VOL 11

ISS 2

PT 5 8 0

Unionization Making Few Inroads

By Marguerite Zientara
CW Staff

The information processing community is overwhelmingly nonunionized and most shops want to keep it that way, judging from the results of a recent nationwide mail survey conducted by *Computerworld*.

Of the 340 responses received out of 1,000 surveys mailed, 312 managers — or 92% — ''cated their shops are not unionized and e never been approached by union organ ers.

the 12 respondents who stated they e been approached by union representa s but are not now unionized, six indi d the union's efforts were voted down, three said there was not enough worker interest for a vote, one said the union (the American Federation of Government Employees) withdrew its interest "before a vote occurred," one said the National Labor Relations Board denied a petition for election and one case is still pending.

A mere 14 out of the 340 survey respondents — or 4% — said their shops are unionized and have been for periods ranging from two years to "forever." One respondent specified "since prior to 1940."

In the 14 unionized DP shops, data entry personnel and computer operators are the primary groups that are unionized (in 11 and 10 of the 14 cases, respectively). Five respondents indicated programmers also are unionized, five cited DP clerical workers, two said analysts are union members, one said "management" and one cited "operations supervisors."

Management's View

And how does nonunionized management view the unions? Six of the 14 managers of unionized sites indicated unionization has not "affected members' work attitudes or performance," has not "affected . . . labor costs/operations" and has not "increased or decreased [the manager's] sense of control over [his] department."

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
ly Newspaper Second class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

Vol. XIV, No. 27 July 7, 1980 $1.00 a copy; $30/year

NEWSPAPER

Manager Pulls Double Duty

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Cort Van Rensselaer pulls double duty in his job as head of Hewlett-Packard Co.'s Corporate Information Systems Department.

On one hand, of course, his responsibilities aren't very different from those of a thousand other management information services (MIS) directors. A large part of his time is devoted, quite simply, to ensuring that each of HP's internal divisions has ready access to the commercial information services it needs to run its daily operations.

His position also gives him control over the hub of HP's worldwide data communications network, which links some 110 nodes to the company's main computing center here.

But Van Rensselaer's job encompasses much more than just the typical MIS director's responsibilities. As chief of his company's in-house computing operations, Van Rensselaer guides the fortunes of a department that plays an integral role in the creation of many of HP's most

(Continued on Page 8)

Hospital Staffs Found Resistant to Computers

By Tim Scannell
CW Staff

CAMBRIDGE, Mass. — Threatened by computerization, a significant number of hospital workers — including doctors, nurses and data entry personnel — are deliberately interfering with the operation of computer-based medical information systems.

This interference ranges from quietly refusing to submit to systems training to covertly sabotaging a computer's billing and, in some cases, altering patient medical data, according to Alan F. Dowling Jr., a doctoral candidate here at MIT's Alfred P. Sloan School of Management and author of a recent report on medical computer systems and staff interference.

"I have witnessed technically good systems go into hospitals and fail," Dowling said, noting that in a number of cases the computer was labeled technically unsound and actually removed from the hospital. For the most part, hospital staff interference has led to months of wasted lease costs, "inappropriate patient care or inappropriate management decisions."

Dowling, who has a background in developing and implementing computer-based medical information systems, arrived at these findings after questioning officials at 40 short-term general and surgical hospitals that use medically oriented systems across the country. His 50-page findings will be published this fall in *Health Care Management* magazine.

Of the hospitals surveyed, approxi-

(Continued on Page 4)

Over Service Costs, Upkeep

Managers Say Uptime Top Concern

By Rita Shoor
CW Staff

PENNSAUKEN, N.J. — The cost of service and the quality of preventive maintenance are relatively unimportant to managers when compared with keeping a system available for productive work and a fast response time to repair.

These conclusions were drawn from a recent survey entitled "Maintenance in Computer Installations" conducted by Alltech Publishing Co. here.

The sample was taken from what Alltech Vice-President Emily Rieker termed organizations with "large DP installations" and gross annual sales ranging from approximately $1.2 million to $13 billion, Survey findings were based on responses received from 176 organizations before the October 1979 cutoff date, according to Alltech.

An effort was made to get the information from higher level management, according to Rieker, since information systems and hardware breakdowns within an organization are having an increasing impact at all management levels.

Of the individuals responding to the survey, 9.2% were characterized as corporate officers (presidents or vice-presidents) and 40.8% were directors in their companies.

DP managers made up about 13.2% of the total respondents, and 19.6% were classified as "other managers." This group included people with titles such as MIS manager or information systems manager, Rieker said. The remaining 17.2% of the respondents fell into the "other" category.

Rieker also noted the fact that an in-

(Continued on Page 6)

Price Hikes Affect Major IBM Hardware

By Tom Henkel
CW Staff

ARMONK, N.Y. — IBM has raised lease, rental and maintenance charges on virtually all its major hardware. In addition, the firm's General Systems Division (GSD) hiked the price of program products for about half its systems.

The increases range from 5% to 10% with the smallest jumps coming from the Data Processing Division (DPD), which makes large systems. GSD raised its lease, rental and maintenance prices about 7%, with some program products boosted to 10%, the firm said.

Also increased by 10% were hourly maintenance charges on some hardware, educational courses and systems engineering services, according to IBM.

Major systems affected by the announcement include 360 and 370 series CPUs; the entire 30 series line (the biggest system IBM makes); all 4300s except the recently announced 4331 Model Group 2; the 8100, on which the purchase price was raised in addition to lease, rental and maintenance; and GSD's System/34, System/3, System/32 and Series/1 CPUs, according to IBM.

Spared from the increases were GSD's System/38 CPUs and 5120 desktop systems, IBM said.

The prices of major peripherals were also increased. Across-the-board 5% increases were announced on 3310 and 3370 disk drives, and maintenance charges were hiked on older 3340 drives. Prices of IBM's recently announced 3380 and 3375 drives were not increased, nor was that of the slightly older 3350 drive, IBM said.

As examples of the increases, IBM cited the case of a 16M-byte 3033, the biggest unit processor IBM sells. The

(Continued on Page 6)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.
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ISSN 127-420.
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Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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Interim Rates Proposed

FCC Plan Could Hike Wats Rates

By a CW Staff Writer

WASHINGTON, D.C. – A government request to reverse a June 24 ruling by the U.S. Court of Appeals and thus immediately implement federal I/O interface stands for government computer systems has been denied by U.S. Supreme Court Justice. William J. Brennan.

Brennan's refusal to vacate the stay means the controversial standards will probably hang in legal limbo for at least another year while the Court of Appeals ponders the legality of four mainframe computer companies' challenge of them [CW, June 30].

U.S. Solicitor General Wade McCree's request to vacate the stay originated on June 24 when it was sent to Supreme Court Chief Justice Warren Burger, who also serves as circuit justice for the Washington, D.C., circuit.

Burger declined to act on the request, passing it to Brennan, who is second to Burger in seniority. Brennan then denied the application.

George Ruttinger of the law firm Crowell and McCree, which is representing CDC, Univac, Honeywell and Burroughs in their challenge of the standards, expressed surpise at the government's maneuver.

The I/O interface standards, based on the IBM 370, were originally called for as a cost-saving measure by the National Bureau of Standards, the U.S. government's standards-setting agency. They are being fought by Control Data Corp., Univac, Honeywell, Inc. and Burroughs Corp.

"I didn't expect to file with the Supreme Court," he said. "I thought they would ask for reconsideration by the full Court of Appeals." The attorney based that statement on the fact that, considering the earlier 2-to-1 vote in favor of the stay, a reversal of opinion might be possible to attain.

Petitioning a Supreme Court Justice for a reversal of a lower court decision in such a case is "very difficult," according to Ruttinger, who said it must be shown that the lower court had "abused its discretion" or was "demonstrably wrong."

Government Asks Reversal On I/O Standards Ruling

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – A plan for allocating AT&T's costs of providing telephone service was proposed by the Federal Communications Commission (FCC) late last month.

Although it is an "interim" scheme, subject to later FCC revision after comments have been received from AT&T and other interested parties, the plan will have to be used by the phone company in developing a revised Wats tariff due next August.

That tariff seems likely to increase rates significantly for present Wats users. But if resale and sharing of Wats – a closely related issue pending before the commission – is permitted, there could be offsetting benefits to smaller volume users who now cannot justify the service.

Fifteen-Year Battle

Announcement of the cost-allocation rules and procedures is the latest development in a battle that goes back at least 15 years and could very well last another 15, sources said. During this period, the FCC has repeatedly found that Wats rates are not cost-justified and that, as a result, dial-up residential and business telephone subscribers have been susidizing Wats customers.

But because of inadequate data, the commission has also declined to prescribe the rates that should be charged. One result of this situation is that AT&T's Wats tariffs, although found to be discriminatory and anticompetitive, have remained in effect.

Last year, MCI Communications Corp. went to court in an effort to get the current Wats tariff replaced. The result was a court order last April requiring the commission to develop a "feasible schedule for a final determination of a just and reasonable Wats tariff."

The schedule, as approved by the court a short time later, calls for development of a cost-allocation manual in June. It also requires AT&T to file in August a new interim Wats tariff based on this manual.

By the end of the year, according to the schedule, the FCC will adopt a final cost-allocation manual and will also decide whether it should permit Wats and MTS services to be shared and resold. In February 1981, AT&T will file a final Wats tariff.

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RESPONSIVE

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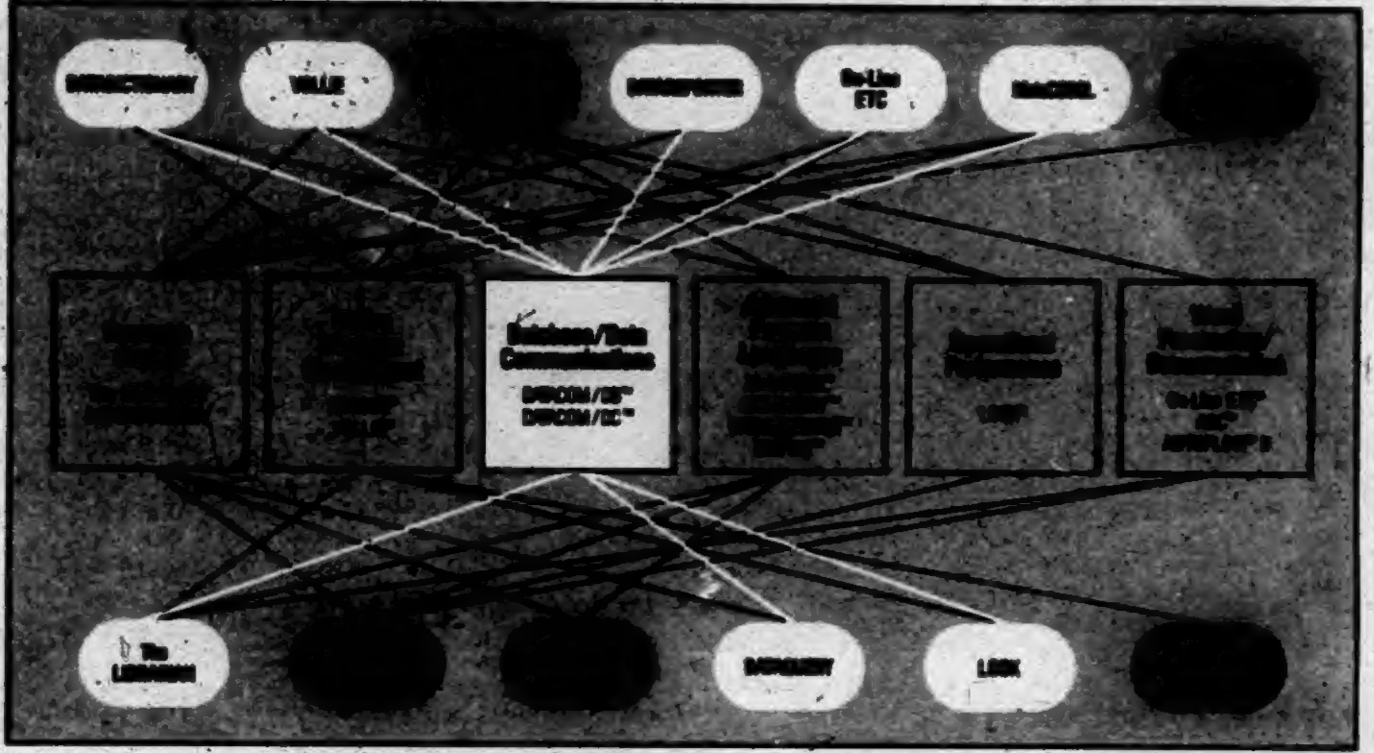

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User Survey Finds Low Rate of Union Activity

(Continued from Page 1)

In sharp contrast to such neutral viewpoints were seven replies that suggest things aren't quite so rosy across the board. The seven less-than-satisfied managers cited problems in the areas of discipline, work attitude, morale and compensation.

"Unless supervision is strong, union members tend to 'get away with more' because of the formal warning system that must be utilized," according to Harry Hoskins, vice-president of administration for Damon Creations, a North Bergen, N.J., wholesale apparel firm.

"Also, supervisors are afraid of potential grievances lodged by [an] employee," Hoskins noted, adding that fringe benefit costs are "approximately 25% higher."

Fringe benefits aren't the only costs that can escalate when unions move in, according to a management information services (MIS) vice-president of a West Coast retail food chain. He cited a "significant increase in labor cost" as a result of unionization.

"Programmers usually start at $15,000 to $16,000 a year, even today, but we're paying them $19,000," the vice-president noted. "We have computer operators — just operators — who are making $20,000 to $22,000 a year, and if you look around you'll find that is very high, an extraordinary pay."

Indicating that "in some cases" programmers are making less money than the unionized computer operators, the MIS vice-president noted, "It makes for a real recruiting kind of a problem; you bring somebody in out of school and he's delighted to start work for $16,000 to $17,000, but after he's here for two months and finds out what data entry people make, he begins to lose some of his self-esteem."

When asked if such employees customarily quit at that point, the vice-president said, "Generally, no, because we make an adjustment in their salary. On more than one occasion, we've sent a letter of offer to a guy saying, 'I know we've agreed on $16,000, but I'm afraid we're going to have to pay you $18,000.' "

Decrease in Control

Of the six who indicated unionization has decreased their sense of control over their departments, one DP manager in municipal government claimed, "Workers have tended to be slightly less conscientious.

"I expect more problems with programmers who will demand compensatory time off for every extra minute worked," he added.

"Rigid working schedules," "hiring limitations" and difficulty in reprimanding an employee "even for just cause" were cited by various respondents as reasons for a decrease in the manager's sense of control.

Another who called unionized workers' attitudes "anticompany" mentioned threat of a strike as another reason for a decrease in his control that has been brought about by unionization.

Donald Maloney, chief of DP for the State of Connecticut's Division of Special Revenue, feels unionization has both increased *and* decreased his sense of control over his department. Unionization has "decreased effective methods of discipline [and] increased working environment control [because] we can now force overtime," Maloney responded:

"Unionization has discouraged some employees because all employees must belong," Maloney added. "The [Connecticut State Employees Union] is not efficient and has little power in [its] ability to negotiate contracts."

The only clearly positive remark made about unionization, by an anonymous respondent, was that it had increased his sense of control because "work areas are clearly defined."

The director of corporate planning for a business that was approached by a union in 1979, but remains nonunion, explained, "I guess they would much prefer working without a union, because generally speaking, I guess they feel they are much better off without it in terms of money, environment and morale."

As final evidence that the issue of unionization is an emotional one, two handwritten comments by survey respondents who are not unionized and have never been approached by unions are revealing. While indicating they did not want to be quoted, they wrote, "Please, I do not want problems in this area," and "Don't make waves!"

State Sets Union Structure

ST. PAUL, Minn. — While unions are commonly voted in or out by those potentially affected by them, a unique situation exists in Minnesota, where the 1980 session of the state legislature established 15 statewide bargaining units for state employees.

"The intent and the expected result are that all state employees not now unionized will be unionized, excluding managers but including supervisors," according to Daniel B. Magraw, deputy commissioner in the Department of Administration. Four unions are involved in the action.

Another department spokesman said state workers generally view the action "somewhat negatively, because they did not have a chance to vote [in the matter]."

So how did the legislation come about? "We were getting a proliferation of unions — we had 135 — and to set up 135 different contracts was causing problems. And the number was increasing year by year," the spokesman said.

"So the legislature elected to go to statewide units that would embrace employees with a common purpose," he added.

While management is not overly fond of the idea, the spokesman said, he stressed it is the worker who is most affected. "There are some employees who have been earmarked for a union who probably didn't want to be in one, but they didn't have the choice."

With a total of about 2,200 state workers in Minnesota, about 530 civil servants involved in information processing would be affected by the unionization action, in which a contract would be finalized by July 1981.

Slated to be represented by the American Federation of state, County and Municipal Employees, the state DPers will not actually have to join the union, a spokeswoman in the state labor negotiator's office stressed.

However, the union will negotiate with the state for the employees' salaries and benefits whether they join or not, she said.

AT&T Requests Verdict Reversal

By Phil Hirsch
CW Staff

CHICAGO — AT&T has asked Judge John F. Grady to overrule the recent jury verdict that found the telephone company guilty of antitrust violations against MCI Communications Corp. [CW, June 23] or, alternatively, to grant a new trial.

None of the charges on which the verdict is based was supported by adequate evidence, the phone company said. The record damage award — $1.8 billion plus interest — was "based solely on [MCI's] Lost Profits Study [that] should not have been admitted into evidence," AT&T argued.

Shortly after the jury's verdict was announced last month, Grady said he thought this study was "the weakest part" of MCI's case. He added, however, that he would deny AT&T's motions. But that has to happen before AT&T can seek a hearing before the U.S. Circuit Court of Appeals.

System Interference Found

(Continued from Page 1)

mately 45% reported some instance of staff interference with their computer's operation, all of it deliberate, the exploratory analysis stated. About 10% of the hospitals admitting interference, acknowledged that outright data sabotage had occurred. In these cases, employees either prepared bills incorrectly or "did omit or change patient data," Dowling said.

While the hospitals reporting data sabotage claimed that at no time were any patients endangered, Dowling asserts that manipulating medical data could result in patient treatments based on erroneous information and other serious medical repurcussions.

Types of Interference

The types of interference Dowling encountered and classified in his research include passive resistance, whereby a staff member deliberately refuses to cooperate with other members and computer vendors; oral defamation, which is an attempt to discredit a computer by pushing its undesirable attributes or inventing fictional problems; an alleged inability to operate the computer system, which could be demonstrated by the employee's making an unusual amount of errors; deliberate sabotage, or the alteration or omission of data; and direct refusal to even consider operating the computer.

As an example of the last type of incident, Dowling detailed the case of a nurse with 30 years of hospital experience who refused to become a trainee on the computer system. Since the nurse was a director and therefore administratively influential, the entire nursing staff chose to ignore and is still ignoring the medical subsystem, the report stated.

"Professionals are used to being in a position where they could be called professionals because they have a body of knowledge and an expertise that is not commonly available," the MIT doctoral candidate explained. Although doctors, nurses and hospital administrators should welcome computer technology because of the nature of their business, they often become "computer-phobic" and reject any infringement on the medical profession.

The computer may also present a hurdle to an employee's reward structure, taking away an administrative duty that might be that person's means of recognition within the hospital, the study said.

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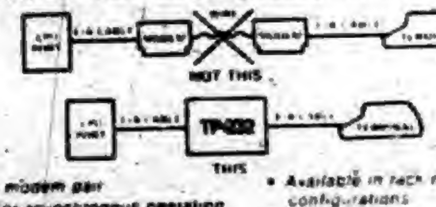

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Also Reports Moves to OCR, Key-to-Disk

Data Entry Survey: 31% Would Switch Vendors

By Tim Scannell
CW Staff

STAMFORD, Conn. — Nearly one-third of the data entry managers who participated in a recent Data Entry Management Association (Dema) study would like to replace their present input equipment with another vendor's machines.

In addition, a substantial number of managers questioned have within the past year eliminated keypunch machines in favor of optical character recognition (OCR) and key-to-disk data entry equipment, according to Dema's 1980 Member Equipment Survey.

Dema's third annual survey was based on 120 responses from the organization's membership and represents 3,015 installed data entry stations comprising about 200 computer systems. The survey also graded vendors on both their equipment and support services.

One significant finding of the report is that about 31% of the users surveyed want to jump their current vendor ship and take up with another data entry equipment manufacturer. However, this year's figure is lower than previous survey findings that showed 38% of the users wanted to switch vendors in 1979, and 32.8% wanted to change hands in 1978.

In addition, spotlighting the need for qualified data entry personnel, the survey reported that 41% of the users questioned would increase their staffs in 1980, while only 12% announced worker reductions.

System Ratings

As part of the study, Dema also asked members to rate various aspects of their data entry systems on a scale of one to five, one being the highest score. Products included in the survey include Univac's 1900; IBM's 3760/90, 3277/78 and 3740; and Four Phase, Inc.'s IV 70.

IBM's 3760/90 data entry station received below-average marks in user programming support, training assistance and vendor willingness to change the system's software to specific needs. However, the unit did score well in operator acceptance and equipment support.

On the other hand, Univac's 1900 machine received a higher rating on operator acceptance, with a score of 1.5, than on user support, which was rated between average and very good. This disproportionate ratio indicates that the vendor should concentrate more on such areas as the availability of spare parts, the time taken to make systems repairs and response time after a user's maintenance call, the study said.

Finally, the report presented user excerpts on what was done in the last year to increase productivity. Comments ranged from better training and supervision and adding new equipment to improved operator training and awareness programs.

The 1980 equipment survey costs $10 from Dema, P.O. Box 3231, Stamford, Conn. 06905.

STC and Amdahl Call Off Merger

LOUISVILLE, Colo. — The proposed merger between Amdahl Corp. and Storage Technology Corp. (STC) is off. The combined company would have offered users for the first time a complete IBM plug-compatible built in-house.

Maneuverings by Fujitsu Ltd. have been blamed by STC Chairman Jesse I. Aweida for the rift in negotiations.

Although executives of the two companies had little to say about the cessation of merger plans, Aweida apparently refused to accept changes Fujitsu wanted to make in its existing agreements with Amdahl prior to the completion of the merger, sources said.

The Japanese computer and electronics component firm currently holds 26% of Amdahl's stock and has an option to purchase another 8%. In addition, Fujitsu has three seats on Amdahl's eight-member board.

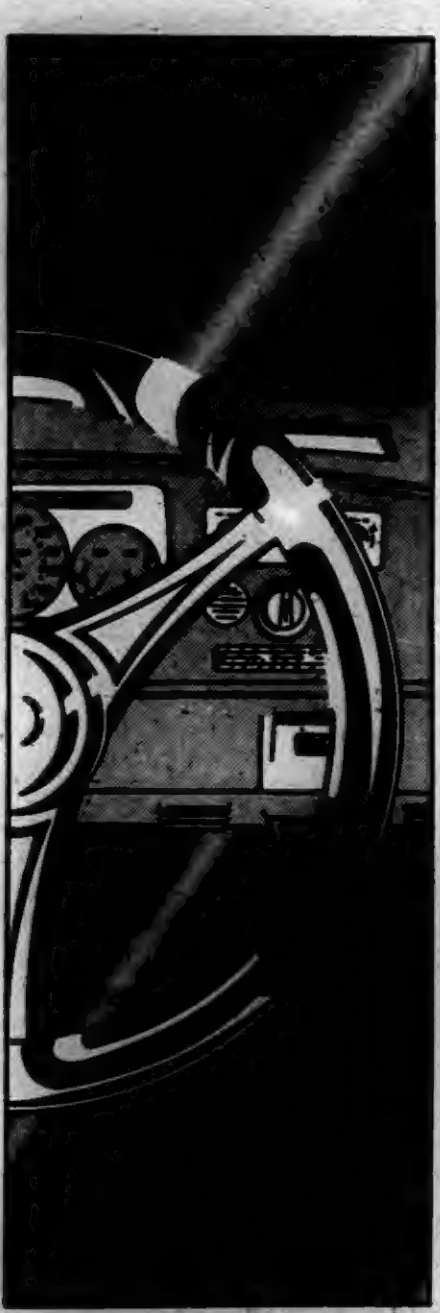
Amdahl Chairman Eugene R. White said "Fujitsu and Amdahl have complex and comprehensive agreements covering cross-licensing of certain future technologies. STC would not agree to the requested modifications. Aweida said "these changes would not be in the best interest of the combined company and its stockholders."

Fujitsu's Position

Speculation on the reasons for the failure of the merger centered on Fujitsu's concern that, when combined, the new firm would diminish Fujitsu's competitive position.

Last year the Japanese firm reportedly supplied Amdahl with $70 million worth of semiconductors. In recent years STC has made significant investment in semiconductor plant capability and is said to be considering external as well as intracompany sales of components.

In addition, Fujitsu wanted Amdahl to agree to purchase a certain number of mainframes per year which, according to a source, had "too many shades of Itel for STC."



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IBM Hikes Lease, Rental, Maintenance Prices

(Continued from Page 1)

monthly rental, formerly $199,040, has been raised to $124,960. Monthly charges on a four-year lease were hiked from $108,290 to $113,600, while the purchase price remained unchanged at $3,253,000. The monthly maintenance charge is also unchanged on that system, according to IBM.

Prices on 4300s

Similar price hikes were announced on the 4300 line, with a top-of-the-line 4341 with 4M bytes of main memory now renting for $8,865 a month, up from $8,448, and the monthly lease charge on a two-year agreement now costing $7,545, up from $7,190. On the 4341, the purchase price remains unchanged at $288,650; however, the monthly maintenance charge was raised from $540 to $594, a spokesman said.

Purchase prices were not increased on the 370 line. However, those systems are subject to the 5% lease and rental increases, IBM said, noting that the 370/158, 370/158-3, 370/168 and 370/168-3 will be taken out of new production effective Sept. 15.

For the smaller 8100 system — used mainly in distributed networks linked to larger 370-type software hosts — the monthly rental was raised to $815 from $778; monthly lease on a two-year agreement was raised from $662 to $694; and the purchase price was raised from $25,950 to $27,240. The monthly maintenance charge moved from $136 to $149, the vendor said.

Prices for 3310s

The 3310 disk drives now rent for $786 a month, up from $751, and lease for $670, up from $639, on a two-year plan. Purchase price for the 3310 was also raised from $22,600 to $23,730.

Likewise, the larger version of the 3310, the 3370, was hiked from $1,132 to $1,187 for monthly rental and moved from $963 to $1,010 on a two-year lease. Purchase price was raised from $36,850 to $38,690. Monthly maintenance charges on the 3310 increased from $94.50 to $103, however maintenance for 3370s is unchanged at $126, according to IBM.

"Most disk, storage and tape subsystems" will not be affected by the price hikes, IBM claimed.

Following lead, GSD also announced across-the-board rent, lease and purchase increases of 7% on all models of System/3 except models 12 and 15. On those two models, only the rent and lease prices were raised 7%, IBM said. Maintenance charges for System/3 are unchanged, IBM added.

System/32 and System/34 prices will increase about 7% in some cases, but considerably less in others. Since the size of those machines is rated by the combination of main memory and virtual storage (as opposed to models per se), IBM said some configurations will face minor changes, while others will get across-the-board increases. A spokesman said the configurations affected most dramatically did not fit any particular pattern.

Series/1 systems, which are offered only on a purchase basis, will go up 7%, but maintenance will not change, IBM said.

GSD also raised the price of most software on the System/34 and System/32. On those systems, software other than Installed User Programs or programs developed by an IBM customer and later acquired by IBM; Field Developed Programs (those IBM developed for a specific purpose); and programs without customer engineer support will be increased by between 7% and 10%.

A spokesman said most software for the affected systems will probably be increased, although some packages may not be changed. The spokesman could not say exactly what program products were affected.

IBM said the increases were a result of a "normal business review, which included the impact of inflation on the costs of doing business."

Increases in purchase prices, hourly maintenance and services are now in effect. Increases in lease and rental, program products and education are effective Oct. 1, according to IBM.

System Uptime Top Concern of Managers

(Continued from Page 1)

creasing number of companies are purchasing hardware rather than leasing it would lead to an increased interest in equipment maintenance at all management levels. Fifty-two percent of the respondents stated that they owned all their CPUs while 34.1% indicated that all of their CPUs were leased, she said. 13.9% of the organizations polled combined ownership with lease terms.

The recognition of hardware maintenance as a large budget item was also cited by Alltech as contributing towards management interest in it. However, only five respondents to a question regarding the priority of various factors (systems availability, fast response time to repair, overall maintenance price and maintenance quality) indicated that price was the primary consideration.

IBM Installations

Ninety-three of the 176 responding organizations were classified as IBM installations in the survey, and two of these did not respond to the question on maintenance priorities. Another gave the same priority to both systems availability and response time to repair time, Alltech said.

With a base of 92 responses from IBM installations, about 51 (55.4%) gave systems availability the highest priority while response time to repair drew 39 (42.4%) responses. Overall price and quality maintenance were tied with one response each.

Respondents from Digital Equipment Corp. installations followed the IBM pattern with seven out of 13 (53.8%) placing systems availability first in importance, five (38.5%) indicating response time to repair as the highest priority and one citing overall price as the major consideration.

When the same question was posed to companies classified as "other major manufacturer" installations, response time to repair was considered most important by 20 (55.5%) of the 36 respondents, and system availability ranked second with 14 (38.9%) of the group giving it highest priority.

Again, overall price and maintenance quality received one response each. The vendors included in this group are Burroughs Corp., Honeywell, Inc., Univac, Control Data Corp., NCR Corp., Itel Corp. and Amdahl Corp.

Finally, the respondents in the mixed CPU manufacturer group (installations having CPUs from more than one vendor) agreed with IBM and DEC that systems availability was most important. Out of a total of 39 responses (multiple answers were received from three firms) 25 (64.1%) rated systems availability Number 1 and 12 (30.8%) assigned the same priority to response time to repair. Again, overall price was only cited by two of the respondents as being of primary importance in their installations.

'Systems' View

The response to the question about the priorities placed on maintenance services by user companies suggests that IBM has been successful in leading its customers to think in terms of "systems" rather than pieces of equipment that must be maintained. The majority of respondents with DEC hardware had the same viewpoint.

However, other vendors have communicated the importance of response time to repair the equipment as the dominant maintenance factor to their customer base, Alltech noted.

Several influences contribute to the "rather subtle" distinction between the time required to make a system available for productive work and the response time for the vendor to repair a piece of equipment, Rieker maintained.

Uptime Example

She cited an example where an installation might have its disk drives operational 90% of the time, its CPU up 98% and its tape units functioning 95% of the time. Since the chances of the down times of the devices occurring simultaneously is statistically negligible, the percentage of the time that the system is not fully productive is probably higher than the average of the time that a given device is not operating, Rieker said.

Even after the device has been repaired, she continued, it usually takes a certain amount of time for the user to get the system and personnel working with it "back to where they were" when the hardware failed.

Vendors, on the other hand, measure their response and repair time as the amount of time it takes to discover, diagnose and repair the piece of equipment, she said.

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Much More Than OS/MVS Changes

Software Specialists Laud IBM's TSM Approach

By Rita Shoor
CW Staff

WHITE PLAINS, N.Y. – The Total Storage Management (TSM) approach heralded by IBM's recent announcement of five program products along with its 3380 and 3375 disk drives [CW, June 16] offers users much more than the OS/MVS operating system modifications needed to support the new drives, two software specialists said last week.

The Data Facility/Extended Functions software, for example, will "loosen the deadly embrace" between Vsam catalogs and the volume on which the catalog and its associated data sets are stored, according to Philip Zawa, a senior systems analyst at Standard Oil of Indiana.

Currently, if a volume or multiple volumes are "owned" by a Vsam catalog structure, the associated Vsam data sets have to be stored on those devices Zawa explained. This device dependence is compounded by the fact that one device cannot be controlled by multiple Vsam catalogs.

In addition, it is "extremely" difficult to access the data sets pointed to by a Vsam catalog structure if the catalog is inadvertently destroyed.

Therefore, Zawa said, it becomes necessary to maintain a backup of both the catalog structure and all the volumes contained in that catalog in order to "keep everything in sync."

Catalog Data Sets

The extended function catalog works by defining two new catalog data sets, according to the vendor. The basic catalog structure contains volume information for both Vsam and non-Vsam data sets. It may be located on any volume, and multiple basic catalog structure data sets can be defined on a single volume.

The second catalog data set, the Vsam volume data set, contains the data set characteristics for the Vsam files that reside on the same volume. The result is that volumes that have the basic catalog structure can be dumped and restored independently of the volumes that contain the Vsam data sets, Zawa said.

The extended function catalog was designed to reduce the potential for damaging the catalog and limits the scope of damage in the event of system failure during catalog processing, IBM claimed.

Zawa agreed with this concept and went on to say that such functions as "moving catalogs, splitting or merging catalogs and the catalog reorganization process" would be accomplished more easily with this program product.

In addition, he felt that going to "native" Vsam data sets should improve the performance of the catalog structures and indicated that the performance figures cited by the vendor in its official program announcement "seemed reasonable."

"This method makes a lot more sense" than the original Vsam catalog structure, the analyst said, and speculated that "IBM knew they were in trouble with the Vsam catalog structure" and had to improve the performance.

Zawa also mentioned the Volume Table of Contents (Vtoc) index features of IBM's Data Facility/Device Support program product as likely to result in "enormous performance improvement. With the giant volumes now available, the old Vtoc is antiquated," he said.

His evaluation of the indexed Vtoc was seconded by the manager of technical services at another installation operating under OS/MVS with the System Extension. This feature can improve access time on any heavily used pack – for example, one containing data sets created via IBM's Time-Sharing Option, the technical supervisor said.

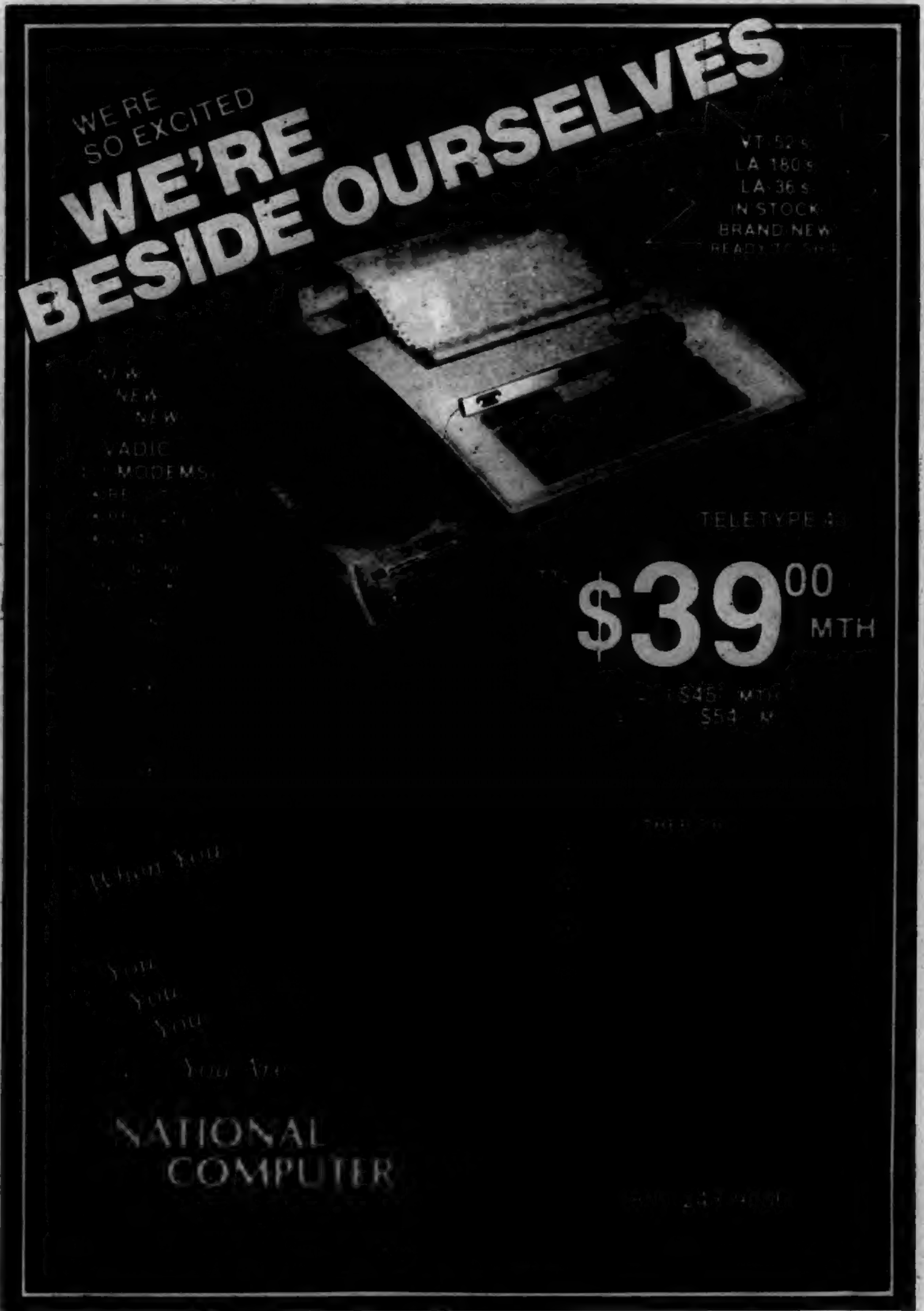
This product would be valuable to an installation even if it were not currently planning to purchase the new disk drives, according to an industry analyst who thought that the Vtoc index was a direct result of a survey of large Direct Access Storage Device (DASD) users conducted by IBM.

The DASD Migration Aid Release 1 was expected to be helpful to users who would be adding 3375 or 3380 hardware to their installations.

Zawa maintained that "IBM had to have one" (a migration aid), and another software programmer recalled the problems involved in going from 3330s to 3350s without utilizing this type of product: "It's not really difficult, but it's tedious and extremely time-consuming because of such factors as the differences in track size and blocking factors between the two devices."

The Hierarchical Storage Manager and Data Facility/Data Set Services program products did not evoke much comment, and they appear to be regarded as necessary to support the 3375 and 3380 drives.

"I think IBM has responded to a lot of user needs," Zawa said, but indicated that he felt that the "total" designation of the vendor's TSM approach was a "little strong." He expressed disappointment that the product releases did not include data base concepts or provide for installation-defined criteria for automatic backup and recovery.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Passing of Rewrite Bill Seen Possibility in 1980

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — There is still "adequate time" to get a Communications Act rewrite bill through Congress this year, a senior staffer on the Senate Commerce Committee said last week.

His comment came shortly after the committee got into a heated debate with AT&T over provisions of the Senate version of this legislation, S. 2827, and announced that it would not be marked up into a final draft "until AT&T reaches an understanding with Senators Cannon and Hollings on key provisions."

Sen. Howard Cannon (D-Nev.) is chairman of the Commerce Committee and Sen. Ernest F. Hollings (D-S.C.) is chairman of its Communications Subcommittee.

At about the same time, the Senate Judiciary Committee told Cannon it wanted to review S. 2827 before the measure goes to the Senate Floor for a final vote; the Senate Government Operations Committee asserted jurisdiction over provisions dealing with electronic mail.

'Hopeful' Discussions

Discussions are now under way between the Commerce Committee staff and AT&T, the source said last week; he is "hopeful" the differences with the phone company can be resolved shortly. Similarly "hopeful" discussions are under way between Commerce and the other two committees, he added.

The chief bone of contention between the Commerce Committee and AT&T is language in S. 2827 which, in the committee's words, would "provide essential protection necessary to prevent unfair practice and monopolistic abuses." These protections "must remain intact if we are to adequately protect consumers and AT&T's competitors," the committee added in a press statement.

According to other sources, AT&T believes the disputed provisions would enable the Federal Communications Commission (FCC) to order a structural split between the phone company's local and long-distance operations, or force divestiture of Western Electric Co. and/or Bell Laboratories from the parent organization.

Further, AT&T reportedly objects to provisions requiring the monopoly of the Bell System to maintain an arms-length relationship with the competitive subsidiaries established by the bill, beginning on the day the legislation is enacted. The phone company has adamantly opposed all of these changes in its earlier comments on the bill.

AT&T's competitors, led in most cases by computer industry groups, have fought just as hard to crank these provisions into the legislation.

Meanwhile, the House Commerce Committee began final markup of its version of the rewrite legislation, H.R. 6121. But that process is not scheduled to be completed until late this month, or possibly next month, after Congress returns from its July 4 recess.

Earlier, several computer industry groups raised a number of objections to S. 2827 (see story on Page 63). Some of these were echoed in the letters Cannon received from the Judiciary Committees.

"This heart of the bill involves a restructuring of AT&T," said the Judiciary Committee letter, signed by Chairman Edward M. Kennedy (D-Mass.), Antitrust Subcommittee Chairman Howard M. Metzenbaum (D-Ohio) and Charles Mathias Jr. (D-Md.).

"The structure of AT&T is the subject of a large number of ongoing antitrust suits [in which] the federal courts are attempting to deal with the question of competition in the context of the special technology of this industry.

"Although the bill contains savings language which purports to leave these suits unaffected, the practical effect . . . may well be to affect the . . . remedies available to the courts to resolve competitive problems in the industry.

The Judiciary Committee also expressed concern about provisions in the bill which would cancel AT&T's 1956 Consent Decree.

The letter pointed out that in 1956, the Department of Justice agreed to drop a prior antitrust suit against the phone company, which included a request for breakup of the Bell System, "provided that AT&T agreed to limit its business to publicly regulated communications." The pending Senate bill would change all this by abrogating the decree *and* allowing AT&T to offer communication services and equipment on a nonregulated basis.

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July 7, 1980

Manager Pulls Double Duty

(Continued from Page 1)

important new products.

At times, the firm's corporate DP center serves simply as an "alpha-test site," where untried new products are "broken in" and debugged before being released to the outside world.

At other times, the initiative for new-product ideas comes from within the corporate information systems department itself. In the latter case, Van Rensselaer and his staff usually pursue one of two courses of action. They either implement the new-product idea themselves and then leave the task of marketing the finished commodity to other HP organizations, or they simply relay their new-product proposal to the appropriate HP division and allow the embryonic idea to take form there.

Either way, Van Rensselaer and his staff have to make sur[illegible]r product-development activiti[illegible] no way distract them from the[illegible]y-to-day information processing responsibilities or impede their ability to carry out their primary mission of serving user needs.

Opportunity, Not Imposition

Although the corporate DP department's contribution to HP's product-planning effort involves a sizable investment in resources and manpower, Van Rensselaer has never regarded the expenditure as a sacrifice or imposition. On the contrary, he welcomes it as an opportunity to pioneer the use of new products and services that someday could prove profoundly beneficial to his department.

About 90% of all new HP products, both hardware and software, are "road-tested" in the company's corporate DP center before being allowed to circulate in the open marketplace, Van Rensselaer said. When the company decided to enter the distributed processing field, for example, Van Rensselaer's staff used several of the center's HP 3000s and its main CPU — an Amdahl Corp. 470V/6 — to test the ability of the firm's processors to talk to one another interactively.

By interconnecting the 3000s and the 470V/6, they were able to reproduce on a small scale exactly the kinds of DP activities that were thought to be typical of geographically dispersed networks. Their simulation uncovered several bugs in HP's distributed processing software and enabled the corporate DP staff to make several worthwhile suggestions for improving the product, Van Rensselaer recalled.

On another occasion, the corporate DP department suggested an important improvement to the HP 3000 family's multiprocessing, real-time operating system. The improvement increased the 3000 line's ability to deal with interrupts and priorities and thus effectively boosted the number of terminals the 3000 series processors could support.

Product Originator

But the corporate DP department's role as an alpha-test site isn't the only important part the group plays in HP's product development activities. At times, the department also serves as a product originator.

Many of the products developed from scratch by Van Rensselaer and his staff were never originally intended for distribution outside the company. But after the products had been installed for a while and had proved their mettle, HP officials began to wonder if the items might not have wider applications. One example is the company's 11-year-old international communications network, which was also intended originally for internal use only but later became the model for many of HP's commercially available networking products.

But even when a new product is conceived and delivered entirely outside the corporate DP department, at least one of Van Rensselaer's staff members usually has a hand in its development. The history of HP's Interactive Mainframe Link/3000 (IML/3000) is a case in point.

Although IML/3000 originated in HP's General Systems Division, one of the key people involved in the product's design was a software expert from the company's main DP center. Van Rensselaer's original plan called for the expert to work full-time at the division and then return home after the IML/3000 development was completed.

But the man had other ideas, and when the project ended successfully six months after it began, he transferred permanently to the division and later became one of its product managers. Over the years, almost 50 of Van Rensselaer's most skilled programmer/analysts have transferred to other parts of the company, but the job changes are always viewed as gains for HP rather than as losses for the corporate DP department.

Author Sees Society Disintegrating

Computing Only Part of New Order: Toffler

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Today's dramatic technological advances in the computing field are only one part of a much broader social and economic revolution whose impact will fundamentally transform the face of modern civilization, according to author Alvin Toffler.

Looking back over thousands of years of human history, the author of *Future Shock* and *The Third Wave* sees three major turning points in the development of world civilization.

The first turning point came some 10,000 years ago with the advent of agriculture. The second occurred only about 300 years ago when the first stirrings of what later became the Industrial Revolution began to be heard.

Today, civilization stands at the threshold of a third turning point that promises to equal or even surpass the other two in its influence on human history, Toffler said recently at the second World Computing Services Industry Congress.

The approach of civilization's third crucial development cycle signals the imminent demise of the existing social and technological world order. Signs of the impending breakdown are already plainly visible in the current world climate of growing political unrest, in the widespread sense of national purposelessness, in the fragmentation of formerly stable institutions and in the decay of nearly all the familiar fixtures of mass society, Toffler said.

Portrait of 'New Order'

In the place of today's dying social and technological world order, a wholly new form of modern civilization is rapidly taking shape. Unlike the world order it will eventually replace, the new civilization stresses diversity over uniformity, independence over conformity, decentralization over collectivization and smallness over bigness, the author explained.

In short, Toffler added, modern society's rate of disintegration is rapidly accelerating and is increasing the need for improved communication among the newly formed fragments. Such widespread dissolution — and the communication requirements it creates — readily explains computing technology's recent emergence and its explosive growth in popularity.

The birth of a new social and technological order will coincide with at least three important computer-related developments, Toffler said. The developments will include a sharp decline in the number of people who regularly commute to work, a fundamental redefinition of certain types of jobs and the growing concentration of high technology in the hands of a few wealthy, industrialized nations.

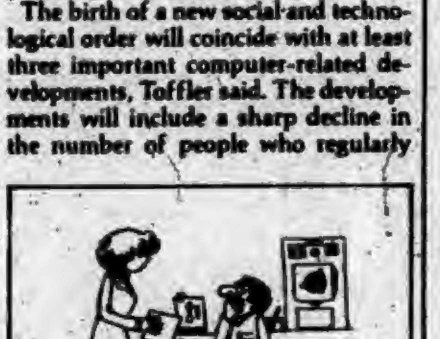
'Electronic Cottages'

In Toffler's scenario for the new world order, increased integration of video and electronic technologies will soon allow a growing number of executives and clerical workers to do their jobs without ever leaving their homes. Such a transfer of job functions from office to home will turn many employees' dwellings into what Toffler calls "electronic cottages" and will help trim gasoline consumption by eliminating unnecessary commuting to work.

Because of its potential for easing the world energy shortage, the rise of electronic cottages deserves to be encouraged. "In fact," Toffler said, "it might be a good idea for the U.S. to set a national goal of having 20% of all its jobs at home by 1990."

Computers will also play a key role in the new world order by continually expanding into new application areas where manual methods have traditionally reigned supreme. System suppliers have to realize, however, that not every member of the general labor force will benefit from the increased presence of computers in the work place. For individuals who will be unable to adapt to the growing occupational demands of the computer age, vendors will have to be prepared to suggest alternative sources of employment.

Hardware vendors could go a long way toward eliminating the problem of computer-caused unemployment if they were somehow able to achieve a technological breakthrough in natural computer languages, Toffler said. Development of a powerful, easy-to-use natural language would make computing systems available for the first time to a large class of unskilled users who would otherwise find the systems forever intimidating and inaccessible.



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Protectionist Trends

Regulation Inevitable In Data Flow Policy

By Jake Kirchner
CW Washington Bureau

ROME — The future of transborder data flow was revealed here recently and it is a future of regulation — not freedom, as advocated by the U.S. government and American multinational corporations.

Statements presented by many of the 60 national delegations to the World Conference on Transborder Data Flow Policies here indicated that some form of regulation of data flows is inevitable. The industrialized countries could only advocate restraint and careful analysis before regulations are instituted.

The inevitability of data flow restrictions arises from the fact that data flow discussions have moved beyond arguments about protecting personal privacy. Concerns about national economies, technological development and cultural sovereignty have become central to the debate.

Protectionist Tendencies

During the wide-ranging discussions here last week many nations made no attempt to disguise the fact that worries about unemployment through use of foreign information resources and the consequent impact on balance of payments will result in controls on information flowing into and out of many countries.

The U.S. could possibly dismiss as reactionary the protectionist tendencies of such up-and-coming information economies as Brazil [CW, June 30], but there is no getting around the fact that even advanced trading partners such as Canada and European nations are moving in the same direction.

The protests of such free flow advocates as the U.S. and Australia are not likely to have much effect in delaying data protection laws. American firms can only hope for an amelioration of the laws' eventual effects on conducting international business.

The case for at least some data flow regulations was laid out for the conference by Peter Robinson, Canadian Department of Communications, who said, "If the multinationals do not show sufficient sensitivity and understanding of government concerns, it is possible that governments will move in and impose solutions that multinationals will find difficult to live with."

Although stated delicately and diplomatically, as were many of the statements here last week, the ominous overtones were unmistakable.

It is only within the last two years, Robinson noted, "that recognition of sovereignty impacts has begun to spread." While "with regard to trade in tangible goods, there are obvious benefits in speeding up the international flow of data." Purchase of foreign data processing services is not seen in the same light by most governments.

The continued purchase of foreign services may itself be, or perhaps become an obstacle to developing a firm indigenous base of technological expertise in an area of rapidly growing economic importance," Robinson said.

Another harmful effect of using foreign information services is the possible loss of jobs at home. In Canada alone as many as 100,000 jobs may be lost to foreign companies by 1985, he said.

In addition, "Canadians are already very concerned about the low level of research and development carried out by the private sector in Canada — due in part to the high proportion of foreign ownership of Canadian industry and the tendency to concentrate R&D in the headquarters country."

Analysis

There is now, Robinson continued, "a growing concern over the amount of data processing activities carried out in the headquarters country" — both in regard to the economic impacts on Canada and to the implications for national sovereignty. Most foreign ownership in Canada is by U.S. firms.

"It is becoming increasingly urgent for multinational organizations to recognize the legitimate concerns of governments" about data flow, Robinson warned, or they must face the consequences — data protectionism not to the liking of U.S. firms.

Ironic Aspects

The data flow debates here have been of serious concern to the U.S. They have also not been without their ironic aspects.

The rush of Third World countries to control access to external information sources has led to a kind of uneasy alliance on the part of the U.S. and European nations, which until now have been America's main antagonists in this issue. Even such staunch data protectionist nations as France expended considerable effort during the conference to slow down the pace of data flow regulation discussions.

"Circumspection" and "a period of long thinking" is needed before ultimate solutions to data flow issues can be achieved, according to Christian D'Aumale, French ambassador to the Organization for Economic Cooperation and Development, until now the main field of data flow battle between the U.S. and European countries.

This remarkable move to a more middle-of-the-road position by the French was attributed by many observers here to the headlong rush to data protectionism by the developing nations. This development has been of considerable concern to French information firms, which have cultivated Third World markets.

Whether the industrialized nations can stave off an impulsively instituted spate of data flow regulations around the world is still in question. But it is generally agreed that the measured discussions about privacy protection and data integrity that have marked the data flow debate to this point are now considerably less important to the overall future of the international information economy.

Running MVS Under VM/370

IBM Charges $2,450/Mo for Correct Timing

By J. L. Midlock
Special to CW

ARGONNE, Ill. – $2,450. That's what it costs per month to get correct Systems Management Facilities (SMF) CPU timing when running MVS under VM/370.

When Argonne National Laboratory here acquired the first of its two IBM 3033s in July 1978, it was installed to provide immediate additional computing capacity for the laboratory's user community. Because the laboratory's central computing facility was not in the position, at that time, to undertake the conversion effort required to move from OS/MVT with ASP to MVS/JES3, it ran OS/MVT on that machine.

When a second 3033 was acquired in May 1979, the lab installed VM/370 on it. One reason for installing VM/370 was to provide the capability to run MVS/JES3 in a virtual machine to assist in the OS/MVT to MVS conversion. The conversion effort was thwarted, however, by the fact that MVS does not function correctly when run under VM/370.

STCK Instructions

Regular MVS, as delivered by IBM, issues store clock (STCK) instructions to get the current value of the time of day (TOD) clock when performing SMF CUP calculations. The STCK instruction is a non-priviledged instruction that cannot be trapped or simulated by VM/370, so the STCK instruction returns the true TOD clock value from the real processor.

Because there is only one TOD clock and because it is associated with the real processor, SMF CPU timings for jobs run in MVS under VM/370 are too large. CPU timings should be the summation of the discontiguous values accumulated only during the periods when the virtual machine is executing.

Instead, the reported CPU timings are the differences between consecutive STCK instructions; these values include not only the time the virtual machine is executing, but also the time intervals when it is not executing.

IBM is aware of this problem, but has chosen not to provide an MVS fix to correct it. The problem was originally submitted to the VM/370 support group as Authorized Program Analysis Report (Apar) Number VM04142. The VM/370 group closed this Apar by stating that MVS violated a VM restriction in using the STCK instruction.

The same problem has been submitted to the MVS support group as Apar 0Z45899. Current indications are that this Apar may also be closed without a satisfactory solution.

The IBM MVS Second Level Change Team is not convinced that this problem is a bug. Argonne was advised that such "design improvements" are only incorporated into IBM's program products.

IBM's solution to the problem is MVS with Systems Extension support. MVS/SE uses the CPU timer to provide more accurate SMF CPU timing. The cost per month for MVS/SE Release 2.0 (product number 5740-XE1) is $1,250.

But, because MVS/SE uses the 370 Extended Facility instructions, VM/370 had to be modified to support these instructions when issued by an MVS/SE virtual machine. These modifications are incorporated in the VM/SEPP Program Product (product number 5748-XE1) and cost an additional $1,200 per month. Total cost for the correct time is thus $2,450 per month.

Through information acquired at Share, the IBM users group, Argonne contacted several persons who were supposed to have incorporated change into MVS to use the CPU timer. These leads proved unsuccessful. No one contacted had successfully located all the STCK instructions in MVS and replaced them with an algorithm that uses the CPU timer.

IBM customers who need to run MVS under VM/370 have only two reasonable choices: Live with the incorrect SMF CPU timings, or spend $2,450 per month for the program products that correct the problem.

New York Issues Security Guide

By Connie Winkler
CW Staff

NEW YORK – New York City has come up with security standards for data processing installations.

"It's one of those things where everybody knows, but nobody knows because nobody is doing it," observed Rolf Moulton, director of Computer Security Services, New York City Department of Investigation.

The 108 pages of standards cover everything from disaster planning, to plastic covers for equipment, to data center access, to cleaning under the raised data center floor.

The city is also studying a uniform disaster plan for the 20 major city data centers.

Systems Security Standards may be ordered from the City of New York for $5 from City Record, Room 2223, Municipal Building, One Centre St., New York, N.Y. 10007.

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Sperry Urges U.S. to Champion Innovation

By Connie Winkler
CW Staff

PORT CHESTER, N.Y. – No one stands up and shouts "Down with innovation," but when change comes under fire no one stands up and champions innovation either, complained J. Paul Lyet, chairman of Sperry Corp.

Lyet believes the U.S. needs a public policy that would champion innovation by:

- Encouraging industry-backed research and development.
- Calling off government regulations that thwart innovation.
- Moving government away from year-to-year budget cycles that conflict with research cycles.

Sperry launched this campaign for innovation, particularly in microelectronics and computers, at a symposium, "Opportunities in Innovation," given here recently for experts and media representatives.

Increased R&D

Lyet urged specifically that the U.S. increase its spending in R&D to 3% of the GNP. The U.S. is now spending on R&D what it did in 1969, and since those man-on-the-moon days America's interest in basic research has been eroded by other issues such as Vietnam and politics.

To implement the 3% investment in innovation, he recommended tax reform and tax incentives rather than increased direct government funding.

"Japan . . . has passed the U.S. in percentage of GNP committed to innovation," Lyet continued. "They multiply the impact of this through a national policy concentrating on high-technology growth areas, such as computers, and innovation in production."

> *'Japan . . . has passed the U.S. in percentage of GNP committed to innovation . . . They multiply the impact of this through a national policy concentrating on high-technology growth areas.'*

Deterrents to Innovation

The Sperry chairman's comments on innovation were reinforced by a specially authorized study for Sperry by the market polling firm of Yankelovich, Skelly and White, Inc. The study found that government regulations, tax policies and antitrust laws were deterrents to innovation, according to the 59 R&D and 42 senior operating executives surveyed.

However, for microelectronics-related firms, capital formation was seen as a bigger deterrent in the 1980's than government regulations.

The U.S. educational system was also listed as a deterrent to innovation in the Yankelovich survey by 20% of the executives. Indeed, several of the symposium speakers lamented the shortage of skilled personnel and falling educational standards.

One particular problem with innovation is that the executives making "go" or "no-go" decisions on innovation have been out of school 15 to 20 years and are not on top of the new technology, the speakers noted.

In computers, however, young people who are now toying with personal computers may prove the salvation of the industry, according to Arthur J. Schneider, general manager of the Sperry Research Center. Today, there is a big chasm in the industry between hardware and software, but young people do not draw that distinction because they see them both working as one, Schneider said.

Other speakers looked at the need for innovation in energy, the recombinant industry – genetic engineering and biotechnology – and new ways to structure companies to encourage innovation.

Innovation Story

One energy innovation story may have a counterpart in the computer industry – in Brazil. Jose Goldemberg, professor of physics at the University of Sao Paulo in Brazil, described how in Brazil in the last four years sugar cane has been converted to ethyl alcohol, which has been added to gasoline to produce gasohol.

Although Brazil is dominated by the large international auto companies, the local companies had to alter the car engines to use gasohol, Goldemberg said. This was the car companies' first independent action, and it has made them autonomous from the parent companies.

Goldemberg suggested this same autonomy should occur in the computer industry. The Brazilian large mainframe industry is already dominated by the multinationals, but the Brazilian minicomputer industry should be protected from them by government regulations, Goldemberg said, noting that there is already a program in place to accomplish this in Brazil.

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Despite Growing Use of MPUs

Computer-Aided Learning Feared Flunking Out

By Ann Dooley
CW Staff

The once widely touted prophecy of a computer in every classroom has so far failed to materialize, and some experts fear that computer learning is in danger of flunking out.

Although the advent of microcomputers spurred rapid growth in computer-aided learning – long held back by the heavy capital investment of time-sharing and mainframe systems – it has not been enough, according to David Kniefel, chairman of a special interest group, Computer Uses in Education, of the Association for Computing Machinery.

Even with gains in acceptance and lower costs of equipment, poor software, computer illiteracy and too little funding are all working to cause computer learning to fail in school.

Much of the software being sold is of questionable design and value, according to Kniefel.

Ludwig Braun, professor at the State University of New York at Stony Brook, agreed, noting that almost anything anybody writes will be sold. Right now, "the only source of courseware is locally produced, educationally produced or real junk," he noted. Publishers are just now beginning to take an interest, but since the market is not strong, they have not done much yet.

Teaching Methods

Some educational centers are researching new techniques, such as MIT's Mathland, designed to teach students to speak the language of math just as they learned to speak their native language. But those more innovative concepts are still largely in the future.

Currently, 75% to 90% of computer learning instruction is either drill and practice or learning to program the computer – "automatic page-turning stuff" – and very little simulation work is being conducted, Braun claimed. According to the Stony Brook professor, simulation will be of most benefit to students, even to the extent of restructuring and expanding their thinking processes.

Teachers' lack of computer literacy is another major problem. Although no longer fearing replacement by computers, most teachers are "woefully unprepared" for their use in their classrooms. Kniefel said that the need to teach this use to teachers and to teach them to use computers fully was "essential."

Continuing education and computer literacy courses should be offered regularly to teachers, Braun agreed. Right now, microcomputers are sufficiently cheap and glamorous that schools will buy them and then not know how to really use them.

Federal Funding?

Many in the field feel that federal commitment is needed. "The apparent antitechnology wave experienced in the Congress in the late '70s has made us the loser in the computer education field. European educators come over, pick our brains and go back to get government help," Braun claimed.

Most European countries have a national commitment to computer learning, both through educating teachers and through research into more creative learning methods. This country has no such commitment, he said, and added as an example the apparently bleak chances for passage of the Downey Bill [CW, June 30], which would establish computer learning centers around the country.

Direction is needed so that computer learning won't wander wherever the commercial market will take it. The enormous potential of computers to expand the learning process could turn into the similar "atrophying quality that TV games and programs now hold." If commercial courseware takes sole control, a "Three's-Company-TV-show mentality may take over," Braun stated.

Without federal funding, for every step forward there will be one backward and people will become disillusioned, he predicted.

Student Users

Estimates indicate that students of junior high age use computers most frequently and that at the college level, computer use becomes more specialized.

Although precollege students' use of computers has been estimated at anywhere from 6% to 25%, even those students who are using computers tend to be clustered in small geographical pockets rather than distributed uniformly across the U.S. Such pockets tend to occur around Long Island, N.Y.; Boston; San Francisco; and in Minnesota and Oregon, where interested groups have pushed for computer usage.

Evidence shows that gains can be made through computers, according to Kniefel. Control Data Corp.'s Plato experiments showed that one class gained two years of knowledge compared to one year for children not using Plato.

Another study showed that students are more likely to attend school when they have access to a computer, Braun noted.

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CBI System Upgrade Delay Blamed on Mismanagement

By Brad Schultz
CW Staff

DENVER — DPers at the Colorado Bureau of Investigation's (CBI) computer facility here delayed a major systems upgrade by goofing off on the job, according to the man who now runs the facility.

To improve support for the Colorado Crime Information Center (CCIC), the CBI was supposed to replace a configuration of two Univac 418 processors with a 1M-byte Univac 1182 under OS/1100 in January, 1979. But target dates were revised repeatedly — the latest is July 1 — because CBI systems analysts kept failing to give Univac programmers specifications for the software they wanted installed, Richard Ehmke said last week.

The CCIC gives authorized local police departments access to a central data base of criminal histories. The CCIC serves the law enforcement agencies of Colorado and interfaces with the Federal Bureau of Investigation's National Crime Information Center (NCIC), in Washington, D.C., Ehmke explained.

The director of Colorado's Local Affairs department, Paula Herzmark, ordered an investigation of management effectiveness throughout the CBI last month and subsequently charged in a formal complaint to the state Personnel Board that CBI director Ray Enright had mismanaged his office.

But that's not how Colorado's top DP official sees it. Enright is an honest and capable law enforcer, according to Robert Miller, who directs the ADP Division within the state Administration Department. The DP staff under Enright simply failed to do its job, Miller maintained.

CBI Inspection

At Herzmark's request, two ADP Division staffers, Ehmke and Robert Yackel, inspected the CBI computer facility earlier this year. The ADP Division normally reviews all major systems procurements by Colorado agencies and oversees implementations, Miller said.

Ehmke and Yackel found that CBI programmers were turning out just 2.3 lines of Cobol code per-man-day — reportedly less than 10% of the "industry standard" for Cobol production. DP personnel played cards, watched TV and read magazines on the job, Ehmke and Yackel stated in a report issued last March.

As the report neared completion, the CBI's DP manager and principal systems analyst resigned. According to Ehmke, who then became acting DP manager at the CBI, the resignations were not a direct result of the report, but were influenced by the situation under investigation.

Replacement Effort

Although the squabble between CBI director Enright and Herzmark, his immediate superior, concerns more than the performance of the CBI computer facility, the Ehmke-Yackel report focused on the facility's effort to replace Univac processors.

Since police computing is not a routine Univac application, Univac personnel needed specifications from CBI's DPers on the software necessary to support the bureau's functions. But the "job folders" of those specifications failed to reach the Univac programmers on schedule, Ehmke said. As a result, he said, the Univac people became bored and started goofing off themselves.

Eventually, Univac sent numerous memos to the CBI personnel, requesting more information on technical aspects of the systems upgrade, Ehmke continued. But the state DPers, including a few managers, reportedly gave little response to these requests.

Furthermore, a company that had purchased some of the CBI facility's aging hardware threatened to sue Colorado because the state had not delivered the gear, Ehmke said. The CBI continued to use some of the equipment under a rental agreement with the firm, which Ehmke declined to identify, but fell behind on rental payments.

Around the time that Ehmke became the CBI's acting DP manager, Univac replaced the person in charge of the bureau's upgrade. Vendor and user now have "a good working relationship," according to Ehmke.

The Univac 1182, with redundancy in all major components, will probably start driving the CCIC on July 1, he said, which also happens to be the day CBI director Enright is slated to face a Personnel Board review panel.

Piracy Viewed Threat to Users

CHICAGO — A new form of piracy poses a growing threat to telecommunications users who transmit sensitive information, Federal Communications Commission (FCC) Commissioner Abbott Washburn said here recently at a meeting of the American Bar Association.

All the component parts of a receive-only satellite earth terminal can now be purchased for "under $5,000," he told the lawyers. At that price, it is easy to eavesdrop on any of the 64 communications satellites that now carry domestic, international and military communications.

All the eavesdropper has to do is point his antenna at a satellite and tune his receiver to the proper transponder frequency; the needed technical information is "publicly available," Washburn said.

Industrial Espionage

Industrial espionage is one application of the new low-cost earth stations, Washburn added. "The consequences become yet more somber when the intercepted signals cross national boundaries and the security of international communications is threatened."

While there are legal remedies available to deal with invasion of privacy, catching the offender and proving he violated the law is "a major difficulty." The signal can be encrypted, but this tends to be expensive.

The FCC's recent deregulation of receive-only earth stations, Washburn said, will encourage individual ownership and, by eliminating the need for licenses, make it harder to detect illegal activities.

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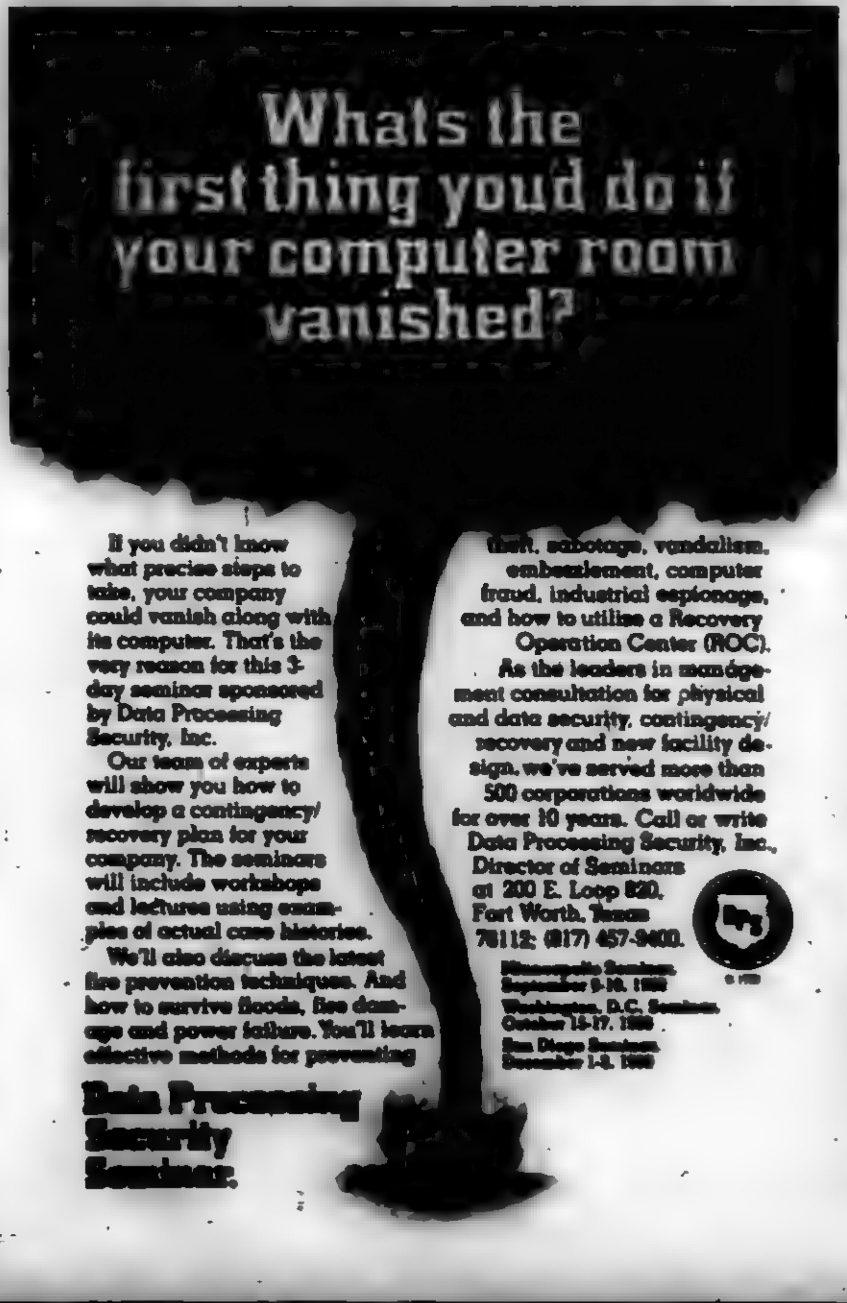
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Large Flare-Up Peaks This Year

Sunspots Threatening Circuits, Communications

By Brad Schultz
CW Staff

BOULDER, Colo. — What may prove to be the largest flare-up of sunspots ever recorded threatens to damage computer circuits and disrupt data communications around the earth, federal scientists here are warning.

Every day, except where the sky is overcast, DPers see a veritable Mount St. Helens looming above them that now showers the earth with cosmic radiation — atomic particles known to haphazardly invert the values of computer-stored bits. The solar bombardment results in a higher frequency of computational errors, though diagnostic equipment may register no problem with internal components.

Sunspot cycles occur every 11 years. The present one began in 1976 and reaches its peak this year, according to Joe Hirman, chief forecaster for the National Oceanic and Atmospheric Administration's (Noaa) Space Environment Services Center.

The worst terrestrial impacts of sunspot flare-ups happen in the two to three years after a cycle's peak, Hirman said in a recent interview, which means an increase in computer errors unexplained by program bugs or hardware malfunctions is predicted to begin now and last through about 1983.

At night, the electronic circuits of Alaskan and Canadian users may blow out if the radiation triggers more than the usual number of "Arctic lights" near power lines, Hirman said. Electrons among the falling particles can stir up a magnetic field around a line, resulting in a power surge that would barrel down on unsuspecting users like water from a burst dam.

Risk at High Altitudes

"Soft fails," the bit inversions caused by cosmic rays striking a computer memory chip, occur more frequently at higher altitudes, where "thin" air scarcely impedes the descent of extraterrestrial particles, and can be averted by proper shielding around a facility.

According to recent research [CW, Dec. 3], a 64K-bit dynamic random-access memory (RAM) chip gets an average of seven soft fails per million hours at sea level. But the failure averages reported for charge-coupled device (CCD) chips were much worse: some 600 and 3,000 failures per million hours for 64K- and 256K-bit CCD chips, respectively, at sea level.

The researchers found much greater soft-failure frequencies for those three chip types at roughly six miles high, where transcontinental aircraft cruise, than at about 1.8 miles, which isn't much higher than the location of the Data General Corp. Nova Eclipse minicomputer used by the Noaa sunspot watchers in Boulder.

The soft-fail syndrome may limit the extent to which chips can be miniaturized, other experts have said, because chips smaller or more compact than the state of the art would fail more often as they approach molecular dimensions [CW, July 23, 1979].

Air Force Assistance

The Noaa Space Environment Services Center works with the U.S. Air Force in monitoring storms on the sun, Hirman said. The Nova Eclipse is linked to a second computer system in Anchorage, Alaska, and the Strategic Air Command's computer complex in Omaha, Neb. Air Force personnel predict the effects of solar activity on U.S. military equipment, while Noaa forecasts for the nation's civilian installations.

Those missions are further supported by the three Geo-Stationary Operational and Environmental Satellites (Goes) that became operational last year, Hirman noted.

Concern for the safety of astronauts caused the National Aeronautics and Space Administration to push for the creation of the Space Environment Services Center, he said, and the Boulder facility continues to advise satellite designers on methods for coping with cosmic radiation beyond the earth's atmosphere.

The present radiation onslaught may damage existing satellites used in data communications, Hirman observed, but will probably not affect microwave broadcast stations aimed away from the angle at which particles descend.

Since the last sunspot flare-up peaked in 1969, when data communications was in its infancy, many of today's data communications users have no experience with the problem, he pointed out.

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Course, Models Offered

BETHLEHAM, Pa. — Two developments in computer-based modeling — one an introductory course and the other, a set of mathematical models — are being presented by Lehigh University.

A five-day short course dealing with the development and use of dynamic models for long-term energy analysis and planning will be held July 28-Aug. 1.

Emphasis will be on analytical methods and associated programs that can be run on essentially any processor with a Fortran IV compiler. The course will cost $450 or $225 for educators.

The university is also offering models available as a 7- or 9-track tape file pertaining to a spectrum of large-scale socio-economic-technological systems and fundamental concepts and methods of mathematical modeling.

Each model is a self-contained Fortran IV program and has a $100 charge, which includes the magnetic tape, a printed listing of the tape and documentation materials.

More information may be obtained from W.E. Scheisser, Lehigh University, Whitaker No. 5, Bethleham, Pa. 18015.

Sponsored by Nasa, Itab

Symposium to Target Productivity

DENVER — The use of computers in increasing U.S. industrial productivity will be the subject of a national syposium here Sept. 17-19.

Sponsored by the National Aeronautics and Space Administration (Nasa) and an Industry Technical Advisory Board (Itab), its theme is "Ipad — A National Resource for Increased Productivity."

Ipad is an acronym for Integrated Programs for Aerospace-Vehicle Design, but its concepts are applicable to industry applications, according to Nasa.

The Ipad goal is to develop computer software and related technology so engineering and manufacturing firms can more effectively integrate engineering design data with the manufacturing process and provide better data to executives.

The registration fee for the symposium is $25 in advance and $35 after Sept. 1. More information is available from Ralph E. Miller, Boeing Ipad Program Manager, Box 3707 Seattle, Wash. 98124.

Three-Day Tutorials Set To Cover Data Encryption

PALO ALTO, Calif. — The first of four three-day data encryption tutorial seminars to be held across the country this summer will be held here July 21-23.

The seminar is intended for managerial and technical staff working in the communications, DP or security areas with responsibility for implementing, specifying, planning or authorizing security measures for the protection of data, according to its sponsor, Hellman Associates.

Topics to be covered range from "Introduction and Basic Concepts" to "Complexity Theory and Analog Scrambling."

Registration is $595 per attendee and includes lecture notes, relevant technical papers or text and lunch, the sponsor said from 299 California Ave., Palo Alto, Calif. 94306.

Seminar to Cover Systems Analysis And Design

PORTLAND, Ore. — A four-day structure systems analysis and design seminar will be held Aug. 11-14 in San Francisco and Sept. 15-18 here in Portland.

The seminar will provide a set of approaches applicable to the entire systems development and maintenance of life cycles with emphasis on the analysis and architectural phases of development.

The $450 fee includes a 300-page course notebook, case study materials and lunches. More information may be obtained from Jane Crosswhite at Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

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Carter's Speech Writers Meet Daily Crises With WP

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. – "It doesn't matter what time of day it is, or what day of the week it is, people go right on having wars and blowing themselves up and sinking ships and having volcanoes erupt on them.'"

And because the world goes on and "the White House in one way or another has to react to everything that happens in the world," President Jimmy Carter's five speech writers are liable at any moment to be called on to write a speech, proclamation or statement, according to Tom Teal, editorial manager for the speech writers.

Election 1980

"The demands on [Carter's] time are so appallingly enormous, that as much as possible has to be done for him," Teal noted.

Considering the fact that President Gerald Ford, for example, had 21 speech writers during his tenure, one might wonder how Carter can get away with only a quarter of that number. The answer lies, at least partly, in automation.

Each speech writer (except for one, who does not type) and each of three secretaries has a Lexitron Corp. Model VT-1202 word processor (WP) and the eight share three Lexitron VT-1000 365 word/min. printers, Teal explained.

Teal described the WP equipment, which has "come in gradually within the last year," as "wonderful machines, absolutely spectacular. We're completely spoiled by them; it's going to be very hard to go back to writing on a typewriter – even an IBM self-correcting typewriter seems primitive compared with these things."

Because of the nature of Presidential speech writing, which may involve an average of "four or five" drafts per speech, each subject to the approval of various Presidential advisers and special interest groups, word processing "reduces the amount of work tremendously," Teal said.

Work Week

While the WP equipment has not reduced the number of speech writers or secretaries toiling for Carter, it has reduced the average number of hours each works from about 70 hours per week to a "less onerous" figure of about 50 hours per week, Teal estimated.

Although the group averages eight to 10 speeches per week – each of which can take as much as 10 hours to prepare – it recently produced 27 speeches in a week in preparation for Carter's European visit. That kind of work load – even with automation – results in 100-hour weeks for the writers, Teal said.

With all previous speeches written on the equipment stored on disk – the number of which Teal "couldn't even guess" – the speech writers often work from already stored information in preparing a new speech. "If we want to use part of some previous speech in a new context, why, we can retrieve it that way," Teal said.

Editing Capacities

Considered essentially as replacements for typewriters, the WP machines do, "of course, give you wonderful editing capacities that you wouldn't otherwise have," Teal noted.

Besides reducing the amount of work, the equipment "makes certain things possible that were previously impossible," Teal added. "There's no limit to the number of drafts we can do for a speech, because each new draft can be turned out with a word processor in 15 minutes.

Besides speeches, the speech writers also compose "talking points" on their WP equipment. Talking points are "ideas and suggestions that a speaker uses to jog his memory even on a subject that he knows extremely well," Teal explained.

"You can imagine, if [Carter] sits in a meeting with the King of Jordan for two hours and then, while the King of Jordan goes off to speak to somebody else for half an hour, [Carter] makes three, 10-minute appearances before three different groups on three widely different subjects," Teal said.

"If he has just spent two hours discussing Middle Eastern policy intensively, it's not an easy step to suddenly turn around and walk in on the Citrus Growers of Florida," he observed. "Even if you know the things that concern them and the statistics and the programs, nevertheless it's handy to have a card or a piece of paper that reminds you of the principle points that need to be made."

Public Statements

Also written by the group are proclamations, statements issued by the President "that he doesn't actually say," and the group edits the part of Carter's correspondence "that is likely to be made public," according to Teal.

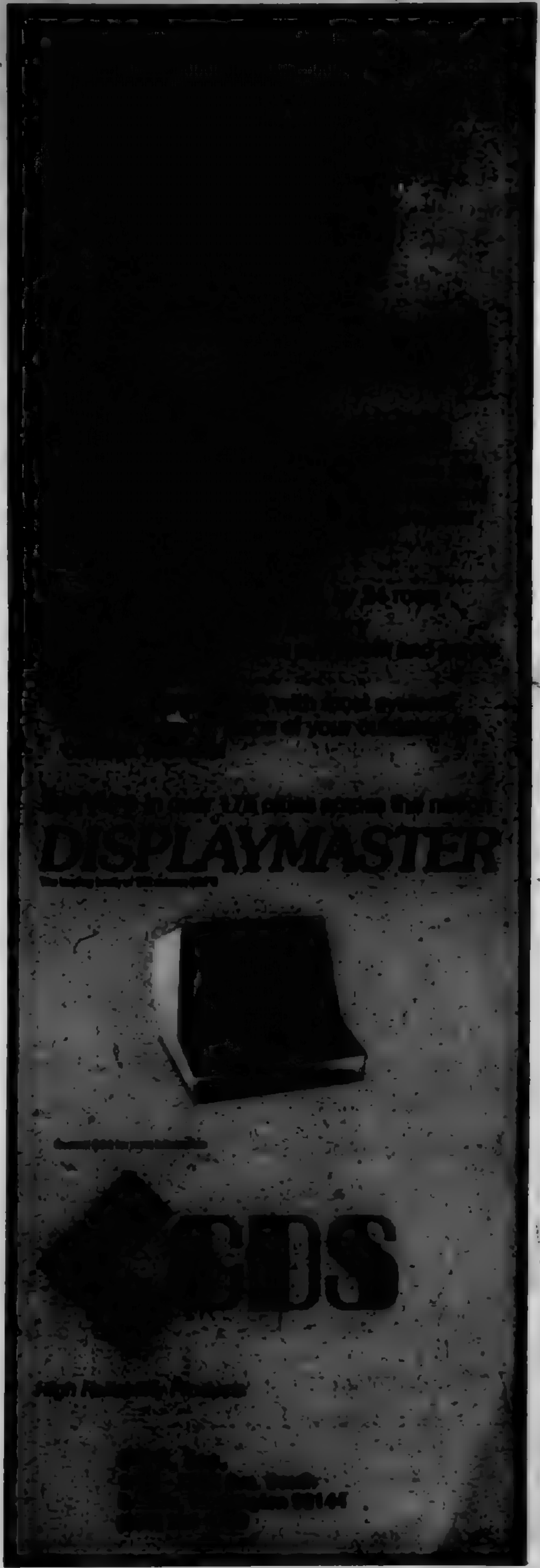
Such correspondence includes letters written to foreign heads of state, to congressmen and public figures. "If Billy Graham writes Carter a letter, Carter reads it but doesn't actually respond to it himself.

"Carter gives the letter to someone else to answer," he said. "Someone writes an answer to it, they send it over to us and we rewrite or edit it to improve the grammer and sense of it and to make it sound like Jimmy Carter, and then it goes to the President.

Even with the help of automation, the job of Presidential speech writer is "draining and exhausting because everything is a crisis all the time," according to Teal. "For example, when that rescue mission failed in Iran, that was the middle of the night here.

"They called the chief speech writer at 2:30 in the morning and said the President was going to make a statement at 7:00 a.m.," Teal recalled. "So he came to work that day at 2:30 in the morning."

While that is "very exciting," according to Teal, "people don't last here – it's very often the case that in a two-term Presidency, people resign at the end of the first term because they're just worn out," he concluded.



'Best Assignment' in 19 Years

Programmer Recalls Stint in Cairo

By Rita Shoor

CW Staff

CHICAGO — A 10-month assignment as an analyst/programmer in Cairo, Egypt, in the early 1970s "was the best assignment" Dennis Harju has had in his 19 years with Standard Oil of Indiana, he recalled.

Between August 1971 and June 1972, Harju was temporarily assigned by Standard Oil's parent company to assist in training Egyptian nationals selected for the Gulf of Suez Petroleum Co.'s computer staff.

During the 10-month period, he installed accounting and inventory systems and began work on a payroll application. The programs were written in RPG language and "to the best of my recollection" ran on a 16K-byte IBM 360.

When he returned in March 1980 for a one-month assignment involving a feasibility study, the programs were being converted to PL/I code, the installation's mainframe was an IBM 370/125 with 128K bytes of main storage and all of the program development and maintenance was being handled by Egyptian nationals, he said.

Although Standard Oil of Indiana currently has approximately 215 people operating in Cairo, none of them are Americans, Harju said. "In fact, [Standard] has no expatriate DP people anywhere in the world today."

Population Growth

The rapid growth of Cairo's population since 1972 — from two million to approximately six million, according to Harju — was responsible for many of the changes he observed.

"The city is overcrowded and walking on the streets becomes totally impossible," he said. "There are no marked lanes in the streets."

The juxtaposition of old and new was illustrated by the fact that garbage is hauled by donkey carts and the carts, not cars, have the right of way, Harju noted.

Tourism, which was "almost nonexistent in 1972," has increased to the point where it's extremely difficult to get a hotel room, Harju said. The bazaar shops formerly managed by older men are run by "the younger generation."

To illustrate the difference, he recalled going into a dingy shop and seeing the proprietor figuring the market value of gold that day on a hand-held calculator.

Financial Incentives

Among the financial incentives Harju received for the temporary assignment were a 35% premium based on his annual salary in addition to his base income and a housing and food allowance, which was also based on his salary.

"It was one of the most lucrative years I ever had," he remarked.

However, Harju explained that the living allowance is intended to allow expatriate employees to live in Egypt on the same level as they do in the U.S. Equivalent housing in Cairo could be rented in March 1980 for approximately $1,200 to $2,000 per month based upon current monetary conversion rates, Harju said.

There is also a cutoff on the 35% premium, he said, and Harju, unlike a recently interviewed DPer who was hired for a Middle East assignment with Aramco Services Co. [CW, June 2], did not receive any extra vacation benefits from Standard Oil.

On the other hand, he was allowed to bring his wife and two children to Egypt with him — something which is not being done for most programmers and analysts who sign up for contracts in Saudi Arabia.

The state of the professional woman appeared to be the same in both countries. There was not a single female on the computer staff when Harju was in Egypt eight years ago and "there was one woman in the accounting area but none in the DP area" when he returned this year.

"It's still pretty much dominated by males," he said.

Rand Names Martins Head Of Information Processing

SANTA MONICA, Calif. — Gary R. Martins, senior information scientist at The Rand Corp., has been named director of its information processing systems research program.

Since 1977, Martins has been leading research and development efforts in simulation techniques, network color graphics and high-level languages. The information processing systems research program is developing artificial intelligence techniques to improve the real-time management of large-scale, high-risk military and commercial systems.

Martins, who holds degrees in linguistics from Georgetown University and the University of California, Los Angeles, is a founding member of the editorial board of the American Journal of Computational Linguistics and former chairman of the Los Angeles chapter of ACM-Sigsoft. He is also a member of the Association for Computing Machinery and the American Federation of Information Processing Societies.

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American Can Designs Space To Meet Programmers Needs

By Ann Dooley
CW Staff

GREENWICH, Conn. — Until recently, American Can Co. had a problem — too many people and not enough space.

But rather than merely ship some of its staff to another office building, American Can designed a new office environment to fit the special needs of its employees — particularly its computer programming personnel.

The Computer Systems management (CSM) group was chosen to move to new facilities as a way of satisfying its unique requirements and as a way of freeing office space — both of which were accomplished, according to Jim Merrell, manager of professional development. Another division, international marketing, also made the move to the new building located less than 10 miles away from its former home at corporate headquarters.

Consisting of approximately 185 employees, the CSM group builds American Can's information systems, according to Merrell, who described the group's responsibilities as including applications programming, testing, debugging and installing systems.

Project Orientation

Once the decision to move CSM was made, American Can designed an office interior that recognized the project team approach. The design was intended to accomodate CSM's need for quiet and privacy while at the same time providing project conference rooms and terminal rooms in clusters to facilitate the project orientation of the group's work, Merrell said.

American Can solicited the support of SLS Environetics, a New York-based space planning firm to develop a space analysis plan. SLS examined the needs of the various groups, assessed their space needs and then came up with the square footage requirements, Merrell noted. From the blocked-off areas, the needs of the individual groups and employees were drawn up.

Acoustic panels on the cubicles provide quiet and yet offer an open landscape design, Merrell claimed. Clusters of cubicles were positioned near conference rooms and shared terminal rooms. The design allows people the flexibility of moving to different areas and cubicles once a project is completed and the group members are reassigned.

The data center, which houses all the computer equipment including an IBM System/34, is located on the terrace level, as is a video library learning center designed for employee's continuing education. The terrace, the first floor and most of the second floor are occupied by CSM.

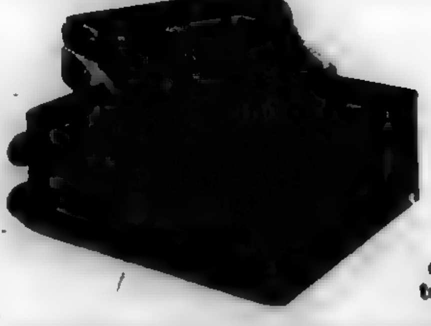
Instead of a terminal at each desk, the office was designed to house shared terminals near clusters of desks, thus creating costs savings and better time management as a result of more people using fewer terminals. An administrative center was also set up to augment general secretarial support of dictation and typing.

American Can began moving its employees the first week in April to the new facilities — approximately a year after the design proposal was submitted. All employees designated for the move are now in the new building and overall response has been positive, Merrell said.

Employees are scheduling their time better and productivity appears to have improved, Merrell stated. One adjustment is that people who were accustomed to sitting at their desks and using their terminals now have to schedule terminal time. But few problems have been attributed to the new design concepts.

Employees at all levels were involved in the planning from the beginning, and good communication channels alleviated initial resistance, he noted.

American Can has recognized the project team approach of programmer/analysts in the office interiors it designed near the company's headquarters in Greenwich, Conn. Cubicles shown at right provide quiet while offering open landscape design. Below, terminal rooms are arranged in clusters and surrounded by private spaces.



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Offers Alternatives at AWC Meet

Chemical Bank VP Decries Outmoded Precepts

By Connie Winkler
CW Staff

NEW YORK — Chemical Bank made 250 major changes to information systems in 1979. "And this is not at all atypical," commented Jack L. Hancock, vice-president of data processing at Chemical Bank here.

He also estimated that half the DP installations in the country had problems Jan. 1 when the calendar jumped from 1979 to 1980.

These examples underline his thesis that DP is operating under many outmoded conventions. "We are misapplying rules that were developed years ago," Hancock said. "I am convinced we cannot do a good job until we get some better rules to follow."

He presented alternatives at a recent meeting of the New York chapter of the Association for Women in Computing (AWC).

Software Breadboards

One innovation is software breadboards, named after the engineering term for the early, bigger-than-life mock-up of a product prior to actual manufacture.

A software breadboard of the critical systems parts would be written by the best programmers using a language not necessarily the final system language. Once the breadboard is complete, it would be turned into systems specifications and programmed.

"Breadboarding would be ultimately much quicker," Hancock contended. "The front-end may take longer, but the total time would be considerably less. You don't need to crash a plane to build a new one — we have wind tunnels."

Hancock also urged system modeling on the computer to get user-designer interaction early — which is much different than the after-the-fact modeling now done of existing systems. Simulation or modeling would allow the user to see what the system is ultimately going to be like.

Two Improvements

Closely related to the breadboard concept, Hancock proposed two other improvements in contrast to the way systems work is now done: structured technology; and more designer/user interaction with the data processing person the project manager.

Most organizations only pay lip service to structured programming techniques and assume programmers and analysts do not like them, Hancock observed.

The go-between with the user and the data processing department should be someone with a DP background who understands the business issues. "You don't go to a banker to build a bank. You go to an architect," he quipped.

All of this harkens back to his thesis that users do not know their requirements. This is in the face of the conventional wisdom which says the user can state his requirements and there is an optimally designed software system to meet them.

"It's really facetious to think we can define them," Hancock said. "In defining requirements you are asking him something he doesn't know — you are asking him to define something he hasn't seen before."

It would be like telling a child at the best restaurant to order anything he wants and the child orders a hamburger, Hancock suggested.

Conventions Debunked

The executive debunked DP conventions. He believes:

- Ten men cannot complete in one month the work of one man over 10 months. Programming is sequential and adding more people only confuses.
- Project time is estimated on a straight-line basis. In fact, work starts slowly, peaks and then declines. This means in the beginning programmers do not have enough to do and at the peak the project is behind schedule causing management to panic.
- Most systems errors are design errors. "This tells us we don't know how to test well," Hancock said. "We know how to test what we expect to be there, and don't know how to test what we don't expect to be there. (The 1979-to-1980 problem would not have been caught in testing, he suggested.)
- Software is not flexible — it takes a long time to make changes, especially when those affect more than one system. The average system changes takes three to four months, he said.
- User changes are never-ending. The user will come up with 50 more changes after the 50 in the DP drawer are implemented, Hancock said.
- Proper documentation is often lacking, not because programmers do not like to document, but because so many obstacles are placed in their way. Hancock recommended documenting on the computer and by a special technical writer, other than the person who did the work. In the long run this would be cheaper, Hancock said.

'We are misapplying rules that were developed years ago . . . I am convinced we cannot do a good job until we get some better rules to follow.'

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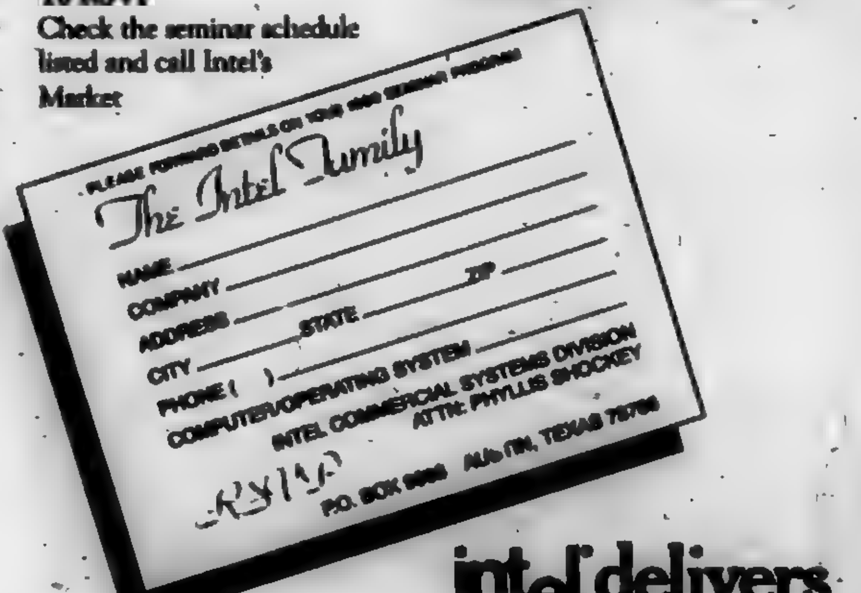
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Government DP Seen Tapping Private Sector

By Rita Shoor
CW Staff

CHICAGO – "I don't think we're doing anything in government DP that hasn't already been done in private industry," James P. Mitchell, chairman of the 1980 convention for Government Management Information Sciences (GMIS), stated.

In an effort to avoid that classic DP problem of "reinventing the wheel," many of the speakers at this year's convention have been drawn from the private sector, he said.

Somewhere between 100 and 150 representatives from state and municipal government DP departments are expected to attend the GMIS convention in Chicago this week. Although Mitchell is "not happy" with the projected attendance, he pointed out that the higher estimate would represent almost 50% of the 317 members in the national organization.

Geocode Example

Geocode – a methodology for digitizing north and south coordinates in order to describe a particular location – was one example of a concept that government agencies drew from the private sector, Mitchell said.

The petroleum industry had been utilizing Geocode to describe the location of oil pipelines in three dimensions (north, south and depth) for several years before the concept was implemented in government DP centers, he observed.

"Now, we take a city and dissect it in different ways depending on how we want to use the data," he noted. An example would be a building with coordinates indicating its physical location eight blocks west and 12 blocks north of a city's center.

Those same coordinates are used to describe the location regardless of the particular application, he said.

"The police district, precinct, ward, community area and Zip Code numbers [for that building] might all be different," he continued, but the Geocode designation would remain the same.

Information Exchange

In addition to speakers from various business areas, the convention provides an opportunity for information exchange among the government DPers, Mitchell said.

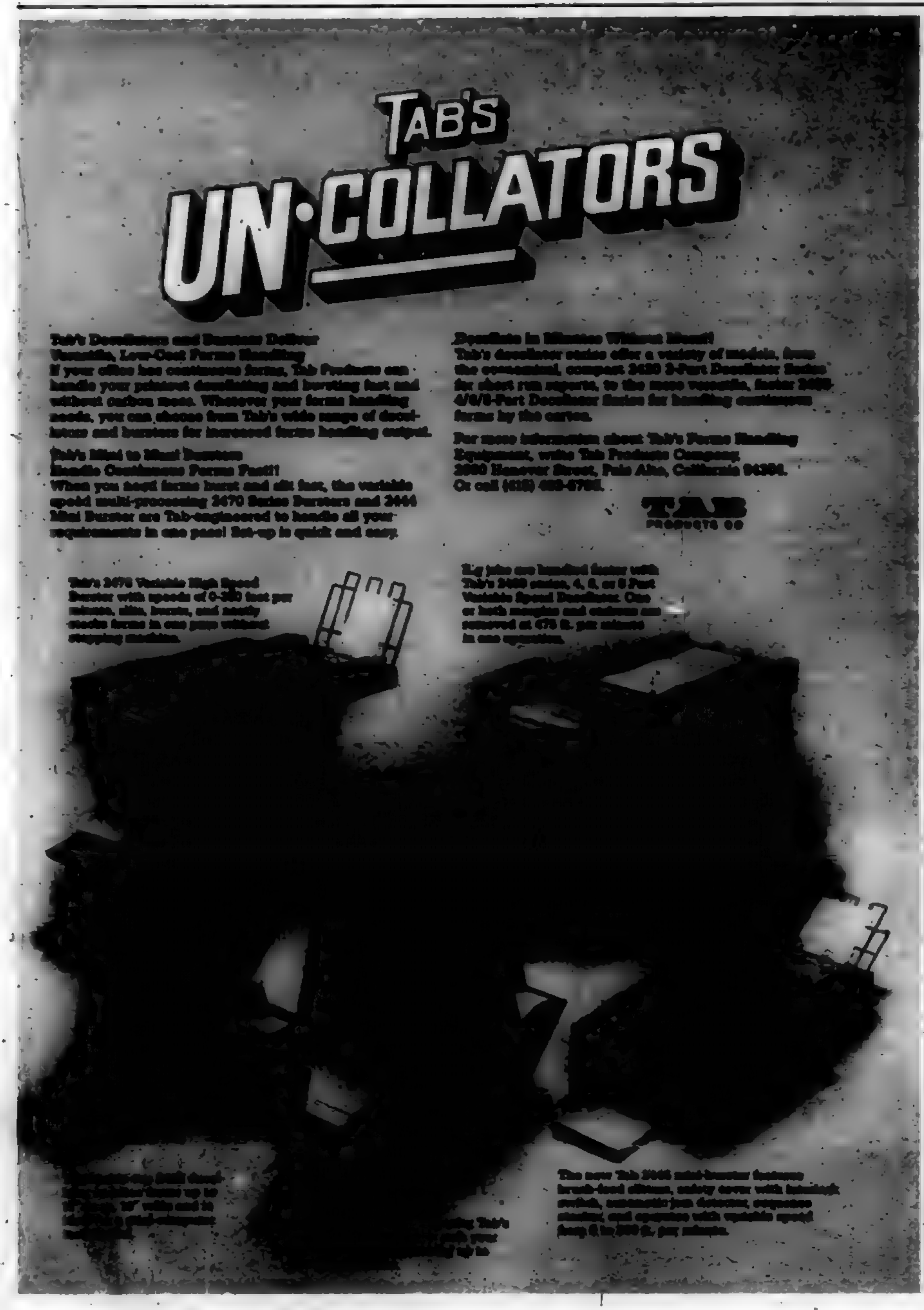
One result of this interaction is a library that contains the documentation for DP systems that have been successfully developed and implemented.

"That way, if one city develops a system and another city wants to do the same thing, we give them a write-up on what's been done," he said.

While this information clearinghouse avoids some duplication of effort, Mitchell conceded that there are "a lot of problems" involved in transferring an application system from one DP center to another.

He described an attempt to transfer a payroll system that was successful for approximately 80% of the conceptual design, 60% of the system design and 20% of the program code, according to Mitchell's statistics.

Although payroll is a standard application, there are always "little idiosyncracies" that vary between cities, he said. Differences between pay periods, union contracts and hospitalization policies were specified as examples of factors that might affect the transfer of a payroll system.



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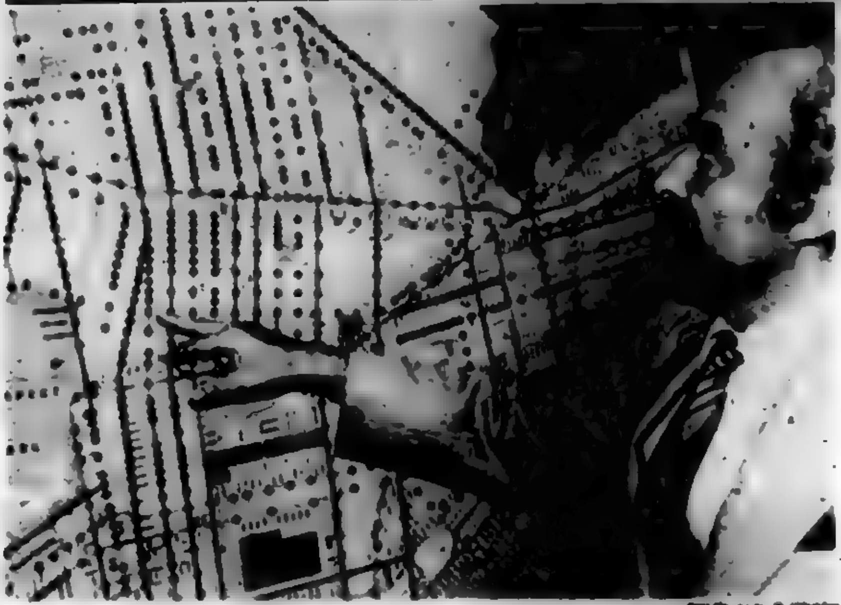

CW Photo by C. Winkler

Bernard Shlasko shows just how many traffic lights there are in the city of New York.

Traffic Control Project Set To Keep Manhattan Moving

By Connie Winkler
CW Staff

NEW YORK — The dreaded gridlock haunted this city during the recent subway workers' strike. But, instead of a dragon slayer to fight the menace, the city's officials relied heavily on a phalanx of IBM 1800 process control units and an IBM 370/158 to control traffic signals.

No one at the City Bureau of Traffic, Division of Signals and Traffic Operations, likes to think about gridlock — let alone describe what it is. But gridlock is the situation that occurs when street traffic on through streets blocks intersections so that cross streets are jammed and all traffic comes to an abrupt halt. The phenomena occurred recently in the Borough of Manhattan in the latter days of the subway workers' strike.

To defeat gridlock, the city already has tied three boroughs — Queens, Brooklyn and Bronx — and their 1,500 traffic signals to computer controls. It is now beginning its biggest effort, the Manhattan project, according to Bernard Shlasko. Shlasko has recently moved from another city DP department to become director of data processing at the Division of Signals and Traffic Operations as part of a concerted effort to beef up the traffic control system.

"We waited with Manhattan where, because of the heavy traffic, we felt it was all or nothing," Shlasko said.

In Manhattan, a dedicated multiplexer cable will run through the island to concentrate the analog signals from the traffic lights before they are transmitted via cable across the Queensboro Bridge to the nearby Signal Division computer center in Queens.

The first contract for that cable will be let this month, he said, but it will be several years before all the signals are on-line.

The 250 traffic signals on Staten Island are also being connected, first to a minicomputer on the island borough and then to the 158. Bids for that work are also being let now.

Largest in World

When Manhattan traffic signals do come under computer control, New York City will have the largest computer-controlled traffic system in the world. Because of the gasoline savings involved, the project is almost entirely funded by federal agencies, predominantly the Federal Highway Administration.

"It's staggering," Shlasko said about the volume of gasoline saved by timing traffic signals. The timing means motorists do not idle their cars, and traffic hopefully moves quickly and smoothly in rush hour directions. Trips have been speeded up by as much as 12 minutes.

And because there are fewer light changes, there are fewer accidents. "Every time a driver has to make a decision, there is greater chance for an accident," Shlasko explained.

Eventually, 8,000 traffic signals will be connected via leased lines to 16 IBM 1800s that are controlled by the IBM 370/158.

Currently, to change traffic flows — during rush hour for instance — operators change tapes on the 158 system. During the subway strike, operators had to put rush hour tapes on earlier and earlier so that, finally, rush hour was beginning at 4 a.m., recalled Allen Shapiro, supervisor of the 24-hour operation. It takes five to ten minutes for each pattern change to show on the street.

However, IBM systems engineers are now programming a system that will regulate the signals completely by computer control. Under this system, sensing "loops" would be installed in the pavement at intersections and, based on traffic crossing those loops, the computer would set the light pattern, Shlasko said.

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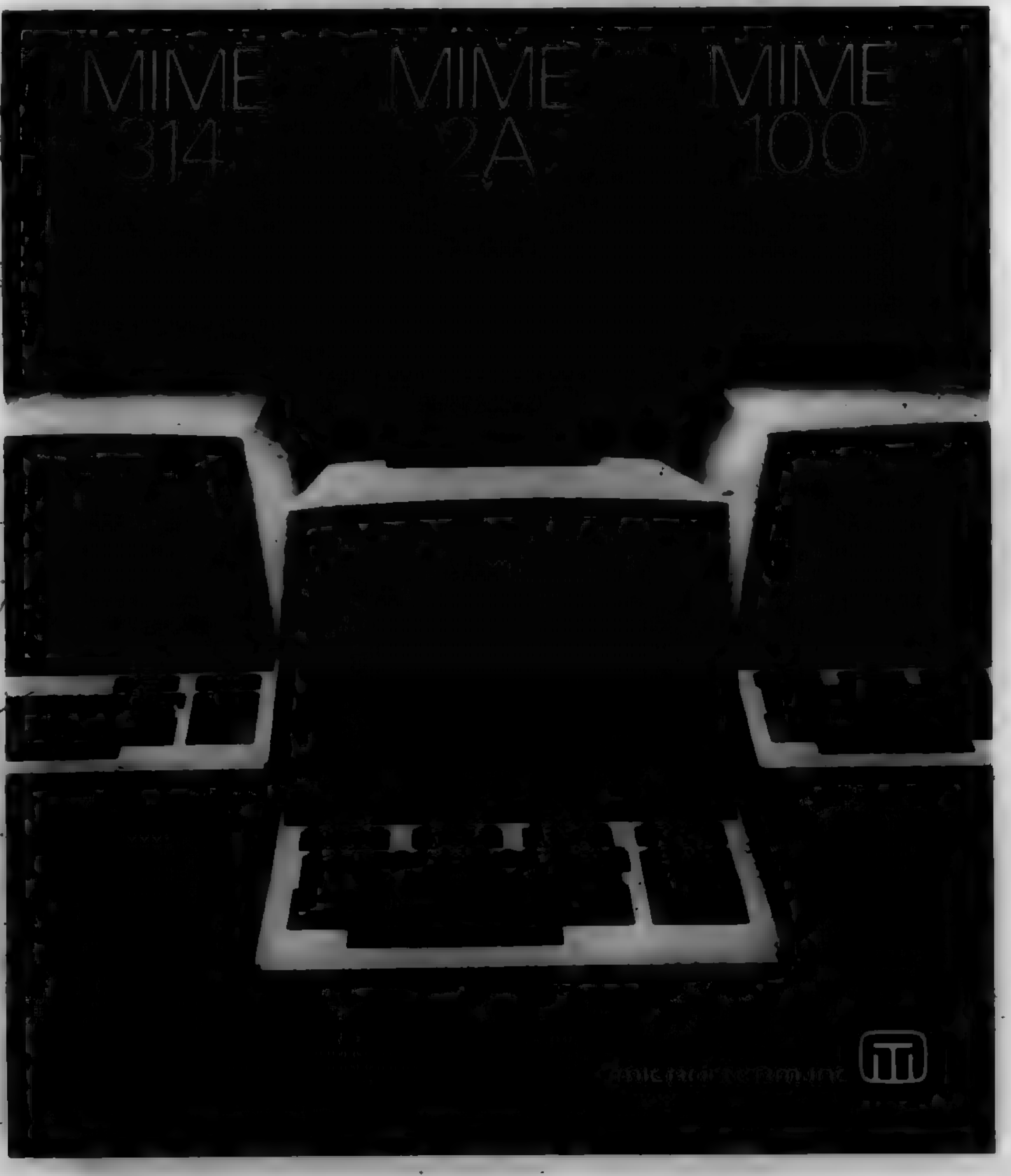

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Managers on the Move

William M. Lang III has been elected an assistant manager in computer processing and research at Manufacturers Hanover Trust Co. in New York. He will be responsible for upgrading and performance of MVS.

Lang joined the bank as a senior systems engineer and was promoted to supervisor in 1979.

He has an A.S. in data processing from Kingsborough Community College, New York.

• • •

Ralph S. Terkowitz has been promoted to assistant director of data center operations at *The Washington Post.* He will be responsible for management of the center as well as his current systems and programming duties for Washington, D.C.'s largest daily newspaper.

He joined the *Post* in 1976 and was named manager of systems and programming early this year. He was formerly employed by Computer Data Systems, Inc. as a member of the technical staff at the Naval Command Systems Support Activity. Prior to that he spent three years at the University of California, Berkeley, where he designed and developed a laboratory communications system.

Ellis

Terkowitz has an A.B. in chemistry from Cornell University and a M.S. from the University of California in physics and chemistry.

• • •

Clinton N. Ellis and D. Alan Najjar were named assistant vice-presidents of the Atlanta-based Trust Co. of Georgia. They are staff members of Trusco Data Systems.

Ellis joined the Trust Co. in 1955 as a tabulator operator and later became manager of that department. He presently heads the Special Services group.

Najjar

Najjar was employed by the Trust in 1974 as a trainee on the bank's operations training program, later serving as manager of operations at several branch offices. He was named hardware manager of Technical Services last year.

Najjar graduated from the University of Georgia with a B.B.A. in personnel management.

Anderson

C. Leon Anderson has been appointed manager, data center operations; James A. Harris, systems manager, special projects; while Barbara Fisher Shewbridge and James M. Hill were named staff managers — all for Philip Morris U.S.A., based in Richmond, Va.

In his new position Anderson will be responsible for P/MIS data processing functions in the James River Center and Commerce Road locations. He joined Philip Morris in 1957 and was promoted to manager of systems, special projects, in 1978. Anderson attended Dunsmore Business College.

Harris will be responsible for maintaining and enhancing financial, marketing and administrative business computer systems. He joined the company in 1970 as a programmer supervisor. He was named systems supervisor prior to the recent appointment. He was formerly employed by Virginia Electric & Power Co. and North American Insurance Co. in Richmond.

Harris

Shewbridge and Hill will assist the directors in budget preparation and monitoring, to formulate strategic and short range plans. She joined Philip Morris as a staff analyst in 1976 and was appointed systems supervisor in 1978. Shewbridge received a B.S. in mathematics from Mary Washington College in Fredericksburg, Va.

Hill joined Philip Morris in 1975 as process control systems engineer and was later named systems supervisor. He holds a B.S. in management science, an M.S. in operations research and statistics and an M.S. in computer science from Rensselaer Polytechnic Institute, Troy, N.Y.

He was awarded a certificate of data processing in 1978.

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CSC Configures Medi-Cal System from Scratch

By a CW Staff Writer

SACRAMENTO, Calif. — California's new Medi-Cal payment system represents a radical departure from the state's traditional methods of processing medical insurance claims.

To make way for the new system, Computer Sciences Corp. (CSC) first decided to completely scrap the state's previous Medi-Cal payment network, which was developed jointly by Electronics Data Systems, Inc. and the Blue Crosses of northern and southern California.

CSC then configured an entirely new system from scratch, first by rewriting the state of California's Medi-Cal payment software and later by replacing existing hardware with two IBM 370/158s and an Amdahl Corp. 470/V7. The company even relocated the system from San Francisco to Sacramento and built a new processing center to house the new equipment.

Like the system it replaces, the new configuration processes Medi-Cal payment claims for four classes of health care providers: pharmacists, nursing homes, hospitals and clinics, and physicians. Pharmacists joined the system on June 1, 1979; then came nursing homes, hospitals and clinics and finally — on June 1, 1980 — physicians.

Fraud Prevention

One of the new system's main advantages over its predecessor is its ability to prevent Medi-Cal abuses and frauds. This year alone, the system is expected to save the state an estimated $77 million by detecting Medi-Cal claims irregularities that, under the former system, probably would have passed unnoticed.

For the system to spot an abuse or fraud, the contents of the provider's Medi-Cal claims forms first have to be transferred to magnetic tape either through optical scanners or keypunch machines.

The system then checks the input against a computer-stored file that lists the names of eligible Medi-Cal recipients, the names of health care providers and similar information.

The cross-checks can indicate whether an applicant for Medi-Cal services is eligible to receive those benefits, whether the applicant has previously filed claims with other health care providers and whether the amount of the claim is excessive.

Under the system, each Medi-Cal recipient and health care provider receives its own unique identification number. Without such a numerical identification scheme, the system's cross-checking capability would be virtually impossible.

Unlike the current system, the previous installation identified patients and providers by name, not by number, and thus was unable to cross-check its files with any degree of sophistication.

Under Attack

Nevertheless, the system has come under attack recently. A few hitches may have marred the installation of California's new Medi-Cal payment system, but no effort was ever made to conceal the difficulties from state or federal inspectors, according to a DPer formerly associated with the project.

The DPer, Phil Gilmore, flatly denied reports that he accused the state's Health Service Department of seeking to cover up the $130 million system's programming errors.

Gilmore's denial appears to contradict, accusations attributed to him in a recent series of stories carried by the Los Angeles *Times*. The stories gave the clear impression Gilmore repeatedly warned his superiors that the system needed additional testing, without which it might not work effectively.

The articles also quoted Gilmore as saying his superiors ignored the warnings and proceeded with the system's implementation anyway.

Gilmore, who headed the project's debugging effort before joining the state Corrections Department last January, conceded he urged his former bosses to delay the system's installation for a few months to allow for further testing. He also conceded his advice was rejected.

But his superiors' decision to continue the project without interruption was prompted, not by their desire to conceal suspected programming flaws, but by their "sincere" belief that the system had been sufficiently tested already, Gilmore said.

In the end, many of Gilmore's recommendations to his superiors proved prophetic. The system was implemented with at least one undetected programming error that enabled the state's Medi-Cal service providers to receive some $450,000 in overpayments.

But both Gilmen and a spokesman for CSC dismissed the overpayments as inconsequential when compared with the $4 billion in Medi-Cal checks the system is expected to oversee each year.

Moreover, about $330,000 of the overpayments have already been recovered, and under terms of the state's installation contract, any part of the balance that remains uncollected would have to be paid by CSC, not by the taxpayer, the company spokesman added.

How did the overpayments arise? Much of the blame, Gilmore said, lay in the state's unwitting failure to give CSC enough time to develop and test its Medi-Cal software thoroughly.

The El Segundo, Calif.-based firm won the system's contract on Sept. 1, 1979, after receiving a request for proposal from a state Health Services Department procurement team.

Intel Sponsoring Seminars On Resource Management

AUSTIN, Texas — Intel Corp.'s Commercial Systems Division is currently sponsoring a series of information resource management seminars focusing on its product line and various productivity and performance issues of the 1980s.

Slated to run through Oct. 14 at locations across the country, the one-day lectures attempt to provide managers and technical personnel with a set of software decision guidelines, a spokesman stated.

The seminars will be led by Jim Tillinghast, an author, data base management consultant and currently Intel's senior data base product support specialist.

The dates for the course are July 10 in San Francisco; July 15, Chicago; July 17, Dallas; July 22, Los Angeles; Aug. 14, Detroit; Aug. 19, Chicago; Aug. 21, Houston; Sept. 9, Cleveland; Sept. 11, St. Louis; Sept. 16, Philadelphia; and Oct. 14 in Fort Lauderdale, Fla.

Additional information on the seminar can be obtained from Intel's Market Information Office, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

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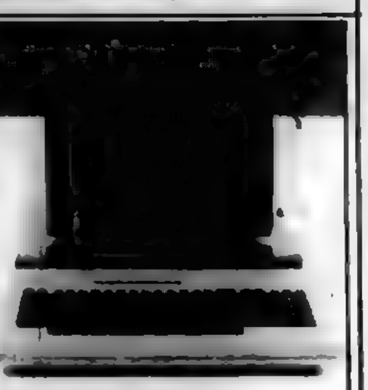

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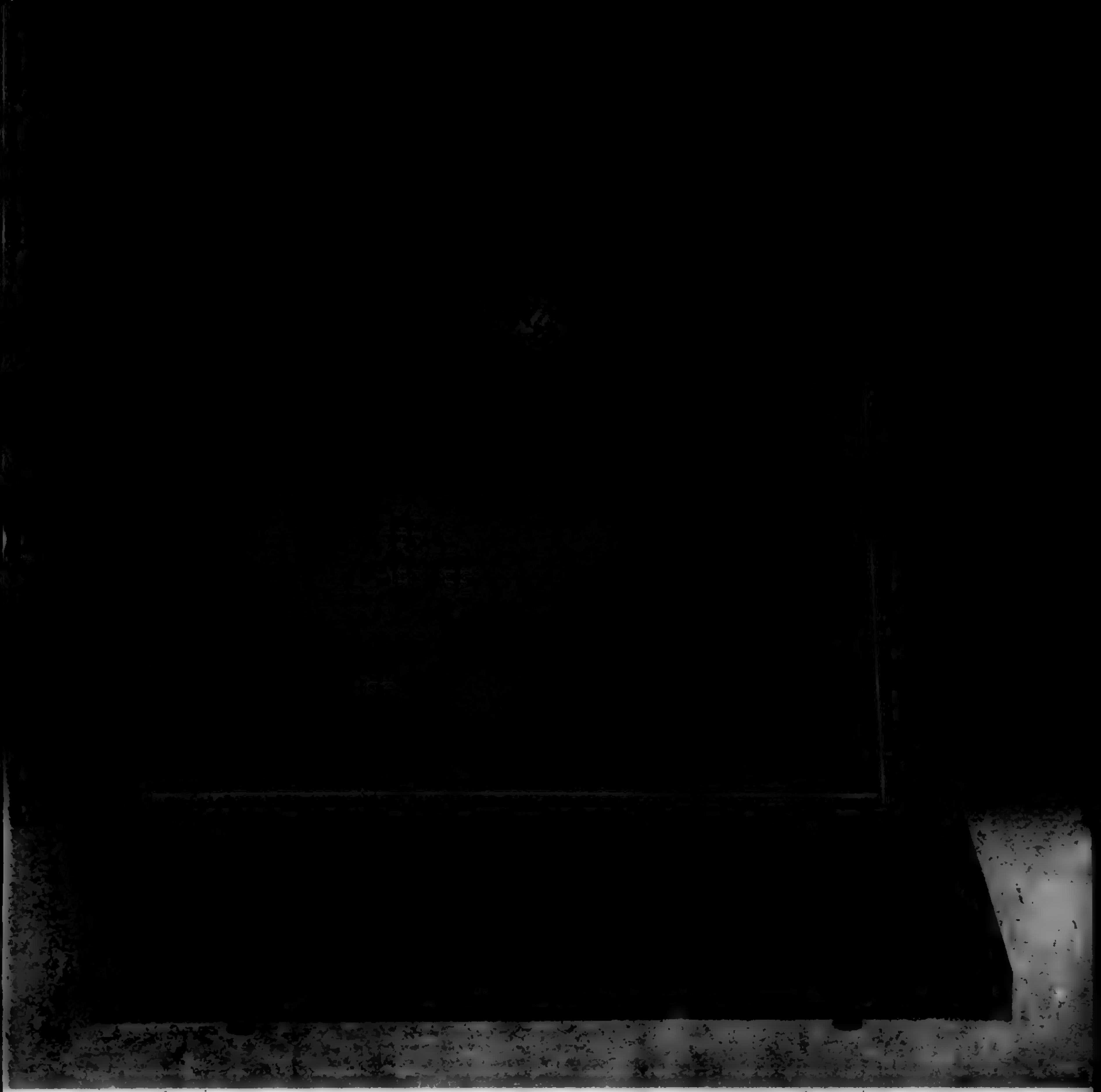

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Switch in CAI Package Saves Schools $750,000

ROCKVILLE, Md. – Officials of the Montgomery County public school system here say they saved taxpayers $750,000 by switching from an IBM computer-assisted instruction (CAI) package to one from another vendor, thus avoiding a hardware upgrade.

The school system had been using IBM's Coursewriter III package on its 370/158 for mathematics instruction in the third through 12th grades. Using 150 terminals, the package took as much as 80% to 90% of prime-shift CPU time, according to Stephen Raucher, director of management information systems.

In addition to eating up too much CPU time, the IBM package also used the Basic Telecommunications Access Method (Btam), which meant the school system could not run multiple applications simultaneously, Raucher said.

IBM suggested switching from Btam to the Virtual Telecommunications Access Method (Vtam) and using its Interactive Instructional System (IIS). That would have solved the multiple applications problem, but the CPU time problem would remain, according to Raucher.

As an alternative to a larger dual-processor 3031, the school system looked at the Phoenix computer-based instruction system from Goal Systems Corp. of Columbus, Ohio. "Phoenix won hands down on Btam," Raucher said. "It was like getting half my CPU back, and it was done over a single weekend."

Phoenix used 60% to 75% less CPU time and 60% to 95% less disk storage than Coursewriter III, he added.

Goal Systems later substituted Vtam for Btam, and the Montgomery County Public Schools have been running smoothly on Phoenix ever since. As to the freed-up CPU time, Raucher said that personnel in the county's central office can now share the CPU with students during prime shift.

Montgomery County currently has 43 schools with terminals and uses terminals at the central office to support 39 additional schools. Phoenix is interactive with 19,000 students in mathematics and supports a total of 38,000 students in one way or another. Total county enrollment is 102,000 students.

"Hopefully," Raucher said, "not only will we improve things in computer-based instruction here in Montgomery County, but these innovations could also easily spread to school systems all over the country.

"One reason is that our methodology applies to any school system. We have urban, suburban and rural environments within our county school system. Our experience could help standardize the curriculum in mathematics all across the country, with the methodologies evolving into the sciences, reading/language arts and social studies," he said.

Johns Hopkins Adds Courses

ANAHEIM, Calif. – The complexities of implementing a software management discipline will be addressed in courses for the public beginning next January at Johns Hopkins University in Laurel, Md.

Since 1976, the school has offered computer systems engineering management courses to graduate students, electrical engineering students, government sponsors and a few undergraduate students, according to John Manley, assistant to the director for systems management technology in the school's applied physics laboratory.

The first two prototype courses were developed and conducted in-house during the fall semester of 1979 and two more courses are midway in development.

A course in software life cycle management is being planned as an integral part of the program's curriculum and will be offered to the public next January, Manley noted, adding that the complete 12- or 13-course curriculum is scheduled for September 1981.

The principles involved in educating and training disciplined software development managers are based on the need for behavioral science training, business management, a realistic approach to project management and student practice in implementing change, he said.

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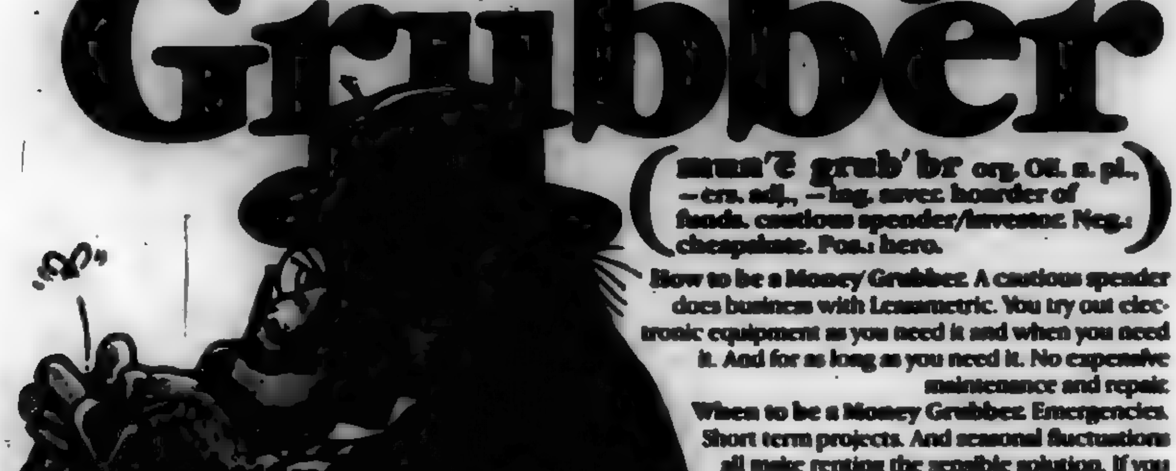

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July 21-23, New York — **Third-Party Lease Negotiations.** Contact: International Computer Negotiation, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

July 21-23, San Francisco — **Audit and Control of On-Line Systems.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

July 21-23, Washington, D.C. — **Computer Simulation Conference,** sponsored by the American Meteorological Society, Instrument Society of America and Society of Computer Simulation. Contact: Paul F. Bohn, Applied Physics Laboratory, John Hopkins Road, Laurel, Md. 20810.

July 21-23, Palo Alto, Calif. — **Cryptography and Data Security.** Contact: Hellman Associates, 299 S. California Ave., Palo Alto, Calif. 94306.

July 21-25, Boston — **Structured Systems Analysis and Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

July 21-25, Annapolis, Md. — **Personnel Productivity in DP.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

July 21-Aug. 1, New York — **Data Communications.** Contact: Data Communications Institute, McGraw-Hill Publications Co., Room 3677, 1221 Avenue of the Americas, New York, N.Y. 10020.

July 24-25, Washington, D.C. — **Trends and Recent Developments in Telecommunications Policy and Regulation in the U.S. and How to Find Information on Telecommunications.** Contact: Information Gatekeepers, Inc., Suite 111, 167 Corey Road, Brookline, Mass. 02146.

July 27-Aug. 1, Oak Brook, Ill. — **Education Coordinators' Workshop.** Contact: Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

July 27-Aug. 1, Cambridge, Mass. — **Computer Graphics Week.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

July 28-30, Raleigh, N.C. — **Data Base Design.** Contact: Q.E.D. Information Sciences, Inc.; 141 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

July 30- Aug. 1, San Diego — **Computer Systems Architectures.** Contact: Computer Technology Institute, Suite 101, 1024 Pico Blvd., Santa Monica, Calif. 90405.

Aug. 4-5, Houston — **Data Administration/Data Dictionary.** Contact: Performance Development Corp., 1101-P State Road, Princeton, N.J. 08540. Also being held Aug. 18-19 in Washington, D.C.

Aug. 4-5, Washington, D.C. — **Software Configuration Management.** Contact: Data Processing Management Association, P.O. Box 91295, 8959 W. Century Blvd., Los Angeles, Calif. 90045. Also being held Aug. 14-15 in Williamsburg, Va.

Aug. 4-6, Boston — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Aug. 4-6, Chicago — **Writing for Results: A Course for Computer Professionals.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Aug. 4-8, Atlanta — **Structured Systems.** Contact: Langston, Kitch & Associates, Inc., 715 E. 8 St., Topeka, Kan. 66607.

Aug. 4-8, Hartford, Conn. — **MVS Internal Logic, System Design and Performance.** Contact: Computer Systems Research, Inc., 195 W. Main St., P.O. Box 45, Avon, Conn. 06001.

Aug. 4-8, Anaheim, Calif. — **Effective Management of Programming Projects.** Contact: The Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 4-22, Saint Charles, Ill. — **Computer Fundamentals.** Contact: Arthur Andersen & Co., 69 W. Washington St., Chicago, Ill. 60602.

Aug. 5-7, San Diego — **Communications Protocols and Computer Networking.** Contact: Computer Technology Institute, Suite 101, 1024 Pico Blvd., Santa Monica, Calif. 90405.

Aug. 5-7, Boston — **Data Communications Network Design.** Contact: The Institute for Science and Public Affairs, 1370 Avenue of the Americas, New York, N.Y. 10019.

Aug. 6-7, Houston — **Service Analysis Methodology.** Contact: Performance Development Corp., 1101-P State Road, Princeton, N.J. 08540. Also being held Aug. 20-21 in Washington, D.C.

Aug. 6-8, San Francisco — **Forecasting Techniques for Decision Making.** Contact: The Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Aug. 7, Chicago — **Automated Rerun and Tracking System.** Contact: University Computing Co., UCC Tower, Exchange Park, Dallas, Texas 75235.

Aug. 10-12, Andover, Mass. — **Advances in High Speed Ultrasound Imaging.** Contact: The Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Aug. 10-13, Dearborn, Mich. — **Convention of State Information Systems,** sponsored by the National Association for State Information Systems. Contact: Glenn W. Goodman, HQ, Iron Works Pike, Lexington, Ky. 40578.

Aug. 11-13, Palo Alto, Calif. — **Digital Filtering and Control.** Contact: Hellman Associates, 299 S. California Ave., Palo Alto, Calif. 94306.

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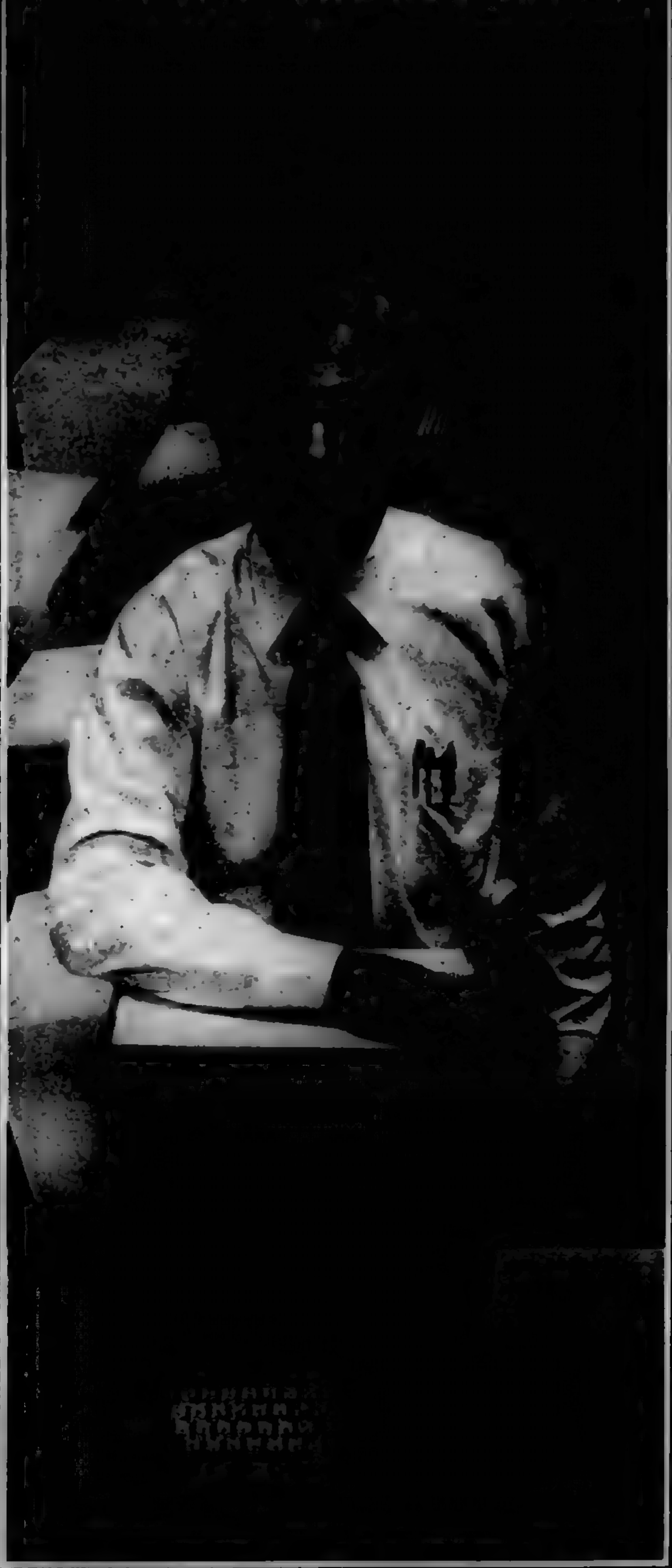

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Air Force CAM Development Project Launched

WRIGHT PATTERSON AFB, Ohio — A seven-year, $100 million program to develop and complement computer-aided manufacturing (CAM) techniques — primarily for the aerospace industry but also applicable in other industries — is under way here.

The Integrated Computer-Aided Manufacturing (Icam) program is funded by the Department of Defense and managed by the USAF Materials Laboratory. Central computing resources for Icam and program participants are provided by Control Data Corp.'s Cybernet Services through terminals installed wherever needed.

Icam's primary objective is to demonstrate the effectiveness of CAM by developing applications and implementing them in participating aerospace industries. Resources for the program come from government-industry-university coalitions, which bid on contracts to conceptualize and/or develop the computer applications.

By establishing common tools and methodologies, Icam expects to revolutionize American manufacturing methods and restore U.S. productivity, now the lowest among industrialized nations. To accomplish those goals, the Icam program needed a central computing facility that would be easily accessible to geographically dispersed participants, provide necessary software development support and be large enough to accommodate the huge data buildup as applications were developed, evaluated and implemented.

Cybernet was chosen for the program because of its reputation, available mechanical and electronic design and analysis software, networking strengths and the number of aerospace companies that use it and have other CDC computer installations, according to Dennis E. Wisnosky, program manager. Cybernet has 30 CPUs installed worldwide and a selection of application software already in use by aerospace manufacturers.

With Cybernet Services, Icam participants share a standard software language, a central data base for maintaining program architecture and a single set of tools. Consequently, each product developed by the coalitions is similar in architecture and easily integrated into an overall operation.

Organizing the Icam program was no small task. More than two years was devoted to the development of standards and modular structuring of a "manufacturing architecture" with paralleled structure definitions throughout all levels of the process.

Each manufacturing function selected for computer application is viewed as a composite of intercommunication activities — executive control, planning, management, reporting, technical support, process control and production. Subfunctions are assigned to all of these activities until the entire production process is task-identified.

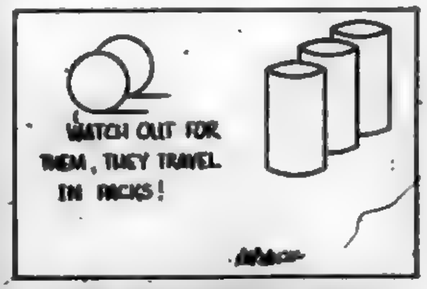
"To determine manufacturing architecture, we visualized ourselves standing at some vantage point above a huge production process, looking down on all the activities," Wisnosky explained. "Although a highly simplified description, it illustrates our all-encompassing approach."

Early on, it became clear the program would require a common language. An integrated system definition language, Idef, was installed on Cybernet computers used in the Icam program. By accessing Idef on a terminal linked to Cybernet, users not only have a full description of a particular manufacturing function, but also can get analysis and uniform description of a particular manufacturing function.

Major Icam projects completed and now implemented include:

- Drilling and routing robots operating at General Dynamics Corp.
- Sheet metal materials and process models in use at McDonnell Aircraft.
- The Integrated Decision Support System (IDSS), a software program for modeling and simulation at Hughes Aircraft Co.
- An automated information analysis package codeveloped by Boeing Aircraft and Softech, Inc., author of the manufacturing architecture adopted by Icam.

Approximately 10 terminals currently are linked to Cybernet Services for Icam projects. Simscript and Plot-10 application software available through Cybernet is used extensively by Icam participants.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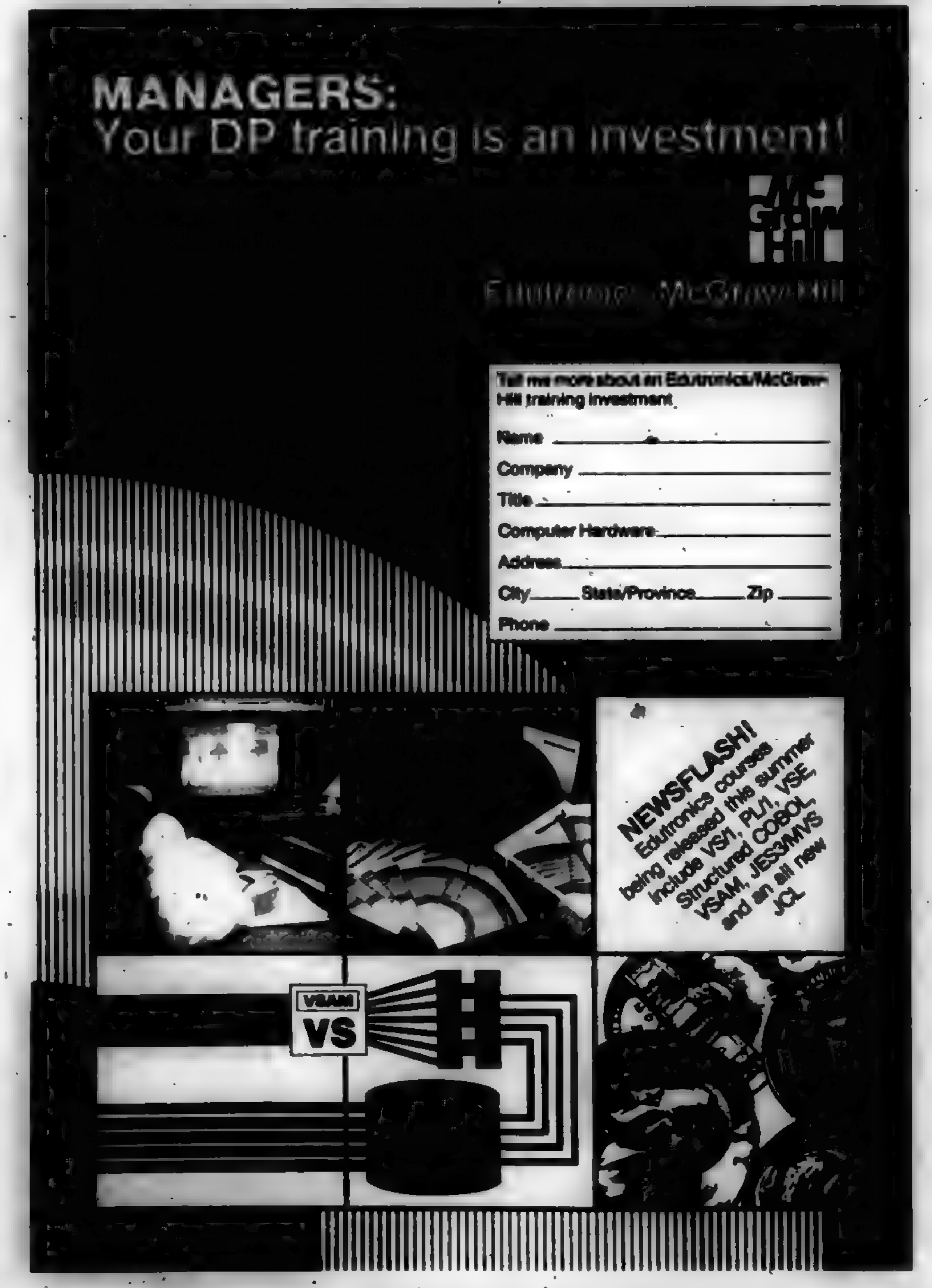
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Benchmark Results Disappointing

Northern Telecom 405 Not Meant for Basic

By Hillel Segal

The Model 405 small computer system from Northern Telecom Systems Corp. is one of the least expensive computers available that runs Cobol, but its performance in the Basic language benchmark testing program of the Association of Computer Users (ACU) proved disappointing.

The 405 ran last (in a field of 12) in the CPU-intensive benchmark test and 10th in the I/O-intensive test. But in this case the benchmark results do not necessarily tell the whole story.

This series of tests covers computers priced from $15,000 to $25,000. But the Model 405, configured with fewer diskettes and a slower printer, would yield essentially the same run-times for under $10,000, according to a Northern Telecom spokesman. So it may be debatable whether the 405 should be tested in this price category.

In discussing the results of testing the Model 405, we at the same time should consider the limitations inherent in the testing method and focus on the purpose of the system within the area of applications for which it was designed.

Customer Interviews

Part of the benchmark program, conducted for the ACU by an independent consulting firm, was a series of interviews with customers of the systems being tested. Their perceptions of the computer, its requirements and capabilities are at least as important as the standardized test themselves.

These surveys and interviews indicated that the Model 405 users had installed the systems for the most part in remote job entry locations where processing demands tended to be lighter. Few of them were using the newly introduced Basic software which, at the time of the testing, was still preliminary. Most had selected the 405 because it offered Cobol and thus was compatible with the larger computers in their businesses.

This Cobol compatibility combined with excellent data communications capabilities and low price (for a business system) made the Model 405 a good choice for the remote, on-site data collection function. Communications links to IBM or other mainframes completed the distributed processing network. A third language, Terminal Applications Language (TAL), provides another method of programming the remote entry function. Used in this manner, the Model 405 drew good reviews.

But because this benchmark testing program has been designed from the start to compare systems in Basic wherever possible, the tests do not indicate what type of performance could be expected in the 405's primary language, Cobol.

Perhaps someday the ACU will have an opportunity to compare systems in that language. Since such results are not available now, we must caution users to consider the benchmark results with circumspection and not to jump to any conclusions that are not based on the test evidence.

The ACU's main premise in beginning the effort to benchmark test modern computers has been that these results can be important and should not be left out of consideration. But speed tests alone cannot be the overriding factor in the purchase of a computer system. Even more important than sheer speed are the applications software (including the desired language), the service and training support and, of course, the price.

The total fit between task and system must include all these factors. While the benchmark tests indicate capability when running certain software under a certain language, they do not address the other factors and thus are not a complete indicator.

We have found that people tend to react in two different ways to our series of reports. Some apparently feel that the tests are the be-all and end-all; that they tell you at a glance which system is the best. People who react this way tend to more interested in the hardware itself and its capabilities than with the problems of running a computer within a corporate environment.

Others seem to ignore the tests completely. For them, the service, support and applications assistance provided are the hallmarks of a good computer equipment vendor, and the question, "Will it fit into my company?" is more important than the results of some "drag race" between computers.

Somewhere in between these attitudes is the accurate picture of what makes a system work well under actual customer conditions.

After all, a computer's speed is important, and in some applications it may be a crucial consideration. But for most users, especially in the business world, where the computing function is used more to keep track of things than to perform exotic calculations, there are other factors of design that are at least as important. These include memory space available, disk storage capacity, desired printer speed and quality and the communications facilities built into the system.

We found the Northern Telecom users contacted were for the most part well-experienced in DP, especially in Cobol, and generally were able to develop their own applications software. Their other computers were linked to the Northern Telecom units through a variety of protocols, including IBM standards such as 2780, Synchronous Data Link Control (SDLC), 2740 and so on.

Because the 405 offers several communications protocols, both asynchronous and bisynchronous, in addition to an internal company standard, it can interface successfully to most business computers. Add to this its use of an industry-standard business language and the 405 functions effectively in a large system with a variety of manufacturer's products.

Frustrating Test

Testing the unit in the preliminary version of Basic that was available to us last year, however, proved frustrating. Since that time improved in the final release version, the language then lacked screen formatting capabilities required by two of the benchmark test application programs, and these therefore were not run.

In addition, the scientific/engineering problem could not be run as designed with 50 variables and 50 equations to solve by the Gauss-Jordan method of elimination. This was a result of the operating system and Basic run-time system together with the problem's own requirements exceeding the memory capacity of 64K.

In retrospect, it was probably unwise to attempt to test using a preliminary version of the language. But Northern Telecom spokesmen are quite frank in admitting that their Basic implementation is not a very fast-running one. They see it as just an additional feature on a system that sells on its use of Cobol.

This is a major advantage Northern Telecom has gained in the marketplace, and many users cited it as a decisive factor in their choice. It made it very easy for them to program in Cobol on a mainframe while implementing a local intelligent terminal application.

Northern Telecom's Model 405, by the way, may be more familiar to readers under the name Sycor 405. The organization dates back more than a decade as Sycor, Inc. and Data 100 Corp., which together became Northern Telecom Systems Corp. when bought by a Canadian firm in 1978.

Users who picked the 405 tended to have looked at systems by Burroughs Corp., Quntel Corp., Data General Corp., Datapoint Corp. and IBM, to name a few. But there are few in the less-than-$25,000 price range which offer the Cobol available on bigger machines.

For users who wanted that commonality of language among elements in their computing network, the range of choices was narrowed down considerably. As one user said, "Why should we spend time to learn a proprietary language . . . and then have applications which can't be easily transferred to other hardware? Besides, we already know Cobol here."

On this point, we agree. The proliferation of one-manufacturer languages has hurt the computer user's ability to mix and match hardware and software options.

Next week: Benchmark testing the Datapoint 1170 and Randal Data Systems, Inc. RDS-100.

Full reports on these benchmark tests, as well as information about other benchmark series, are available from ACU. The entire Series No. 2 costs members $150 (annual dues are $25). More information is available from the association at P.O. Box 9003, Boulder, Colo. 80301.

SCOREBOX

System: Northern Telecom Model 405
Current Price: $15,300

BENCHMARK RESULTS

		TIME	RANKING
C-1	Scientific/-Engineering Problem	*	*
C-3	Accounts Receivable	**	**

OTHER BENCHMARK RESULTS

	C-1	C-3
IBM 5110	8th	4th
Wang 2200VP	1st	3rd
Texas Instruments FS 990/10	—	2nd
Hewlett-Packard System 45	3rd	8th
DEC PDP-11V03	7th	5th
Q1 Lite Microcomputer System	4th	7th
Univac BC/7 Model 610	5th	11th
Northern Telecom/Sycor 405	*	**
Datapoint 1170	To be covered in future issues	
Randal 100		
Texas Instruments DS 990 Model 2		
Hewlett-Packard 250		

* Did not run because of memory space limitations.

** Did not run because of output formatting difficulties.

This weekly column gives the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Need Entry-Level Users Hire DPers?

Turnaround Time
By Larry Long

Q We have made a decision to convert our existing ledger card system to a computerized operation. This conversion is long overdue. Our small company has a rather substantial recordkeeping task. Two computer vendors have proposed acceptable equipment alternatives. Both sales representatives have indicated that we can train our existing staff of clerks to program and operate the computer.

Neither I nor anyone else in the company has had any previous experience with computers. We certainly have no intention of releasing any of our existing staff but, quite frankly, I am concerned about our ability to implement our own computer system. Since the type of service we provide is very unique, the salesmen have indicated that we should develop all of our own software.

The president is optimistic that we can accomplish the conversion with our existing staff. Is it common for entry-level computer users to implement computer systems without experienced personnel?

A Thousands of companies have at one time or another been in a very similar situation. They now have seasoned professionals running their DP department. Many of the professionals once held jobs within the company that were not related to DP.

However, there are many problems involved with this approach. After you have found employees who want to make a career change, do they have the aptitude for DP-type work? Often, they don't.

Without proper direction, you can expect to take the three-steps-forward, two-steps-backward approach for a couple of years.

I would recommend, if possible, hiring someone with a DP background. Hopefully, the new hire will not jeopardize the jobs of existing employees. Many experienced people are debating whether to remain a cog in a big wheel or to be No. 1 in their own small shop.

Be advised that the salary of an experienced DP professional is not even in the same ball park as that of a clerk.

Q I am currently employed as a systems programmer/analyst who primarily uses BAL. Now that I have two years of experience, I feel that it is time to move from the end-user shop where I am currently employed to a systems software house.

My goal is to seek employment with a company that takes a strong interest in providing training and opportunity for professional development as well as a state-of-the-art environment.

Given that I would relocate for the right position, how can I obtain information about various software houses? And, what are the qualities that I might look for so that I might attain the goals mentioned above?

A There is no central repository and, therefore, no easy way to obtain the information you desire. In order to get the in-depth knowledge required to make an informed evaluation of a potential employer, the first step is to make contact.

Look through this and past copies of *Computerworld* to identify companies that develop products of interest to you. Don't forget mainframe manufacturers.

Write or call each company (ask for "personnel" and request an application, written information on both the company and the systems software career and the name of someone you can contact in the systems software development group.

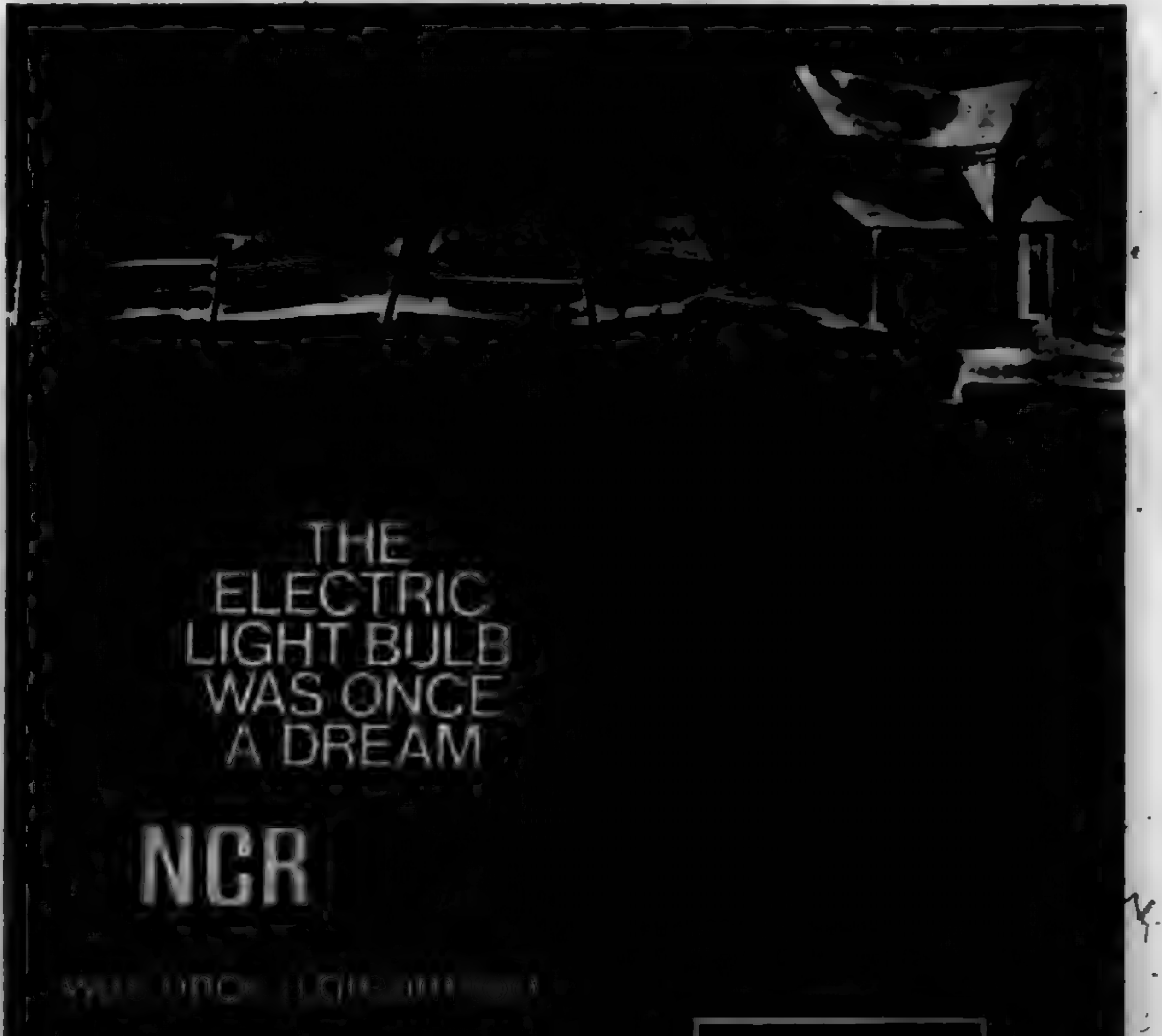
The first corporate quality that I would look for is the level of their initial interest in you. If they show little interest now, chances are they won't show much interest after you come on board.

In order to assess other qualities, you will need an on-site interview. During this visit, look for employee time allocated to education (not on-the-job training); a written career management and development program; the ratio of maintenance to new systems development; level of responsibility initially and after two years; opportunity to get exposure to different systems and environments; immediate and mid-range job function; employee turnover; level of morale; and, of course, benefits such as salary and pension.

Permit me an unsolicited comment. The tone of your letter hinted that you believe a systems software house to be the career goal of a systems programmer/analyst. Equally exciting opportunities exist with end users, especially with the trend to distributed data processing.

Long is a professor at Lehigh University, A DP consultant and author.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.



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TEXAS INSTRUMENTS

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EDITORIAL

On Guard

While there is no indication that the overall economic slowdown is affecting users' computer and information systems buying plans, people should be on guard nonetheless.

Many surveys show that users are staying with their spending plans for computers and other information processing equipment in spite of the economic bad times – and some users are even planning to increase their purchases of such equipment. Clearly, many companies recognize that information systems can help the bottom line and that computer-based systems are productivity enhancers, not just overhead.

However, managers of information systems and services have to be even more careful now in how they present plans to top management. Plans for new equipment and services should be made in business, not technical terms. Productivity increases need to be carefully spelled out – and the potential risks have to be closely explored.

This last need has too often been ignored. Anxious to sell a program within general management, managers often forget to outline the down-side risks that are inherent in almost any project.

So even if times remain good for most computer users, managers need to be extra careful during periods of economic problems that they do not oversell their systems' potential or underestimate the risks associated with information processing products.

Beware of Pressure

Although the Federal Communications Commission (FCC) has delayed the effective date of its deregulation decision to July 18 [CW, June 23], users are going to have to hurry to get ready for the changes.

Basically, most users of enhanced telecommunications systems have to negotiate contracts with suppliers of those services. Previously, the services were covered by FCC tariffs, so individual contracts were not needed.

However, users should not let the vendors of those services rush them into signing standard contracts just because the time is so short. All users should have their lawyers involved every step of the way and be ready to negotiate even after the effective date of the new rules.

DATA PAST

Five Years Ago
July 9, 1975

PROVIDENCE, R.I. – After nearly two weeks of deliberation, the jury in the case of IBM vs. Catamore Enterprises, Inc. awarded Catamore $11.4 million. Catamore, in turn, was ordered to pay $68,453.23 in back rent to IBM. IBM had sued Catamore, a jewelry manufacturer, for nonpayment and Catamore had countersued, charging breach of contract, breach of warranty, fraud and negligence.

- - -

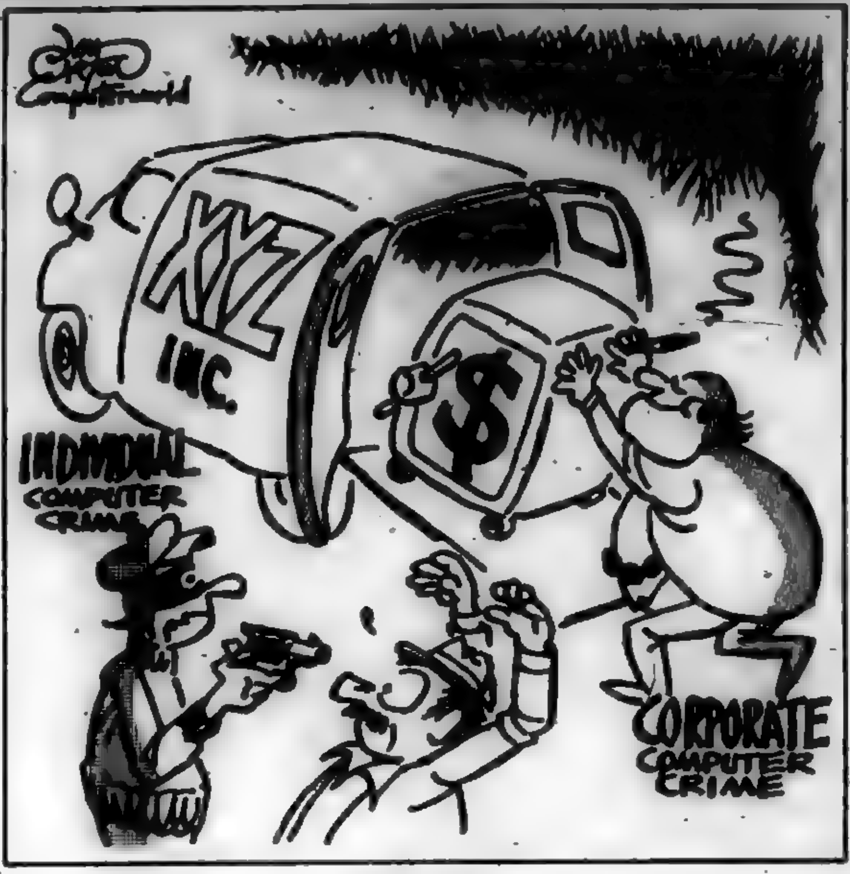
WHITE PLAINS, N.Y. – IBM reconfigured its 3790 terminal system by introducing a simpler key entry station, the 3760, to make the communications system more competitive.

Eight Years Ago
July 12, 1972

DAYTON, Ohio – Codasyl's Programming Language Committee met here to consider a proposal to delete the Report Writer facility from the Cobol standard. The proposal, initiated by the Air Force, called for dropping the RPG-like function because "it is redundant with current features in the language and too complicated for the general report-writing needs of the user community."

- - -

WASHINGTON, D.C. – Sen. Sam J. Ervin (D-N.C.) introduced legislation to ban the Army or any military service from keeping computerized data bases on civilians.



The Pro

LETTERS

Tandem's Mumps

"User Group Calls for Wider Use of 'Mumps' " [CW, June 2] was constructive in publicizing many of the merits of the Mumps language for rapid application development and modification. However, the article's references to Tandem Computers, Inc. and Tandem's implementation were inaccurate. Therefore, I would like to explain the status of Tandem's Mumps.

Tandem offers Mumps in its Nonstop environment under our Guardian operating system. It was reported that Tandem is not offering Mumps in its "intended form as a stand-alone package." However, the national Mumps standard defined by the Mumps Development Committee in 1976 and accepted by Ansi in 1977 is a language standard. Ansi 77 Mumps deliberately avoids specifying an implementation environment.

It was reported that Mumps "cannot be offered as part of a multilingual system." On the contrary, Ansi standard Mumps can benefit from being offered as part of a multilingual system. For example, the mathematical capabilities of Ansi Mumps are very weak. Tandem Mumps largely overcomes that weakness because it allows easy communication with any Fortran process to perform rapid calculations. Tandem Mumps may just as readily communicate with processes written in other languages such as Cobol. Also, Tandem Mumps can readily access disk files created by applications in those other languages.

A "spokesman" for Tandem was reported to have stated that "Mumps eats up a lot of disk storage during execution." No Tandem spokesman was present at the reported session. Obviously, the amount of disk "eaten up" depends on the rate at which data is being written to disk, regardless of the language.

The "spokesman" was also reported to have said that Mumps "often precludes non-Mumps users from using the computer system." Yes, keep out those nasty Cobol programs!

But more seriously, Mumps does not preclude others from the system. Tandem uses a priority/preempt scheduling algorithm: When a process of higher priority becomes ready to run, it takes over from a running process of lower priority.

Decisions about priority are under the control of the system manager. Like other processers on the system, a Mumps process shares available resources.

Joan Zimmerman
Software Education and Support
Tandem Computers, Inc.
Cupertino, Calif.

Time to Switch

After reading several articles from *Computerworld's* June 16 issue, I have decided to leave the ranks of DP auditing as I am obviously not qualified to perform that function adequately. This lack of competence was vividly brought to my attention from quotes attributed to Robert Courtney, an IBM senior consultant, and Brandt Allen of the University of Virginia.

Instead, I think I will change to consulting or teaching. By making such a switch, I can begin impressing innumerable individuals with my knowledge of security theory without having to face the mundane task of actually improving control systems.

Since my change will result in an open position in DP auditing, perhaps Courtney and Allen might care to apply, even through they appear highly overqualified. By doing so, they could use their expertise in helping the wounded and by pointing out the water cooler.

Richard W. Nicoloff
Cleveland, Ohio

COUGER ON EDUCATION J. Daniel Couger

A/V Training Aids Catching Up to Products

The time lag in producing audiovisual (A/V) materials for training computer personnel on new equipment and techniques has diminished significantly. Until recently, production of A/V materials lagged behind release of new hardware or software by more than one year. Now the lag is considerably less than a year for many product lines.

This difference is apparent in the listing of new products in the *13th Annual Guide to A/V Instruction for Data Processing*, published last month by the University of Colorado.

In addition, the publication describes new products to be released in the summer and early fall. Highlights of those new releases are described below.

Systems Analysis and Design

A number of new products will be released in the systems development area. Deltak, Inc, will release "System Development in a Data Base Environment" (five modules), "File and Record Design" (four modules), "Designing On-Line Systems" (three modules) and "Graphics Dialogue Design Techniques" (four modules).

Advanced Systems, Inc. (ASI) will release "Data Processing Quality Assurance" (one module), "Designing Controls for Information Systems" (two modules), "Conducting the Acceptance Test" (two modules), "Data Base Concepts and Fundamentals" (six modules), and "Data Base: Modifying the Data Model for Efficiency" (two modules).

The Edutronics Group will release "System Design Life Cycle" (two modules).

The programming area will be enhanced even more than the design area. Edutronics will release "PL/I" (six modules), "Time Sharing Option" (eight modules), "CICS/VS Command Level" (seven modules) and "Vsam" (five modules).

Deltak will release "Jackson Techniques for Complex Programs," (six modules), "Advanced CICS/VS Command-Level Programming" (five modules); "VSE, DOS/VSE and DOS/VS for Application Programmers" (nine modules), "Structured ANS Cobol" (two modules), "Structured ICL Cobol Series" (19 modules) and "Nonsequential Files in Cobol" (three modules).

ASI will release "DOS/VSE (eight modules), "DL/I Programming: Traversing the Hierarchy" (two modules), "Airline Control Program" (11 modules), "Fortran IV with '77 Extensions" (11 modules) and "OS/MVS: Linkage Editor" (two modules).

Hardware/Communications

A number of new course products will be released in the area of computing systems. Deltak will release "Computer Network Architectures" (three modules), "Communication Network Technology" (four modules) and "The Microelectronics Explosion" (two modules).

ASI will release "IBM 4300" (seven modules), "IMS/VS MFS: Concepts and Terminology" (five modules) and "Data Communications: Codes and Transmissions" (5 modules), "DDP Concepts and Fundamentals" (two modules) and "Networks: An Introduction to Protocols" (two modules).

Edutronics will release "Virtual Machine" (three modules), "4300 VSE" (six modules) and "Distributed Data Processing" (two modules).

None of the media firms has announced a new project management course. I used the Edutronics course (five modules) in my undergraduate system course last fall at the University of Colorado. It fit in quite well and caused the students to cover more material than usual because they could use it on their own time. I also used ASI's new course "Preparing System Specifications" (two modules) and will be using ASI's "Structured System Analysis and Design" (three modules) this fall. Both are quite appropriate for the undergraduate course.

Until recently, little A/V material was available on information systems management. A number of new courses were recently released.

Noteworthy are "Corporate Strategies for Information Systems of the

(Continued on Page 42)

READER COMMENTARY/Reinhard Mirkovich

Packaged Software: More Points to Consider

Joseph F. Duggan made some very interesting points regarding packaged software selection [CW, June 9]. However, a few points need to be added.

Probably one of the most important criteria for selection of large systems software is the reputation and stability of the vendor. The objectives of purchasing packaged software are twofold: low implementation cost and minimal software maintenance expense. It's nice to know that support of the product will continue and that the product will endure for a reasonable length of time.

Another consideration evolves during the initial compilation of anticipated software performance statistics. When the study team evaluates end-user and technical prerequisites for the purchased software, there may be a tendency to allow the conclusion of the study to dwell on technical design specifications as opposed to end-user business requirements.

When this happens, the software selection study team might overstudy the way things are handled by the package rather than the desired results the software is supposed to provide. Often this creates imaginary needs for the user-written programs to supplement the packaged software. That seriously erodes the objectives for acquiring vendor software in the first place.

On the other hand, it is imperative that the study team understand just exactly what the vendor-provided software will do to meet those business needs and what it will not do.

When a package is evaluated for operating performance and test data is actually benchmarked, this test data should be created by the end users, not by the vendor, as Duggan correctly noted. Test data provided by the vendor may prove little, if anything, about the efficiency or accuracy of the software.

Duggan pointed at what he perceives to be a problem in the support of packaged software: the physical distance between the user site and that of the software vendor.

It is true that during the actual installation of a vendor's software, a close physical proximity to the vendor may be important for the end user, especially if the user is billed for travel and living expenses by the vendor. Even though such expenses are usually only a tiny fraction of the cost of implementing the vendor package, the convenience of getting rapid response to inquiries or problems is frequently critical, especially during the final stages of the implementation.

However, ongoing support after implementation should not require extensive on-site assistance from the vendor. If this is true, as it should be in the case of any well-

(Continued on Page 42)

THE TAYLOR REPORT/Alan Taylor

Arbitration Clauses Work in Vendor's Favor

A number of users are fighting NCR Corp., so it is particularly appropriate now to review one of the main fighting areas — the NCR arbitration requirement. As explained below, this is oversold by NCR, and few users, when they sign the agreement seem to realize what the results are.

Yet, according to NCR, some of its prices have been kept low because of the amount of resposibility and risk the users undertake — and the arbitration clause is a key place where the user, rather than NCR, takes on additional risks of losing legal rights and powers.

Unless the user understands how his legal rights can be hurt by the clause, he cannot fairly compare the NCR price tags against NCR's competition.

NCR claims its drafted clause provides a pro-customer method of settling disputes. The company's position was set forth by B.E. Olive, NCR assistant general counsel, writing in "Site Bytes," March 1977.

But if it is pro-customer, why are the customers now reported as fighting the use of arbitration. [CW, June 23]? Or why would NCR fight to prevent them from using the courts, where, presumably, NCR would have better odds? If NCR really believed its "pro-customer" claim, you would think the company would be happy to move to the country's courts if the customer was foolish enough to let it.

NCR's claim is that arbitration is quicker because money does not have to be spent educating those ignorant trial lawyers and judges. Instead, an arbitrator can be chosen who is already "familiar with hardware, software, support, backup" and so forth. Sounds good, but is that the only difference, or are we being soothed with a half-truth?

One way to see if the claim is reasonable is to look at any examples NCR gives and see if they really support the claim. If they don't, one has reason to look more carefully for concealed traps.

In fact, Olive gave only one example, where he discussed the time that a court case might take. He referred to the current antitrust trials underway in the DP industry and pointed out that they take years.

But user suits about broken promises, useless or nonexistent support or lack of backup have no connection with antitrust matters. Olive's choice of an irrelevant comparison suggests that he isn't giving the full story.

In fact, if Olive had instead referred to the then-current computer contract suits, he would have had to remind users about problems involved in getting evidence from inside hardware vendors, tricky legal questions like fraud in the inducement and validity of supercession arguments.

These legal and evidentiary arguments have repeatedly been the key to users obtaining or losing relief in the courts — and it is in these areas where the NCR arbitration clause leaves NCR, not the user, in the driver's seat. NCR can keep its documents hidden and prevent a user from having legal questions properly reviewed by legal experts.

Omitted Facts

The user pays a price for getting the allegedly swifter, more knowledgeable decision making. In fact, the user pays for the greater knowledge (of DP and business) by having to accept an arbitrator with no required knowledge of law! And he has to buy that speed by giving up his rights to get the documents and witnesses he may need to prove forgery, NCR motives, knowledge and so forth.

These user sacrifices are the real difference between the two systems. Arbitration favors the party who has the

(Continued on Page 42)

HUMAN CONNECTION/Jack Stone

Early User Role Enhances Concepts Training

Recently I had the opportunity to develop and implement a concepts training program involving the Wang Laboratories, Inc. 2200VS system, and the experience caused me to update my earlier ideas about such training. Because my experience may be somewhat novel, I thought it might be useful to share my new views in a series of four columns on this subject.

Before beginning, though, I want to note that the 2200VS is not touted here as a dedicated training system nor is it recommended as a solution to all the world's information processing problems; but it does have many features that make initial training of DP neophytes a positive joy and suggest new directions for you to take with concepts training on your own machine. The system presents a wide range of computing facilities at the CRT terminal, and the user can access them easily.

Here are the circumstances surrounding the training program: A large client organization was preparing to make first-time installations (VS minis) in each of a number of major branch office locations. For this reason, and because of the need for standardization and the shortage of skilled manpower, all the software would be supplied in packaged form from the central DP department.

Of course, it was still necessary to identify systems administrators at the branch for data entry, user support, machine operations and so forth. These people, who were new to DP, were then scheduled for an extended training program, the first week of which was devoted to the concepts class. Fortunately, we had a mainframe dedicated to the instruction, with only two students per CRT terminal.

Here are several of the approaches I found useful:

The attendees should start operating the terminals as quickly as possible after the welcome speeches. Right after I arrived at the podium, I asked the students to figure out for themselves how to manipulate the cursor controls to effect log-on and password entry. I directed the students to find their own way through the system often during the course, because the terminal commands and controls on the 2200 are so simple that the "discovery" method of learning is perfectly appropriate.

Besides, by working with another person in the workshop exercise (as nearly all of you did in your high school chemistry class), attendees have a lot of fun — which equates to interest and motivation — trying to determine what the system functions are and how they work. Moreover, it's great training for them in future operations.

Of course, I was constantly hovering over them during the hands-on sessions and speedily moved from terminal to terminal to answer the myriad of questions that popped up. Obviously, an instructor in this learning environment had best know the system well and be able to resolve terminal problems efficiently and with some style, because the system will unerringly point up his knowledge voids.

And it's quite challenging to the instructor to be able to handle unscheduled system problems. Here's my suggested strategy: If there is a program failure, use the incident to illustrate system error diagnostics. If there is a job control procedure failure, use the editor to show how to change the procedure and make it run correctly. And if the system fails altogether, just drag out the hard copies of the workshop screens you have secreted for such an occasion and review them instead!

A/V Materials Catching Up to Products

(Continued from Page 41)

"80s" (Ted Withington), "Strategies for Distributed Data Processing" (Felix Kaufman), "Ensuring Effective DP Training Programs" (Gary Slaughter) and "Motivating the DP Professional" (Dan Couger). These courses were produced by ASI.

Deltak will soon release "Managing the Security Environment," "Corporate Computer Security Strategy" and "DDP and Corporate Politics."

Self-Study Courses

The Independent Study Program (ISP) is a special line of IBM self-study products. The material is usually contained in an illustrated textbook, student workbook and study guide. Problems and machine exercises are built into each course. Machine exercises contain all necessary data sets, programs and Job Control Language (JCL) to run problems on IBM gear.

Most products are single-medium printed materials. About half have supplementary audio materials. A few include video materials.

Some of the new ISP courses are IMS Application Development Facility, IMS/VS Implementation of Logical Relationships, IMS/VS Data Communication Application Programming, DL/I Application Programming and Estimating Application Development Projects.

ASI has completed a new introductory course. I used prerelease modules in my class this semester with good results. Deltak will release "A User's Guide to Data Base" (three modules). Boeing Computer Services, Inc. (BCS) has expanded its widely used introductory course, "Making it Count." Since its introduction by BCS in 1974, the course has been used by more than 90 clients, viewed by more than 30,000 students and broadcast nationwide by more than 60 colleges and universities.

A copy of the *13th Annual Guide to A/V Instruction for Data Processing* is available for $4 ($6 if an invoice is required) from *Computing Newsletter*, Box 7345, Colorado Springs, Colo. 80933.

Packages: Points to Watch

(Continued from Page 41)

tested and well-supported packaged software, the importance of geographical distance between vendor and client diminishes greatly.

Duggan does not seem to understand the impact of centralized software support, directed and conducted from one vendor site. A centralized support mechanism assures that support is of uniform quality.

Regional support usually creates varying levels of support quality; support may be good in one area, poor in another.

However, vendor support site location is not always directly related to level of support. Only careful evaluation by the prospect will provide a clue as to what the actual support quality is.

Contrary to what Duggan implied, conversions of user files to the vendor package should not be a manual effort, if at all possible. Some software vendors do in fact provide automated conversion aids. A few may even accept the total responsibility for the conversion or point out a consultant who is familiar with their package and can offer assistance in this endeavor.

Mirkovich is manager of installation support, human resource management systems, Wang Laboratories, Inc., Lowell, Mass.

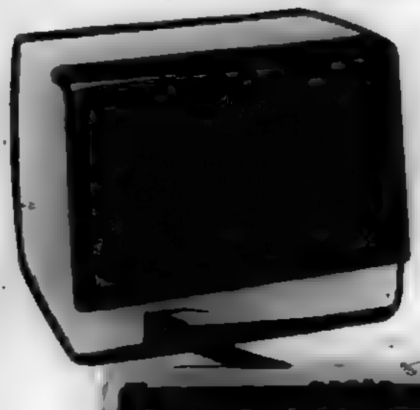
Clauses Work To Help Vendor

(Continued from Page 41)

simplest facts and simplest legal claims. In contract cases, this is usually the vendor who wrote the contract.

The standard basic user claim of mistake, unconscionability or fraud requires hard facts for proof — even in courts. Discovery, using the court's powers, is essential, as is time for careful and reviewable legal argument before judges, not DP businessmen.

By getting the meaning of the contract and its validility clear *before* deciding whether and where to fight a vendor, a user does have a way of improving his situation. But while this is somewhat better than the normal arbitration situation where all points are brought out together, this split arbitration technique is still not as reliable as a court for getting at the truth. In any event, user acceptance of the arbitration clause should not be automatic.



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To Revamp Inventory System

Service Firm Weds 'CA-Earl,' DOS/MVT

ST. LOUIS — Faced with the seemingly impossible software task of redesigning a physical inventory system in one month, Richard Ringen married a report writer and operating system from two separate software houses to beat the deadline.

The situation came about when Distronics Corp. — a service bureau here with an IBM 370/155 running under DOS/MVT, a Software Pursuits, Inc. operating system — decided its inventory system was "an operational nightmare."

The system involved the costly multiple handling of over 500,000 punched cards during a concentrated year-end inventory period.

Clients were sent a set of punched, interpreted cards, each corresponding to a part held in one of Distronics' 81 client warehouses (averaging 14,000 cards per warehouse). Clients indicated the inventory count on the cards and batched them back to the data center.

Written information was punched and verified onto the returned cards — another costly process — and repunched cards were then processed by a series of programs to verify the returned cards.

Lost Time

Clients were lax about getting cards back promptly and in good order. Time was lost replacing missing cards and inventory adjustments, which should have been available in less than a week, took months. Both Distronics and its clients were unhappy.

Redesigning the system's programs in either Cobol or assembly would not have been an insuperable task. However, subsequent testing and debugging would have taken months to complete at prohibitive expense.

Ringen, department manager for Western Union Teleprocessing, Distronics' parent company, was tapped for the task of doing it all in a month.

He was familiar with Computer Associates Corp.'s report writer — CA-Earl — and decided it was right for the reports needed. Ringen decided to use the system's English-like language to develop the inventory reports while his programmers worked on the assembly/Cobol type programs needed to manage the files and format the CRT terminals.

Even then, it looked like a formidable job. Most of the clients had more than one warehouse and some had as many as nine spread across the country.

"Each of those may contain anywhere from 12,000 to 25,000 individual items," he said. "Within our fixed file structure, putting all that data on one data base would have been a grossly inefficient use of disk space.

"To conserve disk space, we visualized four distinct classes of inventory data bases, depending upon the number of branches a client had.

"In the meantime, what had looked like one relatively simple inventory report program was expanded to a multi-program system involving six different reports. Clients would get physical inventory listings before and after inventory counting, missing ticket listings, plus dollar and quantity comparisons."

Distronics asked its clients to enter inventory data on-line via their CRT terminals to utilize special formatted displays. It meant additional work for the client, but paid off in the form of valuable reports that had not been available before.

(Continued on Page 44)

> *'Redesigning the system's programs in either Cobol or assembly would not have been an insuperable task. However, subsequent testing and debugging would have taken months to complete at prohibitive expense.'*

'CA-Sort' Supports DASD on 4300s

JERICHO, N.Y. — Support for IBM's Direct Access Support Devices (DASD) 3310 and 3370 Fixed Block Architecture (FBA) disk drives for IBM 4300 users has been added to Computer Associates, Inc.'s CA-Sort in Release 6.0.

Working for all SORTIN, SORTOUT and SORTWK files, the enhancement adds to the SORT's previous ability to run under VSE and all other IBM operating systems, the vendor noted.

A second enhancement included the Release 6.0 allows users to take automatic advantage of faster run-times of in-core sorting without specification of special parameters. This eliminates additional JCL and makes maximum use of in-core sorting possibilities, Computer Associates said.

Every SORT is automatically run first in-core to the extent of available space, thus ensuring that no opportunity to run a SORT in-core is bypassed, according to the vendor.

Another feature of Release 6.0 includes mixed DASD work file support across various types of disk drives, including the IBM FBA disk drives.

Release 6.0 reduces sorting time by allowing the SUM facility to be handled in Phase I of the SORT, thus increasing the possibility of skipping the Phase II of the sort while I/O accesses are reduced, the firm said.

Release 6.0 also permits variable-length records to be processed with the OUTREC statement by bypassing the need to write special exit programs.

Files are also allowed to be output to the printer allowing checking of formats: a new feature that is especially useful in conjunction with INCLUDE/-OMIT facility of CA-Sort, according to the firm.

Release 6.0 is offered at no charge to users of CA-Sort, which has a perpetual license of $3,900, the vendor said from 135 Jericho Tnpk., Jericho, N.Y. 11753.

AOS Resource Monitor Debuts

MOUNTAIN LAKES, N.J. — Data General Corp. users can reportedly monitor the use of their systems' resources using the AOS User Accounting (AUA) package from Nordata, Inc.

The AUA system provides for the billing and distribution of costs to the individual users or departments sharing the resources of an Eclipse system running under the Advanced Operating System.

Additionally, AUA provides for the production of statistics on usage and machine load to determine the computer resources required to provide the desired level of service.

The AUA package license is available for a one-time purchase of $2,500 or a monthly lease of $145.

Nordata is at 100 Rt. 46, Mountain Lakes, N.J. 07046.

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TP Monitor Embedded in 'OWL'

ATLANTA – A teleprocessing (TP) monitor has been embedded in NCI, Inc.'s OWL on-line programming system to create a product called Independent OWL.

Independent OWL operates in both DOS/VS and DOS/VSE environments, because of the macro-generated, multithread, multitask TP monitor used to drive it, according to the vendor.

The monitor manages re-entrant code, contains dynamic buffer pool management capabilities and automatically provides application and task priorities as well as terminal and systems statistics to help manage and evaluate performance of applications, terminals and the TP monitor.

A special feature intercepts program checks in application programs and releases that application while maintaining the integrity of the TP monitor and other applications.

The system also has enqueue and dequeue at record levels for direct-access files.

Independent OWL is available to new customers for $16,450. Existing OWL customers can upgrade for a one-time charge of $4,000.

NCI is at 3720 Longview Drive, Atlanta, Ga. 30341.

Service Firm Revamps System

(Continued from Page 43)

But six reports and four different data bases added up to 24 different programs to write – a considerable task and not without serious operational difficulties.

At that point, Ringen made a breakthrough. He decided to write one overall CA-Earl program and use DOS/-MVT's PROC processing facilities to selectively create just the JCL and program statements needed to provide the desired reports.

He wrote a 560-line program as one big procedure containing all the statements necessary for the required programs.

Throughout this program and in the JCL preceding it were spread the various DOS/MVT PROC commands to include or not include the various CA-Earl and JCL statements.

Symbolic Substitution

Ringen used symbolic substitution to modify statements and initialize parameters and conditional expansion facilities for the actual reports to modify CA-Earl REPORT, SELECT and PRINT statements.

Nested procedures keying off the client ID sought out the appropriate inventory file and assigned the proper disk, thus tying up only one drive instead of four.

"With just one card and five or six parameters, we could create any one of 24 different reports," Ringen said. "All we needed on the card was the client ID, which report was required, such optional parameters as which branches were to be included, which products and/or product groups, single or double spacing and so on."

Client Response

Clients were happy with the faster service and new reports. They readily agreed to the additional effort and expense required on their part to enter the inventory data.

Instead of the punched and interpreted cards sent previously, they now received printed cards. Using CRT terminals, they could get inventory counts into the host computer on-line during the physical inventory process itself, normally performed on weekends.

Missing items were found quickly through security numbers on printed listings. Verification of data was expedited through interim reports and, most importantly, inventory was completed in days instead of months.

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'DYL-Audit' Enhancements Include Security Features

ENCINO, Calif. – Dylakor Software Systems, Inc. has updated its DYL-Audit package with 10 enhancements that include two security features, a user password option and a subroutine for encryption/decryption that allows the user to extract information and convert it into personal code.

Introduced in January 1979 as a companion product to the firm's DYL-260, Dyl-Audit's functions include record selection, information handling, frequency distribution, aging analysis, letter writing and sampling.

In Release 2.0, frequency distribution can now appear in a histogram form showing intervals by count or value in equal or logarithmic intervals. In addition, frequency distribution can now be categorized on an alphanumeric field, Dylakor said. The package's letter writing function is expanded to allow unlimited letters in one pass of the file. Previously only one letter with variable inserted data was produced, the vendor said.

Aging analysis has been changed so that cash flow can be predicted through a new capability, future aging analysis, the firm said.

COPY Function

Dyl-Audit's COPY function has been extended with Copye, a source macro facility for placing source code on either source library or partitioned data set with embedded symbolic variables. Dylakor has provided a library of Copye routines, which include such auditor-needed functions as sequence checking, missing or duplicate records, file matching, account analysis and phonetic conversion, the vendor said.

Release 2.0 is offered to current Dyl-Audit users signed on to Dylakor's software maintenance agreement, the firm said from Suite 808, 16255 Ventura Blvd., Encino, Calif. 91435.

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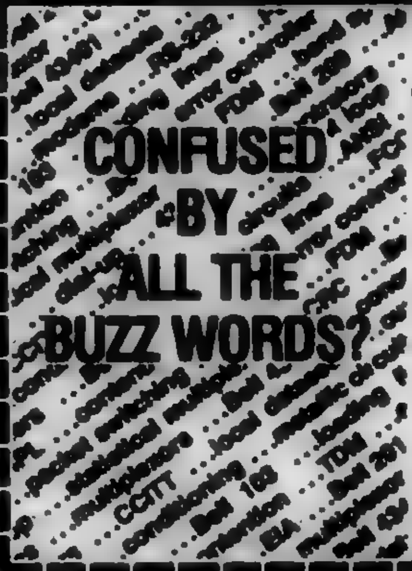

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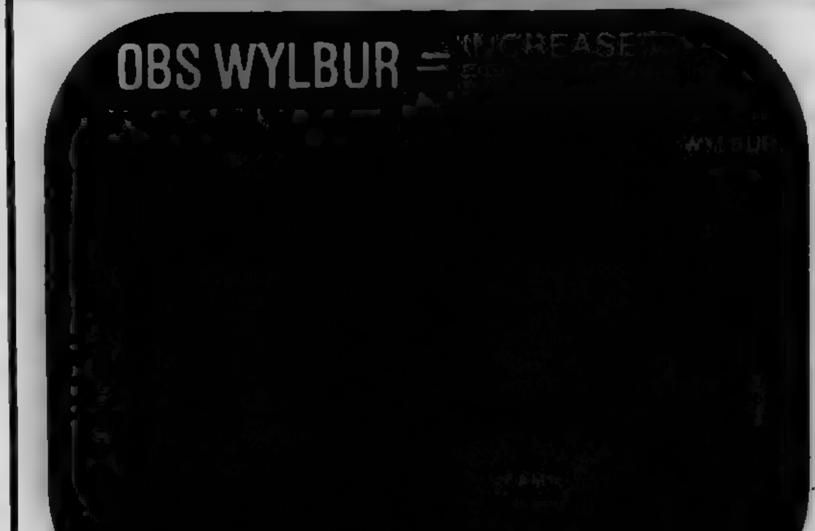

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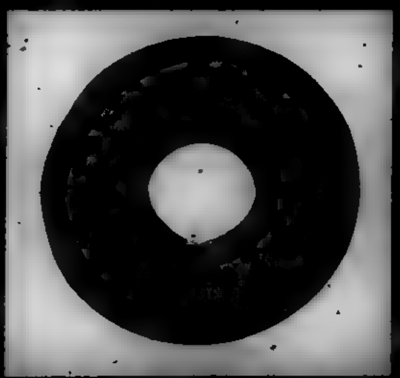

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SNA Protocol Emulator. Now Digital systems can talk to and support IBM mainframes using the SNA protocol. Thus, you can protect an investment in hierarchical networks, even as you commit to more flexible distributed systems.

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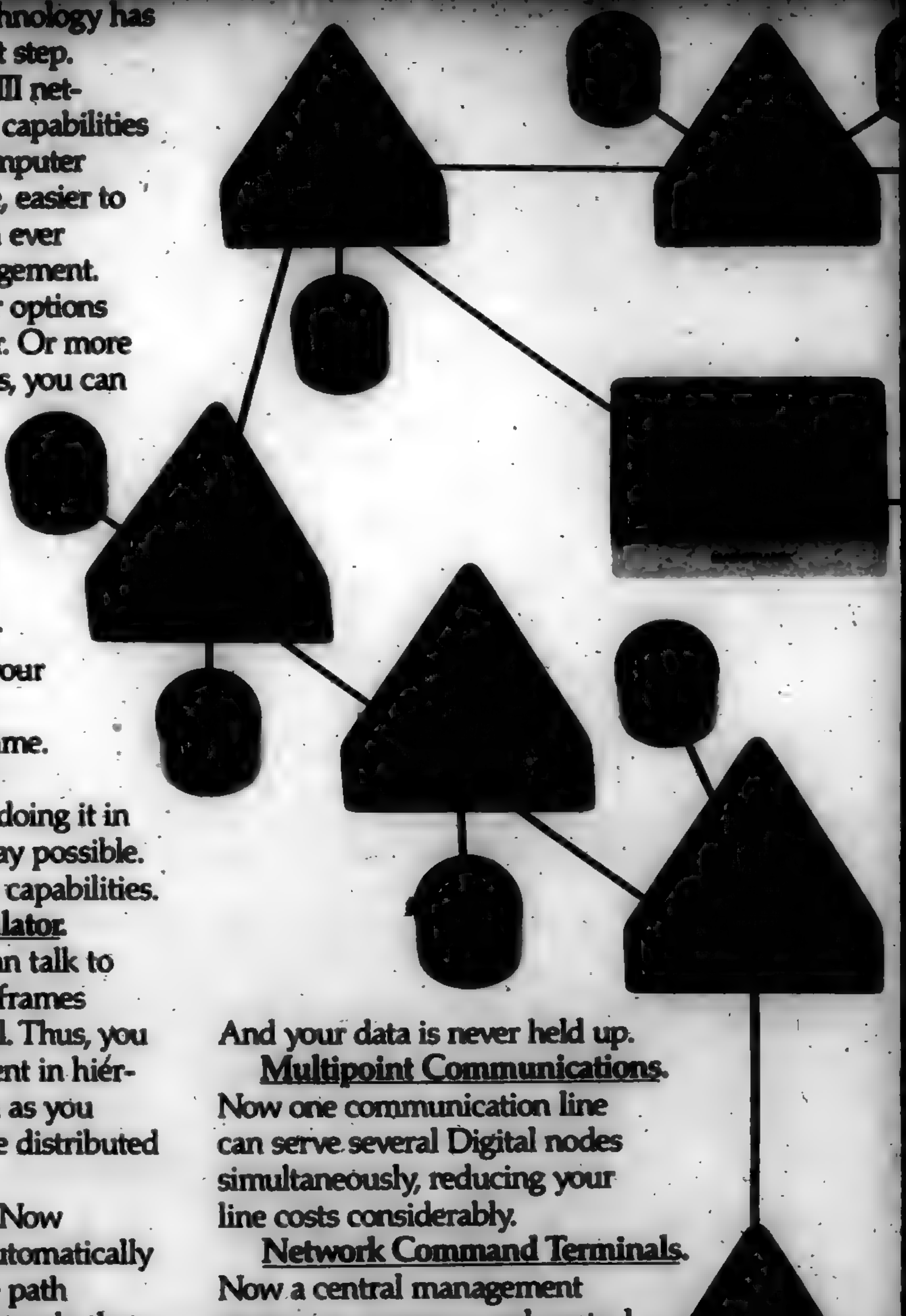

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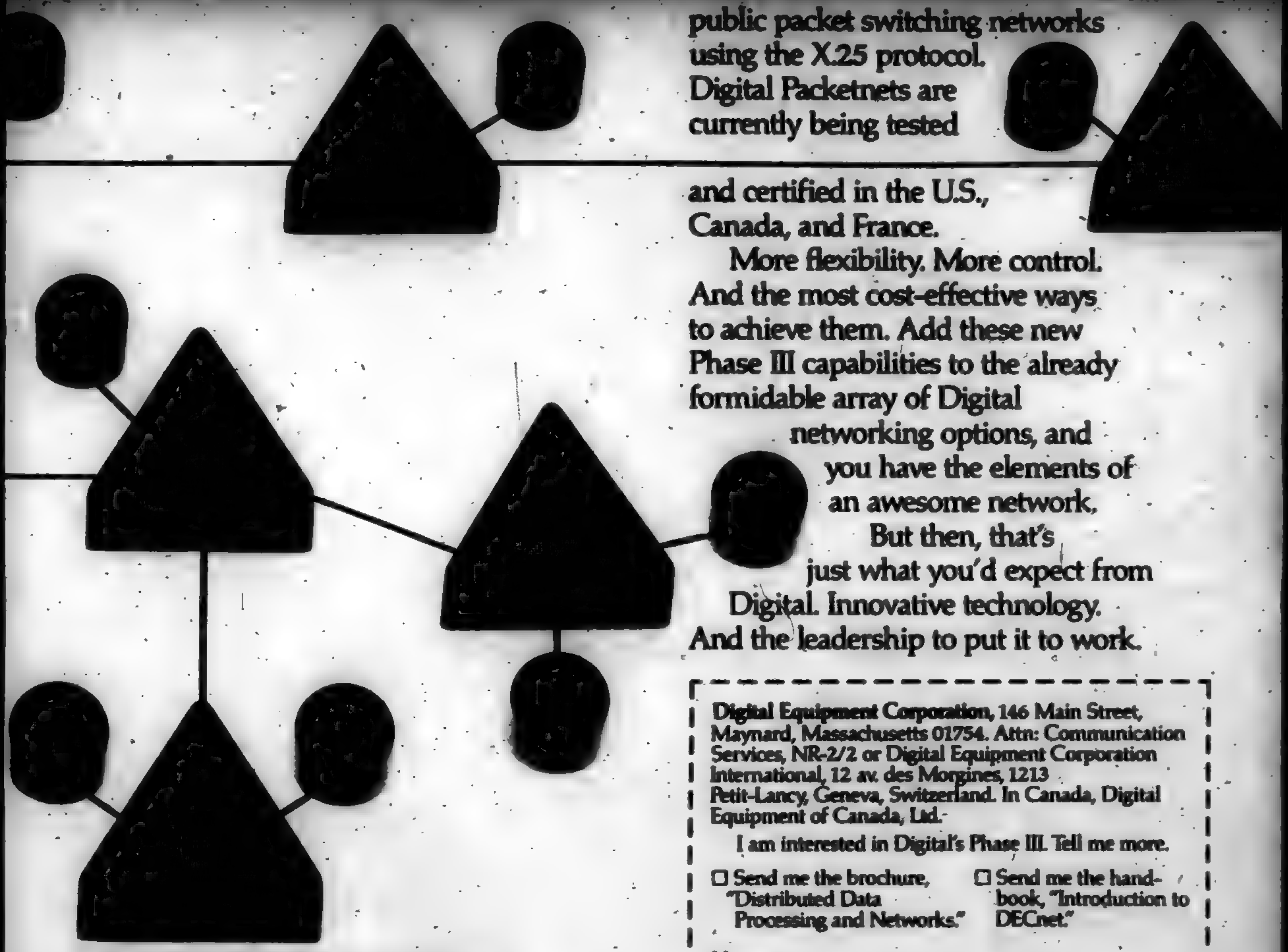

thus cutting the cost of programming individual nodes in widely dispersed locations.

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Users' Guide Revised

'CDPS' Data Base System Updated

CINCINNATI — Tominy, Inc. has released an updated version of its Champion Distributed Processing System (CDPS) distributed data base and distributed data processing package. The firm also released an updated CDPS user's guide.

The package runs on IBM's Series/1, 360 and 370 and compatible systems; Honeywell, Inc.'s Level 6, Interdata Corp.'s 7/32 and 8/32 and Computer Systems Development, Inc.'s Sentinel A8086 small business system, the vendor said.

The package now offers up to 256K bytes of memory, a feature that allows more programs to be system-resident at one time, Tominy claimed.

The CDPS-Champtalk compiler has been enhanced to include expanded numeric functions, new compile options and INCLUDE statement support, the vendor said.

Tominy has also released an enhanced utilities package for CDPS. The earlier version of the package has been extended with more options, such as LIST, COPY, character replacement, double-word and nested groups, definitions of more files and fields and 20% faster SORT execution, according to the vendor.

CDPS is offered in two packages. The first offers complete applications development plus the utilities package for $10,500 plus an annual $1,575 maintenance fee, Tominy said.

The second CDPS option includes control over an application end-user environment. This version only contains end-user-oriented utilities that directly and tutorially support the application use. That package costs $5,000 with a $750 annual maintenance fee, according to the vendor.

Tominy has priced CDPS hardware and software features separately. An RJE workstation costs $1,500 plus a $300 annual maintenance fee, and an on-line query/report writer costs $5,000 with a $750 annual maintenance fee. Tape support costs $750 plus $125/year for maintenance.

In addition, a revised users' guide for CDPS is available for $60, Tominy said from 4152 Crossgate Drive, Cincinnati, Ohio 45236.

TWA Offers Pars II System To Travel Agents

NEW YORK — Trans World Airlines (TWA) has announced a low-cost, multiaccess reservations system designed to extend automation efficiencies to 4,000 to 6,000 travel agencies in the U.S. by July 1981.

Named after TWA's Programmed Airlines Reservations System (Pars), Pars II combines the resources of TWA, which will market and manage the system; the Bell System, which will supply and maintain the desktop Teleprinter 43 user terminal; and Tymshare Travel Management Services, which will supply the local access facilities and multiairline software.

Subscribing travel agents will utilize an automatic telephone dialer that activates the terminal, gains access to Pars and receives immediate answers to queries on the Teleprinter 43 printout.

The system can be utilized for a base fee of $150/mo for a single-unit installation. TWA is headquartered at 605 Third Ave., New York, N.Y. 10158.

Correction

SMC-Proprietary Systems' Idol data base management system for the IBM Series/1 minicomputer [CW, June 23] carries a license fee of $3,500, not $25,000.

Cobol Generation Package Runs on Prime, DG Gear

PITTSBURGH, Pa. — Phoenix Systems, Inc. is now shipping an on-line Cobol program generation package for all Prime Computer, Inc. systems and for Data General Corp. CS series and commercial Eclipse systems.

Called System-80, the package works off key words in a data dictionary to produce Ansi-74 Cobol code. The code will perform any necessary program functions, the vendor said. The package is said to be able to convert most programs to Cobol in less than four hours.

Phoenix claimed users who have never written a Cobol program can sit down and use System-80. The package cuts the need for flowcharting and allows lower level programmers to do high-level programming, easing the hiring crunch for highly skilled programmers, a spokesman said.

Host systems must already have a Cobol compiler. The package costs $19,500 from Phoenix, whose address is P.O. Box 7849, Pittsburgh, Pa. 15215.

Nationwide Service Gives Credit Card Authorization

ATLANTA — A nationwide electronic authorization service for credit cards and checks has been introduced by National Data Corp. (NDC).

Reportedly providing state-of-the-art technology in point-of-sale terminal-based services, the National Electronic Transaction Service (Nets) uses Western Electric Co.'s Transaction II telephone/terminal in its shared system.

Nets will allow any bank or merchant to access the system to obtain authorization on Master Card, Visa, American Express, Diners Club and Carte Blanche credit cards, according to NDC.

In addition, Nets will house the Master Card "Restricted Card List" and Visa "Card Recovery Bulletin," a spokesman said.

Maintained by the Bell System, the Transaction II terminal, when used by merchants, will accept credit card data from magnetic stripes or manually when required. A Transaction II terminal costs $32- to $42/mo, "depending on what part of the country you're in," he added.

NDC is located at One National Data Plaza, Atlanta, Ga. 30329.

RPG-II Added To NCSS Service

WILTON, Conn. — National CSS, Inc. (NCSS) is now offering the ability to write and use programs in the RPG-II programming language on its remote computer service.

RPG-II is the primary programming language used by customers of the IBM General Systems Division.

NCSS is headquartered at 187 Danbury Road, Wilton, Conn. 06850.

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Package Fits SNA

Software Links IBM and DEC Processors

By Brad Schultz

CW Staff

LONDON – U.S. network users can now obtain a software package that makes IBM host mainframes view Digital Equipment Corp. resources as IBM's own, allowing direct communications between IBM and DEC processors while fitting the Systems Network Architecture (SNA).

The XN11 package emulates a major portion of the Network Control Program (NCP) facilities contained by the IBM 370x controller and gives DEC hardware access to various IBM host services under the Virtual Telecommunications Access Method (Vtam).

XN11 was jointly developed by London-based Scicon Consultancy International, Ltd. and the UK Atomic Energy Authority. It already runs at the latter's Atomic Energy Research Establishment in Harwell, Oxfordshire, England, and is marketed by Scicon – a British Petroleum Co. subsidiary – to U.S. customers through a representative in San Francisco.

By mimicking a 370x, the XN11 package can support up to eight cluster controllers, each with up to 32 IBM-type terminals – equivalents of the 3270, 3767 and 3770 lines.

The software runs on a DEC PDP-11 under RSX-11M or a compatible real-time operating system and consists of two main modules: driver software for DEC's DX11 interface, which forms a direct link between the PDP-11 Unibus and an IBM channel; and a network interface that constitutes a gateway between DEC-based and SNA network structures.

An XN11 module, the Transport Station Interface (TSI), is necessary for network communications. At Harwell, the TSI supports a private packet-switched network

(Continued on Page 52)

The XN11 software package from Scicon Consultancy International, Ltd. supports communications between the Digital Equipment Corp. PDP-11 minicomputer shown in the foreground above and an IBM 370/136 mainframe, just behind it.

Terminal for Formation 4000 Competes With IBM 3277-2

MOUNT LAUREL, N.J. – Formation, Inc. has introduced a CRT terminal for its IBM 370-emulating Model 4000 minicomputer that competes with IBM's 3277-2 terminal and offers several features it said are optional or not available on the IBM unit.

Like IBM's terminal, the Formation F4277 provides the user with an enhanced CRT coupled with high-speed interactive computer communications. However, the latter version has a 64- or 90-character Ebcdic character set, an audible alarm, a keyboard numeric lock and an Ebcdic typewriter keyboard with 95 keys, a spokesman said.

The F4277 incorporates a self-diagnostic testing system to maintain computer-to-terminal communications. The test system functions at power-on or whenever an initiating sequence is received, the spokesman continued.

Formation's terminal has a 15-in. diagonal screen with a capacity of 1,920 characters in 24 lines of 80 characters each. Other features include single-stroke function keys, highlighting and cursor positioning control.

The F4277 costs $2,400, which includes an optional terminal stand.

Deliveries of the unit are scheduled for August, the spokesman stated from 823 East Gate Drive, Mount Laurel, N.J. 08057.

Codex Cuts Modem Prices

By a CW Staff Writer

MANSFIELD, Mass. – Codex Corp. has cut modem prices by up to 20%; reduced modem lease rates by an average of 5% to 10%; and will buttress those actions with substantial volume discounts, according to a spokeswoman.

Despite the inflationary pressures that a number of vendors have blamed for recent price hikes, Codex said its new pricing results from increased volume production. Taking effect July 7, the price adjustments lower the tag for the vendor's LSI 48 modem from $4,325 to $3,500, a 19% drop, and allow an LSI 96 modem to go for $6,800 instead of $8,500, a 20% drop, the spokeswoman said.

As for leasing, a one-year plan for the Motorola, Inc. subsidiary's LSI 48 Fast Poll modem is now set at $110/mo, an 8% cut from $120/mo. And the LSI 96 Fast Poll modem is offered for one year at $175/mo, down from $220/mo.

Codex has also introduced a "Systems Plan" that permits "discounts for customers who make major purchases across the company's multiple product lines." Codex is located at 20 Cabot Blvd., Mansfield, Mass. 02048.

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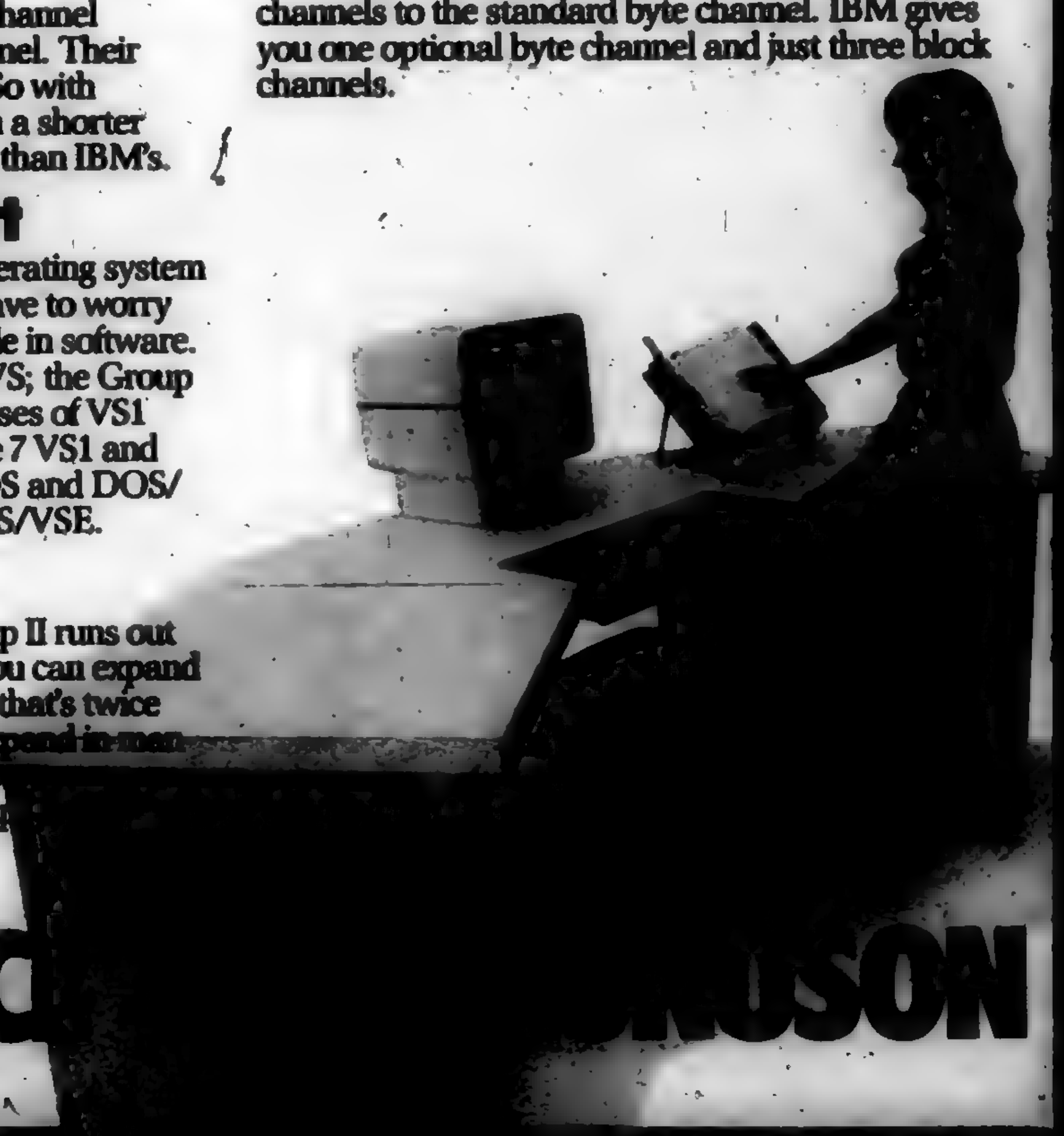

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DIFFERENCE

Unit Eliminates Modems

NORWALK, Conn. — The ME-31 introduced by Datacomm Management Sciences, Inc. allows interconnection of data terminal equipment without modems in applications such as IBM's Teleprocessing Network Simulation (TPNS) program.

The modem eliminator regenerates data and clock interface signals so that 50-ft interface cable may be used at each RS-232 terminal interface.

In synchronous applications, the ME-31 generates send-and-receive clock signals used by both terminals. Operable at strap-receive rates of 1,200-, 2,400-, 4,800-, 9,600- and 19.2K bit/sec, the ME-31 costs $315 from the firm at 181 Main St., Norwalk, Conn. 06851.

Offers Multiple-Page Memory

CRT Terminal Emulates VT-100s

SUNNYVALE, Calif. — A CRT terminal reportedly capable of emulating Digital Equipment Corp.'s VT-100 terminals but offering features not found in them has been announced by Direct, Inc.

The VP 800/A offers multiple pages of memory, an 80-char. by 24-line or 132-char. by 28-line display with an additional programmable status line, bidirectional smooth scroll at two scrolling rates, split screen, double-high and/or double-wide characters and a detachable keyboard.

Options include up to 32K of memory, a buffered printer port and a word processing package allowing the user proportional spacing, the ability to create and download original character sets and the ability to store and display dual character sets within the terminal.

Prices start at $2,250 for the basic VP 800/A with 8K of memory. Direct is located at 1279 Lawrence Station Road, Sunnyvale, Calif. 94086.

IBM Users Gain Link

(Continued from Page 49)

called Hans, which employs Decnet line control protocols. Other TSI versions support the X.25 and other protocols.

The Harwell facility's IBM 3033 runs both IBM's Time Sharing Option and Virtual Storage Personal Computing systems.

Three PDP-11s support the atomic research laboratory's 192 terminals under an architecture similar to Decnet but featuring multinode routing, a Scicon spokesman said.

XN11 joins Scicon's line of "host interface packages," which also includes an emulator for the PDP-11 that directly connects to an IBM channel and appears to the IBM host as a magnetic tape control unit.

An XN11 license costs $53,500, including full support. A license without support privileges, or multiple copies of XN11, cost less, the spokesman said.

In the U.S., Scicon's representative is Noel Isaac at 255 California St., San Francisco, Calif. 94111.

Scicon's headquarters are at the Sanderson House, 49 Berners St., London WIP 4AQ, England.

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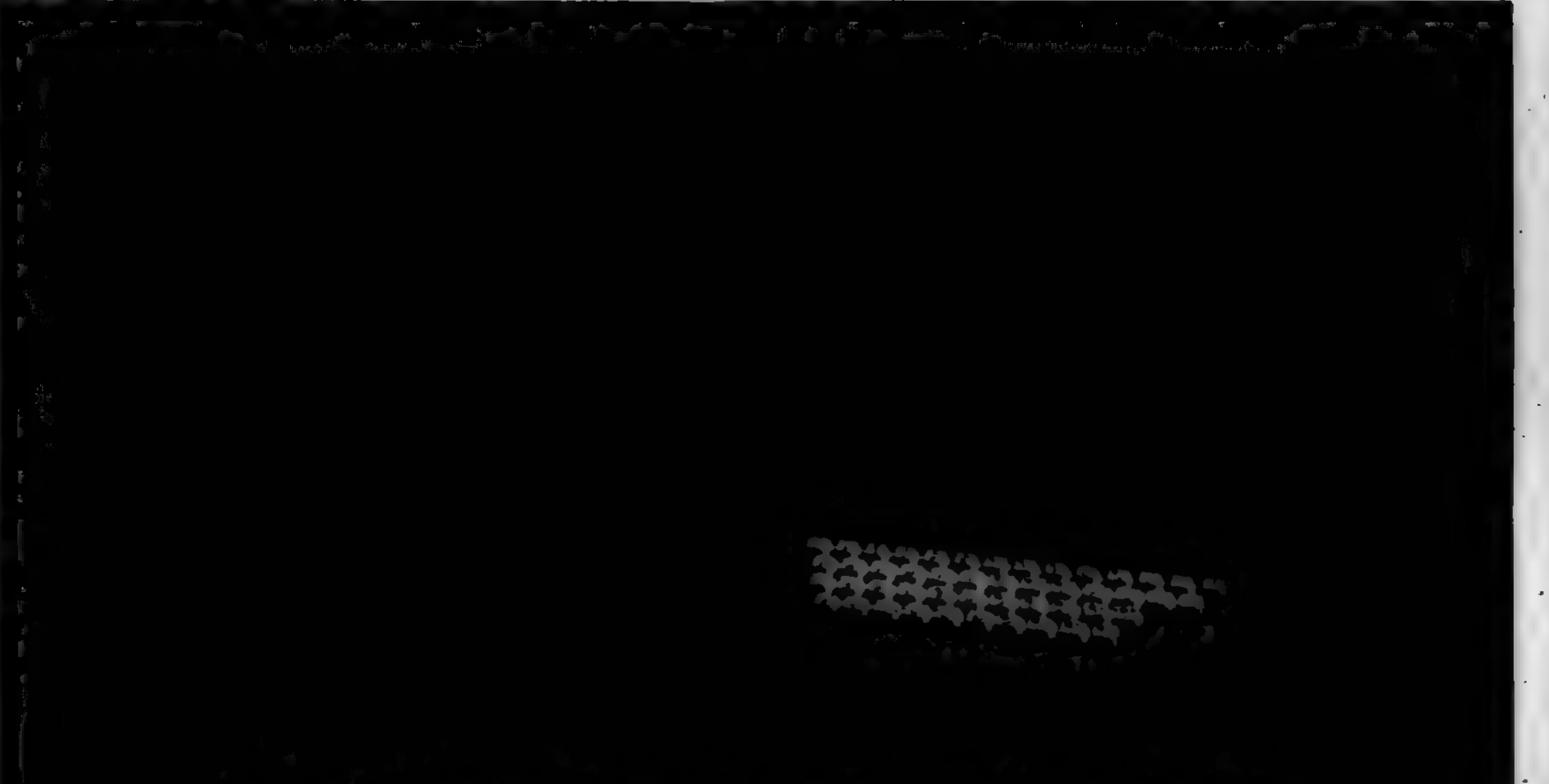

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Modem Suited To Home, Office

MIAMI — Lexicon Corp. has introduced the LEX-11, an acoustically coupled modem than can be used with a home or office terminal.

A battery-power option allows the modem to be used with hand-held terminals that communicate with a CPU from a public telephone.

The LEX-11 can handle up to 300 bit/sec transmission in full- or half-duplex mode, which is switch-selectable. The modem was designed for use in remote computing environments, for electronic mail networks and word processing applications.

The LEX-11 costs $175 or $100 for quantities of 10 or more. Lexicon is at 8355 Executive Center Drive, Miami, Fla. 33166.

Terminal Sends Voice and Data

TORONTO, Ont. — Bell-Northern Research, Ltd. has developed a prototype voice and data terminal for use over voice-grade lines.

The terminal, which has a handset CRT and a keyboard, transmits voice and data simultaneously. It does not require a special RS-232 interface and will probably be priced about $900 less than comparable terminals, according to the "Telecom Market Letter," a semimonthly newsletter published by Northern Business Intelligence.

Release of the prototype product could cut the cost of data entry because the terminal uses existing telephone wiring, the newsletter said.

For Q-Bus, Unibus

Interfaces Fit DEC CPUs

ORANGE, Calif. — A communications interface for Digital Equipment Corp. Q-bus computers and one for DEC Unibus CPUs have been announced by MDB Systems, Inc. Both are DEC DUP-11-compatible.

The first interface reportedly makes the "big-system" protocol handling, error checking and other capabilities of DUP-11 — previously applied only to Unibus computers — available to the low-cost-system user.

Both synchronous, single-line communications interfaces are functionally equivalent to and software compatible with the DEC DUP-11, providing parallel-to-serial and serial-to-parallel data conversion, EIA-level conversion, modem control for full- and half-duplex operation, protocol management and bus interface.

With data rates to 500K bit/sec, the MDB interfaces will accommodate a variety of protocols including IBM's Synchronous Data Link Control, the Advanced Data Communications Control Procedure and High-Level Data Link Control.

The Q-Bus model costs $950 while the Unibus model costs $1,200. Both are available from MDB Systems, 1995 N. Batavia St., Orange, Calif. 92665.

Options Added To Tally Printer

KENT, Wash. — Options for the 300 line/min. Tally T-3000 printer, including a host-defined downstream font selection and an asynchronous communications adapter, are being offered by Mannesmann Tally Corp.

The host-defined font option allows the user to load different character fonts downstream from a computer or other host file and also allows the user to define his own character sets and change them on command, the vendor said.

Tally's Adapter option allows on-line printing of transmitted data and can achieve full-speed 300 line/min. operation at 4,800 bit/sec, the firm said. The adapter is available in three different data communication protocols, and data transfer speeds are 1,200-, 2,400-, 4,800-, 9,600- or 19.2K bit/sec.

A 1K buffer is standard and a 4K buffer is optional.

Data transfer to the T-3000 is bit serial, character asynchronous via an RS-232 or a 20/60 mA current loop interface.

The host-defined font selection option costs $225 and the asynchronous communications adapter costs $595 from the vendor at 8301 S. 180, Kent, Wash. 98031.

Data Terminal Ruggedized

GRANDVIEW, Mo. — A ruggedized version of Computerwise, Inc.'s Transactor data terminal intended for vertical mounting in harsh environments such as a factory floor and plant areas is now available.

The RT-1 data terminal includes a single-line 37-character gas discharge display and a 32-key clustered keyboard. Each key of the keyboard is individually sealed with a neoprene membrane for moisture and dirt resistance, the firm said.

The RT-1 communicates via RS-232 serial asynchronous Ascii coding for direct connection to a local computer or to a modem for remote computing. Internal switches allow selection of the operating mode, which includes 110- to 9,600 bit/sec data rates, full- or half-duplex, even/odd/no parity and one/two stop bits.

The standard unit operates in a TTY-compatible mode. However, optional capability exists to operate in a polled multidropped mode, the firm said. The RT-1 costs $1,050 from Computerwise at 4006 E. 137 Terrace, Grandview, Mo. 64030.

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Mapping Feature, Switch Also Debut

STC Adds 3350-Type Drive, Controller

LOUISVILLE, Colo. — Storage Technology Corp. (STC) expanded its family of IBM plug-compatible peripherals with the announcement of a 3350-compatible disk control unit and a fixed disk drive that is said to require no software migration for the current 3350 user. The company also introduced a multiple-format mapping feature for its 8650 drive and a media interchange switch for its 8350, 8650 and new 8360 users.

The Model 8360 disk drive is hardware- and software-compatible with IBM 370/135 CPUs and above. Two models are available, the A2 and B2.

The first drive is a two-spindle unit with a storage capacity of 317.5M byte/spindle and attaches to STC 8000-2, 8000-4 or 8880 control units. A maximum of three 317.5M-byte B2 units can be attached to an A2, according to the company.

Both models have a reported average access time of 18 msec (28% faster than that of "competitive equipment," according to the company), a data transfer rate of 1.198M byte/sec and an average latency time of 8.3 msec.

A dual port feature that allows spindles to be switched between 8000-2 control units or between directors of 8000-4 or 8880 units is standard on the 8360 drive, STC noted.

Additional fixed storage of 1.14M byte/spindle is offered for both models as an option and a string switch (mutually exclusive with dual port) that permits strings of 8360s to be switched between 8000-2 control units or directors of 8000-4s or 8880s is optionally available on the A2 model, the company said.

Control Unit

The 8880 control unit announced at the same time can attach to IBM's 4300 series, 370/145 through 370/168 and 30 series processors. IBM 3350 drives and STC 8350, 8650 and 8360 units are compatible with the 8880 and configurations include one-, two-, four- and eight-channel interface switching and 64-spindle contiguous addressing, according to the vendor.

The 8880-12 contains two independent storage directors while the 8880-14 contains four, STC said.

The units were designed with the component isolation packaging philosophy, the company said, with each director having a dedicated power supply and all director functions isolated from other directors. Each one is controlled by a dedicated microprocessor with a reported 220-nsec microinstruction execution time.

The multiple-format mapping feature, which is being offered to 8650 customers at no charge, provides them with two data mapping techniques — standard cylinder interleave or a back-to-back method — for migrating data sets to a larger file, a spokesman said.

Cylinder interleave mapping is best for "the majority of applications," according to the company, for placing data on disk so that high-activity data sets are close together which can reduce the seek time for this data.

STC's media interchange switch is said to allow five drive functions to be switched between head/disk assemblies (HDA) in a single box and offers what the vendor described as "the increased flexibility of portable media disk drives" to its 8350, 8360 and 8650 users.

Two-year lease rates on the 8360 drives begin at $1,200/mo for an A2 and $941/mo for a B2. Monthly rates for the control unit start at $1,313, and the media interchange switch is available for a two-year lease price of $75/mo.

Volume customer shipments of the drives will begin in the second quarter of 1981, STC said, and the first customer shipment of the control unit is expected during the fourth quarter of 1980.

The multiple-format mapping feature and media interchange switch will be available in September and October 1980, respectively, from STC at 2270 S. 88th St., Louisville, Colo. 80027.

Trilog Colorplot C-144

Printer Doubles As Color Plotter

IRVINE, Calif. — A combination black-and-white printer/multicolor plotter, the Colorplot C-144, is available from Trilog, Inc. Its cost per copy is one-tenth that of photographic techniques, the company claimed.

No operator intervention is required to make a copy, a spokesman noted. The C-144 makes multicolor hard copies for Chromatics CG series terminals on plain fanfold paper.

In the print mode, the Colorplot C-144 operates at 190 line/min with a 96 upper/lower case character set. In the multicolor mode, hard copies are made with the Trilog Tricolor ribbon and bidirectional paper drive system.

The printer/plotter users raster scan impact technology with a resolution of 100 dot/in. horizontally and 144 dot/in. vertically. It costs $10,700, Trilog said from 17391 Murphy Ave., Irvine, Calif. 92714.

Univac Unwraps 1100/80 CPU For Scientific Applications

BLUE BELL, Pa. — A general-purpose, large-scale system for scientific and engineering applications has been announced by Univac. The 1100/80 S, based on the Series 1100 architecture and software, incorporates a Scientific Accelerator Module, a high-speed LSI bipolar gate array device.

Also announced was a memory expansion feature for the current four-million-word 1100/80 systems. With this feature, memory can be added in two-million-word increments up to a maximum of eight million words of 32 million bytes.

"Performance of the current entry-level 1100/80 system has been increased by at least 25% with the 1100/80 S," according to a spokesman. The basic 1100/80 S includes a central processing complex with the Scientific Accelerator Module, 524K words of main storage, 4K words of buffer storage and one Input/Output Unit (IOU).

Field-installable features are available that reportedly allow a fourfold growth in performance. First, main storage that can be expanded to 1M word is available on the 1100/80 S; second, additional main storage is available with the expansion of the buffer.

The 1100/80 S uses 36-bit, single-precision floating-point representation. Many scientific problems can be solved with sufficient accuracy in single-precision mode, while a 32-bit machine requires double-precision arithmetic, the spokesman said.

The hardware and software for the 1100/80 S are separately priced. The lease price for the basic 1100/80 S is $22,041 including maintenance on a six-year basis. The purchase price for the basic system is $1,447,690.

First customer deliveries are scheduled for the fourth quarter. Univac can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Technique Cuts Signal Dropouts

DENVER — A technique that is claimed to significantly reduce both the signal dropouts on magnetic tape used in high-density digital data recording (HDDR) and the bit errors that are the result of such dropouts has been developed by Honeywell's Test Instruments Division (TID).

The technique was developed as a result of a study called "Characterization of Instrumentation Tape Signal Dropouts", by Leighton Meeks, TID project manager for high-density digital tape systems.

Although the method has not been utilized on any of the vendor's current HDDR equipment, a company spokesman speculated that the technique might be used in a future Honeywell product.

The study's findings open the door to more accurate and more efficient high-density data transmission and storage, according to Meeks. Until recently, he said, a lack of published data made it difficult to select an appropriate strategy for error detection and correction on HDDR equipment.

Satellite Transmissions

Meeks became interested in the problem of signal dropout while studying the use of HDDR to store satellite data transmissions. A satellite may dump data at a speed of 85M bit/sec, but the ground computer may not be able to accept more than .5M bit/sec. To deal with this mismatch, the serially transmitted signal from the satellite is divided into multiple parallel data streams and recorded on

(Continued on Page 58)

Three Line Printers Join Decision Data 6600 Series

HORSHAM, Pa. — Three IBM-compatible line printers have been announced by Decision Data Computer Corp. The three have been added to the 6600 series and include the 6665 (650 line/min), the 6680 (800 line/min) and the 6610 (1,000 line/min).

Features being offered to IBM users for the first time include field upgradability and system interchangeability, the vendor said, and the printers can be equipped with RS-232C for interfacing with a variety of minis.

The three new models, 6665, 6680 and 6610, are priced at $16,000, $18,500 and $20,300 respectively, the vendor said from 100 Witmer Road, Horsham, Pa. 19044.

OCR Unit Reads Courier

BURLINGTON, Mass. — An optical character recognition (OCR) page reader capable of scanning eight different variations of Courier, said to be the most commonly used single-element typeface in the U.S., has been unveiled by Burroughs Corp.'s Office Automation Division.

The Model 1220 scans text prepared on an ordinary 10-pitch typewriter or printer at speeds up to about 3,000 word/min. The system can handle up to 180 pages of draft text per hour, with typically less than one error made for every four to six pages of copy read, a spokesman claimed.

The reader scans typewritten copy and converts text into digital codes. The codes are then recorded on word processor-compatible magnetic media or transmitted to an on-line text-editing system, he explained. Modems can be used with the system to interface the reader to remote processing equipment over ordinary telephone lines.

The 1220 is compatible with most stand-alone, cluster or shared word processors and can be equipped with circuits to interface with more than one manufacturer's equipment at the same site, the spokesman stated.

The OCR reader utilizes a stack loader that handles up to 50 typewritten pages at a time and accepts paper up to 14-in. long.

Finally, the formatting capability of the reader automatically recognizes indents or vertical space as new paragraph criteria; it also recognizes tabular material, placing tab codes between columns. The unit can reportedly be programmed to recognize different text rules from the word processor or typed header sheets.

The 1220 sells for "less than $20,000" from the firm's Office Automation Division, 9 Ray Ave., Burlington, Mass. 01803.

Disk Drive Holds 160M Bytes

SUNNYVALE, Calif. — A self-contained random-access mass storage unit that holds more than 160M bytes on a removable disk pack has been introduced by Ball Computer Products, Inc.

The BD-160 is interface-compatible with Control Data Corp. Trident models and storage module device-type units, making it compatible with almost any mainframe, the firm said. Maximum access time averages 30 msec; between two adjacent tracks, 5 msec; and across the maximum number of tracks, 55 msec.

The BD-160 comes in a rack-mounted or pedestal-based enclosure and costs $11,000, the vendor said from 860 E. Arques Ave., Sunnyvale, Calif. 94086.

Ball BD-160 Disk Drive

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Guide Addresses Project Control

VANCOUVER, B.C. – A manual for systems managers and consultants that presents a step-by-step guide for turnkey or distributed systems projects has been released by Augur Data Planning, Inc.

"Practical Projects: A Standard Model for Systems Development and Project Control" offers a model consisting of nine phases, each of which is subdivided into several specific tasks and activities. Each phase has specified "deliverables" and client checkpoints to facilitate control of project cost and progress.

The manual is available for $19.50 from Augur Data Planning, 1401 W. Broadway, Vancouver, B.C., V6H 1H6, Canada.

Data Entry Unit Reads Bar Codes

TELFORD, Pa. – A data entry terminal with bar code reading capabilities, internal memory, multiplexing and daisy-chain interconnection to existing systems is available from Accusort Systems, Inc.

In addition to two serial transmit/-receive ports, the Model 4610 also provides 24 parallel lines to meet special user needs, the vendor said, adding available enhancements include an alphanumeric display, numeric keypad and alphanumeric keyboard.

The price of the unit is $1,200, the vendor said from 511 Schoolhouse Road, Telford, Pa. 18969.

Signal Dropouts Reduced

(Continued from Page 55)

tapes where the rates per track can range from 50K bit/sec to more than 5M bit/sec, he explained.

Because of the large quantities of data involved, recording tape quality and signal dropouts are critical to the performance of the entire system, he said.

The tape signal dropout intervals are mainly caused by oxide coating flaws, and these dropouts have a high correlation to HDDR bit error rates, according to Meeks.

TID developed a test in which a dropout was defined as an interval of 1 microsec or longer and where the reproduced peak-to-peak signal fell 10 db or more below the normal full signal strength.

For purposes of this test, Meeks considered the signal recovered if it reached a level 8 db below normal signal strength. This range was found experimentally to yield consistent results.

By examining and correlating such variables as head type, tape type, tape speed, track number, frequency of test signal and maximum and minimum length dropouts, Meeks determined that dropouts tend to be isolated and widely separated events that are randomly distributed along the tape length.

Dropout lengths were found to exhibit a logarithmically decaying frequency as they increased. Meeks also found that tape edge tracks showed a much higher dropout frequency than middle tracks but that the overall range of dropout length was about the same for the same tape types.

A significant finding, he said, was that if parallel data tracks were separated across the tape wider than the maximum flaw length – about 40 millimeters for iron oxide-coated tapes – there was little likelihood of simultaneous track dropouts.

Error Detection

Meeks was able to devise several strategies for the solution of the problem of error detection and correction in high-density digital recording systems based on his findings.

One approach was an independent track error correction system. In order to overcome flaw-induced track error bursts, long block error correcting codes can be used in conjunction with time-spreading (interleaving) logic.

The advantage of this approach is that the error-correction encoding and decoding logic can be placed at any convenient location in the track data logic. The disadvantage is the cost and complexity of interleaving and deinterleaving logic required for each track.

A more satisfactory solution was the use of a multiple-track correction system, Meeks said. This approach requires very little additional electronics over and above the deskew electronics already available in the HDDR system.

As a result of this work, Honeywell has developed a proprietary method that uses a signal dropout detector on the reproduce side to replace the check word method. This has the advantage of reducing the memory buffer size, the company said.

Copies of Meeks' paper are available from the Marketing Communications Department, M.S. 218, Honeywell TID, P.O. Box 5227, Denver, Colo. 80217.

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The Fast Track Model 675

Processor Competes With IBM 5120

LOS ANGELES – Compucorp has unveiled an information processor it claims offers more capability and is less expensive than the IBM 5120.

The processor, known as the Fast Track Model 675, provides users with more than 2.6 million characters of diskette storage in a desktop configuration, the vendor said. The standard model employs two disks, but a four-disk version is available.

Comparing the 675 with the IBM 5120, the vendor said the 675 has a 12-in. video display with a capacity of 20 lines, each with 80 oversized characters, while the 5120 has a smaller 9-in. display with a 16-line capacity.

The 675 also has a built-in asynchronous/-synchronous RS-232C communications interface, an additional cost option on the 5120, according to Compucorp.

The 675-2/20 (Fast Track) with a 64K-byte processor, two built-in diskette drives, an RS-232 interface, 80 by 20 video display and full keyboard sells for $9,150, while the 675-4/20 (Fast Track 2+2), consisting of all of the above plus two more diskettes, sells for $11,500. Compucorp is at 1901 S. Bundy Drive, Los Angeles, Calif. 90025.

DEC Expands Laboratory Family

MARLBORO, Mass. – Digital Equipment Corp.'s Laboratory Data Products (LDP) group has added three high-end members to its Minc family of laboratory systems that reportedly increase the power available to researchers in low-cost environments.

Designed to replace the Declab-11/MNC system, the Minc/Declab23 configurations reportedly have twice the processor speed and four times the memory capacity of the older system, according to the firm.

The Minc-23, Minc/Declab23-RT and Minc/Declab23-RSX all incorporate DEC's PDP-11/23 processor for greater capacity and performance than the entry-level Minc systems, according to a company spokesman.

The Minc-23 and Minc/Declab23-RT systems employ Minc modules that enable researchers to configure optimum system elements for specific data acquisition and control applications, the spokesman said.

The minimum configuration for a Minc-23 includes a PDP-11/23 processor, Minc box, VT105 terminal and dual 512K-byte diskette drives. For the Minc/Declab23 configurations, minimum equipment includes a PDP-11/23, a 10M-byte hard disk, a VT105 terminal and a Minc box mounted on a 30-in. cabinet. Prices for the Minc-23, Minc/Declab23-RT and Minc/Declab23-RSX systems start at $15,600, $23,300 and $30,300, respectively. First shipments of all three systems are scheduled for December.

The LDP group is located at One Iron Way, MR2-3/M16, Marlboro, Mass. 02152.

PDP-11-Based System Backs up to Sixty Terminals

SUNNYVALE, Calif. – A minicomputer-based business system that allows up to 60 users to communicate with a central data file through microcomputer-driven terminals has been introduced by Data Node, Inc.

The Data Node I network system features a Digital Equipment Corp. PDP-11/70 processor supported by a high-speed cache memory and a series of DEC VT 100 terminals outfitted with 64K-byte Z80A microprocessors. The multiterminal system is the California firm's first computer offering and was designed to compete, in certain vertical markets, with such minicomputer heavyweights as DEC's PDP-11/70, Hewlett-Packard Co.'s HP 3000 and Data General Corp.'s Eclipse machines, a spokesman said.

Basically, the Data Node I is geared to eliminate system bottlenecking by using the PDP-11/34 processor as a central data handling node and the converted VT 100 intelligent node terminals (INT/200) as local data processing machines. The central node software on the 11/34 is named Node Central and runs in conjunction with DEC's RSTS/-E or Data Systems 500 operating system. The processor's software downloads jobs to the INT/200 stations and performs all the data management functions requested by programs resident in the terminals, the spokesman stated.

By off-loading data entry and inquiry computational chores, the average applications data I/O buffering in the PDP-11/34 processor takes up about 2K words, reportedly an 8:1 advantage over traditional multiterminal minicomputer systems.

INT/200 Terminals

The INT/200 terminals feature extended Basic as a primary language, with built-in Node Protocol and screen handling verbs. However, any microcomputer allowing assembly language subroutines could be software-modified to act as network terminals, the spokesman pointed out. The standard multiterminal system consists of the central PDP-11/34-based processor, cache memory, 256K bytes of main memory, a 16-line microprocessor-controlled multiplexer, two 80M-byte Winchester disk drives and controller, a 45 in./sec 800- or 1,600 bit/in. magnetic tape drive and controller, four INT/200 terminals and a 300 line/min printer.

The system costs $98,850, which includes perpetual single-use licenses for Node Central, INT/200 Basic and RSTS/E. Additional terminals are priced at $3,850 each.

Designed for PDP-11/34, 11/44 and 11/70 systems, the kit costs $325/mo for the Node Central software and support and $1,850 per terminal for the INT/200 conversion board and Basic language license.

The Data Node I will be available this September, but only to West Coast end users during the first year of sales. Data Node is located at 432 Toyama Drive, Sunnyvale, Calif. 94086.

Shared Resource Office System Offered by Exxon Subsidiary

FORHAM PARK, N.J. – A shared resource office system that is said to allow users to concurrently access disk drives, printers and other peripheral devices has been announced by Vydec, a subsidiary of Exxon Information Systems.

Vydec's Netword System consists of a microprocessor-based system controller or CPU; the firm's 1400, 1800, 2000 and 4000 series workstations; and Exxon's QYX intelligent typewriter.

The controller can be attached to other word or data processing systems and handle teletypewriter-compatible equipment via an asynchronous Ascii communications interface, a spokesman explained.

The Netword announcement was described by Vydec as another step by Exxon to further integrate its product line

Two Controller Models

The Netword system controller is available in two models: the S-100, which was designed for small systems and offers up to 20M characters of hard disk storage; and the S-200, which uses a 15-in. hard disk for a 75M-character maximum storage capacity. Both units have a 16-bit architecture and a 20-bit-wide address capability, which results in more than 1M bytes of directly addressable memory, the spokesman said.

Netword's operating system software has a virtual addressing capability of up to 16M bytes of disk-based memory. Designed for upgrading and maintenance, the operating system is modular and written in Pascal, he added.

The S-200 controller costs from $20,000 to $30,000 and is scheduled for delivery in the first quarter of 1981. The S-100 costs from $10,500 to $24,000 and will be delivered in the second quarter of next year. Both of the controller's prices are based on memory and storage requirements. Vydec is at 9 Vreeland Road, Forham Park, N.J. 07932.

Have You a Story On Minis?

Look! In the office! Is it a bird? Is it a plane? Is it an electric pencil sharpener? No, more than likely it's one of the small business computers that are fast becoming as commonplace as typewriters or telephones in the office environment.

But, how do these electronic marvels differ from their parent, the minicomputer? And in what ways are these mild-mannered machines as resourceful as conventional mainframes?

Computerworld would like to have your input on minicomputers and the small business computer boom for a Special Report that will appear in August. If you are an end user with a particularly interesting story to tell concerning your positive or negative experience in selecting or using a business minicomputer system, or if you are a vendor that happens to be in an advising mood, drop us a line. We would appreciate about four or five double-spaced typewritten pages detailing your story, along with any number of charts or graphs to enhance your tale.

The deadline for submissions is July 21. Manuscripts should be sent to Tim Scannell, Minicomputer Special Report/ CW Communications, Inc., 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Intelligent Control Unit Debuts

SAN JOSE, Calif. — Data Management Labs, Inc. has announced the Intelligent Storage Control Unit 4000 (ISC 4000), a microprocessor-controlled multidevice storage control unit for small systems. The system simultaneously supports up to four fixed disks and four backup devices such as industry-standard flexible disks and high-density cartridge tapes, its vendor said.

The feature of universally attaching to a wide range of microcomputers and minicomputers and drive types without control unit replacement is the result of proprietary microprogramming design and controller architecture, which the company termed "device string adapters." Data can be processed at any rate up to 2.5 million byte/sec.

The ISC 4000 currently supports up to four Shugart Associates SA 4004/-4008 fixed disks and up to four Shugart SA 800/850 flexible disks or DEI tape drives.

The ISC 4000 costs $1,850; OEM discounts are available. Data Management Labs is at 2140 Bering Drive, San José, Calif. 95131.

LSI-11 Systems Packaged

NATICK, Mass. — Digital Equipment Corp. LSI-11/2 and LSI-11/23 microcomputers with 32K to 128K words of MOS memory and fully compatible DEC software are now available as packaged systems from Charles River Data Systems, Inc. (CRDS).

A typical system consists of an LSI-11/23 processor with 64K words of MOS memory, dual-floppy disk system, one DLV-11J quad serial interface and 8-quad slot backplane, plus a 21M-byte Winchester disk drive.

The software provided as part of the package gives users the choice of RT-11, RSX-11 or Unix (U/V6), the vendor said. This system costs $15,755. Each component is also available as a stand-alone peripheral, the firm noted from 4 Tech Circle, Natick, Mass. 01760.

Business System Tracks Costs

MARLBORO, Mass. — Digital Concepts, Inc. has unveiled a microcomputer-based turnkey business system that keeps track of labor, materials, machine time and overhead costs for contractors, subcontractors and product manufacturers.

The Job Cost and Estimating Computer was designed to store all labor, material and contracting data and produce a variety of in-house and client reports. The system allows the user to analyze costs by employee, function, department and supplier, a spokesman stated.

The job accounting system is based on Digital Equipment Corp.'s LSI-11/2 or LSI-11/23 microcomputers and offers 64K or 128K bytes of memory, respectively. The package also has 1.2M bytes of dual-density floppy diskette storage, a 100 line/min printer, CRT and detachable keyboard.

The system costs $17,850 including delivery, installation and a training manual with cassette tapes. Additional information or a system demonstration is available from the firm at 45 Maple St., Marlboro, Mass. 01752.

MPU Features Modular Design

HUNTSVILLE, Ala. — The Dacs 5000 microcomputer featuring modular design and intended for industrial and scientific applications has been introduced by Cybersystems, Inc.

The Dacs 5000 consists of Cyberbus, featuring a 16-bit data bus, direct-memory access (DMA), vectored interrupt, memory mapped I/O, low cross talk and high noise resistance. Fifty-four off-the-shelf plug-in cards for CPU, timing, memory, digital I/O, analog I/O and communications are offered. The 6502, 6802, 6809, Z80 and 8085 microprocessors are or soon will be offered as CPUs, the vendor said.

Two packaged units, the 5100 and 5300 Development Systems, have also been introduced. Both contain a complete Dacs 5000 with slide-mounted chassis, 18 card slots, plug-in power supply and diagnostic front panel.

Basic Dacs 5000 systems feature CPU, 2K bytes of erasable programmable read-only memory, 32K bytes of random-access memory and interfaces to all system peripherals.

The Dacs 5000 ranges in price from $1,200 for a basic development unit to $9,500 for the 5100 Development System with printer, CRT, programmer and dual double-sided 8-in. floppy disks. The vendor is at 8300 Whitesburg Drive, Huntsville, Ala. 35802.

Whether, When and How.

A look at Distributed Data Processing in our July 28th Special Report.

The ever increasing cost of communication and the availability of better hardware for less is making distributed data processing a cost-efficient alternative, but:

- When does an organization change over to a DDP network?
- How can the change take place economically and with a minimum of disruption to the organization?
- What are the potential drawbacks of having more intelligence and autonomy in the field?
- What kind of security is there for data in a distributed database?

Produced by Computerworld's Editor E. Drake Lundell, Jr. and Systems Editor Rita Shoor, this Special Report will address these questions with tutorials and application stories. Plus, there'll be a discussion of the impact DDP is having today on the internal operations of large organizations.

If you're a user who watches the trends, you'll want to have the most up-to-date information about DDP and you'll find it in our July 28th report. Closing date is July 11th.

And if you're marketing products or services in the DP field, you'll want to make sure your ad is there. Contact your Computerworld salesman, or call Frank Collins at (617) 879-0700.

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IBM-compatible computers explained–by the leader in IBM-compatible computers.

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This fact has allowed manufacturers such as ourselves to provide superior price/performance alternatives to IBM users. As a result, the IBM-compatible segment is now growing twice as fast as the rest of the data processing industry. In fact, last year was a record growth year for the compatible industry, outpacing even IBM.

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Datapoint 1500-Based System Prints Labels, Tags, Forms

PARAMUS, N.J. — A minicomputer-based label, tag and form-printing system for industrial use is now available from Kimball Systems, Inc.

The Variable Imprinting Tag and Label System (Vital), based on a Datapoint Corp. 1500 minicomputer, is said to generate inventory control tags, box labels, product labels and shipping labels.

Designed for use by warehouses and manufacturing facilities, the Vital system will accept almost any existing pinfeed stock including paper, cards, multiple forms, pressure sensitive labels and perforated tags.

The system consists of a 300 line/-min dot matrix printer, the Datapoint minicomputer workstation with 32K bytes of user memory in addition to 4K bytes of read-only memory, and a dual floppy-disk mass storage unit.

Vital allows for the selection of reverse, slanted, expanded and italicized font styles and can print graphics such as logos, illustrations and line drawings, as well as optical character recognition (OCR) characters and bar codes for electronic optical input.

Complete with software, the Vital system costs $20,000 from Kimball at 64 E. Midland Ave., Paramus, N.J. 07652.

Turnkey for Manufacturers Features Exception Reporting

EL SEGUNDO, Calif. — A turnkey system for small to medium-sized manufacturers and distributors has been built around the Texas Instruments, Inc. 990/10 CPU by Mini Data Systems, a systems house here.

The Topic system emphasizes exception reporting and flagging danger points such as low inventories, so plans can be developed to solve problems before they arise, a spokesman said.

The CPU has a main memory of 128K to 2M bytes; disk memory ranges from 10M to 1.6G bytes. The software features the DX/10 timesharing operating system and comes in RPG-II, Fortran, Basic, Cobol and Pascal.

Topic offers 13 packages ranging from material requirements planning to production and inventory control.

The system costs $80,000 to 100,000, depending on user requirements. The system price includes the hardware, appropriate software packages with source decks, installation and training, Mini Data Systems noted from Suite 359, 2041 Rosecrans Ave., El Segundo, Calif. 90245.

CA Offers Mini to OEMs

IRVINE, Calif. — Computer Automation, Inc. has unveiled an OEM minicomputer offering a 50% faster CPU cycle time than its predecessor and firmware enhancements such as pipelined microinstruction, prefetch routines to reduce access time and onboard diagnostics.

Called the LSI 2/40, the mini features performance improvements and memory expansion for existing LSI-2 customers while maintaining full hardware- and software-compatibility with the LSI 2/10 and 2/20, the vendor claimed.

In addition, the recently announced memory management unit, cache memory and ECC memory boards are available for use with the LSI-2 series.

Basic price of the LSI 2/40 begins at $5,650 with 64K bytes of read-only memory. With the memory management unit, cache and 256K bytes of ECC random-access memory, it rises to $11,400, the vendor said from 2181 Dupont Drive, Irvine, Calif. 92713.

Storage System Includes Backup

SUNNYVALE, Calif. — Microcomputer Systems Corp. has unveiled a disk storage system for hard-disk mass storage and floppy-disk backup.

The MSC-8100 system features an intelligent controller/formatter with a universal IEEE-488 bus protocol for integration into any host system, the vendor claimed.

Primary users of the system will include small business systems, particularly word processing applications, and departments in large organizations with expanding information processing needs, a spokesman said.

The system will be sold to both OEMs and end users. It is priced at $9,250 for single-unit purchases, the vendor said from 432 Lakeside Drive, Sunnyvale, Calif. 94086.

Word Processing Data Processing Electronic Message Service Voice and Data Communications Management New Datapoint combines all four capabilities into one integrated system using a common database. And every function is available at each 3800 workstation.

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3. It cuts long-distance telephone bills up to 40 percent. Datapoint's Long Distance Control System reduces long-distance costs by a combination of least-cost routing for all calls, queuing, and call buffering. It even prints out traffic data to give you greater control of costs. And it works with existing PBX or CENTREX exchanges.

4. It sends messages in a flash — essentially for free. Documents can be stored, retrieved, and transmitted automatically from one Datapoint processor to another — across the hall or across the country. By using the excess capacity of your flat-rate voice communications lines during nonpeak hours, the Datapoint Electronic Message System gives your interoffice correspondence a free ride. With EMS you can even downline load file updates and programs to all your remote Datapoint processors.

5. It gives you a unified approach to office integration. With Datapoint's Integrated Electronic Office, anything goes. Enter data. Compute and store. Retrieve and incorporate in text. Transmit messages interleaved with voice. Receive confirmations of messages automatically. And more.

Let us help you apply the power of the Integrated Electronic Office to your organization now. Call (512) 699-7151 for the number of the nearest Datapoint office. Or write: Datapoint, Corporate Communications, CW-K05, 9725 Datapoint Drive, San Antonio, TX 78284.

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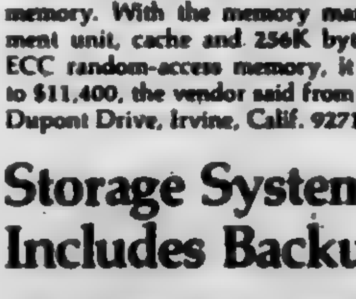
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See page 87 in Buy/Sell/Swap

Delay, Review Asked

Adapso Warns S. 2827 May Hike Prices

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – Users of basic private line service may have to buy more expensive, enhanced services if the Senate's pending communications bill, S. 2827, is enacted in its present form. This was one of several objections made by the Association of Data Processing Service Organizations, Inc. (Adapso) in a recent letter to Sen. Howard Cannon (D-Nev.), chairman of the Senate Commerce Committee.

Along with a number of other trade associations and companies, Adapso asked that the committee delay further action of S. 2827 and reconsider a number of the bill's provisions.

Meanwhile, the Senate Judiciary Committee's antitrust subcommittee began preparing a formal request to the Senate Commerce Committee asking for an opportunity to review S. 2827 before the bill progresses further.

The letter, addressed to Cannon, will be signed by Edward Kennedy (D-Mass.), chairman of the Judiciary Committee, Howard Metzenbaum (D-Ohio), chairman of the antitrust subcommittee, and possibly other members, a spokesman said.

Disclaimer Section

"We're concerned basically about three aspects of the Senate bill: "whether the 'antitrust disclaimer' provision will have the desired effect; whether it's proper for Congress to lift AT&T's 1956 Consent Decree; and whether the new industry structure created by the bill will be anti competitive," the spokesman explained.

The "disclaimer" section of S. 2827 tells the courts, in effect, to ignore the bill in adjudicating antitrust suits filed against AT&T – i.e., the courts are not to infer that Congress, by authorizing AT&T to form fully separated subsidiaries for competitive offerings, is agreeing or disagreeing with the Justice Department and other plaintiffs who argue that AT&T must be divested of Western Electric Co., Bell Laboratories and its operating companies.

Regarding the propriety question, our source said it is "probably within the power of Congress to lift the Consent Decree, but not without throughly considering the implications – such as whether the new structure will promote competition and whether divestiture would be more effective than the separate subsidiary scheme specified in the bill. None of these questions has been considered in the short time since S. 2827 was introduced.

Adapso, in its letter to Cannon, explained that "S. 2827 will deregulate many basic communications offerings such as transparent private line service within, at most, a four-year period. When deregulation occurs, carriers will no longer be obligated to provide service. Those carriers that do elect to provide service will be free to bundle it with other service and equipment offerings.

"As a result, users may find themselves compelled to purchase equipment or service enhancements that they neither want nor need as the price of obtaining basic transmission service. A curtailment of the availability of private line service would be particularly troublesome for users, inasmuch as these circuits are the basic component of most resale, private and data processing networks.'

IDCMA and CCIA

The Independent Data Communications Manufacturers Association (IDCMA) and the Computer & Communications Industry Association (CCIA) also objected to S. 2827. IDCMA said.:

"Our great concern is that the bill fails to require adequate separation. Although the unregulated activities of [AT&T and the other major telephone carriers] are required to be undertaken through a separate subsidiary,

(Continued on Page 64)

By Fujitsu's Akazawa

Reasons for Japan's Success Cited

By Marcia Blumenthal
CW Staff

SAN FRANCISCO – The emphasis on telecommunications and a "two-way" organizational structure prevalent in most companies are two reasons Japan's computer industry has achieved phenomenal growth in the past decade, Shoichi Akazawa, executive vice president of Fujitsu, Ltd., said here recently.

Oil shortages in the 1970s caused the country to begin channeling its efforts into building "knowledge-intensive" rather than energy-intensive industries. In 1970, there were only 6,700 computer systems installed, but by last year 59,000 units were in place, he noted.

Delivering a keynote address at the Second World Computing Services Industry Congress, which attracted 750 people from 30 countries, Akazawa pointed out that today, "not one Japanese computer manufacturer relies on foreign technology." In the early days of the computer industry, Japanese firms established technical relationships with the major mainframers in the U.S.

Although IBM is the largest foreign system supplier in the country, Japanese computer manufacturers supplied about 57% of the domestic market during the past decade, he said. (See related story.)

Today, Japan has 3% of the world's population and 10% of its GNP. Japan's computer industry made mammoth strides because manufacturers were originally designers of telecommunications systems, unlike

(Continued on Page 64)

Fujitsu Overtakes IBM As Top Supplier in Japan

By Bohdan O. Szuprowicz
Special to CW

While the Japanese DP market increased by about 14% during 1979, IBM is reported to have been surpassed by Fujitsu, Ltd. as the largest DP supplier company in Japan with revenues of $1,485 million for the 12 months that ended last March. This is the first time that a domestic mainframe manufacturer caught up with IBM in a market in which the global DP giant was dominant for the last 30 years.

This occasion is one of great joy to the Japanese "money-eating bugs" manufacturers, as the computer industry is dubbed in that country. The Japanese are moving fast to take on

(Continued on Page 64)

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Fujitsu Reviews Decade of Japanese Strategy

(Continued from Page 63)

their U.S. counterparts.

Because of this telecommunications orientation, on-line systems were emphasized early in Japanese systems development.

Moreover, the Japanese labor movement did not feel threatened by computerization, thus hastening the acceptance of systems into organizations.

Problems of the '80s

Despite these gains and the highest productivity rating of any nation, Akazawa said, Japan is beginning to suffer from "advanced nation desease," which is characterized by a loss of vitality and a drop in energy by the population.

Akazawa anticipated that the '80s will be an uncertain and unstable decade because of the domestic shortage of resources and friction created by trade problems. The country imports 89% of its food and 55% of its energy.

To help alleviate these problems, the Ministry of Trade and Industry aims to make Japan even more technology-based than it is today.

"Our technological success rests in part on training large numbers of young people," he said. During the last decade,

Shoichi Akazawa

there was a fourfold increase in the number of students in Japan's schools specializing in information processing technology. However, in the U.S. the number of college graduates with majors in electronics is approximately the same as it was in 1971, he maintained.

Increased R & D

As a means of creating a technological society, Japan's government will increase its contribution to research and development.

Despite the mistaken idea that the government pays for most of the R&D in Japan, the government's contribution today is less than 30%, Akazawa pointed out. However, he would like to see that contribution increased to 40%, which he claimed is comparable to the U.S. level.

Fueling Japan's goal of becoming a more technology-oriented society is its commitment to quality and reliability in its products.

In addition to being one of the three top executives at Fujitsu, Akazawa is also director of value engineering. "In how many American companies is one of the top three executives responsible for value engineering?" he asked.

To stimulate value engineering at Fujitsu, Akazawa asks each employee to make proposals for cost reduction and improvements in procedures and processes.

Last year, Fujitsu received from employees 35,000 suggestions, which were then reviewed by 11 committees. Of those suggestions, 75% were accepted, the president of the firm gave awards and bonuses to employees with the best suggestions.

The generation and acceptance of ideas from workers is what Peter Drucker, a U.S. authority on management practices, calls the "two-way system."

Fujitsu Tops IBM in Japan Market

(Continued from Page 63)

IBM and other competitors in major computer markets around the world.

Foreign computer markets in general and the U.S. market in particular are now considered by the Japanese to be the third most important electronics export targets after consumer products and semiconductors. Already the Japanese government has set up a target to export 16% of Japan's computer production by 1985, twice the current ratio of exports to domestic output of hardware.

However, there are reports that leading Japanese DP manufacturers, that undoubtedly include Fujitsu, are thinking more about exporting as much as 30% of their individual production, and 60% of all Japanese DP exports are expected to end up in the U.S.

Japanese successes in their domestic DP market, however, are the result of a very shrewd combination of restrictive trade barriers, preferential purchasing and financing practices that cannot be readily duplicated in foreign countries.

For example, non-Japanese DP suppliers, which include IBM Japan in the eyes of the Japanese government, have not been able to penetrate more than 3% of Japan's sizable public sector market. This "buy Japanese" policy has, of course, its equivalent in the U.S. where the public sector market is almost entirely supplied by domestic manufacturers.

Western Europe

It is the Western European countries, where government markets may range from 20% to 40% of the country's total DP market, that the greatest concerns are voiced on this question. Already, CII-Honeywell [illegible]ll in France is getting [illegible] treatment in bidd[illegible]f government [illegible] about 20% of government-con[illegible]lled companies' opportunities [illegible] doubt when the Japanese onslaught really commences later during the 1980s, these will be the first areas where purchasing restrictions will be tightened up.

Japan's domestic DP strategy includes production and competition in very large computers manufactured by Fujitsu and Hitachi, Ltd. because this category accounts for almost 60% of the total value of all computers operating in Japan.

According to the latest Ministry of International Trade and Industry report, by the end of 1979 there were 60,000 computers, valued at about $15 billion, operating in Japan. This is a tremendous 50% increase in the number of installations from the just more than 40,000 computers reported in operation at the end of March 1977.

Push for Large Systems

Of the 60,000 computers in Japan, actually 54% are very small business computers accounting for only 6% of the total value of installed hardware, whereas only 2,700 large computers represent 60% of the market. This is why Japan is making such an effort to develop and manufacture very large systems and introduce innovations faster than even IBM can do it.

The many government-supported information networks being set up throughout Japan plus data bases that require large machines and memories are made-to-order restricted markets for such equipment that justifies the research and development effort and will provide very competitive equipment for export.

Adapso Asks S.2827 Delay

(Continued from Page 63)

joint use of facilities would be allowed, as would joint ventures and other joint enterprises.

"Moreover the implementation of the separation scheme would be protracted . . . The preferable approach is to move more rapidly toward more complete separation."

CCIA said that "equipment and software offerings which are now prohibited by the . . . 1956 AT&T Consent Decree should not be permitted unless the manufacturing, research and development, and marketing and maintenance relating to such offerings is performed in a fully separate affiliate.

S. 2827, as presently drafted, allows all of these functions to be performed by "competitive support" divisions within Western Electric and Bell Labs during the transition period, provided the divisions conduct their business with the regulated and unregulated parts of the Bell system on an "arms-length basis."

Another dissent came from William B. Saxbe, who was U.S. Attorney General in 1974 when the Justice Department began its antitrust suit against AT&T.

At a press conference in Washington last week, Saxbe — now a private attorney who represents several telephone installation companies that compete directly against Bell — called the pending legislation a "Trojan Horse."

In the guise of promoting competition, he explained, it will "gut the government's pending antitrust case" against AT&T.

Moreover, the legislation does not provide the safeguards needed to promote "full and fair competiton," Saxbe argued. Instead, it leaves such matters to "the telephone fairy, [which] is both naive and irresponsible."

If the 1956 AT&T Consent decree "is outmoded, and quite possibly it is, then the proper remedy is to seek its modification by the court . . . For a legislative body to preempt such an agreement by statute is virtually unprecedented," Saxbe said.

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Separate Software, Hardware Firms

ADR Vice-President Calls for Breakup of IBM

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — IBM should be broken into at least two independent companies — one for hardware and the other for software — in an attempt to loosen the firm's "monopoly" hold on the computer industry, according to Applied Data Research, Inc.'s (ADR) senior vice-president, Martin Goetz.

Users would benefit immensely if the software side of IBM's business were separated from its hardware side, Goetz said recently at the Second World Computing Services Industry Congress.

For users, the main advantages of an IBM restructuring would include:

- Improved software quality and reduced software prices. With IBM divided into several smaller entities, competition in the software arena would dramatically increase and so would product innovation, according to Goetz.
- Reduced hardware prices. If IBM's hardware and software were sold independently of one another, users would no longer have to pay inflated equipment prices for the privilege of gaining access to the industry giant's program products.
- Streamlined hardware requirements. A separate IBM software organization would remove the temptation for the firm's salesmen to push inefficient programs in the hope of forcing users into unnecessary system "upgrades."
- A widened selection of software products, features and services. As an independent supplier, IBM's software operation would be compelled to diversify its product line to stay competitive with other firms in the same market.

Any attempt to restructure IBM or divest it of any of its holdings would probably sit poorly with many of the company's customers, at least at first, Goetz conceded. After all, any major IBM reorganization would mean the firm's users would have to revert to dealing with multiple vendors — an unsettling prospect many customers would prefer to avoid if at all possible.

But if IBM were suddenly to lose its ability to serve as a "total systems" vendor, users would barely feel the impact. The reason is that an IBM breakup would immediately create intense demand for systems integrators, a demand that would certainly be filled almost overnight by a raft of new market entries, Goetz said.

Structural Relief

Speaking during a session on "IBM Dominance," Goetz called for "structural relief" that would break IBM into six independent companies: one for software, two for hardware and one each for peripherals, services and office products. Under the proposed reorganization, the U.S. Justice Department's principle of "maximum separation" would apply to each of IBM's major businesses.

In other words, each of the six new mini-IBMs would be required to have its own name, personnel, physical facilities and research groups, and each would have to be accountable for its own profitability. Exchanges of services and products between the organizations would be strictly forbidden, as would advances of capital and loans, Goetz said.

The proposed separation of IBM's software and hardware businesses has gained "strong grass-roots support" within the Association of Data Processing Service Organizations, Inc., Goetz said.

MSA Acquires Q-Pac Package

ATLANTA — To facilitate its move into foreign markets, Management Science America, Inc. (MSA) has purchased the payroll package and associated U.S. and British operations from Q Packaged Programs Ltd.

Q-Pac's 11-person development staff in South Africa as well as its group in the UK will join MSA's 300-person development team, according to John P. Imlay Jr., chairman and chief executive officer of MSA.

Although marketed internationally, MSA's own payroll package is cumbersome for overseas markets because of the differences in laws, Imlay said. Moreover, he added, Q-Pac with 45 customers in the U.S. lacked the support needed to keep it current with U.S. laws.

Link Expands Services In Merger With IDC

WALTHAM, Mass. — International Data Corp. (IDC) has acquired Link Resources Corp. of New York City, an advisory firm specializing in electronic distribution of information.

The purpose of this acquisition is to increase Link's ability to serve executives responsible for planning the use of new information technologies, IDC said.

Link, formed in 1976, provides continuous information services in the viewdata, on-line data base and home media fields.

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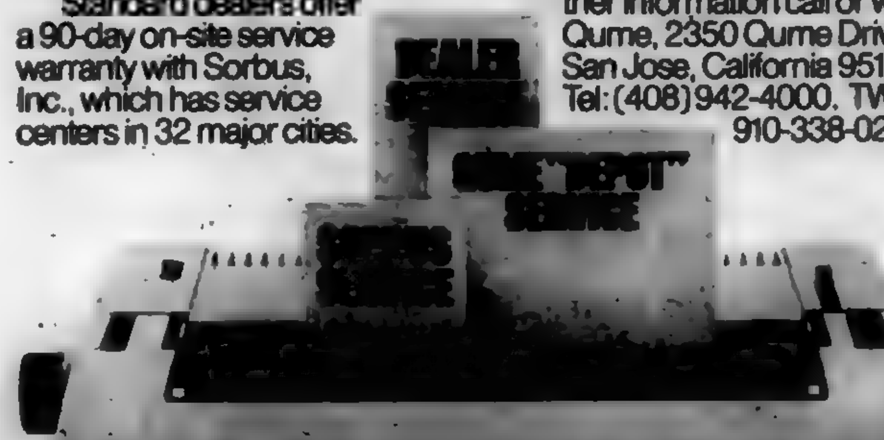

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You will be responsible for the creation and eventual maintenance of a new sales and marketing Forecast System. You will work with users and CIS to spec. design, and implement this system. Supervision of 1 exempt included. You will be responsible for all facets of Project Management including PERT, GANT, and/or Life Cycle, etc. Requires 3-5 years of Programmer Analyst experience or equivalent minimum. BS/BA or equivalent. MBA preferred.

Business Systems Manager

You will be responsible for the development and maintenance of sales and marketing systems. You will be specifically responsible for spec. design, and all implementation problems in performing new system and old system design work. You will interface with CIS for all programming activity. Management of a group of minimally 6 people will act toward accomplishing the above. Requires 5-7 years experience in developing new systems using project control via PERT, GANT, and/or Life Cycle, etc. Specific experience in sales and marketing systems preferred. Experience must demonstrate good technical knowledge of computerized systems. Examples of areas of Application, Responsibility Sales & Marketing Forecast, Distribution tracking, Contracts tracking, etc. BA/Master's Degree or equivalent preferred.

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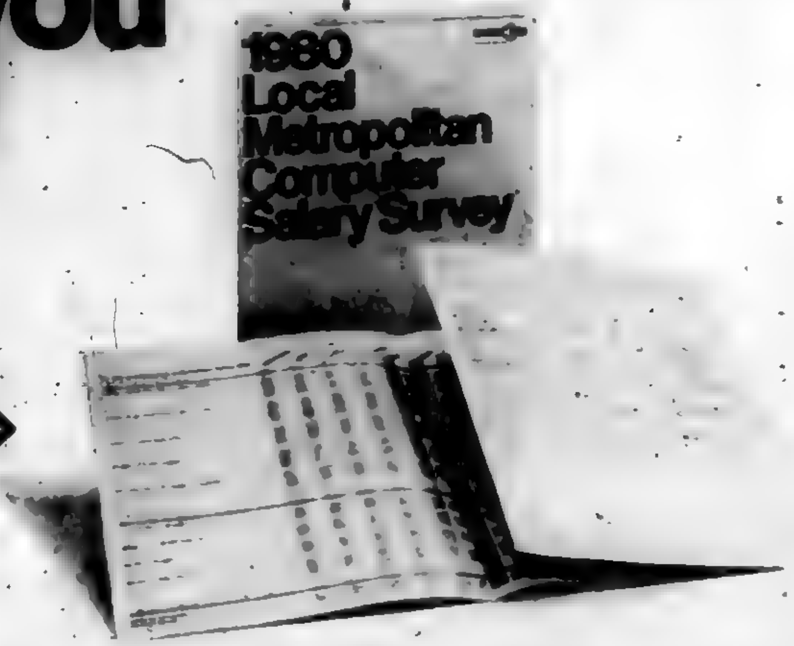

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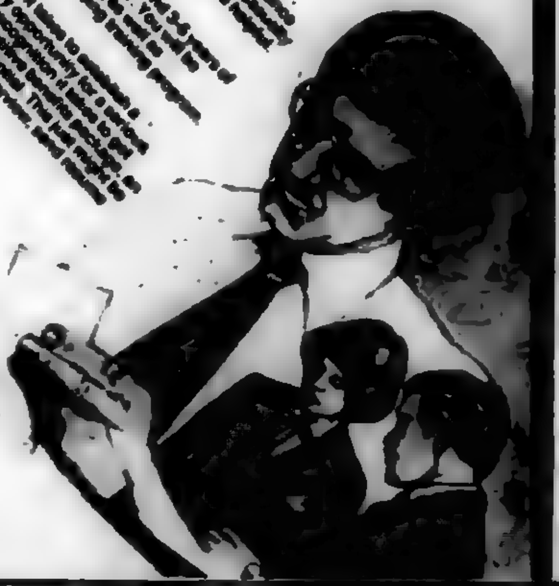

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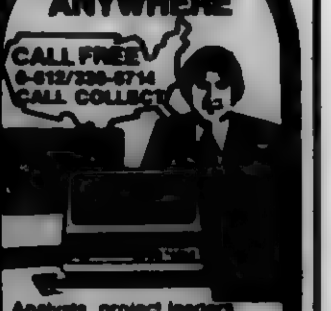

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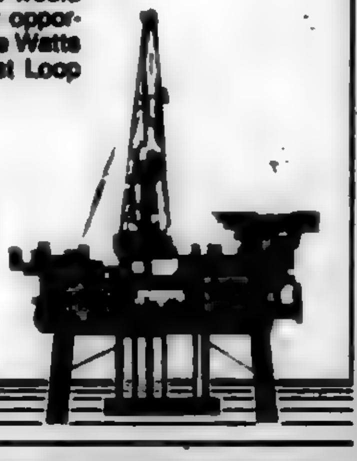

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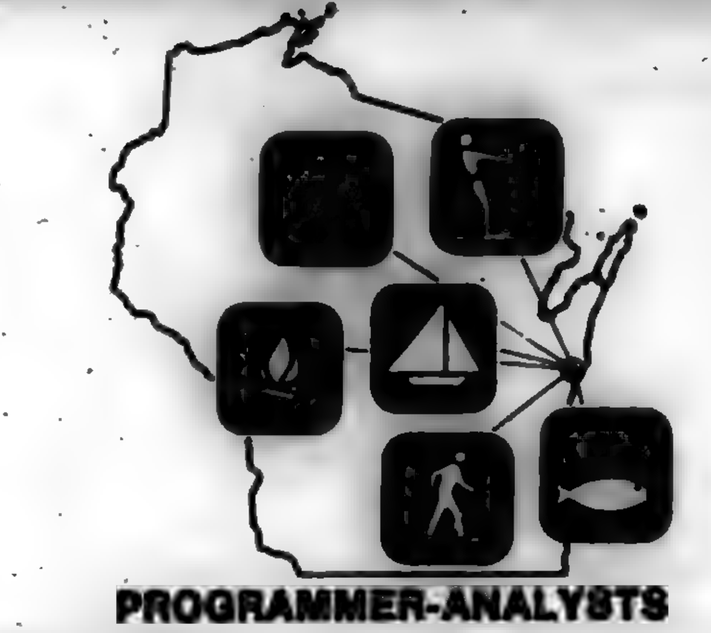

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Clarkson College of Technology, in upstate New York, has an opening for a Systems Programmer with potential development to a Systems Programming Manager. The position will be responsible for the maintenance of the software environment on an IBM 4341 with 100 ports. SCP's are VM/370, OS/VS1, and MUSIC, with a 3705 communications front-end. Primary languages are FORTRAN, BASIC, PASCAL, COBOL, and Assembler. Salary commensurate with qualifications and experience. We offer an excellent benefit package, and our employees are encouraged to enter Bachelors, Masters, and Doctoral degree programs. Send resume, salary history and requirements, in confidence to: Richard B. [illegible], Computing Center, Clarkson College, Potsdam, NY 13676.

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Wismer and Becker is a major ENR-rated engineering contracting firm currently seeking a Programmer Analyst to assist in converting from a Burroughs 3700 to an H-P 3000 system.

We prefer a degree in business applications or computer science, and 2-4 years experience on the H-P 3000. Experience should include COBOL interactive processing and image/query knowledge.

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Superior Farming Company located in Bakersfield, California, seeks Programmer/Analysts to assist in a five year development plan involving the automation of a variety of farming related systems. Desired 2-4 years experience in programming of DOS/VS, CICS/VS Command Level, VSAM, COBOL. Application experience is also required in one of the following systems: Payroll/Personnel; Accounts Payable; Accounts Receivable; Sales Analysis; Invoicing; Fixed Assets. These applications will be developed for an IBM 4331 operation in a DOS/VSE/VSAM Environment. Send resume and salary desired to Personnel Dept., P.O. Box [illegible], Bakersfield, CA [illegible]. Equal Opportunity Employer

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Applications Development

Our Applications Programming and Development Group is looking for Programmer Analysts with a Business Applications background. Responsibilities will include providing support for existing application systems and working with clients in defining and implementing solutions to business problems. Qualified candidates will have 2 or more years of experience, a BS degree in Computer Science (or equivalent) and a working knowledge of BASIC. Experience on a Wang 2200 would be helpful.

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At least 5 years experience in feasibility studies, design and implementation of large DB/DC applications. Must have good knowledge of COBOL, HIPO and project control techniques. Should be capable of leading projects independently. Knowledge of Arabic would be an asset.

Senior Programmer Analysts
At least 5 years experience in design and programming of large DB/DC applications. Must have excellent command in COBOL, structured programming and HIPO documentation techniques. Knowledge of Arabic would be an asset.

User Interface Project Leaders
At least 5 years experience in data processing with emphasis on preparing user documentation, user training manuals, user feasibility studies and support of remote users using RJE/3270 terminals. Some knowledge of COBOL and other programming languages would be an asset. Knowledge of Arabic is mandatory.

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Degree — IBM 370/OS - PL/1

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CITY OF PHOENIX

Personnel Department
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Phoenix, Arizona 85003

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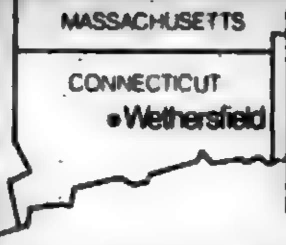

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Texas Southmost College is a Community Junior College with an enrollment of approximately [illegible]. Texas Southmost College is an Equal Opportunity Employer.

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New Hampshire College is currently in need of an Academic Computing Coordinator (ACC). The ACC provides a technical liaison between the college computer center and its teaching faculty. Based on the ACC's knowledge and experience in statistical modeling techniques, simulation, structured design and data-base systems, the ACC assists faculty in the development of curriculum, and marketing simulation appropriate to their specific disciplines in business, management, marketing, etc. The ACC may also be called upon to teach specific courses related to the computer in the following computer languages: FORTRAN, BASIC, COBOL and ALGOL. Accordingly if you have a good working knowledge of these computer languages and if you have a MBA degree, or are currently a candidate for such a degree, and therefore possess a familiarity with graduate academic business curriculum, and if you have 4 or more years of experience in academic computer operations and systems you should apply immediately. Starting salary is $17,000 per year. Contact: Frank [illegible], Director of Computer Center, New Hampshire College, 2500 N. River Rd., Manchester, N.H. [illegible]. Equal Opportunity/Affirmative Action Employer.

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([illegible]) [illegible]

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You should be familiar with DOS/VS or DOS/VSE, CICS, VTAM; plus have previous systems programming experience.

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You should have IBM 370 or 4300 experience working in a centralized HOST environment and/or distributed manufacturing systems development, with knowledge of CICS, MVS, DL/1 and COBOL also necessary.

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AMPEX

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Experienced Administrative Programmers to work on large scale applications. Requires a Degree and two years' experience in Administrative Applications.

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Requires experience at Assembly language level with knowledge in any one of the following systems software areas: Operating Systems; Communications; Teleprocessing; Interactive Systems, and Associated Languages.

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Design and development of an integrated corporate data base for Financial, Manufacturing, Engineering, Procurement, and Logistics Systems.

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Career positions on advanced aerospace programs requiring complex real-time computer based command and control systems. These are primarily ANSI X3.9 FORTRAN systems. Structured programming experience is highly desirable.

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Control of implementation and disclosure (through formal documentation) of system software requirements.

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Perform overall coordination of CADAM implementation of all Space Systems Manufacturing applications. Utilize CADAM in support of initial Numerical Control and Tool Design inputs for Space Systems Division.

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Assist in the installation, modification, maintenance, and development of numerical control software on the UNIVAC 1100/43. Requires experience in FORTRAN computer programming.

For immediate consideration, please forward your resume to Lockheed Employment Office, Dept. CW-77, P.O. Box 504, Sunnyvale, CA 94086. We are an equal opportunity, affirmative action employer. U.S. Citizenship is required.

LOCKHEED
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Scientific Programming

The Research Department of Ciba-Geigy Pharmaceuticals seeks highly qualified candidates for several significant and challenging positions in Computer Mathematics.

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The Project manager should possess a BS or BA in the Mathematical Sciences or related field plus a minimum of 6 years systems experience. Previous supervisory experience and/or training if desirable.

RESEARCH SYSTEMS ANALYST

For this position, the individual we seek should be degreed and have at least 3 years of scientific programming experience with fluency in FORTRAN, PASCAL or C.

For prompt and confidential consideration, please forward your resume, with current salary and requirements, to: Mr. C.R. Grupe, The Pharmaceuticals Division of CIBA-GEIGY Corporation, 556 Morris Ave, Summit NJ 07901. Equal opportunity employer m/f.

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215-[illegible]

Systems Personnel Inc.

THE OFFSHORE COMPANY, a leading worldwide drilling contractor is expanding its MANAGEMENT INFORMATION SYSTEMS DEPARTMENT. Our company offers excellent salary and benefits, and is located in the Galleria area. We are presently seeking the following professionals:

SYSTEMS ANALYST—Needed to define systems requirements in the order entry and inventory management areas. Will act as project leader over development and help Company grow into a data management and interactive processing environment. Advancement to new management position is imminent for the right individual. Five years experience in large scale IBM OS shop with PLI or COBOL and teleprocessing experience is required; previous experience with any data dictionary, DBMS and CICS desirable.

PROGRAMMER ANALYST—Will design systems from formal specifications, prepare program specifications, code and assist entry level programmers. Assignments will include some maintenance and involve user liaison in order entry and inventory areas. This is a choice position for individual ready to move into systems analysis in 1-to-2 years time frame. Three years experience in PLI, or COBOL with CICS using BMS and Macro or Command levels is required. Knowledge of Libraries, Easytrieve, VSAM, and DBMS helpful.

Please submit confidential resume with salary requirements to:

THE OFFSHORE COMPANY
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A major wholesale food distributor based in Dallas, Texas is presently expanding its EDP staff. [illegible]

Present openings include:

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Food industry experience preferred for each position.

Send Resume to:
[illegible]
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[illegible]
Dallas, Texas [illegible]

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A challenging opportunity to work for a voluntary 3 hospital system. [illegible] Submit resume with salary requirements to:

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CHAIRMAN AND PROFESSOR
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Applicants must provide demostrated research capability in software engineering and/or computer architecture; ability to set up a substantial laboratory and develop a world-class research group; organize and teach graduate level courses in computer science and engineering.

Applicants should have an interest in both basic and applied research; proven ability to initiate and gain federal/industrial support for new innovative projects and a strong record of research support and publications. Industrial experience is highly desirable.

Applications and nominations should be submitted no later than October 1, 1980 to:

Office of the President
Oregon Graduate Center
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PROGRAMMERS
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Data Processing

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Require 5 years' combination accounting and EDP experience with at least two years' supervisory responsibility. Degree in accounting or equivalent. Courses in computer programming a plus. Will be responsible for reviewing current financial and administrative systems and procedures. Document existing manual systems. Design, develop, implement new manual and EDP systems and procedures as required.

Systems Analyst

Under direction of the Systems Manager, conduct systems investigation interviews. Write and present proposed solutions of systems problems. Draw Macro-Flow charts. Arrange and conduct conferences with user management using Audio-Visual techniques. Validate programming specifications to include utilities input and output formats. Monitor programming schedule and act as advisor to programmers. Produce test data for program testing, ensure user test data is not ambiguous. Undertake user and Data Control Training, and write all systems documentation. Involved with some programming and detailed design work. Requires Bachelor's degree in Computer Sciences or equivalent and minimum 2 years' business applications systems design. Proficiency in British ICL/UCL (similar to IBM Hardware/Software), COBOL preferred.

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Will be responsible for producing and testing COBOL language programs from Micro to Modular program flow charts. Incorporate manufacturers utilities in programs when required. Produce both source and object control programs and program documentation. Produce operator manual job control manual and programming schedules in conjunction with Systems Analyst. Requires Bachelor's degree in Computer Sciences or equivalent and 2 years' programming on COBOL. Proficiency in British ICL/UCL (similar to IBM Hardware/Software), COBOL preferred.

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Will be responsible for planning for the availability of sufficient resources of adequate quality to meet requirement for systems development project; schedule and monitor project and resource expenditure accordingly. Review systems documentation for completeness, quality and adherence to standards. Systems are currently run on British ICL with George 3 Operating Systems (similar to IBM Hardware/Software). Require 5 to 6 years in Data Processing with minimum 1 year managerial experience. Training in management practices, skills and concepts, administrative management, project control supervisory technique, analyst & design techniques, quantitative method and resource management. Must hold Bachelor's degree preferably in Statistics, Mathematics, Accounting, Computer Sciences or equivalent.

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For information and confidential consideration, please forward your resume to: K.A. Ringwood, Professional Staffing Representative, Global Associates, Dept. 270, P.O. Box 12166, Oakland, CA 94604

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Our environment includes IBM 3033, 3031, 4331, 370/168 and 370/148 CPU's and we support MVS, DOS/VSE, CICS, IMS/DB & DC, TSO, VTAM/NCP. Our major applications are written in COBOL.

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The First National Bank in Albuquerque, as the second largest bank in New Mexico with over $500 million in assets and 18 branches, wishes to fill two positions as senior programmer/analysts in banking applications. FNBA offers a rapidly expanding data processing department with extensive on-line applications. Distributive processing is accomplished with an IBM 370/158, DOS/VS mainframe, IBM 4331, DOS/VSE and an IBM System 34. The primary language is Assembler. Two years of coding experience is a must. COBOL would be a plus and knowledge of financial applications helpful. FNBA offers an excellent working environment and opportunities for professional growth, as well as an attractive benefit and compensation package.

Albuquerque, with a population of 400,000, has a warm, sunny desert climate next to the 10,000 foot Sandia Mountains. Water and Alpine skiing, hunting, fishing, boating and the outdoors are easily accessible.

Qualified applicants should mail their confidential resume and salary history to:

Personnel Recruiter
the First National Bank in Albuquerque
P.O. Box 1305
Albuquerque, New Mexico 87103

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100 W. Madison, Suite [illegible]
Chicago, Illinois [illegible]
(312) [illegible]

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4711 Central, Suite [illegible]
Kansas City, Missouri 64112
CONTACT: [illegible]
(816) [illegible]

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PROJ Ldr int banking on-line . . . [illegible]
SYSTEMS Anal retail banking
[illegible] . . . [illegible]
WALL St Anal P&S Cage [illegible] . . . [illegible]
PROJ Ldr CICS IMS [illegible] . . . [illegible]
MGR Syst DDA, Savings, CD, CL, CP . . . [illegible]
SYSTEMS Engr [illegible] . . . [illegible]
SYSTEMS Planning Wall St [illegible] . . . [illegible]
PROJ Ldr A/R A/P [illegible] . . . [illegible]

NEW JERSEY

S/A [illegible] . . . [illegible]
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SYST Anal CICS DOS VS . . . [illegible]
MIS [illegible] & [illegible]
. . . [illegible]
SYST Anal CICS DOS VS [illegible] . . . [illegible]
PROJ Ldr HP 3000 Image Query [illegible]
[illegible] . . . [illegible]
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DEC 10 systems software [illegible] . . . [illegible]
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Call Bill [illegible] (212)[illegible]-3610

WILLIAM [illegible] ASSOC
[illegible] Broadway, NY NY [illegible]
(agency)

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A leading company in the design and manufacture of minicomputers and terminals is seeking an individual with the knowledge of operating systems and network theory who will be responsible for the design and analysis of the performance of the minicomputer and communication systems. This position requires a minimum of 1 year minicomputer programming experience with assembly language.

Applicants must have an MS degree in Computer Science and a BS in Communications is preferred.

Salary — $[illegible]/year and insurance benefits.

Send resume to [illegible], HONEYWELL [illegible], 300 Concord Road, Billerica, MA 01821.

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West Virginia University announces position openings for Systems Analysts at the senior and intermediate levels. The positions are with a newly formed systems development group responsible for designing new administrative and management information systems. Applicants must possess related experience in systems analysis and design. West Virginia University offers competitive salaries and excellent benefits. Send resume and salary history to: [illegible], Personnel Office, West Virginia University, Morgantown, WV [illegible]. An Equal Opportunity/Affirmative Action Employer M/F.

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FPL
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SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS

Minimum of two years experience in system analysis and design with five years total data processing experience. Bachelors Degree in Business, Finance, Engineering or Computer Science preferred, or appropriate experience in financial, purchasing, inventory and construction application areas. Environment is IBM 370/168, primarily COBOL, with CICS, IMS DB/DC.

SYSTEMS PROGRAMMERS

Experience in OS/MVS, operating system internals in an environment including JES 2, VSAM, CICS and IMS. Data communications software experience with VTAM and Network Control is also desired.

IMMEDIATE OPENINGS

Qualified applicants who wish to be considered for these positions should mail their resumé and salary requirements to:

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Florida Power & Light Co.
P.O. Box 529100
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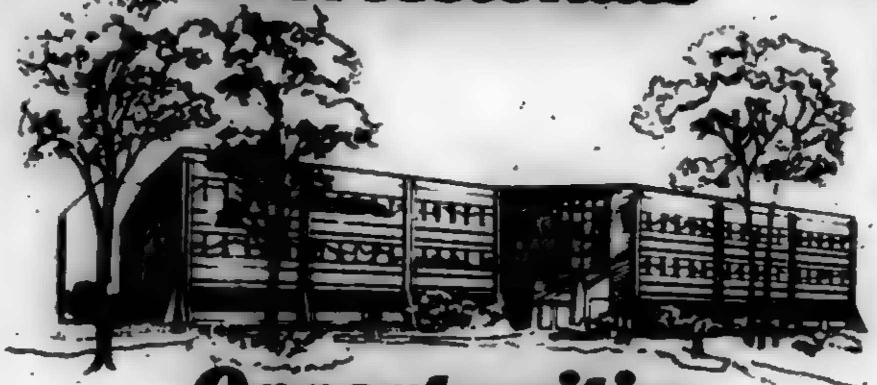

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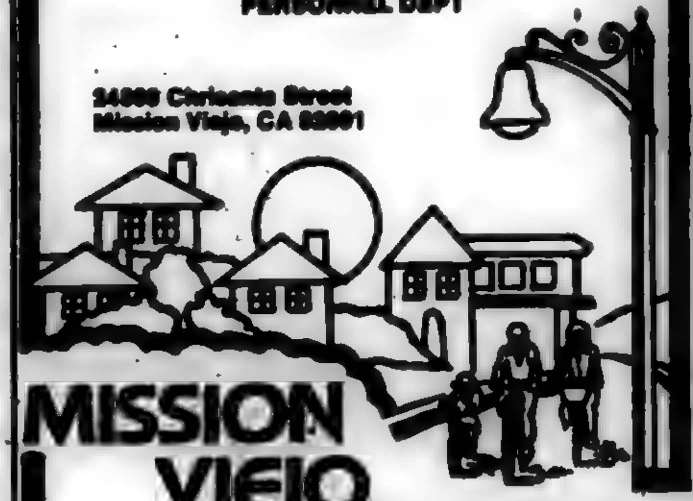

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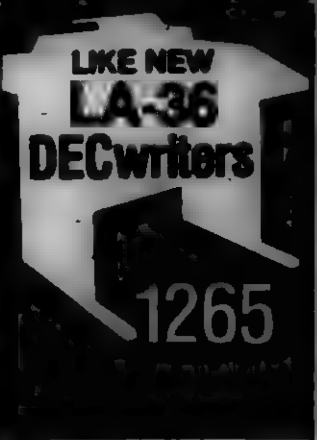

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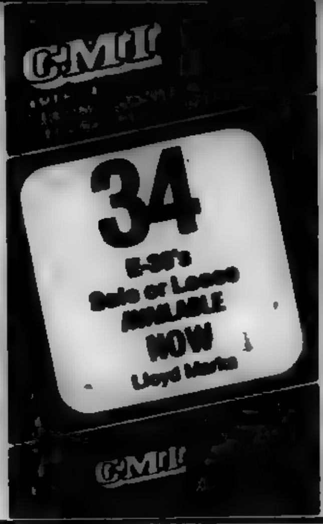

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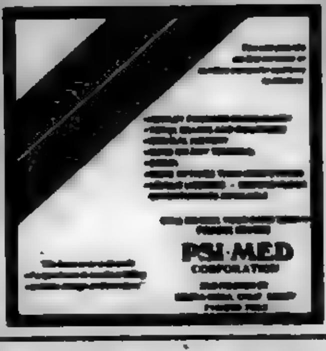
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NEWSPAPER

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
kly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
28 July 14, 1980 $1.00 a copy; $30/year

A Disks Faster, Cheaper

By William F. Juriet
Special to CW

IBM's fixed-block architecture (FBA) disk devices are becoming available, and because these devices are so fundamentally different from traditional count-key-data (CKD) disk devices, the question naturally arises as to whether the different design of FBA devices, which are similar to the old 1401 sectored devices, offers any real advantage.

The answer? Benchmarks reveal FBA devices are not only better, they are also faster and cheaper.

The main features of CKD disk devices, such as the 2311, 2314, 3330, 3340, 3344 and 3350, are a completely variable track format, many search command variations and dismountable data volumes (all except the 3350 and 3344). In other words, CKD devices allow users to control the exact data configuration of each track. Each track and data area can therefore be employed with a data layout most convenient for the application. Because each track potentially can contain a data structure different from every

(Continued on Page 4)

System Outages Cast Doubt On Air Control Reliability

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Recent air traffic control (ATC) computer outages of unusually long duration in New York, Chicago and Fremont, Calif., exemplify charges that the Federal Aviation Administration's (FAA) ATC system may not be as reliable as FAA officials insist.

Furthermore, a computer outage in late May at Chicago's O'Hare International Airport has been blamed for a midair near-collision involving two Boeing 727 passenger jets.

Besides the near-miss, the most dramatic ATC computer failure of late — also at O'Hare — was a 10-day outage, during which three teams of FAA computer specialists worked around the clock to discover the cause of frequent "freezes" of alphanumeric data lasting up to 20 seconds each.

Lasting from June 20 to June 30, the outage stemmed from a software design problem that prevented the system from accepting as much alphanumeric data as the flights into and out of O'Hare generated.

Designed in the early 1960s, the Data Acquisition Subsystem is that portion of the software that handles the beacon replies carrying alphanumeric data from the radar, explained John Rahn, data systems specialist at O'Hare.

"At the time when that was designed, it's possible that it could have been

(Continued on Page 4)

Amdahl, Nasco Tops In IBM's Own Ratings

By E. Drake Lundell Jr.
CW Staff

NEW YORK — Processors from both Amdahl Corp. and National Advanced Systems Corp. (Nasco) are superior on a price/performance basis to their IBM counterparts, according to researchers at IBM.

IBM?

That's right. In documents introduced in the U.S. vs. IBM antitrust trial here, the industry leader said that, in the world of large-scale systems, its competitors are clearly superior. However, at the low end of the spectrum, IBM said its machines — particularly the 4331 and 4341 — compete well against Magnuson Computer Systems, Inc. and Control Data Corp.

In the document, marked "IBM Confidential — Restricted," the firm evaluated all competitive compatible processors, ranking the systems and listing all user sites with installed software-compatible processors. Furthermore, the report also listed all future expected installations that were known to the IBM planners at the time, which was November 1979.

But the most interesting chart in the 28-page document is IBM's rating of the "relative price and performance" of the various compatible processors, based on "vendors claims, benchmark results and *internal IBM analysis*" (italics added).

Amdahl vs. IBM

Of the seven Amdahl processors listed, IBM rates five as superior to their IBM counterparts. For example, IBM said the Amdahl 470V/8 has 30% greater performance than the IBM 3033, even though it costs 11% less. Similarly, the 470V/6-II gives 9% greater performance for the same number of dollars when compared with the IBM 3033N.

Similarly, Amdahl's 470V/7 beats the IBM 3033 in performance by 6%, but carries a price tag that is 17% lower than the IBM machine. The 7A, meanwhile, has 17% greater performance than the 3033N and costs 3% less than the IBM unit. The 470V/7B has only 90% of the performance of the 3033N; but it costs only 81% as much as the

(Continued on Page 6)

IBM-Compatible Products Reviewed

DBMS Offerings Defy Comparison

By Marcy Rosenberg
CW Staff

Ask any data base management system (DBMS) vendor. He will tell you his product is the easiest to use, outshines the others in data management facilities and cannot be beat for integrity and protection features.

Multiply this litany by five or six different vendors and you, like the IBM mainframe user, will scratch your head in confusion.

Several years ago, it was easier to point to features that differentiated one IBM-compatible DBMS from another. Today, however, what were once black-and-white differences have faded to shades of gray as vendors embellished their products to better compete with one another.

Product Spotlight

These nucleus DBMS have grown together in features," commented Thomas F. Meurer, president of Eastern Technical Associates, Inc., a Newton, Mass., consulting firm specializing in data base and data communications software.

Competitive Pressures

"Because of the competitive pressures among DBMS vendors, anything their products lacked was brought to the attention of prospective buyers," Meurer explained. So as a result, "suppliers added missing features to round out the packages."

For example, Meurer noted IBM designed IMS/VS initially to provide only a physical hierarchy, but later added logical data bases so users could develop networks. And Cullinane Corp. added indexing to its IDMS about two years ago, he added.

Although enjoying the advantage of having more DBMS suppliers to choose from than any other mainframe user segment, IBM installations will have to use a finer-tooth comb than ever before to compare packages.

The accompanying chart (see Pages 10 and 11) highlights 11 DBMS, currently marketed to the IBM mainframe

(Continued on Page 8)

IBM and Compatible CPUs Get Link to X.25 Networks

By a CW Staff Writer

ST. PAUL, Minn. — IBM and compatible users can run remote applications through public data networks with X.25-compatible software announced by NCR Comten, Inc. for its 3600 front-end processors.

The X.25 Interface series of software products allows 3600s to act as packet mode data terminal equipment (DTE), a spokesman said. The products can interface more than one packet network, such as GTE Telenet Communications Corp.'s Telenet and Canada's Datapac, while meeting the X.25 and related protocol recommendations of the Consultative Committee on International Telephone and Telegraph.

With the X.25 Interface announcement, NCR Comten has jumped ahead of IBM in bringing X.25 to domestic users. Although IBM offers the protocol to foreign customers and has expressed support for the movement toward worldwide standardization of data communications, the giant vendor is reluctant to endorse X.25 before AT&T does, a high-ranking spokesman said recently [CW, May 26].

(Continued on Page 2)

Norad False Alert Found Avoidable

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A false alert at the North American Air Defense Command (Norad) early last month is directly related to avoidable mistakes made in designing the World Wide Military Command and Control System (WWMCCS), an investigator for the General Accounting Office (GAO) said here last week.

His comment came shortly after the federal watchdog agency issued the latest in a series of reports criticizing the vast "Wimmix" project — a key element in the U.S. defense structure.

(Continued on Page 6)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127620. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.

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$1.00 a copy: U.S.— $30 a year; Canada, Central & So. America — $50 a year; Europe and Near East — $90 a year; other foreign — $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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No More Live Witnesses?

IBM Trial Action Winding Down

By Connie Winkler
CW Staff

NEW YORK — The U.S. vs. IBM antitrust trial may end not with a bang, but a whimper. The possibility that there would be no more live witnesses and that closing arguments would not take place for months was raised during a conference last week in Judge David N. Edelstein's chambers.

IBM's head counsel Thomas D. Barr acknowledged there are problems yet to be ironed out, but said it is a "reasonable prospect" there would be no more live witnesses.

Robert J. Staal, the head of the Justice Department's trial team, agreed there is a good possibility the rest of the case would be presented in writing. The issue depends on whether either side wants to cross-examine the other's economists or whether IBM wants to cross-examine the government's rebuttal case witnesses, particularly Gene Amdahl, founder of Amdahl Corp., Staal said.

What has brought the case to this point is that IBM's last four witnesses, all economists, are presenting their testimony in written narratives, with the last to be produced Sept. 10. Edelstein called the meeting in his chambers to set up a timetable for the narrative production. In February, IBM said the economists' statements would be ready in April.

Staal observed it has been 130 days since the trial adjourned and IBM's delay in providing the narratives was "threatening to make a mockery of the trial."

Barr apologized several times saying that the task was taking longer than expected and the trial transcript is about twice as long as when the government's economists testified.

The government will respond to the IBM economists in its rebuttal case, which will include written statements by three economists called previously. The testimony of four other rebuttal case witnesses (including Amdahl) will also be in writing — either narrative statements, documents of testimony from prior IBM antitrust trials.

Manager Denies Bribery

By Jeffry Beeler
CW West Coast Bureau

REDWOOD CITY, Calif. — A former DP manager living in Silicon Valley pleaded not guilty last week to charges that he accepted bribes and violated conflict-of-interest codes while heading government computing operations for a northern California county.

The DP manager, George Vandermate, entered his plea on July 8 before San Mateo County Municipal Court Judge Phrasel Shelton.

Vandermate's plea came almost exactly a month after he and three codefendants surrendered to San Mateo County sheriff's deputies and were arraigned in Municipal Court on multiple charges of bribery and participating in a kickback scheme.

The three codefendants include Rene Bazan, president of Security Data, Inc., a local keypunch data entry firm; Raymond Shields, a former partner in Security Data; and Colburn Marceau, president of Sigmatics, Inc., a Santa Ana, Calif.-based company.

Like Vandermate, all three codefendants appeared in Municipal Court on July 8 and pleaded innocent to all charges filed against them.

Vandermate stands charged with receiving an unspecified sum in bribes and kickbacks from seven California-based programming and data entry companies. He allegedly solicited the bribes in return for awarding the firms fat contracts from San Mateo County's computing department [CW, May 12].

IBM-Type Users Get X.25 Link

(Continued from Page 1)

To run the X.25 Interface, the user needs NCR Comten's System Control Software (SCS) Release 63.0 and Emulation Processing. The interface software can coreside with the following SCS components: Advanced Communication Function/Network Control Program (ACF/NCR); Communications Networking System (CNS); 3270 Multiple Access Facility (MAF); and Data Switching System (DSS).

The X.25 Interface does the call establishment, virtual circuit management, packet assembly and disassembly and statistics collection functions of a packet mode DTE, the spokesman continued. It allows start and stop terminals to participate in X.25 public data networks without modifications to host-resident applications, application supervisors or access methods.

The X.25 Interface carries a monthly license fee of $300. Monthly fees for the EP Start/Stop Packet Adapter and ties to Datapac and Telenet are $150, $50 and $50, respectively. NCR Comten's address is 1950 W. County Road B-2, St. Paul, Minn. 55113.

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SORTDANCE, ARIZONA – For years this pioneer DOS/VS community was known as the "toughest sorting town West of the Pecos."

According to old timers, this reputation stemmed from the antics of the notorious "Hardware Gang," four renegade sort programs who drifted into town years ago. Still wearing their old convict numbers – 5746-SM1, 5746-SM2, 5743-SM1 and SM-483 – the four brothers made a practice of terrorizing sorts.

"They'd get tanked up on hard computer resources, then they'd go looking for dude sorts," said Gabby Hades, a retired uranium prospector. "When they found one they'd whip out their guns and tell the poor critter to start dancin. That's how the town got its name."

But things are different in Sortdance now. The other day, just before noon, a tall quiet stranger rode into town. He tied up his buckskin horse and ambled into Aunt Kitty's "Last Chance Saloon."

Aunt Kitty looked at the stranger and said, "I reckon you're the SyncSort Kid, stranger. I heard the Sort Reform Committee sent for you. But do you think you're fast enough to take on them four galoots?"

The kid smiled shyly. "Yes ma'am. I don't wanta brag, but I reckon I'm 20 to 40 per cent faster on Elapsed Time, and 15 to 30 per cent faster on CPU Time. I got 'em whupped on Disk Space Utilization and SIOs too."

When Aunt Kitty said the kid reminded her of somebody, he replied: "Probably my big brother, O. S. SyncSort. We got the same kind of features. Things like INCLUDE/OMIT, SUM and OUTREC. We both like to give programmers a break, specially if they're migratin."

Then Gabby rushed in the door and hollered: "They're out there waitin for ya, Kid! All four of the Hardware Boys. They say this town ain't big enough for five DOS sort programs!"

As the clock struck noon, the SyncSort Kid tipped his hat to Aunt Kitty, loosened his guns in their holsters and walked through the swinging doors. Moments later a fusillade of shots rang out.

Aunt Kitty rushed to the door. "I expected to see that nice young feller stretched out in the dust. But he was standin up straight as an oak, with his shootin irons still smokin. It was the Hardware Boys that was ready for a trip to Boot Hill!"

The town is now known as "the sorting capital of the Sunbelt." And at today's general election, the citizens voted to change its name from Sortdance to Fort SyncSort.

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Benchmarks Find FBA Disks Faster, Cheaper

BENCHMARK	VM CPU SECONDS	DOS/VSE CPU SECONDS	TOTAL CPU SECONDS	ELAPSED RANDOM SECONDS	ELAPSED SEQUENTIAL SECONDS
CKD RUN	382	132	539	797	439
FBA RUN	249	90	339	730	439
IMPROVEMENT	34.8%	40.8%	36.8%	8.4%	0%

FBA Disks vs. CKD Disks

(Continued from Page 1)

other track, a large number of search commands are also provided in order to locate data on the free-form track layouts.

FBA devices, such as the 3310 and 3370, feature simplicity of design and higher data densities. Unlike CKD devices, FBA devices employ a rigid track format and are very similar in design to the sectored disk devices, such as the 1405 and 1311, which were available on the 1401 series of computers.

FBA data tracks are presently broken into 512-byte blocks, but provision appears to have been made to vary this quantum block size.

Because no search commands are available, all search operations must be handled by some sort of software implementation. Moreover, all currently available FBA devices are non-dismountable.

CKD devices certainly provide more flexibility and more powerful commands than FBA devices. In fact, it can generally be said that CKD devices offer so many features and options on data configuration and access that very little software is available that utilizes their full capability.

However, the price of this greater freedom of choice is a complex address protocol (cylinder, track and record number), a requirement for some sort of search operation as a prelude to practically all functions and a requirement for a track formatting process during all file creation.

FBA devices, in contrast, offer more limited choices on data layout, but in compensation use a very basic address protocol (relative block number). In particular, FBA devices do not require rotational position sensing calculations in order to provide RPS advantages and contain a hardware write verification option, rather than the software write verify required by CKD devices. Although FBA devices have fewer options and commands than CKD devices and so can be considered "dumber," they do appear to be a better match to the general level of current software "smartness" than CKD devices.

The easiest way to verify whether FBA devices are easier to use is simply to find an installation with both CKD and FBA disks attached to the same CPU and benchmark the two.

The benchmark environment was constructed, the only real variable in the tests was the FBA concept. Both the CKD and FBA system used the same CPU, the same VM operating system, the same DOS/VSE supervisor and same disk drives.

Only the CCW translation routines in VM and the benchmark programs themselves were different between the two systems. The CKD benchmark program accessed its data in CKD mode, and the FBA benchmark program accessed its data in FBA mode, but otherwise each program did exactly the same amount of work.

Each benchmark program consisted of performing 18,000 random and 18,000 sequential I/O operations, with a random number of records between one and 16 being read at each I/O operation. The results of these tests are listed in the figure.

VM required about 34.8% less CPU time to service the FBA benchmark virtual machine, which also required about 40.8% less CPU time, and the resulting combined CPU load dropped by about 36.8% in the FBA test. Shorter path lengths also resulted in an overall 8.4% effective speed increase in random FBA disk operations.

Practically all of the VM CPU savings were the result of having to translate simpler CCW chains. The average length of the CKD command chains was 12 CCWs, but all of the FBA chains were exactly three CCWs long. Practically all of the DOS/VSE CPU savings were the result of the simpler FBA benchmark program itself. The CKD program had to do far more calculation in dealing with its relatively complex addressing protocol involving RPS sector calculations, track overflows, cylinder breaks and so on.

By comparison, the FBA program just worked with one binary number for addressing and was not concerned with rotational position sensing, track capacity or cylinder capacity.

Jurist is a software consultant with Goal Systems Corp.

Doubts Cast on Air Control Reliability

(Continued from Page 1)

enhanced a little further than it was," Rahn said. "The only thing we did here to solve our problem was to put a small patch into the system, which is just an enhancement to the software.

"My own personal opinion is that when the software was designed in the early '60s, perhaps the person that was looking down the road 20 years just didn't relaize the potential was there for saturation," he added.

The 10-day outage caused minimal slowdowns of air traffic, lasting 15 to 30 minutes, according to Richard Scholz, a controller and president of O'Hare's chapter of the Professional Air Traffic Controllers Organization (Patco). "Extremely good weather" and well-paced traffic into O'Hare "because the rest of the country was aware of our problem" also helped the situation.

In New York, Kennedy International Airport's recent ATC computer problems were of a different nature, being of shorter duration, but proved just as mystifying regarding their causes.

On July 2, two computer outages — one from 7:23 p.m. to 9:14 p.m. and the next from 10:37 p.m. to 11:20 p.m. — that occurred during times of heavy traffic stymied technicians trying to find the cause, according to Clint Murphy, chief of the Airways Facilities Division of the FAA's Eastern Region.

"We couldn't get the diagnostics to repeat the problem," Murphy explained. "If you have a component failure and the system goes down, and if you run a diagnostic and bring it back up, then you're doing what the system is designed to do.

"But if you have a situation where you go down and you can't repair the system, you stay down. I consider that [a] major [problem]," he added.

Another outage on July 6, lasting from 12:52 p.m. to 1:05 p.m. "seemed to be related to the previous problem," Murphy noted.

After running and rerunning the diagnostic tapes, he indicated, "we found out we were picking up an extra bit in 2^{17} in memory bank number three. We replaced a circuit board and we've been up and running ever since."

System Reliability

Stressing that Kennedy's system has had "no major problems until recently," Murphy noted there were 16 outages from Jan. 1 to June 30 for total downtime of one hour and 54 minutes.

"In fact, we've worked hard to improve our reliability," he added, noting that from July 1, 1979 to December 31,1979, there were 28 outages.

Others at Kennedy who work with or depend on the computer, however, disagree with that rosy picture. The airport's two Univac 1A computers "are held together with scotch tape," according to Rudy Arnold, a Data Systems Specialist.

"They were put in service in 1966 and they were outdated when they were installed," he claimed.

The recent problems "are a continuation of the normal pattern" at Kennedy, according to Anthony Maimone, a controller Patco member.

Noting that the shorter outages occur "at least once a week," Maimone said the situation is "dangerous for the controller if he doesn't know it's going to happen, for a lot of reasons.

"For one thing, the journeyman level here is not that high — at least half the people are trainees — and a lot of the people who are journeymen haven't been journeymen that long.

"When it goes down like that without any notice, it is dangerous, especially if you're handling more than four or five airplanes," Maimone added.

According to Murphy, however, the system is "absolutely not unsafe. When the system loses alphanumeric data during a system interruption, the controller already has the information on a written flight strip — he's doing the job he's paid to do."

Meanwhile, at the Air Route Traffic Control Center (ARTCC) in Fremont, Calif., June was also a bad month for outages in terms of "the extent of them and the circumstances surrounding them," according to Jim Scott, data systems officer.

The first of four outages that month occurred on June 3 when, once again, computer specialists were unable to determine the cause of a failure.

On June 11, in attempting to have a "planned startover" to clean out bad data from the system, technicians instead found themselves with a "recursive abort situation" in which the system went up and down four times in a nine-minute period, he said.

On June 17, in attempting to "tie-on" to an Automated Radar Terminal Service (Arts) IIIA computer system at a communicating airport, Fremont tried to connect before the terminal was ready, Scott explained.

ON June 22, it took technicians "about 40 minutes" to discover that one of the center's storage elements had a bad card. "We had no report again from the hardware and the software doesn't detect it unless it's reported by the hardware," he said.

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In Wake of Merger Plan Collapse

Experts Pondering Options for STC, Amdahl

By Marcia Blumenthal
CW Staff

With the recent collapse of a merger plan for Amdahl Corp. and Storage Technology Corp. (STC), industry observers have been speculating on the future course both companies will pursue to achieve total systems capability.

Both firms are committed to acquiring this capability, which will make them more attractive to customers who wish to opt for a fully configured IBM plug-compatible system — something that is not widely available from a single source today.

The deal, which had been approved by the boards of directors of both companies, fizzled last month when Jesse I. Aweida, STC chairman and president, pulled the plug on the negotiations. The precipitating factor in the talks breakdown was STC's refusal to modify the terms of the merger to accommodate Fujitsu Ltd.'s demands [CW, July 7]. Fujitsu is the largest shareholder in Amdahl, with about 26% of its stock.

While neither company would comment in detail on Fujitsu's demands, a major deterrent seemed to be Fujitsu's fear that the new, combined company — which would have been known as United Data Corp. — would compete with Fujitsu in the U.S. marke

While industry observers are uncertain about Fujitsu's grand design for the U.S. market, they note that the Japanese computer maker has its fingers in a lot of pies. It recently embarked on a joint venture with TRW, Inc. to sell small business systems and financial systems and it has a cross-licensing agreement with Memorex Corp. for 8-in. disks. In addition, Fujitsu recently bought out the remaining shares of its joint venture with American Telecommunications Corp., blocking the U.S. partner's chance to gain control of the venture.

Amdahl gives Fujitsu an outlet for its high-end computer assemblies and semiconductors. But STC has a large investment in semiconductor technology and plant capacity and Fujitsu feared that would have weakened its hold on Amdahl, one source noted. Moreover, Fujitsu realized that a combined company under Aweida would have been a formidable competitor for Fujitsu, another said.

In Vigorous Pursuit

Although the merger has failed, STC said it is "vigorously pursuing" acquiring CPU capability. Noting that the firm could achieve the desired goal without the benefit of Amdahl, Aweida said the firm's alternatives are to either acquire the technology, merge with someone else or build in-house.

The merger would have been the simplest, but not necessarily the least expensive way to achieve systems capability, one source noted, adding that STC was looking at the association with Amdahl for future rather than short-term financial benefits.

The most likely plug-compatible manufacturer or acquisition candidates for STC appear to be National Advanced Systems or Magnuson Computer Systems, sources speculated. STC already has a $10 million OEM deal with Magnuson, reportedly for a data base processor built around the Magnuson system [CW, Feb. 18].

Although STC's focus is on the high-end, IBM plug-compatible storage products, it has already started to move into more medium-scale products. This could make acquisition of a medium-scale PCM maker feasible. In that case, Two Pi Co. could be a candidate for acquisition, but one source noted U.S. Philips Corp., Two Pi's parent company, would probably not be willing to sell the subsidiary.

While STC could build a processor in-house, observers think it would take about two years before STC could see the results of this approach.

Another source close to STC said he wouldn't be surprised if STC and Memorex reopened negotiations with an eye to jointly developing a CPU.

Like STC, Amdahl is anxious to round out its product line so it can offer systems capability, Amdahl is now also deciding whether to make its own storage equipment or acquire another firm in that area, a company spokesman said.

Whatever Amdahl decides to do, analysts agree the merger was more important for Amdahl than STC. Selling only plug-compatible mainframes is not a wise strategy in the long run, analysts believe. One said, "Who knows what IBM will do in the future to lock in its disks?"

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False Alert Seen Avoidable

(Continued from Page 1)

Possibly the most serious defect of Wimmix, according to GAO, is the batch-oriented circuitry of its Honeywell, Inc. 6000 host computers. Some users, including Norad, have real-time processing requirements, and to serve these latter needs it has been necessary to use what the GAO investigator called "gerrymandered peripherals."

The malfunction that caused last June's alert, he said, occurred within one of these peripherals.

GAO went into the batch vs. real-time controversy in some detail last December, when it issued a lengthy criticism of Wimmix. At that time, the agency said the system's batch orientation creates a "traffic jam" within each Wimmix host computer because each application program must request and be provided sufficient space in memory for the entire program rather than being allocated the [memory] space it needs to execute each set of instructions."

GAO added that the traffic jams "seriously" limit "the computer's processing capabilities and its responsiveness, particularly during a time of high-volume use, such as a crisis."

GAO also charged in its December report that:

- DOD has not yet "clearly defined the functional [informational] requirements of the military commanders who must use . . . WWMCCS," even though computers have been used by DOD "for almost 30 years to support the command and control environment."
- The Defense Department selected "a computer configuration and related software not suited for the environment in which they were to operate."
- The Wimmix management structure is "so fragmented that no one individual or organization [has] responsibility for its budgeting, funding, or management."

The report released last week contained comments on these charges from Honeywell, the major Wimmix contractor, and from the Defense Department, plus replies to these comments from GAO.

DOD said the allegations regarding the system's batch orientation are "incorrect" because Wimmix computers "are functioning daily in an on-line, interactive mode." The Honeywell 6000, the main computer used in the system, "was specifically designed to meet the requirements of a multidimensional environment, not a batch sequential environment."

However, GAO retorted that DOD has merely made it "appear that the standard WWMCCS computer system and related software function in an on-line interactive mode." To do this, "extensive . . . retrofits and modifications have been required."

Avoidable Errors?

Underlying the argument over interactive vs. batch operation is the question of whether DOD could have designed the system differently. In the GAO report dated July 1980, DOD said GAO's December 1979 report compares a system "acquired in the early 1970s against 1980 technology and leaves the overall impression that money has been expended with little or no capability having been achieved. In fact, a capable system does exist."

Honeywell went along part-way with DOD on this point. The company contended that the kinds of interactive data base management system needed to support WWMCCS "generally exceeded" the state of the art in 1970-71, when final specs for Wimmix were being developed.

However, GAO insisted that "since paging technology [was] commercially available before the [Defense] Department's purchase of the WWMCCS standard computers and related software, and since it was well known within the department before the purchase that there was a valid need for . . . on-line interactive computer capability, it is difficult for us to understand how DOD can state that we compared a system acquired in the early 1970s against 1980 technology."

Japanese Systems Tops, Too

By E. Drake Lundell Jr.
CW Staff

NEW YORK — In addition to rating its U.S. competitors' offerings in the software-compatible processor arena, IBM also keeps a close eye on foreign — particularly Japanese — computer manufacturers.

And in many cases, the firm has found that the Japanese potentially offer to users machines of increased performance as compared with the IBM counterparts.

IBM's ratings of these machines, as contained in internal company documents, were introduced here recently in the U.S. vs. IBM antitrust trial.

However, they did not attach any price figures to the Japanese offerings, presumably because the machines are not marketed in the States.

According to the IBM figures, the Fujitsu M200 offers a whopping 44% performance improvement compared with a similar IBM 3033, while the M190 offers 19% less performance than the 3033.

The M180-II similarly offers a 36% performance increase over the IBM 3031, and the M180AD offers 98% of the performance of the 4341. But the IBM 4341 series generally offers performance advantages when compared with Fujitsu, beating the M160 by 26%, the M150F by 42% and the M160S by 52%.

Fujitsu does well against the 4331, however, with the M140F offering 70% more performance than the 4331, and the M140 offering a 10% increase.

Hitachi, Ltd. also comes out well against IBM on a performance basis, with its M200H offering 46% greater performance than the 3033. The M180 beats the 3032 by 12%, while the M170 offers 9% less performance than the 3031.

Amdahl, Nasco Best Buys

(Continued from Page 1)

3033N, which establishes its price/-performance edge.

Amdahl maintains its edge over IBM in the V6 area as well, IBM said. The V/6-II costs the same as a similarly configured 3033N, but offers 9% greater performance. The range gets narrower with the V/6, where users get 3% less performance for a 5% cut in price as compared with the 3033N.

However, at the bottom of the Amdahl line, IBM's 3033N becomes a competitor. Amdahl's 470V/5-II gives 20% less performance than a 3033N, but gives only a 13% reduction in price, according to the IBM figures. Similarly, the V/5 gives only 71% of the performance of a 3033N at a cost of 82% as much.

The former Itel Corp. machines, now marketed and maintained by Nasco, also rate high, according to the IBM researchers, particularly at the high end of the line.

In areas where IBM had prices for typical configurations, Nasco offerings beat the IBM equivalent in six out of seven cases; however, there were seven cases where IBM did not have a price to make a comparison.

For example, the AS/8 offers 35% greater performance than the IBM 3033, IBM admitted, but it did not know the price of the unit.

On the AS/7, however, IBM admitted that users could get a 6% performance increase while at the same time getting a 22% price reduction as compared with the 3033.

Similarly, the 7031 from Nasco offers users performance that is equal to the 3031, IBM said, but is available for a 25% cut in price. The 7031AP equals the performance of the 3031AP for a 13% price break.

However, in the 4300 arena, IBM begins to show its clout. In the only model-to-model comparison where the IBM planners had all the figures, the 4341 did well against the AS/3-5. The 3-5 offers 14% greater performance, the figures admit, but it carried a 23% higher price tag to get to that performance level.

Other Competitors

IBM continued to do well against most comers in the 4300 area. For example, the 3200-III system, marketed by National CSS, Inc., that is based on the processor made by Two-Pi Corp. gives users a 10% performance boost over the 4331, but costs 18% more. However, that comparison may be unfair since National CSS is the only independent that offers its own operating system as part of the price of the equipment.

Control Data Corp.'s 480-III beats the 4341 at its own game. The unit offers a 38% jump in performance for only a 15% increase in price. However, the 480-II and the 480-I do not fare as well. The former costs almost the same as the IBM unit, but offers a whopping 37% less in performance, while the latter offers 54% less performance for only a 24% break in price.

The Magnuson competitors to the 4341 rate just about equal to their IBM counterparts.

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IBM Calls Race Discrimination Suit Harassment

By Jake Kirchner

CW Washington Bureau

BALTIMORE — IBM has termed "harassment" a federal race discrimination suit filed against the company on behalf of IBM employees in Maryland.

In its initial response to the suit filed here June 3 by the Equal Employment Opportunity Commission (EEOC), IBM said the commission "knows or has reason to know" the company has not and is not now discriminating against black employees in the state.

Consequently, "this action has been brought . . . without cause and for purposes of vexation and harassment," the firm's lawyers said in a four-page response delivered to the federal court here last week.

IBM's charge of harassment, while not that unusual in this kind of case, is considered a very strong response, which not only places a burden on the EEOC to justify the conclusions of its investigation of IBM's employment practices and policies, but also sets up later actions in which the company might ask the court to award it attorneys fees if the the government suit is unsuccessful.

Generally, a defendant can only recover defense expenses if it can prove the suit was brought maliciously.

IBM's response to the suit is on the whole a very general denial of race discrimination. A more detailed reply, according to IBM sources, will have to wait until the government advances specific charges to back its claims the company has "intentionally engaged in unlawful employment practices against blacks in the State of Maryland at each of its data processing facilities" in violation of the Civil Rights Act of 1964.

According to the EEOC, a trial, if the suit gets that far, will probably not be held for at least a year.

Belgian Pleads Guilty to Bribery Scheme

By Jake Kirchner

CW Washington Bureau

ALEXANDRIA, Va. — A Belgian citizen recently indicted for attempting to illegally obtain the source code of the Adabas data base management system pleaded guilty to reduced charges in federal court here last Monday.

Under a plea bargain arrangement, Marc Andre DeGeyter admitted trying to bribe a Software AG of North America, Inc. official in order to get a copy of the firm's Adabas source code. Under the original indictment, DeGeyter faced up to 40 years in jail and $80,000 in fines.

DeGeyter was arrested May 18 at New York's Kennedy International Airport after handing over a check for $500,000 to an undercover agent of the Federal Bureau of Investigation in return for two reels of magnetic tape supposedly containing the source code [CW, June 16].

Soviet Company

In entering his guilty plea last week, DeGeyter admitted trying to obtain the tapes for a Soviet foreign trading company, Techmashimport, headquartered in Moscow, according to federal prosecutors.

DeGeyter, a 31-year-old native of Schilde, Belgium, who represented himself as the president of a systems engineering firm in Brussels, faces one year in prison and $25,000 in fines for the charges to which he pleaded guilty. Sentencing is set for Aug 1.

Seven of the eight original charges of interstate movement to facilitate commercial bribery will be dropped after DeGeyter is sentenced on one of them, according to U.S. Attorney Theodore Greenburg.

In addition, the Belgian pleaded guilty to one charge in connection with the Export Administration Act, for which he agreed to pay a $10,000 fine, Greenburg said.

Other Attempts

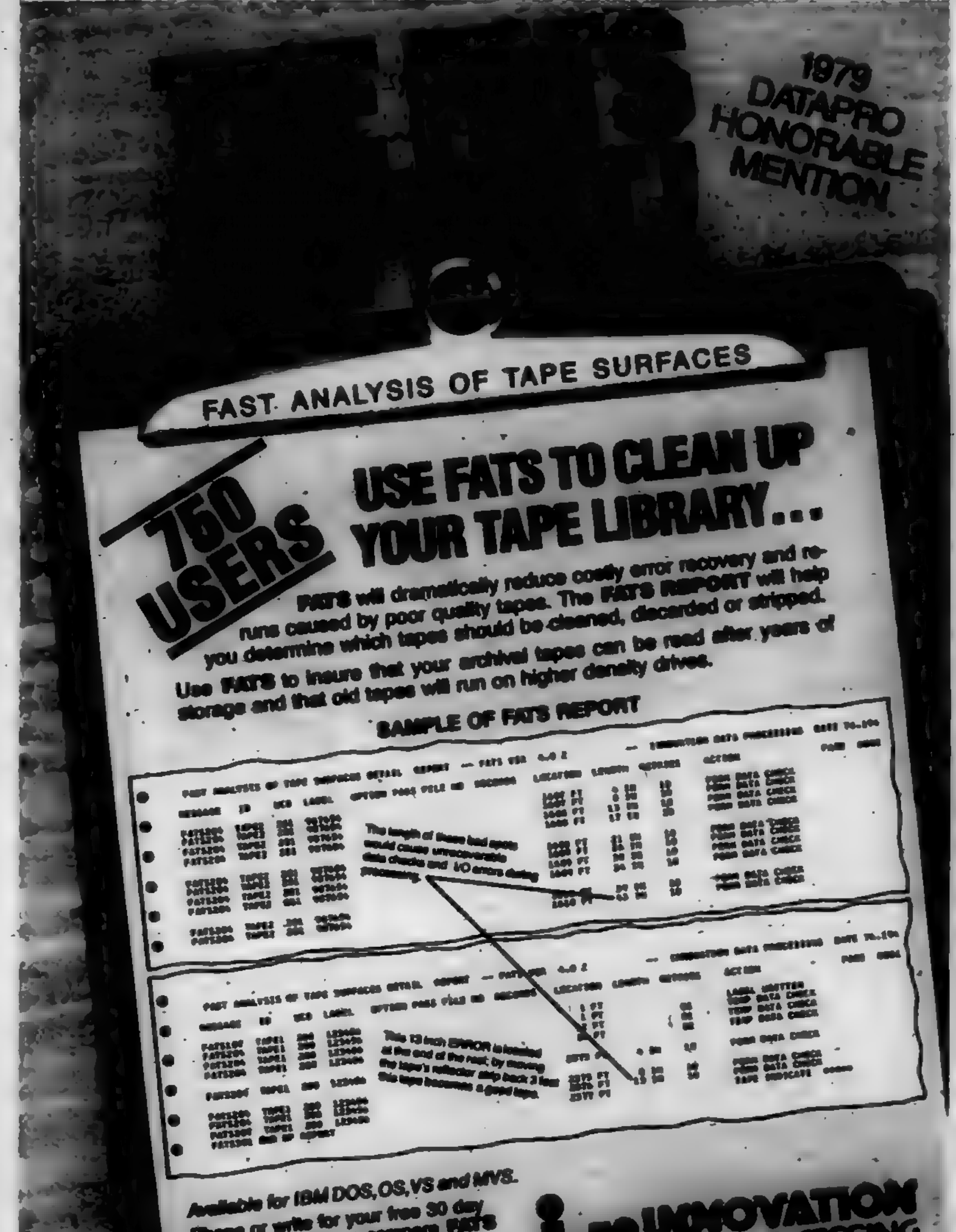
Greensburg said DeGeyter, now free on $100,000 personal bond, had previously contacted "at least one other" firm about obtaining a software package and its source code before he approached Software AG. Greenburg declined to identify that other company.

Although questions remain, including the extent of the alleged Techmashimport involvement in the bribery scheme, Greenburg said the case will be considered closed with DeGeyter's sentencing next month.

Greenburg said no effort was made to determine if DeGeyter actually did represent the Soviet firm in the bribery attempt. But when arrested May 18 in New York, DeGeyter was carrying a Russian visa valid through May 25, according to the FBI.

Greenburg did note one additional item of interest uncovered in the investigation. It seems that in the exchange that led to DeGeyter's arrest in New York, the FBI agent was not the only dissembler.

Just as bogus reels of magnetic tape were given DeGeyter during the exchange, federal investigators later determined that the $500,000 check the Belgian offered in return would have bounced, Greenburg said.



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Advantages Debated

Codasyl? Another Issue for DBMS Shoppers

By Marcy Rosenberg
CW Staff

To go Codasyl-or not to go Codasyl? That's still another question to ask when shopping for a data base management system (DBMS).

Of the nine DBMS vendors surveyed in the accompanying chart, only one, Cullinane Corp., actively markets a Codasyl DBMS to the IBM mainframe user community, although others are available to users outside the IBM camp — for example, from Honeywell, Inc. There are also several for minicomputer users.

Cincom Systems, Inc. claims it has also developed Codasyl versions of Total which it will make available on request, although the firm does not plan to formally announce these products until Aug. 1.

What is a Codasyl DBMS? Briefly, it is a standard model developed by the Codasyl committee which defines a network architecture for data structures as well as the languages and programs to be used to interface with the data base. The committee left the implementation of this model up to the vendor.

Why the debate about a DBMS standard? Well, according to two independent consultants in the data base and data communications field, there are definite advantages and disadvantages to the model.

First, the advantages. Those cited by Thomas F. Meurer, president of Eastern Technical Associates, Inc., include:

- Potential DBMS portability or independence from hardware.
- A larger source of DBMS software professionals to draw from in these times of short supply. It is easier for an individual familiar with one Codasyl DBMS to learn another than it is to move from non-Codasyl to Codasyl.
- The protection offered by a wide installed base — over 4,000 users of Codasyl DBMS', Meurer estimated.

On the minus side, however, the Codasyl model itself is "complicated to use," maintained David Ferris, senior partner of Ferris & Associates. "A programmer has to know a lot about the relations between records and about link paths which become harder to manipulate as the data model grows more complex."

Ferris also contended that the Codasyl model "is not as portable as its proponents would have us believe — but it's a lot better than nothing."

But not to be overlooked is that having a system wrapped around a standard means less dependency on one vendor.

The industry is moving along the lines of these specs and that's what is more likely to survive for the next three to five years."

IBM-Compatible DBMS Hard to Compare

(Continued from Page 1)

user community. While not an exhaustive list of products, vendors or features, the chart presents a comparative overview of these packages.

Clearly a high ticket item, DMBS' carry license fees ranging from $22,000 to $160,000 depending on operating system used, class of CPU and package configuration. Other differences, however, are less clear-cut.

DBMS Architecture

Architecture, for example, used to clearly set one DBMS apart from another. While physical data structures still generally fall into three categories — hierarchical, network and inverted, with relational beginning to evolve — vendors have added capabilities to provide different logical views of data.

This has made boundaries less distinct — for example, network systems that support inverted lists and multilevel hierarchies; hierarchical systems with networking capabilities; and inverted systems with networking capabilities

Users should view architecture in terms of fitness for a particular application. For example, "the more highly inverted the DBMS, the less you'd want to use it for doing interactive updates," remarked David Ferris, senior partner of Ferris & Associates, a computer consulting firm based in San Francisco and London.

Inverted systems are fine for applications that require only ad-hoc querying, he expained, but if a user expects to do "a lot of updates on the fly, the overhead of a highly inverted system may not be appropriate."

Ease of Use

Ease of use for your staff size and expertise is another important evaluation criteria. This characteristic is hard to ferret out, and talking to existing users in similar industries and with similar applications can help.

Industry observers claim some systems, like IBM's IMS, are harder to use because they offer the user many different design choices. Other systems, offering a lot of power but few design choices, are easier to use, they contend, citing Software AG's Adabas which provides only one way to store records and to manage indexes.

Also worth a look are the extent and nature of data management facilities a DBMS vendor offers. For example, all vendors listed claim to offer data dictionaries, but some of these cannot actively capture information from the program source code and have to be fed information by the data base administrator.

Similarly, not all query/update systems are alike.

Another question to pose to vendors of candidate packages is, how integrated are these data management facilities? Earlier this year, for example, Applied Data Research Corp. (ADR) announced plans to further integrate its DBMS system software products through "redesign" and "expansion" by the fourth quarter [CW, May 19]

ADR kicked off this project when it described a three-phase project to integrate The Librarian and Datadictiorary into a single resource control facility, LIB/DD, slated for completion by the third quarter [CW, March 10] slated for completion by the third quarter.

And in March, Intel Corp., which acquired the System 2000 DBMS when it took over MRI System Corp. last year, brought out a number of enhancements to the package, including an integrated data dictionary.

The level of integration of a DBMS with data communications facilities such as teleprocessing (TP) monitors is also important to ascertain. Full integration means one control program, one set of task management facilities, one set of memory management facilities and one log or journal file controls both data base (DB) and data communications (DC) functions.

The advantage of a fully integrated DB/DC system comes into play when automatic on-line recovery is needed after a program fails. In the event of failure, most systems can automatically roll back the data base, but only with an integrated DB/DC system can one also automatically reschedule the message.

Overlapping Features

In surveying these DBMS vendors, certain features were found to overlap all systems and so were eliminated from the chart. For example, all vendors: claim their DBMS':

- Have utilities for file conversion, reorganization and loading/unloading.
- Handle batch and on-line processing concurrently.
- Support data independence down to the smallest addressable unit of data which, depending on vendor terminology, is the field, item or element level.
- Support any IBM and compatible tape, disk and mass storage devices for data base storage. Intel, however, contended System 2000 is the only one that also supports Intel's 3805 semiconductor disk.
- Provide to varying degrees the same performance statistics such as reports on CPU time elapsed, I/O counts, number of data base accesses, disk usage, core usage and contents of the data base.

In addition to candidate packages themselves, the vendors of those packages also bear scrutiny because once a DBMS is chosen and installed, most users find themselves locked in or at least dependent on that supplier for a long time.

Factors such as size of user base and the nature and cost of maintenance, support and training provided are important to consider. Most vendors offer phone-in hot-line services, but some are not operational 24 hours a day, seven days a week. Suppliers usually provide on-site support, but costs and conditions vary.

Regarding the installed base of individual DBMS packages, it should be noted that the numbers cited for Cincom Systems, Inc.'s Total and Intel's System 2000 includes installations of single copies at other-than-IBM mainframe sites.

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Data Base Software Trends Coming Into Focus

By Marcy Rosenberg
CW Staff

A crystal-ball gaze at data base management system (DBMS) technology shows several trends coming into focus.

In the short term, a dwindling supply of software professionals will drive development of new DBMS designs that will minimize the effort required to manipulate data.

Citing this trend, consultant David Ferris, senior partner of Ferris & Associates, points to the appearance of more natural English-like query languages and an increasing dependence of large shops on data dictionaries for control purposes.

And just now peeking over the horizon are two much talked-about data base software developments: software for distributing data bases and relational DBMS.

"We'll begin to see DBMS' that will allow data bases to be distributed geographically and partitioned in different ways, while keeping the physical and logical locations of information in the data base transparent to the user," Ferris said.

Most vendors are working on distributed data base technology and some — including Applied Data Research, Inc., Cincom Systems, Inc., Cullinane Corp., Infodata Systems, Inc. and Intel Corp. — are already touting this capability.

But coming up with the tools for distributing data bases will remain "a challenge for the next five to 10 years," according to Ferris.

Relational Structure

Paralleling the trend to distributed data bases is the evolution of a relational data base structure which has been described as a more abstract way of looking at the data, easier to use and more flexible than hierarchical, network and inverted systems.

A truly relational DBMS has no structure, no indexes and no embedded lists, explained data base consultant Thomas F. Meurer, president of Eastern Technical Associates, Inc. With such a system, he said, a user will see no more complex a view of the data than a flat file or table.

In Meurer's view, some vendors now provide relational views from a structured data base — as Infodata claims to with Inquire and IQ/net — but to support a truly relational DBMS, hardware will have to change. "We'll need trillion-byte memory and content-addressable memory to implement a relational DBMS," he stated.

One vendor that claims to have developed a relational DBMS for Digital Equipment Corp. PDP-11 and VAX-11/780 users is Relational Software, Inc. (RSI) in Menlo Park, Calif. [CW, June 30].

RSI's Oracle, as the product is called, is said to support as its user interface SQL which was developed by IBM as an interface to its own experimental relational DBMS, System R.

Countering the argument that the memory requirements of a relational DBMS are prohibitive, RSI president Larry Ellison said this may have been true of early relational systems which stored data on disk as two-dimensional tables. Today, however, "the relational concept is a logical model and has nothing to do with how data is physically stored on disk," he explained.

RSI said Oracle is currently operating in 20 installations on PDP-11 and VAX-11/780 CPUs running under the RSX, IAS, Unix and VMS operating systems. Plans are to release a mainframe version of Oracle in December for IBM 360, 370, Series 30 and 4300 processors.

CBN Names Casalegno VP

FRAMINGHAM, Mass. — Tom Casalegno has been named vice-president and managing director of *Computer Business News* (CBN), *Computerworld's* sister newsweekly for integrators and resellers of OEM computer products.

Casalegno, formerly president of the Conference Company, will be responsible for sales and marketing for the computer industry publication as well as coordination of all other aspects of CBN's publication, including editorial, circulation and traffic, according to W. Walter Boyd, president of CW Communications, Inc. (CWCI).

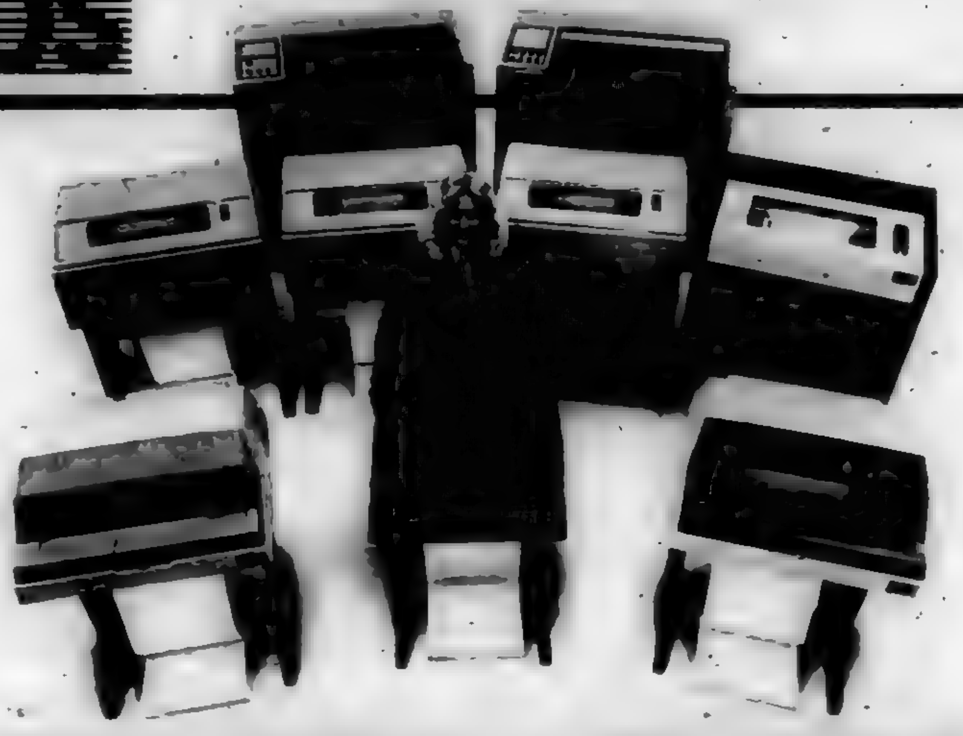
Formerly advertising manager for the Computer Systems Group at Hewlett-Packard Co. in Cupertino, Calif., Casalegno handled U.S. and European advertising for all eight divisions.

"Having spent years on the OEM side of the business," Casalegno said, "I'm really aware of how much this integrator/reseller segment of the industry needs its own publication.

Clarification

Consumers do not always realize that firms sometimes use point-of-sale systems to note which customers seem to have high demand for particular product types, said Prof. Rob Kling of the University of California at Irvine.

These systems can then be used to focus sales campaigns on "likely" prospects, he said, but a recent article [CW, June 23] distorted this observation by calling these consumers "especially susceptible to unscrupulous sales pitches."



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Eleven Representative DBMS Offerings

SYSTEM	Applied Data Research, Inc. Datacom/DB	Cincom Systems, Inc. Total	Computer Corp. of America Model 204	Cullinane Corp. IDMS	IBM DL/1 DOS/VS
[illegible]	No	Codasyl and nonCodasyl versions available*.	No	Yes	No
[illegible]	Inverted list. Index is a separate part of the data base.	Network. Supports multilevel hierarchies and inverted lists. Partial inversion of all key fields is available.	Inverted	Network, with inverted list capabilities.	Hierarchical. Logical relationships and secondary indices provide network and inverted views of the data base.
[illegible]	IBM 360, 370, 4300, Series 30 compatible hardware. DOS; DOS/VS, VSE; OS, VS1, VS2; MVS VM/CMS.	IBM 360, 370, 4300, Series 30 Series 30 and compatible hardware. DOS; DOS/VS; VSE; OS, VS1; SVS; MVS; VM, SCP/CCP VS1; SVS; MVS; VS, SCP/CCP. Runs on other mainframes*.	IBM 360, 370, 4300, Series 30 and compatible hardware. OS and VS; VS1, VS2, SVS.	IBM 360, 370, 4300, Series 30 and compatible hardware. OS; OS/VS1, VS2; DOS; DOS/VS, VSE; MVS.	All 370, 4300 models. DOS/VS, DOS/VSE.
[illegible]	DOS: $47,000 OS: $57,000 Multiuser feature: $11,000	IBM Series 30 DOS Total: $46,000; IBM Series 30 OS Total: $56,000; IBM 4300 Series Total: $15,000*. Other systems fall within these price ranges.	$90,000 to $140,000, depending on features	$80,000	$424/mo*. $384/mo without central maintenance
[illegible]	System itself uses 80K + buffers. No real memory; will run in virtual memory environment.	DOS: 28K OS: 36K	Under 200K for "on-line systems supporting 4-6 terminals."	200K	80K for normal operation. Additional 16K for on-line use.
[illegible]	Datadictionary Datareporter Dataquery The Librarian Extended Text Compositor Dataentry	Yes Socrates T-Ask LMS-II LMS-II ENV-Data	Yes Through User Language Through User Language host language interface or fast-load utility. No No No	Yes Culprit On-Line Query (OLQ) Intellect: an English language query system. No Interact IDMS-Input*	DOS DB/DC Yes Yes Yes Yes Yes
[illegible]	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Through Culprit Yes Yes	Yes Yes Yes Yes
TP Monitor Interfaces	Datacom/DC (ADR), CICS, Task/Master Westi	Series 80 Environ/1-(Cincom) TSO, CICS/VS, Shadow II, Task/Master, Intercomm, Westi	Model 204 TP (Computer Corp of America) CICS, TSO, Intercomm	IDMS-DC (Cullinane), CICS, TSO, Intercomm, Task/Master, Westi	CICS/DOS/VS
Source Program Languages Supported	Cobol, Fortran, Assembler, PL/1, RPG-II, and any language that has a standard CALL facility.	Cobol, PL/1,BAL, RPG-II, Basic and any language that supports the CALL statement.	Cobol, Fortran, Assembler, PL/1	Cobol, Fortran, Assembler, PL/1	Cobol, Assembler, PL/1, RPG-II, VSAPL through CICS
Does DBMS allow concurrent retrieval and concurrent update (multithread)?	Yes	Yes	Yes	Yes	Concurrent access for read and/or update with full integrity and deadlock control.
Limits on Number of: 1) Record or Segment Types 2) Searchable Fields per Record 3) Occurrences of a Single Repeating Group 4) Integrity Relationships	Up to 240 in one data base. 255 No Limit 255	No Limit No Limit Not Applicable 2,500 can be defined per data base file.	No Limit 4,000 256 No Limit	No Limit No Limit No Limit No Limit	255 segment types and 15 levels per data base. 255 fields can be defined within a segment; 1,000 within a data base. Segment occurrences in a data base limited only by external storage. Not Available
Access Methods	Sequential, indexed-random, inverted.	Sequential in user-designated sequence, sequential by key, direct via key, inverted list, partially inverted and multiple keys and random.	Sequential, indexed, indexed-random, inverted and key.	Sequential, indexed, indexed-random, inverted, random, serial and key.	Sequential, indexed sequential, indexed direct, direct.
[illegible]	Only if user knows the direct address of the data.	Yes	No	Yes	Yes
[illegible]	Yes	Yes	Semiautomatic interface	Yes	Yes
[illegible]	Yes	Yes	No	Yes	Yes
[illegible]	200	2,700	50	550	Not Available**

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* Codasyl versions are available on request for an additional $7,[illegible]. Cincom will formally announce these products in October.
* Total also runs on the following mainframes: Burroughs Corp. models [illegible] through 4800 under MCPV and MCPVR; Control Data Corp. 6000 and Cyber 70, 170 under Scope, Kronos and NOS and the CDC [illegible], under Master; Honeywell 200/2000 series under MOS 1 and OS2000, Level 62 under Gcos [illegible], Level 66/6000 under Gcos [illegible] and Level 6 under Gcos 6-400; ICL 1900 series under George and the 2900 series; NCR Century series under B series and Criterion series under [illegible] and VRX; Siemens 4004 under BS-1000; Univac 9000/9700 under OS/4; Univac 90/60, 70, 80 under VS9; Univac 90/30 and 90/40 under OS/3; General Electric Co. of the UK (GEC) 4000 series;
* System 2000 also runs on the following mainframes: Control Data Corp. 6000 Cyber 70, 170 under Scope, Kronos, NOS, NOS/BE and Apex; and Univac 1100 under OS/1100 (Exec 8) and CSTS.
* Cincom's 4300 series Total is only available for the 4331. Shipments are scheduled to begin Aug. 1.
* The extended version costs extra.
* QUEST for System 2000 will be available in third quarter 1980.

Run With IBM-Compatible Mainframes

IBM IMS/VS	Infodata Systems, Inc. Inquire	Infodata Systems, Inc. IQ/net	Intel Corp. System 2000	Mathematica Products Group Ramis II	Software AG Adabas
No	No	No	No	No	No
Hierarchical. Logical relationships and and secondary indices provide network and inverted views of the data base.	Partially inverted. Can connect multiple data bases dynamically without hardwired pointers to achieve network, hierarchical or relational views.	Partially inverted. Can connect multiple data bases dynamically without hardwired pointers to achieve network, hierarchical or relational views.	Hierarchical, with networking capabilities.	Hierarchical, with networking capabilities.	Inverted file, with networking capabilities
All 370, 4300 models. VS1, MVS	IBM 360/40 and above. IBM 370 and compatible. All operating systems except DOS.	IBM 4331, 4341.	IBM 360, 370, 4300, Series 30 and compatible hardware. OS/MFT; OS/MVT; VS1; SVS; MVS; VM/CMS; DOS/VS; VS; VSE; Edos. Runs on other CPUs[6]	IBM 360, 370, 4300, Series 30 and compatible hardware. MVS; OS; CMS; DOS,DOS/VSE.	IBM 360, 370, 4300, Series 30 and compatible hardware. "All IBM operating systems."
$1,040/mo[13]	Inquire/Basic (Single-thread): $70,000. Inquire/-DBMS (multithread): $120,000. Inquire/Text (with text searching): $100,000.	Model 1 (single-thread): $85,000 Model 2 (multithread):	$60,000 to $100,000, depending on configuration.	$22,000 for CPUs up to 370/148 or the 4331. $43,000 for larger CPUs.	$60,000 to $100,000, depending on the operating system.
70K. Memory requirements for prerequisites such as access methods and sorts must be added to the base.	Inquire/Basic: 150K to 200K Inquire/DBMS: 1M 1M (can be virtual)	Model 1: 150K to 200K Model 2: 1M (can be virtual)	IBM: 200K Univac: 32K words CDC: 28K octal words	250K using nonprocedural language. 70K using procedural language interface.	150K of real memory.
OS DB/DC	Edict	Edict	IDD basic IDD extended[7]	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Adacom
Yes	Yes	Yes	Quest QUBE (Query Update By Example)[7]	Yes	Adascript
Yes	No	No	Plex	Yes	No
Yes	No	No	No	No	No
Yes	Yes	Yes	Yes	Yes	Through Natural
Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Not Automatic	Yes
Yes	No	No	Yes	No	Yes
Yes	Yes	Yes	Yes	Not Automatic	Yes
CICS/OS/VS	CICS, CMS, TSO, Intercomm; none from vendor.	CICS, CMS, TSO, Intercomm, none from vendor.	CICS Intercomm Shadow II None from vendor[8]	MPGSWIFT (Mathematical) IMS/DC, CICS, TSO, CMS, ETSS, ICCF, GUTS, TONE	Com-plete (SAG), CICS, TSO, Shadow II, Intercomm, Westi
Cobol, Assembler, PL/I,	Cobol, Fortran, Assembler, PL/I	Cobol, Fortran, Assembler, PL/I	Cobol Fortran Assembler PL/I	Cobol Fortran Assembler PL/I	Cobol Fortran Assembler PL/I
Concurrent access for read and/or update with full integrity and deadlock control.	Yes	Yes	Yes	No	Yes[9]
255 segment types and 15 levels per data base.	No Limit	No Limit	999 per data base	No Limit	16 million records per file up to 255 files
255 fields can be defined within a segment; 1,000 within a data base.	1,000	1,000	No Limit	No Limit	200
Segment occurrences in a data base limited only by external storage.	No Limit	No Limit	16.7 million per data base	No Limit	100
Not Available	In one query can connect 32 different data bases.	In one query can connect 32 different data bases.	No Limit	No Limit	80 files can be in the coupling network.
Sequential, random, inverted, direct.	Sequential, indexed, indexed-random, inverted.	Sequential, indexed, indexed-random, inverted.	Sequential, indexed, indexed-random, inverted, CALC key.	Sequential, indexed, random.	Sequential, indexed-random, random.
Yes	No	No	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	No[10]
Yes	No	No	No[11]	No	No
Not Available[14]	150	6	300 to 400	300	600

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[7] [illegible]-Input will be available from Cullinane in fourth quarter 1980.

[8] A vendor-developed TP monitor, TP 2000, was available for System 2000 until mid-1979. TP 2000 is no longer marketed because "CICS has such market dominance," an Intel spokeswoman said.

[9] Multithreading was added in the latest release, Adabas 4.1.

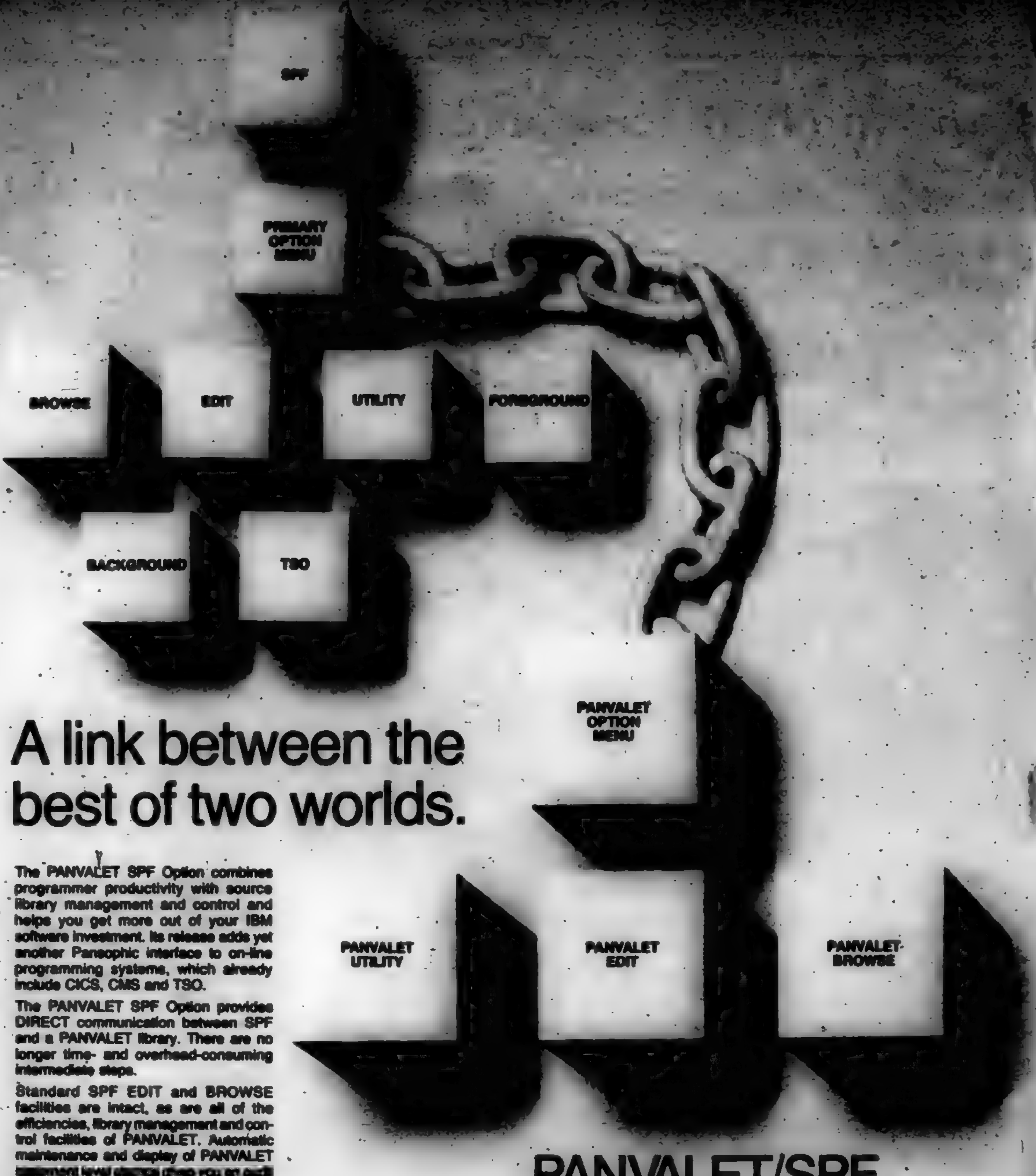
[10] Software AG plans to add this feature in 1981.

[11] Intel will enhance the dictionary in the fourth quarter to provide this feature.

[12] Size of user base is defined as the number of installations of single copies of the DBMS. For example, service bureaus with more than one copy are counted as one installation.

[13] IBM said DL/1 DOS/VS and IMS/VS can only be licensed on a monthly basis.

[14] IBM refused to disclose the number of installations of single copies of DL/1 DOS/VS or IMS/VS. The most recent estimates from International Data Corp. — extrapolated from responses to its May 1979, Planned IBM Migration Survey questionnaire — projected the number of installations for year-end 1979 at IBM 360, 370 and planned Series 30 sites. These numbers were 2,700 for DL/1 and 700 for IMS.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Model Predicts IBM CPUs' Values

By Tom Henkel
CW Staff

NEW YORK — An IBM industry analyst here is offering a computerized model of the IBM 370, 30 series and 4300 series CPU leasing market that is said to accurately predict residual values of IBM CPUs up to five years in the future.

Released by the Gartner Group, Inc. and developed in conjunction with Alanthus Computer Corp., the Residual Asset Value Estimation (Rave) package consists of about 2,000 lines of APL code linked to a 1M-byte data base on National CSS, Inc.'s remote computing service. Unlike similar models, the package is said to incorporate site-specific variables to give the user a more tailored prediction of his CPU's worth, the firm said.

Currently offered only as part of Gartner's $12,000/year end-user and $18,000/year vendor packages, the program is only available to users on a batch-run basis. Users will receive updated runs of the program that will list the best and worst case effects of changes in the IBM system 370 marketplace. If a user wants to submit more specialized information to the model, such as various forms of what-if analyses, he must do so through the Gartner Group, which will then submit the job to the program.

A remote terminal link-up to the program is not available, but Gartner did not rule out the possibility of such a terminal in the future. Additional runs of the program, aside from the regular updates published by the firm, will cost the user about $100, according to Gartner.

The Rave model is predicated on two crucial assumptions: first, the characteristics of the used-computer marketplace are a tangible commodity, and those characteristics are stable enough to be simulated.

Second, the model assumes IBM cannot influence the market value of its systems. Instead, the model assumes that the market value is determined by CPU's perceived price/performance within the constraints of supply and demand. The model further assumes additional IBM CPU announcements are predicated on the macroeconomic, technological and market forces beyond IBM's control, the firm said.

Like similar models, Rave depends on a number of heuristics, such as higher premiums for early delivery following new product announcements and a characteristic drop in demand for used CPUs in anticipation of new CPU price cuts just prior to product announcements, Gartner said.

Drawing from a "complete IBM mainframe evolution scenario" derived from data supplied by Alanthus and similar vendors, the model simulates the market dynamics resulting from displacements of installed used CPUs by more cost-effective CPUs. This displacement is seen to occur in the presence of changing supply-and-demand relationships against a background of steadily eroding price/performance levels and steadily increasing support costs.

Used-CPU prices are projected from this data on the assumption that demand will be satisfied in the most cost-effective way, Gartner's Dave Stein said.

"It is no secret that IBM's actions dominate the market. By making this marketplace more independent through better information, it will be able to stand on its own merits and resist the confusion that often accompanies new technology," Jerry Minsky, president of Alanthus said.

"Investment in IBM hardware is by no means obsolete when a new product comes along. The 370 [software] compatibility will remain the de facto standard," Minsky added.

Minsky provided the seed money for the Gartner venture with the understanding that Gartner's firm would split profits derived from it on a 50-50 basis until Minsky's seed money is repaid, Gartner said.

The Gartner Group is at 545 Steamboat Road, Greenwich, Conn. 06830.

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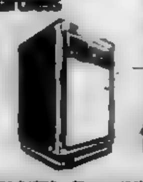

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UCLA Extension

FAA Accused of Lying About CPU Outages

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Federal Aviation Administration (FAA) officials are "not telling the whole truth" about the seriousness of air traffic control computer failures and should be replaced, an influential congressman said here recently.

Opening a day-long hearing on charges that the nation's air traffic control system is obsolete, breaks down more than the FAA admits and is staffed by undertrained personnel, Rep. John L. Burton (D-Calif.) termed the situation "terrifying" and "alarming."

The June 30 hearing before a House of Representatives transportation subcommittee chaired by Burton was marked with heated debates between FAA officials, who claimed the system is reliable and safe, and members of Congress and representatives of air traffic controllers, maintenance personnel and pilots, who argued that the system needs immediate upgrading.

As during similar hearings last November, the central issue was not just the reliability of the system's computers and radar systems, but the accuracy of FAA reports on incidents of computer interruptions and outages [CW, Dec. 3].

Rep. Bob Whittaker (R-Kan.), whose office has conducted an eight-month investigation, told the hearing he has uncovered "startling new findings which cast serious doubt on the conduct and management of air safety by FAA personnel."

Similarly, subcommittee Chairman Burton charged the agency officials of lying "when they tell the American public that there are not safety problems when air traffic computers break down, air controller centers are understaffed and some controllers undertrained.

"If the FAA downplays the seriousness of the situation and continues to give us excuses and the computer radar problem isn't solved," Burton continued, "then the top management should be replaced."

Central to the charges of FAA malfeasance are allegations by Burton, Whittaker and industry representatives that computer maintenance logs are being "doctored" to show fewer problems with computer failures than a full accounting would indicate.

Charges Refuted

FAA Administrator Langhorne Bond, however, told the subcommittee the charges are "incorrect." He also strongly refuted charges that the agency has "attempted to suppress the accurate reporting of data."

"The performance of our air traffic system has improved, not decreased, in the past five years," Bond said. "Significant threats to safety aren't posed by system interruptions."

The system, he continued, "has experienced fewer startovers, fewer outages and the total time for unscheduled outages has also dropped."

Addressing Rep. Whittaker at the hearing, Bond said, "I would like you to show this committee or me or anyone one single example of a falsified record or any piece of evidence to substantiate the claims that you have made about criminal activities or inaccuracies in our [reporting] system — one evidence, one piece."

Whittaker, however, has declined to supply the FAA with the evidence he alleges to have collected during his investigation, explaining that the Justice Department has advised him not to in light of an investigation that has been undertaken by the FAA parent agency, the Department of Transportation (DOT) (see related story).

Falsified Reports

Detailing some of his findings for the subcommittee, Whittaker claimed to have "evidence from FAA employees that they were instructed by FAA management to enter false [computer] outage reports.

Nationwide, he said, from 1973 to 1978 the number of near-miss midair collisions increased more than 83%.

In addition, Howard E. Johannssen, president of the Professional Airways Systems Specialists, told the subcommittee that equipment "repair records are often not recorded or instead are changed to simply indicate that a lesser or minor corrective action is taken in order to boost the reliability statistics."

Beyond wanting the FAA to admit to greater problems than it will concede at this point, critics of the system hope to force the agency to increase funding to replace its World War II vintage radars and aging IBM 9020 mainframes with more sophisticated equipment at a faster rate than now planned by the FAA.

The subcommittee said it will continue its own investigation of the charges leveled against the FAA, and more hearings are expected. In the meantime, Whittaker has promised to continue his own investigation in conjunction with that of the DOT inspector general.

Probe of FAA Requested

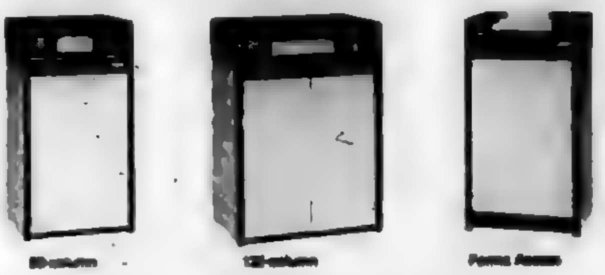
WASHINGTON, D.C. — Following reports of serious air traffic control computer outages in New York, Chicago and Fremont, Calif., Sen Charles H. Percy (R-Ill.) and Rep. Bob Whittaker (R-Kan.) called for an investigation into the safety of the Federal Aviation Administration's (FAA) computerized air traffic control system.

In a letter delivered last week to Elmer B. Staats, the comptroller general of the U.S., Whittaker and Percy said "doubts have been raised as to whether commercial aviation is as safe as it can possibly be.

"The FAA reports that between 1974 and 1978, the number of reported near mid-air collisions has increased 76% from 283 to 503," the letter continued. "And because many such incidents go unreported, these ominous statistics are probably understated."

The letter specifically asked the General Accounting Office (GAO) to investigate the air traffic control computer system and personnel problems within the agency. Personnel problems in question include maintenance technician and controller staffing levels around the country.

Citing the recent 10-day computer breakdown at O'Hare International Airport in Chicago, the letter said, "We cannot afford to underestimate the danger to public safety posed by the lengthy breakdown of air traffic control computers at the busiest airport in the world."



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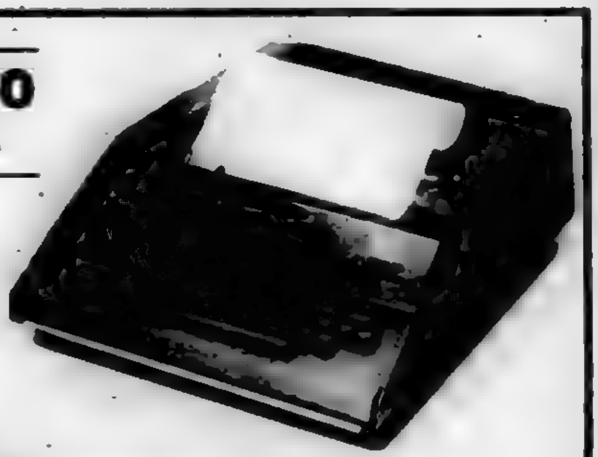

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Transportation Department Agrees to Probe FAA System

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The Department of Transportation (DOT) said here recently it has agreed to investigate Federal Aviation Administration (FAA) management of the nation's air traffic control system.

The investigation was requested by Rep. Bob Whittaker (R-Kan.), whose office has been studying the problem of computer and radar failures at the 20 U.S. air traffic control centers.

Whittaker requested the investigation recently claiming the FAA has "deliberately deceived me and the entire U.S. Congress concerning the severity of air safety problems" [CW, June 16].

At a news conference late last month, Whittaker said he is "very pleased" the DOT inspector general will take on the investigation.

"When I began my investigation into the FAA eight months ago, I had no idea that we would find the wide range of serious problems that we did, nor did I think we would find officials of this agency who would attempt to cover up or fail to report safety problems," Whittaker said.

According to the Kansas congressman, his inquiry has documented 27 near-miss midair collisions involving commercial airliners that had not been reported by the FAA at 10 of the 20 air traffic control centers.

Because the DOT, in conjunction with the Justice Department will undertake this investigation – which a Whittaker aide estimated will take at least six months – Whittaker has refused an FAA request to turn over his evidence to the agency the evidence he has collected.

Whittaker said he did not want to "compromise" the DOT investigation by giving the evidence to the FAA. The investigation could conceivably lead to criminal action against FAA officials if they are found to have lied to Congress about the computer outage problem, the congressman's office explained.

In a recent telephone interview, Whittaker aide Steve Lotterer also noted that the Congressman's investigation has relied in part on confidential information supplied by FAA employees whose jobs could be jeopardized if their superiors were to obtain Whittaker's files.

Lotterer said Whittaker will continue his own investigation.

Net Seminar Set For Six Cities

LOS ANGELES – Cost control will be the focus of the 22nd Annual Data Processing/Datacommunications Conference to be held here Oct. 19-22 by the National Retail Merchants Association (NRMA). The 50-session meeting will draw participants representing many large retailers, but will also offer sessions for smaller and independent merchants.

Robert E. Dewar, chairman of the executive and finance committees of K Mart Corp., is the keynote speaker.

The fee for members is $265 for four days and $135 for one day; nonmembers will be charged $390 and $200, NRMA said from 100 W. 31 St., New York, N.Y. 10001.

Correction

The first paragraph of "Stag, State Lock Horns on Software Taxes" [CW, June 23] erroneously stated that a suit to be filed by California's Sales Tax Action Group (Stag) against the State Board of Equalization would either demand a refund for or contest software taxes assessed on Simplicity Pattern Co., Inc. The action will actually cite the case of a Stag member DP company, yet to be chosen.

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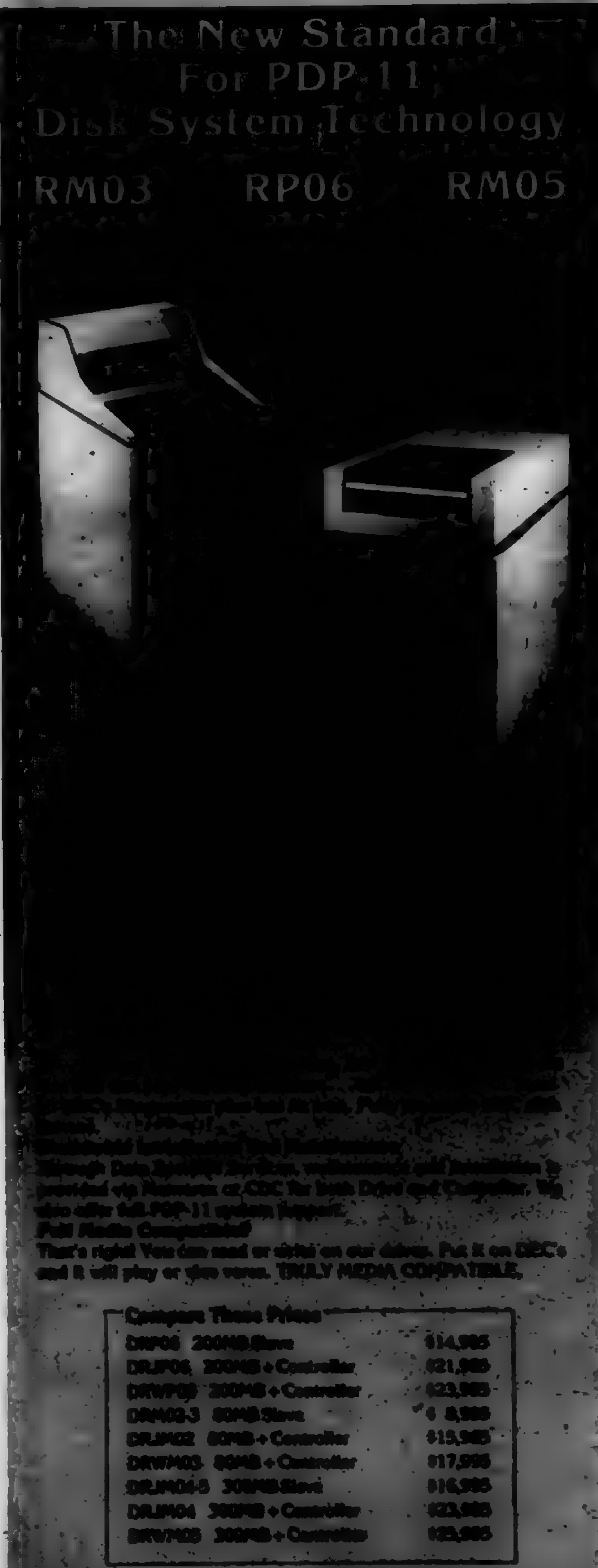

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DATA SYSTEMS SERVICES

High Court Reinstates Federal I/O Standards

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — In a last-minute action, the U.S. Supreme Court recently reinstated four federal I/O interface standards that had been delayed at the request of four mainframe companies suing to have them permanently overturned.

In a five-to-one decision on the last day of its spring session, the court overruled a recent lower court decision to block implementation of the standards pending the outcome of suits brought by Honeywell Information Systems, Inc., Burroughs Corp., Control Data Corp. and Sperry Corp.

The decision came only days after Supreme Court Justice William Brennan had turned down a government request to lift the stay of the standards [CW, July 7]. Following Brennan's decision, the government asked the full court to consider the matter which led to the recent decision to reinstate the standards.

The Supreme Court action culminated several weeks of shuttling activity surrounding the June 23 implementation date for the standards, which are now mandatory for all medium- and large-scale systems procurements of the federal government.

The four companies, arguing the standards will require years of time and millions of dollars to comply with, had hoped to block their implementation until their suits could be heard. As presently scheduled, the suits will not come up before the U.S. Appeals Court until early next year.

The U.S. District Court here threw out the suits in January, deciding the four firms did not have legal "standing" to challenge the federal standards activity in that court. [CW, Feb. 11]. That decision was then taken to the Appeals Court by the firms.

The companies asked the Appeals Court for an expedited hearing, arguing the need for a decision before the June 23 implementation date. That request and subsequent requests for assistance from the Secretary of Commerce and Rep. Jack Brooks (D-Texas.) were turned down.

Finally, on June 20, the four companies asked the Appeals Court for a stay of the standards pending the appeal, a request that was granted June 24 [CW, June 30]. At that point, the government successfully approached the Supreme Court to have the stay vacated and the standards reinstated.

George D. Ruttinger, attorney for the companies, described the Supreme Court action as "virtually unprecedented" in that the whole court quickly overruled one of its members in a situation that, unlike a request for a stay of execution, did not involve life and death.

Looking to the future, the attorney said he will again ask the Appeals Court for an expedited hearing. He noted that, under the present scheduling, the case might not be heard until early next year, with a decision coming as many as six months after that.

Even then, he pointed out, the suits of the four companies will still not have been heard on their merits. Assuming the Appeals Court agrees with the companies and directs the District Court to consider the arguments in the suits, it could be as long as two years from now before the suits are settled.

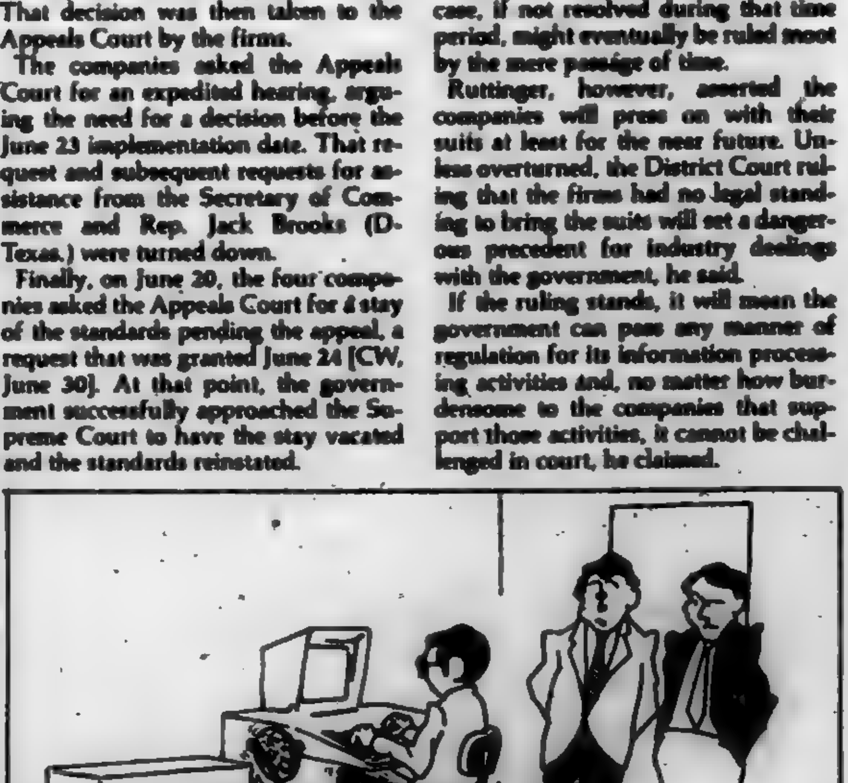
The suits, filed separately by the four mainframers last fall, argued that the Secretary of Commerce exceeded her authority in adopting the standards for federal use, that the standards were arrived at capriciously and that, based on IBM architecture, the standards will harm the four companies' government trade to the benefit of IBM and plug-compatible manufacturers [CW, Oct. 22, 29].

Moot Ruling?

As immediately damaging as the Supreme Court decision was to the four companies' government business, the long-term effect on their suits might be even more damaging, observers noted last week. One source close to the case noted that because the companies argue that complying with the standards will take several years, the case, if not resolved during that time period, might eventually be ruled moot by the mere passage of time.

Ruttinger, however, asserted the companies will press on with their suits at least for the near future. Unless overturned, the District Court ruling that the firms had no legal standing to bring the suits will set a dangerous precedent for industry dealings with the government, he said.

If the ruling stands, it will mean the government can pass any manner of regulation for its information processing activities and, no matter how burdensome to the companies that support those activities, it cannot be challenged in court, he claimed.



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Data Base System Assists Republican Campaign Staff

WASHINGTON, D.C. – A data base management package is helping Republican National Committee (RNC) staffers gain easy access to computerized information needed for campaign decision making with very little assistance from computer center personnel.

The RNC's central computer facility, manned by a staff of 40, is the heart of a widespread sophisticated operation covering contributions and allocation of campaign funds, voting histories down to the precinct level, candidate positions on issues, legislative voting records, general administration, special events calendars and even a reservation and tracking system for this year's national convention in Detroit, according to Director of System Software Development Marcus Heth.

Only two years ago, RNC faced a computing crunch characterized by rising work loads and mounting demands for instant information from various offices.

Marcus Heth (right) consults with Computer Services Director Ron Charnock.

RNC's solution was to acquire greater computer power and put it directly into the hands of the users via data base system. The organization replaced its IBM 360/40 with a Digital Equipment Corp. Decsystem-2040 with 192K words of memory, two RPO6 disk drives, two TU-45 tape drives, an LP07 printer and 16 CRT terminals. Evidence of the system's popularity lies in the fact that today, only six months after installation, RNC needs more memory and has ordered an additional 24 CRTs.

The System 1022 data base management system from Software House of Cambridge, Mass., was chosen in preference to two competing packages because of its functionality, faster data base manipulation and ease of use.

System Use

Direct use of the system has spread to all major activities of the 300-person RNC headquarters, according to Heth. These groups, all reporting to the chairman's division, include:

- Political affairs, responsible for the allocation of both campaign funds and expertise.
- Public affairs, charged with research and dissemination of information relating to various issues and campaigns.
- Finance, which oversees the massive fund-raising effort.
- Administration, whose functions include Federal Election Commission reporting, accounting and other housekeeping functions.
- Computer services most of whose activities are campaign-oriented.

Another growing user of the RNC system is Repnet, a network of Republican state committees tied into the central computer via remote CRT terminals and printer facilities. These groups have their own files on the Decsystem-20 and tap the system for help in fund raising, campaign strategies and accounting.

As nontechnical people located far from day-to-day computer counsel, they are also major beneficiaries of the System 1022 simplicity. "We brought them in for a week's training," Heth remarked, "and they picked up System 1022 in a couple of days." Today, via the central system, they can easily obtain all types of reports that "used to be very difficult," such as year-to-date contributions greater than X or results-analysis of a mailing signed by a governor.

RNC offers its Repnet users a number of computer-based services for analyzing the best use of campaign resources, determining swing-vote areas, providing vote goals, fund raising, word processing for mailings, tracking voting records and performing campaign accounting.

Election Analysis

One of the primary services provided by RNC's Political Affairs Division is election analysis. Its objective is to present solid direction to candidates to help determine where best to devote their resources, e.g., in ticket-splitting precincts. The election analysis system employs a massive data base containing election statistics on 175,000 precincts for all major races dating back to 1972. The data is amassed in the field and brought to Washington, D.C. for computerization.

This information, along with demographic data such as race, religion and income levels is analyzed in "free-form" seminars involving computer services, computer consultants and the System 1022. Via CRT terminals and the Advent screen, various county results and races are analyzed, juggled and analyzed again. "The data base system gives us a quick look at any information we want to see, any way we want to see it," Heth reported.

Surveys are another vital political affairs contribution to campaign strategies. The resulting data is cross-tabbed – using a statistical package (SPSS) – and forwarded to campaign consultants.

Like the electoral analysis system, the Finance Division's fund-raising efforts are on a national level and huge in scope. The main thrust is mailings, primarily handled by purchased lists and outside services. External help is necessary in this area: hundreds of mailings are under way at any one time, and more than 35 million pieces will be mailed in 1980, Heth said.

What comes in, goes out; the Political Affairs Division monitors campaign disbursements to make sure that allocations are made strategically, equitably and according to Federal Election Commission regulations. All allocations are tracked by the system, which also generates the myriad reports required by the commission.

Also under way on RNC's system is testing related to voter registration. Telephone books for selection areas are being compared with voting rolls for those areas to locate unregistered voters.

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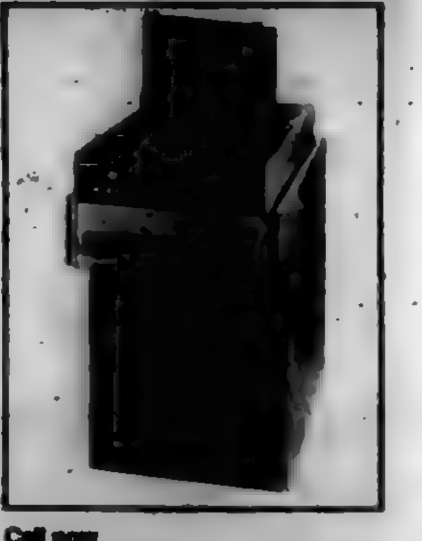

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NTIA Publishes Simulation Aid

SPRINGFIELD, Va. – A computer model for planning and evaluating time-sensitive public service telecommunications systems is available in a special publication from the National Telecommunications and Information Administration (NTIA).

Entitled "Simulation Modeling of Emergency Medical Services Telecommunication Systems," the study explores the application of computer simulation techniques to the planning and evaluation of an emergency medical services system.

The publication, NTIA-SP-80-5 costs $11 from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161.

School District Saves $13,000

WAYNE, Mich. – The Wayne County Intermediate School District saved more than $13,000 by making the loop station connectors (LSC) needed to link terminals to IBM 8100 systems in Christmas tree light fashion. (See story Page 19.)

The LSCs provide improved communications as well as terminal portability – in much the same way telephone jacks allow phones to be moved around.

About 500 loop station connectors were needed for the school district's network, at a cost of $70 each from the original vendor.

The Intermediate's Data Processing Maintenance and Special Projects staff discovered that a locally designed LSC, with parts produced by local firms and assembled under Intermediate supervision, could be produced for a fraction of the manufacturer's cost. This was possible for two reasons.

First, the Intermediate has a history of research and development efforts and supports an R&D facility and staff. Secondly, the Intermediate's need for LSCs for the many 8100 systems to be installed in local districts provided a large base for economical local manufacture.

Local school districts may obtain three of the Intermediate's LSCs for the price of one from the original vendor. This reduction in price has allowed districts to install LSCs in many areas and has encouraged the sharing and moving of equipment where it is needed.

The first 80 Intermediate-produced LSCs were recently installed in local school districts. They are functioning well and have met all original specifications of the manufacturer. The success of this effort has increased efficiency in local buildings.

Anyone interested in obtaining more detail on the development of the Intermediate's LSC is encouraged to contact Jerry Henderson, director of data processing, Wayne County Intermediate School District, Wayne, Mich. 48184.

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What's more, you can forget about those rigid hardware restrictions imposed by IBM. MVT/VSE simulates missing hardware features, allowing the full 4300 instruction set to be used on all CPUs, including 360s. It even simulates block multiplexor functions on selector channels to allow attachment of any vendor's 3330 disks.

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Federal Meet To Target Office

WASHINGTON, D.C. – The First Annual Federal Office Automation Conference to be held here Nov. 4-6 will focus on technological advances in the automated office and state-of-the-art uses by the federal government.

The program features sessions for professionals and novices on such subjects as concepts and terminology and telecommunications as a catalyst for the automated office. More information is available from Federal Office Automation Conference, P.O. Box E, Wayland, Mass. 01778.

Dunbar Elected IIA Chairman

TORONTO – David V. Dunbar of Bell Canada here today was elected chairman of the board of directors of the Institute of Internal Auditors, Inc. (IIA), an international professional association with 22,000 members in 85 countries throughout the world.

Dunbar succeeds Charles L. Brown of J.C. Penney Co. in New York in the top Institute leadership position, according to IIA.

Named senior vice-chairman of the board during the IIA's 39th international conference at the Royal York Hotel here was William E. Thompson of Alabama Bancorp. in Birmingham.

Charles L. Duly of Standard Telephone & Cables, Ltd. in London was chosen international secretary, and James A. Hooper, of Southern California Edison Co. in Rosemead will serve as international treasurer.

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Network Draws Daily Picture of School Budget

WAYNE COUNTY, Mich. — With purse strings tightening on local school budgets around the country, the Wayne County Intermediate School District has developed a computer network that lets its local administrators get an immediate picture of how daily spending impacts their budgets.

"This system allows administrators to look at any account at any time," said Jerry L. Henderson, the Intermediate's data processing director.

"They can get the most current information on the amount spent on items from volleyballs to heating oil, so they'll know exactly where their budget stands at any given moment."

Like other schools, the nation's third largest intermediate district is faced with mounting fiscal challenges caused by decreasing enrollments, increasing costs and the prospect of reducing federal funding.

Up-to-the-Minute Reports

To meet these challenges, the intermediate has developed a system using IBM 8100 processors that gives participating local districts up-to-the-minute reports on all their financial accounts, so they can control day-to-day spending and remain within their budgets.

In addition, the system will be given a personnel function within a year to aid with efficient staffing and is now using the 8100s to access the Intermediate's main IBM computer for student counseling.

The main computer is a 370/158 AP with 3M bytes of IBM main memory and another 3M bytes from Cambridge Memories, Inc. (CMI). An additional 2M bytes of CMI add-on memory will be installed soon, Henderson said.

The system supports two 3705 communications controllers. One runs the 8100s under Systems Network Architecture and the other supports a Bisynchronous network that ties in a variety of other equipment, including several IBM 3780 remote job entry terminals, and scanners and terminals from other vendors, Henderson said.

The Intermediate has installed the 8100 processors at six of its 36 local districts and plans to install them in 21 more during the next two years.

Instead of relying on monthly reports or waiting for time on the Intermediate's main computer to process local financial data, the system gives the local district its own computing power for current budget information, showing the status of all accounts and vendor contracts.

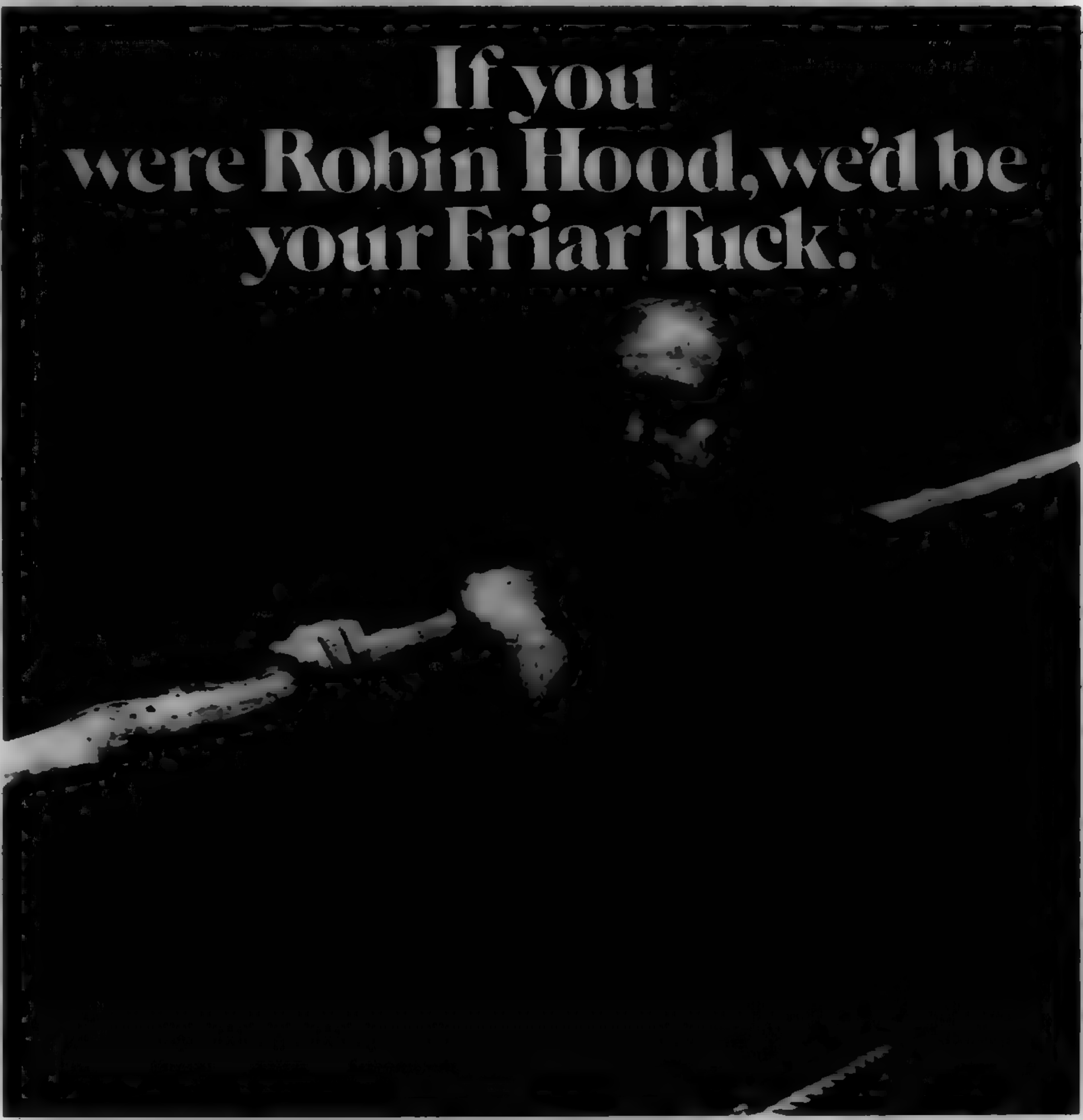
Henderson said that by simply entering an account number, an administrator will be given a complete rundown on the account, including the original amount budgeted, any amendments to the budget, the year-to-date expenditures, the remaining balance, the previous year's budget and the previous year's expenditures.

Accounting tasks that formerly took two days to a week can now be done "in a matter of minutes," according to Henderson. He also noted that the cost of comparable operations run 15 years ago would have been more than 10 times greater than the current cost of an 8100.

This operational cost reduction allows the Intermediate to provide increased data processing operations to the locals without comparable increases in cost.

With the system's connection to the main computer, it already gives counselors and students in the local districts the ability to directly access student educational information.

This information management system has "given new life" to counseling, Henderson said, by allowing counselors to directly enter course requests for students, change student schedules in minutes rather than days and immediately review schedules, grades and attendance.



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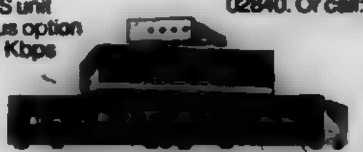

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Computer Graphics Captures

By a CW Staff Writer

WATCHUNG, N.J. — About 12 years ago, Lillian Schwartz, a veteran free-lance artist, discovered the computer as an artistic tool. It happened at the prestigious New York Museum of Modern Art's special show called "Machine," where Schwartz's kinetic sculpture was one of nine works displayed.

Computer graphics selected for display from the works of Ken Knowlton captured her imagination, she said, and from that time on she has been working almost exclusively with processes she borrowed from Knowlton.

The work she saw at that time was based on a 35mm negative that had been scanned, digitized and printed on paper with a variety of character symbols.

From those first tentative steps in 1969, Schwartz has progressed to the point where she now supports herself comfortably by producing sophisticated computer video projects, many of which have been shown on the Public Broadcasting System (PBS). She has shown her works all over the world and maintains an impressive schedule of lecture and teaching engagements.

Schwartz regards the computer as a tool that allows her to expend her artistic possibilities further than many of the more traditional tools of her work, largely because it offers her the opportunity to do a lot of things faster than was ever before possible. That speed enables her to attempt things that "I would otherwise never consider trying," such as complex graphics effects, she said.

Schwartz began learning about the computer by taking courses in computer mathematics, working with Knowlton, and using the software he designed.

Her first work involved putting black-and-white film images in digital form and manipulating them with color, contrast and other effects, she said. But three years ago, she had diversified her use of the computer to include video magnetic film.

A synopsis of her development to date is contained in a 13-minute film called "Poet of His People — Pablo Neruda," in which some of the late Chilean poet's works are accompanied by dance performances. The film mixes a reading of Neruda's poetry with greatly altered images of still portraits of the poet and the live action dance sequences (see Figures 2 and 3).

Visual effects were used for frame-by-frame computer animation of the still photos to create the illusion of bringing the poet, who died in the early 1960s, to life. The computer was also used to process the dance scenes, she explained.

"Real-time computer-controlled processing was a step forward for me. I used a Digital Equipment Corp. PDP-11/40 minicomputer as a controller," she said. Sitting at a CRT terminal, Schwartz manipulated the images from black-and-white video cameras.

Limited in its resolution, the camera's lower information content nevertheless permitted her to store 256 images — more than would have been possible with an ordinary television camera — in a digital "drum" storage system designed for her work.

To make an alteration from the console, Schwartz merely had to press the appropriate key. She could allow more contrast, freeze a real-time scene, reverse the action or break the scene into various levels of gray.

Further, she could fuse one group of dancers into a mass, break them apart and so on, making them look alternately real or abstract. The programming work of Barry Haskell, a research scientist in communications, television and computers, was an invaluable aid in her video projects, she said.

Still Photographs

For still photographs, Schwartz enlisted the aid of Charles Rubenstein, whom she described as a "color vision research scientist in physics and television." Still pictures of Neruda, recorded on video film by a television camera, were animated using the DEC mini. "Since we had no films of the poet to work from, the CPU was used to animate the pictures we did have," she said.

"Poet of His People" has been shown by the New Jersey Broadcasting System and may find its way into PBS, she indicated.

The techniques used in "Poet" were first used by Schwartz two years ago when she assembled a half-hour film studying the conducting style of Pierre Boulez, then conductor of the New York Philharmonic (see Figure 1.) The work focused only on Boulez who has

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Free-Lance Artist's Imagination

a sparse conducting style, as he directed his own composition, "Rituel."

Again, programming for the real-time conducting scenes was performed by Haskell, while Rubenstein worked on the programming that would allow manipulation of still photographs taken at the session. Schwartz was able to make use of capabilities that had been programmed into the PDP-11/40 to create a mixture of music, still photos from color television cameras and action video recordings — all designed to complement and emphasize each other, she indicated.

Although the Boulez film has not been shown publicly — as a result of contractual problems with the New York orchestra — Schwartz is proud of the work because "for the first time" it gave her control of a spectacular range of effects.

"Charley [Rubenstein] had written an extensive library including magnification, translation [from negative to positive or color to color, for example], distortion, reflected images and image rotation, along with traditional effects of dissolve and fade that have been used for some time in filmmaking.

"There is a color program which can take 256 levels of color and change them independently, allowing me to work on a picture in a paint-like fashion," she continued.

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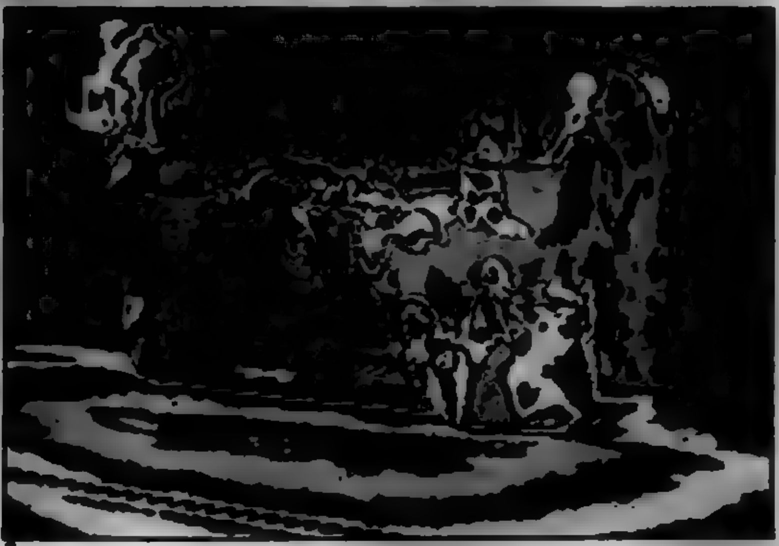

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Schwartz has a long list of accomplishments to her credit. Besides her lecturing, she is a staff committee member of Rutgers University. Her most recent showing was at the Grand Palais in France at an invitational exhibition. But she is most often occupied with special-effects artistry and lately has been working on an upcoming PBS special tentatively entitled "Excavations of Carthage."

The program details the work of a multinational task force of archeologists who have unearthed the secrets of that ancient North African city. Schwartz contributed three pieces to the hour-long program to illustrate time's effect on the alphabet, pottery and the harbor of the shipping city.

With the help of Neil Weste and Bryan Ackland, image processing and display research experts, she developed a sequence in which the 22-letter Phoenician alphabet is transliterated on camera first into Greek, then into Latin.

Pottery urns uncovered in the excavation originated in many periods of the city's life, and Schwartz used the computer to show how the form of the earliest urns evolved throughout that time (see Figure 4).

The outline of an ancient urn is slowly changed into consequent shapes until it reaches the final form assumed by the end of the historical period.

Her final contribution to "Excavations" takes the viewer back into time to show how the present muddy, shallow harbor looked when it was a teeming port in 146 B.C. Working from descriptions and pictures of the present site, information from the excavation and accounts of the harbor in 146 B.C., she created a computer-generated scene that begins in the present and takes the viewer through time to show how the same area appeared in its halcyon days.

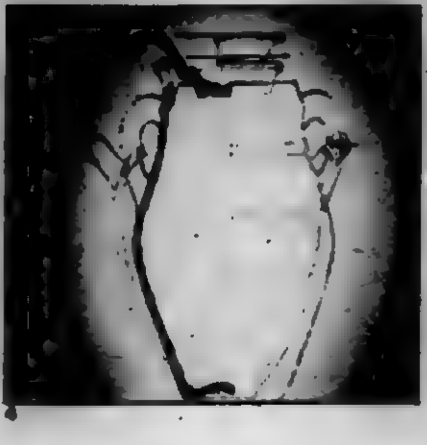
Although the artist knows enough about computers and software and graphics to be able to use the computer as deliberately as she has used paints, graphics and sculpturing tools, she admits that the coming generation of artists may be able to use computers in ways she has not yet considered.

Young artists who have "grown up with the computer" may be able to carry their work into unexplored avenues. This "new breed," as she calls them, does not see the computer as a foreign object.

"When you get a person that can work both sides, the results may be more provocative and more profound. Only recently have schools such as Rutgers started departments of computer art. It is here to stay," she declared.

Further, she thinks the progression to the computer as an artistic tool is a healthy and natural step to take because "the artist uses the tools of his own time."

Figure 1 shows a frame from the animation of still photos of Pierre Boulez conducting his own composition, 'Rituel.' Figures 2 and 3 are taken from a dance sequence from the film 'Poet of His People — Pablo Neruda.' Figure 4 is from 'Excavations of Carthage,' which depicts how the earliest urns of Carthage evolved into different shapes.



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'Good Old Days' Recalled at DEC Museum

CW Photos by Ann Dooley

The first 1,024-word core memory (above left) has the same capacity as the chip available for viewing under the microscope at DEC's Digital Computer Museum. Gordon Brown (top) and J. Forrester (bottom), inventor of core memory, developed MIT's Whirlwind computer.

By Ann Dooley
CW Staff

MARLBORO, Mass. – The good old days of computing were recalled with chuckles as well as groans at Digital Equipment Corp.'s. Digital Computer Museum here recently.

The occasion for the turnout of computer notables and DEC employees was a Computer Pioneer Lecture featuring J. Forrester, the inventor of core memory and a developer of MIT's Whirlwind computer.

The Whirlwind was originally intended to be an analog computer designed to determine data about aircraft, but was never used for that purpose, Forrester said. The year 1945 was spent in dismissing the analog computer, while 1946 was spent in dismissing the serial digital computer, he recalled.

In 1947, emphasis shifted to parallel high-speed synchronization – the final Whirlwind development that enabled the machine to be used in real-time control of radar on Navy ships, planes and submarines.

Forrester told an audience, now accustomed to thinking in terms of microchips, about the early days of walk-in computers that filled an entire room. He recalled coping with real power-loss problems arising from street cars passing by or from elevators being activated in nearby buildings.

The development of the Whirlwind was a "running battle with finance," according to Forrester, who noted that many at the time considered the project an unjustified expense. He told the appreciative audience that "there is little difference between a crackpot and a pioneer except for negotiating the edge" of what can be accepted by the public.

The museum – largely a hands-off exhibit of classical equipment – opened in September 1979 and is intended to illustrate the computer's evolution from calculators to microcomputers. Occupying the lobby and mezzanine of Digital's Marlboro Tower building, the exhibits included precomputer devices (calculators), four generations of logic used to build computers, the computer's primary memory technologies, the Whirlwind, Lincoln Laboratory's TX-O first transistorized computer, a PDP-1 with the original Spacewar program, an interactive query display about computers and the exhibits and other displays.

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Newsletter Cites Case Histories

Computer Malpractice Seen as Blurry Issue

WOBURN, Mass. — The definition of "computer malpractice" is blurry at best, according to the July edition of "Computer Law Newsletter."

For that reason, "users or 'clients' should rely on something more solid than malpractice when entering into computer projects," the newsletter warned. "On the other hand, consultants may be exposing themselves to potential liabilities if they suggest they are professionals."

Malpractice is nothing more than a specific kind of negligence, the article stated. Malpractice theory makes more stringent demands of professionals than laymen and a doctor may be liable for damages when an auto mechanic would not.

Four factors contribute to that increased responsibility:

- Trust or a fiduciary relationship between the professional and the client.
- Judgment or skill of the professional.
- The assumption or imposition of professional obligations.
- The fact that services are rendered as opposed to products sold.

A good hypothetical malpractice case could involve a buyer of DP consulting services who relies on the professional skill of a consultant who holds the Certificate in Data Processing (CDP), the newsletter said.

Whether or not the consultant would be guilty of malpractice for recommending a system that failed his client would depend on "whether the consultant acted with due care under the circumstances. And there is little guidance for defining 'due care' under these particular circumstances," the article noted.

However, the fact that the consultant had a CDP might help the court decide he is a professional and thus subject to a higher standard of due care, it confirmed.

Of the three cases cited in the article, the first was settled out of court, the second ruled out malpractice and the third resulted in the awarding of $120,000 to the plaintiff, but not as a result of malpractice. In that case, the award was made because a turnkey system did not work and the plaintiff won under breach of contract. The court might have examined the malpractice question more closely if there had been no contract action in the case, the newsletter said.

"Computer Law Newsletter" is published by Bigelow & Saltzberg, 100 Tower Office Park, Woburn, Mass. 01801.

Meet to Cover Satellite Use

ATLANTA — The sixth annual Satellite Earth Station Symposium for executives and technical managers of broadcasting companies and cable TV systems as well as other communications users is scheduled for Oct. 27-29 at the Marriott Hotel here.

Sponsored by Scientific-Atlanta, Inc., the symposium will review the current status of and future plans for satellite communications. Topics will include programming available via satellite, teleconferencing, high-speed digital transmission, earth station design and installation and applications of satellite communications. A tour of Scientific-Atlanta's engineering and production facilities will also be conducted.

The symposium costs $95. More information can be obtained from Gene Lovely, Scientific-Atlanta, 3845 Pleasantdale Road, Altanta, Ga. 30340.

Call for Papers

INTERNATIONAL SYMPOSIUM ON COMPUTER MESSAGE SYSTEMS, Ottawa, April 6-8, 1981.

The symposium, sponsored by the International Federation for Information Processing's TC-6 Committee, is seeking papers on naming/addressing issues; user requirements for message services; system design, protocols and formats; hardware/software implementation of message systems; performance of message systems; reliability, availability and integrity; cost/benefits issues; centralized vs. decentralized systems; and security requirements and techniques.

Other topics include authentication and digital signatures; facsimile messaging, integration of text, fax and voice messages; electronic mail; computer teleconferencing; teletex; and human factors in message systems.

Four copies of complete papers must be received by Sept. 30. They should be sent to Ronald P. Uhlig, Bell Northern Research, Ltd., Department 3D20, P.O. Box 3511, Station C, Ottawa, Ont., Canada K1Y 4H7.

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System Tunes Up Saab Parts Delivery Process

ORANGE, Conn. — A foreign car manufacturer doing business in the U.S. relies on a computerized parts system to assure fast delivery, tighter inventory control and far better marketing information for both parts and car sales.

According to Saab-Scania's DP manager, Martin Doyle, the system is as efficient and responsive as that of any auto competitor in Saab's class.

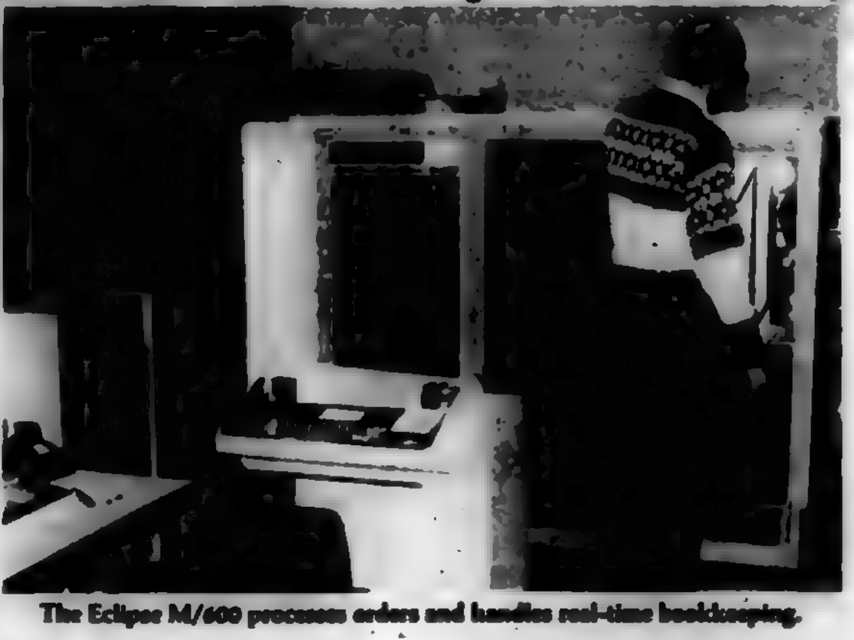
The heart of the system is a Data General Corp. Eclipse M/600 processor, and its principal focus is the emergency vehicle-off-road (VOR) order, which Saab can now enter and process within minutes of the order placement.

But order processing wasn't always as efficient. Scania has three centrally located depots in Los Angeles, Chicago and its U.S. headquarters here. In the past, each had its own order-processing minicomputer. At the close of each day, these systems would forward daily activity as well as unfilled orders to a central computer in Orange.

If the system determined that emergency orders could be completed from the inventory at other depots, packing slips would be batched to those depots and filled the next day. The result was at least a 24-hour delay in responding to emergency orders. The delays were intolerable and, together with additional information requirements, led Saab to a search for a more responsive parts-ordering system, Doyle said.

Evaluation of several vendors concluded with the selection of Computeristics, a systems house in Hamden, Conn., which proposed the Eclipse M/600.

Operator enters the data on the Dasher.



The Eclipse M/600 processes orders and handles real-time bookkeeping.

The proposed system was unique in at least two respects: All depots would have on-line access to a common M/600 data base in Orange, providing current parts information at all times, and remote 300 line/min printers at each depot would be driven by the Eclipse via 9,600 bit/sec communication lines.

Aside from printing packing lists and picking labels for approximately 4,000 order lines per day, the printers give outlying locations instant access to a number of management and marketing reports, Doyle noted.

Saab uses the M/600 primarily for real-time booking and processing of orders and to work in tandem with a batch-oriented mainframe. The latter handles end-of-day inventory and balances and performs other accounting, marketing and administrative functions. The M/600 is configured with 512K bytes of core memory, a 96M-byte disk, four order-entry Dasher CRT terminals, a 180-char./sec Dasher printer, a 300 line/min printer and an 800 bit/in. tape drive that serves as the communications medium between the M/600 and the mainframe.

The Los Angeles and Chicago depots each have three Dasher terminals for order entry and a 300 line/min printer communicating with the M/600.

If an emergency order is entered from Los Angeles for two taillights, but only one is on hand, the system scans other depot inventories to locate the remaining one. It then immediately prints out packing slips (with picking labels) in Los Angeles as well as in the other depots showing the shipping origins.

In addition, real-time operation ensures that inventory levels are correct at all times.

(Continued on Page 25)

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Four-Day Workshops Also Scheduled

Justice to Cosponsor Meet on Computer Crime

WASHINGTON, D.C. – The U.S. Department of Justice, in conjunction with Koba Associates, Inc., is sponsoring a national conference as well as eight four-day workshops focusing on the investigation, detection and prevention of computer-related crime.

Scheduled to take place here Oct. 19-22, the conference will feature experts from government and the private sector who will address policies and issues relating to computer-based criminal activities, a spokesman said.

Topics to be discussed include the ABCs of computer technology, problems of computer fraud and a review and analysis of federal and state laws covering computer crime.

The four-day training workshops are slated to begin Nov. 9 in Charleston, S.C., and will be held at later dates in San Francisco; Kansas City, Mo.; Dallas; New York; Chicago; and here in Washington, D.C. The sessions will cover investigative techniques, personnel security, evidentiary and procedural issues, prosecution and the interrelationship between investigatory and prosecutorial functions, the spokesman noted.

Information on registration fees for both the conference and the workshops was not available at press time. However, additional information on the sessions and future events can be obtained from Georgette J. Sobel, Koba Associates, Computer-Related Crime Project, 2000 Florida Ave., N.W., Washington, D.C. 20009.

System Speeds Parts to Saab Dealers

(Continued from Page 24)

In operation, the M/600 dealer and parts master files are updated each morning from a tape produced by the mainframe reflecting the previous day's activity. From that point on, all activity is conducted by personnel at CRT terminals in the various depots – order entry, shipping confirmations, bin location changes, physical counts, product receipts and dealer and parts inquiries.

Transactions of all types instantly update the files. The system also supplies, by means of CRT terminal inquiry to the dealer master file, updated sales figures for both parts and car sales.

According to Art Staple, Computeristic's marketing representative for minicomputers, the system was designed to help operators avoid key-in errors by the use of explanatory text and screen "prompts." Any errors can be edited on the screen before transmission. In the past, incorrect data entry necessitated complete rekeying of the information, Staple indicated.

In addition, the system has kept the involvement of computer personnel to a minimum, he said.

System Efficiency

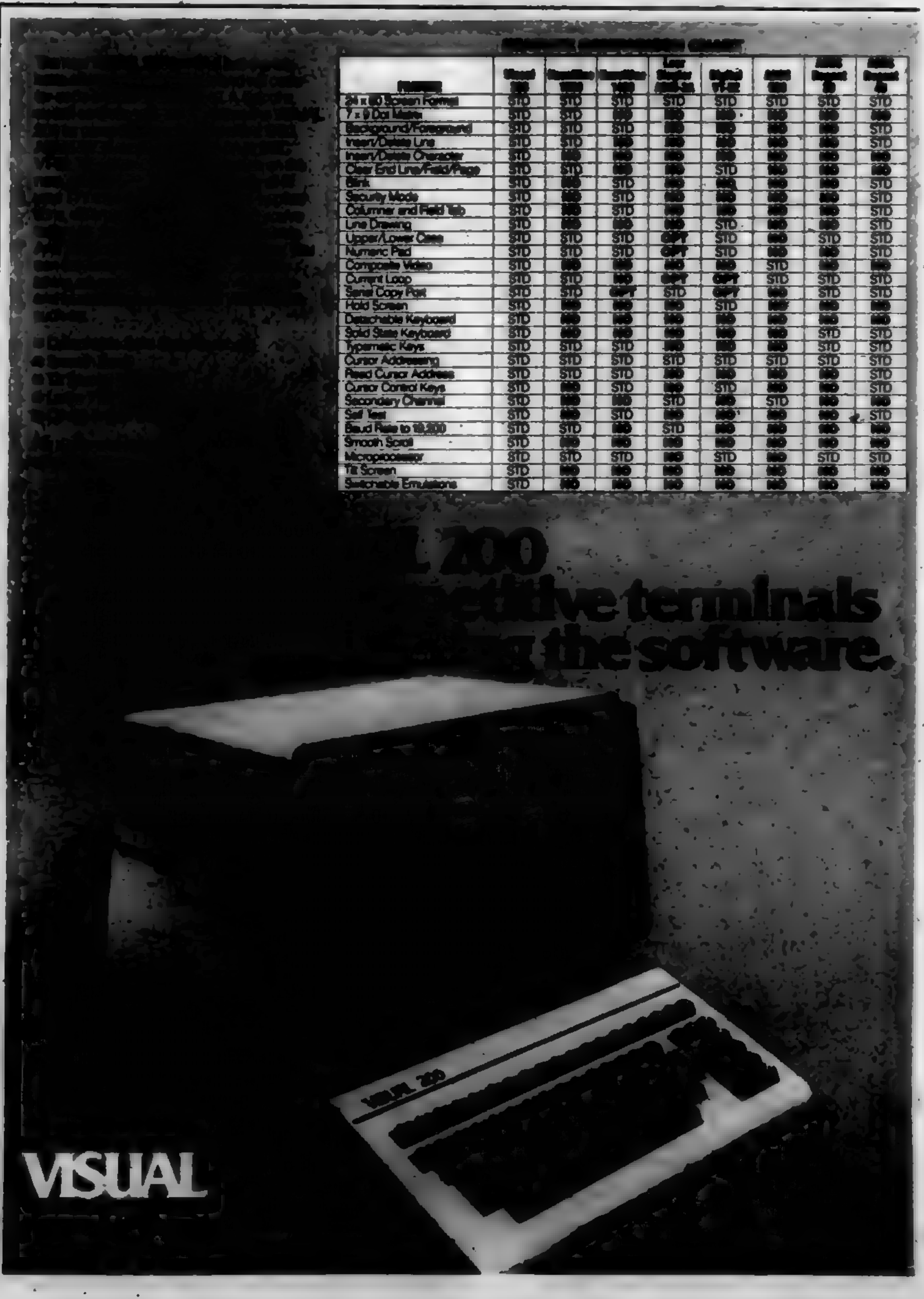
As for efficiency, DG's Advanced Operating System (AOS) conserves memory through its memory management capabilities and permits several operations to proceed in parallel: data entry, transaction updating, program development and printing of reports and packing slips, Doyle said.

The multikey operation of the Infos data-base-oriented file management system relieves operating personnel from many "bookkeeping" responsibilities. Special reports on dealers, for example, can be accessed in a variety of ways with different keys; it is not necessary to know exactly how the file is set up to proceed. In addition, the system simultaneously prints picking labels in the correct sequence.

While Doyle said he cannot assess the system's contribution in dollars and cents because it has been in operation for only a few months, he reported that he has already seen an improvement in dealer response. "We've had word that dealers are pleased when they receive a fast shipment of an order, especially when the packing slip indicates that the order is being filled from as many as three different places," he said.

"Moreover, thanks to the common data base, we can now tell a dealer immediately whether the parts are in stock, anywhere," he noted.

In addition, the system can replace the existing Telex network at a substantial savings since the display terminals, dedicated lines and printers are already in place, Doyle said.



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7 x 9 Dot Matrix	STD	STD	NO	NO	NO	NO	NO	NO
Background/Foreground	STD	STD	STD	NO	NO	NO	NO	STD
Insert/Delete Line	STD	STD	NO	NO	NO	NO	NO	STD
Insert/Delete Character	STD	NO	NO	NO	NO	NO	NO	NO
Clear End Line/Field/Page	STD	STD	NO	NO	STD	NO	NO	NO
Blink	STD	NO	STD	NO	NO	NO	NO	STD
Security Mode	STD	NO	STD	NO	NO	NO	NO	STD
Columnar and Field Tab	STD	NO	STD	NO	NO	NO	NO	STD
Line Drawing	STD	NO	NO	NO	STD	NO	NO	STD
Upper/Lower Case	STD	STD	STD	OPT	STD	NO	STD	STD
Numeric Pad	STD	STD	STD	OPT	STD	NO	NO	STD
Composite Video	STD	NO	NO	NO	NO	STD	NO	NO
Current Loop	STD	STD	NO	OPT	OPT	STD	STD	STD
Serial Copy Port	STD	STD	OPT	STD	OPT	NO	STD	STD
Hold Screen	STD	NO	NO	NO	STD	NO	NO	NO
Detachable Keyboard	STD	NO	NO	NO	NO	NO	NO	NO
Solid State Keyboard	STD	NO	NO	NO	NO	NO	STD	STD
Typematic Keys	STD	STD	STD	NO	NO	NO	STD	STD
Cursor Addressing	STD	STD	STD	STD	STD	STD	STD	STD
Read Cursor Address	STD	STD	STD	NO	NO	NO	NO	STD
Cursor Control Keys	STD	NO	STD	NO	STD	NO	NO	STD
Secondary Channel	STD	NO	NO	STD	NO	STD	NO	NO
Self Test	STD	NO	STD	NO	NO	NO	NO	STD
Baud Rate to 19,200	STD	STD	NO	STD	NO	NO	NO	NO
Smooth Scroll	STD	NO	NO	NO	NO	NO	NO	NO
Microprocessor	STD	STD	STD	NO	STD	NO	STD	STD
Tilt Screen	STD	NO	NO	NO	NO	NO	NO	NO
Switchable Emulations	STD	NO	NO	NO	NO	NO	NO	NO

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ACM Annual Confab Slated for 'Opry' Setting

NASHVILLE, Tenn. – Computers, telecommunications and data bases will share center stage with country-and-western bluegrass this fall when the Association for Computing Machinery (ACM) holds its annual meeting here Oct. 27-29 at the Opryland Hotel.

While plans are still tentative for the three-day conference and show, the ACM has scheduled about 45 paper, panel and tutorial sessions and more than 150 speakers on a variety of computer topics. To date, more than 60 vendors have signed up to display their wares on the exhibit floor, including IBM, Memorex Corp. and Prime Computer, Inc. Exhibits will focus on such areas as office automation, systems and application software, consulting firms and peripheral equipment, a spokesman said.

The conference, entitled "Previewing the Computer Age," will kick off on a Monday morning with a keynote address by Dr. Alvin M. Weinberg, director of the Institute for Energy Analysis at Oak Ridge Associated Universities. Weinberg is slated to speak on the interaction between information and energy systems.

The opening session will also focus on the current state of the ACM and will include the annual Turing Award lecture by a recipient yet to be announced as well as presentations of the traditional ACM awards.

Range of Topics

Although the conference will be surrounded outside by such notable Nashville sites as the Grand Ole Opry and Centennial Park, all of the technical action will be taking place inside the Opryland Hotel. A wide range of subjects will be tackled throughout the ACM event, the spokesman claimed.

Scheduled speakers and topics include Vincent P. Barabba, director of the U.S. Bureau of the Census, who will speak on the growing applications of computers in census work; Fred Maryanski of Digital Equipment Corp., who will chair a session on improving white-collar productivity; Dr. Charles Hughes of the University of Tennessee, who will detail advanced Pascal techniques; and Gerard Salton of Cornell University, who will chair a session on developments in automatic information retrieval.

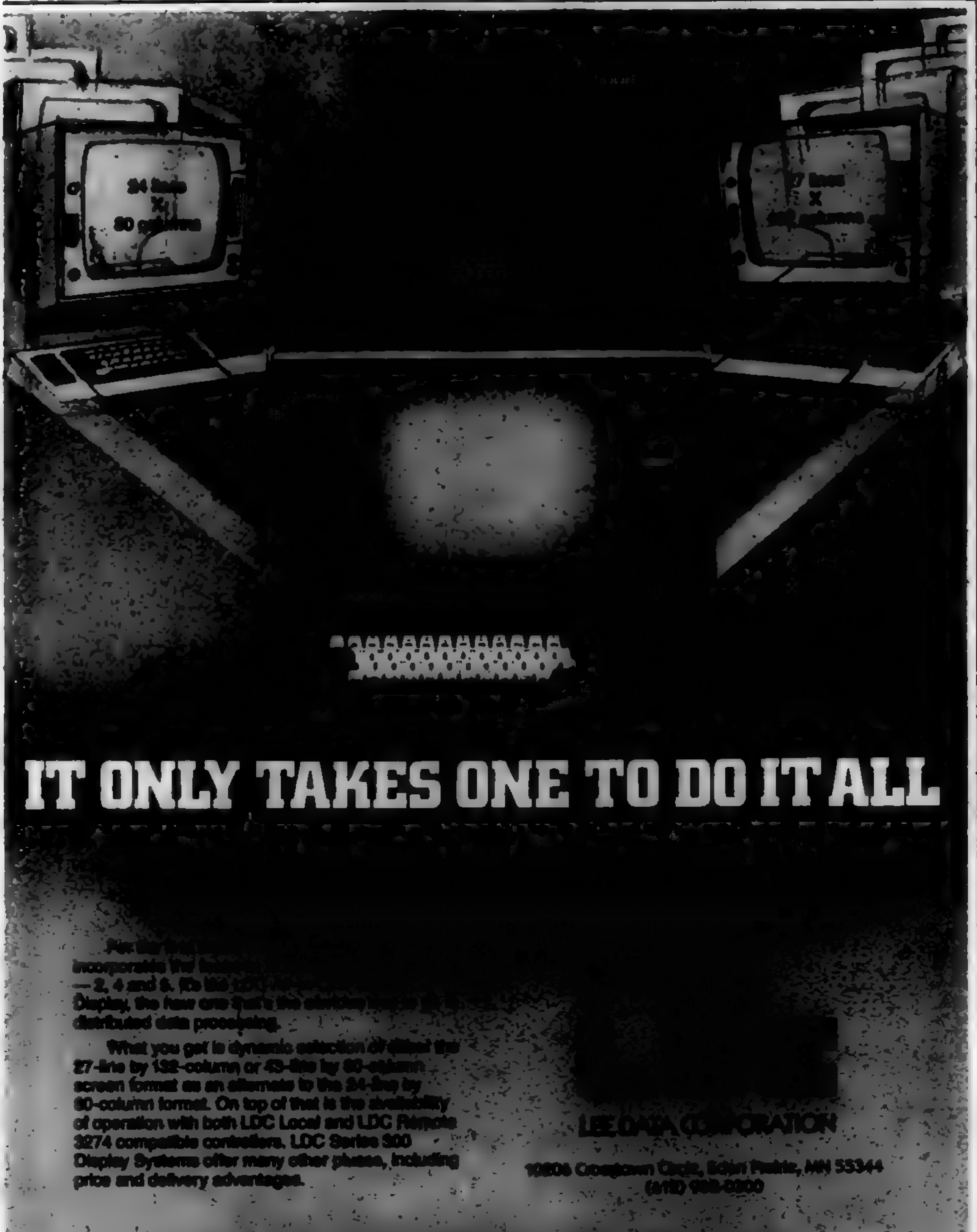
Additional topics include computer literacy, structured design, techniques of research data management, graphics and even "the computerized destruction of Western civilization."

Also participating in the conference will be J. Presper Eckert, coinventor, with the late John Mauchly, of Eniac, the first electronic computer, and Univac, the first commercially available computer.

Finally, as a sidelight to the conference, the ACM will host its 11th North American Chess Championship, which will pit computer against computer in a battle to see which is the best chess program in North America. The four-round, Swiss-style tournament will take place at the Opryland Hotel Oct. 26-28. Individuals interested in participating should write to Prof. M.M. Newborn, School of Computer Science, McGill University, Montreal, Quebec H3A 2K6, Canada.

A maximum of 12 teams will participate in the tournament, and the deadline for program entries is Sept. 8, the spokesman said.

The advance registration fee for the ACM conference is $65 for association members, $85 for nonmembers and $15 for students. One-day fees are $30, $40 and $7 for members, nonmembers and students, respectively. Fees must be mailed no later than Oct. 10 to ACM 80, Box 1980, Station B, Nashville, Tenn. 37235.



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After Switch From Mainframe

Mini Lets Bank Add Applications, Save Money

ST. LOUIS – As minicomputers enter their second decade, they are fast taking over the domain once reserved exclusively for mainframes. One computer user here who made the move from mainframe to minicomputer not only increased the number of applications on its system, but saved money in the process.

"We were paying about $7,000 per month to lease a Honeywell, Inc. system," Don Leupold, vice-president of operations for Lemay Bank, recalled. "The Data General Corp. Eclipse C/330 cost only about $150,000 for the entire configuration. So the switch should pay off in about two years."

Lemay Bank is privately owned with assets of $165 million. It has one central office in South St. Louis and two additional facilities located about three miles and six miles from the bank. Each facility offers drive-up and lobby transactions.

The bank originally had its processing done at a "correspondent bank" with which Lemay had a special banking relationship.

In 1971, Lemay leased a Honeywell system to process the bank's demand deposit and savings account deposit/withdrawal applications. "As we added other applications, we upgraded that system to a large Honeywell system," Leupold said.

Teller Operation Automated

Then the bank decided to automate its manual teller operation and, with the help of a software consultant, began looking for the best system to process that application. Minicomputers from Digital Equipment Corp., Hewlett-Packard Co. and DG were considered.

Based on the consultant's recommendation, Lemay installed the DG Eclipse C/300 in April 1976, and Lemay's tellers went on-line. The teller system allows the on-line updating of records. Check cashing, savings deposits and withdrawal transactions are automatically posted to the appropriate accounts by the C/300.

The on-line C/300 includes 196K-bytes of memory, one 96M-byte disk drive, one 9-track and one 7-track magnetic tape drive. The system runs under the RDOS operating system, which provides multiterminal or batch capabilities in single- or dual-operation modes.

The teller terminals in the main office and drive-up locations were specially designed by Financial Automation, Inc., a local systems house. Up to 32 terminals can be connected to a microcomputer-based communications concentrator. The microconcentrators oversee communications via telephone lines between the terminals and the bank. They also reformat data for screen display.

No changes were made to the Eclipse operating system to accommodate the communications.

Back-Office Work

"We were very pleased with the way the teller system performed," Leupold reported. "Our lease for the Honeywell system was coming to an end. We knew we would either be renewing the lease or converting to a new system.

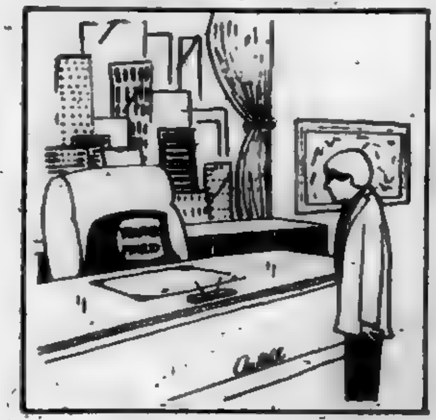
"Since the price/performance on the first Eclipse was so good, we decided to consider Data General for this back-office application."

A second Eclipse system, a C/330, recently replaced the Honeywell mainframe which was handling the processing work. Since Lemay had written all of the programs for the Honeywell system in-house, the bank's DP department converted those programs to the DG system.

"It was a very easy conversion," Leupold noted. "That was another reason we chose the Eclipse system for this application." DG's Cobol was not only compatible with the Cobol Lemay was running on its Honeywell system, but it also provides program development aids to ease the conversion process.

"We spent about a month writing a conversion program," Leupold continued, "which turned out to be extremely efficient. The total conversion effort took us a little over four months."

The Eclipse C/330 includes 256K bytes of main memory, a 96M-byte disk drive and one 9-track magnetic tape drive. The disk drive can be used by either Eclipse processor and is switchable through an interprocessor bus. The C/330 also supports RDOS and Infos, the DG data base management system.



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Mini Cuts Credit Union's Expense/Income Ratio

ST. LOUIS, Mo. – A credit union here reached the lowest expense/income ratio in the organization's history after switching from a time-sharing service to an in-house minicomputer, the credit union president said.

Ozark Air Lines Credit Union President Tom Keyes began his efforts toward a more efficient and more profitable operation of his 4,800-member credit union two years ago with a General Automation, Inc. GA-16/220-based Dorset Data Systems, Inc. credit union system. One year later, he upgraded to a GA-16/440-based system and, despite rising inflation, 1979 turned out to be the "most profitable year" in Ozark Air Lines Credit Union history, Keyes said.

The in-house mini replaced a time-sharing system that had supplanted hand posting and machine accounting systems.

After trying both batch and on-line real-time capabilities, "We were experiencing problems common with many remote computing systems," Keyes said. "We were totally dependent on telephone lines for information transfer."

This resulted in a system availability of approximately 50%, and it was not uncommon to be locked out of the system as much as two hours a day. "It was miserable, unpredictable," he said. In addition, statements processed in batch were received well after the end of the quarter, and management reports did not provide the up-to-date data needed to make effective decisions.

Logical Solution

The logical solution seemed to be an in-house computer system, according to Keyes, but the board of directors was still apprehensive about buying computer hardware because minicomputer technology was advancing so rapidly they were afraid the hardware would be outdated before being written off.

Keyes chose a system from Dorset Data, a subsidiary of the Strauss Fuchs Organization, Inc., and the board agreed to buy it after they were assured the system would be expandable. "Let's face it, the last thing we needed was another system that wouldn't grow with us," he said.

Dorset Data supplies complete turnkey credit union automation systems based on GA-16/220 microcomputers and GA-16/440 minicomputers. Because the two processors are totally compatible – capable of running the same software and using the same peripherals – Dorset can provide a growth path to customers.

After one year of use, the Ozark Air Lines Credit Union staff found that the GA-16/220-based system it originally purchased could not support the additional CRT terminals they needed. Keyes therefore ordered a GA-16/440 unit in anticipation of more CRT terminals, more programming capabilities and more members.

'Excellent' Compatibility

The GA-16/440 unit provided the necessary added speed and power. The upgrade also verified claims Dorset Data and GA had made about compatibility. "The compatibility of the hardware and software is excellent," Credit Union Vice-President Rob Richter stated.

"When we converted from GA-16/220 to GA-16/440, we made no major changes. We just pulled off the disk and added one cable – the only real change was the main CPU. The software was transparent; when we popped it on, it immediately brought the system up. We just hit the switch and operated.

"With other systems in the past, the conversions were timely, costly and full of errors," Keyes noted. "The Dorset Data people came here to do the installation, first with the GA-16/220 and then with the upgrade to GA-16/440. With the GA-16/220 installation, they were here on a three-day weekend, and when they left we were up and in balance. It was handled very professionally."

More for Less

Keyes and Richter both contend that the system has made life much easier and business much more profitable. "Our last fiscal year was the most profitable on record, and our 26.9% expense/income ration was the lowest in our history. We believe that our in-house system was a key to more efficient operation, effectively allowing us to process more work in less time at less cost than any system we had before," Keyes stated.

"If we weren't for the in-house computer, we'd also have to hire more people and take additional space – it lowers our operating costs," according to Richter.

"It's also easy to learn. It requires no computer training or prior programming experience. I haven't got a computer background, and when the GA-16/220 came in, I spent more time with it than anybody else, probably 12 hours. I learned every part of the system in that short amount of time.

The Ozark Air Lines Credit Union staff has found that Dorset Data's unique feature, an integrated general ledger, "really takes care of a lot of problems," Richter said. The integrated general ledger has allowed them to cut back on additional bookkeeping personnel and on the time the bookkeeper has to spend with the hard documentation that is still necessary. With the time-share system, all general ledger activities were handled by hand posting methods.

In the future, Ozark Air Lines Credit Union is looking forward to the development of an automated teller machine that would be incorporated into the present Dorset Data system.

They are also examining the possibilities of a larger CPU – a GA-16/480, again totally compatible – to provide them with even more in-house capabilities and terminals. Obviously, the Ozark Air Lines Credit Union is looking forward to many more years like 1979.

Shelby Offering Research Reports

HILLSBORO, N.J. – The "Shelby Directories" series of research reports on frequently recurring topics of management and sales training, is available from the Shelby Co.

Each directory describes and evaluates approximately 40 works, in assorted formats and media, chosen by a board of reviewers, a spokesman said.

The directories are designed to assist the training decision maker in coping with the profusion of products on the market by reducing the previewing burden to manageable levels, the vendor said.

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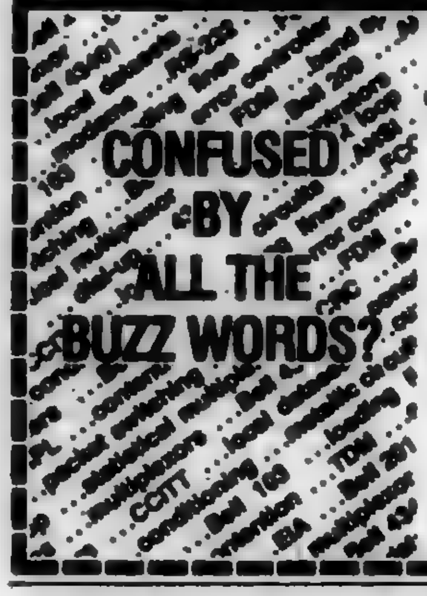

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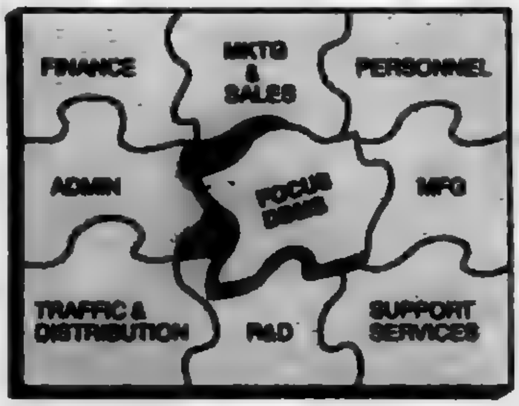

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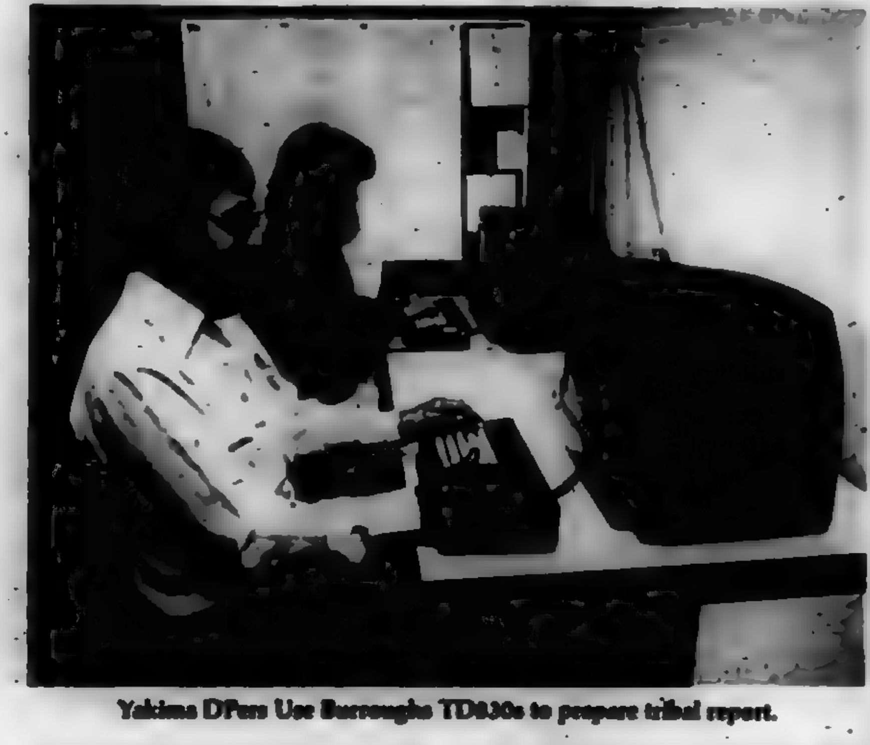
CPU Helps Yakima Indians Handle $66 Million Yearly

TOPPENISH, Wash. – The Confederated Tribes and Bands of the Yakima Indian Nation is using a Burroughs B1860 system to administer a $66 million annual cash flow in an efficient and timely manner.

The Yakima Indian Nation here is a self-governing nation, with about 6,700 enrolled members comprised of 14 recognized Indian tribes and bands.

The nation is involved in a number of enterprises and income-producing programs, such as furniture manufacturing, air charters, a newspaper, restaurant, movie theater, museum, tobacco sales, ceramics, heavy construction and credit and land. It also works with the Bureau of Indian Affairs on a logging operation.



Yakima DPers Use Burroughs TD830s to prepare tribal report.

Foremost Application

"With all these enterprises, our first and foremost application is payroll on the B1860 system for some 1,000 employees working during the summer and 750 full-time off-season employees," Comptroller Ted Strong said.

"Because we are multifunded – receiving tribal funds from the tribal timber stand, various enterprises and limited funding from federal and state government – it would be almost impossible to do the payroll manually.

"The next important application is budgetary accounting, the tremendous and important work of keeping track of income and expenditures by type," he added.

"We also use our computer for a demographic data base, which contains information pertinent to individuals enrolled in the Yakima Indian Nation. Through enrollment, these members have access to land ownership, so we have records by name, address, allotment number etc.

"Right now, we are using the six TD 830 input and display systems in-house, within our DP center and accounting departments.

"The programmers are using them also, as they write program codes directly from the terminals. We have data entry primarily on payroll and for the general ledger system, to make changes to those particular programs. We have some inquiries and retrievals for payroll, general ledger and accounts payable," Strong said.

"What we are working toward is a full-information management system so that we can eventually place terminals at the tribal council office and various division offices. This will allow instant access to vital management information. With present development efforts, we are approximately six months from realizing this goal.

"We'll be using the displays more in the administrative environment than in the enterprise scope of our operations. The immediacy of the management reports from all these applications will allow us to make sound and timely decisions which will favorably affect the future of the Yakima Indian Nation," Strong observed.

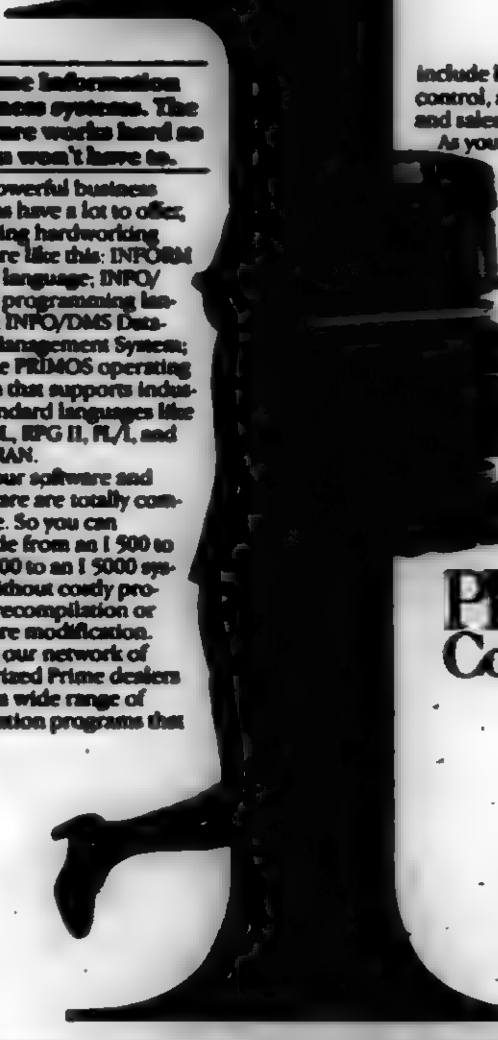
Located on 1.2 million acres in an area 20 miles southeast of Yakima, Wash., the nation is governed by a 14-member tribal council, seven of whom are elected every two years for four-year terms by the enrolled members of the nation.

"Once a year, the enrolled members hold a general council meeting, passing resolutions which set the general policies of our nation.

"Then it is up to the tribal council, which meets once a month, to take the general mandates and resolutions of the general council and develop specific resolutions to meet the general council objectives," he said.

One of the Yakima nation's enterprises is Credit and Land, which buys from non-Indians land originally owned by the Indians. It sells such land back to the Indians, loaning them money for mortgages, to rebuild the nation's land base. The Credit Enterprise also provides low-interest auto and personal loans to enrolled members of the nation. The combined assets of the Credit and Land Enterprise are approximately $30 million.

The Yakima nation's forest land, which brings in approximately 90% of the nation's income – some $20 to $25 million annually – is not considered an enterprise per se. "We are working toward developing the 600,000 acres of mostly ponderosa pine as an enterprise," Strong said.



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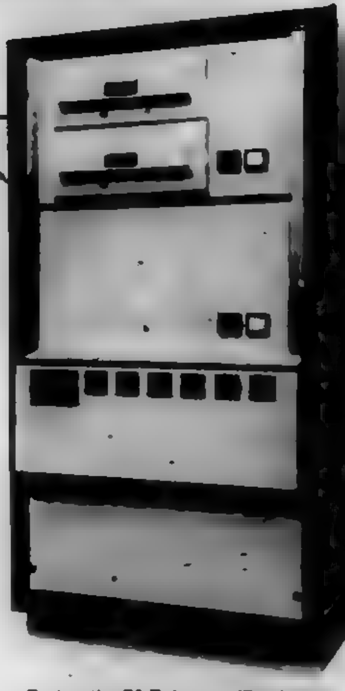

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The CPU employs three micro-processors, the 6502, the Z-80 and the 6800. And the processor bus has been designed so new, more powerful micros (like 16 bit CPU's) can be added to the system later on.

There are also 10 open slots in the basic C3-C. The system supports up to 768K bytes of memory, in a multi user configuration.

The C3-B. 74 Megabytes. Under $13,000.

For those who require even more hard disk storage, Ohio Scientific offers another microcomputer in the C3 Series, the C3-B. Its specifications are the same as those of the C3-C. However, the C3-B offers a 74 Megabyte Winchester drive.

For those who do not need hard disk capacity now, but in all probability will need it in the future, Ohio Scientific offers the C3-A. It is like the C3-B and the C3-C in all respects but two. 48K RAM is standard in the C3-A, and it offers 12 open slots. When more storage is needed, the C3-A is easily expandable to either a 23 Megabyte or 74 Megabyte hard disk system. The C3-A is priced at less than $6,000.

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MIS Heads Urged to Contract for Programmers

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Recession has created a vexing paradox for area information system managers struggling vainly to meet their growing need for programmers.

On one hand, the current economic downturn here has further aggravated the already acute programmer shortage in the U.S. by forcing many management information services (MIS) managers to sharply curtail their personnel budgets. On the other hand, the recession has obliterated many job opportunities for programmers who work strictly on a contract or free-lance basis, according to the head of an employment agency catering to computing professionals here.

Until recently, demand for contract programmers had been steadily escalating, but when the economy fell on hard times earlier this year, many free-lancers here suddenly found themselves out of work. In an atmosphere of retrenchment and deepending recession, many MIS departments could no longer make room for contract programmers in their reduced personnel budgets, according to Real-Time Personnel, Inc.'s president, Stuart Magie.

Root of Problem

While recession certainly accounts for much of the current oversupply of contract programmers, the root of the problem lies as much in attitudes as in economics. Many information system managers simply feel more comfortable with full-time programmers than with their contract counterparts.Magie said.

Magie regards this widespread bias toward permanent programming staffs as a serious mistake.

Many users would probably do well to disband their permanent computing staffs entirely, except for a small core of project leaders and other senior supervisory personnel, and fill the remaining staff slots with programmers working on contract.

"There really isn't any advantage for a company to try to spend a lot of money to hold computing professionals permanently on their payrolls," Magie said. "Very few programmers spend their entire careers working for the same company. In fact, the typical programmer changes employers after only 10 months on the job."

The main benefit, of course, of using contract programmers instead of full-time staffers is that the free-lancers are relatively easy to find. But contract programmers offer more advantages than simple availability, Magie said.

Because they work and get paid by the hour, contract programmers are less likely to loaf on the job than full-time staffers. As a result, "two contract programmers can do the same amount of work each day as three permanent employees," Magie said.

In general, contract programmers also boast more professional experience than their full-time counterparts, Magie concluded.

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Laser COM Aids Medical Center

NEW YORK – The Mount Sinai Medical Center here has helped improve its DP productivity by diagnosing labor-intensive illnesses and prescribing the right mix of medicine – in this case, by changing its computer output microfilm (COM) operation from wet chemical processing to dry laser printing.

The bulk of the printing is now done on a high-speed laser COM device that prints computer output directly on microfiche instead of paper. Within its first year, the new operation solved a variety of problems affecting productivity, quality and ease of operation.

"We realized immediate savings in cost, space and time with the COM printer," commented John D'Ornellas, director of data processing for the center.

"We have counted on computer output microfilm for years," both to save paper and to enable reformatting of computer reports where needed, he said.

Cost-Savings

"We first switched from conventional paper printing to a wet chemical COM device that involved extensive chemical mixing and handling. Now we switched from this operation to a dry laser COM unit and found immediate cost-savings up to 33% – yet increased productivity and quality. By far, that exceeded our expectations," D'Ornellas said.

The DP director replaced Mount Sinai's conventional COM equipment with Eastman Kodak Co.'s Komstar 200 microimage processor, a nonimpact laser printing device that combines laser and photographic technology to produce printed computer reports on either 105mm microfiche or 16mm roll film.

The Komstar processor's dry processing eliminates labor, chemicals, plumbing, maintenance and special facilities required by wet processing, he said.

Mount Sinai installed its Komstar laser processor directly in the computer room and freed virtually three times the space taken by the old equipment, according to D'Ornellas.

The old wet COM equipment was formerly in one room, while chemicals and supplies were stored in another area nearby. All the printing and processing is now done in one room.

"The laser microfilm printer is hooked up on-line to our computer just like an impact paper printer," he said, "and it operates 10 times as fast."

High-speed computer output is critical to the center, because some 188,800 frames of data are printed each month.

The major applications are "Soundex," a monthly updated "history" of all patients grouped in alphabetic and numeric sequences and in-patient billing. The Soundex and in-patient billing reports account for 60,000 and 85,000 frames of computer output each month, respectively.

Other reports for general employees and personnel records, an in-house patient census, payroll and outpatient records account for the remaining 43,800 frames each month.

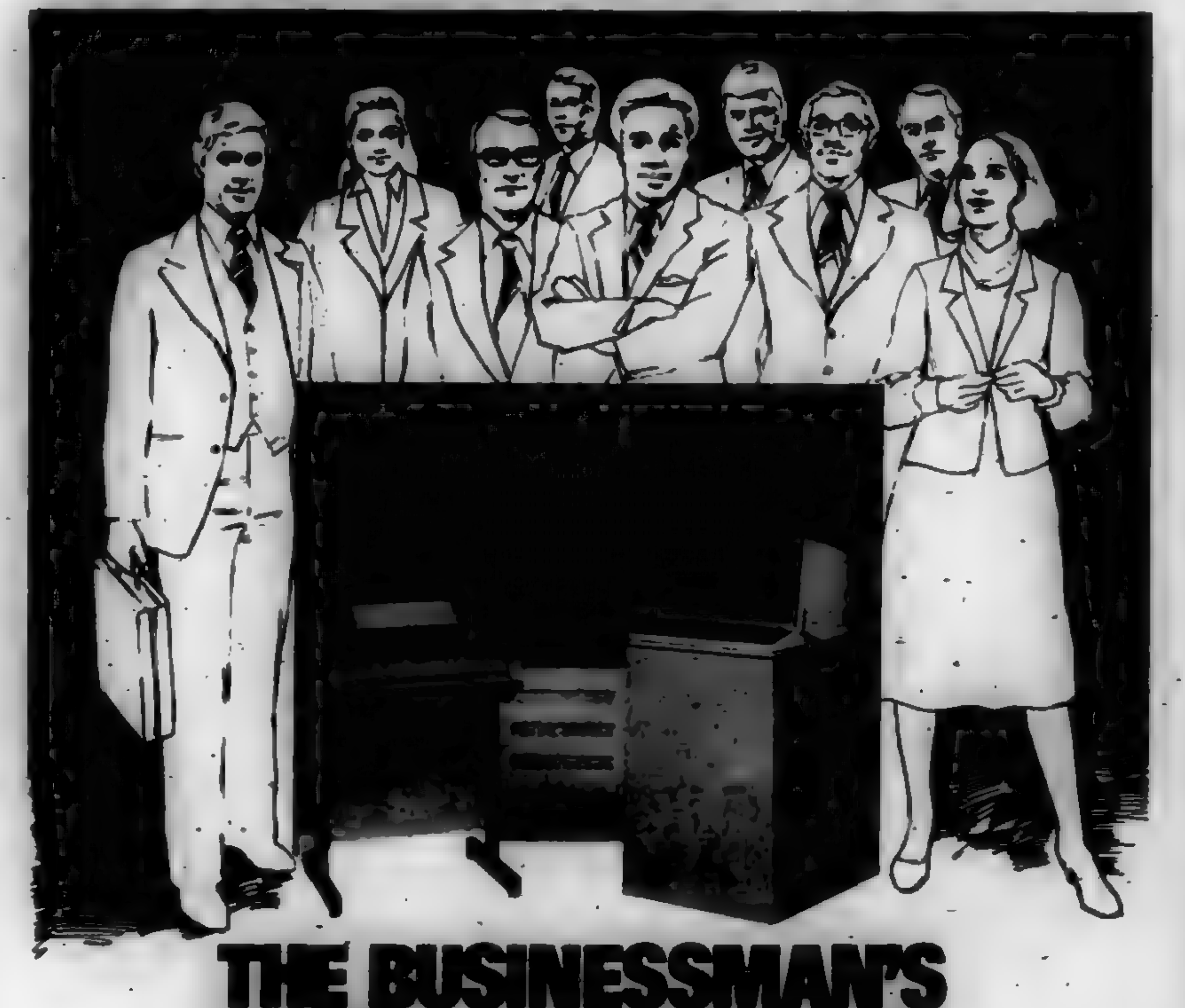
The Center averages some 200 frames on each 105mm by 148mm microfiche – the result of the laser-printer's reduction capabilities of up to 48:1. The microfiche total listed above represents the originals processed in the Komstar processor.

An average of seven or eight duplicates of each microfiche are often made for Mount Sinai departments, ranging from admitting to billing. One application requires 26 duplicates of the original microfiche.

"We have very few paper output applications now," D'Ornellas said. "Only our bills and employee paychecks represent the major paper applications. But even copies of patient bills also are printed on the Komstar microimage processor and stored on microfiche instead of paper."

Future COM applications under consideration are general ledger records and more complete outpatient listings.

A single microfiche containing approximately 200 frames is compared to one paper statement at Mount Sinai Medical Center, N.Y., which recently switched from wet chemical to dry laser COM.



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School District's Upgrade a Lesson in Efficiency

WICHITA, Kan. — The computer center for Wichita Unified School District 259 here is going through a significant upgrading of its magnetic tape subsystem, saving money for the district and making better use of both the computer room and the tape library in the process.

On top of everything else, one of the changes also means the district's 1M-byte IBM 370/138, running under DOS/VS, can be used more efficiently. Just by adding one more tape drive, many batch jobs that once had to wait can now be processed right along with on-line applications, according to the manager of computer operations, LaVern Meier.

Support for both kinds of work is important to the district. The computer center handles both academic administration and business accounting applications for 113 different schools here. Much of the school administration effort is handled on-line through CICS/VS, but most accounting is handled in batch mode.

Along with its 370/138 processor and, now, four tape drives, the district has IBM 3340 and 3344 disk units, an IBM 3881 document scanner and an IBM 3274 communications controller at the computer center. Approximately 40 Telex Computer Products, Inc. 276 and 278 terminals out in the schools are tied in through Bell 208A modems with data transmission at 4,800 bit/sec over leased lines. The system is operational "about two and a half" shifts on weekdays and one shift on Saturday, the manager reported.

The administrative jobs include daily class changes and similar time-sensitive updating that has to be done on-line, as well as grade and attendance reporting — based on documents completed by teachers, submitted weekly by the schools and scanned by the 3881 for entry into the system. The business-oriented applications, supported by a commercially available software package, now include general ledger and accounts payable, but will be extended to inventory control, fixed asset and payroll processing as well.

Beyond the applications and the equipment the center now has, the manager is looking forward to delivery of an IBM 4341 in early 1982, at which time the operating system will be upgraded to DOS/VSE.

The biggest recent change in the operation, however, has been the conversion from three IBM 3420 tape drives with maximum packing densities of 1,600 bit/in. to four Telex Series 80 drives capable of handling 6,250 bit/in. tapes. The district is one of the first user sites for the Series 80 units, Meier said.

The district has moved "two or three applications" to the higher packing density, but even before that some of the benefits of using the new drives were obvious. Meier did not get into specific dollar figures when he talked about the changeover, but was very firm when he said that, in total, the new four-drive subsystem cost less than the three units it displaced.

Beyond that purely financial consideration, each new tape unit is narrower than an IBM 3420 — because Telex places its reels vertically, not horizontally as IBM does — so the four drives now in place take only two or three inches more than the three IBM units. Those few inches were available, he said, whereas he simply did not have room for a fourth IBM drive.

In addition to permitting concurrent batch and on-line work, he expects the change to impact applications now using multireel tape files. clearly, the 6,250 bit/in. density allows more data on each reel and that can reduce the number of reels needed for a file. In one of the runs already converted, for example, a file that took two full reels is now down to "about half a reel," Meier said.

Tape Condition

The cutback in the number of reels in each file may also lead to a stabilized tape library facility. Currently, Meier has about 1,300 tapes from a spectrum of vendors. As applications are added, that number would be expected to grow, perhaps becoming awkward to control and even overflowing the space available. But if the big files can be made more compact, the district may not need to get more tapes and may avoid that space crunch.

Meier said he knows that packing data more densely on a tape means the computer center will have to be even more sensitive to the physical condition of each tape than it is now. The center is outmoded — it is about to be relocated — and the district already follows a procedure designed to schedule tapes for cleaning on a regular basis, with the cleaning done by a bladed device from Kybe Corp.

But Meier knows his procedure is not as good as it might be and said he is eager to learn more about the self-cleaning feature built into the Series 80 drives.

HOW TO USE YOUR TERMINAL WHEN YOU CAN'T USE YOUR HANDS. OR EYES.

You've probably been in the situation many times. Involved in a job that would be much easier if you could use your terminal without using your hands or focusing your eyes on the CRT screen. But you probably thought a solution would never arrive.

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Order-Entry Network Hikes Supplier's Efficiency 30%

ST. LOUIS, Mo. — A high-volume, low-margin industry must run at peak efficiency to make a profit today. That's why Lowy Enterprises, Inc., one of the nation's largest floor covering distributors, has installed an on-line, intercity computer network, according to its president, Steven R. Lowy.

The system "enables us to expand our sales volume and sales force at the lowest possible cost and supports our order desk people most effectively. It ensures that the dollars we spend generate increased sales and minimize overhead expenses, because our order-entry system — one of the best and most efficient in the industry — can handle 30% to 40% more business with the same number of people and do so more accurately and efficiently.

"Also, it has helped substantially to improve customer service. It has tightened cash flow. It provides timely precise data that enables us to react and adjust much more quickly if something gets out of kilter. And, when we get all our facilities on-line, we'll be able to reduce inventory at least 15% — yet operate at an even better service level than our present 90% to 95%," Lowy added.

"In today's inflationary economy, we would have to grow 10% to 12% each year just to stay even in our sales and maintain an acceptable profit, and that is not satisfactory to us. Nor is it enough to concentrate on just short-range goals, although those must be considered, too." To do this, a company must have all the most up-to-date information to make more considered decisions in all facets of the business, according to Frank Schveninger, president of Lowy's St. Louis division here.

Lowy's Network

The Lowy distribution system is a network of 60 Univac Uniscope 200 and UTS 400 CRT terminals and 20 printers interconnected via computers throughout Lowy's 10 companies. All except the factory will be on-line by the end of July, when the total of 14 locations in the six cities will be tied in for order-entry, credit authorization and production of warehouse shipping papers and bills of lading.

"The on-line systems are the threads that enable us to establish operating uniformity and formal, harmonious corporate structure throughout all these facilities," according to Thomas L. Taylor, director of corporate systems and operations.

"All now operate from the same 10 major data files: pricing, inventory, customer, purchase order, order, sales history, accounts receivable, accounts payable, general ledger, and payroll and personnel. Thus, all use the same data. But the system provides the flexibility so that each can modify the customer information, SKU numbers, purchase orders and so forth.

"Incidentally, Lowy Enterprises has no 'data processing department,'" continued Taylor, who has been in DP since 1966 and has moved increasingly into organizational development. He has been with Lowy since 1977.

"Instead, we have a Computer Services Department, which ties into Lowy's overall service concept. This department is a service operation, and its customers are Steve Lowy, Frank Schveninger, the vice-presidents and other managers. We have products and services that we work to upgrade and sell to them."

Goal of 100%

Before the on-line system, Lowy's service level averaged about 85%. Now, it is nearly 10% higher, and the goal is nearly 100%, hopefully by the end of this year.

When a customer calls in, the computer quickly analyzes the stock position, runs an inventory cross-check of the various warehouses and even

(Continued on Page 36)

Order desks at Lowy Enterprises, Inc. temporarily combine the rotary files formerly used and the Univac UTS 400 terminals that have reduced order processing time from about 20 to 25 minutes to the present five to eight minutes.

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Basic Four CPU Tracks 15 Racers In Competition at Indianapolis 500

INDIANAPOLIS – A computer designed for business applications endured heat, humidity and crackling spikes of electromagnetic interference to finish the Indianapolis 500 auto race here in a dead heat with winner Johnny Rutherford.

The Basic Four Corp. System 410 did its work stuffed under the timing stand in Al Unser's pit while 700-horsepower Cosworth racing engines with their unshielded, high-power ignition systems screamed past at 10,000 revolution/min. Track temperatures soaring to around 100 degrees and typical Indiana humidity plus grime and smoking rubber failed to bring down the system. The 410 lasted the entire 500 miles and kept track of 15 selected cars.

Improved Strategy

Believed to be the first such ever to have been used at Indy, the computer was part of the effort of the Longhorn Racing Team, headed by Bobby Hillin, of Midland, Texas. Hillin owns the car that Unser drove at Indy and will campaign throughout the 12-race Championship Racing League series.

"As a businessman, I have some appreciation for how computers can assist management decision making," Hillin said. "I turned to Basic Four for help because the confusion and lack of information faced by a team manager at Indy is a big factor in the race.

"I thought the computer would help – if it could only stand up under the hostile conditions at the track. As it turned out, the computer was easily up to the task."

Unfortunately, Unser's car did not match the computer's performance at Indy, and left the race with a blown engine after 33 laps.

"Our race car is an advanced design based on a very successful Formula 1 Grand Prix car. We need more time to test and sort the car out, but it will be winning races before the end of the season," Hillin said.

"Furthermnore, with the car at peak competitiveness, I expect the improvement in team strategy contributed by the Basic Four computer to provide the margin of victory in at least one race."

Important Difference

Racing is like other businesses, but with a couple of important differences, Hillin said.

The first major difference is the speed with which decisions must be made. Most businessmen have some time to analyze their data before they make a decision.

Hillin has to make snap decisions based on a confusing array of data.

He explains it this way: "At Indianapolis, which is a two-and-one-half-mile track, Al completes a lap in about 48 seconds. In a single lap, a great deal can change in the race. That means that any pause in making a decision could make the difference of a lap or more.

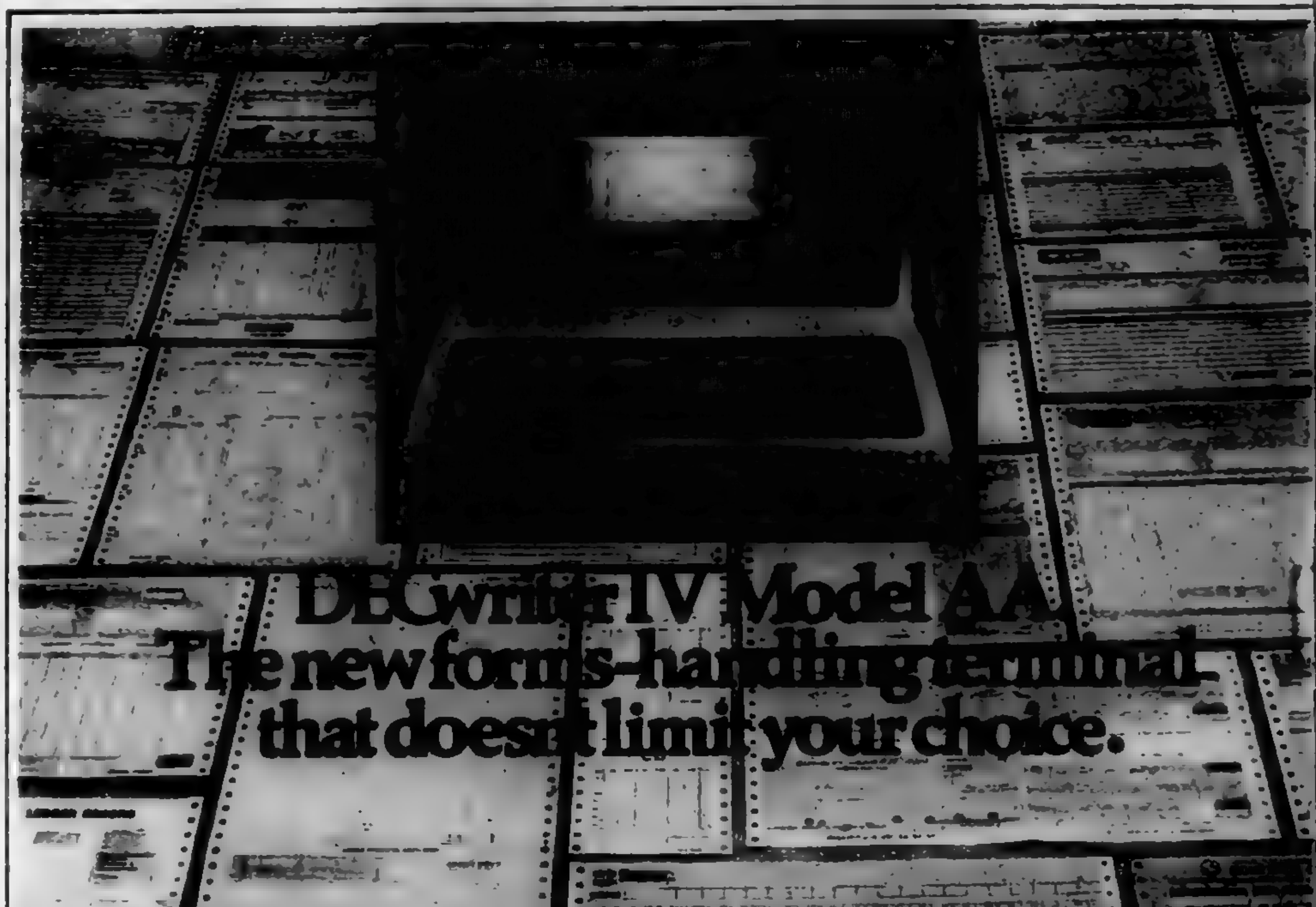
The situation is even more critical at short tracks like Milwaukee."

The Basic Four gives Hillin information at a glance on any one of three CRT terminals.

For Unser's car, a display presents the total number of laps completed, total number of pit stops, lap on which the last pit stop was made, number of yellow-flap laps since

(Continued on Page 35)

The Basic Four System 410 joins Hillin's Longhorn Racing Team in the pit space at Indianapolis.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IGC to Hold Meet On Graphics Applications

ANDOVER, Mass. — The Institute for Graphic Communication (IGC) will hold its third annual conference on business applications for computer graphics at the Andover Inn here on July 30-Aug. 1.

The conference will be an in-depth analysis of modern systems, techniques, equipment and applications. Sessions will include an overview of computer graphics in business, data base concepts for the non-DPer, computer graphics in decision support systems and standardizing formats for executive decision makers.

The conference will be chaired by Carl Machover of Machover Associates. Other conference leaders will include Dr. Robert M. Alloway, MIT Sloan School of Management and John A. Dawson, IBM,

The conference fee is $495 including room, meals, beverages, conference materials and transportation between airport and the center, or $455 without room. Additional information may be obtained from IGC at 375 Commonwealth Ave., Boston, Mass. 02115.

Urisa '80 Confab Slated For Toronto in August

TORONTO — The Urban & Regional Information Systems Association (Urisa) will hold its 1980 conference here Aug. 17-21 at the Prince Hotel.

The theme of this year's conference will be "Ends and Means of Urban and Regional Information Systems: Bridging the Gap in the 1980s." The conference will address defining the purposes and results users perceive from information systems. The seminar will also discuss new requirements placed upon vendors to meet users' changing needs, the organization said.

In addition to the regular seminar, the conference will feature two workshops, a preconference workshop on geoprocessing and a concurrent workshop on financial information systems.

Urisa can be reached at Main Floor City Hall, 100 Queen St. W., Toronto, Ont., Canada M5H 2N2.

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To order your DECwriter IV Model AA, or the original DECwriter IV Model DA, call your terminals supplier or write **Digital Equipment Corporation**, Terminals Product Group, MR2-2/M67, One Iron Way, Marlboro, MA 01752. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment Corporation of Canada, Ltd.

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NSF Grant Targets Minority Schools For $4 Million

WINSTON—SALEM, N.C. — Winston-Salem State University here has received part of a $4 million National Science Foundation (NSF) grant given to 19 predominantly minority institutions.

The grant will be used to establish a microcomputer laboratory to develop, test and disseminate microcomputer-based instructional materials. A further application of the grant will be to incorporate microcomputer-based technology into courses in the physical sciences.

Two microcomputer workshops will also be offered for science and mathematics faculty members from minority institutions, NSF said.

Basic Four Tracks Indianapolis 500

(Continued from Page 34)

the last pit stop and number of laps remaining before the next regularly scheduled pit stop (based on fuel consumption).

Much of the same information is presented for 15 selected competitors — those expected to be in contention with Unser during the race. For more elaborate analyses, a complete report on all 15 cars, including Unser's, is automatically produced on a printer every 10 laps or on demand if needed.

Hostile Environment

The second major difference between the Longhorn Racing application and other businesses is the intensely hostile environment at the motor speedway.

"As it turned out, Basic Four Research and Development wrote the program and, with the help of a maintenance company, Sorbus, Inc., assembled the system so that it ran flawlessly. When Johnny Rutherford crossed the finish line on the 200th and final lap, the computer was displaying data for his car and all the selected cars that were still running," Smith said.

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Distributed Processing To Be Theme of Compcon Fall '80

WASHINGTON, D.C. — Distributed processing will be the theme of Compcon Fall '80, sponsored by the Institute of Electrical and Electronics Engineers (IEEE), to be held here Sept. 23-25.

Besides such presentations as "Management Issues in Distributed Processing" and "Human Factors in Distributed Processing Systems," the conference will include such technical sessions as "Network Architecture for Distributed Computers," "Research Directions" and "Distributed Operating System Kernels."

In addition to the more than 40 sessions to be held, four preconference tutorials will be offered: "An Overview of Distributed Processing," "Distributed System Design," "Local Computer Networks" and "Computer Communications Technology in the '80s."

The fee for the conference only is $75 for IEEE members and $95 for nonmembers. Each tutorial also costs $75 for members and $95 for nonmembers. For any one tutorial in conjunction with the conference, the fee is $150 for members and $170 for nonmembers. An education workshop to be held Sept. 26 on "Current Emphasis in Computer Education" will cost $25 for members and nonmembers.

For anyone registering for any part of the conference after Sept. 12, fees rise $10 each. More information is available from Compcon '80 through P.O. Box 639, Silver Spring, Md. 20901.

Net Seminar Set For Six Cities

CEDAR GROVE, N.J. — A three-day seminar, "Designing, Installing and Managing an International Telecommunications Private User Network" will be presented in four U.S. cities, London and Mexico City, Mexico, between September and December of 1980.

The course is intended for communication professionals interested in gaining an understanding and insight into communications systems, services and techniques in use around the world as they apply to international private systems and networks.

Telecom Systems Group is sponsoring the seminars, and the highlight of the course will be the presentation of the concept of building and operating an in-house user telecommunications facility. More information is available from Telecom at 579 Pompton Ave., Cedar Grove, N.J 07009.

Chicago to Host First Info/MFG

CHICAGO — Increased productivity methods for manufacturers through information systems will be the theme of the Information Management Exposition & Conference for Manufacturing Companies (Info/MFG) to be held here Nov. 18-20.

An outgrowth of the annual Information Management Exposition & Conference (Info '80), the new event is designed to help manufacturers get started with information systems or to extend and integrate existing systems into all facets of production, such as office, sales and finance.

Including an equipment exhibit, the conference will focus on such topics as material resource planning, capacity planning, shop floor control, warehousing, inventory control, production planning and master schedule preparation.

The full conference registration fee is $295; one-day fee is $110 and half-day fee is $60. More information is available from Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Network Boosts Efficiency 30%

(Continued from Page 33)

cross-checks the customer's credit among the three merchandising divisions.

This order-entry system, a modification of Univac's Basic Distribution System, can also cope with cuts or pieces, minirolls or cartons, rolls or pallets and mill rolls. Clerks complete order-entry in five to eight minutes, with great accuracy, giving customers exact information on product availability and shipping dates.

In the past, working from rotary files of often out-of-date data, order-entry clerks took 20 to 25 minutes, often with the customer waiting on the phone. Lowy now markets this new order-entry system to other floor covering distributors.

Thus, the service level has not only increased, but orders move out much faster than in the past — and so do invoices. Billing is now daily, within 24 hours after shipment, compared to 10 days formerly. Consequently, cash flow has considerably improved. Available from the system, too, are terminal displays and daily printouts of the accounts receivable. Naturally, these are scrutinized closely because of the current high cost of money.

"Our computerized system gives us a better and better handle on inventory management, pricing and profitability," Schveninger said. "But, we get just the information we need and have eliminated a dozen different forms."

"We maintain a 45-to-60-day supply of each carpet SKU, based on the rate of sales," Taylor added. "This has become a fashion business, and style changes can occur within a six months' period — the style life of a carpet ranges from only six months to about two years. Now, if a downswing occurs, our managers can see a trend quickly, typically from the 'Monthly Rate of Sales' report, which also shows the amount of inventory we should carry to maintain that 45- to 60-day supply.

"The system also enables management to identify the profitability of a product line, daily, by individual invoice, if desired. This is vital with the constant price increases, which run about 4% to 6% and occur almost quarterly.

"But the system enables management to relate profit to total cost and develop adequate bottom-line profits on each SKU," Taylor said.

Calendar

July 29, Boston — **Distributed Database Management Systems.** Contact: Dennis Merritt, Computer Corporation of America, 675 Massachusetts Ave., Cambridge, Mass. 02139.

Aug. 5-8, Toronto — **Micro International.** Contact: 4300-L Lincoln Ave., Rolling Meadows, Ill. 60008.

Aug. 11-13, Houston — **The Art of Managing Managers.** Contact: Advanced International Research International, Inc., 1370 Avenue of the Americas, New York, N.Y. 10019.

Aug. 11-15, Greenwich, Conn. — **How to Develop Effective Long-Range Data Processing Planning.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

Aug. 12-14, Carmel, Calif. — **Automated Pagination Systems.** Contact: The Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Aug. 12-15, Los Angeles — **Data Base Management Systems.** Contact: Computer Technology Institute, Suite 101, 1024 Pico Blvd., Santa Monica, Calif. 90405.

Aug. 13-14, Washington, D.C. — **Structured Requirements.** Contact: Langston, Kitch & Associates, Inc., 715 E. 8 St., Topeka, Kan. 66607.

Aug. 13-15, Montreal — **EDP Disaster Recovery Workshop.** Contact: EDP Security, Inc., 400-2 Totten Pond Road, Waltham, Mass. 02154.

Aug. 13-15, Brighton, UK — **Computer Graphics.** Contact: Online Conferences Ltd., Argyle House, Joel St., Northwood Hills, HA6 1TS, Middlesex, UK.

Aug. 14, Detroit — **Information Resource Management.** Contact: Intel Commercial Systems Division, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766. Also being held Aug. 19 in Chicago and Aug. 21 in Houston.

Aug. 14-15, Chicago — **Computer-Aided Design and Manufacturing.** Contact: Data Processing Management Association, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Aug. 14-16, Toronto — **Data Processing Operations Management.** Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Aug. 16-18, New York — **Computer Contracting.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Aug. 17-21, Toronto — **Conference of Urban and Regional Information Systems.** Contact: Dale E. Richmond, Urban & Regional Information Systems Association, 5th Floor, West Tower, City Hall, Toronto, M3H 2N1.

Aug. 18-19, Boston — **Computers and Data Communications.** Contact: Data Processing Management Association, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Aug. 18-20, Palo Alto, Calif. — **Error Correcting and Detecting Codes.** Contact: Hellman Associates, 299 S. California Ave., Palo Alto, Calif. 94306.

Aug. 18-20, Park City, Utah — **EDP Strategic Plan Workshop.** Contact: Management Dimensions, 185 E. Garfield Ave., Pomona, Calif. 91767.

Aug. 18-21, Los Angeles — **VSAM: Its Structure and How to Use It.** Contact: On-Line Software International, 65 Rt. 4 E, Riveredge, N.J. 07661.

Aug. 18-22, Cambridge, Mass. — **Key Aspects of Information Systems Technologies.** Contact: MIT, Room E19-365, Cambridge, Mass. 02139.

Aug. 18-22, Chicago — **Structural Systems Analysis and Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Aug. 19-21, San Francisco — **Managing the DP Professional — the Challenge of the '80s.** Contact: Ubi Enterprises, 30 Milbank Ave., Greenwich, Conn. 06830.

Aug. 20-22, Chicago — **Fundamentals of Data Communications.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Aug. 25-26, Washington, D.C. — **Integrating Word Processing & EDP.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Aug. 25-27, Seattle — **Summer Computer Simulation Conference.** Sponsored by Association for Systems Management, Instrument Society of America and Society for Computer Simulation. Contact: Chip Stockton, P.O. Box 2228, La Jolla, Calif. 92038.

Aug. 25-27, San Francisco — **Office Automation Systems.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Aug. 25-27, Chicago — **Third-Party Lease Negotiations.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Aug. 25-27, San Francisco — **Essentials of Budgeting for Operating Managers.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

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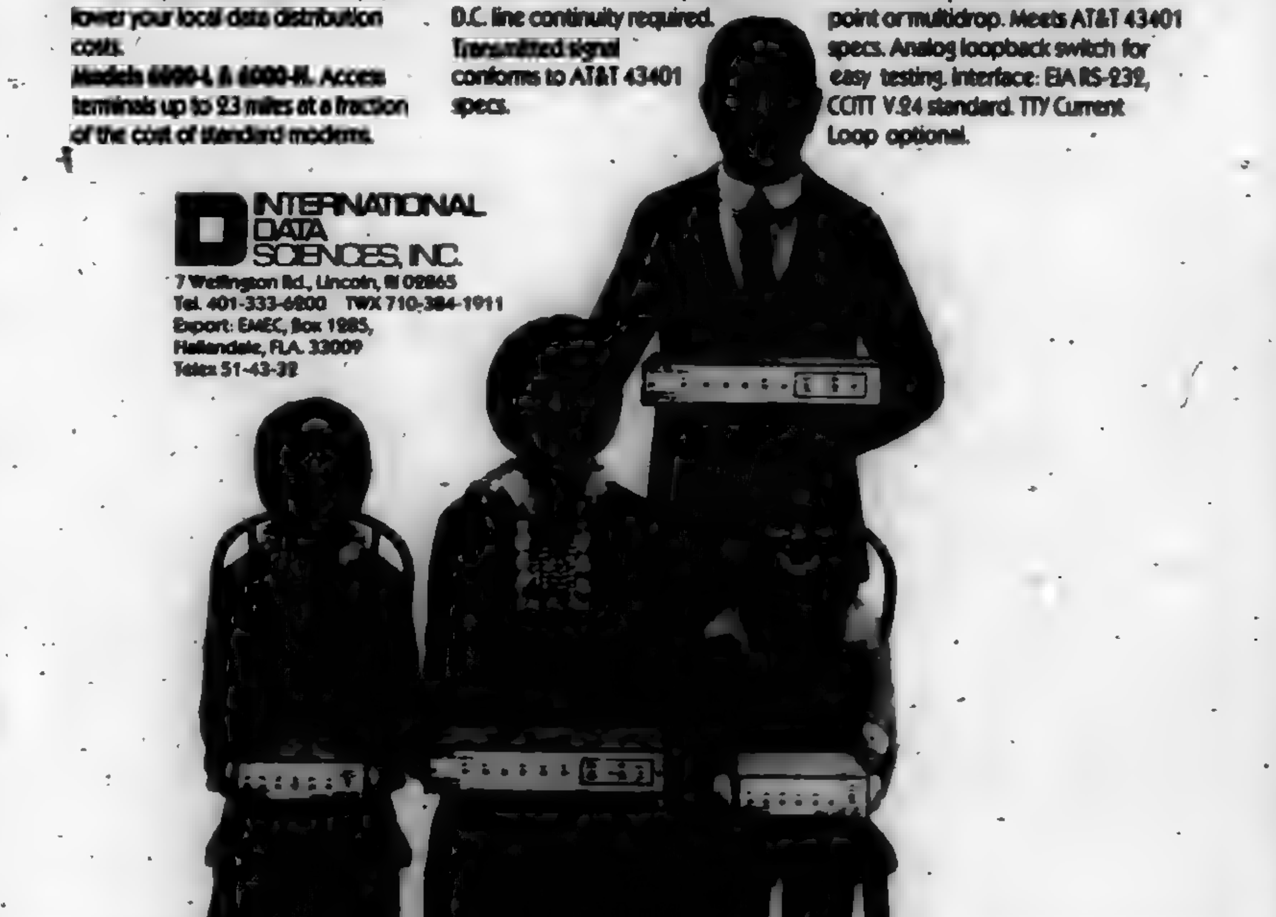

CASS
CAN
WHEN
IBM
WON'T

See page 115
in Buy/Sell/Swap

Mediocre Benchmark Results

Datapoint 1170, Randal 100: Retired Systems

By Hillel Segal

With benchmark testing results that were mediocre, the Randal Data Systems, Inc. Model 100 and Datapoint Corp. Model 1170 are small computer systems sharing a common fate: both are no longer manufactured.

In tests commissioned by the Association of Computer Users (ACU), the two received ratings that ranged from good to poor, scoring no higher than fourth and as low as 12th in the 12-system field.

Datapoint has discontinued the Model 1170, replacing it with the less expensive Model 1802 which, according to the firm, runs faster and offers greater system capacity.

Randal Data Systems, however, has reportedly filed for bankruptcy, and the company could not be reached for comments on its status.

While the Datapoint 1170 is still offered in refurbished condition on an "as available" basis, whether or not any market for Randal equipment exists at this point is uncertain.

The two systems were tested by an independent consulting firm as part of a group of a dozen computers priced between $15,000 and $25,000. The results, published in full by the nonprofit ACU; indicate the systems' performance in running standard benchmark programs written in Basic.

SCOREBOX

System: Datapoint 1170
Current Price: $20,330*

BENCHMARK RESULTS

		TIME	RANKING
C-1	Scientific/-Engineering Problem	38:27.5	9th
C-3	Accounts Receivable	6:50.4	9th

System: Randal 100
Current Price: $17,850**

OTHER BENCHMARK RESULTS

		TIME	RANKING
C-1	Scientific/-Engineering Problem	13:52.4	6th
C-3	Accounts Receivable	10:05.0	10th

OTHER BENCHMARK RESULTS

	C-1	C-3
IBM 5110	8th	4th
Wang 2200VP	1st	3rd
Texas Instruments FS 990/10	—	2nd
Hewlett-Packard System 45	3rd	8th
DEC PDP-11V03	7th	5th
Q1 Lite Microcomputer System	4th	7th
Univac BC/7 Model 810	5th	11th
Northern Telecom/Sycor 405	***	***
Datapoint 1170	9th	9th
Randal 100	6th	10th
Texas Instruments DS 990 Model 2	To be covered in future issues	
Hewlett-Packard 250		

* The Model 1170 has been discontinued. Refurbished systems are offered on an "as available" basis.

** Randal Data Systems, manufacturer of the Randal 100, has reportedly filed for Chapter 11 bankruptcy status.

*** Could not run because of memory or formatting limitations.

Causes of Discontinuation

While the Datapoint and Randal systems tested in the benchmarking program are no longer manufactured, the test results are still of some interest, if only to discover what about the system or company caused the line's discontinuation. User comments obtained during the production of the benchmark report help to clarify the picture: in the case of Randal, they reveal a shaky distributorship structure that may have contributed to the firm's downfall.

In the case of Datapoint, though, the phase-out of the 1170 apparently made way for a better and cheaper product serving the same needs. A comparable Model 1802 was quoted at $13,550, vs. $20,330 for the system tested.

The 1170 scored between fourth and 10th place in the 12-system field. Its highest rating was in the new product problem. In the scientific-engineering and accounts receivable applications problems, the 1170 placed ninth.

Datapoint users contacted during the benchmark testing program rated the company's equipment above average in capabilities and reliable in operation. Most users were working in a business environment running applications such as inventories, receivables, accounting, mailing lists and so on. The abundance of Datapoint software available was cited as one advantage of the system. The availability of Cobol was another item frequently mentioned.

Datapoint users also liked the variety of hardware options and generally described the 1170 as a flexible system that fit in well with other offerings by the same manufacturer.

Maintenance support received a spotty record of comments. While one data processing manager compared the company favorably to IBM and Control Data Corp. in system down time, others questioned the parts availability and consistency of response time.

This weekly column gives the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Randal's Model 100 was one of a line of products offered by the California computer manufacturer. Randal's systems were touted as complete hardware-software packages and attracted first-time users, mainly businesses converting to computerized recordkeeping from a manual system.

With only one exception, the Randal system placed in the lower half of systems tested in running the benchmark programs. Customer comments indicated mixed emotions about their experiences. While some said the combined price for hardware and software was lower than that available elsewhere, others complained that the process of converting to the computer system had taken longer and involved more difficulty than anticipated.

The experiences of Randal users seemed to vary considerably according to the competence of the distributor that supplied the system. For some, installation went smoothly, but one said the conversion process was "terrible." Another commented it was "a lot more time-consuming than expected."

Our benchmark tests showed weaknesses when compared with other similarly priced systems. Best performance was sixth in the CPU test; worst was last place in the editor test. In between, the Model 100 received two 10ths, a ninth and an eighth to score in the bottom half of the 12-system group in five out of six categories.

Why was Randal unsuccessful in marketing its products and maintaining the viability of the corporation? While somewhat beyond the scope of this analysis, we did see a competitively priced hardware-software package running on somewhat slow hardware, backed by a distributorship system that at times broke down. Whether the company can reorganize or in some fashion work out support arrangements for existing users remains to be seen.

Evidence of Change

Randal Data Systems and the Datapoint 1170 are both, in different ways, evidence of the rapid change that exists in the computer industry. New products are introduced and old ones eliminated; new companies rise to challenge established firms, some successfully, some not. Because of the highly sophisticated nature of the products and the rapidly changing designs of CPU and memory systems, turnover in product and maker is taken for granted.

Big firms, of course, can survive one or two failures in a decade of product offerings. Small companies may choke if their sole offering flounders or if organizational problems, growing pains or any of a host of other obstacles come up.

On the plus side, small firms often show greater aggressiveness in responding to customer trends and may gain dominance in a small corner of the market by offering special features unique to that segment. The products of small firms should not be overlooked if the company is sound and has good management, plus the ability to effectively service and support the desired installation.

Users also have to be on the watch for products that are late in their life cycle. How to gauge that is hard to say, because the rate of change varies in different product segments. About the only way of accurately determining the longevity of a product is to compare its features with that of others, checking for elements that are already out-dated by the competition.

Product development cycles vary from company to company as well as among market segments. The useful lifetime of a simple terminal, for instance, could easily be close to a decade; but the product life of a minicomputer these days is likely to be much less than that.

The wise buyer would not put money down on a new system soon due for retirement unless he is a bargain hunter willing to go it alone in the areas of service and support, if it comes down to that.

Next week: we test the Hewlett-Packard Co. Model 250.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several foreign countries.

One of the association's key activities is the publication of monthly "Benchmark Reports."

ACU's Series No. 1 reports on systems priced less than $15,000. Series No. 2 covers the range from $15,000 to $25,000, and Series No. 3 tests systems priced between $25,000 and $50,000.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the Association at P.O. Box 9003, Boulder, Colo. 80301.

Some Vendors Let Users Find Bugs

Turnaround Time

By Larry E. Long

Q I am an accountant and have had some successful experiences with several small IBM computers. We recently purchased a small computer from an emerging computer manufacturer. It amazes me that this company would sell an accounts receivable package without the capability of processing remittances that do not equal an invoice. You cannot process a payment on account, a partial payment or a prepayment. The only way to do so is to issue a credit memo and assign a miscellaneous number that can never be deleted from the system or applied to a future invoice.

I know a credit balance on a customer statement is not the usual thing. However, it does happen.

Any suggestions would be appreciated.

A It amazes me also. This accounts receivable package has a serious design flaw.

Proprietary software packages are regularly revised based on field use feedback. Unfortunately, some vendors depend on users to find the bugs in the system. Discuss the problem with your vendor marketing representative and submit a formal application change request through the proper channels. I would guess that the vendor is already aware of this shortcoming and an update is in progress.

As an alternative, your vendor representative might know of other commercial or user-produced systems that are compatible with your hardware.

Q I have worked in DP for nearly 20 years and have never been able to decide on an area of specialization. I am now thinking that perhaps the new specialty of "DP Auditor" might be appropriate for me. How can I learn more about this area? How might I prepare for and enter this field?

A Although many companies have well established DP auditing groups, most do not. If you decide to specialize in the rapidly expanding career field of DP auditing, you will be getting in on the ground floor.

According to Marvin Remus, president of the EDP Auditors Association, one of the primary functions of the organization is providing education in the area of DP auditing. He suggested that you contact the international headquarters of the EDP Auditors Association to locate the chapter nearest you. The members of the local chapters can answer, in depth, any questions you might have about DP auditing. The address is EDP Auditors Association, 373 S. Schmale Road, Carol Stream, Ill. 60187.

Q For a year and a half we allowed all professional DP employees the latitude to set their own working hours. The experiment was a disaster and three months ago we returned to regular working hours. Now we have the same problems that forced us to implement flexible working hours in the first place, primarily the lack of computer time during regular hours.

Our people thoroughly abused flexible hours by selecting work hours not for the good of the company, but to accommodate their own social schedules.

Circumstances dictate that we consider implementation of flexible working hours again. Perhaps this mode of operation is the lesser of the two evils. Do you have any recommendations on how we should proceed?

A DP is project-oriented and requires close coordination among all members of the project team and users. This coordination is not possible with team members setting their own working hours.

The implementation of flexible hours is doomed to failure unless procedures are established to closely control the use of flexible hours at each level in the department. Make standard working hours the rule and provide supervisory approval of flexible hours on an as-needed basis. Allow an individual employee a certain number of hours at his discretion, perhaps 4 hours per week.

Set aside a minimum of 12 hours per week on three separate days when all employees are expected to be present — for example, Monday, Wednesday and Friday afternoons. These times can be used for department, committee and/or project team meetings.

It's human nature to take advantage of a good thing. Flexible hours can work to the benefit of all, but they must be tightly controlled.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

Long is a professor at Lehigh University, a DP consultant and author.

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MAI

EDITORIAL

Heal Thyself

Despite the growing use of computer-based medical information systems, implementing a computer in a hospital is often difficult and costly.

While equipment can be blamed for a portion of these difficulties, the major reason for hospitals' operational problems seems to stem from staff interference, according to a report released by MIT's Alfred P. Sloan School of Management [CW, July 7]. This interference ranges from the slightly annoying employee refusal to sit in front of a CRT terminal to the potentially dangerous altering of vital medical data.

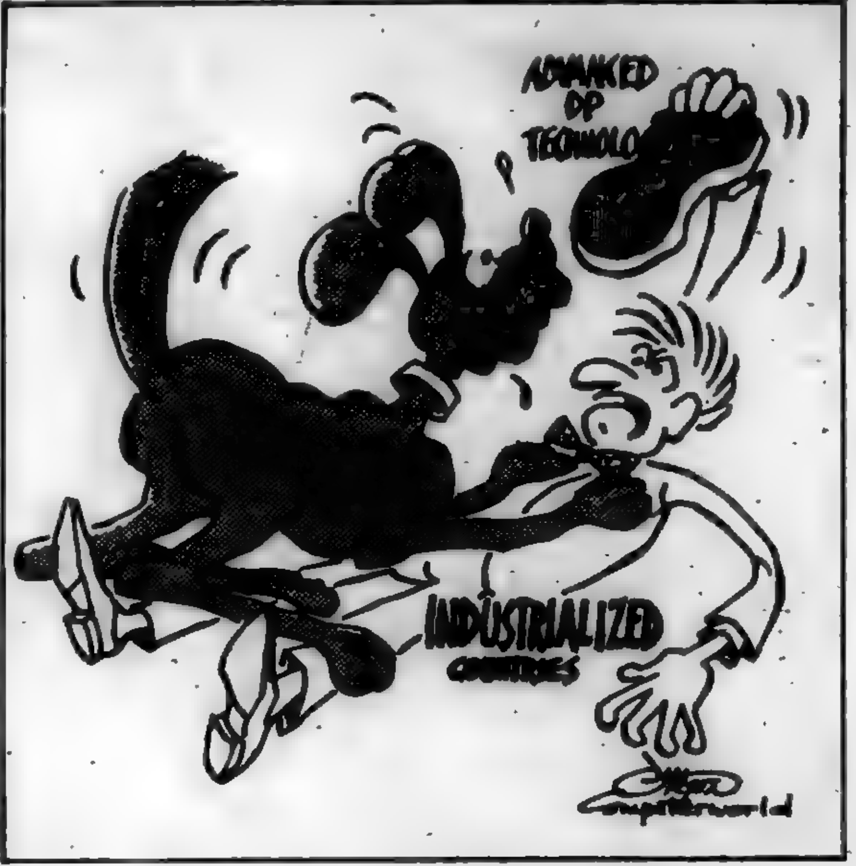
Although staff resistance to hospital information systems has not yet led to any reported medical catastrophes, the seeds for future calamities are there. The MIT report estimates that if a hospital now has or has had a computer-based information system, there is about a 45% probability that the staff has interfered with the system's operation.

In addition, as the number of medical information systems increases, staff interference with these systems – if left unchecked – has the potential for affecting the credibility of the entire health industry. The end result is a detrimental erosion of the necessary doctor-patient trust.

It is up to the vendors of medical systems and hospital administrators to see to it that possibility for staff interference is reduced. Vendors can help by boosting a system's hardware and software security levels, while administrators can do their part by focusing more on people-oriented training with an eye toward eliminating any professional bitterness.

Dependable feedback mechanisms, such as frequent and open discussions on the system, could also help signal hospital management to any impending difficulties.

In the case of these medical systems, the saying "Physician, heal thyself" has never rung truer.



'Now is that any way to sit up and beg?'

DATA PAST

Five Years Ago
July 16, 1975

WASHINGTON, D.C. – The Office of Management and Budget (OMB) issued guidelines that would set into motion dramatic changes in the way government agencies collected and used personal information on U.S. citizens. Under the Privacy Act of 1974, the agencies were directed to identify each system of records they maintained and to review the contents to assure only "relevant and necessary" information was being maintained and that no information about the political or religious beliefs and activities of individuals was being kept.

– – –

SPRINGFIELD, Ill. – A newly upgraded quality control system at the Illinois Department of Public Aid's DP center identified a case of fraud involving a caseworker, a terminal operator and two welfare recipients – but only after 173 unauthorized $425 checks had been issued and cashed. The scheme worked because a member of the fraud team was in a position to control every stage of the payment process.

Eight Years Ago
July 19, 1972

PHOENIX – There was not enough evidence to send the Greyhound Computer Corp. vs. IBM case to the jury, a federal judge ruled in dismissing the 33-month-old antitrust suit. Two days after IBM was granted the directed verdict, Greyhound filed a notice that it would appeal the case.

– – –

BOSTON – The National Fire Protection Association approved the use of Halon 1301 as an alternative or addition to carbon dioxide in fighting computer center fires. The organization also called on computer users to adopt methods to "minimize the possibility of penetration" by explosives or incendiary devices aimed at destroying computer installations.

LETTERS

Life With Aramco

I was very disappointed by "Travel Rewards, Austere Life Anticipated by Saudi-Bound DPer" [CW, June 9]. It contained numerous inaccuracies, all of which misrepresented life with Aramco in Saudi Arabia.

A check of our records reveals that neither the Arabian American Oil Company (headquartered in Saudi Arabia) nor Aramco Services Company (located in Houston) employs, has employed, nor is considering employing, anyone named John McClure. My guess, from his description of his employment, is that McClure has been hired by one of the several firms under contract to do specific work on Aramco's behalf. Each of these firms has its own employment terms, practically all of which differ significantly from the career approach of Aramco.

To set the record straight, Aramco offers continuous employment, not "12-month contracts." We work eight hours a day, five days a week. The majority of our American employees in DP are in "family status," meaning they are married, many with children, living with their families in an Aramco community. However, we also have significant numbers of single men and women living in these same communities. Our office environment is typical of that found in the U.S.

Practically all of the above is at variance with McClure's purported description of living and working conditions with Aramco in Saudi Arabia.

C.W. Ives
Manager
EDP Department

Aramco Services Co.
Houston, Texas

Useful Series

I would like to compliment *Computerworld* on its benchmark series. My position requires that I be current in the area of small computer systems. This task is made much easier by such articles and by associations such as the Association of Computer Users.

I certainly hope CW will continue this series.

J. David Strange

Green Bay, Wisc.

Threat to Californians

Regarding "Slump Expected in California Electric Power" [CW, June 2], I believe you did a great disservice to the people of California concerning the need for the Diablo Canyon nuclear plant.

You neglected to mention that the proposed power plant is located on a known earthquake fault. The credibility of promises of plant safety in the event of an earthquake seems negligible in the light of similar reassurances given to the public after the earthquake in the Livermore area this past spring. Reports of leakage of radioactive water from the Livermore facility came out *after* the public had been reassured that sufficient safeguards protected the nuclear facility from contaminating the surrounding area.

The recent eruption of Mount St. Helens in Washington and the earthquake activity in the Sierra Nevada range point toward a period of increased seismic activity as stresses build up within the earth's crust. A major earthquake has been predicted for California within the next 10 years, with a good chance of it occurring within the next five years. Considering these facts, operation of a nuclear power plant on an earthquake fault would be nothing less than an irresponsible and needless exposure of the people of California to a possible and probable nuclear catastrophe!

Katrina Kern

Oakland, Calif.

Other Letters on pages 42 and 43.

HUMAN CONNECTION/Jack Stone

Concepts Class Benefits From Applications Focus

Providing terminal access to a major user application can be an important stimulus in training new users in business systems and file organization.

I recently developed and implemented a five-day hands-on introduction to computing systems for newly assigned systems administrators and found their enthusiasm rose dramatically when, on the first afternoon, they were able to access their own records on the terminal screen. The students' initial concerns about their abilities to understand such a complex system — much less administer it in their branch office — seemed to melt away.

This is the second in a three-part series on concepts training.

The familiarity of the data was apparently a significant factor in giving them the confidence to move forward in the course. As they operated the terminals, the attendees seemed to focus only on their newly acquired abilities to manipulate *their* data, and they forgot their ignorance of the technology.

Deciding against long lectures, I pushed the students right through log-on into games, after introducing the notions of "file," "library" and "volume" (which, incidentally, I accomplished rather easily by drawing an analogy between data library organization and a "juke box" installation).

As we proceeded through a selection of games, I tried to make points about what computers do. I did have one procedural failure, however: several students were foreign nationals and didn't know how to play "baseball"; but I came through unscathed when I found "soccer" in the file index and fielded the program, as it were, in this new direction.

What better way to introduce students to the concepts of information processing and file organization than to have them enter an interactive conversation with their own on-line computer system?

The students also entered transactions by adding, deleting and modifying records in their own master file (actually, a test copy thereof); invoked a sort from their programming system; made file inquiries using their query language; and generated the operational reports that would be used in their own branch offices. The technique worked like a charm.

Perhaps the best example of how well the hands-on method worked to illustrate concepts is this: Wang Laboratories, Inc. (we were using the Wang 2200VS) provides utility programs that are the cat's meow, and one of the neatest ones is Display. This program shuffles over to any specified file and drags a copy of it over to the terminal screen for viewing. So I had all the students execute the program, using, again, their master file as the Display operand.

The program allows the use of a programmable terminal function key to convert screen data from Ascii to hex — right before your very eyes. So, with the additional aid of a hard-copy Ascii/hex/binary conversion table, I had the students compare the Ascii representation of the first record in their file with hex and binary equivalents to show how the human-comprehensible character set is represented in the computer by binary codes.

(Continued on Page 46)

READER COMMENTARY/Howard A. Karten

Managers Not Left Behind By Technological Changes

Several letter writers and columnists in *Computerworld* have recently asserted the need for DPers to "keep up" with industry developments in the face of an allegedly rapidly changing technology. Most recently, Floyd McWilliams, in a Reader Commentary [CW, June 23], asserted, "It is generally accepted that the half-life of knowledge in computer science is about four years."

What on earth are these people talking about?

Fortunately for business users, the user-technology interface has changed very little in the past four (or even eight) years. If McWilliams and others are aware of changes that significantly affect the professional or job knowledge required by users, perhaps they should let industry vendors in on it. In reporting the news, CW often (a) carries vendor claims that the new hardware (or software) is transparent with older versions and (b) reports on industry experts who tell us that the large investment in IBM 360-compatible software makes unlikely another dramatic upheaval. (Any readers who were in the industry in 1964 will recall the hoopla — and user consternation — that accompanied that transition.)

Indeed, it seems to me that developments such as higher level languages are intended precisely to forestall or minimize the disruptive effects of new technology. One reason for any kind of standardization — such as language standards — is to minimize the effects of change on manufacturers and users of products so as to preserve everyone's investment.

Consider one of the most dramatic changes of the past decade, the dropping cost (and improving reliability and speed) of computer memory. How many computer users need really care whether their data is stored in magnetic cores, charge-coupled devices (CCDs) or bubbles? Users should be concerned with two things, and two things only: higher speed and lower cost. (Indeed, one might argue that such advances mean users can *forget* some of the tricks they have learned to squeeze maximum performance out of a machine. If memory is cheaper, why spend a week trying to achieve a fancy overlay structure that uses 10K fewer bytes when the cost of the programmer's time is greater than the gain in efficiency?)

Certainly there has been technological change, and equally certainly programmers and managers have to add to their knowledge. But these additions are *incremental* — that is, they are new wrinkles — and not upheavals obsoleting knowledge. A new IBM 4331 may give programmers and managers new features, but it has a negligible effect on Cobol or Fortran.

Another disturbing point McWilliams made was that "the very 'height' of the technical manager's position places him farther and farther from the actual technical activity," McWilliams is not alone in this kind of thinking, which is dangerously fallacious. A manager is supposed to *manage* work, not do it himself. What does a manager manage? Resources — such as people, computers and computer time.

Often, information systems managers get into the worst kind of trouble when they try to do the work them-

(Continued on Page 46)

SOCIOLOGY OF COMPUTING/Robert L. Glass

The Interesting/Useful Dichotomy

Everyone should have an ethic.

It gives the person a touchstone, a cause and even enthusiasm.

There is, however, a problem with ethics. By their very nature, they are rarely subject to personal compromise. Name your favorite ethic. Are you willing to discuss the possibility that it may be faulty?

Even that rock-steadiness of ethics is both good and bad. It's good because it makes people relationships dependable and predictable. But it's bad because it makes people relationships over the subject of ethics inflammatory and divisive.

Enough philosophy. What does ethics have to do with software?

Let's take a look at the academic and industrial worlds of software for a while and the relevance will soon become clear.

In the academic world, the researcher pursues those subjects he considers to be *interesting*. He is rewarded for doing so by the esteem of his peers.

In the industrial world, the researcher pursues those subjects he considers to be *useful*. He is rewarded for doing so by the esteem of his management.

The dichotomy between studying things which are interesting or useful is not a small one. The academician looks with some disdain on things that are merely useful. The industrial worker looks with some disdain on things that are merely interesting. Thus each side is making judgements about the basic goals of the other.

In fact, the pursuit of interesting work is an ethic to the academician, and the pursuit of useful work is an ethic to the industrial worker. It is an ethic so strong that it brooks little compromise.

Believers in each of the ethics question the wisdom and even the morality of the other.

Are there some less philosophic examples of this dichotomy? Yes, all around us in software.

Is proof of correctness interesting? Is testing interesting? No. Is it useful? Yes.

Are requirements languages interesting? Yes. Are they useful? Not yet.

Are requirements reviews interesting? Largely, no. Are they useful? Yes.

Is symbolic execution interesting? Yes. Is it useful? Not very.

Is peer code review interesting? No. Is it useful? Yes.

The dichotomy is all around us, and it is very real.

It is also very bad. The researcher who pursues primarily interesting problems communicates poorly, if at all, with the researcher who pursues primarily useful ones. Mutual disdain is a poor basis for sharing knowledge.

Genuine Bridge

The dichotomy is made worse, not better, by the researcher who works interesting problems believing erroneously that they are useful, or who works useful problems believing erroneously that they are interesting. The bridging of the dichotomy must be genuine and not contrived. It must be based on knowledge and not ignorance.

It is time for academic and industrial people to review their ethics. It is legitimate to work interesting problems. It is legitimate to work useful problems. What is not legitimate is to represent one as the other. And it is not legitimate to disdain those who make the other choice.

Local Loyalty

There is a fascinating concept we all grew up with which I call "local loyalty." We all knew our grade school was best in the city. And our high school was the best in the county. And so was our college the best in the state. And so was our city, and county and state the best in the country.

Our religion is the best in the world. And so is our ethic.

Local loyalties are useful. They are also absurd. The likelihood that my personal grade school, high school, college, city, county or state is *really* best . . . is nil!

Understanding is the answer to overcoming absurd local loyalties. It is also the answer to overcoming conflicting ethics.

Everyone, as we said at the beginning, should have an ethic. Everyone, perhaps we would now agree, should mesh that ethic with a large dose of understanding.

LETTERS

Data Flow Testimony

I was surprised at *Computerworld's* interpretation of the testimony I gave on transborder data flow issues before the House Government Information and Individual Rights Subcommittee ["U.S. Trade Reps Not Ready to Guide Data Flow Policy," CW, April 28]. I would like to take this opportunity to clarify my statements and the position of the office of the U.S. Trade Representative (USTR) regarding data flow problems.

As I stated in my testimony, USTR has a mandate to take the lead in international negotiations of trade issues and fully intends to provide leadership on any trade issues in the communications/data processing area. USTR is uniquely equipped to coordinate U.S. policies affecting the foreign commercial interests of the industries involved in teleprocessing and to negotiate appropriate solutions with foreign governments.

I also said USTR did not have to take on overall responsibility for all telecommunications issues in order to discharge its responsibilities for assuring reciprocal treatment of U.S. telecommunications/data processing/information companies in international commerce. This is a far cry from the assertion in the article that USTR "is not in a position to assume the lead policymaking role in the U.S. government for responding to transborder data flow issues."

More specifically, this means we do not see the need for involving ourselves in detailed negotiations of radio frequencies or guidelines in privacy/-data protection laws, *except* where issues in these areas create a significant burden to U.S. commerce.

I would not want any CW readers to have any doubt about USTR's firm intention to provide the leadership and coordination in the U.S. government in tackling the foreign commercial problems of U.S. telecommunications/data processing and information industries.

Towards this end we have taken a number of steps. We have reinforced our efforts to identify foreign barriers adversely affecting these industries; coordinated discussions of the issues between this office, other government agencies and a number of private-sector representatives; and begun work on determining the most effective means for dealing with these issues. We recently conducted a meeting, attended by 40 private-sector representatives to discuss how we might best proceed.

Geza Feketekuty
Assistant U.S. Trade
Representative
Executive Office
of the President
Washington, D.C.

General Insult

Only an egotistical "technician" would have the lack of understanding expressed in the Reader Commentary by Floyd McWilliams [CW, June 23].

Why must those of us, like "Tim" the dimwitted corporate vice-president, who have devoted most of our professional lives to the advancement of our industry, be made to suffer such a generalized insult?

McWilliams' obvious solution (to his nonexistent problem) is to place the technically competent at the helm of our machine-oriented business. What he is probably unaware of is the fact that our industry, as any other, is only as valuable as the people who motivate it.

Since we are generalizing, it can be said that almost anybody can learn the technical intricacies of this business. But, of all of these new wizards of hardware and software, how many are capable of offering viable advice, guidance or judgement to those who work for them or to those for whom they work?

Mere technical expertise is a very familiar crutch used by insecure individuals who otherwise have very little to offer.

As for our installation, mediocre as it is, we believe that technicians are a useful group. They assist us at transitional points. After we absorb what they have to offer, they leave. What remains are the people who have done the job for so long that they realize nothing has really changed.

What McWilliams was so inept at recognizing is what "Tim" and many others like him have seen for so long. It is all a variation of a familiar theme.

Take some good advice. If

your management regards the vendor's latest offering as something really new, you have very naive leadership.

Al Chavez
Oklahoma City, Okla.

LETTERS

Dangerous Accusations

Alan and Clare Kahn's unfounded speculative accusations as reported in "Stolen Credit Profile Allows Telephone Charges" [CW, June 23] are far more serious and dangerous than their petty discovery of a wrong middle initial or Social Security number.

Fortunately, experienced credit evaluators resolve discrepancies, but the same information, forced into inexperienced hands, such as the Kahns', by well-meaning laws becomes abused and misinterpreted.

Thank you for pointing out that an unknown individual "apparently" swiped a copy of their credit profile, but the article could just as easily ended at that word with no loss of relevant material.

John J. Stewart
Wausau, Wis.

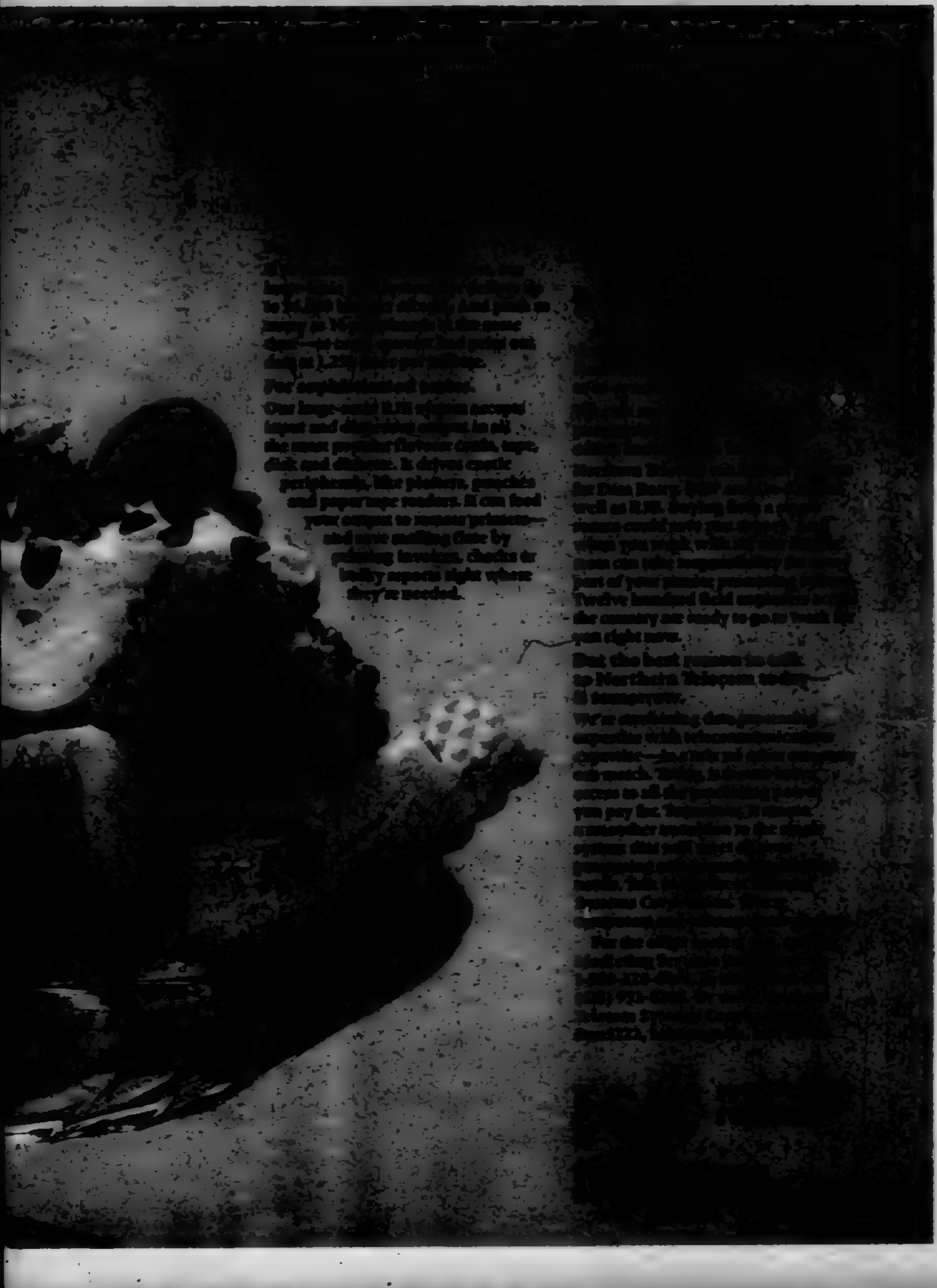
Tenth Pointer

The article "Software: A Sure-Fail Approach" [CW, June 30] promised 10 pointers, but delivered only nine.

In my experience, use of any three is sufficient to torpedo any project, regardless of size.

My nomination for the 10th pointer would be: Write your statement of the problem, and your recommended solution, with obfuscatory prolixity so that nobody is quite sure what you set out to do or is able to measure results against predictions.

Joel Chinkes
Atlanta, Ga.



[illegible] For sophisticated [illegible]. Our large-scale [illegible] system accepts input and dispenses output in all the most popular formats: cards, tape, disk and diskette. It drives exotic peripherals, like plotters, punches and paper tape readers. It can feed your output to remote printers— and save mailing time by printing invoices, checks or bulky reports right where they're needed.

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But the best reason to talk to Northern Telecom today— is tomorrow. [illegible]

CPAs and Software

The question of independence, lack of bias and an objective viewpoint of the certified public accountant (CPA) who performs within a self-imposed framework of "generally accepted accounting principles" is further confused by the announcement concerning the agreement between Coopers & Lybrand, Inc. and Software International Corp. [CW, June 23].

Unfortunately, the issue of "conflict of interest" has been totally obliterated. It would appear that auditing firms are entering the software business with active marketing, full support (including consulting) and training for the customers. Surely, there are questions of ethics which have not been satisfactorily resolved — at least for the user.

Fortunately, there are a few CPA firms who do believe that software, hardware and systems are best left in the hands of an independent computer consultant. I am one of those independents.

G.M. Easely
Houston, Texas

Focus on Education

In response to the June 2 article "AWC Plans to Boycott NCC'81 in Chicago," the Greater New York Chapter of the Association for Women in Computing (AWC) finds it necessary to clarify the position of its local association. The headline and the general tone in the beginning of the article depict an organization that is oriented mainly towards the feminist issue. The article implied the AWC would forsake its original and primary purpose to "jump on the bandwagon" of the Equal Rights Amendment (ERA) issue.

The AWC is a professional association oriented towards the computer field and the part women play in it.

The objective of our local is educational rather than political.

Naomi Koenn
Executive Committee
AWC
Flushing, N.Y.

A Legal Approach

The story of the $500,000 bribery attempt to get the source code for Adabas was a shock [CW, June 16].

For that amount of money, I would write a data base management system or could find someone to write one with me. The result would be legal and profitable for both sides.

Patrick Sweeney
Woodside, N.Y.

Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

AT LARGE/Rex Malik

Maharishi Plans Unorthodox Electronics Firm

What is the Maharishi Mahesh Yogi doing with microprocessors and printed circuit boards in England? And what is his organization called "The Age of Enlightenment"?

Before you have visions of computer-assisted levitation or of mantras being chanted under microprocessor control, let me explain that micros are among the electronic products the Maharishi's UK followers intend to produce as soon as they get organized.

About two years ago, the Maharishi (once associated with the Beatles) inspired the transcendental meditation (TM) movement, and the Age of Enlightenment bought a former Rothschild family country seat (Mentmore Towers in the heart of deepest and greenest Buckinghamshire) an hour or so from London.

They have tried to restore the place to its former glory — indeed they have been trying to do things which were in the original plans but were never actually created. In the process, they have quelled the initial reservations of the locals. However, the locals still think the Maharishi's followers are "not all there," but in a pleasant way, you understand.

The house is now the headquarters of the British end of the Maharishi's meditation movement and houses its company, AEC Ltd. It is from there that the group is planning its venture into the electronics business.

The British plans now being devised are for a plant that will employ around 750 people. It is to be opened in a development area and will therefore qualify for government grant aid. The rest of the capital will come from existing assets and from guarantees of supporters of the movement. It could also include hard cash from supporters.

When the plant is operating, the employees will get the rate for the job. When it is profitably operating, they will between them receive 75% of net profit on top of their pay.

And what will otherwise be different about the operation? It will be staffed by adherents of TM. Those who want to join will come to the area — the location is as yet undisclosed — because they want to practice TM, including its so-called advanced Sidhi techniques, every day.

They will be able to do so on company time: of the working day's eight hours, two will be reserved for such practice, but the employee will still be paid as if he had worked eight hours.

In the UK, the movement's "minister of information" is one Peter Warburton. He claims there is a 50-employee printing plant in existence in which three quarters of the employees practice TM and get paid at overtime rates for doing so.

And of course there are other organizations and plants abroad where TM is part of the daily regime. The claim is simple: TM is supposed to bring benefits to the individual, the company and society. Sickness and absence drop away, productivity increases and no doubt so does quality, and the local crime rate takes a beating.

I have no doubt of these effects. What I do doubt is that they should be attributed to TM specifically, even to the use of advanced TM techniques, whatever its proponents may say in their favor. I believe something at the same time more complex and yet much simplier is happening here.

Chicago Experiment

A famous productivity experiment in Chicago in the '30s had management properly painting and lighting a factory, and doing it to a standard well above employees' expectations: Productivity shot up.

Obvious, you might say. Those who know the experiment of course also know what is coming next. The experimenters decided to see what would happen if they let the plant revert to something resembling it previous condition: By how much would productivity now go down?

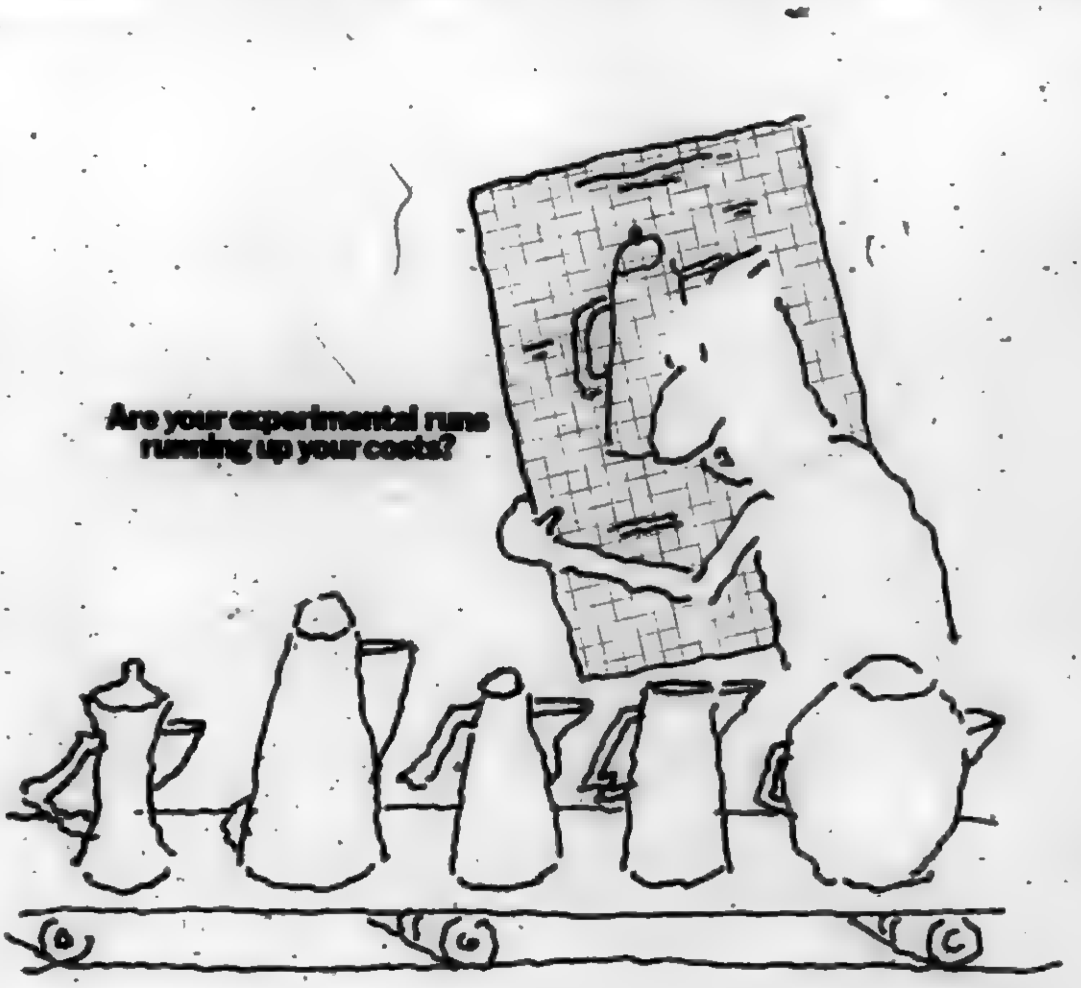
Productivity did not go down: It stayed around the same level as it was after management had improved the working conditions.

The moral of this story is that it did not matter within broad limits what you did, so long as you did something. What had to be demonstrated to the employees was that management cared.

I suspect that if the Age of Enlightenment can bring its electronics plant into being and if the plant shows productivity gains above the industry norm and positively influences the life of the local community, the company will put the improvements down to the practice of TM.

I wish the group well, but I will still not believe such a claim. I will believe, however, that this happened because management demonstrated that it cared and gave some practical demonstration that it did so. And what could be more practical than two hours a day on full pay to practice whatever it may be?

Now, if they were to tell me that the Maharishi's views influenced their choice of microcomputer architecture, that really would be something.



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THE TAYLOR REPORT/Alan Taylor

Computer Crime Posing Unique Problems

IBM's Robert Courtney has found a good, old-fashioned way to make his points on security. Not having any real results he can point to, he uses auditors as scapegoats [CW, June 16]. He suggests that a hard-bitten, undercover police force would be more effective than the routine precautions offered by auditors after a crime has taken place.

While Courtney's attack on auditors was exaggerated and derisive, his discussion did bring up the need to review the circumstances peculiar to computer crime.

The first problem is anonymity. Changes in input, programs or files can be made anonymously. Use of log-on software, personal passwords and so forth does not provide proof that a particular person was involved; a system can be fooled.

Authorization to act independently is a license to act improperly without more embarrassment if caught.

Cost of Exposing Crimes

A second problem is that it is rarely worth trying to expose the culprit. The lack of "fingerprint" capability means that court proceedings are risky, because conclusive evidence is usually lacking. The actual or implied involvement of authorized personnel can damage the organization's image, if publicized.

As a result, except at low-level, bank-teller types of crimes, the cost of exposing a computer criminal is high, often prohibitively so.

The old saw that crime does not pay is seldom applied to computer crime. With abundant monetary rewards to criminals and the high cost of exposing crimes, the risks of engaging in computer crime are rather less than those associated with smuggling marijuana into the U.S. More than 95% of the cases are thought to be profitable for their instigators. When computer crime pays, the standard prevention techniques, whether policing or auditing, just don't apply — yet.

As to what does apply in the place of reliance upon the auditing techniques Courtney is so derisive of — well, there are many possibilities. But that is another column.

In the meantime, the point to remember is that Courtney is facing, in his own way, a real problem that isn't responding to the usual crime-preventative techniques.

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Managers Not Left Behind

(Continued from Page 41)

selves. Generally speaking, the higher one rises in an organization, the less parochial his thinking becomes. A lower level person's concern is his actual day-to-day work; a manager's concerns are (or should be) planning and policy issues — guided by inputs from his technical staff.

Let's take a hypothetical example. Suppose a computer manufacturer introduces a computer it claims to be extremely fast and very reliable. The software is compatible with current software, and the price/performance ratio is a significant improvement. The only hitch is that the computer operates at extremely low temperatures, so it has to be placed in outer space.

What would the manager's concerns be in evaluating such a piece of hardware? (1) How do I get the thing into space, and how much will it cost me? (2) How can I verify the vendor's claims? (3) What do I do for computer power if the system fails? (4) How do I communicate with it?

Cast in more familiar terms, these questions concern (1) site preparation, (2) benchmarking, (3) backup and (4) communications support. Neither the questions, nor the forms of the answers, have changed. Only the numbers change.

The most significant changes for managers in the past decade have been advances in our knowledge of how to manage people — how to select, train, motivate and retain them. All these aspects of management are becoming tougher. Instead of keeping abreast of changes in technology, DP managers would be better advised to stay current on the latest information about working with their key resource — people.

Karten is a free-lance writer specializing in computer topics.

Class Gains From Focus

(Continued from Page 41)

And speaking about binary, I really flopped when I chose to prove to the class that one can perform arithmetic operations with binary numbers as well as decimals. The subject was way over their heads (as it is for the rest of the nonacademic, non-DP population). So my advice is to gloss over the subject in your next concepts class by stating only that arithmetic can be performed in binary as well as in decimal and that binary arithmetic is what is used in all digital computers. For proof, direct the students to the handbooks for their hand-held calculators.

Now it is true that Alexander is a little too young to be using Speakeasy, but thousands of other computer novices have found Speakeasy to be a surprisingly easy way to use a computer.

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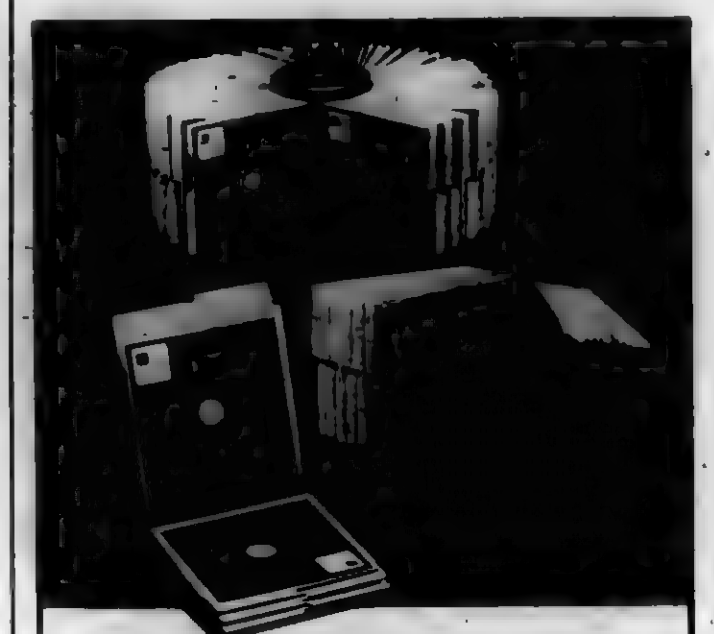

The Data Defenders

It's too late for Ring King once it's ruined. Sure, the diskette itself can be replaced. But the data it stored was too important to lose.

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DDs and the Mini User — Part 1

Mini Environments Get Mainframe Tool

By David Ferris
Special to CW

As corporations increasingly turn to minicomputers to support sophisticated data processing applications, the problems of controlling an intertwined mass of programs, users and data are fast coming to light.

Data dictionaries (DD) — software products designed to help alleviate these difficulties — have been used in mainframe environments for several years and are beginning to be available to minicomputer users.

How do DDs address these problems? First, they let users know what their data base contains. This function becomes especially important as new programs and data types are added to existing applications.

Life is comparatively easy when new systems are built from scratch. If you need to implement a payroll system, for example, all you have to do is set up a couple of files — one for employee master information and another to keep track of their hours. Then, you write a few programs to allow for data entry and query and a batch program to print checks.

With only a couple of files and several programs on your system, there's no problem if the personnel department wants to develop a skills inventory system. All that has to be done is to check if the data base contains the appropriate information, write new programs and change the data base accordingly.

At this stage of development, it is easy to tell what is going on and add new systems. Questions like, "What sort of information do we have on our employees?" "What files contain this information?" and "What format do employee IDs have?" present little challenge.

Explosion of Complexity

However, as the weeks turn to years, applications programs flourish and more and more new types of data are stored in the machine. With the press of events, documentation does not get maintained as well as it should.

At the same time, headhunters are plundering technical personnel so the original development staff often is not around to advise on what went before.

Suddenly the questions that were so simple to answer before become difficult. Why? Employee information may be used in many different files by many different programs; many of the people who wrote the programs are not around any more to answer questions; many of the on-line files have names of doubtful descriptive value; there is a mass of files on tape; when you can find files with interesting information you cannot tell if it is up to date; and further, your reliable people are all busy just at the moment with a new application for the controller.

This explosion of problem complexity is common in data processing. Data dictionaries help by providing a single, centralized and reliable source of information describing the data processing environment.

Part 1 of this two-part article on data dictionaries gives an overview of how this software can benefit the user. Next week: What's available for the minicomputer user?

In particular, DDs provide a "data base about the data base." Data fields and subfields, editing and format criteria, security access privileges, records, files and data interrelationships — for example, employee master file to employee-hours-worked transaction file — make up the data base information typically described by a DD. Consequently, new application development and maintenance work on current systems is greatly facilitated.

DDs can also serve to standardize data references. When programs are written, data fields tend to get renamed by programmers. A field known in the data base as 'EDUC-LEVEL' ends up being referred to as 'EDUCATION-LEVEL', 'E-L', 'TEMP-1' or 'J-S-ED-LEV', depending on which program you happen to be looking at.

This linguistic freedom may suit the creativity of individual programmers and does indeed have its virtues, but such synonyms really hamper maintenance work.

With a DD, however, programs can be made to use the same names for fields, records and files. Centrally specified editing and validation criteria can be homogeneously and nonredundantly used across applications. Source documents such as CRT transaction screens or paper forms can be made more uniform.

The last major function of a DD is to describe general DP interrelationships. In

(Continued on Page 49)

Sign-On, Sign-Off Feature Among 'Secure/CICS' Additions

SUNNYVALE, Calif. — Several support enhancements including an automatic sign-on/sign-off feature have been added to Secure/CICS, Boole & Babbage, Inc.'s on-line security software for IBM's Customer Information Control System environment.

Secure/CICS now enables users to add support for a variety of terminal types in addition to IBM 3270s including the 2740 and TWX-type units. In addition, automatic teller machines that cannot execute the normally required sign on transactions can be automatically signed on, according to the firm.

An authorized operator can now sign on or sign off a group of terminals at once for easier control over terminals with similar security requirements, the firm said.

Additional enhancements include automatic screen blanking for use in sensitive applications and improved compatibility with standard CICS security to allow program products or applications such as IBM's Display Management System to continue using CICS keys for security checking.

Secure/CICS operates on IBM 370, 30 series and compatible mainframes under all VS operating systems in a CICS VS environment and costs $18,800 from the firm at 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

File Search Aid Backs IBM 4300s

ATLANTA — The On-Line Alpha Search (OAS) system supporting both IBM 4300 hardware and the Fixed Block Architecture of peripheral devices is now available from Insurance Systems of America, Inc.

Operating under DOS/VSE using the Customer Information Control System (CICS), Shadow and other teleprocessing monitors, the OAS system was designed for rapid access and high-speed updating of extensive alphabetic files, the software vendor said. High-speed searches of name files can be conducted when only minimal information, such as a last name, is known, the firm said.

The software displays all records that match the search criteria so the terminal operator can isolate the correct record or further define the search specifications.

The cost for OAS ranges from $20,000 to $30,000 depending on the CPU configuration. Insurance Systems can be reached through Box 47975, Atlanta, Ga. 30362.

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TEXAS INSTRUMENTS

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'Erisa-Aid' Handles Range of Benefits

WAYNE, Pa. — SEI Corp. has announced an employee benefits accounting service designed to accommodate all types and sizes of contribution plans and operate in an on-line, real-time environment.

The system supplies requirements of the Employee Retirement and Income Security Act (Erisa) regarding employee eligibility, service and vesting and provides a variety funds allocation programs. Called Erisa-Aid, the service also allows users to design reports and participant statements relating to retirement and benefit plans, a spokesman said.

Erisa-Aid is offered in two forms: on-line, via a typewriter terminal located in the client's office and linked to an SEI computer; or in a batch-processing service mode.

For on-line users, the service costs a minimum of $1,000/mo, which covers roughly 4,500 participants. For additional participants, the client is billed on a sliding scale basis. The typewriter terminal is supplied by SEI at a cost of $215, which includes the modem and all maintenance responsibilities, the spokesman explained.

For batch users, the firm's full administrative support mode also costs a minimum of $1,000/mo plus a 25% surcharge to cover administrative services provided by the SEI staff. The company accepts input from clients in hard or machine-readable formats.

SEI is located at Valley Forge Executive Mall, Building No. 7, 680 E. Swedesford Road, Wayne, Pa. 19087.

Mini Users Gaining DDs

(Continued from Page 47)

addition to basic entities such as fields, records and files, the DP world contains such things as user departments, individual users, applications programs, screen formats, security classes and sets of files.

These have complex interdependencies. For example, particular programs are supported by certain programmers and support certain user departments and certain individual users. Some reports require certain programs to be run concurrently, perhaps to prepare data. A CRT screen format may be used by various user departments and programs.

Determining the impact of change will involve, as the mathematicians say, a nontrivial effort. By maintaining information of these dependencies, DDs can be a great help in correctly determining the impact of change.

In short, DDs are a tool aiding in the control and management of data processing. Implementations tend to be integrated with the software environment, so that to some degree the task of collecting the contents of the DD is automated.

Ferris is the senior partner of Ferris & Associates, a computer consulting firm.

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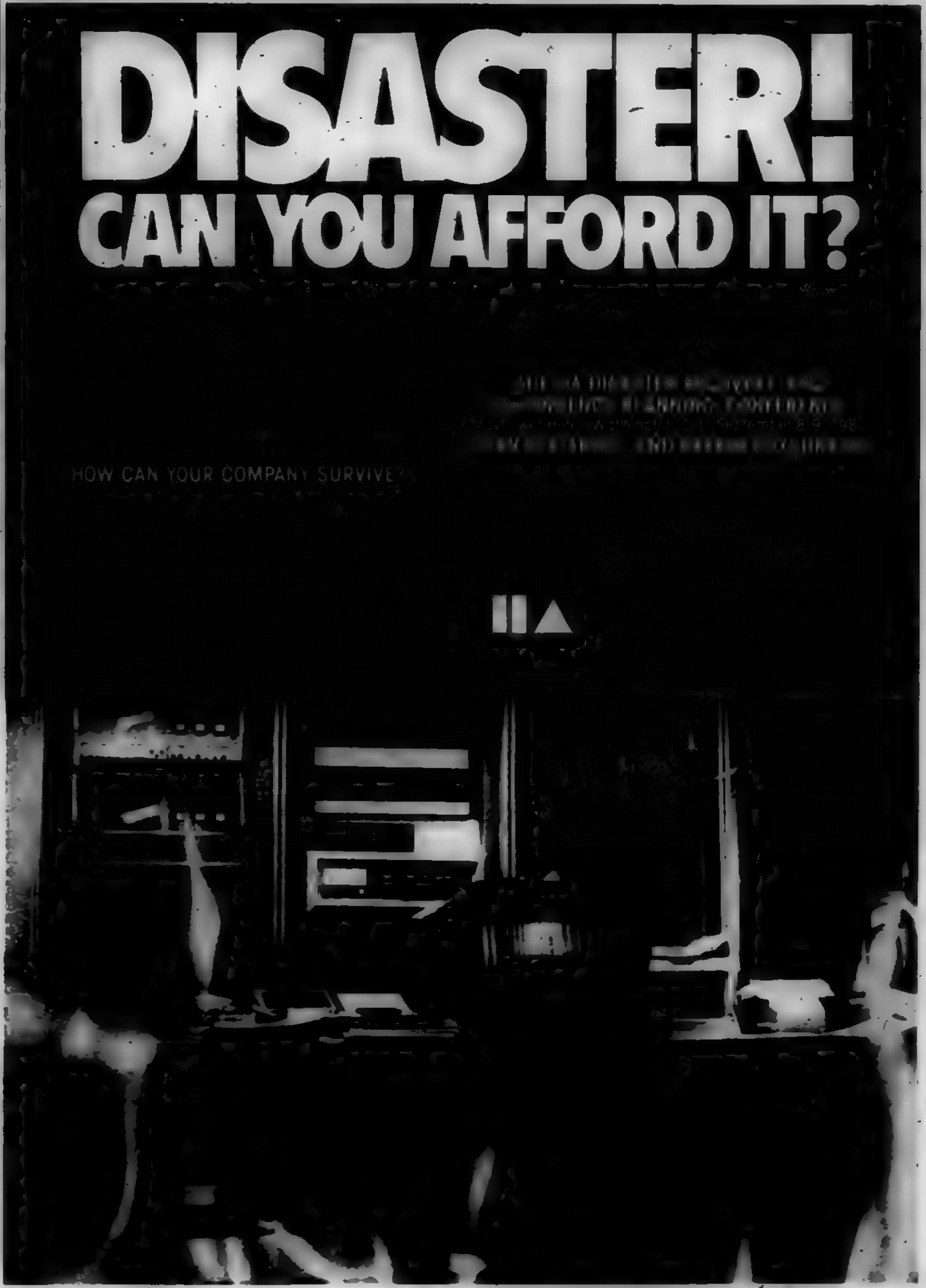

Packages Aid Management Of Corporate Plane Fleets

DENVER – Two packages that manage fleets of corporate passenger aircraft are available from Aviation Information Services, Inc. The packages run on Data General Corp.'s CS systems.

The Operations Analysis System/91 keeps track of aircraft fleet movements, provides performance and fuel management reports and accounts for flight crew performance and training requirements, the vendor said.

The second package, the Passenger Movement report package, provides passenger billing and documentation.

The Operations Analysis System/91 costs $50,000 for a one-time license. Maintenance is an additional $5,000/year. Although an exact price for the Passenger Movement package has yet to be set, a spokesman said it will cost about $5,000 for a one-time license with approximately a $500/year maintenance fee.

The vendor is at Suite 8700, 3333 Quebec St., Denver, Colo. 80207.

Package Assists Data Retrieval

SUNNYVALE, Calif. – Zero-N Systems, Inc. has unveiled a data retrieval package for personnel, medical, legal and general business applications.

The system was originally developed for employee recruiters, who would come up with a list of words that were unnecessary and then program the system to ignore them whenever they appeared. The system could then match people with positions.

Once the system learns the operator's vocabulary, any document can be entered into it; the system scans it and retains important data only, the vendor claimed. The price of the system ranges from $3,000 for a microcomputer application to $60,000 for a large mainframe application, the vendor said from Suite 240, 599 Mathilda St., Sunnyvale, Calif. 94086.

Cincom Unveils Rental Plans

CINCINNATI – Three- and five-year rental plans designed to reduce customers' monthly payments by up to 20% were announced effective July 1 by Cincom Systems, Inc.

The typical Cincom customer using OS Series 80 Total and Environ/1 (the data base/data communications systems), T-ASK (on-line query) and LMS-II (on-line programming) would save $9,780/year by choosing the five-year rental option compared with renting on a one-year plan, Cincom said.

The extended-term rental plans provide for a reduction of 5% for the three-year and 15% for the five-year plan for Series 80 Total customers. Series 80 Environ/1 customers can reduce their rentals by 10% through a three-year rental plan or 20% with the five-year plan.

Cincom is at 2300 Montana Ave., Cincinnati, Ohio 45211.

Honeywell Adds Level 6 Support

WALTHAM, Mass. – Honeywell, Inc. has announced the availability of TPS 6 Release 220, a package designed to enhance the capabilities of the company's transaction processing system for its Level 6 small computers.

Run under Honeywell's Mod 400, the package offers journalization and audit trails, a printer spooling facility and enhanced testbed capabilities. With this release, Honeywell now supplies support for its Commercial Instruction Processor, log-on listener and VIP7804 and VIP7805 line graphics users.

TPS 6 Release 220 is priced at $11,220.

IBM System/3 Gains Utility

VENTURA, Calif. – A communications control programming utility that eliminates the process of patching main data disk files on the IBM System/3 Model 15D is available from Ventura Computer Systems.

Known as Disk, the utility writes a message to the system history whenever files are changed and provides an easy-to-read audit trail, according to the vendor, which is offering the object version of Disk for a free 30-day trial period.

All programs are written in RPG-II. The utility costs $500 from Ventura, P.O. Box 1305, Ventura, Calif. 93003.

Coding Backed Under VS1, MVS

SACRAMENTO, Calif. – Software Module Marketing, Inc. (SMM) has unveiled a conversational on-line programming system for IBM VS1 and MVS systems.

Acep has full text-editing capabilities and a complete remote job submission/-retrieval interface, the vendor claimed.

Acep supports remote terminal operation with CICS/VS and the Basic Telecommunications Access Method. In addition, unmodified OS/VS utilities run in conversational mode and the system features multiple virtual active areas for each user, SMM said.

Pricing for Acep begins at $24,000 from the vendor at 1007 7th St., Sacramento, Calif. 95814.

"WE SAVED
OR 5 TIMES THE
IN THE FIR

"Essex Chemical Corporation is a producer of industrial and specialty chemicals. We're using a Software International Accounts Payable System that saved $75,000 in the first year.

"That's five times the cost of the package, and came just from vendor discounts we would have missed otherwise.

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E George P. Colburn,
Director of Management Information Services,
Essex Chemical Corporation

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- Accounts Payable
- Accounts Receivable
- Fixed Asset Accounting
- Payroll/Personnel
- Manufacturing Resource Planning

Design and Drafting System Runs on Tektronix Gear

SAN JOSE, Calif. — A computer-aided design and drafting system designed to run in a decentralized environment on Tektronix, Inc. hardware is now available from Arrigoni Computer Graphics, Inc.

The interactive system, called Touch 'N Draw, offers a variety of design and drafting capabilities at less than half the cost of competitive systems and is suited for architects, industrial designers, interior designers and others, the vendor claimed.

Touch 'N Draw runs on the Tektronix 4050 series desktop graphic computer, 4663 plotter, 4907 file manager and a 36-in. by 48-in. digitizer.

All programs are controlled by user keys on the desktop computer, a spokesman said. All design and drafting is done by touching a digitizer cursor to the appropriate control commands and symbols on the menu board, then touching the location on the drawing where symbols are to be placed or lines drawn.

Touch 'N Draw software and menu board cost $30,000. A complete system with Tektronix hardware costs less than $65,000 for drawings 17-in. by 22-in., the vendor said from 231 O'Connor Drive, San Jose, Calif. 95128.

Cobol Chart Generator Gets Design Aid Capability

WEST BLOOMFIELD, Mich. — Design aid capability has been added to National Database Software, Inc.'s H-Chart documentation package with its Version 1.2.

As a Cobol hierarchy chart generator, H-Chart produces a graphic illustration of structured Cobol source programs. Using it as a design aid, analysts may produce Visual Tables of Contents (Vtoc) even though they have limited knowledge of Cobol, the vendor claimed.

As a documentation tool, H-Chart can be used after-the-fact to review the application programmer's methodology. The source code analyzer does not make a line-by-line analysis, but rather provides a display of all possible program execution paths.

Requiring 400K bytes of memory to run, H-Chart 1.2 has a page mode option, offering the user the ability to view a top-down program function chart spanning multiple pages of Sysout without having to splice sheets of paper together, according to the firm.

H-Chart 1.2 licenses for $3,000 and is available to IBM Cobol users only. National Database Software is located at 5488 Centerbrook, West Bloomfield, Mich. 48033.

System Analyzes Cobol Coverage

SAN FRANCISCO — Software designed to analyze the testing coverage of Cobol programs has been announced by Software Research Associates.

The Coverage Analysis System (CAS) automatically processes Cobol programs and produces a logically equivalent version that includes special run-time subroutine calls.

The CAS system operates on standard Cobol for the IBM and Univac environments and is accompanied by detailed documentation as well as subscription-type maintenance and upgrade support.

The license fee of $13,500 includes one year of maintenance. Software Research Associates can be reached through P.O. Box 2432, San Francisco, Calif. 94126.

Six MRP Packages Evaluated by MSS

WILLISTON, Vt. — Manufacturing Software Systems, Inc. (MSS) is offering evaluations of six materials requirement planning (MRP) software packages, including reviews of new packages as well as major revisions of existing package evaluations.

New packages evaluated include Comserv Corp. Amaps/3000 and Arthur Andersen & Co.'s Mac Pac Cobol. Revisions include Comserv's Advanced Maps, Univac's Unis 1100 and Software International, Inc.'s net change MRP system. A user reaction was also added to the evaluation of IBM's Mapics package.

The evaluations cost $650 each. However, the firm offers various types of package deals. Manufacturing Software Systems can be reached through P.O. Box 278, Williston, Vt. 05495.

OLS Service Uses AS/6

PITTSBURGH, Pa. — On-Line Systems, Inc. (OLS) has acquired two National Advanced Systems AS/6 mainframes and is offering IBM-compatible processing on its national time-sharing network.

Under the name of OLS/370, the service will provide project management, sales inquiry tracking with advertising analysis, financial management services, data base management systems and custom-developed applications.

Prices for OLS/370 are based on usage, according to a spokesman. OLS is headquartered at 115 Evergreen Heights Drive, Pittsburgh, Pa. 15229.

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Apples Get Subset Of Ansi Fortran

CUPERTINO, Calif. — Apple Computer, Inc. has announced Apple Fortran, a subset of Ansi Fortran 77, for users of the Apple II microcomputer.

Operating in the Apple Language System, Apple Fortran becomes part of a software development environment, including an editor, linker, file handler, assembler, Apple Pascal compiler and system library, a spokesman said.

Apple Fortran will run on an Apple II or Apple II Plus with a minimum 48K-byte memory.

Apple Fortran will be available in the third quarter and will retail for $200, the spokesman said from the firm at 10260 Bandley Drive, Cupertino, Calif. 95014.

Micro Notes

Cobol Development System is available to users of the Radio Shack TRS-80 Model II. Cost: $299 with reference manual, user guide, sample program and disk. Vendor: Radio Shack, 1300 One Tandy Center, Fort Worth, Texas 76102.

Source code for Heath Co. software and firmware is available for cassette assembler, Debugger, Editor and Basic as well as HDOS. Cost: $25 per listing except for HDOS, which costs $195. Vendor: Heath, Department 350-390, Benton Harbor, Mich. 49022.

The **RAZ8002ML Resident Assembler** and **LINKZ8002 Linking Loader** utilities and the **EDITZ8000** resident line-oriented context editor were designed for Z8000 micros. Price: $350 for the two utilities, $150 for the editor. Vendor: Hemenway Associates, Inc., Suite 200, 101 Tremont St. Boston, Mass. 02108.

Cromemco RPG-II is IBM-compatible, runs on any Cromemco, Inc. system with a minimum of 64K bytes. Price: $595. Vendor: Cromemco, 280 Bernardo Ave., Mountain View, Calif. 94043.

Reclaim is a utility program that tests floppy and hard disk systems on micros running under CP/M. Price: $60 ($5 for documentation). Vendor: Lifeboat Associates, 1651 Third Ave., New York, N.Y. 10028.

Fortran-77 has been added to the UCSD System software for 6502, 6800, 6809, Z80, 8080 and LSI-11 micros and is compatible with UCSD Pascal. Price: $400 for the UCSD System with Fortran, $500 for the UCSD System with Fortran and Pascal. Vendor: Softech Microsystems, Inc., 9494 Black Mountain Road, San Diego, Calif. 92128.

Advanced Systems Pascal reportedly cuts by 50% to 75% the time required to write a microcomputer program. Price: $250. Vendor: Infosoft Systems, Inc., 25 Sylvan Road S., Westport, Conn. 06880.

The Easy Data Information Transactor (Edit) is a data base management system for the Hewlett-Packard Co. HP-85A. Price: $1,750. Vendor: Physiologic Corp., 3800 Woodward Ave., Detroit, Mich. 48201.

TI Cobol General Ledger was designed for the Texas Instruments, Inc. 990 series. Cost: $1,500 for a single-use license, $3,000 for a 12-use license. Vendor: Mini-Computer Business Applications, Inc., 117-119 S. Brand Blvd., Glendale, Calif. 91204.

OSS Business Basic includes a PRINT USING statement for the Apple Computer, Inc. Apple II. Price: $124.95 with assembler/editor/debug package. Vendor: Optimized Systems Software, Shepardson Microsystems, Inc., Suite 108, 20395 Pacifica Drive, Cupertino, Calif. 95014.

Tipe-990 is an option that gives word processing capability to Texas Instruments, Inc. DS990 models 4, 6, 8, 20 and 30. Price: $3,500 to $4,300 per license, depending on media. Vendor: TI, Digital Systems Division, P.O. Box 1444 M/S 7784, Houston, Texas 77001.

UCSD Pascal is available for the Onyx Systems, Inc. Model C8001 micro. Price: $400. Vendor: Onyx Systems, 10375 Bandley Drive, Cupertino, Calif. 95014.

Multimedia Course Explains System 2000

AUSTIN, Texas — Intel Corp. has released a multimedia instructional module for its System 2000/80 data base management system (DBMS).

Consisting of six units, the package is called "User Types and Access Language Syntax." It examines various functions of the Access language and shows in detail how to construct effective commands, the vendor said.

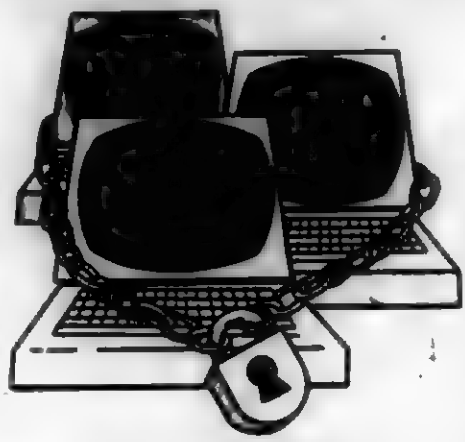
The course contains videotapes, workbooks, an instructor's guide, an exercise manual and a terminal. It is available in two modules that cost $3,300 each from the vendor at 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

Course Details Design Of Report Function

ARVADA, Colo. — Educassettes, Inc. has released "Hierarchical Reports," the first module of the Model Program Series.

Using the Warnier-Orr methodology, the self-study audio cassette course presents the design of the report function. The series is aimed at increasing programmer productivity through the use of skeletal program structures for common computer applications.

The course, with illustrated workbook, costs $59. Discounts are available for quantity orders from Educassettes, Inc. Suite 102, 6777 Wadsworth, Arvada, Colo. 80003.



Looking For A Way To Unlock Your Programmer Productivity?

ACEP is a very efficient and easily learned conversational on-line time sharing system. Some of the major features of ACEP include:

- Foreground conversational execution of batch programs.
- Comprehensive text editor with full screen and split screen support.
- No modifications to operating system routines.
- VS1 and MVS operating system support.
- 3270, 2741 and ASCII dial-up terminal support.
- Terminals supported by CICS/VS, VTAM, BTAM and TCAM.
- No JCL restrictions for job submission and retrieval.
- Comprehensive displays of operating system status.
- Ability to enter system console commands from terminals.
- OS/VS utilities run in conversational mode.
- Security at command level and full control of data set access.
- Dynamic allocation of data sets.
- Private PDS libraries for each user.
- Interfaces to several source program maintenance systems.
- SMF accounting routines.
- User-written commands easily added.
- Constantly active "hot" reader for OS/VS1
- Procedure language with labels, arithmetic and string functions.
- Multiple working storage areas for each user.

Read What Other ACEP Users Are Saying:

A Timber Company
We converted from VM/CMS to ACEP. ACEP is superior to VM/CMS and all other products we evaluated.
When compared with the other products we evaluated, ACEP's response time is exceptionally good.
ACEP uses less resources, responds faster and provides access to everything in the system easily.

A Food Processor
The response time is great and ACEP is a low overhead system. ACEP is easy to install, flexible and the service is exceptional. Our Accounts Payable and Personnel Systems are driven through ACEP.

A Foreign Oil Company
We evaluated the competition and chose ACEP.

An Oil Company
ACEP supplies our remote users a time sharing capability under CICS/VS.

A Major New York Bank
ACEP is very powerful for the systems programmer.
Our service has been very responsive.

A Theater and Distribution Co.
We have installed and used three different systems. ACEP is the best I have ever worked with.
We have always been able to do exactly what we wanted, ACEP imposes no restrictions on us.
ACEP installs quickly and easily.

A Major Manufacturer
We spent many years looking for a system. We evaluated many products before choosing ACEP. It is one of the cleanest systems I have worked with.
I like the way ACEP controls authorization. System security is very good. ACEP has the best editing facilities of all packages available.

A Foreign Oil Company
We have multiple end users interacting with our Data Base Management System through ACEP.

A Title Company
Users that come from TSO shops learn ACEP easily.
ACEP installation is very simple.
The full and split screen editors are beautiful.

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PDP-11 Users Swap Software

NORCROSS, Ga. — A free software exchange service has been established for Digital Equipment Corp. PDP-11 users.

The service allows the user to submit his software for credits that may be used to obtain other software listed in the "Monthly Software Exchange Bulletin."

For information, write PDP-11 Software Exchange, 1101 Noble Forest Drive, Norcross, Ga. 30092.

'ZAP' Handles Mailing Lists

MORRIS PLAINS, N.J. — An address processor for mailing list management and a program that allows the connection of Digital Equipment Corp. LSI-11-based processors to other systems have been introduced by Zia Corp.

The Zia Address Processor (ZAP) reportedly permits the user to build multiple name and address files and to "code" the entries based on individual user needs. ZAP also allows the printing of reports, labels, rolodex cards, form letters or salesmen customer sheets.

ZAP runs under DEC RT-11 on any system from PDP-11/03 up, as does the Remote-11 package, according to the firm. Remote-11 permits the interconnection of LSI-11-based systems either directly or via a telephone line.

ZAP costs $975 and comes either supported or unsupported. The unsupported version carries a 30-day warranty and the supported version carries a $100/year price tag.

A trial, demonstration ZAP program is available for $50, including operating instructions, the cost of which can be applied toward the purchase of the program.

Remote-11 costs $500 with either a 30-day warranty for the unsupported version or $50/year for support.

Discounts of up to 50% begin at the second purchased copy of ZAP, and at the 10th purchased copy of Remote-11.

Zia Corp. also maintains a data base on users of DEC LSI-11 and RT-11 as well as manufacturers of DEC-compatible equipment and software — available free of charge to users of DEC systems. The firm can be contacted through P.O. Box 351, Morris Plains, N.J. 07950.

File Storage Utilities Run With GE Mark III

HINGHAM, Mass. — Information Software & Services, Inc. has announced two file storage utility programs for use on General Electric Co.'s Mark III foreground service.

Flexi-Purge is a flexible purging utility that allows deleting of multiple files with similar names. Master Describe with Cost is a utility that is similar to GE's MDS and EDIT CAT commands except that it costs out each file, subtotals costs by type of file and also costs the total.

The utilities are priced at $45 each or $75 for both. Information Software & Services is at 10 Industrial Park Road, Hingham, Mass. 02043.

Medical Financial System Debuts

BANGOR, Maine — A medical financial management system written in Digital Equipment Corp.'s Dibol-11 language and geared to operate on DEC's PDP-11 or compatible processors has been introduced by Professional Data Systems.

The medical management system runs with a minimum of 32K bytes of memory and 2M bytes of disk storage capacity.

The software was designed to distribute and track income in multiple revenue offices, track receivables, determine financial positions and historical growth patterns and provide detailed and itemized accounts of medical services, a spokesman said. The system can also produce a variety of different kinds and formats of bills for third-party billing chores.

The medical financial management software costs $4,000 with full documentation and source code. A manual describing the system in detail is available for $50, the spokesman said from 2001 Hammond St., Bangor, Maine 04401.

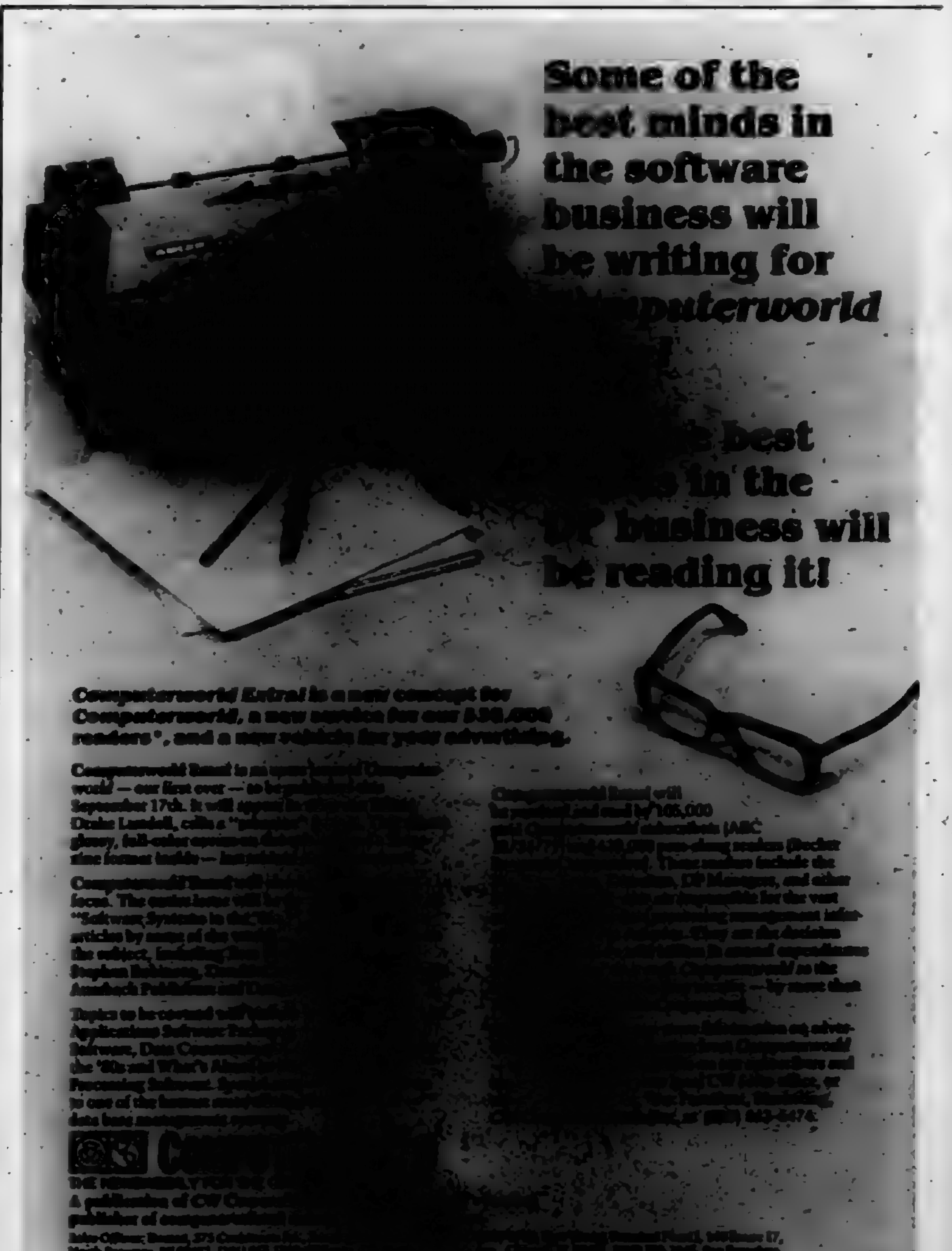
MSA Updates Receivables

ATLANTA — Management Science America, Inc. (MSA) has enhanced its Accounts Receivable System to include on-line real-time capabilities and extended data base processing.

Release 2.0 includes an on-line cash application feature that is said to increase overall efficiency and cut paperwork. In addition, MSA claimed, the update offers more efficient reporting techniques, such as automatic end-of-month reports.

The package accepts European data formats and keywords for companies doing business in the international marketplace, the vendor added.

Release 2.0 of MSA's Accounts Receivable System is currently available for IBM 370, 30 series and 4300 systems running in either OS or DOS environments. It costs between $35,000 and $80,000, depending on selected options. MSA is at 3445 Peachtree Road N.E., Atlanta, Ga. 30326.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Computerworld Extra! is an [illegible] Computerworld — our first ever — to be published this September 17th. It will appear [illegible] Drake Lundell, calls a "[illegible]" glossy, full-color cover [illegible] zine format inside — [illegible]

Computerworld Extra! will [illegible] focus. The entire issue will be [illegible] "Software Systems in the '80s" [illegible] articles by some of the [illegible] the subject, including [illegible] Stephen Robinson, [illegible] Auerbach Publishers and [illegible]

Topics to be covered will [illegible] Applications Software [illegible] Software, Data Communications [illegible] the '80s and What's Ahead [illegible] Processing Software. [illegible] to one of the hottest [illegible] data base management [illegible]

Computerworld Extra! will be [illegible] and read by 105,000 paid Computerworld subscribers (ABC [illegible]) and [illegible] pass-along readers (Becker [illegible]). These readers include the [illegible] Executives, DP Managers, and other [illegible] who are responsible for the vast [illegible] processing management information [illegible]. They are the decision [illegible] in annual expenditures [illegible] Computerworld as the [illegible] — by more than [illegible]

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'Datascan' Gets Sort Facility

SAN ANTONIO, Texas — Data Management Systems, Inc. is offering a sort facility which allows ascending or decending sorts by data item for use with Datascan, its English language information and retrieval and data management system.

The sort feature lets the user sort up to five numeric or alphanumeric data items from one to four data files, the firm said.

The Datascan package is used with Datapoint Corp.'s business processors and can access files created by Datbus, Cobol or RPG applications.

The sort facility costs $750; the basic Datascan costs $2,900 from Data Management at 16272 San Pedro Ave. San Antonio, Texas 78232.

Payroll Aid Fits Burroughs Gear

ITHACA, N.Y. — A time and attendance system that interfaces to any existing payroll system has been announced by The Chord Group, Inc. The Tymar system will operate on a Burroughs Corp. B92 computer system. It requires 128K bytes of core memory and 9.2M bytes of disk space on-line, according to its vendor.

Tymar reportedly allows employees to punch in and punch out using magnetically encoded ID cards, thus eliminating the need for conventional time cards and clocks.

Tymar allows managers to enter their employee schedule into a data base to provide a budget of labor hours by unit. The system produces printed listings of hours worked by employee for each pay week, for use as an input to the user's present payroll system.

Besides Tymar, the firm offers several other food cost and dietary planning packages for the food industry.

Tymar carries a license fee of $10,000 to $35,000, depending on software options, and a $100/mo fee. Chord is at 614 W. State St. Ithaca, N.Y. 14850.

MCBA Revamps Price Policy

GLENDALE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) revamped its pricing and software licensing policies for new licensees as of July 1.

The changes affect MCBA's assortment of business application packages marketed on a "wholesale basis" including the Digital Equipment Corp. Dibol-8 and Dibol-11, Texas Instruments, Inc. Cobol, Data General Corp. CS Cobol, Onyx Cobol, DG Extended Basic and the Wang Laboratories, Inc. Cobol packages.

To simplify its licensing concepts, MCBA has consolidated its various licenses into one license type. The cost for a DEC Dibol-8 or Dibol-11 business package, for example, will be $1,500 in prepaid installation levels and a $1,000 royalty fee.

In addition, MCBA will no longer issue free demonstration copies of its application software packages. The firm will now charge $50 per package for demos, which may be credited toward the purchase of a source license for the package.

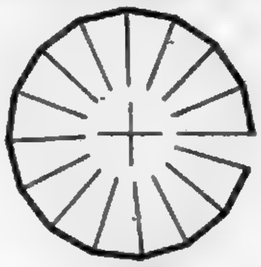
MCBA is located at 117 S. Brand Blvd., Glendale, Calif. 91204.

What's the difference between BASIC and Pascal?

in BASIC

"This is easy..."

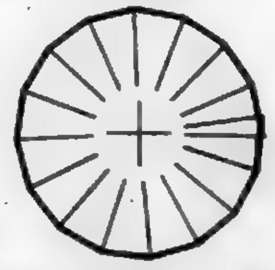
```
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



"Oops, didn't quite meet...

...but that's easy to fix."

```
                    +25
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



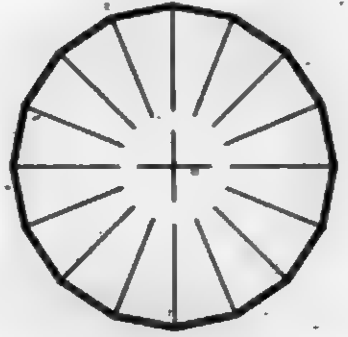
"Oh, now it closes...
in fact, it overlaps."

Programming by trial and error

in Pascal

"The simplest circle drawn with line segments is a regular polygon..."

```
procedure Circle (X, Y, Radius: real);
const Sides = 16; Pi = 3.14159265;
var    N : integer; Theta : real;
begin
  Move (X+Radius,Y);
  for N : = 1 to Sides do begin
    Theta : = 2 * Pi * (N/Sides);
    Draw (Radius * cos (Theta) + X,
              Radius * sin (Theta) + Y);
  end;
end;
```



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Random Notes

Housing Authorities Gain HUD Reporting Support

WARMINSTER, Pa. — NMP Software Corp. has developed a comprehensive Public Housing Authority System (Phas) to help public housing authorities comply with the accounting and reporting requirements of the Department of Housing and Urban Development (HUD).

Written in Basic, Phas runs on Wang Laboratories, Inc. 2200 series minicomputers and Texas Instruments, Inc.'s 990/4, 6 and 8.

The software ranges in price from $17,000 to $35,000, NMP said from 444 Jacksonville Road, Warminster, Pa. 18974.

Sun Valley Provides Spooling To CPUs Running DX10

PHOENIX — A software package with advanced spooling capabilities for Texas Instruments, Inc. DS990-based computers running the DX10 operating system is now available from Sun Valley Systems, Inc.

The software is accessible from programs or through a System Command Interpreter interface and comes complete with installation and user documentation.

The price depends on media requirements, the vendor said from 4607A N. 12 St., Phoenix, Ariz. 85014.

Accounting, Control System Unveiled for Truck Brokers

ORLANDO, Fla. — A Truck Broker Accounting and Control System software package based on Data General Corp.'s CS series CPUs with a minimum of 10M bytes of disk storage is available.

The system performs several tasks, including the preparation of manifests and bills of lading, advance checks and freight settlement checks on demand.

The price for the system starts at $6,000 and moves up. It is available as a complete turnkey package from Computer Utilities of Orlando, 2600 E. Livingston St., Orlando, Fla. 32803.

How Do You Plan, Implement a Net?

How should the communications manager approach planning and implementing a data network? Articles contributed to an upcoming *Computerworld* Special Report, edited by Brad Schultz, will suggest answers to that question.

Can you help? CW welcomes essays from users, consultants, DP vendors and the academic community that identify the main issues of network planning and implementation; recommend ways to manage these processes; or review products and services that managers might consider in setting up a network.

Manuscripts for the Nov. 24 report should be double-spaced, typed on no more than six standard pages and sent to Schultz at CW, 375 Cochituate Road, Framingham, Mass. 01701 by Sept. 26.

AT&T Tariff Proposes Mass Calling Service

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The beginnings of what may become a nationwide AT&T electronic message service were unveiled here late last month in a tariff covering an offering called Dial-It.

Dial-It provides access to prerecorded announcements via a 10-digit number containing a 900 prefix and allows selected callers to speak directly with the sponsor of the message. It also permits limited recording of caller comments or opinions.

Public service announcements are one application of the new service, but the main one appears to be opinion sampling regarding products, political issues and similar matters.

An AT&T spokesman explained that one user of Dial-It might be a store considering which of two competing products to offer. Through newspaper, radio or TV advertising, customers, would be asked to phone specified 900 numbers and indicate which of the products they were most interested in. Political candidates could use this same scheme to survey their constituents on current issues.

Voice Storage

The Dial-It service AT&T has proposed to the Federal Communications Commission (FCC) does not include voice storage capability, but such an enhancement is technically possible, the spokesman indicated.

Another possibility is that the caller could input a detailed response through a Touch-Tone telephone keypad. One application would be an on-line shopping service in which the purchaser placed an order for merchandise by inputting his credit card number, telephone number and related information through the Touch-Tone pad in response to recorded instructions received from the telephone company.

The AT&T spokesman emphasized that neither of these latter applications is currently planned. He added, however, that "we're looking at" services based on input of numeric data through a Touch-Tone telephone.

Bell Telephone Co. of Pennsylvania, meanwhile, has already filed a state tariff covering a store-and-forward voice message service. It allows residential and business subscribers when they are unavailable, to have incoming calls held on disk storage units linked to an Electronic Switching System (ESS) processor.

Under the Dial-It tariff AT&T recently submitted to the FCC, service would begin Sept. 24. The sponsor would pay a minimum of $500 for each day his recorded message was accessible to the public, plus $5,000 per year of usage. The $500 fee would make a single 15 second recorded announcement available within a single time zone, and would include a single 900 number for receiving incoming calls.

A longer announcement, service to additional time zones and/or additional 900 numbers would cost more per day. The basic service also includes a "cut-through" capability enabling the sponsor to talk to ran-

(Continued on Page 56)

Net Concept Uses Modular Approach

BOHEMIA, N.Y. — A multifunction networking concept based upon a modular, building-block approach that gives users the configuration capabilities of an intelligent node, front-end processor or stand-alone transaction processing system for voice response or data communications is being offered by Periphonics Corp., an affiliate of Exxon Enterprises, Inc.

The T-Comm 80 can interface with almost any mix of terminals and hosts, and processor power can be increased by grouping multiple processors together in a single T-Comm 80 system, the firm said.

A data communications network can be built from a library of more than 40 off-the-shelf terminal and host computer interfaces. Network control, error detection and diagnostic services are self-contained in T-Comm 80, according to the vendor.

For voice response capability, the user can obtain the Voicepac 2000 module with any T-Comm 80. Voice output can be chosen from a Master Vocabulary of more than 1,200 recorded words and phrases.

Typical pricing ranges from $50,000 to $150,000 for single nodal and front-end processors and $200,000 to $1 million for stand-alone multiple-processor transaction processing systems with magnetic tape and disk storage. Periphonics is at 75 Orville Drive, Bohemia, N.Y. 11716.

Service Provides Terminal Prices

LEXINGTON, Mass. — A data base of pricing information on 700 terminals is accessible through GML Information Services.

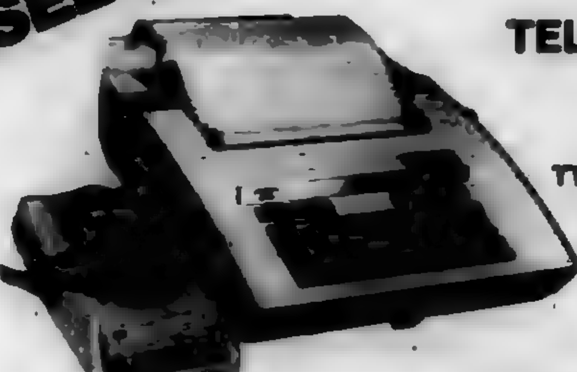
The Pricing Service is a five-part program consisting of an annual analysis of leading companies, quaterly price analyses and indexes, bimonthly bulletins, unlimited telephone consultation and a subscription to GML's 800-page *Computer Terminals Review*.

The GML Display Terminal Pricing Strategy Service, operational since June 1, is currently serving clients with access to the pricing of more than 700 terminals including standard and optional features, according to the firm.

Clients are provided industry and company trends for features and prices; product development trends; product feature impact on pricing; frequent updating of market, product and pricing conditions; "blue books" of terminal and feature pricing; telephone consulting; and personalized help in applying data, according to the firm.

The service is based on GML's data base of all U.S. and foreign commercially available computer products, which is updated daily from a pool of more than 1,700 sources.

The annual subscription price for the service is $3,500. The firm is located at 594 Marrett Road, Lexington, Mass. 02173.



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Terminal Replaces IBM 5251-11

SANTA ANA, Calif. — An IBM 5251-11-compatible CRT terminal that will run on the System/34, System/38 and Series/1 in addition to the 5250 system is now available from Memorex Corp.'s Business Systems Division.

The Memorex 2051-11 attaches to the IBM systems through the workstation controller or an IBM 5251-12 cluster controller.

A tiltable CRT screen allows the monitor to be adjusted to a maximum of 30° up or 15° down the center.

Combined with the unit's nonglare screen and key tops, this feature can aid in reducing operator eye fatigue, which may result from overhead lighting glare with some display station designs, the vendor claimed.

The unit features a 1,920-character display area using 24 80-char. lines that are displayed in an 8 by 16 dot character matrix. A 25th line provides the line and column numbers of the cursor at all times and provides system status information.

First shipments of the CRT terminal will begin in September and its price is $2,850 for purchase or $75 per month on a three-year lease, the vendor said from 3015 Daimler St., Santa Ana, Calif. 92705.

Dial-It Service Proposed For Media-Stimulated Calls

(Continued from Page 55)

domly selected callers directly, plus a daily report of received calls.

Callers would access recorded announcements through 900 numbers previously advertised by the sponsors. Multiple numbers would be assigned to a single sponsor who was seeking multiple-choice responses, AT&T explained.

"For example, a 'yes' response to a question such as 'Do you support holding an international sports competition as an alternative to the Summer Olympics?' could be registered by dialing 900-380-1000, or a 'no' response could be registered by dialing 900-380-9000."

In each case the incoming call would be counted, but anything the caller said would not be recorded. He would be charged 50 cents each time he phoned in. Billing would be handled by the caller's local phone company, in the same way it now handles long-distance calls.

AT&T plans to offer Dial-It nationwide, initially through seven No. 4 ESS centers. Attached to each will be a Mass Announcement Service Frame, a storage unit holding up to 1,800 recorded messages.

Media-Stimulated Calling

Dial-It was developed in response to customer demand for what the company called media-stimulated calling (MSC) services. A typical example is the 1977 "Call President Carter" program, where listeners to a national radio program were asked to call a special White House number to talk to the President.

"MSC applications, in the past, have caused network congestion problems," AT&T explained. "The network was designed to accommodate traffic distributed randomly over time to many destination points; MSC produces large call volume during a short time period to a single destination point. Such traffic can overload the network.

"Special protective measures, however, are costly . . . and not very satisfactory for either customers or the telephone industry."

Dial-It solves this problem, according to AT&T, by offering a mass calling service that avoids interference with other public switched network services.

Multi-Tech Offers Hand-Held Tester

NEW BRIGHTON, Minn. — Multi-Tech Systems, Inc. has released a hand-held, battery-powered modem tester said to troubleshoot transmission line problems in most modems and data sets.

The Modem Microtest will test Bell 103, 113, 202, 201, 208 and 209 modems as well as other vendors' modems up to 29K bit/sec, Multi-Tech said.

Micro-Test costs $345, the vendor said from 82 Second Ave., S.E., New Brighton, Minn. 55112.

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Terminal Rivals IBM 3275

ARLINGTON, Va. — A plug-compatible alternative to the IBM 3275 and 3276 information display system is being offered by Control Concepts Corp.

The EM-3275 communicates with the host computer via the binary synchronous communications protocol; full Ascii or Ebcidic line code variants of this protocol are switch-selectable. All commands, control codes and character sets supported by an IBM 3275 or 3276 are supported by the EM-3275, according to the vendor.

Additional editing features include line erase, line insert and delete, tab set and clear for spacing column positions by the user. A standard RS-232C serial port is also provided to support any compatible printer device.

The terminal cost $2,350 and is available from Control Concepts at Suite 1200, 2361 Jefferson Davis Highway, Arlington, Va. 22202.

Timeplex Offers TwoMultiplexers

ROCHELLE PARK, N.J. — Timeplex, Inc. has unveiled two Traffic Balance statistical multiplexers that use two built-in data links to back up each other and balance heavy traffic or data threatened by faulty transmission conditions.

The models M2407 and M2427 are used at both the remote site and the CPU. They automatically assign channels to each of their data links and dynamically reassign them, depending on traffic volume and link efficiency, the vendor claimed.

The M2427 incorporates a supervisory port that serves as a "window" on the network, permitting the network manager to obtain operating statistics and to monitor the system. The port is unavailable on the M2407.

The price for the M2407 is $3,950 and for the M2427, $4,200, the vendor said from One Communications Plaza, Rochelle Park, N.J. 07662.

CassetteTerminal Offers Edit Mode

SALEM, N.H. — A microprocessor-based digital cassette terminal enhanced with edit, search and rack-mount options is available from MFE Corp.

The MFE Model 2500 has been enhanced with optional edit and search modes and a 19-in. by 10.5-in. by 12-in. rack mount. Standard features include RS-232C or 20mA current-loop interfaces.

For use in the MFE tape transport, a 450-ft tape cassette provides a capacity of approximately 560K bytes formatted or 8.6M bits unformatted.

The MFE Model 2500 operates locally into a CRT or terminal printer or on-line into a Bell 103- or 212-type Modem.

The Model 2500 is unit priced at $1,190 for the standard mode, $1,745 with search and edit, $1,290 with rack mount and $1,845 with rack mount, search and edit. Quantity discounts are offered, MFE noted from Keewaydin Drive, Salem, N.H. 03079.

MPU-Based Unit

CRT Terminal Fits Prime 250 Minis

WELLESLEY, Mass. — A microprocessor-controlled, character-mode CRT terminal that features user function keys, an auxiliary printer port and a numeric pad has been introduced by Prime Computer, Inc. for its 250, 450, 550 and 650 general-purpose minicomputers.

The terminal, PT25, works in any application requiring nonbuffered, interactive operation and can also serve as the system console for the Prime 250, according to the firm. The PT25 uses an 80-char. by 24-line format and displays upper- and lowercase characters within an eight-by-eight dot matrix.

For data entry purposes, an integral keyboard with a 14-key numeric pad, eight function keys, five cursor control keys and the auxiliary port key are offered.

The PT25's 12-in. diagonal screen offers a 25th status line among its other features. The added line reports the status of the terminal — such as how the terminal switches are set — and also reports the results of a self-diagnostic check.

Available in September, the terminal can transfer data at rates between 110- and 9,600 bit/sec at user's selection.

The PT25 operates under the Primos operating system, which supports a range of high-level languages including Fortran '77, Ansi '74 Cobol, Basic/VM, RPG II, PL/I and Pascal, as well as Prime's Source Level Debugger.

The PT25, which costs $1,675, joins three higher end Prime terminals, the PT45, 3225 and the PT65.

Prime also announced it has added processing ability to its PT45, introduced in April as the management workstation for Prime's Office Automation System. The PT45 is now available as a general-purpose, block-mode terminal, compatible with industry-standard languages, Prime's forms driver and Prime's IBM 3270 emulator, the DPTX. The PT45 costs $2,600 and will be available in August.

Prime is located at 40 Walnut St., Wellesley Hills, Mass. 02181.

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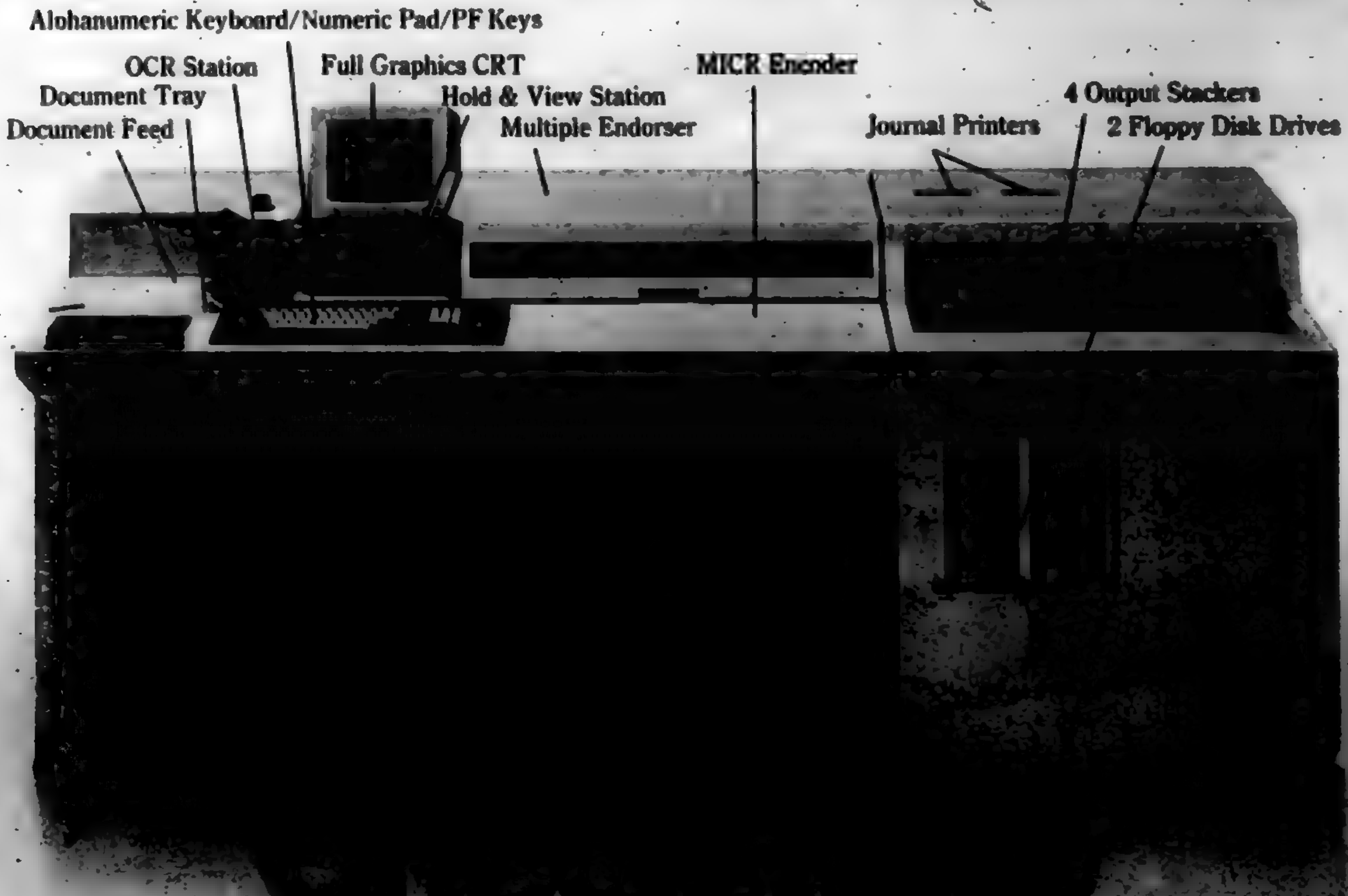

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Test Set Printer, Switch, Sharing Unit Added by IDS

LINCOLN, R.I. – International Data Sciences, Inc. (IDS) has unveiled products ranging from a data test set thermal printer to a unit that allows up to four modems or terminals to share a common device in a polling network.

The Model 2910D printer provides a hard-copy record of data interface test results. It was designed to operate with the firm's Model 3000D synchronous data transmission test set.

Printouts are initiated at preselected times and record the time an event occurred, identify the channel and note the contents of the test set's four event counters: errored bits, errored seconds, total bits and total seconds, a spokesman said. It is priced at $4,410.

The next introduction, an EIA crossover switch, allows operators to exchange two terminals with two modems, switching the entire 25-line interface. All interface connections on the 8539-D are made at the rear panel of the module. The desktop crossover switch costs $350.

Limited-Distance Set

At the same time, IDS also announced a limited-distance modem for synchronous operation over private two- or four-wire nonloaded metallic conductors.

Available in two versions, the Model 6000 operates at either a low range of 2,400-, 4,800- and 9,600 bit/sec; or a high range of 4,800-, 9,600- and 19.2K bit/sec.

The modem can be used in both point-to-point and multidrop network configurations and is suited for local data distribution up to 11 miles, the spokesman noted.

The unit features an internal clock that supplies transmit timing to the user's data terminal, a diagnostic capability and transmitter and receiver lines that are transformer coupled. The Model 6000 sells for $635.

Finally, the firm introduced a sharing unit that is said to simplify or expand data communications systems by decreasing the number of computer ports, modems and transmission lines for existing and future operations.

The Model 6101 operates at 19K bit/-sec in both synchronous and asynchronous modes and includes LED indicators that signal the activities of the unit's four distributed channels. Modems and data terminals can be positioned up to 50 ft from the sharing unit, which allows a maximum separation of up to 100 ft between common and distributed devices. The Model 6101 costs $650.

All of the communications products are deliverable in 30 days from IDS at 7 Wellington Road, Lincoln, R.I. 02865.

GTE Terminals Gain Diskette

MOUNTAIN VIEW, Calif. – A Tri-Data Corp. random-access diskette storage device compatible with GTE Corp. CRT and teleprinter terminals that were previously limited to sequential storage devices is being marketed by General Telephone Co. of California.

The introduction follows the California Public Utilities Commission's approval of tariff schedules for the product.

Reportedly equipped with "easy-to-use" software, the microcomputer-based Flexifile 21 provides capabilities for text editing and letter writing as well as data base inquiry, response and maintenance, according to a Tri-Data spokesman.

The Flexifile with approximately 90K bytes of capacity on a 5.25-in. diskette would rent for $64/mo, including an RS-232 interface.

Tri-Data is located at 505 E. Middlefield Road, Mountain View, Calif. 94043.

New Mailgram Rates Pending

WASHINGTON, D.C. – New rates for Mailgram and public message services have been filed by Western Union Telegraph Co. If accepted by the Federal Communications Commission, they will become effective Sept. 14. Charges were generally increased, but Western Union introduced discounts for Mailgram users who transmit a high volume of messages and input them on-line.

Mailgrams that come in on magnetic tape will cost from 80 cents to $1.35 for the first 300 characters (approximately 60 words), depending on volume. The present rate is $1.

Rates for computer-generated Mailgrams will range from 75 cents to $1.15 for the first 300 characters and from eight cents to 25 cents for each additional increment. Present charges are $1 and 23 cents respectively.

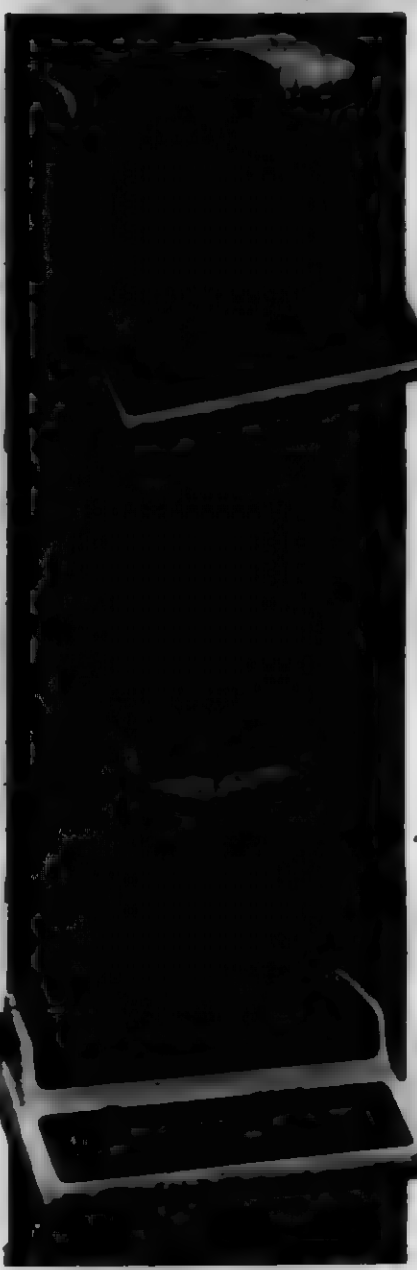
Overall, Western Union estimated the rate changes would produce $2.6 million in additional revenue this year, assuming a Sept. 14 effective date, and $9.7 million more next year.

Set Fits Teletype 43

LOS ANGELES – A modem for Teletype Corp. Series 43 terminals is available from Comdata Corp.

The Model 154E2-12 provides Bell 103/113-compatible 300 bit/sec full-duplex communications with direct connection to private lines or the dial network via Federal Communications Commission-approved standard jacks.

The unit costs $175, the vendor said from 8115 N. Monticello, Skokie, Ill. 60026.



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LA120-KSR	2895	150	200	250	300

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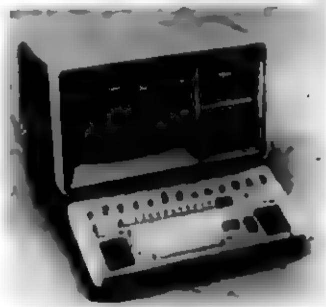
Intelligent Terminal Targets Airline Use

BOHEMIA, N.Y. — Megadata Corp. has made an addition to its Series 700 line of intelligent terminals with a unit designed specifically for airlines or other applications that require an independent terminal to communicate on a worldwide basis to a host.

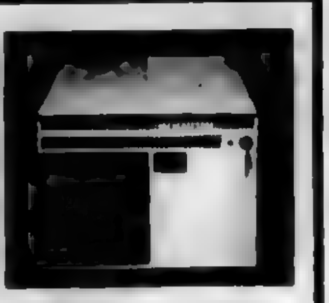


Minifloppy Terminal

Equipped with two integral minifloppy disks, the Minifloppy Communications Terminal has the capability to create forms and provide forms storage for later retrieval and forms display for completion and transmission of data.

The unit comes with 32K bytes of memory, expandable to 64k bytes, for storage and retrieval of forms and messages. The disk capability of each Minifloppy Communications Terminal is 80K bytes, or a total of 160K bytes. The memory structure consists of a 500-byte bootstrap loader on programmable read-only memory and up to 64K bytes of random-access memory. The terminal costs between $9,000 and $10,000 depending on selected options, the vendor said from 35 Orville Drive, Bohemia, N.Y. 11716.

HEX-29



The HEX-29 from DIGITAL MICROSYSTEMS is a low cost, high power data processor. Priced like a microcomputer, the HEX-29 is a multitasking, multiuser, time share computer.

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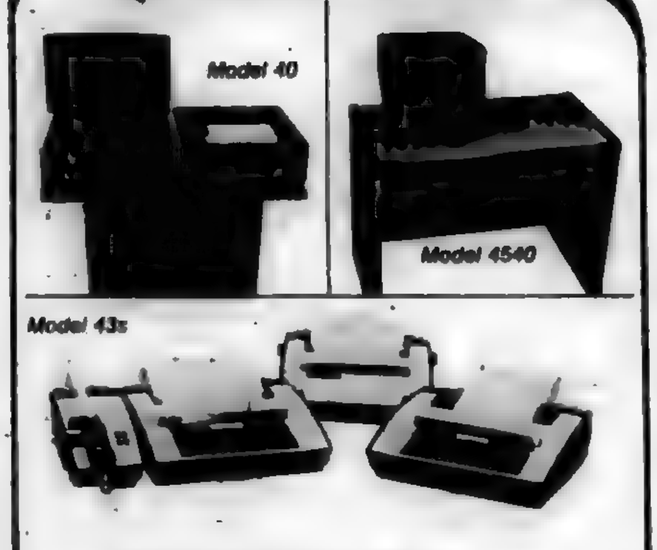

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For Micro600 Port Selector

Micom Adds Security Option

CHATSWORTH, Calif. — Users with multiple minicomputers can now avail themselves of an Access Security Option for Micom Systems, Inc.'s Micro600 port selector, an intelligent terminal-controlled switch.

The Micro600 allows terminal users to contend automatically for the computer ports attached to it, the vendor claimed, adding it also allows the terminal operator to select the "class" of port to access from his keyboard.

A class may represent all the ports on a particular computer attached to the unit in a multiple computer environment, or ports supporting a particular application program or type of terminal.

The Access Security Option permits the unit to automatically limit specified terminals from accessing certain port classes, a spokesman said.

A tabletop version of the Micro600 with the option costs between $6,000 and $10,000, while the floor-standing model starts at $10,000, the vendor said from 9561 Irondale Ave., Chatsworth, Calif. 91311.

Transaction Multiplexer Handles Seven Terminals

COSTA MESA, Calif. — A transaction multiplexer that reportedly enables up to seven terminals to share the use of any application program written to support it is available from Irvine Computer Corp.

The device can be used with any CP/M or equivalent, single-user operating system without modifications to either the hardware or operating system, the vendor claimed, adding it interfaces to any programming language that can display or accept data from a serial asynchronous RS-232C port.

Standard features include programmable terminal type definition, screen functions such as cursor positioning and the ability of the application program to define input field specifications to the unit.

The multiplexer sells for $1,495, the vendor said from 3001 Redhill Ave., 6-103, Costa Mesa, Calif. 92626.

Intelligent Printer With Five MPUs Formats Text

ANAHEIM, Calif. — Howard Industries, Inc. has announced the Typrinter 221 intelligent printer.

The Typrinter 221 is a letter-quality daisy wheel printer with five built-in microprocessors, providing text formatting including right justification, proportional spacing and a variety of other features, the vendor claimed.

The Typrinter 221 is compatible with all microcomputers, minicomputers and mainframes, the vendor claimed. It utilizes a parallel Centronics Data Computer Corp. interface, with RS-232C and IEEE-488 interfaces also available.

The user can select from three different type sizes (elite, pica or mikron) as well as proportional spacing. Each standard daisy wheel has all the characters necessary to print in Spanish, Italian, French, German and English, with more than 20 fonts currently available.

The Typrinter 221 is priced at $2,750, and first deliveries are scheduled for September 1980. OEM and dealer discounts are available.

Howard Industries is at Building 7K, 2031 Cerritos Ave., Anaheim, Calif. 92806.

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IN DEPTH

"If I Flunk Out of Chemistry, I May Seriously Consider the Computer Field."

—College Student

By Sandra K. Sawyer

A survey of the attitudes of high school and college students toward careers in computer programming and systems analysis.

If you have not experienced the problem firsthand, you cannot have missed reading about it in recent issues of professional magazines and journals. Articles by the dozen discuss growing problems with personnel shortages and turnover in the areas of systems programming, applications programming and systems analysis.

Applications programmers reportedly are the worst offenders when it comes to job-hopping, an ever-increasing phenomenon in the booming DP industry.[1] Recent surveys suggest that as many as 65% of all DP staff have a resume circulating or are considering submitting one.[2]

Despite the fact that a few articles have suggested programmers may soon be made obsolete by the high-level languages and super operating systems of the future, most would agree that programmers will continue to be in short supply throughout the '80s, and nothing short of an economic disaster of massive proportions or a major educational effort will change the situation.[3]

Today's job market is a seller's market for DP professionals.[4] While this is a boon to the personnel placement agencies, major corporations are spending millions of dollars annually for placement agency fees and in-house recruitment programs aimed at luring qualified professionals to their shops. Most of this effort is to no avail. One major corporation recently had eight recruiters from different plant locations working career week on a university campus and competing among themselves for potential DP graduates.

While this example is probably extreme, it should become apparent that at least a portion of the recruitment efforts and resources should be spent convincing young people that computer programming and systems analysis can be rewarding and challenging careers. Bidding up the starting salaries of recent college graduates or pirating away the competent staff of other installations will not increase the supply of qualified professional personnel at a rate equal to the skyrocketing demand.

Given the volume of advertisement appearing in newspapers and magazines, and the attractive salaries for DP personnel, it would seem young people would be entering the field in droves. But this is not the case.

Why Not?

In order to discover some of the reasons students do not consider careers in the areas of programming and systems analysis, a pilot study was conducted in which 241 high-school students and 159 college freshmen and sophomores were surveyed to determine their attitudes and impressions about those careers. The survey was designed to determine what the students believed about 1) tasks performed, 2) skills needed and 3) aptitudes required by computer programmers and analysts.

The same survey was completed by 46 DP professionals, most of whom are members of the Association for Systems Management, for the purpose of comparing their responses with those of the students. Almost half the professionals surveyed are responsible for hiring programmers or analysts.

The results were startlingly clear. The high-school and college groups' conceptions of the jobs were generally the same, but the comparison of their impressions with the perceptions of the professional group showed marked differences.

For example, students were asked to rank tasks from 1 to 9, giving a 1 to the task that they thought would be performed most often by a computer programmer or systems analyst. The tasks listed were these:

- Reading current magazines or journals.
- Working with IBM cards.
- Punching buttons on a machine.
- Attending meetings.
- Writing computer programs.
- Teaching someone else about computers.
- Working with complex mathematical formulas.
- Writing correspondence, memorandums or documentation.
- Interviewing someone else in another department.

Writing programs, as might be expected, was the number one choice by both the students and the professionals. Attending meetings and teaching someone else about computers were each ranked about fifth by both groups.

However, the other six items showed a pronounced disparity between the professional and the student ranking. For example: Interviewing someone else in another department and writing correspondence, memorandums or documentation were most often ranked second or third by the professional group, while these tasks were

(Continued on In Depth/2)

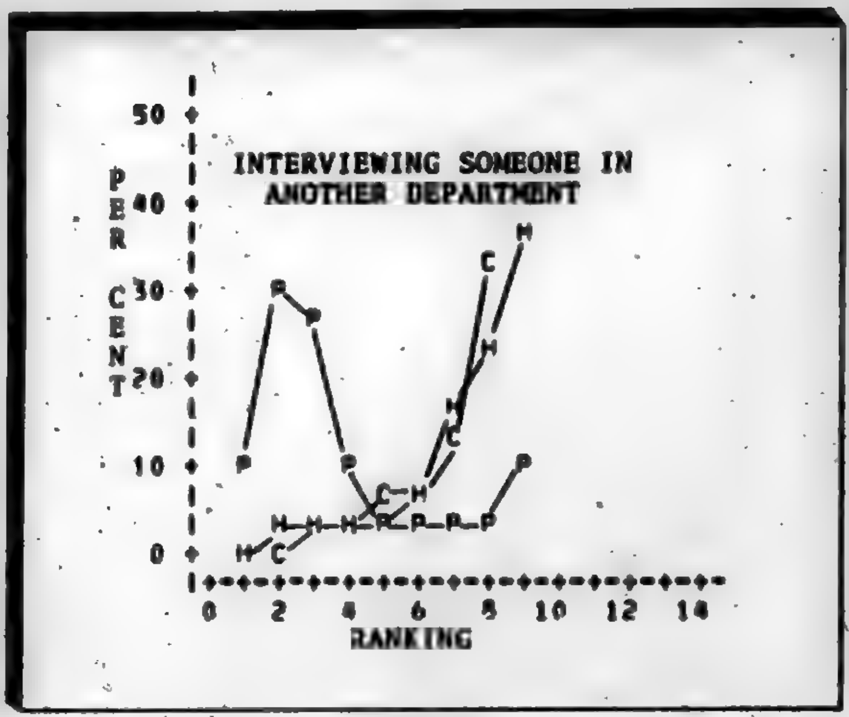

Figure 1

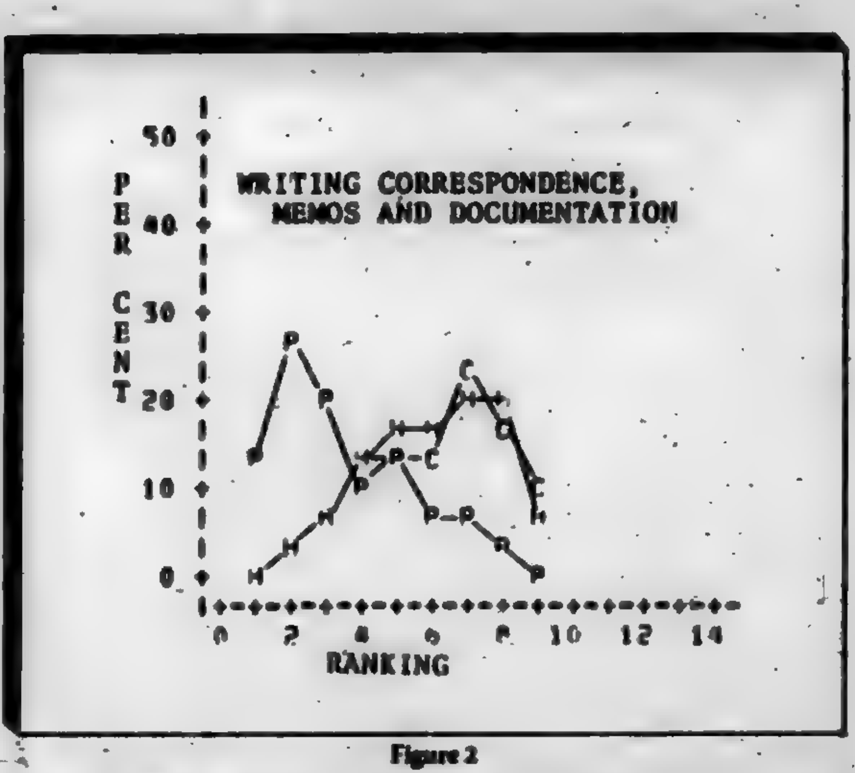

Figure 2

(Continued from In Depth/1)

most often ranked ninth and seventh, respectively, by the student group (see figures 1 and 2). Punching buttons on a machine and working with IBM cards were most often ranked second by the students, but were ranked ninth and eighth, respectively, by the professionals (see figures 3 and 4). Similar patterns appeared in the rankings of reading journals and working with mathematical formulas.

The students were then asked to rank some skills and aptitudes according to their importance or necessity to a programmer or analyst:

Skills:
- Attention to detail
- Ability to concentrate
- Interpersonal communication
- Problem-solving
- Imagination
- Typing
- Meeting people
- Decision-making
- Memory retention

Aptitudes:
- Electronics
- Mathematics
- Written communication
- Sciences
- Interpersonal relations
- Logical thinking
- Oral communication
- Creativity
- Clerical
- Analytical reasoning

Five of the nine skill items listed were ranked totally differently by the two groups. Problem-solving was the overwhelming choice by both groups as most necessary. The professional group most often ranked interpersonal communication, imagination and meeting people as the next most important, while the students usually ranked those items last. Conversely, the students tended to rank concentration and memory retention high, while the professionals ranked those items last (see figures 5 through 8 on In Depth/4).

Comparisons of the ranking of aptitudes required show similar patterns. Analytical reasoning and logical thinking were consistently ranked first and second by both groups. However, these were followed by electronics, mathematics and sciences, on the students' lists, rather than creativity and oral communication, which were ranked next by the professionals (see figures 9 through 12 on In Depth/5).

Why It Matters

What does it all mean, and why does it matter? The students do not know what computer programmers or systems analysts do, which skills are important or what aptitudes are required. One student even commented that he ". . . didn't even know it was a career." It is reasonable to assume that without this knowledge, students are unlikely to make informed and intelligent decisions about these areas as career choices.

The following are typical comments of students explaining why they had never considered a career in programming or systems analysis:

"Because I thought it to be a job of assembly-line work or desk work of tedious range."

(Continued on In Depth/4)

The graphs which appear on these pages were developed from frequency tables which have a significance level of .0001. This means there is a 1 in 10,000 chance that the frequencies in the table could have occurred by chance.

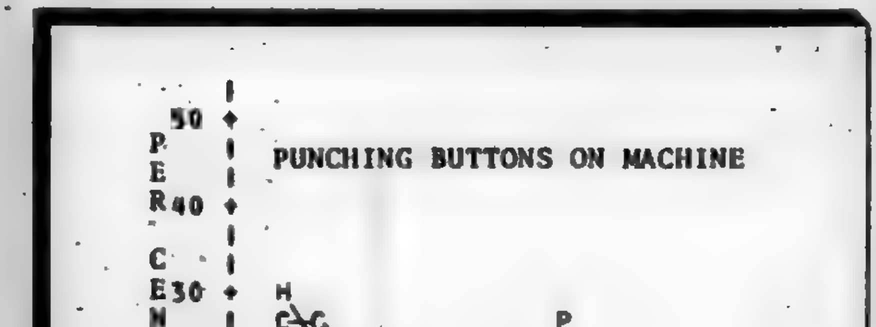

Figure 3

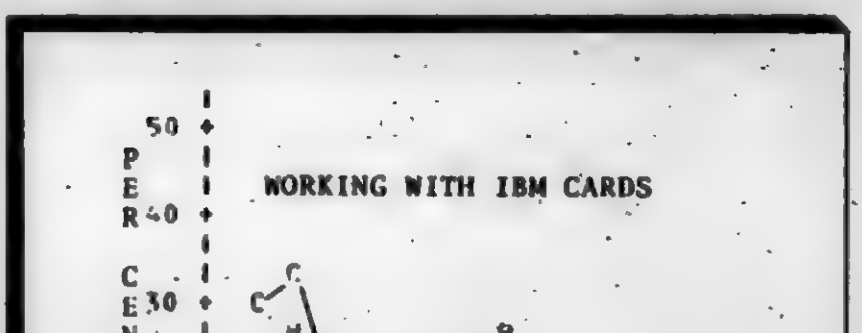

Figure 4

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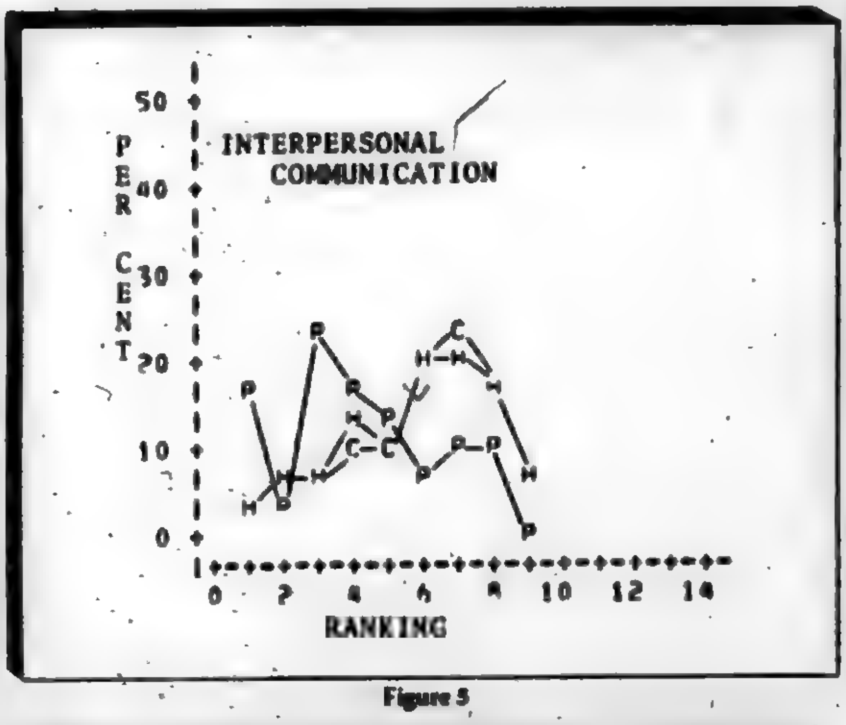


Figure 5

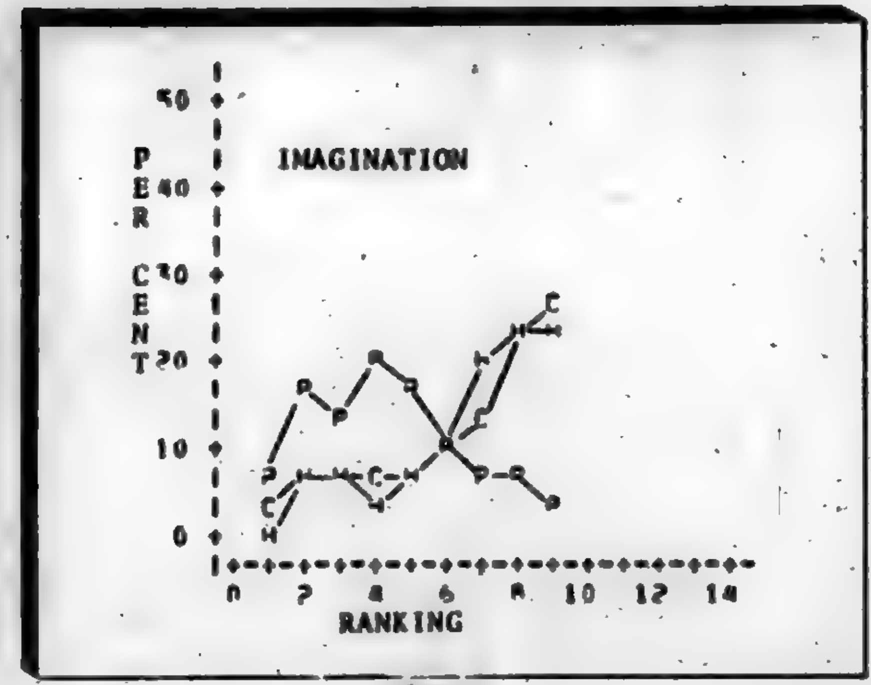


Figure 6

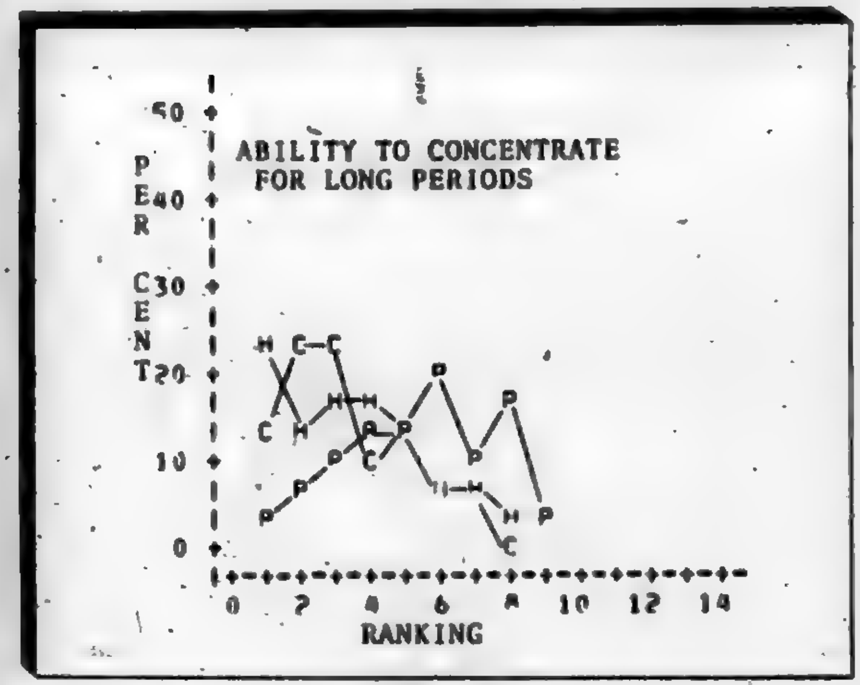


Figure 7

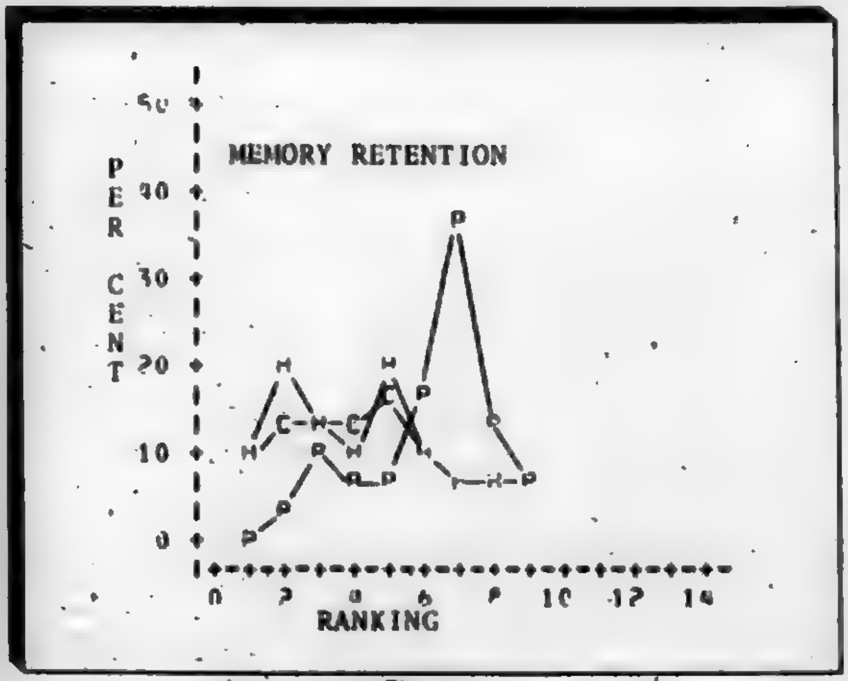


Figure 8

(Continued from In Depth/2)

"I am not good in math."

"I like working with people, not machines."

"I'd rather use my mind."

"Too complicated."

"I cannot stand to work with little parts, and I also hate to type."

"Computers are a sorry, occupation. It would be a big bore working alone with a big machine."

"I want to be able to use my creativity."

"I don't want the same old routine job."

The two most common comments of those who said they had not considered those careers were "It seems like a boring job" and "I know little or nothing about it." Those students who responded that they had considered a career in programming or analysis most often commented that they knew someone in the field and had liked what they had learned about it. Only 28% of the high-school students responded that they had never even considered a career in this field.

It is important to note that the question was not whether they had ever thought they might like to pursue one of the careers, but whether they had ever even thought about one of the careers as a possible choice.

Myths, Misconceptions

These responses are indicative of the many myths and misconceptions that have arisen about computer programming and analysis. Many students tend to equate a programmer with a keypunch or machine operator, while others think the programmer is a mathematical or electronics wizard.

Results of research done by the Minnesota Educational Consortium, under a two-year National Science Foundation grant, showed that programming is the least understood area of computers by secondary students and teachers. The 1,300 students and teachers in grades seven through twelve who were tested in several areas of computer knowledge answered only 7% of the questions on programming correctly.

The origin of some of the myths is not difficult to discern. Computers bear the brunt of a profusion of bad public relations. The machines are easy and convenient scape-goats for human error. Excuses such as "the computer made a mistake" are typical.

DP professionals themselves have probably perpetuated, if not originated, many of the myths. The temptation to present themselves as some sort of wizards or geniuses, amazingly able to deal in the mystical and magical world of computers, has been too great. The convenience of having users in a position of ignorance and awe has not encouraged many DP professionals to dispel the myths and misconceptions.

In years past, some of the myths probably held true. But as today's hardware, operating systems and high-level language processors become more and more sophisticated, the emphasis will shift even further from the bit-twiddling mathematician programmer to the problem-solver and communicator, whose primary responsibilities lie in finding people-oriented solutions to problems through the use of information processing systems.

It may not be easy, but we must correct these misconceptions if recruiting programs are to become more successful. This comment of a high-school senior appropriately states the problem, as well as a possible solution: "Computer programming is something I haven't been associated with in my life. It sounds interesting and would be something I might consider if I knew more about it."

Further Study Needed

The results of the pilot survey indicated the necessity of further investigation into the possible need for more educational programs, either through the formal curriculum or through informal programs in high schools and

STUDENT ATTITUDE SURVEY

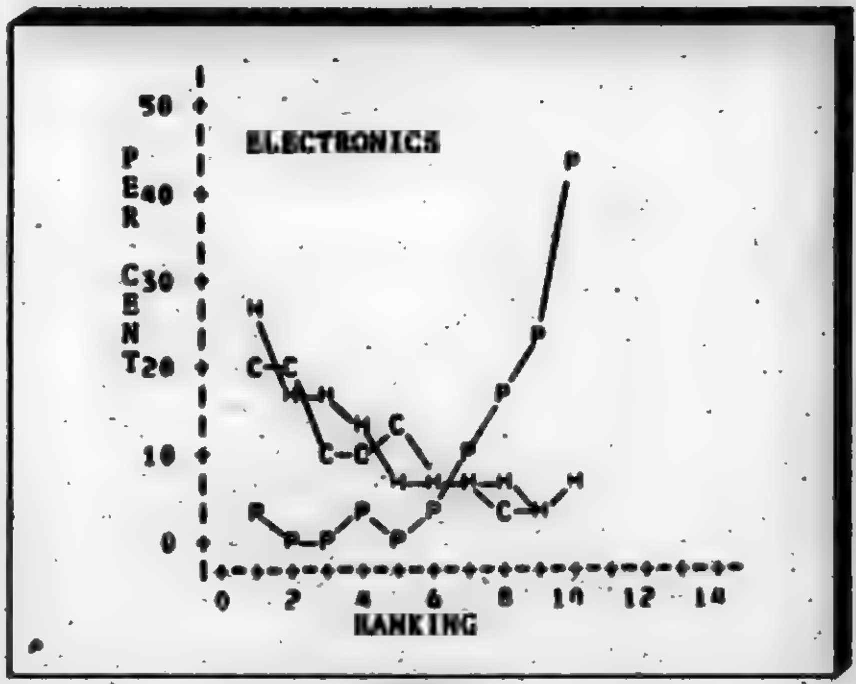
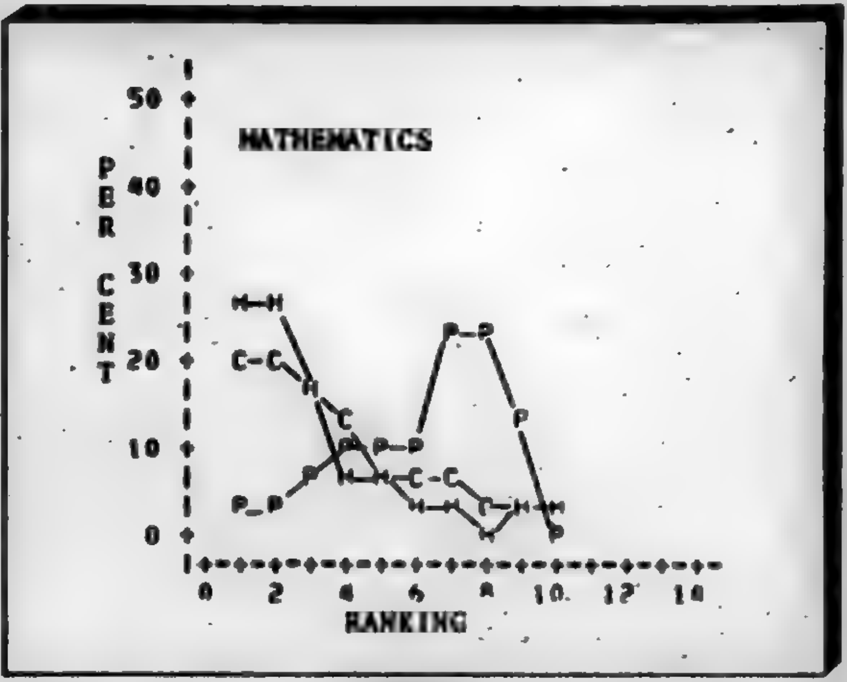


Figure 9



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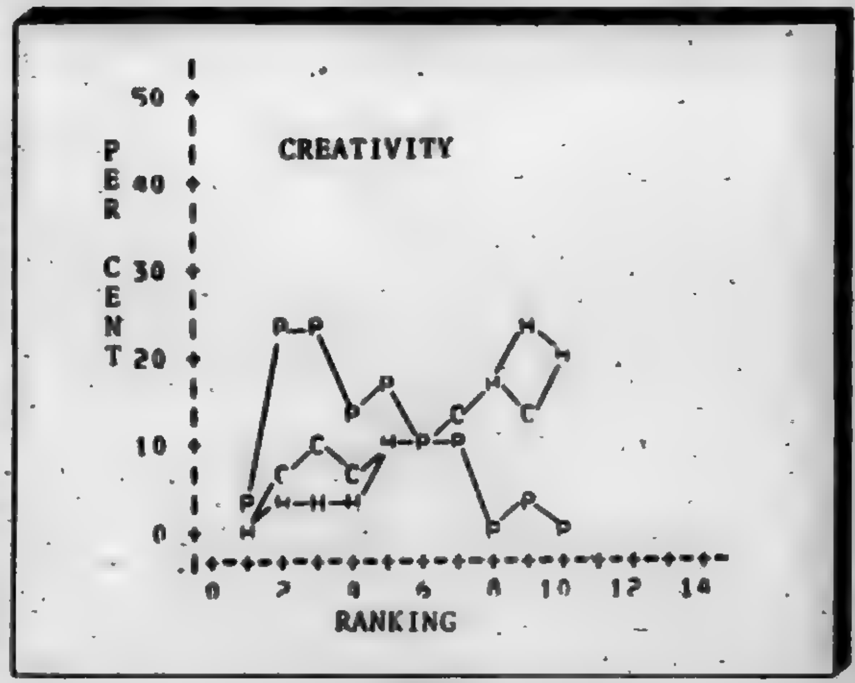

Figure 11

colleges. Such programs should be designed to give students a realistic idea of what careers in DP are available — and particularly what those different careers entail. Cooperation between industry, educational institutions and professional associations is needed in order to do an effective job of informing students about the options open to them.

By channeling part of their present recruitment budgets into areas such as scholarships, public relations and college work cooperative programs, companies would gain a much greater return in the long run. Current recruitment efforts involving local and national advertising, private and state employment agencies, employee bounties for referrals and college recruitment programs are meeting with only limited success.[6]

Computer education in high schools is now limited to vocational training programs such as keypunch operation training and mathematics honors programs which offer courses in computer math. Neither of these types of programs is effective in communicating an accurate idea of the role of the average programmer or analyst in business.

Professional associations should begin to take a more active part in public relations activities which could include projects such as the provision of films and printed information about DP careers to high schools and colleges. Encouragement of student chapters of the associations should become a high priority.

Continued shortages of qualified DP personnel may be inevitable, but it is absolutely necessary that appropriate action be taken to minimize these shortages. If nothing is done, industry will continue to experience what Prof. Hamblen of the University of Missouri, Rolla, has very aptly called "the overutilization of undereducated people."[7]

"Computer programmer/analyst" must be added to the list of career choices considered by students if the DP staffing and recruiting problems predicted for the '80s are to begin to be solved.

Sandra K. Sawyer is a business programmer/analyst in the Information Systems and Services Division of Texas Instruments, Inc. in Dallas.

Previously she was head of the computer Services development department at Tarleton State University, Stephenville, Texas. She has also been the DP department head at one hospital and a programmer/analyst at another. From 1976-77, she ran her own contract programming company, specializing in consultation to small hospitals.

Sawyer holds a B.B.A. degree from Tarleton State University.

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[4] *McLaughlin, XXV, p. 96.*

[5] *"Back to the Books,"* Data Processing in Education, *Vol. XVII, No. 8 (August 1979), p. 2.*

[6] *McLaughlin, XXV, p. 100.*

[7] *Gilchrist, XIII, p. 6.*

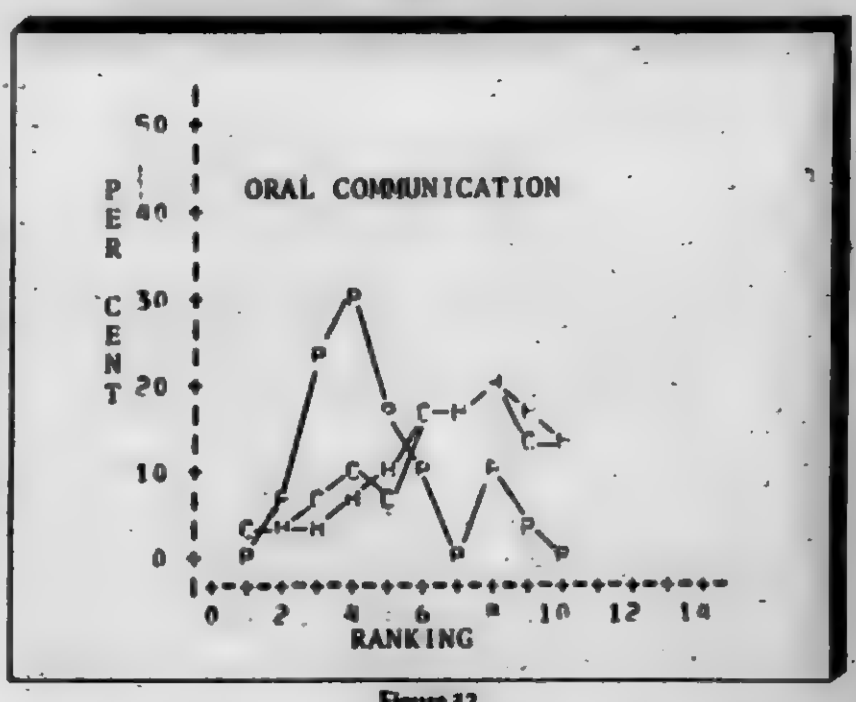

Figure 12

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The obligation of the vendor to perform

WARRANTY

By Richard Raysman

The concept of warranty transcends all commercial transactions, yet "warranty" is a term many business people do not totally understand.

A warranty is a statement or representation made by a seller to a buyer that relates to the goods or services sold and becomes part of the basis of the bargain. Any description of the goods or services or any sample or model that is made a part of the contract creates an express warranty that the product will conform to the description or model. A warranty can be a statement of fact respecting the quality of character of goods sold, is made by the seller to induce the sale and is relied upon by the buyer.

An incorrect warranty can often be a firm basis for proving breach of contract by a seller.

Perhaps the best way to explain the repercussions of breach of warranty in the information processing industry is to describe the details of two actual lawsuits. One suit, entitled *Carl Beasley Ford, Inc. vs. Burroughs Corp.*, 361 F. Supp. 325, was decided in a Pennsylvania federal court in 1973. The Beasley case involved both hardware and software, was a landmark decision in the DP legal arena and has been relied upon by numerous courts as precedent for legal cases relating to computers.

Burroughs submitted a proposal to Beasley, a Ford dealer, undertaking to sell and deliver to Beasley an E-4000 electronic accounting machine for $35,000. In accordance with a franchise agreement with Ford Motor Co., Beasley was required to furnish certain accounting records on a regular basis.

Representatives of Burroughs orally promised to furnish 13 programs that would be sufficient to produce the required accounting records, but no inclusion of or reference to this oral agreement was made in writing and the cost of the programming service was included in the price of the equipment.

At the time of the sale, Burroughs' practice was to sell both the equipment and the programming under a "bundled" price. This meant that the price of the equipment did not vary, regardless of whether Burroughs did the programming. As a result of antitrust considerations, Burroughs later discontinued the bundling policy, and it instead quoted separate prices for equipment and programming and entered into separate agreements.

The Burroughs salesman negotiated the sale of the machine and programming and was also primarily responsible for performing the programming with assistance from Burroughs' technical programming personnel. The equipment was delivered in October 1969, with Burroughs assuring Beasley that the programming would be completed within two months and telling Beasley that it should cancel its arrangement for processing of its records with an outside service bureau.

The court decision gives a lengthy description of the severe difficulties encountered in the attempts to get the programs to operate correctly. The net result was that 14 months after installation, the computer was not working properly and Beasley was in serious trouble with a number of critical accounting records and reports. In spite of continuous reassurances from Burroughs personnel that the chronic programming problems would be corrected, Beasley's lawyer wrote a letter to Burroughs rejecting the computer.

Jury Decision

After trial, a jury determined that Burroughs orally agreed to furnish programming to Beasley and that the programming was inadequate and not furnished within a reasonable period of time. The jury further determined that Beasley rejected the system within a reasonable time period after it knew or should have known of the breach and that Beasley at no time accepted the machine. The issues of timely rejection and of no acceptance were important ones which substantially affected the respective rights of Beasley and Burroughs.

As for damages, $35,000 was awarded as recovery of the purchase price, $5,600 for interest on a loan to purchase, $867.50 for extra help, $16,840 for accountant's services and $6,704.82 for computer services, minus $9,000 credit which Beasley saved by not having an outside service bureau perform the same function. The total award was $56,012.32.

The Beasley decision is of significant importance to the entire DP industry because, despite the presence of express warranty disclaimers in the written contract, oral evidence was admitted to show an agreement for programming services and, in addition, consequential damages were allowed.

Consequential damages are those caused as a result of the breach of a contract. For example, if faulty equipment causes a user to lose an accounts receivable file or inventory records, the cost of reconstructing those files would be considered consequential damages.

The disclaimer of warranty used by Burroughs was absolutely clear, and yet the court still permitted the jury award to stand. The disclaimer disavowed all liability for delay in delivery, installation or service. Further, it disclaimed any responsibility for installation, training or programming. There was also an express disclaimer of all incidental and consequential damages.

Warning to Industry

The Beasley decision is a warning, of sorts, to the entire DP industry. No one disputes that there are often problems with programs and programming packages. Potential problems of this nature should be taken into account as far as the possibility of consequential damages, even for the smallest minicomputer. In addition, salesmen of computer equipment and programming services should be educated in exactly what oral representations can and cannot be made to the end user.

In understanding the consequences of a failed sales transaction, some familiarity with a law known as the Uniform Commercial Code (UCC) is useful. The UCC, which has been adopted in all states with the exception of Louisiana, sets forth legal guidelines and governs a variety of commercial-type transactions.

In particular, Article 2 of the UCC governs business considerations relating to the sale of goods. It addresses the subject of formation of the contract, general obligations under a contract, title, creditors, good-faith purchasers, performance requirements, the effect of breach and repudiation of a contract and remedies of both buyer and seller. Considerations of the UCC permeates sales transactions throughout the U.S.

It should be noted that the UCC governs only the sale of goods, not services such as computer programming services. However, frequently a contract for programming services is somehow linked to the sale of hardware. When that happens, courts generally are inclined to view the programming service agreement plus the hardware sale as one transaction and rule that the entire transaction, including the services, is governed by the UCC.

The Beasley decision was a good example of the way in which the UCC applies to all aspects of a commercial transaction. Burroughs contended that Beasley waived its claim of late delivery because it failed to effectively reject the equipment within a reasonable time after delivery. This contention was based upon UCC Section 2-602, which provides that rejection of goods must occur within a reasonable time after their delivery, and upon Section

(Continued on In Depth/10)

Portions of this article were adapted, in part, from an article the author has previously published in the Rutgers Journal of Computers and the Law, *Vol. 6, No. 2.*

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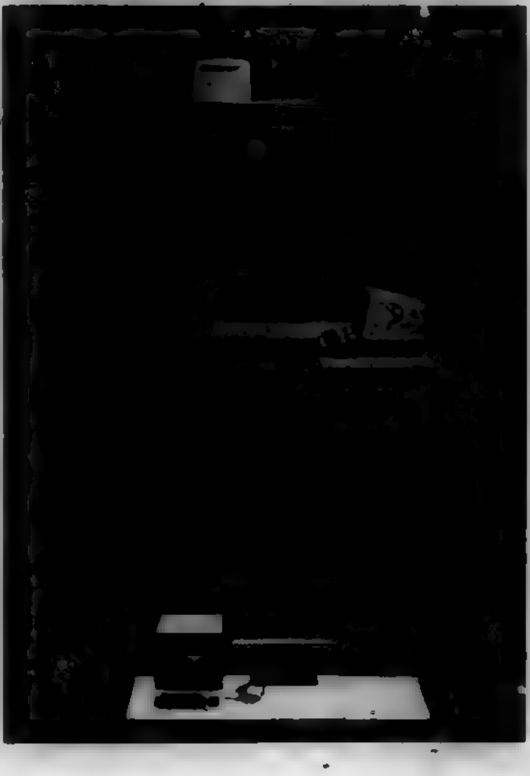

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IN DEPTH

(Continued from In Depth/7)

2-606, which provides that acceptance occurs after the buyer has failed to make an effective rejection.

The court disagreed with Burroughs, ruling that a "reasonable time" within which to give notice depends upon the circumstances of each case. If there was a reasonable likelihood that the seller could overcome the defects, the buyer could retain his right to rescind until he was satisfied that the item could not be made to work properly.

The court held that there was sufficient communication and enumeration of deficiencies during the 14-month period of installation before rejection and accordingly, there was no failure to make a timely rejection. The use of the computer during the period of experimentation did not constitute an acceptance.

This whole issue of acceptance and rejection is a key concept for computer users who are contracting for hardware and programming services. This is an area where silence, or the failure to effectively notify the seller that the system is inadequate, can be interpreted legally to be the equivalent of acceptance.

Once a buyer begins to use the goods as if he owned them, the seller can claim acceptance. A buyer should be careful to notify the seller, at the earliest possible date, of any deficiencies in the delivered items.

In the Beasley decision, another area where the UCC was effective was in the admissibility of the oral agreement. A popular misconception is that only written agreements are admissable in a legal proceeding. Although written agreements often carry more weight, depending upon the circumstances, courts will frequently allow oral representations into evidence.

Burroughs contended that the written agreement constituted the entire contract and that no consideration should have been given to the question of whether an oral agreement existed for programming services and what the terms of the oral agreement were. The court ruled that when there is a dispute surrounding the entire set of circumstances, some in writing and some oral, the fact finder can determine which set of circumstances constitutes the true agreement.

The court's decision to permit oral evidence was based on the fact that the written agreement contained absolutely no reference to the terms of the programming agreement. No mention was made that the computer would produce accounting records, that 12 programs were to be installed and that there was an agreed-upon date for completion. Apparently, the court was also swayed by the fact that Burroughs' salesmen were specifically instructed not to mention programming in the written contracts but instead to come to oral understandings with the users.

Under the UCC, generally, if an agreement is reduced to writing and is intended to be a final expression of the terms, that agreement cannot be contradicted by evidence of a simultaneous oral agreement. Accordingly, oral evidence cannot be used to show a modification of a finalized contract. However, not all written contracts are protected because they are not necessarily intended by the parties to be final expressions of the agreement.

Under the UCC, the mere fact that a contract is deemed to be final on some matters does not prevent oral representations from being admitted to clarify other matters. Even where a contract is considered final, oral evidence can be used to explain or supplement the terms. The UCC definitely rejects the assumption that because a written agreement exists which is final on some matters, it is to be taken as addressing all the matters agreed upon.

Based upon the Beasley decision, and upon interpretations of the UCC, hardware vendors must be particularly careful to note specific disclaimers of any associated software in the sale of equipment. This caveat particularly applies to integrators of hardware/software turnkey systems. Alternatively, users acquiring hardware should negotiate certain representations of software performance to protect their interests.

Consequential Damages

Another area where the Beasley case had particular legal significance was in regard to consequential damages. Burroughs argued that Beasley was not entitled to consequential damages be-

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cause Beasley had disclaimed the right to recover for defective equipment.

The court took the position that there were two separate agreements, a written one for the hardware and an oral one for the software. The waiver of the consequential damages in the written agreement did not apply to the oral agreement for programming, and thus, consequential damages were permitted. The court then looked to the UCC for guidance in determining how to calculate the consequential damages.

As any vendor or user of DP equipment knows, consequential damages in the industry can be an immense sum. The Beasley case is an indication to vendors of both hardware and software to effectively disclaim the performance of any portion of the system with respect to consequential damages.

Chatlos vs. NCR

A more recent case which relied upon Beasley as precedent was entitled Chatlos Systems, Inc. (CSI) vs. NCR Corp., 479 F. Supp. 738. This case was decided in 1979 in a New Jersey federal court.

CSI was engaged in the design and manufacture of cable pressurization equipment for the telecommunications industry. In the spring of 1974, the president of CSI made inquiries into automating the various accounting functions and was visited by an NCR salesman. NCR sold a 399/656 disk system to CSI and represented that it would perform the functions of accounts receivable, payroll, order entry, inventory, state income tax and cash receipts.

NCR further represented that the more advanced system was a good investment for CSI's present and future needs, that it would solve inventory problems, would result in direct savings of labor costs, would be programmed by capable NCR personnel and would be up and running within six months. These are the types of sales representations which become part of an express warranty.

In reliance upon the NCR representations, CSI ordered the system in July 1974 for a total cost of $75,783.31. The hardware was delivered in December 1974. Based upon the representations of NCR, CSI expected the equipment to be fully operational by March 1975.

Out of the six functions promised, only the payroll program became operational in March. Representatives of NCR struggled through the next year and a half without successfully implementing any of the other five functions.

In February 1976, after the first programmer, who had never been properly trained in disk operations, failed to complete the programming effort, NCR substituted two new programmers. NCR gave a nervous CSI assurances that the system would soon be operational.

In March 1976, NCR systems analysts attempted to demonstrate the order entry and accounts receivable functions. However, this demonstration only served to reveal significant problems with both functions.

In June 1976, CSI asked that the lease be cancelled. NCR asked for additional time to make the system operational and CSI consented. NCR then put two new analysts to work on the system. In August 1976, CSI experienced problems with the payroll function, the only job the system had been performing.

In September 1976, one year and nine months after installation, CSI cancelled the lease and asked to have the computer removed from the premises. NCR refused, and the lawsuit resulted.

The court determined that the contract was for the sale of goods and thus applied the warranty provisions of the UCC. It is interesting to note that the judge who decided this case made a serious effort to understand the information processing industry, down to the innermost details of a disk operating system. The judge, in his opinion, referred to the concept of multiple records per sector and some of the problems associated with deletion of records.

Implied Warranty

The court made a noteworthy determination which involved a legal concept known as an "implied warranty of fitness for a particular purpose." Under the UCC, where a seller, at the time of contracting, has reason to know of any particular purpose for which the goods are required and has

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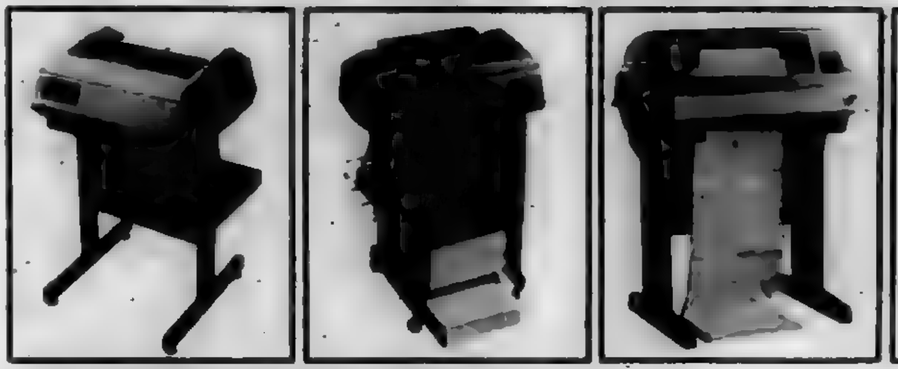

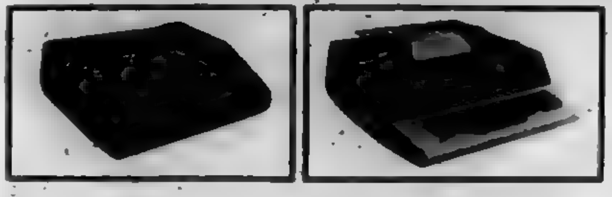

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IN DEPTH

(Continued from In Depth/11)

reason to know that the buyer is relying on the seller's skill or judgment to select or furnish suitable goods, there is an implied warranty that the goods will be fit for such a purpose.

NCR argued that the written agreement effectively disclaimed all implied warranties. On the other hand, NCR also admitted that it had represented that the disk system would perform the six functions and that NCR would provide the requisite know-how necessary to put the system into operation.

NCR further admitted that it had recommended the system for CSI's express purpose and that it was aware that CSI was relying upon NCR's skill and judgment.

The court concluded that, in spite of the express disclaimers, NCR had breached both express warranties and the implied warranty of fitness for a particular purpose.

Once the court determined that there had been a breach, it addressed itself to the issue of damages. The total value of the hardware and software system was $75,783.31. After issuing various credits for partial performance, the court granted a final award to CSI of $57,152.76 for the system itself.

In addition to ordinary damages for breach of contract, the court further determined that consequential damages were applicable. Thus it awarded CSI $45,000 for employee losses, $7,727.20 for executive losses, $6,450.96 for profit losses, $1,750 for manual system cost, $1,433 for supplies and $1,197 for rental space. The total amount of the judgment awarded to CSI was $120,710.92.

Situations to Avoid

The Beasley and Chatlos cases are good examples of types of situations users should try to avoid and of potential liabilities for vendors, particularly those who are supplying both hardware and software. In both cases, the written agreements contained express disclaimers. Yet, in both cases, oral evidence was admitted to show that express warranties had been made and breached. And in both cases, consequential damages were allowed, which resulted in judgments far exceeding the initial value of the contract.

In entering into any contractual arrangement, the objective is to avoid these types of situations which turn sour. The best way to avoid trouble is to structure an agreement which encourages and promotes success. Such an agreement can have periodic checkpoints built in so that both user and vendor are alerted at an early stage of performance to any trouble areas.

Before entering into a substantial long-term commitment, a user should confer with his corporate counsel for advice on how best to structure the arrangement, both from the viewpoint of adequate legal protection and for a successful implementation. It is best to contact corporate counsel at an early stage in the negotiations so that his views can be taken into consideration for structuring the final agreement.

Richard Raysman is an attorney with the New York law firm of Brown & Raysman and chairman of the New York State Bar Association Computer Law Subcommittee.

Raysman specializes in contract negotiations, litigation, protection of proprietary information and other areas of the law that relate to computers. He has written and lectured extensively on computer law for both attorneys and DP professionals.

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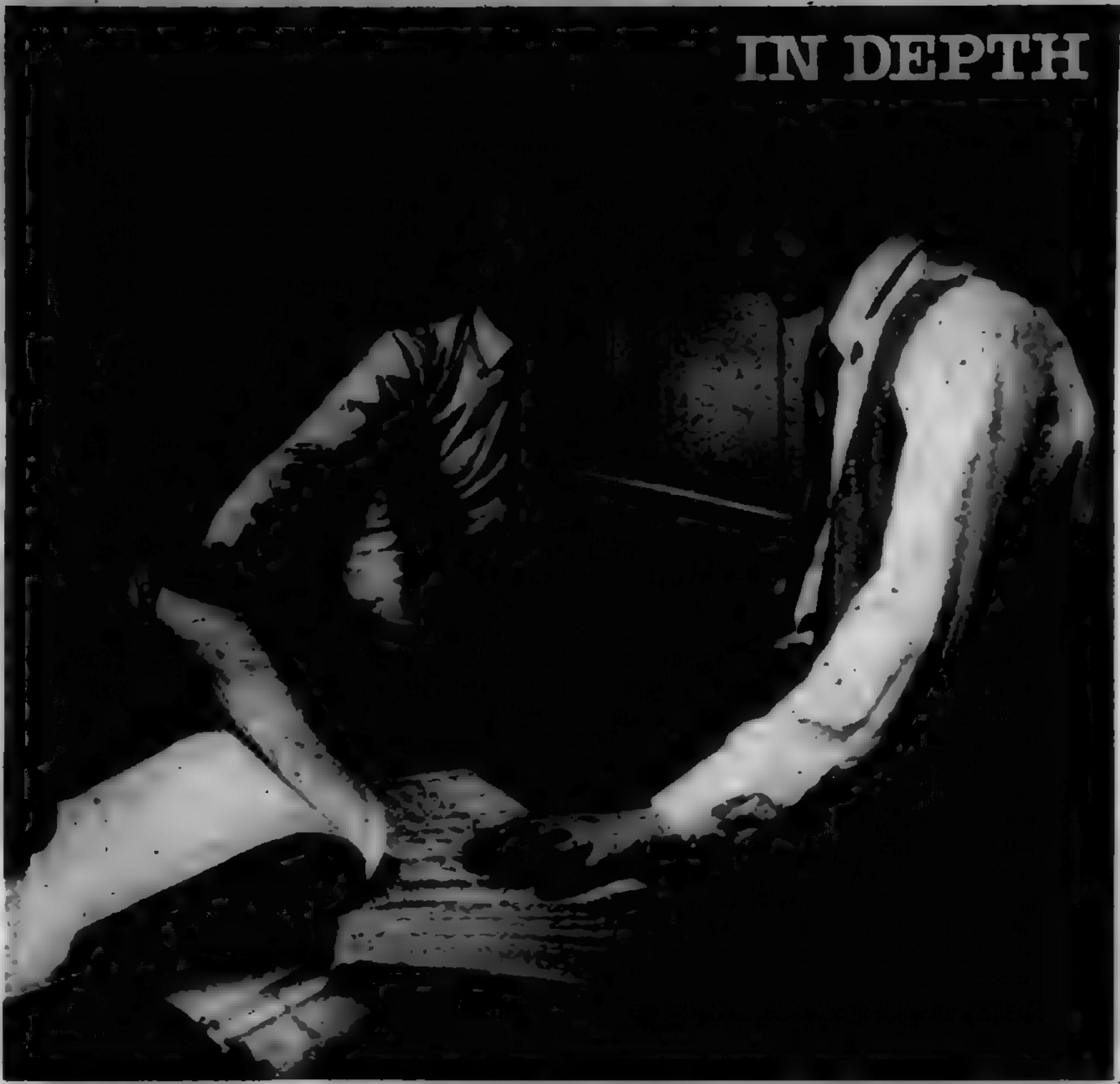

Fine tuning. John Muhs (right) of Illinois Bell reviews a report on computer response time with Tirks systems performance analyst Luis Castellanos of Bell Labs. Bell Labs and the operating companies' joint work on reconstructing Tirks data bases has decreased program running times significantly.

Tuning Tirks Data Bases

Techniques used to restructure data bases in the Trunks Integrated Records Keeping System (Tirks) are saving millions of dollars in computer and user costs and can benefit other data base systems.

By Stephen D. Blazier

When the efficiency of your operation depends on your ability to find a needle in a haystack, you'd better make sure that haystack is well organized. The efficiency of Bell System operations relies increasingly on sophisticated computer-based systems, with "haystacks" of data in data bases that can contain more than a billion pieces or characters. Bell Labs is helping to organize these data bases for rapid, efficient access to the information they hold.

One of the first systems to benefit from such data-base tuning techniques – the Trunks Integrated Records Keeping System (Tirks) – is changing the way operating companies keep track of special services circuits, message trunks and carrier systems. The overall process with which Tirks concerns itself is called "circuit provisioning." Circuit provisioning involves the construction of new circuits from component equipment and transmission facilities.

Tirks helps operating companies meet forecasted circuit requirements, track circuit orders, design the circuits, select and assign circuit components, maintain inventory records and distribute work orders. This is a great advantage to the operating companies, each of which has, on the average, more than 500 new circuit orders to begin to process each working day and about 30,000 circuit orders in progress at any given time.

The amount of data Tirks needs in order to keep track of these circuits is enormous. At the typical operating company, Tirks is responsible for more than 25 billion pieces, or bits, of data about equipment and circuits, stored in more than 100 on-line data bases. This data can easily be accessed from individual CRT terminals by operating company Tirks users. And they do so at the rate of more than 100,000 times a day in a typical operating company.

Searching Data Bases

Users appreciate the ease with which they can retrieve, add to, change and manipulate the data, and they also want to minimize the amount of time they spend waiting at their terminals for the system to respond. Yet a good part of this response time is devoted simply to accessing some particular piece of data.

The computer spends much more time searching the data bases and transferring data than it does actually moving, comparing and otherwise manipulating the data logically within its working memory. The reason for this is simply that the manipulated data is handled in relatively fast main memory, or primary storage. Data bases are usually stored more cheaply on electromechanically driven, relatively slow, disk memories (see Figure 1 on In Depth/14), then brought to primary storage for manipulation a few segments at a time.

So searching for data necessarily takes more time than manipulating the data, and even a small change in the way searching is done can decrease the access time significantly. Tirks might take, for example, as much as .03 second to find and transfer two numbers to the main memory, yet only another millionth of a second to add the numbers together.

Of course, a typical operation involves much more than just one simple arithmetic manipulation. But even so, Tirks spends, on the average, about five times longer looking for and transferring data than it spends manipulating data – assuming the data bases are well organized or well "tuned." When they are not, the situation can be much worse.

Data Base Tuning

This is, in fact, what data-base tuning is all about: cutting down the number of times that data is transferred, the major time-waster in a data base system like Tirks.

How much difference can a well-tuned data base make? In one case, changes made across all of one operating company's data bases reduced the average processing time by 67%. These changes also saved the operating company more than $1 million that would otherwise have gone towards new hardware. In another case, tuning the data bases reduced the program running time from 20 minutes to just 15 seconds.

One program, run frequently at each Tirks installation, used to require approximately 50 transfers from just one data base each time a new item was added to a list. A reorganization of the data base reduced the number of transfers to two. As a result, the program running time was decreased from several hours to just minutes.

In order to better understand how such data bases are tuned, it is necessary first to examine how a data base is structured and accessed.

A data base consists of a number of information segments stored in a memory – for example, on an electromechanically driven disk. Each information segment resides alongside other segments in one of many blocks of storage space on the disk (see Figure 2).

Information segments in a block can be related in one of two ways – either because they are adjacent physically, or because one segment contains a "pointer" to another nonadjacent but related segment. (A pointer is a piece of data that specifies the location of a segment.)

The relationships among segments

(Continued on In Depth/14)

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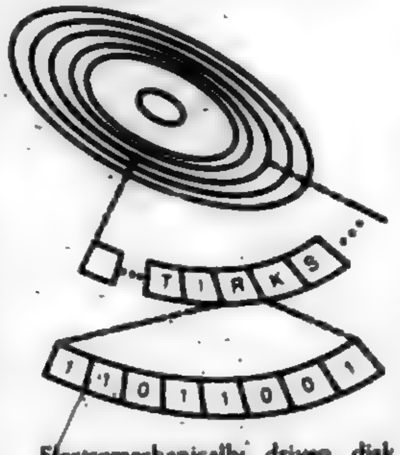
IN DEPTH

The Disk Pack



Electromechanically driven disk packs are one of the most common means for storing data outside of the computer's own primary memory. They function as direct-access storage devices, meaning that a piece of data stored in the middle of a disk can be fetched directly without having to be sought sequentially. Here's why the organization of data in a disk memory affects the efficiency of a computer system.

A disk pack consists of about 15 platters arranged in a stack with a gap between each. A single platter is analogous in operation to a phonograph record. Data is stored on both surfaces of a disk, in concentric circles called tracks. There are, typically, about 500 tracks on each platter surface; in the Tirks system, a track will often hold about four data-storage blocks. A data block contains about 40,000 bits. Data stored sequentially on each track is addressed by specifying the disk pack, track and position on the track.

Disk arms, each one analogous to the tone arm of a phonograph, read and write data onto the platters. The disk arms are replicated for each surface of each platter in a disk pack, and the arms move in concert. When data must be read from a disk, the disk arms first are simultaneously moved in or out to the correct track and positioned near the surfaces of each platter. Then the arm over the desired surface is connected electronically.

The delay incurred in getting to a piece of data depends on two things: principally, on how long it takes to position the disk arm over the desired track; and secondarily, on how long it takes the data on the track to rotate into position beneath the disk arm. These delays are typically .025 and .008 seconds respectively.

Delays can be kept to a minimum if the data required for a new operation is stored on a track somewhere above or below the data just accessed — that is, in the same vertical cylinder. In this case, no further disk-arm movement is required to get to the data; the electronic connection is simply switched to the arm on the next track to be read. If, in addition, the needed data is on the same track and immediately after the last-used data, even less delay is incurred.

Data is stored sequentially on each track by magnetically charging the surface of the disk to one of two opposite states. These states represent the two binary digits (bits) 0 or 1. Eight bits together form one byte, which is roughly equivalent to a character. Thus the acronym "Tirks" requires five bytes, or 40 bits, to store. An entire disk pack might hold around 300 million bytes or characters.

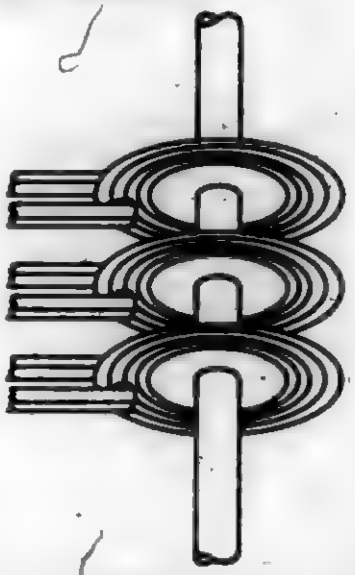


Figure 1

(Continued from In Depth/13)

become important when the computer needs a particular segment of information. It can rely on adjacency and pointers to find the segment, rather than having to search each of the many blocks of a data base from beginning to end.

Although having segments related through adjacency guarantees the fastest access from one to the next, it is not possible in a data-base system as complex as Tirks to maintain all segment relationships by adjacency. After all, only one segment can follow another. So if a segment is related logically to two or more others, it can follow at most one of these and must use pointers to refer to all of the others.

To look for a particular segment, the computer determines which block of storage space is most likely to contain the segment, then transfers that block to primary storage. If the segment is not in the block, a pointer will specify which new block, if any, the computer should next transfer into primary storage and search. The computer should find in this new block either the desired segment or, again, a pointer specifying which block should be searched next, if any.

Data Base Efficiency

After transferring and examining each block in turn, the computer will eventually either find the information segment or report that such information does not exist. The total number of blocks transferred to get to this point depends on the efficiency of the data base structure.

It is frequently necessary for Tirks to access several related segments of information at one time. This can be done most efficiently if all the segments are located in the same block. But block size is limited by the type of disk, and it is rarely possible to put the many segments needed for a Tirks operation into just one block.

The best alternative, then, is to structure the data bases so that the segments used together most frequently are contained in the smallest number of blocks. Although some of the requests for information that occur infrequently may require several blocks to be transferred and searched, those requests that occur most often should require only a small number of transfers.

Organizing a data base in this way is no simple matter. Data bases typically consist of billions of pieces of information.

Data bases should ideally be organized so that any changes made to them through normal use do not make them inefficient. This is most easily done by leaving free space in each block for new segments yet to be added.

In tuning data bases, it is impractical to examine all of the paths connecting segments of information and all of the operations performed on these segments. Rather, systems analysts use computer programs and models — the tools of data base tuning, many of them developed or enhanced at Bell Labs — to identify data bases associated with any Tirks system performance problem. These data bases may be selected for tuning if they meet two criteria: they are not well organized, and the data blocks within them are frequently accessed.

Problem Identification

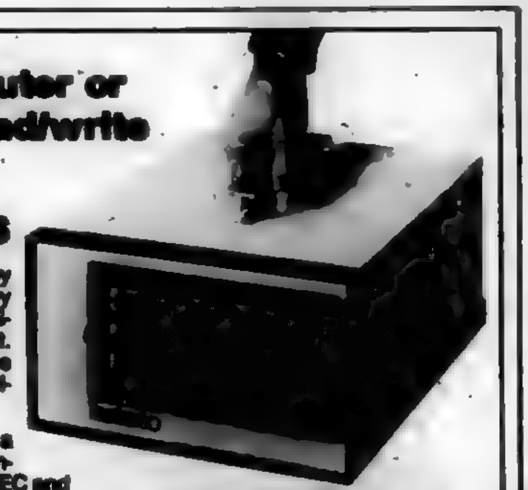
Poorly organized data bases can be recognized in several ways. For instance, one tuning program determines the average number of blocks that must be transferred to find a particular segment type in a data base. This can be done for the data base as a whole or for any portion of it. Another way of recognizing a poorly organized data base is to examine how much free space lies within each block.

Data bases should ideally be organized so that any changes made to them through normal use do not make them inefficient. This is most easily done by leaving free space in each block for new segments yet to be added.

Other programs identify frequently accessed blocks by monitoring the many thousands of Tirks transactions each day. Still others identify the data bases and blocks that are changed most often and are therefore most likely to become disorganized.

These kinds of monitoring are generally done first by each operating company. When possible problems are spotted, Bell Labs and the operating company work together to analyze them and isolate the specific data bases involved. They use models of system behavior, developed at Bell Labs, to

(Continued on In Depth/16)



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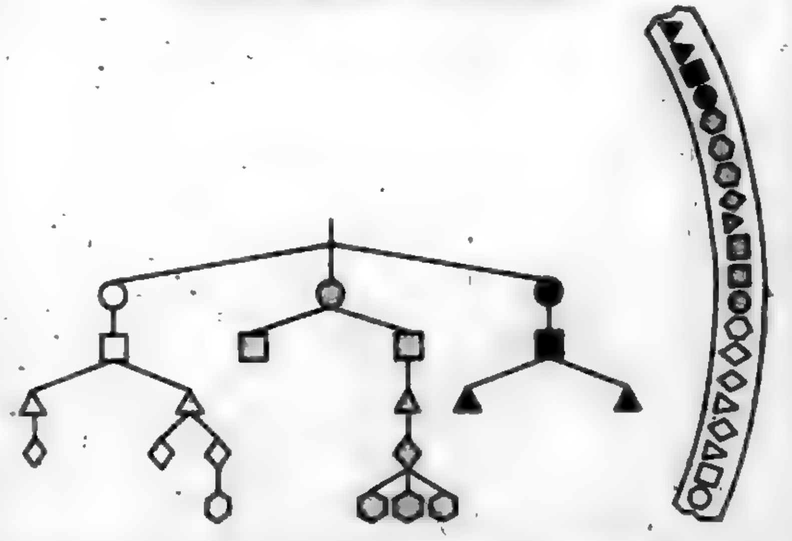


Data segments are stored sequentially on the various concentric tracks of a disk. All of the Tirks data bases, however, have a logical structure that is hierarchical rather than linear — meaning that the different information segments are related logically through a tree structure rather than a straight line.

A typical hierarchical structure is shown by the "polygon trees" above. Each shape represents an information segment, with the relationships between segments shown by connecting lines.

Certain rules govern how a tree must be structured. For example, in this illustration, squares may appear only under circles, triangles only under squares and so on. However, there may be any number of each type of geometric shape, or even none at all.

Suppose now that we want to create a hierarchy of information about various pieces of telephone equipment and their functions. Because many pieces of equipment might exist at any one location, we choose a circle to represent information about each location. We can then place one or more squares under each circle to identify the pieces of equipment at each location.

Finally, since a piece of equipment may perform more than one function, we use triangles to represent those functions. The ploygon tree on the left shows this structure for one such location. The other two structures will usually contain analogous information about other locations, or they may represent different kinds of information altogether.

The bank of shapes at the right above shows one possible way this information from the polygon trees can be stored sequentially in a data-storage block. Information segments are simply entered one by one, reading down each related hierarchy from left to right. The tree structure is maintained by software "pointers" within the segments, rather than by physical location.

The pointer is, itself, a piece of data that identifies where in the data base a related segment can be found. It does so by specifying a relative position within the data base; this relative position corresponds to an "address" on the disk containing the data base.

As with the Tirks system described on these pages, if this new structure proves inefficient, the data base can be "tuned" by reordering the information segments and establishing new pointers. For instance, if the information about equipment function in this example is accessed very rarely, it may be more efficient to move all such information — to a separate storage area or track in the data base.

Figure 2

Tuning Data Bases

As an example of how physical structure can be altered to improve data-base performance, consider a data base with the structure shown in "before." In this example, the large solid segment in block 1 takes so much room that the next two shaded segments, both containing information related to that stored in the white segment above them, cannot fit into the same block. Yet the solid segment, containing such information as notes about a circuit, is accessed much less frequently than the white and shaded segments in the first two blocks.

Clearly there is little advantage to having the solid segment in the first block, when it only serves to increase the access time to those frequently needed segments following it. Yet such configurations are common wherever a data base contains large, infrequently used segments.

Systems analysts tuning this data base would most likely move the solid segment to a separate block at the end of the data base. Then, with frequently used segments condensed together into fewer blocks, access time would be measurably improved.

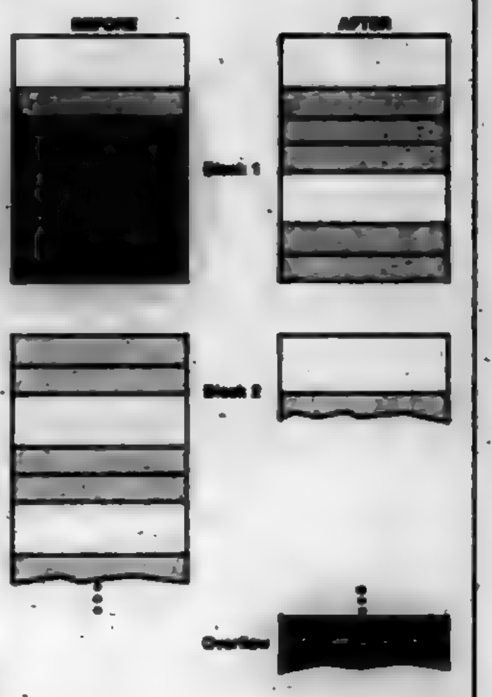


Figure 3

(Continued from In Depth/14)

identify which data bases to tune first, to suggest how best to restructure the data bases and to predict the effects of their proposed changes. These models take into account how the data bases are used, the ways that use may change, how use affects response time and what computer resources are required to access them.

To help choose the most effective tuning methods, for instance, systems analysts employ models to predict how much disk storage space to allow when they restructure a data base and how to distribute this space. This must include both the space for existing segments and some empty space between segments to accommodate growth.

Once systems analysts from Bell Labs and the operating company agree on a solution, the operating company people make those changes. They must reorganize the data bases that are performing inefficiently. They first extract all the information segments from each data base, then replace them in a more effective sequence within the blocks, establishing new pointers throughout the data base (see Figure 3).

The operating company analysts continue to monitor Tirks system performance after the data bases are tuned to make sure that the desired improvements indeed result. In the vast majority of cases, the problem is solved with just one tuning effort.

The entire process of data base tuning, then, consists of understanding certain complex factors and their relationships and then restructuring the data bases according to their actual use. This tuning process is time-consuming and requires significant use of computer resources. But the results are well worth the effort. Improved data-base structures have already reduced Tirks computer and user costs by millions of dollars, and at the same time they have significantly increased user productivity and satisfaction.

Although Tirks is one of the first large computer-based systems to use many of these data-base tuning techniques, it will by no means be the last. The techniques introduced here will benefit — indeed, will make possible the use of — many future generations of Bell System information and operations systems.

Stephen D. Blazier is supervisor of the Tirks Systems Performance Group at Bell Laboratories, Piscataway, N.J.

Blazier joined Bell Labs in 1974 and worked in the Facility Equipment Conversion Group which developed, tested and documented programs to help companies convert to the ongoing Tirks system. In 1977 he became a member of the Tirks Performance Tuning and Configuration Group; in 1979 he became supervisor of the group.

Blazier holds a B.S.E.E. degree from the University of Tennessee and an S.M. degree in computer engineering from Stanford University.

With Parallel Architecture

Denelcor Brings Out Supercomputer

By Rita Shoor
CW Staff

NEW YORK — A "supercomputer" said to be able to execute different instructions on multiple data streams simultaneously was announced here last week by Denelcor, Inc. of Denver.

Dubbed the Heterogeneous Element Processor (HEP), the system is believed to be the first commercially available system to offer this capability.

The ability to execute different instructions upon multiple data streams simultaneously represents a technological advance over vector or array processors, which also handle many streams of data at the same time, because these systems are limited to performing the same instruction on all the data streams, according to industry observers.

Parallel Architecture

The HEP's parallel architecture is said to allow high performance to be achieved at relatively low hardware cost since all processor hardware is utilized to execute simultaneous parallel programs.

For example, while an add is in progress for one process, a multiply instruction may be executing for another and a divide for a third, a company representative explained (see MIMD diagram).

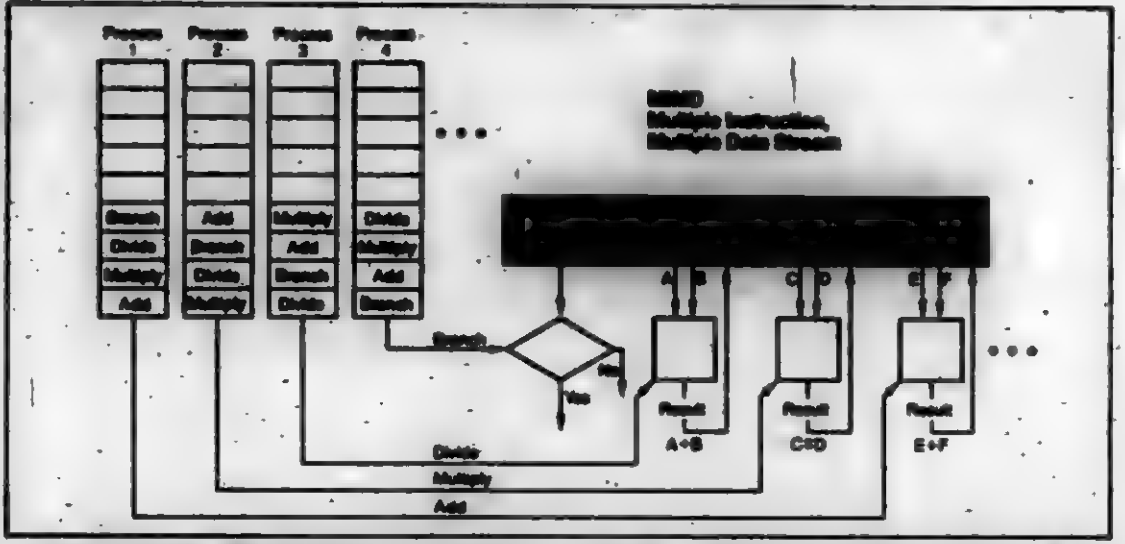
It is also possible to execute similar functions simultaneously, Denelcor claimed, and in cases involving continuous simulation and complicated partial differential equation solutions, the Multiple Instruction, Multiple Data Stream (MIMD) architecture reportedly offers "the only possible method of achieving significant parallelism."

The HEP system consists of process execution modules (PEM), data memory modules and support processors which are connected by a high-speed data switch network, Denelcor said. Each PEM contains 2,048 internal general-purpose registers, and all data memory modules are accessible to all PEMs, according to the company.

Although PEM data memory reference instructions allow partial word and byte addressing, all data and instruction words are 64 bits long and the memory bandwidth in an HEP system, including the data switch network, is 20M word/sec, Denelcor said.

Each PEM reportedly executes a maximum of 10 million instruc-

(Continued on Page 65)



In this sample MIMD architecture, the source of the multiple data stream is represented by the black box being operated upon by concurrent branch, add, multiply and divide instructions.

Audio Data Entry Device Debuts

SAN DIEGO — Wavetek Data Communications, Inc. has introduced an audio response data entry device that multiplexes a series of terminals through a single synchronous or asynchronous serial communications channel.

The ADC 1550 operates over a telephone system, providing an audio response from remote terminal stations. The unit handles up to eight I/O lines with AT&T Touch-Tone receiver data sets and has up to a 240-word vocabulary.

Features of the 1550 include Ascii output speeds of 110-, 150- and 300 bit/sec, simultaneous operation of all I/O lines, a remote diagnostic capability and the ability to use RS-232C and IBM 3270 protocols.

The system will handle alphabetic, numeric and up to 16 special characters. It can be attached to CRTs, Touch-Tone terminals or transaction telephones, a spokesman noted.

The voice response communications unit's cost ranges from $20,000 to $50,000 depending on configuration, Wavetek said from 9045 Balboa Ave., San Diego, Calif. 92123.

Decision Data Expands Line Of IBM-Compatible Printers

HORSHAM, Pa. — Three new line printers — the Model 6665 operating at 650 line/min, the Model 6680 at 800 line/min and the Model 6610 at 1,000 line/min — are being added to Decision Data Computer Corp.'s 6600 series of IBM-compatible printers.

Printer features being offered to IBM users for the first time include field upgradability and system interchangeability, eliminating the user's need to order and ship printers when requirements change, the firm said.

The printers can be used with IBM System/3, System/34, 360, 370, 30 series, 4300 and Series/1.

All three units have electronic partitioning enabling them to accommodate a variety of computer interfaces and controllers.

The three models, the 6665, 6680 and 6610, cost $16,000, $18,500 and $20,300, respectively, from the vendor at 100 Witmer Road, Horsham, Pa. 19044.

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Alphanumeric Capability

Programmable Data Entry Terminal Debuts

CUMBERLAND, R.I. – The Alphaverter Series 400 terminal offering full alphanumeric capability and programmability to non-DP personnel has been added to the Digitronics Division of Comtec Information Systems, Inc.'s line of remote batch data entry terminals.

The terminal comes in a self-contained package measuring 7.25 in. high by 14 in. wide by 18 in. deep and includes a full 55-key typewriter-style keyboard with imbedded numeric keypad, 5 by 7 dot matrix impact printer, magnetic cartridge for recording and built-in telecommunications.

The Alphaverter can be equipped with an optional 40-character vacuum fluorescent display, which will prompt the operator and display each character as it is entered but before it is printed, the vendor noted. The telecommunications capability can be implemented as a built-in modem and acoustic coupler, as a Data Access Arrangement that enables the host to remotely poll the Alphaverter or as an RS232 interface to a modem, according to the firm.

In addition to four independent accumulators for capturing various categories of totals and three non-add function keys for distinguishing different types of data elements, the Alphaverter may be programmed to edit and control the input.

It can also branch to a particular section of the program and prompt the operator on either the printer or optional display of the field to be entered.

The Alphaverter series 400 costs $3,835 from the vendor at 53 John St., Cumberland, R.I. 02864.

Denelcor Unveils Supercomputer

(Continued from Page 63)

tions per sec (Mips) and the architecture allows for a maximum of 128 one-million-word memory modules and up to 16 PEMs, Denelcor claimed.

A spokesman also noted that the HEP's throughput speeds have been achieved without using any large-scale integrated (LSI) or very large-scale integrated (VLSI) logic but with 10K-byte emitter-coupled logic.

Army Contract

Designed for use in scientific or commercial applications that require processing speeds of between 10 and 160 Mips, a manufacturing prototype of the HEP was evaluated by the U.S. Army in November 1979.

Based upon the results, the company was awarded a $2.4 million amendment to an existing contract in May 1980. The entire Army contract calls for a four-processor HEP system scheduled for installation at a ballistic research laboratory during the fourth quarter of 1981, Denelcor said.

The company expects this contract to add "a great deal of credibility" to the HEP system in the eyes of potential commercial customers, David Miller, Denelcor president, stated. However, he admitted that although talks are being held with several potential HEP customers, the firm does not have any other orders for the system.

Available in mid-1981, the basic HEP system price would be in the range of $1.5 million and would include one PEM, 64K bytes of program memory, 64K bytes of data memory, a basic system file processor (Digital Equipment Corp.'s PDP-11), one printer, card reader, tape drive and CRT and an unspecified amount of disk space.

Denelcor is at 3115 E. 40th Ave., Denver, Colo. 80205.

Print Paper Eases Glare

SANTA CLARA, Calif. – Versatec, a Xerox Corp. company, has introduced an electrographic printing paper for the firm's electrostatic printers and plotters that uses a green tint to reduce background reflection and improve readability.

The Ey-Eze paper is available in 11-in. widths of fanfold and roll sizes. A box of 1,000 fanfold 11-in. sheets costs $37, while a 500-ft roll is priced at $39. Quantity discounts are also offered, the spokesman noted.

Additional information and a free paper sample can be obtained from the firm at 2805 Bowers Ave., Santa Clara, Calif. 95051.

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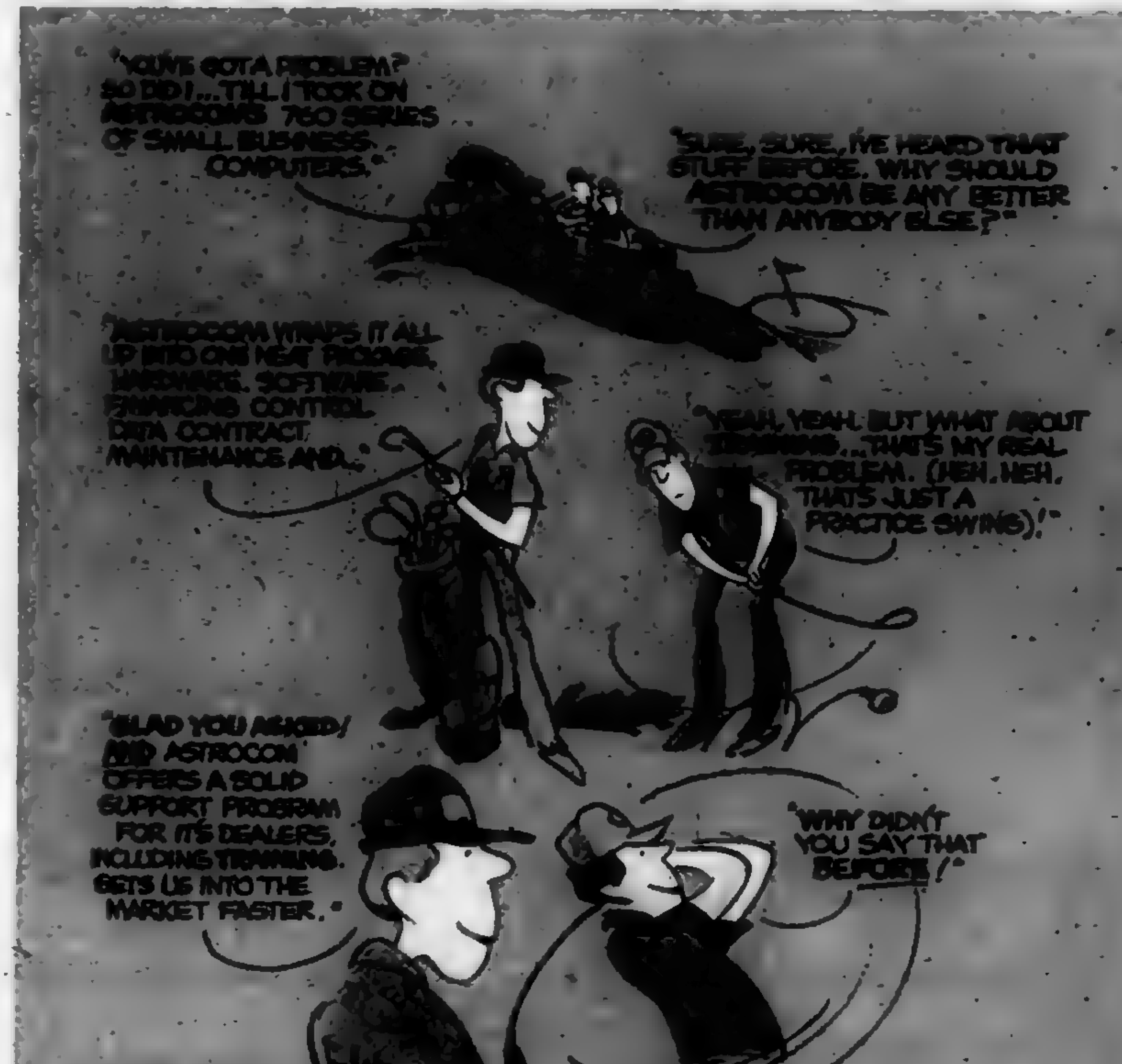
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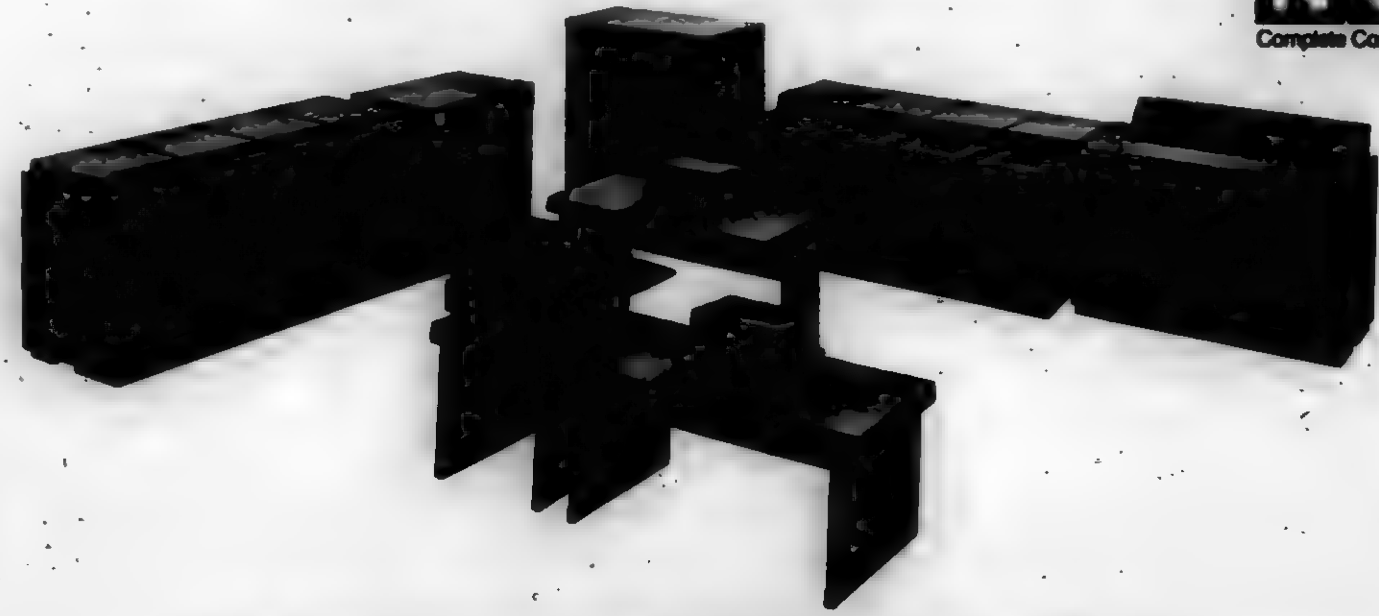

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OCR Page Reader Enters Typewriter Text Into Nets

TETERBORO, N.J. – Text typed on office typewriters can be fed into telecommunications networks without rekeying through Compuscan, Inc.'s expanded Alphaword II optical character recognition (OCR) page reader.

While Alphaword II was previously oriented toward word processing applications, the optional modification allows the use of such networks as TWX, telex and Direct Distance Dialing for worldwide distribution of typed data, according to the firm.

Where only TWX and Telex are involved, text can be entered into the network from the Alphaword II page reader via "economical" paper tape, a spokesman said.

The Alphaword II page reader reportedly can scan a variety of standard typewriter fonts at rates of up to 240 page/hour with accuracy of "less than one error in 100,000 characters," the spokesman claimed. It can accommodate up to six lines of type/in. with character pitch of 10 or 12 char./in. and paper sizes from 7.5 in. by 3-5/8 in. to 11 in. by 24 in.

The Alphaword II costs $24,800 from Compuscan at 900 Huyler St., Teterboro, N.J. 07608.

Kybe Offers Tape Cleaner/Tester

WALTHAM, Mass. – A cleaner and tester for maintaining and evaluating 800-, 1,600- and 6,250 bit/in. computer tapes is being offered by Dennison Kybe Corp.

Priced from $9,995, the MLT-500 series cleaner and tester is essentially a manual version of the Kybe SLT-80 self-loading unit. The MLT-500 differentiates between signal dropouts that are within a system's error correction routines and those that will cause an abort, the vendor said.

The MLT-500 also provides users with higher tape yields because marginal tapes can be better classified as acceptable or not, the firm said. For 6,250 bit/in. tapes, the unit records one-track, two-track and three-track dropouts, which are compatible with industry tape transport error recognition routines, according to the firm.

Errors are recorded once every four inches and are counted on LED counters and graphically displayed, the vendor said from 132 Calvary St., Waltham, Mass. 02154.

Link Based on 2780

STAMFORD, Conn. – Digital Associates Corp. has introduced an interface based on IBM 2780 protocol that links a wide variety of line printers with CPUs from Prime Computer, Inc., Honeywell, Inc. and Univac as well as the Digital Equipment Corp. Decsystem-20.

The interface costs $1,800.

Digital Associates is at 1039 E. Main St., Stamford, Conn. 06902.

Memory Boosted On Multi Picture

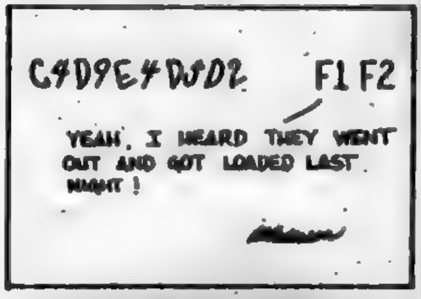
SALT LAKE CITY, Utah – Extended memory capability for Evans & Sutherland's Multi Picture System is said to expand the display list and system functions of the 3-D line drawing system.

While the Multi Picture System until now has had a 64K byte, 16-bit word refresh buffer limit, that can now be expanded to as much as 256K bytes according to a company spokesman.

The resulting memory space will reportedly allow the user to store unprocessed display files as well as more processed image segments, freeing him from address space limitations and improving update rate and system responsiveness.

The Extended Memory version of the Multi Picture System sells for $71,500 including a 32K-byte memory module. Each subsequent 32K-byte module costs $3,000. Retrofits to existing customer systems are available.

Evans & Sutherland is headquartered at Building 580, Arapeen Drive, Salt Lake City, Utah 84108.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YEAH, I HEARD THEY WENT OUT AND GOT LOADED LAST NIGHT!

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Hazeltine Executive 80

Answers for the Eighties

Despite Inflation, Recession

System Keeps Small Town Within Budget

By Tim Scannell
CW Staff

OREM CITY, Utah – In small towns with limited budgets, words like recession and inflation can strike fear into the hearts of most city administrators. But, officials here have a computer-based hedge against the financial elements.

Since installing a Data General Corp. Eclipse C/330 computer system nearly two years ago, Orem City has eliminated the need to add additional personnel to the city's payroll to take care of day-to-day administrative chores. Not only does the computer process the city's accounting, utility billing and police department paperwork a lot faster than under a manual system, but money that would have been spent for extra help is winding up back in town's coffers, Alan L. Dixon, the city's DP manager, explained.

"We're not really eliminating any jobs, but we don't have to hire new people to help out in those areas," which, financially, "probably helped us more than anything," he said.

The city's Eclipse system currently has 512K bytes of memory, two 96M-byte disk drives, an 800 bit/in. tape drive, two printers, 21 interactive CRT terminals and modems for communication with the city's Public Works complex. Presently, the computer handles everything from the city's billing and daily revenue to police dispatch records, Dixon noted.

Growing Needs

As Orem City's population nearly tripled from 22,500 people in 1970 to almost 60,000 people today, so did the city's data processing needs, the system's manager pointed out. Originally, the local government relied on a private computer firm in nearby Provo Utah, to process its records. Subsequently, the city purchased an IBM System/3 Model 10 minicomputer and brought its accounting closer to home.

However, while the System/3 managed to keep the city's head above rising operations waters, the minicomputer was slow and often took all day to process one particular job. For instance, it took from 12 to 14 hours to complete the city's utility bills on the IBM machine. To further slow things down, the computer could process only one job at a time, Dixon claimed.

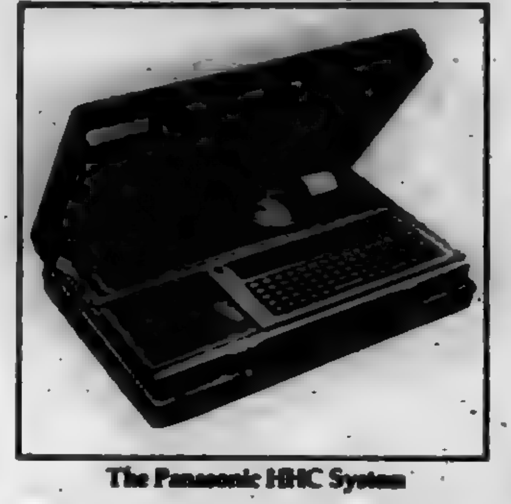
"If something was running, you'd have to wait until it finished before you could do anything else," he said. "Nothing else could be done on the machine in the meantime."

Planning Ahead

In contrast, the Eclipse can run a number of different jobs at the same time and permits on-line access to the city's files. Department heads and city managers could virtually put their fingers on a piece of information or report "at almost a moment's notice," the DP head stated.

Thus far, the only problems Orem City has had with its Eclipse system were from power surges caused by a number of recent thunderstorms. While such storms are infrequent – thanks to Utah's hot and dry climate – city officials plan to install an "up-system" that will keep the computer's power consistent regardless of the strength of the main supply. However, because such a system costs about $14,000 or $15,000, the city will have to wait until next year to fit it into its fiscal budget plan, Dixon said.

Panasonic Offers Hand-Held System



The Panasonic HHC System

CHICAGO – Panasonic Co. has unveiled the Hand-Held Computer (HHC) system consisting of the RL-H1000 hand-held computer and a compliment of separate peripheral devices.

Peripherals available for the HHC include an I/O interface that can attach up to six additional peripherals, an acoustic coupler and telephone modem, cassette interface, video random-access memory (RAM) interface for hookup to a home TV set, a mini-printer and RAM and read-only memory (ROM) memory expanders.

Two self-contained briefcase-style units based on the RLH1000 were also unveiled: a time-sharing module and a personal computer.

Designed for consumer use, the Model RL-H1000 accommodates four 16K-, 32K-, 64K or 128-byte ROM capsules, the vendor said. Each module package measures 2.75 in. by 15 in. by 8 in.

The unit has 65 reassignable keys and a keyboard overlay system. It also has a full matrix liquid crystal display graphics panel that displays graphics, foreign alphabet characters and proportional spacing.

The price for the RL-H1000 alone is approximately $400, and peripheral prices have not yet been established, the vendor said. Panasonic is at One Panasonic Way, Secaucus, N.J. 07094.

Two Printers Replace IBM 5256

• Memorex Corp.: 200 Char./Sec

SANTA ANA, Calif. – A matrix printer designed as a price/performance improvement over the IBM 5256 printer has been announced by the Business Systems Division of Memorex Corp.

The Model 2056, aimed at IBM System/34 users, features a 200 char./sec print speed, a printhead advance rate of 600 char./sec and a paper slew rate of 20 in./sec.

Additional features are a 7 by 9 print matrix and a print compression made to generate an 8.5-in.-wide format, said to be useful for making direct copies of reports on standard letter-size paper.

The 2056 costs $5,975 and is also available on three-, four- and five-year leases from Memorex at 3015 Daimlar St., Santa Ana, Calif. 92705.

• Decision Data: 150 Char./Sec

HORSHAM, Pa. – A 150 char./sec serial printer designed as an alternative to the IBM Model 5256 printer and intended for use with IBM's System/34, Series/1, System/38 and 5280 Distributed Data System is being offered by Decision Data Computer Corp.

The 6541-04 reportedly provides a 25% increase in rated speed at a 25% reduction in purchase price over IBM's 5256 120 char./sec model and a 375% increase in speed at a 5% reduction in purchase price over the 40 char./sec version, according to the vendor.

The 6540-04 prints bidirectionally across a full 132 columns. The printer costs $4,895 or is available on a two-year lease at $175/mo.

Decision Data is at 100 Witmer Road, Horsham, Pa. 19044.

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Burroughs WP Gear Enhanced

DANBURY, Conn. — Burroughs Corp.'s Office Automation Division has announced six enhancements to its R II and R III word processing (WP) systems:

- The R III System 350, a double-storage diskette word processor that uses dual-sided, double-density diskettes.
- A background communications feature for the R II System 250 and R III System 350 that permits the equipment to simultaneously receive incoming electronic mail and perform on-screen editing functions.
- An IBM magnetic card-compatible R II word processor that permits companies to upgrade to Burroughs equipment.
- A reader comfort control for Burroughs R III equipment.
- A high-contrast filter for the R III line that enhances the brightness of screen displays in sunny or brightly lit rooms.
- An OCR Courier font page reader for conversion directly to the R II and R III series diskettes.

The R III System 350 costs $14,500 with a printer and $10,750 without the printer. The R II System 250 costs $1,600, the Burroughs division said from Corporate Drive, Commerce Park, Danbury, Conn. 06810.

Wang Adds Two Systems Combining WP With DP

LOWELL, Mass. — Three additions have been made to Wang Laboratories, Inc.'s Office Information Systems (OIS) family.

Upgradable to Integrated Information Systems (IIS) by incorporating Wang's Office-Basic programming language, telecommunications, printing capabilities and Wang Mailway electronic mail software, the system reportedly combines DP and WP capabilities in one device.

The Model OIS 105 was designed for small office clusters where "functionality required by a first-time or sophisticated user is distributed to the point of need," according to a spokesman.

The OIS models 115-1 and 115-2 are said to fill the needs of small to medium-range clusters.

All three systems incorporate fixed disk drives that offer high cost/storage value and performance superior to many fixed/removable disks, Wang claimed.

The complete OIS family now includes the Models 105, 115-1, 115-2, 125A, 130A, 140 and 145.

The Model 105 supports two workstations and one printer. User storage is provided through the use of a 2.5M-byte sealed disk. User storage is through a 4.2M byte sealed disk. Like the Model 105, a 300,000-char. diskette drive is packaged within the master.

Pricing for the Model 105 begins at $9,300, for the Model 115-1 at $13,400 and for the 115-2 at $15,400. Deliveries are expected to begin in December from Wang, One Industrial Ave., Lowell, Mass. 01851.

Verbatim Makes Design Changes In Minidisk Line

SUNNYVALE, Calif. — Verbatim Corp. has increased the jacket thickness and improved the liner lamination on its 5.25-in. minidisk drives.

The changes were instituted to eliminate potential problems associated with the drives in personal computer systems.

When a disk is inserted to the old version Verbatim drives, the read/write head often contacts the disk, preventing it from centering properly, the vendor said.

By increasing the thickness of the jacket PVC material from 7.5 mils to 8 mils, the vendor reported it has eliminated the potential for disk hub damage and the centering problems.

In addition, the lamination pattern, which secures the lining to the jacket material, was redesigned to eliminate potential "pillowing" problems. Pillows are minute raised areas on the lining surface that can interfere with the lateral movement of the disk as it tries to center itself.

Minidisks in the improved product line are available in both single- and double-sided versions with 35-, 40- or 77 track/surface. The disks cost $495 each from the vendor at 323 Soquel Way, Sunnyvale, Calif. 94086.

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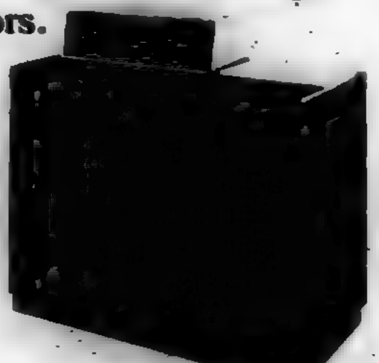

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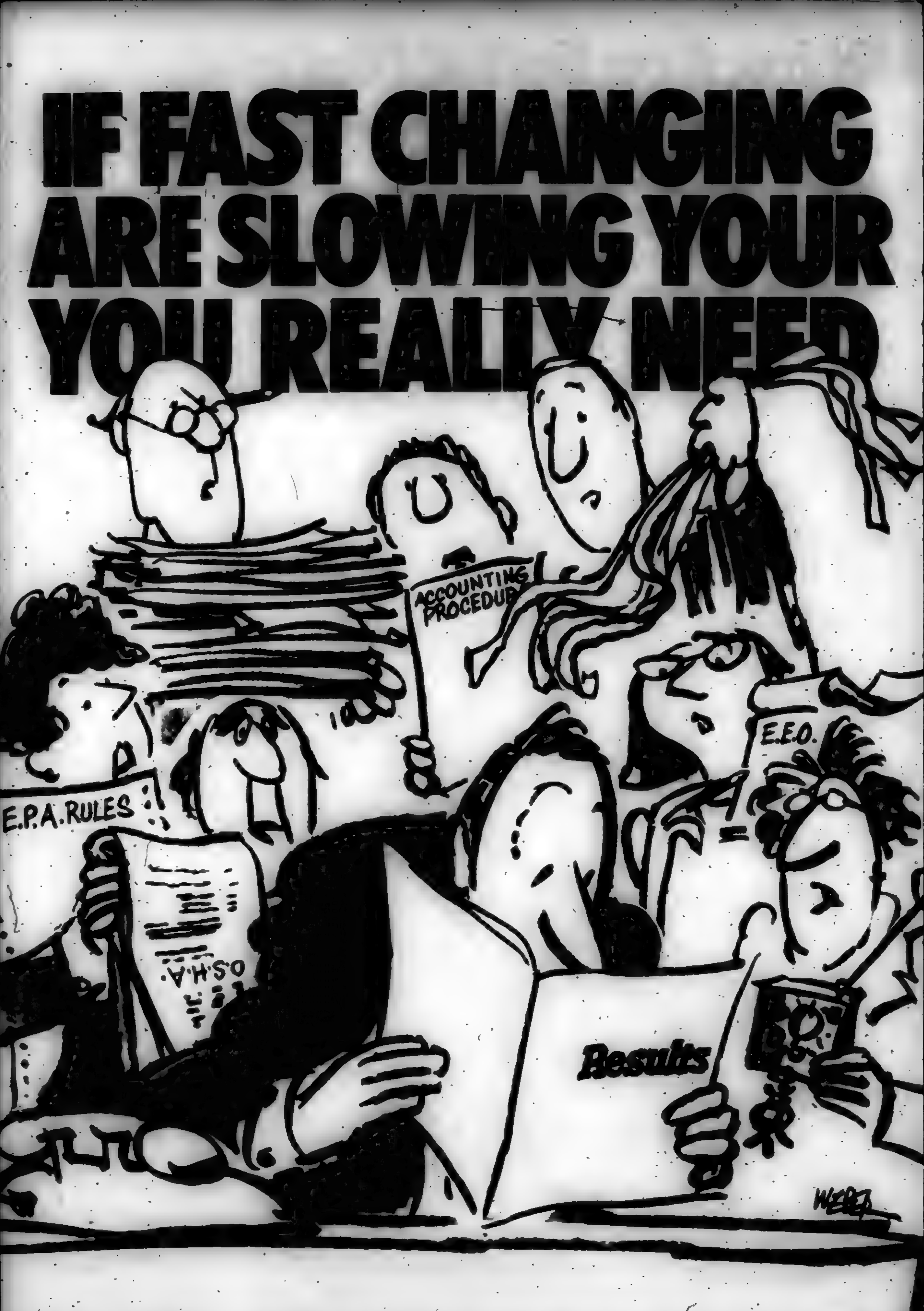
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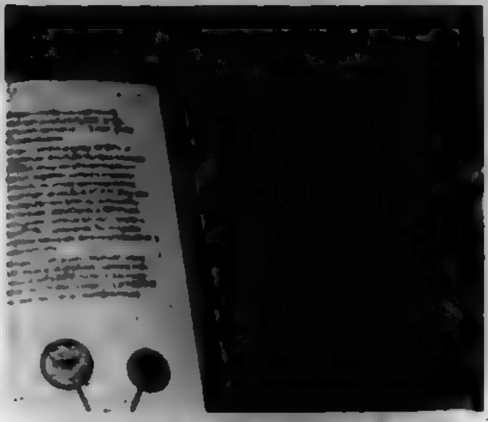

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Dual-Sided Diskettes Fit DG Micronovas

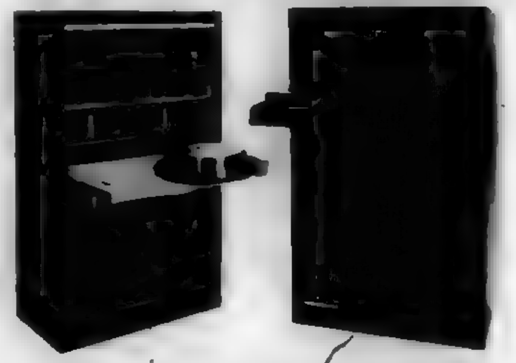
WESTBORO, Mass. — Dual-sided double-density diskette subsystems that reportedly have four times the data storage capacity of earlier diskettes have been introduced by Data General Corp. for its Micronova family.

The systems are available in two models. The Model 6096-A features one diskette drive and the Model 6096-B features two. Up to three DG diskette drives can be configured with a Model 6096 subsystem using an add-on Model 6096-C, the vendor said.

The Model 6096-C can also be used to expand 12.5M- and 25M-byte DG disk subsystems attached to Micronova, Nova and Eclipse computers, a spokesman said, adding such subsystems can attach one disk and up to three diskette drives.

The 6096-A system costs $4,000; the 6096-B, $5,400; and the 6096-C, $3,800, the vendor said from Rt. 9, Westboro, Mass. 01581.

DISC PACK FILING



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Based on Pascal Microengine

Desktop Graphics System Debuts

SAN DIEGO, Calif. — The self-contained Ensemble 120GX graphics system from Integrated Research and Information Systems is based on the Western Digital Corp. Pascal Microengine and offers high-resolution graphics, a 15-in. monitor, a 12-slot S-100 standard motherboard, a detachable keyboard and a double-density, double-sided dual floppy disk system.

The unit also features a Z80 alternate on-board MPU, memory parity, 128K bytes of dynamic random-access memory, the University of California at San Diego's (UCSD) Pascal, Digital Research, Inc.'s CP/M operating system, a constant voltage transformer and a printer port for graphics hard copy. It can also present a 768- by 480-pixel format in 8 by 6 pixel characters, some of which can be user-defined, the firm said. The standard unit costs $9,796.

A lower cost version of the 120GX uses the Z80 MPU, a 9-in. black-and-white monitor, one 5.25-in. floppy disk drive, a 12-slot motherboard, CVT power supply and built-in expansion and costs $3,464.

Additional software and configurations are available. The 120GX supports communications protocols which make the system a desktop computer/terminal, the vendor noted from Suite 320, 10150 Sorrento Valley Road, San Diego, Calif. 92121.

Edunet Users Gain Micro System

PRINCETON, N.J. — Edunet is offering the Edunet Network Access System consisting of Easy, specially designed general-purpose software, and microcomputer hardware to the members of its international education and research network.

The system can function both as a stand-alone microcomputer system and as an intelligent terminal useful in accessing large CPUs that supply services through Edunet.

Easy allows the system to act as an interactive terminal, uploading files from the diskette to other systems and downloading files from other systems to the diskette. Special capabilities permit automatic log-on to Edunet suppliers and file transfer between the system's diskette and specific Edunet services, the vendor said.

The hardware package consists of an Apple Computer, Inc. Apple II Plus system with 48K bytes of random-access memory, a language system card with Apple Pascal, a Disk II drive and controller that can handle up to two disk drives and a communications card and connector cable for network access.

The entire system costs $2,159 to member institutions from Edunet, P.O. Box 364, Princeton, N.J. 08540.

Double-Density Controller Designed for SS-50 Bus

WESTLAKE VILLAGE, Calif. — An SS-50 bus double-density controller board that reportedly allows 336K bytes of storage on a single minifloppy and handles up to four 5¼-in. and four 8-in. drives simultaneously has been introduced by Smoke Signal Broadcasting.

The DCB-4 Disk Master, including DOS-68D or 69D, is said to be fully compatible with hard disk systems and allows users to select either single- or double-sided operation, single- or double-density data, stepping rate, 40-track or 35-track density on 5¼-in. drives and system boot configuration.

The Disk Master occupies 16 bytes of memory and can read and write a single sector by itself, the vendor claimed. The unit, including DOS68D or 69D, monitor object code and manual, costs $449 from 31336 Via Colinas, Westlake Village, Calif. 91361.

I/O Card Suits S-100 Boards

LOS ANGELES — Combining four parallel bidirectional data ports for a total of 32 I/O bits with full handshaking and interrupt control for another eight I/O bits, the Model 4P4S parallel/serial I/O card from Microdasys was designed for most S-100 boards.

The Model 4P4S also offers four serial RS-232 I/O ports which also operate under full handshaking and interrupt control, the vendor noted.

Complete documentation is included with the board, which costs $199 in kit form and $229 completely assembled and tested, from Microdasys, P.O. Box 36215, Los Angeles, Calif. 90036.

I/O Port Meant For DEC Qbus

HARTFORD, Wis. — A general-purpose parallel I/O port for use in Digital Equipment Corp. LSI-11 Qbus applications has been introduced by General Robotics Corp.

The DRV11 is fully compatible with the DEC unit. Its device address and vector interrupt address are switch-selectable by the user, saving time in installation and setup, the vendor said.

The unit costs $250 from the vendor at 57 N. Main St., Hartford, Wis. 53027.

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We take a lot of pride in the way our computers perform. And we take it very personally when they don't. So we'll keep looking for new ways to serve you better and hold maintenance costs down.

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*Available on: VAX-11/780, PDP-11/70, PDP-11/44, DECsystem-10 and DECSYSTEM-20, DEC Datasystem 570 and DEC Datasystem 540.

digital

Primer Teaches Cryptography

IRVINE, Calif. — A Cryptographic Primer Kit designed to educate personal computer owners about cryptography for use on their own data has been announced by Western Digital Corp.

The kit includes an RS-232 Interface Cryptographic Board, in either kit or preassembled form, that attaches to the RS-232 port of a computer and accepts 300 bit/sec data.

A "Cryptographic Primer" and an assembly and wiring manual are included in the package, which sells for $395 unassembled and $495 preassembled. Western Digital is located at 3128 Red Hill Ave. Newport Beach, Calif. 92663.

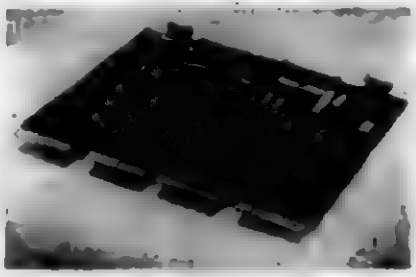
Quad-Size Disk Controller Compatible With LSI-11

TUSTIN, Calif. — An intelligent quad-size disk controller with LSI-11 hardware and software compatibility for interface of any two 8-in. or 14-in. Winchester drives (with SMD interface) in one sub-Unibus card slot is now available from Distributed Logic Corp. (Dilog).

The Model DQ202 utilizes a proprietary UP firmware architecture and interfaces through an SMD cable set to standard industry disks without external circuitry, power or chassis, the vendor claimed.

Other features include dual-port options for redundant processor applications and on-board options for BOOTSTRAP ENABLE/DISABLE, automatic READ ENTRY and FORMAT PROTECT.

In quantities of 50, the price is $1,592, Dilog said from 12800-G Garden Grove Blvd., Garden Grove, Calif. 92643.



Dilog's Controller

Tape Subsystem Fits Micronovas

FRAMINGHAM, Mass. — A dual-cartridge tape subsystem for Data General Corp. Micronova computers has been introduced by Alloy Engineering Co., Inc.

The DMN-1 cartridge tape subsystem features a 14M-byte storage capacity. It provides a medium for Winchester backup, tape spooling or other mass storage requirements.

The cartridge tape subsystem is priced at $2,600 in quantities of 25 including controller, tape drive, power supply and software license, Alloy Engineering said from 85 Spean St., Framingham, Mass. 01701.

EXO Micro Has Color Text

CULVER CITY, Calif. — Exo Electronics Co. has introduced the Nobus-Z, a microcomputer system with color text and graphics.

Featuring a Z80A microprocessor, Digital Research, Inc.'s CP/M operating system, 64K bytes of dynamic random-access memory, dual density 8-in. disk drives with 600K byte/side and 6K bytes of color text graphics, the Nobus-Z can support both personal and business applications.

A typical complete 70K-byte system with 600K bytes of disk storage costs about $3000, the firm said. Exo Electronics can be reached at P.O. Box 3571, Culver City, Calif. 90230.

Two-Day IEEE Course Set for Texas in Fall

BEAUMONT, Texas — The Educational Activities Board of the Institute of Electrical and Electronics Engineers, (IEEE) will present a two-day short course entitled "There is a Microprocessor in Your Future" on Oct. 23-24 here.

The registration fee for IEEE members in advance of the course data is $145; the at-the-door member fee is $165. The advance nonmember fee is $180; at the door is $205.

Further information is available from Vincent J. Giardina, Manager of Continuing Education, 445 Hoes Lane, Piscataway, N.J. 08854.

Power Unit Offered

SAN DIEGO — Topaz Electronics Division has announced a 500 VA Line 2 power conditioner for small business computers that reportedly prevents power line noise, voltage sags and surges and brownouts.

The unit costs $340. Topaz is at 3855 Ruffin Road, San Diego, Calif. 92123.

Console Fits LSI-11

SAN DIEGO, Calif. — Metacomp, Inc. has announced a portable front-panel console for DEC LSI-11-based systems.

The RPC-11 will allow the user to examine or alter memory and registers as well as perform all other standard ODT functions while a program is either running or halted, Metacomp said.

The portable RPC-11 costs $1,195, Metacomp said from 7290 Engineer Road, San Diego, Calif. 92111.

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HM161.
PL/C Essentials: The Basic Elements of PL/1 and PL/C,
L. Mazlack.

This introduction to two important computer languages, PL/1 and PL/C, provides clear-cut programming instructions along with practical examples. Separate sections deal with: program structure; I/O; labels and GOTOs; decision statements; string manipulation; subscripted variables; DO's; and internal procedures. $12.95

CD171.
How to Review and Evaluate Employee Performance.

Prepared by the staff of Universal Training Systems Company in loose-leaf format, this manual contains 18 case-study problems to help you diagnose and sharpen your knowledge of performance analysis and review, including charts and check-lists to assist you in implementing a successful program. Focus is on appraisal techniques to motivate employees for maximum teamwork, productivity and profits. $59.50

HM149.
Information Systems Through COBOL, 2nd Ed.,
Andreas Philippakis and Leonard J. Kazmier.

This book uses COBOL as the programming language and as the vehicle for discussion of systems concepts. It includes comprehensive coverage of the COBOL programming language based on principles of structured programming that does not require any previous exposure to programming or computers. This book enables the reader to write COBOL programs almost immediately. This edition includes greater emphasis on the relationship between information systems concepts and techniques of COBOL programming. $19.95

HM064.
Investing On Your Own: How To Find Winning Stocks In Your Own Backyard,
Richard L. Thorsell.

The guidelines of this book move step-by-step from the original selection process to the final buy/sell decision, explaining how to find, evaluate and analyze the stocks of small local companies. There is a prospect list of 7,200 companies, organized geographically by zip code, including the company's address and the name of its chief executive officer. $17.50

HM159.
Elementary Structured COBOL: A Step by Step Approach, 2nd Ed.,
Gordon B. Davis, Margrethe H. Olson and Charles R. Litecky.

This is a problem-oriented approach to writing and maintaining well-structured programs in COBOL. Practice exercises in writing programs begin immediately so that the reader can grasp the fundamentals of COBOL through application. There is added emphasis on structured programming and disciplined program writing, as well as a more convenient explanation of the COBOL features pertaining to sample programs. $14.95

CD176.
Word Processing,
Walter Kleinschrod.

300 loose-leaf pages with everything you need to know to install a successful word processing system in your organization. Exhibits, checklists, tables and charts help you through a six-point plan for determining the best, most profitable word processing system for your company's particular needs. $59.50

HM155.
Information Systems Concepts for Management,
H. Lucas, Jr.

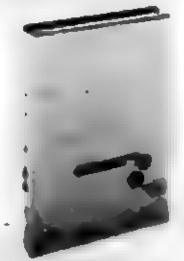
The latest guidelines for successful use of management information systems are provided in this practical reference. Sufficient computer technology is explained to enable readers to converse competently with computer professionals. Information systems are integrated into the framework of organizations, and management problems are presented to aid decision-making. $21.95

CD181.
How to Develop and Conduct Successful In-Company Training Programs,
Universal Training Systems Company Staff.

Another in a series by UTC staff, this loose-leaf, 210-page guidebook helps you get outstanding results from your employee training programs. Written as a working tool, this guide deals with the practical application of good, sound training. It shows you how to plan the training, select the most appropriate training methods to fill your needs, develop training objectives, measure work performance and evaluate the effectiveness of the training program. $59.50

HM074.
Calculator Analysis for Business and Finance,
Texas Instruments Incorporated.

A powerful and time-saving tool for everyone who needs to use calculations in professional or personal life. It offers step-by-step guidelines to the use of a programmable calculator like the TI "MBA" in solving any business or financial problem. Topics include forecasting, bond analysis, compound interest, personal finance, accounting, statistics, and more. $16.95



HM152.
Principles of Interactive Computer Graphics, 2nd Ed.,
William Newman and Robert Sproull.

This unified, comprehensive guide ranges from the essential principles of interactive graphics to a completely cohesive strategy for designing graphics systems. The authors include five complete chapters on raster graphics, as well as detailed information on user interface design, curve and surface manipulation and shading. The section on graphic output software takes the reader step-by-step through the different software elements that together form a device-independent graphics system. $26.95

HM088.
How to Evaluate People in Business,
Dailey and Madison.

The effective evaluation of people in employment situations—including hiring, promoting or supervising—is one of the most serious problems managers face. This practical book argues that employees should be judged on the basis of a documented "track record" of results-producing performances, rather than on such criteria as good conduct, pleasing traits or political pull. $14.95

NV018.
Data Processing Contracts: Structure, Contents and Negotiation.
Dick H. Brandon and Sidney Segelstein.

A detailed framework for structuring and negotiating airtight contracts that clearly stipulate the responsibilities of both vendor and user. More than 250 specific contract clauses included, with risk ratings and fall-back alternatives. $34.50

HM067.
Saving Money Through Ten-Year Trusts,
William A. Hancock.

The only book of its kind to address the middle-income taxpayer, this guide illustrates how to save taxes and money through a short-term trust. The author defines a short-term trust, discusses how it operates, and offers guidelines to aid you in determining its appropriateness for your own situation. $15.95

HM146.
Database Design,
Gio Wiederhold.

From hardware to files to database systems, this is a methodical approach to the principles of database design for commerce and industry, and the scientific disciplines. Throughout, theory is integrated with practical applications. Consistent terminology and theoretical models of immediate practical adaptability make the book particularly helpful for those just beginning their study of database design. $25.95

HM156.
The Analysis, Design, and Implementation of Information Systems,
Henry C. Lucas, Jr.

This practical introduction covers techniques of systems analysis and design as well as implementation from the user's standpoint. Part One provides a perspective on information systems and on a new approach to systems design. Part Two examines systems analysis and design. $22.50

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Good News for DEC and Perkin-Elmer Users

That's our way of letting you know that DIVA now offers a disk subsystem with capacities of greater than 600M/bytes per drive, and up to eight drives. They're available for the DEC Unibus® series of PDP-11 minicomputers, the high-speed cache PDP-11/70 series, and the Interdata line of minicomputers, including the 3220 and 3240.

The heart of this system is our Computroller V, a third-generation disk controller that offers you a software-transparent system that allows up to 1209 K/bytes data transfer per second, processor-independent features such as error-correction and self-testing—and a well-earned reputation for reliability.

Especially critical to this reliable operation is the Computroller's internal error correction (ECC) design. It accommodates the increased densities of the new 600 M/byte drives because the 7-byte ECC is on both header and data fields, which calculates and corrects for burst errors up to 11 bits on-the-fly—all internally. In short, you can dramatically increase throughput. The kicker is that you can get it for about 50% less than the computer manufacturer would offer it for—if they had it to offer.

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How would you like to push 38,400,000,000 bits?

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Large Disk Controller Runs With PDP-11, VAX-11/780

SANTA ANA, Calif. — A single-board large disk controller for use with Digital Equipment Corp.'s PDP-11 and VAX-11/780 processors is being offered by Emulex Corp.

The SC21 is a direct follow-on to the firm's two-board SC11 disk controller and features the ability to interface up to four drives of different capacities and configurations on the same controller, the firm said.

An adaptive DMA Throttle has been added. It adjusts its own Direct Memory Access activity to ensure that other system devices are not locked out, the firm said.

This feature, combined with Emulex's DMA burst length control, controls deadband time between bursts and systems can reportedly be operated without the "data late"-type problems often encountered in complex configurations.

Because of its microprocessor design, the SC21 reduces bus delays on programmed I/O and DMA transfers, according to the firm. In order to fit on a single-board, power consumption and parts have been reduced.

The SC21 is available in three standard versions, depending on the needs of the user.

The three versions of the SC21 are differentiated through microcode and on-board option switches. Any version may be converted to another model by a programmable read-only memory change or switch setting, the firm said.

The SC21 costs $5,000 from Emulex at 2001 East Deere Ave., Santa Ana, Calif. 02705.

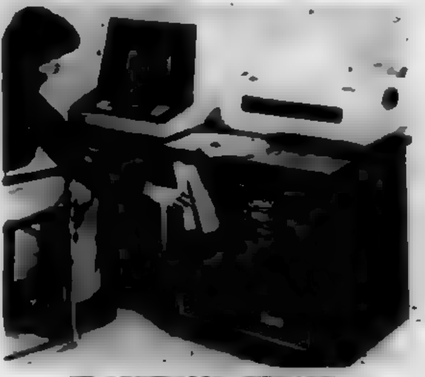
Z80-Based Business System Handles Accounting, WP

LOS ANGELES — Millie, a microcomputer system for accounting, word processing and other functions, is available from Microdasys, Inc.

The ready-to-run system is composed of the S-100 bus, a Zeta Computers International, Inc. Z80 processor, double density 8-in. disk drives and the CP/M operating system.

It can be programmed in Basic, Fortran, Pascal, APL, Cobol and other languages, the vendor claimed. An optional 32M-byte or 96M-byte cartridge hard disk is available.

Prices start at $3,995 and go to $7,695. Microdasys may be reached through P.O. Box 36051, Los Angeles, Calif. 90036.



The Millie Micro System

Wang Gives Upgrade Service

LOWELL, Mass. — Wang Laboratories, Inc. recently announced an equipment upgrade service for users of the firm's 2200 computer systems, designed to answer questions concerning upgrades and system additions.

The Equipment Upgrade Program is geared to put users in touch with a staff of computer specialists at Wang who will offer consultation on everything from adding new memory to a present computer or putting in a whole new system. Users contact these specialists by calling a toll-free number or sending in a 2200 upgrade checklist supplied by the firm.

Details on the program are available by calling Wang at 800-225-0659 or writing the firm at One Industrial Ave., Lowell, Mass. 01851.

Single-Board MPU Emulates 8080

ANAHEIM, Calif. — A single-board computer that reportedly generates all standard S-100 bus signals including emulation of an 8080 MPU has been announced by Vector Graphic, Inc.

The ZCB contains a Z80-A operating at 4 mHz, 1K byte of high-speed static random-access memory (RAM), three sockets for up to 12K bytes of programmable read-only memory (Prom), one serial port and three 8-bit programmable parallel ports.

Circuitry is provided to support static or dynamic memories and use of the 2708, 2716 or 2732 Proms is jumper selectable, with the addressing of the Prom and RAM completely variable.

The serial port makes use of the Intel Corp. 8251 Usart, which enables software to control the format of the transmitted data and to vary the mode of transmission. A dip switch specifies the basic rate between 110- and 9,600 bit/sec.

The ZCB costs $395 with off-the-shelf delivery from 31364 Via Colinas, Westlake Village, Calif. 91361.

AIIE Proceedings Out

ATLANTA — The proceedings of an American Institute of Industrial Engineers (AIIE) seminar entitled "What Every Manager Wants to Know About Mini/Micro Computers" is now available at a cost of $35 for AIIE members and $50 for nonmembers.

Orders for the proceedings, Publication No. 449, should be directed to AIIE Publication Sales, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

There is no shipping or handling charge when orders are prepaid.

[illegible] System to H-Series [illegible]y.

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is [illegible] [illegible] paging [illegible].

Our solution is a case in point. As you add more TSO or CMS users, the [illegible] [illegible] thrashing and [illegible]. [illegible] can be reached long before your CPU is 100% busy.

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Our 4305 Solid State Disk is available in a range of configurations for Magnuson, Amdahl, IBM or other compatible processor. With 0.3 msec. access times, capacities to 45 Mbytes, and transfer rates to 3.0 Mbytes per second, it's the perfect solution to your paging problems.

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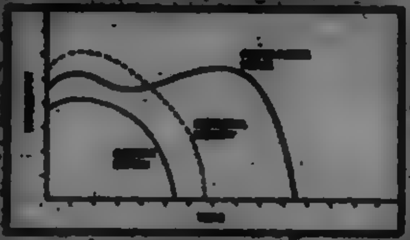
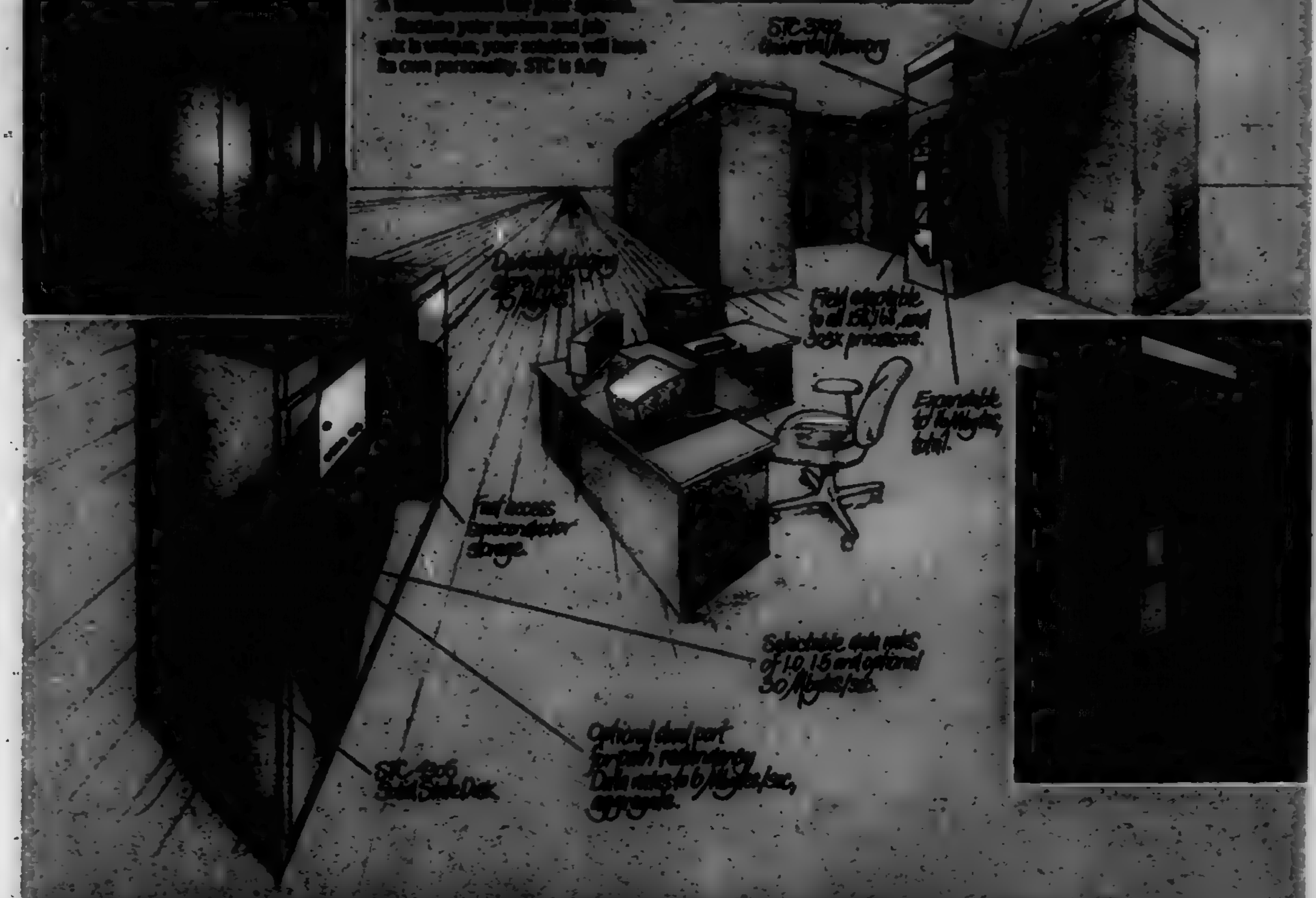
For details, call your local STC sales office. Or write: Storage Technology Corporation, Mail Drop 3M, 2270 S. 88th Street, Louisville, CO 80027. Phone (303) 673-5151.

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*Quantity prices start at $5,833 each for five units, the minimum factory order, with 16KB of main memory (32 and 48KB available) and two microfloppy disc drives. Each drive has its own controller and DMA channel. Availability: 60 days.

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The Perkin-Elmer 3500 handles multiple functions at the same time, maximizing operator productivity. The operator can enter data as the terminal verifies it, accesses the discs, communicates with your host computer, and drives your choice of serial printers.

The Model 3500's 320KB of disc has room for numerous screen formats, application programs, reports, and a day's worth of data for the host computer.

Speeds programming.

The Perkin-Elmer ROM-resident operating system uses only 3KB of main memory. It saves you programming time with its device independent I/O, repertoire of 18 commands for controlling devices and files, command substitution system, and ROM-resident debugger. Complete disc utilities, too.

You can develop your applications right on the 3500, using our extended BASIC Interpreter and Macro Assembly language. The BASIC can call assembly language subroutines. The Editor speeds source coding, the Assembler produces object code, and the Task Generator converts it into executable program or library files.

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The Model 3500's Screen Generator software makes developing transaction processing applications especially easy, from screen formatting right through to establishing, maintaining, and accessing the associated disc files and interfacing with the application tasks.

More good news. The Model 3500 is packaged in three modular assemblies and measures only 19" high, 19" wide and 22¼" deep. Fits anywhere.

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Vendors to Escape Recession

Users Not Closing Wallets, IDC Reports

By Tom Henkel
CW Staff

WALTHAM, Mass. — Most vendors will escape the current recession unscathed because users plan to continue their double-digit growth in spending, a recent International Data Corp. (IDC) survey found.

Overall user spending plans seem to have changed little as a result of the economic downturn — those users that have altered their spending downward are offset by those that have increased it, the market research firm explained. IDC forecast that DP department spending will remain solid at least through 1980, particularly in equipment spending. Of the companies that reported being hit with budget cuts, most said the cutbacks would be made in personnel and not in equipment expenditures.

The IDC study painted a rosy picture for vendors. The mainframe, minicomputer, small business system and desktop computer industry are all expected to experience an average dollar shipment growth rate of 11% during 1980 and a 13% to 14% rate by mid-decade, IDC said.

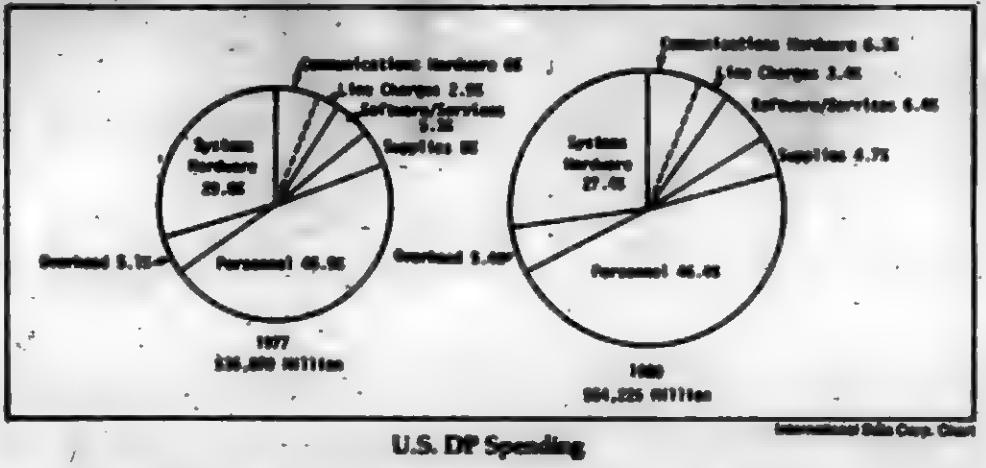
Other market sectors, such as services, independent software vendors, terminals and the communications industry, are expected to grow even faster. Although the current shipment rate for those industries is down 18% to 20% from the 1978-79 period, more older systems are being retired. That means the worldwide installed system base will jump 15% during 1980 to nearly $140 billion, IDC said.

In its report, "Computer Industry Forecast, 1975-1980," IDC noted the number of mainframes shipped took a slight dip after IBM announced its 4300 line. However, the market research firm predicted the number of CPUs shipped during 1980 will mark more than a 70% increase over 1979. IDC further estimated the dollar worth of installed large systems will top $100 billion by the end of 1980.

Bonanza Year

While small business system manufacturers experienced a bonanza year in 1979 with a 45% increase in dollar shipments over 1978, the boom may be over. Manufacturers

(Continued on Page 86)



International Data Corp. Chart

U.S. DP Spending

Tax Incentive Plan to Spur Japanese Software Offerings

By Marcia Blumenthal
CW Staff

SAN FRANCISCO — Although independent software companies represent one of the most profitable and fastest growing segments of the U.S. computer industry, the same has not been true for Japanese software firms.

With the passage of a tax incentive program last year, however, it looks as though Japan's Ministry of Industry and Trade is increasingly viewing software as a critical part of the Japanese computer industry. This tax incentive program applies only to sales of packaged software, Dr. Makoto Hattori, president of the Japanese Software Industry Association, explained in a recent interview here. The association has about 120 independent software firms as members.

Tax-Free profits

Under the new law, 50% of the sales derived from packaged software are tax-free to vendors for four years. The result is that the profits made on these sales can be reinvested into further development projects. While the tax break was designed to assist independent software houses, it also applies to packages developed by hardware vendors.

Hattori views the new law as the government's blessing on the concept of the standardized software package. In the U.S. the standardized application package is well accepted, but this is not the case in Japan where users are not as cost-conscious. Because major hardware vendors have not unbundled their software to any great degree, Japanese users do not understand the cost of

(Continued on Page 88)

Computer Exports Climb 33%

WASHINGTON, D.C. — Exports of computers, word processors and other office equipment resulted in a favorable balance of trade of $1.26 billion for the first quarter, the largest margin in recent history.

Figures compiled by the Computer and Business Equipment Manufacturers Association showed a 33% increase of exports of computers and related equipment including parts.

Exports of this equipment amounted to $1.66 billion and represented 83% of the business equipment industry's total exports. Imports increased 12% from $230.6 million in the first quarter of 1979 to $259.3 million in 1980.

Overall exports of all office equipment rose 29% in the first quarter from $1.5 billion to $2 billion. Imports were up 19% from $619.5 million to $737.9 million.

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*DAS is an Authorized Distributor for TI, Diablo, LSI and Hazeltine

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Decision Data Offers Maintenance

HORSHAM, Pa. — Decision Data Computer Corp. has established a Customer Service Division to provide third-party maintenance. The company said it would not limit itself to maintaining any specific type of equipment, but would take the broad approach used by TRW, Inc. and Sorbus, Inc.

Initially, the division will be staffed with the firm's 250 field service engineers who maintain Decision Data's peripheral and communications hardware. The firm has 70 service offices in the U.S. and Canada.

Realizing how difficult it is for companies to establish their own in-house maintenance capability, Decision Data decided to build on its current staff capability, "turning a resource into a product," a spokesman said.

He also said that other firms had approached the company to do maintenance.

Although the firm declined to comment on the capacity at which its current field service crew is operating, the spokesman noted that no new personnel would be hired in the immediate future. Assuming the vice-presidency of the division is Robert H. Raquet, who, for the past two years, has served as Decision Data's vice-president of operations.

BBN to Market Software For Large Business Users

CAMBRIDGE, Mass. — Bolt Beranek and Newman, Inc. (BBN) has formed a wholly owned subsidiary that will concentrate on developing and marketing software packages for large-scale minicomputers and mainframe systems.

BBN's Information Management Corp. will aim its products at the business sector. The subsidiary plans also to examine the possibility of licensing foreign software for sale in the U.S. and handling software packages acquired from universities and other sources.

The company's first software product is scheduled for release this fall. However, BBN declined to offer any details on the package or its applications until a later date.

BBN's software arm will be headed by David C. Walden as president and John M. McQuillan as vice-president.

Wavetek Agrees To Sell Division To Infolink

SAN DIEGO — Wavetek Data Communications, Inc. has signed a letter of intent to sell the business and assets of its Data Communications Division to Infolink Corp.

Wavetek's Data Communications Division, established in 1970, manufactures computer-based voice response systems that are marketed to the financial, manufacturing, distribution, retail and transportation industries.

Infolink, a privately held company headquartered in Northbrook, Ill., manufactures and markets source data collection and communication systems under the names of Electrowriter and Scanatron.

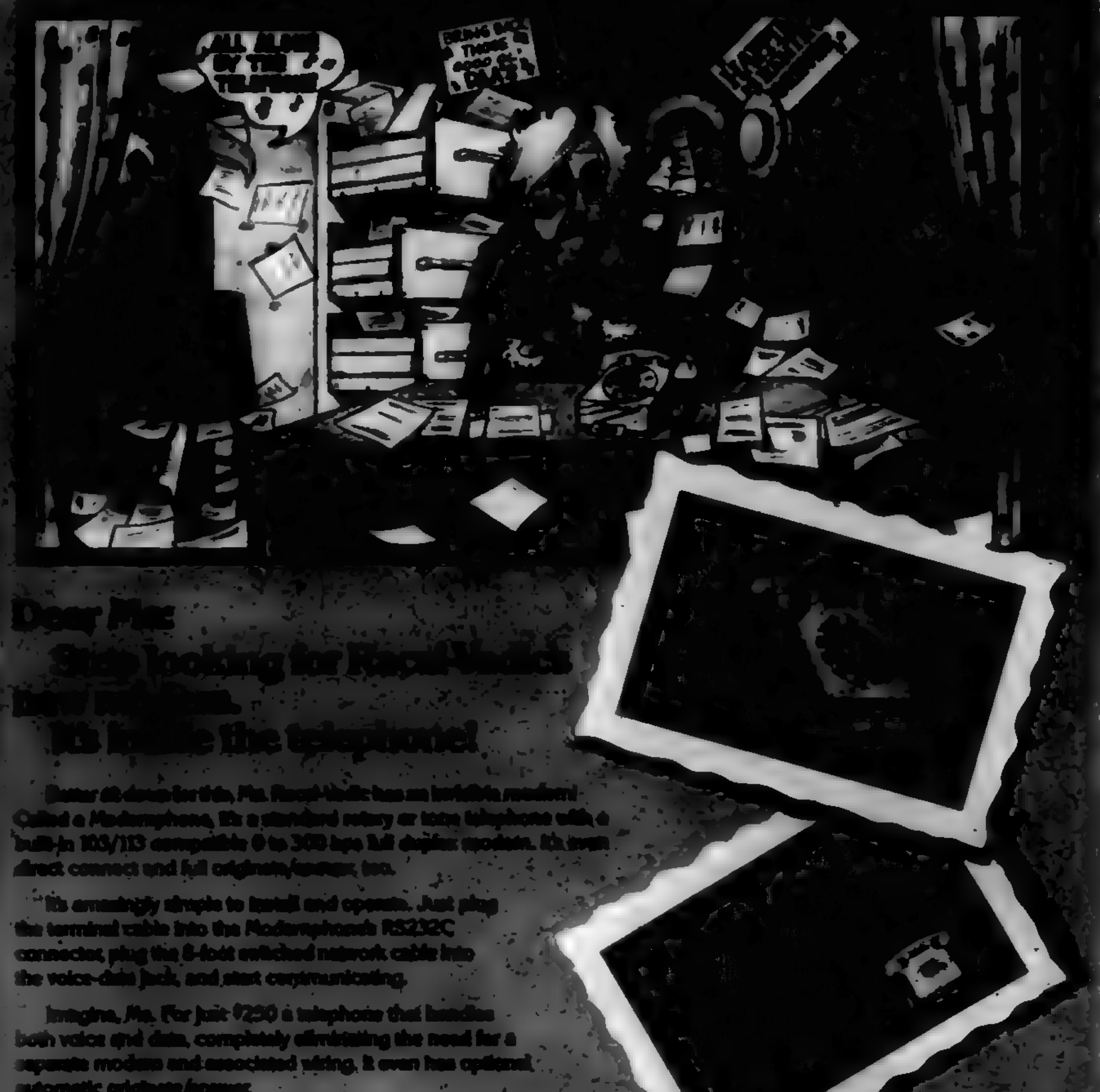
Edward D. Wang, Infolink president, said, "A new division will be established in San Diego under the existing management from Wavetek Data Communications Division." Infolink's marketing organization of more than 25 offices will be utilized to supplement the Wavetek Data Communications organization.

IDG Joins Venture In MPU Software

ST. LOUIS — International Data Group (IDG), parent of International Data Corp. and of CW Communications, Inc., and Education for Management, Inc., a producer of multimedia training materials for management and business development in continuing education, have formed a joint venture here called Educational Programming Systems, Inc. (EPS).

EPS will offer educational software to run on microcomputer systems in small businesses, educational institutions, corporate training environments and the home.

EPS has also established a professional consulting service called the Technology-Assisted Learning Market Information Service (Talmis) to assist in planning and marketing decisions for computers and video-based products and services.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Distributor Files Suit Against Apple Computer

ST. LOUIS — High Technology, Inc., a former distributor of Apple Computer, Inc.'s products, recently filed a $70 million antitrust and breach-of-contract suit in federal court here against the California-based microcomputer maker.

Based in Oklahoma City, Okla., High Technology became an Apple distributor in June 1977, but Apple terminated the contract last March. The termination reportedly centered around Apple's wanting High Technology to restrict its marketing to a six-state area; the distributor was in the process of branching into other states.

Because of this activity, Apple repeatedly threatened to terminate its agreement with the distributor and allocated the amount of products it would ship to the firm, the suit charges. The suit maintains that High Technology had a nonallocation clause in its contract.

Because of diverted orders, the distributor's retail vendors had cash flow problems that resulted in delayed payments to High Technology, the suit claims. High Technology said its sales for fiscal 1980, ended June 30, would have been $20 million if the distributorship had not been terminated.

High Technology is seeking $11.7 million (which would be trebled under antitrust law).

In addition to allegations that Apple pressured the distributor into dropping competitive products, the suit contains 17 other counts on which damages are sought.

Moreover, High Technology claims that Apple promised to acquire the firm for four times its earnings, but after it terminated the distribution arrangements offered only book value for the company.

William Fenwick, attorney for Apple, claimed the allegations in the suit have no merit. He is now preparing a response to the suit.

Although different in many respects, a similar suit was also reportedly filed against Apple by Sigma Distributing of Seattle, Wash., High Technology's lawyer said.

Executive Corner

- Frank C. Bumb has been appointed president of Kennedy Co., taking over the activities of Charles J. Kennedy, who remains as chairman of the board.
- Stephen R. McKenzie was named vice-president of marketing for General Automation, Inc.
- C. Itoh Electronics, Inc. has named Robert J. Cowan vice-president of marketing.
- Modutest, Inc. has named Jack Brady president and general manager.
- William F. Rigby has been promoted to group vice-president of marketing for Basic Four Corp.
- Boole & Babbage, Inc. has named Paul A. Turton vice-president of marketing.
- W. Scott Symons has been named vice-president of commercial sales for Informatics, Inc.
- Eckart G. Vollmer has been appointed vice-president of finance at T-Bar, Inc.
- David L. Hudson has been elected vice-president of business development at Distributed Systems Corp.
- M/A-COM Telecommunications, a division of M/A-COM, Inc., has appointed Donald E. Carruth as director of international marketing.
- Ronald G. Langford was named vice-president of marketing and systems support for Chase Computer Corp.
- George Spadero is the new president of Compunet, Inc.
- Electronic Memories & Magnetics Corp. has named Ronald W. Johnson corporate controller.
- Thomas J. Woodhill has been named president of ICL, Inc., it was announced by the International Division of the ICL Group of Companies.
- Fred Nisenholtz has been named vice-president of support programming products for Alanthus Computer Corp.
- Ronald E. Gocht has been elected vice-president of engineering for Scan-Optics, Inc.
- Dwayne C. Lowry has joined Interactive Systems Corp. as vice-president of sales and marketing.
- Digital Associates Corp. has announced the appointment of Eugene H. Perlman to the position of vice-president marketing.
- Informatics Inc. has announced the promotion of Roger G. McKae to vice-president of western operations for the Implementation Systems Marketing Division.
- Milton Cooper has joined Raytheon Data Systems Co. as vice-president of sales and marketing for the Intelligent Terminal Systems operations.
- Bruce Hechler has been appointed president of Telstat Systems, Inc., a subsidiary of Western Union Corp.
- Harlan E. Dybdahl has been named director of international marketing for Qantel Corp.
- Bernard F. Gallagher has been appointed vice-president for business and industry marketing for the Infonet Division of Computer Sciences Corp.
- General Datacomm Industries, Inc. has announced the appointment of Joseph Scarpa as assistant vice-president of end-user sales.
- Charles B. McQuade has been named president of the Securities Induttry Automation Corp.
- Michael E. Doyle has joined Fairchild Industries as director of corporate development.
- Rand Information Systems, Inc. has announced the promotion to vice-president of four members of its Systems Development Group: Dr. Bernard J. Bennington, Richard M. Lion, Richard J. Tognetti and Charles S. Romig.
- Philip J. Kiviat has been named vice-president, System Technology Division of Ctec, Inc.
- Perkin-Elmer Corp. has announced the appointment of Kenneth I. Cohen as commercial line of business manager for computer operations.
- Intertel, Inc. has announced the appointment of Ralph Lowry, vice-president of product and international marketing, and David Moore, director of international marketing.
- James A. Unruh has been appointed vice-president of finance for Memorex Corp.

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Nickels & Dimes

An investors group represented by Brean Murray, Foster Securities, entered into an agreement with Infomark, Inc. to provide $3.3 million in venture capital in return for a minority position in the company.

$ $ $

The board of directors of Plantronics, Inc. has declared a regular dividend of 4 cents per share on the company's common stock. The dividend is payable Aug. 26 to shareholders of record Aug. 11.

$ $ $

A public offering of 600,000 shares of common stock of Ramtek Corp. at a price of $11.75 per share was announced by an underwriting group managed by L.F. Rothschild, Unterberg, Towbin and Hambrecht & Quist.

$ $ $

Control Data Corp. has acquired at a discount from a commercial bank all interest of the bank in various loan agreements with Scan-Data Corp., including its revolving credit and term loan agreements.

$ $ $

Datapoint Corp. has expanded its revolving credit line from $40 million to $100 million and increased the number of banks in the agreement from six to 10.

Continued Double-Digit Growth Predicted

(Continued from Page 83)

will experience glitches in shipments as they struggle for production capacity, distribution networks and attempts to cope with the recession. In 1980, small business computer shipments will only grow 19% by value to nearly $3 billion, according to IDC.

The value of minicomputers shipments will grow 21% in 1980, down 8% from 29% in 1979. The strong supermini market offsets weakness in the OEM sector of the marketplace. Minicomputer shipments will surpass $4 billion in 1980, the firm added.

In the area of desktop computers, a virtually nonexistent market five years ago will top $2 billion in shipments this year with an estimated one million installed units. Shipments should increase to more than a billion during the next five years, IDC reported.

Software houses and services firms will show almost a 20% growth rate in 1980. But there is even more good news. Sales of independent software will almost triple by 1984 to around $4.5 billion. Processing services will show a less dramatic jump to an estimated 17% in 1984, $12.5 billion, IDC said.

The computer market is diverse — and that is its strongest selling point, IDC said. However, the firm noted mainframes are becoming a smaller part of the industry. In 1974 mainframes accounted for 90% of the value of industry shipments. By 1984 that figure will be cut to 50%.

The widening of the industry is a benefit, IDC said, because it will be less severely impacted by a recession. As IDC put it, "The recession-caused roller coaster ride gets smoother" as the industry widens.

To determine trends in user spending, IDC contacted 200 representative firms. On the average, users said their DP budgets would increase by 15% this year for a U.S. total of $54 billion. That average is slightly higher than last year's 14% average increase, but slightly less than the 1978 average increase of 16%.

IDC reported 46.4% of the average user's budget goes for personnel. That compares with 45.9% in 1977. Users are also spending slightly less for hardware, represented by 27.4% of the budget compared with 29.8% in 1977.

DP supplies also showed a slight dip in 1980 at 4.7%, down from 5% in 1977. All other budget items were up over the 1977 survey.

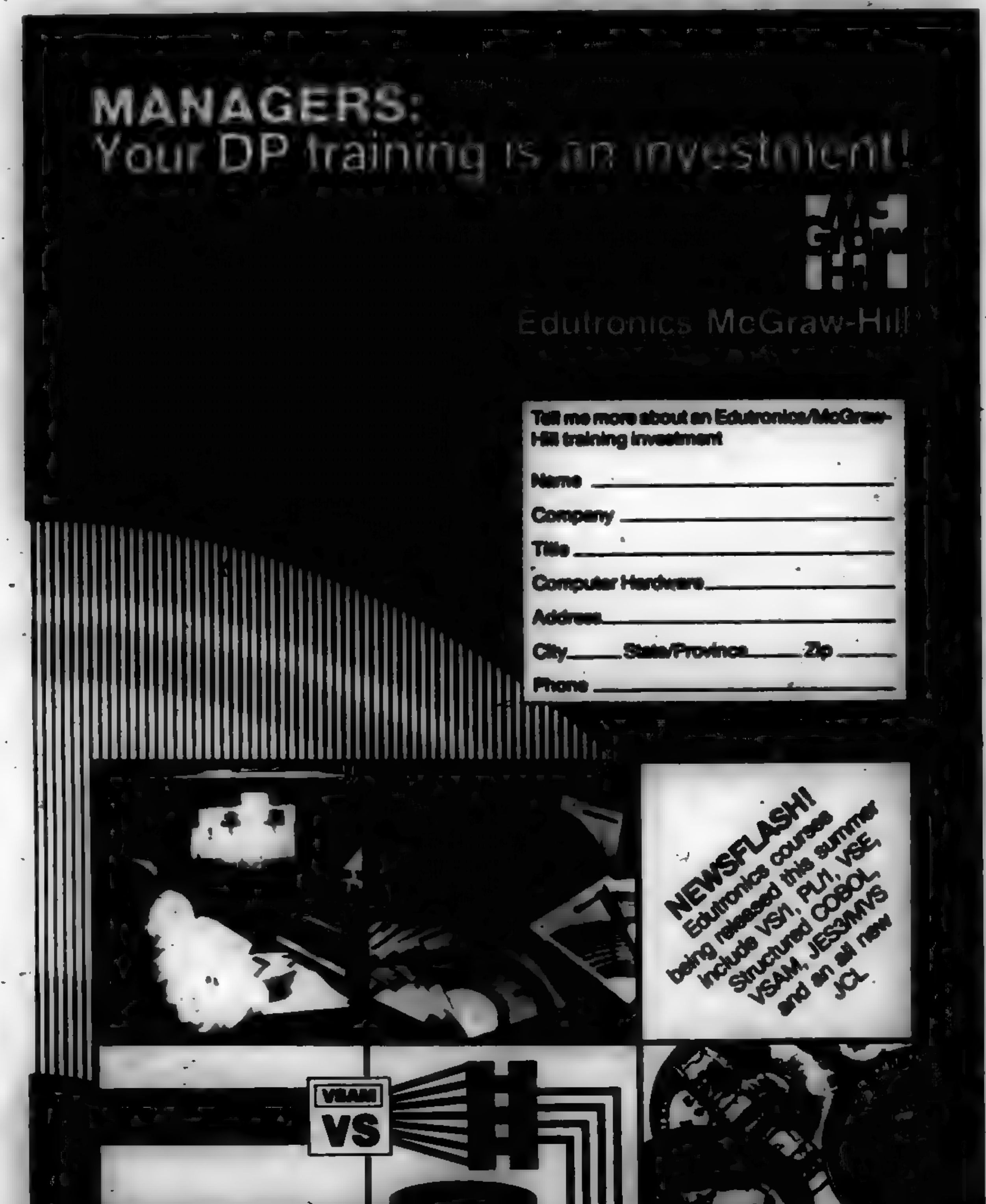
Software and services showed the biggest jump from 5.3% of the total budget in 1977 to 6.4% in 1980. Communications hardware is up from 6% to 6.3% and line charges are up to 3.4% from 2.9% in 1977, IDC said.

Since economic conditions took a downturn since IDC conducted its survey, the firm went back and recontacted 51 of the original 200 in mid-May asking if those users had since made budget changes.

Nineteen percent said they decreased their budgets and 18% increased them, "but the overall effect seems to be that in aggregate, user spending should remain as forecast," IDC said.

Asked to compare themselves with other departments in their companies when it comes to making budget cuts, 24% of polled DPers said they were treated more favorably than other departments. An overwhelming 71%, however, said they were treated no more or less favorably when it came to making corporate budget adjustments. Only 5% of those polled said they felt greater pressure to cut their budgets.

Users who had to make budget cuts, or get more mileage out of an existing budget, said delaying hiring or equipment purchases was the first move. One in four polled said they would postpone spending. The report is available for $150 from IDC at 214 Third Ave., Waltham, Mass. 02154.



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CI Notes

Hazeltine Enters Word Processing Mart

MINNEAPOLIS — Terminal maker Hazeltine Corp. entered the word processing market when it introduced its Opus 80 system at the recent Syntopican VIII Convention here.

"The system is a logical extension of our long, diversified corporate involvement in the production of sophisticated information electronic products and systems for governmental and industrial applications," Al Maurer, Hazeltine's director of new business development, said.

Future enhancements to the system will include communications, list processing, sorting, math and other applications packages and interfaces to such peripherals as optical character recognition units and photocomposition units, the company said.

Autoregister Seeking Buyer To Make, Sell 'Money Handler'

GLENDALE, Calif. — Baskin-Robbins and Safeguard Industries, under the joint venture Autoregister, Inc., are seeking a buyer to assume the manufacturing and marketing of their "Money Handler" electronic cash register.

The "Money Handler" is a point-of-sale microcomputer system that differs from existing electronic cash registers in that paper money and coins are inserted into the machine directly by the customer.

Baskin-Robbins and Safeguard will work with the manufacturer "to assure a sound transfer of technology and business," a Baskin-Robbins spokesman said. A working prototype of the machine is available for demonstration.

Autoregister, Inc. is located at Sonora and Victory, P.O. Box 1200, Glendale, Calif. 91209.

AEG-Telefunken to Buy Minority Position in Ontel

LOS ANGELES — AEG-Telefunken has agreed to purchase from Caesars World, Inc. a minority equity position in Ontel Corp.

The agreement provides for AEG-Telefunken to invest $3.5 million in Ontel through purchase of a combination of common stock and convertible debentures that will represent a 9% interest in Ontel.

Ontel, a manufacturer of microcomputer-based, user-programmable intelligent systems, reported $22.7 million in sales in fiscal 1979. More than 15,000 Ontel systems are installed worldwide.

AEG-Telefunken has been marketing the Ontel intelligent systems in Germany under the product name of Telecomp.

Ziff Forms Firm to Consult In Data Base Management

NEW YORK — Strategic Information, a data base management consulting organization, has been formed by Ziff Corp.

Dr. Lawrence R. Klein's Wharton Econometric Forecasting Associates, recently acquired from the University of Pennsylvania, will be one cornerstone of the new organization, Ziff Corp. Board Chairman William Ziff said.

Dennis O'Brien, former senior vice-president of Data Resources, Inc., has been named chief operating officer and executive vice-president of Strategic Information. The company will be headquartered in Burlington, Mass., with offices throughout the U.S., Latin America and Europe.

Computer Stores Form Association

FORT PIERCE, Fla. — The National Association of Computer Stores (Nacs), a national trade association representing retail computer stores, has recently been formed with the assistance of Intracom, Inc., an organizational management firm based here.

Robert Schweiger, Intracom president, will serve as Nacs' president.

More information on the association is available from association headquarters at 3255 So. U.S. 1, Fort Pierce, Fla. 33450.

Supershorts

Planning Research Corp. has formed a Commercial Products Group to provide turnkey systems to business and industrial clients.

* * *

Computer Network Corp. has signed an agreement to acquire up to 25% of the ownership of U.S. Design Corp.

* * *

Bradford National Corp. captured 58% of the market in computerized trust accounting service or software sales made to larger banks during the past fiscal year. That figure came from a market penetration study, Bradford said.

* * *

North American Philips Corp. and Computervision Corp. have terminated discussions on the proposed sale of Computervision's Cobilt Division to North American Philips.

* * *

Former U.S. Secretary of State Cyrus R. Vance has been elected to IBM's board of trustees.

* * *

Britton-Lee, Inc. said eight Fortune 500 companies are among the firms that have volunteered to become test sites for its IDM 500 data base machine.

* * *

Management Assistance, Inc. has formed a subsidiary to market and service its Basic Four systems in Sweden and Denmark.

Datapoint Corp. has donated a Model 2550 line printer worth more than $40,000 to Stanford University's new Computer Science Department Center.

* * *

Micro V. Corp. and Startel Corp. have entered a joint venture to develop computer systems that interconnect telephone service bureaus.

* * *

National Semiconductor Corp. and Sagem S.A. of Paris have signed a second-source agreement to develop, manufacture and market 256K-bit and 1M-bit magnetic bubble memory devices.

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WASH. D.C., Thursday, July 17. R.S.V.P.: Carroll [illegible] (703) [illegible]
MIAMI, Tuesday, July 22. R.S.V.P.: Cory [illegible] [illegible]
NEW YORK CITY, Wednesday, Aug 6. R.S.V.P.: Dick Squires (212) [illegible]
PHILADELPHIA, Thursday, Aug 7. R.S.V.P.: Candie Schuster (215) [illegible]
DALLAS, Tuesday, Aug 12. R.S.V.P.: [illegible] (214) [illegible]
LOS ANGELES, Thursday, Aug 14. R.S.V.P.: Lou Allen (213) [illegible]
SAN FRANCISCO, Tuesday, Aug 19. R.S.V.P.: Dave Smoot (415) [illegible]
Please call to register for attendance and additional details.

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DATA SYSTEMS FOR INDUSTRY

Orders & Installations

Memorex Corp.'s Communications Group has signed an OEM agreement to purchase its new Memorex Model 1300 matrix screen printer from Centronics Data Computer Corp., of Hudson, N.H.

The New Hampshire State Liquor Commission has placed a $1.2 million order with Data Terminal Systems, Inc. for point-of-sale systems and communications subsystems.

The Madison Metropolitan School District of Wisconsin has ordered a Level 6 Model 43 small computer from Honeywell, Inc.

Software Sciences has received an order from the University of Georgia in Athens for Duet, Software Sciences' computerized point-of-sale inventory management system.

American Management Systems, Inc. has received an order from Riverside Research Institute for a complete financial system, including on-line software and a DEC PDP-11/34 minicomputer.

Codex Corp. has signed a $200,000 contract with the *New York Daily News* for 30 CDX-68 Intelligent Terminal Systems to be used for remote text editing, transmission and photocomposition.

Recognition Equipment, Inc. has received a contract from the Federal Reserve System for the purchase of an additional 50 high-speed currency Verification, Counting and Sorting systems valued at $12 million.

Cray Research, Inc. has announced that Electricite De France/Compagnie Internationale De Services En Informatique has ordered a Cray-1S computer system.

Japan Encourages Software Offerings

(Continued from Page 83)

software, according to Hattori.

Most independent Japanese software companies are quite small, primarily engaging in custom-programming for users and hardware vendors. Because of the custom nature of most software development work, profit margins for the industry tend to be low, in contrast to the situation that exists in the U.S.

"In Japan, software vendors stick to making software rather than marketing it," Hattori observed. He said the marketing concept is not prevalent in Japan. Japanese users understand product costs but not marketing costs.

Although the new law is a recognition of the importance of standardized packages, the software industry has already received some subsidization from the government. During the past five years, the government has funneled about $200 million to the Japan Systems Development Corp., a consortium of 17 software companies, Hattori explained.

Funding for the project, which will end next year, was primarily used for software development tools, the development of standardized languages for use by the three major hardware vendors as well as for the development of DOS systems, he noted.

Software Unbundling

However, before the independent Japanese software industry can become profitable, Japanese hardware vendors must unbundle their software, Hattori stressed. Software costs of these vendors are low relative to the independents. Moreover, Hattori claimed that hardware vendors give users substantial discounts on software.

Japanese users, unlike their U.S. counterparts, have not yet accepted the idea of devoting a large part of their DP budgets to software.

They also tend to remain loyal to the hardware makers and prefer doing business with large companies. These large vendors, in turn, contract with the small independent software firms for the development of applications for users, but the vendor retains the rights to the program, Hattori complained.

He credited the growth of the U.S. software industry to the big systems contracted by the government for aircraft, space and nuclear energy projects. Japan did not have this advantage, he pointed out, because they do not have these types of industries.

User Resistance

Despite the resistance of users to packaged products, Hattori said there are more than 300 independent software firms in Japan. Why so many if they are not particularly profitable? Many are like Hattori, who was an architect, and have an entrepeneurial spirit.

Unfortunately, venture capital is not readily available to these firms and many are undercapitalized.

An added problem of this sector is that it cannot obtain experienced software developers. Rather, it must hire recent graduates of technical schools and universities and invest much time and money in training, Hattori noted. Most experienced MIS personnel in Japan prefer to work for large companies and there is not so much job-hopping.

Moreover, the issue of quality of the applications is another problem. In the past, the Japanese software makers have announced they have, for example, a general ledger package, just like a U.S. maker. However, the quality of the package has not always been satisfactory, Hattori conceded, adding that Japanese software vendors are now becoming more quality-conscious.

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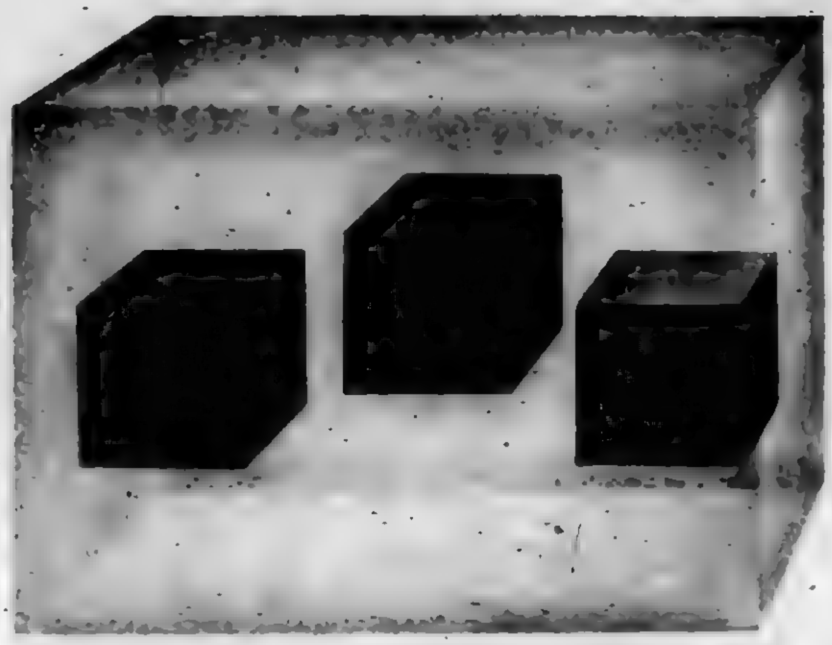

With the recent addition of the Global Console Director (GCD) to Allen Services' line of software packages for Multiple System environments, an entire complex of systems can now be treated almost as though it were one single unified system.

The complete "unified system" effect is achieved through combined use of three independent (but related) program products. Each of these, Super-MSI, MSM and GCD addresses distinct concerns present in multi-system environments.

Of course, since the products are independent, if you aren't yet ready for the full-blown unified system effect, you only need to select the products which interest you.

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The Multiple Systems Integrity Facility provides the same thorough dataset integrity protection for jobs in different systems that would exist if the jobs were in the same system. In addition to propagating "standard" dataset integrity across systems, Super-MSI also insures that the VSAM "internal" SHR options are honored throughout your entire complex. Effective cross-system VSAM integrity can be obtained in no other way than through the use of Super-MSI.

Another feature: Super-MSI also eliminates the hardware RESERVE lockouts which are normally inherent with SHARED DASD in multiple system environments.

Much more besides: Super-MSI has many other exciting features including special aids for operators and TSO Users. All in all, Super-MSI will be a very powerful addition to your installation.

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The Multiple Systems Manager manages the allocation of TAPE and MOUNTABLE DISK devices across all systems in your complex. It allows you to operate normally with all devices ONLINE to all systems. MSM insures that device allocation by jobs in different systems occurs just as if all jobs were operating in one single unified system.

MSM eliminates the operational burden of juggling TAPE and DISK units among systems. It protects against the danger of a system accidently rewinding or overwriting a TAPE in use on another system; this removes the single greatest cause of shared tape mishaps.

MSM will use your TAPEs and DISKs more efficiently — which can result in immediate device cutbacks or (more likely) postponement of future acquisitions.

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GCD allows commands entered from any console to be directed and processed anywhere in the complex; in this respect, all consoles are effectively linked to all systems.

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In nearly every instance where our products have been competitively evaluated against all possible hardware or software alternatives — our software has been chosen. Aside from IBM, Allen Services has been providing commercial software specifically designed for multiple system environments longer than any other company. Over 400 major installations throughout the world have already selected our products as the preferable means of handling problems associated with multiple system environments. The number grows daily. Reliability has always been an integral part of our design.

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Because installations can have widely different characteristics, you may still have a nagging suspicion that our claims may not actually apply to your shop. To alleviate this doubt, we invite you to try our products (whichever ones interest you) at your own installation under your own conditions. This trial carries no charge and is without obligation. One word of caution: You're going to like them so much, you'll never take them out.

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Computer Sciences Corporation

Consider the advantages of programming in an environment where everyone doesn't speak the same language!

The special stimulation of professional cross-fertilization can be a real joy to people whose career paths have tended to limit them to developing software for a particular hardware configuration, or a single line of applications.

It can really get your creative juices flowing!

For sheer variety, sophistication, growth and an environment of professional dynamism, you really ought to look into the biggest array of truly exciting opportunities in the recent history of the CSC Systems Division.

As you can see from the specifications, it's not so much the language you speak, as your fluency.

THE LANGUAGES	THE HARDWARE
COBOL	HP 1000
FORTRAN	HP 3000
HP ASSEMBLER	HP 21-MX
PL-1	UNIVAC 1108/1100
TOTAL	H Level 6
PASCAL	PDP 11/70
ASSEMBLER	H-6000
	IBM 360/370
	TANDEM

THE SYSTEMS

Data Base Management • Acceptance Testing • Large Scale Applications • On-Line Systems • Budget/Finance/Accounting/Payroll • Personnel/Procurement/Inventory Control • Real-Time Process Control • Communications Systems Software • Color Graphics Programming • Microprocessor Programming, Input/Output Drives • Data Communications Programming • GCOS • GMAP • WWMCCS • Network Design

AND A SPECIAL MESSAGE TO H-6000 SYSTEM PROGRAMMERS

There are a number of openings at entry, intermediate and senior levels for individuals knowledgeable in all aspects of the Honeywell operating system (GCOS). You will participate in master and slave program development and analysis, and work on site to provide customer assistance with regard to GCOS internals, and to do some occasional teaching. Must have 3 or more years "hands-on" experience in the operational system, an understanding of how GCOS works, programming experience in GMAP plus FORTRAN and/or COBOL, systems background with application programming exposure, knowledge of Honeywell utility packages, and ability to interpret and analyze master and slave mode dumps.

For a prompt response, mail your resume in strict confidence to The Director of Professional Staffing, MC/218-HF.

The only limitations are the ones you bring with you.

An Equal Opportunity Employer M/F/H

CSC
SYSTEMS DIVISION
6565 Arlington Boulevard
Falls Church, VA 22046

DATA PROCESSING

PHOENIX-NEW MEXICO-COLORADO-CAL-TEXAS

Our client companies have openings for experienced people in various data processing disciplines. Salary ranges are from [illegible] to [illegible] for programmers to project leaders. Call to investigate the opportunities available for your career advancement. Complete confidentiality is assured.

All positions fee paid

[illegible]
[illegible], INC.
1777 W. Camelback
Phoenix, Az. 85015
Suite M 106
Phone: 1-800-[illegible]

TIME FOR A CHANGE?

NATIONWIDE openings ... all levels with top companies in all industries. Companies pay all fees.

- Project Managers/Leaders
- Senior Systems Analysts
- Systems Analysts/Designers
- EDP Auditors
- Application Programmers
- Systems (software) Programmers
- Scientific Programmers
- Managers S/3-34 RPG Shops

For more details send your resume, or call:

[illegible]
CADILLAC ASSOCIATES, INC.
[illegible]
Chicago, IL [illegible]
(312) [illegible]

UNIVERSITY OF VERMONT SYSTEMS PROGRAMMER

The Administrative Computing Center is seeking a Systems Programmer with a Bachelor's Degree, and at least 5 years of experience with IBM operating systems, preferably DOS and/or VM. Applicants with experience in on-line systems or DBMS are preferred. This position is part of a 3 member team responsible for the support of VM, DOS, the OASIS DBMS, and other state-of-the-art software on our IBM 3031 system. The University offers an excellent benefits package, and the salary is high teens to low twenties. Send resume names of 3 professional references by August 4, 1980 to University of Vermont, [illegible] 238 Waterman Building, Burlington, Vermont 05405.

An Affirmative Action Employer

As a software developer at Wang, you not only get plenty of personal freedom and day-to-day responsibility—you also get the chance to design your own future.

Because nothing says you have to follow a certain path to success.

For example, if you prefer to stay strictly on the development side of the business, you can move up to be a senior contributor, working on your own or with a team of your peers. On the other hand, if you'd like to lead others, there are plenty of opportunities in technical management—where you'll supervise people and direct projects.

Either way, you never have to worry about getting trapped in a no-growth position, or stuck in a job that just isn't your style.

The point is: We think best way for you to get ahead is *your* way.

For more information, contact Susan Morse, Wang Laboratories, Inc., Dept. #C714, One Industrial Avenue, Lowell, MA 01851.
(617) 459-5000.

At Wang, you choose your own way to the top.

WANG

Making the world more productive.

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Systems Software Development.

VS/OFFICE SYSTEMS DEVELOPMENT

Participate in the design and implementation of the "Office of the Future" on the Wang VS Computer System.

The Wang VS Computer System provides highly advanced interactive and batch data processing capabilities and hosts Wang Word Processing, the world's most popular CRT-based Word Processing. Integrated Information Systems, however, means much more than simply providing Word Processing on a computer. Highly human-engineered, interactive Document Storage & Retrieval, Calendar Management, Electronic Mail, Voice & Image Processing, Forms Management, and Data Base Query represent just some of the products either under development or to be developed.

We are looking for experienced, creative, product-oriented professionals to integrate Word Processing, Data Processing, Operating System, and Data Base technologies into advanced office automation software products. Applicants should have experience in Document Storage and Retrieval, Data Base, and/or interactive applications; a sensitivity towards human engineering; preferably, some systems programming background; and proven track record in project leadership.

VS/TELECOMMUNICATIONS SPECIALISTS

Would you like a ground-floor opportunity to see your telecommunications expertise utilized to its fullest?

Are you restricted to implememting telecommunications using outdated, "alien" protocols and/or hardware?

Are you tired of not being able to express your ideas - let alone implement them?

Do you want to manage the design and implementation of "state-of-the-art" telecommunications on one of WANG's finest and fastest growing minicomputers?

Do you want to be recognized as the innovator of system integrated telecommunications subsystems providing gateway access to current networks such as SNA and X.25, as well as providing WANG VS network capabilities for distributed processing and remote terminal communications?

Do you want to be part of a fast growing organization of computer professionals, which as a whole, provide the software/hardware excellence that makes WANG the leader in the integrated WP/DP marketplace?

If your answer to these questions is YES and you have a proven track record of design, implementation and management of telecommunications products/systems and have the desire to excel in the telecommunications field then - DON'T WAIT CONTACT:

Susan Morse, Employment Supervisor, Wang Laboratories, Inc.,

EDP OPPORTUNITIES
COAST TO COAST

Robert Half, staffed by EDP professionals for EDP professionals with 70 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

SAN FRANCISCO

COBOL PROGRAMMERS

Our client will train you in IBM data base environments. 1 year experience and up needed in OS and DOS environments.

BUSINESS SYSTEMS ANALYST

Need MBS or MS/CS and two years experience in DP. Will write new systems spec's and interface with programmer analysts.

PROJECT MANAGER

COBOL/ALC/CICS. 6 years in DP. 2 in management. Will supervise 3-7 senior analysts installing state wide on-line systems. Finance/Banking background strongly desired.

MINI PROGRAMMERS

We have several openings for candidates with experience in COBOL/Fortran/Assembler in a mini environment.

IBM ALC APPLICATIONS PROGRAMMERS

For state of the art IBM MVS IMS shop. Multiple openings.

EDP AUDITORS

We have several clients seeking EDP auditors and or auditors to join their staffs.

Jerry Anderson
or
[illegible]
ROBERT HALF
of Northern California, Inc.
111 Pine Street
San Francisco, CA 94111
(415) 434-[illegible]

GREENSBORO

Fin'l institution desires programmers with min 1 yr Basic Plus on DEC PDP/11. $15-22,000

Sub of Int'l corp needs Analysts with COBOL. Hvy mfg design & implementation. On-line a +. To $25,000

Blue chip corp seeks Analysts with min 3 yrs MVS, COBOL, on-line. Fin'l, Mfg, or Pers. systems. To $30,000

Larry Brooks
ROBERT HALF
of North Carolina, Inc.
Suite 1117 Wachovia Bldg.
Greensboro, NC 27401
(919) 274-[illegible]

CHICAGO

EDP AUDITOR/ANALYST

Audit software and/or COBOL programming experience. Top shop with large IBM hardware running under OS/MVS and VM/CMS. Software support includes TSO/SPF and CICS. Company committed to professional development. $28,000

ROBERT HALF
of Chicago
35 E. Wacker Dr.
Chicago, IL 60601
(312) 782-[illegible]

NORTHERN CALIFORNIA
PALO ALTO

PROMOTE YOURSELF

Consider one of the many positions currently available in San Francisco/Bay Area.

COBOL PROGRAMMER/ANALYST

IBM or Burroughs experience in a manufacturing or financial environment. To $30,000

RPG II MANAGERS OR PROG

System 3/15D or System 32, 34 installations. To $30,000

EDP AUDITORS

IBM OS & DOS environments require EDP Auditors at all levels. To $30,000

SYSTEMS PROGRAMMERS

IBM OS & DOS, needed immediately. To $32,000

DATA BASE ANALYST

Experience with DMS, DL1, ADABAS, IDMS or CICS. To $30,000

SOFTWARE MANAGER

IBM 370/OS experience. Supv. small staff. To $35,000

PROJECT LEADER

IBM/UNIVAC Banking + Solid project planning/implementation experience. Major conversion. To $30,000

Over 1050 positions in Northern California are currently open. If you have experience in:

- Banking
- Manufacturing
- Retail
- Insurance

Client companies pay interviewing and relocation expenses. Call us collect today.

Jim Sayre
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of Northern California, Inc.
2 Palo Alto Sq. #212
Palo Alto, CA 94304
(415) [illegible]

BALT/WASH

SYSTEMS SOFTWARE SUPPORT

Position offers extensive outside schooling opportunities with large and growing corp. Work in a relaxed atmosphere. Convenient suburban location. Required: 1 yr. experience maintaining operating system. Data Base, teleprocessing helpful. $26,000

ROBERT HALF
of Baltimore
217 The Quadrangle
Baltimore, MD 21210
ask for Carol
(301) 323-7770

ROBERT HALF
of Washington
7316 Wisconsin Ave.
Washington DC 20014
ask for Judy
(301) [illegible]

ATLANTA

PROJECT LEADER

Excellent position for aggressive take-charge person who is career-minded. Qualifications: Strong RPG II, System 3. Heavy technical ability. IBM 4341 on order, very good location, benefits and congenial working environment. $25,000

PROGRAMMERS

Top-notch people needed for local position. Must have a minimum of 1 year COBOL. Prefer Accounting applications but others considered. Client recognizes excellence and encourages professional growth. State of the Art Shop. $18,000

PROGRAMMER/ANALYST

Sr. level staff position. Excellent upward mobility for person who has: COBOL, CICS, JCL, OS/VS experience. Design and programming of Accounting applications preferred. Approximately 15% travel required. Outstanding growth, liberal benefits and desirable location. Fees and re-location employer paid. $25,000

Ray Jennings
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N. E.
Atlanta, GA 30326
(404) [illegible]

SEATTLE

ALASKA firm seeks applications systems project leader with 5+ yrs. experience in IBM OS COBOL environment and bachelor degree. CICS, IMS, FORTRAN, telecom skills a plus. Need 10 yrs. experience if no degree. To $35,000 plus top benefits.

SEATTLE D.P. shops are eager to interview experienced programmer/analysts. If you have 1+ years experience and plan to visit here, call me collect or send your resume ASAP.

[illegible]
ROBERT HALF
of Seattle, Inc.
1001-4th Avenue
Suite [illegible]
Seattle, WA [illegible]
(206) [illegible]

PHOENIX

LEAD SYSTEMS ANALYST

Challenging position for S/A or project leader with banking charge card & COBOL background. Salary to $28,000

PROGRAMMER

You will maintain applications programs in COBOL on large IBM MVS system. IMS DB/DC and TSO helpful. Salary to $24,000

Rex Rogers
ROBERT HALF
of Phoenix, Inc.
3550 N Central Ave [illegible]
Phoenix, AZ 85012
(602) [illegible]

ST. LOUIS

SUPERVISOR SYSTEMS & PROGRAMMING

NCR Criterion shop. 5 yrs. prog. & systems design experience. NEAT III and some COBOL. Will supervise and develop staff, set priorities, schedules; do feasibility studies.
OUTSTANDING OPPORTUNITY! Mid $20's

PROJECT LEADER

At least 3 yrs. exp. in sys. design, preferably with financial institution. IBM, COBOL/AL. Company has experienced EXTRAORDINARY GROWTH! Upper $20's

PROJ. LEADER/SUPERVISOR

At least 5 yrs. exp. in medium/large scale vendor equip. Supv. background, accounting applications required. TOP COMPANY! Low $30's

COMPUTER CENTER DIRECTOR

Will supervise administrative DP. Mini and programming experience required. Will select new hardware. A "turn-around" situation. Hi $20's

PROGS-PROG/ANALYSTS

COBOL, FORTRAN, AL, RPGII, PL1 or BASIC. The outlook for "pros" is still excellent! Call us—we won't waste your time with uninteresting situations. To Upper $20's

[illegible]
ROBERT HALF
of St. Louis, Inc.
7730 Forsyth
St. Louis, MO 63105
(314) 727-[illegible]

LOUISVILLE

DP SYSTEMS PROGRAMMER

Large Louisville corp. is seeking someone with 2-3 yrs. software experience. Assembler is the key. Degree is preferred but not required. Good relocation package. Excellent benefits. Starting salary to $25,000

SR. EDP AUDITOR

N.Y. City, Louisville, Milwaukee

If you have a degree in Acctg., Computer Science or Business with 2-3 years Systems Design and Programming our client will train you to Audit. Relocation and interview expenses paid. Excellent benefits. Starting salary to $25,000

N.C. OR SYSTEMS ENGINEERING

Western Ky. firm is seeking an individual with experience in programming in N.C. or engineering applications. Fortran III and IV are the prime languages. Relocation, interview expenses paid. Starting salary to $20,000

Tom Williams
ROBERT HALF
of Louisville
[illegible] South Fourth St.
Louisville, KY [illegible]
(502) [illegible]

SOUTHERN CALIFORNIA
LOS ANGELES

PROGRAMMER ANALYSTS

Many openings from staff's to mgr's. FORTRAN, COBOL, BASIC & RPG. Our clients have a wide variety of openings from 2 to 10 yrs of experience. To $37,000

[illegible]
ROBERT HALF
of Los Angeles,
[illegible] Wilshire, Suite [illegible]
Los Angeles, CA 90010
(213) [illegible]

COMMERCE

SENIOR PROGRAMMER

2+ years COBOL. All financial applications. CICS a plus. Client utilizes IBM 4341 under DOS/VS. To $25,000

[illegible]
ROBERT HALF
of Los Angeles,
[illegible] E. Telegraph Rd.
Commerce, CA 90040
(213) 721-[illegible]

ORANGE COUNTY

IRVINE LOCATION

PROGRAMMER ANALYST

Financial applications. You would get involved with major international Orange Co. based company. To $30,000

[illegible]
ROBERT HALF
of Orange County
[illegible] N. Broadway, [illegible]
Santa Ana, CA 92706
(714) [illegible]

TAMPA

PROG/ANAL

DOS/VS/CICS in mfg. environment. COBOL-Assembler a plus. To $20,000

SYS/PROG

DOS/VSE on [illegible] - Min. 2 yrs. COBOL and Assembler. To $20,000

PROG/ANAL

OS/VS or MVS - Acctg. or mfg. appl. COBOL-Assembler a plus. To $22,000

PROG MGR

Solid Skill on Burr. hdwe. - Min. 1 yr. supv. exp. - Org. & plan. $30,000

DIR MIS

S & L-EFTS-NOW-ATM - Min. 5 yrs. supv. exp. - High visibility. $35,000

[illegible]
ROBERT HALF
of Tampa, Inc.
1011 North Westshore Blvd.
Tampa, FL 33607
(813) [illegible]

MILWAUKEE

SYSTEMS ANALYST

Company is actively interviewing individuals to become part of a TOP-PRIORITY sales distribution project. COBOL background needed. ITEL AS/5; CICS, IDMS environment. $24-28,000

SYSTEMS ANALYST

Growth-oriented company seeks professionals to join a dynamic situation. The key to this position is 2 to 3 years DP experience with good knowledge of COBOL programming. $22-24,000

[illegible]
ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI [illegible]
(414) 271-HALF (271-[illegible])

KANSAS CITY

DATA CENTER MANAGER

Fast growing publicly held firm requires a proven site manager. Person will be responsible for the complete hardware/software selection, site planning, personnel selection, and long-range planning for a new data center in the Kansas City area. Person should be capable of stepping back from the details to guide an aggressive professional staff to long range goals. Salary to the mid $40's

MANAGER OF TECH SUPPORT

Opportunity exists for senior MVS support person to move into management. Person will be responsible for a staff of five in a new 3033 MVS, IMS, DB/DC shop. Person will be given total responsibility for the budget, personnel staffing, and hardware/software selection. Salary to mid $30's

EDP AUDIT

Ground floor opportunity for the experienced EDP auditor to start his own department. This publicly held company is starting their first EDP audit function. Person chosen will be responsible for building the total department. A good chance to do it right the first time. Salary to $30,000

PROG/ANAL

Newly installed 4331 presents excellent opportunity for a COBOL programmer with CICS experience. Person will be responsible for the development and implementation of new systems and conversion of old systems. Use on-line design experience to gain project leadership experience. Growth opportunity for qualified professional. Salary to $25,000

SENIOR PROG/ANAL

Excellent opportunity for a strong COBOL programmer to get their first break into management. Solid coding skills and good communications ability qualify you to supervise two junior programmers in the enhancement of a major on-line system. Position offers tremendous visibility and opportunity to break from the coding pool. Salary to $25,000

[illegible]
ROBERT HALF
of Kansas City, Inc.
127 W. 10th St.
Kansas City, MO [illegible]
(816) 474-[illegible]

SAN ANTONIO

SYSTEMS PROG/ANAL

Requires 2 plus years DOS/ASSEMBLER, COBOL, CICS, and IBM/370 experience. Financial or banking exp a plus. Must have degree or exp in lieu of. $22-25,000

SYSTEMS ANALYST

5 years plus ALC, CICS, IBM shop experience a must. Fast progressive company. Degree preferred, but not necessary. $21-24,000

PROGRAMMER ANALYST

COBOL, OS/JCL with 2 plus years experience. Company will rapidly promote proper candidate. $19-22,000

PROGRAMMER

Entry level position 1 yr plus or degree. Must have APL & Fortran ability. Good benefits and potential. $15,000

ROBERT HALF
of San Antonio, Inc.
First Nat'l Bank Bldg. [illegible]
San Antonio, TX [illegible]
(512) [illegible]

ROBERT HALF

DALLAS

SOFTWARE SPECIALISTS

We are directly representing several blue-chip, NYSE listed, progressive Dallas companies in urgent need for experienced software professionals from the intermediate thru senior levels ...We represent you for a specific position in strictest confidence...with never an obligation of any kind...

Below are a few of the large variety of positions (many exclusively ours) currently available:

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Exp. Mgr of Mgrs for large scale IBM shop...Data serv for 100+ locations nationally...Pet'l and Oil & Gas related industry...Super family location...MBA a plus. To $42,000

PROG SUPERVISOR

Proven supvr. for large scale IBM OS/IMS/DB/DC/COBOL shop... Migrating from DOS to OS...Business Applications...Supervise 4 to 6. To $38,000

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Many openings in Metroplex... 1 to 4 yrs exp...COBOL/PL1/ALC/CICS/Large scale IBM and others...All app areas including banking specialist. To $25,000

SR. SOFTWARE ANALYST

Software support for programmers... Real heavyweight in ALC/JCL/Internals/Large scale IBM systems. To $28,000

Call or send your resume, on a STRICTLY CONFIDENTIAL basis to:

[illegible]
ROBERT HALF
of Dallas
Two North Park East, Suite 730
Dallas, TX 75231
(214) [illegible]

NEW ORLEANS

SYS/PRO MGR.

Teleprocessing, OS, MVS, VS1. Excellent benefits and relo package. To $32,000

PROGRAMMER

Manufacturing firm. COBOL-IMS. To $22,000

PROGRAMMER

Manufacturing firm. NCR NEAT 3. To $21,000

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of Louisiana, Inc.
135 St. Charles Ave. #[illegible]
New Orleans, LA 70130
(504) 524-[illegible]

Specializing in E.D.P. positions (not just jobs). Seventy offices throughout the United States, Canada and Great Britain.

ALBUQUERQUE

IBM LARGE SCALE

Several financial institutions in New Mexico have immediate openings for senior prog/analysts and systems analysts. IBM 370 OS or DOS in COBOL and/or Assembler. CICS and Tele-processing. To $28,000

IBM SYS 3, 34

Several positions in this area ranging from P/A to Asst. Manager to Director. Extensive knowledge of RPG II, CCP. Salary dependent upon qualifications. Salary $18-30,000

[illegible]
ROBERT HALF
of New Mexico
P.O. Box [illegible]
Albuquerque, NM 87190
([illegible]) [illegible]

NEW YORK

SR. ANALYST

Develop & implement commercial systems in this always STATE-OF-ART environment. Structured COBOL programming, BATCH or ON-LINE, and good interpersonal skills. IMS experience is a plus. Environment is 3033, 370/168 OS/MVS TSO IMS/VTAM. All development automating from manual system. Outstanding fringes include profit-sharing. $30,000

RPG II
DP MGR 34

Excellent working environment and convenient Midtown location with this well-known firm. 3+ years in DP with heavy RPG II and System 34 experience. Manage programming and operations of manufacturing applications. Highly visible. $28,000

COBOL or BAL

Outstanding CAREER POSITION offers profit sharing tuition refund, 3 weeks vacation, major medical and fully paid retirement. 1+ years COBOL or BAL with good interpersonal skills. Excellent growth potential in pleasant working environment. State of Art 370 OS with IMS and CICS. $20,000

PL/1 3033

Develop & implement commercial systems with this highly recognized FORTUNE 500 firm. 2+ years PL/1 programming experience. CICS, COBOL or BAL is a definite plus. Newly installed 3033. Sophisticated with high visibility. $23,000

EDP AUDITOR

Golden opportunity for Sr. EDP Auditor with this major diversified conglomerate. 2+ years EDP audit and 1+ years internal audit experience. Public experience is a plus. Aid in data center reviews and all EDP audit functions. Outstanding benefits. $30,000

SR. ANALYST

Career climbing opportunity for technically oriented professional. 2+ years PROJECT MANAGEMENT with manufacturing systems and COBOL programming experience in 370 DOS environment. Full project responsibility with NO PROGRAMMING. Pleasant working environment and excellent benefits package. $30,000

[illegible]
ROBERT HALF
of New York
[illegible] Fifth Avenue
New York, NY [illegible]
(212) [illegible]

PORTLAND

OPERATIONS ANALYST

3-5 yrs. high technical expr. in use of JCL, Procs & thorough knowledge of IBM utilities + TSO will provide technical support to production control & computer operations. Must have strong analytical communications, + organizational skills. Salary $17-$22,000

SR. PROG/ANALYST

5-7 yrs. expr. in financial systems development & maintenance in on-line data-base environment. Must have proj. leader supv. expr. Must be competent in analysis & functional design. Requires good oral & written skills. Will perform user & vendor interface. Salary $21-$27,000

[illegible]
ROBERT HALF
of Portland
One SW Columbia, Suite [illegible]
Portland, OR [illegible]
([illegible]) [illegible]

BOSTON

MARKETING REP

Prestigious & rapidly growing business software developer seeks low-keyed pro for start-up opty. Must have solid track record of EDP sales exp. Compensation based on performance with first year earnings realistically $35-40,000

CONSULTANT/PROG

Highly respected software consulting firm seeks aggressive client-oriented prog. to implement wide variety of projs. IBM OS/DOS, COBOL, PL-1, BAL or DB/DC exp. desirable. Frequent perf. reviews & bonus plg.
Base salary $18,000 range

SR. CICS DESIGNER

Internat. consumer services org. seeks top CICS pro. to design, implement & upgrade multi-user network. Must have COBOL knowledge. Interview & reloc. expenses paid.
Salary $32,000 range

MATERIALS CONTROL SUPPORT

Prominent mini vendor seeks senior contributor for their MIS org. Requires exp. in COBOL on any hardware. Applications include materials control, fin'l. & mktg. Heavy user interface exposure. All development done on large scale interactive system with own terminal in an informal atmosphere. Salary $26,000

SYS-34 PROG/CONSULTANT

Dynamic software firm noted for S/34, S/38 & S/32 expertise seeks talented indiv. for sys. devel. & conversion projs. Strong RPG and WSU knowledge desired. Very competitive environ. with profit shr. & perf. reviews. Salary $25,000

IMS SUPPORT

Corp. Hdqtrs. of multi-million dollar retailer seeks hard-driving, ambitious internal consultant to advise top mgmt. on effective IMS integration. IBM 370/168 OS/VS, COBOL environ. Heavy user interface.
Salary $28,000 range

PL1 PROGRAMMER/ANALYST

Prestigious healthcare services org. requires applications oriented PL-1 programmer/analyst for development of new on-line systems. Prior exp. with business appls. on IBM 370/OS system preferred. Excellent fringes including tuition reimb. Salary $23,000

[illegible]
ROBERT HALF
of Boston, Inc.
[illegible] Street
Boston, MA 02110
(617) [illegible]

DENVER

SOFTWARE PROGRAMMER

Large national corp. needs a systems programmer for its Denver data center. Will work with systems dept. in defining CPU demands of new systems. Responsible for hardware evaluations. Experience on large DOS-VS system necessary.
Start $22,000 range

SYSTEMS ANALYST

Denver based financial organization seeks a systems analyst with proven experience in evaluating user requirements. Requires at least 5 yrs. background in data processing. Must have good communication skills.
Start $[illegible] range

[illegible]
ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO [illegible]
([illegible]) [illegible]-1010

BUFFALO

SENIOR ANALYST

Western NY consumer goods mfr. needs systems analyst with hvy. mfg. bkgrd. Candidate must be capable of providing systems insight from shop floor plant mfg. point of view. Hi-visibility pos. rpts. directly to Controller in capacity of user liaison defining & analyzing needs of current systems. Salary $27,000

SR. SYSTEMS PROGRAMMER

Replacement pos. in profitable mfg. co. located in Western NY. Sophisticated VS1 migrating to MVS. PL1 and/or Assembler a must. Resp. include 15% programming, applications support, & OS Systems maintenance. Will be member of 3 person team. Excellent relocation pkg.
Salary $30,000

D.P. MANAGER

Start up position for stand alone [illegible] mfg. S.E. div. of Western NY conglom. needs savvy "pro" for [illegible] site. All around bkgrd. including COBOL & RPG programming, user definition, design & conversion exp. are ideal. Must be able to work with little supv. Good communications essential.
Salary $28,000

PROGRAMMER ANALYST

Fin'l. institution needs Neat 3 programmer. NCR installation presently converting to COBOL 74. DP Mgr needs backup able to handle wide range of duties. Banking applications helpful, not necessary. Salary $22,000

ASSISTANT DP MANAGER

$16mm mfg. co. needs RPG II expert for Systems 34 installation. Position requires multi-plant exp. plus BOMP & MRP. DP Manager needs backup to take over resp. of prog. analyst.
Salary $21,000

[illegible]
ROBERT HALF
of Buffalo, Inc.
[illegible] Liberty Bank Bldg.
Buffalo, NY [illegible]
(716) [illegible]

PROVIDENCE

SYSTEMS TECHNICIAN

National Mfr. seeks broad exposure to the design of systems applicable to a highly complex mfg. shop. BOM/MRP & Inventory Control the Key to success for a self-motivated & inquisitive indiv.
Salary $29,000

DATA BASE ANALYST

Rapidly growing State-of-the art insurance firm will utilize strong DB-DC skills. IBM 3032 OS/MVS expertise preferred. Enter this "Blue Chip" co. and advance to mgmt. Salary $28,000

SYSTEMS PROGRAMMER

Small but prestigious bank seeks tech-oriented indiv. to support IBM 4331 DOS/VS sys. CICS exposure a definite plus. No. RI location. Salary $25,000

EDP AUDITOR

Excellent oppty. for indiv. with min. 2 yrs. solid D.P. bkgrd. & banking EDP audit experience. Develop new automated sys. + audit existing applications.
Salary $30,000

BAL ANALYST

Rapidly growing consulting firm seeks strong BAL skills to design, code & implement new on-line systems. Financial applications experience preferred.
Salary $28,000

[illegible]
ROBERT HALF
of Providence, Inc.
[illegible] Turks Head Bldg.
Providence, RI [illegible]
(401) [illegible]

HARTFORD

TIMESHARING SPECIALIST

VM-CP and CMS problem resolution for major Hfd. area firm. Visible position with significant customer and vendor interface. Min. 3 yrs. IBM Assembler.
$30,000

SYSTEMS MANAGER

Conn. based medium sized insurer seeks 2 yrs. supervision in addition to prog. analyst exp. in IBM OS COBOL facility. Strong interpersonal skills. Excell. firm with flex. hrs. and 3 day weekends. $27,000

PROGRAMMER ANALYST

New oppty. in development area of excell. IBM OS COBOL, JCL, and CMS or TSO. Increased design activity. Superior company training, salary structure and benefits. $22,000

MGR. SYSTEMS

N. East insurance client seeks indiv. to direct prop. casualty application dev. staff. Candidate should have broad mgmt. skill in systems and DB/DC techniques. Salary to $38,000

TECH. SPEC'S.

Conn. opening for CICS or INTERCOMM trained indiv's to provide internal corp. support to multi-div. client. Excell. professional environ.
Salaries to $26,000

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Conn. oppty. for IBM and UNIVAC software trained indiv's. to provide OS/MVS, DMS, DBMS support for expansion of new systems. Salary to $30,000

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Conn. oppty. for indiv. to direct all DB/DC, IMS, MVS user. Extensive tech. and "user skills" required for sr. level oppty!
Salary to $40,000

[illegible]
or
[illegible]
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of Hartford, Inc.
111 Pearl Street
Hartford, CT [illegible]
([illegible]) 278-7170

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PROGRAMMERS

One of America's most progressive leaders in business incentives, trading stamp systems/travel & catalog stores etc. has 8 openings for programmers with at least 1 yr exp in PL1 or COBOL. IBM exposure helpful. Full benefit package. Act quickly to launch your career. $13-20,000

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Are you exp'd with Order Processing Systems? This 200 million dollar mfg organization is in desperate need of your expertise! Client will consider indiv with or without programming exp. High visibility & stability along with excellent benefits (profit sharing) characterize this immediate oppty. Contact ASAP. $24-28,000

ROBERT HALF
of Dayton, Inc.
One First National Plaza
Dayton, OH [illegible]
(513) [illegible]

MIAMI

PROGRAMMER ANALYST

One of the finest International Fortune 500 companies is currently recruiting COBOL Programmer/Analysts. Your career growth will include training in the latest structured programming techniques with exposure to Data Base concepts. This well-known large IBM installation offers an excellent relocation package and a generous benefit program. All-in-all, a terrific opportunity to expand your Data Processing career in a progressive environment in South Florida. $25,000

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Our client, one of the leading South Florida financial institutions, is interested in EDP banking professionals. They are currently experiencing a rapid expansion program in their progressive 370/158 installation and have openings at various technical levels. A proficiency in any of several banking software packages including NCP, or CPCS will help you to become a member of this aggressive team. This top-notch institution offers an extremely liberal benefit package as well as payment of all relocation expenses to qualified applicants.
To High 20's

[illegible]
ROBERT HALF
of Miami, Inc.
[illegible] N.W. 167th St.
Suite 100
Miami, FL [illegible]
([illegible]) [illegible]

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Excellent opty to move into a highly sophisticated OS/MVS shop at the managerial level. Environment includes a 3032 with over 300 online terminals. Need heavy insurance application bkgd. Very visible and highly responsible position. Salary to Mid-$30's

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of Minneapolis/St. Paul, Inc.
[illegible] IDS Center
Minneapolis, MN [illegible]
(612) [illegible]

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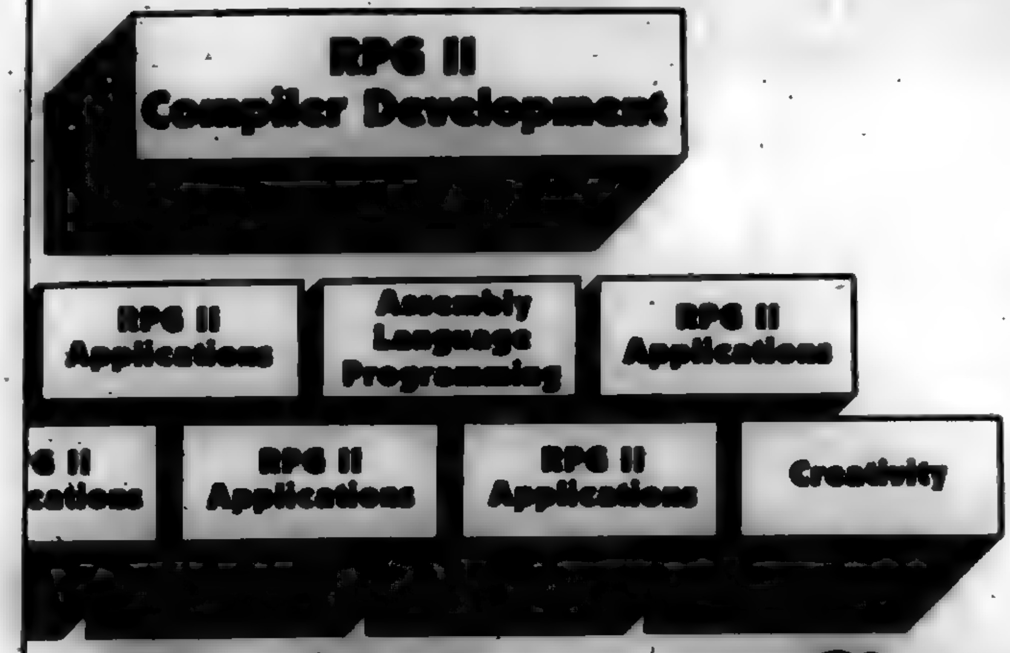
Ask for our latest Salary Survey.



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If you have solid knowledge of RPG II as applications developer and are interested in breaking into system software development, we have an exciting position for you. Our VS, RPG II compiler project is developing RPG II support for sophisticated Advanced Data Management and Forms Management systems. Assembly language and programming experience and a BS in Computer Science would be an advantage.

A small project team environment is emphasized and provides the opportunity for a high level of responsibility and visibility.

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We offer excellent salary and benefits including profit sharing, stock purchase plan, stock bonus plan, medical and dental insurance. Please send resume, including salary history to Susan Morse, Employment Supervisor, Wang Laboratories, Inc., Dept. CW-29, One Industrial Avenue, Lowell, MA 01851.

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The University of Wyoming has added a new position to its systems programming staff. [illegible] CDC Cyber [illegible] NOS operating system. [illegible]

[illegible]

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[illegible]
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If you have a minimum of 1 year of experience, call collect (or send resume) to: Betty [illegible]

[illegible] PERSONNEL
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(615) 329-1771

Florida

Many statewide career opportunities are currently available for experienced programmers, analysts, and software programmers. If you have at least two years experience on any large mainframe and wish to locate in the land of sunshine and low taxes, call or write:

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DEC-10
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Immediate opening for experienced person. Excellent benefits, salary, and chance for advancement. Call or send resume to:

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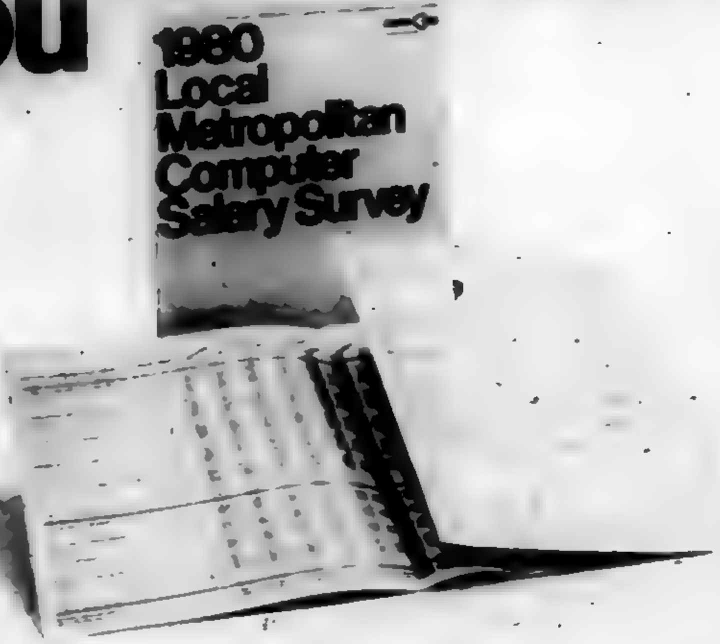

To find out, call today for our new local survey It's FREE!

Includes 23 New Categories

The 1980 Survey has been expanded to provide specific data for 23 new categories. These include positions in data communications, mini/micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

Do you know how your salary compares with other EDP professionals in your specialty—with the same level of experience—working in your city, or in other cities across North America? Are you being well paid for what you do? Are salaries better elsewhere?

Now you can find out simply by calling today and asking for a copy of our current 1980 Local Metropolitan Computer Salary Survey. It's FREE!

Source Edp, North America's largest recruiting firm specializing in the computer field, publishes this valuable Survey annually as a service to computer professionals from coast to coast. The 1980 Survey shows current salaries in your area, 37 other areas in the U.S. and Canada, plus overall national averages. Salaries are shown by career specialty broken down by length of experience or size of computer system.

As you will discover, this Survey can be extremely valuable in helping you make important career decisions. Call for your free copy today.

For your free report, simply phone the Source Edp office nearest you.

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Chicago, Illinois 60606

(When writing, please be sure to indicate home address and position title). Client companies assume our charges.

United States	
Arizona	
Phoenix	602/258-9333
California	
San Francisco	415/434-2410
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Van Nuys	213/781-4800
Torrance	213/540-7500
Irvine	714/833-1730
San Diego	714/231-1900
Colorado	
Denver	303/571-4450
Englewood	303/773-3700
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Hartford	203/522-6590
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Atlanta Central	404/588-9350
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Chicago	312/782-0857
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Baton Rouge	504/924-7183
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Baltimore	301/727-4050
Massachusetts	
Boston	617/482-7613
Wellesley	617/237-3120
Michigan	
Detroit	313/259-7607
Southfield	313/352-6520
Minnesota	
Minneapolis	612/544-3600
St. Paul	612/291-2467
Missouri	
St. Louis County	314/862-3800
St. Louis Downtown	314/231-4880
Kansas City	816/474-3393
New Hampshire	
Nashua	603/880-4047
New Jersey	
Cherry Hill	609/482-2600
Edison	201/494-2800
Paramus	201/845-3900
New York	
Midtown	212/736-7445
Wall Street Area	212/962-8000
Long Island	516/364-0900
White Plains	914/683-9300
North Carolina	
Greensboro	919/378-1642
Ohio	
Cincinnati	513/769-5080
Cleveland	216/771-2070
Columbus	614/221-2070
Oregon	
Portland	503/223-6160
Pennsylvania	
Philadelphia	215/665-1717
King of Prussia	215/265-7250
Pittsburgh	412/261-6540
Texas	
Dallas	214/387-1600
Fort Worth	817/338-9300
Houston Central	713/751-0100
Houston Suburban	713/626-8705
San Antonio	512/344-0217
Virginia	
McLean	703/790-5610
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Seattle	206/454-6400
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Energy is where the action will be in the coming decades, and Santa Fe Energy Company will be at the forefront. With operations in Texas, New Mexico, Utah, Wyoming, Montana and offshore Louisiana, we're the nation's fourth largest independent oil and gas exploration and development company. Our parent company, Santa Fe Industries, is one of the nation's largest diversified corporations. In addition to competitive salaries and a chance for real career growth, we offer excellent company benefits including health, dental, life, disability and retirement. Come grow with us.

Amarillo is a Great Place to Live

Amarillo sits on the northern edge of the Sunbelt, escaping the humid, suffocating summers of the deep south and the bitter cold winters of the north.

Anyone who lives here will tell you its sunsets and summer nights are the best anywhere. Its air is still the clean air of the prairie but its surrounding land has been turned into one of the garden spots of the nation.

Amarillo still boasts a western heritage and flavor but its culture, alive with art and music and literature, is a mix of influences from Denver, Dallas, Albuquerque and Oklahoma City, each of which is just a short drive away. And a half-day's drive puts you in the Rocky Mountains near any of four popular ski areas.

Its schools, including a university and junior college, are excellent. Housing is inexpensive by national standards, averaging only $28 to $32 per square foot for new brick construction. And property taxes are low. The local economy is strong and there is no state income tax. Amarillo is a great place to live and raise a family.

Our installation is an IBM 370/168 6 meg system currently running OS/VS1 with plans to upgrade to MVS this fall. We need people to fill the following positions:

SYSTEMS ANALYSTS— Six to eight years experience, the most recent three to four years with IBM OS COBOL.

DATA BASE ANALYSTS— Minimum three years experience with IBM OS COBOL.

PROGRAMMER/ANALYSTS— Four to seven years experience, the most recent three years with IBM OS COBOL.

PROGRAMMERS— Three years experience, most recent one year with IBM OS COBOL.

DATA BASE TECHNICIANS— General background DP with one year DP and/or programmer.

SENIOR MVS SYSTEMS PROGRAMMER— Minimum two years experience with MVS system generation and maintenance. Working knowledge of COBOL, FORTRAN ASSEMBLER, OS/JCL and utilities required. Experience desirable in data base systems, data communications and computer performance evaluation

Send resume to:
Personnel Department
SANTA FE ENERGY COMPANY
One Security Park • 7200 I-40 West • Amarillo, Texas 79106

Equal Opportunity Employer M/F

DIRECTOR OF DATA PROCESSING SYSTEMS
Salary to $40,000

Blue Cross Blue Shield of Iowa, top rated company in health insurance, has a special challenge for a take charge individual with heavy systems background. Our large, expanding D.P department is in the process of developing and implementing a large, comprehensive computer system and manual operations that will take several years. We have an on-line, real time and batch environment operating under MVS with IBM 3033 hardware.

We're looking for someone with heavy experience in a similar environment and with excellent people management skills to take over the direction of a staff of about 100, including 4 managers. You will report to an Assistant Vice President of Data Processing, and manage an operating budget of almost $4 million.

Our excellent benefits include health, life, dental and pharmaceutical insurance coverage, retirement plan, interviewing and relocation expenses, plus employee and spouse health screening. No travel is involved.

Des Moines, one of the insurance capitals of the nation, has a revitalized, growing downtown area with many cultural developments. The new civic center, a unique botany center, an excellent art center, the exciting and educational science center and a large zoo are among the many facilities that add to the exceptional quality of life enjoyed by residents of this city.

For more information about this exciting opportunity, please send your resume, with salary history, to:

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Blue Shield.
of Iowa

Merlin Lee
BLUE CROSS BLUE SHIELD
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Des Moines, Iowa 50307

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Implement an on-line system

A Fortune 500 communications organization has a hi-visibility position available for a Systems Manager which offers excellent growth potential as well as interesting career challenges. Working with outside consultants in addition to our existing team, you will initially be responsible for coordinating the implementation of a major on-line system.

We require a BS degree plus a minimum of 5 years experience in EDP and a knowledge of COBOL. 3 years in a supervisory capacity is important. You should have exposure to an on-line environment and a systems design background. An ability to interface with senior level management will be an important aspect of this project.

Please send resume and salary history to Dept. CF, Suite 818, 30 Rockefeller Plaza, New York, NY 10020

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Enjoy challenging work environments in "State-of-the-Art" installations and, in your leisure time, enjoy a life-style that blends with a temperate climate. Our Banking clients are seeking qualified EDP professionals with a minimum of one (1) year experience in an IBM environment. Client companies assume all fees including interviewing and relocation cost. Please send your resume in CONFIDENCE OR CALL TOLL FREE 1-800-821-2280 X804 (In Mo. 1-800-892-7655 X804)

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ALL APPLICATIONS	$20-$28K
PROGRAM/ANALYST(s)	
ALL APPLICATIONS	$18-$24K
PROGRAMMER(s) ALL APPLICATIONS	$17-$22K
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LEAD SYSTEMS PROG(s)	
MVS-SYSGENS	$24-$32K
SYSTEMS PROG(s) OS-SYSGENS	$22-$30K
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DOS/VS-CICS/VS	$22-$28K
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Bill Denny, V.P.

Jim King and Associates

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(904) 398-7371

Superior Farming Company

PROGRAMMER/ANALYSTS

Superior Farming Company located in Bakersfield, California, seeks Programmer/Analysts to assist in a five year development plan involving the automation of a variety of farming related systems. Desired 2-5 years experience in programming of DOS/VS, CICS/VS Command Level; VSAM; COBOL. Application experience is also required in one of the following systems: Payroll/Personnel; Accounts Payable; Accounts Receivable; Sales Analysis; Invoicing; Fixed Assets. These applications will be developed for an IBM 4331 operation in a DOS/VSE/VSAM Environment. Send resume and salary desired to Personnel Dept., P.O. Box [illegible], Bakersfield, CA [illegible]. Equal Opportunity Employer.

WANTED:

Data Processing Instructor who has competence in another business area. Qualifications: Bachelors degree or equivalent, masters degree in business administration or accounting preferred.

Contact Everett Belote, Vice President, Carl Sandburg College, 2232 South Lake Storey Rd., Galesburg, IL 61401. Phone (309) 344-2518.

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Our Florida client companies are expanding rapidly and opening new installations. Opportunities have never been better than they are now. Some of the immediate needs are:

IMS experience for IBM 3033 Dual 370/168 OS

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• Analysts	to 23.5K
• Programmers/Analyst	to 23.5K
• Programmers OS experience preferred 1 years COBOL	to 18.5K

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• Project Leaders/Sr. Analyst	to 30K
• Systems Analyst	to 26K
• Programmer/Analyst	to 24K

Many other professional opportunities available. All fees, interview, and relocation expenses paid. Rush confidential resume and earnings history to:

James C. Baynock, President
R.P. RITA, INC.
1211 N. Westshore Blvd., Suite 107
Tampa, Florida 33607

PROGRAMMER/ANALYST

[illegible]

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SYSTEMS ANALYST

The City of Grand Junction [illegible] Knowledge of COBOL and NEAT/3 necessary. [illegible] by July [illegible], 1980. EOE.

Senior Systems Programmer/ Project Leader

University Computer Center seeks individual to head systems programming team of two additional professionals. Current 370/148 being replaced by IBM 4341. Systems include VS/1, CICS, VM/CMS. Database support experience desirable. Bachelor of Science degree required. Technical and supervisory experience required. Forward resume with references and salary requirements by August 1, 1980 to:

[illegible]

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Excellent fringe benefits.

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Leading Latin American academic center for applied information technology has opening in its Fellowship Program for a senior faculty member on sabbatical, mid-level professor, or practitioner who would enjoy [illegible] one year within a challenging environment, devoting 50% of their time to program development and teaching, and 50% to their own fully-supported research. Compensation negotiable depending on background but starting in 30's. Please submit vita and salary requirements in strictest confidence to:

[illegible]

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Optimizes operating system and application software. Designs and implements application programs. Minimum of B.S. with five years of progressively responsible experience in COBOL programming and analysis. Experience may be substituted for education. Facilities include a modern computer center operating with a DEC 11/780 and HIS L62 computer. Apply to Personnel, NTCC, 801 East Benjamin Avenue, Norfolk, NE 68701, 402/371-2020 prior to July 28, 1980.

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Individual must be degreed, energetic and capable of working independently.

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Vienna, VA 22180
(703) 281-0919

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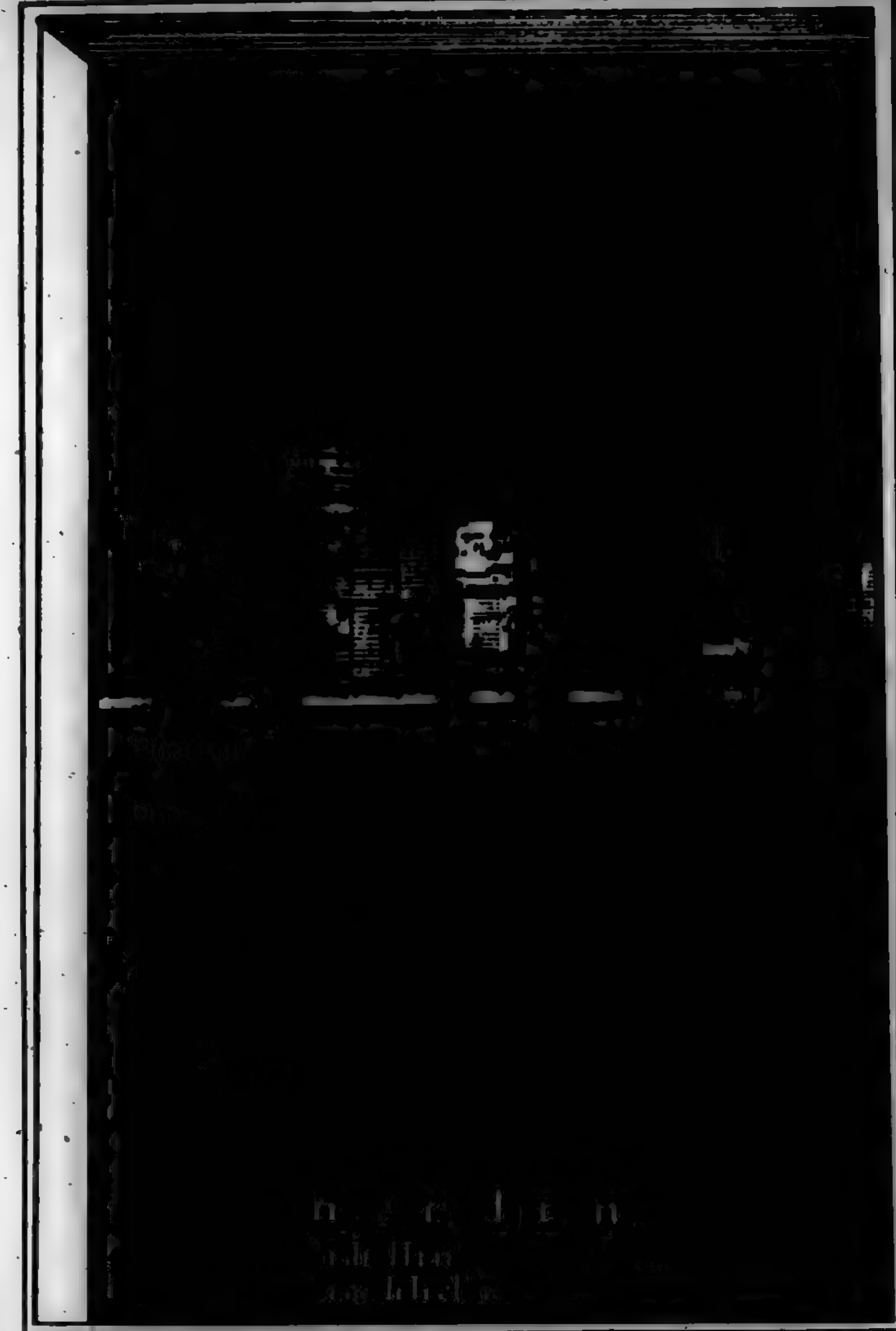
OUR ONLY SPECIALTY



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Grumman Data Systems, a subsidiary of Grumman Corporation is expanding its operations, necessitating the immediate hiring of Senior Marketing Representatives.

If you have a proven track record in the Federal marketplace, then we need and want you.

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- Automated Test Systems
- Signal Processing
- Contract Software and Systems
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Let us open negotiations by the submittal of your resume to Glenn Nichols for our ultimate mutual benefit.

GRUMMAN DATA SYSTEMS CORPORATION

1700 North Moore Street
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- Mgr CICS Applctns to $38K
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- Fincl Systems Analyst to $30K
- Investment Sys Consltnt to $40K
- ADA Base DBA to $40K
- Syst Development Mgr to $38K
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(609) 667-4488

RSVP SERVICES, Dept. C
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1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

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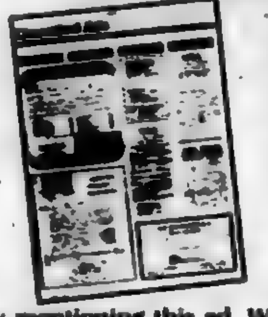

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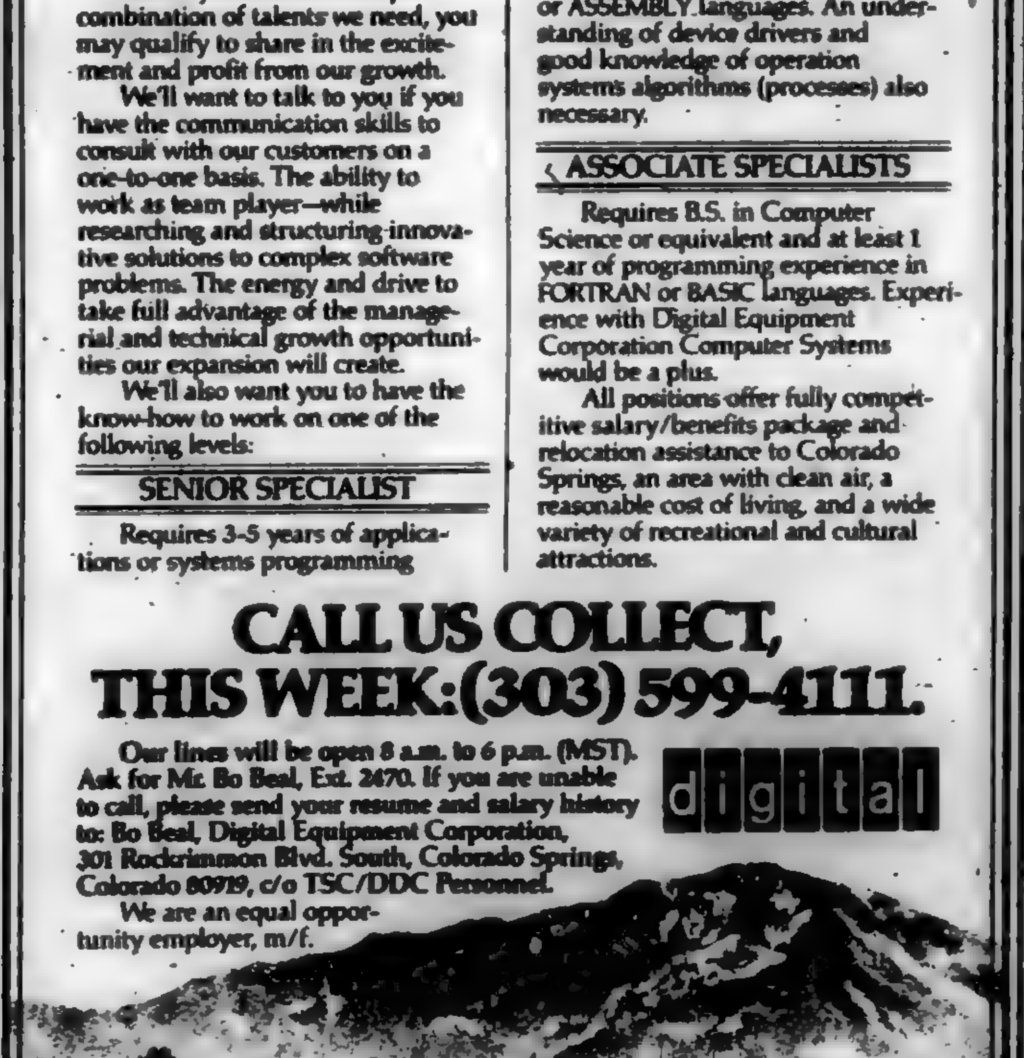

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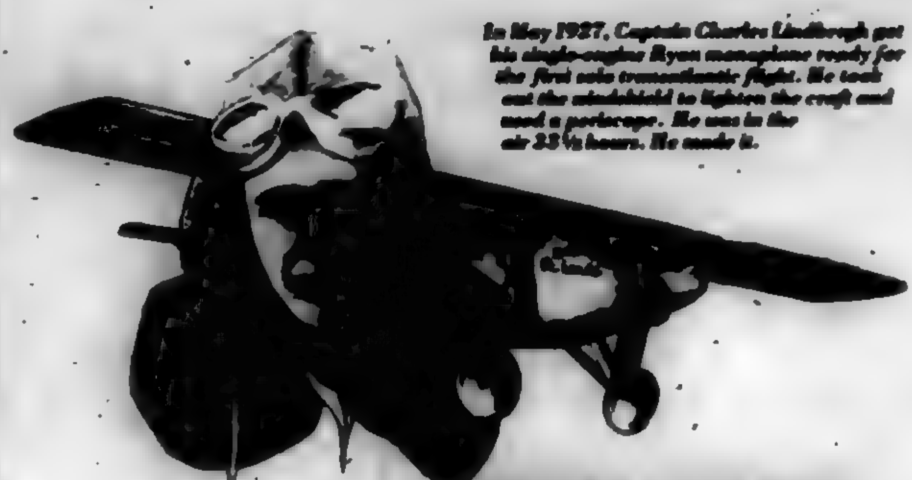

In May 1927, Captain Charles Lindbergh got his single-engine Ryan monoplane ready for the first solo transatlantic flight. He took out the windshield to lighten the craft and used a periscope. He was in the air 33½ hours. He made it.

NOW THAT'S PERFORMANCE!

Lindbergh knew he was going to get there. He saw the whole project from start to finish - and best of all, he foresaw winning.

At Data Architects, that's how we go about being software consultants - which we've been doing for business, industry and government since 1967. Our business is to help our clients become tops in understanding and using the latest technologies: with cost control, competitiveness and ultimate success.

We need more of the excellent people who work here. Are you the "get-there" type? Do you like to take on a project and follow it through, with high visibility and client interface? Do you want to prove yourself fast, with no barriers to what you can achieve? Come to Data Architects. We'll support you all the way. Even Lindbergh needed a vehicle.

We have immediate openings in the following major metropolitan areas:

Los Angeles

Sr. Systems Architect — two or more years experience in mini-computer software development (PDP-11, VAX or Tandem desirable), with an emphasis in Message Switching and Data Communications. Exposure to banking applications and networks such as SWIFT, CHIPS, or Fedwire a plus.

Sr. Applications Programmer/ Analyst — two or more years Cobol programming experience in on-line and batch environments. Mini-computer and banking applications a plus.

New York

Sr. Systems Analysts — five or more years systems programming experience in an on-line, interactive environment. Structural analysis and banking applications a plus.

Programmer/Analysts — we have a variety of needs for programmers with any of the following backgrounds: CICS and BAL, LIFE-70 or programming on Tandem or General Automation computers.

Boston

Project Manager — project management experience required with on-line applications using state-of-the-art technology on mainframe systems. Prior consulting experience and knowledge of banking or insurance applications a plus.

Programmer/Analysts — two or more years experience programming on mini-computer systems (PDP-11, DEC 10, TANDEM) with data communications background a plus.

We offer excellent starting salaries and superb benefits, including medical, dental, profit sharing and tuition reimbursement.

To apply for any of the above positions, please send your resume in confidence to Jim Stewart, Data Architects, Inc., 460 Totten Pond Road, Waltham, MA 02154 or call Jim collect at 617-890-7730 to discuss your future with DAI.

dai

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FLORIDA!!
SYSTEMS PROGRAMMERS UP TO $32K TO START

To qualify, you must be experienced with OS/MVS/TSO. Operating Systems Internals such as JES2, VS/MS, CICS & DBMS preferably IMS. VTAM Communications also desired. This organization offers an Excellent Benefits Package. If you're qualified and interested in a challenging opportunity with a Dynamic, GROWTH ORIENTED ORGANIZATION, "DON'T PROCRASTINATE" CALL COLLECT or SEND RESUME TO:

[illegible]
[illegible] CAREER CONSULTANTS
[illegible] N. FED. HWY., STE. [illegible]
FT. LAUDERDALE, FL [illegible]
[illegible]

INTERVIEW, RELOCATION & SERVICE ASSUMED BY CLIENT COMPANY.

ANALYST/PROGRAMMER SUNNY SOUTHWEST

Ponderosa Products, Inc., a dynamic and growing company in the Wood Products Industry in Albuquerque, New Mexico offers an excellent opportunity to live and work in the Land of Enchantment. We seek an Analyst/Programmer to design and develop automated and manual systems for all departments of PPI and affiliated companies using an IBM Systems/34. Applicant should have a technical or college degree and three years experience in a manufacturing environment with a strong accounting background. Must be proficient in RPGII. This position offers excellent compensation and benefits.

PLEASE SEND RESUME INDICATING EXPERIENCE, EDUCATION ACCOMPLISHMENTS AND SALARY HISTORY TO BILL ADKINS, DIRECTOR OF MIS

PONDEROSA PRODUCTS INC.
P.O. BOX [illegible]
ALBUQUERQUE, NEW MEXICO [illegible]
An Equal Opportunity Employer

Software Engineering Opportunities for Computer Scientists & Engineers

Openings in Dallas and Lewisville, Texas

Join Texas Instruments in the heart of the Sunbelt. You could work in Dallas, TI's hometown, or just north of Dallas in Lewisville, a growing community of 20,000. Live better in Texas, where cost of living is below the average of major U.S. cities and where there is no state income tax.

Work with real-time software applications for mini/micro computer based systems and on distributed computer architectures and uni-processor systems.

Application areas include:
- Computer assisted photo interpretation
- Airborne FLIR tracking and fire control systems
- Ground and air launched missile tracking and guidance systems
- Air traffic control support systems
- Image processing
- Military and commercial communications navigation systems
- Computerized voice encoding/recognition
- Hardware architecture development support
- Advanced radar systems
- Real-time signal processing

Test Support Software Development
- Automatic test equipment
- Hardware diagnostics
- Automatic test generation
- Software unit test system

Systems Development and Operations Management
- Distributed computing system applications
- Operating system utilities: development and configuration management
- Resource utilization and management systems
- User consulting/system analysis/system engineering
- Engineering/management support systems
- Data communication applications

Languages
- Assembly
- FORTRAN
- PASCAL
- JOVIAL
- ATLAS (test support language)
- ADA
- Other higher order languages PL/I, BAL

All phases of software development
- Top-level software system definition
- Program design
- Code implementation and test
- System integration and test (factory and field)

Also special openings in the following areas:
- Software management
- Software configuration control
- Distributed data processing system/architecture design
- Software training: languages, design procedures, computer architectures
- Compiler development
- Functional analytic simulation

Applicants should have a BS, MS or PhD in Engineering, Computer Science or related field. Send your resume in confidence to: Ed Haynes/P.O. Box 405828, Dept. 236/Dallas, TX 75265. U.S. citizenship required.

TEXAS INSTRUMENTS
INCORPORATED

An equal opportunity employer M/F

APPLICATION PROGRAMMER

Cody, Wyoming

Husky Oil, a fully integrated oil company, has an immediate opening in its Cody, Wyoming offices for an Application Programmer with 2-5 years OS/VS or related IBM experience.

If you are a COBOL Programmer and your lifestyle could include a small city in the Rocky Mountain West, please send your resume and salary history to:

C. Ed Hall
Manager, Human Resources

Husky Oil Company
P.O. Box 380
Cody, Wyoming 82414

Husky

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DATA PROCESSING SECURITY ADMINISTRATOR

This newly created position offers a ground floor opportunity for the qualified data processing professional. The position is responsible for the direction of all Administrative Computer Center Data Processing Security Activities. A wide variety of challenging tasks are incorporated in this function. The environment consists of a 3033, 370/168 with MVS, IMS, CICS, TSO and many other state-of-the-art technologies.

Candidates should have a college degree plus five years experience in a progressive data processing environment. A strong technical background with ACF2 or RACF exposure is a plus. Project leader activities for the implementation of ACF2 will be a prime responsibility of this position. Salary level will be commensurate with education and experience, plus an excellent benefits package and a liberal relocation plan.

Kalamazoo is a medium-sized southwestern Michigan city midway between Detroit and Chicago, offering an excellent mix of cultural, educational and recreational pursuits.

Please submit resume, including salary requirements to:

Kathleen diCicco
The Upjohn Company
7000 Portage Road
Kalamazoo, MI 49001

Upjohn

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SYSTEMS ENGINEER

When you explore a move to Magnuson, the first thing you'll notice is a solid sense of direction -- in our people, in our products, and in the way we do business. We call it the Magnuson Difference, and it could be the difference your career needs today.

If you have at least 4 years of experience as a Systems Engineer, Systems Porgrammer or Systems Analyst in the field of MVS or SVS software, you'll want to take a close look at this opportunity.

You will interface directly with potential customers in a national marketing support position, and coordinate MVS benchmarks to demonstrate Magnuson Systems capabilities.

We offer excellent salaries and benefits, of course, but most of all we offer a true ground-floor opportunity with a new leader in the computer field.

Please send your resume, in complete confidence, to David C. Lovell, Magnuson Computer Systems, 2902 Orchard Park Way, San Jose, CA 95134; or call, (408) 946-8100. If outside California, call toll free (800) 538-7908. We are an equal opportunity employer, m/f/h.

HELP MAKE THE MAGNUSON DIFFERENCE

Director Data Processing

Portland, Oregon

Rapidly growing company is seeking an outstanding individual to head up its DP organization.

The successful candidate will be a "DOER" who possesses excellent management and communication skills, relates well with all levels of management and can identify with corporate goals and participate in the planning thereof.

Individual will have implemented complex systems in a large IBM terminal-based environment and will direct the further planning and implementation of cost effective systems to meet rapidly increasing needs. This position offers excellent compensation and growth opportunities.

We are consultants to management. For consideration, please send resume, including salary history, in confidence, to Rob Greene, One Maritime Plaza, Suite 1300, San Francisco, CA 94111. (415) 989-7128. Employer assumes fee.

professionals for computing, inc.
Search & Personnel Services

DATA PROCESSING MANAGER - NORTHERN NEW ENGLAND

Due to a recent promotion, we are seeking a Data Processing Manager for our Group Data Center servicing four (4) operating divisions of this Fortune 500 Company.

This is a highly visible position reporting to the Vice President and General Manager of the Group. The successful candidate will have demonstrated significant Data Processing Management skills, knowledge of manufacturing and financial systems, knowledge of medium or large scale systems, and telecommunications. MRP and inventory control experience are a definite plus.

This position offers a unique combination of significant career opportunity and a unique recreational and cultural setting.

For consideration, resume and salary history should be forwarded to:

CW Box 2204
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

"AN EQUAL OPPORTUNITY EMPLOYER - M/F"

Information Systems Development

Billion dollar electric utility company with centralized data center has immediate need for project members serving at major project level.

All positions will act as team members in development of specialized computer applications relating to engineering, financial, or power plant construction. CICS or DBMS experience would be a plus.

- **System Analyst**
  Requires strong design and analysis background and experience in development of Data Base Systems. Degree preferred. 5-7 years experience as System Analyst. Previous experience in construction systems helpful.
- **Sr. Programmer/Analyst**
  To function in engineering or construction systems environment. Degree preferred. Requires FORTRAN or COBOL with 5-7 years experience in data processing environment.
- **Programmer/Analyst**
  To function in financial or construction systems environment. Degree preferred. COBOL with 2-5 years experience in data processing environment.
- **Programmers**
  To function in financial systems or other business applications environments. Require COBOL with 2 years programming experience.

Selected candidates will have the unique opportunity to grow and develop within a state-of-the-art organization.

Send resume and salary history to Employee Relations Division, Management Recruiting Department. Principals Only.

Central and South West Corporation

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Equal Opportunity Employer

PROGRAMMER ANALYSTS SYSTEM PROGRAMMERS

We need several talented, highly motivated individuals to perform conversion from Honeywell to IBM 4331 Series equipment; immediately followed by system redesign of commercial systems. If you have 5-10 years experience with DOS/VS, RPG, DL/I or CICS, please submit resume and salary history to: [illegible] Brothers Company, P.O. Box 2847, Tulsa, Oklahoma, 74101, Attention: J.L. [illegible].

MICRO DATA BASE SYSTEMS, INC., a leader in sophisticated data base management systems, is hiring persons having substantial hands-on experience with micro-computers for positions in our systems and applications departments. Programming capabilities are required. We also have openings for highly aggressive marketing individuals, having experience in the micro-computer industry. For both positions knowledge of data base management systems and formal training in either Computer Science, MIS or Electrical Engineering are desirable. Salaries are negotiable. Call 317-[illegible], or send resume to P.O. Box 248, Lafayette, IN 47902.

INSTRUCTOR OF COMPUTER SCIENCE

Pikes Peak Community College
5675 South Academy
Colorado Springs, CO 80906

Bachelors degree required plus 3 years production experience. Experience in PDP 11, RSTS/E, BASIC, COBOL, FORTRAN and IBM 370, DOS/VS. Salary will depend upon qualifications and experience. Position effective Sept., 1980. Contact Associate Dean at 303/576-7711, ext. 416. Application deadline Aug. 15, 1980.

N.Y. City

-CONTRACTS, to

$200/DAY

-FULL TIME, to

$35,000

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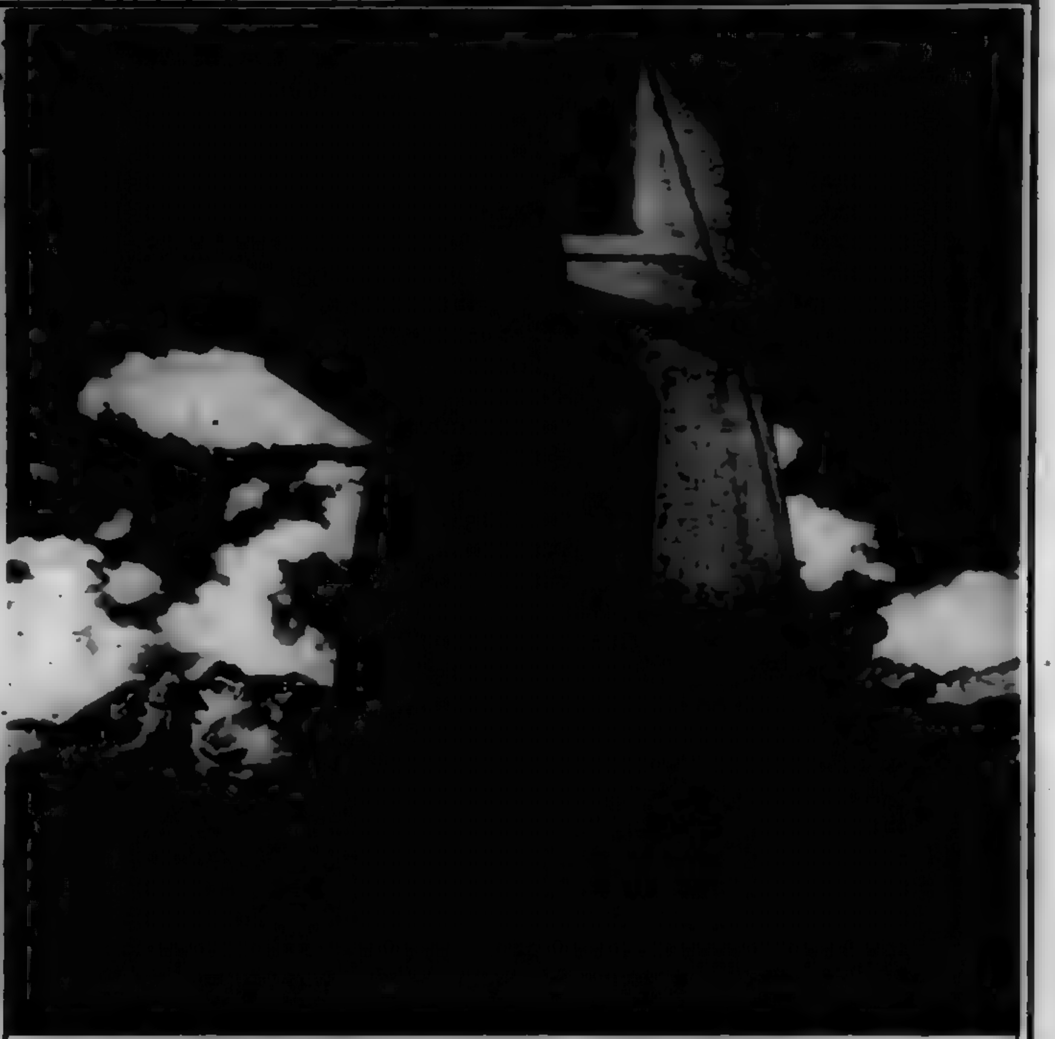
- [illegible]

Call or forward resume to:

PARAMOUNT CONSULTANTS
275 Madison Avenue
New York, New York [illegible]
(212)[illegible]



If you've no place to climb, we'll find you a mountain to conquer.

You're a climber. But you've reached a plateau and the view is bleak. Not too far in the distance stands Dunhill with a whole range of mountains to conquer in EDP; programmers, systems analysts, engineers, marketing people...every phase of EDP. Not just jobs for candidates, but jobs with growth potential. As EDP specialists, our system is based on a firm working principle: Thorough factual input of what a company wants and what a candidate expects of a company. The result is fewer surprises on both ends. And the professionals Dunhill places start with a better opportunity to conquer. Hail the conquerors!

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Advancing Your Interest Is In Our Interest.

If you feel it's time to move to a job that will further your career goals, move on to us. We're Amherst Associates Inc., an expanding consulting and computer services firm. You need more challenge, more room for growth — we need more skilled professionals, nationwide, to fill the demands of the burgeoning computer industry: Programmers, Programmer/Analysts, Systems Programmers, or Senior Technical Programmers. A background in Digital RSTS and BASIC will qualify you.

We also have an immediate need for a financial project manager with exposure to senior management, knowledge of general ledger, accounts receivable and accounts payable.

If you're interested in an outstanding company-paid benefits package and a salary commensurate with your qualifications and experience, you're interested in Amherst.

Please send your resume, in complete confidence, to:

Personnel Office
AMHERST ASSOCIATES INC.
210 Old Farm Road, Amherst, MA 01002
or call (413) 256-6306

We will respond to all inquiries.

Equal Opportunity Employer

SOFTWARE DEVELOPMENT OPPORTUNITIES

SYSTEMS ENGINEERING LABORATORIES is a vigorously growing manufacturer of state-of-the-art 32-bit minicomputer used in high-performance real-time applications. The following career opportunities are available due to SYSTEMS tremendous growth in a sophisticated technological environment.

SUPERVISOR OF COMPILER DEVELOPMENT

Position will carry responsibility for the implementation of all corporate language implementations, including FORTRAN, COBOL, PASCAL, BASIC. Supervisory and planning ability is required. The successful candidate should have built two or more complete language products including all documentation. In this Senior position, the candidate will participate in new product definition in an engineering organization, and interface with the marketing organization to supply data for the corporate product planning and merchandising functions.

COMPILER DEVELOPMENT STAFF MEMBERS

Individuals selected will have experience in coding, testing, and developing compilers and language products. These positions will offer the opportunity to provide technical leadership as the in-house consultant in compiler development.

SOFTWARE SUPPORT ANALYST

This position involves troubleshooting software problems and identifying weak points in new operating systems. The successful candidate will have experience in identifying software design problems or misapplications of software in both the operating system and application level. Background in real-time operating systems and ability to interface with both customers and development engineering is an absolute necessity.

SOFTWARE TECHNICAL WRITER

Dynamic, growing software writing group needs a highly-motivated software writer with background in operating systems, communications, data base management, and/or a language such as ASSEMBLER, FORTRAN, MARY2, PASCAL or COBOL. As an integral member of a product programming team in the Software R&D organization, you will be responsible for producing reference manuals, user's guides, technical manuals, pocket cards, and other literature for that product. You will have the support of the software writing group and in-house word processing, art, and printing departments in this capacity. Substantial writing samples are required. Excellent opportunity for individual with 4 or more years experience in computer-related technical writing who is seeking responsibility and challenge.

We offer competitive salaries, comprehensive benefits and the opportunity to make a personal impact in a totally state-of-the-art environment. For confidential consideration, send your resume or letter of information to Fred Brillante.

6901 W. Sunrise Blvd.
Ft. Lauderdale, Florida 33313

SYSTEMS
ENGINEERING LABORATORIES

We Are An Equal Opportunity Employer, Male/Female/Handicapped

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COUNTY OF HENRICO RICHMOND, VA

The county of Henrico is seeking data processing professionals for the following positions:

EDP PROJECT LEADER

Direct and implement the design, programming, maintenance and documentation of complex, major long term projects. Requires college degree in data processing sciences or related field and 4 years progressively responsible and professional computer systems and programming experience, or any equivalent combination of experience and training. Salary range: $19,170-[illegible]

PROGRAMMER ANALYST III

Direct and implement the design, programming, testing, documentation and maintenance of computer software used in support of application and control systems. Requires college degree in data processing sciences or related field and 4 years progressively responsible and professional computer systems and programming experience; or any equivalent combination of experience and training. Salary range: $[illegible]

PROGRAMMER ANALYST II

Implement the design, programming, testing, documentation and maintenance of computer software used in support of applications and control systems. Requires college degree in data processing sciences or related field and at least 2 years of progressively responsible and professional computer systems and programming experience; or any equivalent combination of experience and training. Salary range: $[illegible]

To request application form please call the Personnel Office ([illegible]) [illegible]. Resumes must be accompanied by completed application form.

AN EQUAL OPPORTUNITY EMPLOYER

ROBERT HALF

[illegible]

HOUSTON

CITY OF OPPORTUNITY!

Energy Company
will buy home and pay interest differential plus relocation for the right people!

Prog/Analyst .... $[illegible]
Systems Analyst .... $[illegible]
Sr. Sys Analyst .... $[illegible]

Must have IBM 370/MVS COBOL exp. Prefer Oil & Gas accounting systems and IMS.

Life Insurance
New positions for new development projects.

Programmers .... $17-[illegible]
Prog/Analysts .... $21-[illegible]
Sys. Analysts .... $[illegible]
Sr. Sys. Analysts .... $[illegible]
Proj Leaders $27-31,000
IBM 370/OS COBOL exp needed.

Consulting
Houston Regional office expansion to Dallas - Denver - Oklahoma - New Orleans. People are needed from Programmers to Project Managers.

Programmers .... $[illegible]
Prog/Analyst .... $[illegible]
Sr. Prog/Analyst .... $[illegible]
Proj Leaders .... $[illegible]
Proj Managers .... $[illegible]

Must have large IBM OS equipment experience and IMS or CICS or ADABAS. Mark IV a plus.

For further information, call JIM FLEMING at 713/[illegible] (collect) or send a copy of your current resume to:

ROBERT HALF
EDP DIVISION
[illegible]
Houston, Texas [illegible]

Assembly Language Programmers

Walnut Creek, California

Varian Instrument Group is a world leader in the field of separation science instruments in research chemistry. Our facility, located in the highly desirable East Bay area of the greater San Francisco Bay Area currently has several career opportunities for individuals to join our team in gas and liquid chromatograph products.

These positions require a minimum of two years' assembly language programming experience on Z80 or 8080 CPU's to participate in the development of microprocessor-based products. Degree preferred in computer science or related field with some chemistry.

We offer excellent fringe benefits package including health and dental insurance plans for employees and dependents. For confidential consideration please forward your detailed resume, including salary history and requirements to: Personnel Manager, 2700 Mitchell Drive, Walnut Creek, CA 94598. Equal opportunity employer M/F/H.

VARIAN
Instrument Group

SOHIO

COMPUTER SCIENCE PROFESSIONALS

Looking for:
-A Challenge and
-Career Opportunities

OLD BEN COAL, the mining division of SOHIO is developing exciting new exploration, planning and financial modeling systems on CYBER 175, 760 computers. To meet our challenge, we need the following experienced professionals:

SCIENTIFIC/TECHNICAL/FORTRAN PROGRAMMER

The incumbent should have a degree in mining engineering, geophysics, computer science or related field and a minimum of four years experience in FORTRAN programming. Mine simulation or exploration systems experience preferred.

COBOL/DATABASE/GRAPHICS/FINANCIAL MODELING PROGRAMMING

A degree in business administration, math or computer science and four years of COBOL programming experience is required. In addition, experience in FORTRAN programming, system 2000 database, interactive graphics software and financial modeling systems is highly desired.

TIMESHARING/CUSTOMER SUPPORT COORDINATOR

A degree with computer courses and two years of timesharing or wordprocessing experience is required. The incumbent will provide timesharing customer support on telephone, train users, write/type user manuals and administer userid's, manuals, terminals, budgets, etc.

SENIOR PROGRAMMER ANALYST

Minimum five years experience in analysis and COBOL programming. Burroughs systems experience preferred. Strong verbal and written communications skills a must. Exposure to engineering/maintenance systems a plus.

In addition to competitive salary, we provide excellent benefits including tuition reimbursement, dental insurance and stock plan. Send your resume to:

Employee Relations Dept.
Old Ben Coal Company
A Division of the Standard Oil of Ohio Company
125 S. Wacker Drive
Chicago, Illinois [illegible]

INSURANCE

Join an established company building a full D.P. capability from zero...

$25-35,000
Project Manager Life Systems
Project Manager Accident Health Systems
Sr. Programmer Analysts

Experience with LIFE/70, ALIS or CFO systems desired. BAL and COBOL experience in a large scale environment is helpful.

Our client is moving over the next few years from facilities management to a full in-house computer department located in the suburban Philadelphia area. If you believe you have the requisite professional and personal skills for the above positions we would like to hear from you. This is a unique opportunity to "do it your way".

To apply, send resume with salary history in complete confidence to:

Systems Personnel, Inc.
Suite 90 P.O. Box 14
Haverford, PA 19041
215-[illegible]

Systems Personnel Inc.

COMPUTER CENTER
UNIVERSITY OF RIYADH

Riyadh University requires the following support personnel for its 3033N MVS/VTAM/ACF/NCP/IMS/VS installation in Riyadh, Saudi Arabia:

IMS/VS Systems Programmer:
At least 3 years experience in IMS/VS generations, PTF installation and debugging. Must have good knowledge of IMS/VS control flow, message format services, performance tuning considerations and IMS/VS program products. Strong ALC background is required. Knowledge of MVS/TSO would be an asset.

Applications Project Leader:
At least 5 years experience in feasibility studies, design and implementation of large DB/DC applications. Must have good knowledge of COBOL, HIPO and project control techniques. Should be capable of leading projects independently. Knowledge of Arabic would be an asset.

Senior Programmer Analysts:
At least 3 years experience in design and programming of large DB/DC applications. Must have excellent command in COBOL, structured programming and HIPO documentation techniques. Knowledge of Arabic would be an asset.

User Interface Project Leaders:
At least 5 years experience in data processing with emphasis on preparing user documentation, user training manuals, user feasibility studies and support of remote users using RJE/3270 terminals. Some knowledge of COBOL and other programming languages would be an asset. Knowledge of Arabic is mandatory.

Please forward a copy of a recent resume to:
The Director - Computer Center
c/o Saudi Arabian Educational Mission
[illegible] Street, Suite 1144, Ottawa, Ontario, [illegible]

SYSTEMS PROGRAMMERS & PROGRAMMERS

For a future of uncommon opportunity consult the resourceful company

We're a worldwide leader in chemicals, energy and technology

Our resources are formidable. With operations in more than 37 countries and assets in excess of $2 billion, we are consistently ranked among the top 200 industrial corporations in the country on the basis of sales and earnings.

We are committed to growth — ours and yours. A significant portion of our total expenditure is allocated to capital and research spending but we believe that people-human resource development- is the key to our future. For that reason we emphasize the professional and personal development of our people through participative management, management by objectives and a variety of skill training programs and seminars.

We have immediate openings in our expanding Pasadena operations for DP people seeking a high order challenge with skills building potential. We work with a large scale Amdahl main frame in OS/VS, TSO, IMS environment using a full complement of vendor supplied software. Candidates must meet the following requirements:

SYSTEMS PROGRAMMERS

1-2 years experience. Join a technical support team responsible for performance monitoring, telecommunications, software and hardware evaluations. A background in one or more of the following areas would be a plus — VM, OS/VS, JES, HASP, TSO, IMS or MAF. College degree preferred.

PROGRAMMERS

1-3 years COBOL experience is required; MARK IV exposure a plus. You will function as part of an application team in an IMS, DB/DC environment using structured technology. College degree preferred.

We offer excellent salary, outstanding benefits and clear prospects for growth in a climate of expansion. Send resume including salary requirements and career objectives to Jesse DeLeon or call collect: (713) 476-6812.

Diamond Shamrock

P.O. Box 1000
Pasadena, Texas 77501
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Programming

IT'S WITHIN YOUR REACH . . .

. . . the career of a lifetime is within your grasp, with the company that's setting the pace in the Data Processing field: Western Bancorp Data Processing Company.

We operate one of the most extensive DP environments in the West (16 data centers in 11 states), applying state-of-the-art technology to meet the needs of Western Bancorp's 21 banking customers. Currently, in our two Southern California facilities, continued growth has created openings for those who would like to progress with us in such positions as:

LOS ANGELES FACILITY

SR. PROGRAMMER/ANALYST

Performs analysis, design and programming assignments for new and existing systems, and offers technical assistance to other analysts. Extensive knowledge of COBOL and OS/JCL essential; CICS command level and VSAM highly desirable.

INTERMEDIATE PROGRAMMER/ANALYST

Handles all phases of programming assignments, designs system enhancements, prepares program specs and designs client manuals and related documentation. Requires knowledge of COBOL and OS/JCL; TSO background desirable.

EL SEGUNDO FACILITY

PROGRAMMER/ANALYST

Performs routine programming assignments and assists in the research and preparation of new system developments and enhancements. Must have COBOL experience in applications development and a good working knowledge of OS/JCL; background in structured programming/design techniques as well as CMS or TSO, VSAM and BAL desirable.

SOFTWARE PROGRAMMER

Will evaluate, develop and implement communication software to support the intersystem communication between our on-line teller terminal network (TIPS) and regional sites. Candidates must have a basic knowledge of communication service systems, strengths in Assembler language and TCAM/VTAM, and effective communication skills through written reports.

SOFTWARE PROGRAMMER

Will assist in the definition and development of new 3600 application functions as well as assist in controller program maintenance and problem analysis. Knowledge of BAL and JCL needed, plus experience in minicomputer programming.

WBDPC offers some of the best rewards in the business, with a wide-ranging benefits plan that includes special banking privileges. Reach out!

For more information and consideration, please send resume or call:
Reva Bennett (213) 647-3034 (El Segundo) or
Susan Garland (213) 614-4067 (Los Angeles)

Los Angeles Facility
411 N. Vermont Ave.
Los Angeles, CA 90004

El Segundo Facility
871 S. Nash St.
El Segundo, CA 90245

WESTERN BANCORP DATA PROCESSING COMPANY

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ID Graphics

Our graphics industry clients nation-wide, both vendors and users, have retained us to help in their rapid expansion. If you have mini-computer oriented operating systems or scientific applications experience, at programmer through management levels, we would like to talk to you to see if your skills and objectives match these highly desirable opportunities. Write or call today at no cost or obligation.

Call Jim Bond, toll-free at
1-800-243-9991.
Connecticut residents, call
528-9393.

Identity Search

111 Founders Plaza East Hartford, CT 06108
All fees are assumed by client companies.
1-800-243-9991

TELECOMMUNICATIONS COORDINATOR

COME GROW WITH US AT WESTINGHOUSE

We are currently seeking an experienced Telecommunications Coordinator with a minimum of five years experience in Data Communications and Data Networks and a B.S. degree or equivalent in Engineering or Electronics.

Background should include experience with terminals, communications controllers, time division and statistical multiplexors, modems, communications protocols, tech control centers, and related diagnostic equipment.

Responsibilities include extensive user contact to coordinate development, acquisition and utilization of data communications systems and networks. You would also provide a consulting service to all corporate locations and ensure that worldwide data systems respond to requirements.

For confidential consideration, please call (412) 244-2884 (collect) or send your resume to Mr. E.C. Koontz.

WESTINGHOUSE ELECTRIC CORPORATION
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1801 BRINTON ROAD
PITTSBURGH, PA 15221
An Equal Opportunity Employer

PROGRAMMER

Adrian College is a friendly and growing liberal arts college located in south eastern Michigan. We are seeking an individual to participate in the design and implementation of administrative and academic software. Applications experience in BASIC and strong communication skills are needed. RSTS experience is a plus. Please forward resume, salary requirements and references to:

[illegible]
Director of Computer Services
Adrian College
Adrian, MI 49221
(An equal opportunity employer)

DALLAS

Software DBMS

Service company needs DB/DC bkgd ([illegible], IMS, IDMS) to specialize in a key support role in new product/service offering. Salary to high 30's. Fees paid.

Suite 1100, Stemmons Tower W
Dallas, TX 75207 (214) 637-6300

DATA PROCESSING CAREERS inc.

LOCAL AREA COMPUTER NETWORKS

COMPUTER SCIENTISTS needed to develop technology and conduct experiments in local area computer networking. This work includes design, implementation and application of local computer networks; participation in voluntary standards technical committees and contract monitoring for the development of standards and supportive technology assessments and forecasts.

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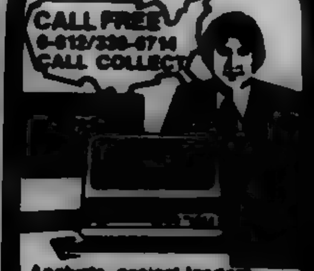

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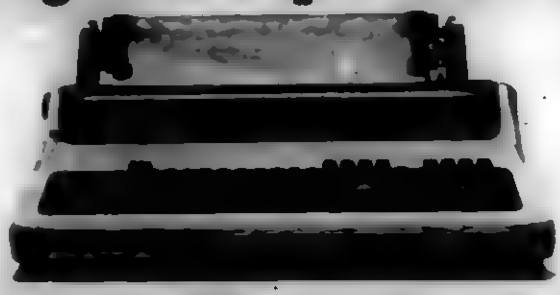

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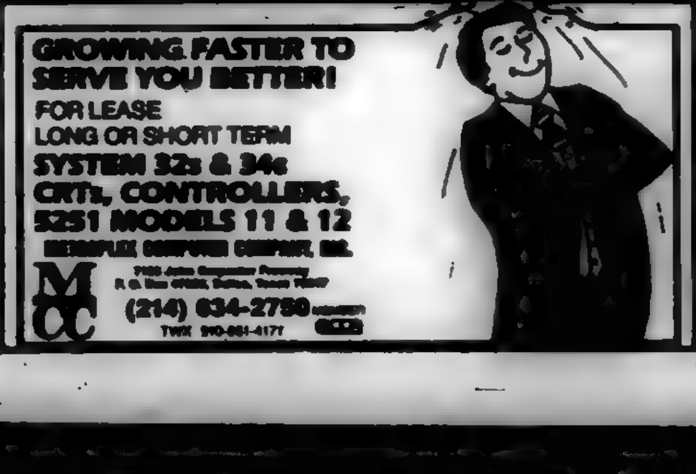

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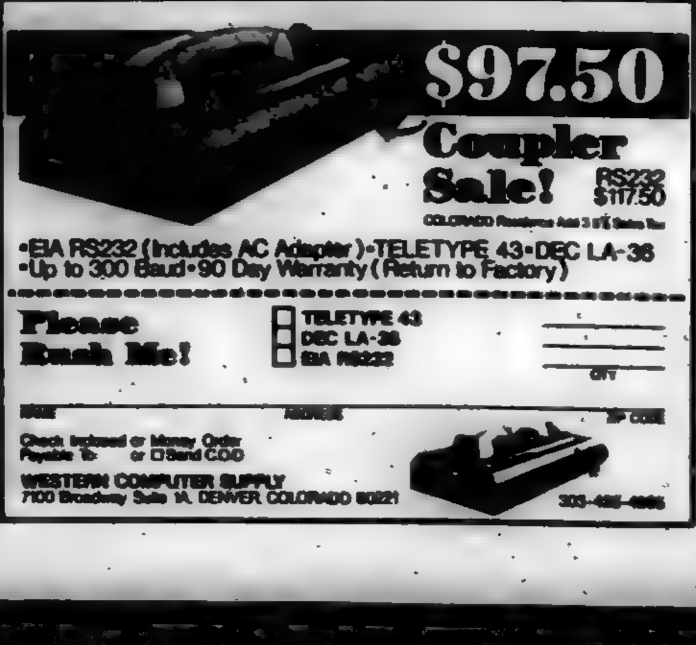

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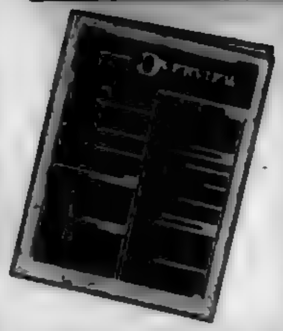

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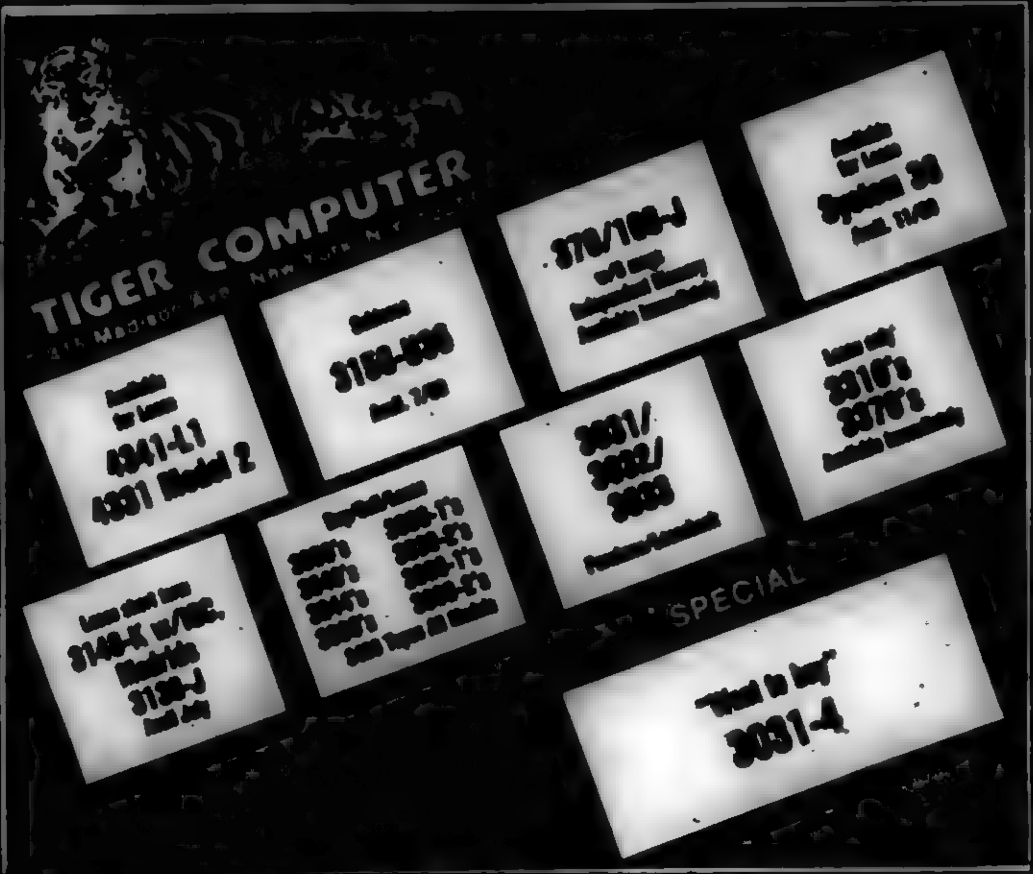

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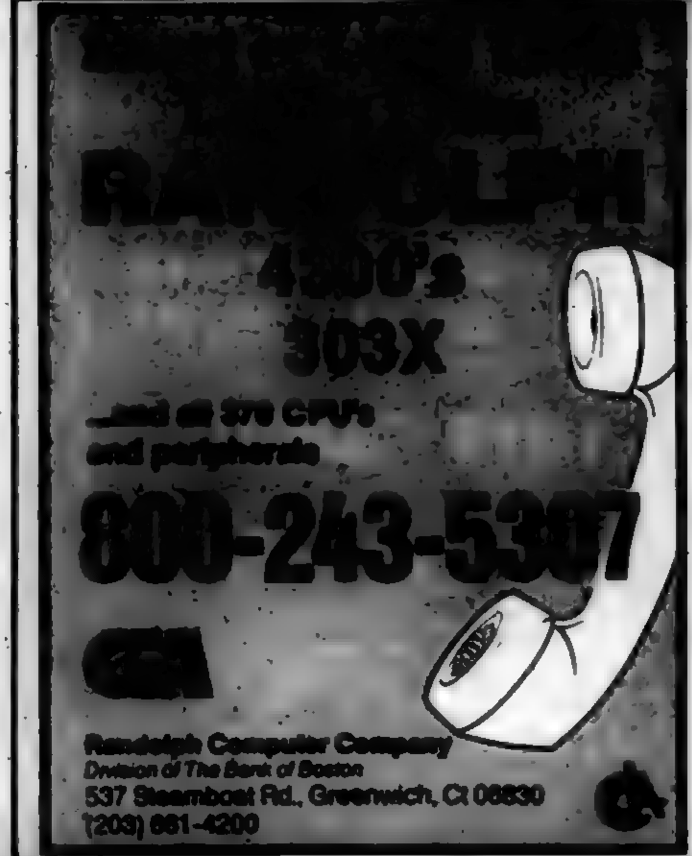

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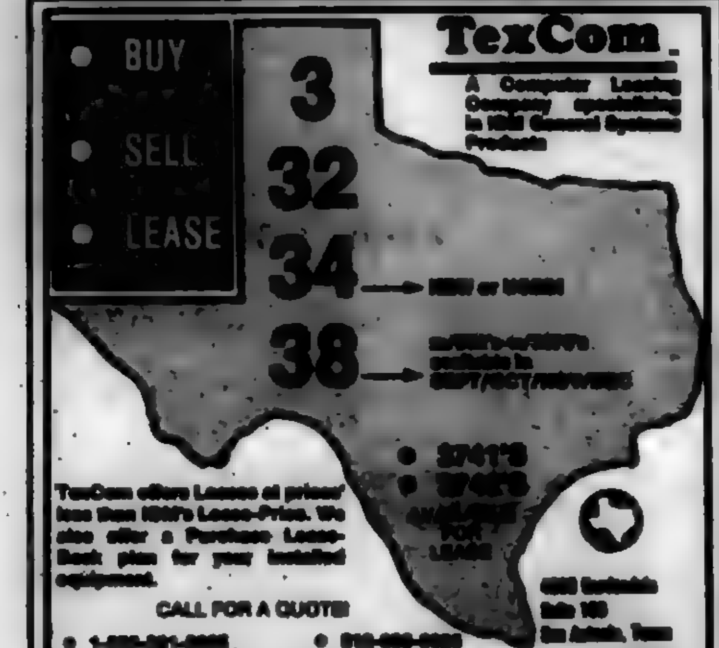

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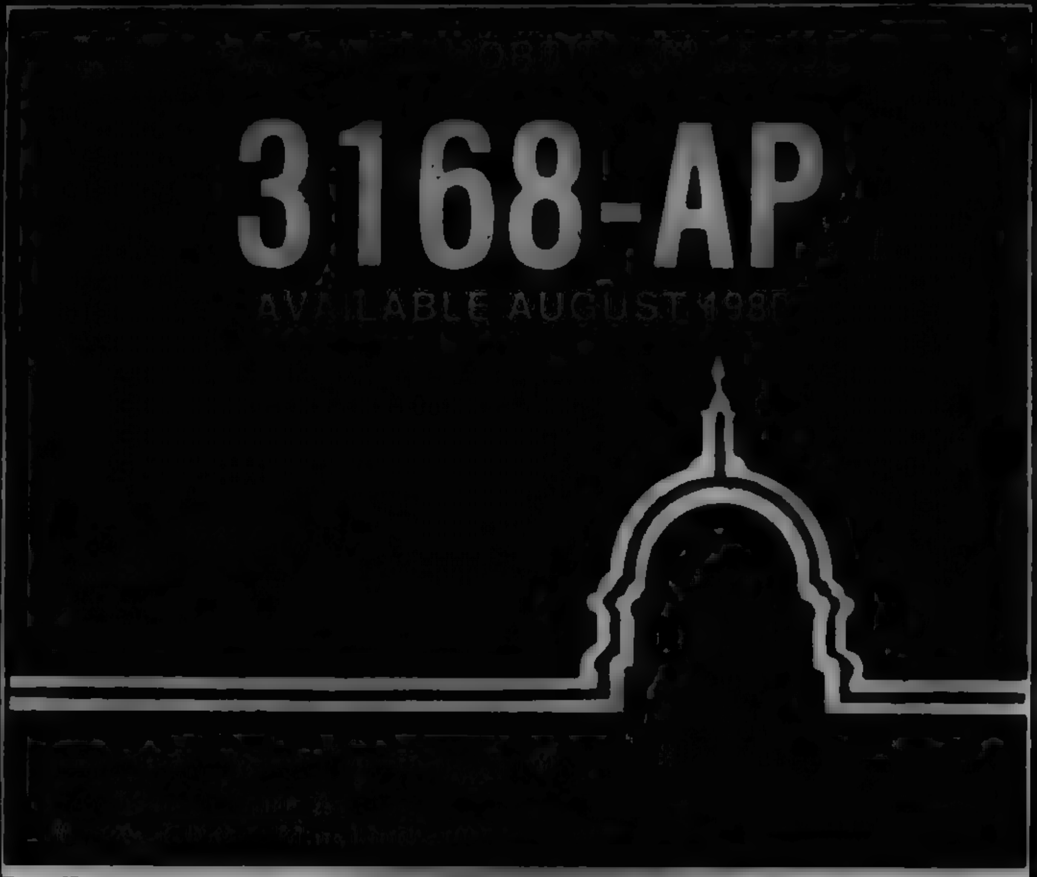

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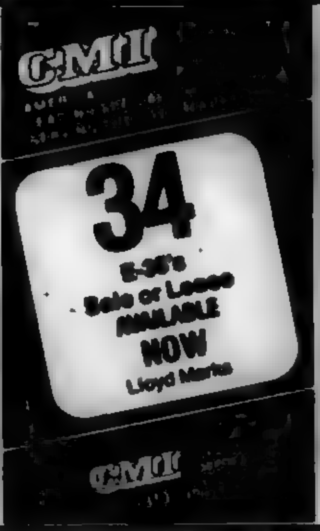

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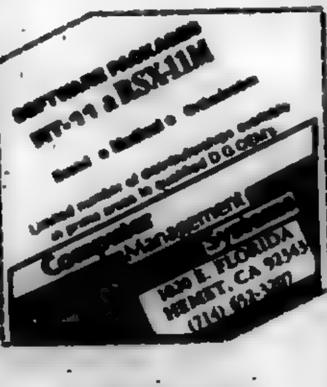

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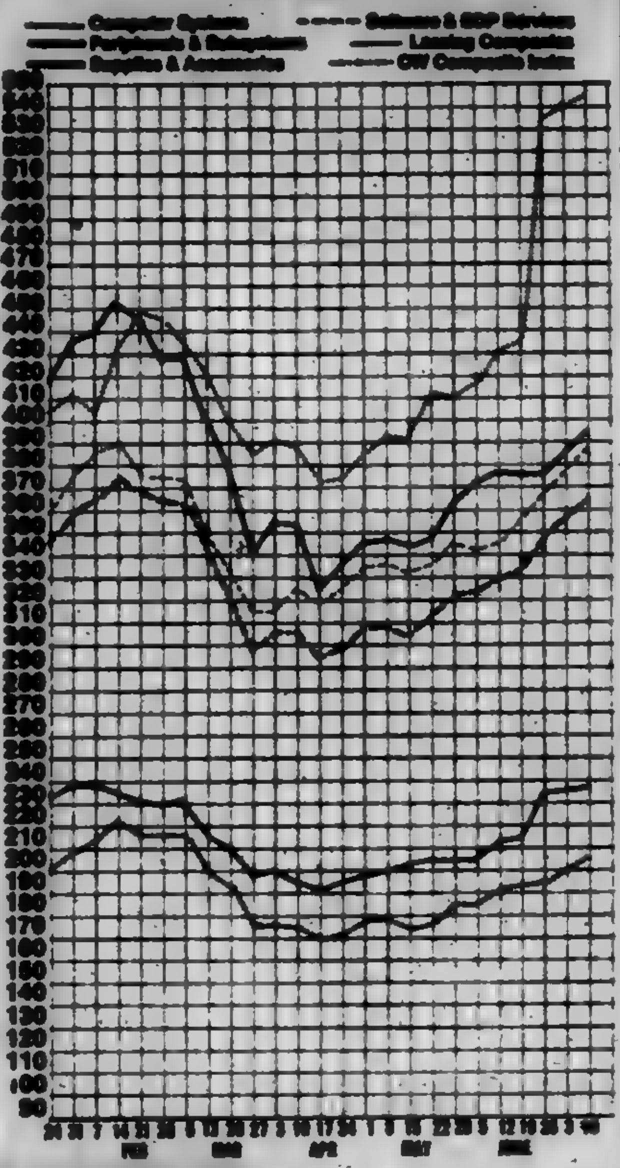

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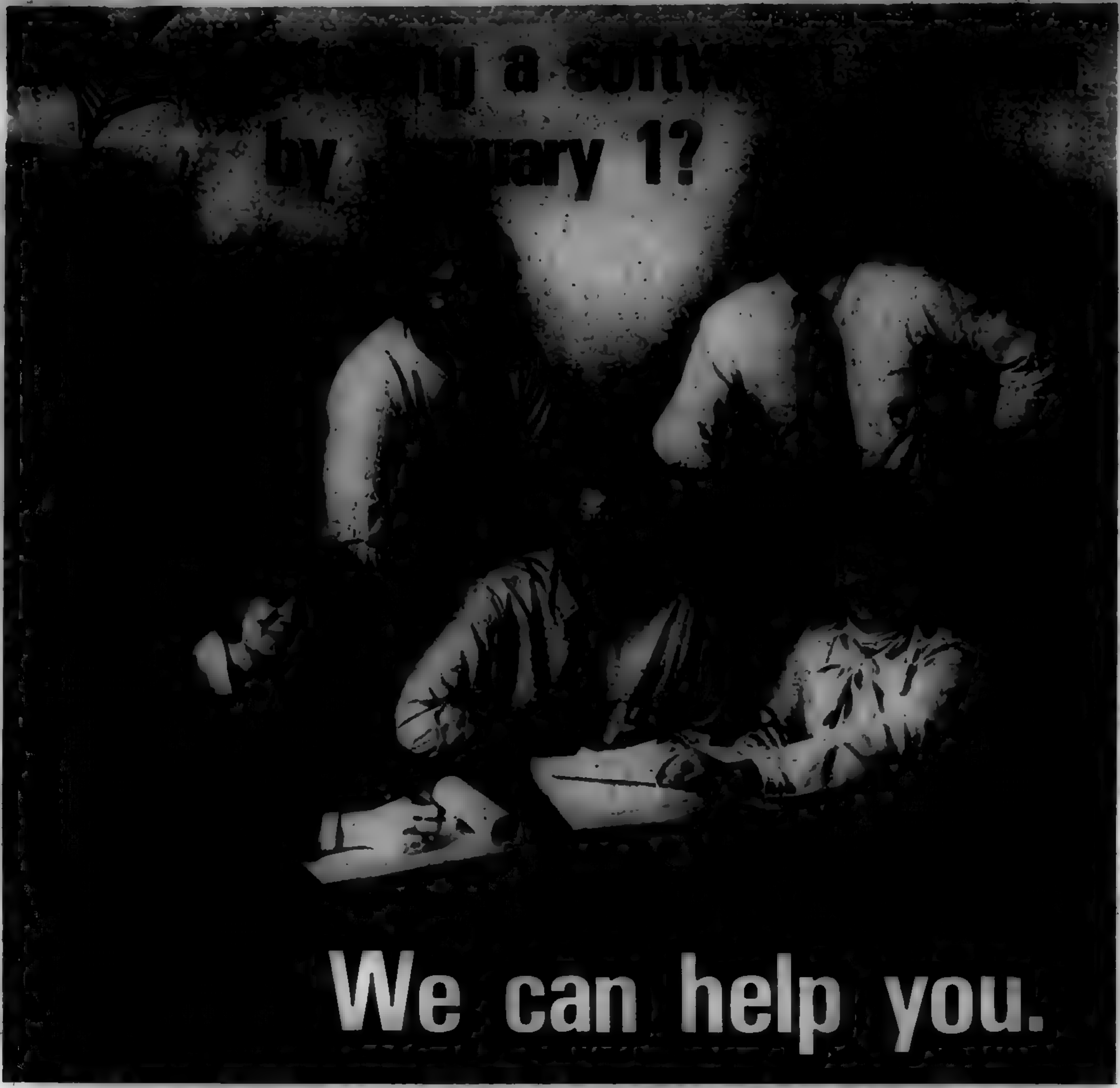
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Space Shuttle Lags May Delay Satellite Use

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Continuing delays in launching the space shuttle are increasing costs for U.S. satellite communications carriers and may delay provision of the related services, carriers said last week.

Although alternate launch facilities are available, Philip Schneider, vice-president for satellite systems at Western Union Telegraph Co., said the delay in the shuttle program will make it more difficult to meet customer requirements.

The present shortage of satellite channels — most satellite communications carriers are putting new service orders on waiting lists — will ease somewhat within the next few years as additional satellites are launched by Western Union and others, Schneider explained.

But, by about 1984, new applications are expected to create another crunch, he said. This will be caused primarily by rapidly growing needs for satellite channels to handle data collection and distribution and cable and broadcast TV applications. Schneider said he is "unsure" how long the shortage will continue after 1984.

First Flight

Originally planned for March 1979, the first flight of the shuttle has been delayed repeatedly. The latest slippage — from November 1980 to February or March of 1981 — was announced early this year by the National Aeronautics and Space Administration (Nasa), which is in charge of developing, launching and operating the shuttle.

Last week, a Nasa spokesman said a further delay of up to 11 weeks is under consideration. He expects a decision to be announced by the end of this month.

Even assuming the present schedule holds, it will be September 1982 before the first communications satellite is sent aloft aboard the shuttle. There will be four flights preceding this launch, but all will be devoted to testing the shuttle and its complex supporting systems.

The September 1982 flight will carry a tracking and data relay satellite (TDRS) to be used exclusively by Nasa. The following November, under the current schedule, Satellite Business Systems (SBS) will be the first carrier to launch a commercial satellite aboard the shuttle.

(Continued on Page 4)

Wide World Photo

Republicans Rally CPUs

• CBS System Tracks Details

By Marguerite Zientara
CW Staff

DETROIT — Amidst the hoopla that was the Republican Convention here last week, CBS News used its electronic wizardry to gather, process and disseminate data about convention goings-on to an army of reporters and millions of home viewers around the country.

Besides gathering and channeling relevant information to its own legion of reporters here at Joe Louis Arena, CBS also ran a computerized system for tallying delegate roll call votes, the results of which were transmitted electronically to all three major television networks.

With the roll call tallying system lying dormant except for the presidential

(Continued on Page 8)

• ABC Marks New Beginning

By Bruce Hoard
CW Staff

DETROIT — The Republicans were seeking a new beginning here last week, and so was ABC News.

For the Republicans, it was political unity; for ABC, it was the implementation of its electronic editorial system. That system, given the blessing of top brass, may develop into a computerized worldwide news-gathering network.

The system was used here to access a political data base filled with 2.4 million bytes of information gathered since the primaries began. After a typed command by a producer, ABC anchormen Frank Reynolds and Ted Koppel had only to watch their CRT terminals to obtain any information

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Address Feature Extends Options For 3033 Users

By Marcy Rosenberg
CW Staff

WHITE PLAINS, N.Y. — One of the newest carrots IBM is dangling before users of all versions of its 3033 CPU is the Extended Addressing feature, but only the 3033 multiprocessor (MP) version can take the full 32M bytes out of it.

One of several OS/VS2 MVS enhancements the firm recently announced [CW, June 16], Extended Addressing was described by IBM as an "architectural extension implemented in hardware and microcode" that will allow 3033 multiprocessors to directly address up to 32M bytes of information. This is double the previous capability for the maximum MP configuration consisting of two 16M-byte processors.

However, IBM is also making this

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Structured Methods: The Impossible Dream?

By Rita Shoor
CW Staff

AUGUSTA, Maine — Does increasing programmer productivity by 21%, training someone without programming experience to generate usable Cobol code in three to five weeks and meeting target completion dates for application systems 94% to 95% of the time sound like the impossible dream?

It's happening at the Central Maine Power Co. here, and much of the credit is attributed to structured techniques, according to Brian S. Callahan, a supervisor of technical support systems.

The switch to structured methodology began with intensive training for several staff members and was based essentially on the techniques generally associated with Edward Yourdon, head of Yourdon, Inc., Callahan said. Once this core group had been trained, audio/visual courses from Deltak, Inc. were provided for the rest of the staff.

This is the first in a series of articles describing users' experiences — both successful and not so successful — with structured methodology.

The following techniques are currently used by Central Maine's staff:

- Top-down design and testing.
- Structure charts with numbering conventions to identify the chart level and special symbols for common modules. (Callahan specified that logic flow switches rather than data flow are illustrated on these charts.)
- Structured walkthroughs.
- Coding rules that include strict indentation for increased readability, the enforcement of a "no literals" requirement and GOTO-less coding structures.

A flexible attitude is essential, since not all structured techniques are appropriate for every organizational environment, he said.

The chief programmer team approach and hierarchical input-process-output (Hipo) charts were among the tools which Callahan's group de-

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.
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$1.00 a copy: U.S.— $30 a year; Canada, Central & So. America — $60 a year; Europe and Near East — $90 a year; other foreign — $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Computer Gear Overtaxed

Data Lags Cited in Nuclear Mishap

By Brad Schultz
CW Staff

LYNCHBURG, Va. — Computer equipment problems during the Three Mile Island nuclear mishap of last year mainly involved a two-and-a-half-hour lag time in generating output data on the overheating reactor plant's status.

So said a spokesman for Babcock & Wilcox, Inc. (B&W), which designed the ill-starred General Public Utilities Co. plant, in explaining how B&W has developed and begun to sell the Real Event Computer Acquisition List and Logger (Recall) to prevent that trouble from happening again.

In an interview last week, the spokesman gave *Computerworld* an insider's view of how overtaxed computer gear stymied early efforts to shut down the Three Mile Island plant, where a melting reactor core appeared ready to send an immense cloud of radioactive gas over the densely populated northeastern U.S.

The plant's main computer system, a special-purpose Bailey Meter Co. Model 855, "worked very well" at the time, according to Jim Brunke, manager of product management at B&W's Nuclear Power Generation Division here. But supposedly "real-time" printers fell hours behind in delivering urgently needed status data because computer data collection devices were too busy recording the information to be engaged in transmitting it.

Atom-driven power plants need data collection systems to monitor temperature, coolant-pipe pressure and other measures of whether safety parameters are being met, Brunke explained. Such information comes from analog sensor units, which send electric current to the data collectors at voltages that reflect degree of termperature, pressure or some other physical condition, such as radioactivity.

Reactimeter Problems

At Three Mile Island, a B&W collection device called the Reactimeter was installed when, in March 1979, the nation's worst nuclear calamity began. Engineers at the plant on Pennsylvania's Susquehanna River found they could not "delog" the Reactimeter — use it to retrieve status data — without interrupting the unit's logging function — acquisition of the data.

The latter was also critical, Brunke pointed out, because only through the Reactimeter could reactor experts gather a continuous digital narrative of how the overheating process developed and thus get indications of how close the core was to the dreaded condition of uncontrollable meltdown.

Worse yet, the Reactimeter, which was designed about a decade prior to the incident, was swamped by the volume of alarm signals touched off as the overheating continued. Some information bearing on the situation was lost because the system did not have time to record it.

Its Replacement

As, in one B&W spokesman's words, an "outgrowth" of the Three Mile Island troubles, Recall will replace the Reactimeter, offering a capacity for recording 448 analog and 192 digital channels. The dedicated system is based on the Compudas microcomputers turned out by Ithaco, Inc. of Ithaca, N.Y.

According to Paul Nyman, Ithaco's marketing manager, each of the three Compudas micros that comprise Recall feature a Zilog, Inc. Z-80 microprocessor; 36K bytes of random-access memory, mostly user-programmable; and an operating system in firmware.

With Recall, analog signals from sensors scattered about a nuclear power plant reach two of the system's Compudas microcomputers at the same time. Numerical values for such voltages are derived by the parallel Compudas micros and entered in memory as packets of five bytes per value. One of the micros, called a data handler, formats this data, adds checksums and other information intended to ensure integrity and transmits the data to Recall's third Compudas, which controls the I/O peripherals used by power plant technicians to retrieve the status readings.

After converting analog signals to digital packets, the second Compudas runs like the flight recorder on an airplane, Nyman continued. The same data multiplexed and routed over RS-232C lines to the I/O-controlling Compudas is stored by the second micro on cassette tapes.

And that is how B&W hopes to avert any recurrences of the Three Mile Island I/O dilemma, the company's Brunke observed. In an emergency, reactor experts could obtain a continuous flow of sensor readings sent from the data handling Compudas to the I/O-controlling Compudas, which would pass the news to graphics terminals and printers.

As for the problem of alarm signals swamping collection systems, Recall can monitor up to 3,300 analog point/-sec, according to Brunke, which can mean monitoring of 3,300 sensors in one second or one sensor 3,300 times in one second.

B&W is aiming Recall at customers within the nuclear industry. A basic system may go for about $65,000, Brunke said.

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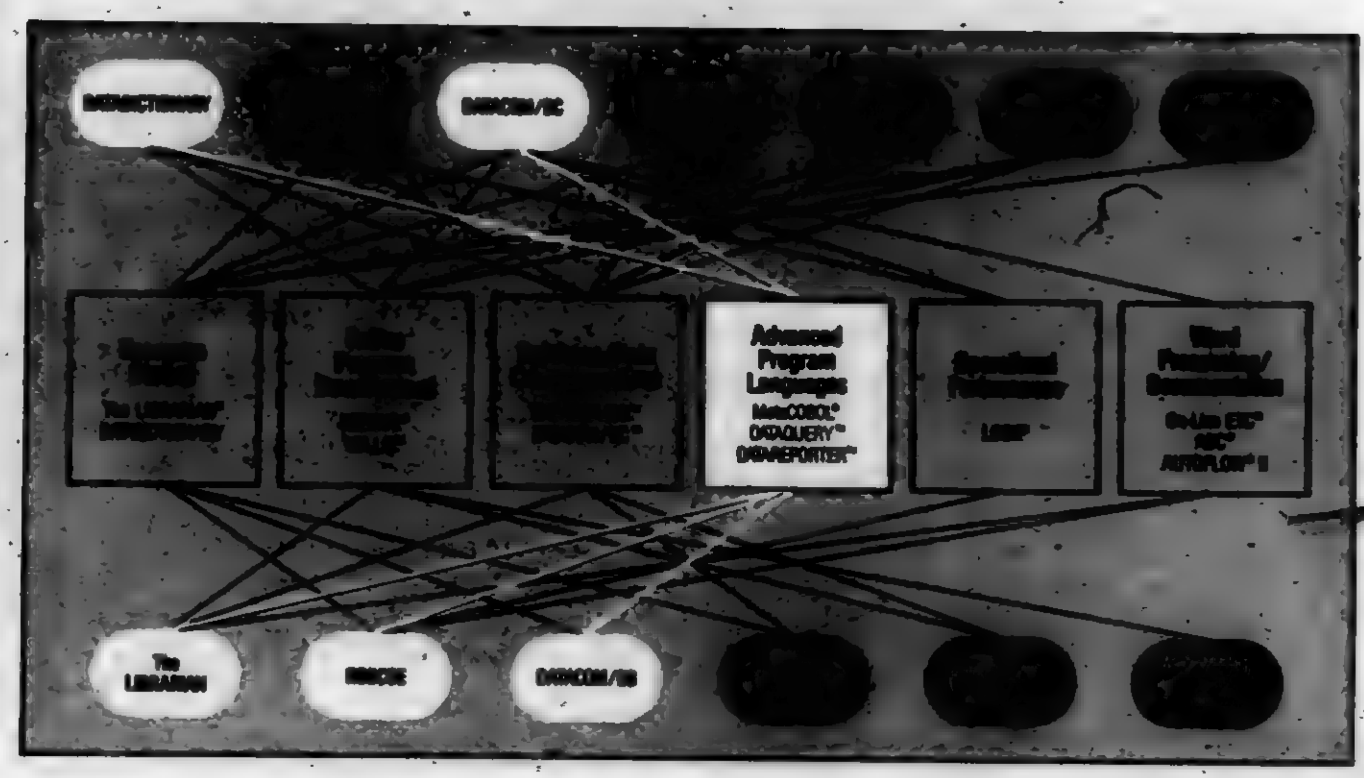

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HP Office Systems Billed as System/32 Upgrade

PALO ALTO, Calif. — Two system configurations targeted directly at the RPG marketplace have been announced by Hewlett-Packard Co. here.

Designated the HP 300 RPG/-Advanced Function System, the products are additions to the vendor's office computer line, according to a company spokesman.

The HP 300 series represents an upgrade to IBM's System 32, an alternative to the System/34 and some of the features of the System/38 for the price of a System/34-type configuration, Tom Haney, product manager, claimed. Virtual memory and data base management were among the functions he cited as more typical of the larger System/38.

Approximately 80% of HP's business in the office systems area is done through OEMs, Haney said. However, the HP 300 will be available to what he termed "major accounts — Fortune 500 companies with in-house DP staffs."

Although the conversion process from an IBM to an HP system has been simplified through software enhancements, "it still takes technical expertise to do the IBM-to-HP conversion," according to Haney.

"Our major market is businesses doing from $5 million to $50 million in sales, he said. The marketing focus at the very large accounts will be to install multiple HP 300s in various departments within the organization, he continued.

Software Enhancements

Software enhancements were also announced which supposedly bring the HP 300 to "nearly total" compatibility with many computers which are currently running RPG software, according to the company. These include an IBM-to-HP conversion utility that converts RPG source code to meet HP requirements and converts data files based on the RPG program's file layout specifications.

Both packed decimal and binary fields are converted without manual intervention, the company claimed.

Additional software includes a sort/-merge 300 extension which converts IBM-type sorts on a one-for-one basis to HP 300 sorts and an RPG file maintenance utility that reportedly allows a user to enter and modify data, delete records and inquire against a file. Neither utility requires the development of additional programs, HP maintained.

The enhancements should be very useful to the OEM that has a library of application programs running on a System/34 and wishes to make those programs available to HP installations, Haney said.

The HP 300 features printer output spooling capability which, according to the company, reduces coordination problems on multiple-user systems. Main memory is preserved during short-term power failures through battery backup, and recovery from long-term power failures or system errors has reportedly been "simplified."

The vendor is also offering support for its Model 2635A printing terminal and 2640 series of CRT terminals on the HP 300, a spokesman said, and the protocol has been modified to allow the system to interface with other RS-232-type devices.

"We're currently running with a Qume Corp. Sprint 5 printer," Haney said.

All three models in the HP 300 series include a processor, 256K bytes of main memory and an information display system. The price range for the newly announced Model 20 begins at $50,000 with 100M bytes of peripheral memory, and the Model 30 with 240M bytes of disk storage starts at $63,000.

Software costs are additional, with the RPG compiler priced at $1,500. Current delivery estimates are eight weeks from Hewlett-Packard at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Space Shuttle Lags May Delay Satellites

(Continued from Page 1)

Two major problems are responsible for slippage of the launch schedules: the thermal shield needed to protect the shuttle orbiter against the tremendous heat generated when it reenters the lower atmosphere, and engine trouble.

The shield is composed of approximately 31,000 specially fabricated ceramic tiles. The shuttle contractor — Rockwell International, Inc. — has been unable to develop a sufficiently strong bond between these tiles and an "underlayment" that separates the shield from the shuttle's aluminum skin.

As for the engines, recent tests indicate they will be ready in time for the launch as presently scheduled, a Nasa spokesman said last week. Meanwhile, a new bonding material is being applied to many of the ceramic tiles. It's a laborious, expensive process, the spokesman indicated, and may require delaying the initial launch an additional 10 to 11 weeks.

Plans Revised

AT&T, SBS and Western Union (in partnership with American Satellite Corp.), are among the carriers planning to launch communications satellites in the next five years. Others, such as Hughes Communications, Inc. and Southern Pacific Communications Co., are awaiting Federal Communications Commission authorization to do so.

In most cases, these carriers originally planned to use the shuttle, but realized some time ago that the launch schedule would slip and revised their plans accordingly. Nearly all plan to use the McDonnell-Douglas Delta 3910 launcher or an improved version known as the 3920 instead.

The chief result of this change will be to make some or all of each carrier's future launches more expensive. According to Irving Dostis, director of development at SBS, the cost of using the Delta is about $23 million, as opposed to approximately $7 million for the shuttle.

Because of the slippage, SBS has already decided to use the Delta to send up its first two satellites — in October 1980 and April 1981 respectively. Dostis expects the shuttle to be available by late 1982, when the final satellite in the first-generation SBS network is supposed to be put in orbit.

He added that the cost increases probably will not force SBS to increase its rates, because launch costs represent only a small percentage of total costs. By next January, when the company expects to begin commercial operation, it will have invested close to $400 million in hardware, software and support.

AT&T, which plans to launch its Telstar III series beginning in 1983, may use the Delta launcher for the first one, according to a company spokesman. But he "fully expects" the shuttle to be available by 1984, when the second of the new Telstar satellites is scheduled to go up. The final Telstar launch is scheduled a year or two later.

The spokesman added that Bell is also considering use of Ariane, a launch vehicle developed by the European Space Administration. Ariane can carry two satellites at one time, which means that AT&T probably could save money by using it, since the costs could be shared with another user.

However, Ariane has been having some problems. One successful test flight has occurred, but a second one ended last May in a nosedive into the sea when an engine misfired.

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Abused ATM Gets Revenge

MONROE, Wis. — Malfunctioning machines have long been the victim of kicks, punches and blows from infuriated humans, but one vengeful computer here recently struck back.

When Robert L. Wenger pounded his bank's automatic teller machine (ATM) in its steely face, he didn't know that the vindictive computer was programmed to get even.

The first blow occurred one Sunday when Wenger tried to make a $10 withdrawal from the electronic teller the day after he had deposited $40. But because the deposit would not be recorded until the next business day, the machine refused to give up any cash.

Angry, Wenger punched out the defiant machine, knocking it out of operation. He might have tried to control his temper if he had known that the computer system was storing in its memory the identity of the last person to insert a plastic card.

The second blow was struck when Wenger was convicted of criminal damage. He was socked with a $298 bill to repair the machine.

Reputation Worse Than Actual Problems

Users Find System/38 Misunderstood System

By Tom Henkel
CW Staff

System/38's somewhat tarnished reputation has caused more problems than the actual system for three of the first users of the IBM machine.

Gearing up for problems that never materialized and chasing down rumored glitches that proved nonexistent wasted more time than actually setting up the system, said Larry Brenner, director of management information services at United Merchants and Manufacturers, Inc.

"This has got to be one of the most misunderstood systems ever," Brenner said. IBM's silence on what exactly went wrong to cause a one-year delay in delivering the CPU only made the problem worse by adding countless rumors of poor performance and inadequate software to an already disturbing situation for potential System/38 users, he added.

While one should bear in mind that IBM released the first users' names, all three seemed to echo a similar sentiment — namely, System/38 has some minor problems, but the system generally does what IBM said it would do.

"The general impression is System/38 doesn't work. That's just not true," Brenner said. "The reliability is here. I can compare it to a system that has been in the field a year."

Admitting that from a marketing standpoint IBM did not have much choice but to release a nearly problem-free CPU — after taking an extra year to do so — Brenner said he has not had a major problem since the system was installed in April.

Smooth Conversion

The most advanced of the three first users, Brenner said both the interactive and batch conversions from RPG-II to RPG-III went smoothly.

The RPG-II-to-RPG-III conversion has been assailed by some as a key problem area for System/38. While Brenner said the switchover using IBM's conversion utilities "takes a lot of work," he quickly added there have not been any real problems, either.

Categorizing his former System/3 Model 15D shop as being "very mature," Brenner said IBM's conversion utilities caused him some extra work because they had to be tailored to his specific needs.

"It's very difficult to have a utility that is all things to all people," Brenner said, adding how much extra work has to be done depends on "where you are coming from and where you are going."

The conversions cause less experienced users some extra confusion by forcing them to do some extra work that may not be necessary, and they cause more experienced users more work by forcing them to tailor the utilities to meet specific needs.

However, despite the extra work, Brenner said IBM is on the right track. The conversion utilities are designed to give the user a workable System/38. Additional tailoring can be done after the basic requirements are met, he said.

For the interactive conversion, any CCP programmer should be able to convert about three to five programs a day, Brenner added. Brenner also recommended programmers take advantage of IBM's System/38 conversion course.

On the batch conversion, Brenner said his same basic criticisms of the interactive conversion apply. "It can drive you out of your mind," he quipped, noting users can convert an average of 50 programs at one time. He said it took United Merchants three to four days to convert its batch programs.

Fewer Problems

Road Machinery & Supplies, of Minneapolis, Inc., has had fewer problems with a batch-only conversion, its DP manager Chuck Petter said.

Although concurring with Brenner that IBM's conversion utilities are very time-consuming, the user said it took about a day to convert all its programs from RPG-II to RPG-III.

Petter's major complaint was IBM delivered the manuals on its conversion utilities along with the actual software. The conversion process would have been much easier if the staff had had time to sit down and study the manuals, he noted.

Asked how IBM serviced the new systems, Brenner and Petters disagreed. While neither had disparaging words to say about IBM, Brenner said his service engineers (SE) didn't seem to be real experts on System/38. Petters, on the other hand, said his SE was well-versed in System/38's structure.

The third System/38 user whose name was released by IBM, Larry Petterson, DP director at St. Olaf College in Northfield, Minn., agreed with Petters that service was excellent and the IBM SEs knew what they were doing.

All three users agreed System/38 was better than System/3. However, Brenner said he missed some of the software enhancements, from other vendors, he had attached to his 15D. He added those enhancements will probably be available for System/38 soon.

All three users also said programming was easier on System/38. An order entry package that took about nine weeks to develop on System/3 took about three weeks on System/38, Brenner said.

The missing software on System/38 [CW, April 28], however, is a subject for disagreement. IBM program products like the Manufacturing Accounting and Production Information Control System (Mapics) will be sorely missed by Brenner, who is forced to run that package on a temporary System/34 until the System/38 version is available next summer — a year later than IBM promised.

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Extended Addressing Offered 3033 MP Users

(Continued from Page 1)

feature available for 3033 uniprocessor (UP) and attached processor (AP) versions — systems limited to attaching a maximum of 16M bytes and therefore unable to take advantage of 32M-byte direct addressing.

Why, then, is IBM aiming Extended Addressing at AP and UP sites at all? The firm itself admits the feature offers these users "no immediate benefit" except to "provide them with the certainty that there is a growth option." So "at the present time," IBM said, UP and AP users opting for this feature would have to upgrade to a multiprocessor before they could enjoy full 32M-byte direct addressing.

Taking this a step further, industry sources viewed the announcement of Extended Addressing — and its planned October 1981 availability to all three types of users — as IBM's way of "extending the upper end of life of the 3033." And by doing so, they surmised, IBM hopes to encourage users not to wait — by leasing rather than purchasing systems, for example — for the "H" series.

To tap the CPU power of two 16M-byte machines together with one copy of the OS operating system — the high-end 3033MP — users need to be able to directly address more than 16M bytes, the MP's current limit, according to one source who asked not to be named.

Noting that as CPU power increases, main storage must also increase, he added that the promise of 32M-byte direct addressing for existing processors signals that the "H" and all future large IBM systems "will clearly be able to directly address at least 32M bytes."

Cost Breakout

For 3033MP users, that capability will become a reality in October 1981, but will also come at a high price. Costs break out as follows:

- A 3832 Extended Addressing feature must be attached to each CPU and to the 3038 multiprocessor communications unit (MCU). If purchased, the feature costs $93,900 per CPU and $12,200 when attaching to the unit. Total: $200,000. (Per CPU, Extended Addressing can also be rented for $3,448/mo or leased on a four-year plan for $3,135/mo. Per MCU, rentals cost $440/mo; four-year leases cost $400/mo).
- Two 3033 extension features, one for each CPU, are prerequisite for using Extended Addressing. These cost $35,000 each. Total: $70,000. (Per unit, rentals cost $1,281/mo; four-year leases cost $1,165/mo).
- Four extended control store features, one for each channel group, are also prerequisite for Extended Addressing. These cost $12,400 each. Total: $49,600. (Per unit, rentals cost $456/mo; four-year leases cost $415/mo).

Added to this grand purchase total of $319,600 is the cost of a monthly license for the MVS/System Product (MVS/SP) programs necessary to support Extended Addressing. Scheduled to be available in December are MVS/SP JES 2 Release 1 and MVS/SP JES 3 Release 1, each licensing for $1,375/mo.

Release 2 of MVS/SP JES 2 and of MVS/SP JES 3 will be available in June 1981, licensing for $1,475/mo and $1,800/mo respectively.

IBM noted, however, that these MVS/SP programs will not support Extended Addressing until October 1981, at which time the firm plans to release updates to coincide with first shipments of the Extended Addressing feature.

Methods Hike Programmer Productivity

(Continued from Page 1)

cided against using within their particular organization.

Company management is pleased with the switch in techniques that has resulted in the productivity increase, Callahan said. Individual department heads "whom we refer to as customers rather than users" no longer react with cynicism when a programmer informs them that "we're here to help you."

The productivity measurement was based upon the increase in the lines of code generated by each programmer per day — a measurement system that is no longer being used, Callahan continued. "We're more interested in determining how often the systems meet the original time and cost estimates."

Current figures indicate that deadlines are met within a 94% to 95% accuracy range, and system costs are within the original estimate more than 75% of the time, he said. Although Callahan acknowledged that there were no figures available for comparison, he indicated that the general feeling within the information processing environment is that the current percentages represent a significant improvement over "prestructured" system statistics.

'Back-Door Approach'

Callahan's group also minimized the problem of resistance to the new techniques from experienced programmers and designers by taking what he called a "back-door approach."

Programmers were not forced to use structured methodology, he said, but there was a sort of social stigma attached to the older techniques. The attitude was that "programmers are allowed to use conventional techniques if they are unable to comprehend the new structured techniques," he said.

> *'Individual department heads, "whom we refer to as customers rather than users," no longer react with cynicism when a programmer informs them that "we're here to help you."'*

This psychological approach resulted in an "I'll show you I can learn it" response from experienced staff members and "by the time they coded four or five [modules], they were hyped on it [structured programming]," Callahan said.

In addition to meeting with the approval of current staff members, structured methodology allows personnel with little or no programming experience to do "productive work" in three to five weeks, Callahan claimed. He maintained that a new staff member with "some DP background or a computer science degree" could be productive in less than two weeks.

After this time span, the trainees were familiar with the usage of about 15 Cobol commands, which enabled them to code relatively noncomplex logic, he said. Editing input records and selecting data to generate reports were examples Callahan provided of the type of work these people could perform after several weeks of training.

The restriction to just 15 commands is viewed as an advantage in this environment and results in logic modules that look "almost identical except for the data names," according to Callahan.

This uniformity makes it easier for a new programmer to understand the logic in any given section of code, he said. Once the novice programmer is assigned to a particular application group, he continues with the specific training required for that area.

Programming standards at Central Maine include limiting a module so that it performs only one function, Callahan explained. This results in small logic sections which can be tied together into an executable program. The rule of one function per module is strictly enforced during the program walkthroughs by the author's peers.

Accent on Analysis

Approximately 95% of the programs at the installation are written in Cobol with the remainder coded in Fortran by engineers rather than programmers, Callahan noted. "We want our people doing the things that the machines aren't capable of doing and, with this in mind, the emphasis for people in information processing is on business analysis. Our goal is for someone to spend 15% of his time programming and 85% of his time on systems analysis."

In line with this philosophy and the commitment to better understanding between customer departments and the programmers and designers, Callahan is also experimenting with sales training for his staff members. "Hardware is so good and technology is so reliable that we are capable of designing any system that a business manager wants."

The next step is to move from the old mentality of the technician telling the user what he needs to the philosophy of "the customer is always right," with the user department functioning as a customer of the services supplied by the information systems specialists, he said.

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CBS System Tracks Details at Convention

(Continued from Page 1)

roll call on Wednesday and the vice-presidential roll call on Thursday, it was undoubtedly the network's own reporting system that proved more valuable last week.

Both CRT terminal-based systems communicated over phone lines, using the interactive APL language, to CBS' two IBM 3033 mainframes at its New York City headquarters, and the news reporting system made use of three 1,200 bit/sec Anderson Jacobson, Inc. 860/121s, two Digi-Log Systems, Inc. Telecomputer II terminals and a 300 bit/sec Computer Devices, Inc. terminal for backup.

Delegate Interviews

For the CBS news reporting system, "we interviewed 1,985 of the 1,994 delegates to the convention and we put together a handbook that lists all the delegations by state and by the name of the delegate, as well as some information on each for our floor reporters to use," explained Warren Mitofsky, director of CBS News' Election and Survey Unit.

The 15-minute interviews gleaned "all kinds of demographics — such as age, sex, religion, income, occupation, race and ancestry — what their public or party office is, a series of questions on their vice-presidential preference, opinions about a number of prominent Republicans, how they were selected in this whole process, information about their expenditures to become delegates and the cost of coming here," Mitofsky said.

Besides the handbooks for reporters, the data was also used to generate news stories to assign to floor reporters. "Maybe they'll try to talk to the 'vanishing Republican liberal' or people that prefer a particular candidate as vice-president," Mitofsky said early last week.

Another thing the system did is help run down rumors, particularly about the future vice-president while Reagan's choice was still up in the air.

Technologically, the system was expected to run smoothly. "We've been doing this since 1972, and essentially it's the same set of programs modified for some changes in the operating system," he said. Security for the system — which was updated constantly throughout the week — was ensured through use of a password system, he added.

Roll Call

As for the roll call vote tallying system, while it may have lain dormant for most of the week, when in use it provided complete vote tallies within "two to three seconds" after the last vote cast, according to Richard Silverman, deputy director of the Election and Survey Unit.

The system is based on two Hazeltine Corp. 1410 CRTs for data input, one 1410 located at the rostrum for verifying discrepancies between CBS' tally and the "official" tally, two Digi-Log Telecomputer II CRTs for master control and display monitoring functions and two Anderson Jacobson 860 printing terminals for logging data entered and displays broadcast.

Also run by CBS in the last two presidential election years, the tally function was not computerized until 1976, Silverman noted.

Since NBC handled the "outside pool" at the convention this year — meaning it was in charge of all cameras and activities outside the convention hall — it logically should have handled the vote tallying system, which is traditionally an "outside pool" activity, Silverman noted.

"But since [CBS] had developed the software and the technique for use in 1976, and since NBC's cost proposal to redo a system that existed and worked well four years ago was considerably more than it cost us to implement it again, it was felt appropriate for us to do it," he said.

In a roll call, states are called, usually in alphabetic sequence, and each of the 54 delegation chairmen indicates how his delegation has cast it votes.

Located outside the hall in a trailer — "one among many that all the networks have" — vote tally personnel listen to the audio of the roll call as it happens, Silverman said.

"Each operator works independently, inputting what he or she thinks he heard. Only when the two agree with each other does the program take that data and actually update the tabulations up to that point," he said.

"If they don't agree, then error messages appear and of course we try to resolve the situation," he added.

The end product is a constantly changing alphanumeric video picture of the data. "That video is fed from our trailer to the separate control rooms of the three networks, who are each doing their own broadcasts," Silverman explained. "The director of each network makes his own decision as to when to put each particular display on the air."

ABC Marks New Beginning

(Continued from Page 1)

they needed.

Just as the GOP sought to unify the disparate elements that marked the Ford-Reagan schism in 1976, ABC was trying to bring together a melange of peripherals that had defied past attempts at reconciliation.

The linchpin that finally succeeded in bringing together almost 70 terminals in Cobo Hall, the Joe Louis Arena and ABC News headquarters in New York City was a multiplexer that simulates a dial-up protocol and led an IBM 370/168 into thinking it was receiving a dial-up rather than a dedicated line.

The system was based on 11 Timeplex, Inc. Series II Microplexers — eight at the convention site, two in New Jersey feeding an IBM 3705 communications controller and one in New York.

"The multiplexer turned out to be the only one that could fool the IBM system into giving us a clock at the master location, the computer, while the terminal clocked the multiplexer at the other location," said John Congedo, manager of data processing and election facilities for ABC News.

Limits Overcome

The ABC system, which used six telephone lines leading to the 8-million-byte 370/168 in Raritan, N.J., used an unmodified version of IBM's Customer Information Control System (CICS) which only supported dial-up communications. But "we didn't want to dial up 50 terminals," Congedo noted.

The CICS needs data set ready, and the terminals on the other end bring up data terminal ready. The multiplexers made the change.

Another problem was the 1,200 bit/-sec limit on asynchronous terminals tied to the IBM system, Congedo said. He wanted more speed — and he got it.

Clocking had to be done externally in order to avoid the 1,200 bit/sec limit. Using an adaptive autospeed option, the multiplexer changed the input speed whenever required without altering the 3705 that front-ended the 370.

"We're running teletypewriter terminals at 4,800 bit/sec, which is the maximum speed of the line we're using," Congedo noted, "and we may go to 9,600 bit/sec in November [for the general election]."

The adaptive speed option gave the system the flexibility to meet the array of terminals on their own terms, and the multiplexer adjusted itself automatically as soon as it received a one-character signal.

Control Provision

Congedo maintained operational control over the system by having the multiplexers equipped with a supervisory port that allowed him to monitor the entire system — the current configuration of each channel, the data traffic load on each channel and how close it was to capacity — from any CRT terminal.

There were very few problems with the system, Congedo reported. Some cables were stretched out of shape and an occasional terminal was left on, but other than that, "it worked beautifully."

Reynolds and Koppel were not the only editorial benefactors of the system. Reporters on the convention floor were able to access minutiae on obscure delegates, primary voting totals or whatever they needed by plugging their Texas Instruments, Inc. Model 745 terminals into an outside phone.

If ABC decides to put together a worldwide editorial network based on the Detroit model, a task Congedo said would cost approximately $5 million over five years, correspondents would have portable text editors instead of typewriters.

But the worldwide system is far from reality. No data is being collected for it yet and top ABC executives, while reportedly impressed by the system's performance in Detroit, have made no commitments to development, according to Congedo.

"This is really a demonstration to show management we can do it," he said, "but we need a transfusion of money."

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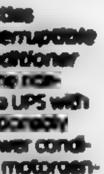

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Despite Civil Rights Objections

Packard Touts South Africa, Slights Nebraska

By Bruce Hoard
CW Staff

SANDTON, South Africa – "Some states back home say they intend to boycott U.S. companies which trade with South Africa. Well, that doesn't worry us at all, we're going to continue to trade. I'd much rather lose business with Nebraska than South Africa."

Those words were delivered here at the recent ground breaking for the South African subsidiary of the Hewlett-Packard Co. They were spoken by David Packard, HP's chairman of the board, and reported by the *Rand Daily Mail*.

The industry mogul apparently took umbrage with the Cornhusker State because its legislature passed a resolution condemning apartheid and urging state investment officials to remove the names of corporations and banks with investments in South Africa from its approved list.

Apartheid is the political system in South Africa under which the 19 million black Africans composing approximately 85% of the population are confined to 10 improverished "bantustans" and three "independent countries" by the white minority. Together, those areas amount to 13% of the country's land area.

Apprised of Packard's comment, Steven Fowler, Nebraska state senator and one of the resolution's sponsors, said, "I'm surprised that an executive of a corporation would feel that way, particularly someone who held a responsible government post [Packard was deputy secretary of defense under Richard Nixon from 1969 to 1971]. I don't think it will sit well with the people of Nebraska."

Low Profits

While the brouhaha over HP's business dealings with Nebraska is likely to blow over relatively soon, the intractable question of its South African investments promises to be an enduring one.

In 1979, the company reaped $15 million from South African sales, less than 1% of its worldwide $2.36 billion total. That $15 million would have been considerably higher had the U.S. government in February 1978 not slapped an embargo on the export of all goods to the South African police and defense forces.

Despite the relatively low profits, Packard has his reasons for remaining in the racially troubled country. One of these is strategic, but the executive also believes U.S. commercial interests in South Africa upgrade the life-styles of all its inhabitants, both white and black, he has said.

During his recent visit here, he told the *Financial Mail* he was "immensely interested in the so-called problems of South Africa. I'm encouraged by what's being done here."

Sullivan Principles

Presumably, he is encouraged because HP and approximately 130 other U.S. multinationals are doing their bit to end apartheid by adhering to the so-called Sullivan principles, drawn up in 1977 by Rev. Leon Sullivan of Philadelphia, a civil rights activist, the first black ever elected to General Motors' Board of Directors and also the head of Opportunities Industrialization Center.

The Sullivan principles state that signatories shall make a "substantial commitment" toward:

- Nonsegregation of races in all eating, comfort and working facilities.
- Equal and fair employment practices for all employees.
- Equal pay for all employees doing equal or comparable work for the same period of time.
- Initiation and development of training programs that will prepare in substantial numbers blacks and other nonwhites for supervisory, administrative, clerical and technical jobs.
- Increasing the number of blacks and other nonwhites in management and supervisory positions.
- Improving the quality of employees' lives outside the work environment in such areas as housing, transportation, school, recreation and health facilities.

HP's Rating

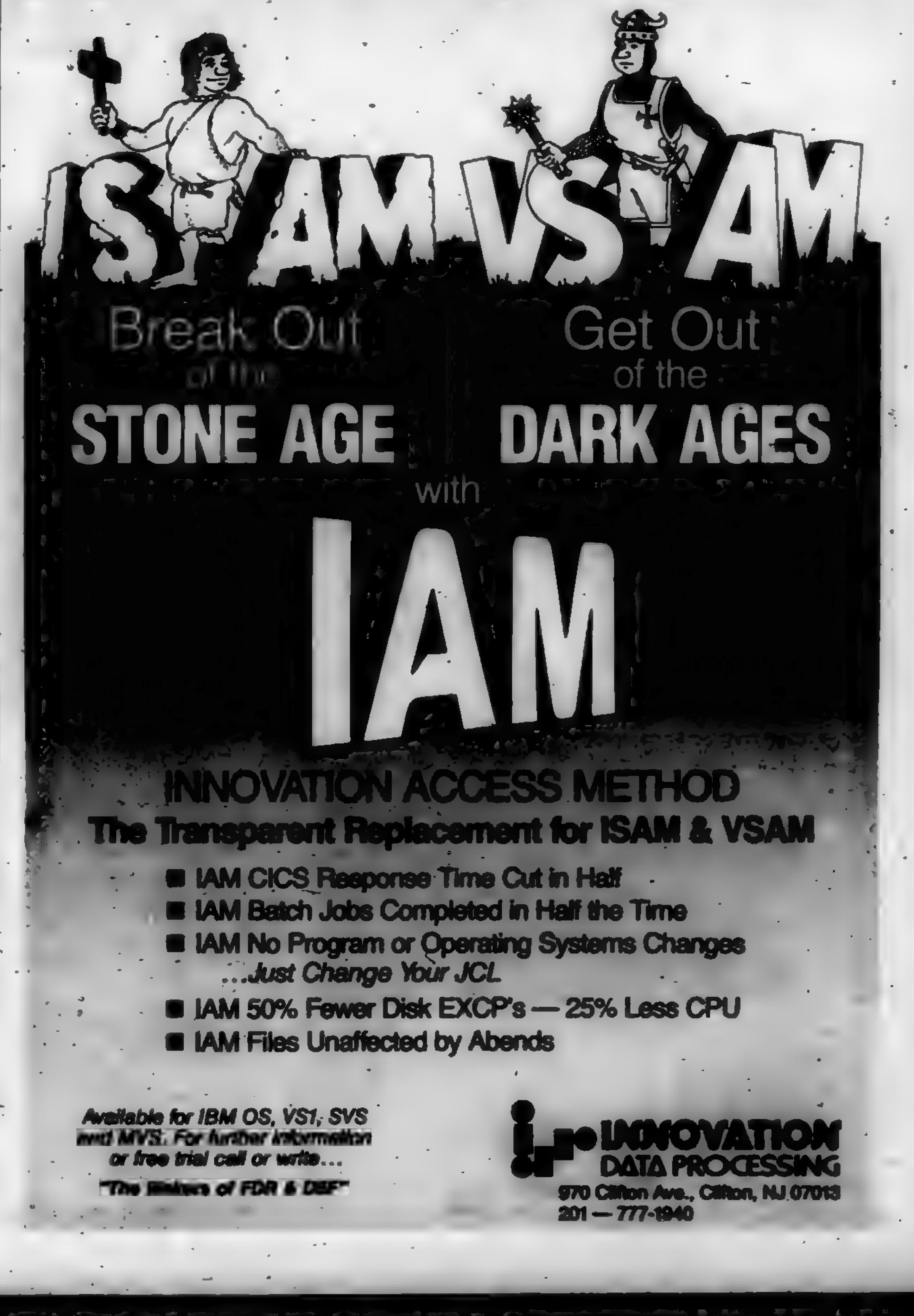
Participation by U.S. multinationals is self-monitoring; the companies involved write up their own reports of what they are doing. In 1978, Sullivan released a report on implementing the principles prepared by the consulting firm, Arthur D. Little, Inc. (ADL).

HP was rated in the top 22 of 105 companies evaluated. It fell under the category of "making good progress." The company currently has 113 employees in South Africa working at three offices, and 14 of them are nonwhite, according to a spokesman.

"All benefits, wages, medical plans, cafeterias and social events are offered to blacks as well as whites," he said. There is neither a black management training program nor any blacks in top management positions because of the difficulty of finding educated blacks, he added. However, 10 of the 14 black employees have received training: five for clerical and technical and five for literacy.

In contrast to the claims of HP and

(Continued on Page 11)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Not Eligible for Patent

Honeywell Firmware is Software: U.S. Brief

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Any use of firmware in DP equipment is software and as such is not eligible for patent protection, the patent office said in a brief to the U.S. Supreme Court recently.

The court has adjourned for the summer without taking up a case involving a disputed patent application for a Honeywell, Inc. firmware-based module in its Series 60 Level 64 product line.

The court agreed in March to consider the case after the U.S. Patent and Trademark Office said the Court of Customs and Patent Appeals (CCPA) erred in ruling the "switch system base mechanism" should be considered for a patent as a new machine [CW, March 24].

The government's Supreme Court brief sought to place the argument entirely in the realm of software patents and only lightly touched on Honeywell's contention that the device is primarily hardware, not software.

"All computer-implemented algorithms are equally unpatentable," the government said. It is not "significant that the novel computer program at issue here is firmware (a microprogram stored in a control unit) rather than software (a program stored in a computer's main memory unit).

"Firmware does not convert the conventional computer designed to accept firmware of this type into a new patentable machine," according to the patent office attorneys.

Disputed Device

At the center of the disagreement is a device submitted for patent in 1975 by two Honeywell employees. It is a firmware module that manipulates system base information in both main memory and internal scratchpad registers.

The patent office first ruled the function could be performed by software. That the function was in "apparatus" format rather than "method" format did not make the invention any less related to an algorithm and it is thus unpatentable, the office and its board of appeals said.

But the CCPA later accepted Honeywell arguments that the device is a machine and should be considered as such for a patent. The CCPA decision was then appealed to the Supreme Court by the patent office.

Honeywell attorneys have tried to keep the question of software patents out of the case and to have the argument decided on the narrow issue of whether or not the module is a new type of machine. That attempt has been largely unsuccessful — almost necessarily so, in light of the court's acceptance of the case based on patent office arguments that the device is primarily software.

Supporting Brief

Also, an *amicus curiae* brief filed by National Semiconductor Corp. backs the government's argument and strongly urges the court to turn down the patent because, the company said, software patents would "stifle . . . technological change and competition."

The government's brief, while constituting a lengthy case for not permitting software patents under current statutes, does touch on the question of whether or not the Honeywell device is a machine.

The government argued that it does not matter whether it is a machine because the device is essentially the application of an algorithm and therefore unpatentable.

The Honeywell "idea for transferring data between the scratchpad registers and the main memory of a digital computer is embodied in the algorithm represented by the flow charts" of the original patent application, the government brief said.

The patent office, in considering Honeywell's contention that the device is a new machine, said the use of a computer to implement firmware does not make the device patentable — the computer is not a new device and the firmware involved is unpatentable because it is essentially software.

"The only machine involved here is the familiar general-purpose digital computer," the patent office said.

"Employing a new computer program (whether that program is conventional software or a new microprogram . . .) does not change how the designers of the computer contemplated it would operate," the government argued. "It merely describes one inherently available operation of the already patented machine."

"A program directing a series of sequential steps is the essence of both [firmware and software]. The algorithm is no less [unpatentable] when claimed as part of firmware." The Honeywell control unit "is capable of being implemented with a variety of instructions," the brief said.

The court's ultimate decision could have a profound effect on the DP industry. The patent office estimated there are more than 3,000 patent applications pending "in which the patentability of computer software or firmware is a potential issue."

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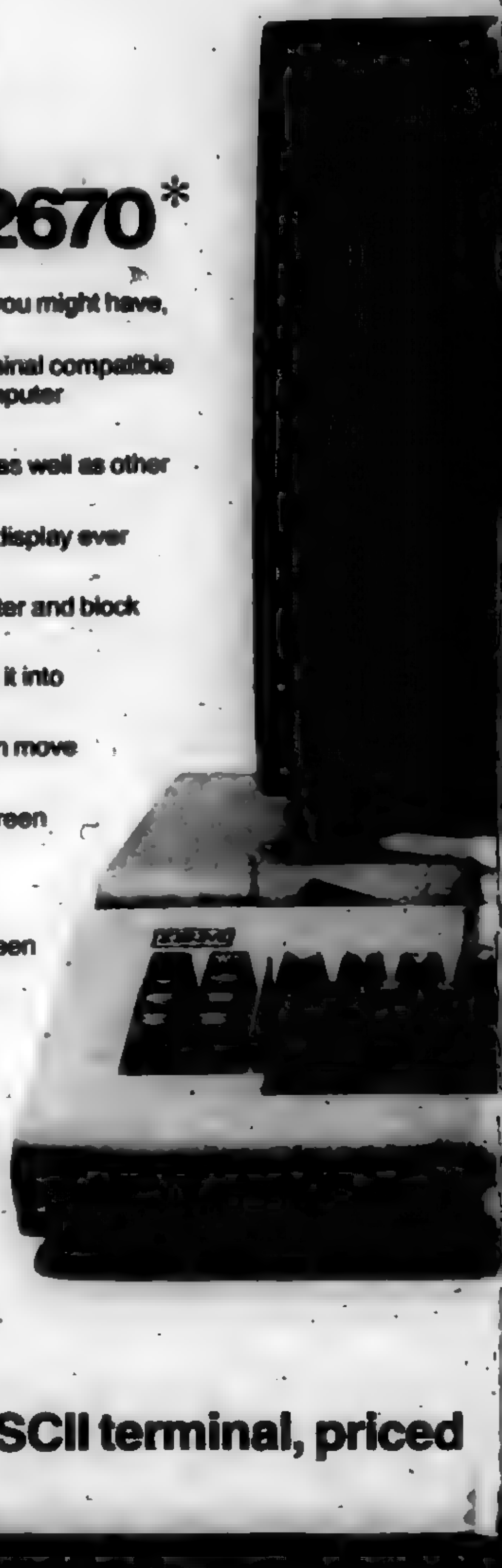

HP Invests in Racially Troubled South Africa

(Continued from Page 9)

other Sullivan signatories is a report written by free-lance writer Elizabeth Schmidt for the Washington D.C.-based Institute for Policy Studies, an independent, nonprofit research institute.

Entitled "The Sullivan Principles, Decoding Corporate Camouflage," the report takes a second look at some of the signatories' claims.

To begin with the "substantial commitment" the companies were supposed to exercise in their quest for compliance was never defined and, as such, is "very, very arbitrary," according to Schmidt.

The equal pay for equal work provisos are also "very deceptive," she claimed, adding "71% of black workers work in segregated job categories." The categories are not officially segregated, but because of the low level of work performed, only blacks are employed, creating a de facto segregation standard.

"And when they talk about their toilets and cafeterias being integrated, often, instead of [segregating] by color, they say 'now we have a cafeteria for the hourly workers and one for the salaried workers.' And there are very, very few black salaried workers in these companies."

Overall Effects

The ADL report glosses over several similar situations making the overall scene look much better than it actually is, Schmidt charged.

The South African managerial work force is approximately 96% white and 2% black. If every black in managerial training programs were hired, the figures would shift from 96% to 94% and from 2% to 4%.

The Investor Responsibility Research Center produced a report in which it claimed many top computer companies spend an average of $67,000 for the training of whites and $3,000 on blacks.

The blacks are trained to be typists, and the whites move on to more skilled occupations, Schmidt said.

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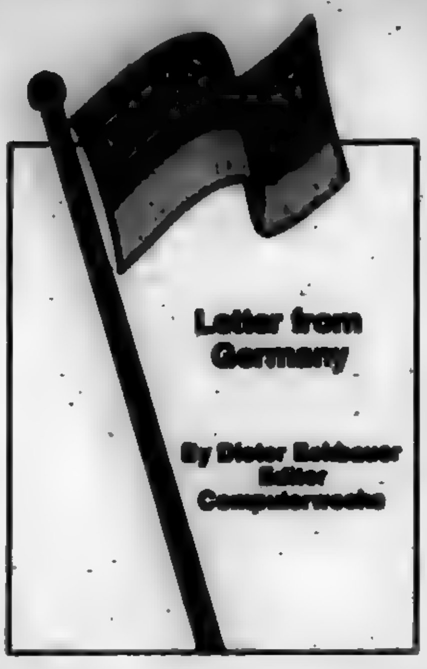
U.S. Computers on Germans' Minds



Letter from Germany

By Dieter Eckbauer
Editor
Computerwoche

Nobody here has been spending too much time worrying about data processing lately. What has really been on people's minds is soccer — the West German team won the European Championship without our two best players — "Kaiser" Franz Beckenbauer and "Bomber" Mueller! And that's something worth writing about!

But there is some computing newsworthy of mention in a letter to America — after all, German DPers are as attracted to American computers as they are to soccer. And sales of U.S.-made computer systems here in recent years are good evidence.

Sales of U.S.-made general-purpose computers, small business systems, word processors and copiers in the Federal Republic of Germany increased by 22% between 1978 and 1979, going from $790.9 million in 1978 to $961.6 million in 1979.

According to the Federation of Distributors for Office Organization (Bundesverband der Vertriebsunternehmen Fuer Bueroorganisation), imports from the U.S. now comprise 19.4% of the German market and the Federation expects that number to increase by 10% by the end of 1980.

While the prices for office products have remained nearly constant, prices for computers have dropped an average of 6.1% with prices falling so drastically, German information managers seem to be willing to buy more hardware, a Federation speaker noted at a recent conference.

Few Surprises

Believe it or not, German information managers do not expect any more economic surprises in the foreseeable future, but this doesn't mean there will be no more surprises in the German market.

One development that hit the German market like a tornado was Nixdorf Computer Corp.'s entrance into the PCM club.

Not so long ago, Nixdorf was regarded as a typical small business computer manufacturer with no intention of competing against the large mainframe companies. But now Nixdorf has taken the first step into the IBM market with the acquisition of The Computer Software Co. in Richmond, Va.

Nixdorf's recently founded subsidiary, Compatible Information Systems (CIS), will offer a complete DOS-oriented system in the fall of 1980.

However, Nixdorf's announcement impressed IBM's competitors such as Siemens, Univac, Honeywell, Inc., NCR Corp. and International Computers Ltd. more than it did IBM users, according to a quick survey of the *Computerwoche* staff. Many users interviewed said it is not enough to take over an American software company and offer the products on the German market.

That's not all on the mainframe front.

Four models have been added to Siemens' medium-scaled series 7.500 computers: a Model 7.536 which competes directly with IBM's 4331 Group 2, and the Siemens 7.551, 7.561 and 7.571 mainframes, positioned against the Series 30 processors.

The new machines, said to be available in the fourth quarter of 1981, will range in rental prices from $13,087/mo to $117,890/mo. The 7.536 with 2M bytes of memory, three disks, 10 workstations and a line printer costs $13,087/mo including basic software programs.

And one final remark: the Siemens announcement, which was apparently planned as a kick in the head to IBM backfired with the debut of IBM's top-of-the-line 3033 processors, according to informed industry sources.

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Replacement Up Within a Week

Salt Water Leakage Wrecks Hospital PDP-11/70

By Brad Schultz
CW Staff

NEWPORT NEWS, Va. – Salt water from leaky pipes totally destroyed the Digital Equipment Corp. PDP-11/70 at Riverside Hospital here recently. But DEC had another 11/70 running as a replacement CPU within the week, helping the hospital avert a major loss of critical DP operations.

As one of 23 health care organizations tied remotely to the Hospital Data Center of Virginia (HDCV) in Norfolk, Riverside used its 11/70 to support emergency room, bloodbank, pharmacy, laboratory and various clinical functions, according to HDCV systems and programming manager Ed Volkstorf. Other critical tasks included patient registration and monitoring of treatments.

The blood pressures of Riverside DP personnel rose therefore when they entered the basement 11/70 facility on the morning of June 23 to find the hospital's computer sprayed with corrosive salt water that had dripped through the previous night from the ceiling and into the computer's air intake port, which generates a powerful suction current.

The salt water came from a laboratory located directly above the basement, Volkstorf explained, where it was used to clean instruments that analyze blood. A few days before the 384K-byte 11/70 was showered, a break occurred in the plumbing installed between the lab's floor and the computer room's ceiling as an overflow drain intended to prevent flood damage in the lab.

Unnoticed Rupture

No one had noticed the plumbing rupture, Volkstorf said, nor the gradual accumulation of salt water above the computer room ceiling. Eventually, the ceiling's tiles separated under the strain, sending the water into the machinery that is supposed to blow cooling air onto the 11/70's CPU and tape drive cabinets.

Instead, the air conditioner blew salt water. Riverside Hospital's information systems director, Barbara Baldwin, called in DEC service personnel immediately after discovering the damage and notified the HDCV, which began finding a way to shoulder most of the hospital's major DP tasks, pending the installation of a replacement.

DEC had the alternative hardware in Riverside's basement within 24 hours, Volkstorf said, but the process of systems generation and checkout took a week to complete. DEC provided around-the-clock support through that week, according to the vendor's computer engineer on the scene, Tom Perkins.

Normally, emergency replacements of computer systems are supported on an eight-hour per day basis, Perkins noted, but DEC skirted this policy because Riverside's applications were so critical to the Newport News area.

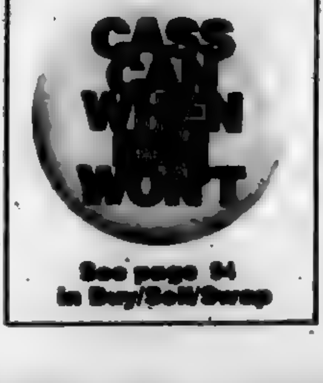
Riverside sent disk packs of its software to the PDP-11/70 run by the HDCV in Norfolk. That 11/70, two DEC PDP-15s and a Honeywell, Inc. 66/10 mainframe bolster the computing resources of organizations affiliated with the nonprofit HDCV, Volkstorf stated. The affiliates communicate with this complex via asynchronous General Electric Co. printer terminals and various CRT terminals [CW, June 23].

With HDCV's help, Baldwin opened 12 communications lines that allowed Riverside Hospital personnel to run critical applications remotely. While DEC field technicians readied the replacement CPU, Volkstorf gave Riverside users high priority access to the HDCV's 11/70.

The 12 lines were multiplexed and open about five hours after Baldwin alerted the HDCV, Volkstorf said. This makeshift link kept Riverside's DP operations alive as the hospital swept salt out of its basement and DEC's Field Service Logistics department tracked down an 11/70 available for fast delivery to Newport News.

After Perkins completed diagnostics tests on the substitute system, Baldwin retrieved the hospital's software disk packs and ran them for six hours on the new processor to verify that Perkins' go-ahead was well-founded.

According to Volkstorf, Riverside's operations are getting back to normal except for problems with the computer room's battle-scarred air conditioning system. The troubles may be caused by "dirty power" from the Virginia Electric Power Co., which regularly creates "brownout" conditions – sustained reductions of current – that upset the delicate circuitry of its customers, the HDCV manager maintained.



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MCI Calls $1.8 Billion in Damages Justified

By Phil Hirsch

CW Washington Bureau

CHICAGO — It may be a whopper, but it is justified.

That is the gist of MCI Communications Corp.'s latest statement concerning the treble-damage $1.8 billion antitrust judgment it won here recently against AT&T.

MCI was responding to an earlier statement, filed by AT&T, that argued that the award was excessive the phone company asked U.S. District Court Judge John F. Grady, who presided over the trial, to either overturn the verdict or order a new trial.

MCI contended that the basic damage award — $600 million — represented fair compensation for profits lost because of AT&T's behavior. MCI said it had been "excluded from over 80% of the market, its construction plan [had been] frustrated and its business nearly destroyed."

The company also contended that the verdict had been trebled "in order to punish and deter. The $1.8 billion judgment may include a windfall for MCI, but, in the boardrooms of American business, that 'windfall' may be doing more to cause compliance with the antitrust laws than all the nation's enforcement agencies combined."

The district court verdict will soon go to the U.S. Court of Appeals for review, and from there it will probably be referred to the U.S. Supreme Court for a final decision.

House Judiciary Asks to Review Rewrite Bills

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The House Judiciary Committee has added its voice to a growing chorus clamoring for further consideration of the "communications act rewrite" bill before it is finally voted on by Congress.

Congressman Peter J. Rodino (D-N.J.), chairman of the committee, suggested that it might be a good idea to let his group review the House version of the legislation. His comments echoed a similar statement made late last month by the Senate Judiciary Committee [CW, July 7].

Several computer industry groups have also suggested further consideration of the Senate bill — S. 2827 — before it is reported to the Floor, and they have been working hard to change the House of Representatives version, H.R. 6121, which is now in the throes of final markup within the House Commerce Committee.

Further action on both bills awaits the return of Congress from its current recess, which ends today. The House will remain in session until Aug. 2, and the Senate until Aug. 7. Then, both Houses will be in recess until the week of Aug. 17.

Rodino, in a letter to House Commerce Committee Chairman Harley W. Staggers (D-W.Va.), said that the restructuring of AT&T contemplated by the House bill will have "a dramatic effect" on the Justice Department's antiturst suit against the phone company, as well as on a number of private suits; the result could be to impair the ultimate settlements.

H.R. 6121 contains language designed to prevent this, but Rodino said that even so, "it is apparent H.R. 6121 will necessarily impact the pending antitrust litigation."

Basically similar concerns were expressed late last month by the Senate Judiciary Committee about S. 2827, which is awaiting markup within the Senate Commerce Committee.

Nonprofit Sale Of Deltak Courses To Aid Disabled

OAK BROOK, ILL. — The Association for Rehabilitation Projects in Data Processing will soon be receiving instructional material at cost from Deltak, Inc.

The association, which is concerned with educating the disabled for jobs as application programmers, will get the use of Deltak's library of approximately 2,009 instructional courses that incorporate advanced video-based instructional techniques.

Students enrolled in the association's programs suffer from such congenital defects as blindness and deafness, or have been involved in traumatic accidents that have left them paralyzed or otherwise disabled and incapable of returning to their former jobs.

Deltak is located at 1220 Kensington Road, Oak Brook, Ill. 60521.

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LA34 DECwriter IV	1,[illegible]	[illegible]	[illegible]	[illegible]
LA34 DECwriter IV Forms Ctrl.	1,[illegible]	[illegible]	[illegible]	47
LA120 DECwriter III KSR	2,[illegible]	[illegible]	140	[illegible]
LA180 DECprinter I	2,[illegible]	[illegible]	117	[illegible]
VT100 CRT DECscope	1,[illegible]	[illegible]	[illegible]	[illegible]
VT132 CRT DECscope	2,[illegible]	[illegible]	[illegible]	[illegible]
DT80/1 DATAMEDIA CRT	1,[illegible]	[illegible]	[illegible]	[illegible]
TI745 Portable Terminal	1,[illegible]	[illegible]	[illegible]	[illegible]
TI765 Bubble Memory Terminal	2,[illegible]	[illegible]	140	[illegible]
TI810 RO Printer	1,[illegible]	[illegible]	[illegible]	[illegible]
TI820 KSR Printer	2,1[illegible]	210	117	[illegible]
TI825 KSR Printer	1,[illegible]	[illegible]	[illegible]	[illegible]
ADM3A CRT Terminal	875	[illegible]	47	[illegible]
ADM31 CRT Terminal	1,[illegible]	[illegible]	[illegible]	[illegible]
ADM42 CRT Terminal	2,1[illegible]	210	117	[illegible]
QUME Letter Quality KSR	3,[illegible]	316	176	119
QUME Letter Quality RO	2,[illegible]	278	[illegible]	[illegible]
HAZELTINE 1420 CRT	[illegible]	91	[illegible]	[illegible]
HAZELTINE 1500 CRT	1,1[illegible]	115	[illegible]	[illegible]
HAZELTINE 1552 CRT	1,[illegible]	126	[illegible]	[illegible]
Hewlett-Packard 2621A CRT	1,[illegible]	144	[illegible]	[illegible]
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Because They Are Juveniles

Students Tied to Datapac Breach Not Charged

By Brad Schultz
CW Staff

NEW YORK — Four 13-year old Dalton School students involved in breaching computer systems linked to Canada's Datapac packet-switched network will not be prosecuted because they are juveniles, according to Ira Bloch, deputy chief of the criminal division of the U.S. Attorney's office of New York's Southern District.

Bloch cited the Federal Juvenile Delinquency Act as grounds for that decision.

But Bloch did not rule out the possibility that others may be charged in the case eventually. Federal authorities in the U.S. and Canada are still investigating how the teenagers manipulated the Datapac-linked computer systems from terminals attached to Dalton's New York Telephone Co. telephone ports [CW, May 12].

The tampering spree apparently did not result in major losses for Datapac users, but U.S. law enforcers are still unsure about the identities of all victims, Bloch indicated.

One victim was a Montreal-based producer of cement and construction materials, Canada Cement La Farge, whose 80M bytes of disk storage support a dual processor configuration of Digital Equipment Corp. PDP-11/34s under RSTS/E.

Terminal Lets Deaf Convert Messages to Voice by Phone

MADISON, Wis. — Using a device that emits over a telephone line a human voice that was converted from a typed message, the deaf will have a new vehicle for communicating with each other and the hearing world.

Development of the communications terminal — currently being manufactured and distributed — means the deaf can now send messages to doctors, bank tellers, grocers, friends or any individual without the bulky teletype terminals that have restricted past communications.

The party being called can send a response by using the Touch-Tone or dial clicks of the phone. The returned message appears as typed words on a display panel on the deaf person's telephone device.

The voice of the terminal, which was developed by electrical engineer Robert Engelke, has a basic vocabulary containing enough words for the average conversation as well as words oriented toward emergency messages such as "Send an ambulance." Additional modules can be added to expand the vocabulary.

The device has a computer capability that allows it to receive and transmit both the common Baudot and Ascii codes, and if the synthesized voice does not "know" a word, it spells it out.

Another feature is a magnetic sensor that detects when the phone is ringing and automatically flashes a house lamp to alert the deaf person to the call.

A 1,000-char. memory (which can be doubled) that stores previous conversations is also available. The message can be played back on the display panel any time. In addition, emergency messages can be "remembered" and sent without having to be retyped.

The price for the terminal is approximately $700. Assistance in the design and marketing of the aid was provided by the University of Wisconsin-Madison Trace Research and Development Center.

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Testimony to Arson

SPRINGFIELD, Ill. — A row of tape reels transformed into a nest of silver serpents, the molten mouth of a baked CRT terminal and charred remains of a data document serve as mute testimony to the intensity of the heat that accompanied a fire in the basement remote job entry (RJE) station of the Illinois Public Health Department this spring [CW, April 14].

The arson-caused blaze was blamed for an estimated $507,000 worth of damage, but its effects have been erased and processing resumed. Unfortunately, the arsonists are still at large and police have no promising leads.

The Department of Public Health has taken steps to prevent a recurrence of the disaster. Locks have been changed, a fire alarm connecting the RJE with the fire department has been installed and janitors are not allowed in the basement after 6 p.m.

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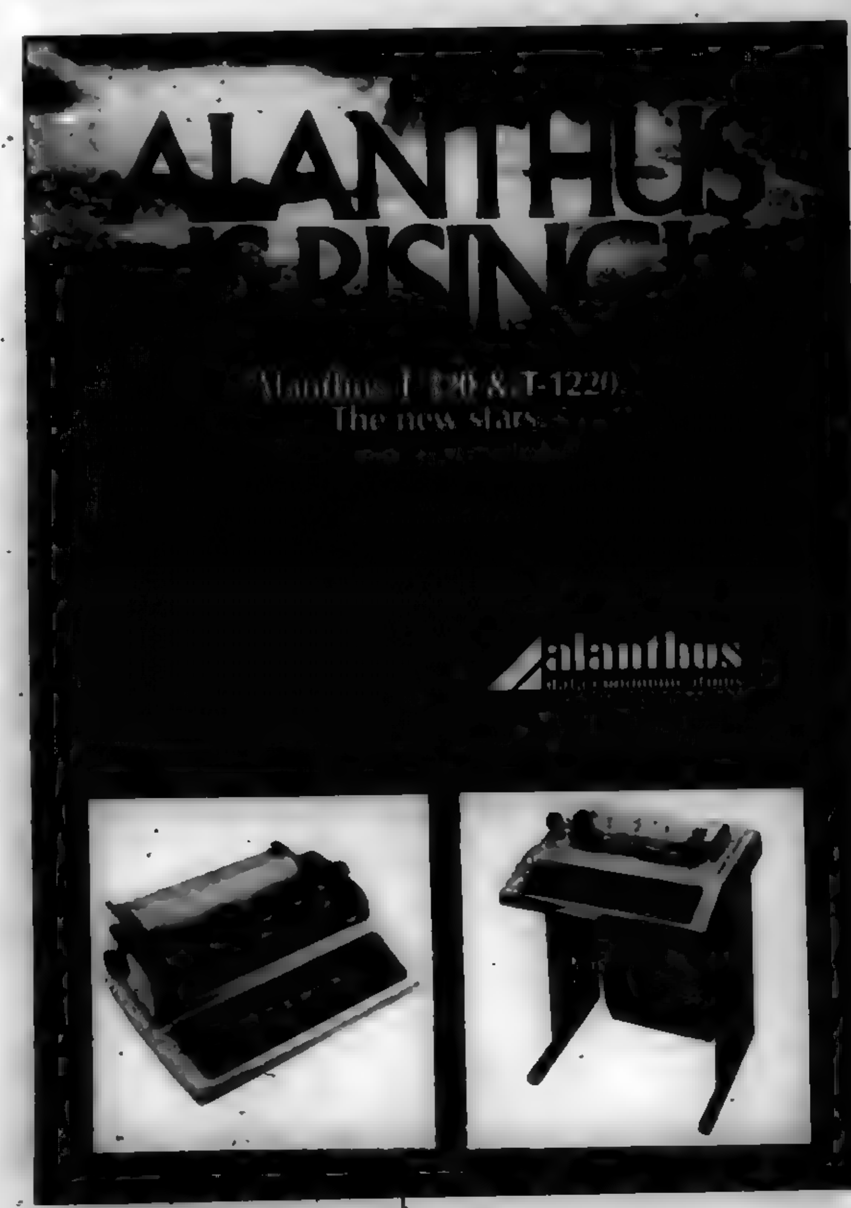

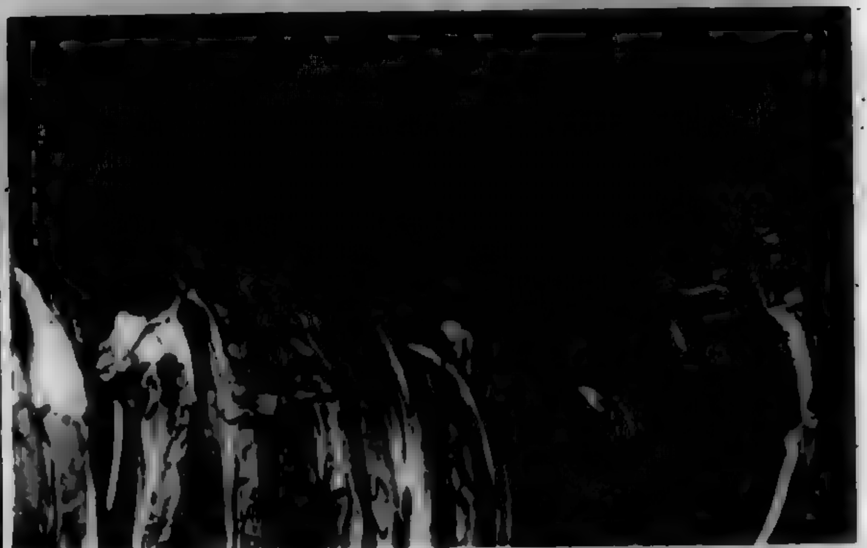

Photos by John [illegible]

Info 80 Keynoter Envisions Office 'Enterprise System'

NEW YORK — In tomorrow's office, paper will be increasingly absent and management decisions will be based on various forms of electronic information, according to Allen J. Krowe, IBM's vice-president and president of the firm's System Communications Division.

Krowe will be detailing these and other ideas on what he calls the "Enterprise System" as the keynote speaker at this fall's Information Management Exposition and Conference (Info 80), scheduled to take place here in the New York Coliseum. The conference will run from Oct. 6-9 and consist of 14 "conferences-within-a-conference." More than 4,000 executives are expected to attend the four-day show sponsored by Clapp & Poliak, Inc., a spokesman said.

Krowe's address, "Enterprise Systems: A Concept for the Eighties," will emphasize the convergence of technology, office systems, data processing and communications into one coherent system. The Enterprise System would contain many of the concepts associated with the "office of the future," such as electronic mail, shared key entry, intelligent copiers, interactive computing and distributed processing. The system would also encompass centralized and decentralized forms of data, text and image processing including graphs, logotypes and, possibly, voice, the spokesman said.

Registration fees for the conference and exposition are $295 for the entire four days, $110 for one day and $60 for a half-day. All of the fees include admission to the show floor. To see just the exhibits, attendees will be charged $10 at the door, or $5 with a special Info registration card, the spokesman said.

Additional information can be obtained from Clapp & Poliak at 245 Park Ave., New York, N.Y. 10017.

IRCs' Telex Rates Offer 55 Cent/Min Discount

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — "Unbundled" international telex rates, offering users 55 cent/min discounts, are now being offered by all the U.S. international record carriers (IRC). To qualify, the user must provide his own terminal and access line.

The first of the new tariffs — covering international telex services offered by ITT World Communications, Inc. — became effective recently. Last week, the other U.S. IRCs began offering similar rates.

Generally, users with large volumes of international telex traffic will benefit from the new scheme; they will save enough in usage charges to balance or exceed their terminal/access line costs. Since the cost of local access is a function of distance, those users in cities served directly by the IRCs will need less traffic volume, typically, than those in outlying areas.

Last December, when the Federal Communications Commission (FCC) ordered the carriers to offer unbundled rates, the commission also expanded the number of cities served directly by the IRCs. Previously there are five such cities (New York, Washington, D.C., Miami, New Orleans and San Francisco). Now there are 21 more, and additional localities are likely to be served directly by the IRCs in future.

The 55 cent/min discount has been available for several months on an optional basis. Customers had a choice of foregoing the discount and getting "free" access — paid for by the IRC — or supplying their own access and receiving the lower rate. Users in the former group used IRC-provided tie lines or Western Union Telegraph Co.'s domestic telex/TWX circuits. The telegraph company collected from the IRC, rather than the user, for the call.

Under the new scheme, tie lines are still available, but the user pays separately for them and receives the usage discount. Access via Western Union remains available on either a bundled or unbundled basis.

However, the bundled version apparently is available only on a limited basis. TRT Telecommunications Corp. said it is the only IRC offering "free" access, without the discount, to international telex customers connected to Western Union's domestic telex/TWX network.

The FCC is now analyzing the newly unbundled rates to determine whether the 55 cent/min discount is enough. The commission indicated there is some evidence suggesting that the IRCs, by charging separately for terminals and access lines, have saved enough to justify a reduction of the former bundled telex rate by more than 55 cent/min.

Bell Services To Cost More

CW Washington Bureau

WASHINGTON, D.C. — The U.S. Court of Appeals late last month upheld the use of fully distributed costing (FDC) to determine the rates charged by AT&T for its communications services. It is a decision that seems likely to have far-reaching impact on telecommunications users.

One likely result is that AT&T rates for its competitive data and voice services will go up. This probably will encourage new offerings from the specialized carriers priced below Bell's rates. The specialized carriers should also have an easier time introducing new services.

Last month's appeals court decision stems from a series of actions taken by the Federal Communications Commission (FCC) three years ago. At that time, in addition to requiring that the phone company employ FDC, the commission also declined to stop AT&T from terminating Telpak and found unlawful a number of AT&T private-line rates. Last month, the appeals court remanded these rate decisions back to the FCC for further consideration.

Telpak is a bulk-rate offering that allows a user with high traffic volumes between common points to lease circuits at substantial discounts. AT&T decided to terminate the service in 1977 after the FCC ruled that the phone company would have to allow sharing and resale of Telpak circuits. The effect, Bell said, would be to make Telpak discounts available to all private-line users and cause a massive loss of revenue to the telephone company.

Telpak users then went to court and won continuation of the service — for existing customers only — pending last month's appeals court decision.

The court concluded that the FCC should have refused to let AT&T cancel Telpak, because the company failed to submit proper justification. But the court also gave AT&T another chance to meet this requirement.

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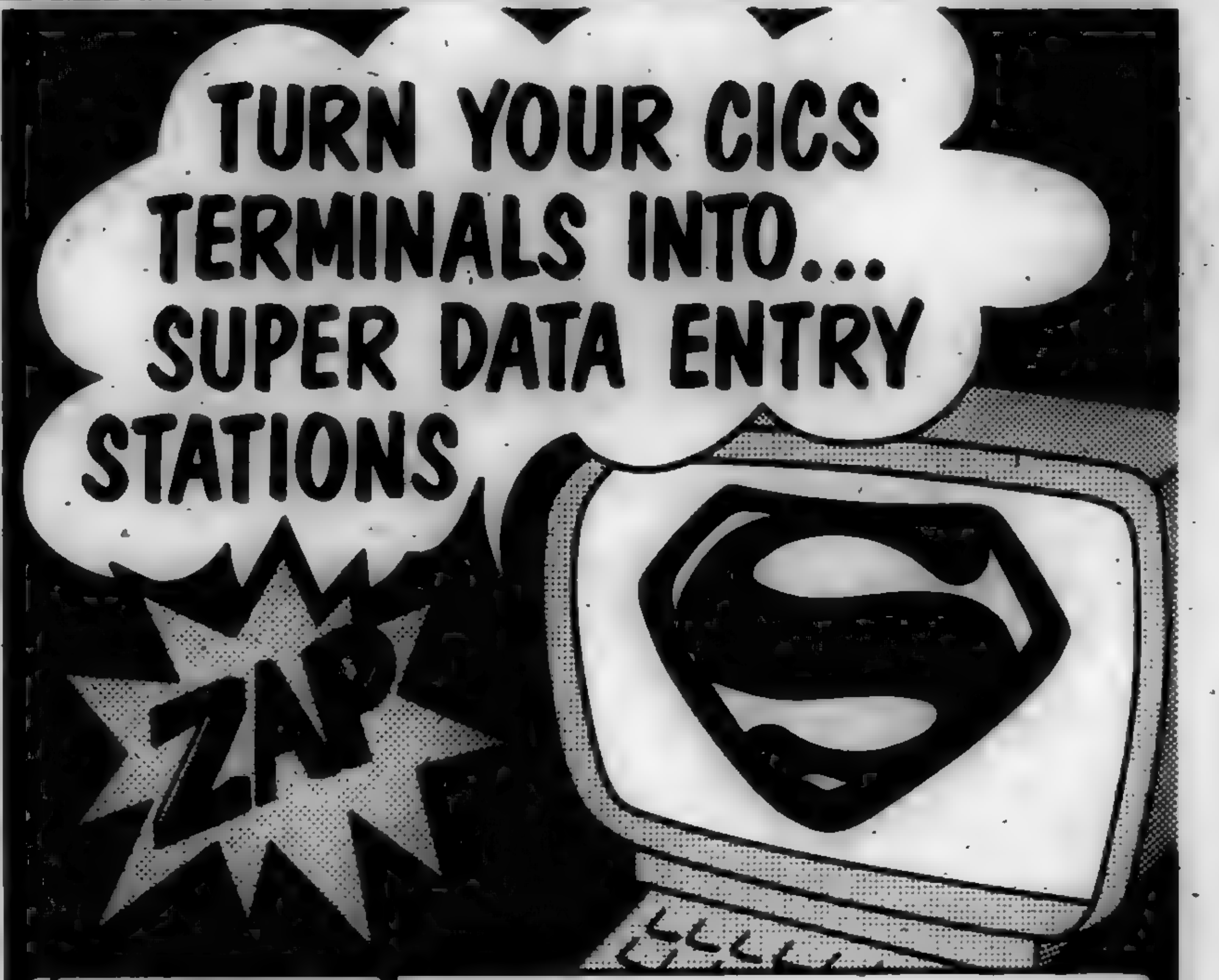

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At Higher End of Price Scale

HP Model 250 Offers Outstanding Performance

By Hillel Segal

SCOREBOX

System: Hewlett-Packard 250
Current Price: $23,650

BENCHMARK RESULTS

		TIME	RANKING
C-1	Scientific/- Engineering Problem	4:06.9	2nd
C-3	Accounts Receivable	4:45.7	6th

OTHER BENCHMARK RESULTS

	C-1	C-3
IBM 5110	8th	4th
Wang 2200VP	1st	3rd
Texas Instruments FS 990/10	*	2nd
Hewlett-Packard System 45	3rd	8th
DEC PDP-11V03	7th	5th
Q1 Lite Microcomputer System	4th	7th
Univac BC/7 Model 610	5th	11th
Northern Telecom/Sycor 405	*	*
Datapoint 1170	9th	9th
Randal 100	6th	10th
Hewlett-Packard 250	2nd	6th
Texas Instruments DS 990 Model 2	To be covered next issue	

*Could not run because of memory or formatting limitations.

Providing excellent human engineering, an advanced Basic language capability and high standings in the benchmark testing program, the Hewlett-Packard Co. 250 small computer system is a "must see" product in its price and application range.

In benchmark testing commissioned by the Association of Computer Users (ACU), the HP 250 scored two first-place and two second-place finishes in the 12-system field of computers priced $15,000 to $25,000. A total of six tests were run.

Exact results of two of the applications tests are listed with the benchmark standings. All systems were tested by running standard programs written in Basic, where that language was available.

The 250 is priced in the upper one-fourth of that price range, selling for $23,650 in the configuration tested. Basic is the only language offered. It is included in the hardware price along with a number of significant utility packages.

Terminal Features

One unique feature of the CRT terminal is the placement of "soft keys" immediately below the screen. Prompts appearing directly above on the screen label the function that the key controls, making use of the system very clear and trouble-free.

Computer operation is done by a pushbutton approach, with the software-driven key labels presenting only the control options available at the moment. Pressing a soft key begins an operation. When the operation is complete, new soft key labels appear on the screen. This greatly simplifies the user's problem of remembering "where to go from here" when using the system.

One user told us, "The human engineering of the keyboard and CRT is the best feature of the 250." The independent consulting firm which performed the benchmark testing agreed with users in the survey that the soft keys contributed significantly to ease of use.

Shining Performance

In its performance of the CPU and I/O tests, which measure the basic processing and file-handling capacities of a computer, the HP 250 really shined, taking first in the diskette-oriented I/O test and second in the number-crunching CPU test.

Add to this the first-place finish in the editing test, and you have to conclude that the basics are there — in spades.

The editing test compares all system editors with respect to ease of use. This comparison is done by starting with a nine-line file, changing it by using the edit functions into an interim form which contains errors, and then editing it back into the original error-free state.

The Hewlett-Packard 250 required 132 keystrokes to perform the test sequence, the lowest of any system tested in this price range. Other systems tested in the series required up to 248 keystrokes when performing the identical operation.

In real-life applications tests, however, the 250 could not maintain its edge. Its finishes in the scientific-engineering problem, new product development problem and accounts receivable problem ranged from second to sixth place.

The 250 ran third in the new product development problem, a real-life application test which models the relationship between production costs and profitability over a four-year period for a hypothetical company. The test establishes a base line and varies several parameters in a "what if" mode.

This weekly column gives the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Final display of the financial model created by this test includes items such as number of units sold, selling price, revenue, gross profits, net income and other factors of the imaginary financial situation created by the test.

The hardware configuration used during the benchmarking test series included a processor with 32K bytes of user memory (160K total), two diskette drives (2.4M bytes total), a 180 char./sec printer, the CRT, keyboard and console. Memory is expandable up to a maximum of 448K total for the system.

As many as three diskettes may be used, and up to two 19M-byte disk drives may be attached as well. Remote stations which are functionally identical may also be connected to the system, up to a maximum of five remotes. The same interface may be used to connect an HP 3000 computer system.

Utility Packages

Not tested in the benchmark studies were some items which are definitely worth mentioning: the utility software packages included in the system.

Image, the data base management system, was universally praised by its users. This was especially true in small business applications. A collection of commands and programs, it provides the capability to create and control an information management system, including password protection.

A utility called Query allows access to the data base for update of retrieval. Forms provides capability for development and modification of customized forms, displaying them on the screen for data entry or print formatting. Report Writer is used to format reports, and Sort performs sorting functions while accessing a data base.

One user of the 250 commented, "I recommend the management software [Image] to everyone." Another said, "The key is software — there's plenty of good hardware out there."

We would be the first to agree that hardware capabilities and test results are only part of the evaluation process. At least as important is the "comfort factor" a buyer feels with the vendor's support services.

So we listen very carefully as users in our interviews enlarge our awareness of the important services provided by the vendor. Increasingly, users are showing a growing sophistication in realizing that in many cases, as was said, "software is the key."

Such insight is a pleasure to share. Creating a process by which customers may communicate their experiences is the essence of a user-evaluation study.

Hewlett-Packard Model 250 customers ranged in their comments from "very pleased" to "absolutely thrilled."

Many remarks included points about flexibility, highly advanced design, and fine human engineering. In particular, the data base software was given by several users as the number one factor in their decision to purchase a 250.

One customer told us, "The documentation is 20 times better than IBM's." Users reported that both Hewlett-Packard and its OEMs provide "A-1" supportive services in the areas of documentation, training and maintenance. These are critical services which are often the cause of customer dissatisfaction in the data processing field.

Price Factor

The one negative factor frequently noted — the price. Hewlett Packard's 250 is in the upper end of the $15,000 to 25,000 range, and users must be convinced that the system is worth the extra cost.

For instance, the price of adding a remote station turns out to be quite high when all costs, including the interface, are considered. But those users who had opted for the HP 250 and were contacted during the survey evidently were satisfied with their decision.

Next week: we take a look at benchmark test results for the Texas Instruments, Inc. DS 990 Model 2.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

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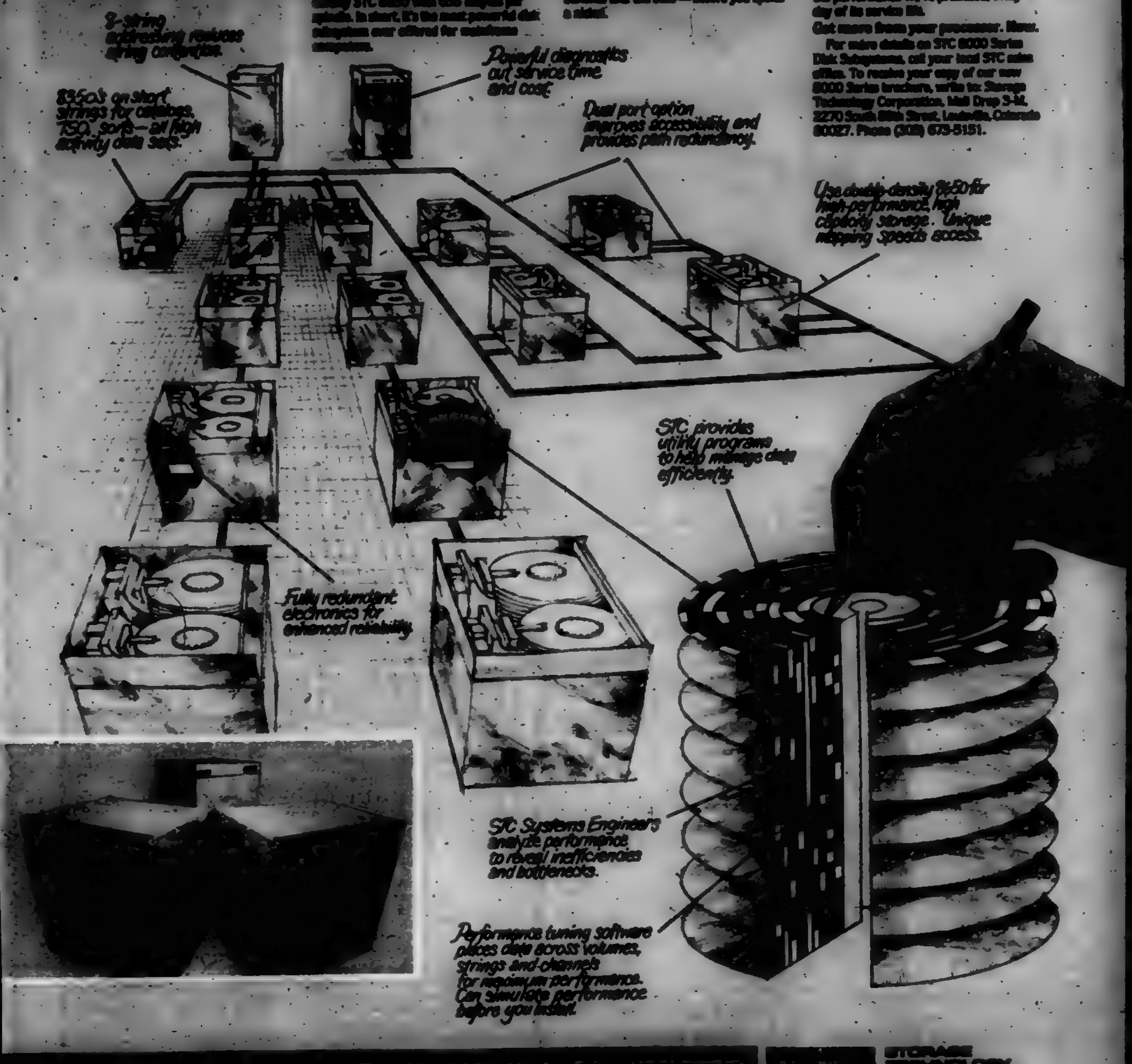
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Managers on the Move

JAMES E. NELLESSEN has been appointed director, group systems and procedures, and LEE WEINSENBERG has been named director, casualty systems development, at Bankers Life and Casualty, Chicago.

Nellessen will be responsible for developing and maintaining information systems. He formerly managed the group records division of Washington National Insurance Co. and Universal Oil Products.

Weisenberg was manager of casualty systems development before his promotion. Prior to joining Bankers he spent more than 13 years with the CNA Insurance Group.

He holds a B.S. in business administration from Roosevelt University, Chicago, and is a fellow of the Life Management Institute.

• • •

ROBERT G. KRAMER has been promoted vice-president, Computer Operations Group, for Federal Express Corp. He will be responsible for daily operations including system software for the centers in Memphis, Tenn., and Colorado Springs, Colo.

Kramer joined Federal Express in 1978 as director of Computer Operations. He has previously held a similar position for four years with Levi Strauss in San Francisco.

He received a B.A. in economics from the University of Chicago in 1966 and an M.B.A. from Lake Forest College, Ill. in 1971.

• • •

GARWOOD HOLLOSY has been elected a vice-president of California Federal Savings and Loan Association in Los Angeles. He will be responsible for the design and implementation of new data processing systems for savings operations and loan services.

He joined California Federal in 1969 upon receiving his B.S. in business administration at California State University at Northbridge. He has served as internal auditor, teller, loan service officer and most recently as DP project coordinator.

Hollosy also holds an M.B.A. from the University of Southern California.

• • •

JOHN S. JANDRAS has joined the Olsten Corp. as director of data processing. He will be responsible for the data center at the company's headquarters in Westbury, N.Y., coordinating planning, design and implementation of all systems and programs and other related functions.

Jandras

Anderson

Jandras brings to Olsten a 20-year background in data processing, planning, organizing and directing for such corporations as Avis Rent-A-Car Systems, Inc., Consolidated Edison and Shell Oil.

The Olsten Corp. furnishes temporary personnel for general office needs, records, management, word processing, marketing and health care services.

• • •

WILLIAM A. ANDERSON has joined Westlands Bank in Santa Ana, Calif., as data processing administrator. He will supervise the bank's programming and computer operations for their escrow, bankruptcy and general ledger accounting systems.

Formerly vice-president and director of data processing at American Savings and Loan, Anderson specializes in applying systems engineering practices to business systems.

A graduate of the University of Mis-

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Managers on the Move

souri, he earned his M.S. in systems engineering from West Coast University at Los Angeles.

• • •

FRANCES D. SMYTH has been named as assistant vice-president in the electronic installations department of Metropolitan Life Insurance Co. In her expanded position, Smyth will still be responsible for software selection, installation and programming. She joined the company in 1974.

Smyth holds a B.S. in mathematics from Brooklyn Polytechnic Institute and an M.B.A. in management from Baruch College. She is also an assistant adjunct professor of management at New York University.

• • •

CHARLES E. JEANS and **KATHRYN S. BENASHSKI** have been elected assistant secretaries in the data processing systems department at the Hartford Insurance Group.

Jeans is an assistant director in information resource management systems division and is responsible for data processing support in property casualty lines and service actuariality. He joined the Hartford as a systems analyst in operations research support. He was promoted to manager of research service and then assistant director of that division.

Jeans holds a B.A. from Central Washington University and a M.B.A. from Trinity College.

Benashski is assistant director of actuarial services, responsible for EDP project management and daily editing and booking of premiums. She began as a programmer trainee and has held various technical and management positions.

Benashski holds a degree from the University of Wisconsin at Eau Claire.

• • •

FRANCIS X. MURPHY has been appointed deputy commissioner of management information for the County of Nassau, New York. He will be responsible for providing countywide data processing, communications, printing/graphics and record/mail services.

Murphy joined the county in 1969 as a programmer trainee, where he advanced to his previous position of director of data processing in 1978.

Murphy holds an M.B.A. from Adelphi University in New York.

• • •

PETER J. LEONARD has been named director of management information systems for the Services Division of AM International in Schaumburg, Ill.

Leonard joined the corporation as a programmer analyst in 1972. He subsequently held various computer-related positions, most recently serving as the division's systems manager.

Jeans

Benashski

Leonard holds a B.S. degree in computer science from Boston College.

• • •

MICHAEL GARELIK has been appointed manager of information systems for the Society of Automotive Engineers, Inc. Located in Warrendale, Pa., this organization is dedicated to educational and scientific advancement of automotive technology.

Garelik will direct the implementation of a new integrated management information system and office automation network that will require five years to install.

He was formerly a consulting psychologist at Psychological Consultants to Industry. Prior to that he was an assistant professor of psychology at the University of North Florida.

Garelik completed his doctoral studies at the Institute for Cognitive Studies, Rutgers University. He received his M.A. in psychology from the New School for Social Research, New York, in 1969.

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8. Grow and Expand. As you grow, so will Datashare. With our ARC™ system architecture, you can add on displays, increase processing power, expand peripherals, and extend your database virtually without limit. And whenever you're ready, you can add word processing, electronic message service, and data and voice communications management to the same system. With Datapoint, anything goes.

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Houston to Host January Networks Meet

HOUSTON — The Communication Networks Conference & Exposition to be held here Jan. 13-15 will feature more than 70 sessions and 200 speakers from around the world.

Sponsored by The Conference Company, the program will emphasize an exchange of professional expertise between users, carriers, vendors and the regulatory and consulting communities. Attendees will also play a role in structuring the 1981 program.

Some of the topics to be discussed include network policy and management for U.S. and international users and carriers, network architecture, network software, satellite developments and information appliances for networks.

The registration fee is $345 before Nov. 15 and $395 after. Several full- and half-day Monday workshop sessions will be held. The full-day charge is $195 and the half-day charge $95, The Conference Co. said from 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.

Information Systems Award To Honor College Leaders

BOULDER, Colo. — Nominations are being sought for two awards to recognize "professional excellence and exemplary leadership in the field of higher education information systems," to be presented by Cause, an association "for development, use and management of information systems in higher education."

The Cause Award for Professional Excellence will be presented to the information systems professional who has made "a significant impact on the field of higher education information systems, or on the establishment and improvement of standards in the field, their institutions or the enhancement of their profession."

The Cause Award for Exemplary Leadership will be presented to the college or university administrator who has shown leadership in:

- Providing resources for improving information systems within an institution.
- Advocacy of information systems as an important part of higher education administration.
- Providing the necessary environment for the development of effective information systems within the institution.
- Significant efforts to make information systems more compatible with higher education administration.
- Significant contributions that, over a period of time, have enhanced higher education information systems within the institution and within the profession.

All Cause members have received a special announcement of the 1980 Recognition Program and a nomination form. The Recognition Committee will review all nominations and recommend the individuals to receive the awards to the Cause board of directors.

Nomination forms must be sent to Cause by Aug. 1, 1980. The two Cause awards, to be presented at the 1980 Cause National Conference in Phoenix Dec. 7-10, include $1,000 scholarships in the awardee's name to the college fund of his choice.

Additional information is available from Cause's national office at 737 29th St., Boulder, Colo. 80303.

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Architect Overlooked CPU; Hospital Does Not

By Connie Winkler
CW Staff

STONY BROOK, N.Y. — It is the heartbeat of this hospital, but architects never anticipated that the computer would play such a key role in running the recently opened State University Hospital here.

Indeed, architects did not design a data center for the twin-tower, 19-story buildings, and the IBM 3031 at the last minute had to be squirreled away in what had been a storeroom in an adjacent building, recalled Frank A. Russo Jr., director of information systems and deputy director of the hospital.

It is particularly ironic because the computer and terminals do everything from admitting patients — even in the emergency room — to ordering blood tests. Later, the patient leaves the hospital with a copy of the computerized bill in hand.

Russo calls it the most comprehensive hospital system in the country.

Throughout the hospital are 130 IBM 3278 CRT terminals and 60 IBM 3287 printers. The system handles about 20,000 transactions daily.

Looking to 1990

"We wanted a hospital for the 1990s, not a takeoff on existing hospitals," Russo said about the days in 1977 when he, a consultant and the hospital director planned the university system.

Russo believes most hospitals today are five to 10 years behind their industrial counterparts in data processing, partly because they are afraid to give up their existing systems and partly because of the money crunch hospitals have experienced.

"We wanted a functionally complete, integrated system," he said. They shopped for software packages and settled on IBM's Patient Care System developed by Duke University. The purchase price was $70,000.

It was one of the few instances when the software sold the hardware, Russo said. In going with the hospital package, the planners rejected using the Univac 1102 at the nearby computer center of the State University of New York, as had been planned originally. The hospital first leased the 3031, then purchased it when IBM cut prices in early [illegible].

Depending on how the hardware evolves, the hospital could well go to a more distributed system, acknowledged Russo, who came to the hospital after heading Nassau County, N.Y.'s DP operation. At present, the hospital laboratory already has an IBM Series/1 to collect data from such multichannel laboratory instruments as blood analyzers.

The hospital provides ambulatory care for Suffolk County, N.Y., and Russo looks forward to having a minicomputer at a county location.

In the data center, the hospital already has a Four Phase Systems, Inc. mini that is on-line to Shared Medical Services in King of Prussia, Pa., to handle all the hospital's financial applications. Eventually, the hospital will take over that financial processing.

On-Line Departments

Stony Brook is an organization where a visitor can walk into any department and find employees riveted to the terminal screens. "There's no other way to work here," Russo said.

On-line departments are radiology and nuclear medicine, respiratory therapy, dietary, central supply, laboratory, pharmacy, electrocardiograph, electroencephalograph, admitting, emergency room, operating room, inpatient nursing and ambulatory care pavilion.

The computer system was rushed into place in order to have employees learn their jobs on the terminals by the time the hospital opened officially in February 1980. "We felt we had an opportunity with the opening of the hospital to overcome resistance to change," Russo said.

System Staffing

With only seven applications programmers, Russo started in October 1979 to build the data base and install the major systems.

The ease and flexibility with which the small staff was able to build their system using the Patient Care System is one reason Russo is so enthusiastic about the package.

The packages allow for easy debugging by the inexperienced staff and are flexible enough to allow for easy changes such as those often requested by health agencies. Blue Cross, the U.S. government and the state of New York all want the same data, but each wants it in a different form. The package allows that flexibility, Russo emphasized.

"Being a state agency, we couldn't afford to have a large staff, nor could we afford to pay high salaries," he added.

The system, with its high-level report writer, makes it easy for users to adapt the 1,000 screens to their needs, and users make their own screen changes. The DP department contains only 25 people, and most of them are the 24-hour operations staff.

Physicians' Benefits

To make the system happen, Russo got good cooperation from the hospital staff, including the physicians.

The physicians are happy so long as they don't believe that they are doing anyone else's job, Russo noted, and there are system advantages that make the doctor's job easier.

A printer in the doctor's lounge gives an immediate listing of the doctor's patients and their status so that the doctor does not have to find the respective charts at each nursing station before making rounds.

Russo estimated the cost of the system per patient at $5/day and said the hospital will realize a net savings in labor of $10 million throughout the next 10 years.

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As Shopping Guide

Phone-In Directory Challenges Yellow Pages

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — A computing system that the general public can "talk" to over the telephone is beginning to challenge Ma Bell's Yellow Pages as the preferred shopping guide for many southern California consumers here.

To an extent, the system — dubbed the Consumers' Computer by its developer, Consumers' Computer Corp. of America — is a latter day Yellow Pages transferred from print to printed circuit boards.

The system contains advertisements for approximately 1,500 product and service classifications representing an estimated 1,000 area businesses. Cataloged in the system's 8,500-item advertising directory are goods and services ranging from autos to adoptions, from diamonds to do-it-yourself divorces.

Consumers interested in buying one or more of the advertised items can gain access to the system and its data base by dialing a standard seven-digit phone number on an ordinary Touch-Tone telephone.

System Advantages

Although the Consumers' Computer serves basically the same purpose as a standard Yellow Pages directory, it offers the buying public several advantages not available with hard-copy phone listings, according to Michael McCafferty, the firm's president.

First, it automatically supplies the name and phone number of the merchant nearest to the caller's current location. For example, if a prospective customer calls to inquire about 35mm cameras, the system searches its directory of photographic equipment suppliers and immediately tells which of the various stores is the shortest distance from the call's point of origin.

Furthermore, because the system's data files can be continually updated, the Consumers' Computer can automatically tell a caller whether a desired product or service is currently on sale.

To take advantage of the system, advertisers have to pay a monthly subscription fee. For consumers, however, the system costs nothing to use and is available 24 hours daily.

One executive responsible for the system's development describes the service as the "first free public computer network in the U.S."

In addition to serving as a clearinghouse for assorted product and service ads, the Consumers' Computer doubles as a personal calculator that users can operate remotely by pressing the right buttons on their Touch-Tone telephones.

By year's end, the system will also be used for forming car pools, performing metric conversions, relaying emergency phone calls from the speech- and hearing-impaired and providing many other free consumer services.

Sometimes referred to as the Product and Area Locator (PAL), the system was developed by the Consumers' Computer Corp. and first went into operation last January. For the moment, its scope of service is confined to the Greater San Diego area.

But efforts to franchise the operation are already well under way and within the next few months additional Consumers' Computer sites are expected to start appearing in major cities throughout the U.S., according to the firm's spokesman.

The system here is currently configured around two minicomputers — an 8K-byte front-end communications processor and a 64K-byte host mainframe, McCafferty said.

The front-end machine controls the system's voice-response unit, multiplexes as many as 64 incoming phone calls, buffers message strings and sends them through an RS-232 interface to the host processor. There, the system searches its files, performs any related processing and sends the appropriate response back to the front-end processor, which in turn relays the message over phone lines to the waiting caller.

For competitive reasons, the firm declined to reveal the model numbers of the two minis other than to describe them as Zilog Corp. Z80-based units with a disk-storage capacity of 11M bytes, only half of which is currently in use.

To operate the system, users first enter a standard seven-digit code on their Touch-Tone telephones. The caller is then answered by a digitally recorded female voice that says, "Hello, this is Pal. May I help you?"

Comprehensive Directory

The callers then enter their Zip Codes, press a button and key in the four-digit identification number of the product or service they wish to order. Each of the system's 1,500 product and service classifications is assigned its own unique identification code, which is listed in a comprehensive 34-page directory, McCafferty said.

After the customers hit a specified key on their phones, the system searches the appropriate data file for the names of businesses that supply the goods and services whose identification numbers were entered earlier. The system then culls from that file the names of businesses that lie within the same Zip-Code area as the callers and, by using its voice-response capability, tells the customers by telephone which of these establishments is nearest.

If the type of supplier a customer needs does not exist within the caller's Zip-Code area, the system expands its file searches in ever-widening circles until it finally finds the name of a suitable establishment.

The system's "voice" then gives the caller the merchant's phone number and indicates whether a sale is currently under way for the product or service the customer wants to buy, McCafferty said.

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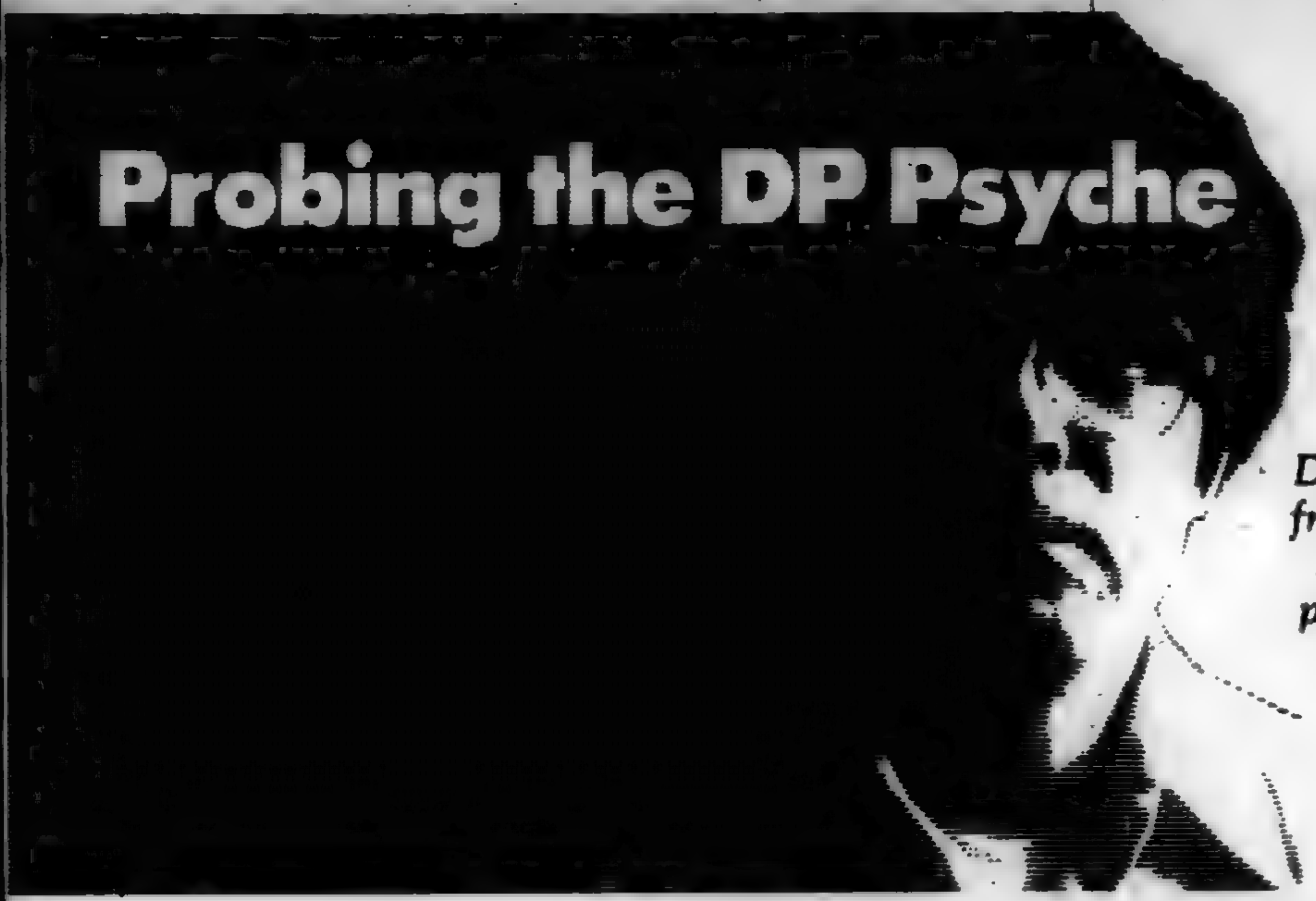

Probing the DP Psyche

By Barry A. Stevens

This profile of the DP personality emerged from psychological tests administered to 6,000 people over eight years. Can you see yourself?

Considerable talk has surfaced about the existence of a data processing mentality.

Gerald Weinberg, in *The Psychology of Computer Programming*, noted differences between the DPer and those he called "others." Philip Kraft, writing in *Programmers and Managers*, stated that "Programmers ... were different in ways that I could not quite understand." J. Daniel Couger, in a recent In Depth article in *Computerworld*, "What Motivates MIS Managers?", pointed to differences in personality between the management information services (MIS) manager and his peers. And whether or not you agree with all of Jack Stone's outspoken views on the DPer and his relationship to the business world, he too has pointed to observable differences between the DPer and others.

If a DP personality does exist and is observable in one form or another in large numbers of DPers, it probably has considerable impact on the industry as a whole. And if indeed it does, then it would be quite useful to understand the nature of that personality.

The source and nature of the material in this article cannot provide conclusive proof that such a mentality exists. But in an attempt to spur discussion, we will deal with the following questions:

- Is there a "DP mentality"?
- Is there a mechanism that creates it?
- What are some possible impacts on the DP work place?

In the following discussion, we attempt to describe that personality and explain the method by which its characteristics were observed. Shortcomings of the method as well as comments from several reviewers are presented. Then the profile is used to subjectively interpret common problem situations found in many DP installations.

Finally, we suggest a more thorough study to derive such a profile and address the benefits that could accrue from a clear understanding of the DP personality.

General Profile

Use of generalizations for anything is risky, but the risk increases as they are used to describe people. People always object to such classification, especially if they are the subjects.

The profile described here may not match the view you have of yourself or of your friends and working associates. It merely describes observable differences among members of the group from which the observations were drawn. We make no value judgments, and none should be read into the material.

The DPer is more cool and impersonal than other personnel. He often prefers to be aloof when dealing with others, prefers to deal in precise terms and is often preoccupied with small details. (Users, on the other hand, are used to generic terms and prefer to avoid detail.) The DPer may be a limited communicator in the interpersonal sense.

The DPer tends to be very perceptive. He is intellectually curious, and has good problem-solving ability. His morale is high, providing that he is not working on what he perceives as routine or simple tasks. He may respond poorly to supervision or leadership he feels is mediocre.

The DPer tends to be more serious and reserved than his non-DP counterparts. He may be introspective and reserved, preferring to conceal his feelings. He makes choices that reflect conservative tastes and values. He also prefers stable life situations and prefers not to take risks.

The DPer tends to be more persevering, even dogmatic. The DPer is reliable in assigned activities and prefers adherence to established practice. He may be inflexible in pursuit of a goal, but tends to be moralistic, driven by his conscience.

The DPer is often more cautious and hesitant than his non-DP counterparts. The DPer may be more shy and self-conscious and tries to steer clear of threatening situations. More likely than not, he harbors unrealistic feelings of personal inadequacy and prefers to avoid challenges on the personal front.

The DPer tends to be more pragmatic than non-DPers. He is used to dealing in tangible, concrete facts and thinking in conventional terms. Concerned with immediate issues and problems, he sometimes takes a narrow point of view. Short-range concerns are of interest, while long-range things are usually not. The time horizon of the DPer is shorter than that of his non-DP counterparts.

The DPer is unpretentious. He is more straightforward and to the point, prefering to be open, frank, candid, even blunt. He may lack empathy in dealing with others. Choices made on social questions show that the DPer may feel socially awkward.

The DPer is more anxious and uncertain. He may harbor unrealistic feelings of inadequacy and may be distracted by moods of defeat or failure. More often than not, he worries over past mistakes and seeks approval of others.

DPers taking the test made more conservative choices than non-DPers. They tended to stay with established ideas, customs or rituals. They rejected departure from tradition and stayed away from unorthodox practices.

The DPers observed were more group-active than non-DPers. DPers taking the test showed strong feelings for mutual dependency. They were joiners and were willing to be cooperative when group interests were at stake. They looked to others in getting things done and tended to value public opinion.

No Differences

There were a number of factors for which there was no difference observed between DPers and non-DPers:

- The degree of patience and stability shown.
- The extent to which the test taker was trusting or skeptical.
- Whether the test taker would act impulsively or in a self-disciplined manner.
- Whether the test taker was calm and relaxed or tense and restless.

Comments on Profile

This material was reviewed by a number of people before publication to get their reactions to the profile and comments drawn from it. Analysts and technical support personnel often singled out one aspect of the profile and said, "I'm not like that! That profile can't be right." Once the initial reactions subsided, other types of comments were documented.

Don Marchand, professor of public administration at the University of South Carolina, has been involved for some time with a project to determine the best way to provide DP services to state and local government agencies. He has reviewed the profile and used it in his work. "I've never seen anything that fits the DP people I've come into contact with so well. We've already used it to cool emotions, clear the air and understand the roles that are, or

(Continued on Page 26)

IN DEPTH

About the Test

Gerry Richardson, an industrial psychologist from Denver, used the test upon which these findings are based as a tool during a course on improving communications between DP and non-DP personnel.

The test was composed of 200 multiple-choice questions, designed to probe various personal characteristics of the persons taking it.

Richardson administered the test to approximately 6,000 people over an eight-year period. Roughly half were DPers and half were "others." All tended to be in middle to lower management positions.

The test takers recorded their preferences or most probable action for the situation described in each question. Sample questions included the following:

- I find it easy to mingle among people at social gatherings.
  a) true
  b) uncertain
  c) false
- When diplomacy and persuasion are needed to get people moving, I am generally asked to do it.
  a) true
  b) uncertain
  c) false
- On a project, I would rather work
  a) in committee.
  b) uncertain.
  c) alone.
- If a heated argument developed between other members taking part in a group discussion, I would
  a) like to see a "winner."
  b) in between.
  c) like it to be smoothed over.
- Talk with ordinary, habit-bound, conventional people
  a) is often interesting and has a lot to it.
  b) in between.
  c) annoys me because it deals with trifles and lacks depth.

Responses were recorded in 16 categories including the following: the ability or desire to communicate effectively; the desire to work alone or in a group; aggressive behavior; self-discipline; creativity; patience; enthusiasm; conservative or liberal choices in life situations; self-confidence.

The purpose of the test was to contrast a student's self-image with reality. As such, Richardson did not retain all profiles, since that could make the students distrustful and affect their answers.

To further complicate things, background information was not kept, and control and test groups were not established. Richardson did keep notes, however, on the characteristics distinguishing DPers from non-DPers. It is from those notes and a small number of retained questionnaires that this profile was developed.

(Continued from Page 25)

should be, played between DP and its users," he said.

Several reviewers noted apparent contradictions in the profile. The DPer's preference to be aloof when dealing with others contrasts with his desire to be part of a group. Others contrasted his intellectual curiosity with the preference to stay with established ideas and practices.

Richardson noted from his observations that "it is likely that there may be contradictory elements built into the DP personality. Intellectual curiosity, for example, which would normally lead to exploration of new ideas, is balanced by caution, by a fear of changes that would result in risk or personal challenges."

Fears, Anxieties

Others have noticed fears and anxieties among DP personnel. Dr. Sammy Pearson, assistant to the administrator at the General Services Administration's Office of Planning and Analysis, has recently completed projects involving use of tests to measure user satisfaction in the DP environment. During his work, he has come into contact with large numbers of DP personnel, and he commented on the "anxiety, uncertainty and unrealistic feelings of inadequacy" in review notes on the profile: "I think that this 'trait,' if common (and I believe that it is), is the single most important aspect of the profile. Fear of being inadequate (or of being discovered to be inadequate) could be the dominant characteristic [of the DP personality]."

Pearson noted several contributing factors. DP jobs have stringent requirements for success. Many pieces have to be exactly in place for a system to work at all. He also described the almost total lack of positive feedback he observed while studying DP environments. And he noted that the field of knowledge in DP is so vast that no one person can truly be expert in most of it.

The rapid growth of knowledge and the need for attention to ever-increasing amounts of detail in order to be successful may be strong contributing factors to this personality trait.

One reviewer commented on the DPer's profile in relation to other disciplines. John Dratch, national DP operations manager for J.C. Penney, noted that "any technically trained group working under stress may exhibit similar characteristics. Engineers, for example, may fit parts of the profile."

But he also said, "The pressures on data processing may be unique. DP is always in a confrontation mode and is usually seen as tearing down empires" that others have created.

Dratch's view is supported by Jagdish Dalal, MIS manager for Brookhaven National Laboratory, who wrote in the *Journal of Systems Management* that "in some cases a change is perceived as a possible threat that will make the empire tumble or will lead to a loss of status and identity." And the author noted such a confrontation atmosphere when implementing change within the DP environment as well.

Personality's Origins

One doesn't have to observe DP hiring activities for very long to discover that people from all backgrounds and disciplines try to get into DP. And labor is so tight in some areas that almost anyone with any talent can be hired at the entry level. If the profile of those who remain is measurably different from the "others," it is reasonable to assume that something may have caused that difference. We will describe three possible causes.

Aptitude tests are often used to identify programmer candidates with high potential. In theory, the tests can't be used in making the decision to hire an employee. But a particularly high or low score on those tests can easily bias the interviewer or manager toward or away from a particular candidate.

The tests are constructed by observing large numbers of people already involved in DP, and the tests yield higher scores for those candidates who most closely approximate the characteristics of the DPers. The result could be to screen out those farthest from matching the characteristics of the group used to make up the test.

Situations in which employees help recruit personal friends or former business associates may contribute to creating a DP personality. An employee is likely to recommend someone who is compatible, perhaps a friend. Unlike in the physical world, where opposites attract, in this situation likes attract. Again, this results in increasing numbers of people with similar characteristics.

But standardized programmer tests are not routinely used at all computer installations; and personal references could not be expected to create a homogeneous set of personality traits among people hired, since the group of people doing the recommending is not homogeneous.

Neither mechanism could adequately explain an industrywide personality, if it can be agreed that one exists. However, a third mechanism, rooted in the characteristics of the industry itself, could provide an answer.

Question of Speed

The DP industry is often characterized as fast-paced. New products and technologies are constantly emerging. Pearson and Kraft both observed the rapid growth of knowledge and the necessity to master ever-increasing levels of detail.

Although there have been moves toward systematic approaches to management, most installations still run in a day-to-day crisis mode. Politics abound, both between DP and its users and within the DP organization itself.

Dratch and Dalal pointed out the "unique pressures" that operate in the DP environment. Job descriptions change as a function of all-too-frequent reorganization and shifts in technology.

The rate of information growth, the increasing level of detail, the increase in confrontation as DP penetrates deeper and deeper into the business world and constant crisis-mode management can all combine to weed out those who don't like or can't tolerate the fast-paced, stressful environment. This is a screening mechanism that could create a clearly identifiable DP personality.

Some Interpretations

In this section, we present some subjective interpretations based on the profile. The assumption is, of course, that there is some measure of truth in the profile, and most reviewers have agreed. The purpose is to present one view of how elements of the profile could combine to enhance, perhaps even create, some characteristics of the DP industry that many have seen and commented upon.

DPer-User Gap

Relations between DP and users have been described by many as strained, political, even hostile. The author, in the role of consultant, has been in dozens of organizations where the story is similar. Users complain about systems that do not meet requirements, projects that have fallen behind or poor operational service levels. DP complains about the fork-tongued users, who say they want one thing, then change and want another. The DP group often spends a great deal of time trying to protect itself against changing priorities, ambiguous requirements or politics. And we have all read numerous articles telling us to communicate in user terminology if we really want to get our ideas across.

Using phrases drawn from the profile, the DPer may be described as "often preferring to be aloof, used to dealing in precise terms" and one who may become "preoccupied with small details." The DPer prefers to avoid risks and personal (as opposed to professional) challenge. He or she may "harbor unrealistic feelings of personal inadequacy."

Since the profile was created by observing two major groups — and the groups were drawn from seminars of DPers and people who use DP services — we'll assume that the characteristics of the users are the flip side of those for the DPers. Richardson noted, for example, that the users are function-oriented, rather than detail-oriented. They try to avoid detail, are even repelled by it.

When users ask a simple question such as "What happened to my job?" or "Why is that report wrong?" they expect a functional answer, in as little detail as possible. The DPer can interpret the question as a personal challenge or, as the profile argues and

(Continued on Page 28)

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PROBING THE DP PSYCHE

(Continued from Page 26)

Pearson reinforces, become fearful that their inadequacy will be discovered. They communicate the answer in precise detail, in concrete terms, in an aloof manner, perhaps a bit defensively.

The user, repelled by detail, backs away from the transaction. The DPer, viewing that backing away as a personal challenge, defends the detail still more vigorously and finally backs away from the transaction as well.

Here we see two groups of people who must work well together to accomplish what they both have been assigned to do. And each has a psychological stake in *not* working closely with the other. The result is a gap across which effective communication and functional contact are difficult.

Manager-DPer Gap

Managers at middle and upper levels in DP organizations often feel a gap exists between themselves and the people they manage. One operations manager in a large shop told the author, "It's frustrating to try to get my people to do what the company wants done. Sometimes I feel I can't control them at all." A DP director said, "I try to translate the corporation's objectives into a technical challenge substantial enough to hold my people's interest. If I fail, I lose some of the better ones to companies that can provide that challenge." A third manager said, "I've made my people follow standards and good project management practices, but only at the price of resentment, lowered morale and some turnover. During an exit interview, one employee told me that I just don't understand the technology or the real problems that the DP group faces."

The profile shows DPer is used to precise terms and small details. Morale is likely to be high unless he is working on tasks perceived to be simple or routine. His response to leadership can be poor if he sees it as mediocre. Short-range topics are of interest to him, and the long-range picture is not.

The manager's role, of course, is to worry about long-range topics — long-term problem resolution, planning, budgets and projects that will not even be begun for a year or two. Obviously, projects that far in the future cannot be specified in complete detail.

The manager cannot be expected to gain a detailed understanding of every aspect of every DPer's work. This can cause the DPer to view the manager as mediocre and to reject his or her authority. (The systems programmer in the exit interview described above told the author "that guy can't even do a Sysgen. He's not going to tell me how to do my job." The rejection of authority is usually not, of course, overt: "How can I commit to that plan if I don't know the details?"

Lack of detail as well as concentration on long-range topics — basic characteristics of the managerial process — can combine with the profile characteristics of the DPer to create a gap between the DPer and manager.

Loyalty to Profession

The question of the DPer's relationship to his profession and to his employer has been raised before. As only one example, Ira Gottfried, president of Gottfried Consultants, Inc., noted in comments reported in CW [March 31] that, among other things, DPers are "less loyal to their employers than to their profession."

The profile was used above to describe gaps that could develop between the DPer and user and between the DPer and manager. Other characteristics described in the profile suggested that the DPer is anxious, uncertain and may value public opinion. He doesn't want to be a party to failure and prefers to stay with established ideas.

Professional associations and meetings are among the best sources of established ideas in the industry, and such meetings gather people in nonthreatening situations to talk about those ideas. DPers who bring home ideas from those meetings are backed up, in effect, by the collective weight of those attending the meeting.

The sessions are conducted at the level of detail needed by the attendees and in language appropriate to their functions. Those who present papers or participate in formal or informal discussions get considerable positive feedback. (Pearson noted the almost total absence of positive feedback within the DP organization. Couger noted that problem is "perceived at all

If Churchill had used SPSS®, he might have saved his statistical department a lot of blood, sweat and tears

In waging war . . . and business . . . great executives know that good data analysis is a matter of life and death. Winston Churchill knew it:

"One of the first steps I took on taking charge of the Admiralty . . . was to form a Statistical Department of my own—(one that I) could trust to pay no attention to anything but realities. This group was able to present me continually with tables and diagrams illustrating the whole war. I (therefore) had from the beginning my own sure, steady source of information, every part of which was integrally related to all the rest." (*The Gathering Storm*—pp467-68)

Thanks to the honest and tireless efforts of his Department, most of the war's critical decisions were based on facts, not hunches. Had they been able to use the SPSS Data Analysis Package, the Department's analysts could have explored the legions of data more quickly, efficiently, creatively . . . with easy-to-generate tables, graphs and reports, as well as sophisticated statistical analysis.

Using the SPSS Graphics Option, Churchill might have had graphs showing The Battle of Britain in terms of German and British aircraft losses by time. Using regression analysis, Churchill would have had an excellent estimate of future losses.

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When you decide which data analysis software package is right for your life and death decisions, consider the facts, as Churchill would have done. SPSS is sophisticated in output, yet simple to input. It's extremely portable—works in almost all computer environments. And you needn't hire any extra data processing people—your data researchers work on their own . . . with considerably less "blood, tears, toil and sweat."

If you would like to see how SPSS-generated graphs and charts would have displayed The Battle of Britain to Churchill, or for more information on SPSS, call or write:

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points of the organizational hierarchy" and went on to say that "the feedback problem ... may be caused by the unique characteristics of personnel in the computer field.")

Further, the ideas of individuals in the field are not held in very high regard. Ideas or approaches to problems are always backed by some authority from "the industry." How often have we all heard, "IBM suggests doing it this way ..." or "The institute approach is ..." or "American Airlines says ..."?

The industry can provide much-needed positive feedback and act as a source of proven successful ideas, minimizing risk and personal challenge for the DPer when he returns home to try out those ideas. When things don't work out at the DPer's organization, industry groups can provide leads to another job. These factors, together with the gaps described above, can combine to make the DPer more loyal to the industry than to any one employer.

Standards, Project Management

What manager has not encountered difficulties in trying to implement or enforce standards and project management? Their beneficial effects are well known. They offer the potential of better-quality work and better overall DP performance. But in spite of the benefits, extreme resistence is often encountered in their implementation or use.

The profile shows the DPer to be skillful in problem-solving and happier with tasks that are not preceived as simple or routine. And short-term projects or tasks are the DPer's favorite concern. There is a clear, almost dogmatic focus on completing such tasks. (And Weinberg noted also that the DPer is very accomplished at pushing a specific project or task through to a conclusion.)

The profile also shows that the DPer may reject things which come through the management chain, since that chain can be perceived as mediocre, as described above.

Standards and project management can be seen as roadblocks in the way of getting the job done. They require that time be spent in meetings and filling out paperwork. And they limit the range of choices available in solving a particular problem for a particular project.

They get in the way of the DPer's basic preference for completing the task at hand as soon as possible, and they prevent the use of shortcuts that could allow earlier completion. They often prevent the use of novel or innovative solutions to problems the DPer is able to devise. Standards and project management are the work of the managers, and they, as with the managers themselves, may be perceived as mediocre.

What Next?

This article has attempted to show how a personality profile of the DPer might be constructed using a standard test. In addition, it has demonstrated some of the many possible impacts of that profile on the DP industry.

Additional work in verifying or expanding this profile, or in creating another like it, would be very useful. The test conditions should be better controlled and more information collected on the test taker's background, experience, position and organization level.

But why bother? What benefits could result? Richardson has already used the material in its present form to structure a very effective seminar designed to improve communication between DP and its users. Marchand has also used the material in its present form to confirm findings in his work.

Additional testing could remove any doubts about the validity of the effort and provide additional detail useful in many different areas. Courses in effective communication, for example, usually include one cardinal rule — know your audience. The profile can provide another important tool in gaining that knowledge. It has marketing implications, since it presumably defines the basic personality of "the average DPer" with whom many marketing campaigns attempt to communicate.

The profile is also very useful as an introduction to the DPer's personality for personnel who have never previously been exposed. And understanding the profile as it relates to users and managers can give the DPer an edge as well. Kraft indi- ctly touched on this when he wrote: "... something struck me with particular force. Most programmers seemed to know well enough how their jobs were organized, at least insofar as knowing means that they possessed most of the information. They had little in the way of an overall perspective ...

"It was apparent that managers and their employers knew something that programmers didn't know. It was also apparent that because of this, managers were in a position to exert a degree of influence that was not — and could not be — balanced."

Better understanding of this profile would help in improving communications between DP and its users and between managers and their employees. It can aid in marketing efforts. And it can aid in restoring a balance that Kraft says is missing, by providing the DPer with a better understanding of the roles and relationships in his organization.

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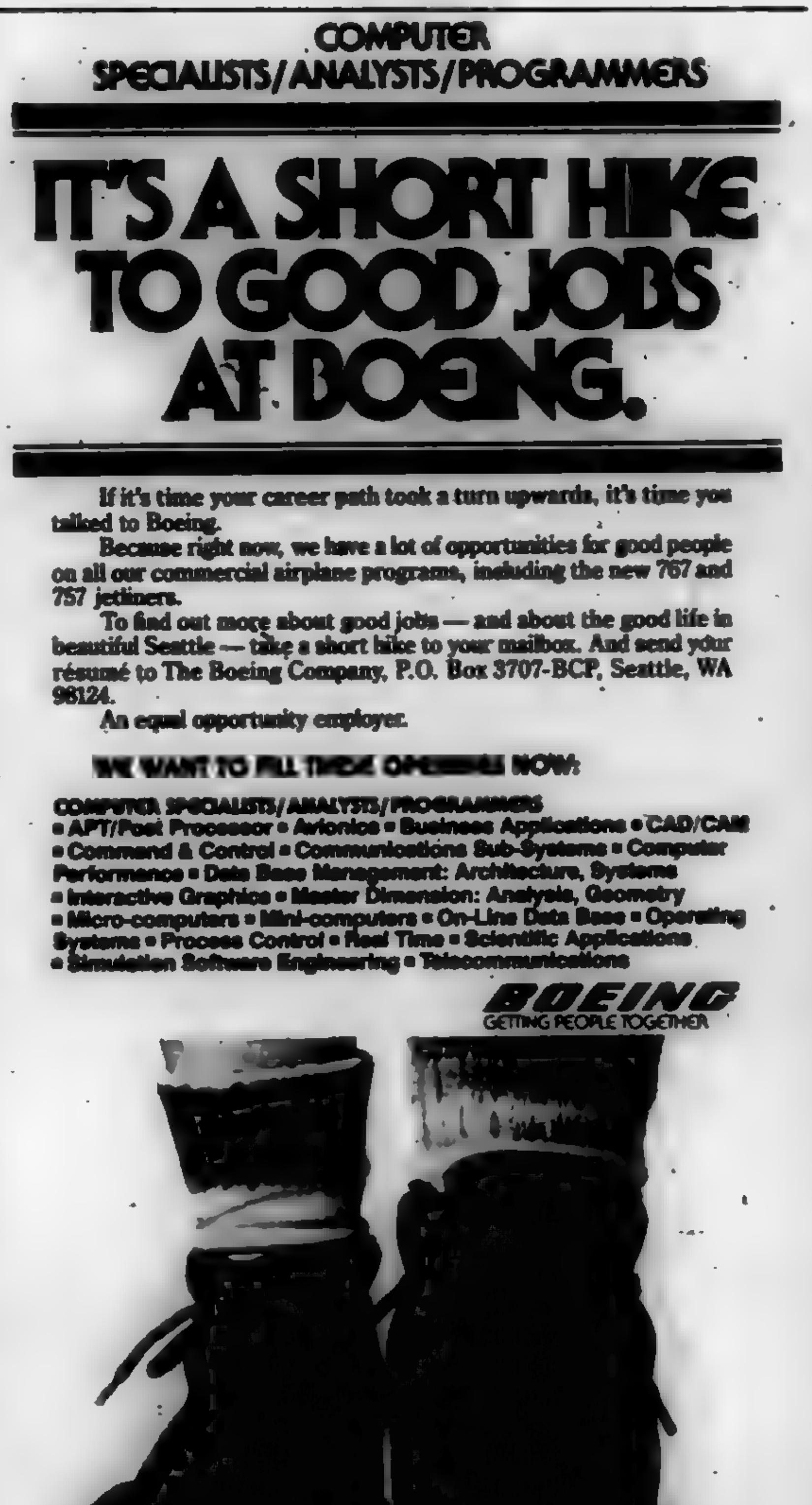
With 15 years' experience, Stevens has seen DP from the viewpoints of the vendor representative, operational management, a public accounting firm and as an independent consultant.

He is the creator of the methodology for DP management documented in Volume 1 of the EDP Performance Management Handbook, *published by Applied Computer Research, Phoenix, Ariz. He has served as associate editor of the EDP Performance Review, was president and director of the Computer Measurement Group, has been active in Share and is a member of the Association for Systems Management.*

Stevens holds a bachelor's degree in electrical engineering from the University of Connecticut.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EDITORIAL

Time Bomb

The Federal Aviation Administration (FAA) is playing with a time bomb that could explode at any moment in the form of a mid-air collision.

While the agency continues to deny charges that the nation's air traffic control (ATC) system is obsolete, computer outages around the country have caused countless traffic delays and at least one near mid-air collision recently [CW, July 14].

At outage-plagued O'Hare International Airport in Chicago, a data systems specialist speculated recently that one of the system's problems could be its age: "My own opinion is that when the software was designed in the early 1960s, perhaps the person that was looking down the road 20 years just didn't realize the potential was there for saturation."

In recent years, aviation industry observers have repeatedly blamed just such lack of FAA foresight for the ATC system's increasing problems, both in software and hardware.

The present ATC system is based on World War II vintage radar and aging first-generaton IBM 9020 mainframes, while air traffic itself — and thus the load the computers must bear — continues to increase yearly.

While the U.S. air transport industry carried 174 million passengers in 1970, that figure increased 60% by 1978, to 280 million. And most forecasts predict the number of passengers will increase to more than 500 million by 1990.

Current FAA plans call for an updated ATC computer system by the end of the decade, but according to recent congressional testimony, the number of near mid-air collisions has already increased more than 83% from 1973 to 1978.

Increasing ATC computer outages — many the result of memory overload — can only compound the danger to air passengers.

Besides near-misses and the inconvenience of delays caused by computer outages, the cost of air traffic delays to the industry is estimated to be more than $500 million a year in terms of wasted fuel and lost operational efficiency.

And while such delays do not in themselves create unsafe situations, they nevertheless increase passengers' exposure to unexpected occurrences that could affect safety.

The FAA should stop wasting its energy on denials and start restructuring the ATC system with the safety of its passengers foremost in its mind.

LETTERS

Against IBM Breakup

Let me be counted among the strong opponents of the stated position of Martin Goetz, vice-president of Applied Data Research, Inc. [CW, July 7]. His call for "structural relief" and a breakup of IBM would not serve to remedy any of the problems facing independent software suppliers or their customers in the 1980s. Pansophic Systems, Inc. is a member of the Association of Data Processing Service Organizations (Adapso) and I can perceive no "grassroots" support for this position there.

Goetz stated that "any attempt to restructure IBM . . . would probably sit poorly with many of the company's customers . . ." I should say so! Such a move would probably cause an overnight halt in the impressive record of technological advancement achieved by the computer industry since the mid-1950s. There would suddenly exist an immense vacuum since no organization (other than IBM) could satisfy the immense worldwide demand for computer equipment, software and services for many years to come.

Goetz failed to consider that the computer users would be hurt most by his proposals for breakup of IBM. I fail to see how such a drastic move could ever result in "improved software quality and reduced software prices." In fact, it would clearly cost more to produce better quality software since it is labor-intensive.

It is also a fact that most IBM software products are very low priced because of its large volume of potential users. Clearly, software prices can only increase (even without a breakup of IBM).

Joseph A. Piscopo
Chief Executive Officer

Pansophic Systems, Inc.
Oak Brook, Ill.

More on Series/1 Cobol

Please add our comments to those of Robert Moreau regarding the Series/1 EDX Cobol [CW, June 9; Taylor Report, May 19]. Our company has been working with the EDX Cobol system for approximately one year. We have developed several software packages using the EDX Cobol, including a commodity brokerage management system, a securities brokerage management system, a common carrier accounting system and a general accounting system.

As Moreau indicated, the debugging time in Series/1 EDX Cobol was more extensive than we anticipated. However, we agree this system is possibly the General Systems Division's finest. Response time and general performance are better than we had hoped.

However, local IBM support in initial debugging, especially in the interface to Cobol, was less than helpful. We felt as if we were pioneering in the system.

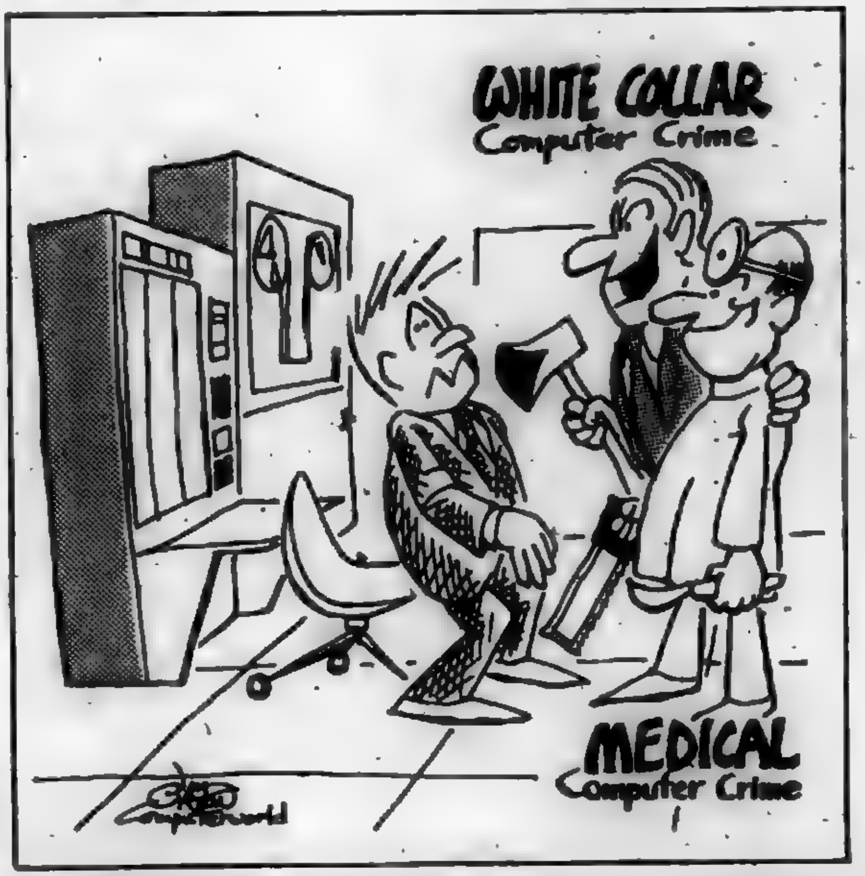
Regarding the Series/1 hardware, we are impressed with price and reliability. We have been using Control Data Corp. peripherals on our Series/1 and find the equipment performs well and is less expensive than comparable IBM equipment. We have found the IBM 4979 display stations' performance quite unsatisfactory. The CDC 80610, on the other hand, is an excellent performer.

We have spent many hours developing our own software to interface the EDX with the Cobol. One of the routines we developed is the Cobol/-$Image interface. This routine allows the user to use the full screen under $Image in the Cobol programs.

We are always pleased to read of developments in the Series/1.

Ben Pratt
General Manager

Idaho Computer Service
Twin Falls, Idaho



"How's about a hearty welcome aboard for my new partner Doc?"

DATA PAST

Five Years Ago
July 23, 1975

WHITE PLAINS, N.Y. — IBM announced the 3344 and 3350 fixed disk drives for the 370/135 and larger systems. For a 3340 user, the 3344 drive would effectively halve the storage cost per byte; for a 3330 user, the 3350 would cut per-byte storage costs by 50% to 70%.

— — —

A majority of women DPers had never met any sexual discrimination and felt competence had become the deciding factor in obtaining promotions, a *Computerworld* survey found. Respondents to the survey were nearly unanimous in crediting the feminist movement with recent improvements in their situation.

Eight Years Ago
July 26, 1972

MONTVALE, N.J. — The Fall Joint Computer Conference would be the last of its kind, the American Federation of Information Processing Societies (Afips) announced. The first National Computer Conference was being planned for June 4-8, 1973 at the New York Coliseum. The NCC would supersede the spring and fall joint conferences.

— — —

WASHINGTON, D.C. — The government found a new use for the Social Security number. As of July 1, it also became the Taxpayer Identification (TID) number, and all banks were required to use it to facilitate record retrieval.

READER COMMENTARY/Michael Gershman

Zeroing In on a Better Job

As a manager who has interviewed quite a few programmers seeking employment at Citibank, I have reached a few conclusions concerning how a professional can help himself get the best job offers.

The hardest job to get is the first one after school. The most marketable trainee is one who knows a widely used programming language on a practical level. Don't expect your teachers to go into this kind of detail; if they wanted to deal in vocational training, they wouldn't be college professors.

The solution is to buy the necessary manuals at least a year before you graduate and make it your business to learn, on your own time, as much as possible about the nuts-and-bolts details of a widely used programming language and computer. If you can actually study working programs written for that computer, or even write and run a few, so much the better.

Instructor-coded JCL, macros and I/O declarations are fine for running programs that play Hexapawn or simulate psychotic chimpanzees. However, a cover-to-cover knowledge of the IBM VS Cobol Reference Manual for OS/VS (GC26-3857) and the IBM OS/VS Cobol Programmer's Guide (SC28-6483) will complement your academic studies to get you the job and salary of a working programmer while your classmates are competing for trainee slots.

There may come a time when your knowledge of computability theory and system architectures will advance you professionally beyond your less-learned colleagues, but years of practical experience are needed to develop the mature judgment with which to apply your theoretical knowledge. Meanwhile, as a famous performer once noted, "Rich is better."

The working professional seeking a position at a new company doing the same basic job will seldom have a problem improving his salary and even his title. Nonetheless, some applicants do consistently better than others at getting the jobs they want. First of all, be clear in your own mind as to why you are moving. If you cannot give a logical reason for leaving, your prospective employer will have little basis for determining whether you will stay any longer at his company.

Second, know what you are looking for. If you would like to further your specialization in IMS or Tcam/NCP, say so on your resume and at every discussion with agencies and employers. It is *your* job to plot and follow your chosen career path.

Finally, don't limit your learning to the bare minimum needed to get today's program written. The fact that you read *Computerworld* is a good sign. Read some of a computer journal and the description of one new language instruction, JCL parameter or software function every week, and not only will you get the better job offer, but you will get a better assignment once you are hired.

Entering Management

The last stage in many programmers' careers is breaking into management. There seem to be three main reasons programmers go into management. Some recognize they can achieve more by directing others than they ever can by personal efforts. Others find their technical ability has peaked, and they would like to be measured on their people skills. Still others are attracted by the reputed money, power and glamour of management.

Whatever the motivation, there are three basic approaches to getting a management slot. You can simply be promoted into a new or vacated management position in your own group, you can actively seek out a job in your own company or you can emphasize the management aspects of your resume and apply for a management job elsewhere.

There are a few problems with the last method. A thousand other people compete for every management job open for outside hires, and many of the other folks have already been managers for years. What is more likely is that you will be hired for your technical expertise but given a management

(Continued on Page 32)

THE TAYLOR REPORT/Alan Taylor

Forth Entering Cobol Territory

The advance of the Forth language into commercial use is being given a major test in Cedar Rapids, Iowa. Here some IBM Series/1 EDL banking applications are being replaced and augmented by Forth-based Source Data Language (SDL) applications that use no operating system. The applications and, earlier, the SDL language itself were developed on Honeywell, Inc. Level 6 minis by a local firm, Source Data Systems (SDS).

It is expected that the use of SDL will give freedom from the IBM EDL software and permit prompt updating of the interactive and data base programs by users — with little or no programmer assistance. And if it all comes off as planned, commercial users will have a new weapon to assist them in their fight to improve computer productivity.

The key to this development is the Forth language. Forth — both from Forth, Inc. and from the independent Forth Interest Group — has been described here a number of times. Started in the field of radio astronomy, it is a compact, independent language that has been implemented on many systems, mainly minis and micros.

The important thing about Forth is its extensibility. That is, a procedure such as TAKE THE HIGHER can be defined in terms of more primitive actions, such as COMPARE, ADD and so forth. Then, once this definition has been included in a program, it becomes quite economically a full part of the available programming language.

Avoiding Standard Problems

This extensibility works both upward, into application-oriented forms, and downward into peripheral drivers and microcode elements. So theoretically, a Forth user can achieve the same freedom from hardware that a Cobol user has — but without being restrained by dictates as to what the upper, application-level software looks like.

Many Forth users, particularly in the dedicated application areas, have objected to any attempt to limit what the language can do. But SDS's president, Bob Barnett, an ex-Collins Radio systems man with hospital systems experience, believes in a different approach. He believes in restricting the system so that it becomes safe for non-Forth programmers — and even users on occasion — to update the application.

At the same time, his approach is to change the lower primitives to fit new sets of hardware as the market requires — without having any impact on the upper areas. And both of these procedures — in the upper, application area and the lower, hardware area — are now being tested simultaneously in the Banks of Iowa Computer Services operation, a rather sophisticated user handling more than 100 banks.

The hardware transportability test is, short of surprises, already over the hump and apparently successful. Barnett had a Forth, Inc. technician adapt the language to Series/1 from the Honeywell Level 6, and this was completed in June.

The new version of the Banks of Iowa application was reprogrammed into the proprietary SDL code at the same time, and the joint product — the Series/1 interface, SDL written in Forth and the bank applications written in SDL — was successfully mounted early this month. File conversion, development of written procedures and so forth will all take time but are coming along.

The simultaneous software testing, while necessary, can be assumed to be successful already — just as it really isn't necessary to test every Cobol application once the compiler has passed the U.S. tests. The same language is in use on Level 6 minis at Iowa National Mutual Assurance (Inma), where it is being used to add intelligence and data base access for branch processing of insurance policies.

SDL is now working at Inma, right at the user level. And the application is not static. Modifications are taking place in minutes, and the testing is being done when the department wants.

Inma is so pleased with the language

(Continued on Page 32)

HUMAN CONNECTION/Jack Stone

Technology Gains Suggest New Training Guidelines

"So what you are saying, then, is that the training of end users in data processing concepts is considerably more effective when presented in the environment of the user's own computing machinery and applications software. Is that right?"

I was slightly embarrassed by this remark because the questioner, with only a few words, captured the essence of the paper that took me 30 minutes to present. (The event was the Annual Computer Personnel Research Conference, sponsored by the Association for Computing Machinery's [ACM] special interest group in the area [Sigcpr], and the title of the paper was "Systems Training for the User Executive.") So I felt challenged to use this column to see if I could be equally concise in offering some final guidelines for user training.

• *Learning Needs.* The unvarnished truth is that the vast majority of end users really do view computers only as tools to handle their data processing needs more easily, just as they view cars as tools to facilitate their transportation needs. As such, their interest in computer systems training extends only to understanding as quickly as possible what the machines can do for them and how they can operate them. Their interest level parallels that of the average citizen in driver education.

This is not to say that users shouldn't learn programming concepts or the elements of the systems development process. But they need to learn only the minimum amount to handle their job responsibilities.

This is the last article in a series on concepts training.

• *Hands-On Training.* Lectures are wonderful, but only when the audience consists of systems types who can assimilate the high-volume, real-time data delivery. These attendees are the same kinds of people who don't want hands-on instruction for fear it will "slow them down." Users don't often say it, but they positively hate lectures from members of the computer department because the presentations usually employ an undefined vocabulary and cover intricate details in too short a period of time to permit decent understanding.

(Continued on Page 32)

Smoothing the Way Toward a Better Job

(Continued from Page 31)

title. Since you have never been a pure manager, you will have a hard time telling the difference until you are working at your new job and find your boss making all the important decisions about your people's careers and making sure they know it.

Other Problems

This is not all bad, for there are other problems with being hired from outside into your first real management slot. Management is politics, and you probably don't have the background to fight for your people and your department in a company where you don't know the ropes, the rules or the contacts. Management is people-oriented and the people will all be strangers to you.

Management requires delegation, and the fact that your new company hired a first-line manager from outside tells you how many of your people can help you without themselves being trained in management. Finally, management requires making firm commitments and irrevocable decisions with incomplete data, and as a newcomer you will have less data than your colleagues.

I realize that sometimes you simply cannot move up in your present company. All is not lost. It is easy enough for a top-notch programmer to land a titular management job. Be sure you will have a few real (not matrixed) subordinates, regular contact with your boss's peers without his always being present and entree to the management-level staff meetings.

Clarify Intentions

During the interview, make it clear that you intend to move into a true management career path. If the company needs technical managers, this will help your new boss give you the right assignments and guidance. If your prospective boss is insecure or overloaded with potential managers, you are better off elsewhere.

Finally, a word about locating jobs. There are three primary routes for finding a new job: personal contacts, direct application and employment agencies (however designated).

If a friend of yours knows of a desirable opening in his company, by all means apply. This route is particularly valuable when you are applying for a job that will stretch your documented abilities in a new direction. It will also probably help your friend in his own career, a point to consider in evaluating his description of the job.

If you read an article or ad in *Computerworld* about a major corporation that seems to fit your work style, or a high-technology company working on a project you'd love to get involved in, you should write directly to the manager of the project that interests you or the professional recruiting office at corporate headquarters (your library has the addresses).

Cover Letters

In addition to your resume, include a one-page cover letter explaining why you want to work there and why your knowledge and experience is useful to that particular company. This approach will often get a department head to open up a job requisition just to bring you into his group.

The most frequently used route for changing jobs is the employment agency, head hunter, school employment office or whatever. These people should know what companies are hiring, for what skills and at what salaries. They should be willing to check with you before mailing your resume to each company and to give you honest feedback if an interview doesn't work out.

Keep in mind that the agent gets nothing unless you take a job through him, and weigh his advice accordingly. The best way to find a good agency is through personal recommendations, and the worst way is to contact every agency in the city.

Above all, remember that in today's programmer job market, you are a valuable commodity. Know what you want and go after it.

Gershman is an assistant vice-president at Citibank in New York.

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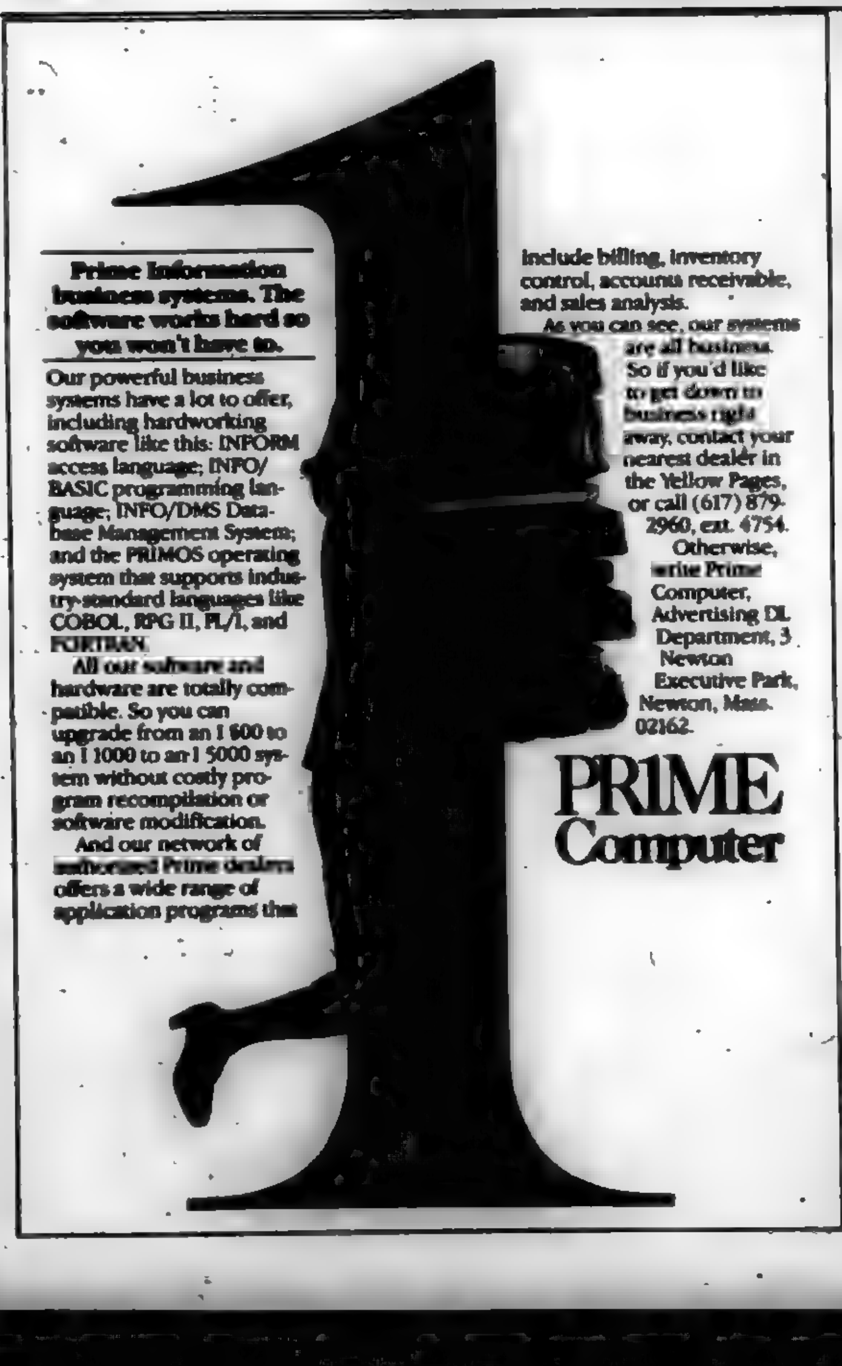

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PRIME Computer

Training Tips Suggested

(Continued from Page 31)

It turns out that the user/terminal interface that's now available on some minicomputers offers a much better match for the instructional needs of users than many DP instructors do. These systems organize the material in packets of about the right length (a screen-full); ask questions that require simple answers; provide immediate feedback on errors at command, program or data levels; and give reference information on-line.

And in cases of concept development where hands-on instruction won't work, I'd look to training films and/or videotapes — presented at the classroom level — before I'd choose an instructor at the blackboard.

- *The User as DP Instructor.* You may be aware of the recent trend of filling systems analysts slots with transferees from user departments and supporting them with a comprehensive information systems training program. The theory is that this may be more effective than trying to make an analyst out of a Cobol programmer.

I can't help feeling that the same strategy applies to user training, namely, that an instructor who has come up the user route may have a better idea of topic content, sequence and timings for the training than the DPer has — or, at the very least, would try to minimize the intellectual trauma that often afflicts users during their first course of instruction in computer concepts.

Stone's paper has been published in the "Proceedings of the Seventeenth Annual Computer Personnel Research Conference, June 26-27, 1980, which is available from the ACM Order Department, P.O. Box 64145, Baltimore, Md. 21264.

Forth Making Strides

(Continued from Page 31)

and the freedom from errors it provides that SDL use is now being extended to branches across the Midwest. And, after watching the way changes can be developed, tested, modified and integrated in a few minutes right in the user department, I'm not surprised.

I can see no technical reason why the Banks of Iowa experience on the IBM system should differ at all from that of the Inma on the Level 6.

So, Forth is becoming "Cobolized." The SDL language, made up of file sections, data sections, work areas, menus and so forth looks more like a modern Cobol than the stack-oriented Forth with its colon definitions.

SDL is new now, but I don't expect to have to wait long before we hear more of it or of other Forth projects.

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IBM Users Gain FBA Support

• Package Runs DA Files

NEW YORK — A software package that is said to allow IBM users to run direct access (DA) files on fixed-block architecture (FBA) devices was introduced by H&M Systems Software, Inc., the U.S. subsidiary of Hubner Mergard in Frankfurt, Germany.

H&M contends its product, Vdam, picks up where IBM left off, a spokesman for the software firm said, stating IBM does not provide any means for its users to run DA files — such as Source Program Maintenance (SPM) — on FBA disks. To do so, therefore, often requires costly conversions of DA files to Vsam, he added.

With Vdam, H&M claimed, DA files can run on FBA devices without degradation of the device and without the need for program changes. Vdam supports IBM's 3310 and 3370 FBA disks.

Because it also supports count key data (CKD) disks, such as the 2314/19, 3330, 3340 and 3350, Vdam is also said to let users convert from one disk to another without having to change address logic.

For example, since IBM's recently announced disks, the 3375 and 3380, are CKD devices and will not be available until 1982, Vdam can aid those IBM users that move to FBA devices and later decide to convert back to the new CKD disks, the spokesman remarked.

Three Levels

Making up Vdam are three levels of software that insert into the core image library: the Test Version, which only supports systems with no FBA devices; the Production Version, which supports both FBA and CKD disks; and the File Version, which supports FBA disks but only predefined DTF (Define The File) names.

Vdam is reentrant, "fully compatible" with Bdam and is said to support all programming languages including compilers and report generators. Vdam is also SVA eligible, meaning it runs in the Shared Virtual Area, a prerequisite for running in VSE, the spokesman said.

U.S. shipments of Vdam are scheduled to begin at the end of the month. Although firm prices have not yet been established, the spokesman noted users will be able to obtain a perpetual Vdam license for between $5,000 and $7,000.

H&M Systems Software is at 40 Rector St., New York, N.Y. 10006.

ADR Offers 'Cobol/IMS'

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has announced Cobol language extensions to support IBM's IMS data base/data communications (DB/DC) systems and plans to support the DB/DC Data Dictionary by year end.

Called Cobol/IMS, the product reduces the programming time and effort required to develop Cobol application programs for IMS/VS and IMS/OS, ADR claimed.

Cobol/IMS supports language extensions that consist of Cobol-like statements for requesting IMS services. These statements are coded as part of the Cobol application program and are automatically translated into equivalent Cobol parameters and CALL statements for IMS, the vendor claimed.

The product licenses for a one-time fee of $14,900, and three- and five-year monthly lease plans are also available, ADR said from Rt. 206 and Orchard Road, Princeton, N.J. 08540.

• Disk Space Manager Updated

JERICHO, N.Y. — An integrated catalog file structure that supports both fixed-block architecture (FBA) and count key data (CKD) direct access storage devices was added in Release 4.0 of Computer Associates, Inc.'s CA-Dynam/D disk space management system.

Formerly available to installations running IBM's DOS, DOS/VS and DOS/VSE and Software Pursuits, Inc.'s DOS/MVT, CA-Dynam/D 4.0 was extended to also support the Computer Software Co.'s EDOS/VS operating system.

The catalog file structure can be shared by other Computer Associates file management components — such as CA-Dynam/T and CA-Dynam/FI — which, according to the vendor, simplifies management control, speeds operations and improves security. A facility for converting to the new file format is provided in Release 4.0.

Also added in this latest CA-Dynam/D version were a faster access module for the catalog file structure, a faster catalog file DUMP/RESTORE program and FBA support by the VTOC display program.

The disk space manager's DYNUTIL disk file maintenance utility program was also improved by adding to it a DELETE file command, an ALTER file command and a DISPLAY command, the vendor said.

CA-Dynam/D 4.0 licenses for $7,500 from Computer Associates at 125 Jericho Tnpk., Jericho, N.Y. 11753.

System 2000 Put on 1100; Gains IDD Enhancement

AUSTIN, Texas — Intel Corp. has released a version of its System 2000/80 data base management system (DBMS) for Univac 1100 CPUs and announced an enhancement to its Integrated Data Dictionary which runs with the DBMS.

Release 2.90 of the 2000/80 package for the 1100 includes several improvements that include programming language extensions for Cobol and Fortran, a simplified map procedure and Ascii and Fieldata Cobol and Fortran compiler support, the vendor said.

Other enhancements include an optimized internal sort for WHERE clauses, disjoint records for the report writer facility, 16 LOCATE files and expanded string and function usage.

The Integrated Data Dictionary that attaches to the 2000/80 DBMS has been enhanced with control, documentation and communications functions that give the data administration staff a way to develop and document a complete information processing environment, Intel said.

The data dictionary can be used interactively or in a batch mode. It can also be used for designing a data base or for analyzing and defining data structures. The package generates reports showing what impact a change to a part of the data environment would have on other parts of the system, the vendor noted.

System 2000/80 for the Univac 1100 costs between $60,000 and $100,000. The data dictionary is included in the 2000/80 package, but can be purchased separately. For IBM DOS environments, the data dictionary costs $11,000, and for OS environments it costs $20,000.

Intel is at 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

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DDs and the Mini User — Part 2

Most DDs for Minis Still in Rudimentary Form

By David Ferris
Special to CW

Data dictionaries (DD) have been accepted and commonly used in the mainframe area for several years. Some of the better known ones are UCC Ten from University Computing Co.; Datamanager from MSP, Inc.; Lexicon from Arthur Andersen & Co; and IDD from Cullinane Corp.

Now DDs are gradually becoming available on minicomputers, although most are still in a rudimentary form. Examples are:

- Datatrieve, Digital Equipment Corp.'s interactive query/update/report processor for PDP-11s that uses a very specialized DD.
- Garden, a query system for DEC PDP-11 and VAX gear from International Data Base Systems that supports

This second part of a two-part article on data dictionaries looks at what is available for minicomputer users.

some DD functions.

- Oracle, Relational Software, Inc.'s relational data base management system with an integrated DD, which also runs on the PDP-11 and VAX.
- Pride-Logik, from M. Bryce and Associates, an extensive DD for PDP-11s and Hewlett-Packard Co.'s HP-3000 processors that is normally used in conjunction with the vendor's automated system design methodology.

One Example

A good example of a full DD for minis is Dictionary/3000 sold by Imacs Systems Corp. of Los Angeles, which runs on HP-3000 minis. It is a stand-alone product in that it does not need to be part of another package; and to the author's knowledge it is the only such DD with a substantial mini user base.

Dictionary/3000 is highly integrated with Image, HP's data base management system, and addresses three functional areas:

- Data processing relationships. Information on the data fields (or "items," in Imacs terminology), records and programs is maintained. This documents the use of data in programs and is used primarily for program development and maintenance purposes.
- Data base relationships. Information on data items, data base files and entire data bases is maintained. This is the "data base about the data base," and it documents what the data base contains.
- Natural real-world relationships. This is a particularly flexible and interesting aspect of Dictionary/3000. Real-world entities are related to other real-world entities and to data items. For example, departments can be related to their application documentation and, in turn, to related data items; functional areas (such as finance) can be related to data used on a subfunction basis (such as personnel data, payroll, benefits, skills).

DD Experience

Because DD is newly arrived to the mini world, many current Dictionary/3000 customers are organizations that have had prior DD experience in a mainframe environment and are turning to minis for the decentralized advantages they offer. According to David Dummer, president of Imacs Systems, "there is a real problem of communicating what our product does. Most people don't know what data dictionaries do, and, frankly, it takes a lot of time to explain how we can help unless they're already fairly knowledgeable."

Despite the lack of DD experience, Dictionary/3000 is growing in popularity among companies of all sizes and has a user base of more than 50 installations.

At the larger end, Exxon is currently negotiating for use of the product at many sites throughout North America. At the smaller end, GATX, a leasing firm with 150 employees, is using an HP-3000 for all in-house data processing. A staff of seven does all software development.

Joe Kraus, director of MIS at GATX, decided to look at the DD at the suggestion of an HP salesman. He uses it for two main reasons: "First, to get a handle on large volumes of Image data, much of which was in duplicate with many different data bases. Second, to use the data dictionary as a systems design and documentation tool. Industrywide, 67% of all programming is spent on maintenance, and Dictionary/3000 helps us cut down on this effort."

HP itself uses Dictionary/3000. Anne Davis, data base administrator at HP's Santa Clara Division, explained that HP uses the product "mainly because things were getting out of control.

"We have many different departmental users, from finance to engineering, many of whom do their own programming. We just didn't know what people were doing, and what data was available. The dictionary greatly eases many of these problems.

**Ferris is the senior partner of Ferris & Associates, a consulting firm based in San Francisco and London.*

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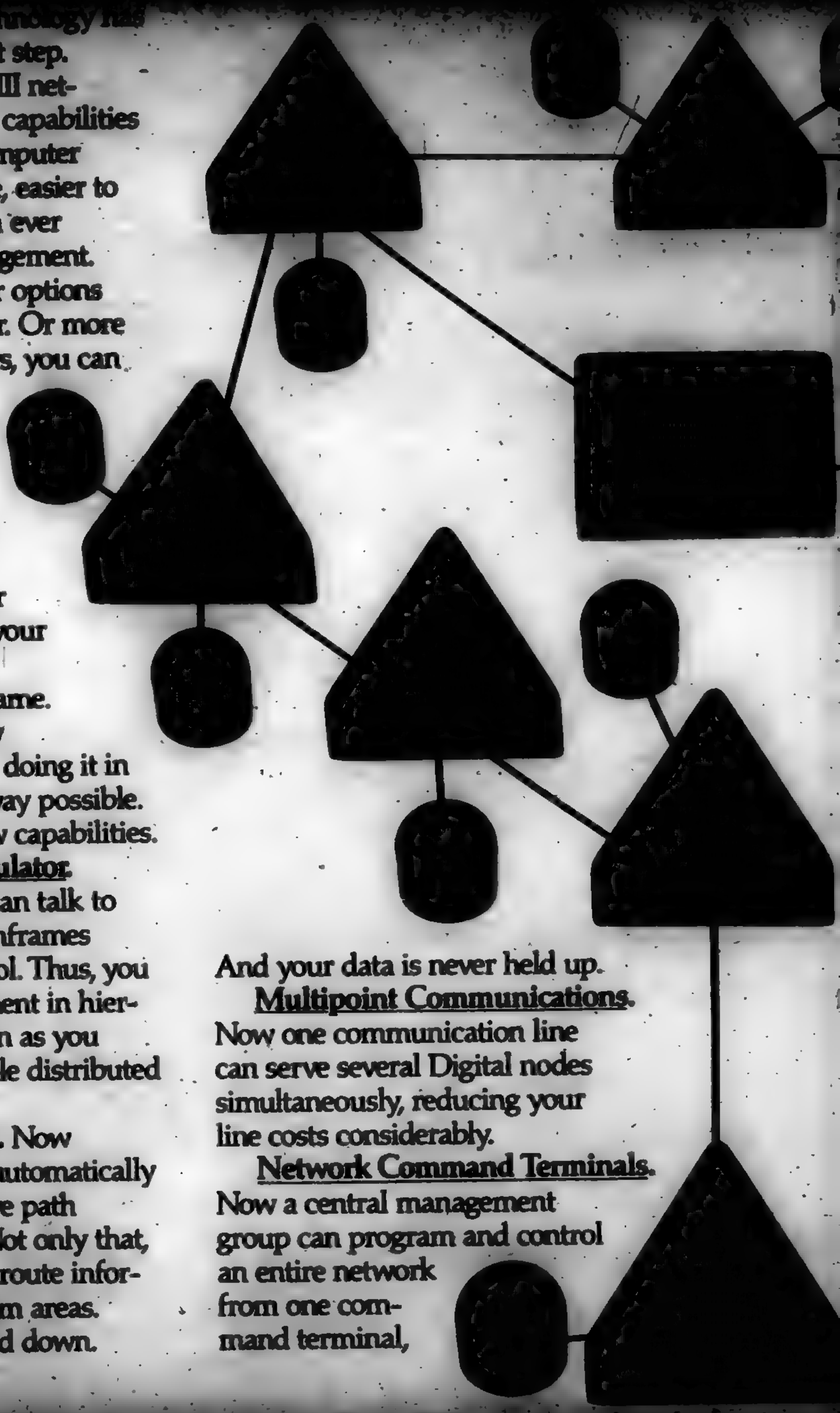

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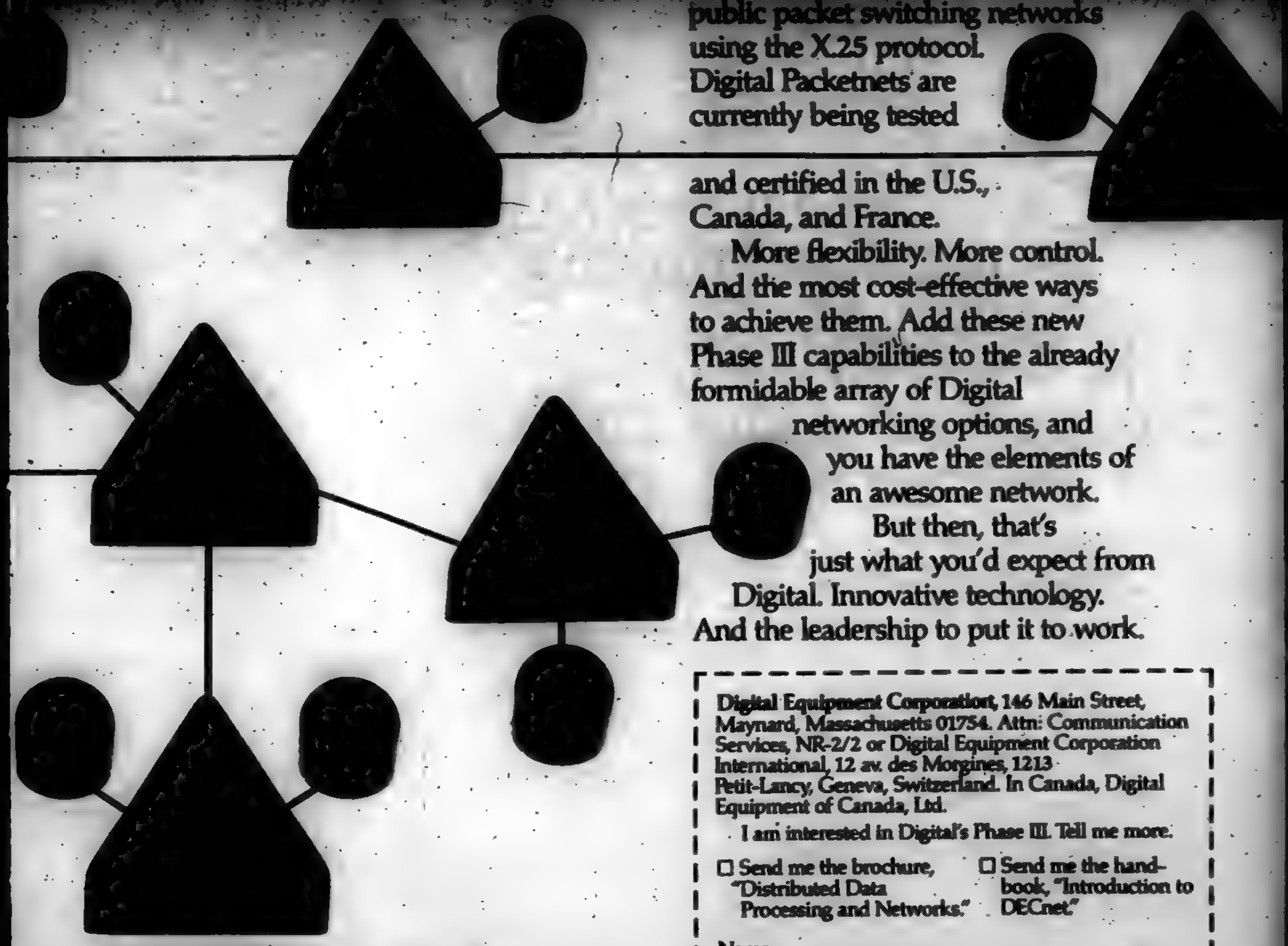

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'Panaudit' Gains 12 Enhancements

OAK BROOK, Ill. — Release 2.0 of Pansophic Systems, Inc.'s Panaudit package reportedly gives the DP and financial auditor additional techniques for verifying the validity of data in computer files.

Of 12 enhancements to the system, the three most important are a test data generator, source program validation and increased statistical sampling capabilities, according to a company spokeswoman.

The test data generator is used to generate files to test the reliability of programs before they are put into production, as well as to train new users of Panaudit.

The source program validation feature is said to compare two versions of a source program and indicate any differences. By using bit pattern analysis, the user can identify additions, deletions or changes between the two compared programs.

Additional statistical sampling routines include attribute, variable and stratified. Attribute sampling is used to estimate the probable frequency with which a given event will occur.

Variable sampling is used to estimate the value of a population composed of items with variable characteristics. When a population includes a number of extreme values in addition to the normal range, stratified sampling assists the auditor by reducing the sample size into individual "strata" containing similar values, the spokeswoman said.

Panaudit is available to users of IBM and compatible mainframes. The "universal" license fee for Release 2.0 (for both DPers and auditors) ranges from $18,400 to $29,900 and, for auditors only, ranges from $13,900 to $19,900, depending on options.

For users who already have the firm's Easytrieve Unlimited Sequential I/O (Usio) package, Release 2.0 fees range from $6,500 to $9,000. If a user has only Easytrieve, he can buy Panaudit for $10,400 to $13,900.

Pansophic is located at 709 Enterprise Drive, Oak Brook, Ill. 60521.

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But if you don't work near one of these service centers, for warranty service you can send your terminal to the nearest Qume "depot," located in Texas, California or New Jersey.

Even the most reliable terminals in the business are ultimately going to need servicing. But with Qume, you'll never have to worry about service problems. For further information call or write Qume, 2350 Qume Drive, San Jose, California 95131. Tel: (408) 942-4000. TWX: 910-338-0232.

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Compiler Backs OS Users

COLUMBIA, S.C. — An OS/-RPG-II compiler that allows users in any OS environment to run DOS/RPG-II has been introduced by Policy Management Systems.

The compiler reportedly was developed to accept DOS/RPG-II source code with no modification and produces results similar to those obtained by running the DOS compiler.

The major benefits of the compiler are no efficiency lost, no change to source code and no additional run-time overhead as in the case of emulators or language converters, according to the firm.

The compiler comes with auto report and map programmer assistance features. The OS/RPG-II compiler can be licensed for $18,750 initially plus a monthly fee of $100 for a minimum term of five years. Policy Management Systems can be reached through P.O. Box 1, Columbia, S.C. 29202.

SDA Adds 'Score' Version

NEW YORK — An interactive version of SDA Products, Inc.'s Score Cobol program generator for IBM OS users includes a prompter for on-line input with a CRT to generate Cobol code.

SDA also announced a guarantee on all Score products for new users: If Cobol programmers don't generate code at least 25% faster within 60 days of installation, the entire purchase price will be refunded.

Formerly available for Univac, Burroughs Corp. and Honeywell, Inc. as well as IBM mainframes, Score is said to be valuable as a time saver for program conversions, maintenance and one-time reporting.

The current version of Score licenses for $25,000 to $35,000, depending on the number of features the user wants, a spokesman said.

SDA is located at 260 Madison Ave., New York, N.Y. 10016.

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NOW Software Directed at Thrift Institutions

DAYTON, Ohio — A software package that reportedly allows savings and loan associations and other thrift institutions to provide negotiable orders of withdrawal (NOW) accounts to their customers has been announced by NCR Corp.

Previously offered primarily in the New England region, interest-bearing NOW checking accounts can be offered by all financial institutions in the U.S. beginning in 1981, under recently enacted legislation.

The Demand Deposit Account/-NOW software operates as part of the NCR Computerized Loan and Savings System (Class), which includes a range of applications handling all aspects of on-line processing for thrift organizations, a spokesman said.

With the on-line system, NOW account data can be entered via teller terminal as the transaction occurs, and the data is processed immediately. On-line magnetic tape input is also provided, NCR said.

The application uses existing Class system savings account files and provides all processing and reports required in administering NOW accounts, according to the firm. The system offers several methods for handling overdrafts and line-of-credit advances and payments.

Other processing features include the ability to handle stop payments, to validate holds and to prepare a variety of reports, including notices of reject-checks, new loan reports and stop payments listings.

Complete NOW account information for customers' monthly statements is also provided. These reports, notices and statements, available through NCR's Business Forms and Supplies Division, were designed to assure system compatibility and enhance the image of the financial institutions, the spokesman said.

The one-time license fee for the Demand Deposit Account/NOW enhancement is $30,000. The alternative monthly license fee is $1,200. NCR central software service is available at no additional fee. Field software service, provided to customers electing the monthly license fee, costs $105/mo.

UCC Plans Seminar Series On Data Set Management

DALLAS — A series of seminars on data set management will be held in seven U.S. cities between July 22 and Nov. 6.

Sponsored by University Computing Co. (UCC), the free one-day meetings are intended for the DP manager concerned with improving the overall cost effectiveness of the direct-access storage device environment and gaining a better perspective of future trends in data set management.

The 1980 seminar schedule includes the following locations: Philidelphia, July 22; Los Angeles, July 29; Dallas, Sept. 4; New York, Oct. 9; Oakbrook, Ill., Oct. 16; San Francisco, Oct. 28; Atlanta, Nov. 6.

More information is available from UCC at UCC Tower, Exchange Park, Dallas, Texas 75235.

'WP/3000' Does Report, WP Jobs

LAGUNA NIGUEL, Calif. — Bradford Business Systems, Inc. has introduced word processing (WP)/report writer software for Hewlett-Packard Co. 3000 minicomputers that provides users with commands to manipulate and format text and reports.

The WP/3000 package is said to be capable of tasks ranging from simple day-to-day correspondence to financial reporting of information stored in HP's Image/3000 data base. The basic WP component reduces the amount of input required to format a document over similar systems, a spokesman claimed.

Separate default settings for margins, output devices, spacing, justification modes and other often-used functions may be predefined for each system user, allowing for customization. In addition, text can be formatted to the screen of an interactive terminal for review and then directed to a printer for final document preparation, the spokesman stated.

WP/3000 is aimed at applications such as dunning letters, billing, mailing labels and reminders, in addition to traditional WP chores. It sells for $4,500 from Bradford at 24991 La Vida Drive, Laguna Niguel, Calif. 92677.

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Choose a Compact Compiler.
The Compact compiler runs on 32K byte microcomputer systems. Its powerful subset includes full support for random, indexed and sequential files.

Or choose the Standard Compiler.
The Standard CIS COBOL compiler requires a minimum 48K of user RAM. A super-set of the Compact compiler, implementing ANSI '74 COBOL to Federal Low-intermediate Level.

The same CIS COBOL extensions for conversational working, screen control, interactive debugging, and special peripheral support are in both compilers. And there are more reasons to consider CIS COBOL:
- It conforms fully to the ANSI '74 standard, so programs are portable upwards and downwards to minis or mainframes.
- Its interactive features enable mainframe programmers to get results fast... working on inexpensive microcomputers.

Forms
The FORMS utility lets you build a screen layout online at the CRT. Then it automatically generates COBOL record descriptions for inclusion in your program.

Forms-2
A superset of FORMS, it eliminates the need to write simple data entry and inquiry programs, because the programs can be automatically generated from screen definitions.

Environment
CIS COBOL products run on the 8080 or Z80 microprocessors under the CP/M* operating system, and on the LSI-11 or PDP-11 processors under RT-11. They are distributed in a variety of disk formats and come with a utility that enables you to use any make of CRT.

OEMs
Intel has adopted CIS COBOL and offers it (as iCIS-COBOL) for their Intellec and Intellec II systems. Ideal for OEM's or private label. CIS COBOL was developed entirely by Micro Focus. Send inquiries for CIS COBOL object packs and application vendor terms to MICRO FOCUS or its licensed distributors. Distributor terms also available from MICRO FOCUS.

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Economic Forecast Service Available via Time-Sharing

GREENWICH, Conn. – The Service Bureau Co. (SBC) is now offering via its time-sharing services the Economic Forecasting Service providing economic analysis and prediction based on econometric techniques.

The forecasting service was designed by Evans Economics, Inc. (EEI), a Washington-based forecasting firm, to incorporate the supply side effects of tax cuts upon productivity and incentives.

The EEI macroeconomic model serves as the cornerstone of a multiple "Satellite Model" forecasting system, which includes financial, industrial production, producer prices, agriculture and international data.

Within several months, these models will be fully linked to the macro model, enabling simultaneous forecasts to be made, SBC said.

Users of EEI's services will also have access to existing SBC time-sharing applications, SBC said. The services are available through a local telephone call from most areas of North America, Western Europe and the Far East.

The EEI service uses an interactive modeling system featuring English language commands.

It is priced according to usage and specific site demands, SBC said from 500 W. Putnam Ave., Greenwich, Conn. 06830.

Program Development System Extends HP Fortran on 3000s

ORCUTT, Calif. – An application development system for Hewlett-Packard Co. 3000 processors that generates program specifications, design documentation and code in a continuous interactive and automated process is being offered by Mini Computer Application Software (MCAS).

The Program Development System Fortran (PDSFort) extends HP Fortran into a structured language that accepts English language input and output program documentation and code through use of an editor, progam design module and a preprocessor, MCAS said.

The editor provides single command capability to create, merge and modify strings and files and operates with the program design module to produce documentation. The preprocessor accepts structured programming constructs produced during the previous process plus standard Fortran code and automatically produces Fortran code and reference files, the vendor noted.

Main memory requirements are 20K bytes for PDSFort which costs $3,000 for a perpetual lease for use of the object code, six months of updates and user manuals. The vendor can be reached through P.O. Box 2553, Orcutt, Calif. 93454.

Programs Offer Job Accounting, Chargeback

NEW YORK – Two job accounting and chargeback programs, AFast/VSE and Time, both of which include a report generator along with approximately 25 reports, are being offered by H&M Systems Software, Inc.

The two programs indicate what is happening at any given point in the daily operations, and the results can be graphically displayed. The programs include checkpointing which, unlike other DOS job accounting programs, does not require that a step END occur during the specified interval of the checkpoint, according to the vendor.

The AFast batch system and Time, the CICS system, reportedly run faster and provide reports easier to understand than the nearest competitor. AFast/VSE and Time are available for $6,450 for both or $4,500 separately.

MFast/VSE, a program which enables users to define and maintain maps and map sets on-line by using a map library, was also introduced.

The CICS software can structure the maps in Cobol, PL/I, assembler or BMS, the firm said. After using MFast, the input is stored in a map library, and the user may assign field names, attributes and field formats or use defaults. Existing maps can reportedly be redisplayed or modified at any time.

MFast can also check for overlapping or misplaced fields at the moment the map is created and a service task is included which can save and restore the library and print, on a batch printer, any map for documentation purposes, the firm said.

The software is available for rental or purchase at $175/mo and $4,000, respectively. All the software is available for a limited free trial period from the firm at 40 Rector St., New York, N.Y. 10006.

To work well for Manufacturing, MRP* must also work on the computer.

When searching for an MRP system, many manufacturing firms reason that: "Only functional capability is important, not how MRP works on the computer."

This misconception frequently results in a manufacturing control system that is unable to achieve its functional capability because it cannot be implemented by data processing. Manufacturing therefore never quite gets the system they need, where they need it—"outside" the computer room.

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Along with "How MRP works on the computer isn't important," there are many other misconceptions that prevent companies from realizing the benefits of MRP. Misconceptions such as: "Once we've implemented MRP, everything will be all right." Or "Some people might need MRP, but our problem is capacity planning."

At Cincom, we've put together a booklet of the "12 Common Misconceptions about MRP." This booklet will help you get a better grasp of MRP. Then you can come to grips with manufacturing control. We'll be happy to send "Misconceptions" to you. It's useful, and it's free. Write or call: Laura Larsen, Cincom Systems, Inc., 2300 Montana Avenue, Cincinnati, Ohio 45211, Telephone (513) 662-2300.

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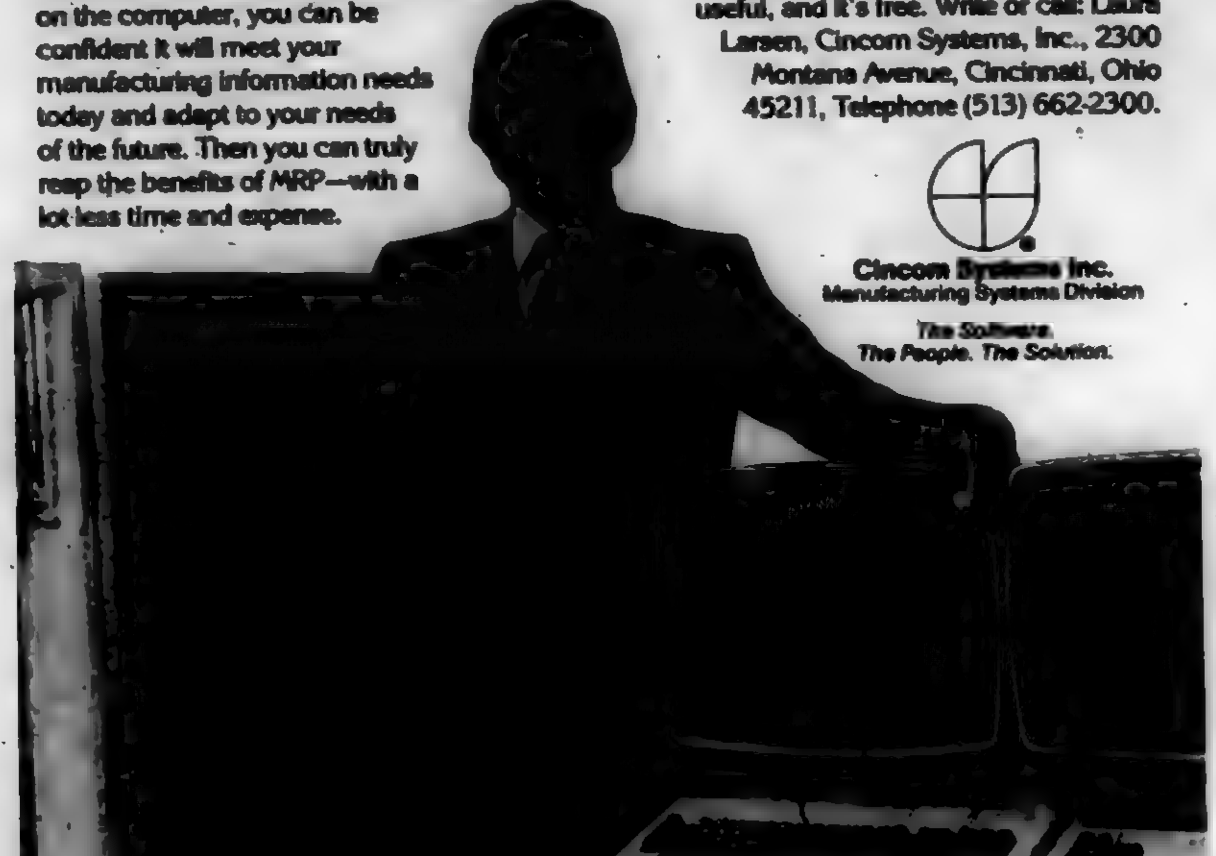

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Programs Let Burroughs Users 'Do-It-Yourself'

JACKSONVILLE, Fla. — Two packages that reportedly allow users of B6700 and larger Burroughs Corp. systems to develop customized on-line data entry and file management systems without programmers is available form Jacksonville Software Systems, Inc.

The Remote Data Entry (RDE) portion of the system handles batch input form users. It has fuel editing and batch balancing facilities and produces terminal operator reports and batch statistics, the vendor claimed.

The Remote File Maintenance (RFM) system provides enhanced capability for on-line inquiry and update and full editing capabilities, but is not organized by batches. It provides access on multiple keys and each key may contain multiple fields.

The RDE is available for $5,500 and RFM, $4,500. Together they cost $8,500 from Jacksonville Software Systems, Inc., Burroughs Sq., 7555 Beach Blvd., Jacksonville, Fla. 32216.

'Focus' Runs Under CICS

NEW YORK — Information Builders, Inc. has expanded its information control package, Focus, to operate under IBM's CICS.

CICS users of Focus' report language, file management and decision support facilities will be able to converse with the system in an interactive mode. This means that "user-friendly" design features now available under TSO and CMS, such as on-line error correction and user prompting, are now available to the CICS user, Information Builders said.

In addition, CICS/MVS users will be able to dynamically allocate files using a new Focus command. The package is tuned so no degradation of CICS response time occurs for other users, the vendor claimed.

Focus CICS costs $8,000 or $240/mo. from Information Builders, 254 W. 31 St., New York, N.Y. 10001.

Cobol/3 Geared For DDP Use

MINNEAPOLIS — Northern Telecom Systems Corp. has announced Cobol/3, an enhanced subset of 1974 Ansi Level II Cobol, for use on its models 435 and 445 distributed data processing (DDP) systems.

Available at no charge to 435 and 445 users, Cobol/3 expands existing features, such as the Perform verb, and adds new features, including Indexed Sequential Access Method (Isam) file support, the use of the computational clause to specify packed decimal storage, new instructions and enhanced table processing.

The Isam file support reportedly allows for dynamic access and alternate key usage. Dynamic access capabilities allow a program to read an indexed file both sequentially and randomly

Cobol/3 will be available in September from Northern Telecom at Data Park, Minneapolis, Minn. 55440.

Cash Flow Analyzed

PALO ALTO, Calif. — A service that provides investment officers with cash flow analyses to assess the profitability of issuing a mortgage-backed security is available through Remote Computing Corp.'s time-sharing network.

The Mortgage Security Analysis System analyzes the effect of changes in the mortgage interest during the life of the issue and the impact of the spread between mortgage yield and the cost of bonds on profitability.

Remote Computing Corp. is headquartered at 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

'Factfinder' for System/34s Gives Query/Report Writing

OAK BROOK, Ill. — Professional Computer Resources, Inc. has released Factfinder, an on-line query/report writing package for IBM System/34 users.

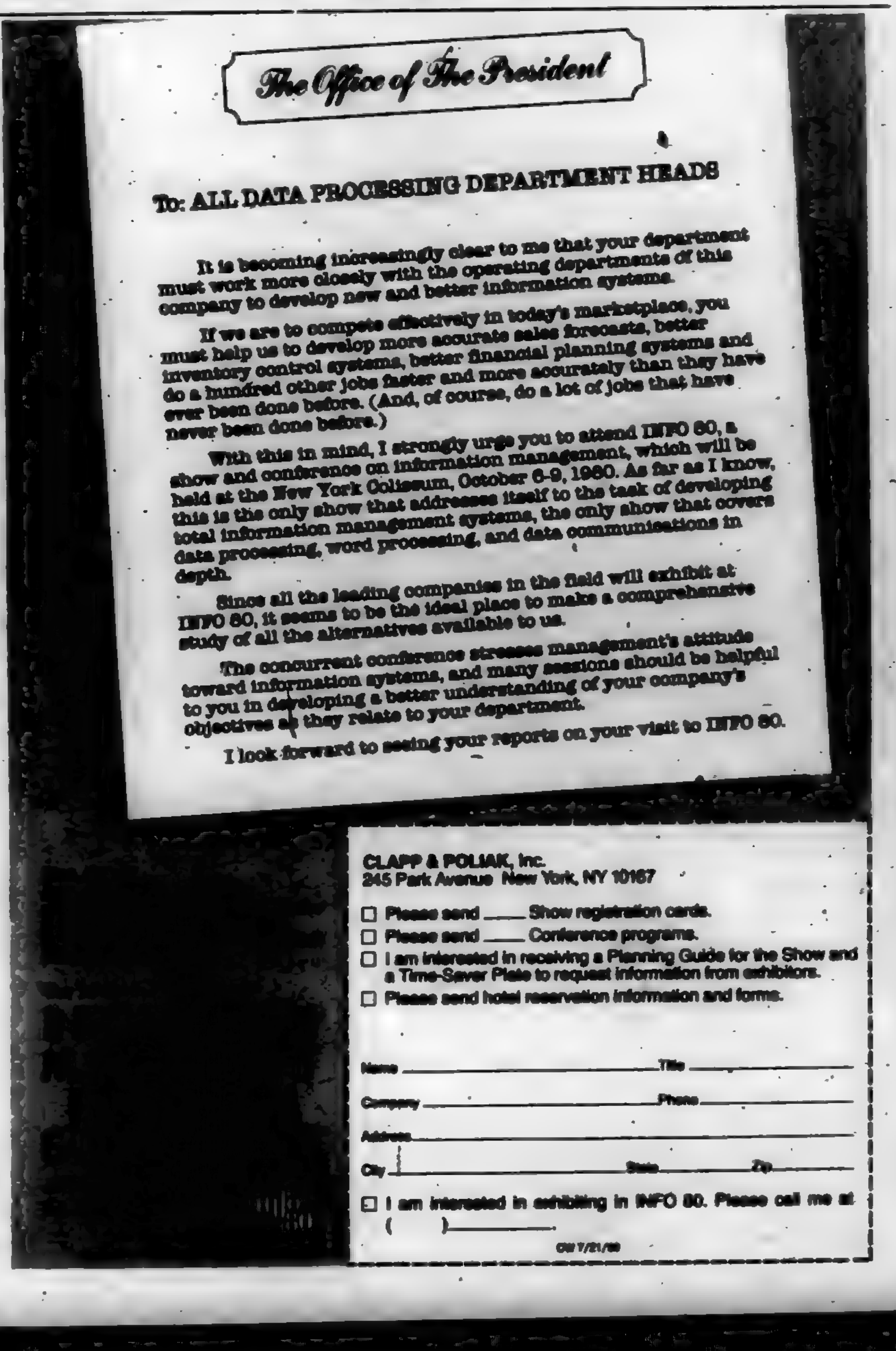
Said to bring System/34 users one step closer to large mainframe capabilities, the package reportedly eliminates the waiting time for reports and inquiry programs. That wait sometimes takes several weeks on current System/34s, the vendor said.

The query/report package allows users to review information stored and prepare reports in less than five minutes, a spokesman claimed.

Other features include Factfinder Security, a protection software that allows only authorized personnel to view confidential information, while nonconfidential information may be viewed by anyone; and Factfinder retrieval methods that allow personnel to retrieve information without extensive training, the vendor said.

All functions are menu-driven, and user keying is minimized throughout the system to numbers indicating the selected alternative. The package can print or display information from any system files in any query, the vendor claimed

The package costs $6,000 with a $500 annual upgrade fee, the vendor said from 2021 Midwest Road, Oak Brook, Ill. 60521.



The Office of The President

To: ALL DATA PROCESSING DEPARTMENT HEADS

It is becoming increasingly clear to me that your department must work more closely with the operating departments of this company to develop new and better information systems.

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With this in mind, I strongly urge you to attend INFO 80, a show and conference on information management, which will be held at the New York Coliseum, October 6-9, 1980. As far as I know, this is the only show that addresses itself to the task of developing total information management systems, the only show that covers data processing, word processing, and data communications in depth.

Since all the leading companies in the field will exhibit at INFO 80, it seems to be the ideal place to make a comprehensive study of all the alternatives available to us.

The concurrent conference stresses management's attitude toward information systems, and many sessions should be helpful to you in developing a better understanding of your company's objectives as they relate to your department.

I look forward to seeing your reports on your visit to INFO 80.

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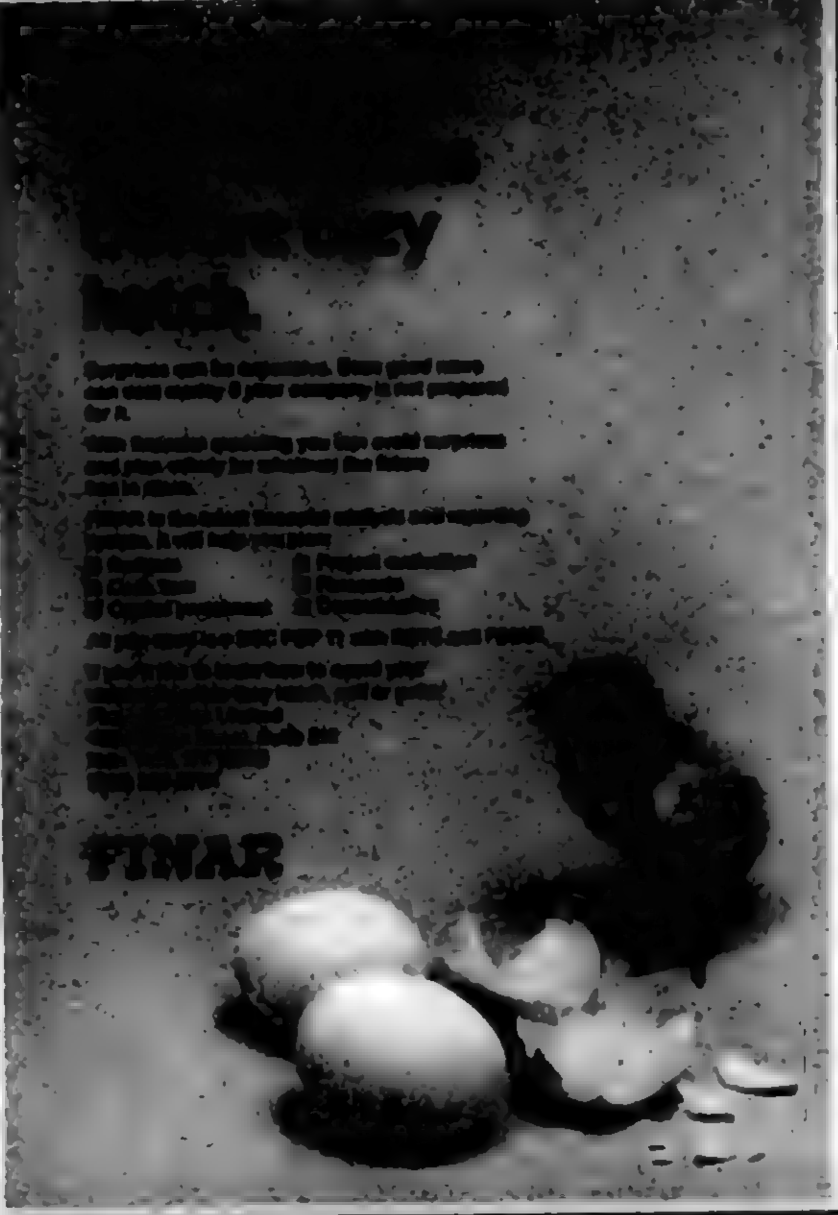

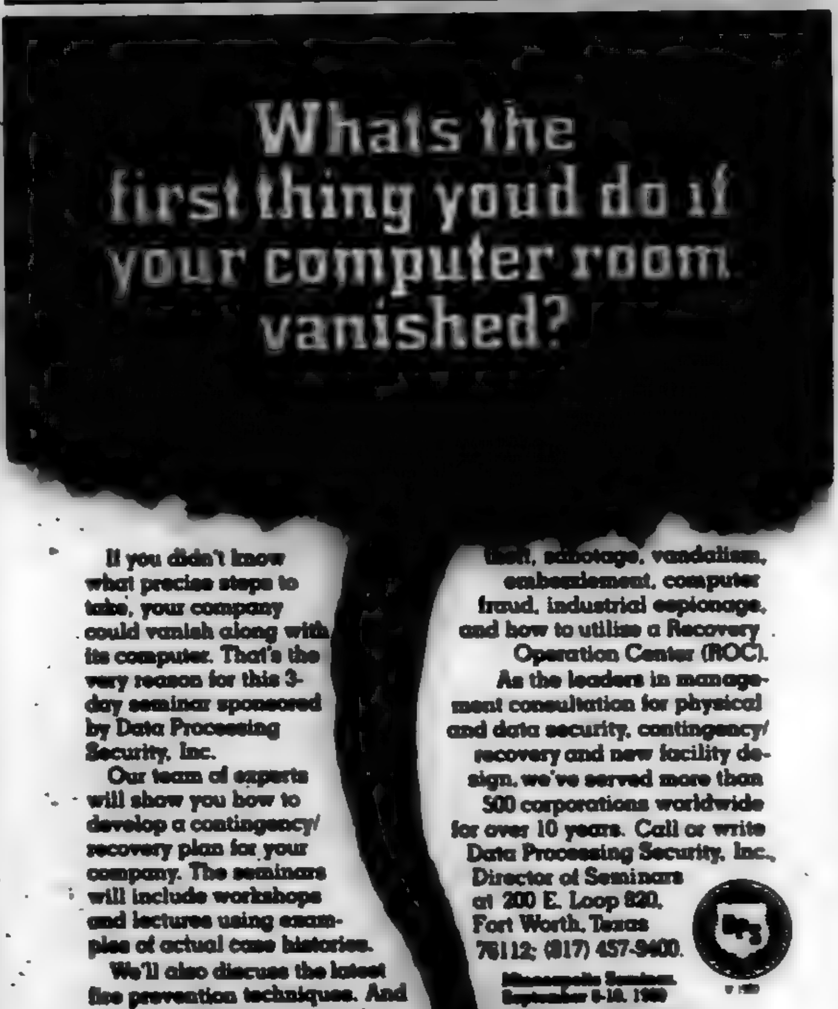
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DEC's 'Datatrieve' Upgrade Enables Cross-File Views

MAYNARD, Mass. – Digital Equipment Corp. recently announced an enhanced version of its Datatrieve query, report and data management software.

Designed to work with DEC's RMS-11 records management files, the latest verison of Datatrieve is available on RSTS/E, RSX-11M, RSX-11M Plus and IAS operating systems for PDP-11 computers and in compatibility mode for the VAX-11/780 mini.

Datatrieve reportedly enables users to locate, sort and update information in RSM-11 files and to generate reports from those files. The recent version has been extended through variable-length record support, cross-file "views" and a revised and expanded documentation set, a spokesman said.

The cross-file views enable users to define logical records that are retrieved from multiple RMS-11 files, he explained.

The enhanced Datatrieve software, Version 2.0, will be available in September and will cost $4,500, DEC said from 146 Main St., Maynard, Mass. 01754.

PDP-8 Gets Word Processing

STONEHAM, Mass. – Automation Development, Inc. has unveiled a word processing system with electronic communications and information retrieval capabilities to run on a Digital Equipment Corp. PDP-8 processor.

Visi-Net is available as software or in a hardware and software cluster package. The system is an upgrade of the firm's Compu-Text word processing software, but features an integrated file structure that is said to allow text and related data to be stored and processed together. Information can be accessed separately or as the related components of one document, and users have the capability to enter, modify, retrieve and track information of varying lengths, a spokesman said.

The Visi-Net system incorporates a network communications architecture that allows two or more users to share a data base and work on the same document. The system can also be used for intracompany electronic mail, the spokesman noted.

DEC's PDP-8 is reportedly capable of driving most standard printers including IBM's 6670 and 6640. DEC's VT-100 or a VT-100-compatible terminal is the system's main workstation, but other terminals can be supported for document entry and printing. With the use of a telecommunications link, any peripheral can be remote.

Using the VT-100 as a main workstation provides the Visi-Net with an upgrade capability, the spokesman continued. With the addition of a DEC LSI-11 microprocessor, the VT-100 can support three terminals, a printer and a communications line at each site. Acting as intelligent clusters, the terminals in remote areas have access to a main data base and operate independently using a system diskette.

The unbundled software costs from $15,000 to $25,000, depending on the user's configuration, while prices for a packaged cluster with the PDP-8, a disk controller with two DEC RK05 disk drives and the ability to support five workstations start at $19,000.

Automation Development is located at 38 Montvale Ave., Stoneham, Mass. 02180.

'TSDump' Gives TSO File Display

MANHATTAN BEACH, Calif. – A file display system that reportedly offers immediate access to file information is available to IBM Time-Sharing Option (TSO) users from de Faro Software Systems Co.

The package, TSDump, was designed for a testing environment. It eliminates the time required and possible errors generated by Job Control Language handling and preparation of one-time programs to strip portions of a file for verification, the vendor said.

TSDump can help avoid problems caused by abends and bad data by giving fast access to the error-causing data and displaying it on a CRT terminal or printer without queues, the vendor added.

The package costs $2,350 for a single site. A 50% discount is offered for multiple sites. The vendor can be reached through P.O. Box 3216, Manhattan Beach, Calif. 90266.

Tax File Subsystem Targets Most CPUs

DEVON, Pa. – Vertex Systems, Inc. has released a reporter subsystem consisting of a series of programs designed to load the subscriber's tax file, access sales and use tax rates and compute tax amounts.

The programs are written in Ansi Cobol and are usable on most mainframes and minicomputers. Two versions of the reporter are available: a GEO code that costs $600 and a ZIP code that costs $750.

More information is available from 222 Lancaster Ave., Devon, Pa. 19333.

Automobile Package Runs on Pertec System

LAGUNA HILLS, Calif. – An inventory-intensive software package that features 11,070 part numbers on a single floppy disk is available for automobile parts stores and similar operations from Pacific Microsystems.

The package operates on the Pertec Computer Corp. PCC 2000 small business system, which supports up to five CRT terminals. In an auto parts store, two terminals and a printer could support four to six salespeople, the vendor said.

System features include automatic printing of sales invoices; stock order listings; quantity-sold reports to identify fast moving parts; and daily, monthly and yearly sales reports.

The package costs $14,700 to purchase or $425/mo on a lease plan, the vendor said from Suite A, 23121 La Cadena Drive, Laguna Hills, Calif. 92653.

Teletext Test to Gauge U.S. Consumer Interest

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. – The first U.S. test of consumer response to teletext – an on-line information retrieval system that utilizes a commercial TV set at the remote end of the message path – is scheduled to begin here next January.

Funded mostly by the federal government, the test will be conducted by WETA-TV, a local public television station, and managed by the Alternate Media Center of New York University.

The first phase of the test, ending in 1982, is aimed basically at determining what teletext services generate the greatest viewer interest. The second phase, also planned to last two years, will explore various financing methods and try to establish criteria for pricing the services.

Widespread Interest

There is reportedly widespread interest in teletext and a companion system, videotex, within the U.S. computer industry and among users. New forms of electronic message delivery, particularly to the home, could be provided by either technology. Also, many business firms with dispersed offices are looking at teletext and videotex as a possible internal communications system.

The major difference between the two technologies is that videotex (also known as Viewdata or Prestel) is a two-way, interactive system which typically operates over dial-up telephone circuits.

Teletext messages are transmitted one-way, usually via TV channels, although a telephone circuit can be used to provide the return path and make the system interactive.

The upcoming WETA-TV test will start with 60 terminals, each consisting of a color television set equipped with a decoder that converts the incoming teletext signal into a TV display. The second phase is planned to encompass 300 to 400 terminals, said John Carey, one of the project managers.

News, weather, sports results, library information, community announcements, consumer and home health advice are among the topics to be included in the teletext programs broadcast during the test. The material will be supplied by a number of government agencies plus some private organizations – notably two local newspapers, the *Washington Post* and *Washington Star*.

Terminals are to be installed in "public settings" – such as libraries, schools and social clubs for the handicapped – as well as private homes.

The broadcast information, which includes both text and

(Continued on Page 46)

DEC, Burroughs CPUs Gain Synchronous Link

CHAPEL HILL, N.C. – A software system that allows synchronous communications between Digital Equipment Corp. PDP-11 and Burroughs Corp. computers is available from Applied Information Systems, Inc.

The Burcom-11 software system supports the Burroughs point-to-point conversational protocol through either dial-up or leased telephone lines, a spokeswoman said. Burcom-11 also allows communications between PDP-11s.

The system's multiple buffers are said to ensure full utilization of transmission links. And error detection and record retransmission are handled automatically, the spokeswoman continued.

User-callable subroutines of Burcom-11 allow sending and receiving of messages, establishment and termination of transmission links and review of line status and error counts.

Applied Information's software runs under DEC's RSX-11M, RSX-11S, IAS and RSTS/E operating systems and is supported by DEC's DU11, DP11 and DUP11 synchronous interfaces as well as the vendor's DN11 auto-dial interface. But DEC's KG11 arithmetic unit is not required for operation of Burcom-11, the vendor said.

A single machine perpetual license for Burcom-11 costs $4,400, includes a 90-day warranty and is available immediately, the stated. The vendor is located at Suite 207, 500 Eastowne Drive, Chapel Hill, N.C. 27514.

Uses Intelligent Clusters

Software Backs DDP Applications

TORONTO – A self-contained data comminications operating system for medium- to large-scale computers that is said to support an unlimited number of users in on-line, real-time distributed data processing (DDP) applications has been announced by Telecom Network Technology, Inc. (TNT).

The Netcom system controls the operation of a large number of computer systems and consists of intelligent multiterminal clusters connected in a multidrop fashion. The system utilizes a full-duplex bisynchronous protocol and runs in a hierarchy of Data General Corp. Micronova microcomputers and Eclipse minicomputers, a spokeswoman explained.

The system's Telesoftware reportedly provides a down-line loading capability and permits dynamic load balancing between processors and the ability to change the number of host and remote processors without affecting application programs.

Each of the system's intelligent clusters can support up to 14 user terminals and two printers, the spokeswoman continued. The remote clusters have no magnetic peripherals, but feature printer spooling.

The system's host generally resides in the user's central location and consists of network control processors as well as application

(Continued on Page 46)

RCA Globcom Services Expanded to 18 U.S. Cities

NEW YORK – RCA Global Communications, Inc. (RCA Globcom) has announced its expansion of direct overseas telex, telegram and leased channel services to 18 U.S. cities and plans to add three more, pending Federal Communications Commission (FCC) approval.

The cities include Atlanta, Boston, Chicago, Dallas, Detroit, Houston, Los Angeles, Philadelphia, Cincinnati, Cleveland, Milwaukee, Minneapolis, Newark, N.J., Pittsburgh, Pa., Stamford, Conn., St. Louis, Seattle and Hicksville, N.Y., which will serve Nassau and Suffolk counties.

Service to Baltimore, Denver and Memphis, Tenn., is under FCC consideration.

Customers in these areas will be able to obtain the services without intermediate handling by domestic common carriers, RCA Globcom said from 60 Broad St., New York, N.Y. 10004.

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ComData

U.S. Teletext Test to Gauge Consumer Interest

(Continued from Page 45)

graphics, will be formatted into numbered "frames," each conforming to the dimensions of the TV screen, and stored in a Digital Equipment Corp. PDP-11/34 computer at the WETA-TV studio. This information will then be broadcast in a recursive sequence.

The viewer will access desired frames by inputting the related frame numbers into a small keypad attached to his decoder. He will begin the process by looking at an "index frame" that shows the major topics and the numbers of those frames containing detailed information related to each topic.

All teletext frames will be broadcast during the "blanking interval" that separates the individual frames of regular WETA-TV programs, so both services can be provided concurrently.

The test will involve a number of innovations, Carey said.

The formatting and coding of teletext information usually requires the information provider to acquire an intelligent editing terminal. In the Washington text, however, low-speed terminals, such as teletypewriters, will be used by most providers.

This scheme will allow the formatting and coding to be done on a centralized basis at the TV studio, which should reduce costs for the information provider and make it easier, later on, to find sponsors for the service.

As the teletext data base grows, it normally takes the viewer longer to access a desired frame, since the process is sequential rather than random. However, in the Washington test, not all the frames will be included in each broadcast loop. If there are four pages of sports results, for example, each page will be inserted in successive loops.

The data base planned for the test will have a maximum of 400 frames, but only about 100 of them will be broadcast in each loop. This should make the maximum access time 12 seconds and the average time 6 seconds, Carey explained.

Service Financing

Probably the major question surrounding the future of teletext is how a commercial offering will be financed. WETA-TV already solicits annual subscription fees from its viewers and could lease teletext decoders as part of this service for an additional charge, according to Carey.

The cost of the programming, he added, could be borne by the information providers, or it could be shared by the providers and the viewers. The teletext technology being used in the Washington test employs a Canadian system known as Telidon, which allows the signal to be addressed to individual terminals; so a program could be sent only to those who paid for it.

Another key question impacting the future of commercial teletext is the cost of the terminal. The one to be used in the Washington test costs $1,500 — $700 for the TV set and $800 for the decoder.

However, Carey expects the decoder price to drop to $600 by the end of 1981.

Netcom Fits DDP Use

(Continued from Page 45)

processors. The host is independent of the number of devices, and the number of computers can be expanded to meet user needs, she claimed.

Netcom's connection to large mainframes is provided by IBM 2780/3780, 3270 or Hasp links, the spokeswoman added.

Prices for the system start at $50,000 plus $1,000 per cluster controller. Additional information can be obtained from the firm through P.O. Box 5918, Station A, Toronto, Ont. M5W 1P2, Canada.

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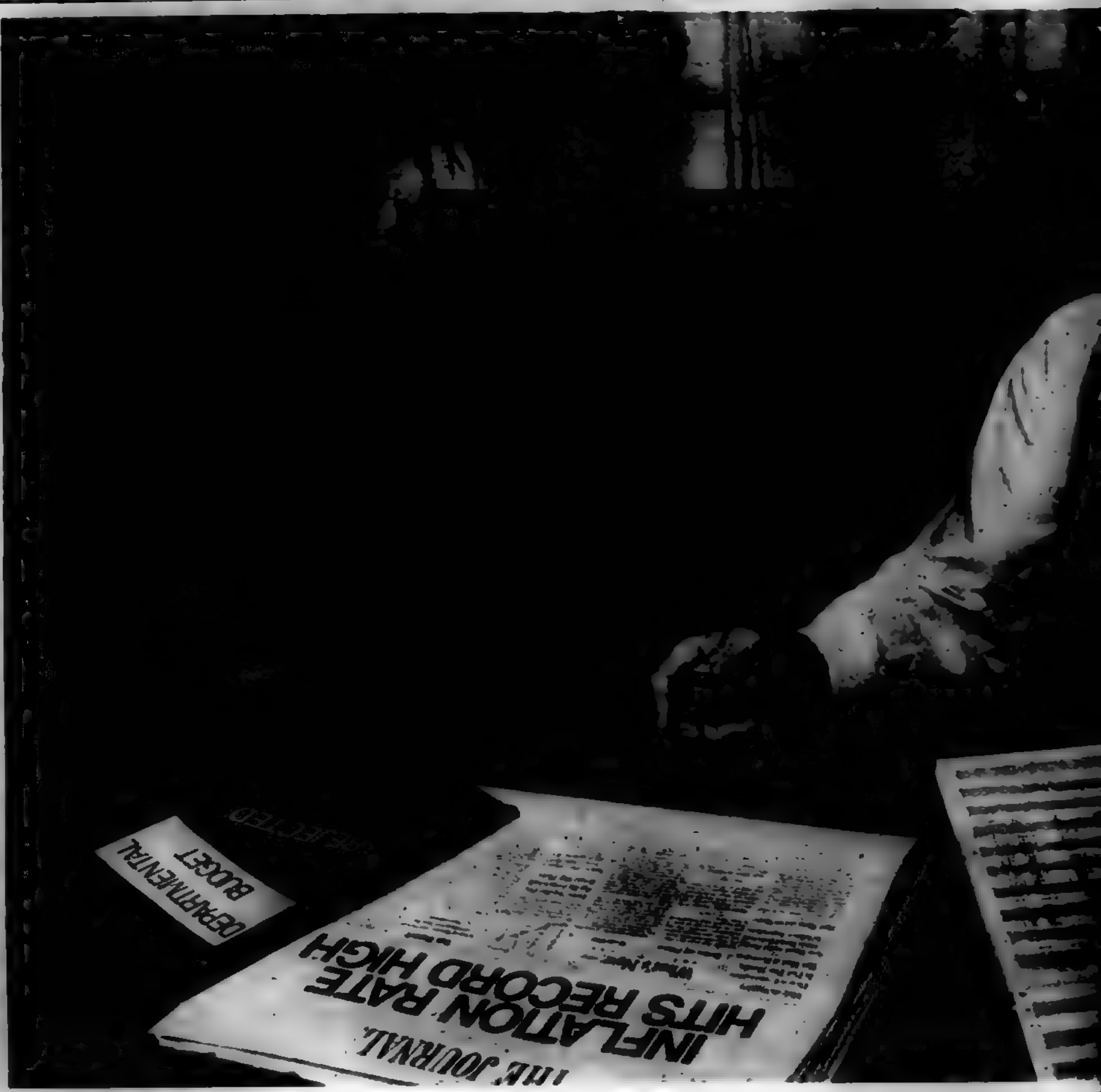

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Ramtek Adds 1,000-Line Color Monitor

SANTA CLARA, Calif. — Ramtek Corp. has unveiled a 1,000-line color monitor for graphics and imagery display systems and a refined version of the firm's GM 713/719 series of monitors.

The GM 865C color monitor is an expension of the firm's GM 850 series and was designed to provide large-screen direct view presentations for small group audiences.

The unit incorporates a 25-in. CRT screen that utilizes a recently developed color shadow mask tube that reportedly does not hinder screen resolution. The 865C costs $12,400.

Ramtek also announced its GM 714 monitor series, which complements the company's GM 713/719 products. The 714 uses a newly developed CRT that has an ultra-fine pitch shadow mask with an in-line gun structure. The unit does not employ any dynamic convergence controls, a spokesman said.

The 714 is geared for mapping, command and control; computer-aided design and manufacturing; process control; and image processing applications. Prices start at $2,200 each. Ramtak is at 2211 Lawson Lane, Santa Clara, Calif. 95050.

Controller Replaces 3274, Offers Three Screen Formats

MINNEAPOLIS — Lee Data Corp. has unveiled a controller that is compatible with IBM's 3274 control unit (models 1A, 1B and 1D) and also supports the All-In-One Softprint Display.

The Model 320 Local Display System offers an All-In-One Display that incorporates three IBM 3278 models, the 2, 4 and 5. With the display, the operator can dynamically select either the 27-line by 132-column or 43-line by 80-column screen format as an alternate to the 24-line by 80-column screen format.

The Model 320

Adding the All-In-One capability to select the screen size that suits the current task avoids changing, relocating or upgrading existing equipment, the vendor claimed.

Softprint features of the Model 320 Local Display System allow viewing of print data without truncation or wrap-around, a spokesman said, adding this method provides significant cost savings over hardcopy printing.

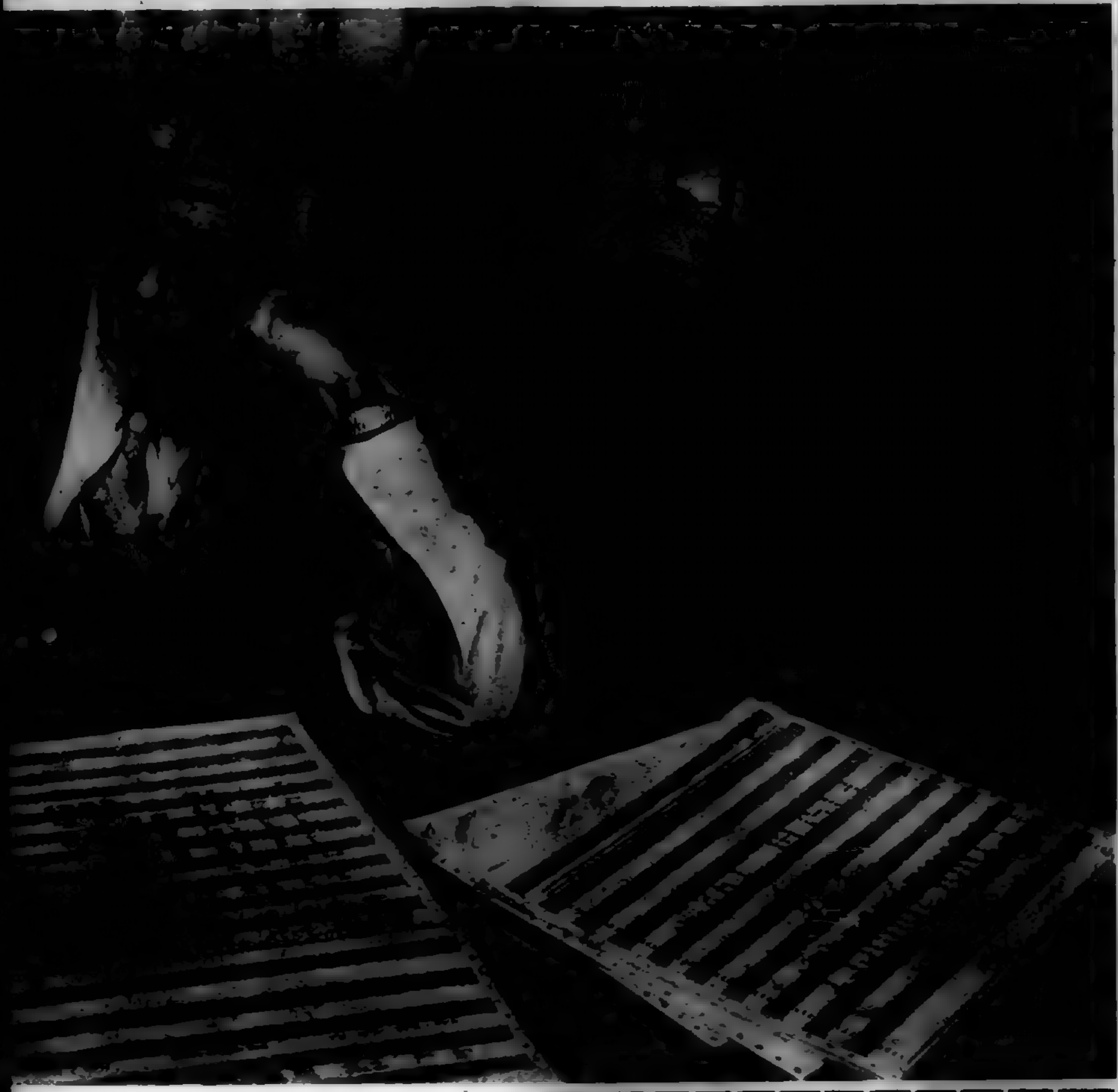
The price for a Model 320 Local System controller is $14,920, the vendor said from 5700 Green Circle Drive, Minnetonka, Minn. 55343.

Modem Assembly Fits Small Users

CHICAGO — A modem assembly for small time-shared computer and multiplexer sites is now available from Comdata Corp.

Up to eight rack-mounted printed circuit card modems operating a 300-, 1,200- and 2,400 bit/sec, including frequency division multiplex channels, may be included.

The unit costs $295, the vendor said from 6115 N. Monticello, Skokie, Ill. 60076.



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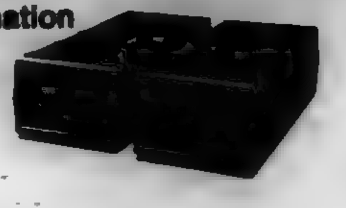

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Terminal Runs In Four Modes

BEDFORD, Mass. — A graphics terminal that is compatible with Tektronix, Inc. Plot-10 software and offers four operating modes has been introduced by Continental Resources, Inc.

The CPG-4010 graphics terminal operates in four modes to permit use for alphanumerics, graphics or both. Compatible with Tektronix Plot 10 software, the package allows use of sophisticated graphics and compatible status read-back that returns alpha cursor position and graphics status information upon receipt of an ESC ENQ command, the vendor claimed.

The unit incorporates a Z80 microprocessor and operates in the ADM-3A Alpha, 4010 Alpha, vector and point modes. The CPG-4010 also allows full screen usage, the vendor said.

The unit costs $1,995 from Continental at 175 Middlesex Tnpk., Bedford, Mass. 01730.

For Interactive Business Use

Send/Receive Graphics Terminal Debuts

PARAMUS, N.J. — A 16-lb portable send/receive printing terminal said to be capable of producing low-cost, interactive business graphics has been introduced by Computer Transceiver Systems, Inc.

The Execuport 4000G wide-carriage terminal features 80- or 136-column printout on either paper or transparent film, according to a spokesman.

The 4000G can draw lines in any direction and print with a resolution of 1,920 points per square inch, or more than four times the resolution of ordinary 5 by 7 dot matrix printers, the spokesman claimed.

Connection to a remote computer is made via telephone lines through the unit's built-in acoustic coupler/modem. A single control allows the Execuport 4000G to be switched from operation in the graphics mode to standard alphanumeric operation, the spokesman said.

Graphics output utilizes a modified Ascii print code with special graphic characters, while alphanumeric output utilizes the standard, 128-char. Ascii code.

The 4000G costs $3,795, with quantity discounts available. Operating leases and financial leases are available starting at $149/mo on a three-year lease.

Computer Transceiver is located at E. 66 Midland Ave., Paramus, N.J. [illegible]

The Execuport 4000G

Auerbach Offers Reference Service

PENNSAUKEN, N.J. — To meet the demand for information about data communications equipment technology and facilities, Auerbach Publishers, Inc. has created Datacom 80, consisting of four continuous information reference services.

The publications are *Auerbach Distributed Systems Reports, Auerbach Commimications Network Reports, Auerbach Data Communications Reports* and *Auerbach Data Communications World*.

The reports will include overviews, objective competitive analyses, user reactions, configuration guides and equipment pricing data.

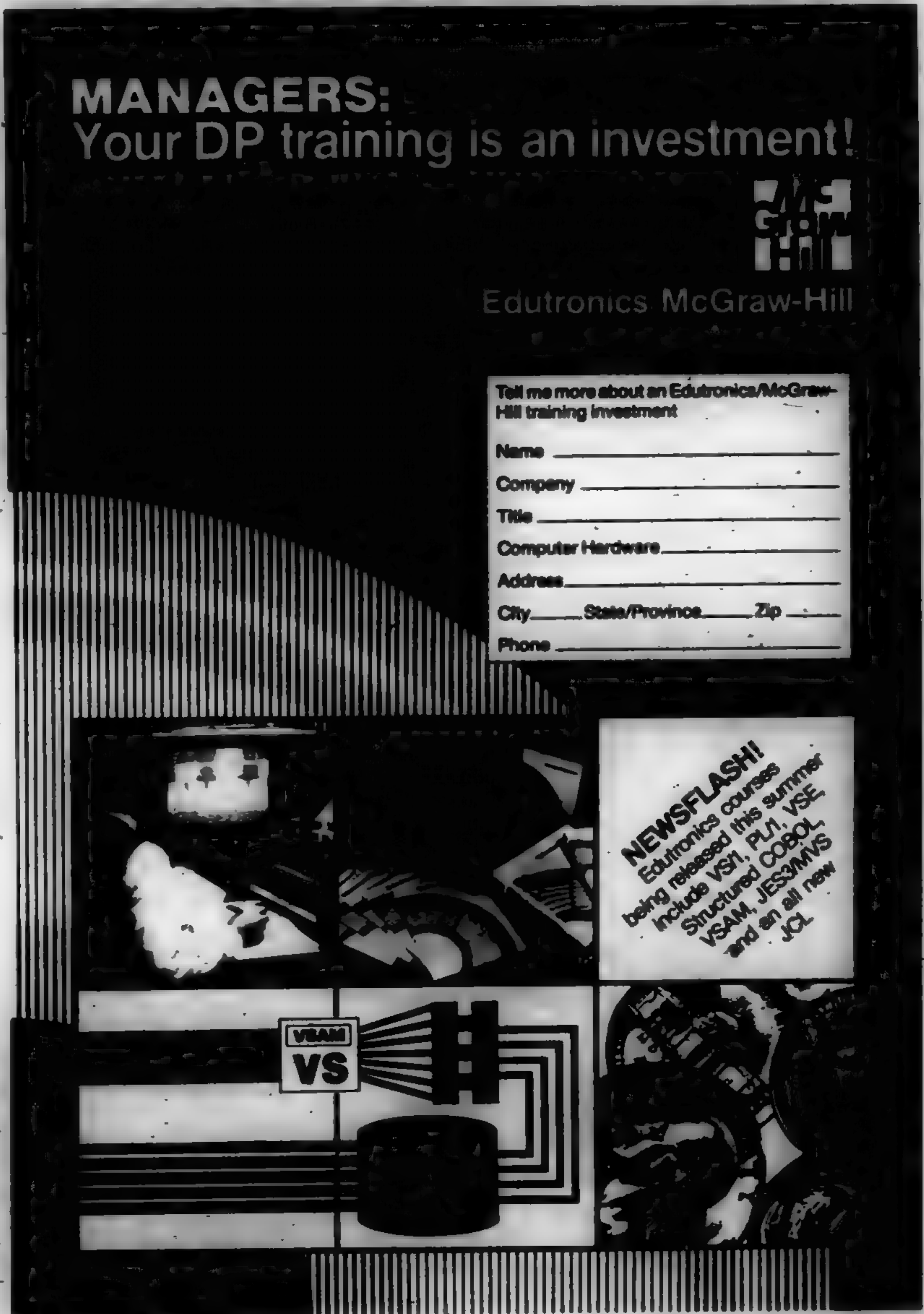
The *Auerbach Distributed Systems Reports* is an 11-volume service, designed for large companies that use distributed data processing. The service covers mainframes, minicomputers and communications and costs $2,795 annually.

The six-volume *Auerbach Communications Network Reports*, aimed at medium-size firms or those using less complex communications networks, provides coverage on general-purpose minicomputers, data handling equipment and data communications equipment and facilities, as well as computer terminals, for an annual charge of $990.

The three-volume *Auerbach Data Communications Reports* coverage is dedicated to communications facilities and equipment and computer terminals and costs $675 annually.

The *Auerbach Data Communications World* provides information on popular, general-purpose minicomputers, communications facilities and equipment, as well as computer terminals. Smaller firms planning for data communications or those with limited activities may subscribe to the reference service for $365 annually.

All of the reports in the reference service are updated monthly, the firm said from 6560 North Park Drive, Pennsauken, N.J 08109.



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MDS Trivex Controller Replaces IBM 3274

COSTA MESA, Calif. — MDS Trivex, Inc., a division of Mohawk Data Sciences Corp., has announced the Plus 80 control unit, Model 8074-1C, as an addition to its line of plug-compatible devices to IBM's 3274 controller.

The Plus 80 was designed to interface with both MDS Trivex and IBM CRT terminals and printers within the same cluster.

The 8074 communicates in half-duplex mode over half-duplex or duplex communications facilities at switch-selectable speeds up to 9,600 bit/sec. IBM 360, 370, 30 series and 4300 mainframes can be used as host CPUs, the vendor said.

The basic controller will operate eight devices. The unit may be expanded to 32 devices through the addition of eight-device adapters, the vendor added.

A program diskette provides the ability to configure the cluster for initial requirements and later change those requirements based on future needs.

The diskette further provides the flexibility to configure the controller for BSC or SNA/SDLC operations alternately.

The initial release of the 8074-1C only provides BSC compatibility. SNA/SDLC will be offered later in 1980, the vendor said.

Resident diagnostic programs are designed for immediate fault isolation, supplying information on all devices connected to the controller and controller-channel communications, providing faster recovery and reduced downtime, MDS Trivex said.

First deliveries are scheduled for early September. No definite price has been set yet, but an MDS Trivex spokesman claimed the Plus 80 will cost approximately 10% less and lease for approximately 12% less than the IBM 3278.

MSD Trivex is at 3180 Red Hill Ave., Costa Mesa, Calif. 92626.

Multiplexer Takes Eight Channels Over One Link

SILVER SPRING, Md. — Rixon, Inc. has introduced an intelligent multiplexer that incorporates a statistical multiplexing technique and can handle up to eight asynchronous channels over a single composite link.

The microprocessor-controlled DCX815 provides an unrestricted intermix of input speeds from 50- to 9,600 bit/sec asynchronous and any 5-, 6-, 7- or 8-bit Baudot, Ascii or IBM code.

Speeds and codes are switch-selectable on a per-channel basis, a spokesman noted. The user can also select an automatic baud rate (ABR) that allows any low-speed channel to adapt automatically to the speed of the incoming data.

To increase throughput, the multiplexer assigns time slots to active channels only and averages the input data, which may be two to four times greater than the output. In addition, an error-checking routing in the device protects the communications link between multiplexers from transmission errors.

The DCX815's random-access memory buffer bridges several seconds of noise or break conditions on the composite link without loss of data, Rixon claimed.

All of the unit's controls and indicators for network configuring and testing are accessed by lowering the multiplexer's front panel.

The DCX815 is available as a four- or an eight-channel unit. The four-channel can be upgraded to an eight by adding an expander card.

The four-channel device costs $1,700, the eight-channel unit costs $2,200 and the expander card sells for $600, the spokesman stated from the company at 2120 Industrial Parkway, Silver Spring, Md. 20904.

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In Alltech Survey

DEC Outranks IBM for Maintenance

By Rita Shoor
CW Staff

PENNSAUKEN, N.J. – IBM ranks second to Digital Equipment Corp. in keeping its customers satisfied in terms of overall hardware maintenance services, according to a survey by Alltech Publishing Co. here.

"Maintenance in Computer Installations" based its conclusions on the percentage of users rating their service "satisfactory" or "unsatisfactory."

The survey sample was derived from what Emily Rieker, Alltech vice-president, described as "large DP installations with gross annual sales ranging from approximately $1.2 million to $13 billion," and said all conclusions were based on responses received from 176 organizations prior to October 1979.

The responding sample, however, included about 93 IBM installations, and 92 of them were willing to respond to the question on satisfactory maintenance.

Only 11 respondents were classified as DEC installations, according to the survey, and all the DEC respondents rated their overall service as satisfactory.

Of the respondents described as having only IBM CPUs in their installations, 86 (93.5%) rated the maintenance service satisfactory, while 6.5% (six respondents) said the IBM service was unsatisfactory.

When the same question was put to 35 respondents classified by Alltech as "other major manufacturer installations," 34 were willing to rate their service. Of those 34, 31 (91.2%) said service was satisfactory.

Of the three that rated their service as unsatisfactory, two were Burroughs Corp. installations and the other respondent utilized equipment from Univac.

Honeywell, Inc., Control Data Corp., NCR Corp., Itel Corp. and Amdahl Corp. were the other vendors represented in this group.

Mixed Installations

Again, the feeling of satisfaction was prevalent among respondents working in environments classified as "mixed manufacturer installations" — those having CPUs from more than one vendor — Alltech's survey found.

Of the 36 companies in this group, two rated the individual CPU manufacturers separately and one did not respond. The result was that 33 (89.2%) gave an overall rating of satisfactory to their service organization, and four described service as unsatisfactory.

A total of 84 CPUs were represented in the mixed manufacturer installations, and IBM, DEC, Hewlett-Packard Co., Univac, CDC, Honeywell, Burroughs, NCR and Four-Phase Systems, Inc. were among the vendors that were mentioned by at least two users in this group. Amdahl, Data General Corp., General Automation, Inc., Itel, Microdata Corp., Mohawk Data Sciences Corp. and Raytheon Corp. had a single CPU in one of the 36 installations, Alltech stated.

All the unsatisfactory ratings were in mixed installations that are IBM-based, according to the company. Two of these had rated their IBM equipment as satisfactory, however, with DEC and HP being characterized as unsatisfactory. One of the other two unsatisfied respondents indicated a mix of IBM, DEC and NCR equipment and the remaining one had hardware from IBM, DEC and Microdata, an Alltech representative said.

Maintenance Sources

Responses to Alltech's question regarding the sources of computer maintenance underlined the tendency for installations having CPUs from multiple vendors to be more dependent on sources other than the manufacturer. The 43 answers from these 36 companies showed that slightly less than three-fourths (74.4%) of the respondents looked to the manufacturer for hardware service.

Eight users (18.6%) obtained their service from third-party firms identified as CDC, Comma, Raytheon Service Co., Sirvess, Inc., Sorbus, Inc. and Syntronics, according to Alltech. Three of this group maintained their own equipment.

When compared to the total 182 responses to this question, the percentage of firms using third-party organizations for maintenance drops to 7.1% (13 of the respondents). One conclusion suggested by this data is that CPU maintenance from third parties is not a particularly significant option for most computer installations, Alltech said.

More information about the two-volume survey, which also includes user maintenance profiles of companies with equipment from various vendors, is available from Alltech Publishing Co., 212 Cooper Center, N. Park Drive and Browning Road, Pennsauken, N.J. 08109.

Bits & Pieces

Storage Technology to Begin Shipping STC 8360 Disk Drive

LOUISVILLE, Colo. – Storage Technology Corp. will begin volume shipments of its newest disk drive, the STC 8360, in the third quarter.

STC's 8880 disk control unit will be shipped in the fourth quarter.

A Media Interchange Switch will be shipped in October, and a multiple format mapping package will be available in September, the vendor said from 2270 S. 88 St., Louisville, Colo. 80027.

CDC's Desktop Matrix Printer Gives Hard Copy for Plato

MINNEAPOLIS – A desktop matrix printer that provides hard copies of text and screen images from Control Data Corp.'s Plato computer-based education system is now available from CDC.

Enclosed in a soundproof cabinet, the dot matrix impact printer produces one to five copies of an image at a maximum rate of 115 line/min using internal Ascii characters or at a reduced rate depending upon the graphics or display involved, the vendor claimed.

When printing normal alphanumeric information, the printer generates up to 132 char./line.

The printer costs $3,950 or may be leased for $200/mo., the vendor said from Box 0, Minneapolis, Minn. 55440.

Honeywell Level 6 Terminal Runs 'Data Entry Facility II'

WALTHAM, Mass. – Honeywell, Inc. has unveiled a terminal for use with its Level 6 Data Entry Facility II software.

The VIP7207's major feature is its offering of two numeric key groups — one embedded in the touch-typing area in the data entry arrangement and one in a calculator-like arrangement in the right side of the keyboard.

The company also announced a field-kit version that permits modification of VIP7200 and VIP7205 units for use as a VIP7207.

The terminal costs $1,980 and the field-kit version is $350, the vendor said from 200 Smith St., Waltham, Mass. 02154.

Paper-Tape Transmitter Reads Five- to Eight-Level Tape

SAN GABRIEL, Calif. – Addmaster Corp. has introduced a stand-alone paper-tape reader and transmitter that can read five- to eight-level tape and transmit 7 to 11 frame/char. at 50- to 9,600 bit/sec.

Other features include starting and stopping on character at all speeds; a choice of manual control or X-on or X-off; 90 to 260 volt; 50- to 60Hz power; and even or odd parity, the vendor said.

The unit is desktop or rack-mountable and costs $656 to $779 from the vendor at 416 Junipero Serra Drive, San Gabriel, Calif. 91776.

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Cartridge System Backs Up 8-In. Winchester Drives

MONROVIA, Calif. — A fully integrated cartridge tape system to back up 8-in. Winchester drives has both transport and formatter in one package, according to its vendor, Kennedy Co.

The Model 6450 measures 8.5 in. wide by 4.5 in. high by 16.5 in. deep with the embedded formatter allowing disk and transport to be placed side by side in a 19-in. rack. The unit dissipates less than 40W, the firm said.

Using 6,400 bit/in. recording density and serpentine serial recording, the 6450 has an unformatted capacity of 17.3M bytes with a 450-ft DC-300 cartridge and 11.5M bytes with a 300-ft cartridge. Transfer rate is 192K bit/sec, read/write speed is 30 in./sec and fast-motion speed is 90 in./sec.

The transport employs a switching-bridge servo amplifier that is 65% more efficient than conventional linear-servo designs, according to the firm.

The microprocessor-based formatter offers prewrite compensation to minimize pulse crowding and phase distortion for higher write-data integrity. The Model 6450 cartridge transport and formatter costs $1,700 from Kennedy at 1600 S. Shamrock Ave., Monrovia, Calif. 91016.

DEI Cartridge Tape Drives Run at 30- or 90 In./Sec

SAN DIEGO, Calif. — Data Electronics, Inc. (DEI) has enhanced its S-3 line of streaming digital cartridge tape drives to offer a choice of speeds and transfer rates.

Designed for use with small Winchester-type disk drives, the S-3 line now runs at 30- or 90 in./sec. This is said to increase the drive's transfer rate to a choice of 1.67M byte/min or 5M byte/min.

The S-3 drives are microprocessor-controlled with either serial or parallel interface. Group code recording is at 7,500 bit/in. and is used with a variety of internal error detection checks.

Both DEI's streaming drive and a stripped-down streaker version offer digital servo electronics, a digital magnetic tachometer, LED sensors, a tape cleaner and full bar ac erase, the vendor said.

The 10M-byte drive costs $746 and the 20M-byte version is $788 from DEI at 10150 Sorrento Valley Road, San Diego, Calif. 92121.

System Handles Data Collection In Factories

NORTHBROOK, Ill. — Infolink Corp. has unveiled a factory data collection system to collect production, material and labor data from wherever it is generated.

Called the Infolink 5000, the system includes the 5100 controller which operates with customized application software to control and direct a network of data entry terminals, printers and other peripherals.

The system can be configured from a series of 16-bit processors with memory capacity of 32K to 256K bytes, and accommodates up to 128 terminals on multidropped lines up to a distance of 10,000 feet at 9,600 bit/sec, the vendor claimed.

A typical system with 20 terminals is priced between $75,000 and $100,000, depending on configurations and systems specifications, the vendor said from 1925 Holste Road, Northbrook, Ill. 60062.

Device Collects Data in Field

HINGHAM, Mass. — A self-contained, battery-operated data collection and processing system for hydrography, material handling and other field applications has been introduced by Digital Design & Development (DD&D).

The PSS-1 portable computer system is said to allow data collection, processing and recording in the fields.

Featuring operator-controlled interrupts and status inputs, the system can control external devices such as distance-measuring and depth-sounding equipment, process control and environmental sensors, position plotters and serial terminals.

Operating on 12/24 Vdc or optional ac power supply, the 60-lb PSS-1 is housed in a water-resistant fiberglass case with splash cover. The unit is priced from $21,000, depending on specifications. DD&D is located at 25 Industrial Park Road, Hingham, Mass. 02043.

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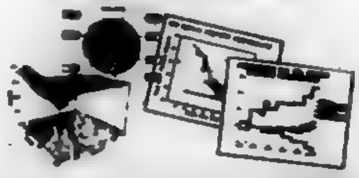

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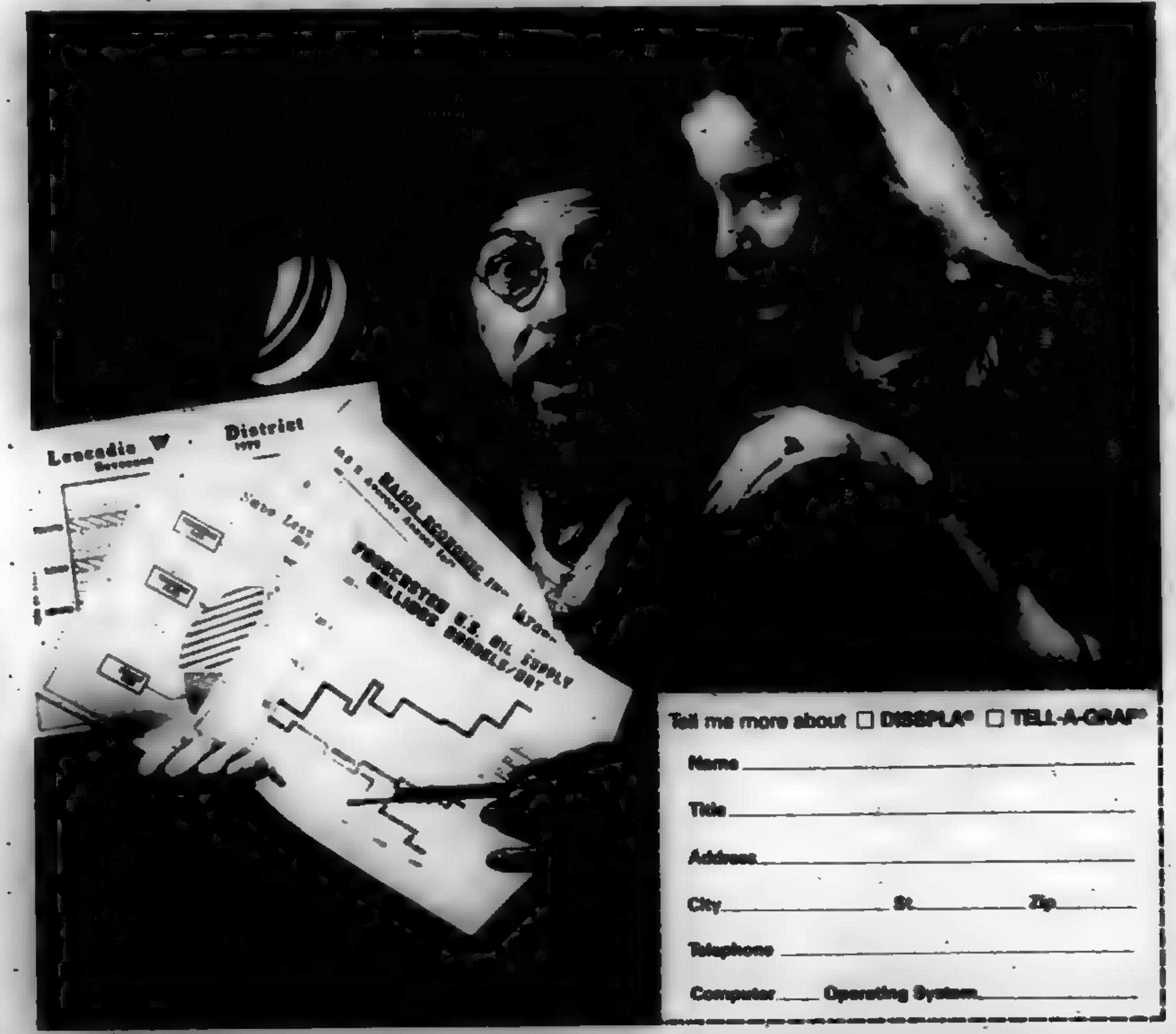

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Canon Brings Out Desktop System Line

LAKE SUCCESS, N.Y. — Canon, Inc. has introduced a series of programmable and nonprogrammable desktop computers that feature built-in printers and have communications capabilities.

Each model in the TX series — the TX-10, TX-15 and TX-25 — features an 8-bit microprocessor and 15K bytes of user memory that can be expanded to 31K bytes. The computers weigh about 15 lb each and are roughly the size of a portable typewriter.

The TX machines use extended Basic and Assembler languages and include a 20-column display and a 26-column impact printer that is capable of producing two copies in addition to an original. The TX-25 also has a built-in micro floppy disk drive for program or data storage, a spokesman said.

When a modem is attached, the units reportedly have full asynchronous communications capabilities and can interact with large mainframes. In addition to one modem port, members of the TX series have an RS-232C interface port for peripherals, the spokesman noted.

The TX-15

Both the TX-15 and TX-25 have full typewriter keyboards, while the TX-10 has a 10-key pad with 26 labeled keys.

User programs are stored in the unit's CMOS or programmable read-only memory. Canon is optionally offering a full banking package containing 24 programs to handle jobs such as installment loans, commercial loans and amortization schedules. A package for automotive dealers, containing routines on finance and insurance, and other packages for statistical markets, government and education will be available in the near future, the spokesman claimed.

The computers will initially be marketed through the company's dealer network. The TX-10 and TX-15 will be available in September and sell for $1,295. The more advanced TX-25 and its price tag, however, will not be released until December.

Canon's Systems Division is located at 10 Nevada Drive, Lake Success, N.Y. 11042.

Multilanguage System Based on HP 1000

PALO ALTO, Calif. — Hewlett-Packard Co. has unveiled a multilanguage computer system aimed at program development that consists of the HP 1000 Model 45 minicomputer and a variety of program optimization packages.

The Performance/45 System also has a number of high-performance compilers, microprogram development and screen-editing software, a spokesman said.

The HP 1000 Model 45 processor incorporates an F series computer and 512K bytes of main memory, expandable to 1.8M bytes. The hardware also features 19.6M bytes of disk storage, expandable to 960M bytes, and a graphics terminal.

Designed to act as a programming tool, the Performance/45 System includes a number of software languages and routines. The first, Pascal/1000, is a superset of industry-standard Pascal and is basically a block-structured language known for its data and control structures. The superset reportedly helps speed up program design, debugging documentation, modification and maintenance.

The second, Fortran 4X, is a superset of Ansi Fortran 66 and has compilation speeds as high as 3,000 line/min CPU and 2,000 line/min in real-time, the spokesman claimed. Fortran 4X is said to be upward-compatible with HP Fortran IV and features direct-access I/O, double-word integer data type and IF-THEN-ELSE construction.

Editing Package

Edit/1000 is an editing package that interacts with users in line or screen modes. In the line mode, it provides for basic text maintenance, character string search and replace capabilities.

Finally, Accel/1000 is a software package that profiles program activity, showing the user precisely where execution bottlenecks exist, HP said.

All combinations include a minimum of 256K bytes of HP 1000 memory plus one of the following products: the Pascal/1000 compiler; the Image/1000 data base management system; the Datacap/1000 factory data collection software; the RTE-IVB multiuser, real-time operating system; the HP-IB fiber optics link; or L series computer featuring a distributed intelligence architecture.

The technically oriented Performance/45 Model 1000 is priced at $57,500 on orders placed through Sept. 30, but will cost $64,000 after that date.

Delivery is estimated at eight to 12 weeks from the firm at 1501 Page Mill Road, Palo Alto, Calif. 94304.

DG Adds Mid-Range CPUs

WESTBORO, Mass. — Data General Corp. has expanded its commercial systems (CS) line by announcing two mid-range CPUs.

The CS/10 is aimed at businesses with annual sales between $100,000 and $10 million. It comes in two models, the C1 with 64K bytes of main memory and the C3 with 256K bytes.

Also announced was the CS/70, aimed at firms with sales of more than $20 million. The Model C/5 in that line offers 256K bytes of main memory and will accommodate up to nine terminals. The CS/70 Model C/6 offers 512K bytes of main memory and can accommodate 17 terminals, the vendor said.

The additions to the CS line were designed to handle order entry, accounts receivable and payable, payroll and general-ledger functions. The systems are programmed in interactive Cobol. The CS/10 costs about $11,000 and the CS/70 about $40,000, the vendor said from Rt. 9, Westboro, Mass.

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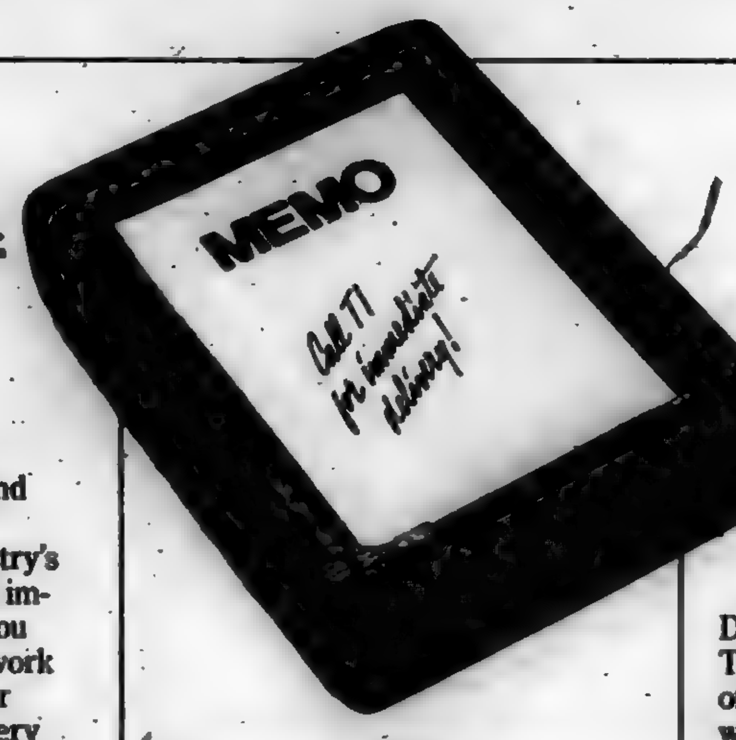

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Multiuser Micro System Debuts

SANTA CLARA, Calif. — OSM Computer Corp. has introduced a multiuser, multitasking microcomputer system that is said to offer each user an MPU, memory, I/O and up to 128M bytes of shared disk memory.

The OSM Model 6300 consists of a Z80 MPU, a service processor, 64K bytes of main memory, a console I/O and an optional local printer. Each system uses the CP/M release 2.2 disk operating system.

Communication between the user and the service MPU is handled via 16-bit interprocessor communications and not through the S-100 bus, the vendor noted.

The unit comes with two 8-in. double-density floppy disk drives. A double-sided disk is optional, as are hard disks in 32M-, 64M-, 96M-, and 128M-byte increments.

The complete system is available with an IBM 3101 CRT terminal and Texas Instruments, Inc. 820 receive-only or optional letter-quality printer for $5,195.

OSM is at 2364 Walsh Ave., Santa Clara, Calif. 95051.

Controller for Novas Handles CDC Drives

ELMSFORD, N.Y. — Mini-Computer Systems, Inc. (MCS) recently announced a disk drive controller for Data General Corp. Nova minicomputers that can handle up to four Control Data Corp. storage module, cartridge module or mini module drives.

The MCS Model 3000 is a one-board device that is said to give users the capability of building disk systems with up to 1.2G bytes of mass storage. The controller features transfers of up to 32K words with a single command, while crossing cylinder and head boundaries automatically using a 1K-word data buffer.

Addressing can be either by disk address or by block number, while error-correction facilities are provided by the unit's on-board microprocessor.

The controller costs $3,600 with deliveries scheduled for this month from the firm's Peripheral Products Division, 399 Fairview Park Drive, Elmsford, N.Y. 10523.

IBM 2770 Emulation Among Lexitron Additions

CHATSWORTH, Calif. — Lexitron Corp. recently announced a number of enhancements for its VT text processing systems, including an IBM-compatible communications protocol, a Basic programming capability and a print multiplexer that allows users to develop clustered word processing (WP) groups.

The communications option, IBM 2770 protocol emulation software, allows VT system users to communicate with IBM-compatible WP systems and their associated high-speed inkjet and laser printers. The software is contained on a minidiskette.

Like all software designed for Lexitron's VT systems, the 2770 program operates on a menu-selection procedure and contains interactive instructions that lead the operator through various transmission criteria. On-line verification indicates whether all appropriate selections have been made, and an identification number can be included for security purposes, a spokesman said.

The emulation package has speed selections of 2,400 or 4,800 bit/sec, or a rate can be established by the modem user. The selectable code sets are Ascii, Ebcdic or Ebcdic transparent. The program includes the automatic transmission of job control language information and a compress transmission option, that is said to remove consecutive space characters from data during transmission and reinsert them when receiving.

The communications software can be used on the firm's 1201 VT, 1202 VT and 1303 VT systems and is priced at $300. If, however, a VT system has not previously been equiped to handle communications, the necessary hardware costs an additional $1,200. A variety of lease plans is also available, the spokesman noted.

Basic Capability

The second enhancement, introduced at last month's Syntopican VIII convention, is a Basic programming capability for the company's 1202 and 1303 VT systems. Using the Basic language, users can turn their WP systems into multifunction information stations, the spokesman observed.

Lexitron enhancements to the Basic package include communications support for an asynchronous channel, allowing VT workstations to transmit programs and data; screen editing; initialization from a command file, allowing operators to run programs without manually executing system initialization; and a clear screen command.

The basic interpreter program will be available this October and costs $3,500.

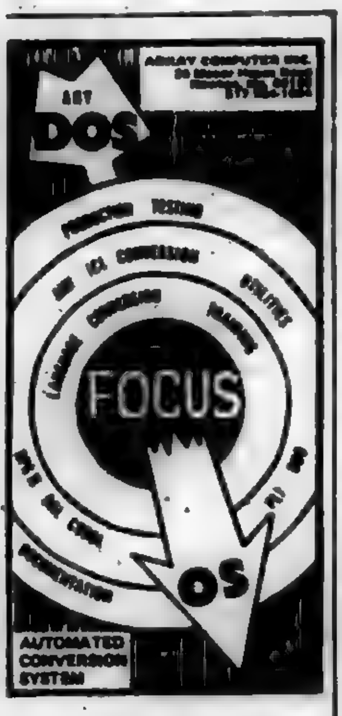
Finally, at the same word processing show, Lexitron showed a print multiplexer that allows users to connect up to six VT workstations in any combination and up to three Lexitron-compatible printers.

When connected to the VT 1630 multiplexer, any workstation can reportedly select any printer, allowing users to send documents for continuous forms to one printer and other jobs to other print stations.

When printers are selected, an extended menu is displayed which gives the operator a choice of printers and additional printer status information, the spokesman continued. Most print commands are identical to those currently used by VT operators, limiting the amount of training needed to operate the system additions.

The multiplexer makes it possible to dedicate a specific printer to a specific editor, which has the effect of taking the printer and editor "out of the system" without plugging or unplugging cables, the spokesman said. A variety of cable lengths, ranging from 15 ft to 100 ft, is available to facilitate installation of custom work groups.

First customer shipments of the 1630 are scheduled for September. The unit costs $2,095 from Lexitron at 9600 DeSoto Ave., Chatsworth, Calif. 91311.



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Mini Bits

Controllers, Printers PDP-11-Compatible

MENLO PARK, Calif. — BDS Computer Corp. has introduced a line of plug-compatible controllers and line printers for Digital Equipment Corp. PDP-11/04 through VAX-11/780 minicomputers and it claimed they are less expensive than their DEC counterparts.

The systems provide 300 to 1,200 line/min at prices of $6,250 to $29,850 including controller and cables. The equivalent DEC LP-11 series printers are priced at $8,600 to $63,000, BDS claimed.

The LPC-11 controllers are fully compatible with the DEC Unibus and occupy one "quad" slot in the system backplane.

The printers are band or drum units with 132-or 136-column-line lengths.

BDS Computer Corp. is located at 1120 Crane St., Menlo Park, Calif. 94025.

Remote Diagnostics Added to PE CPUs

NEPTUNE, N.J. — Perkin-Elmer Corp.'s (PE) Customer Service Division is offering a remote diagnostics feature for its 3220 and 3240 CPUs.

The diagnostic unit consists of a controller and a three-position, key-activated modem. The unit attaches to a standard telephone; hardware problems can be communicated to Perkin-Elmer technicians at Los Angeles, Chicago and Neptune service centers.

The diagnostics feature costs $225 from the vendor at 51-71 Davis Ave., Neptune, N.J. 07753.

HP Personal CPUs Get On-Site Service

PALO ALTO, Calif. — Hewlett-Packard Co. HP-85 personal computer users can now avail themselves of "on-site" service.

Users within 100 miles of an HP service office will receive next-day response under the terms of an agreement that costs $25/mo. Users beyond the 100-mile limit will be subject to longer response time and a higher charge for the service.

For an additional fee, HP-85 peripherals such as printers, plotters and floppy disk drives can be covered by the on-site agreement, the vendor said from 1501 Page Hill Road, Palo Alto, Calif. 94304.

Tape Control Unit Backs PDP-11, VAX

HOUSTON — Information Products Systems, Inc. has released its Model 7800 magnetic tape control unit to support Digital Equipment Corp. PDP-11 and VAX-11/780 CPUs.

The unit supports group code reporting, phase-coded and non-return-to-zero inverted tape densities. The unit is compatible with PDP-11 and VAX 11/780 Unibus adapters and allows attachment of higher performance magnetic tape systems, the vendor said.

The control unit supports triple-density tape systems and three-mode byte swapping required to generate DEC-compatible tapes.

The unit costs $10,500 from the vendor at 6567 Rookin, Houstin, Texas, 77074.

Xycom Introduces Z80-Based System

ANN ARBOR, Mich — A tabletop "microhost/development" package designed for industrial environments is available from Xycom, Inc. The 3805A is a stand-alone, floppy-disk-based microcomputer system for software development and distributed network applications, the vendor said.

The Z80-based system includes 96K bytes of random-access memory, parallel and serial I/O, a 93-key intelligent keyboard and an integrated integral 12-in. CRT. The unit uses an IBM 3740 format-compatible floppy disk drive with 250K bytes of mass storage and a tabletop line printer, the vendor said.

The 3805A costs about $10,000. The vendor may be reached through P.O. Box 984, Ann Arbor, Mich. 48106.

Piiceon RAM Board Addresses 16M Bytes

SAN JOSE, Calif. — Piiceon, Inc. has unveiled a high-speed error correcting dynamic random-access memory (RAM) board that runs in any IEEE-standard S-100 bus. Designated Superem 3, the memory can address up to 16M bytes and be configured for either 8- or 16-bit processors.

The product features error-checking and correcting circuitry that can detect and correct all single-bit errors automatically before they reach the CPU, the vendor claimed.

Single- and double-bit error reporting is controlled by software. An error status register is available for interpreting syndrome bits into a failing memory location. Memory refresh is totally transparent to the processor.

The price for the product is $1,700, the vendor said from 2350 Bering Drive, San Jose, Calif. 95112.

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Stratmar Business Turnkey Targets Medium-Size Firms

NEW YORK — Stratmar Business Solutions Corp. has announced a business turnkey system for medium-size firms.

Supervisor II is built around a Data General Corp. Nova/4 and offers order entry, inventory control and job cost applications in addition to standard accounts payable, accounts receivable and general ledger functions, Stratmatr said.

Users of Supervisor II can expand their computing power without having to make programming changes normally required when upgrading from a single-terminal to a multiterminal environment, the vendor claimed, adding that all the user has to do to expand his system is to add CRT terminals.

The system costs about $710/mo on a rent and lease basis or $54,280 to purchase, Stratmar said from 501 Madison Ave., New York, N.Y. 10022.

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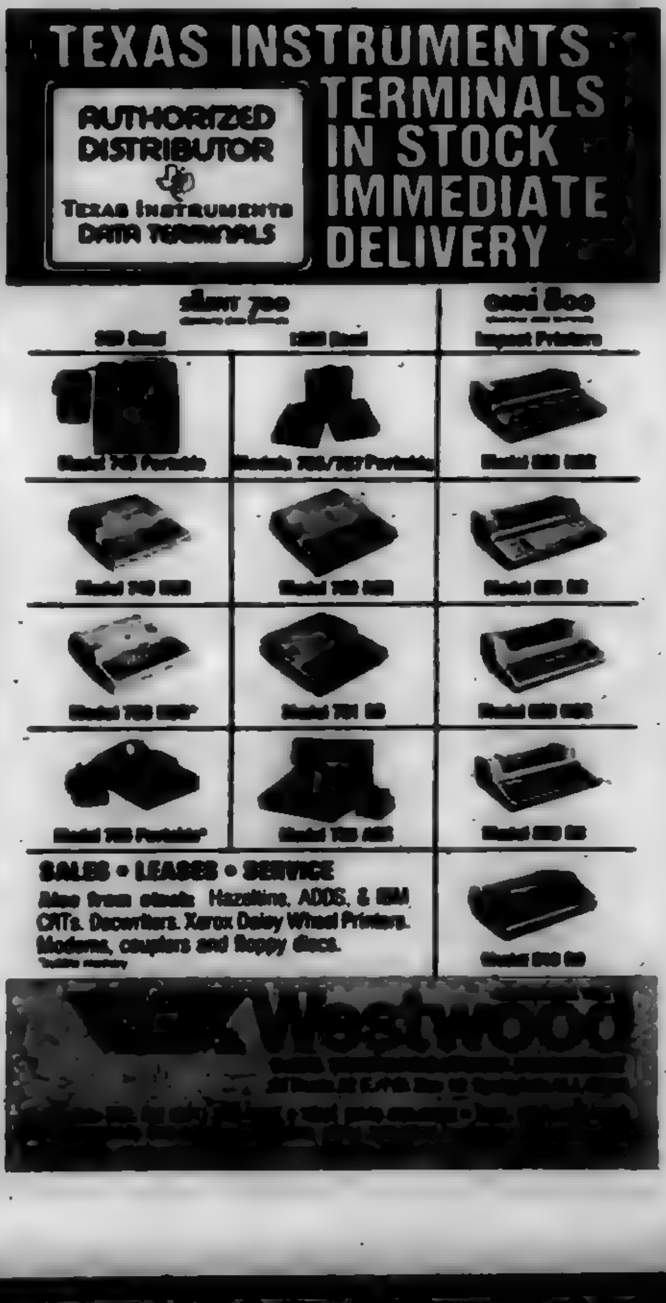
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In case you haven't been introduced to the Bantam, here are a few of its endearing features. The Bantam is a delight to the operator's eyes: An upper and lower case character set with descenders on a sharp 7 x 10 dot matrix. A glare-cutting hood. Switchable white-on-black or black-on-white display. An easy-to-find cursor that frames the character in an inverse video block. And it's silent: no fan.

There's also fixed-position tabbing. Full cursor addressing from the host. Repeat, tab, print, on/off line, back space and shift lock keys. A complete sure-touch keyboard with shadow numeric pad. Options include an anti-glare etched grey or green CRT, printer port, current loop, international power and character sets.

The crisply styled Bantam measures only 15" wide, 19" deep and 14" high, and weighs a mere 28 pounds. Yet it's tougher and more reliable than its competitors, thanks to its custom LSI chip.

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Users to Pay More

IBM Price Hike Ripples May Start Wave

By Tom Henkel
CW Staff

Although a current International Data Corp. (IDC) report suggested the recession has not dampened users' willingness to buy [CW July 14], users will definitely be paying more for most systems.

IBM, viewed by many as the industry trend setter, just boosted its prices for the second time in six months. The increase — which raises rent, lease and maintenance charges on most major hardware by 3% to 10% and boosts some software, hourly maintenance and customer education 7% to 10% — may set off a wave of similar increases throughout the industry.

Some vendors had already buckled to inflation a few weeks prior to the IBM announcement. Amdahl Corp., maker of plug-compatible IBM systems, announced a similar price increase May 1. Prime Computer, Inc., Control Data Corp. and Digital Equipment Corp. have also announced price increases in recent months.

Other firms such as Univac and National Advanced Systems Corp. (Nasco) are taking IBM's recent announcement to heart and are seriously discussing price increases.

Additional firms contacted were less committal on IBM's increases, saying that prices are constantly being evaluated and could be increased at any time.

New Strategy?

Although some sources contended IBM's second price increase within six months is an indication of a new business strategy — namely, to hike prices on a regular basis — most IBM watchers disagreed, saying the increases are in reaction to "exceptional conditions" in the information processing industry.

Spiraling inflation coupled with a severe component (semiconductor) shortage forced IBM as well as other vendors simply to spend more to build computers.

In spite of all indications sug-

(Continued on Page 66)

While NCR's, Burroughs' Dive

IBM Second-Quarter Earnings Rally

The mainframers have begun to issue second-quarter results and, while IBM's earnings rallied, showing a 14.4% increase from the same period last year, NCR Corp. reported a 4% decline in earnings.

Burroughs Corp.'s earnings dived 12%, the first quarterly decline for the Detroit mainframer in 17 years.

Breaking its string of four consecutive quarterly pretax margin declines, IBM posted second-quarter earnings of $763.8 million or $1.31 per share, compared with earnings of $667.4 million or $1.15 per share in the like quarter a year ago. The pretax margin for the quarter showed an 8.6% gain.

The giant's revenues advanced 15.4%, grossing $6.2 billion, up from the $5.4 billion in revenues in the same quarter a year ago.

First Half

For the first half, IBM's revenues topped $11.9 billion, a 12% increase from the $10.7 billion during the first half of 1979.

Earnings for the first two quarters were $1.44 billion or $2.48 per share, an 8.3% advance from the $1.3 billion or $2.29 per share earned in last year's first half.

Commenting on the results, IBM Chairman Frank Cary said, "Purchases of data processing equipment in recent months have been substantially higher than the corresponding months of last year and for the six months increased at approximately the same rate as total gross income."

For the second quarter, purchases of equipment showed a 16.9% increase from the same quarter a year ago, yielding a 10.6% growth in overall outright sales for the year to date. While the growth in rentals and services revenue was 14.5% for the third

(Continued on Page 64)

Western Union Overcharges Alleged

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Western Union Telegraph Co. should be required to pay an estimated $12 million to $15 million to its Telex/TWX customers — that's the amount of overcharges embedded in tariffs filed by the company in 1977 and 1978, the U.S. international record carriers (IRC) charged in a recent statement to a Federal Communications Commission (FCC) administrative law judge.

The FCC has allowed the tariffs to become effective, but on a conditional basis. The need for adjustments, including refunds, will be considered by the commissioners after the FCC administrative law judge has decided whether the rates are equitable. That decision is likely around the end of this year.

The recent IRC statement, which was submitted to the judge, sums up the carriers' objections. Statements were also filed by a "separated" FCC trial staff, representing the public in the proceeding, and by Western Union.

Opponents alleged that the economic data Western Union used to support the increases was incomplete and unreliable.

Western Union said it would be "unfair" for the FCC to refuse to accept the cost studies "when it has recently refused to investigate the international carriers' excessive telex rates."

Symbolic vs. IBM Continues Software Pricing Debate

By Connie Winkler
CW Staff

SAN FRANCISCO — A 10-year-old antitrust suit against IBM that goes to the question of how IBM prices its software has been thrown back to the U.S. district court here for additional proceedings.

In the case, Symbolic Control, Inc. vs. IBM, Symbolic claimed IBM's free distribution of numerical control software — after IBM unbundled software in 1969 — was predatory pricing to monopolize the software market. Symbolic was formed in 1969 specifically to market a refined automatically programmed tool (APT) program called APT/70.

The U.S. Court of Appeals for the Ninth Circuit ruled earlier this month that the district court — which had dismissed the case after Symbolic presented its testi-

(Continued on Page 65)

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GE to Provide Service For ECS Gear

SAN JOSE, Calif. — ECS Microsystems has concluded a service and maintenance agreement and a long-term sales arrangement with General Electric Co.'s Instrumentation and Communication Equipment Service of Schenectady, N.Y.

ECS, which recently moved its headquarters here from Australia [CW, Dec. 10], will supply its ECS 4000 intelligent emulation terminals and its ECS 4500 microcomputer system to GE. GE, in turn, will add these products to those it leases and services throughout the U.S. Currently GE leases modems, multiplexers and terminals.

Deliveries of products from ECS to GE will begin in July, according to Dan Seale, ECS vice-president of marketing. ECS said it will supply units equipped to handle protocols used by the major mainframers and that other mainframe communications capabilities would be added at some later date.

As for service, Seale said under the agreement with GE technicians in more than 90 U.S. locations would provide both on-site and depot maintenance and services to ECS customers, whether they lease from GE or purchase from ECS.

ECS will continue to sell its products to end users and maintain its own service force.

GEC, Fairchild Halt Plans For MOS Joint Venture

MOUNTAIN VIEW, Calif. — Fairchild Camera and Instrument Corp. here and General Electric Co. Ltd. (GEC) have agreed to terminate a joint venture which would have produced 16K MOS random-access memory (RAM) devices at a plant in Neston, England.

Although the two firms declined comment on the reason for ending the venture, the French Schlumberger conglomerate, which acquired Fairchild last year, reportedly wanted no part of the deal.

The GEC-Fairchild Ltd. venture was initially capitalized for nearly $39 million, shared equally by the two firms. The Neston plant was expected to be in full-volume operation by 1982. Its output was to be sold primarily in Europe, where both firms have well-established marketing operations.

While the venture was originally slated to concentrate on 16K dynamic MOS RAMs, the firm was expected to branch into production of 64K dynamic RAMs and 8-bit microprocessor units.

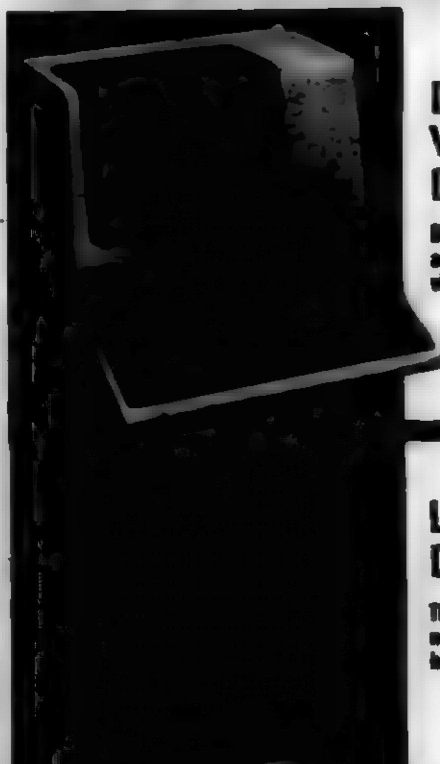
GEC is said to have entered into the project because it doubted it could obtain an adequate supply of memory products. It has arranged to acquire Fairchild's interest in the Neston plant. Financial details were not revealed.

Tymshare to Help Boost The Source

McLEAN, Va. — Source Telecomputing Corp. and Tymshare, Inc. have entered into a development and pilot operation agreement under which Tymshare will provide services to increase the user capacity and technology of Source Telecomputing's The Source consumer information network.

Tymshare will reportedly use its experience in developing distributed multiple data bases and operating more than 50 mainframes as a computer services company to help Source Telecomputing increase the benefits provided to present users of The Source. Tymshare's Tymnet, Inc. subsidiary, which operates the Tymnet public packet communications network serving 200 cities, will also be involved in The Source expansion program, a spokesman said.

Source Telecomputing will continue to work with Dialcom, Inc., its present computer facilities operator, and service users over Telenet, a communications network operated by GTE Telenet Communications Corp. Dialcom will work closely with Tymshare throughout the expansion program.



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In Recognition of Parent Firm

Melcom Now Called Mitsubishi Electronics

By Marcia Blumenthal
CW Staff

COMPTON, Calif. — Melcom Business Systems, Inc. has changed its name to Mitsubishi Electronics America, Inc. (MEA) because of the growing recognition of the name of its Japanese parent firm, Mitsubishi Electric Corp.

Under the former Melcom name, the huge Japanese firm distributed its 8000 series of small business systems in the U.S. In addition to these systems, MEA has a semiconductor division and sells, on an OEM basis, a high-resolution color CRT terminal and communications gear, according to MEA President Akira Takei. IBM is one of the company's primary customers for the color CRT terminal.

Currently the 8000 series consists of three models ranging in main memory size from 48K bytes to 400K bytes and is priced between $20,000 and $400,000. These systems are distributed primarily on the West Coast through eight dealers.

While MEA intends to expand both its geographic distribution in the U.S. and its product line, Takei said the firm does not intend to market its large-scale IBM-compatible system, now under development in Japan. "It is not profitable here, but is in Japan," Takei said.

About 70% of the firm's systems are sold through distributors, with the remainder sold directly to the end user by the firm's own sales force.

MEA also produces 64K dynamic random-access memory chips. At the present time, these are available in sample quantities only, but by 1981 will be available in production quantities, Takei noted.

Although they are produced in Japan, the final testing and quality control of these semiconductor products is done at the firm's plant in Sunnyvale, Calif.

Hitachi Plans

While MEA made the decision to trade on the Mitsubishi name, another well-known Japanese computer maker, Hitachi Ltd., also announced plans recently to sell a variety of computer products under its own name in the U.S.

Currently Hitachi sells its products through National Advanced Systems Corp. (Nasco), a unit of National Semiconductor Corp. that acquired the Itel Corp. computer line. However, the company said it is considering setting up its own marketing and sales organization in the U.S.

But Hitachi does not plan to discontinue its relationship with Nasco, according to Yasuo Miyauchi, Hitachi executive managing director.

"It should be remembered that it is not Hitachi's policy to meet IBM's challenge simply as a CPU maker. Rather, we are putting more effort into promoting the sale of systems using our own product strategy and software development system," he recently told a group of security analysts in Boston.

Wavetek Divests DP Interests

SAN DIEGO — With the sale of its Data Communications Division to Infolink Corp. and its Compata Division to Recognition Equipment, Inc., Wavetek Data Communications, Inc. has divested all its computer interests in favor of a stronger emphasis on the test and measurement (T&M) equipment market.

"We're not a computer company," Wavetek Vice-President John Schweikart said of the divestiture decisions. "The T&M market has really taken off in the past 10 years and data communications just hasn't kept up."

The Data Communications Division was acquired in 1970, when Wavetek felt compelled to follow the trend toward diversification, Schweikart explained. At the time, Wavetek did not anticipate the upcoming rapid growth in T&M.

Because of its strong T&M orientation, the company's sales force "can't sell" the Data Communications products, which consist of computer-based voice response systems, the vice-president said.

The Compata Division's emphasis on communications applications and operating systems presented similar problems for the sales force.

Filling the void created by the two divestments was the acquisition of Rockland Systems Corp., a high-technology instrument manufacturer, in May. Wavetek is "actively looking" to acquire more T&M companies, according to Schweikart.

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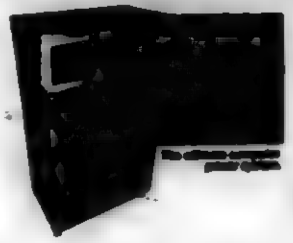

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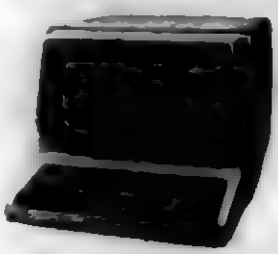

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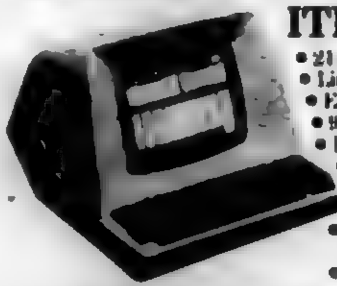

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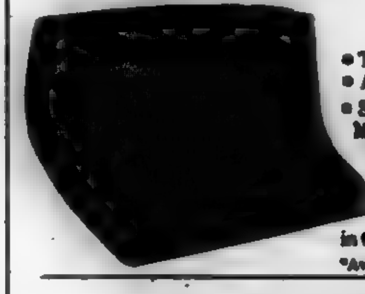

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Developing Nations' Efforts To Curb Multinational Firms Viewed Threat to Advances

By Jake Kirchner
CW Washington Bureau

ROME — Attempts by developing countries to curb the influence of multinational information companies may be biting the hand that feeds them, an international data flow conference was warned.

As the World Conference on Transborder Data Flow Policies wound down here recently, a U.S. Commerce Department official noted most of the advances in information and telecommunications technology have come from the private sector, driven by the profit motive.

The extent to which technology is made available to developing countries by the private sector is dependent on the opportunity to realize some profit. This is "one of the basic rules of commerce and cannot be abrogated," William Fishman of Commerce's National Telecommunications and Information Administration (NTIA), said here.

Fishman's comments were a reminder of the source of most information products to the delegates of 60 nations, many of them from the Third World, who had voiced concerns about the implications of their dependence on the technology of developed countries [CW, June 30].

The "facilities and capabilities" of multinational corporations will not be available to the world's emerging information economies unless the companies are given a "fair and decent opportunity to earn a profit on [their] activities," Fishman remarked.

Developed vs. Developing

The Commerce official's statement pointed to the political and economic differences that separate the developed and developing nations. In many Third World countries, the information sector is closely regulated, if not controlled, by the central government; whereas in nations such as the U.S., information services are provided through free enterprise.

As a representative of Control Data Corp. told the conference, the U.S., for all its reliance on sophisticated information systems and technology, does not have an "information plan" like those the developing nations are struggling to construct to order their technological development.

The diversity of the U.S. information industry makes Third World fears of domination by "a huge monolith" of multinational corporations "unfounded," said Hugh Donaghue, a CDC vice-president and, like Fishman, a member of the U.S. delegation to the conference.

Concerns of other countries' delegates, however, were not so readily assuaged, as shown by the comments of a Bolivian delegate who said he did not "share the very optimistic statements" of Donaghue and representatives of other multinational corporations.

It is unsettling that "even a very powerful country" should not have a well-thought-out policy on information, which is "an enormous strength whose capability goes beyond our imagination," the Bolivian said.

"The influence of some multinational corporations," a Cuban representative added, "is always there and is always a problem."

'North-South' Dialogue

This bit of "North-South" dialogue was as close to an open disagreement as arose during the conference, a meeting notably free of the political rhetoric that has marked many previous international conferences on information practices and policies [CW, June 23].

Which is not to say the specter of multinational corporations as, in the words of one corporate attendee, "helacious giants who live on a daily diet of developing countries," was absent from the week-long discussions.

But, as one U.S. observer noted, it has become clear to developing nations that for all their concerns about preserving cultural identity in the face of foreign information use and about developing technological independence, badly needed information services and equipment are now only obtainable through what the NTIA's Fishman termed "fair and honest and thoughtful commercial dealings."

Expansions

Harris Corp. Division Plans San Antonio Plant

SAN ANTONIO, Texas — Farinon Electric of San Carlos, Calif., a unit of Harris Corp.'s Transmission Systems Division, plans to invest approximately $9 million over the next five years in a new manufacturing facility here.

The plan calls for the purchase of 20 acres of land in a technology park in the northern part of San Antonio and construction within 12 months of a 50,000-square-foot manufacturing plant. Two additional buildings of the same size are scheduled by 1985.

According to William E. Gibson, vice-president/general manager of Farinon Electric, about 100 jobs are being created to staff the initial plant. Employment is expected to increase to approximately 600 by 1985.

The unit's headquarters and the majority of its employees will remain in the southern San Francisco Bay area, he added.

Farinon Electric is a producer of analog and digital microwave telecommunications systems.

Other Moves

Omnidata has occupied a new 10,000-square-foot facility located at 31282 La Baya Drive, Westlake Village, Calif. 91362. This facility will house Omnidata's marketing group, which is undergoing substantial growth.

Computer Sciences Corp. has begun a $13 million construction and renovation program to expand and improve its facilities in El Segundo, Calif.

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DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals

Helping Olin Train Its Pool of Talent

"People remember what they learn under the Interactive Instructional System," says Mary DiDonato, manager, development and training for the Chemicals Group of Olin Corporation. "The effectiveness is in the exercises; the system helps identify weak areas and presents extra drill in these areas."

Olin's Chemicals Group is using the Interactive Instructional System, an IBM program product, to teach newly hired customer representatives how to enter incoming orders through online computer terminals. Jane Murphy, project training manager, directs this effort.

Customer orders for industrial, agricultural and consumer chemical products are phoned into Olin's Stamford, Connecticut, headquarters. There, customer representatives enter them into an IBM System/370 Model 158AP through online terminals. Running on the same computer, the program presents a simulation of this order entry system on which the students practice.

"This helps to overcome the psychological barrier some people have to the use of computer terminals," Murphy explains. "The result has been to make new people more effective faster.

"Previously, we gave a three-week course of conventional instruction with four to eight people in a class. It was almost a full-time job for two of us," says Murphy. "Besides being terribly time consuming it was exhausting; I don't think we could have continued much longer. The program has reduced that load considerably.

"After some training," Murphy continues, "the student takes a quiz at the terminal. This identifies any weak areas and the program gives extra instruction on those topics. At any time the student can go back to any desired subject. We've also injected some humor into the course materials, which the students enjoy."

"Training takes much less elapsed time," says Ben Graves, manager, interactive instructional systems for the corporation, "because we are able to provide sustained practice that wouldn't be feasible in a conventional training program. The students can spend more hours at the terminal than we could give them in the classroom.

"We use it to train DP people, too. We have sequences on IBM operating systems, job control language and on TSO. With these courses in-house, people can take them at any convenient time."

Boris Sichak, corporate director, development and training, summarizes: "The Interactive Instructional System is an outstanding method for delivering training materials in the Chemicals Group, and we are actively working to expand its use to the other groups."

Algae are cultured in the laboratory to test Olin's HTH swimming pool treatment. To train customer representatives on online order entry, Olin uses IBM's Interactive Instructional System.

CADAM* Means Quick Turnaround for Heavy Trucks

Oshkosh Truck custom designs and builds vehicles like this airport crash-fire-rescue truck. Delivery can be as quick as 100 days because CADAM helps produce error-free engineering drawings fast.

Most of the large all-wheel-drive vehicles made by Oshkosh Truck Corporation are custom engineered. Even those based on standard designs are substantially modified to meet individual customer needs.

But fast delivery of the company's vehicles for construction, crash-fire-rescue, in-transit concrete mixing and similar heavy-duty tasks is vitally important. As Ron Gehrke, manager of engineering administration points out: "Quick turnaround—sometimes in 100 to 190 days—is one of the things the customer is paying for. CADAM has drastically cut both the manhours and the elapsed time required to produce the engineering drawings."

The Computer-Graphics Augmented Design and Manufacturing (CADAM®) system runs on an IBM System/370 Model 155 at the company's Oshkosh, Wisconsin, headquarters. In the fabrication of sheet metal parts, Gehrke explains, CADAM has eliminated engineering drawings as a source of error.

Often, the metal stock that must be bent into complex curves is a half-inch thick. Today, to calculate the geometry of the flat equivalent of these parts and draft the patterns by which the stock will be cut, Oshkosh Truck uses CADAM.

"Since we installed CADAM, we have yet to see one drawing come back with errors," Gehrke says. "Because these parts are so complex, we were eating a lot of scrap costs even though we were double-checking. Frequently, we resorted to welding two simpler pieces—which is costly, but cheaper than making scrap."

On the average, he reports, there is a four to one saving of manhours on detail drawings. "The saving in elapsed time is even greater, because CADAM enables us to add late shifts. Many designers prefer the late hours, because they can get easier access to CADAM.

"We see the strongest gains when we are revising a drawing. The designer calls it up on the screen of an IBM 3251 Graphic Display Station and modifies it with a light pen. Once when a customer wanted the fuel tank moved back 12 inches, the designer changed the assembly drawing in five minutes. In general, on engineering changes our manhour gains are 12 to one."

Oshkosh Truck will sometimes "stretch" a vehicle by increasing the frame length, Gehrke notes. Previously, the draftsman changed the dimensions noted on the drawing, without changing the drawing itself. The resulting out-of-scale layout opened the possibility of errors; with CADAM, the line work is as easily stretched as the dimensions.

*CADAM is a registered trademark of the Lockheed Corporation.

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IBM
Data Processing Division

IBM Earnings for Second Quarter Jump 14.4%

(Continued from Page 59)

quarter, for the year to date the growth in this category is 12.9%, exceeding those of outright sales.

Cary attributed the earnings increase for the quarter primarily to increased purchase activities. However, he warned that the effects of inflation and the costs related to the buildup of resources continue to inhibit growth. He also noted that incoming orders for data processing equipment "continue to reflect a small increase over last year's rate."

Burroughs Earnings

From Detroit, Burroughs reported earnings for the quarter of $60.9 million or $1.47 per share, compared with earnings of $68.9 million or $1.66 in the same period a year ago.

Revenues for the quarter climbed 7% to $735.2 million, up from revenues of $680.5 million in the second quarter of 1979.

For its first half, Burroughs reported earnings of $108.5 million or $2.63 per share, down about 2.5% from the $111 million or $2.71 for the first half of 1979. Revenues increased 10% to $1.4 billion, up from $1.3 billion in the first two quarters of last year.

The company said net earnings were impacted during the quarter by a slower than expected rate of shipments, a move towards lease installations, a strike at the company's Detroit-area plants and the general bite of inflation on labor and material costs. Despite the poor earnings performance in the second quarter, Burroughs said it anticipated earnings for the year would exceed 1979's results.

NCR Figures

From NCR, earnings for the second quarter were $56.7 million or $2.12 per share, down from $58.9 million or $2.23 per share in the same quarter a year ago.

Revenues, meanwhile, advanced 10% to $778.2 million from $717.6 million a year ago. Revenues for the six-month period were $1.4 billion, an 11% increase from revenues of $1.3 billion for the first two quarters of last year.

Earnings for the first half were $82.2 million or $3.08 per share, dipping 8% from the earnings of $89 million or $3.35 per share in the first half of 1979.

NCR Chairman William S. Anderson said the firm had been able to increase its output of several of the products that had experienced shortfalls in the first quarter. This should benefit earnings during the remainder of the year, he said.

He also said the firm had launched a number of cost-cutting programs, but "we are continuing to expand our 1980 research and development and capital expenditures programs." R&D expenditures for the company are expected to be 15% above last year's levels.

Anderson reported that incoming orders from overseas markets more than offset a decline in U.S. orders.

Nickels & Dimes

Ampex Corp. has increased the quarterly dividend from five cents to six cents, payable July 25 to shareholders of record July 9.

$ $ $

A two-for-one stock split was approved by holders of Tandem Computers, Inc. common stock, effective June 30.

$ $ $

Logicon, Inc.'s board of directors declared a semiannual cash dividend on its common stock of 10 cents per share.

National Data Corp. announced that its board of directors has approved an increase in its regular quarterly dividend to 10 cents per share, an increase of 43% over the prevailing rate.

$ $ $

Control Data Corp. has declared a regular quarterly dividend of 15 cents per common share, payable Oct. 1, to shareholders of record on Sept. 15. The board also declared a quarterly dividend of $1.125 per share on the company's preferred stock, payable on Sept. 30, to shareholders of record on Sept. 2.

$ $ $

Computer Consoles, Inc. has concluded an agreement with its banks increasing its lease line to $60,000,000.

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Emulex Corp. has negotiated its first bank credit line. The agreement with Imperial Bank of California makes available more than $1 million.

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Northern Telecom Earnings Drop

MONTREAL — Northern Telecom Ltd. anticipates that its second-quarter and full fiscal 1980 operating earnings will be substantially below 1979 levels. The firm earned nearly $2 billion last year.

Although the company declined to give any specific details on its earnings, which will be announced this week, a spokesman said a large portion of the poor performance is the result of its U.S. subsidiary's decision not to sell off its leases to third parties during the second quarter.

By selling these leases at a discounted rate, Northern Telecom Systems Corp. (NTSC) was able to realize revenues and earnings immediately, but sacrificed long-term financial gains resulting from holding these leases. Only limited third-party lease sales will be made in the future, the firm said.

This decision also means the corporation's financial results will continue to be impacted by financing and interest expenses necessary to support the growing lease base of customers. Like other vendors, NTSC has had an increased demand for leases in the past year.

In addition, the firm said earnings were impacted by the activities related to consolidating its Data 100 and Sycor acquisitions into NTSC. During the past 18 months, the company has been combining the products of activities of both acquisitions.

Personnel Turmoil

NTSC dropped all of Data 100's OEM business and has cross-trained both companies' sales and service personnel, the spokesman noted. Presently NTSC has a U.S. sales force of 220 people and a service organization of 1,200 persons located in 135 offices.

The consolidation took longer than expected and was more expensive than anticipated because of the turmoil created by personnel turnover among the executives in the acquired companies.

Both firms were young and had entrepreneurial types of management, who found it hard to fit into the parent company, the spokesman noted. However, he claimed the reorganizations have had little effect on users of the Sycor and Data 100 products.

A third factor causing diminished earnings is the high start-up costs for NTSC's large-scale DMS-100 digital switching system.

A primary future direction for Northern Telecom includes actively pursuing the office systems market, enhancing its current products to fit that market as well as developing new ones in conjunction with its subsidiary, Bell Northern Research Ltd.

Symbolic vs. IBM Returns To Software Pricing Issue

(Continued from Page 59)

mony in one part, injury — had to consider "further proceedings not inconsistent with this opinion."

Bifurcated Trial

District Court Judge Alfonso Zirpoli had ordered a two-part — bifurcated — trial. The first part, on impact, was heard in early 1975. After Symbolic's case, Zirpoli granted IBM's motion to dismiss the case.

The appellate court, in a complicated 11-page decision, found fault with the way Zirpoli bifurcated the trial — under his ruling, the liability or showing of violation was to follow the impact determination.

"The court assumed a violation had occurred, but found that it did not cause the losses sustained by Symbolic. Yet if the assumed violation consists of IBM's giving away a discrete product line in order to bar a potential entrant from competing with the line, it is difficult to assume anything but adverse competitive effects," the appeals court said.

An IBM spokesman said the company is studying the decision. It has been represented on the case by the San Francisco firm of Pillsbury, Madison & Sutro.

Symbolic's lawyer, John H. Boone, who has the case on a contingency basis, said he is waiting to see what IBM and the court decides to do. If there is a new trial, he will ask for a jury. A jury trial was rejected in 1975 because documents in the case related both to injury and liability, the issues the judge bifurcated.

Symbolic, in its trial papers, said damages included $1.2 million, which investors put up to start the new company. Those damages were subsequently estimated through 1978 to be $63 million, said Arthur Pfeiffer, president of the company which for all real purposes went out of business in 1971 when it could not market its product.

APT History

APT was developed by the Massachusetts Institute of Technology (MIT) in the 1950s to design parts, primarily for the auto and aerospace industries. It encompassed as much as 350,000 lines of code, said Pfeiffer, who worked with APT at the Illinois Institute of Technology which took it over from MIT.

APT's successors today are computer-aided manufacturing (CAM) and computer-aided design (CAD) programs.

APT was made available to all computer manufacturers in the mid-1960s, and in 1967 IBM announced its first version, NC/360, Pfeiffer recalled. Symbolic principals felt they had an improved version and began field tests in 1971. Symbolic never won a customer.

IBM did not start charging for the software until 1973, Pfeiffer said. "People don't see any reason to question when its free, but giving it away is the most extreme form of predatory pricing."

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IBM Price Hike Ripples May Be Start of Wave

(Continued from Page 59)

gesting that inflation will be with us for some time, William Easterbrook, vice-president at Kidder Peabody & Co. in New York, said the rapid-fire price hikes will probably level off in the next couple of years.

In addition, IBM will probably turn away from massive price hikes such as that recently announced toward more selective "tweaking" of specific products connected with specific product lines, according to John Rhefield, vice-president of Pacific operations at IDC.

Both analysts agreed IBM's move was an effort to boost its earnings in the third and fourth quarters. And both analysts agreed the move will probably work.

How much the price increase will boost earnings is open to debate. While most analysts agreed on the 7% to 10% range, Easterbrook said he expects IBM to experience a 13% earnings increase.

Clear Shove

IBM's somewhat selective increases in its less than profitable areas constitute a "clear economic shove," Tom Crotty, analyst for the Gartner Group, said.

IBM has made it no secret in the past that it prefers to have its customers purchase hardware rather than lease or rent. The recent price increase further drives home that point because purchase prices on most major equipment were unchanged by the announcement.

The best example of IBM's philosophy, Crotty said, is its 30 series, a line of CPUs quickly coming to the end of its life cycle in the shadow of the long-rumored H series. IBM announced the price increases just at the time when most 30 series CPU leases were coming due.

By raising the rent and lease price and dangling the carrot of expected late-third-quarter purchase cuts on that line, IBM is making it clear it does not want to have to take any leased systems back, Crotty said.

However, there is some good news for 30 series users. The recent price hikes will probably be the last for that line, according to Rhefield. He added that the smaller 4300 line — with which IBM set a precedent by boosting prices less than a year after that system had been introduced — will probably experience at least one more increase.

Just how many other vendors will jump at the chance to get under IBM's price umbrella is still uncertain. Rhefield said the wave of price hikes may be light and will probably be led by the plug-compatible manufacturers Amdahl and Nasco.

Easterbrook, on the other hand, believed most vendors will hop on the price-increase wagon, but the trend will be short-lived. Prices are expected to remain inflated in the early part of the decade and then drop off towards mid-decade.

Shugart, Tandon Conclude Drive License Agreement

SUNNYVALE, Calif. — Shugart Associates here and Tandon Magnetics Corp. of Chatsworth, Calif., have concluded an agreement that provides a nonexclusive license to Shugart for use in its Bi-compliant floppy disk drives.

Under the terms of the agreement, Shugart will pay Tandon an undisclosed sum of money for the patent plus offer Tandon nonexclusive rights to two Shugart patents.

The licensing arrangement resolves the six-month dispute between the two firms concerning the head design for double-headed floppies. Tandon, which holds a general patent for a double-sided head, claimed Shugart had copied its design.

Shugart, which holds patents on other devices, claimed it had not copied Tandon's design. There was no litigation surrounding the controversy.

Acquisitions

Sun Information Services Co. has acquired NMF, Inc., a privately held trust data services company based in Charlotte, N.C. The acquisition is a cash-for-stock transaction.

Information Development and Applications, Inc. has purchased Kee, Inc. of Seminole, Fla.

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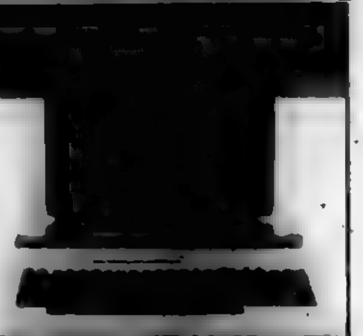

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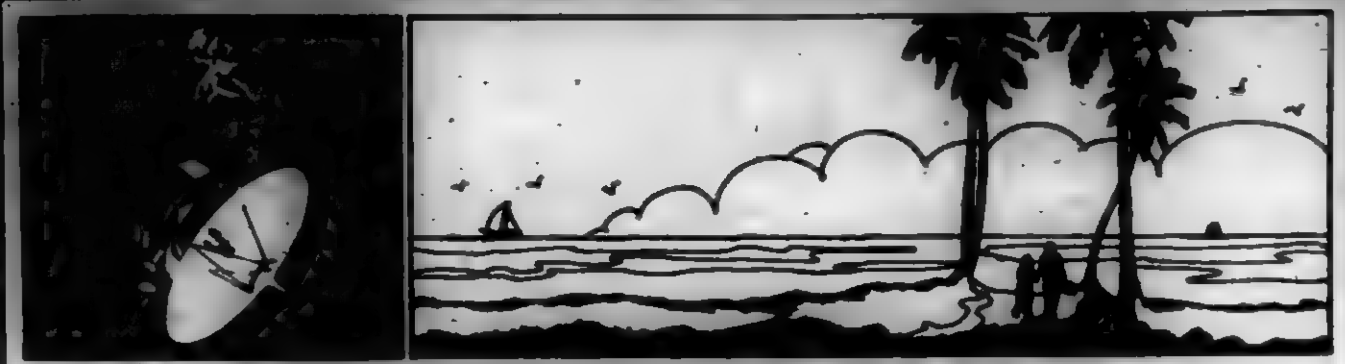

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BOULDER COUNTY, COLORADO is seeking applications for Data Processing Director. Currently the D.P. function is integrated into a joint D.P. Center. Technical environment consists of IBM 4341 using DOS/VSE and CICS/VS. Plans call for the establishment of Boulder County D.P. Center and Director hired will be involved in conversion to own facility. Minimum qualifications are Degree in Computer Science or related field, 6 years total D.P. experience 3 years as supervisor of D.P. Center. Strong administrative background and ability to communicate effectively at all organizational levels. Experience involving major system conversion and public sector experience preferred.

Resumes and applications must be submitted by August 8th, 1980 and should include past salary history. For information and submittal of resumes, contact:

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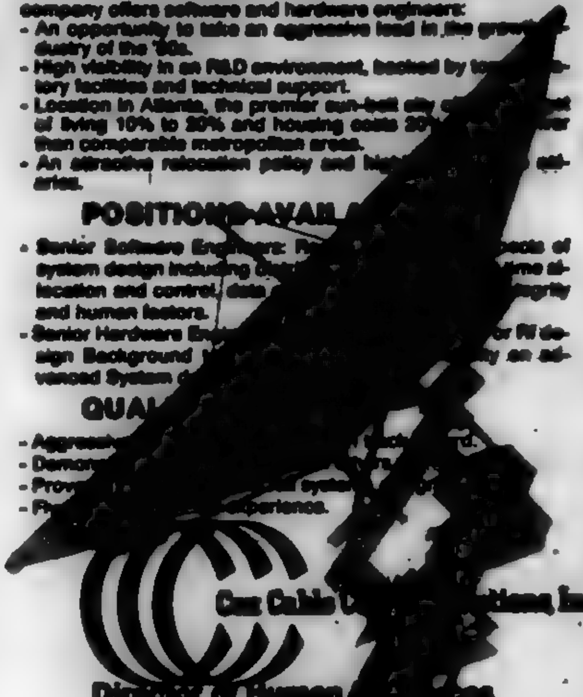

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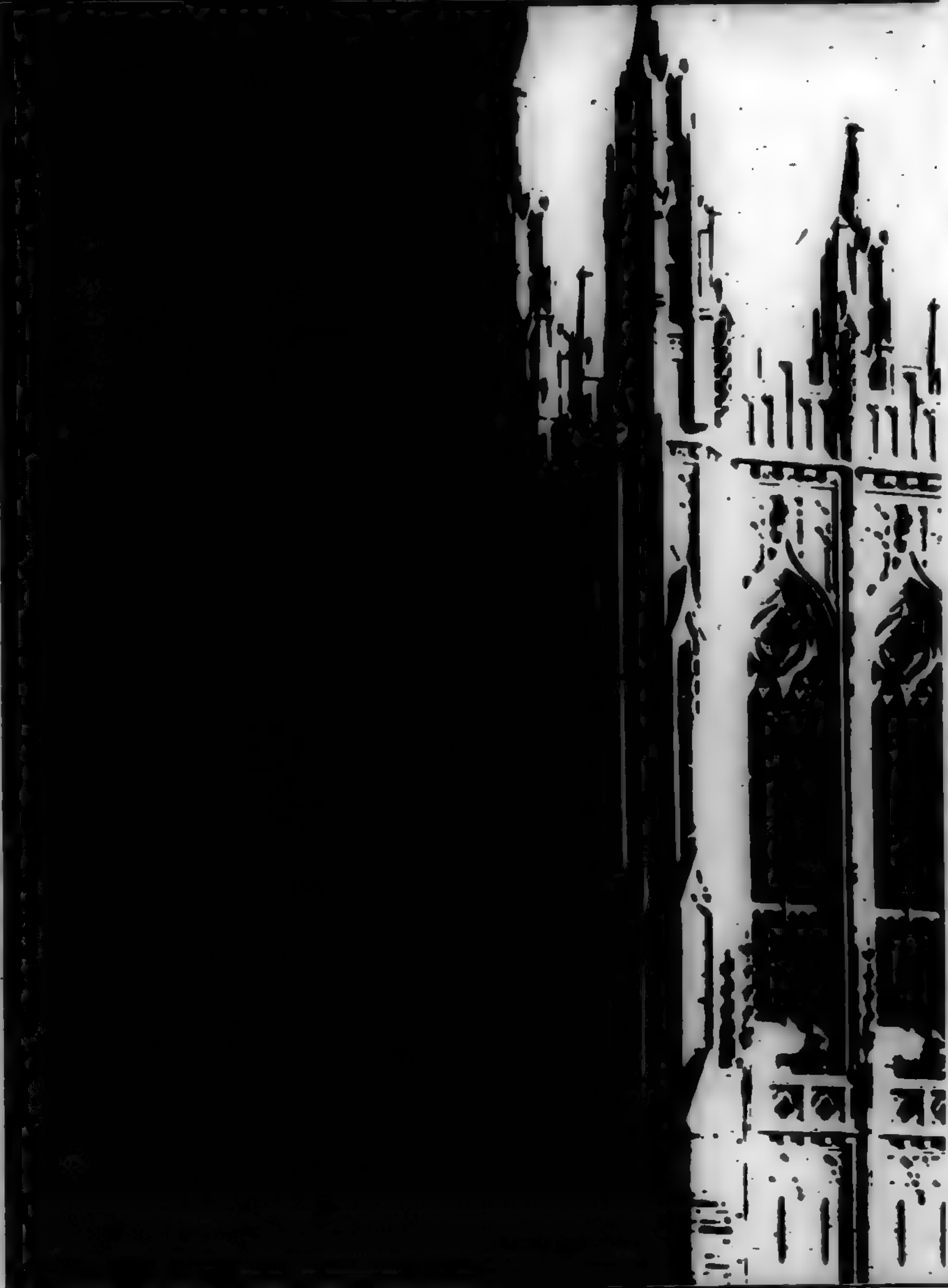

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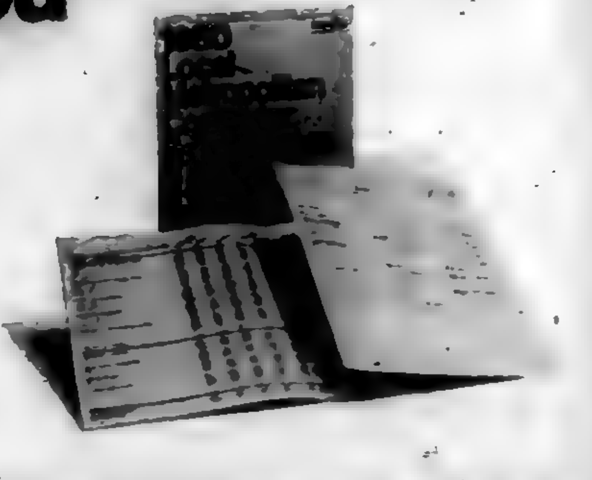

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EDUCATION COORDINATOR

[illegible]

Kerry Cain
CAPITAL HOLDING CORPORATION
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Louisville, Kentucky 40232
(502) 584-8157

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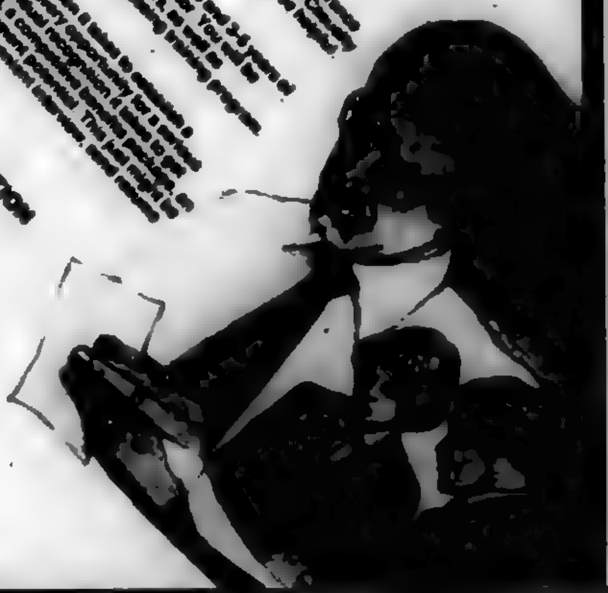

Capital Holding Corporation

Information Systems Development

Billion dollar electric utility company with centralized data center has immediate need for project members serving at major project level.

All positions will act as team members in development of specialized computer applications relating to engineering, financial, or power plant construction. CICS or DBMS experience would be a plus.

- **System Analyst**
  Requires strong design and analysis background and experience in development of Data Base Systems. Degree preferred. 5-7 years experience as System Analyst. Previous experience in construction systems helpful.
- **Sr. Programmer/Analyst**
  To function in engineering or construction systems environment. Degree preferred. Requires FORTRAN or COBOL with 5-7 years experience in data processing environment.
- **Programmer/Analyst**
  To function in financial or construction systems environment. Degree preferred. COBOL with 3-5 years experience in data processing environment.
- **Programmers**
  To function in financial systems or other business applications environments. Require COBOL with 2 years programming experience.

Selected candidates will have the unique opportunity to grow and develop within a state-of-the-art organization.

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Opportunities exist in our offices in Golden, Colorado and Washington, D.C.

ESR is an equal opportunity employer with rewards for outstanding achievement.

Reply to - Engineering Systems Research Inc., [illegible] Road, Golden, Colorado [illegible]

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An undergraduate degree is required, with work at the Masters level in computer science or health/business administration preferred. Individual must be able to exhibit strong creative ability, resourcefulness and analytical acumen; extensive hospital operating experience; data processing knowledge. Significant managerial experience and leadership capabilities required. Familiarity with a large university hospital setting preferred.

Salary commensurate with training and experience. Please send resume to:

Vicki [illegible]
Personnel Services [illegible]
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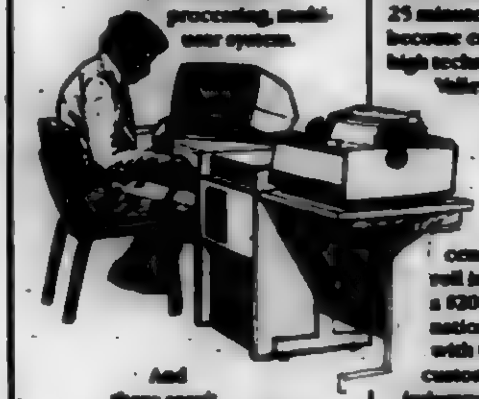

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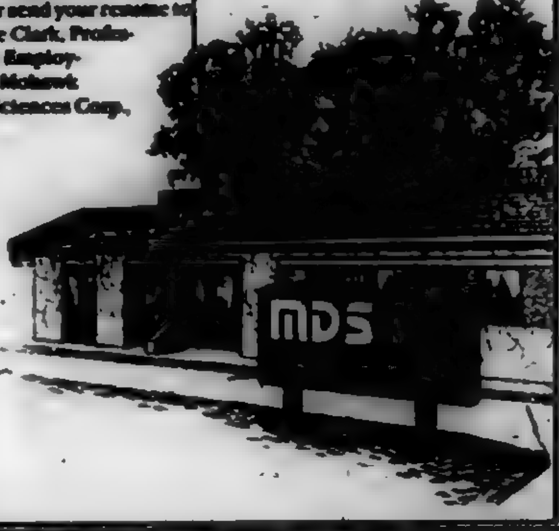
Investigate our excellent opportunities for Systems Programmers and all software development professionals in the areas of O/S Development, Data Base Design, Communications, Systems Architecture, Product Planning and Design Verification. Call or send your resume to Carole Clark, Professional Employment, Mohawk Data Sciences Corp., Advanced Development Center, 102 Cooper Court, Los Gatos, CA 95030; (408) 395-2160. We are an equal opportunity employer m/f/h.



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Require college degree, preferably in computer science, and five years of experience. Desire minicomputer experience. Send resume to:

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Apply to work in an excellent office atmosphere. Candidates should have an MS in Math or Computer Science and experience in analysis of scientific problems, drawing flow charts and block diagrams, programming and documentation to operate HP 9845B, and knowledge of BASIC. Salary [illegible], 40-hours/week. If interested send resume to [illegible]

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Evangelical, Christian college seeks qualified Data Systems Director with at least 3 years experience as computer analyst/programmer and 1 year of staff supervision. M.S. or M.B.A. in computer related field preferred. Send resume to Personnel Director, Biola College, Inc., 13800 Biola Avenue, La Mirada, CA 90639.

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Comarc, the leader in Geo-based information systems is looking for an experienced Sales Manager. The person we seek will have a minimum of three recent concurrent years of management experience over a national sales force. The candidate will also have been involved with large systems in the $200K to $700K range. A technical degree with supplemental training in marketing, sales, and personnel management is desired. Experience with computer graphics, DBMS or MIS will be a plus.

The successful candidate will inherit a staff of three, with scheduled expansion to five, international responsibility, and wide open career opportunities. The position reports to the President and pays $25K-30K, plus an override, profit sharing, and excellent company benefits. Call or send resume to Kay Anderson, Comarc Design Systems, 315 Bay St. San Francisco, CA 94133; (415) [illegible].

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Our client, a highly respected and rapidly growing company, located in the Sun Belt of the Southeast, enjoys a reputation for excellence and offers fine career opportunities to deserving candidates. This newly-created position is responsible for the controllership, planning, and systems assurance functions and will report directly to the General Manager.

The successful candidate should have large-scale IBM systems development and programming experience, in addition to accounting, budgetary, management, and banking experience. Promotability beyond this assignment and a general management perspective are required.

We are consultants to management. For confidential consideration, please send resume and salary history to: William F. Lee, Professionals for Computing, Inc., 12200 Park Central Dr., Suite 400, Dallas, TX 75251, (214) [illegible] (Employer assumes fee).

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Computer Sciences Corporation

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Engineering background stressed, with emphasis on telemetry, digital communications, range applications involving hardware/software systems.

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BA/BS in EE/Physics or the equivalent experience, and at least seven years in system and/or hardware engineering for large scale ADPE/communications/telemetry/radar systems, including experience as a task leader or proposal manager.

With a minimum of supervision, you will be responsible for performing system or hardware analysis, design, studies (including trade studies), planning, costing and specification tasks for a large scale, integrated range control system to be used in the testing of weapons systems. Requires some past experience in specifying and designing interfaces between TM and various sensors, displays, communications equipments, and ADPE components as well as some background in the analysis and/or design of these same equipments.

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To apply, or gain a more complete description of these opportunities in full confidence, write directly to Mr. Walter A. Dienhart, CSC Systems Division, Range Control Center Project, 443 Inyokern, Ridgecrest, CA 93555.

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Data Base Analyst(s)	[illegible]
Sr. IMS Systems Prog(s)	[illegible]
IMS Systems Prog(s)	[illegible]
APPLICATIONS	**TO**
Project Leaders IMS/VS,MFG,COBOL	[illegible]
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For more details, send your resume, or call:
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Candidates should have a BS Degree in Computer Science, Engineering or Architecture, plus experience in working with interactive CAD packages (preferably M&S computing, Inc., DEC). Experience with PDP 11 systems software and RSX-11M + or RSX-11M is essential. FORTRAN IV or RSX-11M Assembler experience is required. Any exposure to Digital Network Architecture (DEC net), including SNA and/or HASP emulation would be helpful.

You will work with a turnkey CAD vendor (M&S Computing, Inc., DEC), architectural drafters, in analyzing user requirements and developing functional and detail specifications. You will develop required packages, test and install the pilot system and direct the subsequent installations at a number of locations across the U.S., while assuming responsibility for managing the entire program from our headquarters. Travel will be required 40 to 50% of the time.

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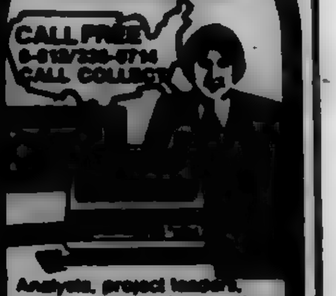

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The incumbent should have a degree in mining engineering, geophysics, computer science or related field and a minimum of four years experience in FORTRAN programming. Mine simulation or exploration systems experience preferred.

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A degree in business administration, math or computer science and four years of COBOL programming experience is required. In addition, experience in FORTRAN programming, system 2000 databases, interactive graphics software and financial modeling systems is highly desired.

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Responsible for assisting the Director in the implementation of the plans, policies and procedures of the Office of Management Information Services including the planning, budgeting, training and scheduling and supervision of certain staff functions. Bachelor's Degree in Computer Science or related fields with considerable experience in the programming of large scale computers, including systems analysis experience in commercial or engineering applications. Previous pertinent supervisory experience is required.

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Qualified individual to be responsible for system feasibility studies and surveys, design and development of system specifications, programming, testing, implementation and maintenance of data processing system applications. Degree in Computer Science or related fields. Extensive applicable and responsible experience in Systems Development and Programming on medium to large scale capacity computers in a multiprogramming or data base environment with several years in a supervisory capacity required.

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[illegible]
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Oretech Branch Post Office
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Positions are available for innovative, problem solvers . . . highly motivated individuals who have the ability to communicate with the different sectors of an engineering/manufacturing community. The successful candidates will plan, design, and develop software systems to aid the entire engineering process.

Principal PWB DA Programmer

To design and develop a new state-of-the-art DA system
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- design rule checking
- layout verification
- test generation

Graphics Programmers

To develop interactive graphics systems for VLSI layout
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- distributed development environment
- hierarchical and automatic artwork generation

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To work on an engineering network involving main frames and mini's
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We offer excellent starting salaries and comprehensive benefits including profit sharing. We are an affirmative action employer (M/F/H).

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XEROX.

SYSTEMS ARCHITECTS, SYSTEMS PROGRAMMERS ANALYSTS PROGRAMMERS

Can you design and implement a system with:
- Several million accounts
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- Real time
- Distributed Processing
- Data Base
- Data Communications

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A proven record of designing and implementing large on-line, data base systems. A minimum of 2 years experience - primarily leading major efforts with current technology - IMS/IDMS/MVS.

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IMS/MVS/IDMS - a minimum of 3 years working experience installing and maintaining one or more of the above systems software products. Performance tuning a plus.

ANALYSTS/PROGRAMMERS

A minimum of 3 years experience designing or developing systems. On-line or data base or financial systems is helpful.

Anacomp provides excellent salaries and benefits, including medical/dental insurance and liberal relocation assistance.

Send you resume and salary history in confidence to, or call: 1-813-[illegible]

Mr. James Culver
Personnel Manager
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Grumman Data Systems, a subsidiary of Grumman Corporation is expanding its operations, necessitating the immediate hiring of Senior Marketing Representatives.

If you have a proven track record in the Federal marketplace, then we need and want you.

In order to be considered, you must have a combination of at least 10 years experience in marketing computer and computer software products involving the following disciplines:
- Software Transition
- Automated Test Systems
- Signal Processing
- Contract Software and Systems
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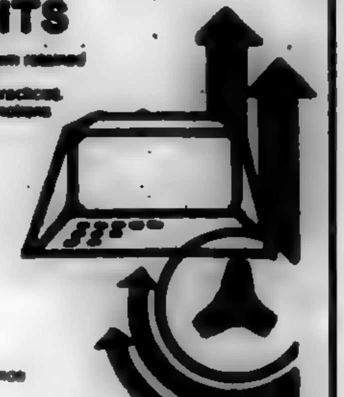

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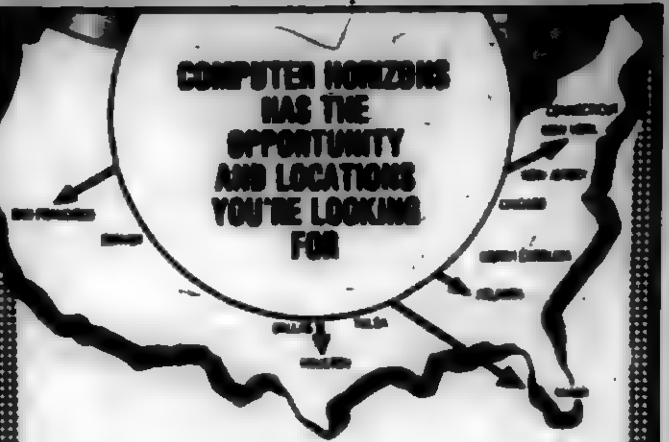

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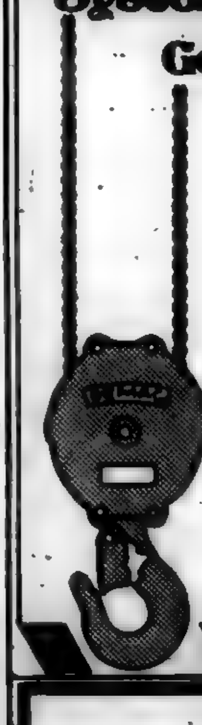

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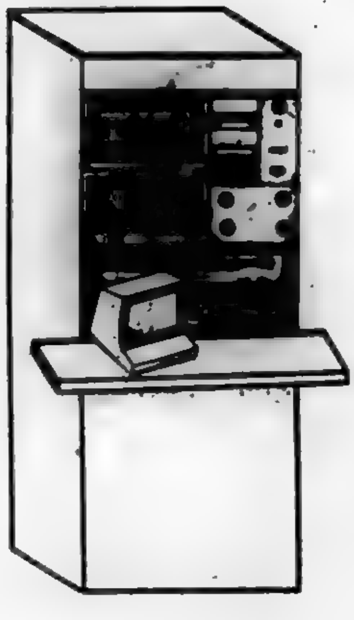

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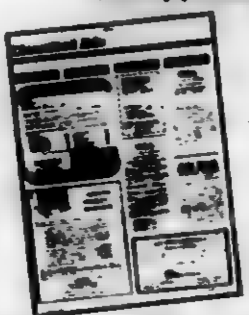

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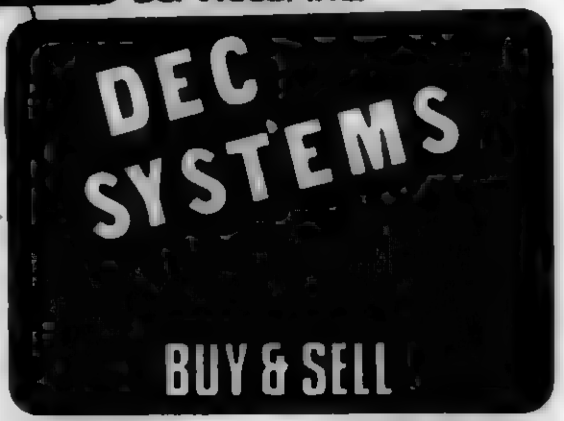

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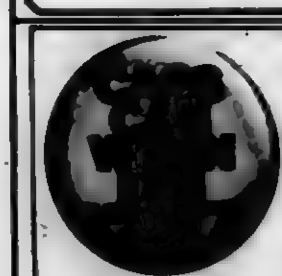

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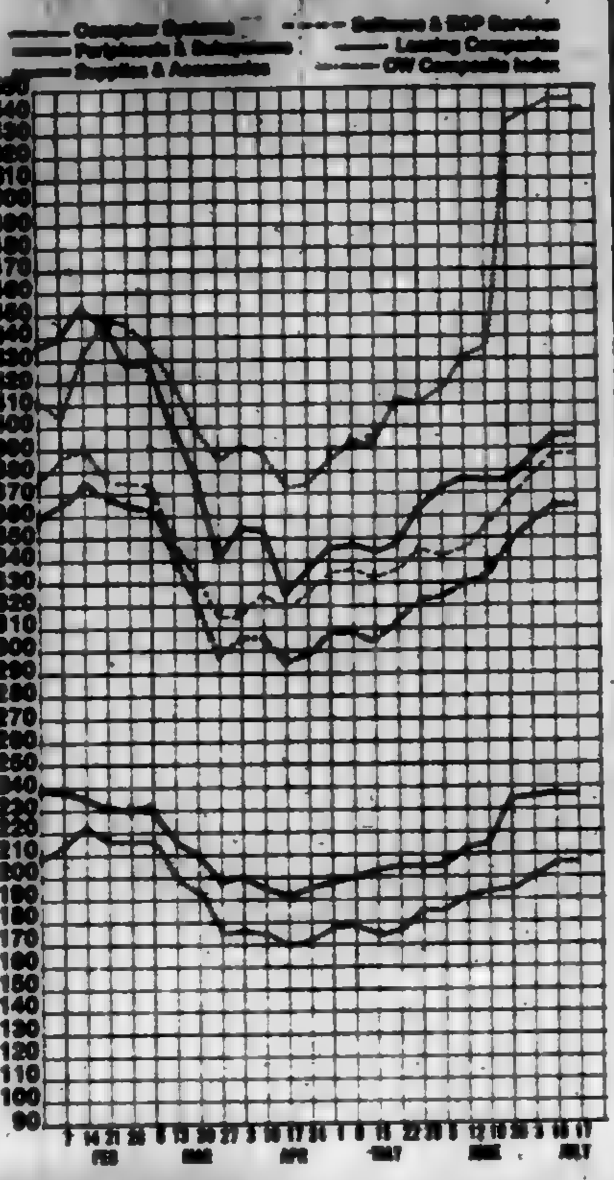

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 9, 1980

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 9 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	16- 42	32 3/4	+3 7/8	+13.5
N	BURROUGHS CORP	54- 80	68	-1 7/8	-2.7
O	COMPUTER AUTOMATION	9- 22	16 3/4	+ 1/4	+1.5
N	CONTROL DATA CORP.	38- 63	59 7/8	+4 5/8	+8.3
O	CRAY RESEARCH INC	30- 59	50 3/4	+4 1/2	+10.9
N	DATA GENERAL CORP	44- 75	72 1/4	+6 1/2	+9.8
N	DATAPOINT CORP	34- 58	50 5/8	+3 1/8	+6.5
N	DIGITAL EQUIPMENT	55- 83	72 3/4	+4 3/4	+6.9
A	EECO INC	9- 19	13 1/8	- 3/8	-2.7
N	ELECTRONIC ASSOC.	6- 12	8 1/8	- 1/4	-3.0
O	FOUR-PHASE SYSTEMS	20- 40	26 1/8	+ 3/8	+1.5
N	FOXBORO	31- 44	42 3/4	+3 3/8	+10.3
O	GENERAL AUTOMATION	7- 10	7 1/4	- 1/8	-1.6
O	GRI COMPUTER CORP	1- 3	3/8	0	0.0
N	HEWLETT-PACKARD CO	44- 71	68 1/4	+4 3/4	+7.6
N	HONEYWELL INC	65-101	83 1/8	+4 1/4	+5.3
N	IBM	50- 70	61 1/2	+1 3/4	+2.9
O	MANAGEMENT ASSIST	9- 21	10 1/2	- 3/8	-3.5
O	MANUFACTURING DATA S	15- 30	24 1/4	+ 1/4	+0.7
O	MINI-COMPUTER SYST	2- 6	2 3/4	+ 1/8	+4.7
O	MODULAR COMPUTER SYS	9- 17	14 3/4	- 1/8	-0.8
N	NCR	52- 82	68 3/4	+4 1/8	+7.2
N	PRIME COMPUTER INC	15- 35	35 1/8	+1 1/4	+3.2
N	PERKIN-ELMER	30- 50	49 1/2	+1 1/4	+2.5
N	SPERRY RAND	42- 60	58 3/8	+1 1/4	+2.3
A	SYSTEMS ENG. LABS	11- 22	19	+2 1/8	+12.5
O	TANDEM COMPUTERS INC	20- 63	62 3/4	+4 3/4	+8.1
N	TEXAS INSTRUMENTS	79-100	97 1/4	+2 5/8	+2.7
A	WANG LABS.	17- 40	36 7/8	+ 3/4	+2.1
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	12- 20	15 1/4	- 1/4	-1.6
O	COMDISCO INC	8- 17	13	+1 3/4	+15.5
A	COMMERCE GROUP CORP	1- 2	1	- 1/8	-11.1
A	COMPUTER INVSTRS GRP	2- 4	1 3/4	- 3/8	-17.6
O	CONTINENTAL INFO SYS	2- 15	1 3/4	+ 1/4	+16.6
O	DATRONIC RENTAL	2- 3	2 7/8	+ 1/4	+9.5
A	DCL INC	4- 6	3 3/8	-2 1/4	-40.0
N	DPF INC	3- 12	6 1/8	+ 1/8	+2.0
N	ITEL	1- 15	2 7/8	- 1/2	-14.8
O	LEASPAC CORP	1- 2	7/8	+ 3/8	+75.0
A	PIONEER TEX CORP	2- 4	2 1/2	- 3/8	-13.0
N	RELIANCE GROUP INC	20- 73	66 1/4	- 1/2	-0.7
N	U.S. LEASING	12- 18	15 3/4	+ 3/4	+5.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 9 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 3	2 5/8	+ 1/4	+10.5
O	ANACOMP INC	5- 16	15 1/4	+ 1/2	+3.3
O	ANALYSTS INTL CORP	5- 9	6 1/4	0	0.0
A	APPLIED DATA RES.	7- 16	12 1/4	+ 7/8	+7.6
N	AUTOMATIC DATA PROC	30- 46	43 5/8	+4 1/8	+10.3
O	COMPUTER HORIZONS	3- 9	8 3/4	+ 1/4	+2.9
O	COMPUTER NETWORK	6- 9	6 3/4	- 3/8	-5.1
N	COMPUTER SCIENCES	11- 26	22	+1 7/8	+9.3
O	COMPUTER TASK GROUP	3- 9	8 3/4	+ 3/4	+9.3
O	COMPUTER USAGE	2- 5	3 3/8	+ 1/8	+3.8
O	COMPUT AUTO REP INC	4- 10	4 7/8	+ 1/4	+5.4
O	COMSHARE	13- 20	16 1/4	+2 1/4	+16.0
O	CULLINANE CORP	16- 40	38	+1	+2.6
O	DATA DIMENSIONS INC	1- 3	1 1/2	+ 1/8	+9.0
O	DATATAB	1- 4	1 1/8	+ 1/8	+12.5
O	DSI CORP	4- 9	5 3/4	- 1/4	-4.1
N	ELECTRONIC DATA SYST	16- 30	26 1/8	- 3/8	-1.4
O	INFORMATICS INC	9- 22	16 1/4	+ 3/4	+4.8
O	INSYTE CORP	1- 3	2	+ 1/4	+14.2
O	IPS COMPUTER MARKET.	1- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/4	0	0.0
O	KEYDATA CORP	2- 5	2 1/8	+ 1/8	+6.2
A	LOGICON	14- 23	20 3/4	- 1/4	-1.1
O	MATHEMATICA INC	9- 16	12 1/2	0	0.0
O	NATIONAL DATA CORP	10- 23	20	+1	+5.2
O	PLANNING RESEARCH	3- 9	6	+ 1/4	+4.3
O	PROGRAMMING & SYS	1- 1	5/8	[illegible]	+10.0
O	RAPIDATA INC	4- 7	5 5/8	+1	+21.6
O	REYNOLDS & REYNOLDS	24- 30	27 1/4	- 1/2	-1.8
O	STSC INC	6- 11	10 3/4	0	0.0
O	SCIENTIFIC COMPUTERS	6- 17	14 1/4	- 1/4	-1.7
N	TYMSHARE INC	20- 30	30	+3 3/8	+12.6
A	URS SYSTEMS	7- 13	13	+1 1/4	+10.6
N	WYLY CORP	4- 9	8 1/4	+ 5/8	+8.2
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 30	16 3/4	+1	+6.3
N	AMPEX CORP	14- 29	21 1/4	+2 1/8	+11.1
A	ANDERSON JACOBSON	9- 17	10 5/8	0	0.0
O	APPLIED DIG DATA SYS	6- 10	8 1/8	+1 7/8	+30.0
O	AUTO-TROL TECHNOLOGY	16- 40	32 3/4	- 1/4	-0.7
O	BEEHIVE INT'L	3- 6	6 1/2	0	0.0
A	BOLT,BERANEK & NEW	15- 23	21 3/8	+1 1/2	+7.5
N	BUNKER-RAMO	17- 32	27 1/2	+ 1/2	+1.8
O	CAMBRIDGE MEMORIES	1- 3	1 3/4	0	0.0
N	CENTRONICS DATA CORP	29- 50	41 1/8	+2 1/4	+5.7
A	CETEC CORP	3- 7	5 1/2	+ 3/8	+7.3
O	COMPUTER DEVICES INC	5- 9	6 7/8	- 1/8	-1.7
O	COMPUTRONICS	1- 3	4 1/2	+ 7/8	+24.1
O	COMPUTER COMMUN.	4- 10	4 1/8	+ 3/8	+10.0
O	COMPUTER CONSOLES	4- 20	14 1/4	+2 1/4	+18.7
O	COMPUTER TRANSCEIVER	1- 3	2 5/8	+ 1/8	+5.0
N	COMPUTERVISION CORP	10- 62	51 1/2	+2 3/4	+5.6
O	CONRAC CORP	12- 25	16 7/8	- 1/4	-1.4

EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 9 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 14	12 1/8	- 1/4	-2.0
A	DATA PRODUCTS CORP	11- 24	17 3/4	+2 1/4	+14.5
O	DATUM INC	2- 4	1 7/8	0	0.0
O	DECISION DATA COMPUT	2- 5	3 1/8	+ 5/8	+25.0
O	DELTA DATA SYSTEMS	1- 3	1 1/8	+ 1/8	+12.5
N	DOCUMATION INC	7- 27	12	-1	-7.6
O	DATARAM CORP	6- 17	9 1/8	- 1/4	-2.6
N	ELECTRONIC M & R	3- 6	4 3/4	+ 3/8	+8.5
O	EVANS & SUTHERLAND	21- 30	27 1/4	+ 1/4	+0.9
O	FABRI-TEK	1- 4	3 5/8	+1	+38.0
O	GENERAL COMPUTER SYS	1- 3	2 7/8	+ 3/8	+15.0
O	GENERAL DATACOMM IND	12- 18	17	+1 1/2	+9.6
O	GENERAL TERMINAL CP	1- 4	1 7/8	- 1/4	-11.7
O	HAZELTINE CORP	13- 30	23	- 1/2	-2.1
N	HARRIS CORP	25- 40	38	+1 1/4	+3.4
O	INFOREX INC	1- 4	1	+ 1/8	+14.2
O	INFORMATION INTL INC	8- 15	11	+1 1/4	+12.8
O	INTEL CORP	40- 75	71 3/4	+5 3/4	+8.7
O	INTERSIL	13- 31	22 5/8	+3 1/4	+16.7
A	LUNDY ELECTRONICS	6- 12	8 1/8	- 1/8	-1.5
O	MSI DATA CORP	5- 11	7 1/8	+1	+16.3
N	MEMOREX	10- 30	14 7/8	- 3/4	-4.7
O	MOHAWK DATA SCI	10- 20	16 1/8	+1 3/8	+9.3
O	OPEX	8- 10	7 1/2	0	0.0
A	PARADYNE CORP	15- 35	33 1/2	+4 7/8	+17.0
A	PENRIL CORP	9- 15	9 5/8	- 3/4	-7.2
O	RAMTEK CORP	10- 17	12 3/4	-1 1/2	-11.7
O	RECOGNITION EQUIP	5- 13	8	+ 1/2	+6.6
O	SCAN DATA	1- 5	2 3/8	[illegible]	+5.5
N	STORAGE TECHNOLOGY	14- 23	16 7/8	+ 3/8	+2.2
O	SYKES DATATRONICS	19- 29	27 1/2	-1	-3.5
O	T BAR INC	14- 21	19	-1	-5.0
A	TEC INC	3- 8	5 1/8	-1	-16.3
N	TEKTRONIX INC	44- 64	58 1/4	+5 1/4	+10.0
O	TELEX	3- 6	3 1/4	0	0.0
O	[illegible] SYSTEMS CP	6- 20	8 1/4	- 3/4	-8.3
O	TIMEPLEX INC	3- 15	14 5/8	+1 3/4	+13.5
O	WILTEK INC	3- 5	5 7/8	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 13	11 3/8	- 1/8	-1.0
O	BALTIMORE BUS FORMS	1- 2	1 1/2	0	0.0
N	BARRY WRIGHT	15- 30	30 7/8	+4 3/4	+18.1
O	CYBERMATICS INC	1- 1	3/4	0	0.0
N	DUPLEX PRODUCTS INC	11- 13	11 7/8	- 1/8	-1.0
N	ENNIS BUS. FORMS	13- 21	16 1/2	- 1/4	-1.4
N	3M COMPANY	46- 58	56 1/4	+ 1/4	+0.4
N	MOORE CORP LTD	27- 36	30 3/4	-1	-3.1
N	NASHUA CORP	28- 35	23 1/4	-1 1/4	-4.8
N	STANDARD REGISTER	18- 31	29 1/2	- 1/2	-1.6
O	TAB PRODUCTS CO	13- 23	16 7/8	- 1/8	-0.7
N	WABASH MAGNETICS	11- 18	13 3/4	+ 5/8	+4.7
N	WALLACE BUS FORMS	22- 33	33 5/8	+ 5/8	+1.9

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
y Newspaper. Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
30 July 28, 1980 $1.00 a copy; $30/year

Wide World Photo

'We Won't Go'

While demonstrators staged a 'sit-in' on the steps of the Boston Post Office to protest registration for the draft, an army of Internal Revenue Service keypunchers were standing by, ready to process registration forms. Story on Page 9.

IBM H Series in Sight; Reason for Delay Blurry

By Tom Henkel
CW Staff

Most analysts agree on what IBM's H series will look like, but just why IBM has not announced it sparks some controversy.

The H series is now being seen as a seven-model line, built on two basic CPUs or "engines." The line will probably be the first fully field-upgradable series IBM has ever offered, allowing a low-end H-1 user with a 3 million-instructions-per-second (Mips) machine to migrate all the way to the largest, H-7, a 20-plus Mips machine. The biggest system IBM currently offers is the 3033 multiprocessor at 7 to 8 Mips.

H series systems will probably cost between $1.25 million and $8.4 million, roughly $300,000 to $400,000 per Mips, according to IBM watchers from at least three consulting firms. These consultants also predicted the first system, a 10-Mips mid-range model, would be announced sometime in the first quarter of 1981.

Backplane Defects?

Why IBM has delayed announcement of the series, originally scheduled for last September, is another story. Some analysts, like Gartner Group's Dave Stein, spoke of tiny bubbles in a new kind of fiberglass backplane that allegedly tear metal connectors off silicon chips — causing short circuits throughout the system.

Other analysts, like those at Strategic Business Services, Inc., said IBM's new computer series works fine and interpret the firm's release date as part of its goal of milking every penny it can from users of the 30 series.

Although one IBM analyst noted that a single rumor can go a long way in the IBM-watching business, most IBM watchers agreed on the IBM terminology, code names, configurations, Mips ratings and projected release dates of the entire H series.

The first announcement is expected

(Continued on Page 7)

Batch Processing Disrupted

Pay Strike Catches L.A. Off Guard

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Many of this city's most important administrative functions ground to an abrupt standstill earlier this month when 200 municipal computing personnel staged a three-day walkout to demand increased pay.

The strike that took place recently caught city officials off guard and almost immediately brought all the community government's batch mode applications to a screeching halt.

Although the temporary loss of batch processing capability resulted in no major disruptions of basic city services, it did prove an irritating inconvenience for a slew of municipal government agencies, including the library, legal, engineering and accounting departments.

Otherwise, however, city services appeared to emerge from the unexpected work stoppage relatively unscathed.

The main burden for keeping the city's on-line systems up and running fell to a skeleton crew of information systems supervisors and, to a large extent, their efforts as substitute programmers and operators apparently

(Continued on Page 6)

Structured Methods Found No Cure-All

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Bob Doolittle knows from personal experience that software engineering and structured methodology can dramatically improve a computing center's operations. But he also knows from personal experience that the improvements seldom come easily.

Doolittle works as information systems manager for a computing installation that, in effect, operates as a service bureau for San Diego County's Department of Education. Built around a 1.5M-byte Burroughs Corp. B6700, the service bureau performs applications like payroll, financial accounting, grade reporting, student recordkeeping and class scheduling.

The service bureau's first brush with software engineering and structured methodology came about two-and-half years ago when Doolittle and his colleagues were still searching desperately for a way to lift their installation out of its perpetual doldrums.

At the time, the symptoms of the service bureau's ailments were legion. Its backlog of unfinished programming work had swollen to unmanageable proportions, Doolittle recalled.

Practically all the service bureau's many ills stemmed from a single cause: excessive software maintenance requirement. Because Doolittle and his colleagues inherited much of their software from outside sources and because some of that software was inferior in quality, the computing center's programming staff typically had to spend a whopping 80% of its work time just maintaining existing pro-

(Continued on Page 8)

Programmers Seen Needing Fewer Skills

By Brad Schultz
CW Staff

BOSTON — The superskilled programmer — that shining knight of computing's heroic age — may never die in some MIS shops, but he's bound to fade away elsewhere because technological progress and economic factors are "de-skilling" software specialties.

Software managers who regularly fret over where to find their next IMS/VS Cobol jockey with Vtam experience might dispute this view of sociologist Philip Kraft. Through three decades and into the stagflated 1980s, programmers have enjoyed rapid salary growth and many have had no qualms about jumping from employer to employer for better pay, greater

(Continued on Page 6)

32-Bit Mini Vendors 'Spreading the Word'

Product Spotlight

By Tim Scannell
CW Staff

Like Bible-toting preachers moving from town to town down South, a lot of minicomputer vendors are busy spreading the word. The word length, that is, from 16 to 32 bits.

Compared to minicomputers with the traditional 16-bit word size, 32-bit machines basically offer a higher transaction throughput and have a faster response time when there are a large number of terminals hooked up to the main processor. They are also able to support larger data base capacities, according to Jim Perry, a marketing manager with Data General Corp.

"In a disk-intensive environment, which most commercial applications are, where there's a lot of disk activity, the 32-bit systems not only handle a larger number of files, but in general are much more efficient at handling the I/O and disk activity and give a better throughput," Perry said.

Also, "if you have an independent I/O channel with a large bandwidth, that could cut down on a significant amount of overhead that is normally associated with a business environment," he added.

DG, a relative newcomer to the 32-bit race, entered a field earlier this year

(Continued on Page 10)

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.
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ISSN 127-420.
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Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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Including System/3 Conversion Aid

System/38, Series/1 Gain Software

ATLANTA — IBM announced five licensed programs for the System/38 last week, including a conversion aid for users of IBM System/3 Communications Control Program (CCP) applications.

The firm also brought out seven programs for Series/1 Event-Driven Executive (EDX) users, said to provide increased communications capability and support for interactive applications.

Consisting of a set of System/3 RPG-II programs and procedures to convert System/3 CCP applications to the System/38 environment, the conversion aid runs on System/3 models 8, 10 Disk, 12 and 15. It will let users do their conversion on a System/3 before a System/38 arrives at their site, IBM said.

Other System/38 offerings include four "customer service" programs — billing, accounts receivable, inventory control and sales analysis — added to IBM's line of applications software in the System 38 Distribution Management System (DMS/38).

Screen Capabilities

New Series/1 EDX software is said to utilize the full-screen capabilities of the IBM 3101 display terminal, which can be attached locally or remotely.

One package, the Series/1-System/370 Channel Attach licensed program, allows EDX users to communicate with another user-written application program in a host 370.

EDX data management enhancements also make it possible to access larger data bases, the firm added. For example, disk data sets now are limited only by the size of the disk attached to the Series/1, compared with the previous limit of 32K records.

Spool Support

A spool support facility automatically routes printer output from multiple programs to the same printer to facilitate execution of concurrent applications, according to IBM.

Another program, an enhanced EDX Multiple Terminal Manager, is said to provide an expanded base for transaction-oriented applications that are source-compatible with the existing EDX Multiple Terminal Manager.

Five of the new Series/1 licensed programs comprise Version 3 of the EDX operating system. They are Basic Supervisor and Emulator, Utilities, Program Preparation Facility, Macro Library and Macro Library/Host.

Scheduled for first deliveries in February 1981, the System/3 CCP to System/38 Conversion Aid Licenses for a one-time charge of $2,225. DMS/38 Customer Service Application programs will be available in December 1981, carrying monthly license charges as follows: billing, $75; accounts receivable, $65; inventory control, $70; and sales analysis, $60.

All EDX programs will be available in September. The Series/1-System/370 Channel Attach program licenses for $60/mo and the enhanced EDX Multiple Terminal Manager will be available for a $15 monthly license fee.

Monthly license charges for the other EDX programs are $29 for Basic Supervisor and Emulator, $24 for utilities, $28 for Program Preparation Facility, $53 for Macro Library, and $150 for Macro Library/Host.

These System/38 and Series/1 EDX software offerings are available from IBM's General Systems Division, P.O. Box C-1645, Atlanta, Ga. 30301.

IBM Offers MVS/SP Support On 4341 as No-Charge Option

WHITE PLAINS, N.Y. — IBM is formally supporting its MVS/SP operating system on the 4341.

Announced as a no-charge option, Extended Control Program Support on the 4341 includes the MVS Base Control Program and Job Entry Subsystems (JES2 and JES3), IBM said last week.

The announcement also applies to IBM's Resource Management Facility, a recently announced feature that provides support for IBM's new 3380 and 3375 disk drives, along with support for enhancements to JES2 and JES3 [CW, June 16].

In addition MVS' users can cash in on MVS extended addressing feature, which allows a CPU to address up to 32M bytes of information, IBM said.

MVS support has been much desired among those who use 4341 systems in a distributed environment with a 370 or 30 series host. While some users have brought MVS up to 4341 systems, official IBM support will open the door for more users to do the same, according to industry analysts.

In addition, the announcement will have a dramatic effect on residual values of IBM's 3031 processor, formerly the smallest CPU capable of running MVS. John Rhefield, vice-president of the West Coast office of International Data Corp. said a used 3031 could drop from a $965,000 purchase price to $350,000.

IBM's anticipated announcement of a 4341 Model Group 2, a more powerful processor than the existing 4341, will help to drop the residual value of the 3031, and the MVS announcement will start the residual downslide, Rhefield added.

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SORTDANCE, ARIZONA–For years this pioneer DOS/VS community was known as the "toughest sorting town West of the Pecos."

According to old timers, this reputation stemmed from the antics of the notorious "Hardware Gang," four renegade sort programs who drifted into town years ago. Still wearing their old convict numbers–5746-SM1, 5746-SM2, 5743-SM1 and SM-483–the four brothers made a practice of terrorizing sorts.

"They'd get tanked up on hard computer resources, then they'd go looking for dude sorts," said Gabby Hades, a retired uranium prospector. "When they found one they'd whip out their guns and tell the poor critter to start dancin. That's how the town got its name."

But things are different in Sortdance now. The other day, just before noon, a tall quiet stranger rode into town. He tied up his buckskin horse and ambled into Aunt Kitty's "Last Chance Saloon."

Aunt Kitty looked at the stranger and said, "I reckon you're the SyncSort Kid, stranger. I heard the Sort Reform Committee sent for you. But do you think you're fast enough to take on them four galoots?"

The kid smiled shyly. "Yes ma'am. I don't wanta brag, but I reckon I'm 20 to 40 per cent faster on Elapsed Time, and 15 to 30 per cent faster on CPU Time. I got 'em whupped on Disk Space Utilization and SIOs too."

When Aunt Kitty said the kid reminded her of somebody, he replied: "Probably my big brother, O. S. SyncSort. We got the same kind of features. Things like INCLUDE/OMIT, SUM and OUTREC. We both like to give programmers a break, specially if they're migratin."

Then Gabby rushed in the door and hollered: "They're out there waitin for ya, Kid! All four of the Hardware Boys. They say this town ain't big enough for five DOS sort programs!"

As the clock struck noon, the SyncSort Kid tipped his hat to Aunt Kitty, loosened his guns in their holsters and walked through the swinging doors. Moments later a fusillade of shots rang out.

Aunt Kitty rushed to the door. "I expected to see that nice young feller stretched out in the dust. But he was standin up straight as an oak, with his shootin irons still smokin. It was the Hardware Boys that was ready for a trip to Boot Hill!"

The town is now known as "the sorting capital of the Sunbelt." And at today's general election, the citizens voted to change its name from Sortdance to Fort SyncSort.

OVERSEAS REPRESENTATIVES—

Düsseldorf: SyncSort Technology GmbH, Tel.: 0211-480351
Johannesburg: Computing Benefits Ltd., (011) 46-5211
Melbourne: Shell Co. of Australia Ltd., (03) 8400311
Milan: SYNTAX, (39-2) 87. 74. 44
Paris: CAP/SOGETI Produits, 33-1-539-22-25
Reading (UK): SyncSort Technology Ltd., 44-0734-481919
Stockholm: BRA, 46 8 88 03 00
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White House Requests Changes in Rewrite Bills

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – Chances of passing a new communications act this year dropped back to near-zero last week after the Carter Administration and a key Congressman called for changes in the legislation. That at least is one view of the situation.

Another is that Ma Bell is being pushed inexorably into a corner, a position that will force her to push for enactment of the pending legislation this year.

The Congressman involved is Rep. Peter Rodino Jr. (D-N.J.), chairman of the House Judiciary Committee. The Administration's position came from the Commerce Department.

Behind the Administration's move, and possibly the Congressman's, was an intensive lobbying effort by opponents of the legislation, with computer industry trade asociations in the forefront.

The Administration's proposed changes were contained in a letter written by Joseph M. Levine, acting general counsel of the Commerce Department, to Rep. Harley O. Staggers (D-W.Va.), chairman of the House Commerce Committee. One version of the "communications act rewrite" bill (H.R. 6121) is pending before Staggers' committee.

Levine and the Administration object to language now in H.R. 6121 which sharply limits the power of the Federal Communications Commission (FCC) to alter AT&T's corporate structure once the legislation is enacted.

"Telecommunications is a dynamic field, and requirements set down today may prove inadequate in the future," he pointed out, adding that the bill should allow the commission to "take further actions, or modify specific requirements, on the basis of experience or changed circumstances."

Underlying this request is an Administration hope of ending – or at least deferring – the controversy that has stymied efforts to pass a new communications bill. For example, AT&T and suppliers of computer-based systems and services disagree about how quickly Bell should be required to transfer its terminal manufacturing, research and development activities from Western Electric Co. and Bell Laboratories to the fully separated subsidiaries established by H.R. 6121.

Levine, in his letter to Staggers, indicated this is one of the disputes the commission could settle if it were given increased discretionary authority.

Senate Dispute

However, AT&T may oppose this change. The Senate communications bill, S. 2827, already contains language allowing the FCC to alter AT&T's structure after enactment of the legislation, and reportedly this is the main reason for the dispute that erupted between the telephone company and the committee earlier this month [CW, July 7]. As a result, the Senate Commerce Committee has indefinitely postponed plans to draft S. 2827 into final form.

The Carter Administration is now trying to resolve the dispute between AT&T and the Senate committee. On July 17, the Commerce Department sent a letter to the committee that suggested retaining the FCC's discretionary authority but making it subject to an "overall plan" and "clear guidelines" established by Congress.

Congressman Rodino's recommendations were contained in a letter to Rep. Lionel Van Deerlin (D-Calif.), chairman of the subcommittee that drafted H.R. 6121.

Congress should not consider deregulating AT&T until after the Justice Department's pending antitrust suit against the phone company is settled, Rodino said.

Settlement in Sight

Pointing out that attorneys for the Justice Department and AT&T have reached "substantial agreement" on the issues, Rodino indicated the trial might be completed "as early as the spring of next year."

The AT&T case is "one of the most important antitrust proceedings brought in the last 50 years." Rodino said, adding that "the chances of a consent settlement of the case . . . are significant, particularly if the possibility of intervening legislation does not deter the parties from entering into serious consent negotiations."

Rodino maintained that if legislation is enacted allowing AT&T to "engage in activities . . . that were previously forbidden," the bargaining positions of the Justice Department and phone company lawyers will "undisputedly be altered" if and when they sit down to negotiate a consent agreement. "By firmly rejecting premature legislative intervention," Rodino added, "Congress can actually encourage consent settlement."

The Computer and Communications Industry Association (CCIA) "supports Chairman Rodino's call for the Congress to defer to the court in resolving the question of AT&T's future structure," said Jack Biddle, president of the association.

"In the course of litigation, the court will undoubtedly have before it a much greater depth of factual material upon which to base a decision than the Congress has thus far reviewed. Certainly CCIA agrees that lifting the 1956 AT&T consent decree before adequate safeguards are in place serves neither the interests of the industry or of the public."

If accepted, Rodino's recommendation would bar AT&T, at least for some time, from offering data processing, data base retrieval and electronic message services, as well as other involving network-resident terminal support and/or information storage.

Furthermore, AT&T would have to continue tariffing all of its terminal equipment offerings, and its freedom to offer intelligent terminals would be limited.

More important, the phone company would run the risk of being forced to alter its present corporate structure even more drastically than is required by the pending legislation.

Both H.R. 6121 and S. 2827 require Bell to establish separate subsidiaries for deregulated services. But the subsidiaries would continue to be owned by AT&T. By comparison, the Justice Department's antitrust suit seeks to break up the Bell System through divestiture. Justice wants AT&T to sell Bell Labs, Western electric and/or other subsidiaries so they can become totally independent companies.

Within the last year, Bell has lost two major antitrust cases. Last November, a federal district court in Bridgeport, Conn., decided unanimously that AT&T and two affiliates had used illegal marketing tactics in an attempt to put Northeastern Telephone Co., an independent telephone and PBX manufacturer, out of business.

Last month, a federal court in Chicago rendered a basically similar verdict against the phone company in a case filed by MCI Communications Corp. While neither decision is final, they are likely to affect the court's disposition of the Justice Department's charges, which are similar to those in the other two cases.

If the government's chances of winning its suit are growing, the telephone company could mitigate the result by accepting the Carter Administration's legislative recommendations.

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NEW

Freighter Crash Follows Tracking System Shutdown

By Ann Dooley
CW Staff

NEW ORLEANS – The two freighters that collided on the Mississippi River here last week and caused nearby residents to flee toxic fumes leaking from one ship might have avoided each other if an automated vessel tracking system had not been scrapped a week earlier as part of a $37 million federal budget cut.

The collision occurred when an empty freighter of Panamanian registry was moving up the river just as a German freighter was steaming down the river. The German vessel was loaded with powdered hydrobromic acid, which became a toxic gas when it spilled into the water.

Residents of the small town of Shell Beach, La., were immediately evacuated to escape the hydrobromic acid fumes released into the atmosphere after the collision. Although neither the cause of the accident nor damage estimates were immediately available, cleanup operations began at once.

Ordinarily, the U.S. Coast Guard's Vessel Traffic Systems (VTS) would have tracked both freighters at several points along the river, monitoring and advising the ships about coordinates and other ships in the area. Without the system, the river pilots had to rely solely on their bridge-to-bridge radios for navigating around each other.

Rain was falling last Tuesday night when the ships collided, which might also have hampered visibility, one official said.

Whether the VTS would have made a difference will be difficult to determine, but more detailed information might have been available sooner if the system had been operational, officials said.

Ironically, even before the collision, the VTS was given a reprieve. Bowing to pressure from environmental and navigational groups as well as state legislators, the federal government agreed to prolong the system's life, and VTS will begin operating again this week.

Begun in 1977 to keep safety tabs on river traffic between the Gulf of Mexico and Baton Rouge, La., the VTS monitors approximately 250 ships at any one time. When a ship comes into the VTS area either from the sea, a lock or up river, the ship's pilot calls in data to the Coast Guard VTS office. Data such as name of the ship, its destination, point of origin, speed, cargo load and its length is entered into one of eight CRT terminals linked to two Computer Automation, Inc. Naked Minis running in parallel.

The system is programmed to relay information on how quickly a ship will reach certain points and where other ships will be in relation to it. It also indicates what hazardous areas are approaching, such as river bends where it might be unsafe to meet another vessal.

Unlike U.S. air traffic control centers which follow aircraft with radar, the VTS system is voluntary and depends on data radioed in from the vessels.

In Survey of 25 Installations

Users Applaud Amdahl Upkeep, Technical Aid

By Marcia Blumenthal
CW Staff

NEW YORK — Amdahl Corp. users, on the whole, appear to be a satisfied lot, with 54% reporting excellent maintenance and 44% rating the company excellent on technical support.

Recently conducted by Martin Simpson Research Associates, Inc., the survey polled 25 users of 46 Amdahl machines. The survey was undertaken because of the controversy surrounding the long-term outlook for IBM plug-compatible mainframe (PCM) makers.

Price/Performance

Overwhelmingly, price/performance was the reason 72% of the users chose Amdahl systems. And 20% of the users also noted these systems are technologically better than IBM's.

Most users said their original reasons for choosing Amdahl are still valid. However, the researchers pointed out that the future technological superiority of Amdahl equipment is not expected to be as striking as initial introductions. Moreover, some users think that IBM is becoming more competitive and will outflank Amdahl's processor capacity.

More than 60% of the Amdahl systems installed replaced one or more IBM systems. In total, 33 IBM systems were replaced, with 370/158 and 168 equipment replaced most frequently (55%).

The users participating in the survey have an average annual DP budget of $20 million. The majority of them, 63%, have one Amdahl system, but most of the 37% who have two or more Amdahl systems are also operating systems from other mainframe vendors.

About 64% of the Amdahl systems have been installed in the past three years. Amdahl is estimated to have placed about 318 machines to date.

Maintenance Ratings

Besides good price/performance, 54% of the users surveyed rated Amdahl excellent on responsiveness and effectiveness of maintenance service. And 44% said the company's technical support is excellent. Reliability also ranked high with 36% of the users, many citing uptimes of 96% or greater.

While 40% of the users surveyed detected no weaknesses with Amdahl, 36% of the respondents did spell out some weaknesses. In 24% of the responses, users expressed dubiousness because of the general volatility of the PCM situation. However, about 24% of those surveyed had more specific problems — dissatisfaction with either the availability of (8%) or the support for (16%) Amdahl software.

Software Worries

With software becoming an increasingly larger component of a system's price, these concerns could jeopardize the continued attractiveness of Amdahl systems, the researchers forecast.

Users complained that Amdahl does not possess the know-how to debug programs or locate or solve problems quickly. Other weaknesses cited include difficulty locating the right person at Amdahl to whom to report a problem, the quality of the field service personnel, the inability to upgrade the V/6 and the limitation on the number of devices that could be attached to the company's processors.

Interestingly, Amdahl recently made its Virtual Machine Performance Enhancement software available to IBM user without requiring that they also have an Amdahl processor on site [CW, May 19]. Depending on the number and location of these installations, these sites may create a broader geographic distribution the Amdahl's field engineering organization can now support, which may exacerbate an already difficult situation, observers noted.

Despite these shortcomings, 40% of the users said they would select an Amdahl system again. However, 24% said they do not plan to stay with Amdahl because of software or service problems. The remaining 36% were undecided about future choices.

Whatever the ultimate fate of PCM vendors, the research concluded that Amdahl has made a visible dent in IBM's revenues and earnings.

The report estimated that IBM lost $270 million in system sales to Amdahl and forfeited another $600 million in price cuts made as a reaction to Amdahl. This translates to an earnings loss of $290 million or 50 cents per share, the report claimed.

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Programmer 'De-Skilling' Viewed Growing Trend

(Continued from Page 1)

prestige or a crack at the latest systems.

But technological developments, such as the advent of high-level languages and structured programming methods, have allowed vendors and many users to create sophisticated software systems comprised of very simple-minded modules, Kraft noted in a recent interview here.

These modules can now be generated by workers with minimal training in computer technology, beyond a few applied courses at the community college or trade school level, the State University of New York/Binghamton professor observed. And, compared to the programming parvenus turned out by universities, these lower paid workers are usually more adaptable to factory-style production environments.

That means a user's management can constrain DP budget inflation, which is especially bad on the budget's labor-intensive software side, and forge tighter controls over software personnel by replacing the older, shining knights of programming's heyday with yeoman coders, grateful for the opportunity, Kraft indicated.

Structured Movement

Computer scientists launched structured programming in the 1960s as an aesthetic movement aimed at making programs more "elegant," meaning more concise and comprehensible, the sociologist noted.

While eminent theoreticians like 1972 Turing Award winner Edsgar W. Dijkstra continue to promote structured programming with evangelistic fervor, DP shopkeepers have warmed to the approach as a means of coping with brisk staff turnover and a nervous feeling that they have less organizational influence than the first-class unstructured programmers in their charge.

According to Kraft, who has studied the relationship between programmers and managers for years, this is partly because program "jumps" — such as Basic and Fortran evoke with GOTO statements — are forbidden by the structured programming canon. When a number of modules within a program jump to each other, flaws in the program's logic can be especially devastating.

This makes debugging difficult and expensive. It also leaves a shop in the lurch when the few people, perhaps only one person, able to comprehend such a jumble take other jobs, Kraft said.

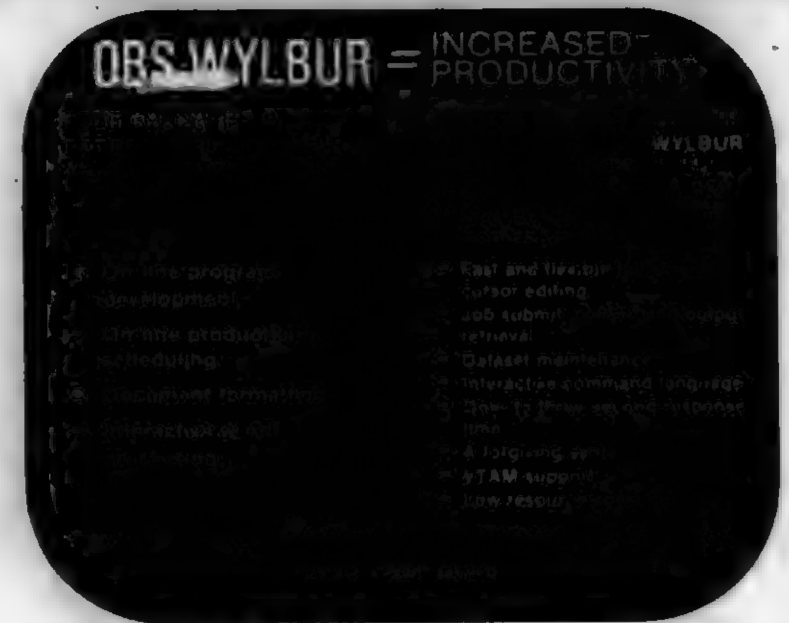
Hence, unstructured users tend to need a more sophisticated — and expensive — class of programmers. Structured users, on the other hand, can assign a less sophisticated crew to each module of a large system under development, Kraft explained.

Roughly speaking, the definitions of three historical periods in the relationship between managers and programmers are starting to gel, Kraft observed.

The programmer had relatively high prestige during the first period — from about 1950 through the 1970s — because he was perceived as a kind of engineer at a time when engineers, as progenitors of the Space Age, were especially revered.

But de-skilling of the software specialties has ushered in the second period, which we now experience. Programmers are being seen as clerical workers and enjoy less prestige, Kraft continued.

The second period is consciously a "waiting period" for managers. While they convert software development shops into factories, information processing executives eagerly anticipate the third period, when software systems will generate other software systems, reducing the need for human programmers to almost nothing.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MIS Managers Not Willing To Give Up Control

By Brad Schultz
CW Staff

BOSTON — Managers are less willing to relinquish control over software functions as those functions come to dominate the MIS budget, sociologist Philip Kraft said in an interview here.

Software development methods like structured programming allow managers to enhance control without sacrificing the raised productivity benefits software is expected to provide, he observed.

Managers now view the organizational impact of highly skilled programmers and systems analysts as a mixed blessing. Software specialists are a lot more expensive to pay since Kraft's book *Programmers and Managers* (Springer-Verlag, New York) appeared in 1977, claiming that employers will act to "de-skill" programming by mandating development techniques that do not require programmers to know much about computer technology.

Continued Demand

For a number of years yet, sophisticated programmers will continue to benefit from a high demand for their skills, Kraft emphasized. But when systems can replace humans as programmers of other systems, less-skilled workers will probably occupy most programming jobs, he speculated.

At that point, older highly skilled programmers will either compete for a dwindling number of positions at the top rungs of the technical career ladder or become managers themselves, Kraft said. Some of the latter will start their own companies — usually service bureaus or consulting firms.

Falling Off Ladder

But many superprogrammers who are determined to stay on the technical ladder are doomed to fall off, Kraft warned. Some may make a career out of systems analysis, since analysts will still be needed to fathom what a long program's myriad parts really do when put together and to lead the design of those parts.

However, the programming wizard who knows 17 languages and has bone-deep rapport with several complicated operating systems will rarely get old and gray in that capacity. At some point, the sociologist pointed out, such expertise will be unnecessary or considered too expensive on the job market.

As for management-bound programmers, they will have their career growth limits too. In years to come, the top managers of information processing will usually be business school graduates, not ex-programmers promoted from the ranks, he said.

The "routinization" of programming may usher in unionization of software development shops as they come to resemble traditional factories, the State University of New York at Binghamton professor stated.

Managers may not be resistant to that trend, he added, since some managers often view unions as a means of disciplining workers and simplifying relations between employer and employees.

Strike Staged in Los Angeles

(Continued from Page 1)

succeeded.

On-line jobs — including the city's crucial police-information system — continued to operate normally, and the municipal government's weekly payroll was processed and delivered exactly according to schedule.

Uneasy Truce

By early Monday morning of last week, the strike had already ended, and operations involving the city's two 6M-byte IBM 370/158s had nearly returned to normal. But even though the worst of the city's short-lived computing crisis appears to be over, both the strikers themselves and their bosses in the upper echelons of local government remain tense and uneasy.

Plans for a second strike are already said to be under way, and rumors that the walkout could last two weeks or longer are reportedly beginning to spread.

If the would-be strikers make good on threats of an extended walkout, the city and its computing services will likely suffer much graver consequences than those of the labor action that just ended. Even with a supervisory skeleton crew again filling in for the regular staff, the city would eventually find itself unable to keep its on-line applications — including critical police- and fire-information systems — up and running indefinitely.

For the moment, though, local officials are still keeping their fingers crossed that the fragile, informal truce now in effect at the city's information systems department will continue to hold and that the grave repercussions of a prolonged work stoppage might yet be avoided.

Like most large American cities, this community is no stranger to strikes by its public employees. This year alone, the roll call of striking workers included the city's building inspectors, mechanics and clerical personnel.

But the recent work stoppage marked the first time in history the city has been forced to deal with a strike by the people who process its data, and fears are already beginning to mount here that the walkout may have set an ominous pattern for the future.

The strike was precipitated by a long-standing dispute over salary. Strikers had demanded a 10.5% pay hike to maintain parity with their state counterparts; they later became disgruntled when they received only 9%.

Attempts to resolve the dispute soon followed, but when municipal officials reputedly struck an uncharacteristically hard-line bargaining stance, an estimated 150 of the city's programmers, analysts and operations personnel suddenly walked off their jobs in disgust. The strikers were later joined for half a day by approximately 50 keypunch operators.

The strikers appear to have staged their walkout with little or no advanced planning and so were forced by economic necessity to return to their jobs after only three days.

H Series Coming Into Focus, Reason for Delay Unclear

(Continued from Page 1)

to be of a mid-range machine code named Iroquois. A 10- to 12-Mips system springing from the combination of two smaller CPUs, the H-2 and H-3, it is being described as a dual-processor system connected to a single storage control unit (SCU) and one memory unit under the storage controller.

CPU, SCU and memory unit will probably all be independent components — meaning the H series will be a "building-block" type of system, where new pieces can be added to build bigger and faster systems.

The Iroquois, a somewhat logical upgrade from the 7-Mips 3033 attached processor (AP) will reportedly be announced during the first quarter of 1981, with first customer shipments expected in the second quarter of 1982. Purchase price is estimated to be in the neighborhood of $5.2 million, according to Strategic Business Services.

The Iroquois, or H-4, is expected to cost about $25,000 for each additional 1M byte of main memory, about half the going price. The processor is believed to sport a 100M byte/sec I/O data rate — about three times that of the current 3033-AP, according to Bob Fertig, an analyst with Advanced Computer Techniques Corp.

Agreeing that IBM will probably introduce the low end of the H line in the second quarter of 1981, Fertig and Strategic Business Systems disagreed on exactly what that announcement would include.

Both agreed the low-end machine will be Catalin (although Fertig preferred to indicate model group numbers after each code name — in this case, Catalin-1). It is said to be the basic unit of the H series, a single CPU, SCU and memory unit offering between 3 and 3.5 Mips plus $1.7 million price tag.

The second step up the H ladder is Lookout, a 5- to 6-Mips processor (either single or dual, depending on which consultant you believe), a single SCU and memory unit.

Fertig parts from Strategic Business Systems on the Lookout outlook because he claims that model will actually be two: Lookout-1 and Lookout-2. Lookout-1 will have the basic qualities reported by Strategic, but Lookout-2 will offer 7.5 to 8 Mips, he said.

Fertig believed the Lookout models H-2 and H-3 would be the basis for the rest of the H line. Strategic agreed with that philosophy, but it claimed the Catalin processor, H-1, and Lookout would be the two main engines.

The next H announcement is believed to be slated for the fourth quarter of 1981, of a model slightly more powerful than the Iroquois.

Called Marcy, the multiprocessor will probably offer 14 to 15 Mips on two Lookout (or H-3, in Fertig's case) engines.

It will probably be the second quarter of 1982 when IBM announces its big guns, Baldwin and Sentinel, analysts are predicting.

Baldwin is said to be essentially an Iroquois, or dual processor, linked as a multiprocessor to a Lookout or Catalin, a uniprocessor.

The top-of-the-line Sentinel will probably be two dual processors connected as a multiprocessor to offer 20 to 21 Mips (Fertig) or 27 Mips (Strategic).

While the IBM analysts agreed on the basic announcement schedule for H, they also agreed it could change at any time. Fertig said another six month-delay in announcement is a real possibility. Strategic said current 30 series users would be the deciding factor in the announcement — whether they buy (literally) IBM's recent price incentives to boost revenue by making it more attractive to purchase a system, rather than leasing or renting it.

The Gartner Group's Stein said both Fertig and Strategic are wrong when it comes to announcements. He said the Iroquois will be announced this year, probably in the fourth quarter, but possibly as soon as four weeks from now. All but the Baldwin and Sentinel models will be announced six months after Iroquois, and the two larger machines will probably be announced in the following year, according to Stein.

IBM Notation	Code Name	Processor Mix	First Shipments	Mips
H-1	Catalin-1	Single	2nd quarter '81	3 - 3.5
H-2	Lookout-1	Single	2nd quarter '81	5.6 - 6
H-3	Lookout-2	Single	2nd quarter '81	7.5 - 8
H-4	Iroquois-2	H-3 & H-2	1st quarter '81	10 - 12
H-5	Marcy-2	2 H-3s	4th quarter '81	14 - 15
H-6	Baldwin-2	2 H-3s & H-2	2nd quarter '82	17.5 - 18
H-7.	Sentinel-2	2 H-3s & 2 H-2s	2nd quarter. '82	20 - 21

From Advanced Computer Techniques Corp.

1) Announcement dates could slip as much as six months on all models except Iroquois.
2) A higher Mips rating will be noted in a scientific instruction mode.
3) First shipment dates do not reflect volume shipments.

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I/O Standard Foes Granted Expedited Hearing

By Marcia Blumenthal
CW Staff

WASHINGTON, D.C. – The U.S. Court of Appeals here last week granted a motion for an expedited hearing to four mainframers who are suing the government to prevent the implementation of the controversial I/O interface standards now in effect for federal DP acquisitions.

The mainframers suffered a setback July 2 when the Supreme Court reversed the Court of Appeals decision which allowed a stay of the standards' implementation. That stay delayed the effective date of the standards until such time as the court could resolve the legal issue [CW, July 7].

The Court of Appeals has agreed to hear the appellants during October or November, according to George D. Ruttinger of the law firm Crowell & Moring, which represents Control Data Corp. and the other mainframers.

If the appellate court decides the plaintiffs have standing, the case will be returned to the District Court for rehearing. However, if the court decides to uphold the District Court's prior decision that the plantiffs had no standing, the case would start its journey to the Supreme Court, Ruttinger said.

Lawyers for the mainframers will ask for expedited action in the Supreme Court, he noted.

Because of the reversal of the stay of implementation, the I/O standards are now effective, despite the pending court action.

Vendors contacted last week generally refused to comment on what moves they are making to develop the required interface, acknowledged to be essentially IBM's interface design. It would allow IBM-compatible peripherals to run on the systems of other mainframers.

Firms' Objections

Aside from citing technological obsolescence, some of the mainframers have balked at the cost of developing the interface and accompanying software. In a court case filed last year, Honeywell, Inc. argued it would cost about $25 million to bring its high-end hardware and software into compliance with the regulations [CW, Oct. 22].

Despite these objections, court documents submitted by the government said that federal government users could realize savings of between $40 million and $61 million during the next five years if the standards were implemented.

Although mainframers have said they will comply with the regulation, observers think they will rely on obtaining waivers from the government for the procurement of their equipment, hoping the case will be settled in their favor. "It's the way any business would logically go," a source at one company noted.

However, CDC is said to be planning on complying with the standards by the fourth quarter of 1981, a source noted.

Not for Government Only

Court documents submitted by mainframers indicate the companies cannot redesign the hardware and software for the government market alone. Therefore, commercial users would also have the ability to attach IBM compatible peripherals to other mainframe systems.

The government market is substantial for many of the mainframers. Univac, for example, claims to have about a 25% share of the local and federal government market [CW June 5, 1979].

It appears, then, that mainframers will be relying on waivers to sell into the federal information processing market, at least for the time being.

The current waiver procedure, requiring the Secretary of Commerce to approve all waiver requests, is in the process of being modified. The new regulation places the waiver decision on the chief of the agency procuring the equipment. The National Bureau of Standards (NBS) is now evaluating the comments on the proposed regulation and should make its final recommendation within a month, according to Tom Pike, an offcial with the Institute for Computer Sciences and Technology at the NBS.

Based on comments received, it appears some agency heads do not want to make the final waiver decision, he said.

The NBS can decide to recommend approval of the modified regulations to Secretary of Commerce Philip M. Klutznick, scrap the proposal or issue a new one, restarting the comment period.

Structured Methods Found No Easy Answer for Users

(Continued from Page 1)

This is the second in a series of articles describing users' experiences — both successful and unsuccessful — with structured methodology.

grams.

Software maintenance accounted for so much of the service bureau's daily activities, in fact, that Doolittle's programmers seldom got an opportunity to develop new applications or do anything else for that matter.

The effect on staff morale was obvious and predictable. "We were working in a typical government environment at the time," Doolittle recalled "Our staff members were performing just like average civil servants, doing little more than drawing their paychecks and waiting each day for five o'clock to arrive." With the help of an outside consultant – Gopal Kapur of Kapur & Associates, Inc. — their shop's gradual introduction to software engineering and structured methodology began.

Today, only about 37% of the service bureau's computing resources are allocated to software maintenance, compared to 80% two-and-a-half years ago.

The sharp drop in software maintenance requirements has led, in turn, to improved staff morale. "Now, our people walk around with smiles on their faces," Doolittle said. "They do a lot of work, and they do it happily."

Adoption of software engineering and structured methodology has also helped Doolittle and his colleagues to greatly improve their software reliability. The service bureau's staff has written some 50 programs since the conversion began, and during the past two years, those programs have "abended" only twice, the information-systems manager said.

One of the main reasons for the service bureau's success in implementing software engineering and structured methodology is that the installation's managers never lost their patience; they realized they would not reap benefits from their experiment overnight.

From the beginning, Doolittle and his colleagues understood that their implementation would take time, that they would probably suffer setbacks along the way and that they would have to exercise perseverance and ingenuity if they hoped to overcome those setbacks.

They spent more than a year, for example, experimenting with structured walkthroughs before they finally got the process down pat, he said.

Management Support

A second key to the service bureau's success with software engineering and structured methodology is that efforts to implement the techniques were supported all the way by top management, particularly by Doolittle's boss, Ralph Cook, the installation's information-systems director.

Lack of strong management commitment is one of the leading reasons why attempts to use software engineering and structured methodology so often end in disappointment, Doolittle explained.

Yet another reason for the service bureau's success with software engineering and structured methodology is that Doolittle and his superiors tried to give their subordinates as strong a voice as possible in deciding how the techniques should be implemented. The decision to continue using GOTO statements, for example, was made by the computing center's programmers themselves, not by management fiat, Doolittle said.

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To Register Four Million Males

Selective Service Recruits IRS Keypunchers

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. -- An army of data processing personnel, recruited from several federal agencies, stood ready last week as another generation of American males began lining up for military registration.

The Selective Service System has mustered more than 1,000 key-punchers to process the four million registration cards to be filled out at 34,000 U.S. post offices last week and this week.

Most of the keypunchers are with the Internal Revenue Service (IRS), pressed into service because "we needed to get one organization that can effect the control that's needed in an operation like this," according to David Cox, associate Selective Service director for management information systems (MIS).

The Selective Service began marshaling federal interagency support for the registration. when President Carter signed the registration legislation June 27. Congress provided $13.3 million for the three-month effort.

The General Services Administration and the Office of Management and Budget provided technical support and helped arrange the cooperative DP operation that will see IRS-produced tapes processed by the Selective Service on an Interior Department Itel Corp. AS/5 system.

Registration Cards

Prodded by patriotism and possible penalties of five years in jail and $10,000 in fines for not registering, males born in 1960 and 1961 will fill out cards at post offices, supplying name, date of birth, telephone number, social security number and permanent and current address.

The cards, after being checked by Postal Service employees, who will request identification from registrants to verify the information, will be forwarded to some 350 regional postal centers, consolidated and then shipped to six IRS offices for keypunching.

Using internal post office shipping mechanisms, such as used by the Postal Service to transfer money, will provide a certain amount of security for the shipments and guarantee delivery, according to Cox.

The IRS-produced 6,250 bit/in. tapes and the original registration cards will then be shipped to the Selective Service operations center here for processing on the Interior Department's system.

The tapes, received daily from IRS, will be edited for errors. Records containing major errors, such as an address so incomplete as to make correspondence impossible, will be routed through various correction loops.

But most errors will be minor and will not disturb registration, Cox predicted, saying corrections for all but the major errors will be picked up when the service notifies registrants of their registration numbers.

Master File

The basic master file should be assembled within four weeks after registration ends, Cox said. About the first of September, letters of acknowledgment will be sent to the registrants. From that point the Selective Service MIS group will be "getting into a fully operational system in a hurry," Cox said.

Not only will there be constant updates of the file as registrants change addresses, but the next group of registrants, males born in 1962, must register the first week in January. After that all males will register as they turn 18.

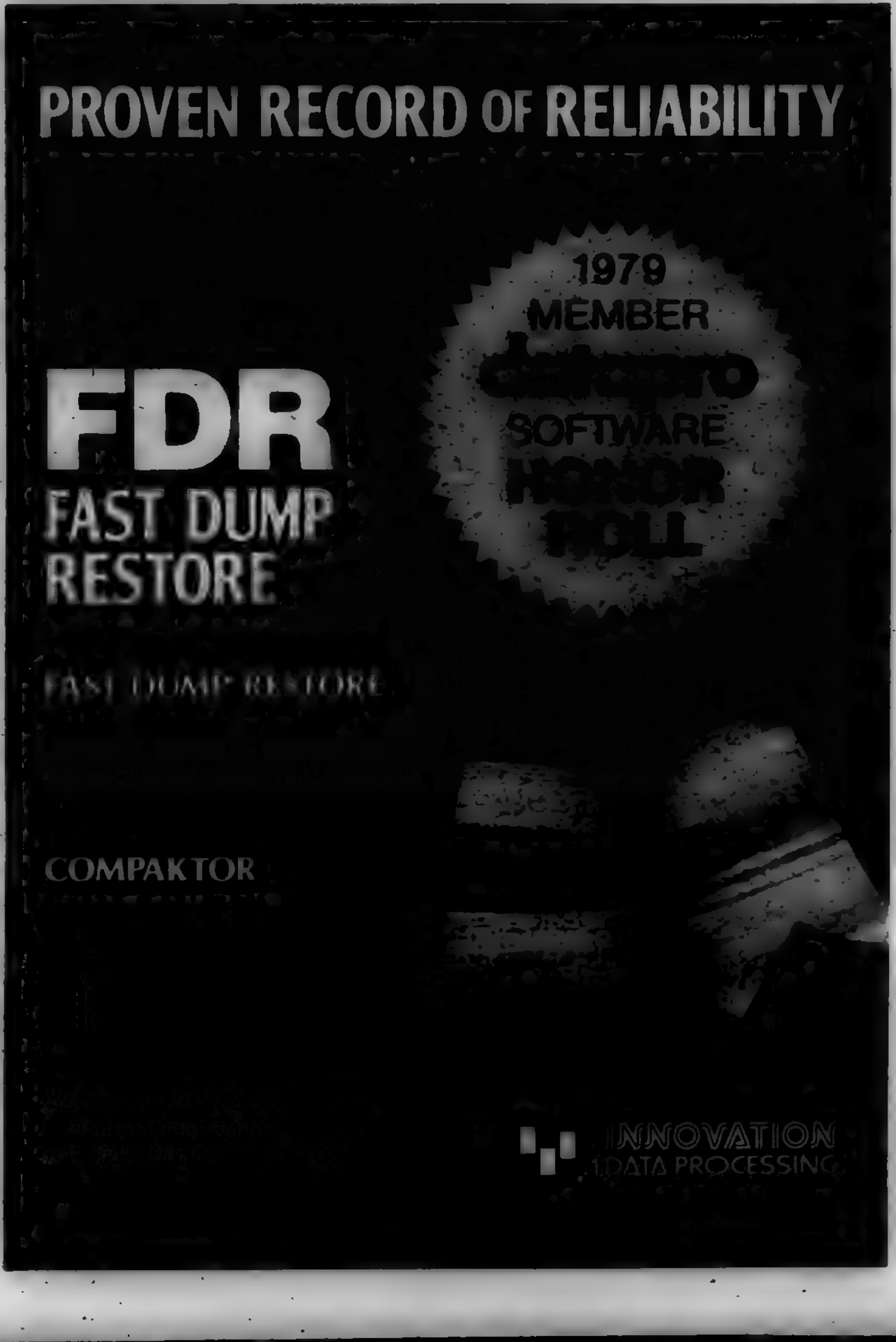
By next summer, the Selective Service plans to have its own DP capabilities in Great Lakes, Ill. There it will share computer facilities with the Military Enlistment Processing Command (Mepcom) which, when necessary, tests and inducts draftees.

Colocating with that Defense Department agency will speed military induction in case of mobilization, Cox explained, but the operational staffs and files of the two agencies will be completely separate to comply with privacy law requirements concerning registration records.

> *'We needed to get one organization that can effect the control that's needed in an operation like this.'*

When the two organizations are settled in Illinois next summer, the Selective Service will have augmented its Burroughs Corp. 3500 system with a government surplus IBM 370/168 to complement the Mepcom Univac 1108 systems. Cox's organization will also purchase enough printers and disk and tape drives to handle 1.2G to 1.8G bytes of on-line disk storage and a master tape file containing, by next summer, about six million individual records.

Eventually the service expects to have files on 16 million registrants. Cox's current budget of $5.5 million will approach $11 million for fiscal 1981, reflecting the increased demand on the Selective Service information systems.



Sampling of 32-bit Mini Offerings

(Continued from Page 1)

with its introduction of the MV/8000. However, unlike most other 32-bit machine vendors that push their machines as scientific tools, DG is tailoring a significant portion of its marketing effort to the commercial business sector.

According to DG's figures, about 30% of the 32-bit computers currently operating are installed at commercial business sites. The remaining 70% are scattered among scientific, computational and engineering applications. And that ratio is rapidly evening out, Perry stated.

Shipments of 32-bit minicomputers have doubled since last year and will grow about 40% each year until 1983, when the 32-bit market will reach the billion-dollar mark. Presently, 32-bit computers account for approximately 7% of the total mini picture and will expand to a 15% slice in only three years, DG projected.

The fact is there are a lot of commercial business users "that really absolutely need that 32-bit word size for large programs and large data structures and for handling large arrays," Perry added.

However, the 32-bit computer does not threaten to engulf the 16-bit minicomputer market, or add the standard mini to the endangered species list, he cautioned. The 16-bit computer "has a niche" in the area between the highest capacity 8-bit microcomputer and the least expensive 32-bit system.

Further, a lot of users do not need the complexity and overall power of a 32-bit machine. A system with 10 to 16 terminals would probably do well with a 16-bit minicomputer, "where 32-bit computers would overkill and a micro couldn't handle it," Perry observed.

The chart below shows a sampling of what's currently available in the latest 32-bit fashions. Word length is probably the single most important characteristic of each machine and accounts for the high price tags.

Basically, word length refers to the amount of information that can be stored or retrieved from a computer's main storage area during a single cycle. Although not specified in the chart, some of the machines noted operate in a dual word mode and can handle both 16- and 32-bit software to its greatest efficiency.

The memory cycle and memory access times are the minimum time between the starts of two successive accesses to a storage location and the time it takes for a CPU to receive data after it is requested, respectively. Although these times vary, it is important to remember that the computer with the fastest cycle or access speeds is not necessarily the best candidate or

Characteristics / System	Memory Capacity	Memory Cycle Time	Memory Access Time	Instruction Set Size	Cache Memory	I/O Transfer Rate
STI Computer Systems, Inc. STI [illegible]	256K- 8M bytes	.67 microsec	.4 microsec	32 bits	None	20M byte/sec
Data General Corp. MV/8000	256K- 2M bytes	.11-.22 microsec	27.5 nsec/byte	Up to 80 bits	16K-byte system	2.27M-16.16M byte/sec
Digital Equipment Corp. VAX-11/780	128K- 2M bytes	.8 microsec	290 nsec/byte	32 bits	8K-byte system	13.3M byte/sec aggregate rate
Formation, Inc. 4000 Information System	256K- 8M bytes	800 nsec	1.2 microsec	Up to 48 bits	None	5M byte/sec
Modular Computer Corp. IV/35-S	128K- 1M byte	1.067 microsec/- word	.8 microsec/- word	16 bits	None	7M byte/sec
Modular Computer Corp. IV/35/CP-S	128K- 1M byte	1.067 microsec/- word	.8 microsec/- word	16 bits	None	7M byte/sec
Perkin-Elmer Corp. [illegible]	256K- 4M bytes	.34 microsec	**	Up to 96 bits	1K byte (optional)	2M word/sec
Perkin-Elmer Corp. [illegible]	256K- 16M bytes	.5 microsec	.25 microsec	Up to 96 bits	8K bytes	10M word/sec
Perkin-Elmer Corp. [illegible]	512K- 1M byte	About 1.0 microsec	About 1.0 microsec	64 bits	2K bytes	2.5M byte/sec
Prime Computer, Inc. [illegible]	256K- 1M byte	.75 microsec	.54 microsec	Up to 64 bits	2K bytes	2.5M-byte word/sec
Prime Computer, Inc. [illegible]	256K- 2M bytes	.75 microsec	.54 microsec	Up to 64 bits	2K bytes	2.5M-byte word/sec
Prime Computer, Inc. [illegible]	256K- 4M bytes	.75 microsec	.54 microsec	Up to 64 bits	2K bytes	2.5M-byte word/sec
Prime Computer, Inc. 750	256K- 8M bytes	.75 microsec	.54 microsec	Up to 64 bits	16K bytes	8M-bytes word/sec
Systems Engineering Laboratories, Inc. (Systems) 32/30A	128K- 1M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M-byte word/sec
Systems 32/27	256K- 1M byte	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M-byte word/sec
Systems 32/75	32K- 8M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems 32/77	256K- 16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems VPS [illegible]	256K- 16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems VPS [illegible]	256K- 16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems VPS [illegible]	256K- 16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Wang Laboratories, Inc. VS-[illegible]	128K- 512K bytes	.66 microsec	About .33 microsec	Half-word: 16 bits Full-word: 32 bits	None	3M byte/sec
Wang VS-[illegible] (100)	256K- 2M bytes	.66 microsec	About .33 microsec	Half-word: 16 bits Full-word: 32 bits	32K-byte system	3M byte/sec
Wang 2200 VS	128K- 2M bytes	.66 microsec	About .33 microsec	Half-word: 16 bits Full-word: 32 bits	None	User-dependent

*Unless specified, prices do not include peripherals.

**Not available

Show Vendors 'Spreading the Word'

Product Spotlight

performer for a particular application. The user's application and a number of mechanical parameters have a large bearing on the potential effectiveness of a 32-bit system.

The instruction set consists of a number of indicators and address parts that, in effect, tell the computer what to do with information and programming data. The larger the instruction set, the more operations and operands a computer can handle.

A cache memory is basically a midpoint for storing various input and output portions of data or a program. The presence of a cache memory usually speeds up the execution time of a processor, making the entire system more suitable for heavy transaction traffic or large terminal number environments.

Next to I/O transfer rate, which is the time it takes for a computer to transfer data to and from peripheral devices, the next important aspect of a system is the number of users it can accommodate. Most of the figures in the chart are recommended numbers and can be expanded. Then again, some machines like Wang Laboratories, Inc.'s 2200VS incorporate special I/O devices that can be expanded to add any number of user terminals.

Finally, and for most users, what's most important are the computer's software languages and price. While most machines use relatively the same languages under their own operating systems, the price tags vary by hundreds of thousands of dollars. As shown by the figures, there are machines to fit a variety of monetary tastes.

	Recommended Number of Users	Programming Languages	Price*
	200	Fortran, Extended Basic, Pascal, Cobol	$86,850
	128	Fortran, PL/I, Basic, Cobol, Extended Basic	$153,150 (512K-byte)
	96	Macro Assembler, Fortran IV Plus, Cobol, Basic	$134,800 (256K-byte and operating system)
	38 (locally)	All IBM 32-byte languages, i.e., Assembler, Cobol, Fortran	$42,500 (256K-byte)
	128	Fortran IV, Cobol, Coral 66	About $203,000 (256K-byte)
	128	Fortran IV, Cobol, Coral 66	$210,560 (256K-byte)
	32	Fortran VII, Cobol, Basic Level II, RPG-II	$33,500 (256K-byte memory plus terminal)
	**	Fortran VII, Cobol, Basic Level II, RPG-II	$85,000 (256K-byte memory plus terminal)
	5-8	Fortran VII, Cobol, Basic Level II, RPG-II	$59,500 (512K-byte)
	31	Basic, Fortran, Cobol, PL/I, RPG-II	$65,000 (256K-byte)
	63	Basic, Fortran, Cobol, PL/I, RPG-II	$70,000 (256K-byte)
	63	Basic, Fortran, Cobol, PL/I, RPG-II	$95,000 (256K-byte)
	63	Basic, Fortran, Cobol, PL/I, RPG-II	$130,000 (512K-byte)
	16	Fortran, Cobol, Basic	$25,100 (128K-byte)
	64	Fortran, Cobol, Basic	$39,500 (256K-byte)
	64	Fortran, Cobol, Basic	$72,300 (128K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$46,300 (256K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$79,000 (256K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$85,000 (256K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$137,500 (256K-byte)
	32	APL, Algol, Basic, Cobol, Fortran, PL/I, RPG-II	$19,000 (128K-byte)
	128	APL, Algol, Basic, Cobol, Fortran, PL/I, RPG-II	$69,000 (256K-byte)
	32	APL, Algol, Basic, Cobol, Fortran, PL/I, RPG-II	$19,000 (128K-byte)

Some Figures Courtesy Datapro Research Corp.

Prime Bases Office System On 32-Bit Mini

The same architectural attributes that make a 32-bit computer a natural for scientific and commercial business applications also make it a shoo-in for the growing office automation field.

Several months ago, Prime Computer, Inc. introduced its office automation system, which is essentially a Prime 550 superminicomputer enhanced with office-oriented software and a number of intelligent terminal and management workstations. The software is mostly geared for sophisticated word processing functions, and the terminals act as limited capacity remote processing sites.

Up and running, the 32-bit-based system does everything from text editing to electronic mail at the Lincoln National Life Insurance Co., a spokesman said.

In October 1979, the company installed a 550-based office automation system at its Fort Wayne, Ind., corporate headquarters. Presently the system handles in excess of 44,000 pieces of paper daily and supports more than 50 interactive terminals, a spokesman said.

Lincoln National installed the system in its data processing department, where management, office workers and secretaries use it for internal communications, tracking and scheduling management functions and word processing. The system is also being used by the firm's law department, the spokesman continued.

Future plans for the system include expanding its terminal base to more than 100 workstations, he added.

Lincoln National's office automation system consists of the 32-bit processor with 1.25M bytes of main memory, one 300M- and one 80M-byte storage disk drive, a 400 line/min printer and a magnetic tape drive. In addition, the system uses Prime's standard multiuser, interactive operating system, Primos, and supports Fortran 77, Basic and Info, an information management package, the spokesman noted.

Western Union Promises Overseas Telex Rate Cuts

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Further rate cuts for U.S. international telex users were promised earlier this month by Western Union Telegraph Co.

Since last fall, the telegraph company has been offering a Low-Cost Routing (LCR) service that provides international telex service to about 100 countries at rates up to 30% less than those charged by U.S. international record carriers (IRC). LCR messages, however, are transmitted to the receiving overseas carriers by CNCP Telecommunications, Inc., a Canadian communications carrier, and by Telexommex, the Mexican telecommunications authority.

Last March, Western Union requested Federal Communications Commission (FCC) permission to eliminate these intermediaries and interconnect with the overseas carriers directly. This month, in response to a request from the commission, the telegraph company supplied further information about the proposed service.

Direct connection with 10 other countries is planned during the first year of operation, Western Union said, and with a total of 30 countries within three years.

Australia, Brazil, France, West Germany, Hong Kong, Italy, Switzerland and the UK are among the first 10, the company added. It said that direct connection should result in rates even lower than those now being charged for LCR service.

This proposed expansion of Western Union's domestic telex service to overseas points was inspired by an FCC decision last December, which reinterpreted Section 222 of the Communications Act of 1934.

Previously, the telegraph company had been barred by Section 222 from offering international telecommunications services. Under the interpretation, however, Western Union is allowed to offer them.

NCC Proposals Due Aug. 25

CHICAGO — Aug. 25 is the deadline for applicants to submit seminar proposals for the Professional Development Seminar series at next year's National Computer Conference (NCC) here.

The theme for NCC 81, slated for May 4-7, 1981 at McCormick Place here, is "Keys to Productivity."

The Professional Development Seminar Series, chaired by George R. Eggert, will cover technical, managerial, productivity and state-of-the-art topics.

An outline, along with a short biography and a black-and-white photo, should be sent to Eggert at the Department of Defense, DCASR, Chicago, O'Hare International Airport, P.O. Box 66475, Chicago, Ill. 60666.

For additional information, Eggert can be reached at (312) 694-2031.

FCC Grants Detariffing Appeal

WASHINGTON, D.C. – Computer-based on-line information services offered by the nation's communications carriers will not be deregulated this month, as had been specified by the recent Federal Communications Commission (FCC) decision in the Second Computer Inquiry [CW, June 16]. Granting petitions filed by Tymnet, Inc. and GTE Telenet Communications Corp., the FCC deferred the effective date until March 1982.

The two value-added carriers had argued that scheduling the detariffing of enhanced services for this month would not have allowed enough time to negotiate new contracts with users. IBM, the Computer and Business Equipment Manufacturers Association (Cbema), Delphi Communications Corp. and Computer Network Corp. opposed the Telenet and Tymnet petitions.

They contended that the relief sought was more far-reaching than necessary and would inhibit the offering of enhanced services by new and existing entities.

The commission agreed in part with this objection. Its order applies only to existing enhanced services; new services will have to be offered on a deregulated basis.

Pennsylvania PUC Delays Forerunner to Bell EMS

By Phil Hirsch

CW Washington Bureau

HARRISBURG, Pa. – The state public utility commission (PUC) has deferred the effective date of a tariff covering Custom Calling Service II, an offering of Pennsylvania Bell Telephone Co. generally regarded as the forerunner of a whole family of AT&T electronic mail and message services (EMS).

Responding to objections from commercial telephone answering services, the Pennsylvania PUC put off the effective date from July 7, 1980 to Jan 7, 1981.

Supporting Material

The supporting material submitted with the original tariff filing "is not adequate to support the conclusion that the rates will be compensatory, the utilities commission said. Analysis of this material by the PUC staff indicated "the proposed rates, rules and regulations may be unlawful, unjust, unreasonable and contrary to the public interest," according to the commission.

Custom Calling Service II would allow the customer to have incoming calls stored within the telephone network when he is away from his phone, or does not wish to receive messages. The customer could also record outgoing messages and have them delivered at a specified time.

In either case, calls could be input and received through Touch-Tone or rotary-dial telephones without any additional hardware of software.

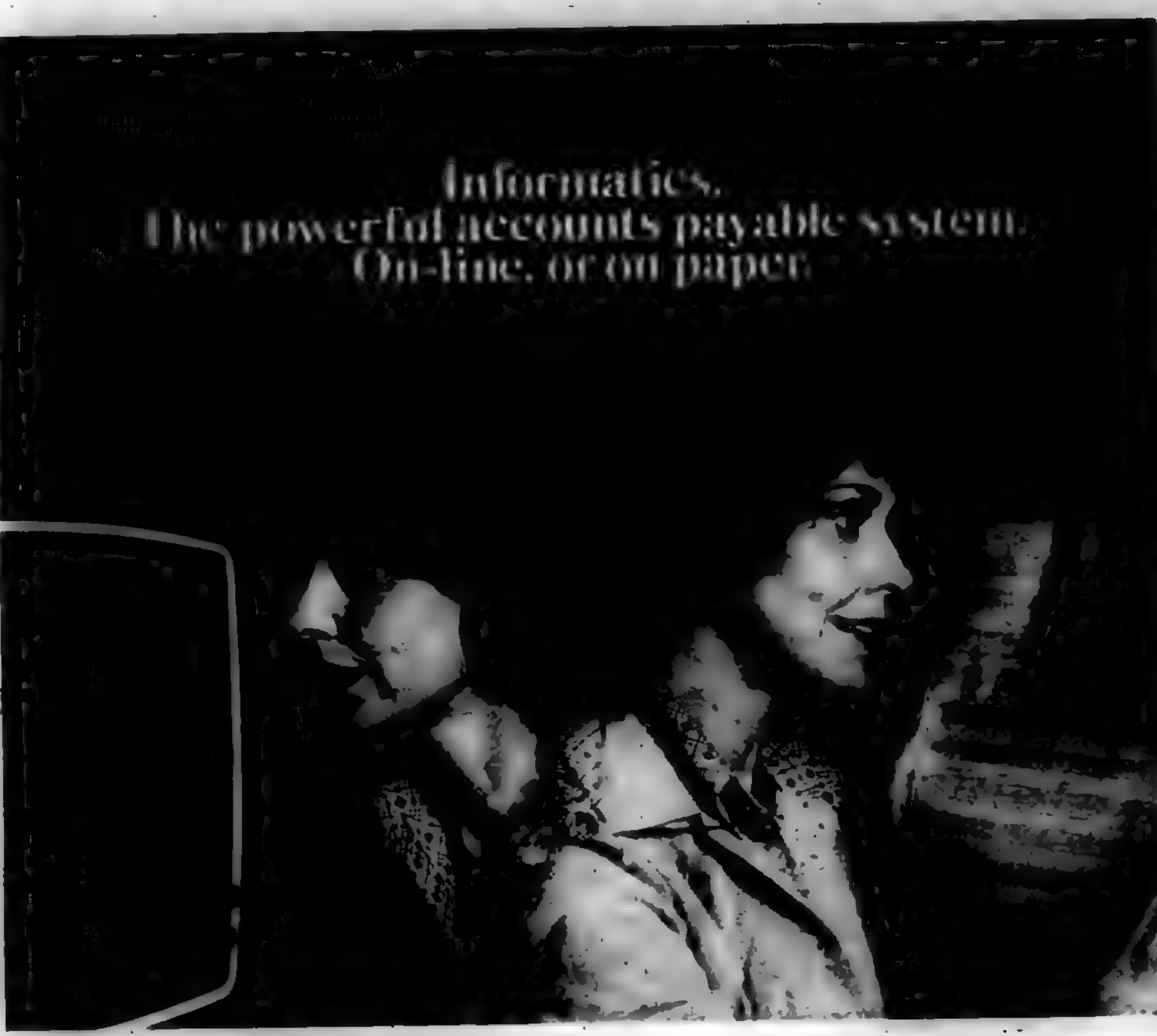
It is significant that Bell plans to convert messages into digital format before storing them. This would permit delivery to conventional data terminals as well as telephones. The storage medium to be used by the network – high-density digital disks – could accept input from facsimile or data terminals as well as telephoned voice messages.

Upper-Income Areas

Pennsylvania Bell plans to offer the new service initially in three upper-income exchange areas of Philadelphia, serving about 14,000 business and residential subscribers.

The company had planned to extend the service to 38 exchanges serving 200,000 patrons by the end of this year, and then, "within two years, to extend it again to half of all telephone subscribers in Philadelphia.

Officials of AT&T Long Lines Department reported recently that as soon as the Pennsylvania Bell tariff is approved, several other Bell operating companies plan to tariff similar services.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See page 91
in Buy/Sell/Swap

Gas Rationing Seen Fueling Long Lines at Banks

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The government's proposed gas rationing plan may put a greater strain on the country's financial computer systems than on its gasoline pumps, according to one group lobbying against the proposal.

The Department of Energy (DOE) plan, now before Congress, would result in "unmitigated chaos," because it would overwhelm the commercial banks that would be called on to implement it, the American Bankers Association (ABA) said in a recent letter to members of Congress.

Unless Congress turns down the plan by July 30, it is automatically approved and DOE will move ahead with preimplementation planning, expected to take about 12 to 18 months and cost as much as $80 million. During a gas crisis, actual implementation of the plan would take another 90 days, according to the department [CW, June 9].

Asking Congress to veto the plan, Gerald Lowrie, ABA executive director, government relations, said the plan would overtax existing banking personnel and data processing systems.

If a gasoline shortfall triggered rationing, the proposal would require an additional 150,000 bank tellers to handle coupons, Lowrie said. And the plan's provision to establish "ration rights checking accounts" could, he said, "literally swamp the nation's payments processing systems."

The checking account proposal would allow companies and individuals to deposit gas ration coupons received from the government and draw "ration rights checks" denominated in gallons of gasoline.

"The major problem with these accounts is logistical," Lowrie said. "There are only about 100 million total checking accounts in the country today, and this proposal could add as many as 170 million more."

Addressing this point in recent Congressional testimony, ABA Gas rationing Task Force Chairman J.C. Welman Jr. said "this provision of the plan is nothing less than absurd.

"Even if only 10% of the eligible population attempted to open ration rights accounts during the 90-day period preceding the implementation of gas rationing," Welman said, "the resulting drain on personnel and additonal paperwork and data processing costs would overwhelm the nation's commercial banking system."

To relieve the potential for chaos, according to the ABA, more coupon issuance and handling points must be designated. The approximately 60,000 commercial banking offices in the country do not have the manpower or backup systems to handle the task alone, the association said.

'Workable' Plan

The Department of Energy, for its part, defended its plan as workable, given enough time to work out the details. DOE points out the plan is still rather broad and said any problems can be ironed out during the preimplementation period.

The ABA countered the plan is still so vague as to be unworkable but sufficiently intimidating in its outline to be unacceptable to the banking community.

In fact, Welman told Congress last month "unless the major operational deficiencies stated or implied in the present plan are remedied by the Department of Energy, we feel certain that few banks will be willing to participate in the implementation of gas rationing."

Welman told *Computerworld*, however, there is little chance banks could escape their responsibilities under the rationing proposal once approved by Congress. This explains why the association has worked so closely with DOE since 1973 in developing a gas rationing scheme, he said.

Welman said in recent testimony he was disappointed that seven years of ABA cooperation with DOE and its predecessor agencies had produced a plan so unacceptable to the banking community.

California Air Control Outages Not 'Solved, Fixed or Stopped'

By Marguerite Zientara
CW Staff

FREMONT, Calif. — Computer outages at the Air Route Traffic Control Center (ARTCC) here resulted in air traffic delays of up to 78 minutes on three occasions within a period of 10 days.

The breakdowns came on the heels of four other major air traffic control (ATC) computer outages here during June, which caused traffic delays and mystified technicians as to their causes [CW, July 14].

Affecting air travelers departing from several northern California airports and as far away as Reno, Nev., the problems began on Thursday, July 10, when the center's IBM 9020A Triplex system "hard-stopped," or stopped processing its electronic instructions, according to Jim Scott, Data Systems Officer at the center.

"We got into a situation like that 10 times, and each of those outages were less than 35 seconds," Scott said. "We have not solved, fixed or stopped it from occurring as far as we know," although the problem has not recurred since July 10, Scott said recently.

Rash of Problems

Although the cause of the problem has not been determined, it is believed to be hardware-related. Whatever the cause, after 10 momentary interruptions between 8:00 a.m. and 9:30 a.m., technicians decided to take the system down for an hour, resulting in 66 known traffic delays.

Delays ranged from three minutes to 78 minutes in length, and affected departures from airports in San Francisco, Oakland, San Jose, Sacramento, Fresno, Monterey — all in California — and Reno, Nev., according to Roger Johnston, public information officer at the ARTCC.

Software-Related?

The next day — Friday, July 11 — a computer outage of one hour and 14 minutes, suspected to be software-related, caused 18 known delays ranging from one minute to 43 minutes and affecting departures from San Francisco, Oakland, Sacramento and Mathers AFB, Johnston said.

Two days after that, on Sunday the 13th, a 36-minute computer outage, thought to be related in nature to the previous one, was responsible for 22 departure delays from San Francisco and three from Oakland, ranging from five to 29 minutes, Johnston said.

Such a "rash of very unusual problems" at Fremont's "generally very reliable" system prompted the facility to call in a three-person team of technical specialists from the Federal Aviation Administration (FAA) Technical Center in Atlantic City, N.J., formerly called the National Aviation Facilities Experimental Center (Nafec), Scott said.

Error Analysis

"What we've done up to this point is designed some software computer logic to trap it and isolate it down to a single program," Scott explained, noting that the problem seems to exist in the system's error analysis program.

"The error analysis program actually scans and looks for software, hardware, whatever kinds of problems and flags it to us," Scott explained.

That would seem to explain the reason why two of the four outages last month, on June 3 and 22, were not reported by the system itself [CW, July 14].

When asked if the recent outages were related to those of last month, however, Scott replied, "I guess we're not that smart yet; we can't pinpoint it that fine.

"It's hard to make a case for any of the previous software problems [being related to] these that just occurred, although we are working toward that kind of end," he added.

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Healthy Turnout of Vendors At Computer Graphics Show Mirrors Growth of Field

By Jeffry Beeler
CW West Coast Bureau

CW at Siggraph 80

SEATTLE — If recent Siggraph 80 conference is any indication, the health of the computer graphics field has never been better. The show, which is sponsored annually by the Association for Computing Machinery's Special Interest Group on Computer Graphics, drew more vendors, occupied more floor space and boasted a wider array of product exhibits than any other conference in Siggraph's seven-year history.

Like the computer industry of which it forms a small part, Siggraph appears at last to be entering a period of rapid growth. Five years ago, the show attracted only 10 vendors and fit easily into a 5,000-square-foot lecture hall at the University of Pennsylvania in Philadelphia.

This year, the conference lured almost 100 graphics hardware and software suppliers and filled 120,000 square feet of the Seattle Center Coliseum, according to Siggraph 80's co-chairman, Harvey Kriloff.

The rapidity of the show's growth has surprised even some of Siggraph's organizers. "When I signed the contract two years ago to hold the conference in the Seattle Coliseum, I was worried about what we would do with all the empty floor space," Kriloff recalled.

"I thought we might have to use curtains to hide some of the open exhibit areas and give the appearance that the vendors were occupying more space than they really were. But as it turned out, the curtains were unnecessary."

Growth of Field

To a large extent, Kriloff explained, Siggraph's growth during the last two or three years mirrors the rapid expansion of the computer graphics field as a whole.

For many of the 6,000 visitors who were expected to attend Siggraph 80 during its five-day run, evidence of the graphics field's recent coming-of-age were everywhere.

On the show floor, visitors could see signs of a new-found maturity in the breadth of Siggraph 80's product exhibit. On display were graphics units of nearly every conceivable size, group and subgroup: CRT terminals (storage tube, raster scan and stroke refresh); pen plotters (drum, flat bed and belt bed); electrostatic printer/plotters; and digitizers.

Variety was also a key feature of Siggraph 80's conference program, which included 16 technical sessions covering graphics-related topics as disparate as algorithms, hardware systems, software and languages, graphics and its impact on business, computer-aided design and manufacturing, standards and raster techniques. The conference program particularly stressed graphics design and user interfaces in an attempt to teach computing professionals how to make displayed data communicate more effectively for the people who use it.

The 16 technical sessions were scheduled to take place during the conference's last three days and were preceded on the first two days by a series of eight tutorials exploring topics like elementary raster graphics, advanced raster graphics, computer-aided design, animation, low-cost graphics and user interfaces.

In general, the advanced tutorials attracted larger crowds than the elementary tutorials — a fact that prompted Kriloff to conclude that Siggraph still appeals more to academic and engineering users than to information system managers, most of whom still know little if anything about computer graphics.

Unit Replaces Tektronix 4014

SEATTLE — A raster-scan replacement for Tektronix, Inc.'s Model 4014 graphics terminal became available recently from the Genisco Computers Division of Genisco Technology Corp.

The G-1000, which was introduced at the Siggraph 80 conference, typically costs about $2,000 less than its Tektronix counterpart, a Genisco spokeswoman said.

In addition to being plug-compatible with the 4014, the G-1000 uses raster-scan technology, unlike the Tektronix unit, which relies on storage-tube technology.

By substituting raster-scan for storage tube techniques, the G-1000 reportedly gains several performance advantages over its Tektronix counterpart. These advantages include the ability to display an image indefinitely without damaging the unit's CRT phosphor, the ability to view displayed data in ordinary ambient light and the ability to do unlimited write-throughs without flicker.

The use of raster-scan technology also allows G-1000 users to selectively erase portions of graphic and alphanumeric images — a capability storage tube terminals lack, the spokeswoman said.

Expandable Unit

At present, the Genisco unit is designed to serve primarily as a simple graphics terminal operating interactively with a local or remote mainframe.

However, because the G-1000 incorporates a Zilog, Inc. Z8001 microprocessor with 16K bytes of random-access storage and 16K bytes of erasable programmable read-only memory, it can be expanded to support floppy-disk storage and various output peripherals, including a plotter and printer.

When the mass storage units and other expansion modules start becoming available during the coming weeks and months, the graphics terminal will be able to double as a complete, stand-

(Continued on Page 15)

CW at Siggraph 80

Charts at the Touch of a Button?

Graphics User Warns of Unrealistic Expectations

By Jeffry Beeler

CW West Coast Bureau

SEATTLE — Computer graphics systems are neither as powerful nor as easy to operate as many users have mistakenly been led to believe, a speaker noted during the recent Siggraph 80 conference.

Many users who acquire or try to develop an in-house computer graphics capability do so with "unrealistically high expectations" for the outcome, according to June Hament, who heads graphics activities for the Insurance Corp. of America (ICA).

Glowing press reports and overly enthusiastic consultants have given many users the false impression that computer graphics systems are as effortless to operate as typewriters and that they can quickly turn reams of text into easy-to-read charts with just a few simple keystrokes.

Unfortunately for their users, computer graphics systems often fall woefully short of their advertised performance, Hament said during a technical session on graphics' gradual entry into the business world.

Lack of Expertise

The problem with many computer graphics systems is not necessarily that they lack the technological sophistication to perform their assigned tasks. Rather, it is that taking full advantage of the systems' capabilities sometimes requires considerably more computing and programming expertise than the average nontechnical business user is willing or able to muster.

"It's ridiculous right now for people to think they can produce well-formed, meaningful computer graphics with the touch of just one or two buttons," Hament asserted.

"How can we expect that kind of capability to be available on the market when we haven't yet developed the data bases and data-reduction tools to make it possible?"

Hament's observations about computer graphics systems and their alleged performance shortcomings are drawn from personal experience. For more than a year, she and her employer, ICA, have been embroiled in the complex and sometimes frustrating process of trying to find and implement a computer graphics system that truly meets their corporate needs.

The implementation, which has yet to be completed, has convinced Hament that suppliers of computer graphics systems sometimes become so preoccupied with developing state-of-the-art technology that they lose track of how that technology is going to be applied.

Lesson Learned

"One of the main lessons we've learned from our experience with computer graphics systems is that vendors in this field sometimes become overly enamored with the theoretical at the expense of the practical," Hament said.

"They become more concerned with the elegance of a technological solution than with the everyday problems their users want to solve."

The first order of business for a computer graphics supplier, then, is to help its customers overcome their corporate difficulties, Hament said.

To achieve this objective, vendors fist have to talk to their users to find out what management tools they need and then fashion a product to meet those needs.

Terminal Debuts

(Continued from Page 14)

alone computing system, the spokeswoman said.

Higher Resolution

The G-1000's 1,024-bit by 792-bit resolution is considerably higher than most nontechnical business and financial management applications require.

As a result, the unit's primary applications will include computer-aided design and manufacturing, circuit-board layout and plot previewing.

But when it soon starts supporting its own peripherals and gains the ability to operate in the stand-alone mode, the G-1000 will have the potential to serve as a general-purpose machine, with business applications accounting for at least part of its total computing work load, a second Genisco spokesman added.

The G-1000, which provides a 60Hz refresh, comes with a 19-in. display, keyboard and a serial, RS-232-compatible interface that transmits 19.2K bit/sec.

In single quantities, the terminal costs $9,995. Shipments of the G-1000 begin in December from Genisco at 3545 Cadillac Ave., Costa Mesa, Calif. 92626.

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Managers Told to Rethink Views on Graphics

By Jeffrey Beeler
CW West Coast Bureau

SEATTLE — Most information system managers still know little if anything about computer graphics, but they can ill afford to continue ignoring the emerging discipline much longer, a speaker noted at the Siggraph 80 conference here recently.

Computer graphics is already beginning to mature into a full-fledged discipline and, as the decade progresses, advancements and growth in the field will continue to accelerate, according to Ken Anderson, publisher of a monthly graphics industry newsletter, "The Anderson Report."

Demand for graphics capabilities will prove especially pronounced in the business world, which during the next few years is likely to emerge as the graphics field's fastest growing market sector, Anderson predicted.

CW at Siggraph 80

In fact, by the end of the decade, graphics will probably become as indispensable to effective business management as computers themselves are today.

This rapid growth in industry stature will force many formerly indifferent information system managers to rethink their attitudes toward computer graphics and seek new ways of applying the discipline to their companies' management and data handling problems, Anderson said.

'Information Explosion'

One of the industry forces that has contributed most heavily to the increased need for business graphics is the advent of the so-called "information explosion." As computing technology has advanced and the ability to process and regurgitate information has steadily grown, commercial users have found themselves inundated in a rising tide of computer-generated facts and figures.

So great, in fact, has the flood of information — and accompanying paper documents — become that no business executive can possibly hope to review it all. The result is that many managers are finding themselves faced with a growing sea of irrelevant facts and are increasingly unable to extract the key financial information they need.

Computer graphics, however, promises to bring the information explosion at least partially under control by allowing executives to quickly distill the essence of large amounts of business data and by greatly reducing the mass of financial reports and other paper with which managers are now forced to contend each day.

A good computer graphics system, especially one that displays its data in color, can condense reams of printout into a few readily understandable graphs and charts, Anderson said.

Another major industry force that seems to be fueling increased demand for computer graphics is rapidly declining memory costs, which are bringing raster-scan and other types of display terminals within easy financial reach of more and more users.

But before computer graphics can realize its full potential, Anderson said, it must overcome a serious technological hurdle: its long-standing shortage of sound, commercially available software.

Developments on the software side of the business graphics field have lagged far behind those in the hardware sector — a phenomenon strikingly reminiscent of the computer industry as a whole.

Tandem Users Slate Third Annual Meet

CUPERTINO, Calif. — The third annual international Tandem Computers, Inc. Users Group conference, expected to draw 450 users from the U.S., Canada and Western Europe, will be held in San Diego Sept. 14-18.

Highlights of the five-day gathering will include a keynote address by Tandem Vice-President David R. Mackie and special interest group sessions covering data communications, OEMs, medical applications, Tandem Mumps and international users.

Tandem users wishing further information on the conference can contact Nancy Trankle at 19333 Vallco Parkway, Cupertino, Calif. 95014.

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Project Opens Computer Science Jobs to Women

AUSTIN, Texas — The University of Texas at Austin has been awarded a grant for $132,420 from the National Science Foundation (NSF) to conduct a project for women who want to change from poor-opportunity technical fields to computer science.

The project, which is part of a continuing program, offers self-paced retraining courses and is slated to become part of the university's regular educational program.

Under the NSF guidelines, the university will be funded to recruit and train women in computer science during the 1981-1983 period.

The past two projects at the university, which were also funded by the NSF, have centered around year-long intensive courses in which students attended on either a full-time or part-time basis.

But the special courses demanded one full-time faculty member for the academic year plus two teaching assistants, and the university had difficulty finding and funding qualified faculty, according to Nell Dale, project director. Computer science faculty are scarce since industry offers more attractive salaries than education, Dale noted.

Alternative Solution

To offset the need for teachers, the university proposed an alternative solution, according to Dale. Under the new program, an intensive introduction will be given during the summer preparing the students for more advanced courses in the fall.

Two basic computer science courses will be condensed and offered sequentially in two six-week summer terms.

Condensing, however, will require additional support, according to Dale, and the university is proposing to institutionalize a multimedia, self-paced materials approach to the courses.

Participants will be provided with a variety of learning materials including videotaped lectures, take-home material and audio lectures, which will be available at any time for self-paced reviews. Traditional lectures will also be offered.

With this approach, only one full-time faculty member is needed each summer rather than each year, Dale asserted.

Variety of Backgrounds

The women who enroll in the program come from a variety of backgrounds and will be training primarily to become programmers. Some of the women selected are housewives who want to reenter the work force, and others are from different kinds of work. Many have no advancement possibilities.

Upon completion of the training, the student can either enter the work force or have the necessary background to enter graduate school in computer science. The students can use their newly acquired computer science knowledge in data processing or in work in another field of science, Dale said.

The $132,420 grant awarded to the university by the NSF will help finance the program until 1983 by providing students with full tuition during the summer and stipends throughout the year.

Most of those who have finished the course work under the previous programs have chosen to stay in the Austin area and are working in computer or computer-related fields, according to Dale.

The NSF presented 23 awards, totaling $1,021,011, aimed at increasing the number of women in scientific and technical fields. Although women comprise 51% of the population, only about 10% of the scientific and engineering work force are women.

The awards, made annually under NSF's Women in Science program, will support 17 science career workshops and six science career facilitation projects across the country.

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Comnet '81 to Highlight Combining Applications

HOUSTON — Communication Networks 1981 (Comnet '81), which will focus on combining voice, data and message systems applications, will be held at the Albert Thomas Convention Center here Jan. 13-15, 1981.

More than 60 sessions, seminars and workshops are scheduled for the conference.

The program will begin on Jan. 12 with full- and half-day workshops. The conference program will include a keynote series entitled "The Future of Telecommunications" with data, voice and carrier keynote speakers.

If attendees register prior to Nov. 15, the cost is $345 for the three-day conference. After Nov. 15, the price goes up to $395. There is a choice of one of six full-day seminars on Jan. 12, costing $195, or one of five half-day seminars on Jan. 12 costing $95.

More information may be obtained from The Conference Co., 60 Austin St., Newton, Mass. 02160.

Program to Lead Ph.D.s to Careers

CHARLOTTESVILLE, Va. — The University of Virginia has established a summer career opportunities institute for Ph.D. students in the humanities and social sciences.

When they arrive at the university, the students will have completed required reading of texts and articles on accounting, computer systems, marketing, organizational management and policy and social responsibility.

The university hopes to use the program to establish a hiring pool for prospective employers. Tuition for the program is $200, the university said.

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Wats Service May Face Demise in September

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. – By the end of September, the Federal Communications Commission (FCC) must decide what it wants to do about the resale and sharing of Wide-Area Telephone Service (Wats).

One possible result is that AT&T will terminate Wats, as it already has been permitted to do in the case of Telpak (see story on Page 47). For the Wats users, who include many operators of on-line computer-based services, this could mean a substantial rate increase.

The importance of Wats to the computer community is indicated by this excerpt from a recent comment GTE Telenet Communications Corp. submitted to the commission:

Wats, often referred to as "800 service," is "used extensively in support of reservation systems, catalog merchandise ordering systems, credit authorization systems and similar consumer-oriented business services," GTE Telenet pointed out.

"A related principal use of 800 service is . . . in support of remote-access computer applications, including message system, data base inquiry systems, remote batch computing and interactive time-sharing."

Web of Rulings

The antecedents of the Wats controversy are buried in a tangled web of court decisions and FCC rulings stretching back many years. At the bottom is a service that allows users with large volumes of voice and data traffic to lease long-distance service at bulk rates far lower than the time-and-distance charges they would pay otherwise for each call.

The resale and sharing question first arose in 1977 when MCI Telecommunications Corp., said to be AT&T's chief nemesis, won the right to offer Execunet service after a long fight with AT&T and the FCC. Execunet involves the resale by MCI of Bell local exchange facilities connected to MCI intercity circuits.

In 1978, the FCC began an inquiry (Docket 78-72) into the question of whether MTS and/or Wats should be provided on a sole-source basis.

Related Issues

Besides resale and sharing, this proceeding was designed to explore a number of related issues — such as whether the responsibility for divvying up interstate telephone revenues should be transferred from the carriers to a government entity, and whether the rate-averaging scheme long used to give rural and urban telephone subscribers equivalent rates for like services should be changed.

By early this year, it became evident that this proceeding would not be concluded for some time. So the commission decided on a shortcut — a separate inquiry concerned only with the question of whether Wats and MTS services should be shared or resold.

Two-Pronged Attack

Largely, the commission was motivated by MCI, which earlier had launched a two-pronged attack on Wats. One prong was a petition to the U.S. Court of Appeals asking for review of prior FCC decisions concerning Wats rates.

Essentially, MCI complained that although the commission had repeatedly found the rates to be unlawful, they remained in effect — allegedly because of footdragging on the part of both the commission and AT&T. (The disputed rates, incidentally, are still in effect).

MCI also proposed to the FCC in July 1979 that it remove the resale and sharing restrictions on Wats. "Direct rate regulation has proven totally ineffective with respect to Wats," MCI argued.

Removing the restrictions would let the marketplace "correct the anticompetitive anomalies." The company added that if the commission considered this medicine too strong, it should permit resale and sharing of Wats on a trial basis.

The upshot was the commission's decision last February launching the present inquiry. Basically, this proceeding addresses two questions: whether the restrictions should be lifted on Wats and/or MTS; and whether resale and sharing of Wats should be permitted on a trial basis.

Last May, interested parties submitted comments on these questions, and early this month, replies to these first-round comments were filed by most of the participants.

Comment Summary

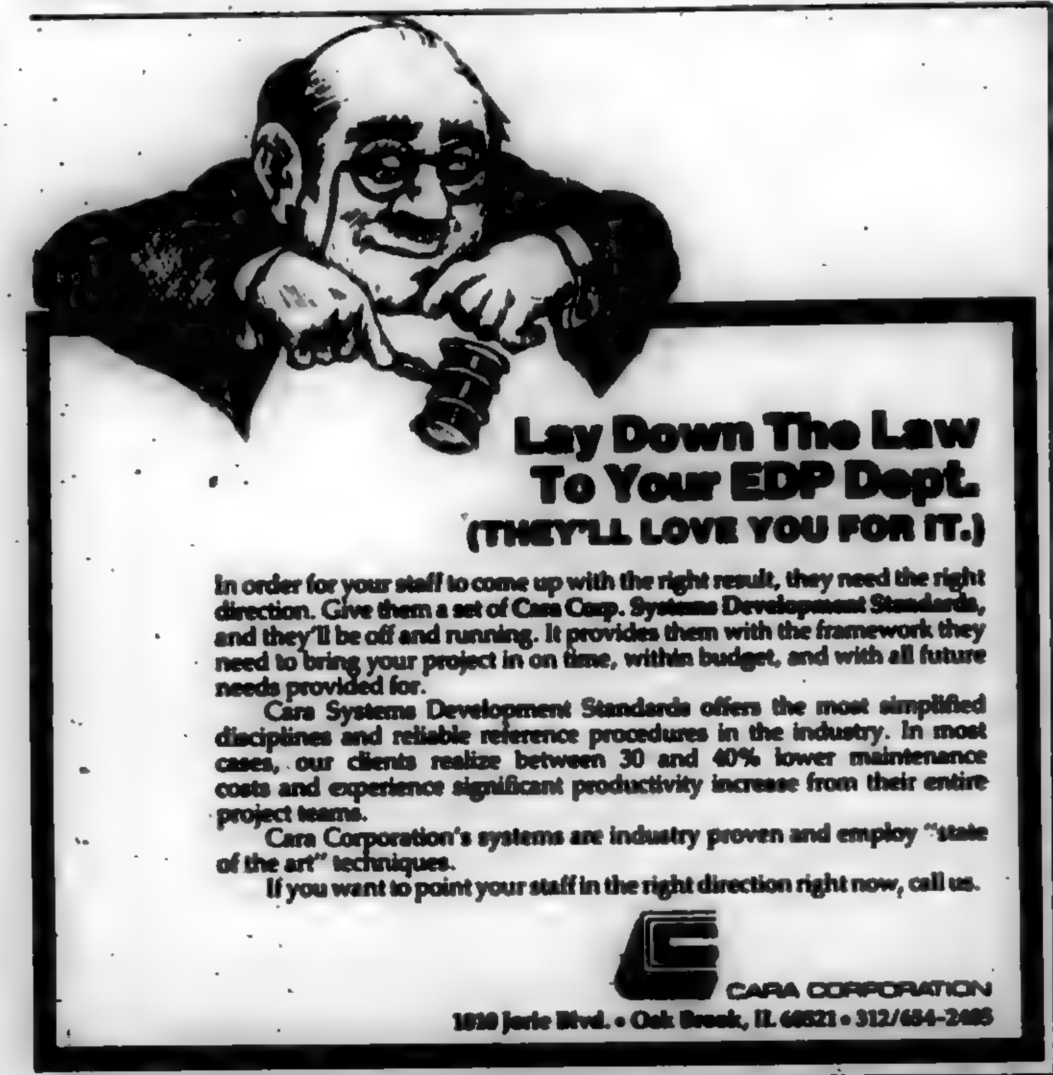
Here is a summary of what was said:

GTE Telenet: "Among all communication services today, only 800 service in its present form" allows the calling party to make toll-free long-distance calls without operator assistance to a specified subscriber location from any telephone within a specified geographic region.

Thus, "there exists no functional equivalent to 800 service, insofar as data transmission is concerned.

"The voice-oriented procedures inherent in the MTS network are totally unworkable for data transmission purposes. To force them upon data customers . . . through . . . regulatory actions which might compel the withdrawal of 800 service would disserve the public interest."

GTE Telenet also argued that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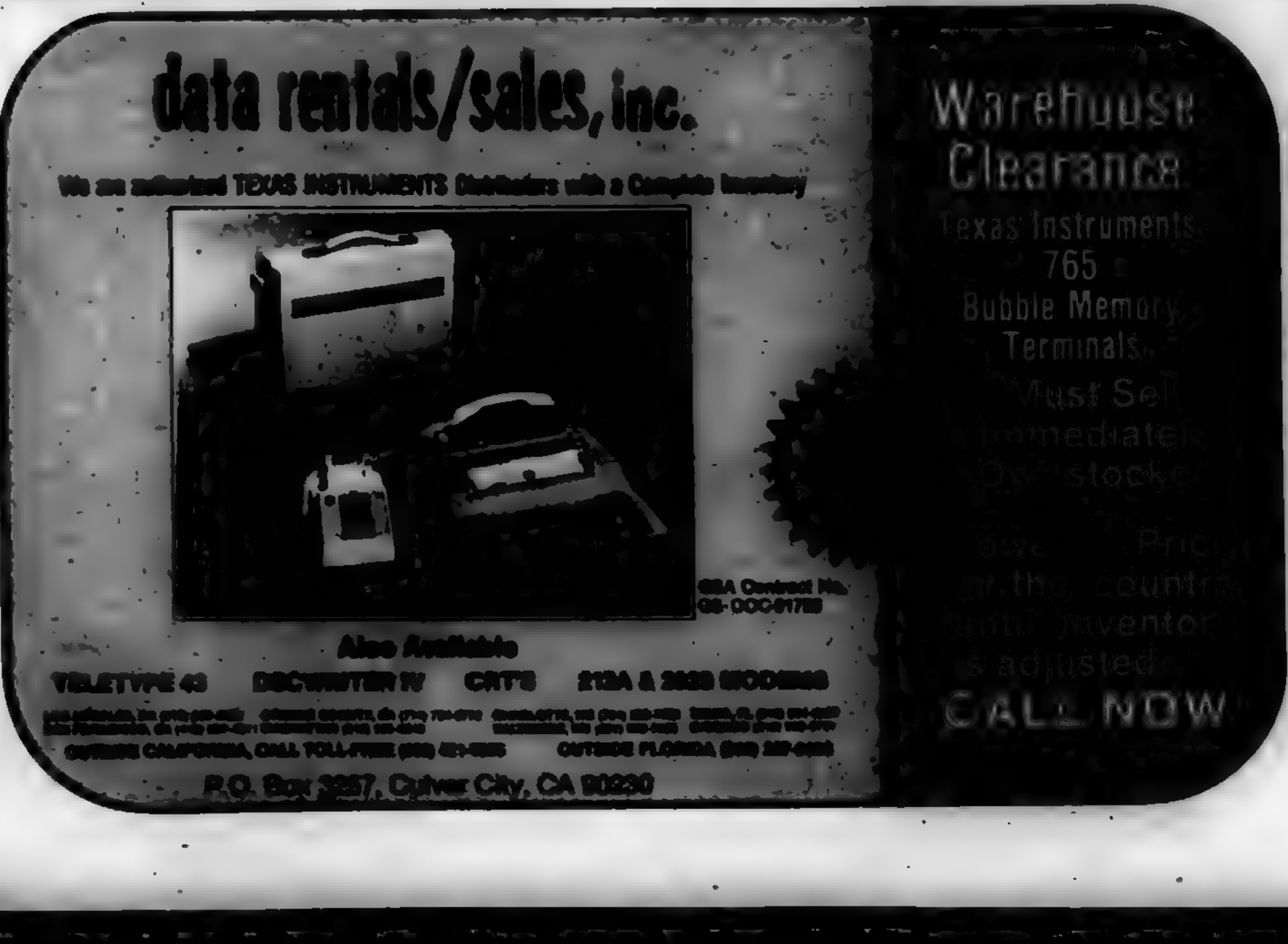
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When FCC Decides on Resale and Sharing

MCI and the other specialized carriers who want the Wats restrictions removed have not indicated they would provide a like offering if AT&T decides to terminate Wats.

Furthermore, although the Wats tariff is anticompetitive, there are other remedies available — the phone company, for example, is required by a court order, growing out of MCI's 1979 court suit, to come up with a new Wats tariff next month.

'Strong Incentive'

MCI: "It is painfully apparent that AT&T needs a strong economic incentive to play the game according to the rules. Resale will create such an incentive.

This "incentive," MCI explained, would come from the competition created by resale and sharing: "if one carrier's bulk rate is too high, its competitors will sell under it, but if it is below costs the competitors will buy the underpriced service and resell it.

"The carrier must therefore price its services at cost in order to avoid these competitive reactions."

Allowing unlimited resale of Wats and MTS will also "result in a major relaxation of barriers to entry into telecommunications," MCI added.

"The investment required to construct transmission facilities is a substantial barrier," and eliminates the need for such investment.

AT&T Stance

AT&T: "It is imperative that the commission in no event order resale and sharing of Wats without the prior implementation of a restructured . . . Wats tariff."

Use of the present tariff, the phone company explained, would allow resellers and sharers to provide long-distance service to present MTS customers at rates substantially below MTS rates, causing a massive migration from that service which would result in "huge revenue losses and cost increases" to AT&T.

Even with a new Wats tariff, however, a trial of resale and sharing is needed before the restrictions are permanently lifted, the phone company added.

The reason: "Even with a restructured tariff, it is impossible to predict the precise nature of arbitrage [resale] activities."

And the trial must be carefully designed "to limit the risk of harm." AT&T offered several suggestions along this line.

The National Telecommunications and Information Administration (NTIA), the President's chief telecommunications adviser, "believes that the benefits of resale far outweigh any potential detriments, and therefore further theoretical studies or a time-consuming, limited market trial would not be the most efficient . . . effective way to proceed."

Regarding AT&T's argument that the trial should not begin until changes are made to the existing tariff, NTIA said it supports the changes in principle. However, "we do not agree that these must be conditions precedent to the implementation of full resale."

One major benefit of resale, the agency added, would be to allow smaller volume telecommunications users to share sophisticated PBX equipment, and thereby exploit such services as minimum-cost routing of toll calls, automatic call distribution, call restriction, metered billing, storing and forwarding of voice messages, call conferencing, centralized answering and recording.

Southern Pacific Communications (SPC): "AT&T's proposed market trial is unnecessary, would yield meaningless results, and its design is flawed in numerous respects."

Furthermore, if resale and sharing is deferred until after a new Wats tariff is adopted, as desired by the phone company, "there is very little reason for AT&T to fully cooperate in the commission's review of that filing" since delay of the tariff would also delay resale and sharing.

On the other hand, if resale and sharing became effective under the present tariff, SPC said AT&T would have an incentive to get a new tariff adopted quickly, for "the more AT&T is convinced that its massive revenue loss projections are correct, the more this regulatory benefit of resale and sharing would seem to apply."

Electronic Mail Slated as Topic Of Symposium

CAMBRIDGE, Mass. — The fourth annual symposium on electronic mail will be held on Sept. 16-17 in New York and on Sept. 23-24 in Palo Alto, Calif., by its sponsor, The Yankee Group.

The symposium will examine user strategies for testing and implementing electronic mail and will demonstrate its cost-effectiveness and increased management productivity capabilities.

The "Integrating Electronic Mail" seminar costs $650. For information and registration, contact Marjorie Sugarman, The Yankee Group, P.O. Box 43, Cambridge, Mass. 02138.

Efta Plans Debit Card Meet

WASHINGTON, D.C. — The Electronic Funds Transfer Association (Efta) will hold a Debit Card I Conference Sept. 7-9 at the Capital Hilton Hotel here.

The conference will be the first in a series sponsored by the organization. Subjects to be addressed include credit restrictions, check processing and national credit card programs, such as Visa, Efta said.

The organization is located at Suite 502, 1029 Vermont Ave., N.W., Washington, D.C. 20005.

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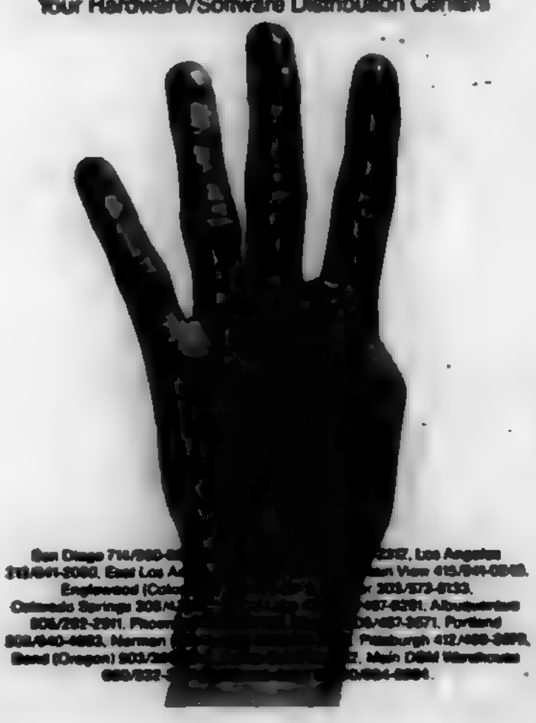

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Managers on the Move

JAMES T. DRUMMONDS has been promoted to manager, computer equipment evaluation, in the corporate information systems planning department at R.J. Reynolds Industries, Inc. of Winston-Salem, N.C.

Drummonds is responsible for reviewing planning and financing for Reynolds and its diversified operating units. He had been project manager of equipment planning since 1978.

He earned a B.A. in physics from Texas Christian University and an M.S. in computer science from the University of Colorado.

• • •

CHRIS D. ERICKSON has been elected vice-president of Information Systems of GTE Service Corp., a subsidiary of General Telephone & Electronics Corp. at Stamford, Conn.

Prior to the election, he was network director of General Telephone Co. of the Northwest, a GTE telephone operating subsidiary. He joined the GTE organization in 1970 as a management assistant in the development program of General Telephone of the Northwest.

Erickson received a B.S. from the University of Washington and an M.S. in business administration from the University of California Los Angeles

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JAMES F. MCALOON was elected second vice-president of Continental Bank's systems operations area.

He joined the Chicago bank in 1972 as a management trainee; later he was promoted to systems officer in 1978.

McAloon graduated from the University of Illinois at Chicago with a B.S. in management and holds an M.B.A. in systems from De Paul University of Chicago.

• • •

BOB D. GALLEY has been appointed data processing coordinator for Farmland Foods, Inc. and Farmland Agriservices, Inc. at the Kansas City, Mo. headquarters. He will be responsible for coordinating data processing operations as well as new applications development for the two Farmland Industries, Inc. subsidiary companies.

He joined Farmland in 1978 as manager of operations in the data processing division. He was previously employed as an information systems development manager at Wilson Foods and at IBM in production control and systems management.

• • •

ROBERT C. WHITEHEAD has been promoted vice-president, automated banking services, while **JOHN D. RUMSEY**, operations, and **CLARENCE J. SHEPPARD**, automated banking services, were named operations officers at Trusco Data Systems, (TDS), the information organization of the Trust Co. of Georgia.

Whitehead joined the staff of Trust Co. of Georgia in 1969 as a management trainee and later served in Augusta, Ga., as a TDS representative where he was elected an operations officer in 1973. He returned to Atlanta in 1974 where he was promoted to assistant vice-president and named manager of automated banking services. He graduated from the University of Georgia with a B.B.A.

Sheppard has rejoined the company earlier this year after being employed by First National Bank of McDonough, Ga., as auditor and First State Bank of Stockbridge, Ga., as executive vice-president and cashier. He was originally employed by the Trust in 1948, where he served as bookkeeper, auditor and in loan operations.

• • •

JOEL RUBIN has been promoted to director of methods and procedures for Avis Car Leasing in Garden City, N.Y.

Rubin joined Avis in 1974 as senior systems analyst in corporate information services and was promoted to manager of systems plan and analysis for Avis Car Leasing in 1978. Prior to joining the company, he was a systems analyst with Consolidated Edison in New York.

Rubin holds a B.A. in Economics from Queens College.

• • •

WILLIAM M. JORDAN III has been promoted to senior equipment planning analyst in the corporate information planning department at R.J. Reynolds Industries, Inc. in Winston-Salem, N.C.

Jordan joined Reynolds Industries in 1977. Until his most recent appointment, he was a systems analyst with the company.

He holds a B.S. degree in physics from Elon College and an M.S. degree in physics from Wake Forest University.

Drummonds

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Computer Fraud Scheme

Three Charged in $500,000 Coca-Cola Theft

By Ann Dooley
CW Staff

MIAMI — After a year-long investigation, three former computer room employees have been charged with using the Coca-Cola Bottling Co. of Miami's computer system here to steal an estimated $500,000 in company products.

Charged with 19 counts of grand theft were Mike Jimenez, Chris Ienco and Mike Torres. The trio will face trial on Aug. 4 in the Circuit Court of Dade County.

The arrests came as a result of testimony form a Coke truck driver who admitted participating in the alleged scam. The driver, who also pleaded guilty to eight counts of grand theft, traded the information for a two-year suspended sentence, sources said.

Although Coke officials declined to comment on the matter, other sources said the alleged swindle was discovered in 1978 during the bottling company's first routine audit — just six months after installing a computer system to automate the firm's old manual accounting system.

The audit showed several large discrepancies in the ordering and billing system and pointed to conflicts in the route of one truck driver in particular.

But before Coke officials could confront truck driver Julio Alvarez with the evidence, a fire ripped through the firm's computer record storage area, destroying many of the printouts to be used as evidence, sources explained.

The alleged fraud was perpetrated by printing phony invoices, creating fake customer accounts in the data base and then, once truckloads of soft drinks were dispatched, eliminating the accounts from the system. The soft drinks were then allegedly sold illegally, metro detectives said.

Fictitious Orders

Circuit court documents and testimony show that fictitious orders were created for some of the firm's larger accounts such as Delta and Braniff Airlines.

The soft drink orders were allegedly filled by employees believing them to be valid and sent out, primarily on the Alvarez route. A forged delivery receipt was returned alleging the goods were delivered to the legal customer, detectives claim.

Records indicate that a bill was posted to the computer's account for that customer, thus clearing up the Coca-Cola accounting records, but before being sent to the airlines, the amount due was allegedly erased.

In this way, the customer would not be charged for something never received and Coca-Cola collected no unauthorized money but was minus the unaccounted load of soft drinks.

Planned Museum to Pay Tribute To History of Computer Science

By a CW Staff Writer

MAYNARD, Mass. — The nation's first large museum devoted exclusively to the history of computer science may rise "like the mushroom cloud of an atomic explosion" in this New England town.

So said a spokesman for the Computer Science Museum project planned by a nonprofit business investment group (BIG) as a tribute to the industry that has given many communities on the outskirts of Boston an economic explosion during the past quarter-century.

Maynard BIG, Inc. has asked most computer firms in the area to financially back the program, which is intended to educate the public and serve as a tourist attraction, according to Paul Connelly, a Prime Computer, Inc. executive who is leading the effort.

Range of Exhibits

The museum will exhibit calculating tools from prehistoric times and other periods prior to the industrial age that began about 200 years ago.

Electronic computing equipment of the vacuum-tube generation will also be displayed along with the first transistor-based hardware and other digital gear through the present state of the art.

Maynard BIG estimates that the museum will cost nearly $390,000 per year to run. But 130,000 adults paying an admission charge of $2 each plus 130,000 children paying $1 each would keep the organization in the black each year.

Maynard's Board of Selectman may grant some helpful appropriations if impact studies presently under way recommend such involvement, Maynard BIG Executive Director Samuel Davis added.

The project is not affiliated with Digital Equipment Corp. or Data Terminal Systems, Inc., which have their headquarters in Maynard.

More information is available from Davis, at Maynard BIG, 74 Main St., Maynard, Mass. 01754.

Afips Names Paul Raisig As Executive Director

WASHINGTON, D.C. — The American Federation of Information Processing Societies (Afips) has named Paul J. Raisig Jr. executive director of that organization.

Raisig will succeed Jerry L. Koory, who has been serving as acting director since last March.

Raisig has served as consultant in the Office of the Secretary of Defense and to the Army Chief of Staff at the Pentagon.

He also served as the principal executive in charge of data processing at a Washington-based life insurance firm, according to Afips.

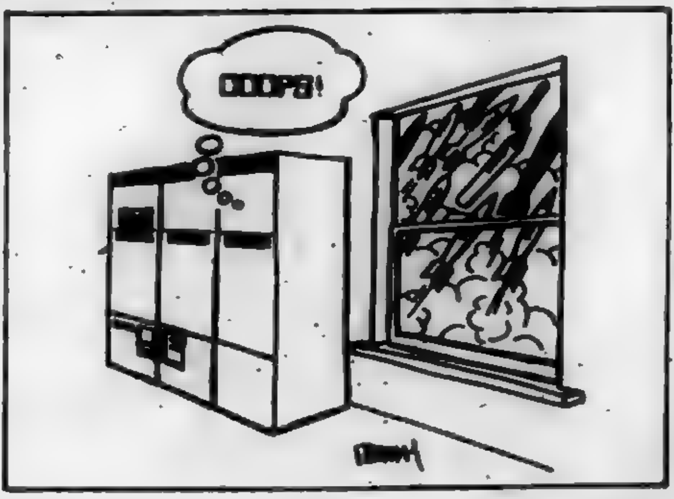
Comtec Elects Officers

ATLANTA — The Computer Micrographic Technology (Comtec) organization announced its new officers for 1980-1981 at its 10th annual conference held here recently.

Officers include president George Michael, director of the Computer Research Group, Laurence Livermore Labs; vice-president, J. Robert Druktanis, systems analyst, Abbott Laboratories; secretary, C.W. Collins, illustration/production manager, Boeing Aerospace Co.; and treasurer, Jeanine Parris, Photographic Sciences Corp.

Other members of the board were presented and several awards were announced.

Comtec headquarters is located at 290 Fischer Ave., Costa Mesa, Calif. 92626.



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UNH Enrolls DBMS To Perform Applications

DURHAM, N.H. – End-user departments at the University of New Hampshire (UNH) here now do a large measure of application work themselves thanks to a data base management system (DBMS) package installed recently.

System 1022 from Software House, of Cambridge, Mass., has helped speed development of applications while, at the same time, freeing the school's computer center staff for other work.

The package is being run on a dual Digital Equipment Corp. Decsystem 10 – two KL-10s – devoted to the academic, research and administrative needs of the 10,500-student university.

Between them, the two systems have over 1.5 million words of memory, 18 disk drives, seven tape units and a host of other peripherals including more than 200 terminals that provide on-line access to users at various campus sites as well as at two other colleges. The administrative system alone hosts 75 terminals and 400 users, with 50 jobs being handled at any one time.

The Codasyl-competible DBMS was installed after an evaluation showed it was "faster and more flexible than other DBMS packages we evaluated," UNH Computer Systems Director Carl Hamrin said.

"It let us add new data without disturbing production. With another system, we would have to unload, refigure our schema, reload and then, in many cases, modify current production programs which access the data base."

Other facets of the data base package also have proved extremely attractive. Simple coding and ease of modification makes application development much faster. In addition, designers and users are able to browse through files, he said.

Conversion Effort

According to Hamrin, not only will new application development employ System 1022, but conversion of other major systems is under way. New applications recently developed using the package include central purchasing and bookstore operations, dining hall management (including meal planning and purchasing), traffic administration (including vehicle registration, permits and tickets) and a public television application which will keep track of sponsors, auction proceeds and donations.

Hamrin credits System 1022 with making efficient the integration of the student record, personnel and alumni operations. "Again, the key advantage is file independence," Hamrin said. "We can link new applications to the biographic data base without affecting current applications."

UNH sees this integration as significantly facilitating file maintenance by eliminating duplicate information and redundant data entry. At least one area to benefit from clean files will be mailings where even a 10% reduction in duplication could save 4,000 to 5,000 pieces in each promotion or fund-raising effort.

On the academic side, the Decsystem-10 and System 1022 are used for a wide range of research activities, frequently for statistical sampling in conjunction with the System 1022 SPSS statistical interface. In addition, Systmm 1022 is one of the primary data base concepts discussed in computer science courses.

Seminars Set On Two Coasts

NEWTON, Mass. – The Institute for Advanced Professional Studies and the Polytechnic Institute of New York will present a series of two- to five-day seminars in the Boston area and one in Palo Alto, Calif.

The first seminar, "Pascal Programming for Mini and Microcomputers," will be held July 28 to Aug. 1 in Lexington, Mass., and Sept, 22-26 in Woburn, Mass., at a cost of $750 per attendee. A two-day workshop for engineers, programmers and technical managers called "Ada Introduction and Trends" will be held in Lexington Sept. 25-26 for a cost of $300.

"Designing for Testability," a seminar aimed at test engineers and managers, will be held Oct. 1-3 in Palo Alto and again Oct. 20-22 in Wakefield, Mass. Cost is $450. From Oct. 6-8 in Lexington, Mass., "Managing Technical Programs and Projects: An Advanced Seminar" will be held, with tuition set at $450.

"Diagnostic Software: Planning and Design" will be presented in Wakefield Mass., Oct.23-25 at a costs of $450 to attendees. All prices include course notes, lunches and evening reception with the faculty. Further information is available from the Institute for Advanced Professional Studies, One Gateway Center, Newton, Mass. 02158.

ICCA Chapter Meets

CHICAGO – The local chapter of the Independent Computer Consultants Association (ICCA) recently held its first meeting here.

Formed to promote professionalism among computer consultants, the group reportedly offers the general business community information about computer-related producst and services.

The next Chicago chapter meeting will be held Sept. 23, the organization said.

Course to Focus On Human Resources

ANN ARBOR, Mich. – A two-day seminar focusing on human resource planning for information processing managers and others is being presented by Comshare, Inc.

The seminar will feature Richard B. Frantzreb, a specialist in human resource planning, and will be held in Philadelphia, Sept. 8-9; Chicago, Oct. 6-7; and Houston, Nov. 10-11.

State-of-the-art approaches to human resource planning, and key issues, goals and objectives and creative problem solving will be studied.

The seminar fee is $495. More information can be obtained from Linda LaBarre, Comshare manager of product marketing, P.O. Box 1588, 3001 S. State St., Ann Arbor, Mich. 48106.

Beyond Measuring Lines of Code

New Gauges of Programmer Productivity Set

By Marcia Blumenthal
CW Staff

BOSTON — While agreeing that programmer productivity is one of their most vexing problems, few management information services (MIS) managers have progressed beyond using lines of code to measure productivity.

But the problem with lines of code measures are that they penalize the use of high-level languages for both quality and productivity measures in exact relationship to the level of the language, according to Capers Jones, assistant director of programming measurement at ITT's Programming Technology Center.

The higher the level language, the worse the productivity penalty, Jones told a group of MIS professionals at a recent meeting of the New England Productivity Exchange Round table here, a group recently formed to address productivity issues [CW, June 16].

Reevaluation Urged

Jones, who has published about 30 articles on the topics of productivity, offered comments on current productivity measures and advocated these professionals start re-evaluating their productivity techniques.

In particular, he stressed the importance of paying more attention to the design and analysis stages of program development and measuring the benefit user departments obtain from the software.

Hypothetical Case

Using a hypothetical example, Jones illustrated the paradox between lines of code produced per month and the level of the application language.

For example, a program written in basic assembler language with 10,000 lines of source code could take 22 months to produce and yield 455 lines of code per month.

However, developing the same program in PL/I with 2,500 lines of code in 12 months produces only 208 lines of code, while a 1,000-line APL program would yield only 111 lines of code per month but takes only nine months to produce.

Likewise, other commonly used software metrics are paradoxical and misleading, he claimed. "Cost per defect" measures tend to penalize high-quality products and "cost per page" measures penalize succinctness.

Moreover, there are at least 15 different ways of defining lines of code and varying line counting rules. Depending on the rules, the same program could be 1,000 or a million lines, he pointed out.

"Unless line counting rules are defined and published, information based on lines of code is worthless," he concluded.

In addition, software projects have work that is not related to coding such as design documentation, which change independently of the number of lines of code written.

Error-Prone Modules

One of the thorniest and most expensive issues in program productivity is error-prone program modules, Jones noted. As a rule of thumb, 50% of all errors in a large system will be found in 5% of the modules, while as many as 60% of modules within a program may approach zero-defect status.

For example, in the IBM OS/360, 4% of the system modules contained 38% of the errors, according to Jones, who worked at IBM for about eight years before joining ITT.

Six key factors lead to error-prone modules, he maintained. Individual human variance accounts for a portion of errors; eight programmers given the same specifications produce code that varies by a 10-to-one error rate, he said.

Design and Testing

Interaction of design and testing create problems; some error-prone modules are never formally tested because they are coded without specifications.

In addition, last-minute changes in hard-to-alter software and revisions without reviewing the update complicate matters further. The size of the program module also creates difficulty.

Modules with more than 500 lines of source code tend to be more error-prone, with 50 lines appearing to be the optimal size, he said.

Moreover, the complexity of the code in terms of the number of operator and operands create chances of errors in a module.

One of ITT's major current productivity projects is eliminating error-prone modules in both its old and new programs. In the design of the new products, ITT is looking for "hot spots" during the design phase and giving these sensitive areas extra tests and inspections.

Although not yet widely used, Jones noted two methods of measuring productivity across languages are increasingly attracting attention — Halstead metrics and functions metrics.

Instead of lines of code, Halstead metrics, now widely experimented with at universities, counts the number of action statements (operators) and data elements (operands) in a program.

Experimentation has found there is a correlation between the sum of the number of operators and operands in the error rate and productivity of a program. Larger companies, such as IBM and ITT, are experimenting with this method.

Function metrics, also under study by IBM, attempts to quantify the cost per function rather than lines of code and assign a benefit to the function.

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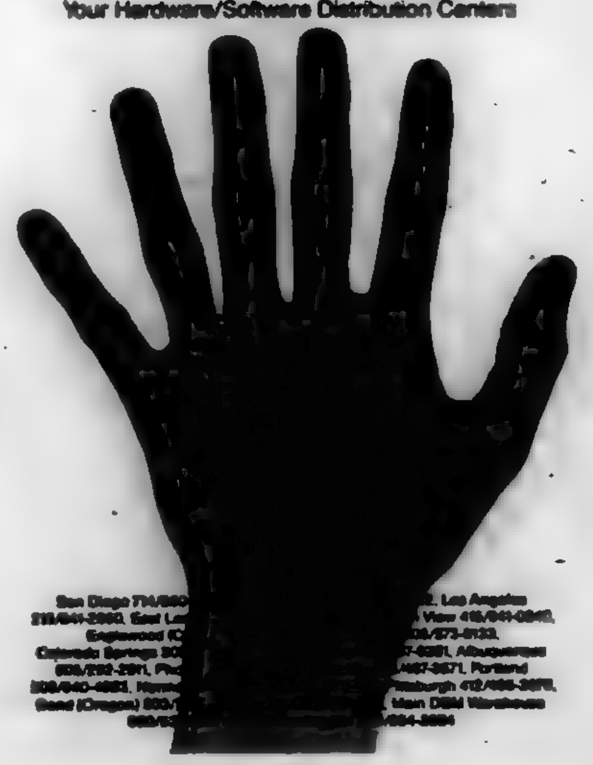

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First Place in Accounts Receivable

TI's DS990/2 Scores High in Benchmark Tests

By Hillel Segal

Texas Instruments, Inc.'s DS990 Model 2 small business computer showed an above-average performance in the Association of Computer Users benchmark testing series for computers priced $15,000 to $25,000. TI's second entry in the 12-system field, the DS990/2, gave results comparable to those of the similarly priced FS990/10, tested earlier.

The DS990/2 came in first in the accounts receivable problem and placed second in the editing test. In other tests it ranked about midway in the group.

One test, the scientific/engineering problem, could not be run because of memory space limitations, a problem also encountered on the FS990/10. All tests were performed in Basic, the language used for this study in all systems where it was offered.

Its first-place finish in the accounts receivable problem was the highlight of the DS990/2's benchmarking runs. Since the system was designed for business use, this test result is a good indication the TI engineers have succeeded in getting the balance of capabilities needed for running a business application quickly.

The accounts receivable problem involves handling a file of 50 account records. Each record has 10 fields for items such as customer number, salesman number, year-to-date sales, month-by-month sales for five months, payments, and credit limit.

During the running of the problem, the sales amounts and payments fields are updated 10 times by customer number. Then a report is displayed on the system CRT terminal, containing billing detail with the company, salesman, year-to-date sales, credit limit, amount outstanding and sales by month.

The TI DS990/2 required 2 minutes 48.3 seconds to run the problem. Others tested in the series took as long as 10:37 to perform and display the same set of functions.

SCOREBOX

System: Texas Instruments DS990/2
Current Price: $18,740

BENCHMARK RESULTS

		TIME	RANKING
C-1	Scientific/-Engineering Problem	*	*
C-3	Accounts Receivable	2:48.3	1st

OTHER BENCHMARK RESULTS

	C-1	C-3
IBM 5110	6th	4th
Wang 2200VP	1st	3rd
Texas Instruments FS990/10	*	2nd
Hewlett-Packard System 45	3rd	8th
DEC PDP-11V03	7th	5th
Q1 Lite Microcomputer System	4th	7th
Univac BC/7 Model 610	5th	11th
Northern Telecom 405	*	**
Datapoint 1170	9th	9th
Randal 100	8th	10th
Hewlett-Packard 250	2nd	6th
Texas Instruments DS990/2	*	1st

*Test could not be run because of memory limitations.
**Test could not be run because of memory or formatting limitations.

Memory Squeeze

The memory limitation occurred because the TX5 operating system together with TX5 Basic language requires all but 14.5K bytes of the 64K total memory area. This left insufficient room for the scientific/engineering problem to be run.

A scaled-down version of the problem, test C-1A with 35 simultaneous equations containing 35 unknowns (vs. 50 for C-1), was able to be run on the DS990/2. Performed only on the latter six systems of the benchmark field, this test allowed some estimate of real-life scientific problem-solving capabilities. The DS990/2 ran fourth in this smaller six-system field.

The memory space squeeze which prevented the scientific/engineering problem from running was being approached in several ways by users and TI. The independent consulting firm which performed the benchmark tests tried TI's Power Basic on the similar FS990/10 system, and it allowed the test to run in 6:31, the equivalent of a fourth-place effort.

(Incidentally, we also ran the scientific/engineering test on the FS990/10 using TI's Fortran IV in a time of 1:02, twice as fast as any system tested in Basic during the entire series. It is easy to see from this statistic alone why Fortran is popular among scientific users.)

The smaller, nonupgradable DS990/1 systems are outfitted with a different version of Basic called small business computer or SBC Basic. This version uses an operating system which takes up significantly less memory space, leaving 26K for the user out of a 64K total memory area.

The Model 1 can use all the same languages as the rest of the DS990 family, including Basic, Fortran IV, Assembly and run-time systems for Pascal and Cobol. However, the Model 1 uses different hardware which cannot be expanded as easily as the Model 2.

With an upgraded processor, including an additional 64K bytes of memory, the Model 2 can be transformed into a Model 4, solving the memory limitation in the most obvious way: add more memory.

This weekly column gives the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

OEM Responses

OEMs contacted during the user survey portion of the benchmarking process indicated that the 64K memory limitation of the Model 2 occasionally caused them to simplify or structure their programs differently. But it was considered an acceptable arrangement for a "target" system, that is, a small computer on which could be run applications programs written and developed on a larger computer.

One user commented, "I have some programming problems because of the high system overhead." "I've gotten used to writing small programs," said one, who added that he also partitions programs to get around the space problem. Another noted the run-only mode allows more memory to the user than the development mode.

The larger systems in the DS990 family, the Model 4, 6, and 8, were being used for development work by OEMs contacted. And it was interesting to note that in contrast to the scientific application-oriented FS990 series, all user respondents to this survey were interested in the DS990 for business applications only.

Compatible Software

Compatible software throughout the DS series was considered a big advantage to users of the line. The Basic used for the FS990 tests was also virtually identical to that needed for the DS990. Only a minor change in I/O statements to address the diskette drives was needed.

"The flexible language offerings and compatibility between systems are really 'plus' factors," one user noted. "I like the fact that the Model 2 software is compatible with the larger DS systems," another said.

The Model 2 offers users an entry into the DS990 family of systems. On the low end of the series, it offers a limited multiuser capability and can be expanded with hard disk drives by adding a DS10 Disk unit with 4.7M bytes of fixed disk and a like amount of removable disk. Reel-to-reel tape is also offered, and up to four floppy diskettes can be utilized.

Nowadays, the company markets the TX5 operating system package separately for $1,700, and a comparably priced DX5 operating system and utilities are also available for users who prefer to run in Cobol on a Model 2 while developing their programs on a Model 4 or larger system.

The price of $18,740 for the DS990/2 includes the 64K processor and memory, a video display terminal, Model 810 printer, TX5 operating system, utilities and the Basic language. Two diskette drives totaling 2.3M bytes were also included in the configuration tested.

The system editor of the DS990/2 was found to have the second-best performance of the 12 systems tested in this price range. It required 155 keystrokes to edit the nine-line sequence according to the script and was rated very easy to use.

Since the DS990/2 was introduced to the OEMs late last year, end-user comments on this model were not as available as for those systems which have been offered longer. However, Texas Instruments itself received favorable comments from end users and OEMs alike, who said the company offered good engineering at a reasonable price.

For end users in the business fields especially, however, the relationship with the OEM supplying the hardware and software would be a critical element in the success of the installation.

Next week: a roundup review of all 12 systems tested in the $15,000 to $25,000 price range.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU are available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

Programming a Logical First Step?

Turnaround Time

By Larry E. Long

Q In my company you are either a programmer or a systems analyst. Each group has a manager, both of equal rank.

All new employees in management information services spend three to five years as programmers before they are "promoted" to the systems group. I think I would enjoy systems analysis and design, but I'm not cut out to be a programmer.

Is programming experience really a requirement to be a good systems analyst? If so, how much is needed?

A First, I would like to dispel the myth that the logical upgrade from a programming position is to a systems analyst position. Both are professional DP positions. Your company apparently encourages this career path and probably has systems analysts who would be better contributors as programmers and vice versa.

I've been asked this question many time and consequently have given considerable thought to a response. Though many will disagree, I would encourage people entering the data processing/information systems profession to develop at least intermediate skills in business programming. Depending on an individual's exposure to programming in college, this may take from six months to two years.

This exposure will instill an empathy for the plight of the programmer and provide background knowledge in the realities of hardware/software capabilities and limitations. These are necessary ingredients for a "good" systems analyst.

Q We are a small combination export-management firm and have been interested in setting up part of our order process and record keeping on a computer. As our business is rather specialized, we have been unable to locate software designed for our type of operation.

Hardware dealers have quoted us a variety of equipment ranging in price from Radio Shack's TRS through IBM, Wang Laboratories, Inc. and so on (prices from approximately $8,000 through $35,000). Estimated software costs from different vendors ($5,000 to $30,000) were such that we are afraid to get started.

Our sales volume, while small, should be in the area of $3,000,000 with some 500 to 700 orders to be computerized. Have you any suggestions?

A I recognize that establishing a DP department in your company will require a significant commitment of funds, both now and in the future. What's more, I can almost guarantee you some very anxious moments, and even months, during the development stages and after implementation. Managers from other small companies have experienced the same reservations as you.

Although the range of hardware and software price quotations may seem extraordinary, they're not. Unfortunately, I cannot be definitive about which computer to select, nor can I say that there is a direct correlation between quality and the price of software services, because there isn't. You may need expert assistance from someone who is familiar with your environment.

If you're like virtually all other initial computer users, you can expect rapid, cost-effective growth. With this in mind, you need to ensure that the computer system you purchase can be expanded to meet your needs and that the software is flexible enough to accomodate interaction with future applications systems.

This expected growth is going to require ongoing attention. For this reason, I would suggest that you consider either hiring someone to handle the DP activities, hopefully with previous experience, or cross-train an existing employee. You might consider either of these approaches as an alternative to having your initial software developed by software vendors.

Initially, the software decision may be more critical than the hardware decision. Therefore, if you elect to go with a software vendor, define the expected software deliverables in writing (programs, program and system documentation, user manual, training, scope of conversion and implementation effort, extent of changes after post-implementation review and so on).

One more point. Many small companies have tried and failed to successfully implement DP systems. Most of these failures can be traced to management's reluctance to be active participants in the development process and their lack of patience to wait for the completion of a quality product.

Long is a professor at Lehigh University, a DP consultant and author.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

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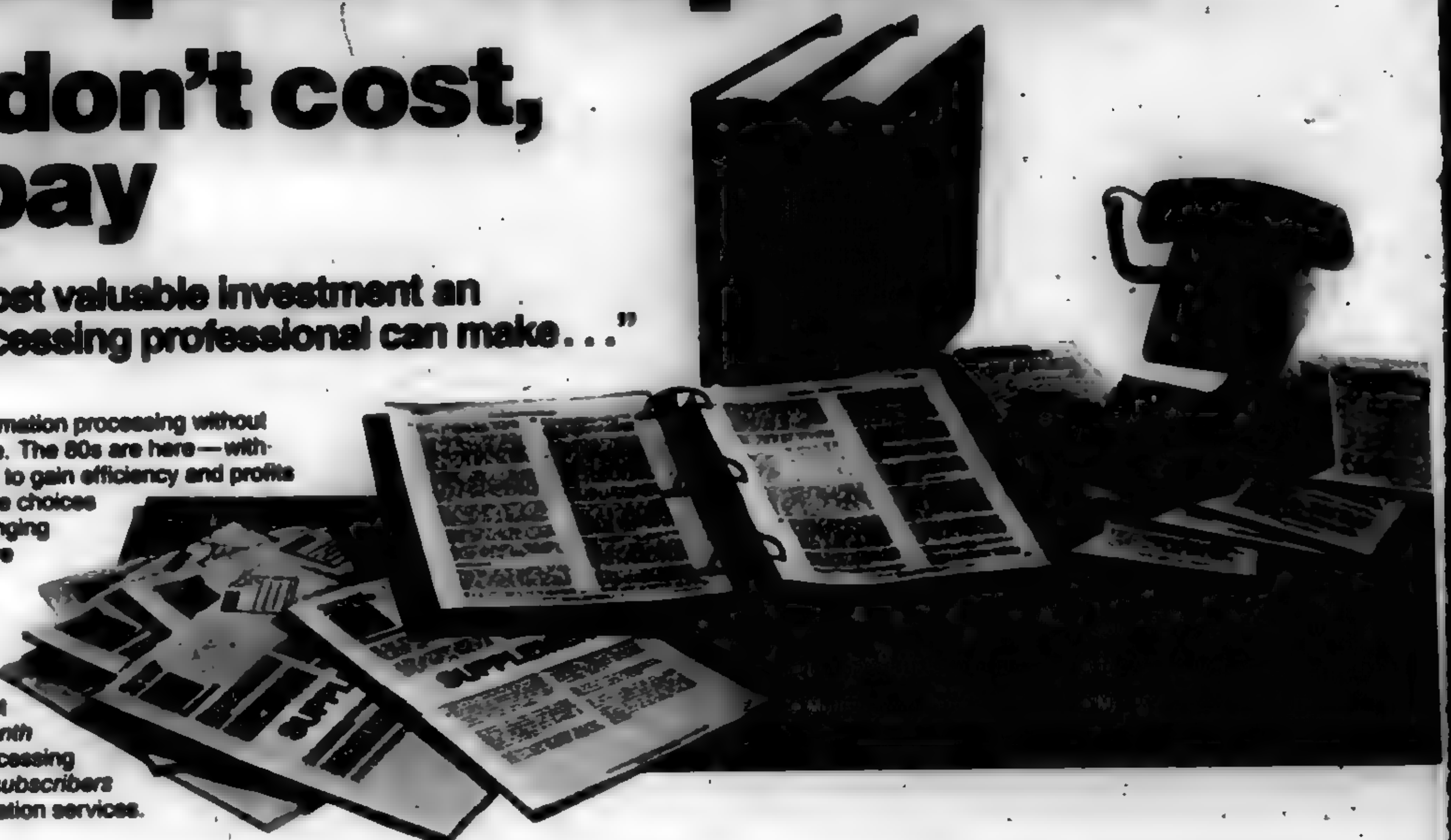

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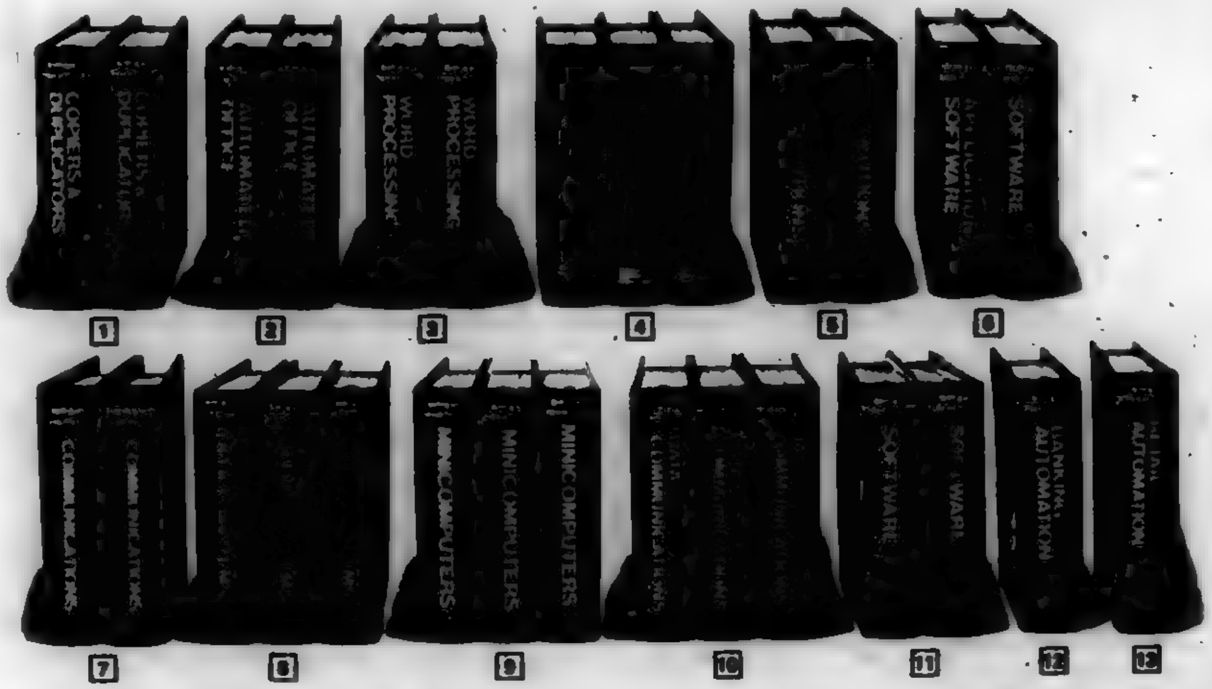

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MAINTENANCE PROGRAMMING

By David M. Clark

With maintenance consuming up to 80% of software costs, it's obvious that paying attention to the black box of maintenance programming could pay big dividends for programming managers.

Maintenance programming is an important but often overlooked facet of most DP organizations. Shunned by programmers who consider themselves the Leonardo Da Vincis of their shop and ignored by many high-level managers who want to know why their favorite project has not gotten off the ground, it remains the frequent burden of those least qualified to perform it: trainees and programmers new to their shop.

The larger, more complex systems that users are currently demanding require detailed knowledge of a system in order to effect even the smallest change without disruption. Yet the high degree of turnover in many shops, plus the requirement to rotate creative, easily bored people through a variety of programming challenges, often necessitates that programmers make changes to a system about which they know little.

Furthermore, with software costs climbing and maintenance consuming as much as 80% of those costs, it becomes obvious that paying increased attention to the black box of maintenance programming could pay big dividends for programming managers. Programming aids, high-level languages and easy-to-use file and debugging utilities help, but there is another side to the story; a formal methodology in how to make changes to an existing program.

Determining how to go about changing a program is one of the biggest headaches inexperienced maintenance programmers have. Typically, they spend too much time on frustrating, misdirected (and expensive) searches for the right code to change. Sometimes they get lost in the wrong section of the forest, sometimes they spend too much time looking at too many of the wrong trees and sometimes they want to chop down the entire forest. In other words, they need help seeing the forest for the trees.

It is a truism of programming that it takes more time to find where to change a program than to make the change. Consequently, the methodology discussed below emphasizes the proper preparation for making a change and not the specific change itself. It is easy to write a MOVE statement in Cobol, but harder to know where to put that MOVE statement.

This methodology should also help experienced programmers and can be applied to nearly all systems. While it is primarily intended as a working tool for the practicing programmer, management will also find it helpful as a checklist against which to measure maintenance training.

Importance of the Task

The first step is to determine approximately how long the task should take and how important it is. While all of your tasks are probably considered important by management, it is important to be able to estimate how much time and effort the task requires. If management does not give you a rough estimate of the time it should take you to complete the task, or if your estimate (assuming you feel confident in making one) is way out of line with management's, ask for clarification.

The time estimate is important to management because it indicates the upper limits of the cost/benefit ratio, that is, if it takes you significantly longer than the estimate to complete the task, management may decide that the cost of completing the task may be exceeding the benefits. The task might be given lower priority, completed by someone else more knowledgeable about the system or perhaps not performed at all. If your net hourly cost in changing a program exceeds the benefit derived from the change, you may be a victim of poor planning or time estimating, but you may also be spending more time than you should on the task.

You should also determine for yourself how important this task is to your work load. To do this, ask the following questions:

1. **Have you been given too little or too much help in determining how you should go about making this change?** If you have been given too much help, that is, another programmer led you right to the code to change and pretty much told you how to change it, you should ask yourself why. That type of approach is costing management more than if the other person completed the task himself and may indicate a lack of trust in your sleuthing ability. Conversely, too little time spent explaining the task may indicate that the task is a vote of confidence in your abilities, however frustrating that may be.

2. **Have you been assigned permanent responsibility for maintaining this program?** If so, a little extra time spent familiarizing yourself with the entire program will pay dividends later.

3. **How much time do you have for testing?** If you are in a shop in which you can only get one test run a day, you obviously want to make that one run count and spend more time in analyzing and desk-checking the required changes.

4. **How difficult is it to test the program?** Can you try out several different changes quickly and easily, or should you spend more time checking the changes? Determine for yourself the optimum testing/desk-checking ratio.

Change Instructions

Paying careful attention to the change instructions is an obvious yet often-overlooked step.

Hopefully the instructions will be in writing, which at least will afford you the opportunity to read and study them. However, this may still not be enough, and you should determine, through direct contact with the user who first requested the change, if the instructions really communicate what the user wants. Although volumes could be written on user/DP communications, keep in mind this simple fact: Most user-related problems in DP are not technical problems, but communication problems.

For example, a user requested two changes to a program that produced a report very similar to another, more frequently used report. As it turned out, there had been other, more recent changes made to the second report. In discussing the changes with the user, we discovered that he really wanted the two reports to correspond exactly. So instead of having to hunt and peck to make the original two changes, we

(Continued on Page 28)

IN DEPTH

(Continued from Page 27)

simply inserted in the first program all the changes made in the last couple of months to the second, more frequently used program.

The task thus became logically easier to accomplish (since we didn't have to determine where the two programs were different), it took only slightly longer to do and the user was happier. And isn't that what we are in business for?

Get an overview of the program before you start. The length of time you spend on this overview will depend upon how much importance you have assigned to the task, as mentioned earlier. However, you should at least determine the following:

1. What is the basic purpose of this program? Is it a report generator, a file update, an edit/update?

2. What is the primary output of the program? If you know what the program is working towards, it becomes easier to understand intermediate calculations or processing.

3. What is the basic framework of the program? How are loops handled? What type of organization does the program have — formally structured, loosely structured (GOTOs allowed, within limits) or "waterfall" (GOTOs cascading down through the program)?

In addition, try to determine the style of the programmer who originally wrote the program. Most programmers have styles of coding as individual as their handwriting. Understanding how their code loops in one part of the program will probably help you understand how loops are coded in a more difficult section of code. Look for patterns in such things as how data names are formed, how IF conditions are handled (positive or negative logic) and so forth.

Answering these questions will help you make intelligent guesses about what the program will do when you finally come to the section that you need to change. That in turn will help you decide more quickly, and with more assurance, what will happen if you change program control statements and thus program logic.

Getting an overview is usually easier with a program that has some structure (that is, it falls somewhere along the continuum from modularized to formally structured). However, if you become hopelessly lost in a program with countless, hard-to-follow GOTOs, than perhaps the best approach, to paraphrase Alice in Wonderland, is to begin your overview at the beginning. Identify the major I/O areas, and then start with the first procedural statement, following the guidelines discussed herein.

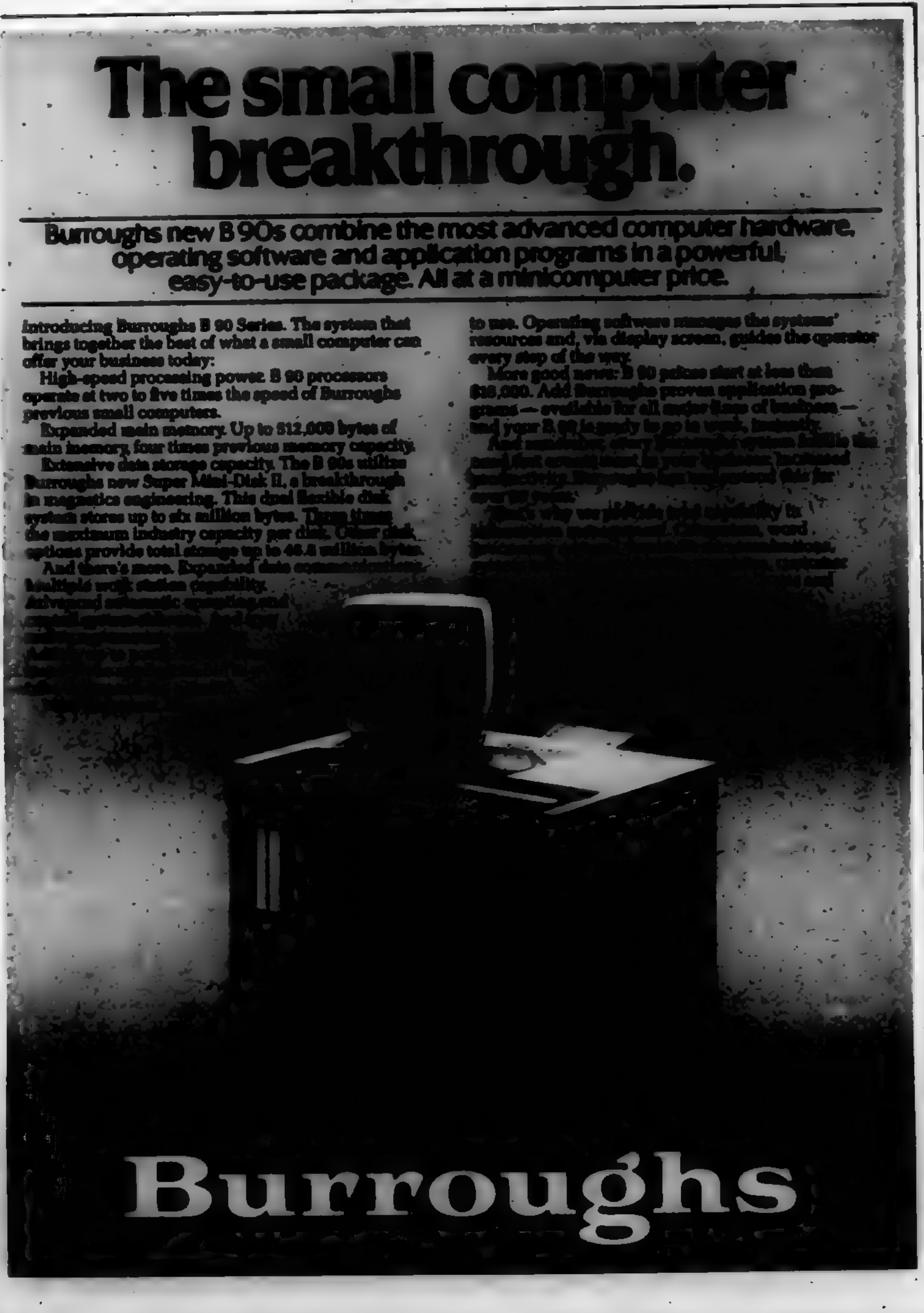
Look for the Loops

Assuming that you know how much time and imporatance you want to attach to this task and that you have some idea of what you and the program are both trying to accomplish, the next step is to stake out the major boundaries of the program logic. To do that, break the program down into its identifiable segments (mainline code, initialization routines, and so forth) in order to determine into which segment your change will fall.

The easiest way to do this is to look for the major processing loops in a program, since they serve as fence posts of logic. Almost every program has them, even if they are implied (PERFORM UNTIL or DO WHILE). The main loops are usually marked, especially in an unstructured program, by some sort of input statement, usually a read, and a program control statement such as a GOTO.

Pay particular attention to unconditional branches. For example, look for GOTOs before paragraph or section names in Cobol, especially GOTOs that loop back to the main input paragraph.

Picking out the major loops in a previously unfamiliar program also has a tremendous psychological advantage: It reassures the programmer that there is, in fact, some way to understand and therefore change a complex program. This advantage is not to be taken lightly, since it is often out of frustration over a seemingly incomprehensible program that programmers make careless, stab-in-the-dark changes. These are the very changes that return to haunt their successors in the form of system crashes, missing input and so forth. We then have the famous vicious circle in which programmers do not have enough time to write correct,



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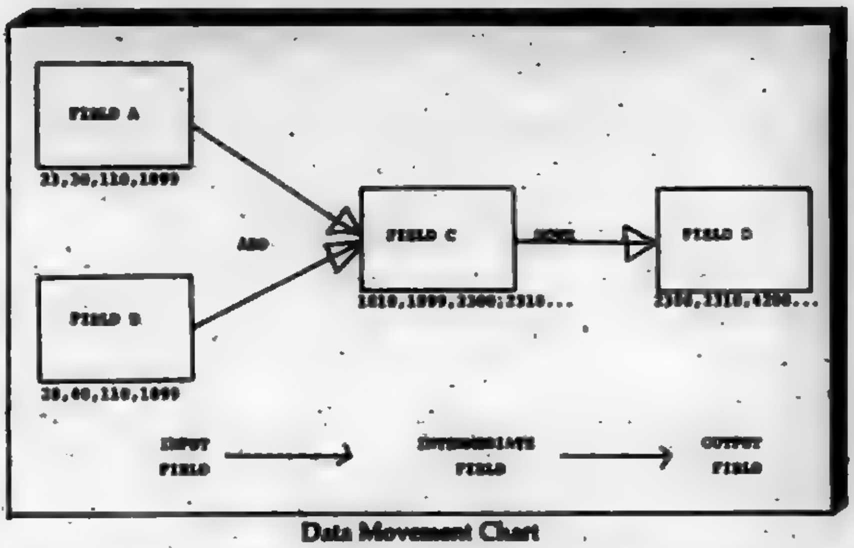

Data Movement Chart

easy-to-maintain programs because they are too busy "putting out the fires" of someone else's previous mistakes.

Ignore Extraneous Sections

Ignore the parts of the program that will not be affected by your change. This is one of the most important yet most difficult steps in maintenance programming, yet it is precisely because programmers jump right to this step that they have so much trouble.

Performing the steps discussed above makes the task of weeding out the inapplicable parts of the progam fairly simple. With an overview of the program in mind, and knowing the style of the original programmer, you can then determine where the main line section of the program falls, where initialization is performed, when the program is likely to loop, why and, in general, focus on the general area of the change. Your familiarity with the change instructions will then enable you to make your change more quickly and confidently than you would have otherwise.

It is also possible to give some general guidelines as to which areas of a program can be ignored, at least on the first go around. For example, initialization sections are usually only important later, when you need to know when and where a key data field is first accessed. Sections that build tables internally are only important when you are changing the layout of those tables. Otherwise, concentrate on what is done after data is stored on those tables. In a file update program, you can ignore the key matching logic if you are only interested in the output on one of those files.

When All Else Fails

If the program you are staring at has the clarity and organization of a pile of spaghetti, then the best thing to do may be to begin at the end of the program and work backwards through the program logic. That is, if you know what fields on a file or what columns on a report you want to change, start with the data names for those fields and find out where those data names are accessed in the program cross-reference dictionary.

A data movement chart may help (see figure). Starting at the right-hand side of a piece of paper, draw a box with the last output field name in it. Below the box, draw the lines in the program in which that field appears. You then check each occurrence of the field, crossing out any superfluous accesses of that field and concentrating on those lines in which the field is created or otherwise manipulated.

Any fields that provide data for that output field are drawn to the left of the field, in their own box, with arrows showing the direction of the data movement connecting the two boxes. The statements that modify or create the data can be written over those arrows.

This process of working backwards through each field is continued until the original source of the data, or the field that needs to be changed, is encountered. Finally, the data movement chart can be filed with the change instructions for subsequent use by later programmers.

Don't go overboard with your changes, but don't be afraid to make a change.

This hardly bears repeating, for most of us learned early in our careers that changing something you didn't have to change because it wasn't done with sufficient elegance can lead to sudden and disastrous results. But what does bear repeating is that "once burned, twice shy" is not necessarily effective programming. People write code, and people can change code — it is not cast in stone.

Conversely, consider using code that you are reasonably confident already works. (Not all existing code works, but give it the benefit of the doubt if you are not sure.) Perhaps there is another similar routine in an existing program that can be copied or modified for use in your program.

At this point, you also might want to consider what other changes the user might want to make in the near future that you could make while the program logic is fresh in your mind.

One of the best additions or corrections you can make to a program is to document what you have learned about the program logic. For example, a few words inserted directly into the code about what a switch does, where it is initialized, under what conditions this paragraph is performed and so forth can help those who follow you tremendously. And who knows, you might even start a trend towards greater documentation in your shop!

Document Your Changes

Document your changes at the lowest level possible in the system hierarchy.

Many programmers will understand the need for the steps discussed above, but balk when it comes to documenting program changes. (It is interesting to watch those same programmers making changes to an unfamiliar program. When scanning a page of code, their eyes will usually jump right to any documentation, even if that documentation is totally irrelevant or out of date. Once in place, program documentation is hard to ignore.)

The pros and cons of documentation

(Continued on Page 30)

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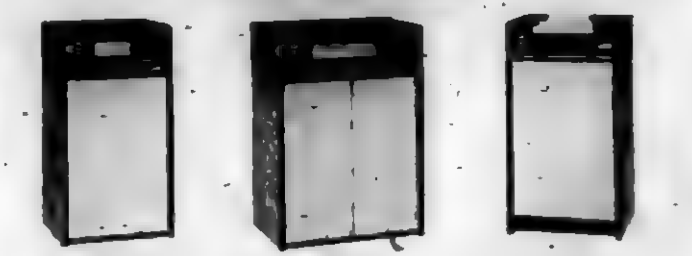

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IN DEPTH

(Continued from Page 29)

and how to document effectively lie outside the scope of this article. However, the following simple tips should prove helpful in answering the question most frequently asked when a program has problems: Has it been changed lately?

1. Document at the lowest level possible, which is usually right where you make your changes to the program. Separate documentation folders or program/system narratives are nice (and important, for different reasons), but they are too far removed from the level of the system that changes most frequently. Most programmers go to the code first when they need to change a program; put your documentation there.

2. Put in the code some reference to the task or change instructions. This enables subsequent programmers to quickly spot which code was changed. For example, in our shop, we insert the word "TASK" followed by the four-position task number in column 73-80 of our Cobol source programs. Then if a programmer wants additional information, he can pull the file on that task (they are filed by task number) to gather any additional information, such as the original change request letter from the user, or notes the maintenance programmer may have made in making the change.

3. File the changes to the program with the program source listing. This ties in with Number 2 and provides a ready reference to all previous changes. For example, we file a separate list of just the permanent program changes in front of our Cobol source listings. Then when we have problems with the program, we can tell instantly by looking at the previous program changes if the program has been changed recently.

Learn From Other's Mistakes

After a stint doing maintenance, most programmers appreciate the difficulties in changing obscure, hard-to-follow code. (Is this why some companies start their trainees in maintenance programming?) Hopefully, this will lead you to improve your own code by making it easier to follow and easier to change.

However, maintenance programming should also help you appreciate the problems the original programmer had to overcome. Providing DP answers to a user's problem can be difficult; code can be difficult to write. So making a program legible and easy to maintain is an important goal, but not as important as writing programs that work as the user wants them to work. Efficient and easy-to-maintain programs, completed within a reasonable period of time, should be the goal.

Following the steps above should speed the time required to maintain existing programs and thus improve programmer productivity and lower maintenance costs.

This methodology should also turn maintenance programming from an archaic, hit-or-miss approach into a more precise and exact science. Hopefully it will also raise the image of programmers as magicians mumbling mysterious mumbo jumbo into true software engineers practicing a rigorous and effective science.

David M. Clark is a programmer analyst with Reynolds Metals Co., Richmond, Va.

Clark's interests include programming techinques, programmer productivity and the psychology of computer programming.

Clark holds a B.A. in English from Dickinson College and an M.S. in business information systems from Virginia Commonwealth University.

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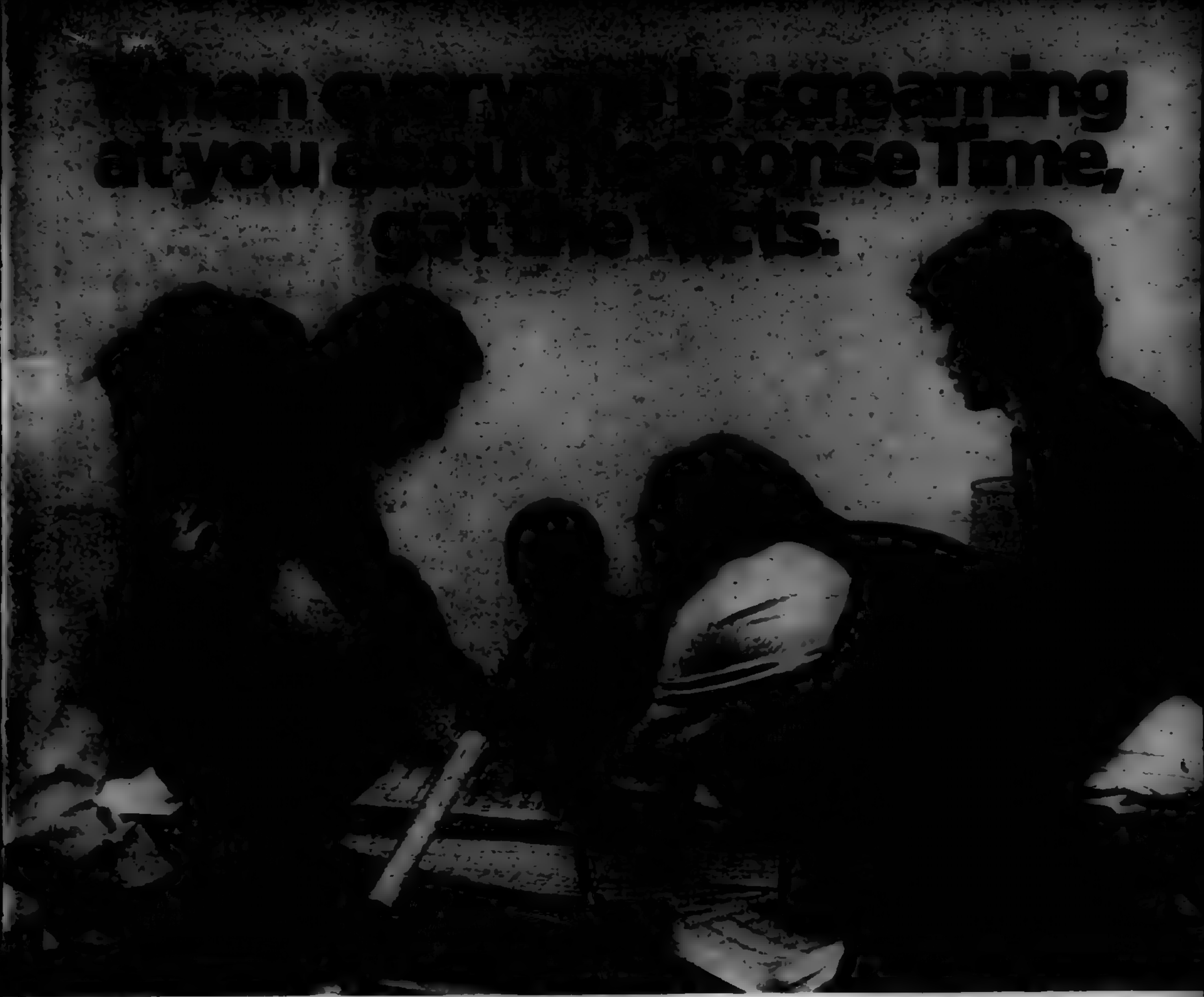

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EDITORIAL

Computers and the Draft

What gives the Selective Service System the right to commandeer the computing resources of other federal agencies?

To support draft registration of 19- and 20-year-old males, the Selective Service has drafted more than 1,000 keypunchers, mostly employees of the Internal Revenue Service (IRS), to handle an expected flood of computerized registration forms.

The IRS, a Treasury Department agency, will convert the data to magnetic tape for processing on a National Advanced Systems Corp. AS/5 mainframe owned by the Interior Department (see story on Page 9). Additional support will be rendered by the General Services Administration and the Office of Management and Budget.

This pooling of information processing resources within the federal government should not escape public scrutiny. It seems to give investigative agencies greater opportunities for encroaching on personal privacy rights and to dilute congressional controls over how the taxpayers' investment in capital equipment is used.

Moreover, the project exploits many federal computing specialists who took jobs with their respective agencies without realizing they would be roped into supporting conscription. Has anyone asked them how they feel about this?

As the federal tax collector, the IRS already possesses detailed financial information about most U.S. residents. And the agency has been known to pass this information along to the Federal Bureau of Investigation for surveillance of political dissenters.

Then there's the Interior Department. Two years ago, the General Accounting Office said Interior regularly wasted millions of dollars by mismanaging its computing resources [CW, July 10, 1978].

What controls exist over the management of that AS/5 Interior is lending to the Selective Service? How extensive is Interior's role in supporting the draft registration process? Does Congress know or care about the answers to these questions?

Other government investigations have found that many federal agencies are only marginally complying with provisions of the 1974 Privacy Act. And the Carter Administration's proposed fiscal 1981 budget slashes funding for the President's privacy program, which was supposed to shore up compliance monitoring [CW, April 7].

In this light, the pooling of computing resources for support of draft registration, an especially explosive political issue during a presidential election year, seems ill-advised and, from a civil rights standpoint, dangerous.

DATA PAST

Five Years Ago
July 30, 1975

STAMFORD, Conn. — Xerox Corp.'s Data Systems Division departed the mainframe scene, but the company would retain certain peripherals, terminals and its DP services business. The move was related to a drastic dip in second-quarter financial results.

— — —

MINNEAPOLIS — Control Data Corp. doubled the basic memory size available on its top-of-the-line Cyber 76 series and boosted maximum disk capacity by 50%. The Cyber 76-142 contained 128K 60-bit words of bipolar semiconductor basic memory.

Eight Years Ago
Aug. 2, 1972

OMAHA, Neb. — In a week of confusing legal activity, one court barred IBM from making a scheduled product announcement, but was later overruled on IBM appeal. IBM said it would announce two models in the 370 series — the 158 and 168 — with virtual storage.

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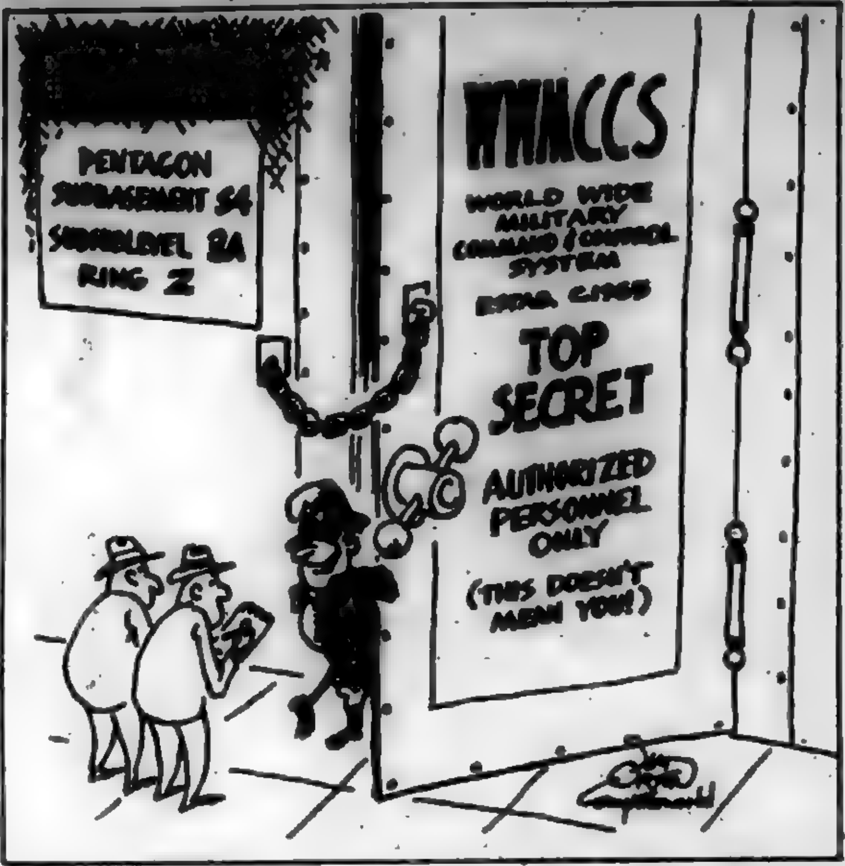
DENVER — A computer operator here was arrested and charged with short-circuiting a system at least 56 times in two years. Before the arrest, however, $500,000 had been spent trying to track down the system's problem.



'Patience, boys! First we decide what to feed it, and then we decide whether it works . . .'

LETTERS

Vsam and FBA Devices

William F. Jurist's benchmark comparison of IBM count-key-data (CKD) and fixed-block architecture (FBA) disk devices was excellent. However, he failed to measure or report on the impact of Vsam, the access method most likely to control any FBA device.

Since Vsam considers FBA to have tracks and cylinders (min-CA, max-CA) and never stores a block number in the catalog, the calculation savings observed by Jurist might be greatly reduced with Vsam.

Wayne C. Sanford

Bowdoinham, Maine

Dispelling Career Myths

Compliments to *Computerworld* and to Sandra K. Sawyer ("If I Flunk Out of Chemistry") [CW, July 14] for the interest expressed and the information provided to enlighten readers about the unclear and incorrect ideas that undermine the identification of data processing career opportunities.

As founder and director of a business-oriented DP technical school which has operated for 15 years, I am keenly aware of the need for available, well-trained entry-level programmers. I applaud every effort to correct misunderstandings rampant about the qualifications and competencies of programmers, the nature of the work they do and the very real rewards — intellectual and financial — to which beginners can look forward.

Stewart W. Swacker

Dallas, Texas

Addition to DBMS Chart

The comparative chart on data base management system (DBMS) offerings was very comprehensive [CW, July 14]. However, there was an omission that needs to be pointed out.

Under "Source Program Languages Supported," Software AG's Adabas also has support for APLSV, VSAPL through TSO, and VSAPL through VSPC. The interface is available using the Interprocess Systems product "Call/AP."

I wish to prevent a possible misconception that no data bases can be accessed from APL OS/VS systems.

Stella Chamberlain

Interprocess Systems
Atlanta, Ga.

Wrong Conclusion

I found "IBM Charges $2,450/Mo for Correct Timing" [CW, July 7] to be of interest, but the conclusion was incorrect.

The MVS under VM/370 user does, indeed, have an alternate choice to bad SMF timing or two undesired IBM products. Amdahl Corp.'s VM/-Performance Enhancement (product number 4PV0-P1) not only provides the primary MVS machine with accurate timing information, but also significantly enhances MVS response and throughput by eliminating most of the VM simulation of MVS privileged instructions.

This is indeed an alternative that users should investigate since it is the only product on the market today that addresses the operational and response/throughput problems inherent with running a production MVS system on the same real machine as VM/370 and provides much more than just accurate SMF timing.

Richard A. Whitcomb

Amdahl Corp.
Sunnyvale, Calif.

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95 Other __________

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11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other __________

Detach here, fold, and place in post-paid envelope attached through binding.

READER COMMENTARY/Walter I. Nissen Jr.

Datapro's Computer User Survey: An Analysis

Recently, Datapro Research Corp. published the largest (and to me the most interesting) user survey ever of computer systems ratings [CW, May 19 and 26]. The survey of *Computerworld* readers covered machines of all sizes and comprehensively investigated users' applications and satisfaction with their systems. In presenting the results, Datapro divided the industry into three parts — maxis, minis and micros.

Survey research on this scale presents massive problems to the researcher. Whatever hard decisions are made about coverage, collection, content and presentation, readers and users of the results will want to apply their own judgment in developing interpretations of the data. This is true even of wholly objective observers. The problems are magnified greatly for those of us within the computer industry itself who already have our own subjective points of view.

After reading the published material and making a first pass at the numerical tabulations, I felt the need to do some retabulation to meet some objectives I had developed for myself while studying the material. Some of these objectives were:

1) General satisfaction. I was concerned with general measures of user satisfaction. Study of the smaller details (applications, languages and so forth) must be left for later study.

2) Vendors. The data is presented by system vendor — essentially, this means hardware vendor, since even companies whose only application runs on a third-party proprietary program product are listed by hardware. I wanted to look at the whole range of systems provided by each vendor, aggregating the data for larger and smaller systems to get an overall measure of the vendor's standing, relative to other vendors.

3) Sample size. Many small companies are represented in the survey by only a few respondents. I wanted to eliminate the smallest of these vendors because the data for these vendors is inherently imprecise, having probable errors greatly exceeding the differences between vendors with larger numbers of respondents. Unfortunately, some vendors with fairly small returns remain in my analysis because only eight vendors had as many as 150 respondents. I chose to draw the line at 36 respondents.

With all due respect to the 10 Tandem Computers, Inc. users and three Magnuson users, I do not feel the data permits comparison of those companies relative to the others. For example, all except one of 44 Amdahl Corp. users and all except one of 39 Prime Computer, Inc. users would recommend their system to another user, compared to all 38 Apple Computer, Inc. users and all 10 Tandem users and all three Magnuson users. Using valid statistical measures, I am unable to distinguish the three larger vendors on this basis, let alone Magnuson. They all appear to be excellent. Hypothetically, if Magnuson were to be put at the top, a single negative response would have plummeted it to the bottom third of all vendors.

4) More Information. The overall satisfaction data reported by Datapro is extremely useful. Still it is only a single number and is based on a minimum amount of data. The question asks the user to distinguish between excellent, good, fair and poor. Is it not possible that those 38 Apple users may have interpreted the question differently than the 44 Amdahl users? I hoped to get some confirmation from other questions.

My hopes both for more information and for confirmation were realized as the table shows, but not entirely. Each of the other measures developed has some problems too.

Basically, I developed two other measures of general satisfaction: the percentage of users who would recommend their systems to other users and the percentage of users who were remaining "loyal" to their vendors in their system replacement plans. Actually the first of these was computed by Datapro, but I used a different method.

Datapro computed this percentage for each computer model or group of models and then averaged these results to obtain a value for the vendor as a whole. However, this gives the same weight to the many responses from a very popular model as to the few from a limited distribution product.

So I recomputed the percentage using the number of user responses to form a weighted average. This leads to the interesting result which is detailed below.

However, even this improved result contains a residual problem. Some users evidently considered system obsolescence in answering the question, "Would you recommend this system to another user in your situation?" (This may also be true of the overall satisfaction responses, although probably to a lesser extent).

This complication raises many problems in comparing vendors. We all know that with time computers are getting more satisfying (We do, don't we?). This puts the more experienced vendors at a marked disadvantage, and even those vendors with lower growth rates should be adversely affected. Also a company's marketing/packaging strategy may affect this number, since a host of new product announcements may make a product seem obsolete, even if the new products are only cosmetically different.

This problem led me to consider using the average system life as reported by Datapro to compute an improved measure of general satisfaction, but with these sample sizes I haven't found a way to accurately calibrate such a modification. I have listed the average system life on the accompanying table so that the reader can make his own subjective evaluation.

In this regard, it is interesting to note the relatively good performance of Digital Equipment Corp. despite a rather long average system life and sad to

(Continued on Page 36)

Rank	Name	Would Recommend System To User (%)	Overall Satisfaction	Replacement Loyalty (%)	Average System Life (Months)	Total Responses
1.	Amdahl	98	3.6	95	22	44
2.	Texas Instruments	96	3.5	100	18	51
3.	Apple	100	3.3	—	12	38
4.	Prime	97	3.3	100	20	39
5.	Hewlett-Packard	87	3.4	87	25	253
6.	Microdata	87	3.4	18	27	45
7.	Wang	92	3.3	30	23	78
8.	Digital Equipment	86	3.1	76	34	475
9.	NAS (Itel)	81	3.2	0	18	37
10.	Datapoint	85	3.1	51	22	79
11.	Basic Four (MAI)	80	3.2	59	[illegible]	45
12.	IBM	81	[illegible]	78	65	1982
13.	Control Data	80	3.1	62	50	36
14.	Radio Shack (Tandy)	80	[illegible]	35	14	70
15.	NCR	73	3.0	67	42	224
16.	Data General	73	3.0	42	22	158
17.	Four Phase	70	2.9	51	31	36
18.	Univac (Sperry)	68	3.0	81	33	171
19.	Burroughs	72	2.9	69	33	316
20.	Honeywell	67	2.9	34	46	203

Consolidated Ranking of System Vendors by General User Satisfaction

READER COMMENTARY/Paul S. Hoffman

Arbitration Has Its Advantages

Alan Taylor recently stated that arbitration clauses work in the vendor's favor [CW, July 7]. However, Taylor presented a one-sided view and ignored arbitration's possible advantages to the user.

From the user's view, suing in court can be extremely expensive, can consume substantial amounts of management time and can (and often does) take place over a period of several years. In some circumstances, arbitration can come to as fair a result while being cheaper, quicker and less demanding of the time of key personnel.

One major advantage of arbitration is that much less management time may be required. Management people involved on the user's side tend to be key people, those who can least be spared to cope with protracted litigation. Although solid preparation tends to be concentrated and the dispute resolved within a few months.

Less Expensive

Another important advantage of arbitration is that it is substantially less expensive than suing in court. A 10-to-one difference in cost would not be unusual. Of course, there are costs associated with arbitration. In addition to legal fees (if you use a lawyer), the American Arbitration Association (AAA) charges administrative fees for handling arbitrations. Fees are assessed on a sliding schedule. Some representative fees for varying amounts in controversy are as follows:

Amount at Issue	AAA Fee
$10,000	$1,300
$100,000	$1,360
$1 million	$3,880

AAA Commercial Panel arbitrators normally are not paid unless more than two days of hearing are required. Most commercial arbitrations run two hearing days or less. In cases that will require either substantial amounts of arbitrator time or special expertise on the part of the arbitrator, the parties may agree to compensate the arbitrator from the beginning.

Fast Procedure

Arbitration is fast. The average commercial arbitration is completed with two days or less of hearings and a front-to-end time of three months from demand for arbitration through the arbitrators' award.

Taylor stated that the discovery procedures available in court are not available in arbitration. This is true, but if arbitration permitted the exhaustive discovery process permitted under the Federal Rules, it would do away with its ability to speedily resolve disputes! An arbitrator (whether a lawyer or not) *does* have the power to subpoena documents, and the parties have ample opportunity to submit their own documentary evidence as well as their own oral testimony. The parties also have the ability to cross-examine the other side's witnesses.

In an arbitration, the rules of evidence tend to be applied less formally than they are in court. An arbitrator might say, for example, "We'll let it in for what it's worth." This can sometimes be an advantage to a computer user.

Another advantage of arbitration is that the arbitration clause in a contract may specify the location of the arbitration tribunal. If you are a user in New York, you may wish to specify that any arbitration will be conducted there. Although all contracts (whether or not there is an arbitration clause) tend to say what state's law will be applied, you cannot specify the location

(Continued on Page 39)

THE TAYLOR REPORT/Alan Taylor

PL/I Escaping Hardware Vendor Control

PL/I has been closely connected to hardware vendors — primarily, of course, IBM — from its inception 16 years ago. Now, following Cobol's movement towards becoming a viable software industry product rather than just a tool for selling hardware products, PL/I is similarly demonstrating its ability to escape from hardware vendor control.

The first software-house PL/I is called PL/I-80 and was quietly issued by Digital Research, Inc. for noncommercial use only early this summer. It is something more than a compiler and does have a tie-in operating system family, Digital Research's own CP/M and derivatives including the new CP/Net. So the compiler itself was not designed to be totally transportable — just hardware transportable.

But a different Ansi X3J1 Committee action seems to have filled in the gap and is making the programs really portable across operating systems too. As a result, PL/I is getting the liberation it lacked in the past and now has a new opportunity to prove itself.

The PL/I-80 language clearly rejects the concept of unnecessary vocabulary or facilities. Floating decimal has been dropped as a numeric data form, but both fixed decimal and floating binary have been retained.

The omissions from the X3J1 Committee's Subset G definition (dynamic arrays, asterisk extents, DEFINED, LIKE and PICTURE) do not prevent many applications from being defined and executed, although there can be a certain loss of automatic inward portability or efficiency.

As for additions, there is a preprocessor control "%REPLACE" which allows constants to be inserted throughout the source program prior to compilation. This makes tailoring of generalized systems a lot easier.

More important additions, however, are the added Ascii group. PL/I-80 has not made the traditional PL/I error of undervaluing I/O convenience. It has added Ascii file processing, permitting variable-length Ascii records and supporting editing and other functions.

Particularly significant is that these additions to the standard are themselves almost de facto standard, having been added into Wang Laboratories, Inc., Data General Corp. and other Subset G PL/Is for minis. So, unlike most extensions, they may facilitate compatibility rather than hurt it.

Execution Efficiency

The compilation goes directly to 8080 machine code, rather than through an interpretive process, so the final program can run — and run fast — on any 8080, 8085 or Z80-type systems. Suitable configurations are being extended from the original dedicated systems to the master-slave networks which will be able to be used when CP/Net is delivered.

(A recent study performed at the National Computer Conference has apparently confirmed the effectiveness of this approach, by placing PL/I-80 above some 40-odd other micro languages. However, a full review of the figures to check on their validity is not yet available.)

Cost, Education

PL/I-80, not including the operating system, is priced much lower than minicomputer compilers. It lists at $500 for noncommercial use, with special terms for purchasers before the end of July. Pricing is certainly one of the advantages of software-house languages. Even though the hardware vendor wants its systems to be powerful, it is not looking to supply much outside its captive market; and within that, it expects to have to add bells and whistles for hardware, rather than software, marketing reasons. All of this can keep prices high.

While PL/I-80 was not itself built to provide for operating system portability, it does encourage it by having an unusual depth of compiler compatibility with the other developers who have provided PL/I Gs for their own operating systems. This has resulted from the success of a standards project which took a different approach to developing the standard specifications.

Standard specifications normally cover only the languages, not the many difficulties in interpreting the specification. This difficulty has been compounded in the case of PL/I and has helped make it unpopular.

The X3J1 Committee dealt with the unnecessary power by issuing a sufficient, but nonredundant, subset, Sub-

(Continued on Page 39)

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Datapro Computer User Survey: An Analysis

(Continued from Page 33)

contemplate the presence of Radio Shack and Data General Corp. in the bottom half despite short average lives.

Replacement Loyalty

The other measure of general satisfaction developed here is the percentage of those users who, having decided to replace their current system, have also decided to purchase the system from the same vendor.

The main problem with this measure is sample size. Few users have firm plans to replace their systems. In Apple's case, no users have such plans. As stated above, such low incidence makes comparison difficult.

A lesser difficulty is the variation from vendor to vendor in the feasibility of replacement. For this question, replacement is probably (but to an unknown degree) dominated by capacity upgrade.

A vendor's number is consequently affected by the breadth of its product line, compatibility within that line, the prevalence of sales of its top-of-the-line model and the phasing of his new products, not to mention whether he has plug-compatible competition. Still, a repeat purchase is a very strong recommendation and I feel this is also a very useful measure of general satisfaction. One can also argue that replacement in itself is a measure of dissatisfaction, but this seems to me to be strongly dependent on a number of other factors not accounted for here.

The Table

The accompanying table represents my attempt to form a consolidated list of vendors ranked by general user satisfaction. Basically this is very similar to Datapro's rankings. I have combined the data for computers of all sizes.

The rankings are based on two measures: Overall satisfaction and the percentage of users who would recommend the system to another user. The measures of vendor "loyalty" and average system life are provided for use in evaluating the ranks, but were not used to compute the ranks.

Generally speaking, vendors whose ranks differ by three or four or less should be considered to be virtually equal in rank. On the other hand, based on the consistency between the various measures and on my own evaluation of the accuracy of the data, a difference of seven or more in rank is significant. In particular, no vendor in the bottom third "deserves" to be in the top third.

Comparisons

I make these evaluations while keeping in mind the status of the computer industry as a whole. It is arguably the most innovative and dynamic industry the world has ever known. It is, the government's argument in U.S. vs. IBM notwithstanding, a very diverse industry with many specialized market shares. Every vendor brings particular strengths to the field. The lower ranked firms can justify their claims to excellence.

But the object of this analysis is to distinguish the vendors one from the other. The results may be only to identify "la creme de la creme." The people who have built and contributed to the higher ranked firms should feel a special pride not shared by those of the lower ranked firms.

I feel the results as presented in the table are somewhat more accurate than a ranking based solely on overall satisfaction. This feeling is partly based on the notion that two measures, like two heads, are better than one. Also the recommendation question is more specific than the overall satisfaction question and more directly requires the user to make a comparison.

Finally, the combined ranking more accurately reflects my own personal evaluation. I hope that this is more a validation of the methodology which produces the combined ranking than an excuse for modifying the data to support a preconceived notion.

In particular, in the combined ranking, Prime, DEC and IBM stand slightly better than the overall satisfaction value alone would indicate. To me, this seems accurate.

Three Levels

The most striking result seems to be the concentration of a majority of the larger vendors in the bottom third. In other words, relatively few users have chosen the highly satisfying systems.

An immediate but speculative conclusion from this data is that users are very poor at picking computers and computer vendors, so poor that a large majority end up less satisfied than the few users who pick the more satisfying vendors. If you are willing to make that jump, you might find therein some support for the notion that in an emerging technology like computers, only an inner circle of initiates really understands the technology and the rest of us are condemned to just muddle along.

This leads into the interesting result mentioned earlier. As mentioned there, I recomputed the percentage of users who would recommend their systems. In doing so, I found that for most vendors, the recomputed value was higher than the unweighted value, frequently substantially higher. Numerically, this is a direct result of the fact that most vendors have sold more systems which are highly recommended. Speculatively, then, one might conclude that although buyers do not know how to pick vendors, at least vendors do know which computers in their lines are most likely to satisfy the customer.

Not only are the vendors with large numbers of respondents nearer the bottom, but there is a tendency for makers of large systems to be toward the bottom. Here Amdahl is an obvious exception. Also all of the companies in the bottom third make minis (or midis), but they are mostly mainframers for whom minis are a relatively small part of their dollar volume.

Excepting Amdahl, all of the top eight make smaller computers. Perhaps it shouldn't be surprising that, as we move toward distributed processing and personal computing, smaller computers are more satisfying.

In conclusion, this excellent survey provides much useful data in a very interesting market. Proper interpretation of the data requires a good deal of judgment mainly because of the small samples for the smaller vendors and because of the necessary oversimplification of complicated issues.

The data does not support a meaningful distinction between each pair of vendors but does support clear distinctions between the higher and lower rated firms.

To CW and Datapro I can only say: Thank you and I hope you will do it again even better in the future.

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Nissen is the data processing manager for the Washington, D.C., tax law firm of Haynes & Miller.

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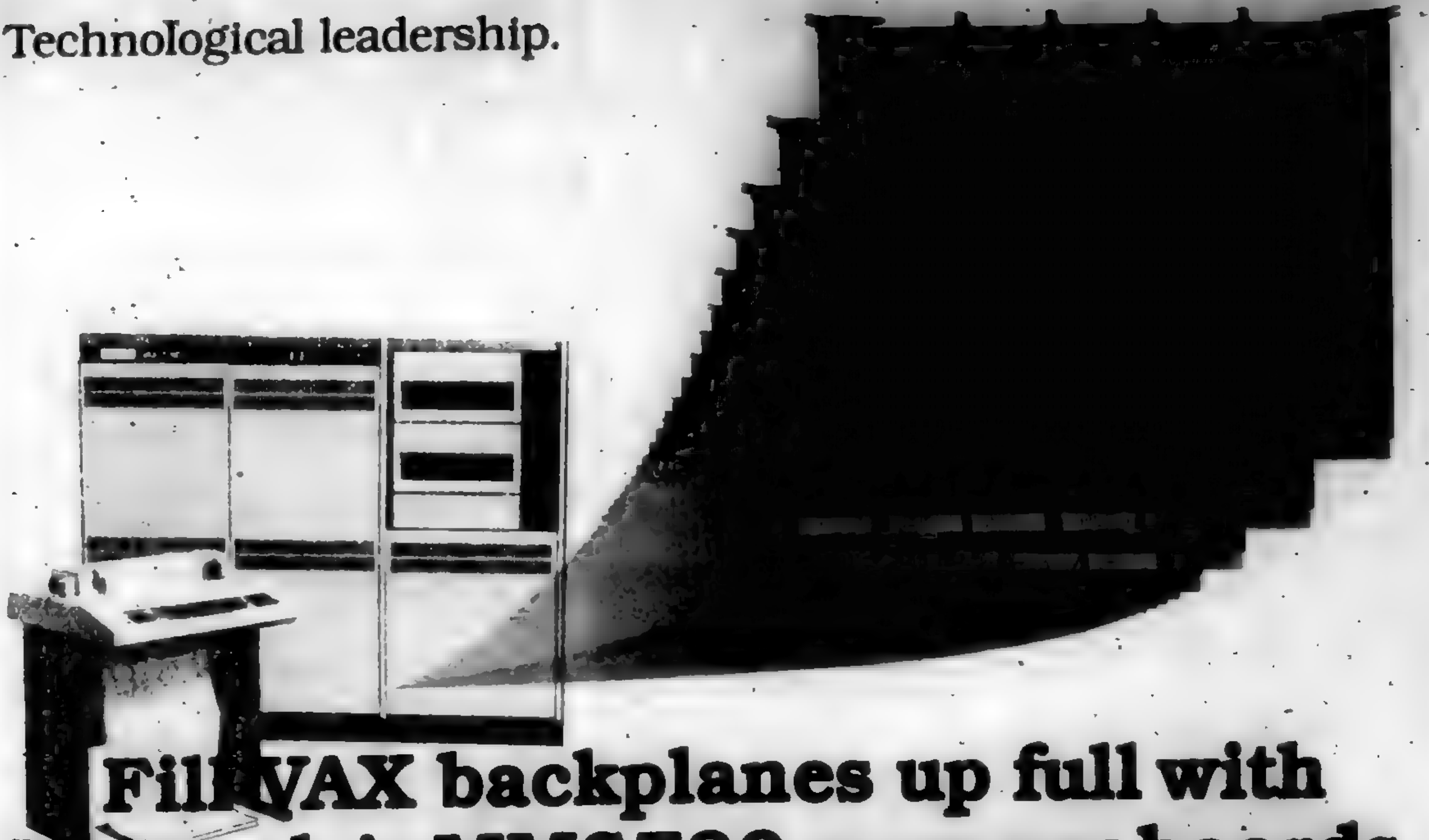

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Systems Managers Describe Life at the Top

The highlight of this year's conference of the Association for Computing Machinery's (ACM) Special Interest Group on Computer Personnel Research (Sig CPR) was a panel discussion on the subject of education of top management. The participants were old-time systems professionals who themselves had risen to executive levels and deal on more-or-less a daily basis with the chief executive officer (CEO) of their organizations.

Topics ranged far beyond purely educational considerations, and the audience gained a rare insight into the personalities and attitudes of former systems people who have who've made it to the executive suite.

The panelists included Frank M. Heinzmann, vice-president for computer and communications services at Eastern Air Lines; Thomas L. McGovern, director of computer services and information systems for Dade County, Fla; and Vincent Swoyer, group director for corporate systems at Ryder Systems. The moderator was Alan Parker of Florida International University.

Following are some of the panelists' observations regarding information processing as it concerns top management.

• *On the Major Concerns of the CEO:* It is not surprising that the DP budget is of primary interest to the CEO. Regardless of industry, the aim of top management is to control — better still, cut — operating costs. Yet the DP executive continued to ask for and receive budgetary increases because the investment in the information systems function results in a big payoff: productivity gains.

But the extra dollars don't appear willy-nilly. Many man-months of planning effort are required by the information processing and CEO staffs to hammer out an acceptable expanded program.

"We've got to do our homework and justify every line item of expense," panelists stressed. One panelist even reported that he must develop decremental budgets to provide program alternatives for various levels of budgetary *cuts!* Another noted that each of his major programs has a postinstallation audit to validate the cost/benefits that were originally forecast.

• *On Communicating With the CEO:* The big day with the CEO is the presentation of the final budgetary package. Typically the DP executive gets all of 15 minutes to compress the year-long studying, analysis and politicking. He sometimes has to make his voice heard over the din of user naysayers who wonder aloud, "Why should our budget be slashed again and his increased?"

So much for the dollar picture. Let's look at operations. Heads of each major functional unit, which includes the information systems department, meet with the CEO on a daily basis to present their "report cards": brief statements or summary graphs on the *previous day's* performance vs. objectives. High on the list of parameters are operating reliability and system security.

• *On the Education of the CEO:* Although CEOs have strong records of achievement in one or more of the functional areas of the business, they have rarely come up the information processing ladder. They need training, recognize this need and the systems executives provide it, usually in the form of periodic one- or two-day outside seminars.

• *On the Question, "How Critical Is the DP Exec/CEO Relationship to the Future of the DP Department?":* Of course, it's very important. But more so is the positioning of the information system activity within the structure of the overall organization. For example, the decentralization vs. centralization issue is of paramount concern because it deals with the subject of ultimate control of the information processing resource. But this and other organizational issues also relate to the careers of capable, professional people in both the user and management information services establishments. Therefore, the discussion on this issue is usually subjective, if not emotional — sometimes, heatedly so.

For this reason, the systems executive must be willing to enter the political and business battles that are part of the thrill of being high up in the corporate or government structure. Otherwise, he will wind up as just another statistic in the extravagantly high turnover rate (20% to 25%!) that is currently associated with the position.

PL/I Gaining Freedom

(Continued from Page 34)

set G. This has now been picked up by many PL/I vendors and has its own following.

In addition to this normal document, X3J1 has also issued a "Large Document" that describes, from the compiler developer's point of view, how to write the compiler. And that seems to have done the trick to gain operating system transportability for PL/I.

Daniel Davis, who is in charge of PL/I maintenance, tells me that this information is the keystone to keeping PL/I-80 free from becoming incompatible with the other Subset Gs, so that here again we are able to get a real liberating development of the language.

Together, the liberation from hardware and compiler-interpretation differences can at last allow PL/I to shed its old image and become a more popular and more effective weapon in the hands of programmers in general.

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Arbitration Has User Benefits

(Continued from Page 33)

of a court for a lawsuit.

Still another advantage is the chance of getting an arbitrator with some knowledge of your business, knowledge of law, knowledge of computers or possibly all three.

Although an arbitration clause is not for every computer user and every contract, in appropriate cases arbitration can provide effective dispute resolution with speed, economy and minimum management time drain.

Hoffman is a member of the AAA Commercial Panel and is chairman-elect of the American Bar Association Section of Science and Technology.

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Package Supports Structured Method

NEW YORK — A structured systems development methodology package that incorporates the techniques of structured analysis, structured design, structured programming and walkthroughs is available from Structured Methods, Inc.

Metasystem 1000 is said to balance the rigors of such techniques by "a strategy of staged commitment in a series of successively more detailed analysis and design cycles, aimed at management's need to control risk."

The Metasystem 1000 is presented as a structured specification with data flow diagrams to show development tasks, process descriptions to detail the steps to be performed in each development task, and data descriptions for all of the life-cycle deliverables. It is packaged in loose-leaf form.

The license fee for the package is $1,000, which includes the first copy and one year of quarterly updates. Additional copies cost $100 each, update service included. Structured Methods, Inc. is located at 7 W. 18th St., New York, N.Y. 10011.

'Trans IV' Update Suits DOS/VSE

LOS ANGELES — Release 2.0 of its interactive application development system for CICS/VS installations is now available from Informatics, Inc. The updated Trans IV is fully operational under DOS/VSE as well as OS/VS and DOS/VS, the vendor claimed.

Current DOS/VS users will have the advantage of uninterrupted use of Trans IV when they migrate to 4300 systems under DOS/VSE, a spokesman said.

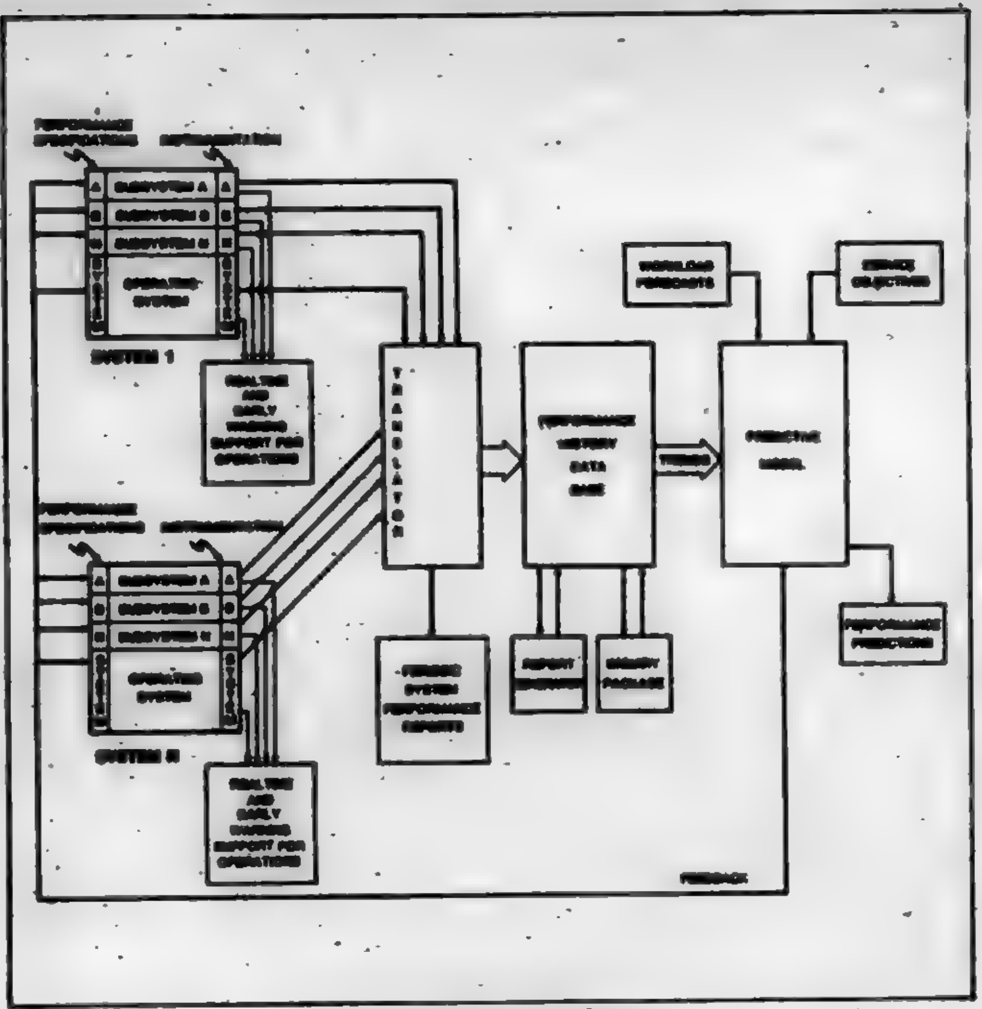
Trans IV enhancements within Release 2.0 include expanded error-handling procedures and error messages. Added cursor control capabilities provide the user with more flexibility in application design, the vendor said.

DL/1 Interface

In addition, new DL/1 interface capabilities provide easier access to DL/1 data bases, and improved procedures for fixing software problems at a customer site result in more timely response to customer needs, the spokesman claimed.

Trans IV is an interactive approach to developing on-line applications under CICS/VS. Existing staff with no CICS expertise can use it since CICS functions are performed automatically by the system.

The price for Release 2.0 is $25,000, Informatics said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.



Capacity Management Architecture

B&B Planning Tools to Ease Capacity Planning Decisions

By a CW Staff Writer

SUNNYVALE, Calif. — Users are becoming increasingly aware of the capacity planning problem, but today's data center manager still depends heavily on expensive and hard-to-get systems programming skills for solutions.

What is needed, then, is capacity management software to provide data geared more for management and less technically oriented to the systems programmer, according to Jack E. van Kinsbergen, president of Boole & Babbage (B&B) since May.

It is this gap that B&B intends to fill with an integrated family of software tools that will collect data on computer resource performance and utilization and also format data for historical trending as well as create a model for predicting future system capacity needs.

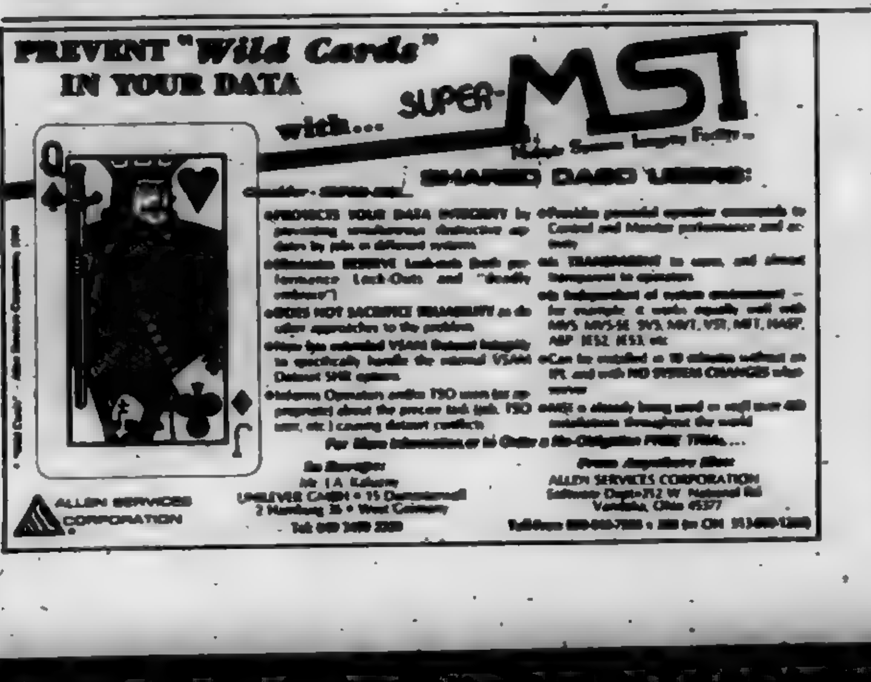
In making this directional statement, van Kinsbergen noted his firm has drawn up requirements specifications for a software series it plans to introduce in mid 1981. The products will integrate three functional levels of capacity management which he described as follows:

- At the first, or instrumentation, level, capacity management software tools must collect operating system data that shows how well software is using the hardware for a given job mix. This information is critical to the system programmers' tuning efforts.
- Level two involves the collection of historical work load information into a data base that is structured to automatically produce trend information that shows the increase in work load and its effects on the system for the past days, months and years.

For these trends to be meaningful to data center management and planning personnel, they must be automatically assembled and presented in formats that correspond with the user organization's business environment.

- At the third level, system information and work-load trends merge into a predicitive model to tell management when and where capacity problems will occur. Such a model should show what resources will be required to provide a certain level of service

(Continued on Page 42)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'PowerVS Queue Stripper,' 'Queue Loader' Enhanced

DALLAS — Sercon Corp. has announced enhancements to its PowerVS Queue Stripper and the PowerVS Queue Loader, including VSE support that allows operation on any Power/VSE supported disk drive such as the Fixed Block Architecture (FBA) available on the IBM 4300 line of mainframes.

Installations with IBM 4300 or Power/VS Release 1.0 or Release 2.0 may not utilize the Stripper and Loader, according to a company spokesman.

The Stripper and Loader support the IBM shared spool file feature available under Power/VSE R2.0, and any number of Stripper/Loader jobs may be executing in different partitions on different CPUs with or without Power/VSE active on any of the CPUs, he added.

In addition to VSE support, several new capabilities have been added to the Stripper and Loader which are now available for both the VSE user and the DOS/VS R34.0 user.

These new capabilities include processing of all Power/VS(E) dispositions (D,K,L,H), job-level enqueue to prevent operators from altering Stripper-selected jobs, creation of standard DOS/VS(E) labels on the Power/VS(E) formatted output tape as a user-selected option for those users who utilize automatic tape management software, selection criteria expanded to include job selection by priority, job number, system ID and RBM count.

The addition of these new features and support of VSE Release 1.0 and Release 2.0 are available to existing or new users at no additional fees to the normal $1,000/year lease fee for the two programs, or the $750/year lease fee for use of one of the programs. The Stripper and Loader are available for 30 days free trial without any obligation. Lease fees include maintenance, support and documentation.

Additional information may be obtained from Sercon Corp., 4611 N. Lindhurst, Dallas, Texas 75229.

Glossary Gives Cross-References

SPRINGFIELD, Mo. — A Cobol Glossary that produces several cross-reference lists using a library of source programs is input as available from MacKinney Systems.

The cross-reference lists are said to take the "guess work" out of conversions and maintenance by showing the user every program that uses the field, literal, called subroutine, file, copy book or device being changed.

For example, if Zip Codes were changed from five digits to nine, a user could quickly find every statement in every program where Zip Codes were used by looking at the data element cross-reference list, the vendor said.

The glossary produce nine reports, according to the firm. Reports showing where data elements and literals are used will show either the program name only, program name and sequence number, or the entire line of code where the element was used.

Cobol Glossary costs $395 for a 99-year lease or $99 for a one-year lease. MacKinney Systems is located at 1412 E. Locust, Springfield, Mo. 65803.

Tools to Aid Capacity Plans

(Continued from Page 41)

at a specific future work load and assist in preventing unnecessary equipment acquisitions.

"Since delivery of hardware today can take months or even a year, it is crucial that decisions on future resource needs be made well in advance," van Kinsbergen stated. And in light of the high costs of technical personnel, "data center management can no longer afford to depend on a staff of programmers to analyze and massage data into a form that is meaningful for decision making; decision-making information must be available on demand and at a reasonable cost."

To further underscore that management and technician look at performance differently, van Kinsbergen drew an analogy between the computer system and the automotive system: A car mechanic wants to know about vacuum pressures and compression ratios while the manager of mechanics — the user — is more interested in miles per gallon and repair rate.

Similarly, systems programmers add up CPU requirements of today's work load, whereas data center management might like to predict future needs based on historical trend data such as how much the work load has increased over time — 1% per month? 5% per month? — and how maintaining a certain batch turnaround time will affect overall response time.

According to van Kinsbergen, coming up with a set of software tools that integrates the three levels of capacity management is a natural evolution of the company's current line of performance-reporting products "designed to make the world safe for systems programmers."

Targeted for IBM users, the "level one" products include Data Set Organizer (DSO), Control/IMS, Control/IMS Realtime and Control/CICS.

As for levels two and three, "We're trying to go through the make-or-buy decision. Do we go forward with a major development effort or take advantage of software that already exists?" van Kinsbergen remarked, adding, "Our target market is any IBM customer with a 370/158 or larger system running VS1 or MVS."

Noting that some of B&B's existing customers have already developed software to gather certain second- and thrid-level capacity-planning data, he said these are application-specific solutions and have to be expanded to be of general use in the marketplace.

B&B is also open to joint arrangements with other companies that have capacity management skills beyond its own expertise. The firm, for example, has no operations research personnel working with predictive performance models, so, "we'll have to acquire that expertise," van Kinsbergen explained.

Book Covers Project Control

OAK BROOK, Ill. — Applied Information Development, Inc. has released a "Project Manager's Handbook" aimed at improving productivity, quality, timeliness, cost and overall user satisfaction in application software development projects.

The handbook covers:

- The standard development life cycle.
- Stringent project control.
- A set of quantitative phase checklists.
- Cost estimating and change control.

The handbook is centered on two principles: The cost to make change and fixes in application software increases dramatically as the life cycle advances. Second, a major source of problems is the gap between what users expect and what DP delivers.

The book is available for a one-time fee of $9,000 or on a time payment plan from 823 Commerce Drive, Oak Brook, Ill. 60521.

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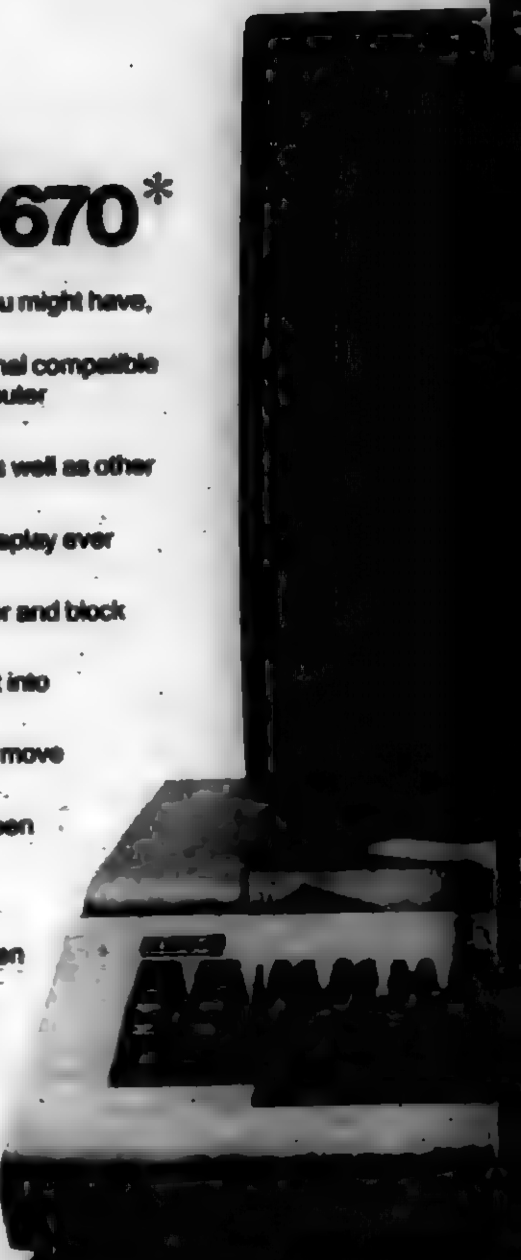

From 1978 Sigplan Conference

ACM Offers Tapes on Languages

NEW YORK – The Association for Computing Machinery (ACM) is offering audio and video cassettes of presentations given at its 1978 Sigplan History of Programming Languages Conference.

The cassettes present key people involved in the early technical development of 13 programming languages. The 1978 seminars discussed the factors that influenced the creation of these key languages.

Included in the tapes are Alan Perlis and Peter Naur discussing Algol, Kenneth Iverson on APL, Douglas Roth on APT, Thomas Kurtz on Basic, Jean Sammet on Cobol, John Backus on Fortran, Geoffrey Gordon on GPSS, Charles Baker on Joss, Jules Schwartz on Jovial, John McCarthy on Lisp, George Radin on PL/1, Kristen Nygaard and Ole-Johan Dahl on Simula and Ralph Griswold on Snobol.

In addition to cassette programs on the individual language seminars, ACM is also offering a two-hour presentation including excerpts from all sessions. Other combination packages are available, ACM said.

Audio tapes cost between $9 and $202 depending on which sessions are chosen.

Video tapes of the same sessions cost between $45 and $1,158, ACM said from 1133 Ave. of the Americas, New York, N.Y. 10036.

Prime Aid Out

SCRANTON, Pa. – Computer Techniques, Inc. has announced PMS-IV, a system management package for Prime Computer, Inc. users.

The package is said to provide easily formatted data entry updates, along with a report writer and an ad hoc inquiry facility that provides plain English inquiries.

PMS-IV, which costs $9,600, can be used with Prime's Primos and Midas operating systems. It is compatible with all Prime languages, the vendor said from 1015 N. Main Ave., Scranton, Pa. 18504.

ASCII two step

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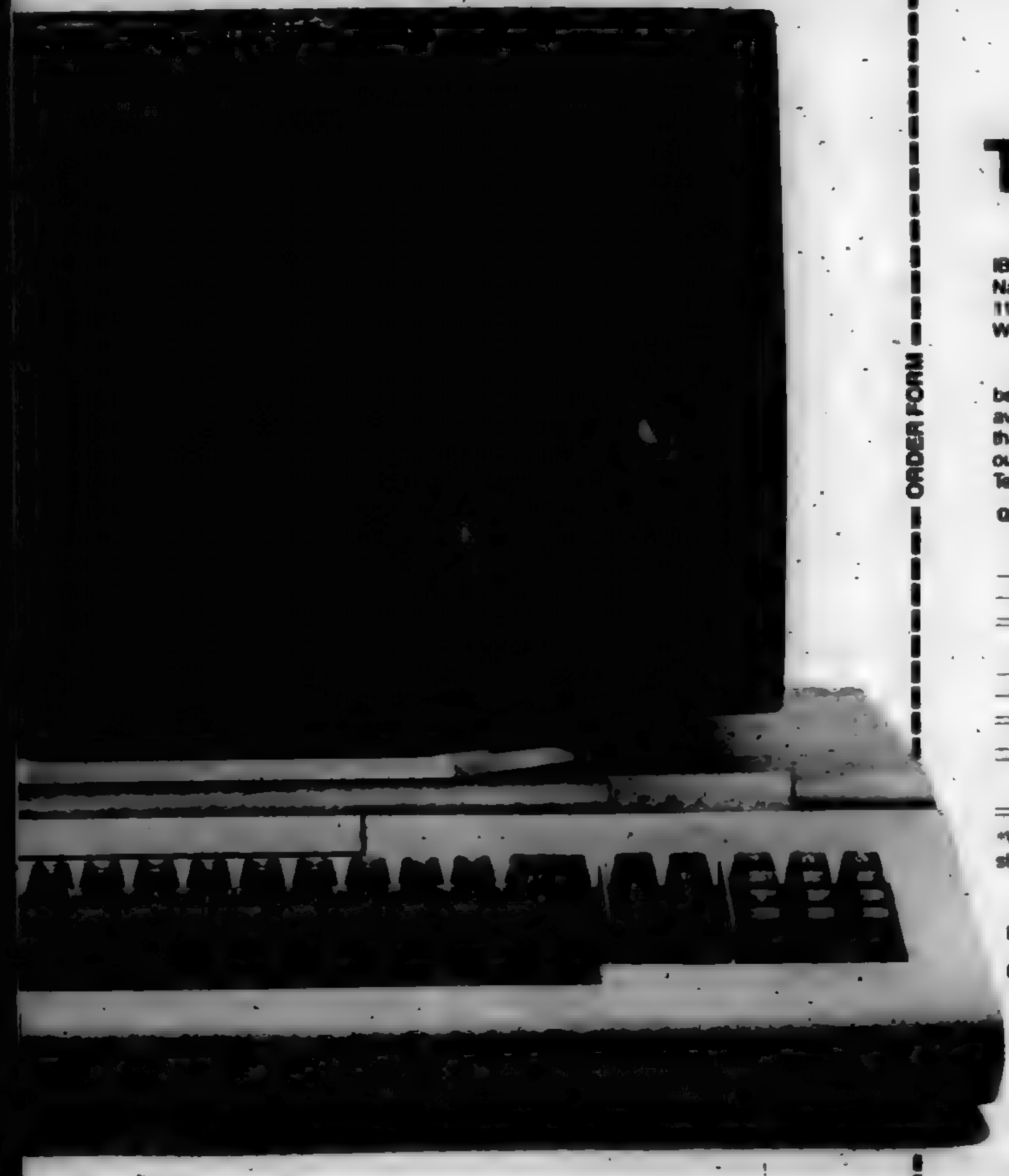

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Forecasts, Models, Reports

SAS Provides Econometric Aid

CARY, N.C. — SAS Institute, Inc. has introduced a software package for forecasting, modeling and reporting. The Econometrics and Time-Series Library (SAS/ETX) is said to offer products ranging from automatic, easy-to-use procedures to advanced statistical techniques.

Included in the SAS/ETX procedure library is the forecast procedure, suitable for forecasting hundreds of variables, according to the firm.

The modeling procedures handle financial and econometric models, and include capabilities for estimating parameters, generating predictions and performing policy simulations.

The Computab procedure organizes data into a tabular form and prints row-and-column reports.

SAS/ETS licenses for $1,500/year with a $500 annual renewal fee to corporate customers. For educational customers, the prices are $500/year and a $300/year renewal fee. Government users pay $1,250/year initially and $500/year to renew, according to SAS, Box 8000, Cary, N.C. 27511.

System Manages Sports Events

SEATTLE — Distributed Data Products, Inc. is offering a Ticket Manager System for sports organizations.

The turnkey system manages season ticket requirements and reportedly can simultaneously handle up to 99 events along with day-of-game sales.

The Ticket Manager System is capable of handling a 65,000-seat sports facility. It costs $88,800 from the vendor at Suite 600, 419 Occidental Ave. S., Seattle, Wash. 98104.

Graphics Tool Fits Most CPUs

BOULDER, Colo. — A machine-independent, device-independent graphics software development system is available from Precision Visuals, Inc.

The DI-3000 offers features for developing graphics applications, including full-color 3D, area fill and patterning, graphic arts quality text, snapshot debugging and a picture library (Metafile).

Current implementations of DI-3000 on Digital Equipment Corp. PDP-11, -11/780 and VAX CPUs and on IBM, Control Data Corp., Harris Corp., Prime Computer, Inc. and Burroughs Corp. processors are examples of the system's machine-independence, the vendor claimed.

Licenses for the system start at $8,000 including one year of maintenance and updates, the vendor said from 1518 9th St., Boulder, Colo. 80302.

Fortran 77 Compiler Debuts

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. has announced a Fortran 77 compiler for its Classic series of systems using the MAX IV operating system.

The compiler conforms to a full Ansi X3.9 1978 standard, Modcomp said. The compiler will also offer extensions to support MIL STD 1753 and ISA S61.1 standards; MIL STD 1753 provides END, DO, DO WHILE, INCLUDE and IMPLICIT statements.

The firm will continue to offer its current Fortran compiler — Ansi 1966 base — for users of existing software.

The Fortran 77 compiler will be available the first quarter of 1981 and will cost $4,000 from the vendor at P.O. Box 6099/1650, W. McNab Road, Fort Lauderdale, Fla. 33310.

Micro Bytes

Apple Pilot is a high-level programming language system that reportedly facilitates computer-aided instruction for educators and corporate and industrial trainers; it runs on the Apple II and Apple II Plus MPUs. Cost: $2,785. Vendor: Apple Computer, Inc., 10260 Bandley Drive, Cupertino, Calif. 95014.

North Star Packages Fit Business Tasks

BERKELEY, Calif. — North Star Computers, Inc. is offering three integrated business application software packages for general ledger, accounts receivable and accounts payable to users of its Horizon microcomputer.

Each package, written for the first-time business user, can stand alone or be used in combination with the other packages, the firm said.

General Ledger

The general ledger package includes a financial reporting feature allowing users to define dollar precision, use multiple columns, define sub- and grand-totaling and carry totals forward to other statements.

The accounts payable package allows users to establish and maintain up to 1,500 vendor accounts and includes flexible controls for printing checks, remittance notices and reports.

The general ledger package costs $499; the accounts receivable and accounts payable packages cost $599 each.

Further information is available from local North Star dealers. The firm is headquartered at 1440 Fourth St., Berkeley, Calif. 94710.

Magic Wand turns CP/M-based MPUs into word processors. Price: $4,000 to $6,500. Vendor: Occupational Computing Co., Inc., 22311 Ventura Blvd., Woodland Hills, Calif. 91364.

Key Realty Management System works on Radio Shack TRS-80 and CP/M-based micros. Price: $2,500. Vendor: Key Systems, Inc., 16 Ocean East, Marathon, Fla. 33050.

Visicalc, which turns a personal computer display into an "interactive electronic worksheet," will soon be available for the Commodore Business System, Inc. Pet and Model 8032 and the Atari, Inc. 800 micros. Price: $199.95. Vendor: Personal Software, Inc., 1330 Bordeaux Drive, Sunnyvale, Calif. 94086.

Data Manager Works With Apple Micros

OKLAHOMA CITY, Okla. — A data manager for use with Apple Computer, Inc. microcomputers features the ability to do calculations, totals and subtotals, according to its vendor, High Technology, Inc.

Information Master is said to let the user define, enter, edit, sort and retrieve data. The user can define printed report formats using the report generation features of the package, according to the firm.

A program is included that transfers files from the data base management system for use with the Information Master, he added.

Information Master costs $150. High Technology, Inc. is headquartered at 8001 N. Classen Blvd., P.O. Box 14665, Oklahoma City, Okla. 73113.

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'Assist' Geared To VM/370 Installations

TOWSON, Md. — A VM Cobol Assist for VM/370 installations doing interactive development or maintenance of Cobol programs is available from Improved Programming Technology Corp.

Assist creates an intelligent editor that "knows" DOS/VS Cobol syntax and has the capability to verify syntactic correctness as existing edit commands are used to enter or modify program lines, the vendor claimed.

The product also features an edit command that allows the whole program (or any part) to be checked without the process of having to leave the editor, perform a compilation, record errors and reenter the editor.

Assist is licensed annually for $225/mo per CPU, the vendor said. More information is available from P.O. Box 19064, Towson, Md. 21204.

Finance System Fits Bank Use

NEEDHAM HEIGHTS, Mass. — McCormack & Dodge has unveiled an on-line General Ledger Financial Analysis System for banks, bank holding companies and mortgage service companies.

GL Plus-Banking provides on-line access to account information and efficient journal entry features to ensure trouble-free closings, the vendor claimed.

Banking operation reports such as teller errors, trial balances by branch, account reconciliations, budget reporting, allocations and balance sheets can be integrated into the user's required format and content through the use of three report writers.

The system costs between $49,000 and $75,000, depending on features, the vendor said from 560 Hillside Ave., Needham Heights, Mass. 02194.

Programmers Offered Tool For Testing, Debugging

SAN JOSE, Calif. — Xpediter, a testing and debugging productivity system for programmers, is available from Applicon Development Systems, Inc.

The system monitors all aspects of the test in anticipation of program errors, the vendor claimed. When errors are encountered, facilities are available to capture relevant program information, analyze the failure and then isolate the problem.

In creating a test sequence, external and internal values can be initialized, including program storage contents, input record areas, parameter values and register contents. In addition, a series of instructions, labeled procedures or callable modules, whether coded or not, may be simulated, a spokesman said.

Xpediter is priced between $25,000 and $35,000, the vendor said from 1530 Meridian Ave., San Jose, Calif. 95125.

Graphics Added to Rapidata Net

FAIRFIELD, N.J. — Rapidata, Inc. has added Graphics, an interactive, keyword-driven language to its timesharing network.

The package can be used to prepare production-quality plots, charts and graphs. Formats available include point plots, line plots, spike graphs, bar graphs, histograms, pie charts, ring charts, pictographs, staircase curves, spline interpolation and straight line regressions, the vendor said.

In addition, the user can specify design options such as shading or crosshatching between data points, offset axes, alternate character sets, logos, user-defined symbols and multiple colors used.

Rapidata is based at 20 New Dutch Lane, Fairfield, N.J. 07006.

Library Debuts For PDP Users

STERLING, Va. — A library of data management routines for Digital Equipment Corp. PDPs and LSI-11s operating under RT-11 or RSX operating systems has been announced by Berman Associates.

Omniprog reportedly allows user-written programs to retrieve and update information that is compatible with the firm's Omnidata interactive data management system.

Omniprog carries a license fee of $495. Omniprog users must also be licensed for Omnidata.

Berman Associates is located at Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

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HP Terminal Screen Gives Four Windows

By Brad Schultz
CW Staff

PALO ALTO, Calif. – A montage of four work areas on the screen of Hewlett-Packard Co.'s latest data entry terminal, plus the ability to interact with two CPUs simultaneously, may open new vistas for users beset with diversified entry tasks and limited staff size.

HP's 2626A CRT terminal can go a three-ring circus one better. Four horizontally scrollable windows on its 6-in. by 8.5-in. screen can show 80 to 160 char. per line and any combination of lines per window within the screen's 1,920-char. capacity.

HP's strategy is seemingly to offer as many resources per cubic inch in a single unit as most users can justify for sizable data entry or software development operations. The user can opt for an integral 60 char./sec forms printer that pumps 8.5-in. wide paper out of the 2626A's top, bearing 132-column lines when font is compressed, expanded print for larger characters and either 60 or 64 lines per page in report mode.

Typical Data Entry Application for HP 2626A Terminal

Two Ports

The terminal's two communications ports permit simultaneous interaction with two computer systems or one system and an external RS-232C serial printer. According to an HP spokesman, data may be displayed by or passed through the 2626A en route to a local printer. And data may also be routed to a computer in block, line, line modify or character modes.

Line modify mode allows the operator to employ the terminal's editing capabilities while running character mode applications on the linked CPU, the spokesman explained.

Both RS-232C and 20mA current loop interfacing are available, he continued, and the 2626A offers point-to-point and asynchronous or synchronous multipoint capabilities as well as full- and half-duplex operation, handshaking and expandable buffers up to 2K bytes.

The terminal runs at from 110- to 9,600 bit/sec and is reportedly able to copy a full screen of data on the optional printer within 18 seconds. Besides the 24 lines reserved for displaying up to four windows of data, the HP peripheral features 25th and 26th lines for labeling of function/softkeys or message/status lines.

The operator can define the functions for each of the eight softkeys and display labels for each function with two lines eight characters long. Software running on the host system can redefine and relabel the keys as needed, the spokesman said.

Audio cues add music for this four-ring circus. HP provides a software program by which the user can assign tones of sound – at up to 15 separate pitches, 16 different durations and two volume levels – to serenade the operator when conditions such as certain keystroke foibles arise.

Finally, the 2626A has several levels of self-testing, including a "power on test" that covers workability of the terminal's basic components, tests of data communications and the optional printer.

With eight-week availability, the 2626A CRT terminal starts at $3,950. HP's address is 1501 Page Mill Road, Palo Alto, Calif. 94304.

Legal Tug-of-War Continues Over Termination of Telpak

By Phil Hirsch
CW Washington Bureau

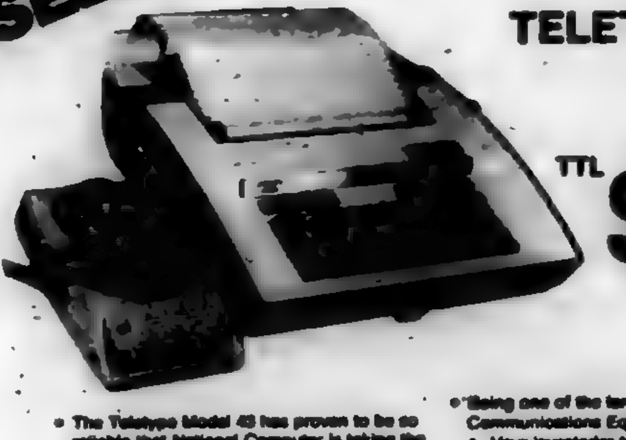
WASHINGTON, D.C. – The future of Telpak remained up in the air last week in the wake of a recent decision by the U.S. Court of Appeals allowing AT&T to terminate the service provided it supplies specified information to the Federal Communications Commission (FCC) [CW, July 7].

Aeronautical Radio, Inc. (Arinc) and the Air Transport Association (ATA) were among the Telpak users asking for reconsideration of the court's decision and for continuation of the present, restricted Telpak service until the reconsideration process is completed.

MCI Telecommunications Corp., which regards Telpak as unfair competition, said the decision should stand as is. AT&T asked for more time to prepare the information demanded by the court and also requested reconsideration of the decision, while the U.S. Department of Justice sought more time to prepare a petition for reconsideration.

The object of all this legal maneuvering is a service AT&T has been offering since the early 1960s, which grants hefty rate discounts to bulk private-line users. In 1976, the FCC found that the rates were anticom-

(Continued on Page 50)



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Net Geared to Test Environment

CONCORD, Mass. — Genrad, Inc. has introduced its 2291 GRnet network, which it claimed is the first network designed specifically for the automated test equipment (ATE) production test environment.

The network provides the link through which a Genrad 2290 Multiuser Programming Station can communicate with any Genrad in-circuit test system, functional test system or programming station on the manufacturing floor, the firm said.

The 2291 can accommodate up to 64 systems on a single line. With a 2290 functioning as a host processor, all systems in the network can call for test files from the central disk storage.

Programming or editing functions from production systems can also be off-loaded via GRnet, the firm said.

Basic Components

The three basic components of the 2291 network are the Network Interface Module, which manages all communications functions for the CPU of each test system; the connecting cable, a part of coaxial cables that can be driven up to 2,000 ft by the GRnet network; and the GRnet system software which, according to the firm, is almost transparent and can accommodate keystroke commands from the test systems' high-level monitors.

Transfer Rate

The network transfers data at a raw rate of up to 655,000 bit/sec. The typical throughput rate is approximately 40,000 bit/sec, Genrad said.

Up to four transfers can be simultaneously executed while the same throughput rate is maintained, according to a spokesman.

The 2291 GRnet costs $10,000 for the license, hardware and software for connecting to the 2290 programming station. Each additional connection to test systems and programming stations is priced at $5,000, the firm said from 300 Baker St., Concord, Mass. 01742.

Drivers Run Multidropped

NORWALK, Conn. — A series of asynchronous line drivers which can be connected in a multidrop configuration is available from Tri-Communications Industries, Inc. (Tri-Comm).

The ALD-I and ALD-II drivers were designed to provide data transmission over twisted-pair wire for terminal-to-computer, terminal-to-terminal or computer-to-computer communications.

The ALD-I's ability to operate in a multipoint environment reportedly reduces cable runs and computer ports required when using other line drivers or limited distance modems.

The ALD-I costs $185 and the ALD-II costs $215, Tri-Comm said from 20 Fitch St., Norwalk, Conn. 06855.

Modem Line Fits Short-Haul Use

CHATSWORTH, Calif. — Micom Systems, Inc. has unveiled a modem series for short-haul data transmission. The Micro 400 Local Dataset family includes both line drivers, designed for use over customer-owned twisted-pair cable, and local data sets for use over private-line metallic circuits supplied by the telephone company.

The local data sets meet the requirements of Bell Publication 43401, which defines specifications for operation over metallic circuits. Both synchronous and asynchronous models are available.

Prices start at $190 for asynchronous models and $290 for synchronous models, the vendor said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

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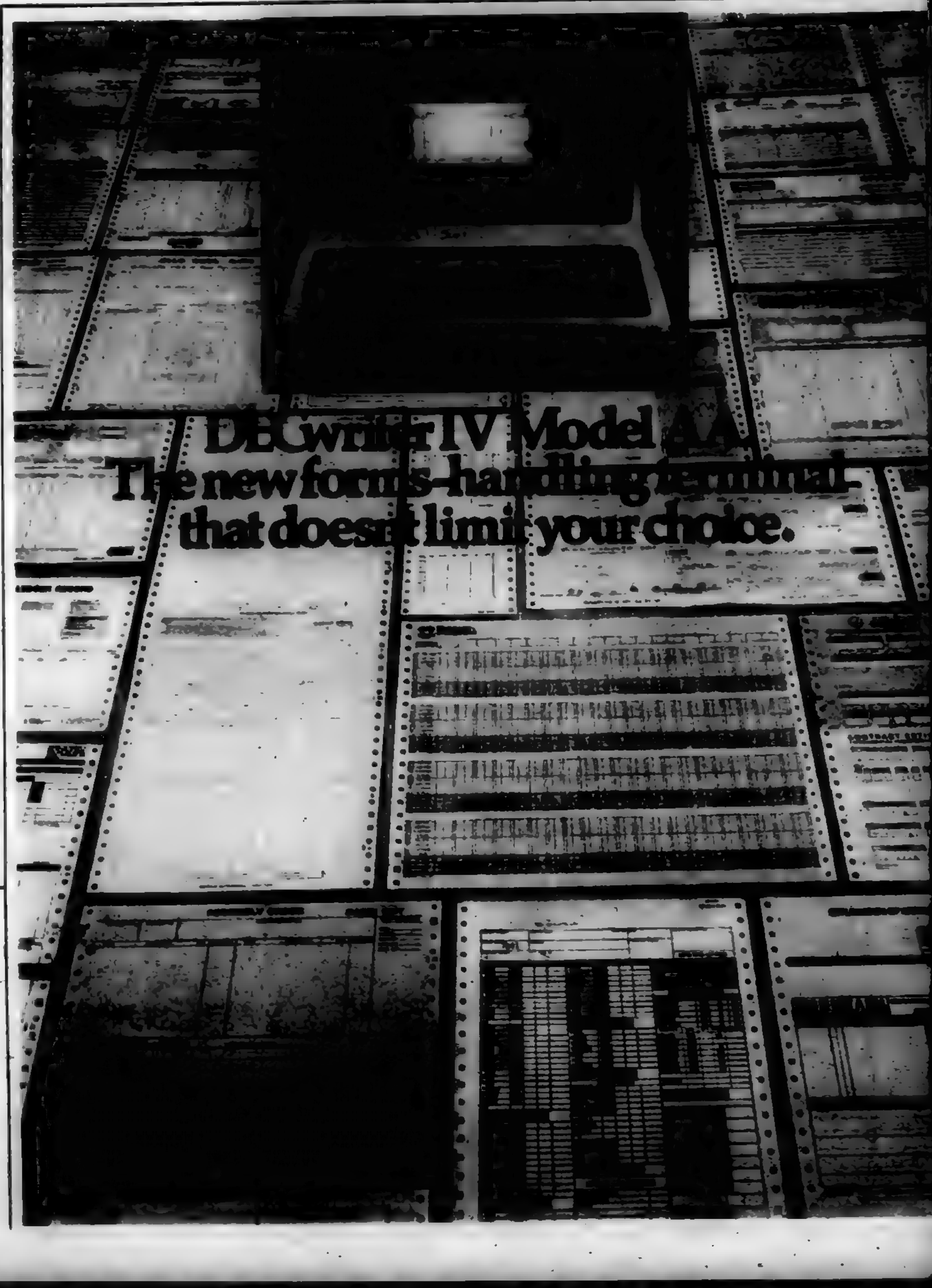
DECwriter IV Model AA.
The new forms-handling terminal
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CRT Terminal Implements Most of Ansi X3.64-1979

ANN ARBOR, Mich. — A CRT terminal that reportedly implements most of the Ansi X3.64-1979 standard has been introduced by Ann Arbor Terminals, Inc.

The Ambassador operates in keyboard send/receive (KSR) or block mode and features editing, erasure, cursor movement and transmission commands, according to a company spokesman.

Setup Mode allows the user to select transmission rates from 110- to 19.2K bit/sec, the spokesman said.

The terminal's memory is 60 lines of 80 characters; the display format is selectable from the keyboard or the computer, ranging from 18 to 60 lines.

The D-Case version of the Ambassador costs $1,430. The desktop unit is also available in a more compact E-Case version, which is also available in a rack-mounted configuration. The basic E-Case costs $1,300, with delivery for both in eight to 12 weeks from 6175 Jackson Road, Ann Arbor, Mich. 48103.

The Ambassador

Terminals Compatible With IBM 3101, DG 6052

RALEIGH, N.C. — Perry Data Systems, Inc. has unveiled a line of compact Ascii terminals that are compatible with IBM 3101 and Data General Corp. 6052 devices.

The 9800 series terminals are available in both intelligent and nonintelligent versions and were designed to be used in areas where office space is at a premium.

The terminals incorporate the firm's PDS9800 CRT display which can produce 1,920 characters in 24-lines on a 9-in. green phosphor tube.

The nonintelligent IBM 3101-type terminal costs $1,395, while its intelligent brother sells for $1,695. The intelligent DG6052-compatible model costs $2,190, and its nonintelligent counterpart is priced at $1,895.

Perry Data Systems is located at 3401 Spring Forest Road, P.O. Box 58535, Raleigh, N.C. 27658.

Penril Adds 4800 DCM

ROCKVILLE, Md. — A diagnostic-controlled modem (DCM) that provides data transmission at 4,800- or 2,400 bit/sec over multipoint, point-to-point leased or general switched networks has been introduced by Penril Corp.'s Data Communications Division.

The 4800 DCM has internal diagnostic features that function as the controller of the user's communications network, checking on the status of the system. The unit conforms to CCITT Recommendation V.27 and has an eight-phase differential modulation at 4,800 bit/sec and a four-phase differential modulation at 2,400 bit/sec, a spokesman said.

The modem design is said to provide a 110 bit/sec secondary channel for diagnostic modes to test and control the remote-site modems without interfering with mainstream transmissions.

Available both domestically and internationally, the modem costs $2,910 for the basic configuration, $3,600 for the master site configuration and $3,340 for the remote-site version.

Penril is located at 5520 Randolph Road, Rockville, Md. [illegible]

You probably know the DECwriter IV for its flexibility in handling paper.

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To order your DECwriter IV Model AA, or the original DECwriter IV Model DA, call your terminals supplier or write Digital Equipment Corporation, Terminals Product Group, MR2-2/M67, One Iron Way, Marlboro, MA 01752. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment Corporation of Canada, Ltd.

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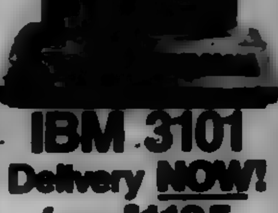

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AMERICAN COMPUTER GROUP

Legal Tug-of-War Continues on Telpak's Future

(Continued from Page 47)

petitive.

The commission, at about the same time, also ordered AT&T to allow resale and sharing of its Telpak circuits.

The phone company, claiming the service would not be economically viable if offered on those terms, then obtained FCC permission to terminate it. But the users, realizing that the demise of Telpak would increase their communication costs significantly, went to court.

The upshot was a 1977 judicial ruling that ordered AT&T to continue offering Telpak temporarily, pending further court action, but no new customers could be signed up, and release and sharing would not be required.

Last month, the appeals court found that the commission should not have authorized termination of Telpak. The reason: the phone company had failed to submit economic data required by Section 61.38 of the FCC's rules.

But the decision allows termination once the data is provided. AT&T was given a total of 120 days to complete the termination process. However, because of a 90-day advance notice required by the FCC's rules, AT&T was required to submit its documentation on or before July 24.

The phone company, in its petition to the appeals court, asked for another 40 days to prepare this material. Furthermore, the phone company wants the present resale and sharing restrictions extended accordingly — i.e., for a total of 160 days from June 24, when the appeals court issued its Telpak verdict.

MCI strongly opposes continuation of the resale and sharing restrictions beyond 120 days, as specified in that decision. "If there should be a 40-day gap [between the lifting of the restrictions and the termination of Telpak], parties who now obtain private-line circuits from AT&T in sufficient quantity to qualify for Telpak discounts, but who did not quality in [1977], will receive the benefit of these discounts," MCI told the court.

Actually, the company probably is worried less about extension of the resale and sharing restrictions for an additional 40 days, as requested by AT&T, than about the much longer extension requested by Arinc, ATA and other users who want the status quo maintained until their petitions for reconsideration are disposed of — a process that could take months or years.

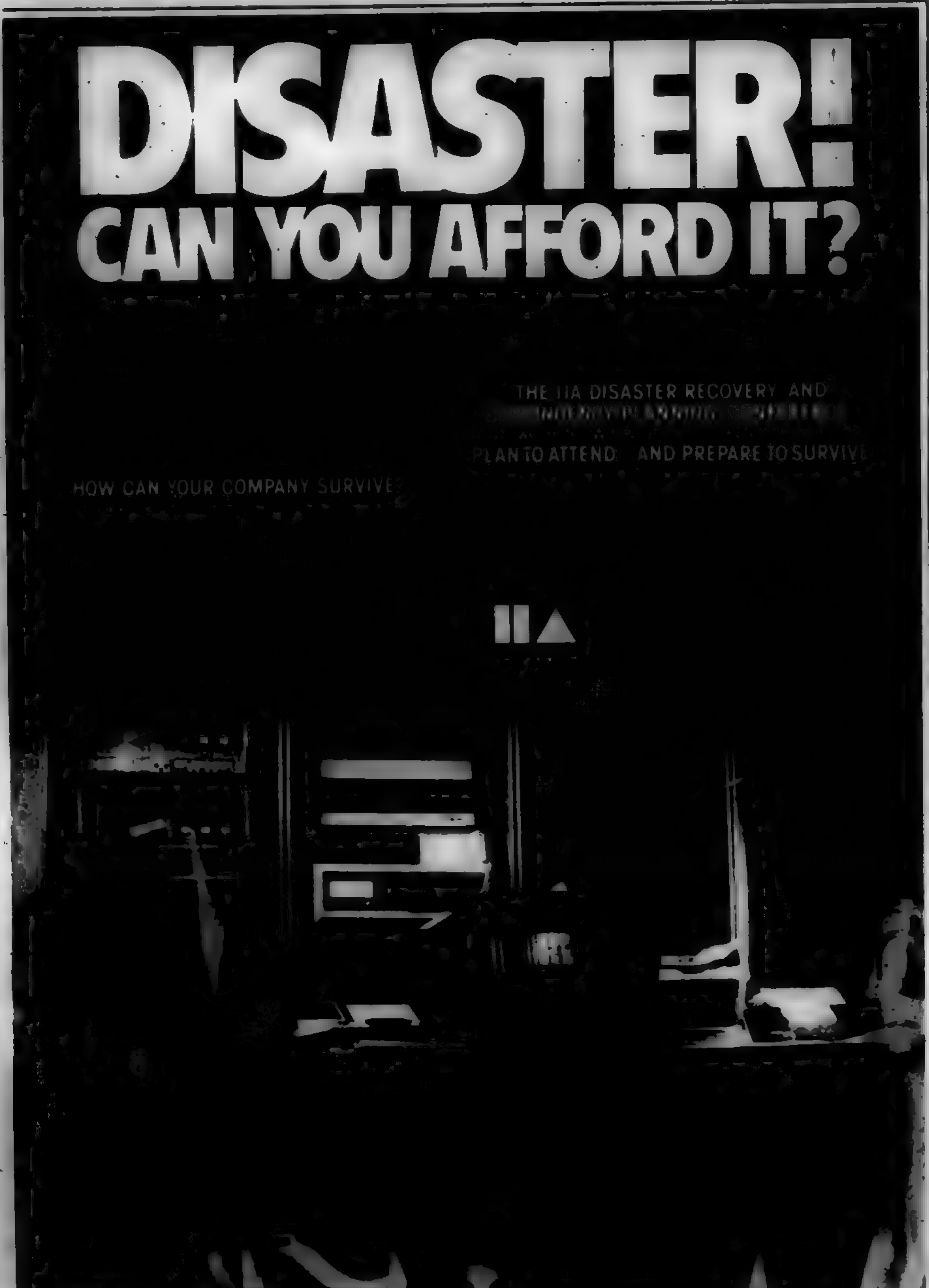
"Competing carriers such as MCI, who have been frozen out of the big-user segment of the market by predatorily low Telpak rates for years, should be permitted at least to get the benefit if such discount with respect to the circuits they buy from AT&T for resale," the company added.

FDC Plan

Underlying the users' objections was a contention that the FCC committed a series error when it decided, in 1976, that Telpak rates were anticompetitive because they were not based on "fully distributed costs" (FDC). This is an accounting scheme that would shift many of AT&T's overhead expenses from monopoly to competitive services — thereby making life easier for Bell's competitors but more expensive for Telpak users. The users indicated that if the court does not reconsider last month's decision, it will be compounding the FCC's error.

There is some support within the court for this view. The Telpak case was decided on a 2-1 vote; the dissenter, Judge Malcolm R. Wilkey, felt the commission had "assumed FDC prices to be necessary to prevent cross-subsidies" without considering other implications.

"This is probably the most important rate case which has ever been reviewed by this court," Arinc and ATA said.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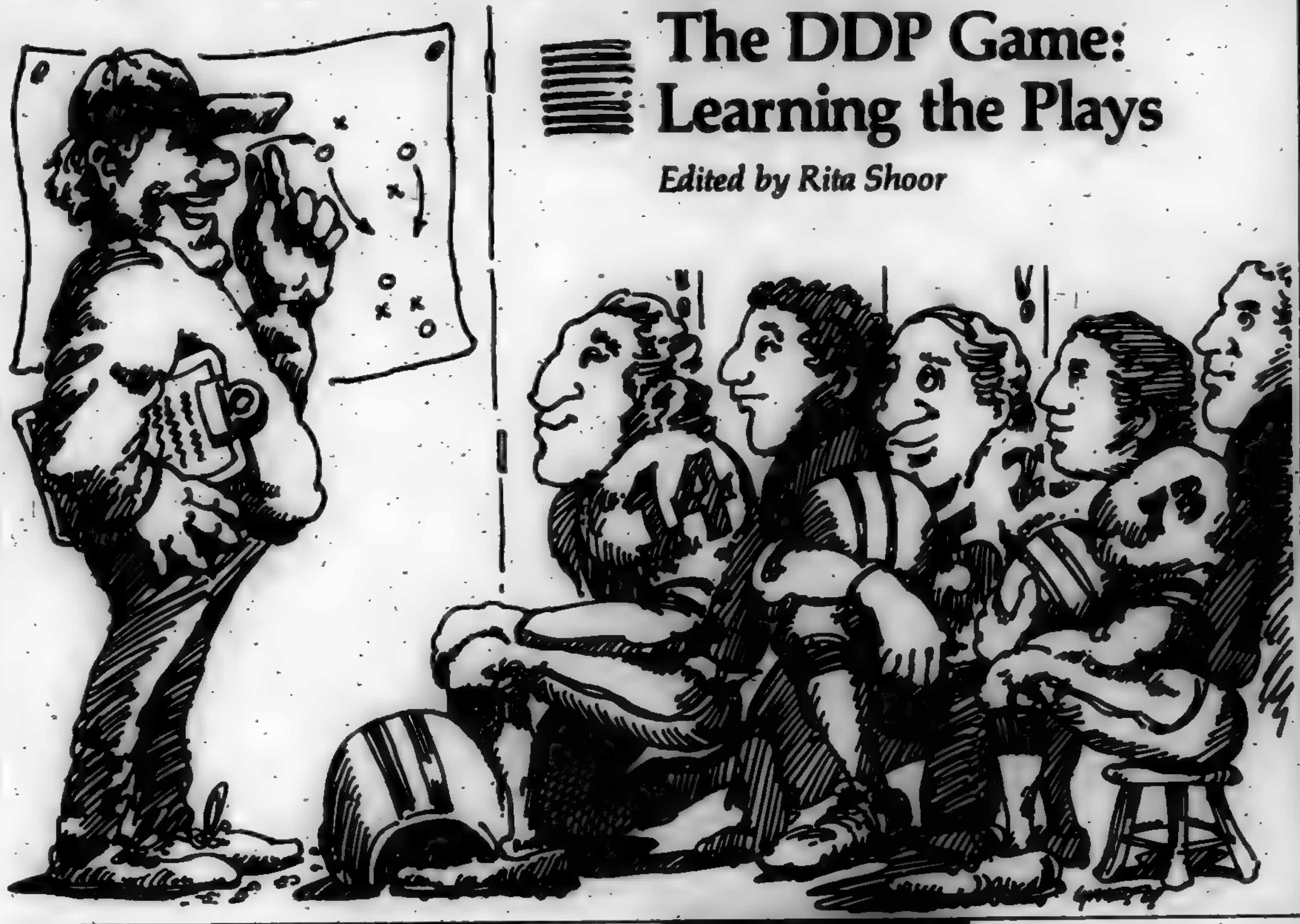
The DDP Game: Learning the Plays

Edited by Rita Shoor



COMPUTERWORLD

Survey Tallies DDP Hits, Misses in Top Firms

By John Gantz
And John Callahan
Special to CW

As the buzzword of "distributed processing" fades and the reality of distributed processing sets in, it becomes possible to establish an historical record — a tabulation of hits and misses.

To accomplish just such a tally, International Data Corporation (IDC) conducted a survey recently of 50 of the Fortune 100 top manufacturing firms. The study augmented and enhanced one on performance by IDC's "Distributed Processing Newsletter" (DPN) for its readers two years ago. In most cases, IDC talked to the communications or DP manager at a company; in 18 cases, it talked to the same person in the same company DPN queried two years ago.

Respondents to the study reported 45,000 terminals in service. Of those surveyed, 75% were adding to their existing distributed data processing (DDP) networks at annual rates of 13% or better (all terminals were not in DDP nets — many were straight teleprocessing). Compared to the 1977 study, the respondents showed fewer companies with extremely high growth rates, but more average growth overall. The annual terminal growth, in number of keystations, is expected to be 24% for the 50 companies.

Some other terminal-related matters surfaced:

- For many users, DDP growth can no longer be strictly equated with terminals, the users said. More software and better communications schemes increase DDP processing per terminal.
- The gross increase in terminals understates the activity, since many users are now replacing older terminals. The churn, then, must be somewhat above 25% a year.
- Some respondents could not project their terminal requirements even as short as one year out. These were primarily demand-oriented shops, where user requests were treated on an ad hoc basis.

DDP Planning

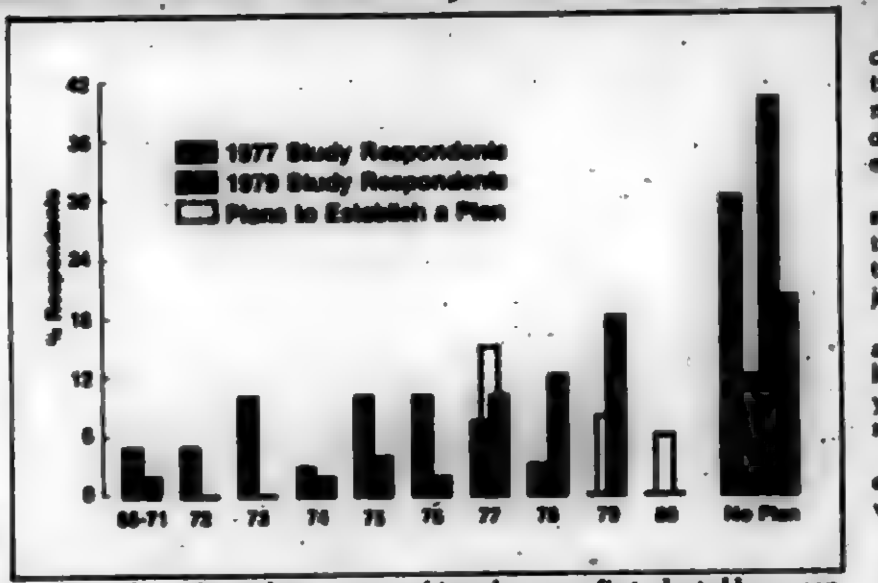
The number of companies that operate without some kind of formal plan for network growth has diminished by 10% to 30% of the respondents in the intervening years between surveys. Furthermore, 60% of those without plans expect to have them before long.

In a majority of cases, DP centers are looked at as support organizations — cost, and not profit, centers. Most planning activities, therefore, consist in trying to meet the load projections handed down by the end users, with costs being an important but secondary matter.

Users also appear to be setting up methods for continual equipment evaluation — some going so far as to have in-house experts, or communications consultants, perform this task, while serving as an interface between DP and management staffs.

For the most part, the users said, network plans were updated yearly and DDP applications were approved on a case-to-case basis by company management.

Within the survey sample, 20 companies said they had DDP up and running. This was a slight increase in the total number of DDP applications reported in 1977, but true penetration is actually deeper — almost all the users said they had some sort of distributed data base. In the earlier study, there was a preponderance of distributed data entry and distributed report generation.



The chart above shows the year networking plans were first adopted by respondents — and clearly the latter years have been pivotal. Under the "No Plans" category, the lower level of each bar represents those who don't expect to have formalized networking plans within the foreseeable future.

The users also reported some high-powered DDP equipment, such as the bigger units from Datapoint Corp., Digital Equipment Corp.'s superminis and even two IBM 8100 installations. Users who were not installing DDP were generally geographically or organizationally unsuited (highly centralized).

As for future plans for DDP, the presence of the IBM 8100 can be seen. Of 21 companies that have future DDP applications planned, nine say they will use the 8100. Some even appear to have ordered their 8100s first and are now casting about for applications (DPN, September 1979).

Of those who already have installed DDP, 60% say they plan more applications, often with specific applications in mind. Those planners of DDP who have not already got an application up and running are a little less specific — most suspect they will go to DDP, but are planning it in stages.

To see how well DDP has fulfilled its promise, IDC went back to the 18 users it had talked to in 1977 and compared them with the recent results. In 1977, seven out of 18 companies said they had DDP systems in place, nine had plans for systems in the future and two had no plans for implementation.

In the intervening years:

- One of the seven DDPers dropped out.
- One of those with "no plans" implemented DDP.
- Of the nine with plans for DDP, four implemented it and five still have plans for DDP.

The statistics are slim, but the insight may be meaningful. It appears that the lines have been drawn at large companies. Those with inclinations to go to DDP are doing so or have done so. There is less planned and more real distributed processing.

Of those users who have DDP (in the subset of 18), all but one plan more applications and more than 80% have specific applications in mind. And of those who do not plan more DDP — both those who have DDP and those who do not — most (80%) have specific applications in mind.

Part of the study that was not included in 1977 was investigation into the interface between DDP management, voice sytems management and office systems planning. Some interesting figures surfaced:

- Almost three-quarters of the respondents said their data communications systems shared lines with voice traffic, but less than half were under joint management.
- Of the companies that shared management of voice and data, a majority had been doing so for more than five years, and 40% had been doing so for more than 10 years.
- Of the respondents, 60% said their data communications staffs were involved in office systems planning.

In Review

If the survey of the Fortune 100 companies tells us anything, it is that DDP is here to stay and, for the big companies, anyway, the highest part of the learning curve is past. The whole DDP arena is more stable.

For smaller companies, the writing is on the wall. DDP will come, if it is not already there. IDC studies into the uses of data bases on minicomputers indicate that some of the more interesting DDP applications are beginning to appear at the smaller companies. DDP is past the leading-edge.

For DDP to remain robust, some problems will have to be solved, none closely related to equipment:

- Easy-to-use software for communications and distributed data bases will need to be developed.
- The acquisition, training and motivation of qualified people will have to be put onto an organized basis and made top priority.

The IDC report from which this story is taken is *"Networking and DDP in the Fortune 100."* More information is available from Mary Trayte, IDC, 214 Third Ave., Waltham, Mass. 02254.

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As Market Tops $2 Billion/Year

Users, Vendors Growing Smarter About DDP

By Ellen Rogers
And John Gantz
Special to CW

The buzzword is losing its glamour. Editors no longer salivate at the thought of articles on it, conference chairmen no longer consider it the foremost leading-edge topic. So what's happening?

Simple. "Distributed processing" is becoming so much a part of daily DP fabric that buzzwords no longer apply. It's real. Users are no longer just curious — they are cruising (or struggling) into second and third generations of distributed data processing (DDP).

A status report is in order, a retrospective.

We start with the market. Derived from subsets of the market for minicomputers, small business computers and processing (intelligent) terminals, the DDP market hit $2 billion installed base this year. By 1983, it will be an impressive $12 billion. In terms of processors at operating nodes within DDP networks, by year-end 1983 there will be about 220,000 in the U.S.

By 1983, system shipments will account for about 85% of total shipments of more than $4 billion worth of equipment to the U.S.; the rest will be add-on equipment. Processors by then will be gushing forth at about 100,000 a year just to the U.S.

At that point, the DDP market will have surpassed the "knee of the curve" in its shipment growth. Shipments and installed base, now of considerable size, could double every three years or faster. By the end of the decade, surmises International Data Corp.'s (IDC) *Distributed Processing Newsletter*, the installed base could include more than one million devices worth more than $70 billion (in 1979 dollars).

No wonder the buzzword is losing its punch. There's too much of substance behind it now.

DDP Management

How has DDP management changed as DDP users have gained experience?

To answer this question, IDC conducted interviews with all the major vendors and conducted in-depth research at 25 large organizations in their DDP implementations. The user survey was structured this way:

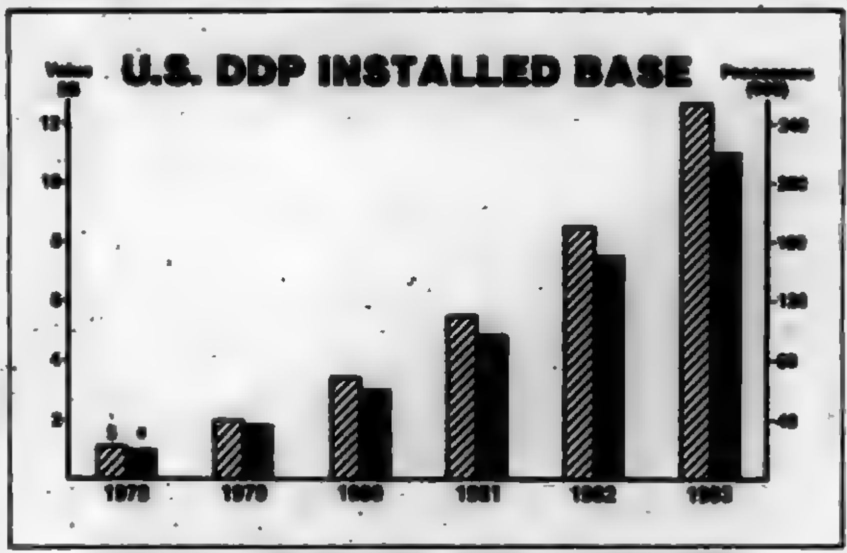
- The 25 organizations were known DDP users.
- The companies were in five broadly defined industry groups.
- Representatives of three of four functions within each organization were interviewed.

In fact, the last point revealed that since IDC had last conducted a similar study several years ago, *there was a new DDP-related function in most companies — a DDP/end-user Liaison.* In cases where talking to the vice-president of management information services (MIS), the DP manager and the end user had covered the subject, a new person was quite often involved. Although coming under various titles, this new function apparently sprung up in the last few years as DP's method of interfacing with end users. It is a function of translation between DP and the ultimate user of DP's products.

In its research, IDC found four major elements in the successful implementation of DDP systems:

- The decision-making process must be established and adhered to *before* DDP systems are designed or implemented.
- Equipment selection and usage must be carried out in a rational manner with an eye toward future growth, flexibility and service.
- Applications development must be carefully planned and only as ambitious as equipment and training permit.
- Education and support for implemented systems and users/-programmers are key to long-term success.

In the decision to go with DDP, users told IDC, control of operations, cost savings and mirroring corporate philosophy were all major driving forces.



By 1983, installed DDP equipment will be valued at $12 billion.

In the latest study, however, a new force emerged — increasing productivity, or leveraging personnel costs.

It's not surprising.

Studies by the Brookings Institute indicate that annual productivity gains in the services sector of the Gross National Product — which is heavily white collar — have averaged only half that for manufacturing, a third of that for agriculture.

Other figures reported by IDC indicate that white-collar workers have shown an increase in productivity of only 4% during that last decade, while factory workers' productivity has increased 80%, primarily as a result of higher capital investment per worker in the latter category.

The Brookings Study has also shown that almost 45% of what productivity gains there have been are related to technological innovation; a third of that is directly traceable to the usage of computer power. DDP, then, can be seen as an application of computing power to an area most susceptible to productivity increase.

Equipment Selection, Usage

Users (and their liaisons) are getting more involved in equipment selection. This reflects their growing sophistication, a yearning for autonomy and vendor marketing. (IBM, for instance, has begun marketing the 8100 to end users, and even the 4300; traditionally, IBM salesmen called only on DP managers.) And as DP managers have found out, not only do users' equipment needs change and evolve, so do their perceptions of needs.

Of particular interest — because vendors are pushing the concept so much — are multifunction systems for DDP use.

Oddly enough, despite the current mania for office automation and the heavily laden bandwagon of DDP suppliers that offer word processing with their products, few DDP users consider either word processing or message handling very important. In the future, there will be moderate interest.

Users at the 25 companies told IDC that for now they need only a few of the various functions vendors are offering in single systems. In the future, however, they'll be in the market for more.

Oddly enough, despite the current mania for office automation and the heavily laden bandwagon of DDP suppliers that offer word processing (WP) with their products, few *DDP users* consider either word processing or message handling very important. In the future, there will be moderate interest.

The reason is probably organizational. Word processing is done under the aegis of another department; for DPers, it's a separate capability that is only "nice to have." Since the vendors are plugging it — and since office automation appears to be heading that way — by the mid-1980s, more DDPers will probably be taking advantage of the WP features on their equipment. In fact, DP managers might have a lot to say about WP networks.

While education is a major factor in the success or failure of any DDP implementation, IDC's user interviews revealed a general lack of organization and planning when it came down to disseminating knowledge. Some users said they learned the system by "osmosis." Others taught each other.

Education, Support

While education is a major factor in the success or failure of any DDP implementation, IDC's user interviews revealed a general lack of organization and planning when it came down to disseminating knowledge. Some users said they learned the system by "osmosis." Others taught each other. Sometimes training manuals were written by DP staffs, in others by user departments. And in general, the higher echelons in the company taught the lower ones — often with some "information losses" along the line.

As a result, DDP-using companies are rethinking their education processes. Three levels of training seem appropriate:

- *Conceptual* — awareness of the rationale behind a DDP system.
- *General Implementation* — how the system will affect the company and specific job functions.
- *Actual Usage* — for those who will actually interface with the system on a day-to-day basis.

Successful DDP users have found that a three-tiered — and well-defined, somewhat formal — training program leads to the best result. It's especially important that end users receive some sort of indoctrination into the first two levels, even though they don't "need to know" on a day-to-day basis. Knowing the concept behind the system helps eliminate resistance to change and allows systems' end users to make more meaningful decisions in their daily interfacing with the system.

It's also important that there be good in-house marketing of the concept, which dovetails with the highest tier of training.

From the vendor's side of the house, the first method of increasing educational levels for DDP users would be to design easy-to-use systems in the first place. Second to that, an understanding of the three levels of training that are involved in user education is necessary; and then, good off-site or in-house programs to familiarize users with the equipment.

Support is also important. Here, everyone gets involved. There must be an overall corporate philosophy regarding training and vendor relations, and money must be allocated. There must be high-level DP management and plenty of non-DP management support for the system. There must be vendor support for hardware and software — a major factor in equipment selection.

Overall comes the message from this IDC study — users and vendors are getting smarter about DDP. Vendors realize they must be prepared to meet increasing demands from users, while being patient as user perceptions of need evolve.

John Gantz is director of publications for IDC and editor of Distributed Processing Newsletter.

Ellen Rogers is IDC's manager of distributed processing studies.

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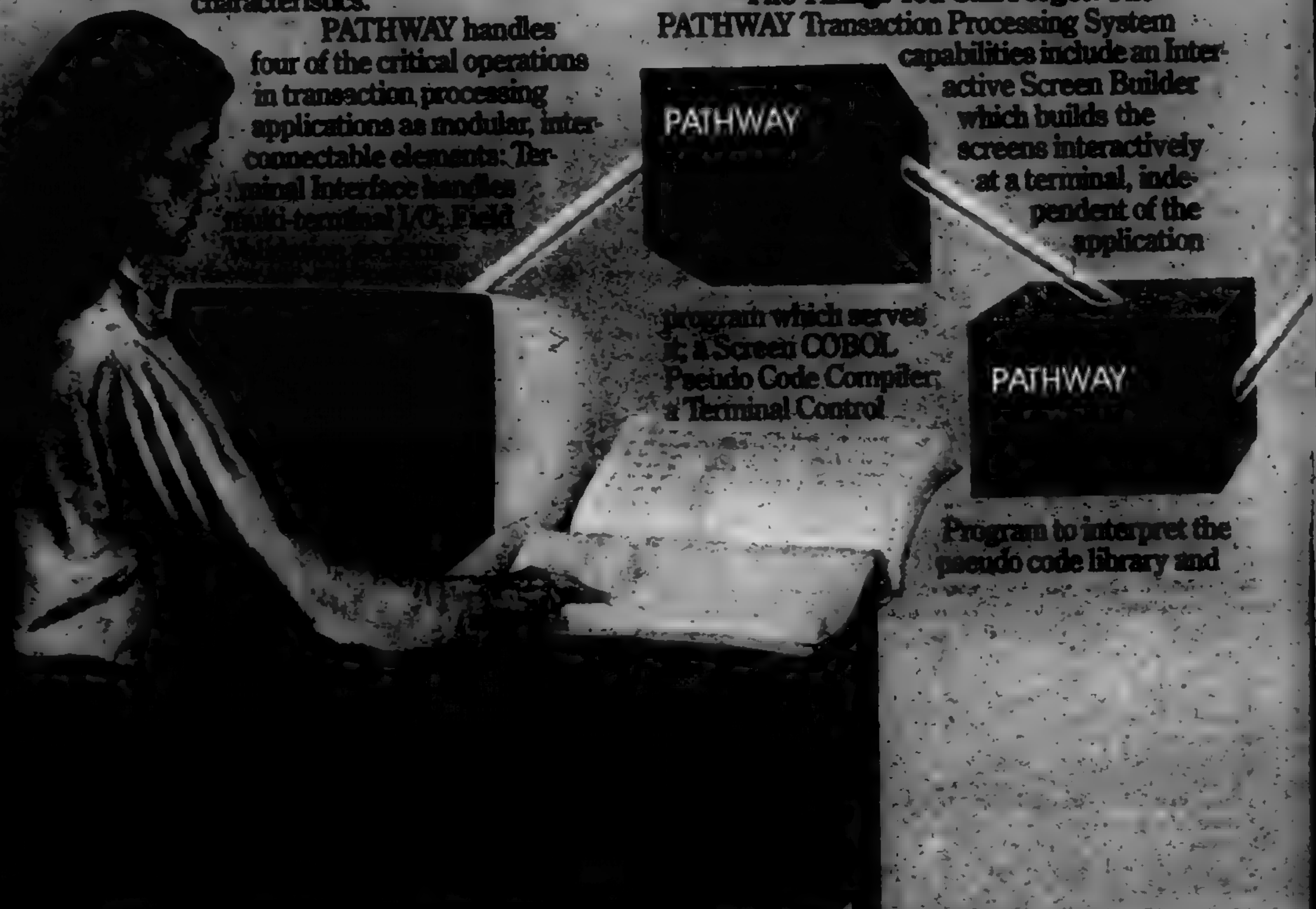

AS BATCH.

check the flow and content internally; the Applications Monitor which has power to create, track and alter the application run time environment; and finally the Application Monitor Control Language which lets an operator communicate with an active Application Monitor. It's a powerful system, easy to use and inexpensive. With everything you need to get your on-line transaction applications up and running, with all the benefits of a NonStop™ System, in record time.

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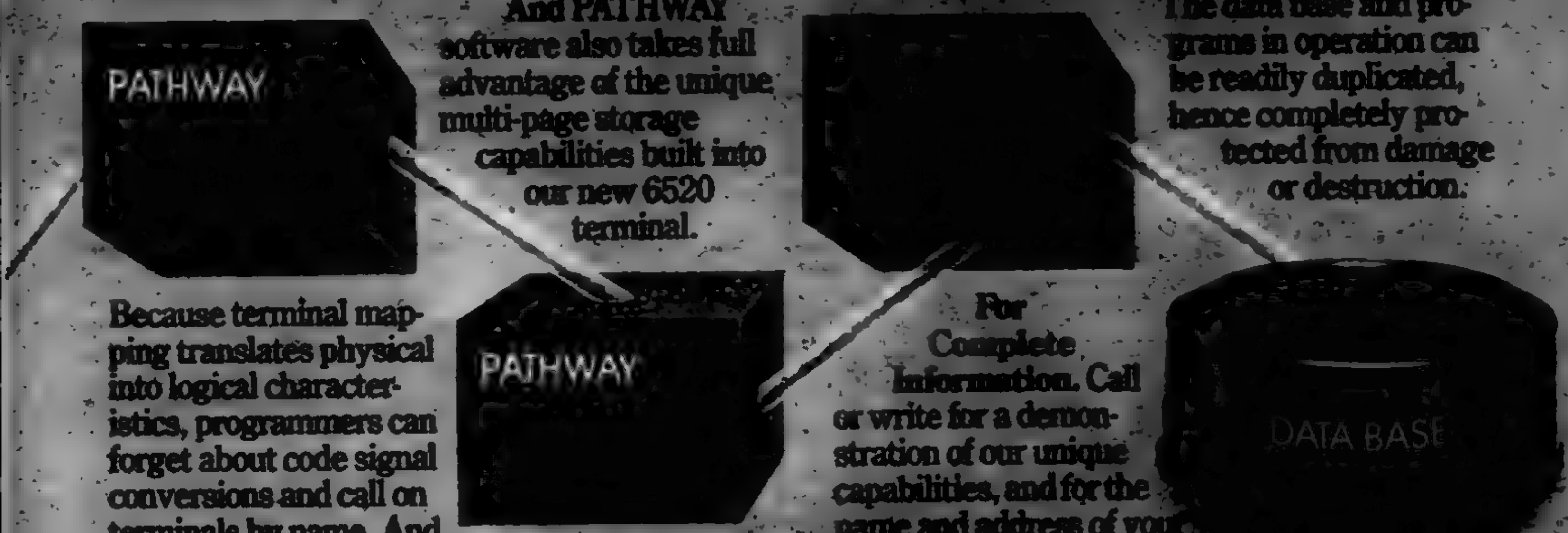

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A Glossary for DDP Users

WALTHAM, Mass. – In the world of information systems technology, new terms are constantly being coined in order to describe evolving concepts like distributed data processing (DDP).

Honeywell, Inc. has developed the following glossary to define the terms commonly encountered in its distributed systems environment. While this list represents only one vendor's definitions, it could apply to many DDP environments and may be helpful to the reader who is inundated with technical literature describing various systems and components.

Application – A definable set of tasks to be accomplished as part of the work of an enterprise. An application may be accomplished partly through manual procedures and partly through computerized procedures.

Application Program – A set of statements defining those tasks associated with an application that are to be executed by the computer.

Architecture – A framework or structure which determines how something is constructed, defining modularity and interfaces among modules.

Communications Network – The collection of transmission facilities, network processors and so forth that provides for data movement among terminals and information processors.

Concentration – The function of routing information from a number of communications links onto a smaller number of higher capacity links and providing the reverse flow from fewer to more links. A device which performs this function is usually called a concentrator. Unlike a multiplexer, the concentrator is a programmable device.

Data Base – A generalized, integrated collection of enterprise- or installation-owned data which fulfills the data requirements of all applications that access it and which is structured to model the natural data relationships that exist in the enterprise.

Decentralized Information System – Two or more sets of information-processing equipment, operated by the same enterprise, but without any implied coordination among the sets.

Distribued Data Base – One logical data base which has been divided between physical locations within a distributed information system.

Distributed Information System – A coordinated set of information-processing capabilities implemented in two or more relatively independent resource centers such as computer sites, terminal locations and so on.

Distributed Processing – A technique for implementing one logically related set of information processing functions within multiple, geographically separated physical devices.

Endpoint – The logical or physical entity at the end of a branch of a network. Endpoints include application processes, terminals and people at terminals.

File – A named increment of storage or an unstructured or user-structured form of data storage.

Hierarchically Distributed Processing – The distribution of functions over components connected in a tree-structured hierarchy. Also called "vertically distributed processing."

Horizontally Distributed Processing – The interconnection of two or more components which cooperate in an essentially "equal-partner" relationship.

Host – An information processor which provides supporting services and/or guidance to users and/or satellite processors, terminals and other subsidiary devices. A host processor is generally assumed to be self-sufficient and to require no supervision from other processors.

Hybrid Distributed Processing – A combination of hierarchically and horizontally distributed processing.

Information Network – Geographically dispersed resource centers, including information processors and terminals, which are interconnected using data communications facilities.

Link – The interconnection between two nodes in a network. A link may consist of a data communications circuit or a direct channel (cable) connection.

Load Leveling – Resource sharing which results in optimum use of resources at all locations.

Message – A collection of data to be moved as a logical entity within an information network.

Message Switching – Computer-controlled transfer of messages from a terminal to other terminals.

Modem – A device that provides an interface between a terminal or a processor and the data communications facilities.

Multiplexing – The support on a single physical link of two or more logical links. A device which performs this function is usually called a multiplexer. Unlike a concentrator, a multiplexer is not programmable.

Network Processing – The physical and logical operations which support the definition, establishment and use of facilities for data movement among physically separated locations.

Network Processor – A computer devoted to the control of data communications facilities, performing functions such as routing, switching, concentration, line/terminal control and host interfaces.

Node – An endpoint of any branch of a network, or a junction common to two or more branches of a network. Distributed system nodes include information processors, network processors, terminal controllers and terminals.

Packet Switching – A mode of data transmission in which messages are broken into smaller increments (packets), each of which is routed independently to the destination.

Partitioned Data Base – A distributed data base which is created in the form of a number of nonredundant partitions, each located at a different processor.

Procedure – A series of operations performed in a regular sequence to accomplish a stated purpose. Procedures may be either manual or computerized.

Program – A collection of one or more computer-executable (directly or indirectly) procedures.

Protocol – A set of rules for the exchange of information between two or more components.

Replicated Data Base – A distributed data base which is created by copying all or part of a "master" data base and placing each copy at a different location within the distributed system.

Resource – An information-system component (hardware or software) which can serve a user requirement. Resources include processing time, storage devices, data bases and language compilers.

Resource Sharing – The function of allocating the processing load of an enterprise to the available processing facilities when multiple facilities exist.

Ring Network – A distributed system in which the information processors are connected via a circular arrangement of data communications facilities.

Routing – The function of selecting the appropriate path(s) for the movement of data within a network, ensuring that all data is directed to the appropriate destination(s).

Satellite – An information processor that is arbitrarily assigned a subsidiary role in a distributed system, communicating with (and perhaps depending upon, to some degree) a host for supporting services and/or guidance.

Schema – An explicit declaration of the interrecord and intrarecord relationship structures of a data base.

Site – A physical location for the housing of information-system equipment.

Star Network – A configuration in which remote terminals and/or processors are connected radially to a central processing location.

Station – A logical endpoint in an information network, such as a terminal, information processor or application program.

System – A collection of components which is under single, unified management.

System Administrator – An individual who defines, controls and manages the information system environment within which the activities of the enterprise are handled.

Terminal – A device which embodies a set of human/system interface functions, such as a teletypewriter or a keyboard/CRT device.

Terminal Controller – A hardwired or intelligent (programmable) device which provides detailed control for one or more terminal devices.

Transaction – An event (such as a sale, order or payroll change) of interest to the enterprise which controls the information system. Also, a computer-processable record of that event.

Transaction Processing – The entering of records of events into the information system when each event occurs. Generally, only relevant data is entered.

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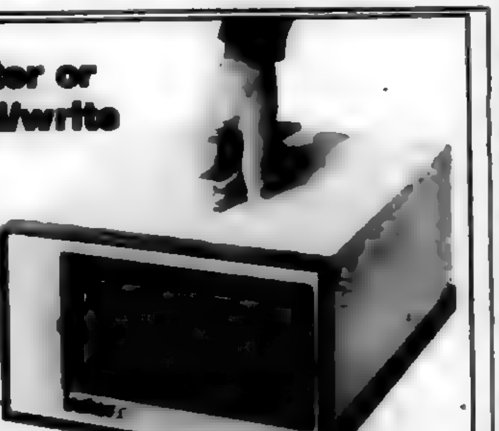

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Centralized or Decentralized?

DDP Opens Spectrum of Management Options

By Grayce M. Booth
Special to CW

The information processing community is still in the early phases of an evolution in the use of distributed systems. This evolution is centered around the concept of distributing computing power and data storage to the places where the ultimate users of the system — the end users — are located.

This distributed system trend introduces many technological challenges. For example:

- Standard communications protocols are needed to allow data exchange across complex networks.
- Global cataloging and access procedures are needed to provide for the use of distributed data bases.
- Load-leveling and resource-sharing algorithms are required so that optimum use can be made of distributed resources.
- Systemwide restart and recovery procedures are needed to ensure that the distributed system can meet the uptime requirements of the application.

Management Challenges

However, of equal importance are the other challenges — and opportunities — which the management of distributed systems represents.

Distributed systems impact managerial philosophies and styles because their flexibility opens up a whole new spectrum of management options not available with centralized information systems.

Centralized computing implies centralized managerial control. Obviously, each user or user group cannot choose its own hardware, operating system and supporting software, nor can each group operate the computer system. A centralized information processing staff must perform these functions, leaving only the application programs to be defined by end-user groups or their representatives.

In this environment, the central staff must make appropriate trade-offs that best meet the needs of all user groups. Often, in practice, this means that no user's requirements are met fully because of the compromises caused by sharing. This disadvantage is typically offset by saving to the organization as a whole through economies of scale in equipment and staffing.

Fewer Advantages

Today the economic advantages of centralization have decreased, particularly when data communications and personnel costs are considered along with information processing equipment costs.

The cost of data communications facilities is either decreasing slowly (more slowly than computer hardware cost) or increasing, depending upon the geographic area and the type of service obtained. For example, in 1975, communications link cost in the U.S. averaged only 65% of the cost of the same service in 1960. However, according to International Data Corp. (IDC), increased use of these facilities has led to an escalation in total link costs for all U.S. users from an estimated $1,091,000 in 1974 to $1,945,000 in 1977.

In some countries, basic costs of communications links have increased. The cost of a voice-grade private link in the UK was approximately 40% greater in 1975 than in 1970. Other countries are experiencing comperable — or even greater — communications cost increases.

Personnel costs are constantly increasing, keeping pace with worldwide inflation. According to IDC, total salaries of DP personnel in the U.S. have increased from an estimated $9,044,000 in 1974 to $10,800,000 in 1977. Comparable personnel costs in the UK are growning at an annually compounded rate of about 15%.

Cost increases in data communications provide a strong incentive to distribute computer power in the hope of minimizing transmission costs. Personnel cost trends can only be offset through productivity increases, which may be achieved through more effective computer use.

Question of Control

As the distribution of processing and data bases becomes economically attractive, the question of managerial control arises. Should control remain centralized, even though the components of the information system are distributed? Or should control follow system structure and be fully distributed? Or is some compromise between centralization and distribution of control most appropriate?

Managerial control can be exercised independently over each of the following major functions: application development, data base administration and equipment selection.

Application development is an important aspect of control; whoever develops the programs determines how the system operates. Application development today ranges from centralized to distributed even in centralized systems.

Some organizations have chosen to maintain a single centralized analysis and programming staff which develops all application programs, in consultation with the user groups.

Other organizations have chosen to support an analysis and programming staff in each major functional area (such as personnel, production controler order entry), with necessary coodination provided by the central computing staff. Each of these patterns has proven successful in many installations.

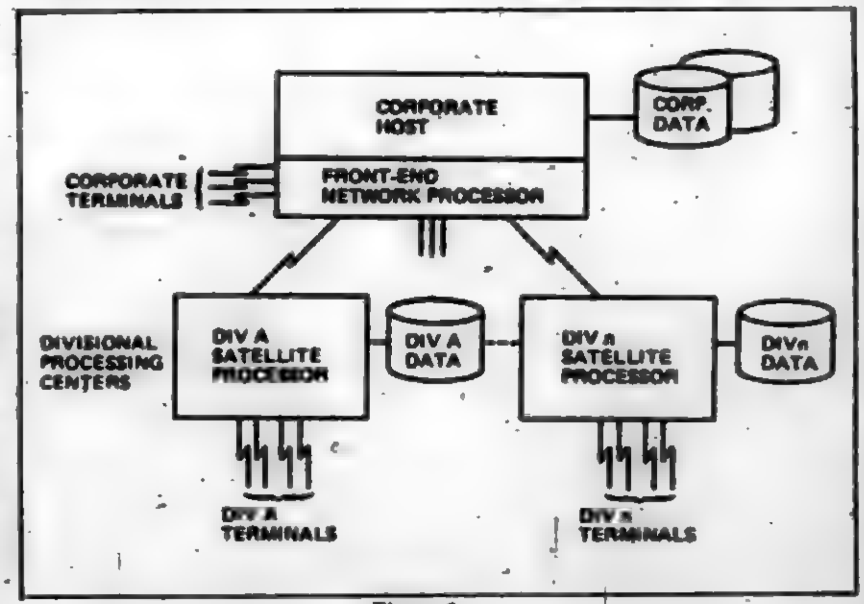
These same choices exist in distributed systems. The major new factor is that application development applies to several information processors and/or intelligent terminal/device controllers in multiple locations.

Hierarchical system

A typical hierarchically distributed system is shown in Figure 1. The central host processor serves as a focal point for consolidated reporting and headquarters-level activities such as budgeting. Each of the satellite (local) processors serves a different division of the organization, performing local processing functions.

With this type of system, some organizations may choose to centralize all

(Continued on SR/8)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CORP. DATA
CORPORATE TERMINALS
DIVISIONAL PROCESSING CENTERS
DIV A SATELLITE PROCESSOR
DIV A DATA
DIV n SATELLITE PROCESSOR
DIVn DATA
DIV A TERMINALS
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Figure 1

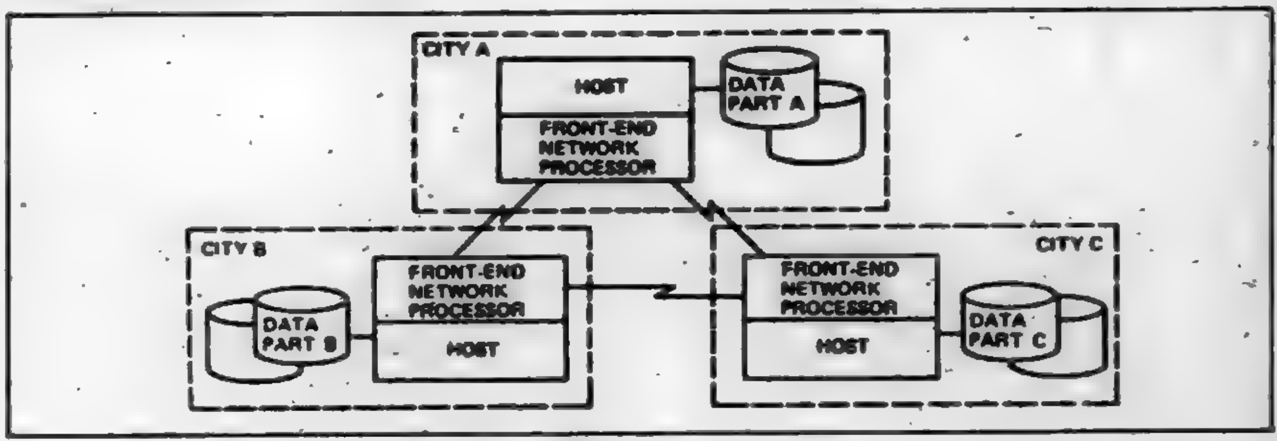

CITY A
HOST
FRONT-END NETWORK PROCESSOR
DATA PART A
CITY B
FRONT-END NETWORK PROCESSOR
HOST
DATA PART B
CITY C
FRONT-END NETWORK PROCESSOR
HOST
DATA PART C

Figure 2

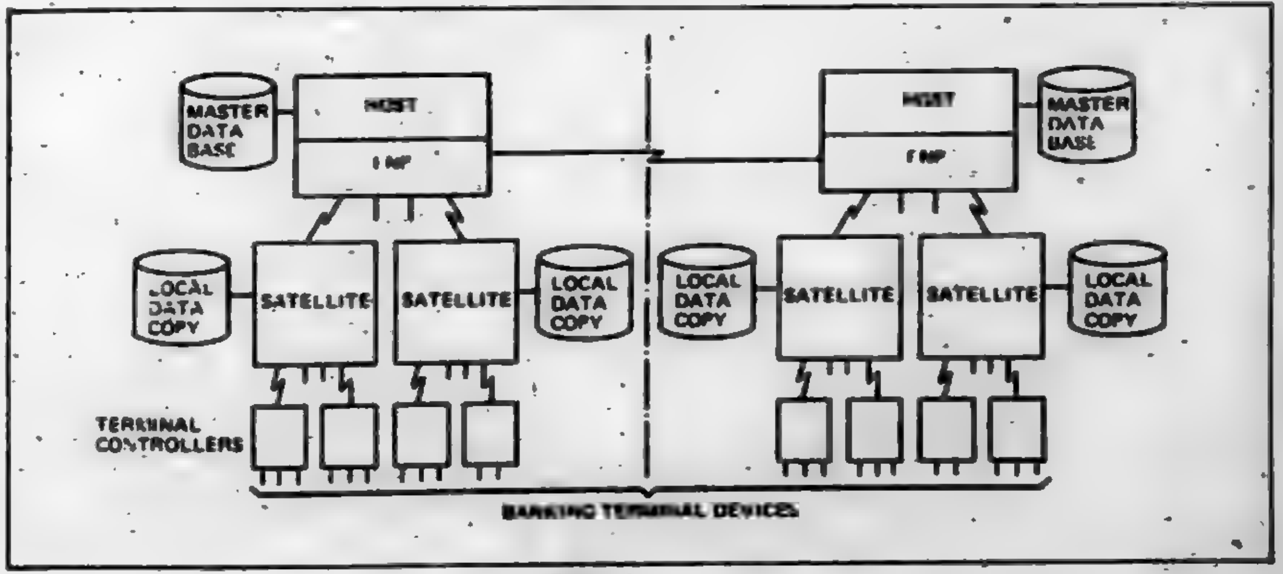


Figure 3

DDP Offers Management a Range of Options

(Continued from SR/7)

application development at the headquarters level. This is most easily accomplished if satellite programs can be developed using cross-compilers and tested, using simulators, on the host processor.

Centralized application development is chosen when management wishes to consolidate control and/or minimize cost.

Alternatively, an application development staff may reside at each host and satellite location, with responsibility for the programs to be used locally. This may be more costly in staffing, but may be more responsive to local needs, minimizing local end-user costs. In this case, cross-compilers, simulators and so on are not usually required.

Distributed application development, however, requires a coordinated set of interface protocols for information exchange. Even though each satellite may operate semi-independently, it must send specific data — on defined schedules — to the host for consolidation and reporting. Similarly, the host may be required to send data to the satellites periodically. Although the remainder of the host and satellite implementations can be unique, these information exchanges must follow mutually agreed-upon rules.

Combination Approach

A large automobile manufacturer has chosen an innovative combination of centralized and distributed application development within one of its major divisions. This division operates a distributed system very similar to the Figure 1 example, with a host computer at divisional headquarters and satellite processors at remote plant locations.

Application programs that are common to all plants are developed at headquarters and sent to the satellite computer at each plant in object form. This avoids local program modifications and guarantees tight control over processing which must be consistent throughout the division.

However, local mangement at each plant may choose to maintain an application development staff. This combination of central and local control provides considerable flexibility to serve the needs of both headquarters and local management.

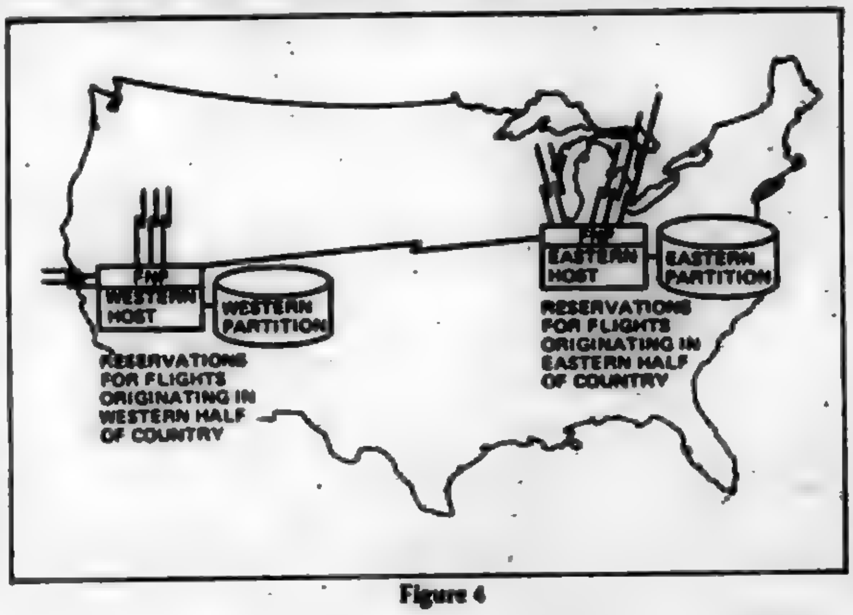
Data base administration is another important aspect of distributed system management control. Today's centralized on-line systems have been developed around large integrated data bases under strong central control. This control is exercised by a data base adminstrator (DBA) or by a data base administration staff if the data base is very large.

The DBA typically resolves conflicting requirements for data base content and access. For example, if an integrated data base serves both engineering and marketing organizations, compromises may be necessary. Engineering requires detailed drawing number information for each product, while marketing needs only major product data. In addition, each component may refer to the same product by a different identifier — one internal and one external.

To make the integrated data base workable, and provide a unified view of 'real-world conditions, realistic trade-offs must be made by the DBA.

In contrast to centralized control of an integrated data base, a distributed data base offers several choices for administration. An example of a distributed system with a distributed data base is shown in Figure 2.

This system includes a partitioned data base. The data partitions stored at all hosts collectively form the organization's data base, but each partition contains data unique to that location.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RESERVATIONS FOR FLIGHTS ORIGINATING IN EASTERN HALF OF COUNTRY

Figure 4

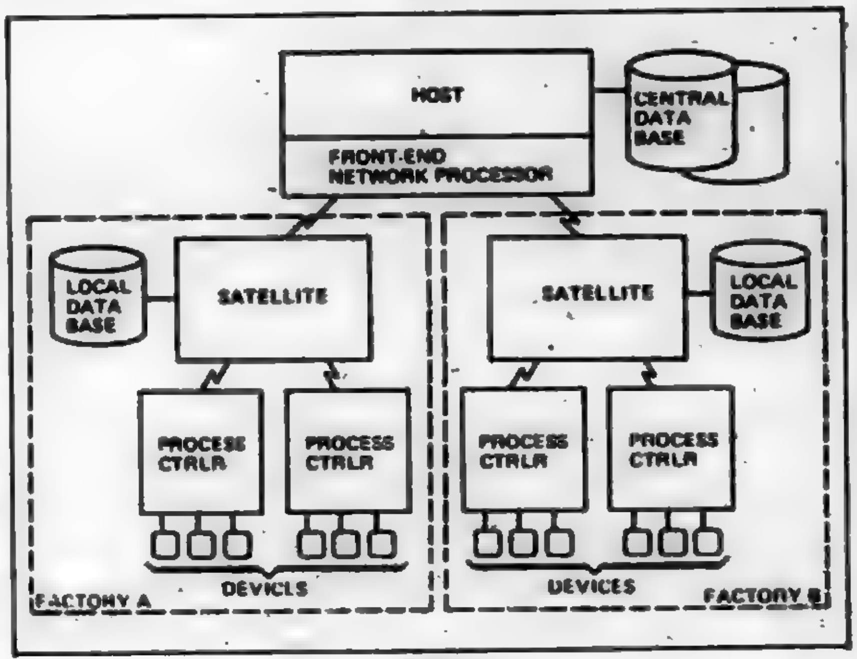

Figure 5

With this type of system, an organization may choose to assign a central DBA to manage the entire distributed data base. Local users at each site can request that certain data elements be maintained, but the DBA determines whether this is done. The DBA maintains all schemas and subschemas, perhaps creating and validating them at the nearest host and then transmitting them via down-line load to the remote locations for use there.

This approach retains tight central control over the partitioned data base and ensures that all of its elements are compatible.

As an alternative, the organization may assign data base responsibility to a DBA at each location. Each DBA then controls the local data base partition, by means of schema and subschema creation. Each data base partition can then be designed to best meet local needs.

In this case, certain coordination activities are required. For example, if data elements are to be moved between locations, compatible data descriptions must be used — or else data conversion procedures must be specified and implemented.

Close relationships among the data base partitions may require coordinated recovery routines to handle failure conditions. The DBAs must collectively provide the coordination and procedures necessary to cope with these situations.

Equipment Selection

This selection function can be either centralized or distributed. Many organizations today require central, high-level approval for computer equipment procurements above a specified cost, leaving items below that cut-off to local discretion. Of course, this is one of the reasons for the current popularity of minis and micros, as these can often be purchased without authorization from central information processing management.

In a distributed system, a new dimension exists in equipment selection. Local equipment, hardware and software, must be interfaced to other local and/or central equipment. Compatibilty problems which are minimal with local free-standing processors become important with interconnected processors.

As the preceding discussions show, available managerial options range from total centralization of control to relatively complete decentralization. Total local autonomy, however, is impractical because certain standards must be defined and enforced to ensure that the distributed system's components can work together successfully.

Cost Factors

Cost is an important factor in choosing a management approach. However, this cost is not simply the cost of information processing equipment. The cost of the entire information system must be considered: computer and terminal equipment costs, data communications facilities costs, software costs (in-house and external), information processing department staffing costs and end-user staffing costs.

It is particularly important to evaluate end-user costs and the effect various system alternatives have on these costs. In any large on-line system that serves the main-line activities of a business, end-user costs tend to be much greater than computer equipment and staffing costs.

This aspect is often overlooked, because information processing people still think in terms of batch systems, in which computer costs far outweigh end-user costs. In on-line systems, including distributed system, opportunities to increase end-user productivity and reduce overall sytem costs should be explored.

Management Philosophy

The managerial philosophy of the organization can also affect the distributed system management approach.

Management philosophy in most large organizations favors decentralization, with each "local" manager assigned full profit and loss responsibility for that segment of the business. However, many decentralized organizations have adopted centralized computing philosophies because of the lack of an alternative. Distributed system technology is beginning to make it practical to distribute control to match the organization.

In general, therefore, an organization that favors decentralized management will tend to prefer this same approach in distributed system control. An organization that favors strong central management will generally retain centralized control of the information processing system, even when system components are distributed.

A large European bank is an example of the latter approach. This bank is currently installing a very large, complex information system, shown in Figure 3, with widely distributed processing.

However, the bank's philosophy is "distributed systems and centralized management." All of the software for the entire system, managing more than 8,000 terminals in more than 2,000 bank branches, is centrally developed, and the system is under central administrative control.

Nature of Application

The nature of the application will often be the deciding factor in determining how to control a distributed system.

For example, it may be practical to

(Continued on SR/10)

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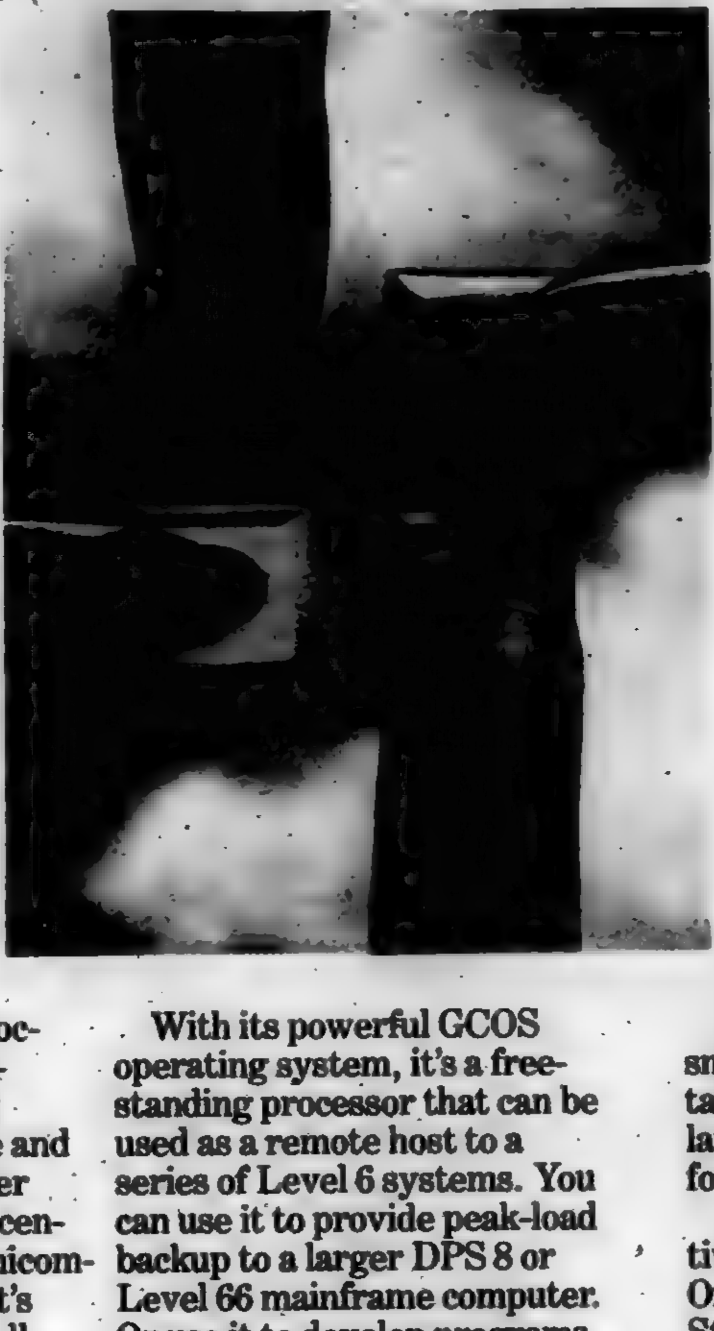

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DDP a Melding of Corporate Objectives . . .

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The concept of DP for most major U.S. corporations has developed along the following lines: centralized, decentralized and distributed.

In the first environment, all computer resources are centralized at a single location, and all requirements for DP services are then directed to that particular location. This permits the corporation to obtain an overall view of the data, but involves additional cost for communications between outlying regions and the central location.

In this case, there is usually a corporate DP organization to implement all systems on the centralized computer, and end-user needs are not always given high priority. This conflict is a result of centralized DP's view of the "corporate" needs vs. the user's view of the application needs.

Many organizations then moved to a decentralized approach, where computers were distributed among various geographic locations. Decentralization did lower communications cost and put the computer resources closer to the need, but, without a centralized coordinator for data, this approach increased costs for maintaining integrity of data and for summarization of data into information to answer corporate objectives.

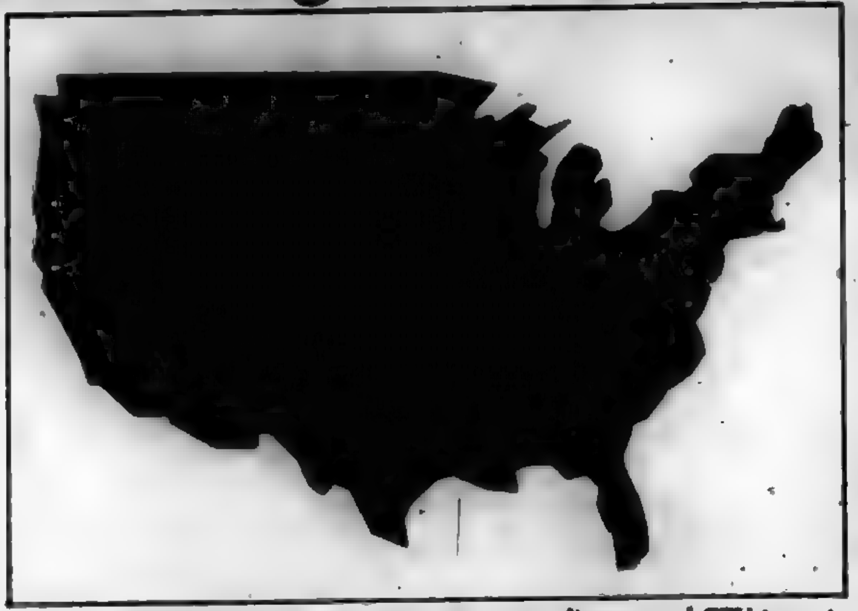

Figure 1. Distributed data base management spans distance and CPU types to pull together important information wherever it resides.

Compromise — DDP

The concept of distributed data processing (DDP) was initiated as a compromise between these two approaches. There is a need to satisfy various user requirements for handling data at the time and place needed. There is also a requirement to reduce communications costs. And, there is the need to maintain a corporate identity and coordination within a computerized environment.

Thus, DDP has come about from a standoff between the corporate needs and the application or end-user needs for information.

If data is to be distributed, however, it should be done in a format and with tools usable by both the local users and the corporate centralized users as well. Data base management has proven to be an effective approach for both end users and centralized DP. So, to make distributed processing work, we have to extend the concept of data base management systems to that of distributed data base management systems.

Within a single processing unit environment, data base management systems have solved the problem of replication and integrity of data that every corporation faces when data bases are constructed. Now there are potentially new problems in distributing data among various geographically distributed data bases.

Most traditional concepts in data distribution — such as centralization, replication and partitioning — view the data resource implicitly as if it were a total unit, planned and coordinated from a single centralized source. This is the systems analyst's dream: a totally coordinated and integrated data base system distributed over every computer system in the world.

But, it is not a very practical approach for most corporations and certainly not practical from the end-user point of view — that end user who has to draw information from this data.

We have to take a new view on the processing and activities of the data resource. These data resources are combined and related as user needs dictate. Within the arena of distributed processing, we now have to allow local and independent data base growth while retaining the ability to relate these data bases as subsequent needs arise.

Independent, local data bases need to be built by users at remote sites for their own needs and, subsequently, incorporated into the corporate data bank through network facilities. This approach represents a significant departure from the traditional single unit data resource concept that was initiated by the IBM Information Management System.

Compatibility Issue

One of the major considerations in the development of distributed data base processing is the compatibility of operating environments between the various processors. While there are processors that perform individual functions better than others, the best approach in any distributed environment for a corporation is to rely on compatible single suppliers for his processing units — processors and software that are compatible with the central computer facility.

Distributed processing got a big push recently with the announcement by IBM of the 4300 along with the 8100 and System/38 systems. The 4300s represent IBM's distribution of operating systems and application machines to end users.

The 8100 and System/38s are construed as logically and physically independent intelligent workstations for users to enter, store and retrieve their information and then summarize up to the centralized processor. They cannot be a true node in a network environment because there are few communication facilities down to the small systems in the IBM environment.

On the other hand, the 4300 system, in conjunction with the larger .370s

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Range of Options Opened

(Continued from SR/8)

distribute the processing and data base storage for an airline reservation system, as shown in Figure 4. However, it would be very difficult to distribute the managerial control of such a system.

This is a highly integrated application, all of whose parts must work together in exact synchronization. Otherwise, a customer requesting a reservation in one city might receive a different response than a customer in another city, even though conditions were identical. All aspects of this type of application therefore require strong central control.

A distributed manufacturing control system involving two factories and a headquarters location is shown in Figure 5. In this sytem, in contrast to the airline reservation example, local control can optionally be exercised at each site, providing specialization to best meet local needs. Only data exchange for decision-making and reporting purposes requires standardization under central control.

Management Preference

In general, information processing management favors continued centralized control of all aspects of the system. End users and their management, however, strongly favor local control, stressing the need to meet specialized requirements.

It is to be hoped that objective analysis, based on evaluation of cost, overall management philosophy and application requirements, will soon replace emotion in decisions on how to manage a distributed sytem most effectively.

Booth is manager of Distributed Systems Environment (DSE) Market Requirements at Honeywell Information Systems.

A 'Standoff' Solution •

. . . With End-User Application Needs

and 30 series machines provides a true networking facility for DDP and data base processing through compatible nodes.

They meet the basic requirement that the operating environments are compatible among all processors in the environment. This means that maintainability of data bases, data structures, application programs and high-level user language procedures are reduced to the lowest common denominator, the operating system. This means that if an application runs on one node it will certainly be able to run on another node.

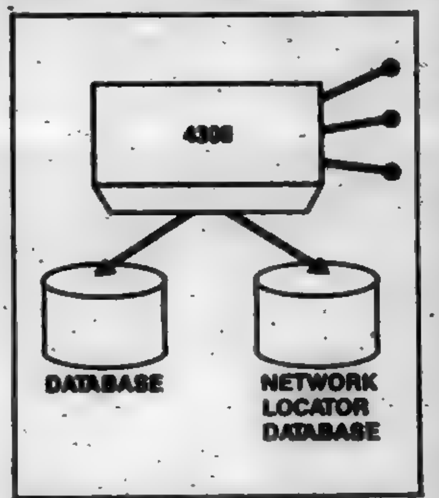


Figure 2. In the Infodata method of distributed data base, the Network Locator Data Base directs each request for information across distance and CPUs and into the data base files to retrieve just the information required.

The next major item is that of communications between nodes in the network. Communications software is the first stumbling block that any organization will run into for implementing a network. Software exists today that allows various nodes in a network to communicate on a superficial level.

The communication riddle is not the biggest problem in implementing networks, but there are no easy solutions and it can be difficult to implement. We're getting to the point where we will be able to communicate in an effective manner soon.

For IBM environments, Systems Network Architecture (SNA) has been around for a while (see Figure 1). While SNA originated as a point-to-point communication facility for terminals accessible to a central CPU, it has been expanded for multiple site distribution of terminals and nodes.

After the machines can talk to each other, these is still a communication problem: How is the user going to communicate with his data in a meaningful manner?

There must be a mechanism to process the data across CPUs. The users should not have to "program" systems for each new requirement. Data base management services with powerful user languages have proven the value of a user interface to data.

The user interface to data must be extended to a distributed environment to allow users to specify their requirements on an ad hoc basis. Thus, a data need is translated into user language statements that provide for data base connections between local data bases and across CPUs.

Eventually, the end user will come to realize that once his local needs are satisfied, there are in the corporation other data resources in which he may be interested. He will want to combine his local data resources with those at the remote parts of the network. He will also recognize the need for the contribution of his data to the corporate information bank.

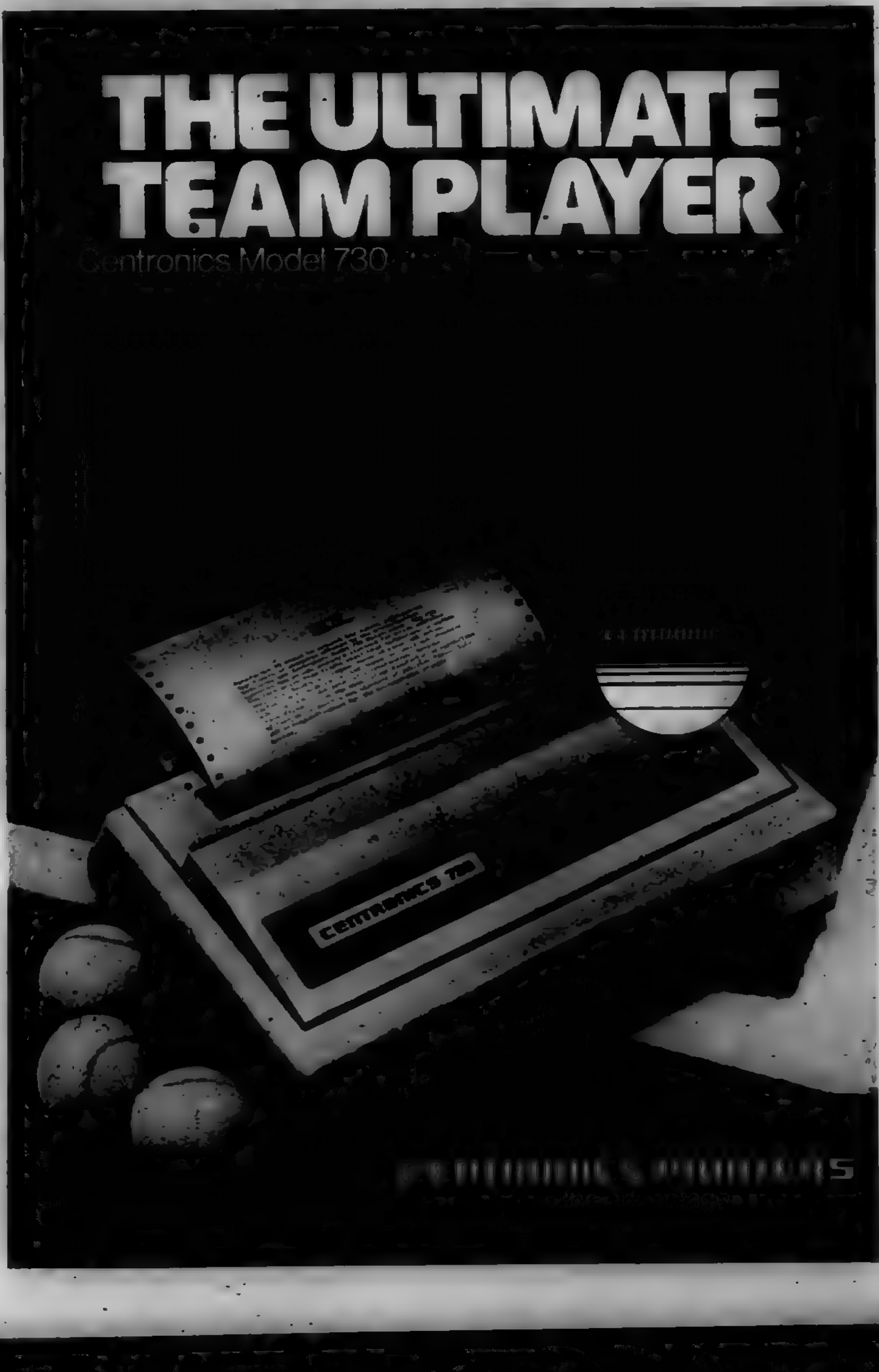
So where is this all leading us? Towards a network of distributed data bases that have local responsibility for maintenance and use, with an additional requirement of correlating them into a network when the need arises.

Infodata Systems, Inc. has an approach to interconnection of data bases on a single CPU, and we have extended the approach to relationships between data bases across CPUs by adding "a CPU address" to the location coordinator. The users build local data bases and then fold them into the network. This approach provides a facility where the whole is more than the sum of the parts and where each data base can stand on its own or be integrated as required.

Global data bases on the same CPU are defined through connection tables that are dynamic. Global data bases across CPUs are defined, in our terminology, via a network locater data base (see Figure 2). This special data base defines the configuration for the data bases across CPUs, but not for the network. The network is handled via the communications software described above.

Data is a resource best used in the proper environment. We are able to make data base connections in a distributed data base environment for a larger view of any data base environment. We have been able to extend our relational concept of multiple data bases across CPUs to allow individual users the ease of retrieval of information from any node in the network.

Allen Joseph is vice-president of Product Management at Infodata Systems, Inc., Falls Church, Va.



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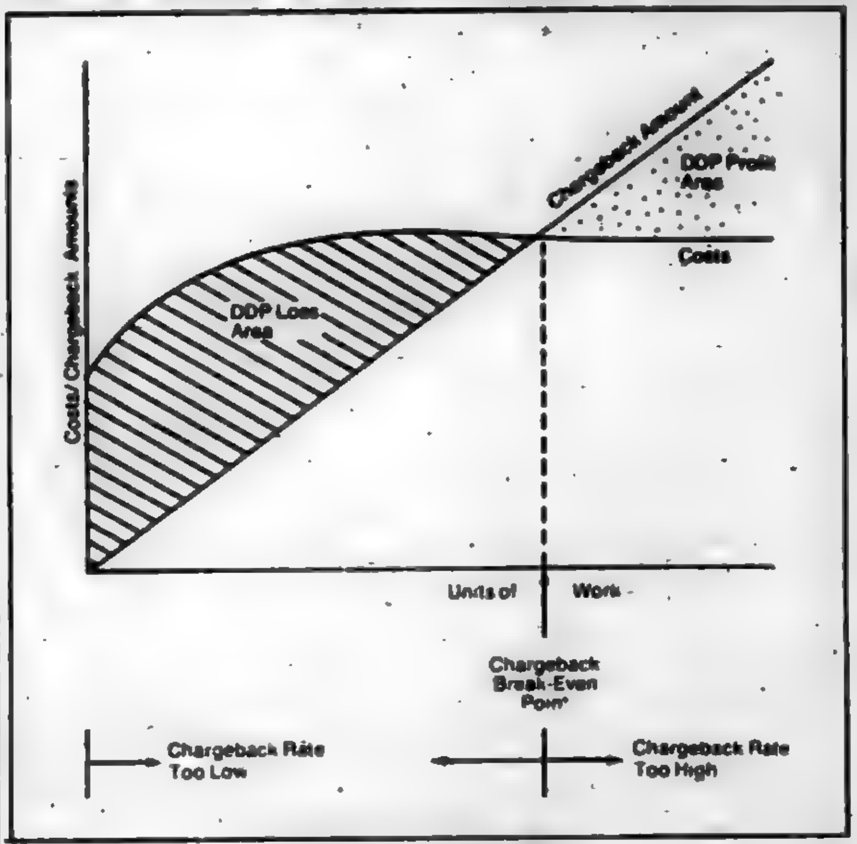
Users Advised on DDP Chargeback Procedures

PENNSAUKEN, N.J. – User chargeback procedures ensuring that the objectives of a distributed data processing (DDP) system are achieved are essential for the system's success, according to William E. Perry, author of a paper on "User Chargeback Procedures for Distributed Systems."

Distributed systems have certain distinguishing characteristics that may require an organization to reassess existing chargeback procedures that work for nondistributed systems, Perry explained. These differences include the following:

- **Absence of centralized control.** Coordination of users operating the system usually lacks the authority found in most centralized systems.
- **Capability to reject requests.** Each workstation in a distributed system is autonomous and has the option to accept or reject requests from other workstations.
- **Users direct operations.** In a distributed system, a work overload may occur at one point in time and be immediately followed by a slack period.
- **Resources are movable.** The cost of moving and storing the resources must be considered when developing a distributed chargeback algorithm.

Resource costs which Perry, executive director of Accountants Computer Users Technical Exchange, recommended for consideration in the chargeback algorithm include those for on-line and off-line hardware, software packages, and in-house software development, communications facilities, data base establishment and maintenance, processing capabilities, resource movement, message rejections by users, support personnel, support hardware and software, job priorities and direct administrative charges.



Chargeback Costing Chart

Chargeback procedures should be developed "hand in hand" with other procedures for the distributed environment, Perry stated and recommended that the information systems manager keep in mind that the cost of executing a unit of work in a distributed facility is not directly proportional to the amount of work performed.

'Break-Even Point'

In order to determine a chargeback rate that will exactly recoup all DDP costs, the manager must find what Perry called the "chargeback break-even point" for his installation. If the "fair value" approach is taken (users are charged for the cost of the resources they use) when designing chargeback procedures, Perry maintained the ideal chargeback rate equals the chargeback break-even point. The chargeback rate per unit of work equals:

$$\frac{\text{Total DDP System Costs}}{\text{Estimated Units of Work at Break-Even Point}}$$

For example, if the cost to operate the DDP system is \$250,000/year and 10,000 messages are processed per year, the chargeback rate is \$25/message.

In order to avoid a loss or profit position, Perry maintained, information management departments have adopted strategies that include adjusting the rate at regular intervals to reflect changing conditions, adjusting user charges at the end of each accounting period to reflect actual costs or transferring the profit or loss to the organization's overhead so it can be billed to the departments along with other administrative charges.

Management Considerations

Chargeback procedures can be developed by either the company's top management or by its DP management, according to Perry, but in either case, he recommended that the following management considerations be evaluated during this process:

- **User control over facilities.** A user who demands exclusive use of resources during normal working hours can be charged more for those facilities than another user who shares the resources.
- **User-owned resources.** The chargeback algorithm can be developed to either encourage or discourage users to buy their own hardware.
- **Single-user facilities.** If a special piece of hardware or software is needed for a single user, that user should be charged the entire cost of the facilities.
- **Facilities for limited numbers of users.** If the facilities are obtained for a limited set of users, only the involved users should be charged for the use of the facilities.
- **Lead terminal charges.** If one terminal is designated as the lead node in a system, charges for the functions performed at the terminal should be allocated among all users.

The entire report, which also described chargeback data collection methods and gave criteria for measuring resource usage within an installation is part of the distributed processing management volume from Auerbach Publishers, Inc., 6560 N. Park Drive, Pennsauken, N.J. 08109.

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Despite Tenfold Load Increase

Offloading Lets Insurer Halve Processing Time

By Jeffry Beeler
CW West Coast Bureau

SAN JOSE, Calif. — In the three years since it began installing its first distributed network, a workers' compensation insurance company has managed to cut its processing turnaround times in half, even though its computing work load has increased at least tenfold.

The user — Employee Benefits, Inc. (EBI) — credits the improved processing efficiency to its installation of a distributed network that ties the company's main computing center here to its five subsidiary sites in the field.

In effect, the network has enabled EBI to transfer or "offload" most of its insurance administration functions from its central office to its remote locations, where many of the firm's policies originate, according to Dana Brown, the company's information systems vice-president.

At the network's heart lie three Hewlett-Packard Co. (HP) 3000 Series IIIs, which communicate point-to-point with about 100 CRT terminals at EBI's remote sites in Portland, Ore., and in four California cities, Sacramento, San Diego, Santa Monica and San Jose. From these distant terminals, the company performs all its major insurance functions, including claims processing, premiums administration and policy issuance.

Claims Use

In the claims area, the firm's terminals are used for checking the validity of each benefit request and later for paying the claims themselves. To authorize a payment, operators enter a beneficiary's name, address and other pertinent data into the terminals, and the system automatically places the input into the appropriate blanks of computer-stored claims forms, Brown said.

The system then updates the approved payment against its data base and uses an on-line HP 2641 terminal to print claims checks at the remote site where the transaction began. The same terminals are also used later in batch mode to do statistical reporting for EBI's actuarial department.

The company's longest program is the one for policy issuance. Working in character mode, the program uses a Ksam file-management system and several of HP's Image data bases to check insurance rates and types of coverage, issue policy numbers and — during the evening shift — to print finished policy documents.

Former System

Before it installed its current network, EBI performed most of its insurance administration tasks manually and farmed the remaining applications out to a nearby service bureau. But as the company's growth accelerated, EBI officials became increasingly concerned that their expanded computing work load would overwhelm their manual processing system and hinder their ability to respond promptly to policyholder requests, Brown recalled.

EBI officials also expressed concern about the firm's growing inability to maintain adequate records. Under the manual system, none of the company's policyholder data was stored centrally. Instead, each remote location kept its own files independently of the other sites, and agreement between the files typically averaged only about 70%, Brown said.

Realizing they faced a potential recordkeeping crisis, EBI officials began phasing out the old manual processing system in October 1977 and installing the current distributed network in its place. Since then, the company's annual revenues have grown tenfold from $15 million to $150 million, and its record-processing volume has expanded by a factor of 10 to 20.

Yet despite its rapid growth, the firm's claims processing and policy preparation turnaround times have shrunk during the same period from two days to just one, Brown said.

Current Configuration

In its current configuration, EBI's distributed network uses HP 2645 CRT terminals for data entry and HP 2621 CRT terminals for data inquiry. The data entry terminals, which operate in block mode, are outnumbered by their data inquiry counterparts by about two to one.

With the help of short-haul modems and Codex Corp. concentrators, the data entry terminals transmit 2,400 bit/sec and the inquiry terminals 1,200 bit/sec over leased telephone lines. All transmissions from the terminals go to three 2M-byte 3000 Series IIIs, all three of which are supported by HP's Multi-Processing Executive real-time operating system.

In the end, the contents of EBI's claims files and other insurance records are stored in the central computing site's 50M-byte HP 7970 and 120M-byte HP 7925 disk units. Altogether, each of the 3000 Series IIIs is configured with about 500M bytes of on-line disk storage.

Two of the processors are dedicated to daily production work, while the third is used exclusively for system development.

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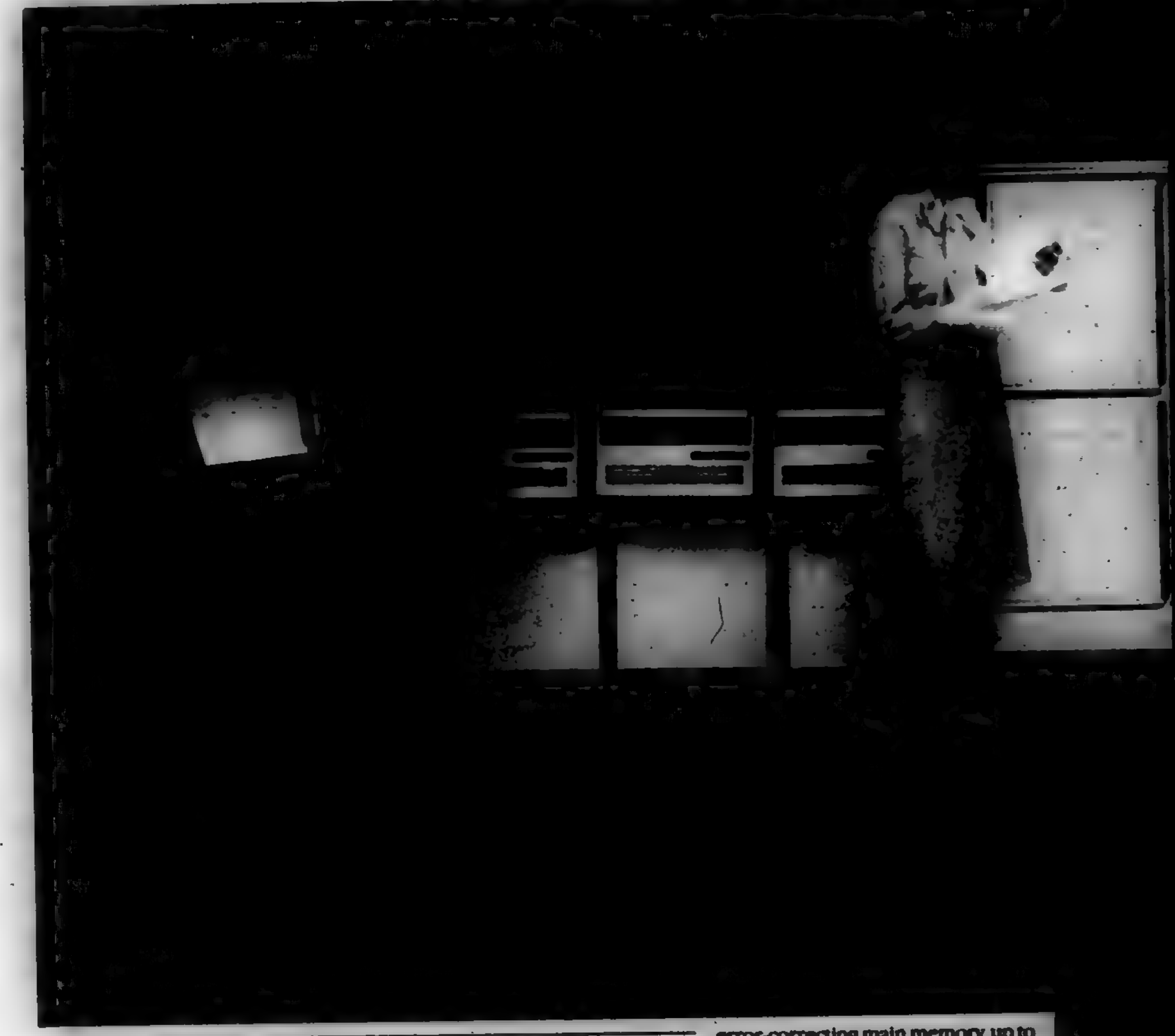

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All of which means the 750 can handle just about anything you can throw at it, including huge computational analyses, big data processing tasks for business, and complex data communications applications.

As you can see, the 750 has a lot in common with much more expensive

mainframes. But perhaps what's equally important are the differences. For example, the 750 is interactive–a highly desirable feature on a computer with this kind of mainframe power.

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Many Avoiding Comprehensive Plans

Backup Can Prove Obstacle, Network Users Say

By Ann Dooley
CW Staff

Most companies try to avoid planning comprehensive backup procedures and the headaches that accompany them, but the headaches can grow even worse in a distributed data processing (DDP) environment.

In a sampling of six DDP sites around the country, *Computerworld* found no one who had ever had to use an emergency backup plan. But few had done any comprehensive planning for the eventuality of a disaster.

Most of the users noted that the expense of backup facilities was a major reason they did not have them. Disaster plans are difficult to carry out, costly to support and, in some cases, hard to justify to supervisors, several claimed.

Communications costs, for instance, particularly in an on-line DDP environment, would be especially costly, the managers indicated.

Several of those surveyed seemed to prefer playing the odds, hoping to be spared any disaster situation, rather than implementing thorough plans. And if a disaster did occur, they said they hoped their methods would ease them through the crunch — which would, they hoped, be short-lived.

Although several managers said they would revert to old, more cumbersome manual methods, no training in old methods had been conducted nor had walkthrough situations simulating disaster conditions ever been performed.

The users disagreed as to whether management would lose control in a backup DDP environment. If centralized control were maintained, users felt there would be less difficulty, but if user sites normally were in control of their own processing, problems could develop, several noted. Different management opinions and time schedules would come into play, creating difficulties in an already difficult situation, they said.

> *'Several of those surveyed seemed to prefer playing the odds, hoping to be spared any disaster situation, rather than implementing thorough plans.'*

Most of the computer operations were originally designed with little thought to backup operations, making it more difficult to implement a plan for an increasingly complex and ongoing system. Only one site, the Hartford Insurance Group, which is now planning a DDP environment, is creating built-in disaster relief.

The Hartford is "giving a great deal of thought to backup" and is currently considering establishing a complete alternative data center for its DDP operations, scheduled to be operational in 1982, according to Carol Vance, director of research and technology.

But Vance noted that an alternative center creates complications of redundancy between files and also drastically increases communications and storage costs.

"Many people think DDP backup is easy since the work is being done on smaller units, but the same basic concerns must be answered as in a centralized site," she said. Some of the work load can be shared, but there are many support aspects that need attending to, she noted, adding that it is easier to lose control of backups at separate and dispersed sites.

Some of the users indicated that DDP itself is a kind of backup and that if one site went down the work could be offloaded to another site. Vance, however, feels that to be effective, a backup plan must be integrated into the normal security and audit procedures.

Reciprocal Agreement

Tom Bartz, corporate director of management systems at Medalist Industries, Inc. in Milwaukee, Wis., has arranged a reciprocal agreement with several companies in the area to trade facilities in case of disaster. But there aren't any companies that can accommodate on-line backup plans, Bartz said, adding, "We can bite the bullet with batch work for only so long."

Setting up another on-line site would require installing phone lines, which would take a long time, and moving people as well as data. "It gets muddy pretty quickly," he said.

If a disaster hit Kinney Drugs, Inc.'s DDP sites with headquarters in Gouverneur, N.Y., Steve Hayden would move the operations to another site with a similar system. "Our own people would move there and work around the normal shifts. We would convert on-line to batch and use the off-site documentation and files," he said.

"We could delay some of the functions for about a week, but after that we would have to start processing everything or we'd never catch up," he noted.

Sandia Laboratories in Albuquerque, N.M., developed its own backup utility system which can restore individual accounts, parts of individual files or the entire system, according to David Darsey, supervisor of the DDP system. The Sandia system, however, is a scientific rather than business information system and runs in a time-sharing mode, which makes backup much easier to arrange, he pointed out.

One user, who wished to remain anonymous, noted that although he had a reciprocal trade backup plan for his mainframe, the only backup for his DDP system was to revert to a manual system or to offload some of the work to other sites. "We just don't plan to be down that long," he said.

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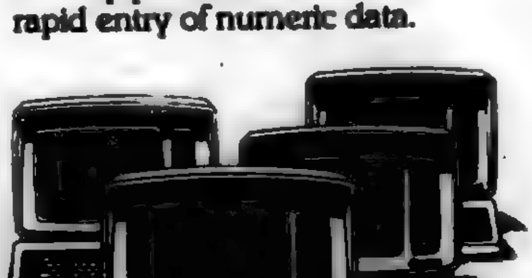

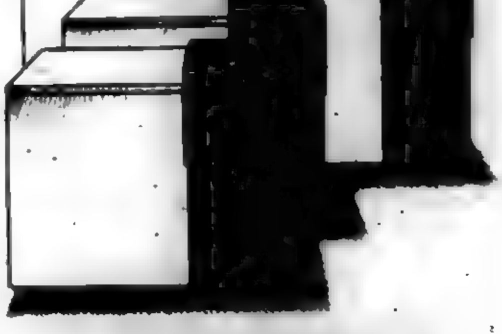

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What's Holding Some Users Back From DDP?

ELLICOTT CITY, Md. — What factors keep an organization from converting or increasing its commitment to distributed data processing (DDP)?

This question was among those put to DP managers selected on a random-sample basis for a survey entitled "DDP Markets: Survey and Analysis" conducted by Impact Marketing Services here. The replies of some 91 users reflected an average of two major constraints on an installation's movement towards DDP, although the specific factors differed from company to company.

More than one-third (34) of the managers indicated that a lack of substantiated cost/benefit data was the most important constraint in their environment. Central staff personnel limitations were specified as a drawback by enough users to come in a close second in number of responses (32).

Limitations in the staff stationed at the remote sites were cited as a negative factor by 26 respondents, and Impact Marketing pointed out that if central and remote-site staffing constraints are grouped together, staffing represented the most significant obstacle to increased DDP since it was mentioned by some 58 of the DP organizations polled.

Approximately one out of five users stated that software limitations and/or the cost of data communications were constraints at their installations, and hardware limitations or the absence of DDP requirements in their current environment were mentioned by a low percentage of the respondent base (12% and 7%, respectively.)

By Industry Type

When analyzing the responses on an economic basis by industry type, Impact Marketing noted that lack of substantial cost/benefit data was mentioned most often by users in retailing and the all-encompassing "other" classification. Retailers ranked central staff limitations equally high and the central staff constraint also drew the most responses from representatives of manufacturing and financial services organizations.

Transportation-sector respondents ranked software limitations as the principal drawback while insurance firms cited remote-site staff limitations as the most important constraint.

Other sectors represented in the survey were wholesaling, data processing services, government and education.

When analyzed by the extent of data communications needs, the respondent cluster composed of firms with nonexistent, local and regional requirements emphasized different constraints from those listed by the firms needing national and international data communications services.

While the former group ranked central staff limitations as the principal constraint to increasing movement toward DDP, the latter group felt that remote staff limitations coupled with the lack of substantiated cost/benefit data were the principal restrictions to DDP growth (see table).

CONSTRAINT	(NONE/LOCAL/-REGIONAL) I	(NATIONAL/-INTERNATIONAL) II
Lack of Substaniated Cost/Benefit Data	2	1
Communications Costs	7	3
Central Staff Limitations	1	4
Software Limitations	4	5
Remote Staff Limitations	3	1
Hardware Limitations	6	7
Insufficient User Interest/Education	5	8
Other	8	9
DDP Requirements Don't Exist	9	7

Insufficient education and interest in the user departments at these companies was cited by only 16 of the DP managers, but when 90 of these respondents were asked about user department interest in DDP, almost 40% (34 of the total number of respondents) said users were either unaware of the potential benefits of DDP or were uninterested in becoming directly involved in it.

Another 40% of the same group rated the user interest in their organizations as "somewhere between 'ecstatic' and 'couldn't care less.'" The relatively low number of remaining companies (17 out of 90) said all of the user departments were interested in DDP.

Transportation firms generally (67%) reported low levels of DDP interest among user departments, while total unawareness of the possibilities offered by DDP was an important factor to 35% of the representatives from the manufacturing area.

This is in contrast to the fact that none of the wholesaling industry respondents reported low levels of interests in DDP in user areas.

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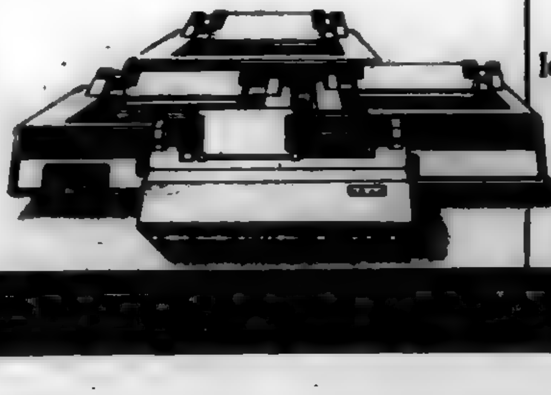

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No 'Standard' Solution

Users Vary Approaches to DDP Security

By Bruce Haard
CW Staff

Everybody seems to have a different idea of the best way to handle security for distributed data processing (DDP) systems. Because of the lack of mature technology, there is no standard for protecting such systems.

Burger King Corp., the First National Bank of Boston and the Chase Manhattan Bank have all taken divergent paths toward security on their DDP systems.

The fast-food chain processes data from its nationwide network of restaurants through 25 regional and distribution centers using Nixdorf Corp. Model 650 minicomputers. The minis are hooked into an IBM 370/158 at corporate headquarters in Miami. The operating systems on the minis feature ID and password protection.

The system is "just getting off the ground," according to James Freeman, Burger King's Miami data center manager, who added it has been in development for approximately a year and a half "and is growing daily."

There are few uniform security standards enforced at all 25 remote computing sites, Freeman said. "They all have their own way of accessing the system," largely because many sites are located in rented office spaces in various buildings around the country.

Each center does have backups for its documents stored on tape and disk, and main computer rooms must be locked when not in use.

Burger King's strongest line of defense against data intrusion is to be found in Miami, where the company runs IBM's RAC FII data security package on its 158. "We are trying to protect the remote job entry input-type access and secure our own local and remote Time-Sharing Option operation," Freeman said.

When a remote site wants access to the Miami mainframe, it must deal with RAC F. "Each particular regional or distribution center has its own ID code so that when they log on; we can monitor them," the manager said, and one remote center may not access data from another.

The restaurant chain is using its own in-house encryption system to retrieve daily data on cash, sales and other areas it considers to be of interest to the competition, Freeman noted.

The First

The First National Bank of Boston enforces a more rigid, standardized set of security measures than does Burger King. William R. Synott, senior vice-president for Information Systems and Services, described a tightly controlled global network closely monitored from corporate headquarters in Boston.

Although Synott said the First employs a wide variety of computers throughout its distributed system — which includes 57 processors around the world — there is currently a preponderance of IBM System/34s, he explained.

The remote sites all answer to two IBM 3032s and two 370/158s in Boston running RAC F, a system the vice-president said he was satisfied with, but which is "pretty difficult to operate with and a lot of work to implement."

The bank distributes two sets of standards to its remote computing sites, Synott said. The regional data centers in London; Buenos Aires, Argentina; Sao Paulo, Brazil; and Boston get one set, while the smaller sites reporting to those regions get another.

"The standards we issue to each site indicate what responsibility they have for the security and control over their physical facilities and data and spell out in general terms what they need to provide, what they need to protect and how," he said.

"What we do is issue London a full set of standards, then issue Paris a shortened version that applies only to minicomputer locations and describes regulations for protecting computers and files."

All programming, development and maintenance is done in the regional centers. To make sure of that, the compilers are removed from the subregional minis, leaving them with object language only. "We distribute our computers, but not our program development. The sites cannot do anything other than what that machine is programmed to do.

"If Paris has a problem, they call London, which is on a communications switch to them. They turn on the machine and London does the diagnosis, solves the problem, recompiles the program and downloads it to give the object code again.

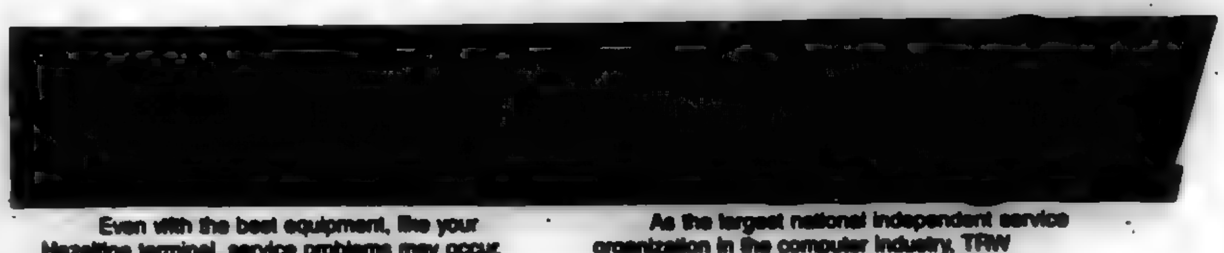
Chase Manhattan

The Chase Manhattan Bank uses a less centralized, but equally rigid approach to security for its worldwide distributed processing network consisting of approximately 45 computer centers.

Chase allows various departments to develop their own security standards, but closely oversees the process and makes sure there is top-level management approval of any finalized plans.

The process began two years ago, when a Systems Review Committee

(Continued on SR/22)



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IBM 4331 Seen Problematical in Some Nets

By a CW Staff Writer

GREENWICH, Conn. — IBM's 4331 CPU is turning out to be the weakest link in distributed processing networks involving 4300s and 8100s, according to one analyst here.

Although the hardware in the 4300 line appears sound, coping with the machine's 370-based software is proving too much for inexperienced users, Dave Stein, an analyst with the Gartner Group, said.

With much of it mired in the early 1960s, IBM's 370 software is "a horror story in three acts." Few people have the background and historical perspective to cope with the many changes that have been made to 370-based software in nearly 20 years. That lack of experience creates a particular problem on 4331 systems where people other than systems programmers are often expected to be able to set up and run the systems, Stein said.

Just bringing the systems up is often a challenge to the novice user, he said. IBM suggests large companies develop teams of 4300 and 8100 installers who will bring up each machine in a distributed system the same way. However, company politics often halts those plans, leaving users at the remote site to their own resources when it comes to installing 4331 systems, Stein said.

IBM's larger 4241 processor hasn't experienced as many installation problems because more seasoned programmers are usually on hand at those sites to aid with installation operations, Stein added.

While Stein's assessment of the 4331 in a distributed system seems somewhat bleak, one user of such a system said he hasn't experienced problems with 13 installed 4331s.

While noting one installation's success doesn't indicate a trend, Louis Bohache, senior vice-president of systems planning at Farmers Insurance Group in Los Angeles, said his 13 remote users have adapted very well to the 4331 with the DOS/VSE operating system after converting from a 360/20 environment.

Although Bohache went along with IBM's recommendation of using crack teams of company specialists to install the 4331s, he added the firm hasn't experienced problems with remote users being unable to run the CPUs after they were installed.

Bohache added the firm didn't provide special training for its personnel in how to use 370 software; it just introduced the software to its employees in small pieces.

Brighter View of 8100

While Stein seems somewhat unimpressed by the 4331, he holds a lot of hope for IBM's 8100.

Although to date the 8100 seems to have made a less-than-impressive impact on the distributed marketplace, that will quickly change as soon as IBM irons out some of the software bugs associated with that system, Stein said.

Equating the 8100 with earlier IBM announcements that offered a combination of new hardware and software, such as the 360, Stein said early problems with such a system are not uncommon.

"The combination of ignorance and insecurity can be deadly" to a new product. However, "IBM doesn't let its marketing people kill a new product by neglect," Stein said.

Once IBM irons out preliminary software bugs and teaches its marketing reps the best applications for the system — a process that could take three to five years — "the 8100 will catch fire and it will be dynamite."

Estimating that the 8100 will outsell all other CPUs in IBM's history, Stein said it should fulfill its intended purpose — to stop penetration by other minicomputer vendors into IBM's distributed marketplace.

This sort of one-stop-shopping is further accentuated by IBM's recent announcement of word processing equipment that will eventually be compatible with Systems Network Architecture (SNA). This means a word processing product used with an 8100 can eventually interface with similar products introduced by OPD, such as the Displaywriter system, a small, reasonably inexpensive word processing systems with data dictionary capabilities.

User Approaches To Security Vary

(Continued from SR/20)

recommended to top management at the bank that computer security be upgraded. Top management then directed the Corporate Systems Department, of which Herbert J. Navarro is second vice-president, to establish a systems security policy and accompanying standards.

Of approximately 400 departments throughout the bank, it was determined that about 80 faced the gravest security needs, and they were chosen to develop risk analysis studies and disaster recovery programs, Navarro said.

The development of security programs for all 300 or 400 departments would have cost the bank $6 million to $8 million, while the lesser number could be accommodated for $2 million — a more palatable figure for the Systems Review Committee, which directs systems activities, sets standards and allocates money for computer systems at Chase.

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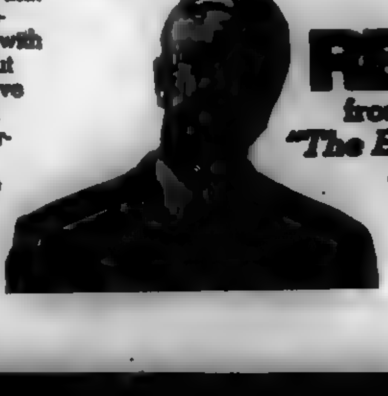

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Distributed Minis Let Brewer Avoid Costly

OLYMPIA, Wash. – The acquisition of distributed minicomputer systems let the Olympia Brewing Co. here avoid an expensive upgrade of its IBM 370/135 mainframe while improving the productivity of its systems staff and its production-scheduling systems.

Olympia Brewing is the country's seventh largest beer maker with sales of $372 million in 1978, according to Wendell Carlson, director of information systems. The company has three breweries – one each in Washington, Minnesota and Texas.

'Heartland' Market

A few years ago, Olympia beer was sold only in the company's traditional West Coast "heartland" market. Today, both Olympia and Hamms are marketed in 26 states as far east as Florida, while Lone Star is sold throughout Texas.

According to Carlson, the minicomputer-based network has helped to make beer available when and where it's needed. This network of Data General Corp. Eclipse systems is the key to the distributed data processing (DDP) approach at Olympia's breweries in Olympia, Wash., and St. Paul, Minn.

By allocating production runs to incoming orders, Eclipse C/330s have moved the required order-scheduling information to the location where beer is produced and shipped, saving valuable time, Carlson said.

The C/330s are looked on strictly as "production machines," in that they support the daily plant-site operations. All development work for the minicomputer is done at the corporate information processing center. There the company has an IBM 370/135 mainframe, equipped with an IBM 3704 communications front end, and a DG Eclipse M/600 system.

Corporate CPUs

"We look on those two machines as the corporate computers. The M/600 is a market research tool that is used for interactive on-line problem solving," Carlson explained. This includes analysis of beer sales using graphics display terminals to project consumption trends in the brewery's product line. This research work on the M/600 is done using DG Dasher CRT terminals and Tektronix, Inc. 4014 graphics terminals.

To streamline the order processing functions, Olympia is in the process of a major upgrade that includes moving the product and order scheduling out from the 370 to the C/330s. The minicomputers presently are operating under DG's RDOS, using an IBM 3270 emulation software package from an independent software house.

Conversion of the C/330s from RDOS to the Advanced Operating System (AOS) environment is scheduled for late this year. The conversion of the Eclipse C/330s to AOS will give the plant site managers greater control over their DP scheduling needs.

Up to now, this scheduling work had to be done on the 370, which is running more than 500 hours a month, handling between 4,000 and 5,000 batch jobs. The production scheduling work had to be fitted into the 370's crowded job stream.

But when the conversion is complete, the C/330s will do much of their own production work, and then the results will be transmitted to the 370 using bisynch communications.

Solutions Near Problems

The DDP approach being implemented on the C/330s is based on the philosophy that it is best to "put the solution where the problem is," Carlson explained.

Whereas marketing and financial work are done at the corporate computer center using the 370 and the Eclipse M/600, it is more efficient to give individual plant managers control of their own destiny in regard to their individual processing needs, he added.

In the past, users had to install DP equipment and then tailor their business to meet the capabilities of the equipment but with the distributed processing approach, "we can install the hardware functionally and geographically where it is needed from a business

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Upgrade

standpoint," he said.

The installation of the C/330s has had other benefits for Olympia. By adding smaller processors at specific locations, the company has avoided the need to upgrade its 370 mainframe.

With the installation of first the M/600 and then the C/330s, Olympia has "frozen" the 370 configuration for the past two and a half years. According to Carlson, this has resulted in a hardware savings alone of $300,000 to $500,000 in the company's DP expenditures.

When the AOS conversion is complete, the C/330s will be able to communicate through the IBM 3704 front-end processor to the 370/135. The 370 is the central point of the network, with the other machines exchanging data with the mainframe.

The C/330 at the Tumwater plant operates as a remote processor even though it is located in the same building as the corporate computer center. By using modem simulators supplied by Teleprocessing Products, Inc., the local C/330 can be connected directly to the mainframe — thereby avoiding telephone charges, but still allowing the minicomputer to look like a remote processor to the 370.

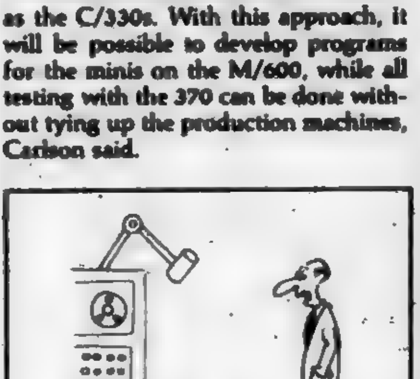
The DDP approach being implemented on the C/330s is based on the philosophy that it is best to "put the solution where the problem is."

The St. Paul site uses AT&T private lines and Paradyne Corp. M90 modems. The 9,600 bit/sec capability of the M96 usually is split into two 4,800 bit/sec lines to handle data transmission needs between the two sites, Carlson said.

Olympia has a staff of 13 programmers performing systems development work on the various applications. The C/330 production scheduling system is being developed on the Eclipse M/600 using DG's Cobol implementation, while the market research applications are coded on the M/600 in fortran 5 and DG's PL/I language, based on the 1976 PL/I standard. Programs being developed on the 370 are written mostly in PL/I with some Cobol.

A total of 63 terminals are installed at Olympia with 47 Dasher CRTs, three Tektronix, Inc. graphics terminals and some IBM 3270 CRT terminals in use.

The M/600 will also be able to transmit data to the 370 in the same manner as the C/330s. With this approach, it will be possible to develop programs for the minis on the M/600, while all testing with the 370 can be done without tying up the production machines, Carlson said.



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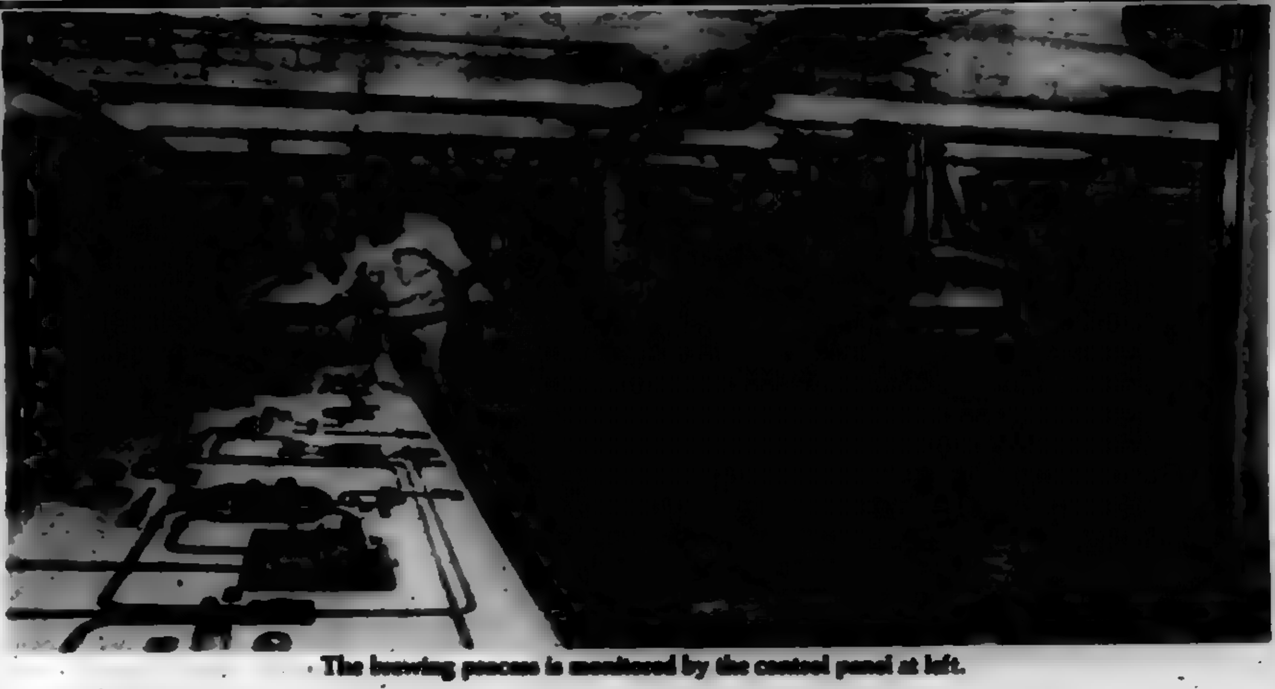

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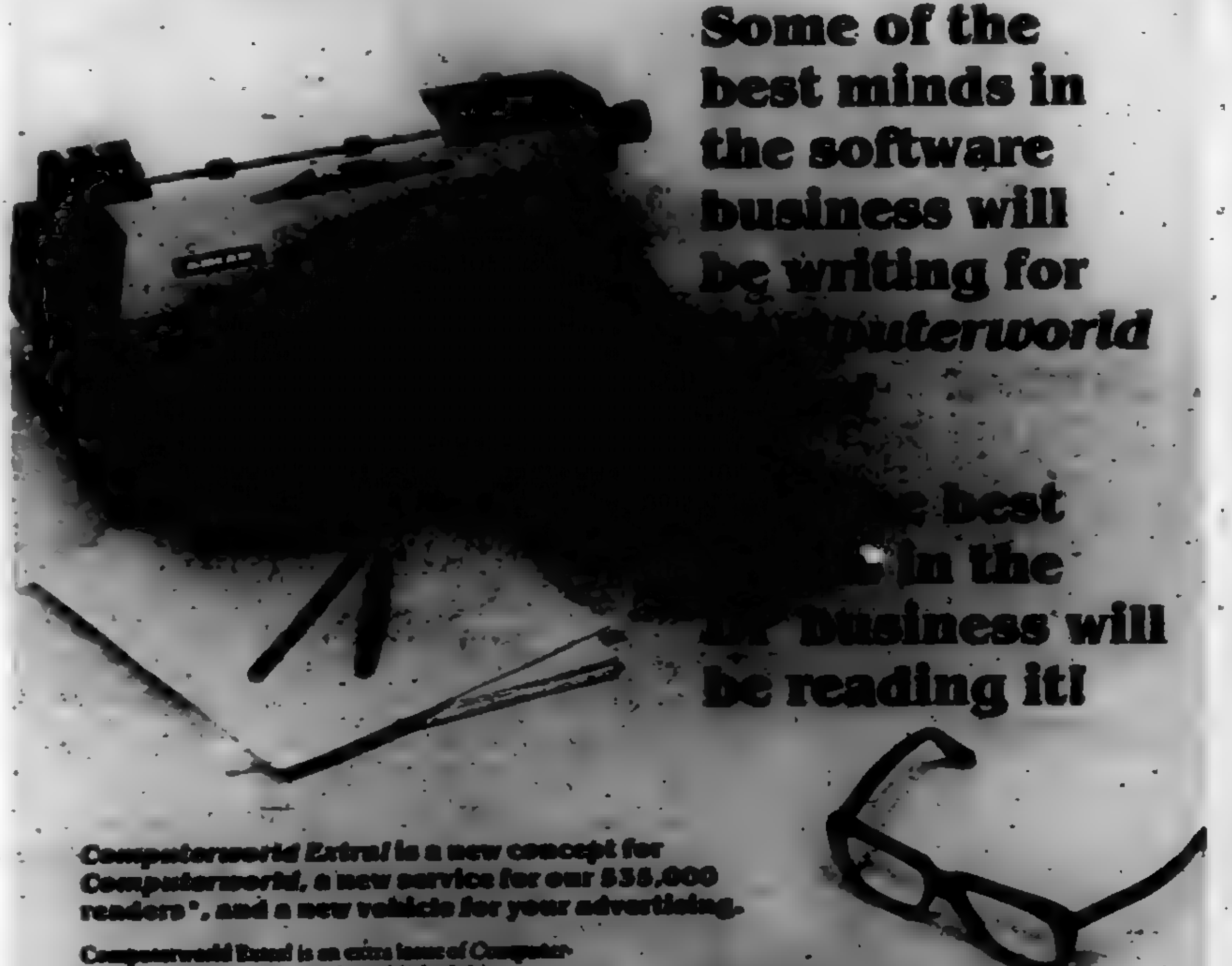

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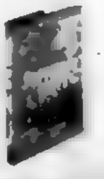

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Farmers' Co-op Reaps Better Grain Accounting

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INDIANAPOLIS — Millions of bushels of grain move through facilities of the nation's farm cooperatives and accounting for it places a heavy and growing burden on the cooperatives' personnel.

Indiana Farm Bureau Cooperative Association (IFBCA) has therefore installed IBM 3790s linked to a 370/158 to help lift the clerical work load and make grain accounting swifter, surer and easier.

IFBCA is moving rapidly with a distributed processing system designed to ease the grain accounting and grain management headaches of its county cooperative members. In fact, the system decentralizes computer power to the county cooperative levels to support day-to-day operations, while maintaining centralized programming, technical services and large-scale computer processing at the state association level.

Key Element

The key element in IFBCA's distributed processing approach is the IBM 3790 Communications System, according to Larry E. Berg, systems manager for member services. "The 3790, placed at the county co-op facilities, provides stand-alone computer power to process grain transactions as they occur; keeps track of receipts, contracts, inventories, prices and shipments; and supplies the management information needed on a daily basis.

At the same time, the 3790 can communicate directly with the IBM 370/158 host computer here to facilitate large month-end and year-end data processing," he explained.

To date, the 3790 systems have been installed by four of IFBCA's county cooperative members. The four members have fully implemented the distributed processing system's key grain accounting application, and the advantages that have accrued to the county cooperative's personnel and management, and indirectly to their farmer patrons, are impressive, Berg claimed.

"Performing as the individual county cooperative's own in-house computer, the 3790 supports every facet of the grain operation, expediting the transactions and keeping detailed records of grain receipts, patron contracts, patron grain bank deposits, terminal contracts and shipments," he noted.

"And it offers on-line data processing capabilities so that county personnel can inquire into the records at any time for current information on a particular patron or contract or on overall grain inventory or position. The result is greater operating efficiency and more responsive management."

Transaction Processing

Data used by the 3790 to maintain the updated grain activity records is entered on-line as the transactions occur. Each of the county co-ops now using the system has at least two IBM 3270 visual display terminals linked to its 3790.

Transaction details are keyed in on the terminals just once. The system captures the data, then uses it to update all related records, initiate subsequent processing and produce needed documents and reports, eliminating a lot of paper handling and manual record duplication.

For example, the one-time entry of a scale ticket causes the system to calculate net weight, dock pounds and net bushel, bushels shrink and/or dryer charge and the price discounts for each grade factor. It then provides that total discount, the transaction bushels total and transaction value.

A single scale ticket can be split by the system to multiple farm patron accounts, and a ticket also can be split between market and contract, if necessary. The system ensures that scale ticket transaction data is entered only once via an edit routine, and it ensures that no scale ticket is missed by producing a missing ticket numbers report.

This same single entry/multiple processing feature applies in all other types of transactions on the 3790. Entry to a patron contract, for instance, will apply the contract, update the patron balance (payable, storage and so on), then update the grain inventory and position records. It will also provide input for a daily summary report of contracts written by type, by commodity, by department, separated by "elevator" and "direct" contracts.

Regardless of transaction type, the 3790 edits and validates all data on input and the county cooperative establishes its own guidelines for price ranges, grade factors, crop dates and the like, which are built into the system. Activity reports are produced daily for each transaction type, providing an audit trail for reference and control purposes.

Settlement checks are printed by the 3790 and a settlement advice detailing the transaction is provided daily for all patrons who have requested a settlement. At any time during the day, a position and inventory report can be produced showing the position as of the last transaction entered. This is shown by commodity within departments and indicates the new long or short position for each commodity.

(Continued on SR/33)

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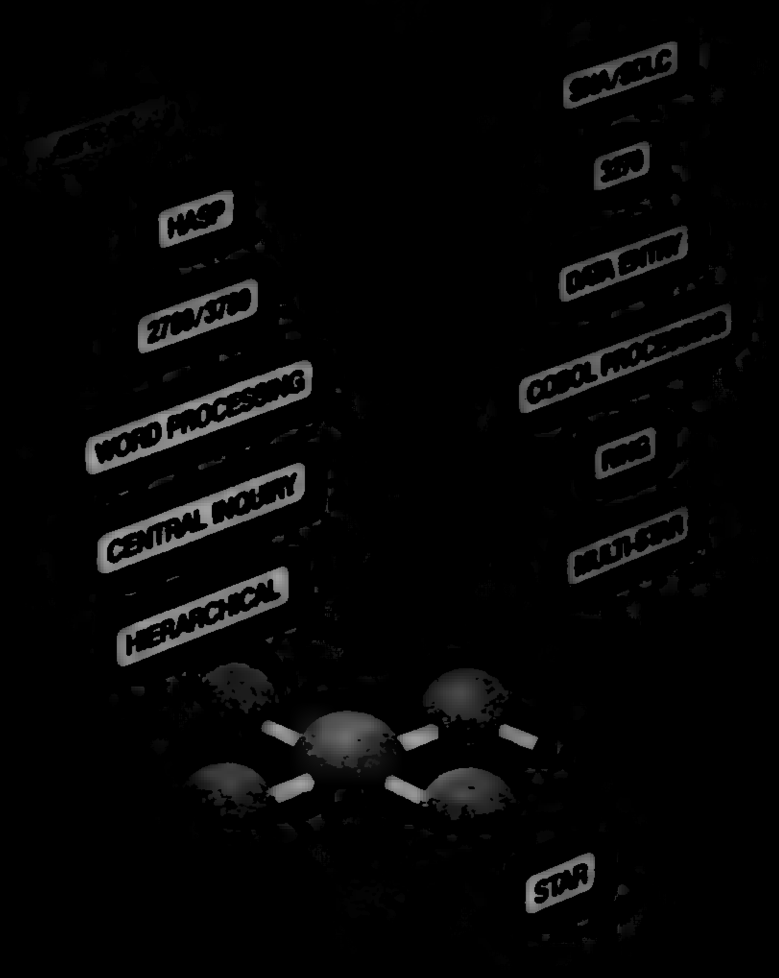
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Manager Cites Continuity as Primary Issue

By a CW Staff Writer

DUBUQUE, Iowa — How does distributed processing affect the information systems manager in terms of his control and responsibility?

Assuredly, there are as many answers to the question as there are distributed environments, but one of the issues faced by managers of distributed networks is certainly "maintaining continuity across the board."

That, at least, was the central problem cited by Donald W. Landa, DP manager for Flexsteel Industries, Inc., a furniture manufacturer here, who has managed a distributed environment since the early '70s.

Different Views

"Every division would like to have something just a little bit different," he explained, "just because — if for no other reason — you've got different people in different locations.

"Everybody's got a different idea about something, so that's probably the major obstacle we have to work with in maintaining continuity," Landa said.

On the whole, the system is "working very well," Landa said, although he now has "much more" responsibility than he had in a nondistributed environment.

"The environment we're working in has exploded, so to speak, into not having just one processor up, but six — five IBM System/32s and a 3741, and these batch-communicate with our system here in Dubuque," Landa explained. The central site has an IBM 370.

On the System/32s, four of which do the batch telecommunications, and on the 3741, the company uses operator-type personnel. The programming, in RPG-II is done on a central basis in Dubuque and the applications running on the System/32s "are paralleling [ours] across the board, but the divisions still have the ability to have their own unique type of things," he added.

"So from that aspect of it, I'd say we've got more responsibility here and also from the software maintenance standpoint," Landa said.

Such files as inventories and dealer master information are "strictly on the central location here in Dubuque, and that's why we have the batch communications. The edit functions and the master files the divisions use are here on the 370 to maintain a central base of products and product information across all divisional lines," Landa said.

Divisional Responsibilities

Such functions as job processing and order entry, however, are the responsibilities of each of the divisions. They transmit on a daily basis to the central site, which returns processed data in a summary-type format, Landa explained.

"When you get into such things as payroll, accounts receivable and accounts payable, which are identifiable each to their own divisions, the divisions are responsible for their own," he continued.

"So, in the strict sense of the word, the processing we do for the other divisions — even in the environment we have — we still do on the 370 as we've always done them," he explained. "It's just that we've allowed the systems in the divisional areas to do some types of work for themselves under central control.

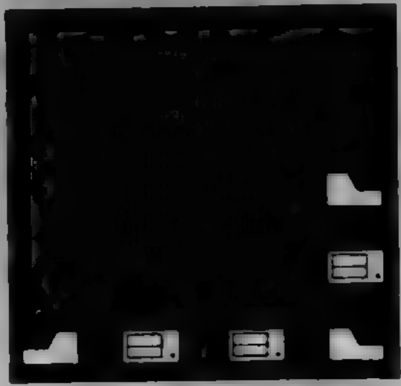
"We can pull from their base of information, and we can work back and forth with it. So while we're doing work here, they're doing parallel kinds of work on the System/32s and we still maintain the central base of inventory information," he said.

Expanding on the efficiency and effectiveness of the distributed system, Landa noted that "Those people out there basically know the jobs they need to have done, and they know every division cannot afford to have its own programmers. I think they are fairly happy with the things they've got going on.

"At the same time, we've been able to improve from the standpoint of the volume of work we can do utilizing the system; the amount of data we can pass back and forth between systems is much enhanced, and we plan to even enhance that further by getting more data handled utilizing the systems in the distributed environment," he said.

Microcomputing comes of age.

Ohio Scientific's OS-65U Level 3 operating system software brings new networking and distributed processing capabilities to microprocessor based computer systems.



Until now, the only alternative for low cost multiple-user computer applications was time-shared systems. However, a serious drawback of microcomputer or minicomputer multi-user time-share systems is the fact that under heavy work loads they slow down to a crawl since the central processor time in such a system is shared by all of the users.

In a microprocessor based distributed processing system, using floppy based microcomputers as intelligent terminals (local systems) most of the work load is handled locally. Overall system performance does not degrade under heavy job loads. Each local system performs entry, editing and execution while utilizing the central data base for disk storage, printer output, and other shared resources.

For more demanding applications it is desirable to have several data bases, each with its own collection of local systems. Such an inter-connected set of data bases is called a network. Each data base and its local intelligent and dumb terminals is called a cluster.

Level III

OS-65U Level 3 now supports this advanced networking and distributed processing capability as well as conventional single user operation and time-sharing. Level 3 now supports local clusters of intelligent microcomputer systems as well as dumb terminals for the purpose of utilizing a central Winchester disk data base and other shared resources. The system also has full communications capability with other Level 3 data bases providing full network capability.

The system utilizes Ohio Scientific's low cost, ultra high performance computer systems throughout for intelligent terminals as well as data bases. This general systems configuration provides a cost/performance ratio never before attained in this class of computer power.

Level 3 resides in each network data base. A subset system resides in each intelligent terminal. Each data base supports up to 16 intelligent systems and up to 16 dumb terminals. However, since dumb terminals can heavily load the system, they should be kept to a minimum. Level 3 also supports a real time clock, printer management, and other shared peripherals.

Data Base Requirements

Minimal requirements for a Level 3 network data base are a C3-C or C3-B computer system with 23 or 74 megabytes respectively, console terminal, 100K bytes RAM and a CA-10X 16 port I/O board for network and cluster communications.

Intelligent Terminal Requirements

Any Ohio Scientific 8" floppy based computer with 56K RAM and one data base communications port.

Connections

Intelligent terminals and networked data bases are connected by low-cost cabling. Each link can be up to 10,000 feet long at a transfer rate of 500K bits per second, and will cost typically 30¢ a foot (plus installation).

Syntax

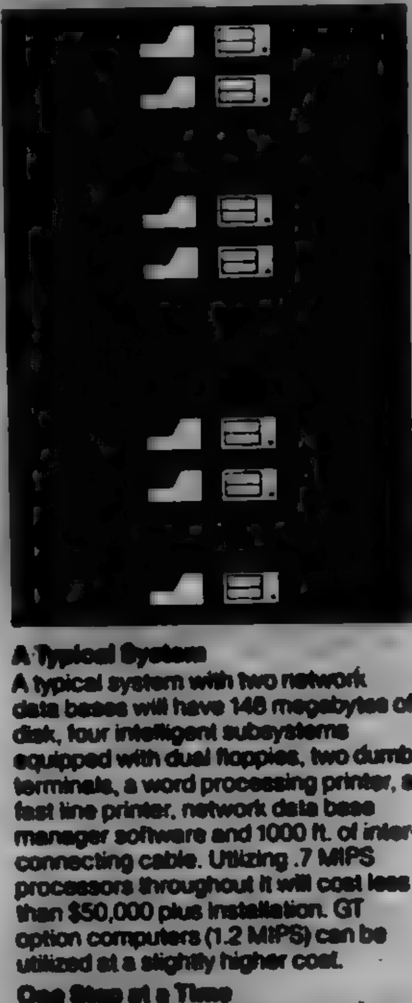
Existing OS-65U based software can be directly installed on the network with only one statement change! Level 3 has the most elegantly simple programming syntax ever offered on a computer network.

File syntax is as follows:

DEV A,B,C,D,	Local Floppies	unchanged from single user and timeshare systems
DEV E	Local hard disks	
DEV K-Z	Specific network Data Bases	

Each of up to 8 open files per user can be from 8 separate origins. Specific file and shared peripheral connections are handled by 256 network semaphores with the syntax Wait N
Wait N, close.

The network automatically prioritizes multiple resource requests and each user can specify a time out on resource requests. Semaphores are automatically reset on errors and program completion providing the system with a high degree of automatic recovery.



A Typical System

A typical system with two network data bases will have 148 megabytes of disk, four intelligent subsystems equipped with dual floppies, two dumb terminals, a word processing printer, a fast line printer, network data base manager software and 1000 ft. of interconnecting cable. Utilizing .7 MIPS processors throughout it will cost less than $50,000 plus installation. GT option computers (1.2 MIPS) can be utilized at a slightly higher cost.

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New Solution to Old Problems

Distributed System Speeds Welfare Benefits

Special to CW

MADISON, Wis. — Delays in determining applicant eligibility for economic aid and inconsistency in applying eligibility and benefit rules are old problems common to the administration of most government welfare programs.

In Wisconsin, however, a distributed system is reducing these and other problems while saving money for the state.

The system is a Computer Reporting Network (CRN) using IBM 8100s linked to an IBM 3033. It reduces the time lag between application for aid and eligibility and benefit determination and ensures equal welfare treatment statewide because the same policies are applied to individual client information regardless of which worker in any of the 72 counties or four Indian tribes takes the application.

"These were primary goals in creating the Computer Reporting Network," according to Bernard Stumbras, administrator of the Division of Economic Assistance of the state's Department of Health and Social Services.

"Results to date have exceeded expectations. The time required to determine an aid applicant's eligibility and benefit amount has been slashed by 50%. And the system applies eligibility criteria with absolute consistency, time after time," he added.

"But these are by no means the only contributions of the new system," Stumbras continued. "Our Economic Assistance Program is locally administered and state-supervised, and the distributed system eliminates a vast amount of clerical paperwork at both the local and state levels. The often overburdened eligibility technician, whose time is now freer to work with clients, is a major beneficiary."

Twenty 8100s

IBM's 8100 Information Systems are key elements in the CRN, according to Paul Pecorin, director of Office Information Systems for the Department of Health and Social Services.

"We now have 20 of the 8100 systems installed at local offices around the state," he said.

"Each of the 8100s is linked via phone line to an IBM 3033 host computer at the state's data center here. Each is similarly linked to its own satellite group of smaller local offices which are equipped with on-line visual display and printer terminals.

The 8100 systems at the local level and the host computer interact to control and expedite the processing of all aid applications and eligibility determinations. The 8100s pre-edit, organize and transmit application data. The host computer performs additional edits and validity checks, determines applicant eligibility and benefits and transmits its findings back to the local 8100.

Combined Form

Basic to this interaction is a combined application form that the state has developed to capture applicant data relating to the three types of economic assistance processed by the computer: Aid to Families with Dependent Children, Medical Assistance and Food Stamps.

The switch from three separate applicant forms to the combined form, together with the common data manipulation made possible by the new distributed system, will save the state an estimated $1 million annually.

Working from the combined application form, the local level terminal operators use on-line CRT terminals to enter the applicant data into the local 8100 system. The system guides the terminal operator step-by-step through the data entry process and data is edited as entered. If an error is found, the 8100 displays an error report.

If the data entry passes the edit checks, and if the host computer is currently available, the 8100 transmits the application to the host. Should the host not be currently available, the 8100 queues and stores the application data that has passed the pre-edit to be sent on as soon as the host does become available.

"The ability of the 8100 to queue and store transaction data is vital," Pecorin said. "The entire application/determination processing cycle starts at the local level and we simply cannot allow application data entry from the local level to be shut off because of the temporary unavailability of the host computer," he explained.

The host computer has many functions in the distributed system. Applicant data coming in from the 8100s at the local offices goes first to a daily activity data base which the host sets up, controls and then draws upon, as needed, to initiate eligibility and benefit determination processing.

To start this process, the IBM 3033 computer accesses a "Case" data base, which it also maintains, and which stores updated records of some 100,000 AFDC, Medical Assistance and Food Stamp cases. A case is a welfare household and includes each person in the household (averaging about three) associated with the case.

The host computer first checks to de-

(Continued on SR/33)

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But Survey Finds Variances Between Industries

DDP Users Rate IBM Compatibility Important

ELLICOTT CITY, Md. – Compatibility with IBM hardware and software is viewed as somewhere between "important" and "vital" in a significant number of distributed data processing (DDP) installations, according to a survey of information processing executives compiled through May.

The survey was conducted by Impact Marketing Services. All statistics are based upon some 97 responses to questions concerning various questions about DDP.

After being related to the total number of responses to a particular question, the answers were broken down by data communications needs, number of DDP sites and the economic sector of the respondents' organizations.

The "economic sector" classification included manufacturing, wholesaling, retailing, financial services, insurance, transportation, DP services, government, education and an "other" category.

Data communications needs were defined as international, national, regional, local or nonexistent.

Number of sites was broken down as follows: 25 or more, 11 to 24, six to 10, three to five, one or two and none.

Eighty-three percent of the respondents described IBM compatibility as mandatory (58%) or desirable (25%) in a DDP environment. The remainder of the respondents said IBM compatibility is not necessary.

When analyzed on an economic-sector basis, the findings revealed strong variances between various industries in the degree to which IBM compatibility is deemed mandatory or desirable. For example, 81% of responding firms in the insurance industry indicated such compatibility was mandatory. However, only one-third of the 12 firms in the transportation sector felt the same way and all three of the government agencies included in the survey agreed that IBM compatibility is not necessary for DDP installations. (See chart for complete breakdown by industry.)

The relationship between organization size and DDP flexibility reflected by users was based upon the number of DDP sites within the organization.

Data Communications

From the viewpoint of data communications requirements, the groups surveyed concurred with the importance of IBM compatibility. A slightly greater degree of freedom was expressed on this issue by firms with local or regional data communications requirements than by users requiring national and/or international data communications services. Forty-four percent of the former group expressed the view that IBM compatibility was not mandatory vs. 39% of the larger data communications user groups that shared this opinion.

The relationship between organization size and DDP flexibility reflected by users was based upon the number of DDP sites within the organization. Forty-five percent of the users with 10 or fewer sites felt that IBM compatibility was not madatory as opposed to 39% of the respondents with 11 or more sites. Only one group — those having three to five sites — had a majority that indicated IBM was not mandatory, although one-third of the 18 respondents in this group said it was desirable.

When the same group of respondents was asked to indicate which of three choices most closely approximated the need in their respective organizations for "complete" DDP systems, the same percentage (83%) that considered IBM compatibility as mandatory or desirable indicated that any new DDP system would be required to interface with presently installed systems. Approximately 12% indicated that new DDP systems would probably be used to replace currently installed systems and just 5% planned for new DDP systems to be completely isolated from present systems with no plans for future interfaces.

Wholesaling Sector

All of the individuals in the wholesaling sector and 15 of the 16 insurance respondents expressed the belief that DDP systems would have to interface with present systems. The only significant difference within the industry breakdown — that interface would be required of any DDP system — was expressed by three of the eight retailing representatives who felt that new DDP systems would replace present systems in their organizations.

Network size appears to have little impact on the responses when the question about interface requirements is viewed on the basis of an organization's data communications needs.

Eighty-six percent of those firms requiring national or international services were concerned with interface capabilities of DDP systems and 80% of those firms with regional, local or nonexistent data communications networks expressed the same concern.

ECONOMIC SECTOR	IBM COMPATIBILITY IS MANDATORY.	IBM COMPATIBILITY IS DESIRABLE.	IBM COMPATIBILITY IS NOT NECESSARY	TOTALS
Manufacturing	13	2	3	18
Wholesaling	4	1	2	7
Retailing	6	1	1	8
Financial Services	7	5	1	13
Insurance	13	3	0	16
Transportation	4	6	2	12
Data Proc. Services	1	1	0	2
Government	0	0	3	3
Education	0	1	1	2
Other	5	3	2	10
TOTALS:	53	23	15	91

Importance of IBM Compatibility In DDP Environment — Economic Sector Basis

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Co-op Reaps Improvement in Grain Accounting

(Continued from SR/27)

As a backup, the local 3790 transmits significant totals and activity to the host on a daily basis. This prevents loss of major record files in the event of a disaster and also provides the host computer with the data needed for input into the general ledger system and the accumulation of marketing volume for each patron.

The host will provide various patron and terminal activity reports to the local 3790 for any time period on request. Obviously, the host computer also uses the accumulated data in monthly grain activity listings and annual patron activity listings.

Management information available on demand from the system is helpful for both control and planning purposes, according to association officials. County co-op personnel can acquire into the 3790s online file records for such patron-related information as current payables balances (including details of latest activity), or for unpriced grain the patron has on hand with the association. Also available on demand are reports showing discount values of unpriced grain for inventory valuation, and contract values for gross margin analysis.

Via Terminal

Similar information is available by terminal and, as mentioned, a position and perpetual inventory report is always available. Audit trail reports of all transactions for the day with detail and totals are available for review, as are monthly grain bank statements with calculations of grain bank charges. As needed, special margin analysis reports or special customer analysis reports can be obtained by the county from the host computer at headquarters.

"Contributions of the new system to our operations cannot be overestimated," according to Joe Latham, general manager of Vico County Farm Bureau Cooperative, one of the first of the IFBCA county members to install a 3790.

Vigo County's current annual grain volume of 6 million bushels is more than double that of a few years ago. It operates a single site, during harvest season, and handles an average of some 200 grain contracts a day.

System Speeds Benefits

(Continued from SR/31)

termine whether or not the aid applicant is known to the system, and if any are currently receiving economic assistance in the local agency originating the application, or in any other agency. This helps eradicate so-called "double dipping" in welfare funds.

Aid Determination

Aid levels are determined by taking into account the combined incomes, assets and offsets of those individuals in the household found to be eligible. The important thing, Wisconsin welfare officials point out, is that the system makes the determinations solely on the basis of each person's situation as represented by the information on the combined application form that is transmitted to the host via the county level 8100 system.

This determination is totally objective to the circumstances. The system always applies current rules, regulations and policies. And it always tests client circumstance and eligibility and benefit criteria separately and independently for each type of aid requested — AFDC, Medical Assistance or Food Stamp.

When the eligibility/benefit determination is made, the host transmits the findings back to the 8100 at the local office. The 8100 prints the determination sheet for use by local administrators and eligibility workers.

That evening, after the CRN goes off-line for the day, the host computer processes the day's activity data base against the case data base to update the case master file records.

"We have seen a dramatic reduction in the time required to determine eligibility and benefits for an aid applicant," Division Administrator Stumbras said. "With the previous system, the delay was often 10 to 15 days after the application was returned to the agency.

"Now, even in the most populous counties, determinations are made usually the same day the application is entered, and, if an application is error-free and valid, a determination can be reported back to the local officials in one-half to three minutes," he asserted.

This swift turnaround applies in the event of reported changes in client situation, and in the mandated-by-Wisconsin-law, which requires a review every six months of every economic assistance case on the books. The new system further assists local officials and eligibility workers by providing six-month review lists of casework activity, enabling the workers to more effectively schedule their time.

Wisconsin was among the first to install the IBM 8100 Information Systems. When the state's CRN was first put into operation, IBM 3790s were installed at the county offices. The switch to the 8100s was made within a few months during the latter part of 1979.

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Network Eases Service's Growing Pains

By Max F. Kenyon
Special to CW

MADISON, Wis. — A distributed network of minicomputers tied into an IBM 3031 here is helping one of the nation's largest medical review organizations handle a growing work load.

Wisconsin Physicians Service (WPS) began in 1946 as a division of the State Medical Society of Wisconsin. In 1977, WPS was independently incorporated as a nonprofit organization.

Today WPS has more than 1,200 employees and is a fiscal intermediary for Part B of Medicare in the state of Wisconsin. WPS has administrative and claims processing responsibility for the Civilian Health and Medical Program of the Uniformed Service (Champus) in 10 midwestern states.

Wang VS system at WPS headquarters is one of 26 planned for installation at PSROs throughout the Midwest.

WPS is also a Professional Standards and Review Organization (PSRO) contractor for 17 PSROs throughout the U.S. In addition, WPS operates one of the largest health maintenance organization-type programs in the country.

Operating Principle

Although they perform private reviews for insuring agencies and large corporations, the primary operating principle of the PSRO is to ensure that appropriateness, necessity and quality of care are rendered by physicians in institutions within the geographical area of their authority.

Founded and controlled by physicians but funded through federal grants, PSROs review patient treatments, analyze the treatment patterns of physicians and report their findings of aggregate data to the federal government. These organizations represent a form of physician peer review, primarily designed to help medical institutions operate most efficiently for the benefit of patients.

WPS' services provide the PSRO with the capability of identifying statistical anomalies in medical operations so the PSRO can mandate changes in patterns of practice of physicians and hospitals and, subsequently, measure the impact of the implemented modifications.

Monitoring volumes of data associated with some 90,000 to 300,000 discharges per year for each PSRO requires substantial DP power. Accuracy and timeliness of data handling is also critical because patient monitoring is performed daily on an ongoing feedback cycle to doctors during patient stays.

Finally, cost-effectiveness, which is seemingly precluded by the first two requirements, is of utmost importance because PSROs are constrained through federal budgets to a limit of $1 per discharge for DP expenses.

WPS originally employed a minicomputer at a remote PSRO site in communication with an IBM 3031 mainframe at WPS headquarters. However, WPS encountered difficulties with the programming language of the satellites — a language which was not Cobol.

In addition, ease of use of reporting capabilities such as browsing and on-demand reporting was lacking; this necessitated a high degree of effort on the part of the WPS staff. It was an intolerable situation which led staff to search for the equipment of another manufacturer.

One might ask why WPS did not opt to install IBM 3277 terminals at each PSRO location. The closest thing IBM offers which has on-demand reporting capabilities is APL. But APL cannot be used on a standard 3277 and requires a

By Augmenting Administrative Tools

special terminal.

Furthermore, APL would also absorb a large percentage of the main core of the WPS 3031; and the data base had to be immediately accessible at any time to a PSRO. The only answer which would not exert too great a demand on the 3031 was distributed processing through remote systems.

WPS surveyed many vendors and finally limited the choice to two — Wang Laboratories, Inc. and another. WPS decided upon Wang hardware for a number of reasons. There was a short deliverable time frame, which staff felt Wang could best satisfy. The Wang system offered excellent report generation and ease-of-use capabilities, which were particularly attractive to nonDP personnel at PSRO locations; Wang also came in with a medium-size minicomputer-priced system — e.g., 128K to 256K memory.

Finally, because one of the languages supported by Wang is Cobol, WPS could easily supplement its present PSRO staff with personnel from its 50-person staff of other Cobol-oriented DP personnel, as might be warranted by future expansion.

VS System

The final choice of WPS was the Wang VS system — in several configurations ranging from 256K memory with tape drive, telecommunications and dual 90M-byte disk drives, downward — depending upon the volume of activity at each site.

A complete VS system is located at WPS headquarters, and six additional systems reside at various PSRO sites. These are configured with from two to four workstations each and one to four printers. Some are also equipped with 1,600 bit/in. magnetic tape drives. In addition, WPS is installing four remote workstations (workstation and printer).

WPS currently has an additional nine VS systems on order and has generated a letter of intent for 10 more systems and remote workstations beyond that. Staff members intend to connect the remote VS and their remote workstations directly into the WPS IBM 3031, with 3270 compatibility. In this way, the mainframe will function as an adjunct, performing large-scale statistical analyses. All programming has been performed by WPS staff.

A year's worth of history on the VS is stored on-line at each location, with multiyear data stored off-line on removable packs or tapes, and is accessible through the master file data stored on the IBM 3031 here. The number of terminals depends upon the amount of data entry performed. Not all data is directly telecommunicated to the VS — some is provided by hospitals and other collectors in magnetic tape format. The data then passes an extensive array of logical edits to ensure validity — for example, an admission date cannot be subsequent to a discharge date.

WPS Goal

The final goal of WPS is not simply to gather data. It is to help the PSRO browse through that data, carrying out comparative analyses in order to determine potential aberrancies in the patterns of practices of hospitals and/or physicians.

Whenever a potential aberrancy is detected — using the Wang-supplied query utility — WPS automatically goes into the report utility and generates associated documentation. The PSRO then presents this to the physician committee that acts upon it — either by requesting supporting documentation or by implementing a remedial plan to correct the aberrancy.

One advantage gained through the report, query and utility capabilities of the systems is the ability to browse data and be able to calculate average length of hospital stays, correlate this with average death rate and then compare average death rate among multiple hospitals to that of one average hospital. This approach enables staff to detect potential aberrancies that may not be evident simply by looking at so-called "normal criteria."

Kenyon is PSRO program director at Wisconsin Physicians Service, Madison, Wis.

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For Low-Priority Requests

Approach Lets User Program Own Jobs

By Rita Shoor
CW Staff

WASHINGTON, D.C. — Rather than giving short shrift to end users' low priority requests and one-time reports, an insurance company here lets user departments program the jobs themselves using APL and "personal computing."

About 13 employees at the Government Employees Insurance Co.'s (Geico) Systems Division here are members of a management services unit with what the firm calls personal computing as one of its primary charters.

The organization uses the term "personal computing" even though the work is actually done on terminals tied to a dual processor mainframe complex because "in a community of users, personal computing has a better sound," according to Ronald Blunck, director of the Management Systems Division at Geico.

Personal computing bridges the gap between using a calculator and submitting a formal request to the systems and DP area for a new system. It brings the home computer concept to the office, he said.

"Maximization of productivity" and a significant decrease in the money spent for time-sharing services are two results of this emphasis, according to Blunck.

The company spent approximately $250,000 annually on time-sharing services a few years ago. Present company estimates predict that this should be cut in half by the end of 1980, and the projected annual cost for time-sharing in 1981 could be as low as $10,000.

Geico is one of the relatively few personal and casualty insurance companies that operates as a direct insurance writer — that is, the bulk of the insurance is sold through the mail and over the phone rather than through field agents.

Approximately 90% of the business written is automobile insurance, with the remainder split primarily between fire and homeowners' policies. The company writes between $500 million and $600 million in automobile insurance premiums alone, he said.

Current Configuration

The current hardware configuration includes dual IBM 370/168s with 6M bytes of storage on each mainframe running under OS/MVS.

A recent review of Geico's insurance systems' needs turned up a need for increased availability of data to general managers and analysts in various user departments.

Based upon the findings of this review, it was decided to develop a set of facilities that would allow these users to work directly with data in order to retrieve meaningful information for effective decision making.

While personal computing at Geico involves distributing information retrieval and data manipulation capabilities to users, centralized control is still maintained over both the data and the tools.

Four personal computing facilities are currently available to

(Continued on Page 52)

Covers Leased Equipment

Customized DP Insurance Offered

BOSTON — Commercial Union Assurance Companies has initiated a data processing insurance policy plan that provides coverage for owned or leased equipment; data and media; and extra expenses incurred by business interruptions.

Custom-designed for each business, the policy extends to newly acquired equipment; equipment moved to a new location; duplicate and backup data and media stored at a separate location; the cost of debris removal; and the cost of refilling or recharging fire protection devices, a spokesman said.

The Commercial Union policy also covers mechanical breakdowns, faulty construction, error in design, short circuits, blowouts, or damage caused by processing or work upon the DP equipment, data or media. Coverage is subject to a minimum deductable of $5,000.

Other Coverage

Additional coverage of the policy includes losses resulting from an interruption of a system's power supply, or power surges, black-outs or brown-outs that happen within 100 feet of the insured site.

Flood, earthquake, mysterious disappearance, water seepage and corrosion and rust are also covered, he stated.

Under terms of the policy, the user can choose either actual cash value or replacement cost. The replacement cost provision includes property of others. This provision is reportedly important for an insured user who leases property and is required to carry full replacement cost coverage on leased equipment.

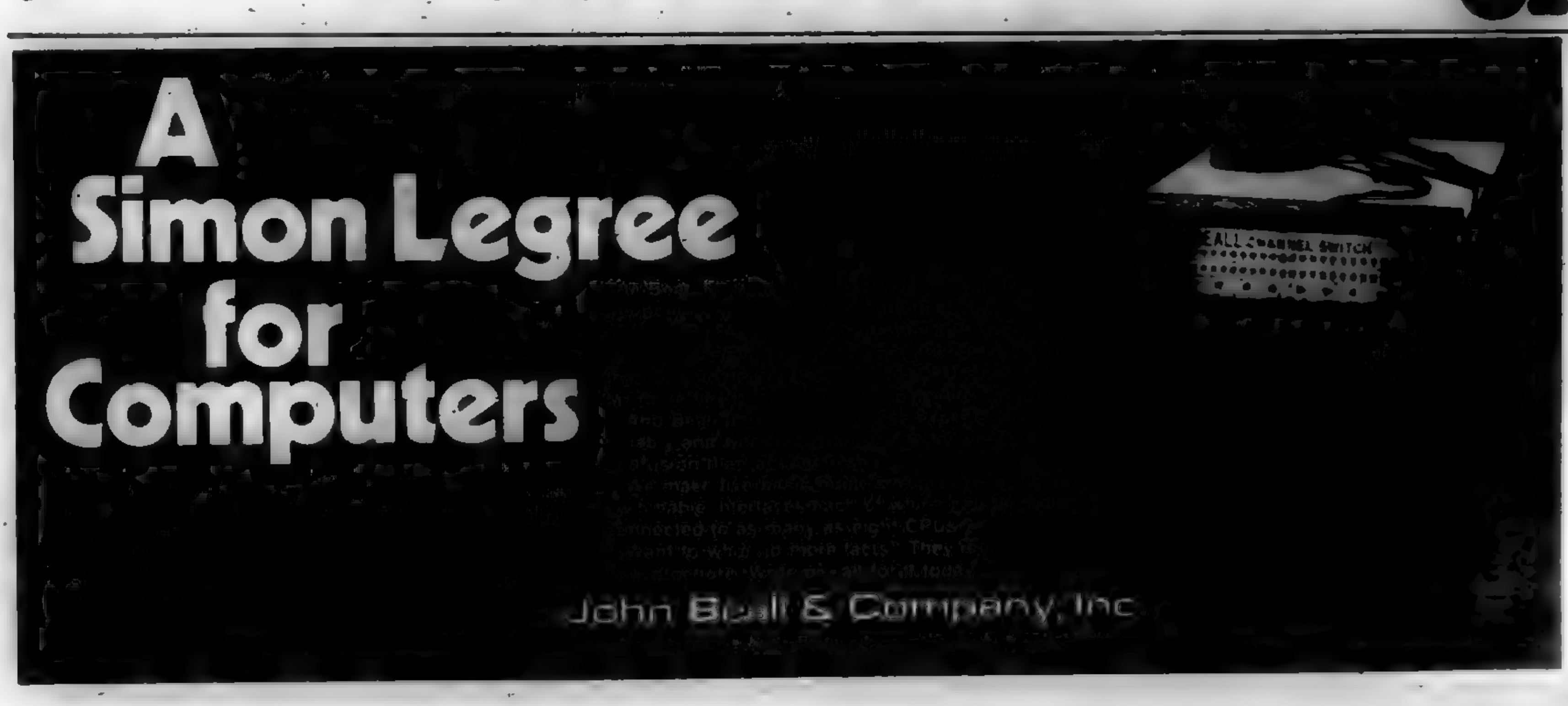
The policy is competitively priced, depending on the user's system configuration and location, the spokesman said. Additional information can be obtained from the firm at One Beacon St., Boston, Mass. 02108.

Four Publications Cover Topics in Micrographics

SILVER SPRING, Md. — The National Micrograpics Association (NMA) has released four publications:

- NMA MS1-1980, "Practice for Operational Practices/Inspection and Quality Control for Alphanumeric Computer Output Microforms" lists for $7 and contains tests and requirements to ensure the quality of alphanumeric computer output microfilm-generated images up to a 48:1 reduction ratio.
- NMA MS23-1979, "Practice for Operational Procedures/Inspection Quality Control of First-Generation Silver-Gelatin Microfilm of Documents" lists for $10 and is an update and combination of two other standards, NMA MS104 and NMA MS110. It details step-by-step establishment of a source-document production operation.
- NMA TR2-1980, "Glossary of Micrographics" costs $9 and is a current listing of more than 1,200 terms used in the micrographic community. It is a revision of the 1971 glossary.
- "Micrographics in Government" is a collection of current articles from the NMA Resource Center and features case histories of many prominent government micrographics applications. It costs $25 in paper and $15 on microfiche.

NMA is located at 8719 Colesville Road, Silver Spring, Md. 20910.



Tab System Handles Receiving, Inspection

PALO ALTO, Calif. – Tab Products Co. has introduced a key-to-diskette data collection and retrieval system to produce reports and handle information in receiving and inspection departments.

The Receiving and Inspection System 9080 (Trip) is geared to create reports covering open purchase orders, closed purchase orders, parts awaiting inspection, parts completed inspection and inspector achievement. The system can also generate analysis reports for people involved in the quality assurance field, a spokesman noted.

The receiving and inspection system costs $12,925. Maintenance contracts and lease plans are available from the firm at 1451 California Ave., Palo Alto, Calif. 94304.

High-Speed Recorder Gives Hard Copy From Transients

WALNUT CREEK, Calif. – A high-speed transient recorder that reportedly provides hard-copy output of recurring or single-shot transients is available from Pedersen Instruments.

The Model 57-TR features switch-selectable conversion rates from 50Hz to 200Hz. The 57-TR will also convert analog input data to 10 bit digital words, the vendor said.

In addition, with an oscilloscope, the operator can view analog input signals prior, during or after recording.

The unit costs $3,300 from the vendor at 2772 Camino Diablo, Walnut Creek, Calif. 94596.

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By Theresa Tanton
Special to CW

ATLANTA – Implementation of a distributed processing system can be beneficial to a company's user and DP areas in terms of improved service and reduced costs. However, this same implementation can be disastrous if the system is not carefully designed and planned.

The objectives of distributed processing are to improve service by keeping edit functions as close to the entry source as possible and to cut costs by reducing communications requirements with the host computer and off-loading some processing functions from the host computer. In attempting to meet these objectives, some specific data characteristics should be considered in order to determine the feasibility of implementing a distributed system.

Applications with complex data structures and a requirement for real-time updates from multiple sources are not well-suited for distributed processing. A good example of this type of application is the typical airline reservation system. The need for real-time updates and accessibility from many different sources requires that the data base be maintained by the host computer. Although data is accessible from many remote locations, the application is maintained by the central processor and all communication is handled by remote terminals through communications lines.

Potential for Success

The application's characteristics will provide some indication of its potential for successful distributed implementation. In order to secure benefits from distribution, the application should be partitionable, simple and well-defined. If communication with the host computer is required, this should be done in batch mode.

In addition, program maintenance should be centrally controlled so that changes at one site can be replicated at all processing locations. Segregated program maintenance will cause problems in processing compatibility between processing sites.

A clear division of processing by function, by data separation or by geographic location is required for an application to be considered partitionable. An on-line data collection application where data is entered and edited in field offices, then transmitted periodically to the host computer for batch processing is a functionally distributed system. Once the host has completed the batch cycle, selected output reports may be sent back to the field office.

Distributed processing applications should be simple and well-defined. Many distributed applications run on smaller computers with reduced CPU power and disk storage capacity. As a result, applications which require complex logic or data structures are not generally suited for distribution since they tend to usurp much of the computer's capacity.

Applications that require few file accesses are good candidates for distribution and those that are highly I/O bound are generally more suited for the CPU.

In summary, the benefits of distribution do not accrue automatically. System characteristics must be carefully considered before choosing distributed processing as the preferred approach.

When distributed processing is indicated, benefits include improved customer service at an overall reduction in cost.

Tanton is a consultant with Dyer, Wells & Associates, Inc. in Atlanta.

Approach Lets Users Program Jobs

(Continued from Page 51)

Geico user department personnel, according to Blunck: APL, Mark IV, Statistical Analysis System (SAS) and specific user request models.

APL is an application language that allows a user to mathematically manipulate data through a terminal.

Primary Users

The primary users of APL are in the actuarial department, where four IBM 3270s are being used for actuarial applications.

Approximately four to six half-day weeks of formal training are required for someone without a programming background to work with APL as a base language, according to Blunck. This period will be reduced considerably if non/programmers are able to use an APL-built package – such as IBM's Financial Planning System (FPS) – for their applications.

The second facility available for high-level business data extraction and manipulation is Mark IV language. Users are able to access files in either batch or on-line interactive mode, and the majority of files created by the Geico large-scale commercial systems are easily defined under Mark IV, he said.

Blunck described Mark IV as a "user-friendly" language. He estimated that someone without previous programming experience could begin to effectively utilize the facility after two to three weeks of training, and that programmers could work with it after only two to three days.

Another personal computing tool – which Blunck said was "not as user-friendly as we'd like," but which is available to perform statistical analysis and to generate both tabular and graphic reports – is the Statistical Analysis System (SAS) from the SAS Institute, Inc. in North Carolina.

And, finally, programmers within the company's systems and DP area have utilized APL, SAS and PL/I to develop models to satisfy specific user requests. After the facility has been developed – models to assist with corporate planning, budget analysis and underwriting audit selection were examples – it is available for access on request from the user departments.

Future Plans

Future company plans include the use of color graphics and a financial planning language as personal computing facilities, Blunck continued.

Two IBM 3279 color graphics terminals and one of the associated 3287 four-color printers are scheduled for delivery in September 1980, with two more terminals and another printer expected by year-end.

An immediate use for this hardware is foreseen in the actuarial department, where it will be used to create color graphs and rate-making displays. Blunck also predicted a

Blunck also predicted a "tremendous increase in productivity" in the company's art department because the artists could use the terminal to modify their displays until the output was completely satisfactory before generating a finished copy.

To Hold Cost Increases to 9%

HP Customizes Service Agreements

By Rita Shoor
CW Staff

CUPERTINO, Calif. — A customized approach to computer support and maintenance has been announced by Hewlett-Packard Co. here aimed at holding down the average increase in the cost of service labor and materials to "about 9%." This figure compares favorably to the 15% increase in these costs caused by inflation, according to HP.

HP's attempt to meet the specific needs of its users has met with the enthusiastic approval of at least one HP customer. The hardware configuration at Longs Drugstore, with its data center headquartered in Walnut Creek, Calif., includes five HP 3000 series mainframes, two HP 2100 minicomputers and about 90 Model 2640 and 2649 terminals from the vendor, Barry Curran, computer operations manager, itemized.

Until "very recently," the drugstore chain used the vendor's Standard Systems Maintenance Agreement to provide service on a same-day, four-hour response basis on all of its HP equipment, he said. "We knew that [HP's] 24-hour coverage seven days a week with four-hour turnaround was really overkill for the terminals."

Modified Contract

HP's newly offered Field Repair Center Maintenance Agreement "custom fits our needs," and Curran estimated that he will save approximately $16,000 per year with this type of service. Six designated HP offices in the U.S. offer this service on a fixed monthly charge basis, according to the vendor, and products which qualify for this service are mailed to the repair center.

The operations manager also noted that he had discussed the possibility of carrying terminals into the HP repair centers if it became necessary to eliminate the mailing time, but indicated that so far, we haven't had to do that."

Curran stressed the flexibility of this type of service and said it worked well with terminal equipment, although he would "question the logic" of anyone sending large peripherals to the service centers.

The Standard Systems Maintenance and Field Repair Center service agreements are the high and low ends of HP's range of agreements, the vendor said.

HP customers are also offered a Basic System Agreement that provides next-day response along with all of the other features of the standard plan. A cost saving of 20% to 25% can be obtained by opting for the next-day-response program, according to a company spokesman.

Finally, an On-Site Product Service agreement provides next-day response and on-sight maintenance services for portable, high-volume products with built-in diagnostic capabilities such as terminals, desktop computers and desktop peripherals — at a savings of about 30% compared with the standard agreement, HP claimed.

A 72-page data book that gives descriptions and specifications of the services is available at no charge from Hewlett-Packard Co. at 1507 Page Mill Road, Palo Alto, Calif. 94304.

DG Offers 'Insider's Guide' To Small Business Computers

WESTBORO, Mass. — Data General Corp. is now offering a pamphlet and audio cassette to help business persons who wish to purchase a small business computer.

"The Insider's Guide to Small Business Computers" contains detailed financial evaluations of typical cost savings in standard business applications and an analysis of how to calculate the real cost of a computer, including the effects of depreciation on tax investment credits, DG claimed.

Individuals chapters of the 70-page book focus on such subjects as how to select computer hardware and software and how much it should cost, the trade-offs between buying application software packages and developing customized applications, how to analyze a computer's cost-effectiveness and how to calculate the time it will take for a computer to pay for itself.

The guide also includes a discussion of the different ways of buying small business computers including the new retail dealer or "computer store."

The "Insider's Guide" comes with an audio cassette tape of interviews with business persons talking about how computers have benefited their companies. The cassette also contains a summary of the contents.

There are approximately two million firms in the U.S. with annual sales between $250,000 and $15 million who may be able to cost-justify a small business computer, according to DG. It is estimated that more than 10% of these businesses will have their own computers by the end of the year.

"The Insider's Guide" and accompanying cassettes are available for $6.95, DG said from General Distribution Division, M,S.S.-223, Westboro, Mass. 01580.

Mini Bits

HP Floppy Disk Drive Line Boosts Memory of HP-85

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a floppy disk drive family that provides between 270K bytes and 1.08M bytes of memory to its HP-85 system.

The HP 82900 series drives read double-sided, double density, 5.25-in. disks and simplify on-line data storage operations found in scientific, engineering and business data base program applications, the vendor claimed.

The interface between the HP 85 and the disk drives is the HP-85 Mass Storage read-only memory (ROM), which makes available a set of instructions that increases mass storage capabilities, a spokesman said.

Included are 30 additional Basic commands that allow the user to take advantage of those capabilities without learning a new language.

Several models are available, ranging from the HP 82901M dual master drive at $2,500 to the $1,300 HP 82905 single add-on drive. HP is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Digital Graphics Plotter Uses Four-Phase Stepping

MOUNTAIN VIEW, Calif. — A digital graphics plotter utilizing four-phase stepping motots to provide drum rotation and linear pen motion is being offered to microcomputer users by Strobe, Inc.

The Model 100's small step size helps achieve high-quality hard-copy output, according to the firm. The drum was designed to accept 8.5-in. by 11-in. paper, and the pen holder can accommodate a variety of commercially available pens. The Model 100 also features an interactive digitizing mode of operation for entering X-Y coordinate data corresponding to pen location directly to the computer.

The Model 100 costs $680 from Strobe at 897-5A Independence Ave., Mountain View, Calif. 94043.

Westinghouse W2500 Users Get Memory Storage System

EL SEGUNDO, Calif. — Imperial Technology Inc. has adapted its Maxiram-25 memory storage system for Westinghouse Electric Corp. W2500 CPUs.

The product is a solid-state, nonrotating, random-access memory system that attaches to the I/O bus and can replace most fixed-head disk drives.

The unit is packaged in a 19-in. rack-mountable chassis and comes with its own controller in a standard I/O card position. The unit can accommodate between 512K and 4,096K bytes of memory, which is expandable in 512K-byte increments.

Maxiram-25 costs from $13,750, the vendor said from 831 S. Douglas St., El Segundo, Calif. 90245.

Logical Analyzers Linked To HP, DG Minis

PALO ALTO, Calif. — Hewlett-Packard Co. has released three minicomputer interfaces to connect logical analyzers to HP and Data General Corp. systems.

The interfaces are Model 10279A Nova 3, Model 10280A Micronova (both for DG systems) and Model 10285A for HP 1000 L-Series systems.

The interfaces attach directly to minicomputer buses and control lines. All interfaces can be used with the Model 10277A/B/C/D General Purpose Probe Interface. Logic analyzer probe pods plug into the 10277, and ribbon cables connect to the minicomputer interfaces, the vendor said.

The HP interfaces are said to make the real-time analytical measurement of analyzers available to users without the extra time and skill often needed to connect leads individually. The flexibility in selecting input signals allows for more efficient use of the logic analyzer in design, integration and preventative and corrective maintenance, the vendor claimed.

The 10279A and 10280A cost $500 each, and the 10285A costs $350. HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

TI's TM990 Series Micros Get Isolated I/O Board

BENTON HARBOR, Mich. — Digital Interface Systems, Inc. has announced the Model 990-130 isolated input/output board compatible with the TM990 series microcomputer from Texas Instruments, Inc.

Bus-compatible with the TM990, the I/O board is available for $450.

Digital Interface Systems can be reached at P.O. Box 1446, Benton Harbor, Mich. 49022.

Data Entry System Based on DG Micro

MEMPHIS, Tenn. — The Minicomputer Division of Data Communications Corp. has introduced a data entry system that utilizes the Data General Corp. MP100 microprocessor. The Unique Micro/Data Collection System was designed to operate in small installations that require comprehensive data entry capability, the vendor said.

The system features data security to provide file access control by operator name and data base name; real-time editing; validation and table look-ups to eliminate postentry edit runs; and user-selectable data verification methods to allow sight or key verify operations.

Along with user functions, the system also supports supervisor-oriented functions such as data base maintenance and system-generated production statistics reports.

The system costs approximately $17,000, and the basic configuration includes a display/keyboard keystation, the MP100 microprocessor with 64K bytes of MOS memory, a dual floppy diskette drive and a 60 char./sec printer. The price includes software, documentation and training.

The firm is headquartered at 3000 Directors Row, Memphis, Tenn. 38131.

For Industrial Sites

TI Adds Data Acquisition Gear

HOUSTON — A line of industrial remote data acquisiton and control equipment to complement Texas Instruments, Inc.'s 990 minicomputer family has debuted.

At the same time the IS990 Remote I/O line was introduced, TI also announced Industrial High-Level Data Link Control HDLC, a communications package that allows differential line industrial networking of TI's DS990 computer systems, IS990 remote I/O systems, PM550 programmable controllers and TM990 microcomputer modules.

The IS990 is a small form-factor microcomputer that allows the distribution of computing power to the site of each industrial application, according to the firm.

Using a DS990 system (models 4, 6, 8, 20 or 30) as a primary system, the user reportedly can configure multi-dropped networks of up to 32 secondary systems on shielded, twisted-pair wire at distances of up to 9,800 ft.

Secondary systems can be any combination of the following TI systems: DS990 Model 2, 990/S microcomputer systems using either TX990 or TXS operating systems, IS990 remote I/O systems, PM550 programmable controllers and TM990 microcomputer modules.

The heart of the IS990 system is a processor module containing 8K bytes of erasable programmable read-only memory (Eprom) and up to 8K bytes of random-access memory (RAM). The Eprom is preprogrammed to provide communications, remote downloading, debug aids and self-testing.

An IS990 four-slot chassis, power supply, processor, three I/O modules, termination panels and cables start at $3,775. The Industrial HDLC communications package software license is priced from $1,300 to $2,500.

Further information is available from TI's Digital Systems Group, P.O. Box 1444, M/S 7784, Houston, Texas 77001.

System Aids Job Shop Control

ANN ARBOR, Mich. — A minicomputer-based job shop management system that reportedly gives quick and accurate job estimating, job costing and general accounting reports has been announced by Manufacturing Data Systems, Inc. (MDSI).

Comshop V, a minicomputer-based business applications software package, was designed specifically to meet the critical needs of small, independent manufacturing shops for detailed financial reports.

According to its vendor, Comshop V is actually two systems in one — a job costing and estimating system, plus a general accounting system. The heart of both systems is a custom-designed general ledger, which gives the package its ability to track both direct and indirect expenses.

Purchase price of a typically configured Comshop V system is $73,000, including a perpetual license to use the MDSI customized software package; training classes; and on-site support for 120-days.

Also included in the price are a 64K-byte minicomputer with 20M bytes of fixed disk storage, a 300 line/min printer, two CRT terminals, a modem to allow remote access by either the customer or MDSI support engineers, and one year of hardware maintenance.

Currently available in Michigan and Illinois, with other areas following "in the near future," the Comshop V system will be demonstrated at the International Machine Tool Show in Chicago, Sept. 3-12.

MDSI is located at 4251 Plymouth Road, P.O. Box 986, Ann Arbor, Mich. 48106.

Information Automation Unveils Factory Turnkey

WHITE PLAINS, N.Y. — A factory data collection and shop floor control system based on a Digital Equipment Corp. minicomputer is available from Information Automation, Inc.

The Datacom system provides continuous automatic monitoring and analysis of production operations and was designed to increase productivity in manufacturing plants by 15% or more, the vendor claimed. The complete turnkey system includes either a PDP-11/04 or PDP-11/34.

Provision is included to interface the system with a plant's central mainframe for inventory, scheduling, requirements planning and incentive pay processing, a spokesman said.

The system costs between $150,000 and $1.5 million from Information Automation at 925 Westchester Ave., White Plains, N.Y. 10604.

Medical Records System Offered by Promedics

PALO ALTO, Calif. — Promedics Data Corp., a systems house specializing in health care and word processing, will market Mass-11, a word processing and data base management system developed by Micro Systems Engineering Corp. of Hoffman Estate, Ill.

With the addition of Mass-11 to its product line, Promedics will offer a medical records system that can store, merge, sort and retrieve medical records and generate reports, letters or documents.

The system features list processing, mathematical functions and user-generated input and output templates. It will be implemented on Digital Equipment Corp. PDP-11 systems using RT-11, RSX-11M or RSTS/E operating systems.

The firm also plans to sell the software as part of complete turnkey systems.

The software itself costs $3,000 for use with the RT-11 operating system and $4,000 for use with RSX-11M or RSTS/E. The turnkey systems will range in price from $26,000 to $30,000, depending on the number of terminals desired, a spokesman said from Suite 240, 1032 Elwell Court, Palo Alto, Calif. 94303.

Micro Printer Offered for $335

ATLANTA — I-Mark is now marketing the Eaton Printer Products' 7000+ dot matrix impact printer on a direct-mail basis for $335. The 7000+ interfaces with Radio Shack TRS-80s, Apple Computer, Inc. Apples, Commodore Business Machines, Inc. Pets and most other micros.

I-Mark can be reached at P.O. Box 11852, Atlanta, Ga. 30355.

AC Controller Has Eight Outlets

SANTA ANA, Calif. — Marway Products, Inc. has introduced a compact ac power controller with eight outlets, EMI filter and built-in circuit breaker for microcomputers.

The MPD 117 costs $89. OEM discounts are available.

Marway Products is at 2421 S. Birch St., Santa Ana, Calif. 92707.

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A Paradox?

High-Tech Stocks Luring Investors

By Marcia Blumenthal
CW Staff

NEW YORK — Despite the decline in second-quarter earnings reported by some computer mainframers, the prices of high-technology stocks have rallied in recent weeks.

A paradox? No. Investors are looking to the long term and are realizing that most computer companies can register gains in earnings during 1980 and 1981, according to William D. Estabrook of Kidder, Peabody & Co. Agreeing with Estabrook was John J. McManus, a computer analyst with Shearson Hayden Stone, Inc. He noted that June order figures in the industry improved markedly over May levels.

This order growth, which in part is causing the spark in the market, is attributable in some degree to users' improved ability to gauge the economy and their willingness to lease machinery now in light of declining interest rates. This is true even for small business system users, McManus said, pointing to activity in the stock of Cado Systems Corp.

Two or three months ago, computer industry stocks were undervalued, observed Jay P. Stevens, an analyst with Bear Stearns & Co., who noted that the market is playing catch-up.

Another fresh source of capital for computer stocks is institutional investors. This group is "viewing high-technology stocks as equally important as petroleum companies because computers and electronics will be as vital to the country in the next decade as oil has been," Steven T. McClellan, a vice-president of Salomon Brothers, observed. Many big investors are ignoring poor short-term earnings results in favor of long-term growth, he noted.

Illustrating the spurt in stock market activity between July 3 and July 17, IBM's stock rose from $60.63 to $64.50, and Control Data Corp.'s stock jumped from $55.25 to $62.75. Likewise during the same period, NCR Corp. posted a gain from $59.63 to $68.53; Honeywell, Inc., from $80.63 to $88.75; Digital Equipment Corp., from $69.25 to $76.75; Data General Corp., from $67.50 to $74.50; and Prime Computer, Inc., from $22.75 to $28.

Evaluating industry prospects for the 1980s from the performance of 13 selected computer companies including the six major mainframers, Amdahl Corp., Automatic Data Processing, Inc., Centronics Data Computer Corp., Datapoint Corp., Dataproducts Corp., Digital Equipment Corp. and Storage Technology Corp., Kidder, Peabody noted that the stock prices of this group increased 11% since April.

While orders for this group averaged 18% in the first quarter

(Continued on Page 58)

Mainframers Issue Second-Quarter Earnings

Control Data Corp.'s earnings from computer operations remained flat for the second quarter, while consolidated earnings at Honeywell, Inc. declined 7%. Sperry Corp.'s consolidated earnings for its first quarter of fiscal 1981 rose 16.6%.

The Minneapolis mainframer reported earnings from its computer business of $23.8 million, compared with the $23.7 million earned in the same quarter a year ago.

Consolidated earnings were $39 million or $2.25 per share, compared with earnings of $37.6 million or $2.18 per share for the like period a year ago.

Revenues from the computer business reached $688 million, up 28% from last year's second-quarter revenues of $536 million. Total corporate revenues were $943 million for the period up from $771 million last year.

(Continued on Page 58)

For 'Syncsort' Program Products

Whitlow Sort Processes Patented

By Marcy Rosenberg
CW Staff

ENGLEWOOD CLIFFS, N.J. — Whitlow Computer Systems, Inc. has obtained a patent on the sorting processes used in its Syncsort sort program products, an effort that took eight years and cost about $100,000.

While not the first patent granted for a process implemented in software, the Syncsort patent (No. 4,210,961) was the first granted for "a sort-related process that is actively marketed for commercial applications," company president Aso Tavitian claimed.

The patent covers 35 specific processes which contribute to two main inventions. The first is said to allow "the immediate reuse of disk space after data previously written there has been read into memory." The second invention "eliminates rotational delay and arm movement time associated with most 'write' operations in the merge process by combining read/write operations during the merge process into a single operation," Whitlow explained.

Commenting in a prepared statement on the significance of the patent, Tavitian said, "This would appear to be the first time the legal protections of the patent laws have been extended to processes implemented in such a critical software program product" — critical because "sorting is the most frequent job on any business computer."

He added that Whitlow "intended to make sure that any existing or future infringements on the patent are protected against." Asked what he meant by "existing infringements," Tavatian declined comment.

He was more talkative when queried as to why it took so long to obtain the patent. Tavitian attributed part of the delay to the

(Continued on Page 56)

NCR to Pump Up Chip Production

DAYTON, Ohio — NCR Corp. will increase from 40% to 60% the amount of its internally manufactured custom-designed semiconductor components by 1984.

The company intends to spend approximately $155 million during the next four years to double its capacity for designing and producing chips for its terminal and computer systems, NCR Chairman William S. Anderson said.

The company will continue to purchase high-volume "standard" microcircuits form outside sources in increasing quantities, Anderson said. However, "innovations in computer and terminal architecture will require very high-performance custom circuits in future years, and standard circuits are not the complete answer to the systems requirements we foresee for the 1980s," he added.

Last September the firm revealed it had chip manufacturing problems [CW, Sept. 3]. Although the company would not reveal which circuits were impacted by the yield problems, the impasse depressed the firm's third-quarter earnings.

NCR established its first in-house semiconductor capability 10 years ago. The new investment will give the firm the capa-

(Continued on Page 56)

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20 Washington St., Norwalk, CT 06854. Tel: (203) [illegible]

Data Dimensions, Inc.

Ramo to Keynote Wescon/80

ANAHEIM, Calif. — Dr. Simon Ramo, a noted technologist and a founder of TRW, Inc., will be the keynote speaker when Wescon/80 is staged here Sept. 16-18. About 50,000 electronics professionals are expected to attend the three-day event, show organizers said.

Ramo will speak on Sept. 15 at the keynote luncheon, a preview event. A scientist, engineer, business executive and educator, he was a pioneer in microwaves and developed General Electric Co.'s electronic microscope. Later, he was the director of guided missile programs for air defense and chief scientist for the nation's Intercontinental Ballistic Missile program.

His government service also includes the chairmanship of the President's Committee on Science and Technology and membership on a number of advisory bodies, including the White House Office of Science and Technology Policy.

His business experience includes executive positions with Hughes Aircraft Co., TRW and its predecessor companies and Bunker-Ramo Corp. He retired in 1978 as vice-chairman of TRW's board of directors and chairman of the company's Executive Committee.

A founding member of the National Academy of Engineering and a member of the National Academy of Sciences, Ramo is a recipient of the National Medal of Science, America's highest science honor.

Whitlow Gains Sort Patent

(Continued from Page 55)

Patent Office, which was awaiting the outcome of several software patent cases before the Supreme Court in 1974 and 1975 before acting on Whitlow's application.

Another factor was the need for revisions and qualifications of the required written description of the invention which, in this case, was very technical. "A small company like ours didn't have a staff of specialized technical writers that could easily translate highly technical descriptions into layman's terms," he remarked.

In light of the various opinions voiced in recent years as to how best to protect software, what prompted Whitlow to go the patent route instead of pursuing trade secret or copyright protection? "Patent laws by definition gave you essentially a legal monopoly," Tavitian said, referring to the fact that patents are issued to the proven first inventor of a unique and unobvious process. "I don't think trade secret protection allows for the timing of the invention."

Another advantage he cited was that under patent law, "you have the option of whether or not to grant a license to use the patented invention."

But perhaps the most important benefit patent protection will offer Whitlow is the freedom to talk about how Syncsort works, something Tavitian feels is an important marketing tool.

Before obtaining the patent, the firm protected the software by never delivering source code to customers and by being "tight-lipped" about its technical details.

NCR to Boost Chip Production

(Continued from Page 55)

bility to respond more quickly to a changing market environment and to protect its supply of components in times of shortages, Anderson said.

Planned Expansions

Slated for expansion are the company's microelectronics facilities in Miamisburg, Ohio, Fort Collins, Colo., plus a new facility in Colorado Springs, Colo., which will supplement the existing facility in that city.

By 1985, employment at those four facilities will reach about 1,940 persons, more than double the 930 employees working at the three plants operating today.

At Miamisburg, NCR will spend $50 million during the next four years on a 87,000-square-foot expansion. Construction will begin this summer. This will be the fourth expansion of the facility, which specializes in nonvolatile memories and custom logic devices.

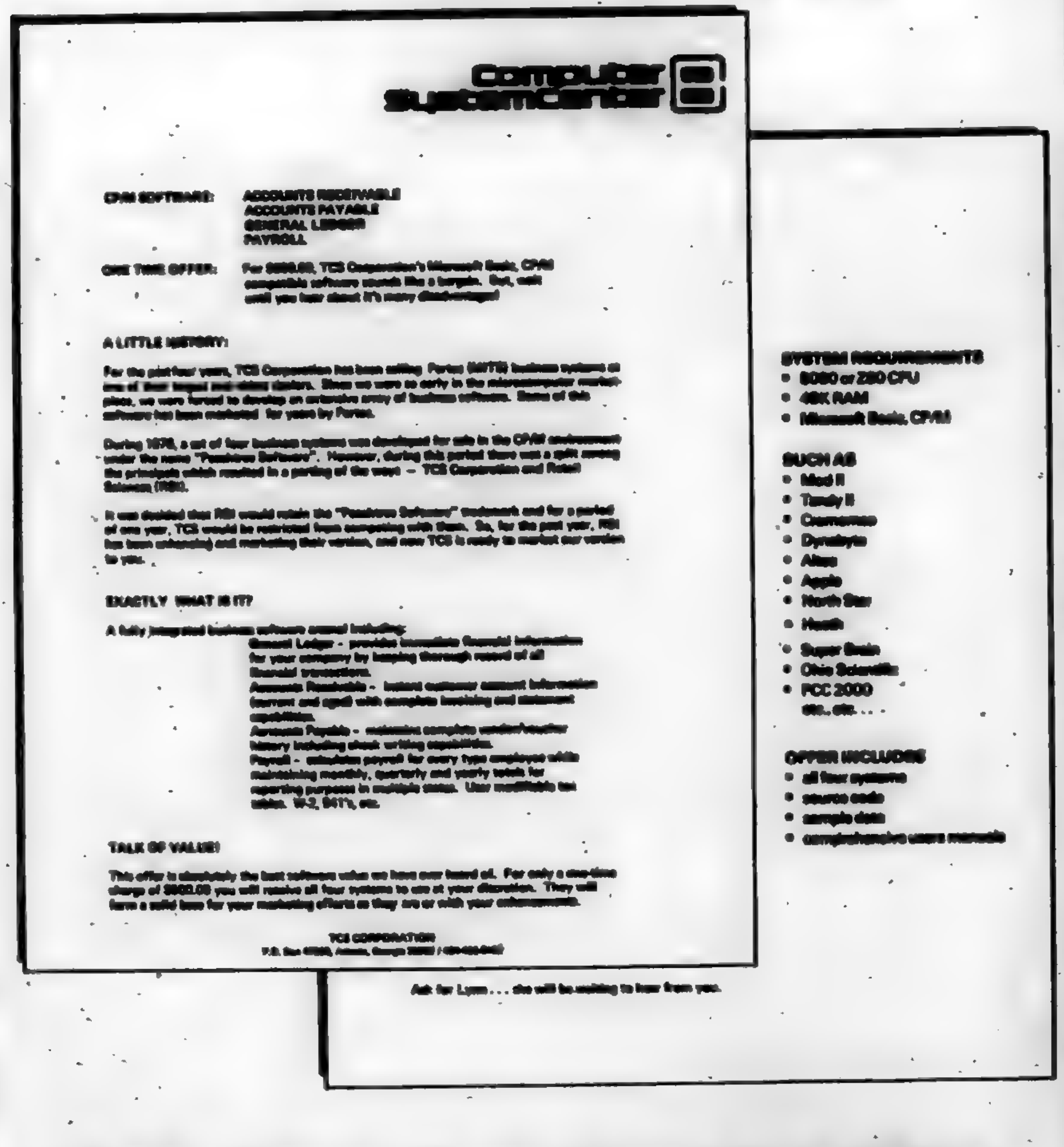
The Fort Collins facility will also receive a $50 million investment over the next four years. The facility will be NCR's source of low-power CMOS components.

A $55 million investment is scheduled for the two facilities in Colorado Springs, the newest of which will product very large-scale integrated circuits.

Correction

Former U.S. Secretary of State Cyrus R. Vance has been elected to IBM's board of directors, not trustees [CW, July 14].

The deal of 1980!



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Raise Procurement Cost Ceiling

GSA Proposals Stress Software Conversions

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Increased emphasis on well-planned software conversions highlights amendments proposed recently to federal DP systems management and procurement regulations.

Now out for comment, the regulations proposed by the General Services Administration (GSA) would raise to $500,000 the procurement cost ceiling under which federal agencies can administer their own competitive procurements without prior GSA approval. The current ceiling is $300,000.

Developed by GSA's Automated Data and Telecommunications Service (ADTS), the proposals pull together existing temporary regulations, changes that have been under consideration for some time and the results of recent ADTS deliberations on software conversion costs in federal DP, according to GSA.

"We faced up to the problem of conversion costs," said Robert Coyer, assistant ADTS commissioner for policy and planning, in describing the detailed guidelines for planning and implementing software conversions.

Under the proposals, which set guidelines for estimating and methods for controlling conversion costs, all federal DP acquisition planning will include a software conversion study.

In addition, preconversion planning is emphasized, with federal DP manager, instructed to, among other things, purge nonessential programs before conversion, identify numbers of lines and files to be converted, and document "specific agency actions taken to reduce the risk and cost of conversion."

The comment period for the proposed regulations ends later this month.

Answer to Criticisms

The recent proposals answer in many respects criticisms leveled at federal DP acquisitions and management. Recent reports by Congress' General Accounting Office, for example, have charged federal agencies with lack of preprocurement planning, failure to take advantage of modern software development tools and consistently bungling software conversions.

ADTS is hoping the hundred or so pages of proposed regulations, along with the recently established federal conversion support center and an ADTS reorganization, will help bring federal DP more in line with up-to-date practices found in private industry.

Among the proposals are regulations that would require:

- Annual agency DP plans, to include estimates of additional DP support to meet mission needs, approximate acquisition schedules, staffing and funding requirements and proposals for taking advantage of new technology, software improvements and "changes in the marketplace."
- A "comprehensive requirements analysis" to support systems acquisitions. Acquisitions must be based on clearly identified agency needs, deficiencies in existing capabilities, changes in agency program requirements or "opportunities for increased economy and efficiency."
- Decisions on purchase or various lease options based on evaluation of life-cycle costs of procurement alternatives.
- A comparative costs analysis of alternatives for meeting agency program objectives. This would include analysis of the relative merits of sharing DP facilities with other federal agencies, using commercial DP services, upgrading present systems, revising job streams to improve throughout capability, and others.
- Throughout, the regulations proposed by ADTS emphasize that federal DP managers should rely on federal or American National Standards Institute standard software languages "to the maximum practicable extent."

Concerning the ceiling for "blanket delegations of procurement authority," the regulations would allow agencies to procure DP equipment costing up to $500,000 (or $12,500/mo) on a competitive contract and $50,000 (or $1,500/mo) on sole source contracts.

For commercial software acquisitions, the ceilings would be $100,000 for competitive procurements and $50,000 for sole source contracts. Provisions for purchasing maintenance services are also included.

Exporters Get Guide To Japanese Market

NEW YORK — Things that prospective exporters to Japan should know and expect are explained in a free booklet, "The Japanese Market: American Exporters Speak," available from the Japan Trade Center here.

Based on a survey of new and established American exporters, the 20-page publication features the actual experiences of members of a U.S. Commerce Department-sponsored export promotion mission to Japan.

Copies may be obtained from the Japan Trade Center, Public Affairs Department, 1221 Ave. of the Americas, New York, N.Y. 10020.

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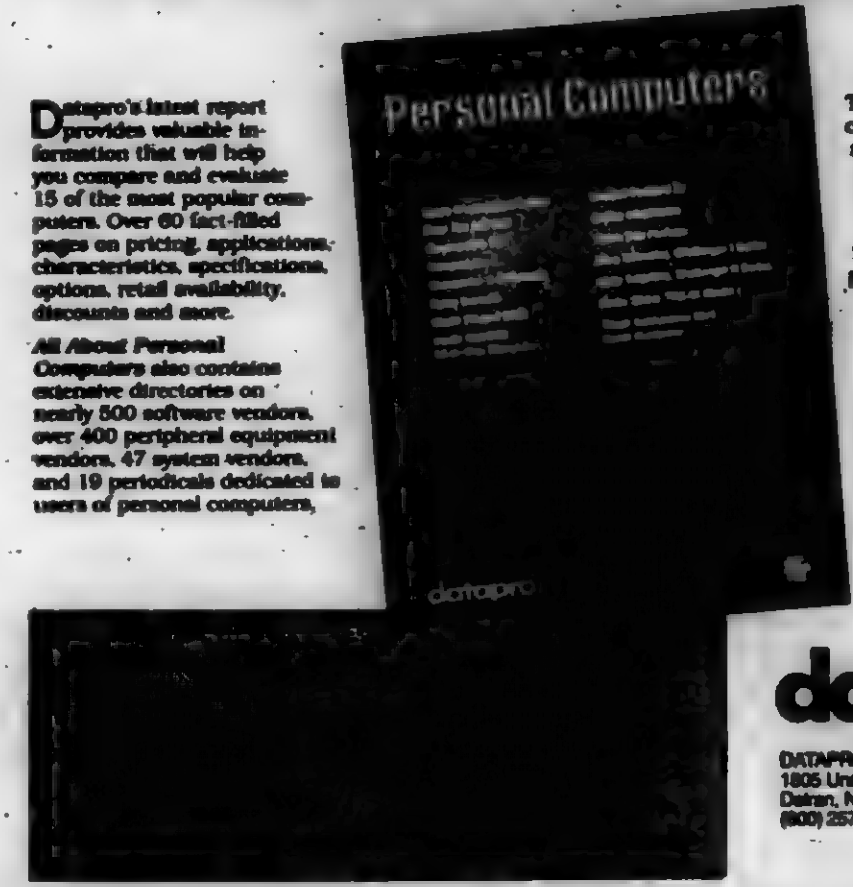

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Magnuson Revenues Rally

SAN JOSE, Calif. — Magnuson Computer Systems, Inc., which went public on June 25, reported second-quarter revenues of $6.8 million, up from $1.3 million in the same quarter a year ago.

Earnings for the second quarter totaled $784,000 or 21 cents per share. Earnings reflected a $360,000 tax loss carryforward. This compares with a $1.1 million loss incurred in the same quarter of fiscal 1979.

For the first half, the IBM plug-compatible mainframer earned $1.5 million or 41 cents per share, including a tax loss carryforward of $700,000. In the like quarter last year, the firm lost $2.4 million.

Revenues for the first six months totaled $12.5 million, up from $1.6 million in the first half of 1979.

Magnuson's stock traded on the Over-The-Counter market was initially offered at $20 and at press time on July 18 closed at $26.25.

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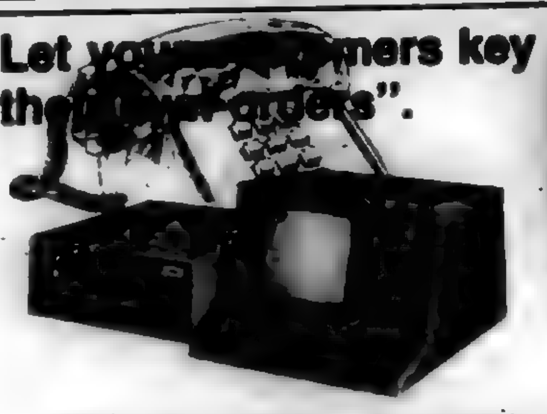

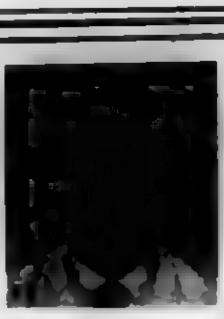

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Mainframers Issue Earnings

(Continued from Page 55)

Six-month revenues for the computer business were $1.3 billion, up from just over $1 billion for the first six months of last year. Combined revenues for the first half were $1.8 billion, up 28% from revenues of $1.5 in the same period a year ago.

Earnings from the computer business to date were $44.3 million, up 12% from the $35.5 million in the first half last year. Corporate earnings for the first six months were $74.2 million or $4.28 per share; up from $62.6 million or $3.63 per share a year ago.

Commenting on the results, Executive Vice-President of Finance Marvin G. Rogers said the modest earnings again in the second quarter reflected the fact that earnings in the comparable period last year were at a record high. He also noted that the company's computer operations this quarter reflected increased expenditures related to new products and services.

At Honeywell, earnings before extraordinary items for the second quarter were $56.9 million or $2.53 per share, down 7% from earnings of $61.3 million or $2.65 per share in the like period a year ago. Earnings for the first six months totaled $103.7 million or $4.61 per share, down from the $120.9 million or $5.32 per share earned in 1979.

Revenues for the quarter increased to $1.2 billion, up from $990.7 million a year ago. For the first six months revenues totaled $2.3 billion, compared with $1.96 billion for the first half of 1979.

"The second quarter results were somewhat better than we had anticipated earlier. The results of our European computer associate CII-Honeywell-Bull, which were a principal reason for our lower first quarter earnings, improved sharply in the second quarter," according to Ed Spencer, chairman and chief executive officer.

For its first quarter, Univac reported revenues were up 14%, and orders and backlog were both up 10%.

Total revenues for Sperry were $1.27 billion, up 16.8% from revenues of $1.1 billion in the first quarter of fiscal 1980.

Earnings were $63 million or $1.54 per share, up from $54.2 million or $1.38 per share in the same period a year ago.

High-Tech Stock Luring Investors

(Continued from Page 55)

and are estimated at 19% for the recently completed second quarter, Estabrook expects the average order rate gain for these companies will moderate to the 10% level during the rest of the year. This would result in an order rate growth prediction of about 14% for the year, down from 1979's order rate growth of 21%.

As for earnings growth for the quarter, the group is expected to average 9%. This excludes Amdahl Corp., which is projected to have a 257% earnings gain. For the first quarter, again excluding Amdahl, the group posted a 4% earnings gain.

Value Line, in a recent report, predicted earnings growth for the industry of about 12% this year.

Now coming out of its earnings slump, IBM is expected to be a formidable competitor in the coming years. In well-publicized statements made at a recent meeting, IBM said it plans to compete in all segments of the information processing market, becoming competitive on a "box-by-box" basis with other manufacturers. This is a product and marketing approach significantly different from the company's traditional top-down marketing approach which avoided subsystem competitive comparisons and stressed bundled prices, the Kidder, Peabody report noted.

IBM also has said it will use new marketing tools such as radio advertising, direct mail, telephone sales, volume discounts and the opening of retail stores.

Orders & Installations

Alanthus Data Communications Corp. has ordered 1,000 Telecommunications Storage Units (TSU) and Flexifile 21 disk storage subsystems from Tri-Data.

National Bank of North America is installing an IBM on-line banking system with more than 1,000 computer terminals to provide automated customer services.

The Braegen Corp. has been awarded a contract for PDP-11-compatible disk subsystems valued at more than $300,000.

The New Hampshire State Liquor Commission has placed a $1.2 million order with Data Terminal Systems, Inc. for point-of-sale (POS) systems and communications subsystems.

Scientific-Atlanta, Inc. has signed an agreement to supply digital satellite earth stations to American Satellite Corp. through 1982. Entertainment and Sports Programming Network has also ordered a major new satellite earth station from Scientific-Atlantic, Inc.

United Airlines has ordered $5.1 million worth of Honeywell, Inc. terminals, including both SPD 1525 systems and Model 1501 visual display units.

Kawasaki Motors, U.S.A. has ordered 600 registered 1,200 bit/sec modems from Codex Corp.

Bob Jones University, Greenville, S.C., has signed an agreement for the purchase of a computerized telephone system from F/S Communications Corp.

Cado Systems, Inc. has signed an agreement to purchase almost $1 million worth of rigid disk drives from Pertec Computer Corp.

Harold Beck & Sons, Inc. has ordered a 90/30 system and the Univac Unis program for manufacturing control. The Austad Co., a midwest distributor of recreational equipment, has also ordered a 90/30 system from Univac.

Citibank N.A. has ordered equipment from Recognition Equipment, Inc., including five Trace systems, valued at $2.2 million.

CSI Sees Steady Growth in Net Processor Sales

By Ann Dooley
CW Staff

SAN JOSE, Calif. — The communications processor industry will undergo dramatic changes in scope, but sales will remain strong during the next five years, reaching $1.2 billion by 1984 — a compound annual growth rate of 19.4%, a report by Creative Strategies International (CSI) indicated.

According to CSI, small independent vendors of communications processors are disappearing: Action Communications Systems was acquired by Plantronics; Comten, Inc. was acquired by NCR Corp. and Tran Telecommunications Corp. was acquired by Amdahl Corp., all within the last several years.

Only Computer Communications, Inc. remains a viable firm dedicated to communications processors, and that is doing only about $20 million per year in revenues, CSI maintained.

The recent Federal Communications Commission ruling allowing AT&T to compete in DP will have a significant impact on the market, according to the market research and consulting firm.

AT&T's Advanced Communications Service will incorporate many of the communications processing functions in the network itself, reducing the need for network controllers, front-end processors and message switches, the report noted.

Hardware Market

The market for data communications hardware — modems, multiplexers, communications processors and assorted peripherals — was $1.13 billion in 1979. By 1981, the market will grow to $2.93 billion, a compound annual growth rate of 21%, CSI predicted.

Communications processors are the largest segment of the hardware market, with revenues of $494 million last year. Communications processors will grow at a compound annual rate of 19.6% to $1.2 billion in 1984, CSI predicted.

Front-end processors, accounting for 51% of communications processor revenues, will continue to dominate, according to the report. Remote concentrators account for 21.3%, network controllers account for 17.7% and message-switching systems account for 10%.

The message-switching segment shows the most growth, with an expected compound annual growth rate of 22.4%, and the remote concentrator segment shows the least growth, a 14.2% compound annual growth rate to 1984, according to CSI.

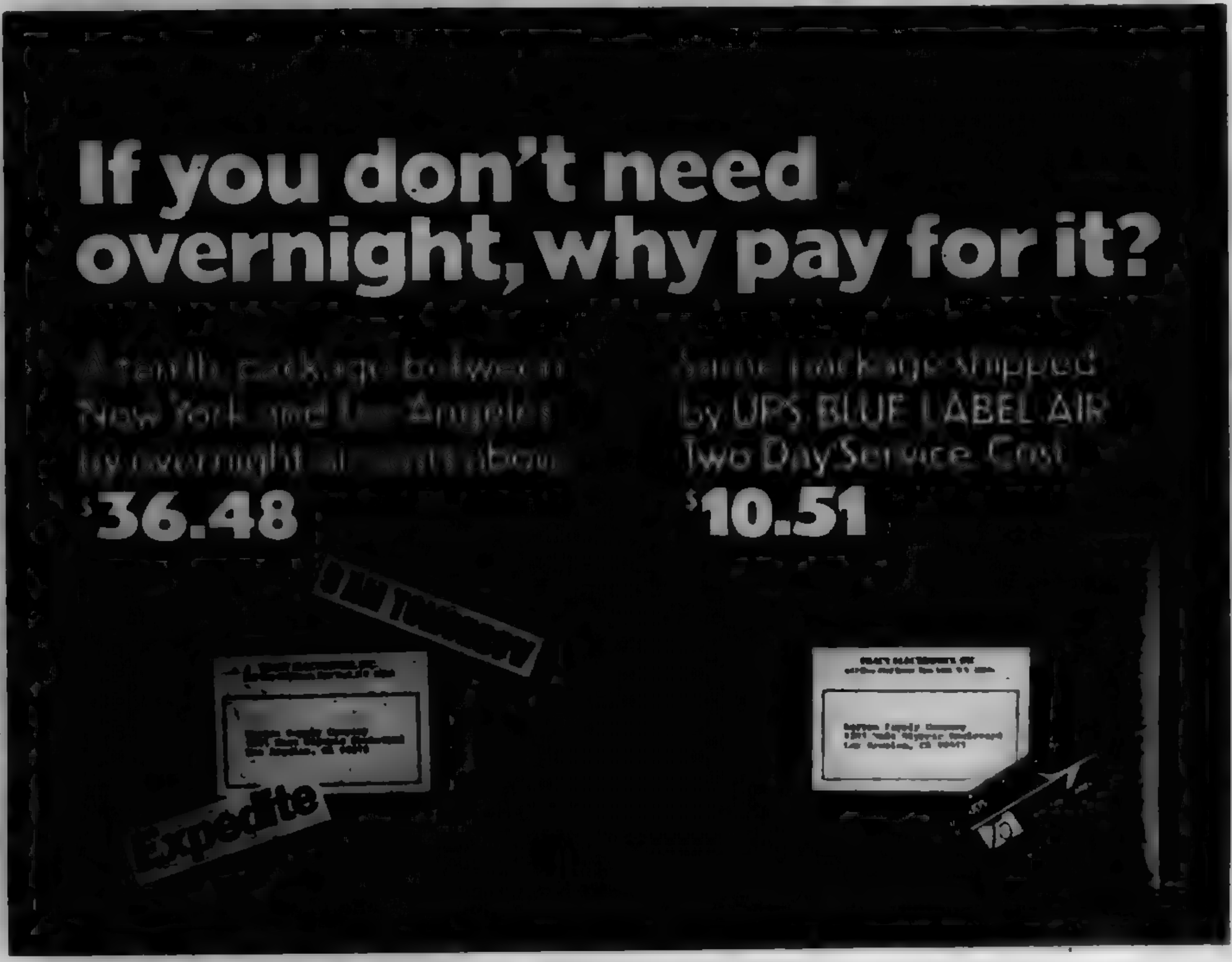
International markets will also experience high growth opportunities, although competition will increase as European suppliers enter more strongly into the market.

The leading competitors in the market are the mainframe computer manufacturers, with IBM dominant in three of the four market segments.

Honeywell, Inc., NCR, Digital Equipment Corp., Burroughs Corp., Control Data Corp. and Univac are all among the top nine competitors, the report noted.

With the increased complexity of network architecture and the host processor defining communications protocol, users are looking to the host processor vendor for communications processors, as well.

Providing a concise analysis of the market and individual equipment, the report costs $995 from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.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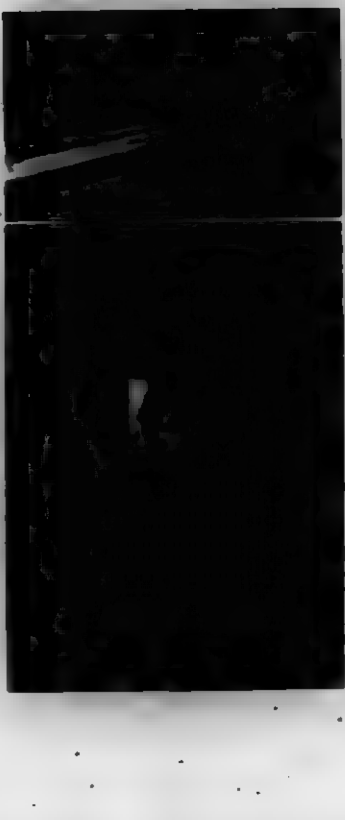

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Verbatim Drops Rigid Disk Line

SUNNYVALE, CALIF. — Verbatim corp. is discontinuing its program to develop a line of rigid disk products.

The company said its decision to discontinue the program was based on its assessment that the return on its investment as well as the profit potential would be less attractive than initially anticipated, primarily because of the company's evaluation of changes in rigid disk market conditions.

The discontinuance of the rigid disk program results in a substantial charge to expense in the company's fourth quarter, which ended June 30, from the writeoff of certain equipment and the provision for costs to be incurred in winding down the program. In addition, the financial rusults for the fourth quarter will be adversely impacted because of sales being lower than forecasted, the company said.

As a result, the company will report a loss for the fourth quarter ended June 30.

Symposium Set for October On DOD Electronics Market

LOS ANGELES — "The Department of Defense (DOD) Electronics Market — Fotecast for the 80s" symposium to be held here Oct. 7-9 will provide an analysis of the key issues impacting mid- to long-term defense planning and the technologies that will be impacting systems Requirements during the decade.

Sponsored by the requirements Committee of the Electronic Industries Association's (EIA) Government Division, the symposium will be comprised of four segments: "Major Defense Issues for the '80s," "Defense Issues as Viewed by DOD Executives," "EIA's Look at the 1980-1990 Defense Electronics Market" and "New Initiatives and Technology Trends."

Registration fees are $200 for EIA members, $260 for nonmembers and $90 for government representatives. For more information, contact EIA, Government Division/Requirements Committee, 2001 Eye St. N.W., Washington, D.C. 20006.

CBI to Move to Minnesota

PALO ALTO, Calif. — The Charles Babbage Institute for the History of Information Processing (CBI) will be leaviang here to take up permanent residence at the University of Minnesota.

A nonprofit foundation that promotes research on the history of computers and computation, CBI was founded in 1977 by Erwin Tomash, founder of Dataproducts Corp.

CBI has instituted a number of activities, including an annual fellowship to graduate students working in the history of data processing. Roger H. Stuewer, professor of history of science and technology at the university, will serve as acting director until a permanent director is appointed.

The University of Minnesota was chosen in preference to 13 other universities that submitted proposals.

Three Appointed As AEA Realigns

PALO ALTO, Calif. — In a major staff reorganization by the American Electronics Association (AEA) in response to 24% growth in membership last year, Barton A. Scowley, Charles Elkind and William H. Phillips Jr. have been appointed to three new vice-president positions by the association's board of directors.

As vice-president for membership, Scowley is responsible for member and nonmember contacts and will supervise AEA's member relations staff in its offices in Palo Alto, Los Angeles, Orange County, New England and the metro New York area.

Elkind becomes vice-president of communications and industry services. An AEA vice-president since 1973, he has headed the association's Southern California operations for the past 14 years.

Phillips, named vice-president of finance and administration, will be responsible for financial planning and budget control. He has been AEA's staff financial executive since joining the association in 1977.

Commerce Approves Data Link Standard

WASHINGTON, D.C. — A standard for advanced data communications control procedures (ADCCP) has been approved by the U.S. Commerce Department and published as a National Bureau of Standards Federal Information Processing Standard (Fips PUB).

Fips PUB 71 defines the data link control procedures to be used by vendors of ADP equipment and services employing bit-oriented synchronous data communications links.

Further details concerning the standard are available from Eric L. Scace, System Components Division, Center for Computer Systems Engineering, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234.

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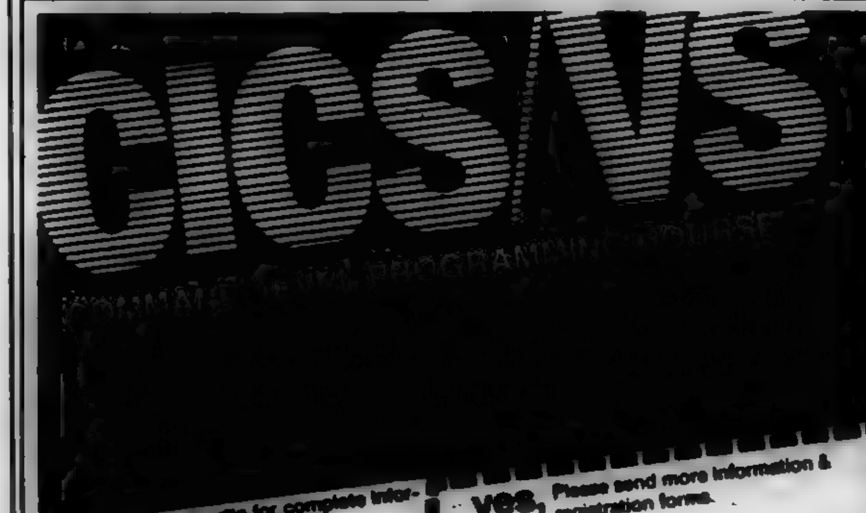

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Work/Study Programs Train Employees for Advancement

• *Honeywell Enrolls 20*

BOSTON – In an effort to meet its increasing need for computer technicians, Honeywell, Inc. has started a "classroom in the factory" program.

Currently being conducted at the company's facility here, the pilot project allows 20 employees to attend classes Monday through Friday for four hours and then spend four hours working.

The program is a joint effort by Honeywell and Bunker Hill Community College, one of the state's two-year public colleges.

The goal of the program is to train employees to become skilled technicians on a full array of Honeywell's small computer systems and terminals.

Upon completion of the seven-month program, students receive 35 college credits from Bunker Hill Community College.

Students enrolled in the program are taught basic electronics, digital electronics, basic computer theory, an introduction to software, microprocessor architecture and applications and firmware concepts.

The company and the state college are sharing the costs of the program, which in part will be defrayed by a grant from the state's Division of Occupational Education.

The creation of the program is Honeywell's response to Massachusetts Governor Edward J. King's call for more cooperation between industry and education.

On hand to formally announce the program, Stephen G. Jerritts, president of Honeywell Information Systems, said he considered the program a way of better matching up the school curricula and the skills needed by industry.

• *Wang Program Graduates 18*

LOWELL, Mass. – Members of the first graduating class of the Twilight Technical Training class at Wang Laboratories, Inc. here have either already advanced into new jobs within the company or are expecting to do so soon.

Eighteen manufacturing employees participated in Wang's recently implemented work/study program. They volunteered for the program in order to advance their careers by increasing their technical knowledge.

Six months after the course began, 11 of the 18 are working in new jobs and the other seven are in line for advancement, according to a Wang spokesman.

The program was open to any Wang employee who had been with the company a minimum of six months. Throughout the six-month course, the 18 participating employees were excused two hours early from their jobs on Monday through Thursday to attend the four-hour classes. The students donated two hours of their time and Wang donated two hours of company time in a cooperative effort, the spokesman said.

Divided into two academic sections – digital and analog – the course was deemed a success by management as well as by the participants, all of whom completed the program.

"We are striving for growth at all levels," Vice-President of Manufacturing Jon Kropper stated. "Most corporations view advancement strictly, almost religiously, at the managerial level; we view it, rather, in the broader context, which allows us to take diverse, small currents throughout the company and create major updrafts," he said.

Contracts

Functional Automation Gould, Inc. has been awarded a $62,000 contract by Andover Controls Corp. for production of a multi-building data acquisition, energy control and report-generating system.

Tymshare Travel Management Services has signed a multiyear contract with Trans World Airlines to provide TWA with a new multiaccess terminal service for use by travel agencies nationwide.

Infotron Systems Corp. has been awarded a $3,600,000 contract by Western Electric to supply more than 1,200 of its Timeline 280 and Timeline 290 synchronous time division multiplexers.

Lundy Electronics & Systems, Inc. has received a $3,798,620 order for expansion of the presently installed Lundy Data Entry System at the UK National Girobank.

The Mil-Spec Computer Division of Rolm Corp. has received a contract for 81 Model 1602B advanced logistic designed computer systems from the Communications and Development Command of the U.S. Army for integration into its Teampack electronic warfare system.

Spear Associates, Inc. has been awarded a $2,699,321 small business contract by the Air Force Systems Command's Electronic Systems Division to build seven airborne test antenna sets.

Computer Network Corp. has been awarded a major contract with a federal government agency to provide full-service facilities management processing with dedicated mainframe, communications, peripherals (tape and disk) and operations personnel.

Science Dynamics Corp. has signed an agreement to provide computer services to a group of 12 Southern California cities. The contract amounts to $2.5 million and extends through June 1984.

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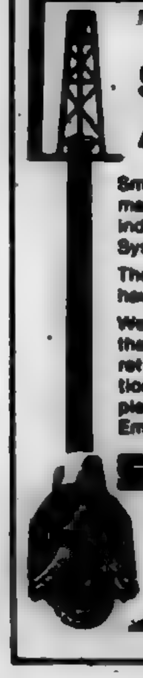

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JOIN US IN THE FUNBELT

PROJECT MANAGER

Business/technical degree or relevant experience plus:

- 2-3 years in complex systems design
- highly developed business and technical skills
- ability to interact at all levels

SOFTWARE SUPPORT MANAGER

Computer Science Degree preferred plus:

- 4-5 years systems software experience
- Honeywell GCOS experience or other operating system

Other applications and support positions available

This is YOUR OPPORTUNITY to get in on the GROUND FLOOR in the development of a sophisticated hospital information system . . . . located in charming, historic NEW ORLEANS, center of the FUNBELT.

We offer

- Top management commitment
- Latest hardware/software environment
- Professional development
- Advancement opportunity
- Transaction Processing/Database orientation

We need your expertise and experience.

Direct confidential inquiries to:

Employment Office
P.O.Box 2841
Baton Rouge, LA 70821
(504) 342-4226

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* * * SENIOR * * *
PROGRAMMER ANALYSTS

SYSTEMS WEST is an established consulting firm that excels at developing and implementing systems in a project team environment.

Due to current project commitments and recent expansion we are seeking Senior Programmer Analysts with a minimum of three years of experience to complement our existing consulting staff in Canada and the U.S. If you enjoy developing new systems and are proficient in the following disciplines we want to hear from you.

***ONLINE DATABASE SYSTEMS. . . (IMS, TOTAL, IDMS)**

***STRUCTURED ANALYSIS & DESIGN**

***STRUCTURED PROGRAMMING. . . (COBOL, PL/1)**

The opportunity to diversify your professional skills and to function in a challenging environment awaits you. We offer excellent salaries based on performance, comprehensive benefits and profit sharing. If you want to be associated with an industry leader please reply in confidence to:

SYSTEMS WEST CONSULTANTS LTD.
SUITE 2506
425 CALIFORNIA STREET
SAN FRANCISCO, CA 94104
(415) 391-1993

SYSTEMS WEST CONSULTANTS LTD.
SUITE 300
10180-100 STREET
EDMONTON, ALBERTA, CANADA
(403) 426-1404

san francisco, vancouver, edmonton, calgary

PROGRAMMER-ANALYST
CICS-CMS

2 YRS + IN
COBOL, ALC OR PL/1
TO $36,000
NATIONWIDE

Cybermetrics Corporation
P.O. Box 579
McLean, VA 22101

EXECUTIVE SEARCH FT. LAUDERDALE, FLORIDA

We are looking for a working partner to join us in our Ft. Lauderdale office. If you have software or computer sales experience this may be for you. Your investment is $12,500 and we will finance the balance. For more information call **E.J. Stephen** at **Cosmo, 800-327-7266.**

ARIZONA
Manager Installations and Customer Relations
Starting Salary To 45K

We are:
A medium-size turn-key house (Consulting — Systems Design — Hardware Procurement — Application Programming — Implementation — Post-Installation Service) We cater primarily to two vertical markets, implementing in excess of [illegible] systems per year.
We need:
An aggressive leader for an excellent and well established software implementation team. Responsibilities include Customer Education and Documentation.
The qualified applicant will have a minimum of [illegible] years of data processing and accounting experience including at least three years in management.

Service Bureau or software house experience will be helpful. Background in automotive or equipment dealer related areas desirable. You should be looking forward to working in excess of [illegible] hours per week.
Your challenge:
Rapid expansion with a well established turn-key house to handle our order backlog and growth. Advance to V.P. possible within 6 months.

Please do not waste your time or ours with a reply unless you have a proven track record in management and possess the minimum qualifications outlined above. A progressive achievement record is a must.

Your answer should be directed to: [illegible], P.O. Box [illegible], Scottsdale, AZ [illegible]

DATA PROCESSING

GROWTH AND OPPORTUNITY

Central Bank of Denver is currently planning the development and installation of a totally integrated banking system. We are seeking qualified candidates in the areas of System Analysts and Programming Analysts with 370 OS/MVS background. Banking experience would be a plus.

These positions offer a competitive salary and benefit pkg. as well as excel. oppty. for advancement. Please send resume in confidence to:

Central Bank of Denver
Staff Resources Dept.
[illegible]
Denver, Colo. [illegible]
Equal Opportunity Employer
M/F/V/H

TOWN OF GREENWICH CONNECTICUT

COMPUTER PROGRAMMER II

$16,213-20,574

Considerable experience in computer programming and systems analysis. College grad or equivalent with major course work in computer science or related field. Excellent fringe benefit package. Resume to Personnel Office, Town of Greenwich, Town Hall, Greenwich, CT 06830.

An Equal Opportunity Employer, M/F

PROGRAMMER/ANALYST

Leading Beechcraft Sales and Service Center has immediate opening in Atlanta for individual with Honeywell experience using GCOS and TDS. Minimum of 5 years experience in Design and Programming: Inventory Control. Excellent salary and benefits package, includes pension and profit sharing.

Send resume to:
Jimmy Smallwood
Hangar One, Inc.
P.O. Box 20718-AMF
Atlanta, GA 30320

DIRECTOR OF COMPUTING AND INSTITUTIONAL RESEARCH

San Francisco State University is recruiting for the position of director of Computing and Institutional Research which reports to the university president. The ideal candidate should have direct management experience in all phases of data processing at a university or college institution; ie., research, academic and administrative services. Advanced degree with appropriate specialization required. The salary is negotiable from [illegible]. The university offers excellent benefits. Resume should be sent to the University Personnel Office, San Francisco State University, 1600 Holloway Ave., San Francisco, CA 94132.

Deadline: Aug. 15, 1980

We are an Affirmative Action/
Equal Opportunity/Title IX Employer.

SYSTEMS ANALYST PROGRAMMER/ ANALYST

Springs Mills, Inc., a leading textile manufacturer, is seeking an experienced data processor who also has a working knowledge of the MSA Human Resource System. If you qualify, please send your resume to:

Personnel Manager
P.O. Box 111
Lancaster, South Carolina 29720
Or Call [illegible]

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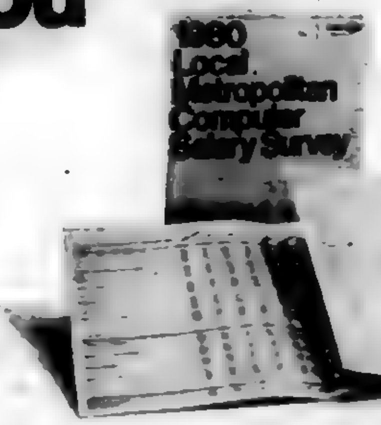
Are you making as much money as you should be?



To find out, call today for our new local survey

It's FREE!

Includes 23 New Categories

The 1980 Survey has been expanded to provide specific data for 23 new categories. These include positions in data communications, *mini/micro programming*, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

Do you know how your salary compares with other EDP professionals in your specialty—with the same level of experience—working in your city, or in other cities across North America? Are you being well paid for what you do? Are salaries better elsewhere?

Now you can find out simply by calling today and asking for a copy of our current 1980 Local Metropolitan Computer Salary Survey. It's FREE!

Source Edp, North America's largest recruiting firm specializing in the computer field, publishes this valuable Survey annually as a service to computer professionals from coast to coast. The 1980 Survey shows current salaries in your area, 37 other areas in the U.S. and Canada, plus overall national averages. Salaries are shown by career specialty broken down by length of experience or size of computer system.

As you will discover, this Survey can be extremely valuable in helping you make important career decisions. Call for your free copy today.

For your free report, simply phone the Source Edp office nearest you.

source edp

If unable to call, write
Source Edp, Dept. CL4
100 South Wacker Drive
Chicago, Illinois 60606

(When writing, please be sure to indicate home address and position title). Client companies assume our charges.

United States	
Arizona	
Phoenix	602/[illegible]
California	
San Francisco	415/434-2410
Palo Alto	415/856-0800
Los Angeles	213/386-5500
Van Nuys	213/781-4800
Torrance	213/540-7500
Irvine	714/833-1730
San Diego	714/231-1900
Colorado	
Denver	303/773-3700
Englewood	303/571-4450
Connecticut	
Hartford	203/522-6590
Stratford	203/375-7240
District of Columbia	202/466-5890
Florida	
Miami	305/[illegible]
Georgia	
Atlanta Central	404/588-9350
Atlanta Suburban	404/325-8370
Illinois	
Chicago	312/782-0857
Northfield	312/446-8395
Oak Brook	312/986-0422
Rolling Meadows	312/392-0244
Indiana	
Indianapolis	317/631-2900
Louisiana	
Baton Rouge	504/924-7183
New Orleans	504/561-6000
Maryland	
Baltimore	301/727-4050
Massachusetts	
Boston	617/482-7613
Wellesley	617/237-3120
Michigan	
Detroit	313/259-7607
Southfield	313/352-6520
Minnesota	
Minneapolis	612/544-3600
St. Paul	612/291-2467
Missouri	
St. Louis County	314/862-3800
St. Louis Downtown	314/231-4880
Kansas City	816/474-3393
New Hampshire	
Nashua	603/880-4047
New Jersey	
Cherry Hill	609/482-2600
Edison	201/494-2800
Paramus	201/845-3900
New York	
Midtown	212/736-7445
Wall Street Area	212/962-8000
Long Island	516/364-0900
White Plains	914/683-9300
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Greensboro	919/378-1642
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Philadelphia	215/665-1717
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Dallas	214/387-1600
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Tomorrow's Energy is Today's Challenge

TECHNICAL SYSTEMS PROGRAMMER

Excellent and challenging career opportunity in Madison for experienced data processing professional. We have an IMMEDIATE NEED for strong systems programmer to facilitate MVS conversion from OS/VS1 on an IBM 3033N8. Will assist in the conversion planning and assume lead role in the installation, maintenance and tuning of the MVS SCP, TSO/SPF, JES2 and RMF.

Must have experience with VSAM, VSAM Master Catalog and Assembler. Excellent opportunity for motivated individual who desires crosstraining in related areas as: ACF/VTAM-NCP; IMS/DL1; CICS, FORTRAN, COBOL.

Offering competitive salary and excellent fringe benefit package. APPLY TODAY.

Submit your resume including salary history in confidence to:

Employment Supervisor

Wisconsin Power & Light Company
P.O. Box 192
Madison, Wisconsin 53701

An Equal Opportunity Employer [illegible]

SALES MANAGER

Comarc, the leader in Geo-based information systems is looking for an experienced Sales Manager. The person we seek will have a minimum of three recent concurrent years of management experience over a national sales force. The candidate will also have been involved with large systems in the $200K to $700K range. A technical degree with supplemental training in marketing, sales, and personnel management is desired. Experience with computer graphics, DBMS or MIS will be a plus.

The successful candidate will inherit a staff of three, with scheduled expansion to five, international responsibility, and wide open career opportunities. The position reports to the President and pays $25K-30K, plus an override, profit sharing, and excellent company benefits. Call or send resume to Kay Anderson, Comarc Design Systems, 315 Bay St. San Francisco, CA 94133; (415) 362-[illegible].

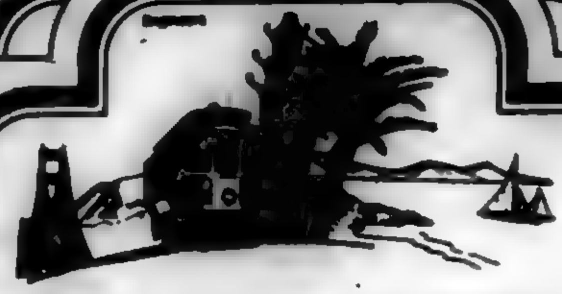
CALIFORNIA

MAJOR TIMESHARING FIRM needs Technical Representatives in their Los Angeles office. These positions require past experience in Fortran prog'g. Mini-computer exp. is preferred but not req'd. Heavy client contact. Salary to $[illegible].

HEALTH SERVICES FIRM needs a Project Leader to assist in the development of an on-line accounting system. Environment is 370/158 (going to 3033) with CICS and COBOL. Excellent benefits. Salary to $[illegible].

MAJOR FINANCIAL INST. seeks Sr. Systems Analyst with exp. in systems planning, system architecture or long-range planning. Successful candidate will join a team reviewing present systems (hardware & software) and developing systems to accomodate reqmnts. thru 1990. Salary to $[illegible].

the jarvis walker group
3255 Wilshire Blvd., Suite 1503
Los Angeles, Ca. 90010 (213) 384-4800



Software Engineers: It's happening here in Santa Clara Valley

A short drive from SAN FRANCISCO, CALIFORNIA, is where the engineering teams of GTE Sylvania continue to revolutionize the electronic defense industry through the research and development of realtime computer-controlled systems.

GTE Sylvania is a leading developer and manufacturer of sophisticated computer-based systems for the Department of Defense and related agencies. These are realtime, interactive systems which acquire and process electromagnetic signals. Their functions are distributed across multiple processors, are coded in structured languages, use data-base facilities such as DBMS-11, and are interfaced to sophisticated devices such as smart terminals, graphic display terminals, receivers, recorders and transmitters.

GTE Sylvania has a continuing need for innovative software professionals to staff our expanding work programs which involve design, development and support activities in the following areas:

Data base technology
Digital communication
Microprocessor controlled systems
Interactive computer graphics
Communication networks
Distributed processing

APPLICATIONS SOFTWARE.................. Design and develop realtime software systems. Programming is done in high level languages (PASCAL, FORTRAN, CMS-2 and PL/I) and assembly. Heavy use of PDP-11.

SOFTWARE VERIFICATION AND VALIDATION.......... Plan software test and integration procedures for complex realtime computer systems. Experience in man-computer interfaces and configuration management desirable.

MICROPROCESSOR SOFTWARE.................. Design and develop assembly language software for microprocessor and minicomputer-controlled realtime systems. Implementation of signal processing algorithms, input/output and interrupt handling and realtime executive functions.

Take advantage of these openings now, and enjoy western living at its best. You can expect an excellent salary, plenty of career challenge and growth opportunities, plus generous benefits including tuition reimbursement, medical, dental, and stock purchase plan.

For immediate consideration, forward your resume with salary history to GTE Sylvania, Attn: Dept. AE-728 P.O. Box 188, Mountain View, California 94042. We are an equal opportunity employer, minorities and females encouraged to apply. U.S. Citizenship required.

GTE SYLVANIA

The Great Technological Environment

We're the little company with the big ideas.

Opportunity abounds at Lexar. We're located in Brentwood, one of the most prestigious areas of Los Angeles. We're small enough so your talents can really be noticed, yet we're large enough to give you all the benefits those big impersonal companies do. And that's great. If you have big ideas, big talent, come and join a group of professionals who know how to enjoy their work in the digital telecommunications field. We have immediate openings for the following positions:

Systems Prog/Anal:
PL/M or ASM 86. 3 yrs. plus 16 Bit microprocessor exper. (Intel 8086)

Mgr. Prod. Assur:
Develop and coordinate staff to perform product assurance, both s/w and h/w configuration control. 3-5 yrs exper. B.S. Comp. S. or BSEE.

Product Assur. Spec:
Plan/perform quality assurance program. Verify test procedures for system delivery. 3-5 yrs exper. B.S. Comp. S. or BSEE.

For consideration, please call Personnel **(213) 820-9516** or send resume to:

LEXAR CORPORATION

11611 San Vicente Blvd., Brentwood, CA 90049

Equal Opportunity Employer M/F

TRW

COLORADO ELECTRONICS, INC.

TRW Colorado Electronics is located in the foothills of Pikes Peak in Colorado Springs, Colorado. Recreational opportunities abound to accent our 4 day workweek.

SENIOR COMPUTER SYSTEMS ENGINEER

To provide expertise to TRW/CE in the acquisition and use of computer-based management systems. Must be knowledgeable in the areas of both computer hardware and software and have a high-level of programming skills in several languages including FORTRAN and BASIC. BS in computer sciences or engineering with computer emphasis and have 5 to 8 years experience in the computer systems field.

Personnel Department, Room 103
TRW Colorado Electronics, Inc.
3650 North Nevada Avenue
Colorado Springs, Colorado 80907

An Equal Opportunity Employer M/F

Director

Management Information Systems

We are an intermediate-sized health care facility, located in Arizona, currently seeking a self starting individual to design and direct the ongoing development of our management information systems.

This position is directly responsible for the data processing operations and management information sections in our distributed processing environment.

The qualified candidate will possess a proven track record in the development of distributive data processing systems. 3-5 years of current systems engineering and programming background, as well as excellent interpersonal and communication skills necessary to interact with all levels of our staff.

We offer a career opportunity with upward mobility, an excellent salary and benefit package, in addition to an ideal Southwestern climate in an urban setting.

To apply, please send your resume including salary history to:

CW Box 3344
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

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SYSTEMS PROGRAMMER OPERATING SYSTEMS

IBM, VM, CMS or OS/VS experience, including installation and assembler coding. IBM 370/148 installed with 4341 and multiple 8100's on order to implement an SNA distributed environment. IBM 8100, VTAM/NCP, CICS/VS, VSAM, or health care experience a plus. Bachelors Degree in Computer Science plus appropriate experience or the equivalent combination of education and experience. Please send resume with salary history to:

University of Louisville
University Personnel Services
[illegible] South Brook St.
Louisville, KY [illegible]

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ROBERT HALF

SOFTWARE SUPPORT

Major Dallas corporation needs skill software technician for systems support. Willing to train candidate with three-plus years BAL applications experience seeking transition to more technical career. TO: $28,000.

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New COBOL financial system development. Mostly analysis for next year, then coding and testing. Two to four years BAL on-line experience required. TO: $28,000.

CONTACT: JOHN [illegible]
ROBERT HALF OF DALLAS, INC.
Two Northpark East, Suite [illegible]
Dallas, Texas [illegible] (214) [illegible]
World's Largest Personnel Consultants For EDP Professionals

COMPUTER OPERATOR

To operate NCR 8455 computer. NCR and CIF experience required. Salary commensurate with experience. If interested send resume to:

Patricia Foster
Personnel Director
State National Bank
6821 Arlington Rd.
Bethesda, MD 20014

PROGRAMMER ANALYST

Senior level career Programmer/Analyst positions available with The California State University and Colleges. Work on a variety of administrative systems in higher education. Minimum of three years COBOL experience and equivalent to graduation from college required. Cost free career development available. Mid-Wilshire location. Salary: $26,893-$32,450 annually. For more information, please contact **JOE MAH** at (213) [illegible], or send resume to:

Personnel Services, Ref: SP

The California State University & Colleges

400 Golden Shore
Long Beach, CA 90802

Equal Opportunity Employer M/F

Compiler Development

Ongoing and imminent projects include optimizing and fast development compilers for FORTRAN, PASCAL, and ADA. Candidates should have a strong background in compiler construction from either industry or academic experience as well as proficiency in assembly language and FORTRAN or PASCAL.

Operating Systems-Data Communications

We need systems programmers who desire to advance themselves in a first line, state-of-the-art, O/S-data communications environment. Successful candidates will work on a number of interesting projects relating to development and maintenance of operating systems, support software, and data communications. Knowledge of assembly language, real time systems, drivers, debugging aides, editors, etc. desirable.

Software Quality Assurance

We have immediate opportunities for SQA professionals with 3 or more years experience in a dedicated SQA function that requires broad technical background and expertise. Successful candidates may also have extensive user oriented experience such as in software support services or may have software development or maintenance experience of 5 years or more and a desire to enter the demanding area of SQA. All applicants must be able to demonstrate proven skills in these areas plus good interpersonal skills to interface effectively with both technical and non-technical people.

Software Technical Writer

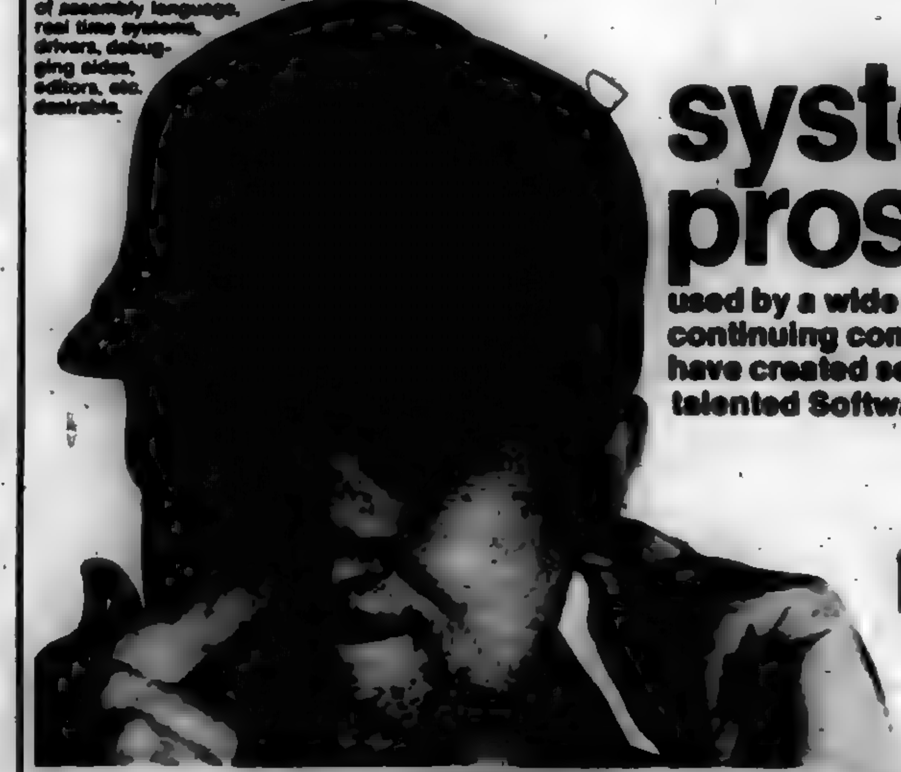
Successful candidates will be knowledgeable in the complete processing of manuals from inception through production. Position requires 2 years experience in software documentation. Research, write, edit programmer reference and user software manuals. Must be able to write from software specifications and to interface effectively with software development and publications personnel.

Knowledge of operating systems, programming languages, and/or data communications desired. Familiarity with software concepts and terminology is essential.

Perkin-Elmer's Computer Operations is located in residential Monmouth County, New Jersey. Our facilities are only minutes from some of the most beautiful beaches and inland waterways on the East Coast and just 1 hour from the cultural resources of New York City.

As a Fortune 500 high technology leader, Perkin-Elmer offers excellent salaries and comprehensive benefits including profits sharing, dental assistance, and tuition reimbursement. For immediate consideration, call collect: John Travers, (201) 747-7300, or send resume to: Perkin-Elmer, Computer Operations, 106 Apple Street, Tinton Falls, New Jersey 07724.

An equal opportunity employer m/f



systems software pros

Catch the signal of Perkin-Elmer's Computer Operations, a leading designer-manufacturer of state-of-the-art small and medium scale computers used by a wide variety of industries. Long term projects and our continuing commitment to developing innovative, reliable software have created several challenging career opportunities on our talented Software Development team.

PERKIN-ELMER

UCLA

An Affirmative Action Employer

Information Systems Opportunities

Exciting opportunities to participate in administrative systems development efforts in one of the top universities in the country. UCLA is committed to the development and implementation of on-line systems for Financial, Payroll, and Student Records processing utilizing modern technology. The Administrative Computing Center configuration includes IBM 3031 AP with MVS, CICS and TSO/SPF, and on-line Xerox 9700 Laser-Printer, 3730's and over 100 distributed terminals throughout California. Immediate plans include migration to a VTAM, SNA and SDLC environment.

Cradled in the rolling green hills of California's Pacific slope, five miles inland from the ocean, with broad vistas, spacious quadrangles, and landscaped gardens that reflect the changing color of the seasons, UCLA is one of the most beautiful campuses in the nation.

Professional, friendly, and flexible work environment; salary highly competitive with three weeks vacation and excellent benefits package. Ample opportunities for continuing education.

Current openings include:

- Senior level programmer-analysts with expertise in COBOL, VSAM, and CICS
- EDP Auditor
- Data Base Administrator
- Systems Programmers - MVS and CICS
- Teleprocessing Specialists
- Computer Operations Supervisor

Please send resume with salary history to:

UCLA
Administrative Information Services
Attn: Patricia Breed
3334 Murphy Hall
405 Hilgard Avenue
Los Angeles, California 90024

[illegible]

FOX-MORRIS has been selected to recruit for prestige consulting firms in the Northern Virginia/Washington D.C. area. Our clients have a combination of both private industry and government business that insures growth and security. High visibility, excellent advancement prospects. Salaries [illegible]-40,000

MANAGEMENT CONSULTANTS

Big 8 consulting firm seeks Sr. Analyst or Project Leader with strong financial, accounting systems experience. B.A. or Masters degree required. Private industry or consulting experience desired.

SOFTWARE PROJECT MANAGER

Responsible for IBM software quality assurance, product distribution, and customer support. Will supervise software acceptance testing groups. Prior management experience a plus.

PERFORMANCE ANALYST

[illegible] has added several new openings on a high powered team of Performance Evaluation Specialists. Unique opportunity to join a leader in this field. Large IBM facility, excellent benefits.

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Excellent opportunity for management level analyst with extensive business systems background for large scale design and development projects. IBM hardware, software.

Our clients assume all fees and employment expenses. For more information, contact David Miller 703/790-1200.

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Personnel Consultants
1710 Goodridge Dr.
McLean, VA 22102
EDP SPECIALISTS

OS/MVS ST. LOUIS

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Project Leader, CICS, IMS — $[illegible]
Senior IMS Applications Tech — $[illegible]
Senior P/A, CICS, IMS — $[illegible]
The following have a [illegible] annual bonus:

Equipment Analyst — $[illegible]+
Sr. Analyst, Financial, IMS — $[illegible]+
Project Leader, Banking — $[illegible]+

All interview, relocation, agency fees paid by employer. Outstanding benefits at both client companies. Contact:

OBJECT Associates, Inc.
Employment Service
[illegible] S. Brentwood, Suite 307
St. Louis, MO [illegible]
(314) [illegible]

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Small Sample of Current Openings (400+)

IBM SYSTEMS PROGRAMMERS (MVS/JES or VM/370 or DOS/CMS)	To $35,000
COBOL PROGRAMMER/ANALYST (BS/BA, 3-5 years Financial Appl)	To $26,500
SENIOR SYSTEMS ANALYSTS (BS/BS, 5+ years Financial/Oil & Gas)	To $30,000
PROJECT LEADERS (BS/BA, Technical & Supervisory experience)	To $33,000
PROGRAMMERS/DATA BASE (BS/BA, 2+ years IMS or IDMS or ADABAS)	To $27,000
DATA BASE DESIGNERS (BS/BA, DB Design IMS or IDMS)	To $34,000
PL/1 PROGRAMMERS/ANALYSTS (BS/BA, 3-5 years Financial/Oil & Gas)	To $26,500
PROCEDURES ANALYST (BS/BA, Good Technical background)	To $28,600
TECHNICAL WRITERS (BS/BA, IBM experience preferred)	To $26,800

All Fees Assumed By Client Companies

Full Interview And Relocation Expenses Paid By Client Companies

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PERSONNEL SERVICES, INC.
6371 Richmond Ave.,
Houston, Texas 77057
(713) [illegible]

Anyone can find jobs in data processing. But, the really good positions are hard-to-find.

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Computer Scientist

Advanced Operating System Development

National Semiconductor is developing software for its next generation microprocessor system and is in need of a top computer scientist to develop state-of-the-art virtual-memory software.

You must have a BS in computer science with experience in operating systems or be a top MS candidate with extensive coursework in OS.

If you fit the bill, you will become a member of a small, dynamic team creating the wave of the future in small systems. For consideration, send your resume in complete confidence to **Nancy McAuliffe, National Semiconductor, MS-16255, 2900 Semiconductor Drive, Santa Clara, CA 95051; or call her COLLECT at (408) 737-[illegible].** An affirmative action employer.

National Semiconductor

If you didn't know that, you don't know National.

PROGRAMMERS
P.O.S. / SCAN APPLICATIONS
SYSTEM SOFTWARE PROGRAMMERS

Experienced D.P. Professionals Needed for Planned Expansion.

Current Environment
IBM System 370-OS/VS1
VM/CMS CICS IMS
PL1 COBOL MKIV

Rapidly expanding Data Processing Dept. offers excellent growth potential, excellent salary & benefit package. Send resume & salary history or call:

ASSOCIATED
WHOLESALE
GROCERS
5000 Kansas Avenue
Kansas City, Kansas
913-281-[illegible] Ext. [illegible]

★★★

SYSTEMS PROGRAMMER

Firm background in DOS/VS and working knowledge of IBM Assembler required. Knowledge of CICS/VS, DMS and DL/I a plus. Competitive salary and excellent fringe benefits. Apply personnel office: Florida Institute of Technology, Melbourne, FL.

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SYSTEMS PROGRAMMERS

Lederle Laboratories, the pharmaceutical division of American Cyanamid, is expanding its distributed data processing network, DEC System-10 KL1090D, Satellite PDP-11 and VAX computer nodes to provide greater support to medical research operations. Systems programmers who can effectively contribute their expertise to this on-going effort will enjoy long-range career growth. These positions require experience in one or more of the following systems:

- TOPS-10 Version 7.00 SMP
- RSX-11M Version 3.2
- DECNET-11M or DECNET-10
- VAX/VMS Version 1.6

Location: Rockland County — only 30 miles northwest of N.Y.C. — easily accessible from the N.Y. Thruway, Garden State Parkway and Palisades Parkway. These growth opportunities offer competitive salaries and outstanding benefits. Please send resume with salary history/requirements to Mrs. Nancy Levine, Professional Employment Coordinator.

Lederle

Lederle Laboratories
American Cyanamid
Company
Pearl River, N.Y. 10965
An equal opportunity
employer, male/female

SYSTEMS PROGRAMMERS

Match your capabilities to our major EDP environment . . . and speed your career growth

New and interesting challenges with opportunity for outstanding accomplishment now await you in our exemplary, state-of-the-art environment:

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Implementing VM SEPP system to run MVS and CMS users.

Positions in our Morris County Headquarters facility are immediately available to work in software support group on technical management of data center. Involves planning, installation, and support of operating systems and program products. Responsibility for problem diagnosis and resolution. Technical interface with users, programmers and software vendors.

These positions require solid background in BAL, JCL, systems support utilities, either TSO or CMS and one of the following:

- OS operating systems, sysgen, and SMP
- VM operating systems, sysgen, maintenance to CP and CMS
- database software, data dictionary standards, options for performance, journaling, recovery

We offer excellent starting salaries. Complete benefits including tuition aid. Latitude for progressive ideas and innovations that will enhance your professional status and personal satisfaction.

For immediate consideration, in confidence, forward resume with salary history and current requirement, or call: John Weber (212) 751-[illegible], ext. 3131 or (201) 884-[illegible], ext. 3131.

NABISCO, INC
East Hanover, New Jersey 07936
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programmer

We are a leader in one of the fastest growing industries — telecommunications — and are currently looking for a talented Programmer who wants to assure his/her own success by making a real contribution to ours. We prefer you have:

- Understanding of MICRO/MINI Assembly language
- 1-3 years related experience
- Familiarity with Rockwell 6500 and DEC RSX 11M a plus.

We offer an excellent compensation package commensurate with background and experience plus realistic potential for professional growth and development.

For immediate, confidential consideration, call collect Mr. R. Sadowy, Chief Engineer, at (212) 392-[illegible]800 Ext. 178. Or, send your resume including salary history & requirements to: Mr. R. Sadowy, Executone Inc., 29-10 Thomson Ave., Long Island City, NY 11101.

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Experience utilizing IDMS- DB/DC, integrated data dictionary and on-line query required. Programming languages: COBAL and BAL operating systems: DOS/VSE and OS/MVS.

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Data Processing Professionals:

The creative spirit is alive and well at UNI-COLL.

Kindred spirits are invited to join us!

Our innovative and dynamic computer utility is experiencing rapid growth. (It's no surprise!) We invite you to become part of our growth, and join our team of highly qualified professionals providing computer capabilities to a wide range of clients in a timesharing/remote job-entry environment.

Our growth has created the following openings (at our Philadelphia headquarters unless otherwise stated):

Systems Programmer—Interactive Systems. You'll be responsible for providing systems-level support for interactive and data communications software components (TSO, VTAM, TCAM, NCP/EP, CICS)...and you must have a thorough knowledge of Assembler Language, JCL, and utilities. *Knowledge of software gen's, PTF application, MVS structure, and CICS is desirable.*

Analyst/Programmer—Product Development. You'll be responsible for internal design, implementation, and testing of products developed by the group. This job requires proficiency in Assembler coding, and a detailed knowledge of data management techniques and interfaces. *PL/1 knowledge is highly desirable.*

Analyst/Programmer—Product Development. You'll be responsible for maintaining accounting, security support, and utility programs; determining enhancements to existing programs based upon users' requirements; and developing new programs as needed. *This job requires knowledge of Assembler Language and PL/1. Background in business/financial systems is important, and knowledge of COBOL is a plus.*

System Programmer & Trainee—**System Development.** The System Programmer will be responsible for providing systems programming support for our MVS/MP installation; for designing and developing changes/additions to the operating system software; for measuring and tuning system performance; and for recommending new hardware and software configurations to meet UNI-COLL's growing needs. *This job requires appropriate experience and maturity, plus a background in operating systems and Assembler Language.* A **Trainee** position is also available for someone with a programming background and a college degree or equivalent experience.

Technical Service Representative. You'll be responsible for performing liaison functions between UNI-COLL and our customers; providing marketing support to customers; and troubleshooting. *This job requires analytic abilities, well-developed communications skills, and familiarity with IBM utilities...as well as knowledge of at least 1 programming language. Knowledge of APL, TSO, or STAT packages is a plus.*

Sales Representatives (3). You'll be responsible for expanding our customer base and handling administration of existing accounts as required. *These positions require background in the data processing services industry—specifically timesharing sales, highly developed skills in communications; and the ability to interface with corporate top management. A profile of self-discipline and strong interpersonal skills is highly desired.* **Locations (one each) are Philadelphia, New York City, and Washington, D.C.**

Production Typist—Word Processor. You'll be responsible for the typing of general correspondence, proposals, documentation, forms, and related projects...on our Xerox 850 word processor. *This job requires good typing skills and experience in word processing or in data entry. We desire a highly motivated individual capable of producing timely, high-quality output. Familiarity with data processing terminology is a plus.*

Our established position and rapid growth provide for truly competitive salaries on each position level, and we keep current in providing comprehensive and meaningful benefits. Most important: we provide you with the opportunity to make a personal impact in a state-of-the-art environment.

● *To explore these excellent career opportunities, send your resume, with salary history, in complete confidence, to:* **Director of Personnel, UNI-COLL CORPORATION, 3401 Market St., Philadelphia, Pa. 19104.** *We're an equal opportunity employer.*

UNI-COLL
CORPORATION

position announcements | position announcements | position announcements

Data Processing Professionals

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If you've been looking for this kind of challenge...and would like to find it in New York...check the job qualifications listed below.

RAMIS II Coordinator

You will interface with RAMIS II users and the vendor as well as with the Computer Systems Division for systems maintenance. You will also maintain required documentation and provide user education as required. To qualify, you should have 1-3 years RAMIS II user experience and good communication skills. Degree desirable.

Data Base Analyst

You will maintain Data Base Systems, interface with users and demonstrate a powerful new language called "NATURAL". Degree desirable plus 1-3 years ADABAS user experience required.

Salaries are in line with your education and experience. And our benefits package is generous. For immediate consideration, send us your resume and salary requirements to: Diana Mackey, Dept. CW-7/28, American Electric Power Service Corporation, 2 Broadway, New York, New York 10004.

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SENIOR PROGRAMMER ANALYST $25,000
[illegible] two (2) P/A's [illegible] COBOL exp. [illegible] a plus.

PROGRAMMER ANALYST $25,000
[illegible] COBOL exp. [illegible]

SYSTEMS DEVELOPER $23,000
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[illegible]
Atlanta, GA [illegible]

[illegible]
Charlotte, NC [illegible]

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The Department of Computer Services is currently seeking qualified applications for the following positions:

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Sr. Systems Planner	To: $30,082
Applications Development Administrator	To: $30,000
DP Systems Support Manager	To: $22,140
DP Sr. Project Leader	To: $20,000
Sr. Programmer Analyst	To: $17,836
Data Base Analyst	To: $16,926

Minimum qualifications for these positions are: BS in Computer Science, Math or related field; plus from 2 to 5 years extensive Data Processing and Management experience.

Located in the Sunbelt city of Little Rock, the Department of Computer Services is the largest DP facility in the State of Arkansas and utilizes IBM 370/AMDAHL-V5 equipment operating under VS1 with IMS, CMS and CICS technologies. We offer liberal fringe benefits and professional growth opportunities commensurate with abilities. Job related education and/or experience may be considered as substitution for minimum qualifications subject to approval.

Resumes should be sent to:

DCS Personnel Officer
Department of Computer Services
P.O. Box 3155,
Little Rock, Arkansas 72203

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Unusual assignments in KINSHASA, REPUBLIQUE DU ZAIRE

Manager
Data Processing Department

Manage & direct activities of DP Dept. including budgeting, pricing, setting rates for use of equipment (user account), planning for software, liaison with other depts. and management, and development of a training program.

Systems Engineer
Hardware

Position requires maintenance and service of minicomputer hardware, including buildup and control of parts inventory (HP 3000 II series desired.) Training provided in domestic location.

Both candidates should have some knowledge of, or willingness & ability to learn, written & spoken French. Assignment length: 2 years. Housing & local transportation provided; tuition reimbursement for children; no local income taxes.

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SYSTEMS & DATA PROCESSING MANAGER

A newly-formed ITT unit in Palm Coast, Florida, located near Daytona Beach, is currently seeking a key senior professional with a B.S. degree in Computer Sciences or related field. Position requires 6-8 years of IBM systems experience or equivalent. Knowledge of RPG II or COBOL languages a definite plus. Must be able to set up a data center function, have at least 2 years supervisory experience with emphasis on personnel management, budgets and procurement of necessary hardware/software. Some travel is required.

In addition to an excellent salary we offer outstanding benefits and paid relocation. To be considered for this career opportunity please send your resume including recent salary history, in confidence, to:

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Available - September 1980

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QUALIFICATIONS:	M.S. in Computer Science or equivalent.
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GENERAL INFORMATION:	Framingham State is a 3000 student institution located less than 20 miles from Boston/Cambridge/Dec/DG/Prime with strong industrial and internship contacts with neighboring computer industries. Computer science division is expanding its major program and planning to develop a graduate program. Facilities include Cyber 72, 73 and PDP 11/34 systems and a microcomputer laboratory.
APPLICATION:	Send resume to: [illegible] Chairperson, Search Committee Department of Computer Science Framingham State College Framingham, MA 01701

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College degree. Experienced in developing and implementing computer based information systems in hospital. Must have experience in project management or DP management.

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For more details, send your resume, or call:
Mark Fuller

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(312) 346-9400

SAUDI ARABIA

Data Processing Opportunities

SYSOREX INTERNATIONAL, INC., a rapidly growing Systems Management Company, now developing innovative multi-technology systems in Saudi Arabia, seeks experienced Data Processing professionals for the following positions:

Applications Programmer

Min. 3 yrs. experience in applications programming on IBM TP systems. Fluency in COBOL and Assembler with CICS and 3270 terminal knowledge a must.

DP User Instructors

These positions involve training Arabic personnel in various uses of a computerized information system. Knowledge of management information systems coupled with instructor skills essential. Complete fluency in Arabic a must. Related degree required, with formal education in computer science a plus. Some travel throughout Saudi Arabia required.

SYSOREX offers excellent salaries commensurate with experience and a comprehensive benefits program which includes 30 days annual vacation with paid round trip transportation for employee and family to place of residence, 15 paid holidays, free furnished family housing and free education for children.

Please send resume (salary history required) to Harry T. Dalk, Director of Personnel & Administration, SYSOREX INTERNATION, INC., 10560 N. Tantau Ave., Cupertino, CA 95014.

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ANALYST/ PROGRAMMER

New Systems Development

We are seeking a DP professional to participate in the implementation of in-house business systems on Data General equipment.

On-line COBOL programming expertise and mini-computer systems development experience required.

We offer an excellent salary and benefit package.

Send resume and salary history to:

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Work with real-time software applications for mini/micro computer based systems and on distributed computer architectures and uni-processor systems.

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Test Support Software Development
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- Automatic test generation
- Software unit test system

Systems Development and Operations Management
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- JOVIAL
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- Code implementation and test
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Also special openings in the following areas:
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- Distributed data processing system/architecture design
- Software training: languages, design procedures, computer architectures
- Compiler development
- Functional analytic simulation

Applicants should have a BS, MS or PhD in Engineering, Computer Science or related field.
Send your resume in confidence to: Ed Haynes/P.O. Box 401636, Dept. 236/Dallas, TX 75265.
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Control Data Corporation
2200 Berkshire Lane North
Minneapolis, Minnesota 55441
(612) 553-4299

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Software Engineers

Play a key role in major developments serving tomorrow's telephony

ITT Advanced Technology Center has exceptional opportunities for Software professionals to support the task of developing ITT's 1240 switching system to the North American market.

We are seeking candidates for Staff and Supervisory positions to be involved with the definition, system design, and development of realtime software for a fully distributed control digital telephone switching system.

Positions are available in the areas of:

- **diagnostic/maintenance software**
- **telephony/call handling software**
- **administrative/data base software**

These openings require a strong computer science background—normally a MS degree in Computer Science or Electrical Engineering. Telephony experience is a plus.

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- most costs associated with purchase of new residence
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- house hunting assistance by professional consultants

Please send resume, including salary history in full confidence to Jack Erle, Professional Recruiting Specialist.

ITT Advanced Technology Center

One Research Drive, Shelton, Conn. 06484.

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LEAD SYSTEMS ANALYST

Oxford Development Corp., a national real estate developer and property manager, seeks an experienced financial systems analyst with the following qualifications:

1) Minimum of 5 years data processing experience.
2) Minimum of 3 years experience in financially oriented computer systems (design through implementation).
3) Excellent verbal and written skills.
4) Excellent skills in COBOL (knowledge of DOS desirable.)

SALARY COMMENSURATE WITH DEMONSTRATED ABILITY, EXPERIENCE AND LEADERSHIP QUALITIES.

Salary Range: $22,000-28,000.

Send resume to:

Director of MIS
Oxford Development Corp.
[illegible] Meadow Drive
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Computer Science faculty member in an independent computer science program, with annually renewable contracts for a period of five years. Minimum requirements include either an M.S. in computer science with ability and interest in teaching some business-related computer courses, or an M.B.A. with current expertise in computer science; previous college teaching experience desirable. Position available August 1980 or January 1981. Academic rank and salary dependent upon qualifications. [illegible] College is a four-year, coeducational, liberal arts college with strong science, business and professional programs, enrollment of [illegible], and located within easy access of major eastern metropolitan areas. Its primary computer facility is a medium-size DEC system-10 with 256 K words main memory, 5 disk drives, 32 ports (24-hour terminal access for faculty and students), and other peripherals. Please direct letters of application, vita, list of references, and transcripts to Director of Personnel, [illegible] College, [illegible], Pennsylvania 17022. Deadline for initial screening of applications is August 4. An affirmative action/equal opportunity employer.

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PROGRAMMER ANALYST II

Will develop and maintain program for administrative system. Will develop small scale administrative system and assist in development of large scale management information system. Will assist in project control, standard development and programmer training. Requires Bachelors Degree in Computer Science or a related field plus 2 years programming experience or equivalent combination of education and experience. Database, Structured Programming, On-Line communications, JCL and CMS experience is helpful. Salary range $13,504-$18,440 based on education and experience.

University of Louisville
University Personnel Services
[illegible] South Brook St.
Louisville, KY [illegible]
An Equal Opportunity/
Affirmative Action Employer

PROGRAMMER/ ANALYST

We are seeking a Programmer/Analyst with a degree in Computer Science or related area, and a minimum of 2 years programming experience or equivalent additional education. Position requirements include: substantial skill in program design, technique, languages, coding and program testing and implementation to the solution of problems. Salary $13,440 — 18,[illegible]. Send resume to:

[illegible]
MISSOURI STATE
JOB SERVICE
[illegible] Washington
St. Louis, MO [illegible]

An Equal Opportunity Employer

Data Processing Professionals

Opportunities in South San Francisco and Portland

GUY F. ATKINSON COMPANY, a leader in the construction industry, is rapidly expanding their data processing departments. If you seek challenge and growth, consider these positions:

Manager, Software Programming (South San Francisco)

Individual will direct planning, organizing and control of all systems activities. Qualified candidates will have excellent management skills and minimum 7 years' IBM systems programming experience.

Systems Software Programmers (Portland)

Responsible for designing, programming and maintaining software to permit continued growth of on-line database manufacturing systems. Minimum of 3 years' experience in V/M and DOS/VS required. Will spend approximately 6-9 months training at S.F. Data Processing Center with permanent assignment to Portland, Oregon.

Applications Programmer Analysts (South San Francisco)

Responsible for programming of on-line commercial systems. Should have a minimum of 2 years' experience in database and very strong in COBOL.

We offer excellent salaries and outstanding employee benefits. Send resume with salary history in confidence to: Professional Employment Representative, GUY F. ATKINSON COMPANY, P.O. Box 593, South San Francisco, CA 94080.

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Companies provide challenge, opportunity for advancement, and "State-of-the-Art" motivations:

Need the following specialities: (Minimum of 1 year experience in IBM environment)

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All fees, including interviewing and relocation expenses assumed by client companies.

Please send your resume in CONFIDENCE OR CALL ME TOLL FREE 1-800 821-2280 X884 (In MO, 1-800 892-7655 X884)

[illegible] Davey/Jim King

Jim King and Associates

1840 Gulf Life Tower/Jacksonville, Florida 32207
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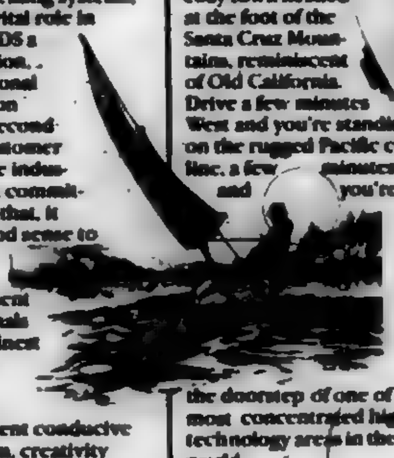

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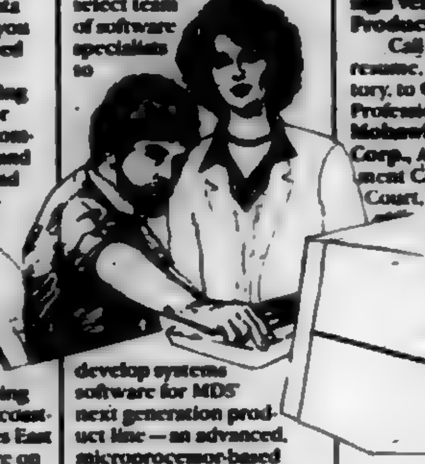

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Country wide opportunities for true proven DP professionals, Programmers to Managers, 1-10 years experience. Call us today to hear about these immediate openings.

Call toll free [illegible] or in Florida call [illegible] collect or mail your resume with position and salary requirements to:

[illegible] DATA SERVICES
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Ft. Lauderdale, Fl. [illegible]

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For variety of Business Data Processing courses. Proficiency in business oriented programming languages and experience in systems analysis and design desirable. Search extended. Please send resume by August [illegible] to:

Mrs. [illegible]
Chairperson, Business Dept.
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EOE M/F

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You can expect an outstanding compensation package with exceptional salary and benefits and relocation to San Diego. For prompt consideration, please send your resume to S.J. [illegible]:

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Data Processing

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Initial assignment will be San Francisco area with reassignment to Gulfport, Mississippi within approximately one year. Expedite resume and salary history to: John F. [illegible], Mgr. I.R.,

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(609) 667-4488

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RSVP SERVICES

Employment Agency for Computer Professionals

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Amarillo sits on the northern edge of the Sunbelt, escaping the humid, suffocating summers of the deep south and the bitter cold winters of the north.

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Amarillo still boasts a western heritage and flavor but its culture, alive with art and music and literature, is a mix of influences from Denver, Dallas, Albuquerque and Oklahoma City, each of which is just a short drive away. And a half-day's drive puts you in the Rocky Mountains near any of four popular ski areas.

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Our installation is an IBM 370/168 6 meg system currently running OS/VS1 with plans to upgrade to MVS this fall. We need people to fill the following positions;

SYSTEMS ANALYSTS— Six to eight years experience, the most recent three to four years with IBM OS COBOL.

DATA BASE ANALYSTS— Minimum three years experience with IBM OS COBOL.

PROGRAMMER/ANALYSTS— Four to seven years experience, the most recent three years with IBM OS COBOL.

PROGRAMMERS— Three years experience, most recent one year with IBM OS COBOL.

DATA BASE TECHNICIANS— General background DP with one year DP and/or programmer.

SENIOR MVS SYSTEMS PROGRAMMER— Minimum two years experience with MVS system generation and maintenance. Working knowledge of COBOL, FORTRAN ASSEMBLER, OS/JCL and utilities required. Experience desirable in data base systems, data communications and computer performance evaluation.

Send resume and Salary history to:
Personnel Department

SANTA FE ENERGY COMPANY
One Security Park • 7200 I-40 West • Amarillo, Texas 79106

Equal Opportunity Employer M/F

EDP INSTRUCTOR

Nat'l. vendor requires analytical & results-oriented pro. to develop & teach software courses. Bkgrd. should include prog. or analysis exp. Excellent growth oppty. in a corp. educ. dept. Salary low 20's. Contact [illegible].

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Personnel Consultants

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Candidates should have a minimum of 3-5 years of experience in bank data processing and possess the ability to interface with key operating departments and manage staff.

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DATA PROCESSING

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SENIOR PROGRAMMER/ANALYSTS

General Physics Corporation is an industry leader in providing information management services to electric utilities and other industries. We are currently seeking highly motivated programmer/analysts for challenging positions in information management software development.

Applicants should possess: • a minimum of 3 years professional programming experience; • working knowledge of two or more high level programming languages, preferably FORTRAN, BASIC or COBOL; • experience with two or more hardware systems, preferably multi-user minicomputers such as PR1ME, MICRODATA, HP1000, WANG 2200 VS, or DEC PDP-11; • good technical writing skills, with experience in preparing user and programmer documentation; • experience with DBMS software and experience within the electric power industry is desirable but not required.

General Physics is a progressive, growth-oriented company, offering competitive salaries, liberal education and health benefits, and a desirable location. Submit your resume in confidence to:

GENERAL PHYSICS CORPORATION

P. K. Parker
Manager, Computer Services
General Physics Corporation
1000 Century Plaza
Columbia, MD 21044
EOE M/F

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San Francisco Peninsula

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If you have related experience in one or more of these areas, we'd like to talk with you. Please send your resume to: G.S. Tehan, (MS-D04), Dept. JT-10, 3939 Fabian Way, Palo Alto, California 94303. An Equal Opportunity Employer m/f.

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PROGRAMMERS/ANALYSTS

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Positions are available in all CHC cities: New York, New Jersey, Chicago, Houston, North Carolina, Tulsa, Miami, Atlanta and San Francisco. We offer an above average salary, a full benefit program plus a dynamic working environment.

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Requires 2-4 years' experience on an IBM 370 OS system with ANSI COBOL and/or BAL experience. Knowledge of banking applications is highly desirable.

We offer excellent career opportunities with competitive salaries and a superior benefits package which includes medical, dental, vision and profit sharing. Please send resume including salary history to: V.F. Garvy, NATIONAL BANK OF ALASKA, P.O. Box 600, Anchorage, Alaska 99510. An equal opportunity employer, m/f.

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Systems Programmers

FOR A COMPUTER-AIDED DESIGN TEACHING FACILITY

Permanent position with responsibilities in system level software development and system management for a computer aided, design teaching facility for undergraduate engineering education. Selected person will help with maintenance of a large VAX-based computer system with sophisticated graphics equipment. Other responsibilities will include maintenance and enhancement of graphics software, consulting with faculty and teaching assistants responsible for instructional software development (including graphics software education), and facility management. Knowledge of DEC operating systems and systems programming experience is necessary. Background in graphics software and hardware, Fortran and general engineering education is preferred. Selected applicant must be able jo work successfully with others.

FOR A COMPUTER GRAPHICS RESEARCH FACILITY

Long term position with responsibilities for the system management of a computer graphics research facility. Responsibilities include system level and graphics software development. Selected candidate will help with the maintenance of a large VAX-based computer system with sophisticated graphics equipment. Other responsibilities will include maintenance and enhancement of graphics software and consulting with faculty and graduate assistants on several research projects. Knowledge of DEC operating systems and systems programming experience is necessary. Background in graphics software and hardware, Fortran and assembly language, and video technology is preferred. Selected applicant must be able to work successfully with others. Equipment includes: VAX PDP 11's, E&S Multi-picture Systems, Color Raster frame buffers and Tektronix storage tubes.
Contact: Dr. Donald P. Greenberg, Director Program of Computer Graphics

Cornell University

[illegible] Hall, Ithaca, N.Y. [illegible] (607) [illegible]

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NOTICE OF FACULTY VACANCY
POSITION: Data Processing Instructor
QUALIFICATIONS: 1) should have baccalaureate degree in computer related field; 2) at least 3 years work experience in computer field; 3) teaching experience; 4) should be proficient in programming at least two of the following languages: RPG or COBOL, BASIC, FORTRAN.
RESPONSIBILITIES: Teaching Data Processing Technology courses, including programming in several different computer languages.
SALARY: Nine month base salary from chart based upon degrees and teaching experience.
APPLICATION DEADLINE: August 1, 1980
APPLICATION PROCEDURE: Submit letter of application, complete resume and transcript of all college level course work to:

[illegible]
Vocational - Technical Division
Texas Southmost College
Brownsville, Texas 78520

Texas Southmost College is a Community Junior College with an enrollment of approximately 5,000. Texas Southmost College is an Equal Opportunity Employer.

LIBRARY SYSTEMS ANALYST, with responsibility for maintenance, continued development and enhancement, and planning and development of existing and new library automated systems in the Minnesota State University System. Qualifications: Bachelor's Degree in Computer Science, with coursework in library/media education and/or a Master's Degree preferred. Experience: Work with UNIVAC 1100 computer or comparable system, familiarity with time-share systems and communications theory. Knowledge of COBOL programming and of data management procedures, with knowledge of library data processing applications desirable. Salary: Commensurate with education and experience, with range starting at $18,000. Three-year term contract, with probability of continuing for indefinite period. Letter of application, resume, and names of three references must be received by September 5, 1980. Apply to: [illegible], Dean of Library, Mankato State University, Mankato, MN [illegible].

informatics inc

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PROGRAMMER/ANALYSTS

We're also seeking individuals with a minimum of 1 year's experience in Assembler or COBOL, and some background in CICS, OS/JCL, utilities.

Resumes should be sent to Personnel Department.

EF Hutton
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UNIVERSITY OF VERMONT SYSTEMS PROGRAMMER

The Administrative Computing Center is seeking a Systems Programmer with a Bachelor's Degree, and at least 5 years of experience with IBM operating systems, preferably DOS and/or VM. Applicants with experience in on-line systems or DBMS are preferred. This position is part of a 3 member team responsible for the support of VM, DOS, the OASIS DBMS, and other state-of-the-art software on our IBM 3031 system. Teh University offers an excellent benefits package, and the salary is high teens to low twenties. Send resume and names of 3 professional references by August 4, 1980 to University of Vermont, CMC 238 Waterman Building, Burlington, Vermont 05405.

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Must have large IBM OS equipment experience and IMS or CICS or ADABAS. Mark IV a plus.

For further information, call JIM FLEMING at 713/[illegible] (collect) or send a copy of your current resume to:

ROBERT HALF
EDP DIVISION
730 N. Post Oak Rd. #[illegible]
Houston, Texas [illegible]

SYSTEMS PROGRAMMER/ ANALYST

St. Catherine Hospital has an opening for a Systems Programmer Analyst. The Programmer is responsible for the complete computer operation, NCR [illegible], operating systems [illegible], Cobol language computerized operations include accounts receivable, general ledger, billing and capital equipment with projections for accounts payable and payroll.

The position is in a five member department in a 117 bed acute care general hospital in Southwestern Kansas. The community of Garden City is 22,000 and growing, with population increase of 10,000 in the near future. Call collect, [illegible], St. Catherine Hospital, [illegible] St., Garden City, KS [illegible], ([illegible]) [illegible].

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Reports to Group Manager - Software Services. Must have two years experience in Systems Programming, extensive knowledge of PUT/PTF applications, IBM OS/JCL and Utilities, TSO, BAL and MVS concepts, and system generation process. Will evaluate the cause of all critical system software malfunctions, apply all necessary repairs, maintain the operating system and system components, and supervise modifications of all such software.

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P.O. Box 230 Portland, Oregon [illegible]

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PROGRAMMER

RUTGERS

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Salaries range into the 20's, commensurate with experience.

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Submit resume, indicating Reference Number for specific position, to:

Mr. Herman [illegible]
CCIS
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P.O. Box 879
Piscataway, N.J. 08854
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PROGRAMMER

Charlotte Data Center has on-line system in a multi-division organization. We are looking for a programmer who relates well to senior programmers and is promotable.

JOB REQUIREMENTS:
- 2 years with ANS COBOL in industrial environment
- conversant in job control languages, editors and debugging aids
- degreed in computer science or related field
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Excellent salary and benefits and advancement opportunity. Send salary and resume in confidence to:

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Manager, Corporate Recruiting & Development
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Charlotte, North Carolina 28204
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Kenneth Martin
Candle Corporation
4676 Admiralty Way Suite 401
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(213) 821-2882

IMS ANALYST

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Responsibilities will include the management of analysts and programmers, installing new banking systems in IBM 370 computers under OS/VS1, CICS, VSAM. Good communications skills, thorough knowledge of banking systems, and project management skills are a must. A bachelors degree, programming and analysis experience, and at least two years' in a management position are desired.

For consideration please submit resume and salary requirements to: Old National Bank, Human Resources Department, P.O. Box 2888 TA, Spokane, WA 99220. We are an equal opportunity employer.

ONB
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Degree required plus a minimum of (5) years of progressive experience in major systems design/analysis and programming commercial applications. Our system is comprised of IBM 370/135, 512K core, disk and tape peripherals, terminals 3720 series. Languages ANS/COBOL, MARK IV, FORTRAN, ASSEMBLER. We are currently converting from batch to terminal processing using CICS/VS. A good knowledge of COBOL and familiarity with CICS/VS plus IBM S/370 DOS/VS power operating system is desirable.

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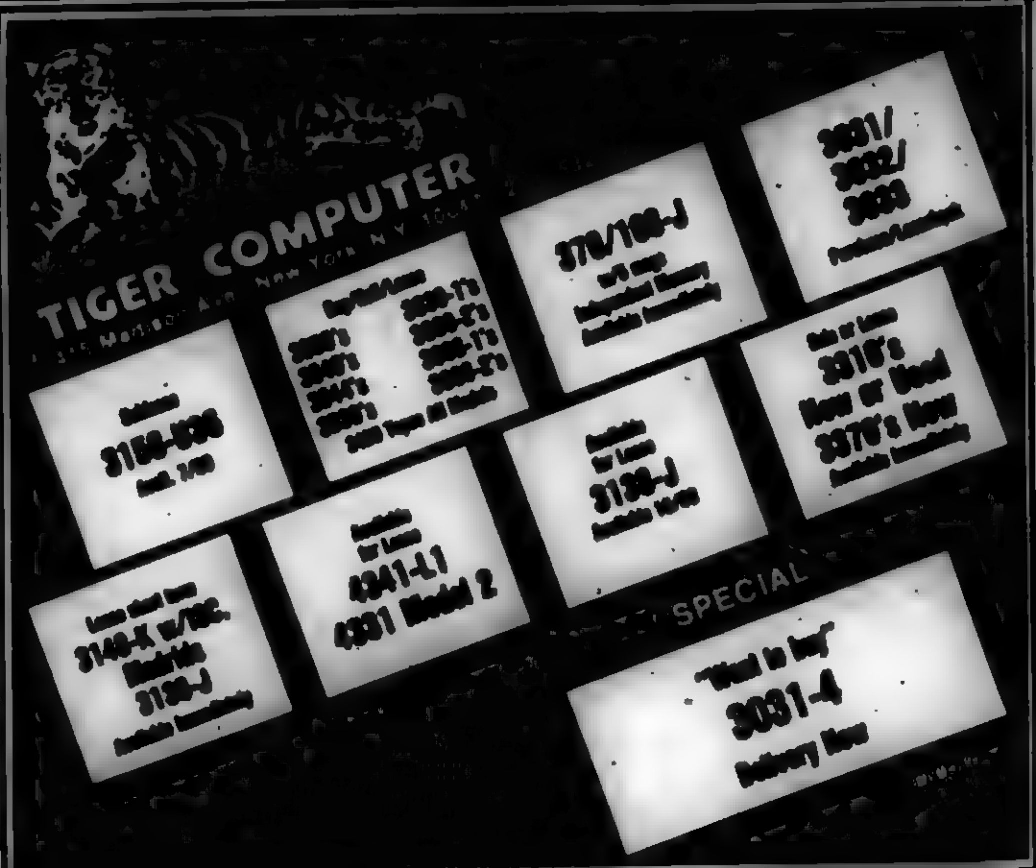
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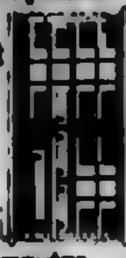

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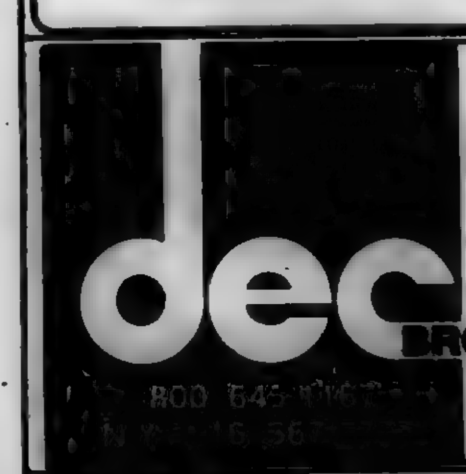

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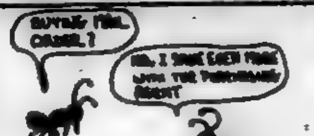

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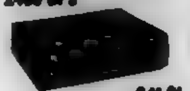
2400 BPS  24LSI	24LSI is a highly reliable modem which transmits and receives full or half-duplex 2400 bps synchronous data over unconditioned, dedicated or dial-up lines.	Purchase $1585 Lease $44/mo.*	Purchase $849 Lease $29/mo.* Installment Purchase $32/mo.**
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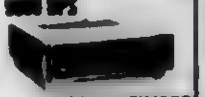
9600 BPS  9600 MULTIMODE	96 Multimode is a superior single and multiport 9600 bps modem. 96MM offers flexible multiport and can accommodate any combination of 2400, 4800 and 7200 bps channels, up to 9600 bps, with independently controlled carrier for each channel.	Purchase $8750 Lease $185/mo.*	Purchase $4995 Lease $133/mo.* Installment Purchase $186/mo.**

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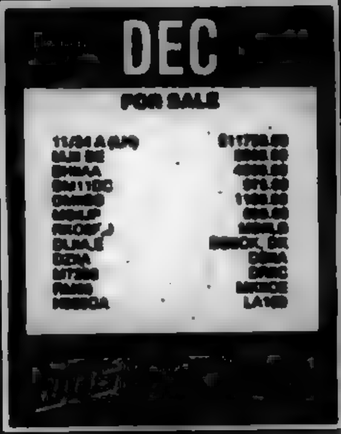

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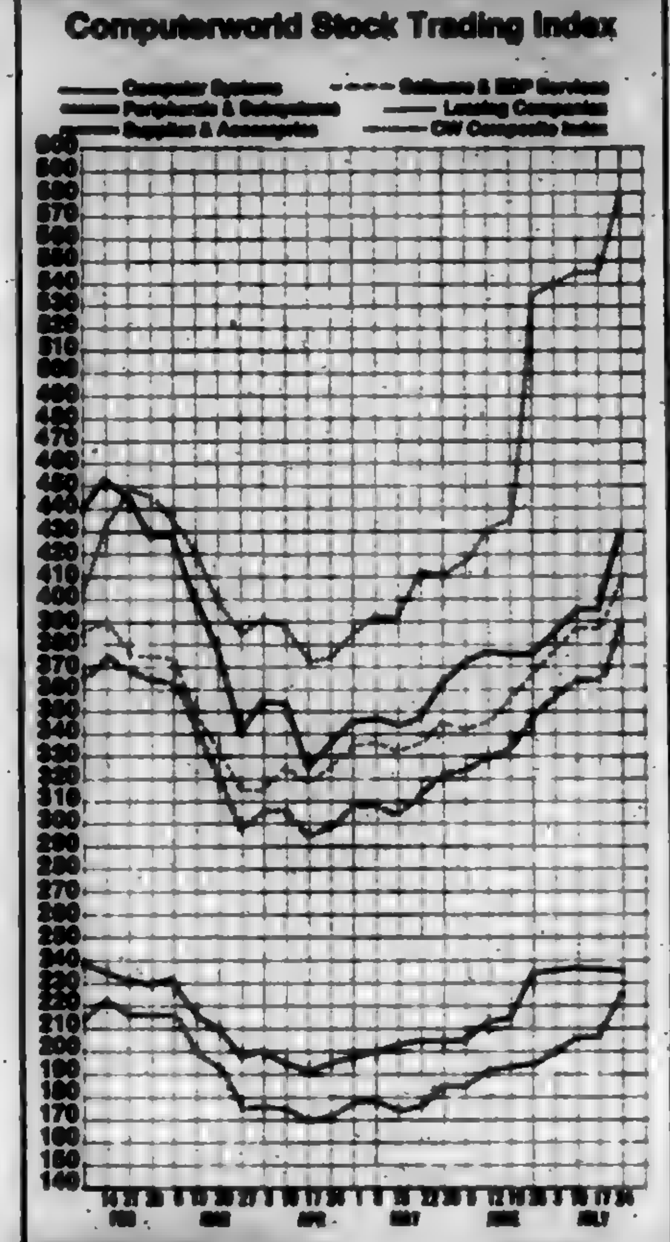

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CLOSING PRICES WEDNESDAY, JULY 23, 1980

All statistics compiled, computed and formatted by
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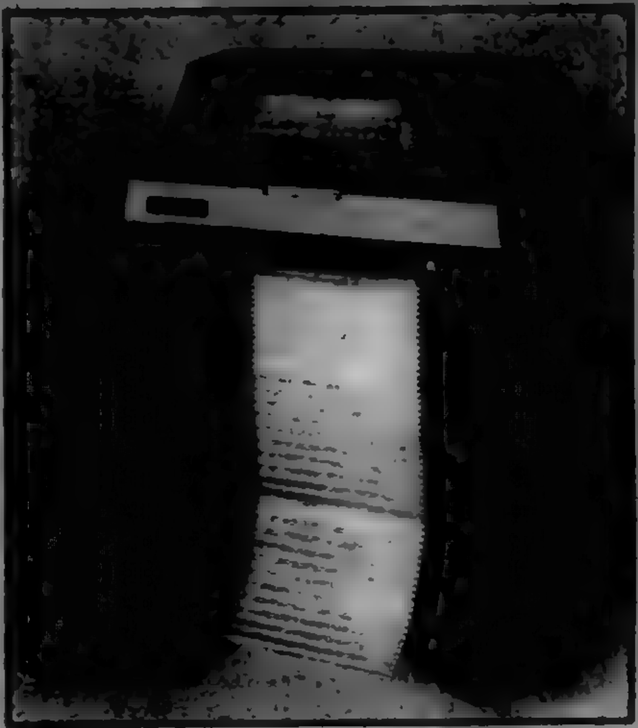
EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 23 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	19- 42	30 1/2	+3 1/2	+13.3
N	BURROUGHS CORP	60- 86	61 3/8	- 5/8	-0.9
O	COMPUTER AUTOMATION	9- 22	19 1/2	+2	+11.4
N	CONTROL DATA CORP	30- 66	60 1/2	-2 1/8	-3.5
O	CRAY RESEARCH INC	30- 62	60 1/8	- 1/8	-0.4
N	DATA GENERAL CORP	46- 79	75 3/8	+2 3/8	+3.1
N	DATAPOINT CORP	34- 69	60 1/2	+3 1/8	+5.1
N	DIGITAL EQUIPMENT	50- 93	90 7/8	+ 1/8	+0.1
A	ECCO INC	9- 19	10 7/8	+1 1/8	+0.1
O	ELECTRONIC ASSOC.	6- 12	9 3/8	+ 7/8	+9.0
N	FOUR-PHASE SYSTEMS	20- 40	30 3/8	+1 1/8	+4.0
N	FOXBORO	31- 40	47 7/8	- 1/8	-0.2
O	GENERAL AUTOMATION	7- 10	8 3/8	- 1/8	-1.5
O	GRI COMPUTER CORP	1- 3	3/8	+ 1/8	+50.0
N	HEWLETT-PACKARD CO	46- 79	72 3/8	+2 1/8	+3.0
N	HONEYWELL INC	60-101	90 7/8	+ 1/8	+0.1
N	IBM	50- 70	66 7/8	+ 1/8	+0.9
O	MANAGEMENT ASSIST	9- 21	14 7/8	0	0.0
O	MANUFACTURING DATA S	21- 35	35	+1 1/2	+4.1
O	MINI-COMPUTER SYST	2- 5	3	+ 1/8	+4.3
O	MODULAR COMPUTER SYS	9- 17	15 3/8	- 1/8	-1.5
N	NCR	52- 82	60 1/2	+ 7/8	+1.2
N	PRIME COMPUTER INC	15- 30	30 7/8	+2 7/8	+10.2
N	PERKIN-ELMER	20- 56	52	+ 1/2	+0.9
N	SPERRY RAND	42- 60	53 3/8	+ 5/8	+1.1
A	SYSTEMS ENG. LABS	11- 22	20 7/8	+ 3/8	+1.7
O	TANDEM COMPUTERS INC	13- 30	30 1/2	+3 1/8	+10.9
N	TEXAS INSTRUMENTS	70-100	90 3/8	+ 7/8	+0.8
A	WANG LABS.	17- 40	35 1/2	- 3/8	-1.0
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 20	10 1/8	+ 1/8	+1.3
N	COMDISCO INC	6- 17	13 1/2	- 1/8	-1.0
A	COMMERCE GROUP CORP	1- 2	1 1/8	+ 1/8	+12.5
A	COMPUTER INVSTRS GRP	2- 4	3 3/8	+ 1/8	+7.0
O	CONTINENTAL INFO SYS	2- 15	2 1/8	+ 1/2	+30.8
N	DATRONIC RENTAL	2- 3	3	0	0.0
A	DCL INC	3- 6	3 1/2	+ 1/8	+3.7
N	DPF INC	9- 12	7 1/2	+ 3/8	+11.3
N	ITEL	1- 15	2 3/8	0	0.0
O	LEASPAC CORP	1- 2	3/8	- 1/8	-10.2
A	PIONEER TEX CORP	2- 4	2 7/8	+ 1/8	+4.5
N	RELIANCE GROUP INC	29- 73	67	-2	-2.8
N	U.S. LEASING	12- 18	17	+1 1/8	+7.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 23 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	3 1/2	- 3/8	-9.6
A	ANACOMP INC	7- 16	14 1/2	- 1/4	-1.6
O	ANALYSTS INTL CORP	2- 6	6 1/8	0	0.0
A	APPLIED DATA RES.	6- 16	13 1/8	+ 1/8	+1.0
N	AUTOMATIC DATA PROC	31- 48	44 3/8	+1 1/8	+2.6
O	COMPUTER HORIZONS	1- 4	3 3/8	0	0.0
O	COMPUTER NETWORK	6- 9	5 3/8	+ 1/8	+4.5
N	COMPUTER SCIENCES	11- 25	24 3/8	+ 1/2	+2.0
O	COMPUTER TASK GROUP	1- 9	9 1/2	+ 1/4	+2.7
O	COMPUTER USAGE	2- 5	3 7/8	+ 1/8	+3.3
O	COMPUT AUTO REP SVC	6- 10	5 3/8	0	0.0
O	COMPUSHARE	11- 20	15 1/8	+ 1/8	+1.0
O	CULLINANE CORP	18- 43	40	+2	+5.2
O	DATA DIMENSIONS INC	1- 6	1 3/8	0	0.0
O	DATATAB	1- 4	1 1/8	0	0.0
O	DSI CORP	6- 9	5 7/8	- 3/8	-6.0
N	ELECTRONIC DATA SYST	19- 28	27 1/2	+1 1/8	+4.7
O	INFORMATICS INC	9- 22	18 1/2	-1 3/8	-10.1
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	2- 4	2	0	0.0
O	KEANE ASSOCIATES	2- 9	5	- 1/2	-9.0
O	KEYDATA CORP	2- 5	2 1/8	+ 3/8	+21.4
A	LOGICON	12- 34	30 1/8	+2 5/8	+12.1
O	MATHEMATICA INC	9- 16	15	0	0.0
O	NATIONAL DATA CORP	10- 23	19 3/4	- 1/2	-2.4
O	PLANNING RESEARCH	4- 9	7	+ 3/8	+5.6
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	6- 7	5 1/8	- 5/8	-10.8
N	REYNOLDS & REYNOLD	20- 30	25	-3	-10.7
O	SYSC INC	6- 11	11 1/8	+ 1/2	+4.6
O	SCIENTIFIC COMPUTERS	6- 17	15 1/2	+ 1/4	+1.6
N	TYMSHARE INC	30- 50	58 1/8	+ 1/4	+0.4
A	UCS SYSTEMS	9- 15	13 5/8	- 1/8	-1.0
O	WYLY CORP	6- 10	9 1/2	+ 3/8	+4.5
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 20	16	- 3/4	-4.4
N	AMPEX CORP	14- 29	26 1/2	+1 3/4	+7.0
A	ANDERSON JACOBSON	6- 17	12 3/4	+1 1/8	+9.6
O	APPLIED DIG DATA SYS	5- 12	12	+3 1/4	+37.1
O	AUTO-TROL TECHNOLOGY	10- 40	40	+4	+11.1
O	BEEHIVE INTL	2- 9	7 7/8	- 3/8	-4.5
A	BOLT,BERANEK & NEW	12- 25	24 1/2	+ 1/4	+1.0
N	BUNKER-RAMO	17- 32	29 7/8	+ 3/8	+1.2
O	CAMBRIDGE MEMORIES	1- 4	2	0	0.0
N	CENTRONICS DATA CORP	20- 55	35 1/4	-3 1/8	-8.1
A	CETEC CORP	3- 7	6 1/8	+ 3/4	+13.6
O	COMPUTER DEVICES INC	3- 9	4 5/8	- 1/8	-1.6
O	COGNITRONICS	1- 8	4 1/8	-1 3/8	-25.0
O	COMPUTER COMMUN.	4- 10	5 1/8	+ 3/4	+17.1
O	COMPUTER CONSOLES	4- 29	16 3/4	+1	+6.3
A	COMPUTER TRANSCEIVER	1- 5	3 1/8	+ 5/8	+23.8
O	COMPUTERVISION CORP	29- 73	71	+5 1/2	+8.3
N	CONRAC CORP	13- 25	17 3/8	+1	+6.1

EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 23 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 14	12 5/8	- 1/4	-1.9
A	DATA PRODUCTS CORP	11- 25	24	+ 1/2	+2.1
O	DATUM INC	2- 4	2 1/8	+ 1/4	+12.5
O	DECISION DATA COMPUT	2- 5	3 5/8	- 1/8	-3.3
O	DELTA DATA SYSTEMS	1- 3	3/4	- 1/8	-14.2
N	DOCUMATION INC	7- 27	13 1/8	- 5/8	-4.5
O	DATARAM CORP	6- 17	9 5/8	0	0.0
O	ELECTRONIC M & M	2- 6	5 7/8	+1 1/8	+23.6
O	EVANS & SUTHERLAND	21- 43	30 1/2	-2 1/2	-6.0
O	FABRI-TEK	1- 4	3 1/8	- 1/2	-13.7
O	GENERAL COMPUTER SYS	1- 4	3 7/8	+ 7/8	+29.1
O	GENERAL DATACOMM IND	12- 18	17	+ 1/2	+3.0
O	GENERAL TERMINAL CP	1- 4	1 3/4	- 1/8	-6.6
N	HAZELTINE CORP	12- 30	25 1/2	+1 3/8	+5.6
N	HARRIS CORP	25- 41	40 5/8	+ 3/4	+1.8
O	INFOREX INC	1- 8	4 1/8	+ 1/2	+12.5
O	INFORMATION INTL INC	6- 19	16 1/2	- 1/4	-2.3
O	INTEL CORP	41- 61	58 3/4	+2	+2.6
O	INTERSIL	13- 33	26 1/2	- 5/8	-2.3
A	LUNDY ELECTRONICS	6- 12	7 5/8	- 1/4	-3.1
O	MSI DATA CORP	3- 11	7 1/8	+ 1/8	+1.7
O	MAGNUSON COMP SYSTS	20- 26	25 3/4	+ 1/4	+0.9
N	MEMOREX	10- 36	13 5/8	- 1/8	-0.9
O	MOHAWK DATA SCI	10- 20	17 5/8	+ 5/8	+3.6
O	[illegible]	2- 10	7 1/2	0	0.0
A	PARADYNE CORP	10- 30	30 1/2	+1 1/2	+4.0
A	PENRIL CORP	9- 15	10 1/2	- 7/8	-7.6
O	RAMTEK CORP	10- 17	11 3/4	+ 1/4	+2.1
O	RECOGNITION EQUIP	9- 13	9 1/4	- 5/8	-7.0
O	SCAN DATA	1- 5	1 5/8	+ 1/8	+12.5
N	STORAGE TECHNOLOGY	12- 21	16 7/8	+1 1/8	+7.1
O	SYKES DATATRONICS	10- 29	27	- 1/2	-1.8
O	T BAR INC	10- 21	18 1/2	+2 1/2	+15.6
A	TEC INC	2- 9	5	0	0.0
N	TEKTRONIX INC	42- 66	59 7/8	+ 5/8	+1.0
N	TELEX	3- 6	3 3/8	+ 1/8	+4.0
O	TESDATA SYSTEMS CP	6- 20	9 5/8	+ 3/8	+4.0
O	TIMEPLEX INC	7- 18	17 5/8	- 3/8	-2.0
O	WILTEK INC	1- 2	2 3/8	+ 5/8	+35.7
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 13	11 3/8	- 1/8	-1.0
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	15- 36	31 1/2	- 1/8	-0.3
O	CYBERMATICS INC	1- 1	7/8	0	0.0
A	DUPLEX PRODUCTS INC	10- 13	12 1/8	+ 1/8	+1.0
N	ENNIS BUS. FORMS	13- 21	17 1/4	- 1/8	-0.7
N	3M COMPANY	46- 60	56 1/2	+ 3/8	+0.6
O	MOORE CORP LTD	27- 36	30 5/8	+ 1/8	+0.4
N	NASHUA CORP	20- 35	24 1/8	+ 5/8	+2.6
N	STANDARD REGISTER	22- 31	28 1/4	-2	-6.6
A	TAB PRODUCTS CO	13- 23	17 3/8	+ 3/8	+2.2
O	WABASH MAGNETICS	11- 18	13 1/8	- 1/2	-3.6
N	WALLACE BUS FORMS	22- 36	35 1/2	+1 1/8	+3.2

Two low-cost answers to your printer questions ...from Southern Systems.



Can I afford it?

Economical purchase price is just the start of your savings with SSI's 300 line-per-minute band printer. Easy maintenance and reliability make SSI's B-300 the lowest cost-of-ownership printer in its speed. If you need 300 lpm output, can you afford not to own it?

Is it versatile?

SSI's B-300 is so versatile that it's revolutionary. Character font bands are changed as easily as a typewriter ribbon. Matching the band to the output needs saves you paper, time, money and operator headaches. Loading and adjusting paper and clean cassette ribbons are a snap. The B-300 is quiet and it produces five clear copies. Versatile? Unbelievable!

What kind of maintenance is needed?

Very little...and most of it is handled in-house due to the convenience of the diagnostic display. Field-proven dependable!

Can I afford it?

SSI's 200 lpm impact matrix printer system costs less than ever before. Just compared to the B-300, the M-200 is amazing...it gives you two thirds of the performance at one half the price of the B-300!

Is it versatile?

The M-200 from Southern Systems gives you 128 characters in condensed, expanded or standard print. Up to six clear copies and form-loading from the front, rear or bottom. SSI makes it possible for use with most mini and micro systems, serial or parallel. Definitely versatile.

What kind of maintenance is needed?

Simplicity of design makes the M-200 unbelievably maintenance-free. In fact, no scheduled preventive maintenance is required. The unique print head has a life of 500 million characters plus it's operator-changeable. A diagnostic display eliminates unnecessary service calls.

MORE QUESTIONS FOR THE ANSWERS:

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____The 2550 (1500 lpm Charaband)
____The 2200 family (300, 600, 900 lpm drum)
____CT-1200 family (600, 100, 1200 lpm ChainTrain)

My needs are:
___Immediate; ___3-6 months; ___For information only

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Title ____________
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City ____________ State ______ Zip ______
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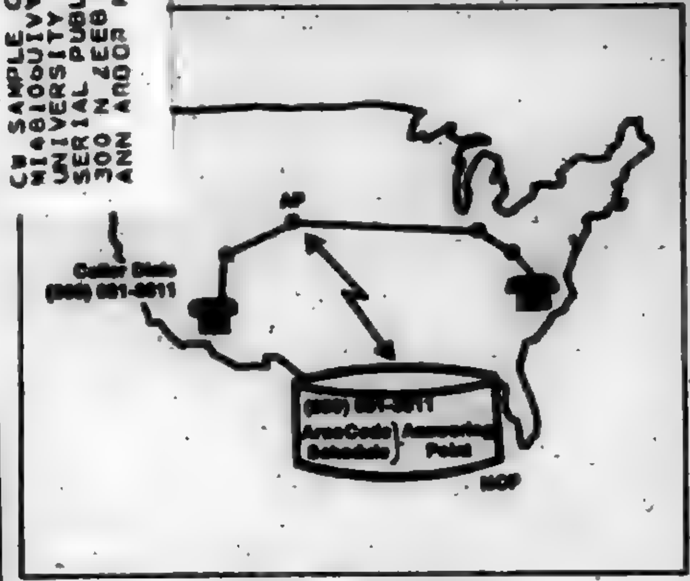
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

kly Newspaper . Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

31 August 4, 1980 $1.00 a copy; $30/year



Bell's 'Improved 800 Service'

AT&T 'Capabilities' On Drawing Boards

By Phil Hirsch
CW Washington Bureau

BASKING RIDGE, N.J. — AT&T's Long Lines Division here is developing several on-line information "capabilities" which have already begun to be converted into commercial service offerings.

One of the managers of this effort — Network Services Planning Manager Roy P. Weber — discussed the project's present status and future prospects in a recent interview. More details were gleaned from a speech given last June to the Armed Forces Communications and Electronics Association in Washington, D.C., by Irwin Dorros, AT&T's assistant vice-president for network planning.

One new offering AT&T is studying, Dorros said, is an "improved 800" service that would enable the American Automobile Association, as an example, to route distress calls from its

(Continued on Page 8)

Report Gives MVS Users Glimpse of What's in Store

By Marcy Rosenberg
CW Staff

MARINA DEL REY, Calif. — Users running MVS on large-scale processors can look forward to:

- More critical system functions implemented in microcode.
- The extension of the "logical address" concept to allow more flexible I/O configurations and permit the attachment of more devices to a channel.
- The extension of existing real and virtual storage limitations.

These and other predictions are contained in a recently released report from Candle Corp. here. The predictions are based on the operating system enhancements — MVS/System Products (SP) and System Extensions Release 2 (SE2) — recently announced by IBM [CW, June 16].

Microcode Use

IBM will use microcode to implement MVS extensions for two reasons, the report observed. First, microcode can execute critical system functions faster and more reliably than software. Second, as these functions grow more sophisticated, IBM's plug-compatible competitors will have a harder time simulating through software MVS microcode changes and extensions.

That IBM will rely heavily on microcode has been "in the cards" since SE first came out with a large part of its function implemented using microcode, according to the report.

Pointing out that the current three-hexadecimal-digit address for physical units is becoming a "severe" limitation, the report further forecast that IBM will extend to MVS the Vtam concept of a "logical address" for each terminal in a network. This will permit users to attach more devices to a channel and more channels to a system.

Along these lines, MVS/SP has expanded from 16 to 28 the maximum number of channels available to a 3042 Model 2 attached processor.

The report also touched on real and virtual storage limitations, both of which plague many large IBM and compatible installations. IBM took a step toward easing real storage contraints when it announced

(Continued on Page 6)

IBM VS Fortran Compiler Joins OS, DOS Fortran

WHITE PLAINS, N.Y. — To extend the capabilities of its current OS and DOS Fortran products, IBM announced VS Fortran Release 1, a program product that supports the most recent standards language for Fortran.

Scheduled for release April 30, 1981 from IBM's Data Processing Division (DPD), the VS Fortran compiler, library and generated object modules will operate on all models of the 370, 30 series and 4300 processors that support VM/CMS, DOS/VSE, MVS and VS1 operating systems.

VS Fortran supports the Fortran 77 standards language (Ansi X3.9-1978 and ISO 1539 1980), which provides for the following:

- Character data type.
- Structured programming support via a block IF statement.
- Internal files allowing in-storage processing of data instead of required additional I/O.
- Symbolically named constants through the PARAMETER statement, which IBM claimed will ease application program maintenance.

Because it uses common code for all but system-specific functions such as I/O, VS Fortran is said to provide compatibility across the four operating systems supported. In addition, it supports cross-compilation, meaning that valid source code that compiles and executes on one supported system can do so on any other supported system without modification, IBM explained.

(Continued on Page 8)

From Liquor, Tobacco Makers

Fedwire May Funnel Excise Taxes

By Brad Schultz
CW Staff

WASHINGTON, D.C. — The federal government may soon order large manufacturers to pay excise taxes via the Federal Reserve System's electronic funds transfer (EFT) network, Fedwire.

Liquor and tobacco producers that pay at least $5 million in federal excise taxes annually will be required to transmit payments from their correspondent banks to the Federal Reserve Bank of New York if recently proposed Treasury Department regulations are enacted.

The $5.5 billion and $2.5 billion in excise taxes paid by liquor and tobacco firms, respectively, each year are usually paid by mail, which means the government cannot draw interest on those funds while they are in transit.

However, computer technology can deliver funds in seconds, not the usual three days required for postal service, giving the Treasury more time to draw interest on the money in its Fed-New York account, according to Jim Hunt, principal architect of the proposed regulations.

The scheme would affect some 150 of the nation's roughly 1,200 manufacturers

(Continued on Page 6)

Plug-Compatible Drives: What to Expect

Product Spotlight

By Rita Shoor
CW Staff

"Faster and cheaper" may sound attractive to potential customers of IBM plug-compatible disk drives. However, several other important factors must not be overlooked when considering a plug-compatible supplier, according to Datapro Research Corp.'s 1980 report entitled "All About Plug-Compatible Disk Drives."

First, end users should be aware of installation costs such as the staff and machine time required to test non-IBM hardware and, second, the plug-compatible customer should be assured that the vendor under consideration can provide the necessary service level in his geographical area, Datapro cautioned.

The charts on Pages 10 and 11 list price, performance characteristics and estimated availability or delivery after receipt of order for a representative group of the IBM plug-compatible disks now available.

No attempt was made to include every disk drive or subsystem currently being marketed to the end-user customer base. In each case, specifications are based on data obtained directly from vendor spokesmen during a recent *Computerworld* survey.

The plug-compatible manufacturer

(Continued on Page 10)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except, a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.
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ISSN 127-420.
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Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

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Ecom May Follow

Enhanced Services Debut Near

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – A new era for users of computer-based on-line services will begin next month when the first "enhanced" communication services deregulated by the Federal Communications Commission's (FCC) recent computer inquiry decision are scheduled to go commercial.

The decision may also persuade the U.S. Postal Service (USPS) to implement its controversial Electronic Computer-Originated Mail (Ecom) service. If that happens, it would be a rather ironic postscript to the computer inquiry because commercial vendors of computer-based on-line services – the group that led the fight to deregulate enhanced services – have been working just as hard to keep USPS from becoming a competitor, observers noted here last week.

Telemail is one of the deregulated services scheduled to begin regular-commercial operation next month. Offered by GTE Telenet Communications Corp., it is a sophisticated electronic mail-box service that, among other features, allows stored messages to be retrieved selectively according to rules specified by the user.

Tyme-Gram, developed by Tymnet, Inc., will begin regular operation at about the same time. This service was designed primarily for credit card merchandisers, department stores, utilities and other mass mailers – the same market the Postal Service hopes to serve with Ecom.

Individual Contracts

Both Telemail and Tyme-Gram were unveiled some time ago as tariffed offerings [CW, April 7 and May 26]. Last week, spokesmen for Telenet and Tymnet said the detariffed versions will be offered on the same terms as those originally announced.

The only difference is that each service will be governed by a contract between the vendor and the customer rather than by a tariff. Therefore, if problems arise that can not be resolved amicably, they will have to be settled by a court instead of the FCC.

Tyme-Gram rates will range from a low of 30 cents to a high of $1 for transmission and delivery of a one-page (1,500-character) message, depending on the number of messages sent each month.

The service will accept messages from a wide variety of dumb and smart terminals and will deliver them on-line to 30 cities, Tymnet said. At each destination point, messages will be converted into hard-copy form, placed in special envelopes and transmitted to the local post office for delivery to the recipient.

In most cases, the company said, delivery will occur within 24 hours after the message is sent.

Access to Telenet's Telemail service will be available by phone or in-Wats circuits, at prime-time charges of $13.25 to $25 per hour, and $3 to $17 per hour at other times. There is also a monthly service charge of $100, plus storage and delivery charges for certain categories of messages.

In addition to selective retrieval of stored messages, Telemail includes step-by-step customer-customized message entry instructions displayed or printed out at the input terminal and multiple addressing capability. Later enhancements will include key-word searching and facsimile terminal interfaces.

Ecom may also be introduced in the near future because, like Tyme-Gram and Telemail, it is an "enhanced" service.

A major obstacle confronting postal service promoters of Ecom, prior to the computer inquiry decision, was an earlier FCC ruling that in effect, required the Postal Service to become a communications carrier before it could offer Ecom as an end-to-end electronic mail service. Deregulation of enhanced services appears to eliminate that requirement, according to comments from knowledgable sources last week.

However, there is still strong opposition to Ecom, at least to the end-to-end version proposed by the Postal Service. Partly, this opposition comes from commercial vendors of electronic mail and message services who do not relish competing with the U.S. government. It also comes from the Carter administration and Congress.

The FCC remains another obstacle; while deregulating enhanced services, the commission has retained "subject matter jurisdiction" over such offerings, permitting regulation in the future if it is needed.

The proposal to implement Ecom service is now pending before the governors of the Postal Service. Reportedly, even before the FCC's computer inquiry decision was announced, several board members favored offering the service on an end-to-end basis, despite the opposition.

According to a source within the postal service, the governors are likely to reach a decision this week.

This Week

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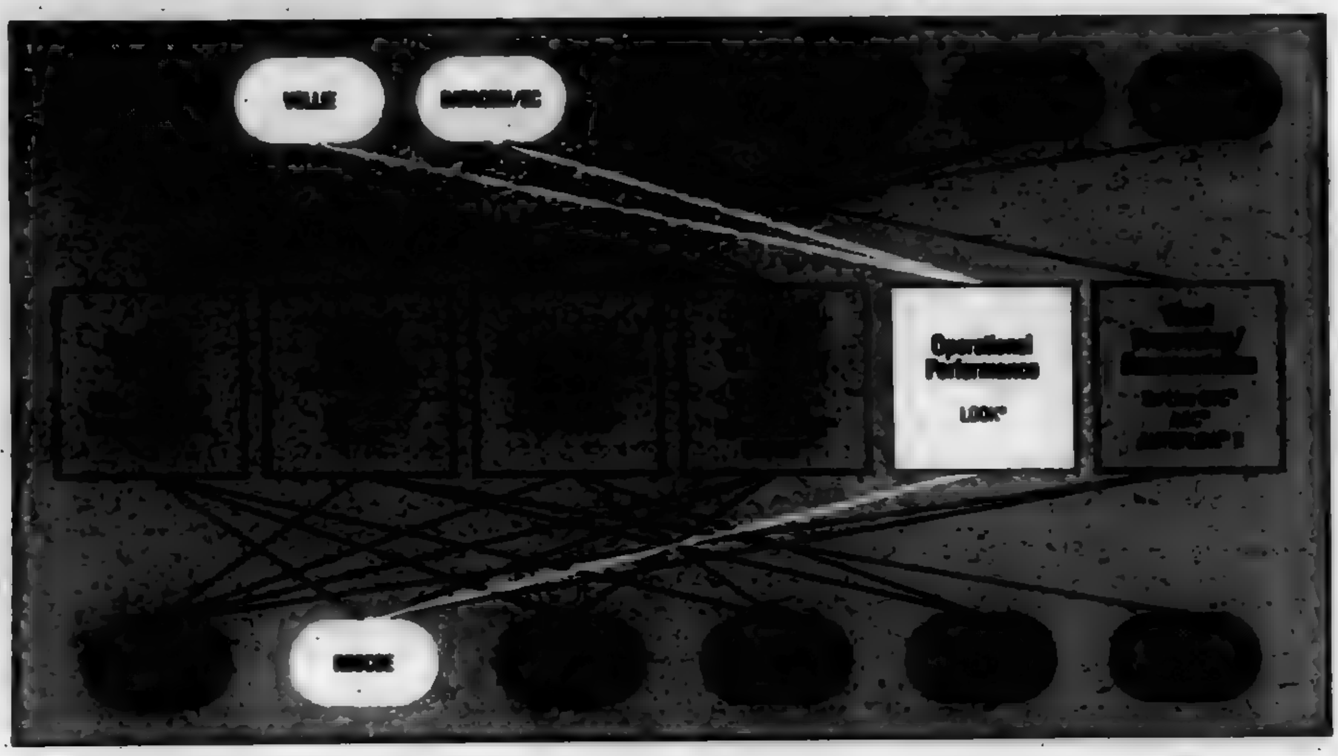

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Joint Effort Trains Visually Impaired to Program

By Tim Scannell
CW Staff

LOUISVILLE, Ky. – Nine years ago Jack Ried, then a financial analyst, lost his sight. He subsequently entered programming and today is the program coordinator of a 13-week computer programmer training course for visually impaired individuals.

Working full time in the Human Resources Department of Manufacturers Hanover Trust Co., Ried selects students, prepares the curriculum and generates corporate interest in the training program. The course is jointly offered by Baruch College, Manufacturers Hanover Trust, the University of Manitoba in Winnipeg, Canada and AGS Computers, Inc.

Before a student is selected and enters the program, Ried lines up a corporate sponsor that pays the $6,000 course fee and buys the necessary equipment, a $15,000 braille terminal. Upon graduation, the student takes his training and terminal and works for the sponsoring company.

To date, three students have graduated from the program's first class; the next class is already scheduled for this fall.

Thus far, the hardest aspect of Ried's job is selling a corporation on the idea of investing more than $20,000 in a blind student and adding that student to its staff upon graduation. Although it may seem like a contradiction, early in his sales pitch Ried makes it clear that there is "no way a blind programmer can do everything a sighted person is doing."

First of all, a blind programmer needs to spend an average of five to 10 hours more per work week than a sighted person just getting organized and oriented to the surroundings. A blind worker may need a human reader to help with the pages of machine and software documentation. Present software may have to be modified so that, for example, a computer's output goes to a terminal and not to a printer.

But, the benefits of hiring a blind programmer far outweigh the difficulties. For example, in an industry plagued with excessive high turnover, blind programmers historically stay with a company a long time – which can save the firm up to $10,000 in personnel finder's fees. The turnover rate among handicapped people is under 5%, he claimed.

Also, that five to 10 hours more per week that a blind programmer puts in at the job is spent constructively, doing extra work and double-checking the accuracy of programs.

Flanked by his guide dog, Rali, Ried noted the importance of going beyond a company's personnel department and getting the acceptance and understanding of people in the DP shop.

"People talk about hiring the handicapped and have all these conferences, but the people hiring don't go to these conferences," Ried observed.

Vendor Apathy Hurts Blind Programmers

By Tim Scannell
CW Staff

LOUISVILLE, Ky. – They can write programs in a variety of languages and debug software with the best of them, but most will never see the computers or terminals used to run their routines.

"They" are the more than 1,000 visually impaired programmers who work at computer sites across the U.S. While lack of sight may be a problem on the job, their greatest handicap seems to be their inability to convince large computer vendors to take an interest in their plight, according to Lee Brown, a consultant and member of Visually Impaired Data Processors International (Vidpi).

Brown and about 50 other blind programmers and data entry people met here recently to learn about the latest technology for the visually impaired and exchange various "war stories" of working in a sightless environment. However, more often than not, the conversation focused on the lack of adequate research and development in the area of technological aids for the blind data processor.

Their stage was the yearly Vidpi conference held in conjunction with the American Council of the Blind's annual meet.

The majority agreed that although a small number of big league vendors spend a portion of their R&D dollars investigating such things as audio terminals and braille CRT readers, and a greater number of much smaller companies invest all their time on such technologies, blind programmers are nevertheless pretty much ignored in the total DP picture.

Two Approaches

The major reason for this "hands-off" attitude is that there just is no market, Brown explained. Since only about two out of every 2,000 programmers are visually impaired, there is no way a large corporation could sell a piece of equipment at an affordable price and still make a substantial profit.

However, there are two avenues a major corporation could take to help the blind programmer and still not risk precious R&D funds, he suggested.

The first is to set up or sponsor a training program, as IBM is currently doing, with rehabilitation centers throughout the country. In the IBM effort, programs are initiated for the severely handicapped and run entirely by the rehabilitation centers. As of June, 283 students graduated from the 15 centers in the U.S.; 247 have been placed in DP positions.

The second route a few large companies take is to back a smaller firm by supplying the equipment necessary to build specialized terminals and keyboards. Of course, the equipment is not free, but it is readily adaptable to the needs of the visually impaired.

Maryland Computer Services, Inc. (MCS) in Bel Air, Md., is one such company that takes bare-bones computer parts for a major vendor, supplies its own software and converts them into state-of-the-art machines for the blind. MCS, an OEM for Hewlett-Packard Co., was described by many at the conference as the most involved vendor in the blind technology field.

MCS makes a variety of desktop terminals and forms-writers for the blind operator. In fact, at the show the company was demonstrating its latest product, a full-speech computer terminal that allows the blind user to hear a single line, word or the contents of an entire CRT screen. The device is built around HP's 2621 CRT terminal and costs less than $6,000.

Insufficient Market

But, while HP does offer technical help to the blind by supplying equipment to MCS on an OEM basis, thus far it has not opened its R&D doors to further the technology. At least one MCS staffer has expressed dismay at trying to convince HP to devote a small portion of its software expertise to the blind with no apparent success.

Again, the problem is that there just is not a sufficient market to warrant an official involvement, Brown stated.

Other companies demonstrating equipment at the conference included Telesensory Systems, Inc.; Triformation Systems, Inc.; United Information Companies (Unicos); and IBM. IBM representatives offered a presentation on its audio-visual typewriter, which debuted earlier this year. Noticeably absent from the conference was Kurzweil Computer Products, Inc., recently purchased by Xerox Corp.

Finally, Tim Cranmer, director of technical services for the Kentucky Bureau for the Blind, speculated on the kind of equipment that might soon be available to aid the blind programmer and demonstrated a prototype of a braille CRT reader. Cranmer is considered by many to be the "leading thinker" in blind technology and is responsible for sparking the development for most of the equipment on the market today.

Cranmer's major complaint was that there is a lot of existing technology that could be adapted for use by the blind, but unfortunately no way "to get your hands on it."

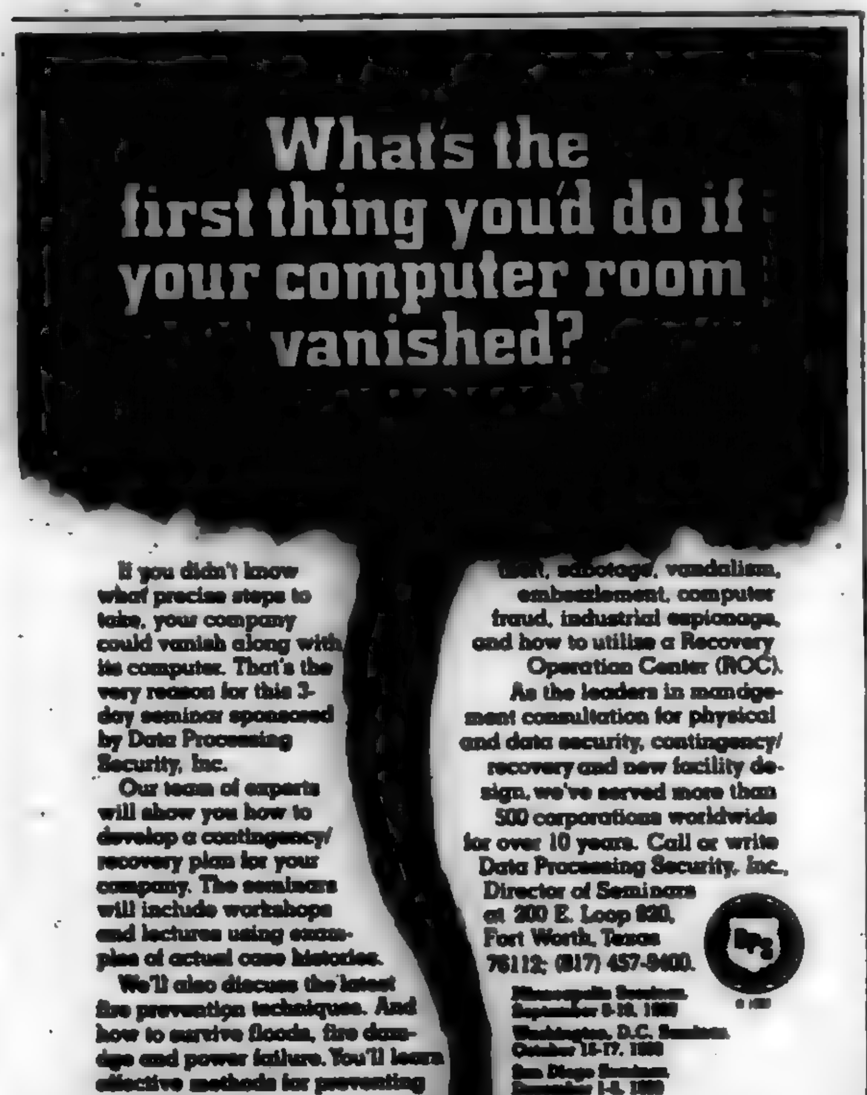
SAD Device

Cranmer ended his presentation by demonstrating "the poor man's" audio computer, which consisted of a Radio Shack voice unit hooked up to an HP 9825 desktop processor, and his newly developed searchable audible display (SAD).

The SAD device is a small box with rows of thumbtacks and switches on top and a speaker on the front. When interfaced to a computer or intelligent CRT, the blind user can "read" the contents of a display by pushing the appropriate thumbtack button.

Information on the screen can also be changed character-by-character to insert certain information or alter a letter from lowercase to uppercase format.

The SAD machine will be available within the next three or four months, and an expanded version is already in the works, Cranmer observed.



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Classed by Six Types

Job Moves Can Have Pitfalls, Article Warns

By Marcy Rosenberg
CW Staff

NEWINGTON, Conn. — Does the word "promotion" conjure up visions of extra dollars gracing your palms and bring thoughts of more power with new and challenging responsibilities?

Well, think again. Promotions come in all shapes and sizes, some of which may fit into your career growth plans better than others.

It's important to understand what a promotion really means; what appears to be a step up may actually be a lateral move or even a step backward, according to an article in the May issue of "Getting Ahead in DP."

The article describes six types of promotions: the pure promotion, silent or blind promotion, power promotion, cosmetic promotion, lateral promotion and self-investment promotion.

'Pure' Promotion

Getting a "pure" promotion means receiving more money, more responsibility and a new title — moving from senior programmer to project leader, for example. And because this kind of promotion is public and highly visible, the recipient gains prestige as well as money.

It sounds great — so far. But the article did warn of potential disadvantages to a pure promotion. First, your increased responsibilities may prove more than you bargained for; second, fellow workers may envy your success.

To avoid political pressures often resulting when staffers resent a colleague's advancement, employers sometimes resort to "silent" promotions. Like the "pure" kind, these are career path promotions — offering more money and a higher job level — but are implemented quietly.

However, silent promotions have trade-offs. While you won't bask in public prestige, neither will you be subject to hassles borne of resentment by other staffers.

Then there is the "power" promotion, where an employee uses leverage to advance in the company. Presenting a "promote me or I quit" ultimatum is one way of achieving this.

If successfully executed, this tactic can bring you the satisfaction of testing the system and winning, but these benefits may be short-lived. As the article pointed out, forcing a promotion can create ill feelings on the part of management and brand you a reputation as a complainer or manipulator.

Another wolf in sheep's clothing is the "cosmetic" promotion, which can be described as a nonpromotion that usually results from a major reorganization. The higher salary, new title and new duties a cosmetic promotion promises really translate to less power and less responsibility.

On the other hand, if your boss offers you more prestige and authority without the raise to go along with it, you're probably getting a "lateral" promotion. In this case, what you don't gain in money you can make up for with more challenging or interesting work, a better title, a nicer department or more visibility. However, management will probably lose respect for you.

Then there are some employees that take a pay cut to move into a new position that will give them experience in a more specialized, job-rich area, such as data base management. If properly conceived, such a "self-investment" promotion — while appearing to be a step down — can pay off in future benefits, such as more earning potential.

To gauge the potential for getting the kind of promotion you want, the article recommends asking your employing organization:

- Policies on promotions.
- How and where internal job openings are posted.
- How much internal mobility is allowed.
- What elements make up the company's appraisal system.
- Whether merit promotions are given or if promotions depend strictly on an annual review.

The monthly newsletter, "Getting Ahead in DP," is published by The Meld Publishing Co., P.O. Box 11573, Newington, Conn. 06111.

GAO Embarks on Safety Probe Of FAA Traffic Control System

WASHINGTON, D.C. — The General Accounting Office (GAO) will begin an investigation in the early fall into the safety of the Federal Aviation Administration's (FAA) computerized air traffic control system.

The announcement came one month after Rep. Bob Whittaker (R-Kan.) and Sen. Charles H. Percy (R-Ill.) requested the study in a letter to Elmer B. Staats, comptroller general of the U.S. [CW, July 14].

Whittaker, who has been studying the FAA's computerized system for nine months, has also successfully instigated a study into the matter by the Department of Transportation's inspector general in conjunction with the Justice Department. That investigation is expected to take at least six months.

In the course of his own study, the Kansas congressman claims to have documented 27 midair near-collisions involving commercial airliners, which were not reported by the FAA at 10 of the country's 20 Air Route Traffic Control Centers, which direct air traffic among 400 continental airports.

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Large MVS Users Get Hints of What's in Store

(Continued from Page 1)

the Extended Addressing feature, which will be available and supported by MVS/SP in October 1981 [CW, July 21].

Extended Addressing allows users of the 3033 multiprocessor (MP) to directly address up to 32M bytes of real storage in 4M-byte increments, double the previous capability. However, virtual storage is still limited to 16M bytes.

But IBM is tackling this problem as well with the Cross Memory Services (CMS) facility. Candle called CMS "one of the most significant enhancements in MVS/SP Release 2, which is scheduled for release in June 1981. CMS is said to provide a means for one address space to load, store data and link to programs in another user's address space.

'While virtual memory is still limited to 16 bytes, CMS effectively removes all limits from the amount of virtual storage a given user can access.'

While virtual memory is still limited to 16M bytes, CMS effectively removes all limits from the amount of virtual storage a given user can access, the report stated. As a result, subsystems like IMS and JES3 will be able to place data that must be accessed more than one address space in their private area rather than in a common addressable area such as common service area (CSA).

In the case of IMS, for example, users can invoke the Local Storage Option (LSO) and so move almost 200K of IMS data from CSA to the private area of the IMS control region.

CMS, then, will offer the benefits of restricting the growth of CSA and give users an alternative to the current mechanism that requires the scheduling of a Service Request Block (SRB) (see accompanying chart). In the past, "many users have had to drastically reduce the size of their private areas to allow for the tremendous and unexpected growth of the common area . . . CMS will reverse this trend," Candle explained.

While CMS can be implemented in software, IBM 3033 users have the alternative of installing the 3033 Extension feature, which will make some extensions to the standard 370 instruction set and enhance CMS performance.

Some Trade-Offs

However, these hardware extensions cannot be installed on IBM 370/158 or 168 processors, the report pointed out, noting that for these users a software simulation feature is available for the new CMS instructions. IBM 30 series users can also use the simulation feature until the hardware extensions become available in June 1981, but there may be "significant" performance penalties, according to the report. What those penalties are will be better known in November when IBM plans to release performance data.

CMS has other trade-offs. By providing the ability to affect data in another user's address space, CMS violates the isolation of users' storage, considered a strong point of MVS. Therefore, to protect against accidental or deliberate modification of another address space, users will need some form of authorization scheme.

Although IBM has released no details, Candle predicted such a scheme will not be geared to system key zero or supervisor state, but rather call for the target address space to somehow allow access from another user. An advantage to this type of authorization is that the number of programs required to run in key zero will be reduced. On the minus side, however, debugging will be complicated since users may not know who is modifying what storage and at what time.

'Primitive Version'

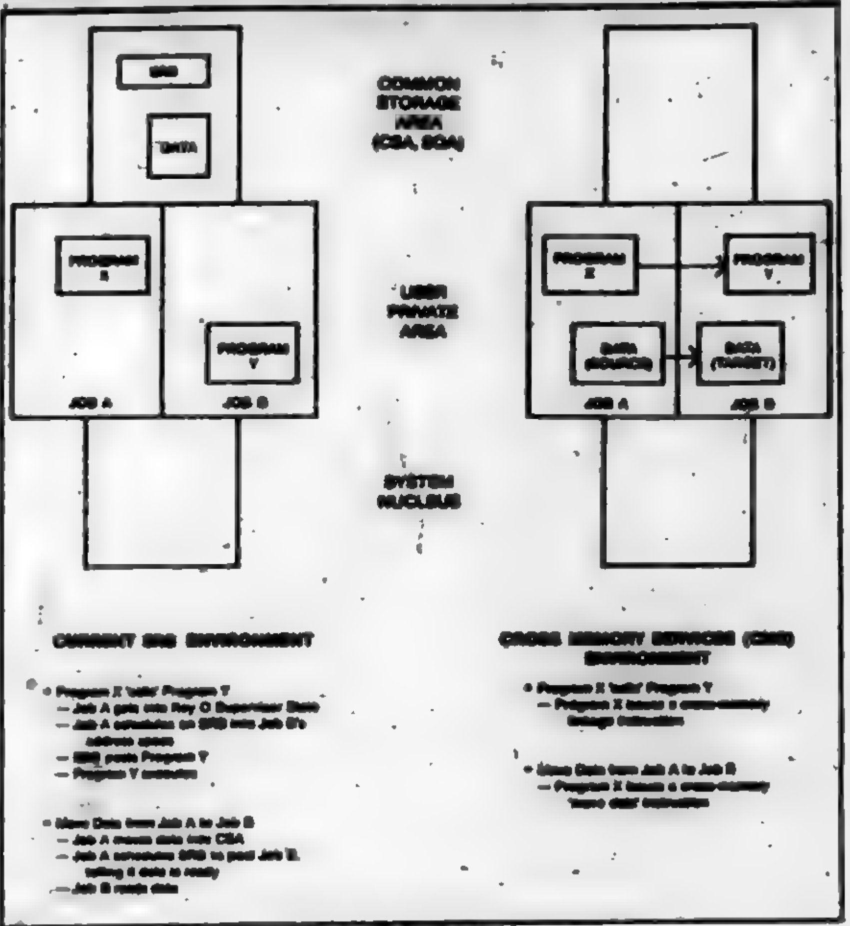
Candle views CMS as "a primitive or transition version" of any extended virtual addressing waiting in the wings for future IBM large-scale systems, postulating that compilers could be rewritten to make it appear to a Cobol or Fortran user that much more tha 16M bytes of virtual storage is available.

The advent of CMS may also put to rest speculation that IBM's hypothetical H series will use more than the current 24-bit addressing.

The reason? If MVS/SP's CMS is used to its fullest, users will be able to easily and quickly access another 16M bytes of virtual address space, limiting virtual memory only by the number of address spaces. And, the report theorized, if compilers were written to take advantage of this feature, it would appear to users, at least theoretically, that unlimited storage were available.

Therefore, IBM will likely retain the current 24-bit instruction addressing on the "H" rather than undertake a difficult design effort to change it, the report said, but was quick to add that even with CMS, this capability will be inadequate for data addressing in the long run.

The 40-page MVS/System Product Report, which examines other features of MVS/SP and MVS/SE2, is available for $10 from Candle Corp., Suite 401, 4676 Admiralty Way, Marina del Rey, Calif. 90291.


SRB
DATA
COMMON STORAGE AREA (CSA, SQA)
PROGRAM X
PROGRAM Y
USER PRIVATE AREA
DATA (SOURCE)
DATA (TARGET)
JOB A
JOB B
SYSTEM NUCLEUS
CURRENT SRB ENVIRONMENT
CROSS MEMORY SERVICES (CMS) ENVIRONMENT
• Program X 'calls' Program Y
• Move Data from Job A to Job B

SRB vs. CMS Environment

Excise Taxes May Funnel Through Fed's EFT Network

(Continued from Page 1)

of consumable alcohol and tobacco products, netting an additional $228 million in revenues for fiscal 1981 and about $5 million in each subsequent year, Hunt said.

Those figures are a bit out of date, however, since they were derived a few months ago when the prime interest rate was 18% and the Treasury was earning 15.38% per year on its Fed-New York assets, he pointed out.

The Treasury's Bureau of Alcohol, Tobacco and Firearms is not the only federal agency that wants to collect money via EFT, Hunt said. The Social Security Administration, for example, would like to have more time to draw interest on the enormous volume of dollars it handles.

'Raft of Briefs'

Hunt's bureau published its proposal in the June 6 Federal Register and asked for public comments to be filed by this week. So far, few comments "have been substantive," Hunt said last week, adding he expects EFT-concerned lawyers to eventually file a "raft of briefs" on the matter.

One issue worth exploring is the impact of a requirement to pay taxes via EFT on companies whose banks do not have EFT links, Hunt observed. The Bureau of Alcohol, Tobacco and Firearms does not know how many liquor and tobacco producers in the specified tax range can comply with the proposed regulations using their present financial affiliations.

The bureau's proposal does not require companies to establish their own EFT links or modify existing information systems, Hunt emphasized, but indirectly the scheme could create problems for the financial institutions serving those firms: They may lack EFT links, they may be legally constrained from establishing any, or they may be having problems with links already functioning.

Hunt's agency proposed the regulations in reaction to a 1978 report by the President's DP Reorganization Project, which looked into the effectiveness of DP operations at a number of federal agencies. Concerned with "cash management improvement," the report recommended that agencies find ways to accelerate the process of computerized funds collection.

Fed-New York apparently did not know its role in the scheme to computerize taxation of the liquor and tobacco industries when *Computerworld* asked the reserve bank for comment last week.

That's not unusual, a spokesman said, because the Treasury often quietly uses the Federal Reserve System's largest member as an agent for nationwide transactions. Fed-New York has direct and unique links to the Treasury as well as other funds-gathering agencies in Washington, D.C., he added.

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Earlier Version Defeated in House

Senate Wants States to Computerize Medicaid

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – For the second time this year, the U.S. Senate has passed a bill that would require all states to install computerized Medicaid processing systems or face the loss of Medicaid funds.

Proposed by Sen. Richard Schweiker (R-Pa.), the measure was approved as an amendment to the Mental Health Systems Act. It must still be approved by the House of Representatives.

The House defeated the Schweiker plan when it was introduced earlier this year because of jurisdictional and technical disputes.

The problems in mandating Medicaid Management Information Systems (MMIS) that doomed the earlier proposal have been worked out with both houses of Congress and with the Department of Health and Human Services (HHS), according to Schweiker.

Savings in Millions

MMIS installation in "laggard states" – only 29 states now have operational MMIS programs – could save $365 million the first year, he said.

The systems are used to establish statistical norms for Medicaid transactions and then "kick out" abnormal billing reports for investigation for possible fraud or abuse.

"Manual claims processing often cannot detect Medicaid ineligibility, duplicate billings, inappropriate changes or third-party liability," Schweiker said during Senate debate on his proposal.

"A sophisticated computer processing system is usually the only way to adequately detect fraud, waste and abuse," he added.

Under the proposal, the federal government would pay 90% of MMIS acquisition and start-up costs and 75% of operational expenses. States without MMIS receive 50% of their operational costs from the federal government.

To minimize federal interference in the state-run Medicaid programs, HHS would not dictate the kinds of systems that should be used, but would periodically check MMIS performance to ensure "that states meet certain performance criteria and that their systems meet certain broad objectives," according to Schweiker.

Under the recently approved proposal:

- States without operational MMIS by Sept. 30, 1982, or six months after the start-up date agreed to with HHS, will start to lose the federal matching funds they receive for Medicaid administrative expenses.
- Very small states that do not need computerized systems could receive a waiver of the MMIS requirement.
- HHS will provide technical advice on installation and operation of effective computerized systems, defined by criteria to be developed by the department.

States without MMIS account for an estimated $7.3 billion in Medicaid expenditures, and nationwide MMIS installation would save up to 8% of the $20 billion spent annually on Medicaid programs, Schweiker claimed.

Despite Protest, Finley to Stay On Sperry Board

By Connie Winkler
CW Staff

NEW YORK – Textile union backers unsuccessfully fought the renomination of the controversial James D. Finley to the board of directors of Sperry Corp. at the corporation's spirited annual meeting here last week.

Finley is the former chief executive of J.P. Stevens, Inc., the textile manufacturer which has long fought unions and has been the object of a boycott.

Among the Finley opponents was Crystal Lee Sutton, whose story was told in the recent popular movie, "Norma Rae." "I don't think Mr. Finley can be an asset to anyone anywhere. He should be in jail – he does not deserve this honor," Sutton said to a standing ovation from at least half of the almost 700 persons packed into the ballroom at the Essex House hotel here recently.

Sutton is a former Stevens worker and led unionization efforts of the Amalgamated Clothing and Textile Workers at a Stevens plant.

Speakers from union, teachers', church and women's groups attacked J.P. Stevens for sex and race discrimination and said the firm jeopardizes the health of its workers by exposing them to noise pollution and cotton dust, which leads to black and brown lung disease.

Sperry Chairman J. Paul Lyet called Finley a "conscientious and dedicated director since 1970" and added, "Sperry should not be permitted to be drawn into problems in which it is not involved."

Very little Sperry business was conducted at the 25th annual stockholders' meeting. Lyet said Sperry would double its profits over the next five years and increase its commitment to the computer industry, which he called "the industry of the 1980s."

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On-Line 'Capabilities' on Bell Drawing Boards

(Continued from Page 1)

members directly to a local service garage. The stranded motorist would call a single, nationwide 800 number, and the network — using the calling number as a reference, plus an on-line file of garage locations — would then connect the motorist with the nearest garage.

Another application of this capability, Dorros said, would be a "person locator" service. The network, after checking the file for the called party's previously input alternate number, would route incoming calls automatically to that number.

As indicated by this example, all of the services the AT&T is investigating are voice-based. But they will almost certainly compete with the electronic mail, electronic message, data base retrieval and similar offerings of noncarriers. That means more arguments at the Federal Communications Commission (FCC) and in Congress between AT&T and computer services and systems vendors. It also means, probably, a prolonged delay in bringing the new services to market.

Custom Calling II

A taste of what's in store is provided by a Bell offering called Custom Calling II service. It allows incoming messages to be stored within the network, in digital form, on high-density disk units when the called party is away from his phone or is busy. He retrieves these recorded messages later by dialing a special access code.

Bell Telephone Co. of Pennsylvania recently filed a tariff for the service, but the Pennsylvania Public Utilities Commission — responding to complaints from telephone answering services — has decided to investigate Custom Calling II service, and meanwhile has delayed the effective date of the tariff from July 7, 1980 to Jan. 7, 1981 [CW, July 28].

AT&T has insisted — notably in its response to the FCC's Second Computer Inquiry — that Custom Calling II is not an electronic message service. Bell attorneys argue that the latter is a text-based offering, while Custom Calling II is voice-based.

However, Bell's competitors contend this is a distinction without a real difference, since the incoming voice messages are converted to digital format before they are stored and in that form can be delivered to the customer through either telephone or data terminals. Also, it would not be difficult, the competitors maintain, to modify the disk units so they could receive data of facsimile as well as voice messages.

Touch-Tone Services

Another new AT&T service, called Auto Bill Calling (ABC), went into limited operation in Buffalo, N.Y., last month, according to Network Services Planning Manager Weber.

He explained that this offering allows customers to make credit card and collect calls without having to go through a human operator. The caller enters his credit card or home telephone number, plus a personal identification code, through a Touch-Tone telephone.

Another offering that AT&T calls Dial-It, now awaiting a green light from the FCC, utilizes this same capability in more limited form.

Dial-It automates the collection of survey information. By dialing one of two specified telephone numbers, the respondent can register a "yes" or "no" to an opinion-type question. (Additional numbers can be used for more complex questions.)

Since both of these new services use the Touch-Tone telephone for data input, an obvious question is whether this capability will be developed further.

The short answer, according to Weber, is that such a development may be possible, but it is not likely. One reason is that AT&T "has no plans to get into the electronic message services business" (as Bell defines that term).

Slow Input

Possibly more important, the Touch-Tone pad is not a very efficient data input device for many applications. If a large amount of information is involved, the process takes too much time, Weber explained.

Moreover, as the amount of input information and its variability increase, there is a corresponding increase in the number of recorded instructions needed to get the user through the input process, and the software needed to manage the whole operation becomes more complex and specialized.

AT&T's development effort, Weber explained, "is pointed in the opposite direction" — toward services which have a wide appeal and a high degree of commonality, do not change over time, require limited terminal support and make minimal demands on the customer's time and intelligence.

All of the information services AT&T is developing and considering depend on the company's rapidly emerging stored-program control (SPC) network, which consists essentially of computerized central office switches, such as the No. 4 ESS, and common channel inter-office signaling (CCIS), an improved method of routing and controlling the movement of voice and data messages through the long-distance telephone network.

Before CCIS was developed, the control information for each message, and the message itself, traveled over the same analog circuit path from sender to receiver. CCIS, however, provides a separate circuit path for the control information, freeing Bell from many shortcomings of analog transmission.

IBM VS Fortran Joins OS, DOS Fortran

(Continued from Page 1)

As described by IBM, VS Fortran consolidates into a single compiler and library most of the capabilities provided by the firm's current OS and DOS Fortran products, including OS Fortran G1, OS Fortran H Extended, OS Fortran Mod II Library, DOS Fortran F and DOS Fortran Option 1 Library. VS Fortran is said to be source- and object code-compatible with these products.

VS Fortran Limitations

While VS Fortran provides the batch debug capability of IBM's Fortran G1, it will not support G1's interactive debug product if used with the 1966 American Standard Fortran language (Ansi X3.9-1966). Other VS Fortran limitations when compiling source programs on the 1966 language level include:

- Inability to use the TSO Fortran command.
- Inability to use the functions for bit handling currently accepted by Fortran H and H Extended.
- Lack of support for the automatic precision increase option currently supported by Fortran H Extended.

VS Fortran will support IBM's recently announced 3375 and 3380 count-key-data devices, accept free form source code and support top-down structured programming via an INCLUDE statement, which may be nested. This statement allows source code blocks to be inserted from a library into a program at compile time, according to IBM.

In addition, the VS Fortran compiler and many of its library's I/O and service routines are reentrant, IBM stated.

Improved Serviceability

The firm also claimed to have improved serviceability over previous Fortran products through self-contained diagnostic messages and a new diagnosis manual for submitting APARs and installing fixes.

The VS Fortran compiler requires 800K of virtual storage to handle a typical 100-statement Fortran source program, IBM said, adding no auxiliary storage is required.

For $185/mo, users can license the VS Fortran compiler and library; the library can be licensed separately for $55/mo.

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Twenty-Year Evolution

Simulation Supports Fifth Presidential Election

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Political computer simulation and modeling — which debuted quietly 20 years ago in John F. Kennedy's bid for the White House — has evolved into a competitive campaign tool used by virtually every major political candidate.

The technique, first employed to project the impact of Kennedy's Catholicism on the electorate, initially entailed condensing very large data bases into smaller structures that could be handled by the slower, smaller capacity and more expensive computers of the day.

"The model we used [in the Kennedy project] would be totally inappropriate today," noted Dr. Ithiel de Sola Pool, chairman of the Political Science Section; Department of Economics and Social Science, at MIT.

As one of the originators of Simulmatics, Inc., the four-man group that orchestrated that first use of computer simulation as a campaign tool, Pool has a unique perspective on what has become a widespread and sophisticated business.

Different Approach

"Today, you wouldn't do any of that data compression at all," Pool explained. "You'd simply handle all the data and do whatever subsets were appropriate for the particular inquiry you were engaged in, so one would use an entirely different approach."

While modeling costs remained prohibitive through the 1960s, in recent years, "virtually every political campaign" has had extensive computer analysis of survey data, including "not just current surveys, but comparative analysis of the old data they have compiled," according to Pool.

Before 1960, however, such techniques were not used in political campaigns. "What was innovative in 1960 was that computers had gotten good enough so we could take 10 years of survey data, 100,000 responses, and do something with it," Pool noted.

What they did was consolidate a total of 130,000 individual survey responses into 480 "types" of voters, such as those who were Eastern, metropolitan, lower income, white, Catholic, female or Democratic, Pool explained.

"Each type was based upon a considerable number of voters of that type who had originally been interviewed, but we no longer dealt with individual responses," Pool said. "You lose data that way; it was a deliberate loss of data to be able to treat this material in a more compressed way.

"Today, you would just go through the tapes of the original 100,000 responses, if that's what you had in your data bank, and pull out the relevant ones," he continued.

Awareness of Options

And what are the results of such massaging of data? Now, as then, the value of the processing lies in an increased awareness of options available to campaigners and gives citizens more of a role in government through the expression of their "opinions, biases and beliefs," according to Robert Chartrand, senior specialist in information policy and technology at the Library of Congress.

Discussing the Simulmatics model in his 1972 book, *Computers and Political Campaigning*, Chartrand wrote, "[T]here seems to be consensus that the system's output was useful to the campaigners in that it contributed another perspective for the strategists, and bolstered one particular set of alternatives with evidence substantiated by hard statistics.

"In some areas of inquiry," he continued, "the project provided results which proved to be highly accurate in the light of postelection analysis."

With such projections available of what might happen in the future under certain conditions, one might logically wonder whether the prediction itself could affect voters' actions. "Not particularly," Pool said in his interview.

Election 1980

"In the first place, voters in this country don't particularly follow the polls — there have been a lot of studies of the extent to which they do — and there seems to be no measurable effect," Pool said. "And in England there's a so-called 'underdog effect' — the polls are harmful to the leading candidate.

"In the second place, the same [demographic] information is available to all candidates — [although] they may not all use it equally intelligently — so they're using it in a competitive way," he added.

And while Simulmatics, Inc. ceased to exist after 1968 "because it didn't make any money," according to Pool, the method it pioneered is here to stay. "I was involved in 1960 because we had some interesting ideas that we were able to sell, and now it's become a very active and widespread field."

How to turn an average COBOL programmer into an outstanding COBOL programmer

We all know that there's a big difference between the programmer who has had ten years of experience and the programmer who has had one year of experience ten times. Unfortunately, the second class of programmer is all too common. It seems once a programmer starts to do production work, he has little time to learn anything new. So he uses what he already knows, year after year, even though a little extra training could make him that much more valuable.

Now, I'm happy to announce a book that can quickly improve the skills of the average COBOL programmer. It is called *Structured ANS COBOL, Part 2: An Advanced Course*, and it covers everything the average COBOL programmer should be using but too often isn't. That includes SET and SEARCH for table handling, subprogram linkage, the COPY library, character manipulation, the debugging verbs, indexed file handling, and the sort/merge feature. As a result, a junior programmer who completes this book will be able to use COBOL the way the best senior programmers use it.

3 reasons why this book is effective

1. This book was written under the technical supervision of Paul Noll, an expert in industry. Paul has taken pains to see that the COBOL in this book is not only accurate, but that it also represents the practices used by the best COBOL shops in America.

2. The educational approach used in this book has been adapted from a book called *Standard COBOL* by Mike Murach. This book has been used by more than 200 colleges and universities for classroom instruction, by dozens of businesses for inhouse training, and by thousands of professionals for self-instruction. As a result, you can be sure that the method of instruction works.

3. This book contains dozens of complete program listings and segments of COBOL code. These examples show such things as how to call an assembler language subprogram, how to store and retrieve books from the COPY library, how to isolate the fields in a free-form input string, how to create and update indexed files, how to sort a file that contains records selected in an input procedure and processed in an output procedure, and so on. In my experience, these examples, more than any other factor, determine whether or not a course is effective. And they are the missing ingredient in most COBOL courses.

Who this book is for

This book is intended for programmers who want to increase their knowledge so they can make full use of the COBOL language. As a result, it covers the language that is either misused or not used by the average COBOL programmer.

This book is also intended for trainees who have completed an introductory course in COBOL. In particular, this book is intended for use by students who have completed *Structured ANS COBOL, Part 1: A Course for Novices*. However, part 2 can also follow any other introductory COBOL course, even one that teaches unstructured COBOL.

Although this book deals primarily with standard COBOL, both 1968 and 1974, it is specifically designed for users of DOS or OS on the IBM System/360 or 370 (or the Series 30). No matter what system you're using, though, you'll find this book useful because of its emphasis on standard COBOL.

Related products

This book is part 2 of a two-part course in structured COBOL. Part 1 is designed to teach a beginner everything he needs to know to become an entry-level programmer in industry. These two books, however, fill only one of the training requirements for COBOL programmers.

The other requirement is to train experienced COBOL programmers to use the new productivity techniques. For this purpose, Paul Noll developed a book called *Structured Programming for the COBOL Programmer*. This book is currently used by hundreds of companies for programmer training. And it can make programming more enjoyable at the same time that it increases productivity.

As a reference manual for the development of new programs, Paul developed *The Structured Programming Cookbook*. It presents standards and guidelines for a structured COBOL shop that have been adopted by hundreds of companies throughout the country. And it presents complete solutions for four typical business problems. By using these model solutions as guides for new program development, a programmer doesn't have to start each program from scratch. In this way, the Cookbook can have a major effect on programmer productivity.

Because we believe in structured programming, we think every COBOL shop should make all four of these books available to its programmers. Paul's books have already shown hundreds of companies how to apply the theory of structured programming to COBOL programs. And he can help you too. As one customer wrote: "Paul's books are the first ones I've seen that are really useful to the COBOL programmer who wants to write structured code."

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Plug-Compatible Drives: What to Look For

(Continued from Page 1)

(PCM) interviewed were Telex Computer Products, Inc., National Advanced Systems Corp. (NASC), Braegen Corp. (which took over California Computer Products, Inc.'s Disk drive organization), Control Data Corp., Memorex Corp., Intel Corp. and Storage Technology Corp. (STC).

PCM price-ranges for disk subsystems vary significantly, with Telex and Braegen equipment appearing on the low end and Memorex and STC stating prices that are usually in IBM's range.

Product Spotlight

In addition to a hardware price adavantage, *Computerworld*'s survey confirms Datapro findings that many suppliers offer faster average access times than those specified by IBM for comparable drives. While these numbers seem "reasonable and valid," they are virtually impossible to verify without elaborate test procedures, Datapro noted. Overlapped operations and operating system overhead can have a negative impact on the reported figures and the faster head positioning times do not reduce processing speeds, according to Datapro.

A review of the charts (see Pages 10 and 11) spotlights the PCM concentration on IBM's 3330 and 3350 drives. Five of seven vendors interviewed offer replacements for the 3330 introduced in 1980 and the double-density 3330-11 announced in July 1973.

Intel and STC are not currently competing in the 3330-type market. STC appears to be targeting nonremovable models with replacements for IBM's fixed 3350 and 2305 devices (see related story on Page 12).

Intel's sole offering for end users in the IBM plug-compatible disk arena is another 2305 replacement — a Model 3805 high-speed, solid-state storage device (see related story on Page 11).

"Removable models do not perform well enough . . . Since the placement of the head and the movement of the arm unit are crucial to successful performance, there could be problems even if it is moved a hair out of line" when an operator removes the pack, STC said.

There is a greater chance of head crashes with a corresponding loss of data with the removable models, the vendor spokesman continued.

Current technology is in the fixed-disk area because of the tight tolerances required for the read/write heads, an industry analyst from International Data Corp. (IDC) agreed.

By January 1980, approximately 70,000 fixed 3350-type spindles had been installed in the U.S. market, he estimated. The independents have installed some 25% to 28% of that total number, and he placed STC first in independent market share with an estimate that almost half of the 3350-style devices sold came from that company.

In addition to Intel, Braegen Corp. has so far chosen to stay out of the 3350 market and Nasc straddles the fixed/removable fence with one device that has the same storage capacity (317.5M bytes/spindle) as the 3350, but is removable like the 3330.

"Our customers wanted more density but also wanted the security of being able to lock up the device," which requires removable packs, Gary Nodine, director of marketing services, explained.

There are also five vendors with plug-compatible hardware for IBM's 2314, but the PCMs stressed that only "refurbished or reconditioned" drives are available. There was a general consensus of opinion that although a customer would not be turned away if he approached them with a request for a 2314 replacement, that type of device was no longer being "actively marketed."

IBM went a step further, saying 2314s currently in use by its customers would receive service from the Field Engineering Department, but the drives are "no longer available."

None of the PCMs have yet announced replacements for IBM's 3375 or 3380 drives, which fits the typical PCM time lag as viewed by both Datapro and IDC. A Memorex spokesman said, "although our [competitive] products are unannounced, something is currently being developed."

This time lag is at least partially attributable to the fact that the exact command structure in the interface specifications for IBM system I/O channels must be known in order for plug-compatibles to function without modifying IBM-supplied software, Datapro said.

Device / Characteristics	IBM 3350 (All Models)	Telex Computer Products, Inc. 6350	National Advanced Systems' Corp.[1] 7330-12 7350 (All Models)	Memorex Corp. 3650	Control Data Corp. 33501 33502 33801	Storage Technology Corp. 8350, 8380, 8650
Storage Capacity (In Bytes)	634M	317.5M	317.5M	317.5M	200M-1,270M[2]	635M-1,270M
Average Access Time (Msec)	25	23	20-27	25	15-25	18-25
Spindle/Unit	2	1	1-2	2	2	2
Maximum Unit/Controller	4-8	16	16	16	16	16-32
IBM System(s) Compatibility	370, 135 and up	370, 30 Series, 4341[3]	360/65 and up 370/135 and up, 30 Series	370, 30 Series, 4300	370, 30 Series	370/135 and up, 30 Series, 4300
Controller Purchase Price	$47,580-$68,730[4]	$38,000	$58,000-$65,300	$47,580	$43,400-$50,200[5]	$55,00-$118,030
Unit Purchase Price[6]	$31,680-$41,380	$13,000	$19,250-$41,000	$31,680	$26,240-$47,880	$39,200-$54,700
Delivery	Not Available	90 days	Immediate	Immediate	30-90 days	Immediate[7] or 3rd quarter 1980

Data transfer rate for all models is 1.2M byte/sec (rounded to the nearest kilobyte).

[1] Higher access time, single spindle/unit, lowest price and 360 compatibility all apply to National Advanced Systems 7330-12, which was announced as part of the vendor's 3330 line. Prices for the 7350 begin at $30,800 for the drive, and the associated controller costs $65,300.

[2] Model 33801 has selectable format capacities of 200M, 317.5M and 400M bytes.

[3] For 4341 hookup, block multiplexer channel is required.

[4] Maximum number of units per controller depends on unit selected.

[5] Depends on number of channel connections and inherent control unit memory.

[6] Price ranges do not include fixed-head capability option offered by several vendors.

[7] STC's 8380 will not be available until the third quarter of 1980.

Device / Characteristics	IBM[1] 3330 Models 1, 2, 11	Telex Computer Products, Inc. 6330 Models 10, 11	National Advanced Systems Corp. 7330 Models 10, 11	Memorex Corp. 3670, 3675	Braegen Corp. 330, 336-II	Control Data Corp. 33301/-33302
Storage Capacity (In Bytes)	100M-400M	100M-200M	100M-200M	100M-200M	200M-400M	100M-200M
Average Access Time (Msec)	30	27	27	27	30	30
Spindle/Unit	1-2	1	1	2	2	1
Maximum Unit/Controller	4-8	16	16	16	4-8	32
IBM System(s) Compatibility	360/195, 370/125 and up[2], 30 Series 4300	360, 370, 30 Series, 4341[3]	360/50 and up, 370/135 and up, 30 Series	360/65 and up, 370, 30 Series, 4300	370/135 and up, 30 Series, 4341	370, 30 Series, "Certain" 360s
Controller Purchase Price	$47,580-$68,730[4]	$15,750	$58,000	$47,580	$4,500-$16,000	$25,000-$43,800
Unit Purchase Price[5]	$19,340-$46,090	$6,500-$9,000	$16,000-$18,000	$32,380-$46,090	$3,500-$16,000	$10,000-$21,000
Delivery	Not Available	90 days	Immediate	Immediate	30 days	30-90 days

All PCMs listed offer models compatible with IBM's 3330-1 and 3330-11. Data transfer rate for all models is .806M byte/sec.

[1] IBM statistics include the 3330 Model 2 — a single-spindle version of the 3330-1.

[2] The 3330 Model 11 is not compatible with the 360, and its 370 compatibility begins with the Model 125.

[3] For 4341 hookup, block multiplexer channel is required.

[4] Separate control unit not required to attach up to four 3330 Model 1 and 2 drives to the 370/125. Maximum number of units per controller depends on control unit selected. Prices are for 3830 Model 2 and 3880 control units.

[5] In general, price "ranges" are actually list purchase prices for either the single- or double-density version of the vendor's drive and associated controllers. However, CDC specified that the price range for the controller for its 33302 drive is $38,400 to $43,800, depending on the number of channel connections and inherent control unit memory.

CW Chart

Despite Reliability, Cost Benefits

Intel 3805's Speed Disappoints Prospective User

Product Spotlight

By Rita Shoor
CW Staff

CHICAGO — A system performance analysis team at the Standard Oil of Indiana installation here returned a high-speed solid-state Intel Corp. 3805 storage unit to the vendor after a three- or four-week evaluation because it "didn't perform up to our needs," according to John Chapman, supervisor of the major systems performance analysis group.

At the same time, Chapman rated Intel's device as a very reliable and cost-effective piece of equipment and said "we were disappointed that space and time considerations forced us to ask them to take the device back." Chapman said the firm would be willing to reevaluate the 3805 after the microcode had been redesigned to improve the effective seek time "assuming that we have the time for the reevaluation process." The microcode changes have since been made, according to the vendor.

Faster on Paper

Although the 3805 "looked faster on paper," the Standard team ran into problems when using the device as a paging tool under an OS/MVS operating system, he explained.

Chapman began the evaluation by assuming an 8-msec access time for the IBM 2305 Model 2 fixed-head storage unit that was used for comparison, but MVS took advantage of the 2305's behavior to reduce the effective access time per page by chaining pages together, he said.

"The result was that the effective access time per page was much less than 8 msec when more than three pages were chained together," he said.

By comparison, the Intel 3805 stayed at a "flat 4 msec seek-time; no matter how many pages were chained together, he stated.

The Intel device was tested in an environment that included two IBM 3033s and two 370/168s with all four mainframes operating under OS/MVS with JES3, the technician said.

Four on-line systems are operating simultaneously, according to Chapman, who indicated that the "very high channel-busy rate" with the 3805 was not acceptable in Standard's particular environment.

An alternative plug-compatible device — the 4305 from Storage Technology Corp. (STC) — is scheduled for evaluation in the very near future. The 4305 is currently being utilized for paging at Standard's installation in Tulsa, Okla., and it could be a "good alternative," Chapman said.

Intel had informed Standard Oil that the first release of the 3805 was "not up to specs on the access time" at the time it turned over the two-controller 48M-byte system to the evaluation group, according to John McNulty, general manager of end-user operations at the vendor's Phoenix, Ariz. office.

It was unfortunate that the new firmware release was not ready when Standard was testing the 3805, he said, and described the device's return as having a lot to do with "bad timing."

Standard might have been "more impressed" if it had been able to keep the 3805 until the new microcode release was available, McNulty claimed.

Space and scheduling considerations in a large and volatile installation were significant factors in the decision to return the high-speed system, he said.

The field changes to update the 3805's firmware [were to have been] made at "the majority of user installations" by July 28, McNulty said, "and, I'm under the impression that we'll [Intel] be going back [to Standard] in the fall — possibly October — for a reevaluation."

'Small, Cool, Reliable'

The 3805 is a good piece of equipment, though, Standard's Chapman agreed. "It's small, cool and reliable." Its size and cost-effectiveness, when compared with the 2305 were the main factors in Standard's decision to test the Intel device. The 3805, equivalent to two 2305 Model 2s, required less than 50% of the space of the IBM equipment, he said.

A basic 3805 unit with one controller and 12M bytes of memory has a "footprint" of 30 in. by 60 in. and is 6 ft high, according to McNulty. However, two controllers and 72M bytes of peripheral storage fit into the same box, the Intel spokesman claimed.

The 12M-byte one-controller 3805 has a list price of $158,500 with an IBM 2305 Model 2 priced at $104,500 and its corresponding 2835 Model 2 controller costing $66,810.

Device / Characteristics	IBM 2305[1] Model 1&2	Storage Technology Corp. 4305	Intel Corp. 3805
Storage Capacity (In Bytes)	5.4M-22.4M	11.25M	12M-72M[2]
Average Access Time (Msec)	2.5-5	.3	.4
Transfer Rate[3] (Bytes/Sec)	1.5M-3M	1M-3M	1.5M-2M
Maximum Unit/Controller	2	4	—
Maximum Controller/-Unit	—	—	4
IBM System(s) Compatibility	360/85 and 195, 370/155 and 165	370/135 and up	370, 30 Series, 4341
Controller Purchase Price	$66,810-$80,700[4]	$55,650	$60,450
Unit Purchase Price[5]	$104,500, $131,600	$84,735	$158,500
Delivery	Not Available	Immediate	90-120 Days

[1] IBM's 2305 is available with either one or two spindles per unit. STC's 4305 and Intel's 3805 are both solid-state devices which are not mounted on spindles.

[2] Basic model available with 12M bytes. Additional memory is in 12M-byte increments.

[3] Data transfer rates are not ranges, but depend on which rate in model is selected.

[4] Prices are specific to Models 1 and 2 of the 2835 control unit.

[5] IBM price is specific to each model. STC price quote is for data transfer rate of 1.5M bytes/sec. Intel price is for basic unit and includes one controller.

Device / Characteristics	IBM 3340, (Model 70), 3344	Memorex Corp. 3640, 3644
Average Access Time[1] (Msec)	25-35	20-25
Maximum Unit/Controller	4-8	16
IBM System(s) Compatibility	370/115 and up 30 Series, 4300	370, 30 Series, 4300
Controller Purchase Price	$47,580-$65,730[2]	$47,580
Unit Purchase Price	$25,460-$31,684	$25,000-$31,050
Delivery	Not Available	Immediate

Data transfer rate for all models is .885M byte/sec and all models listed have two spindles per unit. Storage capacity of 3340 and 3640 is approximately 70M bytes; 3340 and 3344 have 280M-byte storage capacities.

[1] Average access times do not indicate a range, but are the specified access times.

[2] Customer may opt for a 3201 DASD adapter for $3,780 rather than a separate control unit for the 4331. The maximum number of units per controller depends on the control unit.

Device / Characteristics	IBM[1] 2314 (A Series)	Telex Computer Products, Inc. 6312	National Advanced Systems Corp. 3101	Memorex Corp. 3660 215	Braegen Corp. CD12, CD22,	Control Data Corp. 23121, 23122
Storage Capacity (In Bytes)	29.17M-117.08M	29M	58M	29.1M	29.176M-116.7M	29.17M-58.35M
Average Access Time (Msec)	60	32	45	42	35	25-35
Spindle/Unit	1-4	1	1	1	1-2	1
IBM System(s) Compatibility	360/30-195, 370/-135-195	360, 370, 4300[2]	360, 370	360, 370, 30 Series,	360/25 and up[3], 370/-135 and up, 30 Series 4300	360, 370
Controller Purchase Price	—	$3,500	$32,500	$21,000	$1,500-$3,000	$10,000
Unit Purchase Price	—	$1,500	$19,500	$7,000	$2,500-$4,000	$4,000-$6,500
Availability (Delivery)	—	30 days	Immediate	Immediate	30 days	30-60 days

Data transfer rate for all models is .312M byte/sec, and all models have a maximum of eight unit/controller.

[1] IBM's 2314 is no longer available from the vendor.

[2] For 4300 hookup, block multiplexer channel is required.

[3] Model CD12 systems compatibility extends only to the Model 65 in IBM 360, and the CD12 does not offer 4300 compatibility. Model 215 systems compatibility begins with IBM 360/30.

CW Charts

Product Spotlight

Driving Coders Back to 'Ground Zero'

FBA for 3310s, 3370s Called 'Monkey Wrench'

By Rita Shoor
CW Staff

COLUMBUS, Ohio — IBM threw in a "monkey wrench" for its competition when it announced fixed-block architecture (FBA) for the 3310 and 3370 disk drives, according to William Jurist, a software consultant with Goal Systems Corp. here.

Software firms that are involved in the development of I/O code "had to go back to ground zero" in order to interface with FBA drives, he explained.

In addition, the FBA drives are not geared to run under an OS/MVS system, the software specialist continued. Although Vsam access code probably would not be significantly affected by FBA, other operating system software might need extensive modification, Jurist speculated.

JES3 and the OS spooling system are examples of software that would be heavily affected by this architecture, he said.

Software Modifications

"MVS relies on device-dependent I/O in count-key-data (CKD) format," a software programmer from a large Chicago installation agreed. "For example, MVS even allows a user to write his own disk channel program. . .This [software] would have to be completely rewritten [to conform] with FBA disks," he said.

If the installation already has DOS/-VSE or VM operating software, however, a decision to switch to FBA devices would usually be transparent to the organization's application programmers and designers, Jurist said.

A small conversion utility is available for sequential files, and Vsam would present no real problems, he added.

The only "real bottleneck" would be with direct access files. Software technicians might have to write a replacement for that access method for the FBA disks, "but I haven't run into many DOS shops that have direct files," Jurist noted.

Jurist's speculations on the problems created during FBA conversions do not have an immediate effect on six of IBM's competitors in the disk drive arena.

None of the plug-compatible mainframe marketers or manufacturers interviewed (Telex Computer Products, Inc., National Advanced Systems Corp.,) Braegen Corp., Control Data Corp., Memorex Corp. and Storage Technology Corp. have officially announced FBA devices to compete with IBM's 3310 and/or 3370.

However, "an unannounced FBA product is in the works," according to a Memorex spokesman. And, "it would take a lot more than just [IBM's announcement of] the 3375 and 3380 [disk drives with CKD architecture] to convince us that IBM is totally walking away from FBA," STC's said.

Speculation is rife among industry observers regarding IBM's commitment to FBA."I really think that at least the 3375 will [eventually] be set up to go with either architecture [FBA or CKD]" was the educated guess from one software consultant who wished to retain his anonymity.

At least one consulting firm that specializes in "IBM-watching" expressed agreement with this tentative statement. "The announcements now targeted to be made in the fourth quarter 1980 time frame include the FBA operations for the 3380/3375," Strategic Business Services, Inc. stated in a report entitled "IBM's Future Large Systems Software Strategy."

FBA was not previously announced because of marketing considerations as well as continuing technical difficulties in the software implementation area, according to Strategic.

After Comparison Testing

Insurer Scraps IBM 2305 for STC 4305

By Rita Shoor
CW Staff

HARTFORD, Conn. — Although testing IBM plug-compatible disk drives may cost both machine and staff time, the results can be worth it, according to Eric Dugroo, secretary and director of the technical services division, DP services for the Hartford Insurance Group here.

The multiline insurance firm replaced its IBM 2305 disk storage unit with a Model 4305 solid-state unit from Storage Technology Corp. (STC), because "its performance was better and the 4305 was considerably cheaper," Dugroo said.

"Our first 4305 module was installed in December of 1979 and we've added two since then. We're really pleased with them and have had no unusual problems arise," he continued.

The hardware configuration at Hartford includes four IBM 3033s each with 12M bytes of main memory, one 8M-byte V/6 mainframe from Amdahl Corp., one IBM 370/165 with 3M bytes of main memory and one 4M-byte IBM 370/158 attached processor, Dugroo explained.

One of the 3033s runs IBM's time-sharing option (TSO) which supports approximately 140 terminals — the majority of which are CRTs — to serve "roughly 600" people in the systems and programming area, Dugroo continued. "We use the 4305 generally for paging on the non-TSO systems and for swapping on the TSO system," he said.

The most recently installed 4305 is being utilized on an IMS application system and "we have another 4305 on order . . . As our requirements grow, we hope to add others," he said.

RAM vs. CCD

All of the 4305s currently installed at Hartford utilize random-access memories (RAM) rather than the charge-coupled device (CCD) memory that STC had expected to use in the 4305s being manufactured in 1978. However, "it's my understanding that they [STC] are not shipping any CCD units now," Dugroo said, indicating that the expected storage unit will also be a RAM device.

STC and Intel Corp. are two companies which, according to industry observers, market the devices which are the main competition for IBM's 2305 fixed-head storage unit. Both the 4305 and Intel's 3805 are solid-state RAM devices, although the 4305 was orginally designed for DDC memory, according to one technical specialist from International Data Corp. (IDC).

In late 1979, when it "became apparent" that CCD shortages would continue "for some time," STC began producing RAM-type 4305s. Extensive testing — both in-house and at customer sites — has shown that RAM-equipped drives are "just as reliable" as the CCD-equipped units, the vendor claimed.

Intel, on the other hand, originally went the "semiconductor route and basically used 64K fallout chips," IDC stated. IBM's 2305 and the competing 4305 and 3805 were designed for large system users and are most often considered an extension of internal memory — paging devices — rather than peripheral disk storage, the IDC representative said.

"The current demand is very high for this [type of memory]," he added. (See related charts on Pages 10 and 11 for device specifications.)

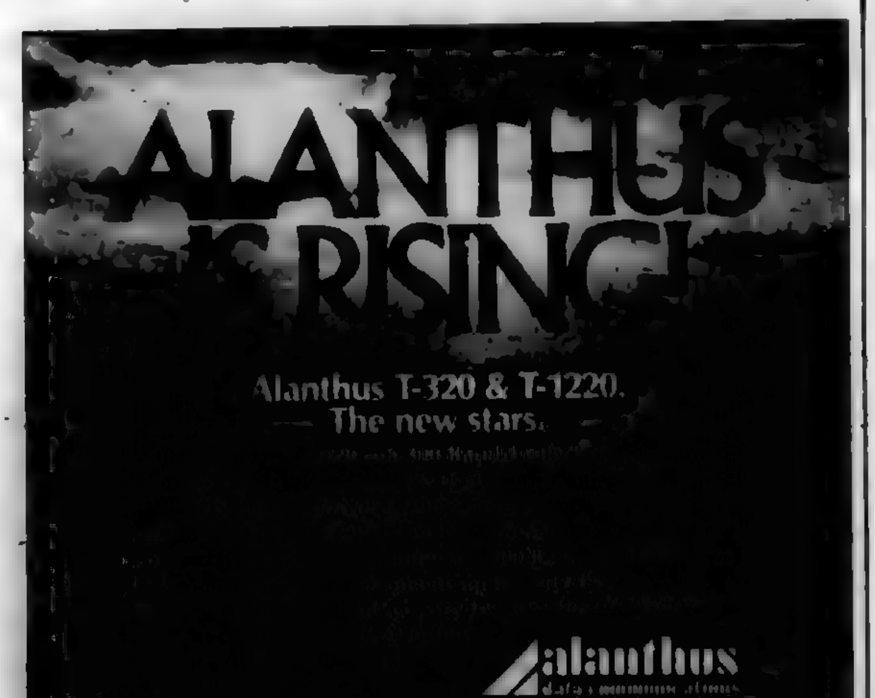
IDC's speculation on this demand may be borne out by the fact that there are about 170 Model 4305 solid-state equivalents installed at customer locations — 60% of which are 16K RAM units, according to STC.

Comparison Testing

While Dugroo pointed out that it is possible to use IBM's 2305 for permanent data storage, customers are utilizing the 2305s for comparison testing of both the Intel 3805 [CW, July 27] and STC's 4305.

An STC customer that preferred not to be identified recently completed a benchmark study on an IBM 3033, which involved alternately using a 4305 unit including one controller and four storage devices and three 2305 Model 2 disks for paging, STC said. In general, the end user found that the device service time of the 4305 offered a 19% to 21% improvement over that of the 2305-2, depending on the size of main memory, and a nonquantified improvement in overall system performance with the 4305.

The improvement was greater in tests involving 6M bytes of main memory with increased paging and swap activity than in those with 8M bytes of main memory, the vendor stated.



Secret Service Seeks Help in Cracking SSA Fraud

By Jake Kirchner

CW Washington Bureau

BALTIMORE — The Secret Service made a special plea recently for public help in its investigation of a fraud scheme that netted at least three people approximately $500,000 through manipulation of Social Security Administration (SSA) computers here.

The request was made after former SSA employee Janet Blair was sentenced to 10 years in prison and $50,000 in fines for her part in the fraud. She was the last to be sentenced of the three persons indicted for cashing phony U.S. Treasury checks she had directed the SSA computer center to issue over a two-year period [CW, March 3].

Blair and her two accomplices had pleaded guilty to the charges, but did not cooperate with the Secret Service, which has not been able to recover any of the missing monies [CW, June 16].

"We're getting no cooperation from anybody," Assistant U.S. Attorney James Rothschild said at a press conference. While investigators have numerous leads and will be presenting further evidence to a grand jury in the case, they are "looking for people who can help us," Special Agent James E. Le Gette of the Baltimore Secret Service office added.

The government is convinced, Le Gette said, the trio did not operate the fraud-scheme for their own profit.

Through wire tapes and "lengthy surveillances," the government has come up with a number of names, but Le Gette would not say if there are other "suspects" at this time or if the government has reason to believe there may be more SSA employees involved in the case.

Le Gette did say the investigation is continuing here and in California, where some of the stolen money is known to have ended up.

The three persons that have been convicted so far accepted stiff sentences rather than reveal any other accomplices — perhaps, one federal offical speculated, because they fear their coconspirators.

Le Gette described the people already identified in the case as "a bad group of people." Blair's accomplice Stella Abrams had a previous narcotics conviction. And Blair's brother-in-law and accomplice, Malcom Blair, has been convicted of 13 various offenses over a 10-year period and was already in federal prison on another charge when the recent indictment was handed down.

Janet Blair had no previous criminal record, but her husband is currently in prison on a double murder conviction.

Blair, a benefits authorizer at the SSA installation, used the "kill credit" correction cycle of the authorization system to erase the computer records of the fraudulent transactions, according to the Secret Service.

The government is especially concerned about this case because it involves a government agency that disperses millions of dollars a week, Le Gette said. He "appealed to all persons having information" about this case or other frauds at the SSA to report them to his office.

He assured the confidentiality of all callers: Le Gette can be reached at (301) 962-2200.

Telpak to Go On Until Dec. 29

CW Washington Bureau

WASHINGTON, D.C. — Telpak service will continue until Dec. 29, the U.S. Circuit Court of Appeals ruled here late last month.

The action came after the court decided several weeks ago that AT&T could terminate the bulk private-line offering [CW, July 7]. Telpak users strongly oppose the decision; they pay considerably less for circuits than other customers who lease individual private-line circuits. Specialized carriers favor the decision because they cannot compete with Telpak rates, nor can they lease Telpak circuits from the phone company and resell them.

AT&T wants to terminate Telpak because of two earlier Federal Communications Commission (FCC) decisions: one requires the rates to be repriced; the other says the phone company must allow resale and sharing of Telpak circuits.

According to Bell, repricing on the terms demanded by the commission would make Telpak unprofitable, and resale and sharing would cause a massive revenue loss. The reason: Subscribers who now pay individual circuit rates would be able to replace these facilities with shared or resold Telpak circuits costing far less.

Last June, the U.S. Circuit Court of Appeals ruled essentially that the commission had erred in accepting the phone company's Telpak termination petition three years ago. AT&T failed to supply required economic justification, the court said.

However, the court gave Bell 120 days to supply this documentation. At the end of that period, assuming the material is accepted by the FCC, the court said Telpak can be terminated.

This 120-day period has now been extended to 180 days, in reponse to a phone company request for more time to prepare the necessary justification. As a result, barring further legal action, Telpak will end Dec. 29. But a number of users, including the U.S. government, are seeking reconsideration of the court's June decision, and so extension of Telpak is possible.

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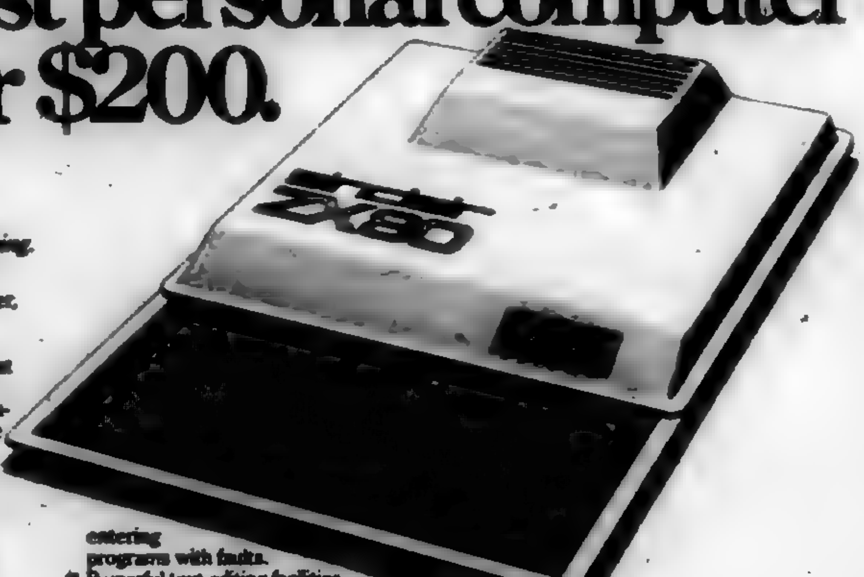

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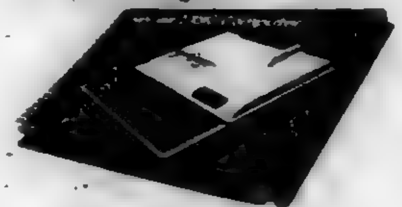

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Outcries From Two Unions

Australia Feeling Social Impact of Technology

Letter from Australia

By Susan Coleman Deputy Editor Australasian Computerworld

This month's preoccupation here has been with the social impact of technology. While the computer community anxiously awaits the report of the Committee of Inquiry Into Technological Change in Australia (Citca), commissioned by the federal government and rumored to be released any day now, two unions have created a terrific impact with their own public protests on technological change — or TC, as it is called here.

The Australian Bank Employees Union this month initiated a series of television advertisements — "Bank on People, Not Machines" — to support its claim for a 32-hour work week.

All three banking unions have banned the servicing of automatic teller machines (ATM), those banking terminals which, though common in the U.S., have only just begun to be introduced here. While banking hours are grossly inadequate for the consumer (one can only bank between 10 a.m. and 3 p.m. except on Friday, when the hours are 9 a.m. to 5 p.m.), the banks themselves are prepared to offer 24-hour banking through terminals.

Nine-Day Fortnights

Contrary to the unions assertions, the banks claim this will not reduce the number of people employed in banks. The union attitude is this: "Fine, you put in ATMs and we'll service them, but only if you reduce our working hours each week (ultimately to 32) or similarly introduce a nine-day fortnight."

This, they assert, will maintain the present levels of employment, which are being eroded by the introduction of the banking terminals and existing installed computer systems. (The banks' recruitment of school leavers fell 40% between 1975 and 1977.)

Clearly the attitude is at variance with the bank employees' desires — they want to maximize their profits and minimize their costs. In the meantime, the consumer is the meat in the sandwich.

What better way to learn about the computing scene in other countries than to ask the editors of computer publications? Computerworld *recently set up an information exchange with its sister publications, all published by CW Communications, Inc., to do just that.*

It is worth noting, however, that the bank employees are happy to extend bank hours — using people — because they say this will increase the number of jobs in the banks. "By all means introduce new technology" is their cry, "but let us, the workers, share in its benefits."

VDT Dispute

While bank employees are using TV to put forth their case, newspaper journalists went on strike and printed their own newpaper, *The Clarion*, to explain their stand. The strike, which lasted for four weeks, started when 29 journalists from Rupert Murdoch's *The Australian* newspaper were fired for refusing to prepare their copy using visual display terminals (VDT).

The journalists had asked for another $50 a week to operate these terminals and were insulted when the Conciliation and Arbitration Commission, a government body, offered $5.

When the 29 dissidents were fired, the union (the Austrialian Journalists Association [AJA]) called out all newspaper journalists. Two national papers were forced to stop printing, but others managed to keep going with the services of freelancers and newspaper executives who were undoubtedly delighted to get back to the typewriter (or, in this case, VDT).

The irony of all this was that the printers' union, which stands to lose most by the introduction of VDTs, refused to support the journalists because of past acrimonies. Thus the impact on the employees was not as dramatic as it might have been.

A conciliatory offer of a 5% raise, which would have given senior journalists an extra $20 a week, was similarly refused. But after four weeks the journalists voted 3 to 1 to go back, for a 6% raise and three days more vacation.

The settlement did nothing to solve the real problem raised by the introduction of technology into this area. In one newspaper alone, it claimed 450 jobs will be eliminated in two years, mostly in the printing and kindred industries. And it is easy to see that faster preparation of copy will make each journalist more productive, ultimately eliminating some of these jobs as well.

The far-reaching effect of both these actions — of the journalists and the banking union — is to further alienate the worker from the consumer and from his employer. Furthermore, other unions, aware of these short-term gains, will be led to react in the same knee-jerk fashion. This could ultimately cripple the Australian economy, which is still reeling with 6% unemployment and double-digit inflation.

The policies of the Federal Labor Party, which is not in power and is not expected to win this year's election, indicate it has a more realistic attitude to planning for technological change — with the proposal for a Technology Planning Council.

Labor policy is for a comprehensive national policy "based on the supremacy of the right to work and including related matters such as education, social welfare and redefinition of traditional concepts of work and leisure." One can only hope that some of this will rub off on the conservative Liberal Party.

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Bay State to Eye Sales, Use Taxes

BOSTON — The Massachusetts Department of Revenue will hold public hearings here on Aug. 27 to discuss the application of sales and use taxes to the DP industry.

While the commonwealth has made feeble efforts since 1978 to reexamine and rewrite tax regulations, departmental reorganizations and often-changing department heads have until now stymied any serious attempts at such action [CW, Oct. 15].

Meanwhile, canned, off-the-shelf and custom software packages continue to be taxed in Massachusetts, as they have been since 1966, resulting in thousands of dollars in revenue for the commonwealth.

Copies of the proposed regulation may be obtained from Joseph X. Donovan, Rulings and Regulations Bureau, Room 610, Leverett Saltonstall Bldg., 100 Cambridge St., Boston, Mass. 02204.

Correction

The vendor of Wylbur [" 'Wylbur' Hikes Manufacturer's Productivity 40%," CW, June 30] is On-Line Business Systems, Inc., not On-Line Systems, Inc.

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NTIA Paper Outlines U.S. Information 'Policy'

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – U.S. policy is that whatever can be distributed through a free market should be, including information goods and services, the U.S. government has told its trading partners.

In a paper submitted recently to the Paris-based Organization for Economic Cooperation and Development (OECD), the Commerce Department outlined U.S. domestic information "policy" – the "fundamental assumptions" and "principles upon which the United States generally approaches information policy issues."

The paper was developed for an OECD information and communications conference this fall and was also submitted to a recent international transborder data flow conference in Rome [CW, June 30].

Drafted to explain the philosophy of U.S. negotiators in international discussions of information issues and practices, the paper noted that "a nation's international information policies reflect its domestic information policy perspectives."

The U.S. is unlike those countries in which basic communications services, such as radio, television and telephone are provided by the government," the document noted. In the U.S. "there is no grand information policy, no single national information policy, but rather a composite of policies, explicit and implicit, about information."

Dual Approach

The paper, prepared by the Commerce Department's National Telecommunications and Information Administration (NTIA), considers these explicit and implicit policies from two standpoints: the legal foundations of information dissemination and the economics and management of information.

Under the first category, dealing with the conditions under which information is or is not available, the NTIA said that in the U.S. "the initial assumption in this area is a policy of openness, with exceptions or limitations being made only for other overriding public policy concerns."

Second Category

In the second category, information distribution in the society "once the fundamental decisions as to its availability and accessibility have already been made," the initial assumption is "to favor the use of free market mechanisms, with exceptions being made for overriding public policy considerations or in the case of market failures."

The basic assumption of the first category, is that information should be openly available "the First Amendment is 'the centerpiece' of U.S. information policy," according to NTIA.

A discussion follows of the growing concern for protecting individual privacy. This concern is motivated, NTIA said, by "the realization that the legal protections relating to personal information have now kept pace with social and technological changes."

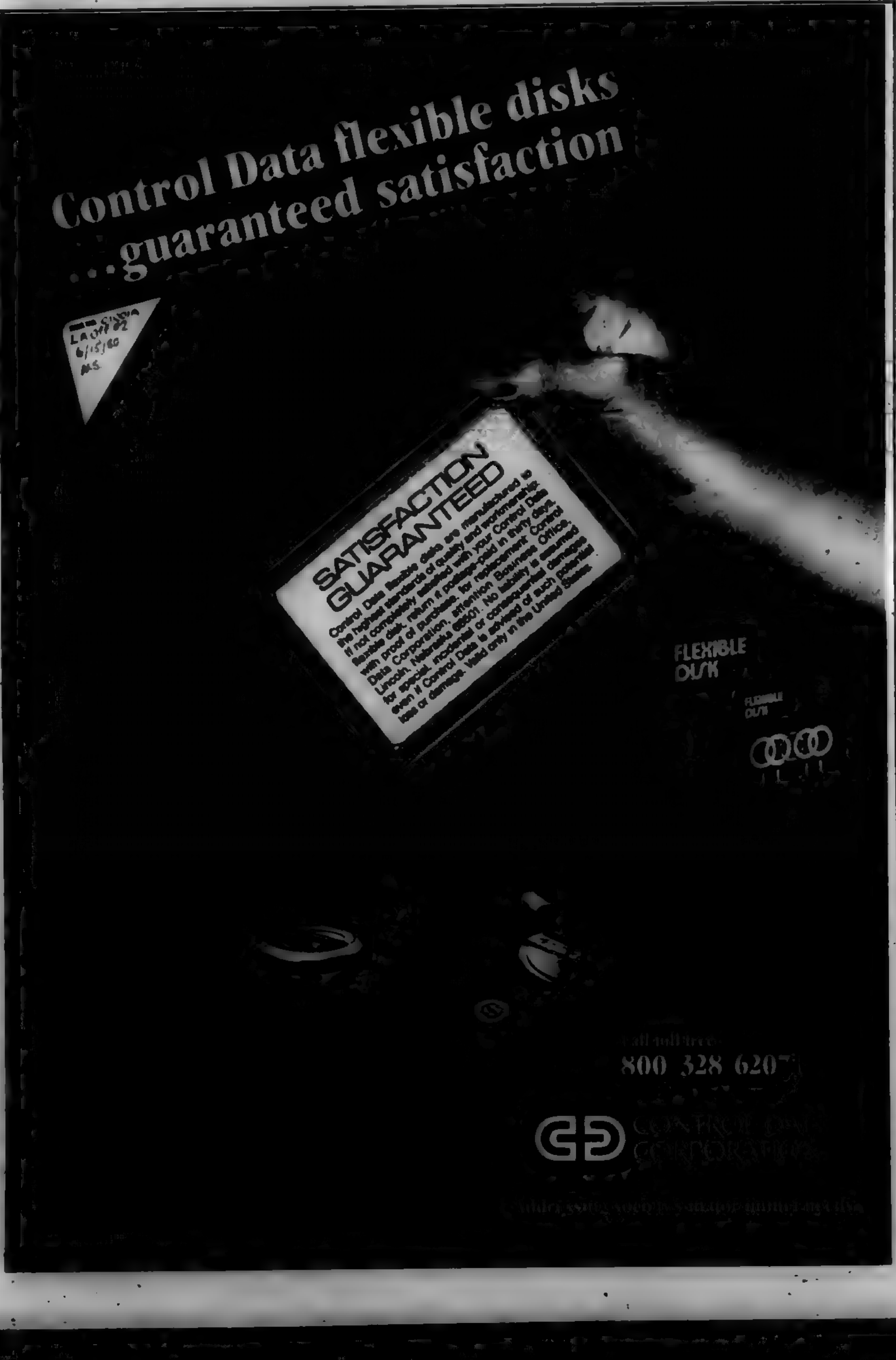
Maximum Competition

Turning to the economic side of United States information policy, the paper said "the fundamental presumption of a largely free market economy, as in the U.S. is that whenever possible there should be maximum competition among private sector organizations for the production and distribution of goods and services," including information goods and services.

NTIA added that reliance on a free market creates problems in "assuring equitable access to information services by all sectors of society."

"A competitive market structure, while it generally holds the prices of goods down, may not provide a mechanism for subsidies to those who need certain information services and cannot afford to pay the going rate to get them," the paper explained.

The resolution of competing interests "in an attempt to achieve a balance between the efficient and equitable production, distribution and use of information goods and services is reflected in United States economic policy, constitutional interpretations and federal information management policy."



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- 95 Other ______________

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- 12 VP/Assistant VP
- 13 Treasurer/Controller/Finance Officer
- 21 Director/Manager of Operation/Planning/ Administrative Service
- 22 Director/Manager/Supervisor DP
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- 31 Manager/Supervisor Programming
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C-1

(Scientific/Engineering Problem)

	Ranking	Time
IBM 5110	8th	28:47.2
Wang 2200VP	1st	2:05.8
Texas Instruments FS990/10	*	*
Hewlett-Packard System 45	3rd	4:38.9
DEC PDP-11V03	7th	14:43.4
Q1 Lite Microcomputer System	4th	6:50.7
Univac BC/7-610	5th	12:09.2
Northern Telecom 405	*	*
Datapoint 1170	9th	38:27.5
Randal 100	6th	13:52.4
Hewlett-Packard 250	2nd	4:05.9
Texas Instruments DS990/2	*	*

*Test could not be run because of memory limitations.

Note: all systems were tested in Basic where that language was available. Results for compiled languages include compile time.

C-3

(Accounts Receivable)

	Ranking	Time
IBM 5110	4th	4:11.0
Wang 2200VP	3rd	3:20.0
Texas Instruments FS990/10	2nd	3:18.6
Hewlett-Packard System 45	8th	5:05.8
DEC PDP-11V03	5th	4:14.0
Q1 Lite Microcomputer System	7th	5:03.3
Univac BC/7-610	11th	10:37.0
Northern Telecom 405	**	**
Datapoint 1170	9th	6:50.4
Randal 100	10th	10:05.0
Hewlett-Packard 250	6th	4:45.7
Texas Instruments DS990/2	1st	2:48.5

**Test could not be run because of memory formatting limitations.

Note: all systems were tested in Basic where that language was available. Results for compiled languages include compile time.

By Hillel Segal

Demonstrating overall excellence, the Wang Laboratories, Inc. 2200VP and Hewlett-Packard Co. 250 small computers lead the field of 12 systems priced $15,000 to $25,000 in the Association of Computer Users (ACU) benchmark testing program.

The Wang 2200VP placed first in three of the test runs, while the HP 250 gained two first place efforts. The Texas Instruments, Inc. DS990/2 was the only other system placing first in one of the six major testing categories.

All runs were performed on standard programs written in Basic, where that language was offered. Tests included CPU and diskette performance, three real-life application problems and an ease-of-use test of the system editor.

The results would appear to disprove the commonly held assumption that systems in the same price range deliver similar performances. Incredible differences in run-time were found among the systems, although all were using the same program designs.

Despite the importance of differences in speed of operation, the DP buyer should not look at benchmark test results alone. Instead, they should be used along with broader information on the systems' capabilities and the suppliers' services.

But the benchmark results do provide a valuable glimpse at the system in operation. Hard data based on experience is far more useful in evaluating the performance capabilities of a system then conventional measures such as CPU cycle speed, diskette access time and memory capacity.

This is because hidden factors in the operating system and language design inevitably come into play during actual performance, seriously diluting the significance of the raw hardware statistics.

With this in mind, let's examine the benchmark test results and user comments on the 12-system field.

Highlights of Benchmark Runs

- **IBM 5110** — The 5110's best showing was a fourth place finish in the accounts receivable problem. One of the first to offer double-sided, double-density diskette drives, the 5110 is also one of only a few systems in this price range with the APL language as an option. While the benchmark times were not spectacular, with most falling into the third quartile ("fair" category), users gave the system high marks for reliability. Biggest complaint was the small CRT screen.
- **Wang 2200VP** — With three first place finishes, the 2200VP showed great strength. The system's only below-average result was in the I/O test, a measure of diskette speed. Programmers liked the sophisticated Basic implementation, user-programmable special function keys and other systems programming features.
- **Texas Instruments FS990/10** — Scoring above average in most tests, the FS990/10 suffered from lack of usable memory space in the scientific/engineering test, which could not be run. It placed second in the accounts receivable test, its best showing. The FS990/10 is described by TI as primarily a development system for OEMs creating applications based on the Texas Instruments 9900 series microprocessors.
- **Hewlett-Packard System 45** — Placing second in two tests, the HP 45 placed most of its results in the "excellent" category. Although priced near the top end of the range of systems tested, the Model 45 is a self-contained desktop system with features that include CRT graphics capability and a built-in thermal printer. Most users, were operating in a scientific or laboratory setting, where extensive peripheral instruments made by HP were cited as an advantage.
- **Digital Equipment Corp. PDP-11V03** — Finishing third in the I/O test for its highest ranking, the PDP-11-V03 scores were distributed equally above and below the median. Priced at the low edge of the $15,000 to 25,000 range, the reliability, peripherals and upward compatibility are advantages users mentioned. Basic, Fortran, APL and two other languages are offered.
- **Univac BC/7-610** — The BC/7-610 was tested in RPG-II instead of Basic, as that language is not offered. Run-time comparisons (excluding the RPG-II compile time) indicate some above-average results, fourth place in the scientific/engineering problem and fifth place in the CPU test. The system is sold primarily to business users, with applications software normally included.
- **Q1 Corp. Lite** — Only the Lite was tested in PL/I, another compiled language. Run-time comparisons showed a second place in the new product application problem. Other results varied from "good" to "fair." More compact than most systems, the Q1 Lite is touted as a distributed processing solution for business applications. Users contacted were generally enthusiastic about the personal service they received.
- **Northern Telecom Systems Corp. 405** — The 405 is one of the few systems in this price range offering Cobol, and that language is the one most 405 users are operating in. Results of the benchmark testing in Basic, however, were disappointing. Highest showing was eighth in the editing test. Because of formatting difficulties and memory space problems with the preliminary version of Basic used for testing, no application problem results could be obtained. But users contacted were satisfied with price/performance in their application; as an intelligent terminal for on-site input.
- **Randal Data Systems, Inc. 100** — Randal Data Systems has reportedly filed for bankruptcy. The Model 100 placed in the lower half of the field in all tests except the scientific/engineering problem, where it ran sixth. Editing was tedious: the system was rated last in the ease-of-use test.
- **Datapoint Corp. 1170** — With a fourth-place finish in the new-product application problem, the 1170 scored in the "good" to "poor" range overall. However, this model has been discontinued, replaced by the Model 1802 at a considerable price reduction.
- **Hewlett-Packard Co. 250** — The overall performance of the 250 is reflected in the fact that none of the results fell below the sixth place mark.

(Continued on Page 18)

This weekly column gives the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

Calendar

Sept. 1-5, Berlin — **Systems and Simulation Symposium**, sponsored by the International Federation of Automatic Control. Contact: A. Sydow, Central Institute of Cybernetics and Information Processes, 1199 Berlin-Adlershof, Rudower Chaussee 5, West Germany.

Sept. 2-3, Buenos Aires, Argentina — **Strategic Planning for the '80s.** Contact: Arthur Anderson & Co., Center for Professional Education, 1405 N. 5 Ave., St. Charles, Ill. 60174.

Sept. 3-5, Las Vegas — **Electronic Business Communications Conference & Exhibition**, sponsored by the Electronics Industries Association. Contact: John Sodolski, 2001 Eye St., N.W., Washington, D.C. 20006.

Sept. 3-5, Washington, D.C. — **International Conference and Workshop on Model Acceptance**, sponsored by the Society for Computer Simulation. Contact: John McLeod, P.O. Box 2228, La Jolla, Calif. 92038.

Sept. 3-5, Chicago — **Advanced Data Communications.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Sept. 3-5, London — **Designing, Installing and Managing an International Telecommunications Private User Network.** Contact: Telecom Systems Group, Inc., 579 Pompton Ave., Cedar Grove, N.J. 07009. Also being held Sept. 16-18 in New York and Sept. 29-Oct. 1 in San Francisco.

Sept. 7-11, Houston — **Nuclear Records Management Association Symposium.** Contact: Kary Hegstrom, Microform Data, 830 Maude, Mountain View, Calif. 94043.

Sept. 8, Boston — **Disaster/Recovery Workshop for RJE/Mini Computer Installations.** Contact: Management Dimensions, 185 E. Garfield Ave., Pomona, Calif. 91767.

Sept. 8-9, Washington, D.C. — **Computers and Data Communications.** Contact: Data Processing Management Association, Education Foundation, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Sept. 8-10, Chicago — **Fundamentals of Data Communications.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Sept. 8-10, Boston — **Fundamentals of Finance and Accounting.** Contact: the Institute for Science and Public Affairs, 1370 Ave. of the Americas, New York, N.Y. 10019. Also being held Sept. 24-26 in Newport Beach, Calif.

Sept. 8-10, Washington, D.C. — **Government Micrographics Conference and Exposition.** Contact: National Trade Productions, Inc., Suite 206, 9301 Annapolis Road, Lanham, Md. 20801.

Sept. 8-10, New York — **Leadership Skills for Office Supervisors.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Sept. 8-10, Washington, D.C. — **Data Communications Network Design.** Contact: the Institute for Science and Public Affairs, 1370 Ave. of the Americas, New York, N.Y. 10019.

Sept. 8-11, Detroit — **Basic Project Management: Planning, Scheduling and Control.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Sept. 22-25 in Los Angeles.

Sept. 8-12, Seattle — **How to Develop an Effective Long-Range Data Processing Plan.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

Sept. 8-20, Sao Paulo, Brazil — **Internal Auditing.** Contact: Arthur Anderson & Co., Center for Professional Education, 1405 N. 5 Ave., St. Charles, Ill. 60174. Also being held Sept. 29-Oct. 2 in Buenos Aires, Argentina.

Sept. 9, Cleveland — **Information Resource Management.** Contact: Intel Commercial Systems Division, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766. Also being held Sept. 11 in St. Louis and Sept. 16 in Philadelphia.

Sept. 9, Portland — **Improving Office Efficiency.** Contact: Dun & Bradstreet, Inc., Business Education Division, P.O. Box 803, Church Street Station, New York, N.Y. 10008. Also being held Sept. 26 in Stamford, Conn.

Sept. 9-10, Washington, D.C. — **Advanced Interlisp Programming.** Contact: Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314.

Sept. 9-10, Montreal — **International Symposium and Exhibition on Office Automation.** Contact: Canadian Section of the International Association of Science and Technology for Development, P.O. Box 25, Station G, Calgary, Alberta T3A 2G1 Canada.

Sept. 9-11, Boston — **Disaster/Recovery Workshop for Large Installations.** Contact: Management Dimensions, 185 E. Garfield Ave., Pomona, Calif. 91767.

Sept. 9-10, London — **Systems for Small Companies.** Contact: Online Conferences Ltd., Argyle House, Joel St., Northwood Hills, HA6 1TS, Middlesex, U.K.

Sept. 9-12, Anaheim — **Digital Filters & Spectral Analysis.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held Sept. 23-26 in Washington, D.C.

Sept. 10-11, Port Chester, N.Y. — **ACH Spells Profitability.** Contact: Mutual Institutions National Transfer System, Inc., 200 Park Ave., New York, N.Y. 10017.

Sept. 11-12, Minneapolis — **Interactive Financial Planning System User's Meeting**, sponsored by Execom Systems Corp. Contact: Larry Schmidt, 3M Co., Bldg. 224-3E, St. Paul, Minn. 55101.

Sept. 15-16, Halifax, Nova Scotia — **Data Courier On-Line Training.** Contact: Data Courier, Inc., 620 S. 5 St., Louisville, Ky. 40202. Also being held Sept. 18-19 in Chicago.

Sept. 15-16, Boston — **CAD/CAM for Increasing Effectiveness in Both Design and Production.** Contact: Data Processing Management Association, Education Foundation, P.O. Box 91295, Los Angeles, Calif. 90009.

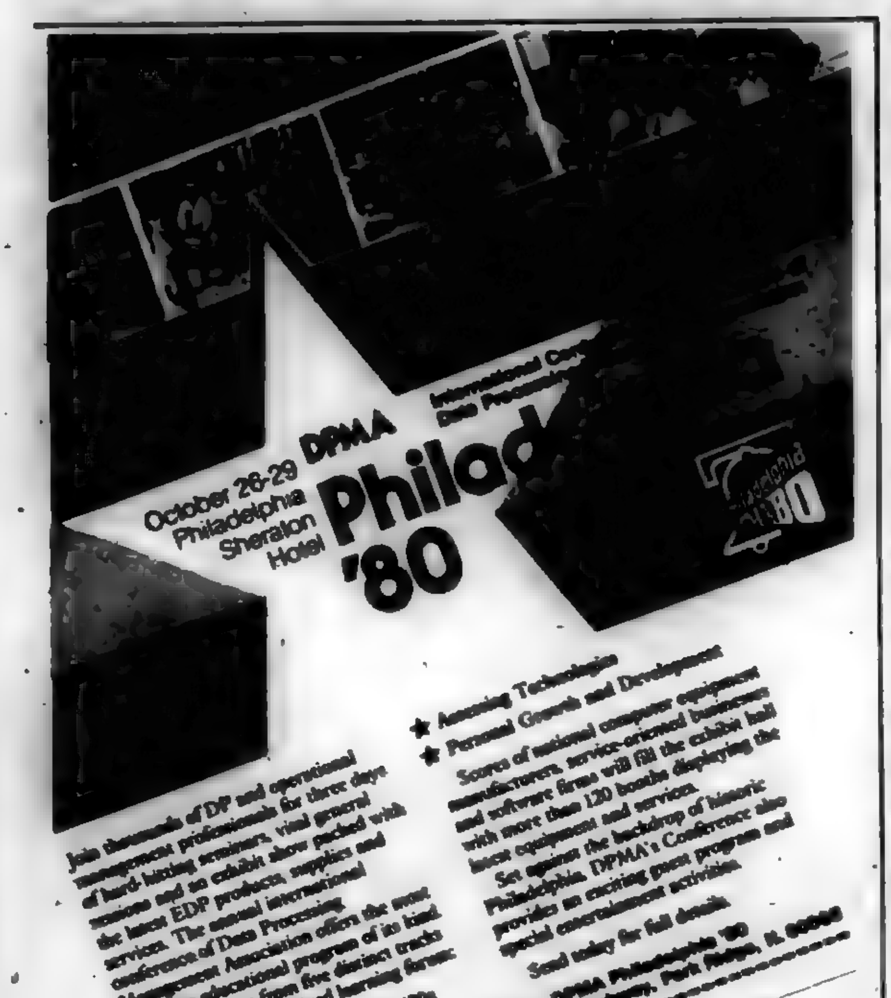
Sept. 15-16, Cambridge — **Computer Graphics: Application and Technology.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Sept. 15-17, New York — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Sept. 22-24 in Houston.

Sept. 15-17, New York — **Data Communications: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 15-17, Atlanta — **General Automation's Users Meeting.** Contact: General Automation Users Group Exchange, P.O. Box 8130, Anaheim, Calif. 92802.

Sept. 15-17, Washington, D.C. — **Computer Controls.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.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Tests Show Wang, HP Lead

(Continued from Page 17)

First in the ease-of-use (and one other) test, the system's human engineering is exemplified by the "soft keys" below the CRT for operator system control. The data base management system received praise from users as well. Price is in the high end of the range, however.

- **Texas Instruments DS990/2** — With mostly above-average marks and first place in the accounts receivable problem, the DS990/2's one area of difficulty was the memory space limitation which TI's other entry in this price range also suffered from. Unlike those in the FS series, DS series systems are intended for use in business applications. Languages available are Basic, Fortran, Assembler and a Pascal run-time system.

Testing Program

In the Series No. 2 benchmark reports published by the Association of Computer Users, the major systems available in the $15,000 to $25,000 range have been tested. We have very briefly described here some of the results.

But new products are continually being offered, many with greater capabilities and lower prices. At the same time, some of the systems already tested are being phased out for newer models. This has already happened to the Datapoint 1170, superceded by the 1802, and the IBM 5110, which has taken a back seat to the new 5120. The Randal 100, to the best of our knowledge, is no longer offered because of that firm's demise.

In order to keep the set of benchmark tests up to date as new systems are announced and others discontinued, ACU will continue to test systems in this price range. Users are invited to contact ACU with their suggestions of which small computers to test.

Next week in *Computerworld* we'll begin looking for the first time at results of Series No. 1 benchmark testing, covering systems priced up to $15,000. The same test programs are used on Series No. 1, providing direct comparisons among systems in both price ranges.

Here again, the results may be surprising: some systems in the lower price category will outperform computers with price tags twice as high. Our first system to examine will be the Pertec Computer Corp. PCC 2000.

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EDITORIAL

Software Workers of the '80s

The manager of information systems must prepare for significant changes in his relation to software workers as software technology strides forward in the 1980s.

Software development is being "routinized," according to sociologist Philip Kraft [CW, July 28] and others who study the organizational dynamics of large-scale programming.

This does not mean a sudden lack of need for highly skilled programmers who can handle "nonroutine" jobs, but it does suggest that, to a growing extent, development managers in many organizations will find they can hand the bulk of programming functions to less skilled and lower paid workers in an environment closer to that of a traditional factory.

In other words, many software development managers will become, in effect, plant supervisors. It also means the upward flow of programmers into managerial positions will probably slow to a trickle. Conversely, more management posts in the development shop will be taken by mangement professionals — those trained to be managers, usually in business schools.

The factors that will allow this to happen include the emergence of software engineering as a discipline; the proliferation of high-level and, ultimately, very high-level languages; and the growing acceptance of structured programming methods. The trend is also pushed on by soaring salary levels enjoyed by software specialists but proving an irritant to many top managers struggling to make ends meet during an economic downturn.

Taken together, these developments tend to reduce the body of skills needed by most people a user might hire to develop software. Hence, users are starting to hire in increasing numbers a class of programmers that demand lower salaries than highly skilled programmers because the former are less trained and easier to find on the job market.

Moreover, as sociologist Kraft has noted, the "de-skilled" programmers work in a manner that is easier to control. And managers want more control after years of being subjected to high personnel turnover, which often leaves important projects in the lurch until adequate replacements can be found for key workers.

Information systems managers may use the de-skilling trend to their advantage. But they can also expect programmers who sense they are losing clout within their organization and on the job market to become more interested in unionizing.

As computer technology alarms other trades and professions by seeming to cause redefinition and elimination of jobs, it is ironic that workers in the technology face the same sort of problems to varying degrees.

DATA PAST

Five Years Ago
Aug. 6, 1975

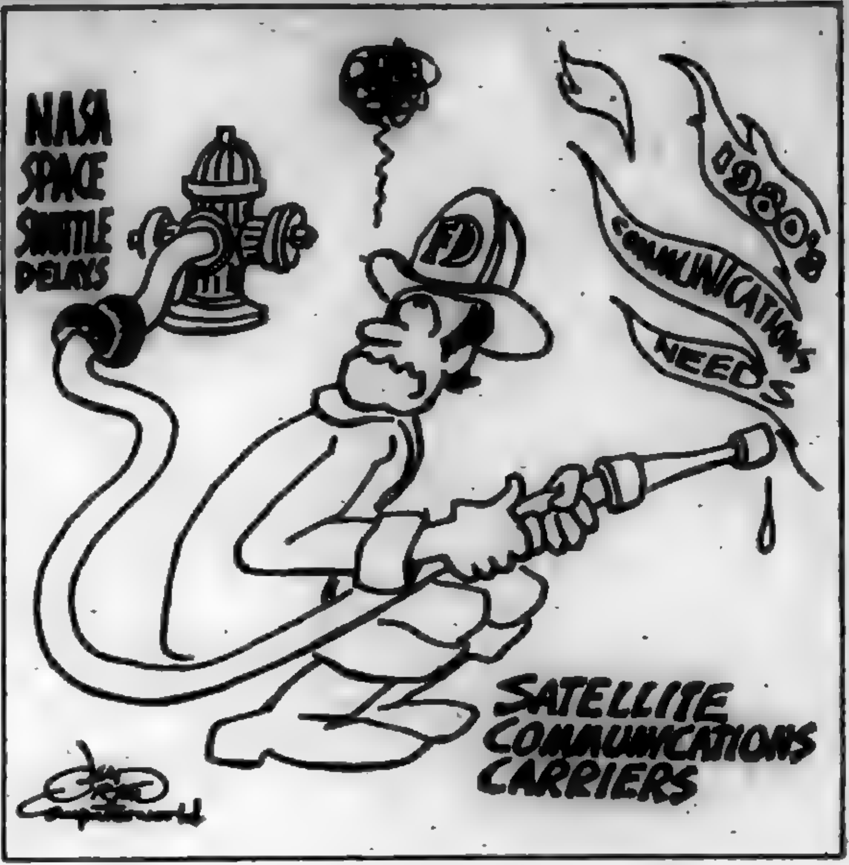
WASHINGTON, D.C. — IBM joined with AT&T in urging the Federal Communications Commission (FCC) to reject a liberalized interconnection proposal. If adopted, the plan would change the requirement calling for Data Access Arrangements to be leased from the phone company.

WALTHAM, Mass. — Honeywell, Inc. dropped two policy time bombs that would make it nearly impossible for users to resell their Honeywell systems. The company warned users that all software provided with their systems was nontransferable. In addition, Honeywell would no longer guarantee equipment previously under Honeywell maintenance after it was resold.

Eight Years Ago
Aug. 9, 1972

WHITE PLAINS, N.Y. — IBM announced the 370/158 and 168, which it said would be available in the second and third quarters of 1973. In addition, the company announced that 370/135s and 145s would be upgraded, at no charge, to include virtual storage capabilities.

SACRAMENTO, Calif. — A computerized system designed to keep track of migrant workers' school-age children might have helped save the life of a 10-year-old girl with tuberculosis. The Migrant Student Record Transfer System located the girl 20 miles west of here after it was discovered in Utah, where she had been going to school, that she needed immediate treatment.



LETTERS

Less Draconian

In "Turnaround Time," Prof. Larry Long stated that "close coordination is essential among all members of a project team and users" [CW, July 14].

I wholeheartedly agree with this sentiment but feel that the procedure suggested to achieve it is more draconian than needed. The tight control proposed by Long may well create ill feeling among the members of the department.

It is my experience that a more suitable solution is to provide a "core time" during which all members are expected to be present in the department. The particular hours of the core time may be varied to suit a particular environment, but it should last at least five hours, for example, 10 a.m. to 3 p.m. This allows three hours of flexitime, before or after core time, to suit the circumstances of individual team members.

Such an approach will result in a more relaxed atmosphere in the department than a strict control approach and yet it will ensure that all members of the team are available during crucial times.

Alex Bykat

Greenville, N.C.

User Revolt at Hospitals

The manifestations of user revolt described in "Hospital Staffs Found Resistant to Computers" [CW, July 7] are, more often than not, symptomatic of situations where a computer-based system is selected and installed by the hospital administration or data processing staff without in-depth analyses of its operational and human-factor impact and without meaningful user participation and control in the selection process.

Such situations are quite common with "ready-made" systems, often implemented using the "one-size-fits-all" philosophy.

A refusal to use the system or an outright sabotage may be the only means of protest available to users at that point.

During my experience in designing and implementing information systems for hospitals, I have learned that hospital staffs seldom refuse to work with or use a computer system if it does the job and makes their work easier. If it does not, the system probably should not have been selected and installed to begin with.

I also find the statement "even the technically good systems failed" hardly relevant to the problem. The real question is not whether the system is "technically good," but whether it is operationally useful and well integrated into the overall process of health care delivery. If it is, people will use it naturally.

George Kolenaty

McLean, Va.

Emphasis Too Negative

The benchmark article on Northern Telecom Systems Corp.'s Model 405 was very interesting, but in many respects disappointing [CW, July 7].

Though much of what was said about the 405 was positive, the headline and first paragraph summed up only the negatives.

I would like to make the following points regarding the testing of the 405:

The tests done are more than a year old. In an industry as dynamic as ours, a year can be measured in generations of products. The 405 tested was a prototype in both hardware and software.

Since the tests were conducted, that version of the 405 has been released, the Basic compiler for the system has also been released and customers have been very pleased with the system's performance in Basic.

A.L. Fazio
Vice-President, Marketing
Northern Telecom Systems Corp.
Minneapolis, Minn.

READER COMMENTARY/Gary D. Ward

DBA: The Phoenix Rises Again

In the early years of data base management, a concept developed concerning a mystical apparition known throughout the data processing industry as the data base administrator (DBA). This all-wise, all-powerful individual was to report only to the highest levels of management to ensure the effectiveness of data processing through the integration of data into common data bases for usage by all of the company entities.

Such an idealistic concept!

Guide and Share gave their endorsements, and IBM, who helped create this apparition, implied that the DBA would rule supreme.

Alas! Poor DBA. I knew him well! Perhaps data base technology was not advanced enough to provide the efficient tools for the DBA to perform his magic. Perhaps corporate management was not aware of the need for control of data and could not justify the support nor make the commitment necessary for the DBA to perform the Herculean task set forth by the idealists of the data processing world.

For whatever reason, the DBA function was slowly deprived of its authority and relegated to the world of technical support, maintaining the expensive access methods known still as data base management systems (DBMS). No longer was the DBA invited to participate in user sessions, much less to attend the council meetings of corporate or even data processing management.

New Era

But times have changed. Management at the corporate level has begun to realize the value of data as a corporate resource. A new concept known as management information services (MIS) has begun to rear its head and speak of such things as information flow, corporate information, data security and all of the unthinkable terms that send chills of ecstasy through the bodies of us never-say-die idealists who still believe. Terms such as data dictionary and many more buzzwords that used to be understood only by DBAs are now being used by executive management and user departments.

The information explosion of recent years has proved to be the needed stimulus for the rise of the phoenix — data administration. The same basic concepts of the original data base administration still apply, with the only difference being in the name and, hopefully, the level of reporting. The important thing to remember at this time is never to let the data administration function slip into the same traps as the original function of data base administration.

To accomplish this, the data administrator must do several things: He must ensure total management support through effective communication with corporate management. Corporate management must be well aware of the commitment it is making in this area.

Management must be aware that effective data administration is not a short-term project — it takes a long time, three to five years, to establish and effectively begin to control information as a corporate resource.

Management must also understand that DBMS are not the total answer. They are only tools for the corporate data administrator and, if not utilized properly, they become glorified access methods and nothing more.

The data administrator must start by establishing a very strong framework from which to build the data administration function through effective standards, procedures and a technically strong DBA function. He must ensure the education of not only the programming staff but the end users and management as well.

A key factor in the success or failure of data administration is the art of taking it one step at a time. The groundwork must be properly laid and the initial DBMS implemented on noncritical, but meaningful applications. This will allow the management and users to see benefits from the DBMS while educating the programming staff in the actual usage of the DBMS itself.

As the knowledge within the organization grows, so will the confidence in data base.

Once the data base administration group is functioning as a technical support group and the users are truly involved in the process of determining application needs, the data administrator is ready to address the nebulous task of data administration.

(Continued on Page 22)

MALIK AT LARGE **Rex Malik**

Challenging Book Explores Management Cybernetics

It is almost axiomatic in Europe that every American learns the skills of modern management at his mother's knee. But readers faced with the reality of their own managements will know that this is not so. This "rule" is in the same class as "Every Frenchman eats frogs' legs" and "The British only like warm beer."

Anyway, if we accept the first proposition for a minute, what would you say if I told you Mother was wrong? That every principle you have learned about the way organizations are built and function is also wrong?

That we in Europe and America have built our organizations the wrong way — with few exceptions?

It would follow that we generally misuse most of our computer systems and that those umpteen billions of dollars worth of systems out there do everything except provide management with the information it really needs.

Those are some of the conclusions that can be drawn from reading Stafford Beer's latest, most challenging book, *The Heart of Enterprise* (John Wiley, publisher).

Beer is a management cybernetician, indeed *the* management cybernetician, for he almost single-handedly invented the field. Indeed, Norbert Wiener, the father of cybernetics, once called Beer the father of cybernetics in business and management.

He has written a number of books, of which perhaps the best known are *Designing Freedom, Decision and Control* and *Brain of the Firm*. (A new and expanded issue of the last named will be available in the autumn and was designed to be read with the new book.)

Beer's work and thought are grounded in real management experience. It began in a large British steel company in the '50s when he got the chance to try out some then-revolutionary ideas in practice. Since then, he has consulted and taught cybernetics.

The Heart of Enterprise is in many ways as important in the history of cybernetics as was the book which started it all, Norbert Wiener's *Cybernetics* (MIT Press).

In its broadest sense, cybernetics has always been about control engineering — about, as Wiener put it in his original subtitle, "control and communication in the animal and the machine." And it has used the language and descriptions of control engineering and the biological sciences.

However, Beer makes a break. If cybernetics is a viable science, he feels, then it must be possible to describe the system in terms of itself. The book concerns itself with how to describe an organization in terms of cybernetics and how to make it function most effectively.

'Variety Engineering'

Dipping into the index, one finds more entries under "variety" than under anything else. This is fitting, because Beer emphasizes that the real job of management is "variety engineering," and that variety is primarily the variety of information.

I searched for a passage to summarize the Beer view of management and found it in the summary of Part Three. "The contention is," he writes, "that most managerial measures as they are commonly understood are worthless in

(Continued on Page 23)

THE TAYLOR REPORT/Alan Taylor

Contract Battle Leaves User in the Lurch

Perl-Mack Enterprises of Denver bought an NCR Corp. 8230 in 1977. It paid $4,841 down, with the remainder to go to NCR after "all programs" were functional on the system.

While the contract terms were not particularly unusual, the course of the agreement took some turns for the worse and ended up leaving the user in the lurch.

The software to be provided was to handle payroll, accounts payable, general ledger and work-in-progress, as well as commercial apartment leasing, daily bank balances and volume projections. Perl-Mack paid $6,100 down on these programs at the same time it made the down payment on the hardware. The total fixed price was $31,000.

Hardware delivery was set to be in five months — by February 1978 — and NCR account manager George Tillman had estimated that the accounting software would take about 4-1/2 months or less to prepare, so that, at least, would be ready at about the same time the hardware was due.

But it wasn't ready in February, six months after the order or even a year later!

NCR Gets Impatient

But before then, NCR had lost patience with the idea of staying with the contract terms. On Aug. 25, 1978, while the accounting software was unfinished, NCR district manager David Olivet proposed finalizing the payments for the hardware by making them payable as soon as the accounting software was ready, without waiting for the other applications.

But Samuel Primack, Perl-Mack president, viewed the missing parts of the software as vital. So he asked NCR to accept a different modification of the contract — one calling for liquidated damages if the software wasn't delivered before a certain date. (NCR was by then giving Jan. 31, 1979 as the final software completion date.)

Rejecting that request, NCR in November 1978 brought the artillery to bear. It threatened to remove the computer from Perl-Mack's site — and to return it only when all the software was ready, which could still be years in the future.

This time the threat was backed up by a misleading reference to the agreement. Olivet put it this way: "NCR, in our original agreement, agreed that you did not have to pay for any hardware or software until such time as all systems were finished and accepted by you."

So far, so good. But Olivet then continued: "We did not state that you could use our equipment free of charge for any period of time."

What NCR really meant was made clear in the next sentence giving Perl-Mack the choice between two options:

"NCR will require that you make a decision no later than Dec. 22 as to whether you wish to continue in the program development and pay for the hardware with software payment due upon completion of the commercial system; or whether you wish to have us remove the NCR hardware until such time as all programs are completed, at which time we would bill both the hardware and software."

(Continued on Page 23)

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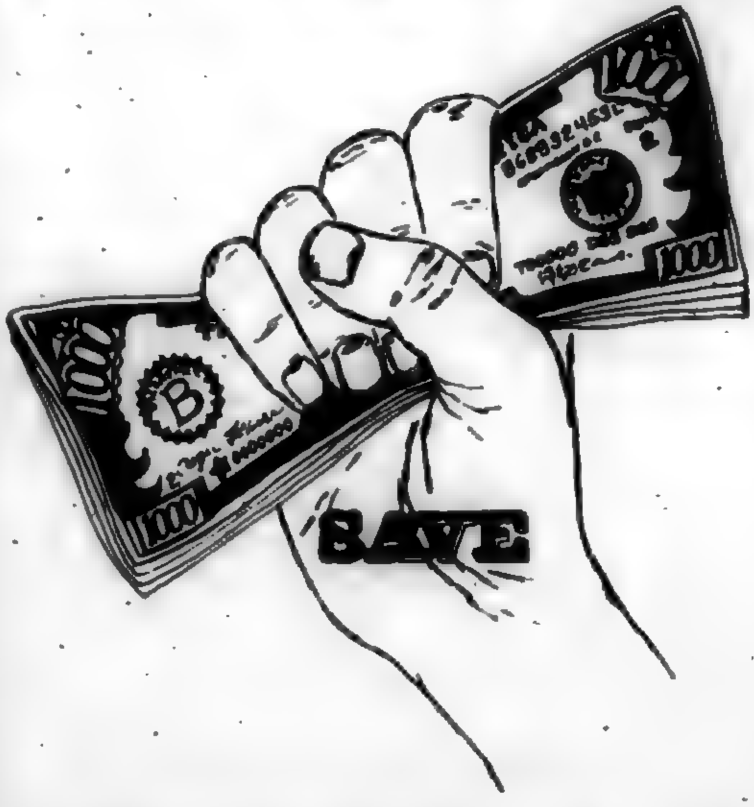

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HUMAN CONNECTION

Jack Stone

Student's View of Industry Impressive, Encouraging

Many of us with a decade or two in the business tend to ignore what college undergraduates have to say about our profession. In the context of the real world of information systems, how valid are their judgments and understandings and forecasting abilities when they haven't had any significant practical experience, other than that of end users of checking accounts?

Well, after listening to one of these students recently, I was impressed. I was affected by the breadth of her knowledge, the maturity of her career planning and the confidence of her success.

Julia T. Miller, a senior at Florida Atlantic University, is on a 20-year track, determined to reach the position of vice-president for marketing and/or MIS in a major corporation. After reading her comments below, you'll agree, I'm sure, that if she is at all typical of the students on campuses today, the industry is in safe hands with the next generation:

"I have a three-part short-range plan which will start me on the way to my ultimate career goal. First, I'm completing my undergraduate program and expect to receive my B.S. degree this December. I chose to major in marketing and minor in computer science because it's clear that future DPers must have a strong business background to better understand user needs.

"Second, I want to find a job with a firm that is recognized as a 'leading-edge' in its industry as regards MIS development. This type of organization will give me the opportunity to acquire the best kind of experience. Of course, it must also have a tradition of promotion from within, based on competitive performance.

"Third, I expect to attend night school for years to come. I feel that continuing formal education is essential if I am to enter the executive ranks. My initial objective is a B.S. in computer science to complete the credentials for the MIS job; then I intend to pursue an M.B.A. to fulfill the academic requirements for the marketing position.

"I can't wait until I become involved with a large-scale systems development project because I feel I have the capabilities for a leadership role and can make the project succeed.

"There are two basic problems facing the industry today, and these are the ones I want to work with and help solve. The first one results from all those users who lack the necessary knowledge about the data processing development and implementation process. These people are willing to accept anything the DPers offer in the way of a system and are afraid or otherwise unwilling to negotiate a change.

"The second one relates to that segment of the user population which selfishly demands that systems be designed their way, irrespective of practical considerations. This group comes into conflict with certain DPers who want *their* way with the design. So, over the long term, hostility develops.

"These problems arise in large measure because both users and DPers are assigned jobs that require certain skills they don't possess: technical skills in the case of the former and interpersonal for the latter. The basic challenge for the MIS leader is to acquire and build the proper capabilities in both the DP and user staffs."

LETTERS

Hold On

I caution reader Richard Nicoloff [letter, July 7] not to act hastily in leaving DP auditing because of the articles in *Computerworld's* June 16 issue. I think Robert Courtney was describing Brandt Allen as "technically obsolete." Further, I think Brandt Allen was describing the intelligence and graphics expert, Courtney, as a drop-out from another area.

Don't despair, Mr. Nicoloff. When was the last time you saw a water cooler? Probably around the time you heard something new from these nonpracticing experts.

Robert L. Mittino
Riverview, Mich.

'At Narrow'

"Maharishi Plans Unorthodox Electronics Firm" [CW, July 14] was obviously written from a very insecure position. Does Rex Malik have any experience or knowledge upon which to base his floundering presumptions?

Malik seems threatened by any philosophy leaning away from his ultraconservative position.

I suggest to the editors that Malik's next article be labeled "At Narrow" instead of "At Large."

Elizabeth Barkley
Lincoln, Neb.

DBA Phoenix Rises Again

(Continued from Page 21)

By this time, any data administrator with vision will already have established the presence of a data dictionary, and as data was being defined for the initial data base projects, it should have been captured in the data dictionary before the control blocks were generated.

The data administrator must get himself and his data analysts out into the user world. They must become a working part of each department to the extent that the user department gets the feeling that the project is not just a data processing problem, but their problem as well.

Ward is marketing manager for system software at Electronic Data Systems in Dallas.

Author Challenges Ideas on Management

(Continued from Page 21)

the actual task of managing. Of course, they are required, often legally required, as statements about viability. But they are elastic and can be manipulated. In other words, they are projections of good health intended for public consumption.

"What the manager needs to know in the course of managing," he continues, "is not what has always been quite evident to him — namely that most things are as he knows them to be. He needs to be alerted, instantly alerted, to any evidence of incipient instability in any of the loops that are supposed to display equilibrium. But nobody is measuring stability. It can, however, be done."

Beer suggests that those measurements could involve different techniques, notably statistical filtration. And, of course, computing would play a part.

His views on the use of computers are interesting. He repeats first a comment he has made many times over the years: that the computer is one of the greatest inventions of the human mind, and yet we use it to "enshrine in incredibly expensive technology those very methods of hand, eye and brain which were the limitations of the manager before computers were invented to transcend them."

So where did we go wrong?

As Beer points out, the real job of the manager is to be a variety engineer, and many managers probably think they already are. However, Beer has a shock for them too.

"The comfortable feeling that we properly know' what is going on is a delusion occasioned by our ability to generate figures, in overwhelming spate, out of computers," he writes. But this experience of floating on numbers is not a real experience because the variety is not there.

"What we are experiencing is the *process* of the proliferation of variety: Usually a few basic figures are being manipulated: they are summed up under various heads, aggregated and disaggregated under various categories, divided into each other, multiplied by each other, and in general made to work to an oppressive degree."

How to handle real variety and be in real control is the challenge Beer poses. Read the book. You will begin to look at management in a new way.

Fight Leaves User in Lurch

(Continued from Page 21)

Olivet's claim misrepresented the facts of the contract, in my opinion. The contract made it quite plain that there were charges involved: one payable on about Sept. 19, 1977 and another payable in accordance with a bill which could not be sent out before all the programs were functional.

Perl-Mack would not be using the system free of charge, as NCR was trying to assert. It had already paid thousands of dollars.

And if that weren't enough, even the use of the system by Perl-Mack is specifically authorized by the contract! The NCR printed form does not use the normal "ship to" entry, but instead, the contract has the words "for use at." And this does, quite explicitly, make it plain that Perl-Mack was expected to use — in any way it saw fit.

NCR won this battle. In January 1979, the month that all the software was supposed to be finished, Perl-Mack paid the $45,731.28 before the software arrived, thus giving up the club over NCR which Perl-Mack had won in negotiations.

Perhaps needless to say, after NCR had the money and could see how Perl-Mack could be pressured, the software was not delivered on schedule — or at all! And just over a year later, in March 1980, there was another battle. But that is the subject of another report.

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To Buy or Not to Buy?

Remote Computing an Economical Option

By C.W. Keller
Special to CW

Hardware dependent for most of the past quarter century, information processing within recent years has ridden a crest of technological innovation to a plateau where equipment is so economical and powerful that it is almost secondary among data handling considerations.

The value of information as a resource has grown disproportionately to its availability, and software development — the science of making data available and making it work — has now become the major area of importance.

This trend has sparked a demand for programmers and analysts that far exceeds the supply. The result: long time lapses between identified needs and usable solutions, and more and more expensive software.

So, for many companies, the solution often is to use remote computing services. Knowing that their growth potential relates directly to the value clients derive from these services, remote computing firms build libraries of hundereds of programs and software systems, which can be used easily and economically by their clients.

And, along with the software, the remote computing firm must provide systems analysis and programming support so that systems can be adapted as necessary to clients' specific requirements.

Often as well, remote computing companies further enhance the desirability of their services through specialization — for example, in service for government agencies or in financial services, engineering, science and technology, financial planning and modeling, corporate tax analysis and data management systems.

Without doubt, a canvass of the remote computing industry will uncover software capable of performing virtually any DP function. When, then, should a user buy a package, develop its own or simply use existing software as needed?

Assessing Needs

Circumstances vary, but general considerations include:

- Budget: Software development is expentive. Estimates have placed development costs at approximately $10 per instruction, and thousands of instructions can be involved. Purchase of proprietary packages permits use of complex systems with development costs shared by many users. Use of the same package through a remote computing company permits use of the system as needed with no captial investment.
- Timing: Even in major corporations with highly developed DP departments, delays of two and three years are not uncommon as programming personnel strive to keep pace with demand. Remote computing companies are geared to perform analysis and adaptive programming quickly, so solutions can be in place and working in the shortest possible time. Often, programs are available to provide immediate solutions.
- Frequency of use: An engi-

(Continued on Page 26)

Series/1 Under RPS Gets Analyzer

VAN NUYS, Calif. — A software program for measuring the CPU utilization of tasks running on IBM Series/1 minicomputers under IBM's Real-Time Programming System (RPS) is now available from Applied Computer Services, Inc.

The performance analyzer consists of a data gathering program that executes concurrently with the programs to be analyzed and two data plotting programs.

The data gathering program uses the optional timer hardware to interrupt processing every 30 msec. Information is then recorded that indicates which task was interrupted and from which address its next instruction will be fetched in order to draw a statistically meaningful picture about CPU usage, the firm said.

'Timeplot' Program

The first analysis program, called Timeplot, graphs the CPU usage as a function of wall-clock time, showing the percent usage by partition. The second analysis program, Coreplot, produces a histogram showing the percentage of CPU time used vs. instruction address within the program.

The program costs $500 from the firm at 16600 Sherman Way, Suite 160, Van Nuys, Calif. 91406.

'CMF/MVS' Update Measures TSO

SUNNYVALE, Calif. — Boole & Babbage, Inc.'s Comprehensive Management Facility for MVS (CMF/MVS) software product has been enhanced with reports that measure Time-Sharing Option (TSO) utilization and its effects on system performance.

Performance analysts can use these reports, in conjunction with other CMF/MVS reports, to improve TSO response time and balance allocation of resources, the vendor claimed.

At the same time, CMF/MVS has been enhanced to be compatible with all versions of MVS through System Extension 2. CMF/MVS monitors and produces reports on all critical variables that affect performance of an MVS operating system.

CMF/MVS operates on IBM 370, 30 series and compatible mainframes under all MVS operating systems. CMF/MVS costs from $9,000 to $21,000, including the first year's maintenance.

Boole & Babbage is located at 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

'QCM Version III' Monitor Runs Under IBM's VMS

PITTSBURGH, Pa. — Duquesne Systems, Inc. has announced that its QCM Version III, an event-driven software monitor, is now available on IBM's MVS operating system.

New features incorporated into Version III include direct measurement of bytes transferred at the job, device, task channel or control unit levels. Called the byte counting option, the enhancement can be used in billing; work load characterization; and device, control unit and channel power computation applications, the vendor said.

The package also offers on-line exception reporting, enhanced DASD and shared DASD measurement capabilities, the vendor said.

QCM ranges in cost from $12,000 to $56,000 from Duquesne at Two Allegheny Center, Pittsburgh, Pa. 15212.

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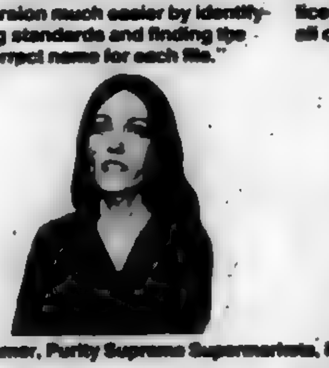

Debby Schumann, Systems Programmer, Purity Supreme Supermarkets, Massachusetts.

Debby Schumann had been managing her program libraries manually until she acquired DOSSIER. Not only does DOSSIER automate her library management, it will be an excellent tool to help her convert to the 4300.

DOSSIER goes beyond source library documentation to translate object code from program libraries into complete and current program and file information. Its 16 management reports address all aspects of controlling and auditing object libraries.

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Updated Vulcan Runs on Harris 100, 500, 800

FORT LAUDERDALE, Fla. – Harris Corp.'s Computer Systems Division has released an updated version of its Vulcan virtual memory operating system for Harris 100, 500 and 800 computer systems.

Version O8A of Vulcan includes a checkpoint and restart facility that gives the user the capability of checkpointing, or saving, the program environment and then restarting from that checkpoint in the event of system failure, a spokesman said. In addition, an on-line reconfiguration feature enables site mangers to change individual components of their system configurations without having to redefine the entire system.

Vulcan's IBM 3270 terminal emulator software package allows users to establish communications links with any remote computer system that supports the bisynchronous 3270 communications protocol, the spokesman continued. User programs establish links and communicate with the emulator through standard I/O calls to virtual terminals.

Also in the release, the TX text editor is an interactive processor that supports full-screen editing of text files on a CRT terminal. If a program abort or system malfunction should occur while using TX, the edit session is reportedly completely recoverable when system control returns.

Compiler Enhanced

The Harris Fortran 77 compiler has also been enhanced to support optimization of user programs through such techniques as removing the redundant code from loops and global register allocation, the spokesman noted. The enhancement is said to result in faster program execution and less memory space requirements.

The Format text processor, another aspect of the 08A Vulcan release, can be used as a tool to produce documentation, reports, correspondence, and other written material, he said. The processor automatically performs such chores as right margin justification; page centering and numbering; and index generation.

There is no charge for Version 08A for current or future Harris system users that want just the Vulcan object code. However, the source code will be sold for a license fee of $3,000. The annual maintenance fee on the operating system is $1,200.

Harris is located at 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

Option: Remote Computing

(Continued from Page 25)

neering firm needing to run design rule checks on new circuits only infrequently or a marketing firm needing access to census data annually would find ownership of the respective programs and data bases an impediment rather than an advantage. Time, money and personnel are more productive on other assignments. As frequency of use increases, cost analyses can determine if and when a "buy" decision should be made.

- Expertise: Careful selection of a remote computing firm can make available a large reservoir of talent to solve less frequently encountered problems, provide solutions for the more routine requirements and develop new computing functions. Further, nonroutine but important problems can be solved quickly, without disruption of ongoing DP activities.
- Rate of change: Most packages or systems purchased require some modification at the time of installation. Subsequent internal system variations and such external considerations as major industry change often necessitate maintenance by either staff personnel or outside consultants. Remote computing firms, servicing many clients, do this maintenance routinely without attention by their users.
- Consulting service: Keyed to broad industry awareness, professional staff at remote computing companies often are well-qualified to provide recommendations regarding the purchase-vs.-service decision.
- System experience: By using a software system in the remote computing mode, clients can evaluate it in terms of various criteria without committing capital.

But whatever the combination of reasons for its use, remote computing services can prove an extremely cost-effective alternative or supplement to purchased software and hardware systems.

Keller is director of corporate planning for United Information Systems Group in Kansas City, Mo.

HP 9845Bs Get Analysis Package

PALO ALTO, Calif. – A package that performs principal components and factor analysis on the Hewlett-Packard Co. 9845B desk top computer system is available from HP Co.

Aimed at chemical, social science and biological applications, the package offers help to professionals in gathering data for statistical analysis and mutivariate data to one or two factors, the vendor said.

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Upgrades for Datapoint 1500 Include Basic Interpreter

SAN ANTONIO, Texas – Datapoint Corp. has announced a number of software enhancements for its 1500 business system, including a Basic language interpreter and a teletypewriter controller that is compatible with a variety of asynchronous peripheral devices.

The Basicplus interpreter is an enhanced version of Basic and permits the use of random, sequential or indexed-sequential access methods for record access, a spokeswoman said. Features of the interpreter include long variable names to improve readability, a more efficient use of processor memory, complete error messages and built-in debug aids, and the ability to format records that are interchangeable with those created by other Datapoint system utilities and languages.

In addition, local or remote printer supports may be configured either automatically or by specifications, and the unused printer support area is released and added to the user's work area, the spokeswoman claimed.

The Basicplus package is also said to speed program execution by eliminating the need for syntax checks at run time. This is accomplished by the creation of a disk operating system command file consisting of the Basicplus interpreter and the program object code, she added.

The ML15TTY enhancement operates in conjunction with Datapoint's Databus business programming language. The software additions support interactive communications with a remote time-sharing mainframe using Teletype Corp.'s Teletype protocol. It can also be used to communicate with other Ascii asynchronous devices meeting RS-232C interface standards such as badge readers, card readers and printers, the spokeswoman stated.

If Basicplus is ordered with a 1500 processor there is no license fee. However, when ordered separately the package costs $500. The monthly maintenance fee for the interpreter is $10. There is no separate license fee for the ML15TTY emulation software, the spokeswoman noted.

When ordered separately, Basicplus carries a $500 license fee. However, the fee will be waived when the interpreter is ordered along with the 1500 computer system. In any case, there is a $10 monthly maintenance fee, the spokeswoman noted.

ML15TTY is not sold separately, but is included with a system purchase. Any software ordered from the firm is supplemented by a small media surcharge, she said from the company at 9725 Datapoint Drive, San Antonio, Texas 78284.

Report, Screen Generators Fit Wang VPs and MVPs

OAK BROOK, Ill. – The Report Sample Generator and the Screen Sample Generator have been introduced for Wang Laboratories, Inc. VP or MVP processors by Real-Time Engineering Systems, Inc.

The Report Sample Generator allows the entry and preparation of hard copy and formatted sample reports that contain any combination of valid print characters, the vendor said. The Screen Sample Generator allows the user to format sample screen layouts that contain any combination of valid print characters and also offers the repetition, modification and edit features of the Report Sample Generator.

The products are available for $50 each or $75 together. They come with complete instructions, Real-Time Engineering said from 2301 W. 22 St., Oak Brook, Ill. 60521.

Mini Version of AZ7 Debuts

FORT LAUDERDALE, Fla. – The first minicomputer version of the Azrex, Inc. AZ7 query language and report writer, which reportedly facilitates information retrieval, report generation and file maintenance, has been introduced by Harris Corp. for its minicomputer systems.

Used with sequential and indexed sequential files, the AZ7 offers multifile coordination, data independence and high-level search functions. The modified software tool interfaces with both the Harris file system and the Cincom Systems, Inc. Total data bases. AZ7 can be used with any Harris system using the firm's operating system.

Nonprocedural Language

The AZ7 features a free-form, English-like nonprocedural language for usage by nonprogrammers, the firm said. An integrated data dictionary provides for the predefinition of information about files and data item characteristics.

A multiple reports feature allows up to 99 different reports to be generated in a single pass of the input file, Harris said.

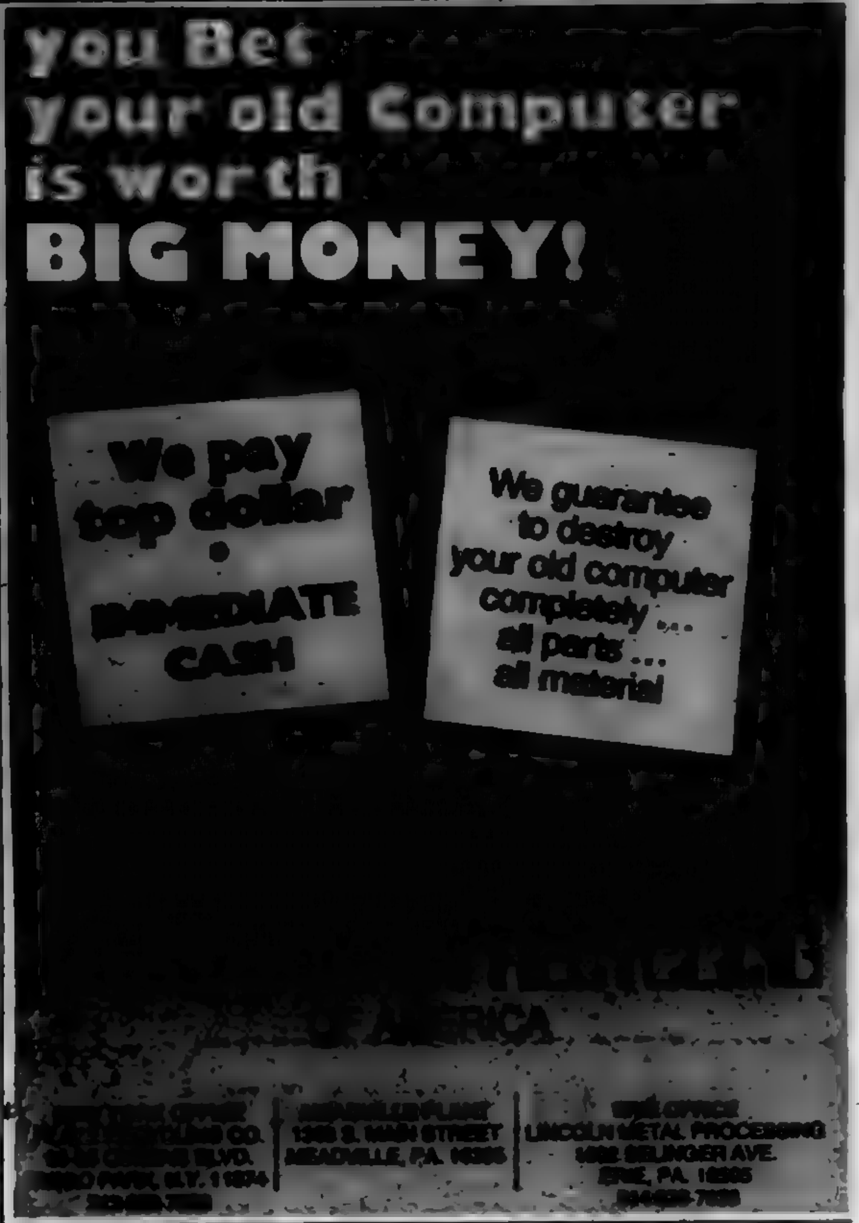
The basic single-use license fee for the AZ7 is $9,500, which includes the first year's maintenance, the firm said from 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

HP 2621 Terminals Get Screen Processor

GROVE CITY, Ohio – A screen processor for Hewlett-Packard Co. 2621 terminals is available from Ace Software, Inc.

Similar to the HP View/3000 and DEL, which operates only in a block mode and only on HP 2640-type terminals, the Ace screen processor will interface with all HP compilers with a call statement to retrieve screens. It includes a forms maintenance program to build and modify screens, the vendor said.

The package costs $1,200 with an annual update fee of $200, from the vendor at P.O. Box 254, 3945 Brookham Drive, Grove City, Ohio 43123.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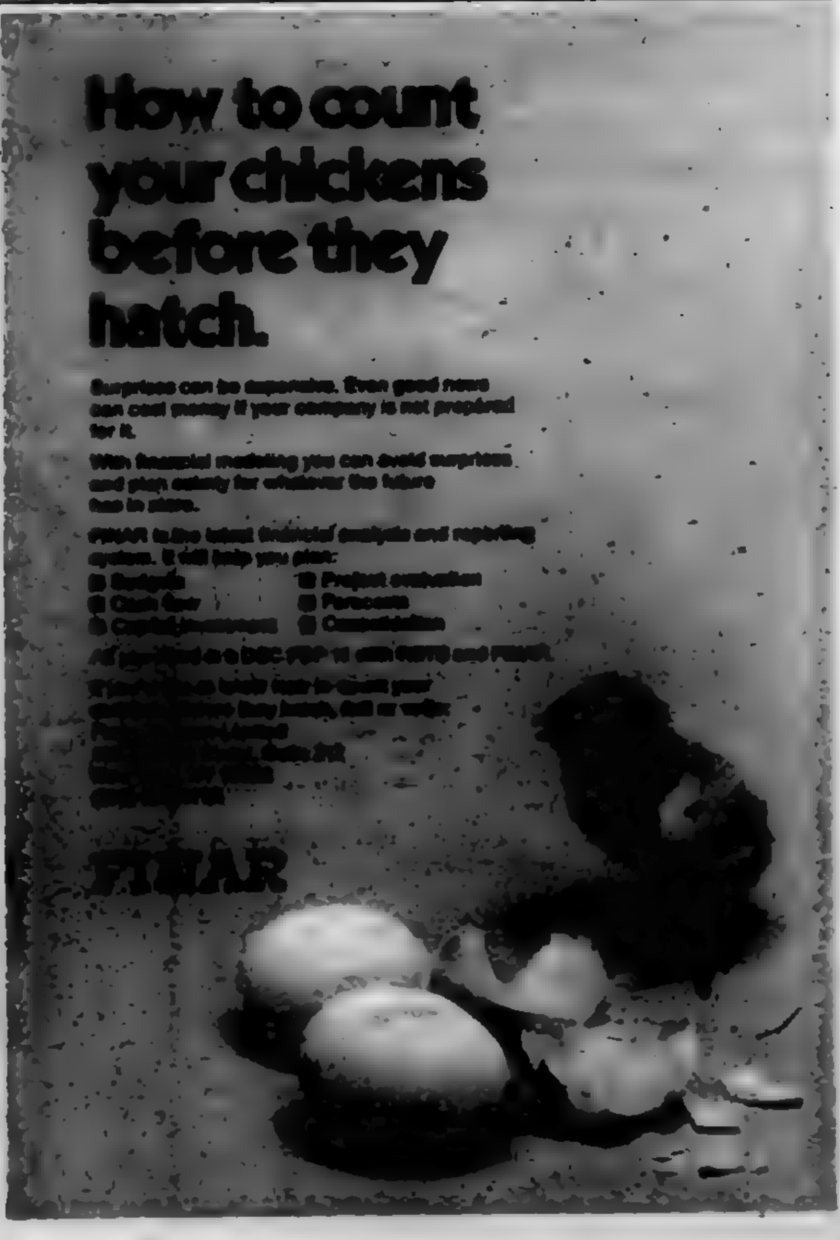
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'Taps/80' Supports Programmer Productivity

AUSTIN, Texas — A software package designed to improve programmer productivity has been introduced by Intel Corp.'s Commercial Systems Division.

Taps/80 reportedly allows applications for Intel's System 2000/80 data base management system to be developed on-line "in a quick and simple manner" by providing an interface between applications code and the teleprocessing network.

The interface is said to relieve programmers of any considerations of the communications monitor (CICS or TSO), the network or terminal devices.

The DOS version of Taps/80 cost $24,000 and the OS version costs $30,000 from Intel's Commercial Systems Division, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

Oil, Gas Package Offered

NEW ORLEANS — Klaassen & Associates has announced the Oil and Gas Information System, an applications package designed to meet the processing needs of independent petroleum exploration companies.

Designed for operation on an IBM 5120 computer, the Oil and Gas Information System offers general ledger, accounts payable, accounts receivable, budgeting and forecasting, joint interest billing, AFE lease costing, royalty and revenue distribution and tax analysis.

The package costs $10,000, including documentation. Installation assistance is also available.

Klaassen is at 1001 Howard Ave., New Orleans, La. 70113.

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'SAC 3.3' Restricts Access, Entry

DALLAS — Electronic Data Systems Corp. (EDS) has announced an enhanced version of its Security Access Controller (SAC), a package that restricts user access to a computer and dictates where user entry can be made.

SAC Version 3.3 features IMS (MVS) support, sign-on authorization and application authorization, the last providing a segregation of IMS test and production environments. The system also restricts users from accessing certain transactions by providing a transaction and transaction group authorization format, a spokesman said.

Version 3.3 offers data set protection by default and submitter-to-submittee verification, which allows jobs submitted through the internal reader to be restricted to the submitting job's authority, the spokesman explained.

Finally, SAC 3.3 has a Time-Sharing Option (TSO) data set default protection for MVS; user identification routines listed by job name, accounting fields, programmer name, password or any combination of the above; MVS catalog control; and a function that controls high-level Vsam under MVS.

Regular SAC features include no need for user exits; the ability to establish security by data sets or data set groups without impacting day-to-day operations; the ability to enforce naming conventions; and class and priority usage control, the spokesman noted.

SAC Version 3.3 is currently available for the introductory price of $15,000 for the first CPU, with a 79% discount for each subsequent mainframe. Multisite discounts are also being offered, again at $15,000 for the first CPU and $1,500 for every other CPU on the user's system.

The introductory prices are expected to be offered throughout the remainder of the year, the spokesman said from the firm at 7171 Forest Lane, Dallas, Texas 75230.

PDP-11s Get Four Tests

CHELMSFORD, Mass. — Accutest Corp. has announced software that permits users to incorporate host computer capabilities in the operation of the firm's four test systems.

The test systems include the Model 3000 process evaluation system, 7700 static memory tester, 7800 dynamic memory tester and 7900 LSI/VLSI tester. The host computer, a Digital Equipment Corp. PDP-11/60 equipped with RSX-11M software, can be used in several ways:

- To provide a common consistent data base for several similar test systems.
- To collect and integrate data from test systems at various states of production.
- To process data collected from test systems in a variety of statistical ways, producing such reduced data as distribution and trend reports.
- To provide overall process control and inventory control for an entire production line, when used in conjunction with several test systems at various points in the line.

Up to 16 test systems, which are time-shared by the software, can be connected to one host computer, while remote test systems can be connected to the host via modems and communications links.

The Host Computer Software's license fee ranges from $15,000 to $20,000, depending on whether the source code is included, a spokesman said from 25 Industrial Ave., Chelmsford, Mass. 01824.

'Edpac' for Small Schools Keeps Variety of Records

ABERDEEN, N.C. — An educational software package written for public and private schools and community colleges is available from Systems Unlimited, Inc.

Edpac contains systems for payroll, budgetary finance, student records, grade reporting and student scheduling. All systems may be used separately or together, and when more than one system is operating, they function as an integrated unit, the vendor claimed.

The system can operate on minicomputers or mainframes. Although primarily designed to operate on Data General Corp. equipment, it is not restricted to any one manufacturer, a spokesman said.

The complete package costs $12,500 or may be leased for $5,520 a year. Individual systems are available, for between $1,900 and $4,000 the vendor said from Suite A, Storey Building, Town and Country Shopping Center, Aberdeen, N.C. 28315.

Decsystem Library Offered

LITTLETON, Mass. — A library service for cataloging, indexing and searching private files is available to Digital Equipment Corp. Decsystem-10 and Decsystem-20/20 users from Inforonics, Inc.

Called the Technical Report/Special Collection Management System, the service provides an on-line data base management module to Inforonics Bibliographic Information Services (Ibis).

In addition to on-line access, the newly announced library service offers printed lists for technical reports and special collections such as studies, maps, journal articles, documents, patents, computer programs and correspondence, according to the vendor.

Although formal pricing on the library service has yet to be set, a spokesman said the Technical Report/Special Collection Management System will cost approximately $18/hour.

Inforonics is at 550 Newtown Road, Littleton, Mass. 01460.

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For Fortran IV Use

'Hook' Eases Move to Series/1

YORK, Pa. — The ESS/1 Hook allows users of the IBM 1130 mainframe to implement Fortran IV programs on the IBM Series/1 minicomputer with little conversion effort, according to the Hook's vendor, Ampersand Corp.

The Hook facilitates the 1130-to-Series/1 Fortran conversion by providing Fortran IV "transparency" to the user, the firm said. Application programs can interact with Series/1 devices (including local and/or remotely attached terminals) using standard Fortran IV READ and WRITE statements, with or without format.

The user is provided with the Series/1 equivalent of the 1130 Commercial Subroutine Package as well as other commonly used IBM 1130 utility subroutines, Ampersand noted. A user's manual addresses upgrading.

The Hook can be licensed for a one-time fee of $3,780 or on a monthly basis. Ampersand is located at 128 S. George St., P.O. Box M-64, York, Pa. 17405.

Consulting Firm Formed For Audit Counseling

SUMMIT, Ill. — EDP Audit Associates, Inc. is a newly formed consulting firm offering audit counseling, staff training, applications, evaluations and specialists.

Counseling services include strategic planning, audit program preparation, project direction and supervision and interpretation of DP activities.

Staff training is available for audit techniques and procedures, use of DP audit software, statistical sampling and DP techniques and procedures.

Applications include data file analysis, computer system analysis, report definition, program development, software installation and logical and technical procedure definition.

Evaluations include operations, physical security, data security, program controls, standards, applications and administrative control.

EDP Audit Associates is seeking clients on a nationwide basis, and the firm is located at P.O. Box 366, Summit, Ill. 60501.

Warehouse Update Runs on PDP-11

WHEELING, Ill. — J. Baker & Associates, Inc. has announced Release 3.0 of its Warehouse Distribution Application package.

The package consists of 10 modules that use a data base designed specifically for distribution functions, the vendor said.

The Warehouse Distribution Application runs on Digital Equipment Corp.'s PDP-11 CPU under the CPS 300 or 500 operating systems, and on Hewlett-Packard Co.'s 3000 series models 30, 33, 2 and 3, using the MPE/3 operating system.

Source code is in Ansi-74 Cobol, and the package costs approximately $20,000, the vendor said from 300 Marquardt Drive, Wheeling, Ill. 60090.

TCI Offers Services For Tandem Systems

REGO PARK, N.Y. — Accept, a management service, and Revise, a support service, are being offered to users of Tandem Computers, Inc. systems by Transaction Concepts, Inc. (TCI), a recently formed management consulting firm.

Accept can be used to manage the acceptance and cutover of a system, the firm said. It includes the review and performance of the acceptance test, a development of additional test procedures, a management report detailing any problem areas and a review of the system.

Revise enables a user to receive installation and support services for each new release of Tandem's Guardian operating system and additional support for staff training, operational difficulties and system refinements. Installation work is done during off-hours.

Accept and Revise both start at $5,000. TCI can be reached at P.O. Box 122, Rego Park, N.Y. 11374.

Cobol-Written System Tracks Purchase Orders

VIRGINIA BEACH, Va. — Coastal Business Systems, Inc. has announced the release of its Purchase Order System, featuring the ability to automatically interface with Mini-Computer Business Applications, Inc. (MCBA) inventory control and accounts payable systems.

Written in Data General Corp.'s Interactive Cobol, the system tracks purchase orders from initiation through approval to pay the supplier's invoice. The system facilitates the ordering of nonstock as well as stock items and allows the user to identify line items ordered with the customer and salesman who initiated the order, a spokesman said.

Several reports are produced by the system, including "Open Purchase Orders," "Purchases Received — Not Paid" and an "Expediting Report" that shows open purchase orders that have gone past the estimated shipping date.

The base price for the Purchase Order System is $1,500, Coastal said from 1213 Laskin Road, Virginia Beach, Va. 23451.

HP 3000 Gets 'Marketab' Version

NORWALK, Conn. — Mnemonics, Inc. has completed a Hewlett-Packard Co. version of its survey tabulation system, Marketab, for use with the HP 3000 series minicomputer.

Used for processing questionnaire and survey data, as well as tabulating existing data files, Marketab is also available for IBM 360 and 370 mainframes and Data General Corp.'s Nova and Eclipse CPUs.

Marketab costs $30,000 from Mnemonics at 280 Connecticut Ave., Norwalk, Conn. 06854.

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Fortran Plotting Offered For Graphics II Upgrade

SANTA CLARA, Calif. – Fortran plotting subroutines are available for Selanar Corp.'s Graphics II upgrade to the Digital Equipment Corp. Decwriter II.

The PLII software allows Fortran users to "call" such functions as XYAXIS, LINE, GRID, CIRCLE and FRAME for execution on Decwriters equipped with Selanar's Graphics II feature.

The package contains 24 standard routines for higher level graphics, and four specialized labeling routines. The Graphics II PC card gives an LA36 Decwriter II most of DEC's options plus vector plotting.

Graphics II-equipped Decwriters may be used on any type of minicomputer or microcomputer and also in timeshare networks. The addition of the PLII software is said to make implementation faster and cost lower in any Fortran environment.

PLII software costs $400. Graphics II costs $995. Selanar is located at 2403 De La Cruz Blvd., Santa Clara, Calif. 95050.

Naval System Check Debuts

ATHENS, Ga. – A package designed for software analysts that provides a means of determining the reliability, maintainability and availability of shipboard computer systems has been announced by the University of Georgia's Computer Software Management and Information Center (Cosmic).

The Reliability and Availability Program (RAP) is geared to run on an IBM 360 mainframe and requires approximately 104K bytes of memory space. Written in Fortran IV for batch execution, the program costs $650.

Cosmic is located at Suite 112, Barrow Hall, Athens, Ga. 30602.

Data Entry Package Aimed at IBM 3277

NEW YORK – H&M Systems Software, Inc. has announced Keyfast, an on-line data entry and verification package for IBM 3277 and compatible terminals.

The package is password protected and data can be edited as it is keyed in. The system reportedly allows the user to set aside up to 160 bytes of memory for each data entry record, and fields can be duped from one record to another.

Keyfast costs $5,000 to $8,000 and will be available in August, the vendor said from 40 Rector St., New York, N.Y. 10006.

Service Gives Stock Data

McCLEAN, Va. – A recently announced agreement between Source Telecomputing Corp. and Media General Financial Services, Inc., publishers of *Financial Daily* and *The Financial Weekly*, will give investors access to Media General's data bank of all stocks listed on the New York and American stock exchanges and more than 800 major over-the-counter stocks.

The data bank of 3,250 common stocks will be updated weekly according to Media General.

The Source investor and power service will enable users to check out and compare their portfolios and/or other stocks of interest against the weekly changes in common stocks.

The service will be available for less than $1,000 a year for prime time (7 a.m. to 6 p.m.) users and less than $500 a year for non-prime time users.

Source is located at 1616 Anderson Road, McClean, Va. 22102.

Pantechnic Offers 'Lobol' For HP 3000

OAKLAND, Calif. – Pantechnic has unveiled a data entry system based on Hewlett-Packard Co. HP 2645 or HP 2649 terminals.

It is compiled on the HP 3000 minicomputer and down-loaded to the terminal via a procedure call.

Lobol runs entirely in the terminal, providing validation, calculation, table hookup and file manipulations without accessing the host CPU, the vendor claimed.

Lobol is suitable for replacing existing key-to-disk systems, bringing the function on-line to the HP 3000, a spokesman said.

It includes the Tnet communications system, a protocol that reduces communications overhead of the host HP 3000.

The product is priced at $7,900 for a one-time license fee.

Pantechnic is located at 5805 Ocean View Drive, Oakland, Calif. 94618.

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Data Communications: Effective Network Design	Sept. 15-17	Dec. 8-10	Oct. 6-8	Nov. 10-12	Oct. 29-31	Nov. 19-21 HOUSTON
Introduction to Teleprocessing Software	Nov. 19-21	Nov. 5-7	Oct. 20-22	Oct. 8-10	Dec. 8-10	Sept. 22-24 DALLAS
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Accounts Payable Package Geared to IBM 360s, 370s

DALLAS — University Computing Co. (UCC) has added an accounts payable package to its applications software line for IBM 360, 370 and compatible systems.

The accounts payable package is the first in a series of general accounting systems the firm plans to add to its Financial Control System line.

The package is said to include enhanced cash management, purchase order control and on-line entry, the vendor said.

The package costs $20,000 to $50,000 depending on the operating system.

UCC is located at UCC Tower, Exchange Park, Dallas, Texas 75235.

'TI Payroll' for TI Minis Handles Multiple States

GLENDALE, Calif. — TI Payroll, a comprehensive hourly/salary system which handles multiple states, is being offered for Texas Instruments, Inc. minicomputers by Mini-Computer Business Applications, Inc. (MCBA).

TI Payroll consists of approximately 46,000 lines of state-of-the-art structured Cobol source code, accompanied by more than 300 pages of technical and user documentation, the firm said.

TI Payroll is available for both single- and multiple-use licenses.

A typical single-use license costs $2,000 including source code, documentation and one year's warranty.

Demonstration versions of these TI packages are available.

MCBA's Sales Department is at 117 S. Brand Blvd., Glendale, Calif. 91024.

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Random Notes

Package Gives Data File Reports

CAMBRIDGE, Mass. — A business-oriented software package that produces a Cobol program for processing reports from existing data files is being offered through the time-sharing services of III Systems, Inc.

IQ is a package that can be used to search existing files, select data from designated criteria and produce reports in desired sequence and format, generating a production-fast Cobol source program from the request parameters, the vendor claimed.

IQ's printed output can be formatted automatically, or the user can specify exact line and position of each item to accommodate complex formats. Output can also be recorded on disk, tape or punch card, the firm said.

The dial-up IQ service is priced according to usage, III Systems said from 763-A Concord Ave., Cambridge, Mass. 02138.

Directory Expands Datamanager Swaps

LEXINGTON, Mass. — The introduction of the first MSP, Inc. Swap Shop Directory marks the expansion of the arena in which Datamanager users may share their development work.

Previously existing on an informal basis, operating mainly as separate entities in Europe and North America, the Swap Shop now has a formal mechanism for international exchange of the Datamanager product, now used in 15 countries.

Items in the Swap Shop are not restricted to user-built software, but also include documents. One such is an overview of the way in which one user implemented and uses Datamanager.

More information about the free exchange service or directory is available from Christopher Coulson, MSP, Inc., 21 Worthen Road, Lexington, Mass. 02173.

Text Processor Justifies Right, Left

SAN FRANCISCO — A text processing system that can do right and left justification of proportional spacing text has been announced by Software Research Associates.

Of interest to users of minicomputers for word processing, the system is based on the Roff tool that is part of the AW tool kit. Called P-Roff, the software system provides for text processing so that output on a daisy wheel printer with the proportional space operating mode is completely right justified.

The current installation is in a Data General Corp. AOS environment, with versions planned for the Digital Equipment Corp. PDP-10 and DEC-11 environments, the spokesman said.

Versions that interface with most of the popular proportional space output devices reportedly can be supplied. P-Roff is available for a one-time license fee of $1,500 from Software Research Associates, P.O. Box 2432, San Francisco, Calif. 94126.

Organic Software Alters 'Textwriter'

LIVERMORE, Calif. — Organic Software has altered Textwriter, its text formatting program, by adding proportional spacing and enhanced printing for Diablo Systems, Inc., Qume Corp., Sanders Associates, Inc. and NEC Information Systems, Inc. printers.

The proportional spacing is accomplished by adjustments to the horizontal motion index on right-justified lines. The enhanced printing capabilities include underscore, double strike, super- and subscript, boldface, strikeout, ribbon color change and normal and alternate pitch.

Enhanced printing is controlled either by Wordstar-compatible control characters embedded within the text file or by the occurrence of a two-character alphanumeric control sequence within the text.

Textwriter is available for $125, Organic Software said from 5082 Shirley Drive, La-Palma, Calif. 90623.

Ventilation System Runs on Cybernet

MINNEAPOLIS — Floyd C. Bossard & Associates' program for designing ventilation systems for mining operations is now available on Control Data Corp.'s Cybernet remote computing service.

The Mine Ventilation Design System (Mivendes) helps engineers assess various conditions in a mine in order to configure the proper ventilation system. Users can access the program from Cybernet or have it installed on any CDC Cyber computer system.

When accessed through Cybernet, Mivendes is priced at regular user rates, which normally range from $50 to $300 per run, depending on the complexity of the problem.

For installation on a CDC Cyber computer system, the monthly royalty price can range from $1,000 to $2,000.

CDC may be reached through Box O, Minneapolis, Minn. 55440.

CPT Word Processors Get Text Input

MINNEAPOLIS — A software feature that enables operators to input text into CPT Corp. 8000 and 6000 word processors using all the special characters necessary for more than 15 languages is available from CPT.

Two disks, the Wordtype Table Configuration Disk and the Wordtype Message Configuration Disk, provide all the software necessary to modify the two models, the vendor claimed.

The table disk converts each keystroke to the designated characters of that particular language on the display screen.

The entire procedure reportedly takes less than 60 seconds. The feature is included with purchase of a Model 8000 or 6000, both of which range from $10,000 to $15,000, the vendor said from 8100 Mitchell Road, P.O. Box 295, Minneapolis, Minn. 55440.

Oil Accounting Geared to HP 3000s

OKLAHOMA CITY, Okla. — Petroleum Software Systems, Inc. has reached an agreement with Hewlett-Packard Co. to provide its Integrated Petroleum Accounting System for the HP 3000 line of hardware.

Features of the package include journal entry, revenue distribution, joint interest billing, general ledger, vendor accounts payable, lease records and asset and information reporting.

The firm also plans to introduce an Integrated Public Fund Accounting System, a Drilling Report System and an Investor Communications System this summer.

The standard Integrated Petroleum Financial System costs $50,000 from the vendor at 8001 S. Interstate 35, Oklahoma City, Okla. 73149.

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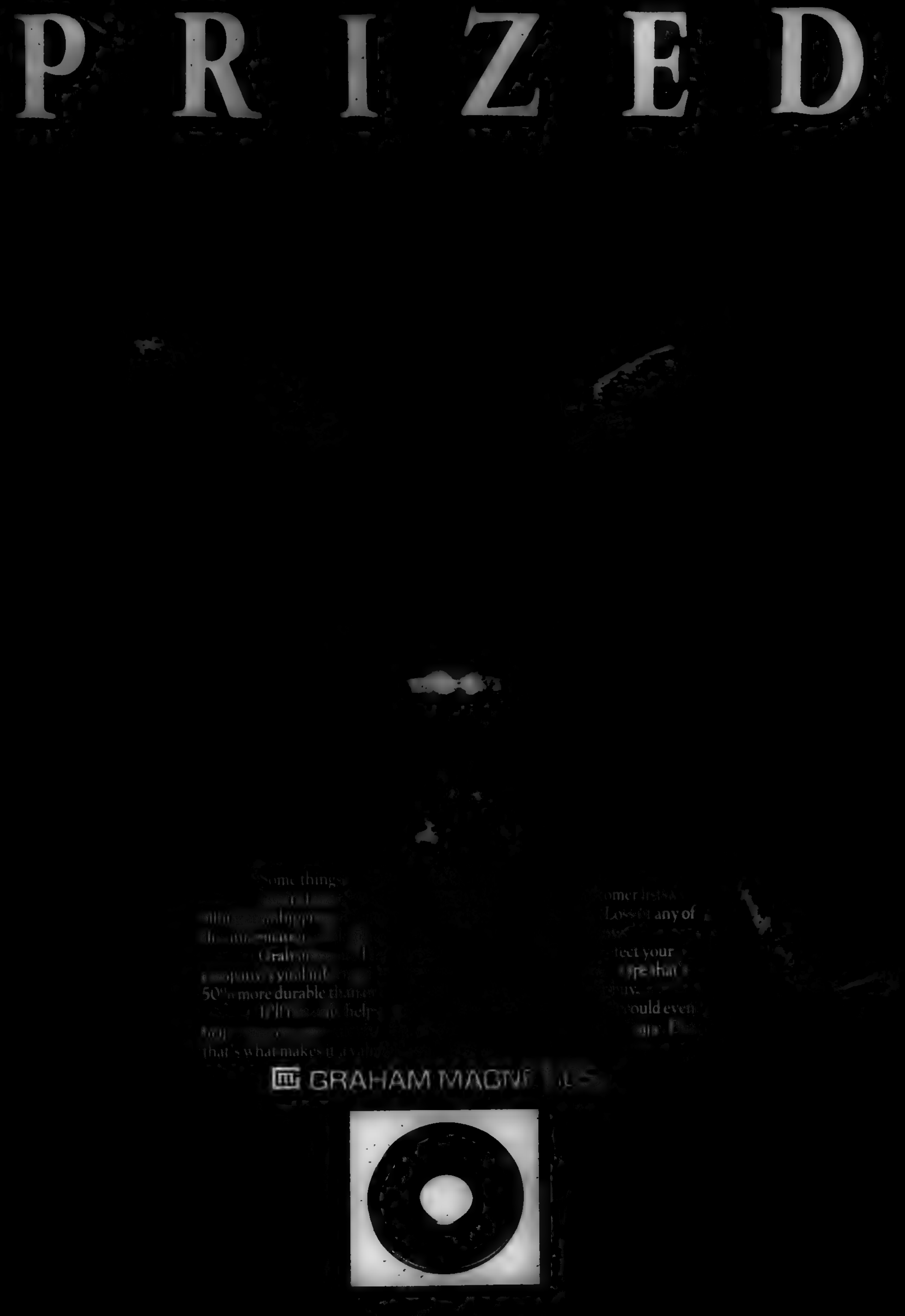
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Introducing the new standard in editing CRT's from Perkin-Elmer.

The 1250. It makes life easier for everyone.

It's easy on the operator...

Operators are more comfortable and productive when they can move the keyboard wherever they like. The Perkin-Elmer Model 1250 offers two detachable keyboards—a compact model for crowded desks or an optional 97-key version (shown) with a 16-key dedicated numeric pad.

Operators work faster and more accurately when the screen offers a high quality image not washed out by lighting glare. That's why the Perkin-Elmer 1250's screen has a frosted face. And it's hooded, tiltable and mounted at the ideal height for operator comfort.

The standard 1250 offers a 32-character forms drawing set and a full complement of video highlights that cut training time and increase accuracy. There's also a printer port that's the most versatile in the industry.

The whole unit measures a compact 17"x15"x23" with the standard keyboard. It'll fit where others won't.

It's easy on the system builder.

The 1250's truly programmable function keys provide a convenient "one key depression" way to transmit frequently used sequences up to a total of 400 characters, stored in non-volatile memory.

That same memory lets you configure the 1250 interactively from the keyboard following an English "menu" or down line from the host.

It's easy on the host computer.

When the operator presses "Send," the 1250 optionally transmits just a three-character "Request to Send" message, not the whole 1,920 character screen. When the host is ready, it issues a "Read Modified Only" command, and the terminal transmits just those fields the operator changed.

This saves time for the operator, time and main memory for the host, and makes the total system more cost-effective.

It's easy on the service engineer.

With three built-in self-test programs and transparent mode for displaying communications control characters, it's very easy to pinpoint problems. Compact design, modular construction and fast access to the circuit boards make replacing faulty modules a snap.

Support for the 1250 comes from 43 district service offices and four regional depots.

Fill in the coupon or call 800-631-2154 for more information on the 1250, the new standard in editing CRT's. In New Jersey, call 201-584-1400.

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College Front End Has Perfect Record

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RIVERSIDE, Calif. — A front-end communications controller is its host mainframe's administrative secretary, charged with bringing order to the mass of access requests steadily filed by contending terminals.

Some front ends, like the Memorex Corp. 1270 terminal controller at the University of California's (UC) Riverside campus here, must field access requests from hundreds of terminals that employ a number of different transmission codes at different speeds over both synchronous and asynchronous lines.

Just as a busy boss needs a reliable administrative secretary, a busy host computer system like UC Riverside's 2M-byte IBM 370/155 under OS/MVT needs a reliable front end. That's why computer center director Jim Henshaw is pleased that his installation's 1270 has run for two years without a hitch, despite around-the-clock usage by researchers, administrators and many of UC Riverside's more than 5,000 undergraduates.

Front-End Replacement

For several years, the UC Riverside computer center used a Telefile Computer Products, Inc. 270X front end to control terminal and line access in its network. When working, that 270X ran well enough, Henshaw said, but it did not always work and too much time was consumed in trying to re-

(Continued on Page 36)

DEC Hard-Copy Terminals, VT100 Port Enhancement Added

MAYNARD, Mass. — Two hard-copy terminals and a printer port enhancement for its VT100 series of CRT terminals were recently announced by Digital Equipment Corp.

The first terminal introduced, the Decprinter III, is a receive-only version of the LA120 Decwriter III. The unit is a bidrectional printing terminal with logic moving the print head to the margin closest to its position after it completes a line, a spokesman said.

The terminal prints 180 char./sec and has a 1K-char. buffer and logic to permit it to skip quickly over white space areas, he added. The terminal reportedly accepts data at rates up to 9,600 bit/sec.

The second introduction is a new member of the Decwriter IV family. The LA34-AA is a 30 char./sec terminal about the size of an office typewriter. It prints character from a 9 by 7 dot matrix and has a 160-char. buffer, the spokesman said.

The terminal has adjustable character sizes up to 16.5 char./in. and prints seven national character sets in addition to the standard U.S. format.

The LA 34-AA incorporates a keyboard selectable local echo, parity and last-character-visible features, and forms length can be selected from one-line to 84-in. lengths.

Port Option

The VT1XX-AC printer port option for the VT100 terminal enables hard-copy printers, including the Decprinter III and Decwriter IV, to be attached. Using the option, a user can reportedly print out the entire contents of the VT100's screen — locally or from the host computer. The option also permits line-by-line printing and printing data directly without it appearing on the terminal screen.

The option requires VT100 terminals to have the firm's advanced video option and a null modem cable.

The LA120 Decprinter III and LA34-AA Decwriter IV are priced at $2,700 and $1,600, respectively, with deliveries to begin within a few weeks.

The VT1XX-AC costs from $385 and will be available this fall, the spokesman said from DEC at 146 Main St., Maynard, Mass. 01754.

For Private-Line Offerings

Western Union Asks Rate Hikes

CW Washington Bureau

WASHINGTON, D.C. — Higher private-line charges have been requested by Western Union Telegraph Co. in a tariff recently submitted to the Federal Communications Commission. The new rates, if accepted by the commission, will become effective Oct. 1.

Milage charges for the telegraph company's low-speed channel service — the biggest revenue producer among its private-line offerings — were increased about 12%; terminal and related equipment charges for that service, and for Datacom Service, went up 5.12%.

Western Union said the new rates are required partly because of increased costs. Some low-speed channels are leased from AT&T, and the phone company recently increased its charges for thses facilities.

Moreover, "inflationary pressures" and "migration of present low-speed customer networks to higher speeds of service have produced deficient earnings which are projected to worsen if these revisions are not instituted."

The increase in the telegraph company rates would raise its revenues by about $2.5 million a year.

IBM Discounts 3270s

WHITE PLAINS, N.Y. — As part of a get-tough move against its plug-compatible competition, IBM has begun offering a volume discount purchase plan for its 3270 CRT terminals and printers.

A reduction of up to 15% off the purchase of certain models will be available on quantity orders. Lease and rental charges will remain the same.

Reduced by 15% are prices on the 3274 controller and 3276 CRT terminal station in quantities of 25 or more. The price of the 3278 CRT terminal is now reduced by 15% in quantities of 100 or more, as is the price of the 3287 printer in quantities of 25 or more. The cost of the 3279 color CRT terminal is reduced 10% in quantities of 100 or more.

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Messenger I Prints, Sends Phone Messages to User's

SUNNYVALE, Calif. — A message handler that sends printed messages to a user's desk using a separate channel of communications in parallel with but independent of an office telephone system is being offered by Amtel Systems Corp.

Initially, Messenger I will be available only in California, but sales channels are planned throughout the U.S. shortly, Amtel said.

Messenger I uses electrical power lines in an office building to transmit messages from a central receiving point to up to 100 small addressable desktop printers in offices throughout a building or office complex.

When a Messenger I user is on the phone or out of the office and a telephone call is received for him at the office receptionist's desk, the message attendant types in the person's name, nickname or initials, records the message on the screen and sends the message to the proper destination printer.

The message is then printed on a thermal printer in the recipient's office. At the same time it is being printed, the message is also stored on the floppy disk.

Messenger I also offers a tickler file for automated calendar reminders, status reminders and other features.

The Messenger I system consists of a microcomputer-based unit with floppy disk, CRT terminal, cables, operator manuals, a start-up set of supplies and on-site training; it leases for about $215/mo. Each office thermal printer leases for $12/mo.

A typical system with a central unit and 20 thermal office printers would sell for about $20,000, Amtel said from 1293 Anvilwood Ave., Sunnyvale, Calif. 94086.

Modem Operates At 1,200 Bit/Sec

NEW BRIGHTON, Minn. — A 1,200 bit/sec modem, compatible with the Bell 212A and registered with the Federal Communications Commission, is being offered by Multi-Tech Systems, Inc.

The MT212D provides full-duplex operation over dial-up and two-wire lines, asynchronous or synchronous. Available in both stand-alone and rack-mounted configurations, it offers originating and automatic answering capability.

Voice to data transferring is accomplished with a button on the modem chassis, eliminating the need for special adapters and other equipment, the firm said. With originating applications, the user's telephone set can be connected directly to the modem.

The stand-alone modem costs $695 and the rack-mounted version costs $565 from Multi-Tech at 82 Second Ave. S.E., New Brighton, Minn. 55112.

Xerox Receive-Only Unit Debuts

EL SEGUNDO, Calif. — Xerox Corp. has announced a receive-only terminal that has a print speed of up to 40 char./sec.

The Model 1730 comes with an interface, control panel, power supply, platen, receive-only covers, a plastic print wheel and a ribbon, the vendor said. The unit also has interchangeable plastic or metal print wheels.

The 1730 costs $2,710 from the vendor at 880 Apollo St., El Segundo, Calif. 90245.

Floppy Disk-Based Terminal Fits Eptak Micro Controller

DAVENPORT, Iowa — Eagle Signal Industrial Systems, a division of Gulf and Western Manufacturing Co., has introduced a floppy disk-based terminal for the firm's Eptak microprocessor controller.

The CP783 CRT programming terminal includes a dual-diskette storage subsystem that can accommodate up to 4M bytes of data.

Housed in a separate case, the dual-diskette drives reportedly boost editing, compiling and copying speeds by seven to 20 times that of conventional cassette-based programming terminals.

The CRT programming system eliminates the need for multiple cassette tapes or disks for different types of programming software such as editing, compiling and debugging. All programs can be called from a single disk, the spokesman said. In all, four programming languages are available with the system.

The CP783 terminal displays 24 lines of 80 characters when entering or editing a program or for monitoring Eptak system operation. The CRT display can be scrolled up or down while generating programs, he added.

The system costs $10,350. Eagle Signal is located at 730 Federal St., Davenport, Iowa 52803.

Front-End's Record Perfect

(Continued from Page 35)

solve or prevent breakdowns.

The computer center replaced the old front end with a Memorex 1270 because its hard-wired design seemed to offer the high standards of reliability necessary for 24 hour/day operation, Henshaw continued.

And "its logic is fully compatible with our mainframe's existing 270X software," he added, "so we didn't have to do any programming at the CPU end."

The 1270 presently controls 16 synchronous and asynchronous communications lines with point-to-point, multipoint and multidropped terminal configurations; but up to 96 lines can be accommodated. Recognized transmission codes include Ascii, Ebcdic and binary-coded decimal.

In the switched (dial) portion of the campus network, the 1270's Autoanswer feature reportedly allows calls from dial-up terminals to be answered automatically under program control. Also, the front end's Autospeed feature automatically adapts to different line speeds, lessening the number of lines needed for port sharing.

RJE Terminals

IBM Hasp supports the UC Riverside network's remote job entry (RJE) terminals, Henshaw continued. The 370/155 can tap 20 disk spindles and six tape drives for on-line storage.

Eight of the 1270 controller's 16 ports are dedicated to 4,800 bit/sec synchronous point-to-point and multipoint lines. IBM 3780-type RJE terminals operate in conjunction with card readers and printers on three of these line. Another line is dedicated to a Memorex 1371 remote controller and 16 Memorex 1377 CRT terminals.

The fifth and sixth synchronous lines run to RJE terminals from Data 100 Corp., now part of Northern Telecom Systems Corp., as well as card readers and printers from that vendor. The remaining two synchronous lines support a 32-port Hewlett-Packard Co. 3000 minicomputer front-ended by an HP 2000 processor and a 48-port Prime Computer, Inc. 400 mini, respectively. The 1270's other ports support asynchronous traffic in the 300- to 1,200 bit/sec range.

The Memorex 1270 controller shown above front-ends UC Riverside's IBM 370/155 mainframe.

Researchers working under state or federal grants and contracts mainly use polled terminals in the network's minicomputer portions.

The terminals linked to UC Riverside's Prime 400 mini serve instruction, data entry and computation applications, as do the HP 3000 terminals, in addition to monitoring experimental sensors.

According to Henshaw, a biochemical researcher uses the HP 3000 to monitor and record chemical synthesis and then pass the data to the 370/155's memory via the 1270 front end. In this application, the HP 2000 front end continuously polls a series of sensors and analog-digital converters, records the data and then forwards it to the HP 3000.

Carter Hawley Hale's ISD Programmers Are Challenged Every Moment.

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Attaches to Intertel EMS-One

Reporting System Aids Net Control

BURLINGTON, Mass. — A minicomputer- and disk-based file management and reporting system designed to store and retrieve data needed for statistical analysis, report generation and determining the status of network operations has been introduced by Intertel, Inc.

The Sigma system interfaces with the firm's EMS-One network control system. Together, the two systems are said to provide advanced file management and historical reporting capabilities to the communications/operations manager.

The Sigma addition maintains and supports EMS-One administrative data on an individual-site basis and also stores histories for all the system's automatic monitoring events, a spokesman said.

Sigma hardware includes a commercial minicomputer with a real-time, multitasking operating system; 5.2M bytes of disk storage that can be expanded by an additional 5.2M or 10.4M bytes; an RS-232C serial interface with a transfer rate of 4,800 bit/-sec; a CRT console; and a 120 char./-sec printer. The hardware links with EMS-One via the latter system's central processor, the spokesman stated.

The EMS-One/Sigma package reportedly provides a full user capability to access administrative data and maintains a history of user-selected automatic preventive maintenance events. Data collected for more than one year's average network operation is stored on standard disks, and the system has a report-writing capability to prepare formatted management briefs.

Sigma is only available as an attachment for EMS-One. The system requires no programming, but can be programmed to meet unique user requirements, the spokesman explained.

Sigma will be shipped this fall and costs $34,500 from the company at 6 Vine Brook Park, Burlington, Mass. 01803.

Unit Prints Tektronix Copy

SANTA CLARA, Calif. — Versatec has released the V-81, a hard-copy unit that reportedly produces high-resolution, archival-quality prints from up to four Tektronix, Inc. 4010 or 4025 terminals.

The V-81 produces copy with a 200 point/in. resolution in less than 20 sec; no warmup is needed, and the cost per copy is less than 3 cents, the vendor claimed.

The standard image size is 10.36 in. by 7.92 in.

The Model V-81 costs $6,000. First shipments are scheduled for November.

Versatec is located at 2805 Bowers Ave., Santa Clara, Calif. 95051.

Multiplexer Targets Users Of Satellites

FORT WASHINGTON, Pa. — A statistical multiplexer that provides multiplex and demultiplex capabilities for up to four lines of serial synchronous data, each at any transmission rate from 100K bit/sec to 48M bit/sec, when connected to a full-duplex 50M bit/sec satellite communications channel, has been introduced by Aydin Monitor Systems.

The Model 781 statistical multiplexer is the result of a contract award from the National Aeronautics and Space Administration to support the space shuttle program.

The multiplexer output can operate slaved to an external primary standard or the communications channel modem's 50M bit/sec clock, the firm said. In a free-running mode, the unit outputs data under control of its internal 50M bit/sec clock.

A multiplexer/demultiplexer connected in tandem through a communications channel constitutes a transparent 4-channel data link. The multiplexer makes optimum use of the 50M bit/sec communications channel bandwidth by using statistical multiplexing techniques, partitioning the input data streams, formatting the data in equal-size blocks with control information and transmitting the data from each port a block at a time based on rate-determined priorities, the vendor noted.

The Model 781 costs about $98,000, depending on the configuration, from Aydin headquartered at 401 Commerce Drive, Fort Washington, Pa. 19034.

Set Runs to 12 Miles

SILVER SPRING, Md. — Rixon, Inc.'s LDM710 modem was designed for operation up to 12 miles at asynchronous speeds up to 9,600 bit/sec over metallic facilities or unloaded local telephone circuits.

Half-duplex, full-duplex, point-to-point and multipoint asynchronous operation are standard on the LDM710. A printer 20mA current-loop interface and "Local Copy" are integral strappable features, according to a spokesman.

The stand-alone unit costs $295 and the card costs $245, Rixon said from 2120 Industrial Pkwy., Silver Spring, Md. 20904.

Shackled by on-line programming systems? Take it off-line with MAESTRO™

MAESTRO™ is an interactive standalone programming system engineered to offload the mainframe and boost programmer productivity.

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Word processing capabilities produce documentation in parallel with program development.

Maestro supports all phases of a program's life cycle including design, coding, testing, maintenance and documentation.

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Flexible procedure language enables you to adapt Maestro to any special development techniques.

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Supervisory System Detects Network Faults

HORSHAM, Pa. — A self-contained fault detection and alarm unit that monitors the signals on a data communications channel for normal or abnormal operation is the heart of the Digi-Log Systems, Inc. Network Supervisory System.

The Supervisory Alarm Module (SAM/1) alerts supervisory personnel to abnormal conditions and helps them analyze, isolate and diagnose system failures via LED indicators and alarms, according to the vendor.

The SAM/1 costs $315 from Digi-Log Systems, Inc., Babylon Road, Horsham, Pa. 19044.

Q-Bus, Unibus Gain IBM Interface

AUSTIN, Texas — A channel-speed IBM interface for Digital Equipment Corp. Q-Bus and Unibus computers has been announced by Austron Data Systems, Inc.

The Model 8911 interface provides both IBM and DEC users with a functional replacement for DEC's DX11-B device, a spokesman said. The unit uses an internal LSI-11 processor to replace the external DEC PDP-11 required by the older DX11. The 8911 can emulate any standard IBM controller and respond to all 256 possible subchannel addresses, the spokesman noted.

Operating on the channel at 1M byte/sec, the 8911 provides channel-speed communication between any IBM selector, byte multiplexer or block multiplexer channel and multiple DEC Q-Bus and Unibus devices.

The interface comes with an IBM controller-emulating software package. Additional emulations will reportedly be available as the unit emulation library is expanded.

The 8911 uses the firm's Aries operating system for developing custom applications.

The Q-Bus interface costs $17,500, while the Unibus model sells for $18,400 from Austron at 1915 Kramer Lane, Austin, Texas 78758.

Terminal Offers High Resolution, Full-Color Mode

SAN JOSE, Calif. — Compatible with the Digital Equipment Corp. PDP-11 Unibus, the ID 1100 CRT terminal from DeAnza Systems, Inc. supports a variety of ultra-high-resolution image display requirements, DeAnza said.

The ID 1100 offers full-color or up to four multi-image monochrome or pseudo color displays with 1K by 1K by 8-, 16-, 24- or 32-bit resolution, according to the firm.

The ID 1100 can be used for mapmaking-type applications and is especially useful in analyzing Landsat data or in medical/x-ray environments, DeAnza suggested.

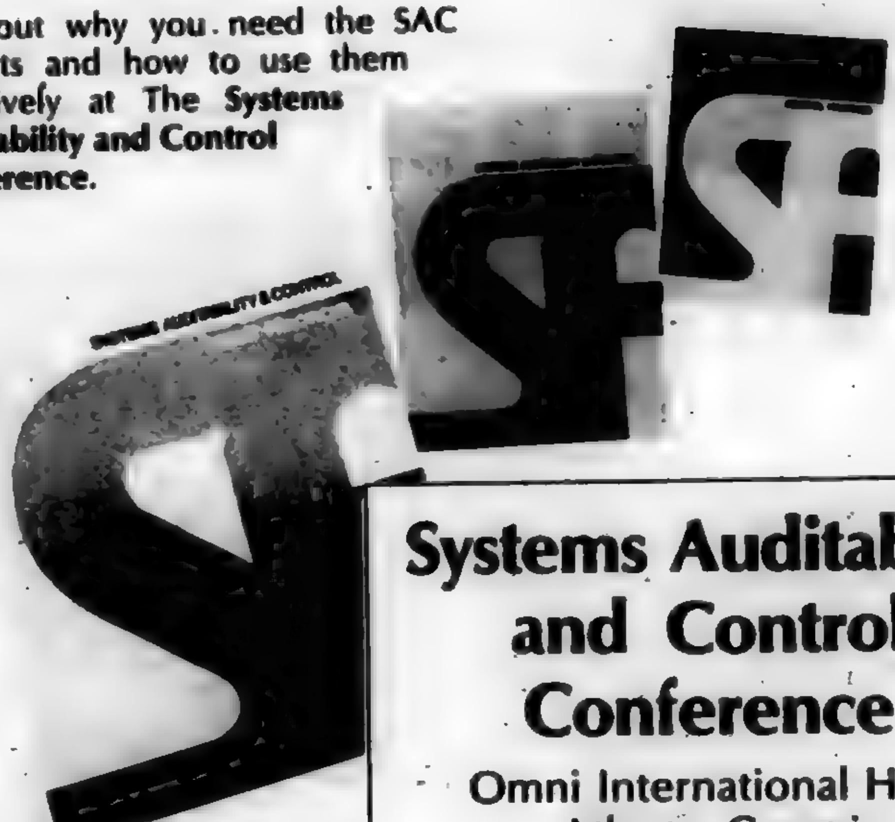
The unit costs $26,000 from DeAnza at 118 Charcot Ave., San Jose, Calif. 95131.

Heuristics Adds Larger Vocabulary

SUNNYVALE, Calif. — An expanded vocabulary option for Heuristics, Inc. and Lear Siegler, Inc. speech recognition and voice response equipment is now available from Heuristics.

The 128-word vacabulary option doubles the standard 64-word capacity and is compatible with the Heuristics 7000 voice response unit and the Lear Siegler 5000 plug-in unit. Each "word" can be a phrase up to 3 sec in length.

The option is available for $200, Heuristics said from 1285 Hammerwood Ave., Sunnyvale, Calif. 94086.



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Device Converts From Parallel to Serial

SOUTHPORT, Conn. – A parallel-to-serial data converter that accepts input data from transient recorders, data loggers, digital clocks and other instruments has been unveiled by Science Accessories Corp. (SAC).

Output of the Model DC-6 is compatible with standard communications units including modems, acoustic couplers, programmable calculators, CRT terminals and any RS-232C-compatible or current loop equipment, a spokesman stated.

The DC-6 can be introduced into existing terminal-to-modem systems using normal software and without disturbing system configurations or capabilities, the spokesman continued.

Functioning as a universal data converter, the unit will accept any form of parallel transmission, convert it and deliver it to serial processing. The unit is completely programmable and has a flexible output format, the company claimed.

The DC-6 can handle transmitted data up to 34 characters. As many as eight special characters can be programmed into the converter and placed anywhere within the event or line sequence. In addition, internal programming switches permit the transmission of data in binary, binary coded decimal (BCD) and other forms.

Transmission rates are available either prefixed or changeable through the use of a rate switch. Speeds range from 112.5- to 9,600 bit/sec.

The converter comes in three models: the DC-6 teletypewriter version, which sells for $1,150; the RS-232C version, priced at $1,150; and the teletypewriter and RS-232C combination unit, which costs $1,360.

Additional details on the DC-6 can be obtained from SAC at 970 Kings Hwy. West, Southport, Conn. 06490.

Each Takes 26 Terminals

Concentrator Boasts Five Ports

S. HACKENSACK, N.J. – A concentrator with five polling ports, each capable of handling up to 26 CRT terminals, has been introduced by Communication Devices, Inc. (CDI).

The Smart Polling Concentrator reportedly has a learning capability that allows it to seek out only those terminals responding to the poll chain and subsequently poll only those terminals that have answered.

Each port is firmware-programmed for transmission rate and bit structure, according to a company spokesman. A 6K-byte memory, expandable to 12K bytes, is provided for each polling port.

When an individual memory has a complete item, it goes into a waiting line for retransmission synchronously at speeds to 9,600 bit/sec to a remote computer.

The answer-back message from the computer is placed in the same memory and transmitted at the proper speed to the CRT terminal.

The unit costs $3,900 from 290 Huyler St., S. Hackensack, N.J. 07606.

Synchronous Line Driver Debuts

NEWPORT, R.I. – Avanti Communications Corp.'s 2200 local area data distributor is a synchronous line driver for high-speed transmission of digital data.

The 2200 operates over unloaded lines or coaxial cables at distances up to 10 miles. The device is compatible with Bell's Lads unit and is available with an asynchronous option, a spokeswoman said.

The data distributor has switch-selectable speeds from 1,200 to 19.2K bit/sec for both synchronous and asynchronous operation. With a high-speed synchronous option, the unit's rates are boosted from 2,400 to 64K bit/sec, the spokeswoman added. Additional rates are available.

Operating modes are two-wire half-duplex, four-wire half- or full-duplex, point-to-point and multipoint. The unit is available as a desktop stand-alone or rack-mounted configuration. The 2200 can also be supplied as a series of rack-mount modules, whereby 10 modules and associated power supply are housed in a single prewired rack assembly.

The stand-alone 2200 costs $795 from the firm at Aquidneck Industrial Park, Newport, R.I. 02840.

Direct-Connect Set Can Run With Six-Line Phone

TARZANA, Calif. – A direct-connect modem that can function on either a multiline or a single-line telephone is available from Novation, Inc.

Approved by the Federal Communications Commission for handset jack connection with any modular phone, the answer/originate direct-connect modem is part of the Cat series introduced by the firm last year.

Designed specifically for the personal and small computer market, the Bell 103-compatible unit is called the D-Cat. It works with a single line or 50-pin, six-line business phone, the vendor said.

The D-Cat costs $199 from Novation at 18664 Oxnard St., Tarzana, Calif. 91356.

Canoga Adds Upgrades

CANOGA PARK, Calif. – Performance upgrades have been announced for three Canoga Data Systems products:

- An RS-422 interface has been added to the presently available RS-232, MIL 188 and optical input channel interfaces of the CMX-100 Fiber Optic Digital Time Division Multiplexer.

The cost of the new interface is $60 per channel above the standard 16-channel (RS-232) multiplexer price of $9,000.

- The one-kilometer maximum transmission distance of all the vendor's products has been increased. The enhanced products will transmit up to distances of three kilometers, the vendor claimed. Enhancements will cost $75 over the standard list price of the products involved.
- The asynchronous data speed of the fiber-optic transmitter/receiver module sets has been increased. The change allows asynchronous data transmissions from dc to 5M bit/sec and continues to provide synchronous data transmission at dc to 2M bit/sec, the vendor claimed. There is no increase in cost.

Canoga Data Systems is located at 6740 Eton Ave., Canoga Park, Calif. 91303.

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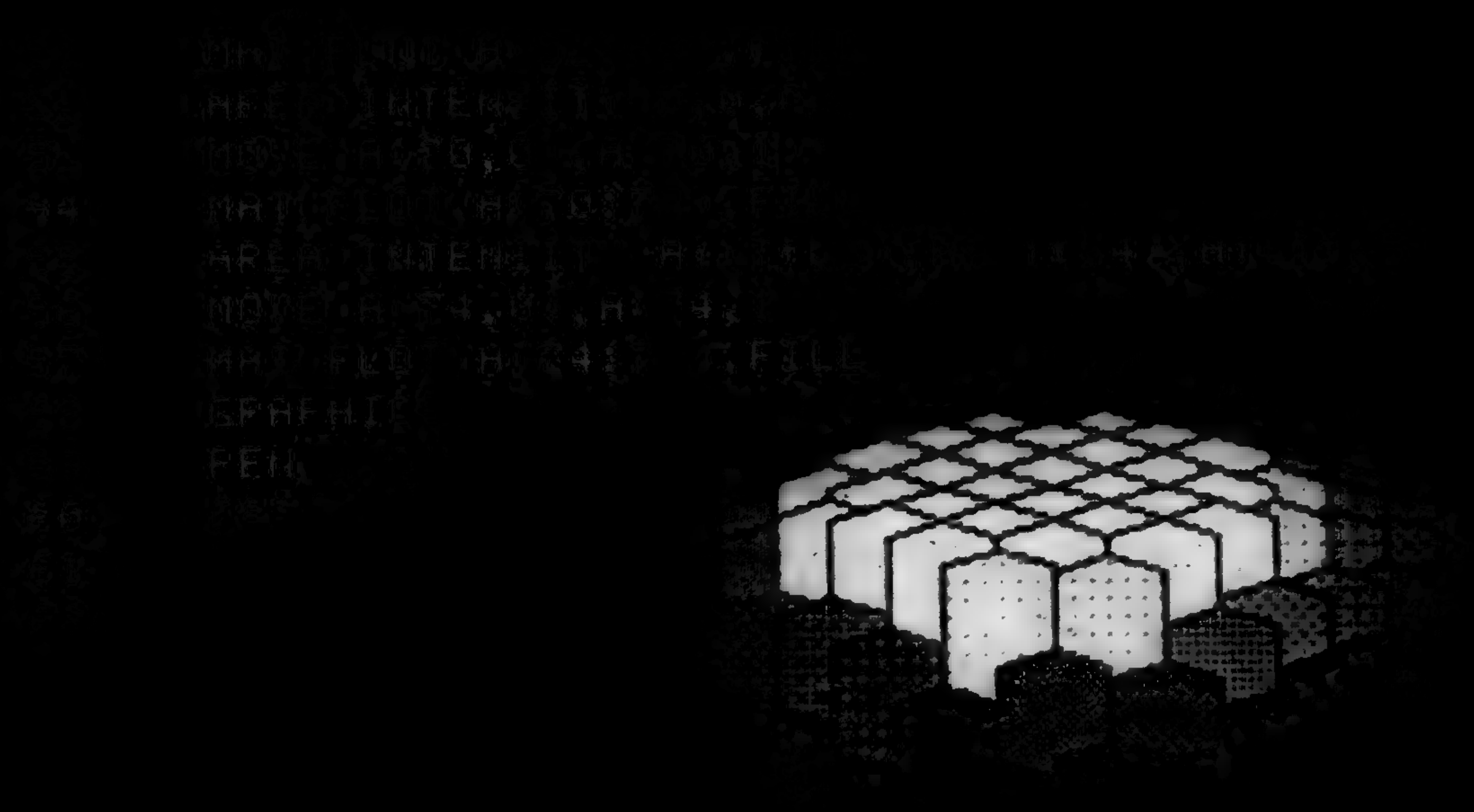


Color and computation integrated in a desktop

4913 fill colors
70 graphics commands
Softkeys
Interactive light pen
2 built-in tape drives
Special-function keys

A new desktop computer—the HP System 45C—combines flexible color graphics and interactive computing in a totally integrated, high-throughput system that plugs into the wall. Features include 4,913 fill colors, 70 graphics firmware commands, high-speed vector writing, an interactive light pen, special-function keys, softkeys, a built-in thermal printer, two built-in tape drives, HP's enhanced BASIC, and up to 449K bytes of user memory.

Designed especially for engineers, scientists and others faced with complex design, analysis, and data acquisition and control problems, the System 45C can handle problems that range from Fast Fourier transforms on 65,000 data points, to multiple linear regressions on 50 variables, to project management with up to 18,000 activities for CPM or PERT analysis—all without accessing a mass memory device. And the system can output numerical data to the CRT in sharp, accurate color graphic format for quick, precise interpretation. A dedicated I/O channel between the 13-inch color display and the mainframe ensures excellent throughput and performance.

◀*Cover*
Image from a System 45C desktop computer. In this 3-D plot, color and height of prismatic solids show values of the function: U=MAX (−.17, MIN (.21,((x−.9)∧2+y∧2)∧.1−((x−.5)∧2+(y−.7)∧2) .1)). Image and computations are enlarged to approximately 150%.

Color works harder

The System 45C's color CRT, with its pixel spacing of .34 mill center to center, uses advanced technology to ensure high-resolution. The CRT uses a shadow mask incorporating a screen covered with triads of phosphor dots with red,

Excited state of H_2 atom

Jupiter's giant red spot

Increase of acid rain

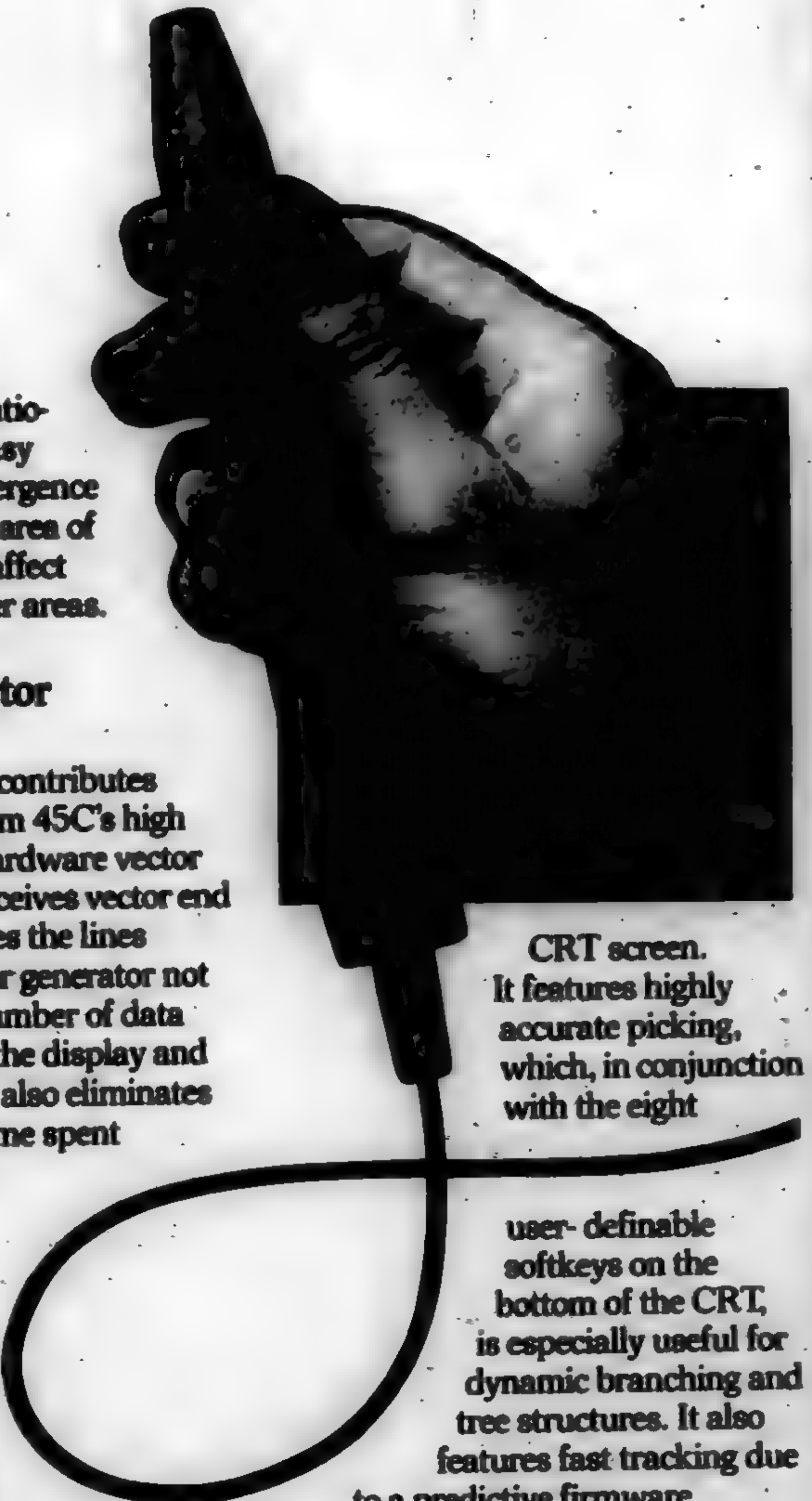
green, and blue emissions. Each phosphor type is activated by an electron beam from a corresponding electron gun. A metal shadow mask guides the beams so that they reach the correct phosphors. This technology provides the user with eight basic colors: white, red, yellow, green, cyan, blue, magenta, and black.

To provide up to 4,913 fill colors, "dithering" is used. In this process, the 560 x 455 graphics raster CRT is divided into 4 x 4 arrays, containing 16 elements called pixels. In each array, each of the 16 pixels can be turned either on or off. The many combinations of pixels being turned on or off in three different memory planes (one for each primary color) creates the great variety of color shades on the CRT.

The system's precision raster scan display uses sophisticated electronic correction technology to minimize pincushion distortion and CRT magnetization and ensure color purity. To achieve long-lasting color convergence, the system provides software-assisted potentiometers for quick, easy adjustments. Convergence adjustments in one area of the screen will not affect adjustments in other areas.

High-speed vector generator

A feature which contributes greatly to the System 45C's high throughput is its hardware vector generator, which receives vector end points and generates the lines between. The vector generator not only reduces the number of data transfers between the display and the mainframe but also eliminates mainframe CPU time spent calculating points within the line.



Interactive light pen

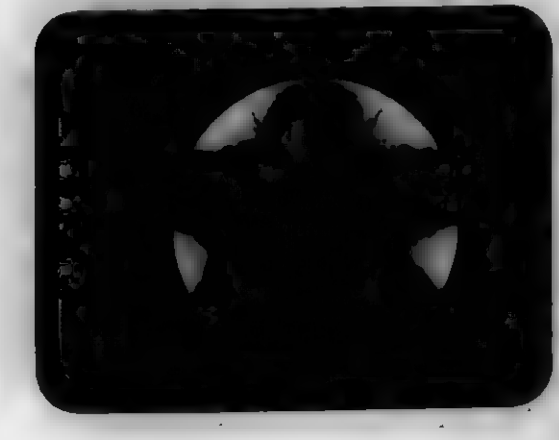
The System 45C's interactive light pen provides a fast, easy way to pick, move, and construct objectives directly on the CRT screen. It features highly accurate picking, which, in conjunction with the eight user-definable softkeys on the bottom of the CRT, is especially useful for dynamic branching and tree structures. It also features fast tracking due to a predictive firmware algorithm that enables the CRT

Continued on page 8

Wire frame design

3-D perspective

Antenna radiation



Interactive software links HP 3000, IBM mainframe

New solution for distributed processing applications.

HP's IML/3000 software (Interactive Mainframe Link) makes the HP 3000 a good complement to your IBM mainframe (or compatible) system. Using IBM 3270 binary synchronous protocol, IML/3000 permits easy programmatic access or update of CICS or IMS data bases on your mainframe through powerful, high-level program statements embedded in HP 3000 user programs. It also permits direct access of the mainframe through HP user terminals.

IML/3000 can provide a smooth transition to distributed processing and improve mainframe productivity. It allows new applications to be implemented on one or more HP 3000s while still having access to mainframe data. Doing this brings processing power closer to users and can reduce communications volume and cost. Alternatively certain of the applications already on the mainframe may be converted to the HP 3000 thus reducing the mainframe's teleprocessing workload.

Network flexibility

With IML/3000, an HP 3000 appears to the mainframe as a remote bisync 3270 cluster control unit. Like a 3270, up to 32 "devices" can be connected to each emulated control unit. Up to 32 control units can be attached to a single leased line. The "devices" can be either HP 3000 programs using IML/3000 statements for programmatic access and update or HP terminals using the Inquiry and Development Facility. IML/3000 lets you multidrop HP 3000s on the same bisync leased lines you are already using for your 3270 terminals, thus reducing communication line costs. In conjunction with DS/3000, which provides interactive communication between HP 3000s, IML/3000 will allow you to configure a network that reflects your organization's structure.

High-level intrinsics

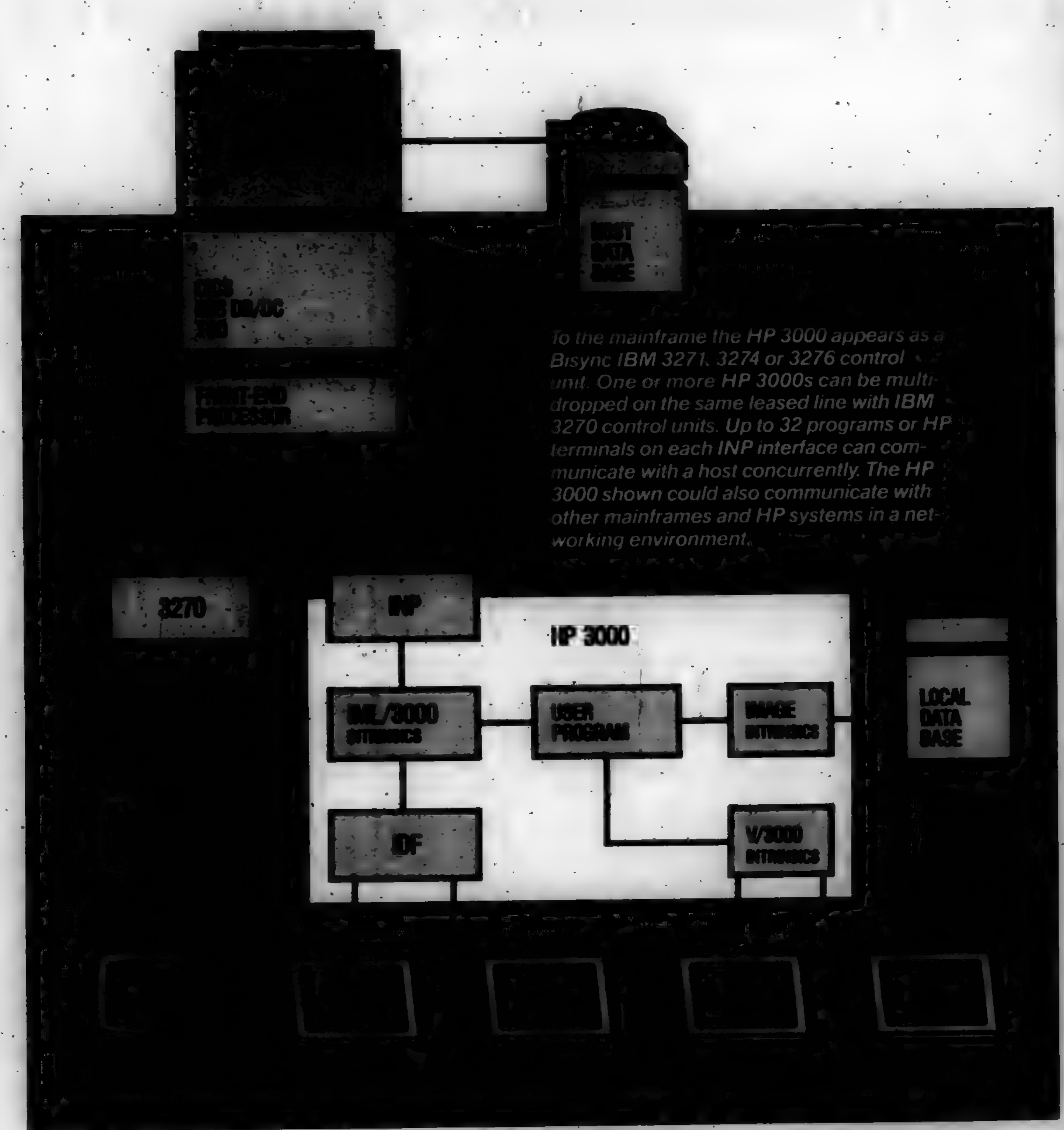
IML/3000 Programmatic Access and Update uses 14 high-level "intrinsics," analagous to subroutine calls, that maximize programmer productivity by automatically handling a lot of the low-level "bits and bytes" programming work required by many 3270 emulators. When data is returned from the host, for example, it is in EBCDIC, and it includes 3270 control characters interspersed with data. IML/3000 handles all protocol management so that you need not worry about terminal ID, polling sequences or screen control. It also handles EBCDIC to ASCII conversion automatically.

The 14 intrinsics—which include such calls as READSCREEN, WRITESCREEN, READFIELD, and WRITEFIELD—can be used in COBOL, COBOL II, BASIC, FORTRAN, or SPL programs.

Integrated data bases

IML/3000 intrinsics can be combined with the intrinsics of other HP 3000 software—

IML/3000 Intrinsics (Program Statements)	Function
OPEN3270	Initiate IML/3000 activity from the program
RECV3270	Receive a screen of data from host
TRAN3270	Transmit a screen of data to host (equivalent to pressing 'Enter' key on a 3270 terminal)
READSCREEN	Read a screen of data from host into a buffer
READFIELD	Read a specific field of data from host into buffer
WRITEFIELD	Update an unprotected field
RESET3270	Equivalent to pressing 'Reset' key on 3270 terminal
STREAM3270	Equivalent to pressing a sequence of keystrokes on a 3270 terminal keyboard
ABORT3270	Aborts an outstanding request to receive or transmit a screen (no-wait I/O only)
CLOSE3270	Terminates IML/3000 activity from the program
VERS3270	Returns the current version of IML/3000 on the HP 3000
ERR3270	Provides easy-to-read diagnostic messages
FIELDATTR	Provides helpful programming information describing specific fields
SCREENATTR	Provides helpful programming information describing the virtual 3270 screen


CICS
IMS DB/DC
TSO
FRONT-END PROCESSOR
HOST DATA BASE
3270
INP
HP 3000
IML/3000 INTRINSICS
USER PROGRAM
IMAGE INTRINSICS
LOCAL DATA BASE
IDF
V/3000 INTRINSICS

To the mainframe the HP 3000 appears as a Bisync IBM 3271, 3274 or 3276 control unit. One or more HP 3000s can be multi-dropped on the same leased line with IBM 3270 control units. Up to 32 programs or HP terminals on each INP interface can communicate with a host concurrently. The HP 3000 shown could also communicate with other mainframes and HP systems in a networking environment.

such as V/3000 for screen handling, IMAGE for data base management, KSAM for file handling, or DS for distributed systems, to develop very powerful, flexible applications. For example, a COBOL program could be written using IML/3000, V/3000, and IMAGE/3000. A user sitting at an HP terminal could enter information under the control of V/3000. The program could look at each item entered and decide if it should be sent to an IMAGE data base, a mainframe data base, or both. The program would then use the appropriate intrinsics to do so. To retrieve data, the program would determine whether the data

Continued on page 6

Interactive mainframe link

Continued from page 5

is on the HP 3000 IMAGE data base or on the mainframe data base. It would then use the appropriate intrinsics to retrieve it. The terminal user does not have to know where the data is located, since the data bases on one or more HP 3000s and the mainframe have been made to appear as a single, integrated data base.

Easy terminal access to mainframe

The IML/3000 Inquiry and Development Facility (IDF) allows almost any block-mode HP 264X terminal attached to the HP 3000 to emulate the principal features of an IBM 3277 or 3278 terminal attached to an IBM 3271, 3274, or 3276 control unit. IDF uses IML/3000 intrinsics in conjunction with HP 264X escape sequences. It displays on the HP 264X CRT the 3270 screen image which IML/3000 constructs from the data stream received from the mainframe. It also monitors the 264X function keys which are used to implement certain 3270 functions.

A few keystrokes on the HP terminal keyboard is all that is required for the terminal to gain direct access to the mainframe. No programming is required. IDF may be used either with host teleprocessing applications such as CICS or IMS DB/DC programs, or for access to host timesharing services such as TSO. A standard access method such as BTAM, TCAM or VTAM must be used on the host.

IDF provides great user flexibility since it allows you to develop programs on the mainframe from the HP 3000 terminal, as well as on the HP 3000 itself. These programs can then talk to each other interactively using IML/3000.

Low overhead

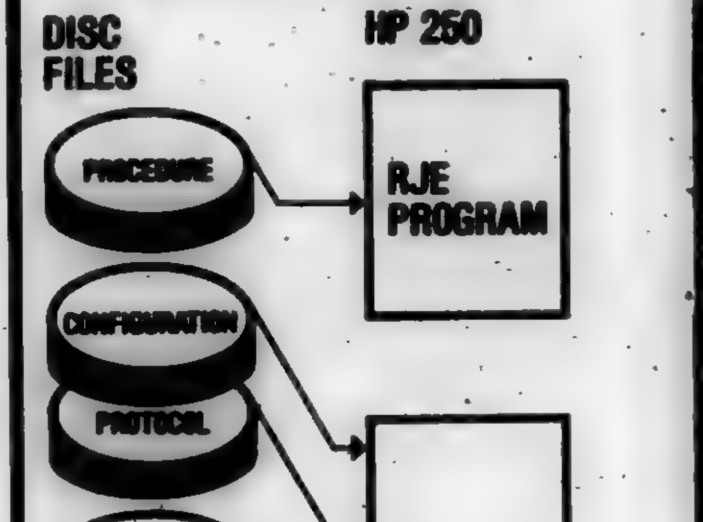
And you don't have to worry about CPU degradation using IML/3000. HP's Intelligent Network Processor (INP) keeps CPU overhead of the 3270 control unit emulation to a minimum. With a silicon-on-sapphire microprocessor and 32K bytes of fast RAM, the INP not only handles protocol data buffering, error checking and polling, but also takes care of decoding the 3270 data stream into 3270 screen images. In short, the INP handles the basic job of the 3270 control unit. This means better performance for IML/3000 and HP 3000 processing alike.

With its networking flexibility, high-level intrinsics, easy terminal access to a mainframe, and low CPU overhead, IML/3000 makes the HP 3000 an ideal tool for providing a smooth transition to distributed processing and improving mainframe productivity.

The cost is $3,500 for one copy to run on one HP 3000. Additional copies for other systems cost $1,400 each.

For further information, check B on the reply card.

Automatically executing program commands contained in a PROCEDURE file RJE250 can configure and load protocol code on the INP/250 then send the JCL program and data for a job to be processed by the host. The results are sent back to the HP 250 for printing or disc storage. At any time other users can be modifying or creating files for other job runs.



INP lets HP 250 run remote programs automatically

With the introduction of INP/250, the benefits of intelligent communications are extended to the small business system. INP/250 is an intelligent network processor, a board that uses its own memory, logic, and central processing unit to handle the communications protocols that would otherwise be processed by the main CPU.

INP/250 does more than save CPU cycles; it gives the HP 250 performance of a different order. Known since its introduction as a small powerful standalone processor, the HP 250 now adds the capability to perform automatic remote job entry with large mainframes.

Like the recently introduced INP/3000, the INP/250 contains a powerful SOS microprocessor and 32K of RAM.

With the addition of this board, and the RJE/250 software that comes with it, the small business user can make the HP 250 emulate an IBM 2780/3780 batch terminal and communicate over data lines at speeds up to 19.2K bits/sec. The INP board takes care of all protocol handling, leaving the main CPU free to treat the RJE program just as it treats any other task in a multiuser configuration.

RJE/250 runs the show

The RJE/250 software can set up a communications link and run background batch programs automatically.

The first time a batch program is run, RJE/250 will prompt the user as to how to enter the required data to open the communication lines. Command and control sequences can be stored in a PROCEDURE file to run the program and a CONFIGURATION file of data on transmission speed, parity, code, transmission mode, etc.

Thereafter, all the operator has to do is call RJE/250 and select PROCEDURE from the softkey menu. RJE/250 will request "ENTER FILENAME"; once chosen, the appropriate PROCEDURE file will enter the commands to run the batch program.

These commands, typically, will first OPEN a communications line by dialing up the mainframe and downloading the configuration parameters and protocol code to the INP/250 chip. The program will then execute several SEND orders, to transmit job control statements, the batch program, and the data to the mainframe. On the command to RECEIVE output from the host, RJE/250 will print out or store results.

CPU busy elsewhere

The operator, meanwhile, can detach from the RJE program and use the HP 250 for other tasks. Because the INP controls communications, the RJE data transmission does not affect the CPU response time for other users.

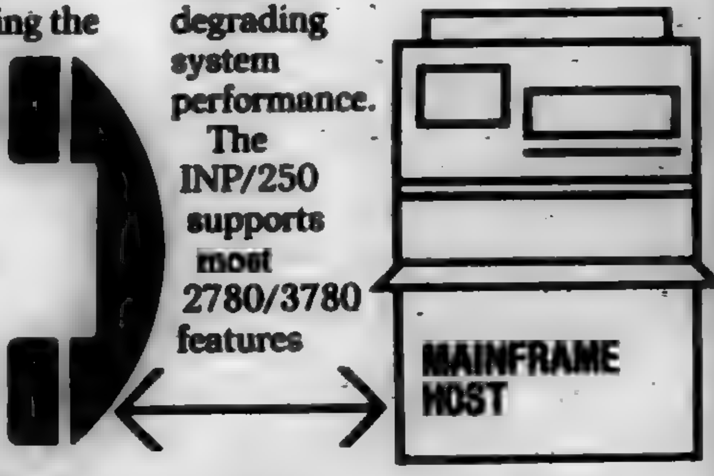
INP/250 will operate with full or half duplex RS232 modems, and with RS366 auto-dialers. It has automatic answering capability, providing for unattended operation once a PROCEDURE is initiated. Results may therefore be received during off-hours, when telephone charges are low.

With this new package, small businesses can access large mainframes through a service bureau, while retaining the use of their own small computer. Large decentralized organizations can use several HP 250s to perform local processing and recordkeeping, and to exchange information with the central computer, without degrading system performance.

The INP/250 supports most 2780/3780 features and offers several extras, including data origination from keyboard or disc file (but not punched cards).

The INP/250 comes bundled with the RJE/250 software. Price of the package, with one cable, is $3,225.

Check C on sender reply card for more information.



Color graphics

Continued from page 3

cursor to move at the same speed and in the same direction that the user moves the pen. This in turn allows the user to do precise digitizing and to know exactly where the pen is pointing. The pen even makes it possible to track a cursor over area-filled colors.

Powerful graphics firmware

The System 45C's powerful graphics firmware is designed to help users make fast, efficient use of the system's various hardware and software features, and to enable users to get their applications up and running quickly. The firmware includes the 40 BASIC commands found on the System 45B, as well as 30 new statements for easy, effective use of color, interactive I/O, and geometric constructions. The POLYGON and RECTANGLE statements, for instance, automatically draw regular polygons and rectangles. And the FILL parameter allows a user to color-fill the insides of figures without calculating points.

The firmware provides the user with a high degree of control over hardware and software. It allows, for example, individual access to the three memory planes and assignment of one of the eight basic colors to each of the three memory planes. This gives the advanced programmer great flexibility in creating a variety of sophisticated color graphics.

Two color models—the color cube and the color cylinder—can be used for selecting area colors. Since all 4,913 colors in both models are logically and numerically organized, colors can be used to directly reflect the result of arithmetic or algorithmic calculations of variables such as temperature, stress, and so on.

Easy linkage to peripherals

The System 45C can be easily linked to a wide variety of fully compatible peripheral devices such as flexible discs, large cartridge discs, printers, plotters, and digitizers, as well as to a large assortment of electronic instrumentation. An input/output ROM extends the BASIC language to exchange data and control information with various external devices via asynchronous handshake, vectored interrupt, fast hand-shake, or DMA. All linkages are handled through plug-in interface cards, including 16-bit parallel, BCD input, HP-IB, Real Time Clock, RS-232C Bit Serial, Incremental Plotter, Disc Interface and ASYNC/BISYNC data communications.

Unified Mass Storage Commands save programming costs by allowing users to address each new device with only a single program line change. The system provides a file-by-name directory and gives the choice of serial or random file organization. Variable record lengths conserve mass memory space, while extensive data buffering balances I/O to provide maximum throughput.

The System 45C. Powerful, and flexible. A fully integrated color graphics/computation desktop system—with 187 KB of memory, HP's Enhanced BASIC, powerful graphics firmware, up to 4,913 colors, and color utilities software—is only $39,500.

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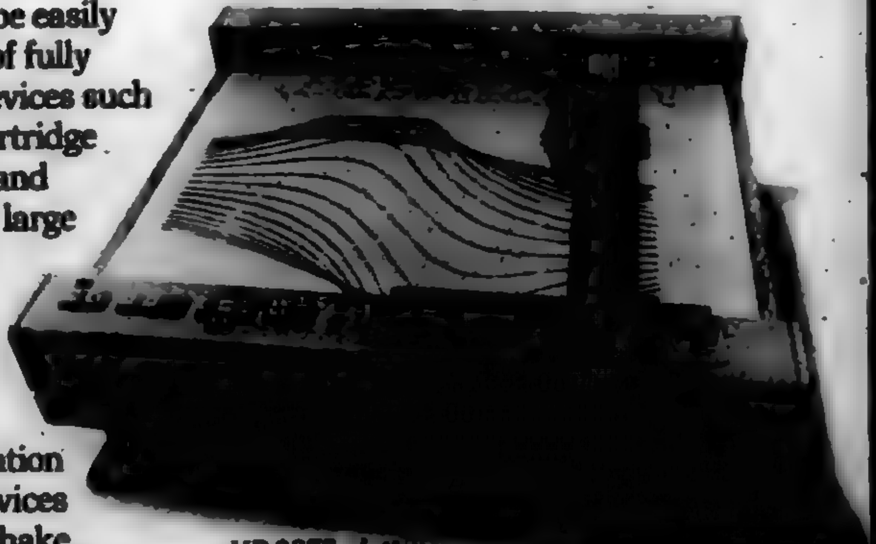

HP 9872 plotter with a 4 color line version plot of computation shown on cover.

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Computers and Privacy in the 80s

I. A Research Agenda

"Privacy" is a complex notion involving the social contract between individuals and the society in which they live. It invites clashes between individuals and institutions and between privacy protection and free access to information.

This article presents an agenda which attempts to outline research priorities that can lead to reasonable resolutions of these conflicts. However, even if all its projects are undertaken, the agenda suggested here cannot permanently resolve these problems, since values are in constant flux and differ across societies and across historical time periods.

Most of the projects listed can be undertaken from philosophical, psychological, press, behavioral, economic, legal, sociological, computer-communications or public interest vantage points. Each of these perspectives contributes to a comprehensive dialogue. Research is needed both from a historical viewpoint (where we have been) and from a policy research viewpoint (where we ought to go).

The major areas on our research agenda are historical research, needed institutional mechanisms, needed technological mechanisms, policy questions, privacy vs. alienation, area-by-area analysis of laws and regulations and assessment of new technological developments.

Historical Research

The time has come for experience with the first wave of privacy legislation – both federal and state – to be systematically evaluated. The Privacy Protection Study Commission, operating under tight time constraints, did this to a limited extent. Researchers today, however, have the benefit of several more years of experience with the relevant laws and administrative procedures.

An interdisciplinary group of experts should examine the experiences to date of government and private organizations that have had to comply with privacy constraints and Freedom of Information Act or public record requests. The effects of federal and state legislation on system development, information exchange and interagency information flows should be understood and evaluated. The parts of the legislation which have worked well should be identified, as should the parts which have remained unused.

Finally, the implications of omnibus vs. specific legislation can be studied, as can the use of privacy as a shield for restraint of trade or for other interests.

Institutional Mechanisms

The 1979 Asilomar workshop on computers and privacy emphasized the utility of interaction among and between various disciplines. Multidisciplinary deliberations should be conducted on a broad scale.

A continuing group should meet periodically to exchange information and discuss current national and international questions related to privacy and information policy. This group should have a broad membership (including the public) and one of its tasks should be a continual updating of the research agenda. This group (or a separate entity) could be a clearinghouse of information on privacy, information policy and public opinion.

Informed critics have long been concerned with the vulnerability of computer systems. Electronic funds transfer systems have been cited as an example of an area where not enough is known about potential risks. Therefore, research is needed concerning the development of "early warning systems" to alert policymakers and technologists to potential risks and harm.

Technological Mechanisms

One of the weakest areas in computer systems is the auditing mechanism. Knowledge of appropriate techniques is improving, but probably not faster than the increase in computer crime, nor faster than the complexity of computing systems that must be understood by auditors. Additional research into improved auditing techniques and their associated costs is important.

Technological mechanisms may have to be developed to allow a "free port" capability to deal with transborder data flows carried over international networks. These mechanisms should be responsive to international guidelines for transborder data flow under development by various groups such as the Organization for Economic Cooperation and Development (OECD). Differences among guidelines must, of course, be resolved.

There has been a good deal of technical work on computer program verification and the proving of security "kernels." An independent assessment of the importance of verifying or proving security-related aspects of computer software and of the work done so far in this area is now called for.

Policy Questions

Deserving of research are the public policy implications of licensing data bank operators at the federal or state level, certifying computer personnel, certifying computer programs and voluntary controls. Appropriate balance in total tracking (womb-to-tomb) systems; purging, sealing and retention policies for public and private records; and universal identifier/Social Security number problems require further study.

Although there has been speculation

(Continued on In Depth/2)

Reprinted from Computers and Privacy in the Next Decade, edited by Lance J. Hoffman. Copyright 1980 by Academic Press, Inc., 111 Fifth Ave., New York, N.Y. 10003. Published in June, the book is available for $16.50 and is based upon the proceedings of a workshop sponsored by the American Federation of Information Processing Societies, Inc. held in Pacific Grove, Calif., on Feb. 25-28, 1979.

A Research Agenda for Privacy in the Next Decade, by Lance J. Hoffman

Privacy and Information Technology – The Years Ahead, by Willis H. Ware

IN DEPTH

(Continued from In Depth/1)

and some theoretical work on formula-based decision making, we have no empirical data on the actions of or alternatives available to persons denied benefits (such as credit) on the basis of point-scoring formulas.

The appropriateness or inappropriateness of the use of truth verification technology (polygraphs, voice stress analyzers and so forth), its effect on the individuals and the rest of society, the technical requirements for appropriate truth verifiers and which (if any) currently available devices meet these requirements are all ripe areas for future research.

Privacy vs. Alienation

The term "privacy" is used more and more as a catchall to denote, in addition to traditional concepts, the sense of alienation or estrangement of the individual from society (especially government). More accurate terms to express the various notions often addressed under the privacy rubric are necessary if these notions are to be properly studied and public policy developed.

Analysis of laws and regulations relating to specific functional areas should be carried out in the context of the historical research and public policy considerations described above. Operational needs should be weighed against privacy requirements in such areas as taxation, financial, insurance, research, social service, employment and educational records and vital statistics.

Criminal justice records, in particular, present important issues which have yet to be resolved. More detailed studies of the effects of technology, law and public policy on the missions of criminal justice agencies are required. Data access relationships among the various components of the criminal justice community (including those between the Federal Bureau of Investigation [FBI] and state agencies) should be studied, keeping in mind that different operating requirements prevail in local, state and federal milieus and in intelligence and criminal history systems.

While some initial work has been done or is in progress (such as Law Enforcement Assistance Administration studies and the Office of Technology Assessment study of the FBI National Crime Information Center), much more should be done in a broader context to satisfactorily answer policy questions in criminal justice.

New technological developments should be assessed continuously for policy and regulatory implication. Regulating citizens band radio, for instance, is child's play compared with the difficulties of imposing a Code of Fair Information Practices on individuals using personal computers; many of these devices may soon be "data havens."

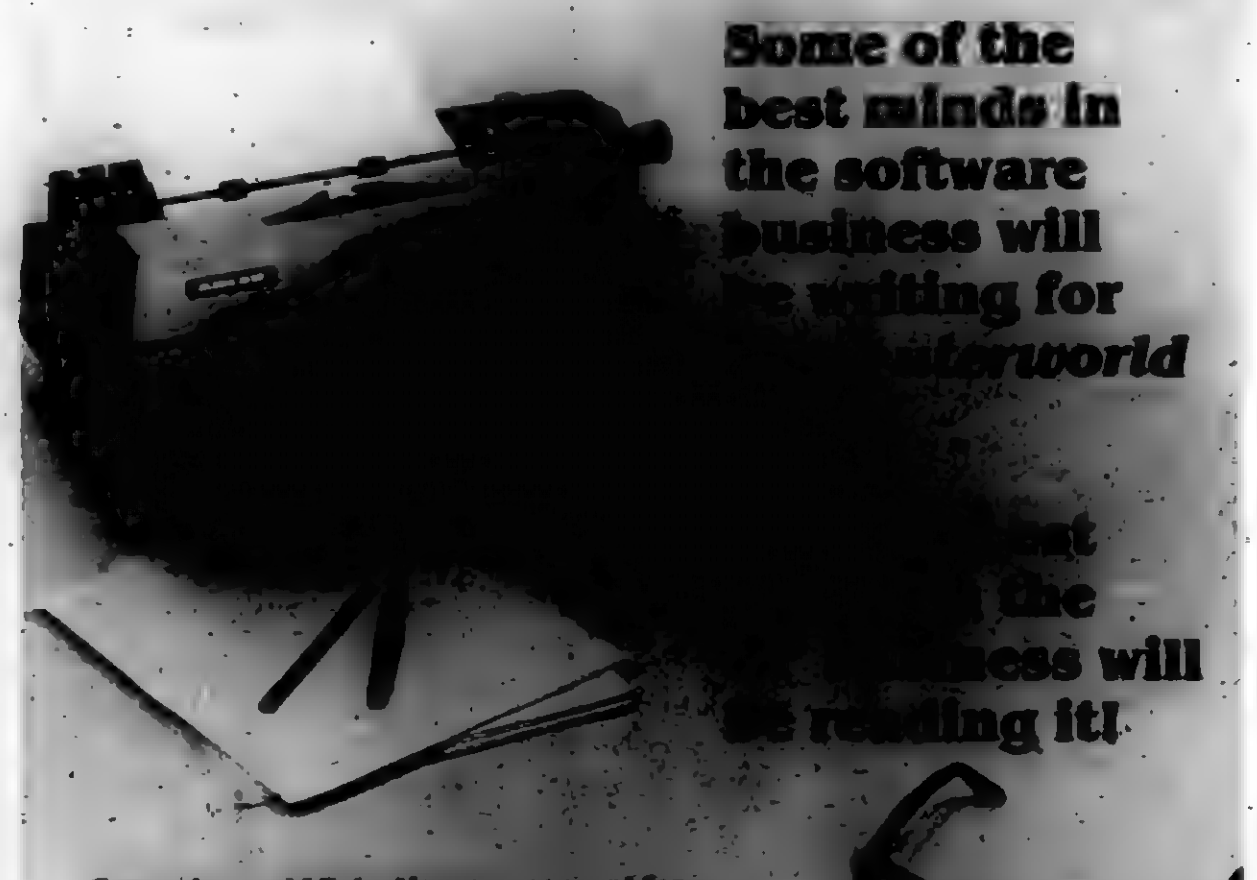
The implications of new identification methodologies and the likely interconnections among computers, cable television and other media are some of the technological and policy questions to be explored in the light of the foregoing discussion.

II. The Years Ahead

The congressional threat in the early 1970s to mandate universal use of the Social Security number as a personal identifier led then-secretary of the Department of Health, Education and Welfare (HEW) Elliott Richardson to form his Secretary's Special Advisory Group, which produced the now well-known report "Records, Computers and the Rights of Citizens." The document's 30,000 copies have been very influential.

The work of the HEW group contributed several important intellectual ideas — among others, the notion that privacy was a matter of mutual concern between record subject and record keeper and the notion that a code of fair information practices should govern how record keepers would deal with their information and their subjects. The HEW report in turn provided the intellectual foundation for the Federal Privacy Act of 1974 which in turn created the Privacy Protection Study Commission.

The work of the commission culminated in its final report and five appendices in mid 1977; the report itself was delivered to Congress and the President on July 13, 1977. It extended the intellectual framework of the HEW effort, generalized it, put it in a



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broader and more appropriate perspective and examined many record-keeping areas of the private sector. For example, the negative notion of harm to a data subject, as expressed by the HEW group, was replaced by the positive concept of fairness in record-keeping matters.

Furthermore, the commission spoke to the question of information collection and its intrusiveness, a subject the HEW group had not dealt with. In some sense, these two reports are the old and new testaments of privacy. There have also been a number of government-funded studies — for example, the Westin examination of medical record keeping.

Privacy and Record Keeping

In the most general way, what do I see privacy to be? First of all, this country is far too large, too complex, and involved in far too many national and international activities to be run with pencils, papers and green eyeshades. Without realizing it in any explicit way, the country has made an irrevocable commitment to computerization. There is no way back.

Primarily because of size, but also in part from complexity, the institutions of government and industry must collect and deal with information about people. We all know that it is essentially impossible for an individual to exist, function and participate in today's society without interacting with a multitude of record systems.

The collision between the legitimate need of public and private institutions for information about people with the rights, privileges, concerns and position of the individual is the nub of privacy. A decade ago, the chips were all in the hands of the record keepers; individuals had little standing to contest what information was collected, how it was used, with whom it was shared and, especially, what government did with it. Beginning with the Fair Credit Reporting Act (FCRA), continuing with other legislative actions of the 1970s and culminating with the Privacy Act of 1974, the odds have gradually shifted toward the individual.

Another way to characterize privacy is to observe that it represents the social thrust of seeking an appropriate balance between legitimate needs of institutions for information about people and the standing of the individual.

Privacy is not a flashy and visible social issue like energy or pollution. It is not as noticeable and its effects are subtle and everywhere. The sense of this comment — namely pervasiveness and subtlety — tends to characterize most situations that involve information, its flow, use, control or management.

We have all seen corporate executives, members of government and other individuals shy away from the mystique of computers and not even try to understand them and their effects. The situation is changing, of course, and getting better in some places, but there still are organizations that do not accurately perceive the role of information in their affairs.

Regrettably, information issues often get only lip service and little action. Thus privacy tends to be low on the priority list for attention.

To distinguish among privacy, security and confidentiality, let me offer definitions of them which I believe reflect contemporary usage.

Privacy. The social expectation that an individual (and by extension, a group of individuals, an institution or all society) must (1) be able to participate in determining how information about him is used or communicated to others, and be assured that such information is properly protected against inappropriate use; (2) be assured of openness, forthrightness and fairness in relations with any record-keeping organization that maintains data about him; and (3) be protected against unwelcome, unfair, improper or excessive collection or dissemination of information or data about him.

Security. The totality of safeguards required to (1) protect a computer-based system, including its physical hardware, personnel and data, against deliberate or accidental damage from a defined threat; (2) protect the system against denial-of-use by its rightful owners; and (3) protect data and/or computer programs (and/or system privileges) against divulgence to or use by unauthorized persons.

Confidentiality. This entails (1) status accorded to data or information in-

(Continued on In Depth/6)

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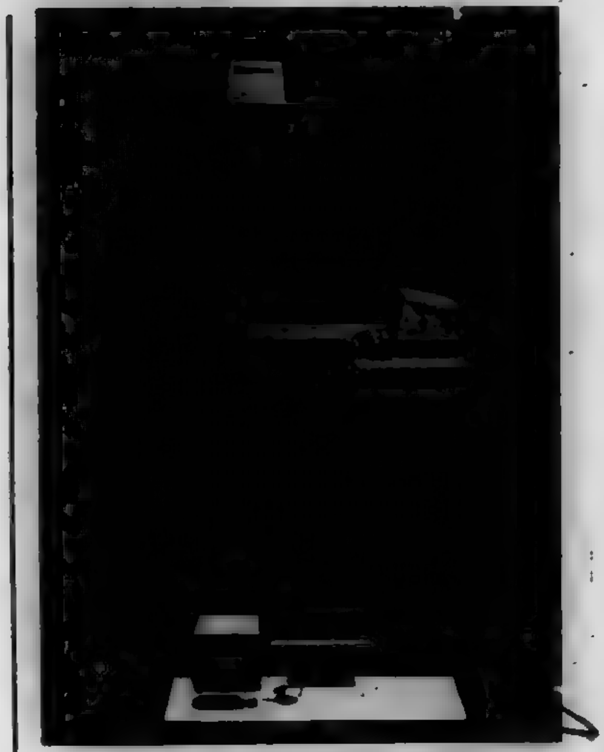

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IN DEPTH

(Continued from In Depth/3)

dicating that it is sensitive for some reason, therefore needs to be protected against theft or improper use and must be disseminated only to individuals or organizations authorized (or privileged) to have it; (2) by extension, status (sometimes assured by law) accorded to data or information that reflects an understood agreement between the person furnishing the data and the person or organization holding it that prescribes the protection to be provided and the dissemination and use to be permitted; (3) a legally recognized relation between certain individuals that privileges communications between them from disclosure in court. (Sometimes, confidential information is legally required to be given in exchange for some benefit, privilege, right or opportunity; sometimes it is voluntarily given.)

Thus, confidentiality is an attribute of information characterizing its need for protection. Computer security represents the technical and administrative means for providing such protection and controlling access to information. Privacy is largely a legally-oriented and procedural matter of how information is used.

It is clear, I think, that computer security is a necessary, but not sufficient, precursor for accommodating privacy. Unless a record system can protect its information and control access to it, there is little hope that privacy protection can be accorded.

The U.S. has made its irrevocable commitment to computers. It has not examined or studied the impact of it; nor, I would assert, does the U.S. understand in the fullest scope what that commitment implies for the future. Let me suggest some thoughts.

Computer-based record-keeping systems — like any system — have to deal with errors and correct them. Moreover, decisions about people made on the basis of information in the record system may have to be modified after the fact for a variety of reasons.

The record system may have a legal responsibility to retain information about people for specified durations of time or for specified purposes. There may be legal or business requirements to audit the functioning and performance of a record-keeping system, and in many cases such a system will have to bill for its services.

Therefore, information about people will exist within a record-keeping system for varying amounts of time, no matter what the system may happen to be.

We refer to some information as being in a data bank. However, some of it will exist for only a moderately short period of time (for example, in a transaction-oriented system); thus we might think of data pools that are part of the system design and necessary to its functioning. Sometimes data will accumulate in puddles for varying periods of time, simply because of the way designers have implemented the flow processes.

Inevitably such data banks, pools or puddles will become attractive targets for government agencies, blackmailers, foreign opponents, law enforcement and perhaps even lawyers in court actions. Why? Because more and more of one's life will be documented in the record, as opposed to either not being documented at all or being documented in a large number of geographically dispersed places.

It will be very inviting to examine such collections of data and to establish factual behavior as opposed to conjectural behavior whose validity has to be established by laborious processes of evidence. It will be tempting to prospect in them for possible criminal acts, malicious mischief or just plain curiosity. Therefore, it will be a problem for most systems — possibly all, especially nationwide ones — to provide very thorough protective mechanisms and access controls.

Normally, in the computer security context, one thinks predominantly of the master file in the system, but I submit that the pools and puddles also need consideration by the designer, particularly since they can exist in the way stations of the system or its communications complex, as well as in the central facilities.

Controlling Access

Second, there is the so-called gatekeeping issue in the context of record systems. The phrase is used to characterize the role of the record in controlling access to services, privileges, opportunities or benefits such as in credit or education.

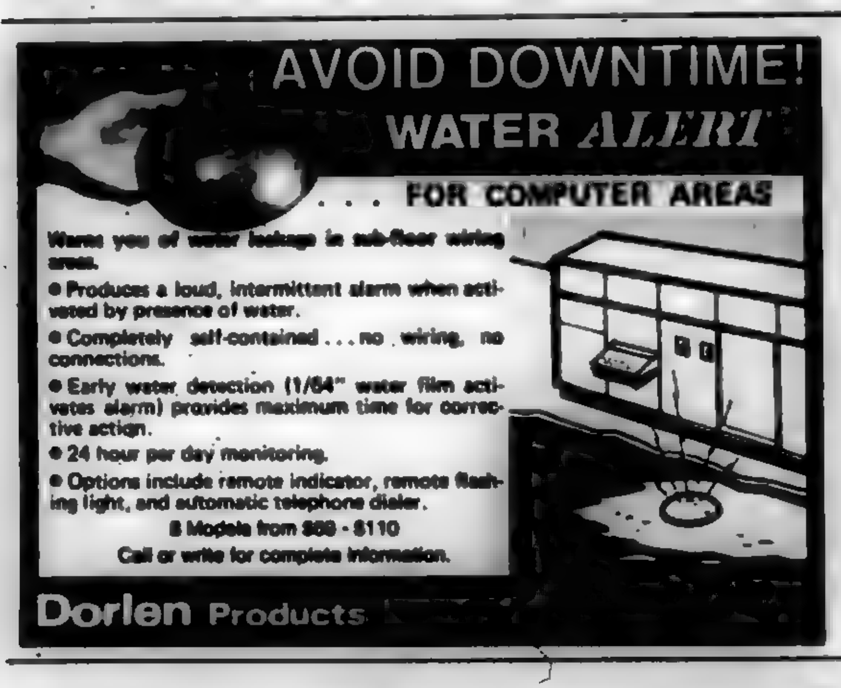
Because the content of the record effectively determines whether an individual has access to something, it can easily become involved with discriminatory questions. To illustrate, there has been in the real estate business a procedure known as redlining, which consists simply of drawing a red line around some geographical area to indicate that real estate transactions within it would be considered undesirable.

Think how subtle that process can become in a computerized system. In granting credit, a process known as point scoring is sometimes used. In effect, it tries to weigh certain characteristics of human behavior and arrive at a composite measure for an individual that indicates whether he is eligible for credit. To put it more precisely, it is an algorithmic approach to granting credit where the parameters of the algorithm reflect the statistical or factual behavior of individuals along many dimensions — for example, age, duration of employment, owner vs. renter, length of time in residence and salary. Point scoring amounts to an automated decision-making process about people, using the content of the record for the decision.

Therefore, we have a discriminatory practice of blocking groups of individuals from some benefit or service. Yet, there is the obvious requirement for business to make good decisions about individuals, lest risks not be adequately controlled. There is obviously a very hazy interface and probably a smooth transition from generalized discriminatory practices to well-based, sound business practices. In the hazy interface between them, I can imagine that someday very interesting case law will have to be developed.

Regulatory Issues

Let me turn now to regulatory issues. Why do we regulate in this country?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There are many reasons, among them: We must manage for the public good a scarce resource, for example, electromagnetic spectrum space; we wish to bring about standards and uniformity of practice for better public service, for example, telephone company technology; we wish to protect the public against natural monopolies – again the phone company example; we wish to safeguard the public where there is a hazard – the airlines and their interaction with the Federal Aviation Administration. Examine for a moment the role of the Federal Communications Commission (FCC), but first distinguish carefully between communications and information processing.

To me, communication is only a transportation network for information. The goal of any communication process is to deliver to the recipient exactly the same information – in particular without error – that was entered by the sender. Information content is to pass through the transportation network unchanged, although its representation may change many times in transit.

Sometimes it is delivered to the recipient in different representation than that of origin. For example, a telegram may be handwritten by the sender but is delivered to the recipient typed. En route, representation of the information in a telegram changes from that of written paper, to that of keystrokes, to that of electrical signals, to that of electromagnetic energy and eventually to that of printed page. Thus, the essence of communication, as I see it, is to deliver the originating information error-free to the recipient in a representation suitable for his purposes.

However, the whole purpose of computing or information processing is to change information by creating new information, destroying information, juxtaposing information or segmenting information, to name just a few ways.

Basically, the Federal Communications Commission (FCC) is in business because it allocates a limited natural resource for public good and guards against monopolistic practices. As part of that, it creates standards and deals with interface issues in an effort to assure the quality of service for everyone. The FCC does not deal particularly with the content of communications, except in the broadcast mode, where it is the public morals watchdog.

For point-to-point communication, the FCC does not generally concern itself with content other than to worry weakly about publicly distasteful things such as obscenity or pornography.

I think this observation is very pertinent to new classes of service that are ahead, for example, electronic message systems. We will need to distinguish with care between the role of the FCC in controlling and regulating the technical arrangements for communication vs. the information content of communication, which clearly involves constitutional rights and guarantees.

Generally speaking, the distinction between information and its representation is not normally made, and I suspect that in the future we will have to care more about such a subtle matter. Parenthetically, I would assert that the only reason the FCC conducted its First Computer Inquiry was because the classical communication industry wanted to change in a basic way; namely, it wished to go from a simple transportation network to one that involved information processing as part of that network. Owing to the commonality of plant and facilities to provide both services, the FCC inevitably became involved, because the country simply had no other appropriate mechanism to deal with the question.

Computer Mystique

Next, I would like to deal with a very general and almost philosophical matter. I will pose it as a question. Do we get ourselves into trouble by believing that computing is mysteriously different? Do we create unnecessary trouble for ourselves by believing that it is not subject to practices and know-how that we have developed in the past and understand?

Should we perceive instead that a computer-oriented situation is similar to things with which we do have experience and seek to identify only those new dimensions which it introduces or only those parameters on which it is truly different? In the latter category, of course, could be such

(Continued on In Depth/10)

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CW8/4

IN DEPTH

(Continued from In Depth/7)

things as timeliness of response or remote and prompt access.

Software is the classical example of this point. In the beginning, we thought it could not be managed. We thought it was somehow so different that we persuaded ourselves it was essentially a creative art form that could not be subject to the usual management principles and practices.

We now understand that the same management principles do apply, but there is a crucial new dimension of the matter, complexity. We have, therefore, developed such things as inspections, walkthroughs, programming teams, structured programming and other techniques that, fitted into classical management structures, did deal with the complexity issue.

We have belatedly learned that software can be managed, that it is not fundamentally different, but it does have a few essential new attributes.

In dealing with a computer-oriented matter, we should look for useful analogs of past situations we have learned to deal with. We should stop arguing that computers are different in some mystical way. Rather, we should take the view that computers do somehow relate to our past experience, and know-how, but can be in a few limited dimensions dramatically different. Such a point of view would then let us concentrate our attention and energies on the differences and deal with them, rather than trying to solve a huge overwhelming problem from square zero.

With hindsight, I would assert that the HEW committee stumbled across a useful analog, although it did not perceive it as such at the time. A few people in a late-evening discussion noted the similarity between the record-keeping question and fair labor practices, and thus was conceived the code of fair information practices.

Information Ownership

Finally, I would like to touch briefly on the information ownership question, which it seems to me has come to the surface very sharply in the whole copyright issue. Historically, one owned information because he owned the representation of it, for example, a book. Moreover, one protected not information but some representation of it.

The situation began to get fuzzy when printed materials found their way into computer systems and, for the first time, the question of representation vs. information began to appear, although I have never heard it discussed clearly in such a way. My intuition tells me that in the years ahead we will have to distinguish conceptually with care — perhaps even in our legislation — between information and how it happens to be represented.

I would like to tie some of these thoughts to the subjects that are discussed in other articles. First, let us talk about the transborder data flow question. It strikes me that this is an instance in which we believed the situation was grossly different in some fundamental way and unlike anything from the past. The discussion of data flow has not been an intellectually precise, clearly defined matter, but rather has tended to involve a potpourri of things, including semantic issues, matters of nationalism, issues relating to national security, cultural heritage and economic barriers. It is not necessary to ask why this was, but it is useful to observe that complex issues often start out intellectually confused.

It has struck me that there are useful analogs that ought to be examined to help us create an appropriate environment in which to allow personal data to flow across national borders. One is the federal-state relationship in this country. I would point, for example, to the Fair Credit Reporting Act in which the federal law gives a floor of protection and states may go further if they wish. Conceivably, we could agree internationally on a satisfactory floor of privacy protection with the option for individual countries to go further if it was seen essential.

Another useful analog, it seems to me, is international travel, in which people fall under the legal jurisdiction of the country they are in, rather than of the home country. There are, to be sure, mechanisms whereby representatives of the home country attempt to assist the traveler. But should the traveler commit a crime against the law of a country he is in, he is as liable as though he were a citizen of that country.

However, not everything about an individual travels with him and so there is a peculiar dichotomy in which the individual and some of his possessions are under the legal jurisdiction of one country but the rest of his possessions remain under the legal jurisdiction of his country of residence. International lawyers have long since figured out how to straddle this difficulty, and in the overview things seem to work smoothly.

Another useful analog would appear to be the international postal conventions, in which first-class mail presumably travels safely, securely and unopened across national borders; there are various agreements about how things are to be done. Other suggestions that come to mind are international agreements on the flow of goods, on the exchange of law-enforcement information and on the conduct of telecommunications.

If one extrapolates such a line of argument to privacy safeguards, one can come out with trying technical issues. If, for example, some information about an individual is subject to the legal jurisdiction of his home country and other information is subject to the legal jurisdiction of a country he is visiting, then everything in the record may have to be very carefully flagged as to source of jurisdiction and access to it controlled accordingly. What is worse, of course, is that information collected in one country may be comingled with information collected about an individual in a second country and stored all in the same computer system under yet a third legal jurisdiction.

New Twist

This is probably one of the new twists international flow of data creates, but I would point to the embassy concept, in which a given country extends its national jurisdiction to a small part of real estate in some second country. Perhaps we can usefully extrapolate such a concept to information.

As a matter of collateral observation, I note that as reported in a recent issue of *Computerworld*, the most recent OECD guidelines seem to mesh with my line of argument. For example, the first guideline says, "Take all necessary steps to ensure continuous and secure transborder movement of personal data." That is tantamount to saying that people should be allowed to move smoothly — not necessarily without controls — across national borders. The next guideline suggests that transborder data flow should not be prevented or restricted unless such movements are contrary to laws on domestic processing of personal data or certain other conditions.

It strikes me that this is analogous to immigration regulations which in effect say that everybody is welcome but we will try to keep out the undesirables or those which in some way have already acted contrary to law. Without going further, I would suggest that the transborder data issue seems to be evolving toward treating information as we treat people or goods, but singling out for special treatment those new and important dimensions that computer-based things introduce.

Personal Computing

The business of personal computing is booming, as we all know, and I wonder whether personal computers will not develop many of the attributes amateur radio has. Are we not going to have buddy networks and personal message services and networks of home computers that collectively cooperate for some purpose? All it takes to bring such things to pass is some agreement among the participants about character sets, formats and interface protocols.

The whole notion of personal computers being involved with others via the common carrier network of the country will be especially enticing if one can get access to low-cost, packet-switched and perhaps overnight ser-

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vice. If packet-switched radio techniques come into common use, we might expect to see a blending between personal computing buffs and the amateur radio buffs. The government, as we all know, depends on amateur radio operators for emergency communication services, and it is conceivable that the government might even take steps to organize the personal computer fraternity into some kind of national asset for emergency or disaster service.

When, not if, such networks come into existence, there now arises the possibility of a message service that circumvents, or at least competes with, anything that commercial industry or the post office might offer. Who knows what interesting regulatory tariff questions or political-jurisdictional arguments might appear?

In another dimension, personal computing will serve the very important purpose of improving the information IQ of the general public. One might have made a similar argument about amateur radio and public awareness of the related technology, but there is a crucial difference. The buy-in threshold for amateur radio is really quite high. Among other things, one needs to acquire substantial technical knowledge and to learn Morse code, and the financial investment can be severe.

In contrast, the buy-in threshold to personal computing is very modest or even low. There is no need to understand technology. Once the financial investment of several hundred dollars has been made, the user is on his way to doing useful things. Therefore, I would anticipate that personal computing will spread much more rapidly and much more broadly than other technology-based public hobbies.

There are a number of payoffs to this significant contribution:

1. Given the pervasiveness of information and the value of information to exercise of power, one can imagine that as the technology prospers, the segment of society that understands it and can exploit it will gradually amass power and control. Thus, technology can be a force for concentrating societal power in the hands of a small segment. A high information IQ on the part of the public will help to offset this trend.

2. The mystery of computer-based systems and the general unawareness of how they function just has to have had some effect on computer crime. Thus, I would argue that improving the information IQ of the public (and thereby executives as well as customers) will exert some deterrent against computer crime.

3. On the other hand, personal computing will create a large number of knowledgeable people, many of whom are bound to be innovative, intellectually sharp and technically informed. There could be a new class of individuals to pose a threat of computer crime. A boom in personal computing may well stimulate computer security concerns vigorously.

4. The comfort index of the typical citizen who unavoidably must interact with the many record-keeping systems that surround him will be increased. In this regard, those involved with computing are not a typical cross-section of the public. Even with their knowledge of computer technology and relative ease with record-keeping systems, computer-oriented people sometimes have traumatic experiences.

Most of the population stands in awe of computer devices and does not have the foggiest idea of how to deal with systems that contain them. It is important that the information IQ of the public be increased because every citizen will have to deal with and be prepared to confront an increasingly large number of such systems.

Electronic Message Systems

I will now turn to the subject of electronic message systems (EMS), point-of-sale (POS) systems and the like. Obviously, every one of them will have the data pool and data puddle problem touched on earlier. Every one will have auditing requirements, error control and remedial action requirements, and where financial matters are involved, there may be legal requirements for retention of data.

Obviously, appropriate safeguards of kinds perhaps not yet conceived will have to be an integral part of every such system. Appropriate legislation is also clearly needed. In regard to EMS, the issue of information vs. its representation is particularly pertinent.

(Continued on In Depth/14)

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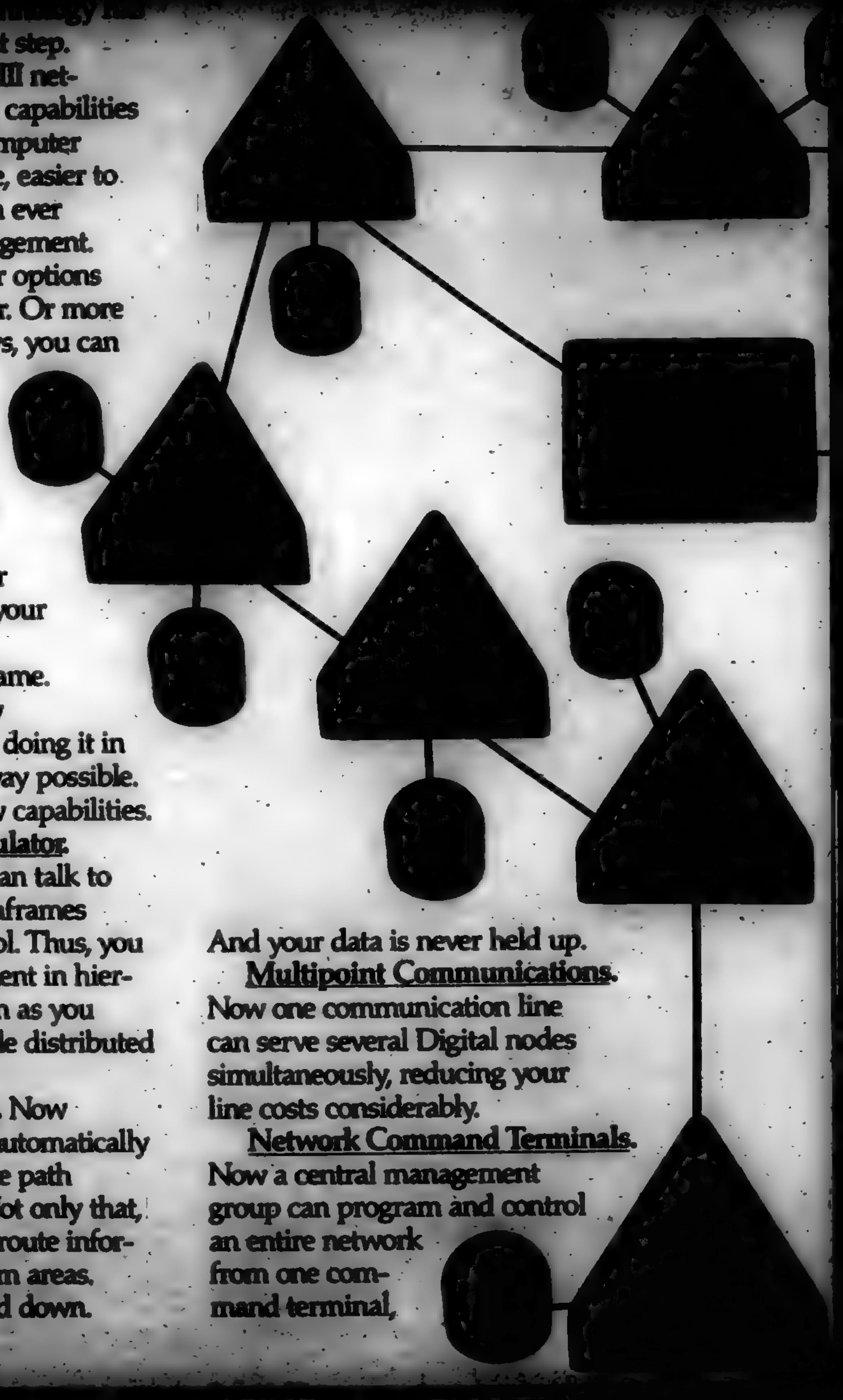

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IN DEPTH

(Continued from In Depth/11)

In the postal system as we now know it, the representation of information is not changed as it transits the system. The physical object put into the system by the sender arrives at its destination in the same physical condition — give or take a little damage that the U.S. Postal Service may have inflicted.

In an EMS, the representation of the information will almost certainly be changed. Perhaps the information content of the original document will be transmitted by facsimile means to an exact replica at the other end; or perhaps, as in the telegraph network, the information content of the original document will be converted to electrical impulses that eventually produce a new representation of the information at the other end.

In any event, unlike mail delivery as we now know it, the error problem during transmission will be new to the post office; it is hoped that it will do better with the matter than the classical telegraph facilities of the country have in the past.

I recently read that one of the undecided issues of an EMS run by the Postal Service is whether the government should monitor all such traffic. If such were to prove the case, there would materialize overnight a huge market for encryption devices, or at least an enormous interest in the data encryption standard (DES). The hobby shops would have DES chips and devices within weeks.

Similarly, if personal computing leads to message services among individuals, the computers themselves could be used to provide encryption protection for the traffic. One way or another, though, I suspect that users of an EMS will demand the privacy and sanctity that first-class mail supposedly provides.

Cost Factors

I would like to deal with the issue of cost. Security safeguards, control over information use and control of access are extremely important in their own right. Aside from personal privacy, such issues are of importance to fraud, embezzlement, malicious mischief, harassment, threats and a whole host of other things important to organizations and the management of business risks.

Having done an adequate job on computer security as I have defined it, it is a very short and easy step to accommodate privacy. The HEW group made an observation that has proved, I believe, to be prophetic; it was said that more management attention, discussion and trauma would be spent in responding to privacy than dollars.

While the issue of cost cannot be ignored, it is essential to sort out with care just what costs are ascribable to privacy controls and/or legislation vs. what costs are really pertinent to safeguarding computer systems and their information for sound business and organizational reasons. Cost would not likely be a matter of debate and excitement except for the suddenness of the change that has occurred. For example, we all readily and without thought accept the cost of maintaining municipal fire departments and paying premiums on fire insurance, but I suspect we would not have been so casual about such matters had the costs of protecting against fire appeared on the scene over a few years.

Society has accepted the cost of providing protection against many threats gradually over at least a century and perhaps longer. In contrast, the whole privacy issue has emerged in less than a decade, and the cost consequences of it have become visible only in the last few years.

Thus, in my view, it is the suddenness of the change that is magnifying concerns about cost, and in the long run, I submit that cost will gradually cease to be an issue. What society wants, society agrees to pay for. We wanted trips to the moon and we

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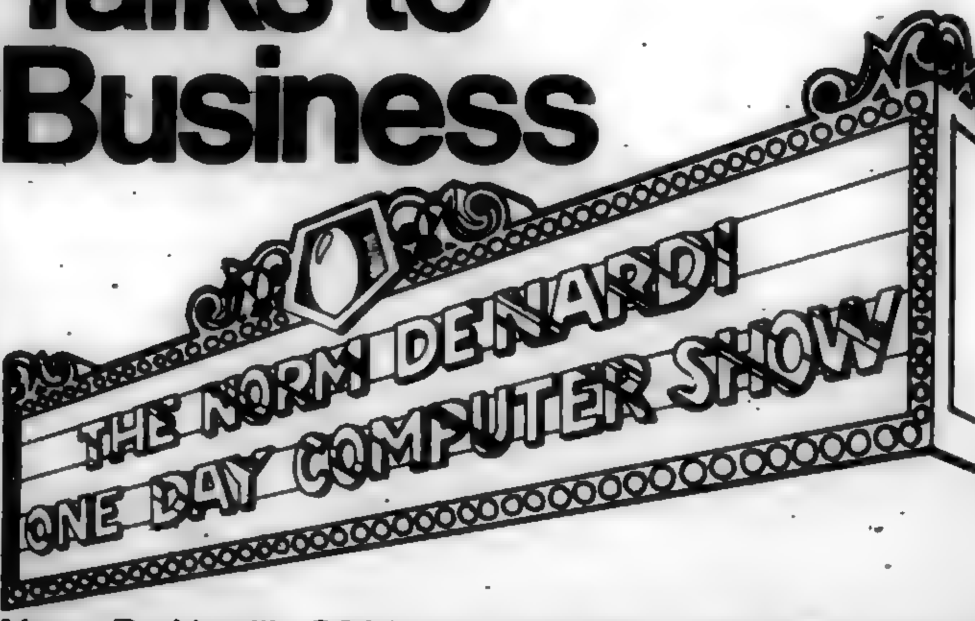

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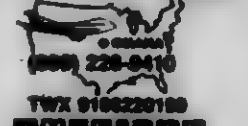

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wanted an elaborate interstate network of roads; we paid the many billions of dollars to get them. Correspondingly, society will come to accept the nominal cost of privacy as part of the protections it wishes.

Miscellaneous Topics

Finally, I submit remarks on a few scattered points. In regard to variability among state laws that deal with privacy, I would note that for the pubic sector, the matter is really not a significant issue. If the voters of a particular state choose to implement a very onerous, restrictive and overly costly law against their own government, it is a matter of whatever such voters wish. Effects on adjacent or other states are minimal and perhaps even zero; there will be some interface problems, perhaps, on the federal scale. However, the matter becomes of major importance for the private sector.

When the voters of one state can enact laws that seriously impact on the behavior of people or the cost imposed on them in other or even all states, then the issue of variability is paramount. In some respects, the variability issue among states resembles the transborder data matter. If we can agree on the easy passage of people, goods and transportation across state borders, then we ought to be able to come to analogous agreements in regard to information.

In this regard, the Fair Credit Reporting Act is illuminating because it provided for the possibility that states could enact additional safeguards. As it has turned out, only a few states did so and the additional restrictions were so minor that it has not proved to be a problem for credit reporting bureaus who operate interstate.

I would take the veiw, therefore, that in regard to private-sector privacy legislation, either the federal government has to be preemptive or it has to lay down some principles to assure that one state's actions do not impair all others. We must be careful not to create internally the analog of the transborder data issue as it was in 1977 and that we are now struggling to resolve. Internationally there are only a dozen or so players. Domestically there would be 50 players, and while I would not care to guess how the complexity of the situation would scale with the number of involved parties, it could get to be troublesome.

In another direction, I would like to observe that of the issues we are addressing, there are some near-term ones. Among them I would note that electronic funds transfer systems are likely to take off in the next few years; as we all know, the U.S. Postal Service is talking about supplying EMS.

Personal computing is upon us, but there are longer term issues. What if our estimate of the growth of personal computing is far too low? Suppose it escalates at a pace five or 10 times what we now predict? As Richard Hamming has observed, a factor-of-10 change in something introduces fundamentally new effects; in the case of the personal computer, what might they be?

We are also looking into an era of the automated office, or more generally, the automated workplace. What are the implications of such advances for the work scene? For labor relations? For management? For job satisfaction? Or even the family structure, should such advances keep people at home

(Continued on In Depth/16)

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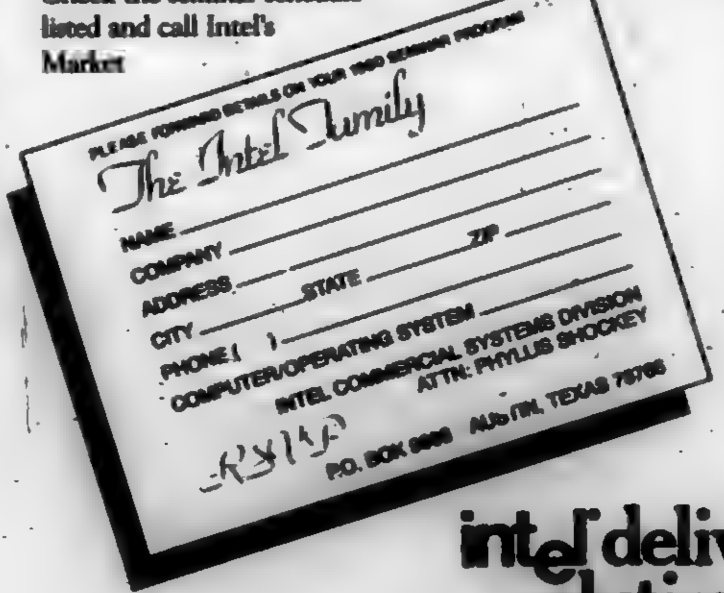

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IN DEPTH

(Continued from In Depth/15)

while doing their work?

Word processing is growing, but not overly rapidly, and it too might grow at a significantly larger rate. Computer-based message systems are mostly in the experimental or research phase and have not been widely used in commercial or government organizations. What are the implications of the two for management issues, job satisfaction and the like?

The technologists who monitor progress predict that cheap storage is just around the corner. What will it mean when everyone has his own extensive data base attached to his own personal computer that in turn has ready access to the telecommunications network of the country?

It would be nice to be ahead of the power curve in the future, so far as effects such as suggested ar concerned. Ideally, the country would have some oversight mechanism that would watch the progress of information technology and would be alert to the implications of its progress for society, its structure and behavior.

Computer Fraternity

The computer fraternity has helped to play the role so far and perhaps in the future it will be sufficient, but perhaps not. The Congress and the country really should have a trigger mechanism to alert us to the consequences of information technology, to the privacy implications of proposed legislation, and developing risks. Again, the computer fraternity has helped to play the role to some extent in the past and its involvement is growing; but our relations with the pressure points in Washington tend not to be extensive or well-developed. Those of the computer industry are not lobbyists; often they are not well received because they tend to be overwhelmed by the details of technology and to talk of them. They fail to rise above the narrow matters and to perceive the global social issues. Thus, they tend to have a real communication gap and a real acceptance problem. In part, this is related to the mystique of computing but in part to the fact that those involved in computing simply have not accumulated decades upon decades of relating to the government scene as have other industries, technologies, or institutional groups.

To be sure, more members of Congress have a familiarity with computing technology; newer congressional staff people are coming from college with training and awareness. One can find more and more managers, some highly placed, that can knowledgeably discuss the intricacies of computer matters. The National Telecommunications and Information Administration has been created. Is government learning rapidly enough how to deal with the broad scope of computer matters? Or is technology running ahead faster than government is progressing? That is the question for the future.

Lance J. Hoffman is an associate professor in the Department of Electrical Engineering and Computer Science at George Washington University, Washington, D.C.

Previously with several industrial firms and a faculty member at the University of California at Berkeley, Hoffman has been a staff associate for the National Academy of Sciences Project on Computer Data Banks and a national lecturer on privacy and security for the Association for Computing Machinery. He currently chairs the American Federation of Information Processing Societies (Afips) Special Committee on the Right to Privacy and is an IEEE distinguished lecturer.

Willis H. Ware is a member of the corporate research staff at The Rand Corp., Santa Monica, Calif.

Formally educated in engineering, Ware has long been concerned with the impact of computers and information technology on society, and as early as the mid-'60s had begun writing and discussing his views on computers as a growing social force.

In 1975, Ware was appointed by the White House to the Privacy Protection Study Commission created by the Privacy Act of 1974. His efforts on behalf of individual privacy earned him the Data Processing Management Association's Computer Sciences Man of the Year award in 1975.

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You can read how small computers are reshaping the business world and what they can do for you in COMPUTERWORLD'S August 25th Special Report.

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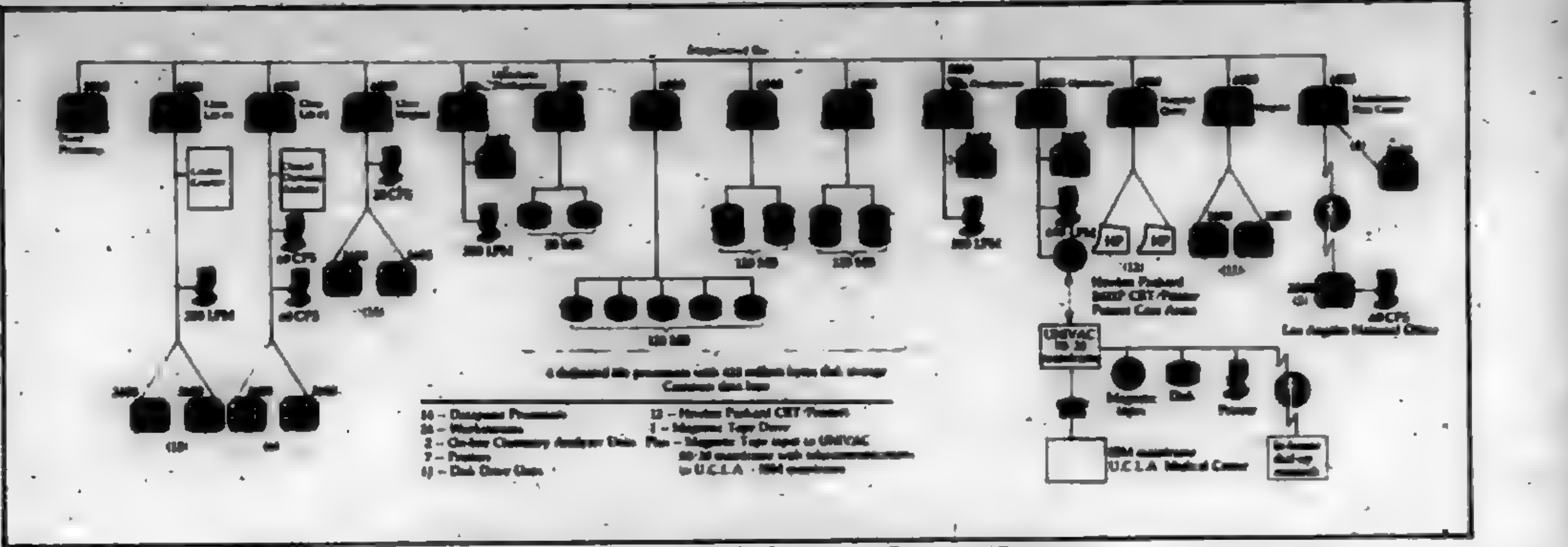

City of Hope's Datapoint Attached Resource Computer System

Texas Medical Center Integrates Systems

Special to CW

SAN ANTONIO, Texas — City of Hope National Medical Center here is utilizing an integrated systems concept supported by Datapoint Corp. Attached Resource Computer system (ARC) to handle the combination of personalized patient care and in-depth research performed by center personnel, according to the center's director J.R. Stephenitch.

A minimum of patient time spent waiting for admission, for laboratory work, for a doctor or other staff appointment, for specialized treatment or for any administrative requirement were goals that management pursued from all angles.

City of Hope, with a patient-care, research and administrative staff of about 1,500 employees, supports about 4,500 admissions and 50,000 outpatient visits annually. With only 214 inpatient beds, City of Hope has a disproportionately large patient-care staff and patient administrative system.

This personalized, research-oriented approach led to increased administrative work loads and paper-shuffling. It also created a need for faster, more reliable data handling and for a total-hospital information management plan. The responsibility for developing and implementing such a plan was given to the 35-person Data Processing Services Division.

After many years of manual systems processing City of Hope began using hand-operated tabulator equipment. From that, it advanced to remote job entry terminals and a service bureau. By 1977 it discovered the opportunities of DP and information management and installed a Univac 90/30 mainframe computer and several Datapoint Corp. processors configured in a Datashare system.

In-house expertise grew, the service bureau contract expired, outside software developmentt ceased and City of Hope became completely self-sufficient in its DP and programming functions.

In November 1978, City of Hope converted from Datashare to the Datapoint ARC system. Today, the system contains 14 processors, 54 workstation terminals, two on-line chemistry analyzer units, seven printers, 11 disk drives, one magnetic tape system, 12 on-line Hewlett-Packard Co. CRT printing terminals — plus tape input to the Univac 90/30 which, in turn, has telecommunications capability to the UCLA Medical Center's IBM computer system.

Consolidated System

The DP Services Division consolidated many small and totally seperate functions with diverse responsibilities and different methods of data gathering and reporting into one homogeneous hospital information system (See related diagram).

Much of the data within the system is cross-utilized by several departments that receive operational and management reports on either a scheduled or on-request basis. With a common data base, each division produces reports that contain information meaningful to managers in other divisions.

"Now, our managers can appreciate their unit's contribution to the administration of the entire hospital. They are able to comprehend and participate in the overall operation as part of the hospital's information system. ARC and HIS allow us to produce combined data reports for top management which were not possible before," Stephenitch said.

Aims Program

The key program system within City of Hope's hospital information system is the admission, census, primary patient information system (Aims), Stephenitch said. Aims' data provides the core for all operational information. It contains information on each patient, such as name and number, geographical home area, admission data, age, sex, smoking status, disease diagnosis, treatments and medications and response, room and ward assignment and reassignments, consultation appointments including doctor and special treatment personnel or facility requirements, transfers and discharge.

All patient data, entered by patient number from any workstation, enters the ARC system, where the information is assigned to the appropriate place within the record file and a total treatment history is developed and maintained, almost transparently. The patient file is cumulative, both individually and in any demographic classification desired.

Aims provides all types of statistical, operational and management reports, such as appointment scheduling, room availability, fa-

(Continued on Page 52)

NAS Says AS/5000, 7000 Can Run Latest MVS, Whitneys

PALO ALTO, Calif. — National Advanced Systems (NAS) recently announced that its AS/5000 medium-scale and AS/7000 large-scale processors will support the MVS software enhancements and 3380 and 3375 Whitney disk drives recently unveiled by IBM.

With an eye toward the microcode-based machine architecture approach, NAS said its AS/5000, said to perform 15% better than IBM's 3031 processor, and the AS/7000, with reportedly 1.2 times the throughput of IBM's 3032, will support IBM's disk units via its 3880 control unit. In addition, compatibility with IBM's data streaming disk enhancement, which slows the transfer rate to a level that the processor's channel can accept, will be provided by the third quarter 1981 for the 3380 and the first quarter 1982 for the 3375.

Support of both disk units using IBM's speed matching buffer option will be available in the second quarter of 1982, a spokesman added.

Finally, NAS announced that it will provide support for the recent MVS enhancements, which include an unbundling of IBM's OS/VS2 operating syeem and an extended addressing feature for the 3033 processor. NAS mainframes will be able to use IBM MVS products currently available and future MVS enhancements as they are released, the NAS spokesman noted from 3145 Porter Drive, Palo Alto, Calif. 94304.

CDC's ESM Put on Cyber 170s

MINNEAPOLIS — Control Data Corp. has announced an improved Extended Semiconductor Memory (ESM) designed to optimize the performance capabilities of its Cyber 170 Series 700 computer systems.

The CDC 7040-100 ESM also can be configured on earlier Cyber 170 and Cyber 70 systems, according to the firm. The ESM succeeds the firm's Extended Core Storage (ECS) equipement, the 7030 ECS series, and reportedly offers several improvements.

The improvements include reduction of access time from 1.86 msec to 1.06 msec — a 40% improvement, greater bandwidth capable of simultaneously performing read and write operations from two mainframes at 1,200 million bit/sec and single error correction/double error detection (Secded), providing greater reliability, the firm said.

In addition, ESM allows access from up to four high-speed ports connected to computer couplers and eight low-speed ports connected to peripheral processor channels.

The 7040-100 ESM ranges from $430,000 for 500,000 words of memory capacity to $925,000 for two million words of memory capacity. Monthly lease prices range from $13,400 to $28,875 under a one-year contract and from $12,060 to $26,000 under a three-year contract. Monthly maintenance costs range from $1,350 to $2,850.

Bits & Pieces

Xerox 9700 Prices Hiked: Purchase, 5%; Upkeep, 15%

EL SEGUNDO, Calif. — Xerox Corp. has realigned prices for the Xerox 9700 electronic printing system, increasing purchase prices about 5% and maintenance charges about 15%.

Lease prices on a typical configuration with typical copy volume and serviced on a seven-day-a-week basis were increased an average of 9%. With no weekly maintenance involved, 9700 lease prices increased about 5%, the firm said.

Monthly lease charges for most Xerox 1200 computer printing systems were increased from 6% to 8%, depending on the configuration and usage.

The duplex option for the 9700, which permits two-sided printing, was increased from $650/mo to $725/mo.

Immediately effective for new customers, the price changes will be effective Sept. 1, for present customers. Xerox's Printing Systems Division is at 880 Appollo St., El Segundo, Calif. 90245.

Data Electronics Drive Offered for Rugged Use

SAN DIEGO — A ruggedized digital cartridge tape drive that is said to provide connector-to-connector replacement for existing 10.5-in. reel-to-reel tape drives is available from Data Electronics, Inc.

Suitable for military and industrial applications, the drive provides 34M bytes of storage, operates at 25 in/sec with 800 bit/in. data density and NRZ format.

The unit sells for $10,400 with 120-day delivery. A two-page data sheet on the unit is available from the firm at 10150 Sorrento Valley Road, San Diego, Calif. 92121.

Powercenter Prices Cut

SAN DIEGO — Topaz has reduced by 15% to 19% the price of its standard line of power distribution centers.

The Powercenter allows user to relocate, rearrange and add to the computer facility without the cost and delay associated with fixed-wire systems, the vendor said.

The basic Powercenter configuration now costs $9,500, down from $11,000, the vendor said from 3855 Ruffin Road, San Diego, Calif. 92123.

Bit Box Stores 50 Disks

NEPTUNE, N.J. — Suzie's Bit Bucket has introduced the Bit Box, which can store and protect 50 disks in four compartments.

Made of a rugged corrugated substance with a removable top, the Bit Box costs $3.95 for 5.25-in. disks and $4.95 for 8-in. disks. The product is available through computer dealers, retail stores and office supply distributors.

Suzie's Bit Bucket is located at 303 Slocum Ave., Neptune, N.J. 07753.

City of Hope Revamps System

(Continued from Page 51)

cility management and treatment information needed at all patient-care areas.

This provides for better staff and facilities utilization, faster patient turnaround, more timely and accurate patient data, less administrative time and, of course, less patient frustration, Stephenitch said.

Dispersed Workstations

With Datapoint's ARC system, most of the workstations are on the floor, where the data is generated and immediately entered into the system. This functional dispersement of computer access devices provides on-line, real-time entry and retrieval of data to the people who need it most.

Patient-care personnel have access to the patient data base through ARC interfaced HP 2621 CRT printing terminals located in treatment areas. All laboratory and other clinical data is available immediately following a patient's examination.

"The system was designed so it would be user-oriented. The timely reporting of laboratory test results and updating of patient records and ancillary files was not available to us before. No batch processing system can ever touch this," Stephenitch said.

City of Hope's DP system identifies all patient charges and assigns them to the proper expense codes. Since all care is "free" as far as patients are concerned, and they may not pay their bill under any circumstance, this is mainly a cost-incurred expense system.

Stephenitch — who has directed most of the growth and development of DP at City of Hope — said, "We are attempting to accomplish what we think of as a 'Concept of Integrated Systems': DP, word processing, information management, etc.

"ARC, with its ability to work with and interface to our other systems, has definitely improved the accuracy and timeliness of our DP services and has established needed rigidity in our business and hospital administration systems, which in many hospitals seem to operate in a rather uncontrolled fashion," he added.

City of Hope and all ancillary operations utilize the total management package operated by the Services Division, which also markets the software programs through City of Hope Service Corp. 1460 E. Duarte Road, Duarte, Calif. 91010.

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Mini Bits

Graphics Video Generator Fits HP 2100MX, XEXF

CUPERTINO, Calif. — Intermedia Systems, Inc. has announced a graphics video generator designed to run with Hewlett-Packard Co. 2100MX, XE and XF systems.

Called the 4424 GVG, the unit can be used with a standard color or black-and-white television monitor. The 4424 GVG resides with the host CPU to simplify system integration, the vendor said.

The unit has switch-selectable display resolution and video signal standards, the vendor said. Software support includes an RTE driver, Fortran callable graphics library and diagnostics.

The unit costs $3,550 from the vendor at 10601 S. Saratoga-Sunnyvale Road, Cupertino, Calif. 95014.

HP 3000 Interfaced With TAB System 700 Terminal

PALO ALTO, Calif. — TAB Products Co. has unveiled an interface package for the Hewlett-Packard Co. 3000 CPU and the TAB System 700 data collection and communications terminal. The interface package allows off-line key entry with automatic batch transmission to the computer at speeds to 9,600 bit/sec, the vendor claimed.

Designated the TAB System 700/HP 3000 interface, the product uses an I/O driver that operates through a terminal port on the computer.

There is a $1,400 charge for the interface. Added to that are two $200 charges for a one-time software fee and a one-time installation fee, the vendor said from 1451 California Ave., Palo Alto, Calif. 94304.

Microtec Turnkey System Fits Medical, Dental Use

COSTA MESA, Calif. — Microtec Business Systems is offering a turnkey system for doctors, dentists or group practices.

The system consists of a Microtech System 100, 200, 300 or 400, CPU, Point 4 Data Corp.'s Iris operating system and Status, a physician-oriented software system. The package provides patient management, patient billing and practice management, the vendor said.

The system can accept up to 32 CRT terminals and 1.2G bytes of on-line storage and costs $24,500, from the vendor at Suite 108, 3176 Pullman St., Costa Mesa, Calif. 92696.

Mini Teams Up With 'Cops' To Help Crack Down on Crime

Desk Sgt. Sidney Wykoff assigns patrol schedules using a DG Nova 4X minicomputer and a Dasher D2 terminal.

Special to CW

MILLBURN, N.J. — Aided by a minicomputer and some crime-stopping software, police are cracking down on the criminal element in this small suburban community.

The Millburn Police Department has a Data General Corp. Nova 4X minicomputer and computerized optimal police system (Cops) software, which is actually a series of interactive computer programs that do everything from analyzing crime statistics to establishing patrol schedules. The computer also organizes criminal arrest information into dozens of categories and retrieves it according to several descriptors.

Detective Robert MacLachlan, who operates the system in the Millburn Police Department with the help of two clerks, said Cops is especially important to his department because there have been no additional police hired in seven years.

"It would be no use to us if all the computer told us was ideally how many personnel we needed for patrol," he said. "The system tells us how to best use our existing resources: That's a great help to the chief, with no new recruiting schedule in sight."

Millburn, a suburban community in Essex County, N.J., has a population of 23,000 in a 10.4-square-mile jurisdictional area. Its 53-member police force responds to 12,000 service calls a year.

System Expansion

The original computer system was installed in 1977 when the Millburn Allied Regional Crime Information System (Marcis) was formed with a grant from the Law Enforcement Assistance Administration. At first, the computer served only Millburn. The following year the contiguous towns of Livingston, Maplewood and South Orange were brought into the network.

With the addition of these towns, Marcis now encompasses a population of 150,000 in about 30 square miles and includes more than 200 police personnel in the four towns.

The complete system of computer hardware and Cops software was designed by Mini Systems, Inc. of Orange, N.J. The heart of the system is a Nova 4X minicomputer with 256K bytes of memory.

Other DG equipment in the system in-

(Continued on Page 54)

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Mini and 'Cops' Help Crack Down on Crime

(Continued from Page 53)

cludes 10M- and 20M-byte disk drives, asynchronous and synchronous communication multiplexers, Dasher D2 video displays and 120-char./sec bidirectional printers.

False Alarms

While the minicomputer-based anticrime system helps keep track of the amount of actual crimes, the computer also puts a dent in the number of noncriminal events, such as false alarms.

Before computerization, false alarms made up a staggering 28% of all calls received at the stations. At that time, the next highest concentration of noncriminal calls was for medical assistance — about 5%, MacLachlan said. Shift commanders knew from scanning reports that the incidence of false alarms was relatively high, but in a few minutes the computer was able to tell them exactly how many false alarms were received, and from which addresses, for any time period they wished to analyze.

In an attempt to reduce the false alarms, the department began cataloging them and sending personalized warning letters, written directly on the computer printer, to those whose alarms sounded for no reason. MacLachlan now issues summonses to those residents whose alarms sound repeatedly for no reason. The detective said the rate of false alarms has fallen to between 17% and 22%.

Each participating police department houses its own CRT input terminal and printer, while the data bases are contained in the Nova 4X central processor unit located in the Millburn station.

Patrol Reports

In use, Cops determines how to best assign available personnel to foot and car patrols, based on current activity levels.

Interactive data storage and editing capabilities allow the computer clerk at Millburn to input the previous day's patrol reports in about one hour each morning. A patrol report may come from the shift dispatcher who gets a call for assistance. The report includes a complaint number, date, time of call, dispatched officer's ID number, location, nature of the request/complaint and action taken.

If the call results in an arrest, the officer dispatched to the scene fills out an arrest report along with an incident report upon return to the station. If there was no arrest, the officer fills out an incident or miscellaneous report, depending on the nature of the call.

Mini Plays 'Sgt. Friday'

MILLBURN, N.J. — It could have been a scene from television's Dragnet, only this time "Sgt. Friday" was a computer.

Late last summer a group of high school students here, angered by drug busts that cut off a ready supply of marijuana, caused a rash of malicious mischief and vandalism all over this small town. However, the police department's minicomputer-based anticrime system thwarted the spree by forecasting where the youths would probably strike next.

The geographically criss-crossing pattern of the vandals around the town became evident to the police, who charted the geocodes of the locations that had been hit, in the order they had been hit. This information told the shift commanders where to place personnel and patrol cars to prevent incidents and where to pick up the offenders.

Another program used by the Marcis group is Geographic Module (GEO), which allows retrieval of any single call or group of service calls. The calls can be formatted with vital data, such as 24-hour time frequency distribution, tabulation of incidents by nature code, radio log summaries and so on. GEO also does a chronological analysis of the data base for any combination of data.

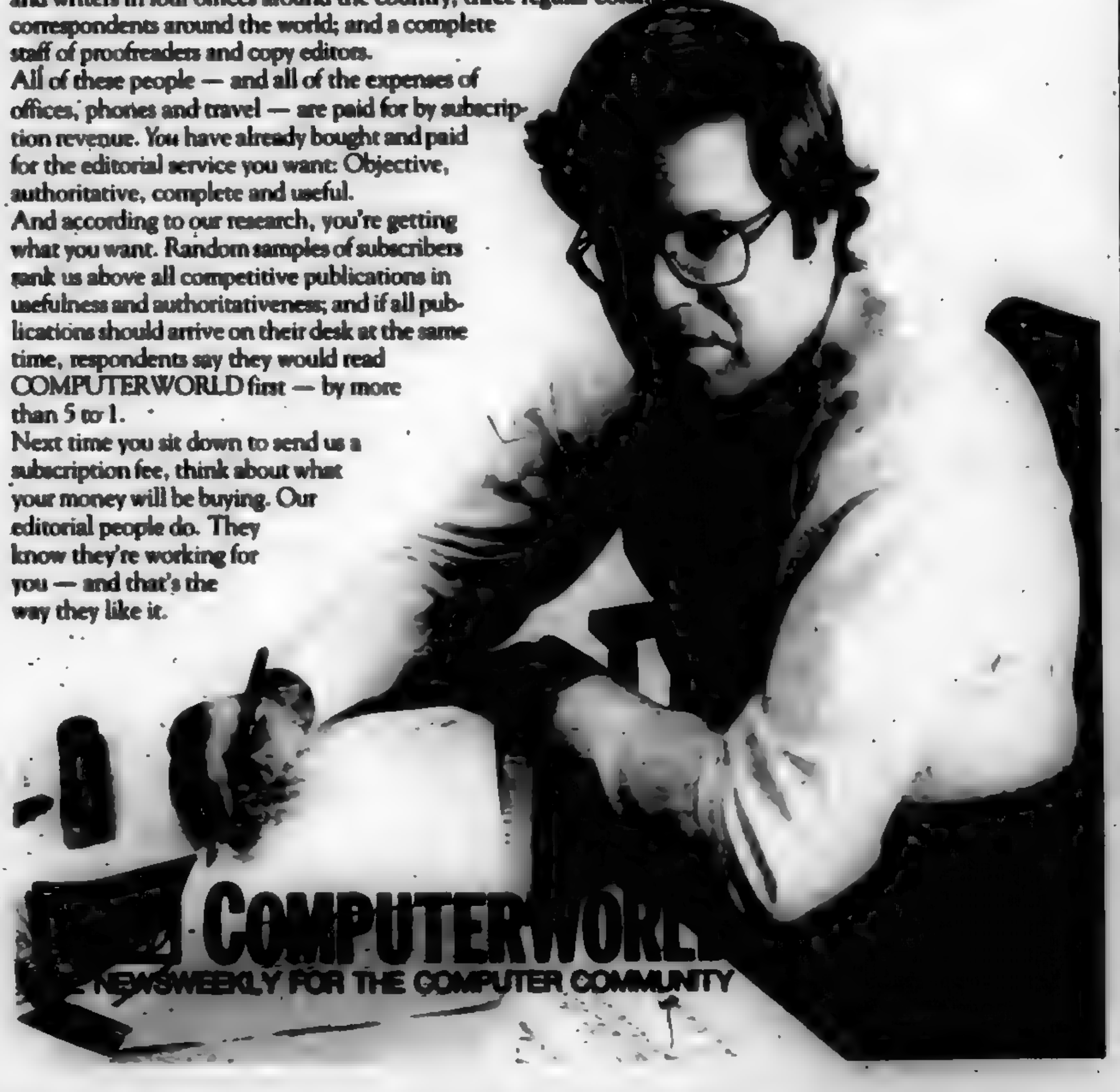
Chase and Laws

Cops has a criminal history and suspect evaluation (Chase) data base and a local active warrants systems (Laws).

The Chase data base stores 76 descriptors on each individual arrested, including name, last known address, alias, nicknames, Social Security number, FBI number, State Bureau of Identification number, charges, date of arrest, modus operandi and 21 physical descriptors on both adult offenders and juveniles.

Laws is an interactive criminal and noncriminal warrant data base that gives on-line answers to requests from officers in the field for information on automobile's license plate numbers. Data available includes address of the person on whom the warrant has been issued, date and locality of the issue, nature of the warrant and the bail required, MacLachlan stated.

Improvements scheduled to be made soon on the system include new programs for burglary analysis, a complete personnel file (including records of guns issued), a work list by shift (so shift commanders can see at a glance who's on duty, out sick, on vacation and in school) and a maintenance log for the 16 department vehicles.



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Few Planning Defensive Action

Discount for 3270s No Surprise to PCMs

By Ann Dooley
CW Staff

IBM's recent announcement of a volume discount purchase plan for its 3270 line of CRT terminals and printers (see Page 35) apparently took few of the firm's plug-compatible competitors by surprise. And, in a recent *Computerworld* poll of those competitors, few admitted they were threatened enough to take any defensive action.

Industry observers agreed the aggressive IBM marketing tactic is an attempt to grab a bigger share of the 3270 market, as well as a means of improving the industry leader's cash flow.

IBM needs to gain ground lost by the lengthy delays in its 3278 shipments, several independents said. The plug-compatible manufacturers (PCM) are beginning to make inroads into the market, Dick Martin, president of the Communications Group of Memorex Corp., stated. Since IBM's deliveries are again competitive with the new pricing, IBM seems to be planning to put an end to the PCMs' gains.

Although one vendor admitted it is reviewing its figures and another noted that "where IBM goes, the independents usually follow," none of those polled claimed to be especially concerned about the price cuts. The PCM prices are generally 20% to 35% lower than prices on IBM equipment, and IBM's reduction "won't change anyone's mind," according to Bert Hochfeld, director of planning and corporate strategies for Telex Corp.

Financial Reason

A second reason for the introduction of the discount plan is seen as financial. "They need the money," an ITT Courier Terminal Systems, Inc. spokeswoman said of IBM.

IBM must encourage purchases rather than leases, or else the industry giant will be unable to report earnings increases, sources agreed.

IBM's only comment regarding its latest action was, "We continually review the way in which we market our products. We're offering these reductions in an effort to be more responsive to customer requirements."

Since 1976, IBM has slipped from a 60% to a 51.5% position in the 3270 terminal market, according to year-end figures from International Data Corp. (IDC). IBM is aware of its steady loss in the plug-compatible market because of the 3278's long delivery dates and intends to make up for it, Gerard Hallaren, manager of IDC's Technical Information Services, noted.

The announcement of the price cuts was no surprise to the PCMs since it was a typical move for IBM to make at this point in the life cycle of one of its products, Barbara Ellis, product marketing manager for ITT Courier, said.

Consistent Move

Memorex Corp.'s George Bragg, vice-president of corporate development, pointed out that the move was consistent with actions involving other products, such as the similar discount plan for the Series/1 hardware.

The independents also pointed out that even though IBM is dropping prices on large-volume purchases and on some of its older models in the 3270 line, at the same time it is raising its leasing prices.

Few of the independents believe this latest action presages the introduction of a new terminal line. Telex's Hochfeld indicated it would be unlikely IBM would consider obsoleting equipment available for high delivery shipments only in the last 12 months, even if the company were able to produce a new line in an economical way at this time.

Others said they do not foresee a new line of IBM terminals until late 1981 or 1982 at the earliest.

Informatics Putting Its Eggs Into IBM-Compatible Basket

By Marcia Blumenthal
CW Staff

LOS ANGELES — Although it has relied heavily on its Mark IV batch-oriented application development product for the past several years, Informatics, Inc. in the last 18 months has stepped up efforts to broaden the range of its software products.

The strategy is aimed at offering inquiry, report-writing and applications development capabilities that operate across the range of IBM's data base and data communications systems.

Yet putting that strategy into operation has taken a toll on the company's financial performance. Second-quarter per-share earnings increased from 23 cents to 31 cents, but Informatics President Walter F. Bauer expressed disappointment in these results: "Software product sales were weak because of continuing startup costs and the slowing economy."

However, he did note that the information processing and professional services segments of the company's business remained strong.

Explaining Informatics' software strategy, Bauer said, "IBM will become increasingly strong in the data base area. Our software products look like applications to IBM."

Implementation software from competitors like Cullinane Corp. and Software AG interface primarily with those companies' own data base products. As data base is very close to machine capability, IBM's next step could be to build this capability into its hardware, Bauer said, adding that this could be disruptive to competitors.

Flurry of Products

In the past 18 months Informatics has introduced a flurry of products to close the gap in its software product offerings. The

(Continued on Page 56)

Venture to Give Amsat New Parent

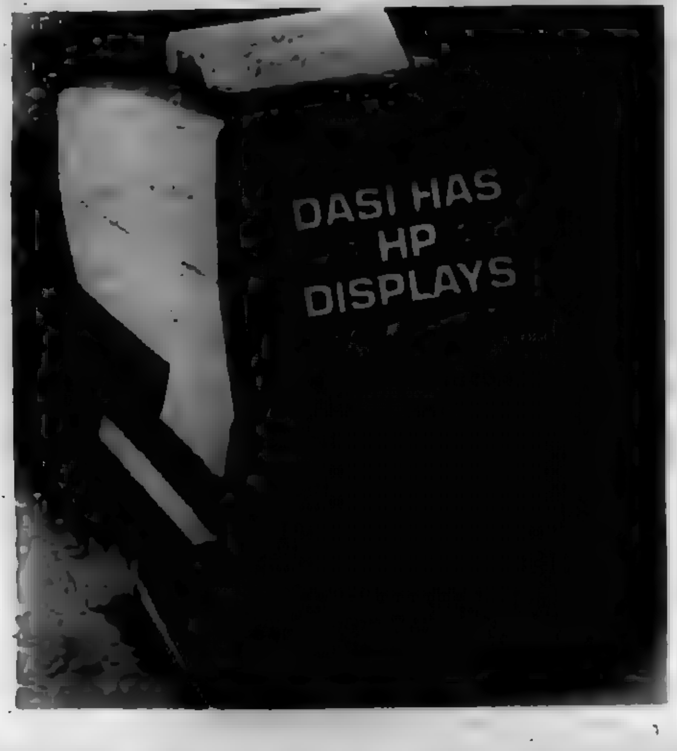
CW Washington Bureau

WASHINGTON, D.C. — American Satellite Corp. (Amsat), a major U.S. satellite communications carrier, will shortly become American Satellite Co. and acquire a new parent, Continental Telephone Co.

Amsat began as a wholly owned subsidiary of Fairchild Industries, Inc. in 1972. Several months ago, Continental Telephone agreed to purchase a 50% interest. Earlier this month; the Federal Communications Commission approved the deal.

According to an Amsat spokesman, the joint venture agreement — which requires a $12 million capital investment by each partner — will be signed next month. All of Amsat's tariffed communication services

(Continued on Page 56)



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Plus—Both HP terminals have two full pages of memory for quick reference. Memory contents are viewable either page-by-page or by scrolling. On the 2621P, upper/lower case letters, control codes and underline are printed on thermal paper at 120 characters per second. And, even in character mode both models allow editing before transmission.

Selection. DASI also has the full line of CRT's from Lear Siegler*, Hazeltine*, Digital Equipment Corp. and Datamedia, and all the complementary hard copy printers from TI*, Diablo* and DEC. High speed modems such as the 212A or Vadic compatible acoustic couplers provide you with the communications speed you need.

Service. DASI maintains the equipment it sells nationwide. Your HP terminal and modem combination will be serviced by one source who stocks the parts and has technicians available for fast response.

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Informatics Seeking to Round Out Product Line

(Continued from Page 55)

company's report writers, Answer/2 and Answer/DB, operate in IBM's OS and DOS batch environment as well as with IMS and CICS/OS and CICS/DOS.

In addition, the company introduced its Inquiry IV and Trans IV products last year.

Informatics intends to make additional major product announcements next year which will complete the comprehensiveness of its product line, according to Bruce Coleman, group vice-president of software products.

For its most recent quarter, the firm had revenues of $31.5 million compared with $27.8 million in revenues in the same quarter in the prior year. Earnings were $733,000, or 31 cents per share, up from $545,000, or 23 cents per share, in the same quarter a year ago.

For the first half of this year, the company's revenues totaled $60.5 million, up from revenues of $52.9 million in the first half of 1979. Earnings to date are $1.2 million, or 48 cents per share, compared with earnings of $935,000, or 38 cents per share, during the same period last year. All earnings are before extraordinary items.

The company's revenues are split about evenly between its three lines of business, Bauer said.

A Risky Route

By Marcia Blumenthal
CW Staff

While Informatics, Inc.'s strategy is to develop software products that operate within IBM's data base and communications environment, some independent software vendors haven't chosen that route. Instead they have developed proprietary data base systems and applications that run with them.

Informatics President Walter F. Bauer thinks this is a risky route since IBM could enmesh its data base systems within its operating system.

Although conceding that is a risk, John Maguire, president of Software AG, said, "There have been hundreds of threats to us over the years from IBM, and every single time, we've solved the problems."

In limiting its products to the IBM environment, an independent software company must be more clever than the competition in applications development, he continued.

John C. Cullinane, president of Cullinane Corp., noted that by tying its products to IBM's data base system, a company eliminates selling applications to 45% of the users who have selected non-IBM data base systems.

Although Cullinane is known for its data base management system, IDMS, it also makes Culprit, a product that operates with IBM's IMS and CICS.

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Amsat to Gain Second Parent

(Continued from Page 55)

will then be provided by American Satellite Co.

Fairchild is a diversified aerospace and communicatoins company which builds aircraft, communications satellites and other spacecraft and industrial and electronic products. Its sales in 1979 totaled $718 million.

Continental is the nation's third largest telephone company. Most of its customers are in suburban and rural areas. Continential also has an interest in Omni Communications Corp., a cable TV firm. In 1979, Continental reported sales of $1.1 billion.

American Satellite Corp. offers voice, data facsimile and video communications nationwide through a network of 40 dedicated and shared-use earth stations.

Sales last year totaled $16.1 million, vs. $10.2 million in 1978.

However, the company still is not profitable, since it lost $6.5 million in 1978 and $4.8 million last year.

Supershorts

Burroughs Corp. said its direct investment in California has grown to $350 million. It now employs almost 7,000 people in the state, about 20% of its U.S. work force.

NCR Corp. and Data Management Systems, Inc. (DMS) have signed a licensing agreement under which NCR will market DMS' ASK data management software worldwide.

Century Data Systems, Inc. has begun delivering production models of customized Trident disk drives for use in Bell telephone systems around the U.S.

Radionics Ltd. has been appointed the executive distributor in Canada of Cipher Data Products, Inc.'s family of magnetic tape peripherals.

A minority-owned small business firm in a Washington, D.C., suburb has become Raytheon Co.'s first "million-dollar minority supplier." Radix II of Marlow Heights, Md., received the order for computer-based energy management and control systems.

Dataproducts Corp. is planning an $11 million expansion of its Irish manufacturing operations.

AM International, formerly known as Addressograph-Multigraph Corp., reported that its revenues from high-technology electronics systems this fiscal year have now surpassed its revenues from traditional electromechanical machines.

Northern Telecom Ltd. has started up its first major offshore packet-switching carrier network. The net was provided to the Deutsche Bundesposte.

Dysan Corp. will manufacture and market a removable disk cartridge to be used in a disk drive, dubbed the Lynx, being developed by Data Peripherals.

Altos Computer Systems has completed negotiations for five European distributorship agreements totaling $9 million this year. The countries covered are Italy, France, England and West Germany.

Tally Corp. has become part of Mannesmann AG, the West German multinational, and is now known as Mannesmann Tally Corp.

Time-sharing vendor Rapidata, Inc. will market an expanded version of Telerate Systems, Inc.'s financial data base.

Honeywell, Inc. has established an information systems division within Honeywell Ltd., its Hong Kong subsidiary, to market and service the Level 6 and terminal products.

Memorex Europe will distribute Dylakor software products in the European marketplace.

Tandem Computers, Inc. has shipped its 1,000th CPU. The Nonstop system went to Applied Communications, Inc. of Omaha, Neb.

High Technology, Inc. will distribute Data General Corp. products to a network of retail computer dealers.

Wang Anticipates Revenues Will Climb to $1 Billion By '82, $5 Billion by '90

By Marcia Blumenthal
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. expects revenues to reach the billion-dollar milestone by the end of fiscal 1982 and then climb to $5 billion by 1990.

Noting that Wang's revenues were less than $100 million five years ago, Dr. An Wang, chairman and chief executive officer, and other top executives recently outlined the company's plans for the decade during a press conference held here in Wang's newly opened 375,000-square-foot office tower.

For the fiscal year ended June 30, the company clocked in an impressive 69% revenue growth and 84% earnings increase. Unaudited year-end results peg revenues for fiscal 1980 at $544 million and earnings at about $52.5 million, or $2 per share.

The firm will not be able to keep up the 70% revenue growth it has had for the past few years, according to John F. Cunningham, executive vice-president of field operations. At that rate, Wang would have revenues of $109 billion by 1990, he joked.

Realistic Targets

Turning to more realistic expectations, Cunningham said the company is targeting revenue growth of 42% for this fiscal year and should average about 26% yearly for the decade. This is the rate the company can sustain from capital formation and managerial standpoints.

By 1990, Wang's word processing products will contribute revenue of $2 billion, its traditional DP systems will provide $1 billion and its Integrated Information Systems (IIS) sales will account for $2 billion, he predicted.

Wang's strategic destiny seems to lie with its IIS product approach — the combination of DP and word processing systems, according to industry observers.

These three classes of products are now essentially three separate businesses, each with a different strategy, according to Carl Masi, vice-president of marketing support. In its small business and full-range minicomputer line, Wang will coexist with IBM standards.

But its CRT terminal-based word processing system differs markedly from IBM's approach to the office automation market, Masi maintained. He said the firm will continue to be an innovator in this market, stretching its products down to the low-end office system.

In the IIS market, no standards exist, Masi noted, adding that Wang will be a leader in this market.

Last year Wang introduced 45 new products, 20 of which are now being delivered. An additional 20 will be delivered by the end of this year, according to Frederick A. Wang, vice-president of market planning and development.

National Accounts

Masi and the other executives stressed Wang's commitment to selling to national accounts. Although it will continue to court the first-time user, Wang's national account business last year was 20% of revenues, up from less than 1% in 1976. And by 1990 it should reach nearly 60% of revenues, he noted. The revenue growth rate for the company's small business systems was 15% to 20%, less than the industry average for that segment.

Although Wang competes with other major mini vendors, the firm seeks primarily end-user rather than OEM business. To that end, it has a big investment in service and support.

With a $1.5 million installed base, Wang last year ran into some problems repairing customers' products because of poor spare parts availability, Ri-

(Continued on Page 58)

CW Photo by M. Blumenthal

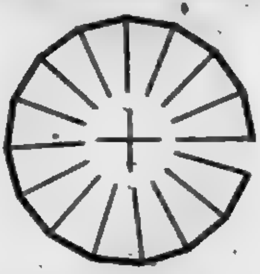
Announcing Wang Labs' 69% revenue growth in the past fiscal year were (left to right) John F. Cunningham, executive vice-president of field operations; Frederick A. Wang, vice-president of planning and development; and Dr. An Wang, chairman and chief executive officer.

What's the difference between BASIC and Pascal?

in BASIC

"This is easy..."

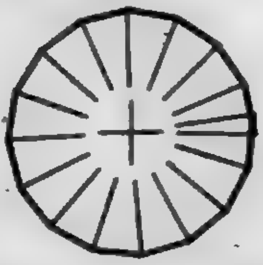
```
100 MOVE R,O
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



"Oops, didn't quite meet...

...but that's easy to fix."

```
100 MOVE R,O
                       +25
110 FOR T=0 TO 360  STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



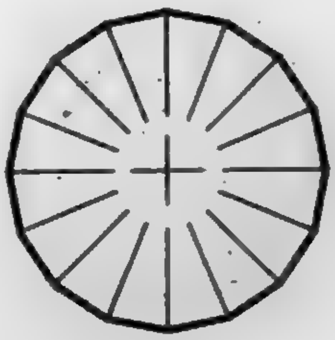
"Oh, now it closes...
in fact, it overlaps."

Programming by trial and error

in Pascal

"The simplest circle drawn with line segments is a regular polygon..."

```
procedure Circle (X, Y, Radius: real);
const Sides = 16; Pi = 3.14159265;
var   N : integer; Theta : real;
begin
  Move (X+Radius,Y);
  for N : = 1 to Sides do begin
    Theta : = 2 * Pi * (N/Sides);
    Draw (Radius * cos (Theta) + X,
               Radius * sin (Theta) + Y);
    end;
end;
```



Programming by design

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CW China Mission Set for October

FRAMINGHAM, Mass. — *Computerworld* will sponsor its second mission to the People's Republic of China Oct. 3-17.

Designed to acquaint representatives of U.S. firms with China's Fourth Ministry, the government agency in charge of buying computer systems, the seminar will include trips to Peking and Shanghai.

U.S. delegates participating in the mission will be asked to give presentations on microcomputing, personal computer systems and data communications to leading computer decision-making experts and academicians gathered by the Fourth Ministry. The mission will also take users to several top Chinese data processing sites, and will include an interview with U.S. Ambassador Leonard Woodcock.

The mission costs $6,250 per person; up to two delegates from each company may attend. The mission leaves from San Francisco with a stopover in Tokyo.

There are still a few places available for the mission. More information is available from Diana La Muraglia, manager of international marketing, *Computerworld*, 375 Cochituate Road, Route 30, Framingham, Mass. 01701.

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Western Electric, Racal Sign Reciprocal Agreement

MIAMI — A recently signed five-year cross-licensing agreement between Western Electric Co. and London-based Racal Electronics Ltd. has ended all litigation between the two companies — litigation which has been pending since 1974.

Although the six separate patent suits were limited to high- and medium-speed modem products, the cross-licensing agreement has been extended to patents for multiplexers and data terminals.

Under the reciprocal agreement, Racal companies are licensed to use existing patents and patents to be issued for the next five years on a royalty-free basis. Those patents are currently held by AT&T, Bell Laboratories and Western Electric.

The patent litigation between the two firms included 11 Western Electric and four Racal Milgo, Inc. patents. The original litigation was initiated by Western Electric in 1974. In 1976, Racal Milgo sued AT&T and Western Electric, claiming various patent infringements.

Two of the patents involved in Racal Milgo's suit were recently upheld in the U.S. Court of Appeals, resulting in a $2 million judgment in Racal Milgo's favor against United Business Communications, Inc.

Wang Sights Revenues

(Continued from Page 57)

chard Hebert, vice-president of customer engineering explained.

The company has now automated its service logistics system, which should provide improved turnaround time for users. For its national accounts, Hebert said, no user should be down for more than eight hours.

User Survey

To aid in determining customer satisfaction, Wang has developed a user survey, much the same as that used by major competitors.

In North America, users rated Wang's service a 7 on a 10-point scale. Noting that IBM's customers rank the company 7.6, Wang's goal is to achieve an 8-point rating for national accounts and a 7.3 rating for other contract customers. The firm takes a user survey every six months.

Also, when asked whether the firm would develop in-house semiconductor fabrication capability, Dr. Wang said the firm recently set up new technology labs.

CASS
CAN
WHEN
WON'T
See page 75
in Buy/Sell/Swap

Memorex Reports $21.7 Million Loss In Second Quarter

SANTA CLARA, Calif. — Forecasting a loss for fiscal 1980, Memorex Corp. reported a second quarter loss of $21.7 million, or $3.11 per share.

The quarter's loss compares with a gain of $10.6 million, or $1.32 per share, in the same period a year ago.

For the first half, Memorex experienced a $20.6 million or $3.06 per share loss compared with a $22.3 million or $2.79 per share gain in the first six months of 1979. Pretax losses for the second quarter and first half totaled $14.5 million and $22.8 million, respectively.

Revenues of the quarter rose to $185.7 million from $181.3 million in the like quarter a year ago. To date, Memorex's earnings have risen 3.2% to $370.6 million from $359.2 million.

Of the net loss, $15.5 million was attributable to a nonrecurring write-down related to the phasing out of certain older products, the company said. In addition, the firm established reserves of $3.5 million to cover excess inventory.

Another $6 million of the loss represented charges and reserves related to reduced staffing requirements and other items.

Anticipating the need for expanded financing capacity in the next six months, the firm received a one-year modification of certain provisions in agreements with lenders.

Reason For Losses

Memorex attributed its losses to continued high manufacturing costs, high start-up costs for new products and reduced sales volume and profits on sales to third-party lending institutions as a result of high interest rates. For the year to date, the firm's sales to these institutions totaled $52.5 million, down from $74.3 million for the same period a year ago.

Despite projected losses for the year, Memorex said its research and development spending for the quarter was $9.2 million, up from the $6.7 million expended in the same quarter a year ago. And order rates, especially for large storage products, are up substantially, the firm noted.

Intel Sees Third Quarter Up Only 5% Over Second

SANTA CLARA, Calif. — Intel Corp. expects its increase in third-quarter revenues to be no more than about 5% over those of the second quarter, its chairman, Dr. Gordon Moore, told financial analysts here recently.

That level of increase would equal the quarter-to-quarter growth rate between the first and second quarter of the year.

Moore said Intel is expanding its assembly capacity and work-force to meet increasing demand for its products. He added that there is increasing competitive price pressure on certain of the company's large-scale integrated memory components.

Amdahl Revenues Up 61% Second Quarter

SUNNYVALE, Calif. — Amdahl Corp. more than doubled its earnings and increased its revenues 61% in the second quarter, compared with 1979's performance in the same quarter.

Revenues rose to $91.2 million, up from $56.5 million in the same quarter last year. Earnings were $3 million, or 18 cents per share, up from $1.2 million, or 7 cents per share, in the corresponding quarter of 1979.

For the year to date, Amdahl's revenues were $172.6 million, compared with $144 million in the first six months of 1979.

Earnings for the first two quarters totaled $3.4 million, or 21 cents per share compared with $14.8 million, or 87 cents per share, in the comparable quarter a year ago.

The firm said outright purchases are continuing to increase, creating positive cash flow and improved profits. Reportedly, 70% of this quarter's sales were outright purchases vs. the 60% a year ago.

The improvement in the purchase/lease ratio was attributed to lower interest rates and to "IBM's announcement that its new product line will not be available until the end of 1981," according to Eugene R. White, the firm's chairman and chief executive officer.

Disk Drive Pact Signed

SCOTTS VALLEY, Calif. — Texas Instruments, Inc.'s Terminals and Peripherals Division has signed a manufacturing and marketing rights agreement with Shugart Technology for 5.25-in. "micro-Winchester" disk drives.

"While this type of agreement is commonplace in the semiconductor industry, it is unprecedented in computer peripherals," Alan Shugart, president of Shugart Technology, said.

Finis Conner, executive vice-president of Shugart Technology, added, "Our agreement with TI signals the end of sole sourcing for critical peripherals. While we recognize that TI will be a formidable competitor in the OEM marketplace, the improved customer benefits resulting from standardized competitive products will increase market potential for Shugart Technology's micro-Winchester."

Shugart Technology was founded in late 1979 by Alan Shugart and Finis Conner.

Nickels & Dimes

Anacomp, Inc. has announced a quarterly cash dividend of $.0325 on each share of the company's common stock. The dividend, for the quarter ending June 30, will be payable Aug. 11 to shareholders of record on July 25.

$ $ $

Four-Phase Systems, Inc. has filed a registration statement with the Securities and Exchange Commission covering an offering of $25 million principal amount of subordinated debentures due 2000.

$ $ $

NCR Corp. has declared a regular quarterly dividend of 50 cents per share of outstanding $5 par value common stock payable Oct. 31 to shareholders of record Sept. 12.

$ $ $

Monolithic Memories, Inc. has filed a registration statement covering 1,268,679 shares of common stock. Prior to this offering, there had been no public market for the firm's common stock.

$ $ $

Honeywell, Inc. has increased its quarterly dividend on common stock from 65 cents to 75 cents per share. The increased dividend is payable Sept. 15 to shareholders of record Aug. 29.

$ $ $

A one share dividend of Data Card Corp. common stock for every two shares owned will be issued Aug. 20 to shareholders of record Aug. 8.

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To Meet User Needs

Future of Graphics Pinned to Design Know-How

By Jeffry Beeler
CW West Coast Bureau

SEATTLE — Computer graphics firms will have to vastly increase their storehouse of graphics design know-how if they expect to build products that truly meet their users' needs for concise and effective management information, a speaker noted at the recent Siggraph 80 conference here.

During the last few years, computer graphics suppliers have invested much time and money in trying to overcome the technological hurdles of converting business data from textual to graphic form.

Now, those same suppliers need to shift their attention to the less technical but no less important question of whether their graphics products are designed to communicate effectively, according to Alan Schmidt, executive director of Harvard University's Computer Graphics and Spatial Analysis Laboratory.

Almost everyone agrees that a few well-designed graphs or bar charts can highlight trends and convey information much more quickly and effectively than reams of printed text or statistical tables.

But what visual elements constitute effective graphics design, and what form of presentation is best suited to expressing an idea with maximum clarity and minimal distraction?

Computer graphics suppliers have yet to come fully to grips with such questions, but they must eventually do so if they expect their products to deliver the performance and benefits that users have long been promised, Schmidt said.

After all, even the most technologically advanced computer graphics system is practically worthless if the forms in which it pictures its data are ambiguous, misleading or overly complex.

In short, Schmidt added, graphics design is rapidly emerging as the computer graphics field's leading issue as well as its least explored and "newest frontier."

Need for Designers

To translate words and ideas into images that can be readily understood by nontechnical viewers, computer graphics suppliers will become increasingly reliant on the services of qualified graphics designers.

"Contrary to what some people may think, the computer graphics field will require more, not less, graphics designers during the years ahead," Schmidt said.

Thus, the future of the computer graphics sector will be characterized by a convergence of two formerly unrelated disciplines, computing science and graphics design.

For computer graphics systems to realize their full user potential, the technical and nontechnical disciplines will have to work together in a spirit of close cooperation, Schmidt said.

Three Requirements

How well a computer-generated chart or graph communicates depends to a large extent on its success in meeting three main design requirements, the speaker observed.

The first of the three requirements is that all computer-generated artwork be drawn as simply as possible, with distracting visual details kept to an absolute minimum.

Simplicity of graphics design is particularly important when the target users are members of top general management. "The level of detail that should be included in a graphics display is inversely proportional to the corporate rank of its user," Schmidt said.

"At the low end of the managerial scale, the amount of detail that can be inserted into a graphics presentation can be fairly high. But when the intended viewers are senior level executives, the only information that belongs in a computer graphics display are the essential facts — the ones that have a direct bearing on a company's bottom line."

A second design prerequisite for effective computer graphics is consistency, Schmidt said. All the computer generated charts and graphs within a given user organization should have key visual traits in common, and these traits should form a kind of trademark.

The third key requirement for effective graphics design is conciseness, Schmidt added.

Communications, Micros

Wescon/80 to Keep Technical Focus

ANAHEIM, Calif. — Communications, microcomputers and microprocessor applications will be emphasized during the Wescon/80 Professional Program at the Anaheim Convention Center Sept. 16-18.

Although devoid of nontechnical and career topics, a marketing session entitled "What Will Be The Effects of Microcomputer Pervasiveness on Instrumentation Markets?" will be included.

Wescon has altered the format of the Professional Program, going to three session blocks each day rather than two, as in past years, to enable attendees to take in more sessions and reduce the chance of conflicts.

Communications and related subjects will occupy six sessions Tuesday and Wednesday with presentations on telecommunications from the user's viewpoint, satellite communications lines, initiatives in satellite systems and services, telecommunications in the 1980s, advances in telecommunications semiconductor technology and advances in telephone switching, transmission and customer premise equipment.

The home or personal computer will be featured in sessions entitled "Home Computer Design with Newer Elements" and "What is Happening in the Personal Computer Market." The single-board computer and other mini and microcomputer topics will also be discussed.

Members of the Institute of Electrical and Electronics Engineers (IEEE) will present a special program on the electric automobile, analyzing the state-of-the-art of the energy-saving concept. Memory concepts for the '80s and bubble memory applications in "harsh environments" will receive attention. More information is available from Wescon, 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Expansions

HP Plans Product Division

GREELEY, Colo. — Hewlett-Packard Co. has exercised options to purchase about 580 acres of land near here as a site for a future electronics plant.

At the same time, the company announced the formation of a product division which will eventually occupy the site. It will be known as the Greeley Division.

For the near term, the new division will be located at HP's existing Fort Collins, Colo., site.

The new division will produce floppy disk memory products and, in the future, computer tape drives.

Other Moves

Prime Computer, Inc. has begun building a 140,000-sq-ft addition to its final computer system configuration and test facility in Framingham, Mass.

Applicon, Inc. has opened a new West Coast branch office at 2540 Mission College Blvd., Santa Clara, Calif. 95050.

Stratus Computer, Inc. has moved into its new corporate headquarters at 19 Strathmore Road, Natick, Mass. 01760.

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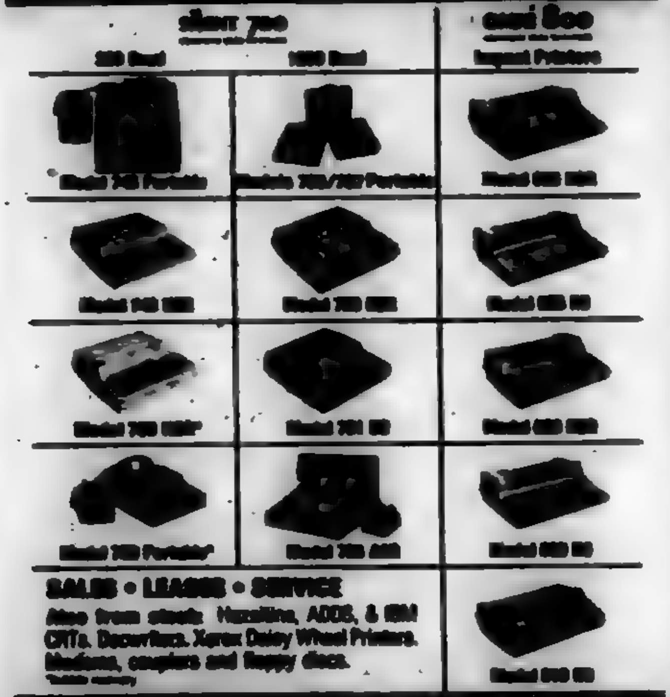

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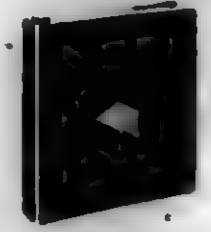

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How to Develop an Effective Company Growth Plan,

by Wilbert E. Scheer.

This loose-leaf bound, 234-page manual includes practical, realistic counsel on developing both short and long-range growth plans for any size company. Scheer offers advice on launching new ventures, upgrading existing products, facilities and personnel, overcoming competitive pressures and developing a realistic, workable growth plan. Packed with charts, exhibits, checklists, tables, time-tested short-cuts, principles and guidelines. $59.50

HM066

How to Evaluate People in Business,

by Dailey and Madson.

The effective evaluation of people in employment situations—including hiring, promoting or supervising—is one of the most serious problems managers face. This practical book argues that employees should be judged on the basis of a documented "track record" of results-producing performances, rather than on such criteria as good conduct, pleasing traits or political pull. $14.95

HM067

Saving Money Through Ten-Year Trusts,

by William A. Hancock.

The only book of its kind to address the middle-income taxpayer, this guide illustrates how to save taxes and money through a short-term-trust. The author defines a short-term trust, discusses how it operates, and offers guidelines to aid you in determining its appropriateness for your own situation. $15.95

HM074

Calculator Analysis for Business and Finance,

by Texas Instruments Incorporated.

A powerful and time saving tool for everyone who needs to use calculations in professional or personal life. It offers step-by-step guidelines to the use of a programmable calculator like the TI "MBA" in solving any business or financial problem. Topics include forecasting, bond analysis, compound interest, personal finance, accounting, statistics, and more. $16.95

CD179

Corporate Growth Through Internal Management Development,

by Wilbert Scheer.

An easy-to-follow loose-leaf manual for installing and conducting your own management and development program. Step-by-step details on attracting, retaining and developing the quantity and quality of managers you need. Shows you how to conduct human resources inventory, write managerial job descriptions, rate performance and appraise potential. $59.50

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How to Prepare an Effective Company Operations Manual,

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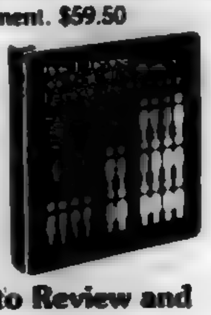
"Helps you save thousands of dollars, improve employee morale and increase efficiency." Concisely written, with a no-nonsense approach, this 210 page loose-leaf guide provides you with a rich reservoir of ideas and techniques to help you plan, prepare and implement a modern operations manual. Special attention is given to employee motivation to help you build a "success-oriented" company environment. $59.50



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How to Review and Evaluate Employee Performance.

Prepared by the staff of Universal Training Systems Company in loose-leaf format, this manual contains 18 case-study problems to help you diagnose and sharpen your knowledge of performance analysis and review, including charts and checklists to assist you in implementing a successful program. Focus is on appraisal techniques to motivate employees for maximum teamwork, productivity and profits. $59.50

CD176

Word Processing,

by Walter Kleinschrod.

300 loose-leaf pages with everything you need to know to install a successful word-processing system in your organization. Exhibits, checklists, tables and charts help you through a six-point plan for determining the best, most profitable word processing system for your company's particular needs. $59.50

CD180

How to Recruit, Select and Place Salesmen,

by Dr. Robert McMurry.

This loose-leaf guidebook contains a tested and proven method of finding those all-too-rare qualified salespeople. Called the "McMurry Step-By-Step Salesmen's Selection Program," it shows you how to uncover and assess a sales applicant's "can-do" and "will-do" qualities; conduct a patterned interview, use knockout questions to quickly screen out unqualified sales applicants; and choose the top producers by determining and assessing their emotional maturity. $59.50

CD175

How to Boost Company Productivity and Profits,

by Raymond Dreyfack.

This 252-page loose-leaf manual helps you increase output and profits, and control your firm's rising costs in the critical years ahead by increasing productivity *without* increasing costs. Dreyfack explains how to improve your return on investment, build customer satisfaction and loyalty through improved quality. Text includes charts, diagrams and tables, plus a chapter on successful programs currently used by some of the country's top firms. $59.50

CD177

Management by Objectives,

by Glenn Varney.

Also in loose-leaf format, this handbook includes a complete, step-by-step approach to an MBO system. Shows you how to install the three critical factors of involvement, participation and autonomy; how to avoid eight deadly pitfalls; and how to use a three-step problem-solving technique to squash problems before they get a good start. Helps you to increase corporate flexibility to meet competition, enhance managers' effectiveness and improve employee committment. $59.50

CD181

How to Develop and Conduct Successful In-Company Training Programs,

by Universal Training Systems Company Staff.

Another in a series by UTC staff, this loose-leaf, 210-page guidebook helps you get outstanding results from your employee training programs. Written as a working tool, this guide deals with the practical application of good, sound training. It shows you how to plan the training, select the most appropriate training methods to fill your needs, develop training objectives, measure work performance and evaluate the effectiveness of the training program. $59.50

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CI Notes

Booz Allen & Hamilton Proposes Subcontract Plan

BETHESDA, Md. — Booz Allen & Hamilton, Inc. has announced a subcontracting program designed to create opportunities for small businesses and small disadvantaged businesses to participate in the work the firm does for federal clients.

Qualifying vendors and contractors also include woman-owned businesses and labor surplus area concerns. Socially and economically disadvantaged individuals include black Americans, Hispanic Americans, native Americans, Asian Americans and other minorities.

More information is available from the firm at 4330 E. West Highway, Bethesda, Md. 20014.

Organizational Meeting Set For Records Center Owners

BOSTON — The Association of Commercial Records Centers, a group being formed for independent record centers to establish standards and procedures, will hold a meeting for interested commercial records center owners Oct. 18 at the Park Plaza Hotel here.

The organizational meeting will focus on establishing the group, as well as ways to deal with protection/-liability, labor relations, DP and micrographic interface, computerized records storage, facsimile and equipment evaluation.

Those interested in attending the meeting should contact Metro Business Archives, 1340 E. 6th St., Los Angeles, Calif. 90021.

Event Clearinghouse Details Graphics Communications

TEQUESTA, Fla. — A clearinghouse of scheduling information on conferences, seminars, trade shows and other events in the area of graphics communications has been established by Graphic Communications World.

Persons responsible for scheduling graphics communications events can contact the clearinghouse prior to selecting a date and learn what has already been scheduled between now and 1987, according to the publisher of the "Official Industry Meeting and Events Calender."

The free service is available by writing Clearinghouse, Graphic Communications World, P.O. Box 3489, Tequesta, Fla. 33458.

Infomark Opens Branches Of National Direct Sales Net

FRAZER, Pa. — Infomark, Inc., a supplier of turnkey minicomputer systems to small and medium-sized wholesale distributors and manufacturers, has opened the first three branches of a national direct sales network.

Expected to extend to 22 cities by 1982, the network has begun with locations in Philadelphia, Atlanta and Cleveland. Previously, the firm sold exclusively through distributors and dealers.

Present plans call for the network to expand ultimately to over 100 cities nationwide. Founded in 1975, Infomark had sales of $4.5 million in 1979, which are expected to almost double in 1980, reach $20 million in 1981 and top $40 million by 1982.

Kosheff President Of Calcomp

ANAHEIM, Calif. — M. Joel Kosheff, executive vice-president of Sanders Associates, Inc., will succeed George M. Canova as president of California Computer Products, Inc.

Canova resigned effective Aug. 1 to form a new company in the computer field which will not compete with Sanders and Calcomp, according to Jack L. Bowers, Sanders president. Sanders acquired Calcomp earlier this year.

Kosheff will continue as executive vice-president and a director of Sanders.

Executive Corner

Other Moves

- Dr. John J. Bridwell and William J. Fritton have been elected to the respective posts of vice-president for marketing services and controller of the GTE Telecommunications Systems unit of GTE Communications Network Systems.
- Mohawk Data Sciences, Inc. has announced the appointment of Louis L. Hickert as president of Sistemas MDS Mexico, S.A.
- Dr. S. Thomas Emerson has been appointed president of Periphonics Corp.
- James Brennan Jr., former Director of Applications Engineering for OKI Semiconductor, has been promoted to vice-president of that firm.
- The following promotions have been announced at Ontel Corp.: Edward J. Heinze to vice-president of marketing; Douglas Wagner to national sales manager; Brian Stephens to general manager of Ontel International, Ltd.; David Schiffer to international marketing manager; and Frank A. Kirby to senior vice-president, corporate development.

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If you've been thinking about adding disk capacity, now's the time. Digital's RK06 disk drives are ready and waiting. Features include: low-profile cab; top-loading 2-platter cartridges; 14 megabytes of storage; average access and seek times of 50.5 msec and 38 msec, respectively; peak transfer rate, 538,000 bytes per sec. High reliability. Daisy chain up to eight drives per controller.

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position announcements

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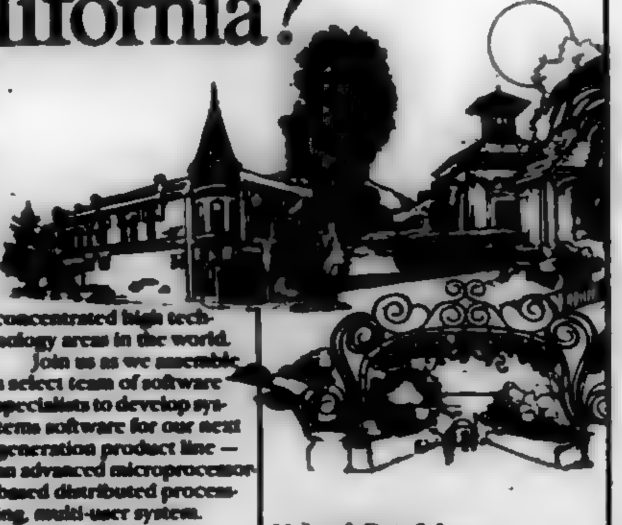

MDS.

Maintaining a competitive edge in advanced computer technology takes more than merely employing a team of talented professionals. It takes a commitment to provide them with the finest resources available. At the MDS Advanced Development Center, that commitment includes an environment conductive to freedom, creativity and unrestricted growth.

Since the Center's function — its *only* function — is to develop hardware and software for highly advanced distributed processing systems, it plays a vital role in making MDS a $200 million, multi-national corporation with the 2nd largest customer base in the industry. We found that to be a very good reason for building our Advanced Development Center in Los Gatos, California.

While we're just a few miles away from the high technology of Santa Clara's "Silicon Valley," you won't find us amidst a busy, distracting manufacturing plant or caught up in the hot competition of marketing and sales. Instead, you'll find a team of top development pros, living and working in a small, cozy town nestled at the foot of the Santa Cruz Mountains, reminiscent of Old California. Drive a few minutes West and you're standing on the rugged Pacific coastline, a few minutes East and you're on the doorstep of one of the most concentrated high technology areas in the world.

Join us as we assemble a select team of software specialists to develop systems software for our next generation product line — an advanced microprocessor-based distributed processing, multi-user system. Excellent opportunities exist for Systems Programmers and all Software Development Professionals in Systems Architecture, O/S Development, Data Base Design, Communications, Compiler Development and Product Planning.

Call or send your resume, with salary history, to Carole Clark, Professional Employment.

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Additional information may be obtained by calling Mr. Ed Smith collect, at (201) 874-3033. Resumes may be sent, in confidence, to:

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Princeton, New Jersey 08540

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Newell Companies is a growth oriented firm in the manufacturing and merchandising of consumer products for the do-it-yourself home improvement market. Headquartered in Freeport, Illinois, Newell has manufacturing and distribution sites throughout the U.S. and Canada.

We have an immediate opening for a Systems Programmer on the Technical Support staff. The primary function of this position is to support the operating system and all other related software products. Additionally, the individual will participate in hardware/software evaluation, installing data communications facilities and working closely with other D.P. functional areas.

Prior experience in the generation and maintenance of OS/VS1 or OS/MVS operating systems is essential. The person should also have a solid background in Assembler, Cobol, OS JCL and Utilities and SMP. Current plans call for installing an IBM 4341 in November, 1980. Todays hardware/software complex consists of an IBM 370/145, OS/VS1, IMS/VS/DB, RES and BTAM. Experience in IMS and/or CICS is a definite plus.

For immediate consideration, send a current resume with salary requirements to:

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Freeport, IL - 61032

Large Systems Support Professionals

Year after year Burroughs has achieved impressive increases in computer technology and sales. Our Federal and Special Systems Group is an excellent example of this growth. As a result, a variety of excellent career opportunities exist for experienced Data Processing Professionals.

These positions involve direct support of our standard products line, with an emphasis on large systems. Specific experience should include familiarity with Data Communications Networking, Data Management or Operating Systems development, either on the Burroughs 6000/7000 series or comparable large systems utilizing COBOL, ALGOL and GEMCOS. If you have experience in any of the following areas, we would like to discuss our opportunities with you:

- Project/Program Management
- Systems Software Development and Support
- System Performance and Measurement
- Data Comm Network Analysis
- Systems Analysis/Programming
- Hardware/Software Integration
- Software Quality Assurance
- COBOL Programming

Burroughs provides excellent salaries and benefit programs; and through our commitment to growth, we can provide you with the kinds of diversified, challenging career positions that offer you the chance to work with an industry leader - doing the kind of work you enjoy. Opportunities are available at our Paoli, Pa. facility (an attractive Philadelphia suburb) plus a number of other locations throughout the U.S.

To apply, please send your resume to: Aileen Unger, BURROUGHS CORPORATION, P.O. Box 517, Paoli, PA. 19301. We'd like to hear from you!

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Kaiser Aluminum & Chemical Corporation, one of the world's largest producers of aluminum, has the following exceptional opportunities for highly motivated professionals who wish to contribute to a major multi-million dollar modernization program, both in the U.S. and abroad.

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We have an urgent need at our corporate headquarters for a Microprocessor Application Engineer with 10-15 years of staff and line experience in plant operations, engineering design and maintenance engineering. The ideal candidate would have a BSEE with a MS in Computer Science and knowledge of FORTRAN language and Mod Comp computers. (Equivalent education or similar background would be acceptable.) This senior level person will work with each plant's management group to identify and recommend equipment for process operations to which microprocessors, computers or programmable controllers can be profitably applied.

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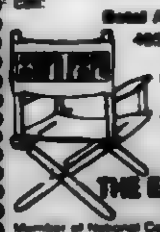

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We seek a Systems Engineer with 3+ years experience troubleshooting minicomputer systems and associated peripherals. Must have strong mechanical/electrical skills.

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To design and develop microprocessor-based terminals interfaces and/or peripheral controllers. BSEE, or equivalent, and 5+ years design experience.

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Central Support Representatives
As a member of our highly-visible Technical Support team, you will perform operating systems support. A minimum of 2 years experience in a related position is essential. You should be technically proficient in operating systems software and software/hardware interface, as well as have internals experience in IBM DOS, DOS/VS, 360, 370, and 4300 operating systems. Richmond positions.

District Sales Managers
The total sales and marketing effort in an assigned territory will be your area of responsibility. A minimum of 2 years experience in the IBM DOS marketplace is required in addition to a proven sales record of success. Up to 50% travel involved. Positions in Chicago and New Jersey.

District Sales Representatives
We need talented professionals to assume responsibility for the direct sales of specifically assigned accounts. At least a year selling IBM DOS system software is essential. Up to 50% travel involved. Positions in Chicago and New Jersey.

Manager of Central Support
You will be responsible for the overall operation of our Richmond Central Support Dept., providing customer support, documentation and user training, and staff development. A highly technical knowledge of operating systems software and 3-7 years experience with the internals of IBM DOS and DOS/VS-based operating systems are a must as well as strong management skills.

Field Support Representatives
Positions are available for individuals to perform field product installation, as well as customer education, documentation and telephone support. At least 2 years experience in systems programming and systems generation for IBM DOS and DOS/VS operating systems is a must. You should also have a solid understanding of DOS/VS internals. Up to 30% travel involved. Chicago and New Jersey positions.

Product Administrators
Opportunities exist in our Richmond Marketing Dept. for talented and ambitious people to manage a product line and develop marketing strategies. A proven record of success in marketing data processing systems is required. Applicants should also have solid experience with IBM DOS, DOS/VS, 360 and 370 or similar systems software.

To apply for any of these positions, please forward your resume, including salary history, to DONALD W. CAUGHEY, Nixdorf Computer Software Company, [illegible] Drive, Richmond, VA [illegible], 804-[illegible] or TOLL FREE [illegible]. Please indicate area of interest and geographic preference.

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PROGRAMMER ANALYST

Minimum of 2 years experience in programming with ALC or COBOL languages.

PROGRAMMER

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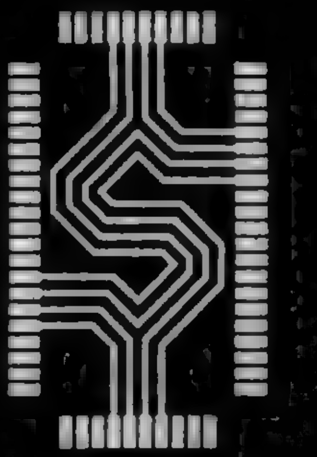

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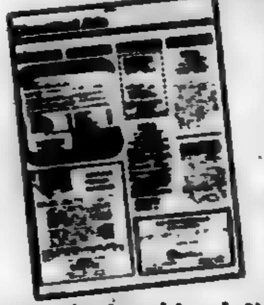

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Suite 2626
Seattle, Wash. 98101

Bob Clawson
(503) 222-9778
One S.W. Columbia
Suite 800
Portland, Ore. 97258

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Computer Professionals

CAREER OPPORTUNITIES IN SAN FRANCISCO

Pacific Gas and Electric Company is one of the country's most innovative investor-owned public utilities in adapting to America's new energy era. Our Computer Systems and Services Department offers the latest hardware and software, including multiple 3033's and an extensive teleprocessing network. To support expansion of our staff and to meet the challenges of the 80's, experienced individuals are needed in the following areas:

Data Processing Instructor

Our Training and Resources Development area has an immediate opening for a qualified trainer, possessing a combination of diversified data processing skills and teaching experience. You'll be part of a team which provides educational services to business applications programmers and systems analysts. Duties will include: analyzing, evaluating, and selecting a complete range of EDP training programs; customizing and teaching courses; and maintaining and developing a course catalogue of available training resources. BA or BS degree and at least one years' technical experience and related teaching experience are required.

Business Systems Analysts

Innovative individuals are needed to assume responsibility in developing computer systems to solve business problems. Ability to interact with all levels of management is important. Basic knowledge of computer processing is desired. Excellent communication skills are essential. BA/BS or advanced degree in business, finance, or related fields required. Two years experience preferred, but entry level candidates with advanced degree will be considered.

Business Programmers and Analyst Programmers

Two years COBOL programming required and working knowledge of OS/JCL and structured programming. BA or BS degree is required. Responsibilities include design, programming, testing and installation of business systems. Knowledge of WYLBUR, teleprocessing applications and structured design is desirable.

Pacific Gas and Electric Company offers a sound, stable future for personal and professional growth. In addition, we offer competitive salaries, a comprehensive benefit program and moving assistance. Please submit resume in confidence, including salary expectations to:

Mr. J. [illegible]
Professional Employment Dept. [illegible]
Pacific Gas and Electric Co.
245 Market Street, Rm. [illegible]
San Francisco, CA 94106
An Equal Opportunity/
Affirmative Action Employer

PG&E

FLORIDA'S ECONOMIC FORECAST . . . IS BRIGHT & SUNNY!!!

Our client, an internationally respected leader in the design and manufacture of Data Processing peripherals and communications systems is seeking talented men and women with above average skills in the following areas:

- SOFTWARE DESIGNERS — One or more years EXPERIENCE DESIGNING, DEVELOPING or MODIFYING OPERATING SYSTEMS, DATA MANAGEMENT SYSTEMS, COMMUNICATIONS SYSTEMS or COMPILERS using ASSEMBLER language.
- SOFTWARE DIAGNOSTICS — EXPERIENCE DEVELOPING DIAGNOSTICS for large scale IBM PROCESSORS and PERIPHERALS (disc, tape, printer, etc.).
- SOFTWARE COMMUNICATIONS — EXPERIENCE in the areas of CICS INTERNALS using ASSEMBLER language on IBM operating systems.

Salaries are competitive, with outstanding working conditions and liberal benefits programs in addition to the bright and sunny recreational and economic climate of Florida's Suncoast! Please forward your resume, in confidence, or call:

(813) 872-1863

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Our new concept in customer service assures that you'll keep up with the state of the art.

This new concept puts engineering back into field service by making you responsible for initial computer problem diagnosis. By simply dialing a toll-free number, our customers can call you with a description of the computer system malfunction. You will make the initial diagnosis which will aid the local Field Engineer to service the customer correctly on the first call. Assisting you in this process are the latest diagnostic and test equipment plus teams of talented hardware and software specialists.

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- You will troubleshoot complete computer systems through communications diagnosis. You will research, structure, and communicate solutions for varied hardware problems.
- If you have at least two years' experience in maintaining mainframe or minicomputer systems, good interpersonal skills, and have experience servicing systems in a time-sharing, real-time, or distributive processing environment, give us a call.
- All positions offer competitive salaries and comprehensive benefits. You'll also enjoy the personal and professional rewards that come with increasing the productivity of a world-leading computer company.

Interested in an appointment? Call 1-800-525-7101 and ask for Bo Beal, recruiter for Digital Diagnosis Center.

If you can't call, please send your resume and salary history in confidence to: Bo Beal, TSC/DDC Personnel, Digital Equipment Corporation, 301 Rockrimmon Blvd. So., Colorado Springs, CO 80919.

We are an equal opportunity employer, m/f.

ROBERT HALF

SYSTEMS OPPORTUNITIES

EDP/MGR/PROG-RPG-SYS 34	[illegible]
PROG-ASSEMBLY-BNK.	[illegible]
PROG-COBOL-FORTRAN-CICS.	[illegible]
PROG-NCR-NEAT 2.	[illegible]
P/A-HONEYWELL-LEVEL 6-COBOL	[illegible]
PROG-NCR-COBOL-NEAT-CRIL.	[illegible]
P/A-DATAPOINT-COBOL	[illegible]
P/L-PROG/APPS-COBOL	[illegible]
P/A-COBOL-IBM-MFG.	[illegible]
P/A-COBOL-FIN'L-BANKING.	[illegible]
SEND	[illegible]

ROBERT HALF
OF LOUISIANA, INC.
[illegible] St. Charles Ave. [illegible]
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N.C. Opportunities

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We are unique in that we offer unlimited growth and upward mobility to our people and yet have security and stability.

Requirements. All applicants will be considered but prefer the following:

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- On-line experience with CICS
- IMS experience is desirable
- Insurance and Finance experience also a plus
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Our greatest needs:

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- Project Managers
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Our corporate headquarters is located in the lovely suburbs of Atlanta and includes a professional environment using the lastest hardware and system techniques available.

For prompt, confidential attention, send your resume and salary history to:

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Distributed D.P.

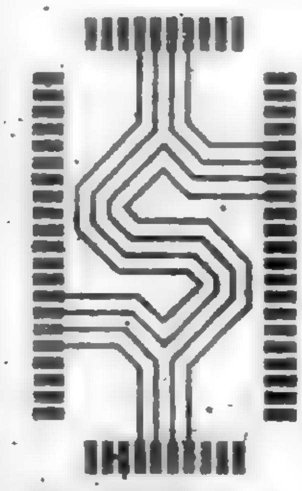
HDR Systems, a national consulting firm and leader in Computer Services has an immediate opening for a Distributed Data Processing Specialist.

Position requires a degree and demonstrated experience in distributive network communications design, distributed processing design/implementation and working knowledge of mini and micro computer architecture and communications. Responsibilities include system design, development, implementation and project management.

We offer a competitive starting salary and complete benefit package. For immediate consideration please call COLLECT Jacque Evans 402-399-1000, or send your detailed resume in confidence to:

Mr. J.C. Evans
Henningson, Durham & Richardson, Inc.
Corporate Headquarters
8404 Indian Hills Drive
Omaha, Nebraska 68114

Technical Support Analysts



San Francisco Data Center

Bank of America needs qualified individuals for exciting, challenging positions in our technical support project. Your responsibilities will include supporting seven 3033's running MVS REL 3.8, JES 3 REL 3, IMS and batch twenty-four hours a day seven days a week and two 168's utilizing VM.

You should have three years experience with MVS JES2/JES3 on system 370/158 and larger processors, and a solid knowledge of MVS, JCL and IBM utilities. A good understanding of MVS externals and a strong software background are essential. Knowledge of IMS, VSAM, NOMAD and IBM 3705 or Memorex 1270 transmission control units is preferred.

Your work week will normally consist of three 12-hour day or night shifts and four days off, but can vary. The salary is commensurate with your experience. Please send your resume and salary history to Bank of America, c/o Charles B. Smith, Dept. 3411TS, P.O. Box 37000, San Francisco, CA 94137. We are an equal opportunity employer m/f/h.

BANK OF AMERICA

BANK OF AMERICA NT&SA
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Senior Systems Analyst — Permanent position with initial assignment as major task leader in development of requirements analyses for a statewide judicial information system. Requires B.S. degree, higher degree preferable; two years of systems analysis experience, preferably in judicial or criminal justice information systems; demonstrated exp. and skills in systems design and documentation; and good oral and written communications skills. Experience with various levels of judicial personnel highly desirable. Prefer applicants with consulting or management experience. Salary [illegible]. Send resume immediately and no later than August 15 to National Center for State Courts, [illegible], 300 Newport Avenue, Williamsburg, Virginia 23185. The National Center is an Affirmative Action Employer.

PROGRAMMERS

IMS SYSTEMS PROGRAMMERS
IMS APPLICATION PROGRAMMERS
IMS SYSTEMS ANALYSTS

Evangelical Christian Ministry seeks qualified Computer Programmers experienced in programming, maintenance and design. Degree desired but will give credit for appropriate experience. If you are qualified and have a desire to serve, please send resume to: CBN Personnel, CBN Center, Virginia Beach, VA 23463. CBN is an equal opportunity employer.

DATA BASE SPECIALIST

American Management Systems, Inc. has an opening for an IMS data base specialist with two to four years of experience. If you are ready to consider a career move and have experience in the design and implementation of large-scale transaction processing systems using IMS DB/DC environments, consider AMS.

We are particularly interested in people whose experience includes data base generation, recovery/restart procedures, performance measurement, tuning of DL/1 data bases in batch and on-line applications and setting up and managing complex systems testing environments.

AMS is a nationwide leader in the design and implementation of custom, large-scale systems for private and public sector clients. We were founded in 1970 and had 1979 revenues of $48 million. Our current national staff is over 900 and growing. Continued company growth through our expanding base of Chicago and midwest clients assures you continued employment and challenging new assignments. Our compensation and benefits package is highly competitive. This position is based in the AMS Chicago, Illinois office. Applicants should be Chicago area residents or be willing to relocate to Chicago. Some travel is required. Please send detailed resume to:

Nancy [illegible]
American Management Systems, Inc.
120 S. Riverside Plaza
Chicago, Illinois 60606

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Washington, D.C. · New York City
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Play a significant role in the major conversion and expansion of our extensive in-house computing facilities!

SRI INTERNATIONAL, a San Francisco Peninsula-based Research Institute, offers rare challenge for innovative, knowledgeable Professionals in our Computer Resource Planning and Systems Programming Departments. These positions offer excellent advancement opportunities through interesting, significant State-of-the-Art work.

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— SYSTEMS PROGRAMMERS who are ready for major responsibilities for the configuration, installation, support and enhancement of the following systems . . .

DEC system 20 TOPS-20
PDP-11 UNIX Version 7
VAX 11/780 VMS
IBM VM and MVS

. . . will find this an exciting, challenging and rewarding opportunity. The emphasis for these SYSTEMS PROGRAMMING positions is on technical expertise and experience — both depth and breadth — suited to a growing organization, combined with leadership and supervisory skills and/or potential.

If the challenge of making key contributions to a growing major research Computing Facility appeals to you, please contact M.S. [illegible], Personnel Services, SRI INTERNATIONAL, 333 Ravenswood Ave., Menlo Park, CA 94025, (415) 326-6200, Ext. 3011. An equal opportunity employer. Individuals only apply.

SRI International

Data Processing

ANACONDA Copper Company currently has the following Data Processing openings available:

COORDINATOR OF TRAINING

(Denver, Colorado)

A new position has been created to meet the training needs of our rapidly expanding Management Systems Department. You will be responsible for developing and implementing technical EDP training programs for users and systems personnel throughout the ANACONDA Copper Company.

In addition, you will assist with the recruitment and personnel development activities for the Management Systems Department in Denver as well as field location.

A degree or equivalent in a scientific or business area is required. Also required is six years broad, current experience in systems and the computing profession including: programming, high level languages, applications systems development, large scale computing hardware and operations/supervisory software. One to two years experience should relate to training. Knowledge of engineering and exploration applications used in the mining industry is highly desirable.

The successful candidate will be a self-starter who exhibits excellent interpersonal, teaching and organizational skills. Travel is required.

TECHNICAL USER SUPPORT COORDINATOR

(Denver, Colorado)

We currently have an opening for a User Support Coodinator to serve as the primary contact for users in the newly developed ANACONDA Denver Data Center located at Inverness. Major responsibilities will include working with IBM utilities, JCL, MVS, TSO and maintaining the systems library. You will also identify and respond to user problems, requests and needs, and will recommend actions to improve service.

A college degree or equivalent experience is required plus a minimum of one year experience in JCL, TSO, utilities and either COBOL, FORTRAN or Assembler. Experience in MVS, Linkage Editor, Teleprocessing and Panvalet also required.

OPERATING SYSTEMS PROGRAMMER SENIOR MANAGEMENT SYSTEMS

(Butte, Montana)

You will provide technical expertise in IBM 3031 computer hardware, software and communications to Management Systems Department and operating properties users. You will be responsible for installing and maintaining VM/370, CMS, DOS/VS operating systems and associated utilities, compilers and other system software. In addition, you will assist in evaluation of new hardware and software, develop and/or conduct procedures and education for Management Systems staff on new or existing systems software or hardware usage.

A degree in Computer Science or equivalent experience and a thorough knowledge of IBM Assembler language required. A working knowledge of COBOL and/or FORTRAN preferred. Experience in installing and maintaining VM/370, CMS and DOS/VS operating systems plus knowledge and/or experience in IBM telecommunications very desirable. CICS and/or DL/1 experience an added plus. Plans call for a conversion to MVS in the near future.

We offer an excellent salary and benefit package. For immediate consideration, please send your resume to **ANACONDA Copper Company, Dept. MJC, 555 17th St., Denver, Colorado 80202. We are an Equal Opportunity Employer.**

ANACONDA Copper Company

Division of The ANACONDA Company

Systems Management/ Reorganization

Orange County

Our client, a highly respected Southern California company, has engaged us to recruit a top-notch manager for its DP organization which is currently embarking on a dynamic reorganization plan. We are searching for a Director of Technical Support.

The individual will have previous experience in an OS/MVT environment and large scale system conversion experience, and will be responsible for managing Systems Programmers, the functioning of the internal operating system, all non-application software, telecommunications, data base management (IMS) performance measurement and tuning.

Respondents should be technically competent and possess a general management perspective. This is an excellent opportunity to join a winning team in a dynamic growth industry. Qualified candidates will be high achievers with potential for future growth. Excellent compensation package, benefit program and relocation are offered.

We are consultants to management. For confidential consideration, please send resume and salary history to: James A. Cox, Professionals for Computing, Inc., One Maritime Plaza, Suite [illegible], San Francisco, CA 94111. (415) [illegible]-7128. Employer assumes fee.

professionals for computing, inc.

Search & Personnel Services

SO. CALIF! BUSINESS PROGRAMMERS!!! WE NEED HELP!!!

A leading corporate Data Center is currently seeking QUALITY ANALYST/PROGRAMMERS (35-40 openings). This is a STATE-OF-THE-ART environment offering unlimited advancement potential. The people that are of interest to us should have the following Experience: Minimum 2 yrs. Programming, utilizing COBOL as your primary language, working on large scale IBM systems. If you know IMS or CICS and have a College Degree, these are desirable pluses. Salary Based On Experience. Don't miss these opportunities. Send Resume To:

CW Box [illegible]
375 Cochituate Rd., Rte. 30
Framingham, Ma. 01701

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PROJECT LEADERS
PROGRAMMER/ANALYSTS

Major New York Financial Institution looking for highly skilled, responsible people at all levels. Data Center is experiencing growth and expansion. Positions involve batch (COBOL) and online (ALGOL) systems in a developmental environment.

Qualifications must include stable programming experience in either (a) COBOL or (b) MCS, DCALGOL, NDL on Burroughs large scale B6700-B7800 equipment. Financial background, or experience in CHIPS, SWIFT or ACH, and college degree in Computer Science, Math, EE or MBA, a plus.

We are committed to excellent inhouse and professional training. Many new projects involve database and telecommunications. Salary commensurate with abilities and experience.

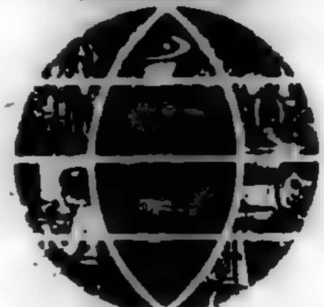
Our staff is aware of this advertisement.

Send resume including salary history and requirements in confidence to:

CW Box [illegible]
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701
An Equal Opportunity Employer

Tomorrow-minded

UNIVAC APPLICATION ANALYSTS



Martin Marietta Aerospace, NASA's Contractor on the Space Shuttle External Tank, has immediate openings for Univac Application Analysts.

Position requires designing and programming a variety of engineering and specific programs utilizing ANS/COBOL for application on Univac 11XX equipment.

Qualified individuals should possess a BS in Mathematics, Computer Science, or related discipline, and have a minimum of 3 years scientific and/or business programming utilizing data base methodology.

We offer competitive starting salaries and fully paid company benefits. These opportunities exist at the Michoud Assembly Facility located in Suburban East New Orleans. Qualified candidates interested in learning more about these opportunities at Martin Marietta, the tomorrow-minded aerospace people, should forward resumes including salary history to: Ms. Dottie McCann, Martin Marietta Aerospace, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

Programmers

SANTA FE, a leading international drilling, engineering and construction company serving the petroleum industry, offers an outstanding employment package including a 4-1/2 DAY WORKWEEK and a professional work environment. In upgrading and expanding our Information Systems Group, we are seeking:

SENIOR PROGRAMMERS

To develop and modify programs for business DP systems. Knowledge of COBOL and 1½ years' programming experience is required. Degreed individuals with background in financial, logistics, payroll/personnel or administrative applications are preferred.

Please call Bill Graves or send resume to:

SANTA FE INTERNATIONAL CORPORATION
P.O. Box 1401
Orange, CA 92668
(714) 558-1300, Ext. 3822

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PROGRAMMER/ANALYST

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Credentials: 2 Years COBOL background
IBM/OS JCL Knowledge
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IMS, VSAM, ISAM, CICS, TSO, CMS
or other Major System supports a plus.

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Salary To: $30,000 based on experience

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To $30,000 for analysts and programmers with large scale IBM experience and COBOL. Applications include payroll, inventory, financial, and manufacturing. [illegible] location with state of the art FORTUNE 100 corp. [illegible]

MARYLAND

To $30,000 for BURROUGHS people as analysts, programmers, and tech support areas. Prefer BURROUGHS medium to large scale hardware. Wide variety of applications experience needed. Multiple openings in Southeast and Nationwide.

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To $28,000 for programmers with DEC PDP-11 experience and FORTRAN. Medium size [illegible] location with significant promotion potential. Excellent training and real time diversity. Low cost of living area.

Client co's assume full fees and employment expenses. For more info, contact David Miller, 703/790-1000.

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MARKETING REP.

National timesharing services firm seeks individual with strong bkgd. in financial systems. Will present projects to corp. officers who are the users of the service. No programming exp. required. Local trvl. only. Salary $30,000. Contact Frank Goldschmidt.

Robert Half of Boston, Inc.
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Boston, MA 02110
(617) 423-1200
Personnel Consultants

DATA PROCESSING MANAGER — BANK

Aggressive, profitable western Kentucky bank with $170 million + in resources is seeking a data processing manager. The bank plans to acquire an IBM 4331 DOS/VSE system and the latest banking software applications. The d.p. manager will have responsibility for installing, converting, and managing the data center (including the hiring of staff).

Candidates should have a minimum of 3-5 years of experience in bank data processing and possess the ability to interface with key operating departments and manage staff.

Attractive compensation package, challenging opportunity in an excellent bank, fine community.

Submit resume and salary history in confidence to Owensboro National Bank, 230 Frederica Street, Owensboro, Kentucky 42301, Attn: E.D.P. Committee.

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III. Because the elementary and secondary education system ranks very high in quality and affords excellent choices between public and parochial programs.

IV. Because Missouri ranks 2nd from the bottom in State and local taxes.

V. Because this central Missouri community is located in a moderate climate in the heart of an abundant area of outdoor recreational opportunities. Floating on the Big Piney, Meramec and Niangua Rivers. Boating, water skiing and fishing on the beautiful Lake of the Ozarks just 40 miles from Jefferson City

REQUIREMENT: Minimum 3 years experience as a Programmer or Systems Analyst

If you are ready for a challenge and will provide the initiative, we will provide the opportunities for you to advance your career in this fast paced industry

To learn more about us and for prompt and confidential consideration, please send your resume and salary history to:

Assistant Director
Information Systems Division
Department of Revenue
P.O. Box 629
Jefferson City, Missouri 65105

DIRECTOR OF COMPUTER SCIENCE CTR.

University of Maryland College Park Campus

An unusual opportunity now exists for an outstanding individual to assume the directorship of the Computer Science Center at a time when the University plans to advance instructional and research computing capabilities as part of its commitment to excellence. The Director is responsible for overall management of the Center and must formulate long-range plans, establish and implement policies regarding academic computing, and advance the campus' computing capabilities in accordance with University and State officials. The successful candidate must qualify for a tenured faculty appointment in an appropriate academic department. An earned doctorate and 5 years university experience are expected. Administrative experience in a computer center is very desirable. This position is for a top flight individual and the salary will be commensurate with qualifications and experience. Address correspondence to the Chairman of the search committee:

Prof. Stephen J. Wallace
Dept. of Physics & Astronomy
University of Maryland
College Park, Maryland 20742

Applications are now being accepted. For best consideration, applications should be received by 2 September 1980.

The University of Maryland is an equal opportunity/affirmative action employer

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UNIVERSITY OF PETROLEUM & MINERALS DHAHRAN, SAUDI ARABIA

The College of Industrial Management will have faculty positions (all ranks) open for the academic year 1981-82, starting 1 September 1981 in:

BUSINESS DATA PROCESSING MANAGEMENT

Academic Qualifications and Experience

Minimum requirements include a Master's Degree in a relevant field, teaching and/or industrial experience, and/or CDP Certificate.

The College of Industrial Management is a young growing college, offering curricula equivalent to the standards of the AACSB. Research is encouraged and high quality proposals are awarded the university grants.

Language of instruction is English.

Minimum regular contract for two years, renewable. Competitive salaries and allowances. Air conditioned and furnished housing provided. Free air transportation to and from Dhahran each year. Attractive educational assistance grants for school-age dependent children. All earned income without Saudi taxes. Ten months duty each year with two months vacation with salary. There is also possibility of extension for university's ongoing summer program with good additional compensation.

Apply with complete resume on academic, professional and personal data, list of references, publications and research details, and with copies of transcripts and degrees, including home and office addresses and telephone numbers to:

University of Petroleum & Minerals
Houston Office
2223 West Loop South, Suite 410
Houston, Texas 77027

PROGRAMMER/ANALYST

The Regenstrief Institute, located in Indianapolis, is seeking a Programmer/Analyst in the Health Systems Research Section to provide design, programming, and documentation skills for simulation language development and compiler design. Responsibility also includes the support of activities in the planning and production of related publications. Opportunity exists for interaction with users and other members of the group for purposes of language development.

Position requires an MS in Computer Science or equivalent. Computer background should include exposure to data structures, compiler design, programming languages, operating systems, and data base management. Use of varied high level programming languages and computing environments desired. Background in simulation and statistics helpful. Exposure to the medical care environment not necessary.

Salary commensurate with qualifications and experience. Excellent benefits. Please send resume and transcript to Ms. Joanne Lepper, 1001 West Tenth Street, Indianapolis, Indiana, 46202.

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If you're a DP professional – with experience in writing, speaking and course development – here's an opportunity to lead seminars throughout the U.S. for the leading organization in management education. A background in DP financial applications would be helpful. Send resume and brief description of skills to:

CW Box 2348
375 Cochituate Rd., Rte. 30
Framingham, Ma. 01701

FINANCIAL MODELING ANALYST

The Southern California Gas Company, the nation's largest distributor of natural gas has an excellent opportunity for a skilled PL/I Programmer in our financial modeling area.

The position is responsible for the design and support of computer financial models used throughout the company and its parent, Pacific Lighting, to support key financial planning and analysis activities. Applicant should have good programming skills, including structural programming and list processing in an interactive computer environment. Ideal candidate will have combined computer science and business background with a working knowledge of financial accounting. 1 to 4 years experience.

If you are looking for a career growth opportunity complimented by a competitive salary and excellent fringe benefits, please send resume including salary history:

Berlinda Fontenot
Professional Employment
Representative

gas

Southern California
Gas Company
P.O. Box 3249
Terminal Annex
Los Angeles, CA 90051

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A Moving Experience.

Finding a new and better career position always is. Because it means much more than simply moving from one spot to another. It represents an integral part of one's life. As exclusive D.P. recruiting specialists, we know that. So if you are a Data Processing Professional, we're ready to discuss the right career spot . . . that spot that's more than just merely a move. Call or write in confidence.

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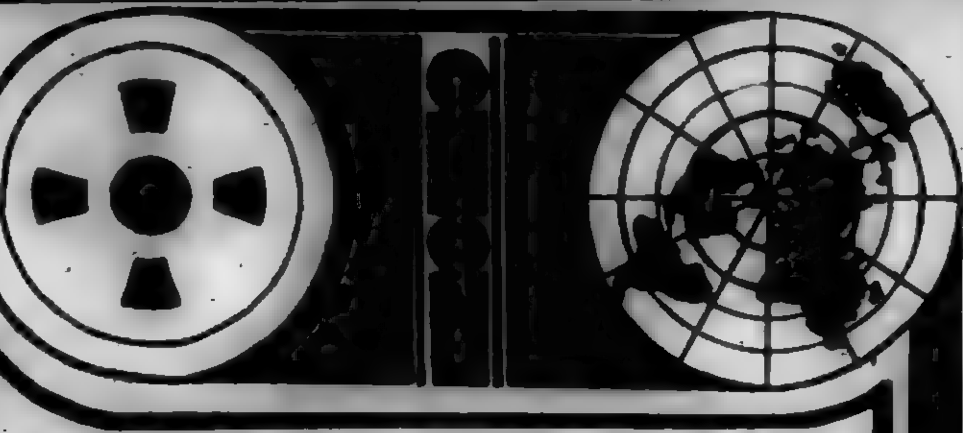
N.J. — 30 Vreeland Rd., Florham Pk. 07932 (201) 966-0600
Calif. — 3255 Wilshire Blvd., Los Angeles 90010 (213) 384-4600
Texas — 3050 So. Post Oak Rd., Houston 77056 (713) 961-3880

the jarvis walker group



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The world's leading independent supplier of software products offers challenging career opportunities in the Los Angeles area. We are building the tools required to meet the fundamental data processing need of the 80's, vastly improved programmer productivity in developing new applications.

SOFTWARE PROGRAMMERS - DEVELOPMENT & SUPPORT: Enjoy the challenge of working with multiple operating systems (OS,DOS,VSE) and teleprocessing environments (CICS,TSO,CMS,IMS) in our Development group. Design and implement new systems, enhance current systems, and write and implement program specifications for our proprietary software products such as ANSWER/DB (our on-line reporting system), INQUIRY IV (our on-line inquiry system), and TRANS IV (our on-line application development system). We offer high visability positions on small project teams with growth potential in technical and project leadership. You'll need at least 3 years (and for some very senior positions, 10 years) experience with solid IBM/360 Assembler knowledge, plus hardware/operating systems experience in IBM OS/VS or DOS/VS. In addition, database experience and knowledge of IMS, CICS or PL/1 is desirable.

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Position will carry responsibility for the implementation of all corporate language implementations, including FORTRAN, COBOL, PASCAL, BASIC. Supervisory and planning ability is required. The successful candidate should have built two or more complete language products including all documentation. In this Senior position, the candidate will participate in new product definition in an engineering organization, and interface with the marketing organization to supply data for the corporate product planning and merchandising functions.

COMPILER DEVELOPMENT STAFF MEMBERS

Individuals selected will have experience in coding, testing, and developing compilers and language products. These positions will offer the opportunity to provide technical leadership as the in-house consultant in compiler development.

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This position involves troubleshooting software problems and assisting customers in installing new software packages. The successful candidate will have experience in identifying software design problems or misapplications of software on both the operating system and application level. Background in real-time operating systems is a requirement. The ability to interface with both customers and development engineering is an absolute necessity.

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Oil-Related Industries
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CALL JIM FLEMING COLLECT AT 713/[illegible]-1800 FOR FURTHER INFORMATION OR SEND YOUR CURRENT RESUME TO:

ROBERT HALF
EDP DIVISION
3[illegible] S. Post Oak Rd. #[illegible]
Houston, Texas 77056

The Louisiana State Department of Education (LSDE), Division of Research and Development, Bureau of Management Information Systems (MIS), is establishing a new large-scale education computing network. The computing system will utilize the following IBM software: MVS, CICS, DL/1, TSO/SPF, IBM DB/DC Data Dictionary and ANS COBOL. During the next several months, the LSDE is seeking 35 qualified computer professional staff in the areas of systems analysis and design, computer programming, data administration, data element dictionary specialist, data base design, systems software, telecommunications, documentation, operations, data control, data entry and word processing.

Educational computing systems experience is very desirable as well as experience in the above IBM software systems.

Interested applicants should send a letter expressing career interests along with a resume and copy of college transcripts to:

Michael C. [illegible]
Director MIS, LSDE
Office 1016-A P.O. Box 44064
Baton Rouge, LA 70804

The LSDE is an Equal Opportunity Employer.

POSITION AVAILABLE

Systems Analyst — Permanent staff position with initial assignment on nationwide-scope information systems project. Performs evaluation of systems for possible transfer, assessment of and planning for systems development projects, and other analytical tasks within the court environment. Provides technical assistance to individual state courts and administrative offices. Minimum requirement bachelor's degree or higher; 1-3 years of systems analysis experience, preferably in judicial or criminal justice information systems; exp. in systems design and documentation; and good oral and written communications skills. Experience with various levels of judicial personnel highly desirable.
Salary $16,[illegible]-$24,[illegible]. Send resume to the National Center for State Courts by August 15, SSC. SYS, 300 Newport Avenue, Williamsburg, Virginia 23185. The National Center is an Affirmative Action Employer.

SYSTEMS & PROGRAMMING MANAGER

Responsible for day-to-day determination of total informational needs of university; plans file addressing schemes, physical data layout, security procedures, data definition, standardization, and liaison; supervises 3 systems analysts and 3 programmers.

Minimum three years' experience in Systems Development required at Analyst level or above; responsibility for developing at least one major on-line system, preferably in university environment. Master's degree in Computer Science preferred; additional experience considered in lieu of advanced degree. Working knowledge of languages, data bases, systems and programs in use at university.

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110 So. Fourth St.
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Phone (702) 386-4[illegible].

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- A minimum of two years experience in developing application systems. This experience will include project definition, analysis, conceptual design, detail design, programming, testing, user training, implementation, and post-implementation.
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If you want to join a team of professionals we would like to hear from you. For confidential attention, send your resume with details of education, experience, and salary history to:

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Attn: S. A. [illegible]
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Candidates should have an MS in Computer Science or EE, be proficient in CAD/computer software and application, have at least 3 years of experience in software and application, and be able to manage a highly creative technical team. The ability to establish a good rapport with customers is also desired.

Send your resume today, in confidence, to J.B. Monahan at Fairchild Professional Staffing, MS 7-101, 464 Ellis Street, Mountain View, CA 94042.

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There are three immediate vacancies. Two vacancies require ANS COBOL programming experience in an IBM [illegible] programming environment. (On-line OS/VS experience using CICS and DMS desirable.) One vacancy requires experience developing/programming systems on mini-micro computers using BASIC language [illegible] using PASCAL/ANS COBOL and developing computer assisted instructional software is desirable.

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([illegible] annually)
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[illegible]
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S/A [illegible] .... [illegible]
ANALYST/Prog CICS MVS [illegible] .... [illegible]
SOFTWARE VS-VM [illegible] .... [illegible]
T/S Fortran [illegible] APS .... [illegible]
TELEINQUIRY [illegible] COBOL .... [illegible]
PROJ LDR H.P. 3000 IMAGE QUERY .... [illegible]

LONG ISLAND

[illegible] Software analyst .... [illegible]
CICS Software support & dev [illegible] .... [illegible]
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SOFTWARE micro processor .... [illegible]
PROJ LDR BAL development .... [illegible]
MICRO/Eng ALP dev product .... [illegible]

CONNECTICUT/WESTCHESTER

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PROJ [illegible] CICS OS/COBOL .... [illegible]
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S/A [illegible] .... [illegible]
COMMUNICATIONS/Software .... [illegible]

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These are just a few of the many job opportunities that our client companies are currently recruiting for. If you have at least one year experience in IBM, NCR, Burr., DEC, or Honeywell, etc. send resume or call collect:

Louise Resnick
Resource Advisors, Inc.
1000 Douglas Rd., Coral Gables, FL 33134
305/446-4782

PROGRAMMERS
WASHINGTON, D.C. AREA

Major suburban Maryland bank is seeking experienced ALC Programmers. Prefer 2 years ALC Programming experience with DOS or DOS/VS operating system, will consider minimum 1 year experience. Banking applications a plus. Send resume or contact Ray Goodie, Citizens Bank of Maryland, 6800 Baltimore Blvd., Riverdale, Md. 20840, 301-[illegible]-7300.

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DATA PROCESSING

EDP COORDINATOR

We are a leader in the telecommunications industry, and due to the expansion of MIS responsibilities, we need an individual to establish standards & procedures, and be responsible for the installation of an in-house data processing system (Delphi) throughout our distributor network. You will report to the DP Manager and coordinate system requirements between Executone and our distributor network.

We are looking for an individual with 1-3 years experience as a Systems Analyst in a manual/EDP environment. You should have been part of a conversion of accounting applications from manual to EDP, and development of user manuals. Previous experience with Delphi and/or MICOS OS desirable. Good communication skills are a necessity, and you must be willing to travel.

Send resume in confidence to: R.J. McMillen, Personnel Manager, Executone Inc., 29-10 Thomson Avenue, Long Island City, N.Y. 11101.

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Engineering/Scientific Programming Consultants

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You should be consulting oriented, highly professional, self motivated, independent, self confident and talented with 2-12 years' experience in any of the above areas.

DASD is a nationwide employee owned data processing consulting and services organization with offices in 27 cities. We are small enough to recognize individual performance and contributions and large enough to provide challenging career growth opportunities.

For immediate consideration, call [illegible] at (206) [illegible] or write to DASD Corporation, c/o WMA, 914 Second Avenue, #1111, Seattle, WA 98104. An equal opportunity employer.

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Located in the center of a thriving downtown business community, employees of Standard enjoy walks in several nearby parks and eating in many of the fine local restaurants. Benefits include: tax-free medical, dental and life insurance, tuition reimbursement, referral awards, paid vacation, a savings plan and 2 on-site eating establishments. Salary is commensurate with background and experience.

Our people have created a fine company and we face the future with confidence. Come join us.

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Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) [illegible]

RSVP SERVICES
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SENIOR PROGRAMMER SYSTEMS - SCIENTIFIC

Arecibo Observatory, located in Arecibo, Puerto Rico, now has a position available for a Senior Programmer. Systems and/or real-time A/D programming, and a background in science or mathematics are required; with at least 3-4 years actual experience in the above areas. Applicants should be fluent in assembler language and at least one higher level language such as FORTRAN or PASCAL. Typical assignments require imagination, initiative, and good problem solving and communication skills.

Arecibo Observatory, a part of the National Astronomy and Ionosphere Center, is operated by Cornell University, an Equal Opportunity Employer. If interested, please send a resume to, or call:

Peter [illegible]
Head, Computer Department
Arecibo Observatory
P.O. Box [illegible]
Arecibo, Puerto Rico [illegible]
[illegible]

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Before you consider your next career move, consider these facts: ☐ ADC is expanding and growing... so are our employees. A great percentage of our personnel have advanced their professional status since joining ADC. ☐ ADC is completely employee-owned. And last year our profit-sharing plan allowed employees to take home bonuses equalling 10% of their incomes. ☐ ADC is located in Newport, Rhode Island, one of New England's most exciting resort towns. Renowned for its sailing, cultural events, natural and architectural beauty, Newport's housing and living costs have remained reasonable. ☐ ADC's highly skilled software professionals work in a flexible, open atmosphere enjoying big-company benefits in small-company environs.

CURRENT OPENINGS

Systems Analysts—for positions that range from entry level through senior systems analysts and programmer team leaders. Required skills include computer program design, coding, checkout, documentation and system integration. Experience is desired in AN/UYK-7 programming, particularly in shipboard systems applications.

Project Manager—systems analyst position requires 5-7 years' experience with AN/UYK-7 programming to manage the development of a rapid module integration system. Experience with real time Navy Combat Control systems is desired.

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For more information, please call Ellen [illegible], Personnel Director (Rhode Island 1-847-7260, Out-of-State 1-800-556-7570) or send your resume to:

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The Information Systems Department supports the patient-oriented computing requirements for the University of Iowa Hospitals & Clinics. The Department is currently developing a patient-centered Hospital Information System. Existing applications, ranging from appointment scheduling to laboratory results reporting, are supported on a network of 230+ terminals attached to an IBM 370/158AP. Both computers run under MVS and the applications utilize PL/I, CICS, DL/I and IBM's Patient Care System. We have the following position openings:

SYSTEMS SUPPORT MANAGER

Will plan and manage the activities of the Systems Support group. The group procures, implements, maintains and tunes the technical systems software necessary to support the Hospital computer configuration. A Bachelor's Degree in a Computer Science related area or an equivalent combination of education and experience is necessary. Systems programming experience involving large-scale online computer systems is required. Supervisory experience is desirable. The salary range is $[illegible] to $[illegible] with beginning salary dependent on qualifications.

DATA BASE MANAGER

Will plan and manage the activities of the Data Base group. The group maintains the Hospital data base system, providing for its definition, organization, security, integrity, efficiency and documentation. A Bachelor's Degree in a Computer Science related area or an equivalent combination of education and experience is necessary. A working knowledge of data base technology is required. Supervisory experience is desirable. The salary range is $[illegible] to $[illegible] with the beginning salary dependent on qualifications.

Send resume, salary history, and position desired to
[illegible]
Information Systems Department
University of Iowa Hospitals & Clinics
Iowa City, IA 52242
The University of Iowa is an Equal Opportunity/ Affirmative Action Employer

EDP SPECIALISTS
career search opportunities
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DATA BASE MANAGER to $[illegible]+. Leading NJ co seeks mgmt level exp in DBA & a degree. Exposure to IDMS a must. This position is highly visible & offers excellent challenge & opty in a state-of-the-art environment. Refer JD.

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DATA BASE ADMINISTRATOR to $[illegible]. Super opty with a growing NJ DP organization. Must have exp in TOTAL, MARK IV, IMS, IDMS or other major Data Base system. Refer JD.

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ANALYST to $[illegible]. We currently have numerous opportunities for Analysts & Programmers at most levels of exp. Financial & manufacturing systems preferred. All costs paid by client companies. Refer JR.

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CHARLOTTE, NC [illegible] — [illegible]
CLEVELAND, OH [illegible] — [illegible]
McLEAN, VA [illegible] — [illegible]
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PITTSBURGH, PA [illegible] — [illegible] 4 Gateway Center [illegible]
PRINCETON, NJ [illegible] — [illegible] U.S. Rt. 1 [illegible]
WILMINGTON, DE [illegible] — [illegible]
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Director Of Computing Information Services

Temple University

Nominations and applications are invited for University position of Director of Computing and Information Systems.

Responsibilities of this office include: identification and recommendation of goals, objectives and priorities; the development of policies and procedures for university computing; participation in and solutions to management issues which will insure cost effective utilization of computing services; and maintenance of close liaison with the university faculty and management to insure that educational, research and informational computing needs are recognized by the appropriate computing services. This position is also responsible for contract administration of the facility manager responsible for centralized delivery of academic and administrative computing services.

A suitable candidate must have: extensive experience in data processing, operations and data processing management; have held a senior administrative position in a large scale computing facility; have had experience in management of a university or of a large scale educational or research computer facility as well as have had experience in management information systems design and development. The candidate, in addition, must hold an advanced degree, PhD desirable. Good interpersonal, verbal and written communication skills are essential.

Temple University, an urban state-related university is located in Philadelphia, Pa. Its 14 schools and colleges have research, instructional and public service programs on multiple campuses and enrolls 35,000 students. The primary computer center is operated under contract with Systems & Computer Technology Corp. The University's computer budget exceeds $3 million dollars.

Resumes should be submitted in confidence by *October 15, 1980* to KATHLEEN McANDREW,

Temple University
Room 203
University Services Bldg.
1601 North Broad Street
Philadelphia, PA 19122

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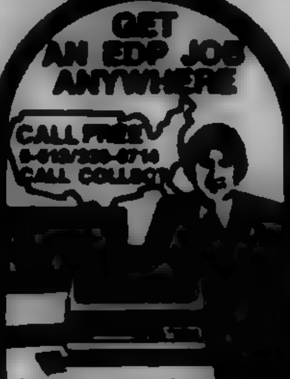

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Programmer/Analyst, Modesto
BAL, IBM 370-158 ..... TO $[illegible]
Programmer/Analyst, Fresno
COBOL, IBM 370 .... TO $[illegible]
Programmer, San Jose
RPG, SYSTEM 3 .... TO $[illegible]
Systems/Analyst, Fresno
BAL, IBM 370-158 ..... TO $[illegible]
Programmer/Analyst, Central Calif.
COBOL, IBM 4331 ..... TO $18,000

For further information, call Robert F. Sherwood at ([illegible]) [illegible] or send a copy of your current resume to:

FRESNO, SHERWOOD & ASSOC., INC.
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PS
1100 E. [illegible] Suite 100 Fresno, CA 93710

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Dr. [illegible]
[illegible]
[illegible]
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Telephone: 314-[illegible]
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([illegible]) [illegible], ext 137

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GSU

SYSTEMS ANALYST

A progressive and outstanding southwest utilities company, located along the Gulf Coast in Beaumont, Texas, is actively seeking a Systems Analyst.

The position requires a minimum of 2 years' experience in an IBM environment using COBOL programming language, and application experience in the area of material control. Knowledge of ALC or IMS, as well as a BS degree in Computer Science, would be desirable.

Gulf States Utilities offers comprehensive benefits, competitive salaries, and relocation expenses. Send your resume and salary requirements in confidence to:

Pat Dewey
Supervisor of Recruiting

GSU
GULF STATES UTILITIES COMPANY
P.O. Box 2951 Beaumont, Texas 77704

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ASSEMBLIES OF GOD

Needed: Programmer/Analyst. 2+ years' experience in COBOL. CICS, VSAM, and DL-1 helpful. Salary 14-18K. Annual review plus annual cost-of-living raise. Good climate, low cost of living, and several lakes within an hour's drive. Applicants should be born again Christians but do not have to be Assemblies of God. Send resume to Personnel, Assemblies of God, 1445 Boonville Avenue, Springfield, Missouri 65802.

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is seeking accountant with national or regional firm MAS-Computer experience. Individual will have 3-5 years experience including computer systems design, installation and operation. Salary commensurate with ability and experience. Excellent opportunity to start new department in fast growing firm. Reply to MAS Partner, P.O. Box 7[illegible], Sarasota, FL [illegible].

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We are seeking a qualified individual in software development. Minimum 2-3 years work experience in COBOL programming and application design in an on-line environment a necessity. Degree preferred.

This career opportunity offers excellent advancement potential in an expanding department, plus liberal starting salary and excellent fringe benefits. Send resume to Personnel —

DUFF TRUCK LINE, INC.
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Dallas

System Software Personnel

Billion dollar electric utility company with centralized data center has immediate need for persons within the rapidly expanding corporate Information Services Department to test and install new or modified systems software.

Positions at multiple levels offer growth potential for professionals demanding challenge and opportunity. Present staff expanding to support installation of second 3033 with MVS/SPI and 2 as well as 4300 distributive process network.

Present state-of-the-art IBM 3032 environment is MVS/SE2, ACF/VTAM with 600 CICS, ROSCOE, and TSO terminals.

Mail resume and salary history to Employee Relations Division, Management Recruiting Department.

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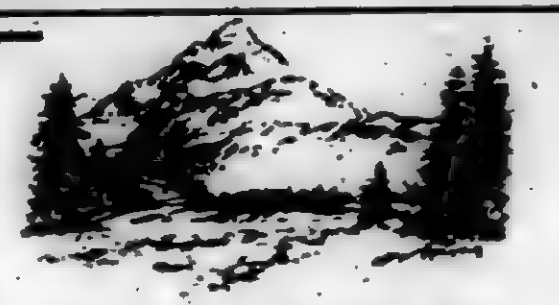

Systems Supervisor

COLORADO SPRINGS

Colorado Interstate Gas Company has immediate need for a Systems Supervisor to guide the activities of programmers & analysts in the definition, design, development and implementation of EDP business systems. New systems to be developed will require heavy user interface, in addition to systems design for large scale IBM hardware using a DBMS. Six to ten years of oil & gas experience is a must (gas transmission company preferred). An advanced degree highly desirable. Successful applicant will possess excellent written & oral communication skills and extensive knowledge of oil & gas measurement & accounting systems.

Qualified candidates may call **COLLECT (713) 877-[illegible]**, or send resume with salary history to **Mr. Cal Brummett, THE COASTAL CORPORATION, Nine Greenway Plaza, Houston, Texas 77046.** We are an equal opportunity employer m/f.

Colorado Interstate Gas Company

A Subsidiary of The Coastal Corporation

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Many others to choose from. All fees and relocation paid. Mail resume to or call collect.

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- PROJECT LEADERS
- SOFTWARE - COMMUNICATIONS
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If you have at least 2 years experience and a solid background in EDP languages such as COBOL, DIBOL and others, you can apply your knowledge in a sophisticated DEC PDP 11 environment.

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Atlantic States, a national recruiting firm is searching for EDP specialists at all experience levels with diverse systems background. Many openings nationwide. For selective handling, without pressure, mail your resume to **Jim Reed, Atlantic States Personnel, P.O. Box 9825, Savannah, Ga. 31412. Fees Paid.**

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This position involves development, implementation and support of systems and procedures to assist administrators in improving services efficiently. Three to 5 years of experience, of which 2 involve a full time commitment to complex programming assignments in the COBOL language and 2 involve a half time commitment to administrative systems analysis responsibilities, are required. An undergraduate degree is desirable. The salary will be commensurate with qualifications and experience. Submit resume to George [illegible], Director of Computing, Oberlin College, Oberlin Ohio, 44074. Oberlin College is an equal opportunity employer

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HOSPITAL PROGRAMMER/ANALYST II

Relocate to Austin, Texas and enjoy beautiful hills, lakes and a lower cost of living. A city owned medical facility is seeking a programmer/analyst with 2 years of college plus 4 years of progressively responsible business systems programming. Experience in IBM 370/148, DOS/VS, CICS/VS and PL-1 desired. Call or write

Personnel Dept.
Brackenridge Hospital
1500 East Ave.
Austin, TX 78701
512/476-6461, ext. 5415

HP 250 SOFTWARE DEVELOPMENT ENGINEERS

We are currently recruiting for a number of product development engineers to develop applications software. Positions require experience with Hewlett Packard computers, ideally the HP 250. Proficiency using BASIC and IMAGE a must.

We are a young, dynamic, growth oriented company located in Marin County. Pursue the lifestyle of the San Francisco Bay area by sending your resume to:

CW Box [illegible]
375 Cochituate Rd., Rte. 30
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ENGINEERS AND PROGRAMMERS

Lockheed Electronics Company is seeking qualified applicants for immediate positions at NASA's JOHNSON SPACE CENTER in Houston, Texas. These positions are in support of the Space Shuttle and Earth Resources Programs and require applicants (U.S. Citizenship or permanent residency) experienced in the following areas:

- **MICROWAVE ANTENNA DESIGN/ANALYSIS/TEST ENGINEERS:** With experience in design, development, analysis, and/or testing of antenna systems. Preferable in S-Band through K-Band frequency range.
- **ENGINEERING ANALYSTS:** Responsible for developing and evaluating math models of spacecraft/aircraft sub-systems including control surface actuators, landing gear systems, etc., for use in large scale digital simulation. Applicants should have a knowledge for modeling dynamic systems.
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- **COMMUNICATIONS ENGINEERS:** Support performance analysis of various communications and tracking links accessed by spacecraft/aircraft. Applicant should be familiar with TACAN, MSBLS, and GPS SYSTEMS, have the ability to develop and evaluate math models, have a high level of competence and written communications and have a knowledge of FORTRAN.
- **DIGITAL DESIGN ENGINEERS:** With experience in design and development of digital/analog equipment including computer interface, display, control and signal conditioning hardware.
- **COMPUTER MAINTENANCE ENGINEERS:** To be cross-trained to support a large, diverse simulation laboratory. Facility includes analog computers, minicomputers and second and third generation medium-to-large scale systems manufactured by several companies.

Send resume in confidence to William R. Jancha at Lockheed Electronics Company, Dept. C-20-CW, 1830 NASA Road #1, Houston, Texas 77058.

LOCKHEED ELECTRONICS COMPANY

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SYSTEMS ANALYSTS

ATLANTA

Rollins, Inc., a nationwide service company with 20 years of unprecedented growth, is seeking three Systems Analysts in our Atlanta Data Center.

We are seeking applicants with a minimum of 3 years on-line systems design and implementation in an IBM OS environment. IMS background preferred.

We are currently running an IBM 370/158 and two DEC 11/70's. We are presently converting our financial systems to IMS. Other systems will be designed in the near future.

If you have the appropriate background and the desire to excel in a stimulating environment, Rollins and Atlanta are the place for you. Forward your resume with salary history to:

Jim Morgan
Employment Manager
ROLLINS, INC.
2170 Piedmont Road, N.E.
Atlanta, Georgia 30324

ROLLINS

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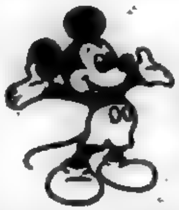
MANAGER SYSTEMS DEVELOPMENT

Walt Disney Productions, internationally established leader in the entertainment field, has an immediate opening for a Manager-Systems Development.

Candidate will have management involvement and total responsibility for the Systems Analysis & Programming activities of a staff of 20-25 Programmer/Analysts working on several new and exciting projects as well as a large base of existing systems.

Qualified applicants must possess a minimum of 5 years experience . . . at least 3 years in a supervisory/management position, have good administrative skills as well as experience in developing and maintaining large business systems using COBOL. Experience in the development of real-time systems and design of data communications networks desirable. Degree required, preferably in Business, Finance or Computer Science.

Interested candidates should submit resume and salary history to:



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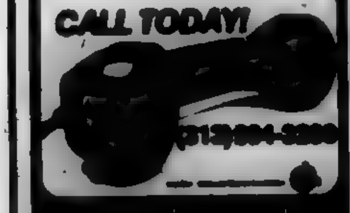

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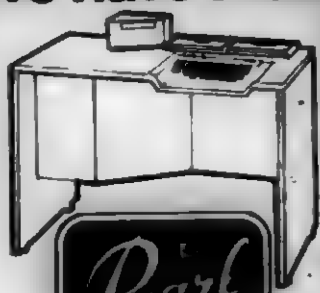

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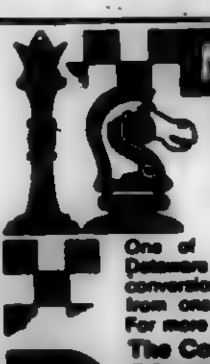

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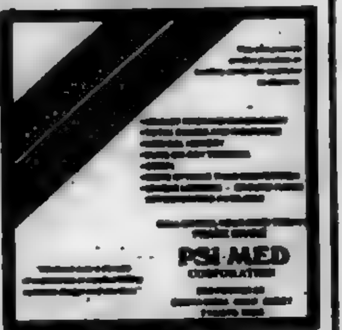

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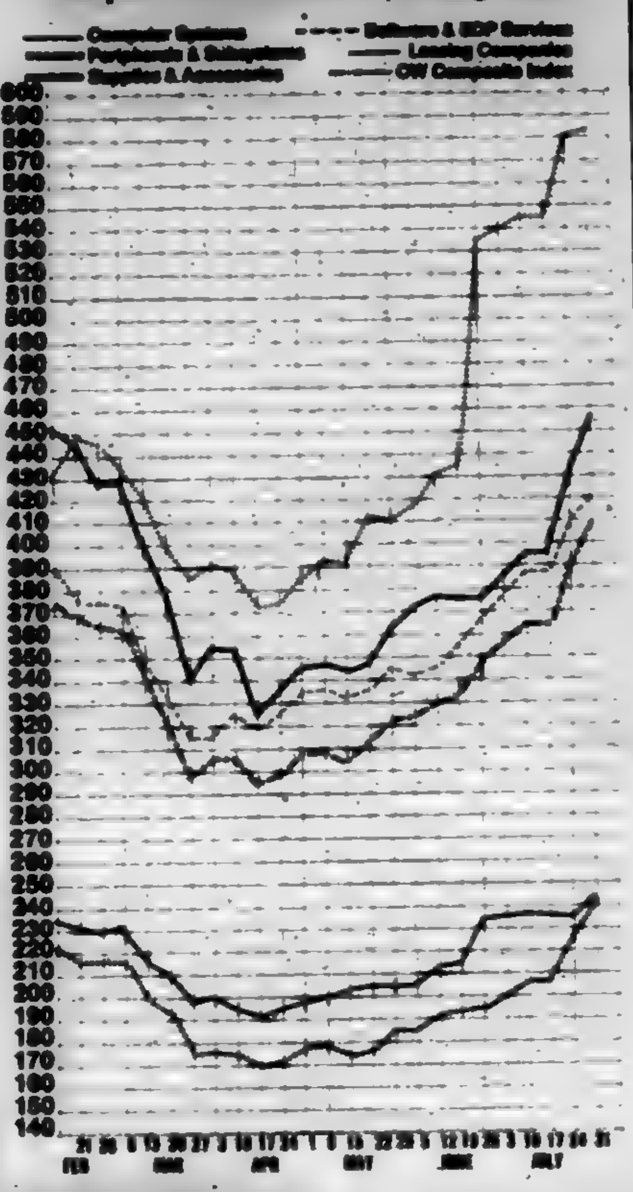

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 30, 1980

All statistics compiled, computed and formatted by
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EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 30 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	19- 42	29 3/8	+ 7/8	+3.5
N	BURROUGHS CORP	60- 88	64 5/8	+1 1/4	+1.9
O	COMPUTER AUTOMATION	9- 22	21 3/4	+2 1/4	+11.5
N	CONTROL DATA CORP	33- 66	62 5/8	+2 1/8	+3.5
O	CRAY RESEARCH INC	30- 64	63 1/2	+1 1/4	+2.3
N	DATA GENERAL CORP	44- 81	80 7/8	+4 1/4	+5.5
N	DATAPOINT CORP	44- 69	65 1/2	+2	+3.0
N	DIGITAL EQUIPMENT	52- 93	90 3/8	+3 1/2	+4.5
A	ECCO INC	9- 19	16	+1 1/8	+7.5
A	ELECTRONIC ASSOC.	6- 12	10	+ 1/4	+2.5
N	FOUR-PHASE SYSTEMS	15- 40	35 7/8	+ 1/8	+0.4
N	FOXBORO	31- 40	40 3/8	+ 1/2	+1.0
O	GENERAL AUTOMATION	7- 19	9	+1 1/4	+15.9
O	GRI COMPUTER CORP	1- 3	3/8	0	0.0
N	HEWLETT-PACKARD CO	44- 76	75 3/4	+3	+4.1
N	HONEYWELL INC	65-101	92 3/4	+3 7/8	+4.3
N	IBM	50- 70	65 1/2	+ 5/8	+0.9
O	MANAGEMENT ASSIST	9- 21	15 1/2	+ 5/8	+4.2
O	MANUFACTURING DATA S	20- 42	42 1/4	+4 1/4	+11.1
O	MINI-COMPUTER SYST	2- 6	3 1/8	+ 1/8	+4.1
O	MODULAR COMPUTER SYS	6- 17	17 3/8	+1 5/8	+10.3
N	NCR	55- 82	77 1/4	+2 3/4	+3.9
N	PRIME COMPUTER INC	15- 35	35	+4 1/8	+13.3
N	PERKIN-ELMER	20- 55	54 1/2	+2 1/2	+4.8
N	SPERRY RAND	42- 60	55 3/8	+2	+3.7
A	SYSTEMS ENG. LABS	11- 23	23 3/8	+2 1/2	+11.9
O	TANDEM COMPUTERS INC	13- 42	41 3/4	+2 1/4	+5.8
N	TEXAS INSTRUMENTS	70-109	108 5/8	+9 1/4	+9.3
A	WANG LABS.	17- 42	41 3/4	+3 1/4	+10.3
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 19	16 1/2	+ 1/4	+1.5
N	COMDISCO INC	6- 17	16 1/4	+ 3/4	+4.5
A	COMMERCE GROUP CORP	1- 2	1 1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	1 5/8	- 1/8	-7.1
O	CONTINENTAL INFO SYS	2- 15	2 3/8	+ 3/8	[illegible]
O	DATRONIC RENTAL	2- 3	3	0	0.0
A	GCL INC	3- 9	3 1/2	0	0.0
O	[illegible] INC	6- 12	6 7/8	- 5/8	-8.3
N	ITEL	1- 15	2 5/8	- 1/8	-4.5
O	LEASPAC CORP	1- 2	3/4	0	0.0
A	PIONEER TEX CORP	2- 4	2 7/8	0	0.0
O	RELIANCE GROUP INC	40- 73	68	-2	-2.9
N	U.S. LEASING	12- 18	17 1/2	+ 1/2	+2.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 30 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	3 5/8	+ 1/8	+3.5
A	ANACOMP INC	7- 16	14 3/4	+ 1/4	+1.7
O	ANALYSTS INTL CORP	3- 6	4 1/4	0	0.0
A	APPLIED DATA RES.	6- 16	15 7/8	+2 3/8	[illegible]
N	AUTOMATIC DATA PROC	31- 48	44 1/4	+ 1/8	+0.2
O	COMPUTER HORIZONS	1- 9	3 3/8	0	0.0
O	COMPUTER NETWORK	4- 9	6 1/2	+ 3/4	+13.0
N	COMPUTER SCIENCES	11- 20	20 1/4	+ 3/8	+1.8
O	COMPUTER TASK GROUP	1- 11	11 1/2	+2	+21.0
O	COMPUTER USAGE	2- 5	4 3/4	+ 7/8	+22.5
O	COMPUT AUTO REP SVC	4- 10	9 1/8	0	0.0
O	COMSHARE	11- 30	26	-1 1/4	-4.1
O	CULLINANE CORP	18- 41	40	0	0.0
O	DATA DIMENSIONS INC	1- 6	1 3/4	0	0.0
O	DATATAB	1- 4	1	- 1/8	-11.1
O	DBI CORP	4- 9	5 3/8	- 1/4	-4.2
N	ELECTRONIC DATA SYST	18- 30	27	- 1/2	-1.8
O	INFORMATICS INC	9- 22	18 1/4	+ 3/4	+4.8
O	INSYTE CORP	2- 3	2	0	0.0
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	9	0	0.0
O	KEYDATA CORP	2- 5	2 1/4	+ 1/8	+5.8
A	LOGICON	14- 35	26 3/8	+ 1/8	+0.5
O	MATHEMATICA INC	5- 16	15	0	0.0
O	NATIONAL DATA CORP	10- 21	19 3/8	- 1/8	-0.6
N	PLANNING RESEARCH	5- 9	7 1/8	+ 1/8	+1.7
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	4- 7	6 1/4	+1 1/8	+21.9
O	REYNOLDS & REYNOLD	20- 36	35	-1	-4.0
O	STSC INC	6- 11	11 1/4	0	0.0
O	SCIENTIFIC COMPUTERS	6- 17	16	+ 1/2	+3.2
O	TYMSHARE INC	30- 59	58 1/2	+ 3/8	+0.6
A	URS SYSTEMS	9- 15	12 3/4	- 1/8	-0.9
O	WYLY CORP	4- 10	9 1/2	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	12- 20	18 1/2	+2 1/2	+15.6
N	AMPEX CORP	14- 29	25 1/8	+ 5/8	+2.5
A	ANDERSON JACOBSON	9- 17	12 3/4	0	0.0
O	APPLIED DIG DATA SYS	9- 13	11 1/4	- 3/8	-3.2
O	AUTO-TROL TECHNOLOGY	16- 48	49	+5	+12.5
O	BEEHIVE INT'L	3- 11	10 7/8	+3	+38.0
A	BOLT, BERANEK & NEW.	15- 28	26	+1 1/2	+6.1
N	BUNKER-RAMO	17- 32	30 1/2	- 3/8	-1.2
O	CAMBRIDGE MEMORIES	1- 9	1 7/8	- 1/8	-6.2
N	CENTRONICS DATA COMP	49- 95	35 7/8	+ 5/8	+1.7
A	CETEC CORP	2- 7	5 7/8	- 3/8	-6.0
O	COMPUTER DEVICES INC	5- 9	6	+1 3/8	+29.7
O	COMPUTRONICS	1- 6	4 7/8	+ 3/4	+18.1
O	COMPUTER CONTROL	4- 10	9	- 1/4	-2.6
O	COMPUTER CONSOLES	4- 20	18 1/2	+1 3/4	+10.4
O	COMPUTER TRANSCEIVER	1- 5	3 3/8	+ 1/8	+3.8
O	COMPUTERVISION CORP	24- 68	61 3/4	+10 3/4	+19.1
O	CONRAC CORP	12- 25	16 3/4	- 5/8	-2.3

EXCH		PRICE 1979-80 RANGE (1)	CLOSE JUL 30 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 15	14 3/8	+1 3/4	+13.8
A	DATA PRODUCTS CORP	11- 27	26 3/4	+2 3/4	+11.6
O	DATUM INC	2- 4	2 1/8	- 1/8	-5.5
O	DECISION DATA COMPUT	2- 5	3 3/8	- 1/4	-6.8
O	DELTA DATA SYSTEMS	1- 3	7/8	+ 1/8	+16.6
N	DOCUMATION INC	7- 27	13 1/8	- 1/8	-0.9
O	DATARAM CORP	6- 37	18 5/8	+1	+10.3
N	ELECTRONIC M & M	3- 6	6	+ 1/8	+2.1
O	EVANS & SUTHERLAND	21- 49	40	+8 1/2	+24.8
O	FABRI-TEK	1- 4	2 7/8	- 3/8	-11.5
O	GENERAL COMPUTER SYS	1- 4	2 7/8	0	0.0
O	GENERAL DATACOMM IND	12- 19	19	+2	+11.7
O	GENERAL TERMINAL CP	1- 4	2	+ 1/4	+14.2
O	HAZELTINE CORP	12- 30	26 7/8	+1 3/8	+5.3
N	HARRIS CORP	28- 46	46	+3 3/8	+8.3
O	INFOREX INC	1- 8	1	- 1/8	-11.1
O	INFORMATION INTL INC	8- 15	11 1/2	+1	+9.5
O	INTEL CORP	46- 86	86 1/4	+5 1/2	+6.9
O	INTERSIL	13- 33	26 3/4	+ 1/4	+0.9
A	LUNDY ELECTRONICS	6- 12	7 1/2	- 3/8	-1.6
O	MSI DATA CORP	6- 11	9 1/2	+2 1/4	+31.0
O	MAGNUSON COMP SYSTS	16- 30	25 1/2	- 1/4	-0.9
N	MEMOREX	18- 34	24 5/8	+1	+7.3
N	MOHAWK DATA SCI	10- 20	15 1/4	+ 5/8	+3.5
O	OMEX	3- 10	7 1/2	0	0.0
A	PARADYNE CORP	18- 40	38 7/8	+ 3/8	+0.9
A	PENRIL CORP	9- 15	10 3/4	+ 1/4	+2.3
O	QANTEX CORP	10- 17	13 1/4	+1 1/2	+12.7
O	RECOGNITION EQUIP	5- 13	8 3/8	+ 1/8	+1.5
O	SCAN DATA	1- 5	2 3/4	+1 1/8	[illegible]
N	STORAGE TECHNOLOGY	12- 21	17 3/4	+ 7/8	+5.1
O	SYKES DATATRONICS	10- 29	27 1/4	+ 1/4	+0.9
O	T BAR INC	10- 21	19 1/2	+1	+5.4
A	TEC INC	4- 9	5	0	0.0
N	TEKTRONIX INC	42- 63	64 1/2	+4 3/8	+7.7
A	TELEX	3- 8	3 1/2	+ 1/8	+3.7
O	TESDATA SYSTEMS CP	6- 80	9 7/8	+ 1/4	+2.5
O	TIMEPLEX INC	7- 10	10 3/8	+ 3/4	+4.2
O	WILTEK INC	1- 3	3 1/8	+ 3/4	+31.5
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 13	11 1/4	- 1/8	-1.0
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	19- 36	33 5/8	+2 1/8	+6.7
O	CYBERMATICS INC	1- 1	1	+ 1/8	+14.2
A	DUPLEX PRODUCTS INC	11- 13	12 1/2	+ 1/4	+2.0
N	ENNIS BUS. FORMS	13- 21	17	- 1/4	-1.4
N	3M COMPANY	48- 59	58	+2 1/2	+4.4
O	MOORE CORP LTD	27- 36	30 1/2	- 1/8	-0.4
N	NASHUA CORP	20- 36	35 1/8	+1	+4.1
N	STANDARD REGISTER	22- 31	26 1/2	+ 1/8	+0.5
A	TAB PRODUCTS CO	13- 25	20 1/8	+2 3/4	+15.8
N	WABASH MAGNETICS	11- 18	16 1/8	+1	+7.0
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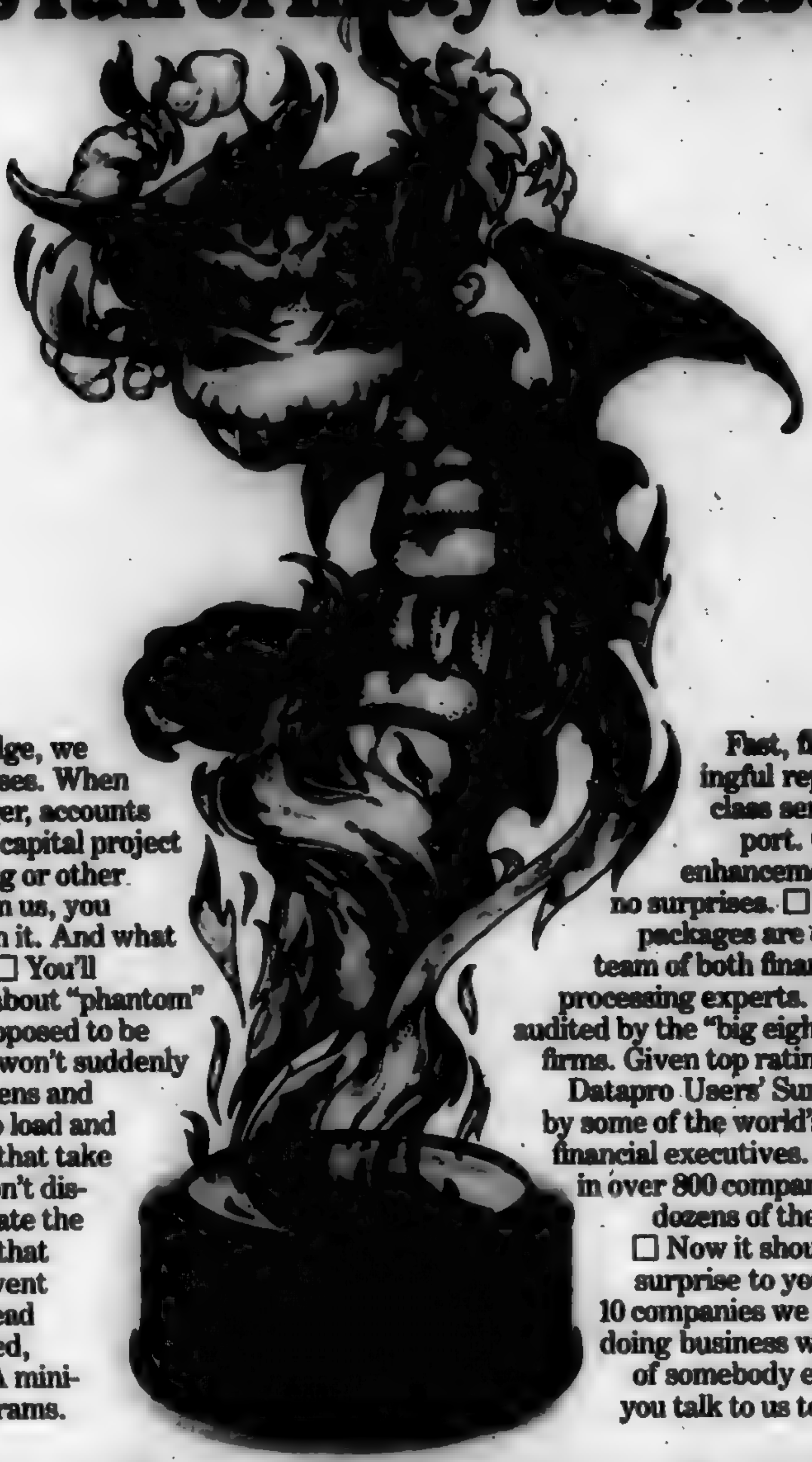

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NEWSPAPER

Japanese Could Cut Equipment Costs

By Bruce Hoard
CW Staff

SAINT-PAUL-DE-VENCE, France —The Great Japanese Computer Invasion" is ised and nearly ready to strike, William ead, Univac's general manager for the UK, ld a group of English and American journlists here recently.

The foreign invasion will be fueled by the ique Japanese economic philosophy that bordinates profit-making to full employent, he told the gathering at the Sperry orp. International Executive Center here.

Speaking at a four-day conference on cision-making, the general manager predicted the most significant casualty will be IBM, which has held unfettered control of the world computer market for the past 25 years.

The key to the Japanese takeover will be its ability to mass-produce today's $500,000 computer for $50,000 within 10 years, Read said.

Additional seminar coverage appears on pages 10 and 11.

Both the U.S. and UK will find themselves on the defensive when the Japanese move because the Westerners' economic philosophies are more strongly capitalistic and profit-oriented, Read pointed out.

"In Japan, 'profit' is a dirty word," he said, adding that the country's overriding preoccupation is full employment, not money. Businesswise, this translates into seeking only a share of the market — not all of it.

Although the Japanese do utilize automation and robotics on a large scale, workers are not eliminated, but rather are shifted to other, sometimes seemingly pointless, positions, Read noted. For instance, there are large numbers of Japanese DP workers in an average computer room — far more than

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

Vol. XIV, No. 32 August 11, 1980 $1.00 a copy; $30/year

Hotel Rooms No 'Issue' For Delegates

By Marguerite Zientara
CW Staff

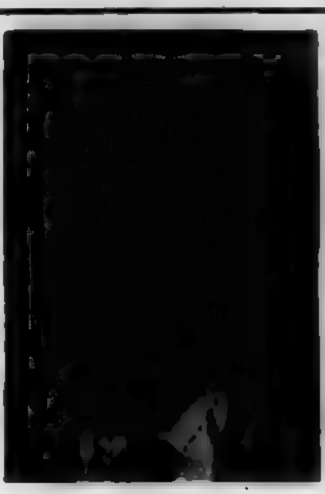
NEW YORK — Although supporters of President Jimmy Carter and Sen. Edward M. Kennedy (D-Mass.) are expected to square off at the National Democratic Convention here this week, one thing convention attendees won't be fighting about is hotel rooms.

A software system designed especially for the Democratic National Convention Committee (DNCC) will track reservations for the 40,000-plus delegates and members of the press, who all needed places to stay here in the Big Apple.

Unlike the city of Detroit, which installed a citywide computerized hotel reservation system as a joint project with the Republicans for their national convention there last month, New York has no such system. Furthermore, its Convention and Visitors Bureau "isn't computerized and did not want to [computerize] when we approached them," according to Charles Howell, assistant Democratic Convention manager.

National CSS, Inc. (NCSS) was chosen from six suppliers to provide the system "be-

(Continued on Page 8)



The Challenger

The Incumbent

Revision of MVS In Works for 'H,' Analysts Believe

By Tom Henkel
CW Staff

When IBM's H series is formally announced, software to manage the system will be little more than the current version of MVS, analysts predict. But the software, like fine wines, will get better with age.

IBM is expected to announce a new version of MVS that will become the native operating system of the H line. While some say the new MVS will be announced with the first H processor — in late 1980 or the first quarter of 1981 — others suggest IBM will hold back on the announcement a few months. But regardless of when the native operating system is formally announced, analysts agree it may take up to five years before its full potential is realized.

An expanded and more modular version of the current MVS, the H series native mode will sport some dramatic changes. Like its baby brother, the native DOS/VSE operating system on the 4300 series, the software will support fixed-block architecture (FBA). It will also eventually scrap current IBM access methods like Vtam, Btam and Isam in favor of a virtual file storage system, according to Dave Stein, an analyst with the Gartner Group.

While the conversion to virtual file storage may be as much as five years off, the stage is already set. IBM's June 11 announcement of its MVS/System

(Continued on Page 6)

Write Needs Down, Managers Told

Users Briefed on Picking Graphics Packages

By Rita Shoor
CW Staff

CAMBRIDGE, Mass. — Chaotic, fragmented, new and confusing. That's how William Nisen, assistant director at the Harvard Laboratory for Computer Graphics, described the graphics software marketplace during a session at the Graphics Week '80 conference here recently.

So how does a manager go about selecting graphics software to meet his organization's requirements? The following five steps were recommended by Richard Spangler, vice-president of International Computer Programs, Inc. (ICP), during the session on "What You Should Know about Acquiring Computer Graphics Software":

- Establish your particular organizational needs.
- Search the software marketplace for applicable products.
- Evaluate alternative products.
- Negotiate with the vendor.
- Install the product.

The process of establishing needs must include writing them down, Spangler cautioned, noting that a hard copy detailing company requirements should prevent the manager from being swayed by conflicting vendor product claims.

(Continued on Page 6)

Amdahl Brings Out High-Speed Channels

SUNNYVALE, Calif. — High-speed channels which support the maximum 3M byte/sec data transfer rate available with IBM's recently announced data streaming feature [CW, June 16] have been introduced for Amdahl Corp. mainframes.

"This feature will make it possible for all Amdahl customers to take advantage of the higher data transfer rates provided by the data streaming feature of the . . . IBM 3880 channel devices," said Michael Clements, Amdahl's vice-president of engineering.

Two of the high-speed channels will be provided in each four-channel group on Amdahl's 470V/6 and V/8 mainframes for a maximum of eight, the company said. One of the high-speed channels will also be provided in each four-channel group on Amdahl's older 470V/5 and V/6 product line, he noted.

This makes the higher data transfer speed available to the 470V/5 and V/6 customer — a rate which is not currently available to the IBM 370/158 or 168 customer, he pointed out.

In a related announcement, Amdahl said it will support the use of extended facility instructions in IBM's MVS/SP operating system software on all Amdahl 470 processors.

The extended facility instruction set will be supported through the use of the "then-current release" of Amdahl's MVS/SE Assist program prod-

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM reg. U.S. Pat. Off.

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.
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$1.00 a copy: U.S. – $30 a year; Canada, Central & So. America – $50 a year; Europe and Near East – $90 a year; other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Software Support Dropped

IBM Pullout Honors Olympics Ban

By Brad Schultz
CW Staff

ARMONK, N.Y. – During the recently concluded Olympic Games in Moscow, IBM honored President Carter's ban on export of high technology to the Soviet Union by withholding support for two 370/148 mainframes the city of Moscow bought to process results of the summer competition.

So said a spokesman for IBM's corporate headquarters here last week, a few days after the games boycotted by teams from the U.S. and other countries came to an end.

The export ban and the boycott were imposed to protest the Soviet invasion of Afghanistan, which began about eight months ago [CW, Jan. 21]. That was a year after Moscow received the 370/148s in a deal sanctioned by the U.S. State Department and the government of West Germany, where the mainframes were warehoused while the sales were negotiated, the spokesman continued.

In Moscow, IBM representatives worked with a Canadian company to implement a software system the latter firm had developed for processing applications germane to athletic contests, the spokesman noted. But IBM pulled its representatives out of the city shortly after Carter's export ban was announced, he said, and left the Soviet capital with the problem of supporting the 370/148s on its own [CW, Jan. 28].

Ironically, the pullout – prompted by a sudden shift in State Department policy toward the Soviets – also gave the State Department the problem of losing touch with how the IBM mainframes were and are being used, the spokesman indicated. According to terms of the sale, Moscow is supposedly transferring one of the mainframes to a city-run hotel and the other to service in support of ambulance dispatching now that the Olympics are over.

However, IBM representatives can no longer keep the State Department apprised of the mainframes' status. Through various federal agencies, the State Department tries to restrict the flow of computing equipment from U.S. vendors to Iron Curtain users to prevent the latter from obtaining systems that might constitute a military advantage.

'Info' Altered For IBM Users

By a CW Staff Writer

WELLESLEY, Mass. – IBM and Amdahl Corp. system users can use Info to juggle the interrelationships of 10 files simultaneously and form a bridge between file management and word processing applications.

Info, a software package which has been available to some other mainframe users since 1975, is supplied by Henco, Inc. here.

Fitting IBM 370, 4300 and 30 series mainframes as well as plug-compatible Amdahl mainframes, Info runs under the VM/CMS operating system as both a relational data base management system (DBMS) and application development language, a Henco spokesman said.

Written mostly in Fortran, Info already runs on some 250 Prime Computer, Inc. and Honeywell, Inc. Level 6 processors, the Henco spokesman continued.

In its IBM/Amdahl form, Info costs $15,000. Henco's address is 35 Walnut St., Wellesley, Mass. 02181.

VA Health Systems Funded

CW Washington Bureau

WASHINGTON, D.C. – Almost $5 million for the development of Veterans Administration (VA) medical information systems has been added to the proposed 1981 VA budget by the House of Representatives.

The $4,984,000 – originally threatened by congressional budget cutters – is needed to bring VA hospitals out of "the horse and buggy days" of medical services by providing sophisticated computerized health care systems, according to Rep. Ray Roberts (D-Texas), who proposed restoring the funds to the VA budget.

A recent survey of hospital computerization found that 87% of private hospitals with more than 500 beds had DP capabilities, compared to only 4% of VA hospitals, according to Rep. John Paul Hammerschmidt (R-Ark.), a backer of the Roberts amendment.

"In the field of pathology, these percentages are 74 to four; in outpatient care 74 to three; and in pharmacy 74 to four," Hammerschmidt said.

Lack of information systems in VA hospitals results in treatment delays of four to eight hours, he said.

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Dear Miss Fortune: No. There are a number of "gigolo" sort programs around today looking for a life of ease and luxury in a rich computer center. The only exception I know is SyncSort OS, which has been earning its living since the age of one. This program will never squander your resources, since it uses 15% to 50% less CPU Time, Elapsed Time and SIOs than any other sort on the circuit today. In addition, SyncSort is very faithful. It never interferes with non-sorts in the mix.

* * *

Dear Dr. SyncSort: One of the things I have always hated about sorting is all the coding, compiling and debugging that is necessary with most programs. Is there any way I can reduce this mind-numbing drudgery? **Hates Housework.**

Dear Hates Housework: Yes, get SyncSort OS. It is loaded with labor-saving features like INCLUDE/OMIT, SUM, INREC/OUTREC, MAXSORT, and slick new straight-copy facility called BETTERGENER. Once you begin using SyncSort, feeling will return to your mind almost immediately.

* * *

Dear Dr. SyncSort: A few months ago I was swept off my feet by a handsome, suave representative of a large hardware company. Under the influence of moonlight and roses, I accepted the sort program which he slipped into my fingers. But once the contract was signed, he became very cold toward me. Now, when I try to discuss sorting problems with him, he says, "Why can't you ever talk about anything interesting—like a new and larger computer?" **Repenting at Leisure.**

Dear Repenting: We receive many heartbreaking letters of this type. You may have to face up to the fact that a happy sort divorce is preferable to a miserable sort union.

* * *

Dear Dr. Syncsort: Help! I am being driven mad by a telephone problem. Every time I call the large company that makes my sort program for help on a problem, I get the run around. Either the phone rings itself off the wall, or I get somebody who specializes in hardware. Is there any number I can call where I can get expert advice on **sorting** problems? **Ringy-Dingy.**

Dear Ringy-Dingy: Yes, call Whitlow. They don't make hardware. All they make is sort programs. The number is (201) 568-9700.

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Human Factors Challenging Terminal Vendors

By Ann Dooley
CW Staff

Terminal vendors appear to be jumping on the ergonomics bandwagon, but are any of them really going anywhere?

Among seven leading vendors polled recently, all claimed they were in the forefront of the ergonomics — man-machine interface — technology and consider it an important part of their design criteria. Even those spokesmen unfamiliar with the term later hastened to add that their firms had been working on the concept for years.

The continuing growth in terminal use has spawned increasing public concern over possible health hazards. Although the fear of harmful radiation emissions has been laid to rest by several recent government studies [CW, June 29], other concerns such as eye strain, headaches and backaches remain.

What are terminal manufacturers doing to counteract these negative effects?

As one cynical terminal vendor put it, "any one terminal does as much as any other, but none of them are really solving the problem. The state-of-the-art technology is not really advancing."

Until recently, U.S. manufacturers failed to emphasize the human factor in their equipment, preferring to stress technical capabilities instead. "Purchases of the equipment (as opposed to actual operators) are usually more interested in the capabilities than the ergonomics, so a specific design implementation probably wouldn't change their opinion about a machine," said Roger Pincus, vice-president of marketing for Human Designed Systems, Inc., a terminal maker gearing itself around the human aspect of machines.

A Poor Second

The vendors all agreed that the U.S. market has been a poor second to Europe's in ergonomic considerations; the latter has been under pressure from unions and employee groups.

In Europe, the operator has more of a voice about the working environment, and in Norway and Sweden, certain comfort features are required in a workplace by law, several vendors noted. Sweden, for instance, has mandated that terminal screens be orange since Swedish researchers have found that color to be most soothing to the eye.

The European vendors aren't doing anything revolutionary. The concepts have been around for awhile, but no one in the U.S. has concentrated on making it easier for the operator, one vendor noted.

In Europe, the terminal is only part of the whole workstation design, according to Roger Hotte, vice-president at Datasaab Systems, Inc. Light, angle of terminal, desk and chair height, position and an individual operator's convenience are all important components of the overall design, whereas U.S. vendors don't place as much emphasis on them, Hotte noted.

But changes are occurring in the U.S. As terminal use expands in the general workforce, unions are stressing possible health hazards. In addition, noncomputer people are becoming more vocal about specific complaints and more assertive about health issues, the vendors noted.

However, really significant changes won't occur until users apply even greater pressure, Pincus stated.

Completely new terminal models appear every three to four years with specific features being introduced in between the cycles, according to Gary Pyles, sales and marketing manager for Innovative Data Technology. So as a new cycle begins, the new terminals are starting to incorporate some of the human-factor elements, he noted.

Pyles predicted, however, that pressure may take longer to filter through to some of the OEM vendors since they don't come into direct contract with the machine operators.

Recent Innovations

Among the several companies that have built their terminals specifically around the human factor are Human Designed in Philadelphia and Input-Ex in Englewood, Colo. Other vendors are making changes in screencolor (green or orange seem to be the favorites) or adding a tilt and a swivel feature, a detached keyboard, stepped and/or grouped keys, anti glare screens and the ability to raise and lower terminal height to suit the operator.

IBM, not to be outdone, recently introduced its "displaywriter", which was said to be designed for the "individual" rather than the "average" operator. The vendor even put out a publication in 1978 dealing with the human factor in terminal design.

The human factor is the most important consideration in terminals today, according to David Baker, director of marketing at Beehive International, Inc. "I don't see how anyone serious about this business can succeed unless they think about the user environment," he said.

According to Al Maurer, director of new business development for Hazeltine Corp., the terminal marketplace has gone beyond focusing on price/-performance features alone. Now customers have the opportunity to examine the sometimes subtle differences between the makes and models of terminals," he claimed.

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Matching System to Identify VA Cheaters Working for U.S.

CW Washington Bureau

WASHINGTON, D.C. — The federal government is planning a computer sweep of its employees to turn up possible student or home loan defaulters or other unlawful recipients of Veteran Administration (VA) benefits on the government payroll.

To conduct the search, the Office of Personnel Management (OPM) plans to give the VA the government's Central Personnel Data File to match against the VA's automated benefits recipients file.

"Whenever a match occurs, the VA will conduct a more thorough review of the recipient's eligibility or loan plan," according to OPM's recent announcement of the matching program.

The central data file contains the name, Social Security number, date of birth, annual salary, work schedule, work location and employing agency of every federal worker.

OPM acknowledged some of this information is "not considered to be public information," but it said the matching program is "the most efficient way" to detect VA benefit cheaters; "anticipated benefits to the public justify disclosure of this information for matching with VA records.

A similar computer matching program using records of the Health, Education and Welfare Department turned up 18,000 possible welfare cheaters on the government payroll two years ago. At that time, the government estimated it would save approximately $12 million in the first year of the HEW match [CW, Dec. 18, 1978].

OPM said the VA will safeguard the personnel files "against unauthorized disclosure and to respect individual rights." The VA will erase its copies of the source tapes after they are used.

Supply of 32K Chips Lagging

IBM to Use 16K Chips on Some System/38s

By Tom Henkel
CW Staff

ATLANTA, — IBM can't supply enough 32K-bit memory chips to meet production schedules on System/38 Model 5 CPUs, so some Model 5 processors will be shipped with 16K chips from other vendors, the firm announced last week.

While IBM said the 16K chips will be tested to meet company standards, and performance or reliability will not be affected by the switch, the firm admitted the 16K version of System/38 will be somewhat different from the 32K version. Users of 16K systems will have to stick with 16K memory enhancements, for example.

IBM announced a similar chip replacement on the larger 4341, Tom Crotty, an analyst with the Gartner Group, noted. However, IBM has reportedly solved its chip production problems on that system to the point where it has cancelled some contracts with outside suppliers, he added.

Although users of IBM's 4341 systems with 16K chips may have a hard time getting the same price for their systems as users with 64K chips, that probably will not become an issue with System/38 users, according to the Gartner Group's Dave Stein.

Users of that system probably will not sell the CPU until the residual value is almost nil, since it is a new-generation system. In addition, since IBM is supporting the use of 16K memory chips, there probably will never be a problem getting 16K memory enhancements, he added.

Demand Miscalculated?

IBM is probably finding itself short of 32K chips because of miscalculations in the demand for 4341s, System/38s and 8100 CPUs. However, IBM's mistakes in all three cases were different, Stein said.

IBM underestimated the space required to support System/38 and 8100 software; as a result, users of those systems were asking for larger models to support the software. In the case of System/38, IBM seems to have enough 64K chips to build Model 3 CPUs, but more users have changed orders to the larger Model 5— partially because IBM's sales force has been recommending such an upgrade, Stein said.

Comparing that shortage to that affecting the 4341, Stein said IBM underestimated demand for full 4300 systems. The System/38 shortage is also less severe, about 50% compared with the 4300 underestimate of about 100%.

Stein claimed IBM is happier having its components in short supply than it would be if the tables were turned. The firm is finding it is most cost-advantageous to keep its components-manufacturing sites going on a 24-hour basis.

That means if there is a miscalculation, IBM is faced with two options — going outside the company to buy the needed parts or building another production facility, a process that would take at least 18 months to two years, he estimated.

While the former option may be undesirable, both to IBM and to its customers, the latter option is even less desirable to IBM. It would much rather run short of components than stockpile them, Stein noted.

Honeywell Hikes More Prices

WALTHAM, Mass. — Blaming "the high cost of doing business," Honeywell, Inc. has hiked prices for the second time this year.

Although purchase prices were left untouched, system and field engineering charges across computer product lines were increased as were some monthly hardware and software charges.

Earlier this year, the vendor increased prices for hardware.

The latest increases will be effective for new customers Aug. 1 and current customers Oct. 1. They include the following:

- A 10% hourly and monthly systems engineering increase covering all Honeywell computer products.
- A 12% to 19% boost in field engineering on-call hourly and material rates.
- A 10% increase in applications software including general ledger, accounts payable and receivable and other administrative applications, as well as education and training services.
- A 10% rise in add-on memory lease/rental charges for the DPS-8 large-scale system.
- A 5% price hike on Datanet front-end processors. Affected models are the 6616, 6624, 6663 and 6678. Exempted was the Model 6661.
- A 5% rental/lease increase on selected older peripherals, central processors and add-on memory for the levels 62 and 64 and Series 60. Included are the level 66 and Level 68 DPS and non-DPS models.
- A 10% maintenance increase on selected peripherals for all of the above-mentioned systems.

Honeywell is the first large mainframe manufacturer to announce price hikes in the wake of IBM's June increases.

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Revised Version of MVS Anticipated for IBM's 'H'

(Continued from Page 1)

Products package is the software bridge to the H series, Stein said.

MVS/SP, essentially a revamped version of what used to be called MVS System Extensions, provides architectural enhancements to support the newly announced 3380 and 3375 disk drives, along with 32M-byte addressing and support for IBM's Resource Measurement Facility, a feature that provides postprocessor selective device monitoring, 3380 and 3375 direct-access storage support and support for IBM's new Job Entry Subsystems JES2 and JES3 [CW, June 16].

The newly announced disk drives, which now support a count key data storage methodology, will be enhanced to support FBA. That move will make those already fast drives even faster and more efficient, Stein added.

The MVS enhancements will ease the conversion from a 30 series mainframe to the larger, faster H. But whether the bridge to H will actually reflect the system's native operating system is unclear, Stein noted.

Tough Decisions

Strategic Business Services, Inc. said IBM is faced with some tough decisions before it announces H software. The first decision is whether to offer more than the current 16-channel limit on 30 series uniprocessors, thus supporting more high-speed devices such as the new 3380 disk drives. IBM will decide against that option, Strategic predicts.

Another tough decision concerns how much of the H series' native operating system IBM wants to base in microcode. While large sections of basically untouchable code may be a good marketing strategy, it may not be a good idea from a maintenance standpoint, Gartner's Stein said.

Strategic said IBM can use microcode to provide more data management facilities "outboard" of the CPU. Microcode assists could be used by the system contol program to open and close data sets. It would also be possible to use control functions in the 3375 and 3380 disk drives that would allow channel directors to set up access to the I/O devices, thus freeing the CPU from some extra overhead, the firm said.

The H native operating system will probably be released in a piecemeal fashion, with the initial announcement being a very basic operating system, Stein said.

William Easterbrook, vice-president of Kidder & Co., Inc., said the native H operating system will be similar in design to 4300's DOS/VSE, but it will be more modular, that is, users won't have to take as many base programs to develop a workable system.

Stein disagreed with that assessment saying IBM wants to eliminate the many different software combinations now available under MVS. To continue with its apparent policy of developing installation productivity options (IPO), or generation tools, IBM will have to standardize much of the current MVS into several generation packages. Stein also speculated IBM could eliminate the IPO procedure by developing self-generating software, a concept already used by other mainframers.

"IBM is not going to offer anything that will save money," Stein said, suggesting the H series software will probably be more expensive than existing IBM products. Easterbrook agreed saying H series software will probably cost approximately $50,000 to $100,000 a month.

To further enhance its software, Stein said, IBM will introduce both front- and back-end processors to be attached to the H line.

The front-end processor could be introduced as early as next year. The back end, which will use IBM's 3880 controller as a base, may be delayed, Stein added.

At least two IBM analyses are offering reports on the H series.

Strategic Business Services, Inc.'s offering is called "IBM's Future Large Systems Software Strategy" and costs $1,500 from the vendor at 4320 Stevens Creek Blvd., San Jose, Calif.

Advanced Computer Techniques Corp. is offering "IBM H Series Forecast" for $1,000 from 125 Greenwich Ave., Greenwich, Conn. 06830.

Clearinghouse to Address EFT Security Problems

CW Washington Bureau

WASHINGTON, D.C. – A clearinghouse for electronic funds transfer (EFT) security information is being established here by the EFT Association.

The service, expected to be available early next fall, will solicit information on real or hypothetical threats to or breaches of EFT systems security, the Washington, D.C.-based association said, adding that reports may be made to the clearinghouse anonymously.

A team of consultants and clearinghouse staffers will analyze problems put forward and suggest potential safeguards. The clearinghouse will also solicit security tips and experiences.

The clearinghouse will publish reports on security techniques, case histories and applications and maintain a library of EFT security materials, the association said.

Available to the entire financial industry, the clearinghouse services will be offered at a discount to EFT Association members. More information is available from the EFT Association, Suite 502, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

Managers Briefed on Graphics Software

(Continued from Page 1)

The evaluation should also consider the gross economic impact of the graphics capability acquisition on the organization. For example, personnel needs in various departments might decrease because of the product's installation, he noted.

Aids in Search

User's group conferences, trade shows, industry publications and hardware manufacturers' catalogs are helpful in the search for applicable software products, Spangler said. However, he maintained product directories available from various publishers and trade associations are sometimes the most cost-effective tools in the search process.

Spangler advised managers to write a letter to each vendor with a package that might fit their installation's needs. This letter should contain a description of the company's hardware environment and software requirements, he noted.

The prospective customer should also make all candidate vendors aware of his time-frame parameters and invite them to provide specific details on product costs, he suggested.

Finally, "let the vendors know if and when you want a salesman to call," Spangler recommended.

After receiving the vendors' responses, the manager should draw up a grid containing such variables as costs, hardware and operating system prerequisites and the number of programs contained in the competing packages, he said. At this point, a meeting including representatives from corporate management, the end-user departments and the DP area should result in eliminating some products from the grid.

Other products could be eliminated by questioning users about specific experiences, he said.

Once the field has been narrowed, Spangler recommended that potential package customers arrange for trial use and demonstrations of alternative graphics packages. The quality of the package documentation and the price for future program enhancements should also be considered during this phase, he said.

After deciding on which product best meets the criteria and environment, managers must "keep in mind that acquiring a graphics software package isn't like buying a commodity. There's often room for negotiation," he pointed out.

The final step, installing the product, "means more than just making sure the programs are running correctly," Spangler warned. In order to ensure the continued success of the system, the end user must see that the appropriate people have been trained to use the system and that training courses will also be available for newly hired personnel, he said.

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Going to House Judiciary Committee

Rewrite Bill Heads for More Changes, Delays

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — A much-debated, much-amended Telecommunications Act of 1980, H.R. 6121, has finally been approved by the House Commerce Committee, but further delay and further changes seemed inevitable last week.

Rep. Peter Rodino Jr. (D-N.J.), chairman of the House Judiciary Committee, requested that the bill be referred to his committee. Judiciary will reportedly need three or four weeks to resolve concerns previously expressed by Rodino about provisions that would restructure AT&T and set aside the telephone company's 1956 consent decree. Essentially, Rodino fears these changes would have an undesirable effect on the Justice Department's pending antitrust suit against AT&T [CW, July 28].

Since Rodino's request for referral has already been agreed to by Rep. Lionel Van Deerlin (D-Calif.), chief sponsor of H.R. 6121, it is virtually certain to be honored. As a result, the bill probably can not go to the floor of the House of Representatives until late in September at the earliest.

Knowledgeable sources said last week that if a "lame duck" session is convened after the November elections, H.R. 6121 may yet be enacted this year, but because of the heavy load of other legislation and the continuing controversy over key provisions of the communications bill, this is only a remote possibility.

Meanwhile, the Senate Commerce Committee announced it would hold further hearings on S. 2827, a companion measure which differs from H.R. 6121 in several key respects.

Issues for Discussion

Just before passing H.R. 6121 on July 31, the House Commerce Committee adopted a number of changes and rejected some others that suggest the issues likely to be discussed in the upcoming deliberations.

For example, language was added to H.R. 6121 barring AT&T and other "dominant" carriers from offering "mass media services or products."

This prohibition was inspired largely by the American Newspaper Publishers Association (Anpa), which fears AT&T will put its classified telephone directory on-line and offer electronic advertising services that compete with newspaper ads.

The phone company is already moving in that direction. Recently, in collaboration with Knight-Ridder Newspapers, AT&T launched a field trial of a videotex system called Viewtron which will allow viewers to purchase a wide variety of products and services on-line (see story on Page 23).

As approved by the committee, H.R. 6121 bars AT&T from supplying such services. But the phone company — directly or through a subsidiary — is allowed to lease the circuits, computers and terminals needed to support videotex and related mass media services. Furthermore, it can market the related software to system operators.

AT&T remains unhappy about this part of the bill, however. Shortly after the committee completed its work, a phone company spokesman said, "The Anpa amendment . . . unfairly freezes the Bell System in the print era while the rest of the country moves into the electronic age."

Main Controversy

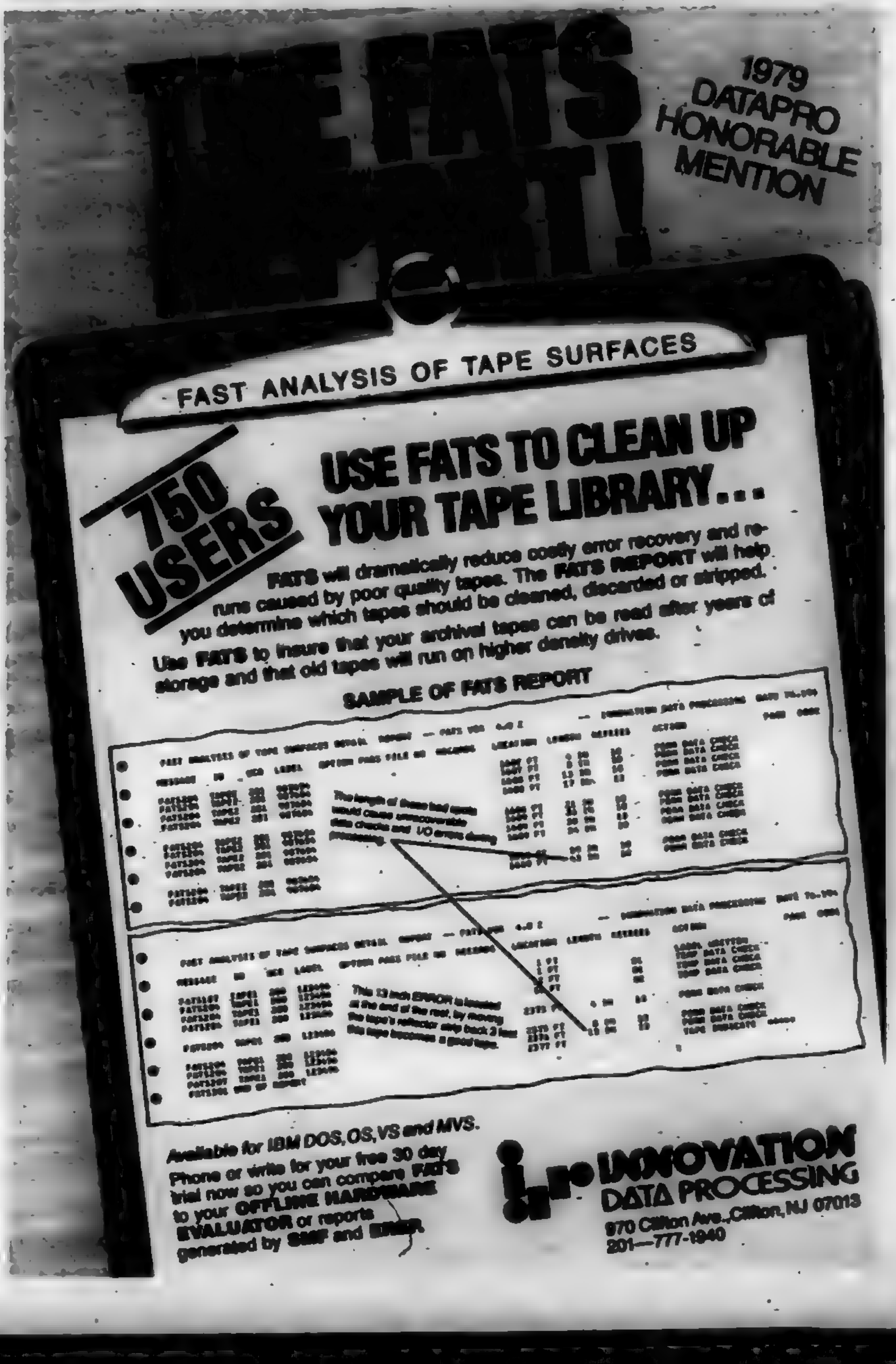
Possibly the most controversial issue in the whole debate over the new legislation involves the question of how much discretion the Federal Communications Commission (FCC) should have to restructure the Bell System and change the terms on which the AT&T parent company, its long-established affiliates like Western Electric Co. and Bell Labs, and the fully separated subsidiaries created by H.R. 6121 do business with each other.

One view — reflected in the Senate bill and supported by the computer industry as well as the Carter Administration — is that the FCC should be allowed to adopt new policies and rules in this area if conditions change in the future and the policies can be shown to promote competition.

As the Carter Administration put it in a letter to the House committee shortly before its final vote on H.R. 6121, "Telecommunications is a dynamic field, and requirements set down today may prove inadequate in the future." The bill should allow the FCC to "take further actions or modify specific requirements on the basis of experience or changed circumstances."

But Bell strongly opposes this idea — basically because it fears the FCC would use such discretion to increase the separation mandated by Congress between AT&T's various corporate components — thus further fragmenting the Bell System and allegedly reducing its ability to compete.

The House committee accepted this latter view. One amendment the committee adopted allows the FCC to establish "policies" and "regulations" permitting another country's telecommunications services and carriers to enter the U.S. market on terms reciprocal with those offered by that country to U.S. vendors.



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Four Hundred Terminals To Carry Convention Copy

NEW YORK — Television is not the only news medium using advanced technology to cover the Democratic National Convention here this week.

The print media are also getting into the act, with 400 terminals set up to transmit stories and information to their editorial offices, compared with only 30 terminals used for the same purpose in 1976, according to convention officials.

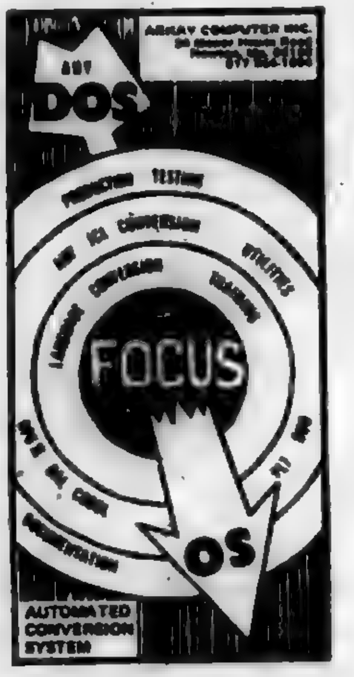
Convention planners have had to set up "rows and rows" of tables to accommodate the sea of hardware, besides widening those tables to 20 inches from the 14 inches needed for yesteryear's typewriters.

"We have 11,000 media credentials," noted Charles Howell, assistant manager of the convention. "I don't know from how many different organizations, but most of them are here for the first time as opposed to four years ago when the technology wasn't there or wasn't as extensive.

"This time there are a lot of newspapers, especially dailies, that are bringing computer terminals instead of typewriters," he added, "so that they're typing the story and it goes directly to the paper."

The reason for such a proliferation of electronics? It boils down to time. "That way, [reporting] is much more instantaneous and the news is much more rapid and, if they have several different editions of a paper, they can update the information pretty fast," Howell said.

Among the major newspapers that will have such equipment at the convention are the *Washington Star* and the *Los Angeles Times*, according to convention personnel. New York City's major daily newspapers, *Newsday* and United Press International and the Associated Press wire services will all have computer equipment located in Madison Square Garden's rotunda area, off the convention floor.



ABC System Up and Running After Trouble in Detroit

NEW YORK — Although ABC News' electronic editorial system ran into some minor technical problems at the Republican Convention in Detroit four weeks ago [CW, July 21], it is expected to function "very smoothly" at the Democratic Convention here this week.

Because the system had diagnostic problems in Detroit, ABC decided to hire "some people to bring down test equipment and help us along," according to John Congedo, ABC's manager of DP and election facilities.

In Detroit, "our multiplexers indicated problems with the telephone company, [but] the telephone company said it had no problems," Congedo explained. "In order to prove it to them, we had to switch lines, which is a pain in the neck because we had to do it over a weekend when there were very few people in our computer center.

"Then, we [didn't] know whether a terminal was bad, if a port was bad in the IBM 3705 communications controller or whether a port was bad in a multiplexer," he continued.

"We had no sophisticated equipment to tell us that, and it's just trial and error trying to figure out what's wrong. Now that we know we can run into that kind of trouble, we're going to add to our very small staff for the Democratic Convention," he concluded.

N.Y. Hotel Reservations Not an Issue

(Continued from Page 1)

cause of the technical superiority of its systems and the firm's understanding of the convention's total information needs," according to Howell.

The DNCC paid $8,300 for NCSS' Detailed Efficient Method of Computerizing Reservations and Tables (Democrat) program. The system was designed to track delegate, media and political representatives' hotel reservations for 20,000 rooms in 60 hotels allocated for convention use.

Structured in NCSS' five-year-old relational hierarchical Nomad data base management system, Democrat will tell Howell, the convention housing director and "one other person, basically" who is staying in which hotel for how long and how many rooms are available at any particular time, Howell said.

Access Limited

Because of the "obviously extremely sensitive" nature of the information contained in the data base, all data entered into the system will be encrypted "according to the federal government-approved encrypting standard," according to Jeff Relkin, professional services consultant for NCSS.

Furthermore, access will be restricted only to preauthorized user IDs, "and then only when the user supplies an extra predefined password, besides the regular password [known only to the user as well] that must be supplied simply to gain access to the NCSS system," according to NCSS' "Detailed Specifications" for the system. NCSS itself can access the data base only with the DNCC's permission.

Operational since April 1, the Democrat system began with a four-copy Hotel Reservation Application questionnaire sent out to all individuals planning to attend the convention "with a delegation, the media or candidate staff," for whom it was mandatory to complete the form.

Information gleaned from the applications included application number, applicant name, state delegation, media affiliation, hotel room choice, reservation-begin date, reservation-end date, credit card payment, deposit sent, guarantee given, hotel assigned, place (airport, depot) of arrival and application numbers of people sharing rooms.

After the left half of the form was filled out by the applicant, DNCC personnel transferred the information in code form to boxes on the right side of the form for keypunching, Relkin explained.

The TBS Division of NCSS handled the keypunching, after which the cards were read into the system at NCSS' New York office and then loaded into Democrat, originally on an overnight batch basis, he said.

While batch entering of data cost the DNCC 60% of the cost of on-line data entry, the committee used both methods "about evenly" for daily updating as convention time drew near, Howell said.

Whether batch or on-line, data went to an Amdahl Corp. 470V/7 computer, 256K of which was dedicated to the Democrat system, located in Stamford, Conn., Relkin explained. NCSS' timesharing operating system is VP/CSS (virtual processor/conversational software system).

Using three rented terminals — two Perkin-Elmer Corp. CRT terminals and one Digital Equipment Corp. Decwriter — located at the DNCC's offices here, the authorized users of the system will spend $10,000 in on-line updating and inquiry functions before the convention is over.

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Japanese to Lower Costs

(Continued from Page 1)

necessary, he said.

Low Japanese unemployment is a result of the unique relationship between workers and management. All workers of the same age are paid the same salary and raises are given to workers when they marry. The end result is satisfied employees who are concerned with the future of their companies because they plan on being there for a lifetime, he declared.

The "invasion" will probably take place before the end of this decade; and the U.S. is horrified, according to Read. In the '60s, America saw the Japanese wrest control of the motorcycle market from U.S. hands and in the '70s, it was the automobile market.

"All the basic characteristics are standing by in place and the chessmen are positioned on the board," he said. "IBM will have to change its scenario when faced with this kind of business."

It will be left to the U.S. and UK to stop the Japanese juggernaut, he said, adding that neither power is likely to do so.

"Do we in Great Britain really want to stop it? People will want the machines and be glad to buy cheap computers that do a good job," he noted. That comment was seen by experts here as a lightly veiled jab at the British computer giant, ICL.

On the other hand, America is "dead worried," but not inclined to stop the invasion because of its capitalistic survival instincts, he said.

In a capitalistic society where profit is the bottom line and success and survival are predicted on quarter-by-quarter earnings, American businessmen are more likely to accommodate, rather than liquidate the competition.

The one hope he held out for IBM and the U.S. computer industry as a whole was a 300% price hike in the price of crude oil. Such an economic catastrophe would "knock out" Japan, he said.

Networks 'Still Learning'

Media Seen Unaware of Technology's Potential

By Marguerite Zientara
CW Staff

NEW YORK — In spite of the media's heavy use of computer equipment in reporting on the Democratic National Convention here this week, the networks still have a way to go before they utilize the technology to its fullest capacity.

That, at least, is the opinion of the man in charge of ABC News' complex electronic editorial system that debuted at the Republican National Convention in Detroit four weeks ago [CW, July 21].

Even though ABC is in the forefront of the major television networks' usage of computer technology for reporting, the network is "still learning how to use it," according to John Congedo, ABC's manager of DP and election facilities.

In the case of the Democratic Convention, for example, ABC is "not aware that they could consolidate functions that require terminals in various locations, not necessarily close to Madison Square Garden or where the event is, but further away like in our uptown offices, and still be getting the information as fast as they could from across the street," Congedo said.

For example, while ABC will use 41 terminals this week compared with the 50 used in Detroit, 17 of those will be divided among 12 different locations, as opposed to the three locations used in Detroit, Congedo explained.

Furthermore, there will be "no more than two" terminals at each location, thus rendering the use of multiplexers too expensive at those locations.

ABC News used 13 Timeplex, Inc. Series II Microplexers in Detroit to concentrate data from 50 terminals and send it over six high-speed phone lines to an 8-million-byte IBM 370/168 in Raritan, N.J.

But because Madison Square Garden is smaller than Detroit's Cobo Hall, terminals will be dispersed and only 10 multiplexers will be used.

Consolidation of terminal functions would have allowed the use of more multiplexers and "we could [have] save[d] on individual telephone bills. Right now we're planning to dial up and stay dialed up for the whole day and the whole time of the convention," he said.

Using Leftovers

Fortunately, however, ABC has about 20 AT&T 212 dial-up modems "left over from the primaries" operating at either 1,200- or 300 bit/sec, 17 of which the network will use to connect its terminals to the 370 mainframe in N.J.

As for why the network is proceeding here as it is this week, "They're not used to working with [the technology] yet.

"They planned their convention months ago. Sometimes planning has gone on for years, and for the producers who have been busy on other political events for the year to rethink [the convention] for the computer — I really don't think it's fair to ask them to do that, because this is something new to them.

"I think they're going to have to see what the results are this time, and the next time I think they'll work it out a little better," Congedo said.

"It's a slow process," he noted, and added that he has "been around here 10 years. They're not aware of what [computer technology] can do for them and they're like the people from Missouri, you have to show them first."

Although it may be a slow process, the situation has progressed in the last decade from running key precinct operations at the computer site during primary elections, to running operations from the studio for quicker results, to sending terminals out in the field so that correspondents could "give intelligent interviews of the candidates based on immediate information," according to Congedo.

In the area of general elections, key precinct operations began in 1970 with just 12 terminals, increased to 24 in 1972, then 48 terminals in 1974, to 96 in 1976, augmented to 250 in 1978 and now in 1980 "we have a little bit better than 300 terminals," he noted.

Amdahl Offers Fast Channels

(Continued from Page 1)

uct, Frederick Trapnell, vice-president of software, said.

The high-speed channels will be available in the third quarter of 1981 for the 470V/7 and V/8 and in the fourth quarter of 1981 for the 470V/5 and V/6, Amdahl said. The option will be priced at $40,000 per four-channel group.

No decision has been made as to whether the new software support will increase the current $250 monthly lease cost for Amdahl's MVS/SE Assist program product, a spokesman said.

Support for MVS/SP Release 1 is scheduled to begin in the second quarter of 1981 with support for Release 2 scheduled for the fourth quarter of 1981, Amdahl said from its headquarters at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

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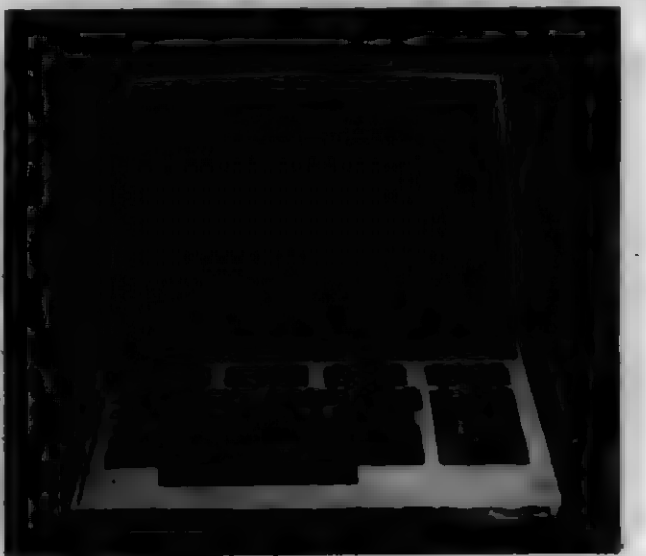

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Human Intuition Irreplaceable, Clinician Says

By Bruce Heard
CW Staff

SAINT-PAUL-DE-VENCE, France — Human intuition can never be replaced by even the fastest computers when it comes to decision making, according to Heinz Wolff, head of the Bio-Engineering Clinical Research Centre within the UK's Medical Research Council. The human brain is able to select essential information from irrelevant information, and computers are not equipped with enough preconceived notions to do that, he commented.

Wolff made his remarks at a four-day conference on decision making held at the Sperry Corp. International Executive Center here recently.

As an example of intuitive prowess, he compared two hypothetical M.D.s and aruged that intuition, not hard data, makes one better than the other. The better M.D. might notice a slight lump or discoloration that would fail to be noticed by the other.

"He is capable of extracting more information out of a given situation using no more than his own senses, or hunches," Wolff observed.

As another example, he mentioned a politician who is superior to his colleagues because he can sense "the mood of the nation."

Such intuitive talents are not quantifiable, he said. "They are the determinants that distinguish a good decision maker from a bad one."

Computers are not always the answer when it comes to information storage and retrieval. They have not been used at the Biological Information Advisory Service, a storage center of medical facts and product companies, because the service is highly reliant on pictures to describe products and procedures.

Had a DP system been introduced there, pictures would have been limited to line drawings composed on CRT terminals. "I don't think anybody would bother to use them," Wolff added.

Circle of Normality

As an alternative to tables and statistics, Wolff proposed the use of what he called a multipolar method, which is based on a "circle of normality" and a series of less perfect circles surrounding it.

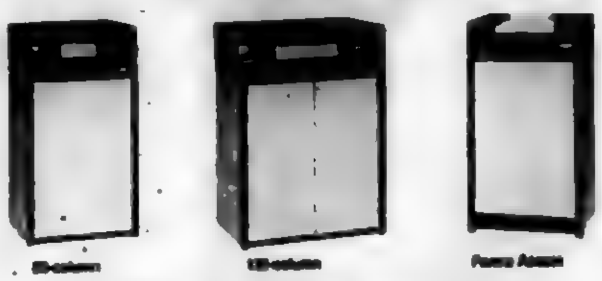
In the case of a medical patient, the circle of normality represents the patient's condition. Its bulges are indicative of ailments and can be compared to the bulges of a representative figure from any previous time, which would be depicted in another color.

The scale of the figure can be altered to reflect greater bulges for more serious ailments. Points on the figure can also be placed in opposite locations so that a bad development can be measured against another, more encouraging, development elsewhere.

What this method provides is the ability to fully monitor the track of a patient's health from one hour — or one day — to the next with little more than a glimpse, Wolff said.

World oil prices could also be better estimated with computer-augmented intuition, he suggested; it would be more useful to research a foreign oil minister's political security than to consult reams of statistic-laden pages.

In the end, people must make decisions and "intangibles as distinct from tangibles, which can be grabbed by computers, are the things that should make the decisions," Wolff said.



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House Panel Sets Hearing On Nine-Digit Zip Code

CW Washington Bureau

WASHINGTON, D.C. — The nine-digit Zip Code plan set for implementation by the U.S. Postal Service early next year will be the subject of a one-day congressional hearing, the House Government Operations Subcommittee has announced.

The new Zip Code scheme, already four years in the works and fast approaching its February 1981 start-up, may not fulfill its promise of streamlining mail sorting through increased automation, according to Rep. Richardson Preyer (D-N.C.), whose Government Information and Individual Rights Subcommittee will hold the Sept. 4 hearing.

Preyer said the Postal Service has not been able to estimate the cost of implementing the plan nor the amount required to purchase new machinery necessitated by the proposal. "Further," he said in a statement released Aug. 1, "critical testing of optical scanners, the linchpin of the system, hasn't been completed."

The plan has also been criticized by the private sector, faced with the prospect of having to update automated mailing lists and expand millions of address fields in computer files [CW, Feb. 18].

Preyer said his subcommittee will want to ask the Postal Service what incentives it will use to persuade businesses, such as large-volume mail-order houses, to use the new zips.

Preyer also said he wonders if the public should be saddled with this bureaucratic brainchild because the Postal authorities admit the new codes will not speed actual delivery, but only the presorting of mail.

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September Meet To Feature SNA

SUNNYVALE, Calif. — Using Systems Network Architecture (SNA) with or without IBM, is the featured topic of a user-oriented three-day seminar and workshop in San Francisco on Sept. 22-24, and in New York on Oct. 20-22.

Aimed at users and manufacturers considering designing or planning to implement SNA-compatible systems, the seminar conducted by Telecom Computer Technology International, Inc. will cover aspects, implications, alternatives and possible pitfalls of compatibility in SNA.

The symposium will include a one-day workshop on: "How to Specify and Test SNA-Compatible Systems." The fee for the two-day seminar in $550 and $750 for the three-day seminar workshop.

More information is available from Telecom at, 599 N. Matilda Ave., Sunnyvale, Calif. 94086.

Futurist Maps Course Of Coming Technology

By Bruce Hoard

CW Staff

SAINT-PAUL-DE-VENCE, France — Tomorrow's decision makers can look forward to a host of electronic marvels including libraries on a chip and factories on a wafer, according to Earl Joseph, a staff futurist for Univac.

Joseph imparted his predictions to a skeptical and questioning audience here at Sperry Corp.'s International Executive Centre as part of a four-day seminar focusing on decision making and its relationship to information technology.

"The technology we currently have in place is at least 100 years behind what it could be," he told a group of largely British journalists and publishers, who came to listen, learn and luxuriate on the Cote d'Azur.

The futurist sketched out his perception of the future information processing order by using a "future map." The map started with the development of the microprocessor on a chip and moved through miniprocessors, minicomputers, medium-scale computers and eventually large-scale computers on a chip by the mid-1990s.

Increasingly large memories will be condensed to chip size, leading to the advent of the library on a chip in conjunction with large-scale computers, he claimed. Joseph's micro-sized reduction list read like a menu of the absurd: book on a chip, MIS on a chip, doctor on a chip and, for those with iron stomachs, politician on a chip.

Wafer-wise, he tossed out visions of the office on a wafer, the factory on a wafer, culture on a wafer and future world on a wafer.

'Awareness Machines'

Intelligent and sensor-perceptive machines that will volunteer knowledge to users based on key words are also within technological grasp, Joseph noted. Primitive models of these "current awareness machines" are now in limited use in such areas as the military, large corporations and other governmental agencies, he said.

"That's a different system, and you can imagine how helpful it would be," the futurist commented.

Advanced communications capabilities will allow other machines to listen to specially broadcast programming aimed at a specific orientation, Joseph said. Farm machines, for example, will listen to information on farm futures and implement it in daily operations.

Of the current state of artificial intelligence, he said. "We have a long way to go," but noted humanity learned more about the brain during the '70s than it had in all the rest of history.

Today's management information services (MIS) systems are complicated and difficult to use, so top-level decision makers are eschewing them, the futurist said. In the future, however, they will be supplanted by deductive reasoning systems and general domain knowledge systems; "these are things that are beginning to come out of the laboratory and will be put in a form decision makers can use," Joseph said.

Just as agricultural and industrial development was marked by a unique set of tools, the information age must "grow" its own set of tools, according to Joseph, who is an advocate of microprocessor-based farming. Those tools include the smart office, books on a chip and videodisks which are "beginning to be integrated with a long list of other things."

Joseph did designate a human role in his new age. People are needed to guide the technology revolution.

One problem is debugging. In the past, technologies have become obsolete by the time they were debugged, but in the future, debugging should be done in parallel with the design process, he asserted.

Call for Cooperation

Joseph also called for less "noncooperative confrontations" between technologists and societal designers. Once that cohesion is reached, humanity will find itself in an "all-win situation," he claimed.

During the question period, Joseph's vision of the future was called "appalling" by one participant who openly wondered how such a depersonalized society could enhance the human existence. Wouldn't the information order Joseph was espousing lead to a considerable amount of unemployment? he asked.

The speaker replied that such technology would actually create more jobs than it eliminated because of the tremendous influx of knowledge. Future jobs that will arise as a result of technology include knowledge engineering and space mining, he said.

Correction

Xpediter, the testing and debugging productivity system for programmers [Cw, July 28], is available from Application Development Systems, Inc., not Applicon.

In the prices given for Version 3.3 of the Security Access Controller from Electronic Data Systems Corp [CW, Aug. 4], the discount for each subsequent mainframe is 25%, not 75%; the discount for multiple sites is 10% for the first CPU and 25% for every other CPU on the user's system.

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In Name of Employees

Insurer Stakes $200 Million on Privacy Claim

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. – Claiming it is protecting its employees' privacy, the Prudential Insurance Co. of America has jeopardized the $200 million business it does with federal agencies by refusing to give the U.S. Labor Department computer tapes of employee data.

In a case that could set precedents in government information gathering and employee privacy protection practices, particularly regarding computerized records, the insurance firm balked at turning over what it considered to be confidential employee information in a Labor Department race and sex discrimination investigation.

Although the conflict stems from the antidiscrimination-law compliance review, the dispute does not at this time involve compliance information or the right of government access to it. Both sides agree that what the case does involve are attempts by Prudential and Labor to dictate the form in which the required information will be presented and whether economies of using the computer tapes for its investigation entitle Labor to files that contain, the department admits, information extraneous to the investigation.

Prudential protests it is not trying to hide possibly incriminating evidence and notes it has offered to turn over either the requested information in printout form or the tapes themselves, but the government would not agree to conditions specified.

The Labor Department would not comment on whether it suspects the insurance company of trying to conceal damning information, explaining that is what the investigation, stymied for a year by this dispute, is meant to determine.

The impasse led the department to issue a debarment order recently to halt all Prudential federal contracts until it complies with the information request. In an agreement worked out in a New Jersey federal court, the order was lifted when the company agreed to turn over most of the tapes in return for Labor's assurance they would be returned unaltered – one of the conditions originally demanded by Prudential.

Government requests for the remaining tapes, containing employee data for years prior to 1976, will be taken up by the court next month.

A Prudential spokesperson at corporate headquarters in Newark, N.J., said the company has always been willing to provide all data on employee hiring, promotion and pay practices required by the Labor Department for its compliance review.

The company refused, however, to turn over its full computerized personnel records, arguing they also contain confidential information, such as tax records and data on employees' spouses and dependents, outside the scope of the Labor investigation.

Economical Tool

The Labor Department, for its part, said obtaining the dozen or so tapes of data on Prudential employees in the New Jersey and New York City area is "the most complete, accurate and economical tool for making fair evaluations of the company's overall job practices."

The department said it could reproduce the Prudential tapes for about $15 each. Labor would then use the copies to make its own computerized analysis of Prudential employment practices. The department said it would cost as much as $123,000 to automate the data on each tape if presented, as proposed by Prudential, in printout form.

Labor spokesman Brad Mitchell also noted that under the 1974 Privacy Act, the department would not be able to disclose any of the information, thus guaranteeing the confidentiality of the Prudential employee files.

"We are not talking about unusual demands here," said Assistant Labor Secretary Donald Elisburg at a Monday press conference. "We are talking about cooperation in submitting existing records that in the past we have asked for and received from other employers."

Prudential has maintained, however, that standard federal contract provisions granting government access to Prudential's "books, records and accounts" to enable policing of employment practices do not entitle the Labor Department to receive data in computer tape format.

At one point in the year-long dispute, the company offered to turn over the tapes if the department would agree not to add, delete from or in any way alter the data; to return all tapes and copies at the end of the compliance review; and to provide the firm with exact copies of all printouts and analyses and explanations of how they were derived.

According to the company spokesperson, the firm has an obligation to its employees to not only prevent "serious invasions of privacy" but also to account for how their records are used by third parties, in this case the federal government.

The department refused the company's conditions for turning over the tapes because letting "employers dictate the conditions of our investigations" would be "opening a dangerous can of worms," Labor's Mitchell said.

Government Turning the Tables?

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. – Labor Department efforts to gain access to Prudential Insurance Co. of America's employee records may turn into an embarrassing case of the government failing to practice what it preaches.

As part of its review of Prudential's equal employment opportunity practices, the department has requested computer tapes containing data on approximately 13,000 company employees.

The firm has refused the tapes, arguing they contain not only the data required for the department's investigation, but also confidential employee information irrelevant to the review.

The government has admitted it does not need all the data on the tapes, but insists it be given the full records because they will make the Labor investigation "easier" and "more economical."

Observers here have not failed to note the irony of a situation that finds the Carter Administration, which has made a public show of its commitment to personal privacy protection – it recently submitted a broad package of legislative proposals to Congress – portrayed as an invader of privacy for the sake of expediency.

Compounding the irony, not only has President Carter directed the Labor Department to monitor employer protection of workers' personal files, but the department is actively engaged in a review of work-place privacy.

The aim of the review is to gauge private sector adoption of the 1977 recommendations of the Privacy Protection Study Commission, which urged, among other things, restricting employee record dissemination.

Kicking off this review of work-place privacy early this year, Labor Secretary Ray Marshall called on private organizations to protect sensitive employee records "from unwarranted disclosure or use" [CW, Jan. 14].

Now, Marshall's minions are demanding access to Prudential's computerized employee records because they are easier to deal with than paper files.

Relevant Conflict

The conflict between the need to protect personal privacy and the need to stop discriminatory employment practices is just the type of situation the work place privacy review was meant to address.

In the end, it may be the courts that decide whether the prospect of the department's saving a few million dollars is more important than protecting Prudential employees from an undefined danger of government intrusion.

Indeed, the courts have found on at least one occasion that private organizations cannot withhold data from the government for the sake of protecting personal privacy. But, as Secretary Marshall noted in January, "We know that when intrusive practices are adopted, it is often because they are seen as a means of meeting legitimate institutional needs."

Marshall was not referring to his own department at the time, although the dispute with Prudential was well under way, when he added "there is a tendency for old ways of doing things to continue without reevaluation" and urged employers to protect their workers against "inappropriate safeguards" of employee records.

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Citibank Charges Graphnet With Illegal Tactics

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Citibank, N.A. has charged Graphnet Systems, Inc. and its parent company, Graphic Scanning Corp., with using illegal tactics to force the bank to use a computer-based telex/TWX message-switching service.

The bank's complaint, which also accused Graphnet/-Graphic Scanning of overcharging for the services it provided, was filed with the Federal Communications Commission (FCC) here late last month.

The allegations were categorically denied by Barry Yampol, president of Graphnet/-Graphic Scanning.

Citibank said it began using Graphnet's specialized common carrier facilities in 1974 to handle overflow telex/-TWX traffic.

In 1976, the carrier suggested adding the computer-based message-switching system. When the bank refused, Graphnet allegedly threatened to "pull the plug" on the overflow service.

This action would have greatly reduced Citibank's ability to make routine money transfers, so in December 1976, the bank reluctantly agreed to subscribe to the message-switching service, it said.

Replacement System

In July 1978, however, the bank developed its own replacement system and stopped using, as well as paying for, the Graphnet/Graphic Scanning service.

This service, according to Citibank, consisted basically of transmission provided by Graphnet plus formatting, addressing and message-routing provided by Graphic Scanning.

The bank contended that the charges for the individual functions were combined into a "complex amalgam" that resulted in Citibank's being "improperly charged in excess of Graphnet tariff rates."

Furthermore, "Graphnet charged Citibank more than once for delivery of the same message" and "charged for a given speed of message delivery while actually delivering the message at a slower rate." Charges were levied for "processing" by Graphic Scanning when, in fact, "no data processing, as defined by the FCC, was performed," the bank added.

In "willfully and knowingly supplying . . . common carrier services which were not offered pursuant to Title II [of the 1934 communications act], Graphic Scanning was operating in violation of the Act.

"Moreover . . . Graphnet unlawfully sold an . . . expanded communications service, for which it charged nontariffed prices, by adding message switching under the guise of a data processing offering from its affiliate, Graphic Scanning," the bank alleged.

Suits, Countersuits

Citibank and Graphnet/-Graphic Scanning have each filed a number of lawsuits against the other. To date, Graphnet has been awarded approximately $300,000.

A key issue is whether Graphnet has violated the communications act. Earlier this year, the U.S. Circuit Court of Appeals said the FCC is the proper body to decide that question. The complaint Citibank submitted to the commission last month stems directly from that ruling.

The bank asked the FCC to investigate the threats Graphnet allegedly made in 1976 to terminate the original overflow service and the alleged overcharges for the computer telex/TWX switching service. Also, the bank is demanding return of the money it paid Graphnet/Graphic Scanning for the latter service — "an amount in excess of $1.7 million" — plus unspecified damages.

"Citibank has sued us several times in the New York state courts and lost every time," said the Graphnet/-Graphic Scanning president Yampol. He added that the state courts have explicitly rejected Citibank's claims that it was overcharged and subjected to illegal pressure.

Yampol disputed the allegations made by the bank and said the dispute arose mainly because Citibank wanted to buy the Graphnet/Graphic Scanning system and "we didn't want to sell it."

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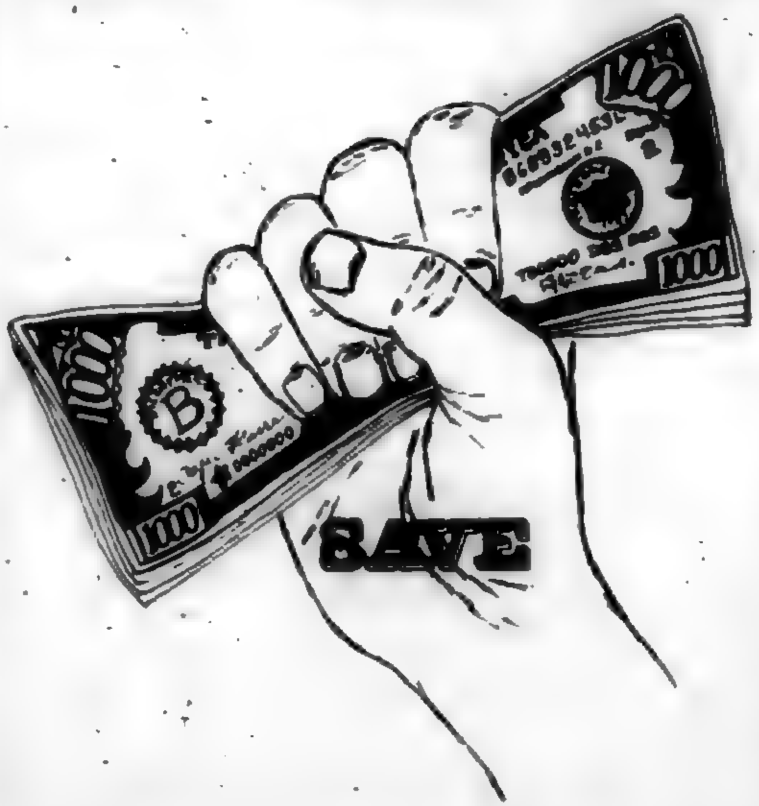

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Users' Millions Riding On Telpak Decision

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. – At first glance, it is an esoteric legal question – whether the Federal Communications Commission's (FCC) decision three years ago to let AT&T terminate Telpak service is subject to court review. But actually, millions and probably billions of dollars paid by users of private-line communications services are riding on the answer to that question.

Immediately after the FCC allowed the phone company to terminate Telpak in 1977, users of the bulk-rated private-line service went to court and blocked the move. The court allowed Telpak to continue, pending a final decision on whether its rates are anticompetitive, as the FCC had decided the previous year.

Last June, the U.S. Circuit Court of Appeals ruled that Telpak rates are anticompetitive, but it also found that the commission, in accepting AT&T's termination petition, had failed to obey its own rules. Specifically, the FCC had neglected to obtain data from the phone company justifying cancellation of the service. After this information is provided, the court said, Telpak can be ended.

Now, both AT&T and the users are seeking reconsideration of the June decision – the phone company because it believes the FCC's 1977 order is not subject to judicial review, the users because they believe existing Telpak rates are not anticompetitive.

The key issue involves "long-run incremental costing" (LRIC) – the method long used by AT&T to determine rates for Telpak and its other communications services.

Under LRIC, new services – i.e. those most subject to competition – contribute nothing to AT&T's overhead costs. This enables the phone company, according to its critics, to gain an unfair price advantage. The critics, along with the commission, want AT&T to use "fully distributed costing," which allocates overhead costs to each of AT&T's services.

According to the FCC, LRIC is inherently anticompetitive; this is the main reason the commission decided in 1976 that existing Telpak rates had to go.

AT&T and Telpak users, however, contend that LRIC is not anticompetitive. The phone company, furthermore, insists that if Telpak rates have to be based on fully distributed costing methods, the service will not be profitable. This was a major reason it decided, in 1977, to terminate the service.

Rehearing Request

Last June, the appeals court agreed with the commission about LRIC, but it was a split decision. One of the three judges who heard the case, Malcolm R. Wilkey, insisted that LRIC is not anticompetitive.

According to Aeronautical Radio, Inc. (Arinc) and the Air Transport Association (ATA), two of the groups that asked this month for a rehearing of the court's decision, it will cost users "well over $100 million per year" if that decision is not reconsidered and Telpak service is allowed to expire.

If the verdict on LRIC is allowed to stand, it will "significantly affect future [commission] ratemaking proceedings and the overall competitiveness of the market for private-line telecommunications services," added the Justice Department in its petition for rehearing.

Because the effect will be to "force AT&T's private-line rates higher than they would otherwise be – enabling AT&T's competitors to find shelter under this high price umbrella – the impact on ratepayers will be highly significant, with likely increased costs to the federal government alone of hundreds of millions of dollars each year," Justice said.

According to the department, the flaw in the commission's and the court majority's view of LRIC is the assumption that this cost-allocation scheme is inherently anticompetitive. "If a firm operates in both competitive and monopoly markets, and uses LRIC pricing in the competitive market, any additional revenue earned there above the LRIC level is a bonus of customers in the monopoly market," said Assistant Attorney General Sanford M. Litvack.

No FX Surcharge, FCC Rules Again

CW Washington Bureau

WASHINGTON, D.C. – The Federal Communications Commission (FCC) has struck a second blow against the New York Public Service Commission (NYPSC), which could save a bundle for data communications users who communicate with Fun City and the rest of the Empire State.

Last Feb. 1, the NYPSC allowed New York Bell to impose a surcharge on private lines leased to out-of-state customers who use common control switching arrangements (CCSAs) and foreign-exchange (FX) circuits. The initial surcharge was $75 per month for each FX or CCSA access line supplied by New York Telephone. It is scheduled to go up this September to $160 per line.

On Feb. 28, however, in answer to complaints from General Electric Co., Aeronautical Radio, Inc. (Arinc) and the New York Council of Retail Merchants, the FCC ruled that the surcharge is illegal. The New York commission then took its case to the U.S. Circuit Court of Appeals, and asked the FCC, meanwhile, to reconsider. Early this month, the commission did so and rejected the surcharge for the second time.

Because the New York Public Service Commission has appealed the FCC's earlier ruling, this month's pronouncement from Washington is not final; it will, however, be considered by the appeals court.

Meanwhile, according to an NYPSC spokesman, the surcharge on out-of-state FX and CCSA subscribers has been suspended "temporarily" by New York Telephone.

The case is significant because a number of other telephone companies reportedly want to invoke similar surcharges and have been following the New York battle closely.

Banks to Act as Agents

Congress Raps But Approves Gas Ration Plan

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Congress swallowed a bitter pill late last month and approved the Administration's standby gasoline rationing plan.

Despite widespread dislike for the plan on Capitol Hill, the Senate and the House of Representatives acceded to arguments that the U.S. needs some rationing plan; that, after five years of effort, this was the best plan the Department of Energy (DOE) is likely to produce; and that, after all, it was congress that directed DOE to come up with some plan in the first place, and it already turned down two previous proposals.

The plan passed easily in the Senate with a two-to-one margin. It squeaked through the House by five votes, although there was general agreement among members of both houses that the plan will be incredibly expensive for those charged with making it work – DOE, state governments and the banking industry.

The recent approval of the plan followed several hours of Senate and House debate that included a large amount of disdainful abuse of DOE and its gas rationing proposal.

The rationing scheme was variously described by congressmen and senators as "ill-conceived," "inequitable," "unworkable," "ridiculously complex," "outrageously costly," "totally unfair" and "an administrative nightmare."

One of the more subdued members commented the plan "could have been constructed by Rube Goldberg." It "looks like Billy Carter wrote it," said another.

But then, what else could be expected from DOE, asked Rep. Clarence Brown (R-Ohio), reflecting what seemed that day to be a fairly popular opinion.

In Congress, however, proposals receiving the most criticism and abuse from legislators are often those facing sure approval.

Better Than Nothing

Backers of the plan won out with arguments that the U.S. must be prepared for the very real possibility of a grave oil shortage. This plan, they said, is better than nothing – which was the highest praise the DOE effort received all day.

The unsuccessful opponents of the plan insisted it could never work, relying as it does on "massive and relatively untested data systems," in the words of Sen. Charles Percy (R-Ill.), to duplicate state computer systems in creating a data base of some 153 million motor vehicle registrations.

The data base will be so difficult to put together and update, Percy said, that "for the first rationing quarter as many as 10 million motorists might receive ration allotments to which they were not entitled, and as many as 15 million individuals might fail to receive allotments to which they were entitled."

Beyond that, it will cost approximately $103 million to produce the registration file, according to one estimate.

Indeed, most of the congressional outrage regarding the plan stemmed from the astronomical estimates for implementation costs, which say it will take as much as $500 million to ready the rationing plan for implementation and cost as much as $2.5 billion for each year it might be in operation.

Banks as Agents

Also, there was concern the plan would overwhelm and possibly destroy the banking industry. Under the proposal, commercial banks would be the main agents of gas rationing – issuing coupons and maintaining ration accounts [CW, June 19].

A last-minute lobbying effort by the American Bankers Association (ABA) against the plan appeared to have some effect on the legislators, but could not carry the day. Many members of both houses worried openly the plan would, as the ABA claimed, be too much for existing banking personnel and information systems to handle [CW, July 28].

But a recent letter from DOE answering many of the ABA objections blunted the effect of the association's disapproval of the plan.

Banks will not be the sole issuers of rationing coupons, DOE assured Congress. Nor will banks be forced against their will to maintain ration accounts, and if they do participate they will be adequately compensated, DOE said.

Because the plan is still in blueprint stage, DOE was able to pledge it will work closely with bankers and other interested parties during the plan's final development.

Now that DOE has the go-ahead, it will ask Congress for the funds needed for the preimplementation period of the proposal, which is expected to take as long as 18 months to get ready.

As presently planned, measures would go into effect if there were a 20% shortfall in gasoline supplies. Localized shortages last year and the subsequent "topping-off" of many drivers' tanks caused shortfalls of as much as 40% per week in some locations.

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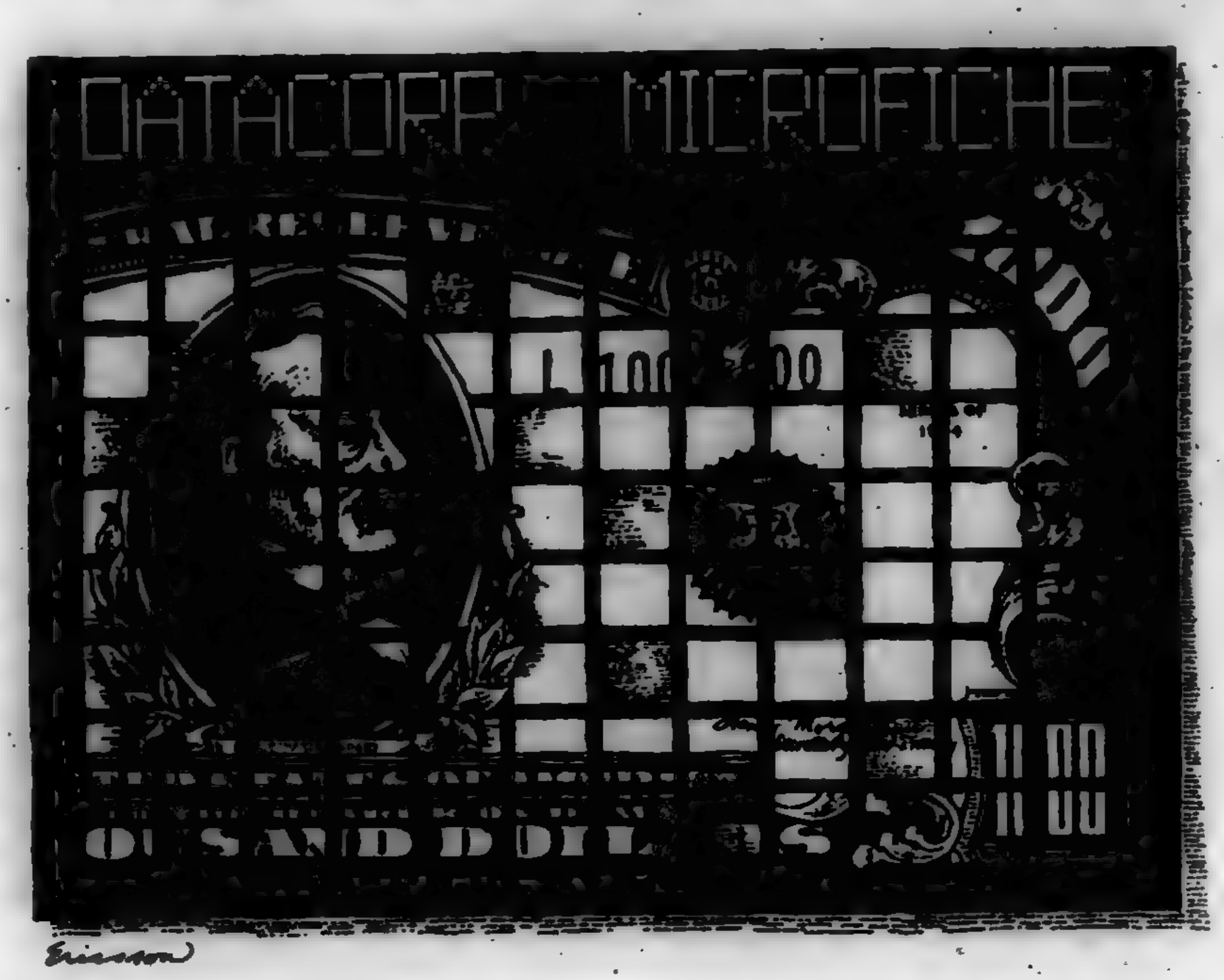

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After Seven Years and $400,000

Court Sentences Information System to Oblivion

By Tim Scannell
CW Staff

GRAND RAPIDS, Mich. — After nearly seven years of planning and expenditures of more than $400,000, the Grand Rapids District Court here has decided to abandon its computer-based court information system.

Plagued by delays, operational deficiencies and bureaucratic disinterest, the Comprehensive Lower Court Information System (Colocis) — which never actually came out of the testing phase — will be permanently tabled in favor of the court's present manual system.

"We had so many (administrative) people we had to deal with, so many other people that controlled the destiny of that effort, that it was doomed to fail," according to James Farrar, a former court administrator here and now a senior staff attorney with the National Center for State Courts in St. Paul, Minn.

Developed on the city's Burroughs Corp. 3500 mainframe, Colocis was eventually supposed to keep track of parking and traffic fines, generate court date notices and generally speed up the whole traffic court process. However, although the system was fully program-tested, had a trained staff and was prepared to run parallel to the city's manual operation, the multithousand-dollar system never got off the ground, Farrar said.

In fact, the most the controversial system ever did was prepare standard operational reports for the court's traffic bureau.

System Collapse

While opinions vary on why the system collapsed, most sources agree that plans for the court computer began to fall apart midway through the project.

For example, just as the project was building up speed, the city temporarily lost interest when the State Court Administrator's Office in Detroit announced it was expanding its data center and would be offering services to limited jurisdiction courts like the one in Grand Rapids. This action had a "substantial impact on the momentum of the project" and delayed things by about six months, Farrar claimed.

Friction between the city and the court eventually resulted in a legal suit, initiated by the court, contesting the city's sudden disinterest in Colocis. The suit also protested the city's desire to fire Colocis' only programmer/analyst, Howard Friar, because he did not meet certain residency requirements, Farrar noted.

Although the court subsequently won the support portion of the suit, the city dismissed Friar because of the residency question.

"Once [Friar] was gone, the system started going downhill," Josef Sopper, who replaced Farrar as court administrator, said.

Like Farrar, Sopper admitted that Colocis failed because there were too many bureaucratic hands in the pot and no clear administrative control of system development.

When Colocis was first proposed, computer-based criminal justice systems, which were fairly new at the time, adhered to the current state of the art — an interrelated-type architecture. By comparison, today's systems are modular and made up of related but independently operating parts.

(Early in the game, Grand Rapids' court officials also considered installing the computerized prosecutor's management information system [Promis], but decided against it because the system is too broad-based for a smaller court's judicial needs.)

Basically, the Colocis interrelated architecture had a lot to do with its demise. When parts of the court system began to fail, the whole system collapsed like so many dominoes, court administrator Sopper explained: "An error in one place screwed up all of the [system's] reactions on down the line."

In addition, when the court was developing and testing Colocis on the city's Burroughs Corp. 3500 mainframe, it found that the computer and the city's DP staff could never keep up with the demands of the batch-oriented judicial system, Farrar said. In fact, even though the city was billing the court about $130,000 annually for its computer time, the court was using computer time worth only a fraction of that amount.

One reason for this billing inconsistency was that while the city was using the computer to process necessary water, tax and other bills, it was also trying to develop a fairly extensive police information system, Farrar stated. All of the city's background computer work reportedly limited the time available to the court to develop Colocis.

Correction

In its July 21 editorial regarding the Federal Aviation Administration's aging air traffic control (ATC) computers, *Computerworld* erroneously referred to "first-generation IBM 9020 mainframes." The IBM 9020 series of ATC computers — installed in the 20 U.S. Air Route Traffic Control Centers to direct traffic en route among the country's 400 airports — are specially configured third-generation IBM 360 machines that were introduced in 1964.

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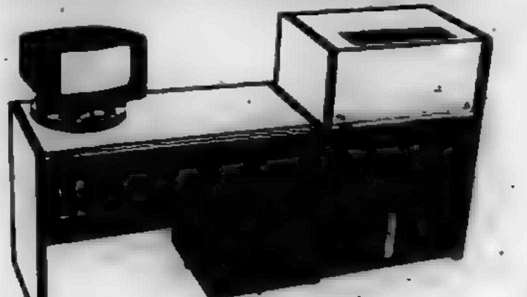

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In Open Job Market

Consultant Sees Benefits in Using Free-Lancers

By Rita Shoor
CW Staff

KITTERY, Maine — MIS managers who balk at the idea of DP consulting firms subcontracting projects to free-lance programmer/analysts have a "distorted view of the world," according to Michael Broos, president of Floating Point, a firm offering both consulting services and custom software development.

The general feeling at the larger consulting firms that specialize in system development is that their clients feel "less confident" in the consulting firm's ability to control a free-lancer than one of its own employees, and this perception of the clients' views is probably correct, he said.

What the clients seem to forget or just do not realize is that consulting firms actually have very little control over their own employees, he said. The market is so open that the typical programmer/analyst will leave if he is not happy — they [consulting firms] have no hold on their employees in terms of job security.

If the firm has subcontracted the work to a free-lance operator, it might actually be able to exert more control.

Broos cited as an example his own current situation — one in which he is subcontracting part of a large project from a major New England-based consulting firm. "If they or the client aren't happy with my work, they can just say good-bye to me tomorrow," he said, "and there really isn't anything I can do about it."

If the same sort of situation arose with a consulting firm's employees, the company might hesitate to fire the employee because of the possibility of running into Equal Employment Opportunity (EEO) problems, he said.

'Real World'

Broos, who brought approximately 10 years of research experience in MIT's Laboratory for Computer Science to what he called "the real world" of business-related information processing in early 1979, also offered the observation that client management could derive benefits by maintaining a flexible approach to the exact methodology used in implementing projects as long as results are achieved.

Broos' first project involved converting to Cobol a financial modeling system that had been originally coded in Fortran.

However, in addition to the straight conversion, the client wanted the system redesigned to provide greater algorithmic flexibility.

Rather than writing the new programs in Cobol, Broos opted to develop for the client a custom-tailored financial modeling language that non-programmers could use, with the language interpreter written in Cobol. The client went along with the idea and received a software product that, according to Broos, allows financial analysts rather than programmers to develop new models.

The information specialist also pointed out that the system had originally been developed by another consulting firm that he described as "good in mathematics but bad in DP." The algorithms for the model fit the utility company client when they were developed "several years ago," but the consulting firm did not provide a flexible means to update the formula to conform to ever-changing federal regulations. The result was that programs were difficult to modify, and the client eventually opted for the completely new system, he said.

Academia Ahead

Despite the emphasis on constant change that is a factor in many DP installations, "academia is about 10 years ahead of the business world [in terms of developing new computer systems]," according to the researcher-turned-consultant. "In a computer science research laboratory, you can work on anything that interests you — assuming that you write the proposal in such a way as to obtain the necessary funds."

The standard for evaluating the success of a system is that it be "tasteful and elegant," and there is no requirement for cost-justification of the development effort. The result is that technicians in research installations are "always on the leading edge of technology," with their own colleagues functioning as the end users of new systems, he said.

"I was tired of building prototypes of systems that might be used in the next decade," Broos recalled. "I wanted to see my work put to more immediate use."

In addition to acting as a consultant, Broos runs a seminar entitled "Integrating Word Processing and EDP: Technology, Architecture Planning," for the Harvard University Laboratory for Computer Graphics.

A question Broos usually gets from the managers who attend these seminars is "what new software products are available?" The former computer scientist predicted the evolution of a "software and hardware supermarket" as one possible answer to the question.

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Aug. 25-27, San Jose, Calif. — **HP/1000 International Users Group Conference.** Contact: Glen A. Mortensen, Intermountain Technologies, Inc., Idaho Falls, Idaho 83401.

Aug. 25-27, Dallas — **Systems Project Management.** Contact: Arthur Andersen & Co., 69 W. Washington St., Chicago, Ill. 60602.

Aug. 25-28, Los Angeles — **Implementing Cryptography in Data Processing and Communications Systems.** Contact: University of Southern California, Continuing Engineering Education, Powell Hall 216, Los Angeles, Calif. 90007.

Aug. 25-29, Saint Charles, Ill. — **Computer Systems Design.** Contact: Arthur Andersen & Co., 69 W. Washington St., Chicago, Ill. 60602.

Aug. 26, Washington, D.C. — **Computer Graphics for Business Charting and Mapping.** Contact: AUI Data Graphics, 1701 K St., N.W., Washington, D.C. 20006.

Aug. 26-28, Philadelphia — **Project Management Workshop.** Contact: Atlantic Software, Inc., 5 & Chestnut Sts., Philadelphia, Pa. 19106.

Aug. 26-29, Harbor Springs, Mich. — **International Conference on Parallel Processing,** sponsored by the Institute of Electrical & Electronic Engineers. Contact: Dr. T. Feng, Department of Computer Science, Wright State University, Dayton, Ohio 45385.

Aug. 27-28, Asilomar, Calif. — **Workshop on Picture Data Description and Management,** sponsored by the Institute of Electrical & Electronic Engineers. Contact: Prof. K.S. Fu, School of Electrical Engineering, Purdue University, W. Lafayette, Ind. 47907.

Sept. 15-17, Chicago — **Systems Analysis and Design: Concepts and Effective Practice.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Sept. 22-24 in San Francisco.

Sept. 15-17, New York — **Data Base Management Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Sept. 29-Oct. 1 in Chicago.

Sept. 15-17, New York — **Data Processing: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 15-18, Seattle — **Senior Project Management.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Sept. 22-25 in Atlanta.

Sept. 15-18, Brussels, Belgium — **Evaluation of Internal Controls.** Contact: Arthur Anderson & Co., Center for Professional Education, 1405 N. 5 Ave., St. Charles, Ill. 60174.

Sept. 15-19, Hong Kong — **International Micrographic Congress.** Contact: Information Technology Services Pty. Ltd., P.O. Box 1239, North Sydney NSW, 2060 Australia.

Sept. 15-19, Detroit — **CICS/VS Application Programming.** Contact: On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661. Also being held Sept. 22-26 in New York.

Sept. 15-19, Seattle — **Structured Programming: Design, Coding and Implementation Techniques.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Sept. 16-19, Rio de Janeiro — **Congress on Automation Controls.** Contact: Brazilian Congress, Department of Electrical Engineering, COPPE/UFRJ-C.P., 1191-ZC-00, 20.000 Rio de Janeiro, Brazil.

Sept. 16-18, New York — **Auditing, Security and Controls.** Contact: Advanced Computer Techniques Corp., 222 N. Central Ave., Phoenix, Ariz. 85004.

Sept. 16-18, Los Angeles — **Managing the DP Professional — The Challenge of the '80s.** Contact: UBI Enterprises, 30 Milbank Ave., Greenwich, Conn. 06830.

Sept. 16-19, Washington, D.C. — **Voice Input/Output for Computers.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Sept. 17, New York — **Four Phase Users Meeting,** sponsored by the Eastern Chapter of the Four Phase Users Association. Contact: Janet Bonante, P.O. Box 765, Old Bridge, N.J. 08857.

Sept. 17, East Brunswick, N.J. — **Unix Programming Environment,** sponsored by the Association for Women in Computing, New Jersey Chapter. Contact: Grace Shen, Bell Laboratories, Room IK 205, 50 Cragwood Road, S. Plainsfield, N.J. 07080.

Sept. 17, Madrid, Spain — **Computer-Aided Thinking for Financial Executives.** Contact: STSC, Inc., Seminar Programs, 11 Clearbrook Road, Elmsford, N.Y. 10523.

Sept. 17-18, Washington, D.C. — **Information Systems Risk Analysis Training.** Contact: CRC Systems, Inc., 4020 Williamsburg Court, Fairfax, Va. 22032.

Sept. 17-19, Palo Alto, Calif. — **Symposium on Small Systems,** sponsored by the Association for Computing Machinery, Inc. Contact: Nancy M. Grosch, 3669 Brach Way, Santa Clara, Calif. 95051.

Sept. 18-19, Geneva, Switzerland — **Controlling International Projects for Profitability.** Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., Saint Charles, Ill. 60174.

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Managers on the Move

CARLTON H. NIMAL has been elected vice-president of Management Information Systems of Dale Carnegie & Associates, Inc., at its Long Island, N.Y., location.

He will be responsible for computer services, statistical services and word processing. He has been with Dale Carnegie for the past 15 years, most recently as manager of computer services.

•••

THOMAS J. McARDLE has joined Reuben H. Donnelley, the New York-based Yellow Pages sales and marketing firm, as director of information services.

He has 14 years' experience in data processing, most recently at Arthur Young & Co., where he was a management consultant. Previous to that he had been employed at Boeing Co., General Dynamics and Computer Sciences Corp.

He graduated from Iona College, N.Y., with a B.S. degree in mathematics and has done graduate studies in computer science at the University of Rhode Island.

•••

WILLIAM R. LAUTERBACH has been appointed director of management services at Ciba-Geigy Corp., Ardsley, N.Y.

He joined the former Geigy Chemical Corp. in 1960 as a systems analyst in management services; later he became the manager of that department in Greensboro, N.C.

Lauterbach has spent the past year and a half in Basel, Switzerland, on the management services staff of Ciba-Geigy, Ltd., the parent company.

He received his B.A. degree in political science from Queens College and his M.B.A. degree from New York University.

•••

JOHN F. McAULEY has been appointed manager of technical planning for corporate information systems at the Union Camp Corp.'s headquarters in Wayne, N.J. He will be responsible for long-range planning involving the company's DP facilities and corporate communications network.

Prior to his recent promotion, he was manager of systems programming in Union's corporate data center.

A graduate of Rutgers University with a B.A. in political science, he joined Union in 1971 as a systems programmer.

•••

THOMAS J. WILKINSON has joined Systems & Computer Technology Corp. (SCT) as manager of computer operations at SCT's Genesee Community College site in Batavia, N.Y., and **MAX PEREZ** will join the SCT Inter American University of Puerto Rico as assistant director of operations.

Wilkinson will assume management responsibility for establishing and evaluating computer services operations performance goals, developing work flow procedures, managing levels of quantity and quality of work.

Wilkinson was formerly employed as an account executive for Compusearch, where he recruited operations and supervisory personnel for the firm's placement office. Before that, he served at the Board of Cooperative Educational Services, a centralized regional educational computing facility serving 23 school districts in New York.

Perez will assume responsibility for establishing and evaluating operations objectives, developing work flow procedures and managing the preparation of production schedules and technical support functions at the San Juan campus.

He has been associated with computer operations at the New Jersey Bank in W. Paterson, N.J., most recently as operations supervisor. A graduate of the Electronic Computer Programming Institute in Paterson, he is presently attending Montclair State College.

Carlton H. Nimal

HARRY A. YOUNG has been named manager of systems and data processing for Special Metals Corp., a member of the Metals Group of Allegheny Ludlum Industries, Inc.

Young joins Special Metals from H.J. Heinz Co. in Pittsburgh, Pa., where he had been employed since 1971, most recently as a consultant in financial analysis.

He is a graduate of Monmouth College in Illinois; he received an M.B.A. from the University of Pittsburgh.

•••

RICHARD D. BRYAN has been elected vice-president in Central National Bank of Cleveland's Management Services Division.

Bryan recently joined Central from the Ocean Systems Division of Gould, Inc., where he had been director of business systems control since 1978. Prior to that, he was a programmer/analyst at Ohio Bell.

He holds a B.S. in mathematics from Ohio University.

•••

RONALD J. BOHM has been promoted to director of information resources at Playboy Enterprises, Inc. Bohm will have responsibility for all information systems used by Playboy and its subsidiaries, with the exception of the facilities of the Playboy Clubs International.

Bohm joined Playboy in 1977 as director of management decision systems. He was previously with Knight Ridder Newspapers, Inc., as a consultant and special project analyst. He also held a related position at Irving Trust Co.

Bohm received his Ph.D. in management science from MIT, with a B.S. in mathematics and an M.S. in finance and economics.

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MIAMI — AT&T and Knight-Ridder Newspapers, Inc. recently began a six-month test here of Viewtron, an interactive home information system that utilizes a standard color TV set as the terminal. The test, involving about 160 families, employs two input keyboards and permits the viewer to buy groceries and several other products on-line.

Services will be provided free of charge during the trial to all of the viewers who are located in Coral Gables, a Miami suburb, according to the two sponsors.

Viewtron is "somewhat similar" to Prestel, the videotex system that began commercial operation in Britain several months ago. Aside from the British offering, the French and Canadians have also developed videotex systems, and trials are now under way or planned in those two countries as well as in several others.

Videotex systems typically use standard dial-up telephone circuits to connect a computerized central data base with a TV set in the viewer's home or office. The data base information is formatted into individual TV display frames or "pages," and each is uniquely numbered.

Grand Union, Sears and J.C. Penney will be among the firms providing home shopping services. Purchases will be billed to the viewer's credit card.

The viewer selects the information he wants by inputting the related numbers into a hand-held control unit about the size of a pocket calculator. He begins the access process by viewing an "index" frame listing the major subjects in the data base and their access numbers. Generally, he must look at additional, more specific indexes before retrieving the information he is seeking.

Shortened Process

In the Viewtron test, this process has been shortened. The viewer can input any of 100 key words representing the topic he is interested in, and the system will then supply the information immediately. The key words are fed in through a typewriter-like keyboard attached to a "decoder," an interface linking the terminal components with the telephone circuit, the sponsors said.

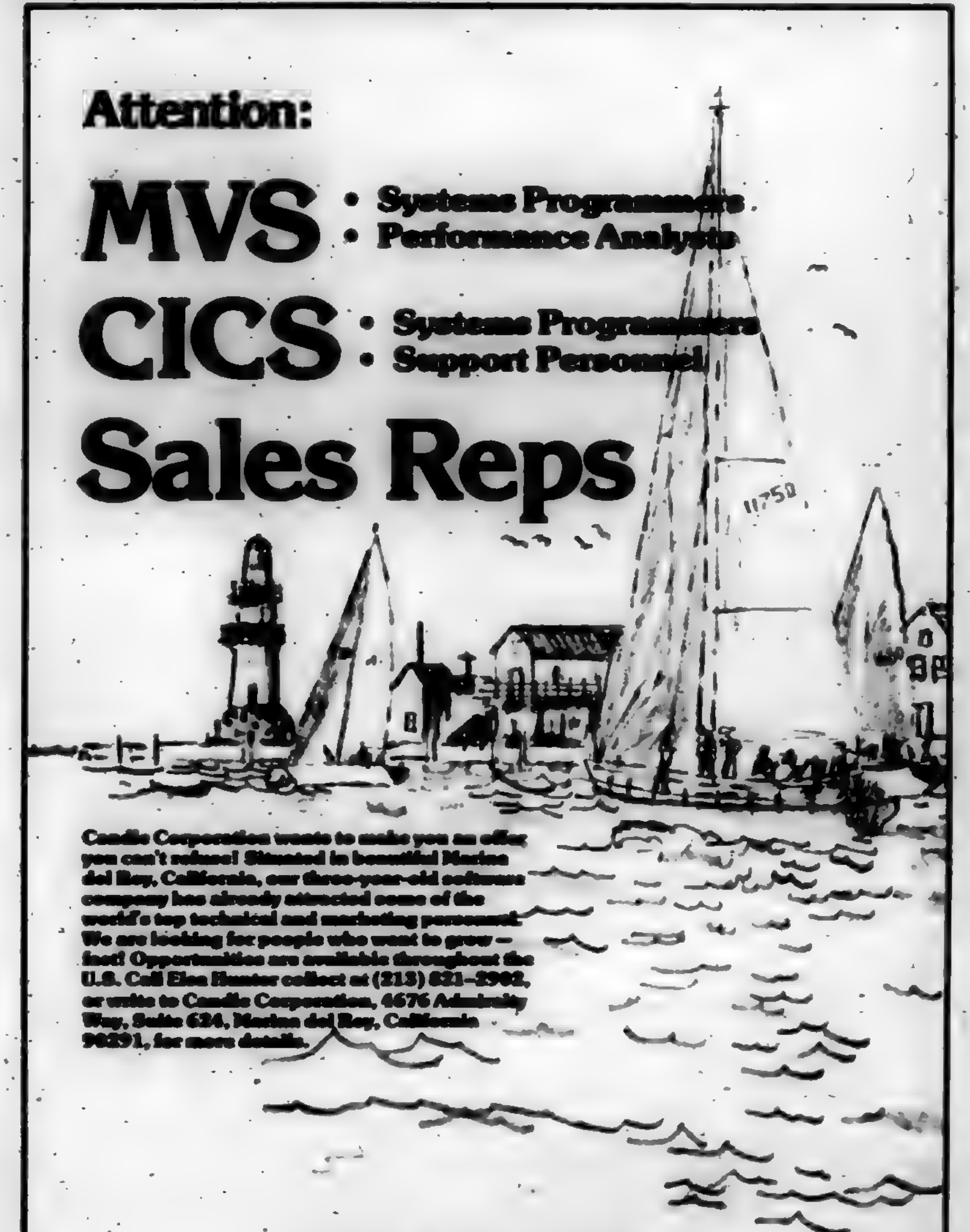
Grand Union, Sears and J.C. Penney will be among the firms providing home shopping services during the Viewtron trial. Purchases will be billed to the viewer's credit card and will be delivered by mail or truck to the viewer's home.

On-line home banking, entertainment and travel services will be among the other services provided. The participating firms include Eastern Airlines, Southeast Banking Corp., Shell Oil Corp., *Congressional Quarterly, The New York Times, The Miami Herald* (published by Knight-Ridder Newspapers), and Consumers Union. Altogether, the Viewtron data base will reportedly contain about 15,000 TV display pages of information.

The terminals were developed by AT&T, Bell Laboratories and Western Electric.

The phone company, together with Knight-Ridder, will conduct "extensive market research on participants' reactions to the terminals, data base and other aspects of the system," the joint sponsors said. It did not indicate when a commercial Viewtron offering would begin.

This is a typical terminal installation presently in the Coral Gables, Fla., Viewtron test. Equipment consists primarily of a modified color television set, a typewriter-like keyboard and a remote control device similar in appearance to a hand-held calculator.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In Under-$15,000 Class

Pertec PCC 2000 Features Software, Not Speed

By Hillel Segal

SCOREBOX

System: Pertec PCC 2000
Current Price: $12,270

BENCHMARK RESULTS

		TIME
C-1	(Scientific/- Engineering Problem)	28:48.4
C-3	Accounts Receivable	6:04.3

OTHER BENCHMARK RESULTS

North Star Horizon	
Cromemco System Two	To be covered
Texas Instruments 771	in future issues
Vector Graphic System B	
Decstation 78	

Pertec Computer Corp.'s PCC 2000 desktop computer system received favorable reviews from customers, but ran more slowly than most other systems tested so far in its price class – the under $15,000 category. Among the first six computers in that category to undergo benchmark testing sponsored by the Association of Computer Users, the PCC 2000 took longest to complete two applications problems, but it received favorable reviews from most users nonetheless.

The PCC 2000 is the first system in its price range to be discussed in this column. In upcoming issues of *Computerworld*, highlights of Series No. 1 benchmark testing conducted on the North Star Computers, Inc. Horizon, Cromemco, Inc. System Two, Texas Instruments, Inc. 771, Vector Graphic System B and Digital Equipment Corp. Decstation 78 will be presented.

The tests, written in Basic where that language is available, are identical to the Series No. 2 programs run on systems priced at $15,000 to $25,000, which have been summarized over the past several months [CW, Aug. 4].

One of the startling results of the Series No. 1 benchmark tests is the realization that in the accounts receivable application problem, two of the systems priced at less than $15,000 outperformed all of the 12 systems in the higher price range . . . and the top performer cost less than $7,000! That system will be featured in a coming issue.

The average time for the accounts receivable problem in the lower price bracket was better than the average for the more expensive computers. In the scientific/engineering problem, however, the results were closer to what you might expect: The costlier systems ran faster as a whole. But the IBM 5110 and Datapoint 1170, which took a beating on this test, were again outperformed by the under-$15,000 computers.

This is hard evidence that the old axiom, "You get what you pay for," doesn't always hold true in the world of data processing. Only an examination of actual performance under realistic conditions can reveal the processing capabilities of a system.

In the case of the PCC 2000, its performance on the scientific/engineering test was not its strongest suit; it took more than 28 minutes to complete the problem. Yet this was still better than the IBM 5110 in the higher price range. The runtime average for all systems in Series No. 2 ($15,000 to $25,000) testing program was 13:23.

The PCC 2000's results in the accounts receivable test were closer to the rest of the group, and its time of 6:04.3 was not far from the 12-system average of 8:04 for the $15,000 to $25,000 group. Furthermore, we should note that the PCC 2000's results were much better in the math-oriented CPU test, diskette-based I/O test, new product development problem and ease-of-use test. And in actual practice, none of the users contacted indicated any dissatisfaction with speed of operation.

This is the 13th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Perhaps one reason for this could be that speed is not a primary consideration in the entry-level computers. The magnitude of problems which the computer is expected to solve is of a much lower order than those a mainframe would likely be presented with.

Moreover, in many cases, a low-cost system is replacing not another computer, but a manual recordkeeping system. Thus the convenience of the applications software may outweigh considerations of sheer processing power.

The PCC 2000 system tested included all the basics of a small computer in its $12,270 price tag. The processor with 64K bytes of memory, a CRT/keyboard, two dual-density floppy disks, a dot-matrix printer and the Basic language are included in the price of the system tested. "Next to service availability, we felt price to be an important factor in our choice of the 2000," one user commented.

Available options for the hardware include hard disk drives with 10M- to 40M-byte storage capacity, add-on terminals and a daisy-wheel printer for high-quality print applications.

While the system was tested with the PCC 2000 Extended Basic language using the 2000 Basic operating system, two other operating systems are available for different applications. Pertec offers a multiterminal executive operating system which accommodates up to five users. A modified Basic language with additional file management techniques and other enhancements is provided with this executive.

The popular CP/M operating system developed by Digital Research, Inc. is also available for the PCC 2000. When using CP/M, the Pertec system may be equipped with Microsoft, Inc. Basic-80, Fortran-80 or Cobol-80. Numerous applications packages developed for the CP/M operating system may be purchased from outside vendors, a type of cross-brand compatibility that is encouraging to see in the small computer field.

Pertec also offers several applications packages in the areas of accounting and inventory control. Dealers often use these as a starting point in developing custom software for the end user.

Applications in Test

Customers contacted by the independent consulting firm which performed the benchmark tests were using the system mostly in the traditional areas for which Pertec had developed packages. A few were using the computer for other applications, including statistics, word processing and special budgeting programs. In the majority of cases, users had purchased a turnkey system and were not themselves involved in programming.

The most popular configuration included dual floppy disks and a Nippon Electric Co. Spinwriter printer. Several customers indicated they intended to add terminals and expand their storage capacity with a hard-surface disk drive.

The ability to start with a low-cost system and add to it later was cited as a particularly attractive feature. As one customer said, "What I like best is the fact that the computer is a compact, self-contained unit, yet expandable in terms of additional storage devices and terminals."

Next week, we continue our examination of under-$15,000 systems with the North Star Horizon.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

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Professional Societies Plentiful

Turnaround Time

By Larry E. Long

Q As a DP manager, I have often wondered why there are few if any DP professional organizations. I have been in data processing for 18 years, and the only organization I have ever heard of for DPers is the Data Processing Management Association, which I've been a member of in the past. If there are more, would it be asking too much to have at least one article on them giving a mailing address and brief synopsis of each?

A Actually, there are a great many professional organizations, societies and user groups that foster the advancement of computers and information systems. There are also many others that have a peripheral, but significant, interest in these areas. These organizations provide a vehicle for DPers to learn more about their profession and to exchange ideas with others. You've asked an excellent question that is of interest to thousands of DPers.

In order to be comprehensive and accurate in my response, I would like to invite representatives of these professional societies to provide me with the following information: organization title; a brief summary of interests and functions; the address and telephone number at which more detailed information can be obtained (probably the national or international headquarters).

It is to be hoped that personnel at the respective headquarters will see and respond to this request, but, just in case, I would encourage chapter presidents to bring this inquiry to the attention of headquarters personnel.

Responses will be published in *Computerworld* for the information of the computer community.

Q Having been in DP only three years, I would be hesitant to make a generalization about all DP management, but I can certainly speak of those where I work.

Actually, I get a great deal of personal satisfaction from my job as a programmer/analyst, but I do have a lot of gripes about management and my fellow workers. The one thing that bugs me the most is that no one ever says "thank you," "good job" or "keep up the good work." I've spent countless extra hours to meet a project deadline. Recently, I suggested a procedure that will ultimately save the company $20,000 annually — not a word.

Neither management nor other programmer/analysts has ever provided any positive feedback. On the other hand, I've had enough negative feedback to last a lifetime. It's frustrating and demoralizing not only to myself, but to a number of others in the same boat.

A Your grievance is a universal problem and not limited to DP. A person should enjoy his work and DP, in my biased opinion, affords a tremendous opportunity to do so.

In order to be truly fulfilled in one's occupation, there must be continuous feedback. This feedback should include the good with the bad, but it often does not. One-sided feedback will build ill feelings and probably affect productivity. Everyone needs to be encouraged to strive for their best effort.

Perhaps I can give you some solace. Even though he doesn't give you any positive feedback, the alert manager will recognize exceptional work.

Q We presently have a remote job entry station that all programmers use. The turnaround time varies from a few minutes to two days, with an average of about 30 minutes.

I've been assigned the task of investigating the economics of converting to interactive program development. Do you have any figures that would help in the economic analysis?

A In the DP business there are very few questions with a clearly defined answer. Whether or not to convert from batch to interactive programming is one of them.

The investment in hardware and software necessary to support interactive programming should have a payback of less than one year. Most corporate investment alternatives do not provide this kind of opportunity.

The one-year payback period is based on a conservative estimate of an increase in programmer productivity of 25%. Depending on the new systems development/maintenance ratio and the level of sophistication of the interactive environment, productivity increases could be as high as 100%.

Long is a professor at Lehigh University, a DP consultant and author.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

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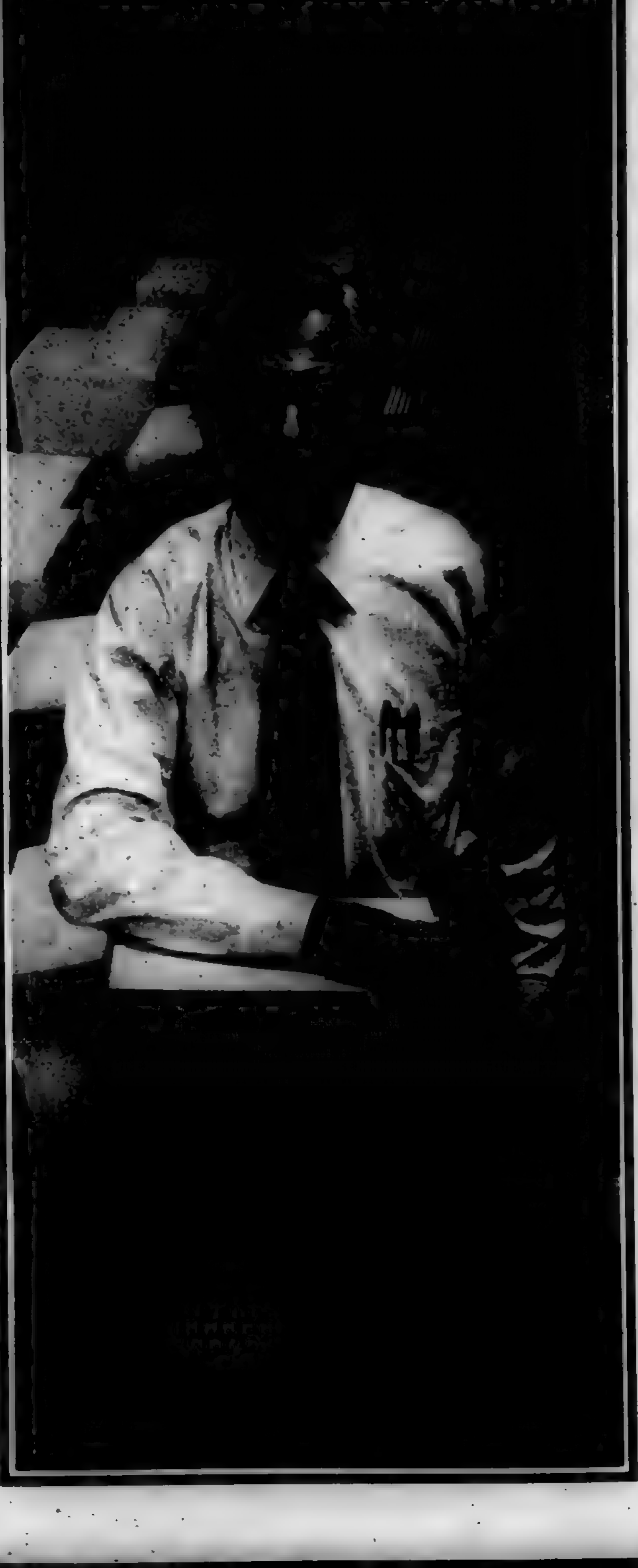

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PERKIN-ELMER

The strengths of PL/I offset the weaknesses of Cobol.

Opting for PL/I

By Howard Foedick

With the personnel shortage rendering the "software problem" at most installations ever more acute, managers at all levels have left few possibilities unexplored in their quests to increase programmer productivity. New programming methodolgies, various software tools, innovative managerial psychologies — all have been applied with fair degrees of success.

However, one aspect of data processing that has remained standard thoughout these changes and improvements is the use of Cobol for applications development. According to various surveys, more than 80% of all applications are written in Cobol. Surely, Cobol has its strengths — but isn't there a better way?

More and more managers are beginning to think so and are replacing further development of Cobol applications by the use of various report-writer tools, on-line inquiry development systems and nonprocedural languages. The success of these "report packages" is evidenced by the sheer volume of advertisements they appear to support. One sees full-page ads for an ever-widening variety of these products in the trade journals and newspapers.

There is, of course, another approach to speeding the development of applications normally written in Cobol. This is to replace Cobol use by some other high-level programming language. Many languages have been suggested for this purpose — Pascal, C, RPG-III and a dozen others.

Articles on these languages often claim that Cobol is deficient is some basic respect and that the proposed language is the panacea, being more perfect in every way. Some of these articles have prompted far-ranging debates in Letters-to-the-Editor columns. Almost invariably, hoards of angry programmers rise to defend the virtues of their own favorite languages.

No Simple Choice

Unfortunately, the manager must inevitably conclude that the question of language choice is not simple. Programmer prejudices aside, most languages proposed as Cobol replacements present certain practical problems. Some are rather exotic. They may not be well known or even available on the particular machine at hand. Programmers may not be familiar with them.

On the other hand, the various languages touted as replacements for Cobol may offer some real advantages in terms of their claims to higher programmer productivity. They may, in fact, be easier to use or maintain or otherwise aid in the rapid development of applications.

So, the question remains open, and the opinions are varied on the topic. Perhaps this is the bottom line on languages — the best language to use is the one most suitable to the application. With the applications so various, and Cobol quite acceptable for most in the data processing environment, Cobol is the language of choice by default.

In this article, another alternative will be presented. The PL/I programming language will be considered as an option. The intent is not to present PL/I as a panacea for the software problem in industrial data processing. It isn't. Nor is it to claim that PL/I is in any sense a "better" language than Cobol. As is obvious from its use at the large majority of installations, Cobol has unquestionable utility and value that this author quite readily acknowledges. The purpose here is simply to suggest that some managers may want to consider PL/I as an alternative to Cobol and to enumerate a few reasons why.

First, let's look at some aspects of the PL/I language that might recommend its use. Later we'll explore some disadvantages to using PL/I.

Block Structure

In terms of increased programmer productivity, PL/I offers some desirable features. It is a naturally block-structured language. This means that it facilitates structured programming in that it does not require the programmer to make any adjustments to his code in order to write structured programs. In terms of applications development, this may be the language's chief advantage as opposed to Cobol. Cobol sometimes requires certain paragraphs to be PERFORMed out-of-line.

Where this feature of the code becomes particularly important, of course, is during program maintenance. The well-modularized, structured program can be quite a bit easier to maintain than a program with many out-of-line statements.

Ultimately, however, whether the programmer properly structures and modularizes his code is up to him. The point here is only that PL/I more naturally implements structured code than does the lingusitics of Cobol.

The figure illustrates the differences between Cobol and PL/I in writing structured code. In Cobol, statements for reading a card and a nested IF had to be PERFORMed because of the function of the period in the language.

(Continued on Page 28)

Structured Code in PL/I and Cobol

Cobol may require certain statements to be written out-of-line because of its syntax. The new Cobol standards, expected in 1981, will surely remedy this inconvenience in writing structured Cobol. PL/I does not have this restriction, although you'll notice that the end-of-file situation is handled by an On-Code condition exit.

Sample code in PL/I:

```
ON ENDFILE (INPUT) EOFFLAG = 'YES';

IF (A = B) THEN
     DO;
     READ FILE (INPUT) INTO (INPUT_AREA);
     IF  (C = D) THEN
          E = C + D;
     END;
ELSE
     WRITE FILE (OUTPUT) FROM (OUTPUT_AREA);
```

Sample code in Cobol:

```
      IF A = B
           PERFORM READ-PARAGRAPH
           PERFORM NESTED-IF-PARAGRAPH
      ELSE
           WRITE PRINTLINE FROM OUTPUT-AREA.

  READ-PARAGRAPH.
      READ INPUT-FILE INTO INPUT-AREA AT END MOVE 'YES' TO EOFFLAG.
  READ-PARAGRAPH-EXIT. EXIT.

  NESTED-IF-PARAGRAPH.
      IF C = D
           ADD C  D GIVING E.
  NESTED-IF-PARAGRAPH-EXIT. EXIT.
```

A Code Comparison

IN DEPTH

(Continued From Page 27)

PL/I did not require such compromises in the code. The new Cobol standard, expected in 1981, will almost surely rectify this basic inconvenience in writing structured Cobol programs. (On this note, it appears probable Cobol will be significantly improved by the new standards in other ways as well).

Another aspect of PL/I's structure that may offer advantages is that the PROCEDURE (or routine) can be readily adapted to use as either an internal or an external routine. This provides a flexibility in this respect that Cobol lacks.

Economy of code is important, too. This is one of the primary accusations detractors make about Cobol. PL/I is generally a more terse language than Cobol. Where the applications to be developed are small and well understood, PL/I can facilitate their being completed more quickly than with Cobol.

For example, PL/I allows use of numerous defaults. The programmer who uses these default options can save code generation and still maintain a high standard of readability. Even in the case of large programs, PL/I versions typically involve a little less code than their Cobol counterparts.

Similar to Fortran, PL/I implements many language features through *functions*. The most useful functions are the 22 provided for string manipulation. Most of these string functions lack equivalents in Cobol. In fact, historically speaking, one major respect in which Cobol has been improved by the Codasyl committees over the years was through the development of the verbs STRING, UNSTRING, INSPECT/EXAMINE and the OCCURS DEPENDING ON clause. The importance of string-handling capabilities should not be underestimated. In modern information processing environments, the need for the programming language to offer such abilities is more critical than was once believed.

Other PL/I functions may be useful in particular programming situations. For example, a full complement of arithmetic and mathematical functions is provided. This is handy in those fairly rare instances in which a program may be required to do some heavy numerical processing. Functions are also available for array handling, I/O and various systems programming purposes discussed below.

Systems Programming Qualities

Historically speaking, PL/I was noted for being one of the first higher level languages to offer certain capabilities previously restricted to assembler languages. These features give the language some ability in the area of systems programming. This is important here because certain of these features are quite useful in everyday applications programming.

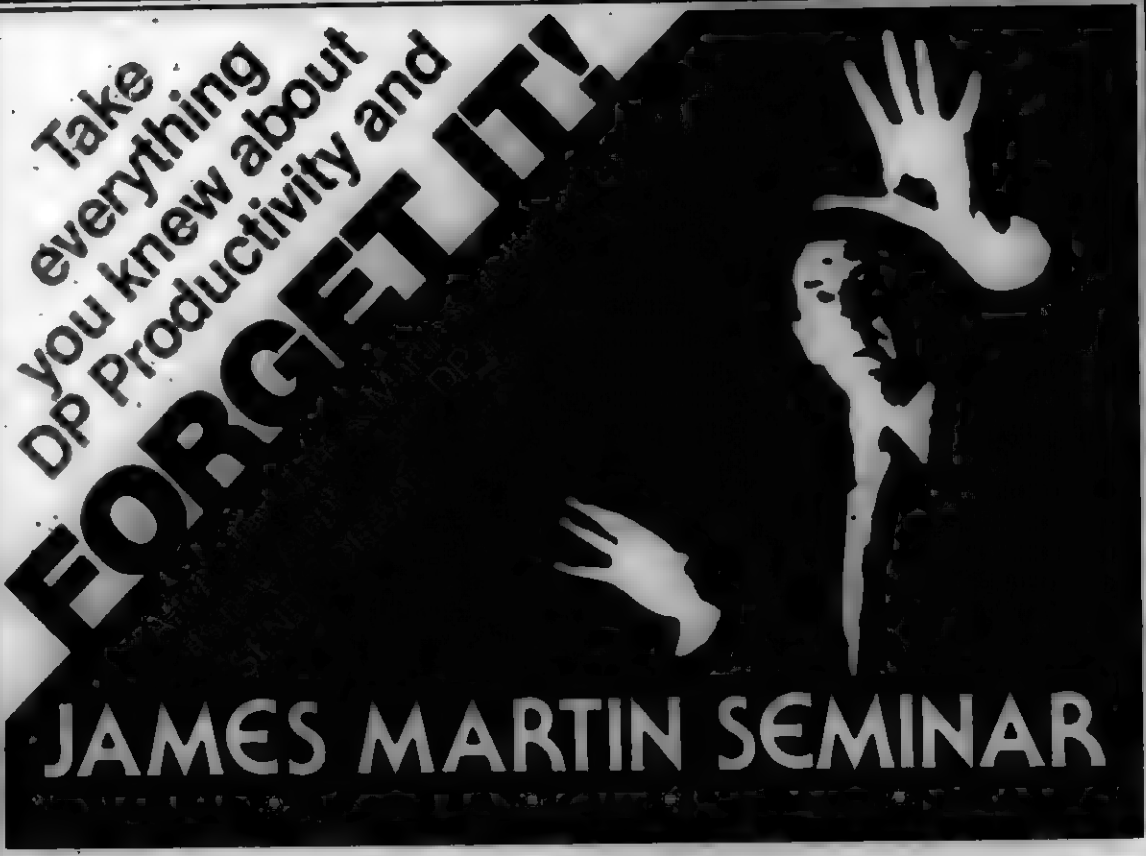
For example, PL/I has bit manipulation capabilities. This is handy in an applications program that must initialize bit pattern attribute bytes, for example, in working with IBM's Customer Information Control System (CICS) or IMS/DC. PL/I also allows working with addresses. This can be useful in various forms of list processing internal sorting.

Other areas in which PL/I has some systems programming abilities will be less frequently used by the applications programmer. Having the option to use them, however, can be an advantage. The most important aspect of their use is that the programmer is not required to know the complex formats of their assembler language macro instruction equivalents.

In PL/I, for example, it is relatively easy to write reentrant code. Dynamic storage management is significantly easier to program than in assembler language. And so is multitasking. A full macro language is provided, and condition exits allow for the trapping of certain exceptional conditions. The condition exits may occasionally be useful to the applications programmer, for example, in the case of various arithmetic overflow and string conditions.

Again, the code can be structured in handling such situations. This is not always conveniently possible, for example, in Cobol use of ON SIZE ERROR, ON OVERFLOW, ON STANDARD ERROR or other condition statements.

The "systems programming" facilities of PL/I, then, may be of direct and frequent use to the applications pro-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grammer in the cases of bit and address manipulation and error condition exits. Many of the other systems programming features of PL/I will rarely be of value to the applications programmer. Statement for multitasking and dynamic storage management fall into this category. Should such abilities be desired, PL/I offers them and may avoid the need for assembler language.

However, PL/I should not be thought of as a "complete" systems programming language. It lacks certain features necessary in many-intensive systems programming situations. It was for this reason that IBM developed PL/S, the PL/I extension used in many internal development activities.

So don't count on PL/I replacing assembler in your shop. It won't.

A major objection to PL/I is that it is less standard than Cobol. In this context "standard" should be taken as referring to the degree of usage, since both PL/I and Cobol enjoy language standards. It is, of course, true that PL/I is much less widely used than Cobol, particularly when one restricts that comparison to information processing installations.

PL/I is, however, a "standard" mainframe language. For example, IBM product manuals for CICS and IMS always feature programming examples in both Cobol and PL/I. So PL/I is certainly less exotic in the information processing world than are languages line C or Pascal, for instance. And in this respect, it offers a reasonable alternative to Cobol.

What about lack of expertise in PL/I on the programming staff? How long does it take for programmers to learn PL/I? Well, the first point to make is that PL/I is similar to Cobol in many respects. For example, PL/I *structures* allows the programmer to describe files with level numbers in a manner directly analogous to Cobol FDs. And, using PL/I RECORD format I/O, the "reads" and "writes" themselves also look very similar to Cobol. Furthermore, editing and print-line formats also can be handled as in Cobol. PL/I, then, is similar to Gobol in many respects concerning its syntax.

PL/I also has more than a few similarities to Fortran. The assignment statement, the manner in which data movement is achieved, edit-directed I/O, functions and the manner in which programs and routines are called are all points of similarity. IBM produced a manual called *PL/I for Fortran Programmers* which defined many areas of likeness between the two languages.

It is fair to say that PL/I represents a mixture or combination of some sort on the syntactical level of Fortran and Cobol. Clearly, it should not be a difficult language for most programmers to learn.

For example, learning PL/I would be a fairly easy task for the newer programmer compared with learning a language like Snobol. PL/I is largely based on the same principles and philosophy as Fortran and Cobol. One couldn't say this about a language like Snobol.

Subset Nature

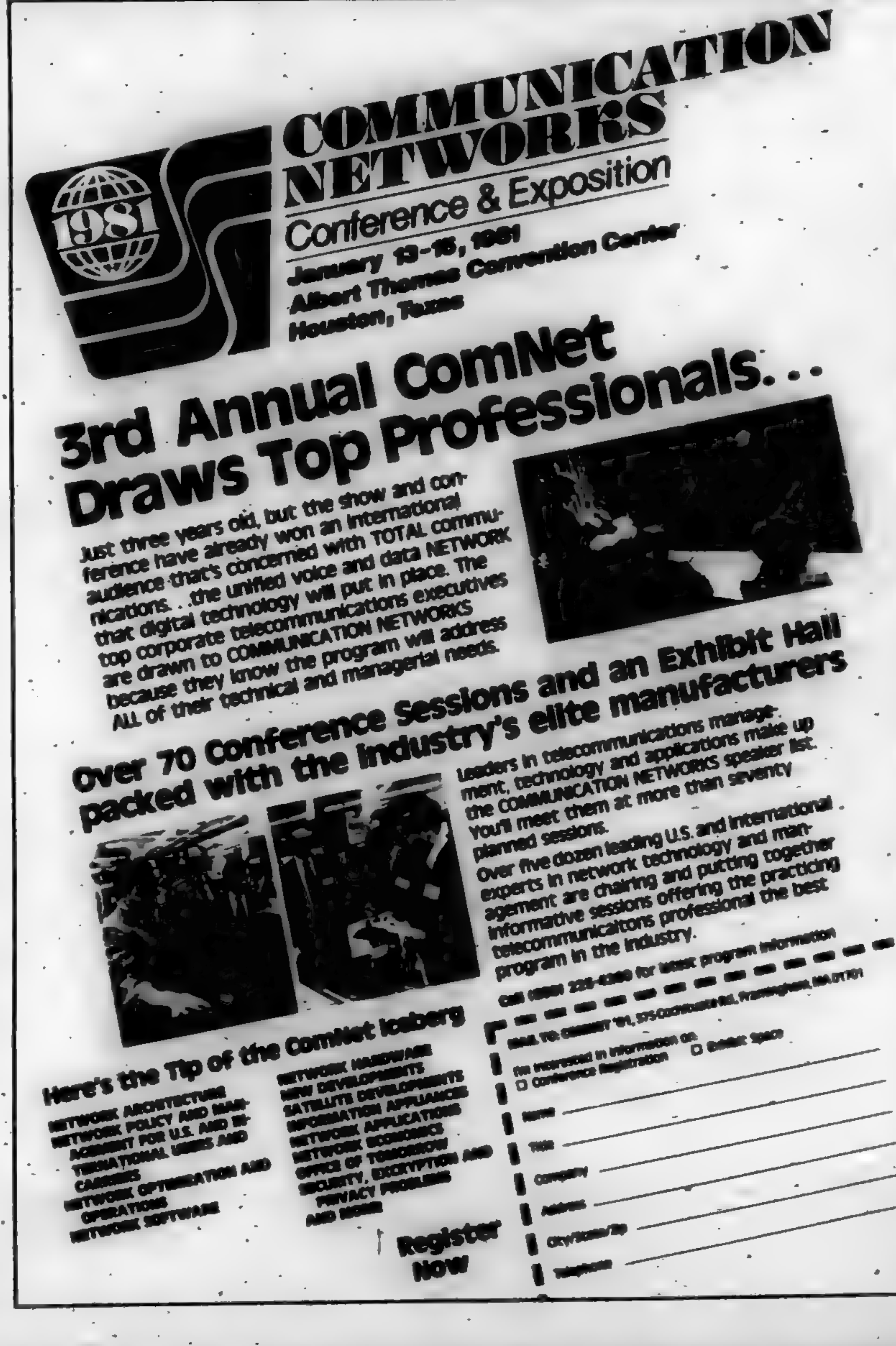
Most important is that the PL/I language does feature a subset nature. Thus, the Cobol programmer can learn a subset of PL/I that will enable him to program the language quite quickly on an unsophisticated level. The programmer can expand his use of the language as he becomes more familiar with its capabilities. The language's defaults can sometimes be of help in this respect.

Furthermore, the PL/I Checkout compiler was specifically designed to be of aid in diagnosing syntax and other compile time errors. And this compiler features built-in, on-line debugging aids that are easy to use. In this sense, the Checkout compiler capabilities are often directly analogous to those found in Cobtest for debugging of Cobol programs under TSO.

In the writer's experience, it has been interesting to note that new college graduates with B.S. degrees are at least as likely to know PL/I in depth as Cobol. Of those graduates who know neither language, such languages as C or Pascal seem to predominate. (Pascal, of course, is as similar in nature to PL/I as are Fortran and cobol.)

Perhaps this situation is a reflection of academic bias against the character of computing in the real world of in-

(Continued on Page 30)



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(Continued from Page 29)

dustrial data processing. But, in any case, Cobol's predominance in industry seems to be slim assurance that college graduates will have much practice with the language.

Finally, we mention that there are many good instructional courses on PL/I available from training organizations. And, of course, there exist a myriad of texts that utilize a structured approach to the language. Where training in PL/I may be required, the resources are certainly available.

What are the disadvantages to using PL/I in the data processing installation? Obviously, any programming language has its defects. Training is often cited as one such shortcoming of PL/I, since all experienced systems personnel know Cobol and only some know PL/I. We do not feel this is a significant disadvantage to the language, however, as was expressed above.

A more serious consideration concerns the breadth of support for the language. Availability, as well as suitability, should always be an issue when selecting a programming language. It is no longer true that PL/I is an "IBM (and plug-compatible manufacturer) language." The language is supported on mainframes by many manufacturers and on more than one make of supermini.

More important, perhaps, is the place of PL/I in the distributed processing environment of the future. Will many minicomputers used for distributed processing allow local program development in PL/I? What about program down-loading in such a situation? And what about the advent of industrial microcomputers?

Many micros, for example, offer languages based on PL/I, such as PL/M. Most of these PL/I-like languages do not meet the PL/I standards, however, and are, in fact, modifications or subsets of true PL/I.

Although speculative, such concerns about the place of PL/I in the more diversified processing environment of the future deserve thought.

Focus on Productivity

Where the "software problem" is becoming increasingly critical, managers must attempt to explore all possible options for increasing the ease of programming. Productivity is the major concern. Report writers, on-line inquiry development systems and nonprocedural languages are one set of approaches to the productivity problem. Investigating whether Cobol should be used, as opposed to other high-level languages, represents another approach to this situation.

In the mid-1960s, some said PL/I was the "language of the future" and would eventually replace Cobol and Fortran. This prediction was naive. The investments of user corporations in applications in these languages were too great for this to occur. Cobol and Fortran were far too good as programming languages, and their ongoing improvement mollified their most severe critics.

Still, it is true that PL/I offers certain strengths that address some of the weaknesses inherent in traditional Cobol programming. Chief among these are PL/I's comfortable fit with structured programming concepts, its economy of code as opposed to Cobol, its string manipulation functions and its "systems programming" capabilities that are useful to the applications programmer.

In the overall view, the choice of language for any one programming problem should be determined by the nature of that particular problem. For programming problems , Cobol is a convenient and capable language. At some installations, however, it is used more by default of tradition than as a result of a conscious choice or comparative language study. PL/I should at least be considered by the managers of such installations as a realistic and viable language alternative.

Howard Fosdick is a member of the technical staff at GTE Automatic Electric Laboratories, Northlake, Ill.

Fosdick writes frequently on computer topics for a variety of trade publications. His first book, Computing Systems Concepts: An Introduction for Library and Information Science, *will be published later this year by Information Resources Press.*

Fosdick holds a B.A. degree from Vanderbilt University and two M.S. degrees from Northern Illinois University and the University of Illinois.

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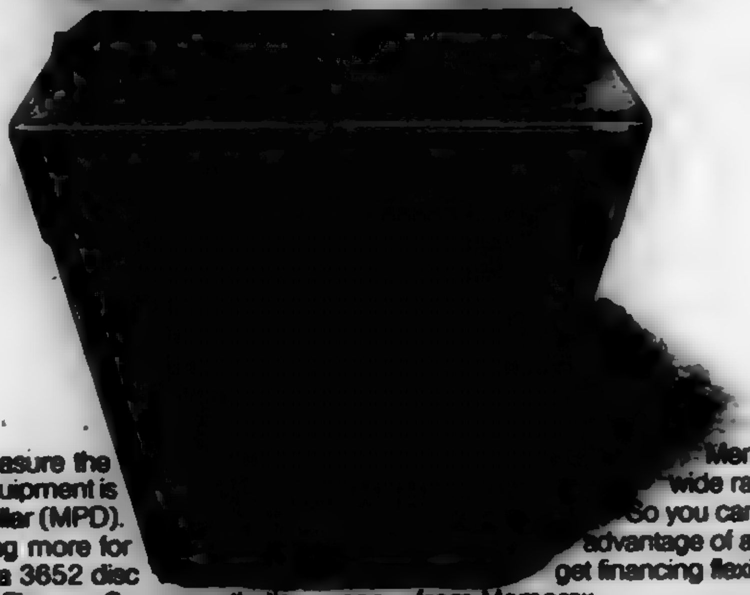

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EDITORIAL

Imposed Computerization

Should government require companies to use computer technology?

Such a requirement is implicit in regulations recently proposed by the U.S. Treasury Department that would compel liquor and tobacco manufacturers to pay excise taxes via the Federal Reserve System's electronic funds transfer (EFT) network, Fedwire [CW, Aug. 4]. If enacted, the regulations would affect only about 150 of the largest firms in those industries, according to a Treasury spokesman.

This proposal, which Treasury's Bureau of Alcohol, Tobacco and Firearms has circulated for public comment, would not require companies to establish direct EFT links or modify current information systems, the spokesman maintained. It would only direct firms to have their correspondent banks transmit excise tax payments via Fedwire — rather than mail them — to the Federal Reserve Bank of New York for deposit in the Treasury's account there.

Intended to accelerate the process of excise tax payment and give the Treasury more time to draw interest on funds in its Fed-New York account, the scheme actually would have its greatest impact on the liquor and tobacco producers' banks, some of which might not even have EFT links.

Besides subjecting those institutions and their clients to risks of reliability, integrity and security failures in Fedwire communications, the Treasury's proposal might have costly organizational effects. And banks that have sophisticated EFT resources might suddenly have a significant market advantage over banks that do not.

Enactment of the Treasury's proposal would establish public policy to the effect that the nation's private sector must, to some extent, keep pace with developments in computer technology where that is deemed necessary to optimize relations with the public sector.

Since many organizations and individuals are starting to implement EFT between themselves and their correspondent financial institutions, privacy and other civil liberties issues relate to this emerging policy. If, in the future, government can order companies and citizens to pay taxes via *direct* EFT links to the Treasury, then government will gain the means of conducting surveillance on those correspondents.

Under the guise of enforcing internal revenue laws, the Treasury might establish computerized monitoring of a company's everyday transactions, ostensibly to ensure that the firm does not acquire taxable assets on which taxes are not paid.

All this is highly speculative, of course. At present, no federal agency appears to be vociferously advocating direct communications between it and private-sector financial files.

Still, the road to hell is paved with good intentions. The estimated benefit to the Treasury — a $228 million drop in the deficit for fiscal 1981 and a savings of $5 million in subsequent fiscal years — of its proposed regulations may not offset the social impacts of imposed computerization.

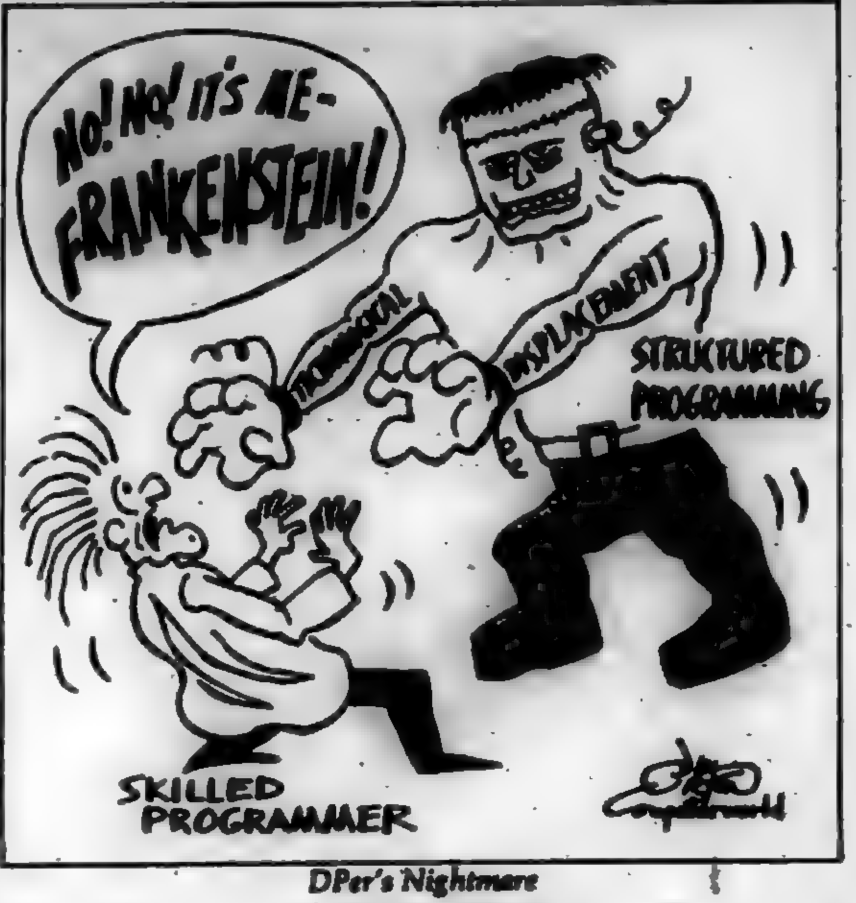
DATA PAST

Five Years Ago
Aug. 13, 1975

WASHINGTON, D.C. — In a brief filed with the U.S. Supreme Court, U.S. Solicitor General Robert H. Bork attacked the concept of software patents. "The translation of an idea into a program for a . . . computer no more imparts patentability to the idea than does the translation of the idea from English into French or from English into Fortran (or any other computer language)," Bork said. The court was planning to review a patent for bank software that had been granted to Thomas R. Johnston.

Eight Years Ago
Aug. 16, 1972

WASHINGTON, D.C. — The employment picture among computer programmers and analysts appeared to be clearing up, although observers claimed it had never been as bad as some people had thought. Several users that had been faced with cutbacks a year earlier reported a return to hiring, though not at former levels. In addition, the users did not expect a shortage of highly qualified programmers and analysts within the next six months.



DPer's Nightmare

LETTERS

No Objection to Sharing

I find it interesting that after years of decrying waste in government, *Computerworld* objects to the Selective Service System using resources of other agencies ["Computers and the Draft," CW, July 28].

Presumably these other machines and people were underutilized and, as a taxpayer, I applaud full utilization.

Using another mainframe is not the same thing as sharing data, so I do not see any concern over privacy.

I can certainly understand how this topic could be considered explosive in an election year, but that is no reason to shy away from cost-effectiveness.

John Rudy

Lexington, Mass.

Against Restructuring IBM

Hooray for Joseph A. Piscopo's letter on the IBM breakup [CW, July 21]. I agree wholeheartedly with Piscopo.

As a customer of IBM (and other vendors) I don't want to see IBM restructured. Now, more than ever, the users of this equipment need a complete integrated line of products.

If we choose, and we do often, we can substitute compatible equipment at any place in the chain, but IBM takes a load from the users by creating an integrated chain. We don't have to spend the time necessary to create the chain and integrate the equipment and software.

As Piscopo stated, IBM has created a large enough volume market that a software house can be cost-efficient in producing products for that market.

Applied Data Research, Inc. (ADR), Pansophic Systems, Inc. and a host of other software and hardware vendors would not exist without IBM.

We have several ADR products in lieu of IBM offerings, but we have none from Pansophic.

It would seem we need to rethink our position because of the attitude of these companies.

Oscar L. Sontag

Plainfield, Ind.

An Image Problem

I read with interest the recent In Depth article that compared the expectations students have about computer programmer and systems analyst jobs with the way these professionals perceived their jobs.

Needless to say, there were some wide disparities between these two groups, leading author Sandra Sawyer to write: "The students do not know what computer programmers or systems analysts do, which skills are important or what aptitudes are required."

This dichotomy bothered me, so I passed the article on to some of my coworkers and asked for their comments. Their responses varied somewhat, but one statement told the whole story: "Those students just described my last job!"

The public at large has a stereotype of what a computer center looks like: a spotless white room; a large electronic machine, with lots of flashing lights; people in business dress walking around with card decks and/or listings in their hands.

It's a common image, and I have often heard it referred to as the "IBM Business System" image, for not-too-obscure reasons. For anyone not familiar with this image, I invite you to make a tour of your local financial service bureau.

The point we must communicate is that this image is a stereotype. It may be accurate for one segment of the computer industry, a large segment in terms of manpower. But it is only a tiny segment in terms of the broad and ever-widening spectrum of uses to which a computer can be applied.

Allen Pothoof

Dallas, Texas

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READER COMMENTARY/David L. McIlwain

Warranty: More Lessons From Case Histories

As a lawyer, I would like to take issue with several statements contained in the In Depth article on "The Obligation of the Vendor to Perform Warranty" [CW, July 14] and think that additional lessons can be learned from a more in-depth analysis of the cases cited.

It is centrally important to distinguish in contract negotiations and contract disputes the differences in subject matter between an equipment order, an agreement for programming services, a maintenance contract and a systems analysis or consulting contract.

Second, in the case of Carl Beasley Ford, Inc. vs. Burroughs Corp., both Burroughs and Beasley made mistakes which contributed to the contract dispute and from which we can draw lessons for today.

Third, the author failed to point out that, because of changes in industry contracting procedures, part of the Beasley decision is out of date, although it is still a useful precedent for the allowance of consequential damages in computer contract cases.

Fourth, the author failed to point out that Beasley should not have been decided under the Uniform Commercial Code (UCC) and that, in that sense, it is "bad" law, although the judge's use of it is understandable.

Last, the truly outstanding result in Chatlos Systems, Inc. vs. NCR Corp. was not pointed out: that a written waiver of consequential damages will not be enforced by the courts when the user has no other remedy.

In the Beasley case, there was a written agreement for Burroughs to sell and deliver to Beasley an E-4000 electronic accounting machine for $35,000 and a separate oral agreement to cover the programming of the equipment. The user, by demonstrating the nonapplicability of the written agreement, because of differences in subject matter, to the programming services promised by the Burroughs salesman, was able to avoid the disclaimer of consequential damages in the written agreement.

In any contract dispute, it is helpful to analyze the problem from the point of view of what specifically has been contracted for, and a written agreement for computer equipment and any onerous terms thereof do not apply to a separate agreement for programming services unless the written agreement specifically so states. In Beasley, if the written waiver of consequentials had been put into effect by the court to cover both agreements, the case would have been uneconomical for the user.

If Beasley were analyzed from the business practices perspective, Burroughs' sales practices contributed greatly to the dispute by allowing front-line salesmen to make oral contracts for programming and by having salesmen do programming as part of their agreement with customers. This situation is ready made for abuse, and I strongly suspect that Burroughs has changed sales practices.

Burroughs' sales management was also at fault in not monitoring the commitments being made by its salesmen. If I were a manager in that situation, I think I would have flagged as an exception an agreement by one of my salesmen to program, test and install 13 major programs in seven months while carrying on all his other normal sales duties. There are also facts in the case that indicate that the Burroughs salesman may have underspecified the equipment to treat the application at Beasley.

Beasley contributed to the formation of the dispute by not requiring that it see another Burroughs site running the same or similar types of programs on the same equipment intended for Beasley. If Burroughs could not produce such a demonstration site and provide Beasley sufficient time to evaluate the applicability and differences of that demonstrated, the contract should have, as suggested by the article's author, provided for performance milestones and reviews.

Beasley also contributed to the dispute by not demanding or running a parallel of the new system by Burroughs against its old accountant's system. This was caused by inexpert

(Continued on Page 38)

READER COMMENTARY/Robert M. Sherin

Mass. Faces Data Services Tax

In a recent bulletin, the Massachusetts Department of Revenue has laid out a series of proposed rules that would impose a tax on such data processing areas as off-the-shelf software, time-sharing, keypunching, data conversion and some output services. Its language echoes California's, where this type of taxation got started under questionable authority in the early '70s.

Both states, like most, have similar laws authorizing a tax on tangible property, with the decision as to what precisely is tangible left to the agencies. Though the so-called software tax has been slowed considerably by industry participation in several states, the California example of taxation continues to haunt the industry.

The California tax was born of apathy. By the time apathy turned to concern and concern to action, the tax was well established and the hour was late. Heartening news came in 1978 when California held an administrative hearing to review its DP tax as a result of New York's 1977 reversal of position on the issue. The hearing, however, was dismissed before its completion in favor of private discussions, and the discussions have predictably gone nowhere. The result? California still taxes most DP transactions.

Early Rejections

Early on, Massachusetts rejected the contested California example it is now proposing to resurrect. Nearly a decade of official Massachusetts interpretations have pronounced software, output services and time-sharing intangible services. Now, without apparent reason other than to collect new funds, the Massachusetts Department of Revenue is planning to enact a new regulation taxing a broad segment of DP industry activities as involving tangible property. If carried out, the move would go completely contrary to the commonwealth's longstanding interpretation.

DP's intangible roots run deep in Massachusetts. You may be surprised to learn, as I was, that the Birthplace of America is also where DP's intangibility has its oldest historical ties. Its factual pattern has been traced back to the beginning of the century by the Massachusetts Appellate Tax Board, the commonwealth's highest agency authority in taxing matters. The board supports DP's intangible status, citing a 1905 decision in which the commonwealth's highest court ruled the communication of information and the transmission of intelligence "were not the production of goods, wares or merchandise to be kept for sale or use." Hence, they were intangible and nontaxable.

The words "tangible" and "intangible" were endowed with distinct meanings by the Massachusetts legislature in 1936. Then, it granted manufacturers of tangible property a special tax exemption, which excluded intangible services. In order to aid its declining mills and factories, the legislature acted on a blue-ribbon panel's recommendations contained in a document called "Report of Special Commission Relative to the Taxation of Tangible and Intangible Property and Certain Related Matters." In 1976 the final arbiter of this tangible-intangible distinction, the Massachusetts Supreme Court, held that DP is a service that falls within the intangible classification.

After these extensive deliberations, the Massachusetts Department of Revenue in 1978 requested and heard the industry's position of intangibility once again, this time articulated by the Association of Data Processing Service Organizations, the Data Processing Management Association (DPMA) and other groups [CW, Jan. 8, 1979]. All information points to the same conclusion: that data processing is an intangible service to the same extent as law and accounting and therefore is exempt from the Massachusetts sales and use tax imposed on tangible property.

The question arises: Can a state rulemaking body ignore official findings of fact? Of course it can try. But the Massachusetts Department of Revenue can only do so by violating the commonwealth's general law declaring decisions of its Appellate Tax Board "final as to findings of fact." And as a matter of record, the board has held that the typical service bureau "is essentially a nonmanufacturing corpora-

(Continued on Page 38)

THE TAYLOR REPORT

Alan Taylor

User, NCR Entering New Phase of Battle

Two and a half years after it entered into a contract with NCR Corp., an angry user in Denver remains without the software it expected and is fighting NCR attempts to get payment.

In 1977, NCR tried to get a $74,000 order from Perl-Mack Enterprises for a computer and four accounting applications. Everything was supposed to be ready within five months.

After Perl-Mack rejected this proposal, NCR added three additional applications at the remarkably low average price of $1,667 each (vs. a $6,500 average for each of the original four) and contracted to let Perl-Mack hold back 90% of the hardware purchase price until all the programs were delivered. The vendor offered delivery within six months.

However, more than a year later (as noted in last week's column), after threatening to remove the partly paid-for hardware, NCR did get Perl-Mack to pay the hardware balance just a few days before the then-scheduled date of complete software delivery. This was to be at the end of January 1979 — about a year and four months after the contract had been signed. This carrot-and-stick attempt to receive payment was organized by letters from David Olivet, the NCR account manager.

However, none of the software was delivered that January, after the payment had been made.

Chapter Two

The next important development occurred this March, 14 months later.

The accounting software called for under the original rejected proposal was now, 2-½ years after contract, ready, according to NCR. However, the three additional low-priced applications were not.

If NCR could convince the user to pay for the four original accounting applications without receiving delivery of the additional three, low-priced systems, then effectively NCR would be substituting its original, rejected proposal for the bargain it finally made with Perl-Mack. As the additional software was priced very low, NCR would almost certainly make money by never having to supply it.

However, during the period in 1977 when NCR had been threatening to physically remove the Perl-Mack computer, David Olivet, the NCR account

(Continued on Page 34)

LETTERS

Millions Thrown Away?

In the July 14 issue there was a letter from Patrick Sweeney of Woodside, N.Y., who expressed shock at the $500,000 bribery attempt to obtain the Adabas source code. He stated that he could write one himself for less money.

I wish I had heard about him earlier as I think of the $12 million we've invested (thrown away?) in R&D Adabas over the last decade.

I don't know what he is doing now, but he apparently is underpaid!

John Norris Maguire
President

Software AG
of North America, Inc.
Reston, Va.

Wrong Vendor

In the June 30 issue, "Wylbur Hikes Manufacturer's Productivity 40%" cited the wrong vendor for Wylbur. OBS Wylbur, which is the product in use by Sundstrand Corp., is sold by On-Line Business Systems, Inc., not On-Line Systems, which is a different company with a similar name.

Barry Hanson
Wylbur Product Manager

On-Line Business Systems, Inc.
San Francisco, Calif.

Quality Programming

In "What Ever Happened to Quality?" [CW, June 30], Richard Singer proposed a career path for "programmers who show talent and a desire to remain programmers" in order to ensure quality programming. I agree with Singer's ideas for the most part and would like to add to his discussion of an important issue.

When I started programming, I quickly learned why it was debatable as a profession: getting ahead meant getting out, which is a bit like becoming a doctor so you can move onto something more challenging like hospital administration. In programming, "something more challenging" meant systems analysis or project and systems management.

This view was further impressed upon me by more experienced data processing professionals, higher in the career path, who, just as Singer described, proudly boasted of their own ignorance with statements like: "I've never written a program," or "I haven't written a program in x years."

These negative viewpoints contribute to the denigration of programmers and the resulting lack of interest in program quality. There are few who can withstand the pressures to join the rest of the crowd trying to move up the data processing career path by moving out of programming.

In contrast, I have found that writing a complex, well-designed, structured program or series of programs, and working along with other skilled programmers in doing so, has been immensely satisfying. I have always found quality in programming, but it came from — and I still see it coming from — the programmers themselves, who take pride in their work and, who are trained in the newest techniques.

To keep programmers doing what it is they do so well, managers and other nonprogrammers need to stop denigrating and start rewarding technical programming ability. By rewarding, I specifically mean they should pay more for the best technical programming expertise.

Mary Harycki

Milwaukee, Wis.

Contract Dispute Enters New Stage

(Continued from Page 33)

manager, had most precisely stated in writing that NCR would not expect any of the software to be paid for until all of it was functional. Nevertheless, Olivet was able to get out of an identical contract agreement with regard to the hardware payment, so NCR tried again. For the software, $6,200 had been paid in advance, so the balance was $19,800.

This time, NCR again misquoted earlier documents, in my opinion. John G. Coleman, NCR's regional systems engineering manager, claimed Perl-Mack failed to respond in writing within a 45-day limit after he had written to the user, demanding information on any inadequancies. According to Coleman, this failure to respond amounted to an admission by Perl-Mack that all the accounting software was properly operational.

March Letter

The peculiar fact, however, is that Coleman never made that original request for any information in writing. The March letter made only two short mentions of the readiness of the accounting software. Otherwise, the letter presented an unsupported claim that somehow money for the software was due, and it discussed the still-missing software, including various demands Perl-Mack had to meet before NCR would perform.

The only 45-day limit brought up in the letter dealt with the time within which Perl-Mack had to obey the new demands just to hope to get the 1977 contract even seriously considered!

Later, Corporate repeated the same demand for payment ahead of the time set by NCR in the Olivet letter.

I find it most interesting that NCR Corporate backs up Coleman and that NCR continues to try to get the $19,800 from Perl-Mack although it has not delivered the contracted-for software. Perl-Mack, of course, is getting more and more furious and is putting its case for damages before arbitration. Next week, we will see what that case is.

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HUMAN CONNECTION/Jack Stone

Life on Project Teams Can Be Rosier

How do you organize your project teams? If you're a member of the vast majority of information systems managers, you would simply make one up from whomever's available, and that's that!

Several people in the industry are developing guidelines to help in forming project teams by using, if you will pardon the expression, "qualitative methods." Two such people are Phil Semprevivo, a manager in the management Advisory Services Division of Deloitte Haskins & Sells, New York City, and Peggy Semprevivo, who is employed in the MIS department of the General Electric Steam Turbine Division at Schenectady, N.Y.

Following is a summary of my recent interview with them.

How would you characterize the current project team situation?

Phil: We know that the concentration of many managers in the past has been almost entirely on hardware and software problems. Aside from some training activities, serious attention to people and organizational problems has not been widespread.

There are fundamental conflicts between the ways people organize and hardware/software capabilities. A classic example is the *discord* that arises when one tries to install an on-line, integrated data base system across the lines of a functional organization. A team can be the vehicle or bridge between current organization and current technology.

Peggy, what is a programmer like you doing studying the socio-psychological attributes of the data processing mentality?

Peggy: Last year, as part of my graduate program at the State University of New York (Albany) for my M.B.A. degree in management information services, I was assigned to project development teams operating at several government and business organizations. I discovered quite quickly that people issues, as well as technical issues, were important to team success. When teams get bogged down in politics, procedures, personal conflicts, small talk, or some combination of them, they cease to be effective and frequently require some form of external assistance to get back on track.

Phil, what is your background in this effort?

Phil: I became involved in the work mostly because it was a practical problem for me, but also because so little is known by DP managers about proper team formation and operating relationships, I thought the subject would be fascinating to study. Ever since I first became associated with data processing — nearly 16 years ago — I was either on a team or forming one. Up until five years ago, there was little available in the DP literature to help me figure out how to form a team that has a good chance at success.

What has been the basic thrust of your investigations?

Phil: We are trying to find a rational structure to support the subjective decisions of DP managers in the areas of organization and human interaction. There are four major steps to the project: 1) Identify research in other fields that is relevant to the DP team. 2) Develop a methodology by which the practitioner can apply research results. 3) Structure a mechanism to help the practitioner evaluate team effectiveness using subjective judgments. 4) Make suggestions on how results of the research can be shared with team participants to help them become more effective.

Would you give a synopsis of what you have uncovered so far?

Peggy: We have identified five basic dimensions of team effectiveness and broken each down into factors that can be observed.

Let's take the dimension of team membership. We have selected 10 criteria by which a person may be chosen for a systems team. These criteria fall into three categories:

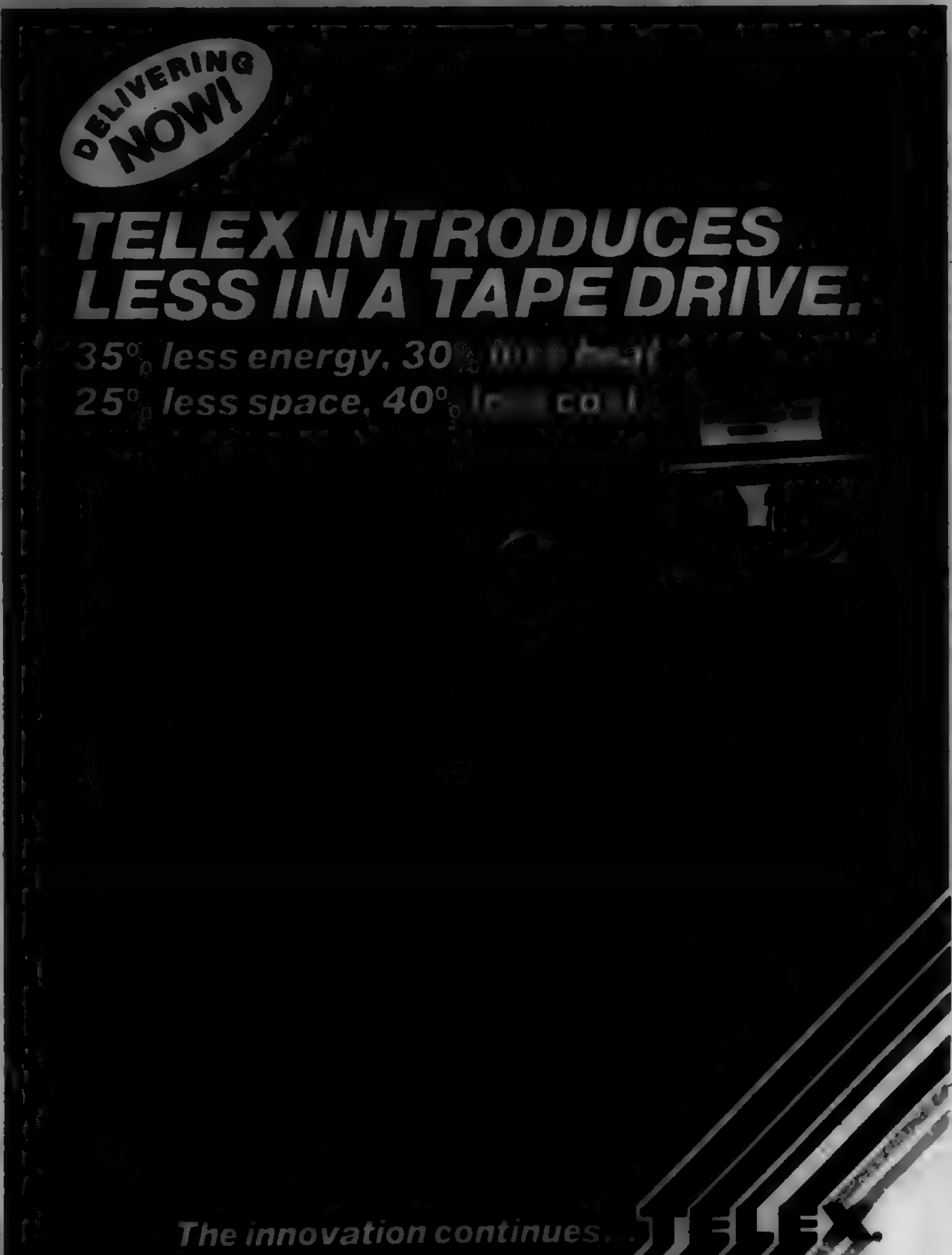
Organizational — ability to influence, authority to make decisions, knowledge and skills.

Team player — interpersonal skills, acceptance of team objectives, acceptance of project goals.

Individual — intelligence, dependability, social sensitivity, ability to adjust.

Phil: I should note in closing that, although we've made some initial progress, there's much left to be done.

The Yourdon Press (New York) will soon release a book by Phil Semprevivo titled System Development Teams.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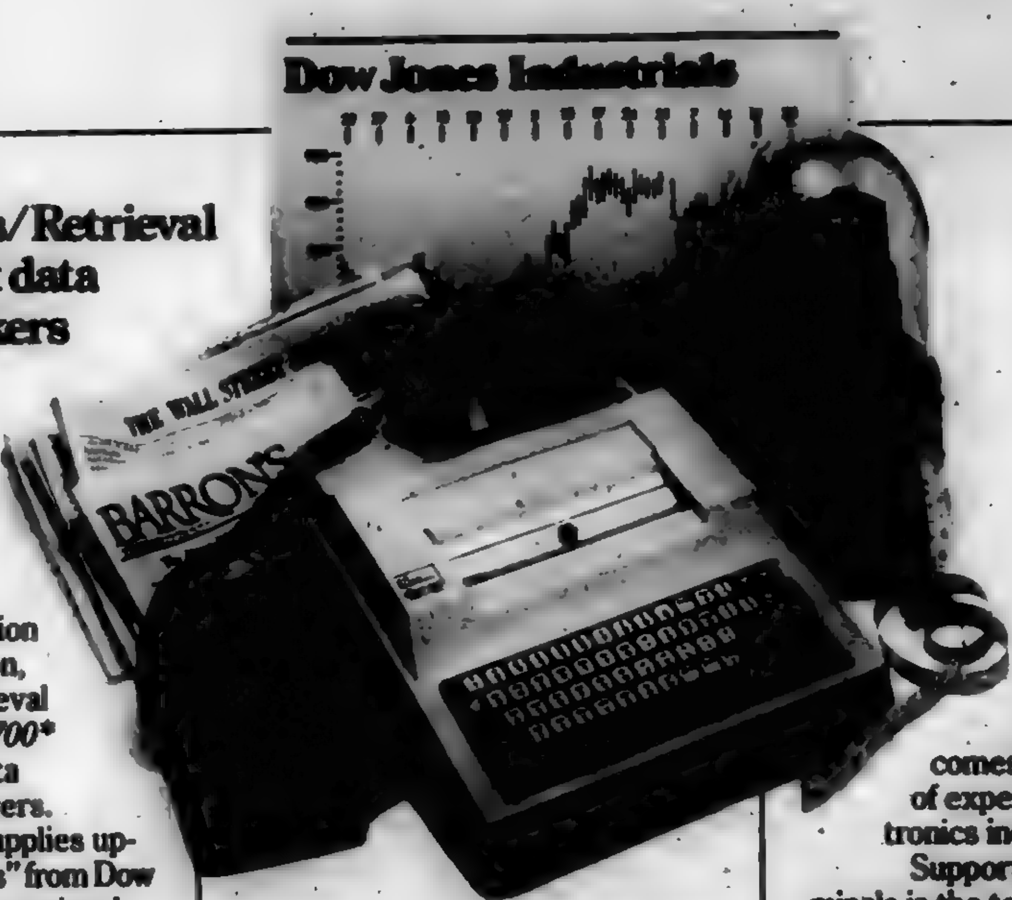

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Warranty: More Lessons From Case Histories

(Continued from Page 33)

advice from Burroughs.

Part of the case is out of date because vendors, who also read court decisions, now have printed form agreements for just about everything a user might need, including programming services, systems analysis, training and software packages, all of which have complete disclaimers of express warranties, implied warranties and which also attempt to disclaim any consequential damages (including lost profits), as a matter of course. Users who sign these form agreements make it much more difficult for their lawyers to bring in the evidence of the promises the salesman made about the product or services during his selling.

If the sales engineer promises anything that a user really wants or expects to depend on, it should get him to put it in writing, over his signature, and be sure that it is referred to in the form contracts.

Improper Reference

The Beasley case, revolving as it did around the failure to provide programming services as orally agreed to by the Burroughs salesman, was not properly decided under the UCC, Article 2. Article 2 applies only to transactions in goods, where goods are defined as all things "which are movable at the time of identification to the contract for sale," and it does not apply to the provision of programming.

Finally, in the Chatlos case, the author failed to mention the important step taken by the court where it allowed consequential damages for total nonperformance (failure to deliver four of the six functions) in spite of express, clearly stated disclaimers for "special or consequential damages from any cause whatsoever." The only warranty in the written agreement was "limited to correcting any error in any program as appears within 60 days after such has been furnished."

This was the sole remedy provided in the agreement, and because the programs were not delivered at all, failed of its essential purpose and allowed the judge to use the UCC provision that provides minimum adequate remedies.

With this decision, made on data processing contract facts, users now have a clear precedent allowing them to avoid express disclaimers of consequential damages (including lost profits) in certain situations.

There was one piece of advice in the article that I must object to: users were encouraged to confer with their corporate counsel on advice about computer agreements. In my experience and in that of the people I work with, we have found that most corporate counsel are scared off by the technical complexity and jargon in these contracting situations and do not have the time to become familiar enough to provide timely advice. There are lawyers and data processing consultants who specialize solely in this field and are able to negotiate less than onerous warranty and damage waiver terms.

McIlwain is an attorney with Christo & Watson in N. Hampton, N.H.

State Confronts Tax Proposal

(Continued from Page 33)

tion that renders a service to customers by supplying them with information and intelligence, for a charge."

What's more, the Massachusetts Supreme Court has enshrined the board's intangible desciption of the DP function, declaring it to be an absolute finding of fact. Conclusive.

Still, its latest bulletin indicates the Massachusetts Department of Revenue wants to tax information processing as tangible property, following in California's footsteps.

In the similar New York case, that state ended up exempting DP, because it decided not to apply old regulatory concepts to "a whole new state of art, a new business." According to New York Tax Commissioner Thomas Lynch, who presided over the hearing at which New York first reversed its position, "The presentation struck me immediately — without having the facts — that we were acting inequitably." Lynch said New York was evolving into a services-based economy and many of the regulations on the books are not equitable when applied to services. The same is true throughout the Northeast.

On Aug. 27, Massachusetts will hold another rule-making hearing. The industry has yet another opportunity to stand up for its position of intangibility and nontaxability, perhaps its last in agency rule-making. The hearing will begin at 10 a.m. in Room 806, Leverett Saltonstall Bldg., 100 Cambridge Street, Boston.

Everyone is welcome: participants and spectators. Written and oral comments in advance of the hearing are welcome, according to the Department of Revenue, and copies of the proposed rules may be obtained in advance from Joseph X. Donovan of the Rulings and Regulations Bureau in Room 810 at the same address.

If we want fair and equitable taxation, let's turn out in full force, as we did when New York gave the industry fair treatment. With a strong and unified voice, we can do it again!

Please be there. DPMA, for one, will be there representing your interests.

Sherin is president of Nova Computing Services, Inc., Miami, and is a nonjudicial legislative adviser for DPMA.

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CACI Service Aids Managers Picking Business Sites

ARLINGTON, Va. – Computer-generated demographic reports to assist managers in determining the optimum location for new business facilities within a defined trading area are being offered by CACI, Inc. via General Electric Information Services Co.'s (Geisco) computing service.

Site Potential produces reports detailing what customers are spending by merchandise line type. It generates reports covering 16 different varieties of retail businesses and three kinds of Financial institutuions.

Each report contains the major lines of merchandise or service items provided by store type, along with 1970 and 1980 estimates of population, number of households, per capita income and total income.

Site Potential and its complement, Site II, are both available via Geisco's IBM-compatible Mark 3000 service as part of the Network Software Services library.

Site II shows the demographic characteristics of a firm's potential customers in a defined area, providing information concerning population, income, age, sex, occupation, education and other information.

Site Potential costs from $50 to $98 depending on the type of report needed. Site II costs between $30 and $65 depending on the report.

Both are available through time-sharing or a leased data base plan from CACI at 1815 N. Fort Myer Drive, Arlington, Va. 22209.

'Easytrieve' Out In VS/9 Version

OAK BROOK, Ill. – Panosophic Systems, Inc. is now offering its Easytrieve information retrieval and data management system on Univac's VS/9 operating system.

The VS/9 version, which runs on Univac Series 90 models 60, 70 and 80, offers an unlimited sequential files, Panosophic said.

Like the Easytrieve offered for IBM systems, the VS/9 version offers free-form English-like keywords suited to a terminal-oriented on-line system.

The firm will release a VS/9 Easytrieve manual noting the "minor" differences from the IBM version. VS/9 Easytrieve costs $18,500 from Panosophic at 709 Enterprise Drive, Oak Brook, Ill. 60521.

IBM Pascal/VS Compiler Targets OS/VS and VM/CMS

WHITE PLAINS, N.Y. – With little fanfare, IBM has released a Pascal/VS compiler for OS/VS and VM/CMS users that is said to support the proposed International Standards Organization (ISO) standard for the language.

In addition, IBM claimed its Pascal compiler offers several extensions to the standard. For example, dynamic character strings are said to support the manipulation of variable length text data, and static declarations reportedly provide localized reusable data between procedure invocations.

Another extension permits programs to be divided into separately compilable sections, IBM said, noting that additional input/-output facilities are also provided including interactive terminal-oriented I/O.

The firm's implementation of the language also provides many standard features of Pascal including the ability to check errors during compilation and execution and support for structured programming techniques.

Use of clear definitions of data structures and its fast compilation capability contribute to Pascal's ease of use, IBM claimed.

Pascal/VS is also said to provide the user with a symbolic debugging capability suitable for interactive environments and to employ code optimization techniques for producing more efficient object programs.

Available immediately, Pascal/VS can be licensed for $235/mo from IBM's Data Processing Division.

Services Aim to Consolidate In-Bank Processing Functions

MINNEAPOLIS – Northwest Computer Services, Inc. (NCS) introduced three versions of what it described as in-bank distributed processing (IDP) services.

The announcement was released at the same time as IBM's announcement of its 3694 document processor (see story on Page 49). Depending on individual bank needs, the hardware for the NCS service centers around the 3694 or NCR Corp.'s 7750 document processor. A third option allows for integrating an IBM System/34 small business computer with in-bank proof processing operations, NCS noted.

The systems based on the 3694 or 7750 consolidate several functions that were formerly performed in separate operations: high-speed data entry and capture, proofing, fine sorting, data reports and batch filing, the company said.

Processing Procedure

Banks that utilize the services will transmit transactions to NCS regional centers which, in turn, will transmit the data to one of two main processing centers in Minneapolis, NCS said.

The transmitting bank's application files will then be updated through programs run on either an Amdahl Corp. 470V/6 mainframe or one of three IBM 370/168s operating under OS/MVS, according to the company.

Currently, most bank proof operators prepare batch entry inputs on site, NCS said. Checks and other data are delivered to a computer cent[illegible] mail or courier and returned the fol[illegible]day together with output reports. The new system will reportedly allow all functions except for application accounting to be performed in the bank's own proof department and thus provide direct control of more bank operations.

The IDP services were developed as a result of a two-year program carried out with the cooperation of both IBM and NCR, according to Frank Powell, president of NCS. The knowledge gained as a result of the pilot program which evaluated various hardware and software options "enables NCS to design and install. . . an individualized system for each customer bank," Powell claimed.

Pricing for the three services will probably vary since NCS's 86 affiliate banks will have separate costing structures for more than 500 correspondent banks, NCS said.

More information is available from NCS, the information processing subsidiary of Northwest Bancorporation, at 1200 Northwestern Bank Bldg., Minneapolis, Minn. 55480.

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Runs Under RSTS/E

Disk Utility Offered for PDP-11

NEW YORK — A disk utility introduced for Digital Equipment Corp. PDP-11 minicomputers running under the RSTS/E operating system offers more features than DEC's package, according to its vendor, Enterprise Technology Corp.

The disk utility operates under both version 6C and 7.0 of RSTS/E, including large-file and small-file systems. The software consists of four separate programs that provide information such as system status display of open files by job, a map of any disk unit showing the size and sector address of each free and allocated space on the disk, a summary of the available free space and the largest contiguous free space at each cluster-size level, a spokesman stated.

The utility is provided to users under a perpetual license with costs ranging from $250 for a single CPU to $450 for a site with four or more systems. The license includes one year of free support, including corrections and new releases.

Enterprise Technology is located at 305 Madison Ave., New York, N.Y. 10168.

Mark IV Courses Slated For 17 Cities This Year

CANOGA PARK, Calif. — Informatics, Inc. will be holding education courses in 17 cities in the third quarter of this year for people interested in increasing their knowledge of the Mark IV/System and other Informatics Implementation Systems.

Various courses will cover the Mark IV, the software for application implementation, data management and information processing; Answer/2, a report writer designed for both repetitive and ad hoc information retrieval and reporting; Answer/DB, an on-line report writer with extensive interactive syntax checking and editing capability; Trans IV, a generalized software program for interactively creating on-line applications in a CICS/VS environment and Inquiry IV/IMS, an interactive on-line inquiry language for IMS data base users.

The courses range in cost from $120 for a one-day session to $550 for a five-day session and vary according to the course topic. Discounts will be made for two or more registrants from the same business. For more information on the course and a list of where they will be held, contact a local Informatics office or Cathy Moran at 21050 Vanowen St., Canoga Park, Calif. 91304.

Package Tracks Catalog Offerings

PITTSBURGH, Pa. — A software package designed to control catalog showrooms' inventories has been introduced by Transcomm Data Systems, Inc.

The Catalog Showroom Management System (CSMS), an extension of Tolas-II, the Transcomm On-Line Accounting System, operates on-line on Digital Equipment Corp. PDP-11/34, 11/44, 11/70 or VAX-11/780 computers.

An analysis of client requirements, installation services and software support are integral parts of each system installation, the vendor noted.

Prices range from $15,000 to $70,000, depending on the performance level purchased.

Transcomm is located at 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

'Scribe/DPS' Targets School Districts

WALTHAM, Mass. — Honeywell, Inc. has released the first module in Scribe/DPS, a modular student information package for school districts.

The student scheduling module was written in Cobol 74 and designed for large-scale Honeywell distributed processing systems. It is said to capture, process and report information about students, teachers and school resources. It also provides school administrators with information to facilitate class scheduling, the vendor said.

The package costs $348 a month or $14,610 for a full license fee, from Honeywell at 200 Smith St., Waltham, Mass. 02154.

'Rabbit-1' Enhancements Include Setup Procedure

WEST PALM BEACH, Fla. — Three enhancements have been added to Rasco, Inc.'s Rabbit-1, a job accounting, session billing and cross-charging system available for Digital Equipment Corp. VAX/VMS and PDP-11 RSTS/E Version 7 users.

Feature 1, a setup procedure, prompts the user and assists in the creation of the account file, resource rate table, discount information and report specifications.

Feature 2 automatically submits a daily job to determine disk file utilization for each user.

Feature 3 is a single command for complete Rabbit-1 system execution. After completing the initial system setup, all that is required to run report writer is one command, the firm said. The Rabbit-1 will then generate all reports specified in the setup phase each time the complete system execution command is invoked.

The system costs $2,900 and is available on a rental purchase program for $99 a month from Rasco at 3336 N. Flagler Drive, West Palm Beach, Fla. 33407.

'Force' Attacks Coding Jobs For OEM Houses

IRVINE, Calif. — Point 4 Data Corp. has announced Force, an automatic programming package for the OEM systems house.

Force directly attacks some of the most time-consuming aspects of programming, including record layouts, data element descriptions and screen and menu formats.

Force consists of a central data base handler. Descriptions of the screen format, record layout and so forth are fed into the data base and executable code is generated.

The package is available only on a monthly lease and costs between $400 and $1,500 from the vendor at 2569 McCabe Way, Irvine, Calif. 92714.

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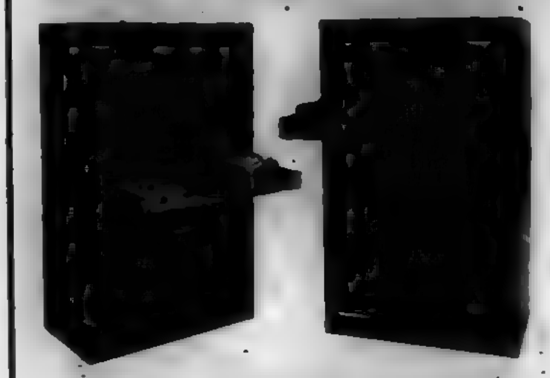

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Time-Shared Service Gives S&L Forecasts

PALO ALTO, Calif. — Remote Computing Corp. has announced a time-shared service aimed at the thrift industry and the groups that service that industry that is designed to do forecasts of savings and loan (S&L) organizations as well as peer group comparisons.

The Savings Comparative Analysis (Scan), expected to be used by accounting firms, brokerage firms and commercial banks, is based on the semi annual reports prepared by the Federal Home Loan Bank Board (FHLB) from forms submitted by more than 4,000 member S&Ls.

Scan creates the necessary files from the FHLB data, applies that data against forecast files either created by the user or available as part of the system and then creates a pro-forma balance sheet, an income statement, a cash flow report and management overview report.

The cost of the service is based on remote computing units (RCU), which measure computer processor utilization, including CPU time, I/O time and core storage. Each RCU costs the user 36 cents.

Remote Computing Corp. is headquartered at 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

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Hooks Into Bank's System

'NAI' Processes NOW Accounts

CLEVELAND — A software product that processes NOW accounts by hooking into a bank's existing system has been introduced by Computer Management, Inc.

NOW Accounting Interface (NAI) is an independent module and does not require a bank to make changes to its system to support NOW servicing, the firm said.

NAI collects data from the existing demand system for all accounts designated by the bank as NOW accounts. Existing accounts can be designated as NOW accounts by the account number range, service charge type, control class or combinations. NAI warehouses the collected data and, when the NOW interest period arrives, calculates for each account the appropriate interest according to specified bank options. It generates an interest transaction and sends it to the demand system for posting, the vendor explained.

All accounting controls are also maintained by the NAI module. A daily control report lists accounting totals per bank for entry to general ledger.

NAI costs $20,000 from the vendor at 1100 Keith Bldg., Cleveland, Ohio 44115.

Team Adds DDA Aid

JACKSON, Minn. — Team Custom Software, Inc. has developed demand deposit accounting (DDA) software for IBM 5110 and 5120 small business computers that features a customer information file and itemized customer monthly statements.

The DDA System is geared for banks that handle a maximum of 2,000 accounts, 50,000 monthly transactions and 2,500 daily transactions. The software runs on a 64K-byte CPU that includes a sort feature and system printer.

The software offers proof totals by batch or transaction codes; overdrawn and returned check notices; a permanent record of closed accounts; password protection for inquiry; automatic batching of entries; user-controlled service charges, return check charges and overdrawn charges per item; and a stop-payment alert that flashes to the computer's operator during entry, a spokesman said.

The DDA System costs $4,000 and can reportedly be installed by the user following documentation instructions and without any additional programming. Team Software is based at 504 Second St., Jackson, Minn. 56143.

Tax System Series/1-Based

NEW YORK — A Computer-Assisted Tax System (Cats) that processes income tax returns on an IBM Series/1 minicomputer is being offered by Lamda Data Systems, Inc.

Unlike other computer-based tax systems, processing on Cats can be performed in one step, reducing the number of necessary personnel to one — the tax preparer, Lamda claimed.

Cats can compute and print Form 1040, Schedule A and New York State Form IT 201. By tax season 1980, this will be extended to include other forms, the vendor noted.

Cats costs $15,000 from Lamda, located at 111 John St., New York, N.Y. 10038.

Real-Time Data Provided On Securities, Options

NEW YORK — A computer service providing real-time financial data regarding securities, options and bonds on a time-sharing basis has been announced by Monchik-Weber Systems Consulting, Inc.

The Data Sharing Service (DSS) allows users to calculate their own historical volatilities, betas and other reference values as well as to develop and execute customized theoretical value formulas, according to the firm.

Monchik-Weber provides storage for all subscriber data and algorithms, and reportedly assures the protection of each subscriber's stored data. Real-time position updating, risk analysis, trade evaluation, spread, selection and ranking are also possible.

The DSS data base is updated by tickers from various exchanges. Subscribers provide their own desktop terminals and lines.

Users access the data base via Fortran subroutines. The system is based on a Data General Corp. Eclipse S/130. The monthly cost of the service ranges from $1,500 to $3,000. The firm is headquartered at 111 John St., New York, N.Y. 10038.

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'Tfast' Update Offers Disk Access Control

IRVINE, Calif. – Tower Systems, Inc. has updated its Tfast tape management software system for IBM DOS/VSE users to include the access control and management of disk data sets.

Tfast 2.0 supports both count-key-data and fixed-block architecture (FBA) DASD devices. The software reportedly requires no change to problem programs, supervisor generation parameters or existing Job Control Language (JCL). In addition, the system is SVA-resident, does not rename or replace IBM phases and does not require a partition to operate, a spokesman noted.

The software allows users to choose versions of a data set at execution time either by operator control, catalog maintenance or JCL. Current versions of data sets are presented to the problem at execution time. The management criteria are user-defined at the data-set level, and the correct version and media will reportedly always be selected regardless of JCL.

Features of the package include an on-line display and update of catalog, Vtoc display and remote console support via CICS; extended operator management of DASD devices from the Syslog; a vault management function that automatically catalogs on-site and off-site media; an integrated run-control system; and complete device independence, the spokesman claimed.

As part of Tfast's dynamic resource-allocation function, the package dynamically allocates disk area within a pool and truncates to the actual data-set size at program close time. Data sets exceeding initial allocations are automatically allocated additional area, the spokesman noted.

Tfast 2.0 costs $475 for a one- or two-year lease or can be purchased for $12,500 from the firm at Suite 365, 19782 MacArthur Blvd., Irvine, Calif. 92715.

'Mizer' Release 2 Cuts Disk Space Needs

LYONS, Ill. – Release 2 of Mizer reduces the disk space required for IBM DOS/VS and VSE core libraries, according to its vendor, General Electronics.

While Release 1 supported only RPG-II subroutines, Release 2 is supplied as four optional series. Series 1 is the original version for RPG-II subroutines, saving over 4,000 bytes per program, the firm said. Series 2 supports RPG-II I/O routines with savings up to 2,500 bytes for each I/O routine used. Series 3 supports Cobol I/O routines with savings up to 2,500 bytes for each I/O routine used, according to the vendor.

Series 4 supports user-defined or user-written subroutines, is custom-designed to each customer's specifications and can contain up to 30 routines.

Typical savings using Series 2 or 3 would amount to more than 10,000 bytes of disk space for each program in a library. These two series contain I/O routines that can also be used by assembler programs, the vendor claimed.

Mizer requires no modification to IBM software and is release- and device-independent. Each series costs $50/mo or $1,200 for a three-year license.

A 30% discount is available when more than one series is ordered. General Electronics can be reached at P.O. Box 79, Lyons, Ill. 60534.

SYSD Users Get Free Facility

DALLAS – A facility to route spool output to CICS hard-copy terminals is available free of charge to users of Information Concepts, Inc.'s SYSD, an on-line CICS utility system.

With the spool display and the new route commands, any authorized CICS user can review his output for validity and completeness and route it to a JES writer, his own terminal or any other CICS hard-copy terminal.

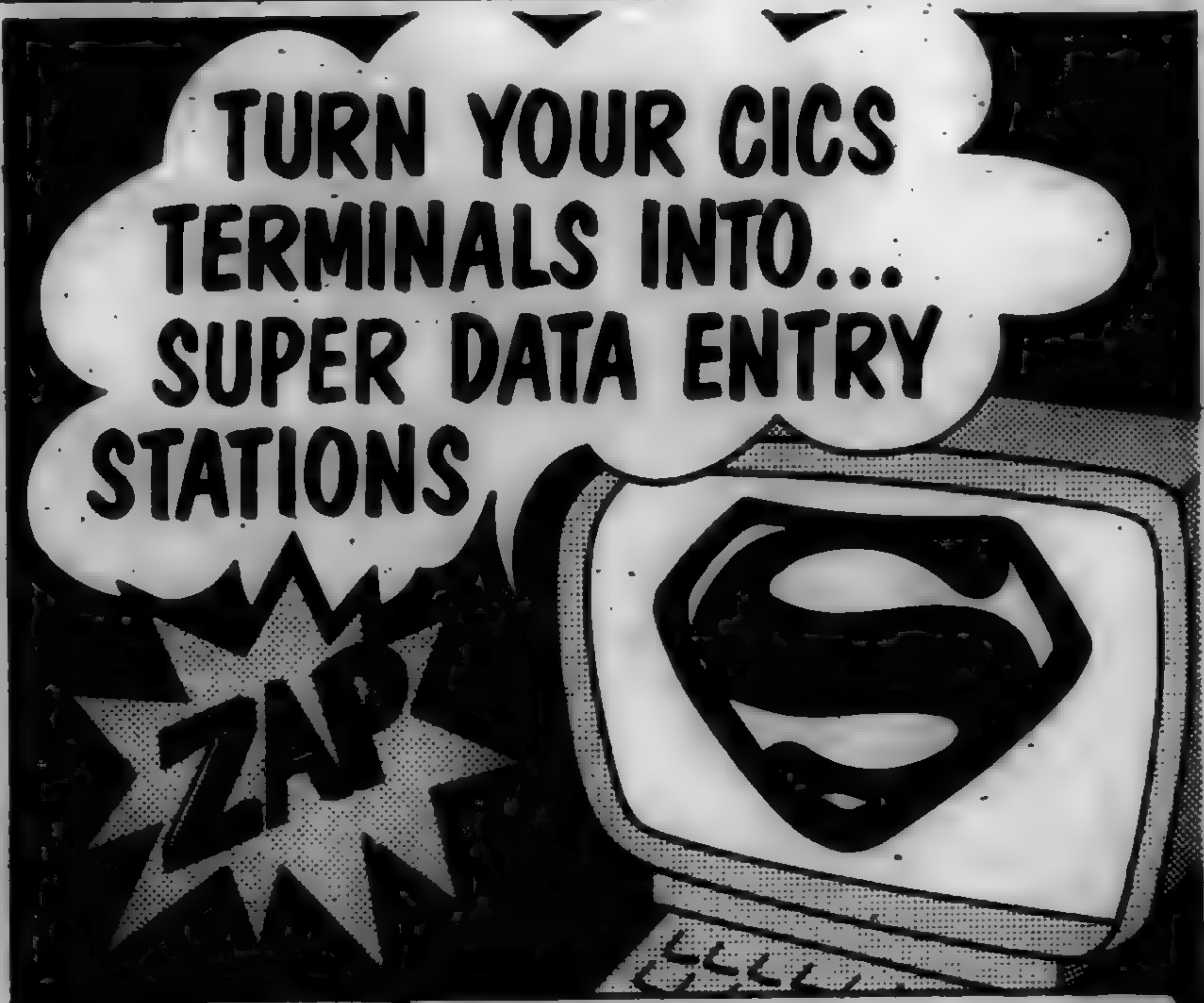
The spool routing facility is available free to SYSD users with active maintenance agreements, while SYSD itself costs $4,800 from the firm at Suite 1730, One Dallas Center, Dallas, Texas 75201.

Utility Backs Job Accounting

BOSTON – A software utility that lets IBM System/34 users run job accounting functions on their machines has been announced by Calvin P. Allyn & Associates.

Job Accounting/34 tracks job and print time by procedure, user identification, device, date and time. Users can also generate a variety of management reports by defining the report contents, sort order and control breaks on the CRT screen formats, a spokesman noted.

The system is targeted for client or departmental billing chores. Written in RPG-II, the package carries a one-time license fee of $435 and can be obtained from the firm at P.O. Box 1741, Boston, Mass. 02105.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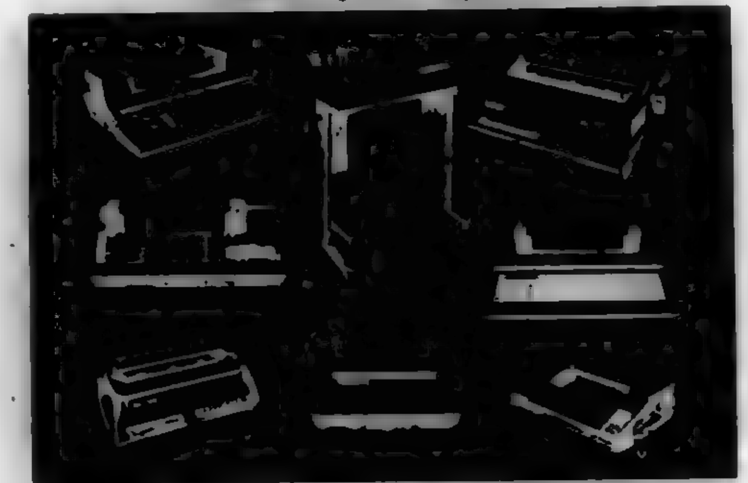

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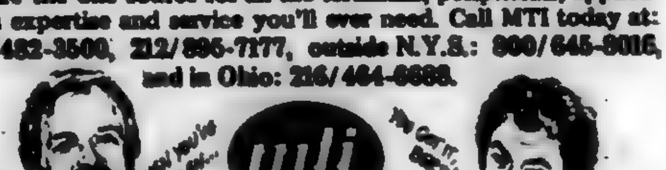
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Payroll System for Series/1 Runs on IBM 4952, 4955

NASHUA, N.H. — An on-line payroll system and production control system that will run on a 128K-byte IBM 4952 or 4955 processor has been developed by The Computer Library Co. (Comp-Lib) for users of IBM's Series/1 Event-Driven Executive (EDX).

Comp-Lib offers a one-year start-up agreement for its Series/1 customers, including installation of IBM software, a custom Sysgen, diskette files, one box of paper and a spare ribbon for the client's printer. Any IBM Program Temporary Fix will be applied for one year for $1,400 for the first year and $700/year thereafter, the firm noted.

The payroll system includes job costing, salary and hourly employees, union, bonus and other special transactions. The time entry program includes automatic overtime calculation and ability to charge sick, vacation, holiday and overtime to different general ledger accounts. The basic package costs $7,000.

The production control system allows the user to write a formula for a product and have the raw material inventory automatically deducted for any size batch of product produced. Prices of raw materials may be updated as they are received. The product package includes several reports and scheduling for $7,000.

Comp-Lib can be reached at P.O. Box 3194, Nashua, N.H. 03061.

'Word-11' Update Places Footnotes

PLACENTIA, Calif. — Automatic numbering and placement of footnotes and a word processing (WP)/DP interface with arithmetic capability are the key improvements in Version 2.5 of Data Processing Design's Word-11.

Word-11, a WP software package, enables users of Digital Equipment Corp. PDP-11s operating under RSTS/E to run WP and DP tasks concurrently.

Footnotes can now be automatically numbered in the text references and in the acutal footnote, according to the firm. Automatic renumbering takes place when a footnote is added or deleted.

In addition, footnotes can be continued across pages. The user may specify the number of nonfootnote lines to be printed per page, and the semi automatic paging feature may be used to preview the paging prior to printing in order to make adjustments.

Besides the new capabilities, the firm claims to have increased Word-11's processing speed tenfold. Version 2.5 costs $8,500 from the firm at Suite F, 181 W. Orangethorpe, Placentia, Calif. 92670.

Graphics Readied For Typesetting

SAN DIEGO — Integrated Software Systems Corp. (Issco) has announced software that will enable phototypesetting equipment to generate graphs, charts and drawings along with typeset text.

Issco's software system will initially drive the APS-5 and APS-Micro 5 phototypesetters and similar units. The phototypsetting software will be available with the next releases of Issco's Tell-A-Graf and Disspla graphics software, scheduled for September 1980 and January 1981, respectively.

The phototypesetting graphics software will cost around $10,000, although an exact price was not ready for release at press time, Issco said from Suite G, 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.

System/3 Users Get CPU History Review

MILWAUKEE — Users of the IBM System/3 Model 15D can review the system history from 3270 CRT terminals under a program developed for IBM's Communications Control Processor (CCP). The program is called System History Inquiry.

The program is available for a one-time charge of $146 on either tape, 80-col cards or 96-col cards from System History Inquiry, P.O. Box 23872, Milwaukee, Wis. 53223.

Service Gives Personnel Data

CLIFTON, N.J. — A personnel reporting service that uses an automated payroll data base to provide reports and information for a company's personnel department is being offered by Automatic Data Processing, Inc. (ADP).

The service, available only to ADP payroll service customers, will provide a variety of data to the personnel department including hiring and termination listings, union seniority reports, employee location and address listings, personnel roster, Equal Opportunity Employment Act compliance data, wage and salary status reports and upcoming salary reviews anniversary listings.

The service can be updated as needed, including changes in the format or frequency of the report or in the number of reports needed.

The cost of the system is about $3 per employee/year, ADP said from 405 Rte. 3, Clifton, N.J. 07015.

Cosmic Clearinghouse Offers 'Flowcharter'

ATHENS, Ga. — The Universal Structured Design Diagrammer (Flowcharter) available from the Cosmic Clearinghouse can reportedly produce flowcharts and concordances for any program written in almost any language.

The generated flowcharts are presented in a tree-like format appropriate for representing the flow of control in a structured program, Cosmic said. Developed by Higher Order Software, Inc., Flowcharter can be used to provide standardized documentation for any type of finished program and can also be used in the debugging phase to show the structure of the program.

The documentation price is $21.30, and the program costs $1,000 from Cosmic, Suite 112, Barrow, University of Georgia, Athens, Ga. 30602.

Network Testers: 'Windows on Channels'

Manufacturer	Digi-Log Systems, Inc.	Dynatech Data Systems	Spectron[5]	Spectron	Spectron	Universal Data Systems
Address	Babylon Road Horsham, Pa. 19044	7644 Dynatech Ct. Springfield, Va. 22150	344 New Albany Rd. P.O. Box 620 Moorestown, N.J. 08057			4900 Bradford Drive Huntsville, Ala. 35805
Model	DLM III	Dyna-Test 2000	D-584 Datascope	D-586	D-601	Comtest
Price	$2,990 (passive only)[1]	$10,945	$8,500	$11,500	$24,500	$7,950
Programmable?	Yes	Yes	Yes	Yes	Yes	Yes
Number of Instructions (if applicable)	Menu-Driven	50	32[6]	32[7]	52	Five predefined protocols
Top Speed (bit/sec)	19.2K	19.2K	56K	56K	1,000K	9.6K full-duplex; 19.2K half-duplex
Protocols Supported (a) Binary Synchronous?	Yes	Yes	Yes	Yes	Yes	Yes
(b) Synchronous Data Link Control?	Yes	Yes	Yes	Yes	Yes	Yes
High-Level Data Link Control?	Yes	Yes	Yes	Yes	Yes	Yes
Others	X.25, DDCMP[2], Ipars[3]	ADCCP[4], X.25, asynchronous	All major protocols	All major protocols	All major protocols	Ipars[3]
Buffer Size (bytes) Send	128 variable	1K	256	1,280	4K	3,500
Receive	8,000 standard	4K plus status data	2,048 (standard); 4,096 (optional)	4,096	4K	3,500
Tests Supported Bit Error Rate	Yes	Yes	Yes	Yes	Yes	Yes
Block Error Rate	Yes	Yes	Yes	Yes	Yes	Yes
Cyclic Redundancy Check	Yes	Yes	Yes	Yes	Yes	Yes
Parity	Yes	Yes	Yes	Yes	Yes	Yes
Display Technology	CRT (5 in.)	CRT	CRT (5 in.)	CRT (5 in.)	CRT (9 in.)	CRT (5 in.)
Number of Characters	512	512	376	376	640	512

[1] $8,575 with simulation of data terminals or other communications devices.

[2] Digital Data Communications Message Protocol.

[3] International Programmed Airlines Reservation System.

[4] Advanced Data Communications Control Procedure.

[5] Spectron is a division of Northern Telecom Systems Corp.

[6] Up to 60 instructions per program.

[7] Up to 50 instructions per program.

These profiles of high-level test devices are offered as an addendum to a recent "Product Spotlight" of 12 models [CW, June 30]. Summaries of the Spectron D-584 and D-586 are repeated here with some errors corrected. Options can add significantly to the prices shown.

By Brad Schultz
CW Staff

"It's a window on your data channels," one vendor spokesman has said in describing the high-level network test device (sometimes called analyzer) suddenly available to users at prices ranging from as little as a few thousand dollars on up to 10 times that much.

The wide price range reflects the diversity in troubleshooting repertoires and programmability available with the latest testers. Some models were designed for particular lines of communicating peripherals; others are "general-purpose," intended for many different makes and models of network gear.

A recent poll of spokesmen for some of the leading manufacturers of data network test devices produced this advice for larger, more sophisticated users: Mix it up. Get maybe one or two of the expensive, high-performance testers — which generally require operators to have a strong programming background — and several of the cheaper models for operation by engineers having varying degrees of programming skill.

A "people analysis" comes first in planning to buy network test equipment, according to Roy Gemberling, Digi-Log Systems,

(Continued on Page 49)

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For X-Y Display

Graphics-100 Fits VT-100, 103

SANTA CLARA, Calif. – A plug-in device that reportedly provides Digital Equipment Corp. VT-100 or VT-103 terminals with X-Y graphics display capabilities has been unveiled by Selanar Corp.

The Graphics-100 printed circuit board fits into the option slot of the VT-100 series terminal and provides a 1,220 by 240 dot resolution on the CRT screen.

Normal VT-100 functions are separate and remain unchanged by the Graphics-100 capabilities, a Selanar spokesman said.

The board is said to provide a separate display memory along with extensive text and graph-labeling functions.

The text includes four character sets, three text rotations for labeling and three type fonts.

In addition, the Graphics-100 memory and VT-100 memory can be displayed simultaneously, the spokesman noted.

The Selanar board includes a built-in vector generator. Users reportedly need only specify line endpoints anywhere in the 64K- by 64K-byte addressable areas. The device computes the line and displays that section of the line which lies within the designated viewing window. The Graphics-100 costs $1,195 from Selanar at 2403 De La Cruz Blvd., Santa Clara, Calif. 95050.

Multiplexer Suits PDP-11

IRVINE, Calif. – A single-board, 16-channel Digital Equipment Corp. DZ11-E equivalent multiplexer usable with any DEC PDP-11 computer system is available from Able Computer.

The DZ/16 replaces two full hex-width 8-line DZ11s; the microprocessor-based controller reportedly occupies half the space and presents only one load to the Unibus.

Features include on-board self-test with LED display, on-board switches for address and vector selection, a data format that is program-selectable for each channel and compatibility with DEC diagnostic and operating system software. The DZ/16 supports all DZ11 transmission rates.

The DZ/16 costs $3,500 from 1751 Langley Ave., Irvine, Calif. 92714.

Sentinel Offers Bisync Package

CINCINNATI – Binary Synchronous Communications (BSC) protocol has been implemented on Sentinel Computer Corp.'s line of 16-bit microprocessor-based computers for communicating with a host processor, another Sentinel or remote terminals using a data link.

Two terminal emulations, the IBM 2780 and 3780 are said to be supported. The implementation has been adapted to utilize printers, keyboards, screens and disk or diskette files.

The Sentinel Bisync package costs $1,000 from 9902 Carver Road, Cincinnati, Ohio 45242.

Modem Handles Short Hauls

HALLANDALE, Fla. – The Model 6000 limited-distance modem for synchronous operation over Telco Products Corp. or private two- or four-wire non loaded metallic conductors is being offered by International Data Sciences, Inc.

The model 6000 is available in two versions, the models 6000 (L) and 6000 (H), that operate at selectable speeds of 2,400, 4,800 and 9,600 bit/sec and 4,800, 9,600 and 19.2K bit/sec, the firm said.

The Model 6000 costs $435 from the firm at 7 Wellington Road, Hallandale, Fla. 33009.

Eliminator Lets Terminals Share Line

ATLANTA – An extender-like device that allows several terminals to be attached to a single communications line has been introduced by Programmed Closing Systems, Inc. (PCS).

The PCS Line Eliminator provides a two-char. address to the host terminal as well as input and output buffers. The device also establishes a Burroughs Corp. standard poll/select protocol for the terminal and facilitates communications at speeds up to 9,600 bit/sec with the user's computer, a spokesman said. The transmission rate is switch-selectable.

The microprocessor-based Line Eliminator facilitates multidropping of terminals and provides multiple buffers for burst transfer of data between the terminal and the computer, thereby off-loading some of the processing duties of the host CPU, the spokesman noted.

Because the Line Eliminator allows several terminals to be attached to a single line, users can support more terminals over a limited number of communications lines. Even though teletypewriter terminals communicate inherently at speeds up to 1,200 bit/sec, the line eliminator boosts that terminal-to-processor speed to 9,600 bit/sec, he said.

Advantages of the Burroughs protocol are that teletypewriter terminals can share the same line with the TD830 terminal; the local microprocessor can facilitate implementation of special terminal functions such as tabbing; and the increased buffer size enables more characters to be transmitted in every burst, the spokesman stated.

The line eliminator costs $1,145 from PCS at Suite 102, 1900 The Exchange, Atlanta, Ga. 30339.

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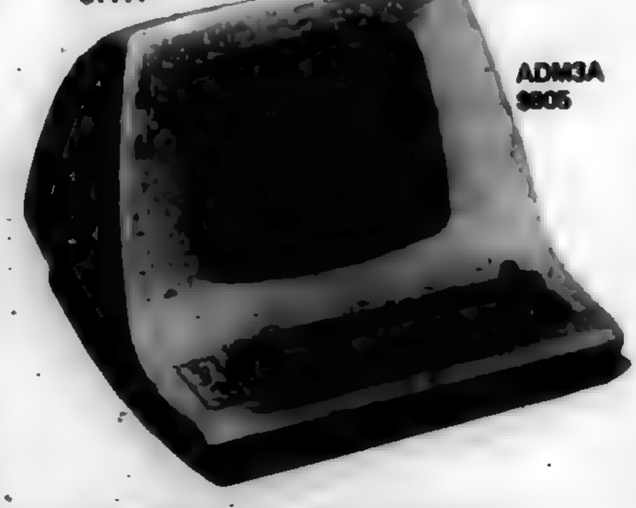

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IBM Adds Document Processor to 3600 Line

WHITE PLAINS, N.Y. — IBM has announced a document processor that performs customer checking and savings transactions and can be used on 370, 4300 and 30 series mainframes.

The 3694 provides on-line check processing for financial institutions and service bureaus providing financial DP services. The unit can also provide full check processing for small banks or thrift associations with installed CPUs, IBM said.

Because it transmits financial data over standard telephone lines, the 3694 can eliminate the need to physically transport checks and reports from bank to bank or to remote computing centers. The unit offers three programs that can perform general document-processing jobs.

Handle Micr

The 3694 units can be arranged in clusters to read magnetic ink character recognition (Micr) documents, as well as inscribing and sorting checks while performing sequence numbering and endorsing, IBM said.

Up to four 3694s can be attached to a 3694 with control functions. Up to 18 of the units can be connected to one 3602 finance communications controller when the proper features are included. Up to two printers can also be attached to a 3694, IBM said.

IBM also announced three program products to provide control and data collection functions for the 3694:

- Check Processing Executive/3694 (CHX/3694) provides application and device control for the 3694 transport and operator functions, along with proof of deposit, inclearing processing, fine sorting, cycle split and exception item pull and statement preparation sorts, IBM said.
- CHX/VS collects data captured by the 3694 and transmits it to 370, 4300 or 30 series processors via an IBM 3270 CRT terminal.
- The 3694 Macro Extensions program generates instructions to perform initialization and control such as stacker selection and item numbering, the firm said.

Eight Models

The 3694 is available in eight models with one to four distribution stacker modules. Each module contains six pockets for document distribution and all models include a diskette drive, operator console, master printer, keyboard Micr capability and item correction capabilities. Four models offer automatic document feeding and high-speed document reader/sorter capability to operate up to 400 document/min, IBM said.

The unit costs between $46,000 and $67,500 and leases from $1,020 mo to $1,505/mo on a two-year lease. Rental charges range from $1,200 to $1,770.

CHX/VS costs $240/mo, CHS/3694 costs $45/mo and the Application Macro Expansion costs $65/mo.

First customer shipments of the 3694 are scheduled for the third quarter of 1981.

IBM 3694 Document Processor

Testers Serve As 'Windows'

(Continued from Page 47)

Inc.'s general manager.

Before deciding which high-level testers to buy, data communications managers should assess personnel capabilities, Gemberling advised. After all, some network device testers require programming expertise that may be in short supply at some installations.

Situations to Avoid

The data communications manager should avoid situations where only one person in his organization knows how to run the available test gear in an emergency, Gemberling remarked. Extensive networks deserve a pool of people qualified to run testers; otherwise, a user risks much when its only capable troubleshooter is not on hand during a crisis or when too many problems arise for that single person to resolve.

According to Gemberling, the prudent net steward will get high-level testers into the hands of as many of his staff as possible, which probably means buying a number of the less-expensive, easy-to-operate products as well as at least one of the high-priced elite.

The chart on page 47 illustrates the wide range in prices and performance available in testers today. The chart is an addendum to a recent profile of 12 testers [CW, June 30], adding five models not included in that sampling and rerunning summaries of Spectron's D-584 and D-586 Datascopes. The June 30 article carried some errors on the latter two models that are corrected here.

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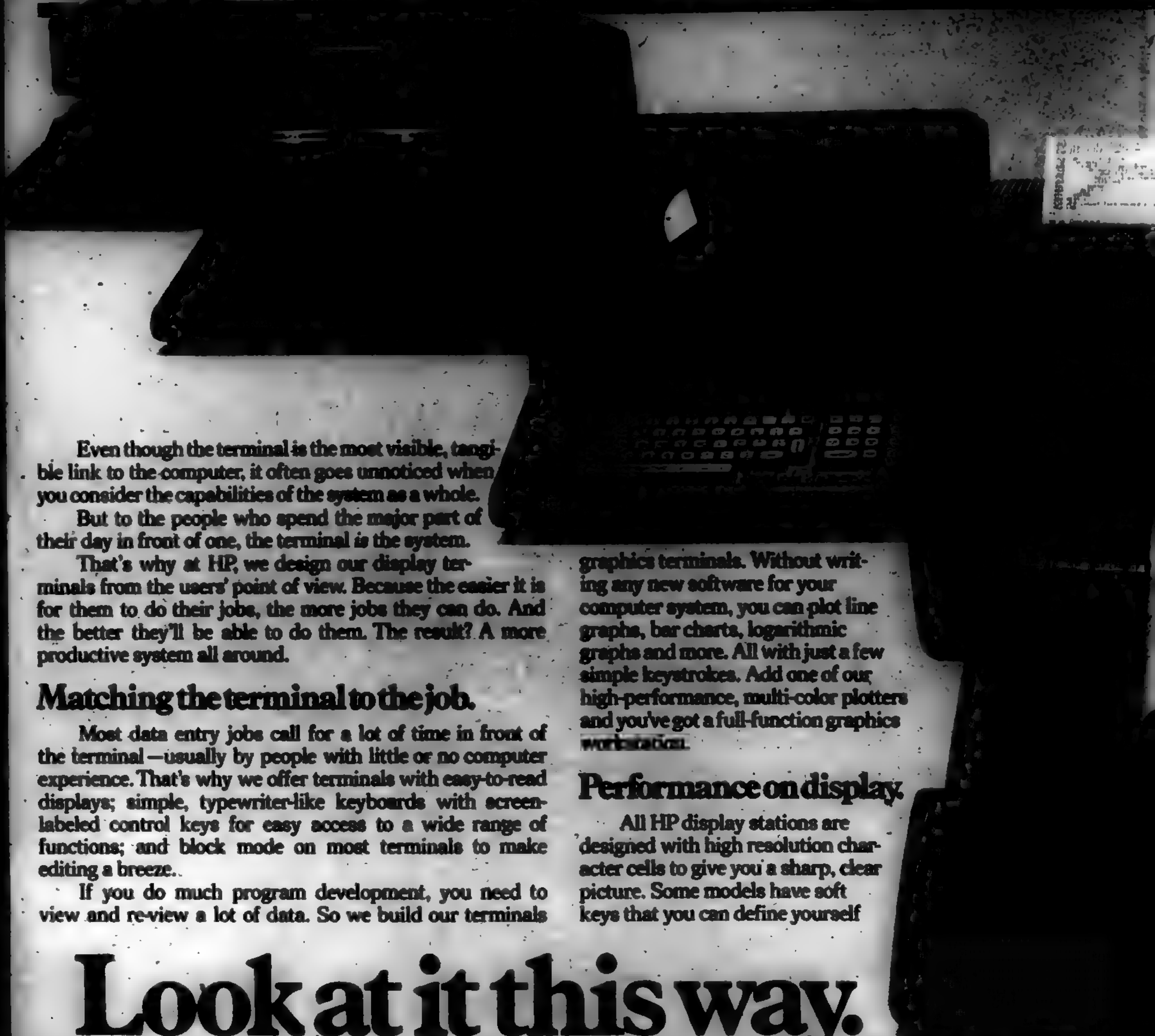

Even though the terminal is the most visible, tangible link to the computer, it often goes unnoticed when you consider the capabilities of the system as a whole.

But to the people who spend the major part of their day in front of one, the terminal *is* the system.

That's why at HP, we design our display terminals from the users' point of view. Because the easier it is for them to do their jobs, the more jobs they can do. And the better they'll be able to do them. The result? A more productive system all around.

Matching the terminal to the job.

Most data entry jobs call for a lot of time in front of the terminal—usually by people with little or no computer experience. That's why we offer terminals with easy-to-read displays; simple, typewriter-like keyboards with screen-labeled control keys for easy access to a wide range of functions; and block mode on most terminals to make editing a breeze.

If you do much program development, you need to view and re-view a lot of data. So we build our terminals with off-screen storage and scrolling capabilities to help you get the entire picture. Some models have built-in thermal printers for instant hard copy at the touch of a key. And our newest terminal has two data communications ports and a split screen capability that lets you compile, execute, monitor and edit programs as if two stations were available.

Data analysis? Take a look at the capabilities of our graphics terminals. Without writing any new software for your computer system, you can plot line graphs, bar charts, logarithmic graphs and more. All with just a few simple keystrokes. Add one of our high-performance, multi-color plotters and you've got a full-function graphics workstation.

Performance on display.

All HP display stations are designed with high resolution character cells to give you a sharp, clear picture. Some models have soft keys that you can define yourself for specific or repetitive tasks; line drawing modules that make it easy to design familiar forms on the screen; and local mass storage to turn your terminal into a true local workstation. Even international character sets are available.

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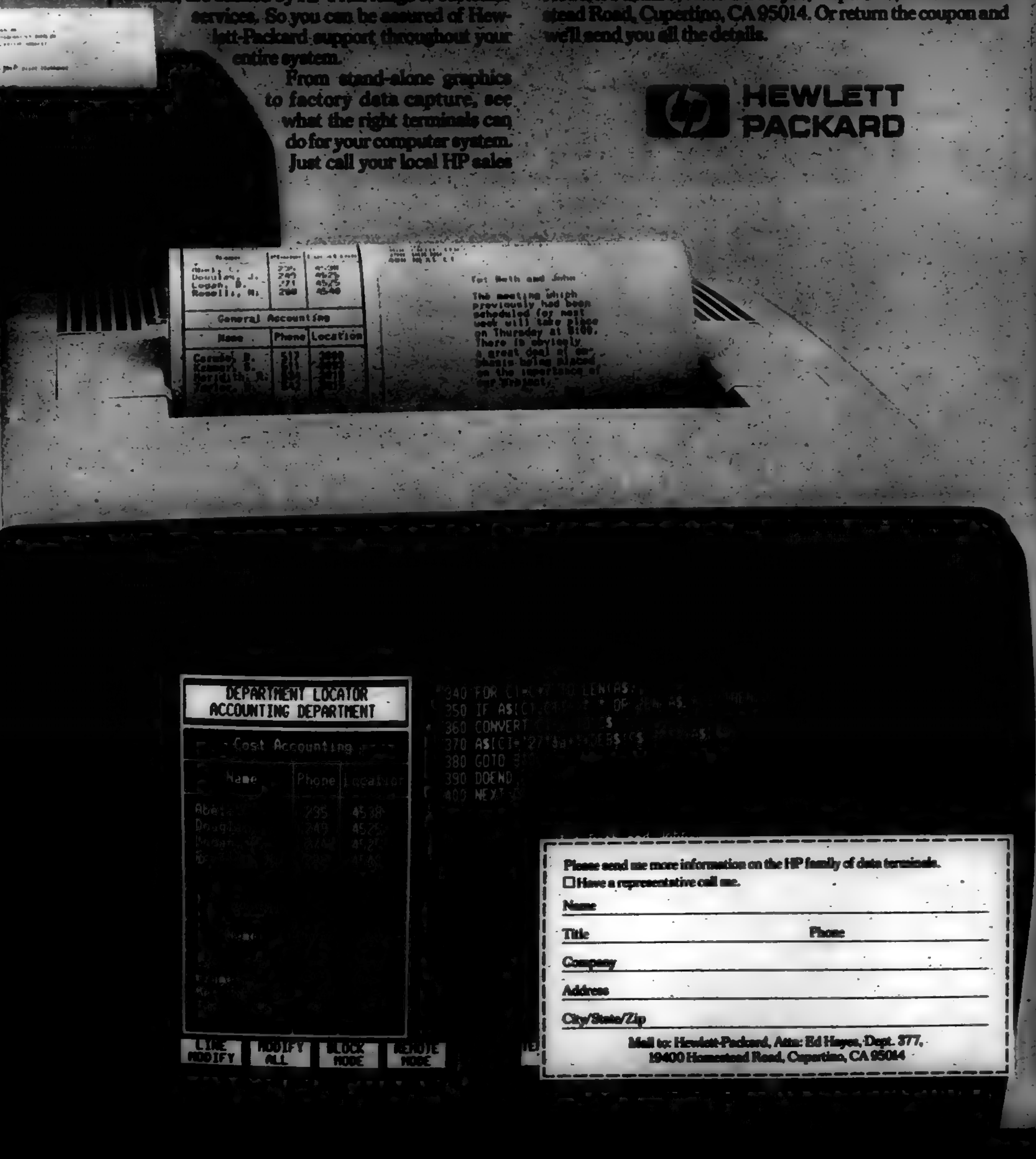
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SCDU Monitors IBM Loop Nets

KIRKLAND, Wash. — A diagnostic and management tool has been introduced that reportedly reduces the operating costs and improves the reliability of IBM loop networks.

Computer Management Consultants' Star Circuit Diagnostic Unit (SCDU) operates on the analog signal present on the telephone lines, the firm said. Transmission characteristics are monitored to provide diagnostic information to the network operator via status lights.

Front-panel switches and monitor jacks permit circuit switching and the use of other test equipment, such as speakers and line level monitors.

The SCDU "fans out" 3601 remote loop ports to four telephone circuits each, requires no additional modems and has a switchable circuit bypass without patching. All components are modular and field replaceable, the vendor said.

The SCDU costs $3,500 from the firm at Suite 200, 135 Lake St. South, Kirkland, Wash. 98033.

Minimax Has 'Terminal'

SUNNYVALE, Calif. — Asynchronous communications capabilities have been added to Minimax, a turnkey microcomputer system for small businesses from Computhink.

Dubbed Terminal, the software option is said to aid in information processing at remote sites. Terminal is Bell-103 asynchronous-protocol compatible through a modem or an acoustic coupler and allows Minimax to communicate with terminals, CPUs, low-speed data networks or another Minimax.

The software enables the user both to retrieve and send data messages and programs and, when communicating with another Minimax, allows the user to receive and transmit executable program codes, the firm said.

In addition, all communications can be immediately recorded on Minimax's disk system for future processing. Terminal also features selectable transmission rates ranging from 50- to 300 bit/sec, Computhink said.

The Terminal option, including modem, costs $645 from Computhink, 965 W. Maude, Ave., Sunnyvale, Calif. 94086.

IPC Controller Gains Processor

YORK, Pa. — Industrial Solid State Controls, Inc. is offering the Model 385-COP, a communications processor that connects directly to the I/O bus of the firm's IPC 300 programmable controller.

The unit can be used to format reports or formulate graphics displays, the vendor said.

The Model 385-COP comes in an 8K version costing $1,895 and a 16K version priced at $2,295. The vendor is at 435 W. Philadelphia St., Box 934, York, Pa. 17405.

Vector 3400 Enhanced

WOODLAND HILLS, Calif. — Vector General has announced two enhancements to its Model 3400 graphics display system that reportedly double the system's capacity and allow for high-density displays.

Vector General has developed a refresh buffer it said is capable of handling 64K bytes of 16-bit words. The firm has integrated the Model 3400 with a Digital Equipment Corp. VAX-11/780 CPU.

The refresh buffer allows the system to perform a variety of sophisticated local graphic manipulations independently on a host CPU. The high computational requirements are performed by the 3400, the vendor said.

The VAX-11/780 uses 32-bit arithmetic rather than 16-bit arithmetic.

The enhancements cost $5,000 from Vector General at 1255 Lincoln Blvd., Santa Monica, Calif. 90401.

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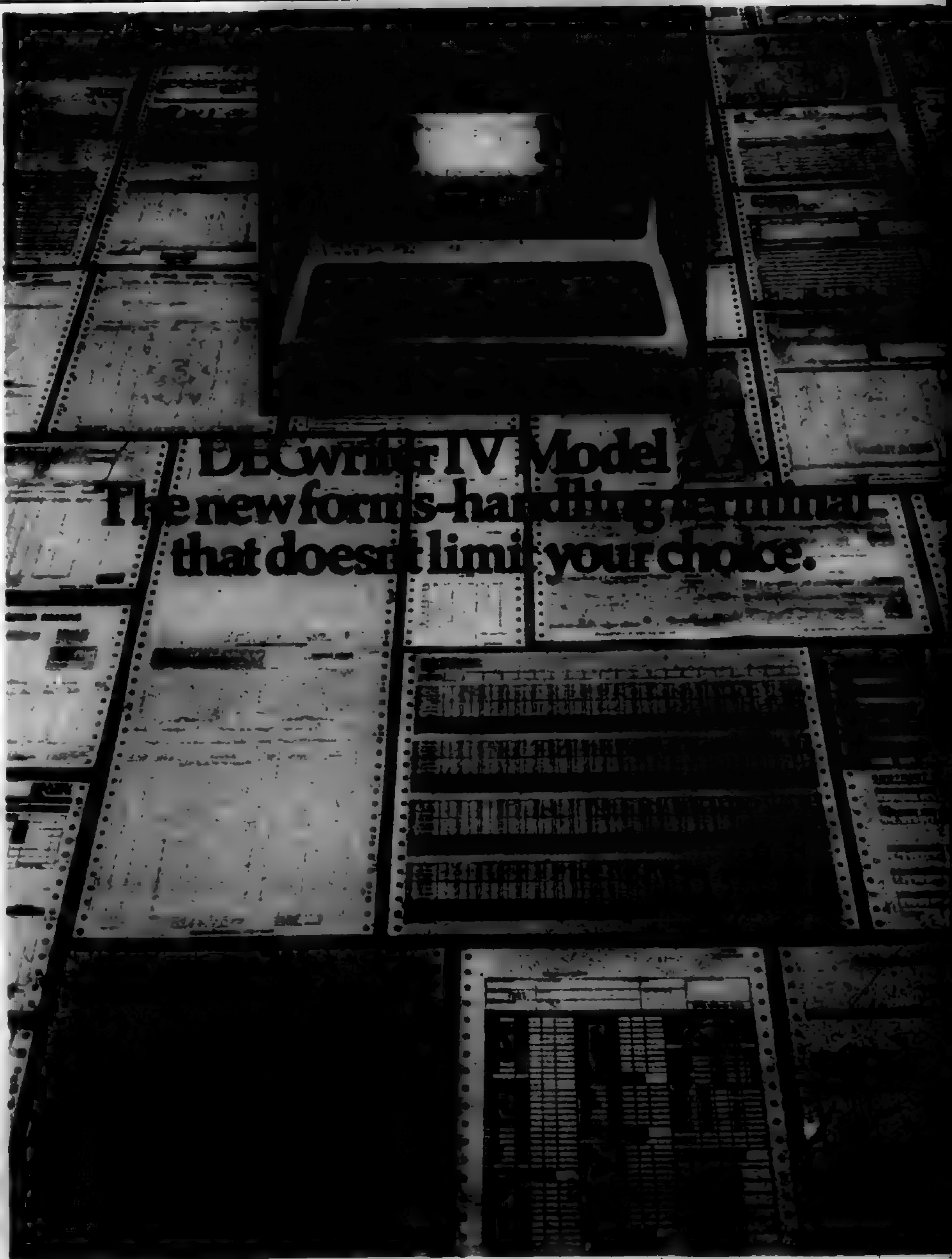
DECwriter IV Model
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Nu Data Introduces Handheld Test Set

LITTLE SILVER, N.J. — A handheld, microprocessor-controlled terminal for data communications and troubleshooting is available from Nu Data Corp.

Supporting duplex synchronous and asynchronous operation, the Model 920 test set has a full keyboard and 16-char. display that handles Ascii, Ebcdic, Transcode and Baudot, according to the firm.

Both hexadecimal and alphanumeric display formats are provided. Two 960-char. buffers may be loaded from received data, from the keyboard or from 'FOX' messages.

The unit costs $1,595 from Nu Data at 32 Fairview Ave., P.O. Box 125, Little Silver, N.J. 07739.

Supports Four Terminals

DEC-Based Graphics Unit Debuts

SAN JOSE, Calif. — A stand-alone graphics display system based on a Digital Equipment Corp. LSI-11/23 microprocessor has been announced by DeAnza Systems, Inc.

The Visacom/23, said to perform graphic and true color, monochrome or pseudo-color image processing twice as fast as previously available systems, supports up to four terminals.

Other features of the system include a memory of up to 512K bytes, independent zoom and scroll on image or graphic overlay, four independent graphic overlay channels, up to four alphanumeric character generators, four intensity transformation units and four independent cursor overlays.

Available with RSX11M or RT11 operating system software, the system costs approximately $39,000, including color monitor, dual floppy disk, terminal and interactive joystick.

DeAnza Systems is located at 118 Charcot Ave., San Jose, Calif. 95131.

Coupler Runs In Two Modes

SANTA CLARA, Calif. — International Minicomputer Accessories Corp. (Inmac) has introduced an acoustic coupler that operates in full- and half-duplex modes and has a self-testing feature to help diagnose transmission problems.

The Clear Signal coupler can be adapted to be used with Hewlett-Packard Co., Data General Corp., Texas Instruments, Inc. and Digital Equipment Corp. hardware and other systems on special order, a spokesman said.

The coupler is Bell 103A-compatible and interfaces with most EIA RS-232C computers and terminals at 0- to 300 bit/sec.

The coupler with a 10-ft. cable, modem and ac power cord costs $270. Cables of extended length are also available, the spokesman said from the firm at 2465 Augustine Drive, P.O. Box 4780, Santa Clara, Calif. 95051.

Book Describes PTT Offerings

CEDAR GROVE, N.J. — Telecom Systems Group, Inc. has announced that the 1980 edition of *The Eurodata Foundation Yearbook* has been published.

The revised yearbook contains information on data communications services and equipment provided by the 18 European member countries of the European Conference of Postal & Telecommunications Administrations (Cept), which also own and fund the Eurodata Foundation.

The 464-page yearbook, including maps, charts and diagrams costs $175 plus $5 shipping charges and any applicable state and local taxes from Telecom Systems Group, Inc., 579 Pompton Ave., Cedar Grove, N.J. 07009.

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You probably know the DECwriter IV for its flexibility in handling paper.

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The new DECwriter IV Model AA with its snap-in tractor feed option can automatically handle both standard and custom forms. Forms as wide as 14⅞". And as narrow as 3". In up to four parts.

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Best of all, Digital has put all this capability into a terminal that fits right into a wide range of environments — either on its custom stand or on a desktop. And the DECwriter IV's solid-state components and microprocessor controls continue to build on the reliability standards set by the DECwriter II. All at a surprisingly low price.

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To order your DECwriter IV Model AA, or the original DECwriter IV Model DA, call your terminals supplier or write Digital Equipment Corporation, Terminals Product Group, MR2-2/M67, One Iron Way, Marlboro, MA 01752. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment Corporation of Canada, Ltd.

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HP213.
Telecommunications and the Computer, 2nd Ed.,
James Martin.

Use the new communication devices to speed all your data transmissions with updated information on how the Bell System works, including such recent advances as PCM, the T1 carrier, DDS, time division switching, and the change from analog to digital operation. The book summarizes the quantity and nature of errors in systems and lines. Read discussions of bursts of errors as a function of message length with an entire section on noise and distortion, line failure, data errors, delays, and blocking. The author also treats on- and off-line, real and non-real time systems. $32.50

HP185.
EDP Costs and Charges: Finance, Budgets, and Cost Control in Data Processing,
James Cortada.

Now you'll see how to manage the cost of data processing within a company, how to invest in DP and how to maximize return on the cost of data processing in hardware, software, people and applications. This guide covers the role of today's changing technology and its costs within a company. $24.95

HP210.
Managing the Systems Development Process,
Charles L. Biggs, Evan G. Birks and William Atkins.

Significantly improve the management of the systems development process of your organization applying the guidelines in this practical guide. The guide details how to apply the latest management techniques in terms that are familiar to the typical manager. The emphasis here is on describing emerging requirements and actually translating the theory to practical solutions. $24.95

HP199.
Structured Systems Analysis: Tools and Techniques,
Chris Gane and Trish Sarson.

Here's a practical approach to the building of logical models for commercial data processing systems. With numerous flow charts, tools and step-by-step procedures, this guide brings you the "how" and the "what" of handling awkward notational problems and making the transition to a top-performance structured design. $22.50

HP203.
Structured Design,
Edward Yourdon and Larry Constantine.

This new approach to designing programs provides strategies for designing the right modules and interconnections for the best possible solution to almost any problem—plus sound techniques for detecting design bugs. The authors take an in-depth look at new concepts of program and systems design, including coupling and cohesions, two new concepts they developed. $25.95

HP204.
A Discipline of Programming,
Edsger W. Dijkstra.

Using precision notation techniques, this book provides a range of programming methods for keeping programs as simple as possible, yet tackling the most difficult applications. Semantic characterizations, properly terminating constructs, array variables, linear search methods, and updating and merging techniques ensure program accuracy and efficiency. $21.95

HP182.
Managing The Structured Techniques, 2nd Ed.,
Edward Yourdon.

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DDP a Valued Recruit at Salvation Army

RANCHO PALOS VERDES, Calif. — For less than $500,000, the Salvation Army's western territory has combined distribution of decision-making at its divisions with centralized administration coordination, according to Virgil Cline, the territory's secretary for business administration.

The Salvation Army, which has traditionally placed a great amount of responsibility and authority at the local level, Cline noted, now operates a distributed data processing (DDP) system based upon equipment from Basic Four Corp.

The investment of "less than $500,000," represents a lower equipment cost than if the territory had decided to upgrade to a larger centralized system. In addition, the organization hoped to achieve savings in operating costs through more careful control and more sensitive responses to the various demands on its funds, Cline said.

"The fact that minicomputer costs have continued to decrease even while most other capital costs were inflating was another factor that helped us make the decision to move to DDP," he noted.

Complex Administration

"For us, most decision-making takes place at our eight divisional headquarters, but all of this activity must be coordinated administratively," Cline explained.

The structure of the organization, various regulations imposed upon charitable organizations by the government and professional standards groups as well as internal ethical perceptions contribute to the complexity of the administrative task.

"We are supported almost entirely by voluntary contributions from the public, and we feel a strong sense of accountability for the funds people entrust to us," Cline said.

"Through computerized accounting we obtain audit trails to satisfy the most rigorous inspection of the disposition of our funds," he explained. However, we decided that a centralized computer operation in territorial headquarters, rather than in the field, was not the most efficient system for decision-making."

Several Upgrades

Beginning with an automated accounting system based on punched cards, the organization went through several upgrades

(Continued on Page 56)

Device Plots From Calcomp Tapes

SANTA CLARA, Calif. — Working directly from unsorted California Computer Products, Inc. 921/925 magnetic tapes, Versatec's Plotting Work Station sorts, rasterizes and controls electrostatic plotting.

The workstation provides a 10-to-1 advantage in total processing/plotting time over 921/925-controlled pen plotting, Versatec claimed.

The Plotting Work Station (Model 430) accepts Calcomp 921/925 tapes, Versatec-ordered vector data and raster data. The system offers CRT-displayed menus to simplify the creation of canned sequences and graphics manipulation and modification of multiple line widths and line masks. It can generate multiple copies, select either of two electrostatic plotters and select files from disk or tape. Integrated disk storage locally stores plots with up to two million vectors, the vendor said.

System components include a microprocessor with 64K bytes of memory, a Winchester disk with a capacity of 24.8M bytes, a CRT, a dual-density magnetic tape drive with embedded formatter and a bipolar algorithmic processor for sorting and vector-to-raster conversion. The system drives two Versatec plotters in plotting widths of 11, 20, 22, 24, 36, 42 or 72 in.

Deliveries of the Versatec Plotting Work Station (Model 430) will begin in the first quarter of 1981. The Model 430 with dual-density 800/1, 600 bit/in. tape drive costs $48,500 from Versatec, a Xerox Corp. company, 2805 Bowers Ave., Santa Clara, Calif. 95051.

Portable Printer/Plotter Debuts

BURLINGTON, Mass. — Computer Devices, Inc. (CDI) has introduced a high-resolution, portable printer/plotter as part of its Miniterm series.

Capable of plotting up to 3,420 dot/sq in. (60 dots vertically by 57 dots horizontally) and achieving horizontal speeds of up to 24 in./sec between plotted points, the CDI thermal matrix printer/-plotter comes with CDI's switch-selectable 80- and 132-column alphanumeric printer feature. Other features include microprocessor control, a 45-char. buffer, a full 96-char. Ascii set of upper and lower case characters and patented print head control mechanism, the firm said.

In its nongraphic mode, the thermal printer is a 5 by 7 dot matrix, friction-feed printer that offers print speeds up to 50 char./sec. Individual dots can be placed as close as .017 in. apart.

The printer/plotter costs $425. Miniterms equipped with the plotter option range in price from $2,410 for the Model 1203 keyboard send/receive portable terminal to $5,910 for the Miniterm 1206 portable terminals that are either self-prompting or programmable.

CDI is at 25 North Ave., Burlington, Mass. 01803.

Printers Offered At Prices 'Up to 40%' Off

STAMFORD, Conn. — Computer Maintenance Corp., a maintenance service organization, has entered the printer market and is offering various makes of serial and line printers at prices it claimed are up to 40% lower than the original manufacturers' price.

The vendor said it will install the printers, provide the necessary interfaces and service them through its established maintenance organization.

While DEC would charge $7,650 for a B300 300 line/-min printer, Computer Maintenance charges $5,700. While Perkin-Elmer Corp. charges $18,000 for the 600 line/min Model 1260 Chaintrain, Computer Maintenance charges $12,600 for the same unit, according to a spokeswoman.

The firm is located at 22 Fifth St., Stamford, Conn. 06905.

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Matrix Ties Eight Devices

WATERTOWN, Mass. — An eight-port universal crosspoint switching matrix that reportedly permits direct data transfer between any combination of computers and peripherals is available from Digital Laboratories, Inc.

The Digital Micro-Matrix reportedly interconnects up to eight serial RS-232C and/or current-loop devices in any combination.

Providing 264 possible paths, the device is said to store up to 16 key-selectable connection combinations in nonvolatile memory.

The unit costs $1,395 from Digital Laboratories, 600 Pleasant St., Watertown, Mass. 02172.

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Salvation Army Pleased With DDP

(Continued from Page 55)

with mainframes from IBM and Honeywell, Inc., Cline recalled. In the mid-70s, the decision to move to DDP was made based upon the recommendations of Cris Castro, a consultant with Coopers & Lybrand, Inc.

Basic Four's Model 400 mini was chosen because it handles multiple functions and provides step-by-step operator guidance to ensure proper data entry, said Castro, now president of Data Solutions, Inc. In addition, "the Basic Operating System Software (Boss) permits us to tailor programs easily."

The 400s were installed approximately three years ago at each of the eight regional divisions. Each installation's equipment consisted of a 32K-byte CPU, one 10M-byte disk drive, one CRT terminal and one printer.

"We found that budget control at the local level was vastly improved," Cline said.

Former procedures required information to be assembled locally and sent in card or tape form to a central processing installation, with reports mailed back. This resulted in up to three weeks of delay and had a negative effect on the Army's ability to respond to the need of the moment. "As the need is gone, we phase it out in order to accommodate a new priority," Cline explained.

Functions assigned to the local systems included all the payroll, payables, receivables and general ledger applications, he said.

In addition, each project or program is now budgeted and tracked independently on the computers. Funds and costs are allocated for continuing established programs such as camps and counselling and for emergency efforts.

Best Use of Resources

"All of this emphasizes the value of having a computer near the point where funds are generated and dispersed," Cline stated. "We are able to generate up-to-the-minute reports on demand and, with this currency, we can always make maximum use of our resources."

A further advantage that evolved from the on-site minis was the ability to do donor accounting, which in turn is now leading to the computerization of the territory's direct-mail solicitation program.

"The solicitation lists range in size from less than 100,000 names in some of the smaller divisions to more than 300,000 in the Los Angeles area," according to Castro.

"The value of this single application has led us to replace the Model 400s with larger computers in four of the larger cities. Seattle and Portland now have installed Basic Four System 610s and San Francisco and Los Angeles have System 730s," he said.

Future plans include replacing the Honeywell, Inc. mainframe at territorial headquarters with a Basic Four System 730 at the end of September, the Army representative said. The hardware configuration will consist of a 128K-byte CPU, two 75M-byte disk drives, six CRTs, one tape drive and one printer. The distributed 610s and 730s will communicate via IBM 2780/3780-compatible interfaces.

CDC Unveils Band Printer For OEM Use

MINNEAPOLIS — Control Data Corp. has announced a 1,200 line/min band printer that uses a standard 64-char. Ascii print band that is interchangeable with CDC's 300-, 600- and 900 line/min printers.

Called the 9380-12, the printer is the fourth in the line aimed at the OEM market. The unit features a towel ribbon that measures 15 in. wide by 35 yards long to provide a minimum of one million lines of printing before it has to be replaced, the vendor said.

Also included with the printer is a microprocessor-based controller and full-line buffer memory that will accommodate up to 136 byte codes and one control code, the vendor said.

The unit costs $13,000 and will be available in the third quarter of 1980. CDC can be reached through Box O, Minneapolis, Minn. 55440.

Tractor Added By Dataproducts

WOODLAND HILLS, Calif. — A bidirectional paper tractor that provides both forward and reverse paper motion for graphics and other applications has been introduced by Dataproducts Corp.

Geared as an accessory for the firm's daisy-wheel printer line, the tractor can accommodate paper forms from 2 in. to 15 in. wide and up to .025 in. thick. Paper can reportedly be positioned and tensioned vertically and horizontally by use of a graduated scale, two large independently adjustable and lockable tractors and a tensioning mechanism.

The device costs $250, with quantity discounts available from Dataproducts at 6200 Canoga Ave., Woodland Hills, Calif. 91365.

Chapman Meter Locates, Measures Static Charges

PORTLAND, Maine — An electrostatic meter designed to determine the location of static-related problems and measure the amount of polarity of an electrostatic charge is available from Chapman Corp.

The price for the meter is $295, and the catalog is free, the vendor said from P.O. Box 427, Portland, Maine 04112.

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Three Storage Options

Multiuser System Accesses Shared Disk

COLUMBIA, S.C. — A multiuser, shared-disk microcomputer system that uses a series of terminals, each with its own memory and tied together in a network, to access a single Winchester or other hard disk device has been introduced by Intertec Data Systems Corp.

The Compustar system's architecture is based around one of three disk storage systems offered by Intertec, consisting of a hard disk unit, power supply and disk controller with multiplexer circuitry. The circuitry ties user stations into a common disk system, a spokeswoman noted.

A series of four types of intelligent CRT terminals, termed "video processing units" (VPU), connect to the disk storage system via an 8-bit parallel interface, allowing a data transfer rate of up to 1.6M bit/sec between the terminals and the disk system. Up to 255 VPUs can be daisy-chained into the network. In addition, each terminal has twin RS-232C serial ports for connecting an auxiliary printer or modem device, the spokeswoman said.

At the heart of the network system are Intertec's models 10, 20, 30 and 40 terminals. The terminals all offer 64K bytes of random-access memory, and all except the Model 10 can function as stand-alone microcomputer systems offering from 350K to 1.5M bytes of built-in mini-floppy disk storage.

The networking hardware is contained in the disk systems. To expand the network, the spokeswoman explained, users plug in additional terminals that automatically provide the memory and processing support needed for the expansion.

Each terminal's daisy-chain connectors are located on the rear of the device and are basically independent of the terminal's operation or the Compustar network. If a problem should develop during the network's operation, a user can troubleshoot the system by disconnecting various terminal "legs" and pinpoint the problem to a specific terminal, Intertec said.

Resource Sharing

Intertec's software, included with the microcomputers, handles the sharing of the system's disk resources, the spokeswoman continued.

Each Compustar microcomputer station has access to up to five logical disk systems, she explained. Each logical unit is designated by a letter. The first two units, A and B, are reserved for accessing any local floppy disk storage devices such as those built into the models 20, 30 and 40 terminals.

Logical drive C is reserved for the VPU's local portion of the disk storage system, which can be designated as a restricted data base; and drive D is used to access the common data base portion of the disk storage system.

The fifth and final unit, labeled E, is used to facilitate print spooling.

For users that require a remote or printer workstation, Intertec is offering a processing unit for the network that is basically the Model 10 VPU without the keyboard or CRT. The Model 15 universal processing unit (UPU) consists of an RS-232C serial port and a Centronics Data Computer Corp.-compatible parallel port and allows printers and line printers, serving as batch printing stations, to be connected to the Compustar network. By utilizing a modem with the Model 15, remote terminals can be included in the network, the vendor said.

Prices for Intertec's VPUs are as follows: $2,495 for the Model 10, $3,995 for the Model 20, $4,495 for the Model 30 and $4,995 for the Model 40.

The disk storage systems cost $3,995 for a 10M-byte Winchester drive, $11,995 for a 32M-byte Control Data Corp. cartridge module drive or $14,995 for a 96M-byte cartridge drive.

The Model 15 processing unit sells for $1,995.

Intertec is located at 2300 Broad River Road, Columbia, S.C. 29210.

Eclipse-Based System Handles Patient Data for Hospitals

EVANSTON, Ill. — A minicomputer-based system that reportedly automates and reduces the cost of hospital functions is now being offered by Spectra Medical Systems, a subsidiary of Medicus Affiliates, Inc.

The newest of the Spectra family, the Spectra 1000 captures, communicates, stores and retrieves patient information during the hospital stay. It links all departments to a common data base.

The system operates on a Data General Corp. Eclipse minicomputer and can be interfaced with any existing hospital financial system, the firm said. Functions include ordering, scheduling, results reporting, charge posting, census management and time recording.

The system also provides worklists and requisitions that permit department supervisors to schedule personnel and equipment efficiently.

A badge card reader is used for security and the time and date recording of all transactions helps track any system misuse or errors, Spectra said.

The Spectra 1000

Spectra 1000 equipment for a typical 250-bed hospital includes 40 CRTs, 40 printers and 40 badge card readers, costing between $600,000 and $750,000.

Spectra can be reached at Medicus Affiliates, Inc., 990 Grove St., Evanston, Ill. 60201.

Communications Explained

CHATSWORTH, Calif. — A booklet entitled "Data Communications for Minicomputer Users" has been published by Micom Systems, Inc. for use with its one-day data communications seminar designed specially for the minicomputer user.

The seminar will be offered in 49 cities throughout the U.S. beginning in September. It was designed for the minicomputer user that plans to connect terminals at a distance from the computer and is not familiar with data communications techniques or terminology. The seminar is presented in layman's language and requires no engineering background, Micom noted.

The 60-page booklet contains more than 35 illustrations, data communications glossary and reference charts for such commonly used standards as the Ascii code set and the EIA interface circuit designations.

The booklet is priced at $15 and is available from Margaret Harveston, Seminar Administrator, Micom Systems, Inc., 9551 Irondale Ave., Chatsworth, Calif. 91311.

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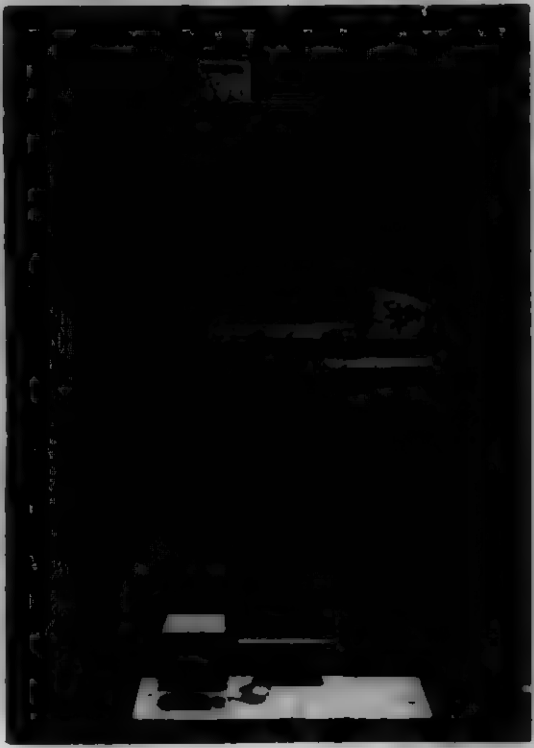

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RX30 Price Cut by $5,500

CULVER CITY, Calif. — Rexon Business Machines has cut $5,500 from the price of its RX30 Marathon multiterminal computer system in configurations with more than four terminals, and has cut $1,000 from the basic system price.

Effective immediately, the lower system price for larger configurations reflects price cuts for the 226-2 Device Adaptor and 235-1 Memory Module, both needed for operation with five or more terminals, according to the firm.

The price of the 226-2 Device Adaptor has been lowered to $1,600 from $4,600. The 64K-byte Model 235-1 Memory Module now costs $2,000, vs. the previous $4,500.

A five-terminal RX30 system with one 20M-byte disk and 150 char./sec printer costs $42,900, down from the previous price of $49,400.

The company is located at 5800 Uplander Way, Culver City, Calif. 90230.

Micronova Gains Three Boards

WESTBORO, Mass. — Data General Corp. has announced three additions to its Micronova board computer (MBC) line, offering expanded I/O and systems capabilities.

The MBC/2, MBC/3 and MBC/SDX, successors to the firm's MBC/1, are targeted for dedicated applications such as process control, medical instrumentation, test equipment and communications.

The MCB/2 and MCB/3 provide a central processor, three types of memory, and serial and parallel I/O on a single board. The user need only add a power supply.

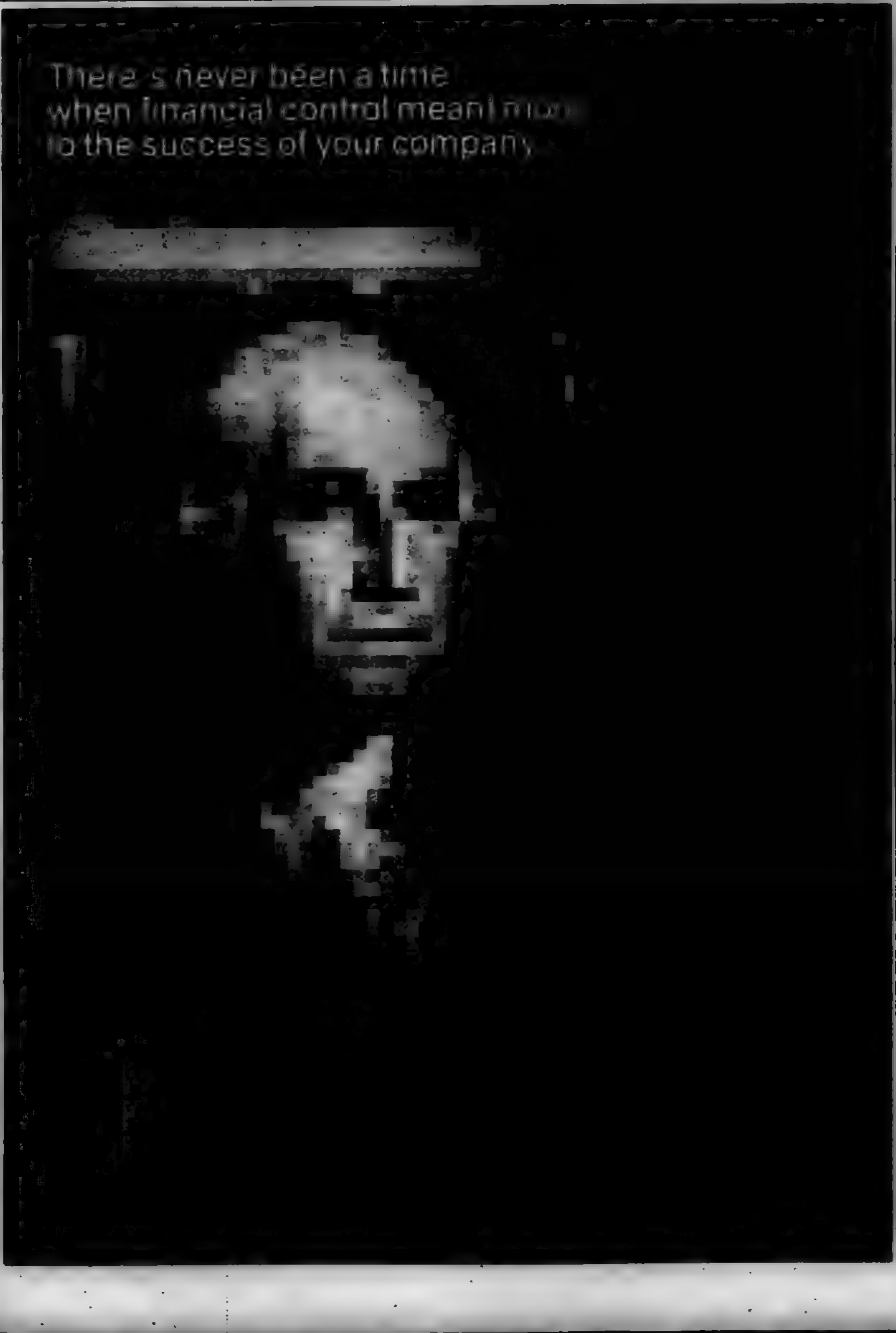
Both the MBC/2 and MBC/3 are based on the Micronova's MN602 central processor unit, which provides full Nova architecture, hardware stack and frame pointer, 16-bit hardware multiply and divide, a real-time clock, and a 16-level priority interrupt. The boards differ only in the size of their random-access memories, 8K-bytes for the MBC/2 and 32K bytes for the MBC/3, a spokesman said.

The third board, the MBC/-SDX, is a debugging aid for other MBC board applications. For instance, when the SDX device is combined with an MP/100 or MP/200 central processor, the board acts as an input/output interface for the system, the spokesman claimed. This lets users utilize the system's hardware and software power to debug applications.

MBC software support allows program development with Micronova, Nova 4 or Eclipse computer systems.

Prices for the boards are: $1,200 for the MBC/2, $1,700 for the MBC/3 and $600 for the MBC/SDX.

Data General is located at Route 9, Westboro, Mass. 01581.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Randal Desktops Get Enhancement

COSTA MESA, Calif. — Microtech Business Systems, Inc. has introduced a single-board memory enhancement for Randal Data Systems, Inc. desktop computers that is said to free existing I/O slots for peripheral devices.

The on-site modification of the Randal system involves the replacement of the computer's processor and memory boards with a single Microtech Point 4 processor.

The Point 4 enhancements cost $4,400 for a 64K-byte version and $6,100 for a 128K-byte model, a spokesman said from the firm at Suite 108, 3176 Pullman St., Costa Mesa, Calif. 92626.

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Soviets Plan New Series Of Riads

By Bohdan O. Szuprowicz
Special to CW

During 1982 and 1983, the Soviet Bloc countries plan to introduce the Riad 3 series of computers, which are now under development.

While only scant details of those third-generation Riad computers are being released, the objectives of the Riad program are clearly stated. The Comecon countries insist on developing their own international computer hardware industry to supply their needs from domestic sources and to eliminate most imports of DP equipment from more advanced Western manufacturers.

Now it is becoming clear more than ever that purchases of any Western equipment are aimed at acquiring hardware and software technology to shore up Come-

(Continued on Page 66)

Lloyd's Pays $55 Million

McLEAN, Va. — Federal Leasing, Inc. here has collected more than $55 million in claims from Lloyd's of London, despite the British insurance syndicate's legal efforts to block payment of those claims.

Last June Federal Leasing filed a $627 million suit against Lloyd's for nonpayment of claims on policies the lessor held. Those policies insured against early lease terminations on IBM computer equipment [CW, July 9, 1979]. Responding to that suit, Lloyd's denied responsibility for $27 million of Federal Leasing's claims and countersued, claiming to have overpaid the lessor.

While Federal Leasing has used the insurance awards — paid out by court order over the past two months — to pay off equipment

(Continued on Page 66)

Biggest Rise in Three Years

Executives' Pay Leaps by 9%

PALO ALTO, Calif. — Executives salaries in the electronics industry have increased 9.2% from 1979, the greatest percentage growth in the last three years, according to the American Electronics Association's (AEA) 1980 Executive Compensation Survey.

Based on responses from a record 858 member firms, the latest AEA survey showed average salary increases of more than 10% for top executive positions in general management, finance and controlling, and engineering/research and development. Corporate-level executives received pay increases averaging 9.6%, while their counterparts in subsidiaries received pay boosts averaging 8.6%.

Average raises for senior positions in manufacturing/operations, marketing and sales, personnel, administration and quality assurance ranged from just less than 10% to less than 7%.

Executive 'Perks'

As for executive perquisites, nearly three out of four companies provide an automobile for high-level executives. The second most popular perk is an annual physical examination granted by about half of the firms surveyed.

However, larger companies — 84% of those with sales of more than $75 million — grant physical examinations, while only 25% of those firms with revenues in the $1 million to $4 million range provide this benefit.

In addition, large companies were found to be more liberal than small ones in granting executive liability insurance, club fees, financial counseling, stock purchase plans, relocation housing allowances, pension plans and supplemental retirement income.

However, a higher percentage of small firms grant low-interest or interest-free loans to their executives, the survey reported.

Job Category	Small Company*	Industry Average
Programmer	12.4%	9.1%
Engineer	12%	8.4%
Buyer	10.3%	6.3%
Technician	14.6%	7.4%
Field Service Technician	12.8%	9.9%
Assembler	14.1%	8.4%

* A small company is defined as one with less than [illegible] employees.

Annual Salary Increases in the Electronics Industry

Regardless of the size of the firm, companies that pay bonuses tend to be more liberal with basic salary increases than those without a bonus plan, the survey noted. Executives in bonus-paying companies averaged pay increases of 10.3% (before bonuses), compared with an average raise of 7.2% for executives working for companies that do not give bonuses.

Electronics Industry

A concurrent AEA survey of technical and general support workers in the electronics industry revealed that overall salaries of general support personnel jumped 7% from the previous year's survey. However, smaller electronics companies' personnel posted wage increases of about 12% for technical personnel and 10% for general support personnel.

Percentage salary increases for various job categories are listed in the figure.

This survey also showed that turnover rates in these job categories rose significantly, from 28% last year to 35% this year. The most dramatic turnover was reported in New England, jumping to 30% from 12%, and the Pacific Northwest, where the turnover rate leaped from 20% to 36%.

The survey covers exempt and nonexempt employees in 73 technical and support job categories and included a record total of 828 respondent firms.

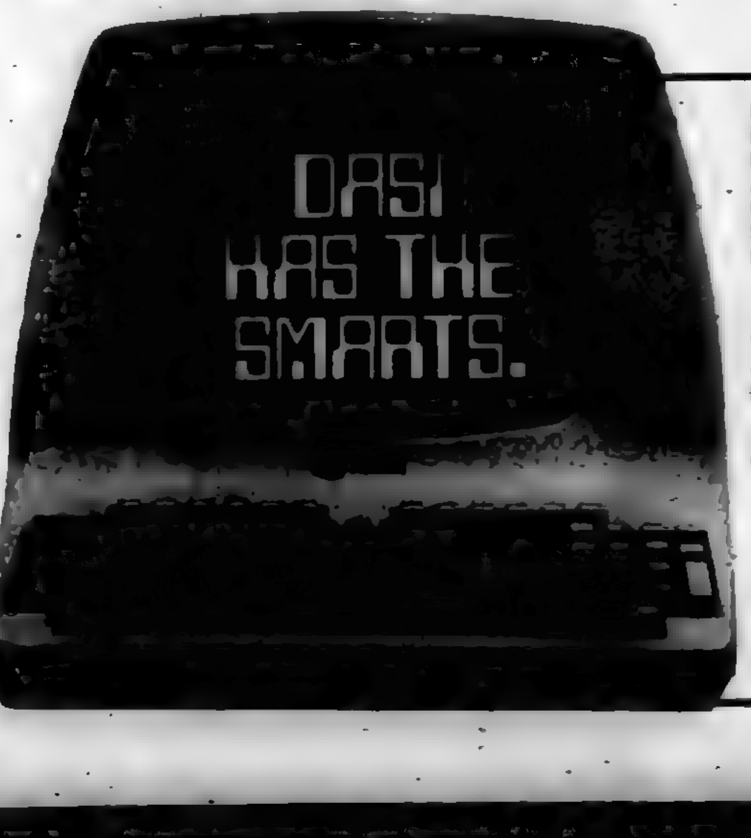
IBM Changes 3420 Status; New Tape Drive Coming?

ARMONK, N.Y. — Probably presaging a new tape drive, IBM has put all models of its 3420 products in limited new production status.

Industry observers have been expecting an introduction of a new tape drive, code-named Ocotillo, by the end of the year. Although there has been much speculation on the new drive's specifications, one industry expert predicted a 10-to-one advance in bits per square inch.

The 3420 Model 3 has been in limited production for some time, a spokeswoman noted.

IBM introduced the 3420 tape drive family in November of 1970.



Like the Lear Siegler ADM-31, a highly intelligent buffered terminal that practically thinks for itself. And the smarter ADM-42 with its 15-inch diagonal screen. Or the low-cost DUMB* terminal from LSI, the ADM-3A which at $850 makes a lot more sense than its name implies.

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*TM Lear Siegler Inc. †TM Digital Engineering, Inc.

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[illegible]

Intel, STC File Large Debenture Offerings

Both Intel Corp. and Storage Technology Corp. (STC) have filed debenture offerings in excess of $100 million with the Securities and Exchange Commission.

STC this week will offer $100 million in convertible debentures due in the year 2000. Proceeds from the sale will be used for partial repayment of domestic debt of the company and a subsidiary.

Smith Barney, Harris Upham & Co. and L.F. Rothschild, Unterberg, Towbin will head the underwriting group.

Intel Corp. intends to make a $125 million offering of convertible subordinated debentures during the middle of this month, the firm said. The proceeds of that offering will be used to retire short-term debt and to finance the growth of the company.

At the same time it revealed the offering, Intel also announced a two-for-one split of its capital stock effective Sept. 8 to stockholders of record on Aug. 29.

Nickels & Dimes

Other Moves

Computer Devices, Inc. has signed a long-term revolving line of credit agreement, with New England Merchants National Bank. Under the agreement the company can borrow up to $3.5 million on an unsecured basis at interest rates ranging between .9% to 1% above the bank's prime lending rate.

* * *

Emulex Corp. has completed a $700,000 private placement of convertible preferred stock. The offering, representing the first outside investment in the company's history, was completed on June 30.

* * *

MSI Data Corp. has declared a regularly quarterly dividend of 10 cents per share payable Aug. 13 to shareholders of record Aug. 1.

* * *

Wespercorp declared the company's regular dividend of 5 cents per share paid semiannually. The dividend is payable Aug. 15 to shareholders of record Aug. 1.

* * *

Paradyne Corp. intends to file with the Securities and Exchange Commission a registration statement covering the proposed public offering of its common stock. The company anticipates offering 600,000 shares.

* * *

IBM has declared a regular quarterly dividend of 86 cents per share on common stock payable Sept. 10 to shareholders of record Aug. 13.

* * *

The board of directors of Computervision corp. authorized a two-for-one split of the company's common stock effected in the form of a 100% stock dividend Aug. 4. The additional shares will be mailed to shareholders on August 22.

Supershorts

C. Itoh Electronics, Inc. has signed an agreement for third-party maintenance service with Western Union.

Scientific Measurement Systems has changed its name to Telegenix, Inc.

Digital American Computers of Ramsey, N.J., opened a showroom for the Perkin-Elmer Corp. 3220 and 3240 to demonstrate actual application systems for small to medium-sized businesses.

Shugart Associates and Tandon Magnetics Corp. have concluded an agreement providing for a nonexclusive license to Shugart for use in its Bi-compliant floppy disk drives.

National CSS, Inc. has signed a marketing agreement giving it exclusive access to demographic data products developed by Urban Decision Systems, Inc.

Digital Associates Corp. has signed a two-year, $15 million pact to provide sales and service support for Data Printer Corp. band and Chaintrain printers in 37 states.

Zilog Establishes Systems Sales Force

CUPERTINO, Calif. — Increased commercial systems market opportunities resulting from product introductions during the last six months have led to Zilog, Inc.'s establishment of a separate sales force for its General Systems product line, the firm announced recently.

Three former systems specialists have been promoted to area systems manager posts and one new manager has been added as part of the sales reorganization. Zilog is also adding systems sales personnel in major market areas.

Zilog's industrial products sales force will continue to handle the firm's microcomputer components, OEM boards and development systems.

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To Reach Nearly $2.98 Billion

Year's Small System Shipments Seen Rising 50%

WELLESLEY, Mass. — Shipments of small business computers will jump about 50% this year from 1979, reaching nearly $2.98 billion, and approach $9.1 billion in 1984, according to a report from Venture Development Corp. (VDC).

Industry leaders such as IBM, Wang Laboratories, Inc., Burroughs Corp., Digital Equipment Corp. and NCR Corp. will increase their market shares at the expense of smaller companies that do not have the financial resources to establish necessary distribution and service network channels, the report continued. The successful firms will be those that concentrate on industry-specific applications including those aimed at retailers, insurance agencies and small manufacturing companies.

The Small Business Computer Industry: A Strategic Analysis focuses on stand-alone entry-level computer systems with main memories of at least 8K bytes and end-user prices of less than $100,000. All of the systems researched in the report are user-programmable, have an internal operating system and are primarily business-oriented, a VDC spokesman said.

Pointing out that there are "some clouds on the horizon" for new and small-scale business computer participants, the report notes that a number of companies will probably consolidate in an effort to survive in the industry.

Also, contrary to some analysts' reports that have downplayed the importance of word processing applications, VDC's research indicates that considerable opportunity exists for those manufacturers that include word processing in their systems' capabilities.

Among present small business computer users, 18% reported that they have a word processing capability in their system. However, of those not presently using a business computer, but who intend to buy a system in the future, 40% indicated that they would like to have word processing powers.

From a manufacturing angle, already more than 80% of the small business computer builders report that they either have or plan to offer word processing applications, the study said.

Additional information included in the report includes market data segmented by price/performance and vendor type.

The report costs $1,950 from VDC at One Washington St., Wellesley, Mass. 02181.

Large CPU Base In UK Grew By 35% in '79

LONDON — Despite gloomy prophesies about the demise of the mainframe computer following the dual attack of stand-alone and distributed microcomputer systems in the UK, the market for larger computer systems there grew by 35% in numbers of installations and 21% in installed value during 1979.

This conclusion is drawn from Volume 4 of B.I.S. Pedder's *7th Annual Computer Census*, which has just been published.

The installed base at year-end 1979 of 29,346 installations, valued at 3.472 billion British pounds, was comprised of 581 different model types, of which 303 were still currently marketed, from 89 different manufacturers or main suppliers. Market leaders IBM and International Computers, Ltd. were neck-and-neck at 29.7% each of the value of the installed base.

Dedicated processor-controlled data entry systems showed an installed value of 137 million British pounds. Market leader Redifon held 21.5%.

Amdahl, Tran Finalize Merger

SUNNYVALE, Calif. — Amdahl Corp. has announced the completion of its merger with Tran Telecommunications Corp.

Tran will be operated as a wholly owned subsidiary headed by Ray W. Sanders, founder and chairman, and by Paul M. Hachigian, president of Tran.

Tran supplies private and public digital communications network equipment.

Lear Siegler Ends Agreement

ANAHEIM, Calif. — The Data Products Division of Lear Siegler, Inc. has given RCA Corp. written notice that it will no longer pay RCA a royalty on the Cole patent.

That patent involves digital storage and generation of video signals.

The action, filed in May in the U.S. Federal Court for the Central District of California, has been joined by similar suits in the Federal Court of Delaware by Applied Digital Data Systems, Inc. and Hazeltine Corp., Lear Siegler said.

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Executive Corner

- Daniel E. Lott has been appointed vice-president of corporate services for Intertek Services Corp.
- Frank Mleko has joined Systems Management, Inc. as vice-president in charge of operations.
- Eugene W. Courtney has been named vice-president of corporate development for National Computer Systems, Inc.
- Karl Yatovitz has been named vice-president of sales and marketing at Columbia Data Products, Inc.
- William A. DeSimone has been appointed vice-president of manufacturing for Computer Design and Applications, Inc.
- John V. Williams has been appointed vice-president of Eastern Operations for Magnuson Computer Systems.
- William F. Deller has been named vice-president of engineering at Computer Consoles, Inc.
- Robert M. Antonuccio has been elected founder and vice-president of manufacturing at Apollo Computer, Inc.
- Thomas S. Stevens has been appointed vice-president and controller of Memorex Corp.
- Vance L. Seagle has been appointed vice-president of sales and marketing for Computer Technology Corp.
- Alfred F. Apple has been named vice-president of marketing at Delta Data Systems Corp.
- William H. Murphy has been appointed vice-president of finance for Norden Systems, Inc.
- Howard Cantor has been named vice-president of Financial Products at Datatrol, Inc.
- Philip J. Micciche has been named vice-president of marketing and sales at Micro Peripherals, Inc.
- J. Fred Raguse has been named vice-president of Informatics, Inc.'s Columbus, Ohio-based MHDS Division.
- Walter C. Benger has been named executive vice-president of marketing at Northern Telecom Ltd.
- Chuck Steele has been appointed vice-president of engineering at ECS Microsystems, Inc.
- Jack McCarthy has been appointed vice-president of market development, Graphics Product Division, for California Computer Products, Inc.
- Tom Malek has been named vice-president of marketing and sales at Garry Manufacturing Co.
- John A. Hill has been appointed president and director of Q1 Corp.
- Lewis Solomon has been named vice-president of new ventures for General Instrument Corp.
- Robert C. Sherburne has joined Zero Corp. as vice-president.
- Michael B. Targoff has been appointed vice-president and general counsel by Savin Corp.
- Stan Winvick has been named vice-president of human resources at Advanced Micro Devices, Inc.
- Robert R. Shaw has been appointed vice-president of southern operations for Magnuson Computer Systems.
- Thomas F. Goldman has been appointed vice-president and director of new business development for TRW Information Services, a division of TRW, Inc.
- Kendall Wright has joined Computer Devices, Inc. as vice-president of engineering.
- Allan L. Rayfield has been named president and chief operating officer of GTE Communications Products, a major component of General Telephone & Electronics Corp.
- James S. Campbell has been named president and Joe T. Booker has been named executive vice-president of engineering and manufacturing at Shugart Associates, Inc.
- C. Oakley Mertz has been named vice-president of research for Gartner Group, Inc. Jack Oplinger has been named vice-president of user operations.
- Ance W. Thatchner has been appointed vice-president of marketing for Solid State Technology, Inc.
- Jerry A. Young has been elected vice-president of International Affairs for RCA Global Communications, Inc.
- Dialog Systems, Inc. has named F.L. Harvey vice-president of marketing and Robert L. Magers vice-president of engineering.
- Malcolm L. Foster has been appointed vice-president in charge of corporate operations at On-Line Business Systems, Inc.
- Paul A. Turton has been named vice-president of marketing at Boole & Babbage, Inc., while Jack E. van Kinsbergen has been named president and chief executive officer of the Sunnyvale, Calif. company.
- Robert S. Iger has joined Candle Corp. as vice-president and general manager of the computer services division.
- D. Bruce Peterson has been promoted to senior vice-president of TMI Systems Corp. and Edward A. Maybury has been named executive vice-president.
- Albert Gluckson has been elected secretary and a vice-president of Computer Sciences Corp.
- Xerox Corp. has announced the appointment of W. Del Berry as vice-president of facsimile business operations in Dallas.
- Howard A. Raphael has been appointed president of Cermetek, Inc., which was recently acquired by Timeplex, Inc. as a wholly owned subsidiary.
- Donald G. Heitt has been promoted to the new position of vice-president in charge of marketing and service planning for Honeywell, Inc.
- Harland K. LaVigne has been named vice-president of systems sales at NEC Information Systems, Inc., a subsidiary of Nippon Electric Co., Ltd.
- Herbert F. Schantz has joined Graham Magnetics, Inc. as vice-president of marketing.
- J.P. Chalmin has been appointed vice-president of sales for Standard Microsystems Corp.
- Thomas E. Diener has been named president of Signetics International Corp.
- Jan Geusens has been promoted to corporate vice-president of product planning for California Computer Products, Inc.
- Linda J. Jardine has been appointed vice-president at Gnostic Electronics, a division of Gnostic Concepts, Inc.

Orders & Installations

Recognition Equipment, Inc. has received orders for its Trace system from several North American petroleum companies.

Manufacturers Hanover Trust Co. has ordered a new multipurpose data and message switching system called Omni VI from ITT World Communications, Inc.

Day Publishing Co. of New London, Conn., has installed a computerized TABS-11 business system from Digital Equipment Corp.

Mosinee Paper Corp. and Precision Tube Co., Inc. have ordered Univac System 80 computers.

The University of California's Lawrence Livermore Laboratory has ordered a 1M-word Cray-1 S series computer system valued at approximately $7.7 million from Cray Research, Inc.

Ecotran Corp. of Beachwood, Ohio, has ordered a Univac 1100/60 computer.

A Radical Departure in Computer Publishing.

Computerworld UK is a weekly news medium aimed directly at the most powerful 25,000 people in the British computer using marketplace.

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In this case the research was carried out by the world's most respected and authoritative computer related market research company, International Data Corporation. From their files they could tell us what had been spent, on what and by whom. Certainly they could readily identify from their existing records the 8,000 companies operating the 17,100 most important systems on over 11,000 sites. Of the $6,300,000,000 spent last year in the EDP market $5,300,000,000—80%—was spent by those 8,000 companies.

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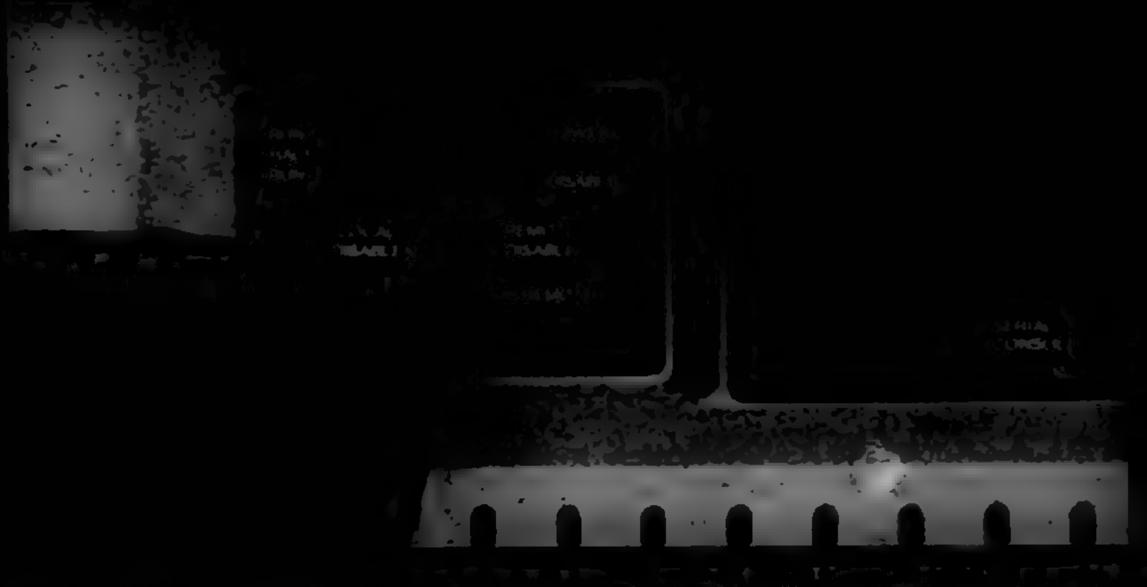

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Centurion

Soviet Bloc Developing Third Riad CPU Series

(Continued from Page 62)

con's domestic research and development effort.

Recent statements about the development of the Riad 3 series of computers were published by M.J. Rakovskyi, Soviet Academy of Sciences candidate member of technical sciences, and Bronislaw Piesowar of the Computer Systems Institute of Mera-Elwro, Poland's state monopoly responsible for DP and instrumentation hardware manufacture. This institute is already engaged in development work on Riad 3 computers that are expected to become serially produced in the mid-1980s.

The basic goal of the Riad 3 series is program compatibility with Riad 1 and Riad 2 series machines in order to take advantage of operating and applications software developed for these computers during the last 10 years. This also means Riad designers are going to continue to take advantage of IBM 360 and 370 software whenever they can get away with it.

Comecon end users who have acquired IBM 370s with virtual memory capabilities are also being informed that by 1981 the Riad EC-1045 computers of the Riad 2 series will also provide virtual memory capabilities.

Six of the seven Riad 2 models are equipped with virtual memory ranging in size from 160K bytes for the EC-1015 made in Hungary to the 16.3M bytes of the EC-1066, the largest number cruncher, made only in the Soviet Union.

The exception is the Czechoslovak-made EC-1025, which has a standard 256K-byte operating memory without the virtual option.

Provision of virtual memory capabilities of better design within the Riad 3 series is a stated objective of the Comecon designers.

Specific models of the Riad 3 series have so far not been identified by Comecon computer hardware designers, but various characteristics being planned have been announced.

For example, the Riad 3 systems are to be seven times more cost-effective than the Riad 2 machines as a result of faster speeds and larger capacity disk memory. The fastest computer of the Riad 2 series is at present the EC-1066, which has a design speed of 4.5 million operations/sec.

The Riad 3 computers are also expected to be about five times more reliable than their Riad 2 counterparts.

There are plans to expand external memory peripherals to include high-capacity memory devices. Disk memories are planned with capacities ranging from 30M to 200M bytes and eventually will reach 400M bytes.

Each Riad 3 machine may be expected to support from four to six such disk drives. Operating memories of the Riad 3 series will increase to an average of 2M to 8M bytes. In addition, tape drives with 6,250 bits/in. densities will be available, as well as mass optoelectronic memories with a capacity of 10^{11} bits and a mass magnetic memory with 10^{12} bits.

All Riad 3 hardware will feature LSI circuitry, which is expected to diminish the size and power consumption of the new equipment from two to 10 times. Microprogrammed hardware for parts of the operating systems, universal use of multiprocessing and availability of specialized problem-oriented processing units are some of the other planned features.

Application Objectives

Application objectives for the Riad 3 hardware include development of distributed processing concepts by the introduction of programming terminals based on minicomputers, an easier method of developing computer networks, introduction of problem-oriented programming systems and universal use of data base systems.

To support these objectives, the standard Riad computer hardware is now also supplemented by the SM-Riad minicomputer series, specifically designed for applications in automated process control systems and various satellite uses in large installations.

The present and future Comecon Riad systems effort is under the authority of a special Comecon International Commission for the Development of a Unified Data Processing System. The commission administers the programs through a central coordinating group, an economic council, a DP manufacturers' council, a DP equipment exploitation council and the technical services council, which represent the various interests within the information processing industries of Comecon.

So far, the 10-year-old multinational effort has developed at least 17 computer models of the Riad 1, a modified Riad 1M and the Riad 2 series as well as about 120 different peripherals.

User Collects From Lloyd's

(Continued from Page 61)

loans, interest charges and late penalties, it is continuing to press its suit against Lloyd's for damages.

The suit asks for punitive damages of some $500 million, according to William Evans, vice-president of Federal Leasing.

Federal Leasing is reportedly the only company so far to have launched a suit against Lloyd's for nonpayment of the controversial "J" policies. Lloyd's has paid out some claims to Itel and those two firms came to a settlement agreement earlier this year [CW, Jan. 21]. Itel's claims reportedly totaled between $150 million and $200 million.

These "J" policies were written primarily on IBM 370 equipment for about 15 to 17 lessors between 1974 and 1977. The policies guaranteed that lease revenues on the equipment would cover a certain portion of the original cost of the equipment [CW, April 23, 1979]. As hardware prices of 370 equipment plummeted after the introduction of the 4300 series last year, many lessors reportedly have been unable to recover the cost of the equipment and may be preparing to submit claims.

In all, Lloyd's liability to these lessors has been pegged at $230 million by the British loss adjustment firm of Toplis and Harding, but some observers think that figure could reach $300 million.

Commission Favors Change

FCC Inquiry on Circuit Resale Meets Protests

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – The chairman of the House Commerce Committee was "deeply distressed," and the director of the Consultative Committee on International Telephone and Telegraph (CCITT) said "I scarcely know how to conceal my surprise and . . . deep disappointment."

Both officials were commenting on the Federal Communications Commission's (FCC) recent decision to consider resale and sharing of international private-line circuits. If implemented, this change could reduce rates significantly for international data communications users, particularly those who do not have a large volume of traffic.

The FCC began an inquiry into the international resale and sharing question last April [CW, May 5], but it clearly favors the idea even though no comments have yet been received. For one thing, domestic private-line circuits have been subject to resale and sharing since 1976; moreover, in the notice announcing the international resale and sharing inquiry, the commission said "the burden of proof for establishing the justness and reasonableness of the [present international circuit resale and sharing restrictions] is on those who seek their retention."

CCITT Recommendations

CCITT, one source of the recent criticism, is an international, quasi-governmental association of telephone administrations which adopts common technical and operating "recommendations." One of these recommendations was that channels derived from a leased private-line circuit "must not be subleased." Another said private leased circuits "may be used only to exchange communications relating to the business of the customer."

Pointing to the "fundamental contradictions" between these rules and the goal of the FCC inquiry, CCITT Director Leon Burtz – in a letter to the U.S. State Department's director of international telecommunications policy – asked "what credibility can the United States [CCITT] delegation have if your Administration decides to apply to international private leased circuits provisions conflicting with those which it has approved at . . . CCITT."

Burtz then asked the State Department official, Arthur Freeman, to use his influence "to ensure" that the CCITT restrictions "continue to be implemented."

In addition, CCITT's concerns may go beyond the FCC inquiry.

For years, telephone administrations in other countries have been complaining about what they understand to be the U.S. go-it-alone attitude concerning international telecommunications.

As they see it, the U.S. adopts policies which, because of its economic and technological clout, they are forced to follow.

One of those who saw the Burtz letter was Rep. Harley Staggers (D-W.Va.), chairman of the House Commerce Committee. Complaining to FCC Chairman Charles Ferris, Staggers criticized the commission's failure to mention CCITT's conflicting private-line rules in its inquiry announcement last May.

He also wanted to know whether the FCC had received any input from the State Department or the President's chief telecommunications adviser, Henry Geller, head of the National Telecommunications and Information Administration (NTIA).

One effect of "misguided commission action in this area," Staggers told Ferris, would be to jeopardize the international private-line services now employed by U.S. telecommunications users. Without these services, "many have estimated that the costs [to] users would increase anywhere from 500% to 1,000%."

Late last month, the FCC extended the comment deadline in its resale and sharing inquiry – presumably to give Western Union International more time to collect its thoughts, but possibly to reassess its own position.

Meanwhile, at the State Department, International Communications Policy Director Freeman answered the letter from CCITT Director Burtz. "We are studying [the CCITT rules] to ascertain the extent of potential conflict," Freeman said.

Electro/81 Seeks Session Speakers

NEW YORK – Electro, sponsor of the Electro/81 high-technology electronics convention scheduled here April 7-9, is looking for speakers.

The organization is seeking full-session speakers, not just individual papers. Session organizers are expected to submit proposals in a business letter format and include a title, scope and content of the proposed session along with the significance of the subject to the electronics industry. Proposals must be submitted by Aug. 29, and papers must be in by Dec. 22.

Further information is available from Dale Litherland, Educational Activities Manager, Electro, 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

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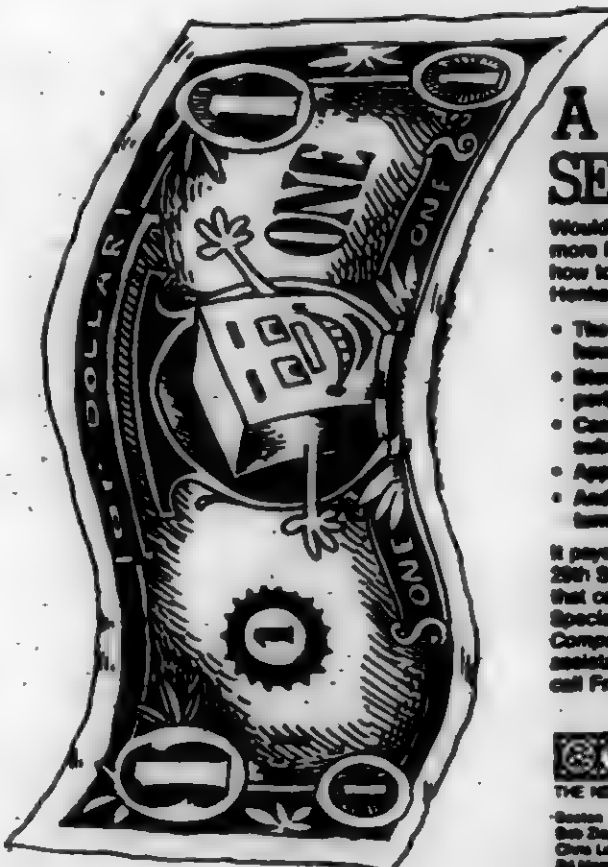

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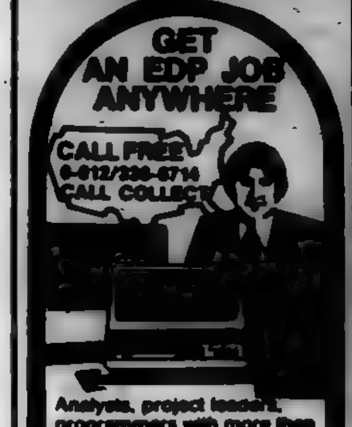

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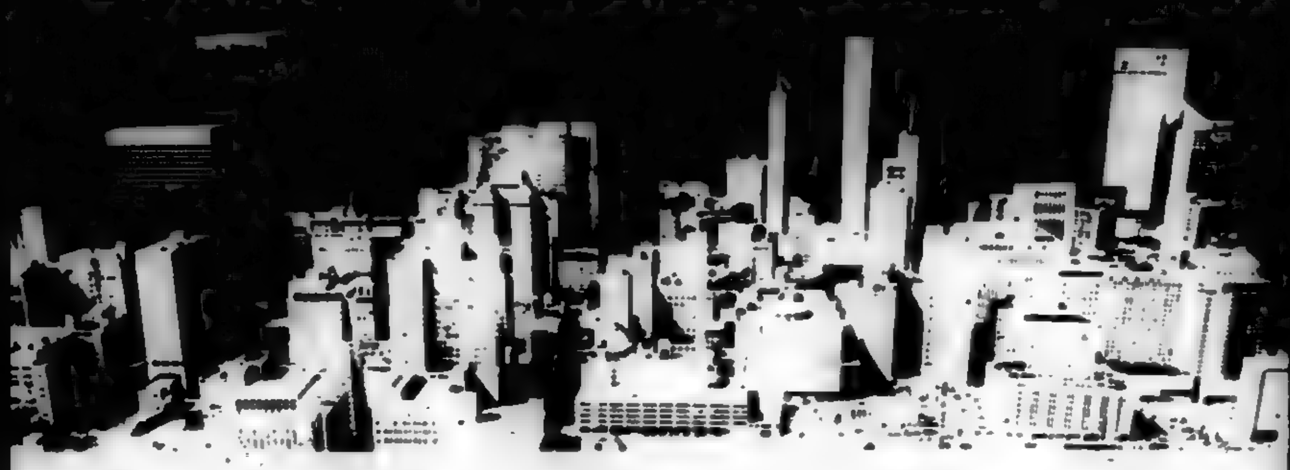

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Providence, RI [illegible]
(401) [illegible]

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MINNEAPOLIS /ST. PAUL

SYSTEMS PROG'S

Fortune 500 co based in St. Paul has an immediate need for a systems prog'r with DOS/VS exp. Will be working on a 3033 utilizing CICS. TOTAL internals is a must! Exp level does not have to be extensive. Salary to $[illegible]

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Rapidly expanding retail firm is seeking a DP manager to control the DP function through their growth. First project involves the design and installation of a Point-of-Sale system. Need self-starter w/ability to handle rapid change. Salary to mid-20's

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301-[illegible]-7770

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ask for Judy
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Degree in Physics, Elec Eng, Math or Comp Sci a must. Entry level position using Assembler heavily. Scientific environment with NO business applications. $17-18,000

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(512) [illegible]

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(404) [illegible]

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Individuals with at least 5 years experience with an emphasis in COBOL here is an opportunity to move up to project leader. All projects include New Development with on-line 5 Data Base. Large system experience would be ideal but is not necessary. Salary to $[illegible]

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([illegible]) [illegible]-1771

SYSTEMS PROGRAMMER III

City of Lincoln, Nebr. Data Processing Division is looking to hire an individual with knowledge of DOS/VS operating system, POWER/VS, BAL, COBOL and VSAM. Experience with IBM hardware preferred. Additional knowledge of VTAM, NCP and CICS is a plus. Salary commensurate with qualifications. Forward resumes to Lincoln-Lancaster, Personnel Department, County-City Building, 555 South 10th Street, Lincoln, Nebraska 68508.

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Due to expansion, [illegible] has an immediate opening for a Systems Programmer.

The position will be involved in a DOS to MVS conversion and the operation and maintenance of the MVS system. Experience in MVS preferred but will consider DOS. Assembly language required. One to two years systems programming experience required. Experience in IMS and CICS a plus.

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Data Processing

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Applicants should submit letter of application, resume, and copies of transcripts by August 15, 1980 to:

Dr. [illegible]
Associate Dean of Arts & Sciences
Northern New Mexico Community College
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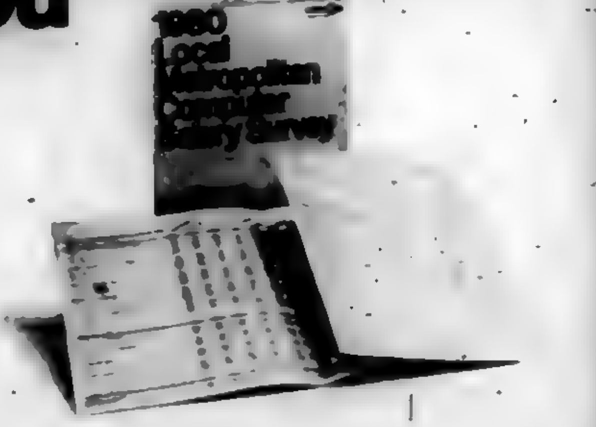

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UNIV. OF TENNESSEE AT MARTIN

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We are now expanding into a data processing publishing market and are looking for a highly professional editor to manage a business publication.

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This position potentially offers a "fast-track" in the company's fast-growing business publications division. Salary and benefits are highly competitive. The location of the position is in the Philadelphia metropolitan area. If relocation is required, the company will pay expenses.

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The successful applicant should have a minimum of 2 years experience in micro or mini computer sales. A degree is desirable but not necessary.

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The successful applicant will have an associate degree and electronic technology or comparable military training and 1-5 years experience. Microprocessor background helpful.

Beehive International offers an attractive compensation package. For confidential consideration submit resume including salary history to: Personnel Department, P.O. Box 25699, Salt Lake City, Utah 84125.

BEEHIVE INTERNATIONAL

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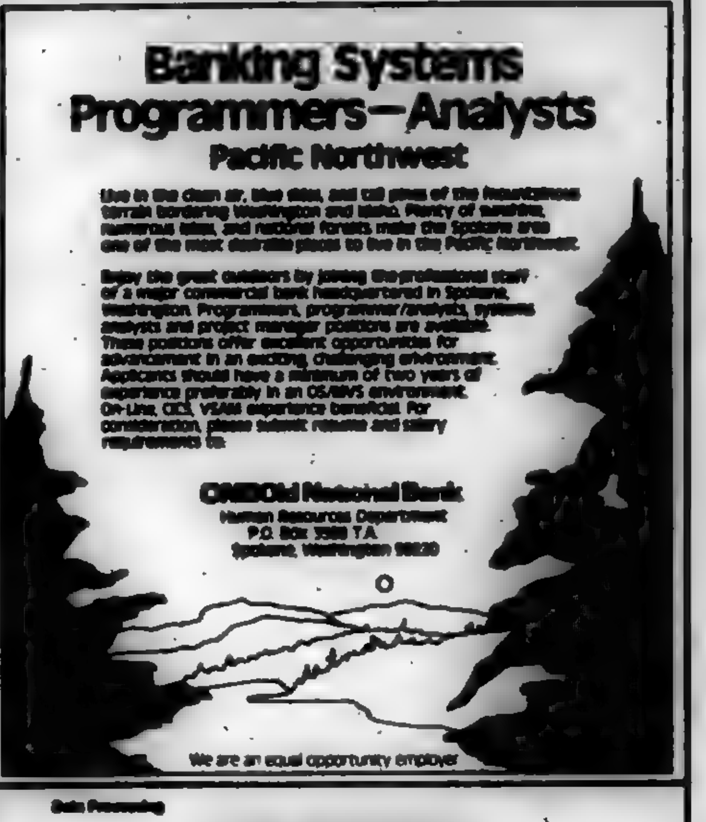

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Excellent position for people with ability to train clients in the use of project management and methodology systems. Must be an excellent communicator and enjoy meeting people.

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Data Processing

SYSTEMS SOFTWARE

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LANGUAGE COMPILER SYSTEM DESIGNER

Senior Level

This position offers the opportunity to participate in high order compiler development for advanced air-borne software. While supervising a staff of experienced software designers, this individual will oversee requirements definition and structuring of both current and future high order compilers using FORTRAN, JOVIAL J73, CMS-II and Ada languages. Prior hands-on experience in compiler design, requirements definition, documentation, validation and acceptance testing is required.

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Responsibilities for this position include the software design of operating systems, assemblers, linking loaders, debuggers, and monitors in conjunction with the development of compilers and application software. The qualified individual should also possess the ability to act as the interface between end users and system software designers.

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PROGRAMMER/ANALYSTS

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Immediate opportunities are available for:

SENIOR SYSTEMS ANALYSTS

You will design, code and debug a major portion of the firmware for the new large-scale, high performance V8600 system; or you could design the system memory S/W; or you may prefer to evaluate and analyze measurement results. You can take your pick if you have a BS/CS or equivalent with related experience.

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CONSULTANT/ANALYST

As project leader, you will lead the design and implementation of application processor firmware which will interface with O/S Software. BS/CS or equivalent experience with eight years' programming and knowledge of O/S and computer architecture required.

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Filing Date: Open

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450 N. Crescent Drive
Beverly Hills, CA 90210
([illegible]) [illegible]

SYSTEM PROGRAMMER/ANALYST
IBM SYS/4331

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PROGRAMMER/ANALYSTS

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The Coastal Corporation

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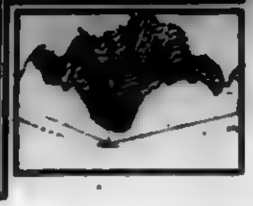
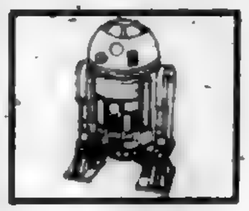
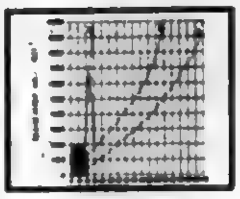
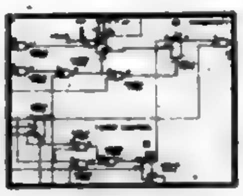
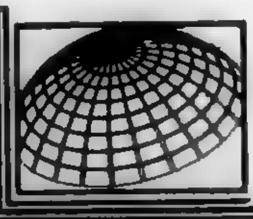
Systems Analysts











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Personnel, BINGHAM-WILLAMETTE CO.
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DATA PROCESSING

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PL/1 PROGRAMMER ANALYST — [illegible]
DP SUPERVISOR/MANAGER — [illegible]
COBOL PROGRAMMER — [illegible]
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If you possess the above skills or if you are a company seeking these skills, please contact:

[illegible] LYNN
[illegible]
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SUITE [illegible]
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(212)[illegible]

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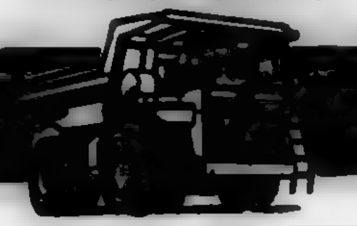

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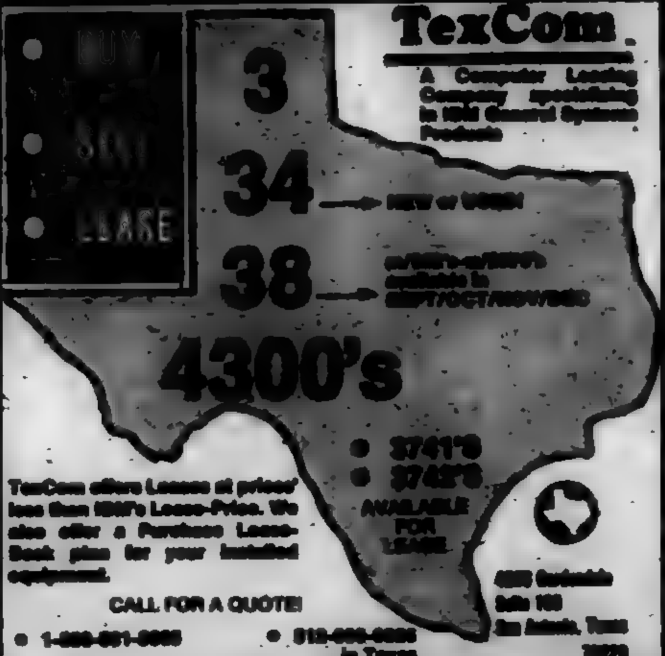

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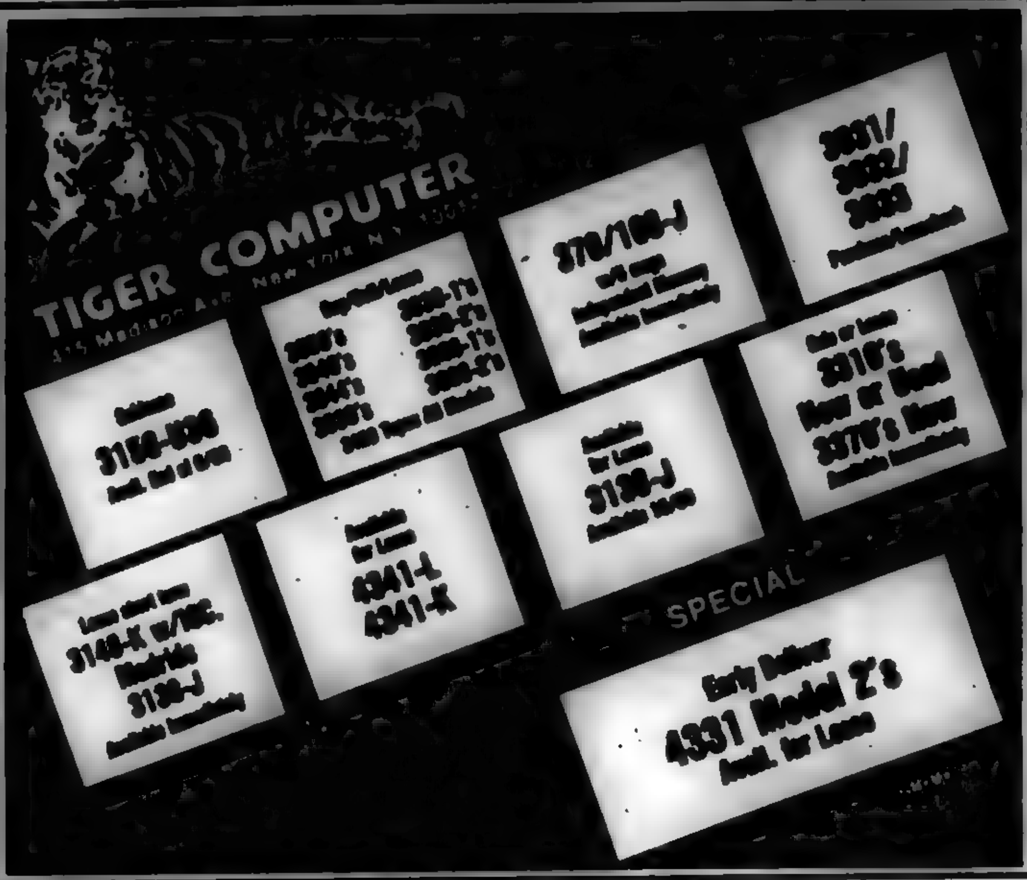

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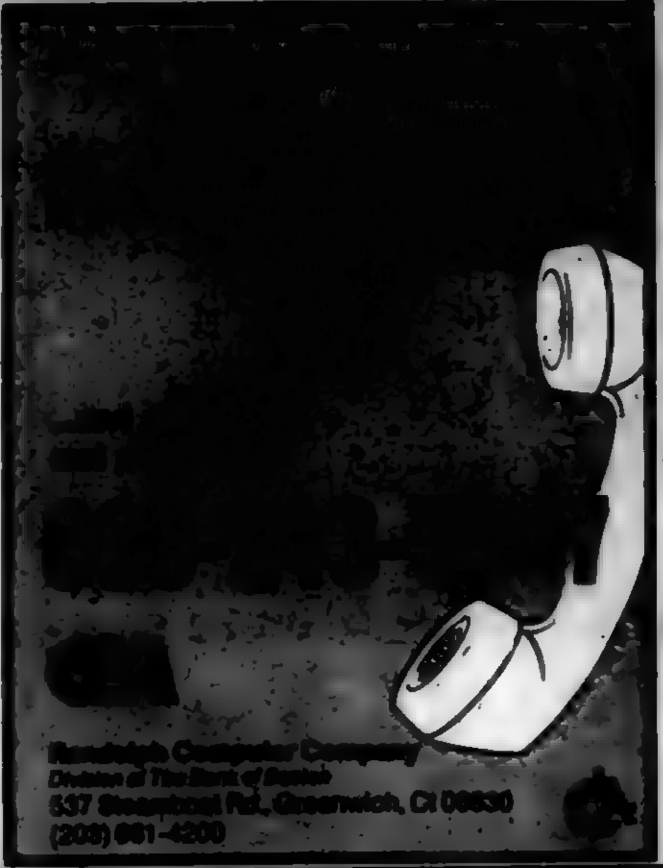

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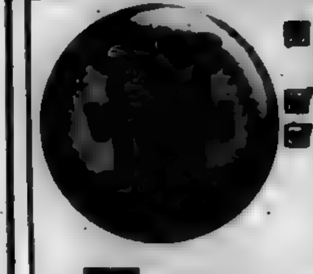

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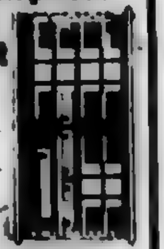

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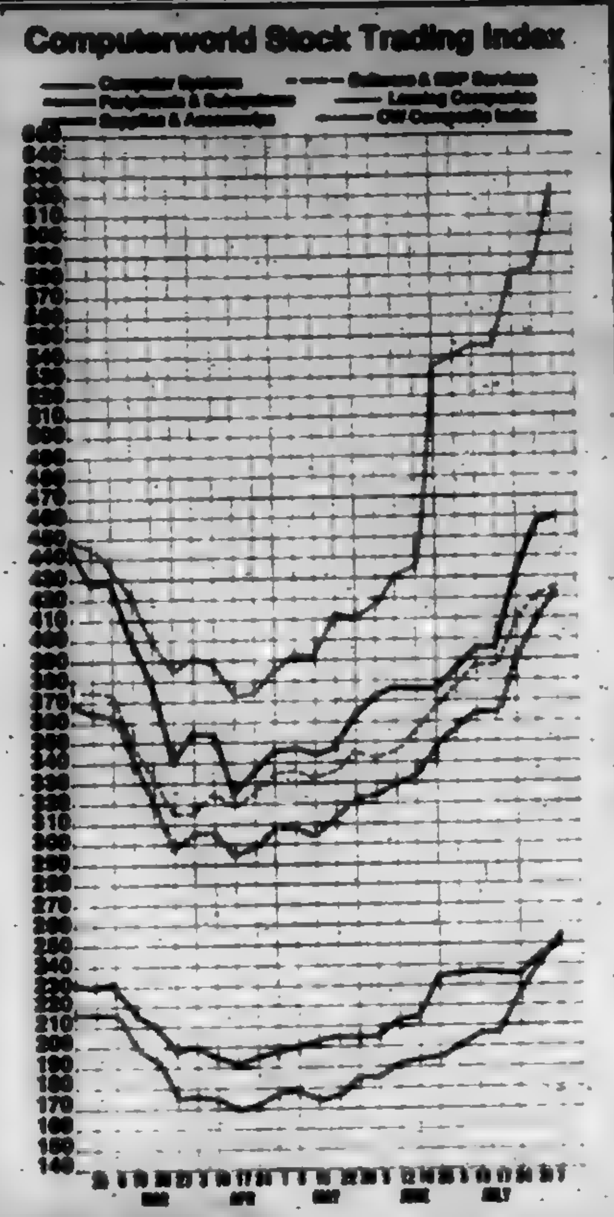
Computerworld Stock Trading Index



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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 6, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 6 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	13- 42	23 7/8	-1 1/2	-6.0
N	BURROUGHS CORP	60- 88	66 1/4	+1 5/8	+2.5
O	COMPUTER AUTOMATION	9- 23	23	+1 1/4	+5.7
N	CONTROL DATA CORP	36- 66	62	- 5/8	-0.9
O	CRAY RESEARCH INC	20- 66	64 3/4	+1 1/4	+1.9
N	DATA GENERAL CORP	46- 81	77 5/8	-3 1/4	-4.0
N	DATAPOINT CORP	44- 69	66	-2 1/2	-3.6
N	DIGITAL EQUIPMENT	52- 83	78 3/4	-1 5/8	-2.0
A	EECO INC	9- 20	15 1/2	- 1/2	-3.1
N	ELECTRONIC ASSOC.	6- 12	9 3/8	- 3/8	-3.7
N	FOUR-PHASE SYSTEMS	20- 40	27	+ 1/8	+0.4
N	FOXBORO	31- 56	50 3/8	+2	+4.1
O	GENERAL AUTOMATION	7- 19	7 5/8	- 3/8	-4.6
O	GRI COMPUTER CORP	1- 3	1/2	+ 1/8	+33.3
N	HEWLETT-PACKARD CO	66- 76	76 1/2	-1 1/4	-1.6
N	HONEYWELL INC	66-101	90	-2 3/4	-2.9
N	IBM	50- 70	65 5/8	+ 1/8	+0.1
O	MAGNUSON COMP SYSTS	20- 30	26 1/2	+1	+3.9
O	MANAGEMENT ASSIST	9- 21	16 3/4	+1 1/4	+8.0
O	MANUFACTURING DATA S	22- 42	30 3/4	-2 1/2	-6.9
O	MINI-COMPUTER SYST	3- 6	3	- 1/8	-4.0
O	MODULAR COMPUTER SYS	6- 15	10 1/4	+ 7/8	+9.0
N	NCR	52- 72	70	+2 1/4	+3.1
N	PRIME COMPUTER INC	15- 36	36 1/8	+1 1/8	+3.2
N	PERKIN-ELMER	30- 55	34 7/8	+ 3/8	+0.6
N	SPERRY RAND	42- 60	52 7/8	-2 1/2	-4.5
A	SYSTEMS ENG. LABS	11- 26	26 3/4	+1 3/8	+5.5
O	TANDEM COMPUTERS INC	12- 42	39	-2 3/4	-6.5
N	TEXAS INSTRUMENTS	79-110	110 1/4	+1 5/8	+1.4
A	WANG LABS.	17- 47	46 3/4	+5	+11.9

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 6 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 20	17 1/4	+ 3/4	+4.5
O	COMDISCO INC	6- 17	14	- 1/4	-1.7
A	COMMERCE GROUP CORP	1- 2	2	+ 7/8	+77.7
A	COMPUTER INVSTRS GRP	2- 4	1 5/8	0	0.0
O	CONTINENTAL INFO SYS	2- 15	2 3/4	+ 1/8	+4.7
O	DATRONIC RENTAL	2- 3	3	0	0.0
A	DCL INC	2- 6	3 1/2	0	0.0
O	DPF INC	6- 12	7 1/8	+ 1/4	+3.6
N	ITEL	1- 15	2 3/4	+ 1/8	+4.7
O	LEASPAC CORP	1- 2	3/4	0	0.0
A	PIONEER TEX CORP	2- 6	2 7/8	0	0.0
N	RELIANCE GROUP INC	24- 73	65	0	0.0
N	U.S. LEASING	12- 18	17 3/4	+ 1/4	+1.4

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC-BALT-WASH
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 6 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 4	3 1/8	- 1/2	-13.7
O	AMACOMP INC	7- 16	14 3/4	0	0.0
O	ANALYSTS INTL CORP	3- 6	4 3/4	+ 1/2	+11.7
A	APPLIED DATA RES.	6- 17	17	+1 1/8	+7.0
N	AUTOMATIC DATA PROC	31- 46	47 1/2	+3 1/4	+7.3
O	COMPUTER HORIZONS	1- 4	3 3/4	0	0.0
O	COMPUTER NETWORK	4- 9	6 1/2	0	0.0
N	COMPUTER SCIENCES	11- 26	24	-1 1/8	-4.4
O	COMPUTER TASK GROUP	1- 12	13	+1 1/2	+13.0
O	COMPUTER USAGE	2- 5	4 1/2	- 1/4	-5.2
O	COMPUT AUTO REP INC	4- 10	5 1/4	+ 1/8	+2.4
O	COMSHARE	11- 28	25 1/4	+1 1/4	+5.2
O	CULLINANE CORP	10- 42	41 1/2	+1 1/2	+3.7
O	DATA DIMENSIONS INC	1- 4	1 3/4	0	0.0
O	DATATAB	1- 4	1	0	0.0
O	DSI CORP	4- 9	5	- 5/8	-11.1
N	ELECTRONIC DATA SYST	19- 29	28 5/8	+1 5/8	+6.0
O	INFORMATICS INC	9- 22	16 1/4	0	0.0
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 6	5	0	0.0
O	KEYDATA CORP	2- 5	2 1/4	0	0.0
A	LOGICON	15- 25	26 7/8	+ 1/2	+2.0
O	MATHEMATICA INC	5- 16	13 1/2	-1 1/2	-10.0
N	NATIONAL DATA CORP	10- 22	22 3/8	+2 3/4	+14.0
N	PLANNING RESEARCH	5- 9	7 3/4	+ 5/8	+8.7
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	4- 7	5 7/8	- 3/8	-6.0
O	REYNOLDS & REYNOLD	24- 36	34 1/4	+ 1/4	+1.0
O	STSC INC	6- 11	10 3/4	- 1/2	-4.4
O	SCIENTIFIC COMPUTERS	6- 17	16 1/2	+ 1/2	+3.1
N	TYMSHARE INC	30- 62	60 7/8	+2 3/8	+4.0
A	URS SYSTEMS	9- 13	12 7/8	- 7/8	-6.3
N	WYLY CORP	6- 11	10 7/8	+1 3/8	+14.4

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 6 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 26	20 1/8	+1 3/8	+6.7
N	AMPEX CORP	14- 29	26 1/2	- 5/8	-2.4
A	ANDERSON JACOBSON	6- 17	13 3/8	+ 5/8	+4.9
O	APPLIED DIG DATA SYS	5- 12	10 1/4	-1	-4.6
O	AUTO-TROL TECHNOLOGY	10- 50	46 3/4	+3 3/4	+8.3
O	BEEHIVE INT'L	3- 13	12 3/4	+1 7/8	+17.2
A	BOLT,BERANEK & NEW	12- 26	25 7/8	- 1/8	-0.4
N	BUNKER-RAMO	17- 32	30 1/4	+ 3/4	+2.5
O	CAMBRIDGE MEMORIES	1- 4	1 7/8	0	0.0
N	CENTRONICS DATA COMP	33- 55	36 1/2	-1 3/8	-3.6
A	CETEC CORP	3- 7	6 3/8	+ 1/2	+8.5
O	COMPUTER DEVICES INC	6- 9	8 3/8	+ 3/8	+4.6
O	COGNITRONICS	3- 6	5 3/8	+ 1/2	+10.2
O	COMPUTER COMMUN.	4- 10	5 7/8	+ 7/8	+17.5
O	COMPUTER CONSOLES	6- 20	10 3/4	+1 1/4	+6.7
O	COMPUTER TRANSCEIVER	1- 5	3 1/4	- 1/8	-3.7
N	COMPUTERVISION CORP	24- 66	64 3/8	+2 7/8	+3.5
N	CONRAC CORP	13- 25	17 1/4	+ 1/2	+2.9
A	DATA ACCESS SYSTEMS	6- 16	15 3/8	+1	+6.9
A	DATA PRODUCTS CORP	11- 29	26 3/4	0	0.0
O	DATUM INC	2- 4	2 7/8	+ 3/4	+35.2
O	DECISION DATA COMPUT	2- 5	3 3/8	0	0.0
O	DELTA DATA SYSTEMS	1- 3	1 1/4	+ 3/8	+42.8
N	DOCUMATION INC	7- 27	12 7/8	- 1/4	-1.9
O	DATARAM CORP	6- 37	10 3/8	- 1/4	-2.3
O	ELECTRONIC M & R	3- 7	6 5/8	+ 5/8	+10.4
O	EVANS & SUTHERLAND	21- 57	56 1/2	+7 1/2	+15.3
O	FABRI-TEK	1- 4	3	+ 1/8	+4.3
O	GENERAL COMPUTER SYS	1- 4	3 7/8	0	0.0
O	GENERAL DATACOMM IND	12- 21	21	+2	+10.5
O	GENERAL TERMINAL CP	1- 4	2	0	0.0
O	HAZELTINE CORP	12- 30	26 3/4	+ 1/8	+0.4
N	HARRIS CORP	25- 44	44 1/4	+ 1/4	+0.5
O	INFOREX INC	1- 8	1 1/8	+ 1/8	+12.5
O	INFORMATION INTL INC	6- 15	12	+ 1/2	+4.3
O	INTEL CORP	46- 65	64 1/2	+ 1/4	+0.2
O	INTERSIL	13- 33	27 7/8	+1 1/8	+4.2
A	LUNDY ELECTRONICS	4- 12	8 1/8	+ 5/8	+8.3
O	MSI DATA CORP	5- 11	8 1/4	-1 1/4	-12.1
N	MEMOREX	10- 30	16	- 5/8	-4.2
N	MOHAWK DATA SCI	10- 20	10 5/8	+1 1/8	+7.5
O	ONEX	2- 10	7 1/2	0	0.0
A	PARADYNE CORP	10- 40	38 1/4	+ 5/8	+1.6
A	PERTEC CORP	9- 25	11 3/8	+ 5/8	+5.8
O	QANTEX CORP	10- 17	16	+ 3/4	+4.8
O	RECOGNITION EQUIP	5- 13	10	+1 5/8	+19.4
O	SCAN DATA	1- 5	3 3/8	+ 5/8	+22.2
N	STORAGE TECHNOLOGY	13- 21	20 1/4	+ 1/2	+2.0
O	SYKES DATATRONICS	10- 32	31 1/2	+4 1/4	+15.9
O	T BAR INC	10- 21	19	- 1/2	-2.5
A	TEC INC	3- 9	5 1/8	+ 1/8	+2.5
N	TEKTRONIX INC	42- 66	65 1/8	+ 5/8	+0.9
N	TELEX	3- 6	4	+ 1/2	+14.2
O	TESDATA SYSTEMS CP	6- 25	9 1/8	- 5/8	-6.3
O	TIMEPLEX INC	7- 18	18 1/8	- 1/4	-1.3
O	WILTEK INC	3- 5	2 7/8	- 1/4	-8.0

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A	AMERICAN BUS FORMS	6- 13	11 1/2	+ 1/4	+2.2
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	13- 34	33 1/4	- 3/8	-1.1
O	CYBERMATICS INC	1- 1	1	0	0.0
A	DUPLEX PRODUCTS INC	11- 15	15	+2 1/2	+20.0
N	ENNIS BUS. FORMS	13- 21	16 7/8	- 1/8	-0.7
N	3M COMPANY	46- 59	58 3/4	- 1/4	-0.4
O	MOORE CORP LTD	27- 36	30 1/2	0	0.0
N	NASHUA CORP	20- 35	27 3/4	+2 5/8	+10.4
O	STANDARD REGISTER	22- 31	30	+ 1/2	+1.7
A	TAB PRODUCTS CO	13- 23	20	- 1/8	-0.6
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User Attitudes Surveyed — Pages 10-12

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Newspaper · Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
V 33 August 18, 1980 $1.00 a copy; $30/year

NEWSPAPER

Industry Spotlight

PCMs Braving Ups and Downs In Disk Market

By Marcia Blumenthal
CW Staff

With product life cycles lasting only about four to five years, the IBM plug-compatible disk market is highly volatile.

Through 1976, virtually 100% of plug-compatible disk revenue was from 3330-type products, but last year only 3.4% of revenues were derived from these products, according to James M. Porter, publisher of the annual "Disk Trend Report."

Much the same fate awaits the 3350, introduced by IBM in 1976. This year the 3350 will comprise 94% of plug-compatible manufacturer (PCM) revenue, but those drives will not even be in production in three years, Porter predicted.

IBM's introduction of its 3380 drive in June with thin-film technology heralded the new generation of disk drives that will replace the 3350. These high-end disk systems offer PCMs the most promising new business area, Porter maintained.

By contrast, IBM's 3370 and 3310 models announced in conjunction with the 4300 last year are not PCM bailiwicks because of the low profit margins that sales of those drives would bring, noted Harry Henry, director of equipment research and services at International Data Corp. (IDC). To date there are no PCM alternatives for those drives, he added.

PCM Market Share

[illegible] total 70,000 3350-type spindles installed in the U.S. today, PCMs hold about 25% to 30% of the market, with more than 20,000 spindles installed, various sources estimated. By 1980, a total of 90,000 units will be installed, a 28% increase, IDC forecast.

Worldwide PCM revenues for 1980 will be about $406 million, with 3350-type drives garnering sales of $380 million, Porter estimated.

Revenue growth for this year will be about 14%, Porter predicted. However, next year revenue will slip 15% behind the 1980 level, Porter noted, attributing the decline to fallout from the 3380

(Continued on Page 6)

Wide World Photos

Crossing Tacks

The 12-meter yacht Clipper crosses tacks with Freedom during the America's Cup trials in Newport, R.I. Both vessels were aided by onboard micros. Story on Page 9.

Surprise Move Puts MIS Staff On Union Rolls

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Management information systems (MIS) workers at Western Airlines, Inc. are being forced to unionize, whether they like it or not.

A recent decision by a federal agency in Washington, D.C., has made union membership all but a certainty for more than 100 computing professionals at the airline.

The employees, none of whom had ever solicited admission to a union in the first place, were taken by surprise at the news that their department is likely to be coopted for the first time by the organized labor movement.

Much of the groundwork for unionizing Western's MIS personnel was laid last fall by the Brotherhood of Railway and Airline Clerks (Brac), an international labor union that until recently represented an estimated 80% to 90% of the airline's total work force.

Brac Petition

In September 1979, Brac petitioned the National Mediation Board (NMB), an independent federal agency, to expand the union's sphere of influence to include all of Western's nonsupervisory MIS personnel, who at the time were still nonunionized. In its petition, Brac argued that because nonsupervisory computing employees exercise no management authority, they deserve to be grouped in the same job classification as clerical and other nonmanagerial office personnel.

Brac also argued that, because it already represented the rest of Western's nonmanagerial office employees, it should be granted authority to do likewise with their "clerical" counterparts in MIS.

The NMB agreed with Brac's contentions, and on May 28, it accepted the union's petition, which specified 11 MIS job categories to fall within the labor organization's domain. The designated categories exclude supervisory personnel like MIS managers or directors, but they do apply to computing-room subordinates like programmer trainees, programmers, systems ana-

(Continued on Page 4)

'Function Points' Described As Productivity Measure

By Bruce Hoard
CW Staff

FARMINGTON, Conn. — Productivity measurement is not as important as timely, cost-effective applications development, IBM information systems adviser Allan J. Albrecht said here recently.

For this reason, IBM's DP Services Division employs a "phased approach" and disciplined management techniques to assure high productivity rather than measuring lines of code. However, it also uses "function points" or "function value" to help maintain high performance and competition among programmers and to help measure productivity.

Albrecht described IBM's productivity management techniques at the fifth meeting of the New England Productivity Information Exchange Roundtable (Pier). The techniques he discussed are intended for use in large-scale applications development for such organizations as banks and insurance companies, he said.

"Lines of code are not reliable for measurement because they have widely differing values depending on the technology used," he said. However, they can be used as a secondary measure to provide a basis for comparing projects using the same language, he noted.

Function Values Defined

Function values consist of the number of inputs, inquiries, outputs and master files delivered for each project.

These counts are weighted by numbers designed to reflect their functional value to the customer. The results are then adjusted to reflect other factors such as complexity.

(Continued on Page 4)

DEC-20 Services Found Cheaper

By Tim Scannell
CW Staff

STAMFORD, Conn. — Local users of Digital Equipment Corp. DEC-20-based time-sharing services are probably getting more for their computing dollar than users of services with IBM or Control Data Corp. systems, according to a report just released by Real Decisions Corp. (RDC).

The 269-page *Timesharing Decisions* report spotlights 22 remote computing

(Continued on Page 2)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.

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Computerworld can be purchased on 35 mm microform through University Microfilm Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

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Cambex Unwraps Mid-Range CPUs

By Rita Shoor
CW Staff

WALTHAM, Mass. – Cambex Corp., which until last week was known as Cambridge Memories, Inc., (CMI), has announced several IBM plug-compatible mid-range processors.

The 1636 is intended as a replacement for IBM's 4331 Group 2 mainframe and the 1641 is meant to compete with IBM's 4341. A third member of the family, a 1651, is expected to be available as a field upgrade for either model in the second half of 1981 and completes Cambex's 1600 series.

An earlier version of the 1636 was actually introduced about two years ago [CW, Aug. 28, 1978] as a CMI Model 3 alternate to the 370/135.

IBM's 4300 series announcement in February 1979 caused CMI to reassess its marketing strategy, and the CMI models 1 and 2 were never pushed, a spokesman said.

The 1636 is available with a maximum of 4M bytes of main memory and offers a 15% performance improvement over the 4331 Group 2 machine, Cambex claimed.

Standard I/O channels include a one-byte multiplexer for all models in the series, up to four block multiplexer channels (in increments of two) for the 1636 and 1641 processors and a maximum of five block multiplexer channels for the 1651. The maximum block multiplexer data rate is 1.86M byte/sec and maximum byte multiplexer rates are 50K byte/sec in byte mode and 180K byte/sec in burst mode.

Storage Capacity

The 1M-byte 1636 can be expanded to 4M-bytes of main storage and the larger 1641 can be expanded from 1M byte to 8M bytes to offer twice the memory capacity as IBM's 4341, the company spokesman noted.

The high-end 2M-byte 1651 can also be expanded to 8M bytes and compares favorably to IBM's 370/158-3 in terms of performance, he claimed. Specifications for the 1651 include a 50-nsec machine cycle time as opposed to the 115 nsec specified for the IBM 370/158-3 [CW, Jan. 8, 1979].

A typical 1M-byte 1636 processor costs $125,000 with a 2M-byte 1641 mainframe priced at $190,000.

Both of these processors can be upgraded to 1651 specifications, the vendor said. The field upgrade packages for converting a 1636 or 1641 to a 1651 cost $160,000 and $92,500, respectively. Upgrading the 1636 to a 1641 costs $70,000 and all upgrade packages will be available for delivery in the second half of 1981, Cambex said from its headquarters at 360 Second Ave., Waltham, Mass. 02154.

DEC-20 Services Found Cheaper

(Continued from Page 1)

vendors and details the results of benchmarks individually run on each service. Performed by RDC personnel earlier this year, the benchmarks were split evenly between Fortran and Basic programs and test the computational power and I/O handling capabilities of each service.

The report also lists the various networks utilized by each remote computing service vendor, the type of computer languages available with the service, whether the vendor offers external data bases for specialized applications, and each vendor's pricing structure.

The results of RDC's efforts: If you are using a DEC-20 time-sharing service, such as American Management Systems, Inc. or Citishare, you are probably paying about 67 cent/hour for Basic CPU time and 89 cent/hour for Fortran processing. This compares with about $2.75/hour and 93 cent/-hour for Basic programs on IBM and CDC equipment, respectively, and $4.57/hour and $1.55/hour for Fortran routines, according to the firm's benchmark tests.

DEC-10 remote computing vendors were also surveyed in the report and faired relatively high in the CPU intensive portion of RDC's benchmarks. For instance, users of DEC-10 services are charged about $2.51/hour for programs run in Basic and $2.77/hour for Fortran.

The CPU intensive benchmarks, designed to test processing power, involved a variety of calculations including addition, multiplication, division, square root and exponentiation. All of the benchmarks were run on 30 char./-sec terminals located at the company's Cherry Hill, N.J., offices, a spokeswoman stated.

The RDC report also compared the average costs charged by each of the 22 services for connect and storage facilities. For example, if you are a DEC-20 time-sharing user, you are probably paying about $6.75/hour for local prime connect time, with a 15 char./sec transmission rate. This compares with an average $11.80/hour charged by such IBM-based vendors as National CSS, Inc. and Tymshare, Inc. and $12.94/hour charged by CDC-based companies like CDC's Cybernet and United Computing Systems, Inc.

In most cases, DEC-20-based firms led the low-price pack for charges on disk storage space. The DEC-20 companies sell space at a rate of 22 cents per 1,000 char./mo for the first to 5Mth char. and 17 cents for any storage above 25M char. By contrast, IBM-based services charge 26 cents and 19 cents, CDC bills users 26 cents and 16 cents and DEC-10 firms charge 55 cents and 28 cents, respectively, per 1,000 char./mo.

Timesharing Decisions costs $695 plus postage and handling from the company at 123 High Ridge Road, Stamford, Conn. 06905.

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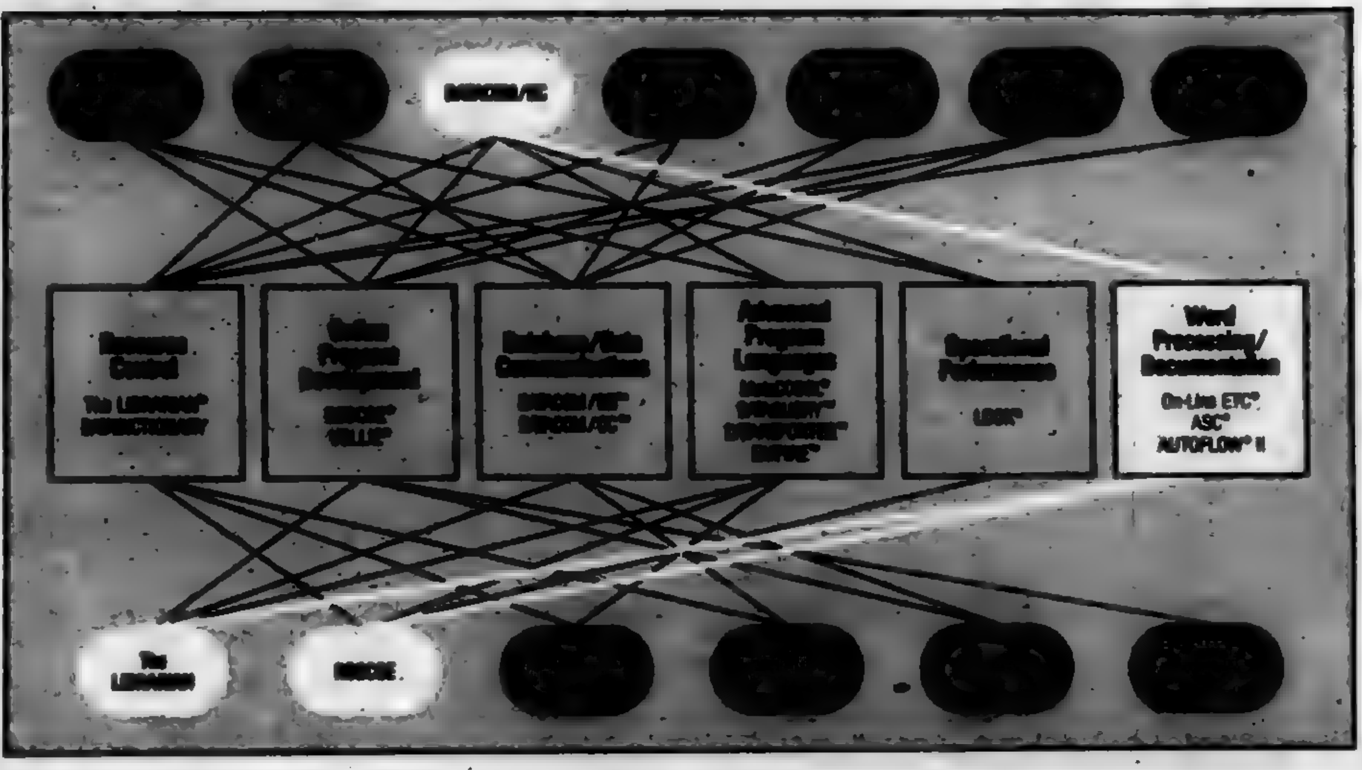

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MIS Workers Forced Into Clerical Union

(Continued from Page 1)

lysts and technical specialists of almost every stripe.

Not Consulted

At no time during the NMB's nine-month evaluation of Brac's petition were the members of Western's MIS department in any way consulted. The federal agency simply never asked the employees how they felt about being classified as "clerical and office" personnel or what they thought of the prospect that they might soon be joining a union, according to Western's systems analyst Elizabeth Davidson.

So when members of the company's computing department finally learned of the NMB's petition decision on June 4, they greeted the news with a mixture of astonishment, anger and resentment. Although no one has yet formally accused the NMB of acting improperly or exceeding its authority, Western's MIS employees have nevertheless roundly criticized the federal agency for denying them a chance to voice their opinions on an issue that profoundly affects their future, Davidson said.

The NMB, for its part, concedes it never informed Western's MIS employees of Brac's intention to unionize them, but the agency still insists its actions in the case were justified.

Like its MIS personnel, Western's management also strongly disapproves of attempts to unionize its formerly independent computing shop.

In early June, shortly after learning that the Brac petition had been approved, Western's management responded to the decision by submitting a petition of its own. In essence, the petition asked the NMB to reverse its earlier ruling that places members of the company's MIS department in the same job category as clerical and office personnel. But on June 23, the managementappeal was refused.

The NMB's rejection reportedly ended Western's last realistic hope of blocking a union takeover.

'Dangerous Precedent'

In Davidson's view, the involuntary unionization of Western's MIS department sets a "dangerous precedent" and holds grave implications, not just for the company itself, but for the rest of the airline industry as well.

The conditions that precipitated a unionizing effort at Western could easily be duplicated — with similar results — at almost any other airline, the systems analyst warned. A carrier whose MIS department looks particularly vulnerable to a unionizing drive right now is Continental Airlines, Inc., which just last Aug. 8 announced that it and Western have agreed to merge soon.

The roots of the effort to unionize Western's MIS personnel can be traced back more than a year ago to an internal Brac membership dispute. At the time, many of the union's members had grown so disaffected with the organization's leadership that they called an election to decide whether they would continue to be represented by Brac or whether they would switch their allegiance to a new, independent union called the Air Transport Employees Association (ATEA).

To delay the election as long as possible and perhaps even sway its outcome, Brac sought to enlarge its universe of eligible voters by including Western's MIS personnel as part of the union's membership, Davidson said.

The apparent ploy proved only marginally successful, however, because last month the requested election was finally held, and on July 30 the results were at last announced: Brac had been voted out as Western's official labor representative in collective bargaining, and the new union — the ATEA — had been resoundingly voted in. So only about two months after being forced to join their first union, Western's computing employees found themselves involuntarily switching to a second one.

Actually, the MIS employees' ATEA membership isn't expected to become complete and formalized until the union and Western's management finish negotiating a new contract — a process that will probably continue for some time to come.

Price Cut 14% On HP 3000 III

PALO ALTO, Calif. — Hewlett-Packard Co. has dropped the price of its HP 3000 III business computer 14% and is offering its Cobol II/3000 compiler free to purchasers of any HP 3000 computer through Oct. 31, the company announced last week.

The new U.S. list price for the 256K-byte system — HP's most powerful business computer — is $92,000, down from $107,330. The normal, one-time license fee for the Cobol II/3000 compiler is $3,000.

HP linked the price decrease to more efficient production methods.

The Series III is composed of the CPU, 256K-bytes of fault control memory, a 50M-byte disk drive, a 1,600 bit/sec magnetic tape drive, 16 asynchronous terminal ports and a system CRT console.

Included with Series III Software is the Image data base management system, the MPE-III operating system, Query inquiry language, Ksam file access and V/3000 forms and data entry subsystem. More than 2,500 Series IIIs have been shipped to date, the spokesman said.

HP is offering the Cobol II/3000 compiler at no charge as part of an effort to introduce customers to the microcode-assisted implementation of Ansi Cobol, he added.

'Function Points' Described

(Continued from Page 1)

"This gives us a dimensionless number defined in function points which we have found to be an effective relative measure of function value delivered to our customer," he declared.

However, interesting though they may be, function points are secondary to the less exotic principles of punctuality and controlled spending when it comes to applications development, Albrecht said.

IBM Approach

IBM's "phased approach" involves two phases. The first, system design, consumes 20% of total development man-hours. The second, system implementation, absorbs the other 80%.

All projects are carried out under a project management system which features a flowchart depicting its fundamental processes. The approach uses disciplined management techniques including periodic feedback checks to keep the project on course.

The first such feedback loop assesses the project risk with a 20-item questionnaire. It is followed by preparation of a project objectives document which is reviewed by both an independent systems assurance group and the customer to make sure both sides understand what is to be done, Albrecht said.

The project is then planned in detail and its progress checked once a week. Results are shared with the customer. The systems assurance group also conducts an overall review every six months, he added.

'Flexible But Firm'

Throughout the process, a "flexible but firm" change control approach is taken because "you can't be locked into an unbreakable straightjacket for the 12 to 24 months it takes to complete a system," Albrecht said.

As each project is finished, a completed-project document is prepared. This document is extremely important, he stressed, because it includes the project's most positive and negative points as noted by the project manager. It may then be used as a guide for future projects.

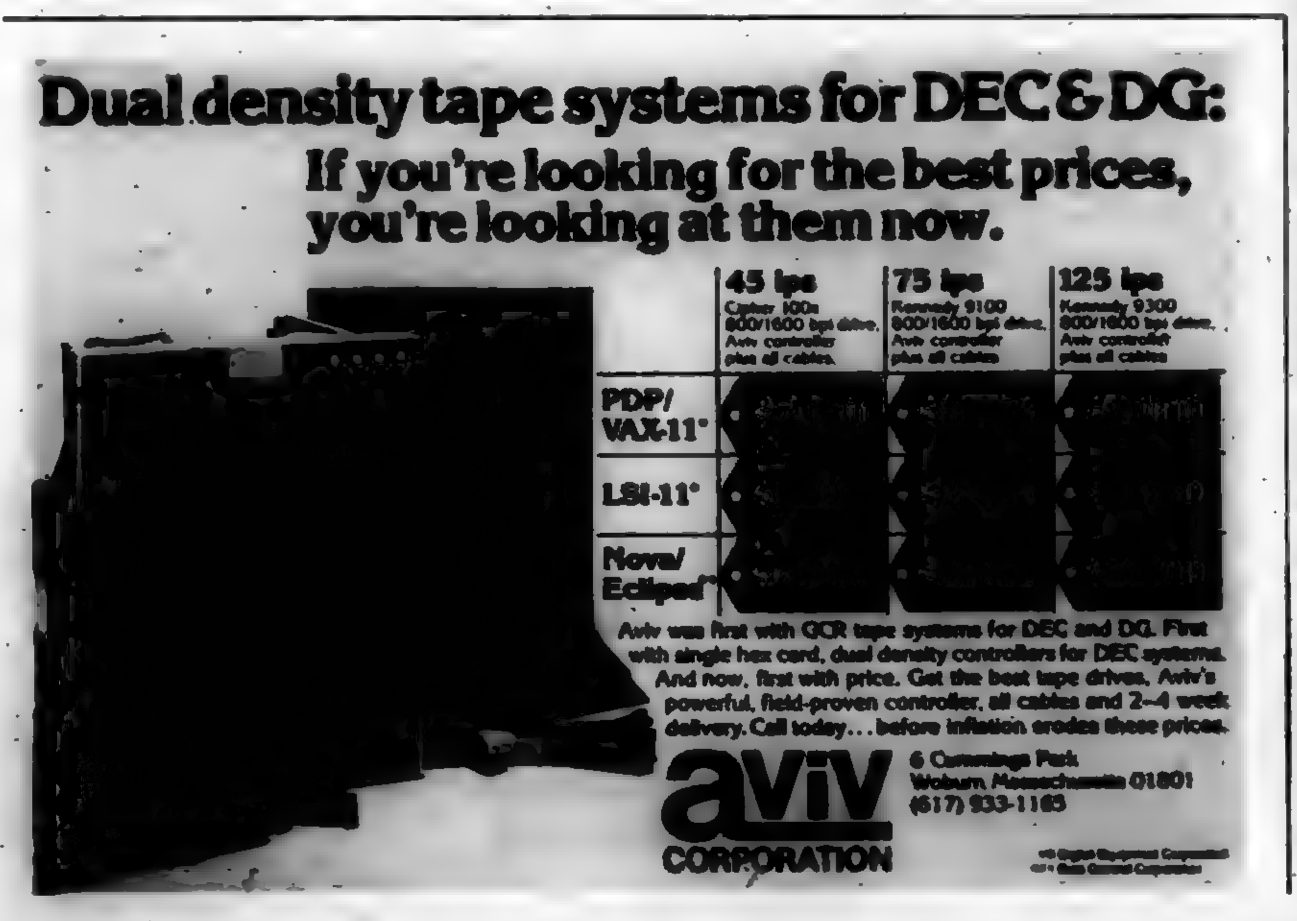
If all the rules were followed and the project was completed on time and within budget, the customer should be satisfied.

Albrecht used a productivity time trend chart to back his contention that the DP Services Division has consistently increased its productivity. It was based on 22 development projects conducted over 4-1/2 years.

The chart revealed progressively fewer hours spent on generating each function point for Cobol, PL/I and DMS/VS projects during the time period involved. The productivity improvement was about three to one, or a 25% compounded productivity increase per year.

"Although with only two projects, there is too little data here to draw conclusions, the initial indication on DMS/VS is that it is probably more productive than either PL/I or Cobol," he said. "If this trend is confirmed, DMS/VS could prove to be about 30% more productive than Cobol."

No one other than IBM is currently employing Albrecht's function value measurement methods, he said.



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And Preemptive Operating System

RDS Adds Raynet Communications Processor

By Brad Schultz
CW Staff

NORWOOD, Mass. – A communications processor that allows data network users to access remote applications regardless of hardware protocol commitments along the way was announced last week by Raytheon Data Systems Co. (RDS) for its Raynet customers.

The vendor also introduced the Preemptive Communications Operating System (Pcos), which reportedly lets Raynet users assign 256 separate priorities to "a virtually unlimited" number of tasks. Both products launch Phase 2 of the Raynet concept for decreasing the number of front-end processor ports in a network by remotely concentrating many communications lines into a few.

Replacing the RDS-500 communications processor, the RDS-7500 has a main memory size ranging from 65K to 262K bytes. This processor features a set of 130 instructions for a 22-bit word length subject to a 700-nsec cycle time. With 12 hardware registers, eight general-purpose registers and 16 interrupt priority levels, the RDS-7500 offers a maximum I/O data rate of 45 million bit/sec, a spokesman said.

Operating System

Replacing the Communications Operating System (COS), Pcos supports interprocessor and I/O control, he added, as well as task, file and memory management. Accompanied by system initialization routines and both debug and reconfiguraton utilities, Pcos also supports multiprocessor operations in a manner claimed to prevent network crashes as the result of a single component failure.

Further, the operating system works with the RDS Inter-Processor Bus (IPB) architecture and Modem Switching Device, which are said to boost Raynet's overall reliability by smoothly engaging alternative circuitry in the event major network components fail. And Pcos features periodic task scheduling, inserting selected tasks in the job queue automatically as predefined events occur or at preset time intervals.

That amounts to another way of raising the priority of tasks whose present rating keeps them in limbo for prolonged periods, he pointed out. Raynet applications software includes packages for network management, connection management and I/O message processing.

A queue processing package gives Raynet users store-and-forward message switching, and a system recovery package offers trouble-shooting expedients.

Basically, Raynet was designed to give a single network node power to manage remote resources and choreograph consolidations of data flow while reducing host communications overhead. By translating protocols, Raynet communications processors such as the RDS-7500 hand the user considerable license to reshuffle the positions of terminals and other communicating peripherals.

These processors' capabilities for remote line concentration also trim the user's need for additional front-end hardware as traffic volumes swell. And the various message-switching features facilitate integration of data and text flows.

RDS now markets five upward-compatible computer systems to drive Raynet that are based on its line of communications processor. The Raynet/I system offers remote line concentration. Raynet/II adds a capacity for network consolidation by giving terminals access to a wide range of the network's mainframes and applications software.

Raynet/III extends the offerings of Raynet/I and II to include protocol translation. Raynet/IV adds message switching. The most sophisticated system, Raynet/V, opens channels between the mainframes and terminals of two or more network nodes.

Raynet/I, II and III are already installed; deliveries of Raynet/IV will begin this October; and Raynet/V shipments will commence in mid-1981, the spokesman noted. A single Raynet/I costs $59,200 or leases for $1,900/mo on a five-year plan.

Rigged to drive 62 "high-speed" lines, a 392K-byte dual-processor Raynet/I with multiplexers, line adapters, modem switching devices, program load device storage, dual operator consoles and printers costs $360,000. Its five-year lease goes for $10,000/mo.

A division of Raytheon Co., Raytheon Data Systems is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

Correction

Two high-speed channels from Amdahl Corp. will be provided in each four-channel group on the vendor's 470V/7 series and V/8 rather than on the 470V/6 and V/8 [CW, Aug. 11]. Only one high-speed channel is provided for each four-channel group on Amdahl's 470 V/5 and V/6 product line.

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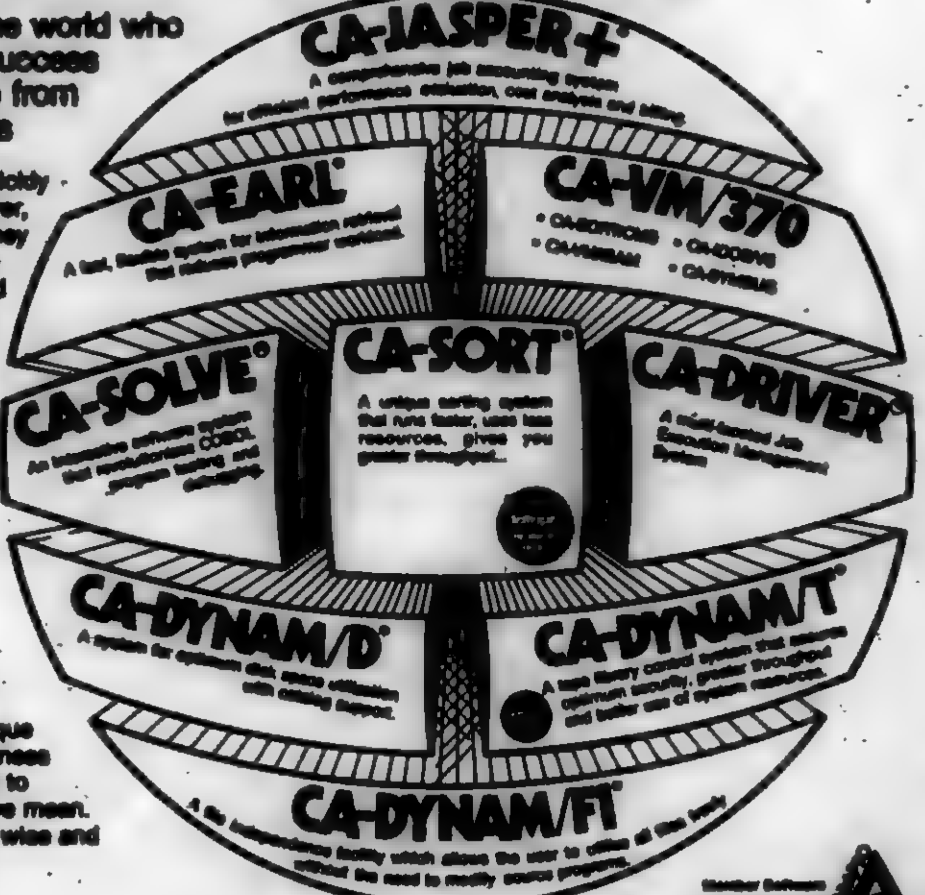
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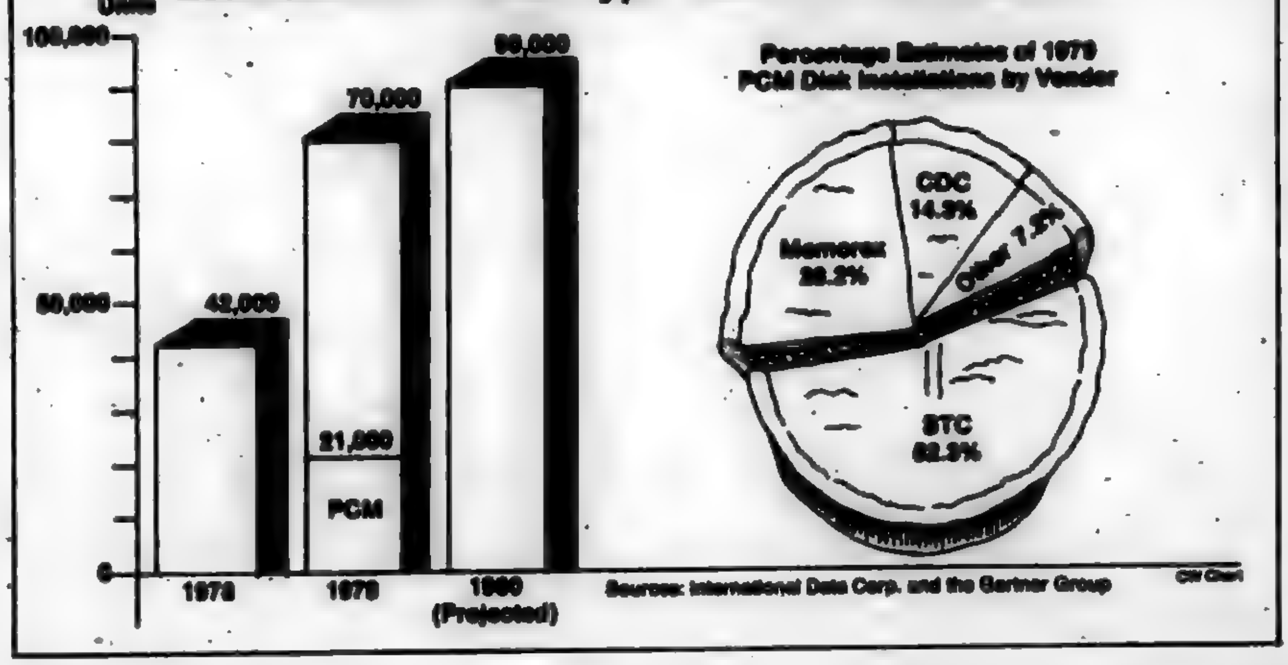
Plug-Compatible Storage Leaders Down to Four

Today the IBM plug-compatible disk and tape market is dominated by four companies, but during the early 1970s there were 15 companies competing in this arena.

What happened to them? In September 1970, IBM introduced its 2319A series, embedding the controller into the box with the storage units. Many vendors did not manufacture controllers, Frank Kline, vice-president of research with Drexel Burnham Lambert, Inc., recalled.

Estimated U.S. 3350-Type Disk Drive Installations



Sources: International Data Corp. and the Gartner Group

Later that year, IBM essentially reduced the cost of its leases by eliminating the charge of using its storage equipment for more than one shift.

With the introduction of the 2319B series, IBM reduced lease prices on its disks by 8% to 16%, Kline noted. IBM made up for some of this decrease by hiking the price of its CPU by 3% to 8%, he said.

Although several vendors, among them Memorex Corp., Telex Corp. and California Computer Products, Inc., brought antitrust suits against IBM, these companies failed to prove that IBM dominated the market, Kline noted.

The companies that withdrew from the plug-compatible storage market are:

- Ampex Corp.
- Bucode, Inc.
- Calcomp.
- Marshall Data Systems.
- Mohawk Data Sciences Corp.
- Potter Instrument Co.
- Singer/Frieden Division.
- Texas Instruments, Inc.
- Tracor/Peripherals General, Inc.
- XLO/Bryant Computer Products.

PCMs Braving Ups and Downs in Disk Market

(Continued from Page 1)

introduction. But by 1982 a recovery will begin, with a 16% revenue growth, and 1983 will be a boom year with an 84% revenue spurt, he predicted.

Storage Prices

While revenue growth will be sporadic during the next few years, storage prices per 1M byte have fallen steeply. During the 1960s, mass storage cost about $25 per 1M byte, but fell below $1 per 1M byte with the introduction of the 3380, not including the control unit or other features.

On a two-year lease plan, IBM disk storage for the 3380/B04 (storage unit only) costs 71 cents per 1M byte per month, an IBM spokeswoman said. With the controller and fixed-head option, the monthly price per 1M byte ranges from 86 cents to $1.25.

For the basic 3350 storage device, IBM's current monthly price per 1M byte on a two-year lease program is $1.46, with a range of $1.87 to $2.39 with the controller and fixed-head option (see chart on Page 7).

Leading Competitors

Leaders in the plug-compatible disk market are Storage Technology Corp. (STC) which, according to Porter, last year held 39.8% of the installed 3350s. Next is Memorex Corp., with 27.6%, and Control Data Corp., with 19.9% of installed 3350-type units.

By contrast, STC in 1978 held 49.6% of the 3350-type installations, with Memorex claiming 21.2%. CDC has increased its share significantly in the past couple of years, he said. (Differences between "Disk Trend Report" figures and those in the accompanying chart vary, possibly by year compiled.)

With the technology and products changing so rapidly, those surviving plug-compatible vendors have done so by adapting quickly to technology changes and often developing products that differ from the IBM counterpart.

Industry Spotlight

However, this was not always the case. Between 1968 and 1973 there were 13 PCM competitors in the disk market. However, with IBM price cuts on its models 2319A and B in the early 1970s, competitors fell by the wayside, Frank Kline, vice-president of Drexel Burnham Lambert, Inc., explained.

Unlike IBM, CDC, Memorex and STC all offer double-density 3350-type devices. IDC's Henry estimated about 50% of plug-compatible disk orders are for these double-density models.

How long it will take the major plug-compatible disk makers to match IBM 3380 technology is unclear. Historically, independents have dovetailed with IBM's new products within 18 months, Porter noted.

Both Memorex and STC have said they have thin-film technology. During interviews shortly after IBM's 3380 introduction, the major independents said they would announce competitive products [CW, June 16].

Aside from technology, IBM's 3380 is highly price-competitive, especially on the two-year lease, analysts have observed. This will squeeze independents' earnings. Some observers question Memorex's ability to remain competitive in the plug-compatible disk business. Despite a first-half loss of $20.6 million, Memorex asserted it will remain in the business.

Whether or when there will be a shakeout in the market from the 3380 introduction is currently unknown. In the interim, there will be a market for 3350s during 1981, but PCM shipments will decline next year, Porter forecast. The number of drives PCMs are able to sell depends on the number of 3380s IBM is able to sell and produce, he said.

• Memorex Stretching Itself Thin? •

SANTA CLARA, Calif. — Posting a loss of about $21 million for its current fiscal year to date, Memorex Corp. is scrambling for a steady footing.

Some industry analysts have suggested Memorex may have stretched itself too thin by offering too many products. They also questioned the company's ability to compete in the end-user IBM-compatible marketplace.

Despite this speculation, Memorex last year managed to claim more than 27% of 3350-type disk shipments, according to James M. Porter, publisher of "Disk Trend Report." He estimated Memorex's 1979 plug-compatible disk revenue at $97.5 million, or 20% of the company's total equipment sales of $490.8 million.

Although Memorex offers the full range of IBM-compatible 3420-type tape drives, these are purchased from Fujitsu Ltd. for resale rather than manufactured in-house. Besides plug-compatible disks and tapes, Memorex sells OEM disk products, communications controllers, terminals, memory products and printers as well as media products.

The company claims to be the leading independent maker of disk drives. Despite declining earnings in 1979, Memorex increased its research and development expenditures 20% last year.

Thin-Film Technology

Memorex's Recording Technology Center has been focusing on thin film heads and media, the technology IBM announced with its 3380 disk products.

For its plug-compatible disk product line, Memorex, like other major competitors, has offered enhanced drives rather than copying IBM. The company has incorporated a dual porting feature into its double-density 3350-type device.

The company's intention is to ship more and more double-density 3350-type units, which will be more cost-competitive with IBM, Gary Land, vice-president of product management for the Storage Systems Group, said.

However, industry observers point to Memorex's increased emphasis on OEM sales. The firm reportedly recently concluded a two-year $60 million deal with Digital Equipment Corp. and another multimillion-dollar agreement with NBI, Inc. of Boulder, Colo.

Memorex's staunch competitor, Storage Technology Corp., has also been increasingly eying the OEM marketplace. OEM sales are a way of beefing up profitability, which at Memorex last year declined 26% from 1978. Moreover, the company said it will post a loss this year.

The company's problems appear to be in equipment sales.

• STC Holds Lion's Share •

LOUISVILLE, Colo. – Concentrating almost exclusively on mass storage devices, Storage Technology Corp. (STC) holds the largest share of both the IBM-compatible tape and disk markets.

Of the estimated 30,000 IBM-compatible tape units installed, STC accounts for about 25,000 or 83.3%, according to Peter Wright, director of portfolio programs for the Gartner Group.

In the plug-compatible disk market, STC last year had $123.9 million or 34.8% of shipments, James M. Porter, publisher of the annual "Disk Trend Report," calculated.

In its formative years in the early 1970s, STC concentrated on high-performance tape products, closing in on a niche IBM neglected because it bet disk storage would replace the need for tape. Today STC's tape products account for nearly 70% of earnings, STC Chairman and President Jesse I. Aweida, estimated.

STC did not deliver its first disk products until 1975, Datapro Research Corp. noted. Currently 90% of the firm's revenue is estimated to be derived from storage products.

While analysts predict IBM's introduction of its 3380 disk drive is likely to mark a dry season for plug-compatible manufacturers (PCM), Porter thinks STC will do well because the company has been quick to respond to competitive moves.

However, because of the volatility of the PCM market, STC has been moving into new markets during the past two years.

Two new areas are OEM minidisk products and communications products. During 1978, STC introduced its 2700 minidisk and its COM2 telephone multiplexer concentrator. At the firm's annual meeting in May, Aweida said STC's goal is to become a major supplier of telecommunications products.

Moreover, the firm is reportedly still attempting to acquire a CPU product line, despite the failure of its recent merger negotiations with Amdahl Corp.

With 1979 revenues of $479.4 million, STC's sales have averaged 50.2% and earnings have averaged 66% annual growth during the past five years.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	$1.48	$1.38	$1.13	$.70	$.71
[illegible]	$1.87-$2.39	$1.55	$1.40 (estimated)	$1.00	$.88-$1.25

* Prices provided by vendors for two-year lease

CW Chart

• CDC Snares •
14% of 3350s

MINNEAPOLIS – Although its plug-compatible disk business is a very small portion of the corporation's total revenues, Control Data Corp. has managed within the past two years to snare about 14% of the IBM 3350-type disk installations in the U.S., one analyst noted.

Expected to produce $1 billion in revenues during fiscal 1980, CDC's peripherals business, advancing at 33% annually, is the fastest growing revenue producer within the company's diverse product line.

Of this revenue, IBM plug-compatible products, including Omega mainframes, account for about 15% of the peripherals business. Last year CDC's plug-compatible disk sales were estimated at $78 million by James M. Porter, publisher of "Disk Trend Report."

Disk products represent between one-half and two-thirds of CDC's total peripheral sales, according to Thomas G. Kamp, president of peripheral products [CW July 2, 1979].

Making the move into IBM-compatible peripheral products was a natural adjunct to products being developed for OEMs and the firm's own systems, Ray Gleason, manager of marketing requirements, noted. "We have a large business, and R&D is applicable to many product lines."

The company is also involved in a joint venture with Honeywell, Inc., Magnetic Peripherals, Inc., for the development and manufacture of disk products.

While CDC intends to pursue the IBM-compatible market, in general that sector of the business takes a back seat to CDC's traditional mainframe and peripherals business. The company's total sales force for plug-compatible products numbers about 150 people, Gleason said.

With computer revenue of $2.3 billion last year, CDC has three major business segments: high-end processors for scientific and engineering segments; peripherals, 60% of which are sold on an OEM basis; and services, which last year produced revenues of $350 million. The firm also operates a finance organization, Commercial Credit, which brought CDC's total revenue last year to $3.3 billion.

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BDS

PCMs More Successful With Tape Than Disk

By Marcia Blumenthal
CW Staff

Perhaps because it has been a relatively stable market, plug-compatible tape drive vendors have been more successful snaring from IBM a greater share of the high-end 3420 market than they have for disk products.

But IBM is expected to announce a new family of tape drive products, code-named Ocotillo, by the end of the year. These new products could offer a 10-to-1 advance in bits per square inch, according to Raymond C. Freeman, an expert in the tape market and head of Freeman Associates. The announcement is likely to leave plug-compatible tape vendors rushing to play catch-up, he observed.

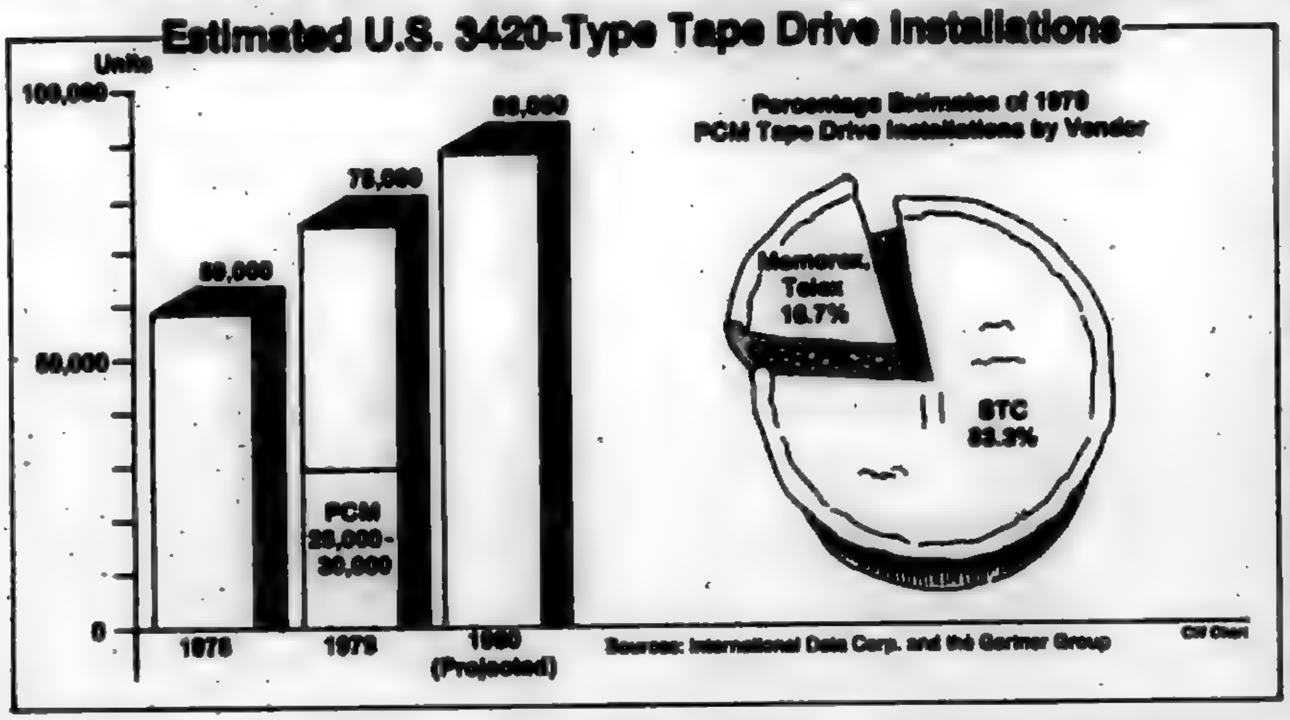
The present IBM 3420 tape drives have been available for seven to 10 years. Other than the 8809, which was introduced in 1978 for use with the 8100, IBM has not announced any new products or significant changes in its six-model tape drive family. The 8809, which can also operate with the 4300 series, is also a streaming device, used for backup storage for Winchester disk files.

About 75,000 of the 3420-type tape drives are installed in the U.S. today, according to estimates by International Data Corp. Plug-compatible manufacturers (PCM) hold an estimated 40% share of those installations, market researchers said. In the higher end 6,250 bit/in. arena, PCMs could hold a 50% share, Freeman maintained.

By far the largest chunk — about 85% — of the IBM 3420-type market belongs to Storage Technology Corp. (STC). While IBM was banking that random-access memory disk would replace tape as the primary mode of mass storage, STC rightly bet tape storage would be around indefinitely.

Currently nearly 70% of STC's earnings are derived from large-end tape systems. And the profits from that line have been used to finance the firm's plug-compatible disk line.

Estimated U.S. 3420-Type Tape Drive Installations



Sources: International Data Corp. and the Gartner Group

CW Chart

Memorex, Telex

While STC claims the lion's share of the market, Memorex Corp. and Telex Corp. are also factors in the marketplace.

Memorex, which entered the tape market in 1977, does not manufacture its 322X line, but rather buys from the Japanese computer giant Fujitsu Ltd. Memorex is estimated to hold 2% of the 3420 market, with 1,200 to 1,500 units installed, according to industry analysts. Telex, which was an early entrant in the 3420 market, is estimated to have about 4,000 to 5,000 units installed.

Although these three vendors have virtually cornered the market, Braegen Corp., which acquired California Computer Products, Inc.'s plug-compatible tape and disk line last year, offers refurbished 3420 Models 5 and 7, according to Dan Jakle, national sales manager of the plug-compatible line.

And, National Advanced Systems Corp. (NASC), which acquired Itel Corp.'s computer business last year, recently struck a deal with Hitachi Ltd. to distribute plug-compatible tape drives.

Although IBM has not ruffled the market with significant new tape offerings, industry observers note a new drive is in the wind. On July 28, IBM put all models of its 3420 line on limited new production. However, one source noted IBM will probably continue to manufacture new 3420s in France.

Whenever the new drive is introduced, it is expected to demonstrate significant advances in technology, leaving PCMs to either scramble to match the product or to decide not to make a comparable offering, tape expert Freeman speculated. He said the drive could have up to 18 tracks instead of the current nine and record up to 30,000 bit/in.

"It will probably not be general-purpose tape drive replacement for the 3420," Memorex's Gary Land, vice-president of product marketing, theorized. Rather, the new drive will be for a specialized purpose, most likely as a backup device, he noted, adding the new product will set the technology standard for a future 3420 replacement from IBM.

• Others 'On the Fringe' •

Although Memorex Corp., Storage Technology Corp. (STC), Telex Corp. and Control Data Corp. dominate the IBM plug-compatible tape and disk market, several other vendors are poised on the fringe of that marketplace.

Until last year, the primary product line of the Braegen Corp., headquartered in Cupertino, Calif., was intelligent terminal systems compatible with the IBM 3270. Last October, however, the firm acquired the plug-compatible disk and tape products, sales and service organization and installed base of the financially beleagured California Computer Products, Inc.

Prior to that acquisition, Braegen had only eight service and eight sales personnel. Making the acquisition primarily to beef up its sales and service organization, Braegen now has 250 service and 40 sales people nationwide, according to Dan Jakle, national sales manager of plug-compatible products.

With the acquisition of Calcomp, the company has increased its customer base significantly, adding 700 disk and tape customers, Jakle noted. This gives Braegen the opportunity not only to market its terminal products but to offer tape and disk upgrades to its customers.

Although a sales and service organization appears to be a prime requisite for competition in the end-user-oriented plug-compatible tape and disk market, Information Storage Systems (ISS), a division of Univac since 1973, always sold its plug-compatible tape and disk products on an OEM basis. Its primary disk customers were Itel Corp., STC and Telex, which in recent years have ceased purchasing from ISS. Today only Telex purchases disks from ISS.

Always the subject of speculation, Japanese makers Fujitsu Ltd., Hitachi Ltd. and Nippon Peripherals Ltd. would welcome a more active role in the U.S. market, analysts note. However, none of these firms have the necessary sales and service organization for heavy end-user sales.

Presently Hitachi and Fujitsu have U.S. outlets through Memorex Corp., National Advanced Systems Corp. and Amdahl Corp. for their products. This activity has the potential of nibbling business away from established vendors in the marketplace.

In addition, the recently established TRW Fujitsu Co. could provide the Japanese maker the direct sales and service organization for plug-compatible peripheral systems, observers note.

Finally, Intel Corp. made a splash into the IBM-compatible disk arena last year with its Fast 3805, a solid-state disk. Intel is expected to introduce a fixed-block architecture version of this product later this year, a source noted. Whatever the firm's intention, Intel will remain in a very specialized area of the marketplace, according to Stephen G. Maysonave, director of sales for Intel's Commercial Systems Division.

• Telex a Survivor •

TULSA, Okla. — A survivor of a bitter antitrust suit with IBM that ended in 1975, Telex Corp. consists of two separate companies, Telex Computer Products, Inc. (TCP) and Telex Communications, Inc.

Once a participant in the plug-compatible disk market, today TCP's storage products are primarily tape, both IBM plug-compatible and OEM. The firm also makes terminals, printers and data entry equipment.

Tape represents more than 50% of the revenues of TCP's Peripherals Division, according to Bert Hochfeld, director of product planning and strategies. Currently the company has a total of 12,000 tape units installed, he said. Some 4,700 to 4,900 are estimated by analysts to be plug-compatible units.

Although plug-compatible manufacturers have seen the most growth in the high-end tapes, Telex until recently only had one IBM 3420-type product that recorded at 6,250 bit/in. — Telex 6420-66.

Last year, however, the company introduced its Series 80. Compatible with the 3420, the Telex units are one-third the size of conventional 3420s, have a patented tape path, generate less heat and use less power than their IBM counterparts and also record at 6,250 bit/in.

The Series 80 is an offshoot of a tape system built for the mini marketplace.

But None for Courageous

Micros Join Two Crews in America's Cup Trials

By Tim Scannell
CW Staff

NEWPORT, R.I. — When three U.S. sailing crews tackle wind and wave this week to decide who will defend this country in next month's America's Cup races, the competition will involve more than seamanship or the cut of one's sails.

Two of the American yacht entries — Clipper and Freedom — will be aided by onboard computers that have been gathering stress and weather data since the beginning of the America's Cup trials last month. Clipper has a Data General Corp. MP/100 microcomputer and Freedom is using a Hewlett-Packard Co. 9825, both installed in each boat's navigator's station.

In addition to its micro crew member, the Clipper team has an onshore DG 4/X minicomputer at its dockside office that is used to analyze statistical data as it is transmitted by the shipboard system.

However, the third American entry, Courageous, will adhere to the traditional seat-of-the-pants philosophy of sailing and go down to the sea without a computer. Although a Digital Equipment Corp. LSI-11 was used onboard the Courageous in 1974 and 1977, when both times it captured the America's Cup prize, the microcomputer will not be used at sea this year.

According to reports, Courageous' captain, Ted Turner, ordered the machine turned off and removed from his yacht. The dejected computer was last seen at the courageous waterfront office, reportedly being used for basic weather analysis.

Not Taking Chances

"Sailors don't understand [computers] too much, but they seem to think its OK," Richard McCurdy, an engineer and designer of Clipper's computer system, stated. Most entries in the race have some sort of computer onboard because "they don't want to take the chance that the computer is not useful."

The MP/100 onboard Clipper is a 64K-byte machine with two teletypewriter interfaces and two I/O ports. Among the people who helped McCurdy install and program the system were Tom Johnson, a systems engineer on loan from DG, and Dave Pedrick, a yacht designer.

"We must have used up a couple of man-centuries of volunteer labor getting [the system] on there, McCurdy quipped.

The computer weighs about 20 pounds and is connected through a maze of waterproofed wires to virtually every instrument and point on the boat. Basically, the computer monitors boat speed, apparent wind angle (the actual wind angle plus the effect of the boat's motion), wind speed, heel angle, the direction the boat is sailing, rudder position, trim tab position, water angle, pitch and time, McCurdy said.

The microcomputer can also handle information input by the yacht's navigator concerning tides and positions of the racing marks, he added.

Data collected by the computer is recorded on tape and also transmitted back to the 4/X minicomputer at a rate of twice a second. The landlubbing mini processes and analyzes the transmitted data — which amounts to about a million pieces of statistical information per day — and has performance results ready when the Clipper crew docks at the end of a sail.

"We build up a file on disk from the [Clipper's] telemetry and on a long day we end up with something like 2.5M bytes of data," McCurdy claimed, describing that amount as "serious work."

As an added option, the MP/100 is also outfitted with a speech synthesizer that allows the computer to "talk" to the navigator during a race, supplying such information as the time to the start of the race and boat speed.

"This type of information is invaluable during those times when the crew is too involved in the race to be able to look at the display screen," McCurdy noted.

Freedom's System

By comparison, the HP 9825 onboard the Freedom is a lot less sophisticated than its Clipper counterpart. Like Clipper's system, the HP desktop is linked to all of the 12-meter yacht's instrumentation. However, information is output via a single-line display and is not retained or analyzed, an HP spokesman said.

Although computers are fast becoming accepted in the worldwide yacht-racing scene, convincing dyed-in-the-wool sailors to use them is "a long battle" because they "change the reference that sailors use to sail boats," McCurdy observed.

"The computer is not there to tell them how to sail the boat; its there to provide hard numbers about what's happening."

For instance, when Clipper moves through the water it is propelled by a combination of the actual wind and the wind created by the movement of the boat, McCurdy said. "Knowing where the wind is coming from and how hard it's blowing is difficult unless you sort of take the boat speed out of the wind so that you can see the wind as through you weren't moving."

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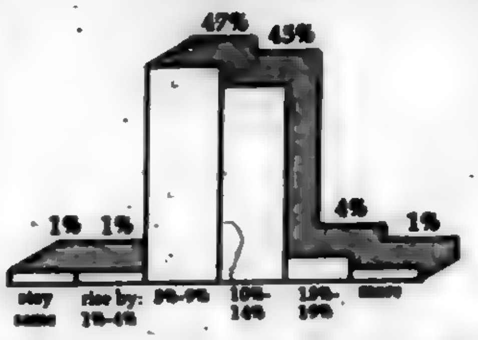
User Attitudes: What

SALARIES OUT OF LINE



most feel pay rises will be less than 10%

• Do you expect the average salary of computer staff in your company over the next 12 months to rise? stay the same? fall?

Nearly half the installations participating in the survey expected to pay salary increases that will fail to keep pace with inflation. "We'll be paying around 10%, which is in no way in line with the consumer price index. The index is running at about 13% at the moment," one MIS manager said.

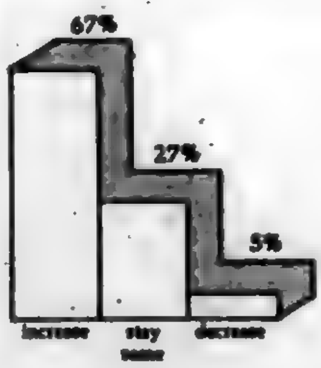
Most of those interviewed believe DP salaries are too high. "We have to pay engineering-type salaries just to be competitive. These guys reach a level and then they become mundane. They don't merit it, they don't need it, but others pay it and it becomes a matter of ego. We have to pay, but we're out of step, higher than the rest of the company," one said.

Those expecting to pay smaller increases will do so because of special circumstances. "Our location means we don't have to pay too high," one manager explained. "We can pick them up OK without offering the earth," another said. "They come from Los Angeles to get away from the commute and the pressure."

The amount of pay rise expected was higher in the larger companies.

company size employees	1-99	100-999	1,000-9,999	10,000+
those expecting to pay more than 9% increase	57%	42%	50%	76%

PACKAGES PREFERRED TO PEOPLE



software budget goes up

• Do you expect the amount spent by your company on proprietary and vendor software over the next 12 months to increase? stay about the same? decrease?

Because of the difficulty putting together development staffs, many installations said, they are turning to packages. "The people shortfall is so great that we just had to find another way," one user explained.

Attitudes are changing. Another user said, "There used to be a time when we wouldn't consider buying packages. People would say, 'Can't you write your own?' But now renting or leasing software has become respectable.

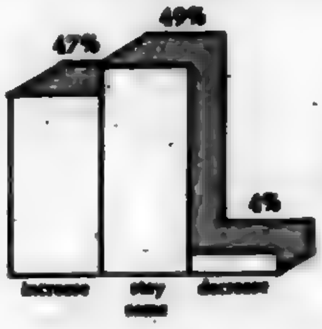
"Today's well-paid man is smarter — but he's narrower. He's not the generalist we used to have. He just can't cope," the user added.

Better control was given as another reason for buying ready-made programs: "I get the certainty it will work, even though it's not the best. And if it doesn't work, I've got an out," one DP manager admitted.

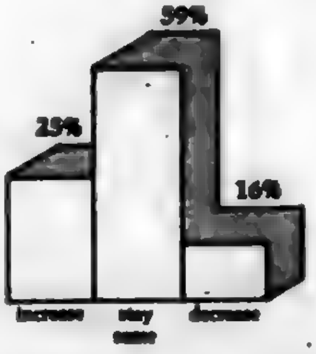
Maintenance was also mentioned: "It's not that we couldn't do it ourselves, but the outside supplier is committed to maintaining the packages and making them better. This way your applications grow. But your own staff — they move on and their programs stagnate."

Many users, however, complained about pricing policies. "The large equipment users are being killed," one DP manager lamented. "The magic number for any mainframe package is $35,000 — plus $5,000 to maintain. I can get the same thing for $600 a month for the System/34."

STAFFING HOPES UNREALISTIC



installations believe they can expand their development teams . . .



. . . and their operating staffs

• Do you expect the number of systems and programming staff employed by your company over the next 12 months to increase? stay about the same? decrease?

• Do you expect the number of operating, data entry and control staff employed by your company over the next 12 months to increase? stay about the same? decrease?

Although the national shortage of programmers and analysts is numbered at more than 100,000, 47% of the installations surveyed expect to increase the size of their development staffs. Where will this staff come from?

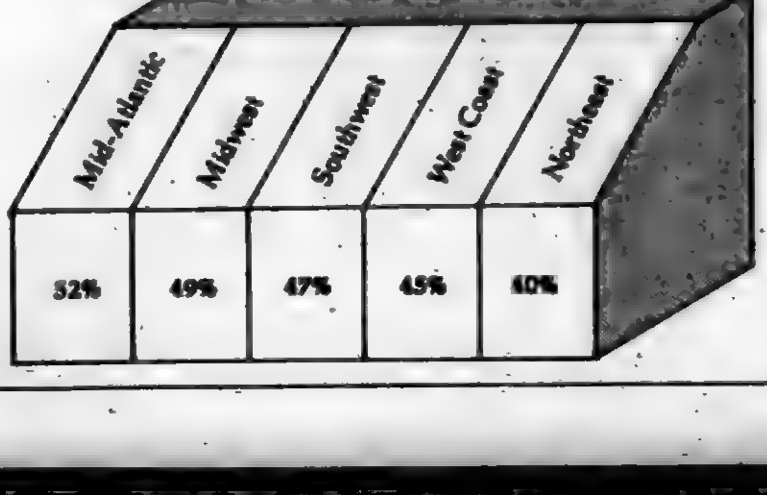
It appears that most of these users' plans will be frustrated, with the more determined companies succeeding at the expense of others: "We use every vehicle we can find: contingency search, retainer search with body snatch money paid up front, we place ads, we even pay internal bounties — good people usually know other good people, and for a bonus they'll tell you where to find them."

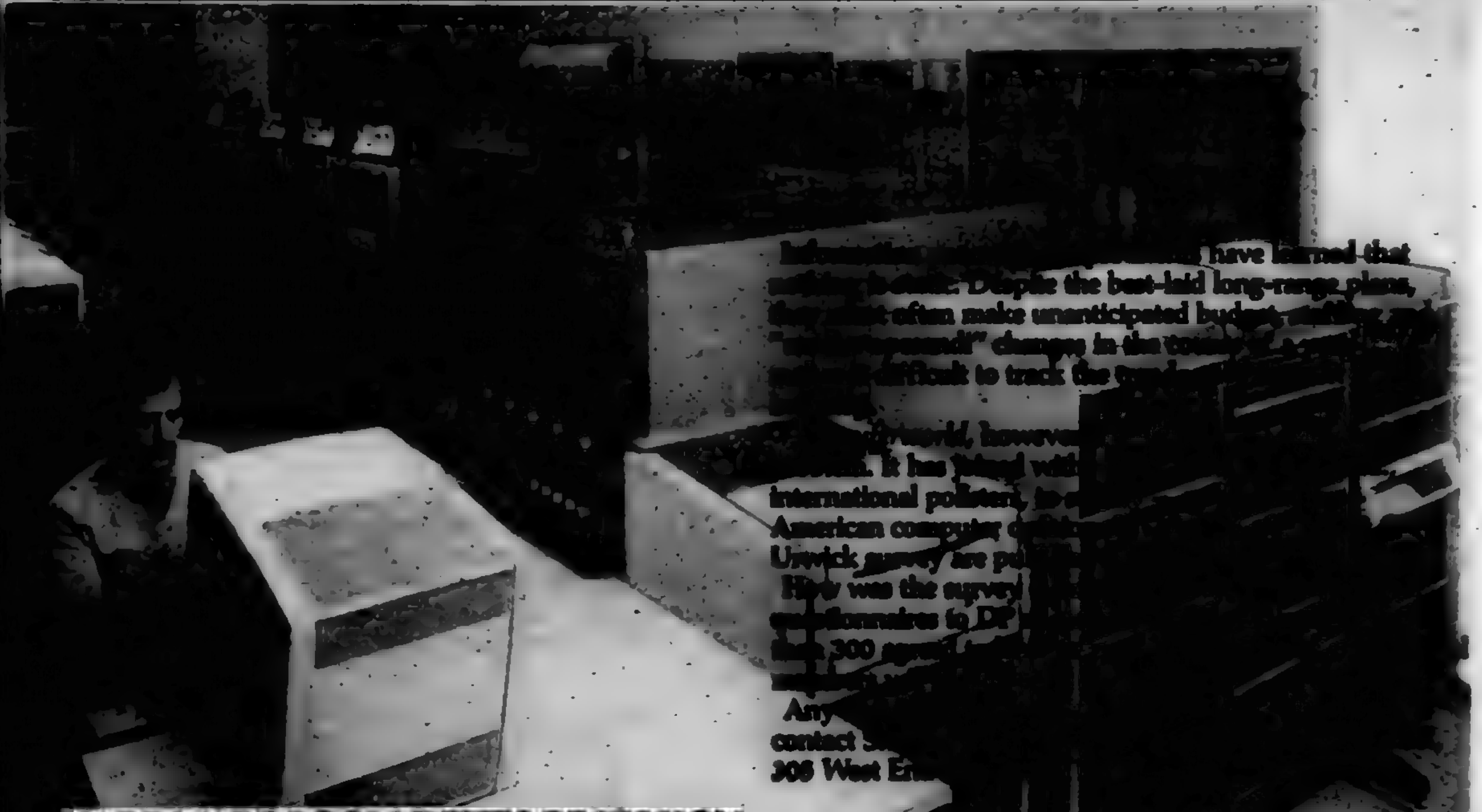
DP managers often conveyed a feeling of desperation during interviews; they cannot take advantage of hardware improvements because of staff shortages. "We've had a hundredfold increase in hardware capacity but only a 5% increase in output. The users are held back because we can't deliver. There's a three-year backlog of demand here," one told us.

Attempts to increase supply were mentioned — "We turned to 'fresh outs' — and to improved job satisfaction — "They're bright but bored, so we changed from pure programming to analyst/programmers."

As the figure below shows, the Mid-Atlantic users have the most ambitious expansion plans.

Number expecting to increase development staff





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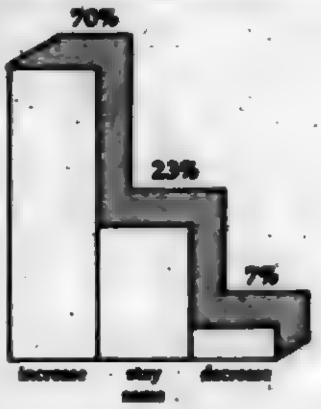
HARDWARE BOOM DEFIES RECESSION



70% plan to spend more

• Do you expect the amount spent by your company on hardware over the next 12 months to increase? stay the same? decrease?

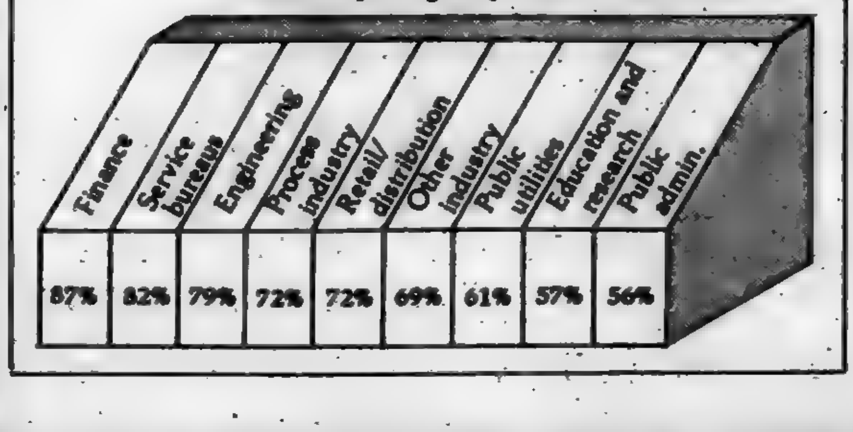
Despite general cutbacks, there is no sign that computer budgets will be affected. The Urwick hardware indicator shows that a massive 70% of those surveyed intend to increase their expenditures during the next 12 months.

Interviews showed that demand was user-led, with cost frequently no object. "We used to cost-justify," one DP manager said, "but not now. It's distributed processing. Everyone wants to push a button. I'm not in favor, but I'm not going to thwart them."

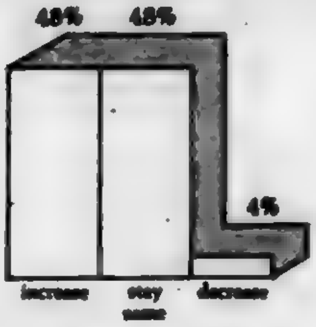
Others felt the computer is now perceived as a genuine aid to cost-cutting: "Data processing is mature now. We've convinced management we can help both expand and contract the business, so the work load never drops off. We used to anticipate a two-year life cycle, but we're upgrading much faster now. The users can fill every disk we install."

The financial sector has the most ambitious expansion plans, with public administration at the bottom of the league.

Number expecting to spend more on hardware



DECENTRALIZATION MOVES AHEAD



nearly half give users more power

• Do you expect the amount spent by your company on user-controlled hardware, software and DP staff over the next 12 months to increase? stay about the same? decrease?

Nearly half the installations polled plan to increase user-controlled data processing during the next 12 months. "It makes psychological sense," one manager said. "We're putting the machines where the people are. Hardware's going to be distributed dramatically."

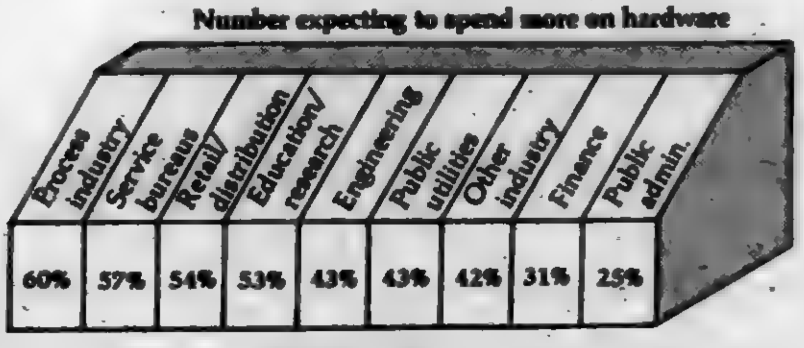
One of the reasons given for decentralization was user education. "There are awakenings," another manager said. "The users begin to realize the reasons for delays."

But decentralization should not go too far, the managers warned. "We have to achieve integrated systems someday," one explained. "Give it to all the users and you're never going to wire all these things together."

Minicomputer vendors came in for criticism. " 'Why use these central mainframe boys?' the salesmen ask us. 'They give you lousy service.' The mini vendors don't tell all the problems; expectations get raised to an unreasonable level."

The process industry has the biggest plans for decentralization.

Number expecting to spend more on hardware

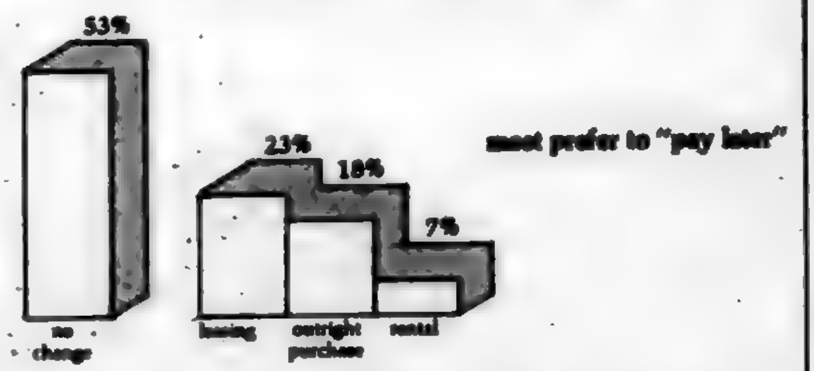


More Survey Data on Page 12

User Attitudes

(Continued from Page 11)

BIG SHIFT TO LEASING



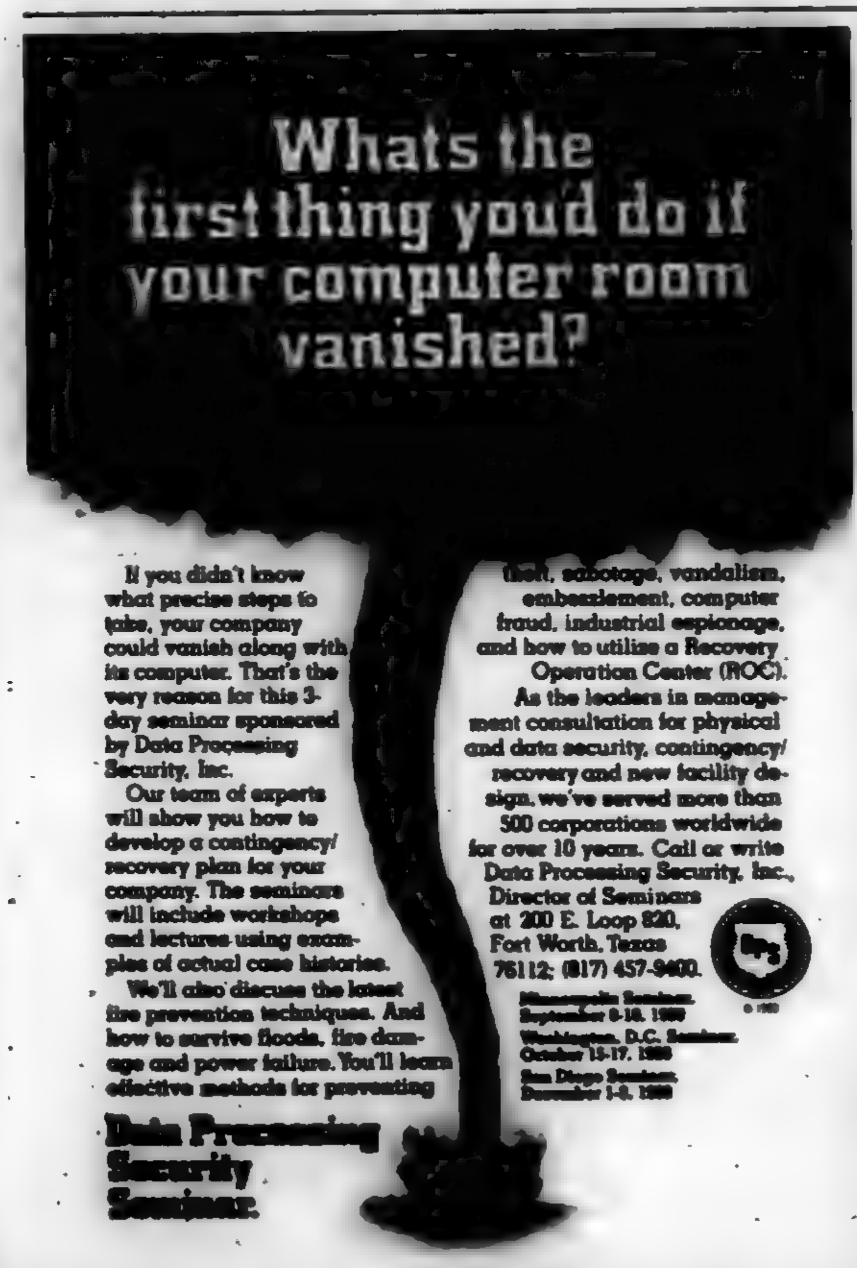
• Do you expect the method of financing your hardware over the next 12 months to shift toward rental? outright purchase? leasing? Stay the same?

Some change in their method of financing equipment was planned by nearly half of those responding to the survey. Most expect to move toward leasing.

Uncertainty concerning future technology was given as the main reason: "We all got burned with IBM's recent announcements. The market values just dropped off, so I'm going to leave the risks in the hands of the lessors – let them get burnt."

Interest rates were considered attractive when considered against a background of rapid obsolescence. "There's been no surge in interest rates, but the manufacturers are obsoleting equipment on a chronological basis by raising the cost of maintenance," one DP manager said.

While 38% of those polled prefer some form of delayed payment, 18% expect to pay cash. Those most in favor of moving to outright purchase were service bureaus (23%), public utilities (21%) and education (21%).



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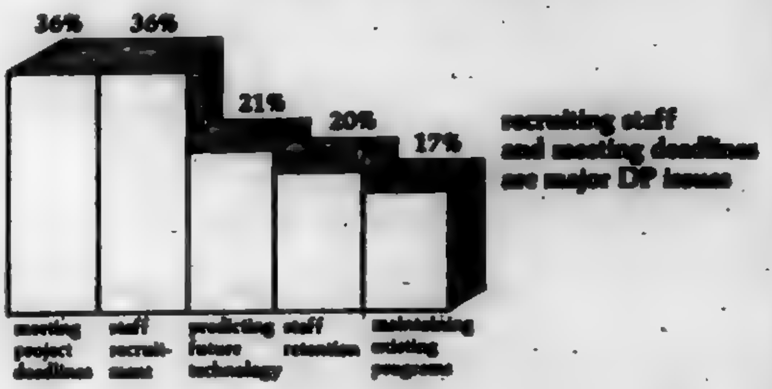
STAFF SHORTAGES CAUSING PROJECT SLIPPAGE



• What is the major issue facing you at present – staff recruitment? staff retention? "go-it-alone" users? meeting project deadlines? meeting project cost targets? maintaining existing programs? evaluating present technology? predicting future technology?

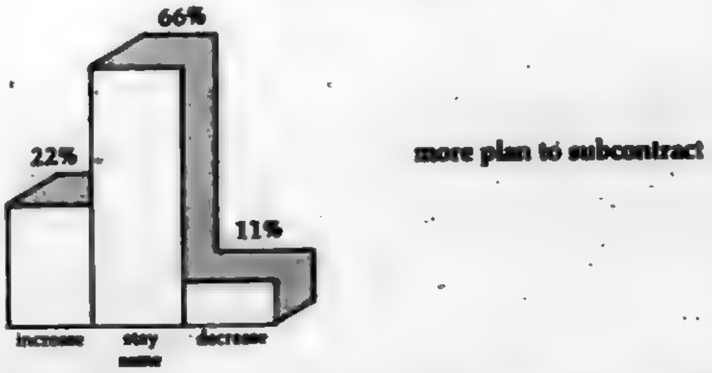
The difficulty of completing development projects on time was the major issue faced by 36% of installations. "The truth is that I'm a lousy manager," one refreshingly frank MIS chief said, "but who ever met a DPer who could tell the truth? People don't want to hear it.

"You know at the start you're never going to make it. It's the maintenance problem. We massage lots of little systems and fight fires and the development suffers. If they would listen, I'd tell them!"

Staff recruitment equalled project deadlines as a major issue; predicting future technology was also mentioned frequently. "We're going to run out of CPU soon. I'd like to order another machine, but I don't know what to do. Whatever we do in DP is long-term, but the equipment doesn't last that long anymore. The problem is, what's IBM going to dead-end? A DP manager has to be lucky," one manager declared.

The issues facing DP managers is analyzed in more detail in "The Urwick Report," an in-depth study of 12 U.S. companies. It is available for 29.95 – less a 15% discount to CW readers – from Shirley V. Pratt, U.S. Representative, Urwick International Ltd., Suite 6R, 305 West End Ave., New York, N.Y. 10023.

CONTRACT PROGRAMMING LOOKS GOOD



• Do you expect the amount spent by your company on outside DP staff over the next 12 months to increase? stay about the same? decrease?

Although DP managers are planning an increase in the use of contract programmers to combat staff shortages, they expressed mixed feelings about this source of programmers.

"You get all sorts," one explained, "but I like them. They give me value for the dollar – or I get rid of them."

Others, however, were not so convinced they get their dollar's worth. "We're trying to get out of the contract business. At $45 an hour, it's got to be a short-term solution compared with $20 to $25 an hour if you do it yourself," one of those surveyed said.

On balance, the pressure of filling staff positions seems to be overriding any objections to contract programming. "I'll take anyone I can get," one manager summed up.

Engineering (36%) and public administration (31%) plan to make the most use of contract programmers.

For PDP-11, VAX-11/780

DEC Adds 300M-Byte Drive, Cartridge System

MAYNARD, Mass. – Digital Equipment Corp. has introduced a high-capacity hard disk drive and an entry-level cartridge tape system, both designed for its PDP-11 and VAX-11/780 minicomputers.

The RM05 disk drive has a 300M-byte storage capacity, a 45% increase over the firm's previous top-of-the-line RP06 model. The drive is available either as a subsystem, consisting of the disk drive and a controller, or as an add-on unit. The unit is compatible with existing Massbus disks, enabling direct add-on to DEC systems, a spokesman stated.

The free-standing RM05 has an access time of 38.3 msec and a peak transfer rate of 1.2M byte/sec. The device employs a 12-in. disk pack with 19 read/write surfaces and one read-only servo surface. It also has a recording density of 384 track/in. Up to eight 300M-byte disk drives can be connected to one controller, the spokesman added.

The TU58 cartridge tape system utilizes DEC's previously introduced TU58 Dectape II cartridge drive and is available as a rack-mountable or table-top device. The unit has a 250K-byte capacity per cartridge, or a 500K-byte capacity per system.

The TU58 has an adjustable data transfer rate, via jumper selection, from 150- to 34,800 bit/sec. The unit's high-speed search mode provides a 9-sec average access time and a 30-sec maximum access time.

In addition, the cartridge tape system has a built-in microprocessor to perform tape housekeeping chores and handle communications protocols. The drive is supported by the RT-11, RSX-11M, RSX-11M-Plus, RSTS/E and VAX/VMS operating systems.

The 300M-byte drive costs $44,000 with a controller, or $34,000 as a system add-on. The TU58 system lists from $1,750.

DEC is located at 146 Main St., Maynard, Mass. 01754.

Managers on the Move

JOHN CRAWFORD has been elected assistant vice-president of the Hartford Insurance Group. He is responsible for claim services, financial services, life systems and corporate services.

Formerly vice-president of data processing and administrative services at Horace Mann Insurance Companies in Springfield, Ill., Crawford joined the Hartford earlier this year as deputy director of data processing. He was previously a senior consultant with Arthur Andersen Co. in Philadelphia.

John Crawford

Crawford is a 1966 graduate of Temple University with a B.S. in accounting.

•••

DONALD H. NEVINS has been promoted to vice-president for insurance systems and services for Mutual of New York (MONY) in New York City.

Nevins will continue to be responsible for the company's policy-owner service functions. In addition, he will chair a committee charged with studying how MONY can most effectively utilize new technology for the accumulation and distribution of information.

Nevins joined MONY's management program in 1958 and has received several promotions up to his most recent appointment.

Nevins is a graduate of Trinity College.

•••

MAX D. HOPPER has been elected vice-president of data processing and communication services at American Airlines' Dallas/Fort Worth, Texas, headquarters.

Hopper will be in charge of data processing activities in Dallas/Fort Worth, as well as systems development and computer operations and technical support functions located in Tulsa, Okla.

Hopper, who joined American in Tulsa in 1972 as director of American's reservations computer system known as Sabre, had been assistant vice-president of marketing automation programs.

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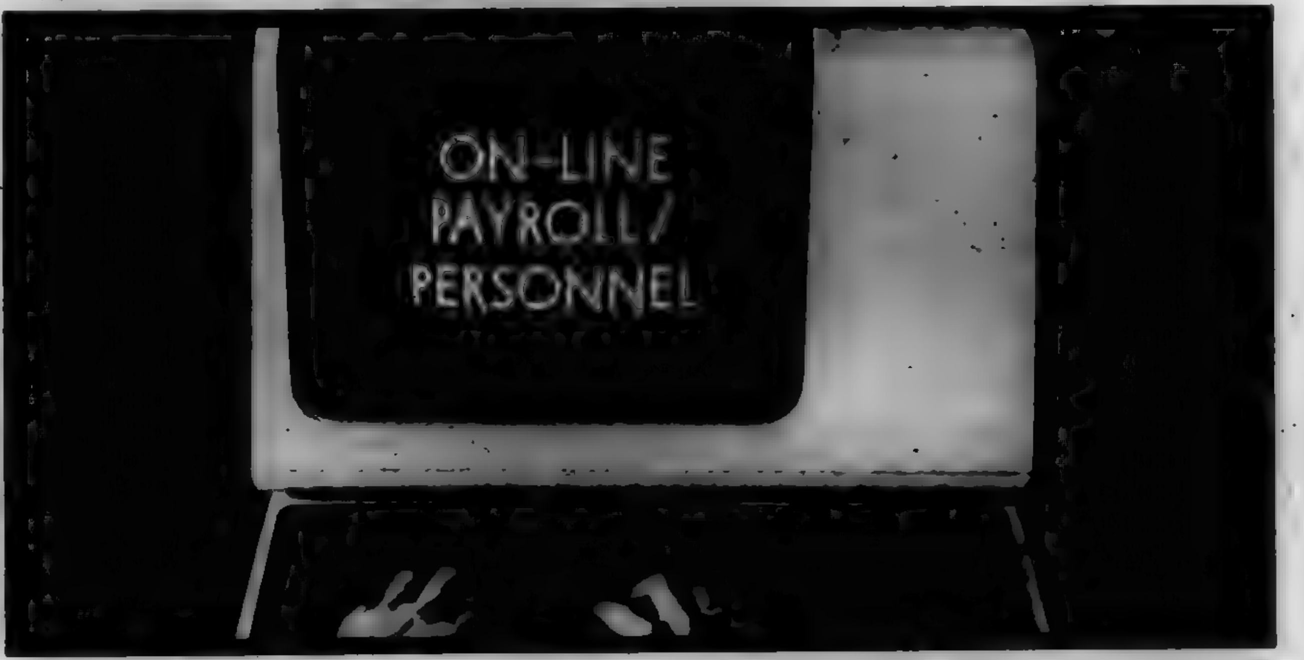

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More Harm Than Help?

Managers Warned of Contract Programmers

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Information system managers should exercise extreme caution if they are thinking of hiring self-employed contract programmers to supplement or replace members of their full-time computing staff.

Although some contract programmers apply themselves assiduously and maintain extremely high professional standards, many others are no more productive or conscientious than their average non-free-lance counterparts. Some contract programmers, in fact, work for themselves not by choice, but out of necessity, according to Al Strong, president of a local contract services firm specializing in securing jobs for management information systems (MIS) personnel.

A few contract programmers can even be classified as occupational misfits who turn in the end to free-lancing because they can't find steady work in any other way, according to Strong, head of Contract Personnel Services, Inc.

Even though self-employed programmers undeniably fill an important business need and often serve their temporary employers admirably, MIS managers would probably be well advised to avoid using free-lancers unnecessarily, Strong warned.

Sense of Loyalty

Unlike programmers who work permanently for one company, most self-employed free-lancers seldom develop a strong sense of loyalty for the users to whom they sell their services.

As a general rule, contract programmers are constantly hopping from job to job, rarely working for more than a few months at a time for any one client. As a result, at times the temptation for contract programmers to cut corners on a project becomes difficult if not impossible to resist, Strong said.

Free-lancers realize their responsibility to a given client ends as soon as their contract with that employer expires. They also realize that if their work contains some imperfection they will probably be long gone from a customer's site by the time the trouble is detected.

One criticism directed most often at self-employed programmers is they sometimes complete their development work and move on to the next job before they have done any of the necessary documentation, Strong said. Later, when the omission is finally discovered, the unfortunate client usually has no alternative but to assign the onerous task of documentation to a member of his full-time staff.

Another alleged drawback of using self-employed programmers is that they are usually unacquainted with the nuances of their employers' work procedures and have to undergo a certain amount of orientation before they can operate at their peak efficiency, Strong said. Self-employed programmers have also been known to stir up staff resentments and even contribute to a clients' personnel turnover by bragging aloud about their salaries, which often run significantly higher than those of their staff counterparts.

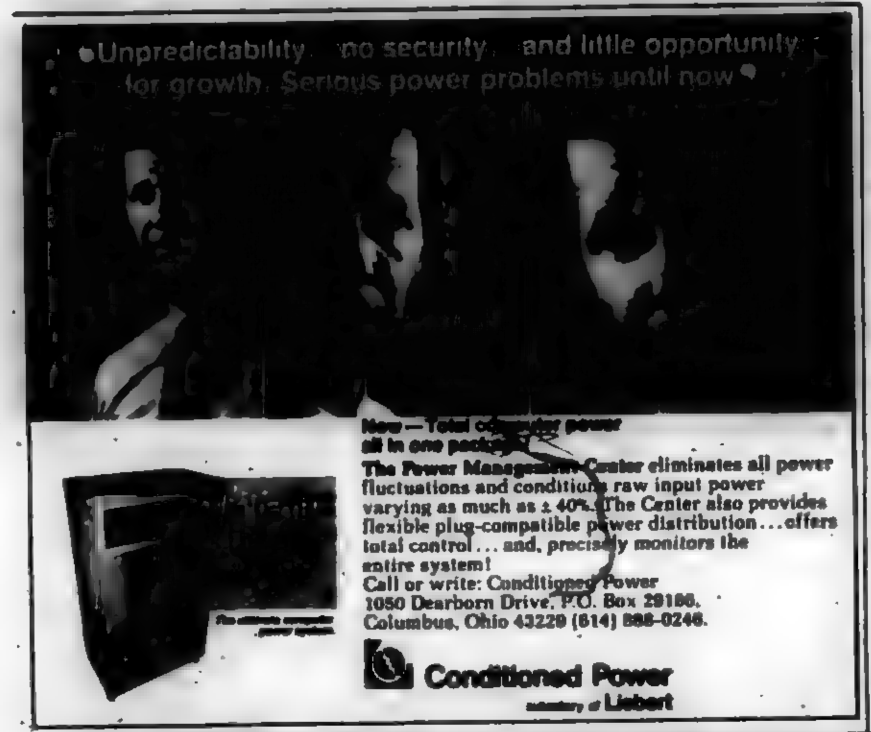
To make matters worse, a self-employed contract programmer's job qualifications and professional competence standards are frequently impossible for a prospective employer to evaluate reliably. The main reason for the difficulty, Strong explained, is that many users keep employment records only for the people they employ permanently — not for individuals they hire strictly by contract.

For some users of self-employed contract programmers, the task of trying to winnow qualified job applicants from the incompetent is somewhat like struggling to find a lost object in the dark.

In short, users who want to avail themselves of a self-employed contract programmer's services would probably do well to heed the age-old adage "Caveat emptor" — let the buyer beware, Strong added.

Strong's opinion of contract programming and its alleged user drawbacks contrasts sharply with the views of another contract services company head, Stuart Magie.

Unlike Strong, Magie regards self-employed programmers as generally superior in professional competence and productivity to their non-free-lance counterparts [CW, July 14]. Magie, who serves as president of Real-Time Personnel, Inc. here, also advises users to dispense with full-time staff members, except for a small core of project leaders and other key senior personnel, and employ contract programmers instead.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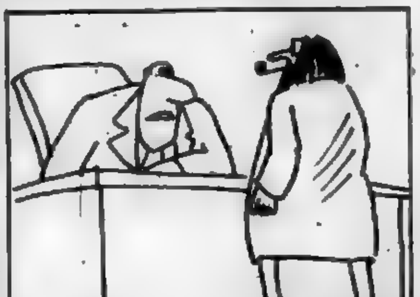
UK Execs Say Guides Needed On Personal Data

MANCHESTER, England — Unauthorized use of personal data stored in computers is getting out of hand and the only way to stop it is to enact some stiff regulations.

That is what 200 UK corporate and data processing executives believe, according to a recent survey by National Computing Center, Ltd. Ninety percent said some form of regulation of computer-stored information is needed. Seventy-five percent said there should be specific laws against unauthorized use of personal data, enforced by a government data protection authority. But if a government agency to guard against privacy violations is not proposed, most of those polled favored a voluntary code of ethics to be enforced by companies with computers, the firm said.

Establishing a clearer definition of personal data use was the main reason, for more regulation, according to those polled.

Despite the overwhelming support for some form of data regulation, only half of those polled said their firm had studied the impact of a government data proctection authority on business operations. Less than one-third reported taking steps of self-regulation, National Computing said from Oxford Road, Manchester, England M1 7ED.



"Your Suppose Your Modeling Group Could Write a Program to Simulate Some Work Back There?"

House Hearings This Week on Revamping FAA

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. – Congress this week takes up several proposals to revamp the Federal Aviation Administration (FAA), after a year's hearings on air traffic control computer outages and assorted attacks on FAA efforts to enhance air traffic safety.

The House Aviation Subcommittee will receive testimony Wednesday and Thursday on three pieces of legislation that would restructure the FAA to ensure, the bills' sponsors said, that safety is the agency's foremost concern.

Numerous reports during the past year on air traffic control computer failures and related midair near-collisions have led to increased scrutiny and criticism of FAA administration and development of the nation's air traffic control system.

Although FAA officials have told Congress the U.S. has the best and most reliable system in the world and is following a well-charted course to upgrade system hardware and software, air traffic controllers and system maintainers have been very vocal in criticizing the system's reliability, or lack of it, and FAA administration in general.

Proposed Bills

Legislation to be considered at this week's hearings include proposals to make the FAA more answerable to Congress, more independent of the aircraft and airline industries and more concerned with air safety in the U.S. in general.

The bills before the subcommittee are:

- H.R. 351, introduced last year by Rep. Barry Goldwater Jr. (R-Calif.), which would make the FAA an independent agency. The FAA presently is part of the Department of Transportation.
- H.R. 6771, put forward by Rep. Elliott Levitas (D-Ga.) this spring, to direct the FAA administrator to perform no "functions, powers and duties other than those pertaining to aviation safety."

Some critics of the FAA have complained the agency spends too much time "promoting" the aviation industry. Under the Levitas proposal, all agency activities not related to air traffic and airport safety would be handled by the Transportation Department, freeing the FAA to concentrate on safety matters.

- H.R. 7850, the "Air Safety Reorganization Act of 1980," introduced last month by Rep. Robert Matsui (D-Calif.), to divide the FAA into separate administrative and R&D agencies.

Matsui's bill would establish a new Air Safety Administration, reporting directly to Congress, to perform "the important regulatory and research activities" that Matsui says are "now buried within the FAA."

The day-to-day operation of the air traffic control system and administering the airways development fund would remain under the Transportation Department, Matsui proposed. There, an "Aviation Operations Administration" would also "develop and report to Congress on a comprehensive, long-term plan to improve the safety of aviation operations, with particular attention to the air traffic control system and collision avoidance."

In introducing the bill July 28, the California Democrat noted several recent reports criticizing FAA policies and practices and recent Congressional hearings on collision avoidance systems and computer breakdowns and outages "which endanger air traffic control operations.

"Because the FAA has no overall planning process, its actions in dealing with individual safety problems are perceived to be reactive rather than anticipatory," he said. "The agency has not adequately marshaled its forces to deal with safety problems quickly and effectively."

Drawing Protest from Arinc

Bell Asks Hike in Private-Line Charges

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. – A 600% increase in AT&T's charges for private-line service calls, scheduled to become effective early next October, evoked a protest early this month from one group of data communications users. Aeronautical Radio, Inc. (Arinc), which operates a large private-line network for most of the nation's airlines, asked the Federal Communications Commission (FCC) to suspend the increase and in the meantime investigate its legality.

Presently, when AT&T makes a private-line service call and the trouble is caused by customer-provided rather than phone company-provided facilities, the customer is charged $11.35. If the customer is later able to convince AT&T that the outage was due to its equipment, he is entitled to receive a credit for the time that service was interrupted.

In most cases, this "service interruption credit" now covers all or most of the bill for the service call, Arinc indicated. But next October, the charge will rise to $80 if the tariff now pending at the commission becomes effective. As a result, the customer will be reimbursed for only a small part of his service call outlay.

"AT&T's service quality has deteriorated markedly in the last few years," the organization pointed out. "More than 40% of Arinc's system failures [have been] due to the failure of AT&T facilities. In more than 30% of the cases, Arinc [has] had to identify the failure following AT&T's denial that a failure existed."

The organization is also unhappy about the phone company's limited liability for troubleshooting expenses the customer incurs when phone company-provided facilities fail.

Arinc pointed out that the customer, in order to determine that a particular outage was AT&T's responsibility, must frequently employ his own maintenance personnel or call in an outside consultant. Under a tariff amendment adopted earlier this year, the most the customer can collect for these additional expenses is an amount equal to the service interruption credit, and in most cases it is far less than the outlay.

"As a practical matter," Arinc added, "such claims are usually not asserted," since the customer must file a claim with the phone company, the filing and followup expense "is usually much greater" than the amount ultimately collected, the organization said.

Proposed Bell Service Runs Voice, Data Simultaneously

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. – AT&T proposed a private-line service early this month that permits a single circuit to broadcast data one-way at 300 bit/sec while simultaneously carrying two-way voice communications. The user who wishes to obtain equivalent service at present must lease two separate voicegrade circuits, the company said.

A tariff covering the simultaneous voice/data station service is now pending at the Federal Communications Commission (FCC) and will become effective Nov. 1 unless delayed or rejected by the commission.

Typically, the service will utilize a four-wire multipoint voice contention circuit (Type 3002) to interconnect a Dataspeed 40/2 terminal with one or more Model 43 receive-only teleprinters.

The tariff covers charges for two types of station unit arrangements – one attached to the Dataspeed terminal, the other to the teleprinter; they keep data and voice signals separate. The former arrangement costs $80/month, the latter $38/month.

In normal operation, a remote station having information for all outlying stations gives the message by voice to the master station. The master station operator then types the message on the Dataspeed 40/2 terminal and transmits it to all outlying locations. They receive a typed copy of the message on the Model 43 receive-only teleprinter.

AT&T indicated that the primary market for the service is users now employing alternate voice/data and voice contention circuits to interconnect an average of 60 locations per circuit.

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Resale/Sharing of Private Lines Sparks Feud

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. – A disagreement over resale and sharing of international private-line circuits appeared to be developing into a major controversy as of last week.

One likely result is that foreign telecommunications carriers and postal, telephone and telegraph agencies (PTT) will become even more reluctant to lease circuits by the month and will accelerate their current efforts to sell transmission service priced according to volume-sensitive rates. For U.S. users who employ computerized terminals, that could be serious.

It would increase charges significantly for many of them. "Also, a good deal of the data traffic transmitted between the U.S. and other countries would be shifted to public data networks from the transparent private lines now used. The networks are less efficient for many data communications applications because their technical parameters (such as transmission speed, frame format and communications protocol) cannot be tailored to individual requirements.

The latest chapter in the resale and sharing hassle began last June, shortly after the Federal Communications Commission (FCC) proposed doing away with an existing rule that bars resale and sharing of international circuits.

CCITT Protest

The commission's announcement evoked a strong protest from Leon Burtz, director of the Consultative Committee on International Telephone and Telegraph (CCITT), the international association of telecommunications administrations that adopts common technical and operational "recommendations."

One such recommendation bars resale and sharing of circuits. Burtz, in a letter to the U.S. State Department, accused the FCC, in effect, of favoring a policy which would violate the CCITT rule. Two key U.S. Congressmen – Harley Staggers (D-W. Va.), chairman of the House Commerce Committee, and Richardson Preyer (D-N.C.), who heads a commerce subcommittee that has been investigating international data flow restrictions – agreed with Burtz.

Preyer and Staggers both worried about the boomerang effect of the FCC inquiry. As Staggers stated: "One effect of misguided commission action in this area" would be to jeopardize the international private-line services now employed by U.S. telecommunications users. Without these services, "many have estimated that the costs [to] the users would increase anywhere from 500% to 1,000%," Staggers added.

FCC Response

FCC Chairman Charles Ferris has responded to these protests. Basically, he told each critic that the commission has kept foreign carriers fully informed of its plans for the resale and shared use inquiry and has made no secret of its disagreement with the CCITT recommendation (formally known as recommendation D.1) which bars resale and sharing.

Furthermore, Ferris said CCITT recommendations are not binding on its members and the FCC, while "fully committed" to supporting the organization, has a higher obligation – to assure that U.S. telecommunications users receive the most cost-effective service.

As Ferris said in his letter to Staggers: "Support of the CCITT should not . . . preclude the United States or any other country from pursuing those policies which best serve its own interest."

Underneath this verbal battle are some other issues that have irritated relations between the FCC and foreign telecommunications administrations for years. As these parties see it, we adopt policies inimical to their interests, which they must then obey because of our economic, political and technological clout. For example, most PTTs prefer cables to satellites, partly because they manufacture the former while we are the major suppliers of the latter. But the U.S. has forced them to invest heavily in satellites.

A second problem arises from the success of U.S. computer services firms in penetrating overseas markets. To protect their domestic service bureaus, other countries have been trying for years to restrict competition from the "Yankees."

One way is to raise the price of international circuits by substituting volume-sensitive private-line tariffs for the traditional leased-line contract which allows the customer to tansmit as much data as he wants, up to the technical capacity of the circuit, for a flat monthly fee.

Another reason for introducing volume-sensitive rates is that it helps the PTTs preserve their existing base of directly served customers, and their existing revenues. If circuits are priced according to the volume of data sent, rather than at a flat monthly rate, the cost increases with the amount of traffic and the economic advantage of sharing the line is diminished.

If the FCC allows resale and sharing of international private-line circuits, however, it will pose a new threat to the international carriers in the U.S. as well as abroad, at least as they see it. Then all U.S. users who have to communicate abroad will be free to use circuits jointly. At the moment, the only users actively exploiting this opportunity are customers of U.S. computer services firms and companies in a few industries – such as banking and air transportation – who have formed sharing groups to lease-line jointly from the international carriers here and abroad.

Other international telecommunications users have not done so mainly because no vendor has offered to resell other types of international telecom services. But, as a result of the FCC's publicly stated support of resale and sharing, that situation has changed.

Within the past year, the commission has allowed two firms – Consortium Communications, Inc. (CCI) and International Relay, Inc. (IRI) – to offer cut-rate, store-and-forward international telex services between the U.S. and UK. (The CCI service also transmits to points beyond the UK.) Recently, another firm, Unitel Corp. headquartered in Ardmore, Pa., requested a similar authorization. Telex, it should be added, is the international carriers' main revenue producer.

Since half of each international circuit between the U.S. and another country is provided by a foreign telecommunications administration, it could frustrate the commission's proposed policy by refusing to interconnect with shared or resold services.

ICA Comment

This prospect already has been alluded to by one of the participants in the FCC's resale and sharing inquiry – the International Communications Association (ICA) – which represents many of the largest U.S. companies that lease international circuits.

In a comment to the commission earlier this month, ICA said that while it "favors adoption of international telecommunications policies which encourage competition . . . and the free flow of information," implementation of the FCC's proposed policy change "may be accompanied by severe restrictions on the use of essential private-line services. Therefore, ICA believes it is premature for the commission to promulgate final rules without adequate consultation in appropriate international forums."

Other interested parties – including the Computer and Business Equipment Manufacturers Association (Cbema) and the Association of Data Processing Service Organizations, Inc. (Adapso) – will probably say more or less the same thing in their comments, which were due to be filed with the FCC shortly after this issue of *Computerworld* went to press.

Even if the commission takes this advice it still may be unable to prevent retaliation from abroad. Says one knowledgeable source: "This controversy has developed its own momentum. The PTTs know that by tightening the screws slightly on their existing private line services, they can make U.S. users of those services scream. It would be smart strategy for the PTTs to do that while the inquiry is under way, just to ensure that the commission gets the message."

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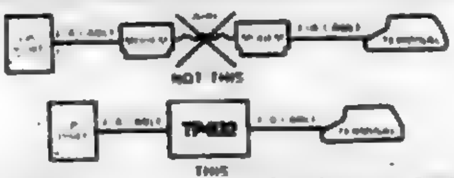

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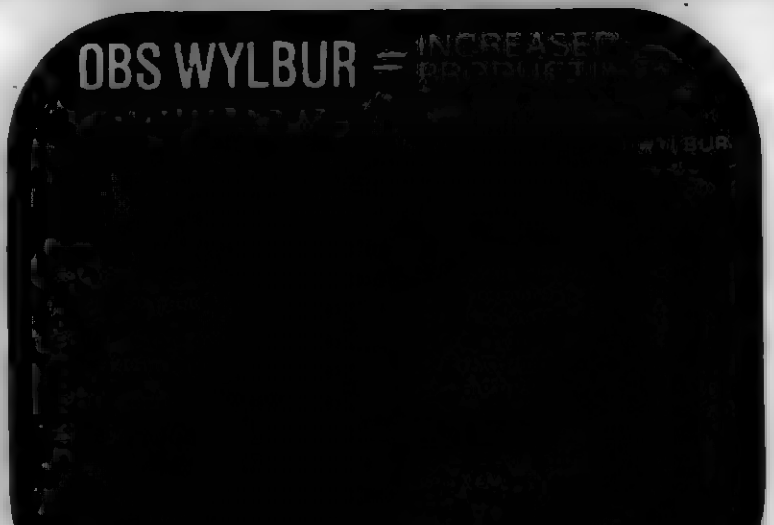

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Citing Importance of Information Systems

IBM Asks Gas Ration Priority for Service Staff

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – IBM wants priority status for computer system service technicians under any standby gasoline rationing plan that is approved, the firm has told the Department of Energy (DOE).

Commenting on the rationing proposal – which was recently approved by both the House of Representatives and the Senate [CW, Aug. 11] – IBM said the plan should take into consideration the importance of information systems not only to the general economy, but also to the administration of the rationing plan itself.

Because IBM's 35,000 service technicians operate their own automobiles rather than company fleet vehicles, under the plan they would not be eligible for the special "priority class activity" allotment of fuel during a gas shortage.

"Information-handling equipment and services are indispensable" for operations in "critical areas" identified by DOE in developing its rationing plan, IBM said.

"Emergency and other municipal services, defense and public transport systems are clearly dependent on those information-handling tasks; less obvious, but as dependent are energy production processes such as oil exploration, refineries and utilities."

Therefore, IBM said, "continual service to information-handling operations of such activities would be required because the equipment and services are interdependent and therefore inseparable.

"In other public and private sector activities," the company continued, "operations conceivably could be continued without information-handling products and services, but only at a significantly lower level of productivity.

"This would have a damaging impact on any economy and a particularly severe impact on an economy that would be weakened already by a shortage of fuels and by the constraints of rationing."

IBM said its 35,000 customer service employees drove an average of 7,000 miles each during 1979 in their work. The company said it would be willing to establish a logging and control system to show the historical use of these vehicles to help administer a supplemental gas allotment to those employees.

Scanners Detect Lung Cancer

BALTIMORE – Doctors here at the Johns Hopkins University School of Medicine are using the computer technology employed in brain scans to diagnose lung cancer.

The system is the Pfizer computer-aided tumography (CAT) scanner.

The scanner develops a detailed image of the patient's chest cavity through a series of special X-rays that reproduce small slices of the patient's chest. Printouts of the slices can be used to determine whether small nodules on the patient's lungs are likely to be cancerous, according to Dr. Stanley S. Siegleman, director of the project.

If the test becomes a standard procedure, it will probably save thousands of unnecessary risky chest surgery operations, Siegleman said.

The test is based on identifying whether there is calcium in the nodule. If calcium is present, even in minute quantities too small to show up on conventional chest X-rays, the nodule is almost always benign, Siegleman said.

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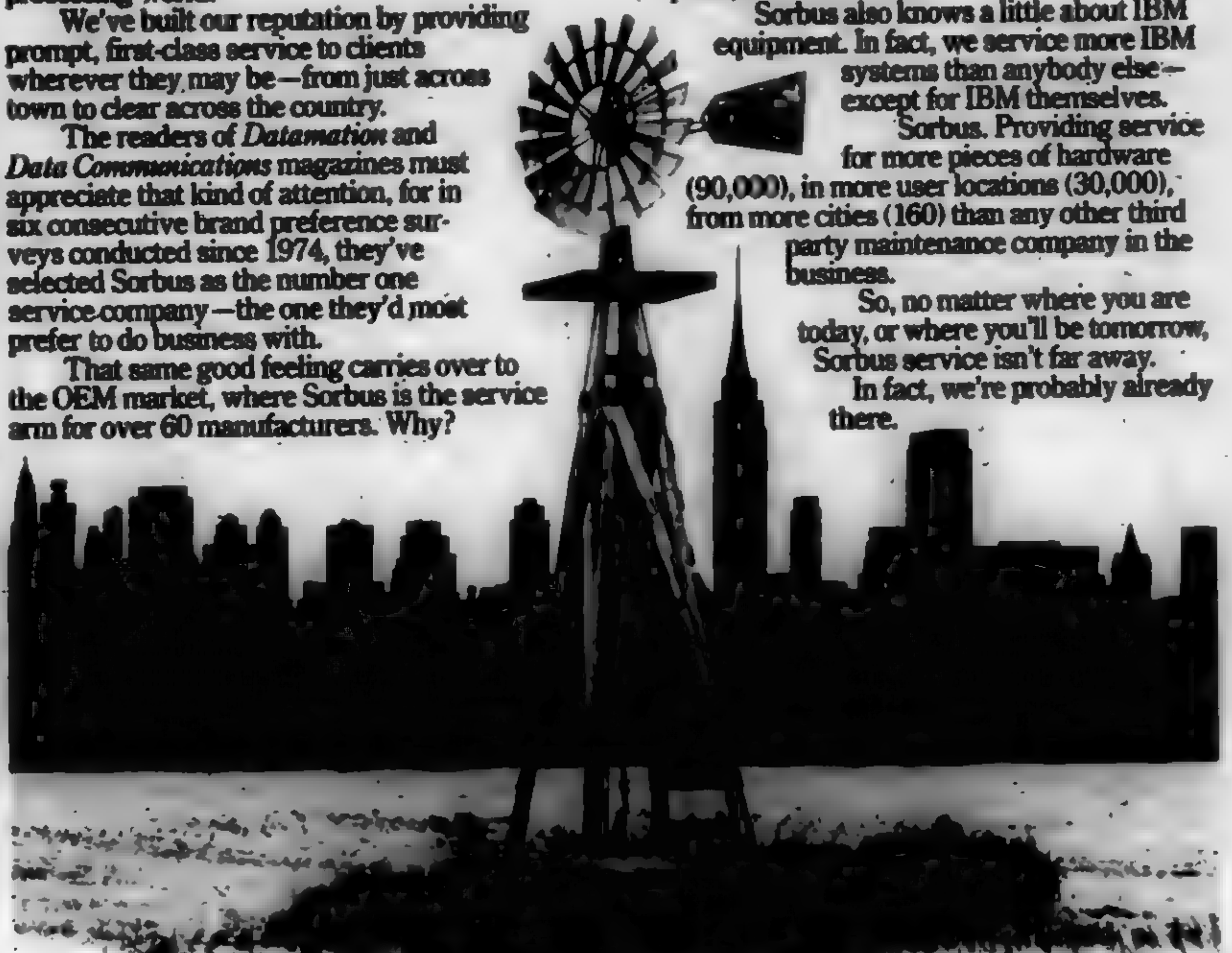

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Transition From Period of Invention

Consultant Sees Era of Implementation Ahead

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO – Just as the 1960s and 1970s were periods of rapid technological invention, the 1980s and 1990s will be periods of rapid technological implementation, a local business consultant predicted during a recent telephone interview.

The advent of the 1980s marks a turning point in the computing field's technological evolution, according to Joseph Fusco, head of Joseph Fusco & Co., a high-technology consulting firm.

During the previous two decades, the computing field devoted the bulk of its energies to laying the technological groundwork upon which all modern-day computer systems are, and will continue to be, built.

The last 20 years of the industry's history have been characterized by a rapid succession of technological breakthroughs in telecommunications, microelectronics and other basic hardware and software disciplines.

Now, with most of the necessary systems building blocks already firmly in place, the main focus of the computing field's technological interests is slowly beginning to shift. The industry's traditional emphasis on technological invention is gradually giving way to a growing concern for how those inventions are going to be applied, Fusco said.

Computing hardware and software will continue to progress, but most of the expected advances will result more from refinements and improvements to existing technology than from new technological breakthroughs, the consultant added.

Impact of Transition

The computing field's gradual transition from invention-mindedness to application-mindedness will bring profound changes in the way Management Information Services (MIS) managers do their jobs.

First, the transition will force MIS managers and their departments to move increasingly into the mainstream of their companies' corporate activities. The computing field will slowly cast aside its traditional role as a mangement backwater and will grow in importance until it finally rivals the stature and influence of more established business disciplines like finance, marketing and corporate law, Fusco said.

"Computing systems managers of the future will have to understand a whole lot more than just how their departments can be used to solve a particular problem at hand," the business consultant added. "They will also have to have a solid understanding of where their departments' activities fit into the overall corporate scheme of things."

At the same time, MIS managers will also be called upon to help dispel the fear and mistrust with which computing systems and personnel are widely regarded by their nontechnical users. Ideally, Fusco said, computers should be as familiar and easy to use in a typical business office as typewriters, adding machines and photocopiers.

Acute Need

The need for nontechnical users to feel comfortable with computers and understand their capabilities will prove particularly acute for high level executives.

"During the 1960s and 1970s, the typical non-computer-oriented business manager could depend for survival on sheer wile and guile, but during the 1980s and 1990s, wile and guile alone won't be nearly enough," Fusco warned. "Executives who know little or nothing about computers are rapidly becoming as obsolete as the whip-cracking Simon Legree type of manager."

Computer-literate or semi-literate corporate executives will enjoy a distinct competitive advantage over their nontechnical counterparts.

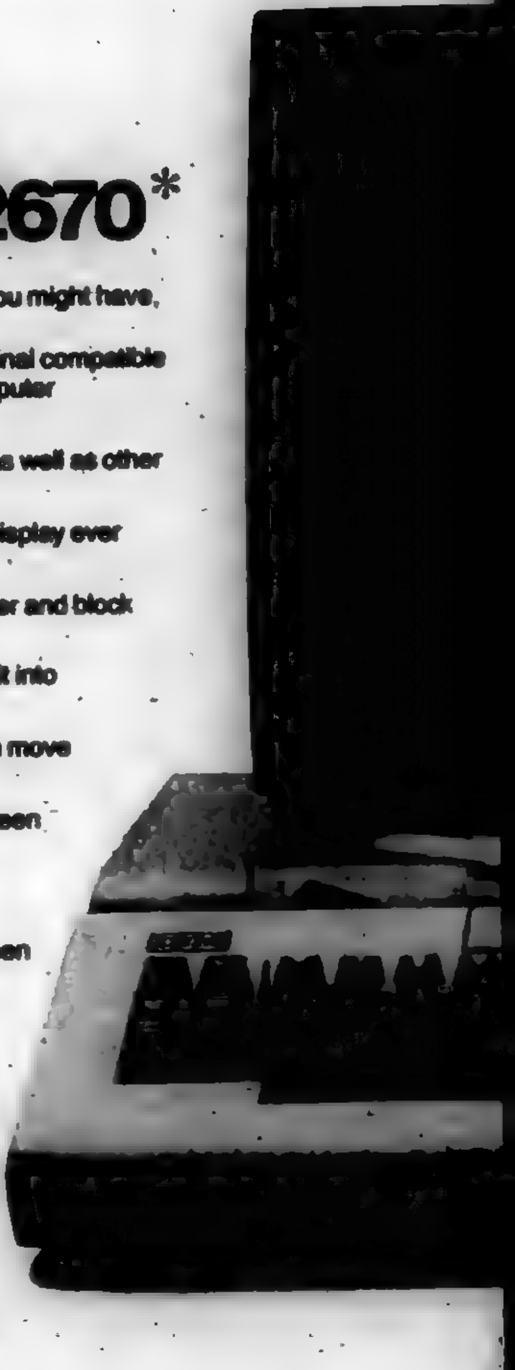
In the past, computing systems have been relatively limited in their business applications and have been used primarily as simple number-crunching tools by corporate accounting departments. Even today, the typical MIS system is limited in its application scope to a few selected management specialties, principally finance and manufacturing.

In the not-too-distant future, however, business computing will increasingly make its presence felt in other management disciplines as well, particularly marketing. Eventually, all the MIS systems for the various management disciplines will be integrated into a single, unified package capable of serving all facets of a company's business operations, Fusco said.

At that point, he added, the MIS field's transition from a specialized accounting tool to a general-purpose, business-management aid will be complete.

In particular, the development will pave the way for a bona fide business modeling capability that will allow top management to quickly tell how changes in crucial variables like overhead and production capacity will affect profit margins and overall company operations, Fusco said.

The availability of effective business modeling promises to relieve top executives of many of their trivial and time-consuming management details and increase the amount of attention such individuals can devote to more important duties like strategic planning and development of staff resources, he said.



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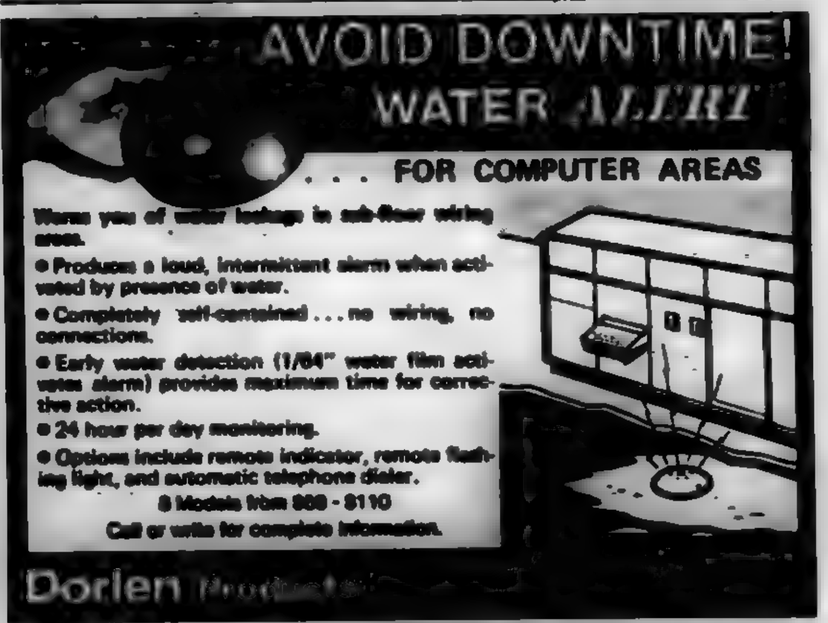

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Los Angeles Pulls Through Three-Day Strike

By Connie Winkler
CW Staff

LOS ANGELES — Although data service bureau management maintained essential on-line operations during the recent three-day strike of 125 city DP employees here [CW, July 28], could they have done so indefinitely?

Yes, "we would do it — but it wouldn't be easy," said Wendell Meyer, general manager of the 350-person operation.

Anton Calleia, executive assistant to the mayor, acknowledged that the city has a contingency plan that includes running city work elsewhere, but he would not go into details. The 27 departments under City Council control "depend on the computer extensively," he added.

Meyer compared the contingency plan to a disaster plan, but would not specify how the city's data processing would operate if the two IBM 370/158 attached processors in the basement of city hall were not available.

At the fire department, firefighters would simply revert to manual or paper dispatching, according to Gerald Johnson, the department's community liaison officer. The department now uses a terminal network to dispatch equipment for its 3,500 emergency calls weekly, but the dispatcher can interrupt the computer recommendation and make his own dispatch.

July Walkout

This operation was totally unaffected by the July walkout of 125 DP employees. The only effect of that work stoppage was an hour's delay in paycheck delivery and a delay in payment for a few rescue and ambulance personnel who had to wait until the next paycheck for overtime pay, Johnson said.

The Los Angeles Public Library is moving data entry personnel back under its own roof to decentralize its data processing work, said Mariana K. Reith, director of technical services there. The library was unaffected by the July work action because the most crucial work, the weekly book orders, was accomplished on the weekend.

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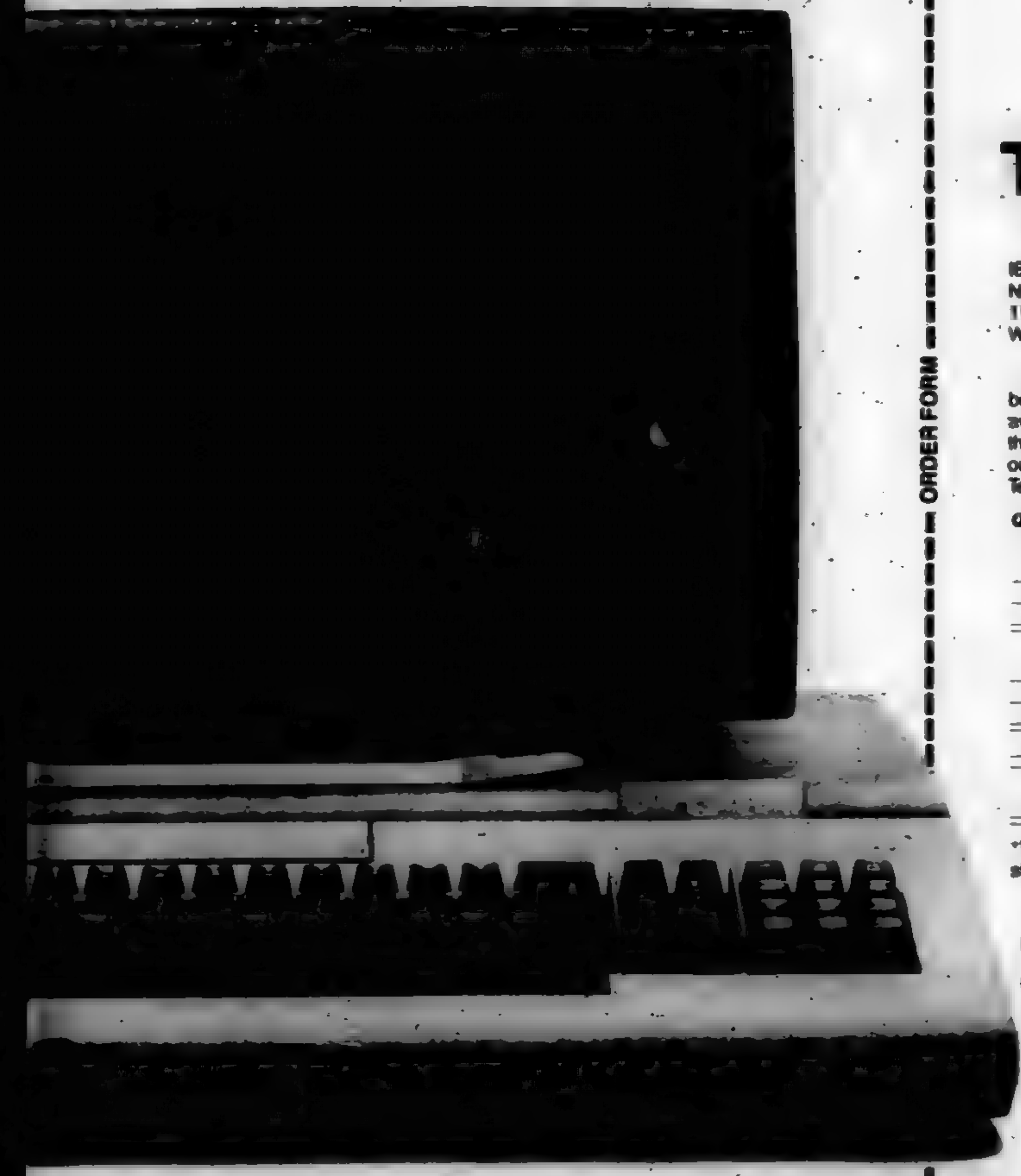

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Statements From 30 Organizations

FCC Hears Further Comments on Inquiry II

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Another round of comments concerning the Federal Communications Commission's (FCC) "final" decision in the Second Computer Inquiry has arrived at the commission. Nearly 30 companies and organizations submitted statements to date. Most reported positions expressed earlier, but a few new thoughts were buried in all the verbiage.

These recent comments represent the latest step in a process that began last May, when the commission's decision was released [CW, May 12]. Comments on the decision from interested parties followed [CW, June 23].

Each participant replied to points made by the others in the preceding round. Now, the FCC must digest everything that has been said and decide what, if any changes, should be made in its "final" decision.

Possibly the most interesting idea came from the Computer and Business Equipment Manufacturers Association (Cbema). It recommended that the FCC institute a "further, separate proceeding" to determine how joint research and development activities should be structured.

In last May's decision, the commission concluded that AT&T as well as General Telephone and Electronics Corp. (GT&E) must establish separate subsidiaries to market terminals and "enhanced" — i.e., computer-based — on-line services. But the commission allowed each parent and its new subsidiary to develop terminal hardware jointly, while barring joint development of application programs and other software not "integral" to the terminal.

AT&T and GTE, as well as their competitors, objected to this arrangement. The carriers said it was too restrictive while the computer industry said it was not restrictive enough. In any event, Cbema said, today's application software is likely to be imbedded tomorrow in "integral" software, such as an operating system, or in hardware (e.g., a silicon chip).

In this way, the commission will be unable to accomplish its stated goal of encouraging the carriers to develop innovative services and systems while denying them opportunities to cross-subsidize these offerings surreptitiously with revenues derived from their "basic" monopoly telephone network services.

"It follows, therefore, that before permitting the parent and subsidiary to proceed in such joint efforts as R&D . . . the commission should institute a further, separate proceeding to establish the specific accounting, recordkeeping, and other conditions necessary to assure the absence of cross-subsidy," Cbema said.

Since the joint R&D scheme suggested by the FCC last May is opposed by AT&T and GTE, as well as by their competitors, there appears to be a good chance the commission will adopt this suggestion. However, judging from some of the other comments submitted to the FCC more recently, it will be difficult for such an inquiry to narrow the Grand Canyon-sized gulf that separates the carriers and the computer industry on the joint R&D question.

Adapso Stance

According to the Association of Data Processing Service Organizations, Inc. (Adapso), the essence of AT&T's argument is that by prohibiting joint development of "nonintegral" software, "the commission will be depriving users of highly integrated hardware-software designs . . . [and] severely affect the ability of AT&T's affiliates to compete with others not so restricted. This is patently nonsense."

In its initial comment on the FCC decision last June, Adapso carried this thought further: Since the decision allows joint development of software "imbedded in or integral to [terminal] equipment," it permits AT&T or GTE to provide the "vast majority, if not all" of the software required by its enhanced services subsidiary, the association contended.

This "shortcoming" should be remedied by changing the decision to require that an enhanced services affiliate of either AT&T or GTE must perform all of its own software development, Adapso added.

This change "would only make it more difficult for the Bell System to produce offerings that satisfy user needs," AT&T said last week. The phone company then lashed out at the computer industry's main objection to joint R&D activity — the contention that such joint effort will lead to illegal cross-subsidization:

"The blithe assumption that basic service rates can be raised to provide a source for cross-subsidies ignores the fact that such Bell System . . . service already is subject to competition, and that competition of [this] traffic is increasing . . . dramatically.

"Local basic service also will be increasingly competitive . . . These factors provide substantial pressure against raising basic rates to support lower prices for enhanced services and [terminals]," Bell said.

Students Consult On Systems

MADISON, Wis. — While most universities teach computer science students to program computers, one instructor here is teaching students how to buy them.

Operating on the theory that buying a computer system can be a traumatic experience, professor Mohan R. Tanniru, with the University of Wisconsin, decided a year-and-a-half ago to give his students some practical experience and solve the needs of some small businesses at the same time. The students evaluate systems for real-life companies for a $20 fee.

So far, the students have evaluated systems for 28 small companies ranging from a bicycle shop to a neighborhood service group.

"Initially, I contacted businesses to arrange a project for a team of two or three students — majors in information systems analysis and design — to tackle a computer problem in the organizations. Now businesses have been coming to me, as they become more aware of what we have to offer," Tanniru said.

Student teams analyze the information requirements of the organization and suggest a system to meet the requirements, he explained. System designs could involve modification of manual methods, a partly automated system or full computerization.

The only demands on the company are a willingness to cooperate with the students, plus the $20 donation to cover student transportation and an end-of-semester party, he said.

"Benefits accrue both to the companies and the students. The companies get virtually free advice on how to adjust or adapt their systems to changing economic or business conditions, and the students obtain valuable experience by applying classroom analysis and design techniques to real-word problems."

Tanniru teaches at the university's School of Business.

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Belgian Sentenced, Fined in Adabas Bribe Case

By Jake Kirchner
CW Washington Bureau

ALEXANDRIA, Va. — A Belgian citizen charged with trying to illegally obtain the Adabas data base management system source code has been sentenced to four months in jail and fined $500 by a federal judge here. He still faces possible fines from the U.S. Commerce Department.

Following his attorney's claim that Marc Andre DeGeyter is not a "Soviet agent" or "Belgian spy" as portrayed in U.S. and Belgian news accounts, the Brussels DP executive was ordered to immediately begin serving his sentence. He received credit for the five weeks he spent in custody following his arrest last May.

DeGeyter had already paid a $10,000 civil fine for violating the Export Administration Act under a plea-bargaining arrangement with federal prosecutors [CW, July 14]. Under the agreement, DeGeyter pleaded guilty to two misdemeanors for which he received the fine and jail term Aug. 1.

'Carried Away'

At the sentencing, DeGeyter's attorney, David Cutner, requested leniency for his client, arguing the Belgian is an honest businessman who got carried away by the prospect of obtaining the Adabas source code from its proprietor, Software AG of North America, Inc. [CW, June 16].

DeGeyter had been under Federal Bureau of Investigation surveillance for a full year prior to his indictment, Cutner told Federal Judge Albert Bryan. During that time DeGeyter's activities in the U.S. had been "perfectly respectable," though he "did step over the line with regard to the [Adabas] transaction," the attorney said.

DeGeyter, in a short statement before sentencing, told the court, "I feel very sorry and very guilty about what happened."

Bryan responded that he assumed the government had reduced the charges because it was unable to prove DeGeyter was a Soviet spy. However, he said, because DeGeyter had pleaded guilty to two misdemeanors, "some incarceration is warranted."

Commerce Actions

In addition to the jail term and fine, the U.S. Commerce Department announced immediately following the sentencing it was initiating administrative proceedings against DeGeyter in connection with "further violations" of the Export Administration Act of 1979.

The compliance office of Commerce's Office of Export Administration informed DeGeyter it was investigating his activities relating to interstate and international travel to facilitate commercial bribery as alleged in two of the charges dropped by prosecutors during the plea bargaining.

DeGeyter could be fined $10,000 for each count of violating the export law and lose his U.S. export privileges. He has until the end of the month to respond to the new charges.

The new Commerce actions were "a complete surprise to us," according to Cutner. Reached last week at his New York law offices, Cutner said the action "violates the understanding we had with the U.S. Attorney's Office." That settlement already included payment of a $10,000 fine for violating the Export Administration Act, Cutner noted.

The attorney protested DeGeyter had already paid his fine and said the Commerce Department was trying to penalize DeGeyter for violations already disposed of in federal court.

Soviet Transaction?

Cutner also vehemently denied that the plea bargaining included a DeGeyter agreement to cooperate with any government investigation of possible activities by the Belgian on behalf of the Soviet Union or any other illegal attempts to obtain U.S. technology.

When DeGeyter first approached Software AG about obtaining the Adabas source code, he said he represented Techmashimport, a Soviet trading company headquartered in Moscow, according to the indictment. Also, the U.S. Attorney's office here said that at the time of his arrest DeGeyter had documents indicating he might have attempted earlier to obtain an Intel Corp. semiconductor design for the Soviet firm.

Cutner said any speculation about cooperation between DeGeyter and the government in these matters is "total and complete nonsense" because there is nothing more for the government to investigate. DeGeyter was acting for himself at all times, even if he did hope eventually to sell the Adabas source code to the Soviet company or another company, Cutner said.

Four-Day Info '80 Program Set

NEW YORK — Nine sessions on information management will be spotlighted in the four days of the Information Management Exposition and Conference: Info '80 at the New York Coliseum Oct. 6-9.

Thirteen other "conferences-within-a-conference" on specialized aspects will be featured. The keynote address for the sessions will be "Enterprise Systems: A Concept for the '80s," by Allen J. Krowe, IBM vice-president and president of the System Communications Division.

The session presentations will encompass information systems management, technology advances in DP, office automation and word processing and a short course will cover word processing/administrative support. A conference program listing speakers and their topics, exhibiting companies and other information can be obtained from show sponsor Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

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The annual conferences of the Society for Management Information Systems are recognized as a unique opportunity to explore the critical issues in information resource management. For that reason, each year's list of speakers and participants includes the nation's leaders in the field.

This year, for example, major presentations will be made by Robert Price, Frederic Withington, Russell Ackoff, Gideon Gartner, Jay Galbraith, Ira Cotton, William Lape, to name a few. Through their contributions and others, the conference will examine the changing nature of management as a result of the convergence of technologies under the information resource/MIS umbrella.

The 1980 SMIS Conference is entitled "Putting It All Together: MIS Management in the Emerging Information Age." If you are an executive with an interest in probing the impacts that telecommunications, computers, office automation and related technologies are having on your profession and your organization, we invite you to join us. And, we suggest you bring your boss; this will insure that your organization receives maximum benefit from this important conference.

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The Society for Management Information Systems

Using 4331 Processor

COG Gets Local Government Forecasts Rolling

WASHINGTON, D.C. – Will Washington's Metrorail commuter system be running in the red in 1980?

That may not seem an important question right now to the thousands of commuters who only want to get to work on time, but it is crucial to the local governments in the Washington metropolitan area, and a computer is going to help them find the answer.

The study is one of many being done by the Metropolitan Washington Council of Governments (COG), which has a newly installed IBM 4331 processor.

For that study, the processor is being used to simulate a typical travel day. It will show what travel system – rail or bus – a commuter picks based on income, job location and so on. The 4331 will contain data showing the transit networks and population demographics.

Previously, COG prepared its forecasts using an in-house minicomputer linked to a data service bureau. Now it can run most of its programs on the 4331 from its downtown Washington offices.

COG is concerned with working toward solutions to area problems such as transportation, growth, housing, hospital care, air and noise pollution, water supply and quality, economic development and crime. It represents 16 local governments.

"With the 4331, we get more information and more timely information," Frank Leser, manager of COG's DP division, said. "It's a flexible tool that lets us get away from worrying about running the computer center. We use it as a hammer to construct options for local officials."

According to Leser, the 4331 increases staff productivity. "Before, we spent about 10% or 15% of our time tending the computer. With the 4331, we are down to 2% to 5%."

Installation of the 4331 is also a benefit for the local government because many have IBM computers and will be able to run COG-developed software on their own equipment. In addition, COG can use federal models developed for larger systems on the 4331, a savings since such models are expensive to develop.

Next year, COG will use the 4331 to put a "one-stop" census center into operation. COG will extract data about the Washington region from the 1980 census and make it available to the local governments, the public and business.

Call for Papers

NATIONAL MICROGRAPHICS ASSOCIATION (NMA) 30TH CONFERENCE AND EXPOSITION, Los Angeles Convention Center, April 27-May 1, 1981.

The Conference theme is "Age of Productivity." The association is inviting professional papers for consideration as presentations. Topics include, but are not limited to, micrographic applications and technology as well as technologies that interface with, or relate to, micrographics.

Abstracts and outlines for presentations should be submitted to the Program Review Committee by Sept. 10. Abstracts should be double-spaced and at least 250 words in length.

All correspondence should be addressed to Al E. Eggert, Age of Productivity, Program Review Committee, NMA, 8719 Colesville Road, Silver Spring, Md. 20910. Further information is available from Sue Wolk, education coordinator at NMA.

THIRD INTERNATIONAL CONFERENCE ON INTEGRATED OPTICS AND OPTICAL FIBER COMMUNICATION (IOOC '81), San Francisco, April 27-29, 1981.

Papers are sought on the various aspects of fibers and cables; connectors, couplers, equipment, systems and transmission techniques; and integrated optics and active devices.

Two copies of both a 35-word abstract and a 200- to 500-word summary should be sent to IOOC '81, c/o Optical Society of America, 1816 Jefferson Place N.W., Washington, D.C. 20036.

WORLD PRODUCTIVITY CONFERENCE, Detroit, May 17-20, 1981.

The congress's theme is "Productivity — The Industrial Renaissance." Among the topics for which papers are sought are current concepts and implications of productivity performance at the micro, macro and international levels; effect and potential of technological developments; and technology transfer within and among nations.

Before Sept. 15, three copies of either a completed paper or an abstract (two-page minimum) should be sent to Conference Program Coordinator, American Institute of Industrial Engineers, World Productivity Conference, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

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Sept. 15-18, Portland, Ore. — Structured Systems and Design. Contact: Portland Associates, 4036 N.E. Sandy, Portland, Ore. 97212.

Sept. 17-19, Toronto — Datamanager User Meeting, sponsored by the North American Datamanager User Group. Contact: Pat Grant, MSP, Inc., 21 Worthen Road, Lexington, Mass. 02173.

Sept. 17-19, San Francisco — Audit and Control of On-Line Systems. Contact: the Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Sept. 17-19, Rio de Janeiro, Brazil — Computer Networks. Contact: Long & Associates, 820 Tioga Ave., Bethlehem, Pa. 18018.

Sept. 17-19, Vancouver, B.C. — Digital Equipment Canadian User Meeting. Contact: Digital Equipment of Canada, Ltd., Box 11500, Ottawa, Ontario, K2H 8K8.

Sept. 18, London — APL*Plus: Introductory Overview. Contact: STSC, Inc., Seminar Program, 11 Clearbrook Road, Elmsford, New York 10523.

Sept. 21-23, Detroit — National Bank Institute Convention. Contact: Bank Administration Institute, P.O. Box 500, 303 S. Northwest Highway, Park Ridge, Ill. 60068.

Sept. 22-23, Washington, D.C. — How to Manage Data and Information as a Resource. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Sept. 22-24, Washington, D.C. — Federal Computer Conference, co-sponsored by the Federal Computer Conference (FCC) and Datamation Magazine. Contact: FCC, P.O. Box 368, Wayland, Mass. 01778.

Sept. 22-24, Gaithersburg, Md. — National Conference of Standards, sponsored by the National Bureau of Standards and the National Conference of Standards Laboratories. Contact: Brian Belanger, B032 Physics Building, National Bureau of Standards, Washington, D.C. 20234.

Sept. 22-24, Sao Paulo, Brazil — Computer Auditing and Control. Contact: Long & Associates, 820 Tioga Ave., Bethlehem, Pa. 18018.

Sept. 22-24, Dallas — Introduction to Teleprocessing Software. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 22-24, New York — The Automated Office. Contact: the American Institute of Industrial Engineers, P.O. Box 3727, Santa Monica, Calif. 90403.

Sept. 22-24, San Francisco — Minicomputers and Distributed Processing. Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Sept. 22-24, New York — Writing for Results: A Course for Computer Professionals. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Sept. 22-25, Philadelphia — Conference for Management Information Systems. Contact: the Society for Management Information Systems, 111 E. Wacker Drive, Chicago, Ill. 60601.

Sept. 22-25, Chicago — Software Package Conference & Exposition, sponsored by Infosystems Magazine. Contact: Professional Exposition Management Co., Inc., Suite 545, 222 W. Adams, Chicago, Ill. 60606.

Sept. 22-26, Rockville, Md. — Applied Time Series Analysis. Contact: Continuing Education Institute, Suite 1030, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

Sept. 22-26, Washington, D.C. — Compcon Fall '80. Contact: The Institute of Electrical and Electronic Engineers, P.O. Box 639, Silver Spring, Md. 20901.

Sept. 22-24, New York — The Automated Office. Contact: The American Institute of Industrial Engineers, P.O. Box 3727, Santa Monica, Calif. 90403.

Sept. 23-25, Boston — Semicon/East '80. Contact: Mathews and Clark Communications, 410 Cambridge Ave., Palo Alto, Calif. 94306.

Sept. 29- Oct. 1, New York — Comparative Data Base Management Systems Symposium. Contact: The Institute for Science and Public Affairs, 1370 Ave. of the Americas, New York, N.Y. 10019.

Sept. 22-26, Chicago — Computer Auditing. Contact: RHY Consultants, 1444 Balsam St., St. Paul, Minn. 55122.

Sept. 22-26, Washington, D.C. — Advances in Electronics Technology. Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Sept. 22-26, Boston — Improving Office Productivity: Analysis & Design Techniques for Manual Systems. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Sept. 23-24, Winston-Salem, N.C. — Records Management and Information Systems Equipment Exhibit and Conference, sponsored by the National Micrographics Association and the Association of Records Managers and Administrators. Contact: Brad Simpson, P.O. Box 1307, Greensboro, N.C. 27402.

Sept. 23-25, Denver — Introductory APL. Contact: STSC, Inc., 7316 Wisconsin Ave., Bethesda, Md. 20014.

Sept. 23-26, Washington, D.C. — Hands-On Pascal Workshop. Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held Sept. 30- Oct. 3 in San Diego.

Sept. 23-26, Portland, Ore. — Structured Program Design. Contact: Langston, Kitch and Associates, Inc., 715 E. 8 St., Topeka, Kans. 66607.

Sept. 24-25, Lincoln, Neb. — The Office of the Future — Today, sponsored by the University of Nebraska-Lincoln and the Data Processors Association. Contact: University of Nebraska-Lincoln, Center for Continuing Education, 33 and Holdrege, Lincoln, Neb. 68583.

Sept. 24-26, New York — Data Base Management Systems: A Comparative Analysis of General-Purpose Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 24-26, Chicago — Computers in Manufacturing. Contact: The American Institute of Industrial Engineers, P.O. Box 3727, Santa Monica, Calif. 90403.

Sept. 24-26, Washington, D.C. — How to Build and Use a Data and Information Resource Directory. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Sept. 24-26, New York — Data Processing Operations Management. Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Sept. 24-26, Boston — DP Disaster Recovery Workshop. Contact: EDP Recovery, Inc., 400-2 Totten Pond Rd., Waltham, Mass. 02154.

Sept. 25, Dallas — Automated Rerun and Tracking System. Contact: University Computing Co., UCC Tower, Exchange Park, Dallas, Texas 75235.

Sept. 25-28, Philadelphia — Personal and Business Computer Show. Contact: National Computer Shows, P.O. Box 678, Brookline Village, Mass. 02147.

Sept. 25-26, Sao Paulo, Brazil — Advanced On-Line Systems Measurement. Contact: Long & Associates, 820 Tioga Ave., Bethlehem, Pa. 18018.

Sept. 28-Oct. 1, San Diego — Lasers in Graphics. Contact: Dunn Technology, Inc., 1131 Beaumont Circle, Vista, Calif. 92083.

Sept. 29-30, Chicago — Successful Selection of Minicomputers. Contact: RHY Consultants Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Sept. 29-30, Salt Lake City, Utah — Integrating Word Processing & EDP. Contact: Harvard Laboratory for Computer Graphics, 48 Quincy, Cambridge, Mass. 02138.

Sept. 29-30, Newton, Mass. — The International Standard X.25 Interface Protocol for Packet Networks and Related Network Protocols. Contact: McGraw-Hill Conference Center, 1221 Ave. of the Americas, New York, N.Y. 10020.

Sept. 29- Oct. 1 — Essentials of Budgeting for Operating Managers. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Sept. 29- Oct. 1, Washington, D.C. — Effective Data Systems Development. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Sept. 29- Oct. 1, New York — Automating Your Office Today. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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User Videocassette Courses Set For Personal, Business Needs

DALLAS — A series of videocassette courses on such topics as personal and business computing and computer software have been released by Evolution 1, a division of Electronic Data Systems Corp.

The video courses are aimed at corporations, schools and retail computer dealers and can be used for management development, sales training and computer familiarization programs.

In all, there is a total of five cassette series. The first two cassettes, "Personal Computing" and "The Bottom Line," are introductory courses designed for use as sales tools in computer retail stores.

The third series, "Basic Training," is a four-cassette and four-workbook program that gives individualized instruction on programming languages. The lessons cover an introduction to Basic, implementation of programming loops and input statements, the programming of simple games and other exercises of microcomputer programming.

The fourth series, "Little Computers . . . See How They Run," is an eight-cassette program that attempts to dissect the basic workings of the computer.

Finally, "Business Computing . . . Cut Down to Size" was designed to educate the student on the key issues of computers in business.

Prices for the individual cassette series range from $250 for "Personal Computing" to $375 for the data communications cassette in the "See How They Run" series. The cost of the entire courses start at $1,350 and run up to $2,700.

Information on the videocassette programs and future topics can be obtained from Evolution 1 at 14580 Midway Road, Dallas, Texas 75234.

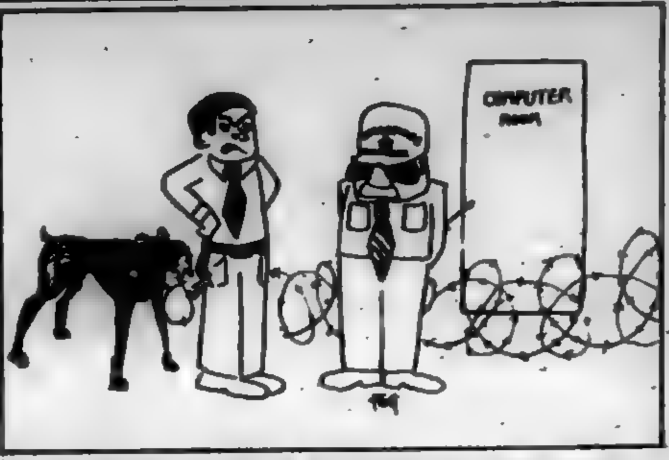
Spring Directory Features Listings Of Top Execs

PHOENIX — The Spring 1980 edition of the Directory of Top Computer Executives is now available and features more than 7,600 listings of the Fortune "Double 500," plus nonindustrial companies and governmental agencies with large computer installations.

The directory, published twice yearly, lists the top computer executives of each company and includes information on mainframe type and company address and phone number.

The listings are cross-referenced geographically with 12 major industry/government types for complete and easy data retrieval.

A single copy costs $95 and additional copies cost $60 each. An annual subscription costs $150 for the two yearly issues from Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.



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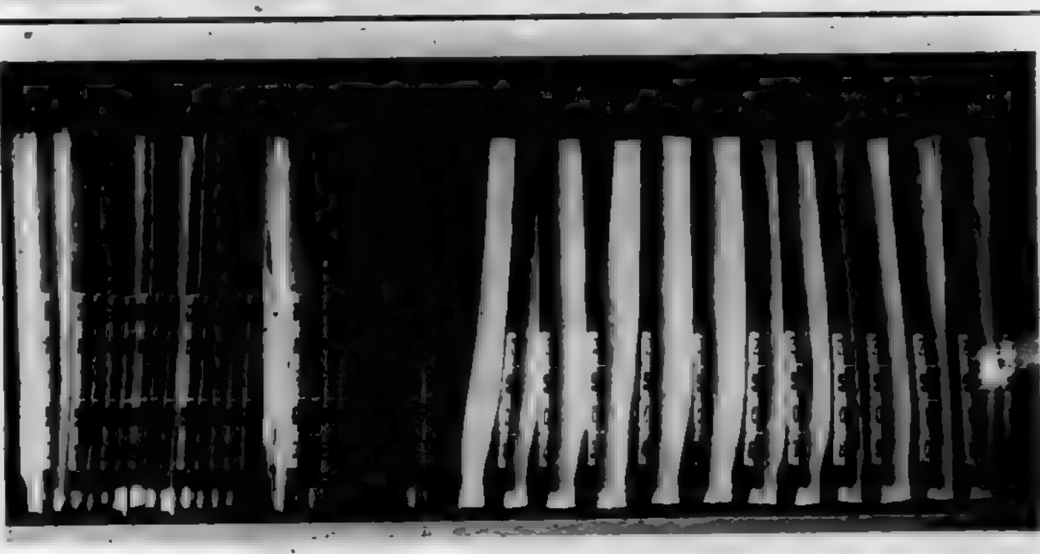

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Courseware Exchange Enrolls Schools

SANTURCE, Puerto Rico – An International Systems and Courseware Exchange (ISCE) has been established to serve as a clearinghouse for schools, businesses and professionals to lease their proprietary courseware and to become aware of existing programs and thus avoid duplication.

Licensing fees will reportedly enable participants to recover courseware development costs.

Providers who wish to license their courseware on an annual lease basis should send a description of the product to ISCE to be published in an annual catalog. Users must specify their needs and their computer configuration.

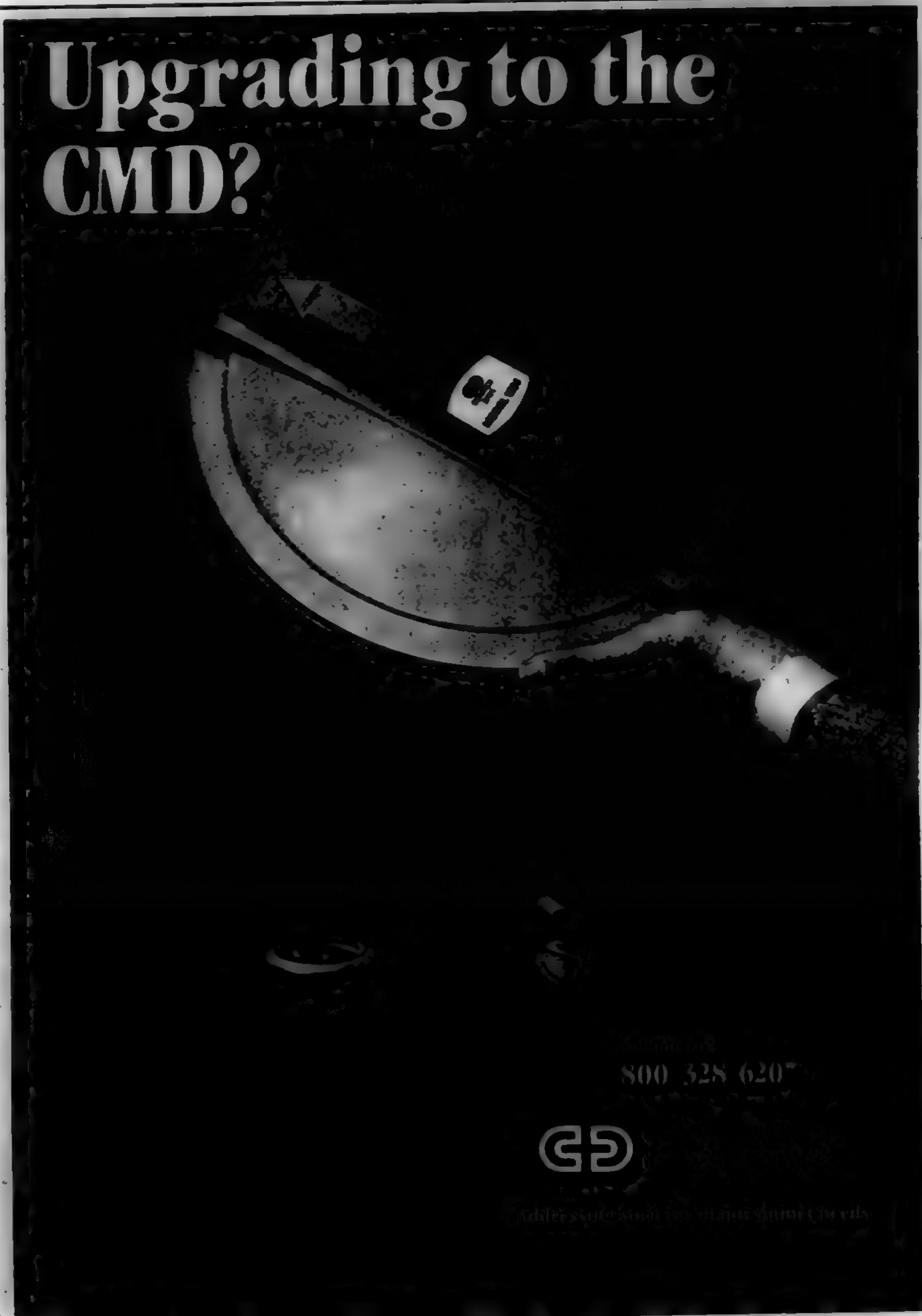
The first catalog will be published in January 1981, and entries must be received prior to Nov. 1.

Providers and users will be charged $25 per item, but will receive a free catalog which will otherwise cost $10. Annual licensing fees for the software will vary with each specific program.

Catalog entries dealing with administrative or business applications should be mailed to Howard Baldwin, Registrar, University of Akron, 3220 Miles N.W., Canton, Ohio 44718.

Educational or professional applications should be sent to Swen Larsen, Dean of Science and Technology, World University, Barbosa Esq. Guayama, Hato Rey, Puerto Rico 00917.

John Earle Associates, Inc., is at ISCE Catalog, P.O. Box 12213, Loiza Station, Santurce, Puerto Rico 00914.



Service Lists User Meets And Projects

SCOTIA, N.Y. – The Bibliographic Retrieval Services, Inc. (BRS) is now inputting on-line user groups' notices of meetings, announcements and projects on its BRS NEWS file.

The offering was designed to prevent user groups from duplicating efforts and enable them to keep abreast of interesting developments, BRS said.

The user group news will appear as a separate document in the BRS NEWS file so searchers may opt to print it or not. The news will be updated daily and can be accessed anytime during BRS operational hours. It will be available at the regular connect hour rate.

Notices should be 250 words or less, include contact person, phone and terminal numbers and be sent to BRS Customer Service, 702 Corporation Park, Scotia, N.Y. 12302.

Industrial Robots To Be Highlight Of Meeting

DEARBORN, Mich. – Industrial robotics will be the focus of a three-day meeting here this fall sponsored by Robotics International (RI), the Society of Manufacturing Engineers (SME) and the Robot Institute of America (RIA).

Scheduled to take place Oct. 28-30, the Robots V conference and exposition will be aimed at present and future users of industrial robots. A total of 25 technical presentations in seven sessions will concentrate on implementation, application and technological breakthroughs.

Registration fees for the conference and exposition are $360, and $310 for RI, RIA and SME members and affiliate members. Fees include a set of available papers, three luncheons and coffee breaks. Registration for the exposition only is $3, or $2 for sponsor society members.

Additional information on the event can be obtained from Patricia Van Doren, Technical Activities Administrator at SME headquarters, P.O. Box 930, Dearborn, Mich. 48128.

See page ___
in Buy/Sell/Swap

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Datapro Sets Seminar Series

DELRAN, N.J. – The Datapro Research Corp. will present a nationwide series of 21 information processing seminars between Sept. 15 and Nov. 21. Sites for the seminars include New York, Chicago, Los Angeles, San Francisco, Dallas, Houston, Atlanta, Denver and Washington, D.C.

They will cover data communications, teleprocessing software, distributed systems, systems analysis and design, DP project management, data base management systems, operations management, minicomputer systems, computer performance measurements, word processing, electronic mail, automating the office and micro/-personal computers.

The seminars are also being offered on an in-house basis, Datapro said, adding in-house versions are conducted for a standard fixed fee which includes program presentation and a reference notebook for each attendee.

The free 48-page catalog details course outlines, instructors, dates, locations, fees and discounts.

Datapro is located at 1805 Underwood Blvd., Delran, N.J. 08075.

Honeywell Plans Courses On Security, Auditing

PHOENIX – Computer security, auditing and crime investigation will be the subjects of four-and-a-half-day seminars by Honeywell, Inc.'s Systems Sciences Services at Cape Cod and in Washington, D.C., this fall.

The "Three-in-One-Seminar" will present an overview of how computer security, privacy, auditing and crime control techniques can be used to manage information system vulnerabilities. The Cape Cod seminar is scheduled for Sept. 22-26 at the Sheraton Regal Inn in Hyannis, Mass. In Washington, D.C., the seminar will take place Oct. 27-31 at the Tyson West Park Hotel, McLean, Va.

The registration fee is $750, which covers all seminar materials and five luncheons, but not lodging. Special room discounts, however, are available through Honeywell, the vendor said.

Additional information and registration forms are available from the Registrar, "Three-in-one Seminar," Honeywell Systems Sciences, P.O. Box 6000,Mail Station T99-4, Phoenix, Ariz. 85005.

Blegen Elected Adcu President

At National Meet

CHICAGO – August Blegen of the Pillsbury Co. was elected president of the Association of Data Communications Users (Adcu) at the group's recent national conference here.

Also elected as officers were Martin Cernese of Avis Rent-a-Car, Inc., first vice-president; Richard Wallace of the Hartford Insurance Group, second vice-president; Lew Haring of Chase Manhattan Bank, treasurer; and Cornelius Toumey of Merrill Lynch Pierce Fenner and Smith, secretary.

Cahners Slates Newsletter For Recruiters

BOSTON – Cahners Publishing Co. is launching a twice-monthly advisory newsletter for management and agencies who recruit engineers, computer professionals and other technical specialists.

The newsletter, "Recruiting Engineers and Computer Professionals," will provide surveys, tutorials, news and analysis of issues associated with the task of locating professionals.

The editor, Beth Paper, can be reached at Cahners Publishing Co., 221 Columbus Ave., Boston, Mass. 02116.

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Computer Crunch comes in many varieties. Peak workload. Major project. Conversion. Even plain attrition. And it always seems to show up when you don't have the staff to handle it. Or the know-how.

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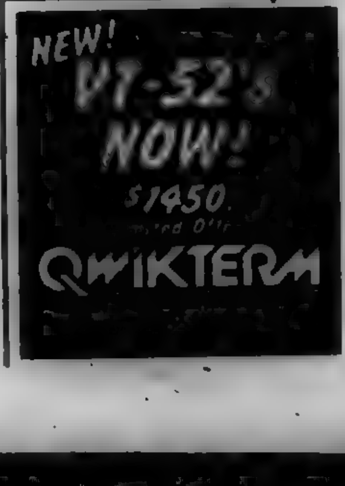


Pace-Setter for Its Price Class

North Star Horizon Excels in Performance

By Hillel Segal

SCOREBOX

System: North Star Horizon
Current Price: $6,911

SERIES 1 RESULTS

		TIME
C-1	Scientific/- Engineering Problem	12:01.9
C-3	Accounts Receivable	1:57.7

OTHER BENCHMARK RESULTS

	C-1	C-3
Pertec PCC 2000	28:46.4	6:04.3
Cromemco System Two	To be covered in future issues	
Texas Instruments 771		
Vector Graphic System B		
Decstation 78		

For a complete system priced less than $7,000, the North Star Computers, Inc. Horizon produced results that were nothing short of astounding. Its run-times in the Series 1 benchmark testing program of the Association of Computer Users (ACU) challenged those systems costing far more. And, as the studies of computers priced less than $15,000 come in, it is clear that the Horizon is a pace-setter.

The strength of the North Star showing in this set of system comparisons is most evident in the accounts receivable problem. In this test, the Horizon's time of 1:57.7 is better than any system tested during Series 2, which covered computers priced $15,000 to $25,000.

Included among those which North Star beat on this test were twelve systems, each priced more than twice as high as the Horizon for a comparable configuration. All were tested in Basic, if that language was offered by the manufacturer.

In the scientific/engineering problem, the Horizon's time of 12:01.9 is also impressive. It remains the fastest performance of that test in the less-than-$15,000 range, and bettered the 12-system average for systems costing $15,000 to $25,000 by more than one minute.

It is worth pointing out, though, that the fastest system in Series 2 for the scientific/engineering problem, the Wang Laboratories, Inc. 2200VP, finished this test in 2:05.8. So although the North Star computer performed better than the average for systems in the higher price range, it could not come near the speed of the top entry.

Hardware Enhancements

Both the Wang 2200VP and the North Star Horizon use mathematical functions implemented in hardware to speed number-crunching operations. With the Wang system, a set of matrix operations available in Basic was used to optimize performance.

On the Horizon, an optional floating-point math module was included with the system tested, and used together with a special version of North Star Basic. Without the optional hardware, the Horizon could not be expected to deliver such dramatic results.

But while recounting its outstanding finish in two key applications problems, it is only fair to note an area of weakness uncovered during the benchmark process. In the ease-of-use test, the Horizon lagged behind, requiring 230 keystrokes to edit a nine-line file according to the script. This is the greatest number required of the six systems tested so far in Series 1.

The Basic-environment editor is line-oriented, and requires the user to memorize instructions which are entered through a standard, cursorless keyboard. Its purpose is to allow greater flexibility. The user can configure the system with either a CRT or printing terminal of virtually any make.

But the price paid for this versatility is a certain amount of inefficiency and reduced convenience when writing or revising software. "I didn't like it at first because I found it tedious," a customer commented.

In performing the editor test, the independent consulting firm which prepared the benchmark reports posted a reference card on the CRT, and observed that combinations such as "Control-G" for displaying a line and "Control-I" to begin an insertion became committed to memory after an hour or so of entering programs into the system.

This is the 14th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

The Horizon system tested was supplied with a Soroc-120 CRT terminal. Included in the configuration were a pair of minidiskettes, an Anadex dot matrix character printer, 64K bytes of memory and the floating-point arithmetic board. The disk operating system and Basic interpreter are supplied at no extra charge, and the entire package was quoted at $6,911.

The Horizon uses 5-¼-in. minidiskettes, but since they are double-density and dual-sided, each holds 358K bytes of data. Less expensive single-sided diskettes are also available. A Winchester-technology hard disk with 18M-byte capacity is offered as well.

Diskette Speed

In the I/O-intensive test, which involves storing and retrieving data from the diskettes, the Horizon again delivered an outstanding performance, finishing the job in only 10.1 seconds. This was better than any of the Series 2 systems, and took the early lead in the series 1 testing program as well. North Star builds its own disk drives, and those supplied with the Horizon are said to have "fast-stepping" capability to reduce access time.

Because the system is built around the S-100 bus, extra equipment is available from other manufacturers. Real-time clocks, digital to analog converters, music synthesizers and other specialized items are available off-the-shelf. In fact, North Star's floating-point board is available separately for use in other S-100 based systems.

The "mix-and-match" flexibility of the Horizon brings with it added responsibilities for the user. Each unit must be personalized according to the accessories, terminal and printer that will be in use. Assistance from the dealer supplying the package will be needed unless the customer is relatively sophisticated. The Horizon is not a ready-to-run system that can be taken out of the box, plugged in and turned on.

Supplied with the computer are North Star's disk operating system, a program monitor and the regular or floating-point Basic, depending on whether the optional board is in use. Pascal is also offered by North Star.

The CP/M operating system is available on compatible diskettes from other sources, and this brings with it several other languages and a variety of applications software.

North Star reportedly plans to offer its own CP/M operating system in the future; currently, they do not actually support it, but a technical representative said personnel at the factory who are familiar with most versions of CP/M are accessible via the company's hotline.

One disadvantage noted during testing is that the North Star Basic requires the user to specify in advance the size of any files created during a program run. The program aborts if an attempt is made to write a larger file than specified.

In surveying users of the Horizon, we discovered it is popular in educational settings. Two high schools and one university contacted were using the equipment for class projects; the university was running it up to 20 hours a day. Common applications in the business world were accounting and word processing.

North Star now sells software for word processing, automatic letters, general ledger and data base management. But these are relatively new offerings; application software is an area which North Star entered only recently.

Next week: we look at the Cromemco, Inc. System Two.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

McGraw-Hill Schedules Meet On Telecommunications in '80s

SAN FRANCISCO — "Telecommunications in the 1980s: A Resource for Growth" will be the theme of a two-day conference sponsored by *Data Communications*, a McGraw-Hill magazine, on Sept. 8-9 here at the Hyatt on Union Square.

The conference is intended for non-technical executives who have ultimate responsibility for managing the flow of information in their organizations.

Lecturers Dr. Howard Frank, president of Network Analysis Corp. (NAC), and Norman Brust, NAC's vice-president of client services, will focus on such issues as underlying technologies and vendor offerings, new approaches to information flow, the industry and regulatory environment, managing the planning process and network strategy tactics, the conference sponsor said.

The attendence fee is $475. Further information on the conference is available from the McGraw-Hill Conference and Exposition Center, Room 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

EDITORIAL

The Hacker Mentality

"A person who makes constant small and unimportant modifications to a computer program for enjoyment rather than to improve the program" is a "hacker," according to an interesting article on computer addiction in the August issue of *Psychology Today*.

Actually, the full meaning generally attached to that epithet encompasses more than mere overindulgence in the cerebral pleasures of programming.

In "The Hacker Papers," musings by students at Stanford University's computer center, *Psychology Today* has assembled a telling portrait of the skepticism these students have about the merit of cloistering themselves, for what might be the duration of their early adulthood, within a "concrete-and-glass" playground.

They know that this cloistering entails a rejection of alternatives for developing themselves and for encountering the world. In an accompanying article, Stanford psychologist Philip G. Zimbardo alludes to this rejection as symptomatic of an entire generation's disenchantment.

"Not just in schools but in society as a whole," Zimbardo observes, "the hacker mentality is upon us, with or without the computer as a rationalization for putting other people at the bottom of our priority stack."

Stanford student Kenneth Peter wrote in the first hacker paper, which was posted in the computer room used to interact with the university's Low Overhead Time-Sharing System, that "when one enters this building through the glass doors, one steps into a different culture. Fifty people stare at terminal screens."

Peter described these people as bright, self-contained ("their entire social existence usually centers around one another") and deliberately predicating virtually all aspects of their lives on computer technology. "The computer is a modifier of personalities," he warned.

Many hackers do not become DP professionals and many DP professionals were never hackers. But consultant Barry A. Stevens' recent In Depth article [CW, July 21] suggested what personality traits hackers might tend to have after leaving university computing environments.

A survey of about 6,000 people conducted over a period of eight years found DPers to be "more cool and impersonal than other personnel," Stevens wrote, and to be "very perceptive, more persevering — even dogmatic, more cautious and hesitant and more pragmatic" than non-DPers.

Further, the DP professional "may harbor unrealistic feelings of inadequacy and may be distracted by moods of defeat or failure. More often than not, he worries over past mistakes and seeks approval of others," Stevens continued.

Managers of information systems will be hackers of a sort themselves if they fail to acknowledge these psychological factors as the substance of what they purport to manage.

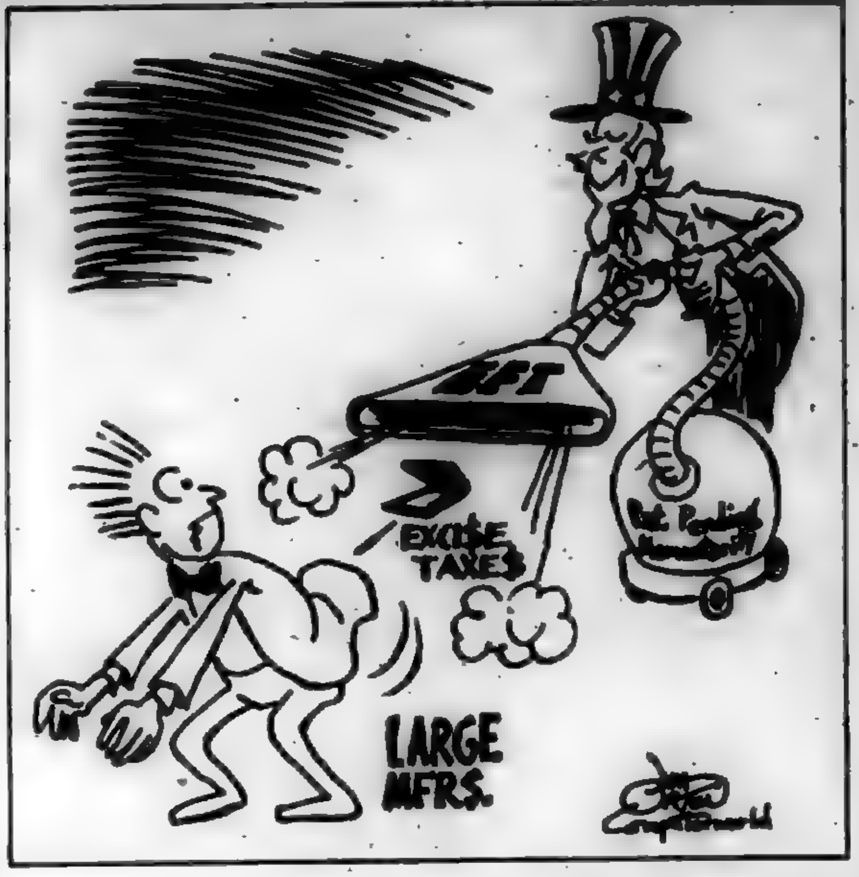
DATA PAST

Five Years Ago
Aug. 20, 1975

WASHINGTON, D.C. — Many state and local government agencies were wasting DP dollars on federally funded projects, a report of the U.S. General Accounting Office found. Some agencies were leasing equipment for short periods of time without considering saving money through purchasing; others were excluding certain sources of supply even though these sources offered lower prices; and still others were purchasing equipment without exploring shared processing.

Eight Years Ago
Aug. 23, 1972

SACRAMENTO, Calif. — Gov. Ronald Reagan signed legislation that allowed the creation of four new data centers in the state as part of a master plan to consolidate computer operations. The four centers would be devoted to business and services, state colleges, law enforcement and revenue. A fifth, for human relations, was planned. Funds totaling $30 million for operation of the data centers had been approved and included in the new state budget.



LETTERS

Distorted Idea

In "Programmers Seen Needing Fewer Skills" [CW, July 28], which reported on the views of sociologist Philip Kraft, many statements were made to which I take umbrage.

Prof. Kraft may have extensive knowledge of the programmer/management relationship, but it is easy to see that he does not have a full understanding of what modular programming is nor does he seem to have an understanding of what a programmer must do when writing a program.

The "three historical periods" basis upon which Kraft builds his hypothesis is as solid as a one-legged stool.

The first period is historical (it is always nice to have at least one segment of a hypothesis that cannot be disproved) and so it may be considered fact.

The second period is current, and supposedly programmers are treated as clerical workers in a factory-style production environment! It was in his discussion of this period that Kraft made his error. Modular programming involves programs made up of many performed modules — not, as Kraft stated, "sophisticated software systems comprised of very simple-minded modules."

In todays' environment, most major systems consist of multiple subsystems; each subsystem is made up of numerous programs. Within these programs are the modules.

No mention is made of the clerical worker (possible senior clerical worker) who is responsible for the control programs (or modules) or who sets up the arrays that would be utilized by the performed modules.

As for this being a period of "deskilling," the opposite is true. If a person is going to be a generalized applications programmer, he will need to know some of the following languages: Ansi Cobol, Cobol, Basic, Fortran, PL/I and Algol.

Today's programmers have many different paths from which to choose when it comes to the type of work they want to do. There are many different types of mainframes and many different sizes — from micros to mainframes. They all need programmers.

Finally, Kraft spoke of the old doomsday prediction that programmers will be reduced to almost nothing. This theory was touted in the early 1960s, but we still have programmers.

The bottom line of this whole reply is that I cannot believe Kraft has any in-depth concept of our field.

James R. Kitchen

Riverdale, Md.

Disservice to Workers

"Structured Methods Found No Cure-All" [CW, July 28] quoted information systems manager Bob Doolittle, who cast aspersion on the abilities and goals of government workers. As the exclusive bargaining representative for 6,000 government employees at the Navy Ships Parts Control Center in Mechanicsburg, Pa., I want *Computerworld* to know that we resent the attitude represented in the article.

I have worked in data processing within the government since 1964 and am now a computer systems analyst. In all the years I have worked here, I have never seen a more dedicated, hard-working group than the computer personnel at Mechanicsburg. During those years, this group designed, programmed, tested and implemented one of the largest computerized supply systems in the world. This would have been impossible if all we did during those years was sit on our hands waiting for our pay checks and the five o'clock whistle.

Dale E. Weller
President

Local 1156
American Federation of Government Employees
Mechanicsburg, Pa.

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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READER COMMENTARY/John G. Leyden

Editorial on FAA Gave Biased View

Over the years, I have found *Computerworld* articles and editorials about the Federal Aviation Administration's (FAA) air traffic control computers to be consistently biased and inaccurate. However, I've always managed to restrain the urge to reply until the July 21 editorial, "Time Bomb," pushed me over the edge.

First of all, the editorial said computer outages are causing countless traffic delays. Wrong! We count them. During the first six months of 1980, computer problems in centers and towers caused 562 aircraft delays and combined with weather for another 455. That's a total of 1,017 delays or 3.5% of the grand total of 29,428 system delays recorded during the January-to-June time frame.

Second, the editorial mentioned an "increase" in software and hardware problems. Wrong again! Computer reliability has increased significantly in recent years. For example, computer interruptions lasting less than one minute dropped from 14,166 in 1977 to 8,483 in 1978 to 6,651 in 1979. Moreover, there has been a similar decline in the number of unscheduled outages of one minute or more. They've dropped from 1,536 in 1977 to 1,146 in 1978 to 873 in 1979.

Next, CW said the present air traffic control system is based on World War II vintage radar and aging first-generation IBM 9020 mainframes. As a point of information, the FAA didn't order its first long-range radar until 1956 and didn't get it operational until 1958. (I believe the Big War ended in 1945.) As for the IBM 9020, it is, of course, based on the IBM 360/65, which is described by the manufacturer as "third-generation" equipment.

Another misstatement was that many computer outages have been the result of memory overload. Although we have had cases of computer overload in the enroute centers, subsequent analysis disclosed that the real problem was the computer program. In each case, we were able to free up additional capacity by changing the program.

CW's use of midair collision statistics to support the assertion that computer outages are creating serious hazards also is misleading. Actually, the majority of near midairs involve general aviation (nonairline) and/or military aircraft operating outside the traffic control system — that is, under visual flight rules in uncontrolled airspace.

In fact, I might add that the statistics on near midair collisions themselves probably are misleading. For example, does the increase in the number of reports over the past five years really represent an increase in incidents or does it merely reflect better reporting as a result of a special program instituted by the agency in 1975? It may be a bit of both.

But if the number of near midairs really is increasing, it would seem logical that the number of actual midairs also would increase. Yet these figures have remained relatively constant over the past 15 years.

Getting back to the subject of delays for a minute, the editorial noted that delays cost the airlines more than $500 million a year, and the reader was left to conclude that the computer outage problem is the snake-in-the-grass here. But, as already noted, computer outages are relatively insignificant as a cause of delays, when compared with adverse weather, which accounts for 85% of the total.

Finally, CW said the FAA should stop wasting its energies on denials and get on with the job of improving the system. Well, we'd like to, but occasionally we have to take time out and deal with publications like CW.

Leyden is chief of the Public & Employee Communications Division in the FAA's Office of Public Affairs.

READER COMMENTARY/Michael Fuerst

Systems Career May Be Harmful to Your Health

Physicians Meyer Friedman and Ray Rosenman, in their book *Type A Behavior and Your Heart*, described a "Type A" personality profile associated with individuals susceptible to heart disease. Meyer and Rosenman wrote, "Type A behavior is an action/emotion complex that can be observed in any person who is aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time and, if required to do so, against the opposing efforts of other things or other persons."

They claim that 50% of Americans show Type A characteristics if placed within the proper environment. Employment environments often provide this catalyst.

In the past few years, these findings have achieved wide acceptance in the medical community. Intriguing, disturbing similarities exist between the Type A and data processing personality profiles, the latter described by Barry Stevens in his recent In Depth article [CW, July 21].

A Type A person has an insatiable sense of time urgency — trying to compress more activities and/or accomplishments into a limited amount of time and establishing self-imposed deadlines. Such behavior often inhibits creativity by forcing the individual to use stereotyped or established solutions to problems. The Type A counts the number, rather than evaluates the quality, of his accomplishments.

The DPer strives for completion of short-term tasks and has an obsession with details — that is, tangible accomplishments — and cannot appreciate the relevance of long-term goals. The DPer makes conservative choices, avoiding unorthodox and possibly risky practices. An attempted solution, if unsuccessful, can stymie a many-pieced system. But in contrast a DPer is a perceptive problem solver. What may be "conservative" in a DP sense probably requires innate problem-solving talent.

A Type A person often exudes a self-assurance which conceals an underlying insecurity caused by concern with the pace at which prestige and accomplishments accumulate. Stevens described the DPer as unpretentious, but harboring feelings of inadequacy, and attributed the latter to the range of

(Continued on Page 36)

SOCIOLOGY OF COMPUTING/Robert L. Glass

Perusing the Product or Its Symptoms?

What is the final product of a software construction effort?

Does that seem like a dumb question? Everybody knows it's the program, right?

But what is a program? (Now this is beginning to sound like one of those philosophical discussions that starts out, "If a tree falls in the forest and there is no one there to hear it . . .")!

One True Representation

Really, now, this is an important question. A program is code, of course. Is it source code? Is it object code? Is it the magnetic tape or disk that holds the code? Is it the documentation that describes that code? Is it the program listing for that code?

Most people, upon giving the issue some microseconds of thought, would say "all of the above." The final product of a software construction effort is the code in all of its forms, the medium that holds that code, its documentation and its listing.

Now consider the ability of the software product to be evaluated. Suppose further that you are the manager of a software construction effort, and you want to review the quality of your product. Personally.

How do you go about evaluating the code? Well, that's nearly impossible, at least when the code is in machine-readable form. How about the medium? Again, impossible. That leaves the documentation and the listing, both of which are readable. Which do you choose?

If you said "the documentation," you picked the obvious and easy answer. You also picked the answer 95% of all software managers would have chosen.

You also chose wrong!

The fact of the matter is, the only thing that truly represents a software product is its listing. It is the only fully accurate, up-to-date representation of the code the computer executes (assuming a reasonable degree of goodness in your configuration management practices!).

This is not to say, of course, that a listing is an easy way to understand a program product. Even a well-commented listing, of which there are all too few, is hard to read. The help of at least a program overview document to find your way around is pretty essential.

But this is to say that documentation is the wrong way to evaluate a software product.

Behind Software Quality

Consider, for example, the attributes that make up software quality. How many of these can you evaluate by reading the documentation?

- Understandability of the program can be evaluated largely only by reading the listing.
- Completeness of the program must involve evaluating both the documentation and the listing.
- Portability of the program can largely be evaluated only be reading the listing, although a special portability overview document (normally not written) would help.
- Maintainability of the program must be evaluated both from the listing and the documentation.
- Testability of the program can probably be evaluated from the documents.
- Usability of the program can largely be determined from the user document.
- Reliability of the program is mostly determined from experience.
- Efficiency of the program is evaluated by reading the listing and by program execution.

In other words, the software manager who tries to evaluate his software product by reviewing the documentation is missing a lot. He's evaluating the product by its symptoms, not by its attributes.

There may be those of you who are saying, "A properly managed documentation effort *will* accurately reflect a software product."

There may be others of you who will snicker at that statement, recalling how many times you have seen "properly managed" software documents thought to be accurate which the programmer knew were not.

The fact of the matter is, a manager who does not read program listings will never know whether the documentation is correct or not. And programmers on "properly managed" projects have been known to take advantage of that fact.

What is the point of all this?

We software folk are churning out billions of dollars worth of software annually. The fabric of our society is

(Continued on Page 34)

HUMAN CONNECTION/Jack Stone

Is Trade Press on the Right Track?

"I don't expect the trade press to offer us the same material as *Time* or *Playboy*, but it could be a lot more humanistic. I don't think I'm jaded, even though I've been in the business 12 years, but I've lived through an awful lot of product announcements, and the excitement of reading about new machines and software systems just isn't there for me anymore."

This was the terse response from a DP manager and friend of mine when our luncheon conversation drifted around to the DP trade press. I chanced to ask him what he thought about it because I knew he received all the well-known trade magazines and newspapers.

He went on to say, "I do scan the industry news sections, which I feel vastly improved over the years, although I think that 11 years of IBM antitrust trial coverage is about enough.

"I don't think I'm too harsh in my judgment. I know very well that hardware prices are coming down and that means we can buy more computing power and storage; and that packaged software has some great advantages and some caveats; and that there are many more meetings that I would like to attend that I can afford to; and when I'm ready to look for a job, I can start my search in the trade newspapers. How much more hot industry news is there?

"Maybe my point is that our own installation is well stabilized since the crazy growth of the '60s and '70s, and any change now is carefully measured and controlled. This is certainly part of the reason there is nothing much in the press that really thrills me."

I'm not at all sure my friend's opinion about the press is typical. Or that mine is either, for that matter. My own interests are the subjects of data processing management, organization, personnel and human communications. Because there are so relatively few of these articles around — although the percentage seems to be slowly increasing as of late — I consider it to be a serendipitous event when I stumble over one of them.

To obtain some measure of what the major trade publications think about these subjects, I made a quick scan of the "Contents" list in recent issues of six of the better known ones and found that not one of them has a major section or department assigned to the "human side" of the business (although they all had at least one article in the general area).

Perhaps the editors feel readers don't really need this information. However, this doesn't jibe at all with my experience. Maybe the editors believe that it's not the role of the trade press to address such subjects in the same depth as it does hardware or software. But if this is so, where does the practitioner go to get a continuous flow of useful articles in the area?

Or do the editors think readers aren't really that interested? If this is the case, then they're missing a good bet for livening up their publications; because I believe an interesting story on computer crime (particularly how one was detected) or user-DP relations (namely, how to succeed at same) or career growth (with advice on how to keep your people) is very, very important to readers these days.

Here's a chance to express your opinion by completing the questionnaire.

Opinions on DP Trade Press

1. My job is that of:

Executive ___ Systems Analyst ___
Programmer ___ Operator ___
DP Manager/Supervisor ___ End User ___
Other ________ ___

2. I am employed in:

Private Industry ___ Government ___
Education ___ Other ________ ___

3. Here's how I rank trade press coverage, relative to my personal interests and needs (5 is high, 1 low):

Hardware ___ Software ___
Applications ___ Industry News ___
Editorial ___ "Humanistics" ___
Employment Ads ___
Other ________ ___
Other ________ ___

Comments (use separate sheet, if desired):

Mail to Jack Stone, Suite [illegible], [illegible] Wisconsin Ave. N.W., Washington, D.C. [illegible].

Perusing the Symptoms

(Continued from Page 33)

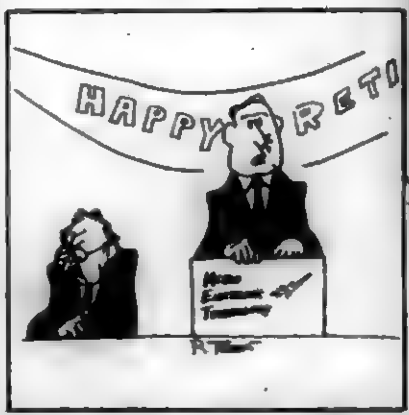
now intricately interwoven with software-controlled threads. Mostly, we are doing our job well.

But nobody — repeat, nobody — is doing the job of evaluating the software product we are producing. Programmers are bored with each other's code. Testers don't have to look beneath behavior. Quality assurance people control without understanding.

And managers? Managers think they are evaluating the product by reading the documentation. In fact, there is a trend toward calling the program product a "software package document." But in reality, managers are kidding themselves. They are not evaluating the program product, either.

So beware, society. Until software managers role up their sleeves and take responsibility for evaluating our software products — by reading listings — we are all at risk.

The software product *must* be evaluated by the manager responsible for its creation.



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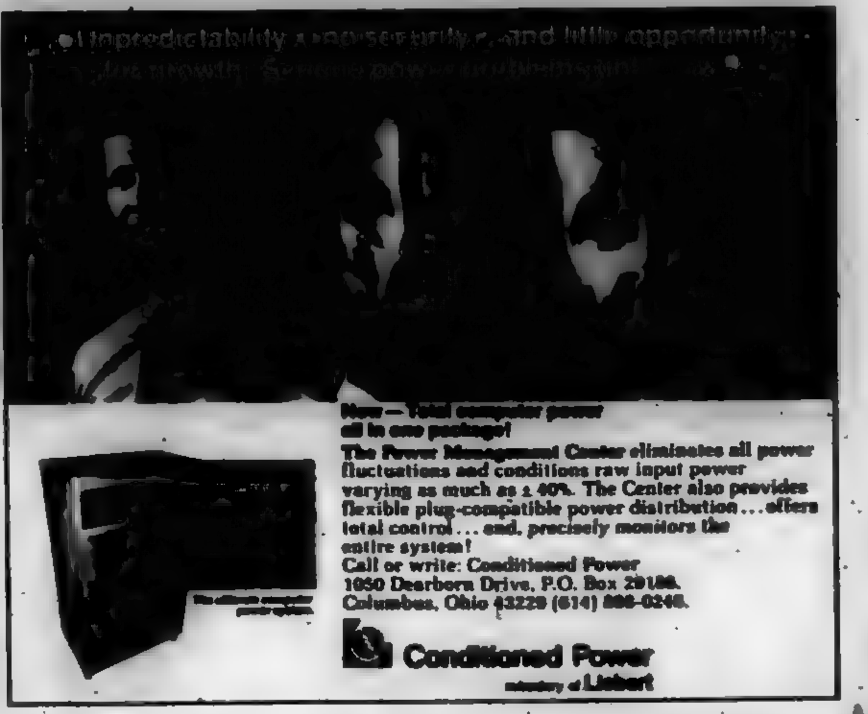

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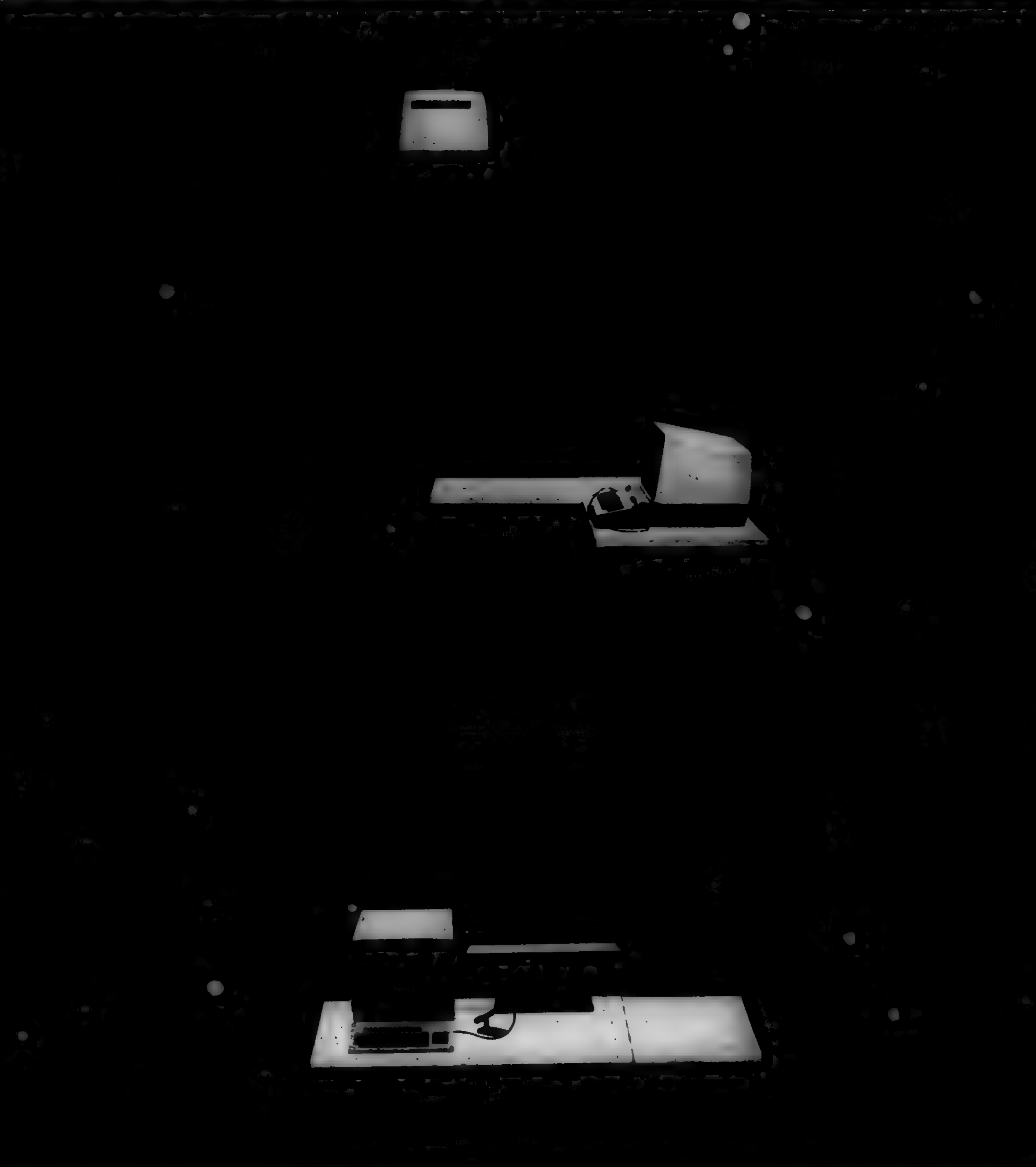


LETTERS

Natural Barriers

Regarding "Probing the DP Psyche" [CW, July 21], the data seems to reinforce my own belief that there are indeed natural barriers that impede the blend of technology into the higher echelons of business.

They are in some measure a function of the personalities who staff our technological front lines.

So, in answer to the question, "Are we technocrats or are we businessmen?", I submit the following quote from Sir Richard Livingstone, who, sometime long ago and far away, wrote:

"A technician is a man who understands everything about his job except its ultimate purpose and its place in the order of the universe."

Paul Skalube

Johnston, R.I.

Borrowing OK

The "Computers and the Draft" editorial [CW, July 28] requires a response.

As a taxpayer, I applaud the decision to borrow manpower, keypunches and computers for registration (not draft, as stated in the editorial headline) instead of creating a new empire for a (hopefully) infrequent event.

As a privacy-conscious citizen, I agree with your privacy concerns, but do not see how the use of borrowed equipment and people materially affects those concerns.

Leland H. Williams

Research Triangle Park, N.C.

A Note About AWC

First, we would like to express our appreciation for *Computerworld's* comprehensive coverage of the activities of our organization, Association for Women in Computing (AWC). CW's reports on the greater New York and greater Boston chapter meetings gave people a chance to get to know what our organization is doing and what it has to offer to them.

However, with regard to the article "AWC Plans to Boycott NCC '81" [CW, June 2], a couple of corrections are required. The major one involves the statement that the resolution was approved by the AWC membership. It was not approved by the membership, only by the AWC board of directors. I related it to the reporter prematurely since there was and is a companion resolution which is still outstanding to bring this issue to a vote of the full membership.

As the article noted, this matter is still open for reconsideration by the new board as well as by the full AWC membership. One other small point: I spoke of women who believe in "themselves," not in "the cause," as stated in the article.

Linda Taylor
President

AWC
Washington, D.C.

Systems Career May Pose Danger

(Continued from Page 33)

knowledge and the concern with many details required of DP personnel.

In order to achieve enhancement in personal status, a Type A person values the esteem of his superiors above that of his peers. This may lead to the aloofness of DPers.

Two factors can explain the apparent contradiction that although aloof, DPers tend to be group-oriented. First, in a DP environment, getting a system operating requires participation within a group. Second, any group of intense, achievement-oriented individuals require an informal support system. Birds of a feather flock together.

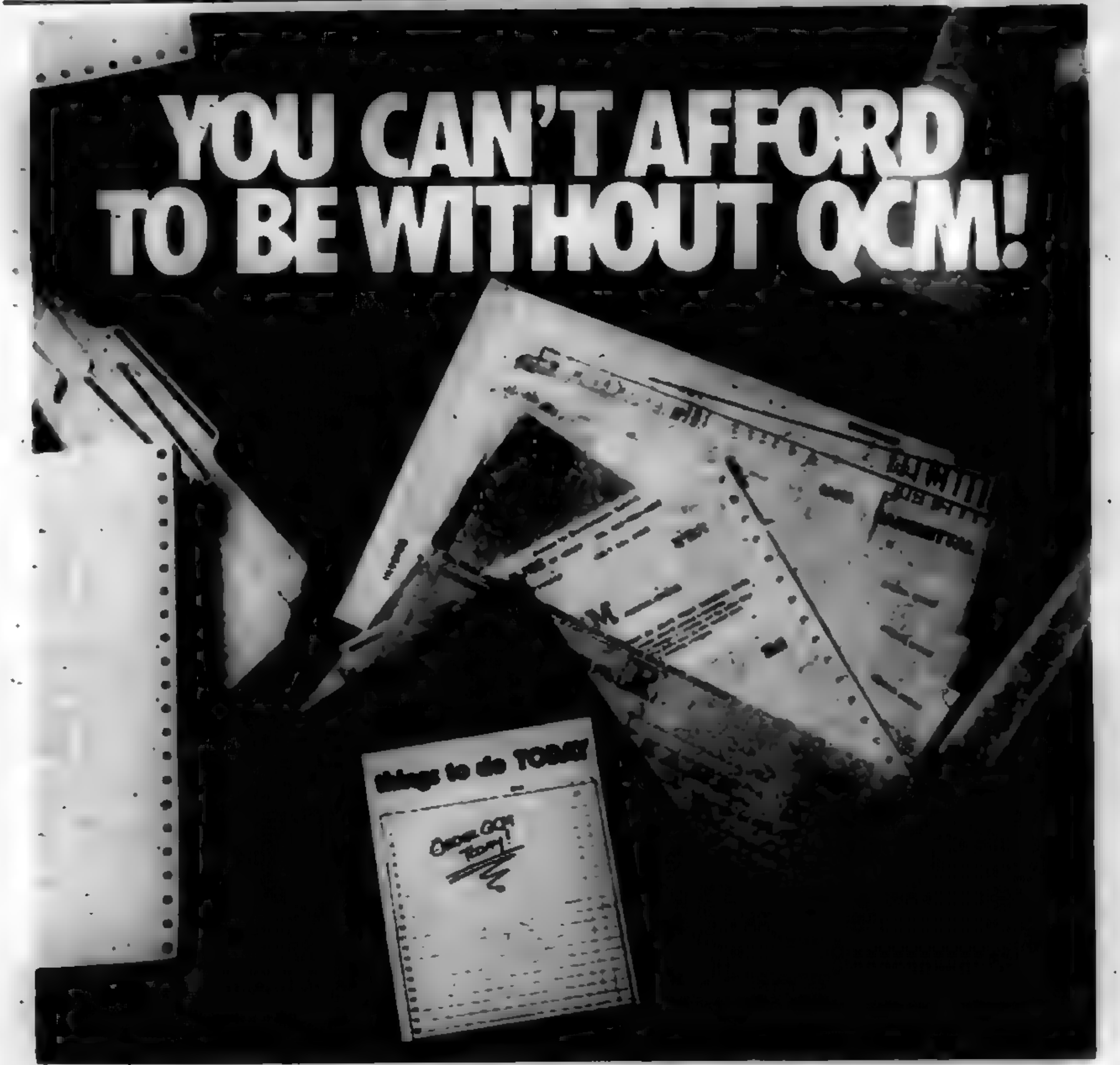
High Turnover

The quest for status and tangible accomplishments, augmented by a covert insecurity, undoubtedly leads to the high turnover among DP personnel.

Stevens noted no difference between DPers and non-DPers with regard to patience and calmness. This contradicts both the Type A profile and the rest of the DP profile.

Data processing appears to provide a perfect environment for Type A behavior to manifest itself. Progressive psychologists and physicians have and are investigating how individuals can control their Type A personalities. Better understanding of the DP function both in limiting turnover and in improving morale.

Fuerst is principal investigator for the Army's Construction Engineering Research Laboratory in Champaign, Ill.



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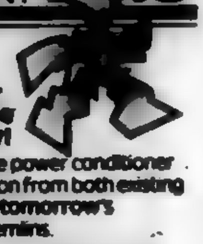

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Over-initiation is a case in point. As you add batch jobs or log-on more TSO or CMS users, the increased job load will eventually result in page thrashing and resource conflict. That threshold can be reached long before your CPU is 100% busy.

As illustrated in the graph, a high-speed paging device, such as STC's 4305 Solid State Disk, will dramatically [illegible] your system's performance capacity by [illegible] to over-initiation. Faster page response time [illegible] your paging throughput while dedicated paging storage reduces contention on your disk subsystems.

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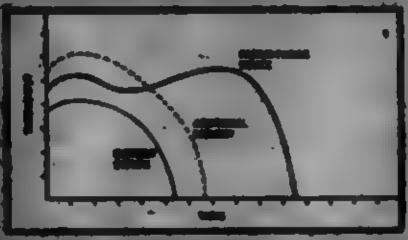

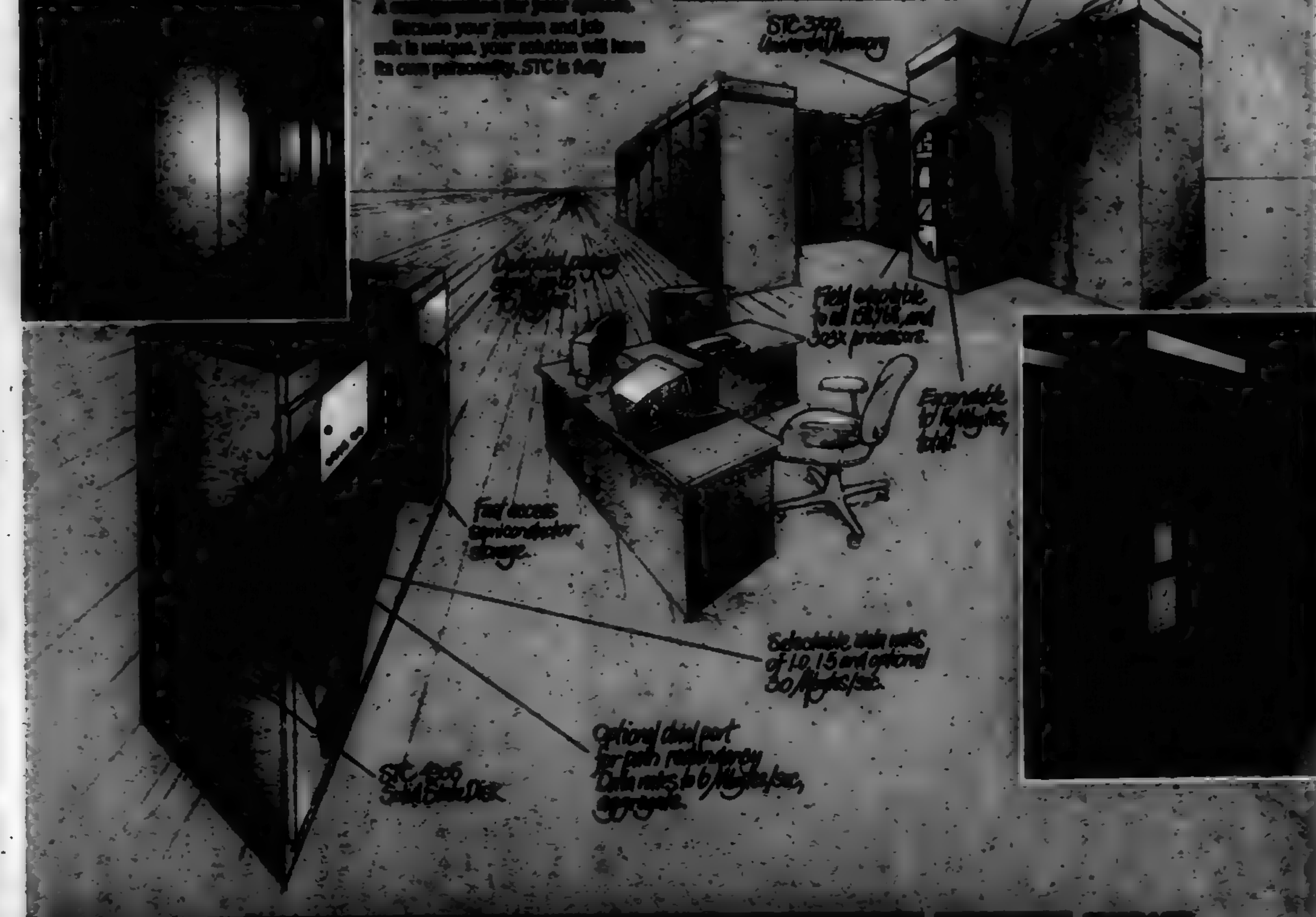
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LETTERS

Experiences With 4341

We have read with interest recent articles in *Computerworld* relating to initial installations of the IBM 4300 systems and the work load and complexity of installing DOS/VSE.

As the first IBM 4341 installation in New Zealand or Australia, we thought your readers might also be interested in our experiences.

Our DOS/VSE conversion involved three major changes:

- From 370/138 to 4341.
- From DOS/VS Release 34 to DOS/VSE Release 35.
- From 3340/3344 disks to a 3340/-3344/3370 combination.

Performance gains have been impressive. In the first stage, still using DOS/VSE Release 34, a 30% throughput gain was observed in batch mode, while many on-line response times were so quick they could not be measured. Unchanged peripherals such as the 3203 printer, 3420 tapes and 3340 disks were a limiting factor on performance.

Implementation of DOS/VSE Release 35 and utilization of the 3370 disk drives was found to double batch throughput on disk jobs compared with use of the 3340s, and the display console operation has proved significantly faster.

Perhaps the most outstanding feature of the DOS/VSE Release 35 software has been its quality. To date, not one bug has been found. A total of five bugs were encountered (in CICS/VS and Sort/Merge II) but fixes were already available for these.

It is perhaps in the area of known problems that advance support from IBM would have reduced the number of typical implementation problems. Nevertheless, the level of IBM support during installation was very good.

A drawback to Release 1 of the DOS/VSE Sipo/E tape is that while it contains the 3705 EP software for Binary Synchronous operation, it does not contain the Vtam or Network Control Program (NCP) components for Synchronous Data Link Control operation. In fact, we were not advised by IBM that it was even necessary to order the NCP software separately. We understand these will be incorporated with the Release 2 Sipo/E tape.

Unquestionably the worst aspects of installing DOS/VSE Release 35 in our "conversion" environment were the substantial amount of work involved in cutting over from Release 34, tailoring of the system and the number of problems encountered in doing so. It was a major exercise requiring one week's planning, two nights on the IBM Data Center 4331 and five full weekends on the MSI 4341 before being operational. Subsequent replacement with the Release 2 Sipo/E is expected to be comparatively straightforward.

A new DOS/VSE installation should not experience the same amount of work. However, the DOS/VSE Sipo/E does require an excessive amount of disk space, and users with less disk capacity than MSI would have a substantial tailoring exercise.

Like many installations, we run an on-line system during the day, with batch production overnight, which prevents concurrent generation of the DOS/VSE system. It seems a serious deficiency of the IBM DOS/VSE software generation procedure that a dedicated machine is normally required, and the whole process is so time-consuming.

Despite these initial problems, we are very pleased with the performance of the IBM 4341 and with the quality of the DOS/VSE software.

Rankin is corporate DP manager for MSI Computer Services, a division of MSI Corp. Ltd., in Auckland, New Zealand.

SCI vs. IBM

On July 1, the U.S. Court of Appeals for the Ninth Circuit handed down an 11-page opinion in the software antitrust suit entitled Symbolic Control, Inc. vs. IBM, reversing the trial court's dismissal. The article "Symbolic vs. IBM Continues Software Pricing Debate" [CW, July 21], was incomplete and at times inaccurate.

1. Contrary to *Computerworld's* article that "for all real purposes [Symbolic] went out of business in 1971" and "Symbolic never won a customer," from April 1972 to April 1974, the National Aeronautics and Space Adminsitration's (Nasa) Ames Research Facility leased Symbolic's ART/70 for $1,000 per month. Although the Nasa lease is not mentioned in the opinion, I told CW about it in a telephone interview. Also, from March 26 through November 1971, Rohr Corp., on a trial basis, leased APT/70 from Symbolic for computer time in lieu of money.

2. I told CW that in September 1974, Symbolic filed its pretrial statement with the court specifying trebled damages of $189 million through 1978. For CW to report that "Symbolic, in its trial papers, said damages include $1.2 million" and then "Those damages were subsequently estimated through 1978 to be $63 million, said Arthur Pfeiffer" creates the *false* impression that Symbolic's actual damage claim is $1.2 million and any larger sum is only the expression of my current subjective wishes.

3. CW reported this case as though it dealt only with acts committed by IBM "after IBM unbundled software in 1969." However, Symbolic charges that IBM failed to price software and related services (including APT) both *before* and after IBM's June 1969 unbundling announcement. The Ninth Circuit understood this and held that Symbolic (incorporated in March 1969) could have been injured by the

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LETTERS

continuing "adverse competitive effects" of assumed violations committed by IBM prior to Symbolic's business existence.

Accordingly, IBM is legally accountable for earlier violations which caused later injury regardless of IBM's trial defense that "'plaintiff knew,' before entering business, about this or that aspect of IBM's marketing" or that "IBM neither could nor would impose a charge on programs already distributed without restriction and in the public domain."

IBM's "public domain" defense is contradicted by its own documents, some of which Symbolic did not discover until after trial, but which are now in the court record, showing that as late as 1972, (a) IBM gave its customers NC360 Systems Manuals labeled "RESTRICTED DISTRIBUTION," (b) IBM selected users to test new NC360 releases prior to general distribution who signed IBM nondisclosure agreements declaring the NC360 material to be IBM "confidential and proprietary" and (c) in February 1972, IBM released for a *$500 per month* price (12-month limit) its *free* 1971 NC360 model modified to run under the CMS time-shared operating system *without* general interactive APT processing.

The Ninth Circuit recognized the critical effect of *price*, or more accurately *no price*, on a buyer's decision to choose a *free* product over a *priced* one. Even assuming that IBM's *free* NC360 software was superior in quality to Symbolic's *priced* APT/70 software (a factual dispute to be resolved in future trial proceedings), the Ninth Circuit concluded: "We hold that, on this record, IBM has not demonstrated that Symbolic's losses were unrelated to conduct of IBM . . ."

The Ninth Circuit went on to point out that a finding of no impact could only occur if IBM could show an intervening cause, such as plaintiff's "managerial weakness" as claimed by IBM, sufficient "to overwhelm any impact of the federal law violations."

For years, to the best of my knowledge, this case has been the only private software antitrust suit against IBM. Although filed on Nov. 16, 1971, this case has never been mentioned by IBM in its annual reports to shareholders. In general, the press and the computer industry have been unaware of its existence.

Nevertheless, in my opinion the issue of predatory pricing of software from 1964 to date is of sufficient magnitude to be of interest to these groups and the legal community. A judgment in this case finding IBM guilty of monopolizing and foreclosing competition in separate software markets via predatory pricing and an illegal tie-in between hardware and software could greatly affect the entire computer industry.

Arthur Pfeiffer
President

Symbolic Control, Inc.
San Francisco, Calif.

'Ego-Filled' Programmers

Whenever I read articles that point to egoless programming as the solution to all our problems, I can't help wondering whether we aren't attempting to contradict history. Throughout history it has been men and women who followed an inner calling and used their imagination to create something unique who have made the greatest contribution to our society. I think of people like Frank Lloyd Wright, Thomas Alva Edison, Albert Einstein, Marie Curie, and Johann Sebastian Bach.

Few of them were egoless. Some were eccentric. While all of them were subject to the criticism of their peers, they did not allow it to rule them or force them to compromise their talent.

I submit that what we need are more "ego-filled" programmers — men and women who take pride in their work, who follow their inner calling in producing something unique, who treat it as their own and have the patience to nurture it through to fruition. What we do not need are interchangeable parts of a machine — blobs of humanity that are indistinguishable from one another.

P.A. Anderson

Chicago, Ill.

Timely Suggestion

Data base processing is now a reality for most large-scale computer outfits. Most shops have developed multiple secondary indexes to achieve inverted accesses to work alongside their one primary index. As a data base grows and sequential processing takes longer and longer, it is the perfect time for alternate primary indexes to come on the scene.

What is an alternate primary index? It is a method of preventing long sequential processes in cases where about 10% to 20% of the data structures contain the information needed. Even the best organized data base can have the sequential blues — meaning, here we go again for another five-hour run.

Simply write a data base utility to extract the keys of the roots you desire to access with one pass of your data base. During this pass, create as many alternate primary indexes as you need on a KSDS Vsam file. Use your daily update system to maintain these new indexes once created.

Now each time you need to access the data base for a special situation, use the alternate primary index as a guide, using qualified GHN calls as you merrily speed through the data base.

How does 80% to 90% faster access sound to you? Well, it sounded great to me, and that is why we now use alternate primary indexing here at Utica National Insurance Group.

D.L. Watson

Utica, N.Y.

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They contain insufficient technical detail and never contain even the most general pricing information. I get angry when I am required to call the companies again to complain that they have not answered my most general questions.

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Stephen B. Waters

Rome, N.Y.

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THE TAYLOR REPORT/Alan Taylor

NCR User Missing Crux of Argument

In its battle with NCR Corp., Perl-Mack Enterprises of Denver may be missing a real contract breach, in my opinion.

As described in the past two Taylor Reports, in 1977 NCR offered to write three additional software applications at a low ($5,000 total) price in order to win a bid that had been rejected. To convince Perl-Mack that it was serious, NCR also included a contract term in the hardware order that delayed the payment of the 90% outstanding hardware balance — but not its delivery for use — until all the systems were functional.

Delivery was expected in less than six months, but in fact the additional software was never delivered. In the meantime, NCR first obtained payment of the 90% hardware balance by threatening to remove the user's computer and also attempted to collect $26,000 for the more expensive four accounting applications that were delivered in March this year — two years late.

The matter has gone to arbitration, and both the user and NCR have set out their claims.

NCR's failure to supply the software for bank balances, commercial leasing and volume projection as it had contracted has had obvious costs for Perl-Mack. Its staff has had to keep doing these tasks without computer assistance, and equivalent software may yet have to be obtained.

In addition, the company's efficiency in conducting its apartment house business may have been lost, and now the software may have to be obtained at 1980, rather than 1977, prices.

In the claim before arbitration, Perl-Mack's president bases damages on NCR's failure to make a Jan. 31, 1979 deadline for the delivery, which he says was agreed upon. However, when this date quoted by NCR during negotiations in late 1978, the vendor also made an equally clear statement that the date might not be kept.

In fact, NCR district manager David Olivet specifically said that if it was not, then no payment for any of the software would be expected by NCR until all software was delivered and functional.

The letter made no real agreement to maintain the Jan. 31 date. And if the Universal Agreement terms are applied to the Olivet letter, as the user seems to suggest in the claim for arbitration, there is no provision that would permit more than direct damages — the cost of replacing the software and so forth.

What the user does not claim — perhaps because he is in the apartment leasing business, not the computer business — is an earlier contract breach, in my opinion, that seems to have occurred in 1977 and after. This was a breach of NCR's duty, under the contract, to put forward its best efforts to make any indicated delivery date.

'Best Efforts' Requirements

John G. Coleman, NCR's regional systems engineering manager, recently set down conditions that the user would have to meet to even stand a chance of having NCR complete the contract. In a letter last March, Coleman demanded that, if NCR were to do anything, it would have the right either to simply write the applications in the way they were currently operating in the user's shop or to make them compatible with the data base approach the user had told NCR it wanted.

This shows — and my investigations have confirmed — that the applications NCR has failed to deliver could be written independently of the accounting software. NCR could have put an independent development team on each or all of them.

Another view of the facts comes to the same conclusion. The fact that the decision as to the basic development approach was still up in the air this March also indicates that NCR, in my opinion, had not even begun to put forward its best effort to deliver the software.

Whether a similar argument can be made for the rest of the software is not particularly clear as yet — but then it may not be legally relevant either. If a breach of contract occurred early, then damages resulting from the breach would extend to the period before the delivery date was missed.

Probably many of the damages that would be consequential for a later delivery date, breach would be direct in the case of the early, best efforts, breach. This would reduce the fight over the legal meaning of the consequential damage clause.

Still, even if Perl-Mack can make a cast-iron case for early, or even repeated, breaches of various agreements, this may not help the user very much at all. In a totally different fight that started just last month, NCR objected to all the arbitrators first selected by the American Arbitration Association. This fight and why it can cost an NCR user its legal rights will be described in a forthcoming report.

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That's why we're covering it in
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October 6th Info 80 Show Issue
October 13th Info 80 Wrap-up Issue

Computerworld will bring you two-part, total coverage of the most important information equipment show in the East. Info 80 will be held again this year at the New York Coliseum, October 6th-9th. A heavy turnout is assured with a record audience of between 22,000 and 25,000 corporate executives, DP managers and administrative managers—Plus, there'll be more than 200 exhibitors, 250 speakers and 80 sessions.

Computerworld will have up-to-the-minute coverage of Info 80 in our October 6th issue. And in our October 13th Wrap-up issue, you'll read what went on in those four days, compare the best ideas of the best minds in the industry and find out not so much how a product works but what it can do for you.

We also have a booth there, so if you're going, stop by #2525 for a free copy of our Show issue. It'll outline the high points of the show—exhibitors, speakers, special events—along with a guide to night life in New York. Ad closing dates for these two special issues are shown below.

If you're aware of the revolutionary changes taking place in the use of information systems and the impact they can have on your business—you can't afford to miss this two-part total coverage. And if you're exhibiting, be sure to put your ad in both of these issues. Your Computerworld representative can give you full ad planning assistance. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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How Do You Negotiate With IBM?

Lawyer Briefs Legal Side of Acquisitions

By Rita Shoor
CW Staff

CAMBRIDGE, Mass. — How do you negotiate with IBM once you have reached the contract stage in the software acquisition process?

You don't. That was the consensus of opinion among attendees here at a session of the recent Computer Graphics Week '80, a conference sponsored by the Harvard Laboratory for Computer Graphics.

"IBM almost removed the lawyer's role [in contract negotiation] with its standard contract," Warren G. Lavey, an attorney with the legal consulting firm Lexecon, Inc., observed.

However, many other vendors are more amenable to negotiating contract terms for software packages, he said.

Legal Aspect Overlooked

"Systems engineers (SE) and DP managers tend to overlook legal considerations" once the contract-signing stage in the acquisition process is reached, Lavey maintained. The technical specialists feel they have done their work and it is up to the lawyer to cement it, he observed.

An SE or DP manager may become intimidated and confused by the legal issues and jargon of software contracts. Soon, anger emerges about delays in closing the deal caused by negotiations over what seem to be unrealistic or inconsequential concerns, he said.

On the other side of the fence, Lavey noted, the lawyers struggle to describe the applications software and its uses, to provide for the risks involved in the acquisition and use of the software and to ascertain whether the transaction fits into certain legal categories.

He stressed the need for an integration of effort between the technical and legal specialists since "the legal aspects of acquiring an applications software package can turn an attractive package into an unattractive deal."

And the legal ramifications may become even more complex when applied to graphics software packages. Graphics software is "very interactive" with I/O devices such as plotters, digitizers and terminals. For example, a graphics application package is "more closely tied to its hardware" than something like a batch-oriented accounting package, Lavey pointed out.

If the end-user purchases his terminals, plotters, CPU and graphics software from four different vendors and the whole system performs unsatisfactorily, the close software/hardware integration may increase the difficulty of pinpointing the blame, he warned.

The result may be an increase in the number of computer-oriented litigation cases and according to Lavey, an increasing need for lawyers who can understand computer technology.

Since "the legal, technological and marketing concerns which ultimately determine the character of the transaction and the benefits each party will derive" are solidified in the software contract, it is to the system

(Continued on Page 42)

System 2000 Gets Prompting

AUSTIN, Texas — Intel Corp. has unveiled a prompting facility that works with its System 2000/80 data base management system and integrated data dictionary (IDD).

Known as Query/Update By Example (Qube), the menu-driven data manipulation facility increases end-user, programmer and data administrator productivity by prompting the user step by step through a transaction, the vendor claimed.

Qube is reportedly similar to IBM's QBE. The user requests its activation by entering the CICS transaction "QUBE." The facility then requests user identification and lists the records which the user has authorization to access.

Next, it presents a formatted screen of item names followed by spaces for each item specified for that record. At any time, the user can choose to display or update any record related to the one currently being displayed, an Intel spokesman said.

The user enters the record name and Qube automatically follows physical (parent or descendent) or logical (linked) relationships until the new record type is found. Multiple data bases are transparent to the user.

The user can continue through the entire network updating any record type, adding a new occurrence to related records or moving a record wherever desired, according to the spokesman.

Using the IDD, the data administrator defines a logical view which determines the items and records accessible for each user.

The facility is priced at $20,000, Intel said from its Commercial Systems Division, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

For Cobol Program Generation

'Score' Now Tackles DOS/VS, VSE

NEW YORK — An interactive version of Score, a Cobol program generator, for IBM DOS and DOS/VS and VSE operating systems has been introduced by Software Design Associates (SDA).

The new version includes a prompter for on-line input with a CRT and carries a guarantee of a full refund if Cobol programmers fail to generate code at least 25% faster within 60 days of installation, the vendor stated.

The price for the basic system is $12,500 and $19,750 for the full-feature system, including a three-day hands-on workshop.

Originally developed in 1968, Score has nearly 500 users in applications of program conversions, maintenance and report writing and test data generation.

An interactive version of Score for IBM OS users was offered by SDA as of June 1980. The product is also available for Univac, Burroughs Corp and Honeywell, Inc. mainframes.

SDA is at 75 E. 55th St., New York, N.Y. 10022.

Prime 50s Get APL

PONTIAC, Mich. — Two APL interpreters that are said to take advantage of the Prime Computer, Inc. 50 series hardware and virtual memory operating system design have been introduced by Mips Software Development, Inc.

The APL/LW — for a large work space with up to 31M bytes per user — and APL/LWSF — for shared files in large work spaces — are said to provide capabilities similar to IBM's APLSV and VS/APL.

Features include the implementation of all APL operators, system variables, system commands, I Beam functions and system functions. Files created by other language processors like Fortran, Cobol, RPG, Basic, PL/I and Pascal may be read from APL/LWSF using the sequential file access functions. APL may also create files designed to be processed by non-APL languages.

The APL/LW version costs $8,900 and the APL/LWSF version costs $11,500.

Mips Software is located at Suite 202, 1899 Orchard Lake Road, Pontiac, Mich. 48053.

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Cincom Updates Series 80 LMS-II

CINCINNATI – Cincom Systems, Inc. has enhanced its Series 80 LMS-II development operations control package to offer IBM OS and DOE users what it said are better system editing capabilities for source programs and improved operating system queue display and system control facilities.

Series 80 LMS-II now contains TOP and BOTTOM commands to allow quicker editing of data members, the firm said.

New capabilities include enhanced forward and backward paging and additional DOS or DOS/VSE features including multipartition job submission.

The enhancements are offered to current LMS-II users at no extra charge. The package costs $17,500 in an OS environment and $15,500 in a DOS environment, the vendor said from 2300 Montana Ave., Cincinnati, Ohio 45211.

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Performance, Integrity Reporting

DBMS Offers IDMS Analyzer

LOMBARD, Ill. – The Systems Division of DBMS, Inc. has released a software analyzing system that is said to provide extensive performance and integrity reports from the archive journals produced by Cullinane Corp.'s IDMS data base management system.

The IDMS Journal Analyzer system is compatible with Release 5.0 and 5.5 of IDMS and its related operating system. Designed to supply information needed to manage the IDMS environment, the analyzer software delivers data concerning program volatility, resource contention, tuning and integrity in an understandable format and at a level of detail controlled by the user, a spokesman said.

The information provided by the software allows verification of new programs and the detection of problem areas such as ineffective programming techniques, data base corruption and improper generation of the central version. A user manual is supplied with the software which allows the user to interpret and apply reported information to the data base environment, the spokesman explained.

The software costs $7,500 plus a 10% yearly license renewal fee. Copies of the user documentation as well as a 30-day free trial are available.

DBMS can be reached at 33 W. Roosevelt Road, Lombard, Ill. 60148.

Training Courses Set

LOMBARD, Ill. – DBMS, Inc., a firm specializing in data base and data communications, is offering a series of software training courses in various locations throughout the country.

Scheduled to begin Sept. 8 in San Francisco and run through mid-February, the courses will spotlight data base technology and Cullinane Corp.'s Culprit report generation package and IDMS data base management system.

The courses generally run a few days and are aimed at experienced programmers, systems designers and programming supervisors. However, anyone with a basic understanding of computers and programming can benefit from the subject matter, a spokesman noted.

Course topics include "Comprehensive IDMS," "Comprehensive Culprit," "Data Base Design With IDMS," "Application Programming With IDMS" and "Integrated Dictionary for IDMS."

A three-day session on "Data Administration for IDMS" will offer the guidelines required to manage a contemporary data base environment, the spokesman explained.

The courses will be held in Stamford, Conn., San Francisco, Chicago and Oak Brook, Ill., and cost from $375 to $495.

In addition, the fifth person enrolling from the same organization can attend the course free of charge.

For those corporations unable to attend classes in the designated cities, DBMS will for a fee send an instructor to set up and arrange a class at the nearest hotel or convention center. The special package programs are priced at $1,300 per day for up to 10 students to $1,675 per day for up to 25 students, plus instructor expenses.

Details on the firm's course offerings and education packages can be obtained from the company's Productivity Division, 33 W. Roosevelt Road, Lombard, Ill. 60148.

Legal Side of Acquisitions Briefed

(Continued from Page 41)

manager's advantage to gain familiarity with how four particular areas of law are involved in acquiring applications software, Lavey said. Those areas include the following:

- Proprietary rights in information (trade secrets, copyrights, patents and trademarks).
- Contractual restrictions on resale and use (antitrust considerations).
- Liability for representations (express warranties, warranties implied by the Uniform Commercial Code and the tort law of fraud).
- State sales taxes related to the transaction.

Trade Secrets

The most common method of attempting to secure legal protection for applications software involves the law of trade secrets, Lavey said. This protects the software developer against disclosures or uses of his information when such actions constitute a breach of confidence.

Software vendors often claim these protections for their products, but don't bother to enforce them because of technological and market changes. "However, an increase in trade secrets litigation" is a reasonable expectation, according to Lavey.

Current antitrust laws cause the "prudent [software] developer to refrain from selling and passing title to his package," Lavey explained. Therefore, the transaction between the developer and the acquirer (rather than buyer) may take the form of a restricted license.

"Careful drafting of the contractual provisions [regarding restrictions on resale and use] is necessary," the attorney cautioned, because "the distinction between a license and a sale is not well-defined in the law."

The acquirer of the software package will naturally want some legal recourse against the developer for unsatisfactory performance, and this is provided for via expressed written or verbal contractual provisions, Lavey said.

Finally, the "body of law dealing with the taxation of such transactions [acquiring an applications software package] has grown," he pointed out.

Inventory/Financial System Fits Honeywell Level 6

TEMPE, Ariz. – An on-line Inventory/Financial Management System for the Honeywell, Inc. Level 6 is being offered by Independent Computer Systems (ICS).

The system includes inventory, accounts payable, accounts receivable, order entry, purchasing, payroll and general ledger.

It features total integration of all systems, secured access through variable menus based upon operator/password codes and transaction logging capability, fast implementation due to flexible system parameterization, on-line and interactive feedback, a maximum of 10K words per terminal memory and full support, the vendor said.

A basic system costs $25,000 from ICS at 1201 E. Knight Lane, Tempe, Ariz. 85284.

Correction

Duquesne Systems, Inc.'s QCM [CW, Aug. 4] has always been available for MVS. Version III, however, offers support for VM/MVS.

A big week for small computer specialists

The sixth Minicomputer/Microcomputer Conference and Exposition will be held in Brooks Hall and San Francisco Civic Auditorium, October 14-16.

Everything that's new and significant about small computers and systems will be on display on Mini/Micro's show floor and reviewed by experts in the Civic's four spacious auditoriums.

And there are some important extras! The Association of Computer Programmers and Analysts will hold its 10th anniversary conference just preceding Mini/Micro (call (800) 556-6882 for full details) and U.S.U.S. (the UCSD system users' society) will meet for three days during and following Mini/Micro. There will also be a day-long, Introduction to Pascal seminar.

Mini/Micro's professional program, previewed below, offers 60 hours of up-to-the-minute information in 24 half-day sessions.

Mark your calendar now, and use the coupon to request the Mini/Micro detailed preview program, available September 1.

TUESDAY, OCTOBER 14, 9:30 AM

1. The Small Business Computer in the Next Five Years
S. Henry Sacks, Mini/Micro Systems

2. Pascal Applications in the Minicomputer Environment
A. Winsor Brown, Point 4 Data Corp.

3. Professional Programmers/Analysts' Role with Small Computers
John Prior, Consultant

4. Impact of New Technologies on Marketing Opportunities for OEMs
Richard Able, Christman/Able Advertising

TUESDAY, OCTOBER 14, 1:30 PM

5. Quality Assurance for Small Computer Software
Murray Zuckerman, Consultant

6. Are Programmers Really Necessary?
Richard Dalton, Open Systems

7. Microcomputers in Banking
Robert Reffelt, Chase Manhattan Bank

8. Data Communications for Minicomputer Users
Roger Evans, Micom Systems

WEDNESDAY, OCTOBER 15, 9:30 AM

9. Pascal Open Forum: Implementation Interfacing to Existing Systems
A. Winsor Brown, Point 4 Data Corp.

10. Design Objectives for Color-Graphics Desktop Computing Systems
Ed Bride, Hewlett-Packard (DCD)

11. Winchester Disk and the Backup Issue: What's Happening?
Larry Hemmerich, Cipher Data Products

12. Effects of Microcomputers on Marketing *Jim Jordan, Moxon Electronics*

WEDNESDAY, OCTOBER 15, 1:30 PM

13. IBM Watching: New Directions for Small Computers
John Rehfeld, International Data Corp.

14. Software Evaluation and Selection
Bill Fisher, Arthur Young & Co.

15. Session title and organizer to be announced.

16. Current trends in Computer Graphics
Dr. John Moreland, Megatek Corp.

THURSDAY, OCTOBER 16, 9:30 AM

17. Latest Armament in the Winchester Revolution
Randy Knapp, Wespercorp

18. Data Base Capabilities in Small Computers
Susan Kolb, Hewlett-Packard (DCD)

19. Computer Security in the Mini/Micro Environment
Bill Fisher, Arthur Young & Co.

20. Information Processing and Reporting: State of the Art in the "Paperless Society"
Mike Helft, Arthur Young & Co.

THURSDAY, OCTOBER 16, 1:30 PM

21. Distribution Alternatives for Small Business Computers
Robert R. Mueller, Office Products Dealer Magazine

22. Increasing Market Potential for Minicomputer Distribution
Bill McNamara, Systel Corp.

23. Systems in Hospitals and Health Care
Neil D. Kelley, Infosystems Magazine

24. Session title and organizer to be announced

Mini/Micro 80 32302 Camino Capistrano, Suite 202, San Juan Capistrano, Ca 92675

☐ Please send me the detailed Mini/Micro preview program (Sept. 1)

☐ Please send details and registration materials for the Introduction to Pascal seminar on October 13.

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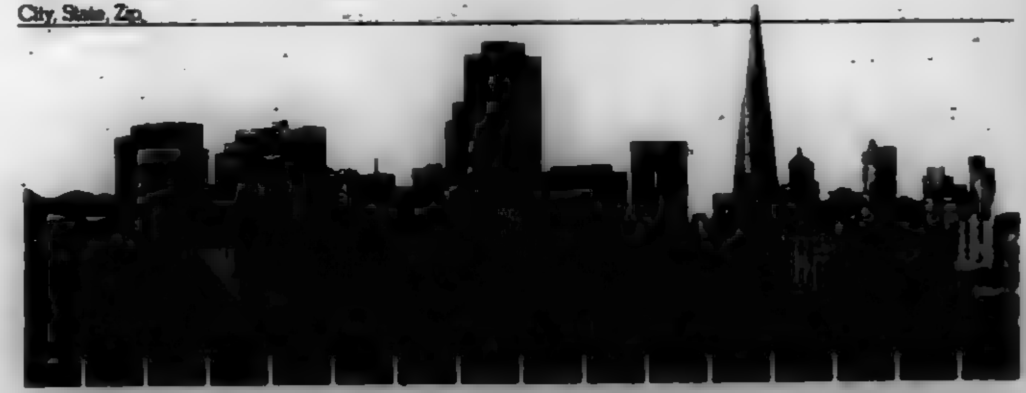

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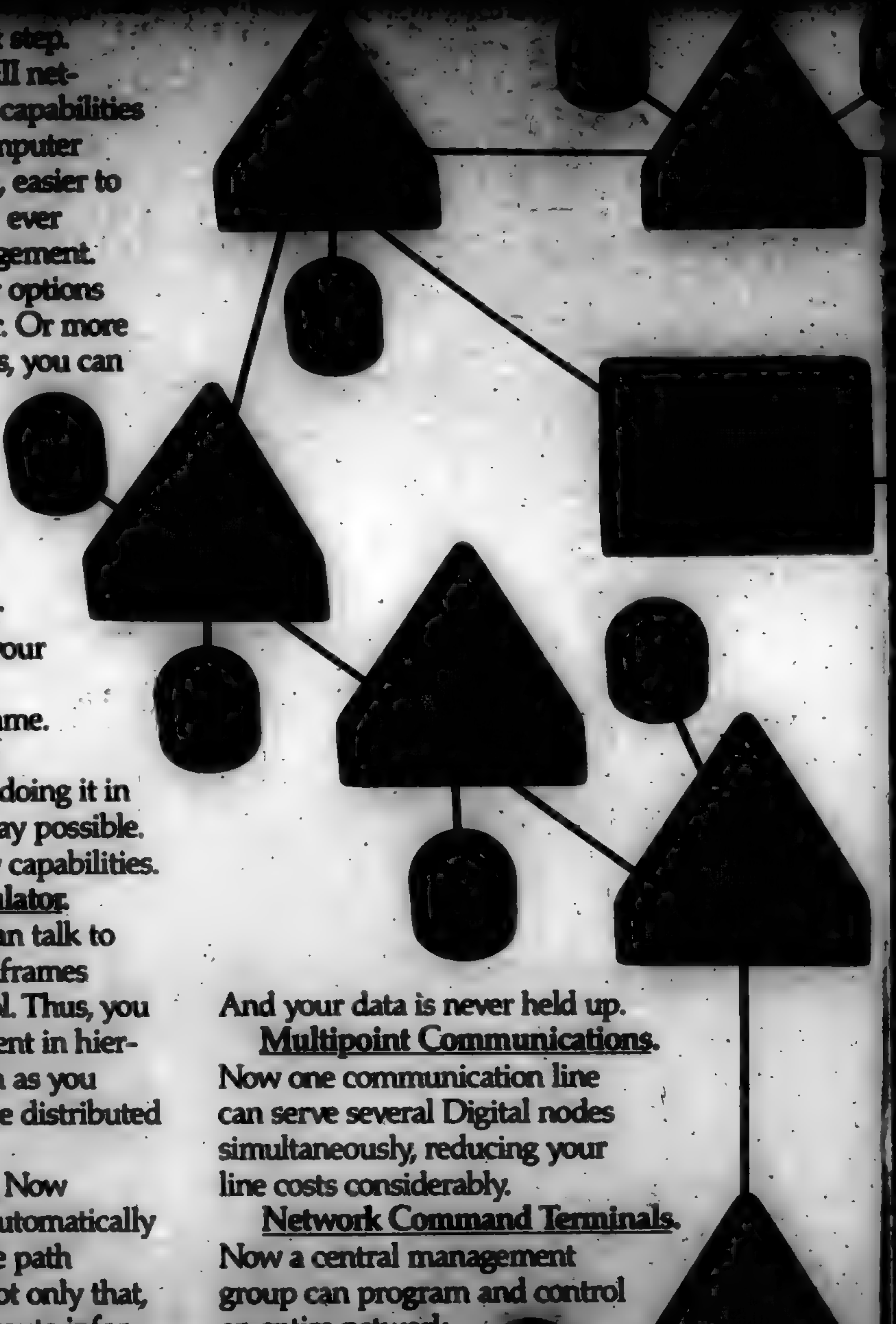

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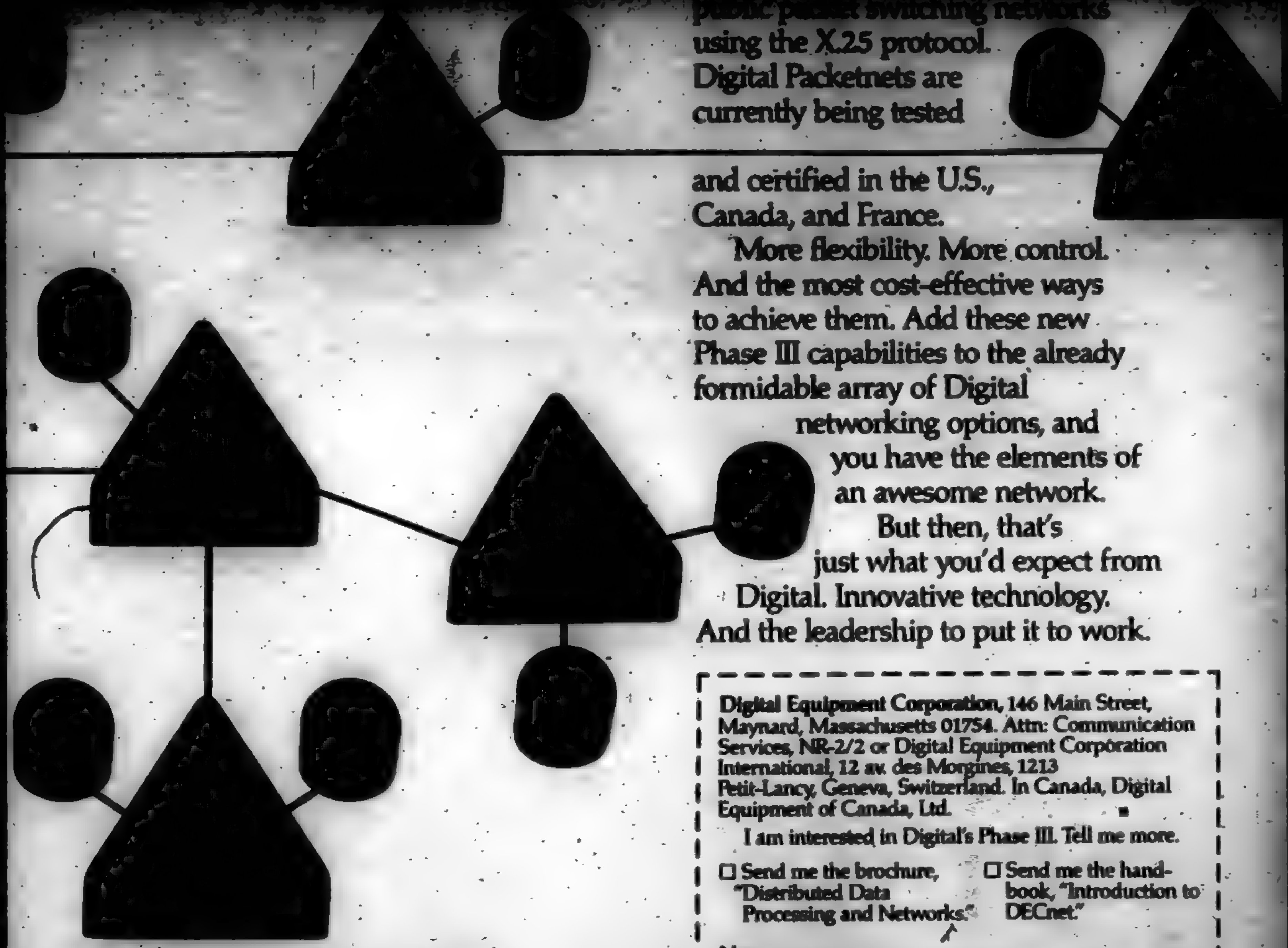

thus cutting the cost of programming individual nodes in widely dispersed locations.

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Digital Equipment Corporation, 146 Main Street, Maynard, Massachusetts 01754. Attn: Communication Services, NR-2/2 or Digital Equipment Corporation International, 12 av. des Morgines, 1213 Petit-Lancy, Geneva, Switzerland. In Canada, Digital Equipment of Canada, Ltd.

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Tests and Distributions

Tektronix Adds Statistical Programs

BEAVERTON, Ore. — Tektronix, Inc. has announced a line of statistical test and distribution programs for its 4050 series of graphics computing systems.

The Plot-50 Tests and Distributions package is a collection of 18 general purpose statistical routines, 17 special-purpose function keys and 13 data management facilities, the vendor said.

The package was designed to support the 4050 in engineering design, statistical research and management reporting applications.

The function keys are said to allow easy program operation for novices, and the programs reportedly generate high-quality plots including cumulative and suspended histograms, stem and leaf displays and box whiskers plots to represent and explore data, the vendor said.

The package also includes programs for probability plots and distribution analysis, contingency tables, random number generators and probability distribution tables, the firm said.

Plot 50 Tests and Distributions is a disk-based package and is supported by the firm's 4907 file manager.

The package costs $600 from the vendor at Marketing Communications Department, Tektronix, Inc. P.O. Box 500, Beaverton, Ore. 97077.

Burroughs CMS Gets Receivables

SOUTHFIELD, Mich. — Logical Design Corp. is offering an interactive, multicompany accounts receivable package for Burroughs Corp.'s CMS family of mainframes.

The open-item system maintains debit, credit and adjustment information for each customer account and provides aged detail and aged summary trial balances for up to 90 days.

The package is written in Ansi 74 Cobol and costs $3,000 from Logical at Suite 330, 27777 Franklin Road, Southfield, Mich. 48034.

Tool Provides Security, Audits

CHICAGO — RES-Q, a systems quality assurance methodology which can reportedly be implemented as an automatic generator of statement-by-statement audit trails for every change made to a source program, is being introduced by Quality Systems.

RES-Q, which also can be used as a recovery tool, produces audit information from a current source member and any appropriate backup. RES-Q features a source-comparison algorithm that enables RES-Q to perform its task with no dependence upon sequence numbers in either the base or the updated copy of the program.

RES-Q reportedly is not affected if the source has been left in its original numbering format, renumbered or even unnumbered. It also can be used on any source format — Assembler, Cobol, Fortran, RPG and others — and works with any source manager and any on-line system, according to the vendor.

RES-Q can be used during the production transfer process and is available for $2,500, including two years' maintenance and support from Quality Systems at Suite 1621, 919 N. Michigan Ave., Chicago, Ill. 60611.

Series/1 Handles Subscriptions

WAKEFIELD, Mass. — An in-house circulation and subscription management system that runs on the IBM Series/1 minicomputer has been introduced by Wakefield Software Systems, Inc.

Andi is capable of handling more than 200,000 subscribers, according to the vendor. It runs under the EDX operating system and uses IBM 4978 CRT terminals, which are menu-driven with a prompting capability for operation by in-house personnel.

Hardware costs from IBM range from $35,000 to $60,000 depending on the number of subscribers and growth potential. Andi licenses for $14,500 including installation and training.

Wakefield Software Systems is located at 28D Vernon St., Wakefield, Mass. 01880.

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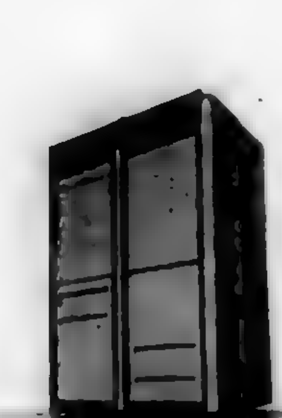

Finally, there's a computer system that lets you grow by plugging in resources, instead of by changing models — the BTI 8000.

Our family secret is Variable Resource Architecture (VRA): a flexible mix of hardware resources controlled by a single, self-regulating operating system. The result is mainframe level performance at substantially lower costs, plus unequalled flexibility.

You can tailor the BTI 8000 to serve over 200 on-line, interactive users. Or to handle large batch loads. Or to do some of each. And, you can vary system performance over a tenfold range by merely adding or deleting hardware modules.

Additionally, built-in growth potential allows you to respond to changing requirements easily and quickly — without modifying either the operating system or your applications software.

As for reliability and support, they're established family traditions, proven by over 2,500 other BTI computers operating in the U.S., Canada and Europe. For full details about the BTI 8000, contact the BTI office nearest you.

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If you think only IBM can make a reliable controller, you haven't heard everything about the Memorex 1270 Model 8. Whether you're starting a system or adding to one already up and running, **the Memorex 1270 Model 8 offers you a total control solution:**

It attaches directly to your System/360, System/370, 303X, 43XX or compatible byte multiplexer channel.

It's the functional replacement for your 270X transmission control units, your 3704 or 3705 communications controllers in the 270X emulation mode and integrated communications adapters.

It's a hardwired control unit that gives you unparalleled simplicity and flexibility.

It's field upgradable to the next larger model, so it grows as your system grows.

But there's more to the Memorex 1270 Model 8 Terminal Control Unit than reliability, flexibility, availability and cost effectiveness.* The specifications tell the whole story. For complete information about the Model 8, other 1270s and the entire Memorex family of display terminals and printers, contact Nancy DeKraker at (408) 996-9000 or write to Memorex Communications, 18922 Forge Drive, Cupertino, CA 95014.

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*The 1270 Model 8 is available in the Continental U.S. only. © 1980 Memorex Corporation. Memorex is a registered trademark of Memorex Corporation.

Word Processing Aid Runs With PDP-11s, LSI-11s

IRVINE, Calif. – The PWS-1 Word Processing/List Processing Software System for Digital Equipment Corp.'s PDP-11 minicomputer and LSI-11 microcomputer has been introduced by Plessey Peripheral Systems.

Formatting commands determine spacing, margins, page length, tabulation and other characteristics, and copy format can be changed as often as necessary, either as copy is being entered or after entry is completed, the firm said.

Using the list processing feature, the software can reportedly sort and merge a list of names and addresses into the appropriate business letter for individualized correspondence.

PWS-1 is written in Macro-11 assembler language and is used in conjunction with the RT-11 operating system, with or without TSX time-share facilities. All insertions and deletions are cursor addressed, and 21 lines of text are displayed at all times. Password security is also provided.

Ascii source files are used by the system for easy interface with existing applications and for support for DEC-supplied utilities, Plessey said.

PWS-1 comes with a choice of media and includes program binaries, documentation and license to use, with optional training and support. It costs $2,300 from Plessey at 17466 Daimler Ave., Irvine, Calif. 92714.

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'Scribe' Backs Eclipse Users

CAMBRIDGE, Mass. – A software package that gives word processing capabilities to users of in-house time-sharing systems based on the Data General Corp. Eclipse under AOS has been announced by Intermetrics, Inc.

Claimed to be comparable to $5,000 to $6,000 word processing systems, but costing only $2,000, the Scribe system generates tables of contents, footnotes and indexes. It offers full use of the printing capabilities of the Diablo 1620, the firm said.

Intermetrics is located at 701 Concord Ave., Cambridge, Mass. 02138.

Updated 'Ihis' Targets Up to 600-Bed Hospitals

DAYTON, Ohio – NCR Corp. is offering an updated version of its Interactive Healthcare Information System (Ihis) that reportedly provides speed and capacity for larger users.

The new version will operate under the Interactive Resource Executive (IRX) operating system on NCR I-8400 series systems. Previously, the largest system that could be used was the minicomputer-based I-8270. This upgrade enables the system to handle 600-bed hospitals, up from a maximum of 200-bed facilities, NCR noted.

Performance should also improve by an average of 50% for applications used on the I-8430 under the IRX compared with timings on an I-8250 under the Interactive Multiprogramming Operative System (Imos), NCR claimed.

Ihis is a series of more than 100 programs covering all hospital business information, and as a multiprogramming system, it can process several applications at one time, the vendor said.

The minimum configuration for the new Ihis version, which is written in Cobol, includes an I-8400 processor with 512K bytes of memory, a printer, a CRT and 54M bytes of disk capacity.

The software is available through payment of either a one-time license fee or a monthly license fee. Major software modules and their license fees include the following: Inpatient Processing: one-time fee of $3,360 or monthly fee of $80; Outpatient/Clinic Processing: one-time fee of $2,730 or monthly fee of $66; Patient Accounts Receivable (without detail): one-time fee of $3,360 or monthly fee of $80; Insurance Proration Extension: one-time fee of $530 or monthly fee of $12.

Package Helps HP Users Control Manufacturing

IRVINE, Calif. – MAC-PAC/HP, a discrete manufacturing control software package for Hewlett-Packard Co. 3000 computers that consists of integrated linkable software modules, each performing specific functions within a complete manufacturing control system, is being offered by Far-West Data Systems, Inc.

Jointly developed and owned by Far-West and Arthur Anderson & Co., MAC-PAC/HP will provide improvement in productivity and performance to due date and increase factory output response by reducing production bottlenecks, the firm stated.

A basic system consists of a design engineering module, an inventory control module, a material requirements planning module and an on-line communications module. The system can also be expanded with eight additional modules at any time, according to Far-West.

The task-driven system operates in both on-line and batch modes, makes use of HP's Image data base manager and is written in Cobol. Price for a single CPU license for the basic system is $49,000 plus implementation support from the firm at 17841 Fitch, Irvine, Calif. 92714.

'Docuscan' Searches Legal Documents

WHITE PLAINS, N.Y. – Vista Computer, Inc. is offering a software package that will search and retrieve legal documents.

Written in an advanced proprietary version of Mumps, Docuscan is menu-driven and does not require special commands or syntax, the vendor said.

The package can search for individual words, word lists, a choice of word lists or word pairs.

Docuscan costs $2,500 from the vendor at 709 Westchester Ave., White Plains, N.Y. 10604.

'Pfas' Supports Pascal Coding

CARDIFF, Calif. – C.J. Wigglesworth Software has announced a package that reportedly can run on I.5 or II.0 UCSD Pascal systems.

Pfas allows a programmer to write programs that access data with user-defined keys. It uses a B+ tree file organization, ensuring that the time required to find any information in the file does not change with the number of records in the file, the vendor said.

The standard version of the package, using less than 6K bytes of memory, can reportedly make a new file, open an existing file, add records to a file randomly or sequentially by key, start reading sequentially with any record and change records already in the file.

The extended Pfas package includes all features in the standard version, besides the ability to provide real-time record and key deletion and retrieval of records by partial key.

Both versions are available in machine-readable form on an 8-in. soft-sectored, single- or double-density floppy disk. A user manual is included.

Single-site license fees are $100 for Standard Pfas, $150 for Extended Pfas, $175 for both and $10 for documentation. The firm can be reached at P.O. Box 755, Cardiff, Calif. 92007.

The Zenith Smart Terminal.

Compare the features.

Reverse video by character can be used to emphasize words, lines, phrases or paragraphs.

High Resolution CRT reduces eye strain and operator fatigue.

Z80 Microprocessor-control brings easy editing, cursor flexibility and reverse video highlighting to your on-line system.

Professional touch keyboard follows standard typewriter layout with 72 keys, including 12 special function keys, (8 user programmable) plus 12 key numeric pad.

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80 character by 24 line format, plus a 25th line for operator messages and prompts.

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For under $1000,* the Zenith Z19 smart terminal is a very smart buy. It can be utilized with almost all commonly available computer systems and provides the most advantageous features for data entry, editing, inquiry, and transaction processing—wherever you need a top-of-the-line, general-purpose terminal.

The Z19 is ideal for high speed data entry. The 12" diagonal CRT gives you a crisp, clear video image. And the Z19's keyboard follows the standard typewriter keyboard layout for operator ease. Along with this you get ANSI and DEC®-VT52 compatibility. And one other important plus: Quality you can depend on, because it's Zenith.

For more information about the Z19 video display terminal, send us the coupon. For fast information, call 800-331-1750, Operator 36, toll free. In Oklahoma call 800-722-3600, Operator 36.

DEC is a registered trademark of Digital Equipment Company.

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HP 3000 Users Offered Report Generator

OAKLAND, Calif. — A report generator program and language for the Hewlett-Packard Co. 3000 CPU series has been unveiled by Gentry, Inc.

REX/3000 was designed to facilitate application systems development.

It performs housekeeping functions such as opening and closing data bases and files or testing for end-of-file conditions.

REX/3000 is said to enhance the use of both Image and MPE files by allowing the user to access any combination of data bases, data sets and files during report preparation and also produce multiple reports on a single pass through the data.

These features were not available with HP's interpretive Query language, Gentry claimed.

The single-unit price is $8,500 and the annual maintenance/enhancement plan costs an additional $850.

Gentry is located at 430 40th St., Oakland, Calif. 94609.

Packages From Morton Support Series/1 Users

SAN ANTONIO, Texas — Morton Data Systems, Inc. is offering a line of software packages for IBM Series/1 systems that support inventory control, general ledger, payroll, accounts payable and accounts receivable.

The packages cost $2,500 each or $12,500 for all five.

In addition, the firm is offering a spooling system for the Series/1. That package will be available in September, the vendor said.

Users of the Morton packages do not have to have OCL or JCL knowledge to operate the software, a spokesman claimed.

The software offers automatic file backup procedures, security code systems, ongoing software support and maintenance, customer software design and programming and no-charge enhancements.

The software also lets the user change variables.

Morton is located at Suite 302, 1222 N. Main Ave., San Antonio, Texas 78212.

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The value of Pascal in computer software design is becoming widely recognized. And our new V1.2 version contains significant enhancements in ease of operation and reliability. Consider the V1.2 Symbolic Debugger.

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Complete interactive control displays your original source lines, including embedded comments. Breakpoints give statement numbers and procedure names, rather than octal addresses. The Debugger can show the program execution history including all stacked procedure calls. Should fatal errors occur, they are intercepted by the Debugger instead of ending your testing.

For more information on our approach, ask for the complete OMSI Pascal V1.2 Product Description.

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With Graphics Capability

CPM Program Written in Fortran

BERKELEY, Calif. — Technical Economics, Inc. has unveiled Critical Path Method (CPM), an interactive project management program that produces graphic diagrams from a line printer or terminal and runs on small, medium and large computers.

The system was written in Fortran and tracks multitask projects of up to 3,000 activities and generates 12 reports, the vendor claimed.

CPM's Precedence Network Printer, a diagram displaying the sequence of tasks governing the entire project, can reportedly be printed on a line printer or any 32-column terminal.

The product runs on Digital Equipment Corp. Decsystem-10, Decsystem-20 and PDP-11 and Honeywell, Inc. 66 computers. Conversion to the IBM System/34, Honeywell Level 6, Prime Computer, Inc. CPUs and the Data General Corp. Eclipse is currently in progress.

CPM's purchase price is $10,500. Technical Economics can be reached at P.O. Box 7261, Berkeley, Calif. 94707.

Course Set On JSP

CINCINNATI — A course focusing on the Jackson Structured Programming (JSP) method, which is based on an analysis of data structures and a matching of those structures with the data being processed, will be offered Sept. 8-12 by MBA Technical Institute here.

The JSP design method was developed in London by Michael Jackson and differs from most functional programming approaches.

The structure imposed on the user's data reflects the user's view of the meaning of that data, a spokesman explained.

This is the original JSP course and will be conducted personally by Jackson and his staff. The cost of the seminar is $800 per person.

Registration information can be obtained from MBA Technical Institute, 1248 Springfield Pike, Cincinnati, Ohio 45215.

Systems Research Makes Changes

MONROEVILLE, Pa. — Three major changes to the licensing fee structure for RIMS/MPG (Requester-Oriented Information Management System Mechanized Program Generator), a program/report generator offered by Information and Systems Research, Inc., have been announced.

Effective Sept. 30, the vendor will raise the basic license fee for all OEM and distributor versions of the product by 50%, it said.

Secondly, all sliding-scale discount schedules for OEMs and distributors will be discontinued. After Sept. 30, the only royalty fee will be "pegged" at one-third of the then-prevailing end-user license fee for the full RIMS/MPG product.

Finally, the vendor announced the addition of a report generator-only version of RIMS/MPG entitled CO-OP (Customer Oriented-Output Producer). This version will be identical to the standard RIMS/MPG product, but without the SCREENS and MERGE capabilities, a spokesman said.

Information and Systems Research is located at the Jonnet Bldg., Monroeville, Pa. 15146.

I.P. Sharp Network Gains Oil Statistics Report

TORONTO — I.P. Sharp Associates has added a quarterly oil statistics report from the Organization for Economic Cooperation and Development (OECD) to its international computer network.

The report covers production, refinery output, stocks, exports (split by destination country), imports (split by country of origin), international marine bunkers and delivery information.

The report is billed on an as-used basis, the firm said from 145 King St., Toronto, Ont. M5H 1J8, Canada.

RCC Adds Finance Reports

PALO ALTO, Calif. — Remote Computing Corp. (RCC) has announced a series of standard reports available to users of the SLP financial planning system.

Designed to meet the reporting requirements of the Federal Home Loan Bank Board, the seven reports are highlights; statement of condition; income statement; cash flow detail; savings analysis; assets and liabilities as a percent of total assets; and income and expenses as a percent of average assets.

RCC is headquartered at 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

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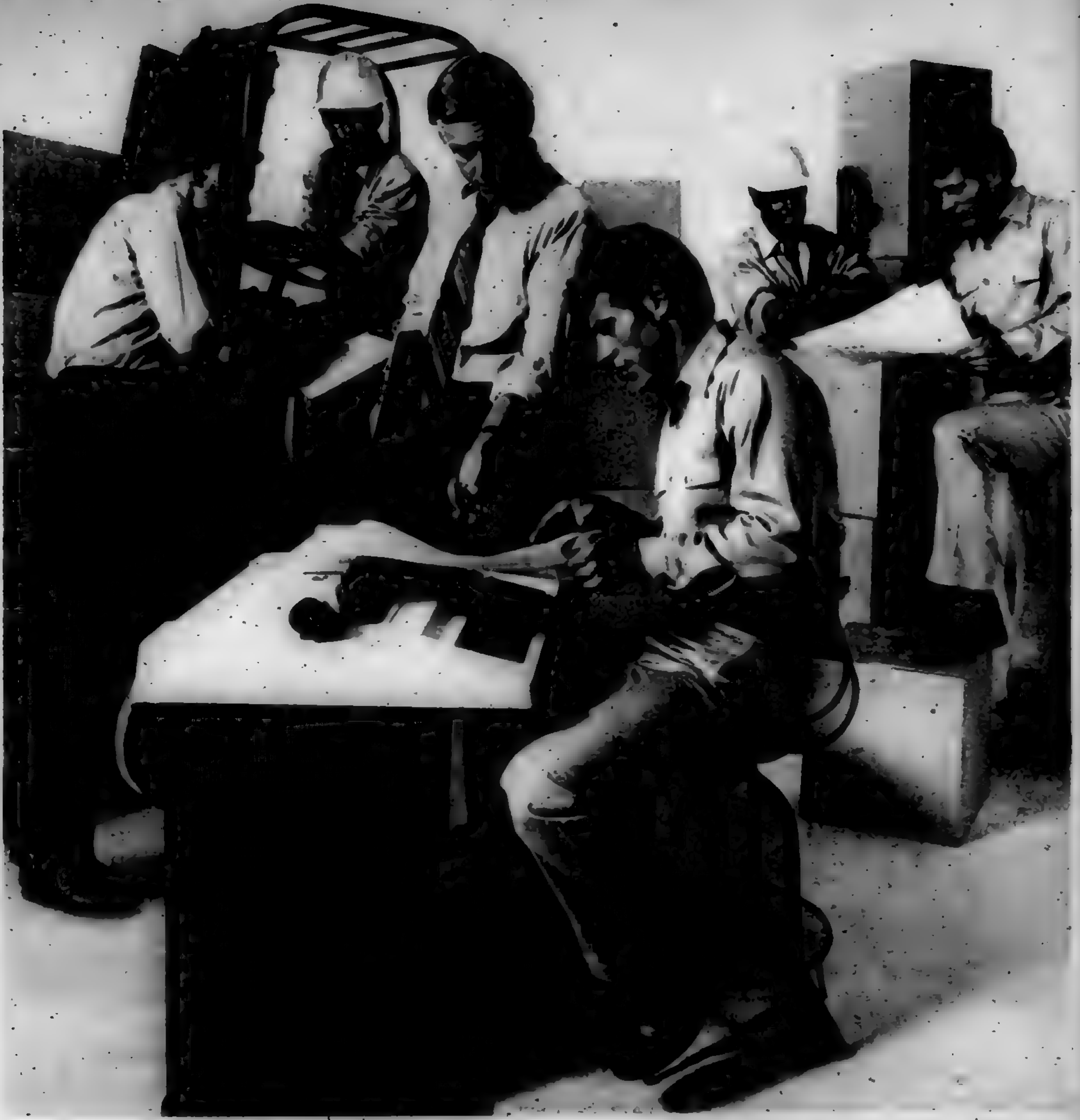

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Now you can watch your four favorite programs...

The new HP 2626 display station will give you a view of your computer system you've never seen before.

It lets you divide the screen into as many as four separate "frames," each attached to a different workspace in the terminal's memory. You can check a program listing in one frame and access a file in another. Fill out a form in one workspace while the computer loads the next form into another. Or do text preparation and editing in adjacent frames. Right before your eyes.

That's not all. The HP 2626 has two data communications ports instead of the usual one, so you can use the split screen capability to talk to two computers at the same time. Or log onto the same computer twice for simultaneous batch and interactive jobs.

More than meets the eye.

A high resolution character cell and a glare-reducing screen coating give the HP 2626 the sharpest, clearest display of any of our terminals. And that's saying a lot.

What's more, you can set line lengths of up to 160 characters in any workspace. Then scroll horizontally to get the entire picture. (The built-in thermal printer includes a compressed mode to print up to 132 characters per line.) Scroll vertically, too, or change the size of the frame at the touch of a key.

An interactive forms drawing module makes it easy to design forms, including drawing horizontal or vertical lines with just a single keystroke. You can even program the terminal for audio tones to cue your operator to critical or non-critical errors, or other conditions within a program.

Split decisions.

Hook up the HP 2626 to two computers (or the same one twice) and it's like getting a multi-tasking capability right in the terminal. Your systems designer can now compile, execute, monitor and edit programs as if two stations were available.

While your user is filling out a form, the terminal can be sending data from the previous form to a computer. And down-loading the next form into an adjacent workspace. By smoothing out the "type and wait" of data entry, you can take advantage of less expensive, low-speed transmission lines without sacrificing the efficiency of your operator. The result? You'll get more out of the entire system.

...same time,

If you'd like to watch a program on the new HP 2626 display station, or any of our terminals, just call your local HP sales office listed in the White Pages. You can also write for more information to Hewlett-Packard, Attn: Ed Hayes, Dept. 371, 19400 Homestead Road, Cupertino CA 94015. Or just return the coupon.

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Mail to: Hewlett-Packard, Attn: Ed Hayes,
Dept. 371, 19400 Homestead Rd., Cupertino, CA 94015.

Datapoint Gear Gains 'Grip'

WESTMINSTER, Calif. – Multiple Data Services Corp. has unveiled a report generator for all Datapoint Corp. processors that supports either sequential or isam index files.

Known as Grip, the product is suitable for one-time special report requirements, short notice requirements, ad hoc report generation by a terminal user, routine reports where extensive or specialized logic and/or formatting are not required and test or experimental situations, the vendor claimed.

Grip is priced at $495, the vendor said from 13612 Goldenwest St., Westminster, Calif. 92683.

System/32, 34 Get Exploder

LANSING, Mich. – A software package for the IBM System/32 and System/34 that is said to generate an exploded procedure listing with indentation of nested procedures has been introduced by Davidson Software Systems.

The Procedure Exploder Utility prompts the user for the appropriate user library, allowing the user to enter procedure names which are scanned for nested procedure calls, such as Evoke, Include and JobQ statements.

The utility is being offered for a one-time lease charge of $300, which includes all RPG-II programming, documentation and procedures.

Davidson can be reached at P.O. Box 21002, Lansing, Mich. 48909.

OS/MVS Training Slated

NEW YORK – Software Education Corp. will hold several September training sessions here for programmers working in OS/MVS shops.

The sessions combine lectures with laboratory training. Courses include "Advanced Vsam," offered Sept. 2-9 and costing $425; "Vsam for Assembler/Cobol Programmers," Sept. 9-19, $475; and "Entry-Level Programmer Training," Sept. 29-Dec. 19, $3,750.

Software Education is in the Grace Building, 37th Floor, 1114 Ave. of the Americas, New York, N.Y. 10036.

'Selector IV' Manages Dedicated, Integrated Tasks

SAN RAMON, Calif. – Selector IV, a self-contained applications implementor providing data, procedural, query and report definition functions, has been released by Micro-Ap, Inc.

The product is primarily geared toward managing dedicated, integrated applications. No language code is required with it and procedures are defined as named definitions and can be executed as needed, the vendor claimed.

Selector IV can process records from several different files at the same time, and information can be freely moved from one file to another. The product is both hard disk- and soft disk-oriented and will manage as many records as the operating system can handle, a spokesman said.

It also allows dates to be formatted according to any country's convention and has provisions for geneological processing of dates.

The price is $550, the vendor said from 9807 Davona Drive, San Ramon, Calif. 94583.

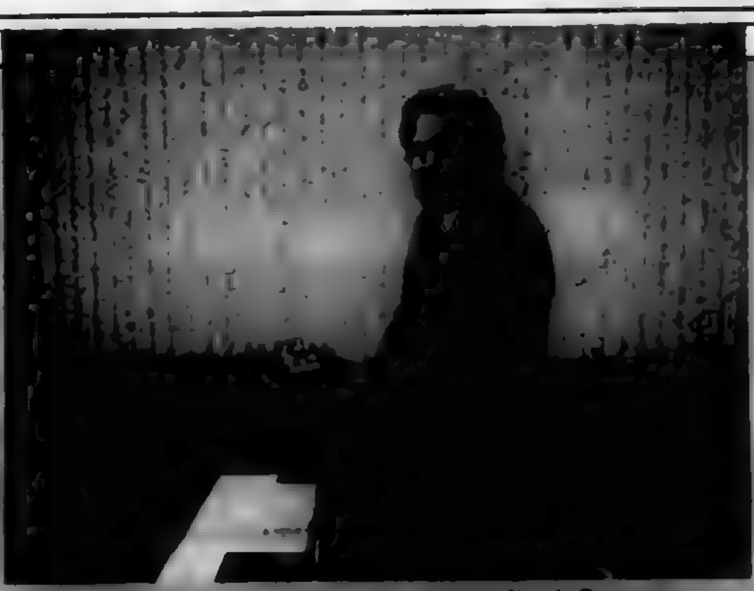
'Specs' Backs Packaging Work

DALLAS – Compucon, Inc. has released a packaging specification package, Specs, a minicomputer-driven system for packaging engineers and departments working with Digital Equipment Corp. PDP-11s.

The package features English-like searching of its Package Component Data Base, specific sheet generation and extensive cross-referencing, the vendor said.

The package will be available in September and will cost $25,000 from Compucon at 13749 Neutron Road, Dallas, Texas 75240.

'My Father Wanted Me to Study Computers Until He Was Replaced by One.'


Bobby Harper, Manager of Information Services, Vought Corporation

Vought Corporation makes planning fly with IFPS.

Vought Corporation, aerospace subsidiary of The LTV Corporation, is a half-billion dollar company which builds military aircraft, missiles and space systems and commercial aircraft components.

Bobby Harper, Vought's Manager of Information Services, recently discussed their use of EXECUCOM's Interactive Financial Planning System (IFPS).

"IFPS was chosen by Vought Corporation in 1976 as our first venture into the area of Decision Support Systems. Comparative studies of products existing at that time proved IFPS to be the only one with a current set of superior capabilities plus unlimited expansion possibilities," he said.

"IFPS has proven itself in direct support of management by providing timely response to management questions that otherwise would have remained unanswered in the time frame allowed. Applications have been most prominent in the financial areas. However, many significant uses are found in manufacturing, materials, and engineering," he noted.

Uses at Vought include debt planning, debt management, treasury operations, consolidation of balance sheet and income statements, transportation, facilities, and engineering planning and forecasting.

He continued, "Answers to critical questions that once were not available may now be researched in a reasonable time. Analysis of data that required production programs and unacceptable lead time to compose routines may now be obtained in time for decision-making department heads to use it."

The challenge of the 80's requires management support that IFPS now furnishes to over 500 users worldwide. Can you afford to wait?

IFPS runs on IBM under OS and DOS/VS, CDC, Univac, Honeywell, Burroughs, Prime, DEC, Harris, and H-P hardware, and is backed by the best professionals in the business.

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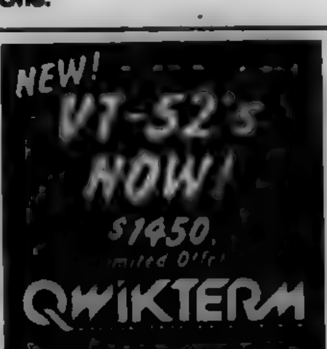

Planned for State Liquor Stores

POS Units May Save Ohio $43 Million

Special to CW

COLUMBUS, Ohio – Data collection for Ohio's 300 state-run liquor stores is being automated by point-of-sale (POS) terminals that may save the Department of Liquor Control (DLC) here about $43 million in 10 years.

That savings estimate comes from a DLC feasibility study on the plan to put two or three POS terminals in each state-operated outlet, typically replacing 100-key electromechanical adding machines whose 15-year-old optical print heads have worn out. Ohio runs the stores to acquire money without raising taxes; last year, they reportedly put $130 million in the state's General Revenue Fund.

By the end of 1981, the DLC hopes to implement a front-end processor at its computer center here to receive on-line communications via a common carrier from the NCR Corp. 2140-3002 terminals in each liquor store. This would increase the stores' rate of inventory turnover, the feasibility study predicted, from about 2.7 to eight turnovers per year, adding $23.8 million to the Buckeye state's coffers.

Warehouse System

As part of the automation program, the DLC has already implemented a Warehouse Access Communications System (Wacs) which allows its 1M-byte IBM 370/148 mainframe in Columbus to communicate via common carrier with each of five liquor warehouses. Wacs optimizes the warehouses' support of the liquor stores by giving the DLC up-to-date information on inventory status and customer demand for particular items, according to Ervin J. Erlanger, a DLC administrative assistant.

After an expenditure of about $13.1 million on buying and maintaining the store POS terminals, the expected $43 million gain in revenues would yield a net cost benefit to Ohio of some $30 million by 1990. Besides the savings resulting from an increased rate of inventory turnover, the DLC looks forward to saving another $16.7 million in the 1980s by eliminating manual procedures for coding merchandise and sales reporting.

And another $1.9 million will be saved if the NCR terminals speed up the DLC's process of depositing revenues in Ohio's Treasury to the extent anticipated. However, inflation could significantly erode these 10-year estimates, which are based on 1978 dollars, Erlanger pointed out.

For the typical Ohio imbiber, the terminals will mean less time at the checkout stand. The "average purchase" of 1.3 bottles will be negotiated in 26 seconds, Erlanger said, a 45% improvement from 47 seconds.

Eventually, one terminal in each liquor store will serve as a "master terminal" with the attachment of a 96K-byte memory board and a tape cassette recorder. The recorders will capture data from transactions at all the store's cash registers.

Cassettes of this information will be mailed to the DLC in Columbus for preprocessing on an NCR 7530 minicomputer. Next, full-size magnetic tapes of the sales data will be transferred from the mini to the DLC's main computer system.

By adding a memory board to each store's master terminal, the DLC will avert a need to have price data regularly keyed into the store's other terminals. Instead, a salesclerk will enter a five-digit code designating brand and size (fluid volume) of each bottle being purchased, inducing the master terminal to verify that the code corresponds to stock on hand and to return the item's price.

For multiple purchases of the same item, the clerks key in the quantity and the terminals return the total pricing. The master terminal capabilities will also expedite the stores' adjustment to price changes set by distillers.

With 10M-Byte Drive, Color CRT

Single-Operator Net Monitor Debuts

MIAMI — Racal-Milgo, Inc. has introduced a single-operator diagnostic and management system for medium-scale networks that features a 10M-byte hard disk drive and a color CRT.

The CMS 1000 is based on the firm's previously introduced multioperator CMS 2000 system and offers network users complete monitoring and test generating capabilities, a spokesman said. The system allows a single user to direct automated monitoring, testing, control, restoration and configuration on up to 32 user lines.

Four-Function System

The four-function system displays priority and test results on a color CRT and uses a color-keyed menu approach to facilitate user understanding and responses.

In addition, the system's disk unit retains significant information about modems and other devices, their physical location in a network and their relationship to each other.

CMS 1000 prices start at $39,500, including the color terminal and a logging printer. First deliveries are scheduled for October.

Racal-Milgo is located at 8600 N.W. 41st St., Miami, Fla. 33166.

Racal-Milgo's CMS 1000

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☐ SERIES 212A
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Each Modem Provides:
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- 8 Status Indicators
- Analog Loopback
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- 300 or 1200 Baud

☐ SERIES 330
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Each Modem Provides:
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38 delivers

The productivity advances of IBM's new System/38 are being confirmed in early installations.

IBM has started delivering System/38's to customers.

And customers have started delivering comments like these to IBM.

"I created a special equipment report in 15 minutes flat. Before, it would have taken a day and a half of programming." —Chuck Petter, Data Processing Manager, Road Machinery and Supplies Company, Minneapolis.

"We've developed an online order entry system with one-third the effort... and the application is much more polished. We're very pleased."—Larry Brenner, Director, Corporate Information Services, United Merchants and Manufacturers, New York City.

"The System/38 significantly reduced the amount of code necessary to write a program and the time and effort required to move into new applications. We're extremely enthusiastic."—Larry Petterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

And we're enthusiastic, too.

Because the IBM General Systems Division's versatile new System/38 is a compact system with many large computer features. Such as distributed online work stations so users don't have to go to the computer; a central data base that makes information easier to retrieve, revise and use; the Control Program Facility, which automatically monitors and manages the flow and processing of data; online program testing, so programs can now be debugged as normal processing continues.

And System/38 has advanced features rarely found in any computer, large or small. Like Single Level Storage, which treats all storage as a single unit and automatically keeps track of it.

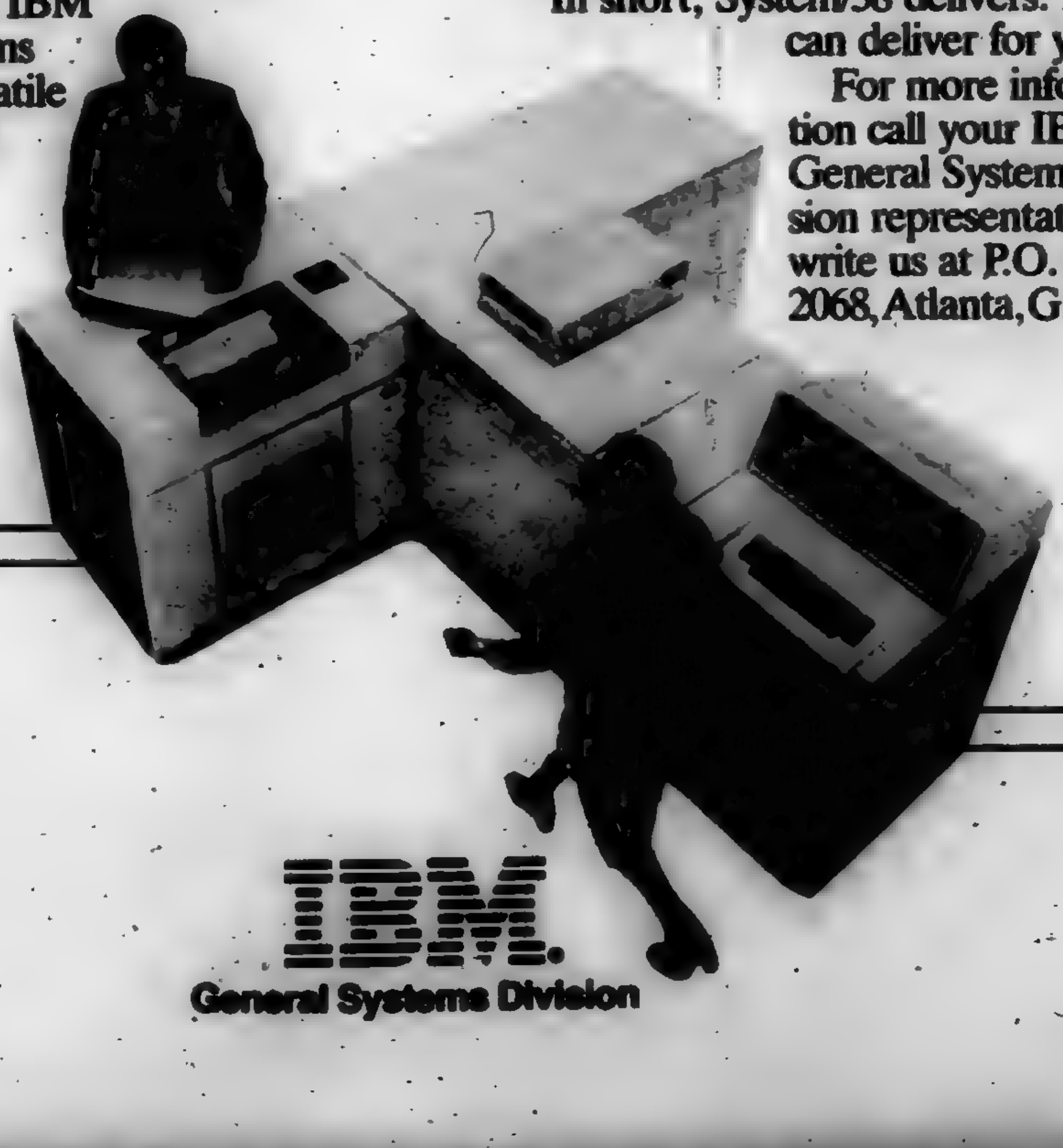
And thanks to System/38's streamlined architecture, many functions that previously required programmers' time have been absorbed into the system itself.

The result of these IBM innovations? A computer that lets you do much more, much more simply.

We're pleased that System/38 is already helping business function with greater cost-efficiency, productivity and profitability.

In short, System/38 delivers. And it can deliver for you.

For more information call your IBM General Systems Division representative or write us at P.O. Box 2068, Atlanta, GA 30301.



IBM.
General Systems Division

NCR 279, IBM 3270 Linked to System/34

BOULDER, Colo. — A financal data system interface that uses an IBM Series/1 computer and proprietary software to connect NCR Corp. 279 teller machines, CRT keystations and IBM 3270-like CRT terminals to an IBM System/34 minicomputer has been announced by Systems Design & Development Corp. (SDD). The system is used for on-line banking applications.

The 4751 interface was designed for main and branch banks for communication with a System/34 to verify account numbers and account balance information and to post transactions to customer accounts. The connection between the IBM minicomputer and the financial data system interface is a standard System/34 point-to-point communications protocol, a spokesman stated.

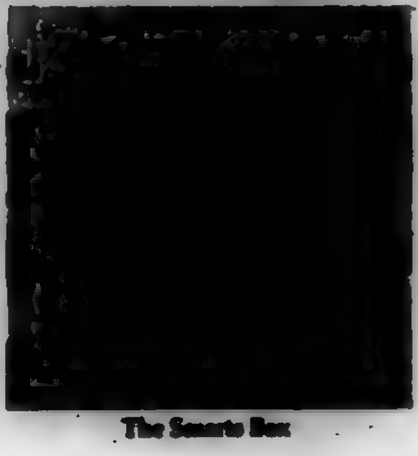
The System/34 attachment is an extension of the firm's 3751 financial data system currently in operation in banks throughout the country. The 3751 is geared for IBM System/3 and 370 machines. SDD 4751 hardware maintenance is provided by IBM, the spokesman added.

The 4751 interface costs $10,000 from SDD at 2355 Canyon Blvd., Boulder, Colo. 80302.

Smarts Box Bows to Make Dumb Terminals Intelligent

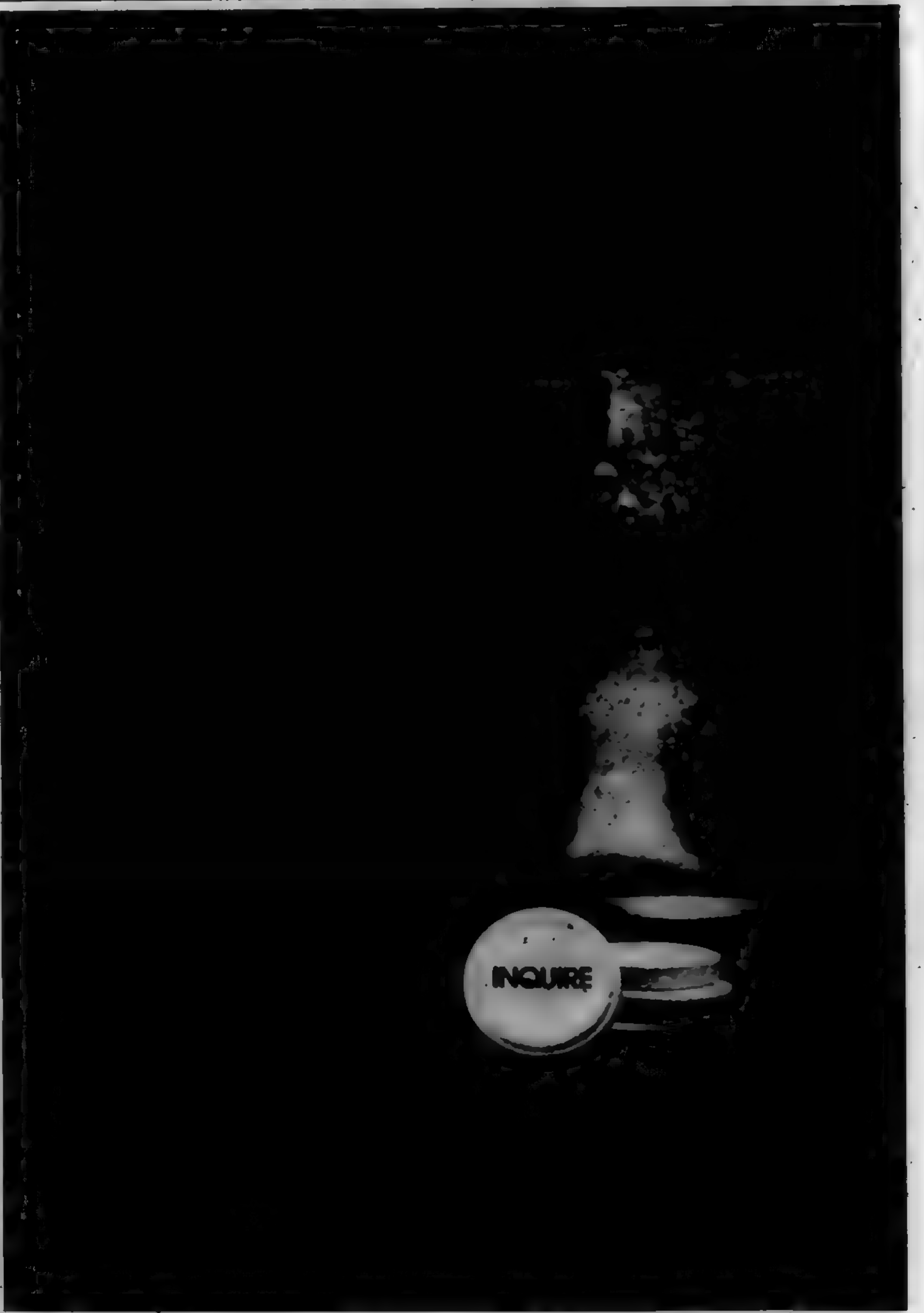
HAUPPAUGE, N.Y. — North Atlantic Industries, Inc. has introduced a self-contained Smarts Box to provide intelligence for nonintelligent terminals.

In addition to a Digital Equipment Corp. LSI/11-2 microprocessor board, other logic cards include two independent RS-232C interfaces, 8K bytes of random-access memory (optionally expandable to 32K bytes), space for 8K bytes of read-only memory, a 60-Hz crystal clock and two vacant Q-bus compatible card slots to accommodate more specialized user dedication cards.


The Smarts Box

The product can be used to link remote terminals to a host computer, as well as upgrade terminal performance, the vendor claimed. The unit was designed for ease of hard-wired connection to users' terminals and also printers, tape transports and other peripherals.

The single unit price is $2,560, the vendor said from 60 Plant Ave., Hauppauge, N.Y. 11787.



PABX Systems Get Channel

KIRKLAND, Wash. — Teltone Corp.'s Data Carrier System (DCS-2B) uses high-frequency carrier techniques to add a high-speed data channel to an existing PABX telephone pair. The derived, point-to-point link is capable of 9,600 bit/sec, full-duplex asynchronous operation without distributing normal telephone service, the vendor said.

The system is said to allow data communications managers to respond faster to requests for service because it eliminates the need for RS-232C cable, additional twisted pair and limited-distance modems.

The basic components of the DCS-2B are the M-821 station unit and the M-831 channel termination card. The station unit interfaces a terminal and connects in series between the telephone and a single pair loop.

At the PABX equipment room or distribution frame closet, the channel termination card connects in series with the telephone pair to separate the physical voice loop from the derived carrier.

The M-821 station unit costs $257 and the M-831 channel termination card costs $246, the spokesman said from Teltone, 10801 120 Ave. N.E., Kirland, Wash. 98033.

Records Management Geared to WP Systems

NEW YORK — Bowne Information Systems, a division of Bowne & Co., Inc., is offering a records management system that is said to be compatible with most communicating word processing (WP) systems.

By adding the package via a telephone link with the vendor, the user gains automatic records capture as a by-product of typing, records security and a central data reference center, Bowne said.

The package is billed on an as-used basis, the time-sharing vendor said from 160 Water St., New York, N.Y. 10038.

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When [illegible] computer tape [illegible]

Like its predecessor [illegible]

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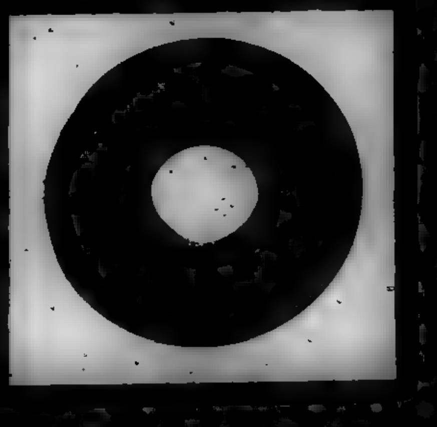
And that's a real bargain.

GRAHAM MAGNETICS



TANDEM NonStop PATHWAY

NOW ON-LINE IS
AS EASY TO PROGRAM

On-Line Programming—25 to 50% cheaper. User developed on-line applications packages just got a whole lot easier. And better. Not to mention 25 to 50% cheaper. We've eliminated all the time-consuming grief of dealing with terminal handling characteristics for one. And not incidentally, there's even greater protection in data base integrity, too.

PATHWAY has all the programs, procedures and structures you need to get your applications up and running, in NonStop™ operation, in record time. Inexpensively.

Terminal Independent Applications. By taking the on-line programming task on in component parts rather than attacking it as an all-encompassing, monolithic whole, PATHWAY software makes the transaction processing system job relatively simple, and frees the application programmer from concern over terminal characteristics.

PATHWAY handles four of the critical operations in transaction processing applications as modular, interconnectable elements: Terminal Interface handles [illegible] I/O; Field [illegible] data consistency checks; Data Mapping controls data conversion and formatting; and Transaction Control covers application and transaction flow. Each resource is partitioned, with well-defined interfaces between them. This is the secret to a modular systems' success. It allows optimized utilization of all the resources and permits additional resources to be dovetailed into the system as needed—without rewrite, without redesign and without degrading system performance.

We Speak Your Language. When it's time for the fifth operation—interaction with the data base—a Data Base Application Program can communicate in any of the languages available on the Tandem NonStop™ System: industry standard COBOL, FORTRAN, MUMPS, or our own transaction-oriented language, TAL, all facilitated by Tandem ENSCRIBE to interact with the Data Base management capabilities.

The Things You Can Forget. The PATHWAY Transaction Processing System capabilities include an Interactive Screen Builder which builds the screens interactively at a terminal, independent of the application program which serves as a Screen COBOL Pseudo Code Compiler, a Terminal Control Program to interpret the pseudo code library and

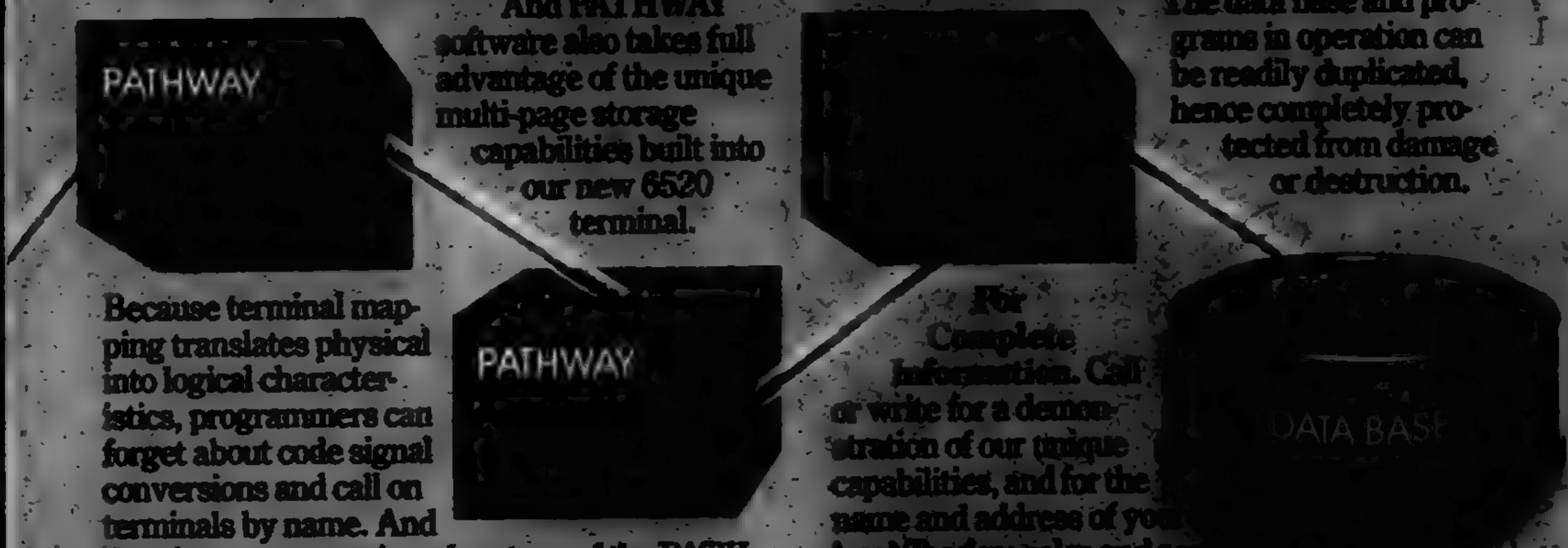
PATHWAY
PATHWAY

AS BATCH.

check the flow and content internally; the Applications Monitor which has power to create, track and alter the application run time environment; and finally the Application Monitor Control Language which lets an operator communicate with an active Application Monitor. It's a powerful system, easy to use and inexpensive. With everything you need to get your on-line transaction applications up and running, with all the benefits of a NonStop™ System, in record time.

Dynamic Load Balancing. It comes from taking logical advantage of the multiprocessor environment. There is no need for the programmer to consider load balancing with the PATHWAY Transaction Processing System. It's handled automatically; with additional copies of PATHWAY applications started in designated CPUs as needed. And deleted when no longer required. Dynamic load balancing—built into the system's resource management capabilities.

And PATHWAY software also takes full advantage of the unique multi-page storage capabilities built into our new 6520 terminal.



Because terminal mapping translates physical into logical characteristics, programmers can forget about code signal conversions and call on terminals by name. And there's one more major advantage of the PATHWAY Transaction Processing System: one system can be used for convenient development, testing and production of application packages.

The Tandem NonStop™ System. Even when it wasn't this easy, it was miles ahead in the on-line world. With immediately available alternatives in all hardware and software elements, the NonStop™ System can go right around any failed element and never skip a beat. Even when a failure occurs in a processor, an I/O Channel, a disc, or a disc controller. Remarkable.

This is the one system in the world which lets you start with only the computing power you need right now and add as your needs grow, in low cost modular elements. From an entry level two processor system, you can go to sixteen processors with thousands of terminals and not lose one cent on your original investment.

Protection From Loss. Because of its unique parallel operation at all critical points, no transaction in process is ever lost or duplicated. The data base and programs in operation can be readily duplicated, hence completely protected from damage or destruction.

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And Brings Out Data Recorder

IDS Enhances Tech Control Center

LINCOLN, R.I. — International Data Sciences, Inc. has released an enhanced version of its Tech Control Center and a microprocessor-based recording device that provides nonvolatile mass storage for digital data.

The Tech Control Center uses IDS' Hawk 4000 Series Datatrap to perform both interactive diagnostics and passive monitoring of serial data appearing at the RS-232 interface to help isolate data communications problems. The unit costs $7,500, the vendor said.

The Model 7000 Datatape is a microprocessor-based recording device that provides nonvolatile mass storage for digital data associated with RS-232C and CCITT V.24 communications interfaces. It can be used as a portable stand-alone unit or in conjunction with the IDS Hawk 4010 Datatrap.

Data can be recorded and later replayed at any one of 16 data rates to facilitate analysis of communications data link problems, according to an IDS spokesman.

The unit costs $5,500 from the vendor at 7 Wellington Road, Lincoln, R.I. 02865.

Ambassador Gains Zoom Capability

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc.'s Ambassador terminal, introduced earlier this year, has now been equipped with a zoom feature that allows an operator to vary the CRT screen's display format from the keyboard.

The CRT terminal is preset by the factory to power on with a 30-line by 80-char. display format. However, the zoom capability allows the operator to move additional lines into the window in order to view larger areas of text. Prices for the Ambassador start at $1,200, the spokesman said from the company at 6175 Jackson Road, Ann Arbor, Mich. 48103.

Power Supplies Provide Outputs Of Up to 60V

SANTA MONICA, Calif. — To meet the needs of the telecommunications industry, Pioneer Magnetics, Inc. has expanded its line of switching power supplies to include outputs of up to 60V.

Operating over a broad input range of 92 Vac to 138 Vac and 184 Vac to 250 Vac, the units have a maximum power rating of 750W, or 1,500W for dual-wide units.

The units regulate through line dips to 80Vac or 160Vac. In the event of a total input power loss, output voltage will hold up for a minimum of 30 msec, allowing for orderly shutdown, the firm said.

The Pioneer 375W single-output unit costs $500. Information about other products in the line can be obtained from at 1745 Berkeley St., Santa Monica, Calif. 90404.

Unit Punches Telex, TWX Tape

WOBURN, Mass. — An automated remote paper tape preparation system that punches telex and TWX tapes in a single typing procedure using standard ball element electric typewriters has been introduced by Leasemark, Inc.

The Papertaper quickly produces 5-track or 8-track punched telecommunications tapes off-line without interruption, the firm said.

The Papertaper costs $3,995 and includes typewriter interface, operator control unit and punch from the firm at 100 Tower Office Park, Woburn, Mass. 01801.

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Set Handles 1,200 Bit/Sec

NEW BRIGHTON, Minn. — A full-duplex, 1,200 bit/sec, Federal Communications Commission (FCC)-registered modem is available from Multi-Tech Systems, Inc.

The modem works over dial-up and two-wire lines, in asynchronous or synchronous modes.

Designated the MT212D, it is available in both stand-alone and rack-mounted configurations and provides originating and automatic answering capabilities, the vendor said.

The stand-alone unit price is $695, while a rack mounted card set lists for $565 in quantities of eight.

Multi-Tech is at 82 Second Ave. S.E., New Brighton, Minn. 55112.

For Runs to Seven Miles

Asynchronous Unit Debuts

LINCOLN, R.I. — A limited-distance modem for asynchronous operation over telephone company or private two- and four-wire nonloaded metallic (twisted-pair) conductors at speeds up to 9,600 bit/sec is available from International Data Science, Inc.

The modem can be used in both point-to-point and multidrop network configurations and is ideally suited for local data distribution up to seven miles using conventional 26-gauge wire, the vendor claimed.

The Model 6210 employs a pulse modulation scheme that varies the transmit signal polarity on a balanced line. Transmit and receive lines are transformer-coupled, so no continuity is required, a spokesman said.

The modem is priced at $300, the vendor said from 7 Wellington Road, Lincoln, R.I. 02865.

Unit Converts RS-232 To Burroughs' TDI

CHAMPAIGN, Ill. — Compre Comm, Inc. has introduced a unit that will convert a standard RS-232 interface to a Burroughs Corp. TDI Direct Connect interface.

Called the SR-500, the stand-alone device contains its own power supply and will interface with either an RS-232C modem or terminal equipment, Compre Comm said.

The SR-500 costs $295 from the vendor at 51 E. Chester, Champaign, Ill.

Modem Called 'Error-Free'

CHATSWORTH, Calif. — Micom Systems, Inc. has introduced a high-speed modem called the Micro5000 that it claimed is error-free because it employs an automatic retransmission-on-error feature.

The unit was designed for use with minicomputers and asynchronous terminals operating at 2,400-, 4,800- or 9,600-bit/sec on standard leased dial-up lines, the vendor said.

The modem costs between $1,500 and $5,500, Micom said from 9551 Irondale Ave., Chatsworth, Calif. 91331.

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Controllers Join Micro Series

COLUMBIA, Md. — Columbia Data Products, Inc. has expanded its Commander microcomputer series with the Communications/Cluster Controller models CC-1 and CC-2.

The CC-1 handles up to 16 ports, while the CC-2 handles up to 32 ports. Through the use of various serial and parallel interfaces, on an optional basis, the CC-1 and CC-2 will interface with "most any" peripheral device desired, according to the firm.

With the use of distributed intelligence to the ports, the device enables the user to implement "dumb" devices and emulate a high degree of intelligence for those devices, a spokesman said.

Prices for the product start at $9,995 from the firm at 9050 Red Branch Road, Columbia, Md. 21045.

ZMS-70 Update Includes CP/M

SANTA CLARA, Calif. — A new version of Zentec Corp.'s ZMS-70 intelligent terminal features hardware and software enhancements including Digital Research, Inc.'s CP/M operating system and dual double-density floppy disk drives.

Aimed at OEMs, this user-programmable system can be used in both stand-alone and distributed DP environments, according to the vendor.

Single units of the ZMS-70 cost $5,695 from Zentec at 2400 Walsh Ave., Santa Clara, Calif. 95050.

Analyzer Monitors RS-366 Interface

NORWALK, Conn. — An interface analyzer designed to analyze the EIA/-RS-366 interface to the Bell 801C or an equivalent automatic calling unit has been introduced by Datacomm Management Sciences, Inc.

The TS-366 reportedly monitors the interface to verify that the proper protocol and telephone number are being produced. Active testing is achieved by a front panel LED display of the RS-366 leads and a numeric display of up to 12 dialed digits.

The interface analyzer is a portable, battery-powered unit that comes with a rechargeable battery and charger. The TS-366 costs $600 from 181 Main St., Norwalk, Conn. 06851.

Focus on Sessions

Graphics Week '80 Draws Few Exhibitors

By Rita Shoor
CW Staff

CAMBRIDGE, Mass. – The recent Graphics Week '80 show here was "the most expensive show per square foot in the world," according to at least one exhibitor, who preferred to remain anonymous.

Expense may have been one of the reasons why relatively few vendors set up exhibits for this conference. However, the exhibitor appeared to be satisfied that the cost was worthwhile. "We've got a good mix of people here, with a large number of middle and high-level DP managers," he said. The result for his firm by mid-week was "lots of firm orders."

Not a single piece of hardware was introduced at the show, although Terak Corp. was exhibiting a color system that had been announced several weeks before at Siggraph 80 in Seattle (see related article).

Trilog, Inc. (the Houston Instrument, Inc. graphics division of Bausch & Lomb, Inc.), Computervision Corp., Xerox Corp., Prime Computers, Inc. and Advanced Electronics Design, Inc. were among the vendors with hardware being displayed.

However, the primary focus of the conference seemed to be on the sessions rather than the exhibits. One attendee perhaps expressed the general feeling of many when he said that "what's frustrating is that no one vendor seems to have everything you need . . . there's always a piece missing."

IBM Representation

IBM was represented by its 3279 four-color vector graphics terminal. Unlike the crowds that the vendor's display drew during the National Computer Conference (NCC) in Anaheim, Calif., [CW, June 2], the 3279 was receiving relatively little attention from Graphics Week '80 attendees.

The difference may be partially attributed to the fact that IBM was printing copies of the 3279 displays on 3287 four-color printers at NCC while no 3287s were in evidence at the conference, sponsored by the Harvard Laboratory for Computer Graphics.

Conference attendees appeared to be especially interested in some of the hard-copy graphics that were being handed out by various exhibitors. Matrix Instruments, Inc. and Dunn Instruments were both exhibiting imaging cameras that generate color photographs of the graphics being displayed on a terminal. Both displays were attracting traffic to the point that Matrix had been "cleaned out" of data sheets for its product, according to the vendor representative.

The Matrix camera ranges in cost from $11,000 to $29,000, he said, with a single sheet costing "between $5 and $6." Dunn's Model 631 was reproducing images being displayed on a Terak 8600 system on Polaroid 8 in. by 10 in. stock.

When a passerby was asked why he was especially interested in this type of device, he responded that the hard copies are especially useful during management presentations and that they save time. "You don't have to bring up the display again" once you have the hard copy, he noted.

The 8000 series desktop computer from Intelligent Systems Corp. (ISC) drew attention with an eight-color display that provides point plotting on a 160 by 192 grid. The ISC format provides 64 standard Ascii alphanumeric characters with 32 Ascii lowercase characters formed by using a 5 by 7 dot pattern on a 6 by 8 matrix.

Erdas Corp., a relatively new company that specializes in site selection and alternative site evaluation for what it termed "large landholders" (utility companies and the U.S. government agencies were cited as examples) exhibited a microcomputing system that includes a 256 by 240 by 16 interactive color display, dual 8-in. floppy disk drives, a Z80-based microcomputer with 48K bytes of main memory, a dot matrix printer, a digitizer, a CRT terminal and a monitor.

The cost of the basic system is between $26,000 and $30,000, Erdas said.

Terak Raster-Scan Display System Shown at Graphics Conference

SCOTTSDALE, Ariz. – A raster-scan computer graphics display system that will operate either as a stand-alone system or as a terminal in a distributed processing network has been announced by Terak Corp. here.

Designated the 8600, the system was first displayed at the recent Siggraph 80 conference in Seattle. It was also one of the relatively few hardware items being exhibited at the Graphics Week '80 meet sponsored by the Harvard Laboratory for Computer Graphics in Cambridge, Mass., last month.

Featuring dual 16-bit microprocessors, the system is available in two eight-color models with resolutions of 320 by 240 by 3 and 640 by 480 by 3, according to a company spokesman. The 640 by 480 model can be upgraded to display up to 64 colors through the insertion of additional frame buffer boards, which results in a 6-plane memory, Terak said.

Based on hardware and software from Digital Equipment Corp., the desktop system includes a DEC LSI-11 main processor and RT-11 operating system and features Q-Bus compatibility, the vendor representative said.

In addition to RT-11, the 8600 reportedly supports the UCSD Pascal operating system for program development, text editing, word processing and interactive applications, Terak noted.

Support for both operating systems is in accordance with Siggraph 2D1-level standards for Fortran, Basic and Pascal programming languages, the company claimed. This conformity is said to provide transportability of Siggraph standard software between the 8600 and other graphics systems.

The multiple memory planes are controlled by the user and permit simultaneous display and independent manipulation of text and graphics to achieve overlays, scrolling and zoning, he said.

The price range for the 8600 is from $14,750 to $18,950 for commercial customers, while a discounted range of $11,750 to $14,750 is being offered to educational institutions. Approximately 60% of the current Terak customer base is at the university level, the vendor said.

Upgrades for Terak customers with 8510/a black-and-white systems cost from $7,850 to $10,850 with the same upgrade available to educational institutions for between $6,495 and $9,495.

Projected availability is January 1981 from Terak Corp. at 14151 N. 76th St., Scottsdale, Ariz. 85260.

Bits & Pieces

Three-Day Seminar to Review Operations Management Skills

CHICAGO – A three-day seminar offering senior DP professionals a chance to review the latest operations management skills will be held in four U.S. cities during late summer and early fall.

Subjects to be covered include setting department standards, planning and scheduling, performance analysis, job accounting, equipment selection, managing the data center, security, recruitment and selection and employee motivation.

There is a $695 tuition fee per person plus a $75 registration fee per organization per seminar, payable in advance, according to the sponsor, the University of Chicago Center for Continuing Education.

More information is available from the sponsor at MC Seminar Division, 1307 E. 60th St., Chicago, Ill. 60637.

Systems Managers, Offered Reference Manual

VANCOUVER, B.C. – A manual intended primarily for systems managers and consultants that contains more than 20 standard policies and practices for systems management has been released by Augur Data Planning, Inc.

Providing a ready-to-use reference source of standard material for key management areas, the manual is organized into five major sections: "Employee Benefits," "Employee Relations," "Customer Relations," "Marketing" and "Administration."

Within each section, specific ideas are provided for recruiting, job descriptions, performance evaluation, salary administration, vacations, expense reporting, job costing, personnel records and others.

The *Management Policy and Practices Manual* costs $45 from Augur Data Planning, 1401 W. Broadway, Vancouver, B.C. V6H 1H6, Canada.

Handicapped Get Voice Terminal

BOSTON, Mass. – Arts Computer Products, Inc. has released the Orator, a stand-alone terminal that reportedly interfaces to any host computer and gives the CPU the ability to reproduce vocal commands for handicapped users.

The speech pattern is synthesized to offer unlimited vocabulary, and special commands have been added to specify speech parameters for each task. Users can choose full word or spelled speech, whether to hear punctuation or capitalization and whether to hear speech on input or output, the vendor said.

The Orator costs $10,000 from the vendor at Suite 1260, 80 Boylston St., Boston, Mass. 02116.

Plotter Gets Cyber, IEEE-488 Links

ANAHEIM, Calif. – Two interfaces for the California Computer Products, Inc. Model 1012 desktop drum plotter – one linking it with Control Data Corp. Cyber 18 computers and the other with the IEEE-488 bus – have been introduced by Calcomp.

Providing parallel input to the Model 1012, each interface is a single-printed circuit board that mounts in the Model 1012's integral controller. No system software modifications are necessary, the firm said.

The Model 1012 is a high-speed, four-pen plotter designed for time-sharing and remote computing applications. It uses fanfolded 11-in. paper and plots at speeds up to 10 in./sec with a resolution of .5mm, the firm stated.

Switch-selectable data rates (from 110- to 9,600 bit/sec) and a 256-byte I/O buffer are included, as is a character generator capable of forming 96 characters in specified sizes and orientations.

The Model 1012 with CDC Cyber 18 interface costs $8,460 and the 1012 with IEEE-488 interface costs $6,940 from Calcomp at 2411 W. LaPalma Ave., Anaheim, Calif. 92801.

IBM-Compatible Floppy Has RS-232C Interface

MOUNTAIN VIEW, Calif. – Scientific Micro Systems, Inc. has introduced an IBM-compatible floppy disk with RS-232C interface capable of storing 1M byte of IBM double-density formatted data.

Modem controls are provided to support remote site usage of the product, known as the FT02271. In addition, high-speed transfers up to 19.2K bit/sec are supported by the unit's intelligent controller, the vendor claimed.

Up to 65K-byte data transfers occur continuously with automatic seek to successive tracks without host computer interruptions. Alternate command modes allow either Ascii or binary data to be recorded or retrieved to facilitate a variety of applications.

Front-panel controls allow the user to execute self-test and diagnostics independent from the host system to verify correct system operation.

The single unit price is $4,400, the vendor said from 777 E. Middlefield Road, Mountain View, Calif. 94043.

Matrix Printer Operates At 180 Char./Sec

WOODLAND HILLS, Calif. – A bidirectional 180 char./sec matrix printer under microprocessor control is now available from Pacific Mountain States Corp.

Named the DS180, the unit employs a 94 Ascii char. set printed in a 9 by 7 matrix. True lowercase descenders and simultaneous underlining are possible because of the 9-wire printhead, the vendor said.

An adjustable head-to-platen gap accommodates forms up to six parts in thickness and fanfold perforated forms from 3- to 15-in; may be fed through the front or bottom of the printer.

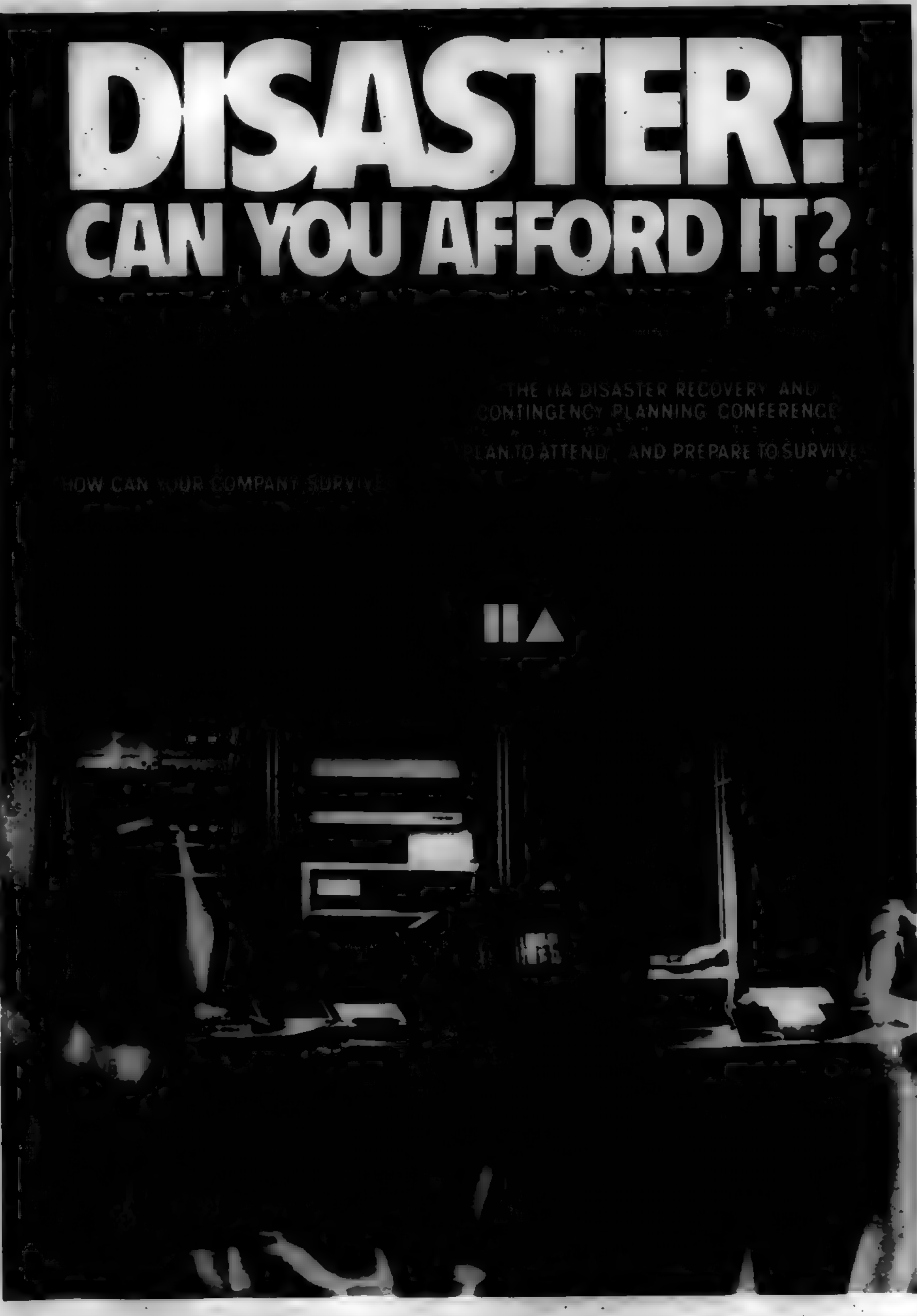
The price of the unit is $1,395, the vendor said from 20601 Deforest St., Woodland Hills, Calif. 91364.

MCG Offers AC Power Unit To Protect Gear

DEER PARK, N.Y. – MCG Corp. is offering the Model 300 – an ac power conditioner that protects CPUs, terminals, printers and modems from an interruption in service, or loss of data.

The unit protects low and high impedance loads from common and transverse mode transients as well as continuous or intermittent power line noise.

Model 300 costs $135 from the vendor at 160 Brook Ave., Deer Park, N.Y. 11729.



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Mini Bits

MIC Updates System Report

CHERRY HILL, N.J. – Management Information Corp. (MIC) has released an updated version of its small business computer report which includes business micro- and minicomputer systems introduced during 1980.

"Pathways Through Data Processing: Small Business Systems" is a 200-page report designed to discuss data processing in general and small systems in particular, a spokeswoman said.

The report costs $39 ($49 outside the U.S.) and can be obtained from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Dot Matrix Printer Gives Text or Graphics at 100 Char./Sec

FULLERTON, Calif. – An addition to Base 2, Inc.'s Model 800 series of dot matrix printers has been introduced by that vendor. The Model 800B is available with four interfaces: parallel, RS-232, IEEE-488 and 20ma interfacing.

The printer operates at 100 char./sec and can be selected to print text or graphics in six different densities, the vendor said, adding it includes both tractor and friction feeds.

The 800B is capable of carrying 10 character fonts and features full horizontal and vertical tab controls as well as a forms control capability.

The single-unit price for the printer is $699. Base 2 can be reached through P.O. Box 3548, Fullerton, Calif. 92631.

Turnkey Aimed at Attorneys

VENICE, Calif. – An Attorney Applications Package, including both hardware and software, has been introduced by SDS Business Computers.

Designed by an attorney who holds a graduate degree in computer science, the package is aimed at non-DP personnel. It includes the SDS 420 small business system, an attorney billing system, a word processing package and a financial applications package.

The system includes 32K bytes of memory, expandable to 56K, up to 10M bytes of storage capacity on high-speed dual-diskette drive, a 12-in. CRT display and detachable keyboard.

The complete system, including software and hardware, leases for $400/mo (dependent on current interest rates) or licenses for less than $15,000 from SDS Business Computers at 344 Main St., Venice, Calif. 90291.

Acquiring a Mini — Part 1

Selection Plan Should Go Beyond Logical Analysis

By Nander Brown Jr.

Special to CW

FALLS CHURCH, Va. – Because of their steadily decreasing prices and increasing capabilities, minicomputers are often thought of as the key to solving most or all of a small company's information processing problems.

However, with the minicomputer market fragmentally served by several dozen hardware vendors, several thousand regional software and systems houses and a number of special package vendors, a small company's quest is fraught with potential financial disasters. It is therefore important to apply some rules to the hardware/software acquisition process.

Selecting the best minicomputer vendor for a small firm involves more than just good logical analysis. A well-structured approach is highly recommended.

A small company's first step before embarking on the hardware acquisition road is the feasibility study. This study is a special analysis of the company's need for automation and basically seeks to determine the most cost-effective approach towards automation.

An effective feasibility study actually consists of a series of well-planned steps that outline a particular company's needs for a computer. The first step, planning, sets the groundwork for the rest of the study and can make the difference between a successful venture and a failure.

The second step is the requirements analysis, which involves defining the problem to be solved and identifying the attributes of an acceptable solution as well as constraints on solutions.

In the third step, identifying the alternative solutions, information about feasible alternatives is gathered. The methodology for locating potential suppliers is also discussed.

The fourth step consists of evaluating and determining whether each alternative is economically and technically feasible, that is, whether it can be implemented within cost and environmental constraints.

It is good practice to establish a target date for each phase of the study.

Vendors' Role in Study

Equipment vendors may offer to perform, or help perform, the feasibility study for you. This may appear to be an attractive opportunity to get the job done without committing significant resources to it. However, while vendors can often provide useful input, they should not be relied upon to recommend the acquisition of a computer from

(Continued on Page 68)

In Part 1 of this three-part series focusing on buying a minicomputer, the author offers some tips on vendor selection and outlines a number acquisition methods. Next week he will explore selection criteria, equipment evaluation and contracts.

Radio Shack Adds To TRS-80 Lineup

FORT WORTH, Texas – Radio Shack recently beefed up its TRS-80 microcomputer line by introducing a high-resolution "color computer" along with a desktop machine that features expanded data storage capabilities.

The TRS-80 Color Computer has 4K bytes of main memory, expandable to 16K bytes, and plugs into a standard television set via a radio frequency (RF) modulator.

The MPU has a 53-key keyboard, an RS-232C serial interface and 32 characters by 16 lines of color graphics. The device can be user-programmed in Basic, with programs stored on plug-in cassette cartridges.

The TRS-80 Color Computer competes with Texas Instruments, Inc.'s 99/4 microcomputer but costs $399, less than half the price of the TI machine, a spokesman said. It is scheduled to be delivered this fall.

The newly introduced TRS-80 Model III is comparable to and compatible with the models I and II, but can handle more data storage than its predecessors. It can store up to 313K bytes of data on floppy diskettes.

The TRS-80 Model III costs $699 for the 4K version and $2,495 for the 32K-byte machine. Radio Shack, a division of Tandy Corp., is located at 1800 One Tandy Center, Fort Worth, Texas 76102.

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District Offices: [illegible]

IBC System 40 Upgraded to 128K Bytes

CARSON, Calif. — Integrated Business Computers (IBC) has upgraded its System 40 with a 128K-byte memory and 96M bytes of disk capacity.

A low-end System 40 features 64K bytes of memory, 2M bytes of floppy disk storage and six serial I/O ports; it can handle up to five CRT terminals and a printer.

The System 40 can now be expanded to a 128K-byte memory and 20M bytes of Winchester disk storage or 96M bytes of fixed/removable disk storage, the vendor said.

The System 40 uses an interrupt-driven compiled Basic and can execute multiple programs with little degradation, the firm claimed. The operating system supports word processing and the Basic supports Isam.

The price for a low-end system with one CRT terminal and one printer is $11,000. A high-end System 40 with five CRTs, one printer, 128K-byte memory, 2M-byte floppy disk storage and 20M-byte hard disk is approximately $24,000.

IBC is headquartered at 22010 S. Wilmington Ave., Carson, Calif. 90745.

Floppy Disk Controller Debuts

ARLINGTON HEIGHTS, Ill. — An IBM 3740-compatible floppy disk controller designed to provide the interface between a microprocessor system and a floppy disk transport has been introduced by the Electronic Sales and Service Division of Hitachi America, Ltd.

The design of the HD46503/-MC6843 floppy disk controller's hardware enables it to be used in any microprocessor environment.

Featured are programmable seek and settling times, read/write operation and consecutive sectors by a single command and both program-controlled and direct memory address data transfer modes.

The controller costs $25 from Hitachi representatives or franchised distributors or through Hitachi America, Ltd., Electonic Devices Sales and Service Division, 707 W. Algonquin Road, Arlington Heights, Ill. 60005.

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Plan Should Go Beyond Analysis

(Continued from Page 67)

another vendor even if the salesman knows it is the best alternative for your company. In addition, they may not be familiar with other alternatives which are available and will invariably be less knowledgeable about your needs than your own staff is.

If vendor personnel are consulted, they should be used primarily to provide information on the alternatives their company offers.

Consultants can be helpful if used properly. They can bring a variety of specialized skills and knowledge to bear on your data processing problems. The main types and sources of consultants are the following:

1. *General management consultants.* These are usually a source of general data processing management advice.

2. *Certified public accountants (CPAs).* CPA firms may provide services such as management consulting, systems analysis and even programming.

3. *Data processing consultants.* These usually concentrate on systems analysis and programming.

4. *Service bureaus.* These firms sometimes help clients develop systems.

5. *Free-lance consultants.* These are usually associated with small firms, perhaps one-man operations, concentrate on a specific area of business.

Acquisition Methods

The acquisition method should be chosen carefully. It will probably be based on your availability of technical resources to help in the selection and implementation of the new equipment.

A sole-source approach is the easiest, but not necessarily the best nor most cost-effective method of selecting a computer. This involves selecting one vendor over all the other vendors without competitive bidding or any other disciplined decision making.

Negotiation involves the informal solicitation of vendor policies, pricing structures, equipment capabilities, software availability and other vendor capabilities.

When the evaluation process is completed, the vendor that appears to meet most of the requirements is selected.

The final step is to negotiate with the vendor for the best price available. If several vendors are rated favorably, it is possible to achieve a degree of competition by negotiating with several vendors at one time.

Brown is the regional audit manager for the Washington, D.C. area office of EDP Audit Controls, Inc., an Oakland, Calif.-based audit firm.

Board Has Sockets For Eight Eprom Units

SANTA BARBARA, Calif. — Microsignal, Inc. is offering a 16K-byte memory board that will interface with an onboard Z80 microcomputer.

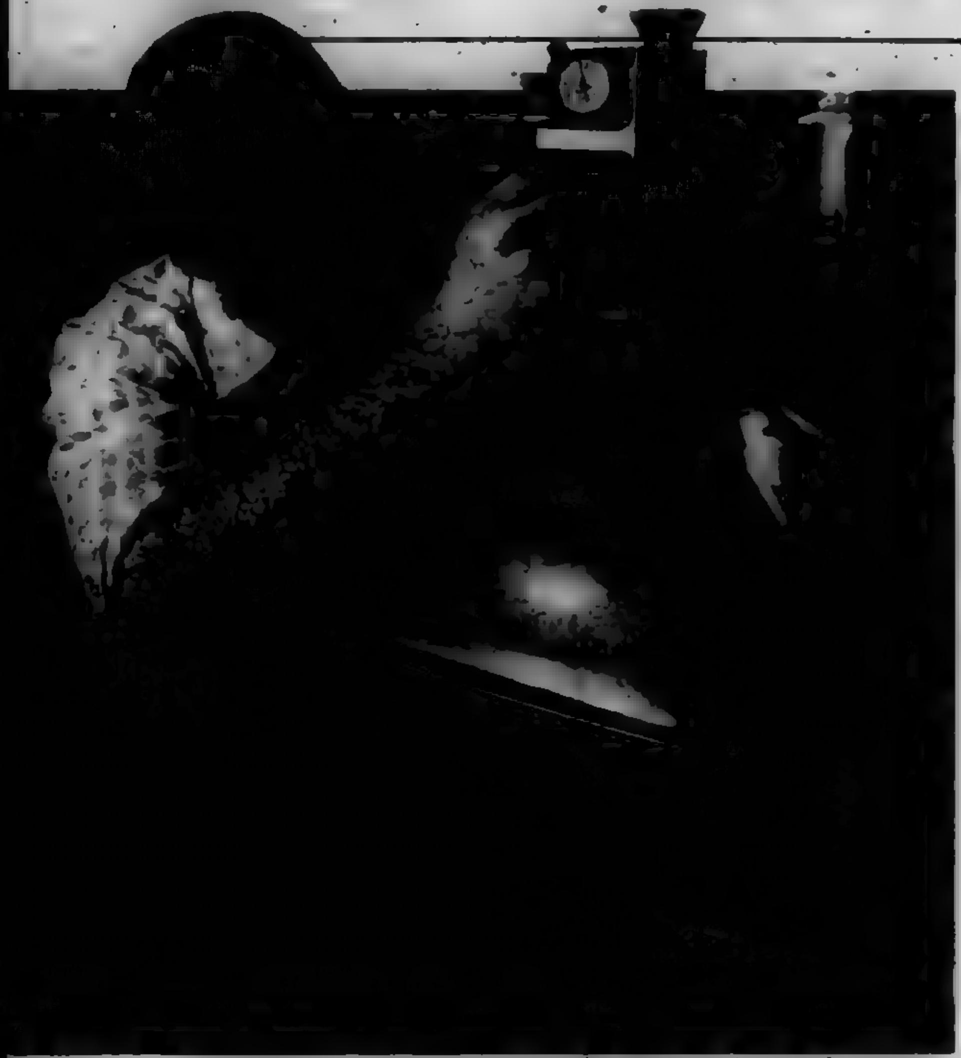
The IM-1680 board offers 16K bytes of random-access memory (RAM) and sockets for eight 2716 erasable programmable read-only memory (Eprom) units interfaced to Intel Corp.'s Multibus.

The IM-1680 costs $595 from the vendor at Suite 214A, 3704 State St., Santa Barbara, Calif. 93105.

Advertisement

DP Dialogue

Notes and observations from IBM that may prove of interest to data processing professionals



PLANCODE Displays the Financial Picture for CRT Maker

Six months before the fiscal year begins, financial analysts at GTE start to prepare the operating budget for the Electronic Components Group. To organize and store the data, they use the Planning Control and Decision Evaluation (PLANCODE) system: an IBM program product comprising an easy-to-use, English-like planning language.

"We can revise the figures at any time by making an entry at a terminal," John J. Nugent, vice-president-controller, says, "because PLANCODE automatically recalculates all the affected variables."

At its Seneca Falls, New York, headquarters, the Electronic Components Group makes Sylvania cathode ray tubes for television sets and data systems. Analysts there use PLANCODE on an IBM 4341 System to forecast sales and budget its manufacturing and marketing operations.

"A complete budget represents literally millions of calculations," Nugent observes. "Suppose we want to revise a sales forecast, expected selling price, or standard direct cost assumption. Each of these affects a lot of dependent variables. Changing the sales forecast, for example, has an impact on the extrapolation of cash discounts, defective returns, and transportation costs. With PLANCODE, we can revise any of these major parameters and the system automatically makes the necessary adjustments.

"PLANCODE lets us look at several variables and measure their effect. We can test the sensitivity of a forecast to the variables we're certain of. The plan is better initially, and is easier to revise."

Budgeting has taken on added importance, Nugent points out, as the economy has become more complex. "Knowing our capital needs in advance is critical today," he notes, "so we can decide how to go to the capital market.

"And with PLANCODE we can react faster—if, for example, a major cost item takes an unexpected jump. We have confidence in our results, since we know the math is accurate. The users control the structure of the budget and of the forecasting models, as well as the format of each printed document. This self-service by the users frees the professional programmers to work on the company's primary computer systems, and gives us the flexibility we need for effective financial planning."

Checking the alignment of a GTE/Sylvania cathode ray tube. Financial analysts at GTE gain flexibility and accuracy by using PLANCODE for forecasting and budgeting.

COMBIMAN Sits in for Air Force Pilots

Can a U.S. Air Force pilot readily reach all of the hundreds of controls typically found in a high-performance aircraft? Can he see all of the indicators? How well can he see outside the plane?

Today, at Wright-Patterson Air Force Base in Ohio, the designer of a new plane can answer such questions quickly and easily, by manipulating the COMputerized Biomechanical MAN-Model (COMBIMAN): a model of a human figure in an aircraft cockpit or work station. It permits the designer to sketch a work space around the figure directly on the screen of a computer terminal, using a light pen and the keyboard.

By touching the light pen to a "menu" of options, the user can select the variables that affect movement, reach, and sight lines, such as the size of the pilot, type of harness and clothes. With the cockpit layout and the human figure visible in the display, he can command a programmed "reach" to any selected point. The figure then executes a five-step reach, showing clearly whether—and how easily—a pilot can perform the same operation. The user can vary the proportions of the figure, using realistic combinations of human measurements stored in the computer. He can adjust the work-station design by moving, rotating, adding or eliminating elements.

The program was developed by the University of Dayton Research Institute under the sponsorship of the Aerospace Medical Research Laboratory of the Air Force Systems Command. Says Dr. Joe W. McDaniel, who directs the COMBIMAN project: "In the display, the work space is very easy to modify, to experiment with, so the designer can try many more possibilities. When the physical mockup is first built, it will be much closer to optimum."

The figure can be made to lean or turn its head in order to calculate realistic sight lines for pilots with various body measurements. As with the hand, the reach of the figure's foot can be checked to insure that a pilot can readily reach the rudder control or other pedal.

As the user builds a complete work space, the computer—an IBM System/370—accumulates all of the details. At any time, the system can be commanded to generate a plot of the design on paper.

"COMBIMAN lets the work-space designers get involved much earlier in a project," McDaniel adds. "This avoids later costly retrofit, or the need to compromise on performance."

The COMBIMAN human figure and work space can be projected on the screen of an IBM 2250 Graphic Display Terminal in an off-axis perspective view. The designer can test and modify a work space by interacting directly with the computer through the terminal.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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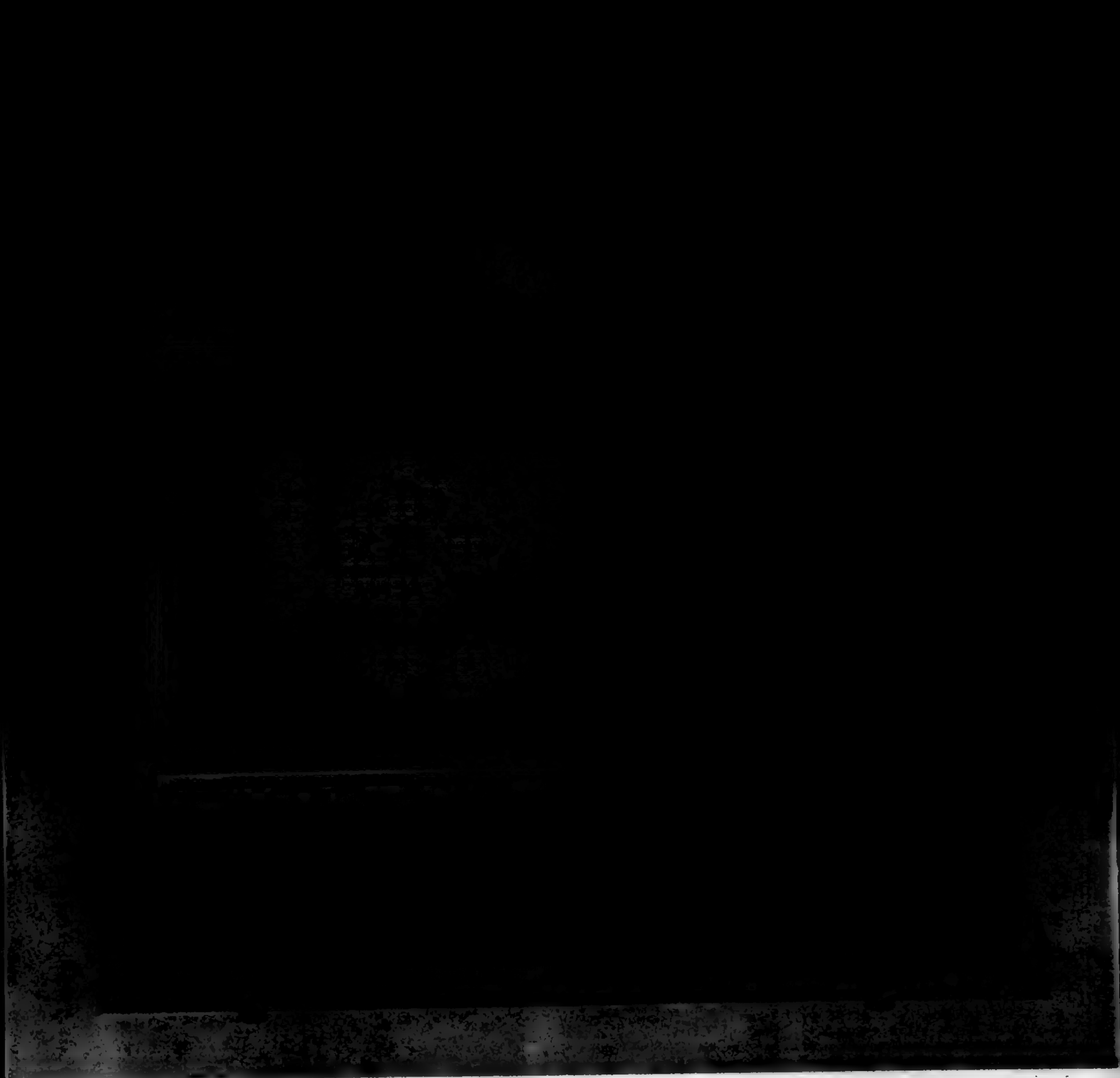

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Time Is Not On The Side Of Time Brokers

By Tim Scannell
CW Staff

NEW YORK — Armed usually with stacks of neatly lettered index cards and a telephone, computer time brokers spend hours wheeling and dealing for computer time, finding just the right seller for the right buyer. But while time is their business, it is also their greatest enemy. Only a handful of dedicated computer time brokers exist today in what was once a highly active field.

"There is a very, very high failure rate in the industry," according to John Rudder, president of Computer Resources, Inc. and self-confessed brokerage veteran. "The availability of hardware is so great today that it's much easier for people to go direct and [there is] much less need for a broker."

Computer Resources is a three-person firm — consisting of Rudder, a secretary and a part-time telephone solicitor — that has been in the computer time brokerage business for nearly 13 years. The company focuses its efforts on the New York metro area and some parts of Philadelphia, and is relatively successful in what Rudder calls "a very limited field."

Although Rudder has never taken the time to count exactly how many computer sites he has on file — except to say that when pressed together the stack of three-by-five cards listing each client takes up about 14 inches of space — he does claim to have a detailed description of every installation in his market area. Computer Resources will list a firm "regardless of whether they do or they don't

(Continued on Page 76)

Computer Associates Tells Boom Story

By Connie Winkler
CW Staff

JERICHO, N.Y. — Four years ago Computer Associates didn't exist in the U.S. Today the company does $20 million annually in system software business.

The story of Computer Associates, which last year moved to new headquarters in this Long Island suburban community, is one of those true boom stories of privately held computer software companies.

With 300 employees worldwide, Computer Associates recently opened sales offices in Italy, Spain and Canada and is peddling IBM-compatible systems software as far away as Borneo and Kuwait.

Accent on OS, DOS

The firm sells and leases IBM-compatible systems software, with emphasis on OS and DOS systems. It's most popular product is the one around which it was founded, CA-Sort, which is in 8,600 of its 9,000 world wide installations, a spokesman said.

This year the U.S. company acquired the European Computer Associates company and its 100 employees, according to Charles B. Wang, president. The European company was founded in 1971 by a group of consultants. CA-Sort is one of 12 products the company develops, maintains and markets.

In 1976 when the American company was started by Wang and several partners as a joint venture, there were about 40 employees in the European company.

Computer Associates has found its niche where IBM has not had good products, Wang explained. Those niches include disk space management, tape library management and job accounting within the DP operation, for instance. "It's hard to compete against IBM," Wang acknowledged.

(Continued on Page 74)

To Block Nixdorf

ADR Asks Ruling on Datacom Rights

By Marcia Blumenthal
CW Staff

RICHMOND, Va. — Applied Data Research, Inc. (ADR) has asked the U.S. district court here for a declaratory judgment which, if granted, would prevent Nixdorf Computer Software Co. (NCSC) from licensing and leasing ADR's Datacom products.

The complaint, filed about two weeks ago, is a response to an earlier action by NCSC, which also sought a declaratory ruling on the licensing rights to ADR products.

NCSC is the new name for The Computer Software Co. (TCSC), which was acquired last April by Nixdorf Computer Corp., the U.S. arm of Nixdorf Computer AG, a large West German computer firm [CW, May 26].

While the controversy focuses on the licensing rights, it appears to have other ramifications. Nixdorf is reportedly gearing up to introduce an IBM-compatible system for the European market and needs software capability for that system.

At the same time, ADR has been expanding sales in Euro-

(Continued on Page 76)

IBM Eyes Cost Cuts, Unity In GSD-OPD Consolidation

ARMONK, N.Y. — In what appears to be a combination cost-cutting move and an attempt to make good its promise to bring more unity to its divisions, IBM has consolidated the product development and manufacturing functions of its General Systems Division (GSD) and Office Products Division (OPD).

Calling the newly formed organization the Information Systems Division, it will make all GSD computer systems and peripherals as well as typewriters, copiers and other small electronic office devices, IBM said.

Since both GSD and OPD will continue to market their own products, industry analysts believe the move was motivated more as a cost-cutting measure than an effort to bring unity to IBM divisions.

However, as the Gartner

(Continued on Page 76)

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John Beall & Company, Inc.

Vendors Say No to Computing Museum

By Brad Schultz
CW Staff

MAYNARD, Mass. – Some of the nation's leading computer vendors have turned down requests by a citizens group for money to support construction of a computing history museum here.

The nonprofit Maynard Business Investment Group, Inc. (BIG) wants to build the largest U.S. museum devoted exclusively to the history of computer science, according to spokesmen [CW, July 28].

As a tourist attraction, the museum would educate the public and pay tribute to technology that has boosted the economy of Massachusetts for 30 years, Samuel Davis, Maynard BIG executive director, explained. Exhibits of calculating tools from prehistoric times to the present would be featured.

But Digital Equipment Corp. – which has its world headquarters in Maynard – Control Data Corp., NCR Corp. and Texas Instruments, Inc. have all said no to Davis' attempts at securing financial backing.

"After thoughtful consideration of the proposal, we regret that we must decline the opportunity to participate, principally because of our commitment to the ongoing evolution of [DEC's] own computer museum," one of the vendor's executives wrote Davis last month.

"Your plans for a computer museum are intriguing," a CDC spokesman told Davis, "and we fully agree that demonstrating the possible applications to the general public is a worthy ambition."

According to an NCR executive, Davis' proposal was reviewed by the Dayton, Ohio-based vendor's Corporate Contributions Committee – and then rejected.

A TI spokeswoman called the scheme "most interesting" in her rejection letter. "May we wish you all possible success with your fund raising efforts," she wrote Davis.

Davis can be reached at Maynard BIG, 74 Main St., Maynard, Mass. 01754.

DEC Passes $2 Billion Mark For Revenues

MAYNARD, Mass. – Digital Equipment Corp. passed the $2 billion revenue mark and posted a 40% increase in earnings during fiscal 1980 ended June 28.

Fourth-quarter revenues reached $699.3 million, a 33% increase from revenues of $524.2 million reported in the final quarter of the previous fiscal year.

Earnings for the fourth quarter grew 35% – topping $83.7 million or $1.73 per share, compared with earnings of $61.7 million or $1.40 per share for the comparable quarter a year ago.

For the year, DEC's revenues jumped 31% to $2.4 billion, up from $1.8 billion reported last year.

Earnings grew to $249.8 million or $5.45 per share compared to $178.4 million or $4.10 per share reported last year.

The company attributed the healthy growth to strong orders for terminals and the VAX-11/780 system from U.S. and overseas customers.

These higher than expected incoming orders resulted in extended lead times, a situation the company said it is trying to remedy via an expansion plan. The firm currently has a dozen sites in various stages of development and last year spent $209.8 million on equipment and additions to its plant and increased its work force by more than 11,000 people.

At the end of the fiscal year, the firm reported it had shipped more than 235,000 computers.

Orders & Installations

Morrow Computer Systems of Nashville, Tenn., has ordered 13 V77-600 minicomputers from the Mini-Computer Operations of Univac, a division of Sperry Corp.

The U.S. Navy has begun using color graphics computer terminals manufactured by Chromatics, Inc. for tracking sea vessels at its Atlantic Underwater Test Evaluation Center.

Canton Textile Mills, Inc. has ordered a Burroughs Corp. B2930 medium-scale computer.

Hewlett-Packard Co. has contracted for the purchase of a three-node nationwide Roadrunner Network Management System from Plantronics Action.

The Athens, Greece, operating subsidiary of Citibank, NA and the government of Singapore have ordered Model 440 Paper Tiger dot matrix printers from Integral Data Systems, Inc.

Arco Oil and Gas Co. of Dallas has ordered a Cray-1S/2300 computer system from Cray Research, Inc.

The Western Union Telegraph Co. has signed a national installation, maintenance and service agreement with Cal Datacom of Santa Ana, Calif. The Cal Datacom CD/300 will be installed by Western Union.

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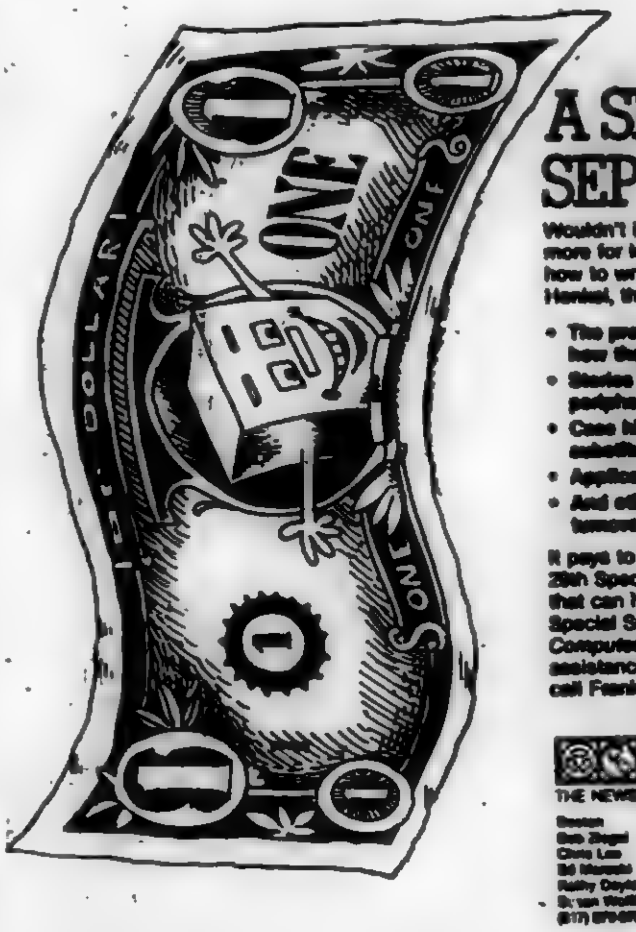

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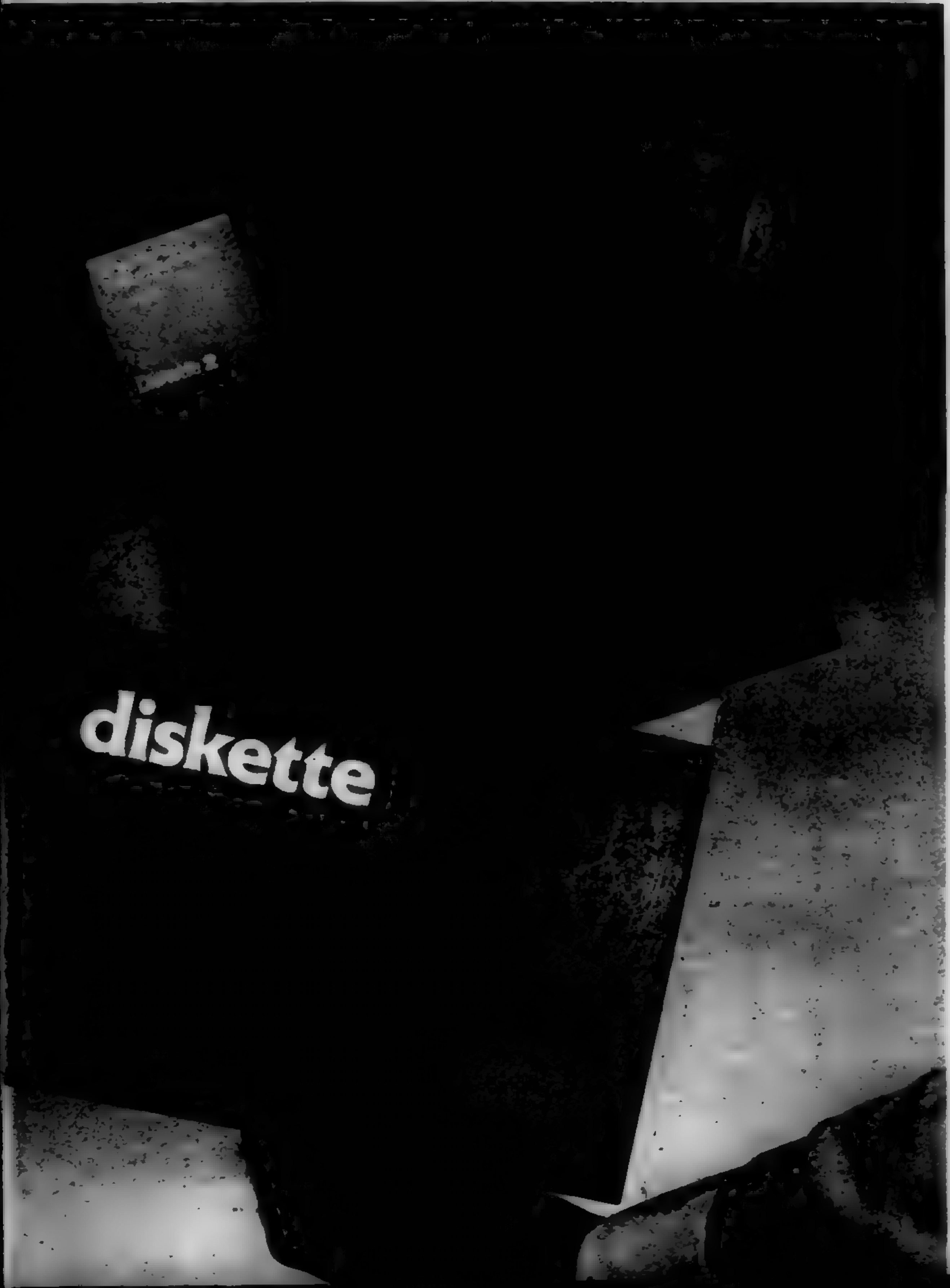

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*DuPont registered trademark.

DU PONT

Computer Associates Tells Software Boom Story

(Continued from Page 71)

Computer Associates does frequent demand analyses of features and products its customers are asking for. Personnel at offices and technical support centers throughout the U.S. and around the world give regular input for product improvements.

With the new IBM emphasis on software for the 4300 series, Computer Associates is looking for new niches.

The small, independent software house has several advantages: IBM software is not performance-oriented, whereas Computer Associates' is, Wang said.

Moreover, Computer Associates has the advantage of hindsight. IBM products typically evolve and become cumbersome and slower in the process. Computer Associates can look at the ultimate product and come up with better approaches to accomplish the same thing, Wang said.

New Possibilities

As the software market changes, Computer Associates is looking at applications packages and the acquisition of either software products or companies. Wang would not specify. CA-Jasper, the job accounting system for OS and DOS users, is one such product the company purchased from a smaller firm and integrated into its product line.

One new possibility is applications software for minicomputer and microcomputer systems, Wang said. The firm already has experience with Pascal code, a favorite of mini manufacturers, since it rewrote its CA-Earl file management and report generation system in Pascal.

Computer Associates software is truly field-upgradable and improvements are regular, company spokesmen claimed. The software is both leased or sold with a monthly maintenance charge. The lease base accounts for about 50% of the revenues, and 50% of the lease base is in the U.S.

Wang suspects customers are comfortable with Computer Associates because the company, with a dozen U.S. locations, is large enough to provide good service and its revenues do not come from one product or product range, a spokesman maintained.

There is about an even split of U.S./-European business and employees, Wang said, so that any U.S. economic downturn would be countered by the European operation. However, Wang said, he has seen no signs of recession.

Charles B. Wang

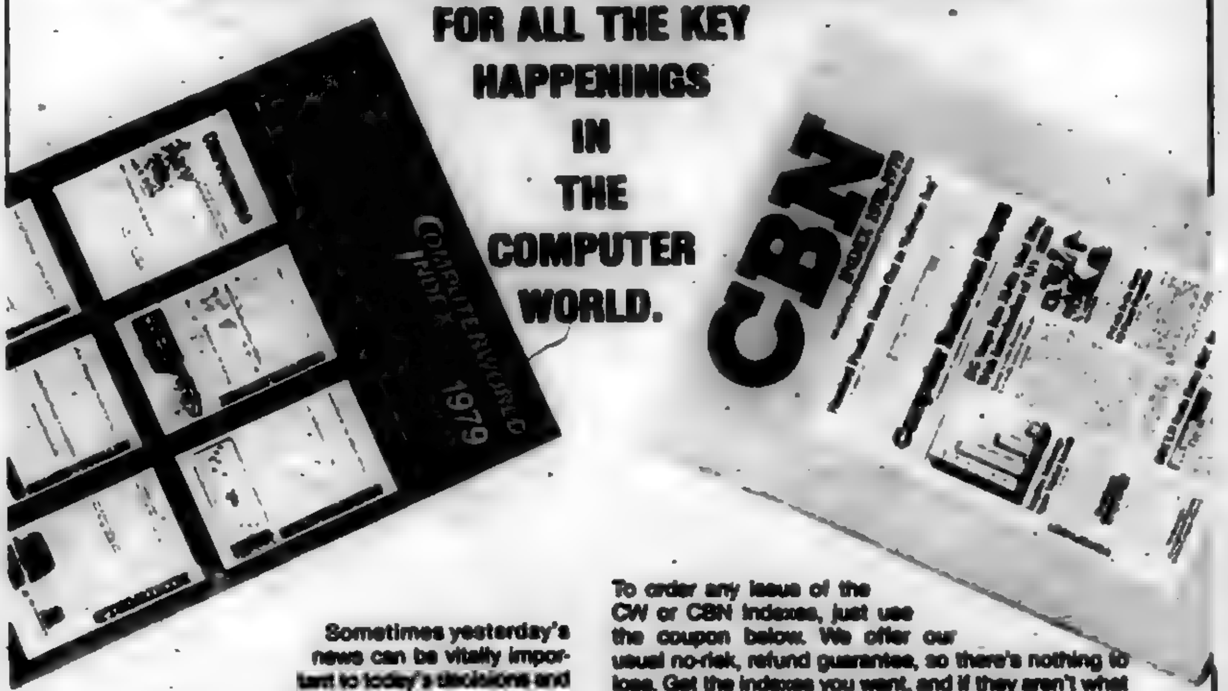
Computer Associates, which is still held by a handful of founders, is looking at additional offices outside the U.S. for future growth and is currently forming an administrative company in Argentina for South American distributors, Wang said.

Wang argued Computer Associates has been successful because of the people it attracted to the business. "We work hard at listening to employees," he said about management efforts. Employees see their ideas implemented and are always given opportunity to present their cases.

The 30 true development staffers in London and Dallas work both in teams and individually on projects, Wang said. The fact that the company is small prevents work being done and then redone by someone else. Headquarters here has in-house IBM 370/135s and 148s for the software specialists.

Wang was formerly involved with Standard Data Corp., a large New York City service bureau, which was a distributor for Computer Associates products in Europe.

THE COMPUTERWORLD AND COMPUTER BUSINESS NEWS INDEXES GIVE YOU A VITAL REFERENCE SOURCE



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CBN	MEMORIES	47
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And that's just a small sample of the type of information you'll find in these two books for just one year! We also have Indexes for *Computerworld* that go all the way back to 1976 (the CBN Index starts with the first appearance of CBN in November, 1978 and runs through the end of 1979).

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Computerworld Books

Acquisitions

Donnelley Marketing, a company of the Dun & Bradstreet Corp., has announced the purchase of substantially all of the business and the assets of Alcon Data Corp. of Bridgeport, Conn. Alcon Data provides a variety of marketing information software systems.

General Dynamics Communications, Co. has acquired the operations of Telephone Systems Management Corp. of Sharon Hill, Pa.

Automatic Data Processing, Inc. has acquired Total Systems, Inc., a subsidiary of Kaneb Services, Inc. headquartered in Houston. Total Systems provides DP services for the savings and loan and mortgage banking industries.

Tymshare, Inc. has agreed in principle to acquire all the stock of Telecheck Services, Inc., a check guarantee service organization based in Denver.

Testifying Before House Committee

Henriques Urges Tax Breaks as R&D Incentive

CW Washington Bureau

WASHINGTON, D.C. – U.S. tax and fiscal policies should be structured to encourage scientific research and industrial innovation, a DP industry spokesman told the House of Representatives' Ways and Means Committee recently.

"Tax credits for research and development will be of significant advantage in promoting new investment and encouraging innovation," Computer and Business Equipment Manufacturers Association (Cbema) President Vico Henriques told the committee.

Testifying on the proposed Research Revitalization Act of 1980, Henriques said the bill's aim to bolster industry-university R&D cooperation is important, but "it is equally important to recognize the necessity of industrial applied research and development."

The legislation would provide a nonrefundable credit to businesses for 25% of the cash contributions to a research fund, with a maximum credit equal to 5% of the company's business income.

Turning to other measures to boost U.S. R&D efforts, Henriques called for simplified and accelerated depreciation schedules to combat "the serious effect that inflation has on capital recovery.

"Much of the industry I represent has capital investment the useful life of which is less than five years," he noted. "A simplified and graduated approach seems to be indicated so as to accommodate industry-to-industry differences."

The Cbema executive also urged Congress to ease the tax burdens on businesses operating overseas. "Tax discrimination against foreign-source income clearly puts American firms operating abroad at a disadvantage and should be avoided," he said, opposing any "further weakening" of present foreign tax credit and deferral provisions.

CI Notes

Sales Training Keyed To Distributed Environment

LOS ANGELES – An advanced sales training program "keyed to today's increasingly competitive distributed data processing environment" has been developed for the sales forces of computer companies by Tratec-McGraw Hill.

Known as "Marketing in the '80s," the program consists of a three-day workshop in which participants are exposed to workbooks as well as to audio and video case studies adaptable to the needs of most computer organizations.

Organized into seven parts, the program was designed to give salesmen a better understanding of the computer industry, changes likely to affect their customers and means of gaining and keeping new accounts in a rapidly changing business environment, a Tratec spokesman said.

Additional information on "Marketing in the '80s" can be obtained from J. William Jarrett, director of marketing, Tratec-McGraw Hill, 2999 Overland Ave., Los Angeles, Calif. 90064.

Honeywell Center to Direct Distributed Systems Center

PHOENIX – The formation of a Distributed Systems and Communications Center within Honeywell, Inc.'s Large Information Systems Division (LISD) here has been announced by Richard R. Douglas, the division's vice-president and general manager.

The center will have overall program management responsibilities, including planning, architecture, design, development and support for the company's current and future distributed systems products.

Its formation follows the assignment to LISD of the overall responsibility for Honeywell's distributed systems products.

Firm Specializes In Business Strategies

STANFORD, Calif. – The Business Development Group, Inc. has been formed here to specialize in the assessment, development and support of business strategy for high-technology companies.

The firm offers three basic services: advisory and consulting projects; strategy and information reports; and tactical support programs.

Additional information is available from Daniel Drucker, Business Development Group, P.O. Box 3044, Stanford, Calif. 94305.

Integral Data Signs 14 Distributors in Year

NATICK, Mass. – Printer manufacturer Integral Data Systems, Inc. has signed 14 distributors worldwide in the past year.

Before last August, IDS sold internationally through a small export agency in Boston.

To meet a higher than expected foreign demand, IDS said it has scheduled production increases of the Model 440 matrix printer, the first member of its Paper Tiger family.

SSE '81 Booking Space

PHOENIX – The Southwest Semiconductor Exposition (SSE '81), which will be held March 24-26 at the Phoenix Civic Plaza Convention Center, is now booking exhibitor space.

SSE '80 attracted 138 equipment and materials makers who exhibited more than $12 million of semiconductor, hybrid and printed circuit board production, processing and test equipment. More than 100 booths have already been reserved by the premiere 1980 exhibitors.

Space can be reserved by contacting the show manager, Cartlidge & Associates, Inc., Suite 1014, 491 Macara Ave., Sunnyvale, Calif. 94086.

AEA Sets East Coast Event

PALO ALTO, Calif. – The American Electronics Association (AEA) is taking its West Coast Spring Conference on the road.

Chief executives from emerging high-technology companies that are interested in possible mergers, acquisitions or additional funding will have an opportunity to meet with members of the financial community at AEA's East Coast Financial Conference Nov. 17-19 in Danvers, Mass.

The conference is open to publicly traded electronics firms with annual sales of less than $20 million and to privately held companies of any size. Both AEA member firms and nonmember companies are eligible to attend, although the conference is limited to 30 electronics companies.

Additional information on the show is available from the AEA, 2600 El Camino Real, Palo Alto, Calif. 94306.

CDC Announces Opening Of Japan Cybernet Center

MINNEAPOLIS – Control Data Corp. has announced the opening of the Japan Cybernet Center in Tokyo.

The center eventually will be the largest of CDC's shared-time computer services facilities outside the U.S., according to Herbert M. Hughes, vice-president of Pan Am/Pacific/Far East Operations.

In addition, the Japan center will be the first outside this country to include the Cyber 205 supercomputer. It is scheduled for installation by the end of 1981 or the beginning of 1982.

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Time Working Against Computer Time Brokers

(Continued from Page 71)

sell time, whether they have a company policy against it or if they have a security-cleared installation," he pointed out.

Rudder's card files are updated about every six months, and more frequently for those clients he deals with on a regular basis.

'Chaperone' Service

Basically, Rudder and his staff spend a great deal of time on the telephone matching buyers with sellers, acting as a sort of data processing chaperone during the initial contact. And like an overprotective father, Rudder makes it a point to know a little bit about the firms he deals with so that the first time-sharing date won't necessarily be the last.

For instance, common sense and experience will tell you that you can't buy processing time from a department store during the Easter or Christmas seasons, Rudder said.

"One of the things to know is when outfits are busy and when they are slow, what type of work they like and what type they dislike, what they are good at and what they are bad at, and things like that," he noted.

The profile of a typical Computer Resources customer might be a firm that was previously using a terminal to do its processing with an out-of-state home office, but temporarily has to find another computer host when headquarters decides to upgrade or scrap its present mainframe, Rudder explained.

The computer time brokerage's fees normally run about 15% to 20% of the total processing cost and is invariably picked up by the seller. The seller will then turn around and bill the customer for the computer time.

Buyer/Seller Referee

While DP matchmaking takes up the bulk of his time, Rudder — a former lawyer who entered the business because "it didn't require much capital" — also spends a fair amount of time smoothing problems that may erupt in the course of his buyer/seller marriages.

Acting as a referee, he will often present buyer criticisms to the seller, help a buyer reach the right person in a company and, in a few cases, step between two parties when there are "angry stares and possibly a punch in the nose."

Most of the time Rudder will busy himself negotiating goodwill between the seller and a disgruntled buyer.

The seller "knows that if I say something's the right thing to do and he doesn't do it then the next time I get a lead I may think over who to bring that lead to and say 'so and so's kind of a hard case, he doesn't like to give an inch for goodwill' and I'll go to somebody else," he commented.

In any case, Rudder accepts his mediator's role as part and parcel of the whole brokerage job. "Anyone in the business who hasn't had some dissatisfaction is either a mighty strange person or he's been in the business a very short while," he claimed.

Supplement Activities

Even though Computer Resources is one of the few brokerage firms that deals only in computer time as a business, it does have a number of competitors in the New York metro area. One of these competitors, Computer Placement, Inc., is also a three-person shop, but sells computer supplies to supplement its brokerage activities.

"There may be thousands of sellers that are never candidates for computer time just because they don't need it, but each and every one of those people, of course, needs supplies," Bob Klar, president of Computer Placement, said.

Klar has been in the time brokerage business about 12 years and has been selling computer supplies for the past six years. He deals with about 200 customers on a regular basis, but has a client list of 2,000 companies.

Like Rudder, Klar is relatively successful as a broker, but decided to sell supplies because it is basically a nontechnical business that uses the same contacts as for marketing computer time.

Oddly enough, both Rudder and Klar maintain that despite an overall downturn of the computer time brokerage field, their businesses are not yet ready for extinction.

"There's a smaller pie, but fewer people are cutting it up," Rudder added. "So long as the market doesn't shrink much more and there aren't any new entrants, there's enough business for everyone to stay alive."

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Ruling Asked on Datacom Rights

(Continued from Page 71)

pean markets, opening nine subsidiaries in Europe over the last year, according to Carol Cohen, ADR vice-president and general counsel.

Because Nixdorf is a large European company, it could present ADR's subsidiaries formidable competition in the European IBM software market, a source noted.

Prior to Nixdorf's acquisition of TCSC, ADR permitted TCSC to license its Datacom/DB, a data base management system, and its Datacom/DC data communications software, to users of TCSC's IBM-compatible operating system, the Extended Disk Operating System (Edos).

Insyte Acquisition

ADR held ownership to those packages by acquiring the assets of Insyte Datacom Corp. Under the terms of that acquisition, ADR agreed to honor "obligations and responsibilities" of Insyte in relation to its agreement to TCSC, the complaint noted.

However, ADR claims that by selling its stock to the JTG Holding Co., the stock of which was later acquired by Nixdorf Computer, NCSC assigned its rights to the software, which was in violation of the licensing agreement.

Countering that claim, NCSC argued the sale of the stock to the holding company did not constitute a merger or consolidation of the firm with any other company and therefore was not an assignment of rights in violation of its agreement with ADR.

Furthermore, ADR contends that NCSC "made available or intends to make available the Datacom system to users of hardware systems other than IBM hardware systems, including users of hardware systems manufactured by Nixdorf Computer AG or Nixdorf Computer Corp."

In its counterclaim, ADR also denied the NCSC argument that Edos is intended for use with IBM-compatible hardware.

No date has been set for the hearing on the matter.

IBM Meshes GSD, OPD

(Continued from Page 71)

Group's Dave Stein noted, OPD and GSD have been making similar products for some time. The consolidation may serve the dual purpose of eliminating some duplicated efforts, he said.

IBM has had a similar arrangement in the European market since early 1975. Plans were under way in October 1978 to impliment a similar policy in the U.S. [CW, Oct. 23, 1978], but those plans were scrapped when IBM was accused of becoming like General Motors, a super-large firm made up of smaller subsidiaries.

IBM Vice-President of manufacturing, Robert B. Dunlop will head the new division, but he will also retain his current position, IBM said.

Contracts

Softech, Inc. has been awarded a $2 million, three-year contract from the Ballistic Missiles Office, Norton Air Force Base, Calif., to build a Jovial compiler for the MX missile program.

James S. Kemper & Co. has signed a multisystem contract with Minicomputer Systems Technology, Inc. (MST), developer of the Abacus minicomputer system for independent insurance agents. MST will deliver a number of Abacus computer systems to Kemper offices throughout the country.

Computer Sciences Corp. has been awarded a seven-year contract for continued management of Pierce County, Wash.'s computer facility.

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Government Agency is recruiting for Telecommunications Hardware Technicians. Must have two (2) years experience in communications circuitry, audio and visual. Experience in communication systems operations including diagnostic understanding and application. General understanding of data processing systems, modems, multiplexing, and network concept. Locations: Minneapolis, MN — New York, NY — St. Louis, MO — San Bruno, CA. Salary Range: 18,061 — 22,522. Send to CW Box 2982.

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Related Job Experience

Successful candidates will have 4 or more years in practical software implementation tool development work. You will have experience in the development of block-structured language compilers, code generation, and optimization.

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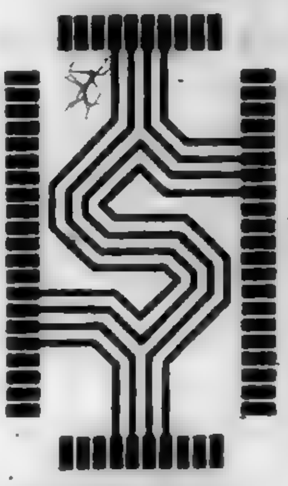

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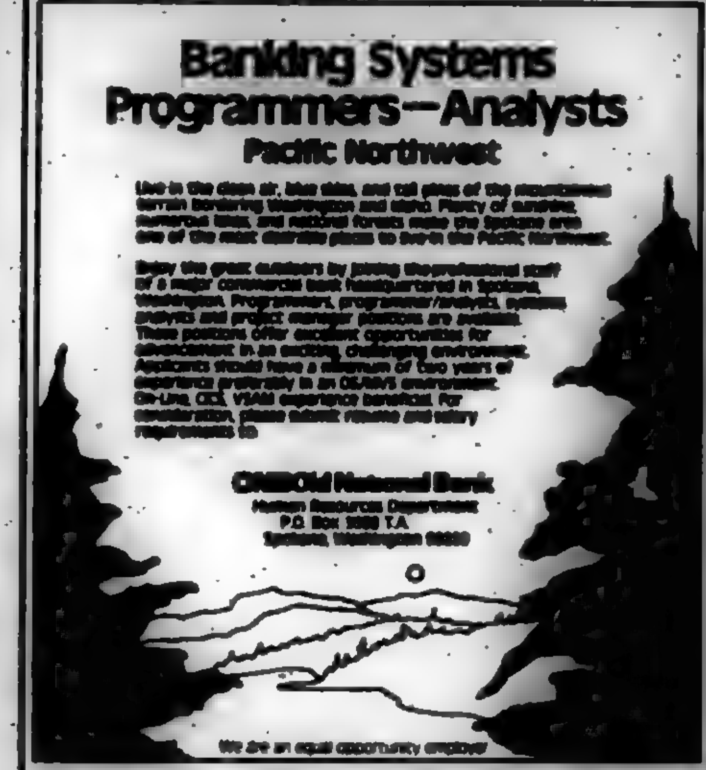

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Human Resources Department
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Applicants and nominees should have an M.S. in Computer Science, or closely related field, and should have several years of demonstrated responsible technical management experience, preferably in a large computer installation. Excellent writing and oral skills, and the ability to work harmoniously and effectively with various internal and external individuals and organizations are required. Experience in higher education is preferred.

Persons interested in the position are requested to submit information concerning the scope of their experience and responsibilities. Applications and nominations should be submitted to Dr. Warren W. Brandt, V.P. for Gen. Adm., University of Maryland, Adelphi, Md. 20783, by September 5, 1980.

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We offer a unique campus-like working environment and a staff of highly competent DP specialists seeking innovative answers to today's information systems problems. TRW - MS is in a growth mode affording potential promotional opportunities to the right individuals. In addition, we provide an excellent salary and benefits package including FLEXITIME, medical/dental/vision plans, a liberal relocation policy and a vacation plan that includes a Christmas week shutdown.

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SYS. PROG'R, [illegible]	[illegible]
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Representative listing of current southern opportunities. Additional positions available in south and nationwide. All fees paid. Call Ole Olsen or mail resume for fast, confidential service.

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Motorola's Government Electronics Division, located in Phoenix, Arizona, has immediate openings for qualified SENIOR PROGRAMMER/ANALYSTS and PROGRAMMER/ANALYSTS seeking advancement opportunities in designing and programming business system applications for IBM 3033.

Prefer degree or equivalent. Positions require a minimum of two years related experience utilizing:

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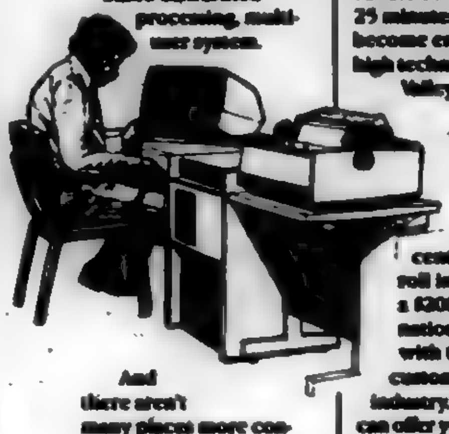

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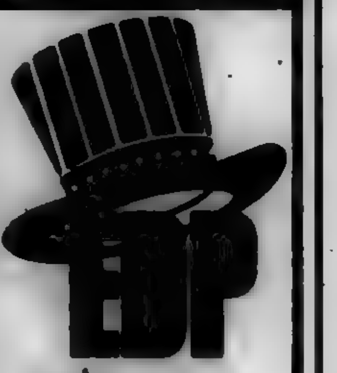
[illegible]

Suite 911, One Summit Ave
Ft Worth TX 76102 (817)[illegible]

DATA PROCESSING CAREERS inc



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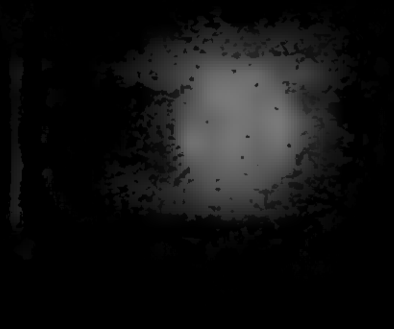

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- [illegible]
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- [illegible]
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Personnel Analyst (517) 337-9714

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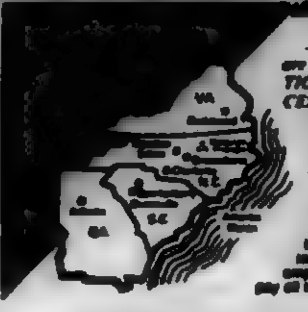

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SR. SYSTEMS PROGRAMMER [illegible]
4 yrs. DOS/VS systems, VM SP, CICS experience necessary.
SYSTEMS PROGRAMMER [illegible]
4 yrs. systems programming, 2+ yrs MVS support expertise.
TECHNICAL ANALYST [illegible]
2 yrs. MVS, JES-2/JES-3, PL1 experience. Ability to debug and read operating systems dumps. COBOL or FORTRAN a plus. Degree required.

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DATA BASE ANALYST [illegible]
IMS exp. required. 2 yrs design & analysis. DB/DC procedures.

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SYSTEMS ANALYST [illegible]
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SYSTEMS ANALYST [illegible]
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Requires 3 yrs. experience in financial, marketing, sales, manufacturing systems analysis and design. IBM mainframe 370/[illegible] multiprocessor environment. IMS or TOTAL DBMS exp. a plus. DOS/OS operating system exposure.
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Personnel Services / Office of the Chancellor

The California State
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Long Beach, CA 90802
Reference: # 07
or call collect
Alex Wake (213) 852-5747
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DATA PROCESSING DIVISION
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(305) 942-5870

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EDP DIVISION
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Houston, Texas 770[illegible]

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You will be responsible for systems level programming, developing specialized hardware and software for interfacing peripheral devices, aid in directing the enhancement of system capabilities and in identifying and developing new applications for real-time computer systems.

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Salary Area [illegible]

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Salary Area [illegible]

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Salary Area [illegible]

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Salary Area [illegible]

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Corporate level position for seasoned programmer analyst. Consumer products mfg. located in Western NY needs analyst with track record in COBOL and/or PL1. Top notch peer group presently revamping financial & mfg. systems. Some maintenance. Salary $26,000. Contact Pam Siegel.

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NEW YORK
PROJ LDR-Banking DOS VS CICS COBOL .... [illegible]
FINANCIAL Syst-Chart of accts G/L sys design .... [illegible]
SOFTWARE communications BAL TCAM .... [illegible]
SYSTEMS Eng communications 3705 BAL OS .... [illegible]
PLANNING Anal Wall St. P&S [illegible] design .... [illegible]
ADVANCED Tech group software [illegible] .... [illegible]
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SYSTEMS ANAL TANDEM ALP .... [illegible]
EDP Audit Fortune 100 co 50% trvl .... [illegible]
SYSTEMS ANAL-G/L Acct. Fixed asst CICS .... [illegible]
SOFTWARE OS MVS VS 1 .... [illegible]

NEW JERSEY
PROJ LDR Chem/Eng OS COBOL .... [illegible]
ANAL Data communications .... [illegible]
SYS PROG IMS Data dictionary MVS OS VS TCAM .... [illegible]
EDP Auditor Intl corp 50% trvl .... [illegible]
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SOFTWARE ACF-VTAM .... [illegible]
PDP 11 VAX FORTRAN .... [illegible]
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Salary: Open

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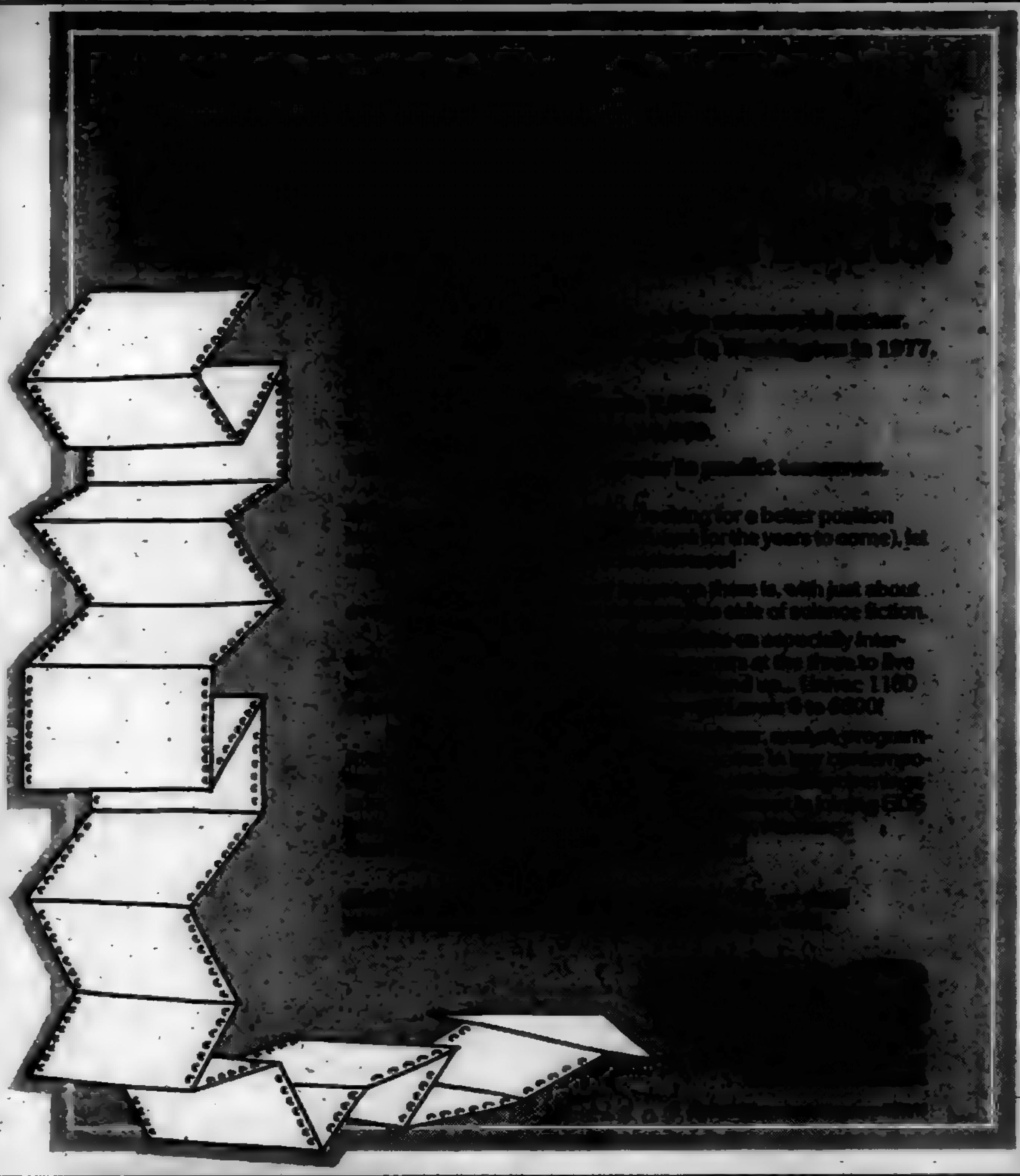

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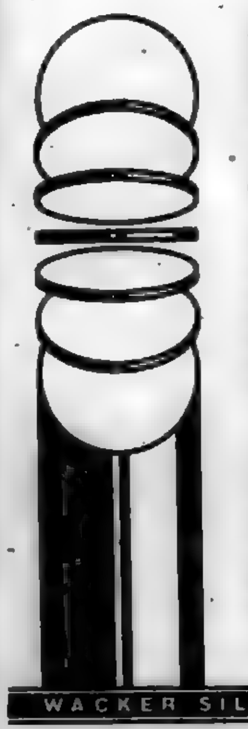

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Applicants should have 3-5 years recent experience managing a complete program development cycle, including contract negotiation. Should also have 5-10 years recent experience in the development and maintenance of interactive programs, including graphics. Applicants should be familiar with a broad range of languages, operating systems, access methods and applications, and should possess a good knowledge of networking and some acquaintance with current work in artificial intelligence. Salary open.

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(206) 623-6790

[illegible] & [illegible]
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Portland, OR 97204
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Responsible for user liaison, systems specifications and design and project control of on line manufactuer/financial and/or marketing systems, at least 6 years' experience in feasibility studies, design and implementation of DB/DC applications. Must have good knowledge of Data Base design, COBOL and project control techniques. Strong verbal and written communication skills a must.

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Join us on the leading edge of excellence in computer maintenance.

Lockheed-California Company is a major aerospace company with state-of-the-art computer systems and equipment. To help us maintain our systems, we are looking for qualified individuals with a minimum of 3 years of experience in:

- Computer facilities-maintenance & layout
- Cabling
- Air conditioning
- Power
- Hardware — IBM knowledge desirable

All positions offer an excellent salary and benefits package that includes free medical, dental, life insurance, retirement plan, and much more.

Qualified candidates are invited to call Mr. Harvey Jaskol at (213) 847-2518 or write to Louise Nagata-HJ, Lockheed Employment Office, P.O. Box 551, Burbank, CA 91520. An equal opportunity F/M/H/V employer. U.S. citizenship required.

Lockheed
Lockheed-California Company
Burbank, California

Due to rapid expansion of our Data Processing Center, Dollar Bank is seeking qualified DP Professionals who possess the following requirements:

DATA PROCESSING PROFESSIONALS

MVS/CICS SYSTEMS PROGRAMMER
A minimum of six months of MVS systems programming experience required. Knowledge of CICS and 3600 Software a definite plus.

SENIOR SYSTEMS ANALYSTS
4-5 years of experience in a large IBM shop with time spent doing both programming and analysis. Four years of COBOL and some Assembler language essential. Banking experience preferred, particularly in Item Processing.

PROGRAMMERS
At least one year of experience in a large scale IBM shop using OS, COBOL.

ITEM PROCESSING MANAGER AND SUPERVISOR
(2 positions)
2-4 years of managerial experience in a large scale IBM DP shop, concentrating on an item or check processing function. Thorough knowledge of proof/encoding and large scale reader/sorter equipment essential. Software experience including CPCS or equivalent desirable.

PROGRAMMER/ANALYSTS
At least three years of experience in a large scale IBM shop using OS, COBOL. Must have programming and analysis experience.

Excellent salary offered, commensurate with experience. Comprehensive company-paid benefits package, training programs, and excellent career growth opportunity exists in our innovative organization. For interview, send resume to:

Dollar Savings Bank
Employment and Communications Specialist
Human Resources Department
P.O. Box 967, Pittsburgh, PA 15230
All replies will be kept strictly confidential
Equal Opportunity Employer

JOIN THE VITAL WORK OF A REVITALIZED BHA

Since being placed into Court-appointed receivership, the Boston Housing Authority (BHA) has embarked on an ambitious program of reorganization, revitalization, and rededication to the people we serve. The well-being of more than [illegible] low-income and elderly Boston residents depends upon our success.

And we will succeed.

With your help, our city can have the finest system of public housing anywhere. Join with the BHA in building a better Boston.

DIRECTOR OF MIS/EDP

The Director coordinates the MIS/EDP Department with the overall needs and efforts of the Authority, and has the responsibility for all facets of data processing, management and application. Required are a minimum of [illegible] years' administrative/supervisory information processing experience, preferably in a large organization; knowledge of information systems design; a thorough familiarity with financial and data processing control systems; and a broad understanding of both hardware and software. An advanced degree in a field related to data processing, business administration or information science is highly desirable.

We offer a competitive salary and attractive fringe benefits. Deadline for applications is August [illegible], 1980. Please respond by resume to: Personnel Director.

Boston Housing Authority
53 State Street
Boston, MA 02109
An Equal Opportunity/Affirmative Action Employer

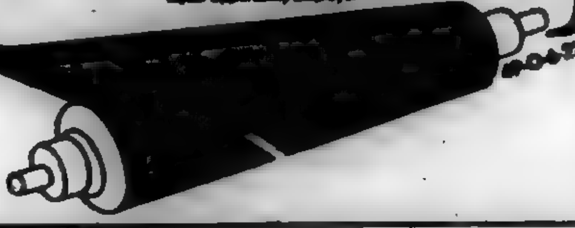
M+B

PROGRAMMER-ANALYST

Meredith/Burda is seeking a Programmer/Analyst to work in a growing Data Processing Department. Candidates for this position should have 2 to 4 years experience as a Programmer Analyst in Manufacturing and/or Financial Systems and a working knowledge of Assembler, PL 1 and Cobol language in an IBM OS/VS environment. Experience with Remote job entry and on-line CICS and a Bachelor's or Associates Degree in Computer Science or related field is desirable.

This position offers excellent Salary and Fringe Benefits. Qualified Candidates should send resume to:

Mr. Tom Hemphill
MEREDITH/BURDA, INC.
PO BOX 11[illegible] LYNCHBURG, VA 24[illegible]
Equal Opportunity Employer



SYSTEMS PROGRAMMER

Three years system programming on IBM OS/VS systems. Mastery of the Assembler language. Ability to interpret memory dumps. Sysgen experience a plus. Mt. Clemens, Michigan area.

Gail S. [illegible],
(313) [illegible], Personnel
Macomb Intermediate
School District
44001 Garfield Road
Mt. Clemens, MI 48044
AN EQUAL OPPORTUNITY EMPLOYER

A SUPERVISOR OF INFORMATION SERVICES

is needed by WVNETwork's User Services group. Requirements include: Master's degree plus three years experience in a large-scale computer center or Bachelor's or directly related coursework and demonstrated ability plus five years experience. Degree areas preferred: Education, English, Communications, Humanities, or related fields. Required: two years supervisory experience (may be concurrent). Demonstrated proficiency in public relations, teaching, production of technical documentation, editing. Exceptional ability to relate to people. Creative, challenging position. Salary open. Apply by August [illegible], 1980 to Judy Martin, WVNETwork, 837 Chestnut Ridge Road, Morgantown, West Virginia [illegible].

An Equal Opportunity/Affirmative Action Employer

SR. COBOL PROGRAMMER N.H.

Well organized Int'l. corp. requires skilled appl. prog. for lead sys. support pos. IBM 370/OS CICS & DB/DC environ. Good mix of devel. & enhance. plus long term growth potential. Salary $22,000. Contact Hank Phillips.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) [illegible]
Personnel Consultants

CAREER OPPORTUNITY

East Carolina University is a major comprehensive university with a growing enrollment located in the beautiful coastal plains of North Carolina. Computing and Information Systems serves the academic community administrative department in the rapidly expanding medical school. Due to recent growth of facilities and personnel, qualified applicants are needed for immediate openings for the following positions.

MANAGER - SYSTEMS PROGRAMMING

To plan and direct all activities of the systems programming section.

MANAGER - APPLICATIONS PROGRAMMING

To plan, organize and control the design, implementation and maintenance of application programs.

DATA BASE ADMINISTRATOR

To direct the activities related to the administration of the computerized data base, including definition, organization, protection, documentation, long term requirements and operational guidelines. Incumbent will work closely with the managers of systems programming and applications programming.

SYSTEMS PROGRAMMER

To develop, modify and maintain Vendor-supplied software and general purpose programs and utilities.

With the exception of the Systems Programmer all positions report to the Director of Computing Information Systems. Applicants with one or more years experience in similar positions preferred. Salary commensurate with training and experience.

Send resume to Personnel Department
East Carolina University
Greenville, N.C. 27834
Telephone 919/757-6362
An Equal Opportunity Employer through Affirmative Action.

MANAGER SCIENTIFIC APPLICATIONS

A management position is available for an individual to supervise the [illegible] Systems Applications Group comprised of [illegible] professionals. [illegible]

LEAD SYSTEMS PROGRAMMER

[illegible] has created an opening for a [illegible] Systems Programmer. [illegible] The facility operates an AMDAHL 470/V6 [illegible]

PROGRAMMER/ANALYSTS-FORTRAN

We also have openings for entry-to-senior level programmers to work in a state-of-the-art scientific environment. A degree in Math, the Sciences, or computer science, and a minimum of one year's experience in FORTRAN are required.

[illegible]

We have an opening for a scientific applications programmer with experience in the [illegible] of programs using different operating systems on large scale array processors. A minimum of five years experience with an advanced degree in the sciences is required.

Please send resume, including salary history and requirements to: [illegible] Code 911, Greenbelt, Maryland 20771. [illegible]

Data Processing

SYSTEM CONVERSION NEW SHOP

American Television & Communications Corporation, one of the largest and most successfully managed multiple systems cable television operators in the nation, is expanding its Data Processing Department. We are seeking several individuals with COBOL programming experience on a large IBM system to assist in the in-house conversion development and maintenance of subscriber billing and receivable systems.

PROGRAMMER ANALYST

2-5 years programming experience, IBM DOS or VS, thorough knowledge of COBOL and some interactive programming tools required.

COMPUTER ANALYST

5 years COBOL programming experience required. Degree in computer science, DOS/VS and understanding of corporate accounting helpful.

COMPUTER OPERATOR

1-2 years IBM DOS/VS operator experience required.

Our company offers excellent benefits, including stock savings and educational assistance. For immediate consideration, please send salary requirements and resume. No phone calls please.

Employment Manager

ATC

AMERICAN TELEVISION & COMMUNICATIONS CORPORATION
160 INVERNESS DRIVE WEST
ENGLEWOOD, COLORADO 80112
An Equal Opportunity Employer M/F/H/V

Sperry Flight Systems is a division of Sperry Corporation and a major supplier of high-technology systems and instrumentation for the aviation and aerospace industries. Our healthy growth has created opportunities in the following areas:

Senior Programmers

You will be involved in sophisticated state-of-the-art applications and challenging work in our Information Systems area. These positions require 4-6 years business applications programming experience, a thorough knowledge of COBOL, and experience in large-scale computers. A four-year degree and familiarity with UNIVAC 1100 Series preferred.

Systems Analyst

In this position, you'll define the requirements of data processing services users and design, specify and implement systems. Your duties will also include involvement in long-range planning and feasibility studies.

A BS degree is preferred, although equivalent experience in general accounting, manufacturing control, or industrial engineering will be considered. Strong interpersonal skills are required; experience with data base management or distributed processing is a plus.

Grow with us!

Take this opportunity to advance your career in a growing organization. Sperry offers excellent salary and benefits as well as a professional work environment. Send your resume and salary history, in confidence, to Joy Vogelgesang.

SPERRY
FLIGHT SYSTEMS

P. O. Box 21111
Phoenix, Arizona 85036

We're an Equal Opportunity Employer.
U.S. citizenship or permanent resident status required.

FIELD ENGINEERING

we have openings in several geographic areas for:

SERVICE ENGINEERS

You belong in our equipment support division if you are experienced in any of the following areas:

- DEC PDP-10 or PDP-11 system maintenance
- IBM or PCM disc, tape or system maintenance
- XDS, Sigma or 900 series system maintenance
- related experience on systems or peripherals

INSTRUCTOR

Use your technical knowledge and expertise to train our PDP-10 hardware maintenance personnel (Santa Clara Valley, California location only).

SUPERVISORS/MANAGERS

We need people with good technical background, budget responsibility experience, proven ability to manage people and withstand the daily pressures of servicing down systems and aggravated customers.

For more information call Pat or Diana at 408/446-7612 or send resume in confidence

TYMSHARE INC.
10231 Bubb Road
Cupertino, CA 95014
Attn: Pat / Diana

TYMSHARE
EQUIPMENT SUPPORT DIVISION

HOUSTON LIGHTING & POWER CO.

Nation's Sixth Largest Electric Utility

Despite the recession, Houston retains one of the strongest economies in the world! As the nation's 6th largest electric utility, Houston Lighting & Power Company, continues as one of the fastest-growing electrical utilities in the country!

To fill The Light Company's increasing demands for energy services, we're in need of the following:

COMMERCIAL APPLICATIONS PROGRAMMERS

SENIOR PROGRAMMER ANALYST

Minimum of 4 years experience which must include 2 years of programming in ALC or COBOL.

PROGRAMMER ANALYST

Minimum of 2 years experience in programming with ALC or COBOL language.

PROGRAMMER

BS/BA degree in Computer Science, Accounting, Math or any 4 year degree with a minimum of 12 hours of Computer Science (plus 2 years work experience).

Minimum Requirements:
BS, BA degree in Math, Computer Science, Accounting, or any 4 year degree with a minimum of 12 semester hours in computer science or equivalent work experience. The individual must program in COBOL or ALC languages. Hardware oriented with large IBM and ANDAHL. Software oriented in OS/MVS, IDMS, LEXICON, TSO, CICS.

Houston Lighting & Power Company provides its professionals with a top salary and full benefits package.

Qualified persons please submit your resume in strict confidence to:

B.L. [illegible]
Recruiting Division
HOUSTON LIGHTING &
& POWER CO.
P.O. Box 1700
Houston, Texas 77001

SENIOR ANALYST/ DATA BASE SPECIALIST

The National Center for Higher Education Management Systems (NCHEMS) is seeking a full-time Senior Analyst/Data Base Specialist for its Information for Management Program. Responsibilities include designing, developing, and documenting data bases; developing edit and verification procedures; working with others to analyze problems and formulate, implement, and verify computer solutions; and supervising project staff in the development of data bases. Qualifications include at least three years experience in the design and development of [illegible] research [illegible] and programming in FORTRAN or COBOL; skill in writing technical documentation and in managing project staff; demonstrated knowledge of [illegible] statistical [illegible] and techniques; familiarity with higher education management/administrative [illegible], and a [illegible] degree. Experience with HP 3000 computer system preferred. Starting salary range: [illegible] to [illegible], plus excellent benefits. For complete position description and/or to submit [illegible], write Director of Personnel, NCHEMS, P.O. Drawer P, Boulder, CO [illegible]. For full and timely consideration, APPLICATIONS SHOULD BE RECEIVED BY MONDAY, SEPTEMBER [illegible], [illegible].

An Affirmative Action/
Equal Opportunity Employer

MGR. BANKING TRANSIT

Well-established Boston based fin'l. mgmt. org. seeks seasoned banking pro. to direct transit EDP functions. Prefer in-depth understanding of transit or other MICR apps. utilizing IBM 3890 or IBM 1420 hardware. Highly visible pos. in a forward-thinking environ. Salary $37,000 range. Contact Gerry Battista.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

PROGRAMMER/ANALYST

Excellent opportunity with a growing DP staff in a rapidly expanding corporation. The successful candidate must have a minimum of 3 years COBOL and 1 year ALC language experience in an IBM 370 DOS/VS environment. Retail systems experience a definite plus. Excellent salary and benefits coupled with a friendly and modern environment makes this position a natural for the career minded. Company will pay all traveling relocation expenses. Call or send resume to:

CATHERINE SHARP
HECHINGER CO.
3500 PENNSY DRIVE, LANDOVER, MD 20785
301/341-0287
Equal Opportunity Employer

DATA PROCESSING

SYSTEMS ANALYST

Our progressive 420-bed hospital is seeking a people-oriented Systems Analyst to take full control of our systems design and implementation for specific projects. This major responsibility position involves the coordination & organization of certain hospital processing systems and the maintenance of various computer master files. Other duties include analyzing and preparing cost of assigned projects, systems and project documentation.

Minimum requirements of this high-visibility position are a 4 year degree, preferably in computer science/business or equivalent job experience of at least 3 years, ideally in a hospital environment.

Your efforts will be recognized with an excellent salary and premium fringe benefits. And, you'll find maximum potential for growth and advancements. For consideration, send your resume with salary requirements in confidence to:

FAITH BEEBE
Staff Assistant

SwedishAmerican
HOSPITAL
1400 Charles Street • Rockford, Illinois 61101

An Equal Opportunity Employer m/f

DATA NETWORK

ENGINEERING PROGRAMMERS

RCA Global Communications, the world's leading international record carrier, has immediate openings at its

PISCATAWAY, NEW JERSEY LOCATION

The individuals we seek will provide software development and support on several types of minicomputers which comprise RCA's low speed data services packet switching system. Programming will be done on Interdata, General Automation, Datapoint, DEC and/or prime CPU's and will be done in Assembler. Tymnet and Telenet system programming experience a plus. Projects will deal with communications protocol implementation including X.25, X.75, SNA, and bisync. Understanding of communications hardware interfaces (modems, interrupt handling, etc.) is required, as well as system configuration and system generation (SYSGEN) type programming. A college degree is preferred but not essential.

If you feel you meet these qualifications and are looking for a career with a progressive, innovative communications company, kindly send your resume in confidence, specifying salary history and requirements, to:

RCA Global Communications, Inc.
Box 11P, 60 Broad Street, New York, NY 10004
an equal opportunity employer

RCA A Tradition On The Move!

Move Ahead Fast In MIS!

GAB Business Services offers challenge, recognition and rewards.

GAB Business Services, Inc., a leader in the insurance service field, has a fast-paced, advancement-oriented opportunity for you, if you can perform one of the following functions:

DATA PROCESSING SERVICES SUPERVISOR

Supervise and coordinate the activities of a staff of ten, involved in job set-up, control, scheduling and the tape library in a batch and on-line CICS environment.

COMPUTER OPERATIONS SHIFT SUPERVISOR

Supervise staff of 5 on a 3 day, 12 hour night shift. Monitor and control Data Centers' operation of IBM 370/145's/155's, OS VSI System. Knowledge of J.C.L. and I.B.M. Utilities.

SR. SYSTEMS PROGRAMMER

Installation and maintenance of CICS/IMS. Generating and supporting VM and VSI Operating Systems.

SR. PROGRAMMER ANALYST

Development of Batch and On-Line Systems Utilizing VM, CMS, CICS and IMS.

PROGRAMMER ANALYST

Development of program specifications and programs for Batch and On-Line Systems.

Management Information Systems at GAB is a dynamic growing operation. We are going places! And, we need good people to get there. People like you. While GAB is a giant in its field our MIS division is considered small — 60 professionals. And that's good. It's good if you want to get things done, see the results of your work and increase the scope of your job. It's good if you want to be recognized for your personal contributions. Don't get lost in the crowd. Come to GAB.

If you're interested, write us detailing your qualifications. Please be sure to indicate the position you're seeking.

GAB Business Services, Inc.
123 William Street
New York, New York 10038
ATT: Personnel Department

An Equal Opportunity/ Affirmative Action Employer

INFORMATION SYSTEMS

Data Base Manager

Battelle, one of the world's foremost research and development organizations, has an immediate need in its multi-million dollar funded Office of Nuclear Waste Isolation for an individual with BS/MS in Computer Science, Systems Analysis or related field; MBA desirable; with experience in both Data Administration and Data Base Administration related to Management Information Systems.

Several years of experience in the following areas are essential:

- Design and management of integrated information systems data base.
- Familiarity with a variety of commercial report generators and graphics packages.

You must have good oral and written communications skills to deal with all levels of management. Familiarity with Control Data Cyber and DEC VAX computers would be a plus.

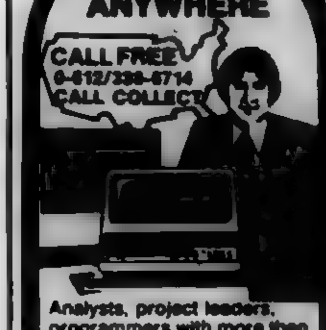
We offer a comprehensive benefits package and an excellent salary commensurate with your background. Send your resume in confidence to CW Box 2370, 375 Cochituate Rd., Rte. 30, Framingham, MA. 01701.

Battelle

PROJECT MANAGEMENT DIVISION
OFFICE OF NUCLEAR WASTE ISOLATION
(ONWI)

An Equal Opportunity Employer

GET AN EDP JOB ANYWHERE



Analysts, project leaders, programmers with more than a year's experience let us help you find a better job. For a decade we have been placing EDP professionals like you all over the country through our network of 25 national offices. Send your resume or call

Electronic Systems Personnel
1710 Midwest Plaza Bldg.,
Mpls., MN 55402

client companies assume our fee.

esp

ESP Placement Specialists
A Member of National Computer Associates

PROGRAMMERS AND ANALYSTS

Free Employment Service

Northeast, Southeast & Midwest U.S.

Scientific and commercial applications ● Software development and systems programming ● Telecommunications ● Control systems ● Computer engineering ● Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C.
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

SAN FRANCISCO PROGRAMMER ANALYSTS

If you are a Programmer Analyst with **TANDEM** or other minicomputer programming experience and are interested in a terrific job in **San Francisco**, then call Jim Stewart at (415) 781-5610 to get more details on these exciting opportunities.

If you are unable to call this week, send Jim your resume at Data Architects, Inc., Francisco Bay Office Park, 1750 Montgomery Street, San Francisco, Calif. 94111. We are an equal opportunity employer, M/F.

ROBERT HALF

PACIFIC NORTHWEST

Washington, Oregon, Idaho & Alaska

PROGRAMMERS/ANALYSTS

Do you have 1+ years experience in business applications? Do you plan to visit or relocate to this area?

If so, we can arrange interviews for you. Call us collect or send your résume and itinerary and we will get right to work.

Ray Magill, CDP
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite 2625
Seattle, Wash. 98101
(206) 624-9000

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 SW Columbia
Suite 660
Portland, Ore. 97258
(503) 222-9778

Corning Community College

Senior Programmer/Analyst

Applications are now being accepted for a one year position of Senior Programmer/Analyst. Duties include preparation of computer programs and analyses of various information processing procedures and their adaptation to electronic data processing. Work is performed in a state-of-the-art computer center. Position requirements: Minimum three (3) years progressive experience using COBOL preferably on DEC System 10 or 20. Experience in non-profit organization payroll and financial systems a plus. Salary $17,000 TO $20,000 depending on qualifications with extensive benefit package.

Interested candidates should submit detailed resume by AUGUST 20, 1980 to:

Director of Personnel
Corning Community College
Corning, New York 14830

Corning Community College is an Equal Opportunity Employer.

ROBERT HALF

[illegible]

Fee Paid [illegible]

ROBERT HALF
[illegible]

SYSTEMS COORDINATOR

A systems research and development coordinator position in a [illegible] environment. [illegible] Working knowledge of COBOL, MARK IV, CICS and user languages is preferred. [illegible] Bachelor's degree and [illegible] years relevant experience preferred. Salary range [illegible]. Send complete resume by Aug. [illegible] to Mr. George F. Bradley, Employment Manager, University of Florida, Personnel Division, 3rd floor Stadium, Gainesville, FL 32611.

University of Florida complies with section 503 of the Rehabilitation Act of 1973 and section 402 of The Vietnam Era Veterans Readjustment Assistance Act of 1974.

An Equal Employment Opportunity, Affirmative Action Employer

CICS
PROGRAMMER/ ANALYSTS
to $38,000

Prestigious, major health care institution in desirable California location seeks Programmer/ Analysts. On-line experience, systems design, user interface, with COBOL or Assembler language. Outstanding benefits. WESTERN HEALTH RESOURCES, P.O. BOX 46915, LOS ANGELES, CALIFORNIA 90046.

Stewart Systems

SYSTEMS ANALYST/ PROGRAMMER

Fast growing software company developing business systems for printing companies in the U.S. & abroad needs a person to design & code a computerized printing estimating system.

Suitable applicants must have minimum of 5 years experience-all aspects of printing production management & estimating, a good working knowledge of high level programming language (preferably ALGOL 60) & mini-computer operating systems (preferably Data General AOS), a strong familiarity with printing production and estimating requirements in U.S. and foreign companies, particularly Canadian & British.

Starting [illegible] depending on experience. Normal working hours 9 - 5. Please send resume to STEWART SYSTEMS, Personnel Dept., [illegible], Boston, MA.

We are an equal opportunity employer

DATA PROCESSING PROFESSIONALS

Atlantic States, a national recruiting firm is searching for EDP specialists at all experience levels with diverse systems background. Many openings nationwide. For selective handling, without pressure, mail your resume to **Jim Reed, Atlantic States Personnel, P.O. Box 9829, Savannah, Ga. 31412. Fees Paid.**

PROJECT LEADER

TULSA PUBLIC SCHOOLS has a career opening for an experienced Programmer/ Analyst. A strong COBOL background working in a 370 environment with DOS/ VSE, CICS, DMS and DL/1 is essential. Extensive benefits include advanced training and four weeks vacation. Salary to $27,000.

Send Resumes to:

Gary W. Watson, Director DP
Tulsa Public Schools
P.O. Box 45208
Tulsa, Oklahoma 74145
918-743-3361 Ext. 224

An Equal Opportunity Employer

EDP Professionals

Discover Canton and an EDP career in America's heartland.

American Electric Power, one of the leading energy suppliers to the United States' heartland, consists of eight operating electric power companies serving more than seven million people from Michigan to Virginia. Our Service Corporation provides both the parent and operating companies with management, professional and technical assistance in planning, engineering, construction supervision and other fields.

The recent construction of a modern computer center in downtown Canton and expanding data processing applications have created immediate openings for several data processing professionals.

We are currently looking for:

Analyst

You should have a college degree (or equivalent) and 3-5 years' COBOL experience. A background in payroll/personnel a plus.

Programmers

We currently have a number of career opportunities available for Programmers who will be involved with accounting applications. A college degree (or equivalent) required. COBOL experience desirable.

Systems Programmer

Qualified candidates should have a college degree (or equivalent) and systems programming experience in at least one of the following areas: MVS/operating systems, JES-2, TCAM/CICS performance/hardware monitoring.

We offer salaries commensurate with experience and education and a comprehensive benefits package (including relocation assistance).

For prompt consideration, please forward your resume, including salary history and requirements in confidence to: Mr. J. E. Bagnoli, Dept.-CW

AEP **AMERICAN ELECTRIC POWER SERVICE CORPORATION**
P.O. Box 487, Canton, Ohio 44701
An equal opportunity employer, m/f/h

MANAGER/SWITCH NETWORK PLANNING

San Francisco Bay Area

SPC provides a common carrier telecommunications systems linking over 80 metropolitan areas. Our Coast-to-Coast network of microwave relay, satellite and switching systems provides voice, data and facsimile transmission services to the Business and Residential Communities.

Your major responsibility will include directing a staff to provide medium-to-long range network designs that meets business plans and recommend and review alternatives to these plans. Your staff will also provide functional specifications for automated switch network design programs which will perform traffic forecasting, trunk group sizing, port, multiplex, radio route forecast and economic analysis, as well as provide standards for network design and traffic engineering including network structure, grade of service, traffic routing and overload strategies.

Position requires 5-7 years "hands-on" experience in communication network design and analysis to include a minimum of 1 year in a managerial position. Bachelor's degree required with higher or additional degrees desirable in Engineering, Operations Research/Mathematics, Economics or Telecommunications Management.

The rewards are extremely attractive. Your professionalism will be challenged — and recognized. Compensation is excellent.

For immediate consideration please send resume to, or contact Harry Speltz, SPCommunications, One Adrian Court, P.O. Box 974, Burlingame, CA 94010, (415) 692-[illegible], Ext. 2233. An equal opportunity employer M/F. Individuals only apply.

SPC ***SPCommunications***
a Southern Pacific Subsidiary

SOFTWARE DEVELOPMENT OPPORTUNITIES

SYSTEMS ENGINEERING LABORATORIES is a vigorously growing manufacturer of state-of-the-art 32-bit minicomputer used in high-performance real-time applications. The following career opportunities are available due to SYSTEMS tremendous growth in a sophisticated technological environment.

SUPERVISOR OF COMPILER DEVELOPMENT

Position will carry responsibility for the implementation of all corporate language implementations, including FORTRAN, COBOL, PASCAL, BASIC. Supervisory and planning ability is required. The successful candidate should have built two or more complete language products including all documentation. In this Senior position, the candidate will participate in new product definition in an engineering organization, and interface with the marketing organization to supply data for the corporate product planning and merchandising functions.

COMPILER DEVELOPMENT STAFF MEMBERS

Individuals selected will have experience in coding, testing, and developing compilers and language products. These positions will offer the opportunity to provide technical leadership as the in-house consultant in compiler development.

SOFTWARE SUPPORT ANALYST

This position involves troubleshooting software problems and assisting customers in installing new software packages. The successful candidate will have experience in identifying software design problems or misapplications of software on both the operating system and application level. Background in real-time operating systems is a requirement. The ability to interface with both customers and development engineering is an absolute necessity.

SOFTWARE TECHNICAL WRITER

Dynamic, growing software writing group needs a highly-motivated software writer with background in operating systems, communications, data base management, and/or a language such as ASSEMBLER, FORTRAN, MARY2, PASCAL or COBOL. As an integral member of a product programming team in the Software R&D organization, you will be responsible for producing reference manuals, user's guides, technical manuals, pocket cards, and other literature for that product. You will have the support of the software writing group and in-house word processing, art, and printing departments in this capacity. Substantial writing samples are required. Excellent opportunity for individual with 4 or more years experience in computer-related technical writing who is seeking responsibility and challenge.

We offer competitive salaries, comprehensive benefits and the opportunity to make a personal impact in a totally state-of-the-art environment. For confidential consideration, send your resume or letter of information to Fred Brillante.

6901 W. Sunrise Blvd.
Ft. Lauderdale, Florida 33313

SYSTEMS
ENGINEERING LABORATORIES

We Are An Equal Opportunity Employer, Male/Female/Handicapped

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COMPUTER HARDWARE MAINTENANCE

Join our rapidly growing field service company. We offer unlimited opportunity to those with initiative and ability. Systec provides a full benefit package, top salaries, and participation in Systec's future.

Immediate openings for Field Engineers with IBM 360/370 CPU, Peripherals, and plug compatible product experience-other large system experience considered.

If you are ready for a company where your abilities and contributions will be recognized and rewarded, call today. At Systec you are not just a part of the company . . . YOU ARE THE COMPANY.

Phone: 800-327-[illegible] In Fla. 305/[illegible]

SysTec

2716 Navigator Ave.
P.O. Box 2915
Sanford, Florida 32771

Equal Opportunity Employer m/f

Systems Design Engineers

Our Division, a recognized leader in the development and manufacture of highly sophisticated telecommunications components and systems for the world's banks and security exchanges, requires several capable, talented computer professionals.

Qualified applicants will possess a minimum of 5 years in-depth experience working with mini and micro computer based terminal systems and Assembly language coding. A detailed knowledge of software/hardware and data communications technologies would be extremely helpful.

Working within our Engineering and Development department, you will become involved with the definition and functional specifications of our next generation of terminal system products. Will participate in software/hardware evaluation and selection, product planning and proposal writing. Excellent communications skills, both oral and written, are essential for effective interfacing with all areas of Engineering and Development to insure the coordination of all projects required to bring the new product to the marketplace

If you have previous experience working on development projects at the design level, and are interested in participating in broad, system level design projects, we can offer you a wide range of opportunities that are fully commensurate with your background and level of experience, and a generous program of employee benefits.

Qualified applicants should forward resume with salary history and requirements, in confidence, to: Mr. Don Romanello, Bunker Ramo Information Systems, Trumbull Industrial Park, Trumbull, CT 06609. An equal opportunity employer m/f.

BUNKER RAMO INFORMATION SYSTEMS

COMPUTER PROGRAMMER

Construction Industry

Dynamic Industrial Constructors, a mechanical construction company, has an immediate need for a Computer Programmer with RPG experience for their office in New Orleans. Other computer language experience would be helpful.

Qualified candidate will work on IBM 38 equipment after completing a 5 week study course in basic IBM languages. Responsibilities will include technical programming in the following areas: costing, planning, scheduling, and estimating. Construction industry experience a plus.

DYCON offers a competitive salary structure, comprehensive company benefits and a generous relocation package. For immediate consideration, please send your resume to:

Chris Pite
Dynamic Industrial Constructors
DYCON
P.O. Box 10662
Jefferson, LA 70181
(504) 888-6730

Systems Programmers

Norwich-Eaton Pharmaceuticals, with headquarters in Norwich, New York, operates a state-of-the-art processing facility and teleprocessing network using a 4 Mb IBM 370/158 AP. We currently operate under VM/370, VSI, CICS, and IMS. Continued technological growth in our data processing activities necessitates the addition of experienced systems programmers.

Prospective candidates should have at least three years experience in IMS and CICS on an IBM System 370/158 or larger computer. Additional experience in MVS, SNA, OS/VSI and VM/370 is desirable.

Norwich-Eaton Pharmaceuticals is the worldwide pharmaceutical division of a Fortune 500 corporation. These challenging positions combined with our location, a small but complete community in upstate New York, offer excellent opportunities to maximize one's professional and personal goals.

We offer a competitive employment package including paid relocation, flexible work hours and company paid medical and dental insurance.

If you'd like to know more call Mr. Morgan, collect at 607-335-2420, no agencies, please, between 8-5 E.D.T. weekdays prior to August 29 or write c/o Personnel Department.

Norwich-Eaton Pharmaceuticals
Division MortonNorwich
17-27 Eaton Avenue
Norwich, New York 13815

An equal opportunity employer, M/F

COMPUTER SCIENCE FACULTY POSITIONS

Assistant and Associate Professor positions available Fall, 1980.

Ph.D. in Computer Science desired - related areas considered. Salary $20,000 - $27,000 per 9 month academic year depending upon experience. Should have interest in teaching and program development at B.S. and M.S. level. Research and consulting opportunities available in diverse industrial setting. Excellent living conditions. Please send resume and three references to Dr. [illegible], Dean, School of Engineering - University of Tennessee at Chattanooga, Chattanooga, TN 37401.

UTC is an affirmative action/equal opportunity employer.

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EMPLOYER: The Commission employs a small, select professional staff of ten persons, who are exempted from the personnel system of the State of Indiana. The Commission has its own PDP 11/70 system which it manages and which supports both word and data processing. RESPONSIBILITIES: Full responsibility for managing the PDP 11/70, negotiating with hardware and software vendors, technical assistance to other members of the staff, and shared responsibility for programming of new systems. DESIRABLE QUALIFICATIONS: Practical experience with word and data processing systems. Programming skills in COBOL and either FORTRAN or BASIC. Practical experience in managing a medium scale hardware/software system, including experience with procedures for preventive maintenance, system generation, updating, patching, and backup. A degree in either computer science or business administration is preferred. TERMS OF EMPLOYMENT: Open and competitive with attractive fringe benefits. APPLICATION INFORMATION: Closing date is September 5, 1980. Send nominations and applications to [illegible], Indiana Commission for Higher Education, 143 West Market Street, Indianapolis, Indiana 46204. Affirmative Action Employer

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PROGRAMMER/ANALYST

Stewart-Warner Corporation, world leader in automotive instrumentation and lubrication equipment, has an outstanding get-ahead opportunity in manufacturing systems development at our Chicago headquarters location.

We require that you be a high school graduate, with 3 to 5 years of heavy programming experience. You will know BAL and/or COBOL, plus IBM 370/DOS-VS. You must also know JCL. CICS experience will be a plus.

You will receive an excellent salary, complete benefit package, including paid overtime, divisional bonus, tuition reimbursement, company paid insurance and much more. An excellent opportunity - please send resume including experience and salary history to:

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[illegible]
STEWART-WARNER CORPORATION
Alemite & Instrument Division
1826 Diversey Parkway
Chicago, Illinois 60614

An Equal Opportunity Employer M/F

University of Massachusetts/Amherst

STAFF ASSISTANT - PROGRAMMER

(2 Positions)

One to three years' programming experience with COBOL required, preferably in an OS installation. Previous experience with and utilization of an Administrative or Business accounting system, preferably in an educational environment. Prefer knowledge of and/or experience with a Data Communication System (CICS). Ability to work well with people in varied organizational relationships. Ability to articulate well both orally and through written communication with University Administrative Data Processing Center users. Prefer knowledge of and/or experience with a Data Base Management System. Minimum attainment of a Bachelor's degree or equivalent professional experience. Willingness to work other than normal work day. Starting salary will be commensurate with experience. Resume by August 25, 1980 to Data Processing Center, 150 Whitmore Administration Bldg., UNIVERSITY OF MASSACHUSETTS, Amherst, MA 01003. The University is an Affirmative Action/Equal Opportunity Employer.

DIRECTOR of ENGINEERING

Our client, a division of a major company in the Telecommunications Carrier Industry is looking for an experienced Director of Engineering for its Domestic Data Systems. Must be able to lead, supervise and handle administration of 75 to 80 Engineers in a Leading Edge Technology Group. Heavy accent on software development in a Packet Switching environment. Familiarity with microprocessing in a word processing environment important. Will be responsible for development, installation and operations support for Domestic Data Systems in an established system.

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John Abbott, Executive Recruiter
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LEAD PROGRAMMER/ANALYST

District Office, Fresno, CA

Salary - $2127-$2584/month

Experience - Extensive and responsible data processing experience in systems analysis and programming involving the design and implementation of applications for financial systems in an on-line, real time environment utilizing COBOL. Expect to shift to a non-procedural language next year.

Education - Principles of Accounting, Managerial Accounting, Governmental Accounting and Analysis of Financial Statements.

Deadline - August 29, 1980.

Inquire - State Center Community College District, PERSONNEL COMMISSION, 1525 E. Weldon, Fresno, CA 93704. Phone 209/226-0720.

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Immediate position available for individual with at least 6 years automated data processing experience. Emphasis in the implementation, design, development and coordination of industrial workload control and management information systems.

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[illegible] COBOL required.
to 27K

Confidential resume in confidence to:
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Fee - Employer Paid

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500 mil South Florida Bank Holding Co. is seeking programmer with at least one year experience with CIF, B or C series. Focis experience a plus. Data center, with on line programming environment, located in desirable suburban area. Call Mr. Baron or Mr. Berryman, (305) 667-1146

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Data Processing Operations Manager

Clark County, Las Vegas, Nevada
(Salary $[illegible]—$[illegible] annually)

Under administrative direction of the Director of Data Processing, has responsibility of assuring an effective, efficient computer operations. Position requires a Bachelors Degree in Computer Science, Business or Public Administration, or closely related field and 3 years of professional data processing experience of which one year must have been at the supervisory level. Annual budget $1.4 million. NO STATE INCOME TAX. PAID RETIREMENT.

Apply by: Open.

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AA-EOE

DATA PROCESSING

PROGRAMMERS ANALYSTS

PROJECT SUPERVISORS

Several new openings in the Data Processing Division of a large regional cooperative dedicated to the service of the farming community. Our activities include:

- Sale and distribution of an extensive line of farm and home products.
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We are located in a pleasant, thriving Midwestern community of about 75,000 people. Two universities and a diversified mix of manufacturing and financial enterprises contribute to the intellectual and economic vitality of the town and the surrounding area.

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Candidates should have:

1. Prefer four-year college degree with emphasis in business, data processing, or equivalent.
2. At least two years' experience in systems development.

Experience in a large-scale Honeywell environment or with Honeywell Level 6 minicomputers is a definite plus, but not essential.

If this opportunity sounds appealing, send a resume to:

Manager, Personnel Administration
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Bloomington, Illinois 61701

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• DATA BASE ADMIN to $40K

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Lead effort for integration of new systems products. Involves large systems, hardware, microcode, and software integration. Will assist in the development of subsystem interface modifications. Knowledge of large operating systems, MVS & JCS2/3 necessary.

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Key role in systems programing of 9 CPU's. Experience with MVS, VS or VSI operating systems required. Will work with IBM 4341 & M80/40. BSEE/CS and 5 years experience necessary.

STAFF DEVELOPMENT ENGINEERS

To assist in complex systems evaluation; hardware, software and microcode. Two to five years development/systems programming experience required in addition to knowledge of MVS, VM, and JCL.

STAFF ENGINEERS

Host software design, code and test. Must have knowledge of MVS/JES and TSO/SPF. Large systems experience a must.

STAFF ENGINEERS

Experience in storage management microcode design, I/O subsystem architecture, systems design and programming required. Five to eight years experience preferred.

STAFF SYSTEMS PROGRAMMERS

To develop and maintain IBM, VM, MVS, VSI operating systems. Will work with IBM 4341 and M80/40. Must have knowledge of JCL and BAL. BSEE/CS and at least 5 years systems experience preferred.

SR. DEVELOPMENT ENGINEERS

Key role in evaluating and integration of complex systems products consisting of hardware, microcode and large software components. Knowledge of MVS and DOS necessary. BSEE/CS and at least 5 years experience in MVS systems development or integration preferred.

DESIGN ENGINEERS

To assist in the definition and development of large systems integration tests. BS/MSCS with knowledge of MVS, DOS, and Pascal preferred. VSI knowledge highly desirable.

SYSTEMS PROGRAMMERS

Assist in systems integration of VSS subsystem; test planning, results analysis and problem determination. Must have knowledge of IBM/370 & OS with Pascal. Assembly language and/or P/1 a plus. Degree and at least one year experience a must.

STC offers an excellent compensation package including health and insurance benefits, stock purchase plan and more. If you qualify for any of the above positions and would like additional information concerning them and other software openings please write Dale Smith, STORAGE TECHNOLOGY CORPORATION. Dept. CW/6, 2270 South 88th Street, MD[illegible], Louisville, Colorado 80027.

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- Scheduling
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For a rapid review of your opportunity with WPPSS, call collect to our Data Processing Department at (509) 375-5483 or send complete resume and salary history in confidence to:

Mr. P.J. Jongeward, DEPT. 12, Washington Public Power Supply System, P.O. Box 968, Richland, WA 99352

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

WPPSS

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Deadline: August 27, 1980.
Starting Date: September 1, 1980

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Newly established installation in southern location requires Analyst/Programmer with B.S. in Computer Science. Experience in Honeywell equipment preferred with "hands on" knowledge of on-line and batch systems using GECOS, DM IV, IDSII and transactions processing. Initial assignment will be analyzing "dumps" and developing solutions to problems. Will, also, participate in implementation of "systems software upgrades." Send resume and salary requirements in confidence to:

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[illegible] BACK OFFICE [illegible] COMPUTERIZED and [illegible] $[illegible]

RPG II SYSTEM 34

[illegible] RPG II programming and SYSTEM 34 [illegible] SYSTEM 34 [illegible] $[illegible]

[illegible]

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Temple, Texas [illegible]
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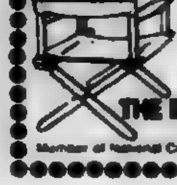

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★★★

SYSTEMS PROGRAMMER

Firm background in DOS/VS and working knowledge of IBM Assembler required. Knowledge of CICS/VS, DMS and DL/I a plus. Competitive salary and excellent fringe benefits. Apply personnel office: Florida Institute of Technology, Melbourne, FL

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[illegible]

AUSTIN COMMUNITY COLLEGE AUSTIN, TEXAS

seeks

DIRECTOR FOR DATA PROCESSING OPERATIONS.

Seasoned EDP professional with 5 or more years experience in programming and design. Experience in supervision and in educational institution desirable. Computer related degree required. IBM 370 DOS system. Salary range $[illegible] plus excellent benefits. Apply to Personnel Office, Austin Community College, P.O. Box [illegible], Austin, TX [illegible]. (512) [illegible]. Deadline for application: Aug. 29, 1980.

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This is a new position with responsibilities for planning, organizing, implementation and coordination of the city's data processing activities. [illegible] currently using new IBM System 34 [illegible] specifically COBOL or RPG [illegible] Minimum starting salary $[illegible] plus excellent fringe benefits. Send resume, in confidence to:

Personnel Dept.
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Appleton, WI [illegible]
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This is a 12-month, administrative position. Salary based on experience and qualifications. Send resume and references to:

Mr. [illegible]
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(309) [illegible]-1177

Deadline for applications: September 12, 1980 An Equal Opportunity/Affirmative Action Employer. Women, Minorities, and Handicapped Persons Are Especially Invited To Apply.

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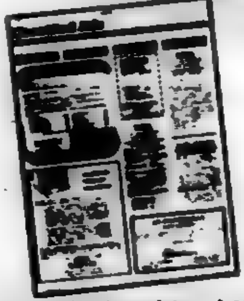

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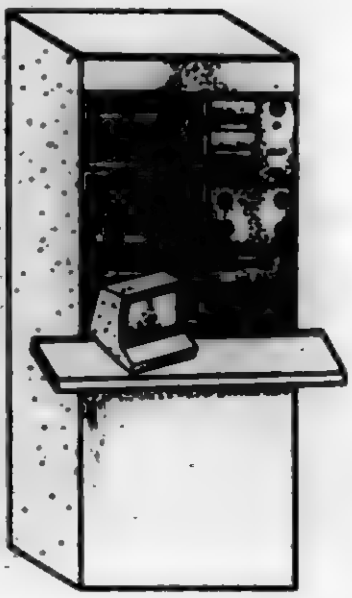

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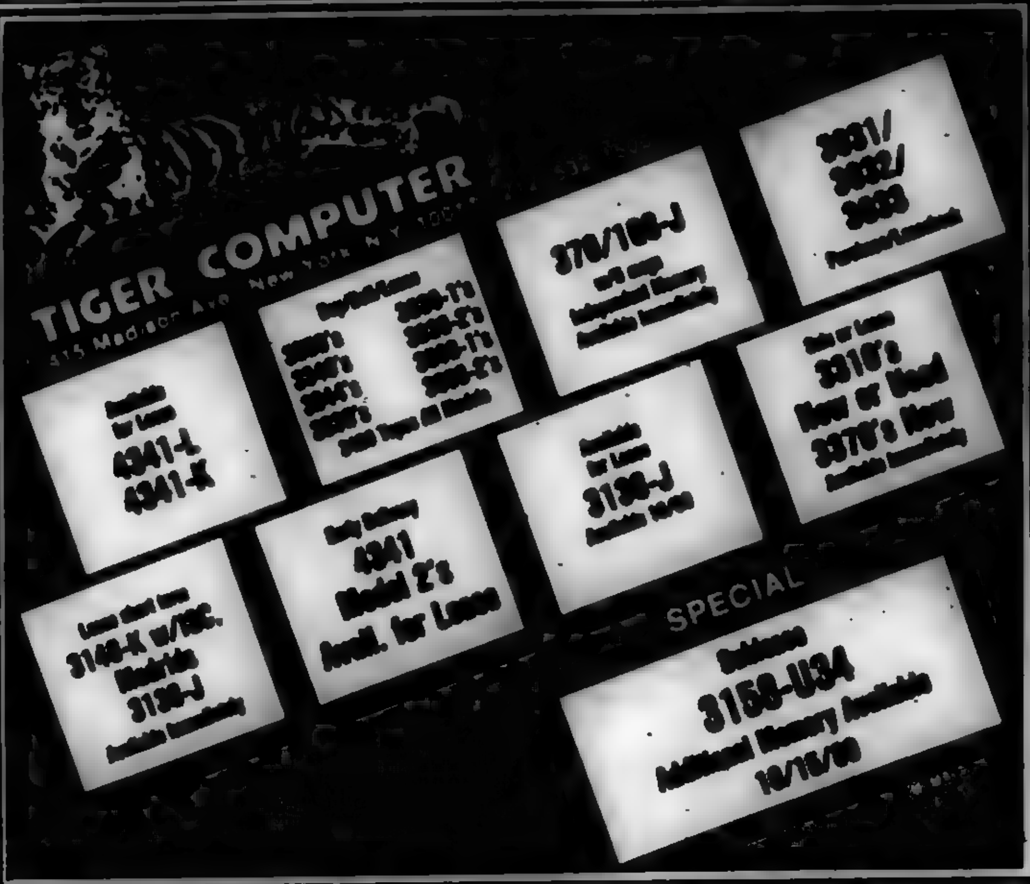
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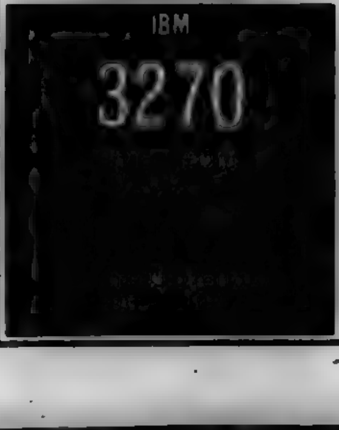

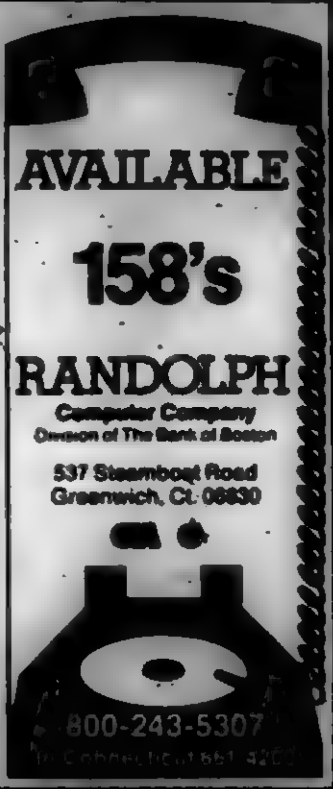

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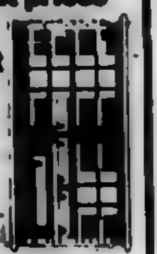

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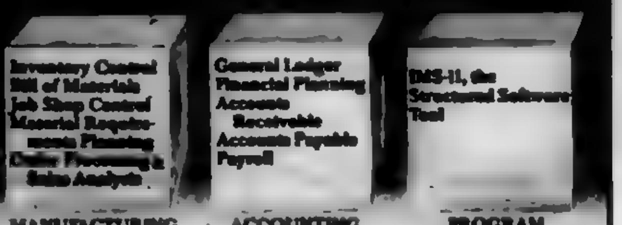

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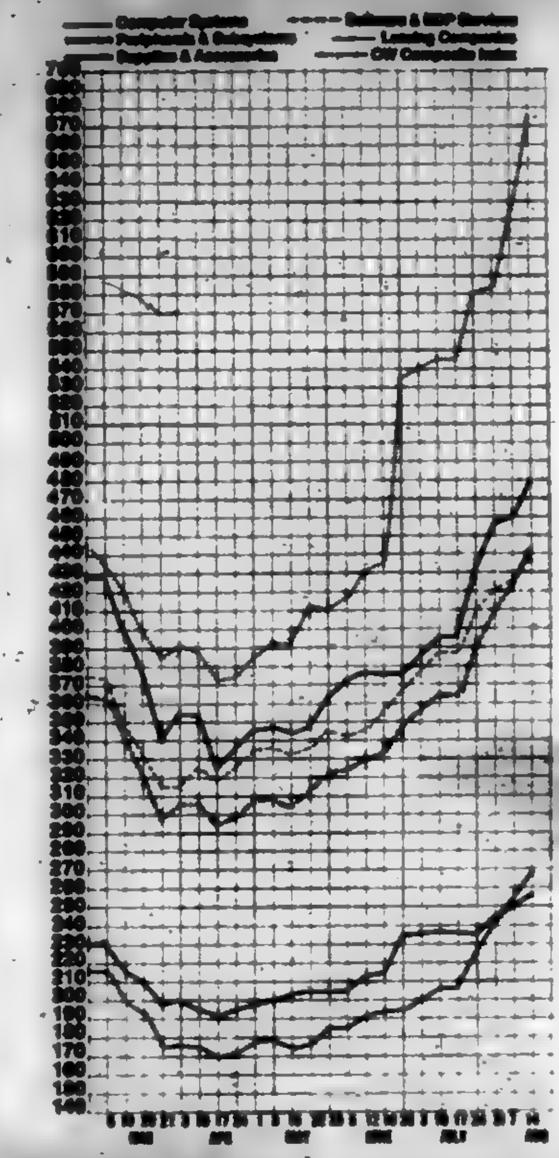

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COMPUTER SYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE AUG 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	27 1/4	+3 3/8	+14.1
N	BURROUGHS CORP	60- 90	70 1/8	+1 7/8	+2.7
O	COMPUTER AUTOMATION	9- 26	26	+1	+4.0
N	CONTROL DATA CORP	33- 66	65 1/2	+3 1/2	+5.6
O	CRAY RESEARCH INC	20- 74	73 1/2	+8 3/4	+13.5
N	DATA GENERAL CORP	44- 86	80 5/8	+2 3/4	+3.5
N	DATAPOINT CORP	44- 70	69 1/2	+3 1/2	+5.3
N	DIGITAL EQUIPMENT	52- 87	86 7/8	+6 1/8	+7.7
A	ESCO INC	9- 19	16 3/8	+ 7/8	+5.6
N	ELECTRONIC ASSOC.	6- 12	11	+1 3/8	+14.2
N	FOUR-PHASE SYSTEMS	20- 40	24 3/8	-2 3/8	-8.7
N	FOXBORO	31- 56	47 1/2	-2 7/8	-5.7
O	GENERAL AUTOMATION	7- 20	7 7/8	+ 1/8	+1.6
O	GRI COMPUTER CORP	1- 3	1/2	0	0.0
N	HEWLETT-PACKARD CO	46- 70	70 7/8	+ 3/8	+0.5
N	HONEYWELL INC	65-101	90 1/2	+ 3/4	+0.8
N	IBM	50- 70	66 3/4	+1 1/8	+1.7
O	MAGNUSON COMP SYSTS	20- 30	30 1/4	+3 3/4	+14.1
N	MANAGEMENT ASSIST	5- 21	16 7/8	+ 1/8	+0.7
O	MANUFACTURING DATA S	27- 42	30 3/4	0	0.0
O	MINI-COMPUTER SYST	2- 6	5 1/2	+ 1/2	+10.0
O	MODULAR COMPUTER SYS	5- 20	15 1/8	+ 7/8	+6.1
N	NCR	52- 82	73	+3	+4.2
N	PRIME COMPUTER INC	15- 36	32 1/2	+1	+3.1
N	PERKIN-ELMER	26- 39	36 3/4	+1 7/8	+5.3
N	SPERRY RAND	42- 60	54 7/8	+2	+3.7
A	SYSTEMS ENG. LABS	11- 20	15	+ 1/8	+1.0
O	TANDEM COMPUTERS INC	13- 42	40 1/2	+1 1/2	+3.8
N	TEXAS INSTRUMENTS	70-121	115	+4 3/8	+3.9
A	WANG LABS.	17- 51	48 7/8	+2 1/8	+4.5

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE AUG 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	12- 20	19	+1 3/4	+10.1
N	COMDISCO INC	6- 17	14 1/2	+ 1/2	+3.5
A	COMMERCE GROUP CORP	1- 2	2 1/8	+ 1/8	+6.2
A	COMPUTER INVSTRS GRP	2- 4	3 5/8	0	0.0
P	DATRONIC RENTAL	2- 3	3	0	0.0
A	DCL INC	2- 6	3 1/8	- 1/4	-7.1
N	DPF INC	5- 12	7 7/8	+ 3/4	+10.5
N	ITEL	1- 15	8 3/4	0	0.0
P	LEASPAC CORP	1- 2	3/4	0	0.0
A	PIONEER TFE CORP	2- 4	2 7/8	0	0.0
N	RELIANCE GROUP INC	24- 75	66 5/8	+1 5/8	+2.5
N	U.S. LEASING	17- 30	29 1/8	+1 3/8	+4.7

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SOFTWARE & EDP SERVICES

EXCH		1979-80 RANGE (1)	CLOSE AUG 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 4	3	- 1/8	-4.0
O	ANACOMP INC	7- 16	13 3/4	-1	-6.7
A	APPLIED DATA RES.	6- 17	15 5/8	-1 3/8	-8.0
N	AUTOMATIC DATA PROC	31- 46	46	-1 1/2	-3.1
O	COMPUTER HORIZONS	3- 6	3 3/4	0	0.0
O	COMPUTER NETWORK	4- 9	6 1/8	- 3/8	-5.7
N	COMPUTER SCIENCES	11- 26	24 1/4	+ 1/4	+1.0
O	COMPUTER TASK GROUP	3- 15	15 1/2	+ 1/2	+3.3
O	COMPUTER USAGE	3- 5	4 7/8	+ 3/8	+8.3
O	COMPUT AUTO REP SVC	4- 10	9 1/2	+ 1/4	+2.7
O	COMSHARE	11- 20	19	- 1/4	-1.3
O	CULLINANE CORP	16- 45	45	+3 1/8	+7.4
O	DATA DIMENSIONS INC	3- 6	5 3/4	0	0.0
O	DATATAB	3- 4	1 1/8	+ 1/8	+12.5
O	DSI CORP	6- 9	9 1/8	+ 1/8	+1.3
N	ELECTRONIC DATA SYST	10- 31	30 1/8	+1 1/2	+5.2
O	INFORMATICS INC	9- 22	19 1/2	+3 1/4	+20.0
O	INSYTE CORP	3- 7	7 1/8	+ 1/8	+1.7
O	IPS COMPUTER MARKET.	3- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	4 3/4	- 1/8	-2.5
O	KEYDATA CORP	2- 5	2 3/8	- 1/8	-5.0
A	LOGICON	13- 26	25	+ 1/8	+0.5
O	MATHEMATICA INC	9- 16	13 1/4	- 1/4	-1.8
O	NATIONAL DATA CORP	10- 22	20 3/8	-2	-8.9
N	PLANNING RESEARCH	5- 9	7 1/8	- 5/8	-8.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 9	8 5/8	+2 3/4	+46.8
O	REYNOLDS & REYNOLDS	20- 36	32 3/4	-1 1/2	-4.3
O	SYSC INC	8- 11	10 3/4	0	0.0
O	SCIENTIFIC COMPUTERS	6- 17	17	+ 1/2	+3.0
N	TYMSHARE INC	24- 46	46 1/8	+2 1/2	+5.7
A	URS SYSTEMS	9- 15	12 7/8	0	0.0
N	WYLY CORP	6- 15	13 3/8	+1 1/8	+9.2

PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE AUG 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	10- 20	19 1/2	- 5/8	-3.1
N	AMPEX CORP	14- 29	26	- 1/2	-2.0
A	ANDERSON JACOBSON	6- 17	14 1/4	+ 7/8	+6.5
N	APPLIED DIG DATA SYS	6- 12	10 3/8	+ 3/8	+3.8
O	AUTO-TROL TECHNOLOGY	20- 50	48	- 3/4	-1.5
O	BEEHIVE INT'L	3- 14	12 7/8	+ 1/8	+0.9
A	BOLT,BERANEK & NEW	12- 27	27 3/8	+1 1/2	+5.7
N	BUNKER-RAMO	17- 33	33 1/4	+3	+9.9
O	CAMBRIDGE MEMORIES	1- 4	3 1/2	+1 3/8	+64.6
N	CENTRONICS DATA COMP	20- 53	48 1/8	+5 3/8	+12.5
A	CETEC CORP	5- 7	6 1/4	- 1/8	-1.9
O	COMPUTER DEVICES INC	5- 9	6	- 3/8	-5.8
O	COGNITRONICS	3- 6	5 1/2	+ 1/8	+2.3
O	COMPUTER COMMUN.	4- 10	6 1/8	+ 1/4	+4.2
O	COMPUTER CONSOLES	4- 29	16 1/2	-3 1/4	-16.4
O	COMPUTER TRANSCEIVER	3- 5	3 1/8	- 1/8	-3.8
N	COMPUTERVISION CORP	24- 92	86 1/4	+3 5/8	+4.3
N	CONRAC CORP	15- 25	25 5/8	+1 3/8	+7.0

EXCH		1979-80 RANGE (1)	CLOSE AUG 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 12	10 7/8	+1 1/8	+11.5
A	DATA PRODUCTS CORP	11- 29	25 5/8	+1 7/8	+7.8
O	DATUM INC	2- 4	2 3/4	- 1/8	-4.3
O	DECISION DATA COMPUT	2- 5	3 5/8	+ 1/8	+3.5
O	DELTA DATA SYSTEMS	1- 3	1 1/4	0	0.0
N	DOCUMATION INC	7- 27	25 1/4	+3 3/8	+15.4
O	DATARAM CORP	6- 27	21 1/4	+ 7/8	+4.2
N	ELECTRONIC M & M	3- 7	6	+ 3/8	+6.6
O	EVANS & SUTHERLAND	21- 59	59 1/2	+8	+15.5
O	FABRI-TEK	1- 4	2 7/8	- 1/8	-4.1
O	GENERAL COMPUTER SYS	1- 5	4 1/2	+ 3/8	+9.0
O	GENERAL DATACOMM IND	12- 22	21	0	0.0
O	GENERAL TERMINAL CP	2- 4	2 7/8	+ 7/8	+43.7
N	HAZELTINE CORP	12- 21	20 1/4	+1 1/8	+5.8
N	HARRIS CORP	28- 46	44 1/2	+ 1/4	+0.5
O	INFOREX INC	3- 8	3 1/4	+ 1/8	+4.0
O	INFORMATION INTL INC	6- 15	12 5/8	+ 5/8	+5.2
O	INTEL CORP	46- 93	90 3/4	+6 1/4	+7.3
N	INTERSIL	13- 33	27 1/8	- 3/4	-2.6
A	LUNDY ELECTRONICS	4- 12	9 1/4	+1 1/8	+13.8
O	MSI DATA CORP	5- 11	10	+1 3/4	+21.2
N	MEMOREX	10- 24	15 1/4	+1 1/4	+8.9
N	MOHAWK DATA SCI	10- 21	20 7/8	+1 1/4	+6.3
O	OMEX	7- 10	9 1/2	+1	+11.7
A	PARADYNE CORP	18- 60	58 3/4	+ 1/4	+0.4
A	PENRIL CORP	5- 15	10 3/4	- 3/8	-3.4
O	QANTEX CORP	10- 17	13 1/4	- 3/8	-3.1
O	RECOGNITION EQUIP	9- 13	10 1/4	+ 1/4	+2.5
O	SCAN DATA	3- 8	2 3/4	- 3/8	-12.0
N	STORAGE TECHNOLOGY	12- 31	29 3/4	+1 1/2	+5.3
O	SYKES DATATRONICS	16- 37	37 1/4	+4 3/4	+14.6
O	T BAR INC	16- 21	16 3/4	+1 3/4	+11.6
A	TEC INC	3- 9	5	- 1/8	-2.4
N	TEKTRONIX INC	43- 69	69	+3 7/8	+5.9
N	TELEX	3- 6	4 1/4	+ 1/4	+6.2
O	TESDATA SYSTEMS CP	8- 20	9 3/8	+ 3/8	+4.1
O	TIMEPLEX INC	7- 20	19 1/8	+1	+5.5
O	WILTEK INC	1- 3	3	+ 1/8	+4.3

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE AUG 13 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 13	12 7/8	+1 3/8	+11.9
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	19- 36	33 5/8	+ 3/8	+1.1
O	CYBERMATICS INC	1- 1	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 15	13 7/8	-1 1/8	-7.5
N	ENNIS BUS. FORMS	15- 21	20 3/4	- 1/8	-0.6
N	3M COMPANY	48- 60	57 1/4	-1	-1.7
O	MOORE CORP LTD	27- 36	30 7/8	+ 3/8	+1.2
N	NASHUA CORP	20- 38	31 3/4	+4	+14.4
O	STANDARD REGISTER	22- 31	30	+1	+3.4
A	TAB PRODUCTS CO	15- 22	21 3/8	+1 1/8	+5.5
N	WABASH MAGNETICS	11- 18	14	+ 3/8	+2.7
N	WALLACE BUS FORMS	25- 37	37 1/4	+1	+2.7

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
ly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
August 25, 1980 $1.00 a copy; $30/year

A CW Special Report
On Choosing the Right Mini
Follows Page 56

MICRO BOULEVARD

Some IBM Defectors Report Retaliation, Service Slights

By Bruce Hoard
CW Staff

Apparently some IBMers are applying pressure to customers who leave its fold. A recent telephone survey revealed five of 17 DP shops that left IBM in favor of software-compatible mainframes during the past year have suffered some form of retaliation or pressure from IBM.

IBM struck back at wayward customers through salesmen, branch and regional managers who questioned the validity of bidding processes, browbeat DP directors and reduced maintenance levels, according to respondents.

However, the majority of users who experienced no negative feedback from IBM praised the company for its forthright business practices.

Feeling Wrath

Ed Prichard, director of DP for the Multnomah County Data Processing Authority in Portland, Ore., replied, "Well, of course," when asked if he had felt IBM's wrath after switching to an Amdahl Corp. 470V/5.

"When the decision was made to go with Amdahl, the local branch manager raised hell with my boss and his boss," Prichard said, adding, "we tend to expect that from them." The branch manager also wrote a letter criticizing the selection process leading to the Amdahl purchase, he noted.

Stressing the fact that taxpayers' money was on the line, he defended the process by alluding to several outside experts, including the vice-president for data processing at the state's largest bank, who participated in it. As it turned out, the 3031 IBM offered was "just too expensive," he said.

Retribution came in the form of an "extremely inexperienced" maintenance technician that Prichard likened to "something out of the Keystone Cops or the Three Stooges."

(Continued on Page 8)

Programs as 'Minibusinesses'

Structured Path Ups Productivity

By Marcy Rosenberg
CW Staff

HILLSDALE, Ontario — Moving from problem to software solution can seem like an endless journey when the way is strewn with GOTO branches typical of the "spaghetti-type" programming Mervin G. Faulkner used back in the early 1970s.

Since then, Faulkner paved a more direct route with his own implementation of structured methods — one that prohibits using GOTO statements and applies to programming the same concept of hierarchical management that companies have used for years to form chains of command within their departments.

"We treat each program as a minibusiness. Each has its own management functions and its own worker functions," explained Faulkner, president of a computer and management consulting firm that bears his name and that has used this structured approach since its inception five years ago.

Mervin G. Faulkner Associates, Ltd. designs and writes software systems for such client applications as mining industry financial cost reporting, public utilities billing, manufacturing and distribution. In-house hardware includes IBM 360/30 and 40, System/32, System/34 and System/3 processors plus NCR Corp. 8415 and 8250 computers. Presently, four programmers each write an average of four programs per week.

The firm bases its structured techniques on the premise that a program and a corporate unit must be managed in the same way. Figure 1, the organization chart of a typical

(Continued on Page 6)

Top Management Can Make or Break MIS

By Bruce Hoard
CW Staff

WALTHAM, Mass. — Industrious and enlightened participation by top management can turn an otherwise mediocre management information systems (MIS) operation into an invaluable, integral segment of a company.

On the other hand, if the MIS director's immediate superior is antipathetic toward computers, the MIS department may never be given the opportunity to be productive under his purview.

The relationship with top management is crucial to the operation of any MIS division, according to a study conducted by International Data Corp.'s (IDC) Information Systems Planning Service (ISPS) Research Group. The study is part of a long-range program designed to identify proven methods of optimizing human resources in MIS.

Entitled "MIS Organizational Structures and Career Paths," the study is based on a number of sources, including a telephone survey of 131 large computer sites, interviews with senior MIS management personnel and prior IDC research.

Management Support

"Perhaps the single most significant difference in attitude and motivation evidenced by the MIS directors interviewed was related to whether they felt they were supported and understood by their executive management," the report said, adding those who did not feel supported claimed problems related to external organization were more nettlesome than internal difficulties.

Now that organizations are beginning to realize information is a resource and should be managed as such, computer systems have become more valued and their organization

(Continued on Page 4)

City Found Not Using 60% Of $7.5 Million Reports

By Rita Shoor
CW Staff

NEW YORK — About 60% of the 65 monthly reports issued by the city's financial information services unit are going unread, and more than half of the remaining 27 reports could be produced less often, according to a recent audit report released by the Office of the State Comptroller for New York earlier this month.

The report also said 66% of the 15 daily reports included in the audit sample are not being used by their recipients.

These reports are part of the monthly output of the city's Integrated Financial Management System (IFMS), operated by the Financial Information Services Agency (Fisa). Surveyed by the comptroller were some 26 employees at five city agencies selected by Fisa.

The agencies surveyed were still maintaining manual records, the users said, and the information being printed was "readily available" through CRT terminals. The same data could also be found on computer-generated reports from the Office of Management and Budget (OMB), the respondents said.

(Continued on Page 8)

Defending Champ

Tracy Austin will defend title at U.S. Open; computers score and rank the pros. Story on Page 14.

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.
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Detroit Layoffs Threaten DP Jobs

By Ann Dooley
CW Staff

DETROIT — Computer professionals are "running a little bit scared" in this city where the automobile is king, as layoffs slice into DP jobs right along with those of hourly assembly line workers.

To computer professionals whose positions have been relatively secure over the years, because of their short supply, this new vulnerability comes as an ironic joke.

Rumors abound about when and where the next layoffs will occur, but few specifics could be obtained last week since no automakers would comment.

No information could be obtained concerning the number of DP people affected, but individuals in at least several departments within each of the auto manufacturers' information processing functions have been cut, sources said.

Five out of 21 DP people at one of Chrysler Corp.'s systems software groups were reportedly laid off last month. And at Ford Motor Co., an undisclosed number of DP staff members are slated to get the axe in the next few weeks, according to industry sources.

Layoffs are based on department and not necessarily on seniority so that programmer trainees in one department may remain untouched while several programmers in another area are laid off, an industry observer noted.

Trend Admitted

Ford noted that DP layoffs have occured primarily in its American automotive operations plants — "the number of people [laid off] is consistent with the status of other functions in the company," Mayford Roark, executive director of Ford's systems, stated.

General Motors indicated that a 10% salary reduction across the board is in effect and that each department is handling the cost cutting differently.

At Chrysler Corp. — hardest hit of the three — layoffs have taken place for some time among white-collar personnel. Some functions have been combined and overtime has been eliminated. Cutbacks have occurred by plant or facility and not by operation so, although no figures are available, "it is safe to say the computer area did not go unscathed," a Chrysler spokesman stated.

All three indicated that their budgets are adjusted to the present conditions and noted that overtime, new hiring, equipment purchases and system development will continue to "reflect the overall business."

Computer professionals laid off have few real worries, however, since they are being snapped up by other industries in the area or are moving to other parts of the country. Few will face long months of unemployment, according to Thomas Hing, DP personnel consultant for Robert Half of Detroit, Inc., a personnel agency.

The auto companies previously had their pick of computer people, frequently hiring new graduates each year. These mainly out-of-town people are the ones migrating to the West Coast or to Houston, currently the DP hot spot, because of the computer needs of the oil industry, Hing noted.

Volkswagen of America, Inc. — not hit as hard as the American car manufacturers — is also campaigning to attract those laid off, he noted.

EPA Confirms Carcinogen In IBM 3800 Laser Printer

By Ann Dooley
CW Staff

WASHINGTON, D.C. — Tests by the Environmental Protection Agency (EPA) have confirmed that a chemical used in the IBM 3800 laser printer is a carcinogen.

The chemical — trinitroflourenone (TNF) — induced gene mutations in bacterial and animal cells in laboratory experiments, but whether it is harmful to humans is still unknown, according to the results of a preliminary evaluation.

The agency has requested further data from IBM before making recommendations on the chemical's continued use. The data requested relates to how much TNF is found in the air around an operating printer, how much chemical remains on the paper with the toner, whether TNF reacts with other chemicals and what happens to the spent toner after it is removed from the photoconductor.

This information will help to "better determine the nature and the extent of any possible risks of injury to human health due to exposure of TNF," the EPA stated.

The mutagenic effects of TNF were found to be dose related in the culture experiments and were "sensitizing and irritating to the skin of lab animals." But the potential for cancer and tumor-causing results demonstrated in the lab do not necessarily relate to human use, an EPA spokesman said.

TNF is also used in the IBM Copier I and Copier II in addition to the 3800 printer and is found on the mylar substrate of the equipment's photoconductor. Trace amounts of the chemical can remain on the output copy.

The EPA did not suggest, however, that people from using the equipment.

IBM, which has 20 days to respond to the EPA's request, has indicated that although it plans to cooperate fully with the EPA, it will not recommend any change in equipment use to its customers and does not consider TNF a danger to humans.

The chemical was called into question earlier this year after results from IBM testing showed the possibility of a health hazard stemming from the chemical [CW, June 9].

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Dear Dr. SyncSort: One of the things I have always hated about sorting is all the coding, compiling and debugging that is necessary with most programs. Is there any way I can reduce this mind-numbing drudgery? **Hates Housework.**

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Dear Repenting: We receive many heartbreaking letters of this type. You may have to face up to the fact that a happy sort divorce is preferable to a miserable sort union.

* * *

Dear Dr. Syncsort: Help! I am being driven mad by a telephone problem. Every time I call the large company that makes my sort program for help on a problem, I get the run around. Either the phone rings itself off the wall, or I get somebody who specializes in hardware. Is there any number I can call where I can get expert advice on **sorting** problems? **Ringy-Dingy.**

Dear Ringy-Dingy: Yes, call Whitlow. They don't make hardware. All they make is sort programs. The number is (201) 568-9700.

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Division of 250 Employees Found Typical MIS Profile

By Bruce Hoard
CW Staff

WALTHAM, Mass. — Although organizations vary from firm to firm, the typical MIS division in a large company employs about 250 people in three basic functional categories: operations; systems development and programming; and support (see accompanying pie chart).

Those results were found by a recent study conducted by International Data Corp.'s (IDC) Information Systems Planning Service (ISPS) Research Group. The study is part of a long-range program to identify ways to optimize human resources within MIS.

Surveys were taken at 131 large computer sites and interviews were held with senior MIS management personnel to research the study, "MIS Organizational Structures and Career Paths."

Operations composes 40.2% of a "typical" MIS division and is itself made up of computer operations and data entry. Systems development and programming comprises an additional 39.1% and may be further broken down into programmers, analysts and managers. Support functions account for the final 20.7% — roughly divided between systems programming and "other."

As the "other" label indicates, the support category is somewhat "residual" in nature and may be subsumed within the operations and systems development and programming categories, according to the study.

Category Orientations

Operations is primarily concerned with applications systems that are up and running in a production mode. Headquartered in the computer room, it includes the preparation of input data and the handling and dispersal of output.

While the advent of distributed data processing has diluted the tendency to centralize data entry within operations, it is still reponsible for a certain amount, usually for smaller applications.

Operations objectives run from minimizing downtime and timely production and distribution of output, to avoidance of input and operational errors and minimizing costs.

Whereas operations is process-oriented, systems development and programming tend to be project-oriented. "It is concerned with the design, development and implementation of new computer application systems as well as the maintenance and enhancement of existing systems," according to the study.

This project-orientation "results in the definition of near-term objectives in terms of the delivery of computer systems which meet specified performance requirements, on time and within budget." Program maintenance is also specified in terms of short-term projects.

Support Functions

As mentioned, support functions may fall through the cracks and end up as part of another category. The study defined support as "everything which is not directly related to the two functions previously specified," and listed the following:

- Operating systems (systems control program) programming.
- DP planning.
- Education.
- Performance evaluation and tuning.
- Standards.
- Quality assurance.
- Other support functions.

The study made it a point to distinguish support functions from operations and systems and development programming to maintain a perspective of their particular characteristics.

When support functions are subsumed, it is usually within a small MIS division, as in the case of Figure 1 below. The basic two-part division, as depicted in Figure 1 may also be found in larger shops and tends to contain a "structural bias" toward an "undervaluation or neglect" of the support functions, according to the study.

Figure 2 on Page 5 reintroduces support, but on a tentative basis, the study noted, adding that its components may be dispersed at random and rarely find their way to operations and system development and programming in even numbers.

Position of Staff

Figure 3 below and Figure 4 on Page 5 are characterized by the emergence of a third entity — the staff. It reports to the MIS director and may infrequently include some of the support functions.

"A typical [Figure 3] organization may have, for example, DP planning and standards and staff to the MIS director, while a production technical support group will be located in operations, and systems programming and education will be in systems development and programming," the study explained.

Although nearly all MIS divisions are constituted of one of the organizations described here, their implementation may be widely divergent.

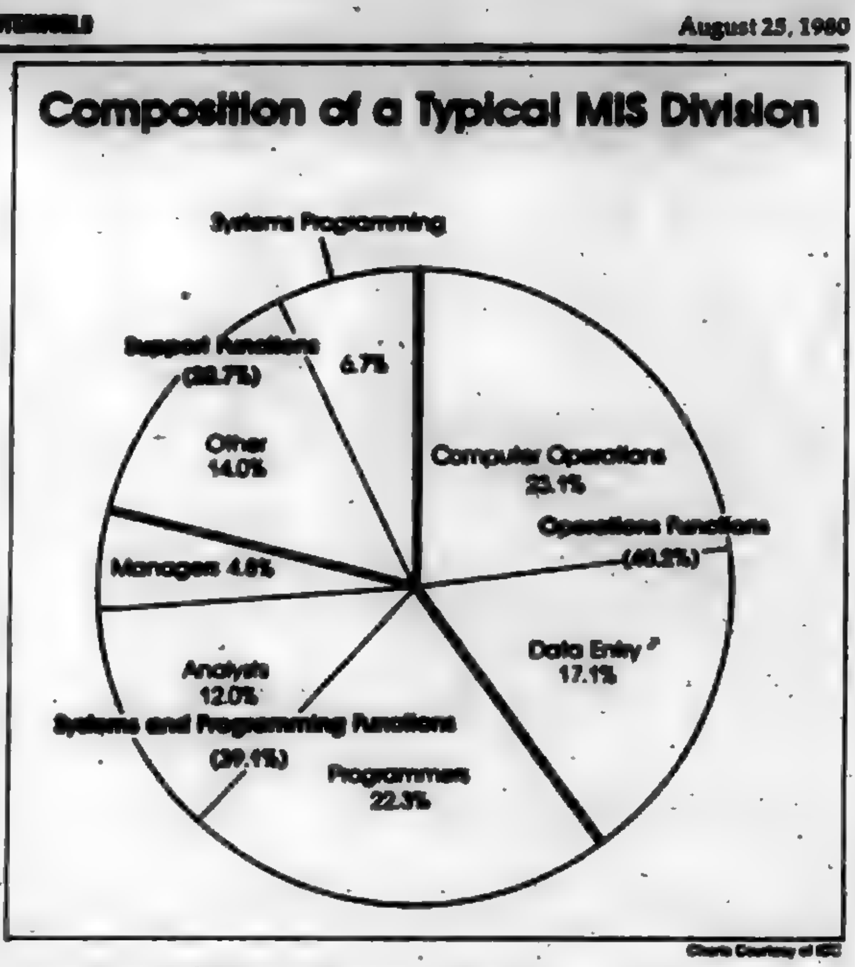
The third functional area in type 3 and 4 organizations may be implemented as two or more separate organizational units reporting to the MIS director. "In such situations, the distinction between it and purely staff implementations may blur," the study notes.

"Similarly, the systems and programming function may be implemented as two or three seperate units divided by application areas," it continued. This changes the internal stucture of one of the basic organizational divisions of the MIS department from internal to external.

"That is, what is represented as one organizational unit is split into several."

The report, No. 2073, is available for $4,500 from IDC at 214 Third Ave., Waltham, Mass. 02154.

Next week: Different career paths.



Charts Courtesy of IDC

Figure 1

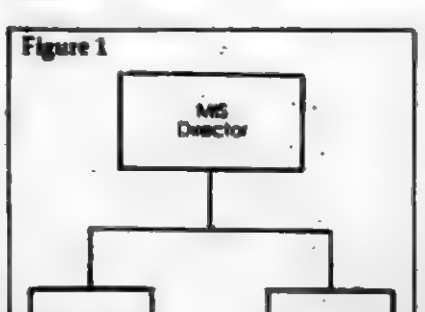
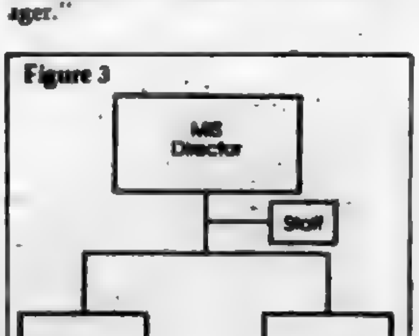


Figure 3



Charts Courtesy of IDC

Management Participation Critical to MIS

(Continued from Page 1)

more sophisticated. MIS directors now frequently report directly to chief executive officers, as opposed to financial or operations officers, whose departments were formerly the most dependent on computers, the study noted.

Although the study cited a tendency by some chief executive officers to "compartmentalize" computers within operations or finance, the overall trend is now toward "properly managing" information resources, the study reported. This trend will gain strength as top executives become more familiar with, and gain more confidence in, their computer systems.

"It appears that direct reporting to the chief executive officer is likely to be a more prominent feature of MIS organizational structures in the future," the study maintained.

Relationship to Users

The MIS division's second most important relationship is that with user departments within the organization, the study asserted. A faulty connection in that area may also adversely affect the quality of MIS.

"We know from over two decades in the development and operation of computer systems that a successful MIS organization nearly always involves users early and continuously in projects which affect them," the study commented.

A senior vice-president charged with MIS responsibilities at a major bank expressed his feelings on the subject: "We always insist on a high-level user with full-time involvement on every significant project."

User involvement is a birth-to-grave proposition that begins with communication during the period of project identification and definition. Users must combine with top management to develop an overall priority plan, the study suggested.

Later on, there must be active user involvement in the functional design process and validation. Next is testing and verification of the system prior to implementation. Finally, the user must have the last word on accepting the system.

In order to ensure good top management-user relations are maintained, the study recommended that "prudent" MIS directors keep a watchful eye on such relationships and suggested some strategies for doing so.

One is the formation of high-level priority committees to involve senior users and top management in deciding on allocation of MIS resources and "implementation of a proactive planning process for MIS which involves top management and users.

"These external factors," the study continues, "while not sufficient conditions for the success of an MIS organization, are much more necessary than commonly recognized and should not be neglected by the prudent MIS manager."

Matrix Strategy Key to Success, MIS Study Finds

By Bruce Hoard
CW Staff

WALTHAM, Mass. — Matrix management can be a successful strategy for getting the most out of people in MIS, according to a recent study by International Data Corp.'s (IDC) Information Systems Planning Service (ISPS) Research Group.

One example of matrix management that failed and then succeeded with modifications was uncovered by ISPS in the course of its study on MIS organizations (see story on Page 4).

The organization is the systems and programming department of a major leasing company. The failed matrix program featured a strict horizontal division between business systems design (BSD) (corresponding to analysis and design) and computer systems design (CSD) (corresponding to programming).

Although project managers were designated by application areas in the original organization, they were not part of either BSD or CSD. Instead, they reported directly to the MIS manager and did not have any supervisory roles.

The project managers tapped "design and analysis personnel [under the supervision of the manager of business systems design] and programming personnel [under the supervision of the manager of business systems design] for their projects on an essentially subcontract basis," the study explained.

The organization failed because the concept of a pool of analysts and programmers created serious morale problems in both areas. Other problems included difficulty in separating programming and design tasks.

Success in Failure

Even in failure, the organization was successful in so far as it exposed "long-standing weaknesses" that had been allowed to fester within the original, less demanding structure. Deficiencies in planning, business knowledge and management were unveiled.

Although retained, the matrix structure was dramatically altered. Project leaders were placed under the authority of the director of systems and programming to provide "a single point of accountability for the systems development activity and reduce confusion about final authority," the study said.

Project managers were given more authority in the development process, but continued to be divided along application lines and to act as the main interface with user departments.

The controversial pool approach to BSD was dropped and team leaders were assigned to all projects. Team leaders are primarily drawn from BSD, but not to the exclusion of CSD, the IDC study noted.

Team leaders now report to relevant project managers, who have two or three development projects and the same number of maintenance projects reporting to them. They act as daily supervisors of project personnel.

BSD and CSD managers have shed their daily supervision of personnel and now oversee hiring, recruiting, training, standards, personnel management, career development and methodology.

"Perhaps the greatest burden of this approach," the study noted, "falls upon the team leader, who, as one respondent put it, 'sees two bosses more than anybody else.' The team leader is responsible to the project manager on the task side and the BSD/CSD manager on the people side."

"The payoff is getting the people to work harder and faster and smarter," he said. "If you can do that, you won't have to worry about getting the productivity tools. They'll demand them from you."

Figure 2

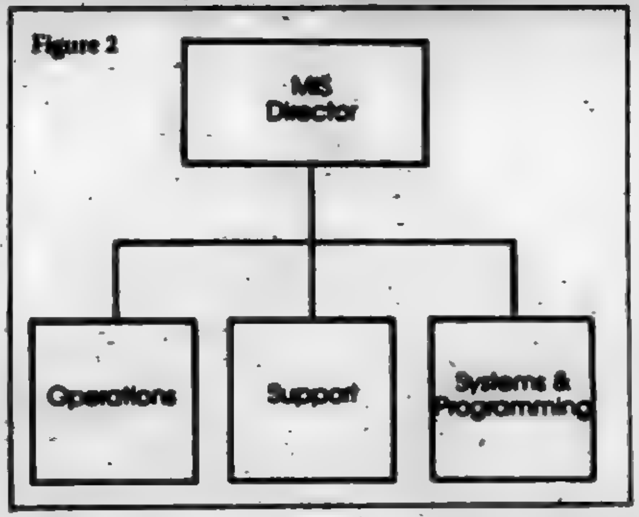
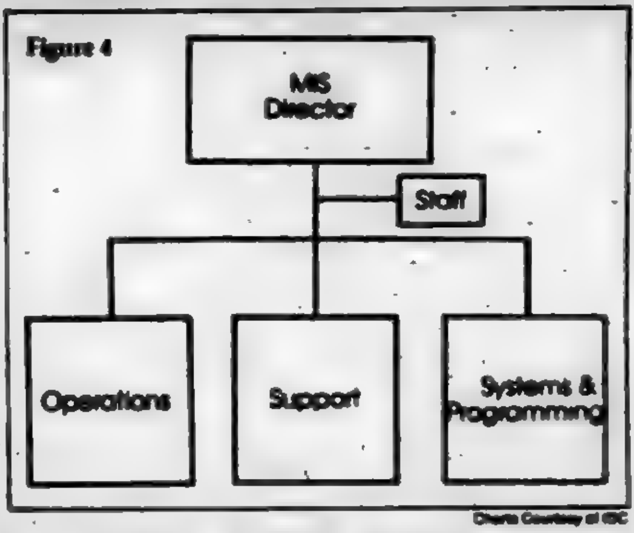


Figure 4



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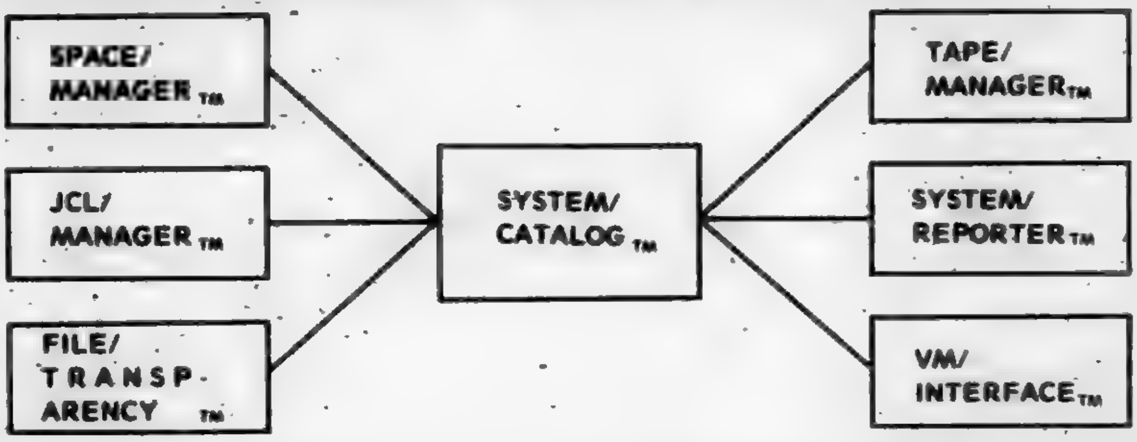

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Gene Amdahl Plans to Challenge IBM's 'H'

By Marcia Blumenthal
CW Staff

SANTA CLARA, Calif. – You can't hold a good man down. Gene M. Amdahl, who retired as Amdahl Corp.'s chairman and chief executive officer last September, is forming a new company to develop a system that will compete head-on with IBM's intended H series.

Breaking his remaining ties recently with the company he founded in 1970, Amdahl said in a telephone interview last week the H series market "is the only big market in the world. To address another is economically not feasible."

While reluctant to discuss his concept for the new system, he said it would have a different machine organization from current technology and would utilize very large-scale integrated circuits. Expecting IBM's H series to be announced between October and next April, Amdahl said his company hopes to introduce its product by 1984.

Amdahl, who is credited with developing the architecture for the IBM 360, said his former company was committed to a particular road for its next product, which will also compete with the H series.

"I had done everything that could be done to get [Amdahl's] new product ready for market. At the time [I retired] I wasn't very productive at the company," he explained.

Amdahl said his idea for a new company and product were "sort of in the back of my mind."

Starting a new computer company now to take on IBM is a "world of total optimism" compared with when he first started his plug-compatible manufacturer (PCM) business, he observed.

While some observers noted Amdahl may not have the same success with his new business because the market is now software- vs. hardware-driven, Amdahl said IBM's 4300 really didn't have much new software. Rather, the giant repackaged existing products and lowered its prices, he claimed, adding that because hardware prices dropped dramatically with the 4300, IBM's percentage of software revenue now appears larger relative to hardware revenue.

As yet the new venture does not have a name, but Amdahl expects a name will be chosen and the firm will be incorporated by the end of the month.

Joining Amdahl in the venture as president is Clifford J. Madden, who is a former senior vice-president and chief financial officer at Amdahl. The two men are presently in the process of discussing funding with potential investors.

Amdahl said the company's capital requirements will be about $50 million to $70 million and he hopes to have the funding tied down by the end of the year. When asked if he would seek funding from Japanese investors, Amdahl responded "not on the same basis" as with Amdahl Corp.

For the time being the new company will operate as a technology company, with 50 people expected on board within a year, Amdahl said.

How does it feel to be an entrepreneur again? "Great."

Structured Methods Hike Productivity

(Continued from Page 1)

computer department, shows different levels of management with connecting lines representing the lines of control. Control information flows up and down the connecting lines, a concept Faulkner applied to programming.

Another management principle Faulkner espouses is that of delegating responsibility. "Managers get things done through others; they don't do the actual work themselves. This keeps the management function simple and more responsive to changing needs."

Illustrating how these same management concepts are applied to the organization of a typical program, Figure 2 also uses connecting lines to represent lines of control. Eliminating GOTO statements assures that control lines are not broken or crossed, he said.

Each management routine in the diagram has supervisory responsibility only, delegating work to other routines lower in the hierarchy. The control routines, then, remain simple and easy to change; the dotted lines show how easy it is to delete and add routines.

Besides allowing programmers to easily add and remove modules without affecting the rest of the program, the hierarchical GOTO-less programming technique offers other advantages over methods that allow GOTO statements.

One benefit is a 50% to 70% boost in programmer productivity, which Faulkner measures not by lines of code but by how long it takes to produce a finished program.

Using one programmer, for example, his firm put up a Cobol general ledger system in three months elapsed time, or two man-months. When programming with GOTOs, the same application could take six months elapsed time or nine man-months, to complete with two programmers on the project, he estimated.

Programming Standards

As for other advantages, program maintenance costs have dropped 50% to 75% and debugging time has been slashed considerably, helped also by the fact that Faulkner requires his staff to number paragraphs sequentially.

Sequential numbering and a ban on GOTOs are two of only a few programming standards Faulkner imposes on his employees. Claiming he doesn't believe in enforcing a rigid set of standards, Faulkner said his only other requirements are that staffers use meaningful data names, paragraph names and the COPY statement instead of redefining a file for every program.

The firm has used its structured programming methods successfully with Cobol and Basic and prides itself on being "one of the first companies" to apply hierarchical GOTO-less programming to RPG-II, a high-level language that does not easily lend itself to this methodology.

One reason why RPG-II cramps the "structured" style is that it restricts data names to a maximum of six characters, making it difficult to come up with meaningful abbreviations. In addition, RPG-II does not have an equivalent to Cobol's PERFORM UNTIL statement, forcing the use of GOTOs to control loops. But by containing loops within routines, Faulkner claimed to still maintain the program modularity a hierarchical design provides.

Programmers' Response

Needless to say, increased productivity, low program maintenance costs and faster debugging time have made Faulkner a strong advocate of structured methodology as he uses it. But do his programmers share his enthusiasm?

Well, "nine times out of 10" Faulkner meets with a certain amount of resentment from new hires who are forced to switch from conventional programming techniques to the hierarchical GOTO-less method. "But once they've written a few programs this way and realized the benefits, I can't get them to change back," he commented.

Also, "the hierarchical GOTO-less method has a tendency to make you work at your desk a little longer to thoroughly understand your problem and to design, code and review the program," Faulkner continued.

He contrasted this to the conventional technique where "if a programmer realized he forgot something halfway through his coding, he could always add a GOTO."

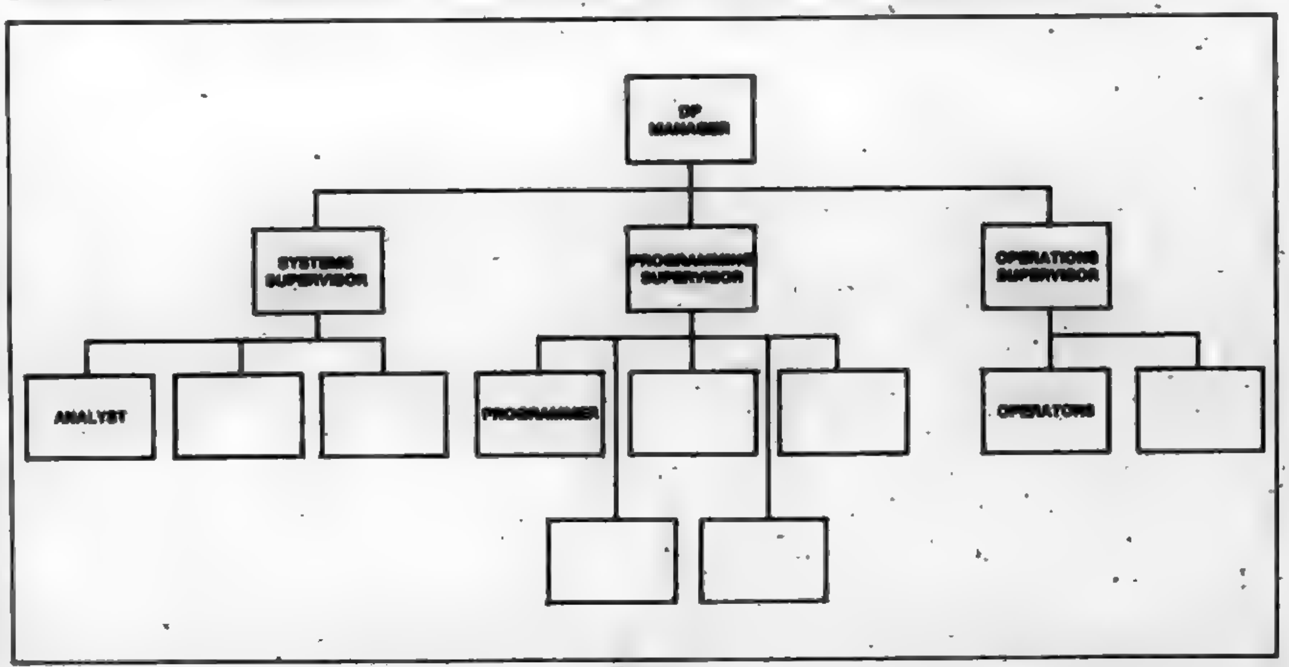

Figure 1

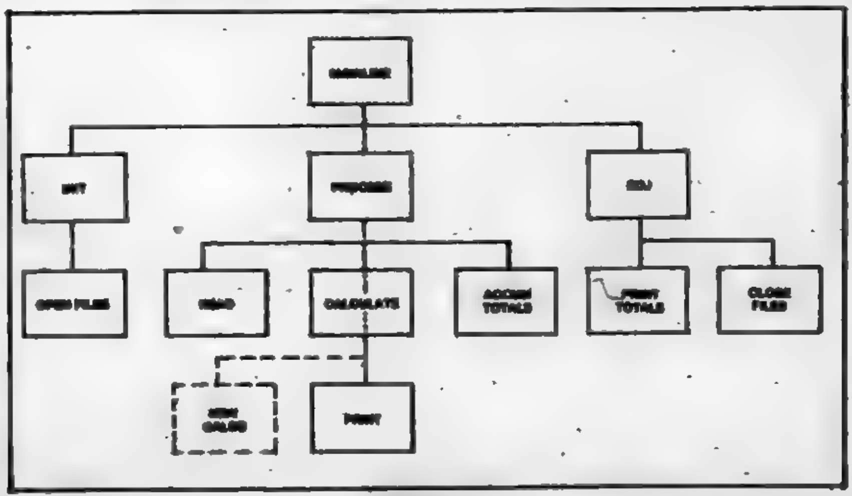

Figure 2

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Some Defectors From IBM Fold Cite Retaliation

(Continued from Page 1)

Another aggrieved IBM user at a large, midwestern university also got the backlash treatment after moving to an Amdahl 470V/5. "I think they were poor losers," he reported. "After we sent out the bid specs, they responded by making presentations and then high-level executives put pressure on us to start the bidding over."

Although those executives went to his superior and "talked," he was not informed of what transpired.

After considering the possibility of further retaliation, he tempered his comments by saying, "We'd like to continue to do business with IBM and any other vendors."

Citing the same sentiments, the data director of another western state agency admitted he experienced a "horror story" of retribution, but preferred to bury the hatchet with the hopes of improved future relations.

Don Higgins, director of computer services for the Florida Power Corp., also ran into transition difficulties. "Oh yeah, you wouldn't expect them to act favorably," he said of IBM's behavior.

The change to an Itel Corp. AS/6 led to a "pretty heated discussion" between Higgins, his boss, the IBM sales representative and the IBM branch manager, who suggested something was wrong with the evaluation process that bypassed IBM's proffered 370/168 system. "IBM said we didn't do our homework," Higgins said.

Reliability and service, not economy, were the primary reasons Florida Power abandoned IBM, according to Higgins, who, like several other respondents, still retains several IBM peripherals.

Disaffection Sparked

IBM's inability to deliver 4331 systems within a year's time contributed to disaffection with several respondents, including Dick Padesky, director of information systems for the Prestolite Corp.

"They brought the whole shebang out including local, district and regional people when we decided to change," he commented. IBM "legal people" also came in and "gave us our rights," he added.

Despite the pressure, Prestolite went ahead and bought a Control Data Corp. Omega 480-II, a system Padesky claimed to be far more convenient than its IBM 370/148 predecessor.

IBM registered its displeasure by reducing service levels. "They don't give us the support they used to," he said. After considering his words, he, too, tempered them. "IBM has treated us fairly regarding their own policies," he concluded.

"Limited" was the word Tim Steinhelber, Manager of Data Processing Operations for the Tennant Co., used to describe the IBM retaliation he faced when his firm acquired a CDC Omega 480-II.

Referring to derogatory remarks made by an IBM salesman as "more an irritation than anything else," he said the Omega, which was purchased as the result of a wide-open bidding process, was Tennant's "best financial move." The loser? An IBM 3031.

"The salesman said we deliberately went away from IBM," he said, adding the result was indifference from the vendor on maintenance for the IBM equipment the company is still operating.

Conversely, crossover plug-compatible users who did not incur IBM wrath evinced nothing but satisfaction.

"We've had absolutely no negative feedback. IBM has reacted as any other businessperson would," Robert M. Hackett, director of application services for the San Antonio, Texas, Water Board, said of its switch to an Amdahl 470V/7.

H.T. Herold Jr., director of the department of computer services for the state of Arkansas, concurred. "We haven't experienced anything in the way of retaliation," he said. "And there hasn't been any change in our level of service either."

Expressing the strongest support for IBM's comportment was the state of Illinois' data center manager, Frank Breakville. "I'm overjoyed with the relationship we have with the two vendors," he said of IBM and Amdahl.

New York Found Not Using Fisa Reports

(Continued from Page 1)

Three of the five agencies surveyed were distributing the report packages to the appropriate personnel as much as a month late. In some cases, the reports never were distributed, the respondents claimed.

Finally, some of the users informed the auditing group that they were receiving too many IFMS reports which served to "distract them from their normal work load," according to the audit report.

Cost of Reports

About $7.5 million was spent in fiscal 1979 on the DP, personnel service and paper costs to produce the reports. This is more than one-third of the $21 million Fisa expended that same year to operate IFMS, the comptroller's office said.

IFMS was originally designed to provide city agency managers with the means for financial accountability, control, planning and analysis, the report noted. The system's reports, which are unused by the majority of the survey sample, were supposed to give the managers up-to-date financial data. This would, in turn, allow them to quickly detect and correct trends in overspending and undercollection of revenues within the jurisdiction of their respective agencies, the survey said.

Consultants called in to work on the system, which became operational on July 1, 1977, have accounted for $8.2 million in fiscal 1979, according to the audit report. However, a comptroller office representative was unclear as to whether this figure was in addition to the previously cited DP cost of $7.5 million for the year.

IBM Shop

The IFMS system runs on a configuration that includes an 8M-byte IBM 3033 processor, more than 100 IBM 3330 and 3350 disk drives and approximately 32 IBM Model 3432 tape drives, based on an interview with Fisa director David Woodbridge early this year [CW, Jan. 28].

At that time, Woodbridge stated that IFMS "speeds paperwork and related functions, improves information flow and helps free managers for more creative analyses and decision making." The director was not available at this point to give his reaction to the audit survey findings.

Canvassing users for their updated requirements, conducting studies to better identify user needs and limiting report distribution to those users with identified needs were among the recommendations in the survey.

Public Pressure

However, the comptroller's office has no legal enforcement powers, a spokeswoman said, adding, "Hopefully, public pressure will bring about a change" in IFMS report distribution.

Fisa is reportedly in the process of conducting its own survey to determine which IFMS reports are needed and by whom. The agency intends to use the results of this survey to revise the monthly report package distribution to fit more closely each agency's needs, the comptroller representative noted.

"However, although this [Fisa survey] seems to be the same thing we are recommending, it's too early to tell if the survey will be broad enough," she said.

The audit report is NYC-66-79, dated Aug. 4.

Corrections

In an article detailing *Timesharing Decisions*, a report released by Real Decisions Corp. (RDC) [CW, Aug. 18], the figures relating to CPU time were mistakenly rated on a per hour basis. In fact, the figures are based on the average amount of elapsed time it took RDC to run a series of benchmarks with a particular time-sharing service.

In a recent story spotlighting computer time brokers [CW, Aug. 18], Computer Reserves, Inc. was erroneously given an alias and identified as Computer Resources, Inc. The East Orange, N.J., firm has no corporate alter ego or hidden nom de plume.

Trilog, Inc. has no affiliation to the Houston Instrument Division of Bausch and Lomb, Inc. Misplaced parentheses [CW, Aug. 18] might have caused the reader to assume otherwise.

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Continuing FAA-Controller Conflict

Controllers Report Midair Near-Collision

By Jake Kirchner
And Marguerite Zientara
CW Staff

BOSTON — One morning early this month, air traffic controllers at Boston's Logan airport watched in horror as their radar screens showed two airliners converge and pass within 200 feet of each other.

While the actual positions of the two planes is in dispute — the Federal Aviation Administration (FAA) claimed there was never any danger of a midair collision — the incident and what followed points up the increasing lack of confidence air traffic controllers have in their radar and computer systems and the growing conflict between the FAA and controller representatives.

According to the FAA, the two planes, an Eastern Airlines Lockheed L-1011 jumbor jet and a Delta Airlines Boeing 727, were never closer to each other than two miles. Logan tower chief Gary Tucker explained the discrepancy between the radar screen representation and the actual positions of the aircraft by noting the blips on the screen produced by the airplanes' transponders can represent as much as three miles of air space.

Eye-Witness Account

Controller Michael Fermon, who was present in the tower during the incident, insisted the radar-produced primary image and the superimposed beacon image from the transponders both clearly showed the aircraft passing much closer than two miles.

"I was there and saw it with my own eyes," Fermon said, "and a whole room full of other controllers saw the same thing. What we saw was the beacon and primary targets merge into one target and at the point of the merger [the planes] were within 200 feet [according to] the altitude reporting information that we took off the radarscope.

"I was scared out of my wits," recalled Fermon, who added that the controller responsible for the Delta airliner was "really shook up" and had to be relieved from duty following the incident.

Fermon said the most unsettling aspect of the incident was that the computerized conflict alert system failed to warn the controller before the planes could be directed to change flight paths.

The alert system, which analyzes incoming data and projects the paths of the airplanes, also measures the information against established parameters, and signals controllers if a dangerous proximity is predicted. This system, Fermon said, is almost completely unreliable.

"Ninety-nine out of 100 times that the conflict alert system goes off it's a false alarm," he said. "The time when we needed it to go off, it didn't."

Tucker, however, said the system was checked after the incident and "it functioned perfectly.

Whether there was nearly a tragic midair collision that Aug. 6 morning, 25 miles southeast of Boston, might not be determined until the FAA completes its investigation.

But the controllers' lack of confidence in the conflict alert system and the apparent discrepancies between radar images and backup system data illustrates flaws in the air traffic computer-radar system that have controllers up in arms. This has motivated a worried Congress to consider broad restructuring of the FAA.

The incident is also indicative of the conflict between the Professional Air Traffic Controllers Organization (Patco), of which Fermon is Boston chapter president, and the FAA, which insists Patco complaints about system unreliability are extravagant.

Whether two miles or 200 feet apart, what happened that morning shows the harried, sometimes frightening work environment of the air traffic controllers.

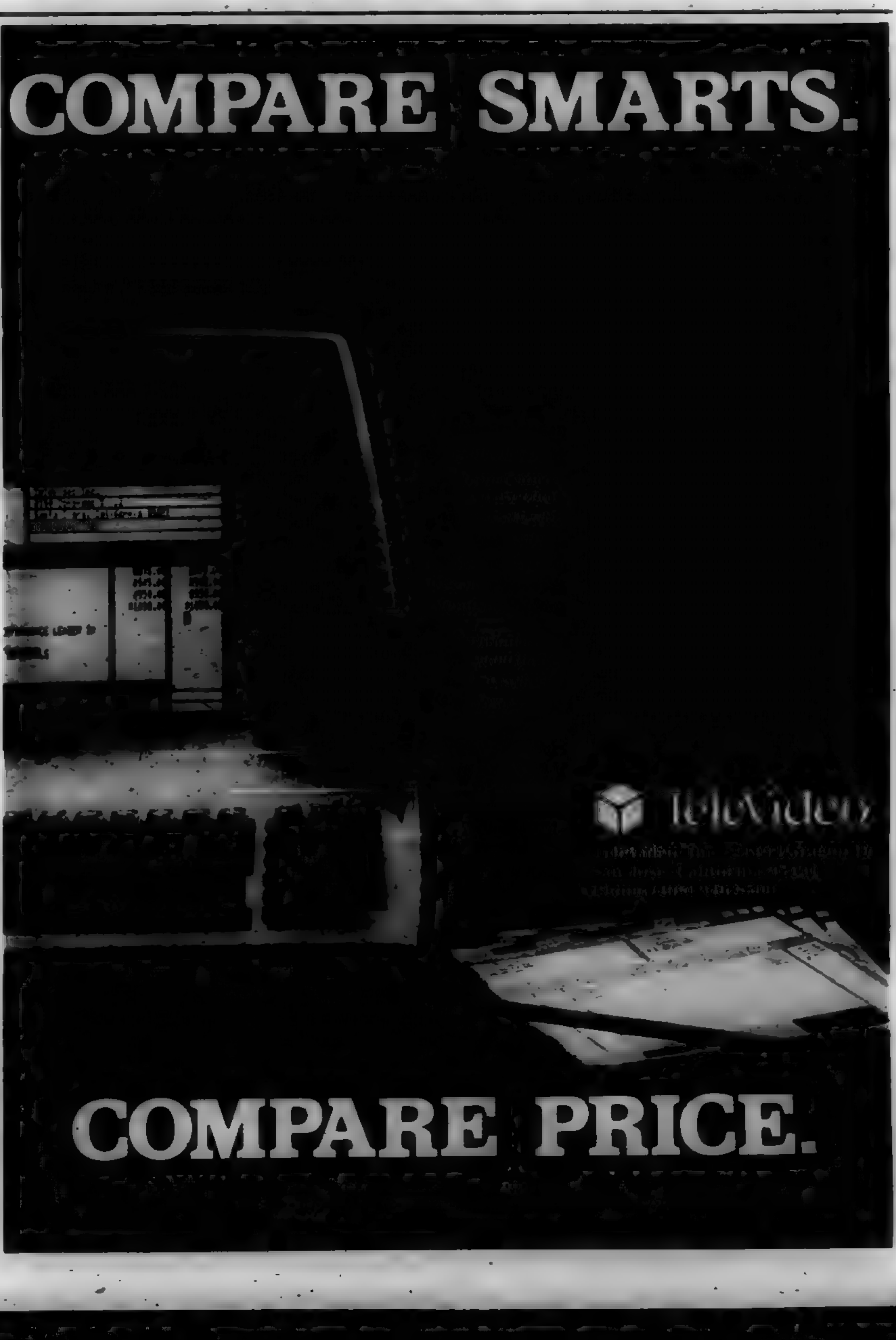
At 10 a.m., Fermon said, his attention was attracted by "a lot of commotion in the [control] room" when two or three other controllers "began hollering" as they tried to separate the two aircraft. Everyone in the room "held his breath" as the two radar images converged and then separated again, he recalled.

Control of the Eastern airliner had already been handed off to the Nashua, N.H., control center when it began climbing toward the Delta jet, he said.

The Delta 727 was instructed by the Boston controller to climb 1,000 feet, according to Fermon, but actually climbed 2,500 feet, apparently to avoid the other plane.

"Human error? Yes, there was human error," Fermon replied, "But it's more complicated than pointing the finger at the controller." If the two planes were really no closer than two miles "then there is definitely a problem with the radar," he said. And if the conflict alert system was working properly, "then it is a damn poor [computer] program and should be changed."

The whole thing is "very frustrating," Fermon said, adding the way it was handled shows "the great deal of antagonism" between the FAA and Patco "that in itself is a dangerous situation. "I don't see it changing any time soon," he said.



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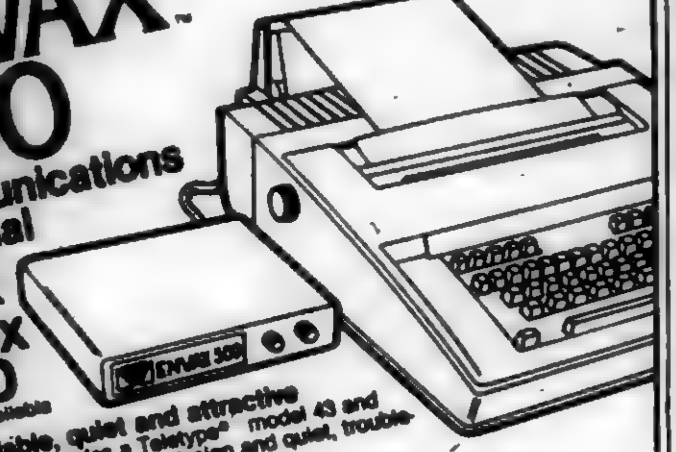

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USPS Gets Green Light To Launch Ecom Service

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service (USPS) finally has received a green light to launch its much-disputed nationwide electronic mail service, Electronic Computer-Originated Mail (Ecom). But when the offering will go on the air was unclear as of last week.

The governors of the Postal Service announced that the rate schedule for Ecom will not become effective until Jan. 4, 1982. They also ordered the new rates to be "placed in effect" on Aug. 15, 1980 and said Ecom service "will commence at such time as the necessary facilities are available."

According to a spokesman for the U.S. Postal Rate Commission — an advisory body which played a major role in developing the new system — this means that if facilities are available before the beginning of 1982, the effective date of the rates will be advanced accordingly.

Initial Charges

Initially, charges for Ecom service will be 30 cents for the first page of text and 10 cents for the second page. Beginning in October 1981, these rates are scheduled, according to the governors' announcements, to drop to 26 cents and five cents, respectively. But in all cases, the charges cover only conversion of Ecom messages to hard copy at the receiving end of the transmission path and delivery by mail carrier to the addressee. The transmission charge, which was not specified, will cost extra.

The governors' announcement also Mentioned two other qualifications. A $50/year permit fee will be imposed on each mailer, and users will be required to send at least 200 messages in each Ecom transmission.

Ecom will interconnect the 25 largest U.S. cities and deliver a message, in most cases, within two days after it is input. The service will handle messages directed to single as well as multiple addresses and will include word processing facilities able to insert different words, phrases and sentences in messages addressed to multiple recipients.

Ecom messages will be transmitted on-line from the mailer's premises to a serving post office (SPO) in each of the interconnected cities. At that point, the bits will be translated into hard copy and the resulting letter, after being placed in an envelope, will then be delivered by a mail carrier the next time he makes his rounds.

Transmission Question

The question of who will transmit Ecom messages from the mailer to the SPO has been the major bone of contention between commercial vendors of electronic mail and message services (EMS) and USPS ever since the Ecom idea was proposed in 1978.

Under the scheme authorized by the governors this month, commercial vendors, at least initially, will provide the transmission. But USPS is allowed to lease its own circuits and provide a competing end-to-end service, provided "there is a demonstrated need" and the postal offering is made available "under terms and conditions which preserve free and open competition," the governors said.

Ecom mailers will also have to "arrange for a communications carrier to transmit the messages to serving post offices," they added.

One of many question left unanswered by their announcement is whether these carriers will be allowed to aggregate messages from separate users to meet the requirement that each transmission must contain at least 200 messages.

Another question is whether private data communications will be allowed to interface with Ecom SPOs. Also, during earlier discussion of the new service, an alternate input scheme was proposed. In this case, magnetic tapes, containing multiple message texts and/or address lists, would be physically transported to an SPO in the mailer's city and fed into the network at that point instead of being transmitted on-line from the mailer's premises.

The Postal Rate Commission must consider each proposal before it can be implemented. Both were strongly endorsed by the governors in their Ecom announcement.

EMS vendors don't want USPS to offer Ecom end-to-end, even on a limited basis. They fear this would enable the postal service to underprice commercial competitors. Whether true or not, this view has strong support on Capitol Hill, and so further Congressional hearings, possibly delaying introduction of the service, are in the offing.

Meanwhile, the governors of the postal service are enmeshed in a fight with the Postal Rate Commission. Ostensibly, the issue is whether Ecom should be launched as an "experimental" service terminating in 1984 — as recommended by the commission — or as a permanent service, as desired by the governors.

The governors insist the commission, by recommending the 1984 termination date, has "far exceeded its authority." They have filed a petition for review in the U.S. Court of Appeals.

APL Methods Topic of Meet

TORONTO — A three-day conference focusing on APL programming techniques and technology will be held here Oct. 6-8 sponsored by I.P. Sharp Associates Ltd.

Geared as a user's meeting, the conference will spotlight the different applications of APL and discuss the viability of PAL compared with other more traditional programming languages. Sessions will involve the use of APL in the aviations industry, personnel and record handling systems, decision support systems and private data bases.

Registration fees for the meeting are $155 for the entire three-day program. Additional information on the event can be obtained from the sponsor at 145 King St., W., Toronto, Ont. M5H 1J8 Canada.

Formula Claims to Predict Value of IBM Gear

By Marcy Rosenberg
CW Staff

SUNNYVALE, Calif. — While some users rely on equipment appraisals and other commercially available services for aid in predicting the residual value of their IBM computer hardware, in fact they may be able to make equally useful estimates in-house.

One such approach is suggested by Jack van Kinsbergen, president of Bool & Babbage, Inc., here

Kinsbergen proposed a manual procedure — applying only to large-scale IBM mainframes — in which he correlated past secondary market trends gleaned from Computer Merchants' computer price guide with new product introduction history taken from Datapro Research Corp. data.

Van Kinsbergen's premise is the following:

- IBM CPU schedules are driven by requirements to maintain factory capacity.
- Secondary market values are directly related to IBM new CPU product introductions.
- A cause and effect relationship can be established based on these points.

Four CPU Stages

His approach assumes that secondary market values have followed a predictable pattern at each of four stages of CPU useful life. Stage I is when a CPU is in full production and readily available, with no successor machine yet announced — much like 3033 today.

At this stage, that CPU's secondary market value would be 85% of its value new, a percentage derived by deducting the 10% in investment tax credits allowable when buying a new computer and 5% as the estimated worth of for free maintenance IBM provides in the first year of ownership.

In Stage II, the next generation successor to that CPU has been introduced and first customer shipments have begun. In effect, this makes the original CPU a generation old and its used value drops to between 60% and 70% of new. The 3033 would enter this stage when IBM begins delivering its successor which for purposes of this analogy is assumed to be the H series.

Taking the analogy a step further, when IBM reaches peak production and volume shipments of the H, the 3033 will enter Stage III and its secondary market value will shrink to between 30% and 40%. Because at this stage the next generation CPU is readily available, the secondary market must adjust its valuation to a new price/performance curve, van Kinsbergen stated.

Elaborating, he explained that if the 3033 costs $X for X amount of power and if its successor offers 2X power for the same $X, a used 3033 has to drop in value to give 1/2X power for $1/2X.

Finally, when a successor to the H reaches full production, it will push the 3033 two generations back into Stage IV and push its used value down to between 0% and 10%.

Van Kinsbergen concluded, then, that "if one can predict when IBM will reach peak production on its next CPU, then one can predict when the current CPU market value will fall below the 40% point."

He charted this four-stage cycle for three IBM CPU families — the 370/155 and 165 (see Figure 1), the 370/158 and 168 (see Figure 2) and the 30 series (see Figure 3). He noted a margin of error of plus or minus 6 months for the dates shown and of plus or minus 10% for the secondary market values.

Based on these charts and his examination of historical secondary market and product introduction data beginning with the 360/50, 65 and 75, van Kinsbergen further concluded that IBM has in the past and will in the future maximize CPU production every four years.

Users, then, that want to keep up with new IBM introductions should put their existing IBM equipment on a depreciation schedule that is consistent with market values, he recommended, adding that "useful life and residual value of CPUs should aim at this peak production point and reduce book value to approximately 30%," a percentage that allows for future IBM price cuts.

Van Kinsbergen admitted his analysis is "simplistic" because it does not take into account costs of conversion if IBM's next computer generation proves incompatible with existing CPU families. Also, it assumes that users will want to stay current and will need to upgrade for more capacity.

However, such an analysis can aid users in making the "purchase versus lease" decision, he maintained. Assuming IBM will continue to maximize CPU prodution every 4 years, users will be able to determine when the next generation will be readily available and what their present equipment will be worth by that time.

With this knowledge, it will then be possible to compare the costs of leasing additional CPU power in the interim as opposed to buying another CPU and reselling it when the new processors become available.

An argument against this analysis and in fact any formula that claims to predict future computer residuals was voiced by American Computer Group, a computer dealer and lessor in Boston.

"If there were a formula for it, then the leasing companies wouldn't have taken the big bath they took," maintained Adolph "Sonny" Monosson, the firm's chairman. "When you have man interfering with the process of changing technology, you can't have a formula."

Agreeing was Paul Blumenthal, vice-president of the American Computer appraisal service. Besides noting the disclaimers van Kinsbergen himself pointed out, Blumenthal contended that formulas assume projected stability in the marketplace.

Continuously changing economic factors also come into play. For example, users were trading in 370/168s for 3032s and 3033s up until three weeks ago "when you couldn't get a buyer or a seller of a 168," Blumenthal said. Why? He explained that while most DP shops were able to budget for their first 3033, they have now started to hold on to their 168s as "cheap insurance" if economic conditions prevent their getting a budget for their second 30 series machine.

Presented with the argument that it might be in the interest of a firm that charges for appraisals to discredit any alternate source of information for predicting residual values, Monosson replied, "If there was a formula, we'd use it ourselves and charge for it."

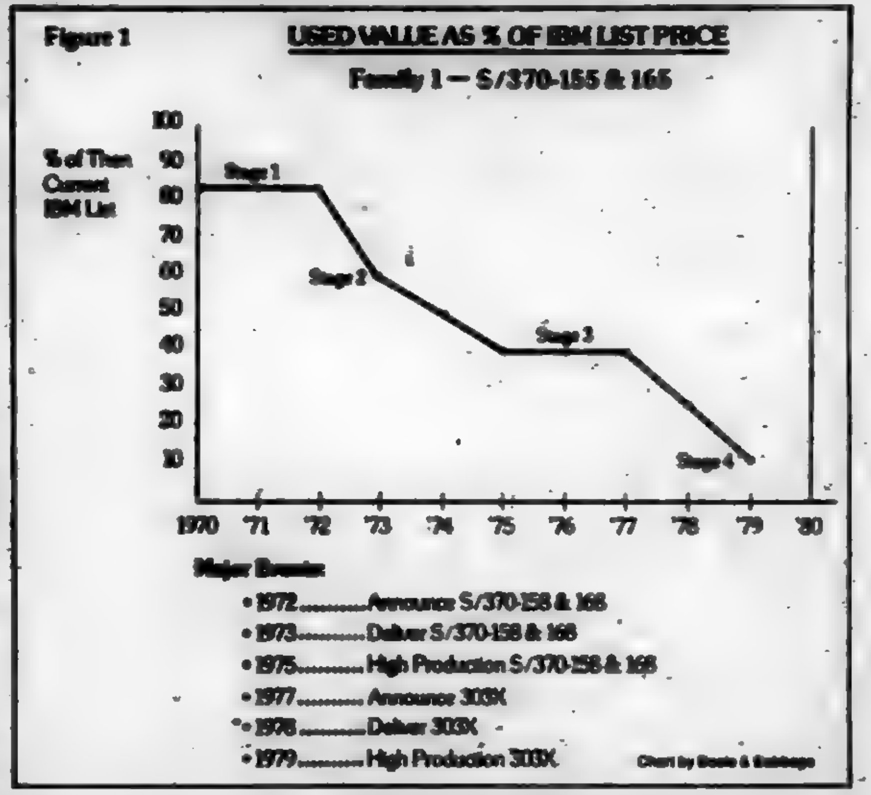
Figure 1

Chart by Boole & Babbage

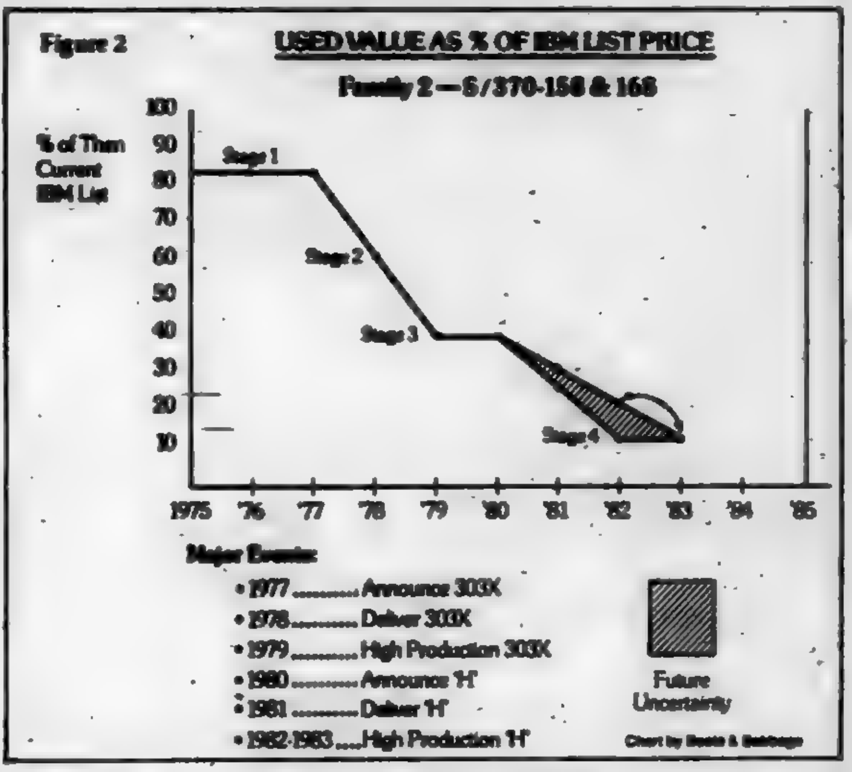
Figure 2

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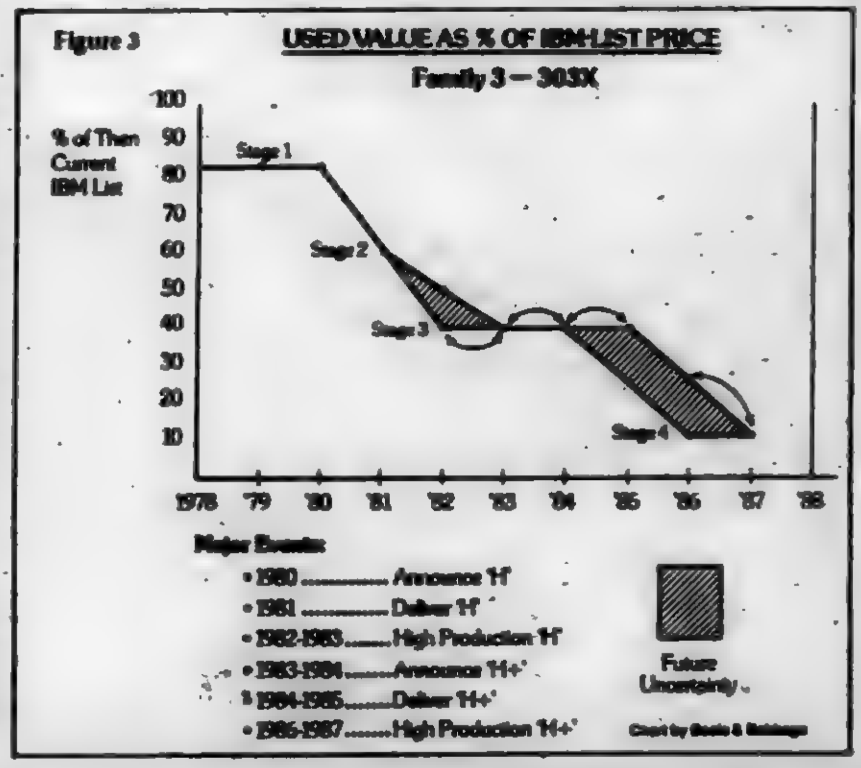


Figure 3

Chart by Boole & Babbage

Deregulation May Launch Major AT&T Venture

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — AT&T is expected to make its debut in the computing field soon, but the company is unlikely to join Amdahl Corp. and Magnuson Corp. as a vendor of plug-compatible mainframes, a communications expert said here during a recent two-day seminar.

The recent deregulation of the computing field's telecommunications sector has opened the way to a major new business opportunity for AT&T, and the company is likely to devote much of its attention to it for some time to come. In fact, so preoccupied will AT&T be in trying to exploit its own data communications market that the firm will effectively bar itself from pursuing any of the computer industry's other important business sectors, according to Dr. Dixon Doll, president of the Ann Arbor, Mich.-based DMW Group, Inc.

Doll, whose company specializes in designing and implementing communications networks, also warned users to expect "gargantuan" rate increases for private, leased data communications lines. AT&T will start pressing for the rate hikes soon and, although they will probably be opposed by a few local regulatory agencies, most of the expected increases will eventually be approved.

'Spin-Off' Foreseen

Doll's comments came during an Aug. 12-13 seminar focusing on AT&T's forthcoming business unregulated subsidiary and efforts to restructure the computer communications industry. The seminar — sponsored by the Yankee Group, a Cambridge, Mass.-based management consulting firm — was held to assess the potential impacts of a recent Federal Communications Commission ruling that in effect deregulates the "enhanced services" and telecommunications equipment business.

Now that longstanding restrictions barring AT&T from entering the computing field have at last been lifted, the company is expected soon to "spin off" part of its existing organization to form its first "business unregulated subsidiary." The main purpose of the subsidiary is to serve as a vehicle for introducing "enhanced telecommunications services" and to give Bell its first entree into the computing marketplace, Doll said.

The "enhanced services" business will embrace a huge range of offerings — about a dozen distinct product categories in the data-communications sector alone — and AT&T will clearly have its hands full in trying to address each of the various opportunities.

One portion of the "enhanced services" product spectrum where Bell's emphasis is likely to be particularly heavy is the sector for electronic mail and document storage, (retrieval) and transmission.

Potential user demand for such products, which will be patterned after the forthcoming Satellite Business Systems, Inc. network, is "absolutely gigantic" and could very well dwarf the market for all other "enhanced telecommunications services," Doll said.

Another sector of the data communications business where AT&T is expected to make a major user commitment is the voice-recognition area. Though still considered something of a "wild-card" technology, voice-recognition could nevertheless develop into an important new field of endeavor for AT&T, provided of course the company insists on making its products top quality, he said.

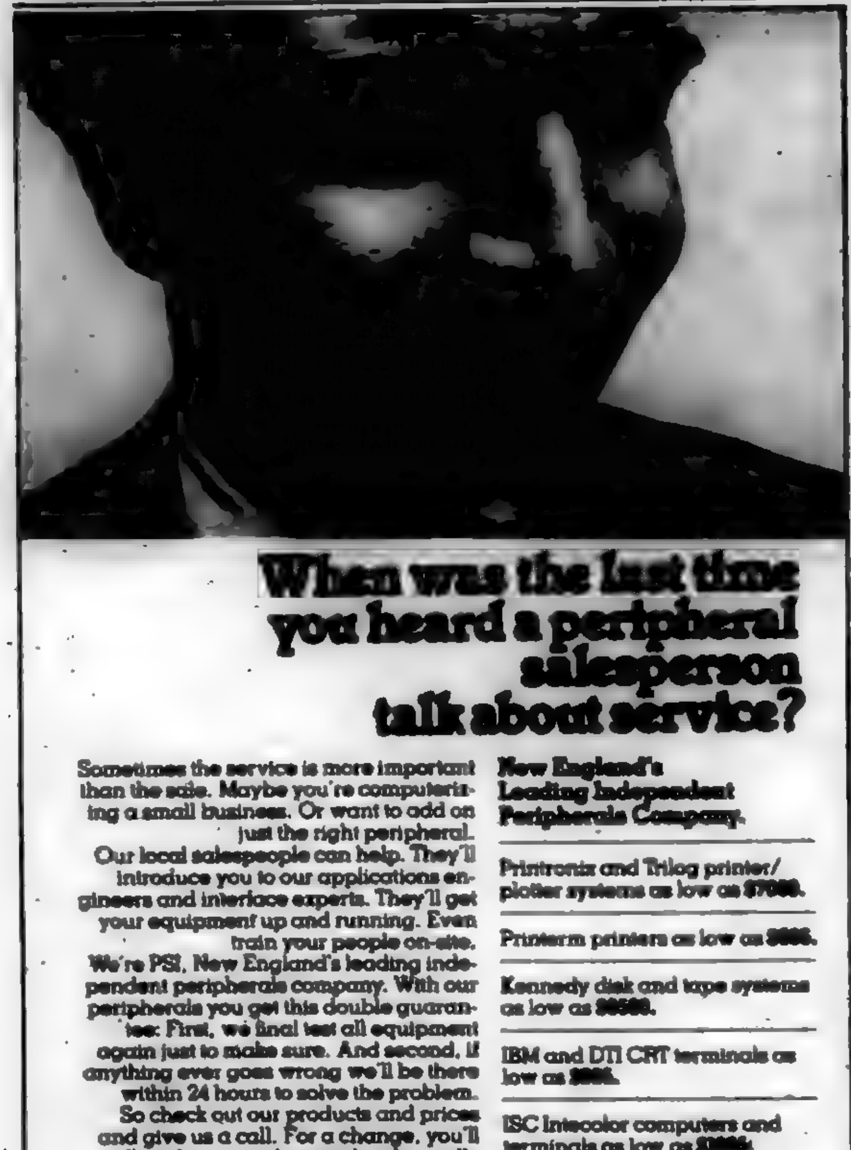
A third major user concern that Bell is almost certain to tackle through its business unregulated subsidiary is the problem of tying together systems that are housed under the same roof. "Most end users don't realize what a serious problem local wiring is until they try to rearrange their in-house communications network and suddenly find themselves faced with the prospect of ripping out and reinstalling miles of electrical cable," the DMW Group president added.

Some of the other important "enhanced services" that AT&T is expected eventually to be supplying, according to Doll, will include:

- Local data networks modeled on Xerox Corp.'s Ethernet.
- Private and public teleconferencing systems.
- Packet-switching networks.
- Interactive, intelligent data terminals.
- Continuously operating corporate data communications networks patterned after the offerings from Tandem Computers, Inc.
- Communications-based word processing systems (both stand-alone and clustered).
- Data-base services and equipment similar to General Telephone & Electronics Corp.'s proposed Viewdata system.

AT&T's success in the "enhanced services" area, however, and its ability to satisfy the needs of its data communications users will depend to a large extent on how many skilled developers of telecommunications software the company can either train or attract.

"The future of the communications field will be very software-intensive, and AT&T will have to make a major investment in teleprocessing programs, even though finding enough skilled programmers to meet its expected demand won't be particularly easy for the company to do," Doll said.



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FCC Chided for Little Input Into Resale, Sharing Rule

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Allowing resale and sharing of international private-line circuits is a good idea in principle; it will promote lower rates and service innovations. But the Federal Communications Commission (FCC) made a mistake last May when it proposed to eliminate the resale and sharing restrictions presently imposed on U.S. international carriers and their customers. The commission should have consulted beforehand with foreign telecommunications administrations.

This was the chief point made by computer industry companies and trade groups earlier this month when they answered the FCC's invitation to comment on its proposed rules change. IBM, the Association of Data Processing Service Organizations, Inc. (Adapso) and others insisted that since an international circuit is a joint undertaking between a U.S. and an independent foreign carrier, agreement of both parties is essential to make sharing and resale work.

AT&T, the U.S. Postal Service and the President's chief telecommunications adviser — the National Telecommunications and Information Administration (NTIA) — were among those that said the commission should allow resale and sharing of international private line circuits even if other countries presently oppose the idea.

As NTIA put it, "we do not believe so fundamental a national goal as the encouragement of competition and market entry should be frustrated by international recommendations."

NTIA added that some recently-authorized U.S. carriers — such as Consortium Communications, Inc., — are now providing what amounts to an international resale service even though they do not have operating agreements with foreign telecommunications administrations.

"No official sanction has been given to this activity" by the other countries, "but to date there appears to be a form of silent acquiescence," NTIA said.

Strong opposition to the FCC proposal has been voiced by CCITT, an international association of telephone and telegraph carriers [CW, Aug. 18]. However, "we cannot now accurately predict the response of all foreign administrations to resale, since that response may well depend upon . . . conditions the commission may place upon resale activities," NTIA said.

It added that CCI and the other carriers now offering international telex service on a store-and-forward basis through leased-and-resold transmission facilities "have had some public benefits."

Even though the services are limited, NTIA explained, the prices are substantially lower than those charged by the U.S. international record carriers (IRC). "Continued provision of such services at low rates could induce the IRCs themselves to initiate rate and service innovations."

Terminals Ease Work Load For GCA's MIS Workers

By Rita Shoor
CW Staff

BEDFORD, Mass. – Gather together a management information systems (MIS) staff that isn't title-conscious, move them into a new building and provide them with hardware that makes their jobs less frustrating.

GCA Corp., an international firm specializing in the manufacture of industrial production and scientific equipment, has applied this formula with successful results, according to Gretchen Hughes, an MIS staff member. The firm's corporate headquarters here are located in a building that was opened for staff use in spring 1980, GCA said.

In the often title-ridden world of corporate information systems, GCA is somewhat unique in that the corporate policy is to refer to the 10 to 12 employees with programming, analysis and design responsibilities as "MIS staff members," Hughes said.

"We don't use titles like programmer/analyst or system designer here," she observed. Each staff member is expected to be capable of performing all of the functions – programming, design, analysis and user interaction – necessary to carry a given project through to completion. "Therefore, the lack of a specific title is immaterial."

Dual-Format CRTs

The selectable-format terminals which GCA has purchased from Lee Data Corp. (LDC) have also contributed to making life a little easier amid the pressures of system development at GCA, according to Hughes. The firm has installed one cluster of LDC Model 2 terminals consisting of a control unit, eight terminals and one printer.

She described the relatively new CRT terminals that allow the technician to switch from an 80-char. print line to a 132-char. format as a very convenient tool.

"It's nice to see your output reports in a single line, particularly when you're developing programs in a remote setup," she observed. The staff is currently running all jobs on an IBM 3033 mainframe located at Oakbrook Data Center in Oakbrook, Ill., with communications set up across telephone lines.

GCA's configuration also includes Digital Equipment Corp. VT-132 terminals with the 132-char. formatting capability, she continued.

This feature appears preferable to the other options available to the programmer working with output report listings, Hughes said. Without a full-line display, the technician is faced with a choice of either swiching back and forth between the left and right sides of the displayed data set or trying to make sense out of a report line shown in wraparound format.

High Resolution

Although character size is noticeably smaller in the 132-char. format, Hughes maintained that the GCA technical staff has not had any difficulty deciphering letters. "Both the LDC and the DEC terminals offer a very high resolution."

This clarity becomes most noticeable with potential look-alike characters. The letter "L" and the number "1" for example, are easy to distinguish on these CRTs, according to Hughes.

A staff member entering a lot of data or working at the terminal through an entire day might prefer the 80-char. format because of the larger letter size, she said. However, if eye fatigue became a problem, you could switch between the formats quite easily, Hughes observed.

She proceeded to prove her point by changing the display of a 132-char. data set to an 80-column format via the entry of two commands and pressing the system attention switch on the LDC terminal.

Availability Decisive

Availability was paramount in GCA's decision to go with LDC's Series 300 rather than the comparable IBM 3278 Model 5, which also offers 132-char. formatting. The price difference on the hardware was minimal, she said, but the 20- to 40-day delivery time from LDC was a major factor in the plug-compatible vendor's favor.

The MIS corporate staff is currently in the process of developing a sample inventory control file under CICS and eventually plans to offer full on-line inventory capability to between eight and 10 remote locations in the U.S., she said.

Hughes was also enthusiastic over the portability offered by the hookup between the terminals and the control unit. Each terminal is attached to a split coaxial cable and the grommet on the cable is plugged into a wall plate.

Twisted pairs of telephone wire run through the new building's walls to a plug board in GCA's computer room. The other cable grommet is attached to the appropriate plug which is, in turn, attached to the controller.

Since there is a numbered plate for each workstation in the new GCA building, any of the terminals can be operated from any location through the simple expedient of reattaching the cable to the plate and its corresponding plug, she explained.

Hughes rated LDC's service and repair facilities as excellent during the testing stage. In fact, the only real problem that the technicians have encountered appears to be tied to the access method software, she said.

CW Photo by R. Shoor

Diane Monaco, one of the MIS staff members at GCA Corp., working at a Lee Data Corp. terminal.

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Computers Score, Rank Tennis Pros on Circuit

By Bruce Hoard
CW Staff

FLUSHING MEADOW, N.Y. — World tennis professionals competing at the 1980 U.S. Open Championship for $654,000 in prize money here this week are being watched by computers as well as people.

While both will track the players' progress and performance, the computers will retain the information long after the other spectators have forgotten it.

It's all part of an effort to rank the pros. The rankings are important because both the Association of Tennis Professionals (ATP), composed of male players, and its counterpart organization, the Women's Tennis Association (WTA), use them as the sole basis for accepting players and seeding for virtually every professional tournament.

The groups use different ranking systems. The ATP has opted for a simple model that can be computed by hand, while the WTA favors the much more complex matrix model designed by the U.S. Tennis Association (USTA).

The ATP system is based on points. The more rounds attained during a tournament, the more points amassed. Points are also awarded in proportion to the total tournament purse and bonus points are handed out to lesser players who defeat anyone ranked 24 or below.

> *While both computers and people will track the players' performance, the computers will retain the information long after the other spectators have forgotten it.*

More than 900 players are followed and their status assessed once a week during the 46-week-long season, according to David Arnott, business manager for International Tennis Weekly, the magazine of the ATP.

The player data is processed on the ATP's Texas Instruments, Inc. TI 990. The results and seedings for 92 tournaments are included. "We have everything from $5,000 tournaments to Wimbledon," Arnott noted.

Originated in 1972, the system was first managed by a service bureau, but grew so rapidly the ATP decided to take it in-house in 1976.

Player Acceptance

One critical aspect of the system is that it be accepted by the players and, according to Arnott, it is. He attributed that acceptance to the effort made by the ATP to apprise the players of how the system works and solicit their input in maintaining it.

"We have a representative in the field each week of the year talking to the players," he said. "Plus, three times a year, each player is mailed a summary of his points and rankings."

In order to ensure player input, a computer ranking committee composed of players was formed. Through the committee the players can express their feelings about the weight of various criteria used to develop the rankings. "The players determine how the system is used," Arnott said.

And the players, especially those ranked between 90 and 130, are especially interested in the weekly standings. For them, tournament eligibility is a week by week proposition and even a slight change in rankings can open — or close — the door to employment.

The USTA system adopted by the WTA is more complex than the number-crunching ATP model, featuring an editing system that walks the user through several pertinent categories of information.

It is similar to the ATP system, however, insofar as it awards lesser players for beating better ones. The difference here is the better player need not have achieved a certain ranking in order for his victor to reap points.

Other criteria include the average rank of players, the overall quality of tournament talent and a player's ranking month by month based on one year's accumulation of data. A minimum number of matches and tournaments must be played for a player to achieve full ranking point values.

John McEnroe

The system runs on an IBM 370/158 located at a time-sharing center in Fairfield, N.J. It is accessed on-line from a USTA terminal in New York City.

How It Works

This system had its genesis in 1975 and was updated in 1978. When operating it, the user is able to select a function from one of several categories such as, "Enter a tournament?" "Check a player's progress?" or "Request a ranking to be done?"

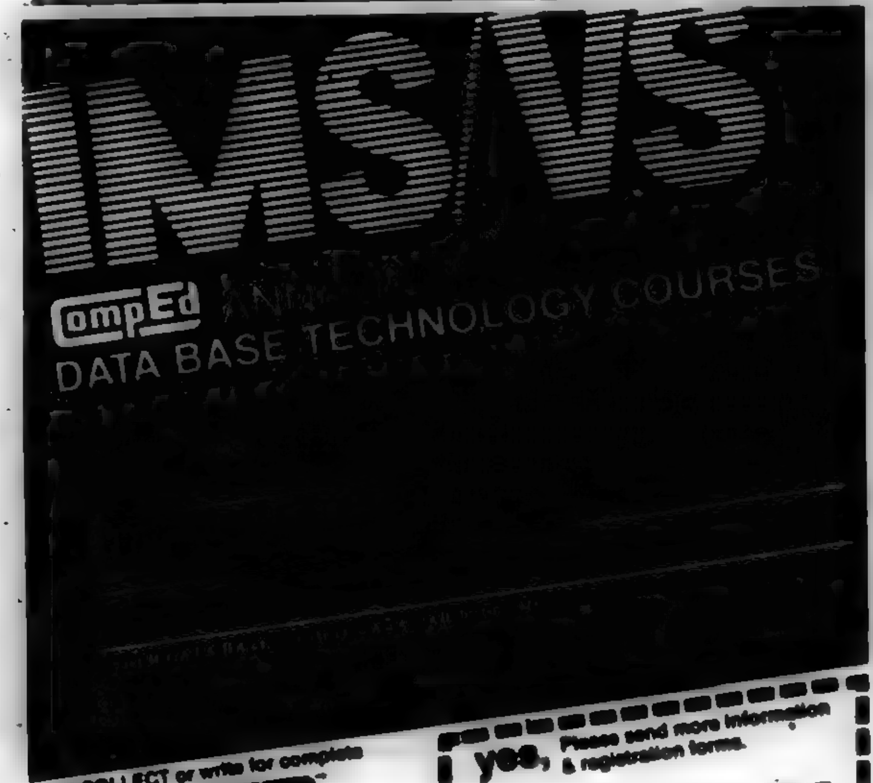
If the first option were selected, the name of the tournament, its location, the date of specific games and the names of all players in the main round competition would come up for viewing.

After all players from the main round are entered and verified, the dialogue is repeated for each succeeding round in descending order, with the final round being entered last. The computer then tabulates the information and determines tournament points for each player.

Although touted for its advanced qualities, the system is not yet perfect in the eyes of the WTA, which is thinking about making some changes in it after this week's open, according to a WTA spokeswoman, Stephanie Tolleson.

Like its male counterpart, the WTA has a players' computer ranking committee and all players have input on everything concerning the system, Tolleson said.

And what do the players think of the system? "They think it's good, but sometimes they don't understand it," she said.



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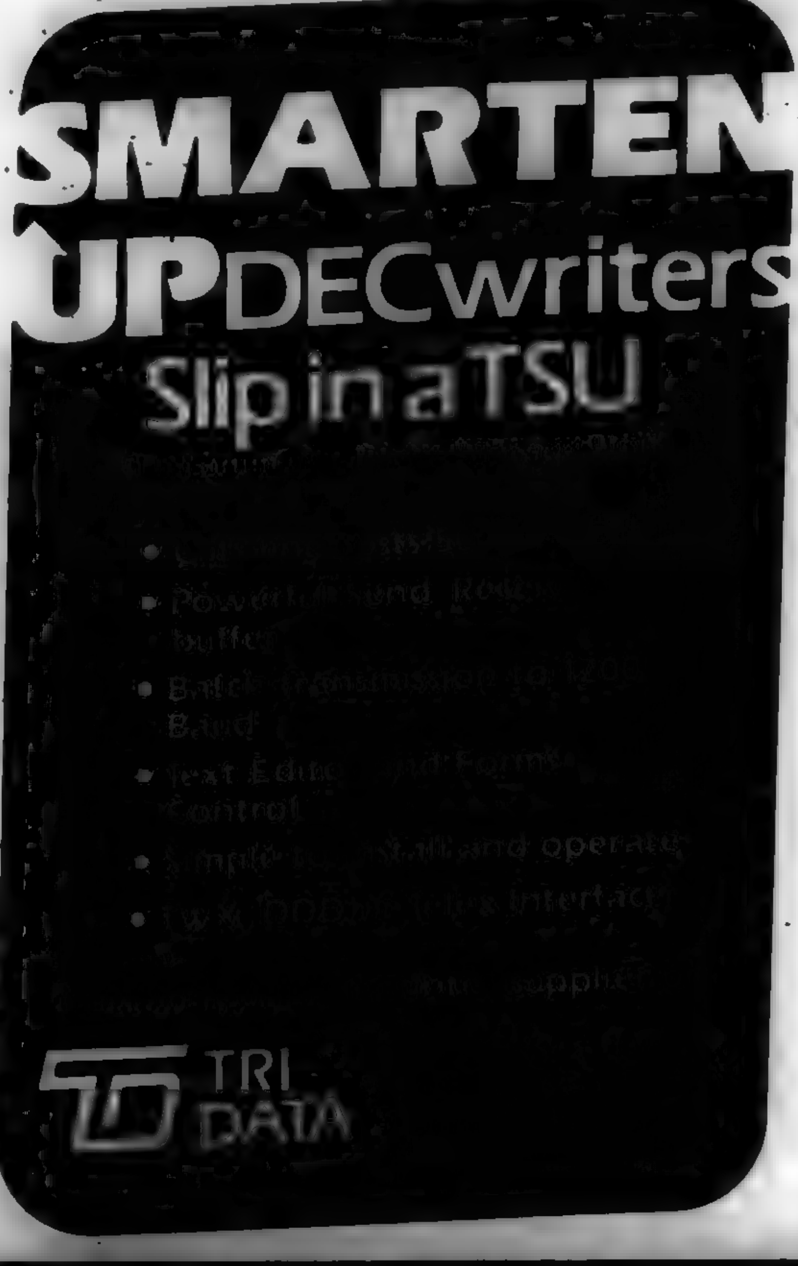

Clockwise from right: Charlie MacArthur surveys Brown's Mill's hydroelectric dam on the Piscataquis River. MacArthur stands beside the smaller of the mill's two hyroelectric power units. MacArthur in his electric car. A lineup of MacArthur's alternative energy vehicles. Ann Richards and Johanna Provost (left to right), employees at Link Management Services. MacArthur rhapsodizes on the benefits of the bottle of liquid compost he's holding before a tour group.

CW Photos by A. Dooley

Entrepreneur Gives Life To Mill Town

By Ann Dooley
CW Staff

DOVER-FOXCROFT, Maine — When Charlie MacArthur talks about growing computer-generated tomatoes, people in this tiny New England town listen.

Nestled in a quiet valley of central Maine, MacArthur and his mill are attracting a variety of cottage industries ranging from a walking-stick shop to a computer software company.

This Down East entrepreneur believes in accomplishing the unusual, so MacArthur's next scheme is to persuade some out-of-state business to establish a computer backup site at the old mill. It would be a great opportunity since the mill can lay claim to three different uninterruptible power sources, among them a hydroelectric station, MacArthur asserted.

"The cost of falling water won't change, while other energy costs are likely to go through the ceiling in the near future," he stated.

A native of Maine, this energy-conservationist extraordinaire left the Connecticut rat race to return to his home state, and in 1977 he and his wife Anne bought Brown's Mill, a former wool mill that was built in 1867 and closed down in 1955.

Although the mill is still in the early stages of renovation with some areas restored and others still in a state of rubble and decay, MacArthur is busy filling its 101,000 square feet of usable space with new businesses.

Looking toward the future, MacArthur would like to see 60 small businesses in the mill. And while he realizes the town needs growth, he would rather see small, soft industry move in than any giant corporations. As MacArthur stated, "Why the hell should we destroy the place by inviting GM or U.S. Steel to swallow it up?"

One of the businesses MacArthur wants to attract is computers. Already installed in the mill is Link Management Services, a software company owned by David Singer, who writes business and tax programs for approximately 20 clients in New Hampshire and Maine.

Although MacArthur would like to attract more computer companies, he wants to keep the businesses diversified so that the town will never be in danger of dying, as it nearly did when the mill previously closed down.

Link Management is situated across the mill from a solar energy store and down the aisle from a bakery. In the next room is a barrel-making shop, and MacArthur is looking for someone to take over a basket business which is "ready to go," according to the backwoods businessman.

Energy Waste

MacArthur undertook his unusual mission — as if anything can be considered unusual for a man who flew over the Arctic Circle in a hot air balloon — partly because of his views against energy waste. Condemning the country's dependence on oil, MacArthur is continually searching for new energy sources.

His search has led him to build a fleet of vehicles powered by anything from bacon or chicken fat to charcoal. The proud owner of a bright yellow electric, car, MacArthur can be seen noiselessly gliding throught the avenues of Dover-Foxcroft.

The Maine "yankees," who will take almost anything in stride, have accepted newcomer MacArthur without question. While some might not be sure what he will be up to next, they realize MacArthur is attracting new businesses and families to the economically stagnant area.

MacArthur believes that Brown's Mill is an ideal location for a computer backup facility. Overlooking the lower falls of the Piscataquis River, the Brown's Mill hydroelectric station generates enough power to meet the needs of the entire town of Dover-Foxcroft — population 4,000. In addition, the mill boasts a wood fire burner and a diesel engine which can also heat and run the entire mill.

Social Stability

Besides the uninterruptible power supply, the area offers almost complete social stability, according to MacArthur. He noted that riots are unlikely, although some of the residents act strangely during hunting and fishing season. Aside from that, the only excitement occurs when "every ten years or so they vote to tear down the two town traffic lights as unneeded."

And unlike other computer centers, the cost of living is low, the pace is slow and as many as 90 houses are available for sale, many for less than what some Silicon Valley computer people might pay for a downpayment.

But MacArthur is not content with just a computer backup facility. He plans to have the computers share their space with vegetables, seperated from each other by impermeable walls. Water power can provide basic energy, and the heat given off by the electronic equipment can be recycled through plant-growth rooms during the winter.

MacArthur is sure that some business will jump at the chance to locate a backup site next to the old mill stream.

In the meantime, Charlie is studying the question of how tomatoes can be grown from the excess heat of one computer.

Honeywell Calls Patent Dispute Misunderstood

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Claiming it is not seeking a software patent, Honeywell Information Systems, Inc. has asked the U.S. Supreme Court to uphold a lower court decision granting the company a patent for a firmware-based module of its Series 60 Level 64 system.

In a brief filed with the court this month, Honeywell said patent office attorneys had "misunderstood and misconstrued" the "switch system base mechanism" in labeling it essentially a computer program and therefore unpatentable under existing statutes and previous Supreme Court decisions.

The device, Honeywell said, "is one of a series of inventions which collectively define an entirely new computer machine." The mechanism in the dispute "comprises register elements, hardware gates, logic circuits and memory elements which are permanently incorporated into the Level 64 computer."

The device, submitted to the patent office in 1975, manipulates system base information in both main memory and internal scratchpad registers. One element of the mechanism, according to Honeywell's description, is "a microprogrammed hardware control element." It is that element that is the basis for the court case.

Invention Misunderstood

According to Honeywell, the patent office has mistakenly focused its argument on the one element of the hardware combination in arguing the patent should be denied because the only novel aspect of the device is the firmware, which is essentially an unpatentable algorithm.

The patent office "has not understood the invention at any point in the history of this case," Honeywell said. The device "is a combination of hardware elements and must be viewed in the totality of its elements. No single element of the combination is sought to be patented."

Further, the patent claim does not in any way involve a mathematical algorithm, as suggested by the patent office, Honeywell said. It does not involve any so-called computer implemented algorithm, the company argued.

The patent office "has not identified where in [Honeywell's] application a computer program, a formula, a method of calculation, a mathematical algorithm, a law of nature, an idea or a scientific principle is disclosed or claimed," the company continued. "Hence, there is no basis in the record for [this] conclusion.

"The invention is a new combination of elements which has not always existed and which elements cooperate and function to achieve an improved result," Honeywell said. "Merely because such combination is a permanent part of a computer machine does not convert it into unpatentable subject matter."

Petition Filed

Using this argument, Honeywell successfully petitioned the Court of Customs and Patent Appeals (CCPA) last summer to grant the firm a patent for the device after the patent office and its board of appeals had rejected the claim.

Earlier this year, the patent office persuaded the Supreme Court to reconsider the CCPA decision [CW, March 24]. The high court will take up the case when it goes back in session this fall.

In stating its position to the court, the patent office described the Honeywell device as a combination of firmware and existing computer architecture. The only new aspect is the firmware, the patent office attorneys argued; therefore the patent should be denied because computer programs are not patentable [CW, July 21].

"Firmware does not convert the conventional computer designed to accept firmware of this type into a new patentable machine," the patent office said.

Honeywell, in its recent filing, said the patent office "erroneously alleges that firmware is a 'computer program' that regulates the internal operations of the computer" and has not shown where in the Honeywell mechanism "any computer program is disclosed or claimed."

The patent office board of appeals, in originally denying the patent, "dissected the claimed combination invention down to only one element which it erroneously labeled a mathematical algorithm," according to Honeywell, thereby characterizing "every digital computer machine as being mathematical and therefore [unpatentable.]

"The [patent] commissioner's unsound position in this case can only be viewd as another step in his repeated attempts to obtain a broad holding from this court that computer-related inventions are not patentable," Honeywell said.

The company suggested the patent office is pursuing the case as a means of dealing with the thousands of computer related patent claims now pending. A decision in the patent office's favor would solve the "administrative difficulties" of handling those claims, Honeywell said.

"The restrictive interpretation . . . espoused by the commissioner would, if followed by this court, effectively . . . prohibit issuance of future patents on computer machines," the company said.

Repercussions for Industry?

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The U.S. Supreme Court will soon take up two patent cases that could have far-reaching effects on development of patent protection for the computer industry.

Decisions in the two cases – one involving a Honeywell device incorporating microcode, the other a computer-based rubber curing process – could determine the resolution of thousands of computer-related claims now pending in the U.S. patent office, agree all parties involved in the cases.

The patent office has characterized the two cases as representing attempts to patent processes or mechanisms that rely on mathematical algorithms, and argued the claims should be rejected because computer-implemented algorithms – software – are not patentable under existing law.

'Chilling Effect'

Honeywell and several patent law associations oppose the patent office approach and warn of a "chilling effect" on computer patent policies and practices if the patent office arguments are upheld by the court.

"This court need not decide any broad policy issues with respect to the patentability of computer programs" in the Honeywell case, the company said in a brief filed with the court this month.

Honeywell suggested the patent office, if successful, could throw out any computer-related patent application claiming it is based on an algorithm and therefore unpatentable.

Other Pending Cases

Indeed, the patent office itself noted it has some 3,000 cases pending in which the patentability of computer software or firmware is a potential issue. The office is seeking Supreme Court guidance in considering these applications, according to patent office attorneys.

However, an *amicus curiae* brief filed by the American Patent Law Association argued: "It is only through the use of an ill-conceived, irrational approach to patent claim analysis that [the Honeywell] case can be said to present the issue of whether computer programs are . . . eligible for patent protection."

The government is pursuing the case because it "seeks judicial approval of a proposed (perhaps already established) [patent office] practice, against its stated policy, whereby all claims in computer-related cases would be summarily rejected," the association said.

The patent office arguments "as a whole badly confuse the issues," according to the Los Angeles association, which represents, its brief noted, an area where a large amount of computer development occurs.

"Computers and computer programming are becoming almost as common today as gears and valves," the Los Angeles group noted. "There is no valid reason for denying patentability to inventions that employ computers or programming under the present law than there is for denying patentability to inventions that employ gears and valves."

The patent office, for its part, claims it does not want to deny any legitimate patent claim but says it needs resolution of conflicting court decisions on software patents.

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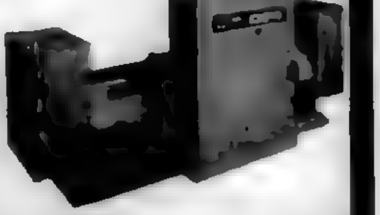

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In Dayton University Program

Women Offered NSF-Funded Career Upgrade

By Rita Shoor
CW Staff

DAYTON, Ohio — Combine a bachelor's degree in computer science with a certificate in electrical engineering and what have you got?

A person who is "absolutely the highest item on the [employment] market right now because of the electronics explosion," according to Carol Shaw, assistant dean at the University of Dayton School of Engineering here.

And, through a program made possible by a grant from the National Science Foundation (NSF), women with degrees in mathematics, physics or related sciences — including computer science — can qualify for tuition-free studies in electrical engineering at the university, Shaw said.

Dubbed the Fast-Track Late Entry Program, the course outline is designed specifically for adults interested in upgrading their education or redirecting their careers to electrical engineering.

The tuition-free part of the program — consisting of 35 credit hours taught during a 50 week time span — allows the student to earn a certificate in electrical engineering in a program that "advances the participant to an academic level equivalent to that of an electrical engineering graduate," the assistant dean maintained.

When questioned why someone who has majored in computer science would choose to enter this sort of program, Shaw cited the expanding number of jobs available to the person with both programming knowledge and an electrical engineering background. A computer science major is basically a programmer, she stated, but the technician who is familiar with both hardware and software is one of the most highly sought after entities in the job market today.

The program has already been offered twice before, and approximately 70 women have received their certificates, according to a university spokesman. The placement effort tied to the program was described as "highly successful," with some salary increases between $10,000 and $15,000 in engineering positions.

A programmer earning $15,000 annually might expect an increase in salary of as much as $6,000 after successfully completing the program, she claimed.

In addition, the certificate credits can be applied toward a second degree in electrical engineering. However, during the first two years of the program, Shaw pointed out, recruiters showed about the same degree of interest in certificate graduates as they did in those who had earned bachelors' degrees.

Technical courses in the program are conducted by the same staff that instructs undergraduate engineering courses, but a separate staff exists to assist in professional development and placement at the program's conclusion.

More information is available from Shaw at the University of Dayton School of Engineering, Dayton, Ohio 45469.

Interface West Set for October

LOS ANGELES — The fourth annual Interface West, to be held here Oct. 28-30, will offer a 50-session conference on data communications, distributed data processing and networking, highlighted by six all-day seminars tailored for advanced DP and data communications professionals.

Seminar enrollment is limited and costs $50 per seminar in addition to the regular conference fee of $95. One-day conference admission is $60, and the exhibits-only fee is $10.

More information is available from Interface West, 160 Speen St., Framingham, Mass. 01701.

Kearns Keynoter Of Federal Meet

WASHINGTON, D.C. — David T. Kearns, president, chief operating officer and director of Xerox Corp., will be the featured speaker here at the Federal Office Automation Conference. In addition to technological advances and potential applications of the automated office, present-day, state-of-the-art uses of equipment will be highlighted at the Nov. 4-6 meet.

More information is available from the Federal Office Automation Conference, P.O. Box E, Wayland, Mass. 01778.

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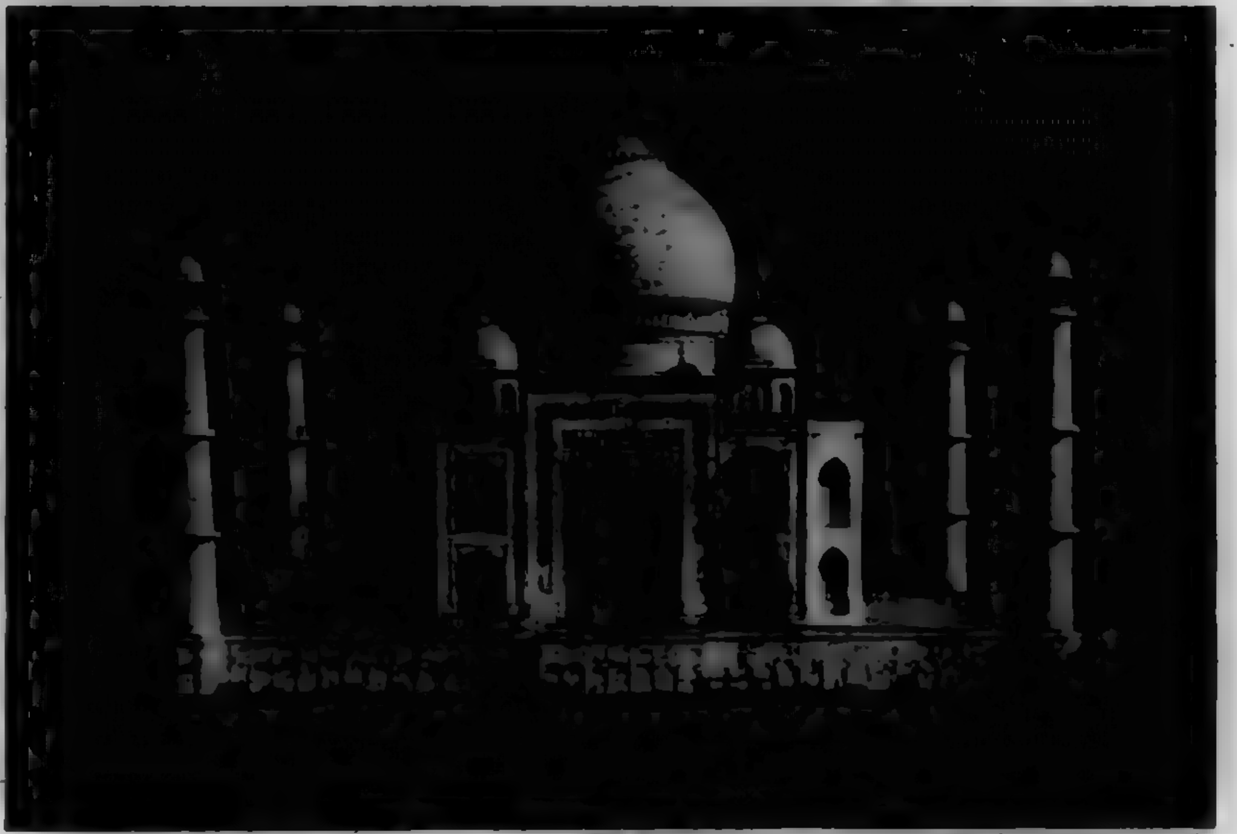

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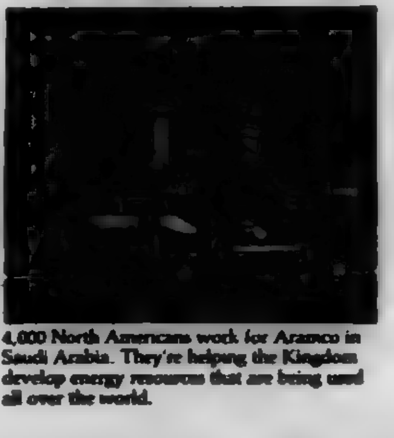

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Computer Link Helps Put Heat on Arsonists

By Bruce Hoard
CW Staff

NEW YORK — The Arson for Profit Information Center here is saving legwork for arson investigators by providing them with a direct link to the city's computers.

Computers lodged in the city's department of Finance, City Planning and Housing Preservation and Development are being accessed for information ranging from the names of landlords to the disposition of property taxes [CW, Nov. 12, 1979].

In addition, the center has put some of New York's elderly to work gathering valuable, noncomputerized information that can be entered into data banks for future reference.

The Arson for Profit Information Center is part of the Arson Strike Force, formed in 1978 to combat the 12,000 fires of suspicious origin that plague New York annually. Last year, the city reported 7,754 confirmed cases of arson.

Quick Information

The center is the brainchild of John Engel, first director of the Arson Strike Force.

"One need constantly expressed by law enforcement people was for a quicker way to gather information on arson-for-profit cases," he said.

In order to get at what Engel termed the "tremendous amount of information" contained in the city's computer system, he lobbied for, and received, a Law Enforcement Assistance Administration (LEAA) block grant.

Established on July 21, the center has already provided information from the city's IBM 370/145s to investigators involved in 150 cases, according to Thomas Martin, the center's director.

Investigators can gain information on such items as building code violations and building locations in two to three days to a half-day. Previously, it took weeks to gather the same information.

One prominent user of the new center is Cecil Maloney, supervising fire marshal within the NYC Fire Department. Maloney has accessed the center for information on 75 cases since July 21.

Unscrupulous landlords are frequently the villains in arson cases, he maintained, and information supplied by the center from city computers is helping to "put a brake" on their illegal activities.

The arson scenario starts when a money-hungry landlord purchases a building from an owner who can't afford it any longer, Maloney said. From there, the new owner milks the building for all he can get, while neglecting to maintain it.

"First of all, he gets welfare people in there because he can get welfare to send their money directly to him," Maloney said, "then he doesn't supply oil because he knows the city will in emergencies."

Once the city starts bailing out the landlord, the various transactions are recorded in the Finance Department computer. Added to information in other departmental computers, such as building code violations and property tax arrears, a detailed profile of the landlord is then developed.

If he decides to torch the building, it is easy for him to blame the blaze on his tenants, Maloney said. The fire marshal hopes that word of the center will spread and make unscrupulous landlords think twice before they pull such tricks.

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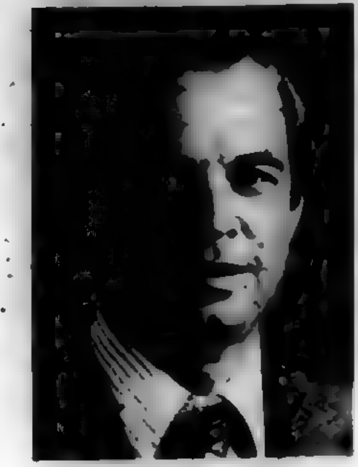


Thomas J. Mueller

Managers on the Move

THOMAS J. MUELLER has been appointed director of the computer center at California Polytechnic State University, San Luis Obispo. He will be responsible for providing computer experiences for the university's students and support for its administration. He joined the staff in 1977 and has been acting director since spring of this year.

Mueller formerly served as systems manager and data specialist for ITT-Federal Electric Corp. and range technical contractor at Vandenberg Air Force Base. He was also a consultant and lecturer in computer science and mathematics at Humboldt State University and chaired the Mathematics Department at the University of San Carlos in the Philippines.

Mueller holds degrees from Divine Word College, Ill., De-Paul University, Ill., and Oregon State University where he received a Ph.D. in computer science.

• • •

ARTHUR S. ACKERMAN has been appointed audit officer at the Fidelity Bank of Philadelphia, Pa. He joined the bank in 1979 as data processing supervisor in the audit group.

He has an M.B.A. in computer science from Temple University and a B.S. in acounting from the Philadelphia College of Textiles & Science.

• • •

JEFFREY N. CHASE has been appointed corporate vice-president of information management for Chesebrough-Pond's, Inc., Greenwich, Conn. He has been director of corporate planning and management information since 1978.

Chase joined Chesebrough-Pond's as director of corporate systems. His responsibilities now include data processing and long-range planning functions.

Prior to joining the firm in 1974, he was vice-president and general manager of Popular Services, Inc.'s management services division. He was also employed with Celanese Chemical as manager of operations and associated with the Service Bureau Corp.

Chase holds an M.A. degree in mathematics from New York University.

• • •

JAMES E. BURKE has been named director of information services at the Noxell Corp., headquartered in Baltimore. He will be responsible for data processing and systems as well as function as advisor to the international division. Before joining Noxell in 1974, Burke was employed with the city of Baltimore as manager of data processing, department of finance. He holds a B.E.S. degree in engineering science from John Hopkins University.

• • •

JOHN DORLAND has been named head of Commerce Union Bank's correspondent banking division in Nashville, Tenn. He was executive vice-president of data processing for the bank. He will now direct the Commerce Union in relations with approximately 150 banks in the southeast.

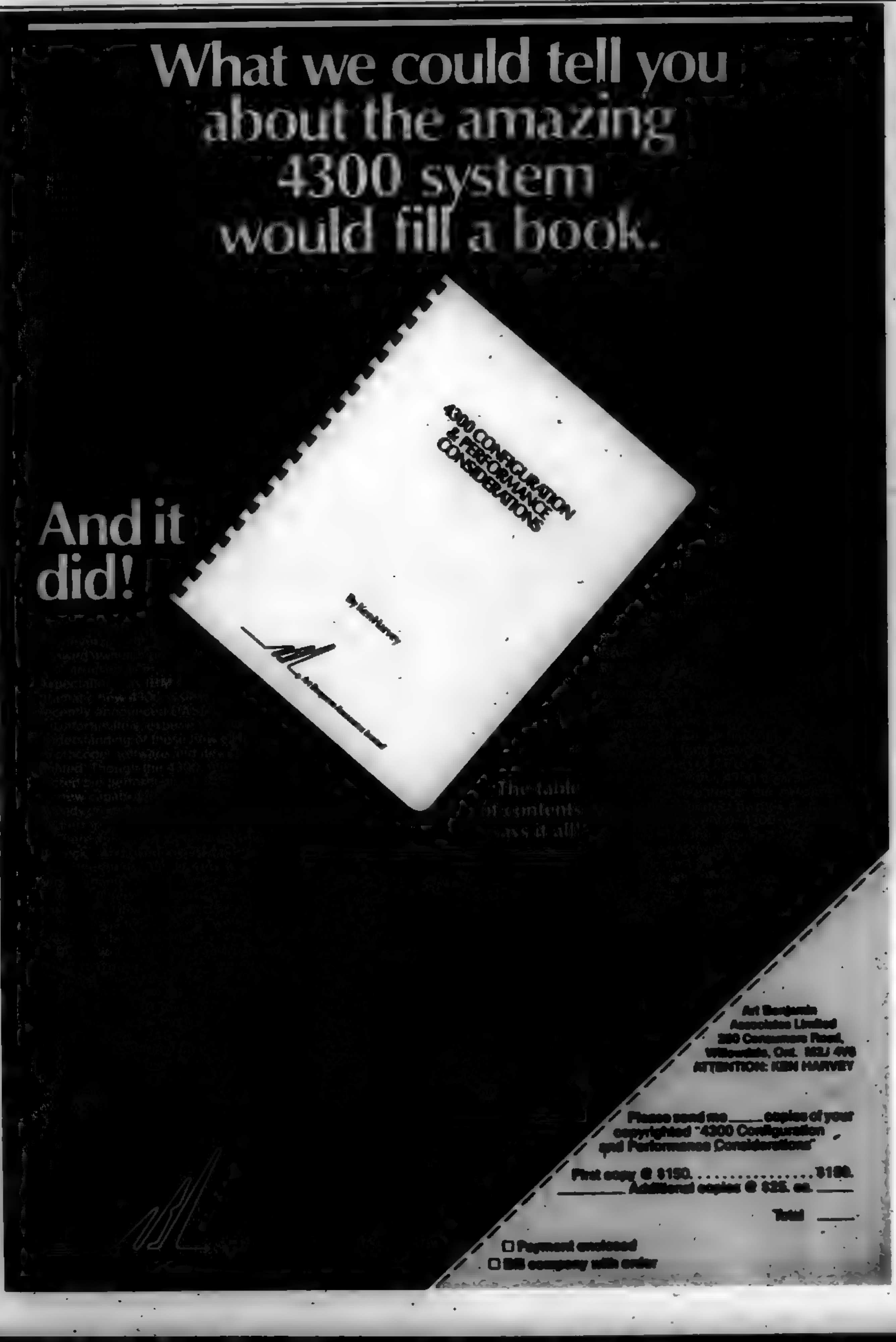
Dorland graduated from the U.S. Military Academy in 1963 and holds an M.S. degree from the University of Southern Mississippi and an M.B.A. degree from the University of Tennessee.

• • •

EUGENE MCKEOWN has been appointed director of technical resources for Columbia Pictures Industries, Inc. He will be responsible for software planning and support technology.

He was formerly manager of management information services at West Chemical Products.

He joined Columbia in 1979 as manager of technical resources and is pursuing a B.S. degree in computer sciences at New York University.



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Managers on the Move

FRITZ EIDSCHUN has been appointed system development manager, data processing division for Panasonic Systems, Inc. He will be responsible for the design, development and implementation of all data processing systems.

Eidschun joined Panasonic as a senior analyst in 1975 and most recently served as systems supervisor in the data processing division.

Prior to this he was employed by Fiat Motors where he developed an order entry and inventory system.

•••

DR. FERNANDO J. CORBATO has been appointed director of Computing and Telecommunication Resources in the Office of the Provost at the Massachusetts Institute of Technology. He will be responsible for oversight of computing services for education, research and administration.

He joined the MIT Computation Center at its inception, later serving as assistant director in charge of programming research, associate director and deputy director.

Corbato received a B.S. degree from the California Institute of Technology in 1950 and the Ph.D. from MIT in 1956, both in physics.

•••

DONALD E. BUSSELL has been promoted vice-president, information services, of Homequity, Inc. in Wilton, Conn. He joined the firm in 1978 as director of information services.

Prior to joining the consulting company, he was assistant vice-president at Maryland National Bank and has held managerial positions at Burroughs Corp. World Headquarters in Detroit and at Northwest Bank Corp. in Minneapolis.

Bussell graduated from St. Cloud State University, Minnesota.

•••

MARTIN NEWBORN has been named director of the Computing Center at Downstate Medical Center, State University of New York at Brooklyn.

Before coming to Downstate in 1967 Newborn was employed at the International Paper Co. and the Mutual Life Insurance Co. of New York.

Newborn holds a B.A. degree from Brooklyn College.

•••

JOHN FIORE has been named vice-president of management information services at Marshall's, Inc., the national retail chain headquartered in Woburn, Mass. Fiore will be responsible for data processing and business systems as well as cash register systems.

Prior to this position he was director of management information services. Fiore has been employed at Marshall's since 1971.

•••

JOSEPH P. LOMBARDO has been appointed vice-president, management information systems for Quality Care, Inc. He will be responsible for information systems support network in the U.S. and Canada.

He joined Quality Care in 1978 as director of data processing. Prior to that he held a similar post with the Haley Corp. of New York.

•••

CEDRIC SNYDER has been appointed manager of geophysical program development and LINDA ELLIOTT has been manager of special processing services at Western Geophysical, Houston.

Snyder will be responsible for the activities of the digital program development group of Western's software services. He received a B.S. degree in earth science from the University of Tulsa and has been managing the PRE/SEIS system for the last four years.

Elliott will coordinate the data base systems and a remote entry system for analysts in Western's processing centers. She received a B.S. degree in mathematics from the University of Oklahoma.

•••

DIANE MAHAN has been named associate director of information systems at Bentley College, Waltham, Mass. She will coordinate and facilitate computer usage by the college's faculty and student body.

Prior to the appointment, Mahan was manager of Academic User Services. A graduate of Clark University, she holds a B.A. in mathematics.

Fritz Eidschun

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Models Provide Crystal Ball For British Gas Supplier

By Robert T. Street
Special to CW

CROYDON, England — In Britain, utilities such as electricity, water and gas are nationalized — that is, they are financed and ultimately controlled by the British government. The image of go-ahead dynamism is not likely to be present in such industries, which by their very nature are not regarded as glamorous.

It is, therefore, surprising to find that one of the most dedicated and enthusiastic users of financial modeling techniques — computer-based, of course — turns out to be Britain's South Eastern gas region (Segas).

The UK has a dozen or so gas regions of which Segas is the one that serves southeast England. Having had their objectives and financial constraints determined by the state, their performance is closely monitored.

Electronic Crystal Ball

To achieve its objective, Segas needs, especially in these days of ultrainflation, the best crystal ball possible, despite the industry's record profits in 1979. This best possible crystal ball turns out to be a mixture of a financial modeling package, modified where necessary, together with computers with interactive facilities.

The computers used are an IBM 3032 and an Amdahl Corp. 470/V7. The IBM 3032 is used in a teleprocessing network for customer service and accounting, while the Amdahl 470/V7 is used for a similar teleprocessing network mainly limted to regional headquarters at Croydon. The Amdahl application is program and systems development, operational research and short and medium term planning.

The financial package used is Financial and Corporate planning System (FCS) originated and sold by EPS Consultants of London. The package is also marketed in the U.S. by EPS through its U.S. and Canadian offices and by certain computer firms.

FCS is applied in areas such as budgetary control, investment and acquisition appraisal, long-term and strategic planning, resource allocation, manpower planning, consolidation and currency conversion, risk analysis and econometric modeling.

Simple Basic

Perhaps the best way to describe the language it uses is as a simplified accountant's Basic. It is, however, simpler to use than Basic and considerably less extravagant in its use of statements.

Its main components are Logic and Data, and the system is row-oriented. Logic contains a sequence of numbered statements which indicate the terms to be used and their relationship, for example:

```
+20 'UNIT PRICE'
+25 'VOLUME'
+30 'REVENUE' = 'UNIT PRICE' *
'VOLUME'
```

Data allows informaton to be entered into terms defined under Logic, for example:

```
+20, U, 1.2, 1.2, 1.25, 1.3, 1.33
```

would allow unit data (hence the U) to be entered into item 20 — that is, unit price.

As might be expected, the DP user takes to this sort of language like a duck takes to the pond, and other staff members without any computer background do not seem to have great difficulty in learning and using the system. However, to cater to staff who may have problems in absorbing the language and, more importantly, to allow new and untrained personnel to use the system very quickly, Segas has further packaged the model so that, where necessary, prompts appear on CRT screens for use in interactive mode.

Primary Model

The overall Segas model is an Integrated Planning Model (IPM), which is sometimes called the Corporate Planning Model. This is heavily marketing-oriented. In fact, the marketing submodels are the driving force behind the system. These forecasts are necessary because marketing and selling by the 12 gas regions and by Segas is a complex business, and also a very large one. Not only does Segas sell natural gas from the North Sea and liquefied gas in much smaller quantities from places like Algeria and Norway, but it also sells complete central heating systems.

The result is that the marketing models alone have to contain forecasts for all these products, together with predictions for the considerable appliance replacement market.

Besides the marketing models which effectively determine overall strategy, the IPM is further influenced by three major factors:

- The philosophy used for the IPM and submodels used interactively.
- The facility with which managers can run their own submodels.
- The speed at which the system, both in part and as a whole, can be processed.

The philosophy used is that the submodel used in the IPM and the submodel for the individual group and management team involved shall be identical, but that every aid possible shall be given to the group to facilitate interactive working.

This interaction is also important since data generated in one submodel can be transferred to other models as required and finally to financial routines where the ultimate assessment of the Segas forecasts is made.

The speed of running of models varies from a few minutes for some satellite models to 15 minutes for the entire IPM. Since staffing costs are ever more significant these days compared with computer running costs, this facility is of major importance.

What is perhaps even more relevant is that Segas has only a small section, staffed by three or four experts, who are directly concerned with modeling and techniques associated with it. This means that the overheads associated with running the system are, especially when considered relative to its usefulness, extremely low.

In fact, this whole concept may be a pointer to the demise of extravagant data bases and heavy-overhead file manipulations which have in many ways characterized the mid- to late seventies.

Publisher Claims Computer Composed Novel

By Brad Schultz
CW Staff

NEW YORK — Vantage Press, Inc. has recently released a novel it claims was written by a computer system called Melopomene at the Jagiellonian University's Institute of Science and Technology in Krakow, Poland.

The novel, set in the South Pacific, is entitled *Bagabone, Hem 'I Die Now,* which the publishing house declares to be Pidgin English for the expression "Bagabone [a character in the novel] is dying."

But two experts in linguistics and artificial intelligence, who have seen the 136-page novel, maintain that, to the best of their knowledge, no computer can do what Vantage Press claims Melpomene has done.

Moreover, the Jagiellonian University has no Institute of Science and Technology, a spokesman observed in Krakow.

After examining a copy of *Bagabone, Hem 'I Die Now* Vantage Press had sent *Computerworld*, computer science professor James Meehan of the University of California at Irvine observed that the author — whether human or machine — chose to write certain sentences by choosing not to write alternative, semantically equivalent sentences.

That means the author had elaborate rules for decision-making that only an extremely complex set of algorithms could have encompassed — if a computer actually wrote the book as Vantage Press advertised, Meehan said.

Style in prose is difficult to map out logically, the artificial intelligence researcher indicated.

In practice, a human novelist may follow a rule only in certain contexts, which means there is another rule that defines which contexts are appropriate for the first rule.

Algorithms designed to enforce such a melange of rules would have software or firmware implementations requiring enormous amounts of memory in a computer, Robert de Beaugrande, a University of Florida linguistics professor who applies artificial intelligence to theories of reading and writing, pointed out.

Moreover, a computer would need to be taught the language of composition, just as a human would, he said, which in the case of Melpomene's alleged accomplishment would entail storing much of the English language, Pidgin English and Pidgin French, including extensive vocabularies, grammars and rules for idiomatic expressions.

According to Bruce R. Kent of the Vantage Press publicity department, "Melpomene was taught a phonemic alphabet of 44 phoenemes [sic], programmed with the works of D.H. Lawrence, James Joyce, several female writers and few books by the 'angry young men' of the 1960s, and, by using 27 verb patterns and 5,000 systemic semantic units of English, 200 systemic semantic units of Pidgin English and 200 units of French, wrote this book."

It is not clear how Melpomene gathered factual knowledge about life in the South Pacific.

After examining CW's copy of *Bagabone, Hem 'I Die Now,* de Beaugrande said he was sure Poland lacks a computer powerful enough to support such prodigious feats of processing — let alone the expertise to significantly contribute to the state-of-the-art in those areas of computer science and linguistics that bear on automated prose writing.

An Englishman named G.E. Hughes, not the University of Krakow, owns the copyright and is supposed to receive royalties on sale of the novel.

Vantage Press is normally paid by authors to publish their books, Kent said. He declined to state the sum Hughes paid.

To date, CW has been unable to reach Hughes for comment.

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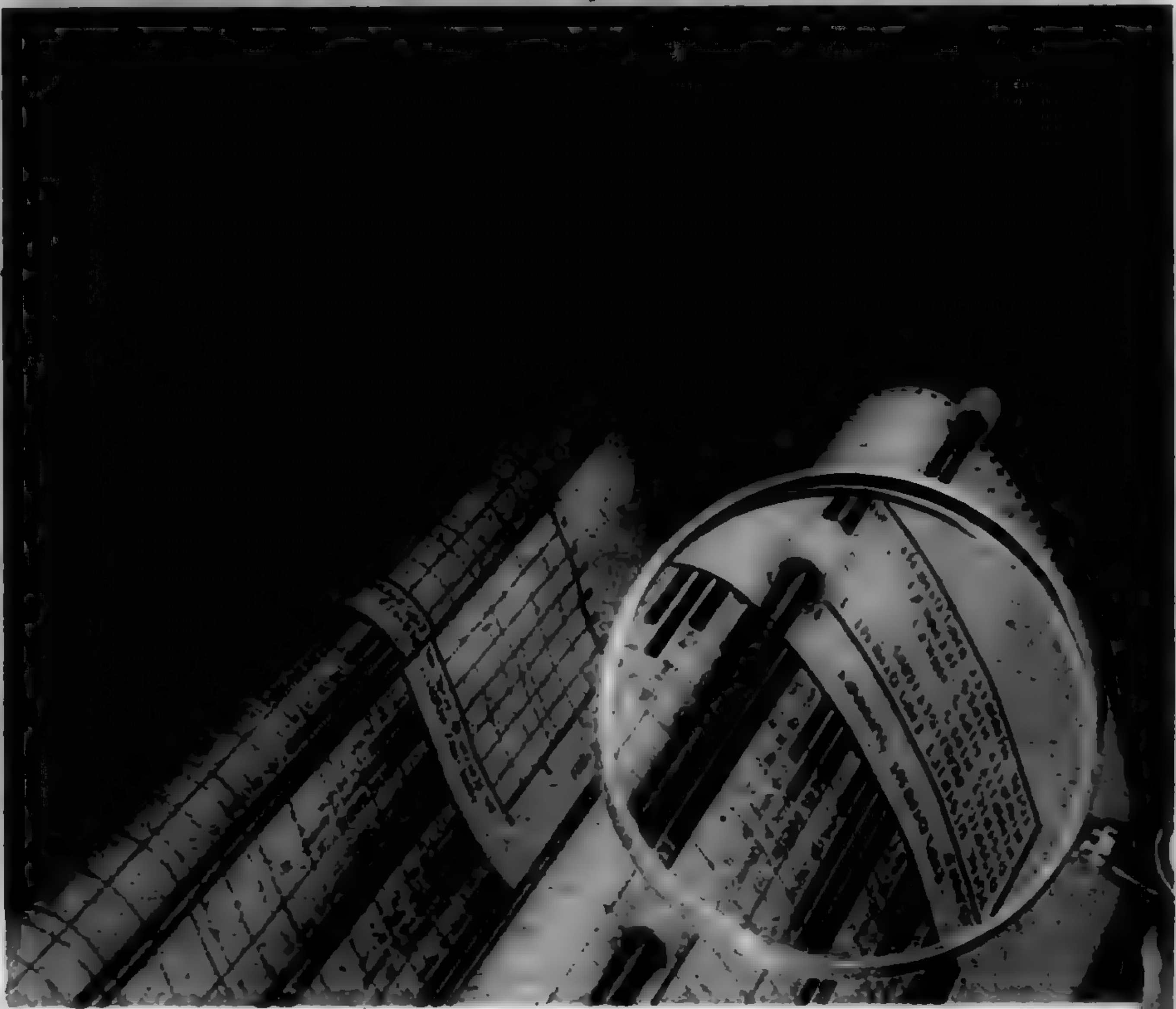

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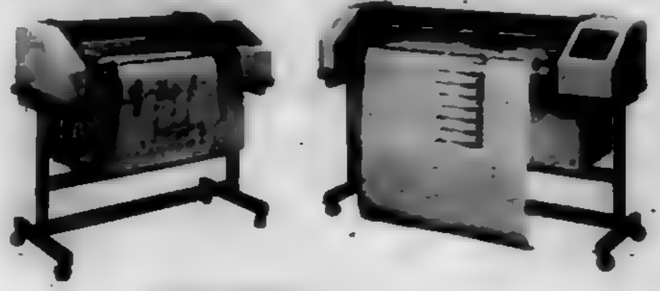

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Bank Offers Information Services, Triples Assets

ST. PAUL, Minn. – In a state that does not allow branch banking, the Midway National Bank here has enjoyed considerable growth and success in the last 12 years by providing 80 correspondent banks with DP services.

Midway National is the largest independent bank in Minnesota. Its 1979 assets totaled approximately $170 million, more than triple its assets of $50 million in 1968, when the bank initiated DP services for correspondents.

Midway National is now the fourth-largest bank in the city and the 13th largest in the state. But, according to Senior Vice-President Gerald A. Bilski, Midway National is a relatively small bank that has remained very competitive in its market.

"Two other banks in this area each have more than $1 million in assets," he said. "Although they are much larger than Midway National – controlling about 55% of deposits in the state – we are competitive and surpass them in many areas because we have made a concerted effort to use good marketing practices and the most sophisticated DP equipment and techniques available."

The bank's first computer, a Burroughs Corp. B300, was installed in 1968. It was replaced by dual B3500 systems, which were in turn replaced by two B4700s in 1977. The B4700s and a network of approximately 175 teller and CRT terminals used by correspondents and by the bank will be augmented by Burroughs equipment on order that includes a B3900 computer system, 20 MT 300 preprogrammed teller terminals, 75 CRT terminals and three RT 6000 automatic teller machines – two to be installed in Midway National's lobby and one to be installed by a correspondent bank.

Bilski said the response time of current terminals is less than three seconds. "The ability to get information quickly is an important aspect of our business," he said.

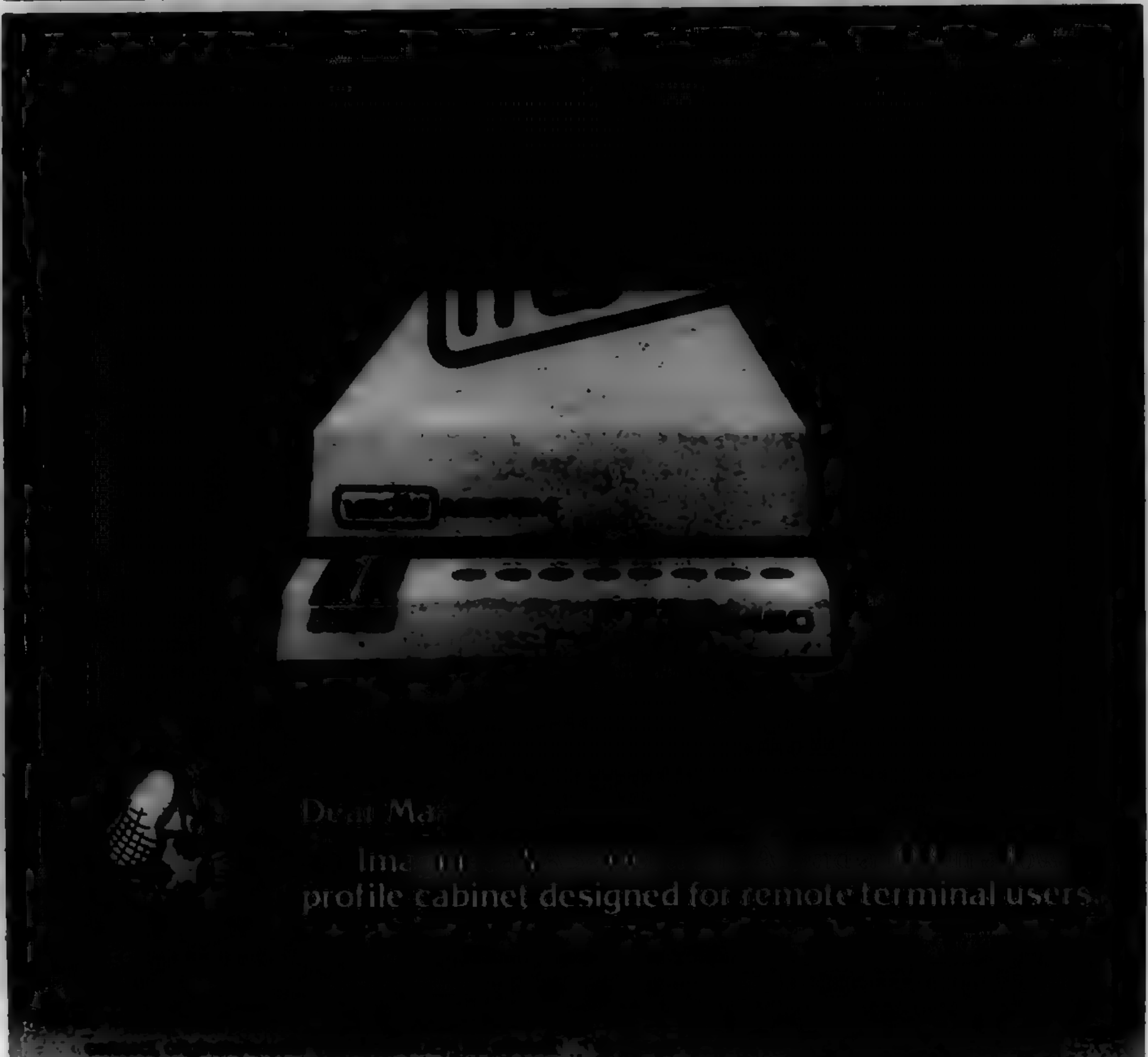
The bank provides its own 35,000 customers in the St. Paul area with full banking services. In addition, since there are no branches, the bank has made extensive use of a shared electronic funds transfer system that allows its customers to deposit and withdraw at 136 remote service units.

In serving correspondents, Midway National is really "a bank for bankers, because we supply services for many state-chartered banks that are not members of the Federal Reserve Bank," Bilski said. Midway National provides full DP services for 40 banks in Minnesota within 160 miles of the data center. Forty other banks in the state use Midway National's services only for check collection.

The B4700s process approximately 500,000 checks each day and service 166,000 checking accounts, 164,000 saving accounts, 52,000 installment loans and handle more than 23,000 overdraft checking accounts. The data center uses terminals; four Burroughs reader/sorters and a number of S1500 document processing systems with magnetic ink character recognition capabilities.

The data center receives deposit slips and checks from correspondents each evening by couriers. Items are processed on the reader/sorters. Files are updated, reports are generated and information is returned to correspondents by couriers the following morning.

The bank's B4700s are presently using a number of Burroughs program products. These include the Network Definition Language, the Item Processing System used for processing checks and the Total Information System (TIS) software package, which accesses and retrieves information regarding all customer, account and management information.



terminal users.

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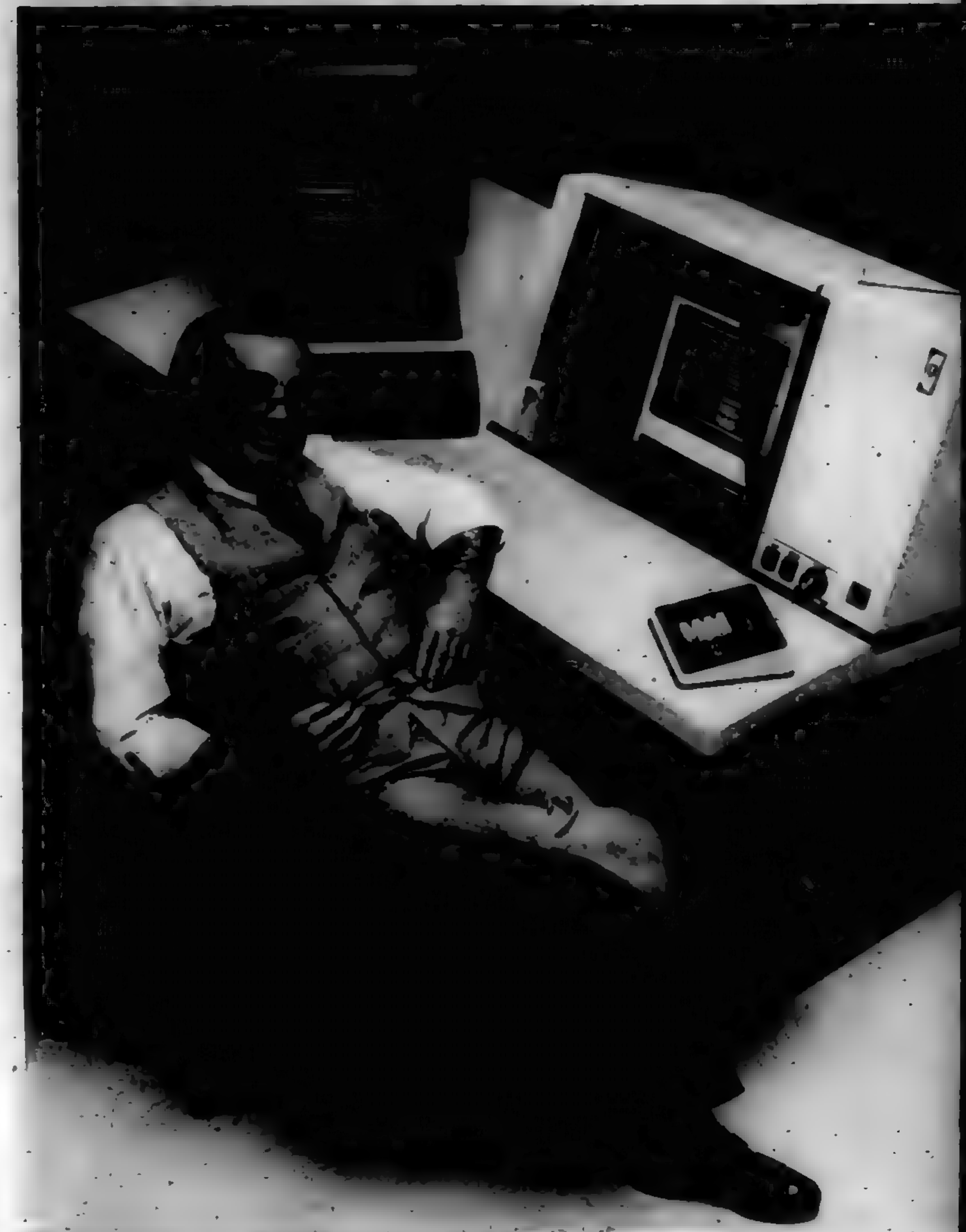

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NTIA Seeks to Curb Federal Home Loan Banks

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The Federal Home Loan Bank Board (FHLBB) should not compete with commercial DP service bureaus, the President's chief telecommunications adviser said recently.

The comment was inspired by a proposed board rule that would permit its 12 member banks to provide a wide variety of on-line data processing services to savings and loan associations and other thrift institutions offering NOW (negotiable order of withdrawal) accounts. The rule was proposed after Congress passed legislation earlier this year allowing widespread use of NOW drafts as an alternative to checks.

The Carter administration's position on the proposed rule was spelled out by the National Telecommunications and Information Administration (NTIA). In its recent statement to the Federal Home Loan Bank Board, NTIA argued that "the government should remain out of the marketplace unless essential services cannot be provided by the private sector.

"This has not been the case; in fact, a wide variety of private companies and financial institutions, already provide services to thrift institutions . . . The presence of expanded government enterprise in this area could needlessly chill private sector initiatives."

Another comment was filed by the Association of Data Processing Service Organizations, Inc. (Adapso), which won a court order in 1976 barring federal home loan banks from performing DP services for their member thrift institutions.

The FHLBB insists that the recently passed legislation nullifies this order. However, Adapso contended in its statement to the board that the legislation explicitly limits the kinds of DP services a home loan bank can perform — they must be related to "the settlement and processing of drafts and other instruments as authorized by the act."

According to the association, this limitation bars a home loan bank from doing account processing, packaging and mailing of customer statements and other chores encompassed by the proposed rule.

The Federal Home Loan Bank Board is expected to take final action on the proposed rule at the end of the month.

Calendar

Sept. 8-10, Minneapolis — National Seminar on Computer Security. Contact: Data Processing Security, Inc., 200 E. Loop 820, Fort Worth, Texas 76112.

Sept. 15-19, New York — Vsam for Assembler/Cobol Programmers. Contact: Software Education Corp., Grace Building, 1114 Avenue of the Americas, New York, N.Y. 10036.

Sept. 23-26, San Diego — Modern Digital Communications. Contact: Evolving Technology Seminars, Suite F, 3725 Talbot St., San Diego, Calif. 92106.

Sept. 29- Oct. 2, Los Angeles — Software Configuration Management, cosponsored by Software Enterprises Corp. and the American Society for Quality Control. Contact: Software Enterprises Corp., 2239 Townsgate Road, Westlake Village, Calif. 91361.

Sept. 29- Oct. 2, Paris — International Symposium on Telecommunications Network Planning, sponsored by the Secretariat for the Post-Office, Telecommunications and Teledistribution and the Societee des Electricaiens, des Electriciens et des Radioelectriciens. Contact: Secretariat General du Colloque International, 11, Rue Hamelin, 75783, Paris Cedex 16, France.

Sept. 30, New York — Computer Finance Methods. Contact: Davsell Ltd., 33 Gold St. L-2, New York, N.Y. 10038.

Correction

The seminar on "DP Disaster Recovery," Sept. 24-26, is sponsored by EDP Security, Inc., 400-2 Totten Pond Road, Waltham, Mass. 02154, not by EDP Recovery, Inc. as listed in *Computerworld's* Aug. 18 issue.

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The Systems Auditability and Control (SAC) project provided the first definitive report on the audit and control practices for information systems. The project, sponsored by The Institute of Internal Auditors, Inc., spanned a two-year period and resulted in three detailed reports: Control Practices, Audit Practices, and the Executive Summary.

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Listen to experts as they revisit the 28 tools and techniques of audit and other control practices highlighted in the reports. Find out about the subjects creating the most excitement in internal auditing and information systems management in 1980. A keynote address by **Shirley F. Prutch**, vice president, Martin Marietta Data Systems, leads off the conference. **Bert Lance**, former director of the Office of Management and Budget, Washington, D.C., will be the special luncheon speaker on Monday, October 13.

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From Risk Analysis to Smoke Detectors

GSA Finalizes Federal Security Regulations

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. – Security regulations for federal agency DP and telecommunications systems and facilities have been finalized by the General Services Administration (GSA).

Two years in development, the regulations announced last week cover everything from risk analysis, temperature and humidity controls and smoke detector placement to the proper use of trash bins in DP rooms.

The new section of the federal property management regulations pull together in one place existing practices and new directives and bring agency security procedures in line with Office of Management and Budget (OMB) policies, according to Charles Schwaner of GSA's Automated Data and Telecommunications Service.

Schwaner, who directed development of the security guidelines, said more than 200 federal agencies commented on the document as it went through various drafts.

Two-Year Development

The amount of research involved and the number of comments received, as well as the need for close coordination with OMB and interested Congressional committees, explain why it took two years to develop and implement the final regulations, he said. Their development was mandated in a 1978 OMB directive [CW, Aug. 7, 1978].

The new regulations establish a general governmentwide policy that "security must be a daily concern that is given priority attention."

All agencies must develop "an adequate security program" that ensures "under all conditions sensitive data is safeguarded from disclosure and [affords] protection from unauthorized modification and destruction." The program should provide for "operational reliability of the ADP and telecommunications systems and provide asset integrity for prevention of loss from natural hazards, fire, etc.," the regulations stipulate.

The head of each agency is made responsible for establishing his organization's security program and designating a security officer for each DP or telecommunications facility. The security arrangements must be independently audited at least every three years in facilities that process personal, proprietary or other sensitive data.

Other parts of the security regulations mandate are:

- A risk analysis for each facility before approval of design specifications for new computer installations or in the event of a "significant change to the physical facility or to the hardware or software." The analysis is to be renewed at least every three years.
- Reduction of sensitive facilities through consolidation of locations processing sensitive data.
- Contingency plans, reviewed and retested at periodic intervals, to provide alternative capabilities for maintaining priority applications. These plans should include "the appropriate response to fire, flood, civil disorder, natural disaster or bomb threat," and include development of backup arrangements and recovery procedures.

As an example of preparing for natural disasters, the regulations specify that "plastic sheets should be readily available to cover at least the CPU and those peripheral units susceptible to water damage." Fire prevention and fire fighting requirements are spelled out in existing government regulations, to which GSA refers in this document.

The new regulations also cover screening procedures for personnel, warning systems for humidity and temperature controls, locking of doors and vaults and supervision of facility maintenance personnel.

According to Schwaner, GSA will soon issue procurement regulations that compliment the security guidelines, specifying how agencies should acquire security equipment and services and outlining security considrations for procurement of new facilities and equipment.

The security regulations went into effect with their publication in the *Federal Register*, Aug. 11.

Canadian Show Set for November

TORONTO – The 1980 Canadian Computer Show will be held here Nov. 11-13 and is expected to attract 200 exhibitors and 15,000 attendees, according to the show's sponsor, the Canadian Information Processing Society (Cips).

Every major computer supplier operating in Canada will be represented, as well as medium and small-size vendors of systems, computer-related equipment, supplies and consulting services, the sponsor claimed.

Exhibitors will be charged $7 per square foot for booth space; standard-size booths of 10 feet by 12 feet cost $840. The registration fee is $3 in advance and $5 at the door, Cips said from 26 Butterick Road, Toronto, Ont. M8W3Z8 Canada.

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The system architecture of the CompuStar is based on four types of video display terminals, each of which can be connected into an auxiliary hard disk storage system. Up to 255 terminals can be connected into a single network! Each terminal called a Video Processing Unit contains its own microprocessor and 64K of dynamic RAM. The result? Lightning fast program execution! Even when all users are on-line performing different tasks! A special "multiplexor" in the CompuStar Disk Storage System ties all external users together to "share" the system's disk resources. So no single user ever need wait on another. An exciting concept with some awesome application possibilities!

CompuStar™ user stations can be configured in almost as many ways as you can imagine. The wide variety of terminals offered gives you the flexibility and versatility you've always wanted (but never had) in a multi-user system. The CompuStar Model 10 is a programmable, intelligent terminal with 64K of RAM. It's a real workhorse if your requirement is a data entry or inquiry/response application. And if your terminal needs are more sophisticated, select either the CompuStar Model 20, 30 or 40. Each can be used as either a stand-alone workstation or tied into a multi-user network. The Model 20 incorporates all of the features of the Model 10 with the addition of two, double-density mini-floppies built right in. And it boasts over 350,000 bytes of local, off-line user storage. The Model 30 also features a dual drive system but offers over 700,000 bytes of disk storage. And, the Model 40 boasts nearly 1½ million bytes of dual disk storage. But no matter which model you select, you'll enjoy unparalleled versatility in configuring your multi-user network.

Add as many terminals as you like - at prices starting at less than $2500. Now that's truly incredible!

No matter what your application, the CompuStar can handle it! Three disk storage options are available. A tabletop 10 megabyte 8" winchester-type drive complete with power supply and our special controller and multiplexor costs just $3995. Or, if your disk storage needs are more demanding, select either a 32 or 96 megabyte Control Data CMD drive with a 16 megabyte removable, top loading cartridge. Plus, there's no fuss in getting a CompuStar system up and running. Just plug in a Video Processing Unit and you're ready to go . . . with up to 254 more terminals in the network by simply connecting them together in a "daisy-chain" fashion. CompuStar's special parallel interface allows for system cable lengths of up to one mile . . . with data transfer rates of 1.5 million BPS!

Software costs are low, too. CompuStar's disk operating system is the industry standard CP/M* With an impressive array of application software already available and several communication packages offered, the CompuStar can tackle even your most difficult programming tasks.

Compare for yourself. Of all the microcomputer-based multi-user systems available today, we know of only one which offers exactly what you need and should expect. Exceptional value and upward growth capability. The CompuStar™. A true price and performance leader!

INTERTEC DATA SYSTEMS.

[illegible]

[illegible]

Mini, Terminals Tally Scores At Memphis Golf Tourney

MEMPHIS, Tenn. — Golfers were not the only ones taking part in the action on the green here last month at the Danny Thomas Memphis Golf Classic. Tucked off to the side, a Honeywell, Inc. minicomputer was used to keep tabs on the players' scores during the event that was held to benefit St. Jude's Children's Research Hospital.

Although Professional Golfer's Association (PGA) personnel did the official scoring, the Level 6 computer and 10 VIP 7700 terminals tabulated results and provided up-to-the-minute summaries for members of the press and golf fans. This was reportedly the first time a computer-based scoring system was used at the yearly fund-raiser.

By punching in the three-digit code assigned to the player, spectators or press members could learn how a particular golfer was doing in the competition. At the same time, the CRT terminals, which were scattered throughout the host Colonial Country Club, provided a listing of the top 15 golfers at any point in the tournament.

In addition to having access to the terminals, fans could pick up a computer printout each morning detailing the play of the previous day on a hole-by-hole basis. The Level 6 produced 2,000 of these reports each night, a Honeywell spokesman said.

The software for the scoring system was developed last year to prepare pairings for the competition. This year, in addition to the pairing, the system was utilized for the on-line scoring, the spokesman noted.

Honeywell field engineers in Memphis volunteered to lay the more than 3,000 feet of cable needed to hook up the CRT terminals at the country club.

In keeping with the purpose of the tournament, all of Honeywell's hardware, software and maintenance services were donated. In addition, the cable was provided by Federal Express Corp., a Honeywell client in Memphis.

Entry Error Becomes Dirge In Medicare Snafu

By Bruce Hoard
CW Staff

CHICAGO — Mary was living in the dead zone. The computer dead zone, that is.

Mary, who prefers that her last name remain withheld, moved into the murky depths of the computer dead zone after filing a claim with Medicare to help defray the costs of her chemotherapy treatments.

She expected to receive checks. Instead, the Social Security Administration's Medicare Unit sent her computer-generated death notices.

"Social Security Administration records indicate that the Medicare beneficiary named above is deceased," they read.

Somehow, word of the snafu finally reached Electronic Data Systems Federal, (EDSF) the company that processes Social Security and other federal claims for Illinois. Informed of the oversight, personnel there corrected their records and began sending Mary her checks.

As it turned out, the hospital billing her had mistakenly entered her discharge date in the date of death section of the claims form. The erroneous information was then entered in the EDSF computer system, which resolutely insisted Mary was dead until the faulty human input was eliminated.

Call for Papers

THE 1981 IEEE/PES TRANSMISSION AND DISTRIBUTION CONFERENCE AND EXPOSITION, Minneapolis Auditorium and Convention Hall, Sept. 20-25, 1981.

"The Impact of Change on Tomorrow's Transmission and Distribution Systems" is the conference theme, reflecting the need for evolutionary changes in components and system integration to meet external uncertainties and changes.

The conference scope includes all transmission and distribution functions related to power systems engineering, lines and accessories, substations, switchgear, transformers and surge protective devices, with added emphasis on system protection, relaying, control and communications.

Prospective authors should immediately request an author's kit from: IEEE Headquarters, PES Special Activities, 345 E. 47 St. New York, N.Y. 10017.

Further information is available from D.L. Nickel, Technical Program Chairman, Westinghouse Electric Corp., 700 Braddock Ave. E. Pittsburgh, Pa. 15112.

CONFERENCE ON LASERS AND ELECTRO-OPTICS (CLEO '81), Washington, D.C., June 10-12, 1981.

Papers are sought for the following topics, among others: optical-fiber communications free-space optical communications systems; optical-fiber sensors and applications; laser scanning, printing and display; and novel laser applications and systems.

Two copies of both a 35-word abstract and a 200- to 500-word summary should be sent by Jan. 12 to Cleo, c/o Optical Society of America, 1816 Jefferson Place N.W., Washington, D.C. 20036.

"COMPUTER INTELLIGENCE: THREE DECADES," a special issue of the *IEEE Transactions on Pattern Analysis and Machine Intelligence* to be published in November 1981.

This special issue will mark the 30th anniversary of the publication of A.M. Turing's paper on "Computing Machinery and Intelligence."

Papers on all aspects of machine and artificial intelligence are invited. They are due Jan. 1.

The papers should be sent to Dr. Judith M.S. Prewitt, Division of Computer Research and Technology, National Institute of Health, Bethesda, Md. 20205.

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Along With North Star Horizon

Cromemco Two Outperforms Costlier Systems

By Hillel Segal

Showing considerable strength in the real-life application problems, Cromemco, Inc.'s System Two performed well in benchmark testing sponsored by the Association of Computer Users (ACU).

Of the six systems tested so far in its price category, the System Two placed first in one application test and second in two others. Along with the North Star Horizon discussed in last week's column, it shared the distinction of outperforming all the systems in Series 2 — which covers computers priced between $15,000 and $25,000 — in the accounts receivable problem.

Like other systems in Series 1, the System Two costs less than $15,000. All tests were run using identical programs written in Basic, where that language was offered.

The Cromemco System Two's best showing was in the new product development problem — an application test which models the relationship between product production costs and profitability over a four-year time period. The System Two's time of 10 seconds leads the current less-than-$15,000 field and bettered the Series 2 average by 7.5 seconds.

The System Two's performance of the other two applications problems placed it second in the six-system field of Series 1 computers tested. It finished the scientific/engineering problem in 14:52.6 and the accounts/receivable problem in 2:48.0. The latter time was also better than that of any system tested in the more expensive Series 2.

Slower Math Functions

In analyzing the results of other benchmark tests on the Cromemco System Two, it is apparent that while diskette access time was on a level with the rest of the less-than-$15,000 group, the mathematics capabilities were hampered by slower performance of the exponentiation and square root functions.

In the CPU-intensive testing group, the System Two scored much better when those two functions were not needed than in the standard test which includes exponentiation and roots along with addition, multiplication and division.

The benchmark tests were performed on a System Two configuration which included 64K bytes of memory, two minidiskette drives, a CRT/keyboard, and a Centronics, Inc. Model 3703 dot-matrix printer. The double-sided 5-1/4 in. diskettes hold up to 173K bytes each.

A hard-disk system using 11M-byte Winchester-type drives is also available. Designated the Z-2H, this system was benchmark tested at the same time. Its results are included in the full report published by the ACU.

As was the case with the North Star system discussed in last week's column, the Cromemco System Two is based on a Z80 microprocessor and designed around the S-100 bus. Many hardware options usable on S-100 systems are available from other manufacturers.

A feature of the keyboard worth noting is the addition of 20 user-defined function keys. These may be labeled by the user and incorporated into the system operating procedure with suitable software. For the person who frequently performs a standard operation or calls a set of programs, this could speed up human interaction with the computer.

However, these are not quite like the soft keys incorporated on the Hewlett-Packard Co. 250, a system covered during the reports on Series 2 testing. HP's version places the soft keys on the CRT housing rather than the keyboard and assigns temporary functions to each key by placing a suitable label on the CRT display adjacent to the key.

Some User Dissatisfaction

Although the Cromemco function keys impressed the independent consulting firm which performed the benchmark tests, one customer contacted during the user survey commented: "While the function keys seemed to be a great asset at the begining, they're really not as useful as first thought."

Another user complained that the desk offered along with the system is "awkward and uncomfortable to work at for any length of time."

The System Two that was tested came with a disk operating system called Cdos and an enhanced version of Basic which included a number of structured programming features. The Basic takes up 32K bytes of the memory area, leaving the user with only 19K bytes. As a result, some of the math computations required in the benchmark programs were done using a short floating-point mode which reduced accuracy from 14 to six digits.

The structured programming statements, such as IF . . . THEN DO . . . ELSE . . . ENDDO, WHILE . . . ENDWHILE and REPEAT . . . UNTIL, supply many programming features now used in Pascal. In addition, the language is semi-compiled in a way that is transparent to the user. After each line is entered, the system checks for errors and establishes tables required by the statement. This initial line-by-line compilation simplifies debugging and speeds up the program run.

A 16K-byte version of Basic is also offered by Cromemco. Besides these, the firm can supply Fortran IV, a rational, structured Fortran called Ratfor, a multiuser Basic and a Z80 Macro Assembler. Recently, Cromemco announced the availability of RPG-II and Lisp as well. But the company calls its 32K-byte Basic "the most complete and efficient language," they offer.

Multitask System

A new operating system called Cromix is reportedly under development and will be announced soon. It is a multiuser, multitask system with a "C" language compiler as an added option.

A memory upgrade to 128K bytes total, leaving 64K bytes for the user, is a precondition of the Cromix system, but a speed advantage in I/O operations of a factor of two and the ability to keep track of multiple users with hierarchical directories are two significant system features. When used with the hard-disk option, it provides "supermini performance out of a micro," according to a spokesman.

All of the users contacted during the survey portion of the benchmark study were using a hard-disk equipped system in a business environment. Applications varied from accounting and inventory control to word processing, data base management and mailing list generation. Most of the customers were doing their own programming and their software experience ranged from moderate to extensive. Cromemco itself does not supply application packages.

Among the users interviewed for our user survey, the System Two was being used at least eight hours/day in most cases. Reliability was rated very high. Several users were repeat customers with Cromemco, and all of those contacted reported they were satisfied with their purchase.

Next week: The Texas Instruments, Inc. 771.

SCOREBOX

System: Cromemco System Two
Current Price: $9,275

SERIES 1 RESULTS

		TIME
C-1	Scientific/- Engineering Problem	14:52.6
C-3	Accounts Receivable	2:48.0

OTHER BENCHMARK RESULTS

	C-1	C-3
Pertec PCC 2000	28:48.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	To be covered in future issues	
Vector Graphic System B1		
Decstation 78		

This is the 15th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

ICCC/80 Conference in Atlanta To Stress Societal Themes

ATLANTA — More than 125 original papers will be presented at the Fifth International Conference on Computer Communication (ICCC/80), to be held here on Oct. 27-30, according to its sponsors.

Hosted by the International Council for Computer Communication, the conference acts as a major forum for exploring social, economic, political and technical aspects of computer communication networks around the globe.

The theme of the four-day event will be "Computer Communications: Increasing Benefits for Society."

Detailed advance programs and registration information are available from ICCC/80, P.O. Box 280, Basking Ridge, N.J. 07920.

Do Managers Condone Retaliation?

Turnaround Time
By Larry E. Long

Q I read with interest the comments regarding vendor retaliation [CW, June 23]. In your comments regarding retaliation by "Big Brother," you stated "these retaliations are prompted by circumstances discussed in the previous column and through the initiative of the individual marketing representatives and, in rare instances, their immediate managers. Vendor retaliation is accomplished without the knowledge and certainly without the support of higher level corporate officials."

I think you should be aware of the fact that in some places, vendor retaliation is conducted personally by the branch manager. This would give the indication that vendor retaliation is condoned in the highest offices of "Big Brother."

A It does happen, but remember, the branch manager is the local operative and is a far cry from being classified as a "higher level corporate official." In this highly competitive market of computers, I still contend that no high level corporate official would condone retaliatory actions of any kind.

Although you mentioned the guilty branch office in your letter, I am reluctant to print the name of the city for fear of retaliation.

Q We have a competent staff of information service managers, but we are highly inbred with all but one having been promoted up through the ranks. I am an assistant manager of corporate information services of a multinational company.

I'm not alone in my feelings that we are all too close to the problems of running information services. It has been suggested that we invite fresh input from someone outside the company, especially in the area of strategic planning. Also, we would want this individual to not only confirm or question our approaches in several other areas, but offer new insights.

Where would I look to find such a person?

A Consultants with the breadth of knowledge that you desire do not confine their work to particular geographic locale and often work on a global basis. Therefore, don't limit your search to the yellow pages.

Good consultants with the general knowledge and wide range of DP experiences required for strategic planning are few and far between and in great demand. Such individuals often author books and articles and are invited speakers at national conferences and professional seminars. Their exposure gives you and your colleagues an opportunity to evaluate the merit of what they have to say and their potential to contribute to your organization. If you are impressed with what a particular person writes or says, the publisher or conference/seminar organizers will usually give you the consultant's business telephone number.

I would like to laud your foresight in recognizing the benefits of having ongoing input from outside the company. Invite several consultants in for at least two days each and give them an overview of Information Services operation, then invite their general input. Select that individual who has the most to offer and place him on a retainer that would include no more than two or three on-site days per month. (Consultants providing general input and advice on strategic planning tend to lose their effectiveness with too much internal exposure.)

Q About two months ago, I read an article in *Computerworld*. The article stated that computer programmers and analysts will have to pass a test and receive a license before they are hired into the job market.

I am presently a student in data processing and am interested in working as a programmer.

Please let me know if licensing is now a requirement or will soon be.

A Licensing and certification have been hot issues in the computer community during the last decade. As the public and corporate executives recognize the enormous responsibilities that programmers have over money and the way people live, the issue of licensing will become more intense. But for now, there is no requirement for computer programmers to be licensed, nor do I expect such a requirement in the foreseeable future.

Have a question? Send it to Larry Long, Editorial Department, Computerworld *375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

Long is a professor at Lehigh University, a DP consultant and author.

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EDITORIAL

Involuntary Union

Management information systems (MIS) personnel may not appreciate being considered clerical workers, but that's how they are regarded by at least one labor union, the Brotherhood of Railway and Airline Clerks (Brac), which recently won approval from the National Mediation Board (NMB) on a scheme to absorb the nonmanagerial MIS staff of Western Airlines, Inc. — whether the staff likes it or not.

In September 1979, Brac asked the NMB, an independent federal agency, for permission to incorporate Western Airlines' programmers, systems analysts and other nonmanagerial MIS professionals, who at the time were unaffiliated with any union [CW, Aug. 18]. The NMB agreed last May to specify 11 MIS job categories as within Brac's purview, but while Brac's petition was reviewed, neither the government agency nor the union bothered to ask the workers in question about their opinions on the matter.

Those workers only learned of the NMB's ruling on Brac's petition in June and, together with the management of Western Airlines, have reacted with expressions of surprise, anger and resentment. Other airlines now face the prospect of a similar government-endorsed union takeover of computing personnel, some of them have warned.

The relationship between Brac and the Western Airlines workers is complicated by the fact that a portion of Brac's membership, disaffected with the union's leadership, recently voted to form a separate organization called the Air Transport Employees Association (Atea).

According to a Western Airlines systems analyst, Brac may have pushed for control over MIS personnel simply to delay the vote that finally established Atea, results of which became public on July 30. Atea is now the official labor representative for Western Airlines, however, so Brac's maneuver has apparently resulted in giving the new union 11 categories of the airline company's MIS staff, but still without that staff's approval.

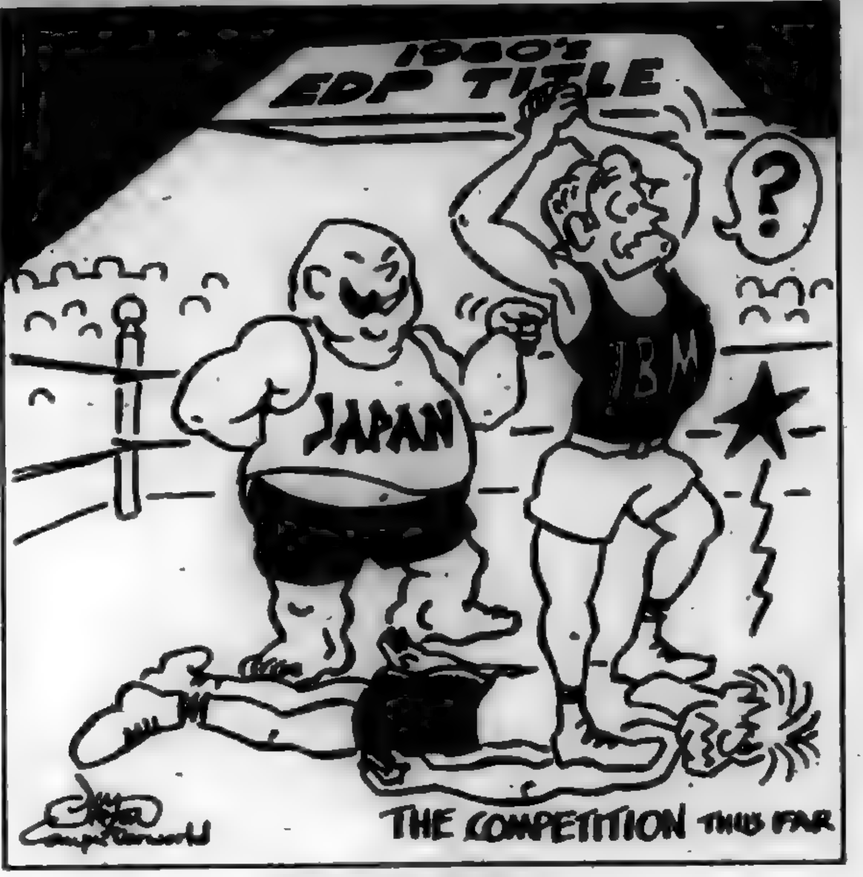
Why are MIS workers suddenly subject to unionization?

Some of the reasons lie with technological developments in software, which are steadily reducing the body of skills needed by most lower level programmers in most large MIS shops. [CW, July 28]. Workers with fewer skills and less value on the job market tend to have more need for a union to prevent employers from exploiting them.

Moreover, the technological developments come at a time when labor costs form the most irritating and inflation-sensitive component of many organizations' MIS budget.

Whatever the reasons for unionization of MIS personnel, no government agency should effectively sponsor a union's effort to seize control over MIS workers without their consent.

MIS workers who wish to form their own unions or voluntarily join an existing union have a right to do so, but government has no right to mandate that MIS job categories are clerical in nature to facilitate a clerical union's drive to subsume them.



'Begging Your Pardon . . .'

LETTERS

Unknown Quantity

The contention of Michael Broos [CW, Aug. 11] that the use of free-lance subcontractors is of benefit to clients reflects the cumulative ills of the "body-shop" philosophy. Using free-lancers is unquestionably of short-term benefit to the consulting firm itself; it can satisfy occasional high demand for its services without incurring either the costs of high overhead or the stigma of layoffs in slack periods. Any claim that this is of benefit to the client, however, is a transparent marketing ploy.

Certainly, Broos would not stake the success of a "fixed-price" commitment on the abilities of a free-lancer. Without maligning free-lancers, some of whom are highly skilled and responsible, the fact remains that they are unknown quantities, often retained solely on the basis of an adequate resume, and too frequently brought in by consulting contractors to "pad" the size of a project.

The real test of the quality of consulting personnel comes from "fixed-price" contracts; as long as the client agrees to "cost-plus" (or hourly) types of agreements, the incentive to the contractor is to make the job bigger and more time-consuming, and to bring in every free-lancer he can get his mitts on.

Albert C. Lowenstein

Austin, Texas

'Big Brother' Protection

Isn't it interesting that in the struggle between the Labor Department and the Prudential Co. of America over the computer tapes of employee data [CW, Aug. 11], that both parties assume that the records are the property of Prudential. Both assume that employees should be treated as children needing "Big Brother" protection.

Wouldn't it have been interesting and more in keeping with the growing realization that employees are adults to have asked each Prudential employee whether or not he wished the record to be given to the Labor department?

It is probably not too late for Prudential to make the inquiry, although the very publication of this letter may put the situation into the "not invented here" abyss.

Eric A. Weiss

Springfield, Pa.

Influencing IP Managers

Marcia Blumenthal did a fine job of summarizing a two-hour discussion in 12 column inches in "Application Tools Seen Underused" [CW, June 30]. She left the impression, however, that I thought vendors of application software tools should always go over information processing (IP) managers' heads to the users. This is not the case.

Mathematica Products Group's advertising and main sales thrust are, in fact, directed at IP managers. My main point was that top management should recognize that tools are now available to increase productivity by a factor of 5 to 10 in applications development and that *they* — top management — should ensure that users as well as IP managers employ these tools.

Many IP managers already recognize the value of these tools in bringing the power of the computer to the decision maker and *are* utilizing these nonprocedural/DBMS combinations. At the conference the question was: What is to be done when the IP department is not supporting their use?

In these cases, the software vendor probably does not have much direct influence on the IP manager — but top management does.

Roger L. Sisson
Director, Consulting Services
Mathematica Products Group
Princeton, N.J.

DATA PAST

Five Years Ago
Aug. 27, 1975

LEXINGTON, Ky. — The National Associations of State Information Systems (Nasis) reported a lack of "concrete action" for privacy and security plans. Nasis called the states' failures to establish auditing systems or install security programs for their computer information systems "potential catastrophes of great dimensions."

Eight Years Ago
Aug. 30, 1972

MIAMI — The Republicans joined the Democrats in rejecting the idea of a National Data Bank at last week's convention. However, in the Democratic platform, access to all data files maintained on individuals was proposed, while the Republican platform contained no mention of the right to inspect and correct files.

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HUMAN CONNECTION/Jack Stone

When Is a System Ready to Be Released?

You'd think that, after the passage of so many years, all of us would have learned by now that the old saw, "It's better to give the users something than nothing at all," is no longer operative.

Yet, just a short time ago, the DP manager of a major installation told me privately how he was forced into the premature release of an internally developed system because "the schedule just had to be met."

Obviously, there are certain sets of organizational and operational circumstances that in the heat of the battle, may help managers rationalize such decisions in their own minds. These circumstances usually relate to the commitment of substantial resources that are involved with the operation of the new system, such as terminal equipment standing ready on the floor or newly trained people arriving on the job — and a senior executive closely monitoring the situation to make sure these resources are being fully utilized.

Clearly, DPers in this situation solve certain political, short-range (or even personal employment) problems by releasing a system "on schedule," even though it's not fully debugged or documented or otherwise "undone." And since, these days, just about everybody knows that no software system is ever perfrect, these DPers can claim that the "complexity of the system is so great, that we will be straightening out bugs for months to come."

User Backlash

I wonder sometimes if DP managers really appreciate the full extent of user backlash that builds when a newly developed system doesn't perform to user expectation. One level of the problem is a major deviation from system specification where users complain that their needs are not being met. This condition is bad enough but, to soften the blow somewhat, it can be attributed to a failure of human communications, which has the aura of mutual responsibility about it.

Another level, which has more serious implications for the DPer, is the case where users say, "The system just doesn't run right." This expression translates into a system which, by user standards, is difficult — or impossible — to operate or use or understand.

Here the users reject any notion of mutual problems, communications or any other. They feel the responsibility for system operability, usability and comprehensibility clearly belongs to the DP organization. They believe these are matters involving state-of-the-art techniques and methodologies which simply cannot be spelled out in a system specification and must be taken for granted. What's more, even a perceived failure in any of these areas reflects in the minds of users as a failure in technical performance by the DP organization.

This last point cannot be overemphasized. If there is one attribute about us DPers that impresses the outside world, it is our reputation for technical competence — and deservedly so. We can make our machines turn cartwheels and spit roofing nails, and we're doggone proud of it. But for the life of me, I can't understand why some DP managers put this supremely important quality — their technical reputation — on the line by releasing a system that, in their hearts, they know is not ready for the user.

One can argue that certain short-term exigencies must supercode long-term image considerations, and that if the product is due out, then out it must go, ready or not. Well, there are trade-offs, I guess, but I have difficulty supporting the position of releasing a not-quite-done product.

System Documentation

User documentation is a classic example of what I'm referring to — a problem area that will be with this industry until every system is screen-oriented, menu-driven, self-directing and self-teaching.

All but a few DP managers have cut corners on this documentation and turned out what they knew to be an inferior product. Of course, their argument is this one: "Now look. I've got a trade-off situation. Should my limited staff of programmers be spending their time writing code or writing manuals? You know the answer."

Sure, we know the answer. The documentation gets short shrift, which helps all those users — who have a history of judging the quality of a system from its documentation — reach a quick and negative conclusion about the level of technical excellence within the DP organization.

SOCIOLOGY OF COMPUTING/Robert L. Glass

Life Can Get Complicated In Software Tools Business

When Sean Hammer got into the software tools business, he had no idea that life would get so complicated. But it did ... and those complications eventually led to a project which failed.

What are software tools, I hear some of you out there asking? Well, a software tool is a computer program used by a programmer to help him build other programs. Like a compiler or a loader, or perhaps a text editor. A software tool builder, in short, is kind of a programmer's programmer.

When Sean emerged, symbolically fuzzy-cheeked (and actually heavily bearded) from the ivy-clad halls of P.Q. Aresti U., he had been assigned, like any other new computer science graduate, to the world of application programming. It was only after a couple of years of application apprenticeship that he moved in to the support tools group of his employer, Copy Cat Xeroexgraphics.

Most of the tools Copy Cat programmers used came from its hardware vendors. If it used a Hobby Horse H-8000 micro in one of its sophisticated copiers, then it would use the compiler and assemblers and linkers that Hobby Horse had on the shelf, ready to deliver. Sometime those tools had been built by the vendor or by a software house under subcontract to him, and sometimes they came from the Hobby Horse user's group. No matter — either way, Copy Cat used vendor-supplied software whenever it could.

Some of the other tools Copy Cat used were purchased on the open software market from companies which had built them to make a profit. Again, whenever Copy Cat could, it begged, borrowed, bought or stole tools-type software. It was only as a last resort that it developed tools in-house.

That meant that Copy Cat's software tools group was pretty small. In fact, when Sean joined it, it constituted a 50% increase in the size of the group. (No, it is not required that readers of this story figure out how many tool builders Copy Cat has!)

Software Reliability

The problem that prompted the dramatic increase in the size of Copy Cat's tools group was software reliability. It was essential to Copy Cat that software never be the cause of failure for a Copy Cat copier in the field. Sean was brought aboard to build some tools to promote the reliability of the corporate application software.

A quick survey of the reliability literature told Sean that he had a formidable task. Sure, there were lots of claims that tool A coud increase company B's software reliability by C percent. But by applying a little educated intuition and common sense, Sean knew that most of those claims were exaggerated. Like other areas of the computing world, there were a lot more paper reliability tigers than there were real ones.

Still, Sean was able to identify a few particularly promising candidates for Copy Cat software reliability tool development. None of them were panaceas, but each could carve out its share of potentially more reliable software. For his first tool, Sean chose to build a Test Coverage Analyzer.

(Continued on Page 40)

THE TAYLOR REPORT/Alan Taylor

'Mystery' Arbitrator To Rule on NCR Documents

"Kevin Mahan, where are you?" is the latest question in the struggle between NCR Corp. and one of its disgruntled users, Perl-Mack of Denver. Closely behind comes the question, "And for whom do you work?"

The reason for the question is that neither the Cerritos, Calif., telephone book or lawyer's reference guides list him. Nor do they list the company for which he is said to be Western regional manager, Computer Services, Inc. And obviously, if he or his company, which apparently could be a software supplier, uses contract terms semiliar to those whose validity he is to arbitrate, then the question of unfairness will certainly arise.

It is quite possible, of course, that this is simply a matter of American Arbitration Association's records not being up-to-date, of unlisted phone numbers and other items. Still, it does introduce another twist into arbitration proceedings that were already developing into a battle between the two sides even before the arbitrator was chosen.

Mahan was never on any of the American Arbitration Association lists that were circulated to NCR or Perl-Mack. The first list — all Colorado attorneys — was turned down flatly by NCR, claiming that they were not knowledgeable in data processing. To support this, NCR cited the contract clause that said the arbitrator should be chosen from a panel of people knowledgeable in business information and DP systems.

The American Arbitration Association granted this and circulated a very different list: Only one lawyer, no one from Colorado at all, and people from time-sharing companies, university engineering departments, personnel agencies and so on.

The lawyer did not specialize in computers and made no claim to knowledge in the area — merely that he had litigated regarding computers in some way.

Perl-Mack struck back, using the NCR defense to its claim to buttress its statement that no one on the second list was acceptable, and that someone able to handle purely legal issues was clearly necessary because the question of consequential damage rights was in dispute. Therefore, Perl-Mack told the American Arbitration Association, a wider search was necessary to ensure fairness.

The American Arbitration Association agreed, but also stopped giving any choices to the parties. Mahan was nominated out of the blue, and a Sept. 22 date was set for a pretrial conference.

It seems that the pretrial conference can bring into focus for computer users the fact about the subpoena power over documents, which Paul Hoffman recently urged here as being an advantage when users fight with vendors.

The Perl-Mack dispute is based upon NCR's alleged failure to in-

(Continued on Page 34)

'Mystery' Arbitrator to Rule in NCR Case

stall a property management system as it had promised to do for a listed price of $5,000 back in 1977. At issue is whether the property management system was just one part of a data base system including accounting data, or whether the two were thought to be independent systems, so that the terminal in the property management area would simply not be used, but stand quiet, while the payroll or other accounting functions were run.

Best Documentation

Some of the best documentation that can exist to determine whether a data base system was contemplated will probably be outside Colorado, in Dayton, Ohio, at NCR's headquarters. This is because the Universal Agreement explicitly gives NCR Corp. the right to reject user-signed agreements originally prepared by NCR branches if the hardware/software combination appears impractical.

Presumably, headquarters got some documents that described the proposed system. Other documents that can shed light on these situations are apparently in the hands of two Denver NCR subcontractors — the original one, Dynamic Systems Corp., and the second, Omega Information Systems, Inc. — or perhaps with the original programmer, Dale Denny.

Other documents the user may request could be ones dealing with NCR's intentions and its assessment of the meaning of the Universal Agreement itself. These might include documents indicating whether definitions were knowingly left out of the agreement, documents by Ben Olive or others explaining the agreement, and even perhaps analyses of Olive's letters to *Computerworld* and of these columns on the NCR paper.

Court Fights Possible

Mahan's background is particularly interesting here because of the one-sidedness of his powers. On the one hand, if he rules for NCR and refuses to subpoena the documents, then that is final. It is a part of the arbitration process, and the user tried and lost.

But if he rules for the user, that can be something else entirely. NCR can fight the whole issue over again in the Ohio courts, if it chooses to do so. All sorts of legal questions can arise, such as whether arbitration is litigation, whether the documents are identified with specificity (often nearly impossible), whether they are relevant and so on. Not to mention the out-of-state reach of the arbitrator's subpoena, and any technical faults that can be claimed.

Getting Papers

Even within Colorado, getting necessary papers may become court cases. Dynamic Systems Corp., Dale Denny and Omega Information Systems, Inc. may, or may not, force court challenges if Peri-Mack wants to see their papers — as is quite likely — to find out both what the system contemplated was and whether NCR really has used its best efforts to install it.

Evidentiary Problem

The evidentiary problem of what the intended system was, and particularly whether the property management system was to be on-line with the accounting system, is clearly crucial to the fight about consequential damages. NCR is claiming that the Universal Agreement holds, but under Colorado law such limitation of liability clauses are replaced by standard UCC liabilities where "circumstances cause an exclusive or limited remedy to fail of its essential purpose," or where exclusion is unconscionable.

If, in fact, what is happening is that NCR is asking payment while only delivering half a contracted for data base capability — like giving only half an encyclopedia — then it is very different from delivering five out of six separate systems. But that, and much more, is now for the arbitrator.

So, Mr. Mahan, you have plenty to do on this matter, wherever you are. The fairness of arbitration looks as though it may be tested through your actions. May it not be found wanting.

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LETTERS

PL/I Alternative

As a computer science student at the University of Houston, I have studied Cobol, Fortran and PL/I. I was both interested in and amused by Howard Fosdick's In Depth article comparing Cobol and PL/I [CW, Aug. 11].

I was interested because I realize that when I get into the "real world" I will probably have to use Cobol, even though I consider it to be absolutely archaic; amused because Fosdick was so timid in his endorsement of PL/I.

While it may not be The Definitive Computer Language, from my (admittedly limited) point of view I see PL/I as infinitely better than Cobol. Programs in PL/I are concise, structured and efficient, whereas in Cobol they become rambling and sloppy — seeming to go in all directions.

At any rate, I want to thank Fosdick and *Computerworld* for giving Cobol advocates an alternative to consider.

Nancy J. Mackin
Houston, Texas

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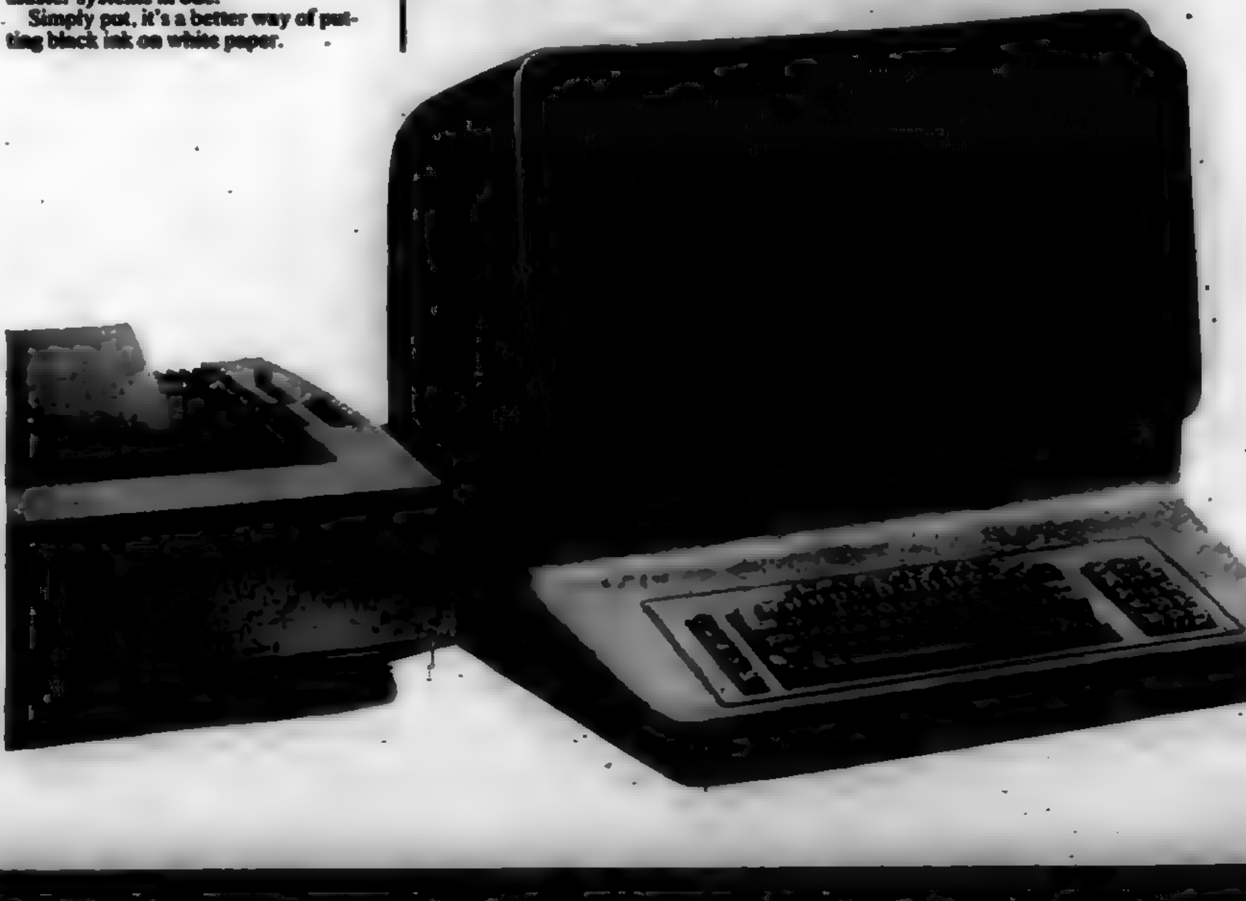

READER COMMENTARY/Arthur Pfeiffer

Symbolic vs. IBM Issues Still Unanswered

On July 1, 1980, the U.S. Court of Appeals for the Ninth Circuit handed down an 11-page opinion in the software antitrust suit entitled Symbolic Control, Inc. vs. IBM reversing the trial court's dismissal. The article, "Symbolic vs. IBM Continues Software Pricing Debate" [CW, July 21] is incomplete and at times inaccurate.

1. Contrary to *Computerworld*'s statement that "for all real purposes [Symbolic] went out of business in 1971" and "Symbolic never won a customer," from April 1972 to April 1974, Nasa's Ames Research Facility leased Symbolic's APT/70 for $1,000 per month. Although the Nasa lease is not mentioned in the opinion, I told CW about it in a telephone interview.

In addition, from March 26 through November 1971, ROHR Corp., on a trial basis, leased APT/70 from Symbolic for computer time in lieu of money.

2. I told CW that in September 1974 Symbolic filed its pretrial statement with the court specifying trebled damages of $189 million through 1978. For CW to report that "Symbolic, in its trial papers, said damages included $1.2 million," and then, "Those damages were subsequently estimated through 1978 to be $63 million, said Arthur Pfeiffer," creates the false impression that Symbolic's actual damage claim is $1.2 million and any larger sum is only the expression of my current subjective wishes.

3. CW reported this case as though it dealt only with acts committed by IBM "after IBM unbundled software in 1969." However, Symbolic charges that IBM failed to price software and related services (including APT) both before and after IBM's June 1969 unbundling announcement.

The Ninth Circuit understood this and held that Symbolic (incorporated in March 1969) could have been injured by the continuing "adverse competitive effects"' of assumed violations committed by IBM prior to Symbolic's business existence. Accordingly, IBM is legally accountable for earlier violations which caused later injury regardless of IBM's trial defense that "'plaintiff knew,' before entering business, about this or that aspect of IBM's marketing." IBM's "public domain" defense is contradicted by its own documents, some of which Symbolic did not discover until after trial, but which are now in the court record. They show that as late as 1972: a) IBM gave its customers NC360 Systems Manuals labelled "Restricted Distribution"; (b) IBM selected users to test new NC360 releases prior to general distribution who signed IBM nondisclosure agreements declaring the NC360 material to be IBM "confidential and proprietary"; and (c) in February 1972, IBM released for a $500-per-month price (12-month limit) its "free" 1971 NC360 model modified to run under the CMS time-shared operating system without general interactive APT processing.

The Ninth Circuit recognized the critical effect of price or, more accurately, no price, on a buyer's decision to choose a free product over a priced one. Even assuming that IBM's free NC360 software was superior in quality to Symbolic's priced APT/70 software (a factual dispute to be resolved in future trial proceedings), the Ninth Circuit concluded: "We hold that, on this record, IBM has not demonstrated that Symbolic's losses were unrelated to conduct of IBM."

For years, to the best of my knowledge, this case has been the only private software antitrust suit against IBM. Although filed on Nov. 16, 1971, this case has never been mentioned by IBM in its annual reports to shareholders.

A judgment in this case finding IBM guilty of monopolizing and foreclosing competition in separate software markets via predatory pricing and an illegal tie-in between hardware and software could greatly affect the entire computer industry.

Pfeiffer is president of Symbolic Control, Inc. of San Francisco, Calif.

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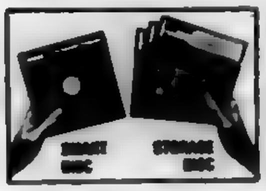

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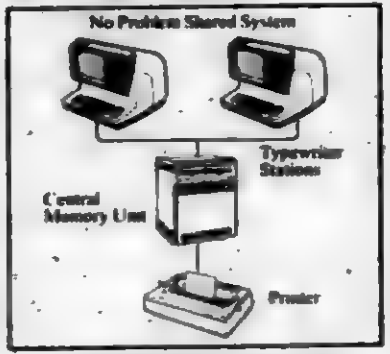

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READER COMMENTARY/Constance Pollack

'Big-Name' Firms Guilty of Unethical Acts, Too

I have been a computer consultant for many years working closely with a large number of software houses and user firms in the U.S. and abroad, and I have been exposed more times than I care to think about to practices which range from shady to downright unethical to entirely dishonest. And lest one thinks that such dealings are carried out by small struggling firms who might cry the proverbial, "I've got to compete against the big-name firms," let me inform you (if you don't already know) that many of the guilty parties are from those big-name companies.

Before you read any further — if you are one of those people who say that's the way of business and that I am naive to think that it can be changed — stop reading this article! Maybe you are right. Maybe kickbacks, unqualified workers at exorbitant rates, inept or nonexistent system design, poor treatment of the user's level of knowledge and so on are doomed to be with us forever.

Maybe, but I don't think they have to be to the degree to which one confronts them today. Are they everywhere? No! Would business fall apart if the practices ceased? No! Who suffers as a result of these practices? Everyone!

How does it all happen? Let's start at the beginning — initial contact for a project between consulting firm or individual and the user representatives. In many cases this has been facilitated by recommendations of business associates who have had good experiences with the particular consultants or by hardware vendors who have had past success with certain firms. This is probably the best first move one can make.

If no recommendations have been made, then one asks around and usually comes up with names of some of the larger firms. This is a feasible method if one remembers at all times that larger does not necessarily equate with better.

Then we have the "clinker." This is the case where extra inducements are proffered by the consulting firms' salespeople working on the account. I have personally been aware of money, trips, sexual presents and employment of the user's children by the winning consulting firm offered as little extras to secure contracts. And I'm sure if I were to ask other people involved in the computer industry to augment my list, it would become quite long. I am saying this not to show diversity in gifts but the extent to which this practice is used.

Now that we have exposed the consulting firms, let us look at the other side — the user. Are all users looking to find the best people to perform the assignment? Some certainly are. But there are a large number of user personnel who treat this as a secondary concern. The main concern is, "What's in it for me financially?" I do not have enough finger and toes to count the firms within the public and private sectors of industry representing among others, government, health care, banking and public utilities that engage in such practices.

You might ask, "Did the users' type of behavior cause the consulting firm to act in an unethical manner or did the consulting firms' unethical inducements sway the user to depart from good business sense?" My answer is all of the above. But at this point it does not matter anymore. The goal is to correct the situation and not to pass blame.

More Pitfalls

Let us go on to the next step. Assume that a fair selection of potential consultants or consulting firms has been made. Next an RFP and/or meetings to glean the desired information about the hardware and software requirements of the user should follow so the consultants can make a realistic and reasonable bid of cost and time to complete the project. In many cases, to the user's detriment but prompted by the user itself, there is its insistence on completely unrealistic timeframes.

The consultant can take one of two approaches. He can argue that there is no way to complete the job within the terms the user wants; and if he cannot convince the user of this, he will walk away from the contract. The other approach, unfortunately, is to lie.

On a fixed-price contract, lying results in some hazards. But a "shrewd" company can get around even this. And on a T&M contract, the consulting firm knows that it has no problems. Once it begins work, even if there are delays beyond a reasonable norm, the user knows it will be more costly and time-consuming to change company in mid-track.

The outcome is to reward dishonesty and often to produce an inferior product. The latter should be expected since the type of firm engaging in such practices is usually not above using shoddy methods.

So once again I say that unethical behavior is not confined to one side or the other. It results from both sides trying to get the best of the deal, and ultimately all sides lose.

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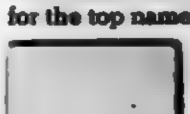

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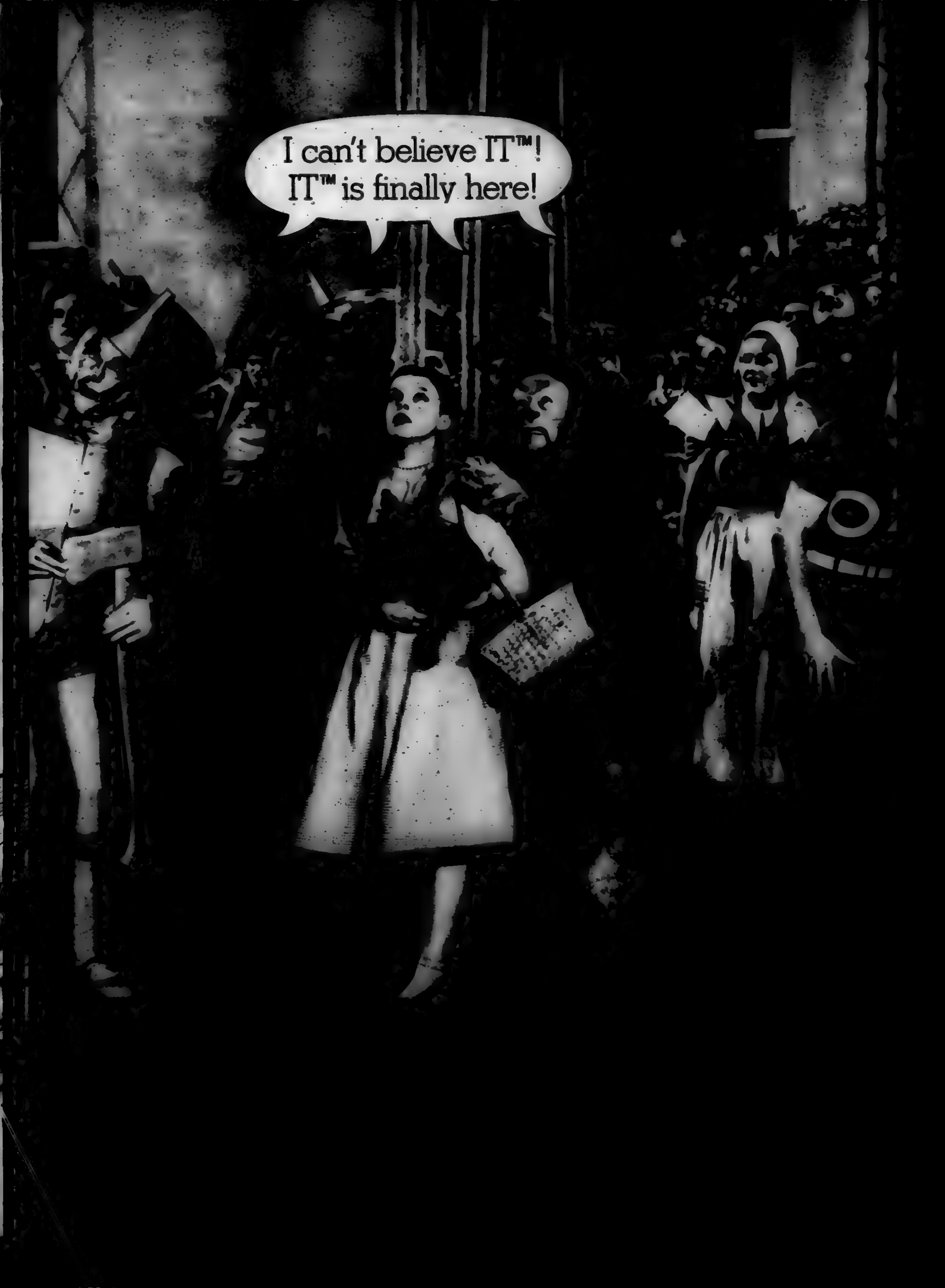
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Each page has the following independent page characteristics: protect, program mode and cursor retention. And when you change from one page to another, these characteristics are stored in memory to be recalled at another time, letter perfect.

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With IT, specific areas are designated as protected fields. They can't be typed over unless you remove the terminal from the protected mode. Even your remote computer can't overwrite the protected fields until IT is removed from the protected mode. Back-

The Intermediate Term

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ground (protected data) can be displayed at a lower intensity, while foreground is displayed at normal intensity and may be modified. You can even tab the cursor forward and backward to the start of each unprotected field.

And when you depress IT's special function key, a special function sequence is transmitted. The remote computer is then in full control. And all control functions that can be initiated from the keyboard can also be executed from the remote computer.

Also on IT, full or half duplex operation is switch or keyboard selectable. You can also choose from conversation or block transmission, which can be initiated by you or the computer. In block mode, a line, a message or a page can be transmitted in its entirety.

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IT's editing capabilities allow you to clear the screen, or use the cursor for a character change. In addition, IT comes complete with character insert and delete, line insert and delete, erase to end of line/field/screen, and tab and back tab. IT's full controls also allow you to skip protected fields, backspace, forespace, move up, down, return, home, and new line.

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LETTERS

Reasonable Checks

The area of "reasonableness checks" in data processing is not new. Many banking programs routinely check that deposits and withdrawals are within reasonable bounds. Such checks might include questioning cash deposits or withdrawals of more than a set limit, or checks of $100,000 where the average balance has been $500.

However, I recently discovered that although, some billing organizations are making such checks, not all are.

My encounter with the billing department of the local telephone company (Mountain Bell) began when I received a closing bill for 5 cents for my residential service. After noticing that the bill had 13 cents of postage (presort rate), I began to question the value of the bill. A telephone conversation with the head of the billing department revealed that I was indeed required to pay the 5 cents if I ever wanted telephone service again.

Determined to get back at the phone company, I returned the bill together with a check for 7 cents, (which was promptly cashed — the transaction no doubt cost both Mountain Bell's bank and my bank more than 7 cents each.) About two weeks later, another notice from Mountain Bell arrived, thanking me for my payment and enclosing a refund check for 2 cents. Once again, the envelope was marked with 13 cents of postage.

I suspect this experience is not at all uncommon. To the computer professional, it is amusing that Mountain Bell spent several dollars (including labor, postage and processing charges) to collect 5 cents. To the layperson, however, this has more important consequences. For some, this will fuel suspicions that computers are unreasonable and, rather than simplifying life, make it more complicated.

If there can be a moral to such a story, it would be that more programs and programmers need to be concerned that the data being processed is reasonable. In a profit-making enterprise, one should not spend dollars to earn cents!

Jeremy Epstein

Albuquerque N.M.

Unruly Computers?

What starts out as straightforward computer documentation often contains unplanned meanings. Even the most innocent technical paper or manual can provide its share of humor through mischoice of words.

Although the word behavior properly may apply to an object, its more common usage is in reference to a sentient being.

In a recently released manual on computer systems software implementation, a major mainframe manufacturer included the statement, "Common routines . . . ensure standard behavior of code."

Does this mean present-generation computers are already learning on their own, perhaps stealing third-digit overflow on the arithmetic bus, maybe taking a few extra nano-smoke-breaks between main and virtual storage, or worse dancing to the megabyte beat of data transfer from disco-storage?

As the computer gets older and smarter, will "common routines" be sufficient to control behavior?

The day may not be far away when hardware diagnostics will have to be replaced by "psychological profile testing" and engineers will be trained to perform logic-lobotomies and main-storage rehabilitation seminars.

Don't say you haven't been warned.

John E. Trybus

Miami, Fla.

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Software Tools Business Has Its Complications

(Continued from Page 33).

Now a Test Coverage Analyzer is a fairly complex kind of tool. By means of an analyzer, it is possible to find out how well particular piece of software has been tested. For example, do the test cases being used cover 50% of the logic of the program? 75%? Or, hopefully, 100%?

To get that kind of data, the Test Coverage Analyzer rigs the program being tested so that it measures itself while it executes. The analyzer actually introduces extra code — called "instrumentation" — into the program, which causes it to bump a count every time each segment is executed. At the end of the run, the instrumented program prints out those counts, and flags unexecuted segments.

Pretty tricky, the first tool Sean chose to build. But an intellectual challenge worthy of a newly named tool builder!

New Copier Line

Now it chanced to pass that, while Sean was developing his analyzer, Copy Cat made an early announcement of a whole new family of copier machines. And at the same time, let a contract to a well-known systems house, Sysboomba Systems, to develop the integrated software and computer hardware for the new line.

Sean was overjoyed. For one thing, the new task was perfectly timed to be the first application of his analyzer. For another, Sysboomba was well known as an innovative company when it came to using advanced concept tools.

In fact, Sysboomba employees probably wrote at least a fourth of the articles in the software engineering journals on the development of modern programming methodologies and tools. The analyzer would be amply allowed to demonstrate its value, Sean felt sure.

Verve and Enthusiasm

Whistling while he worked, Sean completed his analyzer with verve and enthusiasm. The world was waiting, Sean believed, for his analyzer tool. With it in use, both Sysboomba and Copy Cat technologists and managers alike would have a whole new visibility on the testedness of the new software. Sean could hardly wait to appear on the Sysboomba doorstep, analyzer in hand, and watch their expression of surprise turn to joy as he handed his new treasure over.

Change in Demeanor

But something went wrong when the fated day arrived. Far from turning to joy, Sysboomba's demeanor became distant, then outrightly hostile. Stunned, Sean pressed the Sysboomba software folk for an explanation. Slowly, the picture emerged.

For one thing, Sysboomba told Sean, its contract didn't call for the use of an analyzer. Using such a tool was an unwanted intrusion, a perturbation on its already planned schedules. For another, Sysboomba was threatened by the idea that anyone planned to be able to look over its shoulder and evaluate its software testing process. That's our turf, it told Sean clearly — and keep your analyzer off it.

"But," sputtered Sean, "what about your reputation as an innovator? The literature virtually reeks of Sysboomba's new concepts. Aren't you intellectually curious about using the analyzer?"

The answer was one Sean was totally unprepared for. It left him essentially with no ground to stand on.

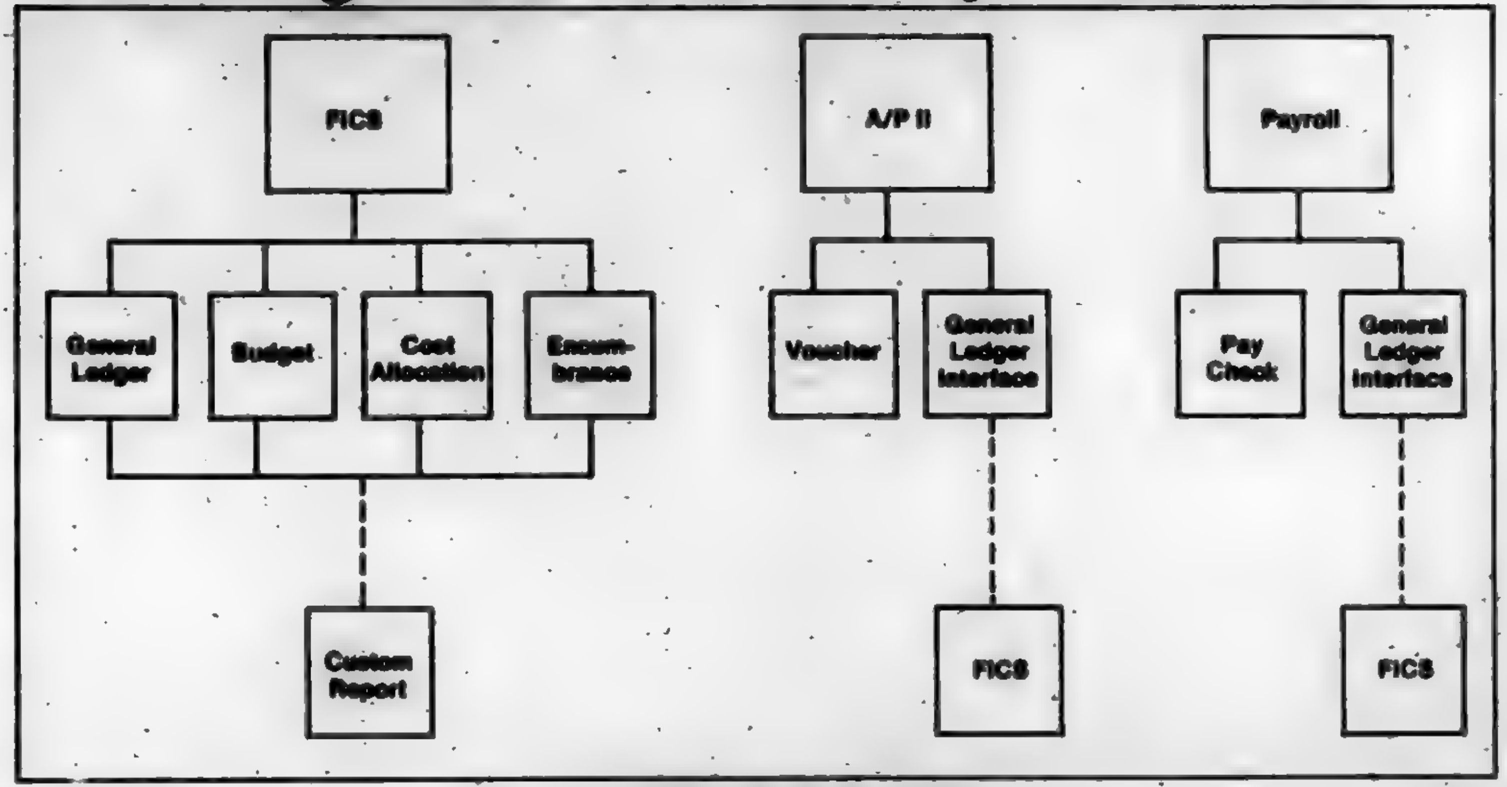
"Oh, sure, we build a lot of tools," the Sysboomba spokesman said. "And, sure, we write a lot of papers on them.

"But we never use them on our own software development acitivities," he concluded. "They're purely for sale."

It's a shame Sean Hammer's introduction into the software tools world was such a harsh one.

The reality of a project that failed was something he'd never in his wildest dreams considered. But there sat his shiny new analyzer, slowly rusting with disuse, as the biggest Copy Cat software job of the decade went to completion — without it.

Seven Agencies' Finance Systems Tied



An overview of MDOT's financial systems.

BALTIMORE — If all the Maryland Department of Transportation (MDOT) faced was a task of implementing an automated financial system in three years' time, it might have developed the software in-house.

But because that system had to accommodate seven different MDOT operating entities whose individual financial systems were compatible only to the extent that they conformed to State Department of Budget and Fiscal Planning requirements, MDOT decided to consider purchasing applications packages.

Further compounding the task at hand was that MDOT was receiving $40 million to $45 million in federal funds, which would be cut off it it did not comply with accounting system requirements of Section 15 of the Urban Mass Transportation Administration by the three-year deadline date.

Back when MDOT began working on the project, the financial systems used by its seven operating bodies "were really fragmented," remarked Pauline Covino, financial systems design and control manager. Three of the seven agencies keep two sets of books — one for normal business and one for state requirements. The other four operate as state authorities only.

"The accounting functions for some administrations were completely manual, some were being automated and others were live on the computers at individual administrations," Covino recalled.

Before deciding to tie these "uncoordinated" systems together through packaged software, a task force consisting of the senior financial officers of each of the seven agencies was formed to do a preliminary investigation of how best to tackle the project.

Under Covino's direction, they listened to subcommittee presentations on the major functions of accounts payable, general ledger, budget and accounts receivable at each agency and reviewed the available financial software packages through face-to-face interviews with vendors.

Their findings boiled down to a

(Continued on Page 42)

How Do DBMS Impact You?

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- How do you establish the management function necessary to control the data base? Often, a new department must be created and directed by a data base administrator (DBA).
- How does this department fit into the organizational hierarchy?
- What should be the role of the DBA?
- To staff that department, must you hire hard-to-find and expensive outside expertise or can you draw from in-house personnel?
- How do you train employees to work with the DBMS?
- How do you ease their transition to working with the new vocabulary, different access methods and different backup and recovery techniques a DBMS requires?
- How do you plan for and ensure data independence, integrity and security?

A *Computerworld* Special Report on DBMS will attempt to explore these and other issues relating to the selection, implementation and organizational impact of DBMS software. Contributed articles on user experiences, technological trends, product comparisons and evaluations and on what the future holds, are welcome.

Please send articles — along with any charts or graphs — by Sept. 30 to Marcy Rosenberg, *Computerworld*, 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.

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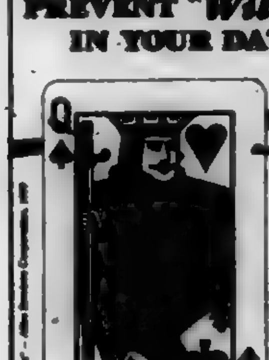

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For Business Programming

Microcobol Fits 16-Bit DEC Gear

LONGWOOD, Fla. – An operating system and business programming language for all Digital Equipment Corp. 16-bit processors is being offered by Microbol, Inc. The Microbol operating system takes advantage of DEC's VT-100 CRT terminal and is optimized for floppy disk handling, including item sorting, the firm said.

Microbol is self-contained, incorporating its own multiuser operating system and language processor, and is memory resident, requiring no overlays; all disk space is available for data and application program segments, according to the vendor. The programmer can construct his own higher level commands, the firm said.

The Microbol operating system is licensed for $1,500 per machine from Microbol, Inc., Box 3384, Longwood, Fla. 32750. Each business application, including source listings, is priced at $500 per customer from Microbol Applications, Inc., CDS Computer Store, 6905 Atlantic Blvd., Jacksonville, Fla. 32211.

Seven State Agencies' Packages Meshed

(Continued from Page 41)

recommendation to procure software systems for general ledger, budget and voucher payable accounting functions – namely, Release 19 of Management Science America, Inc.'s (MSA) general ledger and accounts payable system.

Since MDOT, as a state agency, cannot write checks, MSA provided the necessary specifications for converting its accounts payable system into a voucher payable system.

Selling the System

The next challenge was to sell the numerous using departments on the systems which, according to the task force, could only be accomplished by involving users in the implementation. To foster their user involvement philosophy, task force members assigned a project leader and two technical assistants from each agency to the mission, with the understanding that each project leader would take charge when his organization was to go up on the system.

Project leaders worked directly with Covino and the systems accountant responsible for the general ledger system, plus they served as liaisons with their working level groups.

In this way, each agency's needs were met. For example, when MDOT originally acquired State Aviation, that agency was required to convert from a totally automated system to a totally manual system, a "traumatic" transition, as Covino remembered. To avoid the same negative experience this time around, the task force decided to bring State Aviation up first on the MSA system.

Training procedures were also geared to making the transition to the MSA system as painless as possible for all agencies. The task force held formal training sessions based on MSA's audio-cassette lessons and associated workbooks which were distributed for each system.

And as each agency goes on the system, an accounting manual is compiled that contains control and processing sections, a section on each agency's chart of accounts and a glossary that combines MSA; state of Maryland and DOT terminology.

The general ledger system has been installed at the State Aviation Administration and at the Mass Transit Administration, and Covino terms MSA's support "more than adequate."

Now successfully converted to a voucher payable system, MSA's accounts payable system has also been implemented at these two agencies. A general ledger interface is planned to link this system and the MSA payroll system acquired by the Maryland Central Payroll Bureau in September 1978.

Down the road, MDOT intends to convert to Release 21 of the general ledger system – when it becomes available for the agency's Burroughs Corp. B6700 hardware – to enable the State Highway Administration to convert to the MSA system and take advantage of the expanded field sizes.

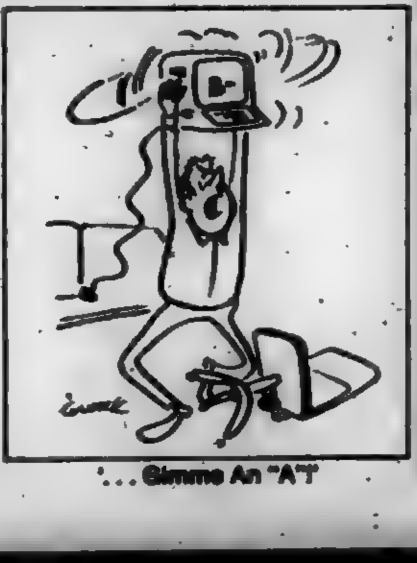
ADP Network Offers Customized Budgeting

ANN ARBOR, Mich. – ADP Network Services is offering a computerized budgeting service that reportedly automates the budget preparation and implementation process.

The service is said to cover all common budgeting requirements, and can be customized to meet an individual firm's needs.

Features include automatic roll up, multiple consolidation paths, exception reporting of variances, automatic error checking and computer-generated work sheets for budget center managers, the firm said.

The service costs $3,000 to $7,000 to install and between $500 and $2,000 a month, depending on how much it is used, the firm said from 175 Jackson Plaza, Ann Arbor, Mich. 48106.



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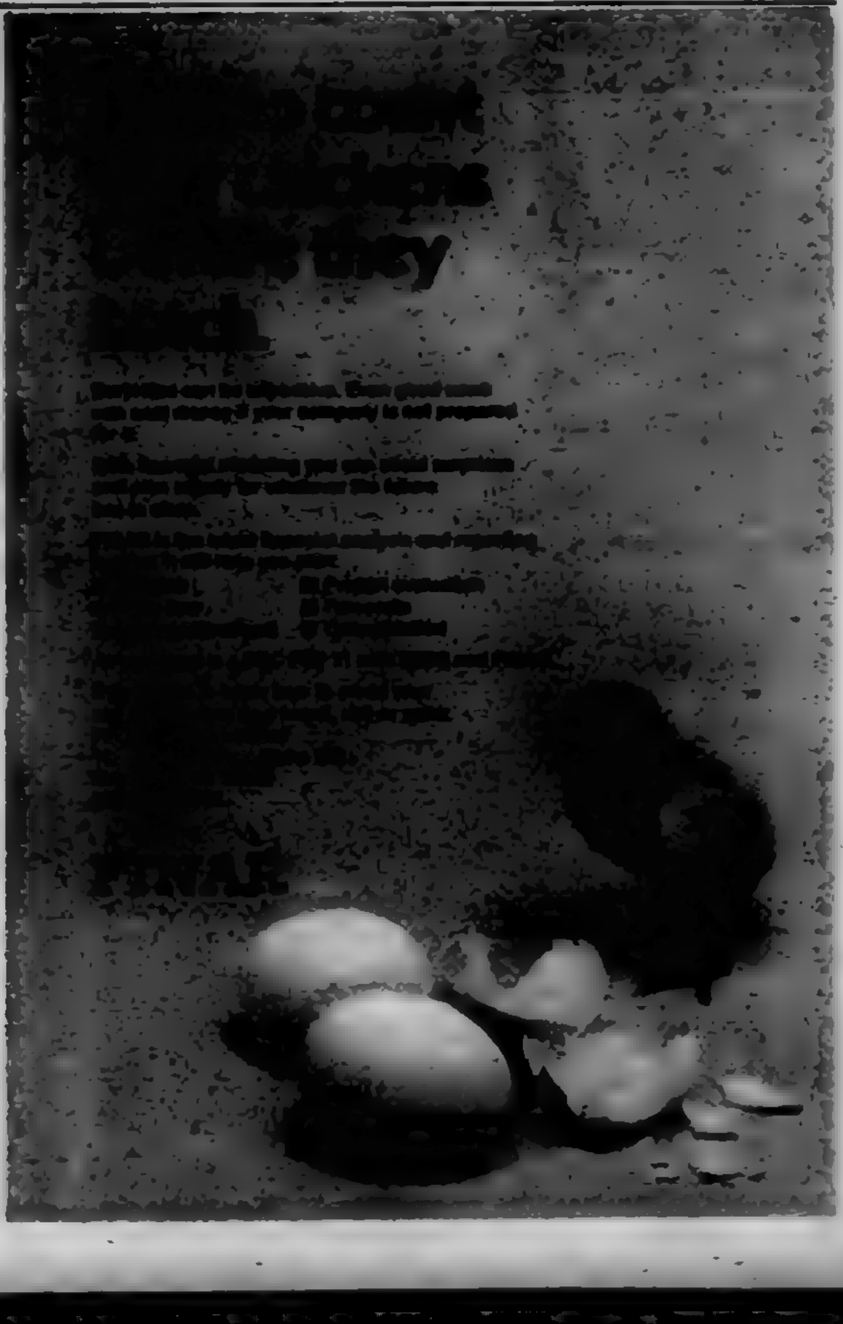

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Enhanced Ansi Compiler Serves HP 1000s

PALO ALTO, Calif — Hewlett-Packard Co. is now offering an enhanced Ansi Fortran 66 compiler for HP 1000 computer systems.

Designated HP Fortran 4X, the product is a subset of Ansi Fortran and includes extensions compatible with other minicomputers' Fortran 66 compilers. In addition, it is upwardly compatible with HP Fortran IV, which remains an HP 1000 system option.

Fortran 4X performs local optimizations of the object code — improving efficiency of operation and economy of resources, an HP spokesman claimed.

Its capabilities include constant expression folding, subscripting optimizations, branch structure optimization and improved register allocation, he said.

Compilation speed is as high as 3,000 line/min, and the product can compile programs using a partition as small as 13K words. With a 28K partition, it can compile programs containing as many as 5,000 line/min.

Other features include double-word integer and double-precision real data types, IBM and Ansi Fortran 77 direct-access I/O, IF-THEN-ELSE, arrays of seven dimensions, embedded comments, bit shift function and lowercase for improved readability.

Fortran 4X is priced at $1,000 and the copying fee is $400, the vendor said form 1507 Page Mill Road, Palo Alto, Calif. 94304.

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No Need to Convert Source Code

DOS-to-OS Transition Updated

DALLAS — University Computing Co. has unveiled Release 4.4 of its DOS-to-OS transition system, UCC TWO.

UCC TWO allows DOS programs to be moved into OS production without conversion of source code and assures their continuing operation. Any release of DOS, DOS/VS or EDOS is supported by UCC TWO under any release of OS or OS/VS, the vendor claimed.

New facilities have been added to extend the level of UCC TWO's support and allow improved usage of OS features by DOS programs.

Among the Release 4.4 enhancements are:

- A file reblocking facility for improved storage utilization — sequential files are reblocked via JCL without requiring change to DOS source programs.
- Support for DOS/VSE program products, including DOS/VSE sort packages, compilers and PL/I.
- Support for native DOS Rotational Position Sensing (RPS) for faster disk seek time, in addition to previously existing support for OS RPS.
- Optional one page abend dump summary containing key debugging information in easy-to-read format to simplify resolution of program problems.
- Support for hard-coded Vsam control blocks.
- Linkage editor improvements for processing DOS PL/I optimized programs.

In addition, new user documentation is available. All documentation has been reformatted and revised, following recommendations received from a panel of UCC TWO users.

UCC TWO is available on an unlimited license for $38,500 or a limited lease arrangement for $1,100/mo, from UCC Tower, Exchange Park, Dallas, Texas 75235.

DEC Gear Gets Forms Entry

MINNEAPOLIS — The E-Code Forms Entry System, a comprehensive high-level language with software tools for developing forms and intelligent data entry applications for Digital Equipment Corp's. PDT family, the LSI-11 microcomputer and PDP-11 minicomputer systems, has been introduced by MCPC Systems.

Consisting of a package of programs and applications routines that allow easy development of user written form and data entry applications using the DEC VT100 terminal in a PDP-11 environment, E-CODE operates under the RT-11 operating system and allows multiterminal applications execution under the single-job monitor of RT-11, RT¹ and RT¹/PDT, the firm said.

The system can execute application programs written in E-CODE at any of four VT100 terminals independently and is compatible with DEC's FMS-11 through a special interface enabling form creation directly on the screen.

E-CODE provides throughput rates to VT100 displays allowing screen draw speeds up to four times faster than other FMS-11 applications. IT also provides nearly unlimited error checking on individual fields and complete management of operator-controlled interrupts; the firm claimed.

The system's components include a compiler, an interpreter and a library file decoder. The standard distribution package costs $800 on a per-CPU license basis from MCPC Systems, Suite 220, 2344 Nicollet Ave., Minneapolis, Minn. 55404.

IMSL's Library Edition 8 Lists Set of Subroutines

HOUSTON — Edition 8 of the International Mathematical and Statistical Libraries, Inc. (IMSL) Library, a set of mathematical and statistical subroutines written in Fortran, is now available.

Edition 8 has been expanded and includes nearly 500 subroutines, increased capabilities for handling larger linear programming problems, 10 additional subroutines to the Random Number Generator Chapter and calculations for solving Fast Fourier Transforms of two- and three-dimensional arrays, the vendor claimed.

Large computer users are charged $1,600/year for use of the library, while minicomputer users must pay $1,400, the vendor said. Universities are granted a 25% discount.

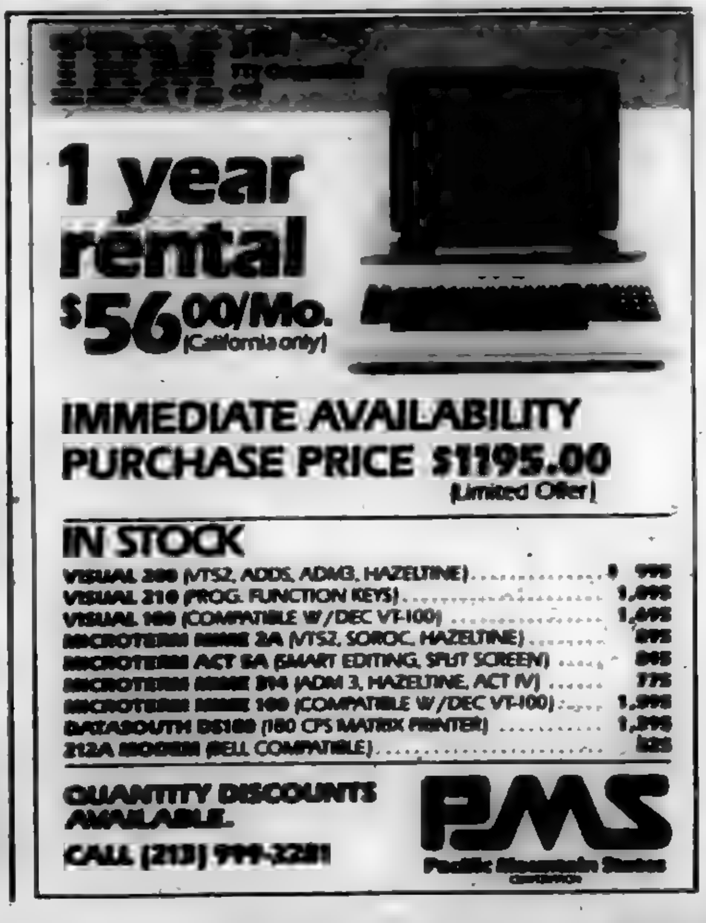
IMSL is located at Sixth Floor, NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.

AID to Repeat Seminar Series

OAK BROOK, Ill. — Applied Information Development, Inc. (AID) will repeat its productivity improvement seminars in Chicago, Milwaukee, New York and Hartford, Conn., during August and September.

The seminars will focus on quality assurance and its role in Aid's productivity improvement program.

More information is available from Aid's branch offices in the scheduled cities, or at the home office at 823 Commerce Drive, Oak Brook, Ill. 60521.



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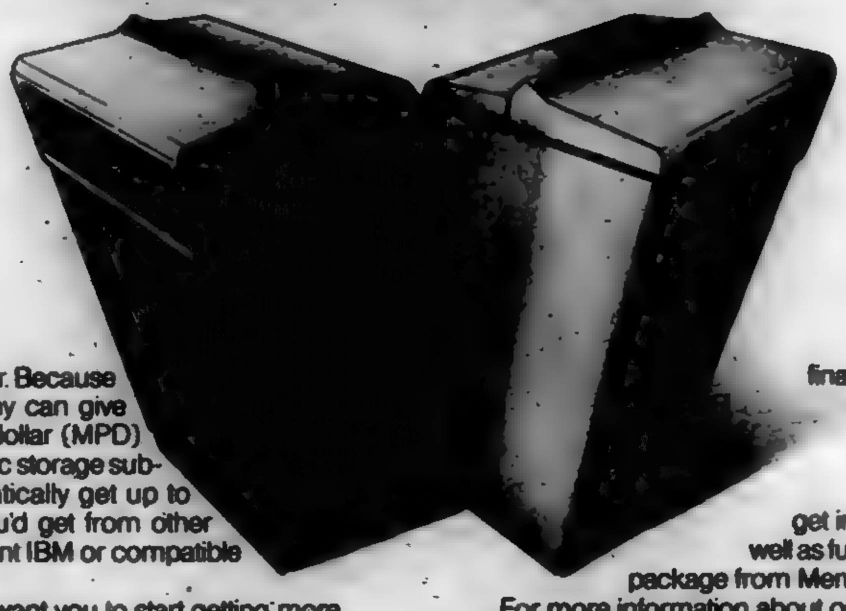

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Graphics Support System Gives Device Independence

SAN DIEGO — A high-level, general-purpose computer graphics support system that reportedly provides computer and device independence in a graphics development package is now available from Megatek Corp.

Template was designed to handle dynamic and static applications in two- and three- dimensional environments, the vendor claimed.

Features include 2D and 3D line drawing and text generation using high-level Fortran functions, user-definable viewing environments, structured archiving of graphic objects, general axis generation, color definition and selection display of 21 character fonts and a virtual display surface capability.

The package is usable on any 24-bit or larger processor and with any commercially available graphics terminal device, according to a Megatek spokesman.

It may be leased for $1,000/mo plus an installation charge of $4,000/computer system.

This price includes the first month's lease payment as well as on-site classroom instruction, manuals, documentation and the use of a telephone hotline for consultation.

Megatek is located at 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.

Graphics Package Provides Fortran Plotting Capabilities

MANHATTAN BEACH, Calif. — Syscon Design, Inc. has unveiled a graphics software package that provides basic Fortran plotting capabilities for Digital Equipment Corp. PDP-11 minicomputers and Tektronix, Inc.-compatible plotters or terminals.

The GP-10 package operates under DEC's RT-11, RSX-11X or IAS operating systems and can be used, for instance, with a Lear-Siegler, Inc. ADM-3A terminal outfitted with a Retro Graphics, Inc. RG-512 graphics board.

Basically a collection of Fortran-callable routines, the software includes MOVE, DRAW and POINT routines that are available in device and virtual coordinates and in absolute and relative modes, according to a spokesman.

Hard copies of graphics images can be obtained via the software's graphics memory readback routines, the spokesman noted.

The package costs $450 and can be ordered from the company at Suite F, 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

Dictionary Gets CICS Update

BEDFORD, Mass. — Synergetics Corp. has enhanced the CICS version of its Data Catalogue 2 data dictionary.

The data dictionary now offers a more tutorial and menu-driven operation. In addition, new formats have been added to allow full-screen display. And the package's QUERY and SHOW commands have been combined to make operation easier, the vendor said.

The CICS support system for Data Catalogue 2 costs $3,000 and is available on IBM's OS, OS/VS, MVS, DOS/VS and DOS/VSE operating systems. The basic dictionary for OS, OS/VS and MVS costs $14,900. The DOS/VS and DOS/VSE version costs $12,900.

The dictionary is also available for Univac's Univac-1100 for $12,900 from the vendor at One DeAngelo Drive, Bedford, Mass. 01730.

Promac Syntax Likened to Cobol

VALLEY FORGE, Pa. — Promacs, a free-form, high-level programming language similar in syntax to Cobol, is available from Management and Computer Services, Inc.

Promacs can be used to create programs using macros that create a structured Cobol program processed by the Cobol compiler. The language is said to increase programmer productivity in utility programs, maintaining software and creating reports, the vendor said.

Promacs can be used in almost any software environment including IBM's TSO, CMS or DL/1. It costs $12,000 from the vendor at Great Valley Corporate Center, Valley Forge, Pa. 19482.

Free Buyer-Seminars Slated For September

ANDOVER, Mass. — Software International Corp. (SI) will hold a series of free one-day seminars starting next month in 46 cities across the U.S. and Canada, aimed at prospective buyers of applications software packages.

"How to Achieve Better Financial Results with Software Packages" will begin its run Sept. 9 in Rochester, N.Y., and wrap up on Dec. 4 in Louisville, Ky.

In addition, each company attending the seminars will receive a certificate worth $1,000 toward the lease price of any SI product, a spokesman explained.

Additional information on the seminar and a full schedule can be obtained from SI at 2 Elm Square, Andover, Mass. 01810.

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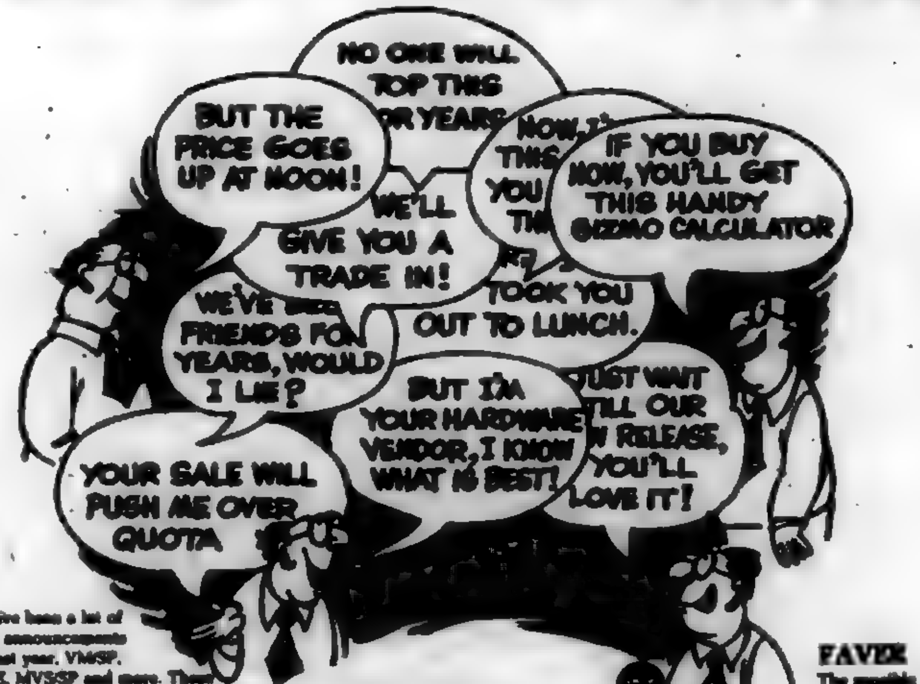
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Packet Nets Adopt 3270 Interface

VIENNA, Va. — North America's three major public packet-switching carriers have agreed to a common communications protocol for interfacing IBM's 3270 binary synchronous data terminals.

The deal affects the Telenet, Tymnet and Datapac packet networks run by GTE Telenet Communications Corp., Tymshare, Inc. and Bell Canada's Computer Communications Group, respectively, according to a spokeswoman for GTE Telenet here.

The three parties to the agreement will eventually extend the protocol specification to other carriers worldwide, she said. The new protocol is expected to give a CRT terminal or printer direct connection on demand to a host computer independent of other devices attached to its controller, resulting in more efficient utilization of terminals and communications lines.

A typical IBM 3270 installation features one to 32 CRT terminals or printers driven by a terminal cluster controller, the spokeswoman noted. The controller generally has direct connection to a host via a leased communications line.

Users can get more details on the protocol from Sheldon Fox at GTE Telenet, 8330 Old Courthouse Road, Vienna, Va. 22180. Tymshare can be reached at 20665 Valley Green Drive, Cupertino, Calif. 95014. Bell Canada's Computer Communications Group is at 160 Elgin St., Ottawa, Ontario, Canada K1G 3J4.

Converging With Ethernet

IEEE Group Drafting Local Net Standard

By Brad Schultz
CW Staff

SAN DIEGO — Representatives from the three firms that jointly announced Ethernet, the local area data network intended to pass 10M bit/sec through coaxial cable [CW, May 26], met with a subcommittee of the Institute of Electrical and Electronics Engineers (IEEE) here recently to start developing a universal standard for local nets.

That standard, known as the Local Network Data Link Control (LNDLC), and Ethernet may wind up as basically the same thing. In fact, Ethernet's "functionality" is a "subset" of LNDLC, according to Gerald Clancy, chairman of the Data Link and Media Access Control (DLMAC) subcommittee of IEEE's committee for local area network standards.

Clancy, who works for Honeywell, Inc., said that David Potter, Robert Printis and Philip Arst of Digital Equipment Corp., Xerox Corp. and Intel Corp., respectively, agreed to help DLMAC draft its approach to data communications among users located within a few miles of each other.

The pledges of help suggest that DEC, Xerox and Intel wish to avoid a situation where two substantially different designs for local nets are each billed as the only approach worth taking, Clancy remarked.

Although the three Ethernet sponsors have not committed themselves to supporting the final version of LNDLC, DLMAC has adopted "virtually all the functionality of Ethernet," Clancy added.

However, the IEEE subcommittee wants LNDLC to operate over a wide range of transmission speeds, whereas Ethernet is pegged for 10M bit/sec only. And a few other differences remain between the two designs, including LNDLC's provision for what DLMAC calls an "acknowledging class of procedure," which Ethernet was said to lack.

The DLMAC subcommittee expects many local net users to transmit data through existing community antenna television (CATV) facilities within a building or strung through the heart of a city.

The coaxial cabling used in CATV is best known to the gen-

(Continued on Page 50)

Eight Programmable Softkeys

HP Portable Printer Terminal Bows

PALO ALTO, Calif. — A portable printer terminal for asynchronous communications as fast as 9,600 bit/sec is available with eight user-programmable softkeys from Hewlett-Packard Co.

The 22 lb HP 2675A can receive and store on tape data retrieved from its host computer system. Without an operator present, the printer terminal can also transmit data to the host or, through an automatic answering capability, print a report. This can be done after hours, a spokesman noted, reducing a user's communications overhead.

The operator may select a print format ranging from 40 to 132 char./line on 8.5-in. wide paper and output as many as 120 char./sec using a 7 by 11 dot matrix.

Able to emphasize characters by framing and underlining, the HP 2675A supports the 128-char. Ascii set as well as sets featured by Swedish/Finnish, Norwegian/Danish, German, UK, Spanish and four French

(Continued on Page 50)

Can You Advise Data Net Managers?

The deadline for contributions to *Computerworld's* Nov. 24 Special Report on approaches to planning and implementing a data network is only about a month off. If you can advise communications managers on this topic, it's time to stop planning and start implementing your contributed article, which should be no more than six double-spaced typewritten pages.

Users, consultants, vendors and the academic community are invited to submit manuscripts that identify the main issues of network planning and implementation; recommend ways to manage these processes; or review products and services that communications managers might consider in setting up a network.

Articles should be addressed to Brad Schultz, November Special Report, *Computerworld*, 375 Cochituate Road, Framingham, Mass. 01701 and received by Sept. 26.

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IEEE Subcommittee Drafting Local Net Standard

(Continued from Page 49)

eral public as an alternative to broadcasting TV signals through the air, but users of distributed DP networks will hearken to the medium, according to International Data Corp. (IDC), when they realize it can greatly extend the number of data channels able to be run simultaneously through a single transmission line.

A single coaxial cable may allow data traffic at faster than 500M bit/sec, IDC stated in "Communications Networks," a report for subscribers to the Waltham, Mass.-based market research firm's Information Systems Planning Service.

What's more, IBM's Systems Network Architecture (SNA) and the X.25 public packet-switching method will be largely obsolete when network users recognize the advantages of broadband coaxial links, IDC predicted.

SNA and X.25 are what the IDC report calls "pipeline" approaches to distributed DP communications. Pipeline transmission, whether analog or digital, entails modulation of a signal across a single physical pathway that must be established prior to the transmission.

In contrast, coaxial CATV links may serve as a "broadcast" approach to data communications. By adding radio frequency modulation capabilities to a CATV network, the coaxial cabling's transmission frequency spectrum may be divided into channels, similar to broadcast TV channels, and those channels may be run through a single line at the same time.

However, two-way CATV transmission links generally do not have transmitting and receiving stations talking directly to each other, the IDC report noted.

Instead, a signal is routed up the coaxial cable to a "head-end" facility, which then retransmits the signal back down on another frequency or a second cable to all receiving stations tuned to that frequency.

Frequency Spectrum

Many coaxial CATV links are already offering a transmission frequency spectrum as extensive as 300mHz, IDC pointed out, and some of the latest coaxial facilities are advertised as offering up to 450mHz.

IDC's estimate that data speeds as fast as 500M bit/sec are possible with coaxial technology assumes a 450mHz spectrum link would be used with the same efficiency as a voice grade dial-up telephone line transmitting at 4,800 bit/sec on a 4kHz bandwidth.

SNA and X.25 implementations may prove unwieldly in large distributed DP networks as significant numbers of connected processing stations are added, removed or relocated, the firm indicated.

Standardization Areas

As to local nets, the IEEE's DLMAC subcommittee anticipates three major areas of standardization, according to Clancy. They are:

- Standardization of a peer data link, independent of both the network's topology and speed. This standard would be incorporated into data terminal equipment (DTE).
- Standardization of an interface between DTE and data communicating equipment (DCE), such as modems. This standard would include specification of a physical coupler interface similar to the current RS-449 and X.21 interfaces.
- Promulgation of multiple standards (essentially one standard for each medium type, such as coaxial, fiber optics and infrared) for access control algorithms, signal encoding techniques and accommodating the disparate properties of media, such as electrical conditions for coaxial cabling.

The LNDLC standard is about 90% completed, Clancy estimated. This month, the DLMAC subcommittee will send its recommendations for a final version to the full local area network standards committee of the IEEE. Clancy can be reached at Honeywell Information Systems in Honeywell Plaza, Minneapolis, Minn. 55408.

HP Portable Printer Unit Operates at 9,600 Bit/Sec

The HP 2673A

(Continued from Page 49)

keyboards.

The printer terminal comes with built-in cartridge tape drives able to store 320K bytes of data per removable tape in files accessible by file name, absolute file number or relative position.

Search/rewind and read/-write rates are 90- and 22 in./-sec, respectively. According to the spokesman, an updatable tape format allows the same section of tape to hold an initial recording and its revised version.

An I/O buffer and line mode transmission feature permits local editing of up to 254 characters per line prior to transmission or storage, the spokesman continued.

Featuring an RS-232C interface, the HP 2673A printer terminal costs $5,000. An optional built-in 300 bit/sec modem costs $490.

HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

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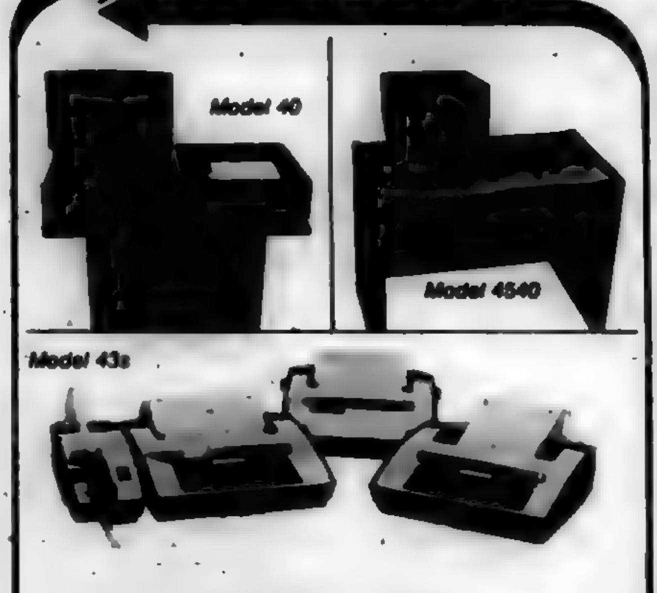

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Bandwidth Compression May Cut Transmission Costs

HOLMDEL, N.J. — The costs of transmitting video along with data and voice signals over digital copper telephone lines may drop following Bell Laboratories' announcement of a video bandwidth compression technique.

TV signals are usually transmitted in analog form, requiring a medium having a bandwidth of about 6MHz, a Bell Labs scientist explained. Coaxial cabling or microwave broadcast facilities normally carry analog video because standard phone lines cannot handle a 6MHz spectrum, he said.

Digitized video, on the other hand, typically demands 64 million and 100 million bit/sec transmission speeds for monochrome and color representations, respectively. But the AT&T research center's new compression technique reportedly can pass digital TV as a 1.5 million bit/sec stream over wire pairs of Bell's T1 phone line.

The technique involves estimating the motion of objects in a scene and then comparing successive frames spatially displaced by that amount of movement, the spokesman noted. With more than 70 million carrier miles of T1 lines installed nationwide since 1962, Bell hopes to make teleconferencing less expensive over those lines when the so-called "motion compensation" video is ready for marketing.

MPU-Controlled CRT Terminals Feature Detached Keyboard

TUCSON, Ariz — A series of microprocessor-controlled CRT terminals featuring a detached keyboard for operator comfort has been introduced by TEC, Inc.

The TEC Series 610 Data-Screen terminals offer OEMs and end users conversational and buffered data communications capabilities at 100 through 9,600 bit/sec to permit simple expansion from a teletypewriter mode to a batch processing operation, the firm said.

The detached keyboard has a standard typewriter keyboard layout with a standard integral numeric pad. Standard features include upper case and lowercase characters, protected data fields, forward and backward tab, five different video attributes, X-Y cursor positioning, cursor sensing, page more or roll up mode and self-test. Various nonglare screens are available, as well as other options.

The 610 is compact, measuring 16 in. wide by 13.5 in. high by 15.5 in. deep. Because the terminal has selectable interface features, it can be configured with most of the popular models of computers, the firm claimed.

The 610 Data-Screen terminal costs $1,090 from TEC, Inc., 2727 North Fairview Ave., Tucson, Ariz. 85705.

System Monitors Remote Stations

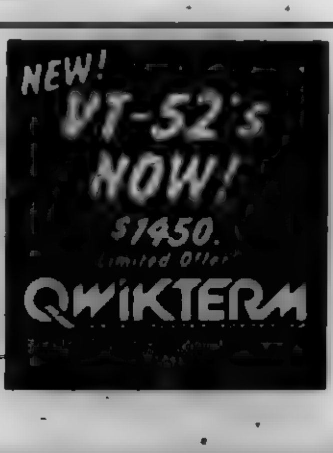
FALLS CHURCH, Va. — The Pulsecom Division of Harvey Hubbell, Inc. has introduced a microprocessor-based control system that monitors and supervises activities of the firm's Datalok 10, 10A and 10D dial-up remote CRT stations.

The Datalok 10 CRT Master remote control/supervisory system monitors the communications functions of remote stations and displays alarm information on the CRT screen or printer. Data is categorized by alarm source, type of alarm, security level and time and data of occurence. An audible alarm alerts the operator of alarm occurrences and changes in previous alarms, a spokesman noted.

In addition, the CRT Master operator can interrogate individual remote stations and analog inputs, lock individual alarms or entire stations, request system status reports and activate controls at a remote station. Prices for the CRT Master, keyboard and printer start at about $15,500 — the final cost based on the user's configuration, the spokesman said from the firm at 5714 Columbia Park, Falls Church, Va. 22041.

Correction

Spectron, a vendor of network test devices and other data communications products, was incorrectly identified as a division of Northern Telecom Systems Corp. (NTSC) in a recent chart [CW, Aug. 11]. Spectron is in fact a division of Northern Telecom, Inc., which together with NTSC is administered by Northern Telecom Industries, Inc., a subsidiary of Northern Telecom Ltd.



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Now you can watch your four favorite programs...

The new HP 2626 display station will give you a view of your computer system you've never seen before.

It lets you divide the screen into as many as four separate "frames," each attached to a different workspace in the terminal's memory. You can check a program listing in one frame and access a file in another. Fill out a form in one workspace while the computer loads the next form into another. Or do text preparation and editing in adjacent frames. Right before your eyes.

That's not all. The HP 2626 has two data communications ports instead of the usual one, so you can use the split screen capability to talk to two computers at the same time. Or log onto the same computer twice for simultaneous batch and interactive jobs.

More than meets the eye.

A high resolution character cell and a glare-reducing screen coating give the HP 2626 the sharpest, clearest display of any of our terminals. And that's saying a lot.

What's more, you can set line lengths of up to 160 characters in any workspace. Then scroll horizontally to get the entire picture. (The built-in thermal printer includes a compressed mode to print up to 132 characters per line.) Scroll vertically, too, or change the size of the frame at the touch of a key.

An interactive forms drawing module makes it easy to design forms, including drawing horizontal or vertical lines with just a single keystroke. You can even program the terminal for audio tones to cue your operator to critical or noncritical errors, or other conditions within a program.

Split decisions.

Hook up the HP 2626 to two computers (or the same one twice) and it's like getting a multitasking capability right in the terminal. Your systems designer can now compile, execute, monitor and edit programs as if two stations were available.

While your user is filling out a form, the terminal can be sending data from the previous form to a computer. And down-loading the next form into an adjacent workspace. By smoothing out the "type and wait" of data entry, you can take advantage of less expensive, low-speed transmission lines without sacrificing the efficiency of your operator. The result? You'll get more out of the entire system.

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If you'd like to watch a program on the new HP 2626 display station, or any of our terminals, just call your local HP sales office listed in the White Pages. You can also write for more information to Hewlett-Packard, Attn: Ed Hayes, Dept. 371, 19400 Homestead Road, Cupertino CA 94015. Or just return the coupon.

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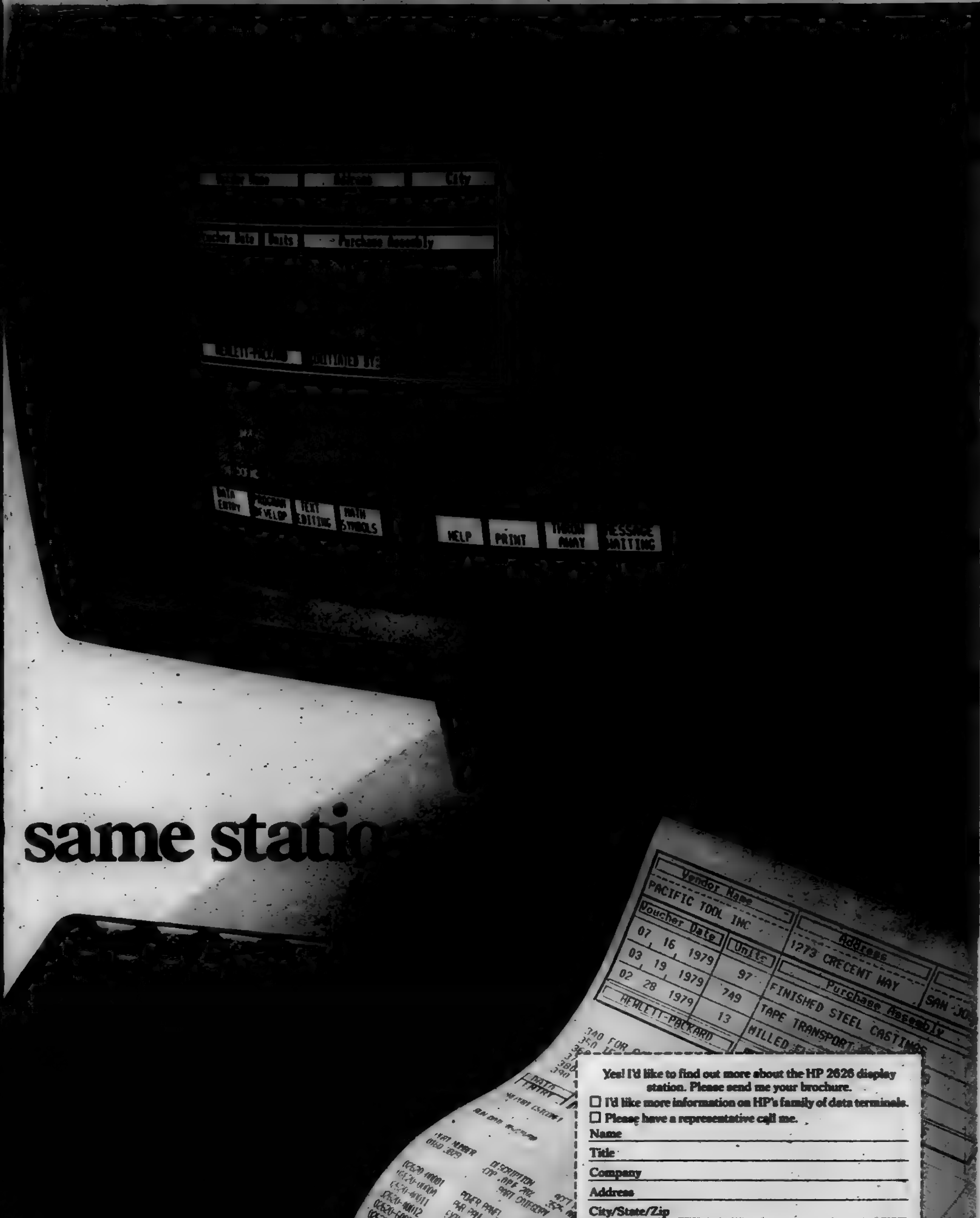
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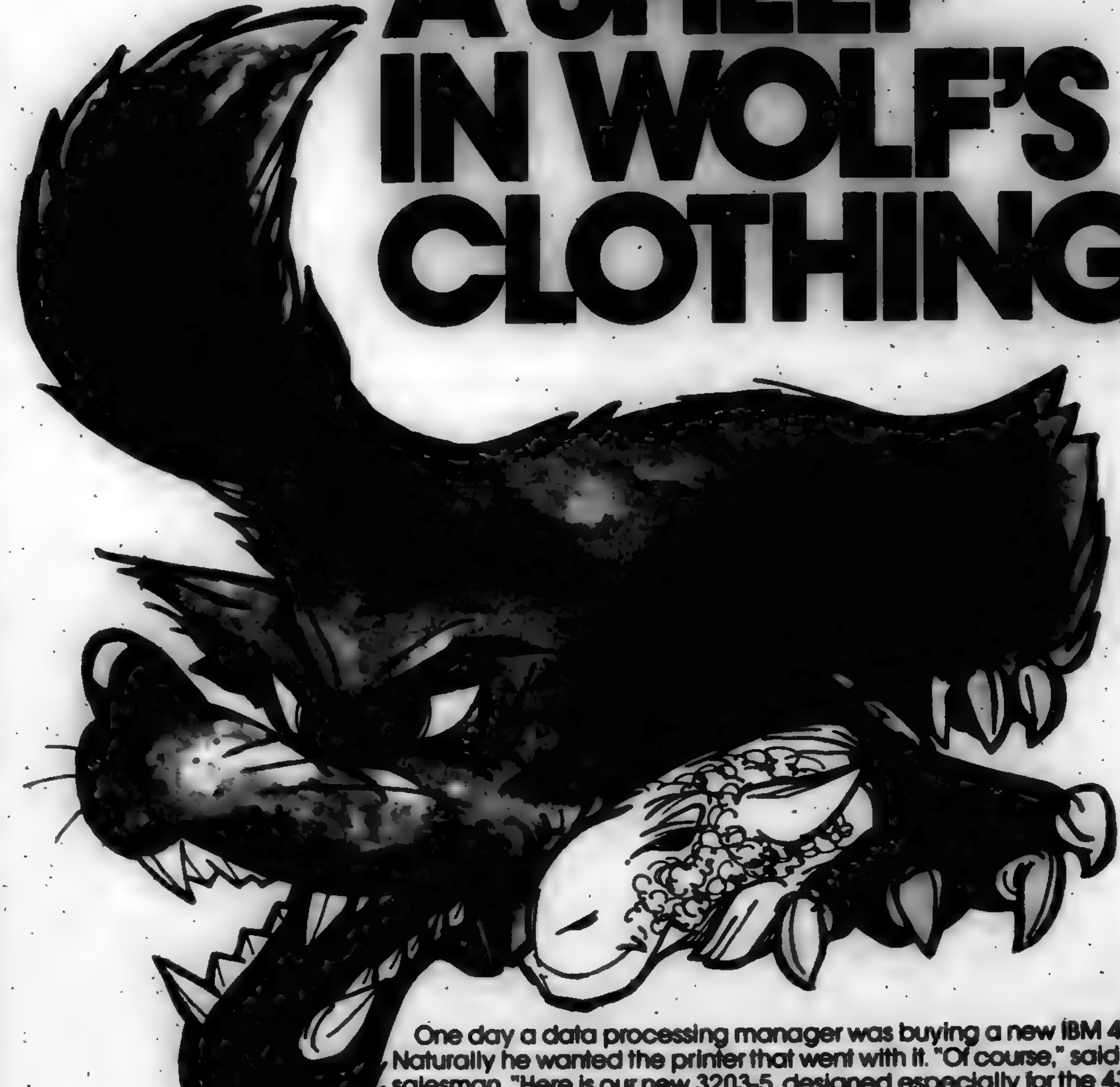
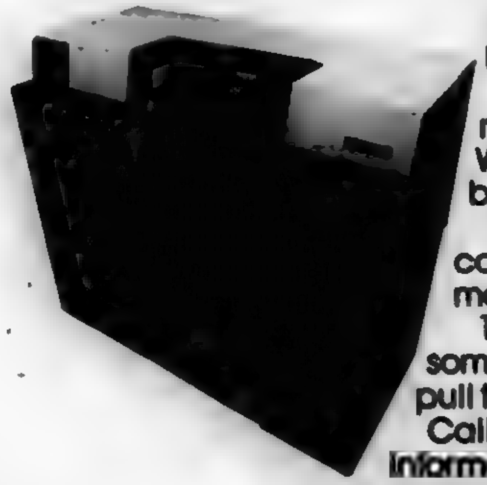
A GRIM FAIRY TALE FOR 4300 USERS

A SHEEP IN WOLF'S CLOTHING?



One day a data processing manager was buying a new IBM 4300 system. Naturally he wanted the printer that went with it. "Of course," said the salesman. "Here is our new 3203-5, designed especially for the 4300."

But the wise data processing manager wasn't fooled. Removing the shiny new 3203-5 cover he exclaimed, "This isn't new — this is the same print technology you've had for 20 years!"



And so the data processing manager bought a Documation IMPACT 4303/15 printer instead. Thanks to its brand new design, the IMPACT 4303/15 is faster than IBM's 3203-5 and is more cost effective.

Featuring the latest print band technology and day-in, day-out reliability, the 4303/15 is fully plug compatible with the IBM 4300. What's more, it is built to last. The same rugged construction that is built into Documation's IMPACT 3000 series is yours in the 4303/15.

Four heavy duty tractors, an easily visible control panel for operator convenience, a power hood with manual override, and its size helps meet your space requirements.

The moral of our story ... beware of a sheep in wolf's clothing. If someone tells you IBM's 3203-5 is really new, they may be just trying to pull the wool over your eyes.

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MVS Study Details Features

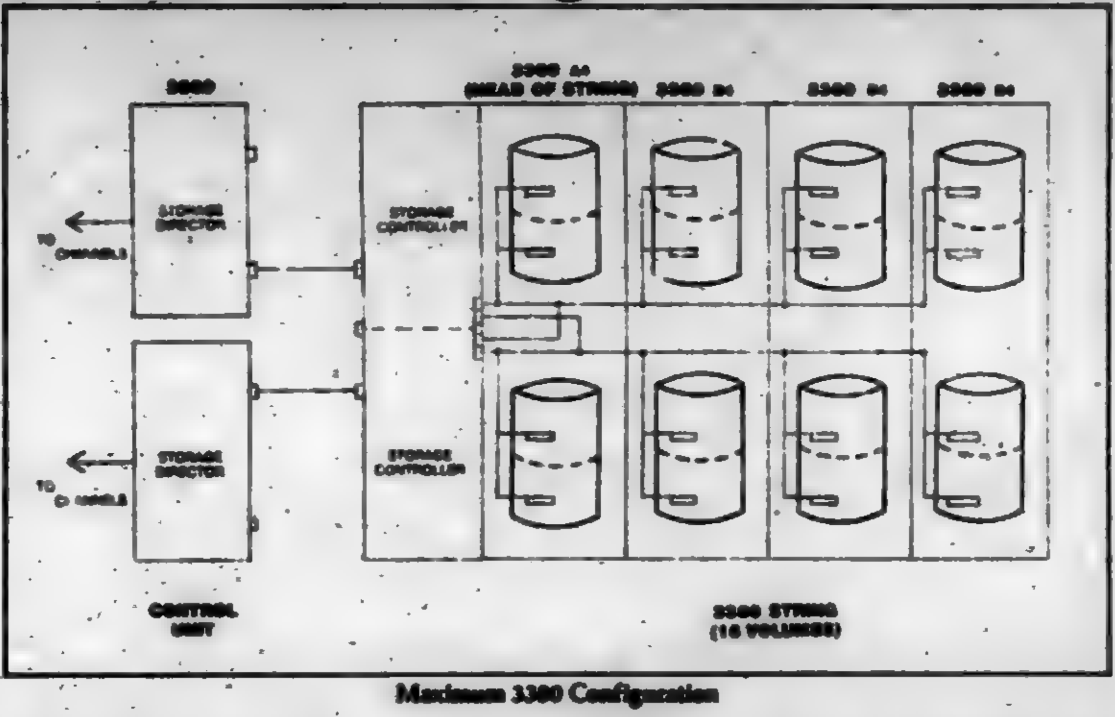
What Does Data Streaming Mean to You?

By Rita Shoor
CW Staff

MARINA DEL RAY, Calif. — What is the Data Streaming Feature introduced by IBM with its recently announced 3380 disk drive (CW, June 16) and what does it mean to your particular installation?

Not much ... unless your mainframe is in IBM's 30 series, according to a study entitled "The MVS/System Product Report" from Candle Corp. here.

Data Streaming was among the features analyzed in this document that covered the MVS operating system enhancements as well as the DASD products that were introduced in June.



Maximum 3380 Configuration

Buffer Option

The 3M-byte data transfer rate supported by the 3380 disk in combination with the Data Streaming Feature is not available on the channels used with 370/158 and 168 hardware. Users with these processors can attach the 3380s to their older, slower channels via a Speed Matching Buffer Option, according to the report.

However, the name of this product describes its function very aptly — it is a high-speed buffer built into the 3380 control unit that can accept data from the fast disks at 3M bytes/sec and transfer it through the 158 or 168 channels at their maximum data transfer rate of 1.5M byte/sec.

"Of course," the report continued, "this reduces the effective transfer rate [of the 3380]."

Under current I/O architecture, a channel and a control unit "shake hands" between each byte of data transferred, according to the Candle analysis. This "obviously" slows down the data transfer rate, but the Data Streaming Feature that will be available for IBM 30 series channels will cause this handshaking to be done between each block — rather than each byte — of data.

Cable Increase

Thus, the total data transfer rate is more than doubled from the specified rate of approximately 1.2M bytes/sec of IBM's 3350 drives, according to the report. Data Streaming also is said to have the effect of increasing the maximum possible cable length from channel to control unit from its current limit of 200 feet to 400 feet.

The Data Streaming Feature may be applied to the first two block multiplexer channels of a channel group. In other words, Data Streaming will affect only two of the six channels controlled by a particular channel di-

(Continued on Page 56)

Offers Continuous Scanning

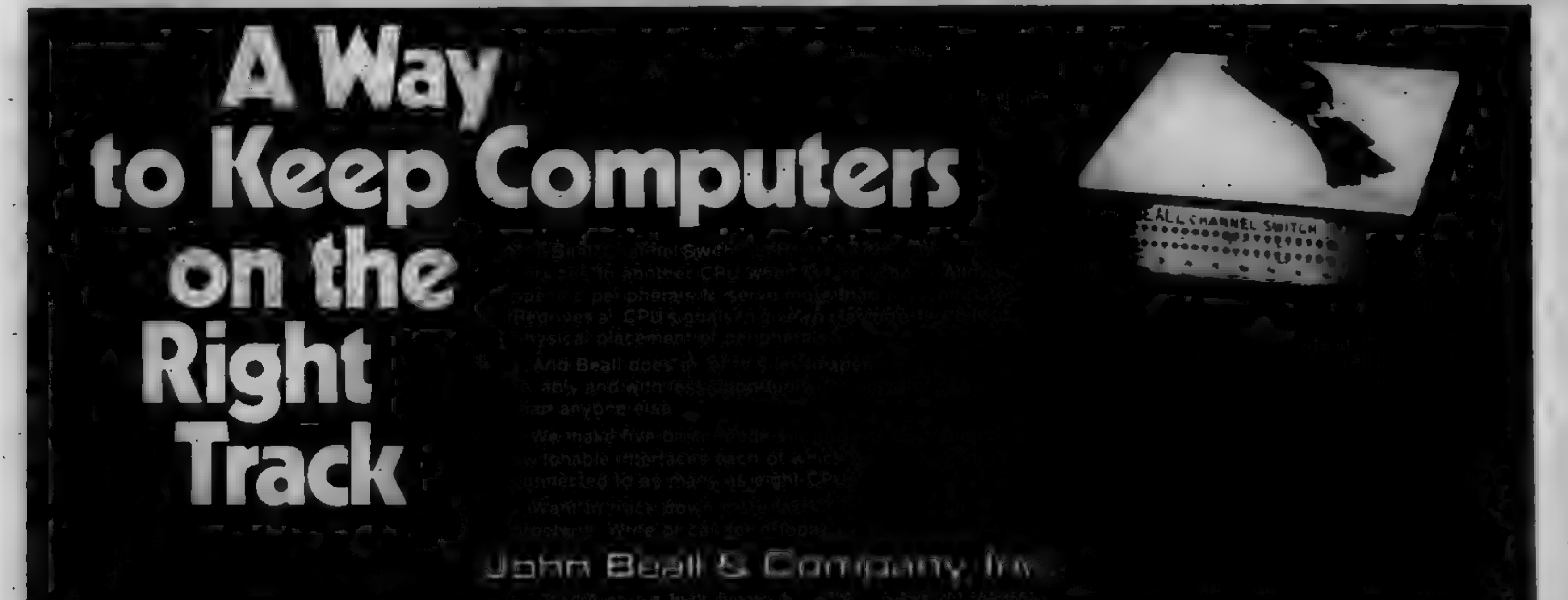
OCR System Reads 3,000 Page/Hour

NORRISTOWN, Pa. — A high-speed OCR system featuring reading rates of up to 750 document/min and page reading rates of up to 3,000 per hour has been introduced by Scan-Data Corp.

The system also features continuous scanning with large area scan window and document loading and unloading on the fly, the firm stated. The 2280/1 OCR system also features serial numbering and in-line or simultaneous multiple reject correction stations with Scan-Plex I at full res-

(Continued on Page 56)

The Scandata 2280/1 OCR System



A Way to Keep Computers on the Right Track

John Beall & Company, Inc.

Bits & Pieces

OMR Scanner Integrated With TI 990 Mini System

MINNEAPOLIS – National Computer Systems, Inc. has introduced an optical mark reading (OMR) scanner and document processing system.

The Sentry 80 features an OMR scanner integrated with a Texas Instruments, Inc. 990/10 or 990/12 minicomputer system, the vendor said.

Two models of the system have been announced. The Sentry 8008 scans 8/5-in. by 11-in. documents at 3,000 sheet/hour and the Sentry 8018 scans 6,000 documents/hour, the vendor said.

The system costs between $90,000 and $200,000 from National Computer Systems at 4401 W. 76 St., Minneapolis, Minn. 55435.

Wabash Hikes Prices On All Media Products

DES PLAINES, Ill. – Wabash Tape Corp. has announced price hikes on all of its media products.

Effective immediately, prices on all IBM-compatible and Shugart Associates, Inc.-compatible diskettes will be increased an average of 6%, while the cost of the firm's Quadronix computer tape will rise by an average of 8%. The company's main tape product, G-Tape, will increase 10% in price, a spokesman said.

The price increases were necessary because of the higher cost of raw materials, he noted from 2700 Des Plaines Ave., Des Plaines, Ill. 60018.

ROM Capacity Boosts 101XL Data Entry Unit

CEDAR RAPIDS, Iowa – Norand Corp. has expanded the read-only memory (ROM) capacity of its 101XL portable data entry terminal from 12K to 16K bits.

The increase is said to allow the terminal to perform more complex data recording, item counting, total generation and mathematical tasks, the vendor said.

The memory enhancement costs $170 from the vendor at 550 Second St. S.E., Cedar Rapids, Iowa 52401.

Data Streaming: What Is It?

(Continued from Page 55)

sector with the other four channel operating in their normal mode, according to the report.

The Data Streaming Feature is supported on models 2 and 3 of IBM's 3880 storage control unit, which were announced at the same time. In addition, the vendor announced an eight-channel switch option that allows the user to attach as many as eight channels to each storage director for a total of 16 (see related diagram).

Ordinarily, as the Candle report noted, the same eight channels must be connected to each storage director, allowing two physical paths to each volume controlled by the 3880 from each of the eight attached systems.

Priced at $10, the 40-page report is available from Candle Corp., Suite 401, 4676 Admiralty Way, Marina del Rey, Calif. 90291.

Scandata Offers OCR System

(Continued from Page 55)

olution.

Characters that fail to be recognized are handled with scanning on multiple stations for maximum throughput, the firm claimed. Rejected character images for correction are separated from good data to ensure maximum throughput of perfect documents. The 2280/1 handles forms as small as 2.2 in. by 3 in. and as large as 12 in. by 14 in.

With a cold light source, minimum moving parts and a single drive and motor, the 2280/1 uses less power and generates fewer British thermal units than any other page and document reader in its price range, the firm said.

Depending on choice of magnetic tape and character font, the typical system starts at approximately $300,000 and is available on a rental basis starting at approximately $6,500 from Scan-Data, 800 E. Main St., Norristown, Pa. 19401.

COMPUTERWORLD can't cover all of Info 80 in **one** issue. That's why we're covering it in **two!**

October 6th Info 80 Show Issue
October 13th Info 80 Wrap-up Issue

Computerworld will bring you two-part, total coverage of the most important information equipment show in the East. Info 80 will be held again this year at the New York Coliseum, October 6th-9th. A heavy turnout is assured with a record audience of between 22,000 and 25,000 corporate executives, DP managers and administrative managers—Plus, there'll be more than 200 exhibitors, 250 speakers and 80 sessions.

Computerworld will have up-to-the-minute coverage of Info 80 in our October 6th issue. And in our October 13th Wrap-up issue, you'll read what went on in those four days, compare the best ideas of the best minds in the industry and find out not so much how a product works but what it can do for you.

We also have a booth there, so if you're going, stop by #2523 for a free copy of our Show Issue. It'll outline the high points of the show—exhibitors, speakers, special events—along with a guide to night life in New York. Ad closing dates for these two special issues are shown below.

If you're aware of the revolutionary changes taking place in the use of information systems and the impact they can have on your business—you can't afford to miss this two-part total coverage. And if you're exhibiting, be sure to put your ad in both of these issues. Your Computerworld representative can give you full ad planning assistance. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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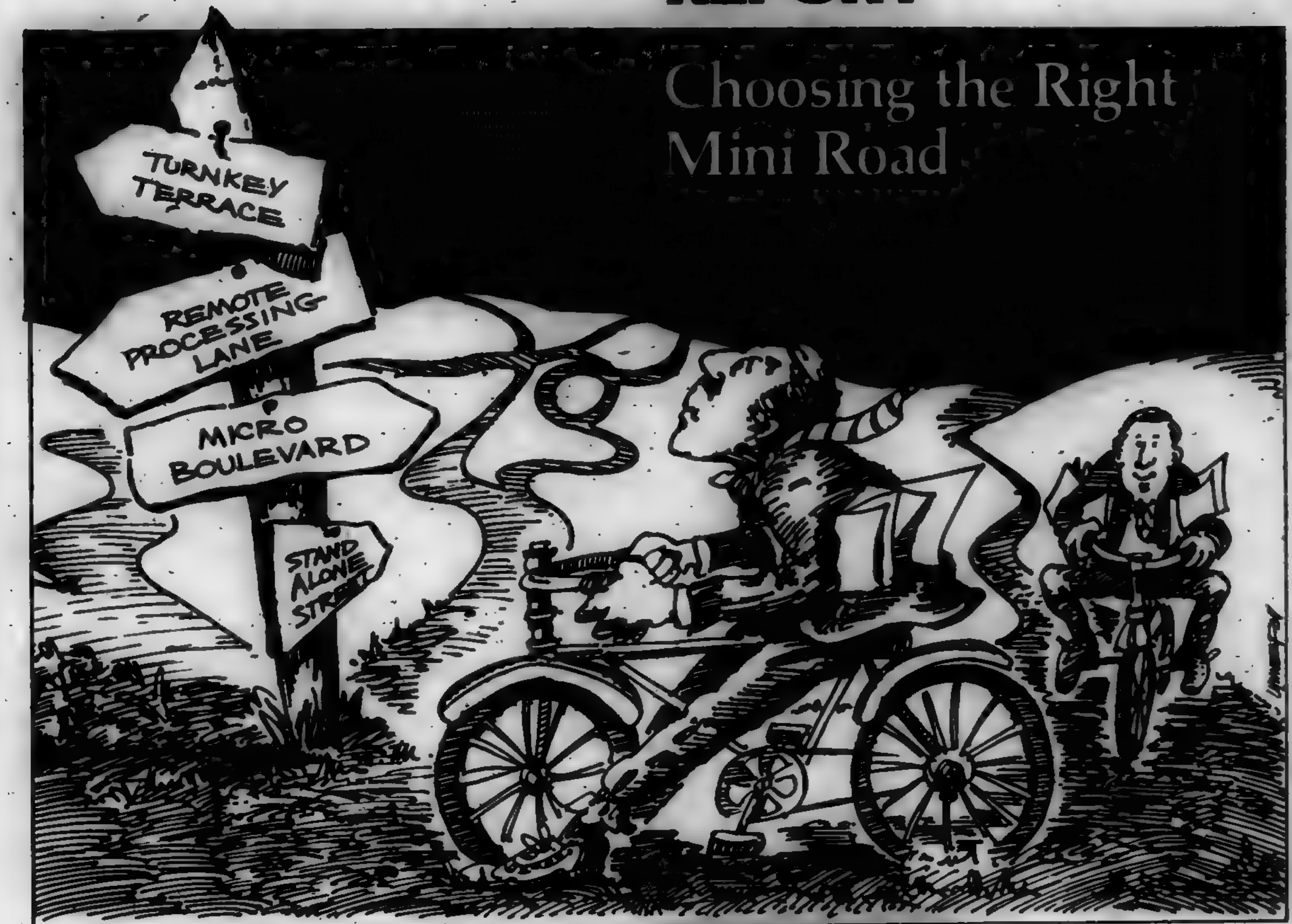
Choosing the Right Mini Road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COMPUTERWORLD

Users Prefer to Deal With Manufacturers

Small business systems are used for a variety of applications, but where do users get the computers for their small business needs?

Presently, more than two-thirds of small business system users obtain their systems directly from the manufacturer, and more than half of potential users will probably follow this route, according to Venture Development Corp. (VDC).

Basically, small systems vendors use four major distribution channels: direct sales, systems houses, dealers/distributors and retail stores (seel figure). Setting up a direct sales-force is costly, and many new vendors choose instead to sell through dealers or distributors, or to systems houses. Some of the larger manufacturers, notably Digital Equipment Corp. have set up retail stores to market systems directly to end users. Independently owned retail stores are also beginning to sell small business systems in addition to personal computers.

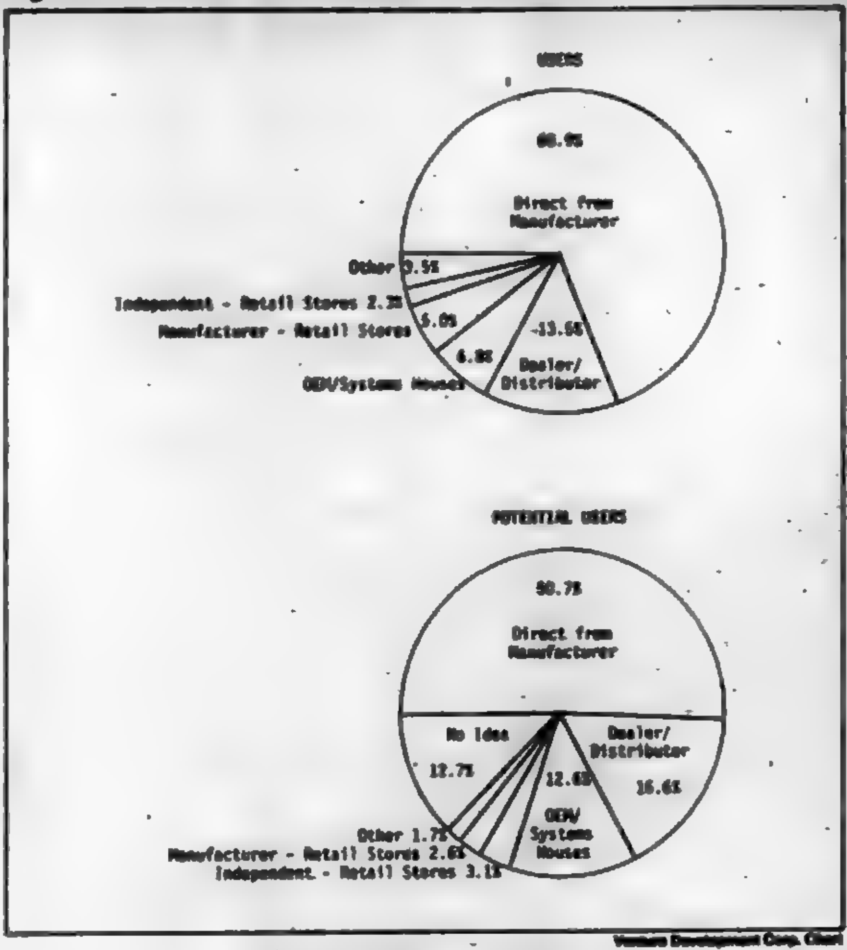
Although buying directly from the manufacturer is the preferred method, 6.8% of present users bought their equipment from systems houses and 12.6% of future users indicated they would. Further, 13.5% of present and 16.6% of future users confessed that dealer/-distributorships are the only way to go, and 7.3% of present and 5.7% of future users turned to retail stores.

Many present and potential users prefer systems houses and dealers/-distributors because a total solution is offered, including industry-specific applications packages and reliable maintenance and service. Because these sources are usually local, they can work closely with the user.

Present and potential users frequently cite one of four specific reasons for not preferring to buy a small system from a retail outlet:

- Lack of industry-specific applications.
- Inadequate software support.
- Need to go to an outside source for maintenance and service.
- The absence of single-source responsibility for their system.

This reluctance indicates that the much-heralded trend toward the establishment of both manufacturer-owned and independent retail stores will *not* accelerate sales of small systems to small businesses. Retail stores will be efficient channels for selling to computer professionals and large companies with computer expertise, the so-called "easy sales," but small businesspeople require more education and post-sales support than the average retail store can provide.



Venture Development Corp. Chart

Method of System Acquisition

Three-Year Search

Faced With Rising Overhead, User Picks Mini

Special to CW

SAN MATEO, Calif. — James R. Spencer, president of Western Building Maintenance, Inc., spent three years searching for just the right minicomputer to handle his business problems and collected an assortment of horror stories along the way.

For instance, Spencer heard tales of users being caught between the computer hardware supplier and the software supplier in the fight about who was to blame when troubles developed. His experiences convinced him that any system he selected should be handled exclusively by one company that would provide hardware, software and support — and time to make his selection was running out.

"I was faced with a decision," Spencer explained. "The paperwork associated with our general accounting was causing me to consider adding another clerk to my accounting staff and that meant another $1,800 a month or so in overhead expenses." Not only that, but storage space for the firm's growing reams of paper was fast becoming a problem.

F-85 Mini

Spencer finally selected a Durango Systems, Inc. F-85 minicomputer, a system that offered features to fill all of Western's needs.

Western had actually begun its office automation in a small way several years ago when it obtained a bank payroll service to handle employee wages and withholding. After the bank payroll service was no longer adequate, it moved to a time-share service that included an on-line terminal. "It was nice having the terminal in the office, so that data could easily be entered and changes made without a fuss," Spencer said.

Unfortunately, the time-shared system did not provide job cost or accrual capabilities and required Western to record the day's activities on computer paper, and that in turn had to be stored. As the business grew so did the volume of paper, requiring more and more storage space.

The lack of data-handling capability combined with the prospect of having to increase Western's storage space and accounting staff was overwhelming justification for seeking a business computer capable of meeting present and future needs while maintaining cost-effectiveness, Spencer said. Having spent three years gathering and studying data about business computers, he felt he was in a good position to make the best selection.

Software Needs

Spencer, aware that software to satisfy a maintenance company's specific needs does not just happen, said "I heard a lot of proposals by computer salesmen. They tried to convince me their standard business software would do the entire job, but I knew better.

"I had learned to ask very specific questions about information I wanted from the computer.

"I wanted to be able to track all direct costs associated with each job; automatically accrue vacation and sick leave for each employee; accrue workers' compensation cost; prepare a self-audit report monthly; and define and maintain a union report capable of

(Continued on SR/4)

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Seventy Percent are 'First-Timers'

Small Users Value Maintenance, Ease of Use

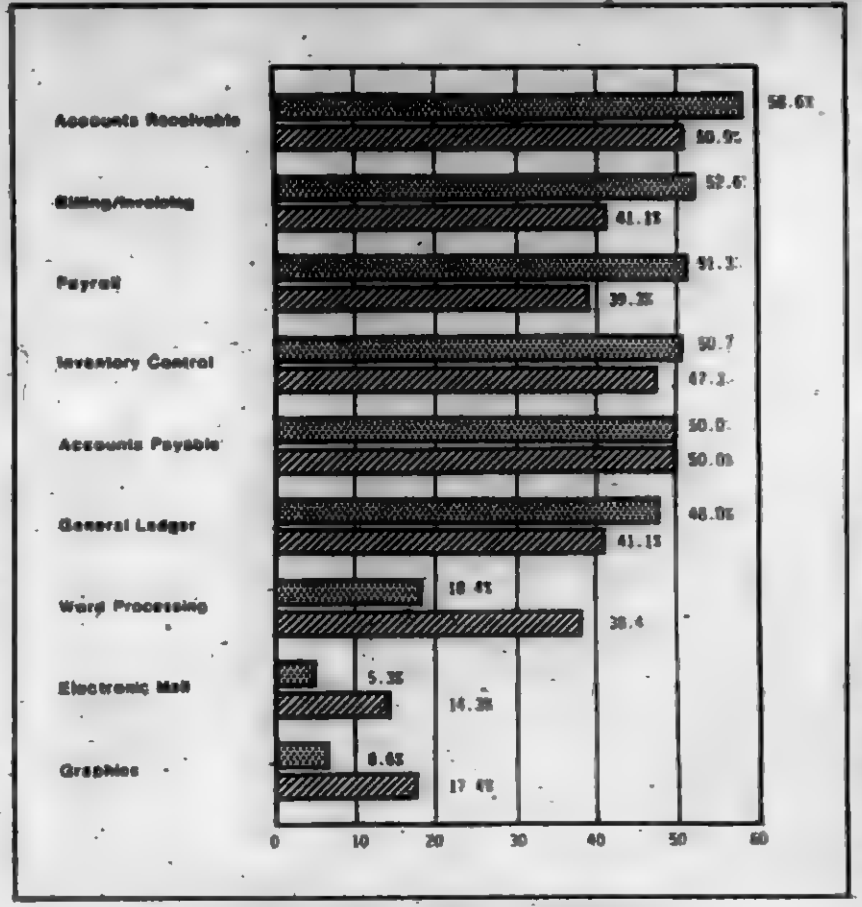
By Karen E. Rosenfeld
Special to CW

WELLESLEY, Mass. — Despite their name, small business computers are not used exclusively by small businesses.

Small systems are also used by Fortune 500 companies in individual departments such as accounting and payroll and as part of companywide distributed data processing networks. Large companies utilize small systems as a cost-effective method of handling specific business-oriented applications, while small companies, two-thirds of which have annual sales of $10 million or less, use them to automate their most time-consuming and paper-generating activities.

Three-quarters of all small business systems are used in four major industry sectors: services (25.3%), manufacturing (20.6%), wholesale/distribution (18.2%) and retailing (10.3%). Therefore, a key problem facing vendors of such systems is how to meet the needs of users who differ in terms of company size and industry type. How can vendors offer applications and services suited to user needs and develop effective channels of distribution to get the complete package to the user?

A recent survey by Venture Development Corp. (VDC) here takes an in-depth look at all these areas in order to provide industry participants with data on which to base future product and marketing strategies.



Small Business Computer Applications

What Users Seek

VDC surveyed present users and potential users to determine exactly what they want in a small system. Maintenance, service and ease of use are top on the list of selection criteria for both users and potential users. Applications availability is second in importance among potential users, while reliability ranks second for present users. Price is the next most important criterion for both present and potential users.

Other key selection criteria are flexibility, ease of programming and expansion capabilities. Criteria less crucial include vendor image and training.

Since more than 70% of small system users are first-time buyers with no computer experience, it is understandable that maintenance, service and ease of use are thought vitally important. Users need systems that can be operated by staffers without extensive training, since few small businesses can afford to hire experts to run their equipment.

First-time users also require handholding through all phases of installation until the system is up and running, and they need the assurance that, if something goes wrong, downtime will be kept to a minimum by fast and efficient service and maintenance. A small company's budget can't tolerate costly downtime and excessive installation delays.

Potential small system users are also concerned about applications availability. Small business owners and mangers want to make sure that systems will work in their own "unique" situation. First-time users typically consider their particular processing needs as truly special, and vendors should be careful to reassure the customer by getting to know his business inside and out before proposing a system and applications software.

Horror Stories

In talking with potential users, VDC found that many were wary because they had heard horror stories about businesses similar to theirs which ran into debilitating problems while installing a system. One potential user in the Midwest cited a story he had heard about a businessman who waited more than a year for his system to be fully operational. During this time, the frantic businessman had to employ two software specialists in order to make his applications programs work.

Small businesses in particular have neither the time nor the money for that type of setback; and the spread of such stories, however apocryphal, underlines the genuine fear some potential users have. Small users want applications suited to their needs, and once they've decided on a system, they want it up and running with no delay or additional expense.

In a small business, accounting functions are generally the first to be computerized, since the simple repetitive operations lend themselves easily to computerization via canned programs. VDC's research shows that the standard accounting tasks of accounts receivable, billing/invoicing, payroll, inventory control, accounts payable and general ledger are the applications for which both current and potential small system owners would most often use computers.

Other applications mentioned by more than 20% of present and potential users include sales analysis, order entry, financial management, report generation, transaction processing and mailing lists.

The accompanying figure also shows three related applications which VDC believes will experience rapid growth over the next five years — word processing, electronic mail and graphics. The first two are tied in with the growing trend toward the automated office of "office of the future." The third, graphics, will be used primarily on higher priced small systems.

Word Processing

Word processing is presently done by only 18.4% of small system users. However, nearly 40% of potential users expressed interest in having word processing capability as part of their system. This makes sense for a small business which probably won't run its system full-time for data processing. With word processing capability, the system can serve double duty to automate office functions such as letter and report writing/editing.

Since electronics mail applications require a system with communications capability, and since fewer than 30% of present owners use this capability, it is not surprising that only 5.3% of small system users make use of electronic mail. However, 14.3% of potential users expressed interest in electronic mail, particularly in departments or divisions of larger companies. One factor spurring usage of electronic mail is the continuing rise in postage rates.

Larger companies will also account for most of the growth in graphics applications, since a more expensive system with larger memory and communications capability is required. Among present users, 6.6% use graphics, while 17.4% of potential users are interested in this application.

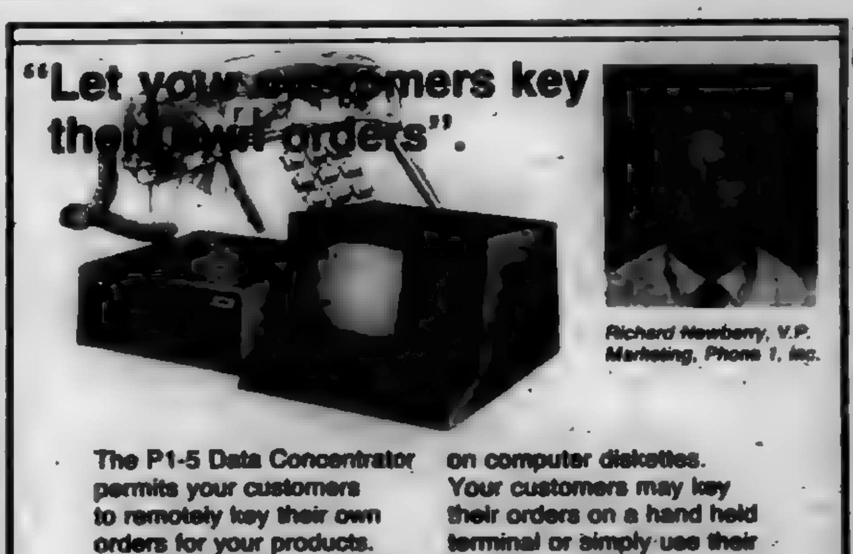
Users Don't Want Waves

Small businesspeople are particularly interested in small systems that meet all their processing needs with a minimum of disruption to current operations. They overwhelmingly prefer industry-specific applications packages tailored to their business, rather than general applications packages which might require a change in company procedures to suit the applications packages which might require a change in company procedures to suit the program.

To be successful, vendors will need to develop applications packages for specific businesses. The large number of retailers, medical and law practices, insurance agencies and wholesalers/-distributors suggest the enormous potential of an "industry-specific" marketing strategy. A general accounting package, for example, could be used in a medical practice, but an accounting package designed to incorporate third-party billing and other requirements unique to the medical business is far more desirable because it requires no additions or modifications.

One marketing specialist from a major small system manufacturer put his finger right on the problem. "Vendors just don't understand the importance of having people familiar with the industry writing applications packages,"

(Continued on SR/4)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Richard Newberry, V.P. Marketing, Phone 1, Inc.

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First-Time Users Who 'Go It Alone'

By Steven D. Bell

Special to CW

As technology advances and equipment prices fall, the minicomputer is finding its way into many small businesses. Small manufacturers, retailers and professionals can now take advantage of this "electronic marvel" in their daily operations.

However, for the first-time user, the process of selecting, acquiring and installing a small business system can be a confusing and frustrating task.

Contrary to popular belief, the small computer user needs at least as much professional guidance and expertise as the large mainframe user. Large amounts of time and effort are required to determine informational needs, document existing systems, select minicomputer hardware and evaluate software packages. And while a few inexperienced users have successfully overcome these difficulties on their own, many more have met with disaster. The less a first-time user knows, the greater the risk of failure.

The problems associated with defining needs and setting goals are especially acute in small businesses where operating procedures often evolve without any real planning or documentation. In such an environment, the true nature of operational problems are not always recognized. The decision to acquire a small business system may represent the "solution" to a perceived problem, but may not address its true cause.

Thus, installing a minicomputer may actually worsen the situation. Perhaps a company's informational needs can be satisfied by streamlining existing manual procedures or by employing a service bureau.

It is important that the would-be minicomputer user adequately define his needs and objectives before proceeding, enlisting the aid of a competent professional if necessary. The time and money invested at this point will be returned many times over the course of the installation.

Entering Marketplace

Let's assume that an informed decision has been made to acquire an in-house minicomputer system. Now the inexperienced user must enter the complex world of the small computer marketplace. Unfamiliar concepts and vocabulary make the difficult process of hardware selection and software evaluation much harder for the first-time user. Unfortunately, this lack of understanding is often exploited by vendors in the rush to close a sale.

Minicomputer hardware vendors tend to emphasize reliability, capacity and ease of operation when dealing with the first-time user. And, indeed, these are important considerations when selecting a small computer or any other piece of equipment. But it is important to keep them in perspective.

Today, almost all minicomputers are well-built and reliable. But, as with any other piece of equipment, they will occasionally break down. When this occurs, the most urgent consideration will be getting the system operational in the shortest time possible. Thus, the first-time user's prime reliability concerns should focus not on the equipment itself, but rather on the vendor's service record. A service contract detailing repair capabilities and response times is a must, as is an agreement for continuing preventive maintenance.

User Battles Overhead

(Continued from SR/2)

handling variables associated with the nine unions and/or locals with which we deal.

"None of the computer companies had software capable of doing that job, including Durango."

Durango, however, was willing to develop Western's special software at considerable expense of its own because it felt other companies would require the same capability. "They impressed me with their willingness to work closely with my company in defraying part of the system's cost," Spencer said.

Although the software was developed for the typical janitorial service company, it can be used by other companies interested in monitoring the direct costs associated with individual jobs.

"The system has helped with a number of tasks not easily assigned to a clerk," Spencer stated. "For instance, we now get a profitability report from the computer for each individual job, combination of jobs by client or all jobs by geographic area — something that would be cost-prohibitive to prepare manually."

The job-cost system provides for up to 99 cost codes and 999 process codes. Each line item prints units, dollars and the percent of total cost.

Job-cost analysis reports supply management with annual or term contract totals (revised price), billing, payments, total cost, profit and loss and all year-to-date with percentage of billings. This system also provides job-estimate and comparative capabilities.

System Installation

Western's F-85 computer system incorporates a central processor with 64K bytes of memory, a keyboard, a 165-char./sec bidirectional printer, a CRT terminal, and two minidiskette storage modules in a single 65-lb desktop unit just a little larger than an electric typewriter. The system also includes an optional 24M-byte fixed disk.

After the purchase had been made, the next steps were the installation of the computer systems and training of Western's office personnel. Training time turned out to be minimal, but Spencer was quick to add, "That doesn't mean you can expect to convert from your manual bookkeeping system to a specialized automated system overnight — it just won't happen. Minor problems are inevitable in a changeover."

Starting with the standard software packages (accounts receivable, general ledger, accounts payable, invoicing/-inventory and payroll), Western was on-line in just 10 days with Durango's help. "We took delivery of the F-85 system Nov. 16, 1979, the fixed disk on Dec. 14, 1979 and we were running parallel with our time-share system Jan. 8, 1980," Western's president pointed out.

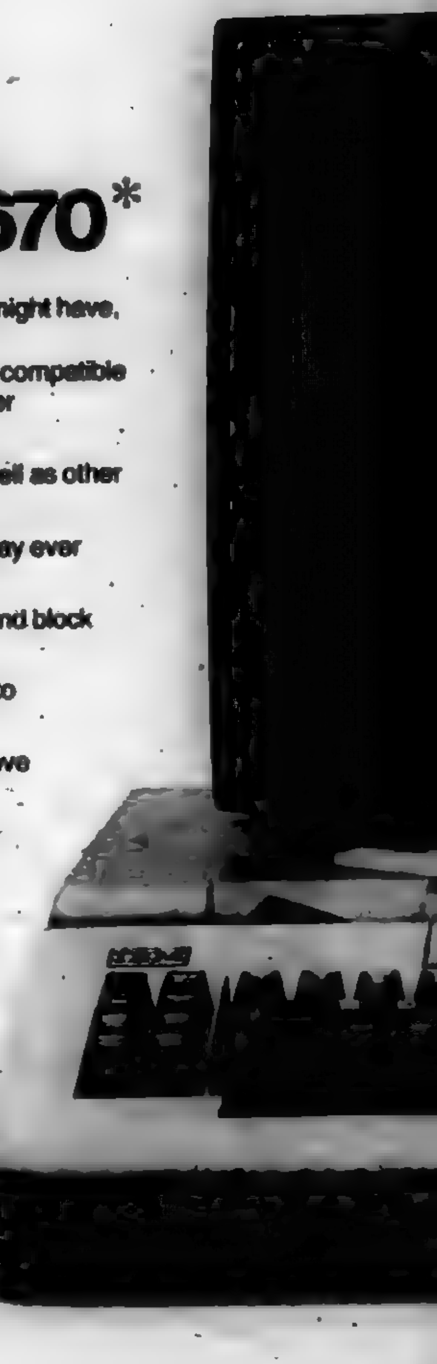
Small Users Value Upkeep

(Continued from SR/3)

he said. "Programming background isn't enough! Accountant should be writing packages for CPA firms! Lawyers should be writing legal packages!"

It's not enough, though, for the vendor to identify user needs and develop applications to fill these needs. He must then set up efficient channels of distribution to reach the businessman. Industry leaders already have existing channels as well as the financial resources to develop new ones.

Rosenfeld is a member of the research staff in the Computer Consulting Division of Venture Development Corp., a Wellesley, Mass. company that specializes in strategic planning and marketing research to electronics companies.



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Might Meet With Disastrous Results

Hardware capacity specifications can be extremely confusing to the first-time user. Statistics about instruction cycle time, read-only memory (ROM) and random-access memory (RAM) sizes, disk access time and so on have no meaning to the small businessperson who wants to know whether the system will work for him.

A hardware vendor's sales representative often does not have the skill necessary to answer this question. A lack of knowledge about the user's business operations and his expected software applications also reduces the vendor's usefulness in determining appropriate hardware capacity.

Without expert guidance the inexperienced small system user may find he has acquired a Porsche, when he really needed a pickup truck.

Modern minicomputers are much easier to operate than their predecessors. In fact, most office workers familiar with typewriters and adding machines can learn to operate the equipment in a short period of time.

However, it is much more important that a minicomputer be operated correctly as compared with a typewriter. Do not be misled by advertisements showing children happily programming their homework assignments on their own minicomputer. Incorrect operating procedures can quicly become costly problems. Operator training should be included in the purchase contract.

Probably the single most important consideration after the decision to acquire a minicomputer is application software. Without suitable software, even the best computer is just so much dead metal. Unfortunately, most first-time users are not aware of this fact, and may wind up with a system that doesn't perform as intended. Computer professionals have heard the story time and again of the small businessperson who buys a minicomputer only to find it doesn't work because there is no software for it.

Bell is a consultant with Integrated Management Systems of Redlands, Calif. specializing in small business systems and software.

ASCII two step

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___Model 12	RS-232C point to point/20MA current loop	$1320
___Model 13	RS-232 & RS-422 point to point	$1320
	IBM 3101 Display – Block Models	
___Model 20	RS-232 point to point	$1495
___Model 22	RS-232 point to point/20MA current loop	[illegible]
___Model 23	RS-232 & RS-422 point to point	$1520
___Model 01	IBM 3102 Printer	$1295
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Insurer Cuts Processing Lag, Saves $6,180/Year

Special CW

DENVER — By automating clerical functions, Harper Reed Corp., a general insurance agency here, has increased cash flow, improved service to its agents and reduced overhead costs.

Its Digital Equipment Corp. Datasystem 310 maintains in-force-policy files, agents' listings, accounts payable, expirations, aged accounts receivable and mailing lists. The system saves $6,180 annually over the cost of the computer service bureau used previously.

Harper Reed was formed in January 1978 to serve as a general agency specializing in home and recreational-vehicle insurance. A general agent functions as an intermediary between independent agents and several insurance companies. They underwrite policies, bill agents and forward payments to the insurance carriers.

The company writes in excess of $1 million in premiums annually through 4,100 agents in 11 western states.

Time and money were the basic reasons for changing from the service bureau to an in-house business system. "Previously, we closed our books approximately 10 days before the end of the month," Brian Smith, Harper Reed's founder, said. "We then sent the material to the service bureau in Tulsa, Okla., since there was no local bureau with a general agency program.

Louise Collins inserts phonograph-record-sized floppy disk into Datasystem 310. Disks contain general agency programs as well as complete data on in-force policies, independent agents in the 11 Western states served by Harper Reed Corp. and mail lists.

"The bureau returned it on about the 10th of the month. It then took about five days to collate the statements for mailing to the agents. On the average, there was a lapse of two weeks in every monthly period."

The time delay caused a number of problems. The agents received statements in the latter part of the month which did not reflect payments made between the 20th and the first. In some instances, the agents were billed for policies they had not yet received. Occasionally the insurance carriers would bill Harper Reed for policies that were not yet in effect.

"When I received a bill for more than $1,000 from the service bureau, I knew something had to be done," Smith stated. "I started calling insurance agents in town to find out who was knowledgeable in insurance programs and computers."

Smith was referred to the Professional Automation Group, Inc. in Denver, Colo., an independent supplier of DEC Datasystems that specializes in the insurance industry. The company provides turnkey management systems for independent insurance agents.

After examining the requirements, Professional Automation recommended a DEC Datasystem 310 with 32K characters of main memory. The compact desk-sized computer has four RX01 floppy disks giving a total storage capacity of more than 1M characters, a VT52 CRT terminal for data entry and a 180-char./sec printer.

"We looked at systems from several other manufacturers," Smith noted, "but DEC seemed to have all the advantages. It is a large well-known company, service is available locally and the system was immediately available."

Smooth Start-Up

Professional Automation wrote the general agency software especially for Harper Reed and is marketing the programs to other firms. "They entered all our data into the floppy disks during March 1978 and then ran the programs as a test. In April the complete system was delivered. In effect, they simply rolled the machine in the room, plugged it into the wall and we were in business," Smith recalled.

All of Harper Reed's staff are underwriters with no previous computer experience, so Professional Automation conducted a three-day training course.

Harper Reed has a complete listing of about 8,000 in-force policies stored on two floppy disks. Each listing contains name of insured, policy number, agent's number, effective policy date, policy expiration data, amount of premium and transaction code (new business, renewal, endorsement, cancellation). The policies themselves are stored in conventional file cabinets.

All important data can be viewed on the Datasystem 310's CRT terminal or output on the printer. The Datasystem 310 sorts the policy lists and deletes cancelled and expired policies from the file as well, adding new and renewal policies to the in-force file. It also selects and prints expirations for the agents or for Harper Reed and prints the in-force file once a month.

On command, the system automatically compiles and prints agent statements, aged acounts receivable, cash disbursements, company accounts current and trial balances.

The general agency software also includes statistical programs with prepared monthly production reports by agent, state and product.

Agents' Statements

"We are able to work right up to the month's end. Then the computer automatically prepares comprehensive country-club statements detailing every transaction for our agents," Smith said. The statement indicates the policy number, name of insured, transaction and class code (whether it be homeowner's, mobile home, motor home, travel trailer, motorcycle, snowmobile or aircraft). It also shows the gross amount of the premium, the percent of the commission, the commission amount and the net payable.

(Continued on SR/8)

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ORDER FORM

Wise Shopper Will Stick to Basics

Buying First System: A Suggested Strategy

By Peter Beal
Special to CW

WESTBORO, Mass. — Advances in computer technology plus declining prices give the small business system buyer some real opportunities to win big and make a smart purchase.

To buy wisely, you should do three things: First, start with a positive attitude and don't take no for an answer the first time somebody tells you you can't do what you want to do. Second, take time to educate yourself about small computers and how they might fit into your business. Third, when you see what looks like the smartest buy for you, weigh the risks against the benefits one more time before you take the plunge.

For a few hundred dollars, you can buy a home computer that can do complex calculations, play games and teach you a great deal about computers. But to computerize your business, you need a business computer.

Home computers have a number of serious drawbacks for serious business use. For one thing, they have limited expansion capacity. Few software packages for home computers can handle the volume of data required for serious business applications (inventory control for a distribution business would be a good example.). And the manufacturers of home computers may not be able to provide the level of support business users require.

Computerizing a small business is a major step, and you need to protect yourself. You want to know that the company that builds the computer is going to be around for the long haul. You should feel secure about the availability of continued support, parts, trade-in, compatible add-on equipment and upgrading capability.

For most small businesses, the greatest potential benefit from the use of computers lies in the basic business applications — order entry, accounts receivable, accounts payable and general ledger. It is in these areas that you have the greatest likelihood of success.

Both computer users and suppliers have devoted a vast amount of energy to develop effective methods of handling these tasks. As a result, there are more proven, reliable software packages available in these areas than in any others. These are also the areas in which you have already developed manual systems. What you have learned using those manual systems will stand you in good stead when you computerize.

Sticking to Basics

Standard accounting applications also offer great potential for profit. A computer can often pay for itself in less than two years in any one of the basic applications, and even more quickly if it is used in several. Sticking to the basic business accounting applications guarantees the most computer performance for your money.

Off-the-shelf, unmodified software packages will give you the most value for your investment. As soon as you begin to modify a package, you begin to lose the benefits you wanted from a package in the first place: low cost and a field-proven product. Modifications are costly and may compromise the package.

Custom software is the most expensive type, and may be less reliable since it has never been fully field tested. Later on it may make sense to develop your own programming capability or to buy custom software, but if you are buying your first computer, start with reputable packaged software.'

If you do buy off-the-shelf software packages, you should stick to products that have a known track record. There are a number of packages available which have been installed in hundreds of locations and have been used widely for years. Most of these are offered by established software firms and computer manufacturers. With this kind of product available, there is no reason to take a chance on an untested package. Its lower cost or added features won't do you much good if you find yourself constantly having to fix bugs.

Service Contract?

Some people are convinced that a service contract is an expensive extra. Others are equally convinced that a service contract is both a necessity and a bargain, an inexpensive way to protect an absolutely critical component of their businesses. We consider it essential for the first-time computer buyer, at least for the first year. At that point, you can reevaluate your position on the basis of a year's experience.

Your greatest asset in installing a computer in your business for the first time will be the people who work for you. Some thoughtful preparation can guarantee their enthusiastic support and participation.

First of all, assure everyone that the system isn't going to take anyone's job away. One of the principal reasons for buying a computer is to cut labor costs. However, the savings is almost always realized in terms of greater productivity based on existing staffing and reduction of future additions to your staff. This is especially true in growing organizations.

As soon as the computer is installed, give everyone on the staff a chance to

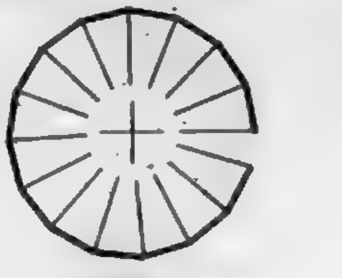
(Continued on SR/8)

What's the difference between BASIC and Pascal?

in BASIC

"This is easy ..."

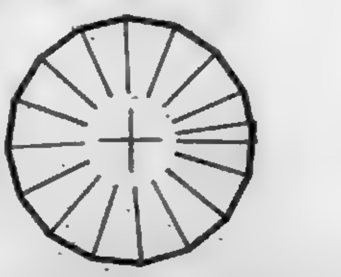
```
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



"Oops, didn't quite meet ...

... but that's easy to fix."

```
100 MOVE R,0
                   +25
110 FOR T=0 TO 360    STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



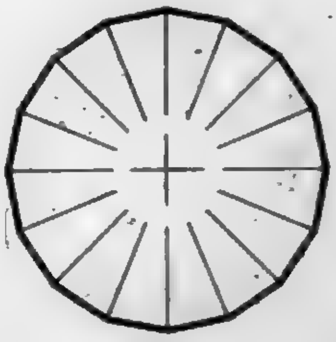
"Oh, now it closes ...
in fact, it overlaps."

Programming by trial and error

in Pascal

"The simplest circle drawn with line segments is a regular polygon ..."

```
procedure Circle (X, Y, Radius: real);
const Sides = 16; Pi = 3.14159265;
var   N : integer; Theta : real;
begin
  Move (X+Radius,Y);
  for N : = 1 to Sides do begin
     Theta : = 2 * Pi * (N/Sides);
     Draw (Radius * cos (Theta) + X,
              Radius * sin (Theta) + Y);
     end;
end;
```



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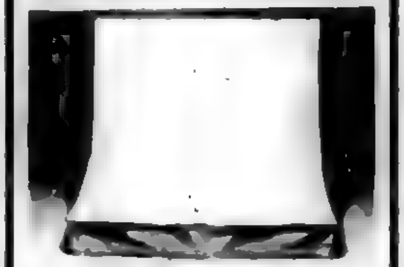

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1916	NEC Spinwriter w/o keyboard
1917	TI-810
1918	DEC LA34 w/o Tractor Feed
1919	DEC LA-30, LA120, LS180
1920	DEC LA-36
1921	Centronics 779, 780
1922	Centronics 101, 102, 103
1923	Gantel 4012

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Buying First System: One Strategy

(Continued from SR/7)

become familiar with how it works and what it does. Make sure people understand how it can make their jobs less tedious, more creative and more productive. And emphasize the fact that you don't have to be a computer expert to use the system. Self-training is one of the strengths of small business computers, and you can take advantage of this capability to get people involved.

If some of your people resist the system initially, be patient: once converted, these people may eventually become its staunchest supporters. And be careful not to prejudge who will catch on to the new computerized procedures most easily. Give everyone a chance and you may be surprised.

Don't Oversell

Finally, be careful not to oversell the system. It offers significant benefits, but it will succeed only if the people using it are willing to make the effort to understand its capabilities and use them effectively.

Try to get only one application up and running at a time. Then, when it looks as though you can turn the job over to the computer, don't. Run both manual and computer system in parallel for at least a month before you depend on the computer totally. You can use this break-in period to solve the problems that will inevitably appear.

Start with the easiest, most straightforward applications. Pick an application in which the software package most nearly matches your current manual procedures, the existing data is well organized and there is a minimum of pressure.

In the course of getting this first application running, you'll have to deal with any number of minor problems, most of which you'll solve easily. But you will be a lot better off getting these nitty-gritty details out of the way before you get into the more difficult applications. Then, with fewer distractions, you'd be able to put all your energy into solving the real problems.

Buying a computer isn't like buying a car. You've bought cars before, and you know what you want. Chances are you have never bought a computer before. You need help! The most cost-effective way we know to get help is to pick a computer vendor carefully, discuss your requirements in depth and realistically and then trust the vendor to help you make an evaluation of your technical requirements. Trust your own judgment when it comes to evaluating the business side of the computer installation, but trust the vendor on the technical questions.

The day the new system comes in the door, it should have more capacity than you think you need. Given the inevitable degree of uncertainty in your estimate of your needs, buying a computer that is already at or near its capacity means you run the risk of being cramped and frustrated before the system pays any dividends. Then you'll be back to ground zero, without really getting up to speed. Having enough capacity from the start to carry you through for a year or two gives you a better chance to make the system succeed, and it will let you grow smoothly.

By the same token, you should buy a system that is not only big enough to begin with, but which can expand easily. Then, as your business grows, you will be able to expand the system simply by plugging in additional memory modules, adding terminals or adding a larger disk memory. You should even be able to upgrade the speed and processing capability of the computer itself without getting a new processor.

Finally, you should buy a computer that is part of an integrated, compatible family of computers. Then, if you need to move up to a new level of computing power, you will be able to do it without having to discard all the software, peripherals and procedures you are using on your first computer. By that time, your investment in the original system will be substantial, and losing it will be a big step backward.

Boni is a sales manager at Data General Corp.'s General Distribution Division. This article was excerpted from The Insider's Guide to Small Business Computers, *which is available for $6.95 from DG, Mail Station A-225, General Distribution Division, Westboro, Mass. 01580.*

Insurer Reduces Processing Lag

(Continued from SR/6)

In short, "the statement gives the agent all the information he needs, whether he has one policyholder or 15," Smith continued. During the summer, he added, the Datasystem prints more than 800 statements in one and a half hours, allowing mailing during the first week of the month.

To give the agents timely notice, the Datasystem 310 sorts and prints expirations by agent account numbers and supplies the listings on one form. This gives them three months' advance notice, which is sufficient time for contacting the insured. The agent requests the renewal on the form and returns it for entry into the system. Printing the expirations normally requires less than 30 minutes.

The firm uses direct mail extensively, not only in dealing with its contract agents but also with other independent agents. The Datasystem 310 produces labels sorted either by name, state or Zip Code. In-force policy listings and mail lists are the most time-consuming printing operations, normally requiring two to four hours. However, they may be done in small sections, so the computer is not tied up.

The Datasystem 310 "reduced my expenses, increased my cash flow and allowed us to give better service to our agents," Smith stated. "We obtained the system through a third-party leasing firm for $466.28 per month, while paper costs are about $30 per month. The total is less than one-half of the service bureau's charges. If we tried to do the same work manually, I estimate it would cost more than $16,000 annually in clerical time."

Smith pointed out that savings are primarily those of cost avoidance, rather than reduced staffing.

As business continues to grow, Smith anticipates using a system with a hard disk that stores up to 5M characters.

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Avoid Dependence on One Vendor

Package Interface Headaches Can Be Eased

By John J. Sterback
Special to CW

NEW YORK – "It peels, it grates, it babysits for your kids, enhances cash flow and interfaces with any kind of accounting system package you may be using. It is also available in a variety of colors, sizes and languages."

While such claims may not be part of every software sales pitch, a lot of vendors are marketing their packages using methods popularized by late-night television. Although this method is not usually used with mainframe packages, it is not unusual with many mini and micro software systems.

The distributor of mainframe software can and must provide a comprehensive package for the sophisticated user with a staff thoroughly versed in the language and operating system utilized by the package. But the typical mini or micro user does not, nor should he, maintain this type of staff.

This is not to say that all interfaces between packages on small computer systems are objectionable. Integration, when optional, is desirable. It is most efficient when data can be automatically passed between packages, such as one for order entry and another for accounts receivable.

The key work here is *optional*. If I choose to buy my accounts receivable package from another vendor, what penalty will I pay? Do I, in fact, have any choice? Can any other software vendor assist me if I become dissatisfied, for any reason, with the current vendor?

It has been my experience that program modifications necessary to interface to existing systems exceed, in many cases substantially, the cost of the new and/or old package. The less dependence on any one vendor's software the better.

Routes of Protection

There are several ways for a potential purchaser to protect himself:

1. Purchase software that is available from more than one source. Many software authors market their packages through agreements that allow a vendor to supply software to an end user for a license fee. The vendor makes his profit from a combination of marking up the license fee and installation charges.

The end user has the option of seeking help from the author directly or through another vendor of the same packages if the original vendor proves unsatisfactory.

2. Purchase the rights to modify the source code. In most cases, modification will void any software warranty you might get from the vendor, but you wouldn't be making the changes unless the same vendor had not performed to your satisfaction. Be sure the language used is one in which you might readily find another source of assistance. This is not to say that you must limit yourself to Basic, Fortran or Cobol, but rather that you should avoid any language that is proprietary to the software vendor.

3. Assure yourself that the interfaces between packages are kept to a minimum. It is far better to reenter some data than be dependent on interpackage transfer. The degree to which you should avoid this dependence on one and two above. The more flexible your vendor options, the less concern you need have for this point.

4. The package should do little, emphasis on *little*, more than its name implies. An accounts payable package should collect the data necessary to print vendor checks. If as an option it collects some data for the general ledger package, you should not be required to enter general ledger data if you do not have that package, nor should the data be totally unavailable to a general ledger package from another vendor. The same rule holds for any package mandatory interface is to be avoided.

All software vendors look forward to a long and happy relationship with a customer. The better prepared the customer, the better that relationship will be. Mutual independence is the best path to that success.

Choose the package that does the immediate job; the small package that gives the desired results. The chances are, if you are pleased with a software vendor, the vendor can provide an interface between its packages.

Sterback is the vice-president of King-Smith & Associates, Inc., a computer consulting and applications software firm based here and specializing in mini- and microcomputer systems.

It has been my experience that program modifications necessary to interface to existing systems exceed, in many cases substantially, the cost of the new and/or the old package. The less dependence on any one vendor's software, the better. There are several ways for a potential purchaser to protect himself.

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DATA SYSTEMS FOR INDUSTRY

Service Should Claim High-Priority Status Among Selection Criteria

By David Fusco
Special to CW

After working with minicomputer and small business systems for more than five years, one can't help but collect a number of personal horror stories, anecdotes and user trivia.

My first encounter with a minicomputer was in 1975 at a Dallas company. The system was supplied by Mini-Computer Systems, Inc. of Elmsford, N.Y. and consisted of a Data General Corp. Nova 2 CPU, a Teletype Corp. Model 33, a Data Printer Corp. 600 line/min drum printer, four Diablo Systems, Inc. 10M-byte disk drives and four Hazeltine Corp. 2000-B CRT terminals. The computer ran under Mini-Computer Systems' Micos operating system.

I began using the system simply as an operator. I had been warned, during my interview for this job, that there were "a few problems" with this recently installed system. I quickly found out that the software — both applications and operating system — was far from perfect.

Corrections to the faulty software involved numerous long-distance calls (at my company's expense) to the hardware vendor in New York and even more calls to the software house in Montreal that had written the applications software under a subcontract from the hardware vendor. Although both of these companies had an obligation to get our system "up and running," people at both companies were frequently "not in," "at lunch" or simply indisposed.

Coupled with these problems was the fact that the four Diablo daisy-chained disk drives frequently caused the system to "Abend Task" at the highest severity level. After the expense of having the Diablo service people come out to diagnose our sick disk drives, we were told to bring our four very heavy, but delicate, disk drives into their Dallas office — they would not come to our location anymore, since they could not find any problems.

I finally took a shot in the dark and applied my audio experience to the situation. Noticing that the daisy ribbon cables between the disk drives were excessively long, and knowing that audio speaker cables of excessive length can cause signal loss, I ordered cables of the Winchester variety with a length that was more in keeping with the small distance between the four disk drives.

I developed some credibility with my superiors. We had no further disk drive problems and no more "Abend Tasks."

Software Solutions

As for the software problems, I finally took it upon myself to learn the system's Extended Basic applications language and to become as educated as possible about the Mitos operating system.

The excutives at the company at which I worked were initially not too enthralled about my newly found software knowledge. They did not want me "experimenting" with their expensive system. The software people at both the hardware and software houses, however, were elated. They probably thought that if I could learn how to fix their system, they'd have my company off their backs. So these people explained to my supervisor, in what must have been a believable manner, that I should most definitely be allowed to work with the system. After all, what harm could I do and/or what did they care?

Upon later discovering that I was, indeed, learning the applications language and software, the executives at my company jumped at the opportunity. Here was their chance to finally get their minicomputer system properly running, make necessary modifications and get new programs implemented. Needless to say, I was, from that point on, kept quite busy. And things vastly improved. My company's long-distance phone expense for computer-related calls dropped from $3,000 per month to almost nothing.

I found the education I got during this one-and-one-half year experience to be multifaceted. I successfully applied it to other companies at which I have been employed (as a systems programmer) and finally to my own company, almost one year old.

Some Pointers

Let me iterate a few points from my experiences:

When you are considering purchasing anything as expensive as computer hardware/software, consider the source. If it is miles away, does it at least have service representation in your area? Sometimes, people thousands of miles away just cannot be too concerned about your problems, even when they should be.

Will the vendor let you talk to some of its other customers — and not just the happy ones? If a vendor rep says he has *no* dissatisfied customers, he is wasting his and your time. Besides, the more people you speak to, the more valuable information you will receive — even if you simply get a tip concerning the placement of your equipment.

Sometimes most importantly, be very careful where software, especially application, is concerned. Beware of software vendors that tell you about their tailored "off-the-shelf" application packages that were especially designed for companies like yours (you know, the ones that will need no modification).

Make a note of those vendors that stick with you closely during your examination of various minicomputers and hardware/software. If they are interested in providing your software, they should know or at least be learning something about your business.

And, most certainly, do not feel the least bit ashamed if you ever do not understand what the vendor rep means when he mentions a bit, byte, CPU or any other computer term. Simply ask him to explain what you do not understand. If he cannot, maybe you should look elsewhere for your supplier.

David Fusco is president and founder of Microware Associates, a consulting firm based in Arlington, Texas.

Before Programming

New Users Must Tackle Problem Analysis First

By James M. Tharrington
Special to CW

STAMFORD, Conn. — A product that originated as an expensive toy is now rapidly penetrating the business environment.

While a great many microcomputer users still occupy their machine's times with the standard games and personal check-balancing routines, a lot of small businesses are turning to the micro to handle payroll, accounts receivable and other business chores.

Most business users clamor for "canned" solutions to a multiplying variety of business problems. Unfortunately, many of these canned solutions do not do what they promise.

After acquiring a microcomputer, the new owner invariably sits down with book in hand to begin writing programs, having been led to believe that programming is simple.

However, one crucial element is missing. Usually the neophyte programmer doesn't take the time to carefully and thoroughly identify the problem's parts and their interrelationships; and in the majority of cases, the problem is simply not being thought through.

The key to solving any problem is in understanding its complexity. Is any structure built without a blueprint? Of course not. The architectural analogy applies because the blueprint represents the analysis of a problem, with its solution presented in a visual form.

In data processing, there is a similar process. Prior to the actual "construction," or writing, of program code, the problem should be analyzed, evaluated and solved on paper.

For solving data processing problems, the tool most similar to the blueprint is the flowchart, a graphic (symbolic) description of a solution to the problem. While flowcharting may not work for every problem, the microcomputer user should always invest some time in identifying the components of the problem before writing a program.

Expensive Lesson

Everyone in the industry has stories to tell about people who learned the hard way about the importance of planning. I have a friend who, over a period of time, has invested some $9,000 in microcomputer hardware. On top of this, he has spent more than $1,500 for software purchased by mail and literally hundreds of hours trying to get the software to run or modifying it to his specific needs, not always successfully.

My friend spent very little time in the beginning of his involvement with computers on analysis of his needs or planning, but instead concentrated on "getting things to work." He has grown much wiser, but it was an expensive lesson that left a bitter aftertaste.

A small mail order firm that maintains its mailing list on a microprocessor had an equally distressing experience. The firm, not anticipating any changes to its mailing list, had optimized the number of records it could fit on a diskette. With microprocessors, every byte is important! While it is customary to optimize the use of space in a record, however, it is wise to leave some expansion space for contingencies.

For instance, when the Postal Service announced the forthcoming expansion of Zip Codes from five positions to nine positions, this firm was left with no space available on its individual customer records. To handle the proposed new Zip Codes, the company will have to undertake a substantial conversion in both its files and the programs that access these files because it did not plan.

'Native' Ability

As a teacher of data processing, I have found that people can be taught to program, but they cannot be taught to solve problems. They can be given the tools — for example, an explanation of flowcharting or of using algorithms — but problem solving is a "native" ability.

> *'Most business users clamor for "canned" solutions to a multiplying variety of business problems. Unfortunately, many of these canned solutions do not do what they promised.'*

Problem solving is thinking — and, as such, can't be taught. Only a person's native ability combined with experience can truly develop and hone problem-solving skills.

Therefore, don't blame your hardware — or even the software package you bought — if your new microprocessor doesn't solve all of your problems.

It may even create some new problems. Successful use of a small computer depends on your solving some problems before you begin to program.

Tharrington is a partner and principal with Case and Co. Inc., a management consulting firm headquartered in Stamford, Conn., and with branches throughout the U.S.

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DATAPOINT

Affordable for Small User

County Court Makes Case for Micro System

By Sidney W. Frost
Special to CW

COMAL COUNTY, Texas — Although computerized court systems have been around since the late 1960s, only those courts with access to large-scale computers have been able to benefit from their use. While minicomputer-based systems do exist, even these with their multithousand-dollar price tags are unthinkable for small courts with small budgets.

However, there is hope.

Recently, the Comal County court here broke new ground in the application of judicial technology by being among the first to use a microcomputer to manage its court cases and keep track of the people involved in these cases. The micro was developed by Justice Information Management, Inc. (JIM) of Austin, Texas, and not only can it track cases and people, but it can assemble information required for statistical and management reports.

"We were too small to afford a big computer and too large to continue doing everything manually," according to Judge Robert T. Pfeuffer of the 207th District Court of Texas. Pfeuffer, who was instrumental in bringing the microcomputer-based system to Compal County, admitted that officials were considering a word processing system until they heard about the JIM/100 system.

"The JIM/100 gives us the same capabilities as the larger counties but at a cost we can afford," he claimed.

Design Objectives

The designers of the system, Jim Dunlap, an attorney and former court administrator, and Joe Lucas, a computer specialist, were both involved in implementing a much larger version of the system when they worked for Harris County in Houston.

Dunlap, who has worked as a court administrator in Texas and Georgia, said, "Our objectives in designing the system were to make it simple enough that even I — a layman to computers — could operate it, and cheap enough to install in any courthouse in the country."

"It's very cost-effective because it's to easy to use. The customer doesn't have to have any data processing knowledge and no programmers are needed. We provide everything: the hardware, software, training and data conversion," according to Lucas, who programmed the system and patterned it after the one he implemented in Houston.

The heart of the JIM/100 is an Alpha Micro, Inc. computer system which was selected after a year-long study of available microprocessors. The system installed in Comal County includes three CRT terminals, two printers and a Control Data Corp. disk storage device. Additional equipment and capabilities can be added as the need arises.

Menu-Driven System

The software, written in Basic, was specifically designed for users with no data processing experience. It is a very nontechnical, menu-driven system. The user starts with a general menu which can easily be linked to more specific menus until the desired function is located and performed. Control automatically passes back to the previous menu after a function is accomplished.

The master menu lets the user select one of the following:

1. Name Inquiry.
2. Case Inquiry.
3. Person File Maintenance.
4. Case File Maintenance.
5. Docket System.
6. Code Table Maintenance.
7. Batch Reporting System.
8. Log Off.
9. Help.

Entering one of the function numbers, 1-9, takes the user to the next screen. Entering function Number 1, for example, would bring up a screen asking for the name, plus some optional qualifiers such as race, sex and date of birth, of the person the user is interested in. Upon entering the name, a display would follow showing everything the system knows about the person and the cases the person is associated with.

If function Number 5, Docket System, had been selected from the master menu, then the operator would get another menu from which to choose, containing such things as:

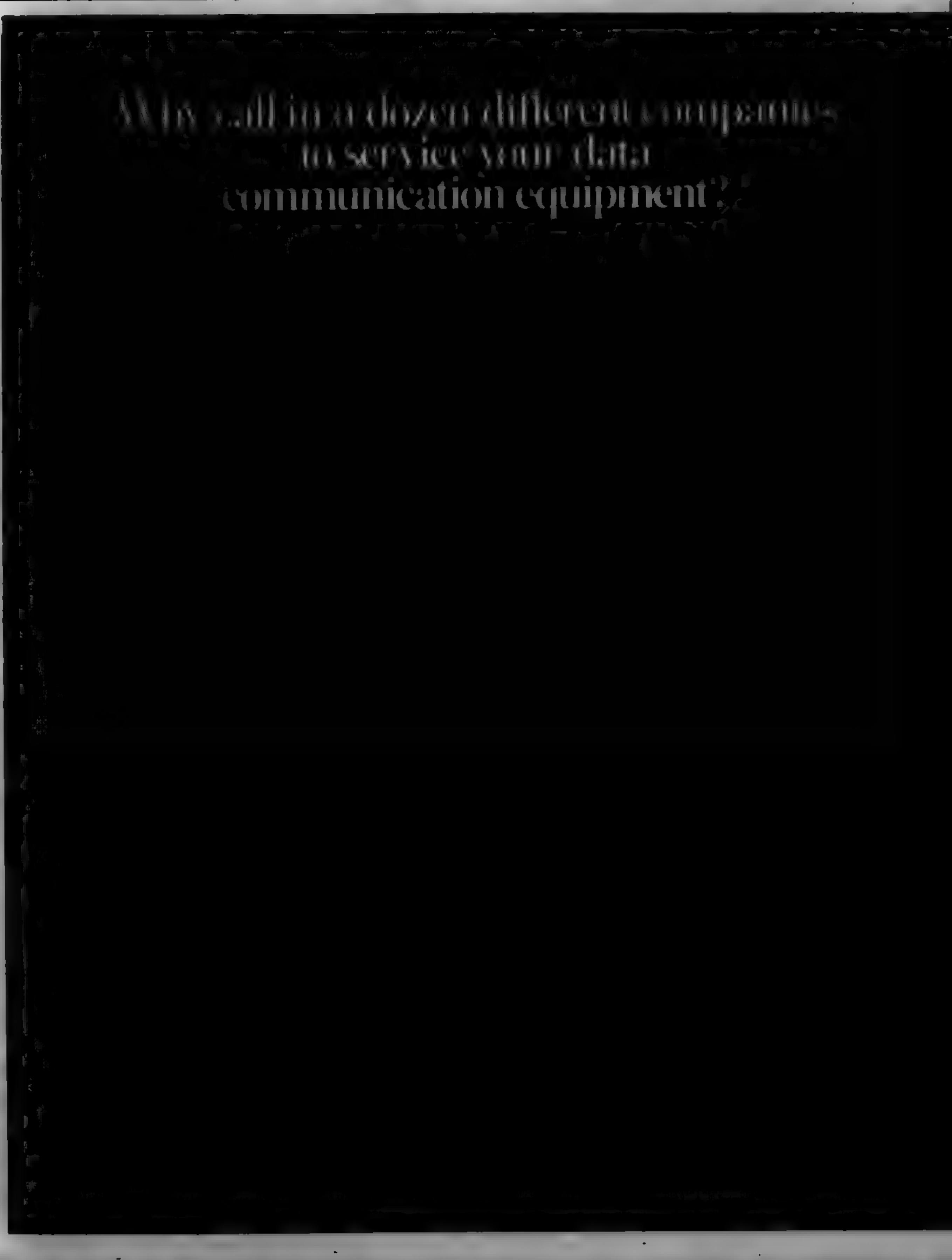
1. Set a Case.
2. View a Case.
3. Enter Results of a Docket.
4. View Results of a Docket.
5. Define a Docket.
6. Reset a Docket.
7. View All Dockets for a Day.
8. Enter Results of a Setting.
9. Docket Batch Reporting System.

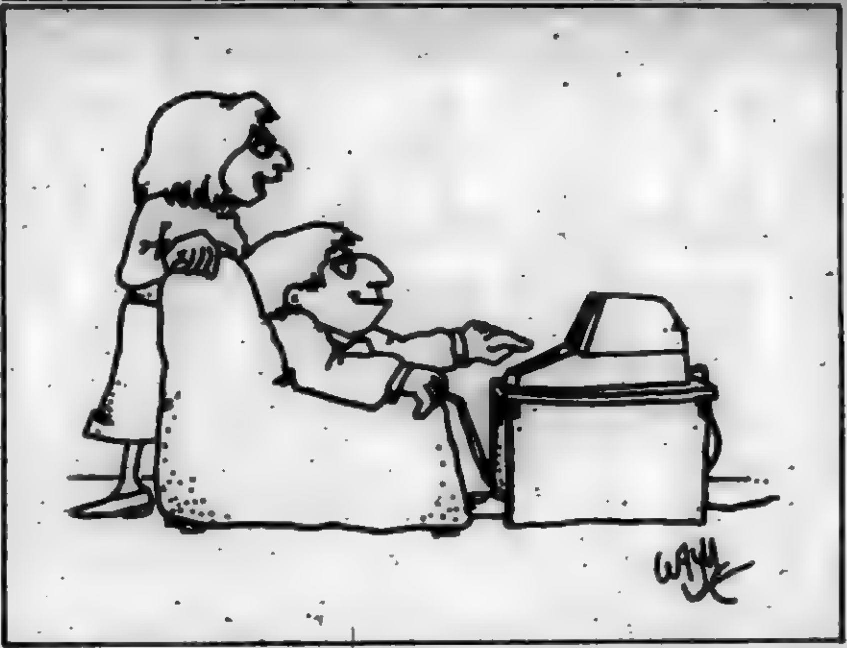
This same approach was successful in Houston and greatly eases the training tasks since the displays and functions are written in a language easily understood by county personnel. Comal County's court administrator, Martin Allen, also worked in Houston and had no trouble learning to use the Jim/100.

Micro Capabilities

Lucas, whose previous experience has been with only large computers, was amazed and pleased with the

(Continued on SR/16)





'You're Right, There's Better Programming on Your Computer Than on T.V.'

High-Level Small Systems Take on Variety of Roles; 'Best Buy' Often Unclear

By Jerry Klamushin
Special to CW

Small computers have evolved to a point where they are now both affordable and "friendly" enough to operate effectively in a small business or large corporation.

Innovations in hardware and software technology have created a situation where a wide range of products — from high-priced toys costing several hundred dollars to sophisticated business tools priced at less than $30,000 — are available to both types of prospective user. However, the distinction as to which type of small computer is the "best buy" for which user is often unclear.

From small businesses, we typically get the following questions:

- Can I get some real use out of the system within a month?
- How long will it take me or my operator to learn how to use it?
- How many CRT terminals can I get?
- Does the machine have a data base capability?
- Which vendor solution should I buy?

And from large corporations, we hear:

- Can the computer grow with the needs of my office?
- Can it communicate with our host mainframe?
- Can the small computer's software be transported to other systems?

The bottom line is that small businesses want to take advantage of low-cost automation without changing their business styles or their people to suit a machine. And large corporations want to use small computers as stand-alone tools for solving problems that can not be cost-effectively solved with larger systems.

Eye on the Long Term

When choosing a small system, first-time users sometimes consider only their present needs. But experienced users have learned to take a closer look at their long-term applications needs.

In order to help them avoid becoming second-time users too fast, we recommend that novice users enlist the services of a software specialist to review the necessary performance needs. A lower performance computer, such as a home computer, generally has limited storage and instruction-handling capacity, a single terminal, no data base capability and limited software. Clearly, although inexpensive, a lower performance computer is not for those whose business depends on a computer, or who have little programming knowledge.

High-performance small computers in the class of the Hewlett-Packard Co. 250 generally sell in the $20,000 to $30,000 range, but offer many powerful large-system features such as a data base manager, editing tools, multiuser growth and so on that make them truly practical business machines. Following are some capabilities to look for:

1. Multiple full-power terminal capability. A system should be able to grow to handle multiple remote terminals so it can be used simultaneously by more than one user in production, accounting or other areas. (Single-terminal systems are generally insufficient to cope with growth in small manufacturing or distribution firms.)
2. A data base system that allows quick answers to management questions.
3. Extensive and expandable storage.
4. Communications. A small computer should have the ability to communicate with a larger mini or mainframe in the event the company grows and the small computer can be used as

(Continued on SR/16)

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Recent Application for Minis

Personnel Record Systems Present Own Pitfalls

By Edward S. Goldmacher
And Joan A. Mitchell
Special to CW

The minicomputer is sending shock waves through the data processing industry. Small, yet amazingly fast and powerful, minicomputers are coming at us from all directions with applications that boggle the mind.

One relatively new application for the minicomputer is the human resource information system. Unlike the original concept of a computerized personnel system 12 to 15 years ago, the idea of applying the minicomputer to personnel record-keeping functions is finding almost instant acceptance. Additional record-keeping burdens imposed by legislation, employer awareness of the computer's role within corporations, and a higher level of sophistication in the personnel function of most organizations has led to this rapid acceptance.

Aside from the relatively low initial investment cost, the most intriguing aspect of minicomputers is their instant start-up capabilities. It is not uncommon for a manufacturer to offer a large selection of application programs along with the purchase of the hardware. Typically, within 60 days the machine is delivered, uncrated, plugged in and ready to go.

However, a word of caution is in order. Because minicomputer-based systems are admittedly flashy and attention-getting, many vendors appear to be selling the "sizzle" and not the "steak."

In many organizations, a payroll can be quickly defined or an inventory system easily documented; nevertheless, personnel record-keeping has its own set of criteria and its own pitfalls. Consideration of the following points before reaching an expensive and long-term decision may be helpful.

First, why even consider a minicomputer? For many organizations, this may be the only way to obtain data processing capabilities in the personnel function. The mini can be applied across the entire spectrum of organizational size, from the very small (where the minicomputer will be the only processor) to the very large (where the information processing function is looking to offload some applications from the host mainframe and put them on a network of dispersed minicomputers). The user must assess the personnel function's needs in light of overall processing capabilities.

A second point for consideration is the fact that payroll capability on a minicomputer is rare at this time. Although many vendors voice their intent to provide payroll capabilities "in the near future," most do not offer it as a current application. The implication is that the payroll system will run separately on a different piece of hardware.

A separate payroll system is not, in and of itself, a problem until the interface capabilities between the two computers are explored. Some type of communications program between the two machines must be developed or an extract file must be created from one system and used as input to the other. Duplicate record-keeping, reporting and file synchronization could become a significant problem in time and cost.

The separate-file problem can be further compounded in the benefits and pension administration area where accurate and up-to-date records (including historical records) are required. In addition, some computers have limited inherent calculation capabilities and rely solely upon the programs to perform the necessary work. As with payroll applications, these programs may not be available, depending upon the vendor selected.

A third and significant issue to be considered is security. Because these machines are intended to operate through input terminals that can be scattered throughout an organization, maintenance of security can be a significant problem. Although many systems provide some type of access code, some have security checks that are more sophisticated than others — and, as has been so often pointed out in the computer industry, nothing is 100% secure.

The problem is compounded by remote terminal applications, where the corporate personnel function may have little or no control. This may possibly result in the need for a company moving into a minicomputer application to assess, evaluate and, if necessary, modify its own security procedures.

Unfortunately for the prospective buyer, this relatively new field is going through many of the same painful, yet necessary, growth phases of the early human resource information system. To capitalize on the concept, a multitude of vendor organizations is appearing on the horizon. Some offer well-developed applications and provide the necessary documentation and support to make their systems effective. These organizations will thrive and prosper.

Other applications, however, have been developed by technically oriented companies with little or no understanding of the personnel function and limited flexibility to handle changing requirements. Although these applica-

(Continued on SR/16)

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(Continued from SR/13)

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5. Software tools to greatly simplify applications development. Such tools are used to quickly create screen layouts and reports, organize data and streamline user programming.

6. Soft key capability. An important feature of high-level small computer, soft keys enable an unskilled operator to call up various screen forms and execute preprogrammed applications with the press of a button. With soft keys, minimal training of operators is required — a plus in small firms where there can be high worker turnover.

7. Support service. Responsive support must be available if a small business is to depend on its computer.

In addition to a long useful life and increased productivity, a third benefit of a well-selected small business computer is startup time. Once a small firm gets the system, it should be up and running — with programs — within a few weeks of installation. Larger firms can afford a few months' delay in startup, but smaller ones seldom can.

Software specialists, or OEMs, are essential to small firms planning to implement their first system. Most OEMs HP works with around the world either began in the field they now service or served the industry as software specialists and service bureaus before small computers became generally available. By focusing on a "vertical" industry, an OEM is able to design hardware/software systems tailored to the needs of that industry.

In Large Firms

Until now, we have primarily discussed the requirements of small businesses. In large corporations, however, computers valued at less than $30,000 are now proliferating.

Why are departments of large firms buying small computers? It's all part of the increasing pressure on department managers to improve productivity and obtain up-to-date information. In addition, many firms want to computerize accounting functions in branch offices. Branch offices typically require a number of stations, good response time and a data-base capability to allow manager inquiries for decision making.

While networking applications are the most common for small computers in large organizations, many of these organizations are also finding it cost-effective to run a small computer as an outpost — particularly in situations where on-line inquiry/response capabilities are needed but access to a central company data base isn't.

A small computer in a large organization can be compared to the tricep muscle in the human body. For this analogy, a mainframe at corporate headquarters can be likened to the heart; the distributed computers at divisions, to a bicep muscle in the arms; and the small computer, which complements divisional functions and handles data for departments and remote offices, can be likened to a tricep, which is used for less heavy extending.

In conclusion, the market for small systems — both in large and small organizations — continues to grow as inflation forces firms to increase automation. High-level small systems — differing from large systems only in terms of disk, main memory and instruction-handling capacity — promise to become the preferred choice as the body of experience users also grows.

Jerry Klemushin is sales manager for the Business Systems Program at HP's General Systems Division.

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Personnel Systems Pose Unique Pitfalls

(Continued from SR/15)

tions are flashy and "machine-efficient," they do not address the underlying issues and leave an unsuspecting purchaser with hardware and software of little or no value.

The value of a package to the user always has been the ability to gain reasonably priced software with the development costs divided among the users. For an organization willing to comply with the prestructured environment developed by the vendor, the packaged approach will provide the greatest economy. For an organization requiring "nonstandard" applications, careful and thorough examination of the proposed package and subsequent negotiations with the vendor must be carried out.

One final point should be kept in mind: Because of the unique package characteristics of minicomputer-based systems, interaction between the client and the vendor will be minimal. Actual on-site vendor time will most likely be devoted to the delivery and installation of the machine and the subsequent user training time. It will be up to the client to decide which data is to be collected, how the collection is to be made and how the conversion will take place.

For the immediate future, "caveat emptor" again applies. Although minicomputer-based human resource information systems will provide capabilities not currently possible in the large mainframe environment, the procurement of such a system requires as much research and knowledge as any other computer-based activity.

Organizations contemplating a minicomputer for personnel use, either as a first system or as a replacement to a current system, should first analyze their data requirements. Once requirements have been studied, a request for proposal should be distributed among potential vendors. Vendors and products can then be evaluated based upon these criteria, and a logical decision on the purchase can be reached

Goldmacher is a consultant on human resource information systems and Mitchell is a word processing systems specialist. Both are with Towers, Perrin, Forster & Crosby, a management consulting firm in Chicago.

Court Makes Case for System

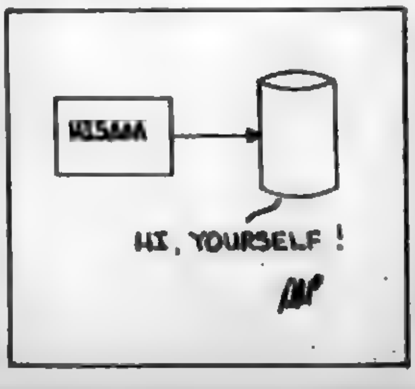
(Continued from SR/12)

micro's capabilities and response time. "Of course we've got a smaller data base here," he said, "but this system responds just like the 370 did in Houston."

Currently, Comal County is looking into the possibility of allowing neighboring countries access to their system via remote terminals which are also supported by the Alpha Micro system. "We do a lot of business with the same people," Judge Pfeuffer said, "and by providing them access to our records, we could prevent rescheduling of cases due to conflicts of attorneys and others involved in a case."

Right now, the system only tracks cases while they are in the courts. However, county officials are already looking into adding to the system at both ends of the judicial process. For criminal cases, for example, they want to add to jail booking system and a probation monitoring system.

Frost is a freelance writer living in Austin, Texas.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ANN ARBOR

Right Hardware-Software Combination

System Fills Dental Lab's Specialized Needs

Special to CW

JENKINTOWN, Pa. — While many small computer systems seem to offer the right features to fill standard business needs, few have the right hardware and software combination to satisfy specialized applications.

Jaslow Dental Laboratory, Inc. is a small business engaged in the manufacturing of dental prosthetic appliances. It is located about five miles north of Philadelphia and employs about 55 people.

Every dental laboratory has a method of entering and tracking cases through the laboratory and it usually consists of a work ticket produced in triplicate. The work ticket is a simplified version of a doctor's prescription and breaks down the procedures necessary to make an appliance, as well as the expected completion date. In a small-scale operation, inventory is normally done by hand.

However, if the lab's work load should expand, as in the case of Jaslow, the paperwork and correlation of data by hand can become a nightmare. Therefore, a computer would seem to be the logical solution to such problems. That is, if you can find the right system.

System Search

In its search for the perfect system, Jaslow examined a number of computers and turnkey packages. One of these systems was offered by Data General Corp., but while the hardware was basically good, the vendor recommended using another company's processor, which meant dealing with two hardware vendors. Having no experience in computers prior to this, the dental appliance maker found this approach confusing.

The company also looked at Burroughs Corp.'s B80 computer, however, in the demonstration, the machine didn't work. After 30 minutes of fumbling with the computer, a report finally came out of the printer. When problems were finally solved, the computer proved to be very slow in processing, although it had a number of bells that went off and made a number of official-sounding ticks.

In the middle of all this looking around, Jaslow was using a DP house for processing our data once a month for accounts receivable and weekly for payroll. The local company was bought out by a larger company in New York and the new representatives came out to our business and told the firm of all the wonderful data they were going to give it with their new system. At the end of the first month, the company had lost one week's worth of billing and not aged any of the accounts.

Jaslow returned the data for a rerun after they located the missing week and on the second run, the aging was done, but no service charges were included. The staff spent a weekend recreating the information and adding the service charges to the accounts and managed to get statements out by the 12th day of the month.

The next month, the statements reflected the data from the first run of the prior month, so the company again could not send out statements. This led to a stepped-up look into the computers and a firm commitment to buy and develop its own in-house data processing.

Further considerations went into purchasing a computer. Being a production system, down time was very critical and field support very necessary so that day to day productivity is not affected for long periods of time in the event of a breakdown. IBM showed Jaslow the Series/1 with a sealed fixed disk that is not sensitive to dust and dirt that all laboratories make and most computers cannot function in.

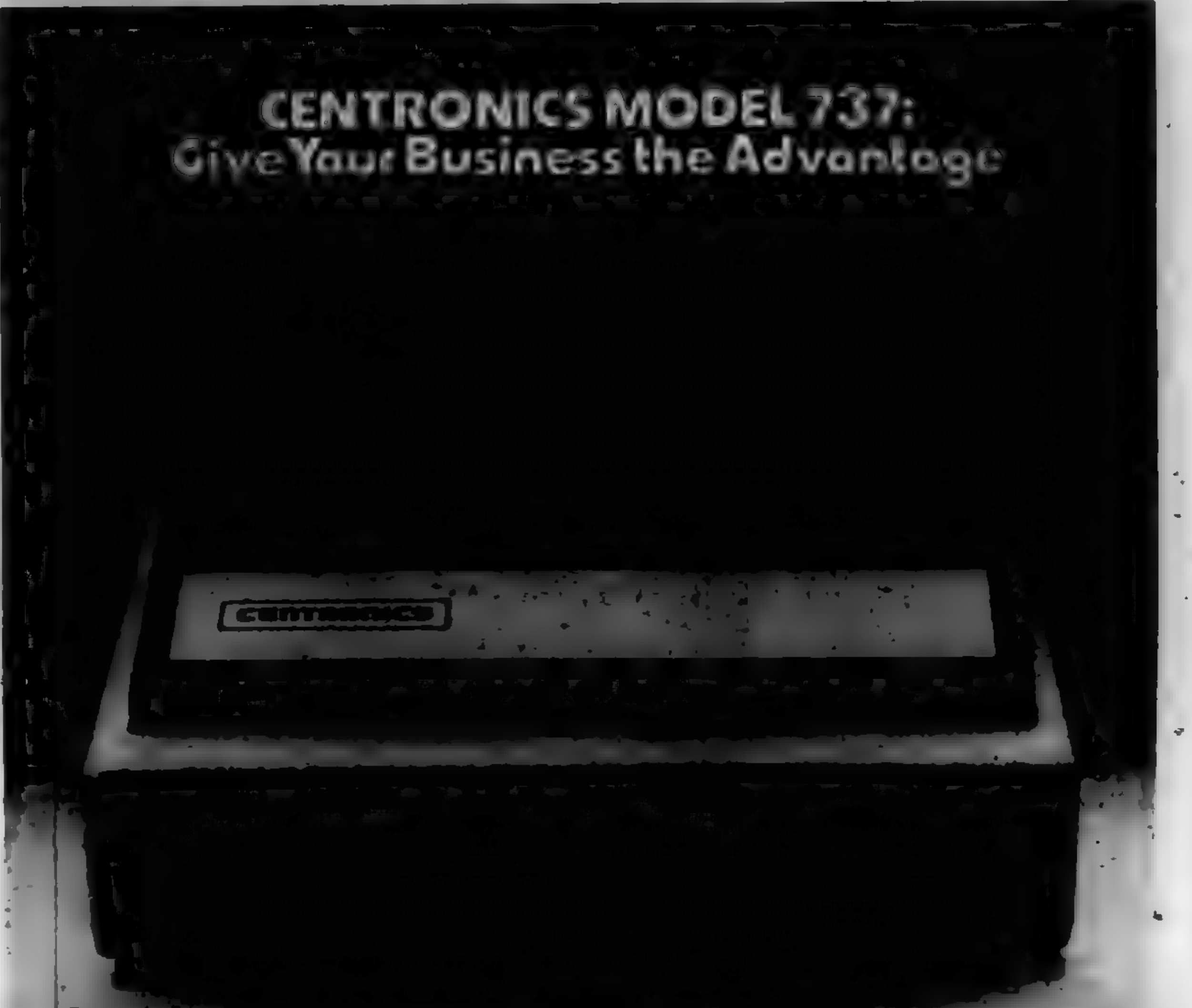
In past dealings with IBM, the firm had found its field support and service to be excellent and response time on service calls is thought of in terms of minutes, not hours, days and weeks.

Software Decision

After making the decision on the hardware, the problem of software was next to be overcome. After talking with many software firms Jaslow decided to go with a local software company that had personnel that it felt it could get along with and would best understand what the firm wanted the end result to be. Some of the programs were modified canned programs and some were written from scratch.

Canned programs were used when the changes needed were minimal and entire programs used when the need was so specialized that nothing offered would fit. The company purchased the Series/1 from IBM, signed the software contract and was on its way. Instead of having the hardware delivered to its location, Jaslow chose to have the computer delivered to the programmers out of our shop and out of the way of production. The only drawback was all the running around back and forth from the programmers' office to the main office.

The system has been operational for a year and a half, and the information the company now gets that it did not have with the service bureau is worth all the effort and money put into it, Jaslow reported.



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NEW YORK — Fourteen years ago Kennedy Galleries, today one of the country's largest galleries of American art, had a little more than $1 million in annual sales and an inventory that was kept on a limited card-file system.

The times, and the gallery, however, have changed. Currently, Kennedy Galleries has about $12 million in sales, more than 15,000 pieces of art that fill the entire fifth floor of the Squibb Building here and two additional warehouses and a minicomputer system to handle accounting and inventory control.

"We are a small business, a typical business in many ways, except that our inventory is made up of one-of-a-kind artistic works that range in value from $500 to $500,000 — and are appreciat-

(Continued on SR/20)

Lawrence Fleischman, Kennedy Galleries' chief executive officer, has information on every piece of art owned by the gallery at his fingertips.

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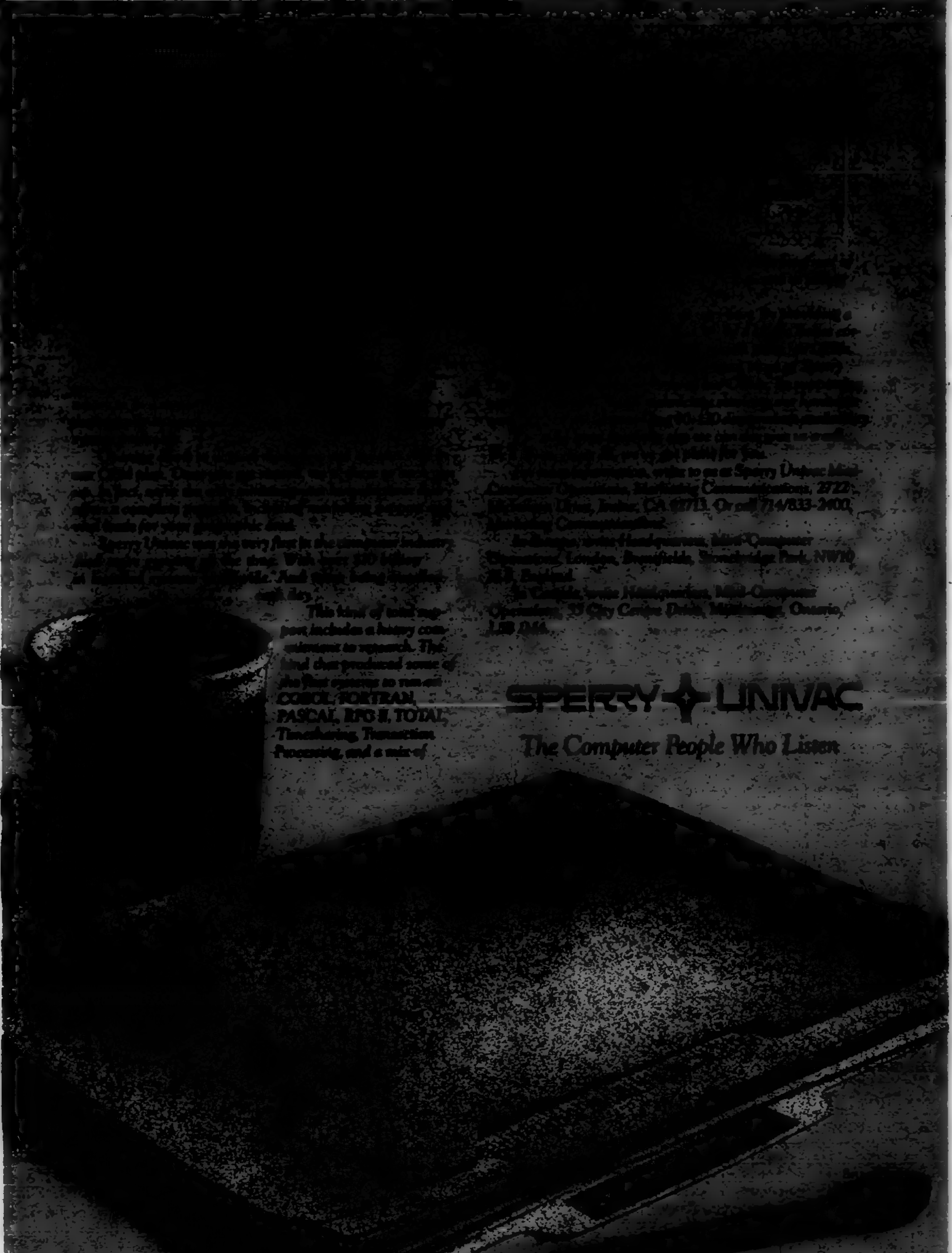

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Mini Handles One-of-a-Kind Art Inventory

(Continued from SR/18)

ing all the time," Lawrence A. Fleischman, Kennedy's chief executive office, said. And "keeping track of each piece of art is a serious part of our business."

A Texas Instruments, Inc. DS990 Model 8 computer system keeps the gallery running smoothly. The system includes five Model 911 CRT terminals located throughout the gallery, two 50M-byte disk drives, two 150-char. Omni 800 Model 8N printers and a 300 line/min printer.

The TI computer runs under the DX10 operating system, which enables multitasking. And the computer can, in fact, be expanded from its present 256K bytes of random-access memory to 2048K bytes, and from 100M bytes of disk storage to 400M bytes.

Micromedia Applied Technologies, Inc. custom-designed the software for Kennedy, using Cobol language with TI's Tiform 990 forms-generation package and TI's DBMS 990 data base management system.

"We have the quantitative concerns of any business, including R&D, marketing, sales, investments, maintenance and collection," Fleischman continued. "And, then, of course, we have the qualitative concerns associated with the arts. For the quantitative work — like inventory control and accounts receivable and payable, I rely on the computer. For the qualitative judgments, I rely on myself."

Fleischman and his partner, Rudolph Wunderlich, have CRT terminals in their offices. "I can do more; at my fingertips is information on every work we own — from when we bought it to where it is at this moment. And, keep in mind, we have from 200 to 800 pieces on loan constantly," he commented.

Twice each year, Fleischman reviews Kennedy's entire inventory to check on valuations. He also checks on trends in sales and inquiries, so he can sense what's in vogue and where.

"I can tell you, for example, that right now my clients in California are asking about paintings quite different from my clients in Illinois," he explained.

Reporting Capability

Kennedy Galleries also has a reporting capability built into its system so that every time an employee inquires for a client about a particular painting, a period or trait, the information is stored on the computer.

Fleischman can then retrieve a frequency distribution report from time to time to help in planning acquisitions. "As a result, I'm able to purchase works of art with some knowledge that there is clearly a market for them," he said.

Fleischman and Wunderlich are not the only ones at Kennedy who consult the computer on a daily basis: so do the sales representatives, the accountant and, or course, the registrar (who is responsible for maintaining the inventory).

"Our sales force can help our customers in quite an extraordinary fashion," Lillian Brenwasser, Fleischman's assistant pointed out.

"For each piece in our inventory, we have stored in computer memory 25 pertinent descriptive details, including the artist, period, type of work, medium, subject, size and other facts, such as characteristics of the artist and even whether the piece is framed or not."

In addition, employees can call up financial information, such as an item's cost and selling price, by using simple commands at the CRT terminal.

"All this makes up our data base, and it's cross-referenced so I can, quite literally, call up for you a list of all of our Winslow Homers in which there's snow on a rooftop. If, of course, that's what you asked about," Brenwasser said.

When a piece of art is sold at Kennedy Galleries, the transaction is entered on the computer, and the inventory is automatically updated. "Our inventory control system and accounting system are really all tied in together.

"With data base management, redundancies are eliminated in our general ledger, accounts receivable and payable and subsidiary accounting," Fleischman said.

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Everything our salespeople have learned in 25 years of working with businesses has been put into Businessware.

TPS-6 is part of Businessware. Thanks to this built-in transaction processing system, Wisconsin Life's new computer is helping in three key areas. First, linked to a network of 60 terminals, it's making clerical functions easier to perform. Clerks now use terminals to check the nuts and bolts of individual claims: Is this policy valid? Has this claim been paid before?

In all, there are more than 30 screen formats.

Once a claim has been approved, a check is written that night. Since the Level 6 arrived, many claims have been paid in a single day.

The Level 6 has also been helping Wisconsin Life develop new applications for their transaction processing capability. For instance, there's a program in the works now that will enable them to process all new business on-line.

One advantage is that the computer can be used to calculate premiums, thus eliminating a great deal of work currently done by hand.

Finally, the Level 6 runs a very efficient data entry facility. Once CRTs are installed, clerks will be able to correct errors immediately, substantially reducing overall system maintenance costs.

Services Improved.

Wisconsin Life's new Honeywell is doing precisely what we knew it would. It's giving them greater control of their operations. And in so doing, it's increasing the quality of service Wisconsin Life offers their customers.

On Wisconsin!

For a more detailed look at the Level 6, write Honeywell, 200 Smith Street (MS 487), Waltham, MA 02154.

Honeywell

And Helps Administration

School System Mini Schedules 14,000 Students

By Rickey W. Parker
Special to CW

CHATHAM, Va. — Just as minicomputers have moved into industry, they have also moved into the educational system.

Recently, the Pittsylvania County school system here started using a minicomputer to schedule secondary school classes and administration. Although this is not the first time computer scheduling has been used, it is the first time the school system used an in-house minicomputer to do the scheduling. Not only is scheduling within the division cost-effective and efficient, but it provides a plethora of additional spin-off services.

The computer used is a Wang Laboratories, Inc. 2200 MVP with 64K bytes of random-access memory and 10M bytes of disk storage. Programs are written in Wang's Basic-2, an extension of the traditional Basic language. In all, the computer keeps track of the academic activities of some 14,000 students living in and around this south central Virginia community.

Many people cautioned against attempting to schedule on a minicomputer, implying that this was a job for a mainframe. Unfortunately, a simplistic approach such as arena scheduling was not acceptable. Instead, an optimizing method was adopted that incorporates a comprehensive balancing scheme. This method relies heavily on the high-speed sorting capabilities of our computer.

The program developed for Pittsylvania's schools is called Computer Priority Scheduling (CPS). It is the priority system that allows the computer to make decisions as to whether a substitution should be made for a particular course or which course should be dropped when a conflict cannot be resolved.

The guiding principle behind this method is to provide the maximum number of students with the courses they have requested. The computer generates a suggested master schedule that, if followed, would produce the least number of conflicts for that particular school.

In addition to the printing of schedule cards, class rolls and homeroom rolls, the program interfaces to a student data base. This allows the inclusion, where appropriate, of student data for use in preparing attendance registers and other administrative documentation.

The centralized scheduling has provided many benefits as a result of required standardization of course names, numbers and student data.

System Characteristics

Some specific characteristics of the method are:

- The algorithm will produce the same schedules for each run if the data and scheduling parameters are unchanged.
- Scheduling starts with the highest grade. Within a given grade, the students are scrambled, giving each student within that grade an equal chance of receiving the courses requested.
- The student requests the course while the program assigns the student to a particular section of that course.
- The program balances on enrollment, with a secondary balance on race. The balance is programmable.
- The set of courses requested by a particular student is sorted into a priority

(Continued on SR/30)

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The new Ramtek 4100 printer/plotter cuts the cost of hard copy. Ramtek's unique four-head design prints full color graphics on plain paper in a single pass. No toners or chemicals are required, and to change ribbons you simply drop in a new cartridge. Add a color camera for transparencies, 35mm slides, and 16mm film.

For MIS, computer-aided design or any application that requires high resolution, high-performance color graphics, look into Ramtek's 6214 colorgraphic computer. To get more information, write: Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050.

Why is Pascal better for business?
Business, industry and education are turning to Pascal for their interactive programming needs. To find out what Pascal offers and how it can benefit you, request "Pascal, A Programming Language For Today." It's issue Number 1 of Ramtek's "USE OUR EXPERIENCE" series.

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A big week for small computer specialists

The sixth Minicomputer/Microcomputer Conference and Exposition will be held in Brooks Hall and San Francisco Civic Auditorium, October 14-16.

Everything that's new and significant about small computers and systems will be on display on Mini/Micro's show floor and reviewed by experts in the Civic's four spacious auditoriums.

And there are some important extras! The Association of Computer Programmers and Analysts will hold its 10th anniversary conference just preceding Mini/Micro (call (800) 556-6882 for full details) and U.S.U.S. (the UCSD system users' society) will meet for three days during and following Mini/Micro. There will also be a day-long Introduction to Pascal seminar.

Mini/Micro's professional program, previewed below, offers 60 hours of up-to-the-minute information in 24 half-day sessions.

Mark your calendar now, and use the coupon to request the Mini/Micro detailed preview program, available September 1.

TUESDAY, OCTOBER 14, 9:30 AM

1. The Small Business Computer in the Next Five Years
S. Henry Sacks, Mini/Micro Systems

2. Pascal Applications in the Minicomputer Environment
A. Winsor Brown, Point 4 Data Corp.

3. Professional Programmers/Analysts' Role with Small Computers
John Prior, Consultant

4. Impact of New Technologies on Marketing Opportunities for OEMs
Richard Able, Christman/Able Advertising

TUESDAY, OCTOBER 14, 1:30 PM

5. Quality Assurance for Small Computer Software
Murray Zuckerman, Consultant

6. Are Programmers Really Necessary?
Richard Dalton, Open Systems

7. Microcomputers in Banking
Robert Reffelt, Chase Manhattan Bank

8. Data Communications for Minicomputer Users
Roger Evans, Micom Systems

WEDNESDAY, OCTOBER 15, 9:30 AM

9. Pascal Open Forum: Implementation Interfacing to Existing Systems
A. Winsor Brown, Point 4 Data Corp.

10. Design Objectives for Color-Graphics Desktop Computing Systems
Ed Bride, Hewlett-Packard (DCD)

11. Winchester Disk and the Backup Issue: What's Happening?
Larry Hammerich, Cipher Data Products

12. Effects of Microcomputers on Marketing *Jim Jordan, Moxon Electronics*

WEDNESDAY, OCTOBER 15, 1:30 PM

13. IBM Watching: New Directions for Small Computers
John Rehfeld, International Data Corp.

14. Software Evaluation and Selection
Bill Fisher, Arthur Young & Co.

15. Session title and organizer to be announced.

16. Current trends in Computer Graphics
Dr. John Moreland, Megatek Corp.

THURSDAY, OCTOBER 16, 9:30 AM

17. Latest Armament in the Winchester Revolution
Randy Knapp, Wespercorp

18. Data Base Capabilities in Small Computers
Susan Kolb, Hewlett-Packard (DCD)

19. Computer Security in the Mini/Micro Environment
Bill Fisher, Arthur Young & Co.

20. Information Processing and Reporting: State of the Art in the "Paperless Society"
Mike Hall, Arthur Young & Co.

THURSDAY, OCTOBER 16, 1:30 PM

21. Distribution Alternatives for Small Business Computers
Robert R. Mueller, Office Products Dealer Magazine

22. Increasing Market Potential for Minicomputer Distribution
Bill McNamara, Systel Corp.

23. Systems in Hospitals and Health Care
Neil D. Kelley, Infosystems Magazine

24. Session title and organizer to be announced.

Mini/Micro 80 32302 Camino Capistrano, Suite 202, San Juan Capistrano, Ca 92675

☐ Please send me the detailed Mini/Micro preview program (Sept. 1)

☐ Please send details and registration materials for the Introduction to Pascal seminar on October 13.

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Robert D. Rankin, Managing Director

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Prime's Office Automation System has more to offer than any other system available today.

It has word processing, data processing, electronic mail, correspondence management, scheduling, automatic proofreading, language translation, networking capabilities – virtually everything you need – all integrated into a single incredibly efficient system.

This means that administrative people can quickly become more efficient because of all the advanced capabilities at their fingertips. And managers and professionals can become more productive because communications will be faster and information will be easier to get.

But total integration is just part of the story. So if you'll stay with us for a few paragraphs, we promise you some very productive reading about a very productive office system.

We'll begin with the word.

Word Processing.

This is the basis of all automated offices. The main things to look for are ease of learning, ease of use, and the ability to work with documents of any size.

As you may have guessed, Prime's Word Processing system embodies all these features and quite a few more, including a screen editor that displays text as it's entered. Menus that lead the user through the system. Labelled function keys that eliminate the need for heavy user memorization. And system storage capability of over 2 billion characters. Which translates into roughly a million pages of information.

Our Word Processing also has management and administrative workstations that provide fast, consistent response time. Powerful text creation and editing facilities. User created boilerplate library. Comprehensive filing and retrieval capabilities. List processing. And letter-quality output from a printer with interchangeable character fonts. In a word, our Word Processing is productive.

Management Communications and Support.

This part of our Office Automation System is a natural extension of our Word Processing function. Like Word Processing, it's simple to learn and easy to use. And it has all the features you need to enhance productivity.

Electronic Mail, for instance, has intray processing, note and memo creating capabilities, receipt acknowledgment, and the ability to annotate received messages and to forward documents and notes to an office down the hall, across the city, or around the world.

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As you can see, our Management Communications and Support function lets you spend less time on routine jobs, and allows you to function better as a manager.

Advanced Text Management.

This tremendously helpful function employs a 60,000 word electronic dictionary. The contents are user-defined, so medical, legal, or industry terminology can easily be added. Spelling is automatically compared with the dictionary for accuracy, and hyphenation is done automatically.

It will also support multi-lingual dictionaries for creating foreign language documents or translating one language to another. In other words, *C'est si bon.*

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Prime's Office Automation System is supported by two workstations; one administrative and one management. They both can access all capabilities of the system, but each is tailored to the specific needs of its users. Together, they make a highly productive information management tool.

The System operates on a multifunctional Prime 50 Series computer system. All Prime computers share the same operating system, the same file system, and the same communications products. So no matter what size computer you start with, you can move all the way up to a powerful 750 without piling up bills for recompiling programs or modifying software. In fact, your office system can easily and economically grow to support over sixty users.

In short, Prime's Office Automation System can deliver what you need. So if you're ready for this kind of office, we're ready to deliver the System. If you'd like to know more, write Prime Computer, Advertising Department, 3 Newton Executive Park, Newton, Massachusetts 02162.

PRIME
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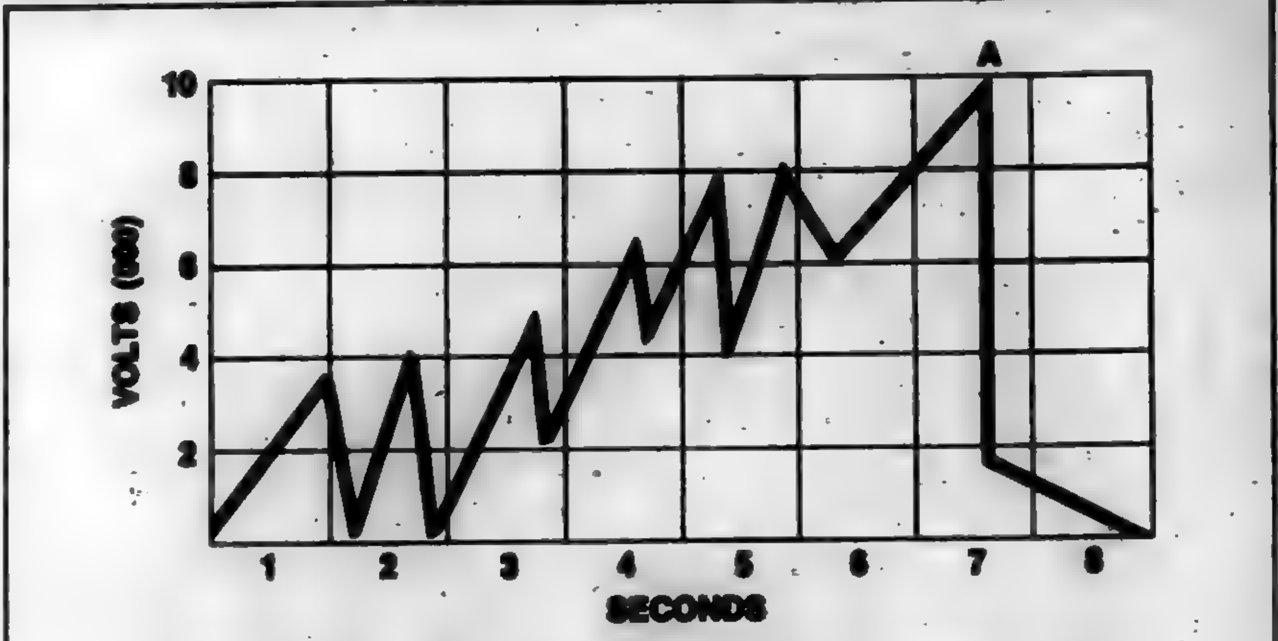
To Prevent Breakdowns

Security, Safety Audits Advisable Measures

By Kenneth A. Eldred
Special to CW



Walking across carpeting can generate nearly 10,000 volts of electrostatic energy in less than 7 seconds. Chart shows that at the point of stepping on an antistatic rug (A), it dissipates immediately.

SANTA CLARA, Calif. — Physical abuse, fire and electrical hazards pose three of the most serious threats to any type of computer installation.

Ideally, a protection system consisting of a combination of equipment and procedures should be integrated into the user's mainframe or minicomputer facility when it is built. But, the manager of an existing site with inadequate safeguards can increase protection by conducting a security and safety audit of the operation and identifying weaknesses.

The measures taken — and the money spent on them — should be weighed against the risk of loss and the likelihood of the threat. As the value of the data or the importance of a continous operation goes up, the measures should be stricter.

The most basic form of protection is control over those entering the computer area. A wide range of devices and procedures are available to maintain control, from highly sensitive perimeter sensing and alarm devices to the simple expedients or regular surveillance and combination locks.

A recent report of a fire in Springfield, Ill. [CW, April 14], illustrates several important aspects of fire protection. The fire occurred in a remote data entry facility operated by the Illinois State Department of Public Health and could have been started deliberately.

Large amounts of paper were being stored in the facility. Security was limited to locked doors — no guard was on duty. Apparently there was no contingency plan and, as a result, no off-site storage of records or programs. Although most of the facility's operation programs were eventually salvaged, damage to computer equipment and the facility itself amounted to more than $750,000.

This incident highlights three levels of a fire-protection system. The first is access control: if a security guard had been present or if some form of warning system had been in effect, this building would have been less vulnerable to deliberate attack.

Second, if large amounts of paper had not been stored in the facility, there would have been less fuel to feed any fire that did start. Once detected, a smaller fire might have been controlled and extinguished more quickly and with less damage.

Third, if backup files and programs had been stored off-site, as part of a contingency plan, the facility's operation might have gone on with only a minor interruption. As it was, the staff was kept out of the facility for a day and a half while arson investigators searched through the debris.

One Common Problem

In this case, as in many others, the presence of fire extinguishers within the facility was moot, since no one was present to use them. (The facility had no automatic sprinkler system.) Nevertheless, fire extinguishers, especially those filled with a compound known as halogenated hydrogen, or Halon, are an essential component in any computer facility's safety program.

Conventional fire extinguishers are filled with water, carbon dioxide or dry chemicals. Water and dry chemicals are poor choices for a computer room because they can cause almost as much damage to the computer equipment as heat and fire can. Carbon dioxide smothers the supply of oxygen to a fire, but it also smothers the supply to humans. Moreover, it is very cold and can shock electronic equipment.

Halon, on the other hand, interacts with the combustion process itself to extinguish flames and leaves no residue.

Halon has become very popular as an extinguishing agent and is available in virtually any size of extinguisher necessary.

Electrical Hazards

Although semiconductors have high switching and storage capacities, they are vulnerable to low voltage. Static discharges or bursts of overvoltage damage equipment by coupling stray electrons into active circuits and wiping out stored data, or by punching microscopic "bullet" holes in semiconductor materials.

Because they are packed so closely together, semiconductor circuit elements can be disrupted or destroyed by very tiny levels of energy — levels measured in millionths and trillionths of a volt.

Static discharges and voltage transients are two major sources of component-damaging and data-erasing energy. Both are inevitable parts of the environment in which a computer system operates. Protection against the threat they pose is, however, simple and relatively inexpensive.

It should be kept in mind that some computer vendors go so far as to specify that equipment damage caused by preventable static discharges will not be repaired under warranty.

Static electricty builds up on humans

(Continued on SR/34)

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"NCR's VRX is more transparent than any operating system I have ever seen."

Peter P. Blozis, H.J. Wilson Co., Inc.

Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

PETE BLOZIS:
"I've been in EDP for 19 years and have gone through many conversions. So I anticipated problems in installing our new NCR V-8585M. It turned out to be the smoothest conversion I ever experienced."

LEA EDMUNDS:
"We had good reason to be apprehensive. We were putting in the first V-8585M to be installed anywhere. And, at the same time, we were switching to new operating software, NCR's VRX. We ran parallel for three weeks and never developed a conflict. As it turned out, we could have switched over in a single day."

PETE BLOZIS:
"We resisted conversion as long as we could, and then discovered it was completely painless. The V-8585M hardware ran just as NCR predicted. VRX is more transparent than any operating software I have ever seen."

* * *

WILSON'S is a chain of jewelry/ catalog showrooms that is spreading across the Sunbelt. And growing at the impressive rate of 37 percent per year. This growth has caused Wilson's to step through five NCR Century systems up to the V-8585M. Supporting an NCR system is easy. As Pete Blozis says "We can support our NCR V-8585M with fewer systems programmers than we'd need for other systems of comparable size."

Find out what NCR VRX can do for you. Phone your representative at your local NCR office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401. Learn how NCR brings a new level of convenience to data processing operations.

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THE FIRST COMPUTER DESIGNED SOLELY FOR THE PURPOSE OF BEING A FIRST COMPUTER.

INTRODUCING DATA GENERAL'S NEW CS/10.

It has been gleefully estimated by all the industry pundits that during the next twelve months somewhere in the neighborhood of 500,000 small businessmen will purchase their very first computer.

Isn't it ironic that, until now, there was no computer perfectly suited to this emerging market? In fact, the choice narrowed down to computers that were either too much, or too little, or weren't capable of expanding to accommodate any but the most stagnant of businesses.

Which is precisely why we at Data General engineered the new CS/10. While the CS/10 is eminently affordable (actually it's the lowest priced—$10,950 list—serious multiterminal computer in America and features one of the most aggressive discount policies for industry suppliers and volume purchasers), it is designed to provide a surprisingly wide range of sophisticated functions with enormous possibilities for expansion.

Its technical specifications? A master-control console with a powerful 16-bit microcomputer, a large easy-to-read display screen, an alphanumeric keyboard (with a wide range of keyboards and printers available as options), two integral diskette systems with up to 2.4 million bytes of on-line data storage (the CS/10 has the ability to be upgraded to Winchester-type technology and 50 million bytes of on-line data storage) and interactive COBOL (ANSI 1974, level I specifications with some level II features implemented) which, aside from being the most widely used programming language, is also among the easiest to use—even for a comparative neophyte.

But beyond these features—which, we'd like to remind you, is where few small computers ever go—the CS/10 truly excels.

It is expandable to a maximum of four interactive DASHER™ display terminals. Such innovative software tools as the Proxi™ program generator can be added to help you customize programming for practically peanuts and there's even an optional remote unit that enables you to diagnose problems from your desk or wherever you happen to be.

And perhaps the most significant competitive aspect of the CS/10 is that it isn't just one lonely machine. It is part of an entire family (CS/10 through 70) of program and data-compatible systems, which of course means that one modest CS/10 installation can easily burgeon into a 17-terminal CS/70 system (with an impressive number of peripherals).

And the software you develop for the CS/10 can be used in any further CS system you may grow into, up to the CS/70, so businesses needn't suffer undue financial hardships if they should become successful and grow.

If you'd care to know more about the new Data General CS/10—and, believe it or not, there's more to tell—simply fill out the coupon below and we'll be happy to inundate you with information.

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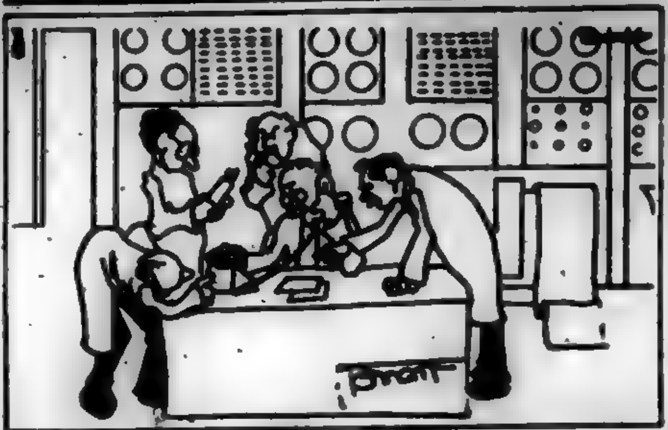


'An Outside Line? Dial One First . . . No, Get the Switchboard First . . . I Think a Three-Digit Code is Required . . . Tap the Receiver Three Times, Then . . .'

Mini Tracks Students

(Continued from SR/22)

sequence; factors considered in defining the priority sequence are number of available sections, length of each section, state code sequence and school-defined priority.

- The set of sections of a particular course is sorted into a priority sequence based on number of available seats and racial balance as a function of the race of the student being scheduled.
- Only courses defined in a master course table may be used. All input is interactive and no course may be entered that is not in the division course table.
- Each school has a separate set of files.
- Students may be transferred from one school to another by use of a student I.D.
- A personal data file is maintained on each student, including name, social security number, address, parent's name, telephone number, race, sex, level, birthdate, alert code and comments.
- Both global and local comments are allowed on the student's schedule card.
- Each homeroom teacher receives a class roll with appropriate personal data provided on each student.
- Each homeroom teacher receives a class roll that includes the personal data needed to prepare the attendance registers.
- A typical schedule for a school with 1,000 students can be run in less than 15 minutes. Therefore, guidance personnel can bring in corrections and watch the progress of the scheduling. If a change is required, it can be interactively made and the schedule rerun.
- A substitution table is set up by each school that tells the program the substitute courses that may be chosen in the event conflicts occur. This greatly reduces the work load by allowing the computer to make those decisions that would have been made by the guidance department.
- Force adds are permitted.
- Administrators have accurate data on school schedules months earlier than was previously possible.
- Administrators now have the freedom to ask "What if?", whereas before the use of computer scheduling, time was critical.

Future Plans

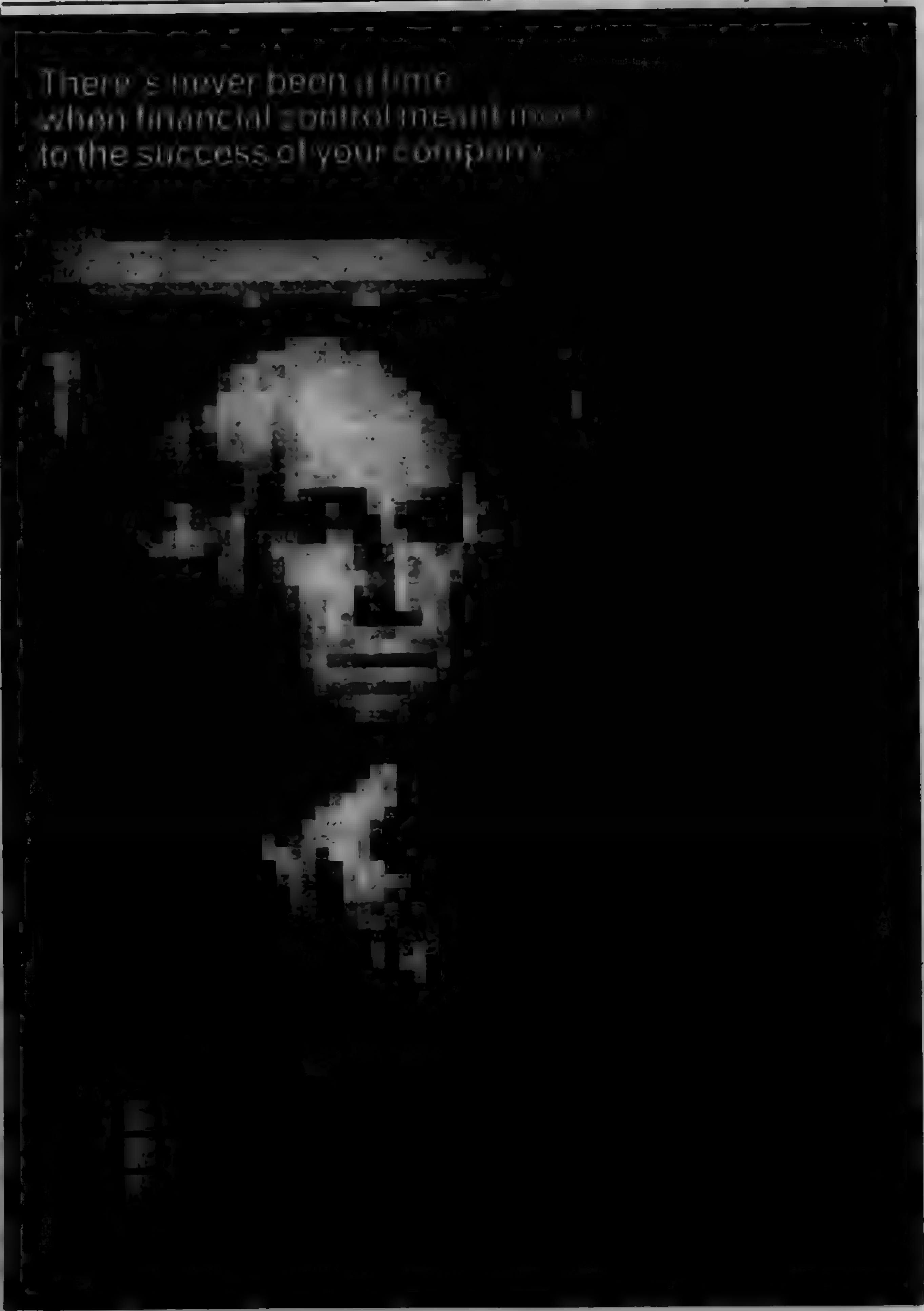
The next step will be the interfacing of a newly acquired optical scanner into the system and the addition of other terminals.

The minicomputer is just becoming cost-effective for many of the nations' school divisions. This influx of technology into an area where change is slow has proved again that staff education must be considered one of the top priorities in the establishment of a successful DP program.

A final comment about what must be the primary objective. In education, any new idea must be evaluated with respect to one question: "Does it promote the welfare and education of the students we serve?"

The use of a computer can free counselors and administrators from mundane and time-consuming work. This precious time can then be used working directly with the students, giving them more comprehensive guidance and providing a more flexible school program, thus providing more value for each ever-dwindling educational dollar.

Parker is a programmer with the Pittsylvania County School Board in Chatham, Va.


There's never been a time
when financial control meant more
to the success of your company.

Microsoft is pleased to announce there will be no 16-bit software crisis.

They didn't realize it at the time, but when Bell Laboratories developed the UNIX* Operating System they solved some mighty weighty problems for 16-bit software development. Now Microsoft is picking up where Bell left off and putting the UNIX Version 7 OS on the Intel 8086, Zilog Z8000 and Motorola 68000. (We've got the PDP-11† version too, at a very reasonable price.) We call it the XENIX™ operating system, pronounced "zeenix." Naturally, we are customizing and enhancing the XENIX OS to meet your needs, and we are providing complete support for every customer.

That's great news for the legions of UNIX OS fans, as well as for everyone getting into the 16-bit market. But even better news is that Microsoft can offer XENIX to OEMs at very competitive prices.

16-bit micros and the UNIX OS—that's a powerhouse combination, and only Microsoft has it.

Finally, a state-of-the-art, standard OS.

As the biggest name in microcomputer system software, Microsoft will define the common ground to unite the next decade's microcomputer hardware.

And the XENIX operating system should make life a lot easier for everyone in the business. As the standard operating system, it will eliminate the crises that normally accompany emerging technology: the relearning and rewriting needed for each new machine. The software investments that become outdated the minute hardware diversifies. The wasted efforts.

The XENIX OS (written in the C programming language) will provide long sought-after hardware independence and portability, thus protecting software investments across hardware lines. Switching to a new microprocessor will be easy, since Microsoft will support them all.

Honest-to-goodness UNIX OS. Only better.

The UNIX system well deserves the attention it's received in the past decade. It's a highly sophisticated, interactive, multi-user, multi-tasking system with extensive utilities and accompanying software packages—creating a total working environment. A standard environment.

Actually, the operating system itself is only a small part of the XENIX package. The vast system of utilities, developed over the last 10 years at Bell Laboratories, includes a C compiler, software development tools, function libraries, games, text formatting and typesetting programs, and much more.

And Microsoft's modifications and enhancements make the XENIX OS even more suitable for general commercial applications. XENIX software will fully utilize the powerful instruction sets and large addressing capability of the 16-bit microprocessors.

As with all Microsoft products, the XENIX system will be customized to your exact needs and specifications, then supported, maintained and updated every step of the way.

In addition, all of Microsoft's already-famous system software (including BASIC, COBOL, Pascal, DBMS), will run on the XENIX operating system. XENIX will also run all existing UNIX Version 7 OS software.

A proven leader in worldwide software standards.

Microsoft's role as the leading supplier and authors of microcomputer system software has meant that we've established a number of standards throughout the industry.

That's why we're called a leader.

The establishment of a 16-bit standard operating system will be a big step forward for the industry.

With the introduction of the XENIX operating system, we're offering a superior standard system, plus the benefit or our extensive knowledge and expertise.

The XENIX operating system. The standard that ends the 16-bit software crisis. Before it's even begun.

---

*UNIX is a trademark of Bell Laboratories

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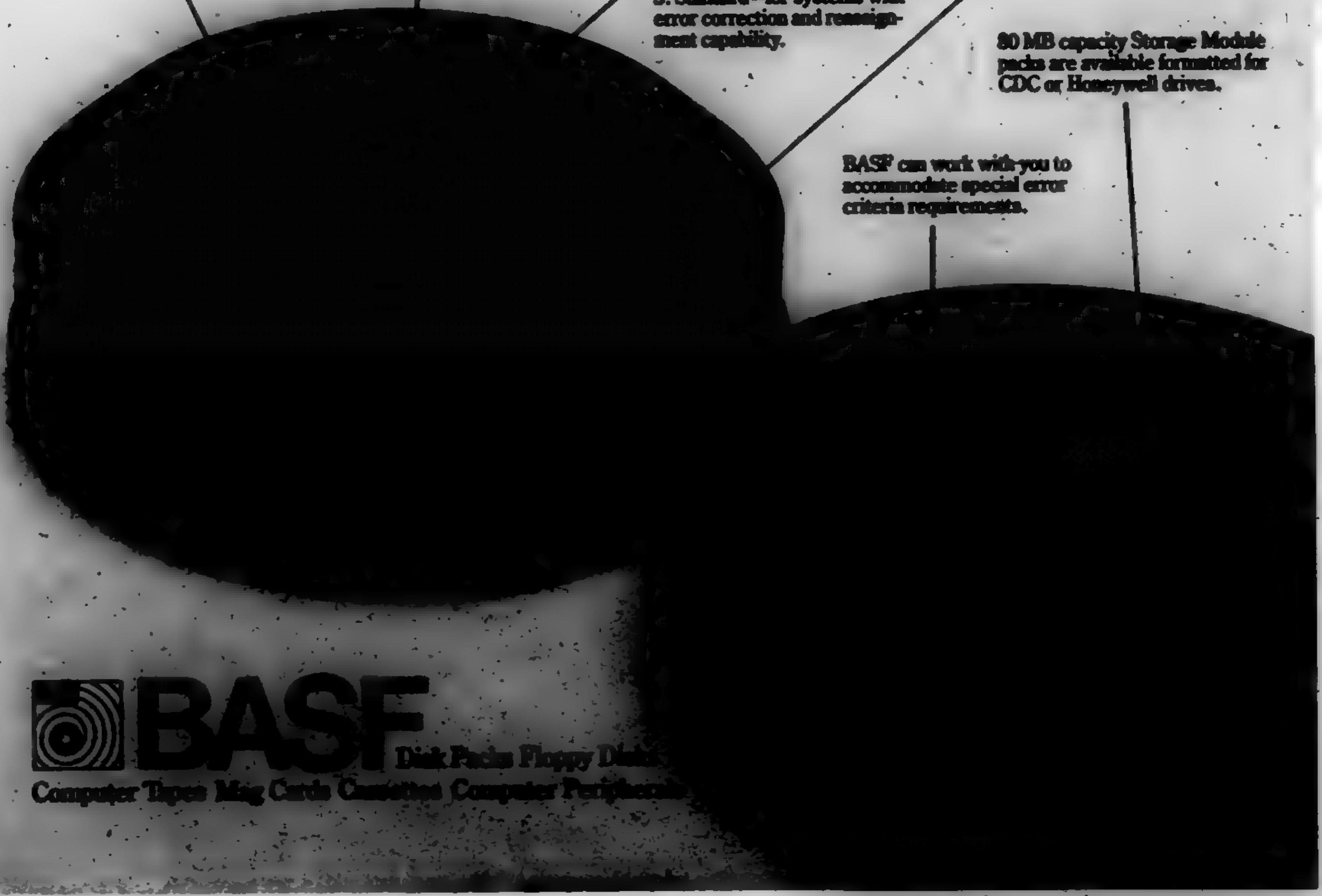

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At Lumber, Supply Firm

Mini Helps User 'Weather' 200% Sales Increase

By Cynthia Casentini
Special to CW

SALINAS, Calif. — What does a small business do when it is faced with a 200% increase in gross sales, an accounting machine in its death throes and a service bureau gently nudging its clients to seek processing power elsewhere?

For the Hayward Lumber & Home Supply Co. here, the answer to these problems was found in a carefully designed growth plan mapped out with and including Datapoint Corp. minicomputers.

Hayward Lumber has five retail lumber and building material centers, a kitchen cabinet outlet, a prehung manufacturing center, and warehousing and land development divisions. The firm has been in business since 1919, with current gross revenues of about $21 million.

Previous planning had prepared management for an upgrade of its processing methods, which in 1976 consisted of an NCR Corp. 400 accounting machine, a leased IBM keypunch and the utilization of an IBM Systems/3 service bureau.

The decision to automate all accounting was hastened, however, by the reluctance of the service bureau to continue indefinitely the processing of Hayward's payroll and voluminous accounts receivable. A consultant firm's survey of the entire company operations yielded two recommendations: convert to a completely in-house DP department immediately with a Hewlett-Packard Co. HP 3000 installation, or make the conversion gradually with Datapoint equipment, which could include an interface with System/3 through specially formatted diskettes.

The second choice was considered more feasible because it would give management and the accounting department a chance to absorb the impact of automation more easily, was more desirable costwise and would permit the training of experienced employees rather than necessitate hiring a technical operations manager. The IBM service bureau agreed to assist in the gradual conversion process by making minor format changes to its existing programs.

A vendor specializing in Datapoint systems, Virginia Winn Software Co., was contracted for all systems design and customized software. Winn also provided staff training, in addition to the Datapoint customer education classes in which two employees participated.

System Installed

The initial installation in December 1976, consisted of 16K processor, 5M bytes of disk storage, the diskette controller, three terminals and a small printer. This provided front-end accounts payable data entry to System/3, as well as accounting systems that remained resident on the Datapoint.

A major consideration in all programming was the establishment of good internal audit controls and system security, which had been recommended by the company's auditors.

Another priority was to keep the accounting centralized and to have as little impact on the branches' daily operations as possible.

The first installation proved so successful that more and more demands were forthcoming from users. An upgrade to a 48K processor with 40M bytes of disk storage, six terminals and a 600 line/min printer was made barely a year later.

This configuration allowed elimination of the keypunch because all data entry was now done through the Datapoint terminals. Processing costs were reduced at the service bureau when accounts payable and payroll came in-house.

The credit department gained flexibility with on-line account inquiry, and the conversion helped it absorb the impact of restrictive credit legislation. Many other accounting functions were augmented, including the development of a data base to support Lifo inventory valuation, which generated additional working capital from substantial tax savings.

Time Demands

Because of the heavy time demands made on the newly formed DP department to accommodate the continued increase in sales and unit volume, the plans of operating totally in-house were accelerated. Housekeeping routines, including the formatting of the IBM diskettes for System/3, were taking up data entry time because the formatting could be done only when Datashare (dispersed data processing) was not operating. Program development for new systems was also having to wait its turn, and heavy overtime hours resulted.

A second stand-alone system was considered for processing and development, but it was at this time that Datapoint announced its Attached Resource Computer (ARC). By this combination of hardware and software, separate processors are dedicated to applications execution, disk I/O and the interchange between the two.

The ARC system would therefore support the data entry functions under Datashare and the processing of data or program development with all users having access to a common data base without conflict. ARC also allows almost unlimited growth because additional processors can be added to the system as needed.

ARC Installation

ARC was installed in June 1979, with three 120K-byte processors, 80M bytes of disk storage and an additional terminal. No software changes were necessitated by either upgrade, and downtime for each installation was held to one day until the system was up and running.

By December 1979, all systems had been developed, and Hayward DP was operating totally in-house, with dependence on the outside service bureau terminated. Data entry is now available to the input clerks for eight hours daily. The entire system is down one hour for security backup, and the bulk of the end-of-day processing is run unattended at night utilizing a print spooler.

By making the conversion in relatively slow steps, and with top management providing input and support during each phase of implementation, the upgrade from the 1976 situation to the present-day operation has been easily absorbed in both cost and personnel factors. With a 50% increase in sales dollar volume since 1976, and a 24% increase in personnel companywide, the accounting department has added only one employee.

A DP committee has been formed, comprised of the chief executive officer, the controller, the assistant controller and the DP director. This committee is responsible for all systems design, the formation of both short- and long-range goals concerning data processing, and the effective communication between senior executives and the DP function.

Casentini is the director of data processing at Hayward Lumber, based in Salinas, Calif.

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Security Audits Advisable

(Continued from SR/26)

as they move about, especially in cool, dry atmospheric conditions. The humidity of the air within the facility can be monitored and regulated using a large, wall-mounted gauge or meter and humidifiers and dehumidifiers in the air conditioning system.

In dry air, the potential for static discharges is great. If the relative humidity falls below 40% immediate protective measures must be taken — either humidifying the air supply or shutting the computer system down until conditions improve.

Use of Mats

The only way to guarantee that static discharges will not damage electronic equipment or cause system malfunctions is to drain the static electricity away before it can be conducted or radiated to the equipment.

This requires that grounded conductive mats be placed around computer equipment and that employees be required to wear leather-soled shoes when working in the computer room. (Rubber-soled shoes insulate people from the grounding effect of the mats, thus defeating their purpose.)

These mats instantly drain away the static electricty that inevitably builds up — to as much as 10,000 volts — with any kind of movement. The mats should be used even along paths close to equipment that is not usually touched. Static electricty strong enough to wipe out data or cause other system malfunctions can radiate from people to disks and processors as they walk past, without their being aware of the buildup.

Power Surges

The normal voltage of ac power lines is approximately 120V, and much (but not all) computer equipment is designed to operate at this voltage (many devices use 220V).

All electrical supply systems are, however, subject to voltage anomalies called transients or surges. These are "spikes" in the voltage level — brief, unpredictable overvoltages up to 600V that, if not suppressed, can cause catastrophic damage to semiconductors and circuits.

Voltage transients are caused by circuit-switching in the utility grid supplying electricity to a region or locale, by the operation of electrical equipment (such as air conditioning units and elevators) within a building, by on and off switching on the feeder circuit and, of course, by lightning strikes on the main power line.

Transients powerful enough to alter data or parity can even be caused by flickering flourescent lights.

Isolating Supply

The first line of protection against transients is to isolate the supply of electrical power to computer equipment from all other power supplies within the facility — those for office equipment, lighting, air conditioning and so forth.

Beyond that, to ensure that the computer equipment is protected, overvoltage protection devices should be installed in the circuits feeding the computer. A surge protector is not a voltage regulator; it cuts off the spikes in voltage, without raising the lows. But it is an inexpensive safety valve, if care is taken to choose one that has the proper specifications.

Unfortunately, many computer facilities are protected on a piecemeal basis, rather than by a comprehensive approach to safety and security. However, when applied intelligently as part of a well-developed set of procedures and precautions, the relatively small investment in protective equipment will be repaid many times over in the preservation of data and the safeguarding of equipment.

Kenneth A. Eldred is president of Inmac Corp., which offers a variety of literature and equipment for the DP industry. The firm is currently offering a booklet entitled "The Computer Room," which contains guidelines and checklists for the design, construction and furnishing of computer facilities. Inmac is located at 2465 Augustine Drive, Santa Clara, Calif. 95051.

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A Food Processor
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A Foreign Oil Company
We evaluated the competition and chose ACEP.

An Oil Company
ACEP supplies our remote users a time sharing capability under CICS/VS.

A Major New York Bank
ACEP is very powerful for the systems programmer.
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We have always been able to do exactly what we wanted, ACEP imposes no restrictions on us.
ACEP installs quickly and easily.

A Major Manufacturer
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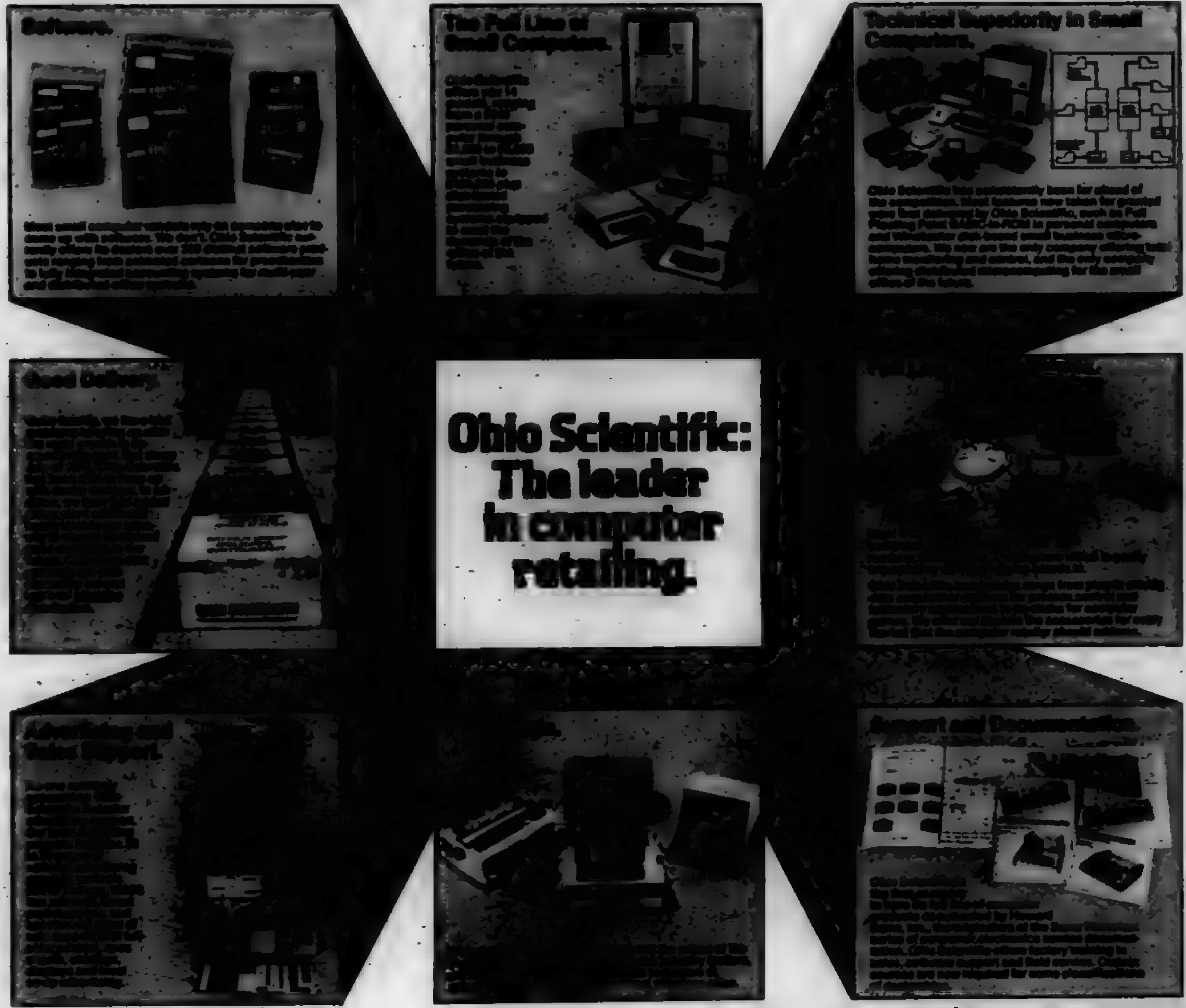
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Consultants' MPU No 'Monument to Stupidity'

By Dave Osgood
Special to CW

BEDFORD, N.H. — In 1977, when Availability, Inc. personnel consultants first considered using a computer to retrieve applicants from our files, the last thing we wanted was an expensive monument to stupidity.

There were many positives and negatives that were weighed, time factors in the data entry to consider, costs and other priorities in our day-to-day operations.

We had spoken to an OEM representative, who had told us how we wanted our system and format, but being individuals and in a business we felt we knew better than he, we dismissed the idea. We wanted to do it our way or no way at all and once again, the cost factor came into being.

After much consideration and deliberation, we felt that "trying the water" instead of "jumping in headfirst" would be the logical way to go. We started off with the McBee card sort system, which is basically punching DP cards and using an ice pick to sort through our files.

Advantageous Venture?

Sounds simple enough, but when we had to start developing some sort of system to code our applicants, jobs and other categories, we started wondering if this venture would be to our advantage or disadvantage.

Many hours were spent among the three counselors in the office trying to come up with some standards we all could agree upon and that would be simple enough yet complete enough to be practical. We finally developed systems and breakdowns of disciplines; the hours were then put into the coding of applicants and punching of cards.

After three months of intense labor, we found this to be a worthy solution of retrieving applicants, but felt it was more work than it was worth, even though it was profitable! At that time, we felt we ought to again look into the possibility of totally computerizing our operation.

Back to OEM

We went back to the OEM that had originally talked to us about a computerized system. After a year of his trying to develop and sell turnkey systems to personnel consulting firms, he had come to the conclusion that no two firms operate in the same manner and that in our business, we were all individuals, hence the need for custom-made systems.

At this point, the hours were just beginning for us, as this "new" computer system was so much advanced over the McBee manual card system. We had to develop our own data entry forms for information our secretary could easily recognize and enter. The next question arose as to whether to put only current applicants into the computer, or to update all the files that we had collected over a 10-year period.

We felt the only way to go was to update all files before entering them into our computer. Boy, what a mistake! Little did we know what we were getting into. The hours spent trying to locate applicants representing the past 10 years was more than we bargained for — hence, another idea out the window.

The only logical move at this point was to enter all applicants' records into the computer and the, as time permitted, update by sending a hard copy of the computer information we had, stating that we would appreciate some updated information.

This system has worked well, and we now have a very up-to-date data base of applicants. Those records we could not update have been destroyed.

Valuable Asset

Our computer has become a very valuable asset to us, not only for keeping track of applicants and keeping an updated data base for our job orders, but also as a valuable sales tool in responding to companies' job listings. Companies seem impressed that we can take a job order on the phone and immediately search our computer to see if we have a "fit" for that position.

We have also had much success in having employers come to our office and do a search themselves for specific qualifications. One benefit with this system is that we can do a search and eliminate applicants who may presently work for that company, in order to ensure the confidentiality of our applicants.

The system that we currently have is a PDT 11/150, which is a user-programmable, intelligent data terminal consisting of a dual flexible-disk drive.

The unit contains a Digital Equipment Corp. LSI-11 microprocessor and is capable of communicating with up to six EIA-compatible serial line devices, which we have not yet had the need to install.

WP Capability

The microcomputer operates with up to 60K bytes on two flexible disks. We also have a DEC VT100 CRT terminal and a Decwriter II. It also has the capabilities for word processing, which in the future we hope to employ.

For a staff of four counselors and two secretaries, it has been a real experience and a very worthwhile venture — one we definitely feel is not a "monument to our stupidity."

Dave Osgood is president of Availability, Inc., located at 160 South River Road, Bedford, N.H. 03102.

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But All Too Common

Do-It-Yourself System Makes a Tough Project

By George Pitagorsky
And Robin Evans
Special to CW

This is a story of what is becoming an all-too-common experience in the world of small business computing.

As consultants specializing in computers for business, we come in contact with many people who have experienced loss of much time, effort and money in the attempt to install do-it-yourself computer systems.

Pat Oro (not his real name) is a seeker. He was looking for a computer system to use in his personnel businesses. He wanted to store and retrieve data on candidates, print resumes, print form letters and perform some basic accounting.

In addition, there was the idea that, with a little effort and money, a package could be developed and sold for fun and profit.

We came in contact with Pat of the Curtiss Group about two years after he had purchased his Imsai Manufacturing Corp. 8080 microcomputer. The Imsai had 64K bytes of random-access memory, two single-density disks and a Diablo Systems, Inc. word quality printer. Potentially, it was a powerful computing system. The cost was about $12,000.

Pat had wisely selected a microcomputer as the hardware for his system. The micro was the right size and had enough capacity to serve a business like the Curtiss Group. A mini would have cost too much to be useful; a mainframe via a timesharing service would not have given the people at Curtiss the independence and security they needed.

Software Experts

Pat found a software expert referred to hereafter as R. Together they planned the system. R would do the software work and Pat would market the package.

R had some great ideas. First, he would modify the micro's operating system, which was Digital Research, Inc.'s CP/M. Then he'd get on to the 'trivial' task of doing the application work.

Unfortunately for Pat and R, R's approach to software development was characterized by minimal planning and documentation, haphazard controls and "seat of the pants" testing.

As the project got under way and problems began to arise, Pat's excitement turned to displeasure. His business required his full attention, and he devoted less and less time to the project.

R also began devoting less time to the project. He wasn't getting paid, so he began looking for more steady employment as it became clear that developing this personnel package was not as 'trivial' as it seemed.

After much hard work, Pat saw the task of developing custom software from scratch was very costly. It required full-time dedication as well as years of computer expertise — quite the opposite of the original goal of acquiring the computer for its time-saving and cost-effective business advantages.

Complex Task

Many business people are misled by advertising that promotes smooth and easy, self-developing software. Purchasing a computer is a complex task. It is a purchase with which there will be a long-term relationship, and it should be acquired carefully, with a full understanding of computers, their applications and their capabilities — both in the short and long term.

By the time Pat called People and Solutions, Inc. (PAS), a consulting firm based here, the Imsai had been gathering dust for months. There was little documentation, several cryptically labeled disks containing the system and a nonworking Diablo Systems, Inc. printer.

At our first meeting, Pat shared his reasons for calling in a consultant. He explained that he wanted an objective view. The vendors he had contacted spoke 'computerese,' a language with which he was not fully familiar. Their demonstration and technical specifications did not allow him to see how their system would help his businesses.

In addition, the hardware from one manufacturer to another did not seem different. He did not know enough about computer software to have criteria with which to analyze and compare the systems. He realized he was relying on the advice of the computer vendors whose opinions were biased, of course, to sell their own systems.

PAS Recommendations

In a short time PAS had analyzed the situation and reported that the Imsai could be made useful if Pat were willing to scrap the software work already done (especially the modifications to the operating system) and start over.

We estimated that custom programming of an information storage and retrieval system and use of existing word processing software would cost approximately $10,000.

PAS also interviewed a number of computer vendors, each selling a turnkey retrieval system designed for personnel firms.

(Continued on SR/40)

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Data Entry Speeding

As Retrieval Systems Evolve, Minis and

By Robert J. Campbell
Special to CW

In most computer and micrographics retrieval systems, about 80% of the data retrieval is accomplished with the computer and about 20% from the micrographics system. This lopsided ration brings up the question of justifying the cost of the microfilm program as part of a data processing system.

The fact of the matter is that the cost per picture element of storage is far less on microfilm than it is on disk or tape files, which is a good justification for adding microfilm capabilities to computers and minicomputers.

Although computer-assisted retrieval (CAR) can be configured on a large mainframe and run along with other tasks, the use of a free-standing minicomputer makes the system an independent entity. In large businesses that may have a large host computer, the dedicated minicomputer approach is often preferred.

The free-standing minicomputer with separate microimage terminals probably was the beginning of CAR. Initially, the configuration was off-line, with the operator simply looking up the data on the CRT terminal and, if documentation was needed, inserting the reel of microfilm into a microimage terminal and searching for the right document image. The minicomputer was used only to sort randomly entered data into an ordered index. Almost any micrographics retrieval method could be used with it, and it became simply an automated key to unlocking the microfilm files.

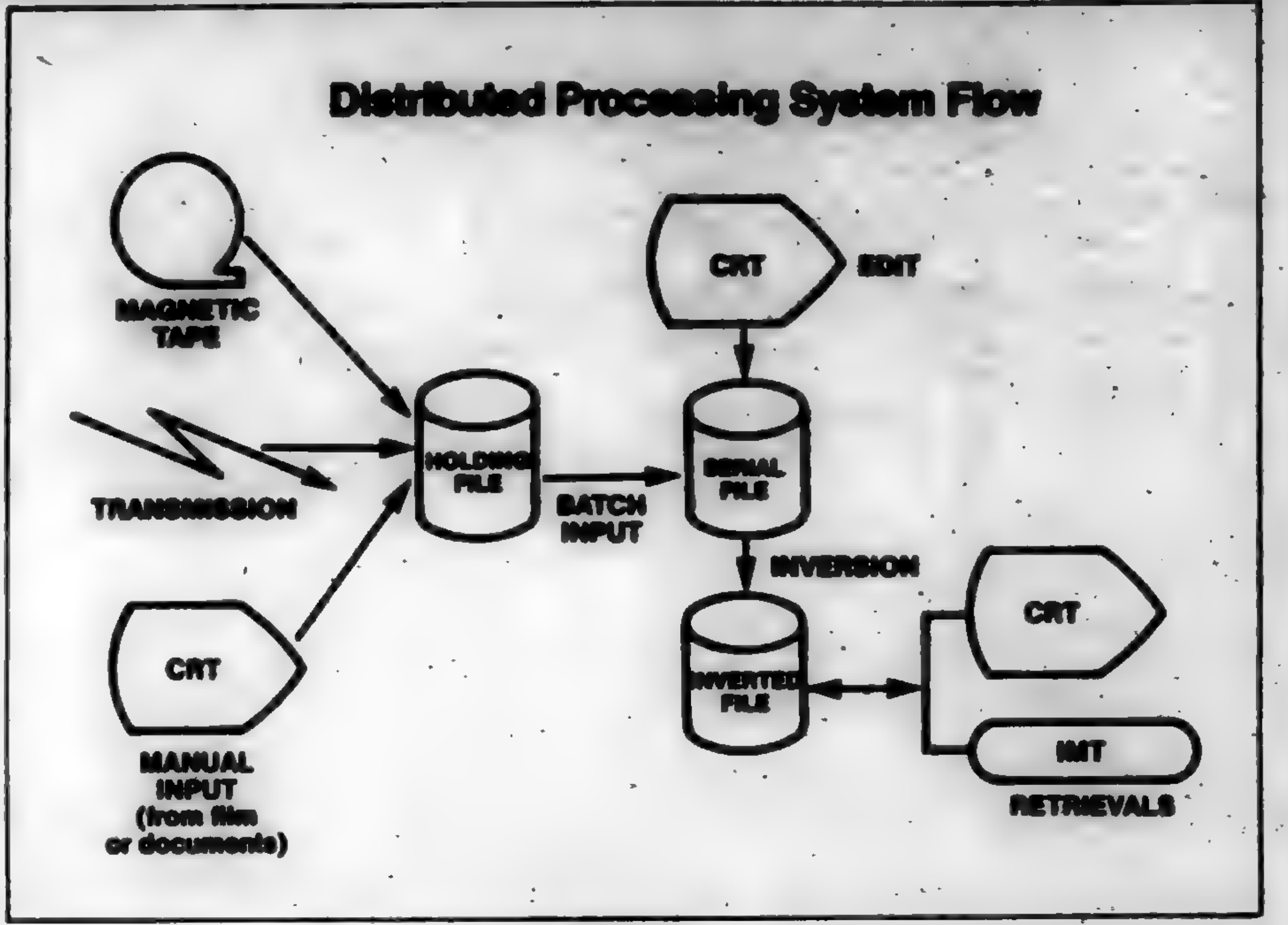

Figure 1

On-Line to Mini

The next step was to put the microimage terminal on-line to the minicomputer. It worked the same as the original off-line system except that the mini could be used to drive the microimage terminal to the proper frame of film. The mini still was used simply as an index to the file. Even though the mini was not used to its fullest capacity, the file integrity and ability to retrieve documents much more rapidly was justification for the installation of the equipment for this application.

On-line use of the microimage terminals required either additional programming in the minicomputer or the addition of some machine intelligence to the microimage terminal to count image marks (or blips) as they passed an electric eye. Terminals such as the Kodak IMT microimage terminal were developed to satisfy this need.

The IMT microimage terminal is controlled by a programmable microcomputer which can "talk" with the host and also store up to 40 microfilm addresses that have been downloaded into its memory by the host. During retrieval, the operator simply inserts the

(Continued on SR/39)

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Up at Lower Cost

Microfilm Provide Efficient Storage

(Continued from SR/38)

appropriate microfilm magazine into the microimage terminal and lets it search and automatically display the desired film image.

The computer was used just as an electronic index for these applications. However, in some installations the computer does more. For example, at a midwestern police department, the CAR system consists of a minicomputer and a Kodak IMT microimage terminal. All arrest reports are microfilmed, then their contents are entered into the computer data base.

Researchers can extract information from the data base using a great variety of parameters, and the data base can also be sorted to prepare statistical reports automatically. Police administrators then can detect trends in crime patterns or recall several of the crime reports from the data base which fall into a *modus operandi.*

The summary data is stored in the minicomputer, while document images are on microfilm. The microfilm is referred to for details not available in the data base or when paper copies of the arrest reports are needed for other law enforcement agencies or insurance investigations.

This configuration represents more efficient use of the minicomputer's capabilities. In addition to serving as an index, the mini also manages data to reveal trends and prepare reports.

One facet of any free-standing CAR/minicomputer configuration is data entry. Even though the data can be entered at random, it still is key-entered through a data entry terminal by an operator, and this can be a slow process.

Distributed image processing, similar to distributed data processing, is speeding up data entry for CAR systems (Figure 1). Initially, distributed image processing used a minicomputer to orchestrate requests from the host computer into optimum retrieval schedules for microimage terminals (Figure 2). Thus, a few microimage terminals can serve the needs of a large number of CRT terminals.

As Total Subsystems

New advancements in distributed image processing are using micrographics as total subsystems to the host computer system (Figure 3). In this case, all transaction data, including information regarding all documents and perhaps status data regarding the documentation, is entered into and handled by the host computer. This data then is transmitted on-line to the minicomputer, although it is not yet associated with any documentation.

The documents are microfilmed at random as a separate step, and this microfilm is delivered to a workstation consisting of a CRT terminal and a microimage terminal. Using the microfilm as source documents for data input, the operator matches up the document location with the data simply by calling up the proper data on the CRT terminal. The computer then automatically assigns the microfilm address and records it in memory.

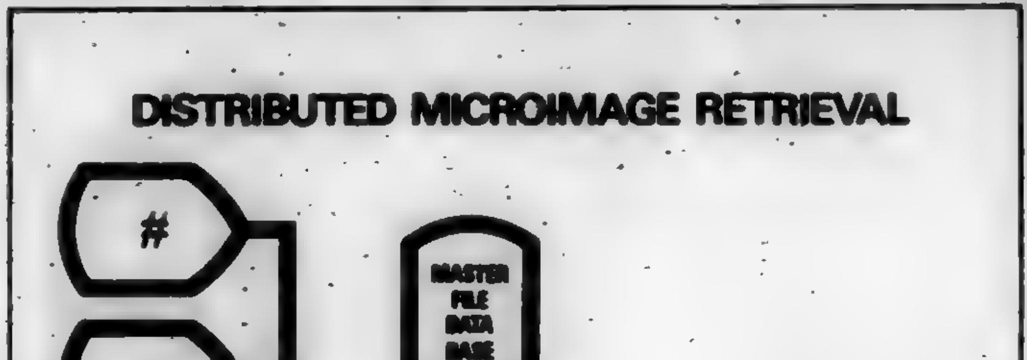
In this case, the minicomputer serves both as an index for retrieval of the images and for data entry. However, only indexing data is entered through the mini. The bulk of the data entry, which used to slow the minicomputer system down so radically, now is accomplished at high speeds by the host. Because there is no paper movement, it is possible to attain input rates up to 1,000 or 1,500 documents per hour.

Some minicomputer/micrographics CAR systems being offered today are self-contained, with both minicomputers and micrographics terminal packaged as a unit. This usually limits the hardware and software capabilities of the overall systems. They were designed to fit the needs of a particular group of applications and often cannot be expanded to fit others.

Instead of limiting the capabilities of CAR systems in which we participate, we have chosen to be as flexible as possible by interfacing with others' minicomputers systems which can be tailored in size to meet almost any application. Also, we have chosen to work with flexible software packages.

One firm in particular, I.P. Sharp Associates, Inc., headquartered in Rochester, N.Y., has prepared several proprie-

(Continued on SR/40)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#
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HOST CPU
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Figure 2

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Minis, Microfilm Team for Efficient Storage

(Continued from SR/39)

tary software systems for use in CAR installations. Working with Data General Corp. hardware, Sharp can expend systems to meet current and anticipated needs and can tailor software to meet customers' specific needs. Its operation is highly flexible and is adaptable to a multimillion-document, public-utility file or a small-court records file of 500,000 documents or less.

Systems Coordinator

In these installations, Kodak often is the systems coordinator and takes responsibility for them from the beginning. Although it is a multiple vendor situation, we have had no trouble with it. If any problems should arise, we feel it is in the best interest of all parties to resolve them quickly. This has been the case so far.

Minicomputers have existed with CAR since the beginning, even though CAR systems have become increasingly sophisticated. The reason is that minicomputers are available (at ever-decreasing prices) and programmable to suit the needs of the application. When minicomputers are combined with microfilm, the result is efficient, low-cost data stroage from which quick retrieval is available.

Campbell has been with Eastman Kodak Co. since 1968, serving in a variety of positions. Currently, he is sales planning coordinator for micrographics, which includes management of sales programs for computer-assisted retrieval.

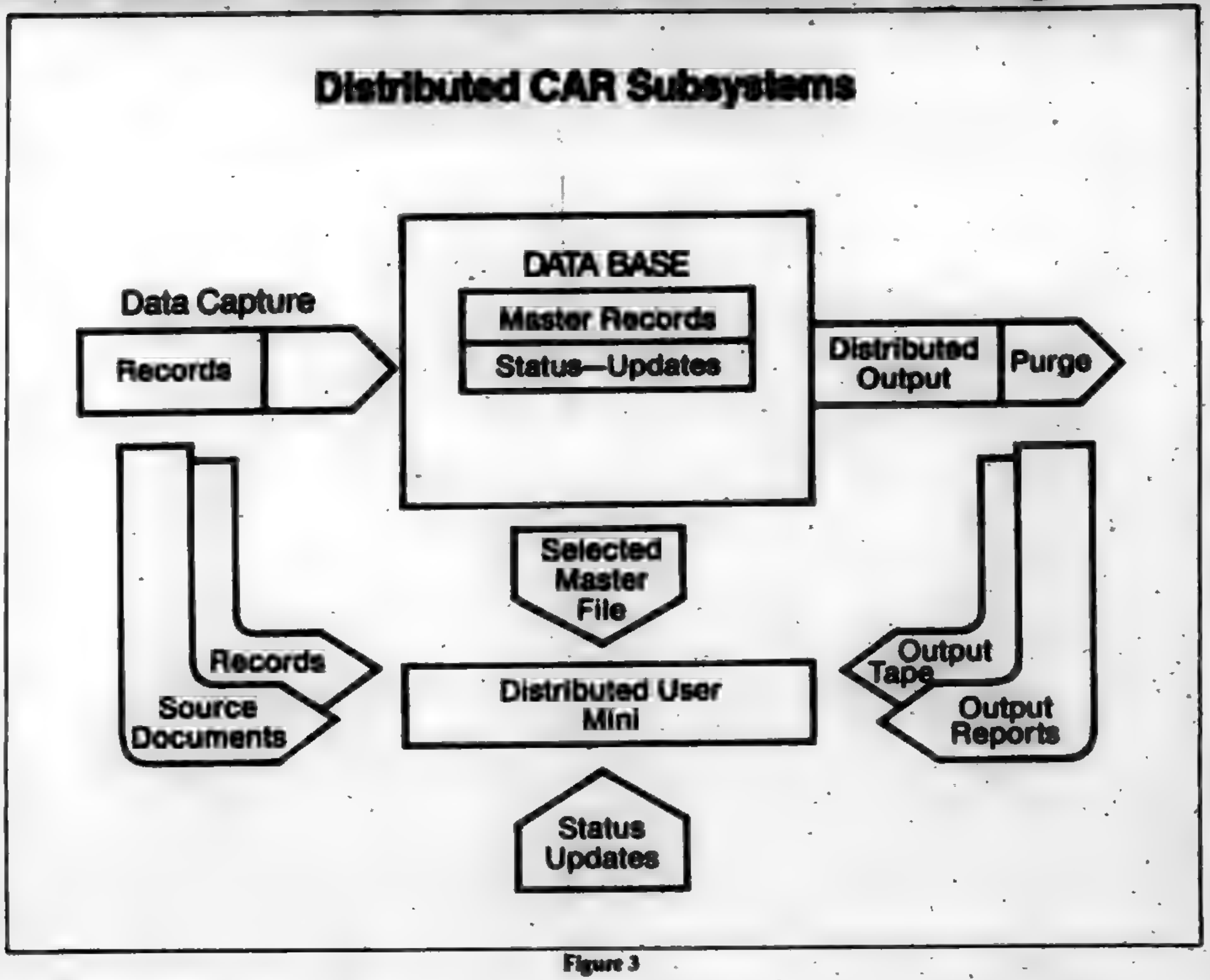

Figure 3

Do-It-Yourself Systems Tough

(Continued from SR/37)

We told our client that for less than $20,000 he could acquire a turnkey personnel system that would serve his current needs and let him expand in the future.

We recommended that Pat acquire a hardware/software package using DEC PDP-11 computers. After seeing the system perform, he followed our recommendation.

Lessons Learned

The lessons to be learned from this story are:

- Developing software on microcomputers requires at least as much skill as developing on mainframes, probably more skill because the available storage space is limited, hardware reliability is low and dealing with diskettes is unweidly.
- Developing a business applications system requires time; effort, planning and documentation, as well as programming.
- Saving money by buying a do-it-yourself computer usually costs more in the long run.
- Buying well-developed, field-proven systems from reputable vendors gets the best results — useful, effective computer systems.

In the course of the installation of the new system, Pat was able to see that DP professionals can objectively select the appropriate computer system, tailor a system to individual needs, train personnel and install a virtually error-free system.

George Pitagorsky is president and Robin Evans is a staff consultant at People and Solutions, Inc., 159 Madison Ave., Suite 12c, New York, N.Y. 10016.

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To Make Work as 'Nice as Possible'

Physician Prescribes Small System for Office

Special to CW

FRAMINGHAM, Mass. – The first things a visitor to the offices of Pediatric Ophthalmic Associates Inc. here notices are the CRT terminals on the desks of the receptionists. After that, they see the toys in the office of the medical center's head, Dr. Richard J. Blocker.

"Our intent is to make this office as unmedical as possible, in terms of the children we treat," Blocker explained.

That kind of thinking – to make the medical office as enjoyable a place as possible – extends to Blocker's office staff as well. For that reason, he has a Data General Corp. microcomputer installed to make his operation more efficient, more accurate "and as nice as possible for the people who have to do the work," Blocker commented.

Blocker became aware of the possibilities of computers when he graduated from medical school in the late 1960s. "I never dreamed then that I'd eventually be able to afford one, since computers were expensive, bulky and complex." From his own experience, Blocker has since learned that computers are "relatively simple to operate, relatively trouble-free and don't need special environments."

Cheaper, Simpler

Eventually, it was the dropping cost and user-complexity of computers, combined with rising amounts of paperwork, that drove Blocker to consider a computer. That led him directly to the one he runs now, a DG 64K-byte Micronova MP/200.

"Our paper load – private patient billing, insurance billing, patient scheduling and record-keeping – was becoming very difficult for the office staff to handle. We had three full-time people, plus one person half-time, and we were actively considering a fourth full-time person. Not only did we not have the space, but we thought it was a little ludicrous, since there were only two doctors in the practice.

"We surveyed the field to see if there was a system that could meet our needs and come in at a price no greater than the cost of another secretary," he said.

Blocker selected Micronova from W.S. Peck Computer Associates, Inc. of Cambridge, Mass., because he was convinced of the need for local support as well as a stable, nationwide hardware operation.

W.S. Peck also supplied the Medical Accounts Receivable System (Mars) software, which is a special application program written in Business Basic.

Problem Quickly Solved

Although Blocker initially had a few problems with the system's operation, they were quickly ironed out.

"We had a questionable problem with one of the CRTs – it was arcing a lot, probably because of the static electricity conditions here. The service rep was here within three hours, replaced the tube and we've had no problems since."

(Continued on SR/42)

Patient scheduling and billing at Pediatric Ophthalmic Associates Inc. is done on a Data General Micronova MP/200 microcomputer. Television-like terminals with keyboards are used by the office staff to read information stored in the computer. Hard-copy printout is provided by the Dasher printer at left.

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Small System Prescribed

(Continued from SR/41)

Although the skills he learned in his medical career, along with the advice of knowledgeable friends, helped him select a system, Blocker has nevertheless been surprised at some of the things he's seen and learned.

"As a result of getting the computer, not only didn't we have to hire the fourth person, but in fact we'll be reducing our office staff by one, so in essence the computer system is saving us two salaries," he noted.

Another surprise is the extent to which he has become involved in programming. "I'm on a learning curve right now. The amount you learn is exponential at the start. It's similar to my experience in medical school, or as an intern or a resident — there's so much to learn and read."

Blocker has constructed a computer terminal from a kit. Using the terminal in his home, he can access the DG computer in the office and get needed data about patients at any time of the day or night.

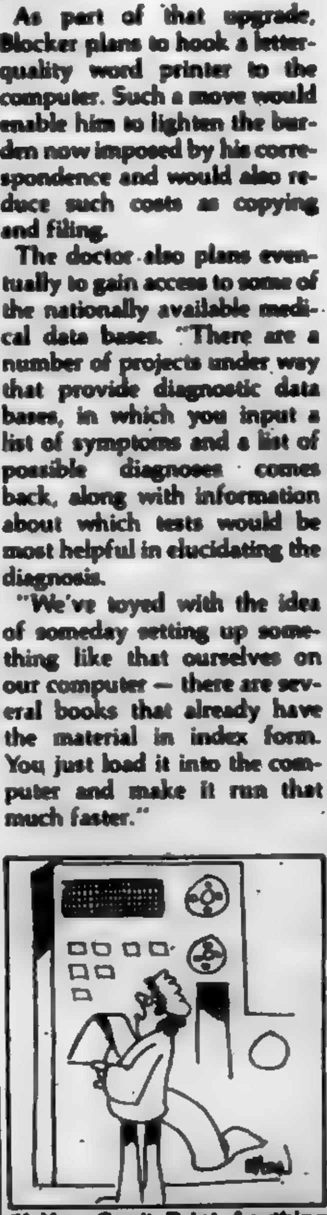
Although he has only had the system about six months, Blocker is already thinking about eventual upgrades. "We're looking towards the possibility of a paperless office, and as the price of memory comes down, it becomes more likely. That's one reason we're actively looking at upgrading our hardware to 256K-byte Nova 4X," he commented.

As part of that upgrade, Blocker plans to hook a letter-quality word printer to the computer. Such a move would enable him to lighten the burden now imposed by his correspondence and would also reduce such costs as copying and filing.

The doctor also plans eventually to gain access to some of the nationally available medical data bases. "There are a number of projects under way that provide diagnostic data bases, in which you input a list of symptoms and a list of possible diagnoses comes back, along with information about which tests would be most helpful in elucidating the diagnosis.

"We've toyed with the idea of someday setting up something like that ourselves on our computer — there are several books that already have the material in index form. You just load it into the computer and make it run that much faster."

The Data General Micronova MP/200 microcomputer with its 10M-byte memory storage disk is no bigger than a two-drawer file cabinet.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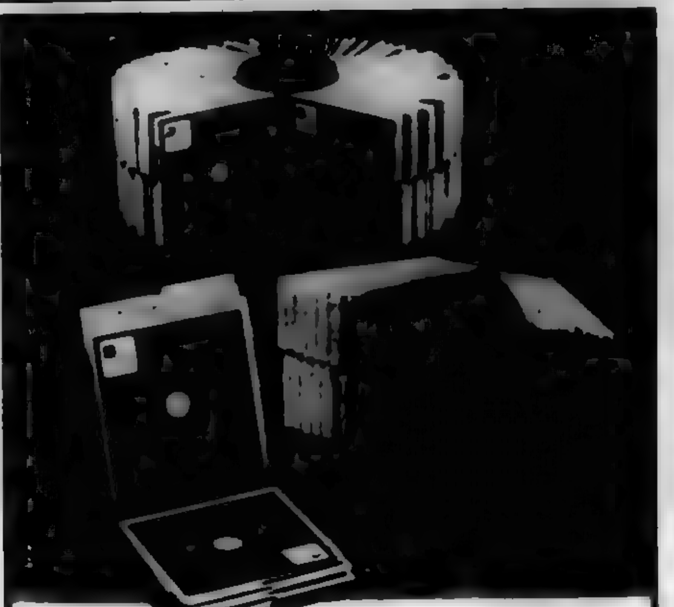
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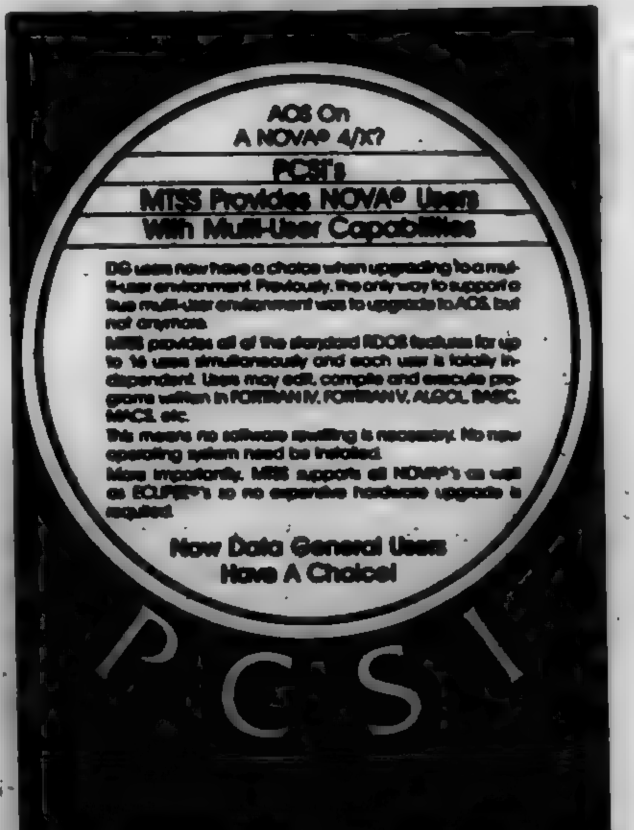
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And Helps Keep Overhead Down

Voice Response System Boosts Supplier Orders

CHICAGO — If you're in a price-competitive business that operates with an average 3% profit after taxes, how do you keep your overhead down and your prices low to attract customers?

If you're Colonial Hospital Supply here, you keep your salespeople and customers talking — not to each other, but into a minicomputer-based, voice-activated order entry system.

As the price of health care products began to rise, hospitals and other customers became extremely price-conscious. That meant Colonial had to cut its selling and distribution expenses in order to improve profits. The distributor's investigation of cost reduction methods ended with the installation of the Touch-Talk Order Entry System (Toes).

Configured by Interface Technology, Inc. of St. Louis, Toes is made up of an IBM Series/1 minicomputer, a Votrax voice response system from Federal Screw Works, telephones and dial-up lines.

"Our customers and our salespeople enter their orders directly into our computer system using a 12-button Touch-Tone telephone or a Port-a-Tone keypad," Ben Welch, Colonial's treasurer, explained. "It normally takes less than 30 minutes to learn to use the system."

Salespeople Benefit

Colonial's 22 salespeople now devote a good portion of their time in pursuing new business and improving their relationships with existing customers as well. Customers reacted favorably to the electronic order entry, resulting in their entering orders directly, Welch said. Consequently, salespeople have gained at least two hours of selling time per day.

With an estimated savings of 220 hours per week in selling time, better management of the use of this time will generate additional sales without any additions to existing sales personnel, Welch indicated.

Colonial's sales are up dramatically and should result in increasing revenues significantly, he added. Thirty customers who are using Toes have been ordering 50% more than they normally order. In one instance, during the fourth quarter of 1979, a particular customer ordered 85% more than he normally does.

Faster Turnover

Colonial has found Toes effective in increasing inventory turnover. Because of the reduction in lead times to accept, process and deliver orders, the level of lead time usage of inventory automatically went down.

Combined with an increase in sales, the capital employed in accumulating inventory and the accompanying inventory carrying charges — which run at a rate of 22% of the value of inventory — were reduced substantially. For instance, for a particular level of sales, the average inventory was 2,136,000 when it should have been 2,400,000, based on previous inventory turnover ratio. Their inventory turnover increased from 7.1 to 10.1 and generated a net savings inclusive of interest

(Continued on SR/44)

Helen Mazur (left), computer specialist for Colonial Hospital Supply, is starting up the system.

When salesmen are on the road, they might not find a Touch-Tone telephone. This small Port-a-Tone terminal shown here converts any telephone into a Touch-Tone telephone.

Orders, after they are processed, are printed in the warehouse.

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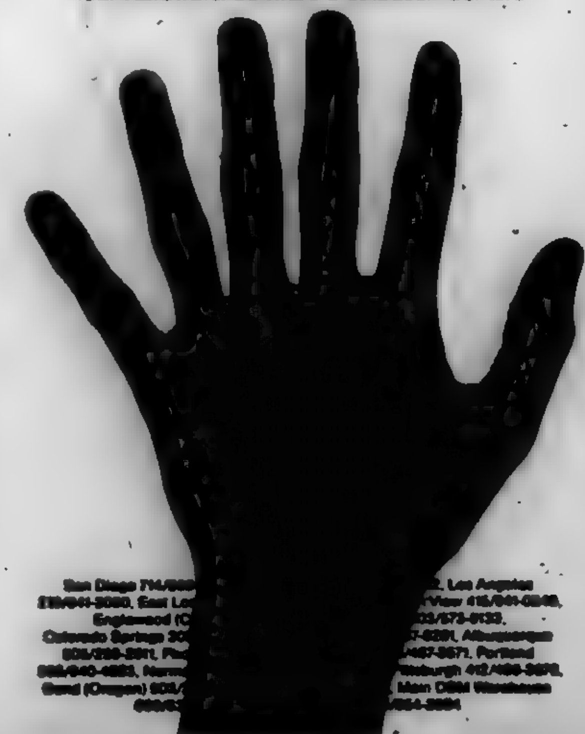

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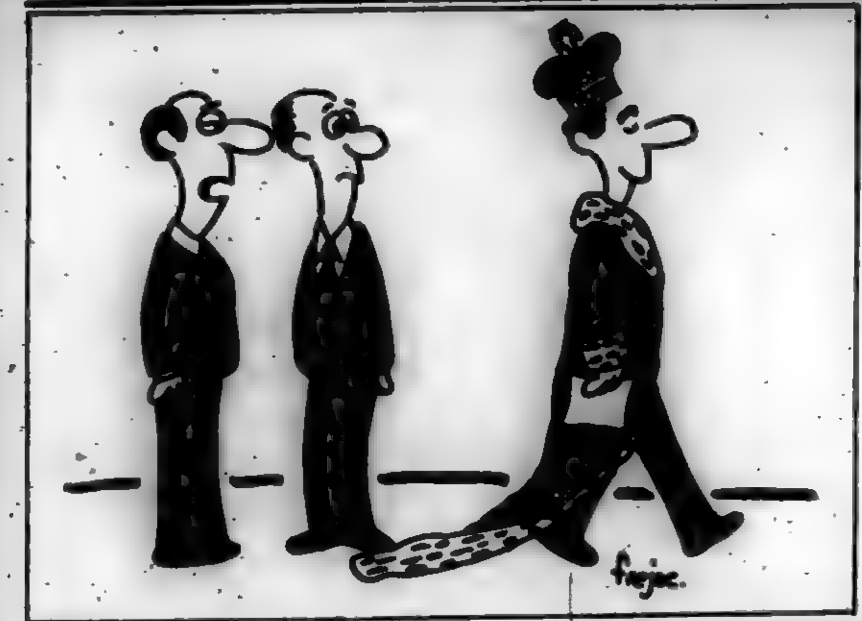

'McColeman Is the Best Computer Programmer This Company Has Ever Had and He Knows It.'

Voice-Activated System Boosts Supplier's Orders

(Continued from SR/43)

carrying charges of about $300,000, Welch said.

In addition to all the financial gains experienced by Colonial, one of the most important results of Toes, according to Welch, is improved work flow.

Impact on Salespeople

Salespeople formerly went home at night and dictated their orders into a dictaphone. From 7:30 a.m. to 11:30 a.m. the next morning, these orders were typed up, which not only tied up administrative personnel, but also meant a delay in dispatching orders from the warehouse. By the time the orders were at the warehouse, it was well past noon.

Now, salespeople enter their orders directly into the minicomputer every night via the voice response system. The orders are automatically processed and dispatched to the warehouse at 7:30 in the morning.

Order Verification

Every step of the order process is verified before going on to the next step, and the system detects the entry of invalid product codes.

If a particular item is out of stock, Toes lets the customer or salesperson know that and given the opportunity to both salespeople and customers to cancel an item immediately and order a similar product from another manufacturer. Hence, customers placing their orders through Toes have their orders serviced hours, and many times days, before conventionally placed orders.

Colonial's initial objective was to collect 300 orders per month on Toes. Contrary to the firm's expectations, the orders placed by salespeople and customers totaled 700 the first month. Now, about 1,000 orders come in each month through Toes.

Prior to Toes' installation, anywhere from 19 to 25 hours a day were being spent on collecting and processing orders.

All of that time is now saved and is being utilized for other purposes — representing an annual savings of $42,000.

"I could have easily relieved some of the people who were performing the order collection functions; however, our company policy is not to replace people with computers," Welch said. Hence, the time that previously went for order collection and processing is now being utilized by a company that Colonial started after the installation of Toes.

TI COBOL packages

MCBA is pleased to announce that the following business application packages are available for immediate delivery in TI DX10 COBOL:

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A survey of electronic message systems

The EMS Revolution

By Raymond R. Panko

At Continental Bank in Chicago, mail is now delivered in seconds — anywhere in the world. More than 1,000 employees are linked by the bank's electronic message systems (EMS).

"They give us a real competitive advantage," said bank Vice-President Bob Champion. "I have people in Europe and the Far East and can communicate with them as easily as I can with people here in Chicago."

Continental Bank created its message system to enhance the productivity of its managers. Judging from the words of another vice-president, Bob Schiewe, the productivity goal is being reached: "I used to get six inches of paper in my 'in-box' every day. Now I get less than half an inch, and the things that come in by computer are easy and fast to handle.

"I have a lot more time to spend with my managers, a lot more time to do my real job."

To send a message in the Continental system, a manager has two choices: type it directly on a desktop terminal or delegate the typing to a secretary. In either case, the message is sent as soon as typing is finished. The next time the receiver checks his box, the message will be waiting. In fact, if the receiver's terminal has been left on, he will see the message immediately.

While the Continental Bank EMS is a large one, it is far from the largest. Texas Instruments, Inc., for example, has a worldwide EMS serving 8,000 terminals and handling more than four million messages each year. And Hewlett-Packard Co.'s internal EMS, while not placing any terminals on the desks of individual office workers, has even more impressive traffic statistics: more than 25 million messages are carried each year.

The message systems at Continental Bank, TI and HP are all in-house developments. But just about every major office products company is now offering or has announced plans for EMS:

- All of the major national computer networks in the U.S. and Canada already offer EMS. Tymnet's system is called OnTyme; Telenet's system is called Telemail; and Datapac's offering is called Envoy 100.
- Electronic message systems are also slated for the next generation of computer networks: Satellite Business Systems (SBS), the Xerox Telecommunications Network (Xten) and AT&T's Advanced Communications Service.
- Several time-sharing vendors and software houses offer fairly complete message systems that can be used via time-sharing, ordered as in-house software packages or purchased as in-house turnkey systems. A partial list includes the Computer Corp. of America; Infomedia Corp.; Scientific Time-Sharing Corp.; Bowne Information Systems, Inc.; DHL, Inc.; On-Line Software International; Anderson Jacobson, Inc.; Cybertek Computer Products, Inc.; Compuserv; SP Communications; and Rolm Corp. (which has a PBX-based message system).
- All of the major computer equipment vendors seem ready to offer EMS as part of the new "integrated" office systems now being designed and introduced. Tymshare, Inc., Datapoint Corp., Wang Laboratories, Inc., Prime Computer, Inc. and IBM already offer EMS in their integrated systems. Xerox has offered EMS in all experiments with its prototype integrated system, Alto. Digital Equipment Corp. originally eyed Computer Corp. of America's Comet system as a DEC offering, but has since decided to develop its own EMS program. Wang has even advertised its system on television.
- Potentially more important than all of these efforts is the work now under way worldwide to upgrade the international Telex service. The new service, teletex, now seems likely to be a relatively sophisticated EMS. The development of teletex is being done under the sponsorship of the Consultative Committee for International Telephone and Telegraph (CCITT), which is the chief international standards agency in telecommunications. Some countries notably West Germany and Sweden, plan to offer teletex by 1982 or 1983.

If teletex achieves its full promise, it could make a fairly sophisticated EMS available worldwide before the end of the decade.

Electronic Mail

Many EMS vendors refer to their systems as "electronic mail" rather than EMS. Electronic mail certainly seems to be an apt name, since the messages are delivered electronically. However, the term "electronic mail" is already in use. In fact, electronic mail is already a $2 billion industry — with little help from EMS. Figure 1 shows an estimate for the electronic mail industry as it was in 1977.

Estimated Electronic Mail Expenditures in the U.S.: 1977
(millions of dollars)

Category		Annual Expenditures
Private teletypewriter networks		$600-$1,200
Western Union Telegraph Co.		
Telex/TWX	$240	
Mailgram	50	
Telegram	60	
Other	50	
Total		$400
Facsimile		$200-$350
Communicating Word Processors		$40-$100
Total		$1,240-$1,850

Source: Reference 1

Figure 1

There are two basic forms of electronic mail: teletypewriter systems and facsimile systems. Teletypewriter systems transmit messages as a string of characters, each character represented by a 7- to 10-bit code. The most common of these codes in the U.S. is Ascii.

Facsimile systems, in contrast, produce a picture of a page by scanning it, much as a television camera scans a scene or a copier scans a printed page. The scanned image is transmitted to a receiver, where it is printed. Facsimile systems are sometimes called telecopier systems.

Teletypewriter systems are desirable because they use much less transmission bandwidth than facsimile. Teletypewriter messages can also be stored in less memory space than facsimile messages. Facsimile, on the other hand, can transmit graphics, letterhead and signatures.

Both approaches can provide high-quality printing at the receiver's terminal. In practice, however, printing quality varies enormously in both approaches.

Electronic mail is dominated by "private teletypewriter networks" or PTNs (see Figure 1). In PTNs, a message is composed on the sender's teletypewriter. Early teletypewriters prepared messages on punched paper tape; new terminals have electronic composition.

When the sender is ready, he dials the receiving terminal's code. A connection is established via the company's internal switching network, which typically uses common-carrier transmission lines but ties these lines together through the company's switches and concentrators. The receiver's terminal prints the incoming messages.

Some PTNs do not require that the sending and receiving teletypewriters be free at the same time; they provide "store-and-forward" service in which the sender's message is stored in the system until the receiver's terminal is free.

Public Nets

Public teletypewriter networks are available in the U.S. primarily from the Western Union Telegraph Co. Although Western Union does not have a monopoly on teletypewriter services in the U.S. (ITT, in fact, plans to compete with Western Union), it offers nearly all public services in this country. Western Union's chief public service is Telex, a worldwide teletypewriter system. Western Union also offers quite a number of other services, including telegram service, Mailgram and Infocom.

(Continued on In Depth/2)

IN DEPTH

(Continued from In Depth/1)

The U.S. Postal Service is attempting to enter the electronic mail market through its Electronic Computer-Originated Mail (Ecom) service. In many ways a Super-Mailgram service, Ecom would let companies such as bulk mailers send teletypewriter messages to local post offices, where they would be printed, then delivered by hand in the next day's mail.

Facsimile, although still fairly small in the overall picture, is growing very rapidly. Before 1970, the hostile interconnection regulations of the telephone system and antiquated technology limited facsimile to specialized applications, such as the transmission of newspaper photos. But when interconnection rules were liberalized, an opportunity emerged, and Xerox exploited it aggressively with new technology and heavy promotion.

Today, facsimile continues to grow rapidly, often at the expense of private teletypewriter networks.

The picture of facsimile should even brighten in the next two or three years. Both SBS and Xerox are encouraging the use of facsimile on their proposed national networks. Cheap bandwidth, coupled with technology to reduce transmission costs, is being held out to clients as a potent way to reduce their mail costs.

In addition, while facsimile interconnection is still far from standardized, several organizations are now providing transmission networks that are claimed to be capable of connecting most facsimile terminals to others. Existing networks — Speed-Fax, Fax-Pac and Graphnet — should grow in power and should be joined by others soon.

Word Processors

Communicating word processors have added an important new dimension to work processing technology: the capability to distribute text after it is created. In early products it was necessary to handle text transfers manually. First, the sender called the receiver; then, they hooked up their systems.

Now, however, transmission work is becoming automated. Many units can work unattended. And IBM's 6670 Information Distributor can create a network linking word processors with one another and with printers scattered around the firm.

But there are problems ahead for communicating word processors. Although many are billed as compatible, most are compatible only in a limited sense: they can exchange streams of text. But when it comes to displaying text on a page or screen — including margins, tabs, backspacing, underlining, fonts and so on — there are no standards. Text that is "successfully" transmitted from one compatible system to another may produce only meaningless jumbles when the receiving system attempts to print it.

It should not be too long before different kinds of electronic mail melt together into hybrid delivery systems. With proper techniques, for instance, text produced from PTN terminals and communicating word processors already can be "printed" on a facsimile terminals. Already the OnTyme II service of Tymnet can send messages to facsimile terminals. Optical character recognition, in turn, will eventually be able to convert facsimile images into teletypewriter codes.

Electronic Mail vs. EMS

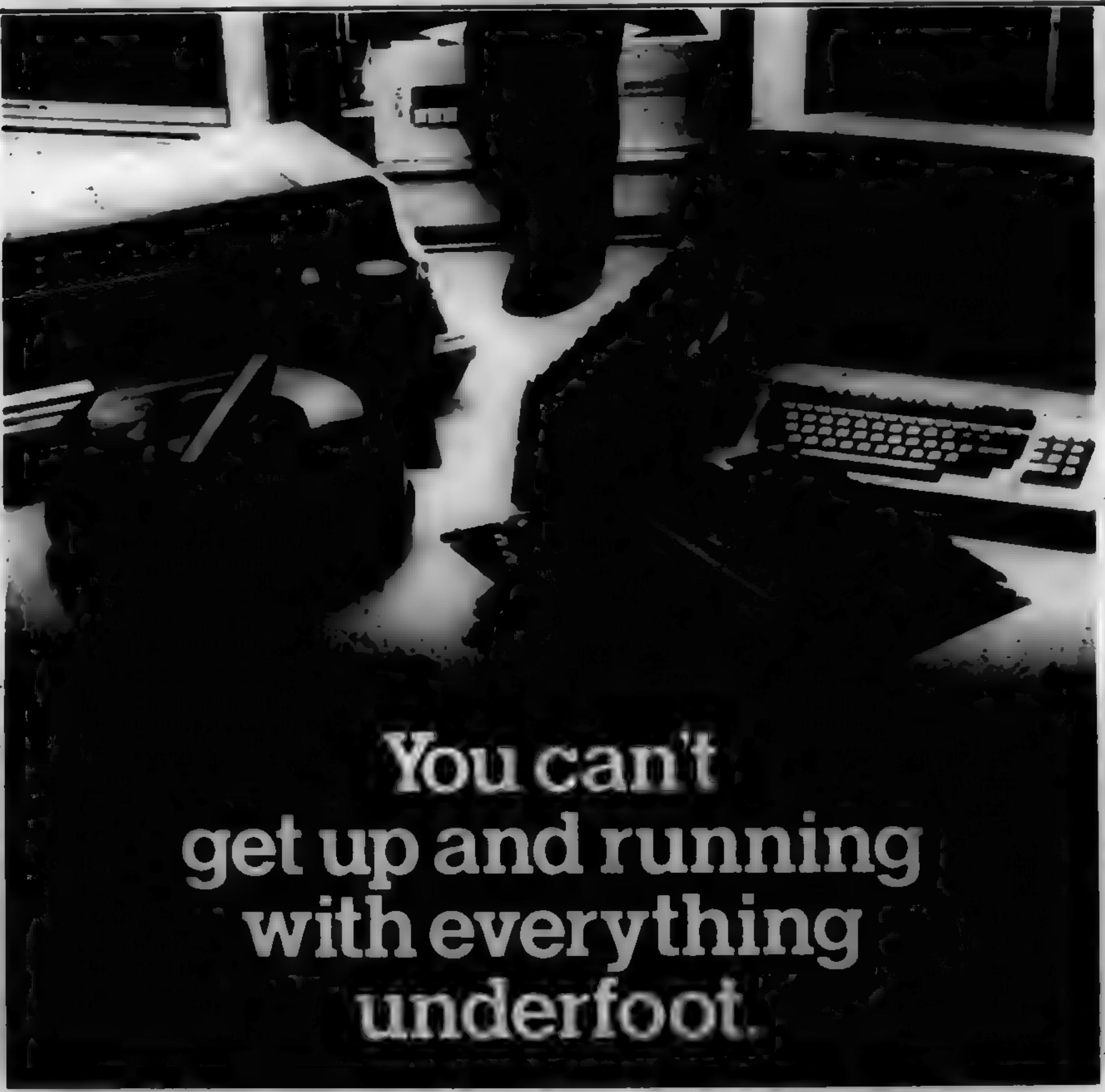
Electronic mail differs from EMS in this way:

- Electronic mail is concerned primarily with message *transmission*. It transmits a message from point A to point B, where it is printed.
- EMS, on the other hand, focuses on the *handling* of messages before and after transmission: research, drafting, editing, addressing, reading, filing, forwarding and so on. Related costs are very high.

There are other differences between electronic mail and EMS. Most notably, EMS terminals are usually placed on the desks of managers, professionals and secretaries. Furthermore EMS commands are tailored to general office workers and avoid the odd codes of Telex and many other teletypewriter systems. Electronic mail terminals, on the other hand, traditionally have been located in centralized communication centers staffed by trained operators.

This difference between EMS and electronic mail, of course, does not hold for convenience facsimile units.

Even the earliest time-sharing sys-



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IN DEPTH

tems had rudimentary electronic message systems[4], but these were generally primitive and required incredibly tolerant users. The real spurt in EMS did not begin until the Defense Department's Advanced Research Projects Agency Network (Arpanet) was made operational in 1972. The Arpanet, an early precursor to Telenet, Tymnet, ACS and Xten, linked research centers around the country. Computer scientists in these centers, who had long maintained informal ties with colleagues in distant locations, soon began to adapt local "mailbox" services to network delivery.

In this hothouse environment, EMS sophistication grew rapidly. A number of the Arpanet systems eventually reached commercial status, and many commercial EMS designs bear unmistakable evidence that Arpanet systems were studied.

But the "Arpanet origin" explanation for the recent surge in EMS is only partly attractive. A number of the current systems were designed in total ignorance of the Arpanet work. Tymnet's OnTyme, for instance, was fully operational before its design staff got its first view of Arpanet mail systems.

Easy Design

Another explanation for EMS's current proliferation is based on the fact that EMS is inherently an easy design problem — at least until some of the tougher design issues are faced. Continental Bank, for instance, had been writing programs since the earliest days of computers to handle the bank's huge transaction loads in checking and accounting. Gradually, over the years, automation affected even higher levels. "One day," according to bank Vice-President Tom Hannagan, "someone asked for a system to exchange messages. We looked at the problem, decided it wouldn't be too hard to do, so we did it. We had our pilot up after four man-months of effort." When asked why the bank had not implemented an EMS earlier, Hannagan remarked that it simply had not occured to anyone.

But this "easy problem" theory too has a weakness. If EMS is so easy, why wasn't it done earlier? To explain the timing of today's many simultaneous introductions, two other explanations seem to carry weight:

- First, many firms, like Continental Bank, have recently become concerned with office automation and are increasingly focusing on systems for managers and professionals. Since managers and professionals both spend about 25% of their day reading and writing, the EMS application is a natural "next step" in many companies once word processing has been installed.
- Second, the costs of EMS have only just recently become attractive. In 1977, for instance, the Planet message system cost $1.48 per message, not including the cost of the terminal. But new technology has greatly reduced cost. At the Continental Bank, the cost per message in a system of similar power is already less than 50 cents.

In retrospect, these four factors — the impact of Arpanet computer mail technology, the basic simplicity of plain EMS, rising user and vendor awareness of office automation and EMS, and falling costs — are all combining to push electronic message systems out of the laboratory at great speed.

User Reactions

Where EMS has been introduced, user reactions have been very favorable. In one recent survey of 210 EMS users in the U.S. Army Material Development and Readiness Command (Darcom), the author found that reactions to EMS were positive among managers, professionals and secretaries alike[5].

Even among those managers who eschewed terminal work and delegated use of the system to support workers, general reactions were highly favorable. In fact, only a handful of people surveyed actually disliked the system; the rest had positive reactions or were neutral.

The Darcom survey revealed that users had experienced a complex pattern of hard and soft benefits (see Figure 2). Nearly all experienced an increase in long-distance communications (a strong benefit in this geographically dispersed organization).

Beyond this, benefits varied considerably by the person's job and whether or not they used the terminal themselves. The only benefit widely disavowed was travel reduction.

In general, the pattern of benefits found was encouraging. EMS *did not* revolutionize the lives of managers, but it produced the kinds of steady gains that will probably mark all successful office automation technologies.

The Darcom survey also found that managers maintained strong discretion over how they used EMS. In traditional data processing systems, everyone had to use the system in exactly the same way. Clerical workers, since time immemorial, have been told what to do *and* how to do it. However, managers and professionals have traditionally been told only what to do, not how to do it, and they have tended to develop highly personalized ways of working.

In EMS, the first computer-based technology to be adopted widely by managers and professionals, this same pattern of idiosyncratic behavior is emerging.

(Continued on In Depth/4)

	Percentages[c]					Significance Levels[d]		
	Direct Users				Indirect	Direct	Direct	M
	M[b]	P	M&P	S	M	M vs. P	M&P vs. S	D vs.
Increased long-distance communication	77%	64%	69%	44%	[illegible]	.180	.046	[illegible]
Increased productivity	74%	90%	86%	36%	35%	.245	.002	.004
Decreased time on phone	67%	52%	58%	21%	42%	.316	.001	.056
Increased liking for job	52%	60%	57%	40%	39%	.066	.052	.004
Increased status	52%	48%	49%	35%	24%	.399	.064	.006
Increased effectiveness on travel	40%	49%	46%	10%	24%	.423	.001	.012
Decreased formality in communication	44%	42%	43%	14%	40%	.199	.006	.476
Decreased time reading & writing	40%	38%	41%	22%	28%	.134	.136	[illegible]
Decreased time face-to-face	39%	30%	29%	12%	29%	.016	.001	.007
Increased flexibility of hours	34%	28%	30%	14%	22%	.024	.009	.006
Increased local communication	15%	22%	19%	10%	2%	.474	.051	.006
Decreased travel	11%	8%	9%	6%	16%	.225	.448	.468

Notes:

a Direct vs. Indirect: Direct users work at the terminal themselves to send and receive messages; indirect users delegate terminal work to others.

b M, P and S: M=managers, P=professionals, S=secretaries

c The percentage shown is the percentage of respondents in this job category, say direct managers, that fit the row descriptor; so percentages do not add across or down columns.

d Significance tests are based on Kendall's Tau. The figure listed is alpha, that is, the probability that the null hypothesis (that there is no difference across job categories) is true. A single 1-tail inference is assumed. See the section entitled "The Survey" for caveats.

e Sample size for all job categories was 210.

Source: Reference 3.

Figure 2. Experienced Benefits to Users by Job Category and Direct vs. Indirect Use[a,e] Percent Rating Benefit as Strongly or Moderately Felt

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IN DEPTH

(Continued from In Depth/3)

Some users employ the full sophistication of the system, while others use only a few commands, and yet others delegate all terminal work to secretaries. The presence of light users and delegators bothers many programmers-designers, but a basic marketing reality is that nearly every consumer product has nonusers, light users and heavy users.

Managers and professionals who decide not to use the system heavily are usually neither lazy nor "computer naive." They are simply exercising their traditional responsibility to decide for themselves how to organize their work days.

One of the most promising things about EMS is that it does not appear to be a "hard sell." If care is taken so that the system works well when it is introduced, and if managers are given about one day of introductory training, a relatively high percentage will adopt even today's rather clumsy systems. It appears that EMS's ability to provide rapid message delivery that works even if the receivers cannot come to the telephone serves a real work need for managers and professionals.

On the Arpanet, a good deal of attention has been given to standardization, so that any EMS program on any machine can exchange messages with other message programs on the network. Even in this hothouse environment governed by a single agency, however, standardization is only partial.

At the simplest level of standardization, different message systems should be able to exchange messages as simple lines of text marked by beginning and ending signatures. This was the first level of standardization attempted on the Arpanet, and it was largely successful. Unfortunately, it was not enough.

Many people on the Arpanet began to get 10 or more messages a day, with gusts up to 50. At these traffic levels, users often demanded ways to scan through their in-boxes and call up old messages by author, date or title — just as managers now have to go through older correspondence and through material in their in-boxes. User complaints caused several basic "fields" to be standardized: to, from, subject and date, to begin with. This was not too difficult to standardize.

But correspondence is a more complex phenomenon than first appears, and soon many Arpanet systems began to rival the complexities of organizational paperwork. More than two dozen other fields were soon in common use. Despite massive efforts, the Arpanet community was never able to standardize more advanced aspects of EMS.

A Distressing Fault

The Arpanet's inability to create a single standard for message structures is distressing because unless the user can operate on a message's structure, the biggest potential benefit of computer mail — its ability to automate some human message handling labor — will not be felt. Unless standards agencies can create comprehensive standards for message structure, EMS will become a lame medium for communication.

As difficult as simple text messages are to standardize, things are likely to grow even more difficult in the future as "multimedia" messages are created, combining voice, graphics, text, programs and perhaps even video communication. And even in the limited area of text, two factors will make standardization difficult:

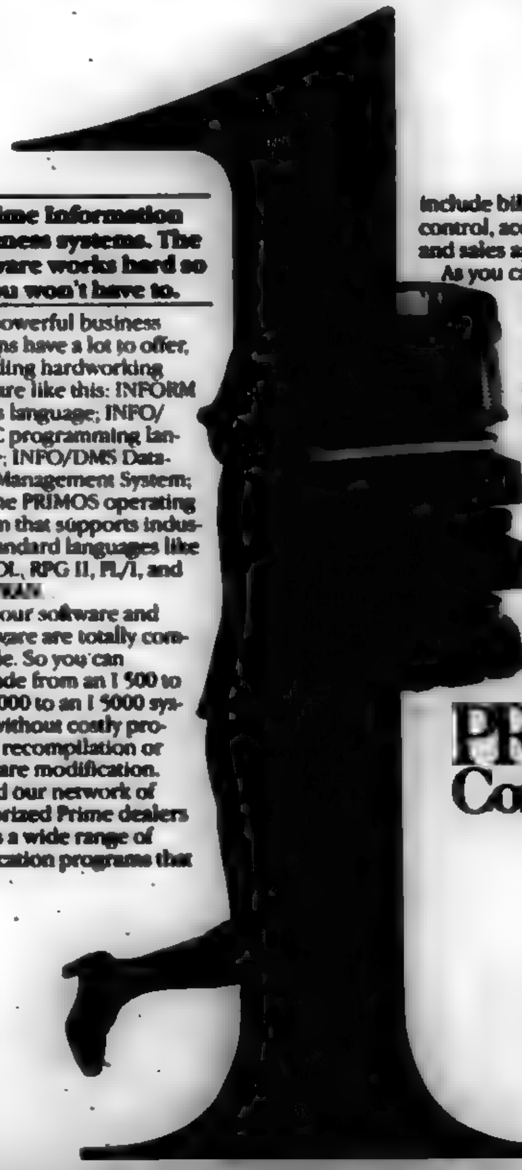
- Many computer messages will be documents prepared on word processing systems. As noted earlier, while most communicating word processing systems can exchange character streams, their approaches to formatting text on a screen or page are deeply incompatible. In addition, many of the newer word processing systems will allow users to specify character fonts, making the screen formatting problem even harder.
- Long documents are extremely difficult to read on a screen. While roughly 70% of all messages will be less than one page in length, many will be longer, and the mean message length should be two to five pages. It is difficult to read large documents on a screen.

"Structured" documents, however, which allow readers to scan through the document quickly, for instance seeing only headings, have proven readable on a screen. But to date we have not even begun to see standards for structured documents.

User Interface

A second area for standardization, after the basic message structure, is the user interface, that is, how the system appears to users. It is not entirely clear that it will be possible or even desirable to build a single user interface.

Such a standard might indeed be desirable, allowing users to move easily



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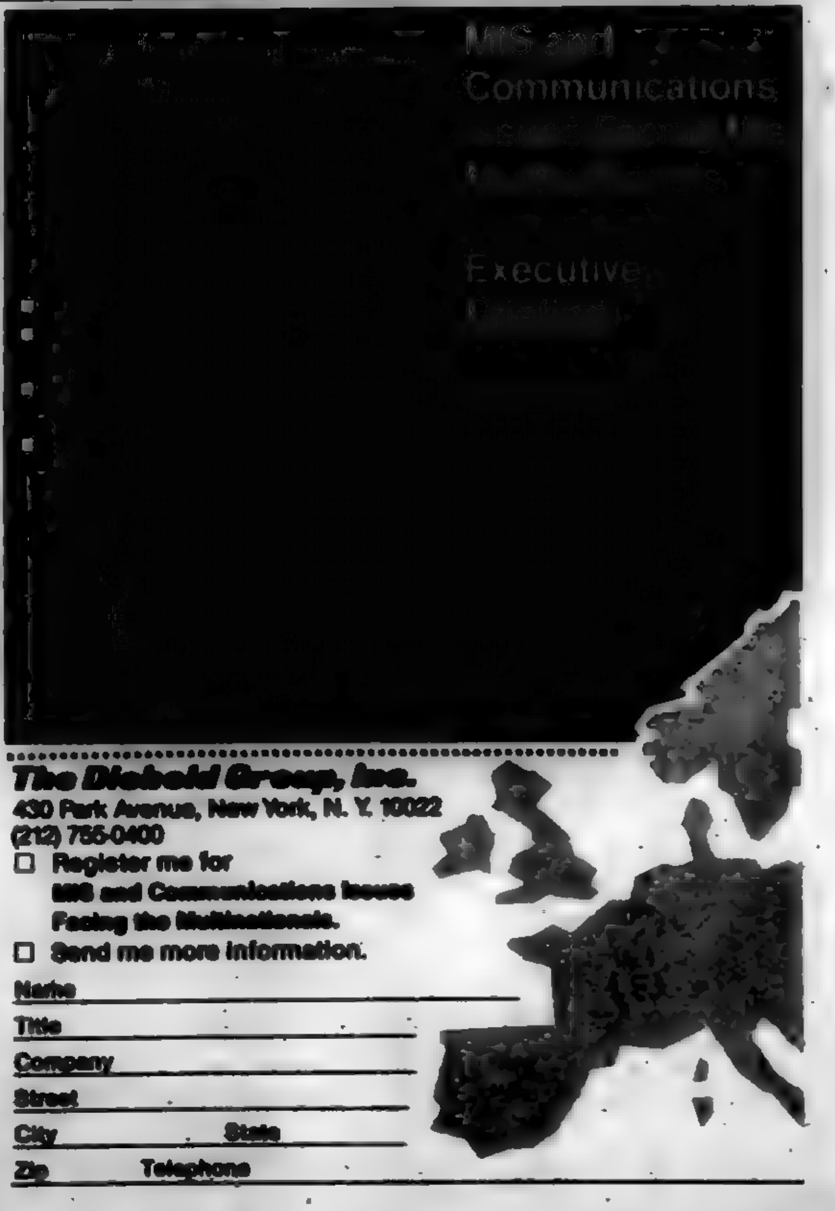

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between systems. But as long as messages have known and standardized structures, many different user interfaces can be used to handle the message.

One approach to standardization would be to allow each user or organization to employ whatever interface it is most comfortable with, at the same time offering a standardized "lingua franca" interface for those who want to use it.

Even if there is standardization, there is likely to be a "product line" of user interfaces for users with different needs. At a minimum, there should be separate tools for delegators, simple users and sophisticated users. We may also need special interfaces for different jobs.

A third area for standardization is delivery. At a minimum, the system must be able to get the message from one user to another user's in-box, handling failures nicely when delivery is not possible. It might not be too difficult to design a standardized delivery system to do this.

Complexities of Delivery

But delivery is inherently a very complex process as evidenced by our traditional delivery services, the postal and telephone systems. There may be levels of priority, levels of security, levels of reliability — each allowing the organization to match its needs with the lowest possible cost for delivery.

A fourth problem is how to interconnect address data bases, so that the formal address of an intended recipient can be located. Neither the postal system nor the telephone system has really provided universal "directory assistance"; the post office stops at the company mailroom in large firms, as does the telephone system's numbering in the directory. And neither traditional system provides universal listings. The telephone system, for instance, allows you to reach someone only if you know their approximate geographical location.

Complicating all of these standardization problems will be the fact that there is not likely to be a single EMS distribution network in the U.S. At least six national computer transmission networks will soon be operating, each with a national computer mail service. There also will be numerous smaller networks, run by time-sharing bureaus, individual corporations, special interest groups and even hobbyists. There will be no national control, in all probability, and standards must neither restrict what the big networks can do nor place burdens on small networks. Almost certainly, levels of delivery standards will be needed.

Work Under Way

Some standardization efforts are already under way, but the very diversity and lack of coordination among existing efforts is itself disturbing. In all cases, only parts of the problem are being worked on, and many of the standardizing bodies seem unaware of the existence of others. Here is a list of some of the standardization work now under way:

- The teletex work of the CCITT is potentially the most important standardization activity in EMS. Unfortunately, most of the teletex working members have only a rather superficial view of EMS and seem unlikely even to face the kind of more advanced questions that must be answered if EMS is to achieve its real promise.
- Within the International Federation for Information Processing, Working Group 6.5 is devoted to EMS standards.
- In the U.S. defense research environment, the efforts of the Arpanet community to set standards for message systems provide a rich supply of information on the problems of standardization and on some possible approaches. A draft for a particularly advanced "next-generation" standard is now being widely circulated and discussed.
- Separate standards may develop in the area of business forms processing as a result of a major working group (ISO TC/154) on trade practices within the International Standards Organization. Since business forms make up about half of all business pages sent each year (see Figure 3 on In Depth/6), the development of separate standards in this area might be highly unfortunate.
- An effort is now under way to develop text formatting standards for

(Continued on In Depth/6)

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* Very rough estimate

Source: References 6, 7

Figure 3. Estimated Written Communication Flows in the U.S.: 1977 (Billions of Pages)

(Continued from In Depth/5)

communicating word processors. As noted earlier, because the average message will be several pages long, formatting will be very important. This work is being conducted through the Ansi X4A12 committee, Working Group 4.

- The National Bureau of Standards is conducting a number of studies that could lead to EMS standards for the federal government.

Clearly, there is no shortage of efforts to bring standardization to EMS. Unfortunately, none of the groups now working on standardization appear to be taking a really creative and thorough view of what EMS may become in the future, and this lack of vision may not produce the best possible standards for the future.

Now that so many incompatible electronic message systems are in place, it is likely that no single standard will ever receive 100% acceptance. The question may be "How do we work together when more than one standard exists?"

One possibility is that just as computer networks now provide code conversion to allow different terminals and computers to interact, future services may be able to translate the protocols of incompatible systems. Perhaps the teletex standard will even be sufficiently powerful to serve as a least common denominator for such translations. (For a further discussion of standards, see Reference 5.)

What About the FCC?

The specter of federal regulation has frightened many vendors and quite a few users too. But the regulatory watchword, at least in the U.S., is now "laissez faire."

In its final decision in the Second Computer Inquiry (Docket No. 20828), the Federal Communications Commission (FCC) recently divided all communication services into two categories: basic and enhanced. EMS falls into the enhanced category. While the FCC has retained the right to regulate enhanced services, it has decided not to do so, at least not in the foreseeable future.

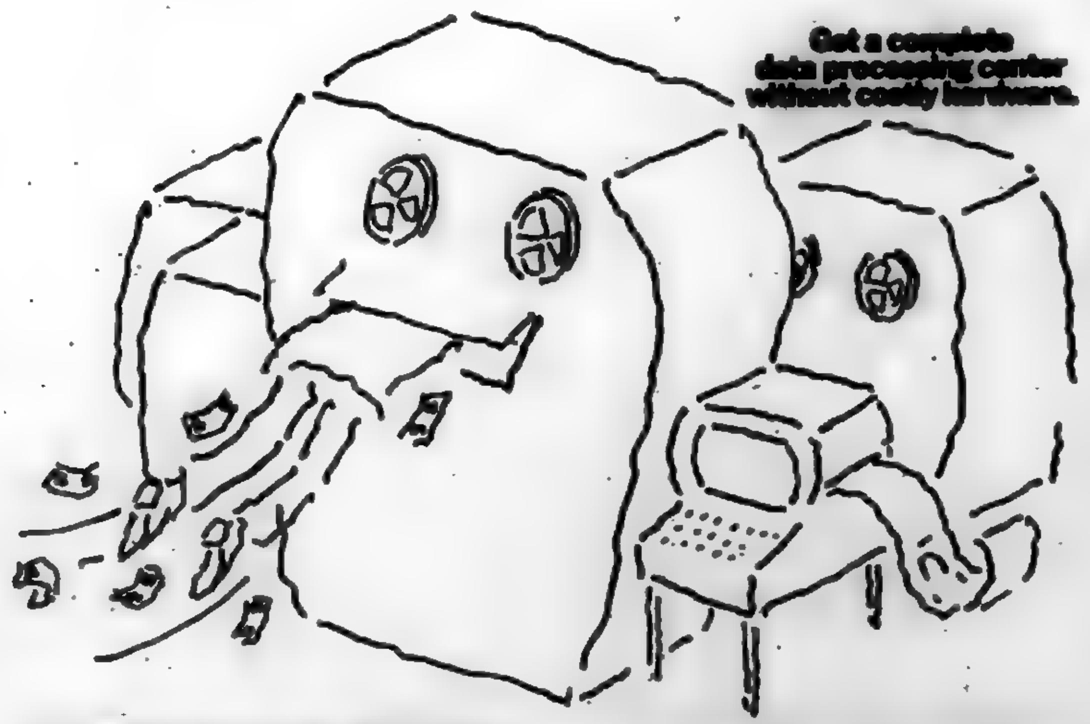
Even if the FCC eventually did decide to regulate EMS, this would only impact public EMS offerings. Intracompany message systems, which should dominate the industry, are almost certainly outside the FCC's realm of authority, just as private teletypewriter networks are today.

For messages going outside the U.S., however, the regulatory picture is very confused. The international record carriers (IRCs) that now handle message communication between the U.S. and the rest of the world are very jealous of their monopoly. Even more jealous of their monopolies are the postal, telephone and telegraph authorities (PTTs) that control domestic communication in almost all countries outside the U.S. and Canada. The rise of telex is likely to strengthen monopolistic trends.

Even companies that only want to send messages to their branch offices in other countries may face major obstacles. When HP established its internal, worldwide message network, for example, it had to negotiate separate arrangements with many different PTTs. Some allowed HP to use direct-dial lines; others required the use of more expensive data channels.

The sum total of the regulatory picture, however, will be very simple for most companies that want to use EMS; more precisely, the picture will be

(Continued on In Depth/10)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IN DEPTH

(Continued from In Depth/6)

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Computer mail's future seems secure. Costs, already low, are likely to fall 15% to 25% each year. By the mid-'80s, the cost per message should be competitive with *both* postal delivery and interoffice mail.

In fact, if the user is willing to live with message systems that handle little more than transmission, the cost of EMS is already below that of postage. Texas Instrument's very simple MSG system costs about 7 cents per delivered message, not including the cost of terminals (which are usually shared by several users).

Hardware for HP's Comsys mail system, sold commercially as the HP 2026, costs that company only about 5 cents per message including the cost of terminals.

As EMS costs fall ever closer to parity with traditional hand and postal delivery, we should see a revolution in the way businesses handle mail delivery.

As noted earlier, electronic mail is already a $2 billion industry, yet it has produced these revenues despite costs of 50 cents to $3 per message. Its total traffic is insignificant compared with the roughly one trillion pages of paper U.S. businesses and government agencies exchange each year (see Figure 3).

EMS's ability to produce delivery at electronic speeds and at postage stamp prices could expand the realm of electronic delivery vastly.

It is, of course, hazardous to speculate about the future of any rapidly changing high-technology industry. At the same time, an earnest attempt has to be made to anticipate the future because the state of the art five years from now should be very different from today's.

Some Predictions

Under these conditions, it seems appropriate to close this article with some guesses about what the future may bring:

1) *Refinement of Simple Systems.* As noted earlier, building a simple EMS is not vastly complex. Still, it is far from trivial, and most systems whose design begins with a clean sheet of paper end up being somewhat clumsy, flawed and imperfectly matched to user needs.

Until now, a majority of systems have been designed in isolation and in ignorance of both other design work and user reactions to other systems. It is hoped that designers will soon be forced by the marketplace to learn from their competitors in order to develop a differential advantage.

2) *Tackling the Next Tier of Problems.* With few exceptions, today's EMS networks work well only with small user communities. When systems grow beyond a few thousand users, the problems of finding a recipient's formal address becomes very difficult. How many Frank Johnsons are there in a large firm, anyway?

Another problem is missed or incomplete delivery. With telephone calls, it is easy to tell whether you have reached your party or at least someone with the authority to give him a message. In EMS, in contrast, the management required to handle "error conditions" is rarely present in any complete form. One user with little traffic leaves an important message unread for a week. Another has left the company without deactivating her mailbox. Another has gone on a three-week vacation.

The managerial work to handle such failures can become fairly large. While machine-based rules can help ("Notify me when the receiver has read the message"), many "solutions" are politically unacceptable.

In the relatively near future, text messages are likely to be carried over the same system as facsimile and perhaps voice messages. "Supercontrollers" already mix text, facsimile and voice. And with microprocessor control, a facsimile device can make a fine printer for text messages when not receiving facsimile. We are only beginning to understand the problems of integrating different forms of communication.

These three problem areas are only a few of the "next-tier" difficulties we can identify today. While the exact nature of the next generation of EMS is unclear; this much is obvious: tomorrow's message systems will be highly architectured and complex, not the relatively simple patches of today.

3) *Responses to Market Needs.* For

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nearly all products, different customers have different needs and requirements. As a consequence, we usually divide the market into a number of segments with members whose needs are relatively similar.

In EMS to date, we have generally created fairly complex systems with one dozen to three dozen commands. Even systems that begin simply soon evolve into powerful systems.

But our survey of Darcom users, as noted earlier, revealed three fairly distinct user segments:

- Heavy users tend to use much of the EMS's full power. Generally they demand an ever-growing number of functions to make their terminal work more effective.
- Light users, in turn, rarely or never use advanced features. They read incoming messages, ignoring filing; and they type replies or new messages, ignoring all but the simplest editing.
- Delegators eschew terminal work, having their secretaries worry about how to use the system.

There has been a strong tendency among system designers in the past to view light users and delegators as being (1) naive, (2) recalcitrant and (3) disdainful of EMS. In fact, this is far from the case.

First, they are not naive. Many users become light users *after* considerable experience as heavy users.

Second, it is difficult to call someone recalcitrant if you cannot prove that he *should* work heavily at a terminal.

Third, the Darcom survey found that almost all users — heavy, light or delegators — liked the system very much; they just differed as to how to use it.

If there is any naivete around, it is on the part of system designers who expect everyone to use the system in the same way. In the realm of consumer products, as noted earlier, there are *nearly always* nonusers (or indirect users), light users and heavy users.

Obviously, we need a line of EMS products, not just a single product. Heavy users may demand rugged terminals and powerful interfaces. Light users may desire simple terminals if they are to be served economically, and they may need a system with few commands and options. Delegators should be able to dictate outgoing messages and have incoming messages printed for their secretaries to pick up.

All should have procedures for working closely with their secretaries, just as they do in paper correspondence. Obviously, all users should be able to exchange messages, and growth paths should be provided for lighter users. (See Reference 6 for more details on possible EMS product lines.)

By concentrating on heavy users, EMS designers have repeated the errors made in color television, microwave ovens and cameras. In those instances, designers began with expensive and highly adjustable products. But in short order, they realized that a large number of users wanted lower cost and more automatic (albeit less adjustable) systems.

In cameras, for instance, there used to be only two major categories: very cheap cameras (less than $50) and expensive complex 35mm SLRs costing about $500. Canon revolutionized this market when it introduced its lower cost, highly automatic 35mm SLR camera, the AE-1.

4) *Structured Communication Systems.* Few messages exist in isolation. Rather, they are usually generated in response to events or (more commonly) other messages. In turn, they turned to generate new messages. Communication, then, is not entirely free-from; it is usually at least partially structured.

In clerical offices, the structured nature of communication is particularly evident. A salesman phones in an order. A form is filled in sales, then forwarded to and added to in many offices — plant scheduling, inventory, credit, production operations, shipping and billing. This and other clerical processes have often been likened to paperwork assembly lines.

In administrative offices outside of the military (where communication structuring is intense, as discussed in Reference 8), the structuring is generally looser, but it exists nonetheless. There is structure in the way we put together end-of-the-month financial statements, manage projects, negotiate nurses' schedules, handle customer complaints and so on.

Very soon, we may see the emergence

(Continued on In Depth/12)

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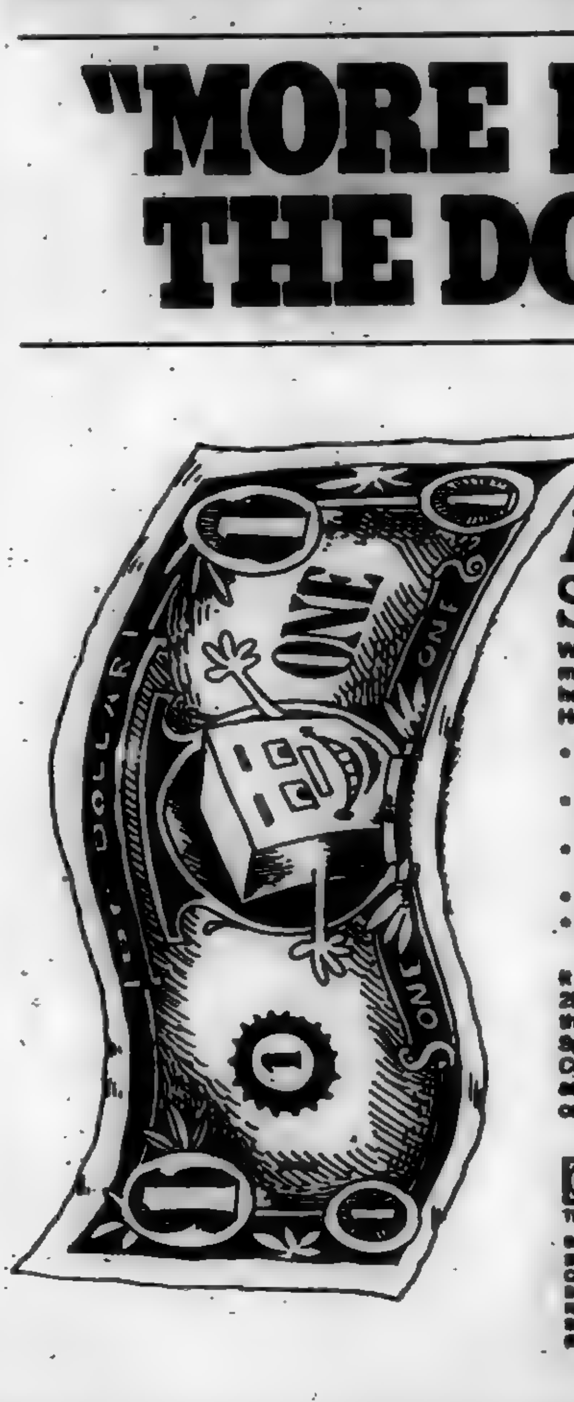

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IN DEPTH

(Continued from In Depth/11)

of message systems that can work with organizational communication structuring. In computer conferencing, in work being done at the Wharton School and in the Military Message Experiment on Oahu, Hawaii, we are beginning to see experiments in this area. Working systems, we would hazard to guess, are still three to five years away.

5) *Voice Message Systems.* It has always been assumed that electronic message systems eventually would compete with or be joined to voice message systems (VMS).

In VMS, the sender does not type the message. Instead, he presses a special "message" key on the telephone, dials the receiver's number and speaks the message. A button lights on the receiver's phone. When the receiver presses his "listen" key, the message is played back.

This may seem rather antisocial, but voice messaging addresses the largest failing of the phone system today — that half or more of all telephone calls do not reach the intended receiver.

Bitter Competitors

Some analysts believe that EMS and VMS will be bitter competitors. "EMS dominance" proponents argue that the written record of EMS and the ease of skimming through old messages will allow EMS to dominate. "VMS dominance" proponents, in turn, feel that the verbal nature of voice messaging make it a sure winner.

EMS costs are rapidly falling toward those of postal delivery and interoffice mail. The economic pressures to adopt EMS should soon be very strong in large corporations. Smaller firms too should soon converse over public message services.

EMS will not be a hard sell. As in any other office system, sloppy introduction can destroy enthusiasm very quickly. But EMS has consistently demonstrated the ability to have its terminals placed on the desks of many line managers and to be used by them enthusiastically.

However, companies should not lock themselves into any one system too tightly. EMS should evolve at a fierce pace throughout this decade. Several early vendors, like Wiltek, Inc., have already failed or have come very close to failure, falling behind the state of the art. But the outlook is bright, even though there are still a few clouds on the horizon.

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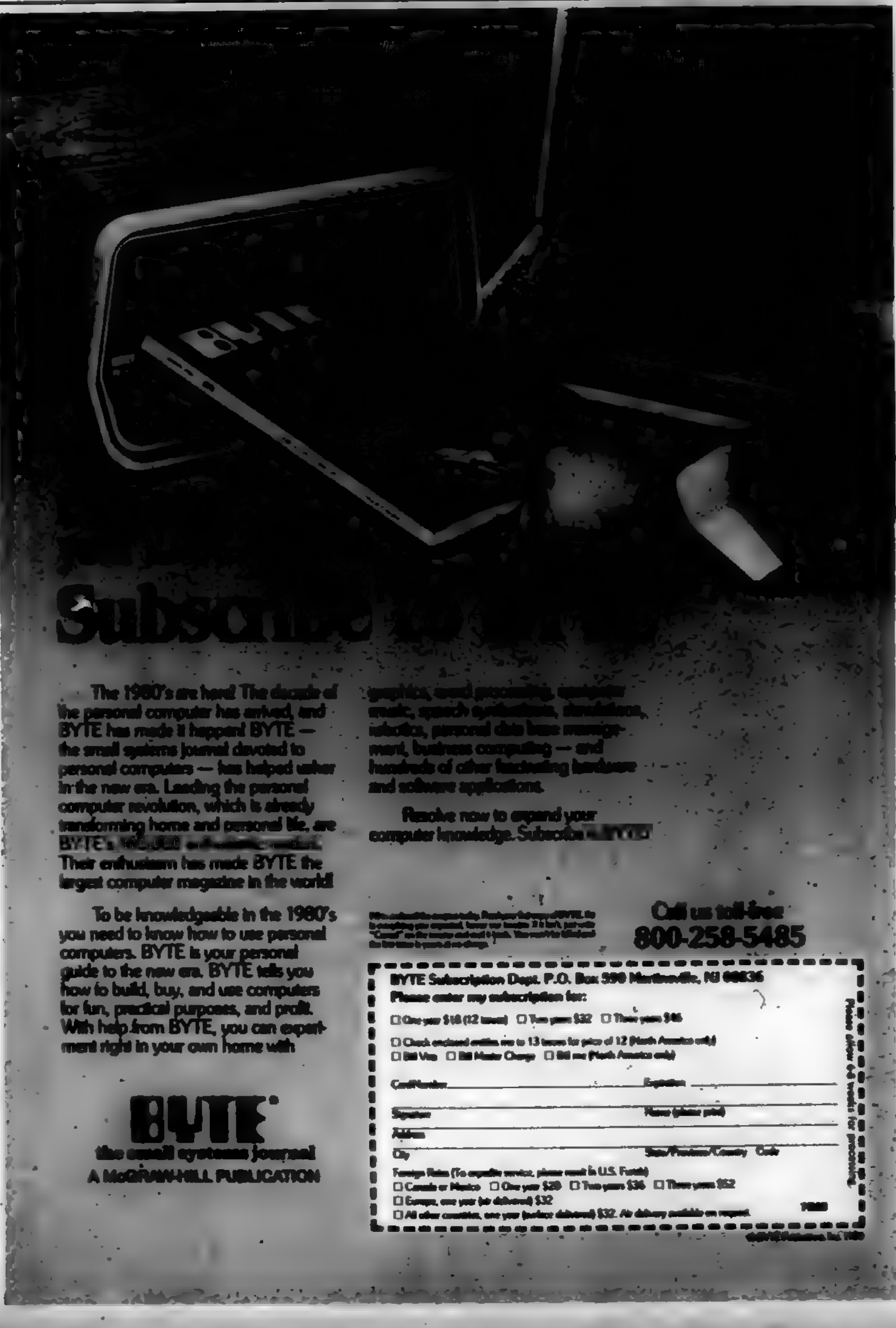
From 1973 to 1977, Panko was on the staff of SRI International, where he focused on communication rather than information retrieval as a key to organizational effectiveness. While at SRI, he conducted the first commercial investigation of the future of EMS as a business and spent one year in the firm's Augmentation Research Center, where the first integrated office information system was created.

Panko holds B.S. and M.B.A. degrees from Seattle University and a Ph.D from Stanford University.



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The B920 is the first model in the company's 900 series and is bracketed between the firm's B90 small-scale computer and mid-range B1900. While the system can be used in stand-alone applications, the B920 can be outfitted as a multiprocessor, multiprogramming machine and reportedly fit into a range of distributed processing environments.

Basically, the B920 employs a series of processor modules, each with its own memory. Each processor applies its resources to a specific system function, and additional processors can be added as the user's work load increases, a spokesman said.

The entry-level B920 features five processors. One processor provides operating control; another manages data files; two act as multiprogramming task processors, compiling and executing user applications; and the fifth processor handles data communications.

The five-processor B920 has 640K bytes of main memory, 44.6M bytes of disk storage space, a CRT terminal and a 300 line/min printer. However, total system memory can be expanded to 1.5M bytes by doubling each processor's memory capacity. Both processor and memory expansion require no additional programming, the spokesman explained.

Users have the option of installing up to three more task processors, or two task processors and one additional data communications processor for a total of eight modules.

The B920 computer offers a redundancy feature which allows users to continually process data and applications. Up to two of the system's task processors can be switched over to act as the file management processor and/or the system control processor. The particular feature is said to act as an instant backup for critical applications that require continuous system availability, the spokesman pointed out.

Peripheral Subsystems

For users who want expanded systems, a wide range of peripheral subsystems can be linked to the B920. These subsystems include the firm's fixed drives, which offer capacities of 38.6M to 77.2M bytes, and removable disk drives, available in 4.6M-, 9.2M-, 65M- and 130M-byte capacities. Up to three disk drives can be used per system.

Additional peripheral subsystems include line printers with speeds ranging from 160 to 650 line/min, three types of minidisks and a phase-encoded magnetic tape subsystem, the spokesman noted.

On the software side, the B920 can be programmed in Cobol or RPG and has also been designed to function with the firm's Computer Management System (CMS) software, assuring program portability across the company's entire small business computer line, the spokesman claimed.

Software and application software programs for the B920 computer are separately licensed and priced, the spokesman noted.

Finally, to support data communications-oriented users, the B920's one or two data communications processors offer a maximum bandpass of 96,000 bit/sec. In addition, each communications line can be configured with the following characteristics: an asynchronous modem connect to 1,800 bit/sec, an asynchronous direct connect to 38,400 bit/sec, a synchronous/bysynchronous modem connect to 9,600 bit/sec and a BDLC modem connect to 9,600 bit/sec.

The B920 Small Business Computer

The basic five-processor B920 costs $60,500 or can be leased for $1,956/mo on a three-year lease. First customer deliveries are scheduled to begin during the third quarter of this year, the spokesman said from the company at 1 Burroughs Plaza, Detroit, Mich. 48232.

Dataram Memory Module Adds 512K Bytes to VAX-11/780

CRANBURY, N.J. — A single-board add-in memory for Digital Equipment Corp. VAX-11/780 minicomputers that is said to offer twice the memory capacity of compatible DEC memory modules has been introduced by Dataram Corp.

The DR-178S has 512K bytes of memory arranged in 16K dynamic random access memory units and organized as 64K bytes by 72-bit words. The board's word length consists of two 32-bit words plus eight bits of error correcting code, a spokesman said. The device's timing is governed by DEC's M8213 memory controller in the host VAX-11/780.

The add-in memory has a typical access time of 250 nsec and a cycle time of 530 nsec, both clocked in a read mode, the spokesman added.

The price for the 512K-byte board is $5,660. However, a 256K-byte version is also available for $3,145 from the firm at Princeton-Hightstown Road, Cranbury, N.J. 08512.

Printronix Unit Replaces 5256

MOBILE, Ala. — An intelligent controller that enables the Printronix, Inc. 150, 300, and 600 line/min printer/plotter to emulate the IBM 5256 printer on IBM's System/34 and System/38 computers has been introduced by Quality Micro Systems, Inc. (QMS).

The Magnum 3400 utilizes a dual microprocessor design consisting of two complete Motorola Semiconductor Corp. MC68-BOOL microcomputer systems on a single 9 by 12 circuit card, which fits inside the printer in its controller slot. The device contains not only the interface, but enhancement firmware which simplifies label printing and bar code generation, the vendor said.

Added Features

In addition to the standard Printronix features, the enhanced firmware on the QMS controller generates variable size block letters from .1 in. to 10 in. upon instruction. Bar codes are generated by programs contained on the controller.

Other features include reverse imaging, mixed sizes on a line, variable aspect ratios, label repeat, double height characters, horizontal and vertical tabbing, line drawing set and picture capability.

The system is available in a printer-only version as well as a complete label-printing version. The price of the system, including printer and full label-printing capabilities, is $9,875 from QMS, P.O. Box 1644, Mobile, Ala. 36633.

Subsystem Backs Tridensity Tape

FORT LAUDERDALE, Fla. — Systems Engineering Laboratories has introduced a high-speed magnetic tape processor subsystem that reportedly supports 125 in./sec tridensity magnetic tape drives with speeds of 800, 1,600 or 6,250 bit/in. and recording in NRZI, PE and GCR formats.

Features include command chaining, data chaining and error correction. In addition, the unit offers auto tape loads, a tape density selection and up to four tape drives that can be supported by either the tridensity or dual-density subsystem, the vendor said.

The subsystem costs $14,500, the firm said from 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33313.

Acquiring a Mini — Part 2

Competitive Bidding Narrows Choice of Vendors

By Nander Brown Jr.
Special to CW

FALLS CHURCH, Va. — Besides targeting just one vendor or informally soliciting a select group of vendors from which to purchase a computer, the next and sometimes most practical method is competitive bidding.

Competitive bidding involves the preparation of a set of requirements that can be used by vendors to make a formal proposal. This requirement's document is called the request for proposal (RFP). The RFP is submitted to those vendors who are known suppliers of small business computers.

Other interested vendors should also be requested to bid on the proposal. Interested vendors will respond to the RFP by proposing a hardware/-software combination they feel will meet the requirements stated in the RFP.

This is part 2 of a three-part series on buying a minicomputer.

RFP is a formal invitation to bid. Invitations to bid should be invited from a representative number of sources. Prior to the preparation of the RFP, a survey should be made to establish a comprehensive list of sources from which to request bids.

Proposal Information

The invitations should specifically instruct the vendors to include in their proposals at least the following items of information:

1. A proposal for a complete equipment system, including necessary or desirable peripheral equipment, itemized.
2. A description of each item of equipment, its capabilities and technical features.
3. Estimates of additional equipment required for indicated peak loads.
4. Detailed cost information regarding equipment, software, conversion, site preparation, maintenance and vendor support should be provided. Purchase price, rental price and available leasing arrangements should also be provided.
5. Programming assistance to be made available with and without charge.
6. Training support to be made under the contract and other training available for management, programmers and operators.
7. Specific maintenance service to be provided under the contract and other maintenance service available with cost.
8. Emergency substitute equipment availability.
9. Vendor service bureau locations and types of service available.
10. Locations of other similar installations.
11. Library resources available — applications, subroutines, compilers and so on.
12. Proposed delivery and installation schedule.

Once the proposals have been received and obvious missing items have been corrected, it is necessary to validate the proposals and determine what each vendor is offering relative to the identified requirements.

Validation involves ensuring that there are no errors and that the vendor's claims correspond with his ability to meet his promises and obligations. Validation also involves throughput analysis — a determination that the proposed alternatives meet the performance and major constraints identified in the requirements analysis phase.

Once the proposals have been validated, the plan and approach of each eligible vendor can be ranked according to defined criteria. The ability to meet the defined criteria must be set forth clearly. Each criterion can be ranked, according to its importance, and the criteria matrix, consisting of the weighted criteria and the vendor rankings for each, can be constructed.

Final Selection

Final selection will then rest upon a check of references, visitations to present users and, perhaps, a benchmark test of the proposed system. Benchmarks need only be performed where terminal response or total system throughput capacity are critical. Throughput refers to the number of transactions that can be processed in a given period of time. This includes concurrent updating of master files and the generation of reports.

Listed below are some of the more critical aspects involved in hardware systems selection. It is felt that each of these should be carefully studied and weighed as to value and importance. The longer term implications should generally be of primary concern.

1. *Compliance with bid specifications.* Will the proposed system do the job as requested?
2. *Price-performance.* Given a specific application with specific volumes of work (10,000 accounts and 5,000 transactions), how does the cost of one system compare with another performing specific work?
3. *Capacity for increased demand.* At what point will another type or more computers be required, expressed in suitable values, such as number of accounts or transactions? Can bigger, more powerful models be used without reprogramming?
4. *Reliability.* What has the experience been with the various types of computers with respect to breakdown and repair time?
5. *Application programs, utility programs, diagnostic and special subroutines available.* Does the DP equipment manufacturer give the customer access to free programs which eliminate certain programming costs?
6. *Operating system features and overhead.* What will the use of an operating system mean in terms of increased operations and programmer efficiency? How much memory and what storage devices are required?
7. *Maintenance.* What is the maintenance cost?
8. *Ability to add memory, input/-output devices and features in the field.* What flexibility is built-in for expansion?
9. *Variety, speed and cost of input/-output devices available and programmed support for them.* Are they adequate?
10. *Delivery schedules.* How soon can the needed devices be installed? Will the equipment be ready to meet your schedule?
11. *Instruction repertoire and power.* How many instructions does the computer have? How do the functions performed compare with the functions provided on another computer?
12. *Device switching, multiprocessing, shared-file and other advanced capabilities.* If required, can input/output devices be switched between systems or channels? Can two systems communicate with each other? Is there a feature which allows input/output devices to be used by two or more systems?
13. *Physical requirements.* What are

(Continued on Page 60)

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Tape Controller Fits PDP-11

TUSTIN, Calif. — The Western Peripherals Division of Wespercorp. has unveiled a tape controller for Digital Equipment Corp. PDP-11 computers that combines both phase-encoded (PE) and NRZ formats on a single printed circuit board.

The TC-131 universal magnetic tape controller plugs into a standard slot in the PDP-11 and can control up to eight nine-track NRZ, PE or dual-density tape units in any combination. All filtering is switch-selectable, and a built-in self-test LED monitor signals the operator when an error occurs, a spokesman stated.

The controller costs $3,300 from the firm at 14321 Myford Road, Tustin, Calif. 92680.

With Winchester or SMD

Disk System Speeds HEX-29 Response

OAKLAND, Calif. — The choice of a 14-in. Winchester drive or a Storage Module Device (SMD) has been added to the HEX-29 minicomputer by Digital Microsystems, Inc.

The HEX-29 disk system allows storage capacities up to 96M bytes and also improves the response time of the HEX-29 minicomputer, according to the vendor.

The Winchester drive comes in 14M bytes or 28M bytes and the SMD comes in 32-, 64-, or 96M-byte capacities including 16M bytes removable.

Housed in a rack-mount cabinet, the disk system comes complete with the HEX-29 computer, the intelligent controller, power supply and cables.

The controller for the SMD can control a number of disk drives from 32M bytes to 96M bytes, the firm said. The channel processor executes a high level set of commands and can operate concurrent with full speed execution of the CPU, the firm noted. Error detection and correction techniques assure long-term data integrity.

The controller for the Winchester drive includes error-correction hardware that will detect almost any error up to a 6-bit error burst. The intelligent controller with its 32K bytes of buffer storage can be microprogrammed to perform much of the file access overhead and reduce the computational load on the computer.

The system ranges in price from $21,000 to $30,000, depending on the configuration. Digital Microsystems is at 4448 Piedmont Ave., Oakland, Calif. 94611.

Competitive Bids Aid Users

(Continued from Page 58)

the physical requirements for the computing system, such as power, floor space, air conditioning and floor loading?

14. *"Free" testing arrangements.* Does the manufacturer provide testing centers for the use of customers, or permit the system to be used at no charge for a period of time?

15. *Availability of back-up equipment.* What alternatives can be taken when the computer breaks down? Are there similar computers nearby?

16. *Guarantee or warranty.* How long is it and what is covered?

On the less technical side, the points below may be equally as important in selecting hardware systems:

1. Availability of educational support from the vendor.

2. Systems and programming assistance.

3. Conversion assistance.

4. Creditability of the vendor: vendor's financial status; vendor's overall experience with computers; vendor's experience in your particular field.

Next week, Brown discusses contracts and the basic rules of implementation.

Brown is regional audit manager for the Washington, D.C., area office of EDP Audit Controls, Inc., an Oakland, Calif.-based audit firm. He has previously served as audit manager for the U.S. Department of the Interior and the Cincinnati region of the General Accounting Office. He has also consulted for the aerospace, insurance and banking industries as well as for several municipal governments.

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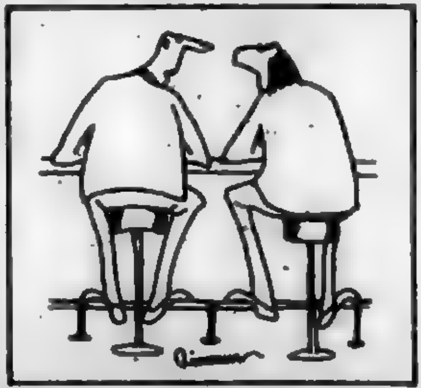

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New Name, New Markets For CMI

By Rita Shoor
CW Staff

WALTHAM, Mass. — The name change from Cambridge Memories, Inc. (CMI) to Cambex Corp. — announced in conjunction with the vendor's introduction of processors to compete with the high end of IBM's 4300 series and its 370/158 Model 3 [CW, Aug. 18] — is not the only upheaval taking place within the 10-year-old firm.

"We have changed our name to reflect our expanding products and markets," Cambex President Joseph Kruy said. In addition to its traditional business in memory systems, Cambex is now manufacturing IBM plug-compatible mainframe processors to sell into the mid-range computer market, he continued.

The past year was characterized by Kruy as "one of transition" with the firm involved in the conversion from being a memory supplier to functioning as a combined memory and mainframe manufacturer.

Cambex — then CMI — sold back its 40% interest in IPL Systems, Inc. for an estimated $4 million just a few months ago, Kruy said. In addition to the cash, Cambex acquired worldwide manufacturing rights to the IPL computer architecture and technology, he said.

IPL currently manufactures the Omega series computers being marketed by Control Data Corp. And, this architecture and systems technology is the basis for the newly announced Cambex 1600 series, he said.

Initial Efforts

CMI's efforts to expand into the mainframe market actually began with the announcement of IBM plug-compatible processors approximately two years ago [CW, Aug. 28, 1978]. Designated the Model 1, 2 and 3, these mainframes were offered as alternatives to the 370/115, 125 and 135.

IBM's E series announcement caused CMI to reassess its marketing strategy, Peter Weill, vice-president of International Operations, explained. The result of this evaluation caused the vendor to drop the two low-end models, which had been redesignated the 1618 and 1628, respectively, he said.

The 4300 series was larger and more price-competitive that IBM plug-compatible manufacturers (PCM) had expected, Weill noted. CMI reacted by concentrating its efforts on the previously

(Continued on Page 64)

Burroughs Seeks to Buy SDC for $98 Million

By Marcia Blumenthal
CW Staff

DETROIT — Burroughs Corp. has reached an agreement in principle to acquire System Development Corp. (SDC) for $98 million.

While Burroughs declined to comment on the reason for the proposed acquisition of the 3,816-employee software and services firm, sources noted Burrough is aiming to improve its competitive position in the sale of special-purpose systems to the federal government. Nearly 70% of SDC's estimated $168 million in revenues is derived from contracts with the Department of Defense and other agencies, an SDC spokeswoman said.

Five or 10 years ago, Burroughs was a strong competitor in the government market. In recent years, however, it has lost ground to Univac and Honeywell, Inc., according to an informed source.

Currently the Detroit mainframer is locking horns with Univac for a contract known as Phase Four, to automate U.S. Air Force bases. At stake in the contract, which has reportedly been highly political and messy, is the replacement of 120 Burroughs 3800s and 150 Univac 1050s, Fredrick Withington, a vice-president with Arthur D. Little, Inc., said.

In the past, SDC and Burroughs worked together developing a system for the U.S. Army's Weapons Laboratory. SDC created the computer architecture — Parallel Element Processing Ensemble — while Burroughs built the special fabrication "supercomputer" for the system, a source stated.

Service Business

Moreover, the privately held SDC has a substantial data processing service business. Burroughs has said it will place more emphasis on services in the future, a source observed, and is likely to use SDC's capability to achieve that goal.

SDC offers its users two commercial products — SDC Search, an on-line bibliographic information retrieval system, and a Cash Administration System for various medical claims. In addition, the company operates a 1,478-person facilities management operation for government agencies such as the National Aeronautics and Space Administration and the U.S. Navy.

Within the past two years, SDC has also established a Products Group. This group is in the process of developing a new type of architecture for a records management system, the spokeswoman said. Products developed for the office automation segment would fit in nicely with Burroughs commitment to that marketplace.

Burroughs recently consolidated its management, manufacturing, marketing and service operations for its Graphic Sciences and Redactron subsidiaries — both acquisitions — into its Office Automation Division [CW, April 14].

Under the terms of the proposed aquisition, SDC shareholders would receive $69 per share, and the company would become a wholly owned subsidiary of Burroughs, retaining its present management, the spokeswoman said.

Although on the surface the price of the acquisition relative to SDC's revenues appears low, the firm's profits are probably low as government contracts are not highly lucrative, one observer commented.

Two-thirds of SDC's stock is owned by the

(Continued on Page 64)

HP Forms Branch For Business Gear

PALO ALTO, Calif. — Hewlett-Packard Co. has formed a new group, the Business Computer Group, which is part of the Computer Products Group. The new group is made up of four products divisions — the Computer Systems Division, the Information Systems Division, the General Systems Division and two international organizations.

The recently formed Computer Systems Division has responsibility for the HP 3000.

Also a newly created division, the Information Systems Division is the first division devoted primarily to software. In addition to developing software tools such as commercial languages and data base management systems, this division, headed by Mathias E. Schmutz, will be responsible for the HP 300 small business system.

The third unit of the new group is the General Systems Division, which oversees the HP 250 small business product line as well as the ongoing development of small systems for the business market. L. William Krause will head this division.

The two international organizations coming under the new division are the Boeblingen General Systems Division and the commercial systems operation in Pinewood, England, both providing software and support for HP's computer systems in major international markets.

Named as general manager of the Business Computer Group is Edward R. McCracken. Milton Liebhaber has been appointed marketing manager for the group.

Aside from the Business Computer Group, HP's Computer Group also includes the Technical Computer Group, the Computer Peripherals Group, the Data Terminals Division and the Computer Marketing Group.

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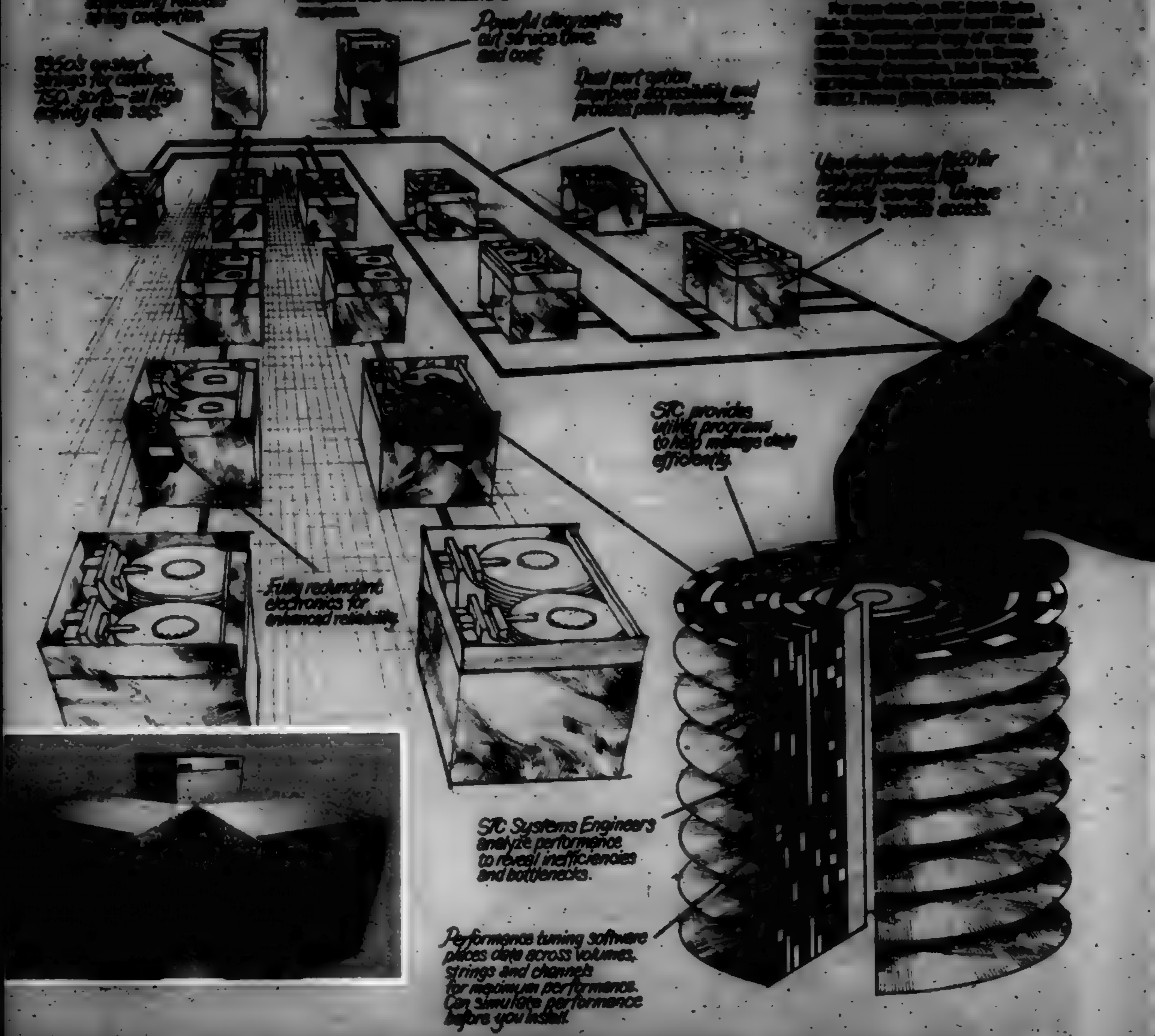
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Information Services Singled Out

USTR Seeking Data on Transborder Barriers

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The U.S. Trade Representative's Office (USTR) is compiling information on barriers to international trade in information, data processing and telecommunications services.

The agency is trying to identify specific examples of nontariff barriers to this type of trade, including national laws, procurement policies, technical standards "or any other policies or practices adopted by foreign governments or industries."

The USTR, a White House office charged with negotiating and administering international trade agreements, is seeking the information to develop a framework for future international discussions on services trade, according to Nancy Adams, chairwoman of the USTR Interagency Services Subcommittee.

Preliminary Study

The subcommittee hopes to have a preliminary study published by the end of September as part of its work in identifying barriers to international trade faced by American services industries in general, she said.

The preliminary study will help define the issues so that a coherent U.S. policy on information services trade can be developed.

The work coincides with studies the agency is preparing of the insurance, construction and shipping industries. Information services were singled out for special study because they constitute "an area where barriers are going up very rapidly," Adams explained.

The first step in developing trade policy is to identify specific problems and link them to existing trade agreements while developing a national consensus on "how we should move ahead," Adams said. In short, the USTR is trying to "hash through the basic questions."

"You can't talk about privacy forever," she continued. There are other issues affecting international information trade, but so far they have not been well documented.

USTR Involvement

Although there has been a great deal of domestic and international activity relating to transborder data flow, the USTR has until now confined its involvement to individual cases of trade barriers to information services trade brought to its attention, Adams said.

The House of Representatives held hearings recently on transborder data flow and related problems facing U.S. firms that market information and telecommunications services abroad.

Those hearings, conducted by the House Government Information and Individual Rights Subcommittee, produced testimony from the public sector suggesting the USTR should become more involved in data flow issues [CW, March 17,31].

The USTR at that time told the subcommittee it is trying to develop more expertise and, to determine exactly what its role should be in this area relative to trade [CW, April 28].

The record of those hearings will be incorporated in the USTR study, she said, as will additional information obtained by the House panel from several Fortune 500 companies.

Adams added that IBM, the Association of Data Processing Service Organizations, Inc. and the Information Industry Association are among organizations that have provided data.

Adams speculated that any USTR involvement in international data flow negotiations is "probably a few years down the road." The first step down this road is to develop a policy structure for those negotiations.

When problems in information services trade are more clearly identified and better understood, the USTR can develop that policy structure, she added.

Submissions Asked

Announcement of the USTR study, published late last month in the *Federal Register*, asked interested organizations or individuals to make written submissions in 20 copies to the Secretary, TPSC, Room 735, 1800 G. St., N.W., Washington, D.C. 20506.

The information "should be categorized by current and/or anticipated barriers to such trade to the country and should include any information concerning the trade implications of the barriers, possible foreign motivations for imposing the restrictions and any other relevant information," the announcement said.

Requests for confidentiaity of propietary information will be respected, the agency added.

CCT, YES Announce Decision to Merge

SANTA BARBARA, Calif. – Computer & Communications Technology Corp. (CCT) and Yang Electromagnetic Systems, Inc. (YES) have reached an agreement in principle for the merger of YES into CCT, according to a joint announcement.

YES, a privately owned company located in Ventura, Calif., is a leading supplier of single- and double-sided magnetic recording heads for floppy disks.

Although no purchase price was announced, the terms of the agreement in principle provide that the shareholders of YES will receive common stock of CCT. The merger would be treated as a pooling for CCT accounting purposes.

Univac, China Sign Agreement

BLUE BELL, Pa. – Univac has signed an agreement with the State Administration of the Computer Industry (Saci) and the China International Trust and Investment Corp. (Citic) to provide technical assistance in the People's Republic of China.

The agreement will enable Saci and Citic to conduct education and training programs, provide customer support to Univac users and develop and modify software.

Both parties believe the agreement, which is subject to both governments' approval, is the first step toward a major international joint venture, Univac said.

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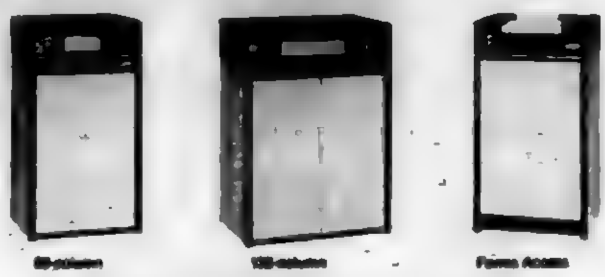

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Supershorts

Informatics, Inc.'s Mini Marc, a minicomputer-based automated cataloging system for libraries, received the 1980 Information Technology of the Year Award from the Information Industry Association.

California Computer Products, Inc. will begin marketing the Sanders Associates Graphic 7 line of intelligent, interactive display systems.

Mountain Hardware, Inc. has changed its name to Mountain Computer, Inc.

Datagraphix, Inc. and Siemens AG have jointly announced that Datagraphix will market an on-line version of the Siemens laser printer, the Datagraphix 9825. The 9825 will operate on-line to IBM 370, 30 series and 4300 mainframes.

Martin Simpson Research Associates, Inc. has changed its name to MSRA, Inc.

Keane Associates, Inc. has changed its legal name to Keane, Inc.

University Computing Co., a subsidiary of Wyly Corp., has acquired ownership and marketing rights to Dimension V batch. The data center scheduling package, which includes Deadline and Streamline, was purchased from Software Systems Corp., McLean, Va.

Harris Corp.'s Data Communications Division will form a specialized marketing team to address the automotive industry and support Harris systems already installed at automotive accounts.

Construction Data Systems, Inc. has been established as an affiliate of Distribution Management Systems, Inc. It will specialize in the development of software for the construction and contracting industries.

OEM terminal maker Beehive International said it will now utilize industrial distributors to address end-user markets.

Management Science America, Inc. has expanded its data center at company headquarters in Atlanta. The company added an IBM 3033-N8 on Aug. 1 and will subsequently replace the existing 370/158 with a 4341.

Burroughs Seeks To Buy SDC

(Continued from Page 61)

System Development Foundation and nearly all of the remaining third is owned by employees. The company does not foresee any major opposition to the acquisition.

One of the nation's oldest software firms, SDC is based in Santa Monica, Calif., and has an interesting history. It was spun off as a nonprofit corporation from the Rand Corp. in 1956. In 1969 it became a for-profit company and at that time the foundation was established.

Today the foundation is overseen by six trustees and has mandated to release the assets of the foundation for cash for use in the state of California. If the acquisition is completed, a major recipient of that distribution could be the University of California's academic programs related to computer sciences.

CMI Changes Name, Markets

(Continued from Page 61)

announced Model 3 — renamed the 1638 — 15 of these processors have been installed in both U.S. and European locations.

With the introduction of a Model 1641, which will be field-upgradable to a 1651, by the second half of 1981, Cambex is now focusing on the high end of the E series, Kruy observed. "It's probably as good a time as any to announce a computer in the E series ... An H series machine would be riskier," he said.

"We expect our computer revenues to be higher than our memory revenues by fiscal year 1982." Kruy also predicted that mainframe revenues would definitely be over $5 million by that time.

When questioned about an organizational plan for coordinating support and service of the new mainframes, Kruy stated that the add-in memory being utilized in the machines made them much easier to service. He also mentioned that Cambex was in the process of working out service agreements with third-party organizations.

"We are re-establishing an end-user sales force," Mike Angier, Cambex marketing director said of a move that began last year [CW, July 23, 1979]. The marketing transition that the firm predicted is now "almost in place," and the next move is to build the overseas sales force, Weill said.

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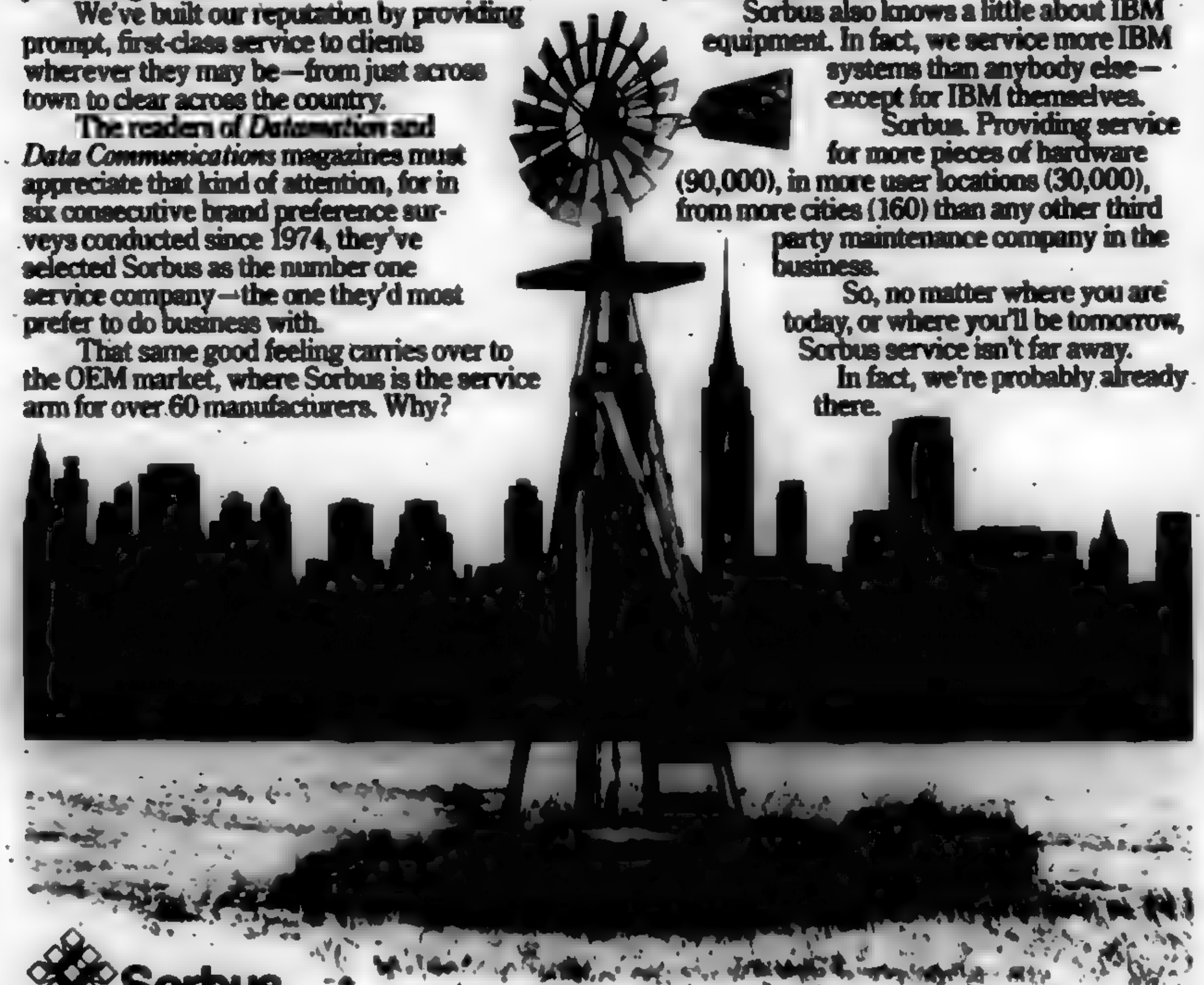

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Denelcor Investors Serious About HEP Supercomputer: Brokerage Activity Spurts

By Connie Winkler
CW Staff

DENVER — The whole scenario is incredible: A small, unsung Denver company announces a supercomputer as fast as — and maybe faster than — the supercomputers now available, and at $1.5 million, one-fourth the cost.

However, Denelcor, Inc. and now some institutional investors are serious about this Heterogeneous Element Processor (HEP) supercomputer [CW, July 13].

"It was incredible to me, too," said Joseph De Felice, a broker-analyst with the New York firm of John Muir & Co. "The story seemed phony." De Felice, who has an engineering background, checked out Denelcor and now reports he's "very enthused." So is the over-the-counter market and particularly a group of Edinborough institutional investors who are at least partially responsible for the recent stock spurt.

An issue of Denelcor went on sale in February at $4.50 a share and recently was near $8-7/8, jumping 5/8 in one day.

Jerry A. Courtier, Denelcor director of communications, said he has been averaging 20 calls a day: "Brokerage activity has been unbelievable."

For the institutional investor, Denelcor is philosophically like the overnight success of Cray Computer Corp. in the mid-1970s, De Felice said. "They have to be there, even if they lose money."

All this is from a company which in 1979 had a net loss of $370,000 on revenues of $2.6 million and a previous year's loss of $19,000 on revenues of $1.6 million

'Drifted Into It'

How — and why — did this small company of 65 employees get into the supercompetitive, supercomputer business?

It wasn't any superconfidence or gutsiness to take on IBM, Cray or Control Data Corp., confessed David R. Miller, Denelcor president. "We just sort of drifted into it."

One key was in early June when the U.S. Army Ballistics Research Laboratories in Aberdeen, S.D., awarded Denelcor a $2.4 million contract to continue work on HEP. That first machine should be delivered to the Army by late 1981, Miller predicted. Denelcor has five CPUs in fabrication, (four for the Army), but has yet to get its first commercial customer.

Industry observers note the recent Army contract was a real vote of confidence in the HEP concept, which is a major departure from the present digital computer design.

Because HEP has been Army funded, it has been kept under wraps, but was officially announced in New York in July. Once other Denelcor customers learned of the machine, it was hard to keep it quiet, Courtier said. This was the "drifting" Miller talked about.

"Their business in analog computers was going nowhere," De Felice said, "but because they were in the analog business it gave them a unique perspective on the supercomputer."

Denelcor was formed in 1968 by Miller out of the remnants of other components companies with which he was involved. However, Denelcor also knew the analog business was going nowhere and set out to build a digital computer that would be as fast as an analog.

Nasa Proposal

In 1973 they made an unsolicited proposal to the National Aeronautics and Space Administration (Nasa) for a digital machine which would replace analog computers. Nasa passed the idea along to the Army which, in 1974, granted Denelcor a study contract and a small hardware contract, Miller recalled.

In 1975 there was a contract for an engineering prototype, which has since been scrapped, but by 1976 the Army awarded Denelcor $2 million for the HEP prototype to be used for ballistics analyses.

It was about this time Denelcor realized it had the makings of a general-purpose scientific computer, Courtier said.

"Because of our unique perspective in design of analog machines, we were very familiar with parallel computing and the need for parallel processing," Courtier said. "We attacked from the parallel computer architecture concept."

MIMD Machine

What Denelcor came up with is a CPU that can perform different instructions on many data streams simultaneously, called a multiple-instruction, multiple-data-stream (MIMD) computer, believed to be the first. Each CPU can operate on 128 data streams.

Originally a 32-bit word length machine, the word length has been changed to 64 bits in the machine slotted for the commercial market.

Even in a small configuration the HEP processor can perform 10 million operations per second (MIPS), Courtier said. While a Cray machine, by example, can perform about 23 Mips, that's only on pure vector or array applications — performing the same process (multiply, add) on the multiple data streams. Whether its a vector or a scalar process, it doesn't degrade the performance of the machine, Courtier said.

Because of the modularity of HEP, several CPUs can be configured together for greater processing power. In one Army test, HEP beat the CDC 7600 benchmarks, he added. However, the current prototype HEP is operating without data memory.

"There are no problems at the moment on the prototype," Miller reported. "Everything is designed — a few things have to be built and tested."

Miller believes HEP will be around a long time, noting, for example, the machine is using ordinary logic chips from the ECL 10000 family. "There's lots of room for improvement without changing the architecture," Miller

(Continued on page 66)

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Dataquest Meet to Focus On Semi Industry in 1980s

SCOTTSDALE, Ariz. — Dataquest, Inc. will sponsor the sixth annual Semiconductor Industry Conference here at the Scottsdale Conference Center Oct. 22-24. Industry speakers will address such issues as the software challenge, the people problem, capital intensity, the outlook for improved quality and productivity and the markets for discretes in the '80s.

A worldwide economic forecast will be presented by Dr. Edgar R. Fiedler, vice-president of The Conference Board. Frederick L. Zieber, vice-president of Dataquest, will unveil his semiconductor outlook for 1981.

Other industry spokesmen will include Dr. Gordon E. Moore, board chairman at Intel Corp.; Charles E. Sporck, president of National Semiconductor Corp.; and John R. Welty, vice-president and general manager of Motorola Semiconductor.

Also featured will be three panel sessions examining procurement and distribution methods for the '80s and the factory of the future. More information is available from Lois Cobb, conference coordinator, Dataquest, Inc., 19055 Pruneridge Ave., Cupertino, Calif. 95014.

Semicon/East '80 Now Sold Out

BOSTON — The Semiconductor Equipment and Materials Institute (Semi) will host a semiconductor exhibition here Sept. 23-25. According to show manager Shirley Pelnar Heim, Semicon/East '80 is sold out with some "210 companies exhibiting in more than 340 booths." A record attendance of more than 5,000 is expected.

The technical program will focus on advances in materials and very large-scale integration (VLSI), the technology of the '80s. Chairman for the three-day technical event, held from 9 a.m. to noon, is Dr. Winston Samaroo of Western Electric in Princeton, N.J.

Show hours for Semicon/East '80 are 10 a.m. to 6 p.m. Tuesday and Wednesday, and 10 a.m. to 5 p.m. on Thursday.

Registration is $5 at the door; complimentary preregistration forms are available until Sept. 10 from Semicon, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

Executive Corner

• Storage Technology Corp. has elected John C. Scott, vice-president of domestic sales; Daniel J. Ellis, vice-president of marketing; Norman B. Barth, vice-president of human resources and Richard D. Benson, vice-president of material management.

• Thomas E. Mc Inerney has been named vice-president of financial services group of Automatic Data Processing, Inc.

• Richard C. Trippett, senior vice-president operations, E. Douglas Larson, vice-president manufacturing and F. John Zapecki, vice-president of design engineering, have been promoted by Magnuson Computer Systems.

• Peter R. Eisenhauer has been appointed vice-president of marketing and sales for Integral Data Systems, Inc., Natick, Mass.

• Computer Consoles, Inc. has announced that William F. Deller is vice-president of engineering.

• International Memories Inc. has named Anthony N. La Pine executive vice-president and chief operating officer.

• Charles J. Hart has been appointed president of Digital Scientific Corp. in San Diego.

• Joseph H. Andre has been promoted vice-president of the minicomputer peripherals division of The Bruegen Corp.

• Kent P. Friel has joined Access Corp. as vice-president, corporate marketing, and Joseph C. Schneider has been appointed national service manager.

• Jack R. Mc Inturff has been appointed vice-president of marketing for Precision Data, Inc.

• Apollo Computer, Inc. has elected Gerald W. Stanley, founder and vice-president of marketing-customer services; David G. Lubrano, founder and vice-president-chief financial officer; and Charles P. Spector, founder and executive vice-president-chief operating officer.

• Robert Korman has been appointed vice-president of finance for Data Processing Security, Inc.

• Alfred F. Apple has been named vice-president of marketing at Delta Data Systems Corp.

• National Computer Systems, Inc. has promoted David Holt to vice-president-controller.

• Michael A. Kelly has become vice-president European operations for General Automation in Slough, England.

• Don M. Avedon has been appointed vice-president of Automated Datatron, Inc.

• Troy D. Lemons has been elected vice-president, systems and market development, for Qantel Corp.

• William F. Rooney has been named president of On-Line Systems, Inc., a subsidiary of United Information Systems, Inc., Kansas City, Mo.

• Memorex Corp. has appointed Gordon Smith to the position of vice-president, corporate communications.

• Tom Malek has been named vice-president of marketing and sales for Garry Manufacturing Co., a division of Brand-Rex Co.

• Shugart Associates has promoted Bob Sandie vice-president of floppy disk manufacturing and Joe Smith vice-president of fixed-disk manufacturing.

• Paul C. Ely Jr. and William E. Terry have been elected directors and executive vice-presidents of Hewlett-Packard Co.

• Herbert F. Balzweit has been named vice-president and controller of GTE Telenet Communications Corp.

• Robert H. Lane has been appointed vice-president, European operations, for Northern Telecom Systems Corp.

Contracts

Anacomp, Inc. of Indianapolis has been awarded a contract to manage the data processing facility of the Indiana Department of Revenue.

Pertec Computer Corp. has received a contract valued at almost $500,000 for the purchase of Pertec disk drives from Markatron, Inc.

Computer Research Co. of Chicago has announced an agreement with Electronic Funds Illinois, Inc. (EFI) of Chicago to provide remote on-line financial services. Computer Research Co. will provide automated teller and point-of-sale support for EFI's 650 member banks.

Datatrol, Inc. has received a two-year contract extension to operate and expand the computerized on-line "Daily Numbers Game" for the Rhode Island lottery.

Dataproducts Corp. has been awarded a major printer contract valued at approximately $22 million by Southern Systems, Inc. of Fort Lauderdale, Fla. The three-year agreement calls for delivery of Dataproducts line printers, including its B-Series band, Series 2200 drum and 2550 high-speed charaband printers.

Century Data Systems, Inc. will deliver a number of its Hunter Disk Drives to Atmore Systems, Inc. under the terms of a recently signed contract.

Hewlett-Packard Co. has contracted for the purchase of a three-node nationwide roadrunner network management system for an amount in excess of $2 million.

Investors Serious About HEP

(Continued from page 65)

said. The HEP secret is in the switches, which Courtier boasts "are ours and ours alone."

There's no consensus on the market for such $1 million or $1.5 million scientific supercomputers. Miller guesses there's a market for 100 machines; De Felice says 200. However, even that will never be reached, the stockbroker said, because researchers will address themselves to larger markets — as Denelcor is already doing.

"The market is established not so much by demand, but by supply," De Felice observed.

Denelcor has been actively looking for commercial customers, even looking to the Coors Brewing Co., which wants to coordinate its production control, De Felice said. He guesses HEP will continue to be best suited for design applications such as cars and defense equipment.

Because of the huge investments Cray and CDC users have in their installations, it appears no one at this time sees Denelcor directly competing with those supercomputer leaders.

9th Comparative Data Base Management Systems National Conference

This unique conference provides a meeting place to review and compare a significant set of the systems now available and learn about their characteristics from speakers with firsthand experience in developing and utilizing leading DBMS.

Systems presented include examples of applications of a variety of data representation and structuring techniques and examples of diverse manipulation languages such as host-based procedural or English-like nonprocedural. The products span a full range of applications and are operational on a variety of microcomputers, minicomputers and large processors. They also include completely integrated software systems such as TP Monitors, Report Generators, Transaction Processors, Data Dictionaries, and Query Languages. The systems presentations are preceded by sessions on data base fundamentals, data base architecture and new developments in data management. There is a comprehensive review of the steps and guidelines in the procurement/selection of data base management systems and of the comparative matrices of key features that summarize each product and provide the framework for the systems comparison. There is a session on recent technological advances and current problems under research.

Each participant receives a copy of the visuals and texts of the vendors' presentations and large matrices comparing the key features of such leading DBMS as *ADABAS, DATA CENTRAL, DATA COM/DB, DATAPOINT 2200, DB-IV, DBMS-10, DBMS, DMS II, DMS-90, DMS 170, DMS 1100, DRS, GIM II, DRISS, IDS-11, IDMS, IMAGE, IMS, INFOS, INQUIRE, MIDS, MODEL 204, MRDS, NOMAD, OLIVER, PRODUCT 3, QUESTOR, RAMIS, REALTY, SEED, System 1022, System 2000, TOTAL* and others.

Coordinators:
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Clay Sprowls, PhD, Professor of Computer and Information Systems, Graduate School of Management, UCLA

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UCLA Extension

Orders & Installations

Anglo-American Aviation Co. of N. Hollywood, Calif., has purchased a Univac 1100/61 computer system.

Floating Point Systems, Inc. of Beaverton, Ore. announced a $10.3 million release of orders from the Medical Systems Division of General Electric Co., Milwaukee.

Honeywell Information Systems has sold four Level 6 computer systems to Yahr-Lange, Inc., a wholesale drug distributor in Elm Grove, Wis.

General Data Systems, Inc. has ordered 66 V77-600/200 computers valued at $2 million from the minicomputer operations of Univac.

Davis Hospital, Statesville, N.C., has signed a contract to install the financial information system recently introduced by Spectra Medical Systems, a subsidiary of Medicus Affiliates, Inc.

C.A. Hume & Associates, Inc. has ordered the recently introduced Univac System 80 computer.

Foreign Orders & Installations

Australia's W.A. Flick & Co. has ordered the Univac System 80.

The Swedish Bank Transfer Services has ordered the Univac 1100/62.

Collins Communications Switching Systems Division of Rockwell International, Inc. has sold its financial network controller to Sparekassernes Datacenter of Denmark.

TSB Trust Co., Ltd. of Andover, UK, has ordered a Redifon Computers R800/70 distributed data processing system.

River Steel Co., Ltd. and Daido Steel Co., Ltd. of Japan have both ordered Univac 1100/60s.

Computer Automation, Inc.'s Naked Mini, teamed with the NMA/10S slave processors, will be acting as the controlling elements in an integrated digital network now being implemented by the South Africa post office.

Vickers da Costa of Sussex, UK, has installed an R50 clustered terminal systum from Redifon Computers.

Aisin Seiki Co., Ltd., an affiliate of Toyota Motor Co., Japan, has ordered a Univac 1100/60 system.

Remington Office Machines of Australia has ordered a Univac System 80.

GEC Computers, Ltd. will supply a 4065 system in conjunction with the British Telecom Prestel viewdata software package to the Austrian PTT.

Yasuda Trust & Banking Co., Japan, has ordered a Univac 1100/82 computer.

The Tokyo Women's Medical College has ordered a Univac 1100/60 processor and 51 UTS 400 intelligent terminals.

Equity and Law Life Assurance Society, Ltd., UK, has ordered an 8,000-line/min Honeywell page printing system.

Nippon Airways has installed a Univac 1100/44 computer at Haneda Airport, Tokyo.

The National Computing Centre, Manchester, UK, has taken delivery of an ICL Computers Inc. 2956/10.

Univac has received a $6 million order from the University of Kuwait.

Ferranti Computer Systems, Ltd. is to expand the videodata communications system at the Austin Morris Metro production plant in Birmingham, UK.

The State Savings Bank of Victoria, Australia, has installed two Perkin-Elmer Corp. Data Systems 3240 processors as front ends for an ICL System 4, Model 70.

Ontario Hydro, Canada, has awarded Valtec Corp. a contract for 104 RS-232C-compatible fiber-optic data links and associated PC10 duplex fiber-optic cable.

Honeywell Information Systems, Ltd. will install a computerized hotel management system for the Swallow Hotel chain in Scotland and England.

The West of England Ship Owners' Mutual Assurance Association, Ltd. has ordered a Honeywell Level 64/DPS to replace an IBM 3/12.

Surrey County Council has ordered a second computer system — the 1100/80 — from Univac.

Brunel University in Uxbridge, UK, has ordered a Honeywell Level 68/DPS Multics system.

Codex Corp. will supply TSB Computer Services, Ltd., UK, with a data communications network valued at $5 million.

Valley Software, British Columbia, will install and distribute SMC Inc.'s Business Basic Interpreter for the IBM Series/1, Idol and applications software in Canada.

A consortium of 210 savings banks in Finland has placed an order for Datasaab Systems financial terminal systems worth $13 million.

Nippon Express Co. has placed a $3.2 million order for two Univac 1100/60 series computer systems. The order was placed with Nippon Univac Kaisha, Ltd., Sperry's joint computer marketing venture in Japan.

Michinoku Bank of Aomori, Japan, has ordered two Univac 1100/60 series computer systems valued at $3.2 million. The systems consist of 1100/61 and 1100/62 model processors.

Nickels & Dimes

United Telecommunications, Inc. increased its common stock dividend to an annual rate of $1.60. The new rate represents an increase of 8 cents.

$$$

Pertel Corp. has announced the public offering of 670,000 shares of common stock at a price of $10.50 per share. Of the shares offered, 600,000 are being sold by the company and 70,000 by certain selling shareholders.

$$$

System Industries, Inc. has filed a registration statement with the Securities and Exchange Commission relating to a proposed initial public offering of 700,000 shares of common stock.

$$$

Anacomp, Inc. has registered a $25 million public offering of convertible subordinated debentures due Sept. 1, 2000 with the Securities and Exchange Commission. Proceeds will be used to repay bank debt and to provide working capital and funds for acquisitions.

$$$

The American Stock Exchange has approved for original listing 2,048,176 common shares of Timeplex, Inc., the manufacturer of data communications equipment. Trading in these shares was scheduled to begin Aug. 13.

$$$

CGA Computer Associates, Inc. has filed a registration statement covering the proposed offering of 480,000 shares of its common stock. Of such shares, 300,000 shares will be offered for the account of the company and 180,000 shares will be offered for the account of certain stockholders.

$$$

The board of directors of Electronic Memories & Magnetics Corp. has voted to pay a dividend of 50 cents per preferred share, which includes a current quarterly dividend of 25 cents per share and an additional 25 cents per share of dividends previously in arrears, reducing the remaining arrearage to 25 cents per preferred share. The 50 cent dividend will be paid Sept. 10 to stockholders of record Aug. 27.

$$$

Wang Laboratories, Inc. has voted to recommend to the shareholders at the annual meeting on Oct. 28 an increase in the authorized shares of Class B Common stock from 30 million shares to 70 million shares.

$$$

MSI Data Corp.'s directors have approved the reincorporation of the company in Delaware. The reincorporation will be accomplished by the merger of the company into a wholly owned subsidiary, Delaware Corp., which would be the surviving corporation in the merger.

$$$

Timeplex, Inc.'s board of directors has authorized a six-for-five split of its common stock in the form of a 20% stock distribution. The distribution will be issued on Sept. 8 to holders of record on Aug. 8. Cash payments in lieu of fractional interests will be made.

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America Meets

At The Invitational Computer Conferences

In Boston…In Ft. Lauderdale…In Palo Alto and seven other cities. OEM decision-makers meet the country's top computer and peripheral manufacturers at the Invitational Computer Conferences — the only seminar/displays designed specifically for the unique requirements of the quantity user.

In one day, at each 1980/81 ICC, guests will receive a concentrated, up-close view of the newest equipment and technology shaping our industry. Some of the companies which participated in the 1979/80 ICC Series were: ADDS, AVIV Corp; Applied Data Communications; BASF Systems; Cambridge Memories, Inc.; Centronics; Century Data Systems; Cipher Data Products; Compugraphic; Computer Devices; Control Data Corp.; Data Systems Design; Dataproducts Corp.; Dataram; Datasystems Corp.; Diablo Systems; Documation; Emulex Corp.; Facit Data Products; Florida Data; Hewlett-Packard; International Memories, Inc.; Kennedy Company; Lear Siegler; MDB Systems; MFE Corp.; Microdata; Monolithic Systems; Mostek; NEC Information Systems; National Semiconductor; Olivetti; Perkin-Elmer Memory Products; PerSci, Inc.; PCC/Pertec; Pioneer Magnetics; Plessey Peripherals; Powertec; Priam; Printronix; Remex; Rianda Electronics; Scientific Micro Systems; Shugart Associates; Siemens; Storage Technology; TEC; Tally Corp.; Teletype; Telex Computer Products; Texas Instruments; Trilog; Universal Data Systems; Versatec; Xylogics.

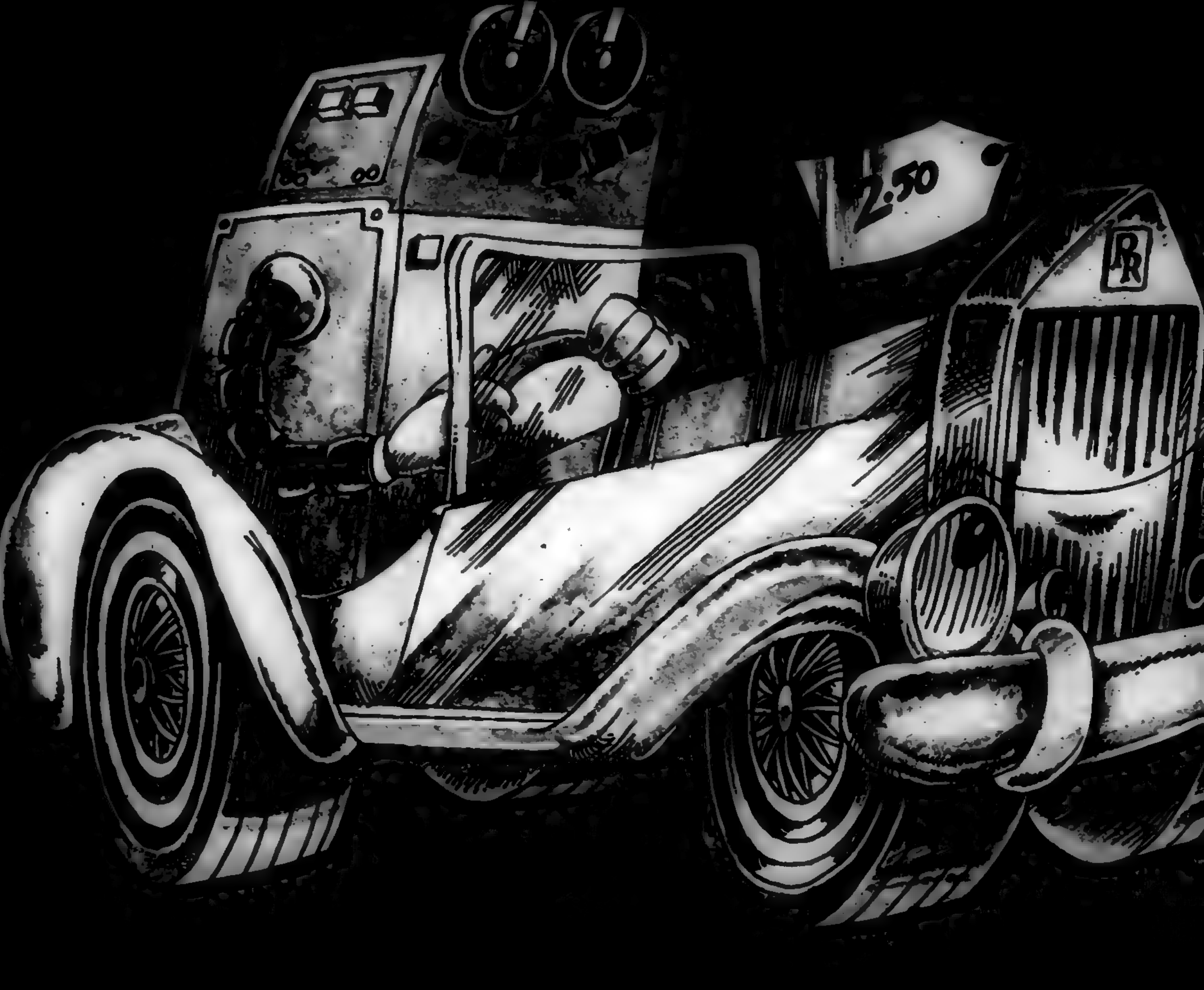
The schedule for the 1980/81 Series is:

Sept. 8, 1980	Newton, MA
Sept. 30, 1980	Valley Forge, PA
Oct. 22, 1980	St. Louis, MO
Nov. 18, 1980	Palo Alto, CA
Jan. 13, 1981	Orange County, CA
Feb. 3, 1981	Ft. Lauderdale, FL
Feb. 5, 1981	Atlanta, GA
Mar. 3, 1981	Dallas, TX
Mar. 5, 1981	Houston, TX
Apr. 2, 1981	Denver, CO

Invitational
Computer
Conferences

Invitations are available from participating companies or the ICC Sponsor.
For further information contact:
B.J. Johnson & Associates, Inc.
2503 Eastbluff Drive, No. 203
Newport Beach, CA 92660
(714) 644-6037

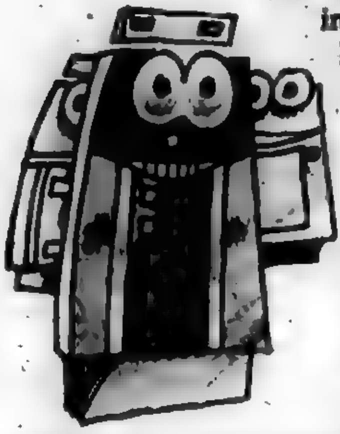
"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."



Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

We are CW Communications/Inc. and despite our youth (we'll be 13 this year) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

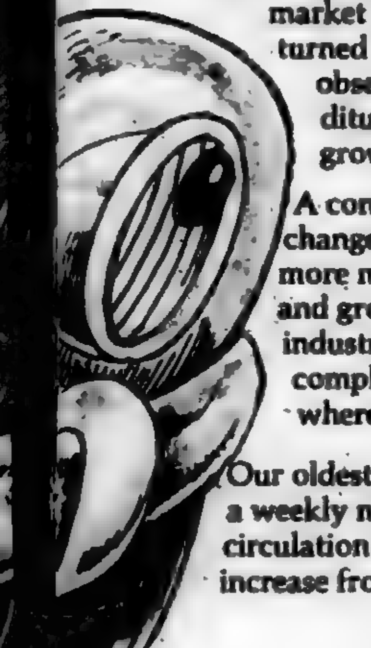
Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear).



In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.



A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is *COMPUTERWORLD*, a weekly newspaper with a growing all-paid circulation in excess of 105,000 (quite an increase from our modest 7,500 in 1967).

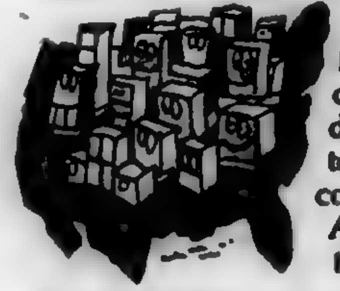
COMPUTERWORLD

COMPUTERWORLD serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.

COMPUTER BUSINESS NEWS is our weekly newspaper for executives in the U.S. computer industry whose organizations are involved in the manufacture, integration and resale of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.

COMPUTER BUSINESS NEWS

The latest phenomenon of the computer industry is personal and desk-top computers and we're covering it with our newest publication, *INFOWORLD*. We report from the user's point of view – with product ratings, and information on using small computers in business and at home. It's a paid circulation, bi-weekly newspaper, and the only publication of its type – located right in the middle of silicon valley — where it's all happening.



The United States alone accounts for nearly half of the worldwide computer market, but billions of dollars are spent by foreign computer people for American-made computers and computer products. And our publications penetrate those marketplaces, too.

We are publishers of newspapers and magazines in the following markets: Australasia, West Germany, United Kingdom, The People's Republic of China, Japan, Brazil and Mexico.

And we provide U.S. advertising representation and editorial services to publications in the following countries: Italy, France, Greece, The Netherlands, Sweden, Argentina, Chile and Southeast Asia.

Our International Marketing Services Department can give you one-stop advertising service for any or all of these publications – including translation and production services. We'll even bill you in U.S. dollars, so it's as easy as advertising in U.S. publications.

Computing is an exciting industry, with a unique need for information. And the publications we produce provide that information to hundreds of thousands of computer people around the world. They are excellent vehicles for reaching these people with your advertising message, and we'd be happy to give you more information on any of them. Just call or write, Roy J. Einreinhofer, *Vice President, Marketing*.

CW COMMUNICATIONS/INC.
375 Cochituate Road, Route 30
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At GTE Automatic Electric Laboratories in the Chicago suburb of Northlake, our team of software professionals are developing some of the most advanced digital telecommunications systems in the industry. To insure our continued role as a leader in telecommunications technology, we are constructing a new R & D facility in Phoenix, Arizona for our Switching Division. We're looking for qualified professionals to fill positions in Phoenix immediately, or in 1981 after a temporary assignment in our Northlake Laboratories. Exciting opportunities exist in the areas of:

DEVELOPMENT SUPPORT SOFTWARE
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CALL PROCESSING AND ADMINISTRATIVE SOFTWARE
OPERATING SYSTEMS SOFTWARE
DATA BASE ADMINISTRATION SOFTWARE
TEST UTILITIES SOFTWARE
SYSTEMS TEST AND CONTROL

If you have a BS/MS degree in Computer Science, Electrical Engineering, or related discipline with experience in any of the above areas, contact us for more details on the future opportunities in Phoenix. Use the mini-resume below for quick response, or forward a current resume to: Manager, Technical Employment, Dept. 471 A-6, GTE Automatic Electric Laboratories, 400 N. Wolf Road, Northlake, IL 60164.

GTE AUTOMATIC ELECTRIC LABORATORIES

GTE Research and Development

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TELEPHONE ____________________
ADDRESS ____________________
POSITION OF INTEREST ____________________
EDUCATION: (School(s), Degree(s), Date(s)) ____________________
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PROFESSIONAL EXPERIENCE (Company, Dates, Titles, Duties) ____________________
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SOFTWARE KNOWLEDGE & OTHER EXPERTISE ____________________
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A rapidly expanding organization located in the southeast has openings for:

SYSTEMS ENGINEER

5+ years experience in a manufacturing environment with emphasis on cost systems necessary. Individual will work in a HP 3000 Cobol shop which is in the initial stages of installing a manufacturing package for engineering control, inventory control, master scheduling; purchasing, cost control and MRP. Person will interface with division personnel to define financial manufacturing and marketing systems needs.

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Degreed individual with 3+ years experience as a programmer analyst, with manufacturing and/or cost systems background. HP 3000, Cobol and/or image experience desirable. Person will perform programming work on manufacturing and cost systems.

This division of an international corporation offers excellent salary and fringe benefits. Submit resume and salary history to:

CW Box 2377
375 Cochituate Rd.
Framingham, Mass. 01701

DIRECTOR COMPUTER CENTER
Southeast Missouri State University
Cape Girardeau, MO 63701

Position Description: Responsible for insuring that the proper level of computational and information processing support is made available to support the instructional, research, administrative and public service functions of the University. Work with the administration, faculty and staff to determine the computational and information processing needs of the University and develop systems to meet those needs. Develop short and long-term budget plans for information support and seek funds, from institutional or other sources, to meet budget priorities. Reports to the Vice President of Administrative Services.
Qualifications: Advanced degree in Computer Science or closely related field desired. Three to five years of supervisory/administrative experience in data processing. Broad knowledge of computer equipment and programming systems. Managerial and supervisory skills.
Application deadline: Sept. 15, 1980.
Starting date: Immediately.
Salary: Open.

Apply to Dr. [illegible]
Director of Personnel Services,
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Southeast Missouri State University is an Affirmative Action, Male, Female, Equal Opportunity Employer.

CICS PROGRAMMER/ ANALYSTS to $38,000

Prestigious, major health care institution in desirable California location seeks Programmer/Analysts. On-line experience, systems design, user interface, with COBOL or Assembler language. Outstanding benefits. WESTERN HEALTH RESOURCES, P.O. BOX 48910, LOS ANGELES, CALIFORNIA 90048.

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JDG ASSOCIATES, Ltd., recruiters serving the Mid-Atlantic areas of Washington D.C., Maryland, Virginia, Pennsylvania, and Delaware, are presently conducting a variety of search assignments for Systems Analysts, Programmers, Software Engineers, EDT Auditors and Data Processing Managers.

The thrust of our search is for fast-track "Pro's" interested in making a quantum leap to a more rewarding career. The demand for those "Top Ten Percenters" has dictated salary adjustments, much in excess of the norm. Specific areas of need include:

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FORTRAN/BAL/PL-1 PROGS.	$18-$32,000
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DATA BASE MGMT.	$20-$40,000
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If you join us today, you'll find much to challenge you on the DSCS-III program... or perhaps a program for the generation beyond DSCS-III.

The Systems Division is deeply involved in many of the world's largest and most sophisticated communication systems from an engineering standpoint as well as the analytical side. Turn-key projects are becoming more the rule than the exception here. Right now, your experience in any of the areas listed can qualify you for some very exciting and long-range growth opportunities here:

Spread Spectrum Communications
Digital Communications Systems
Data Networks & Protocols
System Control
Real-Time Systems
Hardware/Software Interface
Management & Planning
Software Verification & Validation
Message Switching
Satellite Communications
Transmission & Communications Processing
Interoperability
Systems Testing
Hardware Requirement Analysis
Systems Acquisition
Training: Plans & Evaluation

For a prompt response, mail your resume in full confidence to The Director of Professional Staffing, MC/218-10

The only limitations are the ones you bring with you.
An Equal Opportunity Employer M/F/H

CSC
SYSTEMS DIVISION
6565 Arlington Boulevard
Falls Church, VA 22046

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NEW JERSEY

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WESTCHESTER/ CONNECTICUT

[illegible]

[illegible]

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Your career development in Industry and Banking is our business. We are EDP Specialists offering you nationwide market coverage. All positions fee paid by client companies. Contact [illegible], Manager.
[illegible]

dorsey love & associates inc.
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The Computer Science Program at [illegible] State University has faculty positions to be filled by September 1, 1981. Applicants must have a Ph.D. or M.S. in Computer Science or a related field. Applicants with a Ph.D. will be eligible for tenure. Duties will include instruction of undergraduate and graduate courses and research oriented activities. Candidates with interest and experience in operating systems, data bases and languages will be given preference. Contact:

[illegible]
Department of Electrical Engineering and Computer Science
[illegible] State University
[illegible]

[illegible] is an Equal Opportunity/ Affirmative Action Employer.

EDP AUDIT PROGRAMMER

CPA firm located in Beverly Hills has need for EDP Audit Programmer with minimum 2 yrs. experience. Knowledge of COBOL and RPG required. Should have hands on experience in a large DP environment. Salary commensurate with experience. Excellent company benefits. Send personal resume with salary history in confidence to:

[illegible]

DP PROFESSIONALS

Advance your career in the location of your choice!

If you have a minimum of 1 year of experience, call collect (or send resume) to: [illegible]

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[illegible]
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Experienced Programmers and Analysts

Send resumes to: Mark C. Grove, Recruiting Office, Ætna Life & Casualty, 79 Farmington Avenue, Hartford, CT 06156, (203) 273-6828. An equal opportunity employer.

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Need experienced systems/analysts to join young dynamic team involved in programming support for scientific personnel and development and maintenance of administrative systems for petroleum research institute. Should have background in IBM Systems, COBOL, Fortran, OS/VS, TSO and VM/CMS. Duties will include analysis of systems, systems, planning and systems development. Candidate should have minimum of 3-5 years experience in the above areas and a degree. Fluency in Spanish required. Please rush resumes with salary requirements to clients consultant:

K.A. DREXHAGE & ASSOCIATES, Inc.
[illegible] Welch Road, Suite [illegible]
Palo Alto, California [illegible]

WHAT IS OPPORTUNITY?

For MIS professionals, opportunity is joining the company with a commitment to systems improvement. It's joining our team in a new DATA CENTER where you will be working with state-of-the-art technology on an IBM 3033, with the latest software tools.

Where is this opportunity? With the fastest growing semiconductor firm of recent times—Advanced Micro Devices. To give you some idea of our enterprising spirit, our first quarter sales surpassed $70.6 million! That's a 40% increase over the same period in 1979.

What is opportunity? At AMD it's all of the following:

ADVANCEMENT OPPORTUNITIES

We expect the size of our data processing staff to double by years' end. That means that those professionals hired today will be in excellent position to capitalize on AMD's policy of promoting from within.

STATE-OF-THE-ART TECHNOLOGY

At the heart of our new DATA CENTER will be an IBM 3033 under MVS. Our high technology plans also call for the installation of CICS and IMS.

CHALLENGING RESPONSIBILITIES

This includes a physical move/installation, systems conversion, installing IMS/CICS and developing new, on-line application systems. This simultaneous effort will provide the challenge that dedicated professionals demand, and the learning situations that enhance career development.

SYSTEMS DEVELOPMENT

One of the great advantages of working at AMD is that, for the most part, your work will consist of systems development. Using systems development methodologies (SDM 70) and structured programming techniques, you will develop many new systems in the areas of Finance, Manufacturing, Customer Management, Administration and Human Resources.

PROFESSIONAL RECOGNITION

Since you will be in on the ground floor, your personal and professional efforts are guaranteed a high degree of visibility. Increasing responsibilities and rewards are based upon individual performance, capabilities and ambition.

COMPETITIVE SALARIES

AMD recognizes that in order to attract the high-caliber MIS professionals we need, we must be open and flexible in terms of salary requirements. We assure you that our compensation package is as competitive as you'll find in the industry.

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"Exceptional" is the correct term to describe our far-reaching benefits program. Along with such items as health/medical/dental/disability insurance, 100% education assistance, free legal consultation and credit union, we offer a stock option plan and profit sharing that has been averaging in the vicinity of 12% of salary!

Now that you know what AMD has to offer, consider offering us your experience and abilities in one of the following areas:

APPLICATION DEVELOPMENT MANAGERS
PROJECT LEADERS
PROGRAMMERS
PROGRAMMER/ANALYSTS
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ADMINISTRATOR
INSTRUCTOR/TRAINING COORDINATOR
COMPUTER OPERATORS

For immediate consideration, submit your resume, detailing employment and salary requirements, to D. WARD, ADVANCED MICRO DEVICES, 901 THOMPSON PLACE, BOX 453, SUNNYVALE, CA 94086. OR TELEPHONE (408) 732-2400 ext. 4068, COLLECT. All resumes and inquiries will be held in strict confidence.

CATCH THE WAVE

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To qualify, you should have a college degree (or equivalent background) and at least two years of experience in: IBM S/34 or S/3 Model 15D with working knowledge of RPG II and CCP; MAPICS or IPICS and manufacturing systems, and on-line purchasing/receiving systems.

To apply, please call Gil Patton or Kay Donovan at (304) 647-4358. Or send resume indicating position of interest to: Employee Relations Department, Bendix Environmental and Process Instruments Division, P.O. Drawer 831, Lewisburg, West Virginia 24901.

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Multi-plant mfr. ([illegible]) seeks tech. strong prog/analyst to manage small but state-of-the-art environ. Prior S/34, fin'l. & mfg. apps. exp. desired. Key spot with top mgmt. visibility. Salary $[illegible],000. Contact [illegible].

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Growing Florida corporation interested in finding experienced CICS/VS Programmer/Analyst. If you are aggressive, a self starter and full of ideas we are interested in talking to you. Candidates should have a strong working knowledge of ALC and ANS COBOL. The location is in sunny Orlando, Florida. The data processing environment is a DOS/VS operating system using CICS/VS, on an Itel A/S 5-3 (3 meg.) with a state wide growing TP network of over [illegible] terminals. In addition to group insurance we offer a profit sharing and retirement program. Send resume to [illegible], Programming Manager, Lawyers' Title Services, Inc., P.O. Box [illegible], Orlando, FL [illegible].

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For more details, send your resume or call:

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Outstanding opportunity for product development software specialist with heavy CICS or data base or online experience. Experience in graphics, minicomputers, IBM COBOL, project management packages or methodology desirable, but not essential.

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[illegible]

Deadline for applications: September [illegible], 1980. An Equal Opportunity/Affirmative Action Employer. Women, Minorities, and Handicapped Persons Are Especially Invited To Apply.

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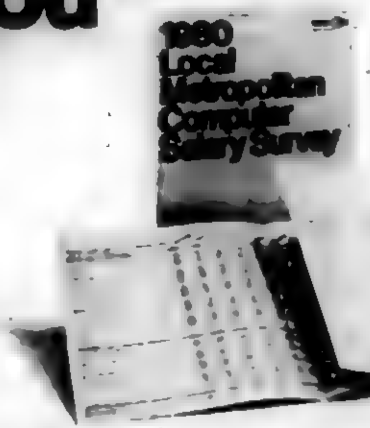

Includes 23 New Categories

The 1980 Survey has been expanded to provide specific data for 23 new categories. These include positions in data communications, mini/micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

Do you know how your salary compares with other EDP professionals in your specialty—with the same level of experience—working in your city, or in other cities across North America? Are you being well paid for what you do? Are salaries better elsewhere?

Now you can find out simply by calling today and asking for a copy of our current 1980 Local Metropolitan Computer Salary Survey. It's FREE!

Source Edp, North America's largest recruiting firm specializing in the computer field, publishes this valuable Survey annually as a service to computer professionals from coast to coast. The 1980 Survey shows current salaries in your area, 37 other areas in the U.S. and Canada, plus overall national averages. Salaries are shown by career specialty broken down by length of experience or size of computer system.

As you will discover, this Survey can be extremely valuable in helping you make important career decisions. Call for your free copy today.

For your free report, simply phone the Source Edp office nearest you.

source edp

If unable to call, write
Source Edp, Dept. CL6
100 South Wacker Drive
Chicago, Illinois 60606

(When writing, please be sure to indicate home address and position title).
Client companies assume our charges.

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Los Angeles	213/386-5500
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San Diego	714/231-1900
Colorado	
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Hartford	203/522-6590
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Seattle	206/454-6400
Wisconsin	
Milwaukee	414/277-0345
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Toronto	416/865-1125
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REAL TIME O/S DESIGN

Our client has an excellent career opportunity available to an experienced Professional to work as a Project Leader in the design of high speed Real Time Operating Systems for Telemetry applications. Duties will include structured programming using HOL (PASCAL, PL/I, ADA) desired with UNIX or VAX VMS experience ideal. The selected candidate must understand CPU Architecture and HW/SW Trade Off options and possess BS/MS EE/CS.

Salary and benefit programs are structured to enhance your lifestyle in beautiful Florida. Please submit your resume, including salary history, in confidence or call:

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Our Client Is An Equal Opportunity Employer with Client Company Paying All Fees

---

Computerized Graphics

Our nationwide clients have retained us to help in their rapid expansion. If you currently have graphics experience, or have a minicomputer software internals or scientific application background, we would like to talk to you.

To see if your skills and objectives match opportunities in this highly sought-after field, write or call today at no cost or obligation.

Systems Engineers **To $30K+**
Join small group with total responsibility for generating all software supporting this fast rising company's graphics products. Solid fortran a must, mini-assembler helpful.

Manager, Mechanical Applications **To $40K+**
Some mixture of mechanical engineering knowledge, interactive systems, and management experience is key. Contribute creatively to market strategies.

Applications Engineers **To $30K+**
Provide pre-post sales support for vendor's graphics products. Good image, communications skills. Programming, NC systems, or engineering knowledge is a plus. Nationwide locations.

Call Jim Bond, toll-free, at 1-800-[illegible]. Connecticut residents, call [illegible].

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111 Founders Plaza, East Hartford, CT 06108 All fees are assumed by client companies.

Your Ultimate Choice

TAKE ANOTHER LOOK AT SAUDI ARABIA

If you have ever been intrigued by the possibility of making the kind of money you hear people talking about in the Middle East, but decided that living conditions or leaving your family would be too much of a sacrifice, you need to talk to us. Call or visit and talk to us about what it's really like to live there. In fact, consider the following opportunities existing with our client:

MONEY . . .

. . . Net income after all expense is equal to your gross yearly income: i.e. if your U.S. base salary is $35,000, you can plan on banking more than $33,000

. . . Includes a 10% cash bonus upon acceptance and a 40% expatriate bonus.

TECHNICAL OPPORTUNITIES . . .

. . . State of the art hardware (twin IBM 3033s)
. . . Latest generation IBM operating system.
. . . Worldwide telecommunication network.
. . . Involvement with IMS DB/DC.
. . . Largest variety of projects in the world.

TRAVEL

. . . Eight weeks annual vacation with travel expenses for the entire family back to the U.S. This time and money can be used to see Europe and the rest of the world.

. . . If you are married, but elect to go single status, the company will give you three tax sheltered trips home each year.

. . . There are ample opportunities for transfer to American and European locations for tenured employees.

LIVING CONDITIONS . . .

. . . Family status American style living.
. . . Only hospital in the Middle East accredited by the North American Hospital Association.
. . . American style grocery store.
. . . Educational facilities to rival any in the U.S.

With inflation and recession outpacing your salary increase 2:1, why not consider interviewing on a position that can in just a few years, make you financially secure for life.

We currently have openings for the following positions.

DATA BASE ANALYSTS

Responsibilities include design and development of IMS data base. Requires extensive user interface on the intricacies of IMS.

SYSTEMS PROGRAMMERS

Technical support of any of the following: MVS, IMS, Internals, VTAM or PDP 11 message switching systems. While working in any of these groups you will be given the opportunity to learn other systems.

IMS PL/1 PROGRAMMERS

Over one million hours of user requests are waiting to be designed, developed and implemented. Applications include general financial, oil and gas accounting, scientific and virtually any other application you can imagine.

All inquiries will be treated with the confidentiality and professionalism that you deserve. For additional information, please contact Roger Hall or Cliff Reilly at (713) [illegible].

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M. david lowe
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1200 Travis

(713) [illegible]
Houston, Texas 77002

SR. PROGRAMMER/ ANALYSTS

Phoenix, Arizona

We are a national firm in sunny Phoenix, Arizona; a leading OEM dealer of WANG systems servicing the legal market. Our company's growth dictates the addition of 2 experienced COBOL programmers and one experienced BASIC programmer.

The candidates will have experience in programming and analysis, preferably on WANG systems or IBM 360/370. For those selected, we offer a very competitive salary (DOE) and an excellent benefit package.

Please send your resume and salary history to: Professional Software Systems, Attn: SOFTWARE DEPARTMENT, 200 E. Mitchell Dr., Suite 220, Phoenix, Arizona 85012.

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EDP PROGRAMMER ANALYST

Salary: $1,980 to $2,325 (depending on qualifications)

Education: Equal to 12 units of college level courses from an accredited college in data processing, business administration, accounting, economics or a related field.

Experience: Two years of recent paid experience in programming with emphasis in COBOL, one year of which must have included experience with third generation hardware and software with emphasis in direct access storage devices. One year of equivalent programming experience may be substituted for the required college education.

The District has installed an IBM 370/138 running under DOS/VS, with plans to move to DOS/VSE. We utilize an on-line program development system to support installation and maintenance of educational, financial and payroll/personnel teleprocessing applications.

Apply: Long Beach Unified School District
Personnel Commission — Rm. 314
701 Locust Avenue
Long Beach, CA 90813

MGMT. SCIENCE ANALYST

Prominent (Boston) fin'l. svcs. org. seeks exp'd. analyst for feasibility studies, requirements definition, fin'l. modeling & analysis. Must have strong FORTRAN skills. Hi-visibility to corp. mgmt. Salary $34,000.
Contact Frank Goldschmidt.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

MANAGEMENT

E.D.P. MGR SUNBELT LOCATION

Medium size original equipment mfg/r serving Blue Chip industrial/commercial clientele nationally needs promotable MIS professional due to advancement of 2 yr. incumbent in co. Data base 4331 environment. Budget 2% of revenues. Respond in confidence, with salary to:

CW Box 2376
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

APPLICATIONS PROGRAMMER

IBM 3600 ATM

Explore a career growth opportunity with excellent potential for upward mobility with a large State of the Art Tennessee financial institution.

Requires:

1. Minimum 1-2 years experience using Assembler
2. Must have experience using the Cole Software package
3. Must be a self-starter, highly motivated

To set up a confidential exploratory interview:

Call — John [illegible], ([illegible]) [illegible] from 8am to 4:30 pm or ([illegible]) [illegible] from 6pm to midnight.

PROGRAMMER/ANALYST PROGRAMMER

This Michigan employer is seeking several individuals for Programmer/Analysts and Programmers to work at their corporate headquarters located in mid/West Michigan. This large organization has approximately 15,000 employees, with over 50 locations throughout central Michigan.

The individuals selected will be working in an environment that consists of IBM 3031-AP and 370/148 computers, operating under DOS/VS, with a conversion to MVS in process. Application development utilizes BAL and COBOL languages and includes the use of teleprocessing and data base techniques.

We offer a competitive starting salary with a complete company paid benefit package.

Persons interested should submit their resumes detailing work and salary history plus current salary requirements to:

CW BOX 2374
375 Cochituate Road
Framingham, MA 01701
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CALIFORNIA

COMPUTER CAREERS INC. AGENCY

3303 Harbor Bl.
Suite C-20
Costa Mesa, CA
92626
(714) 979-7687

Our Tastes Are Simple

We Like To Have The Best

And so do our customers. In order to reach this goal, we have the best computer support professionals available — and we need more of them.

Several positions are now available for highly-motivated experienced computer software support professionals in our Data Processing/Word Processing Software Support Group. These positions will enable qualified candidates to enhance their knowledge of state-of-the-art computer software and architecture while performing a wide variety of exciting and challenging assignments.

The DP/WP Software Support Group is part of the Wang customer and field support organization for our VS Computer Systems, Integrated Information Systems, and Office Information Systems. This group works closely with Software R&D, Market Planning & Development, and Software Quality Assurance so that our clients benefit from the best possible support available. In addition to in-depth problem solving and consultation, this group performs a variety of other stimulating functions, such as conducting technical seminars and on-site troubleshooting.

We are looking for hard-working individuals who thrive on responsibility and respond well under pressure. You must enjoy working with people. Good communications skills are essential and you must be able to travel.

If your tastes match ours and your technical abilities qualify you to join one of our project groups, we would like you to become part of our team. This could be one of the most important steps you take in your career development.

Support Analyst

VS Software Support

Responsibilities for the VS Software Support Project Group include problem solving and consultation in the areas of the VS Operating System, VS Compilers, and VS System Utilities. Also included are benchmarking and performance testing. The technical requirements for these positions include an in-depth knowledge of COBOL, BASIC, or RPG II and experience with Virtual Storage Operating Systems, preferably as a technical support specialist. Experience with Data Management Systems or Telecommunications is beneficial.

A college degree is desired with a Computer Science degree preferred.

Support Analyst

Integrated Information Systems and Office Information Systems

Responsibilities include providing in-depth technical support for customers and Wang field personnel on VS/WP and OIS systems. Requirements include a college degree, preferably in Computer Science. The successful applicant must also have prior experience in COBOL or BASIC and knowledge of Word Processing in an Integrated Information Systems environment. Operating Systems experience is also beneficial.

Support Analyst

Customer Engineering and Operating Systems Interface

This position requires a great deal of interaction with our Customer Engineering and Software R&D organizations. Responsibilities include in-depth problem solving and consultation when hardware/software problem situations arise. Technical requirements include previous experience with computer hardware, primarily in the areas of Central Processing Units, MOS memory, and microprocessors. Also desired is experience with Operating Systems, either as a systems programmer or technical support specialist. A college degree is desired, preferably in Computer Science or Electrical Engineering.

We offer excellent salary and benefits including profit sharing, stock purchase plan, stock bonus plan, medical and dental insurance. Please send resume, including salary history to Tom Bahlo, Professional Recruiter, Wang Laboratories, Inc., Dept. CW-35, One Industrial Avenue, Lowell, MA 01851.

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WANG

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LIBRARY SYSTEMS SPECIALIST

New position, available January 1, 1981. Will be responsible for evaluating, planning, developing, implementing, and documenting computer programs and procedures in support of the libraries' technical services, public services, collection development, and administrative operations. Will serve as library liaison with university data processing centers and participate in development of inter-institutional systems and networks, including interface with OCLC.

Current programs are run in SPIRES and IBM 370/Assembler under the Michigan Terminal System (MTS) on an IBM 3033. The library is developing a set of integrated programs dealing with the full range of library operations.

Required: Knowledge of IBM 370/Assembler; Bachelors degree; working knowledge of state-of-the-art computer hardware, software, programming, and systems analysis; ability to communicate effectively in oral and written form with programmers, librarians and non-technical personnel.

Preferred: Knowledge of SPIRES, data processing in an academic or research library; and appropriate Masters' degree.

Salary commensurate with experience, minimum [illegible].

Rensselaer Polytechnic Institute is an independent technological university with approximately 6000 students and 400 faculty, offering advanced degree programs through the Ph.D. in engineering and the sciences. Send resume and names of three references by October 31 to James C. Andrews, Library Director, Folsom Library, Rensselaer Polytechnic Institute, Troy, N.Y. 12181. An Affirmative Action, Equal Opportunity Employer

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PROGRAMMER/ANALYST

Here is one career worth analyzing.

Harris Hospital has an excellent career opportunity for an experienced Programmer/Analyst who is familiar with IBM computers and in particular PL-1 language. We have an on-line integrated database system, operating under DOS and CICS. A Bachelor's Degree in Computer Science and a minimum of 2 years experience required. The ability to develop software and knowledge of medical terminology will all be a plus.

See if these benefits compute?

In addition to a top salary Harris offers you paid vacation, paid holidays including your birthday, free life insurance and excellent health insurance plus much more.

Start your career program today with Harris Hospital-Methodist, by contacting [illegible] at 817/334-6821 or send your resume to:

Harris Hospital-Methodist
1300 West Cannon
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DALLAS

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New department being created in the management and engineering science area of local oil company. Management & technical Prog/Analyst positions. Salary from [illegible] up.

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- **SYSTEMS DESIGNER** To [illegible]
  H.P. 3000, COBOL, Analysis & Design.
- **D.P. MANAGER** To [illegible]
  IBM, System 34, RPG II
- **PROGRAMMER ANALYST** To [illegible]
  COBOL, PL1, or Assembly, Finance or Manufacturing

Other Positions Available in DATA BASE ADMINISTRATION, OPERATIONS and MANAGEMENT.

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Send Resume or Call Collect:

[illegible]
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Palo Alto, CA 94304
415-[illegible]

or

675 N. First St. #[illegible]
San Jose, CA 95112
408-[illegible]

[illegible] or
[illegible]
111 Pine St. #1510
San Francisco, CA 94111
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TECHNICAL OPPORTUNITIES

Challenging assignments. . . sophisticated environment. . . in a climate of growth

Combustion Engineering, The Energy Systems Company, is a $2+ billion worldwide industrial leader operating one of the most sophisticated state-of-the-art data processing and communications networks in the United States. Our continued commitment to this leadership position creates an immediate need for skilled professionals to assume a key role within our organization at one of the following locations.

Corporate Headquarters — Stamford, Conn.

COMPUTER HARDWARE PLANNING AND EVALUATION

As part of our small computer science team the successful candidate will perform broadly diversified project assignments relating to the identification and fulfillment of current and forecasted hardware needs required for the enhancement of our global information processing capabilities. Ongoing activities will include the continual evaluation of emerging systems; assessment of past and anticipated vendor performance; the financial and operational analysis of alternate acquisition methods feasibility studies and needs analysis to investigate potential systems expansion, hardware logistics, etc. Internal consulting skills will be extensively utilized by operating group management.

Appropriate credentials include a related BS degree (or equivalent) combined with 4+ years experience (a portion of which would have been at the senior level of systems analysis) in a large-scale, technologically advanced environment.

Corporate Computer Center — Windsor, Conn.

SUPERVISOR PERFORMANCE MEASUREMENT/ OPERATIONS ANALYSIS

Reporting directly to the Manager of Operating Services, the successful candidate will provide logistical and tactical monitoring of the installed hardware and software components at the Corporate Data Centers, in addition to assessing available hardware and software monitors that can be used in measurement analysis. The Supervisor will provide management with an ongoing status of the systems' performance, bottlenecks and projects' design to improve overall system efficiency.

TECHNICAL SPECIALISTS/ ON-LINE SYSTEMS

The Communications Systems Group is looking for individuals with 3+ years experience with real-time transaction systems. Data base (IMS or TOTAL), and communications systems experience is highly desirable. Applications experience in a CICS or Intercom environment is preferred. A knowledge of software packages, systems facilities and debugging techniques is a plus.

These positions, located in highly attractive Connecticut communities, offer a very competitive salary and benefit package combined with the challenges and rewards to be found only at the leading edge of your profession. For prompt and completely confidential consideration, forward your resume stating salary requirement and position of interest, to: **J.W. Doyle, COMBUSTION ENGINEERING, 200 Pigeon Hill Road, Windsor, Connecticut 06095**

COMBUSTION ENGINEERING
The Energy Systems Company

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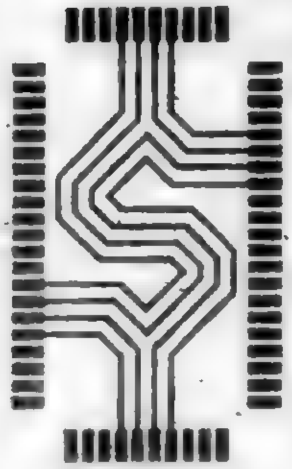
Technical Support Analysts



San Francisco Data Center

Bank of America needs qualified individuals for exciting, challenging positions in our technical support project. Your responsibilities will include supporting seven 3033's running MVS REL 3.8, JES 3 REL 3, IMS and batch twenty-four hours a day seven days a week and two 168's utilizing VM.

You should have three years experience with MVS JES2/JES3 on system 370/158 and larger processors, and a solid knowledge of MVS, JCL and IBM utilities. A good understanding of MVS externals and a strong software background are essential. Knowledge of IMS, VSAM, NOMAD and IBM 3705 or Memorex 1270 transmission control units is preferred.

Your work week will normally consist of three 12-hour day or night shifts and four days off, but can vary. The salary is commensurate with your experience. Please send your resume and salary history to Bank of America, c/o Charles B. Smith, Dept. 3411TS, P.O. Box 37000, San Francisco, CA 94137. We are an equal opportunity employer m/f/h.

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DATA PROCESSING & ENGINEERING CONFERENCE OCTOBER 10-11, 1980
20-25 COMPANIES WILL PARTICIPATE
MAIL RESUME TODAY !!

NEED (4) DATA BASE SYSTEMS CONSULTANTS:
3 yr. exp. IMS, CICS, data base design, [illegible] language Cobol, ALC, JCL, CICS to 30K

NEED (3) SOFTWARE PROGRAMMER ANALYSTS:
2 yr. exp. in assembler, Cobol, VM, OS/MVS, CICS, TP and on-line exp to [illegible]

NEED (4) SYSTEM ANALYSTS:
BS Degree 3-5 yr. on-line exp. application, [illegible] Cobol in [illegible] environment to 27K

NEED (20) PROGRAMMER/ANALYSTS:
3-5 yr. exp. DOS-JCL, Cobol, CICS, DOS-VS knowledge of [illegible] to project leader to 28K

NEED (15) PROGRAMMER/ANALYSTS:
2 Yr. Exp. OS, Cobol, and JCL knowledge of [illegible] either batch or on-line to 24K

NEED (4) SOFTWARE PROJECT LEADERS:
5 yr. of IBM 370 OS/VS exp. 3 yr. in technical support and 1 yr. supervisory exp. DB/DC systems 30-35K

- SOFTWARE ENGINEERS: [illegible]
- METALLURGICAL ENGINEERS: [illegible]
- SYSTEM ENGINEERS: [illegible] & up
- SYSTEM ANALYSTS: [illegible]
- [illegible] ENGINEERS: [illegible]
- STAFF ENGINEERS: [illegible]
- ENVIRONMENTAL ENGINEERS, [illegible]
- [illegible]

Send resume and a snap shot today to Charles H. Jackson, Manager and Technical Recruiter.

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Relocation expenses and fees are paid by our client companies.
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"[illegible]"

CALIFORNIA

MAJOR CONSUMER GOODS DISTRIBUTOR seeks several P/A's with 2+ yrs IBM COBOL progr exp to join staff designing new systems for 3031/MVS installation. Ideal location & benefits prog. & relocation. Salary to $26,000.

SAN FRANCISCO BASED FINANCIAL FIRM Seeks EDP Auditor or Prog Analyst with at least 2 yrs IBM COBOL exp to train in auditing. Co paid full relocation & interviewing expense. Salary to $25,000.

SAN FERNANDO BASED CLIENT is looking for a programmer analyst to assist in major enhancement & new development of on-line financial systems. Requires 3 yrs overall with 1 yr CICS. Salary to $28,000.

MAJOR DISTRIBUTION FIRM seeks a Prog Analyst to join a team developing new applications. This person will work closely with the Systems Analysts to define specifications & implement new systems. Requires DOS & COBOL. Excellent Co benefits. Salary to $24,000.

the jarvis walker group
3255 Wilshire Blvd., Suite 1503
Los Angeles, Ca. 90010 (213) 384-4900

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Out-of-the-ordinary opportunity for self-starter in this 370/135 CICS, DATA POINT front end environment. 3+ years COBOL, DOS/VS programming experience. CICS experience is a plus. Design and develop PRODUCTION SCHEDULING CONTROL system. Realistic growth potential. [illegible]

CCP
$22,000

Attractive growth opportunities are clearly indicated in this rapidly expanding environment. 3+ years RPG II programming with heavy CCP experience. MANUFACTURING applications exp is a plus. Over all project responsibility in SYSTEM 3/15D environment ([illegible] in October). Rewarding and highly visible.

BASIC +2 GRAPHICS

Unbelievable position for sharp above pro to learn GRAPHICS. 2+ years BASIC +2 or COBOL and RSTS/E experience. Aid in conversion from IBM to DEC. Outstanding benefits include 30 days VACATION, DENTAL, MAJOR MEDICAL, ETC. $27,000

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[illegible] (agency)

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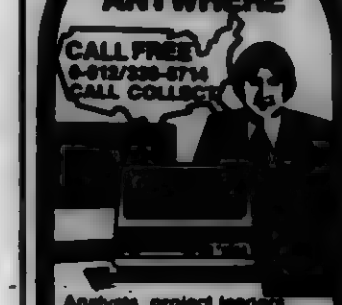

Analysts, project leaders, programmers with more than a year's experience let us help you find a better job. For a decade we have been placing EDP professionals like you all over the country through our network of 25 national offices. Send your resume or call

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- *COBOL or ASSEMBLER
- *On-Line exp with CICS
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If you like a fast-paced, demanding, challenging atmosphere where your individual contributions will be recognized, why not contact us to explore your career goals & objectives. We are dedicated to being worthy of your trust & confidence.

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(203) [illegible]

"We are an equal opportunity employer retained search & placement firm"

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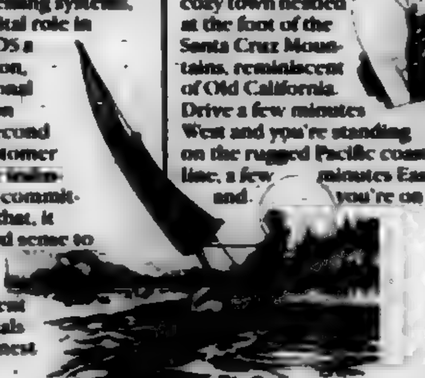
There's a good reason for building our Advanced Development Center in a town like Los Gatos.

You.

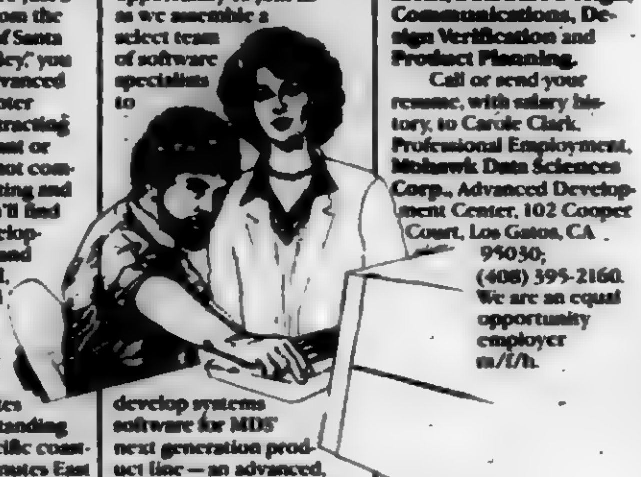
The MDS Advanced Development Center was built in Los Gatos, California for some very good reasons. Our people.

Since the Center's function — its *only* function — is to develop hardware and software for highly advanced distributed processing systems, it plays a vital role in making MDS a $200 million, multi-national corporation with the second largest customer base in the industry. With a commitment like that, it makes good sense to provide our development professionals with the finest resources available, in an environment conducive to freedom, creativity and unrestricted growth.



So, while we're just a few miles away from the high technology of Santa Clara's "Silicon Valley," you won't find our Advanced Development Center amidst a busy, distracting manufacturing plant or caught up in the hot competition of marketing and sales. Instead, you'll find a team of top development pros, living and working in a small, cozy town nestled at the foot of the Santa Cruz Mountains, reminiscent of Old California. Drive a few minutes West and you're standing on the rugged Pacific coastline, a few minutes East and you're on the doorstep of one of the most concentrated high technology areas in the world.

If you're a software development professional, you'll want to explore an opportunity to join us as we assemble a select team of software specialists to develop systems software for MDS' next generation product line — an advanced, microprocessor-based distributed processing, multi-user system. Investigate excellent opportunities for Systems Programmers and all Software Development Professionals in the areas of Systems Architecture, O/S Development, Data Base Design, Communications, Design Verification and Product Planning.



Call or send your resume, with salary history, to Carole Clark, Professional Employment, Mohawk Data Sciences Corp., Advanced Development Center, 102 Cooper Court, Los Gatos, CA 95030; (408) 395-2160. We are an equal opportunity employer m/f/h.

MDS MOHAWK DATA SCIENCES

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APPLIED DATA RESEARCH has several outstanding career opportunities currently available for intermediate and senior programming personnel.

Positions involve assignments as software developers in the following ADR product groups:

VOLLIE® DOS/LOOK® MetaCOBOL®
On-line ETC® The LIBRARIAN® and
new product development.

Candidates must have:

- Minimum of two years programming experience
- Strong IBM Assembly language skills

ADR offers:

- Excellent compensation package
- Superior comprehensive benefits program
- Exceptional work environment

Additional information may be obtained by calling Mr. Ed Smith collect, at (201) 874-3033. Resumes may be sent, in confidence, to:

Personnel Director
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Route 206 and Orchard Road, CN-8
Princeton, New Jersey 08540

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ADR

Sr. Systems Analyst/Programmer
Jr. Systems Analyst/Programmer

Due to expansion and growth, a large teaching medical facility located in Central Texas is presently offering opportunity to ambitious System Analyst/Programmer professionals. Excellent working conditions, living in a pollution free area among the friendly Texas atmosphere. Tops in benefits including medical service to immediate family. D.P. running on a 370-[illegible] utilizing DOS/VS, CICS, DL1 data base, COBOL and some RPG.

Send Resume to:
[illegible]
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EOE

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For further information call Maggie [illegible] at 212-[illegible], or submit resume to: Interface Inc., 17 West 24 St., NY, NY [illegible].

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DPS, the DP Specialists in the heart of New England, has established a broad base of the finest industrial, insurance, banking, and service clients. Soaring demand among our clients has flooded us with new openings at every level including:

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SYSTEMS PROGRAMMERS	to 35K
SYSTEMS ANALYSTS	to 30K
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Send resume or call (collect) A. J. Rachele (413) 781-0982.

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(413) 781-0982

Computer Marketing Opportunities

The Computer Systems Division of Perkin-Elmer's Computer Operations is responsible for designing, developing and manufacturing 32-bit minicomputers and systems for markets throughout the world. We presently have openings for the following:

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This position gives you the opportunity to play a key role in sustaining Perkin-Elmer's scientific leadership with the following responsibilities: formulate product strategies for current and new Perkin-Elmer scientific languages products, including FORTRAN, PASCAL, CORAL 66, BASIC and ADA; propose new product capabilities; monitor implementations of scientific languages products; manage product introductions including training of field staff; and maintain competitive awareness. Qualifications include a technical degree (MBA an advantage), proven communications skills, and 10 years experience on scientific applications of computer systems—exposure to compiler writing an advantage.

Product Manager Processors

You will formulate product strategies for current and new Perkin-Elmer processors and architectures, including multi-processing, multi-processor, and language based system architecture; propose new products capabilities; monitor implementation of processor products with development and manufacturing; and maintain competitive awareness. Qualifications include proven leadership and communications skills; 3 years marketing or product management of computers or related hardware; and engineering degree or equivalent.

Competitive Analyst

You will collect, analyze, maintain and distribute relevant data related to Computer Systems Division competitors to support the Marketing Department. Information on these competitors will be gathered from trade publications, Auerbach/data pro, trade shows, sales force contacts, and personal contacts throughout the industry. Responsibilities will encompass producing periodic reports of competitors activities for sales, marketing, and internal usage; defining structure of Competitive Information Handbook for field sales usage; providing special competitive reports for product managers or market managers as required; establishing and maintaining EPAI agreements; and distributing up-to-date information on Perkin-Elmer products to data pro, Auerbach, and other competitive services.

As a high technology Fortune 500 leader, we offer excellent salaries and comprehensive benefits package, including profit sharing, hospitalization and paid dental plan. For prompt consideration, please send your resume to: John Travers, Perkin-Elmer, Computer Systems Division, 106 Apple Street, Tinton Falls, New Jersey 07724. An equal opportunity employer m/f.

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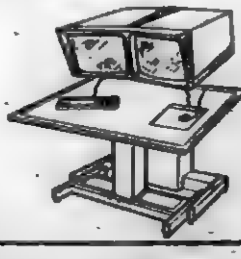

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Position involves implementation of University administrative and academic applications. Desired background includes 2 years experience in DOS/VS, COBOL and Assembly language. Knowledge of CICS helpful. Will be involved in initial stages of development using IBM 4331 hardware functioning with DOS/VSE operating system. A degree in computer science or equivalent experience required. Excellent benefits and outstanding opportunity for personal growth. Submit resume with salary history to The Personnel Office, Lehigh UNIVERSITY, [illegible] Avenue, Bethlehem, Pa. 18015. Equal Opportunity Employer, M/F

[illegible] in 1977.

[illegible] to grow, however,

[illegible] looking for a better position [illegible] (for the years to come), let [illegible] now!

[illegible] there is, with just about [illegible] side of science fiction.

[illegible] especially inter- [illegible] three to five [illegible] 1100 [illegible]

[illegible] programs- [illegible] EDS [illegible]

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Candidate for this position is encouraged to send resume in confidence, or, for more information call: Geoff West, (714) 549-8830, collect.

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Construction Industry

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Qualified candidate will work on IBM 38 equipment after completing a 5 week study course in basic IBM languages. Responsibilities will include technical programming in the following areas: costing, planning, scheduling, and estimating. Construction industry experience a plus.

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Experience: Four years recent paid experience in programming and systems analysis. Programming experience must have been in COBOL, on medium to large third generation, multi-programmed systems. At least two years experience must have been in designing and writing programs for on-line data entry and retrieval. Up to two years of additional experience may be substituted for two years of required college education.

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Apply: **Long Beach Unified School District**
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invites applications from experienced programmer analysts interested in working in a team providing data processing support to a multidisciplinary group conducting large scale clinical trials and behavioural science research.

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— recent experience in analysis and advanced programming, preferably in PL/I and in a scientific environment;

— knowledge of statistics plus familiarity with SPSS, SAS and BMDP;

— experience in a large IBM (370, 3033) TSO working environment;

— an excellent knowledge of English or French (working knowledge of the other language would be a definite asset.)

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World Health Organization
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Qualified applicants may send resume and salary history to Y. Britt, Digital Equipment Corporation, Dept. 825-3867, P.O. Box 38360, Phoenix, Arizona 85069. We are an equal opportunity employer, m/f/h.

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The first project, to be starting in the fall of 1980, will be to design and install a new, integrated student records system to serve the University and College registrars. Future year calls for extending the system to the Financial Aid, Admissions, and Bursar's functions. In addition to these projects in the student area, new on-line systems are planned for Alumni Records, Accounting, Budgeting and Personnel.

The University operates an IBM VM 370/168 system with OS/HASP batch environment. IBM 4341's are planned for installation in November and January 1981 to provide development and transition machines to a major mid '81 upgrade.

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SENIOR SYSTEM ANALYSTS to be responsible for the overall project leadership and system design and development, including working with University and college administrators as well as technical staff. A Master's degree in Business Administration, Computer Science or a related field plus a substantial record of accomplishment in systems analysis and design, (student data systems would be an asset), is required. Familiarity with interactive administrative systems and data base management and IBM operating systems plus supervisory experience and strong communication skills are desirable.

SYSTEMS ANALYSTS OR APPLICATIONS PROGRAMMERS to work under project leaders and who will be responsible for the design, development, installation and maintenance of sub-systems of the overall system. A degree in Computer Science, Business Administration or a related field plus 2 or more years experience, (developing and programming college or University systems would be an asset), is desirable. Experience with PL/1, VM/CMS or OS/MVS, and Data Base Management systems is highly desirable.

Salaries offered will be competitive with education and experience. In addition, Cornell offers excellent benefits, including an employee degree program and free tuition for job related courses (graduate Computer Science Department and School of Business Administration are among the best in the nation) and children's tuition scholarships. The Ithaca area offers outstanding recreational and cultural opportunities as well as unique shopping and restaurants in an exceptionally attractive environment.

Qualified individuals are encouraged to send a resume, including salary history & requirements to: Mr. Edmund V. Hollenbeck, Assistant Director for Administrative Programming Services, B-40 Day Hall, Cornell University, Ithaca, N.Y. 14853.

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You will provide advice and assistance concerning specialized topics pertaining to teleprocessing/telecommunications, information retrieval systems techniques and advanced programming methods as required. Additionally, you will insure that updates and/or changes to master program are explained, documented and implemented by each site. Experience with Data Base Retrieval, Modular Programming, Mathematical Programming and Programming of Decision Logic Tables and Structured Programming techniques is necessary and ability to program in COBOL and Assembler Languages is required, plus familiarity with Job Control Language and RPGII. College degree in Mathematics or Computer Science or its equivalent along with previous supervisory experience are needed.

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You should be versed in 370 hardware capabilities currently being utilized with knowledge of applications and modular programming for complex systems designs and must be a proficient programmer in COBOL. Familiarity with RPGII and Assembler Languages, five years cumulative experience in ADP programming and past or current involvement with a sizeable systems programming effort are required. College degree in Computer Science or Mathematics, or equivalent practical experience preferred.

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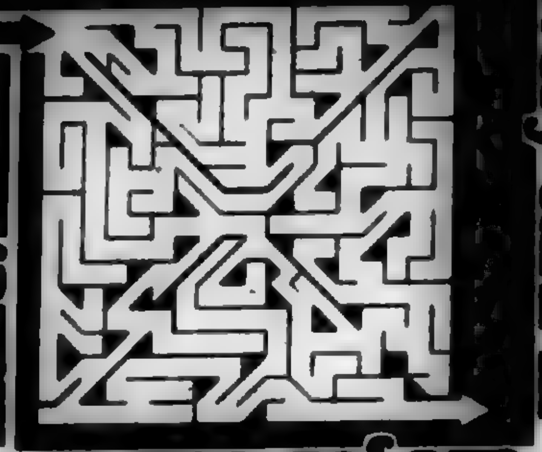

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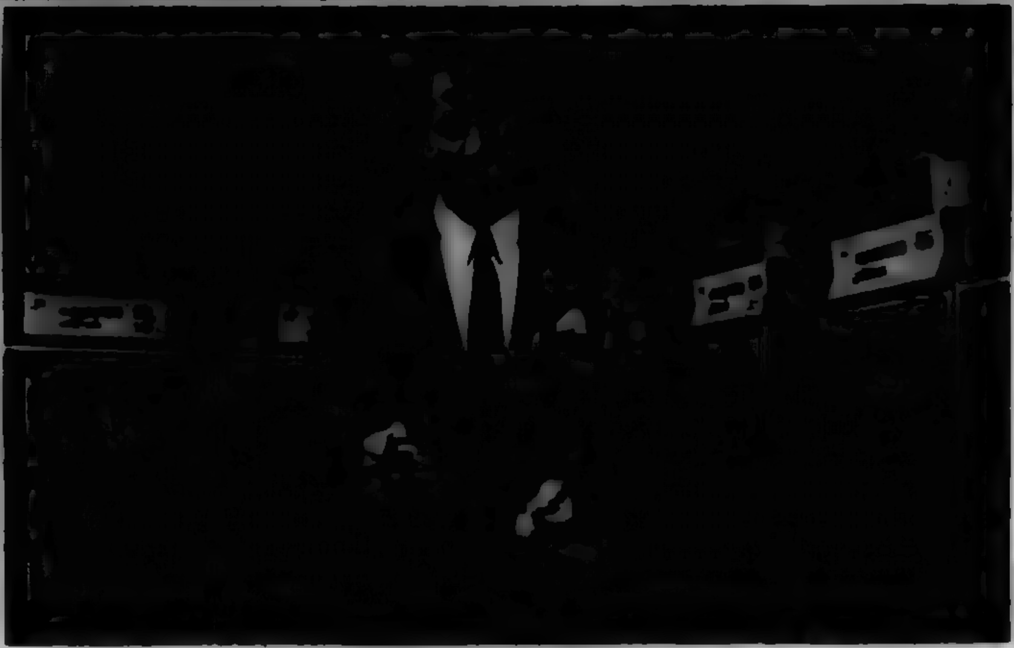

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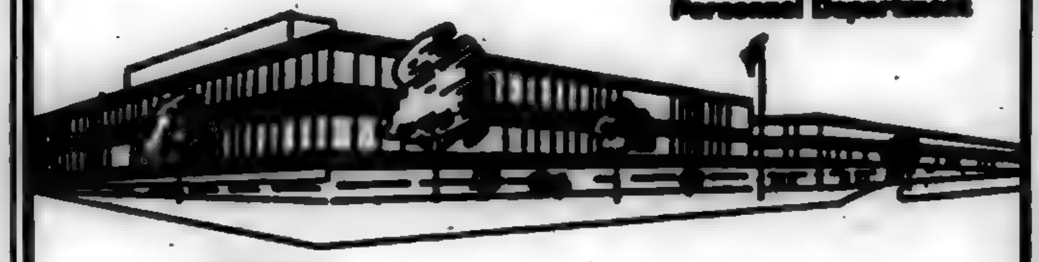
Personnel Department



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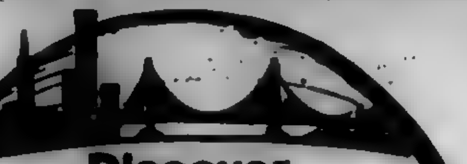

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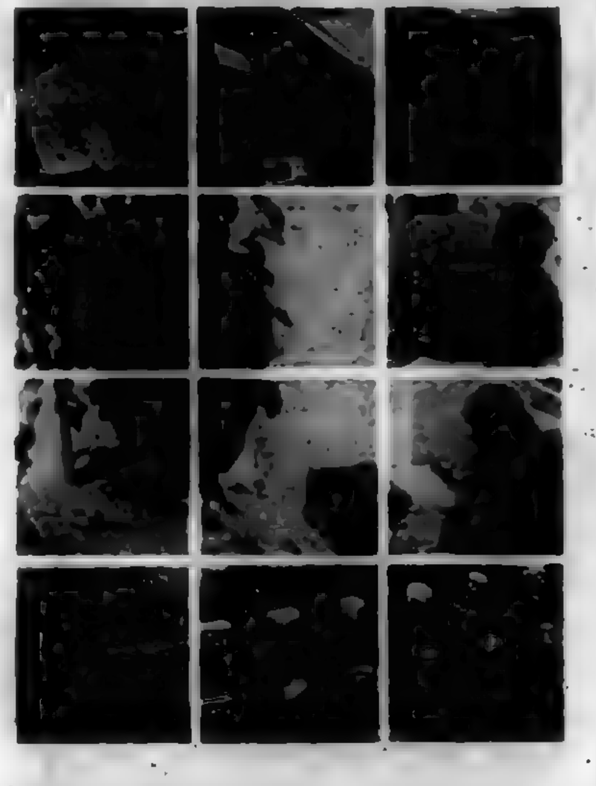

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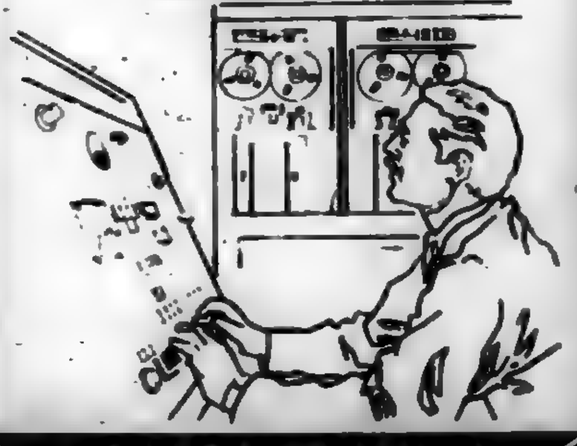

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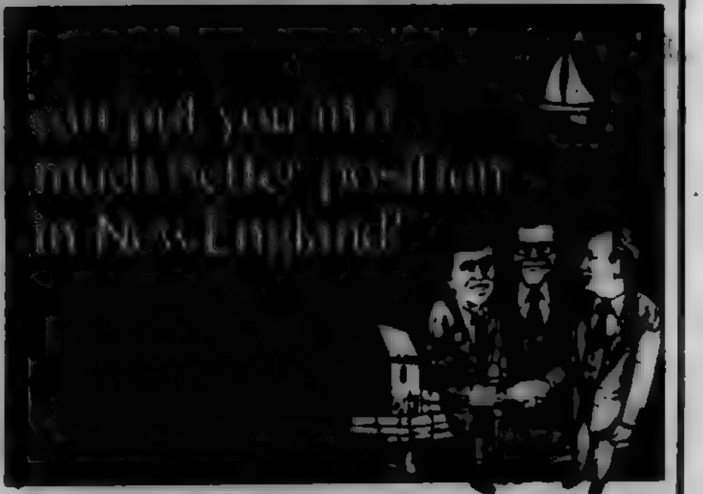

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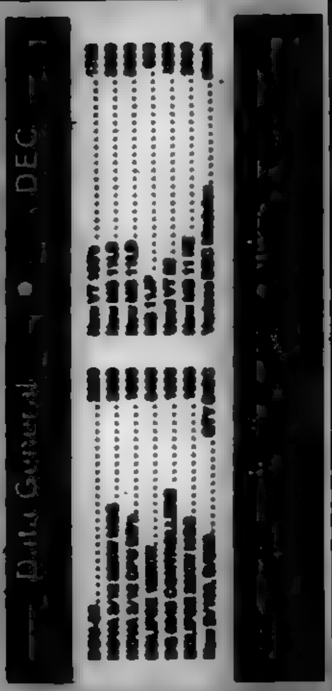

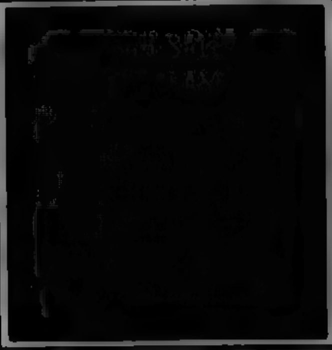

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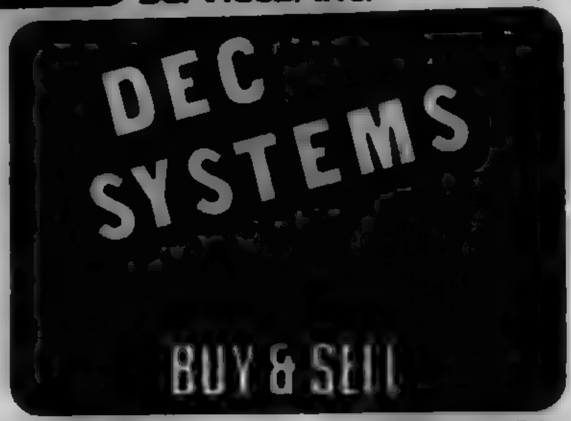

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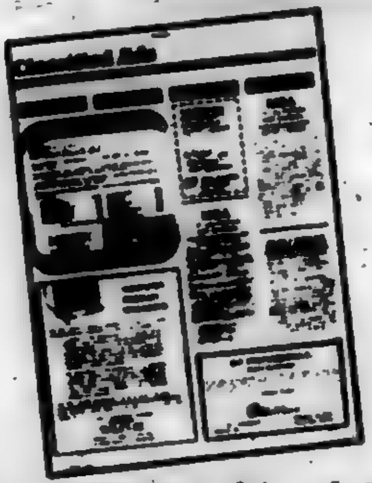

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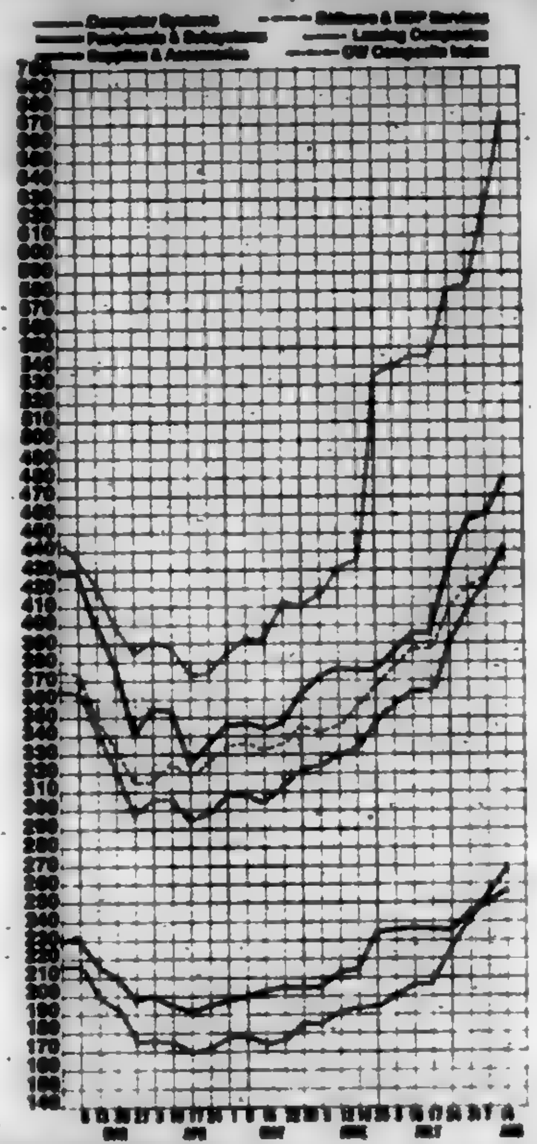

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lo. 35 September 1, 1980 $1.00 a copy; $30/year

Median Supervisory Salaries

Area	Position Scope	Applications Programming	Systems Software	Operations
United States	Level I	$18,800	$20,400	$16,000
	Level II	24,200	25,500	19,800
	Level III	28,600	30,200	25,100
North East	Level I	16,400	20,500	16,000
	Level II	23,700	24,100	19,700
	Level III	27,000	31,500	25,700
South East	Level I	19,400	—	13,900
	Level II	23,400	23,500	18,400
	Level III	27,200	32,400	22,900
North Central	Level I	20,500	20,400	16,300
	Level II	24,200	26,100	19,700
	Level III	29,200	29,900	25,500
South Central	Level I	19,400	—	16,600
	Level II	24,700	26,100	19,400
	Level III	28,900	29,000	25,000
West Coast	Level I	—	—	16,100
	Level II	27,100	25,200	20,900
	Level III	30,600	31,900	25,800
Canada	Level I	17,500	—	16,000
	Level II	23,400	—	—
	Level III	27,700	34,100	—

Figures Courtesy American Management Associations

West Coast Supervisors Found Reaping Top Dollars

By Bruce Hoard
CW Staff

NEW YORK — DP supervisors on the West Coast earn more than their counterparts anywhere else in the U.S., with paychecks reflecting annual salaries from $16,100 to $31,900, according to the American Management Associations' recent study, "Supervisory Management Report."

Despite that national trend, the Southeast, which fared poorly in most DP salary comparisons, boasted the top median salary — $32,400 yearly — for systems programming managers.

The survey focused on supervisors in applications programming, systems software and operations and divided them into three levels of responsibility, starting with minimal supervisory duties and moving up to high-level management slots.

Starting at the top, West Coasters commanded the highest salaries in the top Level III positions — in applications programming and operations — at $30,600 and $25,800, respectively. They also finished second to the surprising and anomalous $32,400 South-

(Continued on Page 5)

Part 2

Study Profiles Operations Staff

By Bruce Hoard
CW Staff

WALTHAM, Mass. — Unlike systems and programming personnel who move quickly and easily into top management information systems (MIS) organization jobs, operations personnel tend to stall out early and then move ahead very slowly, if at all.

This was one finding in a recent study of MIS departments published by International Data Corp.'s (IDC) Information Systems Planning Service (ISPS) Research Group.

Entitled *MIS Organizational Structures and Career Paths,* the report is based on a telephone survey of 131 large (an average of 250 MIS employees) computer sites, interviews with senior MIS management and prior IDC research.

"Operations personnel are typically high school graduates who have not completed a college degree," the study noted. "They have also been, at least

(Continued on Page 4)

Nasc Adds Processors To Challenge IBM 4300

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — National Advanced Systems Corp. (Nasc) last week expanded its IBM-compatible AS/5000 processor family with the addition of two bottom-of-the-line CPUs that provide roughly the same price/performance as the IBM 4341, support the 4300 series instruction set and run DOS/VSE and VSE: Extended Control Program Support (VSE:ECPS) in native mode.

The AS/5000N and AS/5000E reportedly hold the distinction of being the first Nasc processors to support IBM's Model 3370, 3375 and 3380 disk units in speed-matching buffer mode.

Last werk's introduction also revealed the addition of 3370, 3375 and 3380 disk support on the company's existing AS/5000 processor, the original member of the AS/5000 family.

Four Options

Nasc is further enhancing the AS/5000 mainframe with the addition of four previously unavailable options, a company spokesman added. Two of the options include MVS/SP support and the ability to accommodate Model 3380 disk units operating in the data streaming mode at 3M byte/sec.

A third option is a set of cross-memory services that allows users of IBM's MVS/SP Release 2 to tap previously inaccessible memory locations and thus boost their system throughput.

The AS/5000 processor is also being enhanced with an option that will allow the product for the first time to support the 4300 series instruction set, the spokesman said.

The smaller of Nasc's two latest processors is designated the AS/5000N. Described as 75% to 100% more powerful than an IBM 370/148, the AS/-5000N provides about 20% more performance than the 4341 for about a 20% higher price. The AS/5000E, by contrast, offers an estimated 50% to 60% more processing power than a 4341 for a 50% to 60% greater price and outperforms an IBM 370/158-3 by about 30%, the company claimed.

Moreover, the AS/5000E is projected to be roughly comparable in computing performance to IBM's long awaited

(Continued on Page 8)

Cincom Extends Total, Environ/1 To 4331 Users

By Marcy Rosenberg
CW Staff

CINCINNATI — In an aggressive step toward gaining a foothold in the IBM 4300 series market, Cincom Systems, Inc. is offering versions of its Total data base management system (DBMS) and Environ/1 on-line control monitor for 4331 systems at prices it claimed will undercut competitive offerings to this user segment.

The 4331 version of Total, which runs under DOS/VSE, is available to batch users for license fees starting at $15,000 or $385/mo on a five-year lease.

License fees for a fully integrated 4331 series data base/data communications (DB/DC) system, consisting of Total and Environ/1, start at $29,000 or $725/mo rental.

Cincom is able to offer these prices to 4331 users by licensing on the basis of usage, a departure from its usual system software policy of charging a one-time fee independent of how a package is used, according to Alex Kull, sys-

(Continued on Page 8)

Structured Methods: Pros and Cons

• Walk-Through Success

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — A health and beauty aids manufacturing firm here counts itself among those organizations that have successfully implemented structured methodology and walk-throughs into their day-to-day computing activities.

Syntex's conversion to structured walk-throughs and methodology began about two years ago and, at times, these methods have been employed toward some rather unorthodox ends. Unlike many other users, Syntex uses walk-throughs as a project control and management tool to spot software bugs, keep track of error rates and mon-

(Continued on Page 6)

• 'Worst-Case' Example

By Rita Shoor
CW Staff

NEW YORK — "For every action, there is an equal and opposite reaction." Originally applied by Sir Isaac Newton to thermal dynamics, this law also applies when information management technicians encounter a concept — in this case, structured programming — in their real-life environment.

For example, a Cobol program that had been specified with top-down design conventions and coded with as few GOTO statements as possible has led a senior-level programmer analyst here to give an unequivocal "thumbs down" to structured programming.

(Continued on Page 7)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.

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Within Six Months

X.25 Expected With 370X Heir

By Tom Henkel
CW Staff

IBM is expected to announce support of the X.25 protocol within the next six months when it brings out replacements for its aging 370X line of communications processors, industry analysts predicted last week.

Those new devices will become the communications workhorses in networks anchored by H series system hosts, analysts said.

The 370X replacements are expected to be nodal processors that will handle tasks such as line concentrating, multiplexing and other network control functions outboard of the CPU. In addition, the 370X replacement will handle message switching and office automation functions and possibly voice communications, analysts predict.

According to Dave Stein, an analyst for the Gartner Group, the communications processors will be "host-directed but not host-dependent"; the network will be "autonomous of the host to some extent," so when the host comes down, the network won't.

Satellite Effort

IBM's Vtam data access method will also be moved out to the 370X replacement, and the new unit will be capable of terminating line speeds in the neighborhood of 1M bit/sec to accommodate communications with IBM's proposed satellite, a joint effort by IBM, Comsat General and Aetna Life and Casualty, expected to be launched late in October [CW, July 21], according to Strategic Business Services, Inc.

Stein and Advanced Computer Techniques Corp.'s Bob Fertig predicted IBM might introduce the new processors along with its 4341 Model Group 2 processor, expected in mid-October.

Stein and Fertig disagreed on how many processors will be announced. "We expect two 370X replacements, one to replace the 3704 and one to replace the 3705. We haven't made any price predictions on the boxes per se, but we're talking four or five times the price performance" of the existing 370X line, Stein said.

Fertig, on the other hand, said there will be three or four 370X replacements to handle different users' power requirements.

"IBM's objective has to be different than with the CPUs. CPUs are interchangeable and a user has to have a lot of ability to grow up the spectrum. In the case of the front-end processors, IBM is only going to have a couple of models and the capability has to be there," Stein said.

Price/Performance

The 370X replacements are expected to employ technology similar to that of the 4300 and 8100 CPUs, and may offer price/performance similar to those machines.

Fertig said the communications processors will be more like the 8100 because that machine is more specifically designed for communications. In addition, he said, the 370X replacement may only offer a price/performance ratio two times that of the current 370X line.

Stein, on the other hand, said the communications processor will be more similar to the 4300 and offer a greater price/performance.

Exactly what features the new processors will offer immediately still has IBM watchers puzzled. Fertig, Stein and Strategic Business Services all agree the 370X replacements will eventually offer a combination of data, office automation and voice communications. However, the question is when.

Office automation-oriented communications such as word processing and message transfer functions seem a possibility, but whether they will be offered on the first 370X replacements is not clear.

"The big question mark in the whole strategy is what IBM is going to do about facsimile transmission, and how it will tie that in together with the satellite," Stein said.

Whether the new communications processors will offer voice communications could prompt some surprises, Stein said. Program Branch Exchange (PBX), the telephone switch present in most large offices, could be integrated into a communications network, possibly through the 370X processor.

"PBX means it's possible to tie directly into voice networks. That's one of IBM's strategies, to get telephone companies out of the local loop.

"A satellite network will take care of the long lines requirement, but that's only part of the problem. IBM will have to use telephone facilities within metropolitan areas because they have no other solution.

But we think IBM will find a way to minimize [use of] telephone equipment," Stein added.

Fertig agreed that PBX could be used to supply voice communications as part of the 370X processors. However, the analyst was more optimistic that voice communications may be offered earlier on in the new 370X life cycle.

William Easterbrook, analyst for Kidder, Peabody & Co., said IBM's communications processors may have the most significant impact of all the products IBM will announce in the next six months.

An intelligent communications processor that operates independently from the CPU may indicate IBM is planning to go out of the hardware business and into a sort of time-sharing/computer services business. Although Easterbrook said it may be 20 years before IBM makes that change, the 370X replacement may be a clear first step in that direction.

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Need for Structured Methods Cited by 71% of MIS Units

By Bruce Hoard
CW Staff

WALTHAM, Mass. – Almost 71% of management information systems (MIS) divisions surveyed recetnly require the use of structured design and/or programming techniques, according to a study by International Data Corp. (IDC).

The study noted structured design and/or programming techniques have been widely accepted. However, it questioned the validity of what it called an unexpectedly high figure.

"Our personal interviews lead us to some skepticism about whether the numbers shown here reflect actual practice or intention," the study said, adding it was "quite common" for respondents to claim they required the techniques only to find through additional questioning that actual use is in early stages, that some personnel are resisting the techniques and/or they are not required but rather suggested.

Insurance companies and utilities are the industry areas where structured design and programming methodology is widely accepted. Contrarily, the lowest acceptance is in areas with a large proportion of service bureau types of operations, such as DP services, colleges, banks and government agencies.

"There is clearly no significant difference between horizontal and vertical organizations in the use of structured techniques," the study declared. "There is some relationship to programming language."

Of Fortran shops queried, 57.1% used structured techniques while 73.2% of Cobol shops replied in the affirmative. All three PL/I and all four assembly language shops polled reported use of structured methods.

The use or nonuse of on-line program development methods does not have any correlation to the type of organization.

There is an "apparent relationship" between the use of structured techniques and the use of on-line debugging. "This may hint at a tendency of organizations which make use of relatively innovative techniques being more likely to be open to others," the study said.

The report, No. 2073, is available for $4,500 from IDC at 214 Third Ave., Waltham, Mass. 02154.

Career Options Counter Boredom

By Bruce Hoard
CW Staff

WALTHAM, Mass. – "An operations group which feels the door to programming is open can be more highly motivated and may have a greater identification with the objectives of the MIS organization as a whole," according to a recent long-range International Data Corp. (IDC) study on successful human resources techniques.

While the career path in operations tends to be a stable if sometimes stagnant one, systems and programming personnel experience considerably more latitude in career development. Changes to business and technical application areas are among the most popular. Aptitude, interests and personalities are crucial criteria in deciding on a move, the study noted.

Technically oriented people are more likely to drift toward more advanced knowledge and techniques in systems development. These people may prefer working with little personal contact with users.

On the other hand, more gregarious or ambitious individuals may develop more in terms of understanding the functioning of user departments and develop valuable skills in working with users to help user computer systems work more effectively.

Operations personnel have been known to move into systems programming. Such a move may be particularly beneficial for junior personnel. However, institutional policy, such as the demand for a college degree, may stifle otherwise qualified workers.

A move from operations to systems and programming may not make economic sense to senior operators because it means a drop in salary or an unjustifiably high salary for a programming trainee. If an otherwise willing plateaued senior operator is restrained by these reasons, morale problems may result.

Operations Staff Found Slow to Advance

(Continued from Page 1)

until the advent of government [Equal Employment Opportunity] requirements, predominantly male." However, more women are now entering the area.

Factory Environment

The operations area is more like a factory environment than a professional organization, the report said. There is a high degree of group solidarity and peer pressure to conform to group norms, accompanied by low tolerance for individual initiative.

On-the-job rather than formal training is the general rule of thumb for entry-level computer operations personnel. Operations personnel typically move from tending printers to mounting and dismounting disk packs and tapes and then advance to basic console operations.

Because newcomers largely depend on senior personnel for training and senior personnel are frequently reluctant to disseminate knowledge that may undermine their own job security, junior operators may spend up to a year working on peripherals.

Next Step

After an operator learns how to perform an initial program load of the system control program, he may be in a position to become a lead operator. This transition is accompanied by supervisory responsibilities over junior operators.

The next step, to shift supervisor, "is the first major discontinuity in the primary career path within operations," the study explained. The shift supervisor is no longer a participating member of the work group.

Just as junior operators may be plateaued, so may lead operators. It is not uncommon for them to remain in that position for up to 10 years and stay there because of relatively good salaries compared to other jobs requiring the same education and technical knowledge.

The final step up the operations ladder is operations, or data processing manager. This position usually requires planning and writing skills rarely found among operations personnel. For that reason, DP managers are often recruited "laterally from elsewhere in the MIS organization," the report stated.

In contrast to operations, "Systems and programming typically has an explicitly professional orientation, a much higher tolerance for individualism (sometimes to the point of eccentricity) and is accorded considerably higher pay and status," the study reported. There are also high expectations for advancement.

Training Programs

Training programs for systems and programming personnel are common. They may provide the only sure way to ensure a sufficient supply of programming personnel, given the peripatetic nature of many experienced programmers.

After a training period, junior programmers are usually assigned to an applications development team. From there, the typical progression runs to programmer, programmer/analyst, systems analyst, senior systems analyst, team leader, project leader, group leader and systems and programming manager. These titles are subject to change by organization.

There are no major discontinuities up through senior analyst and even the transition to team or project management is not as pronounced as the parallel transition to supervision in operations.

The reason is; "Before being assigned as team or project leader an individual will frequently have had experience supervising one or two people on smaller projects while still a programmer/analyst or analyst."

Another factor easing supervisory transitions is the greater identification with management evinced by systems and programming personnel. A promotion does not necessarily mean that someone is "going over to the other side.

"Partly for this reason, movement into the higher levels of systems and programming management is much more natural than the transition in operations, and experienced personnel are much less likely to plateau," according to the study.

And, while an experienced operator who is content at his present level for the indefinite future has little new to learn and less challenge, the senior systems analyst never runs out of job-related information and can always look forward to "technologically innovative projects."

Study No. 2073 costs $4,500 from IDC at 214 Third Ave., Waltham, Mass. 02154.

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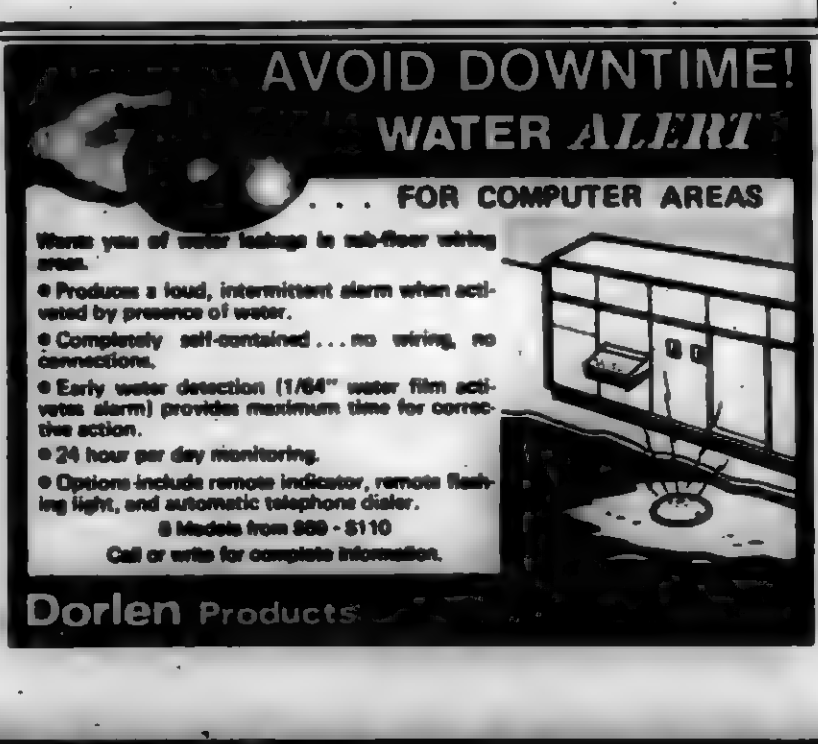

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Bell Threatens Rate Hikes if Liability Increased

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — If AT&T is forced to reimburse its private-line and Dataphone Digital Service (DDS) customers for the repair expenses they incur when service is interrupted, the phone company will have to raise its rates and impose an unfair burden on all of its customers.

This is the gist of AT&T's response last month to a complaint from Aeronautical Radio, Inc. (Arinc), concerning a proposed 600% increase in phone company service call charges.

Arinc operates a nationwide private line network for the major U.S. airlines. The proposed increase — from $11.35 to $80 per visit for private-line customers and from approximately $27 to $80 per visit for DDS customers — would apply whenever an AT&T repairman found the trouble was due to customer-provided equipment.

Arinc Complaint

The Arinc complaint that was submitted to the Federal Communications Commission (FCC) pointed out that a customer often is able to convince the phone company that its equipment, rather than another supplier's gear, was responsible for a service outage. But to do that, the customer must make his own investigation.

However, because of AT&T's limited liability, the customer must bear most of the troubleshooting expense himself.

The remedy, Arinc said, is to increase AT&T's liability and simplify the present complicated procedure established by the phone company for processing service charge reimbursement claims.

AT&T Response

"The limitations placed on the liability of AT&T to a customer for negligence have been found justified by the [FCC] precisely because the level of permitted recovery should not reflect the full or even a substantial part of a customer's potential consequential losses or additional expenses," AT&T said in answer to Arinc's complaint.

The phone company added, "Sound public policy assigns much of the risk for service or maintenance faults to the customer rather than to the carrier or, ultimately, to the general body of ratepayers. The limitation of liability provisions . . . [has] struck a reasonable balance between individual customer rights and the public interest in the provision of communications service at the lowest possible cost."

The new tariff is scheduled to become effective early next month, assuming the FCC accepts it. The commission's decision isn't likely to be forthcoming, according to a spokesman, until shortly before the effective date.

Top Pay Earned On West Coast

(Continued from Page 1)

east figure in systems software.

Moving down to Level II, the Westerners still held sway in applications programming and operations at $27,100 and $20,900, respectively. The South Central region was number one in systems software at $25,200.

Wide Gaps

At the lowest of the three levels, no single region showed the highest wages in more than one category. North Central checked in first for applications programming at $20,500. The Northeast topped systems software also at $20,500, and South Central's $16,600 was the highest in operations.

Down at the bottom, dismal Southeast salaries in operations and applications programming stood out in marked contrast to the relatively sky-high earnings of systems programming managers.

The Southeast finished dead last in all three operations categories with offerings ranging from $22,900 down to $13,900.

That region also placed last for Level II applications programming supervisors and a close second to last for the top-level jobs. The Northeast was lowest in Level I jobs, averaging only $16,400.

Bottom of Heap

Surprisingly enough, the Southeast was again at the bottom of the heap for Level II systems software supervisors, where its $23,500 median salary was a full $8,900 off the $32,400 median earned by top-level supervisors in this category.

These wide gaps, however, are not indicative of typical level and categorical disparities.

Differences between leading and last place salaries were, in almost all cases, minimal and divided by evenly descending increments. (See chart on Page 1.)

Incomplete information on Canadian DPers showed our northern neighbor to be strongly competitive at the highest level of systems software, beating the Southeast figure by almost $2,000 with a median salary of $34,100.

Moving to applications programming, the Canadian performance slumped somewhat. Its top down figures of $27,700, $23,400 and $17,500 placed it fourth, fifth and fourth, respectively, against American competitors.

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Evaluates Program, Not Programmer

Firm Shares Tips on Structured Walk-Throughs

By Jeffry Beeler
CW West Coast Bureau

Syntex Corp. has enjoyed great success in implementing structured walk-throughs in its everyday computing operations.

What were the secrets of Syntex's success? How did the company implement walk-throughs differently from most other users? And what formulas, if any, should would-be users follow to increase their chances of implementing walk-throughs successfully? Dorothy Deran, Syntex's research-information systems manager, suggested the following pointers:

- Avoid using walk-throughs as a tool for evaluating the performance and productivity of individual programmers. Remember that the sole purpose of conducting walk-throughs is to control the quality of a computing shop's main product — its programs. For walk-throughs to succeed, they have to gain their users' absolute confidence and acceptance. But how can they win such trust if programmers suspect the procedures are being used to measure their professional competence and thus might later be used against them?
- If you keep a log of all the programming errors your staff uncovers during walk-throughs — a practice Deran recommends — make sure all entries remain strictly anonymous. Keeping an error log is a good way of measuring a walk-through's effectiveness. But when you're recording a mistake, make sure you don't note the name of the individual who made it. Nothing will arouse a programmer's suspicion faster than an error log that names names.
- During walk-throughs, avoid using personal pronouns when referring to a mistake or to a person's work. Say "*this* error," not "*your* error"; "*this* program," not "*your* program." Remember that the subject of a faultfinding session should be a programmer's work, not the programmer himself.
- Refrain from criticizing a programmer's personal coding style. If a program contains bugs, can be shortened or otherwise needs to be clarified, by all means see that it gets corrected. But make sure all criticisms are based on genuine faults, and prevent walk-throughs from degenerating into mere squabbles over personal programming styles.
- For every bug uncovered during a walk-through, require the finder to state the nature of the error and suggest a possible correction. Merely pointing out a mistake isn't enough.
- Don't apply walk-throughs selectively or preferentially. Once the techniques make their debut in a computing shop, no one in the department should be exempted from participation. Otherwise, staff members might get the mistaken impression that walk-throughs are intended only for individuals whose work can't be trusted.
- Don't allow walk-throughs to drag on indefinitely. An ideal length for most walk-throughs is an hour or less.
- Every walk-through team should designate one of its members as group chairman and grant that individual the authority to suspend any meeting that seems to be making little headway.

Walk-Throughs Boost Product Control

(Continued from Page 1)

itor the status of each new application as it slowly works its way through the development cycle.

The company also uses walk-throughs as a training tool, especially for the newest additions to its programming staff, some of whom are initiated in the techniques during their first day on the job. Early exposure to walk-throughs enables incoming staff members to quickly acquaint themselves with their new employer's operating procedures and often accelerates two- or threefold their ability to master PL/I, one of Syntex's most widely used programming languages.

For the time being at least, Syntex's use of structured methodology and walk-throughs is limited to the company's research-information systems group, an arm of the firm's corporate MIS department. The research-information systems group uses Syntex's central mainframe, an 8M-byte IBM 3033 supported by OS, to collect and process clinical information such as medical records, patient case histories and lab reports.

The finished information is then sent to the company's research scientists, chemists, biologists and staff physicians, who in turn use it to maintain the firm's diversified product line, which includes pharmaceuticals, beauty aids and dental care products.

Syntex's adoption of walk-throughs and structured methodology came mainly at the suggestion of research-information systems manager Dorothy Deran, who joined the firm in 1978, the same year the research-information systems group first came into existence.

Deran, whose main mission was to oversee the new group's formation and subsequent development, had already successfully applied these techniques in her former job and she felt certain she could duplicate that success at Syntex.

One of Deran's first objectives in her new assignment was to spearhead the development of workable MIS standards and procedures. She achieved that objective by organizing a standards and procedures committee consisting of outside management consultant Gopal Kapur and a group of Syntex's own in-house systems managers.

Together, the committee members laid the groundwork for most of the research-computing group's present-day standards and procedures. They then submitted their work to a team of Syntex's staff programmers, who added refinements, filled in details and otherwise modified the original proposals.

Because the resulting standards and procedures are constantly being revised and reexamined, the programmer task force exists to this day, and its members continue to meet regularly.

In Deran's view, programmers deserve a large voice in shaping the standards and procedures that guide their daily activities. After all, she said, programmers are the ones on whom standards and procedures undoubtedly have their most direct and lasting impact.

Thus, a programmer who's given an opportunity to participate in standards and procedures development is much more likely to heed those guidelines than a programmer who simply has a set of ironclad rules rammed down his throat by top management, Deran explained.

Unlike many other users, Syntex uses standards and procedures, not to define coding conventions, but to provide general directions for producing the best possible software.

Five Fixed Points

In general, Syntex's standards and procedures reaffirm the value of structured walk-throughs and require that they be conducted at five fixed points during a program's development life cycle.

A typical Syntex development project calls for walk-throughs of software specifications, hierarchical charts, pseudocode, compiled code and system test.

The results of each walk-through are then carefully recorded on a one-page sign-off sheet, which also indicates the date on which the walk-through occurred and bears the names of each participant.

For each of its on-line application development projects, Syntex's research-computing group maintains a separate ring binder, which allows all of a program's supporting materials, including its walk-through sign-off sheets, to be stored in one place. By simply opening the binder and consulting its accompanying sign-off forms, any member of the research computing group's supervisory staff can check instantly a development project's exact status and can predict precisely when the next stage in that project is scheduled to be completed, Deran said.

Use of the ring binders also offers the group another important advantage: it forces programmers to periodically document their work. At most computing shops, documentation is usually delayed until project's end and then is written in one large step. But at Syntex, the job is effectively taken care of during the walk-throughs and thus is broken into several smaller steps and done gradually.

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User Provides 'Worst-Case' Example

(Continued from Page 1)

This "worst-case" example of what can happen if an installation rigidly adheres to some of the generally accepted coding rules associated with structured programming was provided by Al Volpe, a technical specialist with some 10 years of application programming and design experience.

Negative Attitude

The program which led to Volpe's negative attitude towards structured methodology was part of an accounting system that had been purchased from an unnamed vendor. "First of all," he said, "this particular program consisted of approximately 6,000 Cobol statements." The program's input consisted of daily credit entries which were edited and then used to update the system's masterfile.

While acknowledging that the sheer size of the program increased the difficulties of modifying the code, Volpe maintained that it was the GOTO-less structure in the "logical heart of the program" that eventually caused him to "throw my hands up" and leave that installation.

Apparently, the programmers employed by the software vendor had decided to replace consecutive GOTO statements with one Nested IF sentence that went on for approximately 1-½ pages, Volpe said. The next sentence consisted of a string of Nested IFs that ran for some 37 lines, he claimed.

"Nobody could follow that program . . . One of the reasons I left that company after five months was its complexity." There was "no way I'd say that I mastered the program before I left," the experienced technician admitted.

Granted that this was a worst-case experience, Volpe still said that it had "turned me off forever on the merits of structured programming."

'GOTO-Less Programming'

When asked whether he personally equated the term "structured programming" with "GOTO-less programming," his answer was a definite "Yes." "Everyone I've ever worked with" takes the position that in order to have a structured program "you have to get to nested IFs," he said.

"The advocates of structured programming set up the proverbial straw men and use extreme examples such as a 'spaghetti tangle' of GOTO logic to prove their point." Yet, if a logical construct such as a controlled loop is utilized, control is maintained without nested IFs, he said.

Every subparagraph returns control to the main paragraph which lists the conditions in descending order of importance, he explained. (See related pseudocode example.)

Volpe stressed that while this logic allowed for GOTO statements within performed routines, the GOTO could only transfer control to the subroutine EXIT statement. Thus, control would be returned to the original PERFORM statement which would include the THRU EXIT option.

He described the controlled loop logic as a "primitive sort of top-down coding," but felt that it was easier to follow than a series of nested IF statements. "Any time that I hit nested IFs, I have to stop and almost count on my fingers," he said. "If you have to get to nested IFs, they should definitely be held to three levels."

Currently employed in the research and development area of the systems and DP department at Johnson and Higgins, an insurance brokerage firm, Volpe's decade of experience includes stints with two airlines and the Depository Trust subsidiary of the New York Stock Exchange.

Offending Code

Although unwilling to state which of his former employers had purchased the package that turned him away from structured programming, he mentioned that another one of them had refused to accept the package until the offending code had been rewritten.

There are "no plans at the moment" to implement structured methodology at Johnson and Higgins, according to Rose Marchetti, Volpe's supervisor. "There does appear to be a certain amount of opposition to some structured coding techniques [among the approximately 40 programmers and designers] here," Volpe concurred.

He also has not attended any structured walkthroughs, he said. Instead, he operates directly with the user department to work out problems or changes to the Annual Funding application which is his responsibility.

That is how Volpe likes to work and, based on Marchetti's statement that "there are, to my knowledge, no structured programs in-house," that's the way it will be in the foreseeable future.

```
Paragraph-A.
    If condition-1 is true, go to
    Paragraph-B.
    If condition-2 is true, go to
    Paragraph-C.
    Go to Paragraph-A.
Paragraph-B.
    Perform Subroutine-1.
    Go to Paragraph-A.
Paragraph-C.
    Perform Subroutine-2.
    Go to Paragraph-A.
Subroutine-1.
    Add one to counter-a.
Subroutine-2.
    Add one to counter-b.
```

A pseudocode example of a controlled loop logic construct. File control processing with the accompanying AT END check would be in the highest level Paragraph-A.

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Cincom Offers Total, Environ/1 for 4331 Users

(Continued from Page 1)

tems software division marketing manager.

Usage is measured by number of files generated by the DBMS and, in addition, number of terminals supported in the DB/DC system, he said, adding the low-end $15,000 Total and $29,000 DB/DC packages are systems that will generate eight or fewer files and support eight or fewer terminals.

License charges increase in proportion to usage. For example, a 4331 Total DBMS that generates between eight and 16 files will cost $9,500 more than the minimum $15,000 system or an extra $250/mo on a five-year lease.

Technical Features

Besides adopting a pricing structure that favors the small user, Cincom also added technical features to gear its DB/DC system to 4331 users.

One such feature is fixed-block architecture (FBA) disk support for the multitasking control file and log file. Previously, the log file had to be on tape, count-key-data (CKD) disk or CKD-emulating device. The 4331 version of Total will support all IBM FBA devices including the 3310 and 3370, Kuli stated.

In addition, Cincom is giving 4331 Total and Environ/1 users the option of adding at extra cost other of the firm's system software products to the kernel DB/DC system for on-line programming and query capabilities.

Other Cincom products that can operate with 4331 Total and Environ/1 are the LMS-II on-line program development system, Env-Data on-line data entry system, T-Ask on-line query system and Socrates extraction and reporting system.

Prices will rise according to the number and nature of options. For example, a low-end eight-file, eight-terminal DB/DC system consisting of Total, Environ/1, T-Ask and LMS-II will cost the 4331 user $72,300 for a paid-up license or $1,830/mo on rental.

Under development is a version of LMS-II that will support IBM's Installation Productivity Option/Extended (IPO/E) which runs under DOS/VSE, Kuli added, though declining to say when this would become available.

Cincom is aiming its 4331 DB/DC system version at three user segments: IBM System/3 and System/34 users that will upgrade to the 4331 for better price/performance; IBM 370/115 and 125 users that will convert to the 4331 for the same reason; and large-scale IBM mainframe users that will consider the 4331 for implementing distributed processing networks.

Out of approximately 15,000 4331s on order, Kuli estimated that between 7,000 and 8,000 systems will actually be installed over the system's life cycle, representing "a very large market."

How successfully the 4331 DB/DC system version and its price structure lures 4331 users to the Cincom system software camp will determine whether the firm will implement the same product and price strategy for the 4341 or other future IBM 4300 series models, he added.

With software, "It's not necessarily true that the lowest price system will get the most market share," Kuli observed. "The higher ticket packages often are more readily accepted because users feel if they pay more, they're getting more. We want to see how price-sensitive the 4331 market segment is."

The 4331 versions of Total and Environ/1 are available two weeks after receipt of order from Cincom Systems, Inc. at 2300 Montana Ave., Cincinnati, Ohio 45211.

Bomb Concealed In 'IBM' Wrap

STATELINE, Nev. — The bomb that blew away part of Harvey's Resort-Hotel Casino here last Wednesday was carried into the building by two people posing as computer technicians. Said to contain 1,000 pounds of TNT, the bomb was reportedly wrapped in blankets with the letters "IBM" on them.

A letter demanding $3 million and containing information on how to handle the device was left with the "large, very large" box, according to Curtis Patrick, board member of the Tahoe-Douglas Fire District.

The bomb went off after attempts to disarm it failed.

Nasc AS/5000 Additions Challenge 4300 Series

(Continued from Page 1)

but still unannounced 4341 Group II, sometimes referred to as the 4351, the spokesman said.

Larger still than either the AS/5000N or the AS/5000E is the previously introduced, top-of-the-line AS/5000 itself, which provides 15% better performance than an IBM 3031 for a 25% lower price.

Field Upgrade

Both the Model N and the Model E were designed to be field-upgradable to the next largest member of the AS/5000 line. Here's how a potential AS/5000N upgrade path might look for a user of DOS/VS:

The upgrade would probably start with the user's conversion from an IBM 370/125, 135, 138, 145 or 145 to an AS/5000N. The user could then further boost its computing power by switching from DOS/VS to DOS/VSE and later replace the AS/5000N with an AS/5000E to increase its throughput by yet another 20% to 25%.

Finally, the user could upgrade its Model E to an AS/5000 and, by retaining the same DOS/VSE operating system, expand its computing performance an additional 30% to 35% to rival the power of an IBM 3032, the source said.

For an MVS user, meanwhile, the sequence of upgrade steps would be roughly the same, except that a standard IBM 370 Extended Facility would permit expansion from MVS to MVS/SE or MVS/SP.

In addition to supporting DOS/VS and MVS, the models N and E are said to accommodate widely used 370 operating systems like OS/VS1 and VM/370.

Technical Specifications

In their technical specifications, the two latest additions to Nasc AS/5000 line clearly have a lot in common. Both machines start at 2M bytes of main memory, expand to a maximum of 8M bytes and support six input/output channels, five of which can link to 1.86 M byte/sec disk units.

'The AS/5000 processor is also being enhanced with an option that will allow the product for the first time to support the 4300 series instruction set.'

They also boast a 92-nsec machine cycle, a 400-nsec memory cycle and 16K bytes of writable control storage.

The Model N, however, executes .9 million instructions per sec (Mips) and provides 4K bytes of cache memory, while the larger Model E executes 1.1 Mips and holds a 32K-byte cache..

A 2M-byte AS/5000N with an integrated console display, keyboard and floppy disk system costs $335,000, compared with $500,000 for a similarly configured AS/5000E. Shipments of both systems, which are available through leases as well as purchase, begin this October.

Most of the AS/5000 family enhancements and options won't be ready for delivery until at least the third quarter of 1981.

More information is available from Nasc at 3145 Porter Drive, Palo Alto, Calif. 94304.

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Tymshare Plans to Acquire Microband Corp. of America

By Phil Hirsch
CW Washington Bureau

CUPERTINO, Calif. — Tymshare, Inc., a major international computer services firm headquartered here, will acquire Microband Corp. of America, which operates microwave communication networks in about 75 U.S. cities. The acquisition contract, signed last month, is subject to approval by the Federal Communications Commission (FCC).

The acquisition is significant because it gives Tymshare an improved local distribution system. The company provides on-line service bureau and interactive information services, as well as packet-switched data transmission. Both directly or indirectly through Tymnet, Inc. subsidiary.

Currently, Microband's 75 local microwave networks are being used primarily to distribute commercial TV programs. In some cases, the programming is fed to a cable TV system for relay to the viewer, while in others, Microband interconnects directly with the viewer through over-the-air, rooftop or similar antennae. In either case, the channels can be used to transmit data.

Local Distribution

Tymshare has already indicated it plans to utilize microwave and cable TV networks for local distribution. The company's Tymnet subsidiary is participating with Satellite Business Systems (SBS) and others in a transcontinental data communications demonstration that will utilize such facilities.

The demonstration, to begin early this year, will carry data at speeds of up to 56K-bit/sec between New York City and San Francisco via an SBS satellite channel. The New York earth station will communicate with users via cable: In San Francisco, a combination of cable and microwave will be used. Tymshare will provide the switching node in each city plus the communications control and terminal interface software.

The newly acquired Microband facilities could be used in basically the same way to interconnect Tymshare/-Tymnet customers — via terrestrial or satellite long-haul circuits — with the company's network nodes. This scheme would permit much higher data transmission rates than can be provided by the phone company's analog local loops. It also would make Tymshare/Telenet, as well as their customers, less dependent on local telephone operating companies. The latter change could result in lower rates, faster service start-up, better maintenance and other benefits.

Possibly the most significant aspect of Tymshare's Microband acquisition is that it seems likely to accelerate a developing trend. In addition to SBS and Tymshare, Western Union Telegraph Co. and American Satellite Corp. have shown an interest in interconnecting with local cable TV and/or over-the-air TV networks.

American Satellite, for example, is using Manhattan Cable TV Co. in New York to service one of its customers, Metropolitan Life Insurance Co. Manhattan is among the participants in the forthcoming SBS satellite data communications test.

'Still another possible result of Tymshare's Microband acquisition may be an on-line electronic mail system for home as well as business users.'

Meanwhile, Xerox Corp. has decided to use microwave as the local distribution medium for its Xten electronic message system. It has developed a cable-based local area distribution system called Ethernet for interconnecting clusters of computers and terminals located near each other — for example, within office buildings or in campus-type office/industrial parks.

Mail System for Home Users?

Still another possible result of Tymshare's Microband acquisition may be an on-line electronic mail system for home as well as business users.

Tymnet is already in the electronic mail business. Its Tyme-Gram service, scheduled to begin this month, relies on the post office to deliver each message to the recipient. The mail carrier, however, could be replaced by a teletext system, thus enabling a cable or microwave transmission network to deliver text-type messages to a standard commercial TV screen. Teletext is also capable of feeding the message to an attached hard-copy printer.

Significantly, Microband has been experimenting for some time with a French system called Antiope, which can transmit low- and high-speed data, digitized voice and facsimile concurrently to home and business terminals via TV channels.

Tymshare and Microband officials were unavailable for comment regarding these possibilities. Tymshare Vice-President Warren Prince, in a statement announcing the acquisition, said it "adds a new dimension to Tymshare's growing participation in the communications field."

Clarification

The "mystery" arbitrator selected by the American Arbitration Association to arbitrate the Perl-Mack vs. NCR Corp. contractual dispute mentioned in The Taylor Report (CW, Aug. 25) is regional manager for Computer Devices, Inc., the terminal company, not Computer Services, Inc.

Kevin M. Mahan holds an MBA degree from University of Southern California, and a law degree from Loyola University Law School. He is a member of the California Bar.

Previous work experience includes marketing positions with the following: Rapidata, Inc., where he sold financial marketing systems to corporations; Interactive Data Corp., where he sold computer based financial information systems to banks, investment advisers and stock brokers; and IBM's Service Bureau Corp.

How to increase programmer productivity in a COBOL shop

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A few weeks ago, for example, I looked through the listings of some COBOL programs written by a senior programmer in a medium-sized System/370 installation. To my surprise, the programs were poorly written. They were written in an almost impossible to understand style; there was no structure to them; and there were many inefficient coding practices throughout.

My consultant friend tells me that this isn't unusual at all. In addition, he says all too many COBOL programmers are ineffective when it comes to testing and debugging. And they are dreadfully slow when they have to write unfamiliar routines.

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Third, we have two System/360-370 assembler language books (one for DOS, one for OS). These books are so effective that hundreds of programmers have learned BAL from them without any outside assistance. So if you have programmers that can't debug by using assembler language output, one of these books is a must.

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For instance, the COBOL language books show: how to develop programs that use sequential files on tape or direct-access devices; how to improve processing efficiency by using SET and SEARCH for table handling; how to write and call subprograms; how to improve coding efficiency by using the source-statement library; how to create and process indexed files; and how to write COBOL sort programs. These books cover DOS and OS considerations as well as 68 and 74 ANSI standards.

In contrast, the structured-programming text covers subjects like: how to design programs so they are easy to code, debug, and maintain; how to use documentation and code from an old program when developing a new one; and how to increase productivity with techniques like structured walk-throughs. The cookbook gives standards for a structured COBOL shop, so a programmer can easily find the answers to program-development questions. And it also gives complete documentation for four business programs...documentation that can save a programmer many hours of effort when developing a new program.

As for the assembler language books, they include subjects like: how to write a subprogram that can be linked to a COBOL program; how to write a routine for bit manipulation or code translation when COBOL is inefficient; how and when to use assembler language for processing ISAM or direct files. And always, these books give that extra level of understanding that can turn an average programmer into an outstanding one.

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Time, Inc. Believed First Commercial 1401 User

By Marcia Blumenthal
CW Staff

CHICAGO – Time, Inc.'s Subscription Service Division here is believed to be the first commercial user of the IBM 1401.

The system, installed here just 20 years ago, was brought in to handle subscription applications. Its first job was to convert some 50 million to 60 million punch cards to tape files.

"We were praying the 1401 would hold up well enough to convert on schedule," recalled Don H. Halenza, director of DP at Time, Inc.

To get the conversion done, the company ran the 1401 with seven operators three shifts a day, seven days a week for several months. And the system held up admirably, Halenza added.

Sixfold Growth

Soon the division had six 1401s installed and they were all relegated to printing functions. At the time, IBM had not really developed a good printer, he explained, and the 1401, originally conceived of as a tape editing and printing system, was a very good printer, he said.

Prior to installing the first 1401, the Subscription Services Division had about 300 card machines and about as many employees. After installing its computer system, personnel dwindled to a considerably smaller number. DP personnel numbered about 45 people during the early 1960s, Halenza recalled.

Coincidentally, when the system was delivered, Halenza was the IBM system engineer responsible for assisting the publishing firm to computerize its subscription services. After leaving his assignment at Time, Halenza worked four more years for IBM before returning to Time in 1967 – this time as a Time, Inc. employee.

As computers go the 1401 was IBM's first small computer. It was not originally conceived by IBM as a standalone, but was designed to attach to a larger machine, the 7070, Halenza noted. However, IBM never carried through its plans to have the 1401 attached to larger processors, he maintained.

Things have changed at Time's Subscription Services Division since that first delivery. While the last 1401 departed in 1974, the MIS department has grown to 150 programmers and 65 operators and has a library of more than 10,000 programs. The division has an MIS budget of $12 million, representing about 25% of the total division's budget, he said.

Over the years the division has had a variety of IBM hardware. Currently it uses a 3033 under MVS/SE and two 370/168s in a multiprocessor configuration running under MVS.

Biggest Advantage

Perhaps the most significant advantage of automation has been the company's ability to develop new business ventures, Halenza noted. Today the Subscription Services Divison is responsible for the Time/Life book series and operates a market research service for grocery products, Selling Areas Marketing, Inc. Both of these new ventures started in the mid-1960s using IBM 7070 equipment, but neither would have been feasible if the company had not automated, Halenza observed.

Comparing the MIS environment of today and yesterday, Halenza said in the early '60s training DP personnel wasn't much of a problem. Time, Inc. trained programmers in two weeks, he recalled.

But the cost of equipment compared to today was formidable. The 1401 rented for about $4,000 to $5,000 a month and at first had only 4,000 characters of main memory.

Time does not train as many people as before; consequently the employees do not have the vested interest in the company they used to have, he remarked.

And, while MIS is more interesting today, it certainly "isn't as much fun," he said. "In those days there was more involvement with the equipment. You could get your arms around it."

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Masser Awakens to New Era In 1401-to-4331 Conversion

By Marcia Blumenthal
CW Staff

BELTSVILLE, Md. – Like Rip Van Winkle, who woke up after a 40-year nap to find the world vastly changed, Masser Systems, Inc. here has awakened to a new technology with its conversion from an IBM 1401 to a 4331.

Skipping an entire computer generation, Masser Systems is now discovering the mysteries of an operating system and disk files, neither of which was available with the 1401, first delivered by IBM 20 years ago.

When the 1401 was installed in 1974, Masser's service bureau had five employees, Lee Masser, president, said. Primarily doing mailing list processing for large associations and publishing companies, Masser Systems today employs 15 people, three of whom are programmers. Masser bought the system used, but when it was new, it cost between $250,000 and $300,000, he said.

Before starting his own business, Masser worked as a DP manager for both a large association and a publisher. From time to time colleagues referred customers in need of automated systems to him. He launched his business in 1963 and opened full time in 1975, he said.

During 1978 Masser decided his 1401 with 16K bytes of main memory was too pokey. When a file had more than 100,000 records the 1401 became very slow, he said. Furthermore, customers' files kept getting larger and larger.

Lucky Delay

In evaluating hardware upgrades, Masser was considering an IBM 8100 or a used 360, but decided to delay his decision. That delay was long enough to see the introduction of the 4300 – a lucky move for Masser.

By ordering the 4331 Masser saved his company the headache of converting its programs, because the 4300 has a 1401 emulator which the 8100 lacks.

"IBM's emulator is like having another language. It's beautifully documented," Masser commented.

Operating under DOS/VSE, the 4331, installed earlier this year, is configured with four 3310 disk drives, four 3410 tape drives and a printer and card reader/puncher.

Except for the printer and reader/puncher which were purchased, Masser leases the hardware for $5,200 a month and the software for $1,000 a month. He opted to lease because he was attracted by IBM's 60% rental credit toward purchase terms.

Although he declined to reveal what his monthly DP costs were with the 1401 system, Masser said it was now "a little cheaper."

Assembler-Type Language

While the firm is now in the mainstream of hardware technology, its application programs are written in assembler-type language.

Programmers – Masser has three – can learn more about the operating system and how to use it if working in assembler, he offered. A move to Cobol is not imminent but Masser said he is considering it. The firm, however is still keypunching cards and is not online.

Despite these minor drawbacks Masser is still amazed at the speed of the system, and called the software extremely reliable. "We are pleasantly pleased with that," he said.

A sort that used to take 2 hours with the 1401 now takes 8 minutes, he reported. And an unanticipated side benefit is the system's ability to spool and print jobs at the same time, he noted.

Although the old system still runs like an iron horse, Masser is not nostalgic after converting – "nothing really worked better with the old system."

DDP Tutorial To Precede Meet

WASHINGTON, D.C. – "Distributed System Design" is one of four preconference tutorials that will be presented on Sept. 22, the day before the beginning of Compcon Fall '80 here. The lecturers for this tutorial will be Michael Mariani of TRW, Inc. and David Palmer of GRC.

The tutorial will provide a procedure, treating distributed data processing (DDP) design decisions in an orderly, visible manner, according to a spokesman for the IEEE Computer Society, sponsor of Compcon. The many options for exploiting parallelism, concurrence, redundancy, modularity, decentralized control and data base distribution give "a very rich design decision space," he said.

More information about Compcon Fall '80 is available from Compcon Fall '80, P.O. Box 639, Silver Spring, Md. 20901.

Twenty Years Later

Used Computer Dealer Still Runs 1401

From left to right: Surrounded by machines from a bygone day, Monosson prepares to use 1401 system to print names from his mailing list file. Two 1401 systems can be pulled apart for spare parts. Monosson shows a burned-out circuit board from 1401-G, one of the few problems he has experienced with it.

CW Photos by T. Scannell

By Tim Scannell
CW Staff

BOSTON — For the past 10 years, the American Computer Group, formerly American Used Computer Corp., has been using a nearly antique IBM 1401 computer system for its inventory and general ledger and to keep track of the more than 150,000 names on the firm's mailing list. The punched card-based 1401 processor has 4K bytes of memory and is complemented by a 1402 card reader and a 1403 printer.

IBM first delivered the 1401 series computer 20 years ago this week. Although a popular machine then, today there are only about 10 of the 1401 systems operating in the U.S., according to Alfred F. "Sonny" Monosson, founder and chairman of the board of the American Computer Group.

Unlike modern-day computers that could probably do the same job and take up a lot less space, Monosson's 1401 weighs about 3,000 pounds and requires its own environment with glass enclosures and air conditioning.

Comprised mostly of heavy gears and hundreds of compact circuit boards — all the rage in 1960s — the system has only broken down once in its decade of service at the leasing and used computer firm. A power supply had blown, and because of the machine's limited-edition nature, a part had to be shipped "from another geographic region," Monosson said.

In fact, the 1401 which is used from six to eight hours per day, has proved to be less of a maintenance problem than the Digital Equipment Corp. PDP-11/44 and Wang Laboratories, Inc. minicomputers also used by the 13-year-old firm, he claimed.

Wearing his traditional bow tie, but minus the familiar sandwich board, Monosson demonstrated the 1401 and its two peripherals here last week. Carefully placing a stack of multicolored punched cards in the 1402's hopper, he pressed one of the reader's few buttons. The cards were quickly sucked up into the machine at the rate of up to 800 per minute, a few lights flashed on the 1401 processor and the contents of the cards were printed noisily but neatly by the 1403 printer.

Monosson bought his present 1401 system — half showpiece and half workhorse — for a sealed bid of about $8,500. Brand new, the same computer would have sold for about $340,000. Right now, the 1401 has a market value of zero, Monosson stated, pointing out that the system is "used just for scrap."

American Computer Group's nostalgic computer is not Monosson's first mechanical affair with the 1401. In one of his early business ventures, a commercial finance company called Boston Financial Equity Corp., the MIT- and Harvard-trained businessman used a 1401-G which was a 1401 without "some of the fast electronics." He stuck with the 1401 in later years because he was able to transfer software from his old system to the present machine. In fact, most of the "program changes" involved changing the headers and company names on the punched cards, he commented.

The fact that the present 1401 is very old does not bother Monosson. What bothers him is that if the system should break down and be in need of repair there is virtually no one around who could fix it. Anyone who is well-versed in the ways of the 1401 "either has gray hair or no hair," Monosson said with a smile.

To compound matters, because of its age and scarcity, IBM doesn't support the 1401 under any kind of a maintenance deal.

To keep the gears turning in case of an eventual breakdown, he recently purchased two additional complete 1401 systems that could be cannibalized for needed parts.

Monosson, a computer sentimentalist at heart, even keeps a subtle but effective reminder of the frailty of his machine. On a shelf in his office, near to family photographs and trophies of past accomplishments, is a burned out circuit board from the machine that started it all, the 1401-G.

Time Running Out

House Judiciary Sets H.R. 6121 Hearings

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A subcommittee of the House of Representatives Judiciary Committee will hold a two-day hearing Sept. 9 and 10 on H.R. 6121, the much debated Telecommunications Act of 1980 passed by the House Commerce Committee July 31.

Congressman Peter W. Rodino Jr. (D-N.J.), chairman of the Judiciary Committee, is concerned that enactment of the bill as presently written will have an adverse impact on the Justice Department's pending antitrust suit against AT&T.

Also, he's not sure the bill's "seperate subsidiary" provisions will preserve competition. These provisions, basically, require AT&T to market terminal equipment and enhanced services through fully separated affiliates not subject to regulation. Commercial DP is one kind of enhanced offering; on-line data base retrieval services are another.

The subsidiaries would have to perform their own manufacturing, research and development, but these latter activities would be transferred from Western Electric and Bell Laboratories gradually, and at the end of the process some manufacturing and R&D could still be performed by the subsidiaries jointly with Western Electric and Bell Labs.

The computer industry has been in the forefront of the opposition to this scheme, contending it would enable AT&T to surreptitiously cross-subsidize the products and services offered by the subsidiaries with revenues derived from the company's telephone network operations, and thereby enable AT&T, unfairly, to expand its present hegemony in the telecommunications marketplace.

The House Judiciary Committee, which requested referral of H.R. 6121 shortly after the bill was passed by the Commerce Committee late in July, must complete its consideration of the measure by Oct. 1.

One possibility, said a spokesman, is that a revised version of H.R. 6121 will be reported to the House Floor. This measure would then be considered by the full membership along with the version passed by the Commerce Committee.

Another possibility is that Judiciary will simply recommend rejection of the Commerce Committee bill. Alternatively, the two committees may work out a consensus version.

In any event, since Congress will adjourn Oct. 3 until after the November elections, there isn't much time left in the present session to enact the Telecommunications Act of 1980. A postelection lame duck session of the House is planned, but a number of other bills must be considered during the period.

How to Get Fired With Style To Be Subject of Seminar

ROSSLYN, Va. — "Creative Resignation" is the topic of a seminar by free-lance consultant Jim Rebholz that will be held here on Sept. 18. Rebholz maintains that a plethora of how-to books exist on job-hunting and career advancement, while virtually nothing has been executed on the subject of leaving an organization with grace and style.

According to the seminar's sponsor, the Washington, D.C., chapter of the Association for Computing Machinery (ACM), Rebholz will address such areas as: strategic planning for an exit, three ways of getting fired that never fail, how to take your boss with you and getting paid, getting even and coping with client amnesia.

A former chairman of the ACM's Syracuse Chapter, Rebholz holds an M.S. in physics from Fordham University and an M.B.A. from Syracuse.

More information on the seminar is available from the ACM at P.O. Box 6228, Washington, D.C. 20015.

AT&T to Lower Rates for 75% of Wats Users

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – At least 75% of all present Wats users will pay lower rates under a new tariff to be unveiled Sept. 15, AT&T said last week.

But the other users – those with large traffic volumes – will pay significantly higher rates. Page Montgomery, vice-president of Economics and Technology, Inc. (ETI) a Boston-based consulting firm, estimates the increase will range from 20% to 40% for those customers whose usage amounts to 140 hour/mo. or more. The *New York Times*, citing an internal AT&T memo, said late last month that the upcoming tariff would raise rates "as much as 70%" for such users.

Under the present Wats tariff, customers subscribing to "full business day" (FBD) service pay a bulk rate for the first 240 hours of usage per month, while those buying "measured time" (MT) service receive 10 hours of usage per month on a bulk-rate basis.

In each case, an additional per-hour charge is imposed for usage above these levels, but the additional usage charge is lower, on a per-minute basis, than the related bulk rate, explained Robert L. Raines, director of network services for AT&T's Long Lines Divison and one of the architects of the new tariff.

Raines added that the FBD and MT categories will be replaced with six new categories called "taper points." The first will involve a flat rate for the first 15 hours of usage/-month, and the second will allow a maximum of 40 hours of usage/month on a flat-rate basis. The remaining taper points have not yet been disclosed. As with the present tariff, there will be an additional charge if usage exceeds these levels, but it will continue to be less per minute than the related bulk rate, Raines said.

Competing Services

One way of minimizing the upcoming increases in Wats rates is to use the competing services of the specialized carriers. MCI Telecommunications Corp., for example, offers a network service that can cost significantly less than Wats if the customer needs 200 to 300 hours of usage per month.

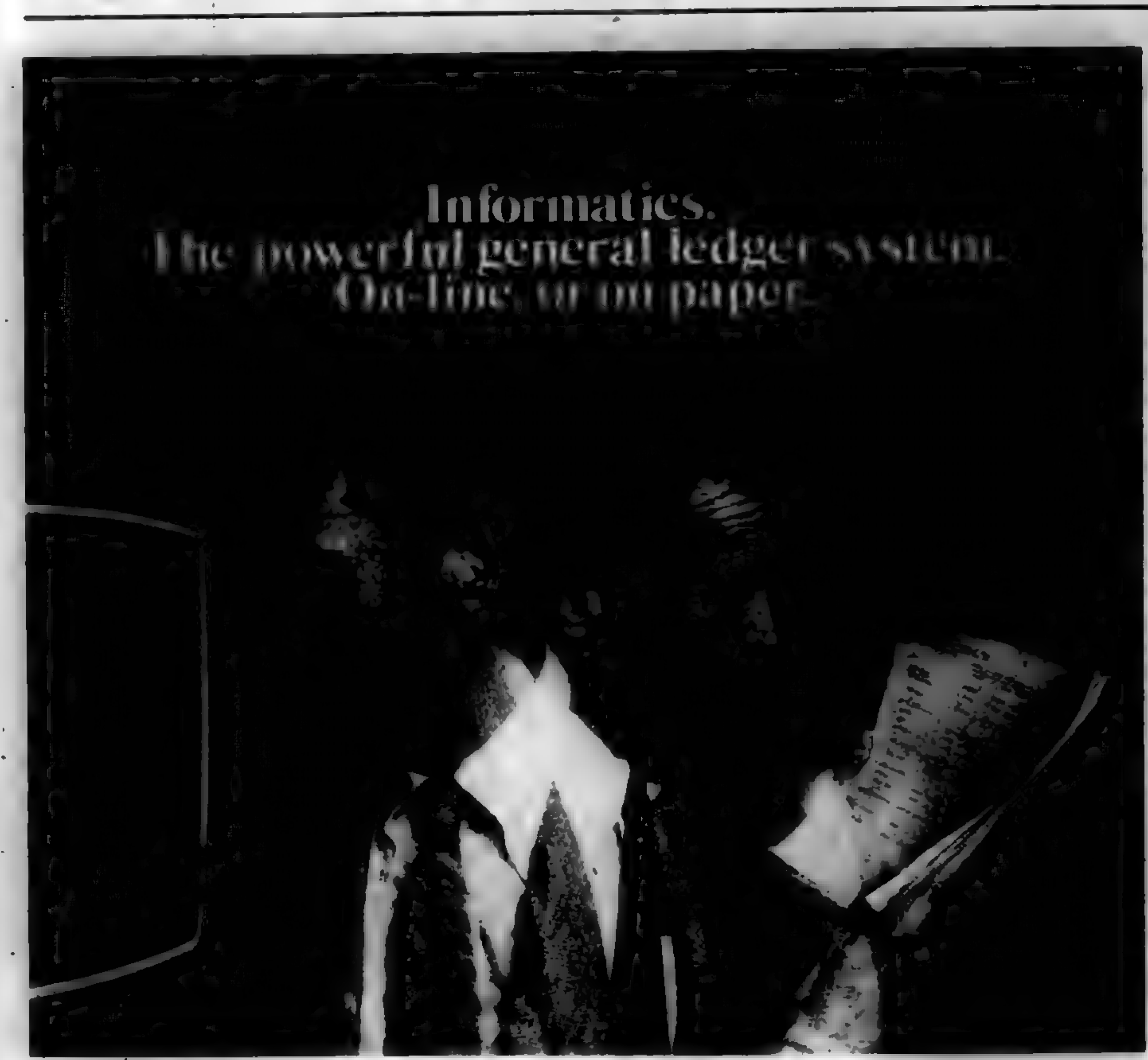
The new AT&T tariff almost certainly will make the MCI offering attractive to users with lower traffic volumes. However, much will depend on the cities to which the customers must communicate. AT&T's network is far more extensive than MCI's, and in many cases the phone company's circuits are the only ones available.

Bill McGowan, MCI's chief executive officer, believes that the way to get around this problem is by using "smart" PBXs that interface with a number of carriers and automatically provide least-cost routing whenever a call is made. This arrangement, he explained, allows the user to fully exploit the offerings of the specialized carriers without losing the benefits of AT&T's more extensive network coverage.

Page Montgomery of ETI expects both AT&T and the specialized carriers to come up with new offerings aimed at capturing data traffic now being transmitted over Wats lines. Today it costs little or nothing, in many cases, to use Wats for data and/or facsimile transmission.

The Wats line is needed primarily for voice communication but not enough voice traffic is generated to fully exploit the bulk rate – particularly in the case of FBD Wats customers. The upcoming tariff, however, probably will make such incremental applications expensive, Montgomery said.

Another way of cushioning the upcoming increase, at least theoretically, is to share Wats facilities with others.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Calls Restructuring Proposals 'Bizarre'

FAA Executive Lauds Agency's Safety Record

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Federal Aviation Administration (FAA) executive Langhorne Bond last week fought through a barrage of Congressional criticism to defend the safety record of his agency.

Despite charges the FAA has badly handled airport safety problems, air traffic control computer outages and aircraft certification disputes — such as last year's temporary grounding of the McDonnell-Douglas DC-10 — the agency's safety record is "excellent," Bond told a House of Representatives subcommittee last Wednesday.

"I don't feel very defensive about the [safety] record that has been achieved" by the FAA, Bond told skeptical members of the House Aviation Subcommittee. The panel is considering several bills to restructure the agency to better promote aviation safety, their sponsors say.

'Bizarre' Provisions

The FAA administrator termed "alarming" and "bizarre" some of the provisions of the three bills that propose, among other things, to make the FAA an independent agency or to split off FAA safety responsibilities into a separate agency [CW, Aug. 18].

Bond addressed the subcommittee following the opening statement of one of the bills' sponsors, Rep. Elliott Levitas (D-Ga.), who asked "How many more charred bodies are there going to be in fuselages" before the FAA takes more positive action to promote aviation safety?

Although noting "our aviation industry is the safest aviation industry in the world," Levitas said "the FAA is not doing the best job possible."

He accused the agency of "stalling and delays" and of giving "bureaucratic answers" to important air safety problems.

"I've lost my patience, quite frankly, with the FAA," Levitas said in explaining why he has sponsored legislation he claims will make the agency more responsive to Congress.

Other members of the subcommittee, while equally critical of the FAA's safety record, showed little agreement on the best way to improve agency performance. Rep. Norman Mineta (D-Calif.), for example, expressed doubt that "the problems that exist [could] be solved by the balkanization of the FAA."

Facing the critical and, at times, hostile members of the subcommittee, Bond, in a strongly worded response, said the proposals to make the FAA independent of the Department of Transportation (DOT) or to divide the FAA into separate agencies "fly in the face of logic" and "threaten" aviation safety.

Being part of DOT gives the FAA "a champion at the cabinet level," Bond said, referring to his superior, Transportation Secretary Neil Goldschmidt. The secretary, Bond added, never interferes with FAA actions to promote aviation safety.

Bond also contended it would be impossible to identify separate FAA offices that could be assigned to a new aviation safety agency, as proposed in legislation recently introduced by Rep. Robert Matsui (D-Calif).

Matsui's bill "does not recognize that each element within the FAA is not a discrete element which can responsively deal with aviation safety needs in an independent manner. The activities performed within the FAA by virtually any organizational segment need careful and continuous coordination with other elements of the agency," Bond said.

Addressing recent General Accounting Office and blue ribbon studies of the agency, Bond said the reports correctly identified problems at the FAA but added the solution to those problems is for the agency to do a better job

(Continued on Page 15)

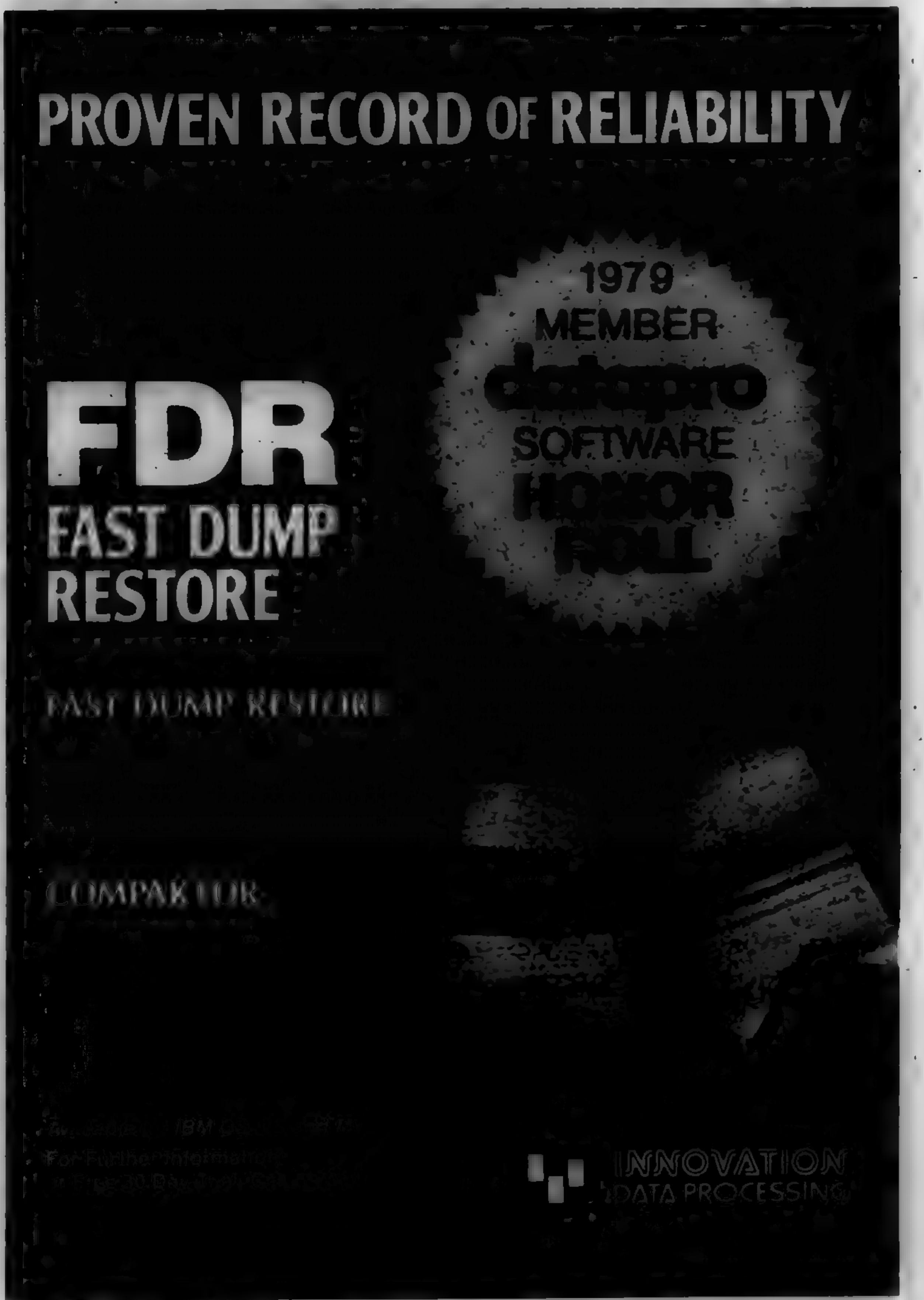
Amdahl Denies Joining Father

SAN JOSE, Calif. — Dr. Gene M. Amdahl may be starting a new computer company, but his son won't be joining him.

At least that's the word from Magnuson Computer Systems, Inc., here, which last week issued a statement labeling "unfounded" the rumors that Carl Amdahl is leaving Magnuson to "join another computer manufacturer." The younger Amdahl is executive vice-president of advanced technology and development for Magnuson.

"Mr. Joseph Hitt, president of Magnuson, stated that Mr. Amdahl has renewed his employment agreement with the company, which includes an understanding that a part of Mr. Amdahl's time may be spent to complete academic studies and to consult with other firms on a noncompetitive basis," the press release stated.

Magnuson manufactures computers that are plug-compatible with IBM systems. The senior Amdahl has announced his intention to start a firm that would produce CPUs to compete with IBM's planned H series [CW, Aug. 25].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Decision Support System Profits Contractor

DALLAS — Repricing proposals to meet new specifications and deadlines set by the U.S. government as it shops for defense system components can mean a lost contract if a deadline is missed.

Vought Corp., the aerospace subsidiary of LTV Corp., is using an Interactive Financial Planning System (IFPS) here to decrease repricing time to "a few hours" with some profitable results, according to Robert Harper, Vought's manager of information services.

In 1974, for example, Vought was in the running for what he described as a "very large army contract." The firm spent more than $200,000 in approximately six weeks on a time-sharing system and never succeeded in getting consolidated prices, he said.

Although a "crash team" of programmers eventually was put on the job, Vought lost that particular contract, according to Harper.

Harper contrasted this experience with the fact that the firm recently received a contract for the "multibillion-dollar" U.S. Army Multiple Launch Rocket system.

"I wouldn't go so far as to say that our modeling capability was the winning ingredient, but it certainly helped. When you're bidding a contract of that size, you have a great many variables to work with," Harper said.

"Multiple profit factors, overhead and labor rates can be used in coming up with an optimum price.

"What typically happens in the life cycle of a pricing activity is that you put together the best package you can [and] take it to top management. They in turn evaluate the package against their latest inputs and this normally dictates the need for a complete repricing. It is not uncommon for this cycle to be repeated many times," he explained.

'Five years ago, we couldn't have gone back and repriced and met our deadline. Today we can rework the entire pricing proposal in a matter of a few hours.'

Time-Saver

"Five years ago, we couldn't have gone back and repriced and met our deadline. Today, we can rework the entire pricing proposal in a matter of a few hours," Harper claimed.

"Five years ago, it took a mass of people to do the pricing activities for large contracts, and the range of options which could be considered was extremely limited. Today, two people can reprice a contract in a few hours, handling enormous amounts of data and several options," Harper said.

IFPS is a set of financial analysis and modeling routines from Execucom Systems Corp. in Austin, Texas. It is used by managers lacking programming backgrounds to develop financial reports, budgets, risk analyses and other decision-support aids.

"Vought was fertile ground for a decision-support system like IFPS," Harper said. "As the nation's defense has shifted from aircraft to missiles, we have gone from being a company with one or two principal products, to a company performing on many contracts for aircraft missiles and subsystems. Anyone who has done work under government contract will appreciate the explosion in paperwork that has resulted," he observed.

Programming Bottleneck

In the early '70s, the demands placed on DP to support the information requirements of Vought's line divisions began to multiply to the point where the management information staff was facing a processing backlog of as much as six months, Harper recalled.

"What we had was a programming bottleneck. We could not program new applications in Fortran and Cobol fast enough to respond to line organizations' needs in a timely fashion. Those programming languages don't have the flexibility or the user orientation needed to support our information requirements in a rapidly moving decision-making environment.

"And, since we didn't have an unlimited supply of application programmers, we couldn't use raw programmer power to compensate for the limitations of our programming tools," he explained.

"In 1975, after experimenting for a couple of years with IBM's Generalized Information System, I proposed that we bring in other computer-based systems, then open up our shop to the users — teach them how to use the systems and let them write own applications," Harper said.

"We already had this type of 'open shop' for the engineering staffs, and planned the same environment for the business community. We launched this program by bringing in IFPS and Ramis II, a report writer data base management system from Mathematica Products Group in Princeton, N.J.," he said.

Both systems were installed on an IBM 370/168 under that vendor's Time-Sharing Option (TSO). "We set up fairly extensive training programs in TSO, Ramis and IFPS," Harper said. That training has reportedly enabled personnel within various user departments to directly utilize the systems to satisfy their own information requirements.

Other Benefits

Other activities at Vought have benefited from IFPS too, Harper said. An application characteristic of these improvements has been employee benefits.

"One of our consultants worked with the Human Resources staff to develop a model of wages and benefits to determine the impact of each proposal when an employee package is under consideration," he said. "We could provide complete evaluations of each proposal in a matter of minutes the first time we used the model."

Preparation of profit and loss statements and budget reports has also been speeded up with IFPS models, Harper observed. "Consolidations which took as much as a month with manual efforts can now be accomplished in a few hours," he claimed.

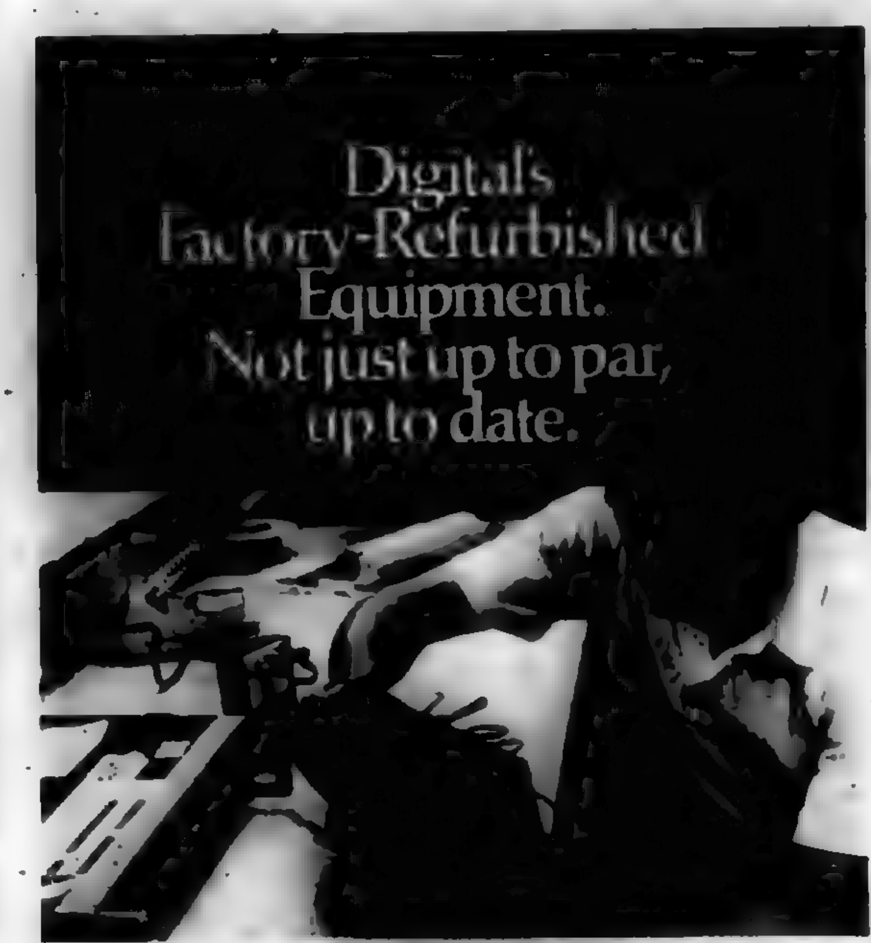
"The fact that users have the tools in their own hands leads to what may seem an unconventional way of developing applications," he said. "Instead of doing a classical systems analysis and then designing the application on the basis of that, we give the user the opportunity to play around with his data to explore different ways of modeling it.

"This . . . makes the definition of a problem and the implementation of the system simpler . . . The user knows what he is going to get and knows that it is useful," Harper said.

Harper predicted considerable growth in the use of decision support systems in top-level corporate analysis and planning in the next decade.

"The systems I am referring to are not standard business applications such as payroll or accounting. They are more like decision or mind support tools," he said.

These systems will help executives determine what actions to take when resources are limited and opportunities are available. "They model the world of the company and the world the company exists in, and those are the worlds with which executives have to be concerned," Harper said.



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FAA's Safety Record Lauded

(Continued from Page 13)

and not to have it restructured.

Quickly moving to the offensive, Bond argued Congress could do much more for aviation safety by removing some of the bureaucratic "constraints" the agency faces in its daily operations.

Noting the FAA has been criticized for the length of time it takes to acquire new equipment, such as radar and computer systems, Bond said federal procurement regulations are "an awful tangled mess" and protract equipment acquisitions for as much as five years.

FAA's record in handling "complex technological equipment procurements" is in line with that of other federal organizations, such as the Department of Defense, he said.

Civil Service constraints, he continued, make it almost impossible to fire incompetent employees or reward especially capable ones. The FAA is just like any other government agency in facing these problems, he said. "The federal manager has not got the ability to move swiftly towards excellence," Bond added.

Under the present organization the FAA's safety record has gotten "steadily better," Bond said. More can be done, he conceded, but added "we will overcome our problems if given enough time."

On the subject of time, subcommittee Chairman Rep. Glenn Anderson (D-Calif.) noted there is almost no chance any of the bills being considered will make any headway during this Congress because of the heavy legislative calendar for the rest of 1980.

Report on Nuclear Systems Out

FORT WASHINGTON, Pa. — A capabilities report addressed to the operators of nuclear plants — under pressure since the Three Mile Island incident to increase the effectiveness of their computer systems — has been published by Macro Corp., a computer systems consulting firm here that specializes in power utilities.

The 95-page report, "Computer Systems Engineering for Nuclear Plants," outlines Macro's recommendations and plans for upgrading nuclear plant computer systems.

Section 1 covers the general motivations and objectives for improving nuclear plant computer operations, problem areas, types of planning activity involved and technical and management needs to be satisfied.

Section 2 outlines the Macro method for achieving a cooperative and effective work force.

Included are descriptions of techniques for work organization, role assignment, experience transfer, communication, evaluation and documentation.

Section 3 discusses in detail the four phases of a work plan: requirements and planning study; specification preparation; procurement; and project management.

The report is free from Brad Schultz, president of Macro Corp., 1260 Virginia Drive, Fort Washington, Pa. 19034.

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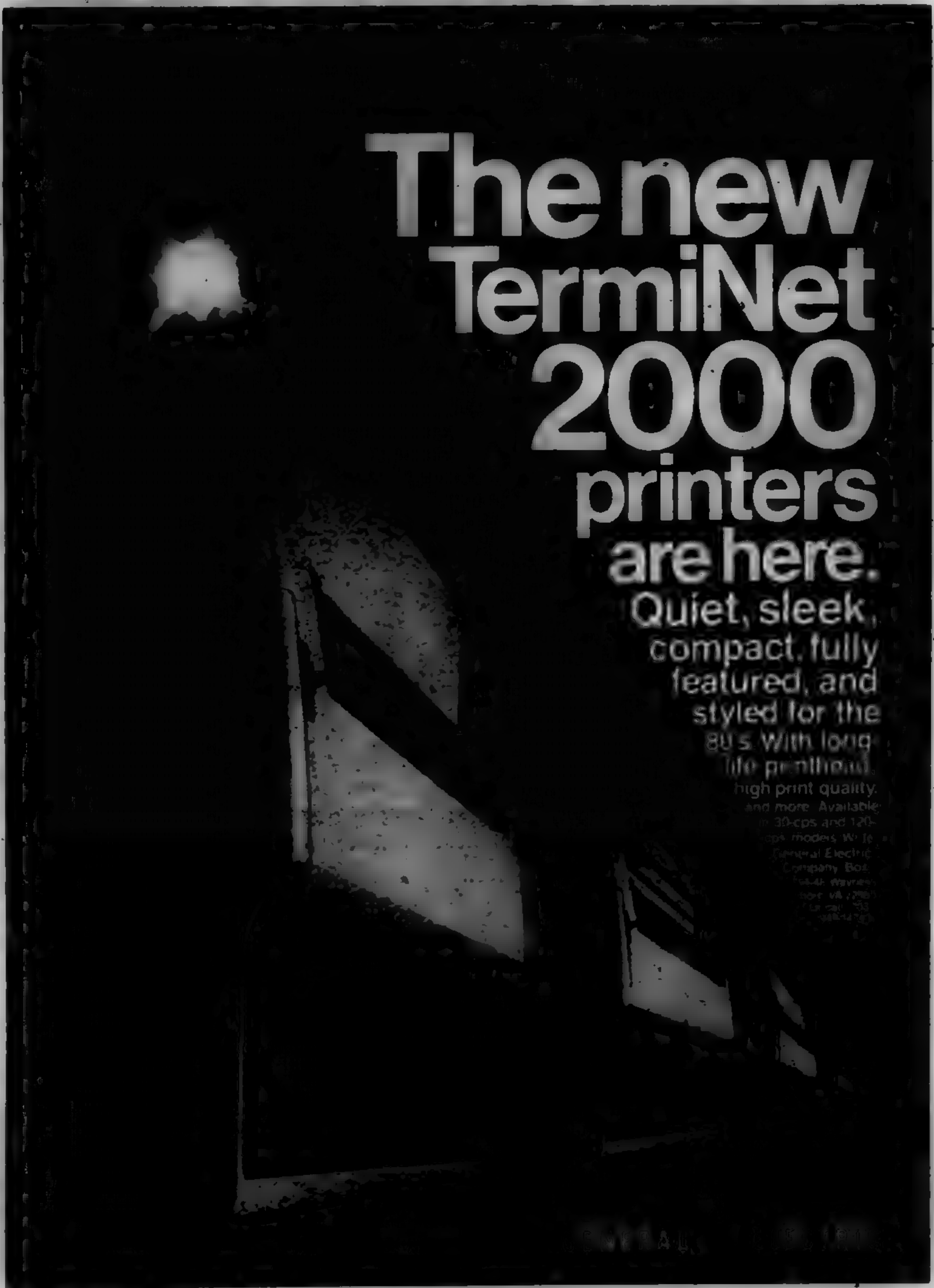
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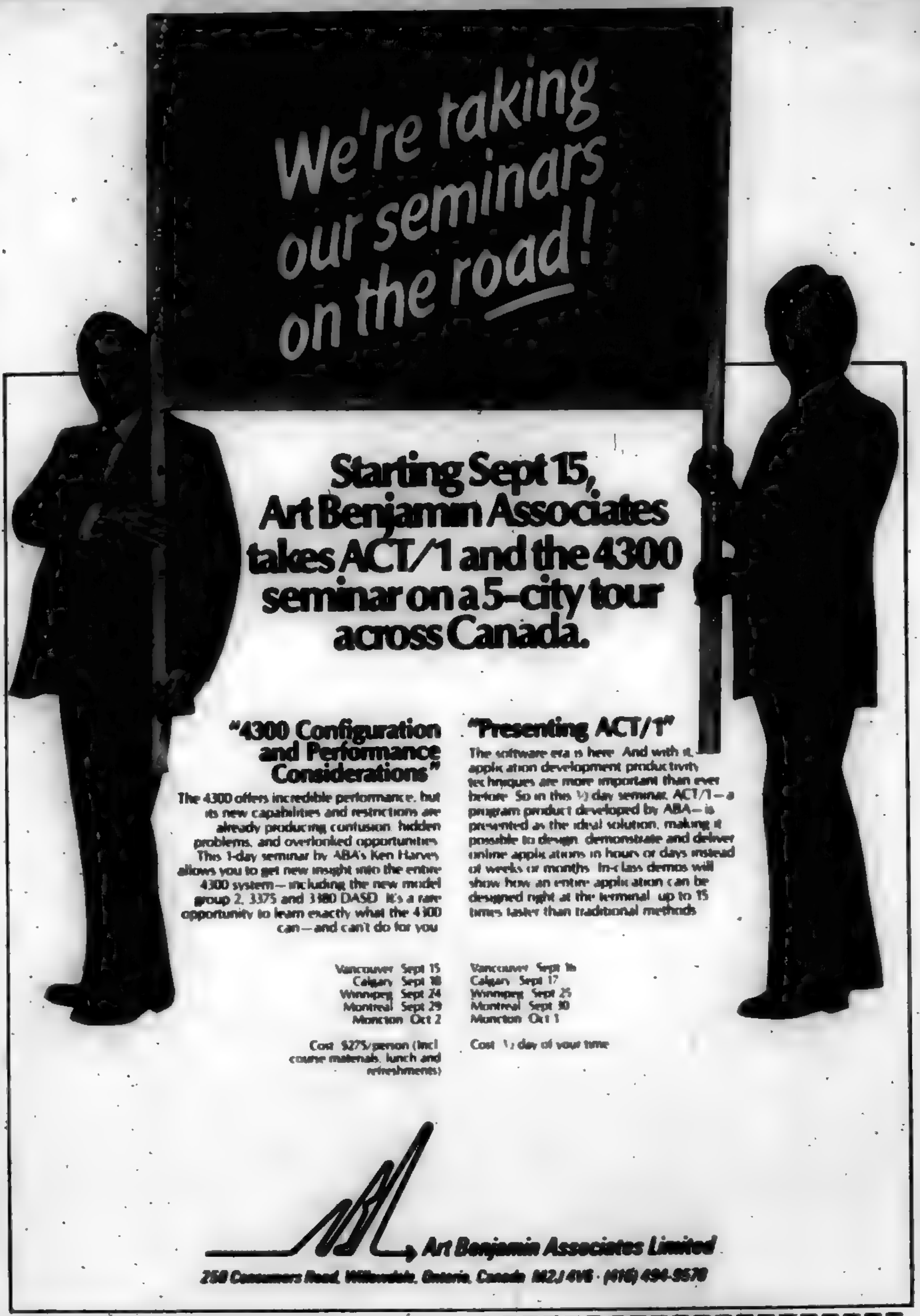
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DPMA Sets Chicago Meet Sept. 15-17

SILVER SPRING, Md. — Electronic mail, teleconferencing and information resource management will be some of the topics covered next month in Chicago at the Data Processing Management Association's (DPMA) National Symposium of Office Automation.

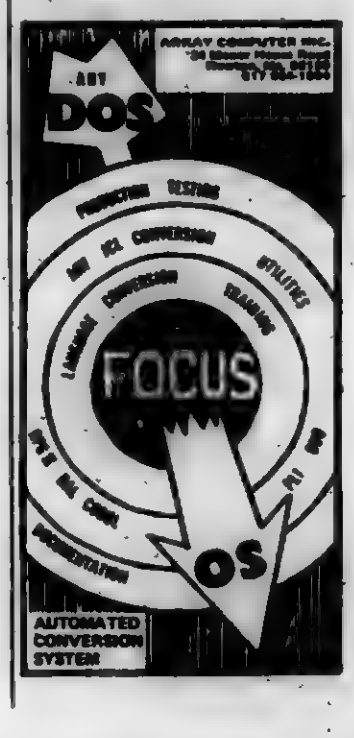
Scheduled to take place Sept. 15-17, the conference will consist of four all-day workshops and a variety of sessions on the following two days that will focus on office automation technology, applications and future trends. The keynote speaker at the event will be Harvey L. Poppel, senior vice-president at Booz, Allen & Hamilton, who will discuss office automation and the organization of the future, a spokesman noted.

Other speakers include S.J. Kalow, manager of systems at IBM; Dr. Dixon R. Doll, president of DMW Telecommunications Corp.; and John J. Connell, executive director at the Office Technology Research Group.

The conference will also include an office-of-the-future user panel.

The three-day symposium costs $445 for DPMA members and $495 for nonmembers. However, participants can attend just the workshop on the first day for $160 for DPMA members and $180 for nonmembers, or the remaining two-days of conference for $335 for DPMA members and $375 for nonmembers.

Additional material and registration forms can be obtained from the U.S. Professional Development Institute (which prepared and will administer the sessions), DPMA-OA Symposium, 12611 Davan Drive, Silver Spring, Md. 20904.



To Run One Billion Instruction/Sec

Nasa Studying Bids for Supercomputer Design

By Brad Schultz
CW Staff

MOUNTAIN VIEW, Calif. – The National Aeronautics and Space Administration (Nasa) wants a 64-bit "supercomputer" built here to execute one billion instructions per second for simulating mathematical models of aircraft designs.

That processing rate is hundreds to thousands of times faster than what the most powerful commercial CPUs are said to offer, but the facility planned for Nasa's Ames Research Center will probably not be operational until 1986, according to Marshall Johnson, leader of the development project. To get a design strategy for the computing colossus, the northern California research center issued a request for proposals to computer vendors last April.

Only Burroughs Corp. and Control Data Corp. submitted bids by the July 29 filing deadlines. Johnson hopes to announce the winning design approach by Oct. 1.

The request for proposals specified a supercomputer featuring 40 million addressable words of memory within its CPU, another 200 million words of "intermediate" memory, two billion words of on-line mass storage retrievable in less than two seconds and 100 billion words of off-line mass storage retrievable in about 10 minutes.

The intermediate storage would be contained in the CPU chassis as a means of averting a classic problem of supercomputers: the "I/O bound" condition, where data is not transferred into the CPU fast enough to keep it busy. In other words, the CPU must wait for data to come from mass storage – to a significant extent, defeating the purpose of having such a fast and expensive processor.

Other Uses

Dubbed the Numerical Aerodynamic Simulator, the Ames supercomputer would be available to government agencies besides Nasa as well as to universities and private industry, Johnson said.

Although mathematical simulation of aircraft designs would be the primary application, the Simulator might support other tasks that demand prodigious number-crunching, such as weather prediction, economic forecasting and geologic studies supporting petroleum exploration.

Aircraft designers want a supercomputer because the mathematical equations describing the dynamics of air flow must be solved with extreme precision for them to be of any use, Johnson noted.

A digital computer can only approximate the curves of an object such as a jet airliner. It interprets each curve as a mathematical function equal to the sum of a series of quantities. Although the series is typically infinite or at least very long, the computer can arbitrarily choose to derive just enough of its terms to total a useful approximation of the function.

'Reasonable' Time

This expedient might entail a great many interations of a calculating software routine, so Ames wants a CPU capable of executing a billion programmed instructions per second. With that level of performance, the Simulator could – in a "reasonable" amount of time – yield approximations of aerodynamic mathematical functions precise enough to verify whether aircraft designs modeled on the system are worth the expense of being physically modeled and run through the research center's wind tunnel, Johnson explained.

Ames has specified enormous memory capacities for NAS to allow modularization of the simulation process. A proposed aircraft could be mathematically broken up into millions of "grids" and each grid could be extensively analyzed from the standpoint of aerodynamics. Conclusions about the entire aircraft could then be based on the aggregate of these analyses.

But more processing speed is required as memory is extended for the Simulator to produce simulations fast enough to be cost-effective, Johnson pointed out; a typical run should not exceed a few hours in duration.

Steering Group

Reflecting Nasa's interest in eventually making the supercomputer available to a wide range of scientifically oriented users in the public and private sectors, the development project is overseen by a "user steering group" of 20 technical experts from universities, government agencies and corporations, Johnson continued.

Those concerned with the project are leaning toward implementation of Fortran 77 when the Simulator's hardware is assembled. But implementing systems software on the supercomputer could prove tricky, he said, naming systems software and the CPU as the two "highest risk" aspects of the project.

According to terms of the request for proposals, the contracted vendor will have 40 weeks to perfect its design and cost estimates for the construction of the Simulator. Actual construction will probably begin early in 1982, Johnson said.

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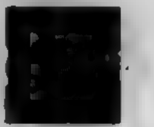

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State Agency Standardizes Computer Acquisitions For Local School Systems

RALEIGH, N.C. – Local school systems here interested in acquiring independent computer systems can save at least $21,000 and avoid wasted time through a plan recently implemented by the State Department of Public Education.

Under terms of the plan, called the Instructional Computing Project, the state acts as project administrator and selects a standardized but expandable line of computer hardware from a vendor and develops standardized software to operate on the selected equipment. Vendors are chosen by a bid process and the software is structured to North Carolina's education specifications, a spokesman said.

The local education agencies (LEA) or schools systems then purchase the computer hardware from the vendor at an average 22% discount (compared with the normal 10% offered to schools by most vendors) and receive the state-designed software at no extra cost.

The state, through its Management Information Systems Division, provides the necessary support and checks to ensure the hardware vendors conform to contract provisions stipulated in the original bid award, the spokesman noted.

A pilot system in the project has been operating since January in the state's Orange County school district. Other installations were scheduled to start up in July and subsequent sites will be operational by the beginning of next year. In all, the computer project is geared to benefit approximately 100 LEAs in North Carolina with enrollments from 3,000 to 20,000 students, the spokesman claimed.

System Software

The initial software required for the project was purchased from Burroughs Corp. and costs about $15,915 per installation. The programs were designed to address the needs of LEAs in financial and student administration, the spokesman continued. The financial package includes budget preparation, payroll, budgetary applications and required reports. The student administration programs consist of student records, scheduling, attendance and grade reporting.

As soon as a staff is approved, the state will assume maintenance of all the software used by each of the LEAs, saving each school system about $2,000 per year.

There are other advantages besides cost for using equipment and software acquired under a standardized umbrella, the spokesman noted. For instance, each LEA would be performing the same DP tasks in the same manner and have the capability of creating a uniform supply of machine-readable data to fit state and federal reporting requirements. The participating LEAs would also share the same growth and upgrade capability.

Finally, when several LEAs have installed equipment a user group could be formed to share solutions to common problems and provide feedback to the state on existing problems and new applications. This is currently not possible with the diversity in hardware and software that exists in many of the state's school districts, the spokesman maintained.

Apdu Slates October Meet In Virginia

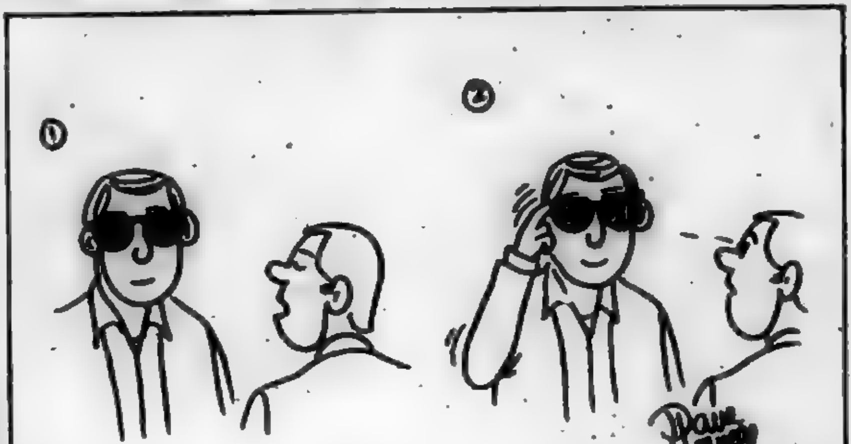
ARLINGTON, Va. – The Association of Public Data Users (Apdu) will hold its 1980 annual conference here Oct. 6-7.

Apdu is a consortium of business organizations, universities, research groups, federal agencies, libraries and others with a major interest in public machine-readable statistical products.

The theme for this year's conference is "1980: Year of the Census."

Presentations, discussions and workshops are on the agenda, to be highlighted by Vincent Barabba, director of the Bureau of the Census. Issues to be addressed include dissemination policy for public data, general data overviews from various federal agencies, and information regarding specific data such as the Current Population Survey and the Survey of Income and Program Participation.

More information may be obtained from Barbara Aldrich, Apdu Annual Conference Program Chair, Data User Division, Bureau of the Census, Washington, D.C. 20233.



"Say, Mister, Do You Happen to Know What Time It Is? . . ."

Computers vs. White-Collar Criminals

OCR to Track Typewriters Used in Crime

By Bruce Hoard
CW Staff

GAINSVILLE, Fla. — Researchers here are making the first-ever attempt to employ computer-based optical character recognition (OCR) as a tool to identify typewriters used in white-collar crime.

With more than 2,000 type fonts, or faces, and the great proliferation of electric typewriters from which to choose, typewriter identification has become much more difficult than it used to be when the manual machine was king, according to John McCarthy, of the Florida Law Enforcement's Regional Crime Laboratory.

McCarthy is working with Dr. Julius Tou, director of the University of Florida's Center for Information Research, in applying OCR crime detection.

"I've been thinking of this for a number of years," McCarthy, who has been identifying typewriters in crime for 30 years, said. "I had no idea until I met Dr. Tau that anybody would be interested in trying to make it work."

The project was made possible when the university's board of regents freed up $10,000 in funding through the state's Application of Research (Star) program, which encourages colleges and universities to participate in state projects.

Embezzlement, blackmail and fraud are three of the most common crimes in which typewriters are used, according to McCarthy. More specifically, a typewriter may be used to compose a threatening letter or falsely date a document, he said.

Hardware Configuration

Presently, the university is employing a hardware configuration consisting of an Optronics International, Inc. P1000 scanner, a Digital Equipment Corp. PDP-11/40 minicomputer with 96K bytes of memory, a DeAnza Systems, Inc. color display system and a memory bank stocked with a few fonts, said Bob Dupree, an associate of Tau at the research center.

"We are after two things," he said. "One is to determine what type font has been used and trace it to a specific manufacturer. The other is to identify a specific machine and tie it to a document.

Electronic identification is not always needed, McCarthy pointed out, saying in the case of a broken serif, or ornamental swirl on a typewriter key, a machine is easily distinguished. Usually, however, typewriters leave a more subtle signature.

For instance, a defect may cause a key or keys to print to the left or right of the desired space. Or a letter may be printed off its feet, with more pressure placed on one part of the letter than another, resulting in that area printing darker.

"Now we make an objective judgment, but it's only a judgment," McCarthy said of noncomputerized identification efforts.

The research center's high density scanner is capable of reducing questionable letters and documents to a resolution of 160 microns, affording investigators a geometric look at them and increasing the likelihood of positive identification, according to Dupree.

Hopefully, the computer-based capability will be honed to the point where analysts will be able to determine the differences resulting from different people using the same typewriter.

Even removing and replacing the same type ball on certain electric machines leaves a detectable trail, Tau claims.

Limited tests to date have been encouraging. The computer has been able to identify and detect differences in samples.

While instrumental in launching the program, the original $10,000 grant is far from the necessary $250,000 McCarthy feels is necessary to carry the program to full fruition. Another $22,000 for the project is about to be approved and he is optimistic the interest evinced by the Federal Bureau of Investigation will lead to further federal funding.

If the money is available, McCarthy is confident that a computerized typewriter analyzer can contribute significantly to the reduction of white-collar crime. The question is when.

Decus Group Features APL

MARLBORO, Mass. — The Digital Equipment Corp. Users Society (Decus) has approved a special interest area for users of APL.

This working group will emphasize the practical use of the APL language in general and on DEC computers in particular; it also hopes to influence the development of DEC hardware and software, according to a spokesman.

Members need not have a DEC processor nor must they be using APL. Membership is free.

Inquiries about Decus membership and requests for an application should be addressed to Decus Membership Services, One Iron Way MR2-3/E55, Marlboro, Ma. 01752.

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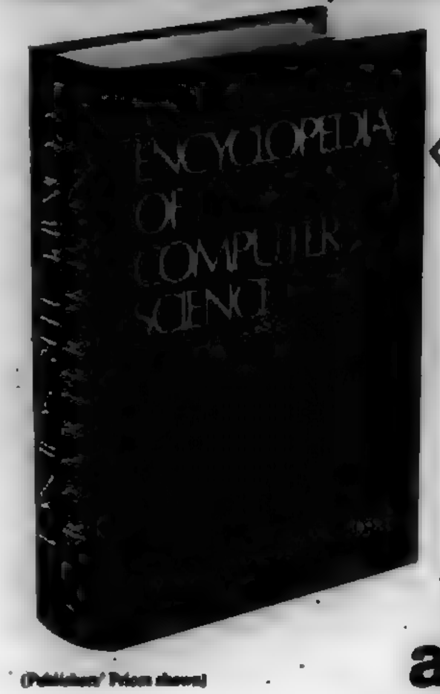

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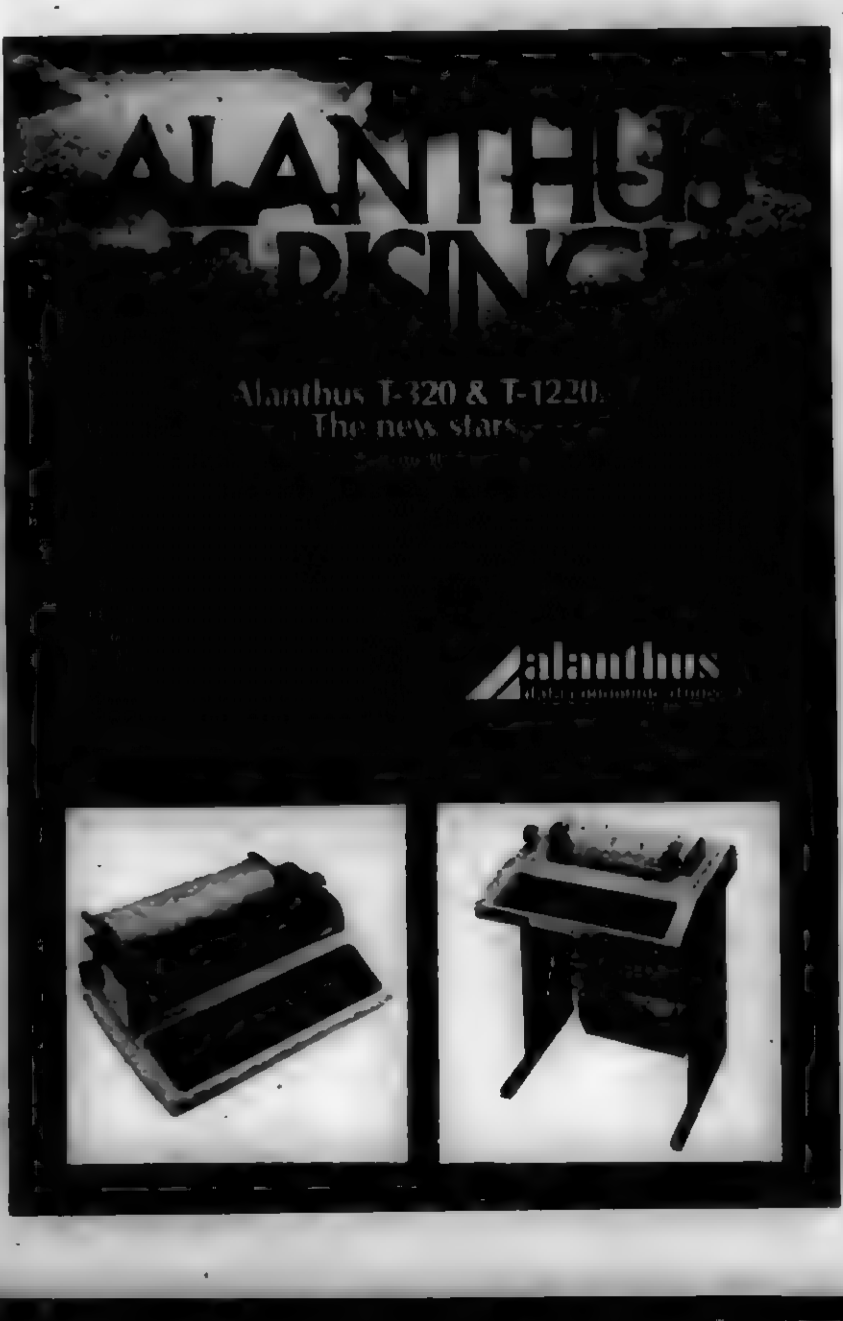

Federal Computer Meet Sets Management Workshops

WASHINGTON, D.C. — Six full-day professional enhancement seminars, focusing on information management disciplines, will kick off the upcoming 1980 Federal Computer Conference at the Sheraton Washington Hotel on Sept. 22-24.

Designed specifically to meet the needs of federal government DP managers who are faced with the problem of increasing efficiency while decreasing costs, the conference will include a seminar on data base management by Dr. Robert Holland, president, Database Design, Inc., and an appraisal of distributed data processing (DDP) given by Victor Janulaitis, consultant, Index Systems.

Other topics will include a seminar on data communications by Morris Edwards, data communications consultant, and a structured methodology approach to federal DP procurement by Dr. Robert DeMichiell, director of special programs, University of New Haven.

George Poonen, manager, Digital Equipment Corp., will speak on high-order languages, focusing on C, Pascal and Ada. Peter Browne, president, Computer Resource Controls, will present a seminar of Privacy and Security.

Theme Sessions

In addition to the professional enhancement seminars, the conference program will feature special "theme sessions" focusing on specific issues in the federal DP community. More than 80 speakers from the private and public sectors will participate.

Supplementing the program will be a full-scale exposition of the latest in computer hardware, software and services from nearly 150 vendors.

Focusing on accountability, mission support management and audits and control half day sessions will be presented, as well as sessions on efficiency in Procurement and Operations.

State-of-the-art technology updates will also be presented and will include topics on computer systems and software, mini/micro technology, computers in defense systems and communications technology. Each will be half-day presentations.

Four half-day applications workshops presenting how-to specifics on applying the latest hardware, software and services in data base, DDP and data communications environments are also scheduled. These sessions include a workshop on procurement, data communications, DDP and data base management.

Other workshops will cover a look at DP Management after the new Brooks Act, acquisition management, project management and cost control and personnel management.

Eight 75-minute "state-of-the-market" product briefings detailing the latest advances will also be presented and will include communications services, business graphics, data base management, computer services and software and different kinds of hardware.

The conference ranges in price from $75 for a federal employee attending one day of the main conference to $295 for a nonfederal employee who attends the entire session.

More information is available from Federal Computer Conference, P.O. Box 368, Wayland, Mass. 01778.

ACM 1980 Turing Award To Honor Charles Hoare

NEW YORK — Charles Antony Richard Hoare, professor of computer science at the University of Oxford, England, will receive the Association for Computing Machinery's (ACM) 1980 Turing Award for his fundamental contributions to the definition and design of programming languages. The Turing Award, the ACM's highest award for technical contributions to the computing community, is presented each year in commemoration of Dr. A.M. Turing, an English mathematician who made many important contributions to the computing sciences.

Hoare will deliver the Turing Lecture on Oct. 27 at the opening session of the ACM Annual Conference in Nashville, Tenn.

'Elegance, Impact'

As noted by the ACM General Technical Achievement Award Committee, Hoare has "identified and clarified basic and underlying principles in his research. His work is characterized by an unusual combination of insight, originality, elegance and impact."

Hoare is best known "for his work on axiomatic definitions of programming languages through the use of techniques popularly referred to as axiomatic semantics. He developed ingenious algorithms such as Quicksort and was responsible for inventing and promulgating advanced data structuring techniques in scientific programming languages. He has also made important contributions to operating systems through the study of monitors. His most recent work is on communicating sequential processes."

Prior Work

Prior to his appointment at the University of Oxford in 1977, Hoare was professor of computer sciences at The Queen's University in Belfast from 1968 to 1977 and was a visiting professor at Stanford University in 1973. From 1960 to 1968 he held a number of computer science positions with Elliott Brothers, Ltd., in England.

Hoare has published extensively and is the editor of the Prentice Hall International Series in Computer Science. In 1973 he received the ACM Programming Systems and Languages Paper Award.

Hoare became a Distinguished Fellow of the British Computer Society in 1978 and was awarded the degree of Doctor of Science Honoris Causa by the University of Southern California in 1979.

Computerized Registration Eases Convention Line Lag, Aids Information Queries

LONG BEACH, Calif. — Standing in a long trade show registration line is like a visit to the dentist. The sooner you get it over with, the better.

However, attendees of about 50 different conferences last year had an easy time of it, thanks to an automated process developed by Registration Control Systems.

According to Robert Gzyl, vice-president of the company, by using CRT terminals to register trade show attendees, lines move 75% to 100% faster than with previous manual methods. On an average day, the system can register about 14,000 individuals, at an estimated rate of 1,760 per hour.

> *'The average operator learns to use the system in about two hours. Because the terminal keyboard format is similar to that of a typical typewriter, the typists can make a smooth transition to the system.'*

The terminals have appeared at such computer industry-related shows as the National Computer Conference, Interface, Mini-Micro and Wescon. In addition, the devices have registered individuals for other organizations' shows such as the Hobby Industries of America, the National Safety Congress, the International Hotel/Motel Restaurant Association, the American Water Pollution Federation and the National Dairy Institute.

How does the registration procedure operate? First, the operator receives the attendee's validated registration form. This information is entered into the terminal. The attendee can verify this data by examining it from the CRT screen.

The operator then hits the "Search" key and the information is automatically recorded on magnetic tape and sent to an embosser. The data is put onto a plastic card which is used as an identification badge. It also serves as an inquiry card for the exhibitors in a credit card-like fashion.

Hardware Makeup

The system consists of 32 Lear Siegler, Inc. ADM-1A CRT terminals, a Data General Corp. 1200 minicomputer with a memory capacity of 8K bytes, a tape drive and embossers. Within the next three months, the company plans to add another 20 terminals.

"Originally the registration process was accomplished by using other terminals. The devices did not have the capability to receive complete, accurate data provided from the attendee registration forms because there were no editing capabilities. This information is important because it is kept for statistical purposes for show management," Gzyl said. "With the CRT terminal's editing features, corrections are made easily during the registration procedure. This helps speed up the registration lines.

"Another reason the system registers people quickly is because operators learn to use the terminals with minimal training. Although Registration Control Systems has 15 employees, we rely heavily on temporary personnel to register attendees," Gzyl said. "The main requirement is that these individuals be experienced typists.

"The average operator learns to use the system in about two hours. Because the terminal keyboard format is similar to that of a typical typewriter, the typists can make a smooth transition to the system," he added.

Besides requiring devices that were easy to operate, the company also needed terminals that were reliable and durable. "In a few month's time, the units might be moved from Philadelphia to Washington, D.C., to Atlanta, to New Orleans to Chicago. We had to have units that would hold up under these conditions," Gzyl stated.

Less Than Ideal Environment

The system's mobility wasn't the only factor to consider. Gzyl pointed out that a convention center atmosphere isn't the most conducive to CRT terminal operation.

"Convention areas usually are exposed to the outside environment. Therefore, dirt particles are always prevalent. In addition, the lighting can vary widely from one site to another, which could hamper the operation of some systems. This has not been a problem for us," he said.

"Additionally, the registration areas of the trade shows are in the building lobbies. The systems are therefore constantly exposed to the same temperature conditions as outside," Gzyl noted. "However, the systems have worked well whether in sub-freezing temperatures in New York in winter or in sweltering summer temperatures in Atlanta.

Attendees supply information to operators of Registration Control Systems' automated system before receiving embossed identification badges.

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Software Eases Strike Impact, Helps Keep Refinery Rolling

INDIANAPOLIS – On the night of last Jan. 7, 190 members of the Oil, Chemical and Atomic Workers (Ocaw) went out on strike at the Rock Island Refining Co. here. Because the strike was the first national one since 1953 and because it was not a primary contract renegotiation, management was caught by surprise.

The refinery, however, kept operating at full capacity during the entire 11-week strike. Sixty-two administrative people, including six DP people, put in 12-hour days, seven days a week.

Bob Gillmore, manager of MIS, and John Kennedy, systems programmer, described how they managed to produce the reports, essential to continuing operations, while spending the major part of their time working down in the refinery itself.

"During the strike, the time available for working in the office on DP projects was most limited," Kennedy explained. "Any time that was spent there took away from sleep time. When we did come up to the office to meet a request or produce a special report, it had to be done quickly."

Easytrieve System

The Rock Island Refinery had installed an Easytrieve system from Pansophic Systems, Inc. early last fall. Easytrieve is a "load and go" information retrieval and utility system designed to allow users to get information from data files with as little work as possible. The refinery uses it with its IBM 360/65 to produce reports for its production, administrative and marketing departments.

The assistant warehouse manager, Rusty Smith, had taken it upon himself to learn how to make maximum use of the Easytrieve system. With no programming background at all, he was pulling reports off the Maintenance Material Storage Inventory master files and producing the information he needed.

"The control of that inventory is extremely important to us. The cost of having the refinery or a portion of it shut down for even an hour because of a missing part is just unthinkable," Gillmore emphasized.

Controlling the inventory was even more critical during the strike. "Midnight requisitions" were made frequently. Rather than let the situation continue too long, the assistant warehouse manager kept his physical inventory counts current.

"He would slip up here and in just a few minutes print out an on-hand material code description and quantity on-hand report, including a line of underscores for each aisle in the warehouse. Then he would take four or five aisles at a time and do a partial physical inventory, bit by bit, on the most active types of parts," Kennedy recalled. "He could then initiate automatic re-orders. So we didn't run out of anything."

Other Problems

But other problems cropped up. Being unable to maintain the various input programs, the DP staff was occasionally called upon to do some unscrambling.

"We'd get a flaw in some data and have a whole file out there with something really wrong with it. The data preparation department, which was working long hours itself, had a choice of either repunching or catching someone who could write Easytrieve. With Easytrieve it took about five minutes to write a new program and create a new master file with correct data," Gillmore commented.

Another project that hit during the strike was the windfall profits tax and the phased decontrol of oil prices. The system that formerly held the economic interest information had to be changed. This involved converting three files into a different format, expanding the size of one for the additional information and creating the base values in all three files.

"By using Easytrieve, I was able to get those files set up and get in and out of that thing very quickly," Kennedy said.

Forum to Focus on EFT, Monetary Control Act

WASHINGTON, D.C. – Changes to the Electronic Funds Transfer (EFT) Act of 1980 will be among subjects discussed by government and industry leaders at a forum sponsored by the Electronic Funds Transfer Association (Efta) Oct. 27-29 at the Capital Hilton Hotel here.

Lynne Barr, senior attorney with the Federal Reserve Board's Consumer Affairs Division, will discuss the Fed's proposed changes to the EFT Act of 1980, Reg E and Truth in Lending.

Henry Polmer, vice-president for public affairs of the Efta and former deputy general counsel of the National Commission on EFT, will analyze the impact of the Monetary Control Act on electronic payment systems. Charles Marinaccio, special counsel for the Senate Committee on Banking, Housing and Urban Affairs, will discuss the forces that shaped the Monetary Control Act of 1980.

The conference registration fee is $275 for Efta members and $475 for nonmembers.

This is the second of four conferences scheduled this fall. The first will be Debit Card I, Sept. 7-9 and the third will be Legal Issues and EFT, Nov. 17-19. The fourth will be Dec. 7-9 on EFT and Corporate Funds Transfer.

Further information is available from Phyllis Orenstein, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

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IMS/VS Message Format Services	Oct. 6-8	Oct. 15-17
IMS/VS Dump Reading	Oct. 9-10	Oct. 30-31
IMS/VS Application Development Facility	Oct. 20-22	Oct. 27-29
IMS/VS Batch Terminal Simulator	Oct. 23	Oct. 14
CICS/VS Command Level Programming	Oct. 27-29	Nov. 12-14
IMS/VS Data Base Design	Nov. 10-14	Dec. 8-12
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Portables Use Phone Outlet

Terminals Let Bank Clients Monitor Accounts

NEW YORK — With fluctuating interest rates, soaring inflation and high-risk investments, many bank customers are maintaining accounts in different banks to maximize their cash management operation. Easy access to information about their balances is important to bank customers, especially to larger corporations, so Chase Manhattan Bank, reportedly the third-largest bank in the country, is using portable data terminals to assist its customers with their banking needs.

"On-line cash management is the latest and most cost-effective way of monitoring and mobilizing funds," according to Steve Levine at Chase Manhattan Bank. "It allows customers to handle their cash more efficiently."

Infocash, Chase's on-line cash management system, along with the portable terminals, enables customers to tie into the system anytime using a standard telephone and electrical outlet. Eighteen of the top 20 industrial corporations in the nation are said to be among the approximately 900 customers utilizing the Infocash service.

"We previously used big, bulky data terminals to demonstrate the system to prospective customers, but we found that they weren't suitable for traveling around the country," Levine said. "The Texas Instruments, Inc. Silent 700 Model 745 is lightweight and extremely conducive to plane travel and baggage checking. It's a compact piece of equipment that stands up to the type of abuse that we put it through."

Adaptable Unit

Chase Manhattan required a terminal that would easily adapt to its customers' needs. With the 745, banking information is printed out at 30 char./sec.

With the 745 link to Infocash, money transfers from one bank to another can be accomplished within moments, saving valuable time, Levine said. The Infocash system is tailored to fit the individual customer's requirements; by selecting from a list of Infocash software modules, the customer can subscribe to a program to serve his particular needs.

With the Cash Reporter module, a descriptive statement of the previous day's transactions within the customer's Chase account is generated. The Current Day Reporting module enhances this report by providing current data.

There is also a Money Transfer module that enables customers to move funds from bank to bank. The Regional Balance Reporter module prints out account balances at banks that are tied into the system all across the country.

For customers doing business overseas, there are the Foreign Exchange Reporter and the International Balance Reporter modules. The Foreign Exchange Reporter provides a summary, updated twice daily, of foreign exchange rate for 18 currencies. The International Balance Reporter was designed for the needs of multinational companies that require day-to-day control of their international cash balances.

Chase Manhattan Bank has used the Model 745 for five years with the Infocash System.

Profitability to Be Theme Of Intelcom 80 Conference

LOS ANGELES — Factors affecting profitability in the competitive environment of telecommunications and computer technologies will be the key focus of executive forums, technical sessions and applications panels at the fifth International Telecommunications and Computer Exposition (Intelcom 80), which will be held at the Los Angeles Convention Center Nov. 10 - Nov. 13.

The conference theme, "Competition in the Information Economy," will be addressed in executive forums chaired by the following industry leaders:

- F.W. Gibbs, executive director of IT&T.
- Robert Hall, president of Satellite Business Systems.
- C. Lester Hogan, former president of Fairchild Camera and Instrument Corp.
- Robert E. LaBlanc, vice-chairman of the board of Continental Telephone Corp.

Discussions on economics, changing markets and industrialization will be led by such experts as C. Gus Grant, president of Southern Pacific Communications Co.; Peter L.V. Hickman, managing director of British Aerospace Dynamics Group; and John Johnson, president of Satellite Television Corp.

Other experts leading discussions will be John N. Lemasters, vice-president, Harris Corp.; Brian W. Manley, managing director, Pye TMC, Ltd.; Thomas Mayer, managing director, Marconi Communication Systems, Ltd.; Desmond H. Pitcher, managing director, Plessey Telecommunications & Office Systems, Ltd., and Albert D. Wheelon, vice-president, Hughes Aircraft Co.

On-site registration for Intelcom's conference program, including exhibits, is $200. Admission to exhibits only is $15.

Horizon House, the organizer of the Intelcom Series is headquartered at 610 Washington St., Dedham, Mass. 02026.

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Naval Observatory Plots Stars With IBM 4341

WASHINGTON, D.C. – Since the days of the Phoenicians, navigators have been using celestial bodies to determine their ships' positions.

Today, to help them navigate difficult waters, they can use the *Nautical Almanac*, published by the Nautical Almanac Office of the U.S. Naval Observatory.

The office published the first almanac in 1855 and back then the calculations of the positions of the four navigational planets – Jupiter, Mars, Saturn, and Venus – were tediously prepared by hand.

Now, they are being done quickly with an IBM 4341 processor.

The almanac office computes the future movement of the planets by making use of past observations. In the case of Mars, there have been more than 10,000 sightings. The positions of the other planets and the theories of gravity and relativity also go into the computer calculations used to plot the position of the four planets.

The office used an IBM 360 Model 40 for many years, but, astronomer Kenneth Seidelmann said, director of the Nautical Almanac Office, "We needed a faster computer with more capacity."

The *Nautical Almanac* is the best-selling publication of Seidelmann's office, but it also publishes the *Air Almanac* and other celestial data.

The data produced by the office is also used by astronomers, other scientists, surveyors, calendar makers and lawyers.

The office receives as many as 1,000 requests a year from lawyers who need to know the exact time of sunrise or sunset, moonrise or moonset, to defend a client. Those calculations are made by the computer based on the longitude and latitude of the city involved, and the date.

Seidelmann's office also has worldwide responsibility for predicting eclipses, for which the 4341 will be used.

Mini/Micro 80 Meet Slated For October in San Francisco

SAN FRANCISCO – The Sixth Minicomputer/Microcomputer Conference and Exposition to be held here Oct. 14-16 will feature 24 sessions and a one-day seminar entitled "An Introduction to Pascal."

In addition to the technical sessions, there will be a product and systems exposition. The technical sessions will be held in concurrent blocks of four.

Mini/Micro 80 will also accommodate gatherings of two special interest computer groups, the Association of Computer Programmers.

Some of the session topics include: "The Small Business Computer in the Next Five Years," "Pascal Applications in the Minicomputer Environment," "Quality Assurance for Small Computer Software" and "Data Communications for Minicomputer Users."

There is a $30 registration fee for the show and conference combined and a $10 fee for the show alone. More information may be obtained from Robert D. Rankin, 32302 Camino Capistrano, San Juan Capistrano, Calif. 92675.

Financial Seminar Offered by RDC In November

NEW YORK – A one-day seminar on "Financial Decisions: Criteria for Choosing a Financial Decision Support System" is being offered here on Nov. 20. The event is sponsored by the Real Decisions Corp. (RDC), a consulting firm specializing in information processing alternatives.

Twenty-eight financial modeling and reporting systems available for in-house installation or through time-sharing services will be examined at the seminar.

A detailed seminar agenda may be obtained from RDC at 123 High Ridge Road, Stamford, Conn. 06905.

Meet to Feature Japanese Authors

WASHINGTON, D.C. – Several distinguished Japanese authors will be participating in Compcom Fall '80 here from Sept. 23-25.

Specific developments that will be reported on include network and processor architectures.

Additional information may be obtained from Compcon Fall '80, P.O. Box 639, Silver Springs, Md. 20910.

CDC President To Keynote Meet

PHILADELPHIA – The 1980 annual Society for Management Information Systems (MIS) conference slated for Sept. 22-25 here will focus on specific management challenges confronting senior information resource managers over the next decade.

The conference keynote address will be delivered by Control Data Corp. President Robert M. Price. Following that, there will be two-and-one-half days of conference programs and executive workshops.

Topics to be discussed include "Centralization, Decentralization or Both," "Organizational Structures and Processes," "Vendor Strategies in the Information Age" and "Communications Systems," among others.

Separate registration fees have been set up for the conference, the workshops and both combined. More information is available from Evelyn Bickley at the Society for Management Information Systems, 111 E. Wacker Drive, Chicago, Ill. 60601.

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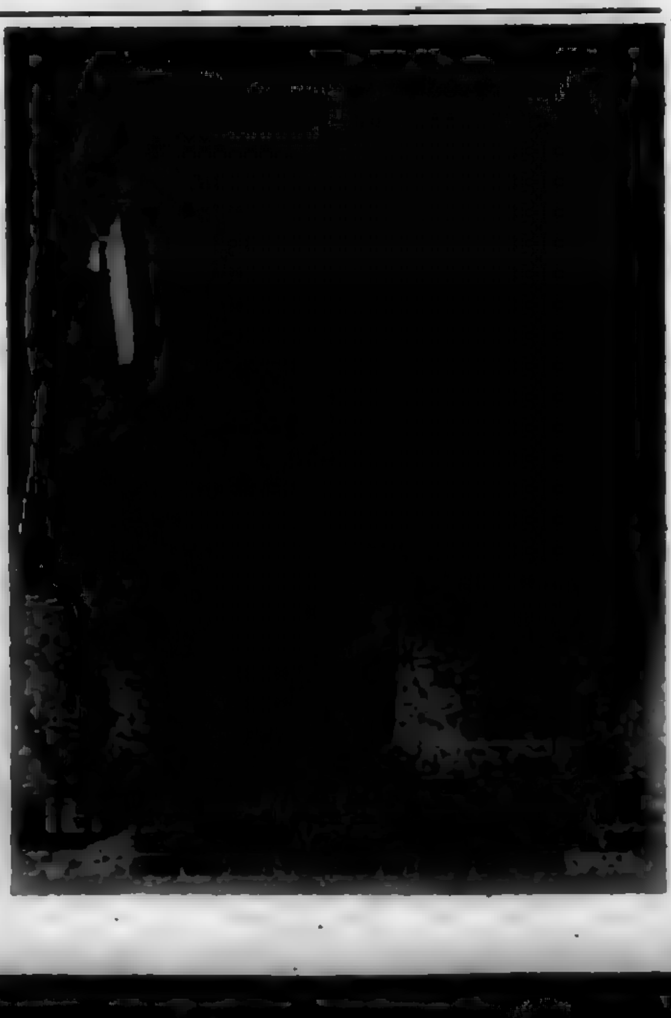

Telecom Library Issues Guide For Managers

NEW YORK – The Telecom Library has published a 250-page manual designed to help new communications professionals get started, *The Telecom Library's Guide to Getting Started in Telecommunications Management.* Written for people unfamiliar with the management of corporate or government telephone expenses, the book details the basic tools and techniques necessary "to make a rapid and significant dent in the corporate telephone bill," the publisher said.

The nontechnical manual reportedly scopes the Bell System, unravels billing methods, deciphers Universal Service Order Codes and examines the pros and cons of various systems, including PABXs. It includes a glossary of telecommunications terms, lists of user organizations and 30 charts and illustrations.

The author of the book is Larry Arrendondo, vice-president of research at the Telecom Library.

The book costs $30 from Telecom Library, 205 W. 19 St., New York, N.Y. 10011.

Seminar Preps Management

READING, Pa. – A series of one-day seminars designed to prepare management and support personnal for working with DP systems will be held in seven Pennsylvania locations this fall by Sarig Business Systems, Inc.

Aimed at small and medium-sized businesses, the seminars will take place from Sept. 4 to Dec. 11 and focus on data processing concepts, systems and project management techniques, designing and installing a data processing system and the feasibility and selection of a computer system.

The meetings will be held in Lancaster/York, Harrisburg, Danville, Reading, King-of-Prussia, Bethlehem and Scranton, Pa.

Registration fees for the meetings are $95 for one attendee or $60 each for two or more participants from the same company. Sarig Business Systems is located at 3701 Perkiomen Ave., Reading, Pa. 19606.

OCR Group Elects Officers and Board

HACKENSACK, N.J. – Ronald E. Harris of the First National Bank in Louisville, Ky., and Sally Williams of Optical Business Machines in Melbourne, Fla., have been elected to the board of directors of the Optical Character Recognition (OCR) Users Association.

At its recent summer conference in San Francisco, the group also elected new officers. They are Richard F. Burns of the Michigan Department of Social Services, president; Charles L. Ginder of Cummins-Allison Corp., vice-president; William F. Reidenbach of Exxon, treasurer; John E. McKemie of the Texas Commerce Bank, secretary; and Russell F. Pound Jr., Hartford National Bank & Trust Co., assistant treasurer.

The OCR Winter Conference is scheduled for Jan. 11-14 in Atlanta.

Education Field Gets Newsletter

CAMBRIDGE, Mass. – Intentional Educations, Inc. has announced the September debut of "Classroom Computer News," a bimonthly newsletter written for teachers and administrators.

Each issue will reportedly include application programs, tutorials, book and new product reviews, and industry news briefs. Interviews with innovators in the educational computer field, accounts of teachers' and administrators' experiences with microcomputers, overviews of existing software within specific subject areas and analysis of trends will also be covered.

The subscription fee is $9 per year from Intentional Educations, P.O. Box 299, Cambridge, Mass. 02138.

'Viewtext' Covers World Market

BROOKLINE, Mass. – Information Gatekeepers, Inc. has begun publishing "Viewtext," a monthly newsletter to provide coverage of the international viewdata/teletext market, including new system descriptions, existing systems' evaluations, proposed experiments in viewdata and publication reviews.

"Viewtext" will combine the work of independent correspondents with more than 120 worldwide telecommunications journals, the publisher said.

The price is $275 per year ($325 outside U.S. and Canada). Discounts are available for both multiple-copy and multiple-year subscriptions. Information Gatekeepers, Inc. is at 167 Corey Road, Brookline, Mass. 02146.

Contracting Indexed

RYE, N.Y. – The complexities involved in contracting for DP program development are indexed in a 105-point "Checklist for Computer Software Contracting" from Reymont Associates. Written for DP and MIS managers and executives with overall responsibilities for information systems, the publication deals with the development of customized software for new applications and conversion of existing programs.

It also includes an executive overview.

The checklist costs $5 from Reymont Associates, 29 Reymont Ave., Rye, N.Y. 10580.

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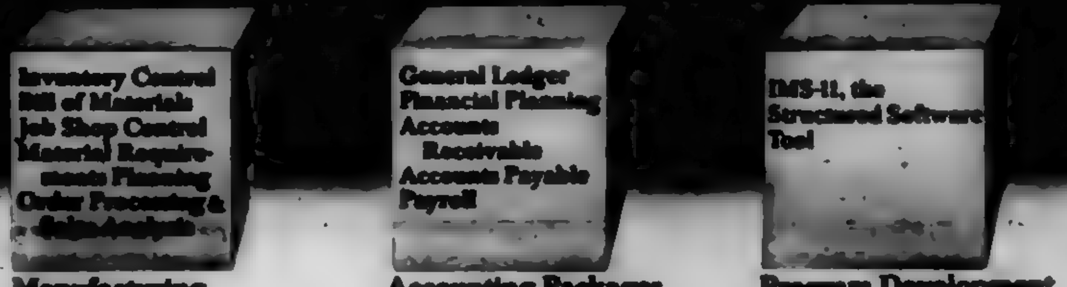

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Calendar

Sept. 29-Oct. 1, New York — **International Security Conference & Expo.** Contact: Cahners Exposition Group, Suite M-38, 8687 Melrose Ave., Los Angeles, Calif. 90069.

Sept. 29-Oct. 1, Washington, D.C. — **Word Processing: Effective Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 29-31 in Chicago.

Sept. 29- Oct. 2, Cannes, France — **International Videocommunications Market,** sponsored by the International Marketing Video, International Television Association, Syndicat National de l'Edition, D/J Brush Associates and the Groupe Intersyndical de la Communications Audiovisuelle. Contact: John Nathan or Lora Ballato, Suite 4535, 30 Rockefeller Plaza, New York, N.Y. 10112.

Sept. 30- Oct. 2, White Plains, N.Y. — **Information Strategies for the '80s.** Contact: Turnkey Systems, Inc., 50 Washington St., Norwalk, Conn. 06854.

Sept. 30- Oct. 3, San Francisco — **Structured Systems Design.** Contact: Langston, Kitch & Associates, Inc., 715 E. 8 St., Topeka, Kan. 66607. Also being held Sept. 30- Oct. 2 in New York.

Sept. 30- Oct. 3, Washington, D.C. — **Distributive Processing/Data Base Technologies.** Contact: the Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Sept. 30- Oct. 3, San Diego — **Computerized Robots.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Oct. 1, Boston — **Managing the Data Center Work Load.** Contact: Systematics International, 10 Park Center, Sterling, Va. 22170. Also being held Oct. 21 in San Francisco and Oct. 29 in Atlanta.

Oct. 1-2, Raleigh, N.C. — **User's Role in Systems Development.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Oct. 1-3, San Francisco — **Introduction to Word Processing: Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 1-3, Washington, D.C. — **Distributed Systems: Effective Approaches and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 29-31 in San Francisco.

Oct. 1-2, Chicago — **Word Processing Supervision Workshop.** Contact: the National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held Oct. 6-8 in Los Angeles.

Oct. 1-3, Miami — **Check-Truncation Conference.** Contact: Bank Administration Institute, 303 S. Northwest Highway, P.O. Box 500, Park Ridge, Ill. 60068.

Oct. 1-3, Chicago — **Integration of Word Processing and DP Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 15-17 in New York and Oct. 29-31 in Denver.

Oct. 1-3, Washington, D.C. — **Advanced DP Management: Methods and Techniques in the 80's.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 29-31 in Chicago.

Oct. 1-3, Montreal — **International Conference on Very-Large Data Bases,** sponsored by the Association for Computing Machinery, Inc., Canadian Information Processing Society and the Institute of Electrical and Electronic Engineers. Contact: Dr. James B. Rothnie, Computer Corporation of America, 575 Technology Square, Cambridge, Mass. 02139.

Oct. 1-3, New York — **International Conference on Circuits and Computers for Large Scale Systems,** sponsored by the Institute of Electrical and Electronic Engineers. Contact: Dr. Guy Rabbat, 32 Tor Road, Wappingers Falls, N.Y. 12590.

Oct. 1-3, Lake Placid, N.Y. — **Symposium on Foundations of Computer Science,** sponsored by the Institute of Electrical and Electronic Engineers. Contact: Prof. R. Book, Dept. of Math & Computer Science, University of California, Santa Barbara, Calif. 93106.

Oct. 1-3, Chicago — **Implementing Computer-Based Human Resource Systems.** Contact: the University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Oct. 2-3, Washington, D.C. — **IMS/VS Data Communications Programming.** Contact: Data Base Management, Inc., Vernon Professional Building, 281 Hartford Turnpike, Vernon, Conn. 06066.

Oct. 2-3, Boston — **Data Base.** Contact: Data Processing Management Association Education Foundation, 505 Busse Highway, Park Ridge, Ill. 60068.

Oct. 2-3, San Francisco — **Software Quality Assurance.** Contact: Data Processing Management Association Education Foundation, 505 Busse Highway, Park Ridge, Ill. 60068.

Oct. 2-3, Washington, D.C. — **Understanding Modern PBX Systems.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

Oct. 5-9, Houston — **Bank DP Audit Conference.** Contact: Bank Administration Institute, 303 S. Northwest Highway, P.O. Box 500, Park Ridge, Ill. 60068.

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Shines in Ease-of-Use-Test

TI 771 Delivers Solid Overall Performance

By Hillel Segal

With an exceptional showing in the ease-of-use test and mid-range results in benchmark speed checks, the Texas Instruments, Inc. Model 771 small business computer delivered a solid overall performance.

Tested for the Association of Computer Users by an independent consulting firm, the 771 is the fourth small computer in the less-than-$15,000 range discussed so far in this column. Standard programs written in Basic were run to obtain the comparisons.

Most notable of the TI 771's benchmark results was its leadership in the ease-of-use test, which compares the efficiency of program editors by recording the number of keystrokes needed to edit a sample file according to the script. Here, the 771's performance paced the under-$15,000 field and defeated all 12 of the systems priced $15,000 - $25,000 which were tested earlier. The TI 771 required 143 keystrokes to finish the task: The leading system in the higher price range, the HP 250, needed 152 keystrokes.

Second Editor

Even more interesting, the 771's second language — terminal programming language (TPL) has a different editor which, when tested, took only 115 keystrokes to run through the script. That is a significant improvement compared with any editor tested so far in either price range.

In the two real-life application tests compared in the scorebox, the TI 771's performance was about average for Series 1 systems. Its time of 22:05.4 in the scientific/engineering benchmark was fourth best in the group of six tested thus far. In the accounts receivable problem, the 771's time of 3:38.1 is third in the same group.

The accounts receivable time, however, is better than the average time of the 12 computers in Series 2. While the best time in that group was 2:48.3 — recorded by the Texas Instruments DS990/2 — the average run-time for the field was 5:03.

SCOREBOX

System: Texas Instruments Model 771
Current Price: $12,100

SERIES 1 RESULTS*** Systems up to $15,000	C-1 Scientific/- Engineering Time	C-3 Accounts Receivable Time
Pertec PCC 2000	20:46.4	6:04.3
North Star Horizon	12:21.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	To be covered	
Decstation 78	in future issues	

Series 2 Results*** Systems $15,000 to $25,000	C-1	C-3
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:06.8	3:20.0
Texas Instruments FS990/10	*	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11VO3	14:43.4	4:14.0
Q1 Lite	6:50.7	5:03.3
Univac BC/7-610	12:09.2	10:37.0
Northern Telecom 405	*	**
Datapoint 1170	38:27.6	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	*	2:48.3

*Test could not be run because of memory limitations.
**Test could not be run because of formatting limitations.
***Both Series 1 and Series 2 were run on the same programs.

Holding Ground

As we progress through the first half of the Series 1 reports, it is becoming apparent that the less expensive systems are holding ground well in the accounts receivable application problem, but cannot compete as successfully in the scientific/engineering problem. We will explore that finding in greater depth in the future.

For now, it is enough to point out that from the standpoint of computing speed, users who have a business application suitable for a small computer should not assume that a higher priced system will do the job better. The systems priced under $15,000 are showing that, within the business environment, they have performance characteristics good enough to deserve a closer look before spending extra money on a more expensive computer.

With the TI 771, the purchase price of $12,100 buys a complete system including two diskette drives, a 150 char./sec line printer, 64K bytes of memory and the language and operating system. The cost can be lowered by substituting an optional build-in thermal printer which is housed in the CRT/keyboard assembly. It runs at 30 char./sec and prints an 80 char./line.

Memory space may prove a limitation in some situations. When the operating system and Basic language are subtracted from the 64K-byte total, less than 18K bytes is available to the user. In run-only mode, just under 22K bytes is accessible. System memory cannot be expanded beyond the 64K-byte total. During benchmark testing, modifications to programs using large arrays were necessary to squeeze the problem into the available space.

Full size 8-in. floppy disks are provided with the 771. These are single-density drives holding a total of 256K bytes each.

The video display unit shows 24 lines of 80 char. each and includes graphics capabilities. The keyboard has a numeric key pad and 32 special function keys as well as the typewriter and cursor control groups.

Features of the Basic language used for testing include a virtual file structure for disk I/O, debugging aids such as breakpoints and tracing and some structured programming enhancements. Programs and files may be protected from unauthorized use.

One limitation of the language was lack of an easy method of changing a program from screen display to print output. Instead of a single change in the default output device, it was necessary to alter each PRINT statement individually. In addition, the Basic operating system lacked a utility to dump data files to the printer.

The TPL language, while costing more, comes with a better-equipped operating system and utilities. It features a forms fill-in package specially designed for data entry applications. The language uses English-like statements and received high marks from OEMs who were using TPL to develop applications software. While this language is unique to TI, it is available on other 700 series systems.

In practice, the 771 may be used as a stand-alone system, as a workstation serving a larger host computer in a distributed processing arrangement, or as a master system accessed by other terminals. When used as a host, only the central station may be engaged in program development. Terminals connected to it must be used for data entry or other program-controlled tasks.

'Small Business Computer'

Among the utilities provided with the Basic operating system is an IBM 3780 emulator, allowing communications to an IBM 360/370 or compatible host computer. While this is a common type of application for the 771, TI officials prefer to call the 771 a "small business computer" rather than an "intelligent terminal." This reflects a growing industry usage of the latter term to denote a less sophisticated device, one which typically has only a few screen pages of memory and no diskette storage.

Since TI does not supply applications software for its computers, most firms contacted during the survey of users had purchased their unit from an OEM who supplied the required software packages. Virtually all applications were written in TPL and were priced from $1,000 to $10,000, depending on size and complexity.

As in the case of most systems purchased through an OEM or independent dealer, we found a variety of user comments. "Our dealer has been great," one user said. Another told us: "We had a communication gap with our dealer ... it took us a while to identify to them just what we wanted done."

In the area of hardware support, TI's service was highly rated. Users indicated that the few hardware problems encountered were normally taken care of in 24 hours or less.

Next week: The Vector Graphic, Inc. System B.

This is the 16th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

EDITORIAL

Standards for Avarice

Back in the days when users were first learning they could save money by hanging plug-compatible peripherals on their IBM mainframes, IBM took umbrage at such acts of disloyalty. Its reaction came in the form of intimidation, according to many users who claimed to be on the receiving end.

Although not officially sanctioned by Armonk, sales representatives, branch and even regional managers were reportedly leaning — very hard — on deserters from the fold. Most of those deserters were too frightened to speak out in print, fearing further retribution.

Aggrieved DP directors claimed that when they decided to farm out some business to a plug-compatible manufacturer (PCM), the computer goliath started its strong-arm tactics. The user was told maintenance on remaining (and there was usually plenty) IBM equipment would suffer if they bolted.

If this friendly advice was ignored and the user strayed, IBM allegedly brought in higher level executives whose job it was to pressure the DP director's boss, who may or may not have known anything about computers.

Playing on that weakness, the ploy called into question the validity of the peripheral selection process and, more importantly, the competence of the DP director who played an integral role in it. This meant he was raked over the coals without a chance to defend himself.

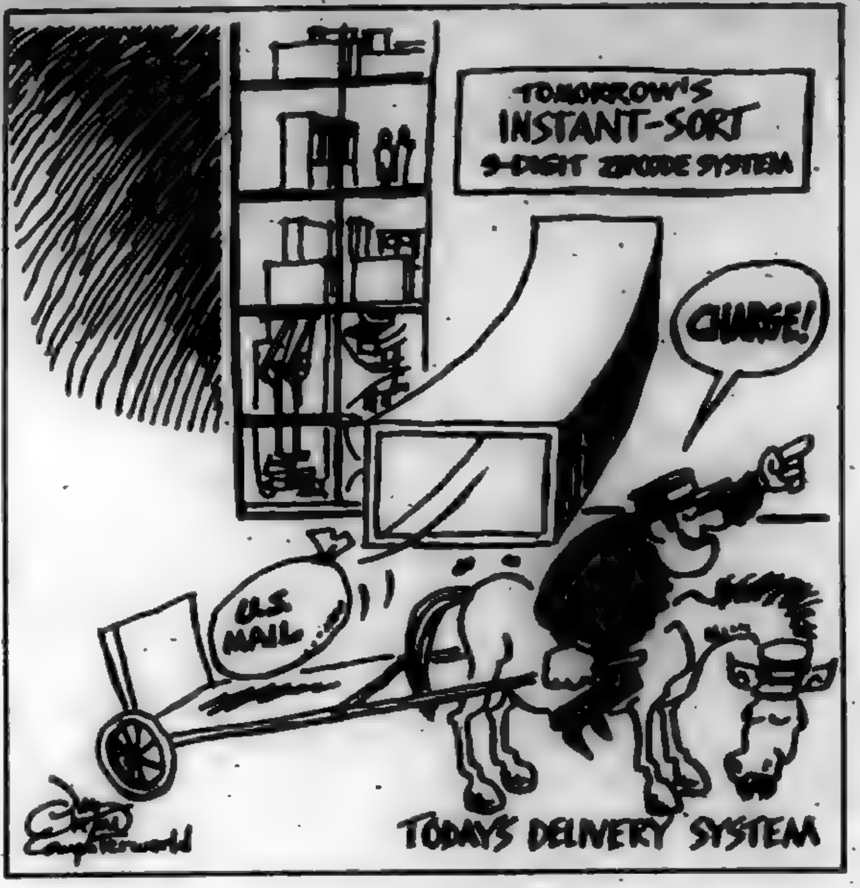
After a few years of this behavior, things seemed to calm down. PCMs had become a reality IBM was forced to accept, albeit grudgingly.

So, just when everything seemed above board again, *Computerworld* received a spate of letters and phone calls complaining of the same old tactics. We conducted a survey of DP directors who had selected PCM mainframes over the past year and discovered nearly one-third of them had experienced some form of retribution.

What goes on here? IBM quarterly earnings in July reflected a 14% increase over the same period last year. Despite the emergent threat from Japanese shores, the company still has a virtual hammerlock on worldwide computer trade.

These latest methods used to maintain that control have done little to enhance IBM's image, and the crude and craven attempts by some of its employees to retain business at all costs have set new standards for avarice.

IBM sets high standards on a corporate level, and it's time it started enforcing them in the field.



DATA PAST

Five Years Ago
Sept. 3, 1975

WOODLAWN, Md. — In a single day last month a programming error resulted in $10,516,000 in overpayments in the new federal Welfare program for the nation's aged, blind and disabled.

- - -

EL SEGUNDO, Calif. — During the phase-out of its computer operations, Xerox Corp. extended the cutoff date for guarantees to fill orders for add-on equipment and spare parts, but did not budge on its earlier request for all mainframe orders by Oct. 1.

Eight Years Ago
Sept. 6, 1972

WASHINGTON, D.C. — The General Accounting Office reported that computer performance evaluation techniques can dramatically increase the productivity and efficiency of computer systems.

- - -

WASHINGTON, D.C. — Senate bill S. 3834 proposed greater access to the records in the FBI's Computerized Criminal History data bank of arrest records. The act would require the bureau to notify an individual if it planned to disseminate the information for non-law-enforcers.

LETTERS

Free-Lancers Defended

The article "Managers Warned of Contract Programmers" [CW, Aug. 18] was obviously an interview of a company that uses employees to do contract programming for various clients. This song and dance has been sung for many years to benefit the big contract programming companies. I have been a free-lance contract programmer for more than four years and have more than 12 years in the industry. This is the most biased article I have ever seen in *Computerworld*, perpetuating the myth that big is beautiful.

Some of the larger contract programming firms, that tout their "qualified" (went-to-school) employees, will tell you that a free-lance programmer is unreliable and sloppy, but that they, on the other hand, have a large staff of "experienced" (average three months) programmers to serve the user.

I have not met a free-lance programmer who is free-lancing because he can't get or hold a job. Regarding a sense of loyalty, what programming shop can say it has a low turnover rate? Current time in job is 10 months. What loyalty!

To Al Strong's "as a general rule," he states that a free-lancer rarely works for more than a few months for one client — that's exactly what we do. The client needs someone for a few months, and that's why he uses our services. The comment (per Al) about cutting corners is nonsense. Any corners cut (i.e., documentation) is generally done by the client. He simply uses lesser skilled personnel, because of the less technical nature of documentation and the cost of the free-lancer.

In regards to "free-lancers realize their responsibilities to a given client ends as soon as the contract is over," have you ever tried to get an ex-employee to return? A free-lancer, although currently working on another contract, can usually arrange to help out his previous client in time of need.

The balance of Strong's remarks can also be said of any company looking for an employee. The benefits boil down to this: If you are not happy with a free-lancer, you can terminate (prematurely) his contract. Have you ever tried to fire an employee?

The adage "caveat emptor" — Let the buyer beware — applies more emphatically to the type of organization that Strong runs.

As a member of the Independent Computer Consultants Association (ICCA), an organization founded "to promote professionalism within the industry," I find this article grossly biased and untrue. I urge any company considering using the aid of a contract house, free-lancer or systems consulting firm to first call the ICCA in St. Louis, Mo., to find out the facts.

Ald M. Horton

E. Pepperell, Mass.

Music of Programming

Bach, Beethoven, Haydn ... these programmed instructions for sequential execution on mechanical devices. Yet none are viewed as programmers.

Recent *Computerworld* flaps on the human/psychological/physiological concerns of programming practitioners leads me to the observation that much confusion lies in the use of a word — programmer. That, in itself, is a distortion, devoid of the beauty, skill, competence, poetry and music of programming.

Peter Kushkowski

Hartford, Conn.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

HUMAN CONNECTION/Jack Stone

Productivity Measures Prove Counterproductive

In these recession-weary days, installations are trying every which way to increase the output from their systems and programming departments. One approach that some DP managers are taking is a strictly scientific one, wherein they will measure the productivity of their staffs, presumably on a wonderfully objective basis, and reward the best performers and, I guess, fire the worst.

You may have read of some efforts that are trying to characterize programmer productivity in terms of lines of code per unit time (LCT). Well, I suppose that the goal of this effort is laudable, but that's about all I can say for it.

My reason? Simply that I don't believe that, at this stage in the development of the industry, the products delivered by programmers can be objectively measured, at least not in the traditional sense that productivity is measured.

To accomplish this, it is necessary that productivity must not only be described in a quantitative way, but also that the output products must be consistent project-to-project and person-to-person, to make sure that all the programmers are measured in the same, standard way. The best DP example of where productivity measurements are valid is the data entry function.

Inadequate Standard

The implication of all this is that two different people assigned the same productivity factor must be expected to turn out the same product per base unit of resource (time or dollars). But it's very difficult to construct situations where this can be done.

Certainly I'm not the authority on DP productivity, but I can't visualize how the LCT measurement provides an adequate standard, because project structures change so dramatically and that includes personnel, organization, system complexity, machine services and so forth. Of course, I'm referring here to relatively large and complex systems development jobs; productivity is not as critical an issue when dealing with simple systems projects.

My intention is not to clobber LCT measurements willy-nilly, in part because I have no substitute ideas to proffer. Also, there may be some validity for gathering LCT measurements, not only at the individual level but also for the team, project and installation, and aggregating them over a relatively long period of time to see if useful statistical trends are detectable. I just have difficulty accepting the use of LCT measurements for the evaluation of the performance – the hire-and-fire variety – of an individual programmer.

For programmer performance evaluation, I favor the well-known – or it should be, by now – management-by-objectives approach, which involves an agreement between the programmer and the supervisor on what is to be specifically accomplished during the next period – the more specific the better. At the end of the period, performance is evaluated on the basis of these accomplishments. The weakness of this system, obviously, is that it's tough to set performance standards with it.

However inelegant my logic may be, I feel there's much that can be done to improve programmer productivity, other than to attempt to measure it in a quantitative way. (We still have our seat-of-the-pants, qualitative measurements which may have to suffice until the DP personnel researchers come up with some better answers.) Without intending to be prosaic, I would start with several changes in the programmer's physical environment which, I believe, would result in vast increases of productivity:

- Programmers need quiet. This means one programmer for one private office, with walls to the ceiling and a closable door. Grouping programmers like cattle in a box car to save on the cost of floor space, I feel, is false economy.
- Programmers need computer services, and state of the art, if you please. This means a private CRT terminal with the full gamut of on-line interactive operating system controls, editors, compilers and debug facilities.

One Cobol programmer with access to such services recently told me that, with her terminal system, it was a snap to debug programs without the necessity to revert to main storage dumps. "In fact," she went on to say, "I can really turn out the work now, because practically all the housekeeping drudgery is gone. Maybe for the first time in my career, I have found that programming can be a lot of fun!"

THE TAYLOR REPORT/Alan Taylor

NCR Wins Recommendation in Case Study

The recent Taylor Reports on Perl-Mack's (PM) arguments with NCR Corp. have apparently been countered by NCR salesmen with two arguments: that they are one-sided and that I am anti-NCR.

Well, curiously enough, I find the first item – one-sided articles – is correct! All my data used in the articles came from NCR, and none from the user!

Thus, when I said what George Tillman said in a letter about the contract, I was basing my report on Tillman's letter and the contract prepared by NCR on NCR forms. I didn't use the PM version of what Tillman said in a meeting, or what he said the contract said – just the NCR documents. Which is rather one-sided and, I think, the stronger for it.

As to whether I have a down on NCR, that's not really so, and in suitable cases I would even recommend NCR. In fact, in an actual case where these accusations of my alleged bias were made, the circumstances were such that currently I don't see anything wrong with the NCR bid. But, like anything else, any recommendation had to get through some tests first. So let's look at the tests.

Three Test Groups

There are three major groups of tests that I would use before recommending NCR or any other equipment under tricky vendor-written terms. These deal with the items offered, the characteristics of the proposed buyer to handle the contract terms and the assumed use of the equipment after the buyer has had enough of it.

In this case, NCR is offering a System 8230 of some type with some oil software packages previously available on Texas Instruments, Inc. systems. The software has been seen and has been available for evaluation. So has the hardware.

Now, this is a great step forward. Under the NCR Universal Agreement (UA), users accept quite severe (and sometimes impossible) responsibilities about whether software they have not seen will fit, or handle the functions it is expected to do.

'There are three major groups of tests that I would use before recommending NCR or any other equipment under tricky vendor-written terms. These deal with the items offered, the characteristics of the proposed buyer to handle the contract terms and the assumed use of the equipment after the buyer has had enough of it.'

In cases like PM's, where the software is to be partly or wholly developed after the contract, I would have to see that branch funds adequate for providing it after an original failure had been firmly appropriated before I would recommend NCR plus the UA terms be accepted. But, in this case, the software apparently has been seen. So, OK for NCR.

Prompt Legal Measures

PM, however, failed in at least one other way. When NCR threatened to pull out the already delivered computer (and so stop the constant updating of the data base that had been going on), PM didn't promptly face up to the legal questions involved or their contractual responsibilities regarding modifications.

Instead, it paid out on promises and is now, years later, trying to enforce a contract out of a letter written by NCR against the express terms of the UA, which makes such letters apparently worthless.

Any customer who has a contract with as many undefined terms and uncertain meaning clauses as the UA, with no clear public precedents that arbitrators can be relied upon to follow, faces problems in enforcing it if they stint on legal and supporting services. They must have both the knowledge, and the capability to face up to hard legal decisions, to understand and carry out their contractual duties fully, to see that changes are handled properly and to be prepared to face up to issues as they arise. This is a measure of both funding and personality. Most users I have known have not had this all-around capability.

In the new case, the firm is prepared to put money out on a consultant; and in talking to the consultant I found him quite knowledgeable of the dangers of misinterpreting the contract or not taking on the duties involved.

Presumably he will pass these matters over to his client, and if the future user knows of them . . . well, as far as I am concerned, NCR can be OK. Thus the second test was passed.

The last area that needs to be considered is the physical equipment, and how much the user thinks that it is worth – on the open market, that is.

Under the UA, the question is complicated by the required agreement that the instruction microcode is software, and also that software belongs to NCR. This allows NCR to compete against current owners of equipment in the open market if it chooses to do so, and effectively may reduce drastically the ability of the user to sell. Unless a user is really prepared to just write off the chances of open-market sales; or can negotiate strong modifications to the UA with NCR, I would not recommend NCR equipment under the UA.

In the current case, the real attraction appears to be the software. The hardware is incidental, and salvage values are not being considered. So . . . again NCR passes 3 out of three. For this case, NCR seems OK by me!

Running through these three points is the concept that users can be misled by promises from large firms like NCR; and that such firms may not have or use the quality control features that are technically necessary. Further, that when marketing computers, particularly in the lower levels, it may be profitable to oversell.

NCR is not unique, but neither is it historically flawless. The information that they gave me when Century was announced was false – but not knowing this I published it. As far as I can tell now, that system was simply not ready for the market.

I am against NCR finding it profitable to oversell, which may have happened. But I am not against NCR itself.

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READER COMMENTARY/Rick Vogel

Why Not Standards for Hardware?

Every moment of every day, we live surrounded by standards. The buildings in which we live and work are built by beams and joists of standard width and thickness. We wear clothing of standard sizes from our hats to our shoes. Standards govern the design of the things we use — furniture, utilities, appliances, tools and vehicles. There are even standards to monitor the air we breathe.

Our industry, data processing, is one of the most rapidly growing segments of business. And it, too, has standards. There is, however, one area that is seriously lacking in standards — hardware performance.

Hundreds of millions of dollars have been invested during the last 15 years to increase the reliability, productivity and capability of DP equipment. Despite this substantial investment, the impact of hardware failure has never been higher.

How Serious?

How serious is the problem of failure? No one can say because there are no reliable quantitative measures available.

In most data centers, managers have ceased viewing failure as an unusual event. Failure is referred to in comparative rather than descriptive terms: "It's worse than last week, but better than the week before." When failures reach an intolerable point, relief is demanded until failure returns to an endurable level. No standards exist for the reliability of DP equipment.

Hardware failure is a constantly destructive presence. It disrupts production schedules, delays development, dissatisfies users and costs corporations millions of dollars in added expense and lost profit opportunities. Computer failure has risen from a minor inconvenience in the early 1960s to a major cost consideration in the late 1970s.

While it is generally accepted that the reliability of components in the current 30 series systems is significantly better than comparable components in a 1401, the order of this improvement is not comparable to the increased size and complexity of the 370 as contrasted to a 1401. The result of this added complexity is an increased impact of failure.

Increased Dependency

Increased dependency on complex operating systems, data base management systems, telecommunications monitors and virtual storage paging systems has increased the probability of failure.

During the last decade, corporations have increased their dependence on computers to a point where failure to deliver timely reports can have cost implications far beyond the items contained in the DP budgets.

New technologies, such as teleprocessing, have introduced a new dimension to the computation of the cost of failure. A system which fails for 15 minutes while supporting 50 on-line clerks is a more costly problem than the same system operating in an exclusive batch mode.

Multitasking, while producing definite production efficiencies, increases the number of programs impacted by a single occurrence of failure.

Two Views

Generally, there are two separate opinions as to the severity of computer failure and the resulting image of computer reliability.

The first opinion, created and continually supported by data center statistics, is that computer failure is an insignificant if not nonexistent problem, that resource outages (particularly in a 30 series environment) are considerably better than comparable 360 outages and that systems availability is in the area of 99%.

The second view comes from those who are serviced by the computer, especially those who are serviced in a teleprocessing mode. There is a growing concern among these people that

(Continued on Page 32)

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RANDALL JENSEN

Dr. Jensen is a senior scientist at the Computer Laboratory of Hughes Aircraft Corporation. One of his recent publications, *Software Engineering*, is the seminar textbook which appears in the new *Prentice-Hall Software Engineering* series (of which Dr. Jensen is editor).

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Standards Needed to Judge Hardware

(Continued from Page 30)

their ability to function is intertwined with a resource that sometimes performs well, sometimes performs poorly and sometimes does not perform at all.

This opinion is not solely restricted to non-DP people. Some of the severest critics of computer reliability are the program development people whose own performance is directly impacted by system degradation or downtime.

Deciding which of these views most nearly reflects reality is the challenge facing most managers today. Does management accept the statistical view that the problem is insignificant, or do we accept the user's view that a major improvement is required?

The computer industry has been using the terms "availability" and "reliability" synonymously. These terms are not the same. Availability is a measure of the amount of time that the service is able to be used out of the total time it was supposed to be available. Reliability is a measure of failure of a device. It is usually expressed as amount of use before failure.

As a measure of performance, availability can be misleading. Consider the computer center that says it has an availability of 99%. Assume it is a simple configuration with a single CPU and 20 tape drives. The CPU was down four hours out of 400 — that's 99%. The tape drives were down a total of 17 hours (1 hour for one, 30 minutes for a second, 13 minutes for a third and so on) out of 8,000 hours (20 × 400). This is an availability of better than 99.8%.

It's hard to believe the center has a problem with availability like that. Upon closer examination, one might ask what the tape drives were doing when the CPU was down. That's 80 more hours of unavailability. Even more distressing is the fact that the CPU failed 12 times, and each time over eight jobs were terminated because of it. Also, one tape drive had 85 failures (both hard and soft) and, therefore, degraded job performance substantially.

Extend this example to a configuration supporting 50 or more on-line users, and it's easy to see how illusory availability statistics can be. Availability statistics can be increased by adding extra hardware, but that won't improve reliability.

After exploring the nature of the hardware failure problem, it becomes natural to explore the relationship which the user has with the vendor in this area. There is no other way to view computer failure from the user's point of view than as a problem. It may come in the form of a minor inconvenience or as a major crisis, but it is always a problem.

The impact of computer failure on the vendor is not clear-cut. While it would appear that computer failures require the vendor to expend manpower and parts, this potential inconvenience is more than offset by the income and profit derived from the charge for the maintenance service.

Maintenance Contract

Another item to be considered in exploring the user-vendor relationship with regard to hardware maintenance is the maintenance contract. This document is unique in the world of modern business. Nor does it define a level of reliability as a goal.

The only specifics in the contract are the charge to the user and the times he can expect to receive service from the vendor. Reliability statistics in this industry, for all practical purposes, do not exist. Hardware vendors have been notorious for not publicizing mean-time-to-failure and mean-time-to-repair statistics.

In responding to a question about these statistics, a vendor might explain that values for parameters such as mean-time-to-failure and mean-time-to-repair are restricted company confidential.

In continuing the explanation, he would say that these values are confidential because of their changing nature (as more and more units are in use, more accurate values can be obtained) and that reliability is still a sensitive area because of a lack of industry-wide standards.

Sensitive Issue

When you remove from this statement the reason that growing accuracy is a justification for confidentiality, the true meaning comes through.

The fact is that any vendor who controls a majority of the market can publish statistics that will set standards for the industry, but this is a sensitive issue.

If the user knew what the figures were, he would hold the vendor accountable. Knowledge of such statistics not only holds the vendor accountable, but also spurs competition among vendors.

The inability of users to hold the vendors accountable for performance because of the lack of industry standards is one of the major flaws in the industry.

Data center management pays for maintenance without any agreement as to quality or quantity or even a specified intent of service. Equipment is acquired with no written guarantee of performance.

Management spends hundreds of hours negotiating, finger pointing, arguing and threatening in order to get what does not exist for the majority — industry standards of performance.

Vogel is a marketing specialist with University Computing Co. in Dallas.

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PE Pascal Compiler Fits 32-Bit Minis

By Marcy Rosenberg
CW Staff

OCEANPORT, N.J. — Perkin-Elmer Corp. (PE) jumped on the Pascal bandwagon, introducing the Computer System Division's first implementation of the language for its 32-bit minicomputers including the Models 3240, 3220, 8/32 and 7/32.

Conforming to the Ansi draft language standard, the firm's optimizing Pascal compiler runs under the OS/32 operating system and OS/32 Multi-Terminal Monitor (MTM); users can migrate from one to the other with no changes required to the program, according to Susan E. Hoffberg, product manager, software.

With MTM, up to 64 users can share access to the compiler for developing and testing Pascal programs, she noted. In this environment, 33 to 64 MTM terminals can be supported by a minimum of 1,536K bytes, although 2,048K bytes is recommended. For one to 12 terminals, a minimum 512K bytes is required, with 768K bytes recommended.

The Pascal compiler produces optimized code that is sharable on a "pure/impure" basis. This means, Hoffberg explained, that only one fixed copy exists of the code being executed — the "pure" code — while users have their own different copies that contain the variables each is using — the "impure" code.

Other features include English language error messages for diagnosis, range checking — a capability not provided by Fortran — and a PE extension to Pascal that is said to let programmers separately copile and debug small program modules rather than having to compile the entire program at once.

In addition, tasks can run up to 16M bytes in size, Hoffberg claimed.

Available Options

PE's Pascal also supports short variable and integer types on the 32-bit processors, allowing for optimal use of available memory. For example, the PE extensions INTEGER and SHORTINTEGER are said to let users choose between a wide range of 32-bit values and the memory economy of 16-bit half-words.

With the PE Pascal implementation, programmers can directly access time management OS/32 services (without having to go through Assembly language); the firm's Fortran VII run-time library; Assembly language subprograms; and its Fortran enhancement package that contains mathematical routines coded for the Writable Control Store option on the 3240 and 8/32 processors.

The compiler supports Pascal identifiers unique to 140 characters, sets of up to 128 elements including set of characters and record compares.

First shipments will start at the end of September. First copy licenses, including documentation and one year's free maintenance, cost $5,250 on magnetic tape and $5,550 on 10M-byte disk. The fee for right of copy is $525.

PE's Computer Systems division is at 2 Crescent Place, Oceanport, N.J. 07757.

Subset of Ansi X3.74 PL/I

DEC Adds PL/I for VAX-11/780s

MAYNARD, Mass. — Digital Equipment Corp. has announced a high-performance compiler for the PL/I programming language running on the firm's VAX-11/780 minicomputer system.

The VAX-11 PL/I language addition is an extension of the proposed Ansi X3.74 PL/I general-purpose subset and is reportedly the fifth language compiler introduced this year by DEC for its VAX machine.

Advantages of the PL/I language in general include support of floating point, binary and decimal data types, arrays and structures of data, character strings and bit strings.

VAX-11 PL/I extends the subset to maintain full-file organization and access support, and to allow calls to the VAX/VMS operating system for services including Sort, Librarian and optional packages such as the forms management system.

AX-11 PL/I is intended for computers with 512K bytes or more of physical memory and is said to have the same compilation speeds as DEC's VAX-11 Fortran — between 2,000 and 3,000 lines per minute.

The single-use license fee for the software is $12,000. The package is scheduled for delivery this December, the spokesman added from the company at 146 Main St., Maynard, Ma. 01754.

'DYL-Table' Eases Tables For IBM, Compatible Users

ENCINO, Calif. — Dylakor Software Systems, Inc. has introduced a software subroutine for IBM 360, 370, 30 series, 4300s and IBM plug-compatible computers to automate the processes involved in table creation and lookup for users of its DYL-260 utility and report writer.

The DYL-Table software automatically stores and retrieves table entries and can manage up to 16 tables concurrently. Information stored in the tables can be from files of any DYL-260 supported organization or format or can be created during execution, a spokeswoman stated.

Used in both a DOS and OS environment, the software provides table load, reload and delete; sequential retrieval from any starting point; serial search starting from the beginning or from any entry within the table; binary search based on key; and random replacement functions. Applications for the package include loading a description file into a table and retrieving entries by key; building and maintaining accumulators; and buffering records for later retrieval and processing, the spokeswoman explained.

On a three-year lease plan, Dyl-Table costs $195/year from the company at Suite 808, 16255 Ventura Blvd., Encino, Calif. 91436.

Has DBMS Affected You?

A *Computerworld* Special Report on DBMS will attempt to explore issues relating to the selection, implementation and organizational impact of DBMS software. Contributed articles on user experiences, technological trends, product comparisons and evaluations and on what the future holds, are welcome.

Please send articles — along with any charts or graphs — by Sept. 30 to Marcy Rosenberg, *Computerworld*, 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.

Texts should not exceed six double-spaced typewritten pages.

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'Unet' Brings Communications to Unix Users

MENLO PARK, Calif. – 3Com Corp. has introduced, in cooperation with Microsoft, Bellevue, Wash., its Unet communications software that provides communication among computers running under the Bell Laboratories Unix operating system.

Unet transfers files, connects remote terminals and carries electronic mail. It implements recently standardized packet internet protocols and related services developed by the U.S. Defense Advanced Research Projects Agency.

Unet software is installed on customer hardware along with Unix operating system software and drives communication services.

From a terminal connected to a local Unix a user can direct the Unet File Transfer Program (FTP) to connect with another Unet FTP running on a remote Unix. After submitting a password, a user can manage files on the remote Unix file system. Unet can list the names of a user's remotely stored files and files can be transferred between a local and a remote Unix.

Again from a terminal connected to a local Unix, a user can direct the Unet Virtual Terminal Program (VTP) to connect with another Unet VTP running on a remote Unix. After submitting a password, the user can then operate the remote Unix as if the local terminal were directly connected to the remote Unix.

A user can direct the Unet Mail Transfer Program (MTP) to take a message typed by the user at a local terminal and distribute it into the electronic mailboxes of a list of users on the local Unix or, using the Unet FTP, users whose mailboxes are on remote Unix file systems.

Unet, like Unix, is written in the portable high-level programming language C. Unet can be used by sites running Unix on Digital Equipment Corp. PDP-11 systems, but most Unet users will be operating 16-bit microprocessors including the Intel Corp. 8086, Zilog, Inc. Z8000 and the Motorola, Inc. 68000.

The first customer release of Unet, called Unet 1.0 will be ready for delivery with documentation in the fourth quarter of 1980. The Unet communication software is licensed following the approach adopted by Western Electric for Unix licenses. Right to use source licenses are offered to end uses and right to distribute binary licenses are offered to OEMs.

3Com offers installation and maintenance support. The Unet source license for the first CPU is $7,300 and is $4,300 for each additional CPU from 3Com, 3000 Sand Hill Road #1, Menlo Park, Calif. 94025.

'Easyentry' for DEC Machines Offers High-Volume Data Entry

CHAPEL HILL, N.C. – The Easyentry data entry system for Digital Equipment Corp. PDP-11 and VAX computers has been introduced by Applied Information Systems, Inc.

The full screen system supports high-volume data entry on a variety of CRT terminals. An interactive screen editor allows the user to create and maintain his own library of forms, the firm said.

During data entry, the required forms are displayed on the screen and the entry operator uses a "fill in the blank" technique.

The Easyentry performs range and validity checks. Field defaulting to values contingent on values in other fields and other forms may be required. Split screen forms and forms chaining are also featured.

Since the data entry code can be shared by all the data entry users, many terminals may be supported with little memory overhead, the firm said. Multiple forms libraries, each with many forms, allow new applications to be developed and tested without disrupting existing production work.

Easyentry is supported under RSX-11M, IAS, RSTS/E and VAX/VMS. It is written in AIS-PL/I but does not require the PL/I compiler for operation, the firm said.

A single machine perpetual license is $4,000 and includes one year of maintenance support from the vendor at Suite 207, 500 Eastowne Drive, Chapel Hill, N.C. 27514.

Package Lets IBM 5280s Run Job Stream Tasks

JEFFERSON CITY, Mo. – Software Systems, Inc. recently unwrapped a software package for IBM's 5280 distributed data system that gives the computer the ability to execute job stream procedures that control program loading, dataset and device assignments, and issue operator messages.

The Job Stream Supervisor is written in a programming language similar to that found on IBM's System/34 minicomputer, a spokesman claimed. Procedures are compiled and placed in a library data set. Parameters entered by the operator can be substituted for compiled parameters to modify the generated job stream and control the execution of the procedure.

The package is designed primarily for business DP and will be available within the next month for a license fee of $500.

Multiple copy discounts are also available from the company at P.O. Box 1766, Jefferson City, Mo. 65101.

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Financial Modeling Tool Gives Planners Reports

MOUNTAIN VIEW, Calif. — A financial planning and modeling system for Hewlett-Packard Co. HP 3000 minicomputers that is said to give planners the ability to create individual, consolidated or batch reports is now available from International Environment Research, Inc. (IER).

Designed for the planning executive rather than the programmer, Plan-It can be used for modeling and forecasting, financial analysis and budget vs. actual performance reporting. The software automatically handles report formatting, including report overflow, and allows the use of standard reports so users need only supply data and not seperate information for each individual, a spokesman said.

The package reportedly uses simple commands to structure the model and reports and can handle a variety of alternative problem solutions, he added.

The software costs $10,000 including all documentation, object code, installation and training. The firm is also offering the software on a time-shared basis for users without access to an HP 3000.

IER is located at 1916 Old Middlefield Way, Mountain View, Calif. 94043.

HP 3000s Get Graphics

PALO ALTO, Calif. — Hewlett-Packard Co. has announced an interactive graphics software product to aid nontechnical users in creating fully annotated line graphs, horizontal and vertical bar charts, pie charts and scattergrams.

The HP Decision Support Graphics/3000 runs on HP 3000 computer systems of Series 30, 33, II and III. Access is by menu-driven, fill-in-the-blanks prompts on a CRT screen.

The product also incorporates graphics with other DP operations via a set of high-level procedure calls that can be used by any of the computer's familiar business languages, Cobol, Basic, Fortran and HP's SPL, the vendor claimed.

Once a graph is specified, it can be stored for future recall and those specifications are kept separate from data, so new graphs can be produced from time to time and updated with no need to respecify form, a spokesman said.

The price of the system is $6,000 plus $60 a month for support, HP said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

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'CA-Dynam/T' Updated With 25 Enhancements

JERICHO, N.Y. — Twenty-five enhancements amounting to more than four man-years of development work are now being offered with CA-Dynam/T, a tape management system for DOS/VS and DOS/VSE users for Computer Associates.

The system will now support both Version 1 and 2 of the IBM DOS/VSE operating system, as well as fixed block architecture Direct Access Storage Devices on which the product's catalog file may be stored.

One of CA-Dynam/T's enhancements is an integrated catalog file structure that enables other CA file management products to communicate with each other for tape disk and unit-record processing.

Other enhancements include the ability to run in the shared virtual areas, thus reducing system overhead, support for multiple operating systems including DOS/MVT, EDOS/VS and DOS/VS and DOS/VSE and an on-line access module.

An optional update of catalog files is included. An installation procedure allows the user to select or modify system options through a "generation macro."

CA-Dynam/T 4.0 may be acquired for $7,500 on a perpetual license from Computer Associates, 125 Jericho Tnpk., Jericho, N.Y. 11753.

D&D Custom Adds Accounting Tool

CHENEYVILLE, La. — D&D Custom, a software house here, has developed a construction application package for IBM System/3, 32, 34 and Univac BC/7, 90XX series and V77 machines that can perform payroll, general ledger and transaction tracking chores.

The total construction information management system (TCIMS) is geared to run on the above computers supporting RPG-II, disk sort, Isam and Isam file processing and comes in two parts.

Part one consists of payables, general ledger and job cost; and part two involves payroll.

Basic features of both parts include a one-time entry of transactions, automated prevailing wage by job or union, automatic overtime calculations, certified payroll registers and the ability to produce time sheets and balancing reports.

The package was designed to meet government, bonding company, financial institution and auditing requirements, a spokesman said.

The base price for the software is $8,500 for part one and $5,500 for part two.

However, discounts are available for cash purchases and lease and rental plans are also offered by the firm. The purchase and lease prices include the software's source code, the spokesman added.

D&D Custom is located at Rt. 1, Box 125A, Cheneyville, La.

ADS Report Display Package Cuts Print Time and Paper

SANTA ANA, Calif. — Application Development Services has introduced a report display package called Page/-Manager for IBM's System/34.

The package is menu-driven and can be used for displaying, reprinting and archiving reports. It gives immediate visual access to reports and cuts print time and paper, the vendor said.

The package costs $204, from the vendor at 1700 East Dyer Road, Santa Ana, Calif. 92705.

NCA Module Calculates Fixed Assets

SUNNYVALE, Calif. — A module that maintains comprehensive fixed asset information and provides asset accounting/property management reporting has been introduced for the NCA Corp. FS-11 Financial System.

Completely integrated with NCA's FS-11 financial and MS-11 manufacturing systems software, the Fixed Assets System calculates and distributes depreciation for all applicable assets, the firm said. Depreciation is maintained and calculated for both corporate and tax accounting, with automatic verification of data and entry of journal vouchers into the general ledger.

Multiple depreciation methods featured with the module include straight line, declining balance with specified percentage, sum of years digits and allowances for other methods, the vendor noted.

Assets may also be automatically converted to straight line depreciation at the optimum time.

The first purchase of any NCA software module costs $18,000 and subsequent purchases cost $7,000 from NCA Corp., 388 Oakmead Parkway, Sunnyvale, Calif. 94086.

Education Meet To Run in Fall

ATLANTA — A two-day seminar on "Designing Software Education" will be held in Atlanta (Oct. 16-17), San Francisco (Oct. 30-31), Boston (Nov. 13-14) and Washington, D.C. (Nov. 20-21) by Shirley Mixon Seminars.

The course was developed for managers and training personnel charged with user and internal education. It will describe low-cost procedures for developing education programs that can be utilized early in the development process, Mixon said.

The registration fee is $495 per person. More information is available from Shirley Mixon Seminars, 4549-E Northside Parkway, Atlanta, Ga. 30339.

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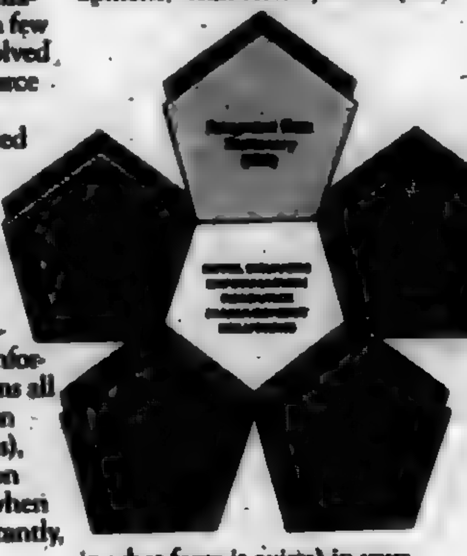

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At 'Competitive' Rates

RCA Globcom Proposes Domestic Telex

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – RCA Global Communications, Inc. (RCA Globcom), one of the four major U.S. international record carriers (IRCs), wants to offer data communications services within the U.S.

In a petition filed with the Federal Communications Commission (FCC) earlier this month, the company requested authority to interconnect the nation's 26 largest cities via voice-grade private line circuits leased from AT&T and/or other domestic communications carriers.

Initially, RCA Globcom would provide telex, but it also wants permission to tariff domestic versions of its other presently offered international services. These include facsimile, a 2,400 bit/sec Datel offering and LSDS, which provides packetized transmission at up to 9,600 bit/sec.

The proposed domestic telex service will feature enhancements RCA Globcom now offers its international customers, including direct distance dialing, one-digit dialing, store-and-forward capability and automatic redialing when the first attempt to complete a call fails.

Rates will be "competitive" with those charged by Western Union Telegraph Co., the company said, adding that certain of the enhancements "are not yet available from Western Union." An RCA Globcom spokesman, queried on this point, said the telegraph company does not offer one-digit dialing and provides only "limited" store-and-forward capability.

The RCA filing is the latest development in a drama that began last year when the FCC opened the international communications market to increased competition.

Specifically, the commission allowed Western Union Telegraph Co. to transmit telex messages abroad via Canada and Mexico; increased the number of cities within the U.S. that could be served directly by U.S. IRCs; permitted two new entrants – Consortium Communications, Inc. (CCI) and International Relay, Inc. (IRI) – to offer international telex service at cut rates; authorized AT&T to add a Dataphone offering to its international voice services, thereby providing an alternative to international telex; and told the IRCs they could add voice services to their existing datel offerings.

International Access

One result of these decisions was to give a much greater number of customers direct access to international networks. For example, in addition to Western Union's new international telex service via Canada and Mexico, ITT Domestic Transmission Systems has interconnected its facilities with the international telex network of its affiliate, ITT Worldcom.

Another result of last December's FCC decision has been to increase the diversity of international telex offerings. In addition to the low-cost services now being provided by CCI and IRI, there is Multilink, offered jointly by TRT Telecommunications Corp. and Western Union, which was designed for users with large traffic volumes.

(Continued on Page 40)

Burroughs CP 9500 Additions Can Serve as DDP Net Hosts

DETROIT – Burroughs Corp. has unveiled two communications processors that reportedly feature twice the internal speed and main memory capacity of its entry-level model.

The additions to the CP 9500 series are the CP 9558 and the CP 9572. They are used to interlink remote DP operations and local networks of terminals with each other and central computers to form data communications networks of virtually any size, the vendor claimed.

They can operate with Burroughs and non-Burroughs mainframe computers and terminals and interface with packet-switching networks, a spokesman said. Because of their local DP capabilities, they can also function as a host in a distributed data processing (DDP) network, he added.

The CP 9500 series utilizes an adaptation of the dedicated processor architecture employed in the vendor's general-purpose computers. Instead of a single, multipurpose CPU, the systems use a number of autonomous, simultaneously operating processors, each of which is optimized for and dedicated to a specific processing function.

As a user's needs change, a CP 9558 or CP 9572 can be expanded on-site by adding processors, more memory or both. The CP 9558 can be expanded to a six-processor system by adding two application processors or one application processor and one data communications processor, the vendor claimed.

Both models use Burroughs software, including Computer Management Systems (CMS), Computer Management Distributed Information System (CDMIS) and Transaction Control System (TCS).

Prices for the system depend on configuration, but average $39,148 for purchase or $1,148 per month on a three-year lease on the CP 9558. The average CP 9572 averages $65,130 for purchase or $1,906 on a three-year lease, the vendor said from Detroit, Mich. 84232.

Device Eases Troubleshooting

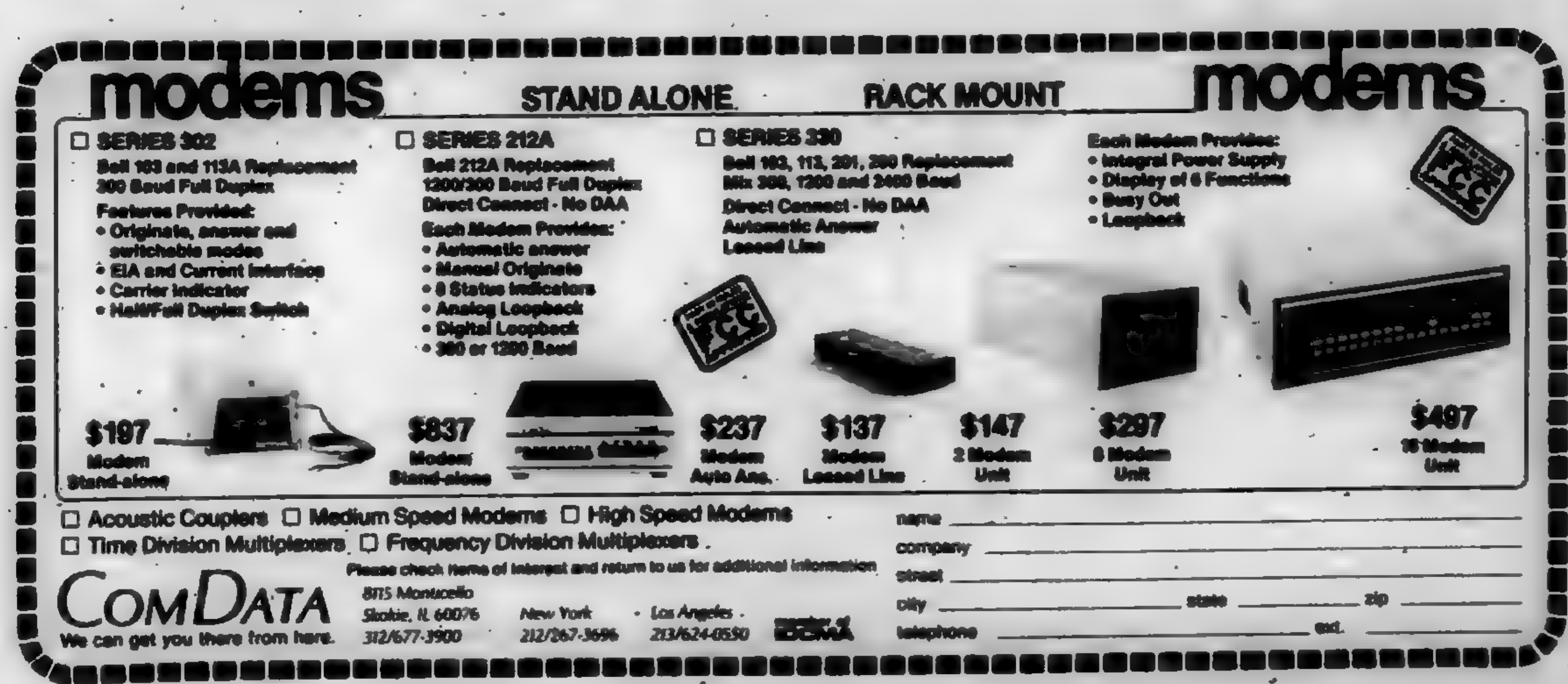
ALTAMONTE SPRINGS, Fla. – The Series TC 500 Tech Control from Epicom, Inc. is designed to facilitate troubleshooting and reduce down-time by providing fast fault isolation and permitting users to bypass failed circuits or equipment through a centrally located patching capability.

The free-standing unit has rack space for diagnostic and recording instruments such as the firm's Epiview or Episolver data line monitors, the Epitape data line recorder and the Epilert data link analyzer.

The equipment allows user monitoring and will indicate when a failure has occured, isolates the problem area, provides a method of rerouting traffic to bypass the fault and restores service, the firm said.

Patented digital patching can be performed via the 25 standard EIA leads, between computers or terminals and incoming or outgoing modem signals with analog patching.

Series TC 500 Tech Control centers in the standard 16-channel digital patching and slope front-rack configurations are available within 90 days and cost $1,925 with additional patching and equipment available as options from Epicom at 592 North Douglas Ave., Altamonte Springs, Fla. 32701.



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Management System Controls Large Networks

BOHEMIA, N.Y. — Amdax Corp. has unveiled a network management system designed to help managers maintain central control over large data communications networks.

The Virtual Monitor incorporates automated systems and procedures executed on the network's host mainframe computer.

It enables management to constantly monitor all network activity, track day-to-day reliability and efficiency, measure performance of vendors and users and spot problems early, the vendor claimed.

Virtual Monitor has three basic elements:

- A software package written in Cobol called Crisp (Call, Response, Information and Service Program) which runs on the user's mainframe and continuously records and reports on every element of a network's operation.
- Establishment of an overall network control center staffed with one or more "receptionist level" call directors. The call director receives all incoming calls, problems or inquiries and enters the data into the on-line CRT terminals.
- Hardware requirements which depend upon the user's existing configuration and equipment (normally, no additional hardware is needed). A typical configuration would include an IBM mainframe running on-line applications under CICS or IMS and using 3270-type terminals.

The automated system is transaction-driven and a complete and current record of all operational events is stored in a central data base, the vendor noted. This information is used automatically to warn management of potential trouble spots that require immediate attention.

A manager may access that data by entering his security code into any of the CRT display terminals attached to the system.

The system costs $4,000/mo and there is a $7,900 one-time installation charge, the vendor said from 160 Wilbur Place, Bohemia, N.Y. 11716.

Two Smart Terminals Join Perkin-Elmer Owl Family

FLANDERS, N.J. — Perkin-Elmer Corp.'s Terminal Division has announced two smart terminal additions to its Owl line — the Model 1251 Super Owl and the Model 1245 OEM Owl.

The 1251 is intended for time-sharing end users and also systems houses. The terminal has 400 bytes of nonvolatile storage that can be accessed through user-programmable function keys. In addition, everything from communication and printer port settings to selectable lockouts on various key groupings can be keyboard-entered or down-loaded from the host CPU.

The 1251 has a standard printer port that can be used to output screen contents to a printer, print host data without displaying it, skip headings on preprinted forms or operate in other modes when interfaced with most RS-232C serial printers.

The 1245 offers modular construction and is similar in design to the 1251. The OEM version can also be hooked up to a printer or light pen and requires no operator access to settings and controls.

Both terminals include a 25th communications line for status information, a full complement of editing capabilities, a forms-drawing character set and anti-glare provisions. Optionally available phosphor display colors can be obtained in green and amber.

The Model 1251 costs $1,895 while the Model 1245 sells for $1,695 from the firm at 360 Rt. 206 S., Flanders, N.J. 07836.

Tuck 1,200 Bit/Sec Modem Serves As Replacement for Bell 202S

CAMP HILL, Pa. — Tuck Electronics, Inc. has introduced the Tuck Model 1653 modem which, when used with the Tuck Model 1912 data coupling unit, forms a replacement for the Bell 202S when reverse-channel signaling is not required.

The Model 1912 serves as a manual originator and provides an alternate voice/data facility. When combined with the Model 1653, it makes an exact 202S replacement, the firm stated.

Field-selectable options include the squelch and data lockout circuits. Soft turn-off is standard. The 1653 may also be used in a four-wire, full-duplex configuration for leased lines in either one-to-one or polling network systems, according to Tuck.

The Model 1653 costs $275, and the 1912 $92.50 and $127.50 in a Touch-Tone version called the 1912T. More information is available from B.C. Hill, Tuck Electronics, Inc., 3645 Industrial Park Road, Camp Hill, Pa. 17011.

RCA Globcom Proposes Telex For U.S. Users

(Continued from Page 39)

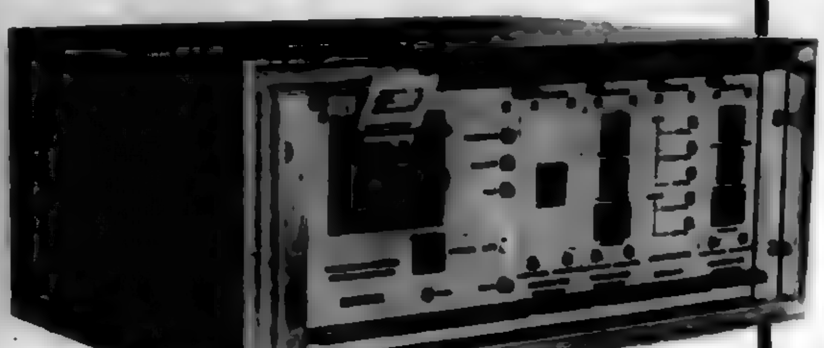
But so far, competition in the domestic telex market is still relatively limited. In 1976, the FCC allowed Graphnet Communications, Inc. to compete with Western Union.

Despite that action, as RCA pointed out in its recent petition to the FCC, Western Union "for all practical purposes continues to be the dominant provider of domestic telex/TWX services."

RCA, if allowed to enter this market, "can reasonably be expected to introduce beneficial competition in terms of both rates and services," the company added.

It also appears likely that if RCA's petition is granted, TRT and Western Union International will propose similar services.

According to a knowledgeable source, an announcement along these lines may be forthcoming from TRT "shortly."



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Infotron Systems Offers Auto-Answer Modem

CHERRY HILL, N.J. – A Federal Communications Commission-registered, auto-answer modem for central computer and remote multiplexer sites has been introduced by Infotron Systems Corp.

The DL 212B answer-only unit is end-to-end-compatible with all call-originating Bell 103, 113, and 212 modems and may be directly connected to the switched network without requiring a data access arrangement (DAA).

The unit operates full duplex over two wires at up to 300 bit/sec asynchronous and at 1,200 bit/sec synchronous or asynchronous. It automatically identifies the calling modem and the speed of operation with no changes to existing protocols. It improves efficiency by eliminating the need for separate speed-dedicated 300- and 1,200 bit/sec port groups, the vendor said.

The enclosure occupies 7 in. of rack space and accommodates up to eight DL 212B modem modules. Modules may be removed from the front without disconnecting EIA or telephone line connections, the firm said.

Also housed in the enclosure is a master test module with eight LED indicators to display the status of selected modems.

The DL 212B will not answer a call until at least one second has elapsed following disconnect of the previous call, allowing time for the computer port to be cleared and thus ending "tailending" problems. Additionally, failure of an individual module will automatically cause only the line to go busy and will not affect other lines.

The DL 212B costs $750 per line plus $625 for the eight-modem rack, power supply and master test module from the vendor at Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Protocol Converter/Emulator Replaces 3271

CAMBRIDGE, Mass. – A protocol converter and emulator that is said to permit users to interface asynchronous terminals to IBM-compatible processors is available from Industrial Computer Controls, Inc. (ICCI).

The CA12-TCP converter reportedly eliminates modems in many applications and permits portable asynchronous terminals to communicate with a host processor over standard dial-up telephone lines. A typical configuration supports four terminals and provides a 16K-byte buffer memory, a spokesman said.

Emulating the IBM 3271 cluster controller, the converter supports up to eight asynchronous terminals as 3277-type devices by performing all screen formatting functions and interpreting keystroke sequences to provide editing and cursor movement controls.

The rack-mountable CA12-TCP costs $5,400 for a typical configuration.

ICCI is located at 196 Broadway, Cambridge, Mass. 02139.

Seminar Covers Cryptography

PALO ALTO, Calif. – A one-day seminar executive summary of its cryptography and data security seminar is being offered by Hellman Associates on Oct. 20 in Los Angeles and Nov. 10 here.

Cryptography is the study of codes and ciphers for protecting information. It has assumed new commercial importance because of the rapid computerization of information processing and transmission, Hellman said, adding banks are its primary users.

The seminar is intended for executives and managers responsible for DP, telecommunications, corporate operations, security or planning. The registration fee for individuals is $295, Hellman said from 299 S. California Ave., Palo Alto, Calif. 94306.

Telex Touts Terminals With Color Brochure

TULSA, Okla. – A six-page full-color brochure describing IBM-compatible terminals, Ascii terminals and accompanying printers plus plug-compatible peripherals including magnetic tape subsystems, disk storage subsystems and train printer systems is available from Telex Computer Products, Inc.

A copy of the brochure may be obtained from the firm at 6422 E. 41st St., Tulsa, Okla. 74135.

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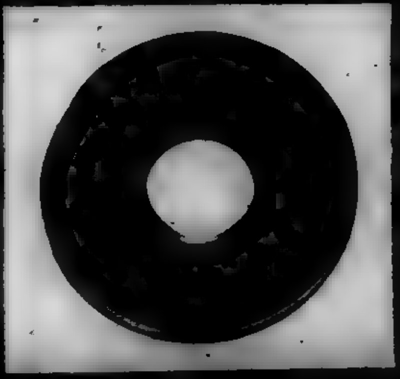

The Zenith Smart Terminal.

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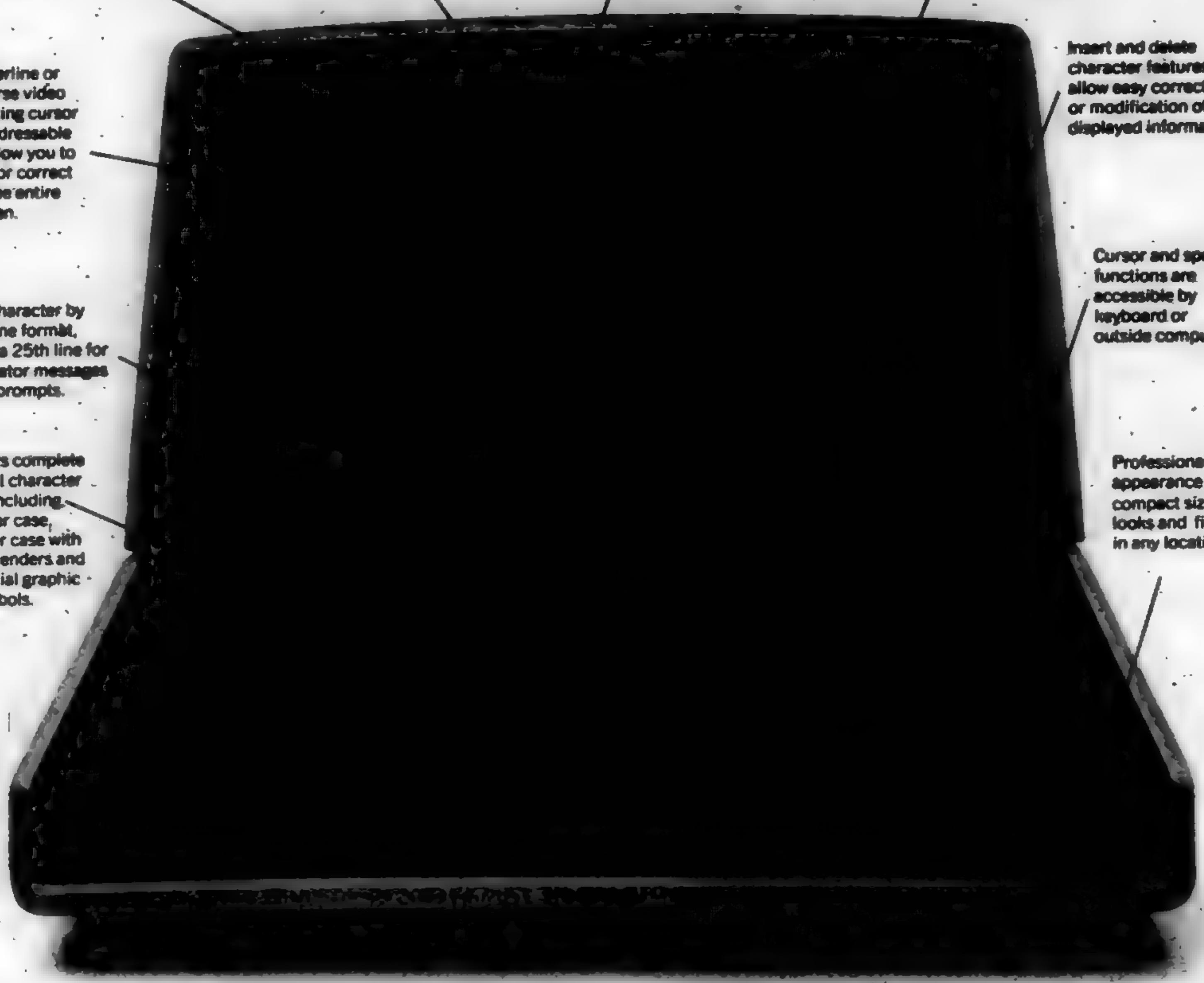

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Based on Josephson Junctions

IBM Tests Superconducting Technique

YORKTOWN HEIGHTS, N.Y. — Scientists at IBM's Thomas J. Watson Research Center here have demonstrated an experimental system that measures ultrafast electrical signals with what IBM said was "unprecedented resolution and sensitivity."

The ability to measure ultrafast signals is valuable in a number of engineering and research fields in which phenomena occur on a time scale as short as picoseconds (trillionths of a second), IBM said.

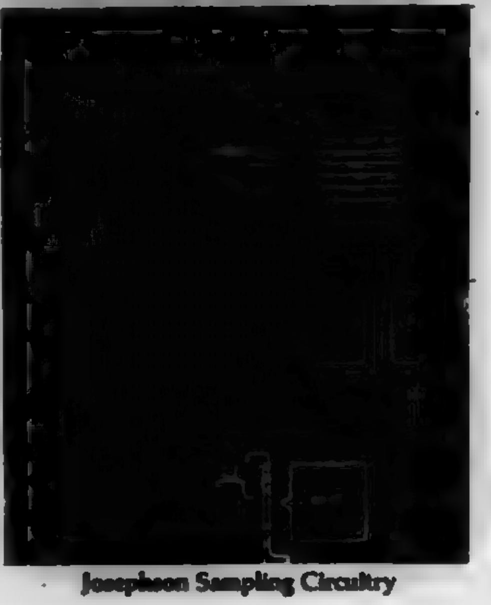
Developed as a by-product of IBM's research effort to incorporate Josephson tunnel junctions in computer logic and memory circuits, the system was designed to reproduce the waveform of repetitive signals and display it on a calibrated oscilloscope screen or strip-chart recorder for measurement, according to an IBM spokesman.

Resolution of the system is said to be 6 psec, and researchers believe that the ultimate limit to the resolution, the switching speed of Josephson tunnel junctions, could be pushed closer to the subpicosecond domain if the capacitance of the junctions is reduced, or if a superconducting electrode material with a higher transition temperature is used in the junctions.

Josephson tunnel junctions are the fastest known low-power switches, the spokesman said. They consist of two superconducting electrodes that are separated by a layer of insulator so thin that supercurrents of electron pairs can pass from one superconducting electrode to the other, up to some maximum supercurrent. When that maximum current is exceeded, the device switches extremely rapidly from a nonresistive to a resistive state, IBM explained.

The research effort to apply such devices to computer technology requires a technique for measuring repetitive, ultrafast signals in a cryogenic environment, the spokesman continued. IBM researcher Sadeg M. Faris invented and patented such a technique, which is a cryogenic version of a measurement scheme called sampling.

Previous systems performing similar measurements were described as hybrid and required the use of a room-temperature sampling oscilloscope, according to IBM. Faris' work, together with extensions provided by David Tuckerman, an MIT student doing research at IBM, led to the experimental system.



Josephson Sampling Circuitry

The sampling system, dc sampling oscilloscope, provides a reproduction in the shape of the signal to be measured, he said. That reproduction is a reconstructed waveform rather than a direct display of the signal itself and is formed by repetitively measuring or "sampling" subsequent signals at well-defined time intervals so that an image of the waveform is built up piece by piece, IBM explained.

Possible Applications

In addition to being successfully used in performing tasks of value to the Josephson

(Continued on Page 46)

Tally T-1612 Printer Options Include Matrix Print Head

KENT, Wash. — A matrix print head for printing lowercase descenders and the capability of red and black printing are options now being offered with the Tally Corp. T-1612 1,200 bit/sec printer.

The nine needle print head design allows Tally users to have APL capability.

Underlining and lowercase descenders are printed without sacrificing printer speed, Tally said. The T-1612 prints bidirectionally at 160 char./sec and slews to the next print position at 48 in./sec.

Ribbon Option

The black and red ribbon option allows the user to employ the same shift principle as a typewriter to achieve two-color printing and is useful in accounting applications for signaling debits or highlighting numbers, or for interactive communications whereby answers and requests can be color-differentiated, according to Tally. The T-1612 also has double-wide character printing and, with the added function of red printing, the user can highlight portions of text.

Both options to the T-1612, which offers 42 standard programmable functions, are priced at $150 from Tally at 8301 S. 180th, Kent, Wash. 98031.

Portable Device Monitors Power Line Disturbances

SUNNYVALE, Calif. — Franklin Electric Co. has unveiled a portable, multipurpose three-phase ac and single-channel dc power line disturbance monitor.

The Model 3600 monitors ac voltages in the 50V to 800V range. A microprocessor and 7K-bytes of read-only memory and random-access memory are used to detect, process, analyze and classify disturbance data, the vendor claimed, adding that a microcomputer provides the alphanumeric ouput.

Some features include six ribbon-connected p.c. cards which may be removed for service or repair, LED digital display, keyboard data entry, in[illegible]PS, internal calibrator and pulse po[illegible]

The unit weighs under 20 lb and comes shock-suspended in a 12 in. by 18 in. by 7 in. briefcase.

Introductory prices start at $3,700 for a single-phase unit and range to $4,800 for the three-phase Model 3600, depending on model and options, the vendor said from 995 Benicia Ave., Sunnyvale, Calif. 94086.

IBM Users Get Link to 3M COM Systems

ST. PAUL, Minn. — An on-line/off-line interface that allows users of IBM 360, 370, 30 series and 4300 series computers to operate their 3M Corp. computer output microfilm (COM) systems directly on-line is available from 3M.

The Channel Control Unit, which can be added to any 700 series COM system from 3M, permits users to order Model 715 COM systems with or without tape drives, as their needs dictate, according to the firm.

The microcomputer-controlled interface functionally simulates a 2803/3803 tape drive controller. With tape drive simulation, two-way communication with the CPU is possible allowing future user developed programs such as job accounting and master summary indexing.

The 700 series COM system operate at speeds averaging from four to five pages per second, depending on factors such as number of lines per page, printing character density and editing and enhancement features used, the vendor said.

The Channel Control Unit, located in the Command Console of the COM system, consists of a 32K microcomputer, a general-purpose IBM channel-to-microcomputer interface and a microcomputer-to-COM minicomputer interface.

Available in the fourth quarter, the unit will cost $19,000 from 3M, P.O. Box 33600, St. Paul, Minn. 55133.

The Channel Control Unit

Link Gives VAX Users Access To Calcomp Printer/Plotter Line

ANAHEIM, Calif. — An interface that allows Digital Equipment Corp. VAX-11/780 users to access California Computer Products, Inc. 5000 series electrostatic plotter/printers (EPP) is available from Calcomp.

The interface, installed on the VAX-11's Unibus, is word buffered (16-bit) and uses the direct-memory access mode to transfer data.

A stand-alone test program provides quick or extensive checkouts in three operating modes: alphanumerics, low- and high-speed graphics.

Optional software, which includes a pilot package and device driver, opens up Calcomp's library of application and functional software to the VAX user, the vendor claimed.

The interface is priced at $2,260, the vendor said from 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Los Angeles to Host First Meet Of Xerox 9700 Printer Users

LOS ANGELES — The first national meeting for users of the Xerox Corp. 9700 electronic printing system is scheduled for Oct. 26-29 at the Airport Hyatt Hotel here.

Xerox 9700 users from throughout the U.S. and Canada will meet with representatives from the Xerox Printing Systems Division to discuss applications, operational performance, facility visits and Xerox demonstrations.

Xerox product plan discussions and special interest group meetings will also be held on topics such as software fonts, graphics, text printing and word processing, to name a few.

Further information can be obtained from Joel Cartun, president, Comvestrix Corp., 1501 Broadway, New York, N.Y. 10036.

Modutest Offers Sigma Upkeep

PHOENIX — Modutest Systems, Inc. has begun offering complete maintenance capabilities for the Sigma computer originally developed by Scientific Data Systems.

Modutest will offer first line maintenance as well as backup support for customers who perform their own maintenenance. The new group will be offering Sigma hardware as well as software training classes.

Modutest is at Suite 6, 10632 N. 21 Ave., Phoenix, Ariz. 85029.

Systems Analysis Topic of Course

STORRS, Conn. — A three-day seminar for systems and management personnel on "Computer Systems Analysis and Design" is being sponsored by the University of Connecticut here Oct. 20-22.

The seminar is designed to help staff analyze the organization's needs, define systems problems, develop a complete systems study plan, identify information requirements and determine cost-effective systems elements, as well as define other skills.

The course fee is $540 and includes lunches and all meeting materials. Group discounts are available.

Further information may be obtained from Caren Dickman, seminar administrator, or Pat Andrews at Management Development Programs, University of Connecticut, Box U-56D, Storrs, Conn. 06268.

IBM Tests Superconducting

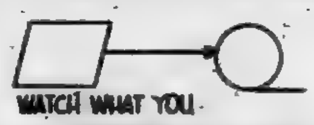
(Continued from Page 45)

computer effort, IBM stated that the Josephson sampling technique could be used to investigate the dynamical details of Josephson junctions themselves.

Another potential application of the technique is in the study of nonequilibrium superconductivity in the transient state, the representative said.

While most investigations in this field have involved the steady state, measurements of the transient state in a cryogenic environment can provide data about a number of superconductivity parameters, he said.

Finally, IBM speculated that the technique might be extendable to measuring waveforms of other than electrical pulses because Josephson devices are also sensitive to optical signals.



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Micro-Based Business System Bows

PORT WASHINGTON, N.Y. — A microcomputer-based small business system with a built-in keyboard, CRT terminal and two dual-sided floppy disk drives, is available from Micro Card Systems, Inc. here.

The MCS 7000 has 64K bytes of memory and features an RS-232C port that can be interfaced with standard teletypewriters, dumb terminals or even tied into a compatible mainframe, a spokesman said. The unit has a full Ascii keyboard, a nine-key cursor, a 12-key numeric entry keypad and 15 special keys for custom symbols. The CRT display is a 12-in. screen and features reverse video, halftone, field, character blinking and an addressable cursor.

Geared to work in a business environment, the 7000 system works with MCS off-the-shelf software that can be modified to suit individual requirements. Some standard programs include accounts payable, accounts receivable, mailing lists, payroll, word processing, inventory control, general ledger and sales charts, the spokesman added.

In addition, the computer can handle several programs consecutively by changing the floppy disk.

Price of the system starts at $4,995 for the computer and basic software to $9,995 for a complete business package with the firm's high-speed printer and custom software.

MCS is located at 185 Main St., Port Washington, N.Y. 11050.

The MCS 7000

Buying a Mini — Part 3

Contracts Designed to Protect Vendors

By Nander Brown
Special to CW

WASHINGTON, D.C. — You've conquered the initial hardware selection hurdles, suffered the preliminary acquisition blues and are now ready to purchase your dream computer system. The worst is over, right? Wrong. Contract time is here, a time for committing vendors to schedules, prices and other agreements.

Most computer contracts were designed by the vendor to protect the vendor's interest, not the users', and in many ways they are vague, ambiguous and lack definition and objective standards. Users can never be sure of what they are getting or to what contractual right they are entitled.

This is Part 3 in a series of articles on buying a minicomputer.

For some unjustifiable reason, the majority of computer acquisition contracts are put together with virtually no involvement by the user's legal counsel. The vendor's lawyer will certainly review every contract term before the contract is signed. You should be represented by legal counsel prior to the signing of the contract.

Regardless of the type of acquisition method, your lawyer should insist that the following be included in the contract:

1. Delivery date.
2. Acceptance and performance test.
3. Warranties (for software and hardware).
4. Equipment expansion rights.
5. Maintenance response time.
6. Backup and equipment rental credits.
7. Software modification.
8. Defaults.
9. Taxes.
10. Patents or copyright infringements.

One final note of caution: The

(Continued on Page 48)

Sentinel Adds To Mini Line

CINCINNATI — Sentinel Computer Corp. has unveiled the Model 80 minicomputer system, featuring an enlarged data storage unit.

The standard configuration for the system is a single 16-bit microprocessor, 128K-bytes of main memory, a double-density 800K-byte diskette drive, an 80M-byte removable hard disk drive, two 1,920-char. CRT terminals, a 150 char./sec printer, a workstation cabinet, a four-channel controller board and a peripheral interface panel.

The system may be expanded to provide up to four 80M-byte or four 300M-byte removable hard disk drives, the vendor said.

The Model 80 costs $48,500, Sentinel said from 9902 Carver Road, Cincinnati, Ohio 45242.

Tape Subsystems Fit VAX-11/780, PDP-11

HOUSTON — Two tape subsystems compatible with Digital Equipment Corp. VAX-11/780 and PDP-11 computers and support 800-, 1,600- and 6,250 bit/sec tape densities have been introduced by Information Products Systems, Inc. (IPS).

The System 780 tridensity tape subsystem incorporates a 32K-byte first-in, first-out buffer to minimize Unibus bandwidth loading and allow simultaneous I/O transfers to other high-performance peripherals such as plotters and array processors.

The second subsystem, the System 11, incorporates a 4K-byte first-in, first-out buffer and supports command and status functions of DEC's TU/10 magnetic tape subsystem while providing additional functions.

Both the System 780 and 11 operate at 125 in./sec and are fully integrated and tested by the firm. The subsystems sell for about $40,414 with installation and maintenance fees extra and based upon the user's locale.

IPS is located at 6567 Rookin, Houston, Texas 77074.

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HP-85s Get RS-232C-Compatible Links

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced three interfaces for its HP-85 desktop computer that allow the user to connect a variety of peripherals and instruments including serial printers and measurement devices. All of the interfaces are RS-232C-compatible, have a general-purpose I/O and accommodate binary-coded decimal communications.

The first interface, a general-purpose card, provides bit-parallel byte- and word-oriented interfacing and is aimed at wide data path applications. The GP-IO card has two low-power bidirectional ports and two high-current ouput-only ports. Users can configure the card as four separate eight-bit ports, two 16-bit ports, or two eight-bit and one 16-bit ports.

Common uses of the card include interfacing to printers, paper tape readers, punchers and card readers, a spokesman claimed.

The second interface, a binary coded interface card, is a digit-parallel interface device which can output up to 11 binary coded decimal digits. The card can accommodate up to two instruments. Typical applications include the automatic monitoring of voltmeters, counters, medical equipment and electronic scales.

The third and final card is a serial interface that is said to provide the HP-85 with bit-serial asynchronous communications capabilities. The device supports both RS-232C and current loop operations, the spokesman noted.

Features of the serial interface include programmable line characteristics, which let the user change transmission rates, parity, bits per character and stop bits without changing physical switch settings. The device also has a full-duplex with I/O buffers to prevent loss on incoming data while transmitting, and a full 20 mA current loop, the spokesman pointed out.

The serial interface also lets users link the HP-85 to a serial printer that can be used in conjunction with the computer's built-in thermal printer. Communication through a modem over telephone lines is also possible via the serial interface.

The GP-IO and Binary Coded Decimal interface cards cost $495 each, and the Serial Interface card sells for $395 from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Introducing the New RAYNET/II:

THIS COULD BE YOUR BRIDGE TO SNA.

RAYNET/II data communications systems from Raytheon Data Systems will provide your existing 3270-type bisynch network with increased functionality and performance, and still protect your present investment in terminals for the future.

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Monthly line costs are lowered by the remote line concentration capability in RAYNET/II systems. Lowering communications overhead on host mainframes is another of the ways RAYNET/II processors can improve your network. The network is decoupled from the hosts, and communications functions are handled directly.

When you are ready for SNA, your RAYNET/II processor will remain totally compatible, and totally productive.

For more information on RAYNET/II or other RAYNET family members, call the RAYNET marketing director at (800) 225-9874. In Massachusetts, call (617) 339-5731.

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Package Fits Airline Use

ROCKVILLE, Md. — A financial management package tailored to the Commuter Airlines Association of America's recommended schedule of CAB accounts is now available from the Vertex Corp.

The software includes programs for the collection, display, analysis and reporting of airline operational information both on a passenger and freight operation level. Other software modules are programmed with priority to customer interest, the firm said.

Designed for an on-line, distributed processing environent, the system is built particularly for Datapoint Corp. 5500 minicomputer equipment.

The system costs depends on the disk capacity and terminal requirements of each user operation. A basic system with two terminals and disk capacity sufficient for a representative commuter carrier can be installed for a turnkey price of $35,000, including hardware, software, installation and training.

Vertex is located at 2401 Research Blvd., Rockville, Md. 20850.

Contracts Lean Toward Vendors

(Continued from Page 47)

vendor may insist that its standard contract has been signed by some of the largest companies and, therefore, should be good enough for a small company. When confronted with that line of reasoning, seek your own counsel.

In football circles, there is a popular phrase: "Those last 10 yards are the hardest." Top management often echos this sentiment when describing the implementation of a new computer or large computer application.

The following activities must be scheduled and monitored:

1. Training and education of user personnel.
2. System acceptance testing.
3. Converting the existing systems files.
4. Determining the conversion method to be used.
5. Performing the "change-over" to the new system.
6. Providing management orientation.
7. Performing a post-implementation evaluation of the system.

Nander Brown is the regional audit manager for the Washington, D.C., area office of EDP Audit Controls, Inc., an Oakland, Calif.-based audit firm.

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With Eye to Computer Inquiry II

AT&T Reshuffles, Forms New Subsidiary

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T last week announced a number of organizational changes designed to "meet the requirements of the future," as Chairman Charles L. Brown put it. He was referring to the new market environment likely to be created by the Federal Communications Commission's (FCC) recent decision in the Second Computer Inquiry, and by the pending rewrite of the Communications Act of 1934.

Separate management groups were established within AT&T headquarters for those activities likely to remain regulated and those likely to be deregulated.

In addition, AT&T's board of directors approved acquisition of a total interest in four telephone subsidiaries, authorized a consolidation of the pension funds maintained by Bell associated companies and decided to form a new, wholly owned subsidiary — AT&T International, Inc. — to consolidate management of Bell international activities.

'First Phase'

The realignment at AT&T headquarters represents "the first phase of a major restructuring of the Bell System," Chairman Brown said. Later stages, apparently, will result in like changes within each of the operating companies.

Under the new AT&T organizational structure, which becomes effective Sept. 1, departments relating to regulated activities will report to President William M. Ellinghaus.

Those with responsibilities relating to prospectively detariffed activities — such as terminals and computer-based communication services — will report to James E. Olson, vice-chairman of the AT&T board. Olson will be responsible for organizing the fully separated subsidiaries required by the Computer Inquiry decision and the pending legislation.

Olson's immediate deputies will be Executive Vice-Presidents Thomas E. Bolger and Charles E. Hugel. Bolger will be in charge of marketing business services, while Hugel will be responsible for residence services, the new international subsidiary, directory, public services activities and development of the fully separated subsidiaries.

The four affiliates whose outstanding common stock is to be acquired by AT&T are the Mountain States, New England, Pacific Northwest and Pacific telephone companies.

In the case of Mountain States, .555 of a share of AT&T common will be offered for each of the approximately 9.965 million shares not owned by AT&T. On Aug. 19, the day before the AT&T announcement, Mountain States common stock closed at $23 a share on the New York Stock Exchange. A .555 share of AT&T common, at that time, was worth $29.35.

In the case of New England Tel, AT&T offered $39.66 for a share worth $34.375, while Pacific Northwest shareholders were offered $20.89 for a share which closed Tuesday at $16.75.

In the case of Pacific Telephone, AT&T is proposing to buy both common and preferred shares. The offering price for the former is $16.13 for a share valued Aug. 19 at $13.50. For the preferred, which closed at $55.50, AT&T is offering $70.06.

Based upon current market values, the company said, the four stock acquisitions will cost about $1.013 billion. All of the proposals are subject to approval of the boards of directors of each subsidiary, and definitive merger agreements would then have to be approved by the shareholders. AT&T now owns 75% to 89% of each company.

The new subsidiary, AT&T International, Inc., will market products and services to multinational corporations, internationally oriented business customers and overseas telephone authorities, a Bell press release said. Tariffed international telecommunications services will continue to be the operational responsibility of AT&T's Long Lines Department.

Demand for Data Base Services Expected to Double by 1984

By Marcia Blumenthal
CW Staff

PALO ALTO, Calif. — While demand for data base services will double during the next five years to more than $22 billion, the commercial market for on-line data base services will quadruple, reaching $4.3 million by 1985, according to a recent study from Input.

Last year users spent $8.9 billion for data base services and $1.2 billion for on-line services, Input said.

Of the on-line segment, remote computing service firms garnered 76% of the revenues, representing more than 25% of total 1979 user expenditures. This service will grow at a 24% average annual growth for the next five years, compared with a growth rate of 21% for the remote computing service segment as a whole, the survey noted.

Data base vendors collected $260 million from on-line data base service users through subscription or royalty fees, and those vendors' revenue from this source will grow 26% annually through 1985, the report forecast.

Value-added network vendors are a small

(Continued on Page 50)

Giving It Away for Free

By a CW Staff Writer

PALISADES PARK, N.J. — While some industry gurus have predicted vendors will give away hardware in order to sell software, a fledgling software company here is giving away its data base management system (DBMS) with purchases of hardware.

The innovative marketing tactic was hit upon after a consultant told Yale S. Landsberg, president of Omnibase Corp., it would cost $750,000 and take a year to create awareness of its Omnibase DBMS among potential customers. If a company doesn't have a minimum number of users, it cannot compete with any of the major DBMS vendors, Landsberg complained.

Describing Omnibase DBMS as "a highly tunable inverted list package," Landsberg said the company developed

(Continued on Page 50)

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So, join the thousands throughout the country who depend on Data Access Systems, the single source for trouble-free telecommunications. For information on economical lease or purchase plans or details on a complete range of supplies call your local district office, or toll free: (800) 257-7740.

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Data Base Market Forecast

(Continued from Page 49)

part of the on-line data base services market today; 2% of revenues. However, Input forecast this segment will pick up rapidly during the latter part of the decade as networks expand and new consumer-oriented networks such as Micronet emerge.

Six industry sectors accounted for 75% of the on-line data base service offerings last year and will achieve growth rates of 19% to 28% annually during the next five years. The six industries are banking and finance, manufacturing, services, retail, transportation and government, Input said.

The manufacturing sector, with 1979 revenues approaching $1 billion, will have the most rapid growth, spurred by services related to marketing, law, resources, properties and news data bases.

The present market for on-line data base services is highly diversified, Input noted. There are more than 400 data bases available on-line, 140 vendors create and maintain data bases and more than 60 vendors of remote computing services offer on-line data base services.

Growth in the market will be fueled by technology advances such as wideband information distribution channels including satellites, fiber optics and coaxial cable communications. Increased use of consumer terminals and mass storage devices such as video disk will help expand the marketplace.

The report costs $3,000 and is available from Input at Suite 600, 2471 E. Bayshore Road, Palo Alto, Calif. 94303.

Semicon/Southwest Set

DALLAS — The Semiconductor Equipment and Materials Institute (Semi) is presenting a two-day semiconductor exhibition here, in addition to its four international shows, on Oct. 8-9.

Semicon/Southwest '80 will focus on the products and processes on which the industry is counting to meet the technological needs of the '80s.

Skyrocketing costs, complex circuit geometrics and competition from abroad are a few of the problems at which the new products are aimed.

Additional information on the exhibition is available from Semicon, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

DBMS Free With System

(Continued from Page 49)

the system after evaluating popular DBMS packages for their strengths and weaknesses.

IBM's IMS and Cullinane Corp.'s IDMS are highly tunable systems, but require a great deal of user training, Landsberg maintained. On the other hand, inverted list packages are traditionally not tunable but, by comparison, are easy to use, he noted.

The system was designed for use with the full range of Prime Computer, Inc.'s systems and for IBM 360, 370, 4300 and Series 30 products. Comparable data base packages sell in the $80,000 to $100,000 range, he reported.

To date, the five-person firm which incorporated three months ago has two users of its DBMS. One is a 3033 user running under MVS and the other a 370/158 user operating with VS1.

Right now the firm is gearing up to sell Prime computers. Prime's own data base software does not run on its 150 and 250 systems, Landsberg claimed.

Moreover, the company recently struck a deal with Somerset Investing of Westport, Conn., whereby Omnibase will sell the hardware and Somerset will take care of the lease arrangements.

By developing a cadre of users, Omnibase is aiming to become competitive with the entrenched DBMS suppliers.

See page 77
in Buy/Sell/Swap

INTERACTIVE USER REPORTS

"Cost savings of 70%."

Chuck Anastasi, Manager, Timesharing Services, 3M, St. Paul, Minnesota.

Price/Performance.

"3M is a worldwide company with 47 U.S. operating divisions and subsidiaries.

"We were buying computer time from 15 different service bureaus and spending between $1.5 million and $2 million a year. Because of this cost we decided to develop an in-house system and establish our own timesharing service.

"Within 18 months we had installed two DECSYSTEM-2060s and were providing 75% of our U.S. timesharing requirements. Eventually, we'll have over 90% of our work done on the in-house computers.

"Our price/performance ratio is outstanding. The in-house service on the DECSYSTEM-2060s costs 30% of what it would cost to do outside. That's a cost savings of 70%, which is even more than we expected."

Versatility.

"The University of D.C. was created in 1976 as a consolidation of three colleges in the area.

"Initially U.D.C. had a batch system, but since it was already overloaded with administrative work, neither the faculty nor the students could get any computer time. We decided to get another system to share the workload and to improve services to the students and the faculty.

"We wanted a distributed system that could be used on all three campuses, and that meant an interactive DECSYSTEM-2060.

"Now we can use our DECSYSTEM-2060 any time day or night because our uptime is over 98%. Our applications range from word processing for producing proposals to sophisticated graphics, which we use extensively in our Physics, Chemistry, and Engineering departments. And response time is six times faster than with our batch system."

Dr. Daryao S. Khatri, Associate Professor, Physics Dept., University of the District of Columbia, Washington, D.C.

Two Major Missions

Reshuffle at Prime Targets Integrated Systems

By a CW Staff Writer

WELLESLEY, Mass. – Prime Computer Inc.'s commitment to the integration of DP, communications and office automation systems has resulted in the creation of a new entity within the corporate structure.

The Information Resources Department reports directly to Prime's President and Chief Executive Officer, Kenneth G. Fisher. The department has two major missions, integrating Prime's data, office automation and communications products to support the profitability of the company and demonstrating advanced uses of the company's products, according to David Butterfield, director of the new department.

Fisher has stated that currently there is no one vendor associated with integrated systems.

However, Wang Laboratories, Inc.'s major objective within this decade is to become a major supplier of what it calls Integrated Information Systems. And IBM seemingly made a commitment to the integrated systems market with the recent consolidation of its development and manufacturing functions of the General Systems Division and the Office Products Division. These functions are now handled by the Information Systems Division.

Prime's new staff organization is made up of 120 people across four major functional areas: business systems, network planning, office systems and technical planning. Managers in charge of these areas will interact with the top executives within Prime's line management structure.

While Butterfield will be hiring staff for the network and technical planning functions, most of the staff are current employees who have been reassigned to the new department.

At the present time Prime's intercompany network has 25 systems linked through Primenet. Within the next year or so Butterfield expects the 500 terminals now hooking into that system will double in number.

Display Ad Pages Advance 7% For 16 Journals

RIDGEFIELD, Conn. – Display advertising pages increased 7% in 16 computer and data communications journals during the first half of 1980 despite the economic recession, according to a study by C Systems Ltd. here.

The 16 journals covered in the report were *Communications of the ACM, Computer, Computer Business News, Computer Decisions, Computer Design, Computer Systems News, Computerworld, Data Communications, Data Management, Datamation, Digital Design, Infosystems, Minicomputer News, Mini-Micro Systems, Small Systems World* and *Telecommunications*.

Computerworld showed the largest increase in total ad pages, up 226 pages from the same period in 1979. *Computer Systems News* had the second largest increase.

Much of the $4.9 million gaining revenues resulted from higher advertising costs and subsequent higher rates, reflecting the inflationary spiral, a C Systems spokeswoman noted.

digital DECSYSTEM 20

Productivity.

"The USRA was created by an act of Congress in 1973 to reorganize bankrupt railroads in the Northeast corridor.

"We were using service bureaus, but it became so expensive that we decided to get an in-house computer.

"We chose the DECSYSTEM-2060 because of its low cost, its interactive capabilities and its excellent implementation of APL. We also hoped that the interactive, user-oriented operating system would improve programmer productivity.

"Our productivity figures are impressive. Now we're able to develop and enhance software during prime time and run complex models overnight that would be too costly to run at service bureaus.

"With the DECSYSTEM-2060, we estimate our return on investment is five to one."

Bill Kelleher, Chief, Computer Facility, United States Railway Association, Washington, D.C.

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Now you can watch your four favorite programs...

The new HP 2626 display station will give you a view of your computer system you've never seen before.

It lets you divide the screen into as many as four separate "frames," each attached to a different workspace in the terminal's memory. You can check a program listing in one frame and access a file in another. Fill out a form in one workspace while the computer loads the next form into another. Or do text preparation and editing in adjacent frames. Right before your eyes.

That's not all. The HP 2626 has two data communications ports instead of the usual one, so you can use the split screen capability to talk to two computers at the same time. Or log onto the same computer twice for simultaneous batch and interactive jobs.

More than meets the eye.

A high resolution character cell and a glare-reducing screen coating give the HP 2626 the sharpest, clearest display of any of our terminals. And that's saying a lot.

What's more, you can set line lengths of up to 160 characters in any workspace. Then scroll horizontally to get the entire picture. (The built-in thermal printer includes a compressed mode to print up to 132 characters per line.) Scroll vertically, too, or change the size of the frame at the touch of a key.

An interactive forms drawing module makes it easy to design forms, including drawing horizontal or vertical lines with just a single keystroke. You can even program the terminal for audio tones to cue your operator to critical or non-critical errors, or other conditions within a program.

Split decisions.

Hook up the HP 2626 to two computers (or the same one twice) and it's like getting a multitasking capability right in the terminal. Your systems designer can now compile, execute, monitor and edit programs as if two stations were available.

While your user is filling out a form, the terminal can be sending data from the previous form to a computer. And down-loading the next form into an adjacent workspace. By smoothing out the "type and wait" of data entry, you can take advantage of less expensive, low-speed transmission lines without sacrificing the efficiency of your operator. The result? You'll get more out of the entire system.

...same time,

If you'd like to watch a program on the new HP 2626 display station, or any of our terminals, just call your local HP sales office listed in the White Pages. You can also write for more information to Hewlett-Packard, Attn: Ed Hayes, Dept. 371, 19400 Homestead Road, Cupertino CA 94015. Or just return the coupon.

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To Reach 3,489,000 Installed Systems

Small Computer Mart Seen Quadrupling by '84

WALTHAM, Mass. – The small computer market will continue to grow rapidly into the foreseeable future, but the marketplace has pitfalls for both new and experienced vendors, according to a report from International Data Corp. (IDC) here.

U.S. shipments of small computers totaled 236,000 systems in 1979. Of this, 200,000 were desktop computers and 36,000 were small business computers. By 1984, total shipments are expected to grow almost fourfold, reaching 930,000 systems, of which 849,000 will be desktop computers and 81,000 will be small business computers. The low-end systems will take the longest time to reach market maturity, IDC predicted.

The present installed U.S. base of small computers is 478,000, with 107,000 of these small business computers and 371,000 desktop computers, according to IDC. The research firm expects the U.S. installed base of small computers to reach 3,489,000 systems in 1984 with desktop computers accounting for 3,114,000 and small business computers totaling 375,000. IDC predicted the compound growth rate in U.S. systems shipments to be 31.6% in number and 27.5% in dollar value from 1978 to 1984.

IDC noted that the dividing line between the desktop and small business computer markets is becoming harder to define because of advances in technology and reductions in price. The range of both systems has extended upward and downward so that prices for small systems vary from $600 to as much as $150,000 for multiuser full configured systems.

The low cost, however, has made computers a viable resource for almost any business, IDC stated, noting that the small computer will also provide future upward migration paths for today's small computer user. At present, five vendors have this upward path – IBM, Wang Laboratories, Inc., Digital Equipment Corp., Hewlett-Packard Co., and NCR Corp. – although not all are software-compatible.

To clarify the two markets, IDC defined a desktop computer as being microprocessor-based, having its own power supply and encasement, using a high-level language, having the capability for peripheral attachments and costing between $1,000 and $10,000. A small business computer as defined by IDC must have internally stored data and instructions, must have at least 4K of memory which is user-alterable and programmable, must be configured with all necessary peripherals and applications software, must be business-oriented and generally cost between $20,000 and $100,000.

But despite its high growth rate and the huge installed base in number and dollar value, the market is still not growing as fast as early predictions indicated and, in fact, vendors were approximately 10% short on shipments for 1979, IDC claimed.

The high cost of components and spiraling costs of doing business will result in few price declines in the foreseeable future, IDC stated. Software is still not of high quality and component parts are scarce, delaying deliveries. All of these factors will slow growth, the report noted.

Some of the oldest companies have been forced out of the market, such as Imsai Manufacturing Corp., and acquisition tactics are present to a large degree, the report indicated. IDC expects an industry shakeout will be completed by 1983, at which time major suppliers will have assumed their place in the market and entry into the market – now relatively easy – will become more difficult. Those vendors unable to sell enough systems necessary to compensate for the low costs per system will disappear, the report said.

Currently there are 50 vendors that offer products in the desktop marketplace and over 70 vendors in the small business computer market.

The small computer market has also created several whole new submarkets such as low-cost printers, or increased business demand for CRT terminals and system house software. Other markets, however, such as the computer chip manufacturers, have been overburdened with the task of keeping up with demand.

IDC's report, "Small Computer Marketplace," costs $3,500 from the firm at 214 Third Ave., Waltham, Mass. 02154.

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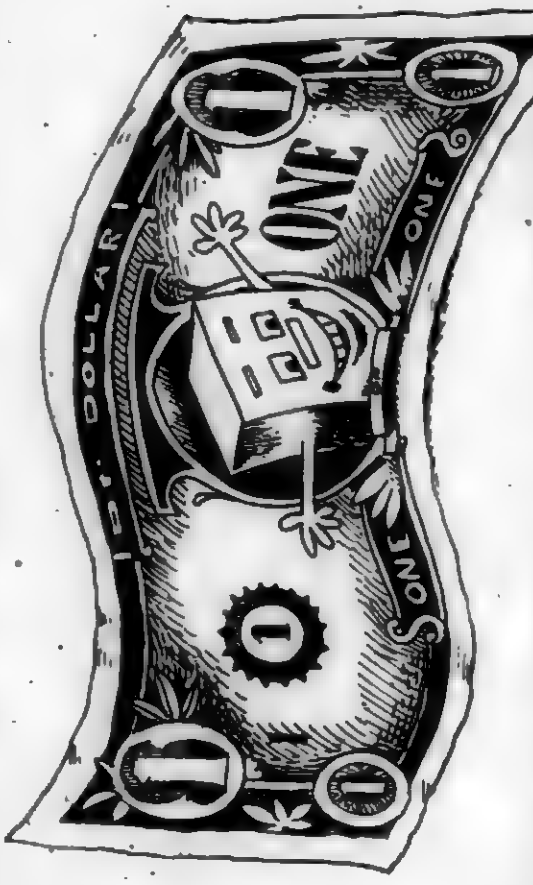

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It pays to save your DP dollars, so don't miss our September 29th Special Report. And if you market products or services that can help cut DP costs, tell people about them in this Special Supplement. Ad closing date is September 12th. Your *Computerworld* representative can give you complete assistance in ad planning. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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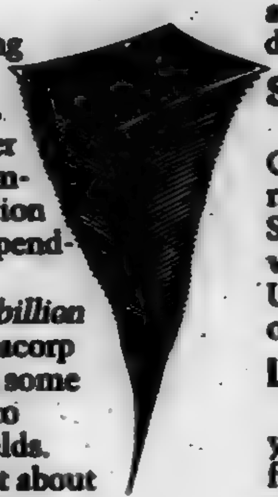

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Simon Ramo Will Keynote Wescon/80 at Disneyland

ANAHEIM, Calif. — "Electronics, the Magic Kingdom" is the theme of Wescon/80, which will be held here Sept. 16-18. The Wescon event is expected to attract 50,000 industry professionals and boast nearly 1,200 booths and 150 technical presentations.

Among the "extras" set for the conference are a 35-session scientific Professional Program, the annual Marketing Conference, preview activities, ongoing motion pictures, interpreter services for foreign visitors, continuous free shuttle buses between the convention center, hotels, airports and Disneyland and a Mardi Gras reception.

Exhibits will be presented in four exhibit hall groupings: instruments/instrumentation and control systems; production, packaging and test equipment; components, microelectronics and fiber optics; and mini- and microcomputers and DP peripherals.

Dr. Simon Ramo, former chairman of the President's Committee on Science and Technology and recipient of the National Medal of Science, will address the keynote luncheon in the Disneyland Grand Ballroom.

Advance registration ($5) is available through any Wescon/80 exhibitor, as well as Wescon, Suite 410, 999 North Sepulveda Blvd., El Segundo, Calif. 90245. Registration at the door is $10 and special "gold card" registration is available to employees of participating companies.

Executive Corner

- Pertec Computer Corp. has named Roberto Maldenado division vice-president for international marketing and private label activities.
- Morton D. Lenske has been named vice-president, information systems operations, for Mellonics Systems Development Division of Litton Industries.
- Control Data Corp. has named George M. Heenan vice-president and executive consultant for applications strategy.
- William F. Vail has been appointed vice-president of finance and administration for Softech, Inc.
- Xylogics, Inc. has appointed Lynn R. Speaker vice-president of sales and Newman E. Silks vice-president of customer support.
- Robert D. De Forest has been named senior vice-president of operations and Richard P. Beck has been appointed senior vice-president of finance and treasurer.
- Edwin M. Adams becomes vice-president of Comshare, Inc. and president of Computer Research Co., a wholly owned subsidiary in Chicago, while John C. Hoffman was appointed vice-president of marketing and sales in New York.
- C. Thomas Deere was elected president and chief operating officer of Data Card Corp.
- Arthur Kranseler has been named vice-president of corporate development for Automatic Data Processing, Inc.
- William A. Manly has been promoted vice-president of technology for Graham Magnetics Inc., a subsidiary of the Carlisle Corp.
- Anthony N. LaPine has been appointed executive vice-president and chief operating officer at International Memories, Inc.
- Dr. John Pope has joined Southern Pacific Communications Co. as vice-president of engineering.
- George Sollman has been named vice-president of marketing for Shugart Associates.
- Phillip S. Paul has joined National Computer Systems, Inc. as vice-president of operations.
- Zilog, Inc. has named Martin Cohen vice-president of field operations; Rolando Exteverena vice-president of systems; Edward Day vice-president of components; and Amaury Piedra vice-president of European operations.
- David R. Wilcox has been appointed vice-president of finance at Distribution Management Systems, Inc.
- George J. Vosatka has been named president of AM Jacquard Systems, a division of AM International, Inc.
- Thomas E. McVeigh has been named vice-president of the Distributor Services Division of NLT Computer Services.

Correction

- Gerry Galicki, not Kendall Wright, was appointed vice-president of Computer Devices, Inc. Galicki's appointment was announced by Wright, who is president of Computer Devices.

Supershorts

Comshare, Inc. announced that the French government has approved Comshare's longstanding application to establish a wholly owned company to offer time-sharing services throughout France.

Mini-Computer Business Applications, Inc. has formed a subsidiary called Micro Business Software, Inc. to develop and market business software to the microcomputer marketplace.

Informatics, Inc. has agreed in principle with Decision Strategy Corp. to acquire the Taps software product and certain related assets. Taps is a proprietary product facilitating transaction processing.

Lear Siegler, Inc.'s Data Products Division has received the President's "E" award for excellence in export.

CIS Cobol from Micro Focus, Inc. has become the first microcomputer Cobol system to win certification from the General Services Administration.

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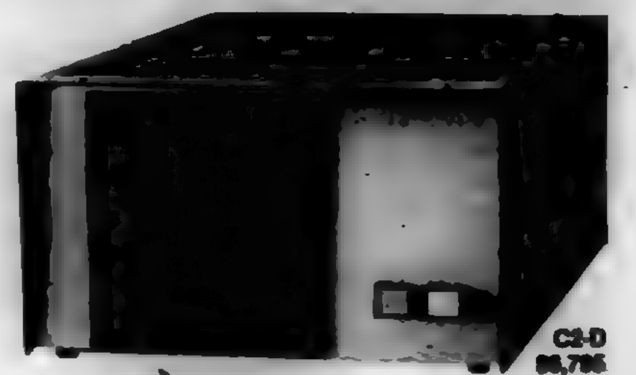

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HP Third-Quarter Revenues, Earnings Jump

PALO ALTO, Calif. — Hewlett-Packard Co. recently reported a 31% increase in revenues and a 33% increase in net earnings for the third quarter ended July 31.

Earnings totaled $810 million, compared with $620 million for the corresponding quarter of fiscal 1979. Net earnings amounted to $70 million, equal to $1.15/share on 60 million shares of common stock outstanding. This compares with earnings of $52 million, equal to 89 cents/share on 59 million shares, for last year's third quarter.

Incoming orders amounted to $762 million, a gain of 14% compared with orders of $667 million booked in the third quarter of fiscal 1979, a spokesman noted.

Earnings for the past nine months amounted to $2.23 billion, a 33% increase compared with the same nine-month period of 1979. Net earnings increased 28% to $189 million, equal to $3.13 a share. This compares with earnings of $147 million, equal to $2.50/share, during the nine-month period last year, he continued.

For the past nine months, incoming orders totaled $2.37 billion, up 25% from a year ago. International orders amounted to $1.25 billion, a gain of 33% compared with the first nine months of 1979. At the same time, domestic orders increased 18% to $1.12 billion.

Finally, for the third quarter 1980, international orders were $393 million, and domestic orders were $369 million.

In reviewing the company's latest figures, John A. Young, president and chief executive officer, noted that "although total orders increased 14% from last year, the order growth rate this year continues to slow.

"International orders, while up 21% from those of a year ago, were down somewhat from the second quarter of 1980, indicating softening in some overseas markets."

HP's electronic data products accounted for approximately 50% of total sales, Young observed.

Contracts

Honeywell, Inc. has been awarded a contract to provide the equipment and associated services to support the new teleprocessing network being implemented by the department of Housing and Urban Development.

Chatsworth Data Corp. has been awarded a $1.5 million contract to provide optical card readers to the New York Stock Exchange.

Plessey Peripheral Systems, Inc. has signed a three-year agreement with Cipher Data Products, Inc. of San Diego for the OEM purchase of Cipher magnetic tape drives.

BWT-Basic, Inc. has been selected to provide the computerized supervisory control and data acquisition system for the Reedy Creek Utilities Co., Inc. power distribution to the Walt Disney World Epcot Center project.

Sanders Associates, Inc. has signed a contract with IBM for more than $20 million to produce additional IBM 3250 graphics display systems.

CGA Computer Associates, Inc. has been awarded a contract by the General Accounting Office for its DCD II product, an automatic Cobol documentation system used for auditing, maintenance, standards and quality control.

Andover Controls Corp., an Andover, Mass., manufacturer of user-programmable, computerized energy management systems, has been awarded a contract in excess of $600,000 by the Fairfax County Public School District of Virginia.

The Computer Systems Division of Perkin-Elmer Corp. has been awarded a major subcontract to provide what could be more than 200 of its 32-bit minicomputers for the B-52 flight simulation program.

Logicon, Inc. has received a $6,163,316 contract from the U.S. Air Force Space Division to provide support services on advanced space defense systems.

Foreign Orders & Installations

Sifferservice Datacentral AB, a computer service bureau in Solna, Sweden, has contracted for a Univac 1100/60 system valued at about $1.2 million. The order was placed with Saab Univac, the Sperry Corp. joint computer marketing venture in Scandinavia.

UK-based P & O Computer Services, a division of P & O Consultancy and Computer Services, Ltd., has ordered a Honeywell, Inc. Page Printing System (PPS II) valued at $330,000.

Tokai University of Japan has ordered a large-scale Univac 1100/80 system and two V77-800 minicomputers valued at approximately $3 million.

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That's why we're covering it in
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October 6th Info 80 Show Issue
October 13th Info 80 Wrap-up Issue

Computerworld will bring you two-part, total coverage of the most important information equipment show in the East. Info 80 will be held again this year at the New York Coliseum, October 6th-9th. A heavy turnout is assured with a record audience of between 22,000 and 25,000 corporate executives, DP managers and administrative managers—Plus, there'll be more than 200 exhibitors, 250 speakers and 80 sessions.

Computerworld will have up-to-the-minute coverage of Info 80 in our October 6th issue. And in our October 13th Wrap-up issue, you'll read what went on in those four days, compare the best ideas of the best minds in the industry and find out not so much how a product works but what it can do for you.

We also have a booth there, so if you're going, stop by #2523 for a free copy of our Show issue. It'll outline the high points of the show—exhibitors, speakers, special events—along with a guide to night life in New York. Ad closing dates for these two special issues are shown below.

If you're aware of the revolutionary changes taking place in the use of information systems and the impact they can have on your business—you can't afford to miss this two-part total coverage. And if you're exhibiting, be sure to put your ad in both of these issues. Your Computerworld representative can give you full ad planning assistance. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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October 6th Show Issue	September 19th	September 26th
October 13th Wrap-up Issue	September 26th	October 3rd

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But there's more to the Memorex 1270 Model 8 Terminal Control Unit than reliability, flexibility, availability and cost effectiveness.* The specifications tell the whole story. For complete information about the Model 8, other 1270s and the entire Memorex family of display terminals and printers, contact Nancy DeKraker at (408) 996-9000 or write to Memorex Communications, 18922 Forge Drive, Cupertino, CA 95014.

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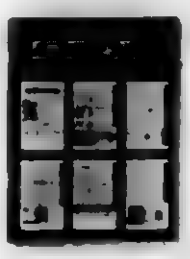

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This book will help you gain a firm working knowledge of the entire PASCAL language. It also teaches the fundamentals of programming in general, and an awareness of the importance of programming style. 16.95

CS127
The Basic Handbook
Dr. David A. Lien, author of the TRS-80 Learner's Manual
The publishers say that this book is an "encyclopedia of the BASIC language," that will help you "make those programs found in magazines work on your computer—or know the reason why they can't." If there is an alternate way to write a needed function that your machine doesn't have, this book will give you a subroutine to accomplish the same thing. If there is another way to write a program with different BASIC words, the book will show you how. $14.95

SP131
Problem Solving: A Systems Approach
Robertshaw, Mecca and Rerick
Shows how to zero in on problems, strip them down to key issues and then resolve them, using general systems principles. Uses many examples from various fields, including data processing, to involve you in real-world problem confrontations and the use of systems tools for their solution. $11.25

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PH124
Research Directions in Software Technology
Edited by Peter Wegner
Consisting of contributions from some of the most prominent researchers in computer science today, this book assesses the past, present and future impact of computer research on the development of software technology. Emphasizes the relation between theory and practice and the reliability of increasingly complex software projects. $29.95

SC126
Computers and Social Controversy
Thomas Logsdon
This book examines the social consequences which the use of computers will eventually bring with it. Seven major areas are covered, including computers and privacy, crime, education, artificial intelligence, automation, communication and banking. $15.95

CS122
Learning Level II
Dr. David A. Lien
This book covers Level II BASIC on the TRS-80, including a special section on converting Level I programs to Level II. It does not require a knowledge of Level I, however. It explores every important BASIC capability in detail, with the emphasis on learning how to use it, including the Editor, dual cassette operation, the real-time clock, printers and other peripherals. $15.95

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PROGRAMMER ANALYST

Service Co needs analyst for Data General and NCR. 5 Yrs Plus Heavy COBOL with FORTRAN a plus. Systems are being converted and growth is fast for right candidate.

SYSTEMS ENGINEER

Must have Data General experience with 3 plus years in BASIC, and COBOL, FORTRAN, NOVA & ECLIPSE exp a plus. Company has a history of expansion and growth.

PROGRAMMER/ANALYST

Degree preferred but not a must COBOL, FORTRAN, IBM/OS experience a must. System exposure and exp a big plus. Manuf environment with remote sites. Travel 30%. Good opportunity for aggressive person.

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(512) 736-3467

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(305) 652-5432

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Newly installed suburban 3031 requires a firm take-charge manager. Must be capable of providing long-range planning, budgeting and systems direction to a fast growing staff. Must have prior demonstrated success running a major data center. Salary to $50,000

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Expanding 3032 shop under MVS with IMS DB/DC needs an innovative data base analyst. Prior experience with IMS required. Salary to $31,000

LEAD PROGRAMMER

Major Kansas City manufacturer is currently installing a new order processing system. Person will join team and participate on front end design and carry through to implementation. System will be on-line using integrated data base.
Salary to $30,000

RPG II

Major Kansas City firm involved in distributive data processing requires a proven programmer analyst with experience in RPG II to install a variety of system 32 and system 34 in a distributive data processing network. Must be capable of working on his own and willing to travel 20%. Excellent benefits. Salary to $28,000

PROGRAMMER/ANALYST

Junior programmers move up! Opportunity for the one to two year programmer with solid COBOL background to learn both IMS and Data Base. Company provides training in both IMS DB/DC with additional training in systems design.
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127 W. 10th
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or
Delores Cook
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(404) 266-2100

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To $30,000

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Install Accounts Payable System throughout the United States (40% travel). Customer Support position requires OS/CICS background, financial degree, and outstanding communications skills. To $27,000

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Support programmers in IMS. Position with a major financial institution requires two years IMS application experience plus three years systems programming, two of which are in IMS Support. Environment is 3033 (Dual) OS/MVT/IMS/JES2. To $35,000

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of Dallas, Inc.
Two North Park East
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(214) 369-3550

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or
Kathi Grant
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of Minneapolis/St. Paul, Inc.
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Minneapolis, MN 55402
(612) 339-9001

GREENSBORO

PROGRAMMER

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To $15,000

PROG/ANAL

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To $24,000

SYS PROG

High demand for experienced sys/prog with either OS, DOS or MVS. To $32,000

Larry Brooks
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of North Carolina, Inc.
Suite 1117 Wachovia Bldg.
Greensboro, NC 27401
(919) 274-3648

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1201-5th Avenue
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Seattle, WA 98101
(206) 624-9000

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Salary to $24,000

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of Phoenix, Inc.
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Phoenix, AZ 85012
(602) 264-6488

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(513) 224-[illegible]

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Gary [illegible]
ROBERT HALF
of Boston, Inc.
[illegible] Street
Boston, MA 02110
(617) 423-[illegible]

LOUISVILLE

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[illegible]

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Starting salary to $26,000

DP MANAGER

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With no degree salary to $21,000

Tom Williams
ROBERT HALF
of Louisville, Inc.
[illegible] South Fourth St.
Louisville, KY [illegible]
([illegible]) [illegible]-1751

HARTFORD

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Conn oppty for indiv with prop/cas ins systs to direct new dev projs. Excellent comm skills and previous project mngmt req'd. Salary to $32,000+

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SR PROG ANALYST

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Stan [illegible]
Paul [illegible]
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

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Baltimore, MD 21210
ask for Carol
(301) 323-7770

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of Washington
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Washington, DC 20014
ask for Judy
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PROG/ANAL

DOS/VS — acctg appl-CICS Macro or command. $18,000

SYS ANAL

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Dan Baker
ROBERT HALF
of Providence, Inc.
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BASIC + RSTS-E Programmer/Analysts wanted by our Digital clients.

Systems Programmers. IBM DOS/VS CICS and OS, VS, MVS. Employers are paying relocation costs for top professionals.

RPG II Programmers, Analysts, Managers for Systems 3, 32, 34, 38 shops....

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Mini's + Networking, Computer Automation ideal, define standards, interface with vendors and users.

PROJECT LEADER

7 years DP system/programming prior supervision with database design/install expertise. IBM CS and insurance applications with project planning experience needed.

SR. EDP AUDITORS

COBOL, good image/presentation skills with 2+ years in the position. High visibility with excellent potential.

Jerry Anderson
or
Bob Couch
ROBERT HALF
of Northern California, Inc.
111 Pine Street
San Francisco, CA 94111
(415) 434-[illegible]

BUFFALO

COMPUTER OPERATIONS MANAGER

Mfg co in Western NY recently converted to IBM 4331. DOS/VS exp required. Co prefers mgr with up thru the ranks record from operator to supv. Resp include staffing & evaluating personnel; planning, directing & coordinating all operational activities. Key to this pos is hands on data communications bkgrd. Div data ctr is being established to centralize a loosely knit decentralized system. $25,000

DP INSTRUCTOR

Unique oppty for systems analyst to move into mgmt capacity. Resp for planning & administrating training program in large health care facility in Western NY. Credentials in technical areas, i.e. CICS, OS, IMS; & communications skills a must. $30,000

SYSTEMS DEV MANAGER

Profitable mfg div of diversified industrial corp needs mgr for both admin & systems support activities. Min 5 yrs systems devel exp + solid track record in supervision a must. Resp include planning, developing, maintaining & auditing all business systems. Position reports directly to VP of div. $31,000

SYSTEMS ANALYST

Sophisticated teleprocessing IBM 4331 installation needs analyst with heavy mfg applications. Will provide mfg systems support for all operating divisions from this location. Keys to this pos are: production control, MRP, user liaison bkgrd & T/P experience. Must be able to work with little supv. $28,000

Pam Siegel
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of Buffalo, Inc.
1010 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-[illegible]

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SR PROGRAMMER/ANALYST(S)

Well established company requires 3-4 yrs COBOL and/or ASSEMBLER. Prefer large scale IBM, but Burroughs or Honeywell exp is acceptable. Salary $18-24,000

SUPVR SYSTEMS & PROGRAMMING

Corporate position requires 4-7 yrs exp in analysis & programming & project mgmt. Must be user oriented. Will analyze, estimate & schedule project requests. Salary $24-30,000

PROG/ANALYST

Progressive shop seeks 3-5 yrs COBOL on IBM OS-MVS. Prefer financial applications/background. FLEX-TIME. Salary $18-25,000

LEAD PROGRAMMER/ANALYST(S)

Excellent firm seeks min 3-5 yrs program/analyst with strong ASSEMBLER. Need good oral & written skills. Will direct subordinates and be responsible for 1-3 subsystems. Salary $21-28,000

Bob Clemens
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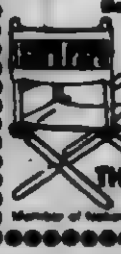

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IBM: DOS/VS, VM or OS, IDMS, VSAM. Must interface with Communication Specialist and DB Designer.

Communications Specialist
IBM: CICS, BTAM or VTAM, 3705 Communications Controller, and EP-VS or NCP/VS.

Data Base Designer
Familiarity with a DBMS, a Data Dictionary, and CICS interface or equivalent.

Minimum Qualifications: Bachelor degree, 3 - 5 years experience, SU career-minded, professional, and ability to get along with people.

Immediate openings.
Salary negotiable.
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[illegible] Hall Southern University
Baton Rouge, LA 70813
Ph: 504/771-4610 [illegible]: 504/771-[illegible]

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(817) [illegible]-1212

dorsey love & associates inc.

TRIMBEC
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[illegible]

★★★

SYSTEMS PROGRAMMER

Firm background in DOS/VS and working knowledge of IBM Assembler required. Knowledge of CICS/VS, DMS and DL/1 a plus. Competitive salary and excellent fringe benefits. Apply personnel office: Florida Institute of Technology, Melbourne, FL.

An Equal Opportunity Employer

PROGRAMMER-ANALYSTS

Here is your opportunity for:

- Rewarding work in development of new manufacturing, marketing and financial planning and control systems.
- Year-round recreation along Wisconsin's Lake Michigan shoreline.
- The quality of life available only in a community small enough to know you, yet large enough to serve your needs.

MIRRO Corporation is a major manufacturer of housewares, recreational boats and builder products, with corporate headquarters in Manitowoc, Wisconsin. Our Top Management is committed to the evolution of our current net change MRP system into "Closed Loop" Manufacturing Resource Planning. This effort requires the addition of qualified Programmer-Analysts to our Corporate Systems staff.

Required:

Two years programmer-analyst experience in design and installation of manufacturing or marketing systems using ANS Cobol.

Experience in data base and on-line techniques.

Preferred:

Specific experience in sales planning, capacity planning, master scheduling or distributed shop floor control.

Our environment is 370/148 DOS/VSE, CICS, DL/1 4341 to be installed December 1980.

Interested? Call our Corporate Systems Department collect, between 7:30 and 4:30 CDT, at (414) 684-0291 and ask for Steve Jatczak or Jim Leschke, or send resume in confidence to:

G.R. Benzschawel
MIRRO Corporation
P.O. Box 400
Manitowoc, WI 54220

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These positions offer competitive starting salaries commensurate with experience, liberal fringe benefits and exceptional opportunities for career development.

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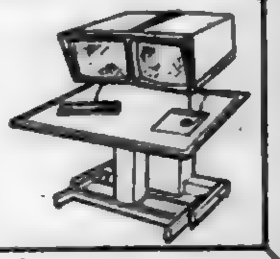
Dianne Naples



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Huntsville, AL 35805
(205) 772-3411
TWX 810-726-2180

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Bourns, Inc., a worldwide manufacturer of electronic components and systems, has several professional positions available at its Riverside, California location:

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$30,000 + +

Immediate requirement for person with strong Systems Programming background. Must be thoroughly familiar with IBM equipment and all software including operating systems. Should be especially knowledgeable in DOS/VS, VM, CICS, VSE and telecommunications to include VTAM, STAM, SDLC, etc.

SR. PROGRAMMER

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PLEASE FORWARD RESUME WITH SALARY HISTORY TO:

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Programmer

[illegible]

MIS
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Interested and qualified candidates submit your resume to:

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SEMICONDUCTOR GROUP

P.O. Box [illegible]
Phoenix, Arizona [illegible]
Department FDM-TANDEM

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SYSTEM PROGRAMMERS

Principal Level ($2644-3187)
Senior Level ($2243-2706)
Computer Facility & Operations
University of California

BERKELEY

Two positions (Pr. or Sr. level) to provide systems programming support IBM VM/370 and OS/VS operating systems on a multiple IBM 4300 processor environment. Exp. with 370 Assembler lang. and analysis of core dumps required. Exp. with on-line systems and teleprocessing controller desired. Job number [illegible].

Senior position to provide technical support for new CICS system in an OS/VS environment consisting of multiple IBM 4341 computers. Exp. supporting CICS including knowledge Assembler lang. and CICS problem analysis required. Job number [illegible].

Benefits include medical, 2 weeks annual paid vacation, excellent retirement.

Phone 415/[illegible] or send resume to UC Employment Division, 2200 Channing Way, University of California, Berkeley, CA 94720. Application must include job numbers. Apply promptly.

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DATA PROCESSING CAREER POSITIONS WITH INTERNATIONAL PAPER COMPANY IN MOBILE, ALABAMA

Programmer/Analyst

Five years experience in Hewlett-Packard 1000 system, Fortran language, RTE IV B operating system, and Image Data Base.

Applications Programmer

Three years experience in Fortran language. Also prefer experience in Hewlett-Packard 1000 System, RTE IV B operating system, and Image Data Base.

Write enclosing resume, salary requirements, etc. to

J.C. [illegible]
INTERNATIONAL PAPER COMPANY
P.O. BOX [illegible]
MOBILE, ALABAMA [illegible]

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SENIOR SYSTEMS ANALYSTS

Major St. Paul, Minnesota based agri-business company which has recently formed a corporate systems department needs analysts experienced in either accounting systems, data processing systems, or database/data communications systems. A major new system utilizing state-of-the-art technology is being planned.

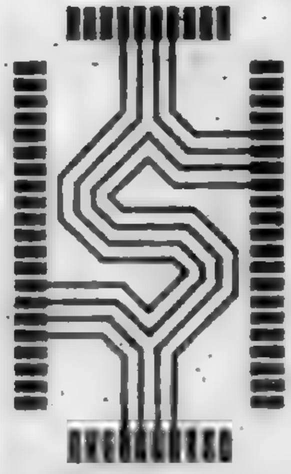
Previous systems analysis and design experience is necessary. Years of experience and education are important, but we are more interested in people who have proven track records in the development and implementation of large scale systems.

These positions offer excellent growth potential. Depending on your qualifications and career goals, opportunities will exist in project management, technical staff and management or user accounting management areas.

We offer an attractive salary and benefit package. For prompt consideration please send your resume to:

CW Box 2372
375 Cochituate Rd., Rte. 30
Framingham, Ma. 01701

Technical Support Analysts



San Francisco Data Center

Bank of America needs qualified individuals for exciting, challenging positions in our technical support project. Your responsibilities will include supporting seven 3033's running MVS REL 3.8, JES 3 REL 3, IMS and batch twenty-four hours a day seven days a week and two 168's utilizing VM.

You should have three years experience with MVS JES2/JES3 on system 370/158 and larger processors, and a solid knowledge of MVS, JCL and IBM utilities. A good understanding of MVS externals and a strong software background are essential. Knowledge of IMS, VSAM, NOMAD and IBM 3705 or Memorex 1270 transmission control units is preferred.

Your work week will normally consist of three 12-hour day or night shifts and four days off, but can vary. The salary is commensurate with your experience. Please send your resume and salary history to Bank of America, c/o Charles B. Smith, Dept. 3411TS, P.O. Box 37000, San Francisco, CA 94137. We are an equal opportunity employer m/f/h.

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DATA PROCESSING & ENGINEERING CONFERENCE OCTOBER 10-11, 1980
20-25 COMPANIES WILL PARTICIPATE
MAIL RESUME TODAY !!

NEED (4) DATA BASE SYSTEMS CONSULTANTS:
3 yr. exp. IMS, CICS, data base design, UCC-10 language Cobol, ALC, JCL, CICS to 30K

NEED (8) SOFTWARE PROGRAMMER ANALYSTS:
2 yr. exp. in assembler, Cobol, VM, OS/[illegible], CICS, TP and on-line exp to 25K

NEED (6) SYSTEM ANALYSTS:
BS Degree 2-6 yr. on-line exp. application, product control IMS Cobol in MFG environment to 27K

NEED (20) PROGRAMMER/ANALYSTS:
3-5 yr. exp. DOS-JCL Cobol, CICS, DOS-VS knowledge of VSAM advance to project leader to 28K

NEED (10) PROGRAMMER/ANALYSTS:
2 Yr. Exp. OS, Cobol, and JCL knowledge of IMS/DL1, either batch or on-line to 24K

NEED (4) SOFTWARE PROJECT LEADER [illegible]:
5 yr. of IBM 370 OS/VS exp. 3 yr. in technical support and 1 yr. supervisory exp. DB/DC system 28-32K

- SOFTWARE ENGINEERS: 20-[illegible]
- METALLURGICAL ENGINEERS: 20-[illegible]
- SYSTEM ENGINEERS: [illegible] & up
- SYSTEM ANALYSTS (SCT/LOC): [illegible]
- MINING ENGINEERS: 20-[illegible]
- STAFF ENGINEERS: [illegible]
- ENVIRONMENTAL ENGINEERS, CHE: 20-[illegible]
- MARKET MANAGERS, [illegible]

Send resume and a snap shot today to Charles H. Jackson, Manager and Technical Recruiter.

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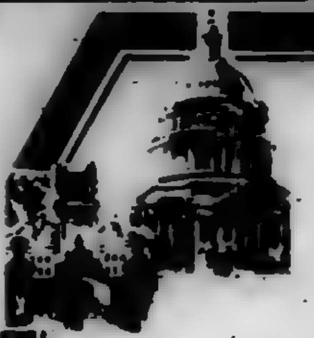

Systems Development Professionals

State-of-the-Art Projects for Higher Education

Systems & Computer Technology Corporation (SCT) has earned its national reputation as the pioneer and leader in the field of systems development and computing resource management for the higher education sector by providing customized, client oriented systems to more than 150 colleges and universities during the past eleven years.

Due to its phenomenal growth, the Educational Systems Division, within SCT's progressive Software Development Group, is currently offering key administrative systems development opportunities for individuals who are creative, futuristic, and possess state-of-the-art skills applicable to the unique field of higher education computing.

New challenges occur daily as SCT customizes its software/services to meet the specialized computing needs of its ever-expanding client base. This environment is the key to SCT's reputation as the only national firm to put aside the technologies of the 60's and 70's to develop and implement sophisticated, state-of-the-art data base, interactive systems based on the technologies of the 80's.

WE NEED:

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- SYSTEMS DESIGN ENGINEERS
- PROGRAMMER ANALYSTS

THE CHALLENGE:

- Imaginative focus on the design, development and implementation of student and/or financial information systems, including fund and encumbrance accounting, student admissions, registration and records, and payroll/personnel/position control.
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- Problem solving and customized design in a broad based, innovative environment.
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SCT offers a broad-based opportunity to work with a variety of hardware/software configurations as well as the newest communications and data base techniques. We are growing and recognize the importance of subject matter expertise, especially with its application in the growing, challenging, creative environment. Consequently, the benefits are outstanding for qualified applicants.

For immediate consideration:

Call COLLECT Monday thru Friday, 10:00 AM-6:00 PM (E.D.T.)
Mr. Dave Volz, Manager, Corporate Recruiting (215) 647-5930

If unable to call, please send your business card or resume, in strict confidence to: Mr. Dave Volz, Manager, Corporate Recruiting, Dept. E80, Systems & Computer Technology Corporation, Great Valley Corporate Center, 4 Country View Road, Malvern, PA 19355.

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Send complete resume to:
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SYSTEMS ANALYSTS AND PROGRAMMERS

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- DATABASE ADMINISTRATORS
- SYSTEMS PROGRAMMERS
- MANUFACTURING DATABASE MANAGERS

These positions require a BS degree or the equivalent, plus several years experience.

Currently we are running a 370/148 under VM with CMS, SCRIPT/370, RSCS, and OBE with a 4341 on order. The on-line database portion consists of OS/VS1, IMS, CICS and DMS. We are establishing a local and nationwide network of the latest teleprocessing hardware.

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Instructional Design and Development Manager

Digital Equipment Corporation, a $2 billion, Fortune 200 company and the world's leading producer of interactive computer systems, is currently seeking a highly experienced individual to join us at our Bedford, Massachusetts facility—headquarters for our Corporate Educational Services Group. You will manage all activities included in two of our development groups: our Computer-Based Course Development Group which designs and develops computer-managed and computer-assisted courses, and our Instructional Media Design and Development Group, which designs and develops both audio-visual and print courses.

Specific duties will include budgeting, staff planning and administration as well as project estimating and project management. You will also be involved in new business ventures and some R&D work in the area of combined AV and computer-based instruction.

Significant experience as a manager of instructional development projects and project teams is required, in addition to strong business skills, especially in the area of financial management. You must have extreme proficiency in, and knowledge of, the design, development and production of both computer-based and audio-visual training products. You should also be well-informed in state-of-the-art instructional delivery systems (video-disk, interactive video instruction) and with the research and development currently being done in these areas.

An advanced degree in Computer Science, Business, Education or equivalent is required.

If you are interested in this outstanding opportunity to join one of the fastest growing computer companies in the world today, forward your resume to Trudy Cordeau, Digital Equipment Corporation, Department K0801 3807, 12 Crosby Drive, Bedford, Massachusetts 01730. We are an equal opportunity employer m/f.

digital

Arizona Opportunities

If you are considering relocation to the Southwest, we may have an opportunity of interest to you. We are a dynamic Phoenix-based savings and loan with assets of $1.4 billion and a history of steady growth. We are now utilizing an IBM 370-148 in an OS/VS1 environment, supporting a statewide terminal network and anticipate conversion to dual 4341 systems using VM/CMS. Positions now available include:

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Design and implement large and complex financial systems related to deposits and loan.

• Systems Programmer

Implement and maintain operating software for IBM 370 including OS/VS1 and CICS.

• Programmer/Analyst

Design, analyze, and code programs for an on-line system utilizing CICS.

In addition to the unique lifestyle available to Arizona residents, we can offer you competitive salary and benefits as well as an opportunity for professional growth.

If this describes your background and interests and you would relocate to Phoenix, direct your resume including salary history and requirements to: First Federal Savings, [illegible] North Central Ave. Suite [illegible], Phoenix, Arizona [illegible].

First Federal Savings

[illegible]

Systems Support Representatives

When you explore a move to Magnuson, the first thing you'll notice is a solid sense of direction – in our people, in our products, and in the way we do business. We call it the Magnuson Difference, and it could be the difference your career needs today.

If you have at least 2 years of experience in Systems Engineering, System Control Programming, or a related field and your background includes VM, OS/VS1, DOS/VS or MVS, you'll want to take a close look at this opportunity to provide total systems support coverage of our CPU installed base. You will identify and isolate software problems, develop emergency corrections and provide general consulting to our customers.

We offer excellent salaries and benefits, of course, but most of all we offer a true ground floor opportunity with a new leader in the computer field.

Please send your resume, in complete confidence, to David C. Lovell, Magnuson Computer Systems, 2902 Orchard Park Way, San Jose, CA 95134; or call (408) 946-8100. If outside California, call toll free 800-538-7909. We are an equal opportunity employer m/f/h.

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McLean, Va. 22102
(703) [illegible]

COMPUTER OPERATIONS MANAGER
Riverside, California

Completion of 60 semester or 90 quarter units at a recognized college including or supplemented by courses related to data processing, systems and procedures analysis, information storage and retrieval systems, project planning and control techniques. Up to 2 years of additional qualifying experience may be substituted for education on a year for year basis. Four years of experience in electronic data processing such as computer operations, programming or systems analysis, 2 years of which were in a supervisory capacity. Salary [illegible] annually ([illegible]) with master's degree. Apply by Sept. [illegible], 1980. Riverside County Superintendent of Schools, [illegible] Lemon St., Riverside, CA [illegible] (714) [illegible]. Equal Opportunity/Affirmative Action Employer.

SR. OPERATIONS RESEARCH ANALYST
MIAMI, FLORIDA

BURGER KING®, an expanding subsidiary of The Pillsbury Co., has challenging growth opportunities in the Corporate Headquarters Management Information Systems Group.

The ideal candidate should possess a minimum of 5 years experience in the area of model development with experience in the area of system analysis. A minimum of 2 years as a Sr. Operations Research Analyst is required and project management or supervisory experience is a plus. A BS in Engineering or equivalent is required. An MS in Operations Research or an MBA is preferred.

We offer an excellent salary and compensation package including a generous relocation in a corporate environment designed for career growth. Send resume including salary history to:

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[illegible]
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CORPORATION
P.O. Box [illegible]
Miami, FL [illegible]

Equal Opportunity Employer [illegible]
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[illegible] in the computer careers market in the San Francisco Bay Area. [illegible] EDP personnel. [illegible]

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(415) [illegible] Suite [illegible]
[illegible] CA [illegible] (408) 727-[illegible]
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MINICOMPUTERS

Multi-location responsibility with major manufacturer headquartered in N.Y. Metro area. Must have solid electronics and/or computer service background, as well as strong managerial experience and proven administrative ability.

Salary base: High $20's — low $30's
Excellent benefits+

Please send resume or descriptive letter to:

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(Our employees are aware of this opening)
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At DTI we hire the best... and keep them.

For good reasons.

The technology. Digital Technology Incorporated is a state-of-the-art software research and development firm. We create systems to meet extremes in performance, reliability, and security. DTI people work at the cutting edge of software technology in:

- operating systems
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- software reliability
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The pay. The best people are worth more. We pay more.

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Digital Technology Incorporated

302 East John Street
Champaign, IL 61820 Attention: R. Newell

Or call **217/384-8500**.

DTI is an equal opportunity employer.

Computer Sciences Corporation

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Immediate opening for a Senior Professional in Washington, D.C.

Computer Sciences Corporation, the world's largest information services company, is seeking an outstanding senior professional to join its marketing staff as Manager, Federal Government Marketing. Reporting directly to CSC's Director of Public Systems, Program Development, you will be responsible for the full range of sales and marketing to include short and long range business planning, opportunity identification and assessment, and matching CSC Systems Group computer software and consulting services capabilities to new business opportunities.

The individual selected will have a minimum of five years Federal Government marketing experience and an in depth knowledge of the Federal procurement process. An ADP systems background and technical degree will be a consideration in candidate selection.

In addition to an excellent salary, the individual selected will be eligible to participate in the Company's incentive bonus plan. We also offer a complete benefits package that includes a stock purchase plan, medical and dental insurance, and more.

If you think you're good, and you're not afraid to find out how good you really are, you should be in touch with Computer Sciences Corporation.

Please submit in strict confidence your resume and salary history to Mr. William H. Gary, Sr., Group Director, Personnel.

The only limitations are the ones you bring with you.

CSC
SYSTEMS GROUP
6565 Arlington Boulevard
Falls Church, VA 22046

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Associate Director for Operations

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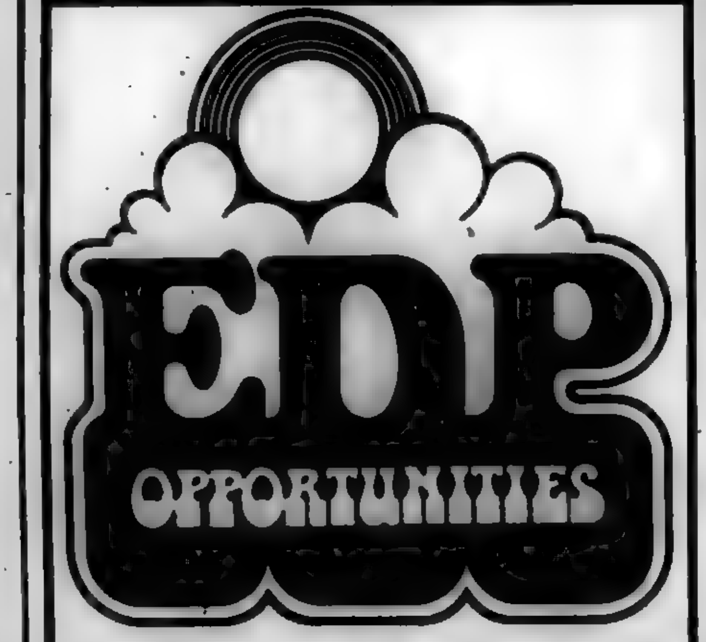

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Chicago, Illinois [illegible]

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1211 Geneva 27 Switzerland

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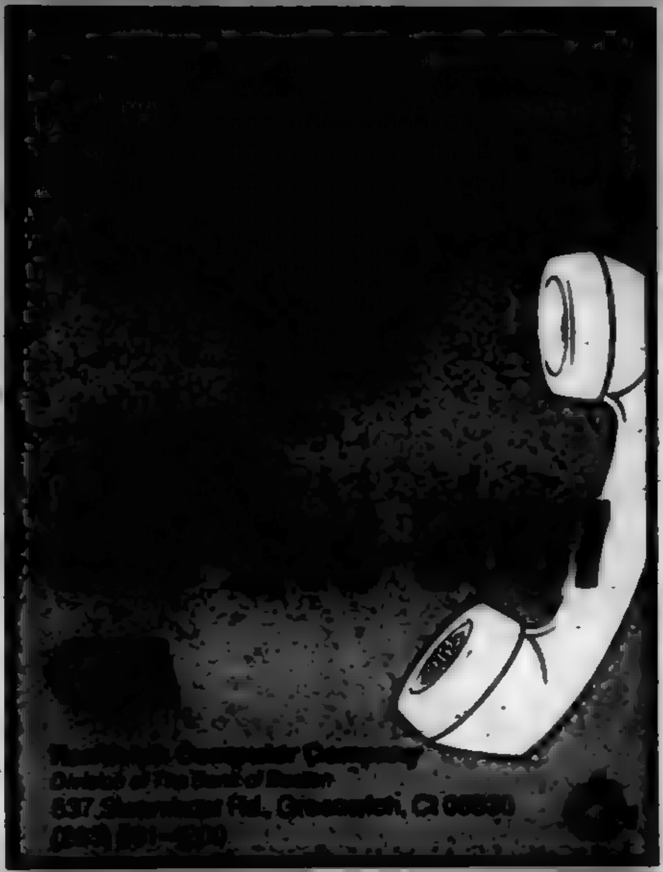

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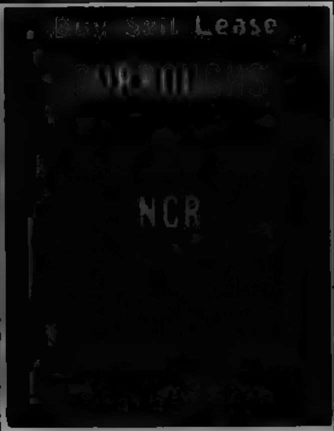

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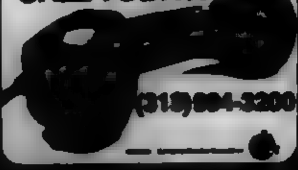

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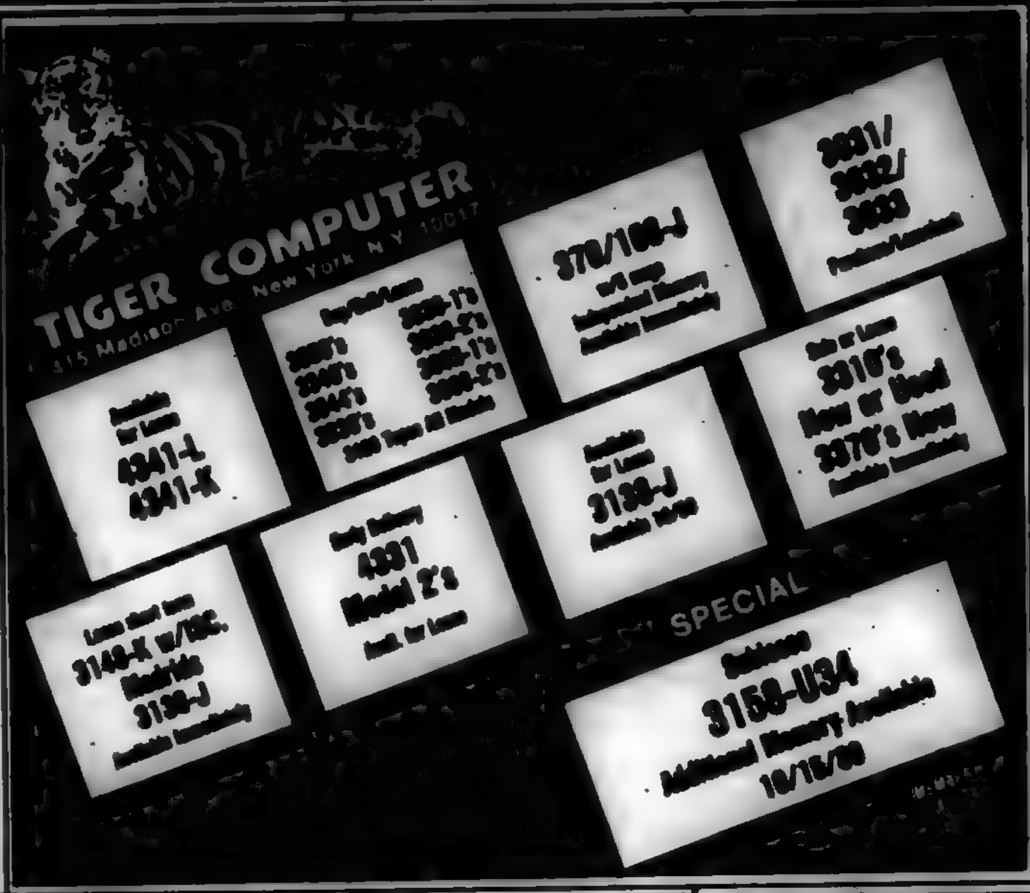

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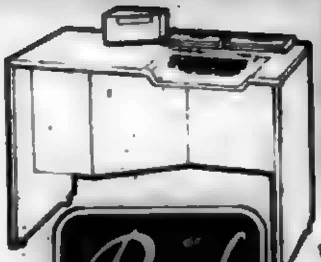

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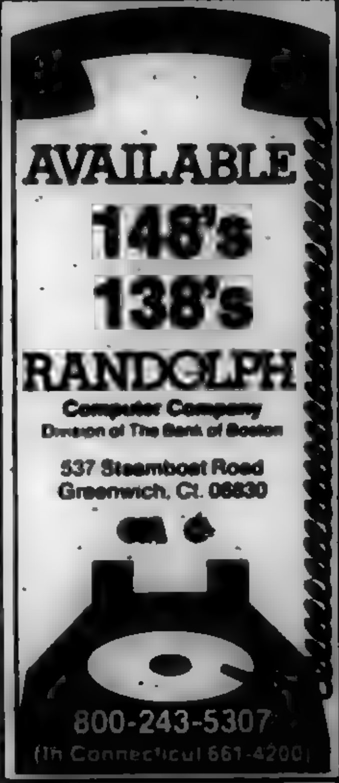

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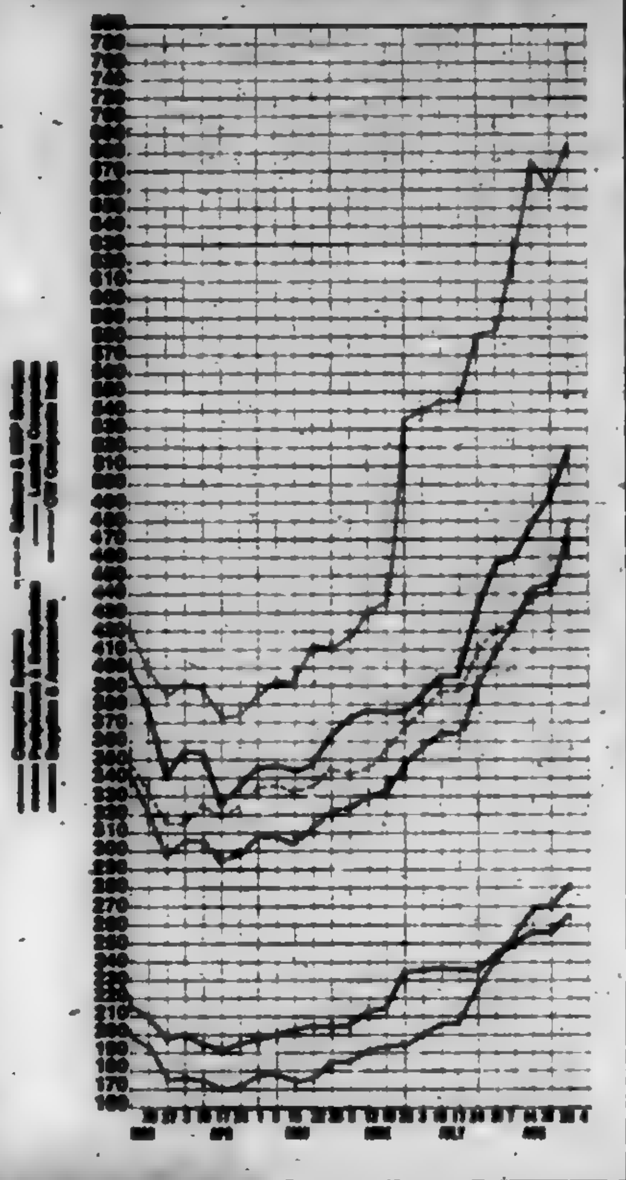

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CLOSING PRICES WEDNESDAY, AUGUST 27, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 27 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	10- 42	28 1/2	+1 3/4	+7.0
N	BURROUGHS CORP	60- 86	67 1/4	- 5/8	-0.9
O	COMPUTER AUTOMATION	9- 27	20	+ 1/2	+1.9
N	CONTROL DATA CORP	38- 76	74 3/8	+7 1/4	+10.8
O	CRAY RESEARCH INC	30- 76	70	0	0.0
N	DATA GENERAL CORP	44- 87	85 5/8	+3 1/8	+3.7
N	DATAPOINT CORP	44- 80	76 3/4	+2 3/4	+3.7
N	DIGITAL EQUIPMENT	42- 90	87	+ 3/8	+0.4
A	EECO INC	9- 19	17 3/8	+ 3/8	+2.2
N	ELECTRONIC ASSOC.	6- 12	12	0	0.0
N	FOUR-PHASE SYSTEMS	20- 40	36 3/4	+ 3/4	+2.0
N	FOXBORO	31- 46	40	0	0.0
O	GENERAL AUTOMATION	7- 10	8 5/8	+1	+13.1
O	GRI COMPUTER CORP	1- 3	5/8	+ 1/8	+25.0
N	HEWLETT-PACKARD CO	46- 76	72 1/8	-2 1/4	-3.0
N	HONEYWELL INC	60-101	91 3/8	- 3/8	-0.4
N	IBM	50- 70	65 7/8	-1	-1.4
O	MAGNUSON COMP SYSTS	20- 36	31 1/4	-1 1/8	-3.4
O	MANAGEMENT ASSIST	9- 28	22 1/2	+3 3/8	+17.6
O	MANUFACTURING DATA S	22- 46	43 3/4	+3 1/4	+8.0
O	MINI-COMPUTER SYST	2- 6	4 3/8	+ 3/4	+20.6
O	MODULAR COMPUTER SYS	9- 26	22	+ 5/8	+2.9
N	NCR	52- 82	70 1/2	-2	-2.7
N	PRIME COMPUTER INC	15- 38	37 1/2	+2 1/4	+6.3
N	PERKIN-ELMER	20- 40	39 1/8	+3 1/4	+9.0
N	SPERRY RAND	42- 60	54 1/4	+ 3/8	+0.6
A	SYSTEMS ENG. LABS	11- 32	32 3/8	+4	+14.0
O	TANDEM COMPUTERS INC	13- 48	45 3/4	+1 7/8	+4.2
N	TEXAS INSTRUMENTS	79-127	125 3/4	+5 1/4	+4.3
A	WANG LABS.	17- 51	48	+ 1/4	+0.5

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 27 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	[illegible] FINANCIAL CP	13- 20	18 1/4	- 1/2	-2.6
N	COMDISCO INC	6- 17	15	+ 5/8	+4.3
A	COMMERCE GROUP CORP	1- 2	2 1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	3 5/8	0	0.0
O	CONTINENTAL INFO SYS	2- 15	4	0	0.0
N	DATRONIC RENTAL	2- 3	3	0	0.0
A	DCL INC	3- 6	5 1/4	+ 1/8	+2.4
N	DPF INC	9- 12	8 1/2	+ 1/4	+3.0
N	ITEL	3- 15	2 1/4	- 3/8	-14.2
O	LEASPAC CORP	1- 2	3/4	0	0.0
A	PIONEER TEX CORP	2- 6	4 1/8	+1 3/8	+50.0
N	RELIANCE GROUP INC	24- 73	70 5/8	+4 3/8	+6.2
N	U.S. LEASING	12- 20	18 5/8	- 3/8	-1.9

SOFTWARE & EDP SERVICES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 27 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 4	3 1/8	+ 1/8	+4.1
O	ANACOMP INC	7- 16	15 7/8	+2 1/8	+15.4
O	ANALYSTS INTL CORP	3- 7	6 1/2	+1 1/2	+30.0
A	APPLIED DATA RES.	6- 30	18 5/8	+3	+19.1
N	AUTOMATIC DATA PROC	31- 50	48 3/4	+2 1/2	+5.4
O	COMPUTER HORIZONS	3- 9	8 3/4	+ 1/2	+15.3
O	COMPUTER NETWORK	4- 9	7 1/8	+ 7/8	+14.0
N	COMPUTER SCIENCES	11- 20	25 3/8	+1 3/4	+7.4
O	COMPUTER TASK GROUP	1- 13	13	0	0.0
O	COMPUTER USAGE	2- 5	4 3/4	- 1/8	-2.5
O	COMPUT AUTO REP SVC	4- 10	6 7/8	+ 1/8	+1.8
O	COMSHARE	11- 20	17 3/4	+ 3/4	+4.4
O	CULLINANE CORP.	18- 53	52 1/2	+3 1/2	+7.1
O	DATA DIMENSIONS INC	1- 6	1 7/8	+ 1/8	+7.1
O	DATATAB	1- 4	1 1/8	0	0.0
O	DSI CORP	4- 9	6 5/8	+ 5/8	+10.4
N	ELECTRONIC DATA SYST	15- 32	31 3/8	+ 7/8	+2.8
O	INFORMATICS INC	9- 22	20 3/4	+2	+10.6
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	2- 4	2 1/4	0	0.0
A	KEANE ASSOCIATES	3- 9	6	+1	+20.0
O	KEYDATA CORP	2- 5	2 1/4	+ 1/4	+12.5
A	LOGICON	13- 26	24	0	0.0
O	MATHEMATICA INC	5- 16	16	+1 3/4	+12.2
O	NATIONAL DATA CORP	10- 22	21 7/8	+1 3/8	+6.7
O	PLANNING RESEARCH	5- 9	7 3/4	+ 1/2	+7.2
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 9	9 1/8	+ 7/8	+10.2
O	REYNOLDS & REYNOLDS	21- 34	21	0	0.0
O	STSC INC	6- 12	12 1/4	+1 1/4	+11.3
O	SCIENTIFIC COMPUTERS	6- 26	26 1/2	+7 3/4	+42.6
O	TYMSHARE INC	34- 60	60	+4 1/2	+8.0
A	URS SYSTEMS	9- 15	13 5/8	+ 1/8	+1.0
A	WYLY CORP	4- 14	14	+1 7/8	+15.4

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 27 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 21	20 7/8	+1 1/4	+6.3
N	AMPEX CORP	14- 29	25 7/8	+1 1/2	+6.1
A	ANDERSON JACOBSON	9- 17	16 1/8	+2 1/4	+16.2
A	APPLIED DIG DATA SYS	9- 12	11 3/4	+ 3/4	+6.8
O	AUTO-TROL TECHNOLOGY	10- 90	57 3/4	+8 1/2	+17.2
O	BEEHIVE INT'L	3- 16	13 3/4	+1 1/2	+12.2
A	BOLT, BERANEK & NEW	13- 25	20 1/8	- 3/8	-1.8
N	BUNKER-RAMO	27- 36	36	+ 3/4	+2.2
O	CAMBRIDGE MEMORIES	1- 4	3 1/4	0	0.0
N	CENTRONICS DATA COMP	20- 56	26 3/8	- 1/8	-0.5
A	CETEC CORP	3- 7	6 3/8	+ 1/4	+4.0
O	COMPUTER DEVICES INC	5- 9	7 1/2	- 1/4	-3.2
O	COGNITRONICS	1- 7	6 5/8	+1 1/2	+29.2
O	COMPUTER COMMUN.	4- 10	8 7/8	- 1/8	-2.0
O	COMPUTER CONSOLES	4- 20	18 3/4	+2	+11.9
O	COMPUTER TRANSCEIVER	1- 5	3	0	0.0
N	COMPUTERVISION CORP	26- 92	66 3/8	+1	+2.2
N	CONRAC CORP	13- 24	19 1/2	+1 3/4	+9.9
A	DATA ACCESS SYSTEMS	6- 17	15 3/4	- 1/2	-3.0
A	DATA PRODUCTS CORP	11- 21	20 3/4	+ 1/8	+0.6
O	DATUM INC	2- 4	3 1/4	+ 1/2	+18.1
O	DECISION DATA COMPUT	2- 5	3 7/8	+ 1/2	+14.8
O	DELTA DATA SYSTEMS	1- 3	1 3/8	+ 1/4	+20.1
N	DOCUMATION INC	7- 27	16 1/4	+1 1/2	+10.1
O	DATARAM CORP	6- 17	13 3/4	+ 1/8	+0.9
O	ELECTRONIC M & M	3- 8	7 3/8	- 1/4	-3.3
O	EVANS & SUTHERLAND	21- 55	54	- 1/2	-0.9
O	FABRI-TEK	1- 4	3	+ 1/4	+9.0
O	GENERAL COMPUTER SYS	1- 5	4 3/4	+ 1/4	+5.5
O	GENERAL DATACOMM IND	12- 27	30 1/4	+1	+3.1
O	GENERAL TERMINAL CP	1- 4	2 1/8	- 1/4	-10.5
N	HAZELTINE CORP	12- 31	27 1/4	+ 1/8	+0.4
N	HARRIS CORP	25- 48	41 7/8	-2	-4.5
O	INFOREX INC	1- 8	1 1/4	+ 1/8	+11.1
O	INFORMATION INTL INC	8- 15	12 3/4	+ 1/2	+4.0
O	INTEL CORP	45- 59	55 3/4	+1 1/4	+2.3
O	INTERSIL	15- 33	25 1/8	- 3/4	-2.8
A	LUNDY ELECTRONICS	6- 12	10 1/2	+ 7/8	+9.0
O	MSI DATA CORP	5- 11	9 1/2	+ 1/4	+2.7
N	MEMOREX	10- 36	35 3/4	- 7/8	-2.3
N	MOHAWK DATA SCI	10- 25	24 1/2	+3 1/4	+15.2
O	OMEX	2- 10	6 1/2	0	0.0
A	PARADYNE CORP	10- 43	40 3/8	+ 3/8	+0.9
A	PENRIL CORP	9- 19	21 7/8	+1	+4.1
O	RAMTEK CORP	10- 17	13 1/4	+1	+8.1
O	RECOGNITION EQUIP	5- 16	15 3/4	+1 1/8	+7.3
O	SCAN DATA	1- 5	2 7/8	+ 1/4	+9.3
N	STORAGE TECHNOLOGY	13- 22	20 3/8	0	0.0
O	SYKES DATATRONICS	14- 30	27 1/4	+ 3/4	+2.8
O	T BAR INC	16- 21	19 1/2	+ 1/2	+2.7
A	TEC INC	3- 9	5 5/8	+ 1/4	+4.6
N	TEKTRONIX INC	43- 70	66 3/8	+ 1/8	+0.1
N	TELEX	3- 6	4 5/8	+ 3/8	+8.8
O	TESDATA SYSTEMS CP	8- 30	13 5/8	- 3/4	-5.2
O	TIMEPLEX INC	7- 27	27	+4 3/4	+21.3
O	WILTEK INC	3- 3	2 3/4	- 1/8	-4.3

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE AUG 27 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 14	13 5/8	+ 7/8	+7.0
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	15- 30	27 7/8	+6 1/2	+30.4
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	11- 15	14 1/4	+ 3/8	+2.5
O	ENNIS BUS. FORMS	13- 21	17 1/4	+ 1/2	+2.9
N	3M COMPANY	48- 65	58 3/8	- 1/4	-0.4
O	MOORE CORP LTD	27- 36	33 1/2	+2	+6.3
N	NASHUA CORP	30- 39	38 1/4	0	0.0
O	STANDARD REGISTER	23- 31	30	0	0.0
A	TAB PRODUCTS CO	13- 29	26 5/8	+1 3/4	+7.0
N	WABASH MAGNETICS	12- 16	15 5/8	+1 1/8	+7.7
N	WALLACE BUS FORMS	23- 38	37	- 3/4	-1.9

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NEWSPAPER

Computerworld Extra!

EXTRA! EXTRA! EXTRA!

Computerworld's 109,000 subscribers will ind something *Extra!* in their mailboxes ext week: A bonus issue that will focus its ntire editorial contents on a single subject, 'Software in the '80s."

A highlight of the first *Computerworld Extra!* issue, scheduled for publication Sept. 7, is a wide-ranging interview with James Martin, considered one of the foremost uthorities on the social and commercial imacts of computers. Martin discusses the hief technological forces at work in society - and what they may mean for DP in the 0s.

The bonus issue represents the first time in its 13-year history that CW has added to its weekly publication schedule.

"With this special issue, *Computerworld* will keep its readers abreast of the fast-paced trends and developments shaping the vibrant new decade in software," according to E. Drake Lundell Jr., vice-president-editorial of CW Communications, Inc.

Extra! will also include specially prepared feature length articles by 10 experts in the software field. Among them:

- **Daniel D. McCracken**, consultant and former Association for Computing Machinery president. McCracken believes software development will remain the albatross around the neck of DP executives but that new tools may transform DP from the whipping boy to the hero of the organization.
- **Stephen L. Robinson**, data base consultant. There will be more effective use of data base systems, Robinson predicts, but for most organizations it will be the late '80s before data base truly realizes its potential.
- **Dixon R. Doll**, president of the DMW Group, Inc. Structured programming techniques will become obsolete, Doll says, as alert corporations try to link users and data directly. Still missing, though, are the effec-

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
Vol. XIV, No. 36 September 8, 1980 $1.00 a copy; $30/year

More Than a Decade Ago

IBM Brass Knew TNF 'Possible' Carcinogen

By E. Drake Lundell Jr.
CW Staff

ARMONK, N.Y. — Top IBM executives knew that chemicals in its copiers — and later its 3800 printers — were possibly carcinogenic more than a decade ago, although the firm did not report that fact to the Environmental Protection Agency (EPA) until this spring.

In fact, the possible carcinogenic effects of the chemicals were discussed by the firm's top management officials during the spring of 1970, when IBM was planning its first copier product.

These discussions, however, were dwarfed by management's concerns over the profitability of that product.

Both the Management Committee (MC) and the Management Review Committee (MRC) of IBM were informed of the possible carcinogenic effects of chemicals during these discussions and almost all of the present top IBM executives — including Chairman Frank T. Cary, President John R. Opel and General Counsel Nicholas deB. Katzenbach — were present for the discussions.

An IBM spokeswoman last week admitted that the firm knew that TNF was a "suspected carcinogen" in 1970, but added that "although TNF was a suspected carcinogen in animal cells, on the basis of our testing, we concluded that under the conditions in which we were using it, in the photocopying process, it did not pose a health hazard.

"Nothing in our continuing test results has altered that position," she said.

Under the Toxic Substance Control Act — passed in 1976 — companies are required to notify the EPA 90 days before they market certain chemicals.

While the original IBM copier and the 3800 printer — which uses the same drum with the suspected carcinogen — were already on the market at the time the act was passed, IBM notified the agency just this past spring that laboratory testing had revealed a possibly hazardous chemical in the 3800.

That chemical, however, was in use with IBM's first copier product and was known to its management to be a possible carcinogen when that product was introduced in 1970, according to minutes of the meetings of the two top IBM executive groups.

For example, in an MC meeting held April 1, 1970 and attended by John Opel, then a senior vice-president, among others, "the MC was informed that the photoconductor is carcinogenic," according to IBM documents introduced in the Telex vs. IBM case in

(Continued on Page 8)

Carter Tax Credit Predicted Boon to Users

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — For computer users, the biggest single benefit of President Carter's new economic incentives program is his proposal to broaden the investment tax credit, according to Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association.

Under the present rules, Henriques explained in an interview last week, capital equipment must remain in use for seven years before the owner can deduct 10% of its cost from his tax bill. If the equipment's useful life is less, the credit declines.

The Administration now proposes to grant a 10% credit for purchase of any capital equipment used for more than one year. As a result, Henriques said, computer users will be encouraged to upgrade or replace more of their existing systems.

The investment tax credit, along with the President's other proposals, is aimed at encouraging businesses to increase investments in new plant and equipment, create additional jobs, improve productivity and promote exports.

Other major parts of the program include an accelerated depreciation period for capital investments which will "increase the rate of return and cash flow for firms investing in new plant and equipment"; increased income tax exemptions for Americans working in the Middle East; and a tax deduction to new businesses for startup expenses

(Continued on Page 5)

FBA Option Announced for Intel Fast 3805

By Rita Shoor
CW Staff

PHOENIX — Fixed-block architecture (FBA) is available on the IBM plug-compatible Fast 3805 semiconductor disk from Intel Corp. through a microcode option introduced here.

Designed for installations which utilize IBM's VM operating system, the VM modifications required to facilitate the use of the Fast 3805 with what has been dubbed native mode (NM) software were developed by technicians at the University of Waterloo, Ont., Canada, the vendor said. These changes to VM also mean that IBM will no longer support the operating system, according to Intel.

Future releases for the modified system would be supplied by the University of Waterloo, Intel added.

The NM option is said to significantly improve mainframe performance by reducing the host processor's channel-driver overhead an average of 70%. This performance improvement would apply when a Fast 3805 running with NM is compared with any device that runs with the IBM 2305 channel program, according to Herb Oberman, product manager.

These would include IBM's 2305 fixed-head storage unit and the 4305 semiconductor disk from Storage Technology Corp. (STC) as well as Intel's Fast 3805 minus the NM microcode, he said.

The reported performance improvement figures would seem to bear out industry speculations that FBA devices can run faster and cheaper [CW, July 14]. An FBA option has not yet been announced for either the 2305 or STC's 4305.

Utilizing FBA, the NM option partitions Fast 3805 storage into uniform blocks based on the block length specified during system initialization, a vendor spokesman explained. The blocks are addressed by a number as-

(Continued on Page 7)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc.

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ISSN 127-420.

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$1.00 a copy: U.S.— $30 a year; Canada, Central & So. America — $50 a year; Europe and Near East — $90 a year; other foreign — $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Better Price/Performance

AS/9000 Seen Besting IBM 3033

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — A high-end mainframe that reportedly offers anywhere from 30% to 80% better price/performance than the IBM 3033 was added last week to National Advanced Systems Corp.'s (Nasc) IBM-compatible processor line.

Billed as Nasc's largest and most powerful general-purpose CPU to date, a fully configured AS/9000 provides approximately twice the performance of the 3033 uniprocessor for only about a 20% higher price, a spokesman said.

The AS/9000 reportedly also offers roughly 33% and 50% better price/performance than the 3033/AP-1 and 3033/AP-2, respectively, while consuming about a third less electrical power and occupying half the floor space.

As part of its main processing unit, the AS/9000 incorporates 16K words of reloadable control storage that allows the mainframe to be restructured as needed to accommodate additional hardware and software functions.

Support for 3375, 3380

One of the first performance features scheduled to be added to the product during the next year to 18 months is support for IBM's recently announced models 3375 and 3380 disk systems. The 3375 will reportedly be supported in data-streaming mode, while the 3380 will transfer data to the Nasc processor at 3M byte/sec.

Another performance feature targeted soon for addition to the AS/9000 is support for both Release 1 and 2 of IBM's MVS Systems Products (MVS/SP). Operating systems already supported by the IBM-compatible processor include MVS, VM/370 and VS/1, a Nasc spokesman explained.

Among its other main features, the AS/9000 sports emitter-coupled logic circuitry that holds 550 gate/chip and boasts 700-psec switching. The density of the machine's large-scale integrated circuitry reportedly allows the product to be cooled entirely by air and thus to dispense with complex water-chilling apparatus.

The AS/9000's introduction marks the debut of Nasc's third Advanced Systems mainframe family, which bears the same designation as the 3033-compatible processor itself. For the time being at least, the AS/9000 is the infant family's only member.

Processor Complex

The AS/9000, though often referred to simply as a "processor," in fact consists of, not just one, but several computers that together form a "processor complex." Each of the complex's constituent parts is said to be individually microprogrammed.

In addition to the CPU itself, the complex incorporates:

- A 20-nsec arithmetic function that speeds fixed- and floating-point operations by three to fivefold.
- Two independent service processors, one for each of the AS/9000's two 20-in., four-color CRT displays.
- Up to three input/output processors.

Supplied to Nasc by the Japanese mainframe manufacturer Hitachi Ltd., the AS/9000 reportedly boasts about 67% better price/performance than the 3033 uniprocessor and provides roughly 10% more raw computing power than a similarly configured 3033/AP-1, AP-2 or MP. In price/performance, the latest Nasc processor beats the 3033MP by approximately 80%.

One reason for the AS/9000's purported performance edge over its IBM counterparts lies in the Nasc processor's reduced machine cycle time, which has been rated at 40 nsec, compared to 57 nsec for the 3033 models.

Two other hardware features that contribute heavily to the AS/9000's reported competitive advantage include the 20-nsec arithmetic function and a 64K-byte cache buffer that uses two-way interleaving and 40-nsec bipolar random-access memory chips, the spokesman said.

In addition to 12 data channels and two I/O processors, a minimum AS/9000 configuration incorporates an 8M-byte main memory, expandable in 2M-byte increments to a maximum of 16M bytes. The processor's main storage, which offers a 320-nsec read/write cycle, uses eight-way interleaving with 16K-bit Nmos memory chips.

A maximum AS/9000 configuration with a 16M-byte main memory and 16 channels costs $4.52 million, with optional leasing arrangements available.

First customer shipments of the AS/9000 will begin this November and coincide with the start of support for MVS/SP Release 1. The beginning of support for MVS/SP Release 2 will come next June.

More information about the AS/9000 and its accompanying support features can be obtained from Nasc at 3145 Porter Drive, Palo Alto, Calif. 94304.

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Robin Hood

High Sheriff of Armonk accuses SyncSort OS of "taking from rich, giving to poor!"

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NEWS REPORT

In a crowded press conference, the High Sheriff of Armonk today charged that a sort program is "taking resources from rich computer systems and giving them to poor OS/VS users throughout the Realm."

Speaking to reporters at his heavily fortified castle, the Sheriff, Sir Basil Bathrobe, said: "Frankly we think it's time somebody blew the whistle on this Robin SyncSort fellow and his so-called Merry Band.

"These varlets cause trouble every time we send an expensive system through Whitlow Forest. First they capture it, then they use software black magic to extract more sorting work for fewer resources.

"And the worst part is that they pass these savings along freely to thousands of SyncSort users. As a result 62% of the nation's OS/VS users are saving anywhere from 15% to 50% on the amount of CPU Time, Elapsed and SIOs they use. They're simply evading their sorting taxes," the Sheriff said.

"King John has authorized me to say that he views this situation with great alarm. He hasn't been so upset by anything since Magna Carta!"

Gee, we'd like to thank Sir Basil for his kind words about SyncSort's performance. But we wish he'd mentioned that we have a couple of other strings in our long bow:

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Data Entry Found Averaging 9.2% Pay Boosts

By Rita Shoor
CW Staff

WILLOW GROVE, Pa. — Data entry operators averaged pay boosts between 8.2% and 9.2% compared to an overall average of 7% for DP personnel in general, according to a survey by the Administrative Management Society (AMS) here.

As of Feb. 1, the weekly salary for lower level ("B" classification) keypunch operators was $184 in the U.S., and operators classified as "A" (higher level) received $205 per week, the survey found. These figures represented respective increases of 8.2% and 8.5% over 1979 salaries for the same jobs, AMS said.

While CRT terminal operators received a lower weekly salary ($189) than the A-level keypunch operators, the annual increase of 9.2% was greater, according to the report.

Average Weekly Salaries for Keypunch and CRT Operators

Position	U.S. 1979	U.S. 1980	U.S. Percent Increase	Canada 1979	Canada 1980	Canada Percent Increase
Keypunch Operator A	$189	$205	8.5%	C$216	C$242	12.0%
Keypunch Operator B	$170	$184	8.2%	C$194	C$222	14.4%
CRT Operator	$173	$189	9.2%	C$193	C$215	10.3%

U.S. Weekly Averages — 1980 by Region

Region	Keypunch Operator A	Keypunch Operator B	CRT Operator
Eastern	$208	$185	$188
East Central	$213	$193	$187
West Central	$204	$180	$181
Southern	$190	$175	$186
Western	$210	$185	$208

U.S. Weekly Averages — 1980 by Type of Business*

Type of Business	Keypunch Operator A	Keypunch Operator B	CRT Operator
Manufacturing/-Processing	$224	$201	$210
Banking/Insurance/-Financial	$187	$165	$172
Retail/Wholesale Sales & Distribution	$203	$180	$178
Government Agencies	$194	$180	$197
All Others*	$211	$194	$197

*This category includes utilities, educational, medical and employment.

Charts Courtesy of AMS

The U.S. weekly salary for the eight DP positions included in the survey was $260, AMS said. This reflected an overall average increase of 7% over the $243 weekly salary for the same group one year earlier, the firm pointed out.

Among the employment classifications included in the DP portion of AMS' report were computer operators, programmers, programmer/analysts and systems analysts. The 34th annual survey, published in *1980-81 AMS Office Salaries Directory*, also covered 12 clerical positions and included some 543,446 employees in 6,613 companies from 134 U.S. and Canadian cities.

Keypunch operators in Canada also realized wage increases higher than the average 10.3% increase for 1980, according to the survey. Based on the AMS figures, A and B-level operators increased their weekly salaries by 12% and 14.4%, respectively. However, Canadian CRT terminal operators' weekly increases kept pace with the average DP increase of 10.3%.

Low End

Despite the percentage figures, data entry operators are still on the low end when compared to the salaries received in other DP-related positions, AMS said.

In the U.S., salaries for the eight DP positions range from $184 per week for lower level keypunch operators to $417 per week for systems analysts. Canadian systems analysts top the surveyed group with weekly salaries of $440 in Canadian dollars compared with $213 received by CRT terminal operators, AMS noted.

The survey also identified salary averages on a regional basis by dividing the U.S. into eastern, east central, west central, southern and western regions. Both classifications of keypunch operator received the highest weekly salary in the east central region, based on the report. However, CRT terminal operators in the western region took home the highest paychecks in their job classification, AMS said.

Manufacturing Pays Most

Based upon breakdowns for U.S. keypunch and CRT terminal operators according to type of business, the manufacturing/processing area pays the highest average salary, the professional management association noted. The average weekly salary for A-level keypunch operators was $224 with CRT terminal operators and lower level keypunch operators receiving $210 and $201 per week, according to the respondents.

The four additional categories included in this portion of the AMS survey were banking/insurance/financial, retail/wholesale sales and distribution, government agencies and an "all other" category including utilities, educational and medical institutions and employment firms.

Regional and business breakdowns are not available for Canada, AMS explained, because of a smaller sample size and the fact that only 12 of the 134 participating cities are in Canada.

In addition to salary figures, the survey includes such fringe benefit data as length of work week, paid holidays, overtime, unionization and vacations for respondents from U.S. and Canadian firms, AMS said.

Copies of the report may be obtained for $75 by writing to the Administrative Management Society, Maryland Road, Willow Grove, Pa. 19090.

DEC Adds 1.2G-Byte Store For Decsystem-10 and 20

MAYNARD, Mass. — Digital Equipment Corp. last week announced a dual-module disk storage unit for its Decsystem-10 and Decsystem-20 mainframe computer systems, offering 1.2G bytes of unformatted storage space.

At the same time, the company announced reduced memory prices for the Decsystem-20 and its Decsystem-1091, and enhancements to the firm's Tops-10 and Tops-20 operating systems to accommodate the new disk drive.

The RP20 disk drive is currently the highest capacity disk offered by DEC. Each unit consists of two data modules, each providing more than 469M bytes of formatted disk storage. In addition, each module has 15 recording surfaces with two read/write heads per surface and a transfer rate of 1.2M byte/sec, a spokesman claimed. The dual port option is said to allow each data module to transfer data independently.

DEC is also incorporating the RP20 disk drive into a disk subsystem called the RTP20. Up to four RP20 disk drives can be included on the RTP20's controller. A total of six RTP20 subsystems can be attached to Decsystem-10 and Decsystem-20 mainframes, for a total of more than 22G bytes of formatted storage, the spokesman said.

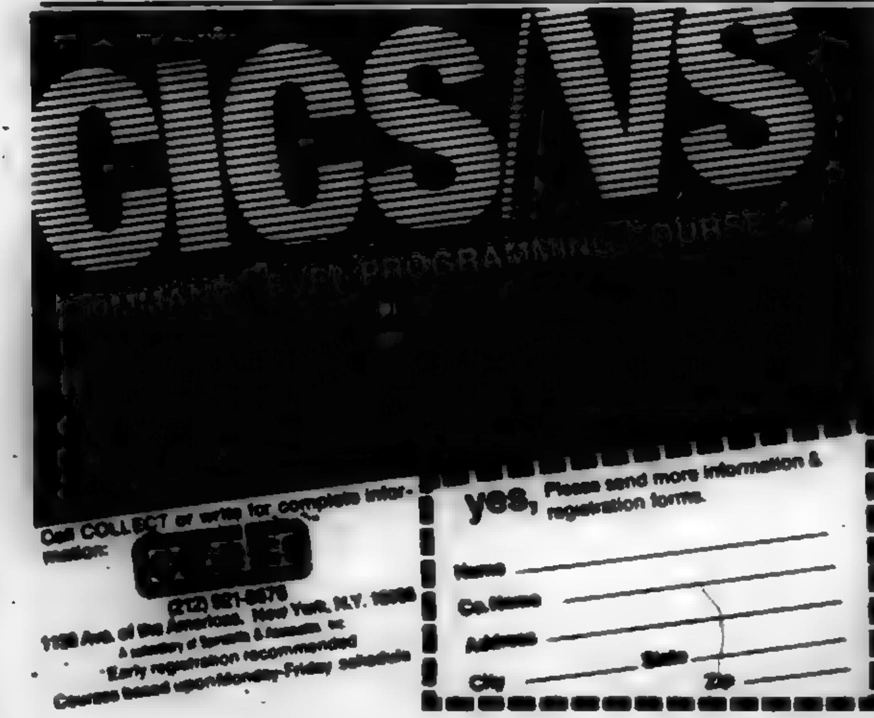
Software enhancements in the Tops-10 and Tops-20 operating systems fully support the RTP20 disk storage subsystem, DEC said. Through the operating system enhancements, the RP20 disk can also be used with the Decsystem-1090, dual -1090 and -1091 computers and Decsystem-2040, -2050 and -2060 configurations.

Finally, DEC has reduced memory prices for the Decsystem-20 and Decsystem-1091 mainframes. The MF20 memory, which was previously priced at more than $56,000 per 256K-byte expansion unit, now costs $42,000.

The high-capacity disk introduction and lower memory cost are both aimed at improving the whole system cost of the Decsystem mainframe, according to Joseph Biula, DEC's Large Systems Product Manager.

The RTP20 subsystem with one RP20 disk unit costs $140,000. Additional RP20 disk units are priced at $49,000.

There is no charge for enhancements to already installed Tops-10 and Tops-20 operating systems, the spokesman noted from 146 Main St., Maynard, Mass. 01754.



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Within Hours of Firing

Suit Filed Against Worker for Erasing Programs

By Tim Scannell
CW Staff

NORRISTOWN, Pa. — An electrical instrument manufacturer here has filed suit against a former employee who allegedly destroyed a number of critical computer programs within hours after being fired.

Joseph Hershman, a project manager and programmer while at the company, allegedly used a remote terminal to tap into the firm's IBM 370/158 Model 3 computer system and erased programming related to one of the company's latest products — a microprocessor-based control system.

Using a password assigned to him by Leeds & Northrup, the former employee allegedly gained entry into the computer shortly after midnight on June 5. He then allegedly spent nearly 12 minutes on the system, wiping out programs needed by the firm for its Max-1 control system product, the suit claimed.

In the suit, filed in Montgomery County Court, Leeds & Northrup originally sought "not more than $10,000" in damages, plus a court order restraining Hershman from tampering with the computer in the future, Theodore J. Swift, a spokesman for the firm, said. However, last week, Hersham's lawyer, responding to the suit, reportedly met with the company's lawyers and reached an agreement "which did not involve dollars." Terms of that agreement and a possible out-of-court settlement could not be released at this time, Swift maintained.

Leeds & Northrup personnel discovered Hershman's alleged unauthorized entry into the computer when later that same day they tried to erase the ex-employee's password key and found that data was missing. Any information pertaining to Hershman and the work that he did on the Max-1 microprocessor control system while at the company had been wiped out, Swift explained.

Leeds & Northrup routinely changes passwords every four to six weeks and blocks out a password when an employee leaves or is let go, he added.

Checking the computer's log, which keeps an ongoing record of the hour, minute and second of anyone who accesses the system's files, Leeds & Northrup people learned that Hershman had entered the system at about 12:48 a.m. on June 5 and used the computer for 11 minutes and 39 seconds, presumably the time it took to erase the needed computer programs.

Fortunately, the instrumentation manufacturer was able to immediately restore the obliterated programs from a set of backup magnetic tapes. The tapes are periodically created from information on the system's disk files and serve as a hedge against natural disaster or incidents of deliberate computer sabotage. It is not known whether Hershman was aware of the existence of the backup tapes, Swift said. However, the Max-1 project would have been seriously jeopardized if the erased programs were not able to be restored.

Basically, Leeds & Northrup filed suit to find out exactly how much damage Hershman did to the computer's files and whether that destruction ranged beyond the project he was working on at the time of his employment, Swift noted. The "not more than $10,000" in damages asked for in the suit is roughly what it would cost in man-hours to search through all of the computer's disk files for additional sabotage.

The company also filed suit to make the issue public and possibly deter any future deliberate acts of sabotage by disgruntled present or past employees.

Tax Credit Seen Boon to Users

(Continued from Page 1)

that are presently nondeductible.

Additional features include regulatory reform, specifically including continued support for pending legislation which would replace the Communications Act of 1934; additional federal support for research and development, particularly in high-technology fields; establishment of a high-level "Economic Revitalization Board" to "promote government and private sector cooperation in dealing with the complex issues of industrial policy," expanded funding for new transportation facilities and energy conservation; and special tax measures designed to stimulate industrial development in economically depressed areas.

The big question at the moment is how much of this program will get through Congress, which will begin considering it early next year. Substantial changes are likely.

There is widespread opposition to one feature of the investment tax credit proposal which would pay a cash rebate to a firm that wasn't profitable enough to use the credit. Opposition is based on the argument that if the rebate is allowed, much of the money will go to "distressed" industries — like the automobile industry — that will remain distressed for other reasons.

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Gets 300 Responses

Firm Advertises for Other Unhappy B800 Users

By Tim Scannell
CW Staff

NORTHBROOK, Ill. – "Attention: Unhappy users of Burroughs B800 and similar Burroughs computer hardware and software. . ."

That is how an ad placed recently in *The Wall Street Journal* began. The ad was authored by a dissatisfied Burroughs Corp. customer – Quality Books, Inc., a publisher and book wholesaler here. The firm was preparing to sue Burroughs for faulty computer equipment and wanted to hear from other firms that may have been the victim of "overly zealous computer salespeople [that] may have misrepresented the Burroughs B800."

To date, the unconventional ad has drawn more than 300 replies from B80 or B800 users across the country, according to Tony Leisner, general manager at Quality Books. "It became pretty obvious that we were not the only ones whose system didn't work," he said, noting that there were already a number of active lawsuits concerning the B800 minicomputer.

A Burroughs spokesman at the company's corporate headquarters said he was not aware of the problem or the ad.

Unused System

About two years ago, Quality Books, which sells material to schools and libraries, purchased a Burroughs B800 computer system to help with its order entry and accounts receivable. The system has 128K bytes of memory, two terminals and a printer. However, since its installation the computer has reportedly never worked.

In fact, for the past six to eight months, the machine has been unplugged and wrapped and sits in a corner of the Quality Books building, Leisner explained. The company's business chores are presently conducted through a service bureau.

When the Northbrook company first had difficulties with the newly delivered B800, officials there complained to Burroughs service personnel who promptly told them that they "were the only ones having problems, everybody else's B800s were working fine," Leisner related. But, after running the ad in the midwestern edition of *The Wall Street Journal*, which drew 50 to 60 responses, and later in the national issue, the company knew that its problems were not particular to its system.

During the past few weeks, Burroughs representatives and the firm's attorneys have had at least one "sit-down session" to discuss Quality Books' problems with its B800. Leisner declined to discuss just what problems are involved with the system because of the "sensitive position" of present negotiations. However, thus far "nothing definite has been set one way or another," he pointed out.

"We have a suit prepared but have not filed it . . . pending the opportunity to sit down and talk turkey with Burroughs," Leisner commented.

Analysis Predicted Win for Miss Kansas

DE KALB, Ill. – If Professor George L. Miller's method of statistical analysis is as accurate this year as it was last year in predicting who would win the Miss America contest, Leann Folsom of Kansas now wears the crown.

Miller, a Northern Illinois University professor of business systems and analysis, accurately predicted in 1979 that Miss Mississippi, Cheryl Prewitt, would win the title, with odds of 9 to 2 [CW, Oct. 1, 1979].

The predictions – which last year caused quite a flap among fellow statisticians and pageant officials – are based on computer analyses of 13 variables that contribute to each candidate's composite statistical profile, according to Miller.

Folsom's profile indicated highly probable success based on choices made by past pageant judges. In fact, Miller listed odds of 2 to 1 that Miss Kansas would be the next Miss America, far better than the odds he gave to last year's winner.

Miller pointed out that his predictive model, which he has refined over the past year, "is set to be right about one out of four times on the basis of information available on the day of the finals."

Applying his model to past pageants, Miller said that if he used just prepageant data as in the case of Miss Kansas, the model would have been on target for four of the last 17 years. Using information available on the days of the finals, the model would have accurately predicted a winner eight of 17 times.

Miss America?

Miller also pointed out that Miss America contestants can walk into the competition with a number of strikes against them, according to his analysis of past contestants and winners.

For example, a winner's ancestry usually does not go back to southern or southeastern Europe; judges seem to prefer western or northern European backgrounds. Furthermore, a contestant who twirls a baton, tells jokes, dances or comes from a large city probably will not win either, according to Miller's analyses.

Asked if judges might be influenced to vote for or against Folsom because of Miller's prediction, Miller pointed out that the effect could be positive or negative depending on the individual judge.

The data was processed – last year on IBM 360/67 and 370/148 mainframes and this year on an Amdahl Corp. 470V/7A computer – using the Statistical Analysis System (SAS) software from SAS Institute, Inc. of Raleigh, N.C.

Former Exxon Manager Arrested for Alleged Deal

By Marguerite Zientara
CW Staff

PHILADELPHIA – A former Exxon Corp. employee who allegedly tried to sell to IBM detailed plans for Exxon's as yet unreleased Hornet line of information processing products was arrested recently by a Federal Bureau of Investigation agent posing as a representative of IBM.

Orion N. Briel, until recently a manager of marketing publications for QYX, the Exxon division developing the Hornet system, has been charged with mail fraud in offering the plans to IBM by mail, according to U.S. Attorney Peter Vaira.

Briel resigned from QYX on Aug. 13. The next day, he allegedly mailed a certified letter to Dan McGlaughlin, vice-president of marketing for IBM's Franklin Lakes, N.J., office, offering the plans, according to Vaira and U.S. District Court documents.

McGlaughlin immediately contacted Exxon and Exxon then contacted the FBI, Vaira said. On Aug. 22, according to the documents, McGlaughlin telephoned Briel, who allegedly repeated his offer to negotiate the transaction.

Five days later, on Aug. 27, the FBI agent and Exxon engineer Jack Atkin, both posing as IBM representatives, met Briel at the Holiday Inn in King of Prussia, Pa., near the Pennsylvania Turnpike.

Briel allegedly presented the two men with detailed plans and specifications for the Hornet product line, as well as for other products, and offered to sell the information for $100,000.

Atkin told federal agents the plans "were very detailed" and had the "potential to badly hurt" Exxon, according to Vaira. The plans, which Atkin called bona fide information, had been previously reported missing from a desk and cabinet at QYX headquarters in Lionville, Pa., by an Exxon security official.

Briel was arraigned in U.S. District Court here and released on $3,000 bail. He "most likely will be indicted" within two weeks, Vaira said. By law, a trial date must be set within 60 days of an indictment, he added.

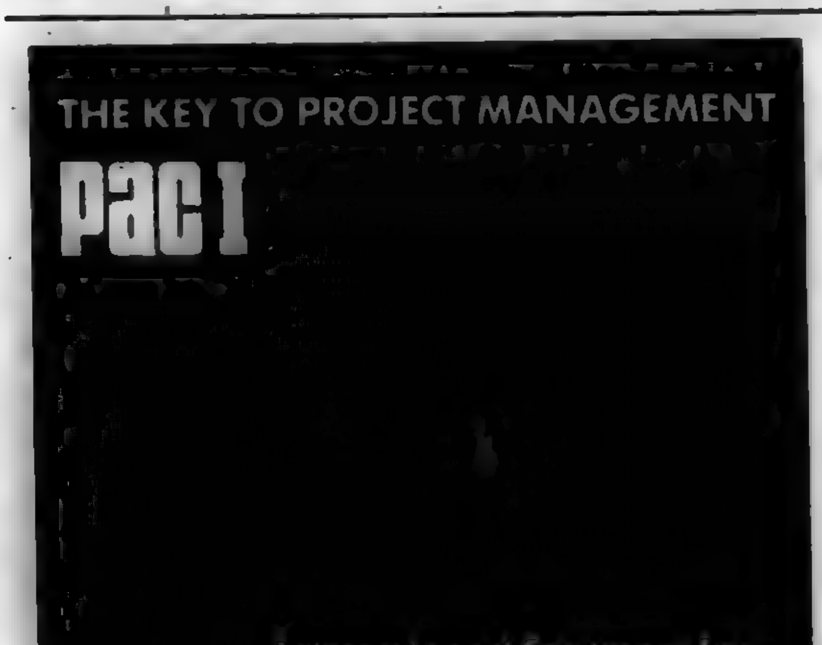
Neither QYX's spokesman on the matter nor Briel was available for comment.

'Extra' to Focus On Software

(Continued from Page 1)

tive pathways between the two.

- Ronald G. Ross, editor of "Data Base Newsletter." Data management will rise to the fore in the '80s, according to Ross. In an excerpt from his forthcoming book, Ross tracks the expanding role of data dictionaries.
- Herbert L. Gepner, group managing editor/software at Datapro Research Corp. Gepner describes the exploding demand for off-the-shelf application packages.



Fastest Boat, Simplest Micro Win Cup Trials

By Tim Scannell
CW Staff

NEWPORT, R.I. — After battling for nearly two weeks in the sometimes stormy waters of Rhode Island Sound, victory in the recent America's Cup trials went to the fastest boat — not to the one with the more sophisticated computer system.

The 12-meter yacht Freedom and its onboard Hewlett-Packard Co. 9825 microcomputer beat the two other American contenders, Clipper and Courageous, following a series of elimination races. Freedom will defend the U.S. against the Australia, winner of the challenger's spot, when the America's Cup races begin Sept. 16.

During the American elimination trials, Clipper's navigation system relied on a Data General Corp. MP/100 microprocessor aboard the 12-meter yacht and a DG 4/X minicomputer located on shore [CW, Aug. 18]. The seagoing micro was linked to nearly every marine instrument on the yacht and recorded such factors as apparent wind speed, boat speed and the direction the yacht was sailing.

Clipper's microcomputer continually transmitted data back to the 4/X via a specially modified Avanti Communications Corp. modem.

Courageous' Micro

Contrary to previous reports, the crew of the Courageous also used an onboard computer to monitor the effects of wind and wave on the sleek yacht. A Digital Equipment Corp. LSI-11 microprocessor was used throughout the rigorous trials and incorporated a number of recently developed programs that reportedly aided skipper Ted Turner in the competition.

Data monitored by the shipboard micro could also be selectively recorded by Courageous' navigator, Bill Jorch, who, when he is not sailing, is a computer programmer and engineer at Grumman Aerospace Corp. Unlike the massive amounts of data continuously recorded by Clipper's MP/100 computer and 4/X minicomputer, Courageous' micro recorded nautical information at the push of a button.

Once ashore, Jorch or Turner could review the data on a DEC VT-103 terminal, transfer it to disk or produce hard copy for later analysis.

It is not known if the Australian crew will be using a computer to navigate during the week's races.

IBM Price Cuts May Mean More

WHITE PLAINS, N.Y. — The IBM Data Processing Division has cut purchase prices for its 3211 printer and 3811 controller. The 3211 Model 1 dropped from $53,440 to $40,080 and the 3811 Model 1 was reduced from $23,580 to $17,685, effective Aug. 22.

However, maintenance charges for the 3211 were increased by 10% to $740 a month. Balancing that was a 20% maintenance decrease for the 3811, to $158 a month.

Industry experts feel the purchase price decreases are a precursor to the introduction of a new printer model and speculated IBM may be coming out with a faster — up to 3,000 line/-min — model to replace the 2,000 line/-min 3211. The 3211 is currently the firm's fastest impact line printer. In some configurations, it can operate at up to 2,500 line/min.

Introduced along with the 370 mainframe in June 1970, the original price tag on the 3211 was $129,150. Prior to these cost reductions, the most recent price alteration was a blanket 5% increase for purchase, rental and lease prices last Dec. 28.

Intel Debuts FBA Option

(Continued from Page 1)

signed to a given range of blocks. Then, data transfer into the storage blocks is started with two channel commands.

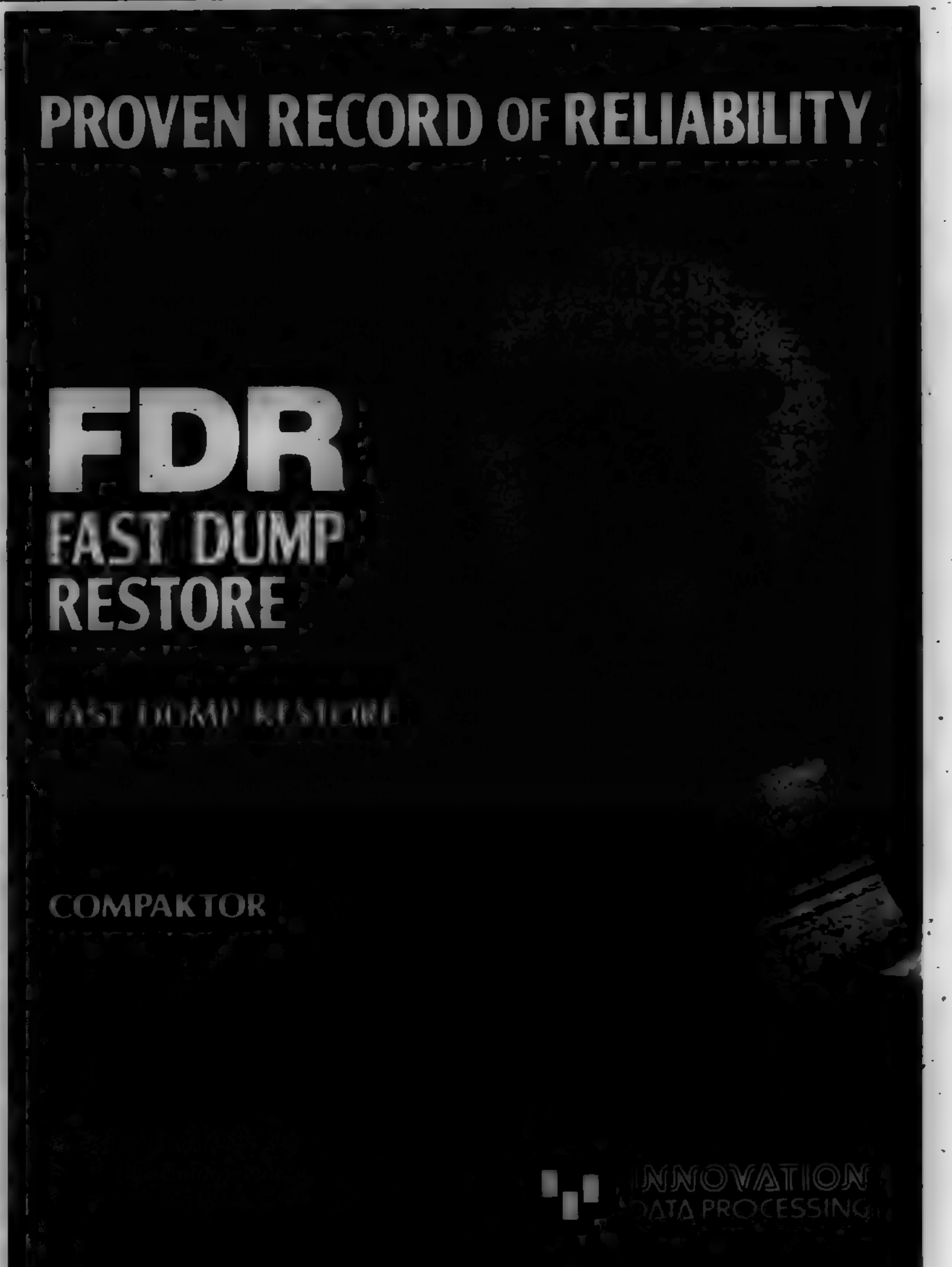
When operating in native mode, the Fast 3805 also utilizes all of the storage capacity available with no loss from the inter-record gaps found on rotating disks, Intel said. This capability is said to increase usable disk storage in some installations by 30% or more.

The Fast 3805 semiconductor disk runs in emulation of an IBM 2305 disk with IBM's 2835 controller, Oberman said. Since two Fast 3805 controllers can be contained in a single box, it will be possible for the single unit to have one Fast 3805 emulating the 2305 and the second controller operating under native mode.

The Fast 3805 for which the NM option was designed utilizes random-access memory to provide a storage capacity from 12M- to 72M bytes, Intel said. The standard data transfer rate is 1.5M- to 2M byte/sec depending upon CPU channel characteristics.

Available in late 1980 both as an upgrade for current Fast 3805 users and as an option to be considered by potential Fast 3805 customers, the NM software including the VM modifications leases for $350/mo, Intel said.

A typical Fast 3805 configuration of one controller with 12M bytes of storage is priced at $4,870/mo on a 36-month lease and can be purchased for $158,000. Intel's Commercial Systems Division is at 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.



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SDI Drops Rental, Requires Two-Year Lease

By Marcy Rosenberg
CW Staff

SAN MATEO, Calif. – Users of SDI, Inc.'s system software will no longer have the option of renting these products on a month-by-month basis. Instead, they will be required to commit to two-year leases by Sept. 21 or the products will expire.

Previously, users had the choice of either renting month by month or leasing at the same monthly rate for a two-year term.

An SDI spokesman said its new policy applies to all products: Grasp, Grasp/VS, Dox, Epat, Fleet and Fleet Online, Reach and Fasttp. Monthly charges under two-year lease contracts signed by Sept. 21 will remain the same as current per-month fees.

Citing a general rise in the cost of doing business, the spokesman called SDI's two-year lease requirement "a decision made in lieu of having to raise prices. We're seeking longer term commitments rather than raising prices."

SDI notified customers of its policy change by registered letters mailed Aug. 15, giving them about 30 days to decide whether to go with the two-year lease plan.

Users Object

Although given the 30 days' notice required under contract, a number of SDI users voiced objections to the new policy. "A $50,000 commitment over two years is not something we want to do," stated the director of computer operations at a New York City publishing firm that has rented Grasp/VS on a month-by-month basis since 1973.

As a result, this user is weighing whether to convert to Power/VS from IBM, an effort it estimated would normally take three months to complete. "Unless we can get a stay of SDI's decision, we'll have no choice but to put in more than 100 hours of in-house staff overtime plus at least 60 to 80 hours of consultant time" to convert by Sept. 21, the computer operations director said. The cost to his firm: "Approximately $5,000 to $6,000."

Nevertheless, he feels the conversion effort is worth it for his department – a DOS/VS shop running one 768K-byte and one 384K-byte IBM 370/148 – because Power/VS provides certain features for on-line systems and programming development that Grasp/VS doesn't offer. For example, his shop uses IBM's Entry Time Sharing System/II (ETTS/II) and "ETTS printed output cannot be retrieved at a terminal using Grasp/VS."

Cost savings was also one of the reasons another Grasp/VS user, St. Luke's Hospital, New York, decided to switch to Power. Admitting that the department was planning not to renew with SDI anyway, systems and programming manager Carol Pulaski noted that Grasp/VS – which her installation has been renting for the past seven years – "was costing us $1,300 to $1,400 per month."

She was quick to add, however, that her department has received "excellent" service from SDI and that an advantage of Grasp/VS is that it will start printing output before a job is finished, "saving some time" over Power, which will wait until a job is completed before printing unless the job is segmented. Pulaski's shop runs one 512K-byte 370/148 under DOS/VS.

IBM Knew TNF 'Possible' Carcinogen

(Continued from Page 1)

1972.

At the time, the MC was discussing possible problems with launching the firm's planned copier product. The firm had planned to inform production line workers that the product contained dangerous chemicals, but "the MC was dissatisfied with the manner in which we planned to notify employees of this fact," according to the minutes.

The MC was not worried about users, however, since it felt that they would have no contact with the carcinogenic substances even though it now says that trace amounts might be transmitted to people operating the 3800 printer, which uses the same chemical.

In a meeting just the next day of the MRC – the highest management group in IBM at the time – that body received a report listing four drawbacks of the system including "potential medical exposures to chemicals on the drums."

That meeting was attended by T.J. Watson Jr., the chairman of the board, T.V. Learson, presently a board member and then president, and F.T. Cary, then one of five senior vice-presidents. While the possible medical problems for employees was one of the issues, a higher priority problem was the "financial outlook" for the project, the minutes indicated.

The Management Committee met again the next day to discuss "the proposed methods of handling the health and safety problems associated with the copier." The MC agreed with an unidentified proposal for handling informing the employees, although it apparently did not mention the possible carcinogenic effects of the chemicals used.

According to the minutes, "The MC agreed [with the methods to handle the problems] although Marshall indicated that he would be inclined to use the word cancer if appropriate."

Burke Marshall, a former U.S. Attorney General, was at that time a senior vice-president at IBM, and resigned just 10 days after the incident, although there is nothing in the minutes to indicate why he resigned.

Tests Reviewed

Another mention of the chemicals comes in a presentation before the Management Review Committee on April 7, 1970, where it is noted that an IBMer "reviewed the history of the medical tests made on the drum material which had the potential for carcinogenic reaction. It was agreed that the exposures here were minimal."

The rest of the meeting – attended by Opel, then a senior vice-president, Cary, Watson, Learson and Katzenbach, among others – was spent reviewing the "market potential" for the copier program. Almost 10 times as much space in the minutes is devoted to profits and marketing as is to the health problems.

Confirmed Carcinogen

The chemical in question is Trinitroflorinone (TNF) which was confirmed to be a carcinogen by the EPA in mid-August.

The chemical was used in the first IBM copiers, the Model 6800, introduced in 1970. Later IBM incorporated the same drum into its 3800 laser printing system, which was introduced in 1975.

In May of this year, IBM reported to the EPA that it had discovered that TNF might be a carcinogen and reported that fact to the EPA [CW, June 9]. The EPA confirmed that fact in August [CW, Aug. 25].

TNF is known to induce gene mutations in bacterial and animal cells in laboratory experiments, based on IBM data, EPA said, but whether it is harmful to humans is still unknown, according to the EPA's preliminary evaluation.

IBM has claimed all along that there is no danger from the chemical to users of the 3800. IBM notified users about the existence of the chemical in the printer's photoconductor process, but assured users that there is no health hazard involved.

TNF, according to IBM, may come into contact with the printer's toner, which is subsequently deposited on the printed page. Trace amounts of the chemical may remain on the output copy and might from there be transmitted to persons operating or servicing the machines.

Additional Data

IBM maintains that the amount – estimated at a maximum of three micrograms per page – would be too small to pose any health risk to humans. Presently the EPA is waiting for additional data from IBM before making recommendations on the chemical's continued use.

The data requested includes how much TNF is found in the air around the operating printer, how much of the chemical remains on the paper with the toner, whether TNF reacts with other chemicals and what happens to the spent toner after it is removed from the photoconductor.

This information will help to "better determine the nature and the extent of any possible risks of injury to human health due to exposure to TNF," the EPA stated.

For now, however, the EPA has not suggested that people refrain from using the equipment. IBM has said it will cooperate fully with the EPA.

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Owl 1200
Bantam 550
DIABLO
Diablo 1640/50
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IDC October Conference To Focus on Productivity

SAN DIEGO – "Information Processing Profitability and Productivity in the 1980s" will be the subject of International Data Corp.'s (IDC) Fall Executive Conference here Oct. 19-22. The issue of falling productivity in both factories and offices will be addressed.

The conference will examine the nature and dimension of the productivity dilemma in relation to what today's information processing executive can do to improve productivity within his own organization. The agenda includes a program in personal productivity improvement through physical fitness and improved life-style management, led by former Nasa astronaut trainer Rob Kideout.

Immediately following the IDC conference is "The New Electronic Media" conference, sponsored by the Link Resource Group, a subsidiary of IDC. It will take place Oct. 22-24, and anyone attending the IDC program is invited to stay for all or part of the Link event at no extra charge.

Conference registration (IDC) is $750; the fee for additional company members is $495. More detailed information is available from the IDC Conference Coordinator at 214 Third Ave., Waltham, Mass. 02154.

Climate Control Malfunction Annihilates Laboratory Mice

LOS ANGELES – Murder by computer is apparently a reality here at the University of Southern California's Andrus Gerontology Center, where a malfunction in a computerized climate control system was blamed for the death of more than 1,500 laboratory mice.

The mice died when temperatures in the basement storage area rose to 106° F from the preset temperature of 72° to 78° F. Scientists, who described the scene as reminiscent of the Guyana massacre, said 1,500 of the 2,000 laboratory mice were found dead, and most of the 500 survivors have either died from shock or have been rendered useless for further experiments.

The mice were part of an estimated $1 million worth of federally financed biological research projects being conducted at the center. Dr. Harold Slavkin, a scientist at the center, estimated it would cost the university about $75,000 to replace the mice.

He also said much of the research in which the mice had been used might have to be repeated.

Some of the mice had been specially bred for specific research. Others, at the crucial age of 30 months – the equivalent of an 80-year-old human – were being used as part of a study into the effects of aging on the brain and the body, Slavkin noted.

Slavkin did not know what kind of climate control system was being used at the center, and school officials were unavailable for comment.

Computer Gives Bay State Unions Political Clout

BOSTON – Massachusetts is one state in which organized labor will have more power to inform and persuade its members in time for Sept. 16 congressional primaries, thanks to computer power.

Although Massachusetts' AFL-CIO previously used a "long and cumbersome" manual system to prepare address labels for bulletin mailings to its 500,000 members, that task can now be accomplished in one day, according to John A. Callahan, director of the state's Committee on Political Education (Cope) – the political arm of the AFL-CIO State Labor Council.

Formerly taking about a week for a mailing to go out to members, the method now involves a single phone call to national AFL-CIO headquarters in Washington, D.C., where data on the group's 13 million national members is stored in a Univac 9030 computer with 512K bytes of memory.

Any mailing labels the state unit requests are generated in Washington and sent directly to the state for its mailing purposes. Such mailings, which contain information on the voting records of congressmen, the status of legislation on issues like job safety, collective bargaining rights and disabled workers' benefits, may go out two or three more times before the upcoming primary, according to Callahan. "It's a tremendous improvement," he concluded.

While the state theoretically could have tapped into the national system before now, "we didn't have the money," Callahan explained. Funding for the operation was approved at the AFL-CIO's state convention two years ago.

"The system is very standard in a sense, but yet it's not, since each state can do what it wants [with the system]," according to AFL-CIO Computer Department Director Richard Drennan.

"The extent to which a state is successful with it, or uses it, depends upon the state. You can have a file and use it, or you can have a file and not use it" – exactly what Massachusetts has done until now.

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Pioneer 4331 Installation Braves Software Snags

By Rita Shoor
CW Staff

LOMBARD, Ill. — "The hardware went in smoothly . . . [but] the software was a little different."

That's how Andrew Filipowski, president of DBMS, Inc. here, summed up what is said to be the first installation of a configuration including IBM's 4331 with two 3370 fixed-block architecture (FBA) disks and the vendor's 600 line/min Model 3262 printer.

While he lauded the efforts of IBM's support staff to help with the DBMS installation, everything about the software was a surprise, according to Filipowski.

The peripherals required Release 2 the DOS/VSE operating system and there was no System Installation Product Option (Sipo) available for this particular configuration, he explained. "Every component in the system had to be generated separately."

Another problem encountered by the system technicians employed by the software products and services firm was the inability of OS/VS1 to support the 3262.

Eventually, this problem was solved by getting OS/VS1 to run under VM with Release 2 of IBM's Basic System Extensions, he said.

Around the Clock

"If it weren't for the exceptional skill of our [in-house] personnel, it could have been a disaster. But by working around the clock, we were able to bring up and tune all the software within 10 days," he said.

This success came about "in spite of the fact that we were clearly poineering with almost every software item," the firm's representative remarked.

In contrast, "the hardware went in smoothly," according to a company spokesman. "The only exception was that we received blue panels on our printer instead of brown."

Delivered to DBMS on June 22 and installed by July 10, the configuration includes the 3262 printer which Filipowski described as a "very low-cost device that could make the whole package very attractive" from a cost/benefit standpoint.

The firm had opted to purchase the system, consisting of the 1M-byte 4331, two 3370s with a total of 1.2G bytes of peripheral storage and one 3262 printer, for approximately $210,000, he said. The two-year lease price for the printer alone had been quoted as $373/mo, he said.

That price range was acceptable to DBMS, which did approximately $3 million worth of business in fiscal 1980.

While some firms have had delivery problems with 4331-based systems [CW, May 12], DBMS was very fortunate in IBM's 4300 series lottery, Filipowski recalled. "We were lucky to get an early ship date in the lottery," he said.

"However, we should have requested more 3370 disk units with that original order," he said. "We ordered two more 3370s the day our system was delivered and IBM gave us a shipment date of Jan. 7, 1983."

He felt that the vendor might have underestimated the user demand for the 3370 and is now "trying to discourage orders" for that device.

The alternative for DBMS is the 3340 disk subsystem which Filipowski said had a much higher cost per byte than that offered by the 3370. Although the 3344s, which can be tied to the 3340, are more price-competitive with the 3370, at least one 3340 is required, he said. However, "in order to protect ourselves, DBMS has ordered a 3340 subsystem as well as the 3370s.

"We may not be as cost-sensitive as other installations," he said. "If we need the disk space, we'll get it." Therefore, the 3344s are considered to be an interim solution to future storage problems, he noted.

After reviewing the cost differential between IBM's 4331 Model 2 and its 4341, DBMS has also opted to place a 4341 on order for November 1981. The larger machine was ordered because the cost savings for the Model 2 did not make up for the increase in processing power offered by the 4341, he said.

Asimov to Open Strategy Seminar

WHITE PLAINS, N.Y. — Dr. Isaac Asimov, noted science fiction author and lecturer, will keynote a seminar on "Information Strategies for the Eighties" (IS-80) here on Sept. 30-Oct. 2. Sponsored by Turnkey Systems, Inc., the conference will emphasize new and emerging computer-based productivity methods.

"Yesterday's Science Fiction Is Today's Reality" is the title of Asimov's presentation.

Other keynoters will include Charles P. Lecht, president of Advanced Computer Techniques, who will speak on "The '80s: Harnessing the Power We Built in the '70s," and Gideon Gartner, president of the Gartner Group.

Attendance at IS-80, which will be held at Stouffer's Inn of Westchester, is limited to 200 enrollees. The fee for the seminar is $965.

More information and registration forms are available from Turnkey Systems, Inc.'s Education Division, 50 Washington St., Norwalk, Conn. 06854.

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Group Meets to Strengthen Role of Minorities

By Bruce Hoard
CW Staff

WASHINGTON, D.C. – Black Data Processing Associates (BDPA) will elect national officers, formally accept its charter and generally try to consolidate and solidify its national identity at the group's second annual meeting here the 21st and 22nd of this month.

The approximately 750 members will also take in technical and vendor displays and attend a workshop in business opportunities, according to Earl Pace, BDPA national coordinator and one of the organization's cofounders.

Organized in 1976, BDPA is devoted to "strengthening the expertise of the minority members of the DP community," Pace said, adding the organization is working to "offer this expertise to those minorities who are evaluating DP for its career/business potential.

"Here's an opportunity for someone to throw off the discriminatory labels we have lived with and do something good," the national coordinator said.

The minority group is hoping to attract more members by participating in such high-profile activities as outreach programs for high school and college students, Pace said. To date, an arm of the organization has worked with handicapped students at the University of Pennsylvania and several public schools in Philadelphia.

Although predominantly black, BDPA membership also includes some Hispanic DPers, Pace said. "Although the objectives of our association are directed toward the minority members of the DP profession, our membership is open to all persons, in accordance with our current bylaws, regardless of race or sex," he added.

> *'Ironically, the Sunbelt states of the southern and southeastern U.S., traditionally bastions of racism, are now the up and coming places for minorities to find DP employment.'*

With the addition of new chapters in Washington, D.C., and Cleveland, and the possibility of expansion to Atlantic City, N.J., Dallas, Atlanta and Oakland, Calif., Pace promised the BDPA will be more aggressive in the upcoming year.

Racism in Industry

"Very subtle," was his reply when asked about the state of racism in today's U.S. DP industry. Only the rapid growth of the industry has made it possible for blacks and other minorities to gain a foothold on jobs, and most of those jobs have been lower level, data entry type of positions, he said.

Pace is anxious to see minorities leave "the computer room and coding pad behind" and move up the managerial ladder. "I think DP organizations owe minority employees some preparation so they can move to those higher positions," he commented.

Progress is coming in the form of more and more minority-owned DP organizations, he claimed, saying he knows a dozen minority members with DP businesses of their own.

Tracing the history of minorities in DP, Pace discussed his own beginnings in the field and said other minorities traveled similar paths.

When he graduated from college in 1965, there was a great national furor over the Civil Rights Act and the age of tokenism was dawning, he said. Pace sought work in labor relations with the Pennsylvania Railroad.

The young graduate was stifled because one black was already employed in that department and "they quote, end quote, did not have any openings," he claimed. However, there was an opening in the DP department and no other minority had applied yet. So Pace filled the slot after taking a test he still has doubts about passing 15 years later.

Eventually, the industry grew so fast, labor demand outstripped available supply and blacks found themselves able to find jobs where before they couldn't, he said.

Best and Worst

He labeled the Northeast Corridor between Washington, D.C., and Boston as the best area for black DPers to seek jobs because of the many computer companies and manufacturers there. But, somewhat paradoxically, he claimed the New England area is the most likely place for blacks and other minorities to encounter discrimination. "I place the New England area as a place of subtle discrimination," Pace said.

Ironically, the Sunbelt states of the southern and southeastern U.S., traditionally bastions of racism, are now the up and coming places for minorities to find DP employment, he claimed.

"As a whole, the southern states are desegregating faster than the northern states and New England," he declared.

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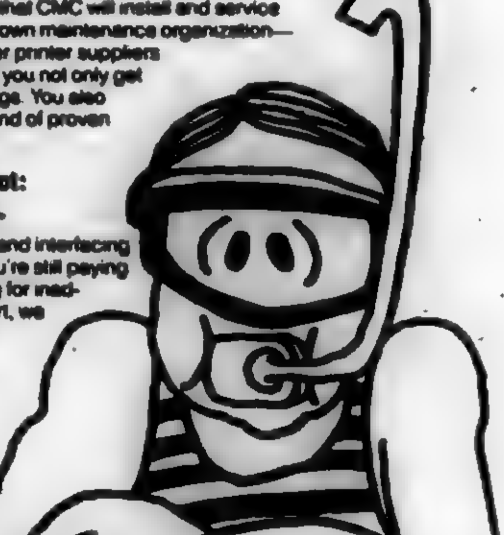

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Call for Papers

SECOND ANNUAL DP PERFORMANCE MANAGEMENT CONFERENCE, Phoenix, Feb. 22-25, 1981.

The second annual conference is being arranged by Applied Computer Research of Phoenix and Performance Management Associates of Scottsdale, Ariz. The focus of the four-day program will be on "Using Performance Management to Improve DP Productivity."

Presentations will be management-oriented, interactive and do not require formal papers, although A/V reproductions are requested for the audience.

Areas to be addressed at the conference include DP productivity measurement (PM), productivity in development, management of change, pricing DP services, fulfilling user service objectives, the role of planning in PM, problem resolution and using PM to improve DP productivity.

More information is available from Jim Christensen, Conference Coordinator, Applied Computer Research, P.O. Box [illegible], Phoenix, Ariz. [illegible].

COMPUTER LAW JOURNAL, SPECIAL ISSUE.

The Computer/Law Journal has issued a call for papers for a special two-issue set entitled "Law and Information Policy" to be published in early 1981.

Papers are being sought in all areas of the information process, from the legal aspects of fact-gathering, to information storage, retrieval and transmission.

Topics of interest include privacy, protection of data bases, viewdata and similar systems, transborder data flow, access to government data bases and cryptography.

Guest editors for these special issues are Dr. Jon Bing and Prof. Selmer of the Norwegian Research Center for Computer and Law.

Authors interested in submitting papers for these issues should write Bing at the Norwegian Research Center for Computers and Law, Oslo University, Karl Johans Gt. 37, Oslo 1, Norway, or to Michael Scott, Editor in Chief, Computer/Law Journal, 530 W. Sixth St., 10th floor, Los Angeles, Calif. 90014.

ELEVENTH CONFERENCE ON COMPUTER AUDIT, CONTROL AND SECURITY, New York, May 4-6, 1981.

The conference is jointly sponsored by the EDP Auditors Foundation, Inc. and Automation Training Center, Inc.

"How to" papers are wanted on new approaches to problems, pioneering efforts in advanced systems, case histories and new audit, control or security techniques.

Authors wishing to submit a paper should send a brief abstract which includes the key ideas and approach to the topic of the paper. A brief personal resume and business telephone number are also requested. Abstracts submitted from outside North America should explain the proposed talk in great detail.

Abstracts must be received no later than Oct. 1 by Harold Weiss, program chairman, Automation Training Center, Inc., Suite 17, 11250 Roger Bacon Drive, Reston, Va. 22090.

Uncovers 1,200 Thefts Yearly

Boston Edison Computer Tracks Power Thieves

By Bruce Heard
CW Staff

BOSTON — Computers played a key role in the arrests of nine people charged with stealing between $15,000 and $20,000 worth of electricity from Boston Edison Co. here last week.

Boston Edison's IBM 370/138 has also led company officials on a path that may culminate in the arrests of 100 additional energy thieves, who have collectively stolen some $50,000 worth of power from the utility, according to a spokesman.

The customers arrested last week, from nearby Stoneham, were accused of altering their meter readings for periods ranging between two months and a year. If convicted, they could be penalized by up to a year in jail and a $1,000 fine. They would also be required to make reparations for the stolen electricity.

Millions Recovered

The utility has unearthed an average of 1,200 cases of theft yearly since it implemented its computer detection strategy in 1975. About $4,000,000 has been recovered over that four-year period.

Boston Edison is confident it can do even better, saying once all the bugs are worked out of its system it will be able to spot suspicious accounts more easily and with more regularity.

The basic detection strategy is a simple one. The utility, which serves 370,000 customers in 40 Greater Boston cities and towns, uses the computers to seek out accounts with large disparities in the amount of electricity used from one month to the next. The spokesman refused to divulge anything beyond that, citing security reasons.

Currently, about 100 suspicious cases weekly are being called to the attention of field surveillance and meter reading personnel assigned to track offenders, the spokesman claimed.

Not far away in Westboro, Massachusetts Electric Co., an even larger utility, serving 750,000 customers throughout western and central Massachusetts and the Merrimack Valley, is using similar tactics to trap thieves.

That utility uses its IBM 370/168 and 370/158-based computer system and a corp of approximately 10 full-time field investigators to study historical billing periods and match records, according to Dick Nadeau, Mass Electric System Diversion Manager.

"Right now, the computers are not effective as the field investigators, but we feel they are pointing us in the right direction," he said. That direction led to 745 arrests and the return of $556,000 in 1979, he reported.

Sotheby's to Hear Computer Bids

By Bruce Heard
CW Staff

NEW YORK — "What am I bid for this beautiful IBM 370/168 computer system used only on Mondays by an office of elderly accountants in Fort Lauderdale?"

Such a seemingly outrageous line may actually be heard at the Sotheby Parke Bernet, Inc. Business Systems Department's inaugural computer hardware auction here this fall.

Sotheby's, a firm that has auctioned off books, fine arts and "just about everything under the sun for 250 years," is now expanding to include computers, according to John Carr, director of the Business Systems Department.

From a mailing list of 20,000, 1,200 companies requested auction catalogs and probably a third of them are willing to sell their equipment at Sotheby's auction, Carr claimed.

He is hoping to highlight the auction with several large IBM mainframes, but also plans to include plug-compatible mainframes and "an array of peripherals, minis and non-IBM hardware. We're going to sell what the market demands."

If the first auction is successful, the firm will continue running them on a quarterly basis at Sotheby's new gallery at the corner of 72nd St. and York Ave. in Manhattan and at other sites around the country.

"We may have peripheral auctions even more frequently than that," he declared.

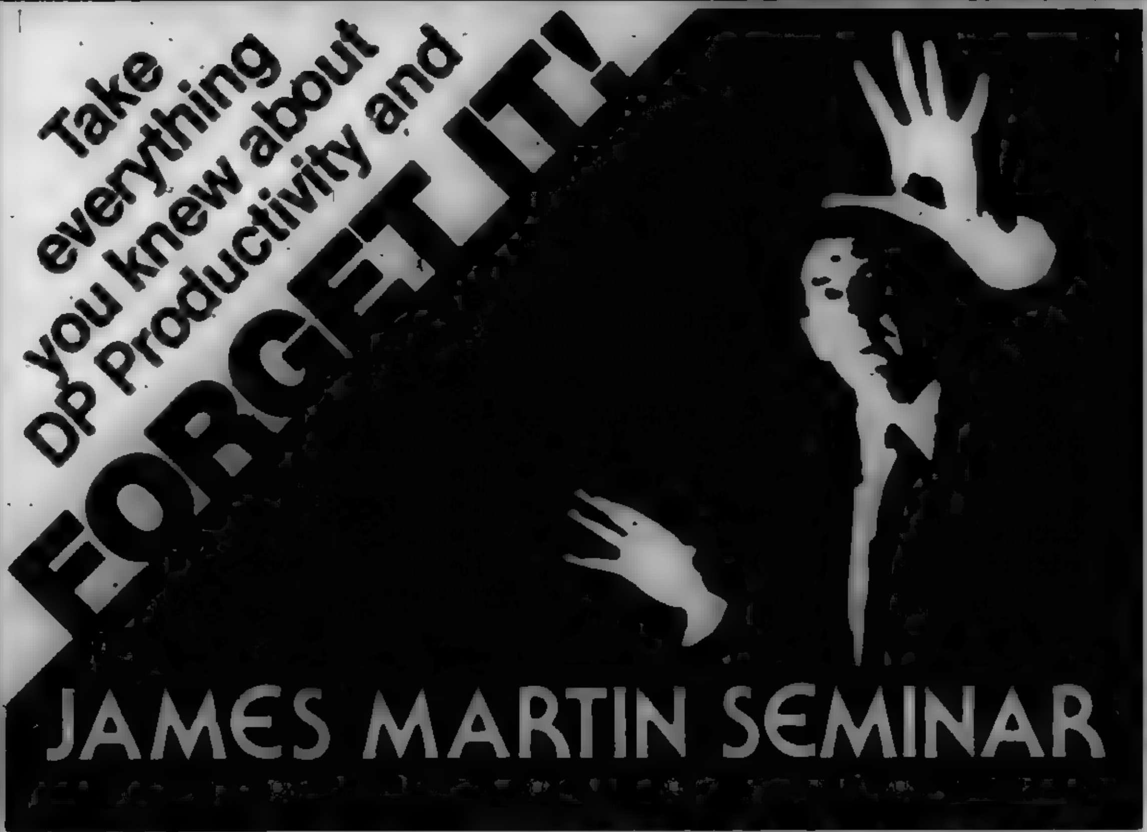
Sealed, open-floor and telephone bids will be accepted at the auction, which Carr said was made possible by the rapid growth of the used computer market.

Eastern Airlines Sets Univac 1100 Courses

MIAMI — Eastern Airlines' Computer Education Department will offer 30 courses, ranging from one day to two weeks, oriented toward Univac 1100 software systems.

The courses, slated to begin Nov. 3, will feature specialized but practical technical education in the areas of demand and real-time communications, the department said.

Details and enrollment information are available from Gail Fraser, Eastern Education, Eastern Airlines, Miami International Airport, Miami, Fla. 33148.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Concepts Do Not Transcend Tools

Computer-Generated Art Still Has a Way to Go

Figure 1

Joseph Scala, shown in Figure 1, has used computer programs to design the commercially applicable work shown in Figure 2 and Figure 3 as well as the artistically 'purer' applications on the next page.

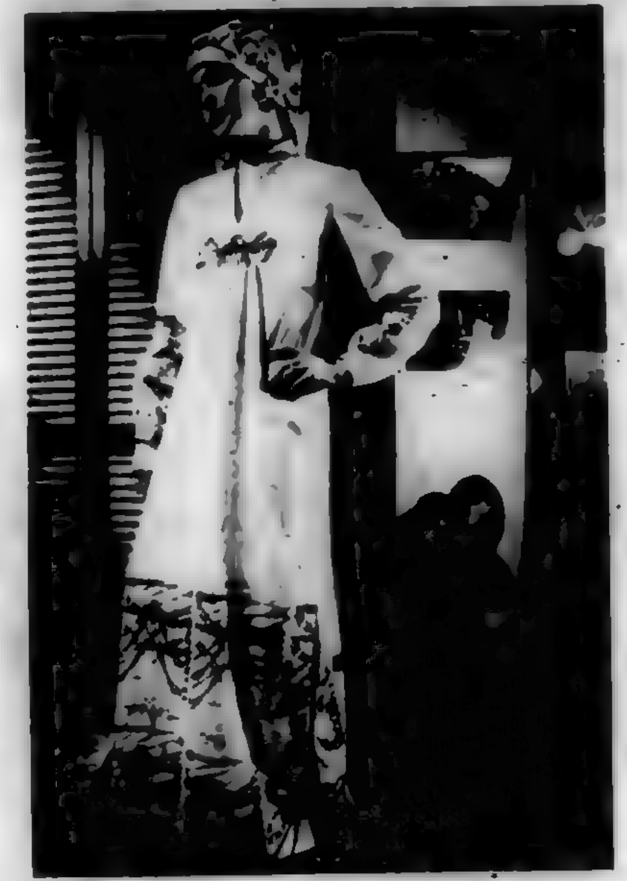

Figure 2

By Marguerite Zientara
CW Staff

SYRACUSE, N.Y. — Great artists have always dealt with concepts that were way beyond the tools they used, according to artist Joseph Scala, and therein lies the problem in computer art today. "At the moment, people using computers are dealing with the tool and not dealing with concepts that transcend the tool."

Currently in his third year as Director of Galleries for Syracuse University, Scala has virtually stopped "making art," as he calls it, and instead concentrates on displaying other people's masterpieces.

Although he still likes, sells and exhibits his past works, Scala is in a "dry period" as far as his own creativity goes, and one reason for it is the dissatisfaction he felt with his so-called "computer art."

"I ended up spending more time on the technology than on the art," he recalled. "The tool became more important and time-consuming as I progressed and I also became very discouraged with the output."

"The final printed output either looked too mechanical — it *looked* like it was made by a machine — or it lacked the human touch, an element that I felt was necessary in art," Scala said.

Scala quit computer art two years ago. Although from 1970-1978 he believed in the natural partnership of art and technology — as witnessed by the designs on these pages, made during that period — he has since undergone a complete change in viewpoint.

Emphasizing that his views are "strictly personal and related to myself" as well as subject to change, Scala maintained that computer technology has not evolved to the point where an individual can truly express himself in an original way using it.

"I'm not putting down computer art, but it has a long way to go before any significant art will come out of it," he contended. "Most so-called computer art, with very few exceptions, has been produced by scientists and engineers who have no sense of art.

"These pseudo-artists — unless they happened to have a machine that makes designs — would otherwise never attempt to make any art."

Classical Training

Scala, on the other hand, has wanted to be an artist "as early in my life as I can remember" and early on received a "very classical training in the arts." Nevertheless, he eventually studied for and received a B.S. degree in math because it was more practical than art.

After nine months in his first job as an engineering aide in a defense plant, Scala "couldn't stand it" and resigned. Scala then taught math in a secondary school and eventually, in 1969, enrolled in Cornell University's graduate program in fine arts — where he first encountered the computer.

After graduating from Cornell, Scala took a teaching position at Syracuse University's Department of Experimental Studios. Searching for contemporary technology to apply to art took Scala to a computer graphics workshop conducted by computer artist Dr. Ken Knowlton from Bell Telephone Laboratories, Inc.

It was Knowlton's software package for artists, Explor, that "opened up a new world" to Scala and his students and launched his eight-year period of computer-aided artistry.

Less Than Ideal

While Scala maintained his enthusiasm for the medium for almost a decade, he now looks back on the period as something less than ideal. "Even then, I often found myself changing the work — putting my hands in and making the computer output different," Scala recalled. "I'd add either paint or color or something, because I didn't like the mechanical end result.

"Either it looked too much like everybody else's computer artwork or it had some personality on it other than my own," Scala said, attributing that to the fact that he generally used programs written by other people.

"[Knowlton's] package generated a certain look which bothered me because it was more Knowlton than it was me," he said. "You got to the point where you had to invent your own software and even then you had to face the problem of the output with that machine-look."

And Scala "wasn't that interested in writing original software programs from scratch. First of all, I found it was fruitless because [the artwork] all came out looking alike anyway," he said. "So I never bothered to do that and just manipulated the packages I had."

Computer-aided video output, on the other hand, does not display the artificial look of hard copy output and allows the artist necessary self-expression, Scala maintained.

However, "in going to paper in any way, you have the whole history of art that that piece of paper has to go up against, and computer technology hasn't reached the point of sophistication to compete with art drawn by human hands," Scala said.

In such cases, "the hardware and the software get in the way of the art," Scala said. "The technology hasn't reached the point where an artist can really use it to say anything that's aesthetically new — the technology's new, but the art isn't.

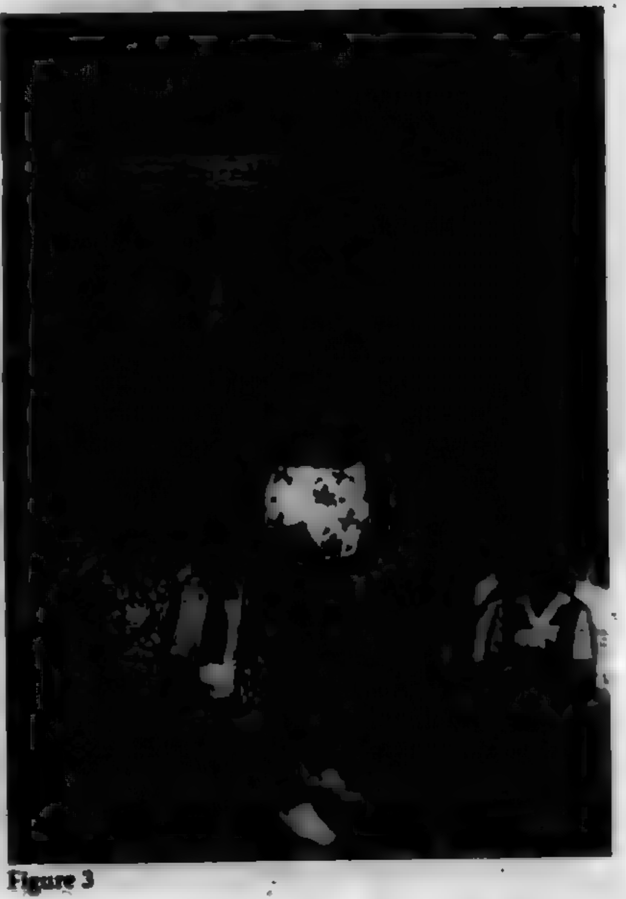

Figure 3

"Even though there are some things that can be done much more quickly with the computer, very complex patterns done at great speeds, no one has yet been able to make any artistic statement of any significance that couldn't have been done just as well some other way," he added.

Emphasizing that the situation could change with increased sophistication of the technology, Scala noted, "I don't want people to think this is my proclamation forever.

"Some Leonardo DaVinci-like genius could come along and do marvelous things with the computer, but we haven't yet reached that point," he added.

On the other side of the coin, Scala suggested, "the computer could actually change the aesthetic tastes of a whole generation, so that what people look at now as being uninteresting, in 25 years may be extremely important and may even be the only art that's significant."

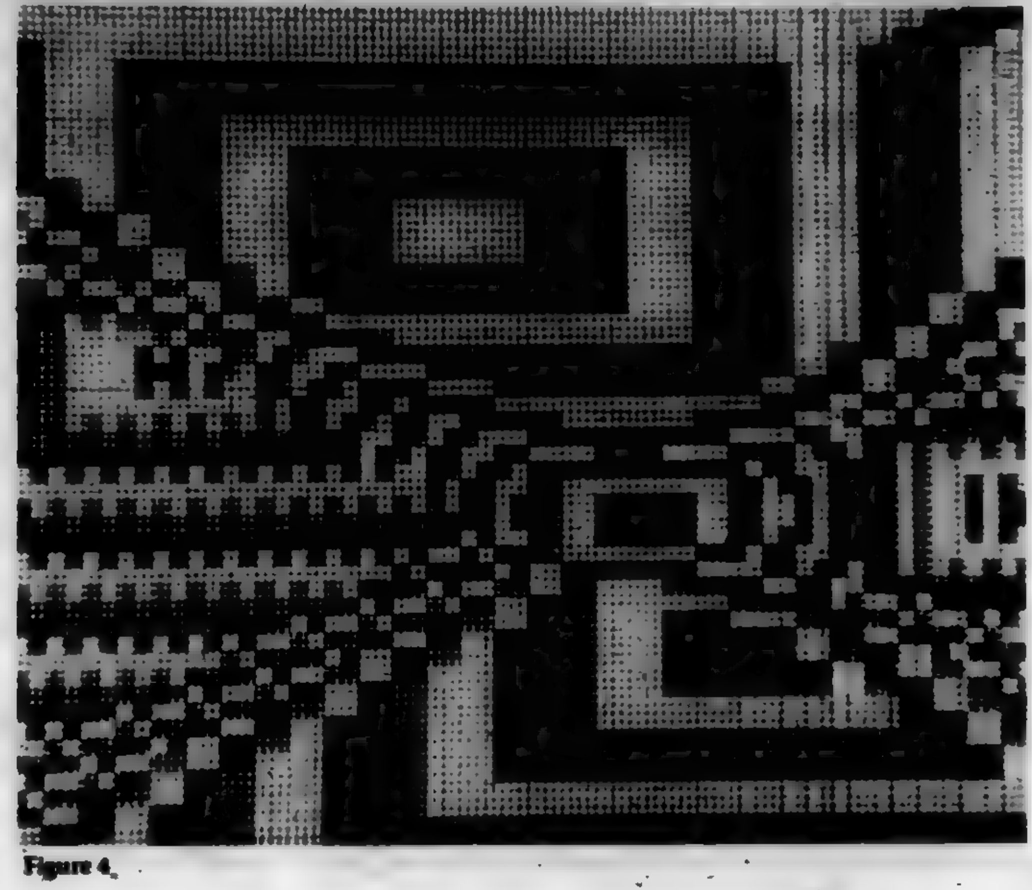

Figure 4

'I even got orders for the stuff; they wanted to buy it, but the students didn't want to sell it,' Scala recalled. 'I think it's something that is going to come into the mainstream of the textile and fashion design business very shortly.'

'Art, But Not Great Art': Computer Prints Images Suitable for Framing

SYRACUSE, N.Y. – Calling his computer-generated designs "art, but not great art," Joseph Scala offered some insights into exactly how they were produced.

The graphic design "Exploring" (see Figure 4) originates from a program called Explor, designed especially for artists by Dr. Ken Knowlton, another well-known computer artist.

Explor, which stands for the production of images from Explicit Patterns, Local Operations and Randomness, allows images to be printed on a high-speed line printer, making the time between execution and finished print extremely fast, Scala explained.

"In fact, with our [Digital Equipment Corp.] Decwriter terminals, the image is typed back almost immediately," Scala said. Each individual image can be produced as many times as the artist wants and each individual point or area of points can be changed explicitly or randomly by the artist's program.

Image Manipulation

While the graphic output in such a process is "immediately suitable for framing," Scala said, further work on an image can produce quite a different result.

Figure 2 illustrates what such additional manipulation can produce.

Using several software packages, including Explor and Splat (Simplified Programming Language for Artists), Scala used Syracuse University's IBM 370/155 mainframe and DEC VB-10C display to produce the desired design for printing on the caftan's material.

Splat involves working with a predefined symbol, such as a circle, square, polygon or line, and drawing and manipulating these symbols by writing a program, "which is closer in concept to the way a traditional drawing is made," according to Scala.

The image produced was then photographed from the CRT screen and its negative was made into a high-contrast, nonhalftone print called a Kodalith. The Kodalith, in turn, was transferred to a silk screen and printed on cotton cloth, which was then made into the caftan.

In Figure 3, the same basic process produced the design for the bathing suit's material, with the exception that the output to be photographed was from either a California Computer Products, Inc. plotter or high-speed line printer, instead of a CRT terminal, Scala said. Several such suits, designed and made by Scala's students, were last displayed at the 1978 Siggraph conference in Atlanta.

If you are wondering whether anyone would actually wear such a garment, rest assured that "I even got orders for the stuff; they wanted to buy it, but the students didn't want to sell it," Scala recalled. "I think it's something that is going to come into the mainstream of the textile and fashion design business very shortly."

Figures 5 and 6 are examples of Splat's video output, shown here as photographs of the CRT screen. They were taken from a video entitled "Our Father," which arose from "an idea of putting together things in myself that make me up, and that affected my childhood and so forth," Scala explained. "It just sort of all came together."

The wiggly line traversing the pictures is an oscilloscope voice pattern of a person reciting the Lord's Prayer. The work was produced using the VB-10C and an oscilloscope.

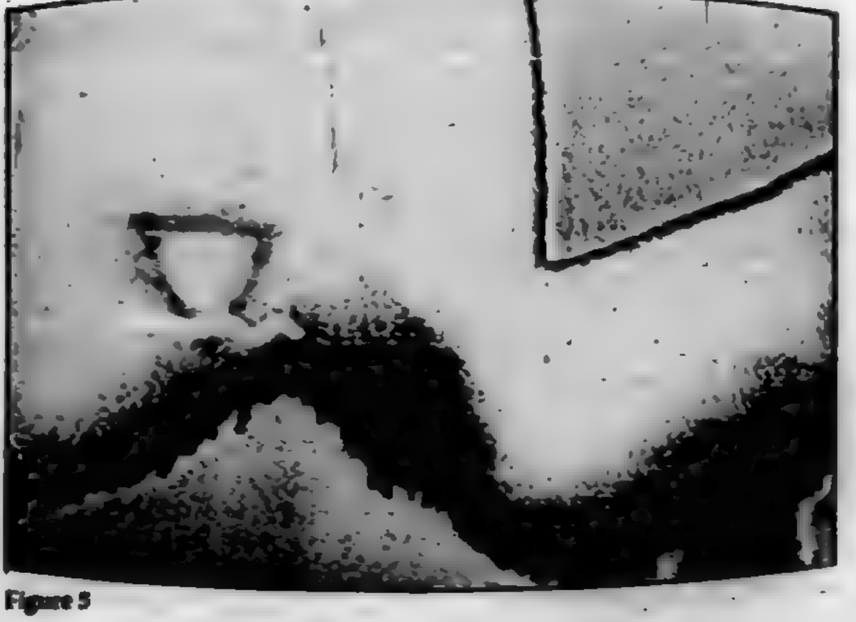

Figure 5

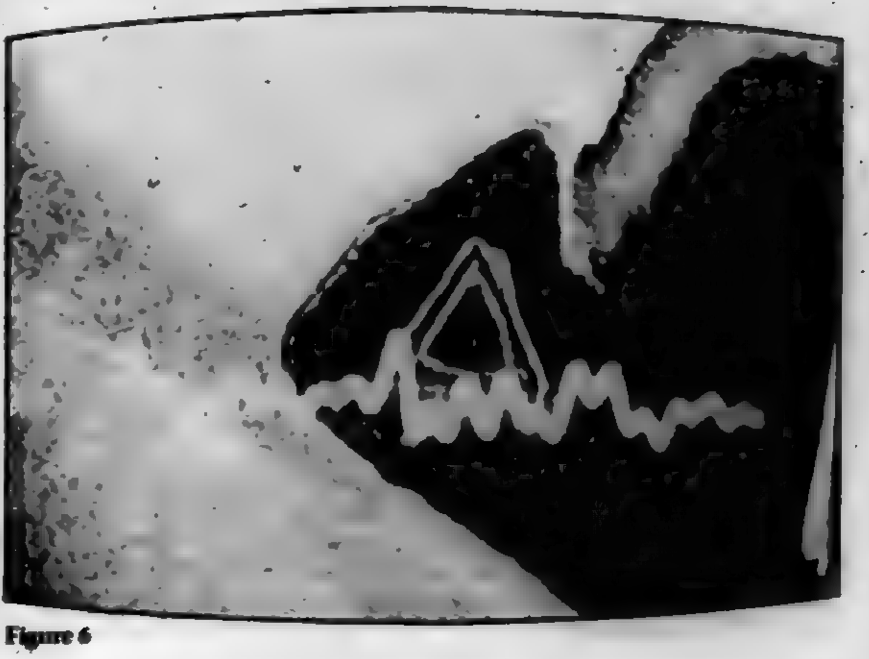

Figure 6

Joseph Scala's more artistic efforts are illustrated here by Figure 4, entitled 'Exploring,' which used Ken Knowlton's Explor program. Figures 5 and 6 are images from a color video display, 'Our Father.'

While Conservatives Cheer Proposals

Australian Unions Condemn Technology Report

Letter from Australia

By Susan Coleman
Deputy Editor
Australasian Computerworld

What better way to learn about the computing scene in other countries than to ask the editors of computer publications? Computerworld recently set up an information exchange with its sister publications, all published by CW Communications, Inc., to do just that.

The long-awaited report by the Committee of Inquiry into Technological Change has finally been released to resounding boos from the socialists but cheers from the conservatives and most of the computer industry.

The report was commissioned by the federal government "to examine, report and make recommendations on the process of technological change in Australian industry in order to maximize economic, social and other benefits and minimize any possible adverse consequences" [CW, Aug. 4] It was prepared by a committee of three men: Prof. Rupert Myers, an academic who, as chairman, gave his name to the so-called "Myers Report"; Allan Coogan, chairman of Nabalco Pty. Ltd.; and Bill Mansfield, federal secretary of one of our most powerful unions, the Australian Telecommunication Employees Association.

Its brief was to identify technological change and its impact, to examine overseas experience and to review the effectiveness of government policies and programs in facilitating the introduction of new technology.

In the U.S., where technological change does not seem to be an issue among workers, such a commission may seem strange. But as I mentioned in my last letter, unions here are extremely concerned about the potential job loss which can be caused by the large-scale introduction of technology.

A meeting of 17 unions representing workers across the board, blue- and white-collar, condemned the Myers Report. There was a feeling that it was a palliative to the union movement to make new technology more acceptable.

Visiting executives from Data General Corp. expressed astonishment that such a concern prevails here. "No jobs are lost by the introduction of technology," according to vice-presidents Barry Fidelman and Rowland Thomas. "Computers free people for other more productive tasks."

The Myers Report advocated speedy introduction of new technology, which it said would promote new profit areas and thus generate more jobs (Australia's unemployed is more than 6% of its potential work force). Ironically, it also recommended provisions to cater to those displaced by the new technology. A "social safety net" provides for compensation payments, after retrenchment, of 60% to 75% of salary for between one and six months, depending on length of service.

In addition, retraining was suggested (but not recommended) to be provided by the retrenching employer.

Should the government accept the recommendations of the report — and it does not have to (its record in implementing the recommendations of commissioned reports is not impressive) — then Australia's indigenous computer industry will get a much-needed shot in the arm. We import almost all our hardware and system software to the tune of $500 million each year — mostly from the U.S. With our relatively tiny population of 14 million and the lack of venture finance, Australian entrepreneurs have been discouraged from developing a manufacturing industry here.

While the government espouses a "buy Australian" policy, it has done little to ensure there are any Australian machines to buy. So Catch-22 prevails: There are no machines to buy, so there's no money to develop machines which could be bought.

In 1949, Australian scientists of the Commonwealth Scientific Industrial Research Organization, (CSIRO) a government statutory authority, developed one of the earliest potentially commercial computers. CSIRAC, as it was known, was claimed to be not the fastest machine in the world at the time, but the easiest to program (that was foresight!)

"It was easier to program even than Edsac. The language we devised was much more flexible and used considerably fewer instructions," recalled Dr. Trevor Pearcey, who did the logical design of CSIRAC.

But limited finances and a philosophical decision to put what money there was into radio astronomy sadly deprived us of our own computer industry from the outset. Even now there is only one company, CMAD Pty. Ltd., which actually manufactures a processor (a 16-bit computer). All other "manufacturers" buy processors from overseas and add value with software and a little homegrown hardware.

Compare this paltry effort with Sweden's LM Ericsson, which is contracted to supply $1,200 million dollars worth of computerized telephone exchanges to the Australian telecommunications authority, Telecom. Sweden has a population about half the size of Australia's.

When Australia launches its domestic satellite in 1984, the satellites and the launch will all be supplied by foreign companies — $200 million added to our national debt.

Attempt to Lead

The 1,500-page Myers Report urges the industry to "keep up with world technological development and where possible, in areas of particular advantage, attempt to lead." As well as defining the means by which venture capital could be made available, the report recommends that the Australian Industrial Research and Development Incentives Board (AIR and DIB) be restructured to become more autonomous and to have its charter expanded to include funding of public interest projects. The AIR and DIB is a government board which grants money for research and development projects on a dollar-for-dollar basis.

Suggesting, as a possible model, the West German venture capital bank Deutsche-Wagnesfinanzierungs-Gesellschaft (WFG), which is a limited company funded by banks and other credit institutions and the government, the report recommends the establishment of a venture capital corporation "to provide risk capital to individuals and to small and medium-sized enterprises to facilitate the bringing to production and the marketing of promising inventions and innovations.

"The government contribution to the establishment of the corporation should include guarantee of loan funds up to a maximum of $25 million over 15 years.

The Myers Report sets out to provide a means to reduce union opposition while providing financial incentives to get technology introduced as fast as possible. There is little attention to the side effects of its introduction.

The Myers committee was reluctant to put a figure on the proportion of those presently unemployed, although it conceded some were attributable to technological change. Nor was it prepared to say what the anticipated job loss of the future might be — although it had calculated that it should allocate $15 million to $20 million for short-term retrenchment payouts to those who might not find another job before leaving their old ones.

Among the recommendations designed to reduce union resistance to technology are:

- To provide between one and six months' retrenchment payments at a percentage (60% to 75%) of weekly earnings and "assistance to find alternative employment."

"An employee's perception of what support he will receive after retrenchment can greatly affect his or her attitude to accepting or rejecting technological change," the report said.

- To lower barriers to union amalgamation and to deregister unions with less than 1,500 members.
- To provide for wage margins that more properly reflect skills and responsibilities via broadbanding job classifications into groups within awards.
- To upgrade, via a "bureau of the working environment," work environments to make them more pleasant and more safe as well as to enhance the quality of work through attention to factors such as organization of work and patterns of work time.
- To consider a means whereby payroll tax might be abolished (to encourage employers to hire more and fire less).
- To set up a technology awareness program to promote technological change and its effects on the economy, industry, the labor force and society.
- To enhance the capacity of the union movement to study and respond to technological change.

It is extremely disappointing to find that the committee did not even theorize on job training and creation schemes to assist these people — blandly assuming these aspects will take care of themselves. The 460,000 unemployed attest to the fact that this simply does not happen.

After 16 months and $1 million, the report contains mainly suggestions for more reports, more surveys, more subcommittees.

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Report Outlines Four Phases Of Graphics Implementation

WASHINGTON, D.C. — If your firm is among those leaping on the computer graphics bandwagon, it will probably go through four phases during the process, according to Allan Paller, president of AUI Data Graphics here:

- Review of the alternatives.
- Preparation of a plan and hardware/software selection.
- Selling the plan within the organization.
- Implementing the system with training and support.

But, what will make computer graphics implementation both effective and successful? The four phases can be subdivided into a step-by-step process with each of the outlined steps having undergone the test of actual implementation, Paller claimed.

These steps are detailed in a study entitled "Ten Steps to an Effective Automated Business Graphics System."

Coordinator Selection

First, the organization must survey the available options, according to the study. It suggested selecting a coordinator to spearhead this effort with a small task force assigned to review progress. Classroom training in computer graphics and reviewing the graphics implementation experience of other similar organizations are among AUI's suggestions for the coordinator at this point.

Step 2 involves arranging preliminary hardware demonstrations and software briefings for the task force so that a consensus can be reached on the best approach to graphics implementation, the study continued.

In step 3, which begins the second phase in the implementation process, a plan that includes the following components should be prepared:

- A summary of existing and potential graphics applications within the company and applications which have proven successful in similar organizations.
- An inventory of existing equipment and expertise within the organization.
- A set of hardware and software requirements.
- A concrete plan for a comprehensive training and technical assistance program.

At this point, the firm is ready to select its business graphics software, according to AUI's report. The firm recommended selection of device-independent software because of the greater flexibility afforded to the graphics end user if he decides to expand the graphics applications in his organization at a later date.

Firms that purchase software from the hardware manufacturer are often either limited to a very small number of applications or are forced to rewrite software when new graphics equipment is installed, AUI claimed.

The hardware selection step involves specifying how often graphics will be needed in the organization; what level of graphics quality will be required; whether hard copy, film or color slides are necessary; and the extent to which individual users require direct access to the graphics tools.

Phase 3 — selling the plan within the organization — is best accomplished by arranging customized computer graphics demonstrations for top-level management personnel, AUI pointed out. The demo should be rehearsed and arranged to avoid computer or communications malfunctions.

Hardware and software installation begins the fourth and last phase, AUI noted. Installation should be scheduled so that hardware is delivered to the end-user location approximately two weeks before the software installation team arrives, the report said.

Business Application

The firm also recommended implementation of a high-visibility business graphics application as soon as possible after the executive briefing had taken place. The client selected by the graphics coordinator for this first application should be the highest level executive in the user department.

In order to ensure the success of this application, the coordinator must determine a specific set of indicators which the client deems as important for monitoring performance in his area.

Next, manual sketches of the charts to be produced by the system are to be prepared for the client's review and approval, according to the study. Finally, the appropriate data is selected and the graphics programming is prepared.

Step 9 in graphics implementation requires the provision of training for the user community, the report said.

Lastly, acceptance of computer graphics throughout a company requires the availability of a technical support group to assist new graphics users with particular applications. This technical support should include access to communications experts and the graphics arts staff as well as programmers, AUI said.

In fact, the firm suggested that a nonprogrammer be included on the technical assistance team to demonstrate that computer expertise is not necessary for effective graphics utilization.

The booklet outlining these phases is available at no cost from AUI Data Graphics at 1701 K St. N.W., Washington, D.C. 20006.

George Will To Address Usita

CHICAGO — George F. Will, columnist and TV personality, will address the U.S. Independent Telephone Association's (Usita) 83rd national convention here Oct. 6-8. Awarded the Pulitzer Prize in 1977 for distinguished commentary, Will is probably best known for his participation on the weekly "Agronsky & Company" television panel.

Keynote speakers at the conference will also include Charles Brown, AT&T chairman. Other features of the convention are management seminars, an awards luncheon and tours of the Windy City.

Admission is free for Usita members and $25 for nonmembers. Housing reservations and ticket information are available from Pam Sprandel at Usita, Suite 1201, 1801 K St. N.W., Washington, D.C. 20006

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Money Fund's System Keeps up With Cash Flow

NEW YORK — Each working day approximately $30 million moves into and out of the $1.8 billion mutual fund operated by The Reserve Fund, Inc. here, originator of the entire $80 billion money fund industry.

"Customers will wire in funds one day and take them out the next. You can't get much more liquid than that," noted Bob Kaczorowski, the fund's director of systems development.

"The Reserve Fund, unlike other mutual funds, is in business to manage clients' short-term cash, or working capital, by investing exclusively in short-term, high-yield liquid investments such as Treasury bills and certificates of deposit," he said.

The more liquid the funds — the more stress that's placed on the old equation that time equals money — the more vital it becomes to provide a fast and reliable service.

"Competition in this business is tough and individual depositors and brokers alike expect us to be able to give them an instant report on the funds they have with us. If we can't tell them, they take their money out of the fund and go elsewhere," Kaczorowski said.

Transaction Processing

A computer system, not surprisingly, is a must for The Reserve Fund's day-to-day operations. Until last summer, the fund had relied exclusively on a single large-scale computer system linked to 32 on-line terminals to manage its activity.

Now, however, it is developing systems based around a transaction processing package called TPS 6 offered by Honeywell, Inc. on its small Level 6 computers.

The Reserve Fund has installed four Level 6s at a cost of approximately $1.2 million and has a fifth on order for delivery early next year.

"We looked at the market for an easy-to-use software package that would help us to implement transaction-based systems speedily. Further, we liked the backup that several small computers provide and the flexibility of being able to bring in another computer system is we want to start another mutual fund," Kaczorowski said.

"For a company that saw its asset base go from $180 million to $2.1 billion over a 22-month period, flexibility is an important consideration."

Using the TPS 6 system, The Reserve Fund is able to do concurrent production and program development work. One Level 6 is dedicated full-time to production, two other systems are employed doing spot duty and acting as backup and the fourth system is used for applications programming.

Daily Update

The production system is currently handling about 5,000 purchase and redemption transactions daily against a data base of about 140,000 active accounts. Every day the fund's portfolio is evaluated and applied to every account in the system.

All purchase orders — by check, wire or transfer of funds — and all redemption orders are entered through terminals linked to the computer. Modifications to account status, such as address changes, are also entered in the same way.

Other terminals are used by customer service representatives to answer on-the-spot customer inquiries on their accounts and balances.

At the same time, the computer maintains a complete history of transactions and produces the periodic and special reports such as those required by the state and federal governments.

The primary key to the account master file, which stores all shareholder information, is the account number. But the file can also be accessed by the customer's Social Security number, phone number or agent account number, either alpha or numeric.

"If a customer can't remember any of these, we're in trouble," Kaczorowski quipped.

All other computer files are linked by TPS 6 to the master account file. These include transaction history, change history, general mailing and agent mailing files.

Security Measures

Because of the importance Reserve Fund places on security, it has designed its own access security mechanism using features built into TPS 6. Each operator has an ID and password and is assigned a certain level of security that allows access to certain information only.

There is also a time-out feature to prevent information from being left on the terminal's visual display screen. Depending on the sensitivity of the information, it will be displayed for a few minutes or just for a few seconds.

The screen data formatting capability of TPS 6 and the multiple key access to files and other features of the system, including recovery features as well as niceties like the time-out feature, have enabled The Reserve Fund to tailor computer systems to meet its requirements in an "efficient and effective manner against a tight time schedule," Kaczorowski said.

Three of the installed Level 6s have similar configurations, being Model 57s with 384K words of main memory, a commercial instruction processor with cache, three 256 M-byte disk drives and two magnetic tape units. The development system, which has ten terminals attached, is a smaller Model 43 system.

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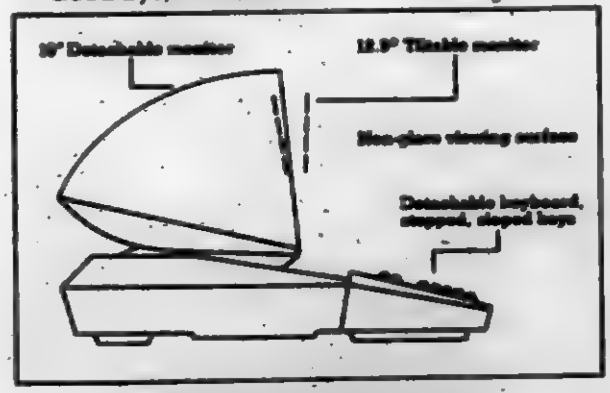
With the Ergonomic Terminal ADM-42, you get a large, non-glare 15" screen to cut down on sore eyes, tearing, and blurring. You get a high-resolution monitor (7 x 11 dot matrix characters) for the sharpest picture available. You even have separate contrast and brightness controls. A tiltable monitor lets you reposition the Ergonomic Terminal, so you don't have to reposition yourself. You can separate the keyboard and video display and locate them in any position you like. And the control base portion of the terminal can be remotely positioned out of the way.

Farewell, eyestrain. So long, backaches. Good-bye, headaches.


15" Detachable monitor
12.5° Tiltable monitor
Non-glare viewing surface
Detachable keyboard, stepped, sloped keys

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The ADM-42 isn't just another pretty face. It's the smartest terminal in its class with full editing capabilities, a full array of visual attributes, flexibility of format, security, interface, and transmission. Not to mention four-page display as standard equipment. With an optional extended memory capable of adding data space up to a maximum of 8 pages.

The Ergonomic Terminal has a bright, easy-to-read 1920 character display (24 x 80), 128 ASCII character set, and 16 function keys (optionally programmable) that store 32 or 64 characters each.

It also comes with a 25th line established and reserved for status indicators and messages of up to 78 characters.

As if all this isn't enough, the ADM-42 comes with options. Galore.

So if you think the terminal you're using now is a real eyesore, consider the Ergonomic ADM-42.

It just may put optometrists and aspirin makers out of business.

Lear Siegler, Inc., Data Products Division, 714 North Brookhurst Street, Anaheim, CA 92803. 800/854-3805. In California 714/774-1010, TWX 910-591-1157, Telex 65-5444. Regional Sales Offices: San Francisco 408/263-0506, Los Angeles 213/454-9941, Chicago 312/279-5250, Houston 713/780-2585, Philadelphia 215/245-1520, New York 212/594-6762, Boston 617/423-1510, Washington, D.C. 301/459-1826, England (04867) 80666.

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DLV11-J 4 Port Serial I/O Interface

uniq PRICE: $21,500.00
With Dual 10 Mbyte RL02 Disk Drives: $25,100.00

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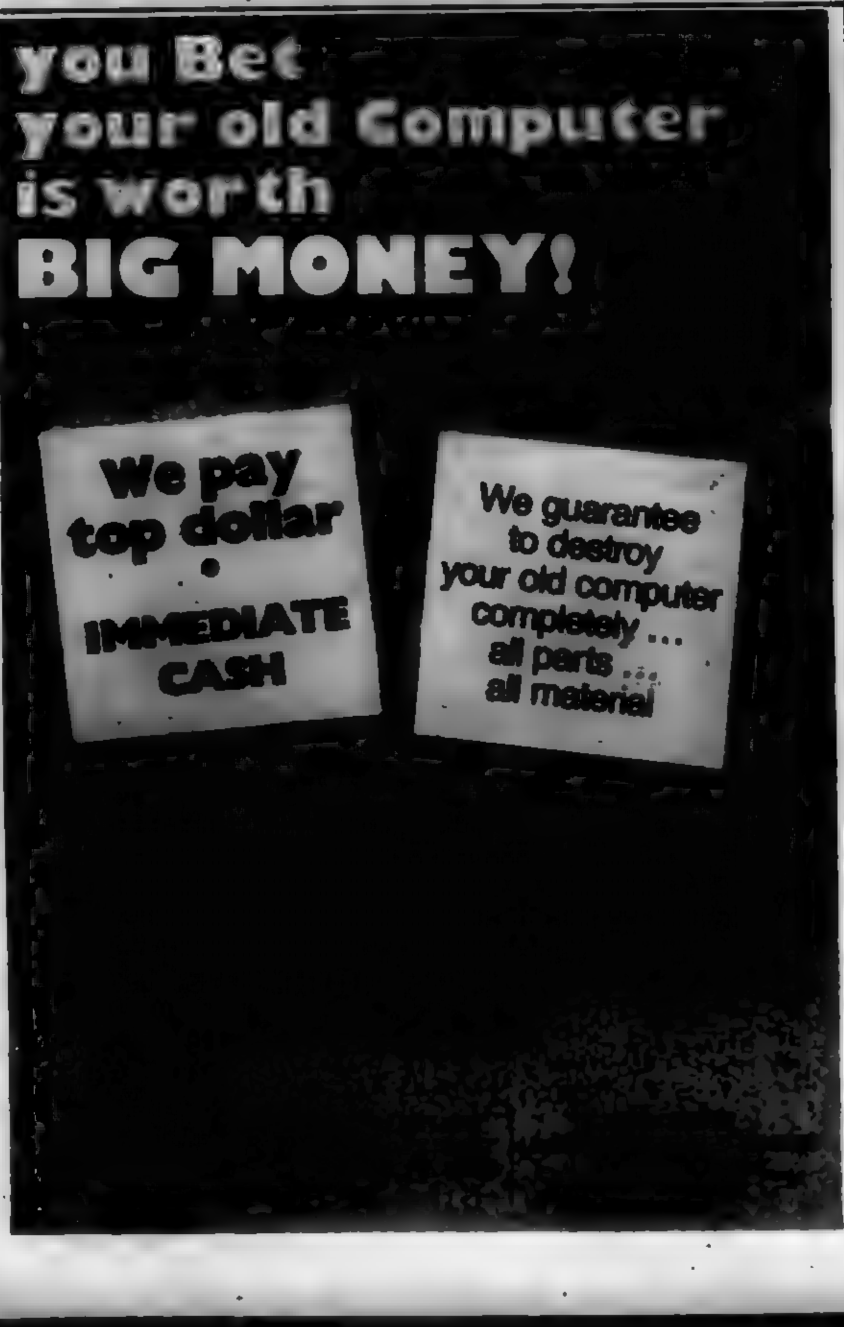
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System Books Reservations For Condominium Vacations

SAN FRANCISCO — After five years in the works, Creative Leisure Corp. here has developed an electronic reservations system that offers travel agencies an effective way to book its resort condominium accommodations.

The firm, which was started in 1969, was founded to offer vacationers this alternative to hotel living. The company has 26 properties in Hawaii and 17 condominium resorts and villas in Mexico.

Six years ago, company president Peter Henze started looking for a hardware system that could provide to a smaller user the sophisticated functions usually required by larger companies.

Further, the firm deals with "a range of products and a variety of customers. We needed software that could handle all facets of studio through three bedroom condominiums and sometimes, villas. But, we also needed something that could accommodate information useful to a budget-conscious family on vacation as well as a millionaire going away for a short trip," Henze said.

Datapoint Gets Nod

Henze decided on Datapoint Corp. and Creative Leisure has gone through a number of system upgrades ever since. In 1977, the firm installed a Datapoint 4520 with 48K bytes of user memory, 5M bytes of fixed and removable disk storage and a 132-char. printer, for development.

After two years of more system improvements and experimentation, the current software program was refined and put into operation with the Datapoint 4650. The current hardware offers almost three times the capacity of the 4520 with 120K bytes of main memory, and 120M bytes of disk storage attached to 11 on-line terminals, the firm said.

The software was designed by Henze, Creative Leisure systems analyst Mark Silverman and Datapoint systems engineers. Henze saw the need for a custom-designed program when the firm first switched to computer reservations, and found that existing software packages could not accommodate the company's needs, he said.

The current software can hold descriptive information, pricing and up to an 18-month availability for each unit of all the resorts and villas. It also can calculate applicable discounts, required deposits and the total price of the package, which may include additional variables such as airfare, rental cars and tranfers from the airport. The system can calculate the total price of a package with a rental car based on type of car desired and number of people, the firm said.

In terms of travel agents, the company's primary liaison in booking reservations, the software offers agents a dollar breakdown of a tour package with agent commissions included. It also stores information on the client such as his name, ages of children, flight numbers, departure dates, itinerary and reservation number, which are then printed on a computer read-out and sent to both the agent and the resort manager.

Following the booking, the system keeps track of payment status, and document status — whether the confirmation, voucher and so on have been sent. The system also registers reservations and cancellations on the spot so availability is instantly updated.

Internal Applications

Another highlight of the system is its application to internal effectiveness. Software programming incorporates analysis reports on Creative Leisure such as accounting and auditing, management and marketing reports in which weekly revenue is broken down by area codes and regions per week. The number of rental cars and transfers is also listed for internal use.

In addition to all this, it produces productivity reports on reservationists and batch reports in which paperwork such as client invoices, vouchers and confirmations is done by the computer in the evening. Creative Leisure's reservation agents, therefore, can focus the whole of their time and attention to bookings and customer service, the firm said.

Recently, Creative Leisure was appointed an industry representative by Datapoint. Under the agreement, Creative Leisure is allowed to sell Datapoint's hardware in conjunction with its software and is the first company to be granted national sales rights, Henze noted.

Drug Molecules Modeled in 3-D

LAS VEGAS — Trying to guess how two molecules fit together without being able to see them is worse than groping for your housekeys in the dark — at least you know the shape of the keys and how they fit into your locked door.

But for years scientists have studied molecules without having any way of seeing how these tiny molecular building blocks stack together to make a drug work in your body.

Now scientists at the University of California-San Francisco's Computer Graphics Laboratory have developed some new computer programs that allow them to look at color 3-D models of molecules on a CRT screen. These moving models can be turned inside out and sliced into sections by a set of computer commands.

These new tools will allow researchers to look at many molecules that are part of proteins used by our bodies.

Four UCSF researchers explained their new techniques recently when they presented papers to their colleagues at the second Chemical Congress of the Northern American Continent. The congress was sponsored by the American Chemical Society.

"Color on the computer is a spectacular tool," said Robert Langridge, Ph.D., director of the Computer Graphics Laboratory at UCSF.

"It enhances the chemical intuition of scientists who are trying to visualize lock and key combinations, called receptor sites, that make the molecules of a drug interact with the molecules in the body."

Langridge and his UCSF colleagues, recently received a $1 million grant from NIH Biotechnology to continue their work.

Envelope Design Eases Parish Donation Process

By Ken Halveland
Special to CW

ST. LOUIS — New collection envelopes with bright colored printing and wider top openings have eased donations for parishioner and processing for the staff at the St. Louis Archdiocesan Data Center here.

These envelopes enable parishioners of client churches to insert their donations for regular weekly collections as well as any special collections such as those taken on Holy Days. Sometimes during the year as many as nine or 10 collections are taken in a single month.

The original envelope was a rather plain continuous form having a side opening which made it awkward for the parishioner to handle. It required that the donation be folded in order to insert it through the narrow opening. And its plainness tended to make it overlooked.

A Standard Register Co. specialist helped by designing a continuous envelope that had a wider top opening, was immediately more familiar to parishioners and certainly easier for them to handle. Colored inks screened on the basic white paper help people differentiate between regular collections and specials.

Depending on each church's requirements, the envelopes are printed with or without a return address with prepaid postage. Full instructions on how to handle the form are printed clearly and concisely.

Between 10,000 and 15,000 envelopes a month are processed on the data center's computer and imprinted on each are the envelope number, week of use, parishioner's name, address, title (if any) and Zip Code.

After printing the margins are removed and the envelopes are detached from the continuous web on a Standard Register Series 1000 Forms Burster. They remain in the sequence in which they are to be used by a parishioner and in Zip Code order. They are then put through an inserting operation that places them in window envelopes ready for mailing.

Designed for Easy Handling

Parishioners return the envelopes with the donations either personally or through the mail. The forms have been designed so that they are equally easy to handle by the church staff. Perforations below the flap seal and along the right side of the envelope enable parish committee personnel to open them quickly and easily. They note the amounts on the faces of the now empty envelopes and send these back to the data center.

A collection envelope may seem a small item on which to expend time and effort in making it more attractive and simpler to handle, but experience has shown that there is a lot of competition for attention and a document that stands out by reason of its appearance is more likely to get a bigger share of that attention.

Halveland is director of data processing for the St. Louis Archdiocesan Data Center.

Parishioner simply inserts money in envelope at the appropriate time and returns it to the church personally or by mail . . .

. . . After the church has removed the contents of envelopes and marked the amount, the envelopes are returned to the data center for entry of information to the computer data base.

Comten User Meet Set For Houston Oct. 6-10

HOUSTON — CUE XV, a user-oriented computer convention sponsored by Comten Users Exchange, Inc., is scheduled to take place here Oct. 6-10.

The agenda includes sessions on performance measurement systems, NCR-Comten's data communications networking perspective, tech control systems, Software Release 63 with CNS trunking protocol alternatives, Comten NTO support and Remote MAF.

The fee is $150 for the whole week or $75 for Thursday-only admission. Detailed information is available from Marilyn Cianciolo, General Motors Research Labs, GM Technical Center, Warren, Mich. 48090.

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Managers on the Move

Richard Sigrist

RICHARD D. SIGRIST has been appointed manager, information systems, Analog Devices' Instrument and Systems Group in Norwood, Mass. He will direct the design and implementation of management information systems, as well as maintain financial control over operational costs.

Prior to the promotion he was a systems analyst at Analog. Sigrist joined the company in 1967. He has been employed in supervisory engineering positions with MIT, General Motors and ITT-Kellogg.

Sigrist has a B.S. degree from the University of Illinois and an M.S. in industrial management from Northeastern University.

Frances L. Chu

FRANCES L. CHU, department head of systems integration services for Chemical Bank, New York, has been named vice-president. She will be responsible for providing data base services, distributed and time-sharing systems services and office automation services.

Prior to joining Chemical as an assistant vice-president in 1973, Chu was an advisory marketing representative for IBM.

• • •

LEONARD H. FROEMEL will join SCI-PRO, Inc. as vice-president of operations. He is responsible for the design, development and production of hardware/software for SCI-PRO's transition from research and development to manufacturing operations.

Prior to the appointment Froemel was manager of manufacturing at Hazeltine Corp. He has held senior manufacturing engineering and operations positions with Applied Digital Data Systems, Lux Corp. and Viewlex, Inc.

• • •

JAMES E. HUGHES has been appointed branch manager of Xerox Computer Services for Wisconsin, Minnesota and upper Michigan. He has been affiliated with Xerox since 1973, most recently as marketing manager of the Milwaukee branch.

Prior to joining the company, Hughes was vice-president of manufacturing, Zimmerman Brush Co.; director of information systems, Pettibone Corp.; and held programmer and systems analyst positions for Zenith Radio Corp. and Admiral Corp.

Hughes received his B.A. degree in mathematics and economics from Ripon College, Wisconsin.

C. Miles Fort Jr.

C. MILES FORT JR. has been named director of staff services for Libbey-Owens-Ford Co.'s management information services department. He will be responsible for system design and development, communications and time-sharing services, material coding, DP form design and control and evaluation of computer hardware and software packages.

Fort was a senior systems analyst before his promotion. He joined the company in 1941 holding posts at the company's Shreveport, La., glass plant before transferring to the executive office in Toledo, Ohio, in 1971.

He received a B.A. in business administration from Centenary College in Shreveport.

• • •

FREDERICK S. WOLFE has been promoted to director of management information systems (MIS) for the St. Regis Paper Co. He will be responsible for designing and operating all of the company's computer systems.

Wolfe joined St. Regis in 1960 as a management trainee in the Flexible Packaging Division's Columbus, Ohio, plant. He was named the division's DP manager five years later and, in 1969, entered the corporate MIS department as manager of the Dallas regional computer center. In 1977, he was named manager of MIS operations and information systems.

He received a B.B.S. degree in industrial engineering from Ohio State University.

DAVID H. BUTTERFIELD has been named director of information resources for Prime Computer, Inc., Wellesley Hills, Mass. He will direct planning, developing, maintaining and operating Prime's internal business and office systems.

Before joining Prime, he was director of systems at Gillette Corp. and prior to that held various sales, marketing, management and consulting positions with IBM.

Butterfield received a B.S. degree in industrial management from MIT and an M.B.A. degree from Washington University in St. Louis.

• • •

JOHN A. MARAGANIS has joined Data, Inc., a Burlington, Mass., consulting firm, as director of the information services division. He will be responsible for managing software projects, computer operations as well as being a technical consultant for the company.

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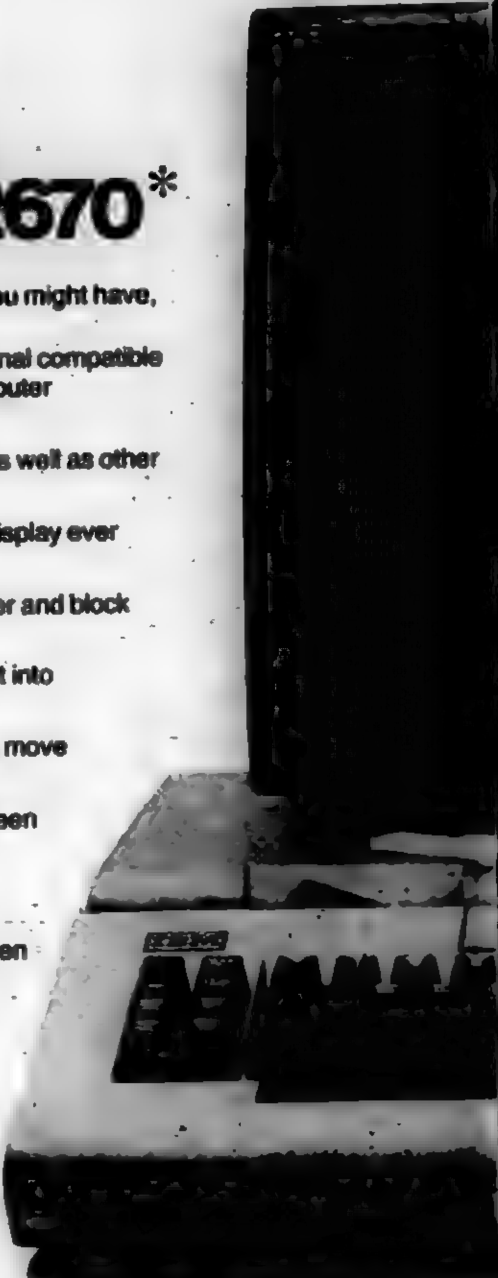


*In New York call 800-942-1918.

The IBM 3101 ASCII terminal, priced

Managers on the Move

He is a graduate of New Hampshire College, with a B.S. degree in management information systems.

• • •

MARK G. HURWITZ has been appointed manager, DP operations for the Sheraton Corp. Hurwitz will be responsible for computer operations, data control and data entry.

Prior to joining Sheraton, he was associate director of administrative computer services at Northeastern University.

He holds a B.A. degree in economics and an M.Ed. degree in administration from Northeastern.

• • •

EUGENE BOYER has been named director of business and finance at the University of New Mexico Hospital/BCMC in Albuquerque. Prior to the appointment, he was director of DP at the hospital.

Before joining the hospital staff in 1979, he was a partner in Jeffrey L. Walker & Co. in San Francisco. Formerly he was a senior systems analyst with International Harvester Co. in Chicago and later joined Arthur Young & Co. in Los Angeles as a manager of its management service consulting practice.

• • •

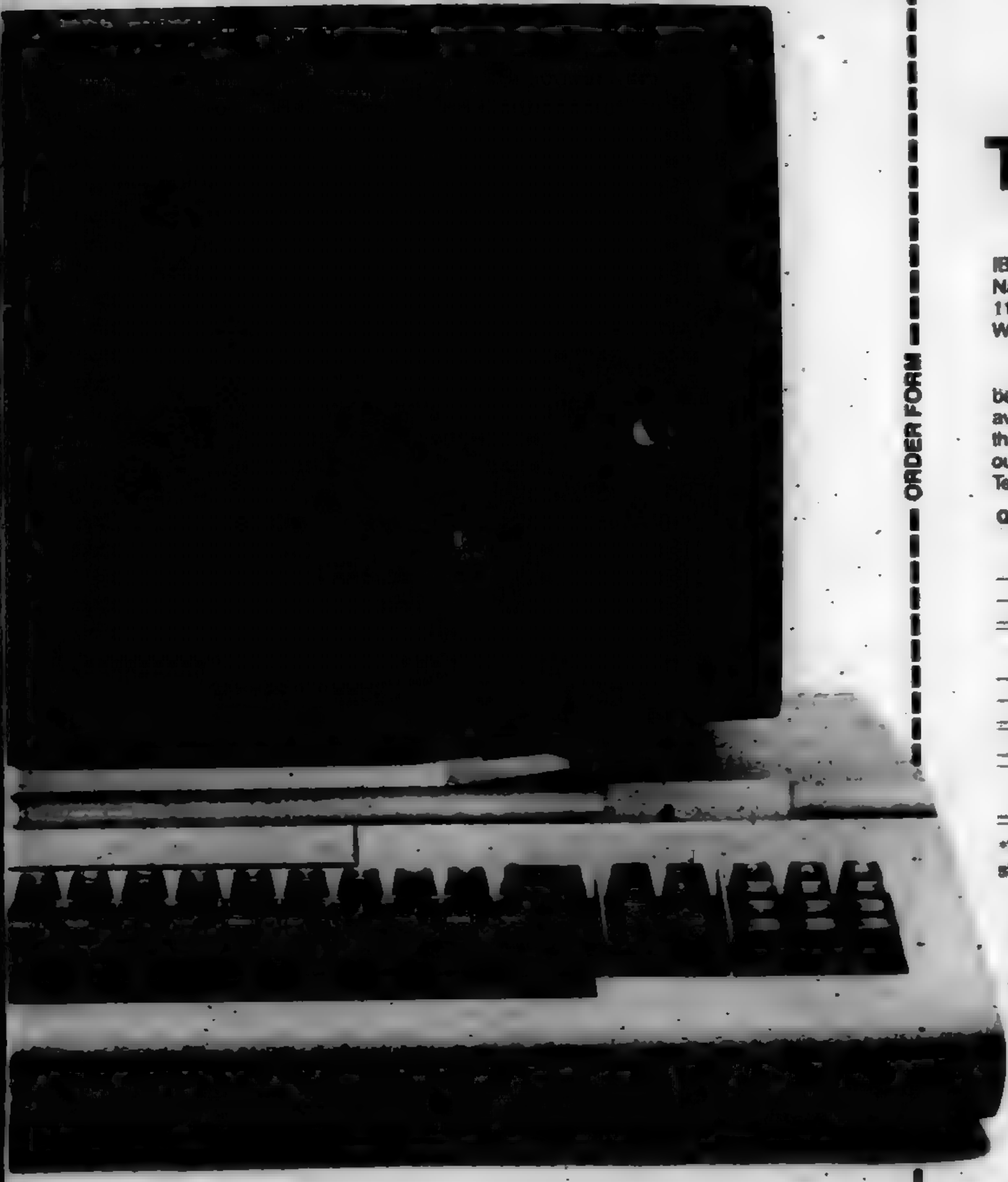
The Pryor Corp. has promoted **DENNIS S. OLES**, manager, computer operations. He will be responsible for all computer operations in the supply and services divisions.

Prior to the appointment, Oles was senior programmer. He joined Pryor in 1974 as a programmer/analyst.

• • •

ANDREW NICHOLS III has been named manager, information processing services, for the corporate DP department of Rexnord, Inc., Milwaukee. He is responsible for computer operations, key entry and data control.

ASCII two step



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QUANTITY	INTERFACE	UNIT PRICE*
	IBM 3101 Display - Character Models	
___Model 10	RS-232C point to point	$1295
___Model 12	RS-232C point to point/20MA current loop	$1320
___Model 13	RS-232 & RS-422 point to point	$1520
	IBM 3101 Display - Block Models	
___Model 20	RS-232 point to point	$1495
___Model 22	RS-232 point to point/20MA current loop	$1520
___Model 23	RS-232 & RS-422 point to point	$1520
___Model 01	IBM 3102 Printer	$1295
	ACCESSORY	
___	Modem Cable	$65

*Volume discounts available. Prices shown exclude applicable taxes and shipping charges.

See reverse for Outline of Terms of Purchase ▶

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Ship to: (if different)

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Network Keeps Landscaping Dealer Posted

PORTLAND, Ore. — At Alfred Teufel Nursery, Inc., a West Coast wholesaler of nursery products and landscaping supplies, several hundred over-the-counter orders per day result in instant invoices, instant customer account posting and instant inventory updates.

"We're among the 10 largest nurseries on the West Coast, and I believe in having up-to-the-minute information," Tom Teufel, vice-president of the family-owned corporation, said. "I think our invoicing operation is unique in our industry."

At the Portland nursery and its branch in Seattle, over-the-counter orders are keyed on CRT terminals online to a mainframe. Following credit checks, the computer sends back invoice header data, line item extensions, totals and discount data for immediate output on printing terminals and presentation to the customer.

At the same time, the computer updates inventory files, handles account posting and — when appropriate — generates purchase orders for replenishing inventory.

The company, formed four generations ago by Gustav Teufel, supplies more than 3,000 landscaping, building and gardening customers across the nation with over 15,000 items ranging from pine trees and rhododendrons to gardening tools and fertilizers. The company sells on a wholesale basis only.

The nursery is located on 100 acres used to grow holly, pine, maple, spruce and a number of other trees, as well as a variety of shrubs. The Seattle branch is located on 20 acres that is also used for stock and growing products. Teufel said the Burroughs Corp. B1855 in Portland is on-line to the Seattle branch via data sets and full-time leased lines to a second AP 310 printing terminal and a number of TD 830 CRT terminals.

The B1855, together with a network of TD 830 CRT terminals, also handles all transactions related to the company's accounts payable and receivable applications.

Expansion Planned

The company intends to expand use of the B1855 in the near future to handle payroll applications and to institute two new inventory control systems to monitor hard goods supplies. According to Teufel, the B1855 presently handles inventory systems for out-of-state orders, local orders and future orders. The company will institute controls for tool and fertilizer inventories, bringing the total number of inventory items managed by the computer to 35,000.

The nursery has been using Burroughs equipment and software since 1968, when it first entered data processing using a Series L3000 minicomputer. The L3000 was replaced by a B800 computer in 1977; the nursery purchased the B1855, valued at approximately $145,000, last Ocotober because it wanted a system that has full audit and recovery capabilities while being able to manage an extensive on-line terminal network.

"Burroughs equipment has always performed well for us. It is very reliable and easy to use. In fact, our main computer operator used to work as a shipping dock foreman with no previous computer experience," Teufel noted.

The B1855, which has 512K bytes of main memory and 65M bytes of expandable disk pack storage, is using a number of Burroughs program products. These include Network Definition Language, Message Control System (MCS), Data Management System II, Data Management System Inquiry and the Command and Edit language.

IT'S EVEN EASY TO READ THE FINE PRINT

Outline of Terms of Purchase. IBM 3101 and IBM 3102 Machines.

PRICES & TERMS

The prices shown on the order form on the reverse side (Order Card) and these terms are subject to change until IBM confirms your order in writing (order confirmation). At that time, you will be given the full terms governing this purchase including any changes to the prices and terms shown here. In the event of any change, you may cancel the order within 10 days without liability by written notice to the DPD Marketing Center. Otherwise, the prices and terms provided at the time of confirmation will apply to this order.

Payment is due 15 days after the Date of Installation. The Date of Installation of the machines is deemed to be two days after the date of receipt by the Customer. In addition to the purchase price of the machine, the Customer agrees to pay all applicable taxes and shipping charges.

INSTALLATION

The Customer is responsible for unpacking, checking out and setting up these machines.

TITLE AND RISK OF LOSS OR DAMAGE

The title to each machine passes to the Customer on the Date of Installation. Up to and including the Date of Installation, the risk of loss or damage will be borne by IBM. Thereafter, risk of loss or damage will be borne by the Customer.

15-DAY TRIAL

The Customer may order the first five IBM 3101's and the first five 3102's on a 15-day trial basis. If, for any reason, the Customer is not satisfied with these machines, the Customer may return the machines and pay only shipping charges to the Customer's location. To return the machines, the Customer must notify the DPD National Marketing Center within 15 days from the Date of Installation and pack the machines in their original shipping cartons. IBM will arrange for their return to IBM.

WARRANTY

IBM warrants that each machine will be in good working order on the Date of Installation and that it will conform to IBM's official published specifications.

For three months commencing on the Date of Installation of each machine, IBM agrees to provide at no additional charge to the Customer, warranty service at an IBM Repair Center to restore the machine to good working order.

DETAILS OF THIS WARRANTY, AND EXCLUSIONS FROM WARRANTY SERVICE, WILL BE PROVIDED AT THE TIME OF ORDER CONFIRMATION.

SHIPMENT

IBM will provide the estimated shipment schedule for this order in writing at the time of order confirmation. IBM reserves the right to amend the estimated shipment schedule as necessary.

INFORMATION ON PATENT INDEMNITY, LIMITATION OF REMEDIES AND OTHER GENERAL PROVISIONS WILL BE PROVIDED AT THE TIME OF ORDER CONFIRMATION.

I have read the above and understand that my order is subject to prior credit approval, that the full terms governing my order will be sent with IBM's confirmation letter and, that unless notified otherwise, shipment will be made within 45 days of receipt of order.

AUTHORIZED SIGNATURE ____________________ DATE ________

NAME (Please print or type) ____________________ PHONE ________

IBM
Data Processing Division

ORDER FORM

Air Canada Loading System Gives Vital Preflight Calculations

NEW YORK — In an effort to obtain better fuel efficiency and more streamlined service, Air Canada is introducing its Automated Load Planning System (Alpac) to 10 of its 12 Caribbean stations.

The system was designed to help load agents ensure that an aircraft's luggage and cargo are balanced as evenly as possible before each takeoff. That process is a delicate one and must be kept within established limits.

Previously calculated by hand using charts, forms and graphs, the job has been performed with the use of a computer keyboard since July — much to the approval of load agents, according to Air Canada.

System Features

Alpac works hand-in-hand with the automated flight planning computer so that total fuel load and individual tank requirements can be established.

With the system, alll information on boarding freight can be input directly from the flight terminal and all load-message information to the succeeding station can be collected and automatically transmitted to the next station. Passenger load information can also be automatically input at stations which are equipped with the automatic seat-selection device.

If the projected load plan goes beyond limits, the computer will refuse the input, and the agent is referred back to the point at which he must start replanning the load.

This system of surveillance and alert remains in place until the final figures are collected and given to the captain of the aircraft.

"The process has been accepted by all load agents as being very important to the accomplishment of optimized trim," reported Barry Blight, Air Canada's aircraft services manager for the U.S. and Southern Region.

"It is also looked upon as an important technological advancement in the industry," he added.

Group Ready for 370 on a Chip

MT. SHASTA, Calif. — Mokurai Cherlin of APL Business Consultants, Inc. believes the long-awaited single-chip computer with the IBM 370 instruction set is just over the horizon, so he has formed Group/380, an interest group that gathers information that will help people figure out what to do with the new system when it arrives.

Cherlin claims there are no serious problems left in developing such a system. He cited *Datamation* report stating that IBM, Intel Corp. and Motorola Corp. have already put the 370 instruction set on a chip. It is now only a question of waiting for it to go into production.

His group's initial plan is to prepare the way for 370-compatible micros by accumulating all relevant information. The software data base is thought to be the most important part of this preperation.

Membership in Group/380 is $10 for individuals and $25 for corporations and groups. More information is available from APL Business Consultants, Inc., P.O. Box 1131, Mt. Shasta, Calif. 96067.

"The federal government has indicated that factory and office productivity are declining—contributing not only to inflation, but to a weakening of our competitive strength in the world market as well."

Are you aware that declining productivity is quickly becoming one of our nation's biggest problems?

Find out about this important issue, and what you as an information specialist can do to improve productivity within your own organization.

Plan to attend

IDC International Data Corporation's Fall Executive Conference

Improving Information Processing Profitability and Productivity in the 1980's

October 19-22, 1980—Hotel del Coronado, San Diego

This Conference, one of two IDC conducts each year, will look at the productivity problem from the standpoint of the information resources manager. While computer and office systems can go a long way toward improving productivity, careful planning of all the resources at hand—systems, people, and procedures—is absolutely necessary for success. Presentations by top vendors and leading-edge users will provide IDC Conference Attendees with insights on new products (both hard and soft), information on new technologies, and examples of successful case histories.

Sunday, October 19th

Early Bird Session!

A panel discussion made up of leading technologies from the semi-conductor, software, systems, and input/output areas will bring Conference Attendees up to a common level of knowledge regarding technology's contribution to improvement in productivity of computer and office systems.

Monday, October 20th

The Dimensions of the Productivity Problem and Possible Hardware Solutions

Kicking things off will be the day's KEYNOTE SPEAKER, Dr. John Hogan, Vice President, Research, American Productivity Center—an organization devoted to improving U.S. business and organizational productivity. Dr. Hogan will inform Conference Attendees on where the U.S. fits in the productivity spectrum; how MIS can contribute to better productivity and how to identify productivity bottlenecks within your organization.

Other topics/speakers for the day:

Managing Information Resources for Greater Productivity—Barry Stevens, Performance Management Associates, Editor, "EDP Performance Handbook."

Leading User Experiences—Len Shea, President, Computer Resources Management

PANEL DISCUSSION: **Hard Versus Soft Productivity**
- Chairman: Wil Zachmann, Research Director Information Systems Planning Service, IDC
- Software vendor (Boole & Babbage)—to be announced
- Hardware vendor—Jim Larsen, Vice President Software, Amdahl

PANEL DISCUSSION: **Comparing Large Mainframes, Mini or Distributed Productivity**
- Ray Smith, Senior Vice President, Microdata
- Vaughn Nyenger, Director Software Support, Four Phase Systems

Programming Productivity Enhancements—Dr. Keith Uncapher, USC Informations Science Institute

Capacity Management & Planning—Diane Faust, Director of Marketing, Institute for Software Engineering

SPECIAL FEATURED SPEAKER:
Improving Productivity Through Systems Planning—John Zachman, Industry Consultant, IBM Corporation.

Tuesday, October 21st

The People Problem: Improving Productivity via Human Resource Management

KEYNOTE SPEAKER for the day's session will be Ira Gottfried, the well-known MIS consultant from Los Angeles. Mr. Gottfried, who has his own consulting organization, is a specialist in internal planning and human resource management. He'll describe how the "new breed" EDP professional differs from the old style DP pioneers, how this affects the selection process, and the career paths open to DP professionals in the 1980's.

Other discussions for the day to include:

Dr. Robert A. Zawacki, Associate Professor, University of Colorado, and Dr. Don Cougar—co-authors of a new study on "**Personnel Development and Productivity Improvement in DP**".

Improving Application Software Quality—Wayne Smith, Vice President, Applied Information Development, Inc.

WRAP-UP SESSION by Dr. Werner Frank, Executive Vice President, Informatics. Dr. Frank, one of the pioneers of the software industry, will examine "**The New EDP Economics: People/Software Tradeoffs.**" One of the main thrusts of his presentation will be a look at the growing packaged software industry as an alternative to expensive in-house development.

Wednesday, October 22nd

KEYNOTE SPEAKER for the final day's sessions will be Kent Black, President of Rockwell Corporation's Electronic Systems Division. Mr. Black will spell out what a chief executive expects from the information systems professional in the 1980's, how "friendly systems" are allowing top executives to interact directly in information processing, and how top mangers can make more productive use of their own time.

Other presentations will include:

PANEL DISCUSSION: **Building Systems More Friendly to the User in Office Administrative Environment and More Economical to MIS.**
- Chairman: Thomas Sinapak, Director, Automated Business Communications Program, IDC
- Lawrence Burden, Director, MIS Services, Northwest Industries.
- Vendor Discussion—Bob Bond, Marketing Manager, Hewlett-Packard 3000 Series.

A Success Story in MIS Productivity—a turnaround case history—James F. Walsh, Corporate Vice President MIS, CIT, Inc.

SPECIAL SESSIONS ON PERSONAL PRODUCTIVITY!

IDC has set up a series of programs on improving your own personal productivity, to be led by Rob Rideout, President, Fitness Resources Corporation, and ex-astronaut/NASA trainer. Mr. Rideout will address Conference Attendees on "Executive Stress and Fitness Management" on Sunday, October 19th in a special early-bird session. This fitness theme will be carried on throughout the Conference with a series of exercise programs to be conducted by Mr. Rideout.

Back-to-Back Conferences at No Additional Charge!

In early June, IDC acquired LINK Resources Corporation of New York, market research specialists covering the new channels of delivery for information into the home and office. LINK will be conducting a Conference, entitled "The New Electronic Media," at the del Coronado immediately following the conclusion of the IDC program. The LINK Conference will begin on Wednesday afternoon, October 22nd and run through Friday, October 24th.

Anyone attending the IDC Executive Conference is invited to stay for all or part of the LINK program at no extra charge. If time is tight, please consider staying for just the Wednesday afternoon session, which will offer a general overview of the new electronic media. Demonstrations will include video disks, online data bases, the Source, personal computers, etc. If you would like more information about LINK—the Conference program, or their product line—contact the IDC Conference Coordinator at 800-225-8952.

Cost and Registration Procedure:

The Conference registration fee is $750. Additional persons from the same organization may attend at the reduced rate of $495. For a complete registration packet, contact the IDC Conference Coordinator—and use our toll-free number: 800-225-8952.

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Hamming's Technique Of Error Correction Marks 30th Birthday

MURRAY HILL, N.J. — It was simple human frustration that led Dr. Richard W. Hamming, then a research mathematician at Bell Laboratories, to devise the first method for correcting machine-caused errors in digital computers back in 1950.

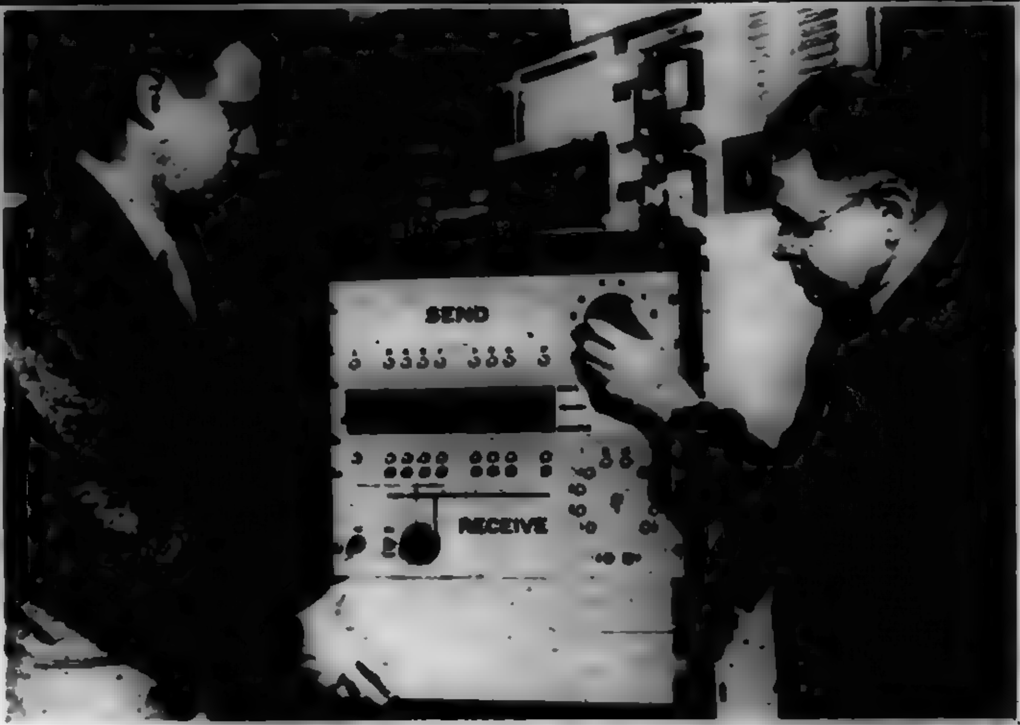
Hamming's technique — a result of his research in pure mathematics — enabled computers to spot electrical errors in the data and instructions and tell where they occurred. And, for the first time, it enabled computers to correct those errors and go right on solving problems without interruption.

This year marks the 30th anniversary of Hamming's development of error-correcting codes. Besides aiding the computer industry, the codes are also essential to call-processing accuracy in the Bell System's No. 1 ESS (electronic switching system).

Early Frustration

Hamming's frustration came about because early computers would simply stop operating whenever they detected an error.

"I knew that if the computer was smart enough to detect an error and shut itself off to prevent false answers to the problem, then it could be made smart enough to correct that error and continue computing," Hamming recalled recently.



Thirty years ago, at switchboard of apparatus that enabled computing machines to correct their own mistakes, are Richard Hamming (left), whose mathematical research made the apparatus possible, and Bernard Holbrook, under whose direction it was built.

In time, Hamming devised a method using a combination of several odd-even checks to identify precisely the position of the error and make the correction. Apparatus incorporating Hamming's mathematical discovery was constructed under the direction of Bernard D. Holbrook, then a Bell Labs switching research engineer.

In the early days of computers, errors usually were caused by faulty relay contacts, open circuits, false grounds or disturbances induced by outside sources. Today, even with the advent of solid-state components, extraneous signals still find their way into the individual transistors and other elctronic devices to cause potential errors.

The error-detecting and -correcting capabilities of Hamming's codes are provided as part of the processor hardware of the Bell System's No. 1 ESS.

At year-end 1979, there were more than 900 such systems across the country serving almost 19 million customer lines. Hamming codes are also used in Bell System electronic tandem switches and in electronic long-distance operator consoles.

Effectiveness Shown

The effectiveness of Hamming's codes was demonstrated during the 1960 trial of the world's first ESS at Morris, Ill. A small piece of wire fell across two terminals of one program memory while the duplicate memory was out of service. This resulted in the possibility of 33,000 call-processing mistakes per second.

It took Bell maintenance personnel nearly an hour to find the tiny wire. However, not a single call was misdirected because Hamming's codes automatically corrected each of the thousands of errors the machines made each second.

Bell Retiree

Hamming joined Bell Labs in 1946, specializing in the use of numerical methods for solving problems on large-scale computing machines. A Bell Labs retiree, Hamming now teaches mathematics and computer science at the Naval Post-Graduate School in Monterey, Calif.

He is past president of the Association for Computing Machinery (ACM) and in 1968 was elected Turing Prize Lecturer of the ACM. In 1979, he received the Piore Award of the Institute of Electrical and Electronics Engineers.

Hamming was recently elected a member of the National Academy of Engineering. His latest book, entitled *Coding and Information Theory*, was published this year by Prentice-Hall, Inc.

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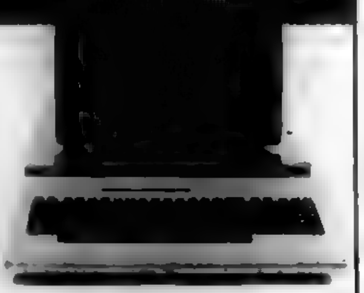

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Calendar

Sept. 30 – Oct. 1, Pittsburgh, Pa. – User's Guide to Systems Development. Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20014.

Oct. 6-9, Tokyo – Eighth World Computer Congress. Contact: Afips, 1815 N. Lynn St., Arlington, Va. 22209. Also being held Oct. 14-16 in Melbourne, Australia.

Oct. 5-10, Anaheim, Calif. – Meeting of the American Society for Information Science (ASIS). Contact: ASIS, 1010 16 St. N.W., Washington, D.C. 20036.

Oct. 6-7, Minneapolis – Conference on Local Computer Networks, sponsored by the Institute of Electrical and Electronics Engineers. Contact: Dr. Abe Franck, USS: University of Minnesota, 227 Experimental Engineer, 208 Union St. S.E., Minneapolis, Minn. 55455.

Oct. 6-7, San Francisco – How to Manage Data and Information as a Resource. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 6-7, San Francisco – Software Cost-Estimating. Contact: Data Processing Management Association Education Foundation, 505 Busse Highway, Park Ridge, Ill. 60068. Also being held Oct. 27-28 in Los Angeles.

Oct. 6-7, New York – How to Sell Data Processing Products and Service More Effectively. Contact: New York University Management Center, 360 Lexington Ave., New York, N.Y. 10017.

Oct. 6-8, Chicago – Data Communications: Effective Network Design. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 29-31 in Chicago.

Oct. 6-8, San Francisco – Automating Your Office Today: Planning and Implementation Methods. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 6-10, Newport Beach, Calif. – Structured Systems Analysis and Design. Contact: Improved Systems Technologies, Inc., Suite 4500, 888 Seventh Ave., New York, N.Y. 10106. Also being held Oct. 20-24 in Chicago.

Oct. 8-10, Washington, D.C. – Introduction to Micro/Personal Computer: Applications, Selection and Usage Guidelines. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 20-22 in Los Angeles.

Oct. 9-10, Chicago – Midwest User's Group Meeting, sponsored by Nixdorf Computer Software Co. Contact: Computer Software Co., 6517 Everglades Drive, Richmond, Va. 23225.

Oct. 6-10, Houston – Structured Data Base Design. Contact: Improved Systems Technologies, Inc., Suite 4500, 888 Seventh Ave., New York, N.Y. 10106.

Oct. 6-7, Syracuse, N.Y. – Successful Selection of Minicomputers, sponsored by the Canadian Institute of Charter Accountants. Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121. Also being held Oct. 20-21 in San Francisco.

Oct. 6-7, Washington, D.C. – Basic Data Communication. Contact: Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314.

Oct. 6-7, Philadelphia – Microprocessing for Managers. Contact: American Institute for Professional Education, Carnegie Building, Hillcrest Road, Madison, N.J. 07940. Also being held Oct. 20-21 in Los Angeles.

Oct. 6-8, Topeka, Kan. – Structured Systems Design User's Conference. Contact: Langston, Kitch and Associates, Inc., 715 E. 8 St., Topeka, Kan. 66607.

Oct. 6-8, Seattle, Wash. – Data Communications Network Design. Contact: Institute for Science and Public Affairs, 1370 Ave. of the Americas, New York, N.Y. 10019.

Oct. 6-8, Los Angeles – Inquiry IV/IMS User Group Meeting. Contact: Informatics, Inc., 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Oct. 6-8, Washington, D.C. – Configuration Management. Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 6-8, Hartford, Conn. – Computer Controls. Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55122. Also being held Oct. 27-29 in Honolulu.

Oct. 6-8, Chicago – U.S. Independent Telephone Association (Usita) Conference. Contact: Usita, Suite 1201, 1801 K St. N.W., Washington, D.C. 20006.

Oct. 6-8, Toronto – APL Users Meeting. Contact: I.P. Sharp Associates Ltd., 145 King St. W., Toronto, Ont., Canada M5H 1J8.

Oct. 6-9, New York – CICS/VS Application Design. Contact: On Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Oct. 6-9, Boston – Senior Project Management. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Oct. 27-30 in Los Angeles.

Oct. 6-9, Anaheim, Calif. – Computer-Aided Design & Manufacturing. Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Oct. 6-9, New York – Information Management Exposition and Conference. Contact: Clapp & Poliak, Inc. 245 Park Ave., New York, N.Y. 10017.

Oct. 6-10, Orlando, Fla. – Sperry Univac's Series 1100 User Meeting. Contact: USE, Inc., Box 461, Bladensburg, Md. 20710.

Oct. 6-17, Tokyo and Melbourne, Australia – International Federation of Information Processing Societies (IFIP) Congress 80. Contact: IFIP Congress 80, G.P.O. Box 880G, Melbourne, Victoria, Australia, 2001.

Oct. 7, Boston – Data Catalogue Update. Contact: Synergetics Corp., One De Angelo Drive, Bedford, Mass. 01730.

Oct. 7-9, Houston – Managing the DP Professional – the Challenge of the '80s. Contact: UBI Enterprises, 30 Milbank Ave., Greenwich, Conn. 06830.

Oct. 7-9, Mayaguez, Puerto Rico – Financial Planning and Control in the Small and Medium-Sized Business. Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

Oct. 7-9, Hong Kong – Advanced Auditing. Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

Oct. 7-9, Los Angeles – Introductory APL. Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Oct. 7-10 in Madrid, Spain.

Oct. 7-9, Philadelphia – Project Management & Control. Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Oct. 7-10, San Francisco – Information Industry Association (IIA) Conference. Contact: IIA, Suite 502, 316 Pennsylvania Ave. S.E., Washington, D.C. 20003.

Oct. 8-10, Washington, D.C. – Introduction to Teleprocessing Software. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 20-22 in Chicago.

Oct. 9-10, San Francisco – Managing Software Projects. Contact: Data Processing Management Association Education Foundation, 505 Busse Highway, Park Ridge, Ill. 60068. Also being held Oct. 20-21 in Los Angeles.

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In Scientific/Engineering Problem

Vector Graphic System B Better Than Average

By Hillel Segal

Although it was one of the least expensive computers benchmark tested so far by the Association of Computer Users, the Vector Graphic, Inc. System B turned in a credible performance. In spite of its low cost, it gave a better than average showing on some tests.

Compared with other computers priced less than $15,000 tested so far, the System B's time of 19:30.0 in the scientific/engineering problem was about 2% better than the six-system average. In the CPU-intensive test, it scored about 18% better than average.

In the accounts receivable problem, the System B's time of 5:56.5 fell below the group average of 4:15. All tests were run on standard programs written in Basic. The differences in time reflect the relative performance which could be expected under actual working conditions, at least when similar software was used within the Basic environment.

Qume Printer Included

While the run-times obtained during benchmark testing of the System B are unspectacular, the inclusion of a 55 char./sec Qume Corp. daisy-wheel printer in the total price of $7,750 is unusual. That component alone sells for about $3,000, and if a less expensive dot-matrix character printer were substituted, the package price would likely fall below $6,000, making the System B the most economical small computer tested. In actual practice, a variety of printers are used with the System B. The Qume would normally be included only in a system designed for word processing (WP).

Other elements of the system include a central processor, 64K bytes of memory, two double-sided dual-density 5.25-in. diskette drives, a CRT terminal and the operating system and language. The diskettes are made by Micropolis and store 315K bytes of formatted data each. An additional pair of drives may be added to expand the system to a total of 1.26M bytes.

Because the System B uses a Z80A processor, S-100 bus and CP/M operating system, an almost endless variety of special-purpose circuit boards, languages and applications are available from outside vendors. Vector Graphic also provides quite an array of options, and the System B configuration is intended to present potential users with a practical, low-cost combination.

The processor hardware is housed in a small unit which fits on or under a tabletop. A separate terminal supplied with the package has a conventional 24 line by 80 char. screen. The terminal was noted by users for its high-quality keyboard: "It feels like you're typing on a typewriter, not a computer," one person surveyed remarked.

Those using the Qume printer were happy with the print quality, which approaches that of a good electric typewriter. It offers interchangeable fonts and prints in several pitch settings. But its speed is not equal to that of a conventional matrix printer, and it is much noisier. Vector Graphic now reportedly offers its own 150 char./sec dot-matrix printer, and for most applications other than WP, it would be the obvious choice.

SCOREBOX

System: Vector Graphic System B
Current Price: $7,750

Series 1 Results*** Systems up to $15,000	C-1 Scientific/-Engineering Time	C-3 Accounts Receivable Time
Pertec PCC 2000	28:48.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.8	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	To be covered in next issue	

Series 2 Results*** Systems $15,000 to $25,000	C-1	C-3
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.8	3:20.0
Texas Instruments FS990/10	*	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11VO3	14:43.4	4:14.0
Q1 Lite	6:50.7	5:03.3
Univac BC/7-610	12:09.2	10:37.0
Northern Telecom 405	*	**
Datapoint 1170	38:27.5	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	*	2:48.3

*Test could not be run because of memory limitations.
**Test could not be run because of formatting limitations.
***Both Series 1 and Series 2 were run on the same programs.

We tested the System B with the CP/M operating system and Microsoft Basic-80, but other combinations are possible. Vector Graphic offers the Mzos and Mdos operating systems by Micropolis. Languages available include C-Basic, M-Basic, Pascal, APL, Fortran, Cobol and assembler.

In addition to these languages, Z80 Disassembler is offered as well, something we have not seen before on a system benchmark tested. With the Disassembler, machine code can be returned to its assembler source form — a reversal of process which comes in handy when the user wishes to modify software for which no source code is available.

Hobbyist Appeal

This arcane procedure has great appeal to hobbyists and others involved in swapping software which never did get proper documentation, or which was supplied in object-code form originally.

This is the 17th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

The Basic-80 language used for the tests has a number of extra features worth noting. It includes several statements of use in structured programming and has the facility to execute Assembly language subroutine calls. This means one can combine Basic with Assembler to speed up execution of frequently-used portions of the program. In addition, Basic-80 offers direct execution of statements. Any statement entered without a line number will be executed immediately in conversational fashion.

The program editor supplied with the System B was not as efficient as some we have tested in terms of number of keystrokes required, but the commands were not difficult to learn and use.

Like most Basic editors, it is line-oriented. The user types the line number he wishes displayed, and various commands may be used to move the cursor, insert, delete and so on. No global search-and-replace capability is provided.

In checking with customers, the independent consulting firm which performed the benchmark testing found that most systems were being used in a word processing application. Some incorporated the Vector Graphic Memorite word processing system, while others had Word Star, Electric Pencil or other standard WP packages. Vector Graphic also supplies a Data Management System besides the WP software. This is the extent of its involvement in customer applications.

Software Packages

Dealers supply a variety of software packages, including the Peachtree Accounting Packages, a group of five modules ranging in price from $800 to $1,000 each.

Few of the customers contacted during the survey were doing their own programming. Most had purchased a turnkey system which was provided along with training, documentation and support. The "personalization" which the System B requires during the setup process was also performed by the dealer.

Factors such as the amount of memory installed, type of printer and so on must be made known to the operating system. Clear documentation is provided to guide the user who wishes to do this himself, but the process does require some technical background.

While there were a few complaints about the suitability of applications software, most customers were very enthusiastic about the System B itself. Despite its low price, some felt it was built better than comparable systems, and one remarked, "The Vector Graphic is the most reliable machine on the market." Low cost and efficient software and repair services were key factors guiding their choice of system.

Next week: the Digital Equipment Corp. Decstation 78.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

Can Human Interface Be Packaged?

Turnaround Time

By Larry E. [illegible]

Q I am doing strategic system planning for a multinational corporation offering financial services. The theme underlying my plans is one of integration. The system will incorporate a central data base, process automation, process tracking and control, word processing and electronic mail. For medium-range time frame, a nationwide network of distributed minis is planned.

Another theme central to the plan is that the system be "user-friendly." For this reason, I feel rather strongly that the system present a uniform appearance to its user. That is, the user should see and use standard command formats, menus, error messages, screen formats, "Help" messages and so on, regardless of whether they are doing data inquiry or word processing.

The problem is this: I would like to purchase at least part of the software required, but how do I get a uniform human interface? What I need is an OEM software house which provides word processing, electronic mail, and so on that are transaction-driven. Then I can package the human interface myself. Is there such an animal?

A Although your intentions are good, it may be impractical to consolidate so many diverse applications. Although hundreds of software houses provide at least part of the systems and applications software support that you require, I know of no single source.

I would be happy to forward responses from software houses who feel they can meet your requirements.

Q In your reply to the question of graduate degrees [CW, June 30], you stated (correctly, I believe) that, "No one degree is best for programming." Then you devoted most of the rest of your reply to computer science and information systems degrees. Even the M.B.S. is a Master of Business Science.

One of the biggest problems we face is communicating with users who do not talk in bits, bytes and nanoseconds. These users talk in terms of debits, credits, inventory turns, expense analysis, budget variance and the like. Let's face it, a company can only stay in business if it makes money. Therefore, financial control is very important.

I'm not slighting the other areas of order processing, inventory control, engineering, distribution and service. The point is that the degree should be in business because it gives a good introduction to the broad scope of business management and is particularly useful to the person who has a nonbusiness undergraduate degree. It introduces business terminology and concepts which are invaluable in dealing with a variety of users. The specific detail needed for solving a problem will be supplied by the user.

I recall a situation where a programmer analyst who knew very little about accounting attempted to solve a problem in the area of general ledger. The accountants knew what they wanted but their proposed solution was a disaster from a DP viewpoint. When the situation was reviewed at the request of the programmer analyst, we worked out a different approach which gave the accountants what they needed, but at the same time it reduced the programming effort required by eight weeks. Just knowing the accounting concepts helped a great deal in this case.

As for the reader's comment that his peers are "pecking away" at getting their master's degrees, Confucius said it best, "Even a journey of 1,000 miles starts with the first step." Get going, friend. I speak from experience, having received both my bachelor's and master's degree at night.

A Thank you for this opportunity to set the record straight. The M.B.S. was a typographical error and should have been the master's of business administration (M.B.A.). I am a strong advocate of DPers understanding not only the basics, but the intricacies of the functional areas in which they work.

Whether a programmer seeks an advanced degree in computer science, information systems or business is dependent on his background.

Programmers should strive to obtain knowledge (or a degree) that provides the mix necessary to enable them to effectively communicate with users and to accomplish their job function.

Have a question? Send it to Larry Long, Editorial Department, Computerworld 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.

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EDITORIAL

High Expectations

According to users who responded to a survey by Datapro Research Crop., Amdahl Corp. mainframe users like their systems better than users of any other equipment. Likewise, more Amdahl users than any other would recommend their systems to other users [CW, May 19].

Another source — this time researchers on IBM's payroll — hold Amdahl systems superior to IBM systems on a price/-performance basis, according to internal IBM documents introduced this spring in the U.S. vs. IBM antitrust trial [CW, July 14].

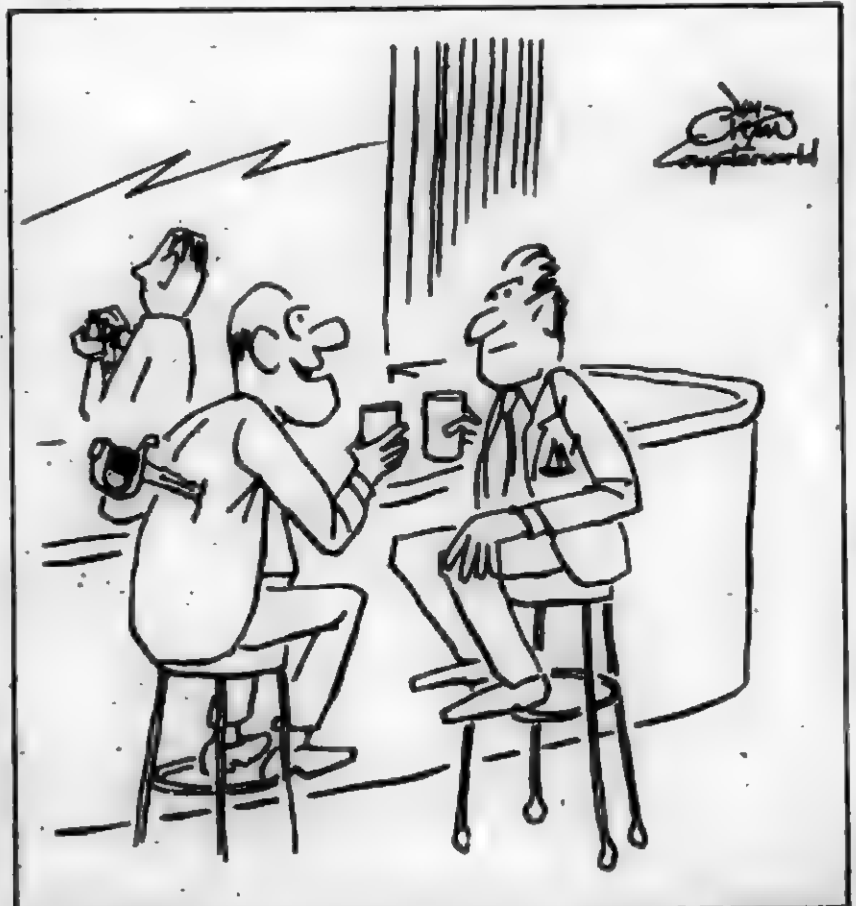
Gene M. Amdahl, founder of Amdahl Corp., who retired from the post of chairman and chief executive officer last September, is the man behind those systems. Amdahl came from IBM, where he is credited with developing the architecture for the IBM 360 series of systems. He's no upstart in the business.

Thus it is with unbridled enthusiasm that *Computerworld* greets the news that Gene Amdahl is forming a new company to develop a system to compete head-on with IBM's intended H series.

IBM plug-compatible mainframes have been a boon to users, helping them save money without sacrificing efficiency, service or their library of IBM programs.

Amdahl, whose new company has yet to be named, expects to have his product ready for the marketplace by 1984, three years after the H series is expected to debut.

Given his past record, it may be something worth waiting for.



'How did IBM take my switch to the other outfit? Well, no worse than expected . . .'

LETTERS

On Behalf of Contractors

The Independent Computer Consultants Association (ICCA) wishes to respond to "More Harm Than Help? Managers Warned of Contract Programmers" [CW, Aug. 18]. ICCA is a national, not-for-profit, professional organization dedicated to "increasing professionalism in the industry."

Many of our members are independent contract programmers. Their livelihood is based on successfully providing services to client companies. We recognize that not all consultants or contract service organizations provide professionally competent services. That is one reason ICCA was formed in 1976.

We have established a code of ethics, are working on a code of professional conduct and have established a "Better Business Bureau" approach to enforcement. Each member agrees to abide by our codes. Complaints by clients are investigated and membership may be revoked for noncompliance. (Because of legal problems, ICCA cannot intervene when nonmembers are involved.) By policing ourselves, we can offer the business community the greatest potential for successful consulting engagements.

ICCA agrees that management information services (MIS) managers should exercise caution in contracting with any outside service. Always check references. It is easier than checking past employment history and probably more accurate.

Independent consulting is not a safe place for the incompetent. They are better off with full-time jobs. To be successful in this business, one must be a self-starter, technically competent, able to get along with people and, most importantly, must be able to deliver results.

Some of the poorest results come from dealing with what are referred to as "body shops." These organizations hire part- and full-time programmers off the street to fulfill time and material contracts. They take little or no responsibility for the work being done.

A contract programmer or small consulting firm is different. They take project responsibility. The principals of the organization must deliver to contract specifications to be paid. Employees in this kind of firm often earn bonuses for jobs well done. There is a real sense of loyalty and responsibility.

Steven A. Epner
President

ICCA
St. Louis, Mo.

Effects of Structure

Under most circumstances, I would have dismissed Philip Kraft's article "Programmers Seen Needing Fewer Skills" [CW, July 28] and the follow-up editorial "Software Workers of the '80s" [CW, Aug. 4] as two more entries in a rather boring lineage of articles predicting the demise of the programmer. What struck me was Kraft's bold assertion that structured programming and related techniques are the vehicle by which this change will come about.

Although I personally endose structured methodologies, I am not aware of one controlled experiment showing that such methodologies affect programmer productivity, the quality of software or the evolvability of systems. A controlled experiment would have the following characteristics:

- It would involve the implementation of a real system.
- There would be two development teams, with members chosen on a matched-pair basis.
- All controllable factors would be identical (e.g., budget, schedule, management).
- It would be a double-blind experiment, with one team using the proposed technique and the other using a competitive technique.
- The experiment would preferably be run multiple times.

It's not surprising that people aren't running out to try these experiments. Who is willing to pay n times as much developing a system to test a technique they're convinced is worthwhile?

I don't believe that any methodology can ever replace a software engineer. However, if we are going to promulgate techniques that inject some science into the art of computer programming, we had better do it scientifically.

Paul C. Anagnostopoulos
Maynard, Mass.

DATA PAST

Eight Years Ago
Sept. 13, 1972

HARRISBURG, Pa. — In the wake of tremendous flood damage caused by tropical storm Agnes, the State of Pennsylvania considered issuing regulations requiring state DP centers to be located in flood-safe locations.

A task force was gathering data from flood-damaged centers.

KENSINGTON, Md. — Position titles in the computer field were in a "state of chaos," according to a report submitted to the Association of Computer Programmers and Analysts (Acpa). This was why programmers and analysts were being denied professional status, the report said.

Five Years Ago
Sept. 10, 1975

SPRINGFIELD, Va. — The Honeywell, Inc. 6180 CPU was better able to provide a secure operating system than the Digital Equipment Corp. KI-10, IBM 370, Xerox Corp. Sigma 9 or Burroughs Corp. B6700, according to a report prepared for the U.S. Air Force by Mitre Corp.

The DEC KI-10 rated close to the Honeywell machine in being amenable to the user implementing a secure system, the report said.

The 370 and Sigma 9, however, were both found to be "very difficult to use as bases for a secure system," and the B6700 would be an "extremely difficult" CPU around which to build a secure computing system, the report said.

READER COMMENTARY/James A. Eastman

Some Project Leaders Suffer 'Fear of Flying'

When a system is about to be implemented, but things are not going smoothly, sometimes the project leader is the person causing the problems.

The reasons for this phenomenon are many and will be examined in some detail. However, they all relate to the fact that the project leader is afraid to implement his project — or, to use the catch phrase, he has a fear of flying.

This fear of flying may be obvious. The project leader may plead with his supervisor to be assigned to another project or tell the users that he wants to get off this project.

The project leader might even know the cause of his fear of having the project fly. For instance, he might feel that the proposed system will never satisfy the user or that the user still doesn't know what he wants.

One the other hand, this fear of flying might be well concealed, even to the point that the project leader with the fear will not admit it to himself.

There are a number of reasons a project leader might want to kill his project. Among them are:

- Fear of the user. In this case, the project leader feels the completed system will not meet the user's needs, either because the user wants the system to have a greater capability or because the user knows only what he doesn't want. In either case, the problem has been allowed to grow because the project leader and the user failed to communicate effectively. In many cases, the project leader probably found it easier to promise the world than to help the user develop realistic objectives.
- Fear that the project development steps to date were done in a sloppy manner. Every DP organization has procedures that supposedly ensure a good system, or at least that is what management wants everyone to believe. The development steps usually involve a sign-off after such stages as the conceptual design. The project leader might feel as the project is about to be implemented that certain things should have been considered at a certain point, and since they weren't, that the project is doomed.
- Fear of having his work carefully examined. It might be that there is a formal review process of a completed project that can be embarrassing for a project leader. Even when there is no formal review process, it is obvious when there is a serious system failure.
- Fear of success. This is not the usual fear, but it is very real. If the project is a success, there can be a real fear that the project leader will be tied to it for a long time, while others get to work on more exciting projects.

Although a project leader might not know or be willing to admit that he is afraid of having his project implemented, the techniques he uses to kill his project are usually very deliberate and easy to identify and can be quite ingenious in the process. Among the methods to kill a project are:

- Try to get the user to back down. This can be done by putting increased demands on him. For instance, the project manager will consult the user on every detail, often many times. Also, the project leader can make the proposed project appear to be impossible to maintain.
- Try to find another project that desperately needs the project leader.
- Look for changes in the user side. In this situation, the project leader looks for personnel changes and then quickly exploits the change, saying either that there is no longer user support or that the new user must be "educated" and that this will take time. Either way, the implementation date has been delayed.
- Decide that the system should be more "advanced." An example of this would be to suddenly insist that the system have on-line updating, when it had originally been decided that batch updating was sufficient.
- Find another job, or at least drop hints that the market looks good. This one is obvious and in DP shops, only too familiar!

Clearly, many of the reasons a project leader might want to kill his project can be traced back to the project leader himself. Often he has difficulty communicating or is really in over his

(Continued on Page 44)

READER COMMENTARY/Peter Bodman

Making Contract Programmers 'Fit'

I read with great interest the recent article concerning contract programmers, "More Harm Than Help?" [CW, Aug. 18]. While the piece was generally informative (though it may not have deserved such banner headlines), I believe there should have been a far greater degree of depth and counterpoint provided to readers.

By and large, "contracting" falls into four general categories:

- The first is "free-lance," whereby the contract programmer works in a totally independent manner, having no association with any type of programming service company, directly charging his clients for services.
- The next category is the "subcontractor," who is affiliated with a contract programming (or similar) company; although this relationship doesn't include the actual employment of the subcontractor, there is usually a legal agreement, or contract, in effect between the two entities for the duration of assignments.

This agreement, besides defining amounts to be paid for services and specifying work to be done, includes provisions for professional and ethical expectations by all parties concerned. Depending on circumstances, subcontractors are paid on an hourly T&M and/or fixed-price basis by the contract service company.

- The third category is what I call the "quasi" contractor, who is actually a captive employee of a programming/-software service firm. As such, this individual, being a true employee, often receives benefits generally parallel with staff personnel of other companies.
- The last general category of contractor is the "consultant," whose overall knowledge, technical ability and analytical experience allow him to problem-define and/or solve dilemmas of DP installations. Typically, the consultant is a free-lancer, often because of the high rates for his services, though he can have a relationship with any of the above categories.

Readers of the article may have assumed, erroneously, that all contractors are of the first type and, from the flavor of your article, *each* is out to rip off users and is an "occupational misfit."

Not All Misfits

While I think that some programmers who have difficulty in maintaining positions of captive employment turn to the contract industry, not all of these people are, stereotypically, misfits. Let's face it: There are occupational misfits in any industry. Yet, through a comprehensive preassignment evaluation by the user (keeping in mind the technical requirements of the work to be done and the personality profile required to do it), DP management can often weed out potential misfits or incompetents before any damage is done.

Jumping around from job to job is really the name of the game for contract programmers, just as it is for mercenaries who are hired to fight wars for countries or ideologies other than their own; and, because the contract programming industry is so highly based on reputation, contractors seldomly remain active in it (for long) unless they're really good at what they do. Whether one talks about "loyalty" in a captive employee or the "pride" of a contractor, both nebulous terms at best, it is *all* who benefit if the assigned work is done correctly and on schedule.

In short, contractors go where the work is, where it's the best obtainable and where the pay is greatest — as most of us usually do anyway.

Avoiding Resentment

The statement that "contractors stir up staff resentments and even contribute to personnel turnover by bragging aloud about their salaries" is, I feel, a generalized potshot. While there are those "uneducated" contract programmers who do make such errors, captive employees have made the same errors with the same results. However, with careful instruction to the contractor,

(Continued on Page 46)

THE TAYLOR REPORT/Alan Taylor

DPMA Practices Show Lack of Sophistication

The Data Processing Management Association (DPMA) recently put on a recruiting campaign and, in doing so, committed a mixture of errors that seem to be endemic to that organization.

One of the recipients of a recruiting letter was R. Peter Ericson, director of data processing at the Institute of Living in Hartford, Conn. He replied to DPMA Executive Director Edward Palmer, pointing out the following:

(a) He had quit DPMA because he felt that "a professional data processing organization ought to set a positive example in its use of computers," and that, at the time, DPMA had not been setting such an example.

(b) The salutation in the recruiting letter, "Dear Peter D," did not demonstrate the sophistication that would be expected from a leading DP professional group.

He was right, of course. Where "Peter D" came from I don't know. There is no "d" in Ericson's name, so that is out. However, there are two "d"s in his title — "director" and "data." I suspect that one of these words was abbreviated, truncated and then used in a name field instead of a title or name-and-title field.

But regardless of the cause, one-letter last names just are not correct here, and a sophisticated user would have noticed this and stopped sending out the standard mailing until the real name was found.

Ericson did not let matters lie there. He wrote to Palmer, giving his reasons for having dropped out (the association's lack of leadership) and for believing that the flaw was still present (Peter D). Shortly thefeafter, he got another form letter from Palmer, apologizing for duplicate mailing and mailing to members. But the letter did not respond to Ericson's comments at all!

At this point, Ericson must have felt justified in his criticism of the DPMA for lack of sophistication. But the crowning glory was still to come. Along came a follow-up, with a handwritten not from Palmer: "If your reply isn't already in the mail . . ."!

Then Ericson, with clear proof that replies sent to Palmer were not even read before replies were sent, blew up and sent the stack of letters to me.

The computer handling of DPMA has always looked somewhat below standard. And doubtless this lack of leadership is a major flaw to

(Continued on Page 34)

READER COMMENTARY/Peter Lacey

Structured Coding's Twin Myths

It would seem to be about time that someone commented on the twin myths of structured programming: (1) that it is successful because it avoids GOTOs, and (2) GOTOs make a program less easy to understand. In actual fact, GOTOs have little, if anything, to do with it.

Let us consider the second myth. It is claimed that GOTOs obscure the logical flow of the program by jumping in or out of sequence. While this is certainly true of poorly planned programs, in which a programmer had to incorporate oversights or corrections as he went along, it does not apply in general. Every program consists of three phases: initialization, processing and termination. The processing phase always involves at least one loop and usually can be broken down into several sub- "programs" which involve the same three phases. This loop is represented by a starting point, an ending point and a transfer of control back to the starting point.

The clearest way of indicating this is with a GOTO: it can be done with a PERFORM, of course, but since this uses two implicit rather than one explicit GOTO and places the details of the processing (which usually would involve further PERFORMs) at a different level in the program, it cannot be stated that it is easier to understand.

Examples on these pages in the past have demonstrated what laborious circumlocutions are necessary to avoid a simple GOTO: nested IFs (which should be avoided like the plague in any programming method), numerous artificial switches and nested PERFORMs ad infinitum. This sort of coding can become routine and natural, as can nearly anything, but in no cases but the very simplest will it produce a control structure as simple, direct and obviously mirroring the program flow as does a properly planned program using GOTOs.

Therein lies the rub, of course: proper planning. No programming method will produce quality programs if proper planning is ignored: any method will do so if it is, including structured programming. Elimination of GOTOs is not a program planning device, but it is an unavoidable method of forcing the programmer to do some planning before he sets pencil to paper.

Structured programming is a subset of structured design, which consists of carefully worked-out methods of designing systems and their component programs as thoroughly and methodically as reasonably possible, with as much emphasis given to review as to design. Such an approach will, in every case that it is properly used, result in better programs (better by whatever criterion one wishes to apply).

Any complete and consistent planning method will produce similar results (I remember reading in *Datamation*, many years ago, about a 10,000-line Fortran program, planned with decision tables, which ran correctly on its first test) regardless of coding rules or language.

This brings us to myth No. 1. The successes of structured methods have come about precisely because of the emphasis on planning and review, not because of coding rules such as "no GOTOs." Let those who would dispute this give it an honest try: subject some system to a full-blown structured design and then program it using GOTOs. The results will be as good as before.

That there should be such a debate over inoffensive GOTOs indicates rather alarmingly how little understood or practiced is the planning function in this industry.

Lacey is an MIS manager with Co-Op Implements Ltd. in Winnipeg, Manitoba.

DPMA Methods Old-Fashioned

(Continued from Page 33)

many. Sometimes it seems DPMA goes out of its way to demonstrate that it is oldfashioned.

Two examples spring immediately to mind — one very recent and one now some years old. In preparing for an Aug. 27 hearing on sales taxes, DPMA quoted a 1977 situation in which New York ended up exempting data processing and "decided not to apply old regulatory concepts to a whole new state of art, a new business." The association then urged Massachusetts to do the *opposite* by using a precedent set in 1936!

Similarly, in the long, drawn-out controversy over the DPMA "Man" of the Year award, one cannot help thinking that even when it was first set up — and presented that first time to Grace Hopper! — there was almost a death wish in labeling the award with a question-begging title. A different name, a different first recipient or a swift change of name would have made the association appear better prepared for the future.

But as it is, the public appreciation is of an association that reads neither the handwriting on the wall nor the letters that people like Ericson write. And that shortcoming, rather than minor incompetence, is why many don't join.

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READER COMMENTARY/Girish Parikh

Software Maintenance Methods Need Refining

The In Depth article "Maintenance Programming" [CW, July 28], by David M. Clark, is one of the gems in the rare but urgently needed literature on how to do maintenance. I offer the following thoughts based on my study and experience.

While other aspects of software maintenance, such as documentation, software tools in maintenance, maintenance management techniques, maintenance reviews, structured retrofit and structured maintenance aid in the maintenance process, the actual maintenance work (also known as direct maintenance, or solving the immediate problems) is the heart of software maintenance.

Techniques of direct maintenance include the technical as well as the managerial areas. Direct maintenance programming addresses the technical problems and includes techniques to solve them.

Other techniques of software maintenance that are implemented and the nature of software to be maintained (that is, structured, semistructured or unstructured; if structured, the methodologies used to develop it) affect the techniques of maintenance programming. To an extent, some of the maintenance programming techniques can be generalized and from this generalized store of knowledge, techniques can be adapted or specific techniques developed for a particular problem.

The generalization of the techniques may begin from the study of the specific maintenance problems and techniques and may transpire over a period of time.

A changed program may or may not work or may even be worse than the original program, depending on the quality of the original software, the magnitude of changes and problems and the competence of maintenance programming.

'Black Box'

What goes on in the black box of maintenance programming? Well, that is the mystery to be unraveled. The techniques of maintenance programming, collected from the often-guarded secrets of a few, can be refined or developed further and made public. Thus, maintenance programming methodologies can be developed.

Maintenance programming, practiced widely, but not yet a formal discipline, is a wide subject like development programming. Some techniques may overlap, however. Maintenance programming should have its own body of knowledge — a collection of tips, techniques, guidelines, standards and sources. I emphasized this point in "Maintenance!" [In Depth, CW, Dec. 10, 1979]: "The need for collecting and developing techniques to handle such unstructured software is even greater than that of structured software."

Clark referred to "a formal methodology in how to make changes to an existing program." The methodology, in my opinion, is concerned with much more than merely changing a program. Preserving the integrity of a program is equally important, so that the maintainability remains at the prior level or is even improved upon. The dual-purpose, direct maintenance programming of unstructured programs should primarily aim at successfully changing the program and secondarily improving the maintainability, whenever possible.

The major structured methodologies should incorporate maintenance techniques appropriate for each method, for providing guidelines in making changes, as well as for preserving the structural integrity during that process. Jean-Dominique Warnier of CII Honeywell-Bull, France, has done notable work by providing guidelines in his book, *Program Modification*, for modifying programs developed according to the Logical Construction of Programs (LCP) method. I believe Jackson methodology also provides some guidelines for changing programs developed using that method. To my knowledge, such work has not yet been done for other methodologies.

How Much Help?

The next point I would like to address is how much help should be provided in determining how a programmer should go about making a change.

Some programmers are good in investigative (like investigative reporting?) aspects of maintenance programming. They incessantly dig into the listings and other sources and point out where changes should be made. Then they lose interest or are not good in further work. A lot of work still remains: making the changes, compiling, creating proper data if not available, testing, verifying the results, updating documentation, saving the old program and installing the changed program. In the future, specializations in maintenance programming may emerge. Such routine tasks can be described in a maintenance programming standards and guidelines manual.

After an expert determines where to make changes, the rest of the tasks can be done by a junior programmer or a maintenance programmer technician under the direction of a responsible senior programmer. The expert may, meanwhile, divide his time to solve other problems. This method should prove to be more cost effective.

The systems analyst should generally be able to define the system problem, or otherwise he would not be able to help the programmer. For instance, in a major Midwest company for which I worked, an analyst gave me an assignment which said, in essence, "Find the problem and solve it!"

Finally, the maintenance programmer, while attacking the direct maintenance problems should also look forward, keep notes and develop maintenance strategies to enhance and improve the life cycle of the system. He should take time to plan ahead (management should encourage this).

Having insights into the program, he is in a unique position to outline the strategies. Also, after looking at what has been done, he can usually establish a pattern and draw inferences. Management should provide training in these areas and reward the efforts of a maintenance programmer.

With the advent of maintenance programming methodologies, a discipline of software maintenance engineering will emerge.

Readers are invited to comment on the techniques they have developed to cope with the maintenance problem, by writing to Parikh at Shetal Enterprises, 1787B W. Touhy, Chicago, Ill. 60626.

Parikh is a consultant specializing in software maintenance and structured methodologies.

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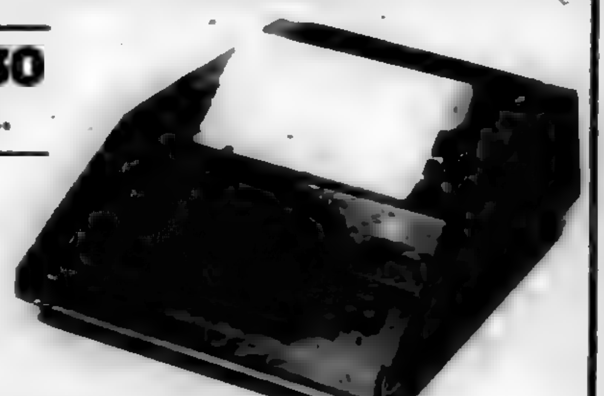

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Clerks now use terminals to check the nuts and bolts of individual claims: Is this policy valid? Has this claim been paid before?

In all, there are more than 30 screen formats.

Once a claim has been approved, a check is written that night. Since the Level 6 arrived, many claims have been paid in a single day.

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One advantage is that the computer can be used to calculate premiums, thus eliminating a great deal of work currently done by hand.

Finally, the Level 6 runs a very efficient data entry facility. Once CRTs are installed, clerks will be able to correct errors immediately, substantially reducing overall system maintenance costs.

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For a more detailed look at the Level 6, write Honeywell, 200 Smith Street (MS 487), Waltham, MA 02154.

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READER COMMENTARY/ Paula Bell

Technical Writers Must Aim for Clarity

I have been a technical writer for two years, long enough for me to wince at less-than-complimentary remarks concerning user documentation.

Critics are not limited by specialty or by level of experience. The user may be an experienced systems analyst or design engineer, a field engineer who has been cross-trained and is not practicing his initial specialty or a novice computer operator who is filling in for the regular operator who is recovering from a skiing accident, for example.

I must risk agreeing with the critics or sounding like the ex-English instructor that I am. My point is that writers in the DP fields must take the responsibility for improving technical documentation.

I mean both hardware and software writers, writers with technical knowledge who may not remember much of what was presented in their last English class — or in what year — and writers with composition skills who are still memorizing acronyms and trying to believe that you really can multiply in binary.

Two Advantages

Technical writing offers two exciting advantages; Valuable access to information, enough to keep up with technological advances in the most advanced of all technologies and invaluable opportunity to practice discipline in the craft of writing.

Communication media and their support industries are proliferating. We are all bombarded with anomolous, useless, and ambiguous data passing as information. An example of each follows and may produce a wry grin in addition to the frustration.

A newsreader, reporting an accident, informed his audience that four of seven people involved were "ambulatory." The other three were able to walk away from the accident.

Or maybe you read about the consensus of the vulcanologists in authority after Mount St. Helens' first spectacular newsworthiness; "We don't know what will happen, but whatever it is, we expect it."

Everyone has come across governmentese like, "No child shall be employed on any weekday when the school is not open for a longer period than four hours."

I have the dread feeling that somewhere among my own published paragraphs I may have committed an equal folly; I only hope my readers enjoy it as much.

We can lessen the amount of worthless information (if such a paradox can exist) and refine the medium by which the message will be carried by writing with precision.

The technical experts — programmers, engineers and designers — are responsible for reading a proposed manual in order to correct technical errors involving contradiction or inadequate information.

Technical experts should not be required, or encouraged, to do a rhetorical edit. Experts are busy too, as they may state, and many do not consider documentation review an essential objective in their pursuit of the leading edge of the state of the art.

If an explanation or a procedure is unclear or incomplete, the expert, already understanding the material and not having to read for information, may not notice the confusion. The writer cannot compensate for these omissions. However, the writer must be the expert in all other

(Continued on Page 42)

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LETTERS

On Management

I read with pleasure Howard A. Karten's response to my commentary [CW, July 14]. He wrote well and addressed himself to the issues. As with any important aspect of management and technology, there are legitimate areas of disagreement. However, there are some points I wish to clarify.

Karten made reference to the "... job knowledge required by users." I was writing strictly about job knowledge required by programmers. I agree wholeheartedly with him that users should be buffered from changes in technology.

Also, the example he presented of the futility of "trying to achieve a fancy overlay structure that uses 10K fewer bytes when the cost of the programmer's time is greater than the gain in efficiency" actually proves my point.

It is technical management which must maintain an environment of awareness and pride in keeping up with changes in technology — and cost is a factor of technology — which would discourage the technical staff from such anachronisms. As recently as 1979, I heard about a manager who advocated two letter variable names because "the resultant programs take less time to compile!"

I also agree with Karten that "a manager is supposed to manage work, not do it himself." But part of managing is understanding. The General Electric Co., one of the major proponents of generalized management, still has engineers managing its engineering sections for that very reason.

I want it clearly understood that I am only addressing technologically intensive activities, such as program development and engineering.

I also agree with Karten that selecting, training, motivating and retaining people has become tougher in the past decade. That, in fact, is the central point to my commentary.

How do you select one programmer over another if you don't appreciate the importance of structured walk-throughs?

How do you train employees if you don't know what training they need?

How do you motivate a programmer to take pride in his work if you tell him to save 10K bytes with a fancy overlay structure?

Finally, how do you retain employees when they don't respect your understanding of the technology they must employ?

Floyd McWilliams
Stanley, N.Y.

Everyone's Paying

How often do we read or hear something and not see or listen to the intended message?

John Stewart's statement in his letter [CW, July 14] that there was "no loss of relevant material" in my data theft case was unwarranted.

Regarding the $2,000 in charges made on four different account numbers within one week, the thief did get a TV valued at $633. We are all paying for this, along with all other thefts of merchandise.

If you do not believe this, ask any police fraud squad and/or your casualty underwriter.

The message is, tighten up credit practices to ensure privacy and accuracy.

Recent events since the publication of my story have pinpointed the access to our, and possibly other, TRW Credit Data profiles by another organization not previously mentioned.

Alan E. Kahn
San Anselmo, Calif.

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HUMAN CONNECTION/Jack Stone

Programs Help States Target Emergency Aid

What do state governors do in the event of sudden and large-scale riots in their cities? Or erupting volcanoes in their countrysides? Or sinking oil tankers near their shores?

Most citizens know that the governor responds with emergency assistance for casualties, acts to reduce the probability of secondary damage, provides special forces to maintain security and speeds recovery operations.

But during recent years, the number and diversity of man-made disasters have dramatically increased. Governors have found it difficult to handle them as effectively as necessary because of a limited supply of trained personnel and special equipment.

Furthermore, although there are many federal government programs that provide emergency assistance, each has its own mandate and restrictions, which makes coordination difficult in times of crisis.

In 1977, the National Governor's Association (NGA) urged Congress to consider the consolidation of these efforts. The end result was the formation in 1979 of the Federal Emergency Management Agency (Fema), whose job is to set national policy and operate the major disaster assistance programs.

NGA also organized the Emergency Preparedness Project, under the direction of Hilary Whittaker, to examine the state's problems in managing all types of emergencies. Here is a summary of a recent interview I had with Hilary and her two associates, Vern Wingert and Jaynelle Ketchum.

What were the findings of the project?

HW: We identified several important areas of concern. First, working with Fema, each state has the capability to coordinate its responses to presidentially declared disasters, which number perhaps 40 to 50 per year across the entire nation. But very few states have the resources to handle their share of the 30,000 to 40,000 lesser disasters that occur each year, such as those involved with technological hazards, energy and materials shortages, droughts or civil disturbances.

Second, emergency operations appear to be fragmented at both the federal and state levels, by emergency type, phases of management and organizational involvement.

What do you mean by "phases of management"?

HW: We describe emergency assistance in terms of Comprehensive Emergency Management (CEM), a four-phase management process. The first is mitigation, long-term actions intended to eliminate or reduce the possibility of a disaster, such as legislation to control the storage of nuclear waste.

Second is the preparedness phase in which plans are drawn up to save lives and minimize the effects of those disasters that cannot be avoided. Third is response, which is generally understood, and the fourth is recovery, during which short- and long-term projects are implemented to return life to normal conditions or, better yet, to a less disaster-prone level.

What is happening with regard to improving CEM operations?

VW: Fundamental to the proper management of emergency assistance, just as in any other government activity, is the acquisition of data that can quickly help identify program resources. We have recommended a long-term program of computerization to accomplish this goal. As a matter of fact, we have just recently implemented our first computer application and are delighted with the results so far.

Could you describe it?

JK: Surely. First, some background. By our count, there are currently 315 federal programs which provide 26 different types of emergency assistance to the states in 30 subject-matter categories. Each subject category is, in turn, organized into dozens of subcategories.

VW: And each of these programs has its own set of requirements by which a state government or other applicant may qualify for assistance. The governors complained that it was very difficult to determine, in time of emergency, just which federal programs could be utilized.

HW: First, we researched these federal programs and summarized their key provisions in an easy-to-read catalog. Then Jaynelle developed a keyword index to the federal assistance programs, and we arranged for software to be developed to convert the index into a computerized data base. We named the application National Emergency Assistance Programs (Neap).

We chose Neap as the first application because it served an immediate need. Also, it required relatively few resources to implement. Fema agreed and supplied the funding for the effort.

Its value has already been demonstrated: working with Neap, we were able to help governors quickly identify relevant federal assistance programs in the Mount St. Helens eruption, the Miami riots and other recent emergencies.

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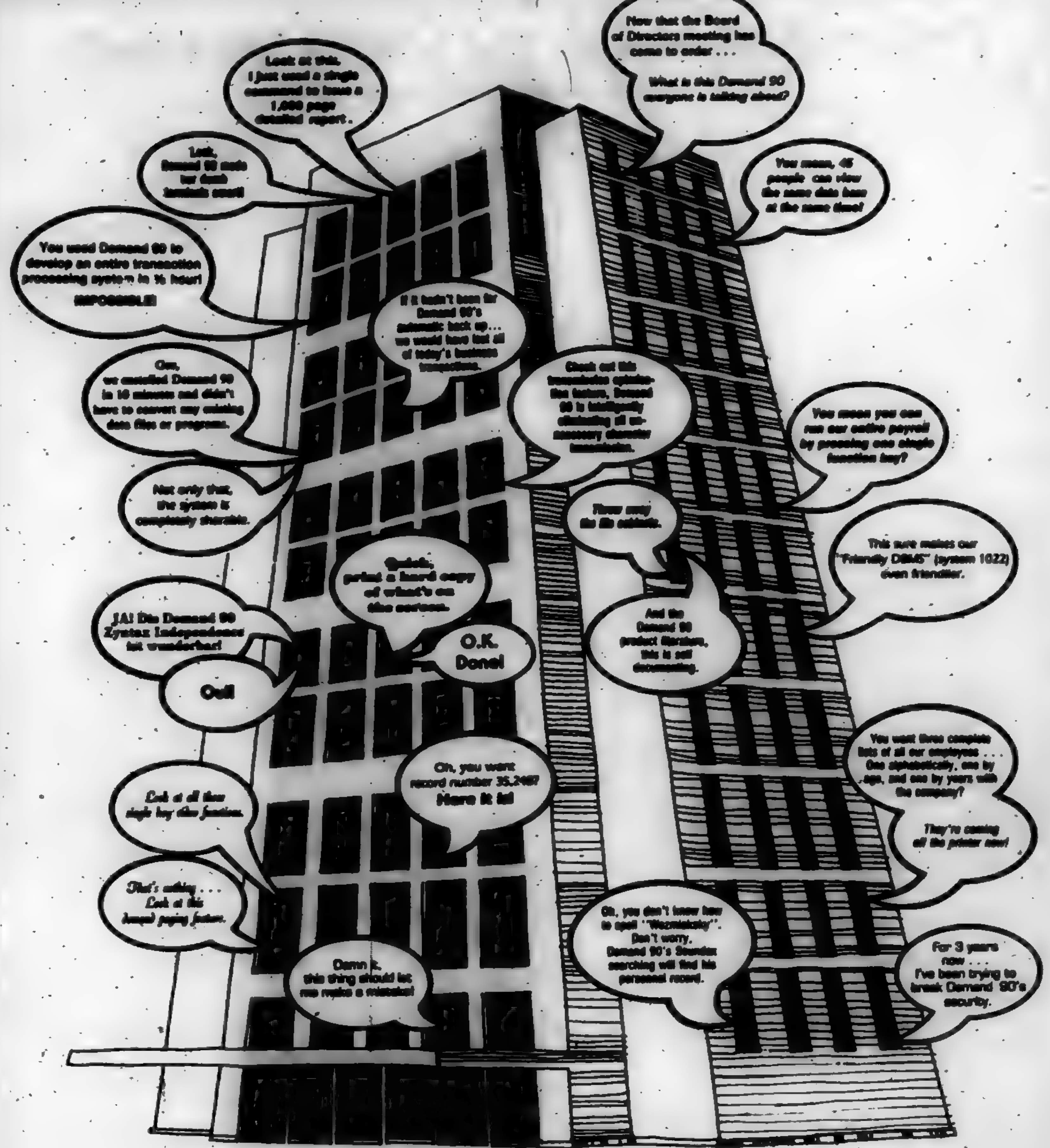
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Writers Responsible for Clear Documents

(Continued from Page 38)

aspects of composition, including diction, grammar, structure and format.

Rhetorical Skills Needed

The technical writer needs the rehetorical skills important to creation of all good writing, the organization skills particular to technical writing and the terminology peculiar to writing in a specific field.

The writer must have adequate technical understanding to write about diverse subjects concerning the assigned manual, its specific purpose and its intended audience.

The subject must be thoroughly researched by interviews with the developers and through document research. The resulting information must be evaluated for exclusion, inclusion, elaboration and then arranged in the proper form for presentation. Now the writer can sit down to write.

On-the-Job-Education

Continual technical education is a part of the job, as it is for everyone in DP. Writing skills are often acquired on the job during the writing of the manual (on the run) or independently (between assignment crunches). We all need to keep learning.

To writers who have come to technology from writing: what does 2**31-1 really mean in the grand schematic of things? To writers who have come to writing from technology: There are fewer rules for grammar than there are mnemonics in assembler language or logical alternatives in chip design. There are far fewer rules to learning how written English works than to learning how a computer works.

Following the basic prescriptions in one good grammar and rhetoric text can help any writer compose more useful manuals. Reviewing Strunk and White's *Elements of Style* once or twice a year is a great refresher and it's less than 100 pages in paperback. True, one must master some grammar jargon, but none more intimidating than technical jargon such as electromagnetic actuator or linear optimization.

Every writer knows how much easier it is to edit someone else's work, how inconsistencies or anomolies in form, logic or reference are more quickly seen from another viewpoint. But it is not often possible, under the pressures of a deadline, to enjoy the benefits of a rhetorical edit before publication.

Some writers assume that readers will not recognize inappropriate rhetorical conventions — that users are unaware of haphazard punctuation or illogical connections.

However, many readers of technical publications are also avid readers in other fields and get annoyed at the drop of a comma. The reader is distracted from the information and the writer — maybe even the company — loses credibility.

Other readers will not recognize a grammatic slip, but also will not read prose that is more complicated than the computer operation being explained. The reader is confused, whether or not realizing that it is the writing at fault.

Good technical writing is like a friendly system. Implementations are transparent to the user and the writing does not further complicate complex subjects.

Some Suggestions

In the interests of organization, clarification and simplification, I suggest the following;

- Know your audience. Though it may not be efficient to write expressly to the temporary operator waiting for the return of the experienced operator on crutches, writing only for the latter probably means that many who most need to use the information will find it frustratingly difficult.

  Maybe you can't please all of the people, but you can at least tell them who you think they are by job title, level of experience and prerequisite reading.

- Be consistent. Second person — subject understood or expressed — is generally the most concise; don't switch to third person without good cause.

- Never trust a technical term. Almost every sentence in a manual has one. The easiest way to check meaning is to ask another technical expert to define the word.

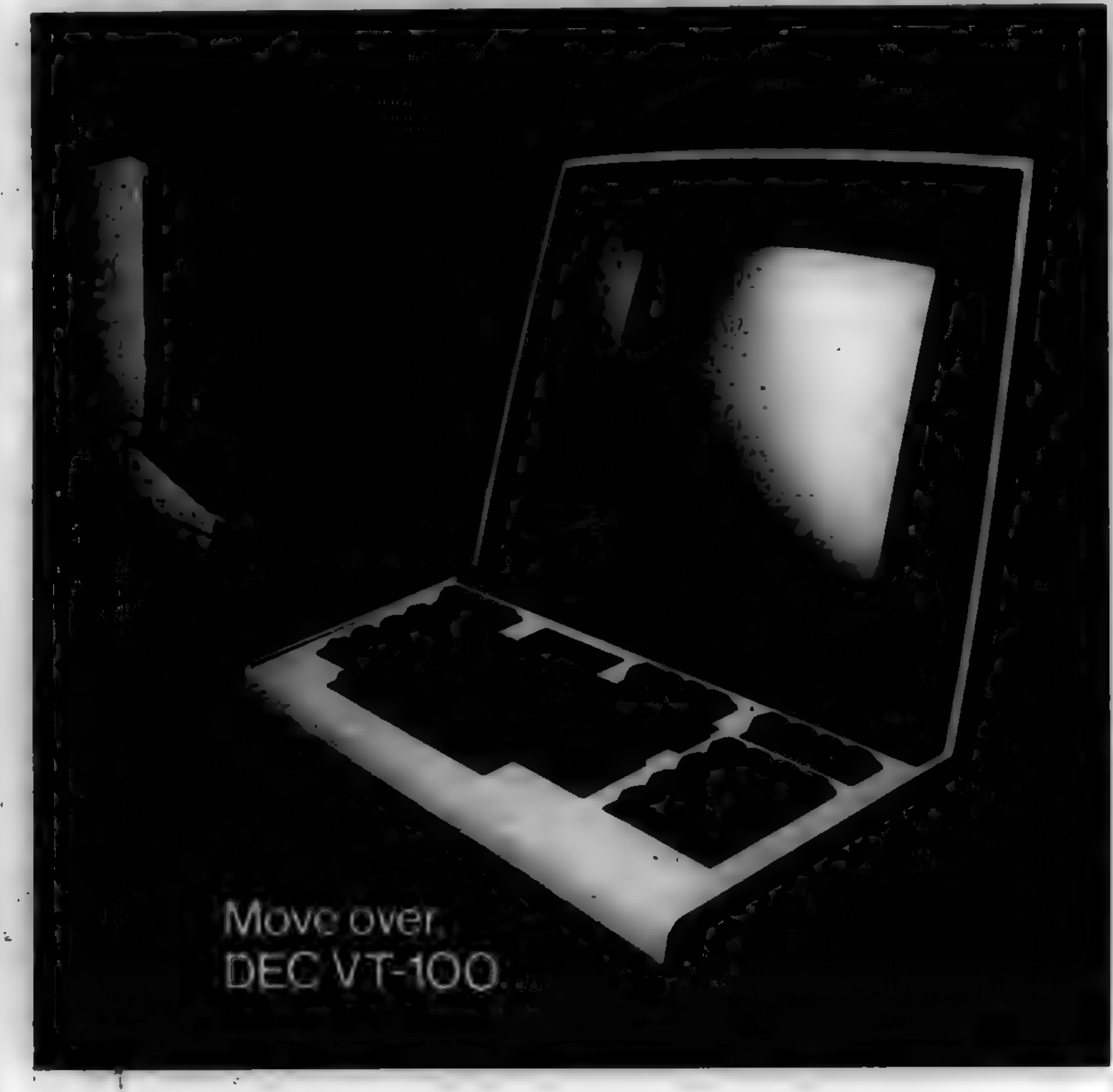
- Avoid passive voice. Its use is often an excuse for inadequate research.

- Make logical connections. "However," for example, is never synonymous with "consequently." Show cause and effect each time and only when it exists. Conjunctions are tricky and have the power to make or break a logical connection just as an OR gate will not work where the decision rests on an AND.

- Use a pronoun only when its referent is clear, especially "it." In the sentence immediately preceding, "its" is the pronoun; "pronoun" is its referent. A vague pronoun defaults to the last named noun; however, that is not always the intent.

I hope that it provides impetus for all of us who write to think about the ways in which we can make ourselves more skilled, our documentation more useful and our users more informed. Then we'll be better able to do our jobs — telling the technical experts how to keep those systems up and running.

Bell is a senior technical writer for Amdahl Corp. in Sunnyvale, Calif.



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Project Leaders Often Suffer 'Fear of Flying'

(Continued from Page 33)

head.

However, there are a few things that the project leader can do to prevent the situation from happening in the first place.

The following are some of the things that he might consider doing:

- Be thorough during all phases of development. There is nothing worse than getting near the end and feeling that an important form was not properly designed and reviewed or that the edit specifications for a program might be next to useless.
- Keep technically abreast of developments. This prevents others, including the user, from telling the project leader how to do his work.
- Get firm (documented) commitments from the user. This prevents the user from changing the specifications without the change being documented. Also, these documented commitments prevent the project leader from having a fear of user rejection.
- Explain the proposed system to anybody and everybody. Then no one is surprised by the final product. The process of explaining will also help the project leader gain confidence.
- Remember that almost any product is better than no product. This is true both for the project leader's in-house advancement and for his resume.
- Remember that most projects require risk.
- Remember that no system is perfect. Even the best systems require maintenance.
- Recall past successes. In doing this the project leader should analyze the successes and see how this project can be made to be just as successful.
- Don't play down the system. If he downplays the system, before he knows it, the project manager will be believing his own modesty.

One final note: Clearly the supervisor of a project leader or an "enlightened" user needs to give the project leader all of the support he needs. A successful project requires the enthusiasm and support of everyone concerned.

Eastman is director of research and statistics for the Department of Social Services, State of Missouri.

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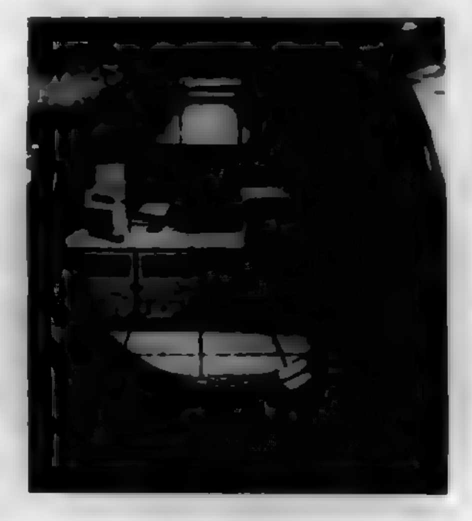

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Letters

Unkind 'Tribute'

I wish to respond to P.A. Anderson's comments regarding "ego-filled" programmers [CW, Aug. 18].

My own observations of programmers' behavior over the years and their attitudes toward themselves lead me to believe that Anderson's requirements for more ego-filled programmers has been fulfilled. Programmers in general seem to have pride in their work, but pride in one's skills and "ego-filled" are in my view two different things.

We all know some turkeys who believe they are in the business by Divine Providence.

According to them, they are the embodiment of structured perfection. Topdown excellence. Their attitude goes far beyond pride in their skills.

These people tend to embrace a view in which everyone is wrong except themselves.

This is not healthy, either psychologically or sociologically.

To imply that the likes of Edison, Einstein, Bach and Wright and any programmer who walks the face of the earth have anything of note in common is truly the unkindest tribute one could pay to those four notables.

K.M. Madson
Palo Alto, Calif.

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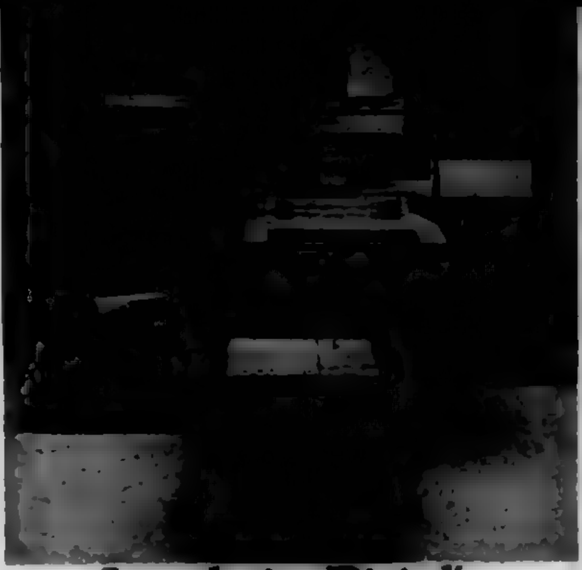

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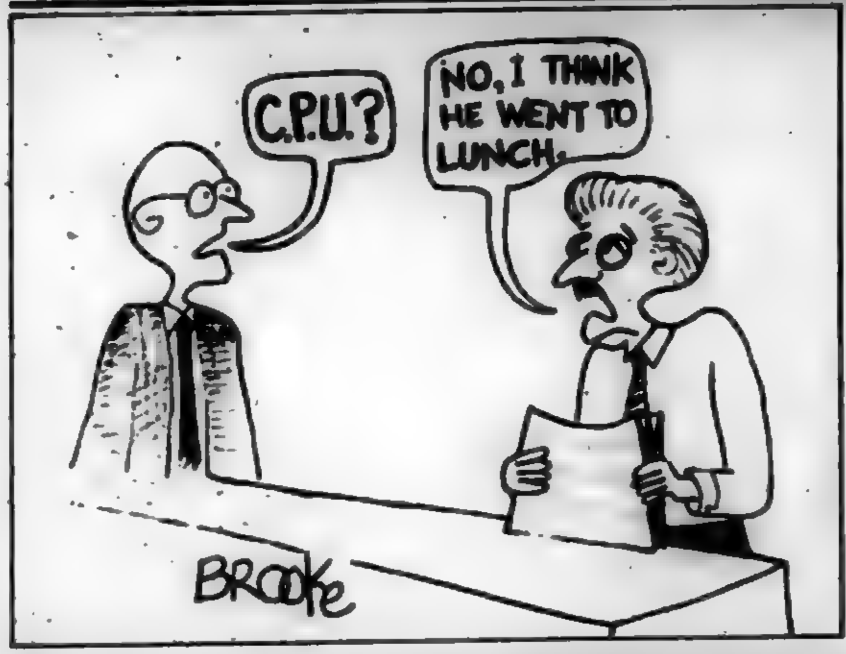

C.P.U.?
NO, I THINK HE WENT TO LUNCH.
BROOKE

Contractors Often 'Fit'

(Continued from Page 33)

prior to beginning any work assignment, not to disclose any financial (or other) arrangements, most staff resentments of this type don't need to happen.

I think many staffers are also aware that, though the contractor makes, in many cases, more money than they do, often for the same type of work, the contractor is on the job site only temporarily and doesn't share in benefits, amenities or promotional opportunities companies provide to their regular employees.

Insofar as incomplete (or nonexistant) documentation is concerned, as a criticism "directed most often" at contract programmers, I think this is another potshot at the professionalism and integrity of the group as a whole. Do contractors leave their clients in any more of a lurch than do captive employees who have been recruited by other companies or employment agencies?

I suspect one has to look at the nature of the beast in order to begin to answer the question. Many applications programmers, contract or captive, don't enjoy doing what they consider to be "demeaning" work such as documentation or maintenance. Yet this work must be done in order to have an effective DP installation. To alleviate the problem of undocumented work (insofar as contractors are concerned), the smart DP manager will clearly define what documentation is necessary, before the work is begun, then consistently interface with the programmer (while the project is being completed) to ensure that instructions are being implemented as the user originally intended.

Contracting is a two-way street between the programmer and DP management; without constant dialogue, even if that dialogue consists of written and cosigned specifications, both management and contractors will spend more time and energy playing "caveat emptor" (and PMA) than turning out productive work. At the bottom line, it is the prime responsibility of the user to determine that documentation, as required, is adequate, during the assignment of any contractor; if not, the user should immediately discharge the contractor in the event an acceptable solution cannot be reached and mutually understood.

'Contracting is a two-way street between the programmer and DP management; without constant dialogue, even if that dialogue consists of written and cosigned specifications, both management and contractors will spend more time and energy playing "caveat emptor" than turning out productive work. At the bottom line, it is the prime responsibility of the user to determine that documentation, as required, is adequate during the assignment of any contractor.'

Any contract programmer's job qualifications and professional competence standards are, in my opinion, as easy to verify as those of any potentially captive employee — perhaps easier. To check the references of most prospective employees, the company providing the reference must generally comply with certain laws and internal policies of disclosure, often limiting the "reference check" to not much more than confirmation of employment.

When checking out a potential contractor, the user merely need ask where he has worked, what he did, when and for whom; then, it's usually a matter of simply calling that previous technical manager to verify ability, reliability and overall satisfaction. Who forgets many $30+/hour contractors?

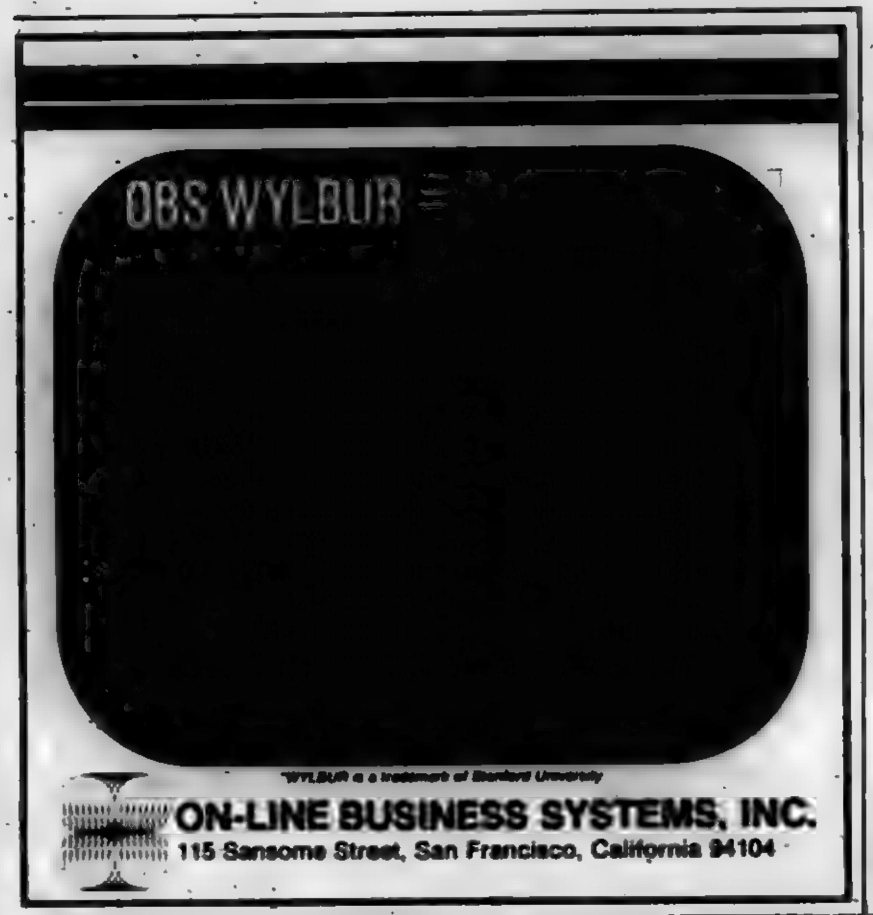
Often, because a contractor has "job-hopped," there's the real possibility that his background (typically, a good mix of hardware, software and applications) could be superior to that of newly hired employees. Getting the contractor up to speed, in many installations, requires only minimal orientation.

The suggestion that some, if not all, installations use only contractors (other than the exception of key senior personnel) could, in some cases, be wise, especially for the large-scale shop with many programmers, in a maintenance or fire-fighting environment.

For the shop engaged primarily in design and/or development, the role of contractors could still be as effective, especially in environments where most projects are under specific deadline and the utilization of captive employees, after completion, isn't as certain.

In summary, using contractors, whether they're free-lance, subcontract, "quasi" or consultants, can be meaningful and rewarding to most DP installations as long as management clearly understands what is needed to be accomplished, at what point and the skills required to do it.

Bodman is regional manager for Sigmatics in Los Angeles.



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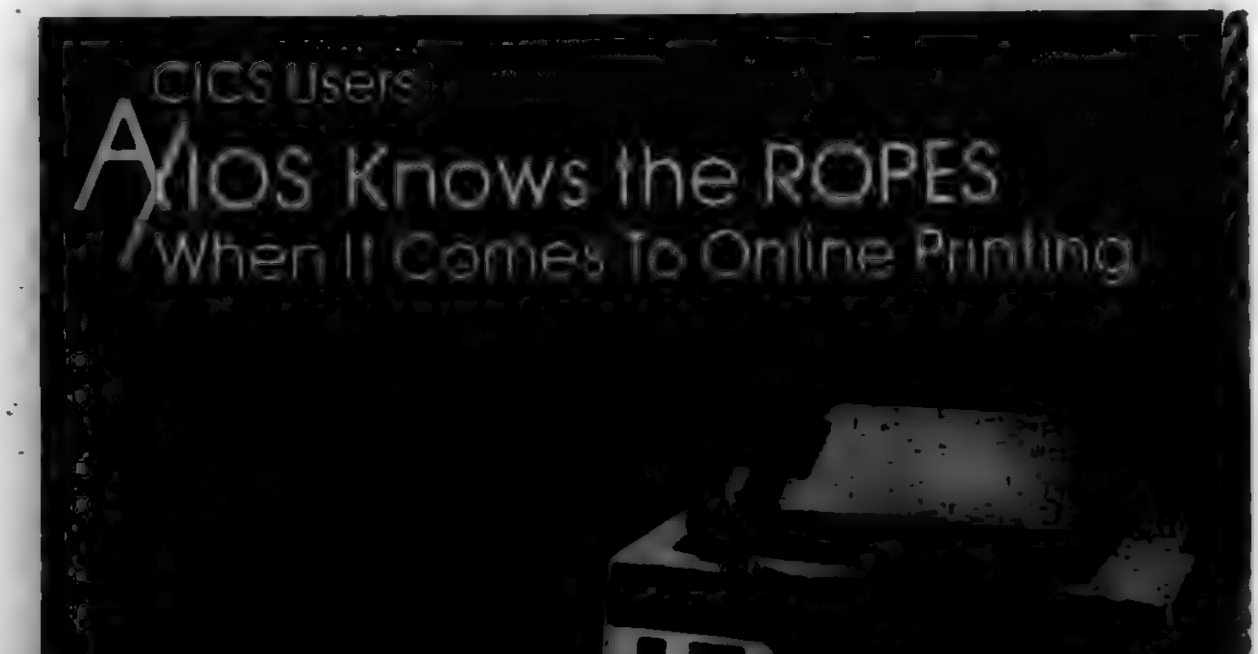

Enhances TCSC Products

Nixdorf Launches Software Offerings

By Marcy Rosenberg
CW Staff

RICHMOND, Va. — Three months after Nixdorf Computer Corp. acquired The Computer Software Co. (TCSC) [CW, May 26], the product of that union — Nixdorf Computer Software Co. (NCSC) — has brought out its first software offerings to the IBM and compatible mainframe market.

While not new products, the announcements come in the form of updated versions of several system software products that were part of TCSC's line before it was acquired.

Among these NCSC announcements are new releases of the Edos/VS operating system and its associated data base management system and data dictionary; an enhanced version of the Extended Console System (Econ); and a CICS interface for the Data Entry Control System (DEX).

Edos/VS is an operating system based on IBM's DOS/VS Release 34 for 360, 370, 4300 series and compatible mainframes. Features added in this latest Edos/VS Release 1.2 include 3330-11 disk support, Isam support for 3330-11 users, priority channel scheduling for increased I/O processing speed, and cross-partition enqueue/dequeue and GETVIS for real systems.

In addition, Release 1.2 enhances IBM 370/155-I support for error recovery and provides an execution frequency monitor for all transients, phases and programs, according to Mike Youmans, NCSC product administrator.

Logical Transient Area (LTA) scheduling was also improved so that LTA is no longer served on a first-in, first-out basis. Instead, programs using LTA are temporarily promoted to high-priority to eliminate contention, Youmans said.

Edos/VS for IBM 370 and 4300 series processors can be licensed for $8,500; a single-charge license for the 360 version costs $13,500. NCSC also offers a VS operating system package for $27,500 that includes 360 and 370 versions of Edos/VS, spooling, supervisor extension and 12-partition support.

NCSC Database

Available along with enhancements to this operating system is Release 7.1 of the NCSC Database, a data base management system (DBMS) that runs on Edos/VS.

(Continued on Page 48)

Candle Unveils CICS Monitor, Add-On Analyzer for MVS

MARINA DEL REY, Calif. — A software program that monitors CICS activity through an IBM 3270-type CRT terminal, a response time analyzer that tracks IBM CICS transaction response times and an add-on analyzer for IBM MVS systems that can be used to determine the cause of program bottlenecks have all been recently introduced by Candle Corp.

Omegamon/CICS provides information on CICS activity for operations, systems programmers and managers. On-line information is displayed in real-time through a CRT in two modes of operation. In the transaction mode, the monitor functions as a CICS transaction. In the dedicated mode, a higher level of communication is used to the CRT to provide increased availability, a spokesman claimed.

The CICS monitor reportedly provides the user with dynamic screen formatting and screen space function. More than 20 commands can be used to display information relating to CICS tasks. In addition, the system displays monitor transaction rate, Vsam and file data and internal CICS control blocks.

Degradation Analysis

Omegamon/CICS also incorporates a feature called degradation analysis that will analyze the cause of CICS slowdowns. The analysis is provided over both short-term and long-term intervals, the spokesman said.

The response time analyzer (RTA) is an optional add-on to Omegamon/CICS and displays data in real-time using the transaction or dedicated modes provided by Omegamon/CICS. Response time data is monitored in terms of transactions or by user-defined groups of transactions. In addition, the computer's response times may be shown across two time dimensions: re-

(Continued on Page 48)

System-80 Runs On DG, DEC Gear

PITTSBURGH, Pa. — System-80, the on-line Cobol program generation system, is now available for users of Data General Corp. and Digital Equipment Corp. computers, according to its vendor, Phoenix Systems, Inc.

System-80 reportedly works off key words in a data dictionary to produce efficent Ansi '74 Cobol code to perform whatever functions are necessary in a program, according to a company spokesman.

The system is said to eliminate time-consuming manual error-and-syntax checking and redundancy inherent in any Cobol program. In addition, System-80 allows lower level programmers to do high-level programming tasks, the spokesman claimed.

The full System-80 is available to users of DG's Advanced Operating System for a one-time cost of $19,500, to users of DG's CS Systems for $12,675 and to Decsystem-10 users for $29,250. Functional modules of System-80 start at $2,500 for DG-AOS users, $16,250 for DG-CS users and $3,750 for Decsystem-10 users.

Phoenix can be reached through P.O. Box 7849, Pittsburgh, Pa. 15215.

Data Catalogue 2 Gets Loading Aid

BEDFORD, Mass. — Users of Synergetics Corp. Data Catalogue 2 can now make use of the firm's IMS and DL/1 Convert feature to aid in loading their data dictionaries.

The feature reportedly allows users to call for automatic scans of existing control blocks or library entries of these control blocks. The function is said to read both Data Base Definitions (DBD) and Program Specification Blocks (PSB).

The function then takes the direct source entries and produces a work file and a printed audit conversion report. The report serves as an audit trail of the control blocks being processed and can also include error

(Continued on Page 48)

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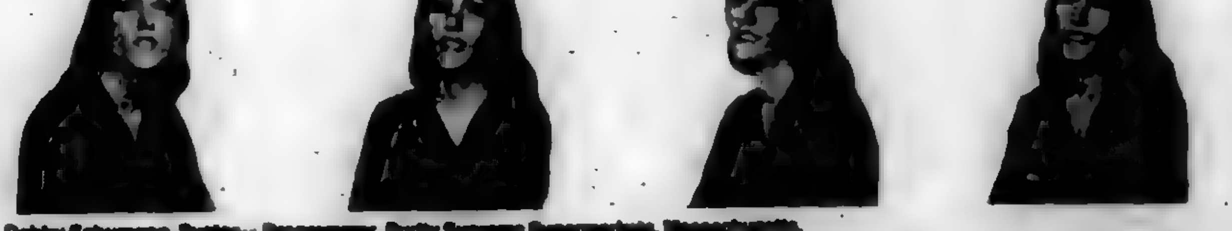

Debby Schumann, Systems Programmer, Purity Supreme Supermarkets, Massachusetts.

Debby Schumann had been managing her program libraries manually, until she acquired DOSSIER. Not only does DOSSIER automate her library management, it will be an excellent tool to help her convert to the 4300.

DOSSIER goes beyond source library documentation to translate object code from program libraries into complete and current program and file information. Its 16 management reports address all aspects of controlling and auditing object libraries.

So whether you have a 4300 conversion on the way or are trying to maximize the effectiveness of your recently installed 4300, DOSSIER will help. Try DOSSIER free, without obligation for 30 days. Discover why more than 600 companies are already using DOSSIER to upgrade, maintain, audit and clean up DOS, DOS/VS and DOS/VSE libraries.

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Nixdorf Launches Offerings

(Continued from Page 47)

This latest DBMS release is said to allow concurrent operation of most utility functions and to use partition memory in a dynamic fashion to simplify data base program operation.

NCSC restructured the index architecture in Release 7.1 to reduce channel utilization and improve throughput rates, Youmans noted. In addition, several utility programs have been modified.

For example, the recovery utility, which manages the transaction journal file, now allows more precise specification of backout processing requirements and expanded Database trace tables for debugging and helps users bring applications back to production status more quickly, the vendor claimed.

A generalized multithread interface in Release 7.1 is said to simplify data base access through any batch inquiry system that will support a CALL feature and through such teleprocessing monitors as IBM's CICS, Westinghouse Electric Corp.'s Westi and Mathematica Products Group's MPGS-xlt.

A single-charge license for NCSC Database Release 7.1 costs $30,000; a multiuser facility must be licensed separately for $8,000. NCSC Database can only run under Edos/VS.

Datadictionary

Edos/VS is also necessary to run NCSC Datadictionary, a new version of which is now available from the firm. Called Release 2.1, this latest version includes an input creation facility that accepts record definitions from existing librarian systems to create data dictionary information.

Other features added include support for user-defined entity definitions, the ability to model new information along existing characteristics and provisions for keeping historical records of changes as audit trails. A single-charge license costs $12,500.

Release 2.0 of Econ was also announced. This new version, which operates under DOS and DOS/VS as well as Edos and Edos/VS, supports magnetic ink character recognition for operating systems executing in extended control mode.

It also supports the IBM 3278 Model A2 console device for the 4300 as well as the 125D CRT display unit used on 370/115 and 125 processors. These are in addition to the previously supported IBM 1052-, 3210-, 3215- and 3270-type console devices.

A new Timeout feature, when used with automatic console transfer, is said to automatically log off a terminal from Econ if no input activity has occurred within a specified time.

In addition, Release 2.0 allows users to assign single characters — A through Z, 0 through 9, #, @, and $ — to canned messages, thus adding 39 more functions to the 36 that previously were available through programmer-defined PF and PA keys, Youmans claimed. Econ Release 2.0 can be licensed for $3,500.

CICS Interface

Finally, NCSC announced a CICS interface for its data entry system, DEX, which formerly was a stand-alone system only. DEX-CICS runs under the CICS standard or CICS/VS telecommunications systems, the firm said.

Available for a single-charge license fee of $6,500, DEX-CICS provides editing facilities and can perform data entry, verification, browsing, autoduplication, batch totals and check-digit generation, according to NCSC.

All software products can also be licensed for monthly charges from NCSC at 6517 Everglades Drive, Richmond, Va. 23225.

Data Catalogue 2 'Converted'

(Continued from Page 47)

messages, according to the firm.

The work file is then sorted and consolidated, resulting in a transaction file and a conversion analysis report. After checking the report, one can make direct entries into the dictionary.

An optional renaming facility enables a user to rename selected data entities.

While the Convert feature is a recent addition, the automatic generation of IMS and DL/1 control blocks from scans of the dictionary has been part of Data Catalogue 2 "for many years," according to a spokesman. Both features are part of the Data Catalogue 2 interface for DL/1 and IMS.

The DL/1 and IMS interfaces each cost $5,000. The basic Data Catalogue 2 for IBM's OS/VS and MVS costs $14,900 and the DOS/VS and VSE versions are $12,900 each.

The dictionary is also available for the Univac 1100 at a cost of $12,900. Synergetics is located at One DeAngelo Drive, Bedford, Mass. 01730.

Corrections

The Easytrieve software from Pansophic Systems, Inc. now available on Univac's VS/9 operating system offers an unlimited sequential input/output option, not unlimited sequential files [CW, Aug. 11], the vendor said.

Software Education Corp.'s course, "Vsam for Cobol/Assembler Programmers," will be held Sept. 15-19, not Sept. 9-19 [CW, Aug. 18].

Monitors Out For CICS, MVS

(Continued from Page 47)

cent time intervals in terms of minutes, or time slots which would involve specific times of the day.

Finally, Dexan for MVS is a degradation exception analyzer that is said to allow a performance analyst to determine the causes of system slowdowns with specific types of tasks.

The Dexan MVS analyzer costs $5,000. The Omegamon/CICS monitor has a permanent license cost of $12,500 that will be boosted to $15,000 as of January 1981. However, as an added incentive, the first 25 charter customers of Omegamon/CICS will be billed $9,500. The response time analyzer option is priced at $5,000.

Candle Corp. is located at Suite 624, 4676 Admiralty Way, Marina Del Rey, Calif. 90291.

Cincom Updates Manufacturing Modules

CINCINNATI — Cincom Systems, Inc.'s Manufacturing Resource Planning System (MRPS) software has been enhanced in the area of its Foundation Modules, which include material control, standards maintenance and system control.

Release 2.0 is said to enable the user to maintain more control over the manufacturing environment. Specifically, it allows monitoring inventory by location, better system control for transactions and auditing procedures and expansion of the data base to include product costing, production routings and work centers, Cincom claimed.

Within the enhanced Foundation Modules is the Material Control Module, which gives the user the capability to define multiple inventory locations, including major and minor locations such as warehouse, stockroom, bin, row and shelf. The system then monitors inventory activity against these locations, according to the firm.

Within the Standards Maintenance Module, Release 2.0 is said to expand the MRPS data base to enable the user to maintain the portion of the data base supporting production routings and work centers.

This feature is important, the vendor claimed, because: It is required for standard cost support; it is required by the new MPSS and PPCS modules; it allows current users to begin now to store data needed for activation of future modules.

Cost data is maintained for material, labor and overhead on both an accumulated cost and an incremental cost basis. This breakdown in cost is beneficial in determining the real effect of a cost increase at any level of the production process, a company spokesman said.

The System Control Module allows the user to control parameters that establish the framework of operation of the system. Global parameters, such as purge control, nervousness dampers and rate tables are controlled by the user.

The Foundation Modules are available for a one-time license fee of $50,000. Cincon Systems, Inc. is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

Synergistic Packages Run In TI Basic on TI 990 CPUs

E. THETFORD, Vt. — Several software packages for the Texas Instruments, Inc. 990 CPU series in TI Basic, each with user manuals and demonstration disks, are being offered by Synergistic Systems.

The Mail-990 mailing list program maintains up to 10,000 addresses per diskette. The Text-990 text editor provides screen-oriented text preparation functions for documents of up to 400 lines. Index-990 multikey indexed sequential-access routines provide instant access to any record in a file by up to five different keys, and sequential access in key or reverse key order.

Forms-990 is a package of functions and subprograms which simplify the development of forms-oriented input routines. The Info-990 interactive data base system enables office personnel to create and maintain a variety of data bases by menu specifications.

Mail-990 costs $500, Text-990 costs $100, Index-990 with source code costs $800, Forms-990 costs $500 and Info-990 costs $800 from Synergistic Systems, Cobble Hill Road, E. Thetford, Vt. 05043.

'Ramis II' Added To MMDS Net

BETHESDA, Md. — Martin Marietta Data Systems (MMDS) has expanded its time-sharing services network with the addition of Ramis II, a decision support software system for nontechnical users.

The product combines a data base management system with an English-like language geared for the business vocabulary of the nontechnical user. Ramis II enables new applications to be implemented five times faster and reports 40 times faster than do conventional computer languages such as Cobol and Fortran, MMDS claimed.

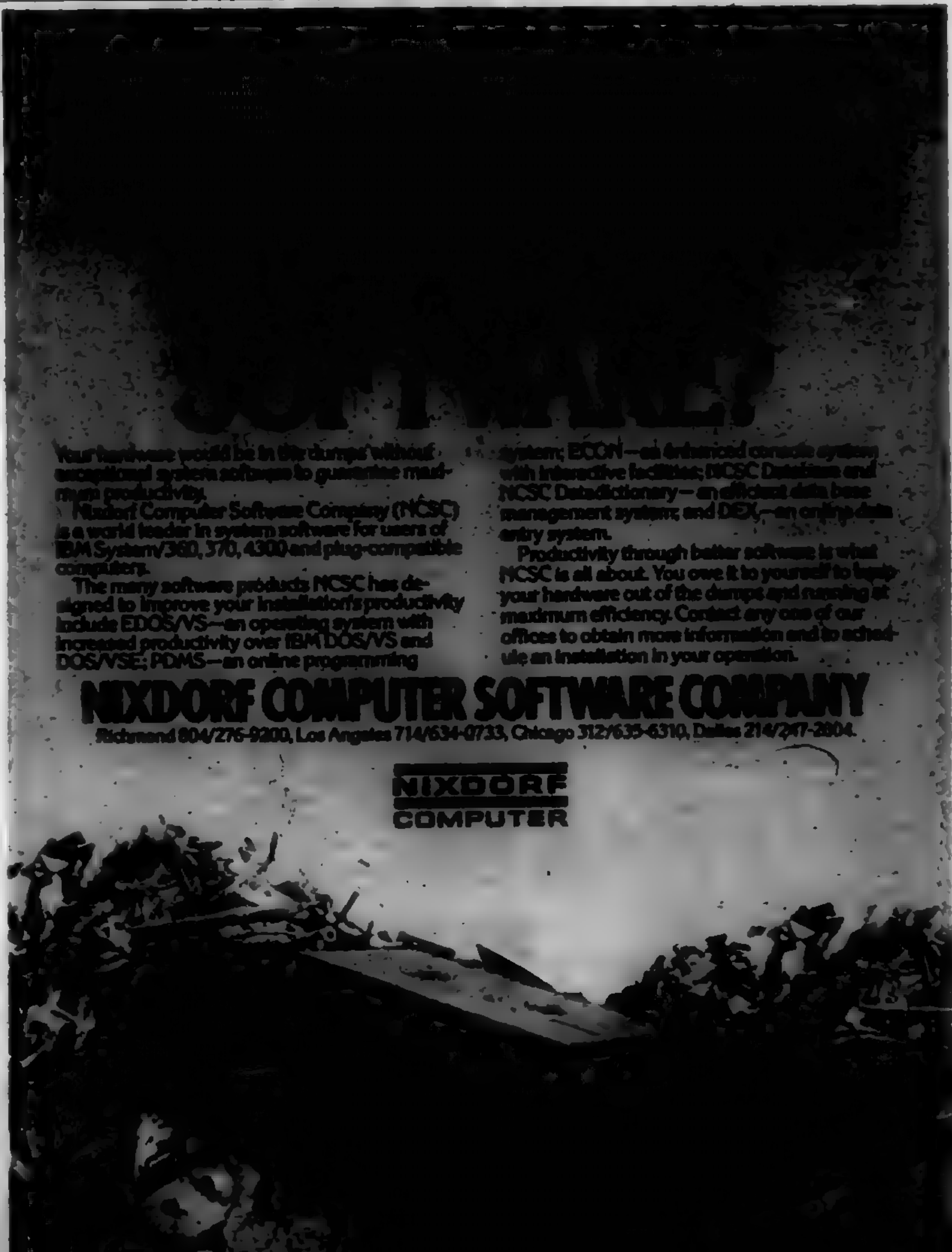
Prices for the system vary broadly, but are based on computer time, priority of service and the particular customer configuration, MMDS said from 300 E. Joppa Road, Baltimore, Md. 21204.

Course Cassette Out

ARVADA, Colo. — Educassettes, Inc. has announced the release of File Merges, the second module of the Model Program Series.

Utilizing the Warnier-Orr program design technique, this self-study audio cassette course traces the development of a generalized design for file merges.

The course, with illustrated workbook, is priced at $59. Discounts are available for quantity orders, Educassettes said from Suite 102, 6777 Wadsworth Blvd., Arvada, Colo. 80003.



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Pascal Updated For DG Gear

NEW YORK – Rational Data Systems, Inc. (RDS) has announced its Release 2.10 of Pascal for Data General Corp. computers. This latest revision of RDS Pascal features facilities for assembler interface and the separate compilation of procedures and functions, RDS said.

RDS Pascal is the only Pascal available for all DG disk-based systems, a spokesman claimed. The one-time license fees are $2,500 for the RDOS version and $3,500 for AOS.

The details of the assembler interface to RDS Pascal are explained in the third issue of "RDS Pascal Newsletter." RDS is located at 245 W. 55 St., New York, N.Y. 10019.

Bookkeeper Fits TI Machines

RALEIGH, N.C. – Business Application Systems, Inc. has announced an upgrade to its BAS Bookkeeping System, a five-module software package for first-time users.

Designed to automate payroll, inventory, general ledger, accounts receivable and accounts payable, the BAS Bookkeeping System is available on Texas Instruments, Inc., floppy disk terminals 771 and 990/1, 990/4, 990/6, 990/8, 990/10 and 990/12, running under the DX10 operating system.

Both hardware and software are available from the firm. Hardware prices range from $27,000 to $100,000. The software package costs $4,000 from 7334 Chapel Hill Road, Raleigh, N.C. 27607.

Package Integrates Medical Data

KING OF PRUSSIA, Pa. – Shared Medical Systems Corp. has added a management reporting package to its general ledger package.

The package integrates complete financial information with statistical information in one data base. Patient billing, payroll, census and inventory data is automatically fed into the general ledger, the firm said.

The shared batch system, with the general ledger and management reporting packages, costs $225 a month plus an additional 10 cents per patient-day. Current users can add the management reporting system for an additional 4 cents per patient-day, the firm said from 650 Park Ave., King of Prussia, Pa. 19406.

Dictionary Uses Listed

LEXINGTON, Mass. – A 125-page book about data dictionary applications is available from MSP, Inc.

The Data Dictionary in Systems Development consists of a general overview of the topic and seven presentations on associated subjects given at Datamanager user group meetings.

While the only data dictionary specifically identified is the Datamanager, the book is said to contain information on concepts and implementation approaches that could apply to any data dictionary system.

The book costs $15 from 21 Worthen Road, Lexington, Mass. 02173.

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Inco's DBA tells why ADABAS, Software AG's data base management system, was chosen for the expanding needs of this international firm.

"Five years ago, we chose ADABAS from Software AG as our data base management system. We demanded a highly flexible, end-user oriented DBMS that would facilitate the development and operation of our business systems. We did not have the time to design our own DBMS, or the luxury of selecting a system that would require a large staff to implement and support. We needed an easy-to-use package with the design phase already accomplished. The available studies indicated to us that ADABAS would be the best choice for our needs. Five years of experience showed us that the studies were right – and so were we in choosing ADABAS."

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we demand adaptability and ease-of-use in our DBMS delivers!

Michael Berman, Corporate Data Base Administrator

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ADABAS: Datapro Honor Roll winner for three years

At Inco, ADABAS has cut both program development time and cost. In fact, the exceptional ease-of-use of ADABAS, combined with its outstanding throughput efficiency and adaptability, helped give this product such a high user rating that ADABAS has been nominated to the Datapro Honor Roll for three consecutive years.

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"ADABAS is up and running at Inco 18 to 20 hours every working day. The system is used daily by literally hundreds of end users and programmers alike. Each day, our New York installation processes more than 400,000 data base commands from departments like accounting, personnel, marketing, customer information, shipping and billing. With all this intense activity, ADABAS is supported by only three people: a data base administrator, a data base analyst, and a data dictionary analyst."

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Cobol Precompiler Designed To End Redundant Coding

RED WING, Minn. — A Cobol compiler designed to eliminate redundant program coding has been introduced by Twin Oaks.

SPRCBL, the precompiler, uses propagation, abbreviation, generation, substitution and alignment to reduce the time it takes to produce an average program by one-half, the vendor claimed.

For instance, data name propagation eliminates the need to rewrite the data name in the object of a move or data transfer statement, and paragraph name propagation reproduces the body of the name throughout multiparagraph routines, a spokesman said.

Input to and output from SPRCBL can be card, tape or disk. It has been installed on Burroughs Corp., IBM, Data General Corp. and Hewlett-Packard Co. computers.

The product is available for a 30-day trial and can be leased for $50/mo or $1,250 perpetually, the vendor said from 269 Cannonview Drive, Red Wing, Minn. 55066.

'Screen Builder' Runs On DEC VT-100 Terminal

DENVER — A data entry and forms management aid for application programmers has been announced by Tallant Associates, Inc. Written in Basic Plus-2 and Macro-11 and running under the RSX-11M operating system with RMS-11K on Digital Equipment Corp. PDP-11 minicomputers, Screen Builder runs interactively on DEC's VT-100 terminal.

Screen Builder was designed to increase programmer productivity by decreasing the significant amount of time required in the repetitive coding of screens and forms, according to the vendor.

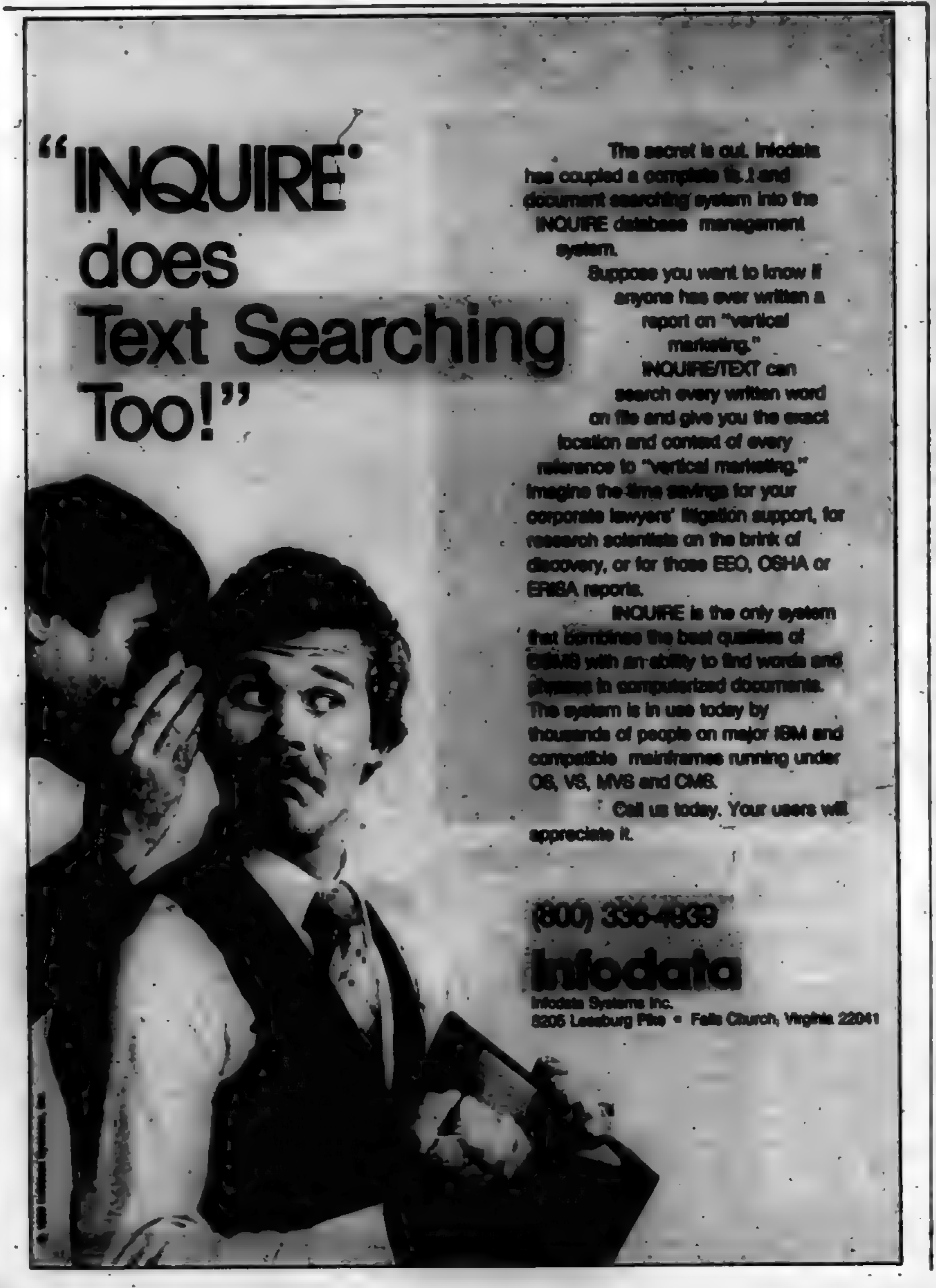
It reportedly is effective in formatting question and answer, menu, inquiry, output or fill-in-the-blank type forms. The price of $3,200 includes the Screen Builder modules and a disk resident Screen Builder Library.

The firm is located at Suite 308 S., 3010 W. Sixteenth Ave., Denver, Colo. 80204.

On-Line Package for System/34, System/38 Aids Manufacturers

SANTA ROSA, Calif. — Data 3 Systems, Inc. is offering MRPS 34/38, an on-line manufacturing resource planning package for IBM's System/34 and System/38 processors.

The packages will be available the third quarter of 1980 and will cost $70,000. Data 3 Systems, Inc. can be reached through P.O. Box 441, Santa Rosa, Calif. 95402.



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Basic Four Minis Get 'Omnidata'

STERLING, Va. — Berman Associates has announced an interactive data management package for Basic Four Computer Corp. minicomputers.

Omnidata handles list-oriented data such as mailing lists, personnel files and inventories.

The package costs $1,995 from Berman at 101 E. Holly Ave., Sterling, Va. 22170.

GE Updates PC/70 for Geisco

PHILADELPHIA — The latest version of PC/70 for Geisco, General Electric's time-sharing service, is available from Atlantic Software, Inc. PC/70 is a project resource management information system.

Critical path methodology, a processing and interactive reporting feature for tabular and bar-chart graphic reports, has been added to the package.

Report Retrieval Enhanced

On-line Report Retrieval has been enhanced to permit page alignment with CRTs and teleprinters ranging from 80 columns by 24 lines to 132 columns by 66 lines and every combination in between, a spokesman said.

The price of PC/70 is based on resources used. Atlantic reports its average customer spends $1,800/mo. New users must also attend a two-day training course in Philadelphia for a charge of $300 per attendee.

If desired, the course will be taught in-house for $2,000 plus travel and expenses, the vendor said from Lafayette Building, 5 and Chestnut Sts., Philadelphia, Pa. 19106.

Newsletter Publishes Listing of Software

BETHESDA, Md. — A listing of software publishers and the types of programs they buy is being started by the *Computer Consultant* newsletter/directory.

Free-lance programmers who want to sell software they have written or who are trying to gauge the market for particular software will now have a reference guide on who's buying what, the publisher said.

More information is available from Battery Lane Publications, P.O. Box 30214, Bethesda, Md. 20014.

COM Tool Frees CPUs From Converting Output

ANAHEIM, Calif. — A computer output microfilm (COM) software package that is said to free the CPU from having to convert data intended for line printer output has been introduced by California Computer Products, Inc.

The Microfiche Management Software (MMS) is an assembly language program designed for the Model 930 off-line controller driving a Calcomp Model 1681 high-resolution COM printer/plotter. The program can be modified by Calcomp to be compatible with most host computer systems, a spokesman claimed.

MMS is provided on floppy disk and accepts CPU-generated information on any standard 9-track 800- or 1,600 bit/in. tape in either NRZI or phase-encoded format. Output can be 105mm microfiche or 16mm film.

Subroutine features of the software include the ability to produce index pages, eye-readable titling and fiche and column breaks. All of the subroutines are geared to respond to operator-selected parameters.

Finally, the software provides continuous flashing of the CRT image and the hardware form, letting the operator align data with the form while viewing both displays.

The MMS package costs $3,600 on a one-time lease and can be obtained from Calcomp at 2411 W. LaPalma Ave., Anaheim, Calif. 92801.

Broadcasting Package Designed for IBM 5120

OPELIKA, Ala. — Datacount, Inc. has introduced a software package for IBM 5120 small business computers that is geared to handle the business and traffic scheduling chores in radio broadcast applications.

The Datacount Accounts Receivable and Traffic Scheduling (Darts) software operates on a 5120 with 32K bytes of memory and includes traffic scheduling with program log generation.

The cost of the system is $7,500 which includes on-site installation and training, documentation and a subscription to future system enhancements, a Datacount spokeswoman said from the firm at 2207 Anderson road, Opelika, Ala. 36801.

Researcher Aided

SHAWNEE MISSION, Kan. — The Customer Satisfaction Research Institute (CSRI) has added a statistical processing service to its line of DP services.

Called Accutab, the no-charge in-house addition offers CSRI clients quick turnaround of questionnaire and survey analysis data.

The vendor is at Suite 107, 4901 College Blvd., Leawood Manor/Shawnee Mission, Kan. 66211.

Enhanced Ansi '74 Version

RJ-11 Cobol Runs on PDP-11s

SUDBURY, Mass. — RJ-11 Cobol, an enhanced Ansi '74 standard version for Digital Equipment Corp.'s RT-11 operating system, is available from EEC Systems.

Consisting of a compiler, run-time system and supporting programs, it runs on DEC PDP-11 computers.

The product was designed for small business applications and combines the advantages of Cobol with relatively inexpensive hardware, such as floppy disks, the vendor said.

The language implementation includes: INSPECT, STRING and UNSTRING verbs; SORT verb; condition names; COMPUTE verb; complex conditions; expressions; program chain and overlay functions; 16 decimal places of arithmetic accuracy; COPY verb; and character, packed-decimal and binary representation of data.

RJ-11 Cobol also features several facilities not available in the Ansi standard such as provisions of two types of indexed-sequential files suitable for different applications and two different techniques for processing files with variable length records, suitable for different file devices, the vendor claimed.

Also available is an interactive, dynamic debugging facility for tracing the operation of programs and automatic line counters to simplify report generation.

In addition, utility programs are provided to print the contents of files or program results; sort files; create files; update files; print file details and extend files.

The product is priced at $2,500, the vendor said from 315 Goodman's Hill Road, Sudbury, Mass. 01776.

Restaurant Software Geared To Point-of-Sale Systems

LOS ANGELES — A software program for the food service industry and tailored to point-of-sale management control systems with nonprinting remote terminals has been developed by AM International's Documentor Division.

Users can record and process up to 250 open accounts, record sales made with six types of charge cards and utilize various tax tables stored in memory, the firm said.

Restaurant managers can maintain timekeeping records for up to 100 employees in six payroll categories and monitor revenue and productivity of up to 40 waiters and waitresses. The software provides more than 30 reports covering operations, complete revenue and inventory control, costs of goods, waiter productivity and timekeeping.

Designed for systems using the AM Documentor 3276 remote nonprinting terminal, the software evolved from the 3225M program currently available for restaurants.

The cost for one nonprinting remote terminal is $5,300 and the price ranges up to $20,000 depending on the number of terminals and options purchased, the vendor said from 1900 Ave. of the Stars, Los Angeles, Calif. 90067.

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Defines 25 Development Roles

'Stradis' Eases Structured Methods

NEW YORK — Improved System Technologies, Inc. is offering a structured methods approach to system development.

The Stradis development package integrates data flow analysis, structured design, structured programming, structured walk-throughs and top-down development, the vendor said.

Stradis defines 25 roles that must be played during system development, installation and maintenance.

The suggested roles are accompanied by briefings and implementation techniques such as data flow diagrams, the vendor said.

The development aid is also said to improve user involvement in system development and cut down the amount of paperwork usually generated while a system is being built, according to the vendor.

Stradis costs $25,000, but special prices are available for smaller firms.

Improved Systems Technologies is at 888 Seventh Ave., New York, N.Y. 10106.

Program Helps Implement Structured Techniques

BOSTON — A program for implementing structured techniques for systems development is available from The Structured Technologies Group.

The program is designed to attack the problems of building systems: low productivity, cost of maintenance, poor communication and inadequate project control.

It focuses on requirements definition, and functional and architectural design.

The approach utilizes structured tools, such as a graphics modeling technique for functional decomposition, a real-time review and validation cycle and dynamic documentation.

The price is based on the size of the analysis staff to be trained, consulting time required and the complexity of the particular project, Structured Technology said from 89 Franklin St., Boston, Mass. 02110.

Brochure Details Method To Structure Fortran Units

CORPUS CHRISTI, Texas — Comp-Aid Co. has announced the availability of an 84-page brochure that reportedly demonstrates a new methodology for structuring standard Fortran modules.

Termed Functional Blocks, the methodology is said to permit the user of standard Fortran to achieve modules that are as understandable and maintainable as that claimed by the users of the so-called structured Fortrans.

The brochure, entitled "Structuring Fortran Modules by Functional Blocks: An Overview (and a Comp-Aid Service)," first presents a brief management overview.

The brochure costs $15 for the first copy, with written permission available to make as many in-house copies as desired. Comp-Aid is located at 3330 Orlando St., Corpus Christi, Texas 78411.

Oil and Gas Package Fits AM-Jacquard Hardware

OKLAHOMA CITY, Okla. — An oil and gas financial and accounting package for the AM-Jacquard line of hardware is available from Professional Programming Systems, Inc.

Features of the package include general ledger, joint interest billing, revenue disbursements, windfall profits tax, accounts receivable, accounts payable, payroll, lease records, land management and delay rentals.

The package is fully integrated with AM-Jacquard's Type-Rite word processing software and allows increased personalized communications with investors and vendors by utilizing the firm's shared logic hardware, the vendor claimed.

There are two versions. The AM J500 for smaller companies costs $12,000 and AM J100 with multiple workstations, printers and network requirements costs $23,000, the vendor said from 1900 N. MacArthur Blvd., Oklahoma City, Okla. 73127.

System Processes Auto Policies

PHILADELPHIA — An on-line automobile insurance policy processing system is available from General Data Systems, Ltd. FAM-V Commercial is suited for either distributive processing in field offices or as a completely integrated system, the vendor said.

Running under IBM communications software, FAM-V Commercial automates such facets of the commercial automobile policy writing business as classification and rating, policy insurance, renewals and endorsements, billing and premium accounting and balancing and control reports.

The base price for the system is $150,000, subject to change with user configurations, the vendor said from 1520 Locust St., Philadelphia, Pa. 19102.

CCP ANNUAL EXAMINATION

SATURDAY, DECEMBER 13, 1980

The annual examination for the Certificate in Computer Programming (CCP) will be held on December 13, 1980, at selected test centers throughout the world.

Specific requirements for this year's examination are detailed in the "Certificate in Computer Programming Examination Announcement and Study Guide." The study guide and application form for the 1980 examination are available on request from ICCP.

Deadline for Filing Application • October 15, 1980

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- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
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Links 200 Terminals

Switched Net Cuts Footwork on Campus

TEMPE, Ariz. — When Arizona State University (ASU) discovered many of its 38,000 students were running from one end of its campus to another to use several computer systems, school officials decided something had to be done.

The obvious solution was a network, but there was a hitch. The University's mainframe population consists of one IBM 370/-158, one IBM 3031, three Digital Equipment Corp. PDP-11/70s, a large Univac 1100/42, another PDP-11 network for independent teleprocessing, plus a few smaller PDP-11s dedicated to word-processing applications — and some 200 terminals.

"The problem was in giving students at Site A access to a computer at Site B. It was extremely difficult to assign people to machines and not force them to make long treks across campus or across town to access the other computer systems," according to Darel Eschbach, the school's director of computing. "With a mixed configuration, however modern, you essentially face the same problem you have with batch systems — getting to the computer.

Two Alternatives

"We knew we could go one of two ways: Either put in an awful lot of terminals and enough copper to string every terminal to every processor or go to a sophisticated switched network. We were also faced with requests to install dozens of additional terminals so that peak loads at the remote sites could be handled.

"The costs of terminals and, more importantly, the cost of space were major concerns," he recalled.

"The added requirement to convert the Univac applications to operate on the Model 158 mainframe — in preparation for switching both the Univac and IBM work loads to an Amdahl Corp. processor — forced our hand," he said.

"Installing a switched network was one of the best decisions we ever made," Lynn Bellamy, Arizona State's assistant vice-president for computer services, said. "The new facility promises students, faculty and administrative users access to all computer resources from any terminal location.

"In addition, it seems to be cutting energy and labor expenditures, reducing communications costs, and greatly increasing message efficiency due to its new message broadcasting capabilities," he noted.

The unnamed network, which is based on an M3200 integrated networking system from Tran Telecommunications Corp., has already been expanded to link over 200 terminals and computer ports to each other, and this number will more than double in the next few months.

Initially installed with a Tran M3201 network processor and six M3211 network access concentrators, the network is taking on a dual-node form with another M3201 processor and four more concentrators.

According to Bellamy, another key consideration in choosing an integrated network was that of pulling essentially all of the security checking out of the hosts, saving that wasted overhead in those machines.

"Our experiment determined that the network did all of those things that we wanted it to, including providing increased security," Eschbach said, "and it proved a real boon to the conversion process. Users can begin with an all Univac application mix and convert programs to IBM compatibility one at a time. Their existing DEC LA36 terminals access either machine easily through the Tran network processor.

"Similarly, they can put jobs on the DEC computers in the same manner, since the network has purposely been kept transparent to the applications."

That transparency will always be a valuable asset, Eschbach maintained, but ASU may not always limit its network to data transport services. "The opportunity, with all that intelligence available in the network, is always there for doing other things with it.

NCR Net Transfers Financial Data

DAYTON, Ohio — NCR Corp. has unveiled a system designed to help banks reduce the number of paper checks written and cut down on courier services required to transport magnetic tapes containing financial data among businesses, banks and the Federal Reserve System operated automatic clearing house (ACH) communications network.

The Federal Reserve System currently operates ACH networks in every state except New York. The purpose of the network is to electronically transfer financial information.

Payments being sent through the ACH network include Social Security deposits, government payments, insurance premium payments and direct payroll deposits.

While there is direct data transfer among the various ACH facilities, courier services are required to transfer tapes from corporations to their banks and the ACH facilities.

Detects Data Errors

Besides eliminating the need for courier services, the NCR system, called 74530 ACH, aids in the detection and correction of errors in the data, the vendor claimed.

Using the system, information can be automatically sent from the organization originating the transaction to the bank. The 7530 can then transmit the data directly to the Federal Reserve's ACH.

While acting in a processing and communications mode, it is able to receive or transmit data without the need for an operator and can be automatically dialed-up by another system. It can communicate with NCR computers or other systems adhering to several different protocols.

A typical system including processor, keyboard, visual display screen, cassette tape unit, magnetic tape drive and communications adapter costs approximately $16,000, the vendor said from Dayton, Ohio 45479.

Racal-Milgo Introduces Statistical Multiplexer Line

The Omnimux Series

MIAMI — Racal-Milgo, Inc. is now offering a series of statistical multiplexers designed to provide advanced management and performance features for data communications networks.

The Omnimux series consists of three basic models: Omnimux 80, which offers eight channels; Omnimux 160, with 16 channels and Omnimux 320, a 32-channel unit.

Each is capable of multiplexing a mixture of asynchronous and synchronous data with full protocol transparency, with all channels operating up to 9,600 bit/sec, and with the aggregate link running up to 19.2 bit/sec, the vendor claimed.

Advanced management features include a variety of diagnostics, statistical reporting, remote control and ease of operation. For statistical reporting, data on both individual channels and aggregate links are continuously accumulated and available form local or remote units via the front-panel display.

The price of one eight-channel Omnimux is $3,850, the vendor said from 8600 N.W. 41st St., Miami, Fla. 33166.

Data Bits

RCA Globcom Asks To Extend Telex in U.S.

NEW YORK — RCA Global Communications, Inc. (RCA Globcom) has filed with the Federal Communications Commission (FCC) to extend its direct international telex, telegram and leased channel services to six more U.S. locations, increasing to 32 the number of metropolitan areas to which the company provides direct overseas operation.

The six new metropolitan areas are Anaheim and San Diego in California; Charlotte, N.C.; Indianapolis; Phoenix; and New Brunswick, N.J.

IDC Issues X.25 Study

WALTHAM, Mass. — "X.25: The Unknown," a study that reportedly discusses the latest developments in telecommunications standards in layman's terms for the nontechnical executive, has been released by International Data Corp. (IDC).

Researched and written by Ron Frank, a telecommunications consultant and journalist, and John Gantz, IDC's director of publications and editor of its Distributed Processing Reporting Service, the study explains the evolution of the X.25 standard, discusses differences within the standards world and offers "Who's Who in the Standards World."

The report is part of IDC's Distributed Processing Reporting Service, but is available to nonsubscribers for $125. More information is available from George Pardi at IDC, 214 Third Ave., Waltham, Mass. 02254.

Terminal Has Touch Pads

NEWTONVILLE, Mass. — A touch-sensitive CRT terminal designed for public access is available from Interaction Systems, Inc. The terminal reportedly simplifies interactive dialogue and eliminates the need for a keyboard.

The screen of the microprocessor-based unit is divided into multiple transparent capacitive touch pads. All switches, adjustments and cable connections are inaccessible to prevent tampering, the vendor claimed.

Equipped with a program-selectable two-page display memory, the Z80-based terminal incorporates a high-resolution 15-in. CRT screen and a 10 by 14 dot matrix. Full upper- and lowercase Ascii character set is standard, and customer specified-fonts up to 240 characters are available.

The price for the terminal is $2,800, the vendor said from 24 Munroe St., Newtonville, Mass. 02160.

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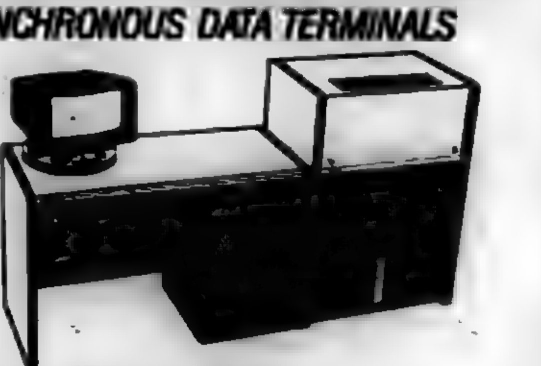

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Ascii POS Terminals Give Interactive Capability

RALEIGH, N.C. — Perry Data Systems, Inc. has unveiled an Ascii asynchronous point-of-sale (POS) terminal that reportedly provides interactive communications POS capability with computer-controlled receipt printing and program control of up to four cash drawers.

The 16-line by 80-char. display gives access to inventory, pricing and sales data communicating with the Data General Corp. 6052 control character set. The attached keyboard and 10-key pad feature yes/no keys for menu-driven software to speed customer handling, the vendor claimed.

There are three basic models of the product, designated the PDS9700 series:

- PDS9700-1 CRT terminal for data entry, inquiry and telephone sales operation.
- PDS9700-2 CRT cash terminal with cash drawer for nonreceipt cash collection stations.
- PDS9700-3 CRT terminal with cash drawer and 20-column alphanumeric printer for complete POS transaction handling.

The price for the PDS9700-1 is $1,765; for the PDS9700-2, $2,383. The PDS9700-3 costs $3,235, the vendor said from 3401 Spring Forest Road, Raleigh, N.C. 27658.

DG Adds Three Products For Micronova

WESTBORO, Mass. — Data General Corp. has introduced three communications products geared to enhance the flexibility and hardware support of its Micronova MP/100, MP/200 and Micronova board computer (MBC).

The first product, an asynchronous/synchronous line multiplexer (ASLM), has four serial communication lines with modem control. Each of the four lines supports either character-controlled synchronous protocols (including IBM bisynchronous) or asynchronous communications. The device can operate at 19,200 bit/sec in either mode, a spokesman claimed.

The second introduction is a four-line asynchronous interface that is designed for use in network applications or as a terminal concentrator.

All line characteristics of each of the four asynchronous interfaces are said to be fully programmable with a maximum operation speed of 19,200 bit/sec. Line interfaces meet EIA RS-232C specifications, the spokesman added.

Finally, DG unwrapped a communications software package which supports up to eight synchronous communications lines. The MP/OS synchronous communications package (MSCP) supports ASLM on the Micronova.

The ASLM costs $750 while the asynchronous interface is priced at $600. The MSCP software sells for $500 with an initial license and $100 for a run-time license, the spokesman said from the company at Rt. 9, Westboro, Mass. 01581.

ATMs Extended

DALLAS — Docutel Corp. and American Express Co. have jointly announced an automated teller machine (ATM) capability that will enable financial institutions to issue American Express Travelers Cheques, as well as cash, on a 24-hour, seven-day-a-week basis.

The feature uses Docutel's Total Teller 2300 ATM and costs $150 from the vendor at P.O. Box 222306, Dallas, Texas 75222.

Micro600 Gets Option

CHATSWORTH, Calif. — Micom Systems, Inc. has announced a Monitor Port Option for the Micro600 port selector, its intelligent terminal-controlled matrix switch.

The option extends the capabilities of the Micro600 by allowing it to be used to monitor data activity while a connection is in progress, using commercially available data monitors such as Spectron Corp.'s Datascope. The option adds "patch and monitor" capability to the Micro600 port selector.

The Micro600 is available in a tabletop enclosure for single minicomputer installations and in a floor-standing cabinet for larger installations supporting several hundred computer port and terminal connections. The tabletop version ranges in price from $6,000 to $10,000; prices for the floor-standing model start at $10,000, Micom said from 9651 Irondale Ave., Chatsworth, Calif. 91311.

HEX-29

The HEX-29 from DIGITAL MICROSYSTEMS is a low cost, high power data processor. Priced like a microcomputer, the HEX-29 is a multitasking, multiuser, time share computer.

The powerful bipolar bit-slice processor includes 16 or 32 bit integer and 64 bit floating point operations, multibyte/character string processing, translation table instructions and more. HEX-29 will accommodate bit, nibble, byte, word, double word, quad word and variable field operations.

The micro-programmed HEX-29 is a complete system with an expandable complement of powerful software tools.

The HEX-29 is a feature-packed minicomputer suited for business or scientific applications.

CONTACT: [illegible], DIGITAL MICROSYSTEMS, 4448 [illegible] Avenue, Oakland, CA 94611
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DCP 2050 Models Links

CHERRY HILL, N.J. – Datatel, Inc. has introduced the DCP 2050, a data link simulator that models terrestrial or satellite communications links and inserts delays and introduces errors so users can determine what effects various characteristics will have on their protocols.

Delay and error settings are also independently switch-selectable. The DCP 2050 will inject errors of various lengths.

The unit will test half- and full-duplex protocols and costs $2,700 for RS-232 interfaces.

An optional CCITT V.35 interface is available for $500, the vendor said from 2005 Greentree Road, Cherry Hill, N.J. 08003.

Modem Geared To Private Lines

SUNNYVALE, Calif. – A multispeed modem for use on private-line, short-haul data communications circuits is available from Prentice Corp.

The SLD-MKII modem is four-wire, full-duplex, or two- or four-wire half-duplex in point-to-point or multipoint/polled modes.

Available with switch-selectable data rates from 2,400 bit/sec to 28,800 bit/sec, the modem is said to be a low-cost, direct replacement for Western Electric Co. 201, 208, 209 and 301 modems.

Designed for distances up to 20 miles, the unit costs from $600 to $670 for the 9,600 bit/sec model to $880 to $950 for the 28,000 bit/sec modem. Prentice is at 266 Caspian Drive, Sunnyvale, Calif. 94086.

Modem Serves Short-Range Links

WHEELING, Ill. – Gandalf Data, Inc. is offering a synchronous modem for short-range point-to-point communications links.

The LDS 329 will transmit data up to eight miles over dedicated four-wire unloaded lines at switch-selectable speeds of 2,400-, 4,800- or 9,600 bit/sec. Other features include constant carrier operation, an internal crystal clock and phase lock loop for added stability, the vendor said.

The LDS 329 costs $450 from the vendor at 1019 S. Noel Ave., Wheeling, Ill. 60090.

Taper Group Sets Fall Schedule Of Systems, Network Seminars

ATLANTA – The Taper Group, Inc. will conduct a series of seminars on DP and data communications September through December.

A three-day course entitled "Datacomm II" will be held Sept. 17-19 in Atlanta; Oct. 22-24 in St. Louis; Nov. 19-21 in Charleston, S.C.; and Dec. 10-12 in Pensacola, Fla., at a price of $350 per student.

"Understanding Data Communications Network Components," which identifies and describes more than 25 network components, will be held Oct. 27-28 in Atlanta for $375 per attendee.

"Understanding the Equipment Acquisition Process" will be held in Atlanta Oct. 29-30 for $375 per student.

The Taper Group is located at 2433 Hawthorne Drive N.E., Atlanta, Ga. 30345.

Fallback Switch For RS-232 Lines

NORWALK, Conn. – A fallback switch that permits push-button switching of RS-232 data lines between communications and/or terminal equipment has been introduced by Datacomm Management Sciences, Inc.

The FS-25 unit switches all 25 signal leads of the RS-232 interface.

A passive device, the switch requires no operating power and is transparent to all data rates through 19.2K bit/sec. The FS-25 costs $100 from the firm at 181 Main St., Norwalk, Conn. 06851.

Aydin Offers Error Tester

FORT WASHINGTON, Pa. – Aydin Monitor Systems is offering a bit error rate tester that can generate and compare digital data at rates from 100 bit/sec to 5M bit/sec.

Directed at users of low-speed wire communications or high-speed satellite communications, the Model 852B features signal generation, signal perturbation, signal comparison and data quality readout.

The cost of the Model 852B begins at $8,500, Aydin said from 502 Office Center Drive, Fort Washington, Pa. 19034.

3Com Book Lists Local Net Vendors

MENLO PARK, Calif. – A book that lists more than 40 vendors of network components and systems, including transceivers, modems and communications software, has been published by 3Com Corp.

The *Local Computer Network Vendor List* is a compilation of manufacturers that supply products that fit within the loosely defined category of local computer networks.

The book is available for $125 from 3Com at 3000 Sand Hill Road, Menlo Park, Calif. 94025.

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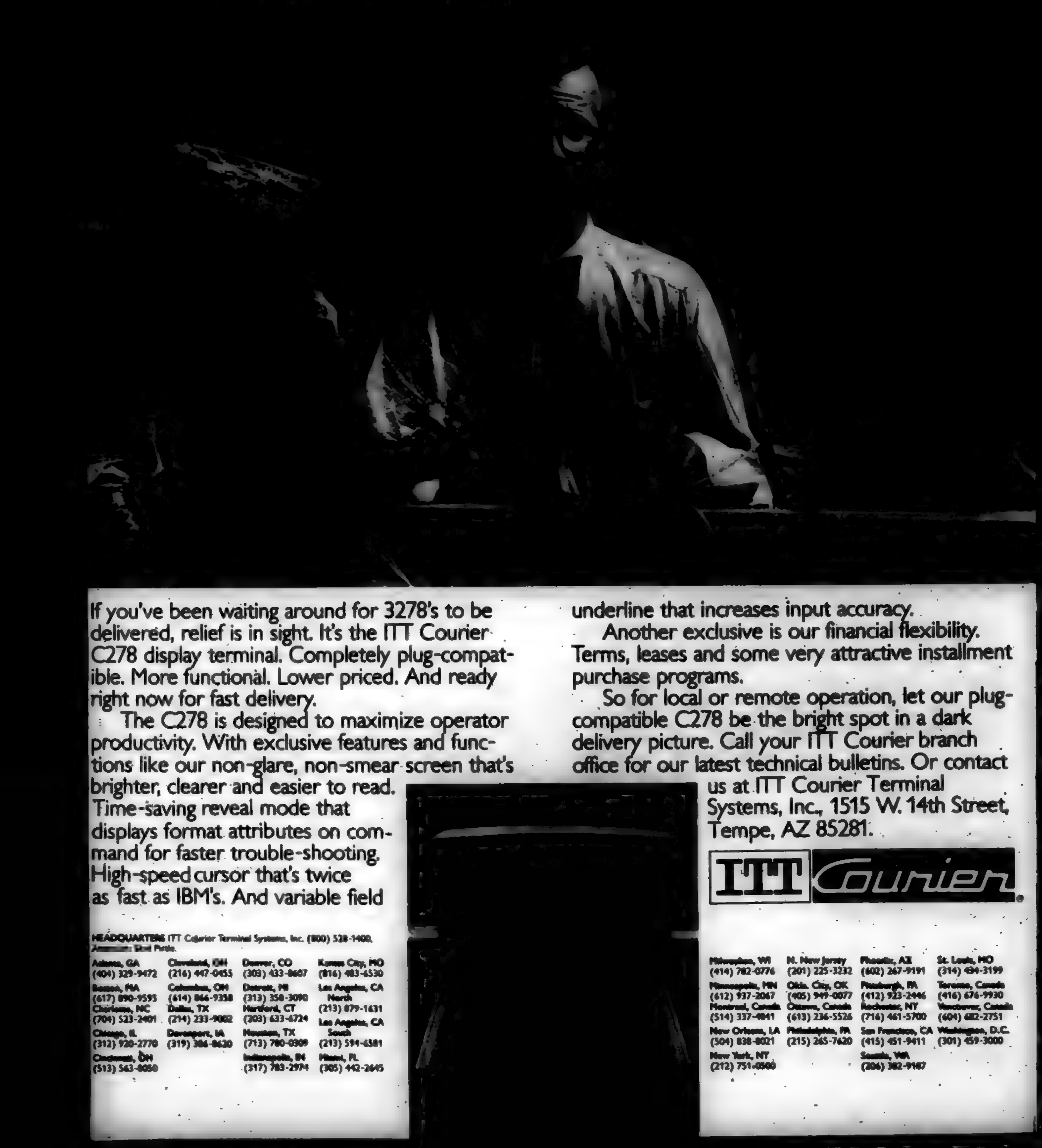

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The Programmer/Analyst Is an Endangered Species

By Lawrence H. Cooke Jr. and Joseph P. Campaniello

Rarely do banking organizations innovate in labor productivity. Most of the time, data processing in banks is viewed as less innovative than, say, in universities or in manufacturing.

However, there are profound changes occurring in the data processing function within banking organizations. The transformation is moving so slowly and naturally that most observers are unaware of the fundamental nature of the shift. The key to this phenomenon is the emergence of the customer services representative (CSR).

One might trace the original CSR to the hardware vendor's systems engineer (SE). These individuals represented the vendor in dealings with the customer on a long-term basis, while the salesman concentrated on pure selling. The SE provided continuity with the client and established a detailed level of communication over long periods of time.

Evolving somewhat later were customer service personnel at time-sharing companies. These individuals also served to augment the sales staff but the emphasis shifted to addressing the user's software needs, rather than explaining how to utilize hardware.

The banking model for the CSR moves entirely away from the sales role. As we shall see, the function of user liaison is autonomous. This has positioned the CSR to be a coincidental predator to the species called the systems analyst.

Stated bluntly, the systems analyst *job* is obsolete and is going the way of the dinosaur. The systems analysis *function* is shifting to the user. The CSR is the liaison between the technical programmer and the user. These representatives have unique "survival of the fittest" qualities.

To be convinced of the impending extinction of the nontechnical systems analyst, one need only turn to the Help Wanted section of any newspaper or trade publication and seek the following ad (here satirized only slightly):

Wanted: "Nontechnical systems analyst; programming experience must be nonexistent or at least 10 years old. Duties consist of misinterpreting users' requirements, introducing delay and policing user areas to make sure programmers do not contact users directly. Salary commensurate with desuetude."

An ad like that, if it exists, is buried among thousands of ads seeking programmer analysts. DP shops may even encourage any nontechnical systems analysts they have on board, but nobody is looking very hard for them in the marketplace. The systems analyst pool is drying up slowly, and those in that pool will survive only by adapting to the technical ranks or by becoming users.

To notice evolution, a long view must be taken. In the '50s, programmers were mathematicians who coded in "actual." Cobol was invented in 1959 to eliminate programmers, so that any Jack or Jane in the user area could write programs. Well, that did not happen, except perhaps in accounting. In the '60s, programming became more complex. To deal with that world, applications and systems programmers were differentiated. Programmers raided the user areas and installed technically elegant systems that didn't serve users' needs very well.

In the '70s, DP "came of age." Systems analysts blossomed and systems improved. But in the '70s, computers had improved a millionfold over the prototypical models, and 10,000-fold over the '60s alone. Most systems analysts simply could not keep up. Instead of facilitating DP growth, they began to impede it. As a group, they failed both as users and as programmers. The natural selection process must lead them to follow the "actual" coding mathematician and the user-Cobol writer into the DP museum as interesting but defunct species.

Moving Into Void

Imperceptibly, the customer services representative is moving into the productivity void left by the retreating systems analyst. Through increased generalization of the CSR, rather than through the narrowing specialization of the systems analyst, we believe (in DP as in the physical environment) that generalization offers better adaptability for survival. This CSR hybrid will grow and flourish in the '80s.

Before we turn to the CSR, let us examine the growing evidence of the end of systems analysis as a career field.

First, there is the marketplace's lack of interest, noted above. Then, there is the unreasonable explanation of superhuman qualities for systems analysts of which we will name only a few: "organizational skills, conflict resolution, planning and control, design skills, leadership ability, comfort with all organization levels, sensitivity to politics, sympathy with company goals and empathy for technology." A recent study at MIT's Sloan School of Management noted "alarming results" for expectations of chief executives about systems analysts. The study stopped short, however, of the conclusion of obsolescence.

In our opinion, no job category can perform all those functions. There are some isolated individuals who have those skills but these are as rare as "Renaissance men." We are not proposing that an organization fortunate enough to have Leonardo da Vinci on its staff should discharge him; rather, we advocate a realistic appraisal that the systems analyst's job is in fact three jobs — DPer, user and liaison (CSR).

Case of Adaptation

The appearance of the CSR function in user departments coincided with the systems analysis shift to the user. In order to prevent DP from running rampant throughout user areas, an emissary was appointed to deal with DP personnel as a way of limiting the intrusion into the daily routine. The em-

(Continued on In Depth/2)

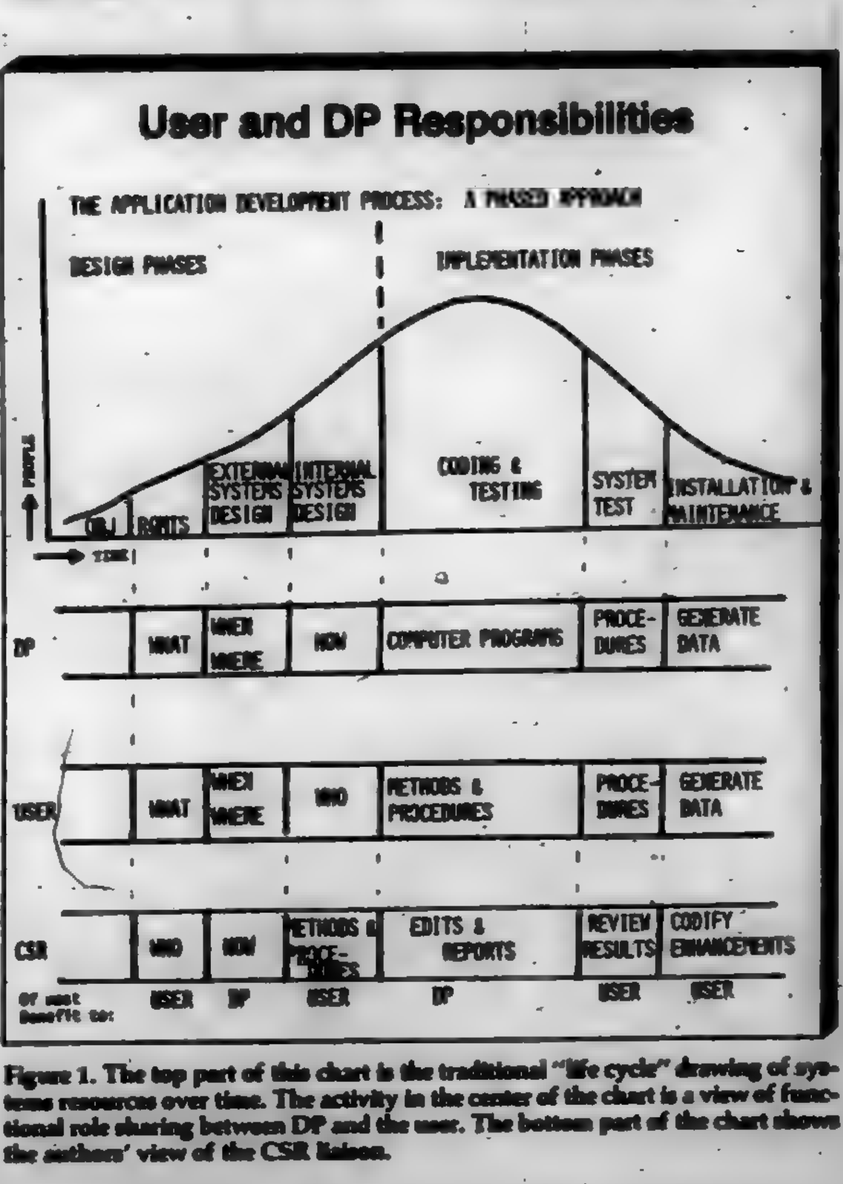

Figure 1. The top part of this chart is the traditional "life cycle" drawing of systems resources over time. The activity in the center of the chart is a view of functional role sharing between DP and the user. The bottom part of the chart shows the authors' view of the CSR liaison.

IN DEPTH

(Continued from In Depth/1)

issary became more intertwined with DP activities over the project's life.

This involvement was soon perceived to aid DP as much as or more than the user. DP recruited these individuals to propagate the techniques in different areas where users did not have intimate, detailed knowledge of a particular routine. This was found not to be too great a drawback; these individuals knew how to ask questions and take notes.

Figure 1 illustrates the process. The top curve is the project life cycle. The middle "activity bonds" show user and DP roles across the project. The bottom portion shows the CSR role and who benefits most at each stage.

Over the last few years, enlightened DP shops have learned to "use the user." Also, users provided themselves with defenses against DP excesses. Feasibility studies are a symbol of the former, and formal user sign-offs characterize the latter. These mechanisms evolved independent of the CSR phenomenon we are outlining; nonetheless, CSRs facilitate the process.

The CSR offers a significant comparative advantage over other groups within organizations in three basic areas. In providing a liaison between DP and the user, CSRs provide communication, continuity and credibility.

Primary Strength

Communications ability is the primary strength of the CSR. The purpose of the function is, first and foremost, to communicate. Rightly or wrongly, DPers are not known for communications prowess. Most of the time, DP activity is viewed from the user side as downright secretive—or worse. CSRs break down some stereotypes through their constant contact with users.

Used effectively, the CSR has a leading role in all DP-user contacts. Commonly, the forum is a meeting. Meetings may take the form of specific project meetings, periodic status meetings or ad hoc meetings to air user concerns. Unlike the systems analyst, who is expected to pontificate for DP on the spot, the CSR usually records questions and issues which are to be reviewed later.

The communications function of the CSR is initiated, not surprisingly, at the beginning of the project. The bottommost "activity bond" of Figure 1 highlights the major focus of activity at each stage of the life cycle. In a properly functioning liaison group, the CSR acts as go-between to get the right people involved. Depending on the strength and seniority of the CSR group, the CSR may be the controlling function (that is, the project manager) or the recording secretary for DP. Below, we will illustrate some organizational options.

External Design

Formation of the project group having been accomplished, CSRs next aid DP in external system design by transmitting specs to DP in English. The maximum potential of the CSR is realized in this stage. By articulating requirements in business English, CSRs avoid the pitfalls often engendered by systems analysts. Rather than confuse the user with Cobol or pseudocode, English allows an exchange of requirements, free from mystique or jargon.

When the organization has a framework of standards, CSRs can filter a

(Continued on In Depth/4)

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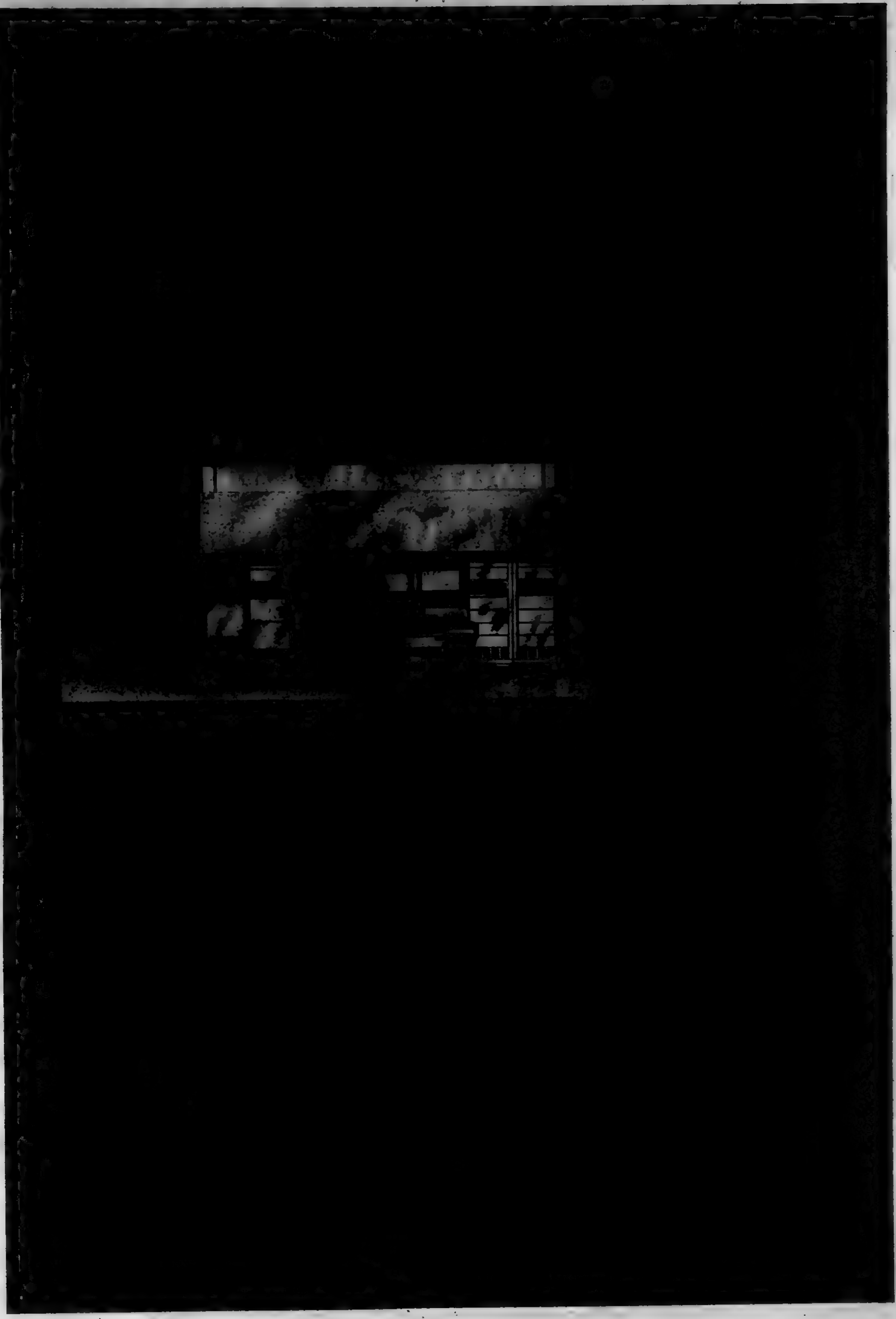

IN DEPTH

(Continued from In Depth/1)

checklist of design actions to DP in a coherent way that is not easily learned by users unfamiliar with DP parameters. Such a checklist could include volume expectations, peak vs. average loads, response time variables that are commercially viable and so forth.

Unlike the systems analyst, the CSR makes no pretense of knowing all the answers to complex technical issues; these come next in internal design and are made by DP. This deferral to the proper stage avoids the systems analyst's tendency to execute the internal design prematurely, thereby falling either into a technical void or missing the user's real problems. English provides an effective feedback mechanism.

Preventing 'Freeze'

In internal design, the CSR devotes time to the user while DP constructs the system. The CSR has exclusive contact with the user during this stage. Without this contact, disaster could occur.

The CSR presence counteracts a classic flaw with the systems analyst's approach; the system may be "frozen" for months and the user's needs may change unnoticed. The CSR presence with the user through the "winter of discontent," while no life seems to emanate from DP, may prevent inflexibility to user changes. This presence permits a penetration to DP for a "thaw" in the frozen specs' should it become necessary to keep up with the user's business plan.

The CSR leaves a path open to identify which methods and procedures are required to place the DP (system) software in the user's (human) environment. Insofar as the CSR represents DP, at least someone is continuously aware of the user's environment. His prior experience with users in other system installations eases the user through the trauma of computerization.

Coding and testing shift the CSR's view back to DP. The CSR gathers test cases and highlights unusual conditions. He helps DP understand edit requirements and provides a first line of defense for the user against meaningless, unusable and incomprehensible reports. (However, we all recognize some incomprehensible reports will get through to the user notwithstanding — we are not describing perfection, but improvement.)

This interaction frees programmers from hunting down users for approvals without the iron wall systems analysts tend to build. Since the CSR's function is that of a facilitator rather than a guru, professional pride is not an issue. CSRs avoid the source of friction between nontechnical systems analysts and programmers in search of the goat: "I specified it right, but you implemented it wrong." If the CSR is not sure what the user wants, exactly, he will ask. After all, that is the job — not to pontificate or interpret the user's needs, but to communicate those needs.

Later On

Later phases have the CSR linger, when the systems analyst would usually flit away to the next project, leaving the poor programmer holding the bag. CSRs help the user interpret system test results. A new or modified system requires users to behave differently. Change is hard to accept where routine normally prevails. Having a presence in the user area during system installations (probably the same individual who was there in the design process) is very comforting to users cutting teeth on new processes.

Help over the initial rough edges may spell the difference, *in user perception*, between a success and a failed DP project. CSRs help smooth the rough edges by providing sympathetic on-the-scene feedback to DP which cannot be duplicated elsewhere. They can be more objective than either user or

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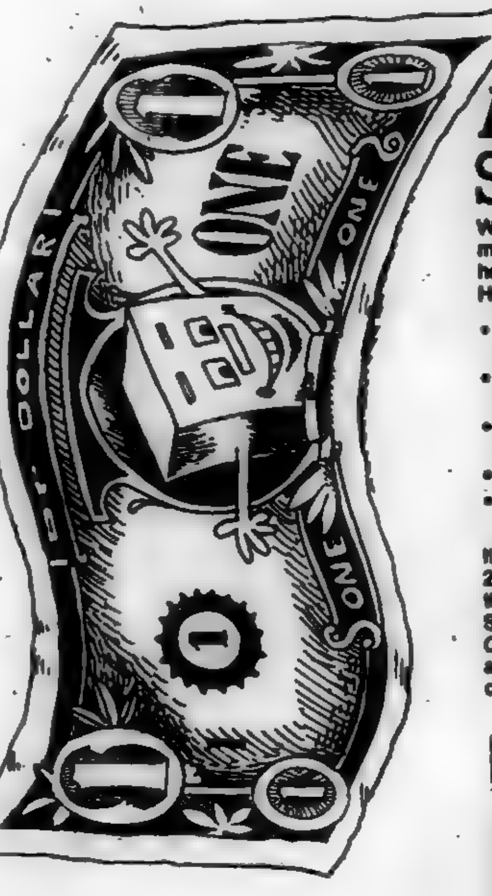

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DP, for they neither invented the system, nor are they shackled with past traditions.

Last, in the installation and maintenance phases, CSRs provide a conduit to DP to explain and possibly rank enhancements. Properly used, they buffer DP from expensive and frivolous requests, yet they allow users to reach DP on sensitive issues.

Communications is the core of the CSR job. CSRs provide no product other than packaging user requirements to DP and unscrambling DP for users. This process may be properly viewed not as overhead but as an efficiency tool.

A paragraph of clear English is worth a box full of Cobol to most users. From the other vantage point, a crisp, ordered checklist to DP is worth a week of aimless rambling about what the old procedures used to be.

Most DP projects that are less than successful are more often the result of "failure to communicate" rather than technical flaws. CSRs help get the messages through both ways.

Concern for Continuity

With turnover as rapid as it is today, many DP shops risk total disenfranchisement from their parent organizations. Rapid turnover exacerbates the loyalty shift in DP (never strong) away from the organization at an increasing rate. Programmers generally care little about user concerns; they are technology-oriented.

Tenure in DP areas is dropping even as the industry is leaving its "infancy." (It has been only 35 years since the Eniac was developed as opposed to nearly 400 years since double-entry accounting.) How many DPers in your organization have the 25-year pin? How many have the *25-month* pin? DPers proclivity to jump ship for the next technological mirage makes the traditional technical organization a poor reservoir for the

(Continued on In Depth/8)

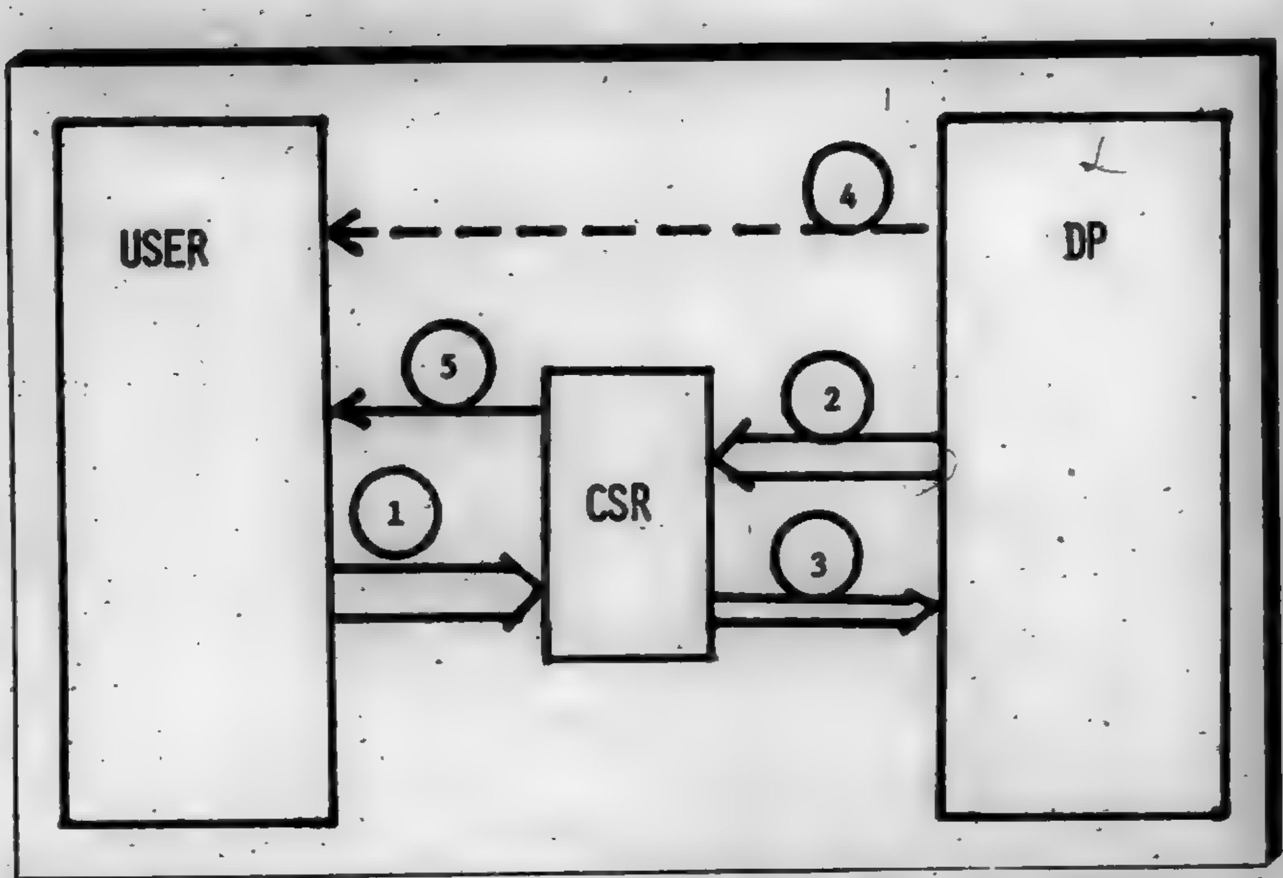
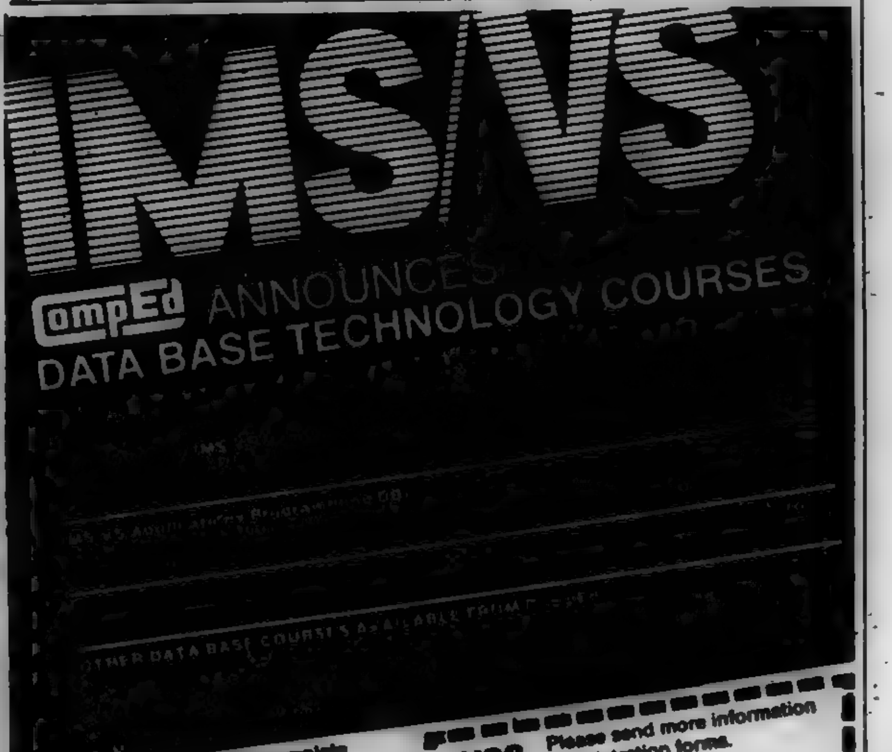


Figure 2. Personnel flows into and from the CSR area. As a general rule, the width of the arrow implies relative magnitudes of the flow.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(Continued from In Depth/5)

company's long-term, strategies.

On the other hand, the CSR organization has far lower turnover, retains company loyalty and identifies with the company rather than with technology. Most CSRs couldn't care a fig if a report is accessed via Vsam or Tcam or what. They certainly would not cross the street to join another company because it was using the latest buzzwords. They care about content of reports, about timeliness and about the good old virtues users know and love.

If a user starts a dialogue with a CSR at the beginnng of a project, there is a very high probability the same CSR will be with the company at the end of the project and available for consultations even years later. Contrast this possibility with the more standard view from the user's perspective: "Hi, I'm your fourth systems analyst. What are you guys doing on this project, anyway?" That is more typical of the high-turnover situations. The user's frustration with the constant restarts got ground zero in the high-technology approach earns DP the black eye it generally receives in those cases.

CSRs move too, but at a pace most organizations can control and live with. Basic company orientation, loyalty to the firm and product association with the user rather than to technology combine to provide continuity sufficiently long to complete projects.

More Credibility

It is easy to see how the long-term, ongoing relationship the CSR offers increases DP credibility with the user. Arrogance of the super-tech and flightiness of a succession of company know-nothings are both avoided. Technological solutions that miss the user's needs are not as likely. The CSR's ongoing presence allows for controlled changes rather than for freezing specifications for eons.

Last, company orientation permits a comradeship few DP technical staff members ever form with users. There are far more "us" sentiments to share and fewer "them" attitudes to overcome. Common goals build bridges which increase rapport and enhance DP credibility in the process.

We have tried to show that the CSR development process involves more than taking selected users and dressing them in DP uniforms. CSRs, in the main, come from the user community. However, the role of liaison is substantively different from either DP or the user structure from which most, but not all, CSRs come.

Making a Start

Any organizational entity must start somewhere. Figure 2 illustrates some possibilities of staff transfer among the user, DP and CSR groups. Clearly, to start the process, the initial transfer must be from the outer areas toward the center. Initially, the main flow is from the user to the CSR group. However, infusion of DP methodology in the CSR area is also helpful to form a nucleus CSR group.

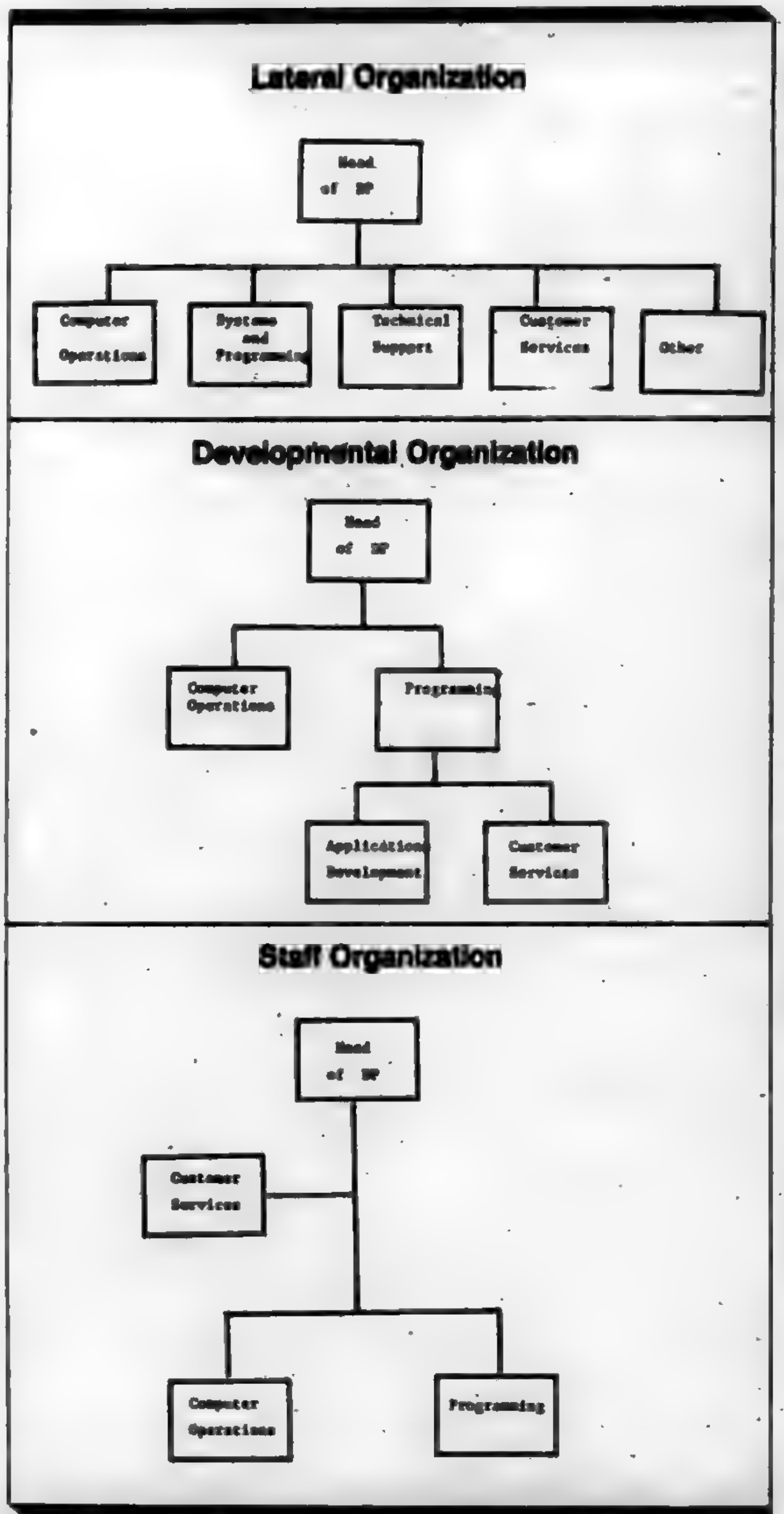

Figure 3. Organizational choices for positioning the Customer Services Group within DP. These three are not the only choices; they are merely suggestive of options available. Of these, (A) offers the most visibility within the DP organization and would probably engender the best user relations.

Once the organization is in place, controlled rotation of personnel is both possible and highly desirable. We know of situations where CSR personnel have become heads of DP and of major user areas. The process of flow from DP to user areas (which Bill Synnott, head of Management Information Services (MIS) for the First National Bank of Boston, calls placing "Trojan Horses" into centers of the organizational structure) is greatly enhanced by the way station of CSR training.

It links DP discipline with user concerns and sympathies. CSR training and development offers an ideal pond in which to incubate user-DP rapport.

Perhaps the most difficult task is to position the CSR relative to the user and DP. The authors have found that the best reporting relationship is equivalent to the DP technical staff, i.e., programmers and programmer/analysts. Since the orientation is toward the company rather than toward the industry, the influence of supply and demand factors is not as noticeable on CSRs as it is on programmers.

In pay structure, the salaries of junior, experienced and senior programmers should be equivalent to those of CSRs with the same amount of experience. In our opinion, as the CSR function becomes better known, understood and sought after, salary levels will adjust. Today, the CSR function (along with systems assurance, technical writing and others) is not yet classified by nationwide salary surveys. However, this lack of clear fit of the CSR function into the organization will be corrected over time as understanding increases.

Figure 3 offers some alternatives showing how the CSR organization might be structured within DP.

The CSR function offers a way to build user-DP relationships. This process offers fresh insights into methods for closing the communications gap, both with users and within the DP organization itself, relative to the obsolescence of systems analysis.

Most organizations need look no further than within themselves. There exists a largely untapped source of talent to help stem the flow of turnover within DP. If programmers are buffered from unnecessary and unproductive user contact, programmer turnover also declines.

We do not pretend that all the problems of technical change will be solved overnight through this organizational move. We do feel, though, that the emergence of the CSR is the most promising development to come along in years.

Lawrence H. Cooke Jr. is senior vice-president and product development manager at BayBanks Data Services, Inc., Waltham, Mass.

Cooke has 17 years' experience in data processing. He joined BayBanks in 1979 after five years as manager of systems and programming at Midlantic Bank in New Jersey. He has also held positions with IBM, Computer Applications, Inc. and the Federal Reserve Bank of New York.

Cooke holds the Certificate in Data Processing and earned a B.A. from Boston University and an M.B.A. from New York University.

Joseph P. Campaniello is vice-president for customer services at BayBanks Data Services, Inc. He has nearly 20 years' experience in banking operations at BayBanks and, before that, at Worcester County National Bank, Worcester, Mass.

For more than 10 years, Campaniello has championed the cause of customer services within the data processing function and at BayBanks customer services has achieved an equal partnership with programmer/analysts.

Campaniello is a graduate of Clark University and has received executive postgraduate training at MIT's Sloan School of Management.

Attacking Maintenance Costs

By Larry M. Singer

More than half the programming budget in many data processing installations is devoted to "maintenance programming" — that nebulous, hard-to-define activity known as "keeping the system running." One frequently quoted estimate is that by the mid-1980s, this system maintenance function will require 60% to 80% of the available programming talent. Even now it is not unusual for the maintenance of some business application systems to cost a company more in one year than it cost the company to develop the application systems in the first place.

The DP manager may feel helpless in controlling system maintenance costs. After all, isn't the maintenance burden intrinsic to data processing? Even if an application system requires continual, expensive maintenance, isn't it better just to accept reality and pay the price until the system can be rewritten?

The answer is an unqualified "no." Systems and programming maintenance costs can be reduced by a manager who is willing to take a long, hard look at his entire organization and perhaps challenge some traditional DP procedures. A project to reduce system maintenance costs will involve careful planning, thorough research and forceful implementation. In fact, some reorganization of the DP department may be necessary to fully accomplish such a goal.

An additional benefit of reducing system maintenance costs (besides improving the bottom-line P&L) is that the DP manager will probably improve the morale and productivity of his entire programming section. Most programmers and analysts would prefer to work on development projects rather than maintenance, and most DP managers would rather use their programming resources to help satisfy the ever-increasing demands from user groups.

Moreover, shops which have a high maintenance effort tend to have high rates of costly personnel turnover.

It is essential that the DP manager prepare his professional staff before any planning or research on a project to reduce system and programming maintenance begins. Obviously, the systems and programming staff will be intimately involved in such a project, and its extra efforts will be a determining factor in the success or failure of the project.

Management should stress that any additional demands placed on programmers — such as extra paperwork — will be justified in the end by reducing the maintenance load.

A program to reduce system maintenance costs usually has three separate but overlapping stages:

(1) Measuring the existing maintenance effort.

(2) Summarizing and analyzing the maintenance activity.

(3) Resolving the maintenance problems on a prioritized basis.

Note that such a project is similar to the classical systems analysis procedure by which the DP profession attempts to help various user groups. In this case, however, DPers will be attempting to help themselves and their company by applying the scientific method to help increase their own productivity. This experience should be very educational for all DP professionals who are engaged in systems analysis and design type work.

Measure the Maintenance Effort

The first step in any measurement process is to define the activity to be measured. System maintenance, however, is one of those required activities everyone is sure they dislike, but not exactly sure what it is.

For example, a given task may be classified as "development" when interviewing a prospective analyst but defined as "maintenance" when asking the controller for a larger DP budget. The guiding question should be: Is this task necessary to keep the application system running in a sound, professional manner?

If the answer is "yes," that task or activity is indeed part of the maintenance effort and is not correctly defined as "development" or "enhancement." Such typical programmer and analyst actions as answering questions from users, rearranging data on a report, adding badly needed transactions to an update program and making logic fixes are all examples of system maintenance.

> *Most programmers and analysts would prefer to work on development projects rather than maintenance, and most DP managers would rather use their programming resources to satisfy ever-increasing demands from users.*

Because of the high degree of judgment sometimes involved in separating maintenance from development, the DP manager himself may elect to categorize each activity, or he may appoint one senior-level professional to be the final judge. It is very important that the standards used be consistently and fairly applied in each case.

A time- and project-accounting system is the ideal method to collect the basic data on system maintenance. However, the average time-accounting system (either in-house or purchased as a software package) may have serious deficiencies, either in the way it is structured or in the way it is implemented.

Home-grown time-accounting systems are often of marginal value because they do not have enough categories and because the existing categories are so vague that they can cover literally everything. If the categories are not properly defined and do not match a shop's typical activities, the programmers may spend more time trying to accurately categorize an activity than the task took in the first place.

Since programmers are more interested in job satisfaction and reward from DP-oriented projects than in "paperwork," they will soon learn to gloss over "paperwork" requirements in favor of more "productive" work.

Some of the typical but sometimes overlooked "maintenance" actions include:

- Answering phone calls and having personal meetings with users.
- Helping the operating staff with production questions.
- Doing the paperwork necessary to keep the system running.
- Tracking down errors in reports.
- Correcting errors and rewriting application system documentation.
- Performing reruns and restarts of production jobs, including after-hours.
- Following up on production problems.
- Running special jobs that are under programmer control.

If the time-accounting system does

(Continued on In Depth/12)

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IN DEPTH

(Continued from In Depth/9)

not include these activities as "maintenance," it needs to be examined and upgraded before it can be used in any serious study of DP maintenance activity.

Still Problems

Even with a well-designed, comprehensive time- and project-accounting system, the DP manager may find problems. In the average DP environment, the time-accounting system is the last production job done during a cycle, and the reports usually sit on a desk until someone bothers to file them away.

Members of the professional staff soon discover the lack of importance of time accounting and become careless in monitoring their time.

Not only should time-accounting jobs be treated as production, but the professional staff should be made aware of the new purpose behind the time-accounting system: that data is not being collected to be ignored, but to be used as part of a serious, ongoing study.

Personal Logs

As a by-product of any good time-accounting system, the participants will be forced to log specific events so they can accurately record their time for the week. These "personal logs" will be just as important as the actual time-accounting summary reports, since any qualitative analysis of the maintenance effort must focus on the specific activities that caused the effort.

Discovering that a programmer spent 70% of his time on maintenance is one thing, but knowing *what* that 70% consisted of is just as valuable.

The DP manager should *insist* that his staff utilize a daily personal log to record activities and events. While the format of the log should be standardized (with name, time and activity), the actual contents should be left up to the individual, as long as the log is readable and accurate. This log approach should be implemented along with the time-accounting system.

Again, it is vital that management give the staff some feedback from the logs and the accounting reports, even if it is a simple "I can't read this line." Without feedback, the professional staff will never realize the importance of the study and the entire data collection process.

At this point, DP management may encounter overt resistance from the professional staff, especially as it relates to the extra paperwork and the perception that the study has been triggered by a feeling "that some people aren't doing their jobs." The extra paperwork is indeed a burden on a busy staff, but management should point out that the results of the study will be valuable and worthwhile.

The uneasy feeling caused by any study of professional activity can be alleviated by stressing that maintenance is a widespread problem in most DP shops and that a study of maintenance effort is literally a state-of-the-art project.

An interesting sidelight to the use of personal logs is that management may now be able to estimate the hardware

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resources being used in the maintenance effort. Despite what many programmers think, computer time is not free, and some DP managers will be surprised to learn how many resources they have tied up in "maintenance."

Analyze the Maintenance

Once the data collection and personal log procedures are in place, DP management may be tempted to start attacking the apparent causes of the high maintenance effort. This impulse is usually premature, since the true causes of a high maintenance effort may not show up immediately. Rather, long-term study and analysis may be necessary to discover important patterns and trends.

For example, an input error caused by lack of editing in an accounts payable program may cause a high maintenance effort one week, but may actually be a rare incident that happens once every few years. By throwing his limited resources on that one problem, the DP manager may be missing the more expensive and common maintenance problems.

During the data collection process, DP management should have contact with the rank-and-file programming and system staff to explain and encourage the system collection project. But the communication should be both ways — production-minded programmers can provide a wealth of information that will be useful during the summarizing and analysis phase of the project.

For example, if programmer John Jones asks if his unofficial job of helping balance the payroll register every few weeks is a "maintenance task," the DP manager should carefully note such comments. They will help him get a feel for questions that will certainly arise during the analysis phase.

Any study of maintenance effort should also cover those staff members who are not normally thought of as part of the maintenance team, such as first-line managers and systems analysts. If any part of their time is spent in supporting production, their log sheets should be included in the time-accounting and data collection process.

Looking Over the Data

The summarization and analysis phase of the project can begin with two months of raw data. This phase is designed to summarize the quantitative aspects of maintenance (the time-accounting reports) and the qualitative portion (the personal logs).

A summary of time-accounting reports may show that the maintenance effort is cyclical. That is, certain times such as month-end or quarter-end require a higher degree of maintenance hours. This information is valuable in planning development projects where certain staff members have dual development and maintenance responsibilities. In those shops with permanent teams of maintenance programmers, the cyclical trends may show that during certain periods some manpower is actually wasted.

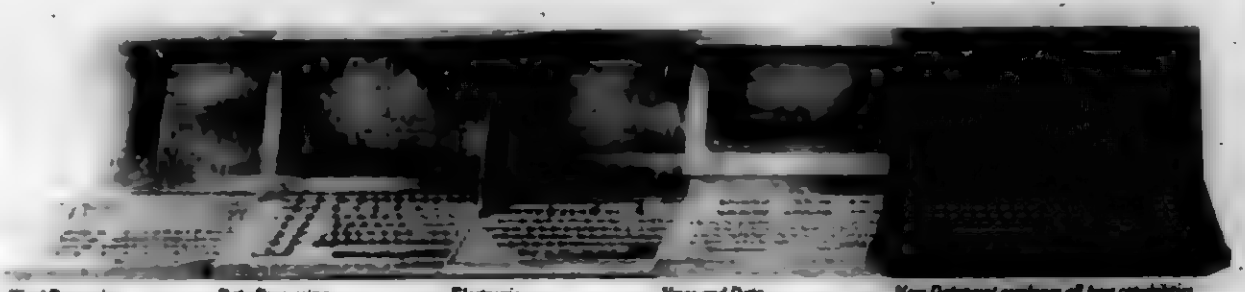
Management should use the quantitative data to determine the correlation, if any, between high maintenance activity and turnover. If the shop does indeed have such a correlation, management can predict which individuals are likely to leave and take preventive measures, such as salary adjustments and rotation of assignments.

The qualitative information contained in the personal logs should be summarized by an experienced project leader or senior programmer who is familiar with both the application systems and shop procedures. This summarization needs to have a minimum amount of interpretation and a maximum amount of pattern analysis. In other words, the summarization should show trends that reveal patterns of maintenance activity consistent over the long term.

This pattern analysis might be arranged by application system, such as an accounts receivable system that needs continual updates to the aging calculations or an inventory system that requires continual programmer intervention to handle specific requests from user groups. Perhaps the summary will be arranged by operational problems, such as incomplete restart instructions that require programmers to become involved in restarts and reruns.

The trend analysis should be performed independently by several individuals, each taking a one- or two-

(Continued on In Depth/14)



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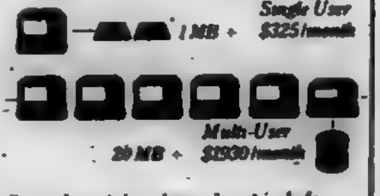
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IN DEPTH

(Continued from In Depth/13)

week period and summarizing the results. Naturally, some analysis of the causes of maintenance effort will be integrated within the summarization — this is unavoidable. However, the final analysis will be performed by management using the separate summaries provided by the senior staff. Allowing different individuals to contribute to the maintenance summarization will assure that no major aspects of maintenance will be missed during the final analysis, which will cover four to six months of data.

Both the senior staff and management should note that maintenance can always be divided into "unavoidable maintenance" and "avoidable maintenance." Updating state tax tables in a payroll system is required by law, but the process by which that updating takes place can be analysed for efficiency — there is a significant difference between a procedure that takes 10 minutes and a payroll update procedure that requires several hours of professional time. Any analysis of the time-accounting and personal logs must carefully note this distinction.

Reducing System Maintenance

After several months of data collection and analysis, management should feel confident that it now has enough facts to begin attacking the true causes of costly system maintenance on a priority basis. The priority list should be determined not only by which problem leads to the most expensive system maintenance effort, but also by factors such as degree of problem (an incorrect payroll run may be a political disaster for data processing), associated morale problems (a programmer called in to fix the same error week after week may be the next programmer to leave) and availability of resources.

This last factor may be the single most important factor in developing any priority list. For example, if the general ledger system is the single most expensive system from a maintenance view but if the general ledger experts are busy on another project, the maintenance problem will simply have to wait.

There are a number of common system maintenance problems that can affect almost any business DP installation to a degree, but the specific causes of high maintenance are still usually unique to any particular shop.

One expensive area of unnecessary programmer maintenance is in the general category of operational support, usually with reruns, restarts and requests from Operations for help with specific difficulties. Obviously, any application system can and will abend because of bad tapes, disk failures, software errors and operator mistakes, but each jobstream should be documented enough so that members of the Operations staff can handle all common problems themselves. Not only does programmer involvement in the computer room take valuable programmer hours; it can also be a major source of friction between the programming and operations sections.

Adding restart and rerun documentation to production jobstreams involves substantial resources, but the payback period may take less than a year. Also, such a task can offer an excellent training tool for new programmers or for experienced programmer/analysts who are learning these systems and shop procedures.

Too often, however, operational documentation is useless because there is simply too much. For example, Operations "run sheets" typically contain detailed data set or file information, but not specific, cookbook-style restart instructions that can be followed quickly by an operator or shift supervisor.

Before any major documentation project is undertaken as part of a plan to reduce system maintenance, management should carefully reevaluate the current type and style of documen-

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tation. Good, simplified operational documentation can significantly reduce programming involvement in day-to-day operational problems.

User Support

A second area of usually unnecessary programmer and analyst maintenance effort is in the area of user support. Answering questions regarding reports, data entry, transactions and system usage are all part of a maintenance burden that should be examined.

It may be impossible or politically inadvisable to discourage users from asking questions about application systems, but the DP manager can reduce this burden by verifying that each production system has clear, easy-to-use documentation that explains the system from the user viewpoint. It may be necessary to ask another area of the company for assistance in reviewing written documentation for clarity, such as the sales or advertising division.

Another solution might be to select one professional or paraprofessional to serve as a single production liaison point and free other staff from continual interruptions. It may not be evident from a time-accounting report, but a day interrupted by seven phone calls from various users is a day that has been severly disrupted if the programmer was deeply involved in a task requiring concentrated mental effort.

A third area of programmer activity that affects almost all DP installations is the difficulty in making changes to existing application systems. While adding a new report or new transaction code to a system may be thought of as "development," in many cases such a "development" task turns out to be a maintenance nightmare. Not only is it a difficult, time-consuming project, but errors usually result from these new features that require extensive maintenance effort.

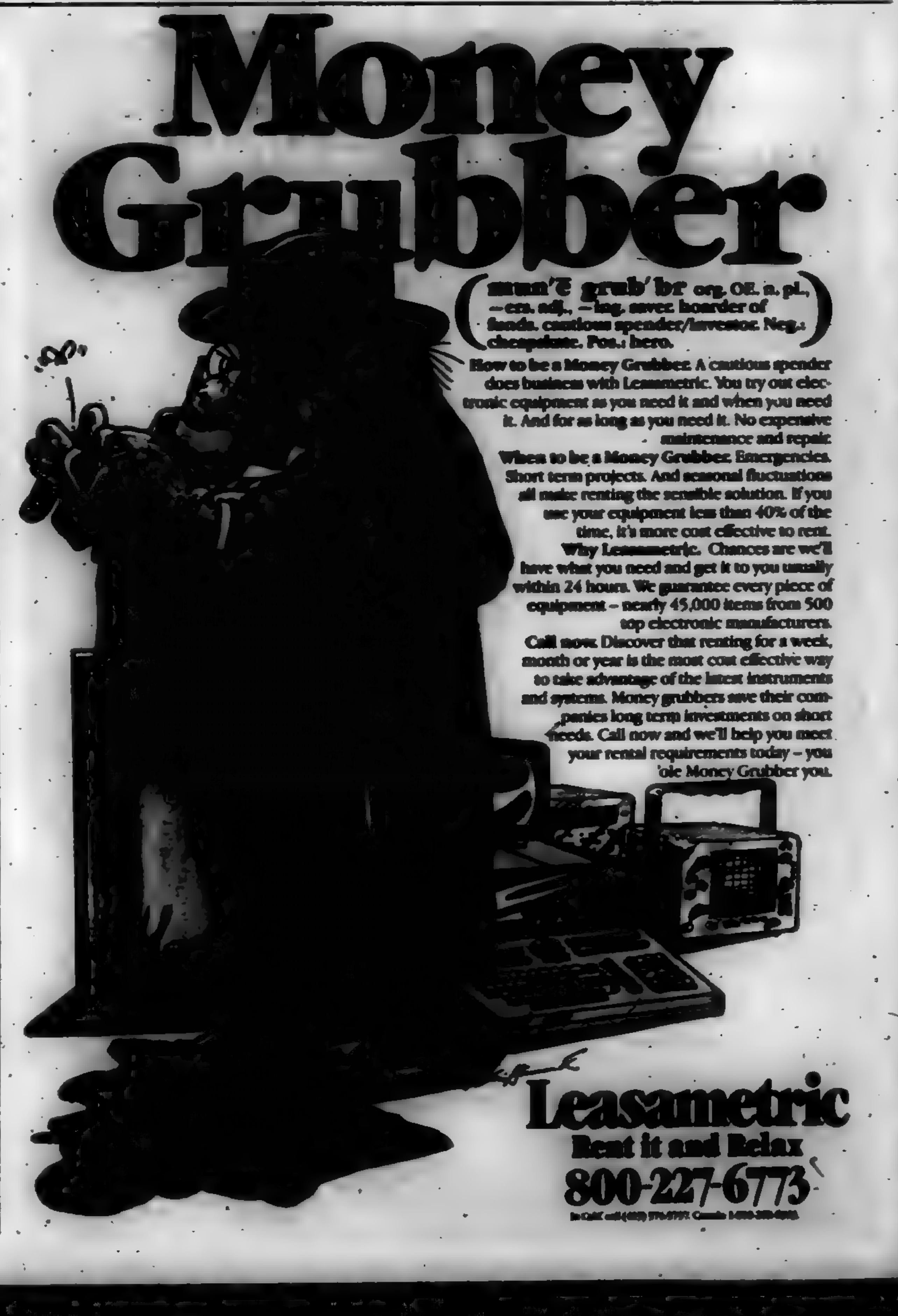
Such "simple" changes can cause severe problems because DP management does not control the efficiency of system maintenance changes. In fact, most DP shops perform maintenance changes in an archaic, inefficient manner that would not be tolerated in any other division of the company.

The entire change process can be simplified and made more reliable by realizing that changes to any application system are rarely unique. For example, during the seven-year life of a payroll system, there may be 15 requests to add new data fields to the payroll master file. Yet in each maintenance (or "development") project, the analyst or programmer usually has to reinvent the wheel by first determining how to accomplish the required change.

The answer is usually a list of 10 or 20 or 30 specific steps written on a scrap coding form. After the maintenance task is complete, the programmer usually discards the list, and the next programmer to update the payroll master file goes through the entire mental effort again.

Programmers and analysts usually do not retain documentation showing how a particular change was made; rather, they congratulate themselves that they have updated the user documentation correctly. Management should insist that any written documentation developed during a maintenance project be copied for a permanent system file. This requirement alone should save a substantial amount

(Continued on In Depth/16)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(Continued from In Depth/15)

of time in future maintenance changes.

Furthermore, with specific steps documented, the programmer and analyst will be better able to ensure the correctness of the change, which should result in fewer maintenance problems after the change is installed.

Production Changes

A fourth area of high maintenance that is often overlooked is the question of continuous changes to production systems. The DP manager should examine the time-accounting and personal log summaries for instances when programmers had to recompile and relink production programs.

Since production systems should be generally static, he must ask why the programming staff needs to make continual changes to keep the system running.

Are the changes designed to bypass batches of data that were input by mistake? A control card and some simple bypass logic would accomplish the same result with much less programmer effort and time. Do the programs need to be modified to trigger certain reports and options that are not user-controlled? Perhaps the system needs a new transaction code or method for the user to select and trigger reports he needs himself.

The Question of Control

The DP manager may wonder if he can go too far in giving up control over certain application systems. Some analysts and DP professionals adhere to the seldom-stated but often-followed theory that certain application systems need DP staff control and that the users cannot always be trusted to handle critical aspects of production systems. They might argue that certain options and updating should be controlled by a programmer familiar with the system and its internal processing.

> ***'Contrary to DP beliefs, users can be trusted with their application systems if they are given proper documentation and training.'***

Such an argument ignores the real world of data processing. While a system is being developed, it is true that the programmers and analysts know the system better than any user group and would prefer to trigger critical system action themselves. After all, the system is still relatively new, and the technical people are anxious to help bring the system into full production status.

But the programmer who wrote that critical update process will eventually leave, to be replaced by a programmer who lacks not only the detailed knowledge of that particular system but also the desire to trigger a weekly update or critical report run. The new programmer treats that requirement as a maintenance burden. The original reason for preserving data processing control over that production applications systems no longer exists, and the DP staff is stuck with one more maintenance burden for the next 10 years.

A general policy should be to transfer as much system control to the user group as is practical and safe. Ideally, the user management should "control" the system without DP professional staff assistance or involvement. Contrary to some data processing beliefs, users can be trusted with their application systems if they are given the proper documentation and training.

By examining systems which do require continual programmer intervention, the DP manager can develop a plan to transfer control over the system operation from his programmers to the user groups where it belongs and correct a mistake made long ago when the system was first developed.

By following a plan to study and evaluate system maintenance activity, then, a DP manager can control and reduce his system maintenance costs. However, such a program does require hard data, such as time-accounting reports and summaries of personal logs. It is usually not wise to accept the opinions of professional staff who feel they "know" how to solve the maintenance burden, since they tend to see matters from their own personal viewpoint.

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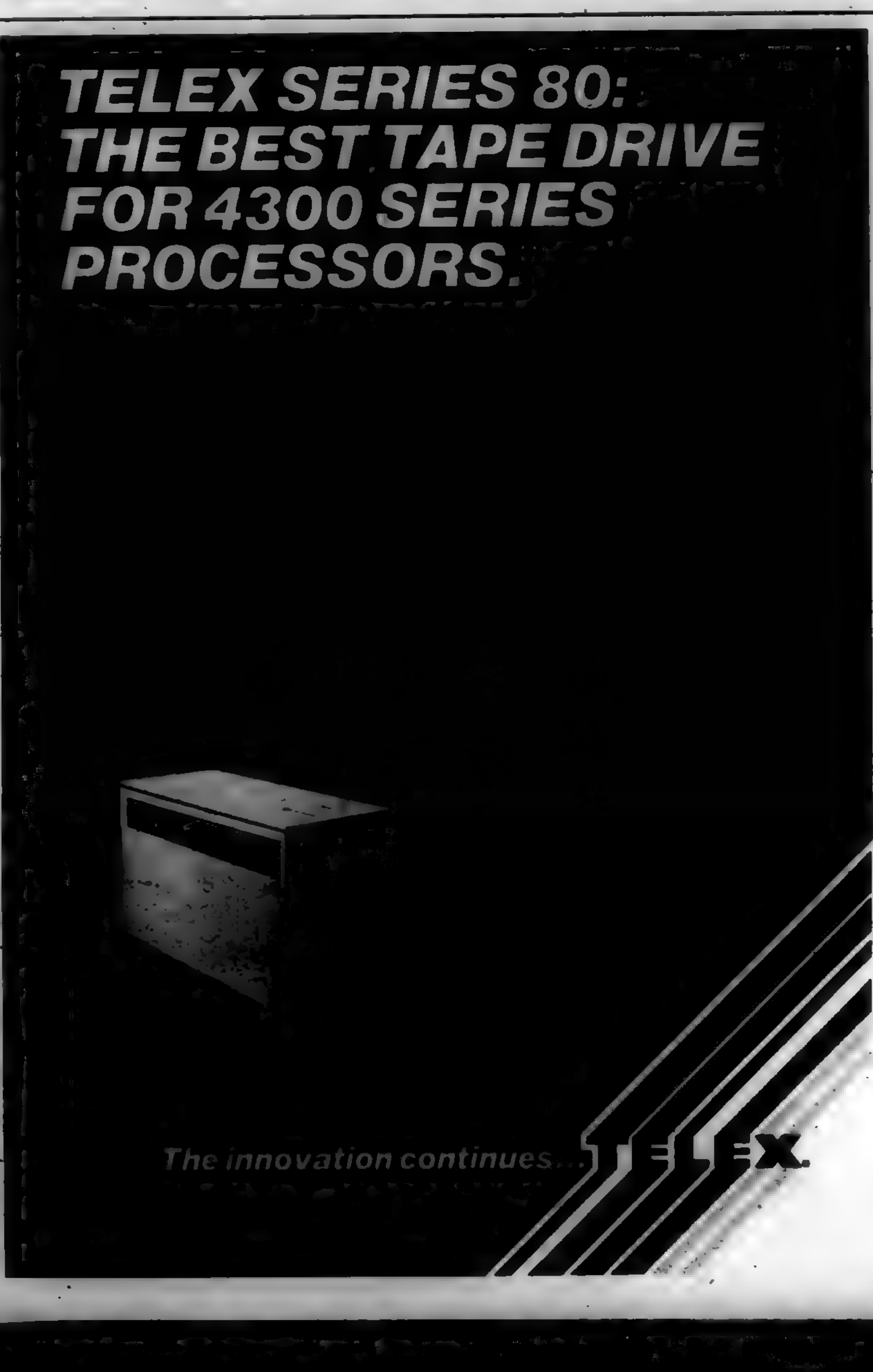
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DP and Security Just Aren't Talking!

By Dennis F. Poindexter

Burgeoning interest in DP security has come about, in part as a result of the proliferation of stories, some sensationalized, dealing with computer-assisted crime and the misuse of computer equipment.

This interest has been heightened by an increasing awareness by management of the vulnerabilities of computer-stored data, by the issues of privacy and by the increasing value of goods reduced to transferable forms.

The result: Many firms have sought to increase the protection of their computer systems. As this emphasis has increased, the security professional has been hard-pressed to keep pace with an ever-changing, technically complicated environment.

A common method of upgrading security has been to introduce DP professionals to the security staffs or assign technical specialists to augment inspection programs and auditing. This requires cooperation between two fields, security and data processing, that coexist at degrees ranging from mutual assistance to diametrical opposition. The difference in the level and intensity of cooperation is often the intuitive understanding of difficulties in communication between fields that have only recently found themselves working together.

Oversimplified Explanation

A ready and familiar explanation for communication problems between security and DP professionals is the differences in language. However, this is a totally oversimplified and misleading factor. Although it does play a part in reducing the time necessary to develop understanding, there are fundamental differences between these two groups that are more significant and divisive than language alone.

Traditionally, DP has relied on a widespread ignorance of its functions as a built-in protective device. During the field's early stages of development this was a logical and practical approach, since there were few computers and very few people who knew the secrets of the inner workings of the machines.

While this is no longer a recognized security measure, a number of computer professionals began their training and gained their experience in an environment where security was by exception. Many of these persons are today's systems supervisors and managers. The less flexible among them still accept and expect that ignorance of their system will protect it. There is enough truth to this belief that unless — or until — the vulnerability is demonstrated by an abuse or some other event, it will persist.

The degree to which people specialize in various branches of the computer field has contributed to the belief that ignorance remains a protection. It is now almost impossible to be a computer expert. There are a myriad of distinct hardware and software areas which for simplicity, and often for protection of proprietary business interests, are intentionally protected. The usual "Help Wanted" ads of any newspaper will attest to the demand for a variety of exclusive skills.

In this environment, it becomes increasingly difficult to be a generalist except in one of the generalized areas. There is, of course, a great deal of necessary overlap between these areas, but it is a paradox that such specialization produces its own ignorance. As a result, there is a need for an increasing number of DP specialists to assist in security.

Best Approach?

In many businesses, security and data processing are mutually exclusive. Even some of the largest corporations have established computer security sections which are made up solely of DP persons. The decision to assign these persons to security is an expeditious approach. Unfortunately, it may not be the best.

In the discussion that follows, it should be clear that there are differences in the orientation of security and DP persons and that these differences slant the view each has of his work. By limiting security sections to computer personnel, management may unknowingly cause restriction in the scope and understanding of computer security problems.

There are fundamental differences between these two groups that are more significant and more divisive than language alone.

Even in facilities where the security department is not responsible for data security, consultation and coordination between the two functions is common. The quality of this cooperation is affected by the ability of persons in each field to relate to the other.

The importance of this communication cannot be overlooked. The technical knowledge of persons outside the facility is growing. Today, with high school sophomores writing programs and building hardware, the number of technically qualified potential abusers is increasing dramatically. Computer security, as a consequence, is an urgent concern and preventive measures require cooperation between security and DP.

The question then becomes how to express security problems to data processing persons and how they, in turn, should express the technical issues impacting on security.

The language barrier is only part of this problem. We all tend to use terms common to our field. We all expect a certain amount of adjustment in learning the language of a new office or new associates. However, the difficulties in communication between security and DP people are much more complicated than the meaning of terms. I once learned this when a DP professional, in response to a question on the impact of the addition of a particular type of hardware, said: "The answer to your question is easy enough, but I wonder why you asked it."

This represents a fundamental difference in orientation. It is caused, in part, by previous experience with security measures, but to a greater extent, by the differences in levels of abstraction in these fields. This is not a matter of knowledge or language, but of the focus of both.

Hiyakawa[1] described levels of abstraction using the example of a cow. At one level, the animal is molecules and atoms, then flesh, skin and bone, then an object, labeled "Bessie"; then a Holstein; then a cow and so forth. Persons speaking about Bessie are going to lose the message, or part of it, when they operate at different levels.

Level of Abstraction

With a complex field like data processing, one is tempted to say that the computer specialist operates at a higher level of abstraction than the security specialist, but this issue is far more complicated.

The diversification of computer technology has meant a high level of ab-

(Continued on In Depth/18)

DP AND SECURITY NOT TALKING

(Continued from In Depth/17)

straction in specific specialties, but not necessarily a higher general level. This is a relative distinction for the security specialist looking into the DP field, but one that deserves recognition.

The second point is that the security person brings his own level of abstraction with him → one, incidentally, divergent from data processing. Security is by far a more generalized field. While there may be wide technological specialization, the orientation of security demands a broader perspective. A security specialist is more of a generalist than a computer specialist. Thus the level of abstraction is generally higher in the security field than in data processing. This is not particularly important until these divergent fields are forced to establish policy and work together.

Differences in Perspective

The fact is that both sides have to recognize these differences in perspective. This is, unfortunately, often a time-consuming process; in many cases, it is never resolved.

For example, suppose the problem of "access" comes up. This is a familiar term in both fields, but the concept is viewed differently in each. The security specialist may consider that access begins with entry controls at the front door and goes down to authorized users with passwords. Generally, however, the DP specialist thinks of access as it relates to the data base. Use of a device may not qualify as access to the system if a user is denied it by software features. The difference in approach may cause untold days of discussion if the definition of terms is not settled in the beginning. Note that it is not only definition of the term "access" that is required, but also the level at which the discussion is to be bounded.

Different Products

Another matter related to levels of abstraction is the orientation of the fields to different products. The DPer is oriented to efficiency of operation. At almost every level of the business, speed and accuracy are stressed.

The security specialist is also oriented to efficiency, but the field is not. Were there no need for security, every phase of business would be affected. Every aspect of security requires certain restrictions which impact efficiency and limit its scope. Security works toward a tolerable restraint to management's specified limits. Data processing works to eliminate whatever restraints are placed on its efficiency. This is not to say that a DPer would intentionally subvert security, only that the orientation to restraint is not as great.

This is particularly important when attempting to establish policy for computer security. The area of hardware maintenance is a good example.

Most installations do not have the capability to hire a maintenance specialist for each type of DP equipment they use. This is obviously impractical.

When equipment malfunctions, the operators lose productive time, and expensive equipment is idled. The maintenance person is needed quickly and must be able to expeditiously locate and repair the problem.

Security is interested in a number of restrictions to this technical specialist. Not just anyone can be admitted to the business. He must be identified as a person sent by the repair function. Second, there may be proprietary information in the plant (it may be in the computer) which the facility would not want removed, observed or destroyed.

Perhaps an escort is to be provided. This is a complicated issue because few people, and least of all security, understand what needs to be done to affect repairs. A reasonably knowlegeable representative is required to monitor a visitor. Maintenance persons often test and replace various component parts using diagnostic routines and analyzers. Many of these have recording functions or remove recorded media. This can be extremely complex where critical proprietary or classified defense information is being secured. The computer staff is not very amenable to restrictions placed on getting the hardware back into working order, but the business must make certain concessions to protect its wider interest.

Consultants, too, may find more and more restrictions placed upon them in spite of the fact that they are often hired to increase efficiency.

The difference in orientation of security and data processing is not easily

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resolved. Each viewpoint tends to have its own momentum which continues to divide the fields. In interpersonal communication there is a well established principle of "set" which, in this instance, works against cooperation.

In this instance, there are two fields with different experience upon which decisions are made. The experience creates expectations about an anticipated event, and inputs from a source which do not fit these expectations are likely to be ignored.[8] This has serious implications for security. Security systems are many times cued to particular events which indicate an unusual occurrence and may be a key to an attempted system penetration. Ignoring these keys will increase the number of attempts at entry to a system and give a greater chance of success. A simple example will illustrate this point.

Typical Situation

In most systems, some type of file protects are used to restrict access. Passwords are a common means of limiting this access. In theory, every person should be able to enter a password on one attempt, but practicality allows for more than one. After this number, software features can be used to lock out the originating terminal, or in the more sophisticated systems, the terminal is identified to the operator console and kept on line so that its activity can be monitored.

The trouble with any such system (and most mechanical/electrical entry systems) is that it usually works. Every time the passwords are changed, that well-known "10% who never get the word" start showing up, operators are busy with jobs, hardware goes down and software doesn't always work as it should. These are typical everyday problems.

There is an unfortunate inclination to believe in the familiar. The terminal on the fourth floor locks out. Dave calls to say he is locked out and needs to get data for Jim up in Production. The corporate procedure calls for an investigation, but this is the second time today and . . . the software probably isn't right. Maybe all the changes weren't made. To an experienced security officer, this is all too familiar.

In computer systems, the problem is aggravated by continuous system failures of all types. If everything worked properly, we would set up a computer system and never have to worry about it, but it seldom does. The anomaly is common and frequent. Operators are attuned to these occurences and make the "obvious" assumptions about the cause.

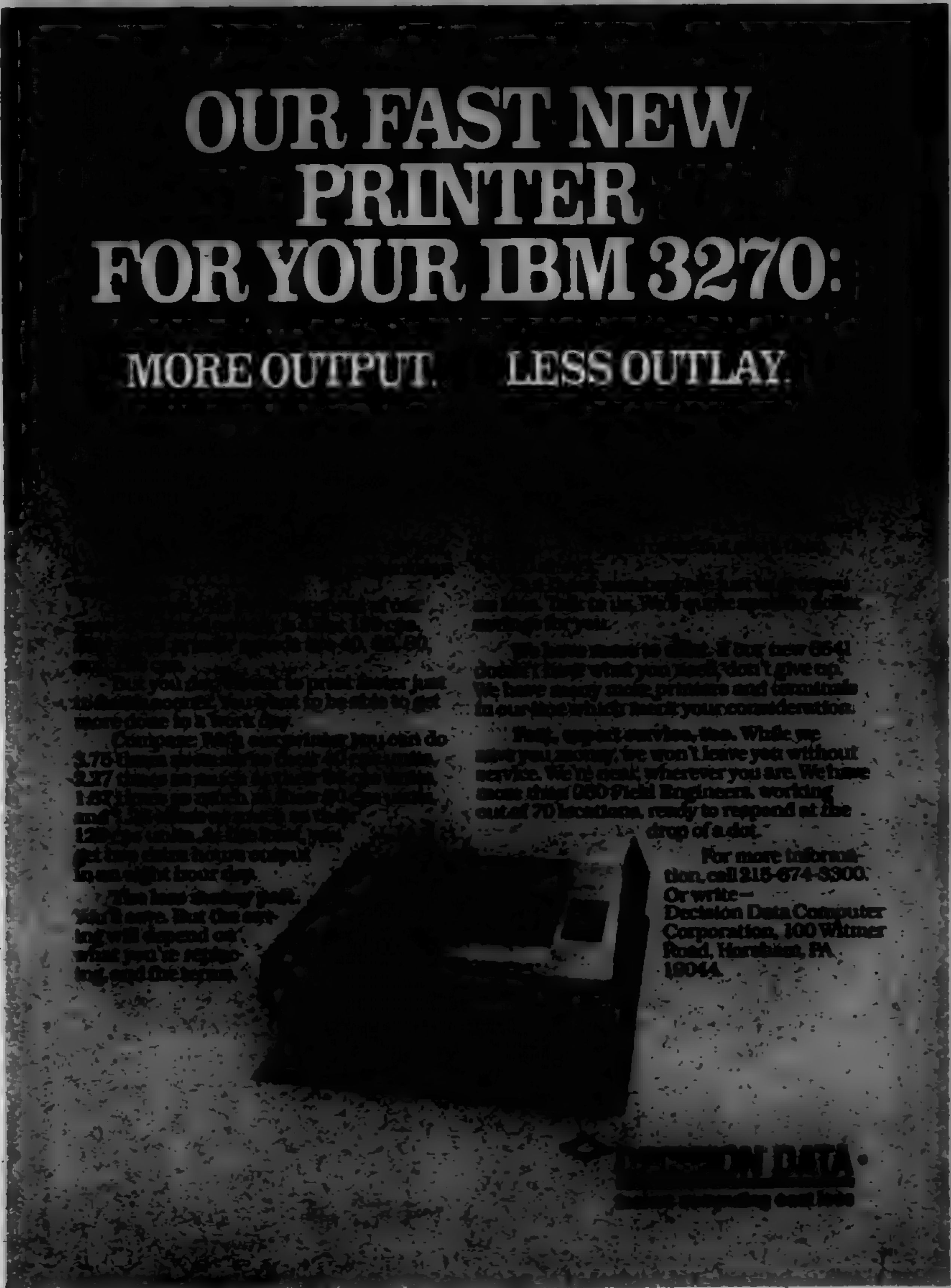
The difference between a very good security patrolman and the average is often that the good one notices something out of the ordinary and has the patience to follow through in an investigation. If the computer operator did the same, that person might well be working elsewhere in a week or two.

The three major areas of discussion – level of abstraction, orientation and the momentum of sets – are the elements of an environment not conducive to high levels of cooperation. If recognition were a panacea to resolving all differences, it would be sufficient to state fundamental differences and let intuitive understanding lead to cooperation. But in practice, recognition is not enough.

Some believe there is a choice between making a computer security specialist from a computer expert or a security specialist. The comment is generally made that it is easier to make a computer security effort by using DP-experienced persons. These comments are voiced by persons with a computer background.

But there are enough conceptual differences in the two fields that there is a need for both. They each have something to bring to the other. Because of

(Continued on In Depth/20)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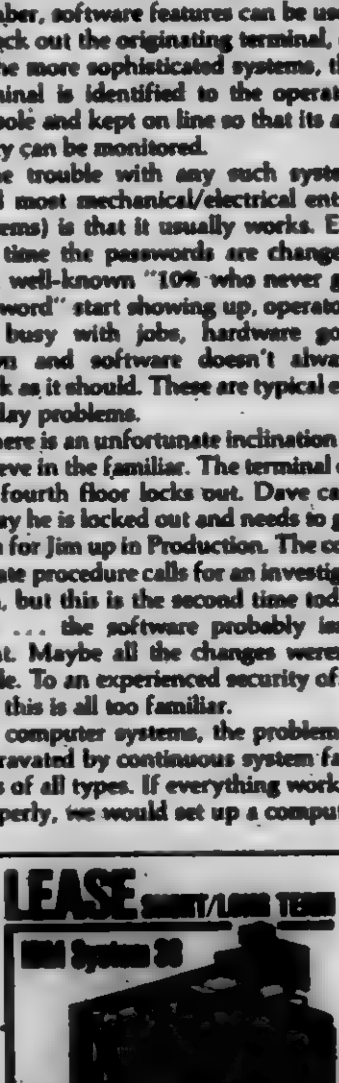
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the technical complications of the computer field, it becomes difficult, if not impossible, for a single person to be a computer security expert. It becomes more and more important to develop a team approach to bring the backgrounds of both to work.

Donn Parker once described the areas required in an audit to achieve a satisfactory result. Although the auditing function is a limited portion of total computer security, the problem remains. Parker said: "The areas of specialty include physical security, operational security including recovery and backup application analysis and programming, systems programming and electronic engineering. This implies a team approach to auditing to achieve the necessary depth of expertise in these diverse areas."[3]

Another related publication of the Rand Corp. stated: "The security problem of specific computer systems must be solved on a case-by-case basis employing the best judgment of a team consisting of systems programmers; technical, hardware and communications specialists; and security experts."[4]

Unfortunately, no single person can be responsible for all computer security. Even agreeing that more than one person is necessary and bringing both security and data processing together is not enough.

A natural tendency between differing groups is for them to become defensive about their respective positions. During the development of policy there is little room for provincialism and egalitarian responses. These may be partly the result of an understood difference in status of the participants.

The computer mystique has its rewards, for all its difficulties. It is not easy to compensate for the high regard that computer specialists have; security, except in rare instances, has operated with less money, emphasis and status. Where the high-stakes corporate interests are at issue, cooperation on an equal basis is essential. There must be recognition that policy will be made through a variety of inputs which may be logically considered.

This requires a belief in the worth of persons who have to work together. The person or office which is to direct computer security must ensure that the corporate interests are placed above whatever differences in policy develop. Initially this may be easy enough, but over a period of months impingements on efficiency take a quick toll on DP and the technical details of computer systems can slow the best security professional. It is easier to compromise the computer security program than to face the fact that there are acknowledged differences that take time and frank discussions to resolve.

Management's Duty

Management's responsibility in resolving differences is to define what level of restraint is acceptable and what information is to be protected. One might believe that this is a necessary first step, but "agreeing to agree" is a satisfactory beginning.

Defining the level of restraint is a complex problem in which decisions must be made on the nature of the threat to the data base. Security has resources to develop many of the known threats and the general types of corporate information being protected. Data processing can relate this information to what is on the computer system and make realistic inputs on the types of threats most easily carried out.

The second facet of this is to decide what information is most important and deserving of the greatest protection. In data processing, management may neglect to designate what information is to be backed up, leaving this decision to the systems managers. It may not occur to them that what is essential to restoring the computer system may not be the same information necessary to restore the business. In the same way, protecting everything at the same level is protecting the most important information at the same level as the least important. Just as there are limits on the backup capability, there are limits on how much can be protected.

Once these matters are resolved, the technical nature of the discussions will become more apparent.

Most Prevalent Problems

In this, the problems of abstraction, orientation and set are most prevalent. Here too is the legitimate problem of language — linguistics and abstraction. By sheer weight of volume, the burden largely falls to security, but it is equally important for the data processing professional to realize that "computer security" is two words. Security has its own set of terms not easily understood and there is an equal responsibility to discuss them.

Although there are arguments to the contrary, considering the state of the art, computers are not very secure. Demonstrations by the somewhat obscure tiger teams have shown that a number of techniques, both simple and sophisticated, make it possible to extract data from a system without authorization.

In security, it is generally preferable to prevent crime, but if that fails, to detect it. Computer security has changed the latter goal. The careful theft of data is much like the "theft" of important papers by photographing them and returning them to their rightful place. There is not evidence of a loss and no cause for concern. The problem, then, is to make this as difficult as possible. We are getting better at this — but only through extensive cooperation between people who are conceptually attuned to both security and data processing.

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Special to CW

Much has been said about the benefits of distributed data processing (DDP). Defined as a system in which a group of computers and communication lines dynamically share data and processing, DDP can combine the central control and economies of scale of centralized processing with the system tailorability and timely access to data of decentralized systems.

However, because DDP is a broad and flexible concept, it is often difficult to determine its real value — if any — for your own particular environment.

If you are considering a move to DDP, there are five criteria that will help to determine whether DDP is right for you. If more than one of these criteria is applicable to you, DDP deserves a closer look.

These criteria are the need for interactive processing, the 80/20 work load, the need for local accountability, organizational structure with dispersed functions and rapid company growth.

If you have no need for on-line processing, then DDP is not for you. If you do need an interactive system, however, DDP can often be much more cost-effective than a centralized system.

DDP can hardly be called a new concept, but the controversy over centralization vs. decentralization is still going on. This two-part series provides five criteria for determining whether DDP is right for your organization.

The underlying principle of distributed processing is that processing power should be placed where it is needed most or where the job can be performed most effectively. It frequently makes much better business sense to have local data storage which can be directly accessed and updated and to send summary information to headquarters on a "need-to-know" basis than to use expensive communication links to stay on-line to a centralized system.

Moreover, if you need fast response time yet have a large terminal population or heavy data traffic, then a distributed system may be essential. Otherwise the central computer could easily be overloaded and overall processing speed reduced.

If it is crucial that your on-line system provide uninterrupted service, then you will definitely be a candidate for DDP. Having most of the processing power distributed where it is needed is a safeguard against the communications outages possible with a centralized on-line system.

Thus a company with distributed systems in its sales offices, for example, can continue to take orders from customers even if phone lines to the mainframe are down. And if a local processor itself goes down instead of the phone lines, processing power is not lost as it would be with a centralized system, since the other processors in the network can be used as backup.

Local/Remote Ratio

If on-line interactive processing is required, this second criterion for DDP will probably also be applicable. Under this rule, DDP makes economic sense when 80% of the processing is done locally and 20% remotely.

In this situation, distributed processing will usually be much more efficient than centralized processing. Data transmission costs can be significantly reduced, since only summary data is passed to the central computer.

The slow response time of the central com-

(Continued on Page 62)

HP Graphics Input Tablet Allows Drawing on CRT Screen

PALO ALTO, Calif. — A graphics input tablet suitable for drawing on a CRT screen, tracing graphics documents or picking from a menu has been introduced by Hewlett-Packard Co.

The HP9111A features user-definable softkeys, ceramic platen, lightweight stylus and programmable data rate. It was designed for applications in interactive graphics, graphics entry and menu selection.

Interfaced through HP-IB, HP's implementation of IEEE Standard 488-1978, the tablet is compatible with a wide variety of HP computers, including the HP-85 personal computer, the 9800 series of desktop computers and the HP family of technical minicomputers, the vendor claimed.

The HP911A is priced at $1,950 from HP at 1501 Page Mill Road, Palo Alto, Calif. 94304.

The HP9111A

CDC, HP CPUs Run Calcomp Plotters

ANAHEIM, Calif. — California Computer Products, Inc. has released two plotter control interfaces that reportedly permit Hewlett-Packard Co. 3000 and Control Data Corp. Cyber 18 CPUs to use most Calcomp plotters.

The interfaces are single-printed circuit cards that mount in Calcomp's 907 on-line controller.

The interfaces give HP 3000 and Cyber 18 users access to drum ~~and beltbed~~ plotters that offer plot widths from 11 to 72 in. and plotting speeds up to 30 in./sec, the vendor said.

The HP 3000 interface costs $5,740 and the Cyber 18 interface costs $6,140, the vendor said from 2411 W. LaPalma Ave., Anaheim, Calif. 92801.

No-Nonsense Traffic Cop

The Beall Channel Switch [illegible] computer traffic jams by [illegible] services [illegible] another CPU when trouble occurs. Allows specific peripherals to serve more than one computer. Redrives all CPU signals to give you far more flexibility for physical placement of peripherals.

And Beall does all of this less expensively, more reliably and with less opportunity for operator confusion than anyone else.

We make five basic models [illegible] switchable interfaces [illegible] connected to as many as eight CPUs.

Want to summon [illegible]

John Beall & Company, Inc.

BEALL CHANNEL SWITCH

Look Again at DDP if On-Line System Needed

(Continued from Page 61)

puter, flooded by data from every division or department, will be replaced by instant interactive access to the local data base.

Local management decisions will be based on timely and accurate information, and top management will still receive the integrated summary data it needs. With a capable network, headquarters can remotely access data without local operator intervention.

> *'Hardware is not the only system resource easily shared in a distributed system. Program development personnel can be centrally located.'*

In general, the 80/20 rule means that one should distribute the processing power to where the work is done or the results are needed.

Economies of Scale

But what about so-called economies of scale?

When applying the 80/20 rule and implementing DDP, can one achieve the same economies of scale that seem to be evident with a centralized system — the savings in hardware, program development and maintenance of software and hardware?

The answer — to a great degree — is yes, because DDP allows the sharing of many system resources. Processors themselves can be shared, so that an application program can be processed on the hardware best suited to it.

For example, scientific data can be analyzed most efficiently on a system with a scientific instruction set and a floating-point processor. But the processors used for gathering the data need not have these capabilities.

It is only necessary to transmit the data to the scientific system for processing, thus lowering total costs while making greater capabilities available to each site.

The same principle applies to the sharing of expensive peripherals, such as high-speed printers, plotters, large disk drives and magnetic tape units.

While it is true that DDP requires more processors than a centralized system, these processors are generally smaller and less expensive. In addition, hardware costs are dropping so rapidly that by 1985 they are projected to be only 10% to 20% of the typical DP budget.

Shared Resources

Hardware is not the only system resource easily shared in a distributed system. Program development personnel can be centrally located and yet develop programs for use at many sites.

New software is transmitted through the network to the computer that will be using it. In the same way, software needing to be debugged can be transmitted to a software engineering group at one location.

In effect, those program development and software engineering people are "shared" through the results of their work: application programs.

In addition to sharing application software, even hybrid sofware — consisting of software and firmware — that cannot be copied may be shared.

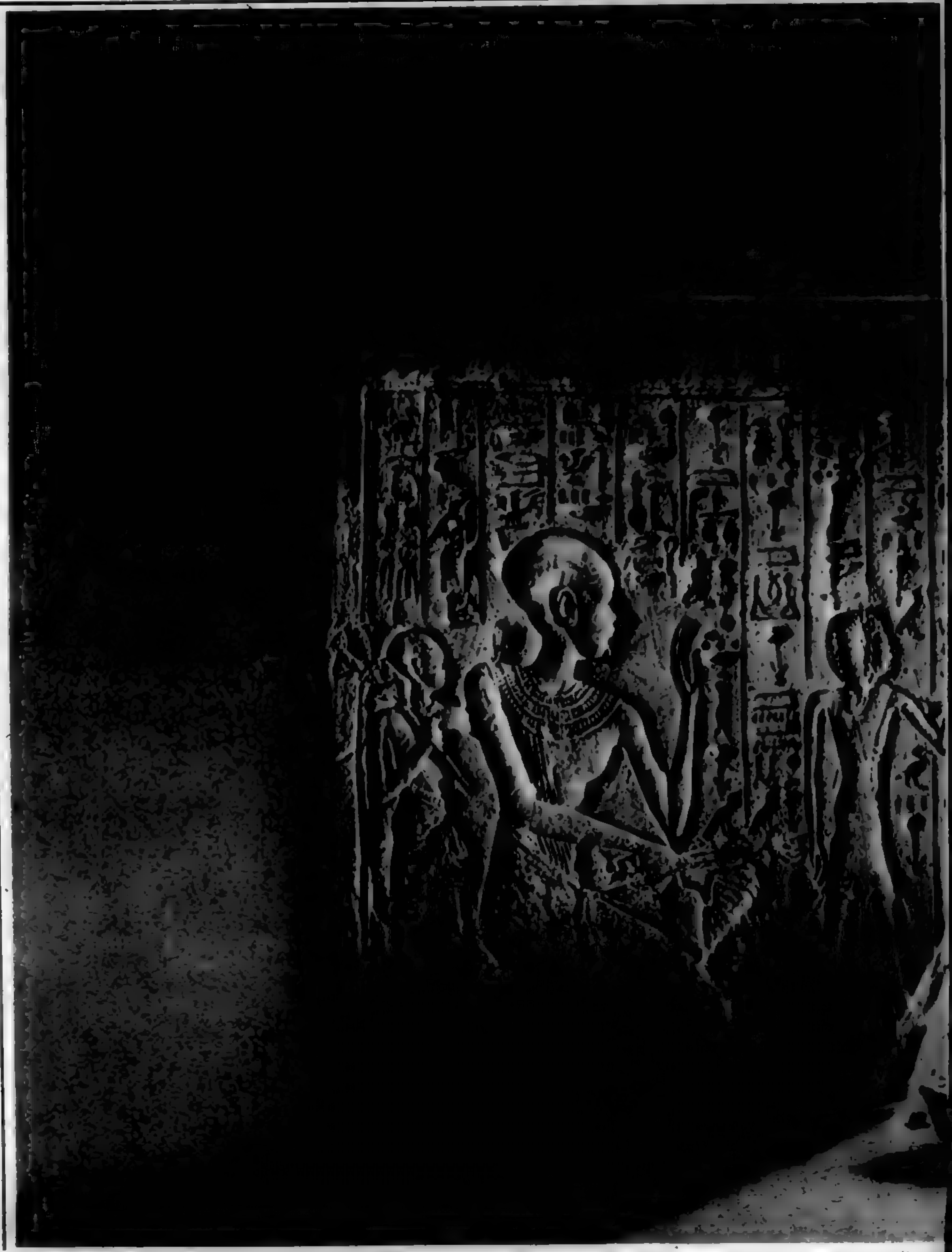
If this software is an advanced compiler, for example, all programs in that language can be compiled on one system, and the compiled program transmitted back to the system on which it will be run.

Thus, an extensive sharing of system resources is made possible by the communications network connecting the processing nodes in a distributed system.

Another major benefit of applying the 80/20 rule in a DDP environment is that projects can be managed much more effectively. The magnitude of the applications running on DDP systems is considerably smaller than applications running on a centralized mainframe.

Smaller, more manageable projects tend to be completed in a more timely fashion without associated cost overruns.

The remaining three criteria — local accountability, organizational structure with dispersed functions, rapid company growth — which should be assessed in DDP decision making will be explored next week by Hartge, who is with the General Systems Division of Hewlett-Packard Co.



Dema Spotlights Productivity

ORLANDO, Fla. — "Improving Productivity and the Quality of Working Life for Data Entry" will be the theme of the Fourth Annual Data Entry Management Association (Dema) Conference to be held here Nov. 10-13.

Fifty sessions will cover such subjects as distributed data entry, the office of the future, alternatives to traditional data entry, management and communications and equipment evaluation.

Addressing productivity from the industry's point of view will be Ryal Poppa, president and chief executive officer of Pertec Computer Corp. Also scheduled to speak are Donald Brosnan, president of MSI Data Corp., Gary E. Liebl, president of Microdata International, and Raymond Kurzweil, president of Kurzweil Computer Products.

Equipment exhibitors will include IBM, Univac, Advanced Systems, Computer Devices, Consolidated Computer and Inforex.

Individual fees for the conference are $300 for Dema members and $345 for nonmembers; team fees (three or more) are $270 per Dema member and $315 per nonmember. Dema can be reached through P.O. Box 3231, Stamford, Conn. 06905.

Plessey Disk Subsystems Emulate DEC's RP11-C

IRVINE, Calif. — Plessey Peripheral Systems has introduced an array of computer subsystems that emulate Digital Equipment Corp.'s RP11-C and utilize Plessey's PM-DC1100 controller.

The subsystems provide compatibility with the line of system software for RP series expansion and the controller features transparent EEC and multiword transfers.

It can be cabled directly to one or two drives; with a multidrive interface chassis, the controller can support up to eight drives.

Combined Controllers

When the PM-DC1100 is combined with the PM-FD11/G Winchester disk drive, it becomes the PM-FS11/G Winchester disk subsystem.

Using a multidrive interface chassis, a single PM-DC1100 controller supports up to eight 25.3M-byte drives over 200M bytes of data storage utilizing the Winchester technology, the vendor claimed.

The PM-FS11/G Winchester Disk subsystem is available for $7,442.

Plessey is located at 17466 Daimler Ave., Irvine, Calif. 92714.

Free Brochure Treats Recovery, Disaster Backup

WAYNE, Pa. — A free brochure written to help DP professionals in large computer-dependent organizations evaluate disaster recovery-backup options is available from Sun Information Services Co.

Entitled "When Management Asks about Computer Disaster Backup and Recovery, What will You Tell Them?" the 10-page publication uses a question-and-answer format to review possible risks and complications to computer operations in emergency situations.

The brochure is available from Sun, 656 E. Swedesford Road, Wayne, Pa. 19087.

ICE, Inc. Supplies Printer Service

ELMHURST, Ill. — ICE, Inc. has announced the establishment of two national maintenance services for Printronix, Inc. and Data Printers Corp.

The firm will handle maintenance for the full line of Printronix printers and the data printers' Chaintrain line.

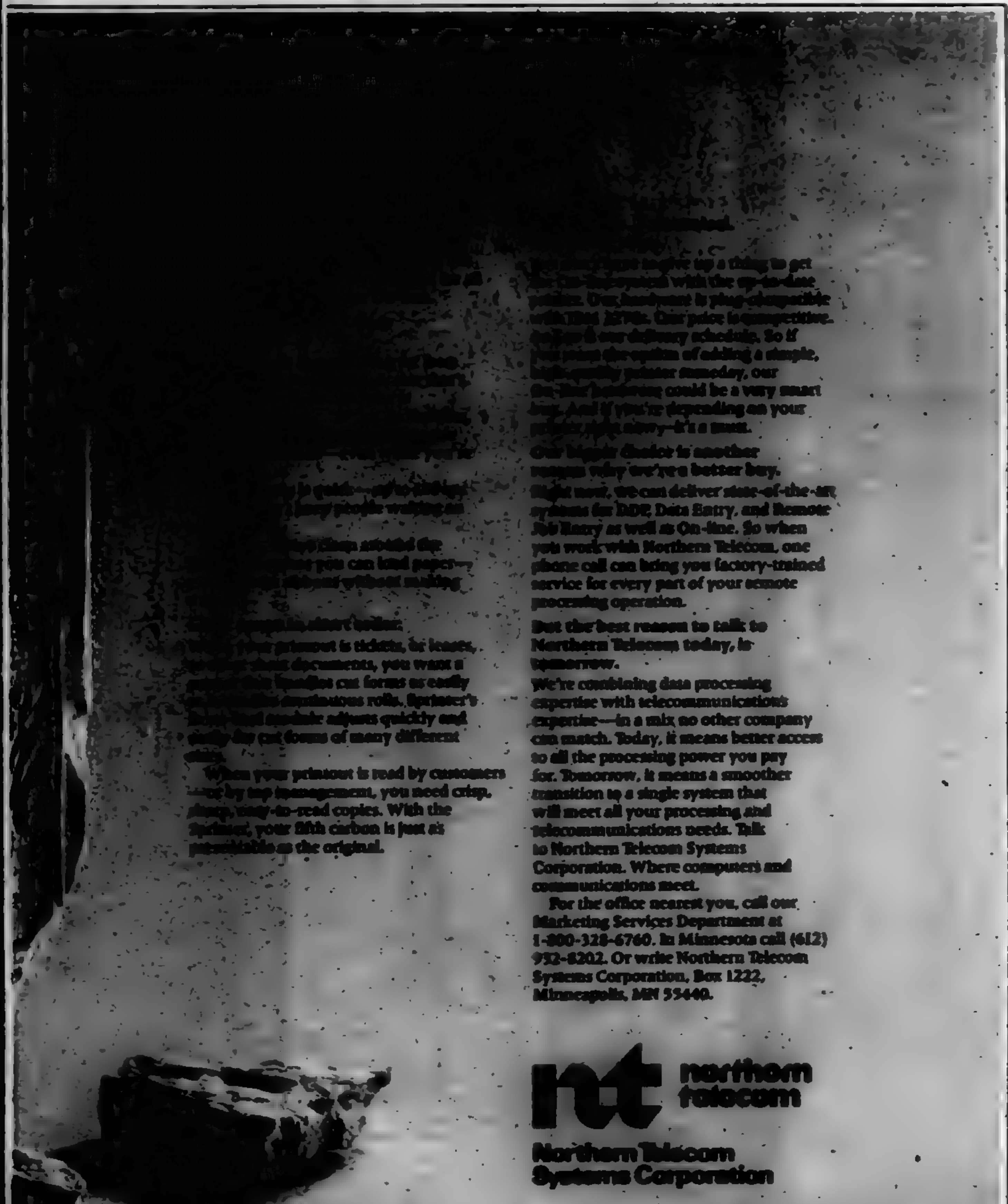
A full service maintenance contract for either company can be obtained from ICE at 772 N. Church Road, Elmhurst, Ill. 60126.

Template Offered

SAN LEANDRO, Calif. — Levitt Products Co. is offering an overlay template designed for software, drafting or graphics DP personnel.

The templates are available in 10 char./in. by 8- or 6-line/in. and cost from $34 for large versions and $21 for smaller templates.

The vendor can be reached at P.O. Box 4308, San Leandro, Calif. 94579.



[illegible]

When your printout is tickets, or leases, [illegible] documents, you want a [illegible] that handles cut forms as easily as [illegible] continuous rolls. Sprinter's [illegible] module adjusts quickly and easily for cut forms of many different sizes.

When your printout is read by customers —or by top management, you need crisp, sharp, easy-to-read copies. With the Sprinter, your fifth carbon is just as [illegible] as the original.

[illegible] to give up a thing to get [illegible] with the up-to-date printer. Our hardware is plug-compatible with IBM 3270s. Our price is competitive. [illegible] our delivery schedule. So if [illegible] the option of adding a simple, high-quality printer someday, our [illegible] could be a very smart buy. And if you're depending on your printer right now—it's a must.

Our bigger choice is another reason why we're a better buy.

Right now, we can deliver state-of-the-art systems for DDP, Data Entry, and Remote Job Entry as well as On-line. So when you work with Northern Telecom, one phone call can bring you factory-trained service for every part of your remote processing operation.

But the best reason to talk to Northern Telecom today, is tomorrow.

We're combining data processing expertise with telecommunications expertise—in a mix no other company can match. Today, it means better access to all the processing power you pay for. Tomorrow, it means a smoother transition to a single system that will meet all your processing and telecommunications needs. Talk to Northern Telecom Systems Corporation. Where computers and communications meet.

For the office nearest you, call our Marketing Services Department at 1-800-328-6760. In Minnesota call (612) 932-8202. Or write Northern Telecom Systems Corporation, Box 1222, Minneapolis, MN 55440.

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Northern Telecom Systems Corporation

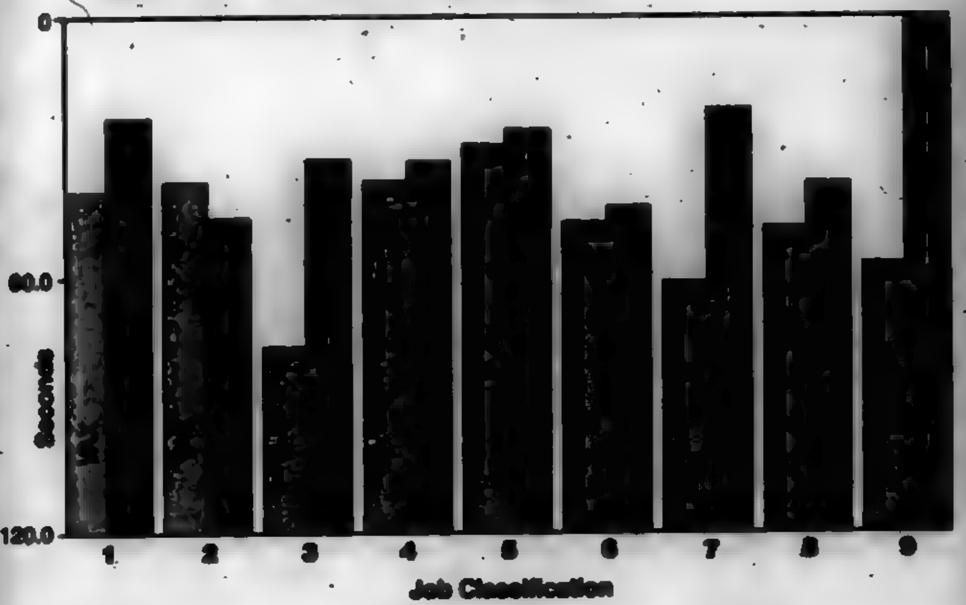
The benchmarks prove it...

1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.485	1.05
PMS0354	9.180	8.990	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0654	1.610	1.350	1.19
PMS0764	7.040	6.679	1.05
PMS0864	13.730	13.370	1.03
PMS0964	66.830	66.066	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.306	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.006	0.98
PMS1724	52.550	53.133	0.99
PMS1807	50.180	34.766	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.284	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.610	137.997	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2708	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.190	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	156.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.060	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.784	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4584	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5006	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5208	0.900	0.917	0.98
PMS5306	0.330	0.029	11.38
PMS5406	2.080	1.697	1.23
PMS5502	1.130	2.180	0.52
PMS5602	207.140	198.885	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

*Performance Ratio = VAX 11/780 CPU time / Perkin-Elmer 3240 CPU time

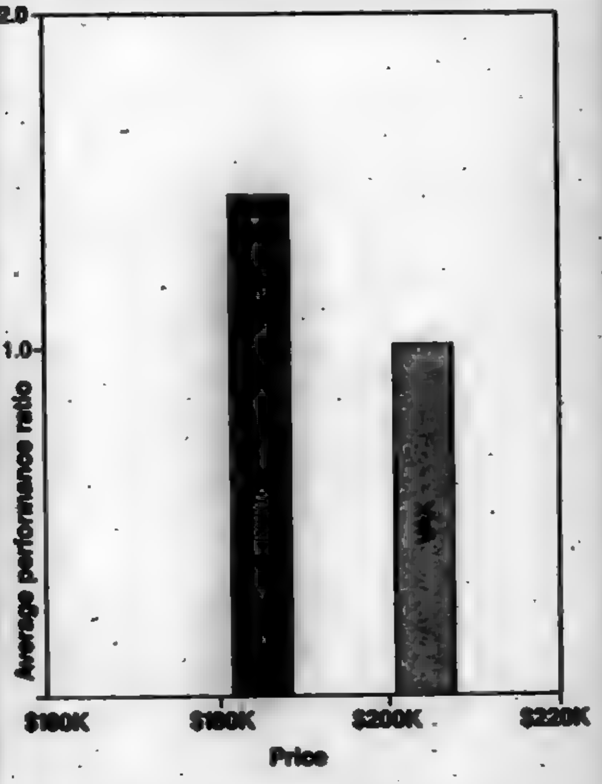
2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



1. Integer
2. Single-precision
3. Double-precision
4. Math functions
5. Single-precision whetstone timings
6. Double-precision whetstone timings
7. Arrays
8. Job mix
9. Compiler technology

*VAX is a trademark of Digital Equipment Corporation

3. Proven Price/Performance



The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

The Perkin-Elmer 3240 is Faster than VAX.

Our 32-bit Model 3240 performed 44 out of 58 benchmark tasks faster than the more expensive VAX 11/780.

We matched our Model 3240 against the VAX 11/780 in 58 customer supplied benchmarks, comprising 697 million FORTRAN statements.

In 44 of the benchmarks, the 3240 performed *faster* than VAX.

Overall, the 3240 delivered an average 1.4 times higher performance.

Yet the 3240 configuration costs approximately $20,000 less than its corresponding VAX configuration.

All 58 FORTRAN benchmarks listed in Table 1 were submitted by our customers and prospects reflecting their application needs. Applications that deal with the same kind of problems you face every day.

All benchmarks were run on-site at various locations across the country. And all were run by vendor-trained operators.

In Table 2, we organized the benchmark results into nine common types of job classification, so you can see at a glance how the 3240 stacks up vs. VAX 11/780. (The ninth classification demonstrates the superiority of Perkin-Elmer's system software, in this case globally optimizing FORTRAN VII.)

As shown in Table 3, the story is simple and uncomplicated. The Perkin-Elmer 3240 outperforms VAX 11/780. And it costs less.

The 3240 is faster than VAX in another important way—we can deliver it faster.

We'd be happy to send you a sub-set of those benchmarks which are non-proprietary or have been released with permission, so you can run them yourself. We'll also send you hardware and software documentation.

Before you make a decision on any supermini system, get all the facts on the new 3240 from Perkin-Elmer.

The Perkin-Elmer Corporation, Marketing Communications,
2 Crescent Place, Oceanport, NJ 07757

Please send me ☐ complete information on the 3240
☐ documentation ☐ a sub-set of benchmarks.
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PERKIN-ELMER

Sprint 5 Gets Feeder, Stacker

SAN JOSE, Calif. — A cut paper feeder and stacker for Qume Corp.'s Sprint 5 terminal has been announced by the firm.

Designed with new electronics and the same mechanical structures as the Qume Speedfeed, the Speedfeed 5 is a single hopper feeder that automatically stores, inserts, ejects and stacks up to 220 sheets of paper in a variety of sizes, the firm said.

Installation of the Speedfeed 5 may require upgrading of some systems by a Qume service dealer. The feeder and stacker costs $1,000 with 30-day delivery from Qume at 2350 Qume Drive, P.O. Box 50039, San Jose, Calif. 95150.

Color Graphics Printer Has Built-In Auxiliary Computer

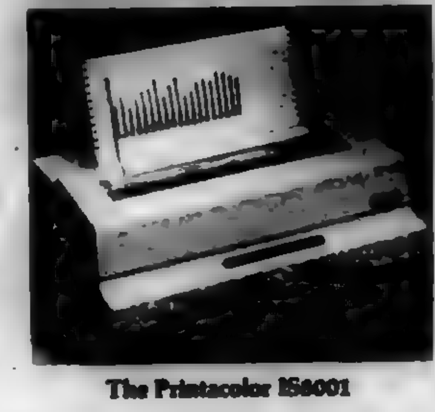
NORCROSS, Ga. — Printacolor Corp. has unveiled an intelligent color graphics printer terminal with an auxiliary computer enclosed within it.

The Printacolor IS8001 consists of a three-color ink-jet print head capable of giving graphics output. The internal computer enables it to interface with the host computer and limits dependency on the host, the vendor claimed.

The terminal has a 14-7/8-in. paper system with 70-char. capability and the printing head has 12 ink nozzles which print any of seven colors, by the overlay of three color inks.

Each of the three ink color jets has four nozzles.

The price for the product is $6,000, the vendor said from 5965 Peachtree Corners E., Norcross, Ga. 30071.



The Printacolor IS8001

Paperless Device Produces Braille From Cassettes

STUART, Fla. — A paperless device which reportedly produces braille from magnetic cassettes, computers and other information sources is available from Triformation Systems, Inc.

The Digicassette can be used as a notebook, audio recorder, calculator and word processor, the vendor said. It is equipped with high-speed search that permits the operator to call back lines of braille.

The seven-key keyboard includes six braille keys and one space key and is used to write braille. The heart of the system is the braille display with 20 braille char./line, each made of six dots which protrude silently.

The shape and size of the characters are identical to those of braille books. The price for the device is $4,350, the vendor said from 3132 S.E. Jay St., Stuart, Fla. 33494.

Career Courses Set for Fall

NORRISTOWN, Pa. — A career development program for executives, managers and information processing professionals was announced by William Maxwell, president of Maxwell Institute, Inc. Designed to provide advanced educational training with a minimum of time and expense, the course runs for six three-hour evening sessions.

The Deleware Valley-based training center also offers courses on data base concepts, management of application development, selection and implementation of a business minicomputer system, legal contracting with hardware companies, development of a DP auditing function and computer system fundamentals.

The cost of the Maxwell programs is $150 each. Further information can be obtained by contacting Bill Valinote at Maxwell Institute, 2860 DeKalb Pike, Northtowne Plaza Shopping Center, Norristown, Pa. 19401.

Federal Meet Features Ex-U.S. Navy Admiral

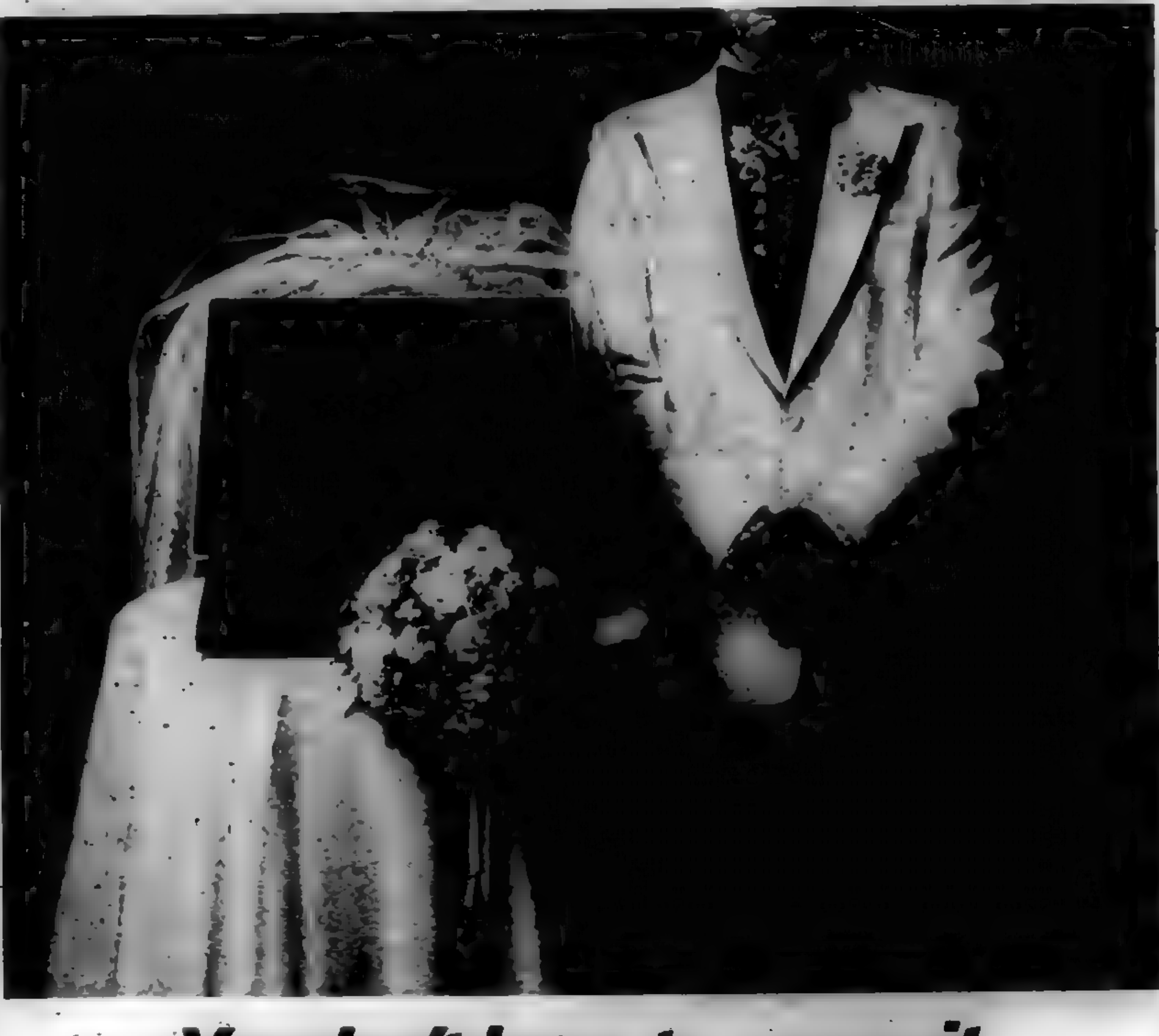
WASHINGTON, D.C. — Former U.S. Navy Rear Admiral Rowland Freeman III, administrator of the General Services Administration, will be the featured speaker at the Federal Computer Conference here on Sept. 22-24.

The conference was designed to help Federal Government ADP managers solve their productivity problems and give them an in-depth understanding of recent advances in information processing.

Oriented specifically toward ADP's role in making the Federal Government more efficient and accountable, the conference is expected to attract more than 9,000 attendees.

More than 80 speakers from both public and private sectors will take part. The latest in computers, peripherals, accessories, software and services will be on display.

Additional information is available from the Federal Computer Conference, P.O. Box 368, Wayland, Mass. 01778.



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All we ask is that you treat our terminals with respect, honor our standard purchase agreement terms, and take responsibility for freight charges.

But obviously we aren't worried about unrequited love. We wouldn't commit to the best guarantee in the business if we couldn't put you together with the best terminals in the business, from our teletype-compatible models to our interface-compatible models.

And to make our togetherness even cozier, we've coupled our 90 day guarantee to our standard 6-month warranty. Nobody can offer you a bond as strong as that, for love or money.

So take us on for 90 days. We may have the first honeymoon that never ends.

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For more information on GTC products and services, call toll-free today. In California: 800-432-7006. Anywhere else in the United States: 800-854-6781. Ask for Mary Hart. Or write Mary Hart at General Terminal Corporation, 14831 Franklin Avenue, Tustin, CA 92680. Telex: 910-595-2428. We have offices throughout the world. In Canada, contact Lanpar Ltd., 85 Torbay Road, Markham, Ontario, L3R 1G7. Phone: 416-495-9123. For a free reprint of this ad please write the GTC marketing department.

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Fold and insert order form (attached through binding) and remittance here.

Offerings Based On DEC Hardware

• *LSI-11/23-Based System Takes Floppy, Hard Disks*

MOUNTAIN VIEW, Calif. — Scientific Micro Systems, Inc. has introduced a system compatible with the Digital Equipment Corp. LSI-11/23 that supports both floppy disk storage and Winchester disk technology.

The Disk System 11X features an LSI-11/23 MPU, 128K bytes of random-access memory, four RS-232C serial ports and up to 2M bytes of floppy disk storage in a single enclosure. Storage can be expanded by adding a 26.4M-byte Winchester drive.

The 11X system is compatible with standard DEC RT-11 and RSX-11M operating systems. The addition of dual-head floppies reportedly doubles the storage normally available when running the RT-11 operating system offered on DEC's RX02 floppy diskettes. The device is also said to have a 40% faster disk access compared to DEC's single-head floppy drives.

Two Modes

The disk system contains a proprietary controller to interface between the LSI-11 Q-Bus and both floppy and Winchester-type drives. Two modes of operation are

(Continued on Page 68)

• *PDP-11/23 Offering Features RSTS/E, QDMS*

HARTFORD, Conn. — Two Digital Equipment Corp. PDP-11/23 configured systems which feature RSTS/E time-sharing software and include the QDMS Data Management System have been introduced by Quodata Corp.

Composed exclusively of DEC hardware, the Q610 and Q620 also feature local DEC field service maintenance contracts.

Aimed at smaller users or a department within a larger company needing a time-sharing system, the basic configuration consists of DEC's PDP-11/23 CPU, 192K bytes of MOS memory, a four port multiplexer and two removable disk drives all mounted in a 40-in. high cabinet. In addition each system includes a VT100 CRT terminal, the RSTS/E operating system with Basic-plus, QDMS Data Management System and complete installation by DEC.

The RSTS/E supports concurrent, interactive and batch processing, Basic-plus, Basic-plus II, Cobol, Fortran, Pascal, APL, RPG-II, PL/I and assembler languages. It can run on PDP-11/34, 11/44, 11/60 and 11/70 computers with as many as 63 independent user jobs and connections to 127 terminals.

With the QDMS Data Management System, users can build data files quickly and

(Continued on Page 68)

Gene Walker (left) discusses screen output with Bob Gensamer at VS console in DP department. Systems will be in operation 24 hours per day, seven days a week.

'Instead of posting job openings on a bulletin board, department heads will be able to access this information on-line at a workstation,' George Croop stated. 'At the touch of a button, VS/HRMS will generate a complete listing of employees with the required skills for available positions.'

Mini Has Hand Behind Scenes At Hotel Casino

Special to CW

ATLANTIC CITY, N.J. — While the roulette wheels, blackjack and crap tables are not computerized, a computer is playing a very big behind-the-scenes part here at Resorts International, Inc.'s newest gambling casino.

Since last year, the casino has been using a Wang Laboratories, Inc. VS minicomputer to track payroll for more than 5,000 people, monitor the number of hours each person spends on the casino floor and keep a running tab on each person's skills and job-related abilities. The minicomputer operates with Wang's Human Resource Management System (HRMS) software which is geared to monitor each facet of the casino's business from an individual worker standpoint.

"At the present time, we have input 42 different earnings types to our system," George E. Croop, director of Resorts International's financial accounting, said. "In addition, many members of our staff work at more than one job. For example, in the casino there are a variety of gaming tables."

Labor Monitored

Labor-hour tracking requirements are unique in a gambling casino and must be accurately monitored, especially from the viewpoint of the Casino Control Commission that monitors all of the on-floor activities at the establishment. Resorts International's Atlantic City casino currently has about 400 day dealers, 400 swing-shift dealers and a variety of pit bosses, floor people and box managers.

Like hours flown by airline pilots, accrued time worked by dealers at specific games can be as important as a college degree, according to Robert L. Gensamer, assistant controller at the organization's North Miami, Fla., office.

"In order to be promoted, each [dealer] must have a minimum number of hours at a particular game or multigame experience," he explained. "When a dealer decides to leave our hotel — which we hope won't hap-

(Continued on Page 70)

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Three Cities to Host Small Computer Show

ARLINGTON, Va. — Small business computers, software and office automation will be the focus of a four-day conference and exposition scheduled to take place this fall in three different cities.

Sponsored by The Information Exchange, the Mid-Atlantic Computer Show will be held in Washington, D.C., Sept. 18-21, in Chicago Oct. 16-19 and in Boston Nov. 20-23.

The event will be comprised of a series of lectures dealing with a variety of small business computing aspects. Featured speakers include Lewis Kornfeld, president of Radio Shack; John Davenport, president of Software Development Corp.; and S.R. Senkus, a program administrator with IBM.

Session topics will be aimed at the issues affecting the use of computers in a small business, business software, the advantages of automation, implementation and hardware and software trends, a spokesman stated. The keynote address, delivered by Radio Shack's Kornfeld, will deal with the importance and necessity of computers to the small business venture.

The entire event is geared for small business operating executives, managers of small DP departments and small computer users seeking to expand their current capacities. Fees for the full conference and exposition program are $245. However, special single-day rates for the first two days of the show are $145 per day.

Additional information on the show or registration forms can be obtained from The Information Exchange, Suite 400, 1730 N. Lynn St., Arlington, Va. 22209.

Z80-Controlled

System Hikes HP Mini Print Speed

MENLO PARK, Calif. — A microprocessor-controlled printer system that reportedly gives users of the Hewlett-Packard Co. 300/3000 Series 30/33 minicomputers printing speeds up to 1,800 line/min has been announced by BDS Computer Corp.

Allowing a system more than four times faster than the 400 line/min printer supplied by HP, the HPI-33 controller includes a Z80 microprocessor, an Intel Corp. 8291 talker/listener for interfacing with the general-purpose interface bus (GPIB) and associated memory and logic circuits.

The HPI-33 program includes program control mode, transfer mode and test mode operation. BDS supplies seven line printers.

Band printers range from 300- to 600 line/min; drum printers have 300-, 600-, 800- and 1,800 line/min speeds, and the Charaband printer runs at 1,250 line/min.

The HPI-33 costs $2,500, with printers ranging from $8,200 to $31,500, depending on speed and print technology. BDS is located at 1120 Crane St., Menlo Park, Calif. 94025.

Turnkey Aids Clothiers

WAYNE, Pa. — A turnkey minicomputer system for apparel manufacturers is available from Ketron, Inc.

The Apparel Management Support System includes a Qantel Corp. 220 minicomputer, a 12M-byte disk drive and a CRT terminal. It gives apparel manufacturers a fully automated cut size allocation system, a finished goods order allocation system and an automated pick slip generator, the firm said.

The system costs about $50,000 from the firm at the Valley Forge Executive Mall, 530 E. Swedesford Road, Wayne, Pa. 19087.

Floppy, Winchester Disks Backed

(Continued from Page 67)

possible, a spokesman noted.

The compatible mode provides complete DEC RX02 hardware, software and media compatibility. Standard DEC software will run on the 11X without any modifications to the device handlers. To access the Winchester disk and IBM-compatible floppy disks, the controller's extended mode can be utilized with an appropriate device handler.

The extended mode also increases system throughput. Rather than transferring only one disk sector per command, up to 65K-byte data blocks can be transferred in a single command.

Additional features of the system include test and diagnostic support, a menu-driven display and a diskette-based automatic boot for stand-alone programs.

Finally, either 13.2M or 26.4M bytes of formatted Winchester disk storage may be added to any disk system via a plug-in cable. Included with each 11X system are four rear-panel-mounted RS-232C connectors and an eight-slot backplane for additional power or customer-furnished LSI-11 modules.

Prices for the 11X with an LSI-11/2 start at $7,400 and $9,995 for the system with the LSI-11/23. Add-on Winchester storage prices begin at $3,800. Quantity discounts are also available from the company at 777 E. Middlefield Road, Mountain View, Calif. 94043.

System Based On PDP-11

(Continued from Page 67)

obtain reports from several files simultaneously.

The Q610 comes with two RL01 disks for 10M bytes of total on-line storage and costs $33,100. A Q620 includes two RL02 disks with 20M bytes on-line and costs $36,900.

Inquiries may be addressed to Myron Congdon, Quodata Corp., 196 Trumbull St., Hartford, Conn. 06103.

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The AS/5000 supports all IBM System/370 and 303X operating systems, including their extensions. The AS/5000 runs complete VM-ECPS, including EVMA, more than is offered on the IBM 3031.

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Another important feature of the AS/5000 is its advanced microcode architecture. Through microcoding, language functions become a part of the machine itself, rather than an element of the software. This feature allows performance enhancements such as MVS/SE and VM-ECPS to be implemented, and allows the AS/5000 to remain compatible with any additional enhancements to existing IBM systems. We provide what you really need – on-going compatibility to protect your sizeable investments in systems, software and training.

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AS 5000

Mini Plays Behind Scenes at Resort Casino

(Continued from Page 67)

pen. — we must supply the new employer with a notarized record of hours worked . . . an extremely important function in the licensing and promotion process."

Skills Bank

One of the more integral parts of the VS/HRMS is a skills bank that keeps a continually updated inventory of each staff member's training, education and experience. Information from this bank can be retrieved immediately as a need arises. For instance, if the organization were searching internally for a technician who has had some training in computers, the HRMS would pinpoint those with degrees or academic experience.

Keeping an up-to-date file on employees is necessary because the Casino Control Commission maintains that a casino must try to promote from in-house before going to outside sources.

Also, "before an individual can start on the casino floor, he or she must be cleared by the commission," Gensamer continued. "It is important that we maintain follow-up on these licenses and their renewals, as well as in the work permits of all employees."

Like any business-oriented system, the VS handles payroll for the 5,000 people currently on hotel/casino's staff and will be able to accommodate the 7,000 more people expected to be hired within the next two-and-a-half years. Presently, 23 different payroll deductions reside on the VS and the system can print some 10 different types of earnings on an employee's check. The computer has also reduced the amount of paper floating around Resort International's management by about 90%.

Other Applications

Other potential financial applications include general ledger, accounts payable and job costing, Gensamer said. By-products of the system include a car-pooling system for matching riders, drivers and shifts and a VS word processing option that will be used in credit collection and casino control regulation violation reporting.

At the moment, the Wang VS computer has two 288M-byte disk drives, a tape drive, a 600 line/min printer and six CRT workstations. Three terminals are located in the Payroll Department, and one is situated in each of the casino personnel, development and DP departments. Cobol, RPG-II and Basic are being used from the VS language repertoire. But hardware and software expansion is definitely in the cards.

For instance, having workstations directly on the casino floor is one possible avenue of expanding the system.

"We presently track, manually, about 22,000 different numeric forms per day," Gensamer noted. "Although you can't computerize the games, there is a certain amount of paper going through the games over which you must maintain numeric control."

Possible Advantages

At some point in the future, there could be some advantages to having a computer-link right in the gambling pit, he pointed out. For instance, "they could be used to process credit verification — for people who gamble on credit or with customer checks — for the 22,000 credit files we maintain."

But, before bringing computers to the roulette and blackjack tables, there are many other applications for system expansion that may occur first. Resorts International is a multicompany organization comprised of more than 25 firms in the U.S. and in the Bahama Islands.

TRACTOR FEED
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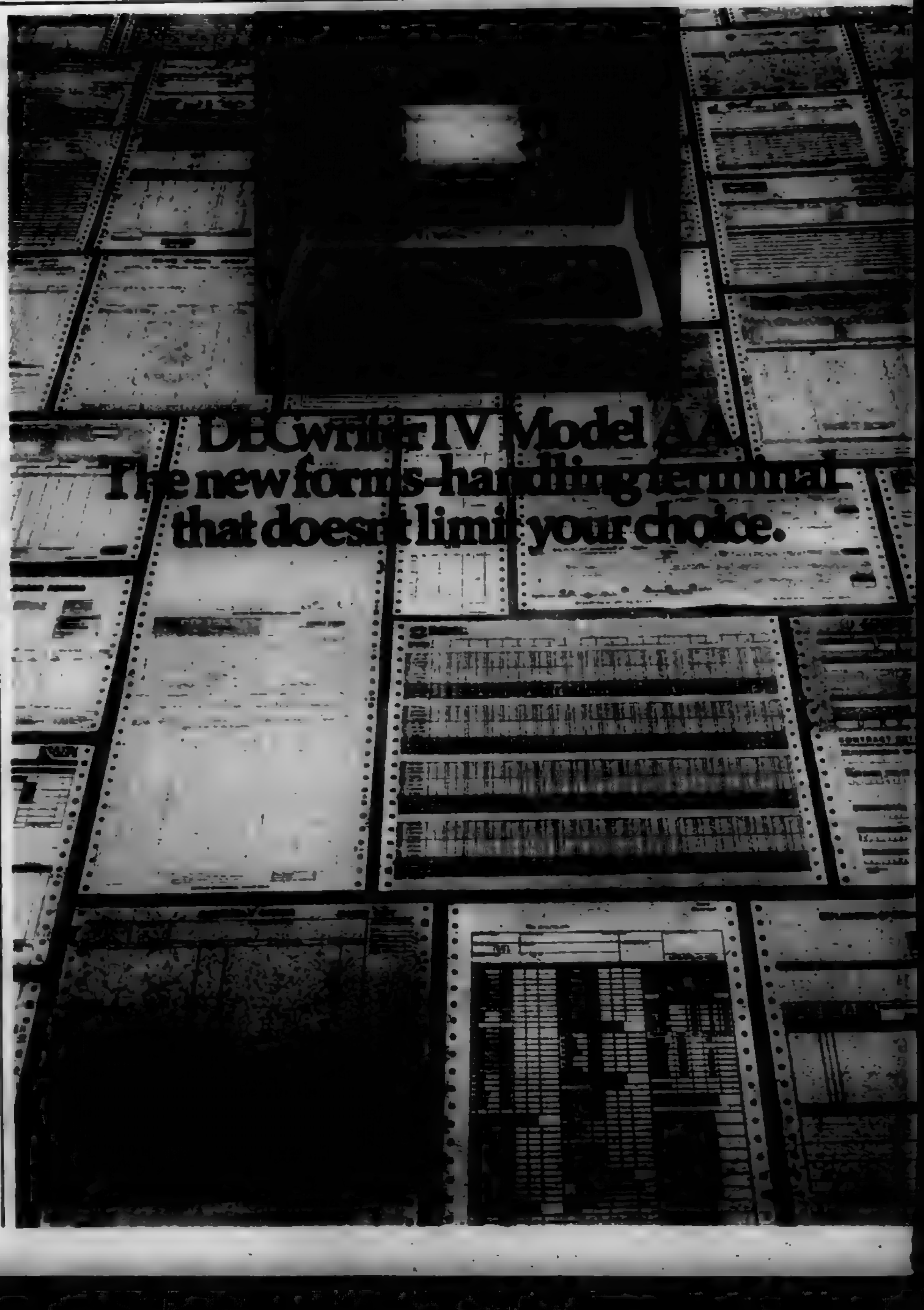
DECwriter IV Model AA
The new forms-handling terminal that doesn't limit your choice.

Floppy Loading Automated

SANTA ANA, Calif. – An automatic floppy disk loader designed for data certification, initialization, batch terminal data storage, error logging and program spooling from magnetic tape or disk has been unveiled by Media Systems Technology, Inc.

The Media Loader subsystem is software-driven and features a stacking capacity of up to 50 diskettes in any size and single- and double-density configurations.

Individual diskettes are fed through an input hopper and then accepted or rejected into respective output hoppers after completion of a read or write function, a spokesman said. In addition, the device contains a halt-on-reject feature which is said to enable an operator to stop the automatic sequencing of diskettes with the last diskette in the output hopper. Up to eight loaders can be used by a single operator in a system.

The Model 100S media loader, for 8-in. diskettes, costs $4,075 for the single-sided version and $5,370 for the double-sided model. The 050W loader, for 5.25-in. floppies, costs $4,675 for the single-sided and $4,875 for the double-sided version.

Media Systems Technology is located at 1616 S. Lyon, Santa Ana, Calif. 92705.

McAuto Hospital System Based on Microdata Gear

ST. LOUIS – McDonnell Douglas Automation Co. (McAuto) has announced a minicomputer-based financial information system which it claimed was designed to eliminate the risks often associated with hospital establishment of in-house computer operations.

The Mini-Based Hospital System (MHS) combines computer equipment manufactured by Microdata Corp., a subsidiary of the McDonnell Douglas Corp., and software developed for hospitals.

"With MHS, it is not necessary for the hospital to hire computer specialists," a McAuto spokesman said. "Interactive system prompting and step-by-step instructions enable existing hospital personnel to quickly learn the procedures for the Microdata computer equipment used by MHS."

The approximate costs of MHS should range from $4,000/mo to $15,000/mo, depending on hospital size, volumes and options selected. McAuto can be reached at P.O. Box 516, St. Louis, Mo. 61366.

Controllers Use 6800s

NASHUA, N.H. – Functional Automation/Gould, Inc. is offering a line of programmable controllers that can be used to link multiple minicomputers in distributed networks or energy management systems.

Cyblok consists of two 6800 microprocessors. One handles applications processing while the other handles I/O processing, the vendor said.

Each unit in a Cyblok is a control point capable of operating independently or with other CPUs in its own or other Cybloks. The unit's data base is partitioned so there is no specific file location, a spokesman added.

Cybloks cost around $20,000 each, the vendor said from 3 Graham Drive, Nashua, N.H. 03060.

Power Unit Bows

PLAINVIEW, N.Y. – The Voltector Series 5 ac power conditioners from Pilgrim Electric Co. remove electrical disturbances from the power line to protect minicomputers and microcomputers, according to the vendor.

The Voltectors come in models ranging from 1A to 20A and range in price from $148 to $393.

Pilgrim Electric is at 29 Cain Drive, Plainview, N.Y. 11803.

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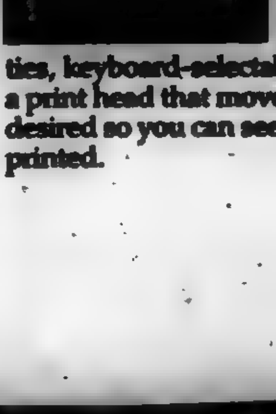

You probably know the DECwriter IV for its flexibility in handling paper.

Well, now you can have that same flexibility in handling forms.

The new DECwriter IV Model AA with its snap-in tractor feed option can automatically handle both standard and custom forms. Forms as wide as 14⅞". And as narrow as 3". In up to four parts.

And you can control this new terminal either directly from its keyboard or from a computer.

With the DECwriter IV Model AA you can condense characters down to 16½ per inch. Or expand them up to 5 per inch. On a field of 132 horizontal and 84 vertical tabs. And a simple setting also lets you super-condense lines down to 12 per inch. So you get more information per line, per form.

You can also be sure of synchronized printing from one form to the next, no matter what form you're using. Because with the DECwriter IV Model AA you program "top of form." And parity is easily selected at the keyboard, simplifying communication with other computers.

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Of course the new DECwriter IV gives you switch-selectable 110 and 300 baud rates. And a 45 CPS catch up rate so you get the true 30 CPS throughput found on our original DECwriter IV Model DA. You also get the extra attention to features you expect from Digital. Like foreign character printing, super/sub-script capabilities, keyboard-selectable local echo, and a print head that moves aside when desired so you can see the last character printed.

Best of all, Digital has put all this capability into a terminal that fits right into a wide range of environments—either on its custom stand or on a desktop. And the DECwriter IV's solid-state components and microprocessor controls continue to build on the reliability standards set by the DECwriter II. All at a surprisingly low price.

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To order your DECwriter IV Model AA, or the original DECwriter IV Model DA, call your terminals supplier or write Digital Equipment Corporation, Terminals Product Group, MR2-2/M67, One Iron Way, Marlboro, MA 01752. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment Corporation of Canada, Ltd.

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The list of IT's special features could go on all afternoon. Outstanding among them are the two pages of display that are standard with IT. Use them both and get up to 3840 characters of display potential. Or, allocate the second as a print buffer and be sending data on page two while entering data on page one.

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With IT, specific areas are designated as protected fields. They can't be typed over unless you remove the terminal from the protected mode. Even your remote computer can't overwrite the protected fields until IT is removed from the protected mode. Background (protected data) can be displayed at a lower intensity, while foreground is displayed at normal intensity and may be modified. You can even tab the cursor forward and backward to the start of each unprotected field.

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Also on IT, full or half duplex operation is switch and keyboard selectable. You can also choose from conversation or block transmission, which can be initiated by you or the computer. In block mode, a line, a message or a page can be transmitted in its entirety.

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IT's editing capabilities allow you to clear the screen, or use the cursor for a character change. In addition, IT comes complete with character insert and delete, line insert and delete, erase to end of line/field/screen, and tab and back tab. IT's full controls also allow you to skip protected fields, backspace, forespace, move up, down, return, home, and new line.

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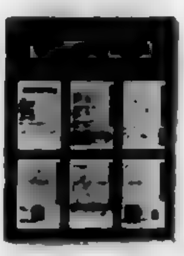

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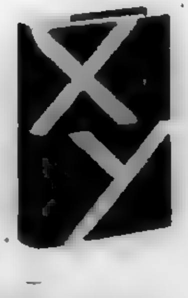

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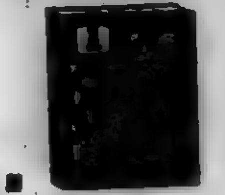

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Getting the Most From Trade Show Dollars?

By Jeffry Beeler
CW West Coast Bureau

IRVINE, Calif. — True or false: One of the surest ways to win new customers and develop sales leads during trade shows is to stock your company's exhibit booth fully with product literature and keep the material in plain sight at all times.

True or false: a trade show exhibitor can attract a greater than usual number of qualified customers and thus increase its sales opportunities by opening a conveniently located hospitality suite and inviting all interested visitors to come by for free snacks and drinks.

If you answered "false" to both of the above questions, go immediately to the head of the class; you're absolutely right.

But if you answered "true" and if you have a hand in planning your company's trade show participation, chances are good your firm is wasting at least some of its resources at major industry gatherings like the National Computer Conference.

Matchless Opportunities

Trade shows provide high-technology companies a nearly matchless opportunity to showcase seldom-displayed products, generate new sales leads, make friends with members of the press and corral large numbers of otherwise inaccessible new customers.

Yet at the same time, the cost of renting booth space and of trade show participation in general has soared to dizzying heights.

So failure to make the most of their trade show appearances can cost high-technology exhibitors dearly, both in squandered expenses and in lost business opportunities.

But exactly how can a company's effec-

(Continued on Page 80)

By 1990, ADL Projects

Communications Mart Seen Doubling

CAMBRIDGE, Mass. — The worldwide telecommunications equipment market will more than double by 1990, with Asia setting the pace, according to a two-year study by Arthur D. Little, Inc. (ADL).

Specifically, the world market is expected to grow from an estimated $40 billion in 1980 to about $87.5 billion (in constant 1979 dollars) by the end of the decade, at an annual rate averaging 8.5%.

With a projected growth rate "well above the world's average," according to ADL, the Asian region will grow from 1980's estimated market of $10 billion to $27 billion in 1990.

The Asian spurt will come chiefly from heavy capital investments planned by five countries — the USSR, Japan, Korea, China and Turkey — according to Edgar A. Grabhorn, senior ADL telecommunications expert, who directed the World Telecommunications Study II 1980-1990.

A 1970 ADL world telecommunications study, also directed by Grabhorn, accurately predicted the current worldwide $40 billion market, according to the firm.

Russian Market Studied

Included in the current four-volume report is the first English language in-depth survey of the Russian market, ADL claimed, which points out that the USSR currently accounts for one-third of the Asian telecommunications equipment market.

The $3.5 billion size of the USSR market is partly obscured by the fact that much of the equipment is obtained through barter with Eastern European countries, Grabhorn observed.

Somewhat behind U.S. developments in television via satellite, the USSR is following a similar pattern of installing hundreds of receive-only earth stations, primarily to service remote communities. On the other hand, there are about 20 million telephones in the USSR for an estimated population of 268 million vs. 175 million telephones in the U.S. for a population of 224 million, the study found.

With about 30% of the world telecommunications equipment market by 1990, Asia is expected to have surpassed the European region and be second only to North America in size. In some cases, the country representing the largest market within a region will be displayed by another country in 1990, the study projected. For example, Russia is expected to replace Japan as the largest market in Asia.

The study breaks telecommunications equipment into six system categories: telephone; telegraph, telex and data communications; satellite communications; mobile radio and radiotelephone; radio paging; and CATV.

Grabhorn sees the proliferation of more sophisticated semiconductor devices, particularly large-scale integrated circuits, as one of the technological forces driving the continuing explosion of markets for telecommunications; mobile radio and radiotelephone, radio paging; and CATV.

(Continued on Page 82)

Offer Valued at $60 Million

NCR Beats Mitel in Bid for Adds

HAUPPAGE, N.Y. — NCR Corp. and Applied Digital Data Systems, Inc. (Adds) have reached a tentative agreement by which NCR will acquire the CRT terminal manufacturer located here.

Adds' board of directors met to discuss the NCR offer Aug. 26 and announced their acceptance the following day, according to a spokeswoman there.

Under terms of the agreement, NCR will pay $12 a share for the approximately 4.7 million Adds common shares. NCR will also pay $27 a share for the company's 162,549 convertible preferred shares.

The NCR offer is valued at about $60 million, some $5 million more than Mitel Corp., the only other bidder, offered.

No effective date for the transaction has been announced yet and Adds is awaiting a formal NCR offer.

Bryce Verdict Reaffirmed

MILWAUKEE — An appeals court judge here has affirmed a jury verdict that Arthur Young & Co. misappropriated the trade secrets of M. Bryce & Associates, Inc. when preparing a DP standards manual for one of its clients.

The jury decision was first affirmed by a circuit court judge here [CW, April 28] before it was appealed by Arthur Young & Co. to the appellate court, where Judge Leander J. Foley reaffirmed it.

Bryce filed the original suit in 1974, charging that Arthur Young stole a proprietary methodology Bryce had developed for designing DP systems. The accounting firm learned about the methodology, packaged first in a manual and later automated and called Pride, during a presentation Bryce made to the Harley-Davidson Co., an Arthur Young client, according to Andrew Riteris, Bryce's attorney.

Riteris expects Arthur Young to appeal Foley's decision.

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Hughes Aircraft Co. Gets AT&T Satellite Contract

WASHINGTON, D.C. – AT&T has awarded a $137 million contract to Hughes Aircraft Co. covering construction of three communications satellites. Each will have a capacity of 21,600 simultaneous telephone conversations or 24 TV programs.

The satellites will be used for long-distance toll and Wats services and for any other authorized service "where the characteristics of satellite transmission might best satisfy customers' special needs," the phone company said.

The first of the Telstar 3 satellites will be launched in 1983, the second the following year and the third in 1985 or 1986. They will replace the three Comstar satellites which AT&T, together with GTE Satellite Corp., now leases from Comsat General Corp.

Pergamon International Corp. has concluded a 10-year agreement with the USSR for the compilation and exclusive distribution of modern English language abstract services and on-line data bases in science, technology and engineering. Under the agreement, Pergamon will utilize the extensive resources of Viniti – the world's largest abstracting service covering all fields of science, technology and engineering – to create jointly new abstract and computerized data base information services.

Other Awards

Lambda Biosystems, Inc. of Englewood, Colo., has been awarded a contract to place a multiuser computer system in the laboratory of St. Joseph Mercy Hospital, Mason City, Iowa.

Digital Equipment Corp. has received a $12.8 million contract from the National Institutes of Health for multiprocessor mainframe computer systems and peripherals.

The Corporation for Applied Systems, Bethesda, Md., has been awarded a two-year contract valued at almost $1 million by the Veterans Administration to provide ADP Technical Support Services to the VA's Benefit Systems Support Service and its several nationwide data centers.

Contracts

Tandon Magnetics Corp. has announced the signing of a multiyear agreement with Hewlett-Packard Co. for its TM-100 5.25-in. floppy disk drives for use in HP's computational products.

Softech, Inc. has been awarded a $590,403 contract by the U.S. Air Force Avionics Laboratory at Wright-Patterson Air Force Base, Dayton, Ohio, to participate in the development of a High-Level Language Machine, an advanced avionics computer that can execute high-level language statements.

Codex Corp. has signed a contract with Utah State Information Systems Center for LSI 48FP/LSI 96FP modems and technical control facilities.

Great American Insurance Companies of Cincinnati has signed a contract to license Policy Management Systems' Series II family of systems.

Cullinane Corp., Wellesley, Mass., has contracted for the McCormack & Dodge financial software products and plans to convert them to run under the IDMS data base management system.

Integral Business Computing has signed a $200,000 contract with Nordair Ltd., of Toronto for its Tours computerized reservation system.

Nickels & Dimes

Amdahl Corp. has filed a registration statement with the Securities and Exchange Commission relating to the proposed public offering of 1,350,000 shares of common stock. The First Boston Corp. has been named manager of the underwriting syndicate.

In addition, Amdahl Corp. will sell 650,000 shares of its common stock to Fujitsu Ltd., a principal stockholder which presently owns 32% of the company's outstanding common stock.

$ $ $

Timeplex, Inc. has filed a registration statement with the Securities and Exchange Commission relating to a public offering of 548,288 shares of its common stock, of which 500,000 shares are to be offered by the company and 48,288 shares are to be offered by several selling stockholders. The company anticipates the offering will be made in September. The proceeds from the sale will be used for capital expenditures and working capital.

$ $ $

Modular Computer Systems, Inc. has filed an application for the listing of its common stock on the New York Stock Exchange. The company anticipates that trading on the Exchange will begin on or about Sept. 17.

$ $ $

Wang Laboratories, Inc. has filed a proposed offering of $100 million convertible subordinated debentures due in 2005.

$ $ $

Informatics Inc. has been advised by the Equitable Life Holding Corp. that the Holding management intends to recommend to its board of directors that Holding make a secondary public offering of the 1,267,250 shares (61%) of Informatics common stock that it owns.

$ $ $

Harris Corp. has declared an 11% increase in the quarterly dividend to 20 cent/share from 18 cent/share, raising the annual rate to 80 cent/share compared with the previous 72 cent/share. First dividend at the higher rate will be payable Sept. 19 to shareholders of record Sept. 5.

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"We've developed an online order entry system with one-third the effort... and the application is much more polished. We're very pleased."—Larry Brenner, Director, Corporate Information Services, United Merchants and Manufacturers, New York City.

"The System/38 significantly reduced the amount of code necessary to write a program and the time and effort required to move into new applications. We're extremely enthusiastic."—Larry Petterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

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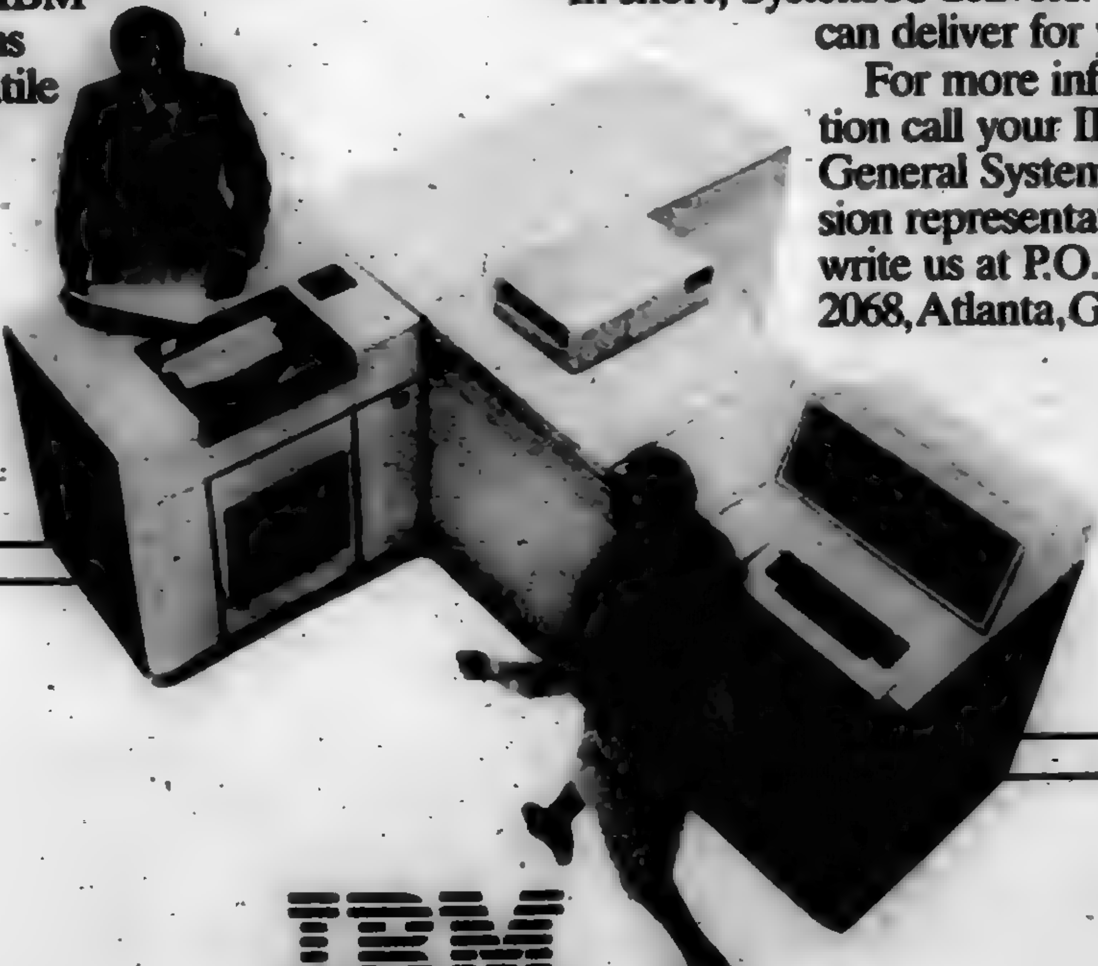

IBM

General Systems Division

Getting the Most From Your Trade Show Dollar?

(Continued from Page 75)

tiveness at trade shows be improved to minimize its costs and maximize its payback? What obvious but often ignored sales techniques should an exhibitor be employing, and what common pitfalls should be avoided?

In hopes of getting answers to these and similar questions, representatives from about a dozen frequent trade show exhibitors converged here recently for a one-day seminar entitled "Getting the Most from Your Trade Show Dollars."

The seminar, sponsored by Westly Enterprises, Inc., a Palo Alto, Calif.-based conference organizer, showed attendees how their companies can boost their effectiveness as product exhibitors by following simple tips such as setting the right trade show objectives, designing an appropriate booth, using correct sales techniques and taking advantage of show services.

Each of the meeting's seven speakers urged exhibitors to follow a few commonsense "do's" and "don'ts" for maximizing their trade show dividends. Some of the recommended do's and don'ts include the following suggestions.

Don't attend an industry conference simply because your competition will be there. Trade show participation should complement a company's strategic marketing and sales objectives. If exhibiting at a conference fits in well with those objectives, a company's presence at a trade show might be justified. Otherwise, a firm should stay home, regardless of what its competition decides to do.

Hospitality Suites

Control the use of hospitality suites. Only a relatively small part of the expense of running a hospitality suite goes toward promoting future sales and attracting qualified new customers. The rest of the cost is generated by freeloaders and by a company's own personnel, lured by the promise of free food and drinks.

To hold down unnecessary expenses, show exhibitors should avoid widely publicizing their hospitality suites, nor should the suites be treated as social gathering places or entertainment centers. Rather, they should be used as conference rooms where vendor salesmen and prospective customers can meet privately to discuss the visitors' business-related problems and explore potential solutions.

Don't keep product literature in your exhibit booth, but if you do, at least make sure the material stays well concealed. The main purpose of exhibiting at a trade show is to get as many qualified customers as possible to stop at your booth and inquire about your product line. Such visits give booth personnel an opportunity to record the visitors' names and phone numbers and thus generate new sales leads.

When product literature is conspicuously displayed, however, prospective customers no longer have an incentive to stop at a vendor's booth and chat. They simply grab a handful of brochures and proceed to the next exhibit.

Study Finds 81% Buy After Seeing NCC

NEW CANAAN, Conn. – Attendance at a major trade show is followed by the purchase of one or more items that had been exhibited, a research report released by the Trade Show Bureau at the Washington meeting of the National Trade Show Exhibitors Association indicates.

Don Vaughn, bureau president, told the meeting that a study of those who had attended the 1978 National Computer Conference in Anaheim, Calif., found that 11 months after the show, 69% had already made a purchase; within the following year, 81% of all attendees would have bought something shown at the show.

The average purchase had reached $254,100, and about two-thirds of these had been influenced by the show visit.

Copies of the report are available without charge when requested on business letterhead from the Trade Show Bureau, 49 Locust St., New Canaan, Conn. 06840. The complete research study is available at $30 per copy.

Supershorts

A U.S. Bankruptcy Court has confirmed Inforex, Inc.'s plan of reorganization subject to completion of its pending acquisition by a subsidiary of Datapoint Corp.

– – –

Alanthus Corp. said that during the month of June it arranged leases for IBM 3033 mainframes valued at approximately $20 million.

– – –

Cipher Data Products, Inc. has donated electronic components valued at more than $110,000 to the colleges of science and engineering at San Diego State University.

– – –

National Semiconductor Corp. plans to open a semiconductor wafer fabrication plant in Arlington, Texas, in early 1982.

– – –

Neoterics, Inc. has reached an agreement in principle for its merger into the Computer Task Group, Inc.

– – –

Control Data Corp. has formed a business venture with a client, Compagnie Generale de Geophysique (CGG), to supply the petroleum industry with a system made up of CDC hardware and CGG software.

– – –

Information Design and Human Engineering in Chicago has formed a division to provide planning and human engineering services for hardware and software firms.

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TTY 43 [illegible]	[illegible]	[illegible]	[illegible]
HAZELTINE [illegible]	[illegible]	[illegible]	[illegible]
HAZELTINE [illegible]	[illegible]	[illegible]	$ 77.00
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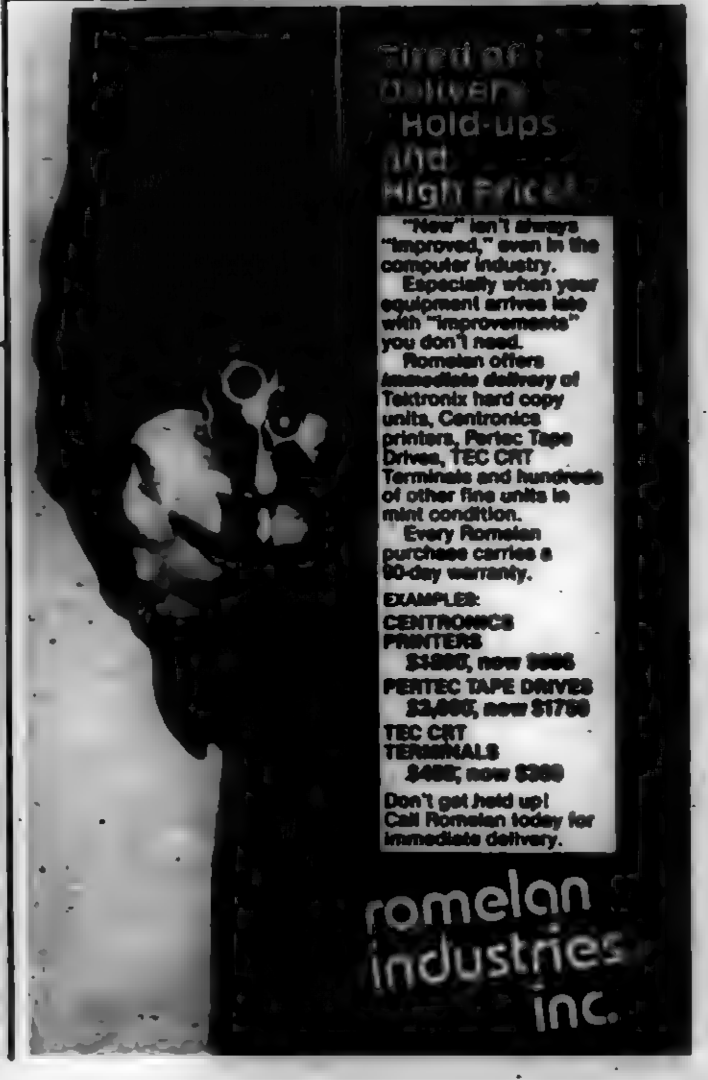

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Market Far From Saturation

France Leading Services Supplier in Europe

By Bohdan O. Szuprowicz
Special to CW

Western Europe's information processing services markets have been growing faster than comparable markets in the U.S. in recent years.

Although Ireland is expected to show the fastest growth — at 60% — during the 1978-1979 period, France is by far the largest European supplier of such services, accounting for almost a quarter of the $5.7 billion market and still growing at a healthy 28% annually.

The results of a study made by the European Computing Services Association (Ecsa), which represents most information processing services and consulting organizations in Western Europe, pointed out that the European market is still far from saturation.

In comparison with the American experience, the value of those services relative to the gross domestic product of Western Europe is only 75% of comparable ratio for the U.S. But the Western European market is growing at almost 16% annually as a whole, while the American growth is now down to just under 13% per year.

If such uneven growth continues for a few more years, Western Europe will catch up with the American market in size in about 1983, when both will approach $12 billion in annual sales.

Specific to the European information processing services business is the fact that although IBM is also the largest supplier of such services, it does not enjoy anywhere near the market share it has in production and marketing of computer hardware. This in itself opens up the possibility for many enterprises to enter the field and compete vigorously for a market share.

Fragmented Market

The European market is in fact much more fragmented than that of North America because it consists of at least 15 different national markets, each with its own peculiarities and opportunities that are creating best prospects for domestic organizations.

This explains why the top 50 European information processing services organizations can boast no more than 39% of the total market, while comparable market share of the top 50 American suppliers is almost twice as large.

Among the top 30 suppliers of information processing services in Europe are 15 French organizations, four of which — namely, GSI, CAP/Gemini/Sofeti, Cisi and SG2 — are among the five European suppliers. IBM is, of course, the largest single supplier, but it is considered an American company even though it generated and sold almost $370 million of information processing services in Europe during 1978.

The French suppliers as a group led all the other European countries with more than $1.3 billion in sales during 1978. The country closest to France in sales is West Germany, where information processing services and consulting sales have been estimated at almost $950 million.

The UK, Italy, Sweden and the Netherlands are the next largest information processing supplier nations, while Ireland and Portugal are the smallest two markets in the group, valued at only $32 million and $15 million, respectively, in 1978.

France's continued leadership as the largest supplier of information processing services is not entirely unexpected.

Even during the "Plan Calcul" days of the 1960s, when the French government was supporting the fledgling French domestic hardware industry, it became clear that France has neither the technology nor the market base that could hope to compete effectively with foreign (mainly American) suppliers.

At that time French DP circles and the government determined that software in all its forms would become a large and significant market as DP usage developed.

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Telecommunications Mart Seen Doubling by '90

(Continued from Page 73)

sist of advances in optical fiber manufacturing, computer system architecture and satellite communications components and subsystems.

"The outstanding technological event in the 1980s for the telephone systems industry will be the widespread introduction of digital switching at the local exchange level," Grabhorn predicted. "Every manufacturer of switching equipment is heavily committed to this approach in developing new products. With few exceptions, carriers of all sizes around the globe will adopt digital switching technology during this decade."

Grabhorn also expects short-haul digital transmission to increase more rapidly. While long-haul transmission will vary greatly from country to country, Grabhorn believes that single-mode optical fiber holds great promise as replacement for terrestrial and submarine coaxial cable. In addition, he foresees greater use of domestic satellites designed for special functional applications and a proliferation of stored program-controlled private branch exchanges (SPC PBXs).

The study predicted tremendous growth in the use of satellites for long-distance transmission, with more than a fourfold increase in Intelsat usage by 1990 (up to 200,000 voice-grade half-circuits). Efficient use of the scarce radio spectrum will be achieved by mobile radio communications equipment featuring automatic vehicle identification, digital squelch, digital status reporting and frequency synthesis, according to the study.

World Analysis

Grabhorn believes the competitive environment within regions and countries will vary greatly during the 1980s. It will be determined largely by national policies and international marketing aggressiveness.

Analyzing the six telecommunications regions (North America, Europe, Asia, Latin America, Oceania and Africa), the study highlighted the following conclusions:

- Competition for the relatively homogeneous North American market (the only region for which private carriers provide most telecommunications) will center in the private buyer sector. This market is projected to be about $6.5 billion in 1990.
- Additional restructuring of European markets is possible in this decade, continuing the shifts in market shares which occurred in the last decade.
- The Japanese will continue to invade Asian markets dominated in the past by European and U.S. suppliers.
- In Latin America, the broadest competition will be in the interconnect market sector for equipment that can be attached to public systems.
- Oceania will continue to deal with large numbers of suppliers and remain an open market, amounting to about $1.4 billion in 1990.
- As a developing region, Africa represents a growing market for all major suppliers.

World Telecommunications Study II 1980-1990 was completed by Grabhorn and five other key project team members, who conducted 42 in-country surveys and an analysis of more than 90% of the world's telecommunications market. Cost of the study to ADL subscribers is $29,000; the firm is located at Acorn Park, Cambridge, Mass. 02140.

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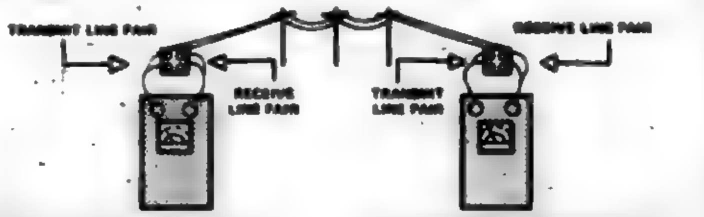

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Acquisitions

Triumph Adler Activities Consolidated Into Pertec

LOS ANGELES – Computer product development, marketing and service for two subsidiaries of Triumph Adler, Inc. are being consolidated into Pertec Computer Corp.

Thomas H. Elrod, Pertec senior vice-president, said 200 people at more than 20 Royal Computer Systems domestic field and headquarters locations are already in the process of integrating into the Pertec systems marketing and service divisions. Integration of computer-related activities for Triumph Adler's Pertec and Royal units into one organization will strengthen the channels of distribution, product development and field support activities in the U.S., he added.

The resulting domestic computer systems organization will continue to market the 8000 and 9000 series of small computers developed by Royal as well as the PCC 2000 small business system manufactured by Pertec. Field service personnel will be cross-trained to support Pertec products and the 8000 and 9000 series of computers as well as various other computer products previously serviced by the Royal computer products organization.

Pertec is a wholly owned subsidiary of Triumph Adler, which in turn is owned by Volkswagen AG.

Other Moves

EG&G, Inc. has acquired Almond Instruments Co., Inc. through an exchange of common stock. Almond Instruments, located in Covina, Calif., develops and manufactures custom power conversion systems.

Digital Scientific Corp. has acquired Computer Office Systems, Inc., producer of an office business and word processing system.

Total Systems, Inc. has acquired Performance Systems of Indianapolis, which specializes in computer resource monitoring.

National Data Corp. has announced an agreement in principle for the acquisition by National Data of Cisco, Inc., a financial DP subsidiary of the First National Bank of Atlanta.

Automatic Data Processing, Inc. has acquired Business Systems Research, Inc., a supplier of computerized tariff data bases and accounting and documentation systems.

Anacomp, Inc. has completed the acquisition of Computer Management, Inc. for stock and cash totaling $1.4 million.

Tandy Corp. has reached an agreement in principle with the shareholders of Lika Corp., manufacturers of double-sided and multilayer printed circuit boards, to acquire Lika for $4.5 million in cash and notes.

Remote Computing Corp. has completed negotiations for the acquisition of Fiscal Recovery Associates, Inc. of San Mateo, Calif.

Sytek, Inc. has acquired Network Resources Corp., a data communications equipment firm specializing in broadband cable television interface hardware and related technologies.

Cuadra Associates, Inc., a Santa Monica, Calif.-based R&D firm specializing in on-line data base systems and services, has acquired the staff and resources of Knowledge Resource Consultants, library systems specialists.

Projected $2 Billion for 1985

Exxon Expected to Make It Big in Information

NEW YORK — Despite current problems with management defections and antiquated word processors, Exxon Corp. will stick it out and make it big in information, according to a report published by Northern Business Intelligence, Inc., a market research firm based here.

Major advancements in word processing, DP, computer components, telecommunications and electronic funds transfer (EFT) systems will put Exxon back on the leading edge, the report said. Northern further speculates that Exxon information sales will top the $2 billion mark by 1985.

Exxon office product ventures — Qwip, Qyx and Vydec — all achieved early market success, but recently Exxon has been losing ground, particularly in word processing. Despite the introduction of the new 2000/4000 word processors and Netword shared resource system, Vydec will have problems regaining market share, the report said.

Xonex, another Exxon company in the development stage, may become Exxon's star in the word processing field, overshadowing both Vydec and Qyx.

Committed to Micro Systems

Exxon is committed to microcomputer system development through Zilog, Inc. and the recently formed Summit. Zilog has just introduced an Ethernet-type networking system for its micros, and Northern speculated that Zilog may soon supply end-user markets.

Northern predicted that Exxon's office product sales will grow from $146 million in 1979 to $695 million in 1985.

While full systems integration is some time off, Northern said Exxon is paying close attention to integrating the organizations of its disparate information operations and to developing networking capabilities. Four distinct paths to systems integration are being pursued. Northern believes software development may be Exxon's biggest problem in tying the loose ends together.

Through Dialog, Kylex, Inc., Magnex Corp., Zilog and others, Exxon is leaving essentially no stone unturned in components and subsystems for information processing, storage, display and entry, Northern said. Component sales were forecast by Northern to grow rapidly from their 1979 level of $49 million.

Exxon has launched a broad assault on the telecommunications business, the research firm reported. Intecom, Inc., a new venture, has announced its first product: an advanced data/voice switch.

(Continued on Page 84)

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Case for Intangibility

Software Tax Proposal Blasted in Bay State

By Marguerite Zientara
CW Staff

BOSTON — A proposed regulation of the Massachusetts Department of Revenue that would tax off-the-shelf software, time-sharing, keypunching, data conversion and some output services came under heavy fire last week at a public hearing here.

After an impromptu change of venue due to the unexpectedly large attendance — more than 100 people overflowed a room designed to hold 50 — Tax Commissioner L. Joyce Hampers opened the hearing at which 15 businessmen, both DP and non-DP, pleaded their case for the intangibility of software and services.

Software may be entered into a computer directly or via telephone lines with no tangible personal property and with the identical result as if tangible property were used as the input communications medium, software tax hearing veteran Robert M. Sherin, nonjudicial legislative adviser for the Data Processing Management Association (DPMA), told the tax commissioner.

This point was the first of five key arguments used successfully by the DPMA in New York, Florida, Rhode Island, Wisconsin and Michigan.

DPMA Presents Case

Furthermore, the DPMA argued:

- Such communications media are merely an intermediate means of entering software into a computer on a one-time basis before it is transformed into its intangible end state of binary pulses.
- Tangible property, if any, is either destroyed or reused after being used to transfer the intangible information therein to the computer on a one-time basis, leaving instructions (program) and information (data) in the computer in the form of binary pulses as the intangible end state.
- The value of such tangible property is small — 5% or less — in comparison to the value of the intangible software.
- Any tangible property, if used, has virtually no value in itself. Any value is in the information which is valuable only when read and transformed by the computer into its intangible end state of binary pulses.

Sherin likened computer output to an accountant's reports, a court reporter's paper tape and a typist's typed sheet — objects that are considered intangible fot tax purposes because the objects are inconsequential to the information contained therein.

Addressing the Department's proposed taxation of keypunching, S. Paul Blumenthal, vice-president of American Computer Appraisal Service here, termed the idea "discriminatory" since it would "amount . . . to taxing labor."

He also stressed that computer software object code, or machine-readable program language, has been found to be intangible and nontaxable in federal court, and therefore that finding should hold for Massachusetts.

After discussing the "true object" of a DP transaction as being the intangible information — a recurring theme at the hearing — Ronald J. Palenski, attorney for the Association of Data Processing Service Organizations, Inc. (Adapso), further claimed that the Department of Revenue's distinction between prewritten and custom programs is "artificial and irrelevant.

"In both instances," he noted, "what is sought by the customer is the professional skill and intelligence represented by the program."

Citing New York, California, New Jersey, Wisconsin, Texas and "many other" states that do not tax time-sharing services, Palenski isolated a key issue in Massachusetts' proposed rule regarding whether a customer controls or operates the computer in a time-sharing situation.

"There is never exclusive use by any particular customer, nor does any customer have the right or the means to exclude others from the system," Palenski explained. "No single customer controls the hardware, or decides when a job will be done — the computer decides that.

Hampers set a time limit of 60 days for further written or oral statements from interested parties.

Comments should be directed to John White, chief of the Rules and Regulations Bureau, Department of Revenue, Room 810, 100 Cambridge St., Boston, Mass. 02204.

Exxon Expected to Make Big

(Continued from Page 83)

Intecom will have difficulty breaking into the market, but with leading edge technology and Exxon resources, this small company will make it, Northern said.

Last year's purchase of Reliance Electric Co. has thrust Exxon into the nuts and bolts carrier, voice frequency, outside plant and power markets.

Other Exxon communications products include communications controllers, voice recognition-based network controllers and fiber-optic data links.

In EFT systems, Periphonics may build its credit authorization terminal line into the point-of-sale terminal area, the report said. But Northern believes Exxon is assessing its future in EFT and has no plans for automated teller machines or integrated EFT systems development.

The complete report is available for $250. Northern Business Intelligence is at 150 Nassau St., New York, N.Y. 10038.

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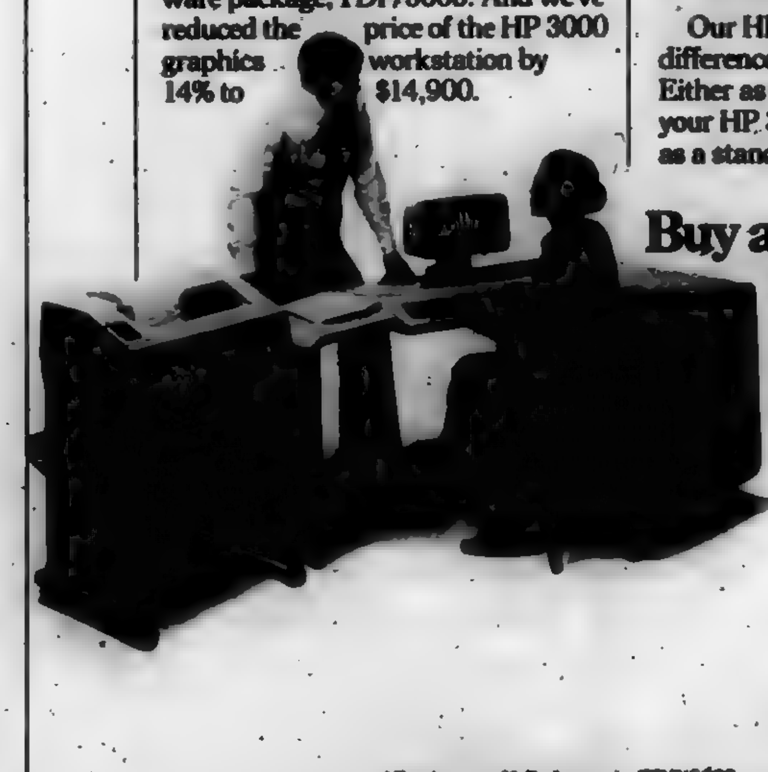

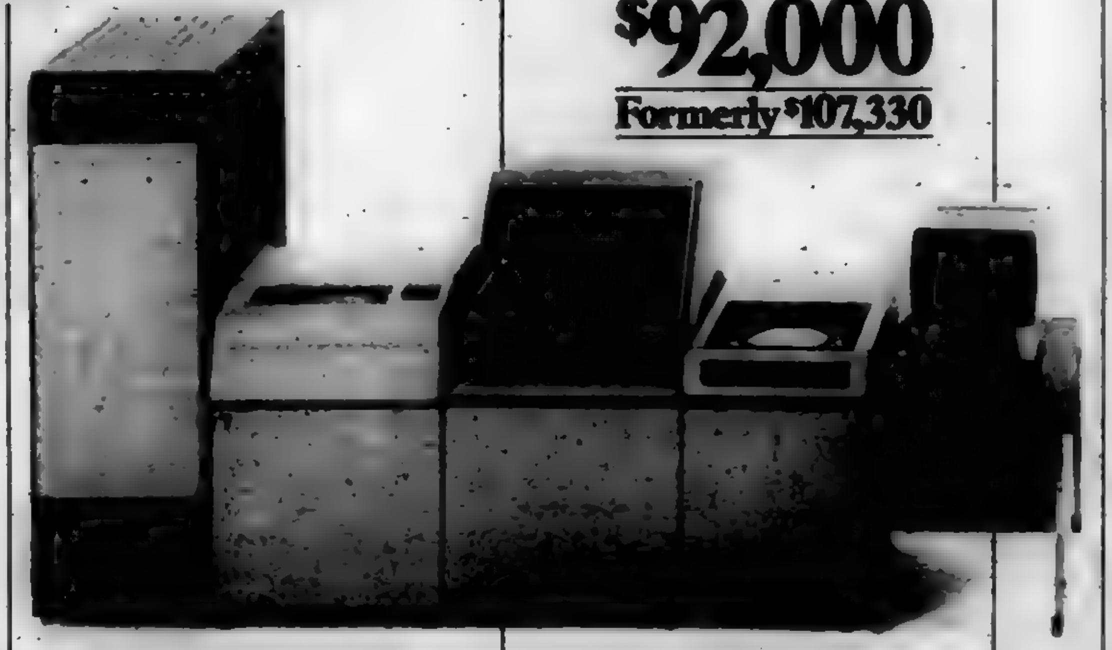

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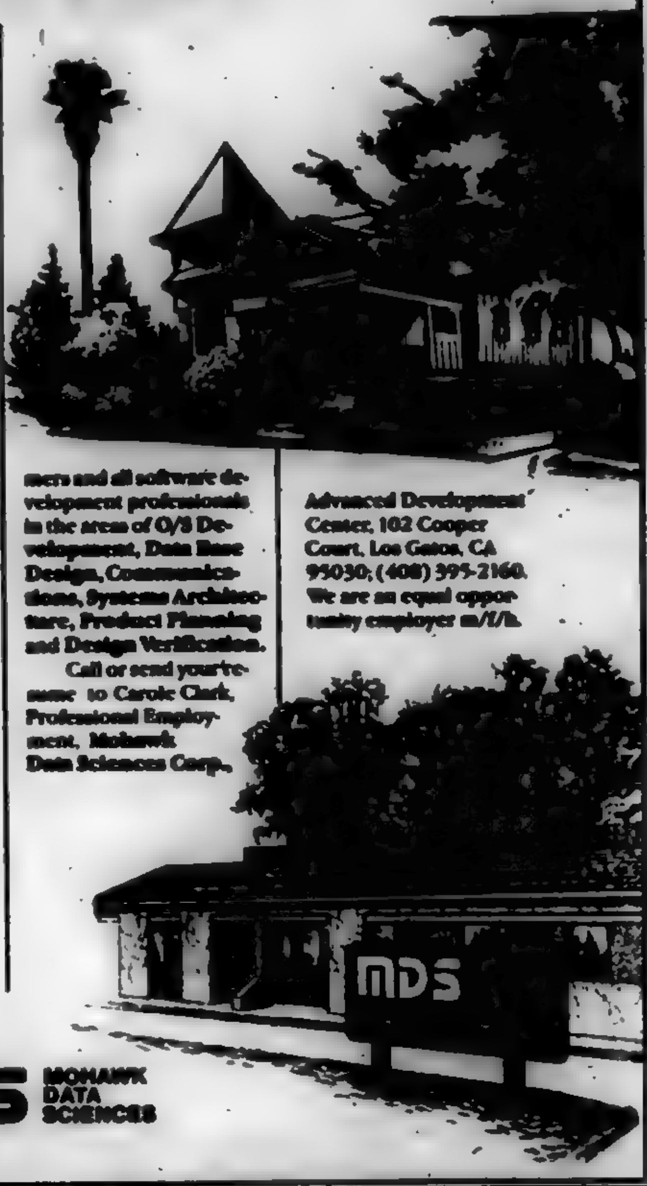

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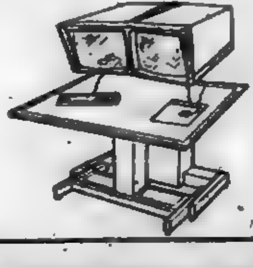

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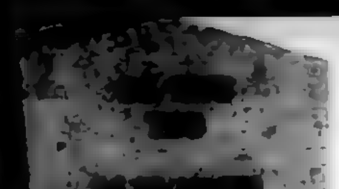

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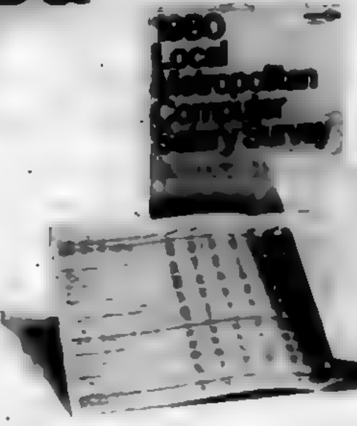

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Send resume or call Susan Brown at 800-257-7748. (In New Jersey call 800-232-6510.) All replies will be held in strict confidence.

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SAN DIEGO
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We are looking for an experienced manager or supervisor who is a self-starter with strong organizational skills to take over supervision of the Technical Reps Department. Individual will be involved in heavy interface with customers regarding installation and maintenance of hardware and software. Experience with minicomputers is a must. Prefer DEC. Knowledge of FORTRAN required and MACRO 11 preferred. Exposure to hardware for minicomputer required. Must have previous supervisory/management background.

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Requires a minimum of 2 yrs. experience in PL1 for IBM370.

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- Answer II Report Writer

Due to recent expansion of our MIS Department including implementation of new hardware and reorganization by application system functions, we have several openings for aggressive self-starters with some technical expertise in Data Base Systems (IDMS-DB/DC) in the listed areas:

SR. PROGRAMMER ANALYST

Should have a minimum of 3 years experience within a manufacturing company, preferably involved with MRP &/or shop floor control systems. We are looking for an individual who shows the ability to become a future project leader and be highly involved with the user interface. This position will implement and develop programs in a multi-plant environment. Will encompass approximately 75% systems analysis work and limited coding (ANS COBOL).

SR. PROGRAMMER ANALYST

We are looking for an experienced Programmer Analyst (2 years minimum) interested in joining our financial and distribution system group. This position, on our MIS staff, is highly involved with marketing, distribution invoicing, order entry, sales forecasting and basic financial systems.

DATA BASE ADMINISTRATOR

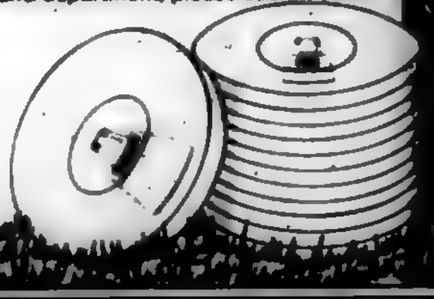
A systems specialist familiar with the design of company Data Bases to assist with the complete conversion from DBOMP to IDMS. Knowledge of COBOL required.

PROJECT LEADER

Multiple plant environment requires experienced MIS professional to lead in the conversion of current systems to new IBM COPICS and Data Base/Data Communications oriented systems. IDMS Data Base experience a plus.

We offer highly competitive salaries and a complete range of benefits. If you are interested in meeting the challenge of a growing organization and department, please submit confidential resume or call:

JoAnn Palmer (414) 637-6711



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REQUIREMENTS
- 5-7 years ANS COBOL programming
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- project team experience
- experience with UNIVAC 90/60-90/80 or IBM 370 OS
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- degree in computer science or related field.

PROGRAMMER/ANALYST

REQUIREMENTS
- 2-3 years COBOL programming experience in OS/370 or UNIVAC VS/9 environment
- manufacturing experience
- some experience with analysis and design
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Both positions offer attractive salary, excellent benefits and career opportunity. Send resume and salary history in confidence to:

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- The ability to write and present technical materials clearly and effectively.
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- Knowledge of any of the programming languages (FORTRAN, COBOL, PL/1), and a high level of proficiency in ALC desirable.
- Ability to learn advanced systems and new software and hardware technology.

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PROGRAMMERS

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Systems Analyst — Perm. position with initial assignment on national-scope information systems project. Performs eval. of system for possible transfer, assessment of and planning for systems development projects, and other analytical tasks within the court environment. Provides tech. assist. to individual state courts and [illegible] offices. Minimum requirement Bachelor's degree or higher; 1-3 yrs. of systems analysis exp., preferably in judicial or criminal justice information systems; exp. in systems design and documentation; and good oral and written communications skills. Exp. with various levels of judicial personnel highly desirable. Salary $18,[illegible]-24,791. Send resume to the National Center for State Courts by September 15, SSC, [illegible], 300 Newport Ave., Williamsburg, VA 23185. The National Center is an Affirmative Action Employer.

[illegible]

POSITIONS
Programmer Analyst
Systems Analyst
Project Leader
Systems Programmer
Data Base Analyst/Admin.
R-T Interactive Distributed
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Mini/Micro Design & Programming
Micro Code/Firmware Development
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All jobs require extensive travel. Salaries will be top-level, and commensurate with experience.
Canadian citizenship or landed immigrant status in Canada are preferred but not required.

Please forward resume with salary history to:

Mr. George [illegible]
[illegible] Systems Division
[illegible] Drive
Weston, Ontario [illegible]
Canada
416-[illegible]

All replies will be held in Confidence.
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Sr. EDP Auditor

This is a hands-on position responsible for evaluating new systems and auditing performance of existing systems in an IBM 370/3031 OS environment. DP auditor experience with IBM OS systems using COBOL and/or BAL, analytical ability, supervisory experience and good oral and written communication skills are required. Banking experience and degree in accounting or DP would be a plus.

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If you think "point-of-sale" merely means clever cash registers, then there's a lot you should know about POS systems at National:

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National Semiconductor

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[illegible] DATA SERVICES
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Amarillo still boasts a western heritage and flavor but its culture, alive with art and music and literature, is a mix of influences from Denver, Dallas, Albuquerque and Oklahoma City, each of which is just a short drive away. And a half-day's drive puts you in the Rocky Mountains near any of four popular ski areas.

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DATA BASE ANALYSTS— Minimum three years experience with IBM OS COBOL.

PROGRAMMER/ANALYSTS— Four to seven years experience, the most recent three years with IBM OS COBOL.

PROGRAMMERS— Three years experience, most recent one year with IBM OS COBOL.

DATA BASE TECHNICIANS— General background DP with one year DP and/or programmer.

SENIOR MVS SYSTEMS PROGRAMMER— Minimum two years experience with MVS system generation and maintenance. Working knowledge of COBOL, FORTRAN ASSEMBLER, OS/JCL and utilities required. Experience desirable in data base systems, data communications and computer performance evaluation.

Send resume and Salary History to:
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Personnel Department

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- operating systems
- computer security
- network systems
- software reliability
- formal verification
- communications protocols

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The pay. The best people are worth more. We pay more.

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Digital Technology Incorporated

302 East John Street
Champaign, IL 61820 Attention: R. Newell

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We have positions for Senior Consulting Analysts in Retail Systems Software, Operating Systems and Communications Software . . . who will establish and control overall architecture and design philosophy in these areas and have a significant corporate impact.

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Faculty Position

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HEAD OF COMPUTING SERVICES

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Applications, including a typed resume, quoting reference HCS/AML, should be sent airmail to

Dr. R. Levien, Director, IIASA
Schlossplatz 1, A-2361 Laxenburg
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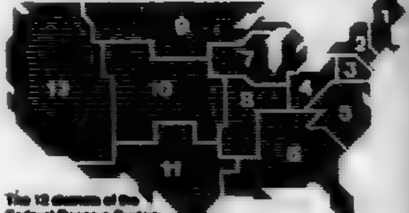

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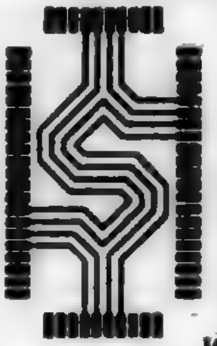

The network will be SNA with Multiple system/370 IMS host systems. You will develop software for over 1000 remote computers. The terminals include 10,000 CRT's and an expanding network of Automated Teller Machines (ATM). Programmable controllers are employed.

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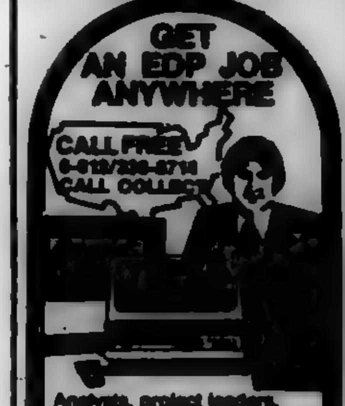

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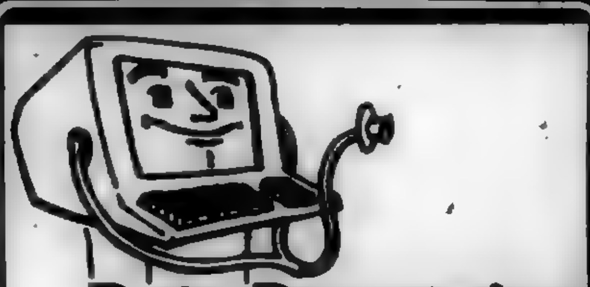

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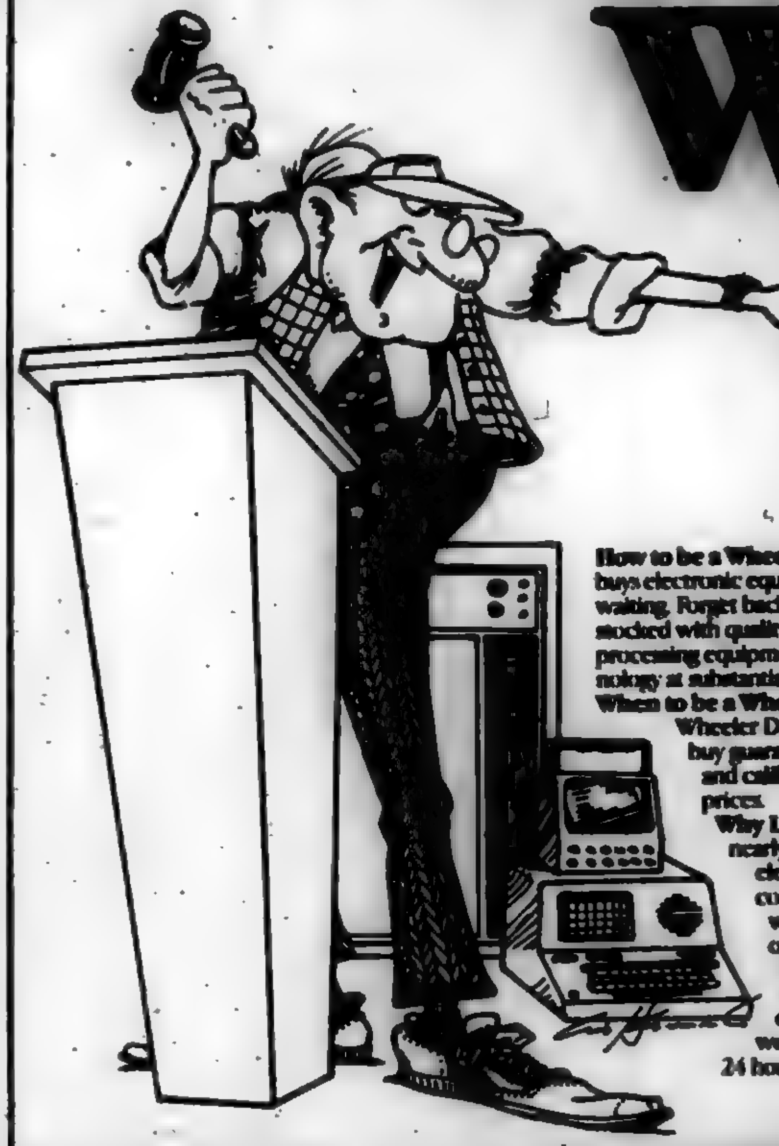

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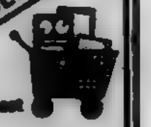

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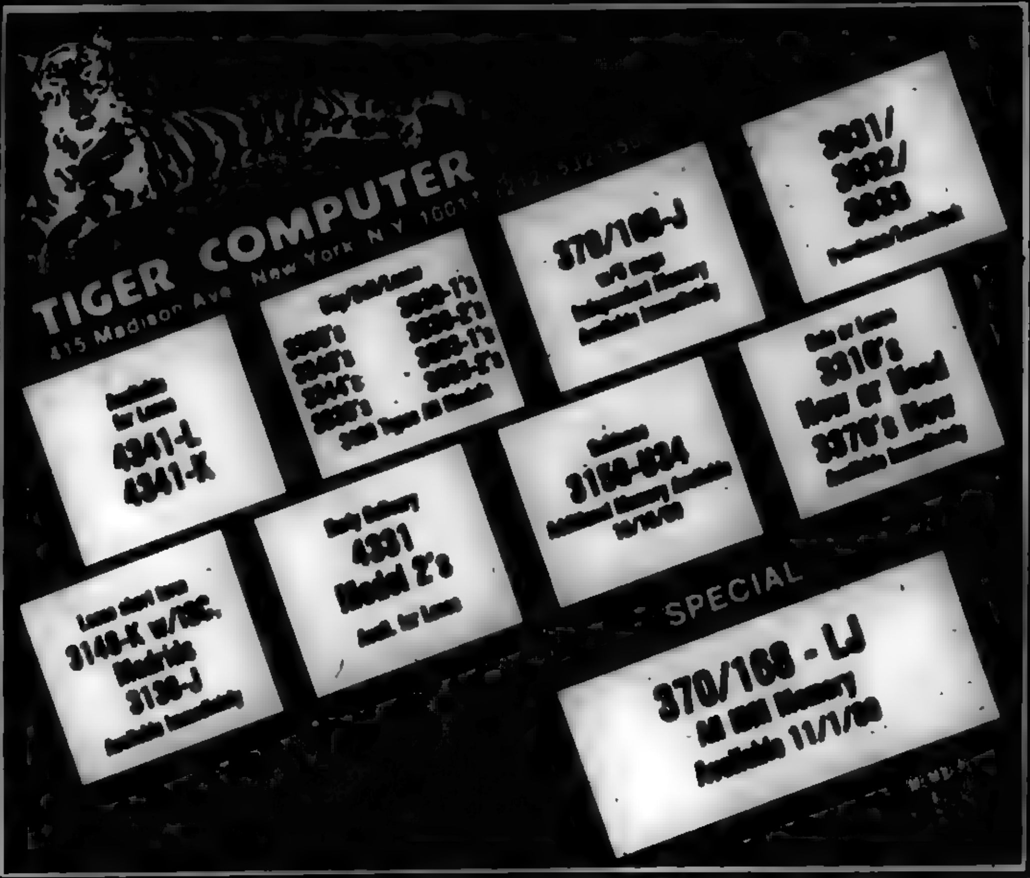

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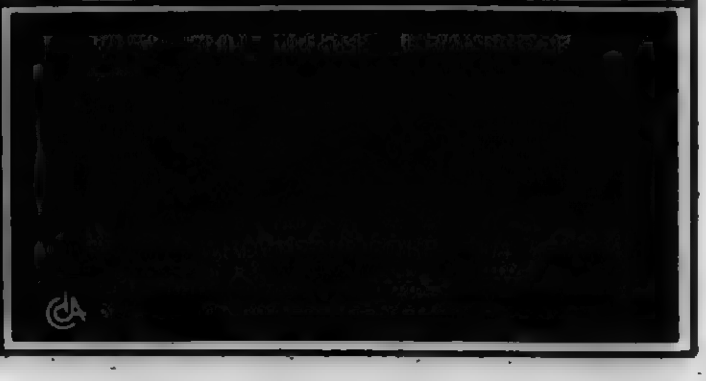

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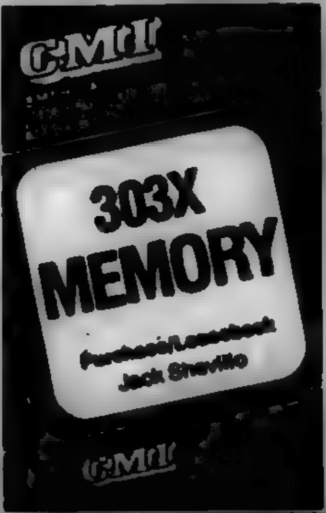

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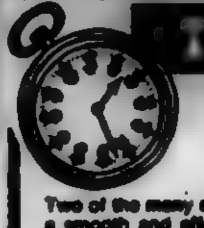

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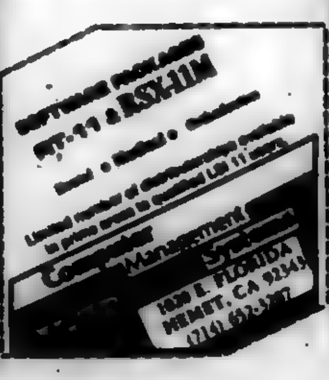

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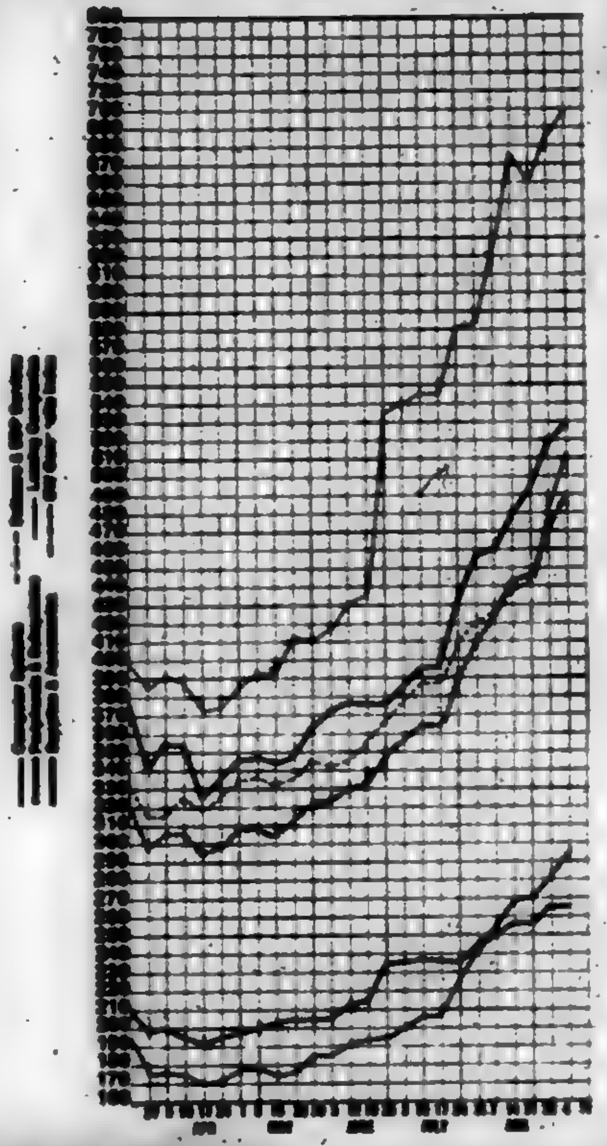

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N	AMDAHL CORP	15- 42	28 3/8	+1 7/8	+7.0
N	BURROUGHS CORP	60- 88	69 7/8	+2 3/8	+3.5
O	COMPUTER AUTOMATION	9- 27	27 1/4	+1 1/4	+4.8
N	CONTROL DATA CORP	39- 75	75	+ 5/8	+0.8
O	CRAY RESEARCH INC	30- 70	70 1/2	+8 1/2	+12.1
N	DATA GENERAL CORP	40- 87	85 7/8	+ 1/4	+0.2
N	DATAPOINT CORP	40- 80	70 1/2	+1 3/8	+2.2
N	DIGITAL EQUIPMENT	52- 90	90	+2	+2.2
A	EECO INC	6- 19	17 1/8	- 3/8	-2.1
N	ELECTRONIC ASSOC.	6- 12	12	0	0.0
N	FOUR-PHASE SYSTEMS	20- 40	27 1/4	+ 1/2	+1.8
N	FOXBORO	31- 46	40 7/8	+1 7/8	+4.9
O	GENERAL AUTOMATION	7- 10	9 7/8	+1 1/4	+14.4
O	GRI COMPUTER CORP	1- 3	3/8	- 1/4	-40.0
N	HEWLETT-PACKARD CO	66- 98	92 1/4	+ 1/8	+0.1
N	HONEYWELL INC	69-102	92 1/8	+ 3/4	+0.8
N	IBM	50- 70	67 1/2	+1 5/8	+2.4
O	MAGNUSON COMP SYSTS	20- 35	25	+3 3/4	+17.6
O	MANAGEMENT ASSIST	9- 26	23	+ 1/2	+2.2
O	MANUFACTURING DATA S	33- 48	46 1/2	+2 3/4	+6.2
O	MINI-COMPUTER SYST	3- 6	4 3/8	0	0.0
O	MODULAR COMPUTER SYS	9- 25	24 1/2	+2 1/2	+11.3
N	NCR	52- 82	72	+1 1/2	+2.1
N	PRIME COMPUTER INC	15- 50	50	+1 1/2	+3.0
N	PERKIN-ELMER	30- 60	50 1/2	+ 3/8	+0.6
N	SPERRY RAND	42- 60	54 5/8	+ 3/8	+0.6
A	SYSTEMS ENG. LABS	11- 35	32 1/2	+ 1/8	+0.3
O	TANDEM COMPUTERS INC	13- 48	48 1/4	+ 1/2	+1.0
N	TEXAS INSTRUMENTS	70-127	123	- 1/8	-0.1
A	WANG LABS.	17- 52	51 5/8	+3 5/8	+7.5

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE SEP 3 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	19- 30	30 1/4	0	0.0
N	COMDISCO INC	6- 17	16	+1	+6.6
A	COMMERCE GROUP CORP	1- 2	2 1/8	0	0.0
A	COMPUTER INVSTRS GRP	3- 4	3 5/8	0	0.0
O	CONTINENTAL INFO SYS	3- 15	4 7/8	+ 3/8	+8.3
P	DATRONIC RENTAL	2- 5	3 1/4	+ 1/4	+8.3
A	DCL INC	5- 6	5 1/4	0	0.0
N	DPF INC	5- 12	9 1/8	- 3/8	-4.0
N	ITEL	1- 10	2 1/2	+ 1/4	+11.1
O	LEASPAC CORP	1- 2	3/4	0	0.0
A	PIONEER TEX CORP	3- 4	3 3/8	- 1/2	-12.9
N	RELIANCE GROUP INC	36- 73	71 5/8	+1	+1.4
N	U.S. LEASING	15- 20	19 7/8	+1 1/4	+6.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		1979-80 RANGE (1)	CLOSE SEP 3 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 4	4 1/4	+1 1/8	+36.0
A	ANACOMP INC	7- 17	17 1/8	+1 1/4	+7.8
O	ANALYSTS INTL CORP	3- 8	8 3/4	+ 1/4	+3.0
A	APPLIED DATA RES.	6- 21	19 5/8	+1	+5.3
N	AUTOMATIC DATA PROC	31- 50	49 1/2	+ 3/4	+1.5
O	COMPUTER HORIZONS	1- 5	3 1/2	- 1/4	-6.6
O	COMPUTER NETWORK	4- 9	6	- 7/8	-12.2
N	COMPUTER SCIENCES	11- 20	21 1/2	+2 3/8	+8.3
O	COMPUTER TASK GROUP	1- 13	13	0	0.0
O	COMPUTER USAGE	2- 7	6 7/8	+2 1/8	+44.7
O	COMPUT AUTO REP SVC	4- 10	7 1/8	+ 1/8	+1.8
O	COMSHARE	11- 21	19 3/4	+2	+11.2
O	CULLINANE CORP	19- 61	60 1/2	+8	+15.2
O	DATA DIMENSIONS INC	1- 6	1 7/8	0	0.0
N	DATATAB	1- 4	1 1/8	0	0.0
O	DST CORP	4- 8	6 7/8	+ 1/4	+3.7
N	ELECTRONIC DATA SYST	19- 32	31 3/4	+ 3/8	+1.1
O	INFORMATICS INC	9- 25	24 3/4	+4	+19.2
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	2- 4	2 3/4	0	0.0
O	KEANE ASSOCIATES	3- 9	6 1/2	+ 1/2	+8.3
O	KEYDATA CORP	2- 3	2 1/8	- 1/8	-5.5
A	LOGICON	12- 28	24 1/2	+ 1/2	+2.0
O	MATHEMATICA INC	5- 18	18	+2	+12.5
O	NATIONAL DATA CORP	10- 22	21 7/8	0	0.0
O	PLANNING RESEARCH	5- 8	7 5/8	+ 1/4	+3.3
O	PROGRAMMING & SYS	1- 1	3/4	-	-7.7
O	RAPIDATA INC	4- 9	6 3/4	- 3/8	-5.2
O	REYNOLDS & REYNOLDS	21- 26	22	+1	+4.7
O	SYSC INC	6- 14	13 3/4	+1 1/2	+12.2
O	SCIENTIFIC COMPUTERS	6- 26	26 1/4	+ 3/4	+2.9
N	TYMSHARE INC	16- 60	60 1/8	- 7/8	-1.2
A	URS SYSTEMS	9- 15	15 1/2	- 1/8	-0.9
N	WYLY CORP	4- 18	17 3/4	+3 3/4	+26.7

PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE SEP 3 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 32	31 5/8	+ 3/4	+2.5
N	AMPEX CORP	14- 29	26 1/2	+ 5/8	+2.4
A	ANDERSON JACOBSON	9- 17	17	+ 7/8	+5.4
N	APPLIED DIG DATA SYS	5- 12	11 3/4	0	0.0
O	AUTO-TROL TECHNOLOGY	18- 40	38 1/2	+ 3/4	+1.9
O	BEEHIVE INTL	3- 16	15	- 3/4	-4.7
A	BOLT,BERANEK & NEW	12- 29	27 1/2	- 5/8	-2.2
N	BUNKER-RAMO	17- 26	26	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	4	+ 3/4	+23.0
N	CENTRONICS DATA COMP	27- 59	38 7/8	+ 1/2	+1.3
A	CETEC CORP	5- 7	6 1/4	- 1/8	-1.9
O	COMPUTER DEVICES INC	5- 8	8 1/2	+1	+13.3
O	COGNITRONICS	3- 7	7 3/8	+ 1/2	+7.2
O	COMPUTER COMMUN.	4- 10	6 7/8	+1	+17.0
O	COMPUTER CONSOLES	6- 20	18 1/2	- 1/4	-1.3
O	COMPUTER TRANSCEIVER	1- 5	3	0	0.0
N	COMPUTERVISION CORP	24- 57	49 5/8	+3 1/4	+7.0
N	CONRAC CORP	13- 28	28 3/4	+1 1/4	+4.6
A	DATA ACCESS SYSTEMS	6- 17	15 3/8	0	0.0
A	DATA PRODUCTS CORP	11- 31	29 3/4	+1	+3.4
O	DATUM INC	3- 6	5 3/8	+ 1/8	+3.0
O	DECISION DATA COMPUT.	3- 5	4 3/4	- 3/8	-7.5
O	DELTA DATA SYSTEMS	1- 3	2 7/8	+1 1/4	+76.9
N	DOCUMATION INC	7- 27	18 3/8	+ 1/8	+0.7
O	DATARAM CORP	6- 37	32 1/2	-1 1/4	-3.8
N	ELECTRONIC M & M	3- 8	7 5/8	+ 1/2	+7.0
O	EVANS & SUTHERLAND	21- 50	56 1/2	+ 1/2	+0.8
O	FERRI-TEK	1- 4	3 1/8	+ 5/8	+25.0
O	GENERAL COMPUTER SYS	1- 5	4 3/4	0	0.0
O	GENERAL DATACOMM IND	12- 22	20 1/4	0	0.0
O	GENERAL TERMINAL CP	1- 4	2 1/8	0	0.0
N	HAZELTINE CORP	12- 31	27 3/8	+ 1/8	+0.4
N	HARRIS CORP	29- 46	42 5/8	+ 3/4	+1.7
O	INFOREX INC	1- 4	1 3/8	-	-8.3
O	INFORMATION INTL INC	8- 19	16	+1 1/4	+8.4
O	INTEL CORP	40- 55	51 1/2	+2 3/4	+5.6
O	INTERSIL	13- 33	33 3/8	+1 1/4	+4.0
A	LUNDY ELECTRONICS	4- 12	10	- 1/2	-4.7
O	MSI DATA CORP	5- 11	10 7/8	+1 3/8	+14.4
N	MEMOREX	10- 34	16 7/8	+1 1/8	+7.1
N	MOHAWK DATA SCI	10- 27	27 1/4	+2 3/4	+11.2
O	OPEX	2- 10	8 1/2	0	0.0
A	PARADYNE CORP	19- 43	41 3/4	+ 7/8	+2.1
A	PENRIL CORP	9- 15	12	+ 1/8	+1.0
O	RAMTEK CORP	10- 17	16 3/4	+1 3/4	+11.3
O	RECOGNITION EQUIP	5- 15	15 3/4	0	0.0
O	SCAN DATA	1- 3	2 1/4	+ 3/8	+17.7
N	STORAGE TECHNOLOGY	12- 22	19 7/8	- 1/2	-2.4
O	T BAR INC	16- 21	17 3/4	- 3/4	-4.0
A	TEC INC	3- 9	5 3/4	+ 1/8	+2.2
N	TEKTRONIX INC	42- 70	67 1/2	+1 1/8	+1.6
N	TELEX	3- 6	5 7/8	+1 1/4	+27.0
O	TESDATA SYSTEMS CP	8- 36	31 3/4	+ 3/8	+1.0
O	TIMEPLEX INC	7- 27	26	-1	-3.7
O	WILTEK INC	3- 3	2 5/8	- 1/8	-4.7

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE SEP 3 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	9- 14	12 7/8	- 1/2	-3.7
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	16- 30	30 1/2	+ 3/8	+1.6
A	DUPLEX PRODUCTS INC	11- 15	14 1/4	0	0.0
N	ENNIS BUS. FORMS	13- 21	17	- 1/4	-1.4
N	3M COMPANY	46- 60	58	+ 3/8	+0.6
O	MOORE CORP LTD	27- 36	33 3/8	- 1/8	-0.3
N	NASHUA CORP	27- 35	30 5/8	+1 3/8	+4.8
O	STANDARD REGISTER	22- 31	28	0	0.0
A	TAB PRODUCTS CO	19- 25	25 3/8	+ 3/4	+3.0
N	WABASH MAGNETICS	11- 20	15 5/8	0	0.0
N	WALLACE BUS FORMS	21- 30	27 1/4	+ 1/4	+0.6

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NEWSPAPER

★Watch for 'CW Extra' This Week ★★

COMPUTERWORLD
HE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
y Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

37 September 15, 1980 $1.00 a copy; $30/year

Benefits Derailed in Forced Unionization

By Jeffry Beeler
CW West Coast Bureau

Middle-level computing personnel at U.S. railroads have apparently been targeted for unionization by an international labor union as part of a nationwide campaign to swell its membership rolls.

The Brotherhood of Railway and Airline Clerks (Brac), which already represents many of the railway industry's low-level computing employees such as programmers and operations personnel, now appears to be claiming a similar authority over the industry's system analysts and project leaders, who have traditionally been considered exempt from union control.

Take the case of the Union Pacific Railroad Co., for example. Earlier this year, Brac officials approached Union Pacific's management with a proposal that all 48 of the company's formerly nonunionized system analysts and project leaders be brought immediately into the union's fold. Brac's representation already extended to the company's programmers and other low-level computing personnel, according to David Cavanaugh, one of Union Pacific's system analysts.

At first, Union Pacific rejected the idea of unionizing its system analysts and project leaders, but when Brac threatened to call a general strike unless its demands were satisfied, management's resistance suddenly crumbled.

(Continued on Page 6)

Cary Letter Says IBM Not Obliged To Report TNF

By Nancy French
CW Staff

ARMONK, N.Y. — IBM last week denied any wrongdoing in failing to make public the fact that its line of photocopiers and its 3800 laser printer use a carcinogenic substance.

Full text appears on Page 4.

In a letter to the editor of *Computerworld*, IBM Chairman Frank T. Cary said CW's reporting showed ignorance of Environmental Protection Agency (EPA) regulations.

(Continued on Page 5)

A key feature of IBM's 3800 laser printer is the forms overlay negative that reduces the need for preprinted forms. In this 1975 photo, provided by the company with the introduction of the machine, an operator is shown inserting the film negative next to the printer's drum. The overlay is used to print complex designs on plain paper according to a programmed control.

'The Thing to Do': Don't Use 3800, Expert Cautions

By Bruce Hoard
CW Staff

BOSTON — "The thing to do is not use that machine."

That was the opinion of Dr. William Haseltine, a specialist in molecular biology of carcinogens at the Sidney Farber Cancer Institute here, when apprised of laboratory tests conducted on trinitrofluorenone (TNF), a carcinogen IBM has been using in two copiers and two printers for up to 10 years.

The machines in question are the Copier I and II copiers, the 3800 laser printer and the 3896 tape-document converter.

Haseltine based his opinion on the results of tests conducted by IBM, tests in which laboratory mice developed tumors after inhaling TNF and having it injected in them.

"I think there are probably health hazards," the Harvard Medical School associate professor of pathology said, referring to use of the IBM equipement.

"If there were studies in the literature that they knew about that said this compound induced tumors in animals, rats or mice, then it was [IBM's] responsibility to make sure it was safe before they marketed it. I think they were irresponsible."

IBM maintains that TNF, as used in

(Continued on Page 4)

Ordered to Pay User $1.1 Million

Honeywell Guilty of Fraud, Jury Finds

By Tim Scannell
CW Staff

NEW YORK — In what may be a first-of-its-kind situation, a major computer vendor has been found guilty in federal court here of fraudulently misrepresenting a computer system to a now-defunct company in order to meet a yearly sales quota.

Honeywell, Inc. has been ordered to pay $1.1 millon in damages to Robert Weinstein, former president of Triangle Underwriters, Inc., which was forced out of business in late 1974 as a result of an untested and inoperable H-110 computer system sold to the company four years earlier.

Honeywell has moved to dismiss the jury's verdict and will appeal the decision if its dismissal is denied, its attorney Thomas A. Shaw said.

Memoranda Surface

According to Honeywell inter-office memoranda introduced last February, the $120,000 H-110 computer was installed even though "60% of the programs [had] not been tested." Despite apparent shortcomings, the computer was delivered in December 1970 to meet established sales goals for that year, the memos said.

Although Honeywell was ordered years earlier to produce all documents related to the Triangle case, the memoranda did not surface until after nearly five years of pretrial proceedings. The existence of the memos was discovered in the course of taking depositions

(Continued on Page 8)

Supercontroller vs. Coax: Debate of '80s

By Brad Schultz
CW Staff

Product Spotlight

Supercontrollers that integrate data, voice, text and other information flows through a telecommunications network will find a home with many users in the 1980s, a number of management information systems (MIS) experts have predicted this year.

But these souped-up private automatic branch exchanges (PABX), which would consolidate telecommunications control, will "undoubtedly" compete with the concept of running the information flows to dispersed intelligent devices via coaxial cabling, according to International Resource Development, Inc. (IRD), a market research firm based in Norwalk, Conn.

It seems that old debates about whether to decentralize an organization's DP resources may be recapitulated as debates about whether to decentralize the processing of all forms of telecommunications that coaxial lines accommodate.

Many data communications users will adopt coaxial technology to greatly extend their rate of communications, since certain modulation techniques allow a coaxial line to run many data channels simultaneously [CW, Aug. 25]. But others may not, finding the cost of laying new cable prohibitive.

(Continued on Page 8)

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127620. *Computerworld* (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Broadband Cable TV Net

NRC Unveils System 20 'Localnet'

By Phil Hirsch
CW Washington Bureau

SUNNYVALE, Calif. – System 20, a low-cost terminal-oriented data communications system that can support thousands of terminals on a broadband cable television network was introduced here last week by Network Resources Corp. (NRC), a recently acquired subsidiary of Sytek, Inc.

System 20, according to NRC research director Jose Picasso, allows transparent communication among all terminals within the network, provides for data encryption and interfaces to long-haul as well as other local networks. The system supports transmission of voice, video and facsimile concurrently with data.

Essentially, the new system consists of microprocessor-equipped terminal interfaces and other devices which control communication on a multichannel, frequency-divided cable TV network. Sytek/NRC refers to the latter as a "Localnet." System 20 components are the first in a series of Localnet product groups.

Each System 20 interface acts as a packet assembly/disassembly device for associated terminals. It also performs numerous other functions, such as speed/code conversion, error control and flow control.

Two Interfaces

There are two interfaces in the System 20 line. The Tbox serves single terminals, while the Tmux connects with up to eight RS-232C devices.

At the moment, only start/stop terminals can be connected to the Tbox and Tmux, but interface software for intelligent terminals based on the international X.25 standard will be announced "in about a month," according to marketing director Wayne Martson.

The Localnet cable is frequency-divided into 120 logical channels. Each channel services "200 or more" 9,600 bit/sec terminals.

CSMA/CD Subsystem

Basically, a terminal transmits through the Tbox or Tmux whenever it has data to send, but a sophisticated subsystem known as CSMA/CD (for carrier-sense multiple access with collision detection) minimizes interference.

Before data is output on the cable, the interface checks to see if other terminals are already engaging it. The message, when sent, must travel the length of the cable and come back to the sending point; otherwise, the bits are retransmitted after a preset interval which is different for each sending station. Retransmission also occurs if the receiving terminal fails to send an acknowledgement message back to the sending station.

The cable provides a bit error rate of $1:10^{-8}$, according to Martson. He added that automatic error detection and correction procedures built into the transmission format raise this to $1:10^{12}$ end-to-end.

"Immediate application areas" for System 20, Martson added, are sites with existing two-way CATV systems – such as office buildings, campus-type research parks, and multibuilding industrial plants. Commerical CATV systems, he added, represent a major future market. Today, most of these systems lack two-way transmission capability, but all of those now being installed are required by the Federal Communications Commission to be bidirectional.

"System 20 and the Localnet concept fill a technology vacuum that exists between baseband approaches, such as Xerox Corp.'s Ethernet, and long-haul distributed processing schemes such as Arpanet," said Martson. Ethernet, he explained, is limited to a maximum range of 2 km. A Localnet system can cover up to 50 km on a single coaxial channel. And because multiple, frequency-divided channels are employed instead of a single, time-divided channel.

Localnet's capacity is "orders of magnitude greater" than Ethernet's, even in local intrabuilding operations," Martson contended.

Included in the System 20 product line announced last week were four devices. The Tbox interface is priced at $995 and the Tmux costs $4,238. A Tverter is $3,500; it is located at the head end of the cable and links sending channels – which operate on one set of carrier frequencies – with receiving channels, which utilize different frequencies.

A somewhat similar device, known as a Tbridge, interconnects the Localnet with outside networks. The Tbridge costs $4,500.

This Week

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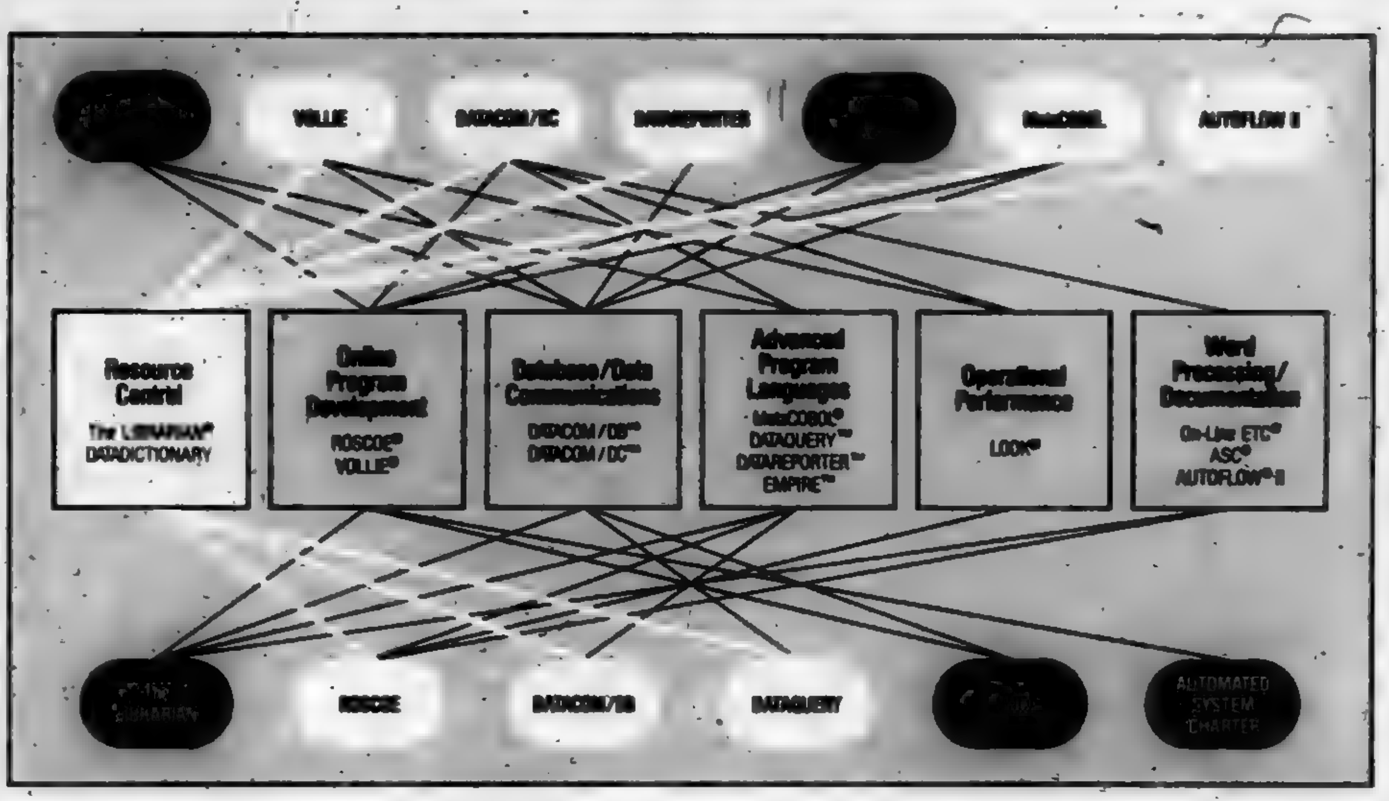
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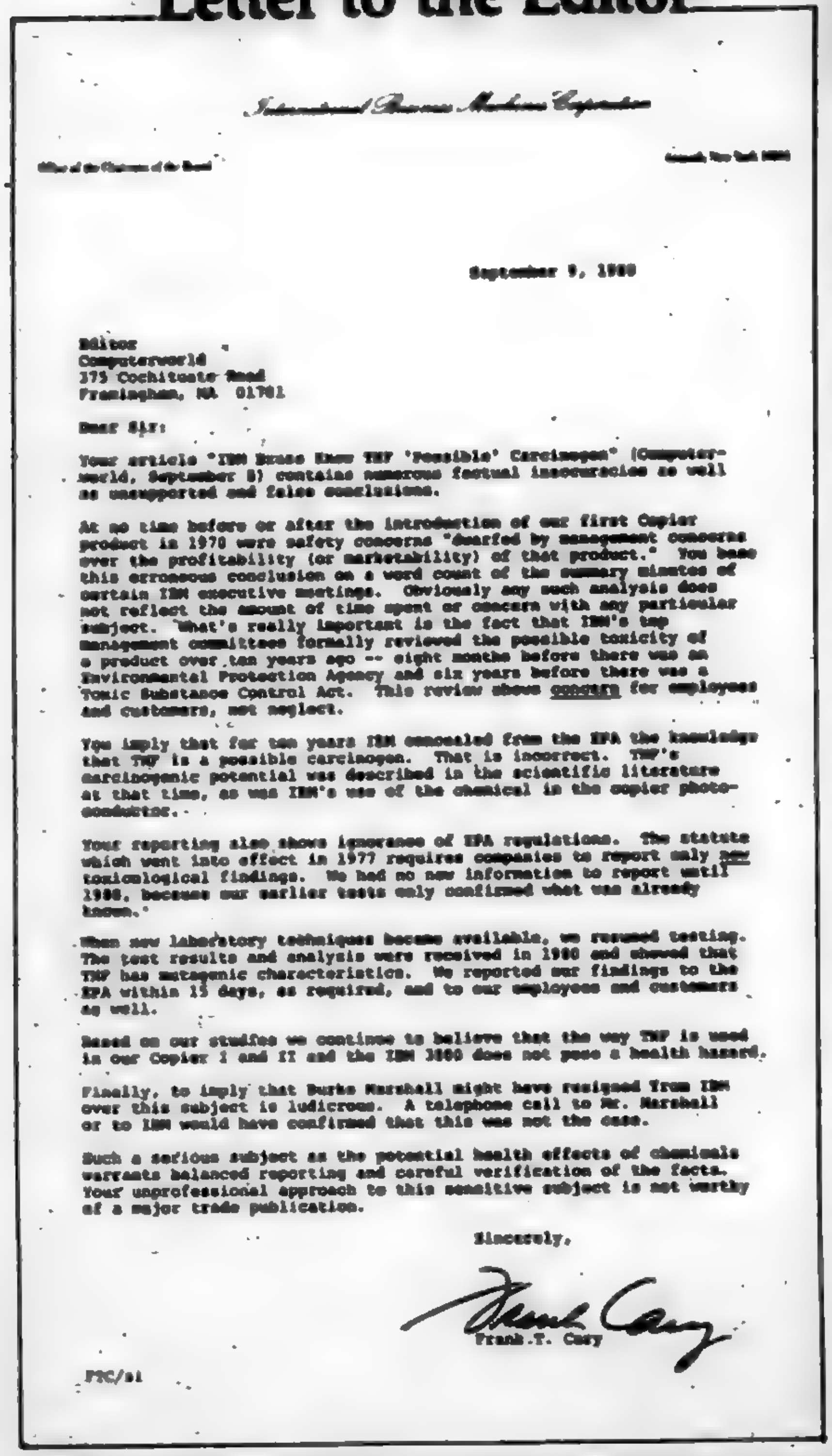
Letter to the Editor



International Business Machines Corporation

Office of the Chairman of the Board

Armonk, New York 10504

September 9, 1980

Editor
Computerworld
375 Cochituate Road
Framingham, MA 01701

Dear Sir:

Your article "IBM Brass Knew TNF 'Possible' Carcinogen" (Computerworld, September 8) contains numerous factual inaccuracies as well as unsupported and false conclusions.

At no time before or after the introduction of our first Copier product in 1970 were safety concerns "dwarfed by management concerns over the profitability (or marketability) of that product." You base this erroneous conclusion on a word count of the summary minutes of certain IBM executive meetings. Obviously any such analysis does not reflect the amount of time spent or concern with any particular subject. What's really important is the fact that IBM's top management committees formally reviewed the possible toxicity of a product over ten years ago -- eight months before there was an Environmental Protection Agency and six years before there was a Toxic Substance Control Act. This review shows concern for employees and customers, not neglect.

You imply that for ten years IBM concealed from the EPA the knowledge that TNF is a possible carcinogen. That is incorrect. TNF's carcinogenic potential was described in the scientific literature at that time, as was IBM's use of the chemical in the copier photoconductor.

Your reporting also shows ignorance of EPA regulations. The statute which went into effect in 1977 requires companies to report only new toxicological findings. We had no new information to report until 1980, because our earlier tests only confirmed what was already known.

When new laboratory techniques became available, we resumed testing. The test results and analysis were received in 1980 and showed that TNF has mutagenic characteristics. We reported our findings to the EPA within 15 days, as required, and to our employees and customers as well.

Based on our studies we continue to believe that the way TNF is used in our Copier I and II and the IBM 3800 does not pose a health hazard.

Finally, to imply that Burke Marshall might have resigned from IBM over this subject is ludicrous. A telephone call to Mr. Marshall or to IBM would have confirmed that this was not the case.

Such a serious subject as the potential health effects of chemicals warrants balanced reporting and careful verification of the facts. Your unprofessional approach to this sensitive subject is not worthy of a major trade publication.

Sincerely,

Frank Cary
Frank T. Cary

FTC/sl

EPA Had Option to Demand IBM Test Data on TNF

WASHINGTON, D.C. — Although IBM voluntarily turned over test data on a chemical used in its 3800 laser printer to the Environmental Protection Agency (EPA), the EPA easily could have demanded the information from the firm.

Under the Toxic Substances Control Act, enacted in late 1976, the EPA can order firms to release data on the production, use and health effects of chemical substances and mixtures. The EPA can also regulate the manufacture, processing, distribution and disposal of these chemicals, according to the law.

Recently, the EPA confirmed, through test data supplied by IBM, that trinitrofluorenone (TNF) is a definite carcinogen — capable of inducing gene mutations in bacterial and animal cells [CW, Aug. 25]. However, it is not yet known if the chemical is harmful to humans.

Basically, the Toxic Substance Act allows the EPA "to anticipate and address chemical risks before it is too late to undo the damage," according to an explanatory booklet offered by the U.S. Government Printing Office. The EPA can require that manufacturers or processors conduct tests on certain chemicals either to evaluate its toxicity or, in the case of TNF, determine whether it is carcinogenic or mutagenic.

Before requiring testing, the EPA must first find that (1) the chemical represents an unreasonable risk to health or environment; and (2) there is no sufficient data to determine just how the chemical will react on a person's health, with other chemicals or on the environment. Manufacturers of new chemicals must submit test data to the EPA at least 90 days before the manufacture and commercial distribution. However, existing chemicals can be examined if they are used for a unique application that might extend their exposure to humans or the environment.

In any case, if a chemical is found to be definitely harmful to humans, the EPA can either totally ban the manufacturer from making or using the chemical or limit the use of the chemical.

Any person or company that refuses to comply with any requirements of the Toxic Substances Control Act can be fined up to $25,000 for each day the law is violated in addition to any civil penalties.

Don't Use 3800, Expert Advises

(Continued from Page 1)

its machines, pose no health hazards to users.

When asked if the 2.6 micrograms of TNF that IBM said may be found on hard copy processed through the controversial peripherals is dangerous to humans, he echoed a sentiment frequently expressed by other experts: "There's no way of knowing without looking at human epidemiological [test] data from exposed populations."

The people who should be examined in order to determine what, if any, effects TNF has had on users, are those who service the machines and use them extensively, he added.

However, epidemiological studies have shown cancer's gestation period frequently exceeds the two years that have passed since the 3800 was introduced.

Haseltine linked the TNF situation with previous and similar cases by saying, "IBM should not do what has often been done and that is introduce a product and then withdraw it under pressure. That's highly irresponsible because whatever population has been exposed has already been exposed."

The pathologist was unsure as to whether the use of masks or gloves would mediate against any possibly dangerous TNF exposure. That depends on the route of exposure, which could come via touch or inhalation, he said, adding, inhalation is probably the more dangerous of the two.

"The fact of the matter is, there's no way of knowing what will happen to people. Therefore, if there is any indication TNF is dangerous, unless there's absolutely no substitute, you shouldn't use it."

Lawrence Garfinkel, vice-president for epidemiology and statistics with the American Cancer Society, warned against extrapolating animal test results to humans, but said of TNF, "The best thing would be for IBM to stop using it."

Choosing his words carefully, Garfinkel went on to say, "As long as a doubt exists from either bacterial or animal tests that it may be potentially dangerous, then most people would probably agree, if you can find a reasonable substitute, do it."

IBM has been requested to submit additional TNF test documentation to the Environmental Protection Agency, and until that information is obtained and studied, no conclusions should be reached concerning the carcinogen's potential, Garfinkel claimed.

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Honeywell, Xerox, Uppster, Univac Say 'No'

IBM Alone in Using TNF, Informal Poll Finds

Interviews with four vendors who market high-speed nonimpact printers have indicated IBM is alone in using the carcinogen trinitrofluorenone (TNF) in any of its printing products.

IBM, which only recently acknowledged use of the chemical after knowing it was at least a possible carcinogen for 10 years [CW, Sept. 8], uses TNF in its Copier I and II copiers, 3800 laser printer and 3896 Tape-Document Converter.

Honeywell, Inc., Xerox Corp., Uppster Corp. and Univac all said "No" when asked if they use TNF.

They just don't seem to need it.

"We use a different fusing technique and different toner," a spokesman for Uppster Corp. said. "We use cold pressure fusing and pressure fused toner."

"We do not use that chemical in the laser printer," according to a Univac spokesman.

Horace Becker, vice-president for engineering at Xerox, said his company uses a technology in its copiers and printers similar to that employed by the 3800, but with one big difference: no TNF.

TNF in the 3800 emanates from the unit's photoreceptor, he claimed. "We hold the patent on the photoreceptor we had and IBM had to develop their own," he added. The two companies have clashed in court previously over alleged IBM patent infringements on Xerox's xerographic process.

However, Becker took issue with the argument that IBM's photoreceptor emits TNF, saying "This material does not come out of the machine." Apprised of conclusions reached by IBM that up to 2.6 micrograms of the chemical may be found on hard copy processed by the IBM machines in question, he replied, "I'm suprised it's that high. I didn't think anybody could measure it."

Changing photoreceptors could be a difficult and costly job for IBM. However, "there are different photoreceptors available," according to Ron Borelli, director of Page Printing systems operations at Honeywell. His company does not use TNF in its printer, he added.

IBM has expressed no interest in modifying any of its TNF-bearing machines, saying, "Under the conditions in which we were using TNF, in the photocopying process, it does not pose a health hazard."

Cary Denies Wrongdoing

(Continued from Page 1)

According to minutes from meetings of top IBM decision-making committees, IBM knew since before 1970 that the substance used in its photocopying process, trinitrofluorinone (TNF), is a carcinogen [CW, Sept. 8]. Cary, however, maintained the company was under no legal obligation to make that information public because the Toxic Substances Control Act did not become effective until 1977.

Cary said the act requires companies "to report only *new* toxicological findings. We had no new information to report until 1980, because our earlier tests only confirmed what was already known."

Cary further contended that IBM did not attempt to conceal TNF's carcinogenic effects: "TNF's carcinogenic potential was described in the scientific literature at that time, as was IBM's use of the chemical in the copier photoconductor."

"When new laboratory techniques became available, we resumed testing," Cary said.

One of the techniques to which Cary referred is known as the Ames technique and was developed in late 1975. It involves the uses of specialized bacterial strains that react differently to different compounds used as stimuli, allowing the measurement of potential mutagenic effects of those compounds, an IBM spokeswoman said.

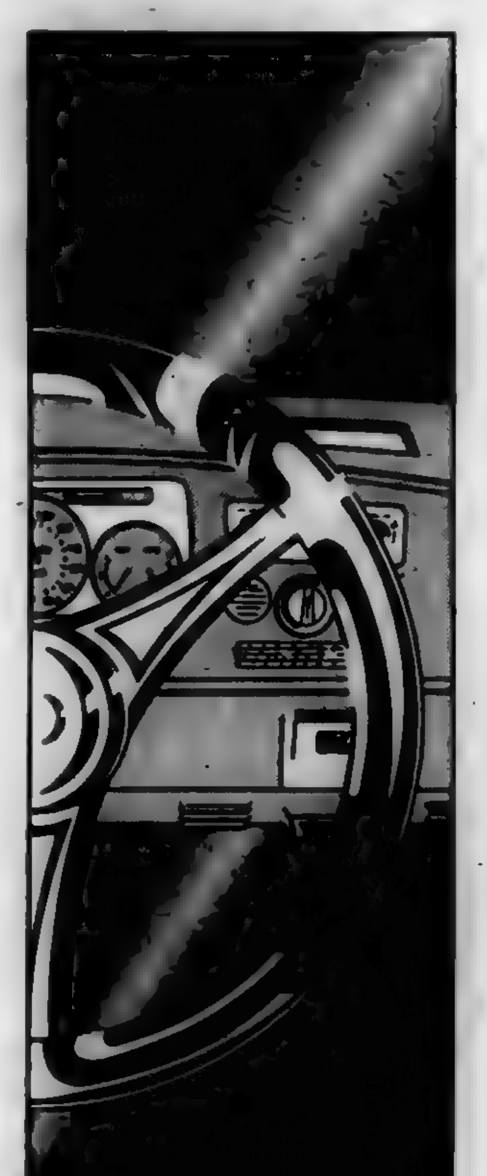
"The test results and analysis were received in 1980 and showed that TNF has mutagenic characteristics. We reported our findings to the EPA within 15 days, as required, and to our employees and customers as well," he said in the letter.

The letter also denied IBM's top management was motivated more by potential profits than concern for user safety when it introduced its line of copiers and laser printer that incorporated use of TNF.

"Word count of the summary minutes of certain IBM executive meetings" does not reflect "the amount of time spent or concern with any particular subject.

"What is really important is the fact that IBM's top management committee formally reviewed the possible toxicity of a product over 10 years ago — eight months before there was an Environmental Protection Agency and six years before there was a Toxic Substance Control Act."

The letter did not help clarify the mystery over how documentation of that research may have benefited the average user of IBM photocopiers or the 3800 laser printer who may not customarily read scientific journals.



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IBM to Discount Extra System/370 Programs

By Marcy Rosenberg
CW Staff

WHITE PLAINS, N.Y. – Users of selected System/370 licensed programs will be able to trim monthly license charges for each extra copy by about 25% when IBM makes its Distributed Systems License Option (DSLO) available for these products Jan. 1.

On or after that date, users will still have to pay the full basic license charge for their initial program copy that runs on the primary CPU, but will then have the option of licensing any number of extra copies for each additional CPU at the DSLO discounted monthly rate.

Although IBM would not discuss in detail the criteria for DSLO eligibility, a company spokesman said one requirement was that only programs currently supported out of IBM Support Centers are included.

User Responsibility

Previously, System/370 programs could be licensed month-by-month under a basic license only, with DSLO offered as an option solely to users of 8100 Information Systems licensed programs.

To enjoy the cost savings DSLO provides, however, users will have to take more responsibility for software installation and maintenance and, in addition, give up certain protections provided under basic license.

For example, IBM will distribute directly to users basic license program copies only. But if opting to license additional copies under DSLO, the user will be responsible for copying and distributing to each DSLO location (CPU) tapes of the initial licensed program that IBM provided in machine-readable form to the customer's basic license location. Replicating object code tapes takes a fairly sophisticated user, the spokesman pointed out.

Customers must also shoulder the responsibility for installing and testing on each DSLO machine any new release, local fix, correction or bypass IBM provides on the basic license software.

This means that the basic license location – the one or more CPUs running programs licensed at full rate under a basic license agreement – serves as the focal point for direct IBM maintenance and support.

Problem Assistance

It is also through the basic license location only that customers can directly interface to IBM support centers for problem-related assistance. Therefore, if a software problem originates at a DSLO location, the user must replicate this problem at the basic license location for remote diagnostics and repair or, failing that, call for an on-site visit by an IBM field engineer to the basic license location.

The level of vendor field support differs for basic licenses and DSLO licenses. Customers licensing programs at full monthly rates are entitled to on-site support at each basic license location for either a flat monthly fee per program or payment on a time-and-materials basis per service call.

If choosing to pay flat monthly rates, these users pay the full charge for the initial basic license program copy and a reduced rate for each additional copy under basic license.

DSLO locations, on the other hand, are entitled to on-site service only when field engineers do not successfully correct the problem at the basic license location. Charges for a field visit at the DSLO location are payable on a time-and-materials basis only.

Other differences between basic and DSLO licenses relate to warranties and testing periods. Not all System/370 licensed programs are warrantable, but for those that are, IBM warrants under a basic license that the product "will do what we say it will do" for the user's given application.

Under DSLO licenses, however, "We are not warranting any program product that the customer has replicated to a secondary machine [DSLO location]," he explained.

Further, no testing period is allowed for DSLO licensed program copies, although users can test basic license copies.

Testing periods, depending on the program product, can last up to two months, during which time users can run their own live data and are not required to begin paying for the software until it is running in production.

There is no limit on the number of program copies that can be licensed under DSLO. And any IBM CPU that runs DSLO-eligible System/370 licensed programs – be it a 370, 30 series or 4300 processor – can serve as a DSLO location, the spokesman noted.

Under both basic and DSLO licenses, users pay for System/370 licensed programs on a month-by-month basis.

Union Eyes Railway Computing Staffers

(Continued from Page 1)

So late last June, all 48 of the company's system analysts and project leaders abruptly lost their status as independent employees and were formally annexed into Brac's membership.

As members of Brac, the employees were automatically reclassified as clerks, and their fringe benefits were downgraded accordingly. Thus, in joining a union, they immediately lost a week of vacation, had their life insurance coverage cut drastically and forfeited the privilege of participating in the company's profit-sharing, pension and employee-ownership plans.

For most of Union Pacific's systems analysts and project leaders, loss of the company's fringe benefit package represented a stunning reversal. "Many of these people worked hard to earn their fringe benefits, but now they've all been taken away," Cavanaugh lamented. "The employees here have suddenly discovered all their years of hard work were for naught."

For each of the employees directly affected by the decision, news of Brac's unionizing coup came like the proverbial bolt out of the blue. Not until their union membership was already an established fact did the employees even dimly suspect that an organizing effort had long been under way, Cavanaugh said.

No one had ever asked the computing department staff members whether they considered union membership desirable, nor were they ever given an opportunity to vote on the matter, Cavanaugh said. Union membership was simply foisted upon them.

"We literally walked into work one morning and were told, 'Guess what, each of you is now a member of a union,' " he recalled.

To counter Brac's recent moves to unionize them, the Union Pacific computing personnel early this month petitioned an independent federal agency known as the National Mediation Board (NMB) to reject Brac's claim that it represents all the railway industry's middle-level management information systems (MIS) employees.

No one knows yet exactly when or how the NMB is likely to rule on the question, but Union Pacific's computing personnel are only mildly optimistic about the outcome. "In the past, the Board has seemed to be very pro-union in most of its decisions, and we've concluded our chances of getting a favorable ruling stand at only about 50-50," Cavanaugh said.

If things go well, the employees eventually plan to organize themselves into an autonomous bargaining unit and then decertify themselves in the hope their employer will take them back in their former nonunionized status, the system analyst added.

Union Pacific is not the only U.S. railway where Brac has unionized computing personnel without their prior knowledge or consent. Other companies where cases of forced unionization have lately been reported include the Missouri-Pacific Railroad Co., where an organizing attempt apparently flopped, and the Burlington-Northern Railroad Co., where such an effort appears to have succeeded but has since gone into litigation.

Brac is also rumored to have launched unionizing campaigns within other U.S. railways and is undoubtedly the driving force behind a recent organizing effort involving MIS personnel at Western Airlines, Inc. [CW, Aug. 18]

At Union Pacific, reaction to Brac's latest attempt to unionize the company's computing personnel has been frankly "indignant," Cavanaugh said.

Under the Railway Labor Act, Brac's authority to exercise its power is restricted to members of the loosely defined "clerical craft or class." In Brac's view, the "clerical craft or class" includes nonmanagerial computing personnel such as system analysts and project leaders, and the union has used that argument to justify its attempts to have those people unionized.

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Staff Resistance Found

Efforts to Unionize Airline DPers Grounded

By Connie Winkler
CW Staff

Union efforts to organize DP employees in the airlines have only gotten a few feet off the ground, according to a spot telephone survey of airline systems analysts and programmers last week.

Most individuals interviewed said they could never be forced into a union and classified as clerks even though that is just what happened at Western Airlines in Los Angeles last month [CW, Aug. 18].

The survey turned up only one case of unionization — the Braniff International DP shop. Here, entry level programmers — Programmer I grade employees — were brought in under the aegis of the International Brotherhood of Teamsters (IBT) in January.

Unions Nothing New

Data conversion and computer operations employees at Braniff have long been part of the IBT, John Bonness, vice-president of computer services, said. The 10 Programmer I level employees were included in the IBT in January without choice as part of union efforts, Bonness said.

The Programmer I employees who have been promoted have not been bothered by the fact they were moved out of the union. As for new employees who might be bothered coming into a union, Bonness said he didn't know how they would react — he has not hired any new programmers since January.

A Braniff staffer who, like almost all of the employees contacted, asked not to be identified, said the higher level management information systems workers have been assured by management that their jobs are not targeted for unionization.

He predicted the reaction of Braniff DPers to union organizing efforts would be "mixed." "Personally I would have to know a lot more about it, be assured of some of the specifics," he said.

The Braniff employee said working conditions there were better than other shops in the area, but pay was below average. "Braniff seems to have a policy of using airline benefits to leverage salaries," he said. "I'd like to have the situation slightly different: I'd like to see more effective communications."

Burned by Unions

At United Airlines, "people were very burned by the unions in the 1979 strike," one DPer said at the suburban Chicago computer center. She was referring to the April and May strike of United mechanics during which DP employees' pay was cut in half.

"We were never reimbursed," she said. "People forgave, but never forgot — there's a lot of bad sentiment toward the power of the unions."

Nevertheless, if a union approached United management information systems workers, she believes "most people would listen initially. Whether or not they would vote to unionize is something else."

Another United programmer said there is a possibility a union could get a foothold in the MIS function, but he had a "gut feeling it would not be too likely."

He guessed the United pay is about average for the Chicago area, but felt working conditions were better than average. United has hundreds of MIS employees working on two giant systems, an IBM-based administrative system and a Univac-based reservations system.

Keeping Low Profile

At the American Airlines DP headquarters in Tulsa, all the employees contacted were hesitant to talk about possible union inroads, although none of them had been contacted by the unions.

"People here don't want to talk about it — none of the airlines are doing too well and there's the possibility of layoffs," said one tight-lipped DPer. One MIS worker said he was opposed to unions and said American treated its employees pretty well, including the 300 in DP.

(Unions at American have attempted to extend their membership; most recently, the Teamsters sought to organize ticket agents.)

Eastern Airlines DPers do not expect unions to make much headway at their Miami operation. "Florida is a free state and because of that unions aren't prevalent in Miami," according to Steven Costa, a technical programmer at Eastern.

Costa called himself a conservative person who believes "unions are dragging this country down." If the Eastern MIS operation was unionized, Costa said he would look for another job.

The Eastern operation has a professional attitude and Costa believes employees are satisfied. At Eastern, programmers technical staff and the like are classified as management. The Eastern employee said he would object to being classified as a clerical employee. "We're professionals. We should be classified as something different than management or clerical."

Neither have there been any union overtures to DP employees at TWA's center in Kansas City, Mo.

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Supercontroller vs. Coax: Debate for 1980s

(Continued from Page 1)

Two Exxon Enterprises, Inc. affiliates presented both sides of the argument last May. Dallas-based Intecom, Inc. unveiled the Series 40 Integrated Business Exchange (IBX/S40), a supercontroller featuring a nonblocking switching matrix and redundant Perkin-Elmer Corp. 32-bit processors. The IBX/S40 is said to handle asynchronous and synchronous data calls in the 110- to 56K bit/sec range [CW, May 12].

Shortly afterwards, Zilog, Inc. of Cupertino, Calif. introduced a local data network architecture called Z-Net that gives the user coaxial links between distributed microcomputers [CW, May 26]. Zilog also makes the Z80 microprocessors within an IBX/S40's switching partitions.

During the week Z-Net debuted, Digital Equipment Corp., Xerox Corp. and Intel Corp. jointly announced Ethernet, a basic design for local nets closely resembling what the Institute of Electrical and Electronics Engineers seems ready to adopt as the industry standard.

According to IRD, supercontrollers can be attached to architectures like Z-Net or Ethernet without difficulty, but the extent to which they dominate local net traffic is a conundrum the data communications manager may not resolve easily.

In the U.S., only a few supercontrollers suitable for both data and voice communications are presently available. Those are offered by Intecom, Inc. of Dallas and Northern Telecom, Ltd. of Montreal.

Survey's Predictions

As for the future, IRD's recent market review of PABX, Interconnect and the Future Office Controller, predicted that IBM and Bell will accompany other vendors into the arena in the next few years.

Overseas, however, IBM has installed systems to switch both data and voice since the 1960s, only recently encountering stiff competition in that regard. Based on the 360 mainframe, IBM's 2750 switching system came to France in 1969 and had modest success. Three years later, the vendor's Data Processing Division gave Europeans a successor based on the 370 mainframe, the 3750 switching system.

But, for reasons both subtle and direct, Bell may prove the spoiler in the supercontroller sweepstakes. The world's largest telecommunications carrier is rumored to be building a juggernaut of a supercontroller in Colorado, code-named Antelope and expected to appear in the next few years [CW, Feb. 18].

With its circuitry already inside the buildings of most U.S. users, Bell may want Antelope to fit those wires snugly as an alternative to the costly overhaul that coaxial implementations might impose. But informed sources have told *Computerworld* that Bell's strategists remain divided on which switching techniques Antelope will utilize. These matters relate to how rapidly Bell wishes to replace its analog transmission facilities, which force computer users to run data through modems, with all-digital links.

Point of Contention

One point of contention among Bell planners, the sources said, is whether to endow Antelope with pulse code modulation, a switching technique featured by the Intecom IBX/S40 and Northern Telecom Ltd. SL-1 supercontrollers, but not by Bell's voice-oriented Dimension 100 and 2000 PABXs, which have pulse amplitude modulation.

Pulse code modulation involves sampling the analog waveform run through a telephone line at an 8KHz frequency and then coding each sample into an 8-bit digital packet. Sampling with pulse amplitude modulation usually occurs in the 8/16KHz bandwidth; pulses vary in amplitude as they are sampled and multiplexed onto a common signal bus.

For the user, pulse code modulation is often more expensive to implement than pulse amplitude modulation, but it is less subject to cross-talk and other distortions which can introduce errors into a data stream, IRD indicated.

According to an Intecom spokesman, supercontrollers come in two varieties. The Intecom and Northern Telecom Supercontrollers focus on the user's local environment, coordinating information flows within a single building or complex of adjacent buildings. Others, like a model American Satellite Corp. announced earlier this year [CW, Feb.4], focus on the network, rendering services such as encryption to subscribers separated by long distances.

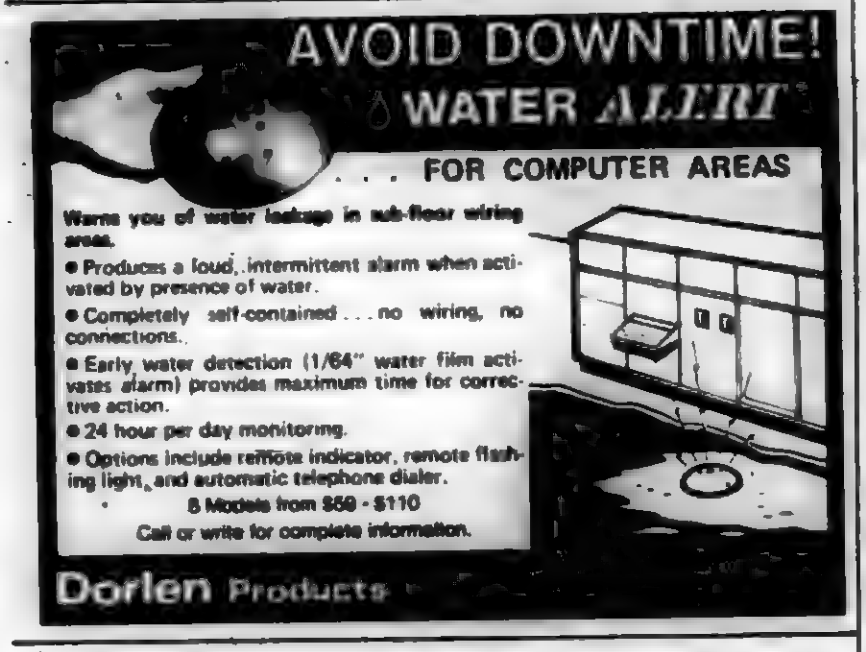
The Yankee Group polled 150 users of voice-oriented private branch exchanges (PBX) (sold by different types of firms) and Centrex systems (sold by telephone companies) to learn what they feel about upgrading to supercontrollers that integrate data and voice.

Among respondents employed by the 500 firms *Fortune* magazine designates as the nation's largest, 63% of PBX users and 86% of Centrex users said they would pay for integration of data and voice.

As to integration of data and text flows, the Yankee Group found that 55% of *Fortune* 500 PBX users and 79% of *Fortune* 500 Centrex users said they would pay for it in a switching system.

International Resource Development, Inc.'s report, "PABX, Interconnect and the Future Office Controller," is available for $985 from the firm at 30 High St., Norwalk, Conn. 06851.

"PBXs and Switching – The New Generation of Supercontrollers" was published in October 1979 by The Yankee Group as part of its Communications Information Systems Planning Service. More information on that service is available from The Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138.



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Jury Finds Honeywell Guilty

(Continued from Page 1)

from individuals involved in the 1975 suit. The memoranda were reportedly crucial to the jury's recent awards decision.

Triangle Underwriters, an insurance broker originally located in Manhattan and later in Queens, purchased the H-110 tape-oriented mainframe to replace an IBM 360-20 card-based system. The Honeywell computer was slated to handle the company's billings, customer payments, insurance policy cancellations and keep track of the $5 million in business the company had with various insurance firms.

However, the system never worked. What's more, Honeywell personnel knew the system was not ready to handle Triangle's work load, but never let the company in on that fact, according to Honeywell internal memoranda.

Shipped to Meet Goals

"The system was [shipped] in 1970 to insure 1970 shipment goals would be met for the sales office, in spite of the fact that all programs were not complete, no systems test had been performed, nor had any parallel tests been performed," a Honeywell memo dated 1972 claimed.

Problems with the H-110 centered around Honeywell's plan to convert the IBM 360-20's RPG-II programs to operate in a Cobol environment, Paul Warner, national director of management services at the accounting firm of Mann Judd & Landau, said. Warner testified as one of several expert witnesses for the insurance firm.

To accomplish the RPG-II-to-Cobol conversion, Honeywell allegedly assigned a project leader "who they claimed had insurance experience" and two programmers, Warner noted. "One was fresh out of school and the other had some experience in Cobol." Even though "their RPG-II-to-Cobol manual stated that the people involved had to be experienced in both."

On-Line Disaster

Triangle did not realize that the system was inadequate until the computer was switched on-line. At that time, "billings were incorrect, commissions were in error, many agents were paid multiple times [and] some were not paid at all," a Honeywell internal memo revealed. In addition, "cancellations of policies were not handled properly [and] customer payments were not applied to their policies."

Honeywell installed the computer system "without ever completely even writing it," Howard Radin, another expert witness for the plaintiff, added. "They never ran a whole system test. Although the H-110 looked operable on paper, the system was "never able to run its business properly."

The defendent's lawyer, Thomas Shaw, declined to comment on the court's decision.

M/A-COM Satellite Net Displays Broadband Power

By Phil Hirsch
CW Washington Bureau

BURLINGTON, Mass. — Transmission of a two-page letter in six seconds is one feature of a private satellite communications network which M/A-COM, Inc. headquartered here, plans to put into operation early next year. The system will be a showcase for demonstrating sophisticated hardware and software that replaces analog local loops with broadband, all-digit facilities.

Based on M/A-COM's marketing plans and those of other suppliers, it appears likely that this new technology will become generally available to data communications users within the next two years.

M/A-COM's upcoming private network — Macomnet —, will interconnect company headquarters here in Burlington with affiliates in Maryland, California and North Carolina. Two affiliates — Digital Communications Corp. (DCC) in Germantown, Md., and Linkabit Corp. in San Diego — are leading manufacturers of microwave and satellite communications equipment.

The third remote termination will serve Valtec Corp., which produces coaxial and fiber optic cable, as well as laser diodes. Backbone channels for Macomnet will be provided by Western Union's Westar satellite.

Initially, Macomnet will support teleconferencing, facsimile and electronic mail applications. Later, computer-to-computer data transfers will be added. The system is scheduled to begin operation early next year, assuming M/A-COM's soon-to-be-filed application is approved quickly by the Federal Communications Commission.

DCC Earth Terminal

The Westar satellite channel will interface at each of the four sites with an earth terminal recently developed by DCC. According to a company spokesman, this Dynac terminal costs about $50K "in limited quantities" and provides the benefits of time-division multiple-access at a far lower price than anything on the market today.

Initially, the earth station and its associated five-meter antenna will be connected by coaxial cable to multiple terminals located within a single building at each of the four sites. Later, multiple buildings in Burlington will be attached to the Macomnet using two other recently developed DCC products.

One is a cable-based switching and control subsystem called Capac that time-shares the cable capacity among multiple attached terminals, allowing them to communicate with each other and, through the Dynac earth station, with the outside world. The other subsystem, known as Rapac, is a microwave version of the same basic capability. Each can be modularly expanded to support "tens of thousands of terminals," according to DCC.

Satellite Business Systems

Satellite Business Systems (SBS) may be the first U.S. satellite communications carrier to make this broadband digital communications capability generally available end-to-end. Early next year, the company will launch a transcontinental data communications demonstration, utilizing a 56K bit/sec satellite channel connected to cable and/or microwave local loop facilities in New York and San Francisco.

Almost certainly, SBS plans to add similar facilities to its commercial network once the demo has shown the benefits. The satellite-local loop interface for the SBS test will consist essentially of DCC's Capac and Rapac subsystems.

In addition, Mitre Corp. has just licensed DCC to manufacture a new interface that permits multiple and varied data terminals to be connected to a community of antenna television system. For details, see story on Page 55.

Local Loops Link Satellites

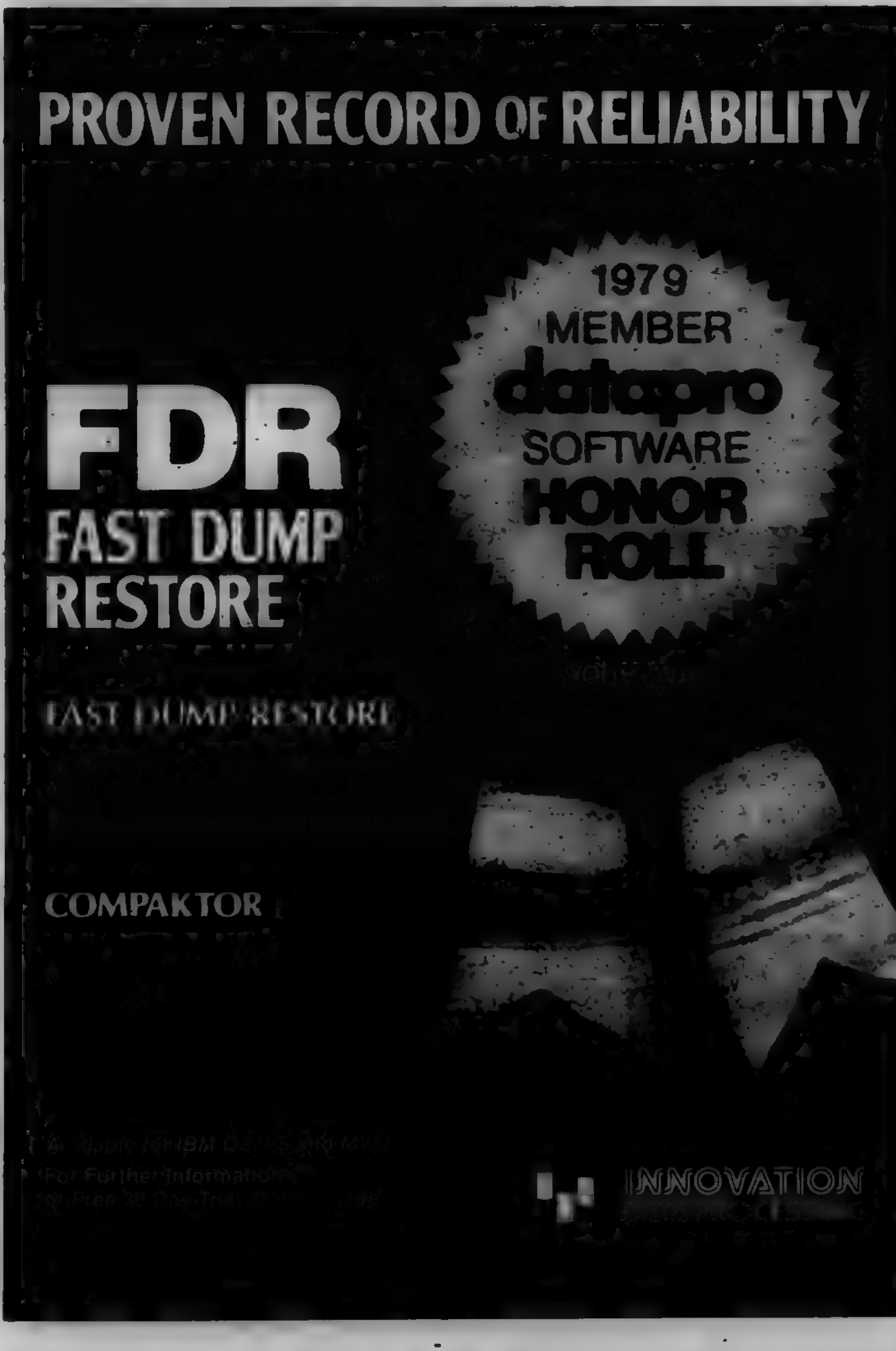
The basic architecture of satellite networks such as that developed by M/A-COM, Inc. consists of cable or microwave local loops connected to microprocessor-equipped network nodes.

Communications between the user's terminal and the node is typically at 256K bit/sec. On the network side, the node — through an associated earth station — is connected to a broadband satellite channel.

In addition to higher speed and the use of digital instead of analog format, this scheme employs time-division multiple-access (TDMA) software, which assigns satellite channel capacity to each pair of network nodes for a specified time interval. During this interval, data collected from the associated terminals is transmitted in bursts at rates up to 64M bit/sec.

Voice, facsimile and slow-speed video, as well as conventional data, can be transmitted concurrently. Moreover, point-to-point traffic can be intermixed with point-to-multipoint messages.

A basically similar capacity-allocation scheme is used on the microwave or cable link connecting the network node with its associated end points. Multiple send-receive channel pairs, each utilizing different carrier frequencies, connect the node with the remote locations. A single channel is shared by a number of remote end points.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INNOVATION
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There She Is, Miss . . . Oklahoma?

Prof. George L. Miller

By Marguerite Zientara
CW Staff

DE KALB, Ill. – Statistics lie. That in a nutshell is the reason Prof. George L. Miller wrongly predicted the winner of the 1980 Miss America contest.

Miller, a Northern Illinois University professor of business systems and analysis, created as much of a stir as Miss America herself when he correctly predicted the 1979 winner based on computerized statistical analyses of past pageant winners [CW, Oct. 1, 1979].

This year, however, his prediction that Miss Kansas, Leann Folsom, would wear the crown [CW, Sept. 8], was far off the mark. Miss Kansas was not even selected as one of the 10 finalists.

What went wrong? "I really had very limited information," Miller explained. "I've never seen the contestants. I don't see them when I make the predictions, so I've never heard them speak, seen them perform and I don't know how poised they are.

"The reason I missed is that [I] had something that looked real good on paper and was likely to be a high winner based on what happened in the past," Miller explained. "But this year they had 10 excellent semifinalists and [Miss Kansas] really had a lot more competition than she would have had last year," he observed.

"It's not like it used to be. Here you have almost college graduates who have maybe 10 or 12 years of vocal training or something like that," he added, "and while they used to average 19 years of age, now they're very close to 22."

Furthermore, he noted, "I really didn't have any evaluation of [Miss Kansas'] talent, so when they had the talent and the swimsuit [competition] and she didn't score well in either one of those, that indicated that – even though she had the correct numerical statistics – others in the pageant may have had better musical arrangements or whatever."

Is it possible that Miller's prediction actually contributed to Miss Kansas' losing the contest? "According to the current Miss America, it didn't," Miller noted. "She was on the Today Show and she said she didn't see how it could influence judges in any way and I sort of feel that way."

While Miller's predictions may not have influenced the judges, his determination of "favored" talent categories and personal characteristics apparently has influenced contestants.

"Last year I announced that piano playing and singing was one of the better categories, and this year they ended up with four in that category," he noted. "Just like green eyes – I've been announcing that all along and they ended up with six green-eyed people in the final 10."

Although Miss Kansas and her followers may have suffered a great letdown as a result of the incorrect forecast, "I think she got a heck of a lot more publicity than the 39 other [also-rans]. She got in *People* magazine, and so forth, so at least I got some publicity for her," he said.

Undaunted, Miller plans to again predict a winner next year "if I can get the information from the pageant people."

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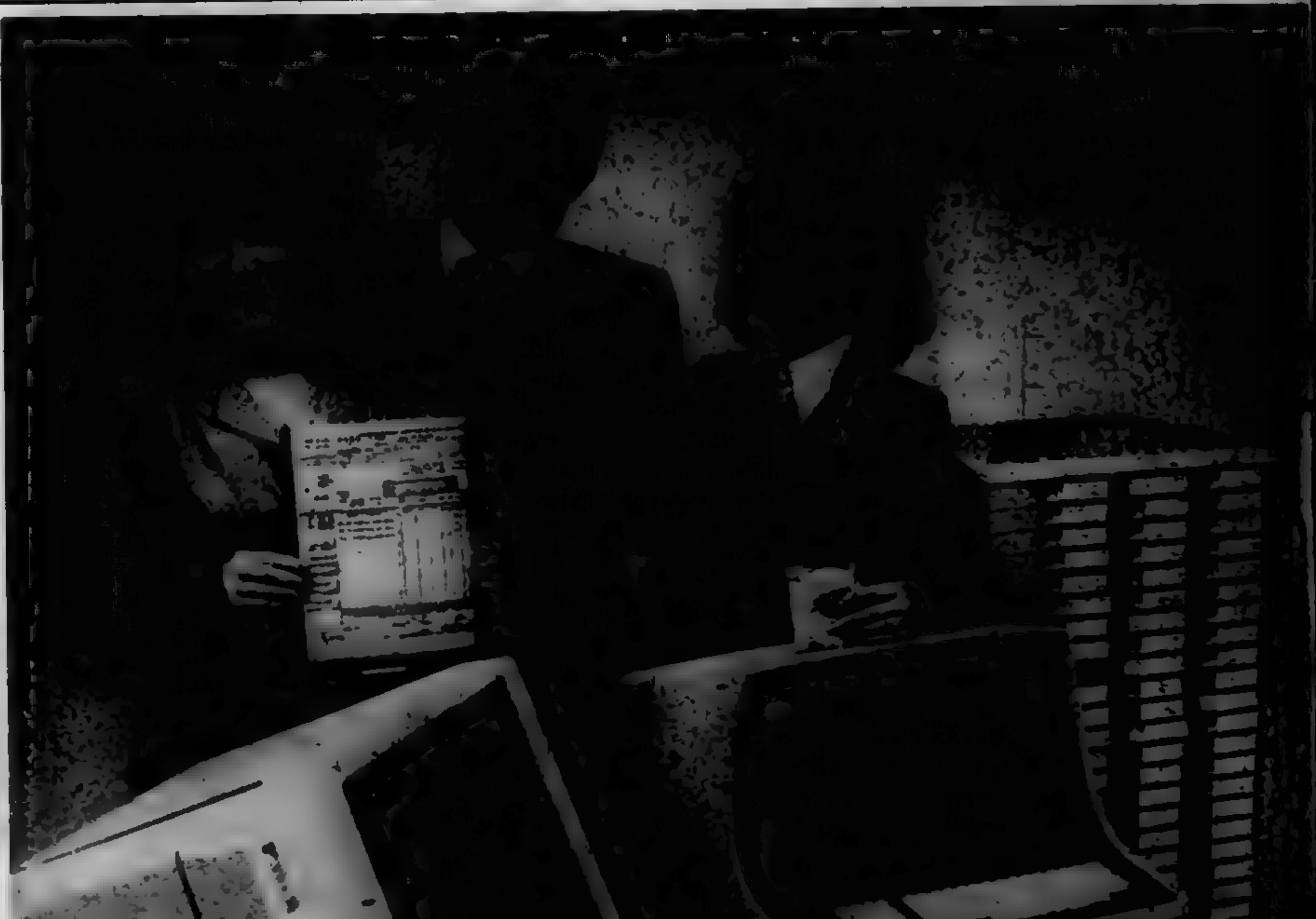

Threatening Telecom's Monopoly

IBM Venture Spawns SBS Clone Down Under

By Brad Schultz
CW Staff

SYDNEY, Australia – An IBM subsidiary and another 10 of Australia's largest corporations have moved to take control of this nation's long-range communications planning away from the federal government by forming their own version of Satellite Business Systems (SBS).

Called Business Telecommunications Services Pty. Ltd. (BTS), this joint venture will be headed by Peter Holmes A'Court, former external affairs director of IBM Australia Ltd. BTS will do much to prepare Australia for its first domestic communications satellite, informed sources predicted when news of the company's founding broke last week, in opposition to the federally run Telecom monopoly, which wants to keep data flowing through its telephone lines.

Telecom fills the same function as the postal, telegraph and telephone authorities of European countries. The giant corporation is often compared to AT&T because both organizations have entered the DP marketplace by drawing on vast revenues from strictly telephone operations.

Both in the U.S. and down under, computer vendors have called this cross-subsidizing unfair. The U.S. Federal Communications Commission (FCC) has agreed, ordering Bell to keep financing of its voice operations separate from financing of its DP side.

In Australia, foreign (including U.S.) and native computer vendors have pushed for similar restrictions on Telecom. But Australia has no FCC. As a government agency, Telecom has monopolized the nation's telecommunications with only nominal accountability to the federal Ministry of Post and Telecommunications.

So 11 major Australian firms have seized this look-alike Bell by the horns, forming its BTS to – in A'Court's words – "establish whether government and private enterprise can cooperate in the provision of [advanced telecommunications] services."

Joining IBM Australia, which transferred A'Court to the BTS top job, are Australia's largest or nearly largest firms in the oil, insurance, electronics, diversified manufacturing, publishing, broadcasting, retail, trucking and mining industries.

Those three organizations may prove to be the largest customers of their own joint venture, some observers have said, but SBS' main purpose will be competition with AT&T's terrestrial links, notwithstanding Bell's Ad-

(Continued on Page 12)

Heavy Hitters Sign With IBM

SYDNEY, Australia – In facing a combined challenge in data communications from 11 of Australia's largest companies, the Telecom monopoly's plight might be compared to what AT&T would face in the U.S. if similarly threatened by a consortium of IBM, Exxon Corp., Aetna Casualty and Life, Texas Instruments, Inc., Columbia Broadcasting Systems, Sears Roebuck and Co., United Airlines and a few other industrial giants.

Telecom, like the postal, telegraph and telephone authorities of Europe, was formed to ward off telecommunications domination from abroad and coordinate a nation's assimilation of telecommunications technology. Immensely profitable, Telecom depends on revenues from its considerable investment in telephone lines and resources.

Like Bell, Telecom has much to lose if its data communications customers decide to replace terrestrial links with independently supplied satellite facilities. The organization, a component of Australia's Ministry of Post and Telecommunications, must now reckon with the following shareholders of Business Telecommunications Service Pty. Ltd. (BTS) in the remote DP arena:

- IBM Australia Ltd., whose former external affairs director will manage BTS.
- CRA Ltd., Australia's second largest company, a mining giant partly owned in the UK.
- CSR Ltd., Australia's third largest company, also in mining.
- Ampol Petroleum Ltd., one of the largest Australian oil producers.
- The Myer Emporium Ltd., Australia's largest retail chain.
- Publishing and Broadcasting Ltd., a giant in both industries.
- Australian Mutual Provident Society, the largest Australian insurance company.
- Amalgamated Wireless Australasia Ltd., huge in diversified electronics.
- Thomas Nationwide Transport Ltd., big in trucking and a major domestic airlines.
- James Hardie Industries Ltd., a construction materials supplier.
- Australian Consolidated Industries, Ltd., a diversified manufacturer.

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Court Rules Western Union's LCR Illegal

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – Western Union Telegraph Co.'s cut-rate overseas telex service, which costs the user up to 30% less than what U.S. international record carriers (IRC) charge, is on the verge of being terminated because a federal appeals court in New York City has ruled that the offering is illegal.

That decision came in a suite filed by three IRCs – Western Union International, Inc., ITT World Communications, Inc., and RCA Global Communications, Inc.

The service is still being offered, a Western Union spokesman said late last week, because the court's verdict directed the Federal Communications Commission (FCC) to issue a stop order which had not yet been received by the telegraph company. But the spokesman indicated that orders from new customers were no longer being accepted.

The FCC, meanwhile, has asked the New York appeals court for more time to prepare a request for reconsideration. That petition was pending at press time last week. If the petition is granted, Western Union's Low-Cost Routing (LCR) service would continue until the court completed its deliberation.

Launched last fall, LCR service provides connections to about 100 countries. Messages are handed off to CNCP Telecommunications, a Canadian carrier, and to Direccion de Telecommunicaciones, the Mexican telecommunications authority, for relay overseas.

At the moment, LCR provides one-way outbound transmission only, on an immediate delivery or store-and-forward basis. Before being shot down by the appeals court, however, Western Union had planned to establish a direct, two-way service with overseas carriers.

The court said basically that LCR violates Section 222 of the 1934 Communications Act because it involves international telegraph operations and the handling of overseas traffic. Under Section 222, as interpreted by the court, Western Union is barred from performing either function. Only Congress can lift these restrictions, the court indicated.

FCC Logic

Last year, when the FCC allowed Western Union to provide LCR, the commission pointed out that much of the international telex traffic originating within the U.S. is carried over Western Union facilities to the domestic switching centers of the U.S. IRCs. "In our view, land-line haul traffic handled by Western Union remains land-line haul traffic regardless of whether it is handed off to [a U.S.] IRC . . . or . . . to a Mexican or Canadian carrier."

However, the appeals court said that if this reasoning is accepted, "Western Union could defeat Congress' purpose, which was to protect the IRCs from abuse by Western Union of its domestic monopoly power . . . simply by teaming up with one or more foreign carriers . . . and bypassing the IRCs altogether."

Shortly after the court's ruling was announced, Robert M. Flanagan, Western Union's chief executive officer, pointed out that the FCC's main purpose in authorizing LCR last year was to promote competition in the international telex market.

"This expectation of effective competition was on the way to being realized. During the past year, international telex prices have been reduced dramatically – concurrently with Western Union's initiatives in the marketplace. If the court decision is allowed to stand, however, the users of international communications will be the real losers," Flanagan said.

However, the court's ruling applies only to Western Union, not to the resale carriers which the FCC authorized concurrently with its OK of LCR. They are also offering international telex service at rates significantly below those charged by the IRCs.

DPMA Conference Expects Success Despite Recession

PHILADELPHIA – "Despite the recession, the Data Processing Management Association (DPMA) anticipates its 29th international conference and business exposition to be one of the most successful ever presented," according to DPMA executive director Edward J. Palmer. The conference will be held in Philadelphia on Oct. 26-29.

The conference agenda includes preconference workshops, "early-riser" sessions, 50 seminars, and an optional tour of Atlantic City, N.J.

The annual conference highlight is the presentation of the DPMA Distinguished Information Sciences Award (formerly "DPMA Computer Sciences Man-of-the-Year"). This year's recipient of that award is John Diebold.

Additional information is available from DPMA International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

SBS Cloned Down Under

(Continued from Page 11)

vanced Communications Service, for the data communications dollars of U.S. users large enough to afford the roof-mounted dish antennae necessary for satellite traffic.

"The emergence of BTS shows the increasing significance of telecommunications to business as the much reported communications revolution gathers momentum," A'Court remarked. It may also indicate that IBM, through foreign subsidiaries, plans to wage war from outer space on the telecommunications monopolies or near-monopolies it finds in lucrative markets outside the U.S.

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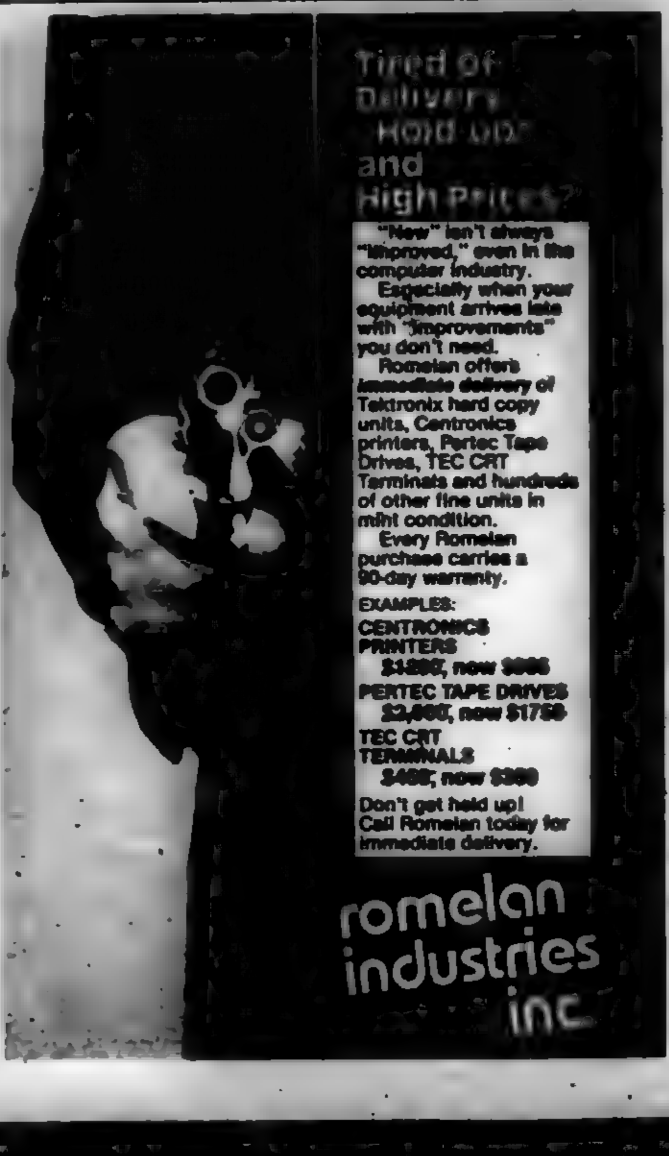
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Claims 10% May Go Unread

Fisa Denies New York Ignores 60% of Reports

By Rita Shoor
CW Staff

NEW YORK — Some reports generated by the city's Integrated Financial Management Systems (IFMS) may be going unread, but the number is closer to 10% than 60% claimed David Woodbridge, director of the information systems unit that produces these reports.

Woodbridge was responding to recently published audit results from the Office of the State Comptroller for New York. It stated that close to 60% of the 65 IFMS monthly reports and some two-thirds of the daily reports were essentially ignored by many of their users [CW, Aug. 25].

The Financial Information Services Agency (Fisa) might "produce more information than people can use" and didn't necessarily produce it in the best format for the city's line agencies, Woodbridge acknowledged. However, he took exception to the research methodology utilized by the comptroller auditors.

Audit Sample

The term "report" as used in the comptroller's audit actually referred to a report/agency combination, according to Fisa's official response.

Twenty-one different monthly reports were shown to personnel at various agencies for a total of 66 report/-agency combinations, Fisa explained. Similarly, three of the 21 daily reports produced by IFMS were the sample given to five agencies to produce 15 report/agency combinations.

Therefore, the sample used by the auditors can be summarized as follows, Fisa noted:

- Personnel at eight of the 140 line agencies (about 6%) were contacted regarding approximately 11% of the total number of reports sent to line agencies (15 out of 131).
- Personnel at the two central agencies included in the audit — comptroller's office and Office of Management and Budget — were contacted regarding six (9.5%) of the 63 monthly reports sent to the central agencies.
- Personnel at five line agencies (3.5% of the total) were asked about their use of approximately 14% (three out of 21) daily reports.

The comptroller's representatives "only looked at the trees" in the forest of IFMS, Woodbridge said, "and then [the auditors] misdefined the forest."

Primary Goal

The agency maintained that its primary goal is to maintain auditable financial records to provide financial statements in accordance with generally accepted accounting principles (Gaap).

IFMS has, in fact, met this goal since the city's books have been certified as auditable for 1978 and 1979 — the two years that IFMS has maintained the financial records. The audit for fiscal 1980 is currently in progress and "there are no known problems," Woodbridge said.

The provision of financial and budget information required for line agency managers to operate their areas is a secondary goal, Fisa noted. The first goal has been accomplished, the agency said, and it is now working on ways to help city agencies make use of the detailed information available from IFMS.

Fisa also pointed out that all of the figures contained in the audit report were generated more than a year ago — around April 1979 — although the report was not formally released until last Aug. 4.

In the meantime, Fisa implemented an improved Reports Distribution System (RDS) in December 1979. The RDS was based upon a questionnaire survey conducted with the Urban Academy, visits to major city agencies to discuss individual needs, memo notification to all agencies to review the proposed reduced report packages and user meetings in November 1979 to which all city agencies were invited, Fisa said.

The result of the RDS has been "a significant decrease in output" for 48 small agencies and a 5% increase in output for 31 large agencies, according to Fisa.

In addition, three of the 63 monthly reports sent to central agencies have been eliminated and four other reports have either been eliminated or replaced since early 1979, Fisa noted.

Comments about the daily IFMS reports also indicated a lack of understanding with a corresponding need for training at the line agency level, Fisa said. The agency also claimed that the perception among some IFMS users that certain monthly reports were received too late to be helpful could be traceable to late internal distribution.

In response to the audit's recommendations for remedial action, Fisa stated that it is currently reviewing usage of daily reports with plans to eliminate three reports and consolidate another.

The agency also canvassed the 11 or 12 large agencies that manage "approximately 90% of the city's budget" and a "good sampling of the smaller agencies" regarding usefulness of Monthly Encumbrance Reports which should result in additional report consolidation.

To work well for Manufacturing, MRP* must also work on the computer.

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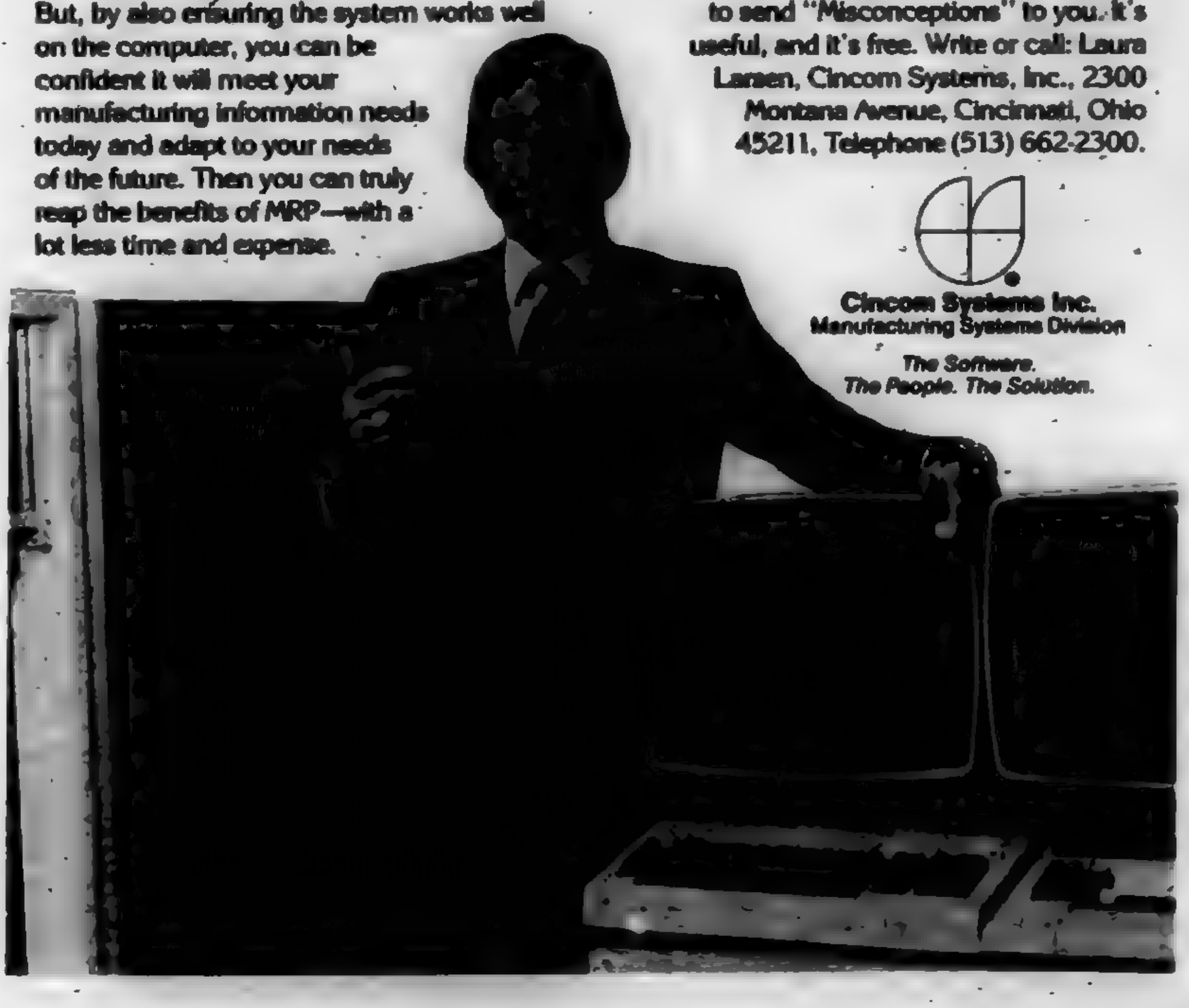

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SOFTWARE INDUSTRY ASSOCIATION

Fax Service in Wings

Ecom Slated to Begin January 1982

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The controversial Electronic Computer-Originated Mail (Ecom) service proposed by the U.S. Postal Service (USPS) two years ago will begin commercial operation in January 1982 — and possibly sooner, Postmaster General William F. Bolger said here last week. Another new electronic message offering — an international facsimile service called Intelpost — will be established "before very long" between the U.S. and Canada, he added.

Speaking to the National Postal Forum — a conclave of postal officials, users and suppliers — the Postmaster General also said the agency's Express Mail service would be expanded; a proposed change in the private express statutes, opposed by the computer industry, will be abandoned, users of the new nine-digit Zip Code will qualify for reduced postal rates, and accounting requirements for metered mail users will be simplified.

Separate Subsidiary

The first step toward implementing Ecom will consist of forming a separate subsidiary. It will "oversee" not only that offering but also all of the agency's other electronic projects — presumably including Intelpost and the Electronic Message Service System (EMSS), a still-nascent plan to transmit regular first-class mail on-line among post offices throughout the nation.

Startup of Ecom was recently approved by the USPS board of governors, which directed the agency to develop interface standards cooperatively with private vendors of electronic mail and message services. In his Postal Forum speech, Bolger said "we will move forward rapidly" to establish the standards. He has asked Henry Geller, the President's chief telecommunications adviser "to give us the benefit of his assistance."

Negotiations have already begun with Canada to establish Intelpost service, Bolger added. This offering will employ domestic circuits to get messages to the border "and thus would be acceptable under applicable communications law. Upon completion of an arrangement with Canada, we would . . . commence negotiations aimed at establishing Intelpost between the United States and Western Europe by transmitting . . . through Canada."

Private Express Charges

Bolger also reported that USPS will shortly promulgate a number of changes in the private express statutes. One proposed change, involving a new definition of telegrams, has been dropped, he said. "This proposal was wrongly interpreted by many as an attempt by the Postal Service to bring new forms of electronic transmission under the protective umbrella of the statutes. We have denied this repeatedly."

Express mail service is being expanded to include every three-digit Zip area, which will add "over 3,000 pickup stations," the Postmaster General reported.

Regarding metered mail, Bolger said users of this service from now on "will no longer be required to keep a daily record of their meter use. With the advances that have been made in metersetting technology, this requirement becomes an unnecessary nuisance and we are doing away with it."

Nine-Digit Zip May Lower Rates

WASHINGTON, D.C. — Users of the new nine-digit Zip Code will qualify for reduced postal rates, Postmaster General William F. Bolger said here last week.

The expanded Zip Code, Bolger said, "promises to reduce both our costs and our error rate and thus is not only in our interest, but in the interest of every user of the mails."

There has been widespread criticism of the nine-digit Zip by computer users, who contend it will require massive and expensive reprogramming. Apparently mindful of these added costs, Bolger said the U.S. Postal Service will share the benefits of the expanded Zip Code.

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World Teleconference Extends Boston's Great Cities Meet

By Connie Winkler
CW Staff

CAMBRIDGE, Mass. — The Great Cities of the World Conference marking Boston's 350th anniversary will be heard around the world because of a teleconference planned by Future Shack.

"We are augmenting the physical gathering here in Boston with teleconferencing," according to Frank Catanzaro, vice-president of Future Shack and executive producer of the Great Cities teleconferencing project.

Several terminals will be publicly available in Sweden and Toronto — in Sweden at public libraries, for instance. By the time Boston's Great Cities conference begins Sept. 22, there will also be a terminal in Jerusalem.

U.S. locations include Los Angeles — now going into its 200th year — Kansas City and Boston.

These locations will receive reports from the Boston proceedings, which will focus on the prospects and problems of large cities, and communicate with other cities. Catanzaro sees this as the beginning of a city-to-city network — which would remain in place after the Boston session — and an innovative aproach to international relations.

The cities' teleconference will use the Electronic Information Exchange System developed through the New Jersey Institute of Technology which is linked into Telenet.

The nonprofit project will cost about $50,000, with most donations coming from in-kind contributions of equipment manufacturers and corporations, Catanzaro said.

Future Shack is a Cambridge-based consulting group which integrates multimedia and computers to, as Catanzaro explains, "demystify computer technology."

CFI to Provide IBM, Amdahl Residual Values

By Connie Winkler
CW Staff

NEW YORK — Computer Financial, Inc., (CFI) has jumped into the business of predicting residual values of IBM and Amdahl Corp. computers. The residual information will be available in reports and newsletters from CFI's new affiliate, CFI Publications, Inc.

CFI is enlarging its initial business of providing residual value projections on IBM computer equipment to banks, financial institutions and third-party lessors since 1971, Tom C. Martin, CFI president, said at the CFI Publications announcement recently.

CFI's competitors include The Gartner Group — which in July announced the Residual Asset Value Estimation (Rave) package — and International Data Corp.

Unique Service

CFI provides information on both Amdahl and IBM mainframes and IBM disks, tapes and printers. "Unique among the services offered today by both major consulting firms and small specialists in the field, CFI's program permits subscribers to select reports germane to their needs," Martin said.

To make its projections, CFI uses a data base that dates back to 1971. Both the firm's principles are former IBM employees.

The reports are listed according to product and range in price from $100 to $900. It is necessary to buy several reports to appraise the precise configuration. There is also a $440 annual membership fee.

The need for residual value information is becoming increasingly important for users as they evaluate the increasing number of computer systems options. Martin told of one user who is leasing an IBM 168 for $89,000 a month, when the same 168 model can currently be had on the used market for $20,000 a month.

CFI Publications is at One University Plaza, Hackensack, N.J. 07601.

Colorado Rewrites Tax Rule To End Canned Software Tax

By Marguerite Zientara
CW Staff

DENVER — Following the lead of the dozen states that have granted sales tax exemption status to computer software packages — and without pressure from the DP industry — Colorado has rewritten its tax rule to tax only system control software.

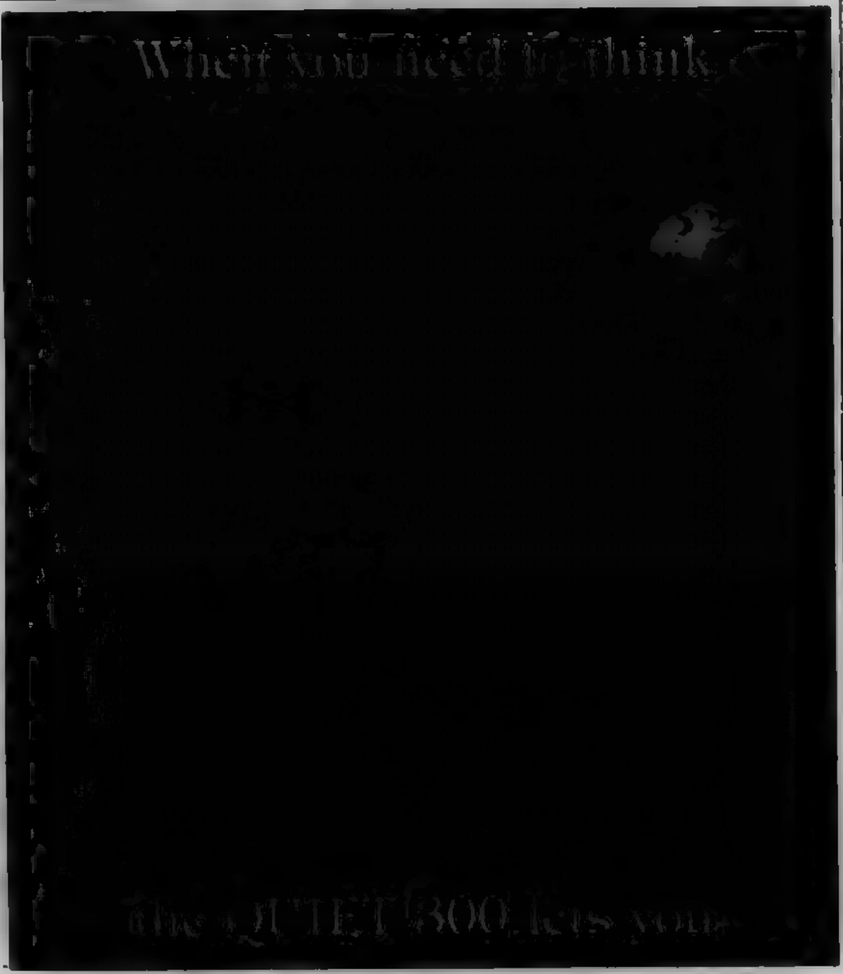
Currently before the state attorney general awaiting an official opinion, the new rule is "very valid" and will probably be approved, according to Joseph Macias, tax supervisor for the sales tax department of the Colorado Department of Revenue.

Expected to become effective "around Nov. 1" if approved, the rule would end taxation of canned software, which began in July 1977.

"What we've decided is that, in the operation of computers, there is really no such thing as a canned program," Macias said. "Everything becomes a custom program, in that even for a normal canned program, somebody still has to study your needs."

Even if Colorado stops taxing the sale of software come November, however, the City of Denver may continue to do so. As one of 29 Home Rule cities in the state, Denver administers and collects its own sales taxes, Macias explained.

If Colorado exempts the tax and Denver maintains it, problems could arise, Macias said. "Someone that's operating in Denver would have to know they have to [pay] the Denver tax and not the State of Colorado tax."



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50 Wholesale/Retail Trade
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23 Systems Manager/Systems Analyst
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32 Programmer/Methods Analyst
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42 Other Engineering
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L.A. DPer Strike Threat May Be Averted as Unions Approach Wage Settlement

By Jeffry Beeler

CW West Coast Bureau

LOS ANGELES — Local authorities appear to have averted, at least for the time being, a prolonged and possibly crippling strike involving the bulk of the city government's computing staff.

Starting in mid-July, many of the city's approximately 200 programmers, analysts and other computing personnel threatened to walk off their jobs for two weeks or more unless local officials OK'd their demands for an immediate 10.5% pay hike.

Now, however, the workers' wage dispute with the city appears to be nearing a settlement, and the danger of an extended computing-staff walkout seems to be subsiding, a local source said.

Word that city officials and computing personnel are apparently resolving their differences has been greeted here with a sigh of relief.

If the would-be strikers had made good on their threat to stage a two-week walkout, many of the community's most vital public services would almost certainly have been severely disrupted, despite the best efforts of computing-department supervisors to keep the programs running.

Especially hard hit would have been key on-line applications such as the city's fire and police information systems.

City officials got their first bitter taste of a computing-staff strike in July when almost all the community's 150 programmers, systems analysts and operations personnel left their jobs for three days to press their demands for higher pay [CW, July 28]. The strike — the first involving computing staffers in the city's history — proved only a relatively minor inconvenience for area residents, primarily because of its brevity.

But no sooner had the work stoppage ended than disgruntled employees began threatening to stage a second, much more prolonged walkout.

For a while, prospects for averting a follow-on strike looked dim, but then came a development that suddenly and dramatically altered the picture. Late last month, a widely publicized walkout involving another group of city employees — the water and electrical-power workers — ended abruptly with an agreement that granted the strikers a pay raise of somewhere between 9% and 10%.

De Facto Standard

The agreement, which represented a compromise of the two sides' bargaining positions, in effect set a de facto standard for other groups of dissatisfied city employees, including the municipal computing workers, to follow.

Since then, efforts to resolve the computing staffers' continuing wage gripes have apparently gone smoothly. The city's approximately 50 keypunch operators, who are represented by a local clerical union, have already received tentative approval for a 15% pay hike that includes an initial 10% raise with an additional 5% equity adjustment, the source said.

A similar agreement has recently been forged by the union representing the city's computing-department supervisors.

The only computing workers for whom the outcome of wage-negotiations is still uncertain are the city's programmers and operations personnel, who are represented by a union named the Engineers and Architects Associations. But even for those employees, the prospects for a new labor contract and higher pay look bright, the source said.

Deadline Moved For NCC Papers

CHICAGO — The deadline for papers and presentations has been extended for the 1981 National Computer Conference (NCC), to be held here May 4-7. General papers can be submitted until Oct. 27, and the last day to propose topics for the technical panel sessions is Oct. 1. Also, the personal computing festival program, which focuses on hobby and small business applications, will accept papers until Feb. 1, 1981.

With the theme "Keys to Productivity," the convention, chaired by Albert Hawkes of Sargent & Lundy Engineers, will feature approximately 100 technical sessions and 190,000 square feet of exhibitions. This is the 30th anniversary conference, which also coincides with Univac I's 30th birthday, to be commemorated on "Pioneer Day" at the conference.

The five major subject areas to be handled at the conference were set by the steering committee as hardware, software, information process management, applications and social and economic implications. According to program chairman Alex Orden of the University of Chicago, 1981 NCC looks to be the largest computer conference of its kind.

It will all be happening at McCormick Place.

More information is available from AFIPS/NCC '81, P.O. Box 9658, 1815 North Lynn St., Arlington, Va. 22209.

Microfilm Legality Codified by Study

CHICAGO — "Legality of Microfilm" is a research study on the admissibility and acceptance of microfilm records in the court system, according to its publishers, Cohasset Associates, Inc. Identifying and analyzing all laws and regulations pertaining to microfilm, this publication reprints more than 750 laws, rules of evidence and interpretations.

The 556-page document also features a "how-to" micrographics section that details the implementation process of a microfilm system that will satisfy 32 key provisos upon which the legal acceptance of microfilm may be contingent.

It is available for $100 (plus $25 per update) from Cohasset Associates, Inc., 3806 Lake Shore Drive, Chicago, Ill. 60601

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Survey Finds DDP Users Lack Recovery Plans

By Tom Henkel
CW Staff

ELLICOTT CITY, Md. — Almost half the DPers who responded to a recent survey on distributed data processing (DDP) systems admitted their firms currently do not have disaster plans.

Fifty-two percent of those polled by Impact Marketing Services, Inc. here said they had a disaster recovery plan; 47% said they did not. Of those without a plan, 34% indicated a plan was in the works, while 13% said their firms had no immediate plans to develop a recovery plan. One respondant to the survey didn't know if he had a recovery plan, according to Impact Marketing Services, Inc., which conducted the survey.

Broken down according to types of industry, manufacturers tend to be the best equipped to handle a computer disaster with 14 of 18 firms in that category indicating there was a disaster plan. Although not as well prepared as manufacturers, insurance firms also tend to be well set for a disaster. Nine of 17 firms in that group said there was a disaster plan. The majority of wholesalers, retailers, financial services and transportation firms, however, said no plan exists.

The education field, which had only two respondents in the survey, is an unusual case. One DPer polled said his firm had a disaster recovery plan, while the other DPer didn't know if a recovery plan existed, the report said.

Favorite Answer

Asked whether a DDP environment would enhance a firm's ability to recover from a disaster, the pollster came up with a definite "maybe."

Twenty-two percent of those polled said DDP would "absolutely" enhance recovery. Twenty-six percent were less optimistic but said the firm would probably be better off in a DDP environment.

On the other hand, 29% of those polled said DDP probably wouldn't hurt recovery, while 13% said it would probably complicate things even more, the report noted.

Manufacturing firms, wholesalers, retailers and transportation firms tended to feel DDP would enhance recovery while financial services, insurance firms and the catch all "other" grouping said DDP would not be a benefit, the report noted.

Smaller DP shops tended to be more concerned about recovery in a DDP environment. Firms with 24 or more remote sites generally felt comfortable (64%) about recovery in a DDP environment, according to the report.

The full report, priced at $550, is available from Impact Marketing Services, Inc., 10318 Globe Court, Elliott City, Md. 21043.

What Effect on Security?

ELLICOTT CITY, Md. — The opportunities for computer fraud don't increase when a firm switches to a distributed data processing (DDP) network, according to 92 DPers responding to a recent Impact Marketing Services, Inc. survey.

Of those polled, 47 said a switch to distributed processing doesn't make a difference in system security. However, better than a quarter of those questioned (29%) said they were unsure of what effect the DDP switch would have on security.

Eight percent said DDP leaves the door wide open to computer fraud, while 1% said it closes the door on fraud. Four percent of those polled said they didn't care about the possibility of computer fraud, and 11% answered in the "other" category.

The survey was conducted from January through May of this year.

Interchange Sets October Meet

TINTON FALLS, N.J. — Interchange, the user group of the Perkin-Elmer Corp.'s Computer Systems Division, will hold a general meeting here on Oct. 6-7. Called "Interchange '80," the meeting will be comprised of discussion between Perkin-Elmer top management and Interchange members, technical papers, workshops and special interest group meetings.

User-developed software and hardware and Perkin-Elmer's newest products will be demonstrated.

More information is available from the firm at 2 Crescent Place, Oceanport, N.J. 07757.

NCCMG to Hold Fall Meeting Sept. 30

SAN FRANCISCO — The Northern California Computer Measurement Group (NCCMG), a recently established division of the national CMG, will hold its fall meeting here Sept. 30.

Newcomers to the industry as well as parties interested in computer performance evaluation are invited to attend.

Preregistration is $15; registration costs $18. Further details are available from Standard Oil of California, Room 3826, 525 Market St., San Francisco, Calif. 94105.

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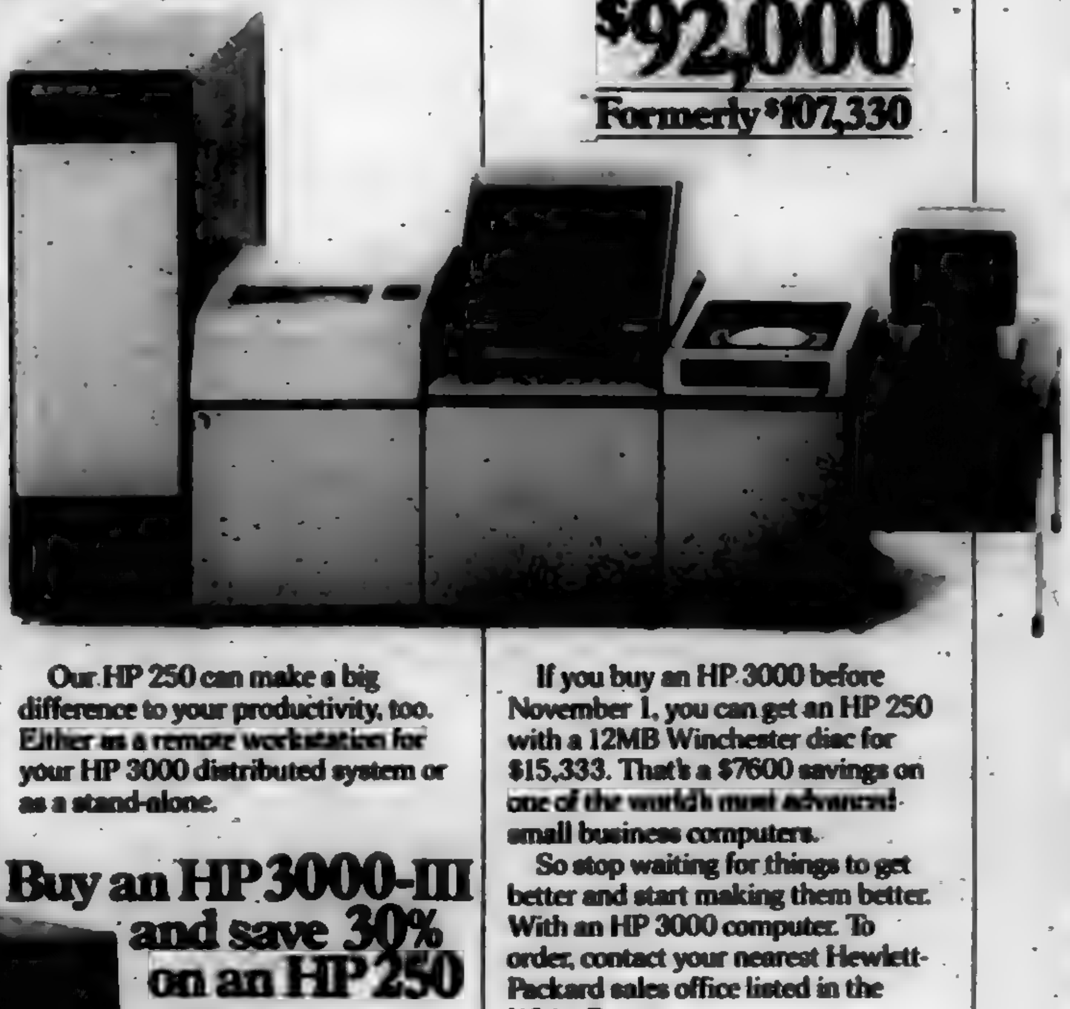

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Supermini 'Service Bureau'

Weyerhaeuser's Applied Math Center has 10 printing and CRT terminals for use by researchers.

Special to CW

FEDERAL WAY, Wash. — Weyerhaeuser Co. here has installed an internal superminicomputer time-sharing "service bureau" to aid researchers in evaluating everything from sophisticated process control algorithms to baby diapers.

The supermini has exhibited less than one-year return on an investment of $350,000, including operating and amortized facility costs.

Weyerhaeuser is a $4.4 billion manufacturer of lumber, fiber board, plywood and finished wood products as well as a presence in the pulp, paper and container industry. It owns nearly six million acres of tree land and harvest rights in the U.S., Canada, Malaysia and Indonesia.

Allied interests include real estate, agriculture, salmon ranching and shrimp growing. It also is the largest private-label supplier of baby diapers to chain stores.

Research Staff

To support these varied interests, Weyerhaeuser maintains a 1,000-person research and development staff in a 260,000-square-foot Technology Center near headquarters here.

Prior to 1979, the researchers used either an internal service bureau based on a Honeywell, Inc. mainframe or outside time-sharing services.

"The internal bureaus lacked on-line modeling and statistical capability," recalled Dr. Paul DuBose, manager of the Applied Math Center, "while outside services with these facilities were quite expensive. We had been analyzing this problem for some time and began evaluating minicomputers, including superminis.

"One very attractive system was the Digital Equipment Corp. VAX-11/780, which combined the 32-bit-word addressing range needed for complex modeling with a broad number of available statistical analysis packages.

"It also had interactive capability and compatibility with the PDP-11 equipment used by our process control people," he added.

The VAX-11/780 was installed in August 1979. It has 1.5M bytes of main memory with two 67M-byte RM03 disk drives and two 176M-byte RP06 disk drives. Peripherals include a TE16 tape, two high-speed printers and an X-Y plotter/-printer.

There are 32 communications ports: 14 dial-up and 18 direct lines to various users. The 170 users employ about 90 Decwriter-II and III printing terminals along with VT100 and other CRT terminals. Most of these terminals are also used on other Weyerhaeuser computers.

About 60 users log on the VAX during each business day, with 20 to 30 on the computer at any one time.

Interactive Research

"The primary purpose of the Technology Center is to examine new technological concepts, evaluate them and ultimately test them in operational facilities," DuBose noted. "The applications are developed on-line to the VAX-11/780 and, when proven feasible, the concepts are transferred to appropriate divisions for implementation."

The process control group has several PDP-11/34s along with a variety of specialized data acquisition equipment and proprietary interfaces.

The group acquires test data on the PDP-11s, then transfers it to the VAX, via Decnet,

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Bolsters In-House Research

for further modeling and statistical analysis. Control algorithms are also developed on the VAX for down loading to the PDP-11s.

"All of the process control programs involve large data storage and number-crunching operations, many using graphic analysis programs," DuBose observed.

Some of the new concepts involve techniques for computer-controlled sawmills. Researchers are working on systems that recover maximum value from each log cut in the mill.

They develop models on the VAX-11/780 and synthesize various conditions, then compare economic factors against various schemes to adjust algorithms and associated memory requirements to levels suitable for minicomputers.

The programs are then tested in plants which may be on-line to the VAX-11/780.

Environmental Programs

One program under in-plant study is a waste-water treatment process which employs a series of tanks and containment basins. At various stages, chemicals are added to breakdown effluents, settle the sludge, and then the water is aerated before it is released.

Once a day, a plant operator logs on the VAX-11/780, which then prompts him to enter 30 to 40 specific process parameters. These include acidity, biochemical-oxygen demand suspended particulates, dissolved oxygen, temperatures, tank and pond levels, flows, equipment in operation, type of pulp being processed and other process variables.

The VAX-11/780 then compares entered data against computer-resident models and previously entered data to calculate proper control settings. Some processes, particularly biochemical ones, are quite slow so the once-a-day period is sufficient for plant operations.

The VAX-11/780 also prepares management reports that document the treatment conditions daily and monthly.

"The strength of the pilot program is that it lets people who are knowledgeable in energy conservation and effluent treatment aid the operators in plants," according to Dick Zimmerman, programmer analyst. "The programs also acquaint plant personnel with the computer equipment and prompting concepts.

"It also allows research and development people a great latitude in equipment selection. Many times what we think we need at the project's start is quite different than the final configuration.

With the VAX-11/780, we can develop the programs, debug them and try them under actual plant-operating conditions prior to investing in computer hardware."

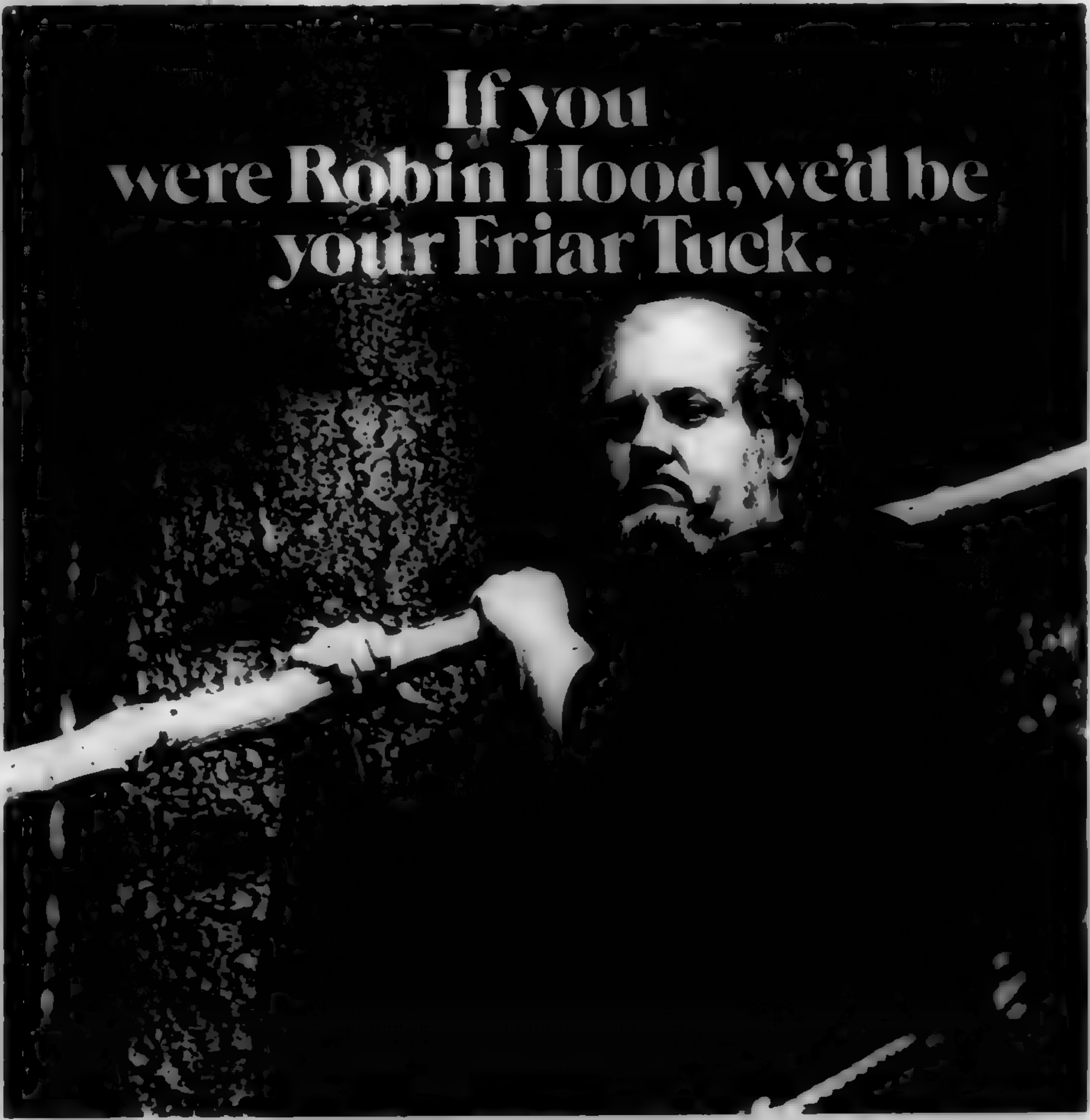
A similar pilot project involves maintenance programs at another Weyerhaeuser plant. Resident in the VAX-11/780 data base are all the records that are normally kept on paper.

Using a dial-up CRT terminal, maintenance personnel select listings from a main menu. These include process-control loops, available personnel, equipment by area and by type, spares, cross references and lubrication schedules.

Further submenus let plant personnel select specific records needed to perform the necessary work. As service or maintenance is performed and spares installed, the workers can immediately update the

(Continued on Page 22)

Weyerhaeuser researcher Susan Kimbal enters responses to baby diaper questionnaires (foreground).



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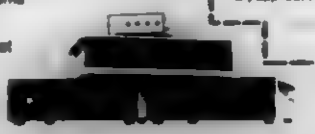

Intelcom Sets Meet

LOS ANGELES — "Competition in the Information Economy" is the theme of the upcoming International Telecommunication and Computer Conference and Exposition (Intelcom), which will convene here Nov. 10-13. Organized by Horizon House International, the event will bring together information processing and telecommunication technologies under the same roof.

Participants in the conference will include senior policymakers and technical experts from government, industry and commerce. The theme of competition will be presented in a three-tiered program: executive forums, technical sessions and applications panels.

Admission to the exhibit is $15 and, to the conference program, $200. More details are available from Janet Schotta, Media Relations, Horizon House International, 610 Washington St., Dedham, Mass. 02026.

Supermini Aids In-House Researchers

(Continued from Page 21)

files on-line. With paper records, this task is often overlooked, resulting in inadequate documentation.

Keeping Tabs on Time

With such a large research and development organization, Weyerhaeuser has a special 100-person group that provides testing and laboratory analysis services for other scientists in the Technology Center and for the company as a whole.

"The Scientific Services group devotes about 200,000 hours per year to various projects," according to Bill O'Meara, programmer analyst, "and our salaries and equipment costs must be attributed to the appropriate project. We have about 1,000 active service requests each month, with around 100 added and completed during a 30-day period."

The Scientific Services Group uses the VAX-11/780 to monitor service requests, keep records, prepare reports and enter data into the corporate accounting system.

When a group needs testing or laboratory analysis, an operator runs a "program creator" routine which validates the request number and prevents duplication of jobs. The routine also prepares a work order describing the tests or procedures required.

At any time, various files and records may be viewed on the terminals or printed as reports. These include listings of all active work orders, the charges associated with each, summaries by activity and hours worked by employee name.

Reports are prepared using DEC's query language, Datatrieve, which speeds selection and sorting of the numerous files.

As the work is accomplished, each employer records the time required on a daily time sheet, which is entered into VAX files.

When the job is completed, appropriate files are dumped to tape for transfer to the corporate computer for billing.

"When we got the on-line system running, we found that we were able to more accurately attribute costs. As a result, we were able to reduce charges to our laboratory service users," O'Meara said.

Baby Diapers, Too

Technology Center personnel are also involved in new product development and use the supermini for a number of diverse applications. "One is a consumer evaluation of baby diapers," DuBose smiled.

"Questionnaires are enclosed in diaper packages which request information from the customers. These might ask about absorbency, moisture retention, strehgth and other factors."

The data from the returned cards are entered into the VAX for statistical analysis, and the results used to develop new products.

Because of the diverse user requirements, the Weyerhaeuser VAX-11/780 has an extensive software complement such as Basic Plus 2, Datatrieve, Fortran IV+, Macro and VAX-11 Pascal.

Other installed software includes the Biomedical Computer Products Statistical Analysis Programs, IMSL Library of Fortran math and statistical programs, Penn State University's Minitab Statistical Programs, Tektronix Easygraphing and Plot-10, Omsi Pascal and Runoff.

"We are planning to incorporate Interactive Systems' 'enhanced' Unix, Relational Systems, Inc.'s Oracle data base language and IBM 2780/3780 to transfer data to and from the Honeywell, Inc. computer," DuBose said.

AMA 'Limited Membership' Planned for Small Firms

NEW YORK — The American Management Associations (AMA) has issued a "Limited Company Membership" plan that enables smaller organizations to belong to the organization.

Among potential beneficiaries of this new opportunity, the AMA cited community hospitals, local school districts, hotels, accounting and architectural firms and real estate companies.

Limited Company Membership is for companies with an annual budget of $15 million or less or fewer than 250 employees. Membership allows three company officials to become AMA members.

They will receive a number of membership publications throughout the year that focus on the concerns of smaller organizations, including the 190-page annual report, "Compensation Policies and Practices for the Smaller Organization."

All employees become eligible for membership rates (10% to 15% discounts) on the more than 3,000 AMA yearly seminars.

Further details on AMA Limited Membership are available from the Director of Membership, AMA, 135 W. 50 St., New York, N.Y. 10060.

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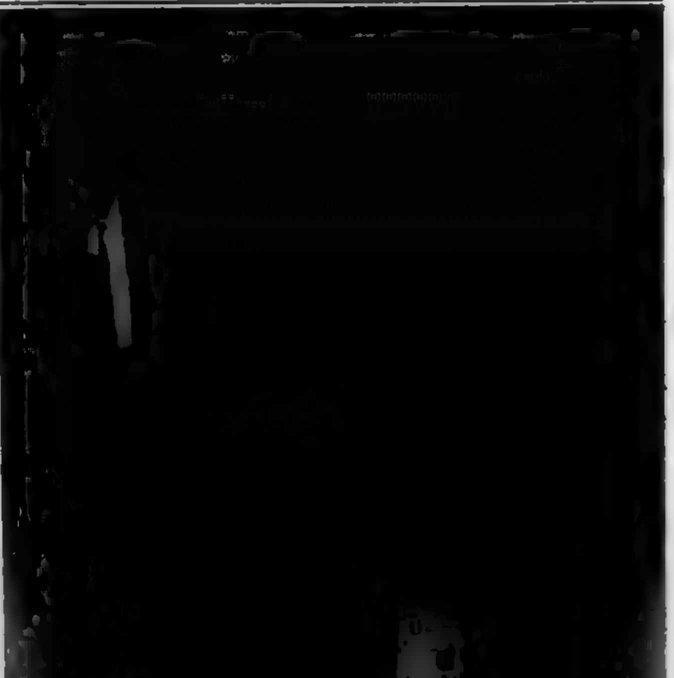

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New York	Barbizon Plaza	Oct. 6-7
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Health Service Network Cuts Red Tape and Attracts U.S. Government Attention

SANTA FE, N.M. — All too often humanitarian projects deserving of governmental funds go wanting because project administrators find themselves ill-equipped to deal with the bureaucratic red tape associated with such funding. Not so, however, with Presbyterian Medical Services (PMS), a rural health care company headquartered here.

In this case, in fact, the project administrators have proved so adept at handling the myriad details required by the U.S. Department of Health, Education and Welfare that the government agency has asked for advice in terms of the PMS information system for its own recordkeeping use.

PMS is a nonprofit, community-based corporation formed in 1966 to provide primary health care services, both medical and dental, to a widely scattered, isolated population in New Mexico. It has built a substantial health care network consisting of a hierarchy of hospitals, diagnostic and treatment centers and health stations.

PMS hospitals provide all of the services associated with such institutions, including complete laboratory and X-ray facilities. The diagnostic and treatment centers administer to the needs of ambulatory care patients, with an emphasis on preventive medicine. These centers also provide dental, laboratory, X-ray and pharmaceutical services.

Home health care and health education programs (including paramedical training for residents of the area), which are an important part of the PMS program, are handled by the centers as well. Providing backup for the full-time physicians, who man the health centers, are health stations supervised by nurse practitioners or physician assistants. Serving tiny settlements in remote areas, some of the health centers have no telephone and must communicate by radio.

Federal Funds

Many of the PMS clinics and programs are funded in part by the federal government. According to Dan Smith, PMS president, "Federal aid is absolutely crucial to the project." This is why since 1968, when it was awarded one of the first Neighborhood Health Center grants, PMS has been heavily involved in implementing methods to meet federal reporting requirements.

Sam Gray, director of PMS' management information services (MIS) department, attributed the success of the PMS system to its data base approach. "From the information in our Automated Patient Data System we were able easily to generate a set of programs for the Bureau of Community Health Services Common Reporting Requirements [BCRR], which includes tables on operating statistics, personnel, and financial information," he said.

"In fact, our department proved itself when the BCCR was introduced. Our data base already contained the information required for the report, and all the data processing staff had to do was to create the necessary output programs.

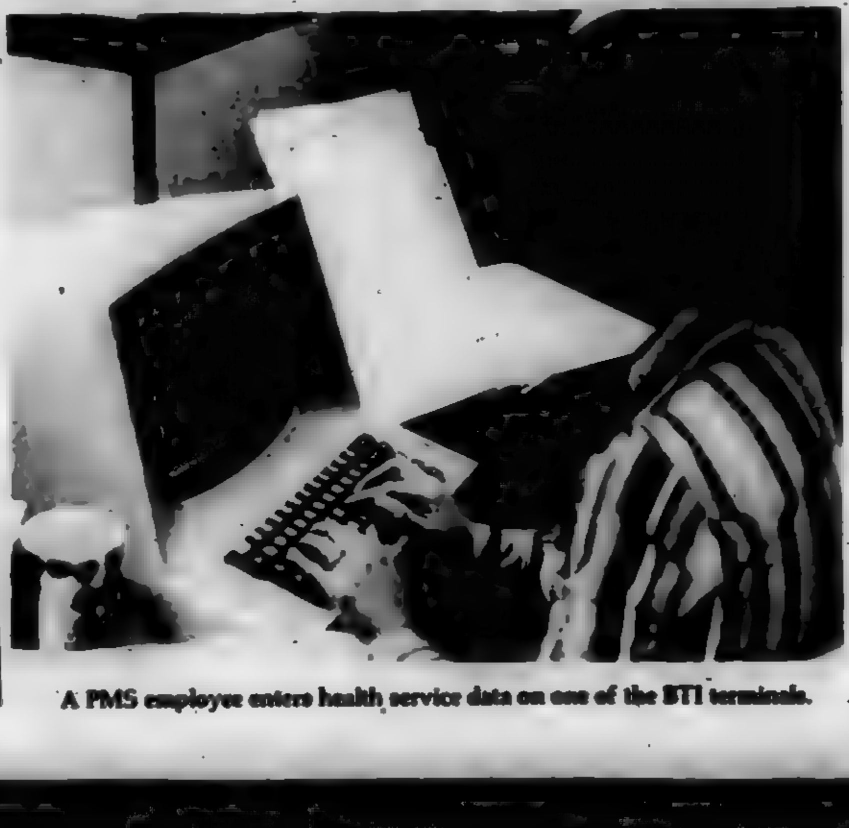
"No management time was consumed, no procedures were changed, no forms were modified. When you're used to operating widely dispersed rural clinics, you really have to utilize all your resources to the utmost, and that includes data processing," Gray added.

Forms MIS Department

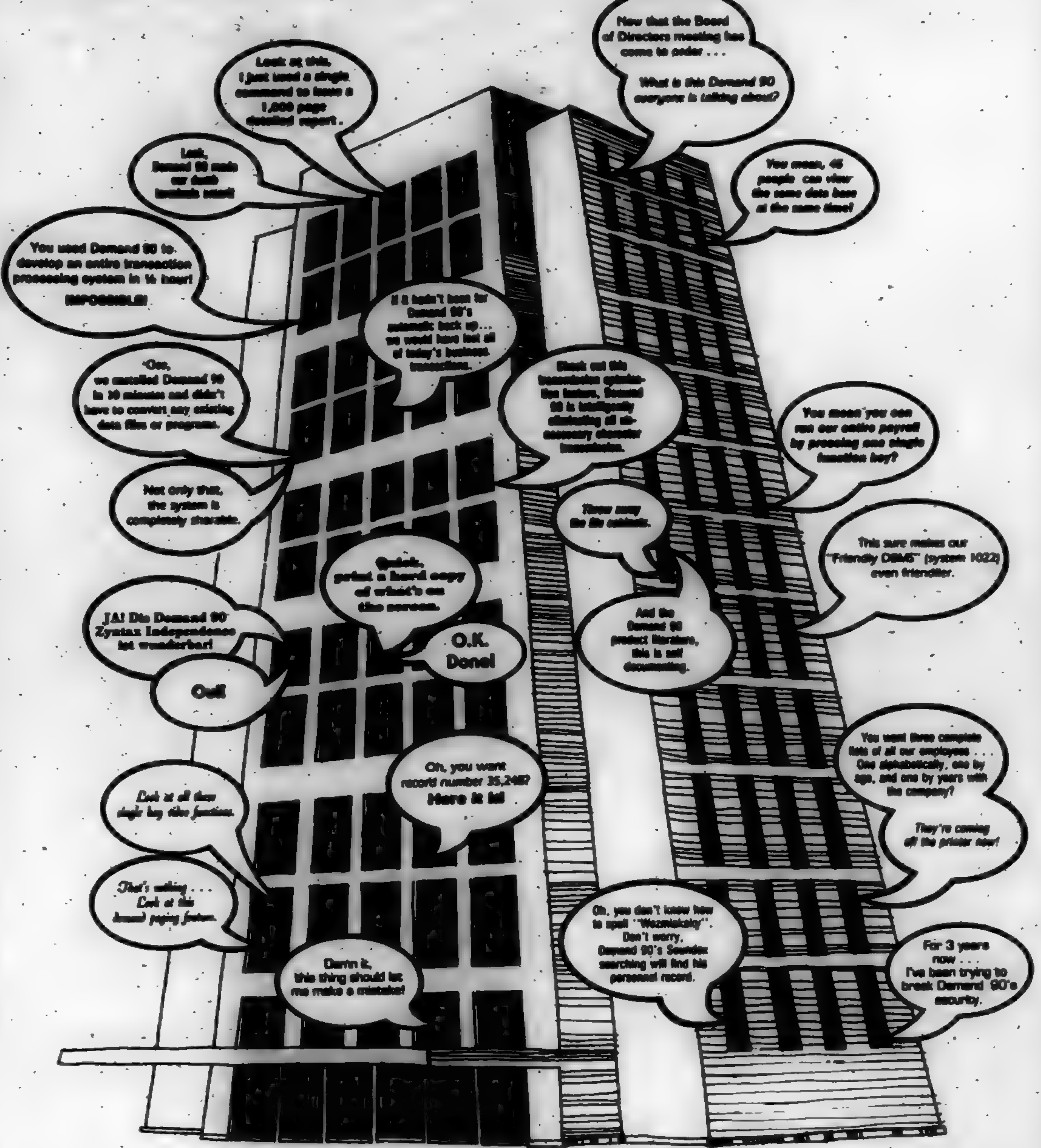
Back at the time of that first grant in 1968, PMS contracted for its information services needs with DP companies and service bureaus. "The major disadvantage to this," Smith recalled, "is that we were dealing with firms whose primary interest was in computer science rather than health care delivery, which of course is our major concern."

After several years with the batch service bureau, PMS decided to operate its own MIS department and lease time on another company's computer. Through terminals in the PMS office linked to the time-sharing computer via leased telephone lines, PMS was able to do data entry and report preparation. During this period, PMS began

(Continued on Page 26)



A PMS employee enters health service data on one of the BTI terminals.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Oui!
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Symposium Set For Managers

PALO ALTO, Calif. – The American Electronics Association (AEA) will hold a Human Resources Symposium in San Diego on Nov. 9-12 for high-technology senior industrial relations executives.

The fee for AEA members is $395, and $525 for nonmembers.

Also upcoming on the AEA agenda is the East Coast Financial Conference, to be held in Danvers, Mass., on Nov. 17-19.

The cost of this seminar is $225 for AEA people, and $400 for nonmembers.

More details can be obtained from 2600 El Camino Real, Palo Alto, Calif. 94306.

Service Network Cuts Red Tape

(Continued from Page 24)

to develop its own capability in systems design, programming and data management.

Finally PMS had the control over the operation of its management information system that had been lacking with the batch service bureau. But in a period of rising costs (the mid-'70s), the expenditure for leased time rapidly became so high that PMS was forced to look for a suitable alternative. So in September 1976, primarily for economic reasons, PMS acquired its own computer.

After a thorough investigation of the marketplace for a computer powerful enough to meet PMS' specialized reporting needs, yet reasonable enough in price to prove cost-effective, PMS decided on a system manufactured by BTI Computer Systems, Inc. of Sunnyvale, Calif.

The model selected at the time was a 64K-byte BTI 4000 computer system with 16 interactive user ports and 17.5M bytes of disk storage, later expanded to 32.5M bytes (four Diablo Model 24 and one Diablo Model 31 disks), along with one Digital Equipment Corp. Decwriter II and one Decwriter III hard-copy terminal, three CRT terminals – a Lear Siegler, Inc. ADM-3 and two Soroc, Inc. IQ 120s – and a Zobex Systems, Inc. magnetic tape drive.

The project administrators proved so adept at handling the myriad details required by the Department of Health, Education and Welfare that the federal agency asked their advice for its own recordkeeping.

The PMS data base, which is now stored entirely on the BTI system's disk, contains three distinct types of information, which can be manipulated internally according to need:

- Registrant information – identification information such as residence area, current and previous payment source and third-party billing numbers, as well as socio-economic data regarding family size, ethnic background and income.
- Health care activity data – information gathered from clinic operations, referral services and hospital admissions.
- Data validation tables – comprised of the codes against which the input data is verified.

Data is entered into the system via a CRT terminal either at the user site or at the PMS computer facility in Santa Fe using both question and answer and CRT form display processes. At the time of entry, the data is automatically checked against the validation tables and other established criteria. If there is any discrepancy, an error message is displayed.

This extensive checking at the point of entry virtually eliminates typographical errors, invalid codes, incomplete entries and assignments of encounters to the wrong individuals. In fact, Gray estimated the entered data to be more than 98% accurate.

Since the data base is kept current at all times, most routine monthly, quarterly and annual reports are generated automatically by the BTI system. This provides a safeguard against possible omission. Extensive use of computer output microfiche gives widely dispersed administrative and clinic personnel quick access to the centrally maintained data files.

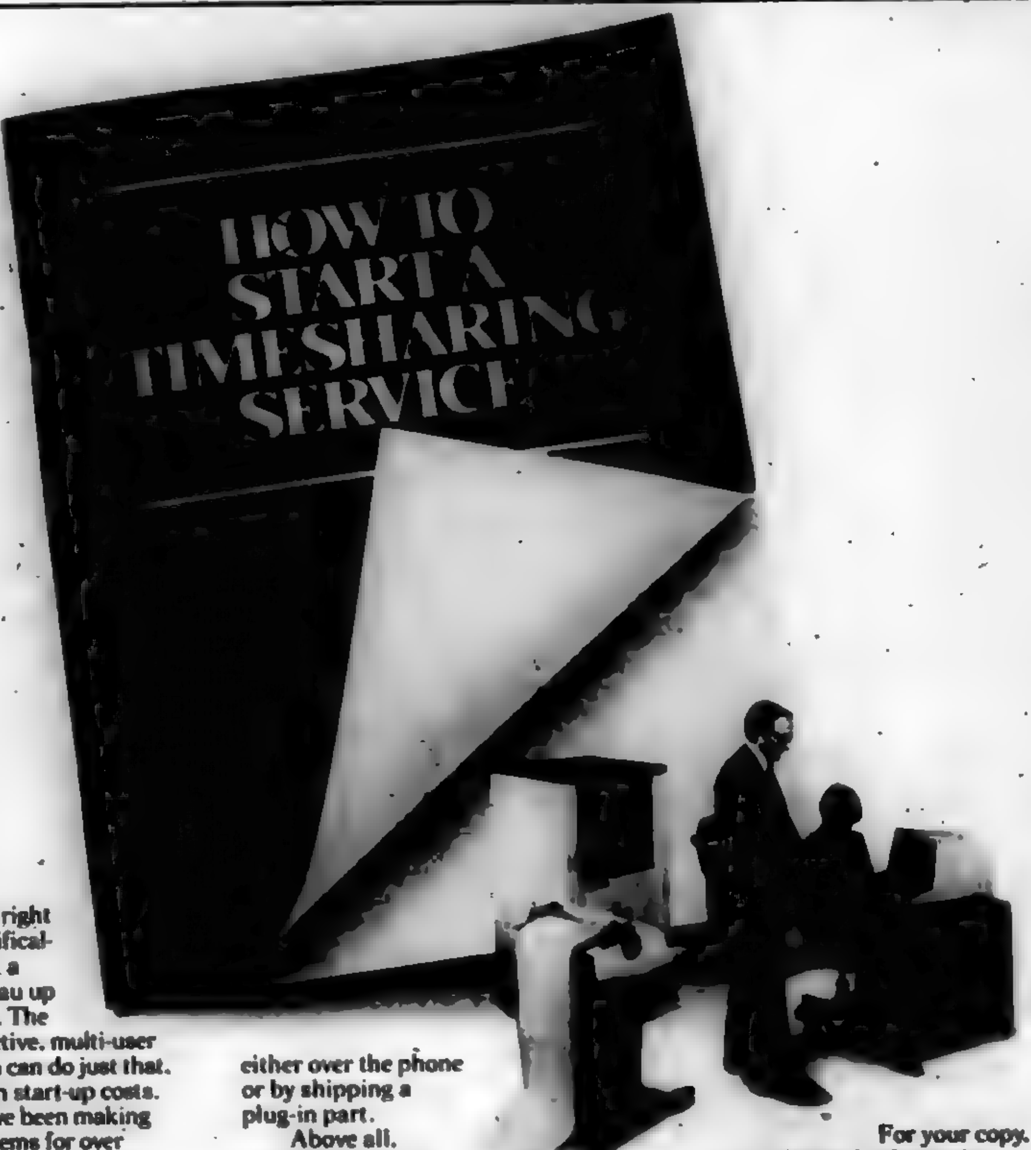
Highly Reliable

The BTI computer system has proved to be highly reliable through its years of installation, performing at an uptime of over 97%, Gray said. Further, he pointed out that when most computer and data communication equipment manuals specify that they can operate under "normal" office conditions, they aren't thinking of the New Mexico norm of low humidity, high temperatures, high altitude and dust.

The next big project for the MIS group is to put all the PMS accounting functions, which are presently being done manually, on the system. The first of these will be general ledger, which is expected to be completed within the next year. The computer is already performing cost allocations, Gray reported.

Further down the line are plans to automate financial functions, fixed asset management and real-time pharmacy inventory.

Both Gray and PMS President Smith are enthusiastic about the future uses of the BTI system. They feel the decision to operate their own computer system entirely in-house was a significant one. With the BTI system, federal reports have been both accurate and on time, accuracy of the data base has been improved, and more management data is now available to PMS and clinic administrators.



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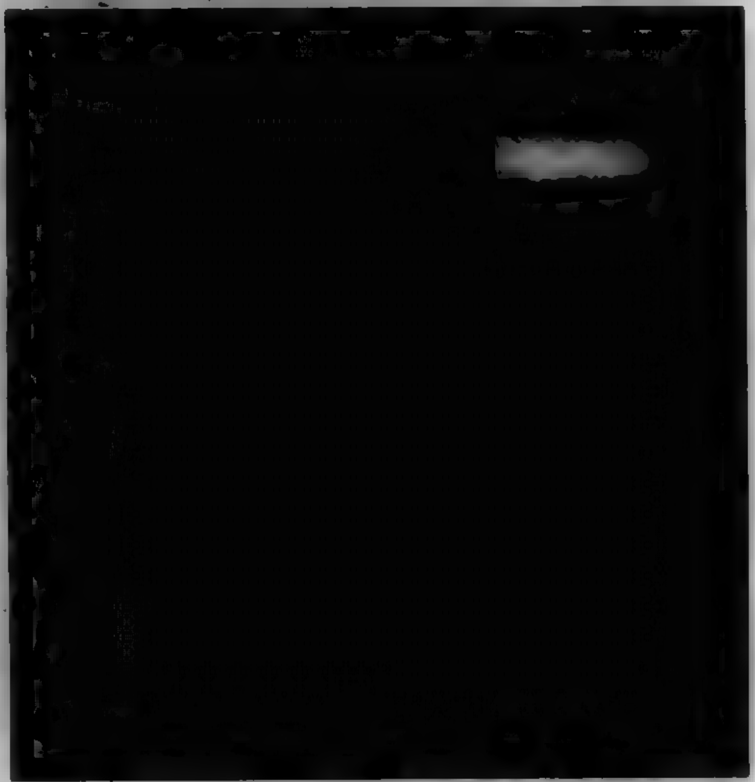

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Retro-Graphics. Added Value From Digital Engineering.

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Of course, a great idea like Retro-Graphics always starts with a good one. And the VT100—featuring 96 upper/lower case ASCII characters, up to 132 characters per line, numeric and function keypad, detachable keyboard and a wide variety of screen customizing features—is a very good idea, indeed.

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A Good Idea Is Where You Find It. And When.

Where you'll find the Retro-Graphics VT100, up and running, is at Info '80, New York Coliseum, New York City, October 6-9. Look for it at National Computer Communications' Booth #2132. Beginning in November, the Retro-Graphics VT100 will be sold through NCC as well as by selected other Digital Engineering distributors.

For more information on how and where to order, call or write Digital Engineering directly. As for when to order, we suggest immediately.

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Technical, Personal Seminars Geared to Women

NEW YORK — A series of technical and personal development seminars has been announced by Women in Data Processing, Inc. (WDP).

An overview of telecommunications will be presented at one-day sessions either Saturday, Oct. 11, Friday, Oct. 24, or Saturday, Nov. 8, or at two-hour evening sessions on six consecutive Thursdays, Oct. 2 through Nov. 6.

The career development group is also sponsoring sessions on data base and team management. The one-day data base seminar will be conducted by Shaku Atre on Saturday, Nov. 1. Atre is the author of a book, *Data Base — Structured Techniques and Design, Performance and Management,* that will be available at a discount to seminar participants.

Two seminar workshops on "Building an Effective Team" will be presented either Friday, Nov. 7 or on two consecutive Thursdays, Nov. 13 and 20. The workshops will show how time management is vital to completing projects.

Assertiveness training, specifically designed for women in the computer field, will also be offered. The first session will be seven consecutive Tuesday evenings, beginning Sept. 30. The second session will be on seven consecutive Wednesday evenings, beginning Oct. 1.

All sessions will be held in New York City. For more information contact WDP at Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Session Opens Networking to Women

NEW YORK — A session on networking for women will be sponsored Sept. 26 by Women in Data Processing, Inc. (WDP) at 5:30 p.m. at the Biltmore Hotel here.

The speaker will be Mary Scott Welch, author of the book *Networking*.

Networking links women for information, advice and moral support, and allows women to test behaviors, ideas and strategies within the network before risking them in the real world, said Denise L. Hausman, president of WDP.

More information is available from WDP, Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Forum Regroups Special Interests

CHICAGO — To better meet the current needs of members, Forum International has announced the restructuring of its special interest group (SIG). Forum is the association for System Ten users.

The only SIG that will survive the reorganization is the Client Accounting System (CAS) SIG. Three general SIG categories in addition to CAS have been established: technical, management and applications.

The new SIGs will convene for the first time during Forum/10, Forum's fall conference, to be held here Oct. 20-23. More information is available from Forum International, 4300-1 Lincoln Ave., Rolling Meadows, Ill. 60008.

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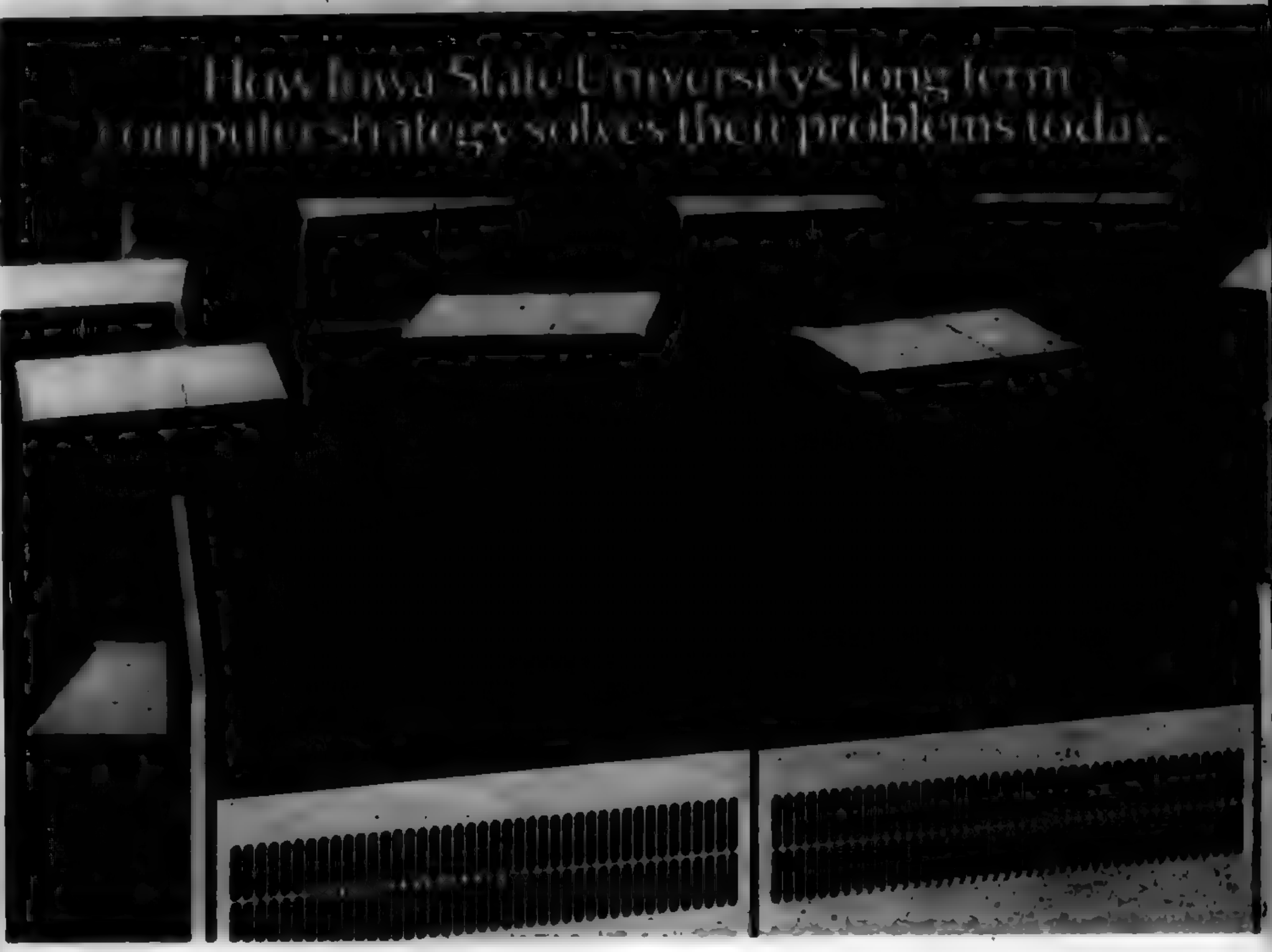


How Iowa State University's long term computer strategy solves their problems today.

One of the most difficult problems faced by computer centers is planning for future needs, while at the same time meeting today's skyrocketing demands.

But some universities, like Iowa State, have found a simple, practical solution. Distributed processing with Digital. Thanks to Digital's broad line of compatible minis, superminis, and mainframes, they can add and reassign computers as needed.

Distributed processing with Digital means more students get more time on more terminals.

To solve one of their biggest problems—availability—Iowa State bought one of Digital's VAX systems in 1978. The VAX-11/780 gave them the ability to connect 64 interactive terminals to one computer, which they spread out among various math, engineering and science departments. Then when funds became available, they added another VAX-11/780 and 64 more terminals, including several in special dormitory rooms.

"Until we acquired the VAX systems," says Dr. Clair G. Maple, Computer Center Director, "Iowa State was not providing enough accessibility to our students. We wanted to get into an interactive, distributed environment, and the VAX-11/780, with its 32-bit architecture, gave us a lot more power than a standard mini.

"We also look at the VAX system as more than just an object of study, we see it as an educational tool," says Dr. Maple.

The VAX-11/780 is a natural for teaching computer science. But it's so simple and so widely available, just about every department is using it—no matter what level of understanding the students have.

Dr. George Brant from the College of Agriculture explains, "We have a program that teaches students to estimate the amount of meat they'll be able to sell from a steer carcass. The program is already written, so the students simply follow the program sequence, prompted by the system each step of the way. If the student enters an incorrect answer, the computer instantly tells him he's wrong. That way the students get a better understanding of the problem, and can keep on working until they get it right."

Of course the VAX-11/780 is also used for extremely complex computations in departments like mathematics, engineering and aerospace. And it's been a tremendous tool in those departments as well.

Distributed processing with Digital means an introduction to the real world.

According to Dale Anderson, Prof. of Aerospace Engineering, the university's combination of a mainframe supplemented with VAX systems

Yankee Group Sponsors Two-Day ST&T Seminar

BOSTON – An intensive two-day seminar from the Yankee Group focuses on "The Impact of the AT&T Business Unregulated Subsidiary and the Restructuring of the Computer/Communications Industry."

Speakers include Dr. Charles Jackson, technical director of the House Subcommittee on Communications, Philip [redacted] Dr. Larry Roberts, president of GTE Telenet Corp.

Additional information on their planning service, or a detailed outline of the seminar topics, is available from The Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138.

And Information Exchange

Ifip Organizing Technical Group

LOUGHBOROUGH, England – An information exchange and technical study group is being organized by the International Federation for Information Processing (Ifip) Technical Committee No. 6 concerning data communications, human-computer communications, networks and message systems.

Ifip is currently trying to determine the extent and specific areas of interest and welcomes suggestions. Suggested topics of study concern human-computer interaction, man-computer communication, user-friendly systems, computer ergonomics and computer human factors.

Ideas for possible information exchange include mailings to participants of a newsletter containing a directory of those working in the field and details of the work. Suggestions for projects or organization structure or anyone wishing to become a member of the group may contact Brian Shackel, Department of Human Sciences, University of Technology, Loughborough, UK.

Mail Systems To Be Topic Of Seminars

CAMBRIDGE, Mass. – An intensive one-day seminar entitled "Electronic Mail: The Message System Approach" will be presented in Boston on Oct. 14, New York on Oct. 20, Washington, D.C., on Oct. 23, San Francisco on Nov. 5, Chicago on Nov. 17 and Dallas on Nov. 19.

Offered by the BBN Information Management Corp. in conjunction with the CW Conference Management Group, this program is designed for people investigating, planning, implementing and expanding computer-based message systems.

The seminar fee is $85 for the morning session, $125 for afternoon-only, and $195 for the full day.

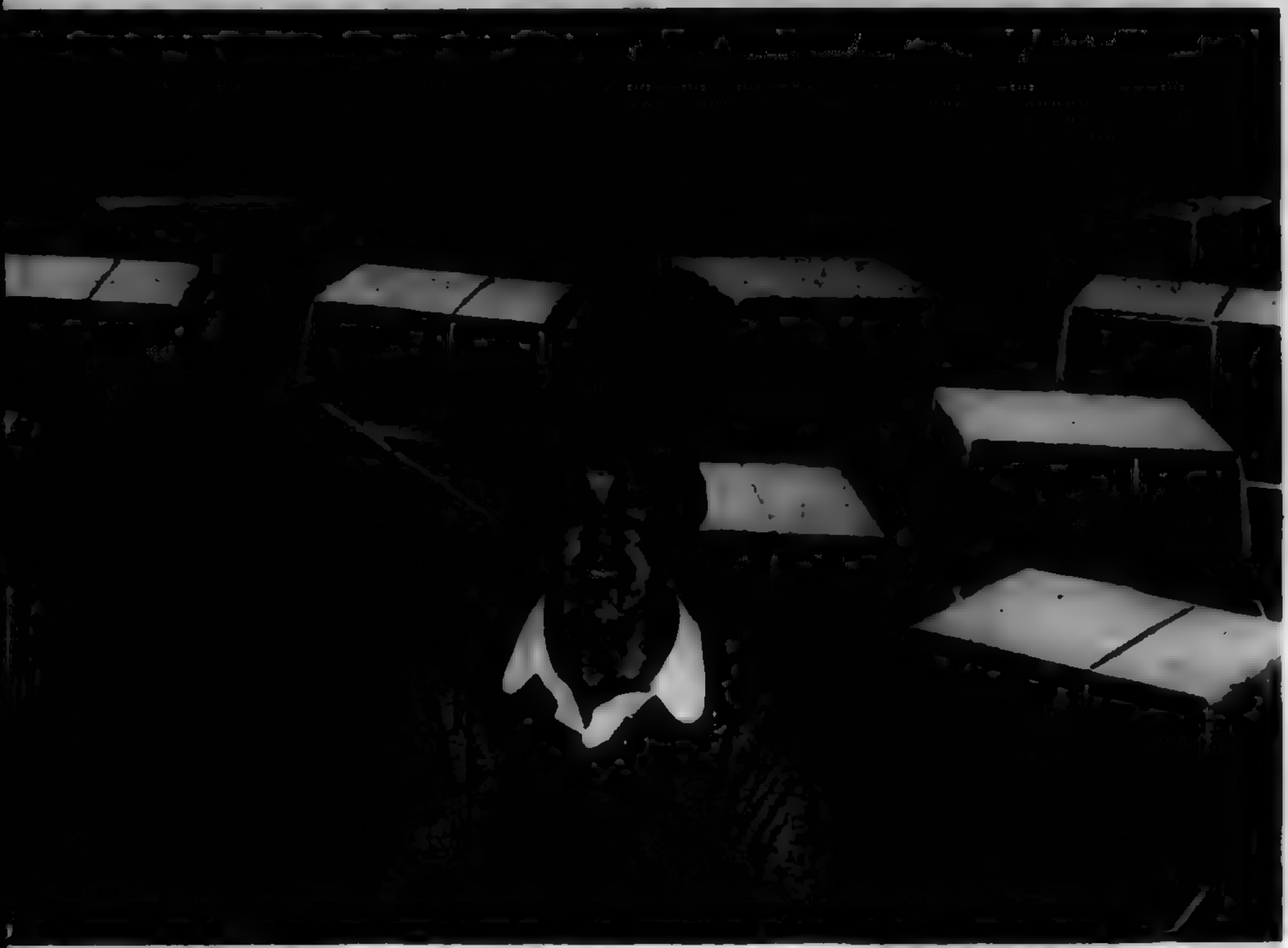
More information is available from CW Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

DPMA to Name Award Winners

BOSTON – The Boston Chapter of the Data Processing Management Association (DPMA) will announce this year's scholarship winners on Sept. 17 at 5:30 p.m.

The three fortunate recipients of the annual Frank Power/Control Data Institute Scholarships will receive more than $13,000 at the ceremony.

Further details are available from Charles Greco at DPMA, P.O. Box 1606, Boston, Mass. [redacted]



and more than 40 other minis from Digital gives students a better feel for computers used in the real world.

"We had little distributed processing here until Digital. With the VAX-11/780, students are using terminals interactively to study aerodynamics, structural dynamics and propulsion. Not only do they learn faster that way, they're better prepared for jobs in the real world when they leave college."

"No matter how the system is used," says Dr. Maple, "the students are finding that the VAX-11/780 is very easy to operate. It's had tremendous acceptance to the point that, now, in a peak month, 38,000 log-ins have been recorded, averaging more than 40 minutes each."

The Iowa State story is just one example of how Digital is committed to making the computer a practical, economical and accessible tool for education. We offer the world's broadest and most widely used family of educational computers—from entry-level minis to 36-bit mainframes. Plus the networking tools to tie them together.

Our upward compatibility lets you grow in manageable, logical steps instead of awkward, costly leaps. It also lets you steadily increase services while protecting your basic investment.

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9th Comparative Data Base Management Systems National Conference

This unique conference provides a meeting place to review and compare a significant set of the systems now available and learn about their characteristics from speakers with firsthand experience in developing and utilizing leading DBMS.

Systems presented include examples of applications of a variety of data representation and structuring techniques and examples of diverse manipulation languages such as host-based procedural or English-like nonprocedural. The products span a full range of applications and are operational on a variety of microcomputers, minicomputers and large processors. They also include completely integrated software systems such as TP Monitors, Report Generators, Transaction Processors, Data Dictionaries, and Query Languages. The systems presentations are preceded by sessions on data base fundamentals, data base architecture and new developments in data management. There is a comprehensive review of the steps and guidelines in the procurement/selection of data base management systems and of the comparative metrices of key features that summarize each product and provide the framework for the systems comparison. There is a session on recent technological advances and current problems under research.

Each participant receives a copy of the visuals and texts of the vendors' presentations and large matrices comparing the key features of such leading DBMS as *ADABAS, DATA CENTRAL, DATA COM/DB, DATAPOINT 2200, DB-IV, DBMS-10, DBMS, DMS II, DMS-90, DMS 170, DMS 1100, DRS, GIM II, DRISS, IDS-11, IDMS, IMAGE, IMS, INFOS, INQUIRE, MIDS, MODEL 204, MRDS, NOMAD, OLIVER, PRODUCT 3, QUESTOR, RAMIS, REALTY, SEED, System 1022, System 2000, TOTAL* and others.

Coordinators:
John J. Rosetti, BA, Manager, Minicomputer and Information Technology Laboratory, TRW Defense and Space Systems Group
Clay Sprowls, PhD, Professor of Computer and Information Systems, Graduate School of Management, UCLA

Monday, Tuesday and Wednesday, October 13, 14, 15, 9 am-4 pm Los Angeles

For additional information write: A. Cooke, UCLA Extension, Room 515, 10995 Le Conte Ave., Los Angeles, CA 90024 or phone (213) 825-9094 or 825-7031.

UCLA Extension

Introducing China Computerworld

The only specialized computer publication written exclusively for the People's Republic of China (PRC)

The PRC is a huge country with a relatively small installed base of computers. But the future looks very bright for the Chinese EDP business.

Government plans call for extensive use of computers in the PRC's technological modernization, and annual EDP expenditures are expected to grow into the billions in the 80's.

A good deal of this money will be spent on foreign computer equipment, and the decision-makers for this equipment will be using China Computerworld to help them in choosing the products and the companies they need.

China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications Inc. and it includes among its 25,000 subscribers the key government officials and computer managers who have EDP purchase decision authority.

China Computerworld will have three monthly issues in 1980, and will be published twice a month beginning in January, 1981. It has tabloid size and a newspaper format, and gives you a unique opportunity to introduce your products and services to this sleeping giant of a marketplace.

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Managers on the Move

RICHARD R. BERTAPELLE, GARY L. PEASLEY, DENNIS RAYER and GREG C. KING have been named vice-presidents at Bankcal, of California. Bertapelle, Peasley and Rayer have been promoted within the systems and project management department, while King is now responsible for the group's corporate services operations unit.

Bertapelle joined Bankcal as a senior project manager and was named assistant vice-president last November. Formerly he was a systems development manager with Western States Bankcard Association, and prior to 1975 was a project manager with Wells Fargo Bank. He received a B.A. degree from Michigan State University in business administration.

Peasley joined Bankcal's systems and project management department as a senior project manager. He was later named assistant vice-president and then group manager. Peasley was a major systems project manager at Bank of America. He is a graduate of the University of California at Berkeley with a B.A. degree in mathematics.

Rayer joined the bank in 1979 as an assistant vice-president and project manager in the systems and project management department. He formerly served as a senior consultant with American President Lines and prior to that was a project manager with the Bank of America. Rayer earned his B.A. from San Diego State University.

King entered the funds management in 1979, later being named assistant vice-president in corporate services operations of Bankcal. He formerly was assistant vice-president and manager of funds management accounting at Crocker National Bank. King has a B.A. degree from Gonzaga University in Spokane, Wash.

• • •

FREDERICK MEYERRIECKS has been promoted vice-president of DP for Eastern States, Lake Success, New York. He is responsible for supervising data center operations, facilities, control and communications.

Prior to the recent promotion he was assistant vice-president of DP. Meyerriecks joined the firm in 1976 as a senior on-line programmer analyst.

He holds a B.A. degree in English from Queens College, New York.

• • •

WILLIAM T. MALIN has been named vice-president of management information systems for the Federal Land Bank and Federal Intermediate Credit Bank of Columbia, S.C. He will be responsible for effective corporate use of information processing.

Malin has been executive director of the Regional Computer Services, a DP service company operated as a joint venture by the Farm Credit Banks of Columbia, Baltimore and New Orleans.

He graduated from the U.S. Naval Academy and received his M.B.A. degree at the University of South Carolina. After resigning his commission in the U.S. Navy in 1970 to join Electronic Data Systems, Malin joined Regional Computer as manager of systems and programming in 1975.

• • •

F. RICHARD LENNON has been appointed vice-president, management information services by Southern Pacific Communications Co. He will be responsible for providing DP support to SPCommunications (SPC), its three subsidiary companies and its litigation and regulatory groups. He will oversee the development of long-term information requirements and manage new information system efforts.

Prior to joining SPC, Lennon served as a manager with the public accounting firm of Deloitte Haskins & Sells. He also was employed by Electronic Data Systems Corp. and IBM.

Lennon holds a B.S. degree in economics from Villanova University, Pa.

Blue Cross Training Program Graduates Second Class

BOSTON — Designed to make programmers out of nonprogramming employees, Blue Cross of Massachusetts' six-month "Initial Programmer Training" (IPT) course has graduated its second class.

The new graduates brought to 27 the number of employees who have completed the course. Selection has begun for the third class, which is slated to begin early next year.

After three years of in-house training, each of its graduates has been successfully placed, Blue Cross said.

The course is divided into two parts. The first is unpaid by the company. After working their regular eight-hour day, trainees put in two hours of classroom study, four days a week for four months.

Those who pass this part are accepted into a full-time company-paid final two months of training. After-hours classes during the first course segment help to contain costs while confirming trainee interest, Blue Cross said.

Because placements are made only after trainees have demonstrated their skills by passing one part, DP managers are assured of qualified candidates, a spokesman said.

Entry criteria include two or more years with the company, one previously taken DP course and a good-to-excellent work record.

Processing Background

"Because most of our trainees come from claims processing areas, they bring practical knowledge and sensitivity to user applications that off-the-street programmers usually lack," Ralph Desmond, project leader, said.

"By training on the exact equipment they will be using after graduation, our trainees are productive sooner and adapt better to company procedures."

Vice-President of DP at Blue Cross Ralph Loftin described the corporate objectives for IPT by saying, "The IPT program is the third stage of a comprehensive DP training effort.

"The first stage addressed the needs of our on-board programming staff. The second was an orientation program for new hires.

Small Business System Wins Applause at Carnegie Hall

NEW YORK — When Carnegie Hall was a service bureau client, its administrators sometimes felt like square pegs in a world of round holes. Their computing needs were not being met by standard programs and services available from a service bureau utilizing a slow batch system.

So when Carnegie executives decided to build their own DP operation, their first step was to decide upon the concert hall's specific DP needs. These, they determined, included help with fund raising, accounting, scheduling and box office operations. Carnegie then developed a two-year plan to build a computer system that would perform those functions.

"We went against the normal process by picking our software consultant first," explained Herb Weissenstein, Carnegie's director of development and head of its computer project. "Once we knew what our needs were, we went shopping for hardware. Usually it's the other way around."

Carnegie Chose Wang

Last winter, Weissenstein examined the products and capabilities of six manufacturers before selecting Wang Laboratories, Inc. as the hardware supplier. The choice was based upon equipment, specifically, flexibility and equipment upgrade potential in allowing Weissenstein and Northeast Data to design the system around Carnegie's priorities. Carnegie's first need was help in raising money.

As a nonprofit organization, Carnegie Hall depends upon effective fund raising. Carnegie's present Wang equipment — a 2200MVP small business system with a disk drive unit, a terminal and a printer — maintains detailed donor records and uses this information to type personalized letters to solicit contributions.

"Right now, we use our equipment for a combination of DP and text generation duties," Weissenstein explained. "Our next step will be to add another terminal and a higher speed printer. When we do, we'll have the capacity to handle all of our accounting in-house."

The addition of another terminal and printer will also allow Carnegie to use the foreground/background capability offered by the Wang 2200 MVP system. This system allows each terminal to perform multiple tasks simultaneously.

When Carnegie upgrades its present disk drive unit with a disk that offers more capacity, the system will be complete. The concert hall will then be able to use the computer to schedule and book house space, handle box office duties and develop and maintain special mailing lists in addition to those currently available for use in fund raising. It is this

(Continued on Page 32)

The staff backstage at Carnegie Hall give rave reviews to their modular computer system from Wang Labs.

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London to Host Infotech

LONDON – More than 75 of the world's top information processing experts are expected to participate in Infotech's annual State of the Art Review '80 here Nov. 26-28. Recruited from nine different countries, speakers will give specially commissioned presentations.

Designed for senior members of the global DP community, sessions will include future systems, corporate information management, the software revolution and business information, among others. Speakers include Gordon Bell of Digital Equipment Corp., Peter Naur from the University of Copenhagen and Ian Barron of Inmos.

Further information about State of the Art Review '80 is available from Maureen Nichols, Infotech, Nicholson House, Maidenhead, Berkshire, SL6 1LD, UK.

Small System a Backstage Hit

(Continued from Page 31)

flexibility in hardware configuration that allowed Weissenstein to plan his upgrade in a modular approach, he said.

This appraoch has helped the concert hall's employees accept and use the system.

"If everything were put on the computer at once, it could appear awesome," Weissenstein said. "But by making the move in stages, we hope to avoid this unnecessary fear."

Although the equipment will greatly increase the productivity of Carnegie's staff, no staff reductions are expected. Weissenstein predicted, however, that the computer system will eliminate, or at least delay, the need for new secretarial and clerical staff.

Besides saving the cost of added staff, Carnegie's data and text generation system is directly cutting the cost of computing itself.

For example, Carnegie was spending $6,500/year to have its basic accounting tasks handled through its service bureau. Since the total cost of adding this accounting capability to Carnegie's in-house system was $19,000, the equipment will pay for itself in less than three years.

By the time the complete system is installed, Weissenstein may have enough experience to qualify as an expert on establishing a small computer system. But even at this admittedly early stage in the computerization of Carnegie Hall, he has some general advice for organizations contemplating an in-house computer system.

First, he feels the best investment is in first-class, professional counseling. Mistakes made in the beginning are very expensive since they can lead to purchasing unnecessary, inadequate or inappropriate equipment.

Second, he warns against making the "safe" choice when picking a hardware supplier. Weissenstein was extremely disappointed with equipement offered by at least one major supplier.

Meet Set For Miami

MIAMI – The City of Miami will be the permanent site for Communicaciones Expo, an annual international telecommunications/computer exhibition focused on the Latin American market, the first of which will take place next April 26-30.

Coordinated by the city's Department of Trade and Commerce Development and Latcom, Inc., the event hopes to attract large numbers of foreign buyers, among whom will be high-level Latin American ministers and their staffs.

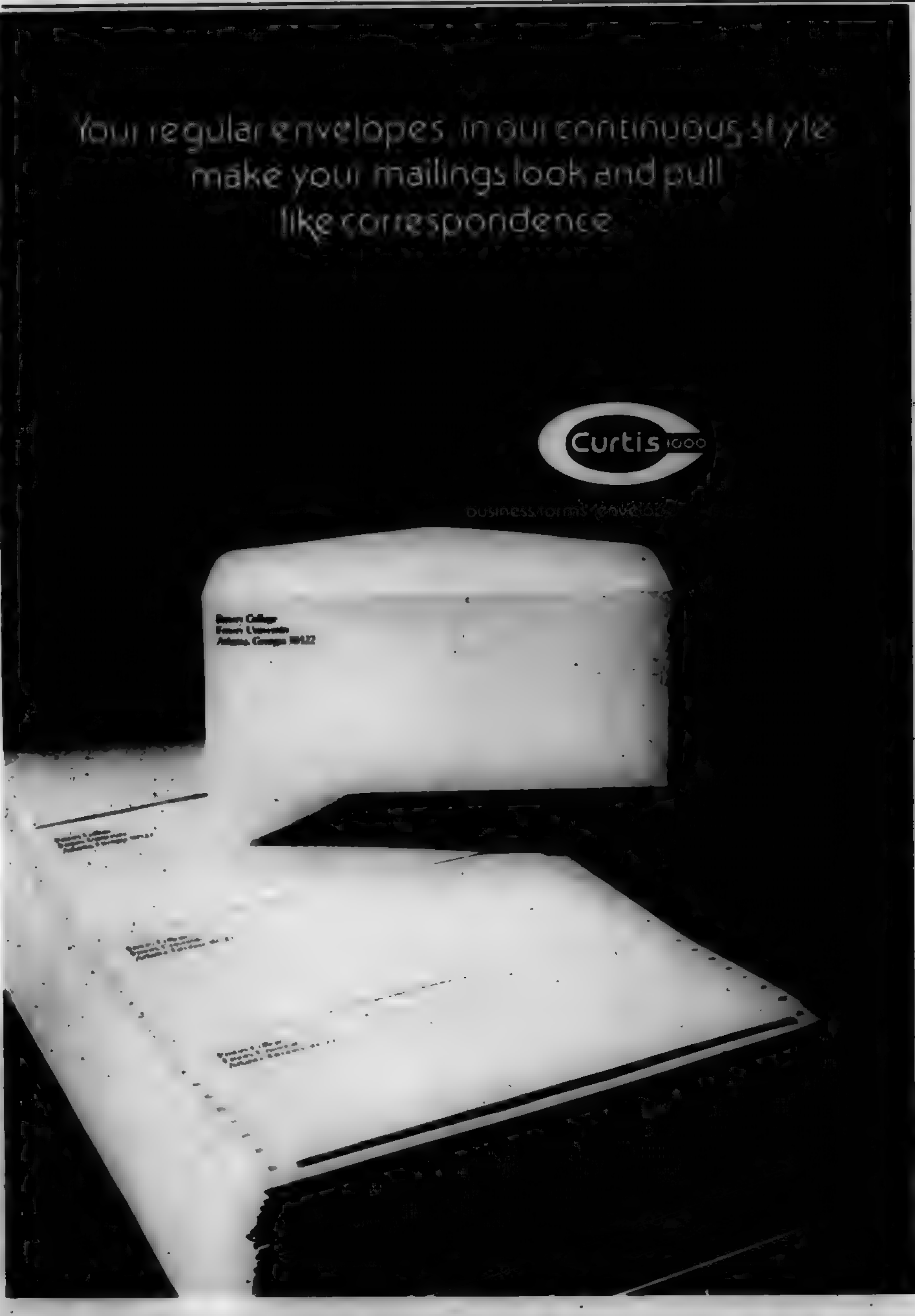
Admission to the exhibition costs $15. More information is available from Gloria Gomez-Mena de Marina, Marketing & Promotion Division, City of Miami Department of Trade and Commerce Development, Suite 901, 100 N. Biscayne Blvd., Miami, Fla. 33132.

Seeking Work? Kit Offers Help

CHIGAGO – An "Executive Job Finding Kit" to help job-seeking executives evaluate methods in making career changes has been compiled by Allerton, Heinze & Associates, a management consultant group.

The premise of the kit is that job-hunting is an underdeveloped but critical skill in today's job marketplace.

The kit is free from Allerton, Heinze & Assoc., Inc., 2 N. LaSalle St., Chicago, Ill. 60602.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- Word Processing and Text Editing
- General Applications
- Other Applications

User's Guide
A time-saving narrative that quickly familiarizes you with all aspects of the service, summarizes each major section, and helps you get even more for your money.

Inquiry Service
By phone or mail, Datapro analysts are at your service to help with your small computer questions. Convenient mail-in forms are included.

Basic Computer Concepts
The essential components and characteristics of small computer systems are explained, and are conveniently cross-referenced to the Glossary section.

Advice and Guidelines
"How-to" in nature and business-oriented in perspective these Datapro reports will show you:

- How to define and prioritize your basic business functions
- How to identify the costs of your current business information system (automated or manual).
- How to compare your current costs to the costs of new in-house small computer system.
- How to estimate how expensive a system you need.
- How to identify potential computer systems suitable to your business and economic requirements.
- How to evaluate these systems.
- How to determine whether to "make or buy" your software packages.

Personal Computers
Definitions, history, market insights, applications and future trends are summarized to help you better evaluate specific product reports in the service.

Small Computer Systems
Hundreds of brief, easy to read reports on individual small computer systems. Each system report includes:

- A concise summary
  - Current Models
  - Memory
  - Base List Price
  - Typical List Price
  - Primary Uses
  - Popular Options
  - Principal Applications
  - First Shipments
  - Number Installed
  - Availability
- Background Information
- System Characteristics
- Hardware/Packaging
  - Processor/Memory
  - Display
  - Keyboard
  - Direct Access Storage
  - Printers
  - Data Communications
  - Other I/O
  - I/O Electronics
- Software
  - Languages
  - Operating System
  - Utilities
  - Database Management Systems
  - Communications Support
  - Applications Programs
- Support Services
  - Documentation
  - Support
  - Terms and Conditions

Company Profiles
Uniform, easy to compare descriptions of over 900* companies involved in the manufacture, marketing, and servicing of small computer systems, including peripherals, software, maintenance and others. Included are industry leaders as well as many new, fast-growing entries to this burgeoning industry. Each profile includes:

- Company name
- Address
- Telephone
- Principal business
- President
- Director of Marketing
- Date founded
- Number of employees
- Sales volume
- Primary customers
- Sales concentration
- Product line description

Directories
Extensive listings of the thousands of companies involved with the small computer industry. Full names, addresses and phone numbers are listed alphabetically and by zip code. Cross-referenced to appropriate reports and profiles in the service to help you quickly locate additional information about their products and services. Included are:

Manufacturers/Integrators
  Alphabetical Listing
  Zip Code Listing
System Vendors and Stores
  Alphabetical Listing
  System Listing
System Distributors
  Alphabetical Listing
  System Listing
  Zip Code Listing
Software Vendors
  Alphabetical Listing
  System/Processor Listing
  Zip Code Listing
Peripherals Vendors
  Alphabetical Listing
  Peripheral Type Listing
    Add-on Memory
    Cartridge/Cassette Magnetic Tape
    CRT Display Monitors and Terminals
    Data Communications Devices
    Disk Drives
    Diskette Drives
    Printers
    Other Peripherals
  Zip Code Listing
Computer Services Vendors
  Alphabetical Listing
  Zip Code Listing
Maintenance Companies
  Alphabetical Listing
  Zip Code Listing
Other Vendors
  Alphabetical Listing
  Vendor Type Listing
  Zip Code Listing

* Figures change with monthly updates.

Fact-packed with Hundreds of System Reports and Company Profiles.

Here's a small representative sample of the System Reports and Company Profiles you'll find in the Directory of Small Computers:

System Reports
Apple II, III
Mattel Intellivision
Megatek Whizzard 5000, 7000
NCR 7500, 8100, 8200
North Star Horizon
Ohio Scientific Challenger, I, II, III Series
Point 4 Computer
Qantel 100, 200, 300, & 900 Systems
Radio Shack TRS-80 Model I, II, III
Smoke Signal Broadcasting Chieftain
Texas Instruments DS990, 99/4
Wang 2200 Series
Plus nearly 200 others.

Company Profiles
Basic Four Corp.
Centurion Computer
Cincom System Inc.
Condor Computer Corp.
Cromemco Inc.
Digital Equipment Corp.
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Calendar

Oct. 8-10, Amsterdam — **Coated Products, Systems and Markets.** Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Oct. 8-10, San Francisco — **How to Build and Use a Data and Information Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 9-10, Albany, N.Y. — **Conference of the Museum Computer Network.** Contact: David Vance, Center for Contemporary Arts and Letters, Library E-2340, State University of New York, Stony Brook, N.Y. 11794.

Oct. 9-10, Houston — **IMS/VS Dump Reading.** Contact: Data Base Management, Inc., Vernon Professional Bldg., 281 Hartford Tnpk., Vernon, Conn. 06066. Also being held Oct. 27-29 in Washington, D.C.

Oct. 9-10 New York — **Financial Analysis for Telecom Professionals.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

Oct. 9-10, Columbia, Md. — **Audit Forum '80, Internal Controls in Automated Systems & Risk Analysis.** Contact: Education Concept Co., 9509 Paragon Drive, Richmond, Va. 23228.

Oct. 9-10, Arlington, Va. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Oct. 10-11, Port Chester, N.Y. — **ACH Spells Profitability.** Contact: Mutual Institutions National Transfer Systems, Inc., 200 Park Ave., New York, N.Y. 10017.

Oct. 12-15, Cleveland — **IBM Users' Conference.** Contact: David G. Lister, Common, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

Oct. 12-16, San Francisco — **Programmers and Analysts Conference.** Contact: Association of Computer Programmers and Analysts, 294 Main St., E. Greenwich, R.I. 02818.

Oct. 12-18, Jacksonville, Fla. — **Data Processing Trade Show.** Contact: Data Processing Management Association, Jacksonville Chapter, P.O. Box 272, Jacksonville, Fla. 32201.

Oct. 13, Paris — **Statistical Packages Presentation.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Oct. 13-14, Atlanta — **Data Courier On-Line Training.** Contact: Data Courier, Inc., 620 S. Fifth St., Louisville, Ky. 40202. Also being held Oct. 16-17 in Norman, Okla.

Oct. 13-15, London — **CMCS Implementation Workshop.** Contact: STSC, Inc. Clearbrook Road, Elmsford, N.Y. 10523.

Oct. 13-15, Los Angeles — **Conference on Comparative Data Base Management Systems.** Contact: University of California at Los Angeles, Department of Management, Labor and Business, P.O. Box 24901, Los Angeles, Calif. 90024.

Oct. 13-15, Atlanta — **Systems Auditability and Control.** Contact: Institute of Internal Auditors, Inc., 249 Maitland Ave., Altamonte Springs, Fla. 32701.

Oct. 13-15, Atlanta — **Essentials of Budgeting for Operating Managers.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 13-15, San Francisco — **Effective Analysis and Design of Information Systems.** Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Oct. 13-16, Denver — **Basic Project Management.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Oct. 27-30 in Seattle and Philadelphia.

Oct. 13-17, Washington, D.C. — **Electromagnetic Interference and Control.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 14, Ft. Lauderdale, Fla. — **Information Resource Management.** Contact: Intel Commercial Systems Division, 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

Oct. 14-16, Toronto — **Understanding and Using Computer Graphics.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Oct. 14-16, San Francisco — **Mini/-Micro Computer Conference and Exposition.** Contact: Robert D. Rankin, Suite 202, 32302 Camino Capistrano, San Juan Capistrano, Calif. 92675.

Oct. 14-16, Wellesley, Mass. — **Computer Control and Audit.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181. Also being held Oct. 15-17 in Indianapolis.

Oct. 14-17, Los Angeles — **International Conference of Production and Inventory Control.** Contact: American Production and Inventory Control Society, Inc., Suite 504, Watergate Office Building, 2600 Virginia Ave., Washington, D.C. 20037.

Oct. 15-17, San Francisco — **EDP Operations Today: Effective Scheduling and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 15-17, Atlantic City, N.J. — **Jersey Systems Conference,** Sponsored by the Association for Systems Management. Contact: Mark Robertson, 22 Milltown Road, E. Brunswick, N.J. 08816.

Oct. 15-17, Washington, D.C. — **Records Management for Law Enforcement Organizations.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 15-17, Newport Beach, Calif. — **Computer Contracting — A Practical Guide.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Oct. 15-17, San Francisco — **Computers in Manufacturing.** Contact: American Institute of Industrial Engineers, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 15-17, Chicago — **Electronic Mail: An Overview of Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 22-24 in San Francisco.

Oct. 15-17, Chicago — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: the University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill, 60637.

Oct. 15-17, Buenos Aires, Argentina — **Structured System Analysis.** Contact: Compucenter, Suipacha 760 Oficina 14-16, 1008 Buenos Aires, Argentina.

Oct. 15-17, Atlanta — **Data Base Management Systems: A Comparative Analysis of General Purpose Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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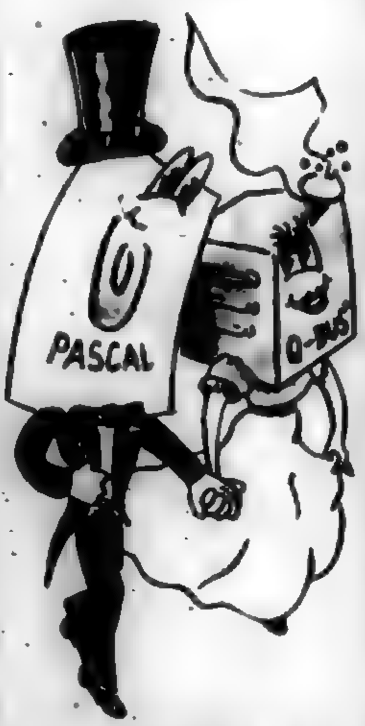

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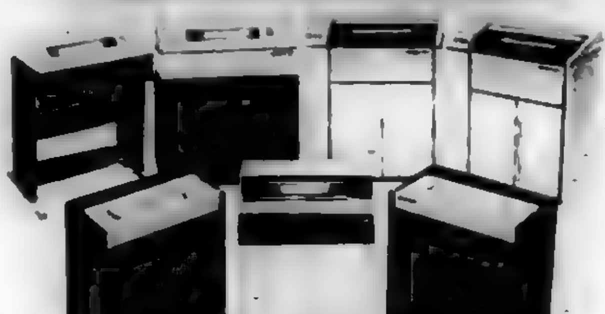

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Short-Order Updates

POS System Serves Up Restaurant Reports

DALLAS – Switching from a manual to computerized management system that provided constant updates of labor percentages, personnel and marketing data and menu control information proved a boon to The Steak and Ale restaurants, here.

Besides saving time, cutting costs and improving service, the new system gave the restaurant chain the added bonuses of tracking inventory, sales costs and payrolls and producing management reports. Here's how the system works.

Each restaurant has a point-of-sale (POS) device which is basically a computerized electronic cash register manufactured by the Documenter division of Addressograph Multigraph. The cash register is also computerized so that it can store all sales and employee payroll information.

Input consists of guest check information and employee clock-in and clock-out time. The computer/register automatically takes hourly readings, calculates labor percentages, monitors personnel and marketing data, controls menus and produces management reports.

Output is obtained through a Computer Devices, Inc. (CDI) Miniterm 1202 terminal located in the restaurant manager's office. Through the terminal, the manager can extract a printed report at any time of day or night.

Among these reports are sales breakdowns item by item; payroll dollars spent up to the minute; labor percent figures; product mix information, describing how many of what items have been sold; and ones describing what percentages are related to gross sales in the restaurant.

The manager also uses the CDI terminal to change the cash register keyboard. If a menu or price are changed, the manager simply inputs the new information via the Miniterm 1202 to the cash register.

To change a cash register item, the computer asks what key number is to be changed and the manager then inputs the appropriate key number, a new item description up to seven characters in length and a new price.

From this point on, when a waiter rings up a guest check, he simply keys the appropriate cash register key and all the latest items are printed out on a ticket with item prices and totals.

CDI equipment had been recommended for use as a result of an extensive Steak and Ale research and development planning project. The primary reason for the recommendation was reliability, according to Frederick R. Hipp, manager of Restaurant Systems for Steak and Ale.

Issue '80 Slates Meet

ALEXANDRIA, Va. – Issue '80, the fourth annual SPSS, Inc. users and coordinators conference, will be held here Oct. 5-6, according to Issue, Inc., the independent association of SPSS users.

A "short course" in new or enhanced SPSS/SCSS procedures will be taught by the SPSS staff. Other topics to be examined are statistical methodology, data management and local user services.

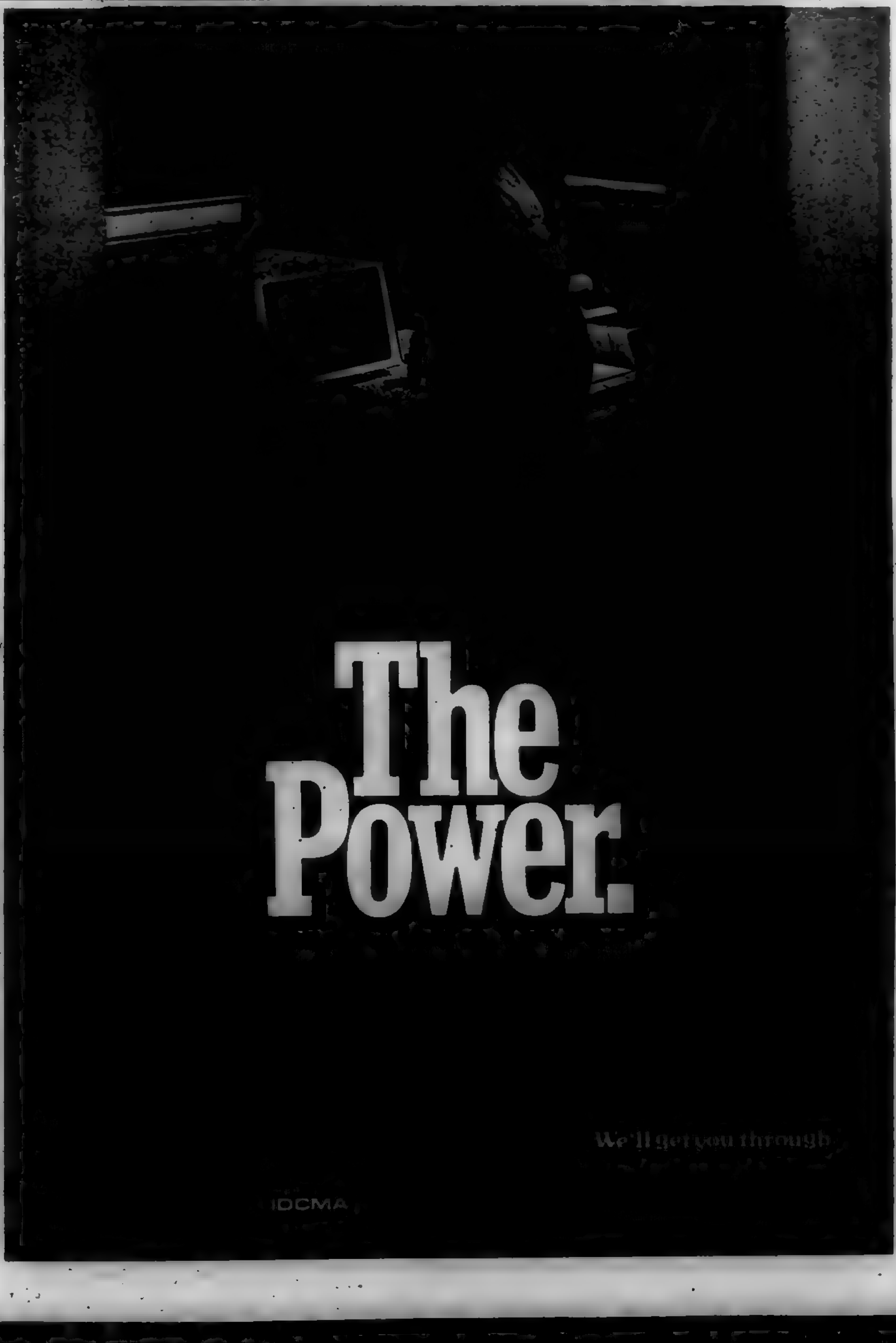
Registration for the three-day event is $75 for members of Issue and $90 for nonmembers. More information is available from Steve Hamburg, Issue, Inc., P.O. Box 8224, Chicago, Ill. 60680.

SCMG Seeking Papers, People

ATLANTA – The Southern Computer Measurement Group (SCMG) is seeking papers for its Oct. 23-24 meeting.

Contributions should be sent to Sidney Finehirsh, First National Bank, 2400 Piedmont Road, Atlanta, Ga. 30324, or Joseph B. Allen, Southern Company Services, P.O. Box 720071, Atlanta, Ga. 30346.

Nominations for the October elections are open as well.



IDMS...The DBMS for On-Line Systems.

Leading database consultants have stated that it is an absolute must that any organization considering on-line systems use a database management system. However, on-line systems demand a particular type of database management system, one that is capable of providing unusually high performance plus elegant backup and recovery facilities. However, users are also very interested in tools for fast application development and easy access to data by end users in an on-line environment. IDMS provides these facilities.

As a result, IDMS has proven an indispensable tool in supporting on-line systems with an extensive number of the most sensitive and important applications for business, industry, and government. From this unique experience has emerged new versions of IDMS and related facilities to support on-line systems meeting the diverse needs of application developers, end users, and processing departments. IDMS, supported by Cullinane Corporation, has been particularly successful because it meets the six key factors for success in database software. They are:

1. Vendor Record: Cullinane Corporation has an unparalleled record for vendor support. (Number One every year in Datapro ratings.) And with an unequaled record in system enhancement and new product development.

Cullinane Corporation is also the most financially successful database software company with the best growth record and highest earning rate of all software companies. As a result, in 1978, Cullinane Corporation was the first computer software company in ten years to have a public offering, thus providing substantial financial resources for product enhancement, new product development, and company operations.

2. Control Via an Integrated Dictionary: The Integrated Data Dictionary serves as the control facility for all information about the database and data communications environment. In addition, it integrates all components of IDMS facilitating easy application development, end user access to data, and efficient processing in an on-line environment.

3. Facilities for Fast Application Development: IDMS is the most powerful DBMS in the world. It allows applications designers to truly mirror a company's operations within the limits of the company's computer processing capabilities. However, users also want to develop applications faster with less skilled people. Simply stated, IDMS has easy-to-use tools for input processing, data management, and output processing. Traditional programming is greatly reduced via the Application Development System, On-Line Query, CULPRIT Report Generator, and the INTERACT on-line program development and word processing facility.

4. Easy Access to Data by End Users: In addition to the user facilities described above IDMS has On-Line English, the only true English language query facility for top management and other users. Management needs to tap the application's data flow easily; but more importantly, it needs the information immediately. On-Line English makes this a reality. Also, the user will not need to know anything about the organization of the database.

5. Computer Processing Efficiency: While users of on-line systems like ease of use, they demand high performance and sophisticated backup and recovery facilities. IDMS was designed to meet these requirements through its architecture which fully integrates the database and data communications facilities. IDMS DB/DC is fully multi-threaded providing for efficient processing in both the update and retrieval modes. Also, an application developed under IDMS DB/DC using the Universal Communications Facility will run under any other TP monitor without modification. In addition, IDMS includes a Shared Database System which supports multiple CPU's sharing databases, eliminating problems associated with shared DASD.

With the introduction of the IBM 4300, users want a system capable of supporting distributed database networks. IDMS is the only database system architecturally designed to support not only distributed access to a database but distributed databases, and combinations thereof.

A facility important to the IMS/DL1 user is ESCAPE which allows use of IDMS with IMS/DL1 applications without modifying the application programs.

6. Protection: DBMS users want two types of protection—protection that their investment in database applications will be protected from any changes in IBM hardware or software. IDMS is written in such a way as to make it virtually impossible for IBM to make any practical move that would make IDMS-based applications obsolete. In addition, Cullinane Corporation contracts state that it has the obligation to keep each user current with any new IBM developments.

DBMS users also want protection that their IDMS applications can be audited by themselves or their respective audit firms. Cullinane Corporation is the world's leader in EDP audit technology and offers user-oriented audit software including a library of audit routines especially tailored to the IDMS on-line environment. Thus, IDMS provides the user with complete protection, the only DBMS to do so.

Attend a free seminar in your area on the DBMS for On-Line Systems.

Free Seminars

Tailored to management, these seminars introduce the complete family of integrated software systems from Cullinane. Particular emphasis will be placed on the six key factors to success in database systems and on IDMS, the DBMS for On-Line Systems.

Dates and Cities

SEPTEMBER
23 Omaha, NE
23 San Diego, CA
24 Greenville, SC
24 Newark, NJ
24 St. Louis, MO
24 Toronto, ONT
25 Houston, TX
25 Manchester, NH
25 Rochester, NY
30 Denver, CO
30 Indianapolis, IN
30 Jacksonville, FL
OCTOBER
2 Edmonton, ALT
2 Ft. Lauderdale, FL
2 Toledo, OH
7 Allentown, PA
7 Columbia, SC
7 Phoenix, AZ
7 Portland, OR
7 Vancouver, BC
8 Albuquerque, NM
8 Darien, CT
9 Jackson, MS
9 Madison, WI
9 Milwaukee, WI
14 Austin, TX
14 Moncton, NB
14 Nashville, TN
14 Oklahoma City, OK
14 Piscataway, NJ
15 Cincinnati, OH
16 Providence, RI
16 White Plains, NY
28 Baltimore, MD
28 Cleveland, OH
28 Columbus, OH
28 Grand Rapids, MI
28 Newport Beach, CA
29 Syracuse, NY
30 Montreal, QUE
NOVEMBER
4 Saskatoon, SASK
5 Albany, NY
5 Southfield, MI
6 Green Bay, WI
6 Salt Lake City, UT
6 Springfield, MA
6 Woodbury, NY
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12 Ft. Wayne, IN
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CW/Sept. 15, '80

Tired of Freeway Hassles?

Remote Terminals May Replace Commuting

LOS ANGELES – Telecommuting.

The word may not be part of most people's vocabularies today, but it probably will be within a few years.

In fact, by 1990 people won't just be talking about telecommuting, according to Jacks Nilles, the University of Southern California (USC) researcher here who coined the word. Millions of people will be doing it, five days a week or more.

And those who won't might be sporting bumper stickers proclaiming "I'd rather be telecommuting."

"Explained most simply, telecommuting is the substitution of telecommunications and computers for the commute to work," explained Nilles, whose research on alternative work patterns is described in Alvin Toffler's bestselling book, *The Third Wave*.

Two Types to Evolve

Nilles, who directs interdisciplinary programs at USC, predicted two types of telecommuters will evolve. Some will eliminate the workday commute entirely, turing portions of their homes into offices.

Others, who need face-to-face contact to do their jobs, will shorten their commutes by traveling to nearby regional offices that are tied by telecommunication systems to central headquarters many miles away.

Converting a room at home into a telecommunications station will not be particularly expensive, Nilles said since it will require only the addition of a personal computer terminal (costing about the same as a high-quality electric typewriter) and a simple telephone accessory to gain access to other computers.

Telecommuters most likely to stay home, he projected, will be specialists who don't usually need face-to-face contact to do their work – researchers, word processors, accountants, writers, data base researchers and lawyers not often involved in court proceedings.

Some workers may combine the two types of telecommuting, going to a regional office for everyday work and staying home occasionally to complete reports, correspondence and other "solo" work.

Some families may telecommute together, with one parent traveling to a regional office, the other working at home on a computer connected to the regional office and the children in charge of proofreading and data storage tasks.

Telecommuting will not become the norm, Nilles said, but if will become a viable work pattern, based on the premise that it's easier and cheaper to move information than to move people. Telecommuting will become feasible for about half the labor force – the workers whose jobs deal mainly with information.

"By 1990, an estimated 47 million people will have information jobs in the United States," Nilles said. "Maybe 2 million to 5 million of those people will be telecommuting to some degree."

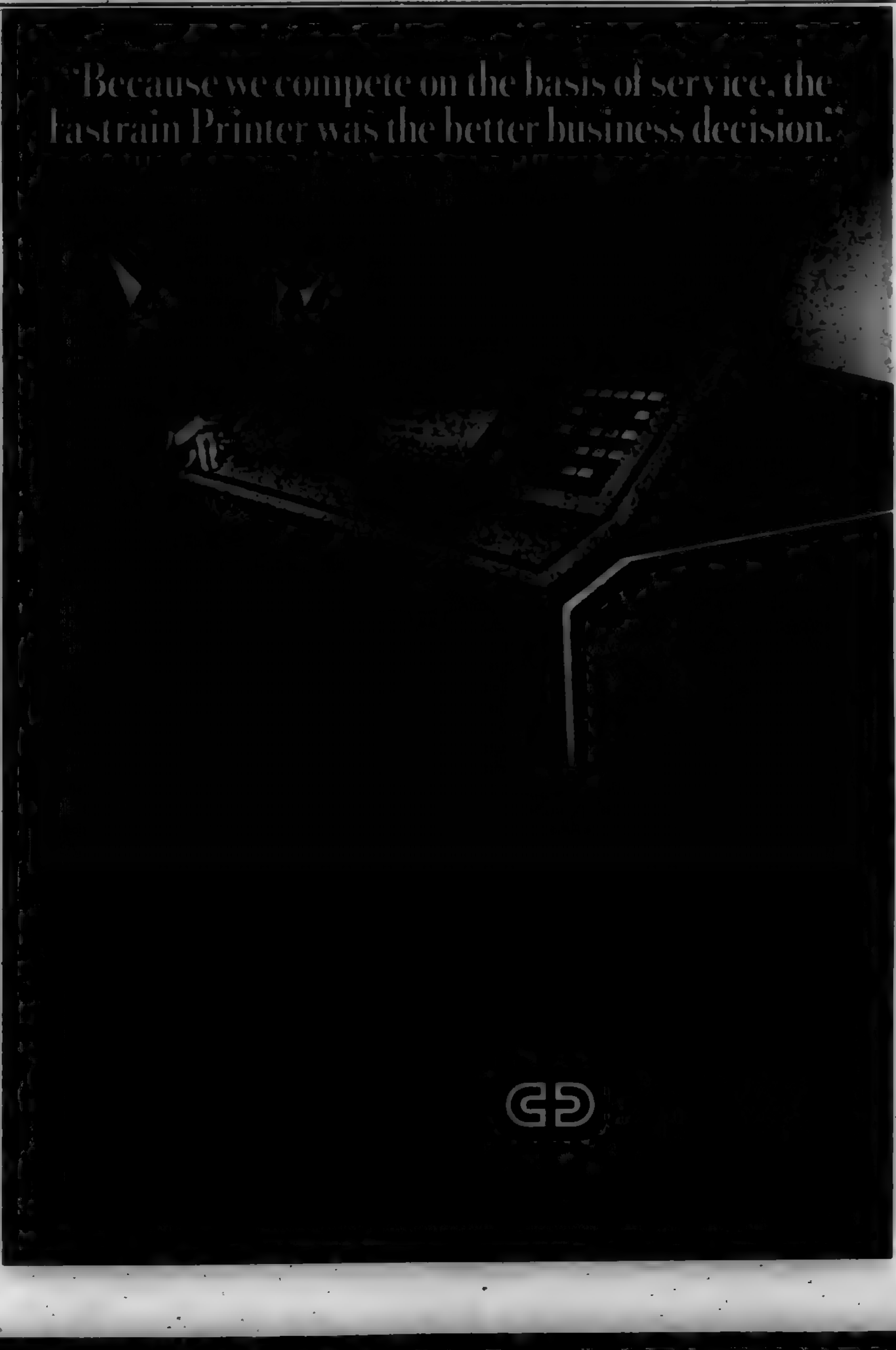
Besides having more leisure time, gained by eliminating or reducing the daily commute, telecommuters will enjoy a substantial savings in fuel costs.

In a two-year study funded by the National Science Foundation, Nilles and his research team found the 2,000 employees of a large Los Angeles-based insurance company averaged 21.4 miles per day commuting.

Nilles figures that for every seven employees who telecommute, the annual energy saving would equal the electrical energy required to run an average American home for a year.

Freeway-filled Los Angeles is not the only place where telecommuting will work. "We did a survey of major cities to find out how far people commuted to work. The average distance in large metropolitan areas was only about 12% less

(Continued on Page 38)



"Because we compete on the basis of service, the Fastrain Printer was the better business decision."

Computer Links May Eliminate Commuting

(Continued from Page 37)

than in L.A.," Nilles discovered.

The pressure for telecommuting will go up as fuel prices increase, according to Nilles, who expects to see telecommuting first become common in Los Angeles, Chicago and New York.

The workers' advantages are obvious, but what's in it for management?

Among the 2,000 insurance company employees, Nilles noted a general increase in job satisfaction when the company decentralized and established three regional offices. Once the workers' commutes decreased, the company's turnover rate of 30% dropped sharply.

"People were happier, there was less grumbling and productivity increased 15%," he reported.

Based on the insurance company study and other research, Nilles believes that telecommuting, upon first consideraton, appeals most to the worker and least to management.

He said managers are often nervous about telecommuting — partly because of ingrained ideas about workers and their work habits. The manager thinks, "If I can't see this guy working, how do I know he's doing anything?"

However, Nilles insists that effective monitors can prevent telecommuters from "goofing off." The solution at regional offices is to have two managerial types.

"One is a traditional manager, physically located where the workers are. His function is to be sure workers are there on time and to supervise other physical aspects of the job.

"Job content and performance, on the other hand, are monitored by a specialist-manager — an accountant, a clerical supervisor or whoever is appropriate. He or she can be located anywhere, connected to the other workers by a telecommunications network."

For home workers, Nilles suggested the simplest and most effective monitor would be to judge the quality and quantity of work at periodic intervals.

Edifice Complex

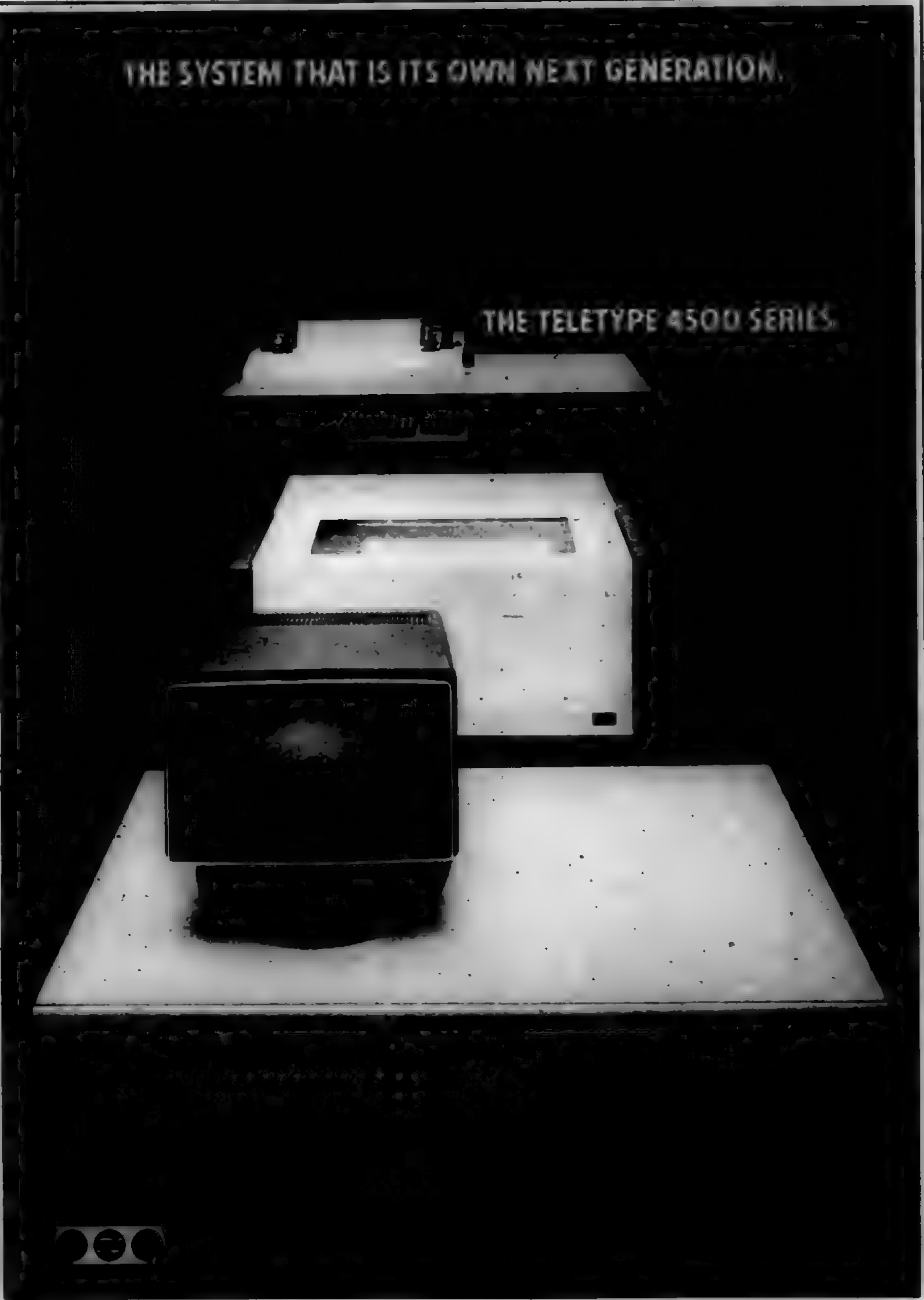
Another managerial obstacle is the built-in aversion many executives have toward computer technology. "The typical manager doesn't like computers — wouldn't be caught dead touching the keyboard," Nilles said. Other corporate executives have what Paul Gray, a member of Nilles' research team, calls "the edifice complex."

"They think they have to have a building with the company's name on it," Nilles explained.

Nilles hopes to persuade victims of the edifice complex and other nonbelievers that telecommuting can be good for business.

"A lot of psychological barriers will have to be overcome," he acknowledged. "And some effects of telecommuting, such as possible feelings of isolation for home workers, need to be examined."

These days, Nilles divides his hours between working at his USC headquarters and telecommuting from his home. His book, *Your Personal Computer: Friend or Foe?* is scheduled for publication next year.


THE SYSTEM THAT IS ITS OWN NEXT GENERATION.
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Course Set On Crime

SAN FRANCISCO — A three-day workshop on "Computer Crime: Investigation and Prosecution" will be held here on Sept. 30 — Oct. 2 by *Assets Protection Journal*. It was designed for security and law enforcement investigators, prosecutors, attorneys and computer specialists who have had training and/or experience in investigating financial or computer crimes.

The program will include actual case studies presented by experienced investigators who will cover initial case planning, investigative methodology and techniques, evidence gathering and analysis and case preparation and presentation.

The workshop fee is $575. More information is available from Paul Shaw, *Assets Protection Journal*, Suite 503, 500 Sutter St., San Francisco, Calif. 94102.

Best Results In CPU Test

Decstation 78 Excels in Business Applications

By Hillel Segal

Digital Equipment Corp.'s entry in the less-than-$15,000 price range performed well in the CPU-intensive benchmark test of the Association of Computer Users (ACU). But it was in the area of business applications software that users said the Decstation 78 was strongest.

The system's best result was its time of 31.8 seconds in the math-oriented CPU test. This put it second among the first six systems tested in Series 1 benchmark reports of similarly priced systems.

Comparisons of the Decstation 78's times with others in the series should be made with caution, however, since the DEC 78 uses a compiler, and test results reflect the total time for compilation and run of the benchmark program. In most applications, the run-time would be the more significant element of the two-step process. If run-only times for the system were available, the comparison would be much more favorable to DEC.

Near the Lead

While the Decstation 78's result in the CPU test gave it a position near the lead in that aspect of performance, the tests emphasizing diskette access ran slower. In the disk I/O-intensive test, the Decstation 78 was positioned much further down in the six-system group.

For the real-life applications tests, the DEC time (again including compile) placed the system in the low mid-range of the six-system group. The scientific/engineering test was completed in 22:35.6, and the accounts receivable problem in 5:04.8.

The configuration tested included a VT78 processor with 16K words of memory (each 12-bits long), a video terminal, two double-density disk drives and a 180 char./sec printer. This combination, along with the operating system Basic and a stand to hold the computer and disk drives, was quoted by a DEC computer store spokesperson at $11,570.

The price straight from DEC itself would be somewhat higher, at least for the single-quantity buyer. Most buyers, however, currently purchased the system through an OEM who installs the system, trains users and provides software support.

An unusual aspect of the hardware is the 12-bit word length used by the VT78 processor. This enables arithmetic calculations of 16-digit accuracy, as opposed to the more conventional six-digit accuracy of many Basic systems. It also allows two-instruction fetches from memory, which speeds up execution.

DEC Basic

The version of Basic supplied with the Decstation 78 presented some difficulty during the benchmarking process. While file manipulation statements and output device references commonly vary from version to version among different manufacturers, the DEC Basic added a new wrinkle.

The system required that arithmetic positioned on the report output be defined as string variables, and constants needed quotes around them in the source code. Numerous modifications to the standard programs were necessary as a result of this restriction.

At the same time, it should be noted that, in practice, relatively few users of the computer do their own programming, and most applications are written in Dibol. As a consequence, inconveniences introduced in the Basic compiler do not affect customers as much as they would in a computer marketed as primarily a user-programmable system relying heavily on Basic.

As mentioned, the DEC Basic is a compiled, or more precisely, a semi-compiled version. The compilation may be treated as either a separate step in the program development process, or as part of the run. If treated as a separate step, an object file of intermediate code is produced which during run time is interpreted into machine-executable code.

The optional separation of the compile and run steps has the effect of saving time during the program run, although not as much time as would be saved by a true compiler system that dispenses with the intermediate code and the run-time interpretation step.

While the editor included with the Basic language did not rate at the top in number of keystrokes used, it was very easy to operate. A more sophisticated symbolic editor with global search-and-replace and block insert/-delete is available as a separate part of the operating system.

Sophisticated utilities supplied with the Decstation 78 include a disk packing routine to eliminate wasted storage space, a line-by-line file comparison feature and commands to set printer and terminal margins and character sets.

A trace feature provided as a debugging tool follows the execution of a program, showing the order in which each program step is executed.

DEC customers were contacted for comments about the system by the independent consulting firm which performed the tests, and they indicated that hardware speed was not their highest priority. Most users said that software was a key criterion in choosing the system, and in that respect, DEC's applications packages were the deciding factor.

Customers agreed with ACU consultants that the system is easy to use. The operating system and applications packages are menu-driven.

DEC supplies applications packages in the areas of accounts payable and receivable, general ledger, invoicing and inventory control, payroll and word processing. OEMs offer these or modified versions of them, as well as additional applications software.

In most cases, the system is sold on a turnkey basis to customers who wish to purchase a specific application system rather than a general purpose computer. "The most important factor in choosing a computer is software," one user said.

It was a bit surprising to find that there were very few complaints about software or the support provided by OEMs. This was in contrast to comments received on several previously tested systems sold through OEMs, where the quality of customer support varied greatly from vendor to vendor.

Experience with one or more hardware problems was mentioned by more than half of those surveyed. Here, the users again praised DEC service. Disk-drive difficulties were most frequently mentioned: the mechanical aspects of floppy disks have been notoriously troublesome throughout the industry.

One area of negative comments on the system related to the 16K-word memory size, which can be a limiting factor in larger applications. Also mentioned was the speed of some operations. "Searching time is slow and sort programs take a long time to execute," one user noted.

DEC officials stressed that the system was not intended to be the fastest computer on the market. Its strong points are considered to be ease of use and good applications programming.

Next week: The significance and interpretation of benchmark results.

SCOREBOX

System: Decstation 78
Current Price: $11,570

Series 1 Results**** Systems up to $15,000	C-1 Scientific/-Engineering Time	C-3 Accounts Receivable Time
Pertec PCC 2000	26:46.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.8	2:48.0
Texas Instruments 771	22:05.4	3:36.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	22:35.6*	5:04.8*

Series 2 Results**** Systems $15,000 to $25,000	C-1	C-3
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.8	3:20.0
Texas Instruments FS990/10	**	3:18.8
Hewlett-Packard System 45	4:38.9	5:06.8
DEC PDP-11V03	14:43.4	4:14.0
Q1 Lite	6:50.7	5:03.3
Univac BC/7-610	12:09.2	10:37.0
Northern Telecom 405	**	***
Datapoint 1170	36:27.5	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	**	2:43.3

*Results include both compile and run time.
**Test could not be run because of memory limitations.
***Test could not be run because of formatting limitations.
****Both Series 1 and Series 2 were run on the same programs.

This is the 18th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

EDITORIAL

Irresponsible Attitude

330,730 Americans died of cancer in 1970, the year IBM decided to use a "suspected carcinogen" in its first copier, the Copier I. Prior to that, the chemical in question — Trinitrofluorenone (TNF) — had been found to produce tumors in tests on laboratory animals.

IBM pushed ahead with its copier program despite the knowledge that every Copier I customer would be exposed to TNF.

Since 1970, thousands of Copier Is and Copier IIs — as well as 1,200 IBM 3800 laser printers using the same technology — have been placed with unsuspecting users.

IBM was not alone in its use of toxic substances in products manufactured for the public in that period. To help protect the public from such chemicals, the Toxic Substance Control Act was passed in 1976. That act required companies to notify the Environmental Protection Agency (EPA) 90 days before marketing new chemicals.

With passage of the law, did IBM take the opportunity to notify the EPA it was marketing a suspected carcinogen? No. The law was not retroactive, so the company didn't have to.

No new research had been done on TNF and all the old data was available in "open literature." One such source was a 1962 study conducted by Huggins and Yang that established TNF as "a medium potent mammary carcinogen in rats." That determination, a much harsher indictment of TNF than any arrived at by IBM researchers, might have given a less imperious organization cause for reconsideration, yet it didn't stop IBM.

While it is true that no case of cancer in a human has ever been linked with TNF, the risk to humans may still exist.

We find it amazing that IBM waited so long to let its customers know it was using TNF in these printer products.

So what's a little TNF in the environment? Lots of chemicals commonly used in our everyday life have produced tumors in laboratory animals. Saccharin is a perfect example. Yet millions of people use saccharine in their coffee every day. Cigarettes, too, have been linked with cancer — in humans, not just laboratory animals — yet millions of people use them every day, too.

But there is an important difference in the latter two examples. The products are clearly marked and the individuals who choose to risk their use are making that choice themselves.

In the case at hand — the IBM printer products — IBM knew there was a risk and did not make that information public.

At a time when cancer will predictably strike one out of every four Americans, it is nothing less than irresponsible to offer for public consumption a product containing a known carcinogen.

DATA PAST

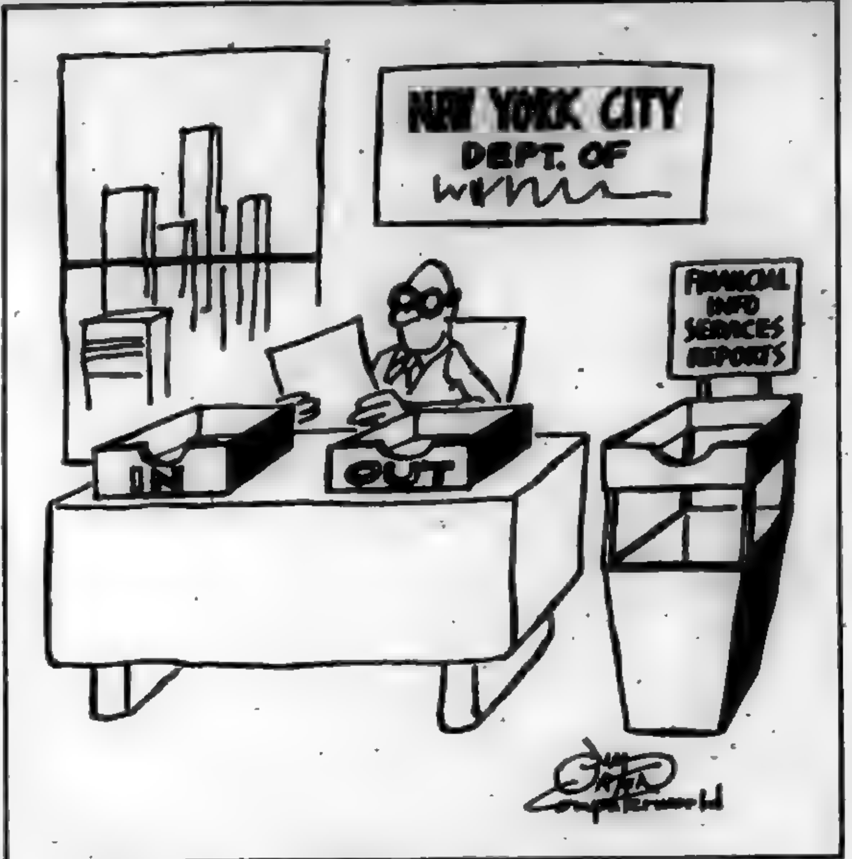
Five Years Ago
Sept, 24, 1975

FORT LEE, N.Y. — IBM's System Management Facilities (SMF) was inadequate as a performance measurement tool, according to three separate studies at user installations. In each case, the study was geared to evaluation of IBM's and an independent vendor's sort package, and each utilized a hardware monitor to get what were finally considered accurate measurements.

Users of all the more popular data base management systems (DBMS) were generally happy, but users of DBMS from independent software houses tended to like their systems better than users of IBM's IMS liked theirs, according to results of a *Computerworld* survey. Adabas from Software AG came up with the highest weighted averages.

Eight Years Ago
Sept. 20, 1972

WASHINGTON, D.C. — A draft revision of the 1968 Cobol standard was completed by the American National Standard Institute (Ansi) technical committee X3J4. Under the new plan, there would be a nucleus and 11 functional processing modules in the complete ANS Cobol, rather than the nucleus and eight modules that made up the old standard.



LETTERS

Sticking With Cobol

I would like to respond to the recent letters endorsing PL/I over Cobol.

PL/I is admittedly very powerful, but that power is also a source of potential trouble not found in other languages. Because PL/I has such inherent flexibility, the user must explicitly define the attributes of all variables or suffer the consequences. Consider:

```
I = 1;
X = I + .1;
```

The value of X is 1.0625, *not* 1.1. The variable I is fixed point binary, whereas .1 is fixed point decimal. The addition requires conversion to like bases, in this case binary. One decimal digit is carried to *only* four binary digits.

The conversion is inexact — that is, $(.1)_{10} = (.0001)_2$ — and therein lies the problem.

Robert T. Grauer

Coral Gables, Fla.

Missed the Point

I applaud *Computerworld's* coverage of structured methodology, but I think the recent article "Structured Methods: Pros and Cons" [CW, Sept. 1] missed the point. The point is that structured methodology is a set of interrelated techniques which must generally be applied simultaneously if we are to make software development the humane and productive enterprise it must become.

Syntex's use of walk-throughs is interesting, but the article doesn't indicate what other techniques it uses. I would suggest that walk-throughs are of negligible value in producing quality software if your people use unstructured techniques to specify, design, code and test software.

The case of Al Volpe proves only that a good concept can lose its value if it is applied in an extreme and ignorant fashion. I doubt that there are many people who would consider a 6,000-statement Cobol program a paragon of structured methodology.

As Volpe suggested, it is possible to write a GOTO-less program which is unmodifiable. I don't think anyone ever suggested that GOTO-less programs mean absolutely no GO-TOs.

I would ask Volpe to consider a broader view of structured methods.

Cary Coovert

Natick, Mass.

Not 'Out of the Blue'

Alan Taylor's recent column concerning NCR Corp. and user Peri-Mack Enterprises of Denver [CW, Aug. 25] contained inaccurate and misleading information about my background and about the way I was chosen as arbitrator in the case.

1. I am presently employed by Computer Devices, Inc. (a hardware company), not Computer Services, Inc. as reported. As such, there are no contract terms which would bias my decision.

2. Although I am not listed in the Lawyer Directory, it is by choice, as all my clients are sent to me by referral and are not walk-ins.

3. My background in computer services, systems and hardware is extensive, and I was therefore selected by the American Arbitration Association to arbitrate this case. I was not nominated "out of the blue."

4. Finally, I am a dual professional in law and data processing, and the combination of my education and experience uniquely qualifies me to meet this challenge.

Taylor's technique is not new. It is typical of the new wave of self-centered journalism that worships innuendo as its godhead. For him to write, for example, that I was nominated out of the blue is not only journalistic arrogance but a sheer flight of fantasy.

Kevin M. Mahan

Covina, Calif.

SOFTLINE/Werner L. Frank

The Software Scene

Software is difficult to conceive as well as to construct. And software is a subject about which much is said, but less understood. Software is a topical item.

That is why we are beginning this series of columns to explore views, myths and facts about an area which overwhelms the data processing scene.

To get started and set the stage, let's look at some software-related statistics which continually reappear in the literature and thereby seem to be achieving credibility:

- There exists worldwide more than $200 billion worth of developed software which is more than twice the value of the installed hardware base.
- The software/hardware cost ratio has moved from 20/80 to 80/20 in the last 25 years.
- There are just under 500,000 programmer/analysts in the U.S., approximately 40% of the DP work force.
- Only 19% of the total DP labor is available for new application development.
- Software maintenance occupies 60% of an installation's manpower efforts.
- Personnel costs, often equated to software costs, are 40% to 50% of an installation's total DP expenditure.
- Software purchased by DP installations is 2% of the total budget.
- System software costs associated with some new computer offerings are increasing by factors of three over predecessor systems.
- Software product sales are increasing at more than 30% per annum, representing the fastest growing segment of the computer services industry.

This is the first appearance of Softline, a biweekly column that will deal with software-related topics.

- Software productivity improvement appears to be at a near-standstill.
- Average time to develop a new application is two years.
- Average number of lines of code produced per unit of time is invariant for the different implementation languages.
- The application programmer produces 10 to 15 debugged lines of program per day; the systems programmer generates about one third as much.
- Individual programmer differences in rate of program statement generation and in end program efficiency can easily differ by an order of magnitude.
- The use of structured programming techniques will double the productivity of the DP effort.
- Application development systems have the potential for increasing productivity over the software life cycle by an order of magnitude.
- The number of errors/defects in 1,000 lines of code are on the order of 1% to 5%, depending upon use of structured techniques or conventional methods, respectively.
- Only one sixth of the total effort in developing an application should be devoted to programming; the balance of activity is involved in design and testing.
- User's average backlog of number of pending applications awaiting development stands at more than ten.

Not Necessarily True

It is not clear nor certain that the above assertions are necessarily true. In many cases, it is difficult to reach conclusions because of the unavailability of the underlying facts. We even differ on definitions. For example, what do we mean by productivity? Is it code generation per unit time? Or is it a performance measure based on some nominal standard? Or is it quality of code or quality of satisfying a user's needs?

The above data and observations are often presented to demonstrate the problems of software development and operation. There seems to be an underlying hope and expectation that software should be more predictable, maintainable, operable and certainly less expensive. In a world of continuing decreases in unit hardware prices and accompanying increases in performance, software cost effectiveness does not seem to keep pace.

Indeed software is the whipping boy of DP. Software results in project cost overruns as well as schedule slippages. Software is treacherous because it often produces incorrect results or at least does not perform according to the end user's expectation.

We are also unhappy at the seemingly low productivity in software development by practitioners who may have had many years of experience. And we are displeased that software needs so much tender care, an

(Continued on Page 42)

READER COMMENTARY/Michele Landon

Capacity Plans Pay Off For Shops of All Sizes

In the data processing industry, the need for hardware forecasting and the economic payoffs resulting from capacity planning and hardware fine-tuning have not yet been fully recognized.

A clearly defined and easily implemented forecasting procedure for all equipment, from mainframes and terminals to remote job entry (RJE) equipment and printers, prevents two extreme situations from occurring. The first is having more hardware or the wrong combinations of devices than can practically be used, and the opposite problem is not having enough power to support the software and programming staff.

Both of these extremes are more complicated than at first appear.

Having more hardware than can reasonably be used in the near future wastes financial resources which might be used to acquire more software or programmers. For example, having more terminals than the mainframe can support wastes the dollars spent on the terminals as well as programmers' time as they wait for a response from an overload mainframe.

This, of course, leads to the other extreme. Any shortage of hardware leads to a loss of programmers' time. A prime example of this is the situation which often exists when time is wasted waiting for printouts because of insufficient printing resources.

Although much has been said about programmer productivity, the direct relationship between capacity planning and productivity has not been fully explored.

Insufficient hardware is also responsible for inefficient use of software and, consequently, poor performance. Today, with many users linked directly to the computer and immediately aware of performance problems, allowing deficiencies is poor business. So, in fact, capacity planning is a powerful economic tool and should be implemented in shops of all sizes.

Several points should be considered in a complete and thorough procedure:

1. Capacity planning should be done for all hardware.

Although the mainframe is the largest, most expensive and most important piece of equipment, all peripheral devices need to be included. For the mainframe, both CPU time and core should be evaluated. In larger, more sophisticated machines, the CPU time needed to run a job will be less than that needed by a smaller machine. However, in simplest terms, there is only a finite number of seconds a machine can run, and the amount of time your machine is using is of prime importance in determining its capacity to turn out more jobs.

The core available to run jobs is of equal importance in nonvirtual storage machines. In virtual storage machines, the actual core available might not be as important, but even in a virtual machine, certain software and also certain jobs have to be run in real core. For purposes of fine-tuning in a VS shop, both real core and paging rate should be considered. If the paging rate is excessively high, more CPU is used by the paging supervisor, and the trade-

(Continued on Page 44)

READER COMMENTARY/James Rosenwinkel

Lax Documentation Effort Can Kill Team's Morale

Documentation is not generally considered to be one of the more fascinating aspects of a systems project. The subject is sometimes considered boring to talk about, to listen to, to read about and even to write about. In fact, about the only thing less stimulating than reading another dry article on documentation is performing the actual task of compiling documentation. That's one strike against the cause for good documentation. It's not very interesting.

Documentation is not visible. If it's there, it isn't easily seen. Task priorities have been known to shift in favor of more visible tasks. As long as the project appears to be floating along successfully, no one is really going to miss the life boat. Strike two.

The final blow is the optimistic notion that the result of a great documentation effort may never really be needed. If the system is designed logically, if user procedures are complete and if the coding is straightforward, much of the documentation might be redundant anyway. Why make a double effort to protect an "unsinkable" system? Strike three.

Because of these three simple reasons, some of us will find ourselves, today, in at least one of the following categories:

- We're assuming documentation is there because we don't need it.
- We're hoping that it's there because we have a feeling we might need it.
- We're wondering where it is because we're beginning to sink.
- A project has recently settled on the bottom and we're still wondering where the documentation was.

Not taking the extra effort to keep system project documentation from falling victim to these natural hazards paves the way for additional, and potentially greater, problems. More specifically, if system project documentation is not a daily task during the course of the project, we open the door to morale problems on the project team.

Process Behind It

Crisp, clear, accurate documentation should be an integral, vibrant force throughout the evolution of a systems project: Compiling and using system project documentation should be an ongoing process throughout all phases of the project. The project team's familiarity with the documentation structure should at least equal a programmer's familiarity with TSO.

If we assume that system project documentation is only an end result, an after-the-fact activity, some place to go when there is a problem; there will be a price to pay in each of the following areas:

1. There is only one way to thoroughly review the quality and feasibility of a planned system's design. Complete, clear and accurate documentation must be constructed. It must be available at each milestone, or point of evaluation. Poor design or other faulty front-end work must be identified as soon as possible to keep coding or pro-

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Lax Documentation Plan Can Kill Team Morale

(Continued from Page 41)

cedure development from turning to waste. It is difficult for a professional to watch long hours of coding or procedure work turn to useless scrap paper.

2. As a system project progresses through its phases, a myriad of questions will arise. If the supporting documentation is not accurate, simple questions can easily lead to confusion, false assumptions and misunderstandings. Getting the right answer should not depend on asking the right person at the right time.

3. There are temporary absences and a turnover factor for every project team. Whenever a team member does anything that is inadequately documented, that person's absence will mean an additional burden will eventually shift to the remaining veterans on the team. This additional burden will consist of "piecing together what happened." This kind of unplanned task is never popular.

Documentation Support Group

Merging documentation activities with the daily duties of a system project team should be encouraged. A possible first step is the formation of a documentation support group within the systems development area. This independent unit would assist selected project teams in the creation of the documentation for their project.

The scope of the support group's involvement could vary by project according to the needs of management. Accordingly, the following five responsibilities for the group would vary with each project, depending on the scope of each assignment:

1. Assist the project team in determining documentation needs. This might include familiarizing the project team with company and departmental documentation requirements, standards and so forth.

2. Assist the project team in developing a customized methodology to maintain control over the status of documentation. This might be nothing more than setting up an open file of memos, notes on decisions made or pending changes in requirements and so forth and how each item affects the documentation. A more involved technique would be to design a formal control document.

3. Review with the project team on a regular basis (perhaps weekly or biweekly) the level of success in keeping the system project documentation current.

4. Gain a departmentwide familiarity with documentation compilation. This would enable the group to identify common obstacles, common problems and any redundancies of effort.

5. Provide project manager with estimates for the time required by the project team to comply with the documentation requirements.

These five contributions are secondary to the one main value a documentation support group would provide. It would exist as a symbol of management's realization of the advantages in making system project documentation a process.

Rosenwinkel is a consultant for CNA Insurance who specializes in user documentation for new systems.

Software Scene: An Overview

(Continued from Page 41)

activity which we label "maintenance."

Since software is a human creation, it is as solid or as frail as those who are its authors. This people intensiveness makes software more a craft than a disciplined engineering task. Hence, opinions vary. Approaches to issues and their resolution are often widely divergent, which gives us plenty of room for comment.

And so we hope to engage in both presenting viewpoints as well as questioning positions. We wish to impart information as well as clarify issues. This column will also serve as a forum for discussion of points that remain controversial. And there will also be opportunity for readers to contribute.

We will, in turn, look at subjects such as:

- Definition of the software budget component.
- Significance of maintenance.
- Critical factors in software production.
- Productivity-enhancing issues.
- Organizing and controlling the software effort.
- Impact of implementation languages.
- Role of firmware/hardwire software.
- Cost effectiveness of software.
- The software product in the commercial marketplace.

Welcome to Softline.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

"Virtually every one of the large, multinational Fortune 500 corporations has undertaken experiments in electronic messaging."
—INTERNATIONAL DATA CORP.
The Compleat Guide to
Electronic Messaging

"As automation costs continue dropping... the mid-1980s will see a doubling of present office worker capitalization levels...due mostly to the popularity of word processors and facsimile devices."
—INTERNATIONAL DATA CORP.
The Compleat Guide to
Electronic Messaging

"...Multi-functional terminals inhabiting the automated office of the '80s will be able to communicate with each other, across the hall, across town, or across the country."
INTERNATIONAL DATA CORP.
The Compleat Guide to
Electronic Messaging

"We are, indeed, fast approaching a time when a service company's data communications networking capability determines, in significant part, its success in the market."
—INTERNATIONAL DATA CORP.
The Compleat Guide to
Electronic Messaging

"Data communications is becoming economically viable for many applications and in many environments where only a few years ago it was a pipedream. Near the top of this new and growing list is general-purpose message switching...electronic mail."
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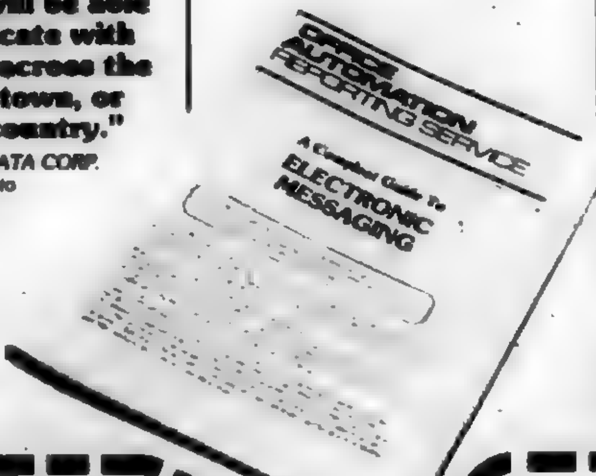
The Compleat Guide to
Electronic Messaging

"By the time the legislators come to grips with electronic mail and USPS, they will have to give serious consideration to this question: Why couldn't the postal service launch a separate subsidiary that would operate ECOM—Electronic Computer-Originated Message Service—and ultimately a broader, publicly accessed electronic message system? ...It might be the only way the U.S. Postal Service will survive."
—INTERNATIONAL DATA CORP.
The Compleat Guide to
Electronic Messaging



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HUMAN CONNECTION/Jack Stone

Readers Toss Bouquets, Brickbats at Trade Press

My survey of readers on their opinions of the DP trade press [CW, Aug. 18] brought a deluge of mail. Many people chose just to fill in the blanks; others wrote emotion-packed comments and letters, both pro and con, about the DP trade press.

For the former group, the ratings were so widely varying for people in the same profession from the same industry sector that I really couldn't draw any significant conclusions about what particular groups of people thought about the trade press.

As usual, a number of readers complained about the anti-IBM bias of the press, a subject I don't intend to pursue in this column. But let me touch on some other comments:

A trainer/consultant from industry, on hardware coverage: "Overkill!"

A recruiter who entered a 5, the highest rating, on all counts: "Without *Computerworld*, I wouldn't be as successful as I am."

A programmer/analyst who rated hardware 5, applications 1 and professional development 0: "Has any part of the trade press ever taken a stand on the certification issue?"

An executive from the education industry, who gave "industry news" a 5: "Thorough, but boring, boring . . ."

An auditor in the banking industry: "Many times I find CW more interesting to read than the evening newspaper.

"I used to manage a small mini-shop for a savings and loan firm. It was then I began subscribing to CW. At first, I couldn't understand the articles because I didn't feel they related to me and threw them onto a pile of backlogged reading material . . .

"Then I acquired a new boss, and DP awareness became the main theme. So I went back to that old stack of CWs and read the articles one by one and started to learn about the buzzwords the vendors toss at you . . .

"The point is that the DP trade press could be used to educate a young graduate like myself whose career situation required a heavy exposure to data processing . . ."

A college professor who gave "employment ads" a 5: "If I weren't looking for a better job, the grade would have been a 2 or 3."

An executive in the computer industry for two decades, who gave "editorial" coverage a 1: "Editorials are 40% journalistic 'hype,' 50% B.S. and 10% practical and timely."

An analyst who assigned an overall grade of 3 to the coverage: "My thinking is that our trade press is still missing a retrospective look at where we have been; and analysis of where our past is leading us (and how it might be different if another option were taken); and an indication of what it really can be like "if" — if we had the time, budget, labor? Are there any success stories? . . .

"Moreover, we have to get a handle of the user's perspective. Do any users read our trade press? What for?"

An actuary for an insurance company, with heavy experience in scientific programming: "In spite of my longtime involvement with programming and computers, I consider myself an end user. Why? Because the goal of any of my programming assignments is never the program itself, which I view only as the means to accomplish my specific assignment.

"In addition to our own minis, our company has a large-scale installation and a staff of DP professionals who are badly misused and/or mismanaged. Their problems are perhaps typical of management of the DP function and suggest a desperate need for more attention to humanistics.

"Your column serves an important purpose in highlighting these areas. Good luck in your survey!"

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Now, Ramtek offers the first integrated system for MIS graphics users.

Ramtek's new 6214 color graphic computer frees you from buying each of your display elements from a different supplier. Ramtek has put it all together in a true stand-alone color graphics system complete with processor, monitor, console, mass memory storage and UCSD Pascal.™ And full Ramtek support with field service, training and documentation.

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Interactive UCSD Pascal makes programming easy.

Complex programming is simplified with Pascal. Adding Ramtek's GRAFPRO (graphic procedures) software package provides the basic drawing functions, programmable patterns and text fonts you need. To dramatically speed applications software development.

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The new Ramtek 4100 printer/plotter cuts the cost of hard copy. Ramtek's unique four-head design prints full color graphics on plain paper in a single pass. No toners or chemicals are required, and to change ribbons you simply drop in a new cartridge. Add a color camera for transparencies, 35mm slides, and 16mm film.

For MIS, computer-aided design or any application that requires high resolution, high-performance color graphics, look into Ramtek's 6214 colorgraphic computer. To get more information, write: Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050.

Why is Pascal better for business?

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Capacity Planning Pays Off in Any Size Shop

(Continued from Page 41)

off between more CPU and the possibility of adding a megabyte more of core has to be evaluated, especially if CPU utilization is reaching capacity.

Peripheral devices that can affect overall capacity and performance and that should be carefully planned for are RJE units and printers for the batch environment and terminals and control units for the on-line environment. Storage-related devices such as channels, tape and disk drives, as well as tapes and disk packs, should also be included in any hardware forecasting procedure.

2. Monitor usage of all hardware.

There are many software packages that monitor hardware usage. They usually have an interface with the operating system and can measure and report on most aspects of hardware utilization. This utilization can often be broken down by job and program in a batch environment, and by transaction and program in a communications environment. This breakdown is of particular use for fine-tuning. It can be used to arrange for a better mix of jobs so, for example, several jobs that require large amounts of tape drives can be single-threaded, allowing several other jobs to run concurrently with each of the demanding jobs.

3. Develop mathematical relationships between the mainframe and other devices wherever possible.

After the initial monitoring, the number of CPU seconds used should be measured against the number of seconds the machine is actually operating. There are often relationships between the amount of CPU used on one machine and the amount used on another machine, or between CPU and channel usage, printer usage or other utilizations.

At this point, it may be wise to attempt some mathematical modeling to develop numeric relationships so that projections for CPU utilization can be used to forecast utilization of devices for which independent projections are difficult.

Mathematical relationships can also be used for fine-tuning purposes. For example, if two channels running against the same CPU have an unbalanced relationship, when projections are extrapolated on the equations, a potential critical channel problem can be foreseen and changes can be made before the overloaded channel ever reaches capacity.

4. Establish projecting procedure.

The present utilization can be used as the base for making projections. For both capacity planning and performance, it is necessary to be able to project when hardware will reach its capacity limit since lead time is needed to order, obtain and install new equipment.

The monitoring reports should include breakdown of CPU and other utilizations by several main categories — batch production, batch development, TSO or CMS, data communications production and communications development. Production is usually fairly stable, and new production utilizations should be provided as part of the system development project.

So the major outstanding factor is development projections. These are dependent on two factors that may or may not be related. One is new projects planned to be developed, and the other is planned programming staff. Of the two, programming staff is probably more significant.

Mathematical relationships may exist between number of programmers and resources used, and a pilot should be done over several months measuring the number of programmers against TSO or CMS usage, batch development and communications development utilizations. A linear equation can then be developed and if there is a high positive correlation, projections of development utilizations can be based on planned programming staff.

5. Establish reiterative forecasting cycles.

For the hardware forecasting to be useful in providing sufficient lead time to order new equipment and refine performance, it must be done on an ongoing basis. It should be a reiterative process where past projections are compared to actual utilizations and future projections are modified based on new developments in the shop and in the industry. A semiannual, two-year projections cycle would probably work well for most shops.

Each shop will, of course, develop procedures and standards that meet its specific needs. What is important is that procedures for hardware forecasting, capacity planning and fine-tuning be developed and implemented. In our industry, we perform a visible, essential service, and we should provide ourselves with procedures to ascertain that we will have the tools of our trade when we need them.

London is a supervisor in the Commercial Lines Automated Division of Hartford Insurance Group in Hartford, Conn.

See page 109
in Buy/Sell/Swap

Attention: Engineers Age 40 and Up

Put yourself on easy street by spending pre-retirement years with Aramco in Saudi Arabia

Retirement incomes that sounded princely a few years back are beginning to look paltry in today's economy. And they may be hopelessly inadequate in tomorrow's.

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LETTERS

Readers Stand Up for Contract Programmers

Hard to Swallow

With regard to "Managers Warned of Contract Programmers" [CW, Aug. 18], while I enjoy your publication immensely and would be lost without the information it provides, I find this sort of biased journalism hard to swallow.

I certainly have no intentions of defending the whole of contract programming as without fault; I know better. But then neither do I feel that several paragraphs of condemnation are adequately balanced by one brief paragraph of approbation.

I think that even Al Strong would allow that contract programming fills a need and provides a service. The point of contention seems to be whether, or how well, we accomplish our task.

At the risk of being accused of an elitist attitude, I would have to agree with Stuart Magie that most of the people whom I have met as contract programmers have been either extremely well qualified or out-and-out "kooks." Without exception, I have found the larger middle ground to be safely ensconced as "direct" employees. I would venture to suggest that it takes a somewhat different breed to accept the challenges and to provide the services required of contract programmers.

Two other accusations in the article seem to me to be another pair of our strong points turned inside out: The idea that we are job-hoppers, unable to keep a decent full-time job, is perhaps true in a few cases but patently ludicrous in most. Where did we get this vast array of experience that enables us to step into a job at a moment's notice and perform productive work? Certainly it wasn't by sitting contentedly at one job with one company for all those years, doing essentially the same work day after day.

The second item is that we are disconnected, and by implication disloyal, to the company for whom we are currently performing a task. In my mind, this position allows us to take a more objective view of the task at hand. We are isolated from company politics and our fate does not depend upon hitching our wagon to the currently rising star in the company's firmament. We are able to view the current project with regard to its technical requirements only.

Joseph W. Chambers
Lynn Haven, Fla.

Touch of Humor

"Managers Warned of Contract Programmers" provided a rare touch of humor for your readers. According to the article, Al Strong claims that, "Unlike programmers who work permanently for one company, most self-employed free-lancers seldom develop a strong sense of loyalty for the users to whom they sell their services."

As everyone in data processing except Strong knows, most salaried programmers are neither loyal to their employers nor are they "permanently" employed. Articles deploring the high turnover rate appear frequently in *Computerworld* and other trade publications.

On the contrary, a free-lancer is strongly motivated to build a long-term relationship with a customer. It is usually more difficult, more expensive and more damaging to his reputation for him to change customers than it is for a regular employee to change jobs.

Richard Mautner
New York, N.Y.

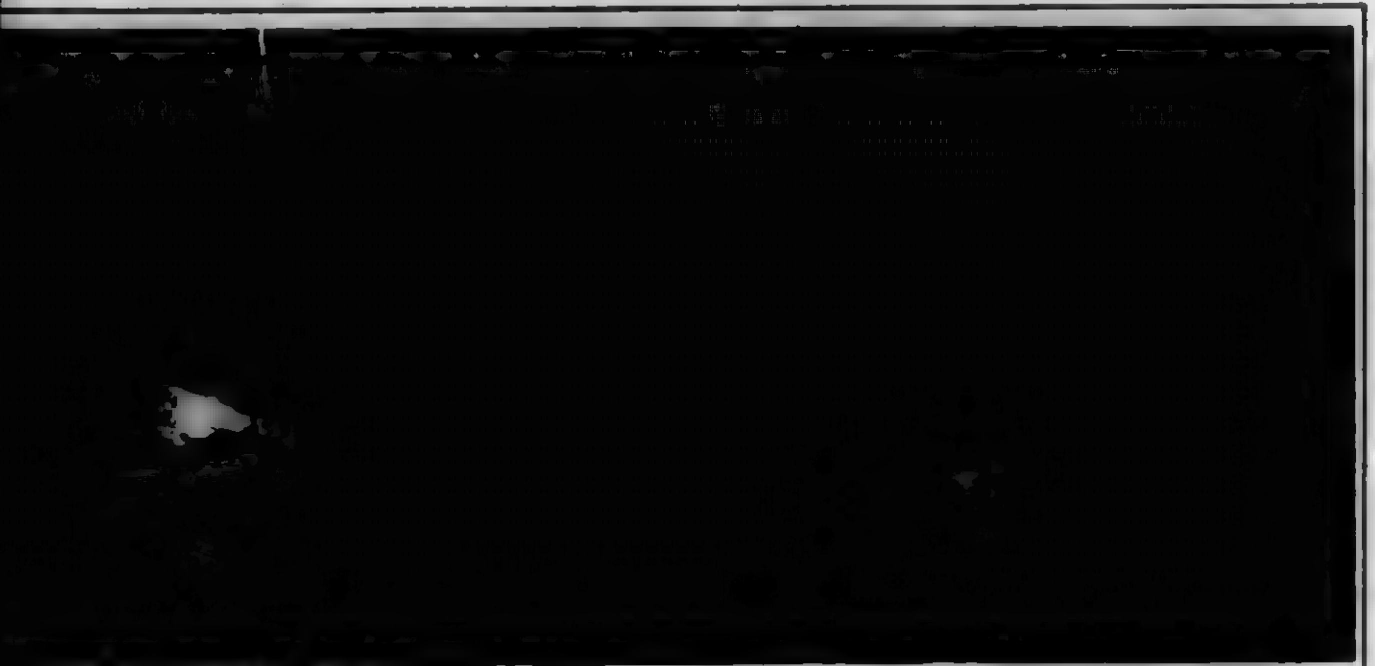
Moved to Protest

I appreciate *Computerworld*'s weekly arrival. It provides me with information on new products, legal precedents, market trends and the like which are unavailable from any other single source. I am moved to protest, then, when I see this source stray from its normal self-policing of material.

I refer specifically to the recent article on contract programmers. As in most industries, people who work in ours range through good, bad and indifferent. This is true in all areas of job performance, including programming, documentation, loyalty, job longevity and so forth. It is true for regular staff, contractors placed through agencies and self-employed contractors. It is the job of a personnel manager to develop a work force high in the positive qualities and low in the negative.

It is also self-evident that one can emphasize one set of qualities over another, or one group over another, in order to serve one's own ends — and with little regard to objective evaluation. Was any reader surprised to learn that the president of a "contract services firm" should issue warnings against self-employed contractors?

George Koch
San Francisco, Calif.



Will your retirement home be near some mountain greenery, or farther south within the Sun Belt, or on the shores of the Pacific? Aramco's big bundle of benefits will help you secure it sooner than you think. See below.

All your medical needs are free while you are in Saudi Arabia — even your prescriptions.

Unlike medical care, dental care is not free for Aramco employees. However, the costs are comparable to what you'd expect to pay back home.

A chance to save huge sums of retirement money

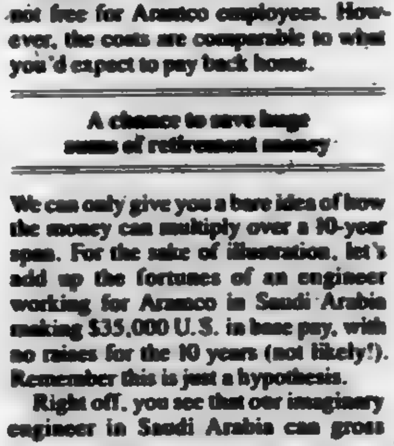
We can only give you a bare idea of how the money can multiply over a 10-year span. For the sake of illustration, let's add up the fortunes of an engineer working for Aramco in Saudi Arabia making $35,000 U.S. in base pay, with no raises for the 10 years (not likely!). Remember this is just a hypothesis.

Right off, you see that our imaginary engineer in Saudi Arabia can gross around $183,000 more. The amount saved out of that grand total is strictly up to the individual.

But look at that $130,000 premium. Whatever the dollars work out to in your case, please remember that this is the bundle which is *totally* tax-protected.

This graph doesn't show what you save on medical expenses, it doesn't show the allowances on your children's education, it doesn't show the travel allowances which cut down on vacation costs, it doesn't show the retirement benefits you may accumulate.

What it does show is that you have the chance of a lifetime to save a really important amount of money.



This is not an offer or an indication of wage scales. It is merely a hypothetical example of how your gross income can accumulate dramatically when you work for Aramco in Saudi Arabia. Employees are not fully vested in the savings plan until 60 months of continuous service. All projections subject to change.

A sensible way to check out the new lifestyle

Everyone in Saudi Arabia lives within the letter of the local law. (No alcohol, for instance.)

But the Americans and Canadians eat steak and french fries, they go golfing and sailing and water-skiing, they tend their nice suburban houses.

While the lifestyle is easy, sometimes living so far away from relatives and friends can be difficult for some. That's why we've begun a new policy. The Aramco overseas tryout.

If you don't want to move your whole family over at once, come and work for us on bachelor status for one year. We'll fly you home three times so you can keep the family informed about your adjustment to life in Saudi Arabia. Then at year's end or sooner all of you can decide whether the life is for you or not.

Take on job challenges you thought you'd never see again

Aramco is the world's largest oil-producing company. So the job opportunities for experienced engineers are boundless. You can stay within your specialty — or you can expand into new territories.

Here are the engineering job categories we're interviewing for right now.

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Facilities Planning
Project Management & Construction
Corrosion Control
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Resources Planning
Maintenance

(P.S. Our job opportunities are open to qualified engineers of *all* ages.)

Interested? Send your résumé in full confidence or write for more information to: Aramco Services Company, Department CW09158AOMCLA
1100 Milam Building, Houston, Texas 77002.

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THE TAYLOR REPORT/Alan Taylor

Foul-Up Shows Abuse of Redundant Data

A recent error in a reader's subscription renewal form for the magazine *Arizona Highways* shows that a good system of redundant information can be subject to design abuses.

The facts are simple. The Zip Code for a Chatham, Mass., resident was entered incorrectly into an address book. In a transposition error, the 2 and the 6 were transposed to give the Zip Code 06233 instead of 02633. This type of error would be caught by any check-digit system — if Zip Codes were designed to be used independently of other information.

The wrong 06233 Zip Code, with the right address, was then used to order a gift subscription to *Arizona Highways*. The magazine never arrived at the right address because somewhere in *Arizona Highways'* system the Zip Code was used in preference to the town and state identification in the original order. As a result of the normal and anticipatable error, the magazine was sent to Ballouville in Connecticut, rather than to Chatham in Massachusetts!

It appears, from the details *Arizona Highways* now gives, that its computerized system does not in fact check the original town and state, but simply uses a table lookup based upon the Zip Code. If, as in this case, the magazine is not returned, no action is taken.

Abuse of Redundancy

This is not a very important matter, on the surface. But still it is one which, in some form, should be part of any system designer's education — and elementary education at that.

The *Arizona Highways* system is clearly at fault in at least three ways. (I suspect that there may be more system faults here, but three will do.) And, while in this instance the subject matter is not that important — a $12 subscription — such faults can be uncorrected indefinitely in other computerized systems as well.

The first fault, chronologically, comes in the data input system. The actual input is ignored! The actual instructions of the input originator are never fully carried out.

No system should ignore input data. The data may be discarded after input and checking, but it certainly should not be ignored. Even if, as will be the case in this particular application, the actual town and state information is often in error (can you think of how many variations of Ballouville will occur?), the input must be input. That's elementary, and that was mistake number one.

The reason the input was ignored is that in the mailing address case, as in many systems nowadays, a possible, definite address can be obtained from only part of the input. The designer accepted as the design goal producing *an* address, without concern as to whether it was the correct address.

Items like Zip Codes are error-prone. Transposition, transcription and other errors can and do occur without obvious format problems in any nonprotected numeric strings, even short five-digit ones.

Any system designer knows that check digits can protect the accuracy of such number codes, but apparently the corollary has not been understood. If check-digited numbers can be used, then presumably it is dangerous to use noncheck-digited numbers. And this is what the *Arizona Highways* designer has done. The Zip Code has been used without protection. So that is error number two.

The third error, which may well be the cause of the others, is that the system confuses input with production.

In the production of an address, table-identified town/state printing is perfectly all right. Once the correct Zip Code is in the address, there is no need to hold the individual address lines in a redundant form. Redundancy and redundant checking are needed in input, not during production.

The quite common system fault that seems to have happened here is that the production standard of not needing the town/state data has been carried too far into the system and has been used in the input area.

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CCP

The annual examination for the Certificate in Computer Programming (CCP) will be held on December 13, 1980, at selected test centers throughout the world.

Specific requirements for this year's examination are detailed in the "Certificate in Computer Programming Examination Announcement and Study Guide." The study guide and application form for the 1980 examination are available on request from ICCP.

Deadline for Filing Application is October 15, 1980

Please forward the "Certificate in Computer Programming Examination Announcement and Study Guide" along with application and test site list.

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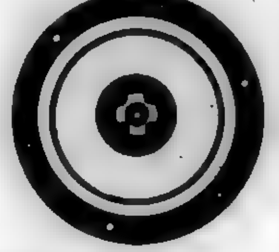

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For Systems Developed Top-Down

Bottom-Up Documentation Best Bet

By William T. Harding
Special to CW

Perhaps the best way to document systems developed using the top-down approach is from the bottom up.

The top-down approach first involves determining a general overall concept with certain applications and reports in mind. Second, system and subsystem designs are developed. Third, master files of information are outlined and program specifications are written. Finally, the programs are coded and the system is tested and implemented.

Several people were involved in the development of this system, but now there is only one person left to document it – you. And you may not have a full understanding of this system nor may anyone else remaining from the original project team. So how can you document and develop the system's manual efficiently and still maintain a low level of frustration?

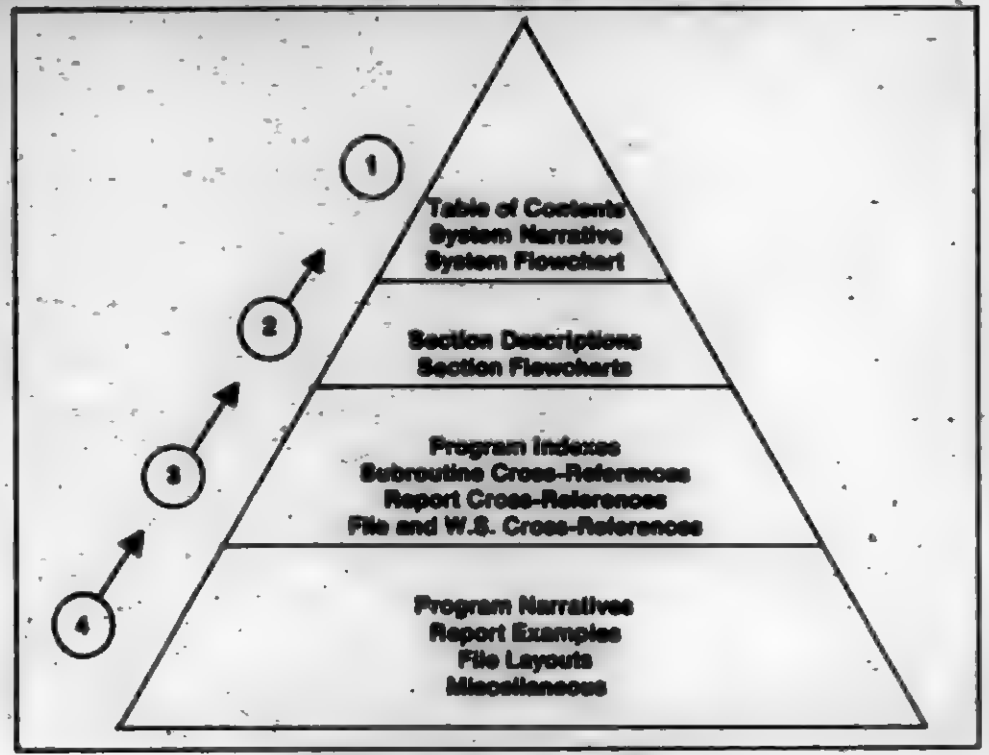
Common-Sense Steps

While there are no magic formulas, there are some basic common-sense steps which, if followed, should prove helpful. These steps form what is called "bottom-up documentation," so named because it resembles going through the development steps in reverse.

With this approach, the first level of documentation – or ground-level detail development – includes the following steps:

- Collect all existing documentation. Begin to find out what has been done, what has not been done and what is incomplete. At this point, do not change or delete any existing documentation since not enough is yet known to be able to tell if it is correct or incorrect. When more is learned about the system, you can add to the incomplete and alter the incorrect.
- Assemble all the report examples. To do this, you may have to inventory the reports from the programs.
- Inventory the program numbers through the following procedure: List the program numbers first from the source librarian, next from the vault index and finally from the existing documentation.
- Determine what programs are missing from these three sources.
- Write the program and subrouting narratives, explaining the complex processing where required.
- Assemble the file layouts and the working storage including name layouts.
- Assemble all available miscellaneous information from the existing documentation

(Continued on Page 48)



The Bottom-Up Documentation Pyramid

VAX Gains Modeling Language

PALO ALTO, Calif. – A financial modeling language and an interactive data base management system DBMS for users of the Digital Equipment Corp. VAX-11/780 have been announced by Ross Systems, Inc. While both products were developed originally for the PDP-11 under RSTS/E, the VAX versions are said to be 100%- compatible with the PDP-11 versions; while exhibiting enhanced capabilities.

Maps, the financial modeling and reporting language, uses the virtual address facility of the VAX to manipulate large reporting and consolidation matrices. In addition, financial data bases and reports can be stored and manipulated, according to the vendor.

Intac, the interactive DBMS, utilizes the rapid compilation and execution times of VAX Basic for execution of both its report program generator and its screen formatter/transaction input program generator, the firm said.

Maps and Intac cost $20,000 each for a one-time license fee, or $1,000/mo under lease, with 50% of that monthly price applicable toward a one-time license at any time, a spokesman said. Ross Systems is headquartered at Suite 208, 1900 Embarcadero Road, Palo Alto, Calif. 94303.

'Softool 80' Backs Development

GOLETA, Calif. – Softool 80, a set of tools for software management, development and maintenance, is available from Softool Corp. The product consists of an integrated collection of software tools that are hosted on a conventional computer system to create a software development and control facility.

Softool 80 supports an explicit distinction between the host environment, where software is developed and controlled, and the target environment, where programs are executed, the vendor claimed.

Release 1.1 features short-hand language, structured languages, source code auditor, error detectors, libraries of prefabricated code, testing aids, tracing aids, optimizers, dynamic memory managers, tutorials and interface language, a spokesman said.

Release 1.1 can be obtained off-the-shelf for IBM 370, Digital Equipment Corp. and Data General Corp. computers.

The product is priced between $2,500 and $60,000 depending on the number of tools procured, the vendor said from 340 S. Kellogg Ave., Goleta, Calif. 93017.

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Manufacturing Control Geared to Univac Processors

BLUE BELL, Pa. — A data base-oriented interactive manufacturing control system for use with Univac System 80, 90/30 and 90/40 systems has been announced by the firm.

Unis 80, reportedly usable by non-DP personnel, is said to provide a built-in capability for integrating data, data base management control, data security and recovery and interactive updating of data. Those features are provided by the OS/3 Codasyl standard data base management system DMS, according to the vendor.

The Unis 80 approach is to provide a closed-loop manufacturing system and let the manufacturer choose all or part of the system, a spokesmand said.

The closed-loop system assists in all phases of manufacturing from order processing and inventory status and control to master scheduling and purchase and work order control.

All transactions are entered through terminals, validated and processed immediately into the data base, according to the firm.

The minimum hardware configuration required to support Unis 80 is a System 80 with 524K bytes of main storage, two disk units, one workstation or Uniscope 200/UTS 400 terminal, one printer and one diskette unit.

The minimum 90/30 and 90/40 hardware configuration for Unis 80 is 524K bytes of main storage, expanded control memory, two disk units, one workstation or U200/UTS400, one printer and one diskette unit or magnetic tape unit.

With first customer deliveries scheduled for December, the minimum System 80 hardware configuration is priced at $87,325 or $1,884/mo on a five-year lease. The software license fee is $500/mo including support.

Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

Service Analysis Meet Set

PRINCETON, N.J. — "Data Administration and Data Dictionary" and "Service Analysis" are the two seminars featured at the first annual Service Analysis User Group Conference organized by the Performance Development Corp. (PDC). Offered in two locations — New York on Sept. 26-27 and San Francisco on Oct. 24-25 — the conference is aimed at current and potential service analysis users.

The "Data Administration" session is intended for DP management, project leaders, senior application designers, lead programmers and business analysts who desire a better understanding of application systems for both data base and non-data base applications.

Registration is $495 per seminar, $875 for both. Each additional company enrollee receives a $75 discount. Details and hotel reservations (not included in registration fees) are available from PDC, Building P, 1101 State Road, Princeton, N.J. 08540.

Bottom-Up Method Advised

(Continued from Page 47)

into one pile.

At this first level, you learn many details about the system, but it is at the second level that you start to organize this information into logical sections. Level 2 steps involve the following:

- Establish logical sections of documentation allowing a minimum amount of duplication from section to section. Remember, this is not a user manual developed with the user in mind and organized by applications.
- Write the program index for each section including the program number and description. List in alphanumeric order, matching the same order as the program narratives.
- Draw the subroutine cross-reference for each section. Set up the calling program numbers down the left side of the page and the called subroutine numbers across the top. Mark an "X" where the row and column intersect connecting the two.
- Write the report cross-references for each section, including the name of the report, report number, print program number and data-extract program number.
- Draw the file cross-references for each section. Set up the files across the top of the page and the program numbers down the left side. Mark an "X" where the row and column of the two intersect.
- Draw the working storage Include Name cross-references for each section. Set up the include names across the top of the page and the program numbers down the left side. Mark an "X" where the row and column of the two intersect.

Third-Level

Steps involved in the third level of documentation — section logic and summary — are as follows:

- Draw the section flowcharts. By now you should have a good idea of the logical makeup of each section. The section flowchart should contain every program, every file and every report included in that section. The subroutine cross-reference, the file and Include Name cross-reference and the report cross-reference will provide much of the information needed to develop a good flowchart for each section.
- Write the section descriptions. The section flowcharts and the other sectional documentation already prepared should aid greatly in writing the section description summaries.

The fourth level of documentation — system logic and summary — involves the following procedure:

- Draw the system flowchart. Now that you have completed the section flowcharts and the section summaries, you should have a good idea of how all the sections together contribute to the logic of the total system.
- Write the system narrative. Using the system flowchart just developed and the section summaries, summarize and write the system narrative.
- Write the table of contents and glossary.

Now comes the review stage. At this point, assemble the review team for an overall look at the rough draft of the documentation. Each member of the review team should take one section of the documentation — preferably the one that he is most familiar with — and review it in depth.

Review each section individually with the team member responsible for that section and address the member's question list as well as the question list you put together on this section. The review team should then be reassembled to review all additions, changes and deletions to each section.

The final product should be presented to and critiqued by the review team before being distributed to management and staff members for use.

Harding is director of computer services for Agrimetrics Associates, a Richmond, Va., firm specializing in measuring cost and performance.

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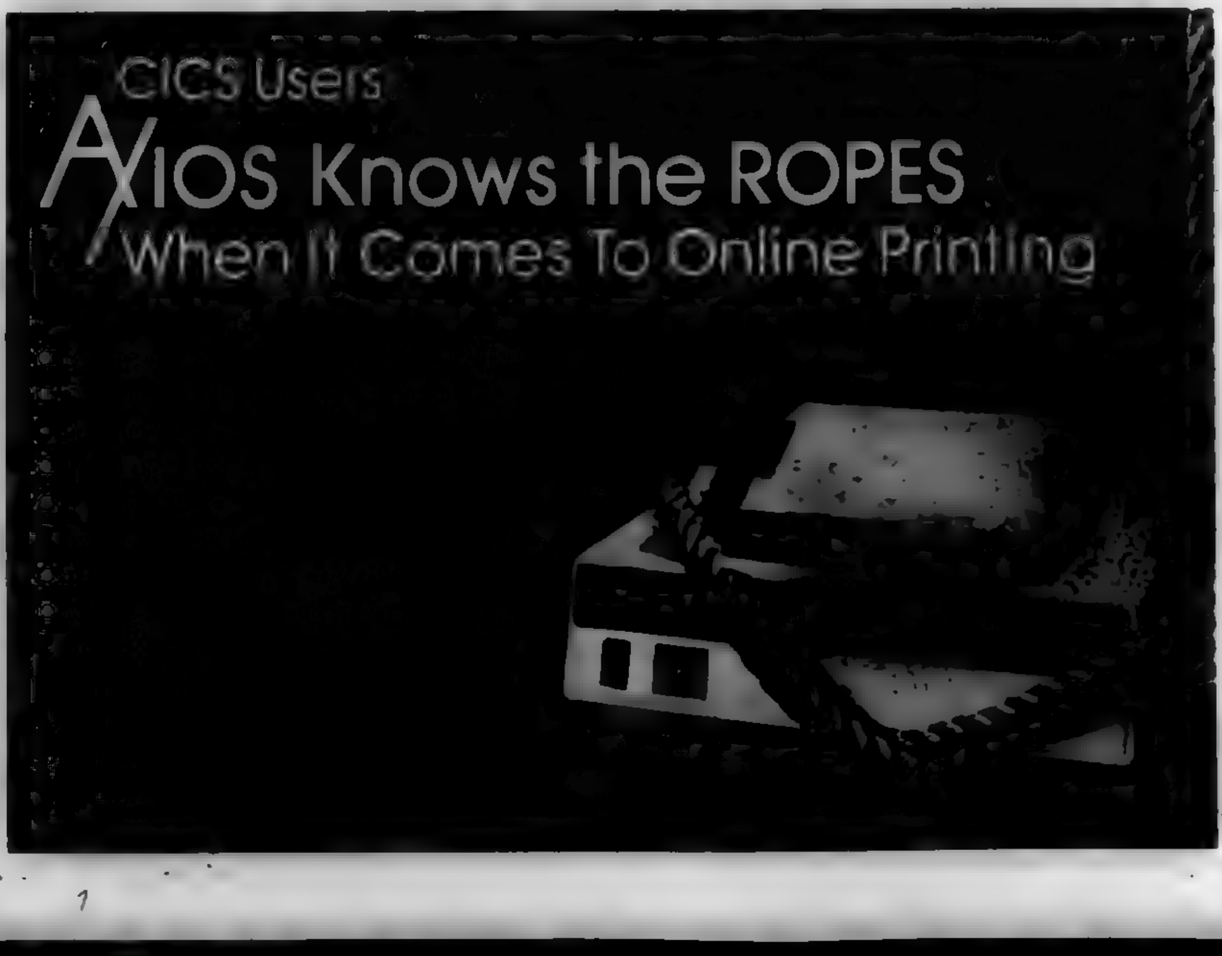

Productivity Tool Aids TSO-Based Programs

SAN FRANCISCO — A programmer productivity tool for IBM Time Sharing Option (TSO)-based application programs is available from Diversified Programming Services.

Saint is a screen maintenance and mapping program that is said to allow programmers to design, develop, test and update screen and print images directly from an IBM 3270-type CRT terminal.

The package reportedly allows users to define their own screens, and permits the development team to prototype the system without coding a single line of code.

In addition, Saint is said to decrease the time required to create and maintain 3270 screens from days to hours.

All screen and print images are stored by name and thus can be retrieved by utilizing the "get screen" facility of Saint, according to the vendor. Because Saint automatically generates copy code of the screen or print images, coding errors in these image descriptions are eliminated, the firm claimed.

Saint includes a mapping subroutine that allows an application program to map data fields to and from a 3270 without elements such as macros and assemblies.

Under TSO, the mapping and terminal functions have been combined into a single CALL to retrieve screens, placing them in character areas and returning control to application programs.

Saint is available on a free 30-day trial evaluation license. The one-time license fee is $12,500, with lease plans available from the firm at 85 Sotelo Ave., San Francisco, Calif. 94116.

Unix Version 7 Adapted By Xenix for 16-Bit Micros

BELLEVUE, Wash. — Microsoft is offering for 16-bit microprocessors Xenix, an adaptation of the Version 7 Unix operating system from Bell Laboratories.

Xenix is an interactive, multiuser, multitasking operating system that will run on advanced microcomputers including Intel Corp.'s 8086, Zilog, Inc.'s Z8000 and Motorola Corp.'s M68000 as well as Digital Equipment Corp. PDP-11 minicomputers, the vendor said.

All existing Microsoft system software — including Cobol, Pascal, Basic and DBMS — will be adapted to run under Xenix. All software compatible with the Unix operating system will also run under Xenix, the vendor noted.

Written in the C programming language, the operating system is said to be easily transportable to different microprocessors.

Xenix will be available in October and costs between $2,000 and $9,000 depending on the number of users, the vendor said from Suite 819, 10800 N.E. Eighth, Bellevue, Wash. 98004.

System/34 Gets Menu Enhancer, Display Packages

LUDLOW, Mass. — A menu enhancer introduced by Computer Technologies, Inc. reportedly allows users of IBM's System/34 to modify items on standard menus to highlight, reverse image, underscore, blink or a combination of the above.

The package is being offered for $350, with full documentation.

In addition, Computer Technologies is offering a line of packages to display customer open items for accounts receivable, a display of customers by selected last name and a combination of these two items.

The combination allows the user to enter a last name, or part of a last name, display all customers with the selected name and then display a selected account for receivable information.

The open item display costs $1,200, the name search, $500. The combined display is priced at $1,850.

Computer Technologies can be reached at P.O. Box 259, Ludlow, Mass. 01056.

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SHRINK Software by Informatics.

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'Safer' Eases Student Aid On HP 3000s

GAITHERSBURG, Md. — Several software packages designed to facilitate student financial aid determination and processing for Hewlett-Packard Co. 3000 computer users are available from College Student Financial Aid Services, Inc. (CSFAS).

The Student Aid Financial Evaluation and Recordkeeping (Safer) system is aimed at financial aid processing for institutions of higher learning. Cost for the package is $7,500.

The Student Online Output for Needs Evaluation and Recordkeeping (Sooner) software computes the estimated financial need and BEOG index for a potential college student directly from his Financial Aid Form. Sooner costs $1,000.

College Assistance for Students in Higher Education (Cashe) is a College Scholarship Search service geared specifically to students in Maryland, Virginia and the District of Columbia. The search, costing $35, is said to include many local scholarships not typically included in national searches.

CSFAS is located at Suite 208, 16220 S. Frederick Road, Gaithersburg, Md. 20760.

Service Assists Auto Dealers

DAYTON, Ohio — Reynolds and Reynolds Co. is offering a service to give auto dealerships information processing control of accounting and parts inventory functions.

The TC 1000/dealer management system offers remote intelligent processing. The dealer's transactions are entered through Reynolds' TC 1000 terminal and transmitted via telephone lines to Reynolds' regional processing center. The transactions are processed into reports and transmitted back through the terminal, the vendor said.

Reynolds will either lease or sell terminals to users. The minimum monthly charge is about $200 for the accounting service and $250 for the parts service, the vendor said. It can be reached at P.O. Box 1005, Dayton, Ohio 45401.

Library System Targets Health Science Users

SPRINGFIELD, Va. — An Integrated Library System (ILS) aimed at health science libraries but usable by any library has been developed by the National Technical Information Service (NTIS) of the U.S. Department of Commerce.

Designed for Digital Equipment Corp. PDP-11, Data General Corp. Eclipse and IBM Series/1 minicomputers, the ILS software runs under Cambridge, Mass.-based Meditech, Inc.'s Meditech Interpretive Information System operating system.

ILS includes a Master Bibliographic File (MBF) that supports all functions — circulation, serials control, acquisitions, cataloging and authority files — and a circulation subsystem that indicates the status of any item.

The ILS package No. PB80-202658 costs $2,000 from 5285 Port Royal Road, Springfield, Va. 22161.

At INCO,

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Inco's DBA tells why ADABAS, Software AG's data base management system, was chosen for the expanding needs of this international firm.

"Five years ago, we chose ADABAS from Software AG as our data base management system. We demanded a highly flexible, end-user oriented DBMS that would facilitate the development and operation of our business systems. We did not have the time to design our own DBMS, or the luxury of selecting a system that would require a large staff to implement and support. We needed an easy-to-use package with the design phase already accomplished. The available studies indicated to us that ADABAS would be the best choice for our needs. Five years of experience showed us that the studies were right – and so were we in choosing ADABAS."

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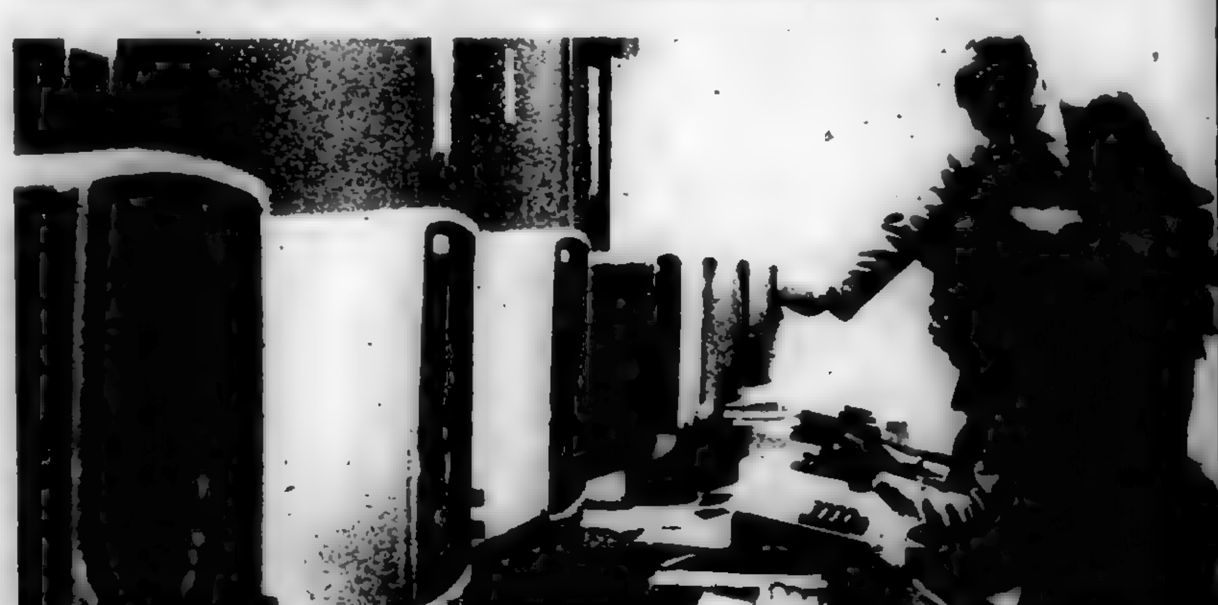
Cost-effective new program development

"In planning new applications, we do not have to include the high cost overhead for restart/recovery, security, or data base



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If you'd like to know more about how ADABAS met Inco's demand for a truly adaptable DBMS, send for Software AG's ONLINE report today. You may find that ADABAS is the ideal data base management system for a demanding company like yours, too.

loading. These utilities are all included in ADABAS already. Applications programming is faster and easier, too – because ADABAS provides the tools. This means we can concentrate on the application problem – not the data base.

"ADABAS gave us a powerful end-user query language – ADASCRIPT+, an interactive report generator – ADACOM, and an online Data Dictionary all in the same package. And recently we have added NATURAL, Software AG's instant applications language, which we expect will decrease development time. Furthermore, the ADABAS system can be fully installed in a single day!"

High company-wide productivity

"ADABAS is up and running at Inco 18 to 20 hours every working day. The system is used daily by literally hundreds of end users and programmers alike. Each day, our New York installation processes more than 400,000 data base commands from departments like accounting, personnel, marketing, customer information, shipping and billing. With all this intense activity, ADABAS is supported by only three people: a data base administrator, a data base analyst, and a data dictionary analyst."

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'UCC One' Tape Manager Updated

DALLAS — University Computing Co. (UCC) has announced an upgraded version of its UCC One tape management software that it said contains a user-restricting security interface and a facility to aid combining or splitting tape libraries or tape management data bases.

Version 4.6 includes support for IBM's system modification program (SMP) 4, allowing users to perform system maintenance using either Superzap, SMP 3 or SMP 4, a spokesman said. The system maintenance utility has also been enhanced to automate the selection and installation of the data management interfaces.

The key aspect of the upgrade is the version's Inquiry/Update function which now has a security interface that prevents users from performing certain functions and, in the case of updating, prohibits them from modifying specific fields in the UCC One data base. When centralizing or decentralizing computer operations, the upgraded package is said to also aid in pulling together or splitting tape libraries.

The UCC One software costs $15,200 from UCC at UCC Tower, Exchange Park, Dallas, Texas 75235.

Free Electronic Magazine Offered for PDP-11 Users

NORCROSS, Ga. — Digital Publications, Inc. has launched an electronic magazine and software-buying service for Digital Equipment Corp. PDP-11 users that offers free information, a software buying co-op, hardware and software product reviews and other user-oriented features.

The 24-hour *Digital Digest* magazine is free and can be accessed via a terminal and 300 bit/sec modem set up for seven data bits, even parity and one stop bit. Basically, the magazine offers an electronic mailbox, a continually updated bibliography of computer-related articles and publications, a reader comments section, an up-to-date listing of the latest DEC products or DEC-related gear, a product review section and a guest editorial column.

For an additional $75, participants can subscribe to the "Digital Exchange," a feature of the magazine that allows users to select and buy needed software at current market values.

If, however, the participant is also a software contributor who submits software to the listing for sale, that subscription is free.

The contributor also receives software-exchange credits for the software in the amount of 1.5 times the average market value. These credits can be used toward the purchase of other software products listed in the Exchange.

For an additional $75, users can join the magazine's Digital Buying Group which offers members the benefits of cooperative software purchases.

Software offered by the buying group is geared for DEC RL01, RL02, RK05, RU58, floppy disk and magnetic tape media.

While the electronic version of the magazine is free, a printed monthly synopsis can be obtained for $15 per year. In addition, memberships in both the noncontributing Digital Exchange and Digital Buying Group can be bought for $125, rather than the usual $75 each initial fee.

Although the service is currently limited to DEC users, the company is presently planning to expand it to users of Data General Corp. gear.

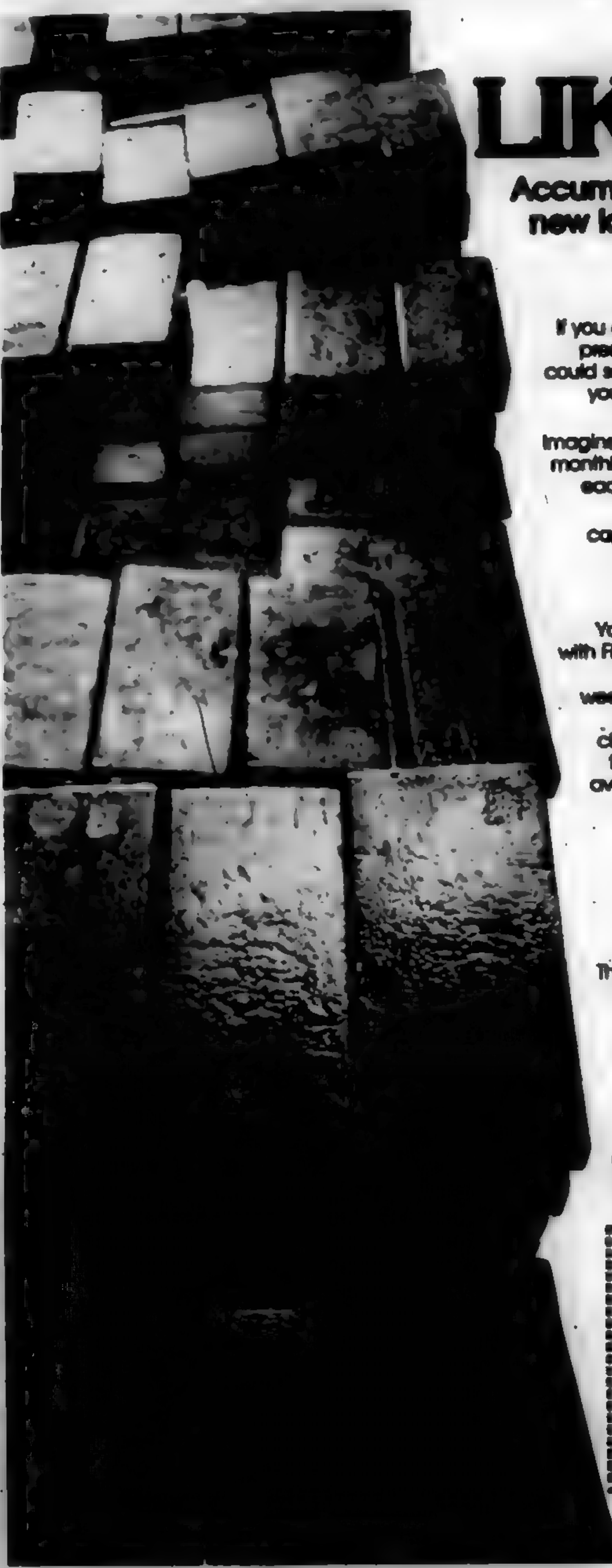
Additional information on the service is available from Digital Publications at 1101 Noble Forest Drive, Norcross, Ga. 30092.

Directory Gives On-Line Listings

SANTA MONICA, Calif. — The "Directory of On-Line Databases" describes all the major on-line bibliographic and nonbibliographic data bases that are publicly available on an international basis through telecommunications networks.

The reference tool, updated quarterly, includes 550 indexed listings.

Yearly subscription rates are $60 within the U.S., $66 in Canada and Mexico and $72 for all other countries. It is available from Cuandra Associates, Inc., 1523 Sixth St., Santa Monica, Calif. 90401.



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Two Utilities for Series/1 Revised

ORINDA, N.Y. – Enchanced versions of EDXREF and EDXDMP, utility programs designed to shorten IBM Series/1 application development time and reduce program maintenance efforts, are available from Legler Systems Co.

The Disk Record Dump (EDXDMP) program has been expanded to include a "FIND" capability where all records in a file can be selected by the user specifying a binary data value or character string that is used to select records to print, a spokesman said, adding that disk and diskette records can be printed by specifying a relative record number.

The Cross-Reference Dictionary (EDXREF) program prints a stored listing of where all data names and labels are used in EDL source programs. The new version can be initiated from a stored procedure automatically, whenever the source program is recompiled, the spokesman added.

Both programs run under the EDX supervisor on any IBM Series/1 processor with a CRT terminal or system printer, he claimed.

They are available for a one-time charge of $95, the vendor said from 23 Charles Hill Road, Orinda, Calif. 94563.

MIS to Hold IBM Seminars

FRAMINGHAM, Mass. – MIS Associates is offering three three-day seminar programs on auditing IBM's OS/VS, DOS/VS and MVS operating systems.

MIS will hold "Auditing OS/VS" in San Francisco, Oct. 6-8 and again in Phoenix, Dec. 1-3. "Auditing DOS/VS" will be hold in Boston, Oct. 15-17 and Dec. 1-3 in Chicago. "Auditing MVS" is scheduled for Sept. 24-26 in San Francisco, Oct. 13-15 in Philadelphia and Nov. 12-4 in Chicago.

Each seminar costs $465, MIS Associates said from 12 Juniper Lane, Framingham, Mass. 01701.

Isam Capability Provided To Fortran Programmers

MANHATTAN BEACH, Calif. – A disk-based file management system that provides an indexed sequential access method (Isam) file capability for Fortran programmers has been announced by Syscon Design, Inc. Available for users of Digital Equipment Corp. PDP-11 minicomputers using the RT-11, RSX-11M or IAS operating systems, the FMX package supports random, sequential, reverse sequential and mixed access modes.

FMX provides random access by matching the key field of a record with that provided by the user, according to the vendor.

The package provides sequential access by maintaining data records in doubly-linked lists, eliminating the need for file restructuring when records are added to or deleted from the middle of a file, a company spokesman said.

FMX is available for a one-time license fee of $14,500, including object code, from the firm at Suite F, 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

J.C. Penney to Host Focus Users Meeting

NEW YORK – Fuse, the newly organized Focus users group, has completed plans to hold a two-day conference here Oct. 6-7 hosted by J.C. Penney. Keynoting the event will be Dan Walkovitz, president of Corporate Management Systems, Inc., who will speak on "Effective In-House Time-Sharing – Fact of Fancy?"

Focus is the data base management system from Information Builders, Inc.

The meeting is open to all Focus users and potential users. Registration for the conference costs $45. More information is available from Bobbi Feldman at Information Builders, Inc., 1250 Broadway, New York, N.Y. 10001.

DOS/VS Terminal Printer Spooling
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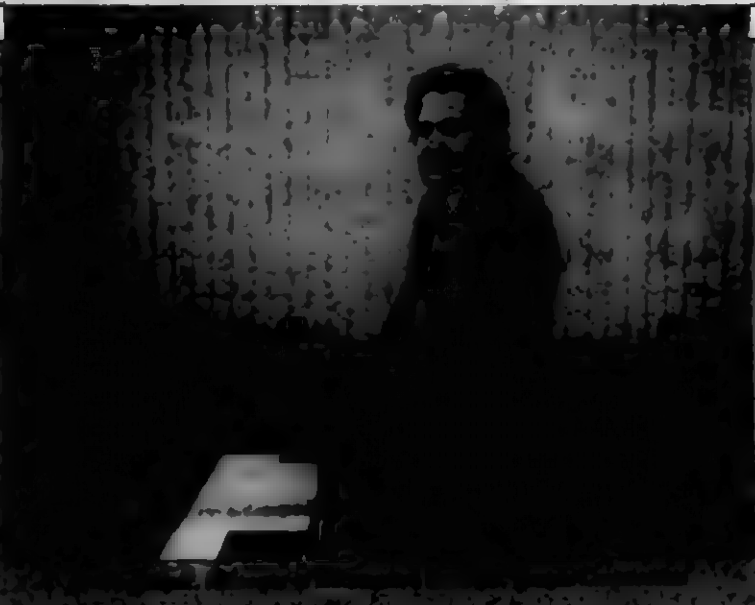

Vought Corporation makes planning fly with IFPS

Vought Corporation, aerospace subsidiary of The LTV Corporation, is a half-billion dollar company which builds military aircraft, missiles and space systems and commercial aircraft components.

Bobby Harper, Vought's Manager of Information Services, recently discussed their use of EXECUCOM's Interactive Financial Planning System (IFPS).

"IFPS was chosen by Vought Corporation in 1976 as our first venture into the area of Decision Support Systems. Comparative studies of products existing at that time proved IFPS to be the only one with a current set of superior capabilities plus unlimited expansion possibilities," he said.

"IFPS has proven itself in direct support of management by providing timely responses to management questions that otherwise would have remained unanswered in the time frame allowed. Applications have been most prominent in the financial areas. However, many significant uses are found in manufacturing, materials, and engineering," he noted.

Uses at Vought include debt planning, debt management, treasury operations, consolidation of balance sheet and income statements, transportation, facilities, and engineering planning and forecasting.

He continued, "Answers to critical questions that once were not available may now be researched in a reasonable time. Analysis of data that required production programs and unacceptable lead time to compose routines may now be obtained in time for decision-making department heads to use it."

The challenge of the 80's requires management support that IFPS now furnishes to over 500 users worldwide. Can you afford to wait?

IFPS runs on IBM under OS and DOS/VS, CDC, Univac, Honeywell, Burroughs, Prime, DEC, Harris, and H-P hardware, and is backed by the best professionals in the business.

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Dibol Report Writer Fits DEC Operating Systems

TAHOE CITY, Calif. – A Dibol report writer that runs under Digital Equipment Corp.'s RT-11, RSTS/E, CTS 300, CTS 500 DBL and TSX operating systems is available from ABC Computers, Inc.

The report writer is said to be capable of creating any type of report from Dibol data files or from Isam files.

The report writer costs $2,000. ABC is also offering versions of the package that are integrated with its job cost accounting package for accounts receivable, accounts payable, order entry/inventory, general ledger and payroll, the vendor said from P.O. Box 7529, 500 Tonopah, Tahoe City, Calif. 95730.

Cuts Development Time

Screen Utility Aids IMS/VS Work

NEW YORK – MFSGEN, an interactive screen formatting utility said to reduce IMS/VS on-line applications development time, is available from PFK Systems, Inc.

The package generates the IFS and application program source code necessary to format, identify and route messages, the vendor claimed.

It also reduces errors, frees programmers to concentrate on application-specific logic and eliminates much of the need for special MFS and IMS DC expertise, the vendor said.

Batch or On-Line

The product may be obtained in batch and interactive versions. The interactive version runs as an IMS DC application on any system including 3270-compatible devices.

The batch version costs $3,200 and the interactive version, $4,000. A tutorial guide is available separately for $300, the vendor said from 120 Wall St., New York, N.Y. 10005.

'Rabbit-4' Protects RSTS/E Files

WEST PALM BEACH, Fla. – A stand-alone data file security system that operates under Digital Equipment Corp.'s RSTS/E Version 7 operating system is available from Raxco, Inc.

Rabbit-4 prevents access to classified or confidential data files by unauthorized personnel and even privileged users, the vendor claimed.

The system logs all attempted file violations and makes them available for analysis. In addition, computer operations and security management may be immediately notified of the file violation attempt, and the offending job is rolled out and killed.

The RSTS operating system may also be disabled until the intrusion is cleared.

Six Security Levels

The system provides up to six levels of security on a present maximum of 64 data files.

Up to 32 wild-card notations define the authorized users for each secured file.

Rabbit-4 is available through a permanent license for $2,500 or rental program for $99 a month, the vendor said from 3336 N. Flagler Drive, West Palm Beach, Fla. 33407.

'System-80' Available To TI Users

PITTSBURGH, Pa. – System-80, the on-line Cobol program generation system from Phoenix Systems, Inc., has been made available to users of Texas Instrument, Inc. computers.

System-80 works off of key words in a data dictionary to produce Ansi '74 Cobol code to perform whatever functions are necessary in a program.

The typical program in any application should take no more than 20 minutes to write, Phoenix Systems claimed.

The full System-80 is available to TI users for a one-time cost of $12,675. Functional modules of System-80 start at $1,625.

Phoenix Systems can be reached at P.O. Box 7849, Pittsburgh, Pa. 15215.

Cincom now offers a complete DB/DC system for your 4331.

That can't be matched in performance–or price.

IBM's 4331 has the potential to offer users mainframe capability at a minicomputer price. But many have already found the performance of the 4331 to be disappointing, simply because the overhead required with DL/1 and CICS overwhelms the CPU. This becomes a critical problem when most new sophisticated applications are based on DB/DC.

Cincom's new DB/DC system enables the user to optimize his 4331 performance with minimal overhead requirements. At the foundation of this system are Cincom's 4331 TOTAL® and 4331 ENVIRON/1®, products whose inherent strengths have been enhanced for the unique operating requirements of the 4331. These include: the Fixed Block Architecture disk drives; the enhancements to DOS/VSE; the system's emphasis on data communications; and potential for distributed processing.

Building on this foundation, users can easily solve every on-line requirement and maximize productivity through the use of Cincom's facilitative software, which includes: LMS-II, our on-line program development system; ENV-DATA, our on-line end user data entry system; T-ASK, our on-line query system; SOCRATES, our data extraction and reporting system; and our integrated Data Dictionary.

In addition, Cincom's fully compatible 4331 DB/DC system simplifies growth from the System/3 and 34 environment to all IBM mainframes and operating systems. This complete solution is important to the first time mainframe user and the user building sophisticated distributed processing systems.

Along with superior performance Cincom's 4331 DB/DC system offers a price advantage designed to meet your unique needs. The data base rental starts as low as $385 per month and the on-line system starts at $340 per month.*

4331 TOTAL, E/1 Performance

4331 DL/1, CICS Performance

For complete details on how Cincom's 4331 foundation and facilitative software can provide you with superior price/performance, write or call Dennis Yablonsky, our Systems Software Sales Manager, at (513) 662-2300.

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2300 Montana Ave.
Cincinnati, Ohio 45211

*These prices apply only to the U.S. and Canada.

Fate Rests With FCC

Two-Way Microwave Link: Race Is On

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. – The weakest link in most data communications systems is the analog local loop connecting the user to a carrier's network. Replacing the analog circuit with a microwave link could improve throughput considerably in many cases.

Until recently, however, there's been a hitch in that solution: While microwave facilities are available in a number of U.S. cities, they cannot be used for two-way data communications applications.

That situation now appears to be changing. Xerox Corp. last year proposed using broadband microwave to support its Xerox Telecommunications Network (Xten) electronic message system.

Early this year, Satellite Business Systems (SBS) indicated it has plans to do basically the same thing, starting early next year with a transcontinental data communications demonstration utilizing a combination of satellite inter-city transmission facilities connected to cable and/or microwave local loops in New York and San Francisco.

And last month, Tymshare, Inc., one of the participants in the forthcoming SBS demonstration, acquired Microband Corp., which operates microwave-based multipoint distribution systems in about 75 U.S. cities [CW, Sept. 1].

UP to FCC

None of these efforts will help data communications users, however, without some action from the Federal Communications Commission (FCC). Basically, the problem is that the commission's present rules limit multipoint distribution systems to one-way-only services.

Typically, these systems deliver commercial TV programs to local community antenna television (CATV) networks. The program is collected at the local termination of an intercity satellite or terrestrial broadband circuit, transmitted by cable or microwave to a multipoint distribution system transmitter and then sent over the air to one or more local CATV nets.

More often, the operator of the multipoint distribution system broadcasts directly to the viewer, who receives the program via a rooftop antenna.

Several months ago, the commission proposed a number of

(Continued on Page 56)

Technique Connects Devices For Local-Area Networks

The Mitre-developed and licensed Bus Interface Unit permits terminals and a variety of other peripheral devices to be connected on a CATV coaxial-cable system to form high-speed local-area networks for such applications as office automation and process control.

BEDFORD, Mass. – A patented digital communications technique that offers connectivity of dissimilar digital devices with low bit-error rates as well as high transmission speeds has been licensed for commercial application.

Such devices as terminals, printers, word and data processors can be connected on a community antenna television (CATV) coaxial cable system using bus interface units employing the new technique. These elements constitute high-speed local-area networking systems that have application in such fields as office automation and process control.

The Mitre Corp. here, which developed and patented the new technique, signed the licensing agreement with Digital Communications Corp. (DCC) of Germantown, Md. DCC, a subsidiary of M/A-COM, has already begun production of an interface unit making use of the licensed technique.

The technique involves operation of a common-channel digital-bus communications system in a carrier-sense multiple-access mode, employing a collision detection feature. The system can accommodate hundreds of connected subscriber devices. The underlying patent was awarded to Gregory T. Hopkins and Paul E. Wagner, both of Mitre.

System Combines Modem And Statistical Multiplexer

ROCHELLE PARK, N.J. – A data transmission system that combines the Timeplex, Inc. Series II Microplexer statistical multiplexer and a 9,600 bit/sec modem into a single package has been announced by the firm. The Microplexer Transmission System (MTS-11) is said to provide "greater economy and convenience" in statistical multiplexing of up to eight asynchronous or synchronous channels.

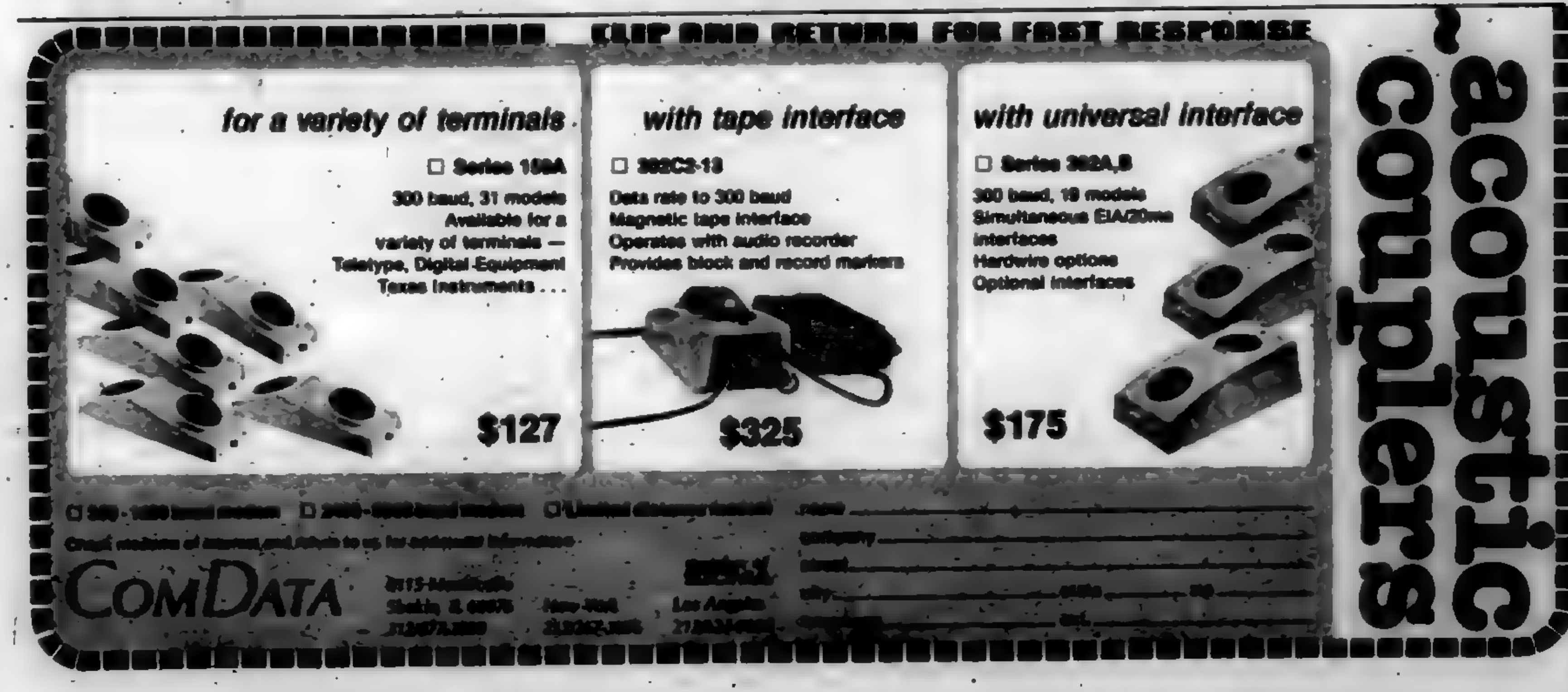
It also reportedly permits parameter programming on a per-channel basis so that many different types of terminals, printers and other peripheral devices can share a single telephone line.

A supervisory port option provides operating statistics that allow monitoring of network performance, according to the vendor. The MTS-1 provides "complete compatibility" for local and remote diagnostics at both the channel and data link levels, a company spokesman said.

The unit features functional displays and fallback to 4,800 bit/sec in the event telephone line degradation prevents operation at higher rates. The system is available in 4- and 8-channel configurations.

The Timeplex Series II microplexer, introduced last year, is a family of microprocessor-controlled statistical multiplexers that transmit and receive data from up to 24 asynchronous and/or bisynchronous data sources.

MTS-1 costs $7,350 for four channels and $7,950 for eight channels from Timeplex at One Communications Plaza, Rochelle Park, N.J. 07662.



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Boasts 'Personality Features'

Terminal Falls Between Intelligent, Smart

ANAHEIM, Calif. — Lear Siegler, Inc. has unveiled a smart terminal that reportedly spans all features falling between conversational dumb terminals and programmable intelligent terminals.

Designated the ADM-31 Intermediate Terminal (IT), the product has microprocessor-based electronics and block mode transmission. Other features include two 1,920-character pages of memory, complete editing capabilities, function keys, visual attributes (reduced intensity, blinking, blanking, reverse video and underlining), numeric keypad, full- or half-duplex conversation modes and typewriter tab stops.

IT has "personality features" which can be modified dynamically at the keyboard to satisfy application needs that cannot be met by other features, according to a spokesman. An example of a personality feature is the terminal's ability to interpret the carriage return code so as to erase to the end of the line before performing the carriage return function, he said.

The cost of the ADM-31 is $1,450. Lear Siegler is at 714 North Brookhurst St., Anaheim, Calif. 92803.

Microwave Link Awaits Action

(Continued from Page 55)

changes in the rules governing multipoint distribution systems. Among other things, the FCC would allow these networks to support two-way transmission services. The outbound link would be the present 6 MHz channel used for TV broadcasts; the return would be a 120 KHz subchannel.

According to the FCC, multipoint distribution systems are now operating or ready to operate in 86 U.S. cities, and construction permits for some 50 additional systems have been awarded. Thus, if the commission implements its proposal, digital broadband local-loop distribution systems could become available quickly throughout the country — particularly since Microband Corp., recently acquired by Tymshare, operates many of these systems.

Tymshare, through its Tymnet subsidiary, is already a value-added communications carrier and will almost certainly use Microband's facilities to extend the reach of the Tymnet network.

According to SBS, however, the value of multipoint distribution systems to data communications users will be greatly diminished unless the FCC increases the bandwidth of the return channel.

A 120 KHz channel would allow users to "acknowledge receipt of information and communicate brief coded messages back to the sending node," but they "could not carry on a true interactive data exchange," the company said last month.

Increased Bandwidth

If 6 MHz return channels were authorized, however, a multipoint distribution system could provide "local data distribution to a number of customers within a limited service area." This greater bandwidth "would have sufficient capacity to support a broad range of user applications, including very high-speed digital data transfers, video teleconferencing, electronic mail and similar applications."

As an alternative to 6 MHz return channels, SBS suggested that the FCC allow operators of multipoint distribution systems to use paired 3 MHz channels for two-way data transmission. "Such an alternative would clearly not provide the same capacity for local data distribution as . . . paired 6 MHz channels," the company said, but this scheme "would be far superior to having only 120 KHz of bandwidth available for a return channel."

FCC staff members are now reviewing the SBS comments. By the end of this year, according to a spokesman, the commission is "likely" to reach a final decision.

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Over-initiation is a case in point. As you add batch jobs or log-on more TSO or CMS users, the increased job load will eventually result in page thrashing and resource conflict. That threshold can be reached long before your CPU is 100% busy.

As illustrated in the graph, a high-speed paging device, such as STC's 4305 Solid State Disk, will dramatically broaden your system's performance range by decreasing its sensitivity to over-initiation. Faster page response time raises your paging threshold while dedicated paging storage reduces contention on your disk subsystems.

A configuration for your system.

Because your system and job mix is unique, your solution will have its own personality. STC is fully prepared to help you discover the combination of paging store and memory that fits your cost, performance, and productivity objectives.

Our 4305 Solid State Disk is available in a range of configurations to fit your Amdahl, IBM or other compatible processor. With 0.3 msec. access times, capacities to 45 Mbytes, and transfer rates to 6.0 Mbytes per second, it's the perfect solution to your paging problems.

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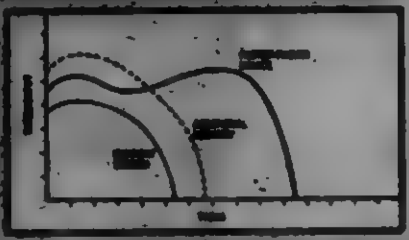
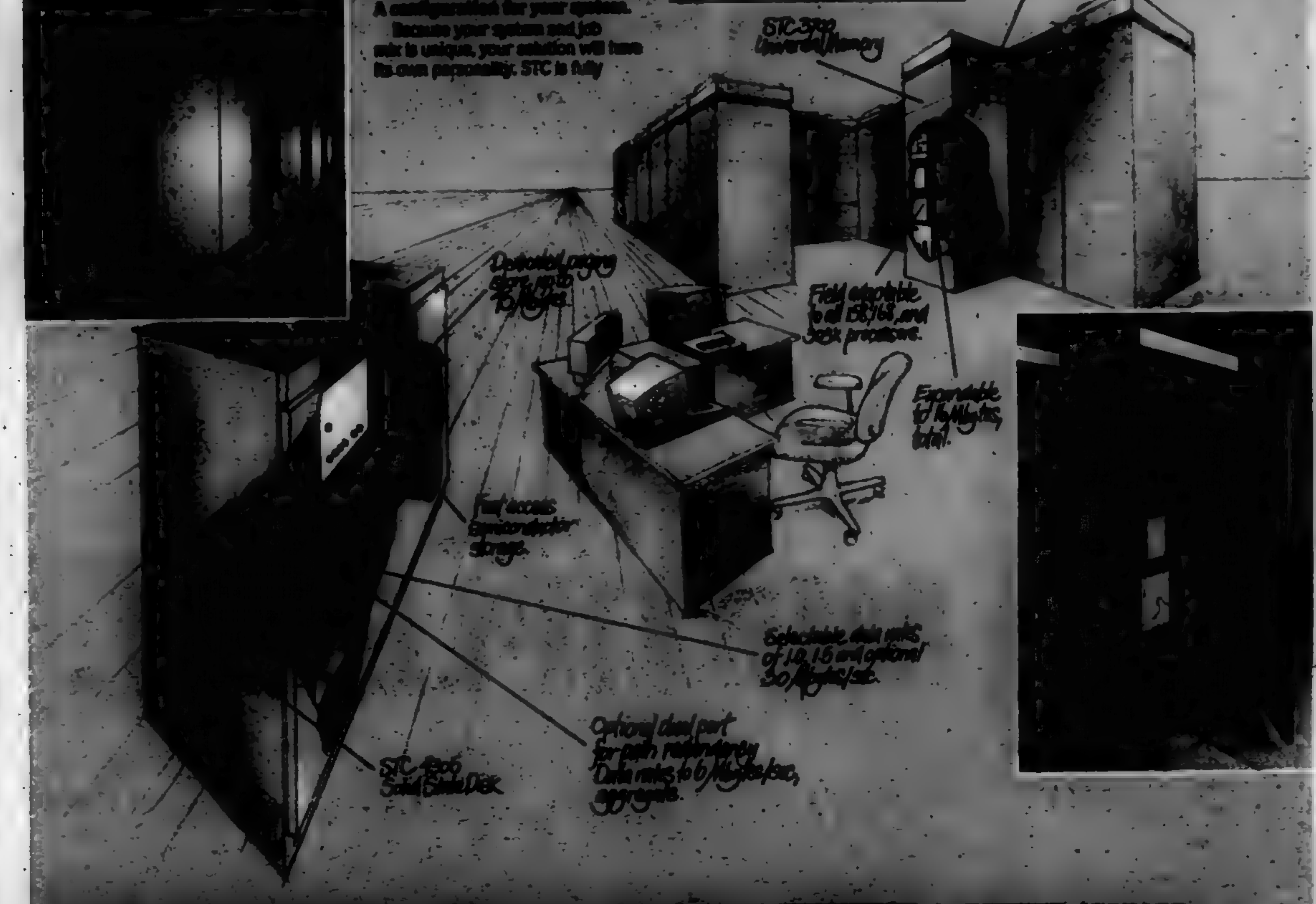
For details, call your local STC sales office. Or write: Storage Technology Corporation, Mail Drop [illegible], 2270 S. 88th Street, Louisville, CO 80027. Phone (303) 673-5151.

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IDS Offers Printer, Two Test Sets

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has introduced a modern eliminator, a printer, a test set and a miniaturized test set.

The Model 6100 modem eliminator was designed to permit the interconnection of terminal equipment without modems. It can be used in either asynchronous or synchronous modes and with terminals configured for half- or full-duplex operation, the vendor claimed. It costs $360.

The Model 2010 programmable digital printer is a thermal printer designed to operate with any IDS modem test set. Features include a presettable real-time clock, six selectable trigger channels and seven selectable print periods. The cost is $3,650.

The Model 1320 data test set was designed to analyze the error rate of any digital transmission network. It can be used to test synchronous, asynchronous or start/stop character-oriented systems such as time-division multiplexers, the vendor claimed. The Model 1320 costs $3,950.

The Model 65/60 miniaturized modem test set was designed to perform bit error rate tests on synchronous and asychronous EIA data communications channels. It contains separate transmitter and receiver sections, allowing full-duplex tests to be performed in either end-to-end loopback configurations, IDS said.

The price for the Model 65/60 is $850, the vendor said from 7 Wellington Road, Lincoln, R.I. 02865.

Testing Units Pocket-Sized

LITTLE SILVER, N.J. — Nu Data Corp. is now offering two electronic testing devices, the Model 920 and 921-T.

The hand-held microprocessor-controlled Model 920 provides data entry or retrieval and testing in duplex synchronous or asynchronous modes.

All Ascii, Ebcdic, Transacode and Baudot codes can be sent or received and displayed on a 16-char., 16-segment display in either alpha or hex format, except for Baudot, which has hex only.

The pocket-sized, battery or ac-powered Model 921 interface test set was designed for field use. It installs between transmitting and receiving equipment to test and identify trouble sources. It uses mark and space signal simulation and provides for the visual display of 11 leads on 13 LEDS, the vendor claimed.

The Model 920 sells for $1,595 and the Model 921-T sells for $220, Nu Data said from 32 Fairview Ave., Little Silver, N.J. 07739.

PE Offers Link

OCEANPORT, N.J. — Perkin-Elmer Corp. (PE) has announced a data communications interface, the 801 Automatic Calling Unit Interface (ACUI), which allows PE's computers to interface with up to two Bell 801 automatic calling units.

Using the 801 ACUI, the computer system can dial any telephone number in the Bell Direct Distance Dial network to establish a data link, PE said.

The 801 ACUI sells for $1,600 from PE's Computer Systems Division at 2 Crescent Place, Oceanport, N.J. 07757.

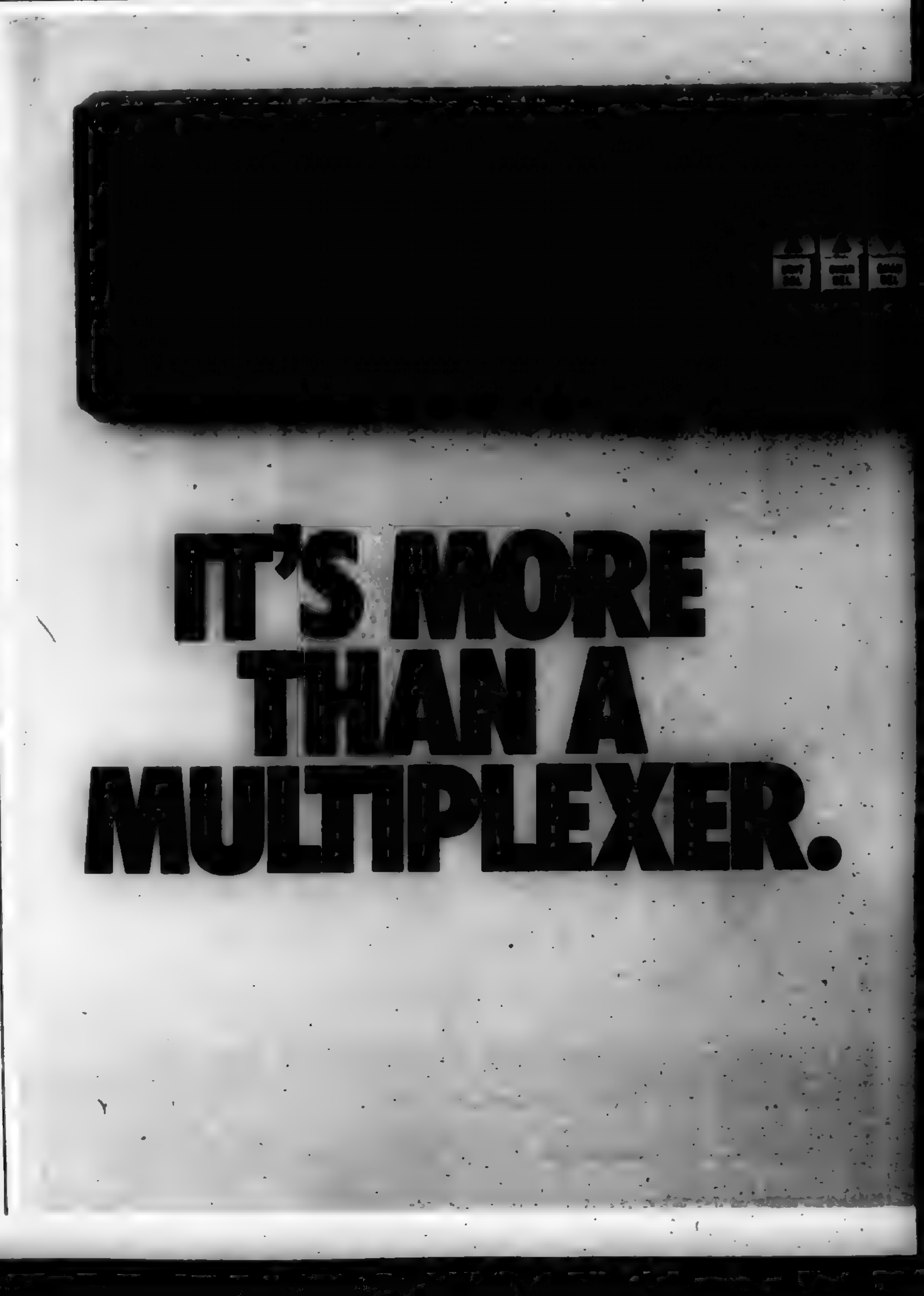
Remote Printers Use Dual Micros

JESSUP, Md. — Digi-Data Corp. has introduced its 2510 series of remote printing stations that use dual microprocessor control to print up to 200 char./sec.

The printers are capable of sustaining a 1,200 bit/sec printing rate and will accept data bursts of 19.2K bit/sec with a buffered RS-232 interface.

The units use a Lear Siegler, Inc. nine-pin matrix print head and have a printhead failure rate of 600 million char. before failure, the vendor said.

The printers are priced from $2,150, the vendor said from 8580 Dorsey Run Road, Jessup, Md. 20794.



CRT Terminals' Keyboards Detach

TUCSON, Ariz. — A series of intelligent CRT terminals that feature detached keyboards and a variety of switch-selectable features have been unveiled by TEC, Inc.

The Series 670 Data-Screen terminals' detachable keyboards incorporate an optional 15-key numeric pad. The terminal's switch-selectable features, also standard, include 10- or 11-bit asynchronous Ascii data bytes with odd, even or mark parity; space code suppression during transmit; and automatic carriage return at the end of line, a spokesman said.

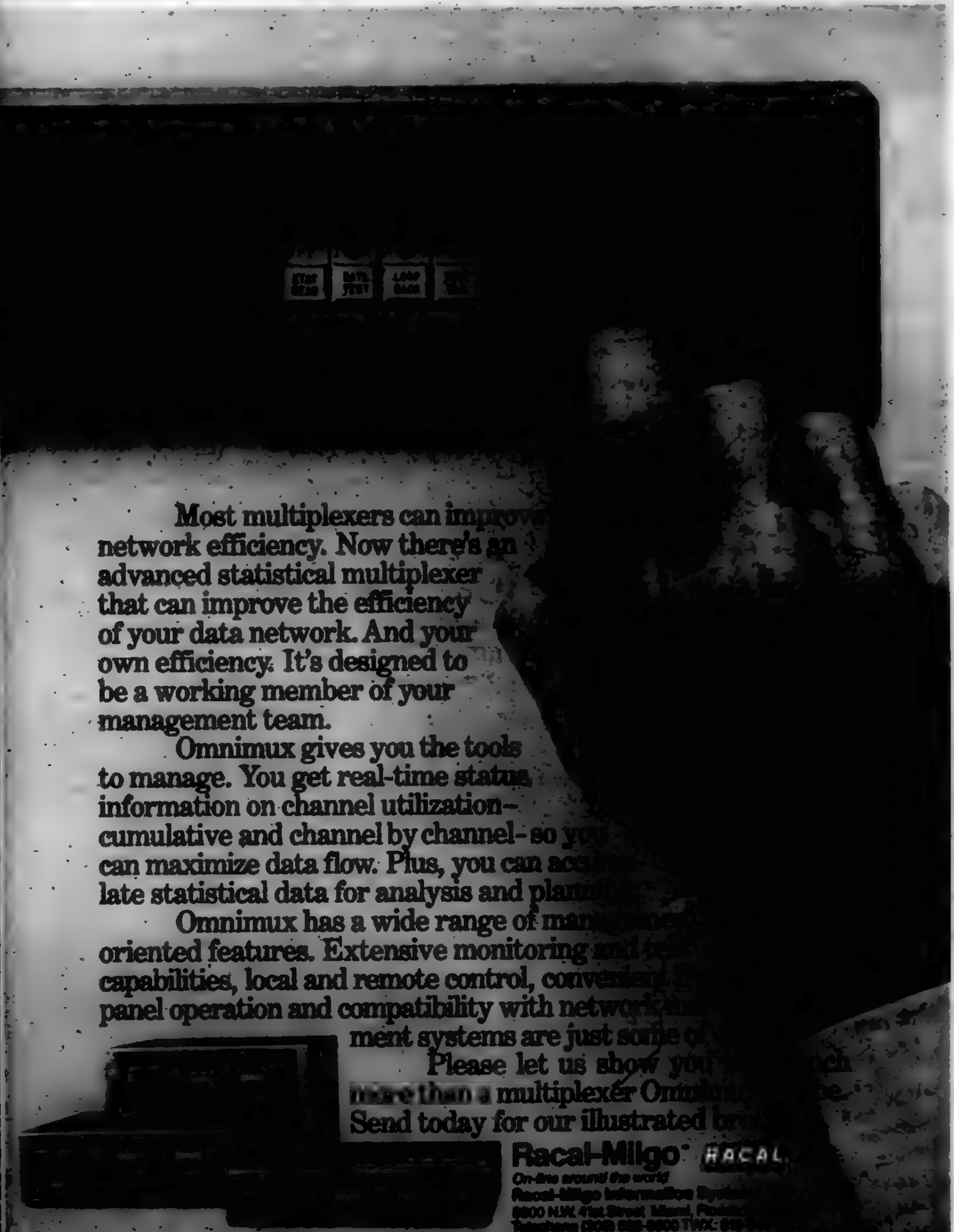
Other standard features include upper- and lowercase with descenders; conversational or buffered data communication capabilities, including line or page transmits at 16 different transmission rates up to 19.2K bit/sec; and software-controlled keyboard lock/unlock and local and teletypewriter keys.

Editing Package

The 670 terminals also have an editing package that consists of insert/delete characters or lines; a complete tabbing capability; and an erasing capability, the spokesman noted.

The terminal also offers a number of options. Included are a buffered or nonbuffered hard-copy adapter, light pen, auxiliary diagnostic test unit, up to two pages of additional memory and a 96-char. graphics set.

The price for the standard 670 terminal, with 12-in. screen and keyboard, is $1,590 with quantity discounts available from TEC at 2727 N. Fairview Ave., Tucson, Ariz. 85706.



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Zentec Adds Generator To ZMS-40

SANTA CLARA, Calif. — Zentec Corp. recently announced an enhanced version of its ZMS-40 user-programmable intelligent terminal featuring an extended character generator and a telecommunications interface that functions in both synchronous and asynchronous modes.

The enhanced ZMS-40 incorporates an 8085A microprocessor, up to 32K bytes of random-access memory and 8K-byte read-only memory and customized firmware and software. Like the original model, the upgraded terminal has a 14-key numeric pad, 12 special-purpose function keys and 16 programmable function keys that operate both in a shifted and nonshifted mode.

A 128-char. generator is standard with the latest terminal, but an expanded generator which displays 256 symbols is also available. The programmable telecommunications interface employs a Zilog, Inc. communications chip that can operate at speeds up to 19.2K byte/sec.

Another option of the boosted ZMS-40 is a hidden attributes feature that reportedly provides off-screen storage of all video attributes and allows any attribute to be changed without using a position on the screen.

The terminal costs $1,720 with quantity discounts available from the firm at 2400 Walsh Ave., Santa Clara, Calif. 95050.

CDI Offers Converter

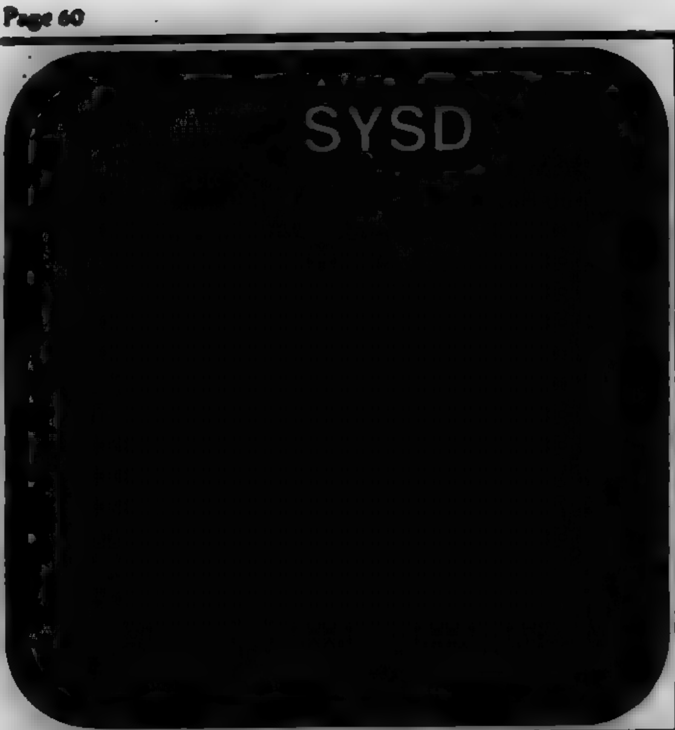
SOUTH HACKENSACK, N.J. — A code, speed and interface converter that can also act as a protocol converter linking two computers, has been introduced by Communication Devices, Inc. (CDI).

The Model 01-13-0090 reportedly accepts an input of current loop or EIA RS-232 and provides an output of EIA RS-232 and/or current loop, complete with battery and loop regulator.

Code translation and transmission rate are firmware-programmed, (erasable programmable read-only memory).

The unit contains 1K byte of random-access memory that is used as a circular buffer to store input or output data when the input transmission rate is higher than the output rate, or when the output conversion contains many more characters than the input data.

The unit costs $700 from CDI at 290 Huyler St., S. Hackensack, N.J. 07606.



Modtech Modem Out

LIVERMORE, Calif. — Modtech, Inc. has announced a limited-distance modem for asynchronous communications over private lines at distances up to 20 miles.

The M-SH1 transmits in full- or half-duplex mode up to 19.2K bit/sec over two- or four-wire continuous metallic circuits.

It connects to any device equipped with an RS-232C or CCITT V24 interface, the vendor said.

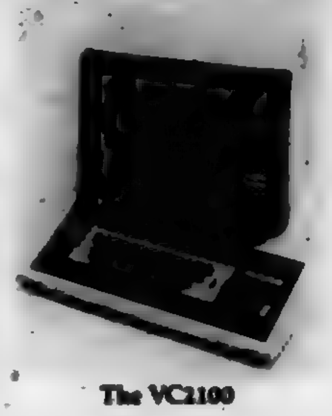
The unit costs $160 from Modtech at 1958 Helsinki Way, Livermore, Calif. 94550.

Volker-Craig Announces VT100-Compatible Terminal

WATERLOO, Ont. — Volker-Craig Ltd. has unveiled its VC2100 CRT terminal, designed for compatibility with the Digital Equipment Corp. VT100.

The VC2100 reportedly offers all the benefits of DEC VT100 compatibility as well as features the VT100 lacks, including microprocessor-based M6801, advanced video option as a standard feature, bidirectional/variable speed smooth scroll, eight programmable keys and local or remote copy, the vendor claimed.

The U.S. price for the VC2100 is $1,900, Volker-Craig said from 333 Metro Park, Rochester, N.Y. 14623.


The VC2100

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Modem Gives 1,200 Bit/Sec

NEW BRIGHTON, Minn. — Multi-Tech Systems, Inc. has introduced the MT212D, an FCC-registered 1,200 bit/sec modem that is compatible with the Bell 212A.

The unit can accept full-duplex operation at 1,200 bit/sec over dial-up and two-wire lines. The unit will operate in an asynchronous or synchronous mode and is available in both a stand-alone or rack-mountable model.

The modem costs $695. Multi-Tech is at 82 Second Ave., New Brighton, Minn. 55112.

Unique Converts to RSX-11M

IRVINE, Calif. — Unique Automation Products, a telecommunications software supplier for Digital Equipment Corp. RT-11 users, is converting its product line to RSX-11M.

Currently, the Remote Job Entry program is ready for delivery. The next offerings will be EZTran, a Decnet alternative, and EZShar, for time-sharing links.

The firm still offers custom programming in the system integration and telecommunications areas for RT-11 and now RSX-11M users, a spokesman said.

Unique Automation Products is located at Suite L, 17922 Sky Park Circle, Irvine, Calif. 92714.

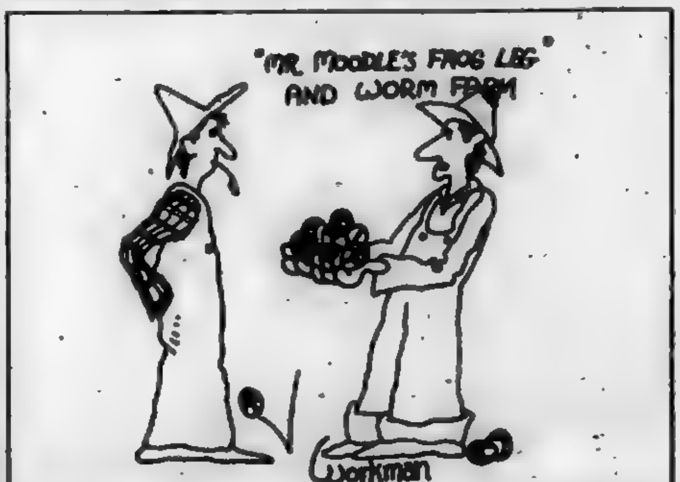
Unit Transmits Stock Orders

CAMBRIDGE, Mass. — A portable order entry terminal for use with the Auto/Mate automotive warehouse computer system that reportedly lets jobbers transmit stock orders in minutes has been introduced by Radix Systems Corp.

The Radix Jobber Order Entry System lets jobbers automatically transmit daily stock orders to suppliers, reducing telephone time and transcription errors. Using the Texas Instruments, Inc. 763/765 bubble memory terminal, jobbers type in stock orders and transmit up to 300 part numbers in 90 sec over ordinary telephone lines.

Capable of storing up to 1,000 line items, the Radix Jobber Order Entry System has an integral acoustical coupler or external modem and a thermal printer that uses no ribbons.

The system is priced at $2,995 from Radix, 675 Massachusetts Ave., Cambridge, Mass. 02139.


"MR. MOODLE'S FROG LEG AND WORM FARM"
Workman

'Computer Eyes' Them Fellers from the City Kept Tellin' Me. Well, Clem, Now What?'

THE PERSONNEL CRUNCH

By Harold S. Bott

Data processing executives face personnel problems in the 1980s that can only be characterized as dangerous.

The reasons are familiar. The backlog for DP applications requires three to five years and is growing rapidly. The increased demand for more applications comes at a time when DP budgets are skyrocketing, turnover is rapid, hiring is difficult and skills deficiencies are great. For many DP departments the personnel shortage has reached critical proportions.

Moreover, the workplace is changing, so motivating employees and properly supervising them will be difficult compared with the '70s.

In addition, some of the major trends in society itself will cause major problems for the DP workplace.

In order to increase productivity, increase job satisfaction and minimize personnel costs, DP management must adopt the new personnel and administrative tools that are emerging. They include executive management of systems, cross functional analysis, training needs analysis, new and better DP department organization, participative management, techniques for better understanding employees and career path planning.

The personnel scenario requires a closer look at these problems and some possible solutions.

Five major social trends will affect DP departments in the 1980s. They are:

- Continued economic difficulties and their consequences for American business.
- The increasing rate of technological change.
- The increasing levels of education and the importance of a college degree.
- Decreasing productivity.
- The changing nature of the work force.

There are other major trends — internationalism, regulation, defense, natural and human resource shortages — but they have much less direct impact on the DP environment.

The Economy

The American economy has not kept pace with the economies of other countries. The 1980 Economic Report of the President showed that the annual growth in gross national product per worker increased less in the U.S. than in other industrialized countries (see Figure 1).

Inflation will continue to rage in the 1980s. Government spending for defense and for social goals will continue to increase as will the size of our national debt. We will, in effect, continue to print money. Our balance of payments will be hurt because Opec and other nations will continue to raise the prices of raw materials. We will continue to experience trade deficits and a slowing rate of increase in our gross national product. Steel and automotive imports will increase; the value of the U.S. dollar will continue to decline.

To make things even worse, we are in the midst of a recession. Stagnation will continue, political leadership will be weak and economic pressure groups will remain strong. There will be uncertain economic conditions in the 1980s, to say the least.

Technological Change

Nevertheless, advances in technology will continue in many industries. In the DP industry, we will continue to see the switch from batch to real-time systems, more sophisticated minicomputers, data bases, data communications and voice communication. Distributed processing will become the norm but with stronger central administration of data. There will be new advanced programming languages which will approach English.

Hardware sophistication will increase in the '80s even faster than it did in the '70s. We may also start to see some standard systems for industries which begin to imply standardization of such items as part numbers. Computer-to-computer communication across corporate lines between vendors and suppliers will increase.

(Continued on In Depth/2)

> *The 1980s will see an exploding DP requirement. It will mean difficult obstacles for DP management to face, but the tools mentioned here will be of benefit in facing those problems.*

Annual Growth in GNP Per Employed Worker
(major industrial countries, 1963-79)

Country	% Change Per Year 1963-73	% Change Per Year 1973-79*
United States	1.9	0.1
Japan	8.7	3.4
Germany	4.6	3.2
France	4.6	2.7
United Kingdom	3.0	0.3
Italy	5.4	1.6
Canada	2.4	0.4

*Estimate

Source: Organization for Economic Cooperation and Development

Figure 1

Output Per Hour of All Persons
(private business sector)

	% Change Preceding Period
1979	− .9
I	−3.0
II	−2.2
III	−1.3
IV	− .4

Source: Economic Report of the President, January 1980

Figure 2

DP Budget

Personnel		46.4%
Hardware		33.7
Other		19.9
	TOTAL	100.0

Source: International Data Corp.

Figure 3

IN DEPTH

(Continued from In Depth/1)

A specific DP-oriented example of this increasing technological change is the office of the future with word processing as its centerpiece. Word processing was invented by the Germans to reduce redundant typing, but it has grown from simply replacing the typewriter to include office automation with smart copiers, machines capable of making images of documents that do not physically exist, electronic mail and computer graphics.

Rising educational levels and widespread popular knowledge about computers will affect the DP departments of all of American business. Not only will more people be receiving higher levels of education, but data processing will grow as an accepted major in more and more schools. Recently, the number of computer science majors has been increasing at a rate of 7% a year. There will be a significant increase in the number of computer science majors in connection with other subjects such as marketing or engineering.

Thus, our users in the '80s will no longer view the computer as a mysterious black box. Doctors, engineers and businessmen all will have had academic and work experience with our capabilities. Many will have experience with computers in their homes.

The increasing sophistication of the user has many ramifications for the management of DP in the '80s.

Productivity remains a problem in the U.S. Last year, according to the President's council of economic advisers, productivity in the private business sector decreased (see Figure 2 on In Depth/1).

Moreover, if one analyzes the data from 1968 to 1977, U.S. productivity increased only 1.9%. This is a rate slower than that in France or Germany and slower even than in Great Britain, where some say that the popular wisdom is that workers really don't work very hard.

There are many reasons for this decreasing productivity. The increase in the consumer movement is one. The slowdown in capital formation and thus in research and development expenditure is another. In 1964, research and development consumed only 3% of the gross national product. By 1977, however, it consumed only 2%. Moreover, there is a new attitude in our work force concerning mobility and especially toward work itself.

Changing Labor Force

A final major trend is the changing labor force. In the 1980s more women will be graduating from college and entering the labor force. Many older women, having reared their families, will reenter the work force. These women often will have college degrees, but in fields other than those in which they choose to reenter.

Among men, there will be a significant number of mid-life career changes. Loyalties which once were to the corporation will be more toward the profession. Thus, new workers will have new values and even loyalty to their employers.

These are the trends that we anticipate in the '80s and in many respects they are a continuation of the trends of the '70s. They will have a major impact on the way in which DP can function within organizations, and each has specific consequences for DP management.

Impact of Social Trends

Social trends will impact the DP department with increasing budget problems, training needs, user demands, changed employee personal goals, turnover and the possible growth of unions.

In the economic arena, the impact of economic problems on DP organizations will be significant. DP budgets have been growing at 14% a year from 1974 to 1980. With inflation, they will grow even more rapidly. Personnel costs and the costs of outside consulting have risen at 15% yearly. The cost of application software has increased 31%, and salary levels are rising rapidly. International Data Corp. (IDC) breaks down the DP budget into three categories (see Figure 3 on In Depth/1).

In the '80s hardware costs will continue to decline somewhat, but personnel costs will rise more rapidly. Thus, proper control over DP personnel is the number one problem that DP managers will face. It will be a greater problem than those related to hard-

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ware planning or software planning. The problem of controlling DP personnel will be even greater as many DP-oriented personnel will become members of user organizations and distributive environments rather than of a centralized DP department.

Skills Deficiency

The increasing rate of technological change will make keeping up with the state of the art very difficult. A DP organization must be technically current or it will be left behind. Its personnel must be familiar with the latest hardware and software.

With the knowledge of DP resident in many functional areas throughout a company, the demands on the DP department will be even greater. This poses a significant problem for many small- and medium-sized companies that made costly systems changes in the '70s, but did so without modern tools such as data bases. Conversions to integrated data bases will be very expensive. It will be very difficult for these companies to undertake another major upgrade in their data base because of the great pressures already on corporate profits in such companies.

This increased rate of technical change will mean an even bigger distance between the skills that are available and the skills that are needed. Obviously departments must not only maintain current skills, they must gain skills in the new technologies that are now upon us — distributed processing, security, distributed network design, data communications, voice communications, multiple hardware environments and microcomputers.

In addition, it will be necessary to understand new services that are available. Remote processing, for example, is increasing at 17% per year. Interactive remote processing using data base is increasing at 25% a year. The use of remote external data bases such as freight rate data bases is increasing. Many new types of application software are now on the market and departmental management should be aware of them.

The impact of these new technical requirements will be significant. Managers must have new processes to control the skills available and the skills required. Management skills to control the new, more complex environment will be critical. Managers must enhance their skills in planning and project control, to mention just two important areas.

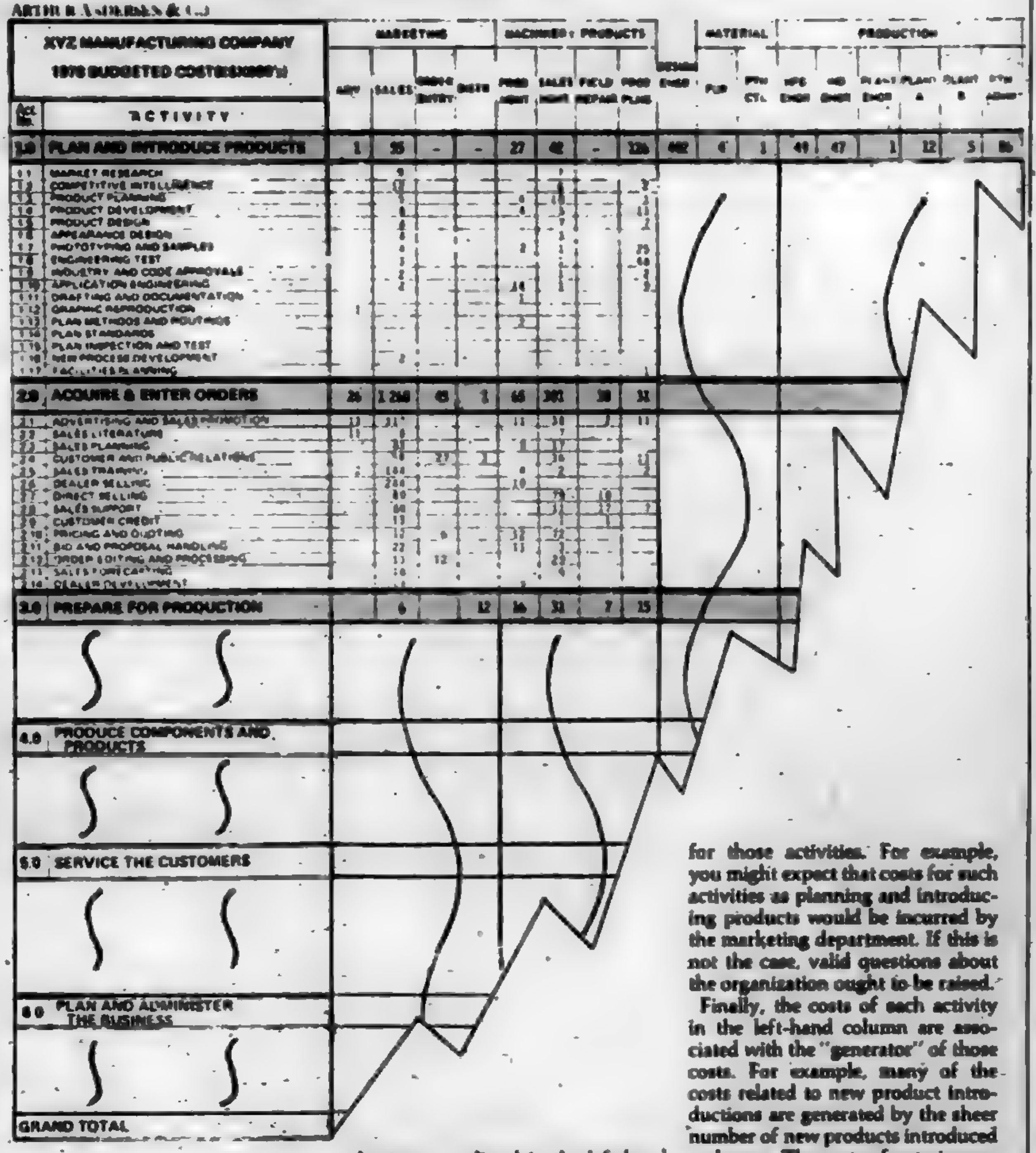
Increased Educational Demand

The effect of rising educational levels on the DP department will be significant. First, there will be a very large increase in the demand for new systems. This will cause DP departments to look more and more to the outside for help in creating new applications.

It is anticipated that there could be as much as a 32% increase per year in application program package utilization (see Figure 4). But many packages contain poor coding since they were

(Continued on In Depth/6)

Cross Functional Analysis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4.0 PRODUCE COMPONENTS AND PRODUCTS
5.0 SERVICE THE CUSTOMERS
6.0 PLAN AND ADMINISTER THE BUSINESS
GRAND TOTAL

Cross functional analysis helps to establish priorities among systems projects.

The technique begins by defining the basic activities of a business, such as entering an order, starting the order in manufacturing and shipping the order.

Typically there are at least 200 such activities in most medium-size businesses, but they are not reflected in the typical chart of accounts. It is possible, however, to associate costs with these activities, even when the costs cross functional lines (as when the company president spends time on a sales call or when a salesman spends part of his time expediting an order).

In the accompanying chart, the various activities required to run the business are listed in the left-hand column. These are the activities that must be accomplished whether or not they are reflected as separate items in the chart of accounts and regardless of which department performs them.

The company departments or organizational units are shown across the top of the chart. Below each department are listed the dollar expenses allocated to each activity in the left-hand column. Total figures by activity are shown in gray.

When all the figures are filled in, the chart can be analyzed. First, a review of the total dollar amounts for each activity is made to see if the total is reasonable in terms of expectations.

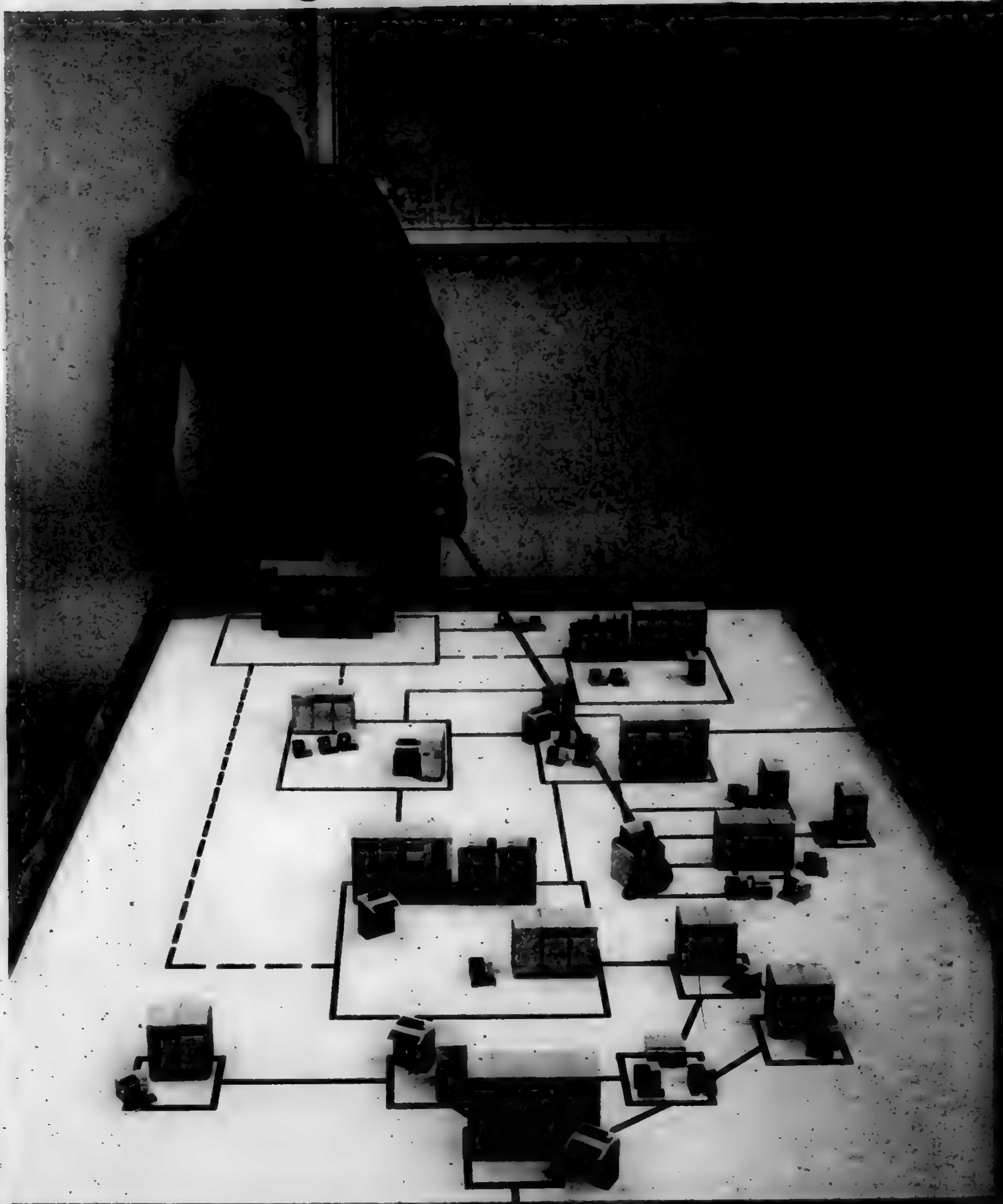
Next, a review is made of the departments that incurred the costs for those activities. For example, you might expect that costs for such activities as planning and introducing products would be incurred by the marketing department. If this is not the case, valid questions about the organization ought to be raised.

Finally, the costs of each activity in the left-hand column are associated with the "generator" of those costs. For example, many of the costs related to new product introductions are generated by the sheer number of new products introduced each year. The costs of entering orders are generated by the number of orders entered and so on.

In these cases, the analyst divides the total activity costs (gray bars) by the number of cost generators to determine the cost per occurrence. Thus, if the cost of order processing is $100,000 and 2,000 orders were processed, the cost of processing a single order is $50. Other activities, such as the cost of reviewing a customer's credit, might also be related to incoming orders.

If the cost of all the activities generated by incoming orders is excessive, a manager might consider how to reduce that cost through better systems or by lowering the number of orders processed through a minimum order size policy.

DEC Datasystems. How to gain the benefits of distributed computing without losing control.



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IN DEPTH

(Continued from In Depth/3)

created before the era of data bases and many have inflexible code. Contract programmers will be utilized at a rate of 10% each year, primarily to help install packages.

It is anticipated that the DP consulting firm practice may increase at about 10% a year and overall the DP budget will continue to rise significantly more than the 15% a year of the late 1970s.

Employees will more frequently find a conflict between company goals and their own personal goals. Although they are initially attracted to DP as an exciting and dynamic field, they will not necessarily remain in the field if their career expectations are not met. Educated personnel with a DP background can be useful in many other fields as well, and they will change fields.

Recent trends among DP personnel are alarming. Recruiting is falling 25% below demand. The sources of recruiting are drying up. There are fewer responses to ads; jobs remain open for longer periods of time. Any trends in the short term to the contrary merely reflect the temporary effect of the recession.

Personnel shortages put more pressure on DP management, which must properly match the skills with the needs. If people are overqualified for the task they are given, there will be turnover. If they are underqualified, there will be lower productivity. Even worse, there will be project failures.

Turnover is a growing problem. A recent issue of *Datamation* showed that turnover was running at about 28% a year on the average, and for programmers, turnover was as high as 34% a year.

This means that most people in a DP department have changed within about three years. Fortunately, there are some oldtimers who remain. But one difficulty is that these people must now be used to train the newcomers rather than work on products. Because of turnover, it is often necessary to overstaff systems projects.

IDC, in a recent study, addressed the problem of turnover. The largest cause of turnover is that programmers can find better jobs. The second largest reason for turnover is related to the change in the work force — family-oriented reasons. Spouses move to new jobs, the jobs interfere with private lives, some people no longer have to work and some dislike having to change locations.

In 1979 DP departments experienced a 10% shortfall in personnel overall and had 17% of their programming jobs going begging. The figure was as high as 17% for communications experts. In 1980 it is expected that DP departments could have as much as 25% of their posts open and in certain geographic areas as much as 30% of their posts open. Increased turnover means productivity loss because of learning curves even when these positions are filled.

Overseas the problem is little better than in the U.S. In Britain, for example, a survey by Urwick Computing found similar shortages. In France the shortage of trained DP people is a matter of state significance and the premiere of France has commissioned studies to determine what can be done to alleviate the situation.

There is a particular problem with respect to programmers. Every programmer wants to become an analyst as soon as possible. Over a five-year cycle, 67% of the total effort in developing a system is maintenance programming. But maintenance programming tends to reduce programmer career motivation.

Maintenance requirements are rising rapidly. According to Input, 1979, about 49% of the programming effort in an average DP department is now new systems work, 45% is maintenance and 6% is administration (see Figure 5). This trend is shifting toward more maintenance on new systems and more modifications to applications programming packages.

At the same time there is huge pressure on DP departments to install new applications. An average department will have a three- to five-year backlog of systems projects, according to one survey. Thus, lower career appeal, turnover and increased backlog pressure tend to cause productivity to decline. Productivity is declining also because processing personnel are seeking ends other than those related to output.

More educated users make higher de-

What's the difference between BASIC and Pascal?

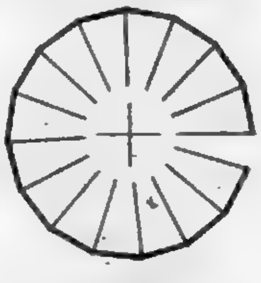
COMPARE THESE APPROACHES TO DRAWING A CIRCLE

in BASIC

"This is easy . . ."

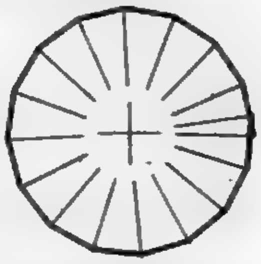
```
100 MOVE R,O
110 FOR T=O TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```

"Oops, didn't quite meet . . .



. . . but that's easy to fix."

```
100 MOVE R,O
110 FOR T=O TO 360 +25 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```



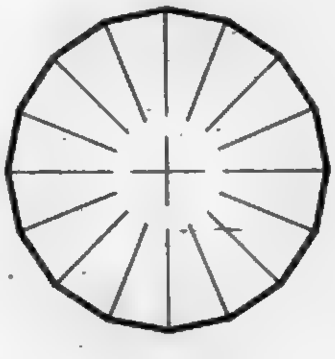
"Ok, now it closes . . . in fact, it overlaps."

Programming by trial and error

in Pascal

"The simplest circle drawn with line segments is a regular polygon . . ."

```
procedure Circle (X, Y, Radius: real);
const Sides = 16; Pi = 3.14159265;
var   N : integer; Theta : real;
begin
  Move (X+Radius,Y);
  for N : = 1 to Sides do begin
    Theta : = 2 * Pi * (N/Sides);
    Draw (Radius * cos (Theta) + X,
          Radius * sin (Theta) + Y);
    end;
end;
```



Programming by design

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mands for new systems. More educated DP employees seek not only more satisfaction in the work itself, but also achievement, recognition, responsibility and advancement. DP personnel now want to participate in job-related decisions that affect them. They are no longer satisfied with authoritarian or paternalistic styles of management. DP personnel are becoming reluctant to accept second- or third-shift assignments or weekend work.

The growth of unions is possible with the changing nature of the labor force in the '80s. Today, unions are not widespread in DP. Unions can affect the flexibility to move analysts and programmers around as the need arises. They can result in even higher pay and benefit demands. Unions can insist that promotion be on the basis of seniority rather than merit. Thus, it is possible that unionism could increase the cost of DP and make efficient management more difficult.

In summary, these social trends will make management of DP personnel in the '80s much more difficult. We can look forward to increased personnel costs, significant technical innovations, a growing disparity between skill needs and skill availability and between company and individual goals. We can foresee an increasing backlog of projects, increasing employee turnover and, perhaps, more unionism. There is an absolute need for better personnel management tools to help solve these problems.

Possible Solutions

What are some of the personnel and administrative tools that may be useful to DP managers in the '80s?

The first is a job classification and pay system. If salary ranges are too high, excess cost will be incurred; if they are too low, there will be costly turnover. A job classification and pay analysis can ensure that salaries paid are commensurate with the skills and responsibilities of the various individuals in the department.

Job classification levels are determined by assigning points to such factors as the importance of the relationships required, the amount of education required and the experience required. Then current positions are inventoried in terms of job points, placed in classification groupings based on point totals and present rates of wages and salaries are associated with the classifications. A pay plan is developed based on a salary survey for jobs of like responsibility in the community as well as on the basis of company financial constraints.

A program for periodic review of jobs and performance in the jobs is developed, and then the entire class and pay scheme is implemented. Class and pay systems help ensure that wages are commensurate with responsibilities and with the market.

Executive Role

Due to the increasing costs of DP in a difficult economy, it is important that executive management be involved in DP decisions and that it support them. An approach described as the "executive management of systems" focuses on the communications between executive management and DP management (see Figure 6).

Executive management must be involved in organization planning. It must understand proper control of resources and must know proper purchasing, vendor and perhaps chargeback and rebilling procedures.

Worldwide Revenues Of U.S. Independent Software Suppliers
($ Million)

	1979	Compound % △	1984
Custom	745	10	1,200
Packaged	126	19	296
Systems	335	29	1,192
Applications	459	32	1,852
Subtotal	920	30	3,340
TOTAL	$1,665	22	4,540

Source: International Data Corp. 1980 Briefing Session

Figure 4

Programmer Utilization

Industry Sector	Percent of Use Programming Personnel New Program Development	Percent of Use Programming Personnel Existing Program Maintenance
Discrete Manufacturing	56%	41%
Process Manufacturing	51	43
Transportation	48	46
Utilities	46	53
Wholesale Distribution	51	41
Retail Trade	64	29
Banking & Finance	39	51
Insurance	42	51
Services & Other	48	46
Average	49%	45%

Source: Input EDP User Panel, 1979

Figure 5

Executive Management of Systems

Strategy
Information Processing Services (IPS)
  Goals and Objectives
Coordination With Organization's
  Objectives
Review and Approval by MAC
Communication With User Management
IPS Functional Strategy Coordination
IPS Functional Strategy
  Personnel
  Space and Location
  Administration
  Quality Assurance

Planning
IPS Organizational Plan
Annual IPS Budget
Systems Plan Initiation
Personnel Plan
Individual Manager's Objectives
Administration Plan
Quality Assurance Plan

Control
Reporting of Key Control Factors
  Systems Project Status Reports/Exceptions
  Maintenance Activity and Backlog Reports
  Capacity Utilization and Trends Reports
  Service Level Reports
Financial Reporting
Budget/Variance Performance Analysis
Personnel Career Path Tracking
Quality Assurance Reviews
Functional IPS Reviews

Transactions
Performance Results
  Performance Monitoring System
Budget Analysis
Personnel Activity Reporting
Internal Administrative Systems
Audit Triggers
Quality Assurance Exceptions/Follow-Up

Figure 6

Executive management of systems involves summary reporting to help management determine how well DP is doing. It includes procedures to convey management plans and objectives to the DP department in a structured fashion. It involves the development of budgets and the development of measures to evaluate systems projects in terms of timeliness and cost. In addition to monitoring costs, the procedure provides reporting mechanisms so that executive management can be informed of the quality of systems that are being installed and the security of these systems.

Executive management of systems is becoming increasingly important as companies become more dependent on DP systems. There have been recent cases where companies have failed, and the causes of failure have been attributed to DP negligence, such as the failure to back up files properly. To avoid such situations, top management must be involved in critical DP activities.

There are other means of helping to control DP costs in the economically troubled 1980s. One particularly useful tool is cross functional analysis (see box on In Depth/3), which is used to evaluate the priorities of a possible new system or to rank the proposed system with other system proposals.

Project Management Techniques

Management ought to define the major steps for each systems project. At the outset, project management can only define in detail those steps required in the design phase. After the design phase, project management is

(Continued on In Depth/8)

IN DEPTH

(Continued from In Depth/7)

able to detail the steps required for installation, and after installation management is able to detail the steps required for ongoing maintenance. At each of these checkpoints the major steps in the following phase are defined and those steps which are large or have considerable risk are planned in great detail. Planning is done for cost and time. Frequent reporting against both time and dollar plans enables management to monitor the status of the project from the outset and avoid surprises if the project is not progressing well early on.

Department Training

In order to react to the increasing technical requirements, additional training is required in the DP department. Much of this training must be technical and must concern data base technology, teleprocessing, data security, restart and recovery, CRT design, distributed DP, office automation and new programming languages. It is necessary to retrain not only systems people but also users because of the significant amount of turnover in most organizations. Training in the '80s must cover not only the technical subjects developed in the '70s but also the new technologies developing in the '80s.

'The rising level of education of DP people has created a need to change the way work assignments are made. So much maintenance is required that departments need better procedures for assigning maintenance and still preserving stimulating career opportunities.'

Equally important, DP management must be trained in new managerial techniques. These techniques include systems planning, internal control, operational auditing, business fundamentals, accounting, project management, effective presentations, report preparation and leadership. In the 1980s managers must be good businessmen to supervise their departments properly.

Training Needs Analysis

More and more DP departments are looking to the outside to meet their training requirements. At present about 38% of DP training is handled outside the corporate DP department. The reason DP managers are looking to the outside is that outside suppliers frequently have better facilities and can conduct more cost-effective training than the department can.

Often an outside trainer will undertake a formal review to determine the training needs. Such a review is called a "training needs analysis." The reviewer gathers a great deal of preliminary information such as business results, performance and organizational information. He also surveys the perceived needs through discussions with DP management. Once the interviews and the data have been analyzed, a program is developed, not only of technical subjects, but also of functional and managerial training. When the needs have been established, plans are then made to develop training material: how many training designers are required and how many subject matter experts are needed.

Departmental Organization

The increase in applications demand plus new hardware and software technology are pointing up new organizational needs in the DP department. Planning groups that can coordinate the needs for hardware and software are required. DP controllers are needed to work with users on the operating side.

The rising level of education of DP people has created a need to change the way work assignments are made. So much maintenance is required that departments need better procedures for assigning maintenance and still preserving stimulating career opportunities.

One major corporation hires contract programmers to do as much of the maintenance work as possible, leaving its own programmers free for new systems development. Another major corporation rotates new programming and maintenance work on the assumption that after the push of a major new systems installation, personnel are ready for a series of small, less pressured maintenance assignments.

Technology also affects the organization of DP departments. Not long ago the trend was to centralize DP skills and activities because of large central CPUs. Then the trend reversed and decentralization became popular with distributed processing. Currently, the thinking is that a proper mix of decentralization and centralization depends on a number of factors including the corporate organization philosophy, the hardware and whether it is distributed or centralized, and the commonality of user needs and systems.

Interfunctional Coordination

Education has meant more educated user personnel. Distributed processing and the popularity of report generators has meant far greater user involvement in systems development. The days of interaction exclusively between the DP department and the accounting department are over; today many users must interface with DP.

Thus, when projects are undertaken it is necessary to establish proper means of participation for different user groups who will benefit from the project. Executive steering committees of senior executives should often be established to lead new projects. At the working level project advisory teams, which include middle-level members of the user departments and technical DP personnel, are needed. If users are not involved — and if new systems are therefore not accepted — there can be great frustration among DP personnel.

New Productivity Tools

Programming workstations are being installed to help improve programmer productivity. The programmer enters code at a terminal, and in certain situations he can select among parameters and options. Programming workstations allow a programmer to program on-line and eliminate the need for coding sheets, pencils, card decks, docu-

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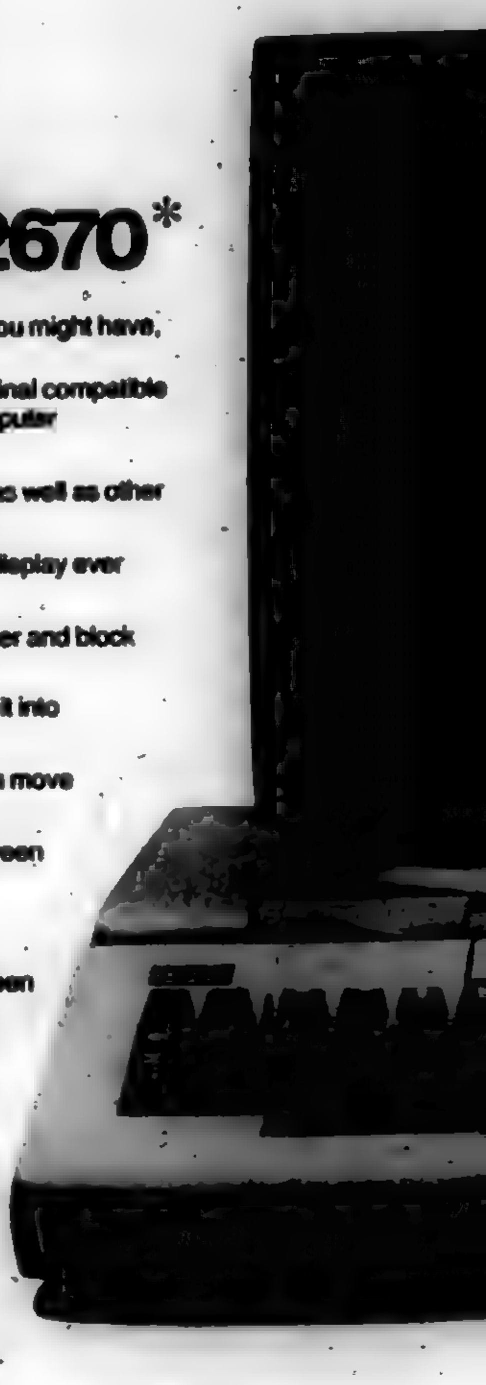

mentation typists and walks to the computer room. Programming stations can speed development and reduce maintenance. They can reduce testing and provide better documentation, better visibility for project management and systems with better security.

There are a whole range of new programming and debugging software aids, such as documenting and flowcharting software, report writers, dictionaries and table maintenance systems. Logic libraries are being conceived whereby coded subroutines can be reused. Employees know these tools exist, and DP management must consider making them available.

Structured systems planning can help make departmental personnel more effective. Such productivity controls as structured project management, formal testing, formal work programs and project status reviews can also help to improve project productivity. In addition, programming standards can be related to actual performance on performance reporting.

(Continued on In/Depth 10)

ASCII two step

2

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IN DEPTH

(Continued from In Depth/9)

New methods of improving productivity relate to the new structured programming and structured design methodologies. These methodologies can reduce programmer time, provide better documentation and lower maintenance requirements. Method/1 is an example of a structured methodology which we think will help increase productivity (see Figure 7). It is a comprehensive integrated approach for planning, designing and installing supportive systems.

Documentation is provided of structured methodologies for explaining detailed tasks, for forms required for each task, for systems documentation aids and for systems management. There are detailed task description and documentation for preliminary systems designs, for systems installation and for production systems support. There are checklists for quality control, outlines of job manager responsibilities and estimating guidelines.

Personal Goals

More educated employees also react better to participative leadership styles. The old leadership styes have to be eliminated. Managers will have to solicit and incorporate employee suggestions in decisions that affect these employees personally. There has been a great deal of experimentation with such styles in Europe and Japan, and American managers have a lesson to learn from their counterparts in these countries.

Management by objectives (MBO) is not a new subject, but it can be helpful in administering the more educated employees of the '80s. In an MBO program, one defines objectives with the employee to suit both company needs and individual needs. Specific steps to achieve the objective are outlined; dates and defined output are documented. Such objectives include work assignments as well as training. Objectives are documented and reviewed periodically. Such a program helps to make the department responsive to both company and individual needs.

Method I
(Various Manuals)
Systems Management
- **Systems Planning**
- **Preliminary Systems Design**
  - —Task Descriptions
  - —Documentation
- **Systems Installation**
  - —Task Descriptions
  - —Documentation
- **Production Systems Support**

Project Management
Maintenance Management
Work Programs
Estimating Guidelines
Project Control Procedures
Quality Assurance
Documentation

Method I is a newly released Arthur Andersen & Co. structured methodology which uses techniques and addresses problems that did not exist a few years ago when systems were far simpler. The structured documentation emphasizes clear and concise communication which can build the important bridge from user requirements to the analyst's design to the programmer's implementation.

Figure 7

Managers can attempt to improve productivity through a genuine effort to improve motivation and to understand their subordinates better. They should start by analyzing employee strengths and weaknesses, their sources of motivation and their career goals. Managers should establish an effective transfer policy so that people are placed in roles where they can be most effective. Managers should maintain records on their key people, plan ways in which they can spend time with them and think through how they can recognize the achievements of their people. Personal attention will go a long way toward improving motiva-

(Continued on In Depth/24)

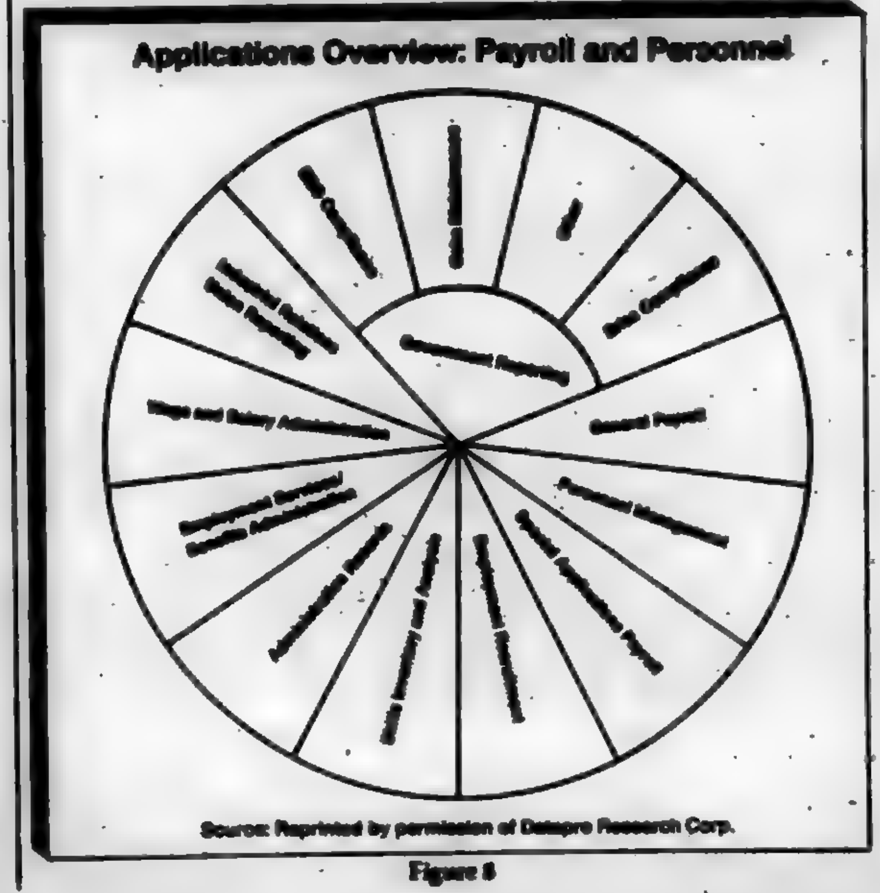
Applications Overview: Payroll and Personnel
Government Reporting
General Payroll
Wage and Salary Administration

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Figure 8

IT'S EVEN EASY TO READ THE FINE PRINT

Outline of Terms of Purchase. IBM 3101 and IBM 3102 Machines.

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INSTALLATION

The Customer is responsible for unpacking, checking out and setting up these machines.

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The Customer may order the first five IBM 3101's and the first five 3102's on a 15-day trial basis. If, for any reason, the Customer is not satisfied with these machines, the Customer may return the machines and pay only shipping charges to the Customer's location. To return the machines the Customer must notify the DPD National Marketing Center within 15 days from the Date of Installation and pack the machines in their original shipping cartons. IBM will arrange for their return to IBM.

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IBM will provide the estimated shipment schedule for this order in writing at the time of order confirmation. IBM reserves the right to amend the estimated shipment schedule as necessary.

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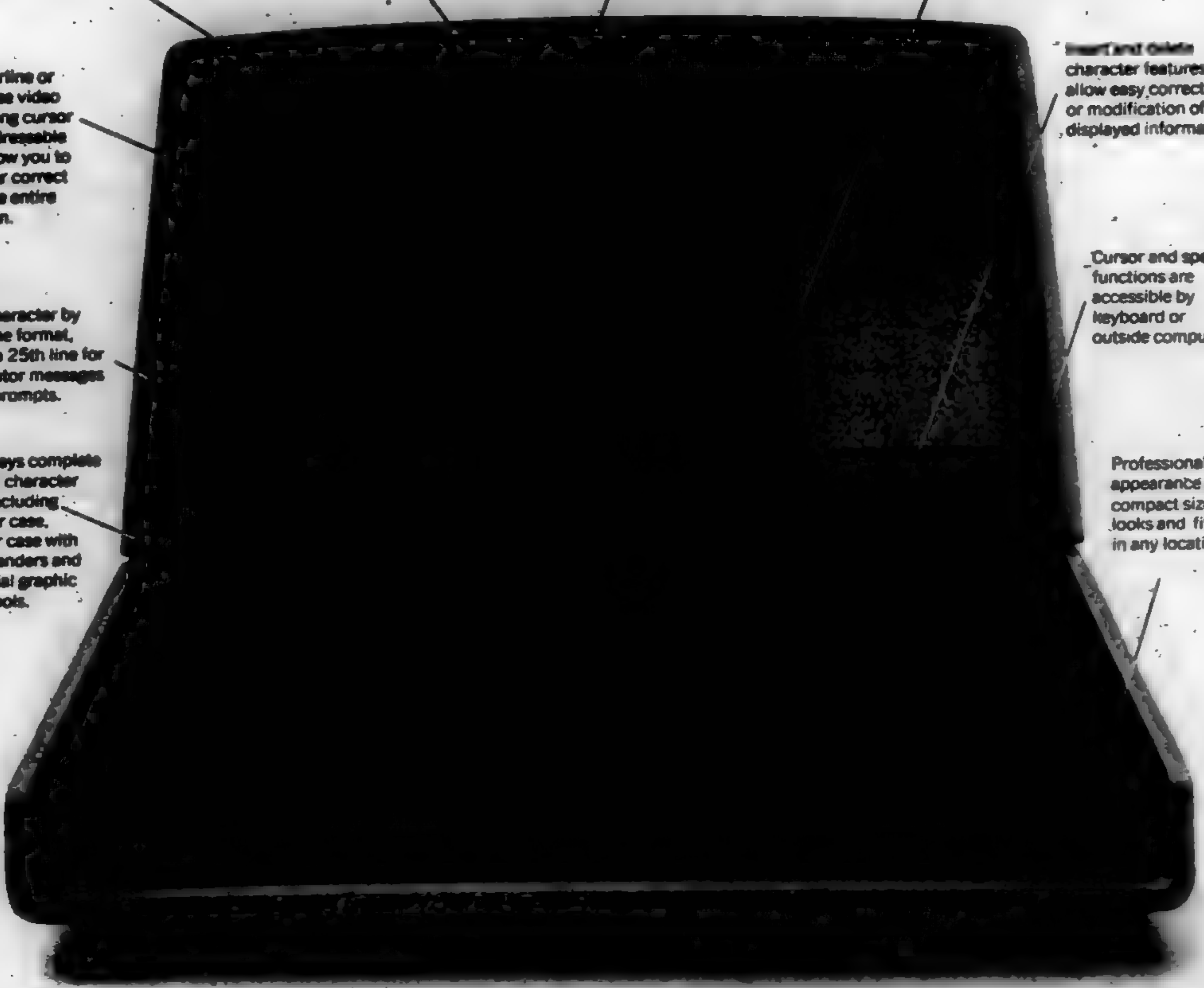

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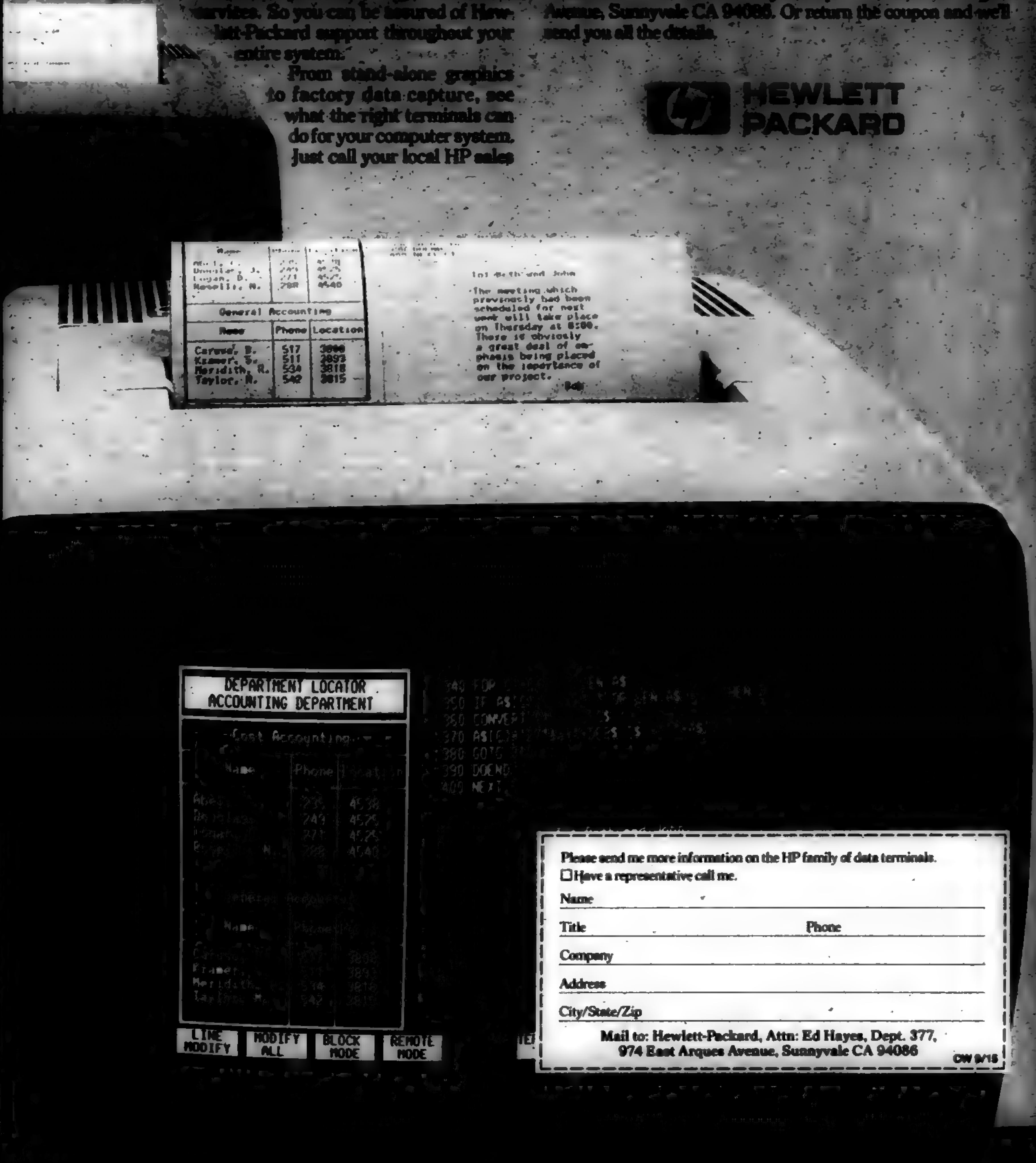

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Kramer, S.	511	3893
Meridith, R.	534	3818
Taylor, N.	542	3815

To: Beth and John

The meeting which previously had been scheduled for next week will take place on Thursday at 8:00. There is obviously a great deal of emphasis being placed on the importance of our project.

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CW 9/15

IN DEPTH

(Continued from In Depth/10)

tion.

In addition, managers must be prepared to react to and use the new personnel practices which will become prevalent in the 1980s: flexible time, sabbaticals, benefits menus and the four-day week.

More formal employee information systems can be helpful in controlling the changing labor force. Figure 8 is an illustration of the modules in a representative employee information system.

Managers are recognizing that employee information that can be obtained rapidly can be extremely useful in making timely staffing decisions. Such systems can result in improved employee morale, since they convey to employees the credibility of the corporation's personal interest in them.

In addition to payroll and labor distribution, such systems may contain modules for benefits administration; wage and salary administration; salary change analysis; Equal Employment Opportunity Commission (EEOC) modules providing numbers of men and women and minorities by job classification; an Occupational Safety and Health Administration (Osha) module providing information on attendance at safety training programs; education and training modules providing courses attended, courses scheduled; career path and skills inventory modules providing skill codes, job potential and job preferences indicated; manpower planning modules providing open posts; and labor relations modules providing union lists and overtime.

Employee information can be automated and should not be maintained in small manual files throughout the company.

Career Path Planning

Another way to address the challenge of a changing labor force is through career path planning. Career path planning can increase productivity, reduce turnover and thereby benefit the organization as a whole. The best qualified people are identified. Training efforts are targeted and assigned to meet organizational needs as well as corporate needs.

Career path planning permits cost-effective training programs which can also benefit the individual. If his career path is known, an employee can develop his interests more effectively. He is less likely to be slotted into positions that do not fit his talent.

Research has shown that career path planning increases employees' satisfaction because they can better see what the future may hold for them.

The first step in career path planning is to organize the program. Each position is defined in terms of its tasks and requisite skills. Various paths of progress are defined. Programmers, for example, might progress from maintenance programming to package programming to custom programming to systems analysis, or they might progress to technical specialists. The skills required for each position are analyzed and the overall level of skill is determined. A network of possible horizontal or vertical career moves is established.

Next, personnel within the department are evaluated. Training needs are identified in terms of catch-up or enhancement, and required training costs are projected. The career path program is then communicated to individuals and made part of an ongoing management system. The products of a career path program are the development of horizontal and vertical paths, job descriptions profiling skill requirements, planned training needs and skill ratings.

In summary, management must adjust to the challenges of the '80s. It must consider new techniques to combat a difficult economy, class and pay systems, new budgeting techniques such as cross functional analysis and the executive management of systems. To address the rapidly changing technical environment, management and technical training is needed. Training needs analysis may be helpful. To address the increased educational levels, new programs for participative management and management by objectives should be considered.

Productivity decline may be arrested through new standards and project controls and through structured analysis such as Method/1. The changing labor force can be monitored more closely through employee information systems and career path planning.

The 1980s will see an exploding DP requirement. DP management will face many difficult obstacles, but the tools mentioned here will be of benefit in facing these problems.

The decades of the '80s will combine danger and opportunity for the DP manager in the motivation and supervision of personnel. It will be a challenging period indeed.

Harold S. Bott is a partner in the management information consulting division of Arthur Andersen & Co., Chicago.

Bott is the managing director for planning and operating information and is responsible for human resources, business planning, profit improvement, materials management, office automation and related service areas.

Bott holds a B.A. degree from Princeton University and an M.B.A. from the Harvard Graduate School of Business Administration.

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"Put It In the Contract!"

By David J. Connelly

The selection of a software program that best fits a user's needs can be — and usually is — a formidable task. The process involves the coordination of a variety of disciplines, each of which may have significant effects on the user's business.

In addition to the technical considerations, the user must also be concerned with the legal consequences of the transaction and associated administrative details.

The selection process is further complicated by the fact that most programs will contain a number of latent errors which may not be discovered until the program is executing in the user's operational environment. As a result, the user's business may suffer significant losses and damages.

Besides problems with the software itself, the user must cope with a variety of issues that are inherent to the software industry. Unlike their hardware counterparts, software companies can be formed with a minimum amount of capital investment. Basically, the initial investment need only cover office expenses, advertising and the cost of developing the programs. The software industry therefore has a much more volatile nature than the hardware industry.

Indeed, the software industry has developed a "revolving door environment" in which companies are continually established and, shortly thereafter, terminated for any one of a number of reasons. Only a relatively small number of software companies will mature into financially stable businesses.

The instability of the software industry presents a major area of concern for the user. The user must be assured of the continued existence of the vendor in the foreseeable future so its software will be serviced. At a minimum, the user will require the vendor to correct any bugs in the software and to develop future enhancements which the user may require.

As a corollary consideration, the user should realize the possibility always exists that its business will incur losses and suffer damages from defective software. If that occurs, the existence of the vendor becomes essential in order to reimburse the user for the losses it has suffered or to join as a party defendant in subsequent litigation.

Anticipating Problems

The problems described above are only a sample of the critical issues a user faces when purchasing a major software program. However, if the user adheres to a comprehensive acquisition strategy, it should be able to anticipate and resolve many potential problems before they occur.

In addition, the user will be able to ensure that it is provided maximum legal protection in the event a dispute with the vendor does arise. Unfortunately, many users segregate the software technical evaluation and selection processes from any associated legal consideration.

In the typical transaction, the user will not consult with his attorney and will not consider any associated legal ramifications until just prior to the execution of the sales contract. History can verify that this approach can only lead to problems and potential disaster for the user. Ideally, the legal considerations should be integrated into each phase of the acquisition process.

Prior to any contact with software vendors, the user must define his processing requirements in a clear and unambiguous manner. Typically, the user's requirements will be contained in a document called the software specifications.

While the generation of this document is a time-consuming and expensive project, it will produce a number of beneficial results for the user. Primarily, it will allow the user to establish a set of standards against which potential programs can be measured.

Natually, the more detailed the specifications, the stricter the performance standards for the program will be. The specifications will also communicate the user's processing requirements to the software vendor.

The source of a great many problems is poor communication between the user and the vendor. The vendor often does not completely understand the user's requirements, while the user expects more performance from the software than it has indicated to the vendor. Many of these problems can be eliminated through detailed software specifications.

The software specifications will also have significant legal implications. Generally, no agreement made between the parties will be enforceable in a court of law unless it is specifically included in the final, written sales contract.

Although this point may appear obvious, it is often ignored or overlooked in computer transactions. Either the user will neglect to produce the software specifications or it will fail to incorporate them into the final sales contract.

Without a standard against which to measure the performance of a program, any program delivered by the vendor that conforms to the general description of the user's processing requirement, contained in the sales contract, will satisfy the vendor's obligations. In order to avoid future problems, the user should incorporate any agreements, including the software specifications, made with the vendor into the written sales contract.

Vendor Negotiations

Upon completion of the software specifications, the user should begin evaluating and selecting a program which can satisfy his processing requirements. Inevitably, as part of this process, the user will engage in some type of negotiation with the vendor.

Negotiations can be informal, involving only the user and the vendor's sales personnel, or formal, involving both parties' legal and technical representatives. Regardless of the formality of the negotiations, it is imperative that the user take minimum precautions during this critical phase of the acquisition process.

The preliminary contact with the vendor will involve his sales personnel. During this process, the user should take care to accurately record all representations which are made. Besides detailing the processing requirements, the parties should also agree to definitions. Any potential ambiguity or misinterpretation should be resolved to the mutual satisfaction of the parties.

At the culmination of the negotiations, all agreements, representations

(Continued on In Depth/16)

IN DEPTH

(Continued from In Depth/15)

and warranties made between the parties will be incorporated into the final sales contract.

Sign With Caution

The user should be extremely wary of signing the vendor's standard contract without first reviewing it for both its legal and technical contents. All vendors have similar sales contracts which secure for them maximum protection while providing the user with the minimum legal protection required by law.

It is essential that the user appropriately modify the sales contract to reflect the realities of the purchase. The contract should be modified to provide the user with equitable protection in the event future problems do arise. Unfortunately, the modification of the standard sales contract is not a simple process and requires a combination of expertise in both the computer and legal areas.

While modification of the standard sales contract may be in the best interest of the user, insufficient modification may be more detrimental than beneficial to him. Any changes made are indicative that the user has examined the standard contract and is satisfied with it as modified.

However, the vendor will often agree to only cosmetic contract changes which do not alter any right or liabilities of the respective parties. The vendor is very aware of the substantive contract clauses which provide him the maximum legal protection. The user can be assured that these clauses will be retained unmodified in any sales contract to which the vendor agrees.

Difficulty for User

Typically, the user will encounter difficulty in determining the modifications required because of the inherent nature of the contract. Basically, the sales contract is an integration of technical consideration expressed in a legal document. In order to understand the legal ramifications of the contract, a person need also understand the software industry and its technology.

The final document will contain a mixture of legal and technical terms. If a contract is to be properly modified, the user must be able to anticipate potential technical problems and provide adequate remedies in legal terms for incorporation into the contract. However, the user cannot segregate either the technical and legal issues from each other. This interdependence of distinct and separate disciplines makes modification of the standard vendor contract a nontrivial exercise.

The need for the user to contractually protect himself is emphasized by the potential damages he may suffer with a defective computer. Clearly, the cost of the computer is not the extent of the damages which the user may suffer; the user must also consider loss of customers and the taint of his business reputation, the cost of purchasing a new system, the cost of retraining personnel and other similar expenses as potential damages.

Estimate of Damages

Realistically, it is not unusual for user's damage to exceed by several orders of magnitude the cost of the computer. Further, the damages will increase substantially if the user can show deceptive marketing practices on the part of the vendor and, thereby, receive punitive damages. In any event, it is evident that the potential damages in this type of suit are extremely high.

In one extreme case, a user purchased a computer for approximately $400,000. After several years of complaining that the computer was defective and was damaging its business, the user was forced to bring suit against the vendor.

The vendor had protected itself from potential liability to the user by limiting its damages in the sales contract. However, the user's attorney was able to prove fraud and misrepresentation on the part of the vendor and thereby voided the sales contract and its associated limitation of liabilities clause. The user received a jury verdict in excess of $11 million for damages. The case was subsequently appealed by the vendor and settled for an undisclosed amount.

Clearly, even with the purchase of only software, the stakes are high and justify due precaution on the part of the user.

David J. Connelly is an attorney with Curry & Connelly, Bricktown, N.J.

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October 6th Info 80 Show Issue
October 13th Info 80 Wrap-up Issue

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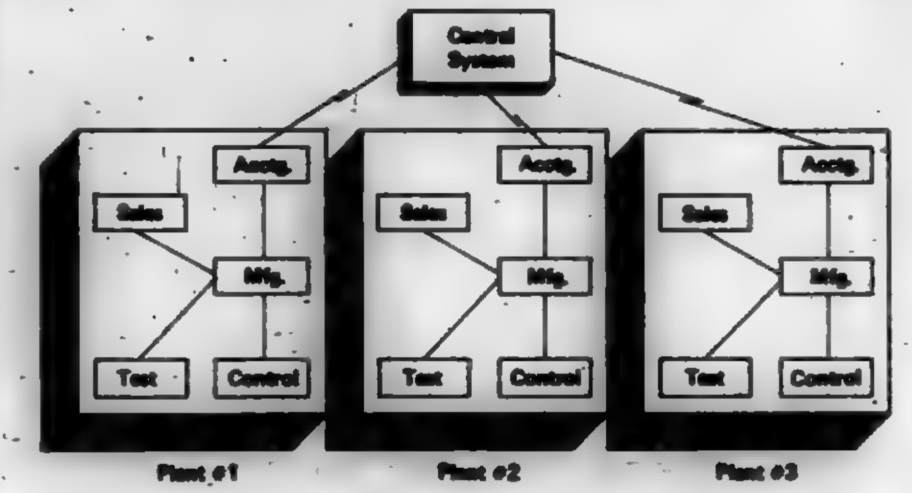
Is DDP Right for You? — Part 2

HP Favors 'Management by Objective'

By Lawrence C. Hartge Jr.
Special to CW

Decentralized management responsibility at the operating level with strong central management coordination — a management-by-objective philosophy — is favored within the Hewlett-Packard Co. organization. Companies with this type of structure and firms that drive profit and loss accountability as far down in the organization as practicality will allow can benefit from distributed data processing (DDP).

This is the last half of a two-part series in which the author outlines five criteria to determine if DDP is viable within various organizational structures. The first two governing criteria — on-line interactive DP and what Hartge calls an "80/20 work load" — were described last week.



Integrated Distributed Processing

In a centralized system environment, divisional managers must accept the central organization's estimation of their computer system costs. However, financial responsibility for the computer can be placed at the divisional level with DDP.

As a result, costs can be directly allocated to the division, and its integrity as a profit or cost center is strengthened. Accountability may be driven even further down the organization if the processing is dedicated by function. This allows areas such as marketing, accounting and production to have maximum responsibility for their computer operations.

No Loss of Control

It is important to recognize, however, that increasing local accountability needs not mean sacrificing central control. Control can be as centralized as is deemed necessary, with a distributed system.

For example, a central location can poll remote sites for data. A network can be configured so that personnel at the central location can activate programs on remote systems without operator intervention. Given the proper password authority, even a satellite can be audited remotely by the central location.

However, an increase in central control is usually accompanied by a rise in communications costs. If economy is a primary interest, the 80/20 rule — 80% of the processing done locally and 20% remotely — should be followed. That is, place the data bases and programs on the systems where they are most used.

Distributed processing has proven to be admirably suited to large companies with a structure consisting of functionally different, organizationally independent geographically dispersed operations. Manufacturing plants, distribution centers and sales offices would be typical examples.

DDP provides flexible and specialized processing for each part of the organization.

Systems can be tailored specifically for each division's applications so that its unique needs are met. The divisions can also exchange information with one another and report relatively inexpensively to the corporate headquarters through a communications network.

Closer scrutiny of possible DDP system configurations indicates that a dispersed company structure is not the only one that can benefit from a distributed network. There are, in fact, two basic system types — one applicable to a dispersed, decentralized environment and the other ideal for a single site. A third type, combining the two, will work in either kind of environment.

Geographical Distribution

First, there is geographical distributed processing. This is the type of system that was initially considered when DDP began to gain popularity. It is characterized by separate geographical sites tied together in an integrated network, often to a central system.

Each computer is dedicated to the same function and a user on one system can both inquire into his own data and interactively access another site's system. The results of the final transaction or summary can be stored locally or forwarded to a corporate

(Continued on Page 62)

Optical Scanner Bypasses Input Step

By Rita Shoor
CW Staff

NEW YORK — An optical scanning system designed to eliminate one of the input steps usually required for automated pattern recognition has been announced here by Auerbach Computer Telephone Corp. here.

Billed as a technology rather than a product introduction and named after its inventor, Dr. Sidney Auerbach, the Auerbach Optical Scanner (AOS) system funnels video images through an analog-to-digital converter and the digitized data stream is then fed into a minicomputer for processing.

The digitized image is then compared to images that are in the "same functional class," according to Auerbach, and, through proprietary pattern recognition software, it is determined into which class the newly input image falls. The results of this determination are then either displayed on a CRT or used to generate a hard-copy report, he said.

Because of bypassing the intermediate input step of graphics plotting or keypunch/CRT data entry that is associated with this type of pattern recognition processing, the system can scan visual images at a rate of 30/sec, Auerbach claimed.

The proprietary software includes programs written in Cobol, Fortran subsets, Interdata, Inc.'s 7/32 assembler language, Taps command language from Decision Strategy Corp. and Digital Equipment Corp. LSI-11 microcode, he noted.

Possible Applications

Although originally developed to aid the medical community with pathology slide and X-ray image identification, other applications such as security identification and industrial quality control could logically be handled by the AOS system, he said.

Signatures, credit cards — even human faces — can be scanned and matched against images within the system's data base, he pointed out.

Any video image camera that generates a standard black-and-white composite can be utilized with the system, according to Auerbach, and currently operating systems are running with scientific minis from both DEC and Perkin-Elmer Corp. with equal success, he said.

Current plans call for offering licenses for sale and manufacture of the equipment through Control Data Worldtech, Inc., the marketing arm of Control Data Corp., he continued.

Fees for viewing and testing the equipment for a three-month period have been set at $1 million while auction bids for nonexclusive licenses for equipment sale and manufacture will start at $50 million, Auerbach said.

Future plans include making a stand-alone version of the system available for approximately $100,000, he said. However, this type of agreement would include a stipulation that Auerbach receive a negotiable percentage of the gross sales achieved through the system's utilization, he added.

Additional information can be obtained from Auerbach Computer Telephone Corp. at 246 West End Ave., New York, N.Y. 10023.

Provides 675M Bytes

Harris Adds Hard Disk Subsystem

FORT LAUDERDALE, Fla. – Harris Corp.'s Computer Systems Division has introduced a Winchester technology disk drive subsystem that it said has more than twice the storage capacity of the firm's previous disk systems.

The Model 5660/5661 disk drive provides 675M bytes of random-access storage in a fixed, sealed media drive. Harris' previous maximum disk capacity was 300M bytes, a spokesman claimed.

Besides being a fixed module disk drive (FMD), the Harris offering features a light load, contact start/stop head designed for product reliability and microprocessor-controlled servo mechanism that provides an average seek time of 25 msec. The disk's average latency time is 8.3 msec, yielding a total average access time of 33.3 msec, the spokesman noted.

Transfer Rate

The 5660/5661 has a transfer rate of 9.67 MHz or 1,209K byte/sec and is sold with the firm's UDC. In addition, up to seven FMDs can operate from one UDC.

The price of the disk with UDC is $71,260. Additional storage drives cost $61,860. Deliveries of the disk are scheduled to begin next January, the spokesan said from the company at 2101 W. Cypress Road, Fort Lauderdale, Fla. 33309.

Micrographics Meet Set for California

LONG BEACH, Calif. – The first annual Western Micrographics Conference and Exposition will be held here on Nov. 18-19, according to an Orange County National Micrographics Association (NMA) spokesman. The seminar series featured at the conference will include segments on fundamentals, technology and applications.

R.W. Colbert of the Douglas Aircraft Co. and Paul E. Douglas of Southern California Edison will be on hand to lecture at the conference. Equipment will be on display.

Preregistration for NMA members is $70 prior to the event and $90 on site. For nonmembers, fees are $100 for preregistration and $120 at the door. More information can be obtained from Orange County NMA official Adolphus N. Spence, P.O. Box 1162, Cerritos, Calif. 90701.

Nabs Workshop to Focus On Operations Management

MEMPHIS, Tenn. – An operations management workshop is being offered here by the National Association of Bank Services (Nabs) Nov. 12-13.

Enrollment for Nabs member company representatives is $150 for the first person and $125 for additional persons from the same outfit. Nonmember registration is $200.

Additional information is available from Nabs, Suite 1331, 50 W. Broad St., Columbus, Ohio 43215.

HP Favors DDP Approach

(Continued from Page 61)

machine to update a central data base.

As computing costs dropped and system capabilities increased, it became possible to justify individual computers performing dedicated applications at a single facility.

Technical computers could control the instrumentation and process control functions, as well as manage quality assurance and shipping. The technical processors would be networked to the business-oriented computers. With multiple divisions, these computers, in turn, could be tied into an intrafacility information-sharing network.

Functional DDP has the advantage of allowing each unit to utilize the processing most suited to its needs. No compromises need be made between number-crunching requirements and a need for transaction processing. Instead, the right processor is chosen for each job, and the 80/20 rule is followed to determine where to place the hardware.

Integrated Distribution

The third general category for a DDP system configuration is integrated distributed processing. It combines features of geographical and functional systems. (See diagram on Page 61.)

The intrafacility functional systems in each of a company's plants are linked together as in an interfacility geographical system to form an integrated information network for the whole company. While the integrated system takes advantage of DDP's system tailorability, it requires more planning for successful implementation.

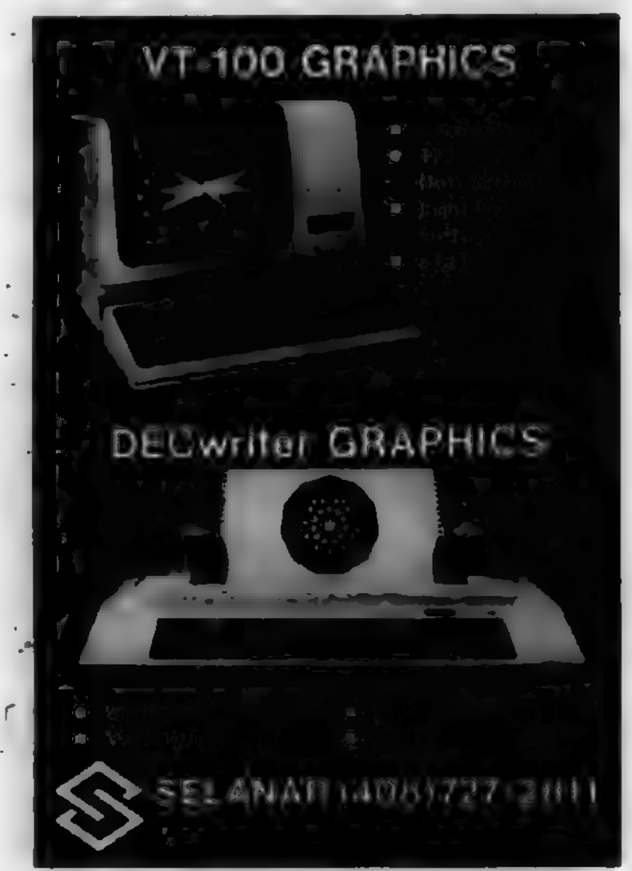
Beginning with remote job entry or source data entry, a firm might move to local data inquiry and update for satellite locations. Although some companies describe this phase as distributed processing, it is mainly directed towards offloading tasks from a central mainframe.

It is not until the next step – functional DDP – that the processing is truly distributed in nature since it is at this point that the computing requirements of an independent functional entity are being fulfilled.

Not only is DDP flexible enough to accommodate different organizational structures, but as these structures grow and change, the DDP network can easily accommodate this growth.

If an organization meets more than one of the five outlined criteria, a distributed processing network may be the right tool for maximum DP flexibility in a high-growth environment.

Hartge is a product manager in data communications for Hewlett-Packard.



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LA34 DECwriter IV Forms Ctrl.	1,295	124	[illegible]	47
LA120 DECwriter III KSR	2,495	239	140	[illegible]
LA180 DECprinter I	2,095	200	117	75
VT100 CRT DECscope	1,695	162	101	[illegible]
VT132 CRT DECscope	2,295	220	122	[illegible]
DT80/1 DATAMEDIA CRT	1,995	191	106	72
TI745 Portable Terminal	1,595	153	[illegible]	57
TI765 Bubble Memory Terminal	2,595	249	145	94
TI810 RO Printer	1,895	182	101	[illegible]
TI820 KSR Printer	2,195	210	117	79
TI825 KSR Printer	1,595	153	[illegible]	57
ADM3A CRT Terminal	875	84	47	32
ADM31 CRT Terminal	1,450	139	78	53
ADM42 CRT Terminal	2,195	210	117	79
QUME Letter Quality KSR	3,295	316	176	119
QUME Letter Quality RO	2,895	278	155	105
HAZELTINE 1420 CRT	945	91	51	34
HAZELTINE 1500 CRT	1,195	115	64	43
HAZELTINE 1552 CRT	1,295	124	69	47
Hewlett-Packard 2621A CRT	1,495	144	80	54
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The Level 6 has also been helping Wisconsin Life develop new applications for their transaction processing capability. For instance, there's a program in the works now that will enable them to process all new business on-line.

One advantage is that the computer can be used to calculate premiums, thus eliminating a great deal of work currently done by hand.

Finally, the Level 6 runs a very efficient data entry facility. Once CRTs are installed, clerks will be able to correct errors immediately, substantially reducing overall system maintenance costs.

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Honeywell

The HP 3000 has established a 99% availability rate during the last year of operation; Syncrude Canada has saved $1.2 million a year in inventory alone since its installation.

Syncrude Canada uses terminals throughout its warehouse area to gain instant access to the computer, which helps keep track of a $40 million inventory.

Oil Inventory System Replaces File Tubs

Special to CW

MILDRED LAKE, Alta. – Before Syncrude Canada, an oil research and exploration firm here, replaced its manula inventory system with a computer-based system, the company's primary recordkeeping tool was tubs of files.

When spare parts or equipment for its oil extraction machinery were needed, employees would pull the files from the tubs and transcribe the transactions manually into general ledgers.

Today, however, the company uses a Hewlett-Packard Co. 3000 minicomputer system to keep track of the 65,000 inventoried items valued at about $40 million, as well as monitor the purchasing of approximately $2.5 million worth of equipment each month.

The firm's material handling system saves the company $1.2 million a year in inventory costs, according to Harley Bricker, a superintendent at Syncrude.

'Fast Response'

"The system gives fast response to maintenance personnel inquiries, more realistic availability information, shorter lead time for procurement and faster delivery," Bricker claimed. The HP-3000-based system also provides better use of the firm's production facilities and supporting services, as well as more creative use of management time.

Syncrude is not the usual oil-drilling operation. The company deals in a form of strip mining that extracts a mixture of heavy oil, called bitumen, and sand which is soaked with the rich oil.

The sand is put through an upgrading process that extracts the bitumen which is then pumped to refineries in Edmonton, Vancouver, B.C. and Montreal for further upgrading. After this final process, the refined products are marketed for consumer use, Bricker said.

Stored in about 23 million cubic feet of warehouse space are the spare parts and materials for the equipment needed to keep the oil flowing. The company's Materials Management Division handles this multimillion-dollar inventory and its job to ensure that stocks are kept at a proper level.

They also respond to various

(Continued on Page 68)

Links 16 Users

Multiprocessor Micro System Bows

BOSTON – A microcomputer-based multiprocessor computer system that is said to provide up to 16 users with an independent operating system to eliminate response lag and simplify debugging has been introduced by Computer Service Systems Network, Inc. (CSSN).

The System 1000-MP links users via an S-100 bus and is expanded by adding single cards that contain a processor, memory and dual port memory windows. Specialized cards that provide high-speed communications are also available, a spokeswoman stated.

Built around a Z80A processor, the CSSN computer supports up to four Winchester 8-in. hard disks with a maximum 96K bytes of storage. File backup is maintained on a tape cartridge drive.

The system has a hard disk operating system that is upwardly compatible with Digital Research, Inc.'s CP/M 1.4 and can run a variety of industry standard languages and applications.

The four-user System 1000-MP with 24M bytes of storage costs $25,000 and is available in a desktop or rack-mountable version. CSSN is at 120 Boylston St., Boston, Mass. 02116.

Disk System for DEC Users Takes Floppies, Winchesters

MOUNTAIN VIEW, Calif. – Scientific Micro Systems, Inc. has introduced a microcomputer-based floppy and Winchester disk system that is compatible with Digital Equipment Corp. hardware and software and has four RS-232C connectors for input or output devices.

The Disk System 11X includes a DEC LSI-11/2 or 11/23 CPU with up to 128K bytes of random-access memory and up to 2M bytes of floppy disk storage in a single tabletop enclosure. Storage can be expanded by the addition of a 26.4M-byte 14-in. Winchester drive option, a spokesman noted.

The disk system is compatible with standard DEC RT-11 and RSX-11M operating systems. The addition of dual-head floppies is said to double the storage normally available when running the RT-11 operating system available on DEC RX02 floppy diskettes.

The unit also has a 40% faster

(Continued on Page 68)

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Selection. DASI also has the full line of CRT's from Lear Siegler*, Hazeltine*, Digital Equipment Corp. and Datamedia, and all the complementary hard copy printers from TI*, Diablo* and DEC. High-speed modems such as the 212A or Vadic compatible acoustic couplers provide you with the communications speed you need.

Service. DASI maintains the equipment it sells nationwide. Your HP terminal and modem combination will be serviced by one source who stocks the parts and has technicians available for fast response.

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Turnkey Accounting System Features Report Writing

LOS ANGELES – A turnkey Client Accounting and Bookkeeping System (Cabs) to meet the needs of accountants is available from The Briareus Corp.

The system features a report writing capability that includes income statements, balance sheets, statements of changes, sales analyses and other reports an accountant may need, the vendor claimed.

A variety of client-oriented programs are possible with Cabs, such as automatic arithmetic allocation.

The system is available in four basic hardware configurations ranging in cost from $25,000 to $57,000, the vendor said from Suite 302, 1801 S. La Cienega Blvd., Los Angeles, Calif. 90035.

HP 2100 Gets Interface

SAN DIEGO – Innovative Data Technology has introduced the TDC-3011 interface for its TDC-3000 digital cartridge drive. The interface reportedly occupies one card slot in the Hewlett-Packard Co. 2100 series of minicomputers and connects to the cartridge drive via a 40-wire flat ribbon cable.

The TDC-3011 costs $1,800 from Innovative Data Technology, 4060 Morena Blvd., San Diego, Calif. 92117.

PE Offers CAD/CAM Line Based on 32-Bit Minis

OCEANPORT, N.J. – Perkin-Elmer Corp. is offering a series of mechanical design and drafting systems based on the firm's 32-bit minicomputers and using software supplied by Manufacturing and Consulting Services, Inc. of Santa Ana, Calif.

The preconfigured systems utilize PE's 3220 or 3240 minicomputers and can support up to 12 workstations.

The AD-2000 computer-aided design and manufacturing (CAD/CAM) software is menu-driven and provides five separate but fully integrated sets of capabilities that include computer design, total tool design and numerical tape production, annotated drawings, a comprehensive management information system and a compatibility with most existing design applications software, a spokesman stated.

Dimensional Accuracy

The software is said to provide a dimensionally accurate data base that can be used for all phases of design, drafting and manufacturing, he added. In addition, PE provides its Fortran VII software as a separate facility that can be used for program development or other manufacturing functions.

The entry-level 3220-based system is priced at $179,000 with two workstations, while an expanded model with three CRT terminals and more disk storage space costs $251,000. The high-end 3240 version sells for $300,000.

PE is located at 2 Crescent Place, Oceanport, N.J. 07757.

Entry-Level CPU Provides WP

WESTLAKE VILLAGE, Calif. – An upgradable entry-level computer system offering word processing (WP) and list management capabilities is available from Vector Graphic, Inc.

Designed for business users and software developers, the system, termed the Vector Intelligent Partner (VIP), is based on the Vector 3, an integrated video console with built-in S-100 electronics.

The system's single 315K-byte minidisk drive is housed separately, allowing addition of up to three more identical drives, or replacement by Vector 2 Dualstor diskette unit, the 30M-byte Megastor Winchester drive or other future Vector units, the vendor claimed.

The price for the VIP is $3,695 from Vector, at 31364 Via Colinas, Westlake Village, Calif. 91362.

MIC Study Asks User Help

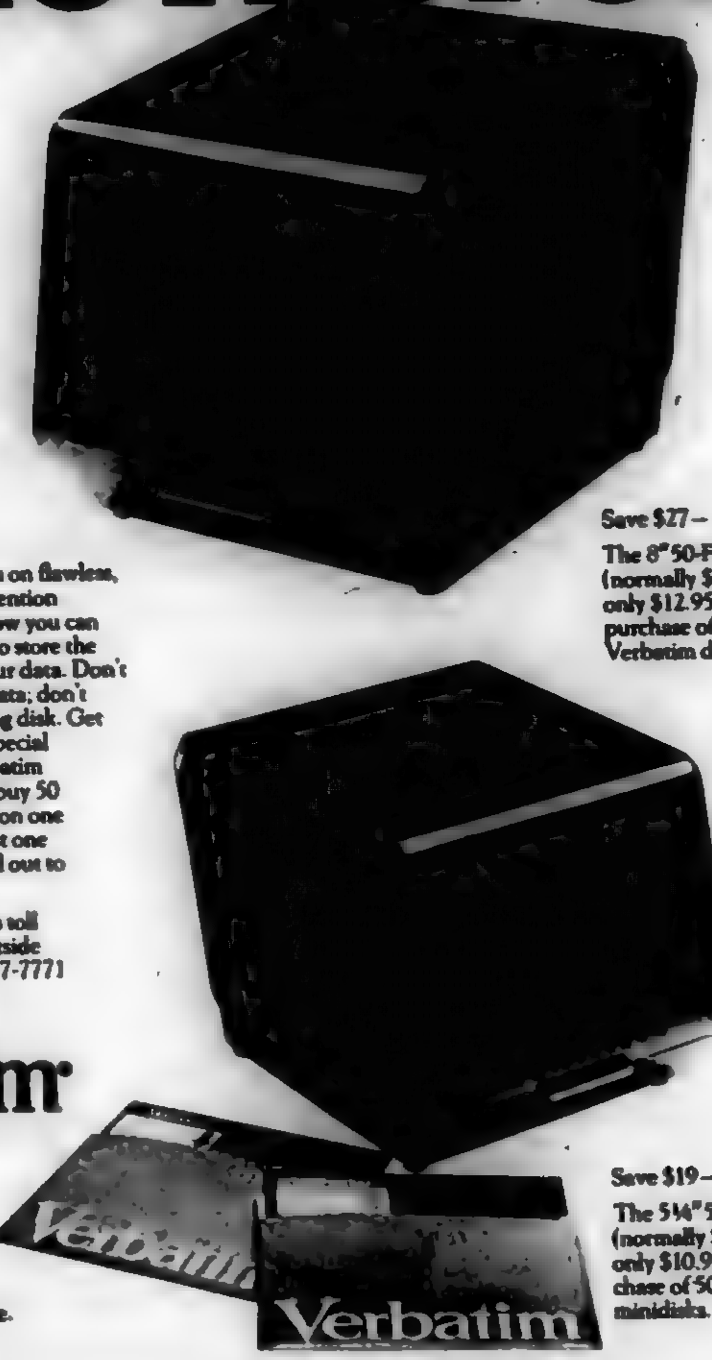
CHERRY HILL, N.J. – Management Information Corp. (MIC) is inviting vendors and user groups to participate in five annual surveys that focus on six different DP products.

The MIC surveys concentrate on small business computers, data entry equipment, packaged business software for micro- and minicomputers, data communications, distributed processing equipment and word processing systems.

Vendors and user groups can distribute questionnaires to system users or they can be circulated by MIC. Organizations assisting the research firm will receive complimentary copies of the respective newsletter containing the survey findings. As in past surveys, respondents can elect to remain anonymous.

Finally, companies whose products are highly rated, and for which sufficient responses are received, will be presented with a Certificate of User Commendation, a spokesman noted.

Specific information on the questionnaire distribution program as well as on each of the surveys is available from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.



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AMF scores with TI's 820 KSR.

Teamed with AMF's MagicScore* and DataMagic* computerized systems, TI's OMNI 800* Model 820 Keyboard Send-Receive Data Terminal offers bowlers full league secretarial services. Within minutes after a match is completed, this desktop model prints out updated team standings, scores, averages and number of games played, all at a responsive 150 characters-per-second. And the 820 KSR's clear, multiple copies make it easy for both managers and bowlers to reference league reports.

The 820 KSR is also a valuable promotional aid. With its easy-to-use typewriter-like keyboard, proprietors can enter collected demographic information about bowlers. Stored in the host computer, the information is easily referenced through printouts provided by the 820 KSR. And with flexible options like forms control, the versatile 820 KSR can be used to generate labels for mailings to selected bowlers when tournaments or new leagues are forming.

A real cost and time-saver, the 820 KSR is also proving itself a winner with businesses like banking, real estate and insurance.

TI is dedicated to producing quality, innovative products like the Model 820 KSR. And TI's hundreds of thousands of data terminals shipped worldwide are backed by the technology and reliability that come from 50 years of experience.

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For more information on the 820 KSR, contact the TI sales office nearest you or write Texas Instruments Incorporated, P.O Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016. In Europe, write Texas Instruments, M/S 74, B.P. 5, Villeneuve-Loubet, 06270, France.

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TEXAS INSTRUMENTS

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Oil Firm's Inventory System Replaces File Tubs

(Continued from Page 65)

work orders from the maintenance staff, handle equipment requests from the operating staff and order new parts and equipment when necessary, Bricker explained.

The Division's HP-3000 has 1M byte of memory, six 50M-byte disk drives, two 1,600 bit/in. tape drives, 50 CRT terminals, eight Digital Equipment Corp. Decwriter printers and a number of slave printers.

Specifically, the system handles eight computer applications: inventory control, bill of materials, master schedule, work-order control, purchase-order control, accounting control and two special manager routines.

Syncrude selected its present computer and software by using a selection process based on both required and desired system features. This method, called the Kepner-Tregoe system, indicated Syncrude required an on-line system easily operable because of limited programming expertise from within the company.

A list of 86 potential systems was narrowed to three. The firm finally chose a material handling system developed by the Electronics Support Division of Boeing Aerospace with the HP-3000 at its heart, Bicker pointed out.

Operations Procedure

When a new piece of equipment is received, it is broken down into the smallest possible number of component parts and entered into the bill of materials, Bicker stated, describing the system's operations. An on-line query can then determine exactly what replacement parts are required.

When an order for a part is received, all pertinent information — material requirement, work order number, order data, required data, equipment number and quantity — is entered into the master schedule.

A material requisition is run to determine whether or not the required part is in stock. If the item is not available, a purchase order is generated and an order placed.

When the item arrives from the supplier, the quantity received is entered into the computer and checked against the quantity ordered. If a discrepancy exists, a discrepancy report is issued, enabling the supervisor to determine the cause of the difference and correct the problem.

The part is then moved to the receiving dock where it is assigned a storage bin. The location of the part or the warehouse floor is now entered into the computer.

When a request for parts is made, the order is entered via a CRT terminal, and a "pick tag" is generated that informs the warehouse of the location of the required items and the number needed.

When the invoice arrives from the supplier, the accounts payable department in Edmonton keys the new price item into the computer, thereby updating the pricing on all like items in inventory.

On-Line Approach

According to Bricker, the on-line approach, which uses HP's Image data base management system, is the key to Syncrude's successful operations. The fifty terminals located throughout five warehouses, the materials management offices, the maintenance planners offices, and the data center provide almost instant access to the computer. Even during peak usage, the terminals help ensure that machinery is maintained and repairs are handled as quickly as possible, he commented.

The HP 3000 has established a 99% availability rate during the last year of operation. The 1% down time includes the regularly scheduled maintenance, Al Walker, Syncrude's manager of systems and computer services, said.

Clerical access and input is facilitated by HP's Query, an English-language type program which allows direct access to the computer and also helps edit the data input to assure that it is correct. Programming is in Fortran, with some use of Basic.

Since the computer's installation "We have achieved better use of our production facilities and supporting services," Superintendent Bricker claimed.

"Management time is now used in more creative ways, because there is less data to handle."

System Based on LSI-11

(Continued from Page 68)

disk access speed than DEC single-head floppy disk drives.

The unit uses the firm's proprietary controller, code-named Flinchester, to interface between the LSI-11 Q-bus and both floppy and Winchester disks.

Two modes of operation are possible: a compatible mode that provides complete RX02 hardware, software and media compatibility; and an extended mode that is utilized with an appropriate device handler to access the Winchester and IBM-compatible floppy disk drives.

The extended mode is also said to increase throughput because of high-performance direct memory access interface operations. Rather than transferring only one disk sector per command, up to 65K-byte data blocks can be transferred by a single command.

Prices for the 11X with LSI-11/2 CPU start at $7,400, while costs for the system with an LSI-11 start at $9,995. Add-on Winchester storage prices start at $3,800.

Scientific Micro Systems is at 777 E. Middlefield Road, Mountain View, Calif. 94043.

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Display Interfaces Offered For Q-Bus, Unibus Systems

OAKLAND, Calif. — A line of direct-access alphanumeric and graphic video display interfaces for the Q-Bus and Unibus structured systems of Digital Equipment Corp. LSI-11 and PDP-11 minicomputers has been announced by Peritek Corp.

The Vistrum family of color and monochrome interfaces was designed for use in highly interactive systems, process control information displays and applications requiring rapid update of screen information, Peritek said. It can also be used for applications that combine interactive portions of the monitor screen with real-time background display in split-screen formats, such as in laboratory and control room settings, the firm said.

On-board video memory appears to the host CPU as full speed main memory, receiving character, attribute, pixel, color and control information from operating software in the form of high speed, direct memory reference.

The interfaces employ on-board memory in a dual-port, transparent design, "thereby creating no CPU contention problems," according to the spokesman.

Prices range from $475 to $2,000 from the firm at 2014 Lakeshore Ave., Oakland, Calif. 94610.

The Vistrum Video Display Interface

Burroughs CPUs Get Printer

GAITHERSBURG, Md. — Printer Systems Corp. (PSC) has introduced a plug-compatible serial matrix printer for Burroughs Corp. processors that emulates Burroughs' 9249-1, 2 and 3 printers.

The T-1602 printer, a Tally Corp. machine, can be shared with up to three CRT stations on a nonpriority daisy-chain cable and is linked to the CRT terminals via an included interface that is said to permit screen image printouts under operator control.

The printer has a 132-col bidirectional print mechanism with a 96-char. Ascii set, and prints six line/in. and 10 double-width char./in. The device has a slew speed of 8.5 in./sec on a 4-in. to 15-in. paper width.

The printer costs $2,695 from PSC at Suite 104, 1 W. Deer Park Road, Gaithersburg, Md. 20760.

HP 2619A Runs On HP 1000s

PALO ALTO, Calif. — Hewlett-Packard Co. is now offering its fastest line printer, the HP 2619A, for use on HP 1000 technical and industrial systems. It was formerly available with HP business computers only.

The printer uses horizontal chain technology and prints 132 columns of a 64-char. set at 1,000 line/min or 750 line/min with a 96-char. set, the vendor claimed.

The printer is fully compatible with HP 1000 computers of the M, E and F series and costs $23,000, HP said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Micro Meshes Pascal With DEC's Q-Bus

SAN DIEGO — Advanced Digital Products has announced a microcomputer that combines Pascal with Digital Equipment Corp.'s Q-Bus.

The unit is a 16-bit processor with a bus-compatible backplane that will accept up to 14 Q-bus memory modules, the vendor said.

Called the PDQ-3, the unit was built around the UCSD Pascal compiler. The MPU features a 16-bit stack processor, a real-time clock and a DMA floppy disk controller, the vendor said.

The unit costs $6,495 from the vendor at 7584 Trade St., San Diego, Calif. 92121.

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Pascal Compiler One of Intel Debuts

SANTA CLARA, Calif. – Intel Corp. has introduced a number of products ranging from a multiuser development system to a Pascal compiler for programmer support for its 8-bit and 16-bit microprocessors.

The Model 290 Intellec disk file sharing system or Network Development System-1 (NDS-I) is said to enable up to eight development system users to simultaneously share files on one or two hard-disk drives providing up to 15M bytes of central, shared storage capacity. Present Intel standalone development systems can be used as entry points to the networked system.

The NDS-1 is reportedly the first multiuser distributed program system offered by the California-based firm.

The major component of NDS-I is the network manager which controls communications between the system's work stations and the shared hard disks, a spokesman noted. One or two fixed disk drives are hard-wired to the network manager. Workstations can be located up to 20 feet apart and up to 120 feet from the network manager.

The system also includes a communications manager that monitors the activities of the eight workstations, a message manager that maintains a table of logged-on users and a file manager that creates, reads, writes and deletes files on the shared hard disk.

With the multitask operating system, the NDS-I costs $25,105. Workstations are priced at $1,100 each. Users who are already have the firm's models 240 or 245 development systems can purchase just the network manager and interconnect kit for $2,180.

All of these products will be available at the end of this year, the spokesman pointed out.

Intellec Family

The second offering is a family of Intellec microcomputer development systems tailored for Intel's iAPX-88/86 applications. The Intellec Series III supports a variety of high-level languages and supports structured, modular programming.

The Intellec Series III

The Series III can address up to 1M byte of system memory and contains a CRT with detached keyboard, an integral floppy disk drive, power supply and cables.

The system costs $16,900. However, users fo the firm's current Series II development system can purchase a Series III upgrade kit for $7,500. Both products will be available this month.

Finally, the Santa Clara company unveiled a Pascal-86 compiler for its iAPX-88/86 family of microprocessors that runs on the Intellec Series III or any other Intellec development system.

The compiler produces relocatable machine code directly from a programmer's English-like source code. The software also allows users to port Pascal programs and employ a compiler-time option that lets the compiler flag end-use of a programming extension.

The diskette-based software, user's guide and pocket reference manual costs $4,000 and is scheduled for delivery at the end of this year.

Additional information on these and other Intel products is available from the company at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Columbia MPUs Get Graphics

COLUMBIA, Md. – The Model 900 Commander microprocessor system from Columbia Data Products now offers comprehensive graphics display capability in a desktop configuration.

Bar charts, pie charts, histograms and point-to-point plots can be displayed with the 900's self-contained vector and point plotting features.

The Commander 900 provides dual independent Z80A processors, 96K bytes of random-access memory and dual floppy drives.

The Commander 964 – Columbia's most common model – costs $5,375 from the firm at 9050 Red Branch Road, Columbia, Md. 21045.

TRS-80, Apple MPUs Get 8-In. Disk Drive

MANHATTAN BEACH, Calif. – Matchless Systems, Inc. has unveiled an 8-in. disk drive compatible with Radio Shack, Inc. TRS-80 models I and II and Apple Computer, Inc. Apple II and S-100 systems.

The MS-800 has a capacity of 77 tracks, 26 sectors per track, 128 bytes per sector – for a total of 256K bytes. That is 2.2 times the capacity of the Apple 5.25-in. drive, the vendor claimed.

The price range of $995 to $1,595 covers all hardware, software and documentation, the vendor said from 18444 S. Broadway, Gardena, Calif. 90248.

one for the files.

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CI Notes

Datapoint Christmas Gift: Competitor to IBM 3033?

Datapoint Corp. is expected to announce a mainframe in the IBM 3033 class before Christmas. According to industry sources, the large-scale machine will have a memory of 1M byte or larger and a peripheral processor unit.

The CPU will be able to operate on a stand-alone basis or within Datapoint's Attached Resource Computer (ARC) environment, the sources added.

Moreover, Datapoint will also announce a new high-technology operating system with resource transparency, they said.

Braegen Charges Calcomp With Misrepresentation

SANTA ANA, Calif. — Braegen Corp. has sued California Computer Products, Inc. for more than $42 million, charging Calcomp with misrepresenting the financial status of its IBM plug-compatible memory division, purchased by Braegen last year.

Calcomp said it will file a countersuit early next month.

Braegen's suit alleges Calcomp claimed the division was operating at the break-even point and misrepresented certain warranties and the supply of spare parts. Braegen said it would not have purchased the division if it had known of the losses.

Since the acquisition, Braegen claimed it has lost $3 million in operating that portion of its business.

STC Offers $52 Million To Acquire Documation

MELBOURNE, Fla. — Storage Technology Corp. (STC) recently offered $52 million to acquire Documation, Inc., a financially troubled printer manufacturer here.

Based upon the letter of intent, Documation shareholders would receive .85 shares of STC for each Documation share. The exchange rate would be based on the $20 closing price of STC common on Aug. 29.

The agreement further calls for the assumption by STC of $30 million worth of Documation long-term debt. If the merger is approved by the boards of both companies, Documation would become a wholly owned subsidiary of STC. The transaction could be completed by early November, Documation said.

Although a significant factor in the printer market, Documation last year lost more than $10 million on sales of $58.7 million.

Carter's Tax Credits Held Not Much Help to Vendors

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — While President Carter's new economic incentive program — broadening investment tax credits — may be a boon to computer users [CW, Sept. 9], it doesn't offer very many advantages to vendors.

Why? Much of the equipment used to manufacture computer components will have to be replaced to exploit new technology before it can be fully depreciated, according to Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association (Cbema). This is despite the fact that a major thrust of the new economic incentives program is to promote innovation in high-technology industries.

"Aside from a number of specific initiatives ... to enhance collaborative research among universities, industry and government," the Administration plans to "develop and expand programs to assist ... small high-technology firms."

This latter effort will include "expanding the National Science Foundation small business innovation research grant program that provides seed money for research on concepts not yet ready to compete for venture capital," the proposal said.

According to Henriques, however, the Administration would accomplish far more by granting tax credits for research and development investments made by high-technology companies. He cited as a model a bill recently introduced in the House by Rep. Charles Vanik (D-Ohio). This measure, H.R. 6632, would provide a nonrefundable

(Continued on Page 73)

European PTTs Viewed Likely To Lead World in Public Nets

By Graham Bunting

Computerworld/UK

LONDON — The European postal, telephone and telegraphs (PTT) rather than the U.S. network operators and would-be operators are "in a strong position to take leadership in the field of public data works in the next few years," according to Phillip Hughes, chairman of Logica, a leading UK systems house and consulting firm here.

These words were part of the introduction of a report the firm completed recently for Eurodata Foundation — an arm of the European PTTs — a report that estimated the growth of public data networks in Europe from just under 400,000 in 1979 to about 1,420,000 in 1987.

The U.S. operators are often "hamstrung by legal proceedings like Ma Bell, which is still stuck in the courts," Hughes said. Hughes also cited the "superiority of the French Transpac" packet-switched network and its Europe-wide derivative, Euronet; the Nordic network's "world lead in circuit switching"; and the fact that "X.25 is essentially a European standard."

The report contained a number of surprises, according to industry observers.

First is the amount of data communications equipment actually installed today. This turns out to be twice that predicted by the first Eurodata study, which was carried out in 1972. The study talks in terms of num-

(Continued on Page 74)

Seminar Vendors Feeling Pinch Of Recession

By Connie Winkler

CW Staff

NEW YORK — Seminars and workshops designed for DPers are feeling the recession's pinch — all, that is, except for those covering this year's hot topics like telecommunications, productivity and structured programming, office automation and distributed processing.

- Last year a disaster recovery seminar drew 170; this year in Washington, D.C., only 70 are registered.
- A Connecticut education firm scheduled 10 workshops this year on "manag-

(Continued on Page 76)

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Impact of Amhahl Move 'Potentially Massive'

WALTHAM, Mass. — What will be the effect of Dr. Gene M. Amdahl's departure from Amdahl Corp. to start a new company that hopes to compete head-on with IBM's expected H series of mainframes?

In the short term, the effect will be minimal — Amdahl reportedly had not been active in the company for more than a year.

The long-term effect, however, is "potentially massive," according to International Data Corp.'s Information Industry and Technology Service (IITS).

In a recently issued report, the IITS explained that "with another competitor in the market for [IBM 3033-size mainframes], those most likely to lose market share are the other [plug-compatible mainframers] rather than IBM."

Personnel May Leave

As for the effect of Amdahl Corp. itself, "Cliff Madden, the chief financial officer, has already thrown his hat into Gene's ring. The lure of designing something new cannot be underestimated," the report observed.

"Amdahl Corp. appears to have been essentially in a holding pattern for some time with regard to systems design, concentrating on countering or besting IBM software/firmware code. Will these people be at Amdahl Corp. when it needs them to counter H?" the report speculated.

Moreover, "Amdahl once portrayed itself successfully as the young American company that dared to become the first [plug-compatible mainframer] and challenge IBM. But with recent events such as the axing of the Amdahl-Storage Technology Corp. [STC] merger, Amdahl's departure leaves the public staring squarely into the eyes of a Japanese-controlled company.

"Fujitsu owns about 26% of the stock and is increasing its share in a recent stock offering. With the distinct possibility that protectionist 'buy American' feeling is rapidly mounting in the U.S., the Amdahl-Fujitsu bond could be a problem that is not easily solved by fancy software code."

Noting that it took about $45 million to develop Amdahl Corp.'s first machine, the 470V/6, the IITS report gave an emphatic "You bet" to the question of whether Amdahl could find the $50 million to $100 million financing necessary to deliver an H series competitor.

"He's proven himself — twice — once within IBM's womb and once on his own," the report recalled. "After having had to go into hock with the Japanese the first time around, you better believe the stock market won't let that happen again."

Among the likely bankrollers:

- Amdahl himself.
- Jesse Aweida and STC. Noting that Amdahl resigned from Amdahl Corp. the day after STC "went to the money market," IITS asked, "Coincidence?"
- "John Q. Public and venture firms, banks, etc.," which IITS expects to provide backing after privately raised capital is consumed.

If Amdahl decides not to go it alone, IITS suggested some companies that might be inclined to help him:

- STC, which acquired a custom chip manufacturer, Microtechnology Corp., last year "and has been amenable to linking with a mainframer — witness its unconsummated merger with Amdahl Corp." this year, the report said.
- National Semiconductor Corp., whose "Charlie Sporck is forever berating the lack of quid pro quo re tariffs with the Japanese." However, IITS noted, National Semi's National Advanced Systems Corp. has signed an agreement with Hitachi Corp.
- Intel Corp., whose acquisition of MRI Systems Corp. sparked talk of a data base machine and "might be interested in participating in the mainframe market, if only in subassembly."
- Wang Laboratories, Inc. "An Wang has reiterated his statement that Wang will have a system in the 3033-size class," IITS said. "But it cannot get its VS 100 out the door. So that might be a long-shot linkup."

The report was issued as part of IITS' continuous information service. More information about the service is available from Internationl Data Corp., 214 Third Ave., Waltham, Mass. 02154.

H Series Rival: How Soon?

WALTHAM, Mass. — How quickly will Dr. Gene M. Amdahl be able to deliver a competitor to IBM's anticipated H series of mainframes?

"Probably fairly fast — if the very large scale integration technology is in place" is the prediction contained in a report issued by International Data Corp.'s (IDC) Information Industry and Technology Service.

Amdahl, who has announced his resignation from Amdahl Corp. and his intention to start a new company [CW, Aug. 25], "has gained a lot of experience on the last round — getting financing, designing, really getting a company up and running — and encountering curve balls from IBM in the form of the [370/158]. IDC predicts he can deliver product within about two and a half years," the report said.

But, it noted, "the more important question is how long after H is shipped will he deliver? Probably between six and 18 months. IDC is saying first H shipments about third quarter 1981, so that makes Amdahl's shipments about second half of 1982. Amdahl is saying sometime by 1984."

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Sales Expected to Double by 1985

Memorex Beefing Up Drive Into OEM Market

By Jeffry Beeler

CW West Coast Bureau

SANTA CLARA, Calif. — After years of focusing its attention almost exclusively on end users, Memorex Corp. is at last making its first concerted foray into the computer industry's other major business sector, the original equipment manufacturers (OEM) market.

OEM sales today account for only 15% to 20% of Memorex's overall revenues, which this year will total about $800 million. But by 1985, the OEM share of Memorex's combined sales will have ballooned to approximately 50%, according to William Bayer, president of the company's Peripheral Equipment Group.

Memorex's drive to increase its penetration of the OEM sector took another apparent step forward late last month when the firm announced its decision to make its Model 3652 disk storage subsystem available for the first time to OEMs. The 1.27G-byte Model 3652, a double-capacity version of the IBM 3350, had previously been sold only to end users.

OEM Workshops

Word of the 3652's debut as an OEM product came Aug. 26 at Memorex's first OEM press conference. The announcement also coincided with the start of a series of OEM customer workshops scheduled to be held here and in five other major U.S. metropolitan areas.

Sponsored jointly by Memorex and Microcomputer Systems Corp. (MSC) of neighboring Sunnyvale, Calif., the series will consist of six day-long workshops aimed at schooling OEM buyers in the use of Memorex's Model 101, an 8-in. rigid disk unit, and its accompanying controller, MSC's Micromodule 9000. The first workshop in the series took place Aug. 26 at Memorex headquarters and will be followed later this year by similar meetings in Boston, New York, Dallas, Los Angeles and Chicago.

As a result of the Aug. 26 announcement, the Model 3652 has become the seventh disk drive system to join Memorex's OEM product line during 1980. The first member of that line was added earlier this year with the introduction of the Model 101, an 11.7M-byte Winchester-type disk unit.

Since then, Memorex's OEM disk system family has gained several additional members, including:

- The Model 677-30, a 300M-byte, direct-access system with removable media and a storage module drive interface.
- The Model 612, a modular Winchester-type unit incorporating a choice of 28M-, 56M- and 84M-byte drives.
- The Model 659, a 677M-byte, single-spindle version of the 3652.
- The Model 102, a 23.4M-byte, double-capacity version of the Model 101.
- The Model 201, a 25M-byte disk system offering both fixed and removable 8-in. media.

Although Memorex has a long tradition of dabbling in the OEM sector, this year marks the first time in its history that the company has pursued the non-end-user market in earnest, Bayer said.

Memorex's decision to greatly expand its activities in the OEM field in no way signals a weakening of the firm's long-time commitment to the end-user arena, Bayer said. Nor does it reflect a major realignment of the company's product line.

The shift in the company's market emphasis means merely that Memorex is beginning to seek new channels of distribution for its existing products and for the underlying technology it originally developed for end users, Bayer explained.

Twofold Rationale

The rationale behind the company's intensified OEM push is twofold. First, an expanded OEM presence promises to bolster Memorex's sagging sales and lessen its vulnerability to IBM's harmful pricing and market actions.

Like many other suppliers of large-scale systems hardware, Memorex during the last year or so has suffered serious financial setbacks at the hands of IBM, whose industry dominance allows it to keep disk and tape system prices in the end-user sector artificially low. In the OEM market, however, Memorex's risk of succumbing to the same financial reversals is relatively slight, primarily because prices in that arena are set by customer demand, not by IBM, Bayer said.

The other important motive behind Memorex's increased OEM business thrust is a desire to take advantage of major new growth opportunities. As an OEM vendor, Memorex will shift its attention from the large-systems sphere, the company's traditional bread-and-butter sector, and concentrate instead on the high-volume minicomputer and microcomputer arenas.

That Memorex chose this time as the moment to make its transition from a large- to a small-systems orientation is no accident.

The minicomputer and microcomputer fields rank among the computing industry's fastest growing market sectors, with an estimated 30% to 50% and 50% to 90% annual growth rate, respectively.

The large-systems sector, by contrast, is expanding each year at only a comparatively modest 10% to 15%, Bayer said.

Tax Credit Won't Help Vendors

(Continued from Page 71)

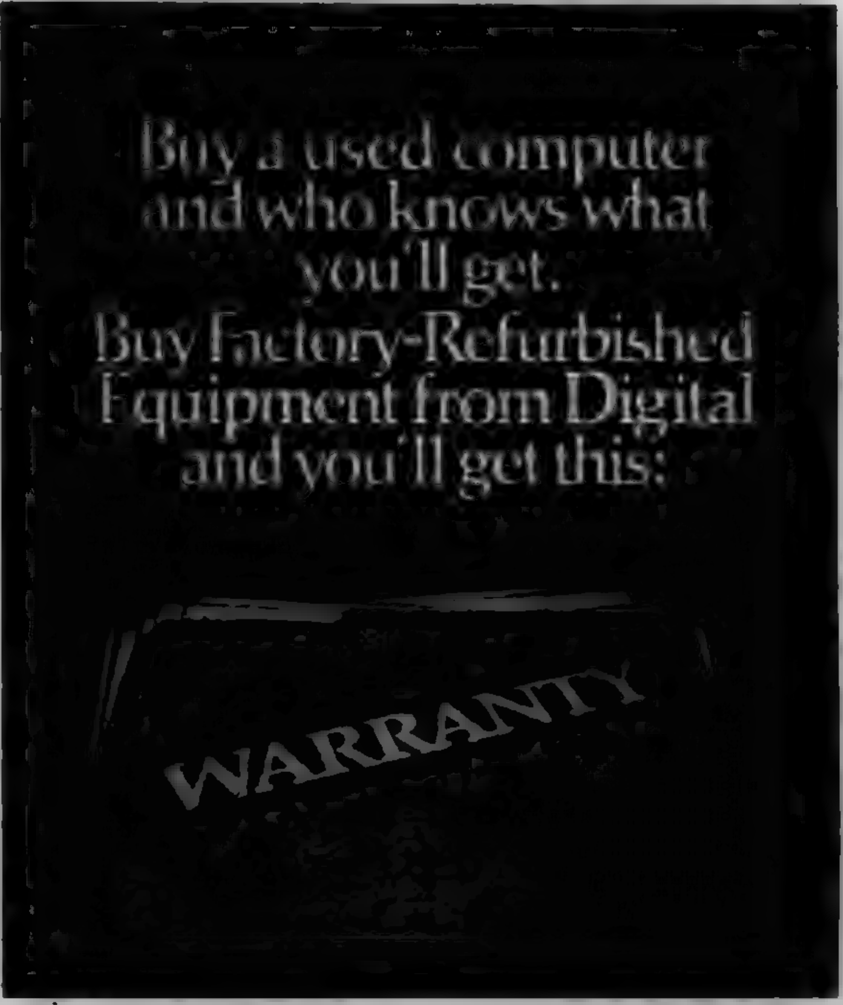
credit to a company which contributed to a college- or university-directed R&D program.

The credit would amount to 25% of the contribution and would be limited to 5% of the firm's business income. A related Senate measure, S. 2906, would grant companies a tax credit for increases in their internal R&D investments above a previously established base amount.

Henriques is also unhappy with present Internal Revenue Service rules concerning R&D expenditures of U.S. companies that operate abroad. Even when all of this money is spent in the U.S., he explained, the government requires part of the expenditure to be charged to the foreign subsidiary — which means a smaller deduction on the parent company's U.S. income tax return.

"We don't believe the Administration's plan to participate directly in private sector R&D activity will be nearly as effective as encouraging companies, through tax incentives, to spend more of their own money," Henriques added.

"The regulations and paperwork generated by a partnership with the government discourage most of the prospective private partners. Also, the government is almost always interested in promoting social objectives — such as increasing employment or reviving failing industries — and this tends to direct money away from those R&D areas that could be most fruitful in terms of technological innovation."



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European PTTs Seen Likely To Take Lead in Public Nets

(Continued from Page 71)

bers of network termination points (NTP), the point of connections of the user's equipment (usually via a modem) and the PTT transmission facility.

The number of NTPs is put at 393,000, accounting for some 5% of the total revenues of the PTTs in Europe. In the UK last year this amounted to some $480 million.

The second point of major interest is the anticipated growth rate over the next seven years, observers indicated. Four million terminals using data communications will generate something like 20% of the annual revenues of the European PTTs to give total revenues of $8 billion compared with $2 billion in 1979 — a fourfold increase.

"British Telecom and all the other PTTs and manufacturers of terminals and computers are going to have to run much faster than they are used to to keep up with the pace of demand that is being forecast," remarked Tim Johnson, of Logica.

"In the UK alone, British Telecom is going to have to install another 260,000 modems or other data connections, compared with around 120,000 in 1979, and the terminal manufacturers are going to have to provide 730,000 more terminals — nearly four times as many as there are data communications users in the whole of the UK today."

	1979	1987
Austria	4,480	38,400
Belgium	9,050	64,000
Denmark	12,000	48,800
Finland	7,000	33,100
France	84,100	341,000
Greece	890	7,170
Ireland	900	6,430
Italy	46,500	198,000
Luxembourg	640	2,000
Netherlands	16,500	74,200
Norway	6,640	24,900
Portugal	704	7,740
Spain	26,000	121,000
Sweden	20,000	82,000
Switzerland	10,900	47,000
UK	117,000	377,000
West Germany	61,700	230,000
Western Europe	393,000	1,880,000

Installed European Net Termination Points

The biggest surprise in the report is perhaps the share of the market which is likely to be taken by public data networks by 1987: from a combined total of 3% in 1979, circuit and packet-switched networks will have taken 30% of the much larger market by 1987 with a total of nearly half a million connections.

This demand will in many cases greatly exceed what was previously generally expected. The PTTs' planning departments will have to do some rapid rethinking.

Of the 30% growth in data connections in Europe accounted for by the public data networks, the ratio of packet switching to circuit switching will be two to one. Meanwhile, leased circuits are expected to hold their share of the market, while the use of the telephone network for data is expected to halve in percentage terms while staying steady in terms of actual volume, the report said.

The real strength of the public networks will be not so much their technical advantages as the fact that they should be able to offer users cost savings. Logica believes that the Eurodata study can point up ways of optimizing the tariffs to meet the objectives of the PTTs and the requirements of the market — to create maximum appeal against private leased circuit networks, for example.

If the public data networks prove to be as successful as predicted by the Eurodata study, there will also be considerable opportunities for the manufacturers including the provision of 800,000 terminals using X.25 packet switching by 1987 — supported by 43,000 front-end ports to host computers — and of 175,000 ports to accessing circuit switching networks.

Higher Transmission Rates

Another finding emphasized in the report is the predicted move to higher data transmission rates with users saving on transmission costs by using the faster 4,800 and 9,600 bit/sec rates.

The number of terminals is expected to grow even faster than the number of network connections because of an increasing tendancy to cluster two or more terminals onto each network termination point. CRTs will continue to be the most widely used terminals, growing from 50% to a share of almost 60%. However, the biggest growth will be in the use of banking terminals which are expected to increase more than 50 times in number to 42,000.

Overall Western European traffic in terms of the numbers of transactions per day will rise by nearly six times from 136 million to 790 million in 1987 (where a transaction is a completed task such as an airline booking or a data enquiry). In terms of bits, that is a total volume of 10 million million bits of data communications traffic in 1987.

That, at any rate, is the predicted demand. The question is: "Will the PTTs be able to cope?"

The Eurodata report, for which Logica was the prime contractor, took two years and involved 50% man-years of effort. It is based on statistical data gathered mainly from the PTTs and on 2,800 face-to-face interviews.

Foreign Orders & Installations

The UK's Royal College of Nursing has ordered a Honeywell, Inc. Level 64/DPS medium-scale computer system valued at approximately $450,000. In addition to a 768K-byte central processor, the system will include 600K bytes of disk storage capacity, tape unit, 1,000 line/min printer and 18 CRT terminals and three terminal printers.

National Bus, UK's national bus authority, has ordered three mainframe processors and 31 minicomputers from Univac for the establishment of a nationwide distributed data processing network.

Saitama Prefectural Credit Federation of Agricultural Cooperatives, near Tokyo, has ordered a Honeywell, Inc. large-scale dual processor DPS 8/70 computer system valued at about $5 million. The computer is to be the nucleus of an extensive on-line agricooperative banking system that will communicate with 645 terminals across the Saitama prefecture.

The Eastbourne Waterworks Co., which supplies water to 90,000 households and 3,500 industrial consumers over a 320-square-mile area in East Sussex, England, plans to install an NCR Corp. V-8555M computer system in December.

Yamanashi Chuo Bank Ltd., headquartered in Kofu, Japan, has ordered Univac computer equipment valued at $6.2 million to improve customer services and increase management efficiency.

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• San Francisco, Ca. (415) [illegible]

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For more information, contact your local National Advanced Systems sales office, or contact Marketing Dept. A1, 3145 Porter Drive, Palo Alto, CA 94304, 415/856-5000.

National Advanced Systems. In economic times like these, it's nice to know there's a company compatible with today's budget realities.

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Some Workshops Feeling Pinch of Recession

(Continued from Page 71)

ing the DP Professional," but only two sessions in March and April came off.

- In-house educators report a surge in business. There is no expensive travel and everyone sings out of the same hymnbook, observed one DP educator.

Education and the related travel and hotel expenses are the first to be cut in tight fiscal periods, a random survey of a dozen seminar and conference givers showed.

The softening first started when the prime rate peaked in April, reported Robert T. Santis, president of EDP Security of Waltham, Mass. Registration since has been "reasonably consistent" at each session around the country.

Other educators, however, report their attendance is still off by two or three participants per session.

Exceptions Exist

There are many exceptions, however, depending on the topic and the location of the seminar or conference.

Data Processing Security, Inc. of Fort Worth, Texas, had to cancel a seminar the week of Sept. 8 in Minneapolis, but already has 10 registrants for the same session in early December in San Diego. Minneapolis was a poor site at this time, observed Steven H. Dark, who coordinates seminars for Data Processing Security.

Houston is the hot spot where business is up, reported Karen Guth, president of Performance Development Corp. (PDC) of Princeton, N.J., which is offering data base seminars and in-house education. PDC has purposely avoided Chicago because of the sagging business clime.

Guth has also found sessions are getting more local and regional attendance. "It's not that there's no money for education, but there's a reluctance to spend for the long trips," she said.

Hot Topics Needed

Seminars that are doing well are offering hot topics; the ones suffering are technical and personal development training, said William R. Leitch, president of the CW Conference Management Group. Hot topics include telecommunications, productivity, office automation, distributed data processing, structured programming and other new specialized areas.

Course business for Improved System Technologies is "very strong," 50% ahead of last year, and President Chris Gane believes it's because the company is addressing productivity. "The work we are doing, structured analysis and structured design, is increasing people's productivity," Gane said.

Yourdon, Inc. in New York has also found heightened interest in productivity improvement through structured programming, which it pioneered. "However," said Antonia Yourdon, executive vice-president, "companies are scheduling the classes tighter — two months ahead instead of a year."

"We projected 75 to 100 and already we have 180 for a conference on debit cards," reported Phyllis Orenstein at the Electronic Funds Transfer Association (Efta) in Washington, D.C. Like a bank credit card, the debit card immediately deducts the purchase at the time of the transaction, more like a check.

"I don't think it's fair to say this is a trend," Orenstein said. "It depends on the topic — this conference is the first of its type." The debit card conference, at $385 for nonmembers and $285 for Efta members, is $100 to $150 less than tuition generally charged for two- to three-day sessions.

Higher Levels Succeed

Another best-seller is the Ninth Comparative Data Base Management Systems National Conference sponsored in October in Los Angeles by the University of California at Los Angeles (UCLA) Extension.

Centronics Restructures

HUDSON, N.H. — Centronics Data Computer Corp. has announced a rearrangement of the company's management and a new business structure with an eye toward supplying the microcomputer user.

"We expect 1981 to be the start of a dramatic increase in the demand for our printers, with the microcomputer printer area our most dynamic opportunity," Michael D. Kaufman, Centronics president, said. "We feel that the number of microcomputer printers sold during the next 12 months could come close to the total of all printers shipped in our 1980 fiscal year.

"At the same time, we are also beginning to gear up for production of some exciting new products, including the Quietwriter."

Centronics' products have been grouped into three business areas and a line vice-president has been named to manage each business area.

George R. Rea, former vice-president of sales/marketing, has been named vice-president of the microcomputer business area. Centronics' industrial printer business will continue to be headed by Robert W. Kilcullen, who was promoted to vice-president. William H. Chalmers, who joined Centronics from Digital Equipment Corp.'s Peripherals Division, has been promoted to vice-president, with continuing responsibility for developing the Quietwriter business.

HAVE YOU BEEN
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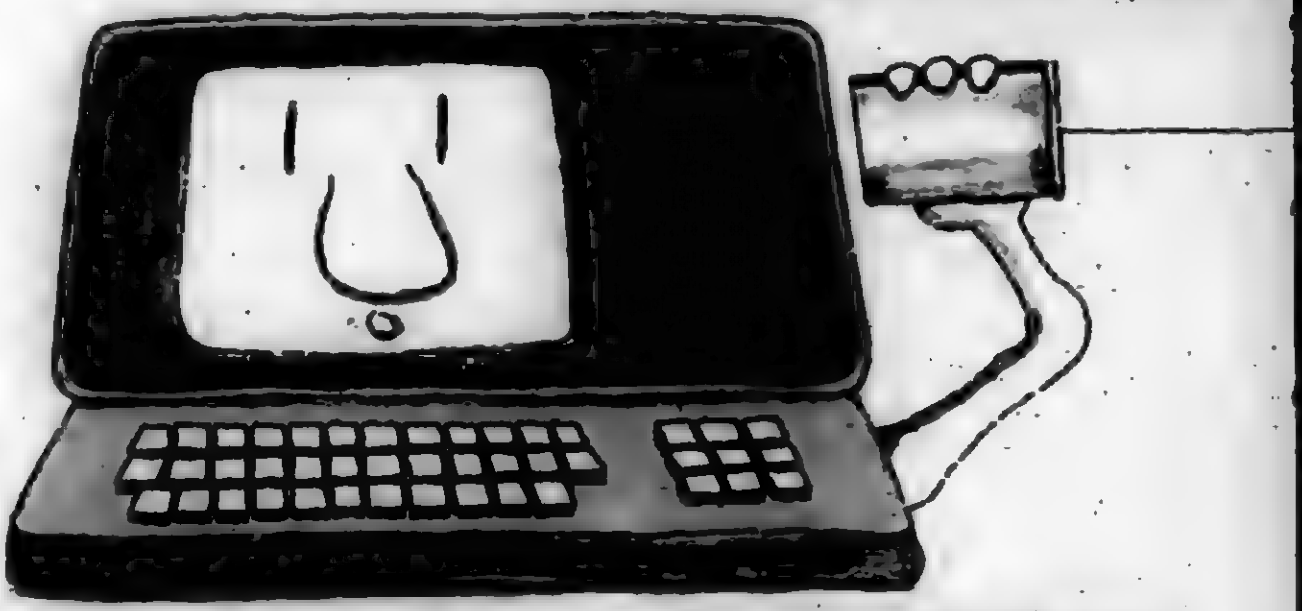

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Common Software. With BBN, software is the same at each node. Already in place throughout the network is the Interface Message Processor (IMP) program to handle packets from both hosts and other nodes. A program variation, Terminal Interface Processor (TIP), supports terminals as well as hosts.

Maintenance costs are now dramatically reduced. More important to the designer, system configuring couldn't be easier.

Equality among nodes. For flexibility all BBN nodes are created equal. When you add or subtract sites, the change is automatically sensed and accepted throughout the network. No special hardware, software change or system redesign is required.

Superior Message Control. Importantly, BBN networks deliver messages in milli-seconds, not minutes. They do so with superior message control. Routing control. Error control. Status control. Traffic control. It's all automatic—the host node even receives an im-

While Others on Hot Topics Staying Strong

Attendance has been about 150, but this year 170 are expected, said Mike Reilly, assistant director of the Department of Management, Labor and Business Administration at UCLA Extension.

The conference for high-level data base administrators and their executives is at such an elevated level, that it isn't impacted by discretionary budget-related decisions, Reilly suggested.

"It's not only the air fares," said Rob Muirhead, assistant manager of conferences at the Institute of Internal Auditors (IIA). "Whoever's signing off on the seminars is also looking at the $69 to $79 a night hotel rooms." Muirhead guessed it is not unusual for an employee to spend $1,000 for tuition and conference expenses — and that says nothing about time away from the job.

To beef up attendance at an October Atlanta conference on Systems Auditability and Control, IIA, besides mailing to its 24,000 members, sent 17,000 brochures to the Data Processing Management Association and planned three large ads in *Computerworld*. Response has been so limited that it canceled the third *Computerworld* ad, a spokesman said.

In a recessionary time, discretionary funds are the first to be cut and those discretionary funds in the past went for management training such as Ubi Enterprises attempted with its first public session on "Managing the DP Professional," according to President Ursula Bleth Connor. Despite disappointing interest in the U.S., the program is now going to be offered in Brazil and others have become interested in other Ubi educational services because of the workshop promotion, Connor said.

Joseph Ferrara, vice-president of the Diebold Group, observed the trend from another perspective. "Hotels are a lot easier to negotiate with; booking meetings and locations is a lot softer," Ferrara said. Most of the Diebold sessions are for subscribers to the Diebold service.

The American Management Association (AMA) sponsors about 3,500 meetings a year. This year's attendance, which averages 23, is down about two registrants per meeting, reported Robert M. Newton, AMA director of public relations.

There is one bright spot. Those firms providing in-house education report a spurt in business.

Datapro Research Corp. offers more than 100 sessions all around the country. Although there's no decline in enrollment because many of the attendees are Datapro subscribers, there has been an increase in interest for in-plant training, according to Joseph F. Menendez, manager of seminars.

"From the recession point of view it's cheaper to train people already in the organization than to pay the agency fees to bring in someone new," said Joseph E. Wehr Jr., vice-president of Data Base Management, Inc. of Vernon, Conn., which is currently offering IMS and CICS courses.

Turn Key Systems, Inc. in Norwalk, Conn., which provides software support and education for National CSS, has also found an increase in requests for in-house training, according to Connie Galley, manager of educational services. However, she's uncertain if the trend will continue.

"This is a very cyclical business. The first six months are always higher than the last."

Aydin Forms New Operation

FORT WASHINGTON, Pa. — Aydin Corp. has formed an operation to develop and market products in digital telecommunications, specifically in time-division multiple access (TDMA) systems, for satellite communications.

Dr. Joseph Deal has joined Aydin to head the development of products for this new operation.

Deal was previously Comsat Laboratories' department manager in TDMA systems.

The new operation will initially be based on the West Coast at the Aydin Microwave Division in San Jose, Calif.

Aydin designs, manufactures and sells microwave and digital data communications products and systems, computer-controlled color display terminals and high-power electronic equipment for fusion experimentation.

HP Service Catalogs Desktop Programs

PALO ALTO, Calif. — Hewlett-Packard Co. is offering a service to make it easier for software suppliers to market their Basic language scientific and engineering software to HP System 35 and System 45 desktop computer users.

The Software Catalog Service provides program descriptions in several application areas, including aeronautical, electrical, mechanical and civil engineering; mathematics and statistics; life and physical sciences; business management; computer utilities; and a special section on assembly language, which is an option on HP's desktop systems.

For more information on the HP Software Catalog Service, third-party software suppliers should write on letterhead to Market Development Manager, HP Desktop Computer Division, 3404 E. Harmony Road, Fort Collins, Colo. 80525.

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Nickels & Dimes

Compuscan, Inc. expects to report losses of approximately $6.5 million on revenues of approximately $18.2 million for its fiscal year ending May 31, 1980. Approximately $4.7 million of these losses will be attributable to discontinuance of its Start and Comap text editing product lines, previously sold to the graphic arts industry, and a $700,000 extraordinary noncash charge relating to the exchange of its subordinated debt for common stock.

Compuscan has been engaged in preliminary merger discussions with Hendrix Electronics, Inc., a manufacturer of text processing systems and optical page readers located in Manchester, N.H. No agreement has been reached on the terms or conditions of the possible merger.

Microcomputer Systems Corp. has been awarded a $1 million contract to supply custom-developed disk drive controllers to Microdata Corp.

$ $ $

American Management Systems, Inc. announced that it intends to file a registration statement with the Securities and Exchange Commission for a public sale by the company of approximately 150,000 shares of its common stock. The offering is expected to take place this month.

$ $ $

Sidereal Corp., a terminal manufacturer, has concluded equity and line of credit arrangements. The funding will be used for working capital requirements, new product development, marketing programs and corporate expansion.

$ $ $

Chromatics, Inc. has raised more than $4.1 million to finance additional expansion and new product development in a private sale of stock.

$ $ $

Wang Laboratories, Inc. announced that it intends to call for redemption on Oct. 3 all of its $50 million principal amount of 6.75% convertible subordinated debentures due 2004 and all of its $50 million principal amount of 9% convertible subordinated debentures due 2005. Wang has filed a registration statement with the Securities and Exchange Commission covering the issuance of a maximum of 2,593,199 shares of Class B common stock upon coversion of the debentures.

$ $ $

Topaz, Inc. has announced a 3-for-2 stock split effective and payable Sept. 26 for shareholders of record Sept. 15.

$ $ $

Varian Associates, Inc.'s board of directors has declared a regular quarterly cash dividend of 13 cents per share payable Oct. 31 to shareholders of record on Oct. 15.

$ $ $

Amdax Corp. has concluded a major financing package whereby seven venture capital firms have invested $2.1 million in the firm. The investors are Business Development Services, Inc. (a wholly owned subsidiary of General Electric); Collier Enterprises; Pioneer Investors Corp.; Doan Resources; International Industrial Interests, Inc.; Adler & Co.; and American Diversified Enterprises, Inc.

$ $ $

Informatics, Inc. has filed a registration statement with the Securities and Exchange Commission covering a proposed public offering of 1,267,250 shares of common stock. Meanwhile, Informatics and the Equitable Life Holding Corp. jointly said they know of no developments to account for the recent increases in the trading volume and market prices for the common stock of Informatics in the over-the-counter market.

Orders & Installations

The Riverside Regional Education Data Center of Riverside, Calif. has ordered a Burroughs Corp. dual processor B6900 computer system to institute extensive on-line student accounting and financial-payroll applications for 54 school districts in Southern California.

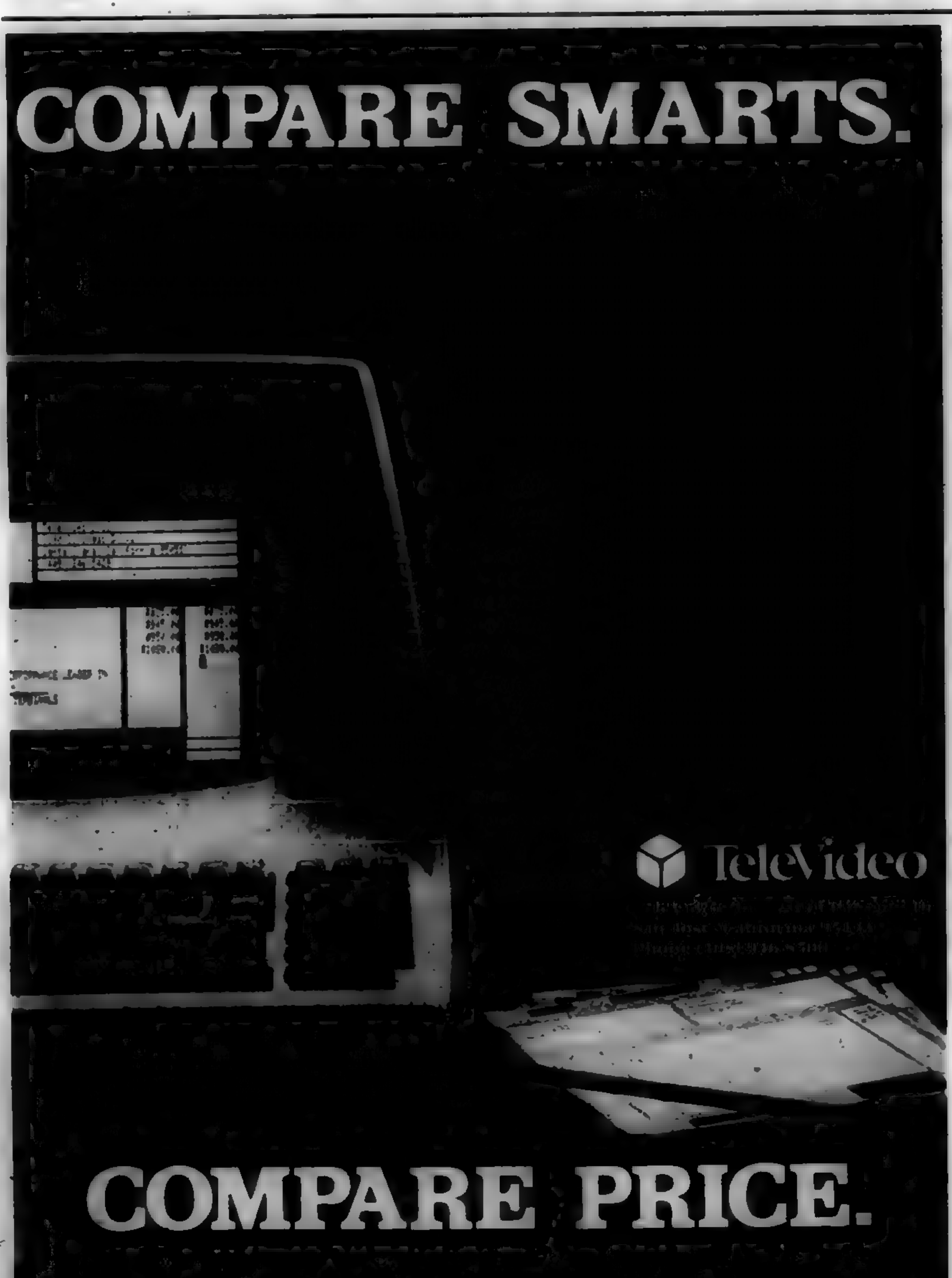
Norand Corp., Cedar Rapids, Iowa, has received an order for 462 of its Alpha-1 hand-held data entry terminals and associated transmission equipment valued at approximately $1.1 million from Federal Express Corp. of Memphis, Tenn.

MIT has ordered and is now installing a Honeywell, Inc. large-scale Level 68/DPS Multics computer valued at about $4 million.

Genuardi Markets, Inc., a supermarket chain in the Delaware Valley, has ordered a Univac System-80.

Contracts

BDS Computer Corp. has been awarded a contract by the General Services Administration for plug-compatible line printers, controllers and interfaces.



Report Cites 23% Growth Rate

Printer Market Seen Hitting $10 Billion by '88

NEW YORK – The computer printer market will reach $10 billion in 1988, growing at a compounded annual growth rate of 23%, according to a report by Frost & Sullivan, Inc. (F&S).

While today's models use as many as 30 different technologies, there will be major shifts between the two dominant ones, nonimpact and impact, with the former making large gains, the report said. (For growth projections by hardware category, see adjacent box.)

Nonimpact technologies provide higher speed and improved print quality and offer greater reliability as a result of their electronic basis, as opposed to mechanical designs. "They also offer opportunity for higher profit margins," the survey noted.

Electrostatic, thermal, laser and other nonimpact printers will gain 40% of the market in 1988 compared to 7% last year. "Our survey indicates user acceptance with the absence of multiple copies the only significant objection," F&S said, adding most users say they are "willing to live with the deficiency" or "work around the problem."

Dramatic Gains

The most dramatic gains will occur at the market extremes. At the high end, laser-xerographic applications will gain more than sixfold in market share – from 2% in 1979 to 13% in 1988. At the low end, ink jet printers will do even better, going from a negligible market share in 1979 to 14% by the end of the forecast period.

In dollar volume, electrostatic printers will grow from $39 million last year to $613 million in 1988 because of graphics applications. However, improved resolution and appearance of ink jet applications will compete strongly with electrostatic techniques toward the latter half of the decade, the report said.

Gains will also be chalked up by laser-electrographic printing whose 1% market share will increase to 3% by 1988, while impact-type printers' dominant 92% market share will decline to 61%.

Within that category, full-character serial printers will retain the lead position. But matrix printers will come to hold nearly twice the market share as band printers, and the market share held by drum and chaintrain printers will also decline, each to 1% by 1988.

Trends in distributed processing and data communications are proving the spur to the printer boom, F&S claimed. The survey indicated each system installation will have an average of 40 nodes, and "most will require a printer."

In addition, user respondents "strongly selected" medium speed transmission and on-line operation for their printers. "This places a premium on higher speed printers," F&S said, adding "An overlap of computer and communications have blurred traditional functional boundaries."

The survey characterized the printer marketplace as one in upheaval and constant change, with rapid technological developments and continuous downward price pressures. Independent, plug-compatible printer vendors, for example, shift to OEM marketing to obtain volume business, and such shifts will continue and even intensify.

The survey, entitled "The Computer and Communications Printer Market," costs $900, the vendor said from 106 Fulton St., New York, N.Y. 10038.

1979-1988 Compound Annual Growth Rate

Hardware		
Mainframe computer systems		23%
Small business computers		22%
Low-priced	29%	
High-priced	17%	
Communications		29%
Terminals		9%
Word processors		24%

Growth Projections by Principal Market Sector

Royal Sells Dataroyal Stake

NASHUA, N.H. – Royal Business Forms, Inc. has sold the balance of its equity interest in Dataroyal, Inc. to Dometic, Inc., a subsidiary of AB Electrolux, for an undisclosed amount of cash.

Prior to the transaction, Dataroyal, Inc. was owned by Dometic, Inc., Royal and Dataroyal Management.

The sale by Royal was the last in a series of steps that began in May 1978 as part of a program initiated by Royal to reduce its obligations and risks in areas outside its immediate expertise in the forms industry.

This advertisement is neither an offer to sell nor a solicitation of offers to buy any of these securities. The offering is made only by the Prospectus.

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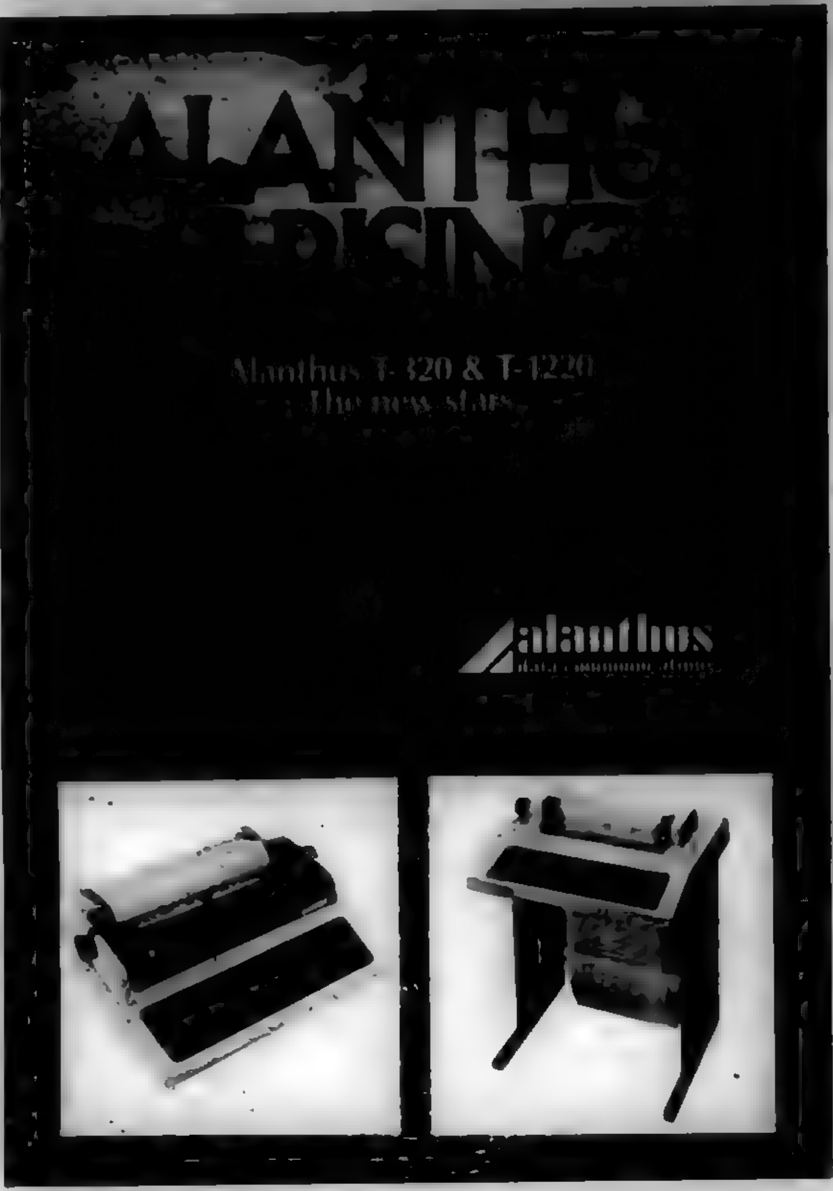

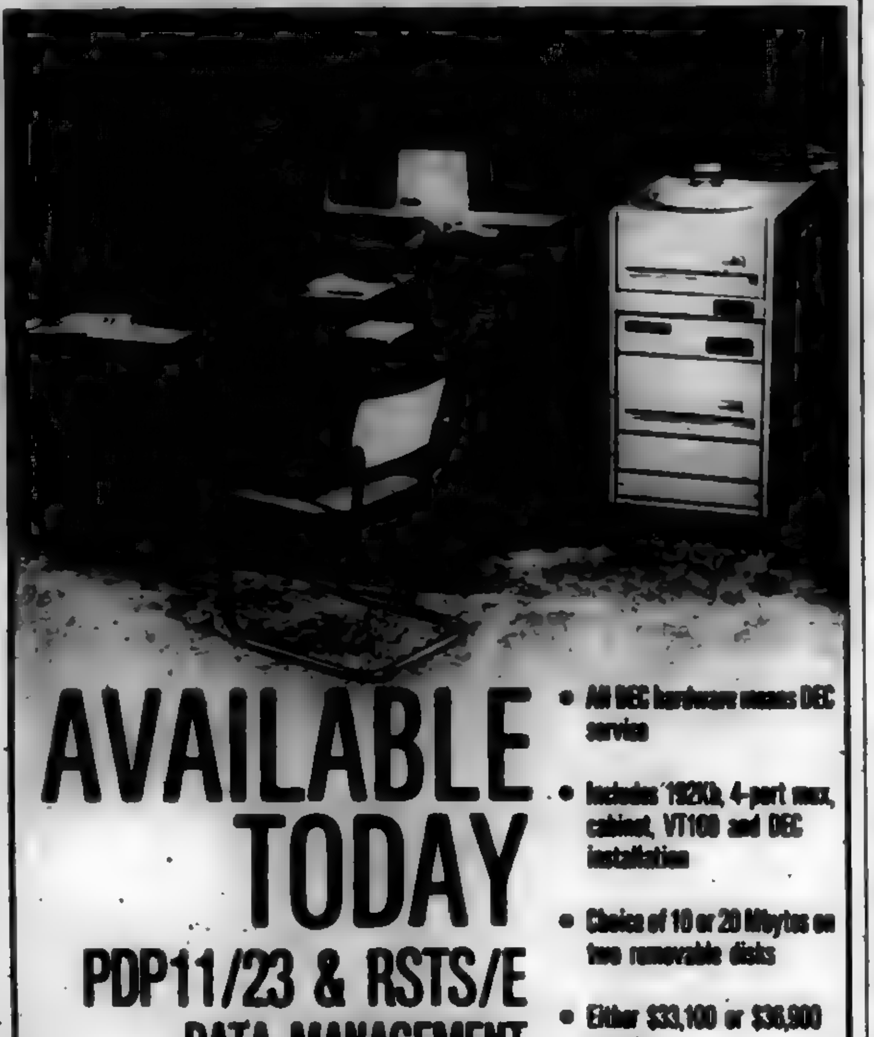
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Executive Corner

• William S. Wheatley Jr. has been elected president of the American Satellite Co.

• Dan Trunk has been named vice-president of marketing for Computer Associates.

• The Prentice Corp. has named Karl H. Moeller Jr. corporate vice-president of finance.

• D.E. Eckdahl, senior vice-president of NCR Corp.'s Engineering and Manufacturing Group, has resigned to pursue other interests. W.F. Buster, currently vice-president of the Computer Systems Division, has been appointed to replace Eckdahl.

• Graham O. King has been promoted to president and chief executive officer at the Auto-trol Technology Corp.

• David H. Zirkle has been appointed vice-president and controller for Northern Telecom Systems Corp.

• Dr. Joseph Burns was elected vice-president of Mikros Systems Corp.

• Paul H. Till has joined United Communications Systems, a subsidiary of United Telecommunications, Inc., as vice-president of planning.

• Walter S. Jonsson has been named vice-president of sales for T-Bar, Inc.

• Threshold Technology, Inc. has appointed Joseph J. Bove vice-president of marketing.

• Pat Warren has just been named vice-president of technical services at Business Application Systems, Inc.

• Andrew W. Mathews has been elected vice-president of marketing at Visual Technology, Inc.

• E-Systems, Inc. has appointed Billy Hooker vice-president of advanced systems; Franklin Stapp vice-president of electronic Warfare; and Dr. Phil Rogers vice-president of electronic systems software.

• Peter S. Anderson has been promoted to senior vice-president of marketing at Mohawk Data Sciences.

• Anthony Middleton has been named vice-president of systems and programming in the minicomputer division at Data Communications Corp.

• Earl Andrew has been made vice-president of manufacturing at Data Electronics, Inc.

• Marvin Crumb was appointed president of U.S. operations at the Mannesmann Tally Corp.

• William Robinson has been appointed vice-president and head of Commodore Business Machines Computer Systems Division.

• Jack Comish has been promoted to vice-president of technical services for Intertek Services Corp.

• Robert E. Wilcox has been promoted to vice-president and director of operations for ITT Datanetics Corp.

• John Bentley Jones has been appointed vice-president, Systems and Support Division, and Robert F. Teitel has been named technical director of data research and analysis at Maxima Corp.

• Holly Hobart has been promoted to manager of management information services at Tymshare, Inc.

• Charles R. Bush has been appointed vice-president of program management at MSI Data Corp.

• Andrew Krycerick has been named vice-president of engineering for Wespercorp.

• Qume Corp. has announced the appointment of five new officers. The new officers are David Mans, vice-president of finance, comptroller and treasurer; Jack Jamieson, vice-president of research, development and engineering; Gail James, vice-president of marketing, Memory Products Division; Allan McVicar, vice-president of operations, Memory Products Division; and John DeSantis, vice-president of operations, Printer Products Division.

• Richard W. Brail has been promoted to director of international sales and support for MSI Data Corp.

• James E. Herlinger has been appointed vice-president of Plantronics/-Santa Cruz.

• Thomas J. Spadafora has been named vice-president and division manager of the Transmission Products Division at Timeplex, Inc.

• John R. Walker has been appointed executive vice-president at Ontel Corp.

• Mike Gray has been named vice-president of research and development for Zitel Corp.

• D. Otis Wolkins has been named president of GTE Microcircuits Division.

• Robert S. Buzard has been appointed vice-president of marketing for E-Systems, Inc., Commercial Division.

• Dr. Jan Prokop has been appointed senior vice-president of computer services and Edward W. Green has been appointed vice-president for information product development at Data Resources, Inc.

• Mel W. Bosch has joined Integral Data Systems, Inc. as director of oem marketing.

• D. Jerry Bowman has been promoted to senior vice-president and director at Comserv Corp.

• Walter B. Davis Jr. has been appointed director of international marketing for Bunker Ramo Corp.'s Information Systems Division.

• TEI, Inc. Chairman and President Garry Walker has appointed four new vice-presidents. Harry H. Rayner has been promoted to vice-president of sales, Pat McCormick to vice-president of manufacturing, Davis S. Bennett to vice-president of planning and development and Wallace Berry to vice-president of production engineering.

• Richard M. McCraney has been named vice-president of sales, Robert P. Berry has been named vice-president of field engineering and Gary A. Land has been named vice-president of product management at Memorex Corp.

Supershorts

Electronics/China 80, the first exhibition restricted to U.S. companies as exhibitors ever staged in that country, attracted more than 40,000 executives from every province in the People's Republic of China except Tibet.

Informatics, Inc. has established headquarters in Germany for operations in Central Europe. The operation will encompass all three business segments of Informatics — software products, professional services and data services. The operation will be built around the existing subsidiary, Informatics GmbH, and will be headquarterd in Dusseldorf, West Germany.

NTSC, Sycor Alumni to Produce Winchesters

By Rita Shoor
CW Staff

ANN ARBOR, Mich. — Approximately one year of start-up time and product development is producing results with the announced formation of Irwin International (II) here.

The firm will be guided by alumni of Sycor, Inc., a manufacturer of computer terminal systems, and Northern Telecom Systems Corp. (NTSC), formed when Northern Telecom Ltd. (NTL) merged Sycor with Data 100 Corp. in 1978, according to an II spokesman.

II's first product — dubbed the Irwin 510 — is a 5.5-in. Winchester disk drive system introduced by Samuel Irwin, president and chairman of the board, in conjunction with the formal announcement of II's formation.

Privately Held Firm

Irwin is a former president and chairman of Sycor who was with that company from its start-up in 1967 through its sale in 1978. Although he preferred not to reveal the details of II's financial structure, Irwin described himself as "the major investor" and indicated that the firm is privately held with no need to "resort to the debt market" so far.

Among the II executives who chose to leave NTSC are Paul Cochlan, vice-president and chief operating officer, and Donald Pate, senior vice-president in charge of marketing. Several months ago, NTL acknowledged that there had been some problems with the consolidation operation because of the turmoil created by personnel turnover among the executives in the companies acquired to form NTSC [CW, July 21].

II has a lease on 24,000 square feet of administration, research and engineering space in Ann Arbor with another 8,100 square feet of pilot manufacturing space in a nearby building, Irwin noted.

The company is also hoping to purchase an existing plant in northern Michigan for a manufacturing and assembly facility. This would give II approximately 50,000 square feet of space for its equipment production, he said.

Integrated Cartridge Backup

Specifications for the Irwin 510 include a storage capacity of 10.2M bytes formatted with an integrated cartridge tape backup, Irwin said. The backup system allows all of the formatted data to be dumped and restored on the backup tape cartridge "in less than four minutes," Cochlan claimed.

Average access time of the unit is said to be 25 msec — reportedly twice as fast as most 8-in. Winchesters.

The 510 will be aimed at both small and large OEMs, systems integrators and distributors, according to Pate. "At this time, we will only sell to end users if a particular end user is large enough to justify our interest," he said.

Although he conceded that no distributors had yet been formally signed up, he maintained that this was because the completed distribution contract "wasn't back from the lawyers yet."

Standard Winchester design components have been utilized in the basic 510 system, Cochlan said and claimed that "most of the technology has been proven on larger, more expensive equipment — what we've done is find ways to reduce size and complexity."

The package is priced at $1,500 per unit in OEM quantities of 500, Irwin said. This breaks down to a cost of 12.2 cents per 1K byte, he said. II is building 100 units for customer evaluation in early 1981 and expects to be at a production stage enabling it to build about 7,500 units that year by May 1981, Cochlan noted.

The firm, which currently employs 35 people, is headquartered at 200 Green Road, Ann Arbor, Mich. 48105.

Expansions

A.B. Dick Co. of Chicago has announced plans to open the Phoenix Computer Development Center to be located in Scottsdale (Ariz.) Industrial Airpark. The facility will operate as a section of the company's Research and Engineering Division.

Intertel, Inc. has completed a move to an 83,000 sq ft headquarters building in the Andover Tech Center Industrial Park. Its address is 6 Shattuck Road, Andover, Mass. 01810.

Genrad Semiconductor Test, Inc., a subsidiary of Genrad, Inc., has broken ground for its permanent development and manufacturing headquarters in Oak Creek Business Park, Milpitas, Calif.

STSC, Inc. (formerly Scientific Time Sharing Corp.) is building new corporate headquarters in Bethesda, Md. The building is located at 2115 E. Jefferson St. in Rockville, Md.

Computrend, Inc. has announced the signing of a long-term lease on a 16,100 sq ft facility on Rt. 128 in Woburn, Mass. The facility at 13 Wheeling Ave., will house Computrend's national service organization, warehousing operation and its Boston sales and service group.

Data Card Corp. has announced the start of construction of a 14,700 sq ft addition to its Plastics Division in Buena Park, Calif.

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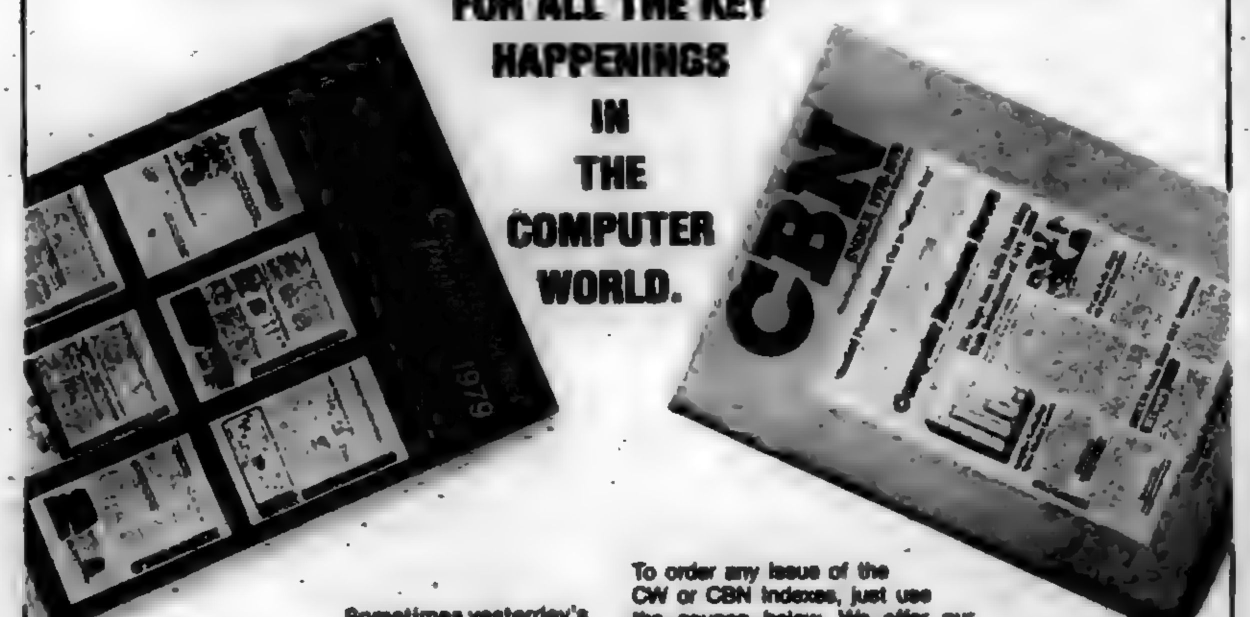

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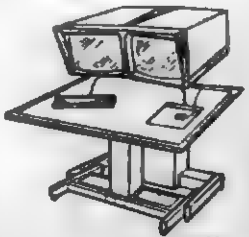

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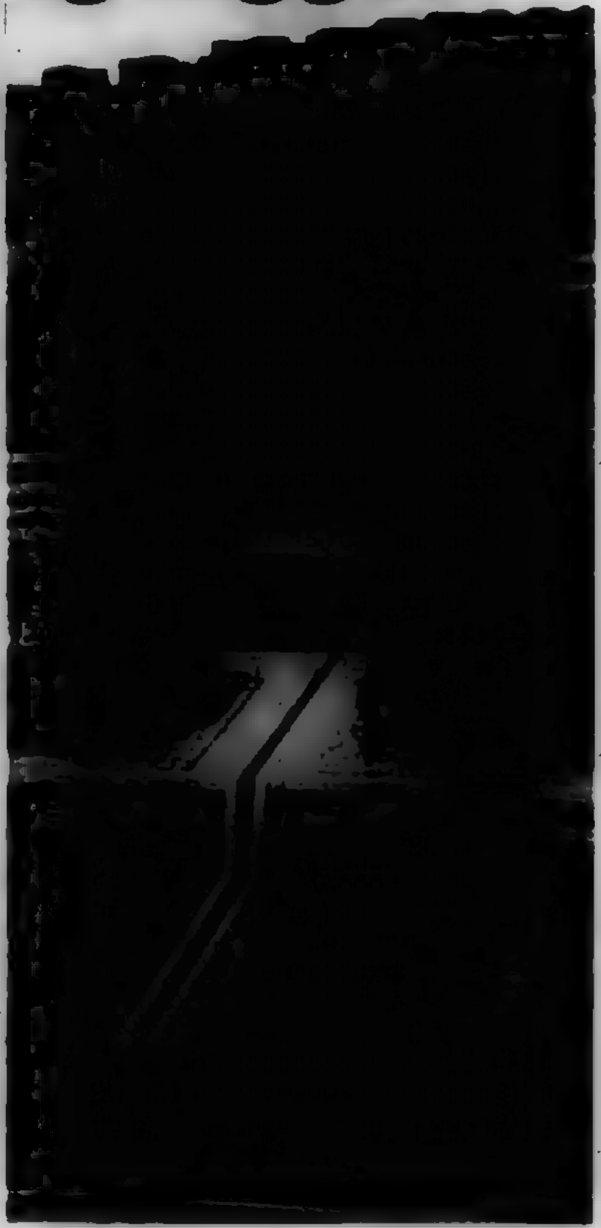

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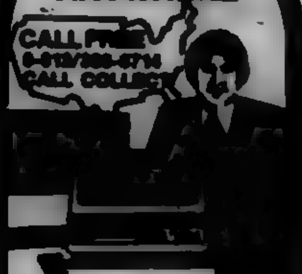

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Position involves providing technical guidance and support in the planning, development, and implementation of hardware and software systems as they pertain to defined user service levels from the performance and capacity planning perspective. The successful candidate will be thoroughly familiar with the use of performance/capacity tools such as TESDATA hardware monitors, PLAN IV, MVS, RMF II, CUE, TSA, DSO, PPE and RESOLVE in a large multiple CPU/multi-datacenter environment using MVS 3.8/JES3 and VM/370 6.0 software. The ability to define, conduct, and present performance studies to technical and management personnel and to interface effectively with user representatives is required.

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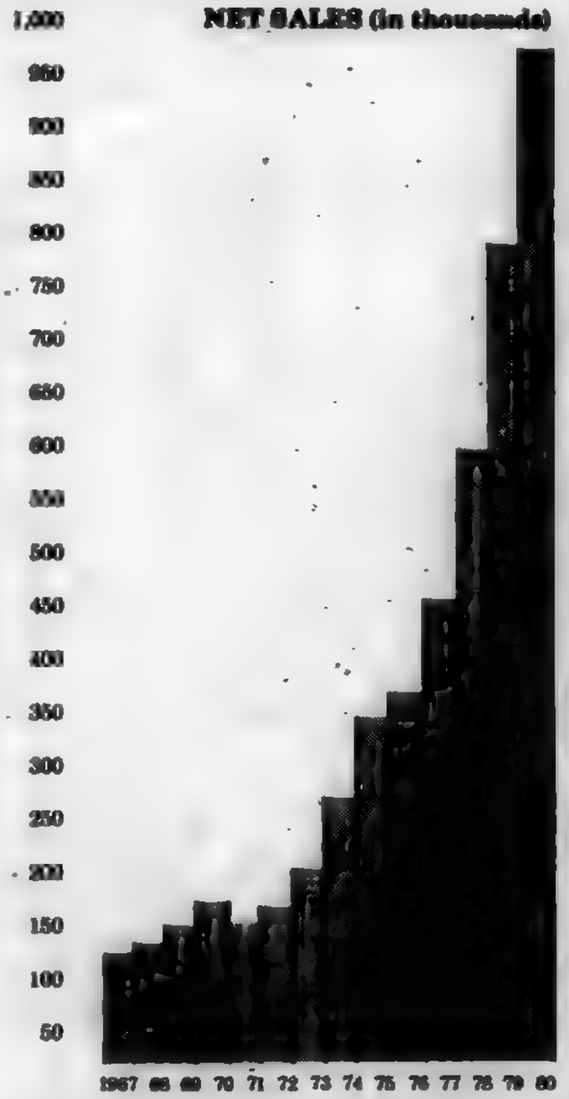

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John B. McManus, Director
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University of Illinois
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SofTech is a rapidly growing international organization active in the development and application of new systems and software technology. We have a reputation for excellence with our clients and are currently seeking talented people to extend that reputation in the Washington, D.C. area.

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To design and develop a data-flow oriented language, compiler and operating system to be the basis for implementing signal processing applications. This exciting project also involves signal processing applications code and microcode. This significant software effort will cover all phases of development...systems programming, applications programming and microcoding.

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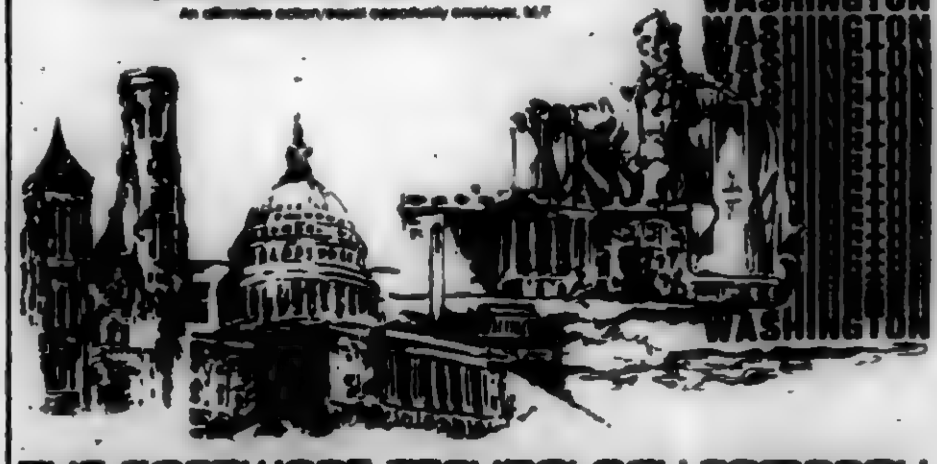

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We're searching for an individual to assist us in additional applications (Manufacturing and Order Entry) on our dedicated DEC PDP 11/70. Current plans include the use of BASIC +2 as well as DECNET in a 35 terminal environment.

You should:

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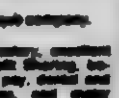

Personnel Department
[illegible]
[illegible] St. and [illegible] Ave., Troy, N.Y. [illegible]

NEW YORK

How to Read an EDP Ad. . .

There is rarely, if ever, an exact fit between job and candidate, and yet people are hired every hour of every day.

The advertising problem is a twofold one: 1) the advertiser does not know how to say what it wants to say; which when simplified equates to: "We'd like to hear from you EDP people out there!" 2) the reader misses an opportunity by not investigating because there is apparently no fit.

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- Bunker Ramo Banktran, ATM
- IBM 3600, 8100
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A B.S. Computer Science will be considered a plus. Salary will be commensurate with your experience. Benefits are excellent. You will work in metropolitan San Francisco which offers a wide range of cultural and recreational activities.

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IBM EXPERIENCE REQUIRED

CONTACT [illegible], V.P.

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Our expanding data processing department offers opportunities for career oriented data processing professionals to play key roles in meeting future objectives. Responsibilities include extensive contact with user departments for systems support, analysis, design and programming.

Applicants should have at least three years' or more COBOL experience in commercial applications. Experience with Burroughs medium systems in an on-line data base environment is preferable.

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We have positions available in our U.S. offices in **San Francisco/San Jose, Los Angeles/Orange County** and our Canadian offices in **Edmonton, Calgary, Regina, Vancouver and Victoria.** Applicants should have at least three years' experience in any of the following skills:

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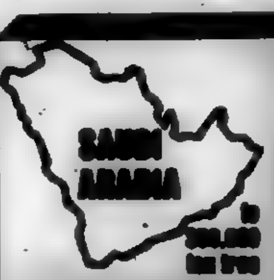

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When you think of Saudi Arabia, do you think camels and deserts?

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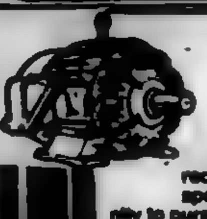
ATA Services, Inc.
1616 P Street, N.W.
Washington, DC [illegible]



PROGRAMMER ANALYST

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We are a successful and progressive multi-plant manufacturing firm, located in the pleasant medium-sized, Midwestern city of Wausau, Wisconsin. If you enjoy a clean, recreation-filled, family-oriented community with unspoiled natural resources, while having the opportunity to pursue an exciting career with a leader in its industry, this is your opportunity.

We are seeking an individual with two or more years experience in programming and some analyst background. A related degree is a definite plus, though not necessary. You will have project responsibility for developing and implementing new systems.

We offer a professional challenge and excellent levels of compensation to the right person. Call COLLECT today or send a resume in complete confidence to:

Pete [illegible]
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Design and develop systems to integrate CAD/CAM family of systems.
[illegible] .... [illegible]
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Manufacturing systems [illegible] COBOL)
[illegible] .... [illegible]
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[illegible] .... [illegible]
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[illegible] .... [illegible]
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[illegible] .... [illegible]
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For a confidential discussion of these and other positions call collect or mail your resume to:

1940 116th Ave., N.E.
C-[illegible], Suite A
Bellevue, WA [illegible]
(206) 453-2700
[illegible]

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---

data processing

CAREER OPPORTUNITIES

Blue Cross and Blue Shield of Kansas City, a leader in the health insurance industry, has immediate opportunities for DP professionals to expand and develop their skills in business and insurance applications.

SENIOR SYSTEMS ANALYSTS

Must have previous experience in total development and implementation of large systems using data base concepts. Leadership abilities and excellent communication skills provide growth potential.

PROGRAMMER ANALYSTS

Strong COBOL programming ability including some analysis and design background and user interface experience is required.

SENIOR PROGRAMMERS

Solid COBOL coding, testing and debugging experience is required. IMS coding and structured programming techniques strongly preferred.

Our environment consists of an IBM 3032 operating under MVS with IMS DB/DC. We offer flexible hours, highly competitive salaries, and excellent benefits including a dental plan, credit union, educational assistance and retirement package. Previous experience in a Blue Cross and Blue Shield or similar environment is preferred. For immediate consideration, call Kathy Jensen, collect, 816-932-5262, or forward your resume, in confidence, to her attention.

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Mini-Computer Operations is launching a major new thrust in its mini-computer system and is seeking key individuals at all levels to join its Software Development team.

- **BREAK INTO THE MINI-COMPUTER FIELD** by joining our software team to provide technical expertise outside the development organization and solutions to customer installed systems. With a willingness to learn about new products, you will gain a broad background in overall mini-computer software design and applications.
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At Sperry Univac, the individual counts, is listened to, makes the difference, determines the program success. We have a reputation of listening to our customers, our employees; we'll listen . . . to you . . . to your ideas . . . developing innovative solutions to our very complex technical projects. Let us evaluate your resume to see where you may fit within the variety of opportunities we have available to you.

A position with Mini-Computer Operations offers you a stable, rewarding career, accompanied by a compensation package that is second to none in the industry, and includes free dental insurance, 10 paid holidays as well as a comprehensive medical and life insurance plan. Submit your resume and salary history in complete confidence to the address below, or phone our Employment Department, Ext. 250, at either 714/833-2400, or 213/771-6910 for additional information regarding these exciting career opportunities.

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RPA

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Applications Analyst Responsible for security systems; security standards, disaster recovery OS COBOL programming and design/evaluation experience plus a degree is required. [illegible]

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Project Leader to $41K

Our client, a Fortune 500 manufacturing company located in the Mid-Atlantic States is seeking a candidate who has demonstrated sound technical data processing credentials and is now ready to assume additional responsibilities involving heavy user contact and management of a major applications development team.

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halbrecht & co.
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We are looking for an individual with supervisory or management experience in tabulation services with an established TAB or research supplier. The ideal candidate will have 4-5 years experience and a Bachelor's degree with concentration in computer administration, quantitative methods or systems.

The individual will have primary responsibility for management of the Tabulation Services Department, including Coding, Keypunch, Spec Writing and Computer Operations (Prime [illegible]).

This position offers an attractive salary commensurate with experience, performance bonus and a complete benefit package which includes profit sharing and educational reimbursement.

Qualified candidates should submit a resume, including salary history and requirements, to [illegible], Manager of Personnel Services.

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[illegible] Road
Indianapolis, Indiana [illegible]
(317) [illegible]

Data Collection Offices: New York/[illegible]/Indianapolis/St. Louis/Phoenix
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You will be responsible for developing software to monitor system performance and utilization, assist the operation staff in production scheduling and operating systems support and telecommunications. Successful candidate will have 5 plus years experience in a systems programming technical support position or a strong technical background with applications programming experience. On-line systems experience in a distributed processing environment using HP-3000, BASIC, SPL or FORTRAN required.

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Responsibilities will include providing analysis and programming support for MRP, inventory and shop floor control system. Requires BSCS (or equivalent) and 2 years experience.

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[illegible] ASSOC
150 Broadway (agency)
NY 10038

ROBERT HALF

[illegible]

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P/A-BASIC-FORTRAN	[illegible]
P/A-OS/MVS MPR	[illegible]
PROG-FORTRAN [illegible]	[illegible]
PROG-COBOL-CICS	[illegible]
PROG-RPG II-COBOL	[illegible]
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ADVANCEMENT POSITIONS

[illegible]

- Project Managers/Leaders
- Senior Systems Analysts
- Systems Analysts/Designers
- EDP Auditors
- Application Programmers
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- Scientific Programmers
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For more details, send your resume or call:

[illegible]
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[illegible] Chicago, IL [illegible]
[illegible]

FLORIDA POSITIONS

Urgently need Programmers, Analysts, and Systems Programmers for Florida and other Sunbelt locations. Experienced individuals needed in financial, manufacturing, and for Software Development. IBM 370, COBOL, CICS, OS/VS, DOS, BAL or Assembler. Others needed with Univac, Burroughs, Honeywell, PDP-11 or NCR experience. All fees, interview and relocation expenses paid. Salaries 15 to 35K. Rush confidential resume and earnings history to:

J.C. [illegible], President
[illegible], INC.
[illegible] Suite [illegible]
Tampa, Florida [illegible]

Data Processing Instructor

Full Time instructor needed immediately. Teaching field to include three of the following data processing subjects: FORTRAN, Systems Analysis, COBOL, Assembler and OS. Call Vice President, Academic Services, Lincoln Land Community College, Springfield, IL 217/786-2287.

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Our graduates are thoroughly trained in "Business Computer Programming Languages." Students have "Hands-on-training using the latest IBM Equipment. Graduates are willing to relocate.

For further information contact the Placement Director at the school nearest you:

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9720 Rodney Parham Rd. Little Rock, Arkansas
72207

United Electronics Institute (214) 324-2811
3040 N. Buckner Blvd. Dallas, Texas
75218

United Electronics Institute (216) 923-9959
1225 Orlen Ave. Cuyahoga Falls, Ohio
44221

United Electronics Institute (515) 223-1486
1105 Fifth St. West Des Moines, Iowa
50265

United Electronics Institute (405) 528-2731
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40216

SENIOR SYSTEMS ANALYST

Procon International Inc. has an immediate need for a Senior Systems Analyst for assignment in Jakarta, Indonesia, for a two-year minimum period. Ten years heavy analyst experience required preferably in petroleum refinery or other process construction activities and with construction scheduling systems. Engineering background desired.

Excellent salary opportunity with liberal additional financial incentives for this assignment. Superior employee benefit program. Married status available.

Procon is a leader in the international process engineering and construction industry and is in a growth pattern that provides outstanding career opportunities.

Send your resume in confidence to:

Carol Cheney
PROCON International Inc.
30 UOP Plaza
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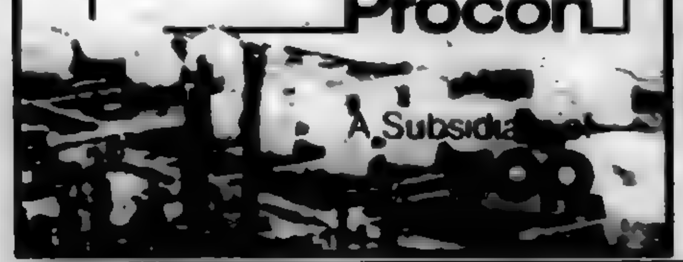

Computer Systems Manager

The National Center for Appropriate Technology seeks individual to develop [illegible] software and identify and design computer applications for NCAT [illegible] and engineering tasks. Additional responsibilities for preparing software documentation and providing user training in the use of computer systems/software. Supervision responsibility of NCAT programming staff. Specialized knowledge of computer data analysis techniques, computer modeling, computer programming including FORTRAN, Statistics and Engineering Principles highly desirable. Salary range $17,[illegible]-[illegible]. Resumes by Oct. 1 to Personnel Office, NCAT, P.O. Box [illegible], Butte, MT [illegible]. [illegible]

AA/EOE

Systems Development Project Leader

Management level position available to direct the efforts of the Criminal Justice Project Team. Experience with criminal justice applications in an on-line database environment with IBM hardware and software is desirable. Selected individual will be responsible for coordinating the development efforts of 10 criminal justice users within a service organization environment. Good communication skills are mandatory. Security clearance is required as a condition of employment. Salary $1700-2100. Apply Spokane County Personnel, West 1116 Broadway, Spokane, WA [illegible]. Open until filled.

EOE

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- ☐ Consultants/Systems Engineers
- ☐ System Software Programmers
- ☐ EDP Auditors
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SAM LOVE is Regional Manager based in Denver. Sam has a B.B.A. degree from the University of Texas. He began his career in computing in 1966 with RCA as a Systems Engineer and Marketing Representative. He has over eight years of experience in recruiting and counseling experienced computer professionals and has been a frequent speaker on career planning for D.P.M.A., A.S.M., and several universities.

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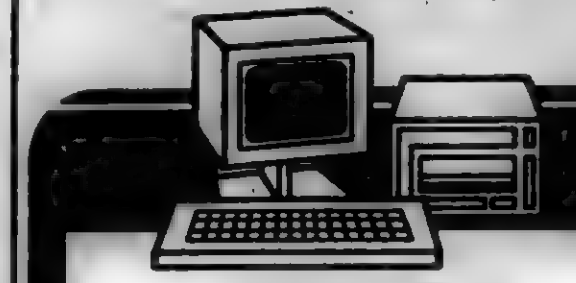

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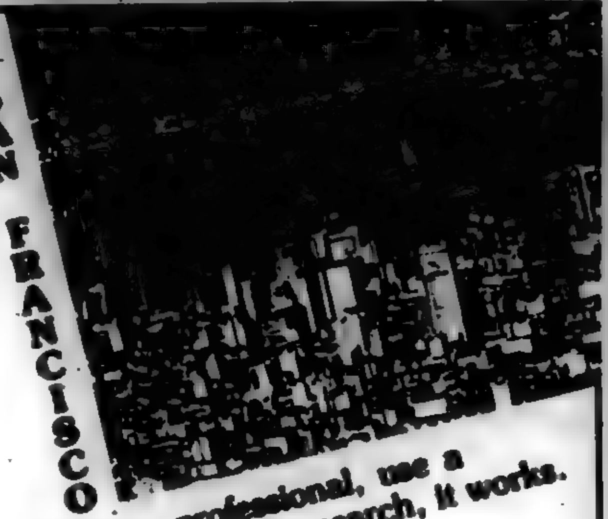

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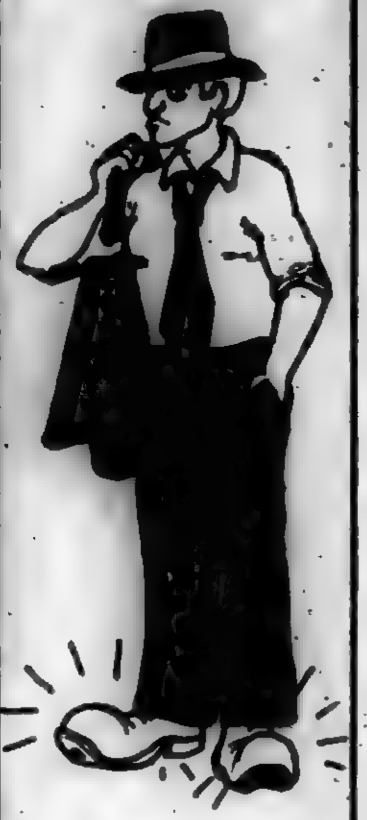

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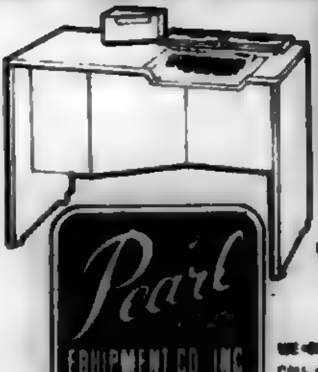

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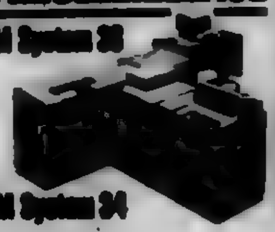

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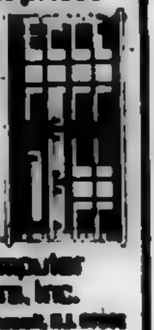

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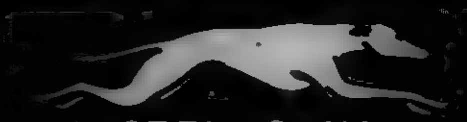

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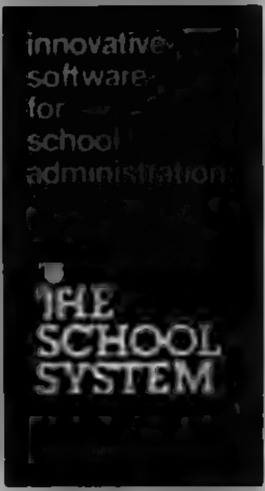

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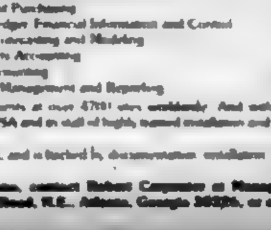

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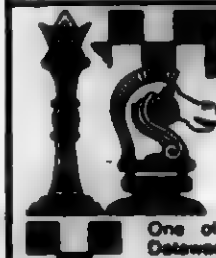

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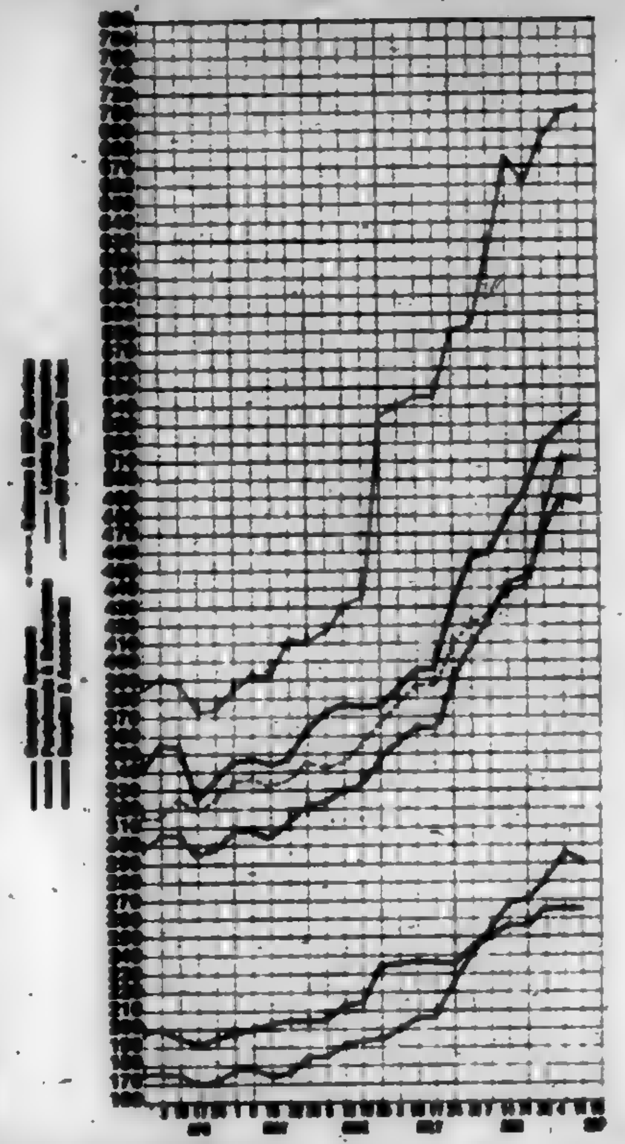

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 10, 1980

All statistics compiled,
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Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	13- 42	27 1/2	- 7/8	-3.0
N	BURROUGHS CORP	60- 80	66 1/8	-3	-4.2
O	COMPUTER AUTOMATION	9- 27	20 1/8	-3	-11.8
N	CONTROL DATA CORP	38- 75	72 1/2	-2 1/2	-3.3
O	CRAY RESEARCH INC	30- 80	77 1/2	-1	-1.2
N	DATA GENERAL CORP	46- 87	73	-12 7/8	-14.9
N	DATAPOINT CORP	44- 80	76	-2 1/2	-3.1
N	DIGITAL EQUIPMENT	50- 99	83 3/8	-3 3/8	-3.9
A	ESCO INC	7- 19	19	+1 7/8	+10.9
O	ELECTRONIC ASSOC.	6- 12	11 3/8	- 1/8	-1.0
O	FOUR-PHASE SYSTEMS	18- 40	38 3/8	- 5/8	-1.6
O	FOXBORO	28- 55	52 3/8	+2 7/8	+5.7
O	GENERAL AUTOMATION	7- 19	9 3/8	- 1/2	-5.0
O	GRI COMPUTER CORP	1- 3	3/8	+ 3/8	+100.0
N	HEWLETT-PACKARD CO	44- 78	66 3/8	-3 3/8	-4.8
N	HONEYWELL INC	60-101	95 1/8	-2 7/8	-2.1
N	IBM	50- 70	65 3/8	+1 3/8	+2.5
O	MAGNUSON COMP SYSTS	20- 38	32 1/2	-2 1/2	-7.1
O	MANAGEMENT ASSIST	9- 25	21	+2	[illegible]
O	MANUFACTURING DATA S	22- 50	49 1/2	+5	[illegible]
O	MINI-COMPUTER SYST	2- 6	4 1/8	- 1/8	-2.7
O	MODULAR COMPUTER SYS	9- 25	22	-2 1/2	-10.2
N	NCR	52- 82	69 1/8	-2 7/8	-3.9
N	PRIME COMPUTER INC	15- 39	38 7/8	- 1/8	-0.3
N	PERKIN-ELMER	20- 40	37 3/8	-1 7/8	-4.1
N	SPERRY RAND	42- 60	52 3/8	-2	-3.6
A	SYSTEMS ENG. LABS	11- 41	41	+6 1/2	+18.1
O	TANDEM COMPUTERS INC	13- 49	48 1/8	+1 7/8	+4.0
N	TEXAS INSTRUMENTS	79-131	126 1/8	+1 1/8	+0.9
A	WANG LABS.	17- 32	30 1/2	-1 1/8	-3.1

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 20	18 3/4	+ 1/8	+0.7
N	COMDISCO INC	6- 18	17 3/4	+1 3/4	+10.9
A	COMMERCE GROUP CORP	1- 2	2 1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	1 5/8	0	0.0
O	CONTINENTAL INFO SYS	2- 10	4 3/8	- 1/8	-2.9
P	DATRONIC RENTAL	2- 4	4	+ 3/4	+23.0
A	DCL INC	2- 4	3 1/8	- 1/8	-3.8
N	DPF INC	9- 12	7 5/8	- 1/2	-6.1
N	ITEL	1- 13	2 3/8	- 1/8	-5.0
O	LEASPAC CORP	1- 2	5/8	- 1/8	-16.6
A	PIONEER TEX CORP	2- 4	3 5/8	0	0.0
N	RELIANCE GROUP INC	20- 73	18 5/8	+1	[illegible]
N	U.S. LEASING	12- 21	21 3/8	+1 3/8	+6.8

SOFTWARE & EDP SERVICES

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 5	4 1/2	+ 1/8	+2.8
O	ANACOMP INC	7- 17	17	- 1/8	-0.7
O	ANALYSTS INTL CORP	3- 6	6 1/2	- 1/8	-1.7
A	APPLIED DATA RES.	6- 21	20	+ 3/8	+1.9
O	AUTOMATIC DATA PROC	30- 50	49 1/2	0	0.0
O	COMPUTER HORIZONS	1- 9	3 3/4	+ 1/8	+7.1
O	COMPUTER NETWORK	6- 9	7 1/8	- 7/8	-10.9
N	COMPUTER SCIENCES	11- 28	27 3/8	+ 1/8	+0.9
O	COMPUTER TASK GROUP	1- 15	17 1/2	+4 1/2	+36.0
O	COMPUTER USAGE	2- 8	7 3/8	+ 7/8	+13.7
O	COMPUT AUTO REP SVC	6- 10	7 3/4	+ 5/8	+8.7
O	COMSHARE	11- 21	19	- 3/4	-3.7
O	CULLINANE CORP	20- 61	55	-3 1/2	-6.0
O	DATA DIMENSIONS INC	1- 6	1 1/8	0	0.0
O	DATATAB	1- 4	1	- 1/8	-11.1
O	DSI CORP	6- 9	6 1/8	- 5/8	-9.0
N	ELECTRONIC DATA SYST	19- 38	30 3/8	+3 3/8	+11.4
O	INFORMATICS INC	7- 25	22 1/2	-2 1/4	-9.0
O	INSYTE CORP	1- 3	2	-	-3.0
O	IPS COMPUTER MARKET.	2- 4	2 3/4	0	0.0
O	KEANE ASSOCIATES	3- 9	6 1/8	- 1/8	-2.0
O	KEYDATA CORP	2- 5	2 1/8	+ 1/8	+6.0
A	LOGICON	12- 26	25 3/8	- 1/8	-0.5
O	MATHEMATICA INC	5- 18	16	-2	-11.1
O	NATIONAL DATA CORP	10- 22	21 5/8	- 3/8	-1.1
P	PLANNING RESEARCH	5- 9	7 5/8	0	0.0
O	PROGRAMMING & SYS	1- 1	3/8	-	[illegible]
P	RAPIDATA INC	4- 9	8 1/8	- 5/8	-7.1
O	REYNOLDS & REYNOLD	21- 38	33	0	0.0
O	SYSC INC	6- 14	14 1/8	+ 1/2	+3.6
O	SCIENTIFIC COMPUTERS	6- 27	20 1/2	+ 1/8	+0.9
N	TYMSHARE INC	14- 40	46 3/8	-1 3/8	-2.9
A	URS SYSTEMS	9- 15	13 1/2	0	0.0
N	WYLY CORP	4- 10	16 1/2	-1 1/8	-7.0

PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 20	23 3/8	+2 1/8	+9.8
O	AMPEX CORP	14- 29	26 1/8	- 1/8	-0.9
N	ANDERSON JACOBSON	9- 17	15 7/8	-1 1/8	-6.6
O	APPLIED DIG DATA SYS	9- 12	11 3/4	0	0.0
O	AUTO-TROL TECHNOLOGY	20- 55	50 1/2	-3	-5.1
O	BEEHIVE INT'L	3- 10	12 5/8	- 3/8	-2.8
A	BOLT BERANEK & NEW.	12- 29	26 3/4	- 3/4	-2.7
O	BUNKER-RAMO	17- 30	30 1/8	+3 1/8	+12.0
O	CAMBRIDGE MEMORIES	1- 9	3 1/2	- 1/2	-12.5
N	CENTRONICS DATA CORP	20- 50	36	- 7/8	-2.3
A	CETEC CORP	3- 7	7 1/8	+ 7/8	+14.0
O	COMPUTER DEVICES INC	3- 4	7 1/8	-1 1/8	-10.7
O	COGNITRONICS	1- 7	6 3/8	-1	-14.0
O	COMPUTER COMMUN.	4- 10	6 3/8	- 3/4	-10.9
O	COMPUTER CONSOLES	4- 29	20 3/8	- 1/8	-0.6
O	COMPUTER TRANSCEIVER	1- 5	2 7/8	- 1/8	-4.1
N	COMPUTERVISION CORP	21- 52	49	- 5/8	-1.2
O	CONRAC CORP	13- 25	20 1/8	- 3/8	-1.8
A	DATA ACCESS SYSTEMS	6- 17	15 3/8	- 3/8	-2.3
A	DATA PRODUCTS CORP	11- 31	20 1/8	-1 1/8	-5.0
O	DATUM INC	1- 6	3 1/8	- 1/8	-3.8
O	DECISION DATA COMPUT	1- 5	3 1/4	+1	[illegible]
O	DELTA DATA SYSTEMS	1- 3	2 1/2	- 3/8	-13.0
N	DOCUMATION INC	7- 27	15 7/8	- 1/2	-3.0
O	DATARAM CORP	6- 37	32 3/8	- 1/8	-1.0
N	ELECTRONIC M & M	3- 8	8 1/8	+ 1/2	+6.5
O	EVANS & SUTHERLAND	11- 39	36	- 1/2	[illegible]
O	FABRI-TEK	1- 6	3 5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 5	4 3/8	- 1/8	-2.6
O	GENERAL DATACOMM IND	12- 22	20 1/8	0	0.0
O	GENERAL TERMINAL CP	1- 4	2	- 1/8	-5.8
N	HAZELTINE CORP	12- 31	20 7/8	- 1/2	-1.8
N	HARRIS CORP	30- 40	43 1/4	+ 5/8	+1.4
O	INFOREX INC	1- 6	1	- 1/8	-10.5
O	INFORMATION INTL INC	8- 35	33 3/8	- 1/4	-1.7
O	INTEL CORP	46- 98	80 1/2	-3	-3.2
O	INTERSIL	13- 30	31 1/8	+6 7/8	+28.2
A	LUNDY ELECTRONICS	6- 12	9 1/2	- 1/2	-5.0
O	MSI DATA CORP	6- 13	11 3/4	+ 1/2	+4.9
N	MEMOREX	10- 30	15 3/8	-1 1/8	-7.4
N	MOHAWK DATA SCI	10- 27	25 5/8	-1 3/8	-5.9
O	ONEX	2- 10	9	+ 1/2	+5.8
A	PARADYNE CORP	10- 63	62 1/4	+1 1/2	+2.4
A	PERTEC CORP	9- 25	21 3/4	- 1/8	-2.0
O	RAMTEK CORP	10- 17	13 3/8	-1	-6.7
O	RECOGNITION EQUIP	5- 16	15	- 3/8	-2.3
O	SCAN DATA	1- 5	3	- 1/8	-4.0
N	STORAGE TECHNOLOGY	12- 42	39 7/8	0	0.0
O	SYKES DATATRONICS	10- 30	27 1/8	- 1/2	-1.8
O	T BAR INC	10- 21	18 1/2	+ 3/4	+4.2
A	TEC INC	3- 9	5 1/8	- 1/2	-8.6
N	TEKTRONIX INC	41- 70	67	- 1/2	-0.7
N	TELEX	3- 6	5 1/8	- 5/8	-10.8
O	TESDATA SYSTEMS CP	8- 20	11 3/8	- 3/8	-3.1
O	TIMEPLEX INC	7- 27	25 3/4	- 3/8	-1.4
O	WILTEK INC	1- 3	2 1/2	- 1/8	-4.7

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE SEP 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS FORMS	8- 10	12 1/8	- 3/8	-2.8
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	13- 30	27 1/2	-1	-3.5
O	CYBERMATICS INC	1- 1	1	0	0.0
A	DUPLEX PRODUCTS INC	11- 15	14 1/8	- 1/8	-0.8
N	ENNIS BUS. FORMS	13- 21	17 1/8	+ 1/8	+0.7
N	3M COMPANY	46- 60	57 3/4	-1 3/8	-2.3
O	MOORE CORP LTD	27- 30	33 3/4	+ 3/8	+1.1
N	NASHUA CORP	28- 35	39 7/8	+ 1/8	+0.3
O	STANDARD REGISTER	22- 31	29 1/2	- 1/2	-1.6
A	TAB PRODUCTS CO	13- 20	20 3/4	+ 3/8	+1.4
N	WABASH MAGNETICS	11- 16	16	+ 3/8	+2.3
N	WALLACE BUS FORMS	19- 30	30	+ 3/4	+2.0

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ISS 38

SE 17 80

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Vol. XIV, No. 38/Sept. 17, 1980 © 1980 by CW Communications, Inc.

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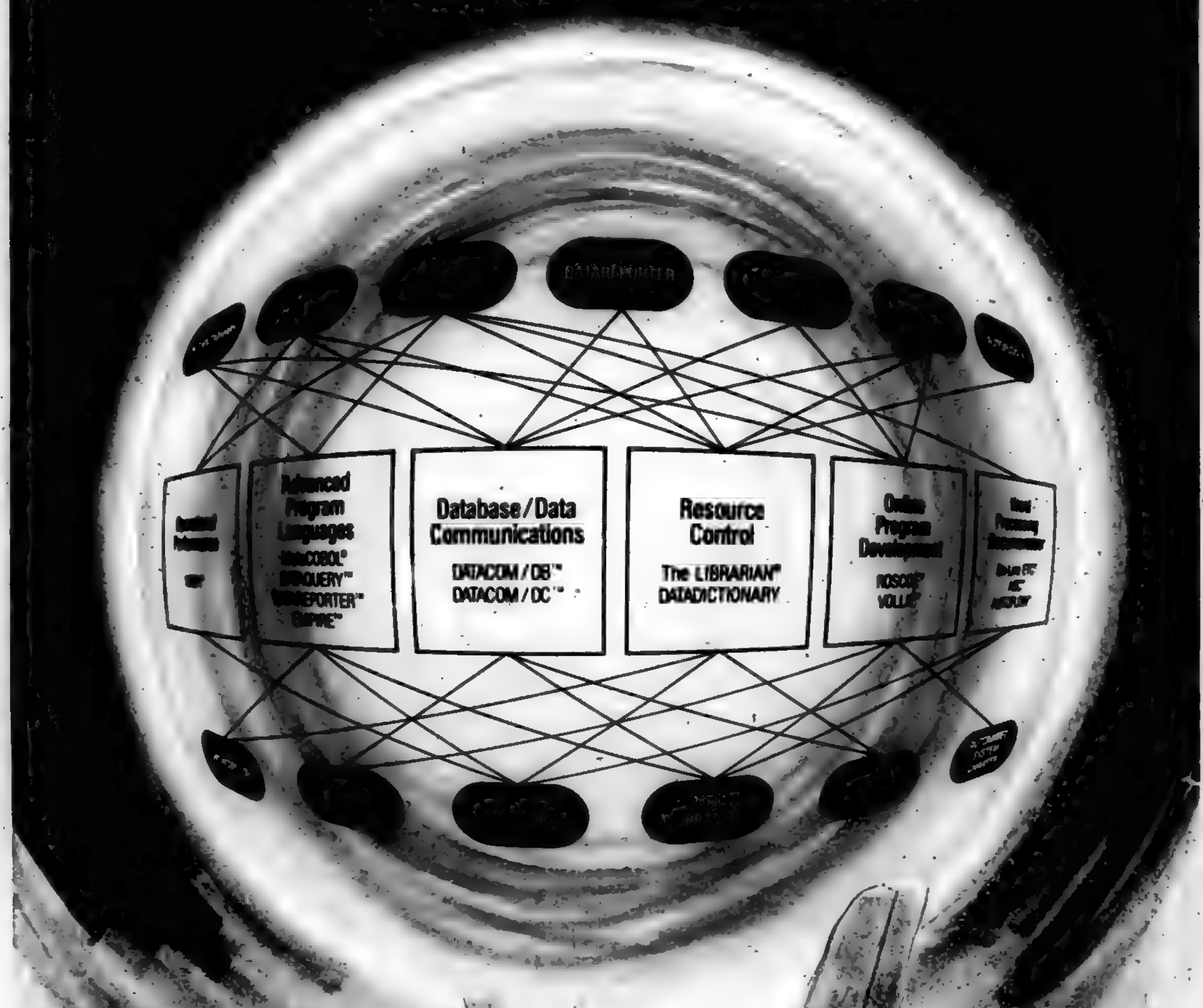
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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications, Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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James Martin is the foremost authority on the social and commercial impact of computers. In a wide-ranging interview, he tells Computerworld of the chief forces and developments shaping society and DP. He also gives us a glimpse of his life at home in Bermuda.

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By Herbert L. Gepner

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The role of data dictionaries is expanding. Their encroachment into system design is gradual — but inevitable. The next step is assistance in implementing those designs, and that would represent the most significant change in implementation of computerized systems since the acceptance of Cobol.

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By Thomas F. Meurer

Designers awash in the sea of data base know there are few strict rules in the logical and physical design of the system. A successfully structured methodology establishes a baseline design that is independent of hardware and software and that forces the production of documentation every step of the way.

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By Chris Gane & Trish Sarson

Structured methodologies have begun to crystallize only in the last three years. While project experience is still limited, some successful users are reporting significant savings in time and money. The secret, they find, is the construction of a graphical, logical model of the required system plus a statement of its objectives and constraints.

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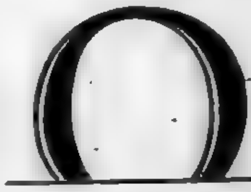
Open System Architecture and the Computerized Corporation

By Dixon R. Doll

Applications design should link users and data. Missing are pathways between the two.



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Overview of Systems and Utility Software Packages

By William B. Engle

Don't expect dramatic breakthroughs in systems and utility software, but do watch for evolutionary enhancement. Here's an overview of the industry, including product assessments and two listings of major package vendors.

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The proliferation of minicomputers has rekindled the debate over distributed versus centralized computing.

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The Plight of Programming

By G. T. Orwick

The trickle is becoming a flood as the migration of programmers into application software companies leaves fewer and more expensive resources for DP managers. Despite new software development tools, an overall increase in programmer productivity is not expected to offset the loss.

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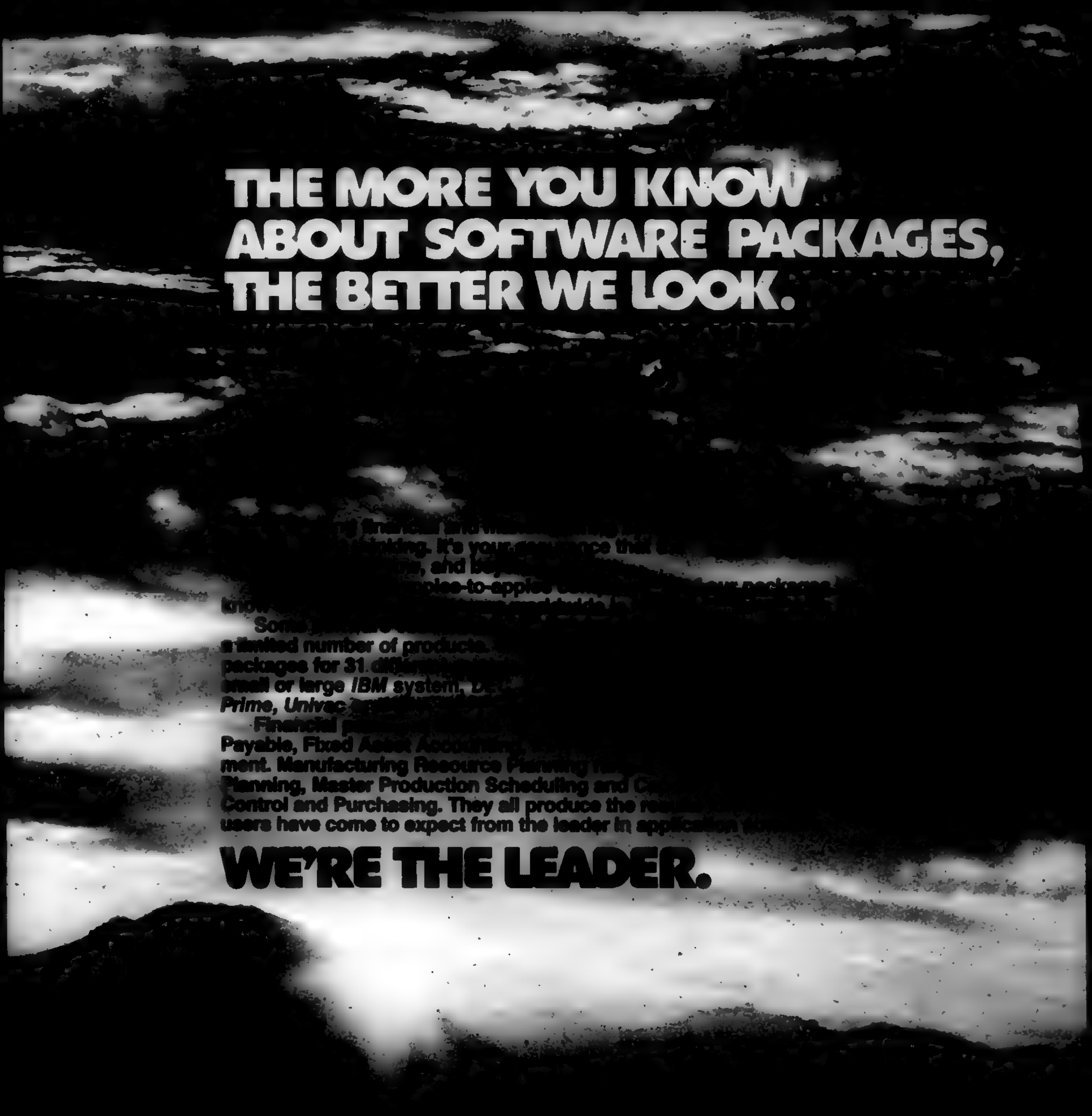

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OFFICES AROUND THE WORLD

By Daniel D. McCracken

SOFTWARE IN THE 80S
PERILS & PROMISES

Software development remains what it has always been and probably will be for at least several more decades: the limit on what we can do with computers. Software development has improved, to be sure; higher level languages, structured methodologies, data base techniques — these and many other developments are significant steps forward that deserve to be used more widely than they are.

Still, by themselves, they are not enough. With rapidly dropping hardware costs and past successes creating vast new demands for computer applications, we simply cannot keep up by using existing software development methodology.

This is bad news in the obvious sense, of course, but there are two kinds of good news. For one thing, information processing is a victim of its own success. We're in trouble because users want more and more of the kinds of things we've already done.

The second item of good news is that the software development limit is being rapidly pushed back. We do not have to settle for the bleak prospect of mere incremental improvements in methodologies that will clearly never let us catch up. Quantum leaps are possible right now.

With continued intensive development of the new approaches, the level and sophistication of computer applications in the '90s could well look like another world.

The Problem

Presumably no reader of this publication needs convincing that we in applications software development have a problem. Everyone is aware of such symptons as:

- Backlogs of new applications and major changes that measure in the years *and are getting longer*. As an industry, we can't even keep up — let alone catch up — with what our users want us to do.
- Projects months and years behind schedule, vastly over budget and put into production with known major flaws or perhaps canceled outright after man-decades of effort.
- Incredible shortages of programmers and analysts, as indicated by a glut of recruiting ads, turnover rates reported at 30% to 40% and bounties for programmers ("Get your buddy to work here and we'll pay you $1,000 — if he stays six months").
- A dreadful crunch on the colleges, which see their present and future faculty being hired away so fast that their ability to produce more computer science and information science management graduates is probably *decreasing*.

We definitely have a problem.

The explanation that first leaps to mind is that we have a shortage of people. And we *do*, of course. Even if everything I'm predicting actually comes to pass, we will still need everyone now in the field and lots more besides. Anyone who wants to work in DP need have no fear of unemployment.

But a shortage of qualified people is clearly not the entire explanation of our troubles.

The root cause, I believe, is that to a great degree we are using the wrong applications development tools:

- We are writing unstructured code that is likely to contain bugs, be slow to get into production and be unnecessarily difficult to maintain — when structured methodologies have been amply demonstrated to ameliorate all of these problems.
- We are using Cobol and PL/I instead of much higher level languages, that, by comparison, are nonprocedural.
- We are writing what amounts to the same piece of code over and over, instead of writing it once in reusable form, or buying an application package or using utilities wisely.
- We are doing our own file management, security and integrity checking (if we do it at all), our own selection logic and our own report-writing functions — when a good data base management system, which includes a high-level inquiry language and a report writer, will do all of that and more with much less effort.

An analogy I like to use is that if you are using a hammer to drive screws, it really isn't going to help much to put energy into finding the right size hammer. Or deciding how to hold it. Or training people to use it. You're using the wrong tool, and that's all there is to it.

The analogy is imperfect, of course. The screwdriver was invented at the same time as the slotted head, whereas in our case we are still developing our tools. Maybe a closer analogy would be that we are still using screws and screwdrivers when what we need is glue or a new bonding process or a one-piece mold that doesn't involve *any* kind of fasteners.

The Solution

As a preliminary, since it underlies everything else I want to say, let me introduce what I will call "the software skill amplification principle." The assumptions are that (a) we don't have enough software writers, and (b) our methods are getting better but too slowly to solve the problem.

The proper response, I suggest, is to use our scarce software writers in such a way that their efforts are amplified, i.e., their work is made available to many others rather than applied solely to one application.

This is not a very earth-shaking concept; after all, it underlies things as old as subroutine libraries and reusable code. But it is coming into play in a wide variety of relatively new ways that have profound ramifications, such as software tools that put the computing power directly in the hands of the end user in many cases and let the DP expert bypass the wasteful step of specification writing in many others.

One characteristic shared by most of the new software tools and approaches that I want to discuss is that they involve what for lack of a better term is frequently called a *non procedural* approach. The term is unhappy; it defines an approach in terms of what it is not, and "procedural" isn't precisely defined.

Furthermore, a lot depends on one's point of view. In some sense, "Get born, live, then die" is a procedure.

Nevertheless, a sufficiently large difference of degree becomes a difference of kind. If a dozen lines of "code" containing the three "commands" LOAD, CREATE and LIST is a "procedure" even though it would take 30 pages and three weeks to do the same thing in Cobol, so be it — but you'll have to admit that it's a different *level* of "procedure."

Similarly, when a few options inserted into a data base schema can provide the automatic data validation — on both loading and maintenance —

Five Commandments for Developers

1. Don't solve any problem that has already been solved. Example: Don't write date routines, general ledger applications or your own analysis of variance routines — those problems *have already been solved*. Use utilities, buy packages or otherwise get software that has the capabilities you need.

2. Don't solve any problem twice yourself. Example: Don't write a program and then document it — use applications development methodologies that are self-documenting, such as very high-level languages or well-structured Cobol.

Writing the documentation after writing the program means that (a) it probably won't get done at all; (b) it is extremely unlikely to be fully accurate even when first written; and (c) it will almost never be up to date.

3. Don't solve any problem that someone else can solve better and more efficiently. Example: Encourage end users to develop absolutely every application they possibly can. Naturally, you'll have to provide them appropriate applications development tools to make this possible (see text for discussion).

4. Don't "solve" any "problem" that results in a net loss of time and resources in completing the application. Example: Don't write formal specifications except in those few cases where the need for them can be fully established; even in those cases, do so only after you have a prototype running.

5. Summary of above: Don't work harder than you have to, don't do any useless work and don't do any work that has negative value.

Daniel D. McCracken is an author, consultant and immediate past president of the Association for Computing Machinery. He lives in Ossining, N.Y.

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Another page from the SEED catalog

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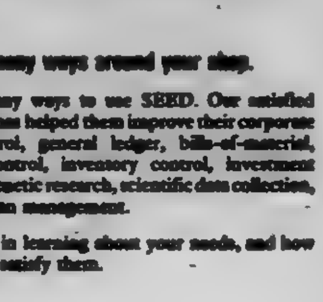

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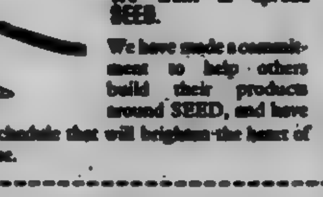

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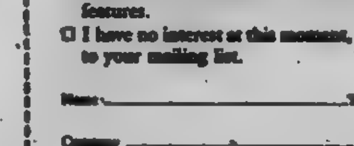

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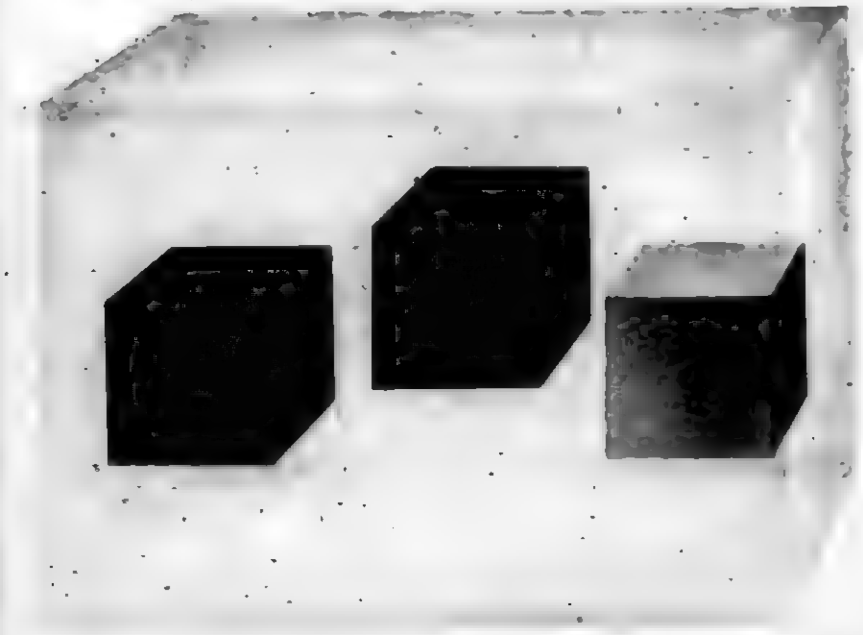
The Transparent Single System Image *Has Arrived!*



With the recent addition of the Global Console Director (GCD) to Allen Services' line of software packages for Multiple System environments, an entire complex of systems can now be treated almost as though it were **one single unified** system.

The complete "unified system" effect is achieved through combined use of three independent (but related) program products. Each of these, Super-MSI, MSM and GCD addresses distinct concerns present in multi-system environments.

Of course, since the products are independent, if you aren't yet ready for the full-blown unified system effect, you only need to select the products which interest you.

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SUPER-MSI™
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The Multiple Systems Integrity Facility provides the same thorough dataset integrity protection for jobs in **different** systems that would exist if the jobs were in the **same** system. In addition to propagating "standard" dataset integrity across systems, Super-MSI also insures that the VSAM "internal" SHR options are honored throughout your entire complex. Effective cross-system VSAM integrity can be obtained in no other way than through the use of Super-MSI.

Another feature: Super-MSI also **eliminates the hardware RESERVE lockouts** which are normally inherent with SHARED DASD in multiple system environments.

Much more besides: Super-MSI has many other exciting features including special aids for operators and TSO Users. All in all, Super-MSI will be a very powerful addition to your installation.

UNIFIED DEVICE MANAGEMENT

MSM™
MULTIPLE SYSTEMS MANAGER

The Multiple Systems Manager manages the allocation of TAPE and MOUNTABLE DISK devices across all systems in your complex. It allows you to operate normally with **all** devices **ONLINE** to **all** systems. MSM insures that device allocation by jobs in different systems occurs just as if all jobs were operating in one single unified system.

MSM eliminates the operational burden of juggling TAPE and DISK units among systems. It protects against the danger of a system accidently rewinding or overwriting a TAPE in use on another system; this removes the single greatest cause of shared tape mishaps.

MSM will use your TAPEs and DISKs more efficiently — which can result in immediate device cutbacks or (more likely) postponement of future acquisitions.

MSM is so transparent that it can be operated without the use of any new operational commands. Of course, there are powerful new commands available — however these are extras, not necessities.

Only MSM allows such truly NATURAL and transparent shared device management.

Other features (for MVS environments only):

- The MSM Device Preferencing capability allows devices to be dynamically structured into a hierarchy of sets; MSM insures that units in preferred sets are used, wherever possible, before less preferred sets
- The MSM **SOFTSWAP™** feature insures that DDR device SWAPs for TAPE units will NOT impact JOBs or TSO users which are not using tape allocation. Without SOFTSWAP™, TAPE DDR SWAPS are likely to impede all allocations in a system — including even those which do not use tape.

UNIFIED OPERATOR CONSOLES

GCD™

The Global Console Director is an extremely flexible tool. It allows (selected) message streams from different systems to be logically "blended" to create a **unified system image** (to whatever degree desired). In a slightly different vein, GCD allows **any** console on any system to be logically attached concurrently (and perhaps in different ways) to any set of systems in your complex!

GCD allows commands entered from any console to be directed and processed anywhere in the complex; in this respect, all consoles are effectively linked to all systems.

In almost every aspect, GCD is philosophically and operationally compatible with the standard system console support.

GCD can improve overall throughput by simplifying operations. By allowing several physical consoles to be logically merged, excess devices can be eliminated for immediate savings, or deployed elsewhere to strategic advantage.

GCD is absolutely transparent to your users, and aside from major simplifications, nearly transparent to operations.

If you wish to use more than one of the above products, they can be integrated together into a single control task (thus further reducing overhead and complexity).

In nearly every instance where our products have been competitively evaluated against all possible hardware or software alternatives — our software has been chosen. Aside from IBM, Allen Services has been providing commercial software specifically designed for multiple system environments longer than any other company. Over 400 major installations throughout the world have already selected our products as the preferable means of handling problems associated with multiple system environments. The number grows daily. **Reliability** has always been an integral part of our design.

When considering software, most people consider **support** to be a very important factor — Allen Services has over 200 support personnel.

The only other comprehensive approach to unifying multiple systems is JES3 (or ASP). Aside from the fact that MSI/MSM/GCD can be installed and implemented in only a few minutes, there are several other significant differences from JES3: For example, MSI/MSM/GCD (combined) use only 1% to 2% overhead; MSI/MSM/GCD are invisible to your users; MSI/MSM/GCD were designed to be strictly compatible with OS/VS/MVS philosophies — in this regard none of your personnel will require re-training.

The majority of all eligible multiple system installations are now using our products to help manage their systems.

Because installations can have widely different characteristics, you may still have a nagging suspicion that our claims may not actually apply to your shop. To alleviate this doubt, we invite you to try our products (whichever ones interest you) at your own installation under your own conditions. This trial carries no charge and is without obligation. One word of caution: You're going to like them so much, you'll never take them out.

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that would take days of work to program laboriously in PL/I, we surely are dealing with a new kind of animal.

Let's see how these concepts come together to offer hope for a way out of the present applications development crisis.

An extremely promising approach to the shortage of applications software developers is to let the end users do the development. This approach also solves the underlying problem of communication between DP expert and end user, both of whom (necessarily) have their own specialized languages that require a translation. For applications on the smaller end of the spectrum, it is now possible to provide the users with sufficient power to let them specify the processing themselves, in systems that can be learned in a few days (really!).

I am most familiar with Nomad, a product developed under the direction of Harold F. Feinleib by my principal client, National CSS, Inc. (a Dun & Bradstreet Company), but there are a number of other systems that are to some degree similar.

These products are not identical (as their vendors will be happy to explain!), but all of them permit end users to do highly useful work in time scales that boggle the mind compared with traditional methods. Would you believe half a day to put up a focus benchmark version of a management reporting system for Heublein that had taken six months to do in Cobol? Would you believe that the Bank of America has something over 500 Nomad applications running, almost all put up by end users with the support of a staff of half-a-dozen Nomad consultants and training people?

I'm not quite sure what essential characteristics of a software tool let the end user do his or her own applications development.

Let me venture a short list anyway. The systems that permit the kind of results I'm talking about share these characteristics:

1. They are user-friendly, which, I take it, is a new buzzword signifying simplicity of learning, a natural syntax, helpful error messages, a default-driven design that makes simple jobs *really* simple and a nonprocedural approach that permits specifying a great deal of processing with a few commands.

2. They involve a data base management system that includes a high-level inquiry language, a sophisticated report writer and the ability to specify most of the data integrity and validation routines with nonprocedural options in the data base schema.

3. They are themselves large software packages, having taken away man-years, if not man-decades, to design and implement.

Naturally, not all applications development can be done by end users. There are always going to be big, complex applications with interdependent end users that demand the skills of the trained DP expert.

The traditional approach to such tasks usually involves, somewhere near the beginning of the process, the writing of a formal system specification. This can require man-months or man-years and result in a document at least a few inches — and not uncommonly *feet* — thick. The user is asked to sign off on it, and before he does so it is considered unwise — if not immoral — to begin program design or coding. An elaborate body of doctrine has been built up to prove that this is the only responsible way to do things.

The only trouble is, it doesn't work.

It doesn't work because users don't really know what they are agreeing to, for one thing. How is the user supposed to know that if he signs something saying "Dates will be stored in month-day-year order," that means we can't sort on the field? Why on earth should he be expected to know *that*?

Or how does the user know for sure that when he specified "A report of aged accounts receivable will be produced weekly," the systems analyst *really* understood what "aged" means?

The analyst *should*, so the user may not think to check his understanding — which can lead to major grief six months or a year later, when the misunderstanding has been cast into the concrete of an inflexible procedural program.

The communication problem here is the same one I mentioned in connection with end-user application development: both users and DP people have their own areas of expertise and their own vocabularies. When it is necessary for them to talk to each other, as it assuredly is on major applications,

Current Trends in Applications Development

1. Computing power is being placed directly in the hands of the end user. The process is limited mostly by human and organizational inertia. Applications development methodologies need to be tailored better for such use, of course, but fully operational existing methodologies that suit the purpose nicely are vastly underutilized.

2. Prototyping is coming into its own. Applications development specialists are learning how to get a version of even major applications up and running in a few days or a few weeks, and *then* they are worrying about performance.

3. "Nonprocedural" approaches are coming into much wider use. It just doesn't make sense to spend days writing a program in Cobol or PL/I or Pascal to do something that can be done with a few lines of commands in a much higher level language.

4. The "One Function in One Place" motto is being recognized as having wide applicability. It isn't *just* making parameters of the data of an application rather than scattering constants through the program (thus making changes extremely difficult and error-prone).

Much more broadly: Solve the documentation problem at the same time you write the program — by writing the program in a self-documenting methodology.

5. The attitude of data processing management is changing. More managers now are *welcoming* heavy end-user involvement, rather than feeling threatened by it. More have faced the real costs of getting work done and realized that the hardware costs are approaching negligibility compared with software development costs, the costs of long lead times and opportunity costs.

The Parable of the '67 Chevy

Once upon a time there was a man who wanted to be able to get from New York to Los Angeles on 12 hours' notice. His means of transportation was a 1967 Chevrolet that had bald tires and fired on three cylinders.

Recognizing the deficiencies of his means, he had the car tuned up and bought new tires, a supercharger and a radar detector. Performance improved 87%, but he still couldn't get from New York to L.A. in 12 hours.

He next put in a Cadillac engine and added streamlining; still not fast enough. His last gasp was to install a turbine engine and aerodynamic controls, which got him to 200 m.p.h. on the interstates — within reach of what he needed — but led to bad scenes going through the small towns.

When last heard of, he was complaining about problems with his turbine engine and small-town police; he had not realized that he was trying to improve the performance of a basically wrong means of transportation.

He was also asking what caused contrails and, when told about jet airplanes, said, "They'll never fly!"

Morals:

- If you're using the wrong tool, improving its performance won't help much.
- The people who know the most about existing tools are often the hardest to get to accept better and different ones.
- The development of new tools seldom makes the existing ones totally obsolete. Even if our man had accepted jet airplanes, he would still have needed his car for getting to the grocery store.

they have problems understanding each other and being sure they are talking about the same thing when they use a term.

Enter prototyping. Here is what *I* mean by *that* term:

Say you are a system designer. You get a call from a client who has a job to do on your computer, so you go to his office and talk for a while — a few hours, maybe a day. You try to establish clearly what the fundamentals of the tasks are, ignoring or almost ignoring data volumes, report formats, who authorizes changes and all that.

You go back to your office and put up a running prototype — which should not take more than a day or two ("should not" in the sense that otherwise the process isn't serving you or your client properly, and also in the sense that with proper tools there is no reason why it need take longer). You take your portable terminal to the client's office and say, "Gee, we talked an awful lot the other day, and I thought I'd just put up a simple version to see if I got it straight."

You sign on to the time-sharing system and let him try it. He says, "You know, that's amazing — it's almost what I want. Now, of course, you've got the columns backwards, and I forgot to tell you that I need subtotals, and the union rules changed since Tuesday, and anyway our conversation reminded me of some other things I'll need."

So you talk for another day, *with the running prototype to guarantee that you're both talking about the same thing*. Eventually you say, "Well, let me go back and play with this thing some more. I'll see you in a couple of days."

This iterative process continues until the client says, "You know, I just can't believe it, but that's the system I want! How fast does it run?"

OK, now you have a decision or two to make. If the whole job is going to run four minutes a month, you're done. Who cares if six man-months of programming would cut the running time in half? Doing any more work would be foolish.

On the other hand, if it's something that needs to run in no more than eight hours of every business day and your prototype version takes 20 hours, you need to do some more work. You have several options, depending on the circumstances:

1. You can go to someone expert in the implementation tool you're using and say, "Well, here's basically what I'm trying to do and here's how I did it. Can you make it run faster?" Maybe he'll see that you could have saved 30% by a different data base design and another 60% of the remainder by sorting the input. Maybe you're done. I know of instances where this step, taking a few days' time, improved performance by a factor of 20.

2. You can look at the implementation to see where the time-eaters are and reprogram them in PL/I or BAL or whatever it takes to get the necessary performance.

3. If the circumstances warrant, you can take the running prototype as the basis for writing a set of specs that is as complete as needed to support a complete reprogramming in some suitable language. (Ideally, software should produce the specs from the prototype. The only system I have seen or heard of with such capability is itself still in the prototype stage.)

In this latter case, where are you, compared with a more conventional approach? First you are very much more certain that the system you are about to design will actually solve the client's problem. *You've both seen something working*, and in the process of getting to that point, you've flushed out misunderstandings based on the language barrier. You've also flushed out more of the things he wouldn't have thought of until implementation, when they are harder to put in.

Second, the total time from start-up to finished specs will have been very much shorter.

Third, you have something that forms a far better basis for responding to changes — the inevitable changes — in the future. You can still use that prototype to try the changes out!

That's another thing fundamentally weak about procedural approaches and formal system specs: they resist change rather than responding gracefully to it.

Why isn't everybody doing it?

Fair question. Anybody who claims to have the solution to most of the world's problems — in any field of endeavor — should expect to be greeted by skepticism. I've made a few exaggerated claims for world-savers myself and had to eat crow later.

Well, the skepticism feeds on itself to a certain extent. Most people prefer to let some one else do the pioneering; once the passage of time has sorted out the wheat from the chaff, the good stuff can always be picked up later. Maybe that's smart. Surely not very many organizations can afford to try everything new, just to find the few goodies.

Another factor is inertia, which is perhaps another angle on the point just made. It simply takes a long time for a new idea to penetrate any field.

Another factor, if you'll pardon my saying so, is that it takes a long time for books supporting a new technique to appear. Something as basically sound as structured programming must have taken more than five years from inception to penetration of half the texts in the field.

Finally, in this listing of possible reasons for slow acceptance of these ideas (end-user applications development and prototyping), there is the opposition from the conventional wisdom. It isn't *just* that not too many people seem to know about these methods; there are still people going around saying that the methods are bad, wrong, unworkable, and maybe immoral.

Those of us who think as I do — and I am hardly alone and surely not the originator of the ideas — have our work cut out for us, spreading the good word.

Implementation Requirements

Three areas of change are needed to support extensive utilization of the newer approaches to applications software development that I have discussed:

1. More and better tool programs. This requires intensive research and development and will take time. For example, some systems provide good nonprocedural facilities for report writing and data validation, but force the designer back to procedural techniques for data maintenance. This particular problem is clearly solvable, but actually doing it takes work. In other areas further research is needed. This whole arena is a major illustration of the software skill amplification idea.

2. Wider acceptance by the technical people now in the field and more training support for end users and the students who will be coming into the field in the next few years. This, too, will take time. Resistance to change is to be expected and may in some ways be defensible. Those of us who claim to have seen the promised land always tend to be impatient.

3. A new breed of DP managers who *welcome* end-user application development; who are not threatened by it and who provide the facilities to do it (e.g., in-house time-sharing). I could name a few such now, if it were appropriate to do so here; there will need to be a great many more. And they, in turn, will need the support of top management — which will also need education.

Changes as fundamental as these will clearly require some years to implement. The scope of this special issue of *Computerworld* is the entire decade of the '80s, and I think that is probably about right; I expect that by 1990 today's conventional methods of applications software development will have been largely superseded.

Meanwhile, the new techniques are available for the using *today*.

The programmer or analyst who seizes the opportunity can be in on the ground floor of a major advance that is transforming our field.

And the manager who realizes what is within reach has an unparalleled opportunity to make a true leap forward in satisfying his users (finally!), in providing better service to his organization and in utilizing his scarcest resource — software development people — more effectively. After all these years of being the whipping boy, today he has the opportunity to be a hero in his organization. ☐

By Stephen L. Robinson

DATA BASE: THE NEXT FIVE YEARS AND BEYOND

For the last five years or so (and for the last three years in *Computerworld*), I have been making fearless forecasts concerning the next year's data base activities. I have had a significantly high rate of accurate predictions. There is a trick, of course, to such accuracy: a short prediction horizon.

When one concentrates in an area such as data base, it is relatively simple to forecast one year ahead, especially since most vendors usually announce new developments six months in advance — and leak them several months earlier. That leaves only a three-month span for intelligent guessing.

Now, however, I have been asked to write about the next 10 years in data base, not just the next year. Needless to say, looking 10 years ahead in an industry such as ours leaves one open to considerable error.

Accordingly, I have divided my predictions into three time intervals:

- Short term, an interval for which we expect the greatest accuracy.
- Intermediate term, for which accuracy is somewhat diminished, but still will hopefully be quite good.
- Long term, where a forecaster really succeeds or fails.

Actually, 10-year forecasts are good to make. If they prove accurate, you can resurrect them to demonstrate your success. If they prove inaccurate, no one will have remembered them anyway.

Short Term: 1980-1982

The future of data base systems will be significantly affected by future hardware developments. Our short term here is intended to cover a period of time in which no *radical* hardware architecture changes occur. This is not to say that hardware will not get more powerful and significantly cheaper; that will surely occur over the next three years.

However, I view this interval as one in which data base machines (see later discussion in "Intermediate Term: 1983-1985") will still not have made a major impact on the DP world.

I recognize that this interval may be too generous. Intel Corp. has recently announced the integration of its System 2000/80 data base software with its Fast-3805, a fixed-head disk memory replacement. In this configuration, all pointer tables for System 2000 will be placed on the 3805. This should markedly improve performance of the data base software. (At the time of this writing, Intel has published preliminary figures of a 50% to 100% improvement in performance, but I have not had an opportunity to experiment with the system yet.)

Given the definition of "short term," what can we expect from data base software? The biggest change by far should be an expansion of the role of data dictionaries. At present, many vendors of data base packages also market data dictionary packages. The packages are, for the most part, quite limited in scope.

The typical data dictionary package today is an "off-line" utility to provide services such as:

- Storing data about an organization's data and the attendant areas of interest (eg., reports, files, projects, people, etc.).
- Selectively querying the above for information about the data base environment (eg., what file contains the field product number; what programs update the field department, what fields are accessible via the password PAYR2815; etc.).
- Maintaining control cards to run various configurations of the data base package.
- Maintaining "canned" data base procedures, usually for report writers or query languages.

While the above are quite useful, it is clear that most of the data base package vendors are working toward the configuration shown in Figure 1. Here the data dictionary has been truly integrated into the data base package. Indeed, it might be said that the data dictionary is the controlling package in such a configuration.

The functions attributed to the data dictionary interface are, of course, only representative of the most likely areas that will be implemented in the time frame under discussion. Indeed, we have "cheated" a bit in that several of the functions have already been implemented in several integrated data base/data dictionary environments.

Query Language

It is clear that the data base package vendors are making major development efforts to enhance existing query facilities, with a view toward the evolution of true natural language query facilities.

In short term, the major benefit in this area should be for DP personnel, not end users. System development times should be reduced through effective use of query languages but, unfortunately, increased use of these facilities will also promote the idea of reduced system analysis time, which will certainly lead to problems in the second half of the '80s.

Ever since it was claimed that Cobol and Fortran would eliminate the need for programmers, end users have been regularly promised natural language query facilities. At present there are numerous packages which claim to be "user-friendly."

The packages which come closest to earning this label are the simplest retrieval systems. Basically, such systems provide minimal flexibility in record qualification and display and thereby require minimal grammar constraints.

By contrast, some packages combine extensive report-writing capability with true programming language facilities. These systems are not "user-friendly" and should only be utilized by DP personnel.

The latter class of package is very useful in computer personnel's generation of "canned" parameterized modules which can be stored in a library and called by non-DP personnel who have only to conform to minimal constraints on the entering of required parameters.

During the next several years, the major area of query language development — combination programming languages and report writers designed to optimize the use of data base facilities by DP personnel — should be discussed.

It appears unlikely that we will see significant strides in data retrieval languages for non-DP personnel.

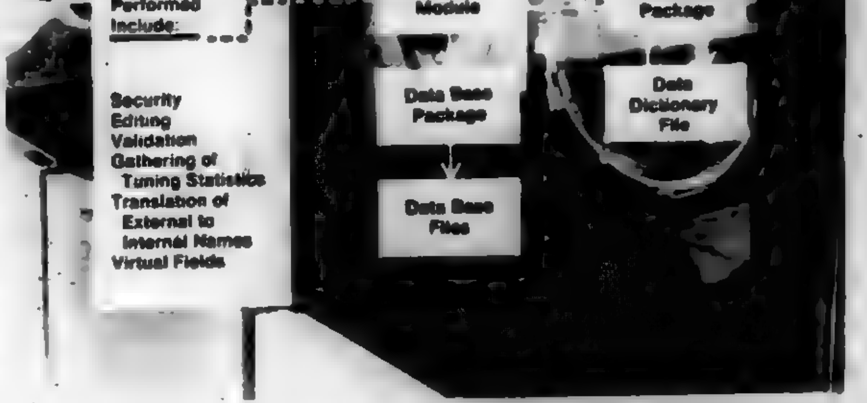
Possible events that might negate this view would be the rapid development of word processing interfaces; and a significant overlap of word processing and DP facilities and personnel; and a proliferation of major data bases implemented for minicomputers and microcomputers.

One last thing should be mentioned in conjunction with query language development and use. Such facilities are currently being used in much the same manner as data base packages. That is, application-oriented files are being processed in isolation from the remainder of an organization's data.

This is usually done in one of two ways. Either additional indexes are created for production files (thereby creating additional overhead for the maintenance of the production files), or a spin-off file is created from the production file, solely for query purposes (usually resulting in querying against "almost up-to-date" files not to mention the computer resources required to create the spin-off files).

If our estimate of three to five years for a significant shift from file-oriented systems to data base-oriented systems is correct, the same time frame should roughly predict a switch to interapplication use of query facilities. Almost unnoticed

FIGURE 1



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Robinson will present this paper at the Infotech State of the Art Review to be held Nov. 26-28 in London.

amidst the hoopla of data base systems, data banks are now truly coming into their own. Data banks range from the trivial (automated mailing lists, usually with at least minimal selection capability) to the complex (economic forecasts broken down by industry and time interval); from the small (several thousand entries) to the enormous (millions of entries).

Until recently the use of most such data banks has been limited by system design; that is, usage was batch-oriented. Clients would submit requests and get printouts in return. Browsing and heuristic analysis were not easily accomplished.

This is now rapidly changing. Systems are being implemented that encourage on-line utilization of data banks and associated data analysis software (e.g., statistical packages).

"Bare-bones" data retrieval systems are being replaced by extensive information systems. Where economic data used to be available on various industries, now information is available on the interaction of different segments of the economy, computed at varying interest rates, different international assumptions, etc.

The next several years should witness an expansion of information systems based on data banks. Financial systems will lead that development; marketing and communication/transportation systems should follow. Pandora's box will then open to release virtually every nonautomated data bank.

Intermediate Term: 1983-1985

I have already discussed the significance of the lower boundary for this period — the advent of important hardware architecture changes. Without predicting the nature of such changes (associative memory, high-speed mass storage and large-scale directly addressable memory, for example), I will address the processing environment that might result.

The hardware changes should markedly improve our ability to store, index and retrieve data. Given such changes, performance criteria will become progressively less important. During the early part of this period, we will see an embracing of the heuristic systems design methodologies now beginning to appear in our industry.

It will not take the industry long to realize that there are indeed no short-cuts to good system design. Rapid development and implementation of faulty systems working off of erroneous data will once more result in an angry user community.

By 1985 or 1986, it should become evident to corporate and organizational management that the major obstacles to the development of data base systems are organizational, not technical. This should result in the most significant change in data and information processing since the development of written symbols and numbers. The upper bound for this interval, therefore, is intended to reflect a timetable for the transition of our industry from solely data processing to data management.

Organizational Changes

It has been 25 years or so since automated data processing made its first major inroads into the business world. Electronic accounting machine (EAM) equipment rapidly gave way to sophisticated second-generation computers. The DP industry was well under way.

DP as a profession has been somewhat slower to mature. We are still mired in the three-step operator-programmer-analyst career path. This despite all the evidence pointing to the fallacy of such procedures — better programmers tend to be introverted, better analysts extroverted; better analysts thrive on unstructured, ill-defined problems, better programmers work best on well-defined problems, and so on.

Of equal significance is the slow, almost nonexistent progress toward the recognition that there is more to DP than the creation of working programs and systems.

It is clear that there is a growing awareness that data, and resultant information, is a corporate (organizational) resource, and therefore should

Success Is A Matter Of Performance

In today's computer environment, systems are so complete . . . and so dynamic . . . that attempts to maintain in-house development of systems software are becoming counter-productive. The fundamental fact, that has been accepted by successful data processing center operations, is that not every center has the capacity to produce each and every software tool that the present expanding hardware utilization allows.

The "communication age of the '80's" establishes a *data processing society*, that calls for a formal, yet workable, mode of operation.

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"The trickiest problems to resolve will be those where functions overlap between the areas of MIS, DP and data base."

be managed. DP departments, as noted above, do not manage data, they process it.

Progress is slow. Recognition usually begins in the DP area. Given the funds to acquire data base, teleprocessing and related software and given the charter to create a data base system, most data base administrators quickly realize they do not have authority to implement interfunctional area decisions.

Without such authority they cannot develop the systems they have been promising to the user community. Intent on keeping their jobs, data base administrators rapidly fall into the file system trap. That is, although they recognize the long-term problems, they use a data base package as a sophisticated access method to reimplement existing systems.

There have already been several well publicized, costly "data base failures." Invariably such failures are not failures of data base, but failures to recognize its organizational implications.

Several years after management has paid for new hardware and software and still does not have the data information systems it requires, we should see the slow but certain transition to the type of high-level data administration function that presently exists mainly in the literature and rarely in practice.

Figure 2 (see Page 15) shows a possible positioning for data administration in an organization. Many such organizational charts can be hypothesized. Especially in the early days of this period, organizations will be experimenting with reporting lines.

The trickiest problems to resolve will be the responsibilities below the vice-president level, where functions overlap between the areas of MIS, DP and data base. To date, corporate management seems willing to let the areas "fight" over the overlap. Eventually, hard decisions will have to be made to ensure effective cooperation between the three groups.

These problems will not be resolved by 1986 in the majority of organizations. However, they will be recognized, and will therefore be on their way to resolution.

Software Changes

The literature today is filled with articles on relational data base structures. This proliferation of articles, more than anything else, has led to a great misunderstanding on the nature and state of development of relational data base systems.

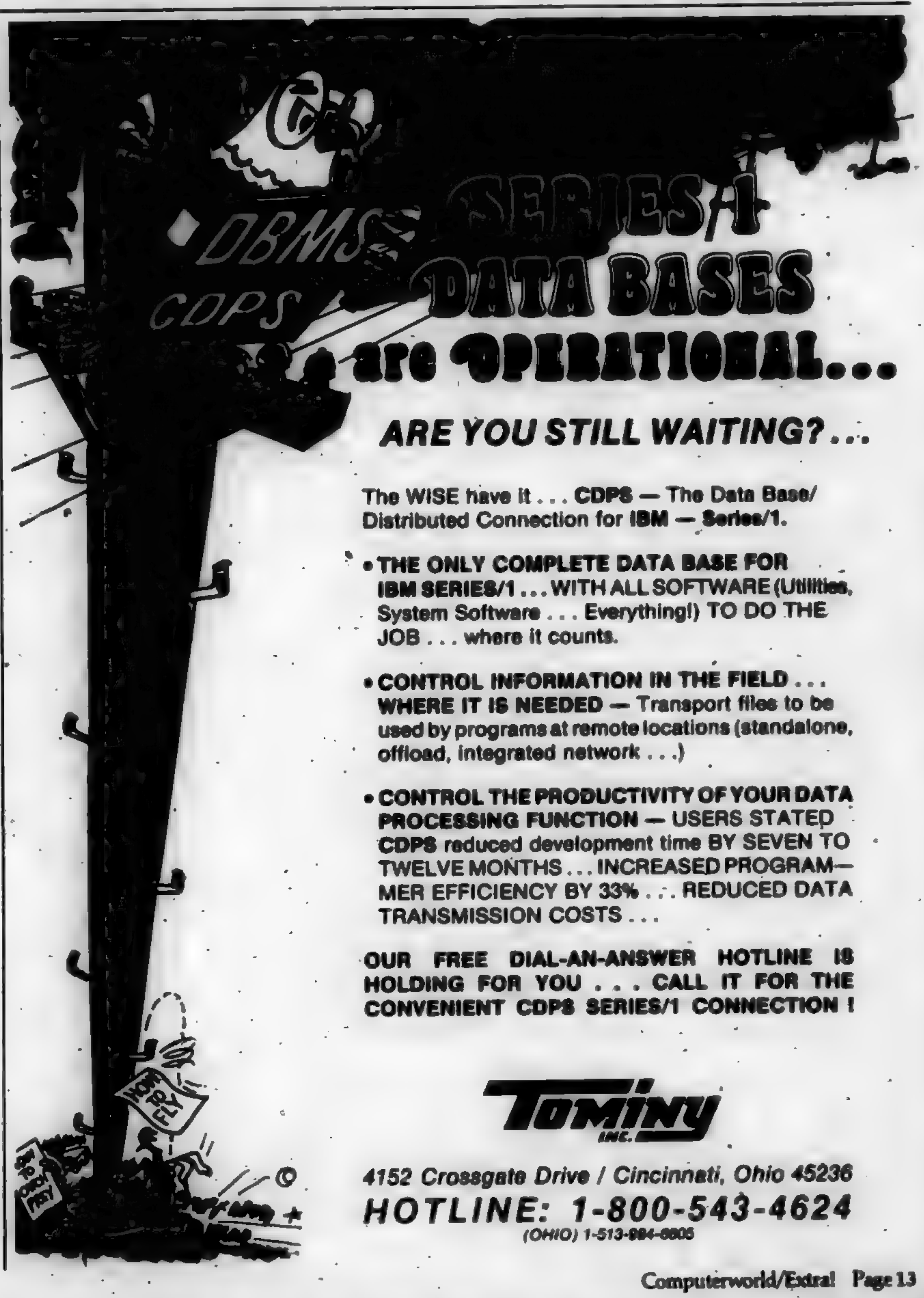
First, some software vendors have managed to convey the impression that relational data base is a physical concept they have implemented and are presently offering in the form of a relational data base package.

Second, the preponderance of theoretical articles on relational concepts and the relative validity of third, fourth, fifth and sixth normal forms has led many people to regard relational structures as the province of academicians and theoreticians with beards, long hair and sandals.

In reality, of course, relational structures represent a means of logically representing data structures. Other logical modeling techniques exist (infological modeling, entity-attribute-relationship modeling, etc.). However, the support being given by IBM to Codd's work suggests that third normal form structures will dominate modeling efforts.

Direct physical implementations of relational structures are impractical with today's hardware for the representation of most organizations' data. However, as noted in the discussion of the year delimiters for this period (1983-1985), I anticipate that 1983 may well be the time horizon for significant hardware changes in particular, changes which may facilitate the implementation of relational structures.

The advent of relational packages will not, however, ensure the development of integrated data base systems. As noted in the discussion starting this time period, practical physical relational structures should precede the recognition and acceptance of true



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> **"It is not at all clear that a true natural language facility is what is really needed."**

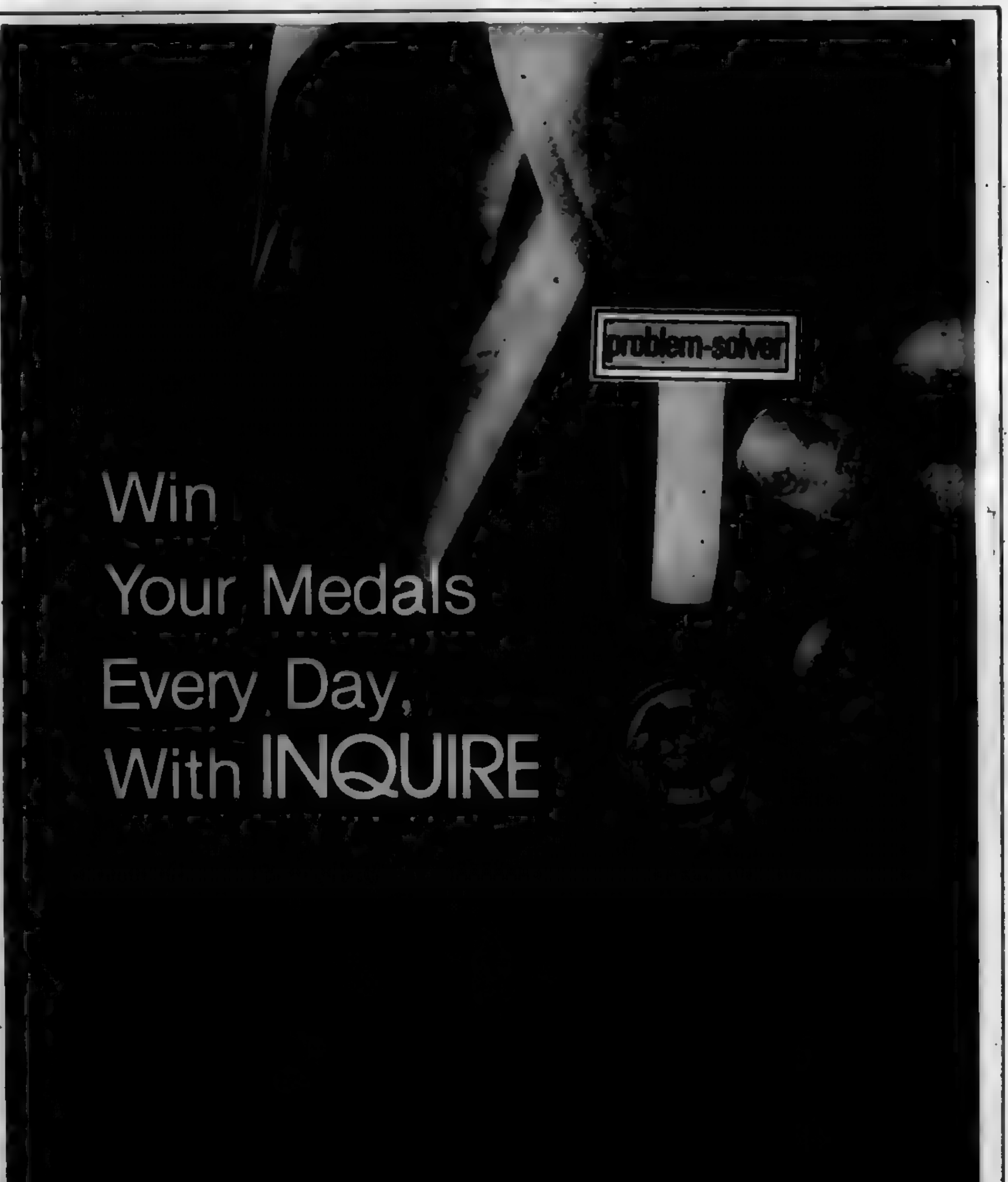
data administration. Consequently, it is likely that relational data base packages will initially be used simply as access methods to underlie relational query languages.

Query Language/Data Banks

There are many people who feel that relational query languages, when practical, will revolutionize DP. The end user will finally be freed from the necessity of communicating with an analyst who, while proficient in the language of computers, doesn't really understand business procedures.

There are flaws in such expectations – perhaps enough flaws to completely negate the potential value of such query facilities.

First, most non-DP personnel, while quite capable of following simple grammar rules to define the characteristics of records of interest and the format of a report, are quite incapable of writing procedural statements for even simple business algorithms. This is not attributable to any shortcomings on their part, but rather to a distinct lack of natural language flair in the present programming languages, report writers and query languages. It is unlikely that these problems will be resolved in the next five to seven years.



Second, it is not at all clear that a true natural language facility is what is really needed. Marketing people, after all, speak "marketingese," manufacturing people speak "manufacturingese," and so on.

Take a simple word like "extend." It can take on half a dozen meanings depending on the application area of the person using the term.

The ideal query systems may very well turn out to be the ones in which simple data querying can be done by non-DP people with little or no ambiguity, and complex programming can be done by DP people to create parameterized programs for execution by non-DP people. At present, several such systems are in existence (eg., Software AG's Natural language), and we can anticipate further enhancements and refinements to make them more user-friendly.

Crystal Ball: 1990

It is 1990. You have just finished a project ahead of schedule. Your manager suggests you take a couple days off without reducing your annual leave.

You fight the evening rush hour traffic (some things won't change by 1990) and eagerly head for your home entertainment center (for such will be the name chosen by the marketing people – witness the already growing reluctance to call a microcomputer a computer). You activate ("log on" sounds too computerese) the vacation information channel from your Comm Station (sounds better than "keyboard"), thereby initiating charges to the appropriate service vendor.

Snow conditions are ideal in Davos and crisp, sunny days are forecast for the next week with a likelihood of snow for five of the evenings.

You cancel the vacation channel and dial a reservations channel. In rapid order you arrange for air transportation, ground transportation, lodging and ski lessons.

Sounds farfetched? It's not. The reservations facilities, of course, are here now. Ski conditions are available through telephone dial-ups. Add a microcomputer to tie together the Comm Station, the wall television and the telestation (or pick your own name for the telephone of the future) and you have the system just described.

A competent microcomputer hobbyist could build the necessary home hardware configuration for less than $1,000. The existing cable TV stations, if tied into satellite transmitters, would provide the requisite channel selection for the system.

Want to buy some ski clothes for the trip? New equipment? Transfer funds? All done from the convenience of your home. Again, farfetched? Not really. Likely? Perhaps not; like everything else, such facilities will have to be able to pay their own way. Their cost in of 1990 may not justify their implementation.

So much for the bright side of 1990.

Let us now turn to the grim reality of the business world. Jean Smith, director of international sales for the ABC Co., is considering the expansion of a product line. She consults her corporate data base system and discovers that:

- Inventories of the product increased by 175,000 units in the last quarter.
- Production was 1.2 million units last quarter.
- Sales were 1.4 million units last quarter (note the contradiction in the preceding three statistics).
- Entering PRINT SALES results in a thoroughly confusing error message "IRROE2745-Invalid Operator," or nonindexed key or anomolous word sequence.
- Kicking the base of the terminal in response to the above message, banging several random keys and hitting ENTER results in a strange message about a SOC4, from which it is necessary to telephone the computer center to recover.

In short, the business world may be little better off than it is now. Let us try to identify why this may be true in order to avoid such problems.

If we do not recognize that DP personnel are notoriously poor at human engineering, we will continue to provide the outside world with interfaces that look like JCL (possibly the worst travesty ever foisted on our industry). We must realize that human engineering is a discipline unto itself, and we must develop people capable of producing user-friendly systems.

We must begin to draw our system boundaries larger. It is unsatisfactory now, and will be even more so in the future, to have separate and independent order entry, manufacturing, general ledger and warehouse systems.

Data administration must be recognized as distinct from DP.

We should understand the different skills required from application programming, system programming, computer analysis, business analysis and computer project management. We should accordingly establish career paths which allow personnel to pursue their interests and talents without suffering financially.

We *must* stop using new hardware and software to emulate (simulate) older hardware and software systems. It's a little like an airline which has completely changed its fleet from props to jets, but maintains the old schedule.

EAM Systems

The future of data base systems is very much up for grabs. In the beginning DP personnel designed systems based on EAM equipment. When tape-based computers arrived on the scene, very little new systems analysis was done.

Instead, process boxes with "read a card" were replaced by boxes with "read a record." Records were invariably 80 characters long (or multiples of 80). Systems tended to be an endless succession of sort/print operations.

Along came third-generation computers. The wave of the future. But, alas, along with them came emulation. Why perform new systems analysis and design when old programs could be emulated? Disks could be made to look like tapes etc.

Along came data base software. Another opportunity for change. Another failure. Yes, failure. Data base software has been around for 10 years, give or take a year or so, yet accomplishments are few and far between. An estimated 75% to 90% of data base package installations are using the software as a sophisticated access method to reimplement file system logic which at the source was probably EAM logic.

Data base software and hardware will continue to evolve. Quite honestly, I don't believe they will be effectively utilized until late in the 1980s. We must overcome 20 years of DP inertia before the direction of our profession can change. It will be a struggle, a challenge; with a bit of determination, we will succeed. The alternative is continued chaos.

What's Missing

The discerning reader has probably noted several omissions in this article — for example, distributed data base, the latest industry buzzword. Where to place it is a bit of a problem. Software is already starting to appear which offers some capability which could be called distributed data base. Are we already there? Where is there?

Definitions of distributed data base abound. For the purposes of this article:

- Decentralized data processing — autonomous computer centers.
- Distributed data processing — physically disparate computer centers under *central* control. The separate centers may or may not be physically connected by channels or other communications lines.
- Decentralized data base — autonomous data bases usually representative of individual functional areas.
- Distributed data base — physically disparate data bases under *central* control.

The term "distributed data base" is unfortunately used today to refer to autonomous data bases under a single data base package or manager. "Unfortunately," is an appropriate interjection since such an environment inevitably leads right back to file systems concepts.

Also, without a central data administration group, the notion of "my data" will be maintained as opposed to the concept of "our data," which underlies any successful data base system endeavor.

The concepts of decentralized/distributed data base are often interwoven with the concepts of decentralized/distributed data processing. Thus far we have avoided a discussion of hardware advances and their impact on data base. Potentially the most disastrous occurrence would be unchecked proliferation of *independent* minis and micros throughout an organization. Decentralized data processing invariably leads to decentralized data bases, which invariably lead to the end of integrated data base systems.

To summarize, the hardware and software for distributed systems are quite far ahead of the organizational controls needed to support such systems. We may see a disastrous tangent in the development of decentralized data processing and data base systems.

Voice Recognition

Since 1990 is 10 years away, we must be permitted a little fantasizing. Science fiction devotees have long been familiar with talking, intelligent computers. HAL in the movie "2001" and the onboard computer on the starship Enterprise in "Star Trek" brought such systems to the attention of a large portion of the world's population in the 1970s.

How impractical are such systems? Again, the answer is surprising to many. Voice recognition is here — now, today. I have seen demonstrations of relatively powerful, although primitive, voice recognition systems that respond to numbers and arithmetic operators.

Can a voice recognition programming language be far behind? There is research going on now in this area.

Perhaps by 1990 Jean Smith from the ABC Co. will be able to press a button and ask for various pieces of data from the corporate data base.

Our job, over the next 10 years, will be to instill sufficient confidence in the data base to override Smith's temptation to send someone out to count the stock as a double check on the voice computer system.

The 1980s will be a period of maturity in DP. In data base, this maturity will be evidenced by the development of true data administration functions. Data and information systems will be recognized as important integral parts of an organization.

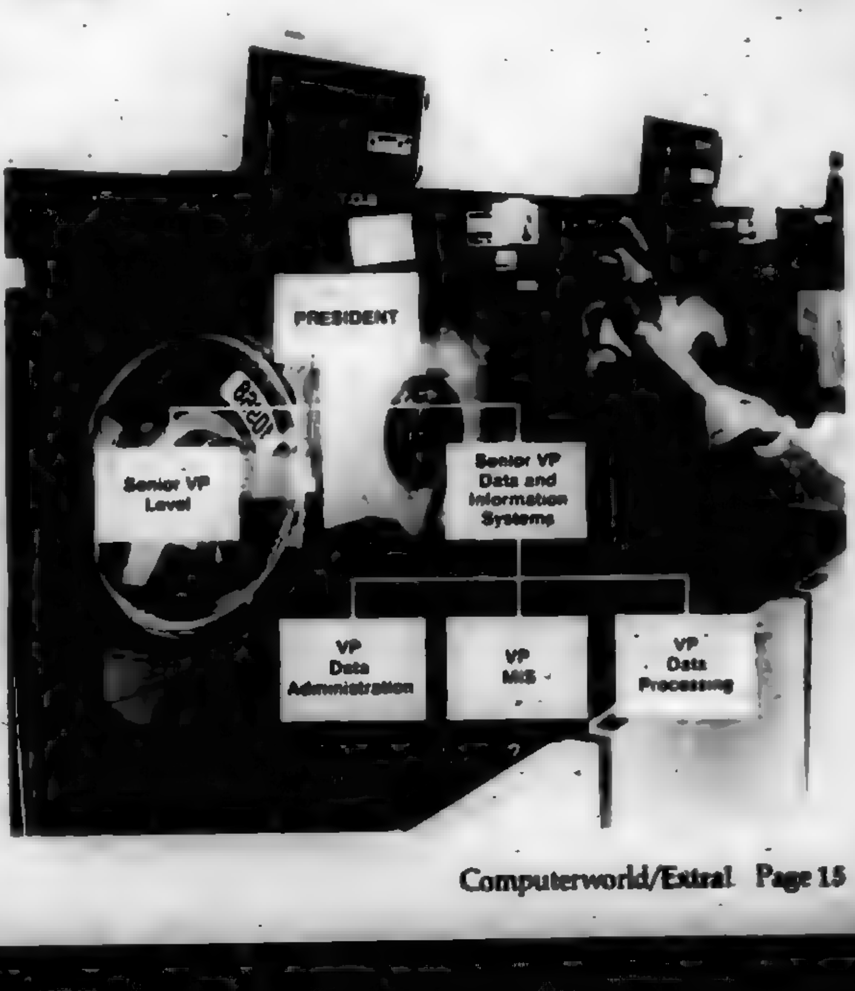
Technical advances in software will mainly be in the areas of query languages and data dictionaries. The latter will become integral parts of, or the drivers of, data base packages. Data base packages themselves will evolve to support relational structures. Software advances in the '80s will far outstrip our intelligent utilization of them.

Computer hardware will advance to a point where data base systems will be far easier to design and utilize than at present. Indeed, hardware advances will far outstrip software advances, which as already noted will far outstrip our ability to utilize them.

The rapid progress in hardware and software may actually result in decreased effectiveness of data base systems (a trend towards decentralization rather than distribution).

In summary, some organizations will be greatly pleased by the import of data base in the '80s. For most, however, it will be the late '80s before data base truly begins to demonstrate the potential predicted for it 10 years ago.☐

FIGURE 2



INTERVIEW:

AT HOME WITH JAMES MARTIN

You are hypnotic on stage, but few people know what James Martin is like off stage. What do you believe in?

I believe that our generation is going to change the world. We've got a lot on our shoulders. Technology could make a world that's hell, and I think we appreciate that. We probably appreciate it much better than we did in the naive 1950s. Technology, on the other hand, could create a world that is just fabulous.

So I think about what my [four-year-old] daughter will be living in when she's my age. If we don't create something that's better than we have today, then we are pretty poor systems analysts — or we've done a lousy job of implementation.

So as a private individual I'm tied up in the things I talk about on my world seminars. I am just fascinated by technology. I live technology — not only the technology which I'm an expert on and write books on, but also I'm fascinated with technology on which I'm not so expert.

How do you relax?

I like to hike. I swim long distances; I sometimes swim in the sea for an hour or so the way other people jog. I enjoy photography and like portraiture very much. It is very fascinating trying to capture people with a camera. I am always surprised at how few people are good at portrait photography. I like Yousuf Karsh [the Ottawa-based portrait photographer]. I met him in an elevator once, and we chatted for a few minutes.

If you could choose to be any character of this century, who would it be?

I'd like to be a combination of Herman Kahn and Alfred Hitchcock. I've always wanted to be a fat man.

You are widely regarded as the foremost futurist in the data processing industry. Are you comfortable with that characterization?

Not entirely. I don't entirely like the word "futurist" because it sometimes has an odd connotation. There are a lot of cranks running around as "futurists."

But I do spend a lot of time trying to work out what telecommunications and other technologies are going to look like.

I think there are certain responsible statements you can make about the future and a lot of irresponsible statements. There are some statements we can make with a fairly high probability of them being correct. There are certain technology trends that are a fairly safe bet. Where you have a six-year lead time on a very complex project, that gives you a statement you can make about the future.

One can make speculative statements about the long-distance future, and I think it's important to do that because it's clear that electronic technology is going to change the world much more than the motor car did. Therefore, I think it's a responsibility of everybody who's making this happen to ask the question: What sort of a mess are we making? Or what can we create that's great?

You wrote in *Telecommunications and the Computer*: "There are forces for change of shattering magnitude inherent in today's technology. The public perceives them only dimly with a vague feeling of uneasiness." What are these forces and who is at fault for the public's dim perception of them?

Let's first talk about what the changes are. I think perhaps the most important one is that we're going to change almost everybody's job. A lot of this is going to happen in the 1980s because the 1980s is a decade which may combine turbulence with incredible developments in microchips and networks.

Another new industry that's growing very fast now — and growing much faster in Japan than in the U.S. — is the robot industry.

So if you look at networks, the office of the future, computer technology and the robot industry, there are not many jobs that are left which are not going to be affected.

Now if you change everybody's jobs, there is no question that a lot of people are going to be displaced from their jobs. And if one is socially responsible, one will want to adapt society so that they can get another different type of job so that you don't cause mass unemployment . . .

But rather mass displacement?

Yes, mass displacement, not mass unemployment.

Displacement is not necessarily bad because the jobs which we can automate tend to be the rather inhuman jobs — the routine paperwork, the routine work on the shop floor and so on. But as we automate these jobs it does mean that the people have got to move up to jobs which are more demanding. So they've got to learn more and they've got to be retrained. They will probably eventually earn more as the G.N.P. grows. And they will probably eventually have more leisure time. So the whole question about how people use their leisure time is a question that will become very important.

The combination of those factors means that we are changing society, and I suspect the rate of change in the next 50 years is going to be greater than the rate of change *ever* in any 50-year period in history. That change will be driven by technology — much of it electronic technology.

Of course there are a few other important technologies as well. Such as genetic engineering; hydroponics to grow more food; space technologies; new energy sources, with eventually nuclear fusion and solar energy.

As to the second part of your question, it is mainly the media that are at fault for the public's dim perception of these changes.

The most powerful medium by far is television, and television today is not by and large making responsible programs about technology and how technology is going to change people's lives. This is why I have an enormous desire to get hold of the television medium and do something about that. It's not a question of wanting necessarily to make any money out of it; I think it's important that the perception is put across to the general public.

One of the things we've got to say to them is, "You shouldn't be scared of the technology — it may be scary, but in the long run everything is probably going to turn out OK; with good things as well as bad things, and the good things will predominate. But on the way we're going to have to make a lot of changes which will be temporarily uncomfortable, like running out of petroleum."

Alvin Toffler, author of *Future Shock*, has a lot to say about the present and the future. In his latest book, *The Third Wave*, he writes about today's rebellion against runaway technology: "It involves a fast-growing army of people — by no means poor or unlettered — who are not necessarily antitechnological, or opposed to economic growth, but who see in the uncontrolled technological thrust a threat to themselves and to global survival." How do you differ from Toffler's assessment?

I don't differ from that assessment. Incidentally, I think that assessment is one-sided because he also says a lot of things in his book which are pro-technology. It is by and large not an antitechnology book. But it is saying that we want to change technology — technology which is usable by small companies, small entrepreneurs, small villages in India, rather than megalithic technology like gigantic nuclear power stations. He's advocating distributed technology in a sense.

Of course that's what's happening in the computer industry. Now we're getting distributed technology moving in pretty fast which is changing the responsibility of the end users and managers and changing the jobs of many people.

I wouldn't entirely disagree with Toffler's characterization of technology, but he may take it a little too far. One of the big questions for the future, in data processing *and* in society, is what ought to be centralized and what ought to be decentralized.

This is a continuing debate . . .

That's right, and I think it changes as the technology changes. For example, the fact that computing is now swinging more toward decentralized control is due to the technology rather than due to any pendulum effect. We're getting very cheap technology.

Is technology out of control?

"Out of control" is a word I would never use for the situation. I think man is in control, *but* there are certain aspects of it where you might use that phrase.

We're in the middle of a wild adventure, and the adventure is being driven by the expediency of the present time, whatever that time might be. So we don't know what the end of that adventure is going to be, and we don't have quite as much freedom of choice in selecting the end of the story as one would like to have.

Society is heading into the unknown pretty fast. So if one wanted to interpret that by saying that "technology is out of control," one could, if one was a sensationalist journalist, but I wouldn't use that phraseology.

Are you afraid of technology?

No, not at all. I think we are going to make mistakes with technology — big mistakes. But every computer programmer knows that he is going to write a program with bugs in it, and he also knows that he is going to be able to get the bugs out of the system. If Three Mile Island didn't have adequate safety controls, we know very well that 10 years later we are going to have power stations which have corrected those mistakes. There are going to be other mistakes which are much bigger than Three Mile Island. But I think we are going to be able to recognize them and correct them — recognize them almost too late in some cases.

We make progress heuristically. Heuristic progress always leaves a few casualties along the route.

As hardware and memory continue to make quantum drops in cost, there is a strong tendency to erect ever more complex computer systems. Are these systems becoming too complex for any one person or group of persons to understand?

Yes, some of them are becoming too complex for one person.

Incidentally, it is going both ways. At the same time that we are building more complex systems, we are also building more simple systems.

How so?

The microcomputers, the small office systems, systems which are built of collections of micros.

If one looks at the best operating systems of the new minicomputer vendors and compares them with the biggest operating systems of the mainframe vendors, then you are achieving the same results and sometimes better results — like the increased reliability in Tandem computers, for example — in a much simpler fashion than the old operating systems.

So at the same time that there's a move toward increased complexity we are also seeing a move toward simplification.

There is a very old engineer in AT&T who is about 75 years old and retired, and he spent an evening once trying to pass on to me the experience of a lifetime. One of the things he kept coming back to, stressing over and over again, is that in the long run *great engineering is simple engineering*. And I think that is true with some of the systems we're building today. If we let them get so complicated that they're out of control or if we let them get too complicated for the system programmers to know what they're doing, then there is something wrong with the engineering.

Then are we on the right track to simpler systems?

I think both things are happening at the same time. Some systems are getting more complicated, some are getting too complicated.

Which ones are getting too complicated?

Any system where you haven't got the design tools to make it perform in a fully predictable fashion, for example.

There are two images one can create of distributed processing. One is where distributed processing becomes like a bowl of spaghetti, and every time you pull one piece it makes every other piece of spaghetti in the bowl shake.

The other image of distributed processing is a whole lot of modules, each one of which is largely self-contained. Each module is simple to understand by itself, each module has a standard interface to a network, the network is completely flexible so you can go from any point to any other point, the network is managed in its own right — it's well-managed, has good diagnostics, is reliable and highly flexible.

Here you have a system which could build up to enormous complexity and yet each component of it is understood and comprehensible. That's good engineering.

Are companies making adequate use of today's technology to process information?

I don't think they are. I think most companies have not yet perceived the full implications of computers for increasing productivity.

The reindustrialization of America has got to happen with much higher levels of automation and productivity, and concentration on the industries of the future, not the industries of the past. Productivity has slipped too much. And also productivity in data processing is nothing like as high as it should be.

I decided to swing my next round of seminars toward the subject of productivity because I think it's particularly important at the present time, especially if America is slipping into a recession.

What I'm doing at the moment is looking at every consideration which could increase productivity in data processing. The fascinating thing is, when you do that, the ones which most people are talking about are almost insignificant in their effect — like structured programming, structured analysis, structured design. They are *not* increasing productivity very much, whereas there are other forms of management of data processing that can make enormous step-function changes in productivity. We need to be asking the questions: What are they? Can we use them now?

My answer would be many of them can be used now, but there is a price to be paid and that is that you've got to change the management of data processing in order to use them now.

Is there a danger in what appears to be our over reliance on computers?

I think we've always got to keep it in balance. And if we build systems which could be knocked out by a catastrophic failure beyond our control, then there would be danger. It may be that some of the systems of society that we build today are too vulnerable.

Vulnerable to what?

Suppose for the sake of argument there were very bad economic times in the United States. I'm not predicting that there will be. But suppose that one of the largest banks in New York went belly up. There could be a whole chain reaction of events which might cause

The man generally acknowledged to be the computer industry's most widely read author, best attended lecturer and foremost authority on the social and commercial impact of computers greeted me at the doorstep of his home in an open sport shirt, tan shorts and bare feet. Tall and lanky, he towered over me as he towers over the information processing industry.

A graduate of Oxford University (with an M.A. in physics) and a British citizen, James Martin spent 19 years with IBM, both in the field and in development laboratories. For 10 of those years he worked at IBM's Systems Research Institute in New York.

Martin has discussed advanced technology on radio and television around the world and since 1977 has conducted the "James Martin World Seminar" on all six continents. He was cofounder and board chairman of Graphnet, America's first operational value-added common carrier.

Martin left IBM in 1978. He is now an independent consultant, a visiting fellow at Lancaster University in England, board chairman of The DMW Group, Inc. and vice-chairman of Butler Cox Associates, a London-based research group.

Among Martin's current projects is a study on the computing environment of 1985-1990 for one of the largest computer manufacturers. He is also working at the chairman level with one of the world's largest office equipment vendors.

Martin is an adviser to the British government. On the day before our meeting, he received a phone call at home from British Prime Minister Margaret Thatcher, asking him to consult on an overhaul of the British telecommunications industry.

Martin is only 41 years old.

I interviewed him at his secluded home in Bermuda, where he spends only 40% of his time, but where he does much of his writing. He is in the midst of his 23rd book (on data base), rising before dawn most days to work in his second-floor, book-lined "office of the future" overlooking the Atlantic Ocean. His latest book, The Wired Society, *was nominated for a Pulitzer Prize.*

Books are not Martin's only medium. He is also working with Deltak, Inc. to design and produce the Advanced Technology Library, a collection of more than 200 video-based courses on a wide range of information processing disciplines.

But Martin chiefly has "an enormous desire to get hold of the television medium." He has written a detailed synopsis for a proposed seven-hour television series about the future.

"The programs don't attempt to predict the future, but try to create a philosophy of what is now within our grasp and what could go wrong," Martin told me. "The last of the seven programs is a portrait of a utopian society which could possibly be created — but on the way there is all manner of chaos."

The series would cost about $7 million, and Martin is worried. "Chances are we won't ever get the money. The series probably won't be made. But the world absolutely needs it. Most of the programs made on technology are doomsday programs. Even the very good programs like 'Nova' have a negative tinge to them. This series says we could create a great world with technology IF. . . ."

Much of Martin's philosophy rests on that single word — if. He professes an unshakable belief in the power of technology to create that better world. And he is using every medium at his disposal to spread the word.

What he fears and mostly leaves unsaid is that man and his misuse of technology may foul things up.

Forceful and magnetic on stage, Martin in private conversation is polite, reserved, borderline shy. He speaks, as he writes, with simple eloquence. His carefully chosen words reflect intense thought, a vast knowledge of the technical literature and an intimate familiasity with the technological, economic and social forces at work in information processing and society at large.

Egotist? Dreamer? Genius? Martin has been called all three. But the lasting impression of James Martin is of a powerful man with a clear vision of the world as it is — and could be. If.

John Whitmarsh

the trucking industry to stop operating for two weeks, say. For two weeks there is not an adequate delivery system in the United States. What would happen if Manhattan ran out of food? What else would happen to American society? It would bring things to a screeching halt, and the results could be catastrophic.

This is perhaps too sensational an example. But you can look at certain examples of technology and ask the question, "What would happen *if* there was a certain improbable catastrophe?" If the answer to that question is that the whole damn thing is going to fall down like a pack of cards, then it's bad technology.

Are you also referring to vulnerability from terrorism?

We have not yet seen high-technology terrorism that is effective. I would think it's irresponsible to make that statement in a newspaper. If the terrorists read it, they might do their homework a little bit better.

New technology may be the factor which most changes the way corporations are managed over the next few years. What kind of MIS strategy should these companies assume to minimize the disruption of technology and also to take advantage of its opportunities?

That's a very complicated question and one which I happen to be writing a book on today.

There are quite a lot of components to it. A very important component is understanding what information is. So I'd like to use the phrase "information engineering."

Information engineering needs top management involvement in planning the information resources of a corporation. What we're seeing in many corporations today is the data processing department looking *out*. The data processing professional is never going to — in most cases — fully understand the needs of top management. He cannot know what a chief executive officer knows. He cannot know what the board of directors knows. Therefore, if information engineering proceeds from the data processing department outward, it is never going to be as good as if you use a methodology which involves top management in making certain statements about types of information which they feel are necessary to run the company.

What are now coming into existence are methodologies which enable one to look at information resources, translate those resources into data models, get the data models into a stable form that is independent of technology, translate the data models into today's data bases (which are going to change) and, into distributed data bases, to work out the types of distribution you want on networks and *then* to select the tools which will give you the highest productivity in creating the types of information processing which a corporation needs.

How long does this process take?

It's not quick. There is a long cycle time associated with it which will vary from one corporation to another. So you won't be able to change the whole of data processing overnight. But if you haven't yet started, you are not serving your organization as you should.

But the first ingredient in "information engineering" is top management's involvement in the data processing function . . .

Yes, and in order to do that you've got to have a methodology. If you just go to top management and say, "Hey, you've got to get involved," top management will say, "Sure, I want to be involved. What do I do?"

At that point if you cannot give them a detailed action plan and hold their hand right through the plan, then it's not going to work. So you must have a methodology, and it's got to be a methodology which top management will get excited about.

But management seems as anxious as the general public about technology. They are afraid and don't really want to get involved . .

Yes, yes. One of the things I detect in the boardrooms at the present time is a very high nervousness about technology. Much more so than five years ago. One might almost say that some members of top management are almost scared of what is happening.

Why?

They have not got the subject in perspective. They don't know what to do about it. They don't know enough. They don't know the methodologies.

If somebody can go to them and say: "Do this! This is the way to protect yourself from the Japanese. Do this! This is the way to increase your productivity," then I think they would welcome that. I believe that top DP executives ought to be doing that.

A more aggressive stance with more options for top management?

Yes. But at the same time they've got to be careful how they do it. Because there have been a lot of mistakes in the last 15 years, and there is a substantial credibility gap between the DP executives and top management in many corporations (but not all).

Why the credibility gap?

I think we've oversold. We *badly* oversold MIS for top management. There are people who say now that MIS for top management will never work. I don't believe that at all. One can find certain examples of it that are working very well, but you've got to have an entirely different design methodology for creating it.

Does one particular company come to mind that has a top-notch MIS system?

"The reindustrialization of America has got to happen with much higher levels of automation and productivity, and concentration on industries of the future, not industries of the past."

CW Photos by J. Whitmarsh

"We're going to see much more dense memory and logic chips. We're certainly going to see 10M-byte chips, though that may take 10 years or more. That means the cost of main memory is going to plunge down. The military are asking for an IBM 370/158 on a single chip. I expect they will achieve that in the second half of the 1980s. The impact that will have on the possible range of products put on the market at low cost will be just gigantic."

"The most important thing in top DP executives is to be a businessperson. To think like a businessperson and to understand how the business works. To understand the businessman's vocabulary and needs."

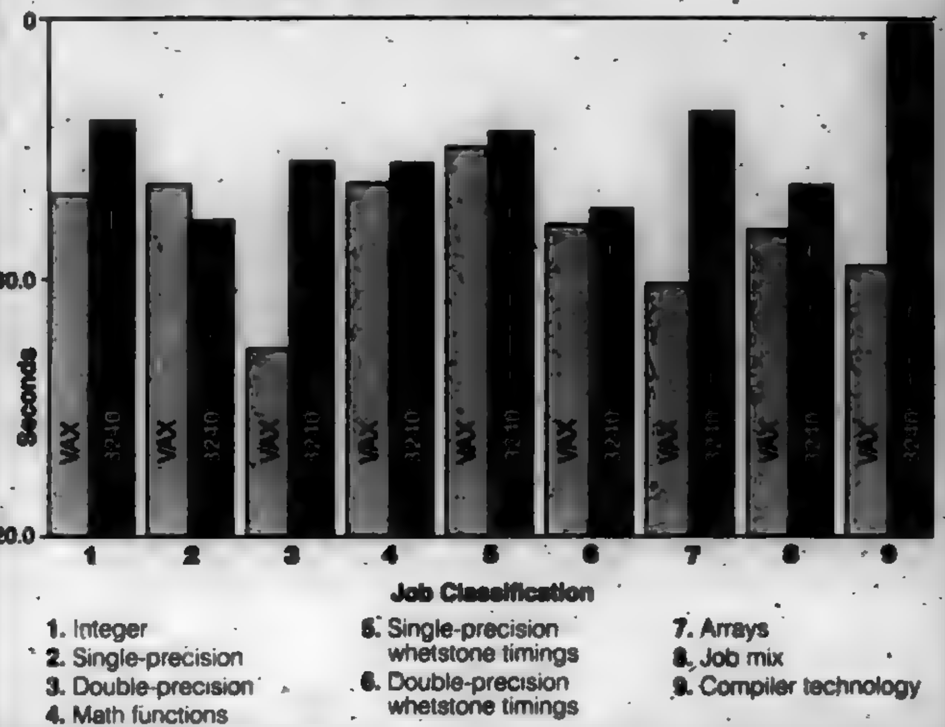
The benchmarks prove it...

1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.485	1.05
PMS0354	8.160	7.990	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0664	1.610	1.350	1.19
PMS0764	7.040	6.679	1.05
PMS0864	13.730	13.370	1.03
PMS0964	66.830	66.068	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.306	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.005	0.98
PMS1724	52.550	53.133	0.99
PMS1807	50.180	34.766	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.264	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.610	137.997	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2708	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.190	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	156.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.060	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.764	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4584	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5008	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5206	0.900	0.917	0.98
PMS5306	0.330	0.029	11.38
PMS5406	2.080	1.697	1.23
PMS5502	1.130	2.180	0.52
PMS5602	207.140	198.685	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

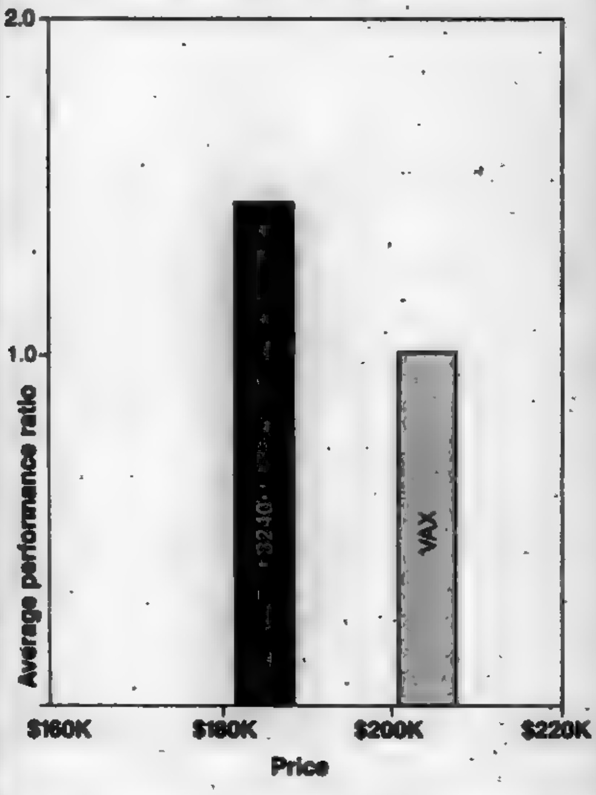
*Performance Ratio = VAX 11/780 CPU time ÷ Perkin-Elmer 3240 CPU time

2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



*VAX is a trademark of Digital Equipment Corporation

3. Proven Price/Performance



The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

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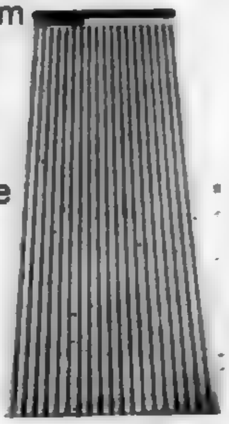

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One sees a lot of different pieces of different types of MIS systems for different types of top management, which are working excellently.

Is MIS still an evolving function?

I think the word is used differently by different people. So "MIS" is a term which I am cautious about using.

In the work I'm now putting together, I'm dividing data processing up into four types of systems. One is a routine system. It processes volumes of work, very often a heavy-duty system which is completely predictable.

The second type of system is an information system. This is a system that doesn't change the information but makes information available where it's needed at the right time in the right level of quality and with the right type of presentation. We are now beginning to see much better information system technology.

The third type of system is a decision support system. This takes some particular type of decision and uses both information and algorithms for enabling that decision to be made much better.

The fourth system is a highly specialized system, like an operations research system or a design system.

In planning the data resources for a corporation, I think it's desirable to understand the different data needs of those four types of systems in planning your corporatewide structure of information resources.

What should the MIS structure be five years from now and how do we get there from here?

Traditional data processing has started with *processes*, and by using conventional systems analysis on the processes you then determine what files or data you need for operating those processes. If you look at today's structured analysis, it says examine the processes and examine the work flow, and the data will fall out as a byproduct of doing that.

Now there is another technology which is almost the opposite to that. It says that we start by looking at the information needs, translate the information needs into data base structures, make the data base structures as stable as possible, then use high-level languages — much higher level than Cobol — for generating the processing on top of the data base with maximum productivity. That's almost exactly the opposite to the traditional way of doing processing.

Now one can translate that statement into a set of hard design methodologies for accomplishing it. It is that set of hard design methodologies that I think is going to be the mainstay of MIS five years from now. Much of what will be happening at that time will be the central or coordinated planning of the data structures, but those data structures being used in a highly decentralized fashion — by means of networks, distributed processing, minicomputers, small decision support systems as well as very large computers.

There is still a place for the very large computer?

Oh, yes. In fact, large computers aren't large enough today for the things we want to do with them. So the whole industry needs the next generation of Amdahl and the next generation of IBM very badly.

DP managers were once thought to be the next group to enter the executive suite, and some of them have. But top management today seems increasingly disgusted with DP. What will it take to improve the relationship?

I think the most important thing in top DP executives is to be a businessperson. To think like a businessperson to understand how the business works and and to understand the businessman's vocabulary and the businessman's needs.

At the same time, top management

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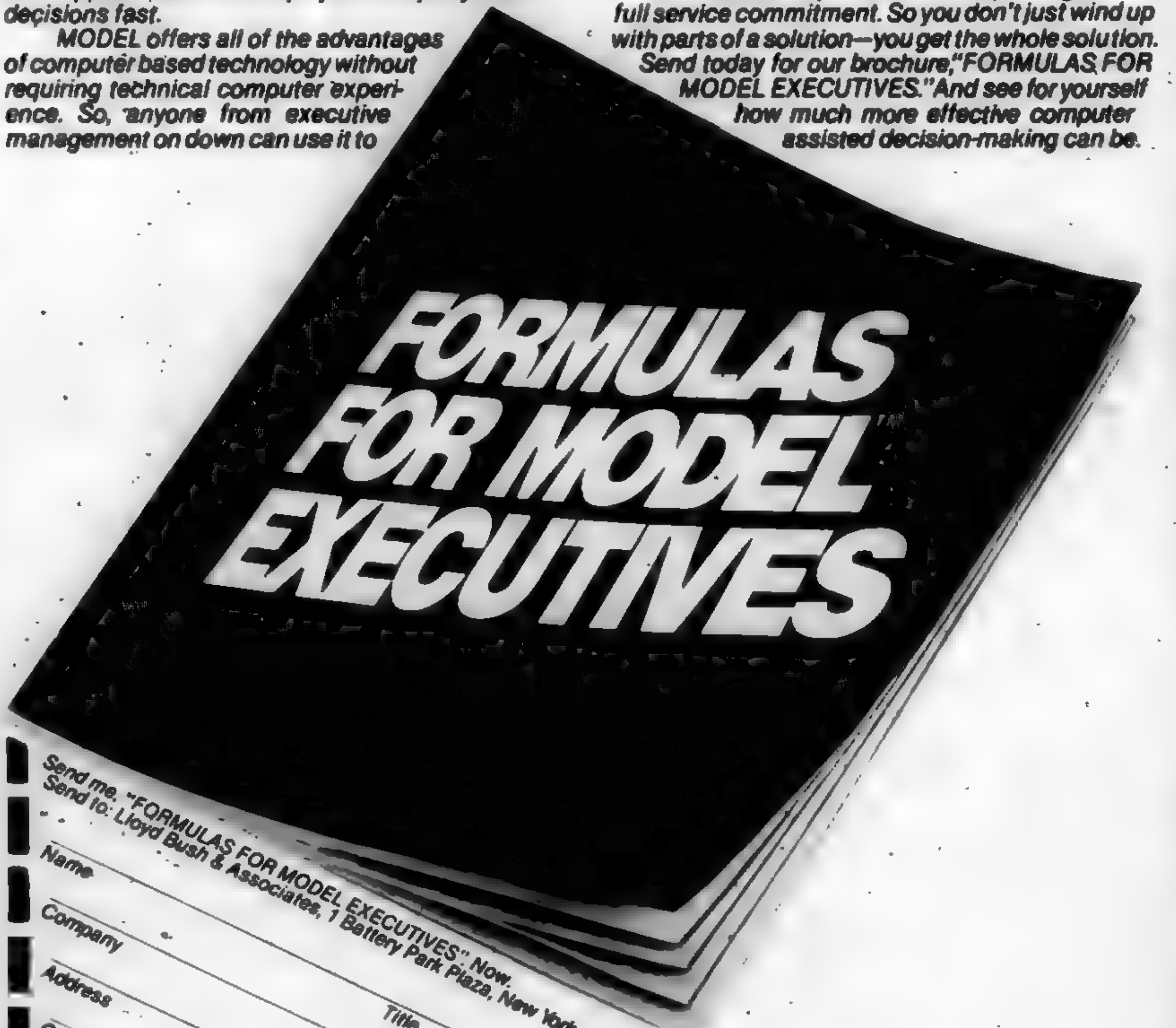

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"Many of the statements which most people are making today are failures of imagination."

must understand that if it is going to be competitive by 1985, it's got to be operating a highly computerized corporation. And so it becomes the job of the CEO to make sure that a highly efficient computerized corporation comes into existence.

A lot of top management in the past has abdicated its responsibility for data processing; it has said, "This is something that can be done by the technicians." I don't believe it can be done by the technicians. The beginning of data processing has got to be a set of businessman's decisions.

But you said earlier that top management is afraid of technology . . .

I have just given a seminar in Australia for top management in which I didn't use many technical words. There is simply no need to tell them that intersection data in IMS can be handled by physical or virtual pairing with bidirectional pointers. You can phrase the whole thing in simple language which they can understand. This is part of a very basic communication process and that process is necessary if we're going to have good communication between DP people and top management.

Then Rule No. 1 is to get rid of the technical jargon . . .

When you are talking to non-DP people, you've got to get rid of the jargon. We obviously want to talk to ourselves in jargon because it's very useful shorthand. But we've got to understand that we do not use that shorthand when we're communicating with the board.

Unless you don't want them to hear you . . .

Yes, right.

You say that the job of data processing in the '80s is to build the computerized corporation. How?

By a set of information engineering methodologies. Ideally a methodology which enables top management to look at the objectives they want to accomplish. A methodology for the strategic planning of information resources in order to achieve those objectives. A hard methodology for translating those information resources into data models applicable to the corporation as a whole. Then a methodology that translates that into data bases. And the data bases unfortunately have got to incorporate the many systems which already exist today because you cannot convert them easily or cheaply. Network engineering that gives access to the data bases. Design techniques for distributed systems and for planning the distribution of data. Having created the data bases, then a set of high-level languages for doing everything we can to automate the application development process and automate the generation of information without having to write programs which are slow to write and expensive to maintain.

Now there are a lot of implications in what I've just said. One implication is that you're totally changing the job of the systems analyst. Another implication is that you're totally changing the job of most, but not all, programmers. You'd like to automate documentation, you *must drastically* lower the maintenance ratio.

Everything I'm describing is there, and you can see illustrations of bits and pieces of it. But if you look at almost any corporation, the statement you can make is that is hasn't fully understood it and hasn't fully got its act together. A corporation which is well-managed from a DP point of view ought to have its act together by 1985 in these areas — and the sooner the better.

Do corporations that are well-managed from the DP point of view have DPers at the vice-president level?

Absolutely.

In one of your other books you refer to Arthur C. Clarke, the science fiction author, who divides forecasting failures into two classes: failures of nerve and failures of imagination. You write: "Arthur Clarke's second category, failures of imagination, applies with a vengeance to the data processing and communication industries." What exactly did you mean?

Look at the 20-year history. Go back and look at what people were predicting 20 years ago. There were a lot of wild, crazy predictions — the computer-is-going-to-take-over-the-world types of predicitions.

But nobody 20 years ago would have predicted today's data bases, today's X.25 networks, today's microchips, the beginning of the industrial robotics industry. So all manner of things have happened which were not predicted.

Now, let's look at the next 20 years. If only it were possible for us to see the year 2000 now, I think what would be apparent to us is that many of the statements which most people are making today are failures of imagination. What is actually going to happen is going to be much more impressive in certain ways thanwhat most people are predicting today.

What I'm really saying is there are going to be technological surprises, but I don't think it's necessarily possible to describe them.

Suppose you take the subject of networking. The X.25 networks which are now spreading, by the year 2000 will go into absolutely every nook and cranny. They will be everywhere. Everywhere there will be inexpensive access to a network which moves data around the world fast and very, very cheaply. So all computers can be in communications at very low cost.

By the year 2000, just about everybody will have a pocket terminal. I think every school child will have one. It will be able to access computers inexpensively over these ubiquitous networks. The applications of that pocket terminal are endless because it is connected to computer systems, software banks and data banks everywhere by the networks and data banks.

By the year 2000 I would think just about every television set will be a computer terminal, like viewdata today. Viewdata will get very much better, but the cost of putting the viewdata chips into a television set soon is going to be very small — much less than the cost of the plastic case and knobs on the television set, probably. But in order for it to be interesting, you've got to have the networks and the data banks which become interesting for the mass public to use.

That would create vast security problems as well . . .

Yes, but there are solutions to the privacy and security problems.

Does this scenario include the replacement of printed newspapers and magazines by electronic versions?

I don't believe so. I think one of the aspects of an electronic society that is desirable is the maximum diversity of media.

I've done a lot of thinking because people have attacked me so many times about 1984 and totalitarianism and George Orwell and all that. I think the best way we have to protect ourselves from the possibility of future totalitarianism or future excessive control in government is to have the maximum diversity of information channels. So I don't want electronic newspapers to replace paper newspapers — they are a different medium.

If you have ever used an electronic newspaper (one or two of them do exist in Europe), it's totally different in feeling to the *New York Times* and the information you get is totally different. When you look through the *New York Times* you've got big pages and lots of long articles to read, you can scan through it by hand.

On the other hand, if I go to a viewdata set in London and ask what the *Economist* has to say about the Russian invasion of Afghanistan, in order to put that into electronic form they've had to structure it. So I've got a set of structured indices in which I can look up different aspects of the story. It is more structured than a story in the *New York Times*. The amount of read-

"The best way to protect ourselves against totalitarianism is to have the maximum diversity of information channels."

ing is smaller.

I may get insights from the *Economist* on viewdata that I do not get from the *New York Times*, but on the other hand I am going to get some things from the *New York Times* that I certainly don't get from the electronic magazine. I say they are different media so let's have both of them.

I do not believe that electronic newspapers will replace the *New York Times*. I think the *New York Times* and other such big papers will still be in business in the year 2000.

But only the marketplace will decide?

Only the marketplace will decide, yes. I think if you have free enterprise you probably will get maximum diversity of channels. But if it looks as though it's going to kill certain important types of channels, it may pay to have them artificially kept in existence. I think it's a very important principle that we ought to have maximum diversity of information sources in order to protect ourselves from the wrong forms of control of information.

If you look at television, for example, you might say isn't the best way to handle television to have absolutely free enterprise. But I think the public broadcasting service is clearly giving us something that's very important that we would not have got in the same time frame from free enterprise. I'd say the same thing about the BBC in Britain.

Should AT&T, which provides communications services, also provide the news and information that could be transmitted over those networks?

AT&T is just a common carrier. Are you suggesting that it should become a journalistic organization? I'd prefer to separate the common carrier business from the journalist business. If the two are put together, then with an organization the size of AT&T that becomes extremely powerful.

Considerable resistance is surfacing among professionals and executives in companies with state-of-the-art office automation systems. They complain that these systems impose their own structures and considerably narrow the freedom of old work habits. They say the systems are designed so that people must adapt to them instead of the machinery adapting to the people. They also claim they must make major psychological and behavioral changes under these systems. Are we moving too fast into the office of the future?

I don't think we're moving fast enough into any use of technology which increases productivity.

I think there's a much more uncomfortable danger ahead for America and for Europe than the danger which you've just mentioned, and that is the fact that the economy is going to be very sick. In order to correct the sickness of the economy we need to move as fast as we can into any area of improving productivity.

But having said that, you can certainly find lots of examples of systems which are badly designed from a psychological point of view.

Think how many training courses you could send a programmer on to learn the psychology of the terminal interface — there are very few such courses. I am just putting together a long training course on that subject with Deltak, and I think it will be absolutely unique. Having gone through the work of building this course with Deltak and writing my books on the subject, I am constantly amazed when I sit down in front of a new terminal system and play with it to discover the mistakes they have made. They are rather obvious mistakes which they would not have made if they had had the right sort of training. So the psychologist has an important role to play and that's becoming more and more recognized.

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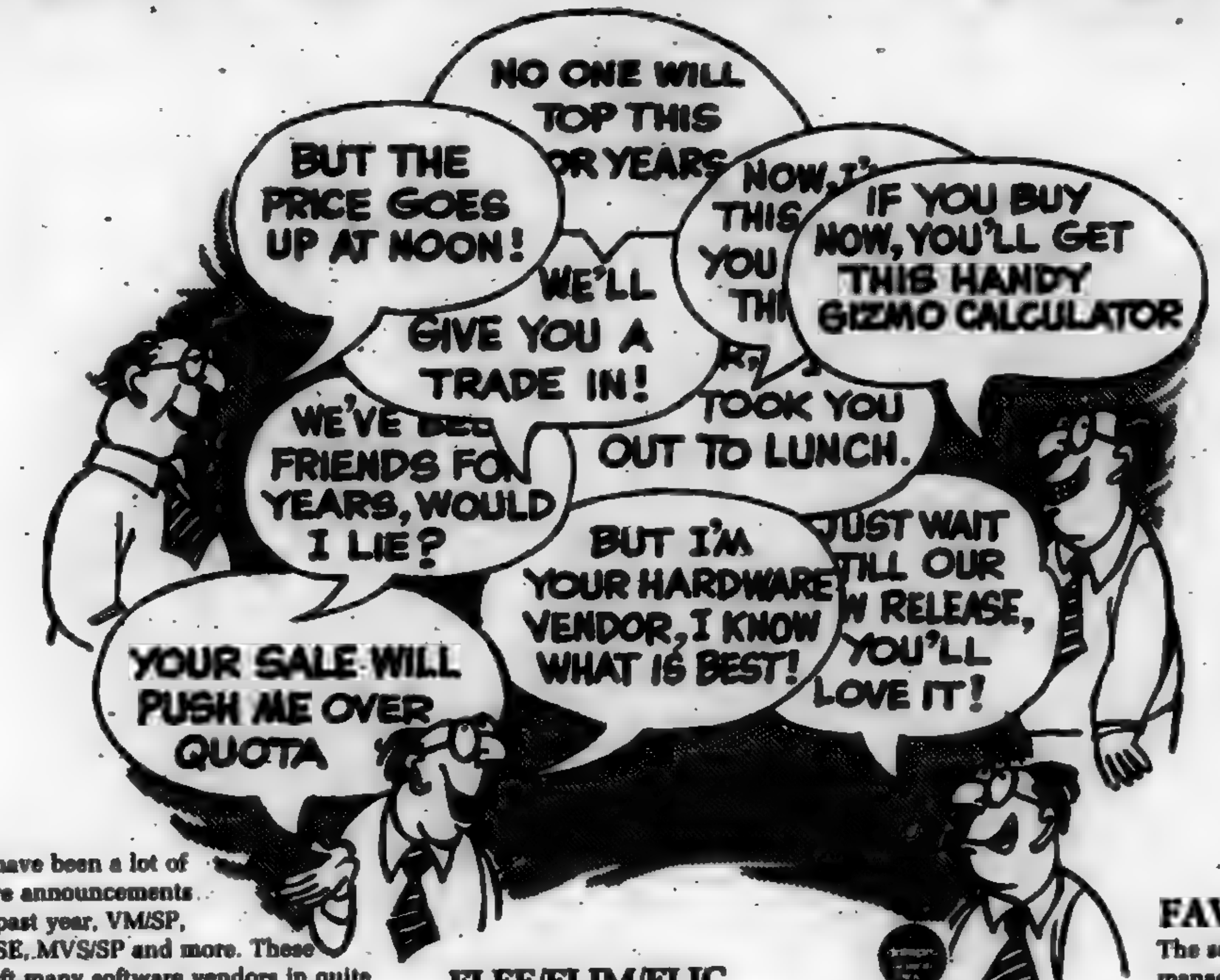
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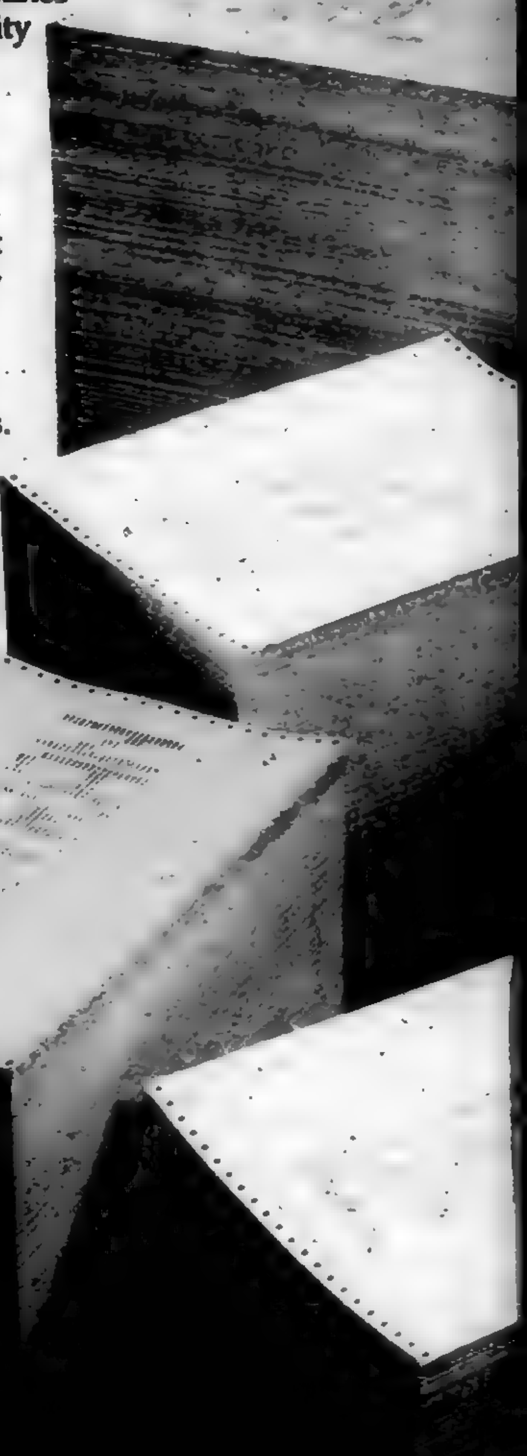

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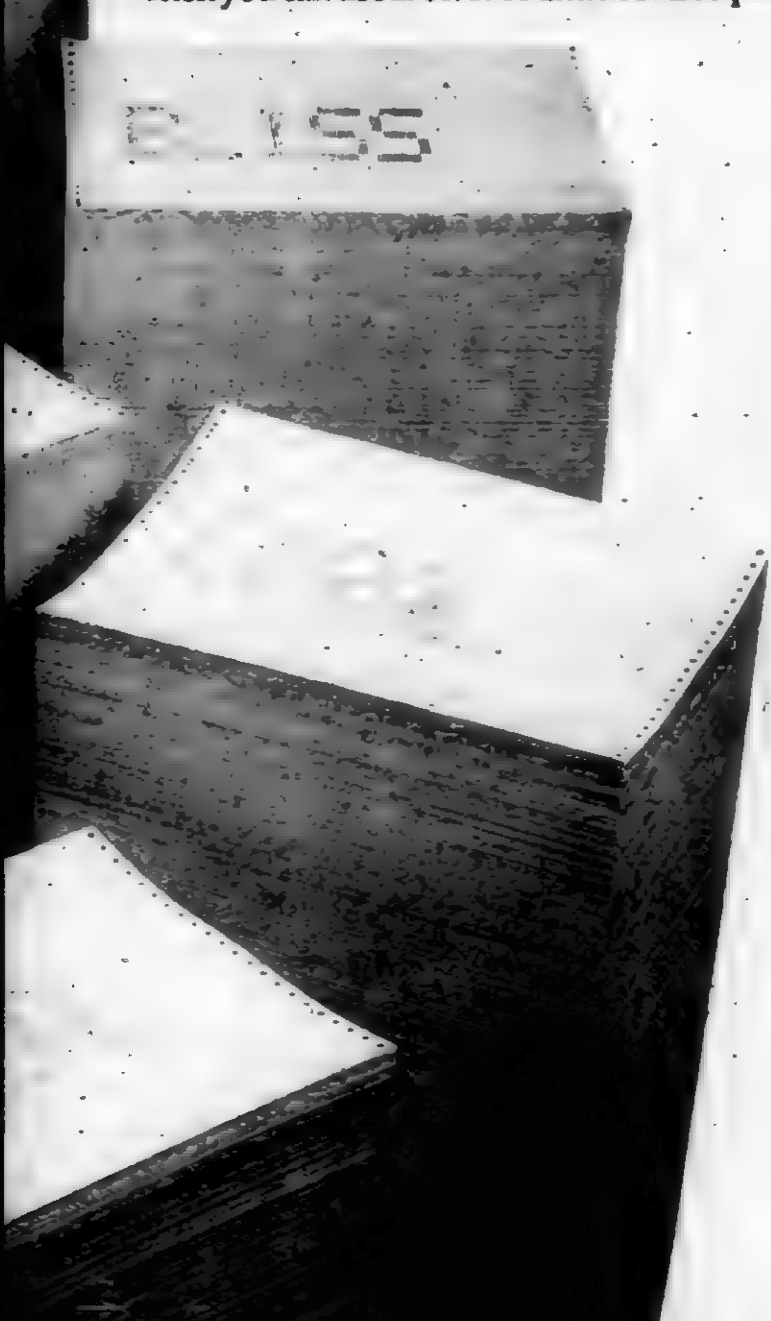

In addition, VAX/VMS Release II offers a new Mail utility for interterminal communications, even with a terminal on another CPU through DECnet.

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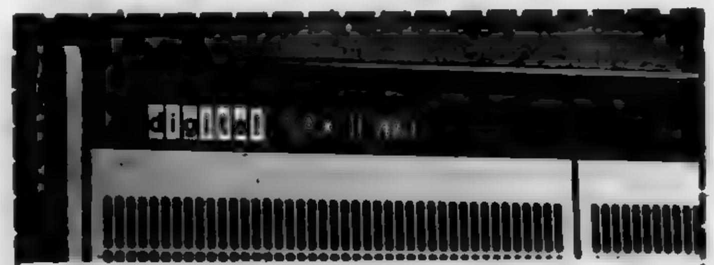

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"The industry is absolutely forced to change the methodology of creating applications within the next five years."

from 50% to 75% of all U.S. factory workers could be replaced by smart robots by the end of the century. Office workers, too, wonder if word processing and automation will replace them even sooner. Is a confrontation between labor and management over automation inevitable at the bargaining table? What is the possible outcome of such a confrontation?

We're certainly going to have a confrontation at the bargaining table. The question is, how bad does it become?

I've recently spent some time with some of the trade union leaders on the subject. This came about through another film I'm making with Deltak called "The Microelectronics Explosion." One of the trade union leaders that we had in the studio was Thomas Weekly, who is the United Auto Workers person in charge of activities relating to robots. As you know, the automotive industry is considering robots very heavily at the present time.

Weekly's attitude is that in the long run it will be good for the auto worker if robots are introduced *extensively*, on a wide scale. The reason for that is that it will enable a person who is doing a rather boring and rather inhuman job today to move up to a job which needs more training, is more interesting to do and will give him higher pay.

So I think the attitude of the most responsible union leaders is that in the long run they very definitely want these things to happen. In the long run they are going to increase the wealth of everybody.

You said recently that "structured programming increases productivity only about 10%. It is *absolutely* not the answer. We need far more powerful tools with far greater orders of magnitude."

That's right. If you look at the rate of dropping cost of computers, we know fairly well what chips are going to exist by 1985. So we can project the cost of computers by 1985. On that basis you can try to work out how many programmers you would need to program them *if* you did it with today's productivity. The answer to that question is ridiculous.

The industry is absolutely forced — it has no option — to change the methodology of creating applications with a step-function change within the next five years. Otherwise it simply won't be able to sell the computers that it is creating.

If you look at the amount of application programming, systems programming and systems analysis that is going on with the average IBM 4300 at the moment, it's totally out of balance with the cost of the machine. If you then think that that machine is going to be a very small fraction of that cost by 1985, then you see my point.

Do I understand that you believe the 4300 is underutilized right now?

I'm not saying it's underutilized. I'm saying the cost of getting it to work is too much compared to the cost of the machine.

Yet you said earlier that we need far more powerful mainframes . . .

Yes, very definitely.

. . . And far more powerful tools to increase efficient use of these larger machines?

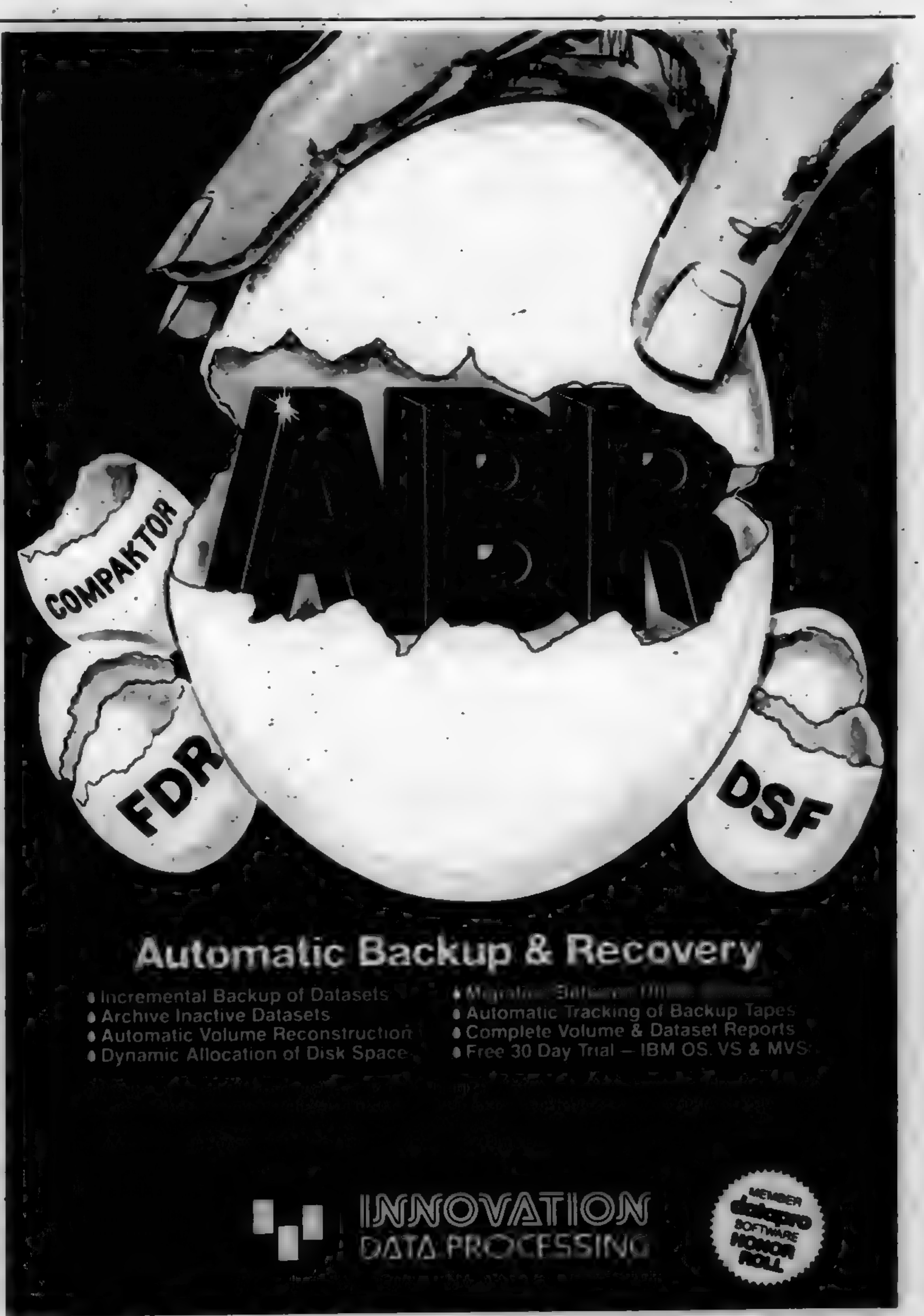
Yes, absolutely.

Is automated programming among those tools?

I don't normally use the phrase "automated programming."

There are a variety of different types of new languages. Many of them relate to data bases. In fact, these new languages are more powerful if the machine already understands the data and if the data is described in the dictionary that is built into the system.

(Continued on Page 113)



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INNOVATION
DATA PROCESSING

By Herbert L. Gepner

APPLICATIONS SOFTWARE EXPLOSION

The use of applications software packages got off to a slow start in the 1960s, but has gained steady momentum since. The author surveys the present status and future prospects of "off-the-shelf" packages, supplies some guidelines for purchasing them and concludes with a list of 100 important software vendors.

Today's demand for and availability of virtually every conceivable type of applications software transcends all computer lines, from the very small to the very large. There are software vendors which offer simple individual modules that can be executed on small business computers, either sequentially or as part of an integrated system. At the same time, there are multiphased, totally self-contained manufacturing systems developed by both hardware manufacturers and independent software suppliers for use on large mainframes. Developers of data base systems have begun to realize the benefits that can be derived from supplementing their systems with interfacing applications software.

Where does the applications software industry stand as we enter the decade of the '80s? The minicomputer/-microcomputer marketplace is now the dominating factor in terms of the volume of software development. An important factor to be recognized in this new information revolution is that the software being designed for these small systems is "user-dictated," as opposed to the early mainframe software, which was largely vendor-dictated.

It should also be recognized that much of the microcomputer applications software being developed is very simplistic in nature, to complement the low-cost hardware for which it is being designed. (This is not to say that there is no sophisticated software for these small systems. Many of the software systems designed to run on larger mainframes, such as data base management systems and telecommunications monitors, have been modified to fit into the smaller processing units.)

New types of applications are being demanded by the users of these inexpensive, versatile systems. The products now pouring onto the market in response to these user demands include graphic design systems that will prepare management reports without secretarial assistance and do it at the moment of request; interactive design support packages for architects and automobile designers; hotel and motel reservation systems; doctor and lawyer patient/client accounting systems; and many other unique applications.

'Caveat Emptor'

The minicomputer and microcomputer manufacturers cannot hope to satisfy this large and diverse demand for applications software, so they are turning to the individual software developers and acquiring the marketing rights to their packages. In many cases, they pay an acquisition price and establish some sort of royalty plan for the developer. Occasionally, they purchase the packages outright.

The end-user purchaser of a microcomputer software package should be aware of the risks involved in acquiring some of these packages. With mainframe software, a stipulated warranty or guarantee usually goes along with the sale. With microcomputer software offerings, the watchword is "caveat emptor," since more often than not the package carries little, if any, guarantee that it will do what the user wants it to do.

The risk, however, is not as great as one might imagine because of the previously noted simplistic nature of most of this new software. When a low-priced package is designed to do one job and do it well, that is all the user should demand. This, however, requires the user to know what he really wants.

We certainly don't mean to imply that all the applications software activity is taking place in the small-system arena. The availability of software for the larger mainframe computers is growing dramatically in the fields of data base management, communications and large applications systems such as total manufacturing systems. Whereas the small computers lend themselves to straightforward software packages for individual applications, the larger mainframes are geared to handle large banks of data with sophisticated, interfacing applications and systems software.

What the Future Holds

Now let's polish our crystal ball and look at the applications software of the future. In the table of contents of the *Datapro Directory of Software*, we have identified 12 specific applications areas that are prominent in today's marketplace: accounting; banking and finance; education; engineering and scientific; insurance; management sciences; manufacturing; mathematics and statistics; medical and health care; payroll and personnel; sales and distribution; and word processing.

This list is by no means exhaustive, and each of the 12 categories can readily be further subdivided, as we have done in the *Datapro Directory*. Moreover, certain types of software transcend several categories and therefore are more difficult to pigeonhole.

These 12 major applications areas, along with the new technologies brought on by the word processing and automated office revolution, the expected growth of distributed processing architecture, the increased importance of international satellite communications networks and — most of all — the proliferating mini/micro systems will dominate the applications software industry of the '80s. Let's review the anticipated future trends in each of these applications areas.

Financial Software

In the 1980s we will see a steady and continued growth in the demand for more extensive and effective accounting packages to meet the growing paperwork requirements at both the federal and state levels. Payroll and personnel systems will continue to be in high demand, especially as the payroll activities within groups of businesses become increasingly standardized (again, thanks to government regulations).

The growth in these areas will be strongest in the mini/micro sector. Only slow to average growth in new accounting and payroll applications software for large systems will be noticed, and most of this work will be a result of the ever-increasing government requirements. The established vendors servicing the large mainframes will continue to enhance their existing offerings and to combine interacting modules (or packages) into large data base-oriented systems.

We do not want to infer that the development of applications software for large computers has bottomed out. To the contrary, as mentioned before, certain major applications systems are only beginning to make their presence felt in the marketplace.

There is a growing demand for manufacturing control systems and the next decade will bring major advances in this area. Project planning and standards development systems will also come to the fore. After all, now that computers are making mountains of data available to management, there have to be better ways to control and organize this data so management can derive meaningful information from the ever-increasing data bases.

Banking software will again undergo a flurry of activity, especially in response to the demands that will be generated by federal action regulating electronic funds transfer and by the increasing use of automated teller machines. In addition, we foresee an increasing demand for sophisticated financial planning and control software, especially in the area of protfolio management.

Medical Systems

One of the more promising applications areas, medical and health care, will continue to be relatively slow in evolving, but only in the proprietary software marketplace. Most of the systems and development work in this area is currently being undertaken by contract software houses, tailoring special systems to satisfy individual hospital environments.

Hospitals not big enough to afford their own systems are typically using service bureau-type facilities offered on a usage basis. Several large remote network service vendors are installing hospital-oriented services on their systems to meet the growing demand.

On the other hand, small systems for doctors' offices and small clinics will gain widespread acceptance when the mini/micro market calms down and doctors realize the benefits afforded by in-house recordkeeping. Although mini/micro packages for doctor/clinic accounting will be available in large numbers, total hospital administration systems available "off-the-shelf" will continue to be relatively scarce. We also predict relatively slow growth in customized systems for laboratory control.

Education Slow, Too

Education is another area in which we foresee slow growth. Most educational institutions, except for a few well-to-do universities, are hard-pressed to afford the expenditures required to install high-powered computer systems. The installed computers are being used mainly for school administration functions.

Many school districts share computer services on their local community systems or go outside to independent service bureaus. As we progress into the financially strapped '80s, there does not seem to be any relief in sight.

Despite this gloomy outlook, significant strides have been made in the field of computer-aided instruction (CAI). CAI has evolved out of combined manufacturer/community/government experimental efforts. The benefits have been widely observed and reported. Dramatic results have been noted, especially in inner city areas where traditional teaching of the learning skills has long been a frustrating problem.

However, unless a dramatic influx of funding is forthcoming, it will be many more years before this promising technology will be fully developed and widely available.

Scientific Software

Software addressing the engineering, mathematical, statistical and other scientific areas will continue to evolve along with the underlying technologies. Since the beginning of the computer age, these application fields have been of primary concern to scientists of all disciplines. We see no letdown in the '80s, especially in light of the de-

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7

mands for computer solutions to our society's increasingly complex social and economic problems.

One area that is certain to attract a great deal of attention in this decade is energy. This will be closely followed by the increasing efforts to protect the environment in which we live.

If there were no other reasons for predicting marked growth in the engineering/scientific areas (and there are many), these two problems alone would challenge the scientific software developers.

Sales and Distribution

We predict that sales and distribution software will experience moderate growth during the '80s, with more activity in the distribution area than in the sales area. Even though retail sales technology attracted a great deal of attention during the '70s, the acceptance of computerized applications has been rather slow, and the dismal near-term economic forecasts provide no reason to be optimistic about any sudden upsurge in demand for retail-oriented software. Most new developments in this area will probably come off the hardware manufacturers' drawing boards.

Automated systems to speed the distribution of products will be more in demand as a result of the desire to conserve energy and establish better control of the movement of goods from the warehouse to the dealer. As energy becomes scarcer, we can expect to see more large companies employing automated inventory control and distribution systems, and they will look first toward the proprietary software market to meet these needs.

Word processing (WP) and automated office system software deserves special mention. As noted before, we are entering an era frequently referred to as the "information revolution." A quick look at what is happening in the WP market validates the appropriateness of this term. More and more offices are converting to WP to increase the efficiency and accuracy of their operations; ordinary typewriters are being replaced with WP systems at an astounding rate.

The 1980s will see the marriage of WP systems and mini/microcomputers consummated, and one of the results of that union will be a great demand for sophisticated text editing and WP software. Initially, we can look to WP and computer equipment manufacturers to lead the way in supplying this software. The independents will soon follow suit and enter this marketplace, with initial emphasis on the most popular computing systems, such as the Digital Equipment Corp. PDP-11.

Some independents have already taken this step. Ultimately, however, when the inevitable shakeout occurs, the major suppliers of this type of software will be the successful manufacturers of WP systems.

A specialized branch of WP, electronic mail, is another area where much is being said but little is actually being done. The major efforts are currently being directed toward in-house development and usage by very large companies, including computer manufacturers. This technology is slowly making its mark in the larger commercial remote processing networks as well.

Although the '80s will see more activity in the evolution of electronic mail technology, actual in-house installation of these systems will be slow and selective.

Accent on Micros

The big thrust in the '80s, as noted before, will be applications software for mini/micro users. More and more people are getting involved with personal computing hardware and software. Packages to help prepare income taxes, keep track of household budgets, prepare account records and play nearly every imaginable kind of game are available for as little as $9.99.

Is this a significant trend for software development in the future? You'd better believe it! Just look in any shopping mall for the nearest Radio Shack store and judge for yourself. Go to any of the proliferating personal computing shows and view the thousands of enthusiasts who come to buy.

The 1980s have begun with a mini/micro marketplace that is noteworthy for its lack of organization. In fact, a better characterization might be "cha-

The following is an alphabetical list of 100 well-known applications software vendors. This list includes vendors whose products were either mentioned in Datapro Research Corp.'s 1980 survey of proprietary software users or identified through subscriber inquiries to the Datapro Consulting Department.

It's important to note that there are hundreds of other respectable vendors of applications software. The *Datapro Directory of Software* and the *Datapro Applications Software Solutions* reference services list far more vendors and products than can be listed here.

In most cases, the field(s) of applications specialty are noted below each vendor's name and address. In the case of the major computer manufacturers, however, the specialty fields have been omitted because of the wide range of offerings available.

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Burroughs Corp.
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Detroit, MI 48232

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Los Angeles, CA 90049
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Wellesley, MA 02181
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Datapoint Corp.
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San Antonio, TX 78284

Digital Equipment Corp.
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Maynard, MA 01754

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Fort Wayne, IN 46802
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New York, NY 10038
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Wellesley, MA 02181
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Chicago, IL 60606
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[illegible]-SAI, Inc.
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Ann Arbor, MI 48104
Electrical Engineering

Haverly Systems, Inc.
78 Broadway
Denville, NJ 07834
Management Sciences
Mathematics and Statistics

otic." Hardware is coming from hundreds of sources, and software seems to be coming out of every backroom or kitchen that can house a TRS-80, Apple or Pet microcomputer.

As in the mainframe market, where order and direction was established when IBM introduced its third-generation computers and proceeded to lead the development of appropriate software, we can look forward to IBM and a few other major manufacturers, such as DEC and Data General Corp., to lead the way toward an organized mini/micro market in the '80s.

We believe this transition can take place within as small a time span as five years. By that time, a few leading mini/micro software houses will have clearly risen above all the rest. Among these will be companies such as Microsoft, Inc., producing compilers for virtually every type of microprocessor on the market; Personal Software, with its business application packages; and Digital Research, Inc., with its operating systems and communications control software.

Going out on a limb, we project that there will be 10 major microcomputer software suppliers when the market finally settles down.

One factor that will take on extreme importance in the small business computer market is software portability. The ability to acquire or develop an application and run it on a variety of hardware systems will be a "must" in this industry. As he moves back and forth from 16-bit to 32-bit processors, the user should not have to change his applications software.

One approach to solving the software portability problem has been introduced by Apple Computer, Inc. for its 6502-type microprocessor. The user can purchase, for approximately $400, the "softcard," actually a separate microprocessor that enables the Apple to "emulate" the Z80 or 8080 environment.

Considering that there are now more than 200,000 users of Radio Shack's Z80-based TRS-80 microcomputer alone, it's easy to understand the benefits afforded by this type of portability.

Firmware Advances Key

Firmware advances will play a large role in the mini/micro market. Mainframes users will also benefit from a steady movement toward firmware in the '80s. Segments of operating systems, access methods, I/O routines and even data base management systems will be increasingly implemented in firmware for increased efficiency. In fact, almost any coding that can be depended upon to be static in its function is a candidate for firmware implementation.

The serious small businessperson will be increasingly likely to install a mini or micro system of his own, especially if his is a small establishment that doesn't need a complex, multiphased applications system. This potential computer user has two ways of proceeding: He can acquire his own computer system from the manufacturer and purchase the necessary software to handle his operations, or he can go to a turnkey vendor and have him install a ready-to-use system.

The turnkey vendors have been and will continue to be an important factor in the growth of the applications software industry. These innovative firms purchase the hardware modules that make up a minicomputer or microcomputer system and develop specialized industry software to run on that system.

At first, the turnkey vendors concentrated on the lucrative, never-ending demand for accounting software systems. One of the major developers of minicomputer accounting software is MCBA, whose offerings are constantly being modified to support a wide variety of computers. Turnkey vendors soon broadened their efforts to include specialized systems for the pharmaceutical, hotel and auto industries, and today you can probably find a turnkey vendor addressing almost any specialized application for which there is a measurable demand.

It's also worth noting that the turnkey vendors frequently offer their software packages "off-the-shelf" to users with compatible hardware systems already installed.

As systems become easier to program and the accompanying software becomes simpler in nature, the turnkey industry will probably level off. However, for the next five years at least, it should enjoy vastly increased revenues.

Glowing Prospects

We can conclude that applications software in the '80s will see sizable growth in acceptance and revenues in most segments of the business and scientific fields, with truly spectacular growth in software for the small business and personal computing environments. Although the revenues produced by individual applications products may not approach those produced by large systems software products because of the wide differences in product prices (e.g., a mainframe data base management system may sell for $150,000, while an accounts payable package for the same computer may sell for $15,000), the installation frequency of applications software products will greatly exceed that of the systems software offerings.

As this trend continues, we expect to

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"Companies have finally realized that generalized software can be modified to meet individual needs with relatively little effort."

see total revenues from applications software exceed the revenues from systems software within five to 10 years.

It is generally agreed that the average computer installation in the '80s will spend more money on software than on hardware. Proprietary software, as opposed to software developed in-house, will account for an increasingly large portion of these software expenditures, and applications software will account for more than half of all proprietary software costs before the end of the decade.

Why Go Outside?

We've discussed what we expect will happen in the coming decade. Now let's look at some of the reasons for the recent upsurge in the popularity of proprietary applications software.

There is, of course, the "sameness" factor; companies have finally realized that reinventing the wheel is wasteful and unproductive and that generalized software can usually be modified to meet individual needs with relatively little effort on the part of the user. Let's examine some of the other major reasons for the reversal of thinking about proprietary versus in-house software.

In a recent *Computerworld* article, Martin Goetz, senior vice-president of Applied Data Research, Inc., estimated that in-house development costs are currently running in the range of 10 to 1 over the costs for the same software acquired on the open market. He went on to say that a cost ratio of 100 to 1 is not unusual.

Another significant cost aspect, pointed out in a speech at the 1980 National Computer Conference by Fred Tatar of the Ford Aerospace Corp., is the costs involved in obtaining and supporting qualified personnel. Tatar noted that in his experience, it costs about $15,000 to hire someone to do the job, $20,000 a year to support him and $10,000 if you lose him once he has been trained.

Maintenance Bugaboo

All of these cost-related factors help explain why DP installations are more agreeable to acquiring outside software, but they are not the whole story. A brief look at the management-oriented reports in the *Datapro Applications Software Solutions* service uncovers many other factors that can influence the decision to seek out proprietary software packages.

Maintenance of systems developed in-house is one of the problem areas discussed in this reference service. Several reports address the increasing costs and complexities involved in system maintenance.

Software experts believe that the planning, implementation and maintenance efforts associated with an applications system normally become cost-inefficient after about five years — and even sooner in some cases. Therefore, it becomes increasingly clear that installing a generalized package that has been pretested, is guaranteed and can be maintained at a fixed price may well be more economically feasible than doing the job in-house.

Other historic deterrents to in-house development efforts have been the overrunning of costs and the slippage of delivery dates. These problems do not necessarily reflect poor judgment on the part of management and are often attributable to influences beyond the control of the development group.

Delays and overruns may result from machine downtime, personnel absences, loss of key personnel, unscheduled shifts of key people to handle emergency situations, expenditures that were not anticipated plus a myriad of other problems. Poor planning is another frequent cause, and much has been written about that problem.

Outside software, on the other hand, comes ready to be installed. The worst that can be expected is that the vendor or user may have to tailor the package to meet the individual user environment and/or to correct some undetected bugs.

We do not want to make light of the software tailoring aspect. With mini/-micro software, tailoring is not normally a problem. Because the makeup

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of this software tends to be relatively simplistic, it usually is not feasible to modify the functional coding extensively. It would be simpler to look for another package that will do what is required. In view of the wide variety of choices now available, this shouldn't be too hard.

In the case of larger mainframe systems requiring multidivision, multibranch capabilities, by contrast, it is the customer who dictates his needs and the vendor who must satisfy those requirements through software tailoring. In some cases the required modifications are minor and will be performed by the vendor at no cost; in other cases it will be necessary to contract with the vendor to do the work at some fixed cost figure.

All too frequently, the user does not realize the need for extensive modifications until the installation has begun, at which time the user is likely to be trapped because of the initial acquisition agreement. This situation can be avoided through careful planning and thorough investigation of the product being considered for purchase.

The *Datapro 70* reference service carries a feature report called "How to Buy Software Packages," outlining the things you should look for when getting ready to purchase outside packages. Basically, you should seek answers to the following questions:

Do the basic functions of the package meet your needs?

Will the package run on your computer system?

What are the operating system or language requirements?

How well do the detailed capabilities (input, computational capabilities and output) match your requirements?

Is the performance adequate for your needs?

How flexible (portable) is the package?

In what form is the software delivered (is it compatible with your hardware)?

How difficult will it be to install the software?

Will it be easy to use?

Is adequate documentation provided?

What support (if any) will the vendor provide, and at what cost to you?

What is the operational status of the package (has it been fully tested by others)?

What will be the total cost of acquiring and using the package?

What financial arrangements are offered?

The importance of clear, complete documentation could hardly be overemphasized. Because of the end-user aspects of applications software, the operations manual plays an extremely important role in installing and using the software successfully. Many a package has been shelved because the documentation was too difficult to use and the user did not want to take the time to get some help.

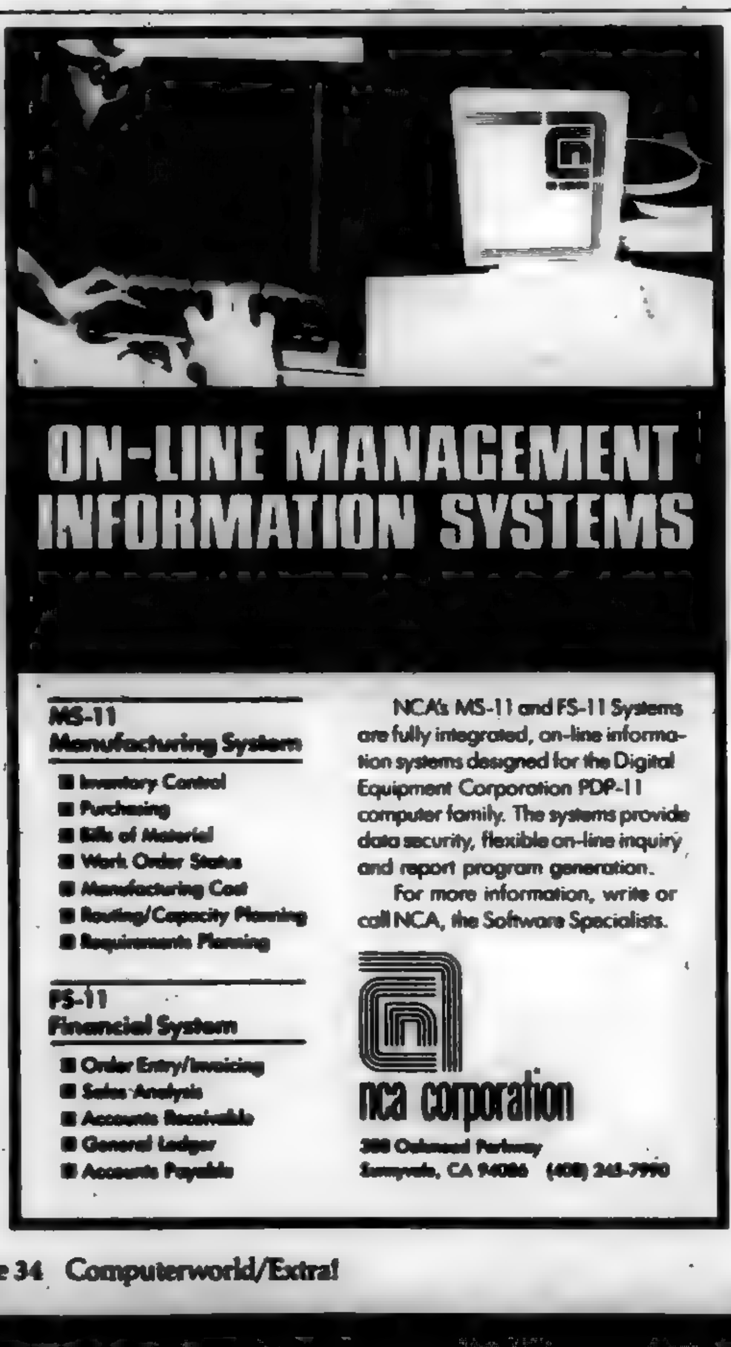
Source Code Key

The availability of source code becomes extremely important when dealing with a company that could fold, since without it the user could be left high and dry in case of a serious problem or if modifications are required. Equally important are adequate training and orientation of the software users. It is up to both the vendor and the customer to make sure that the eventual end users of the software are properly trained and prepared to utilize the software in the manner in which it was designed.

Another significant facet of the task of choosing and acquiring proprietary software is the contract negotiating activity. With mini/micro software, this activity is generally not as significant as in mainframe software acquisition. Because mini/micro software is frequently supplied with the hardware or made available on an "as is" basis, the customer has little recourse and therefore little to gain from an expensively negotiated contract.

Mainframe users, however, should carefully protect themselves when acquiring expensive, sophisticated software systems and/or applications packages. The *Datapro Applications Software Solutions* service contains a feature report that lists the key factors to consider in drawing up a contract for software acquisition:

- The contract should specify the guarantee period after installation (and/or acceptance) during which the supplier will correct all bugs and furnish all required maintenance at no additional cost.
- If the package is found unacceptable, the contract should permit its return within a specified period after installation at no cost to the user.
- Any penalty for late or incomplete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Research Park
Princeton, NJ 08540
Construction

> **"In acquiring sophisticated software, it is wise to seek the assistance of a lawyer familiar with software contract negotiations."**

delivery and installation should be spelled out.

- A clear description of any reduced rates or extra support should be included if your installation happens to be a product test site for the vendor.
- All agreed-upon modifications to the package, together with the responsibility and deadlines for making them, should be specified in detail.
- Objectional restrictions on the modification or use of the package should be eliminated from the contract.
- Installation support, training and maintenance promised by the vendor should be spelled out in detail in the contract, together with the additional costs of the services, if any.
- The names of specific individuals who will supply the on-site support, or the specific qualifications these individuals will have, should be specified in the contract. (It is particularly desirable in the case of a new, untried package to have the people who developed it present at installation time.)
- The method to be used for correcting bugs discovered after installation, and the guaranteed response time for correcting them, should be specified.
- The contract should specify exactly what items will be delivered in what forms (e.g., source decks and listings for all programs plus all relevant documentation at installation time, followed by modified or improved versions of the package whenever these are made available to new buyers).
- The buyer should be willing to agree to reasonable clauses that protect the supplier's proprietary rights by forbidding resale or other unauthorized distribution or use of the software.
- Payment for the package should be contingent upon delivery of all the promised products and services and successful operation of the package in your installation.

Probably no software package vendor will be willing to make all these concessions; he's in business to make a profit, too. But by playing the role of a tough, sophisticated negotiator and demanding everything you can get, you're likely to save more money and get far better support than the buyer who meekly signs the standard contract form. In the acquisition of sophisticated software systems, it is wise to seek the assistance of a lawyer familiar with software-contract negotiations.

The Wise Software Buyer

The prospective buyer of an applications software package should take a long, hard look at what is available these days. More than 5,000 proprietary software packages are currently on the market. Of these, more than 3,000 are applications-oriented in nature. Over 50% of the current packages are geared for use with minicomputers and microcomputers, and this percentage is growing rapidly.

The wise buyer will shop around carefully before committing himself to any one package. In summary, he should:

(1) Determine his requirements.
(2) Gather information about all the available packages that appear to meet his requirements.
(3) Narrow the field by rejecting unsuitable packages.
(4) Perform a detailed evaluation and comparison of the remaining packages.
(5) Talk to other users.
(6) Conduct benchmark tests (or use each package for a trial period).
(7) Select the most suitable package.
(8) Negotiate a sound contract.
(9) Install the package.
(10) Check the results.

By following these guidelines and keeping aware of what is available in the applications software marketplace, the software user of the 1980s can face the approaching decade confidently, secure in the knowledge that he can stay on top of all the dynamic changes that will be taking place. The next five years will be the most critical, and a firm footing now, with a planned and plotted course for the future, is likely to mean the difference between organization and chaos.☐

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By Ronald G. Ross

DATA MANAGEMENT FOR THE 80s

Experience with data dictionaries over the past several years has demonstrated that it is considerably easier to understand the functions of a data dictionary system than to precisely define what the data dictionary is. There seems to be something unsettling about definitions that contain phrases like "data about data" or "a repository of definitions for data" or "meta data for the data base." Such descriptions seem either to say too much or to say nothing at all.

PART I
Data Dictionaries: Basic Concepts

For this discussion, a data dictionary system is viewed simply as a tool for managing corporate data resources. A data dictionary contains that information needed by this system to perform its various objectives.

This approach places the emphasis squarely on function, rather than on methodology or dictionary structure. An implication is that in selecting a data dictionary, it is more important to understand *what* a dictionary does rather than *how* it goes about doing it.

This sharply contrasts with evaluation strategies for selecting software systems of other types. In data base management system (DBMS) selection, for example, it is neccesary to examine how a package solves problems of a general type in order to determine whether the system can solve the particular needs of the given corporation.

The reason for this is that a DBMS is a generalized software tool which must be designed and tailored to each particular application problem. The number of these potential applications is practically unlimited. For each given case, the internal mechanisms of the DBMS may make a great deal of difference.

Some applications, for example, are best served by inversions of record values, whereas others are better served by interrecord pointers. The purchaser must decide which is the best for his applications.

A data dictionary system is not generalized in this sense. In fact, it is designed to solve one rather specific type of "application" problem, the area of data resource management. Its internal mechanisms make little difference, since the user is not asked to tailor the system to this application at a detailed level. The decision to acquire a data dictionary system is essentially the same as purchasing a turnkey system — the emphasis is on *function*.

This does not imply that the problem area is small; on the contrary, it has proven extensive. Nor does it imply that it is easy to define precisely the needs of this application. Testimony to this fact is the variety of commercial packages now on the market.

Despite this, there is in fact a common theme to all the offerings, which reveals itself most clearly in similarity of function. One might say this collection of functions delimits the traditional approach to the data dictionary problem.

Will the traditional approach to the data dictionary problem be eventually supplanted by new data dictionary technology? Recent evidence suggests that the answer to this question is undoubtedly "yes." There are, in fact, both theoretical and practical grounds to suspect that the data dictionary problem is not a specific "application" problem after all, but instead a generalized problem, in essence equivalent to the DBMS case. Although this does not invalidate the more traditional functions examined here, it certainly adds to them new and exciting dimensions.

Inseparable Problems?

During the first decade of data base development, DBMS were often viewed as more or less the final solution for all data management ills. During the latter years of the 1970s, however, data dictionary systems began appearing in increasing numbers espousing DBMS-like themes.

For example, data dictionary systems purported to assist in "the management of data resources," something to which DBMS claimed all along. Many professionals thus began asking: If data base, why also data dictionary?

Even more recently, data dictionary systems have begun encroaching on non-DBMS territory — specifically espousing potential for those organizations with no data base development at all. Now professionals have begun having to ask a second question: If *not* data base, then why data dictionary?

Surprisingly, from an organizational point of view, the answers to these two questions are largely equivalent. In general, a data dictionary system is aimed at improving DP productivity by optimizing control and use of the definitions on which systems are built. Although more tangible in the case of DBMS (schemas and subschemas are explicit types of definitions), all systems, data base or not, are nonetheless built on definitions.

By automating the management of definitions, a number of documentation needs are served. These needs arise in the enhancement and maintenance of large application systems, increasingly a difficult and costly concern within every DP installation, whether data base-oriented or not.

Furthermore, once the management of definitions is automated, a springboard is established for offering other types of system-related services. These services, and the occasions for their use, are largely indentical for both data base and nondata base applications. The enforcement of standards and the generation of programmatically usable data descriptions are prime examples.

Back to Basic Questions

To return to the basic questions about data base and data dictionary, the first really asks how DBMS and data dictionary systems differ. A close examination of their respective functions, classed within a single breakdown of data management goals, is shown by the analysis in Figure 1. This analysis shows that the real distinctions are actually ones of level, rather than ones of purpose.

What about data dictionaries for the non-DBMS installation? Traditionally, the bulk of data dictionary thinking has focused on the DBMS-supported organization. There are two reasons for this. First, data base evolution, in and of its own momentum, naturally suggested additional areas in which more sophisticated data management techniques were possible. Data dictionary systems have arisen largely in response to these DBMS-oriented ideas.

Secondly, DBMS in their own right make possible more centralized management of data resources. They thus provide a solid foundation for the elaboration of basic data management capabilities.

In non-DBMS organizations, there is less centralization of control and consequently less on which a centralized tool can readily operate. Similarly, since system management is generally more diffuse, specific needs are ironically often more difficult to pinpoint.

As a result, the need for a data dictionary system has been more slowly perceived in non-DBMS organizations than for those with DBMS. Acceptance by the non-DBMS community has therefore been slower.

Picture Changing Fast

This picture is changing rapidly. Many non-DBMS users — whether they avoided data base because of smaller machine size or because they are interested in supporting only existing application software, or because they are suspicious of how existing DBMS fit into an evolutionary mainstream — are looking increasingly toward data dictionary to solve basic system management problems.

Even DBMS users, many of whom have been surprised to find what a large percentage of their system resources persist under nondata base schemes, are using dictionaries more and more for all systems, not just data base alone.

Perhaps the most profound concept that has emerged from recent data dictionary experience is that the dictionary represents the most viable of all alternate routes for easing the pains of migration to data base technology by non-DBMS organizations. This is *not* because a data dictionary can help lessen the conversion impact of DBMS (or more accurately, the reimplementation impact), but rather because a dictionary can help set in motion a centralization of administration and control — the most difficult to achieve in practice of all data base requirements.

In other words, data dictionaries help create an organizational climate for data base by encouraging the formation of a data administration team and by planting the seeds of the data resource concept, the essential first step in successful data base projects.

These are not just idle claims; these are the findings of pioneers that have shown the way for successful data dictionary and data base projects during the 1970s.

The Problem

Every class or type or software is specifically designed to address one or several identifiable problem areas. DBMS software, for example, focuses heavily on the separation of logical and physical data base views, allowing greater protection for the integrity of the data base as well as improvement in DP productivity. A second focus is the elimination of data redundancy, which is achieved by complex and generalized data structures.

For data dictionary systems, a central theme is improving the authenticity of information, or documentation, about a corporation's application systems. A dictionary does this by bringing an end to the unnatural isolation that has always characterized DP documentation strategies.

The typical DP installation keeps its documentation within a library. Although often housed within the same building as the computer, this physical proximity is usually the full extent of any direct relationship or integration with the actual software systems it

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This article is excerpted with permission from Data Dictionaries and Data Administration: Concepts and Practices for Data Resource Management *by Ronald G. Ross,* *© 1981 by AMACOM, a division of the American Management Associations. All rights reserved.* *This book will be available from the publisher next spring.*

Data Resource Management Goal	DBMS Function	Data Dictionary Function
To build and control corporate data resources.	Management of corporate data resources.	Management of the definitions and documentation for corporate data resources.
To organize models of corporate information.	Physical support for relationships between data that is meaningful to the corporation.	Support for documenting the types of information within corporate data resources, as well as the system components that support them.
To improve the accessibility of corporate information.	Physical support for data access, by keys and interrecord relationships.	Support for investigating the types of corporate information available, as well as the means by which they are supported.
To increase the longevity of system and data resources, to facilitate their maintenance and enhancement and thus to protect the corporation's investment in them.	Separation of logical and physical data base views, making application programs independent of changes in data organization and making new applications easier to implement.	Provision of tools to accurately assess the specific impact of data and system changes and to determine what the content and extent of existing resources are.
To improve the accuracy and consistency of corporate information.	Elimination of data redundancy through systems-supported methods of data integration.	Elimination of the artificial segregation, between system documentation and system driving definitions.
To bring coordination and consistency to information system implementation efforts.	Centralization of data definition.	Centralization of definition management, standards enforcement, naming procedures and modification control.
To improve the productivity of the data resources staff.	Provision of programming tools to implement complex application problems, while isolating systems from the impact of change.	Provision of programming aids, such as ready made data definition and trustworthy impact assessment tools.
To protect the data resource.	Support for access security and data base integrity, backup and recovery.	Support for protection of all definitions on which information systems are built.

FIGURE 1. A COMPARISON OF DBMS AND DATA DICTIONARY FUNCTIONS, WITH A COMMON CLASSIFICATION OF DATA RESOURCE MANAGEMENT GOALS

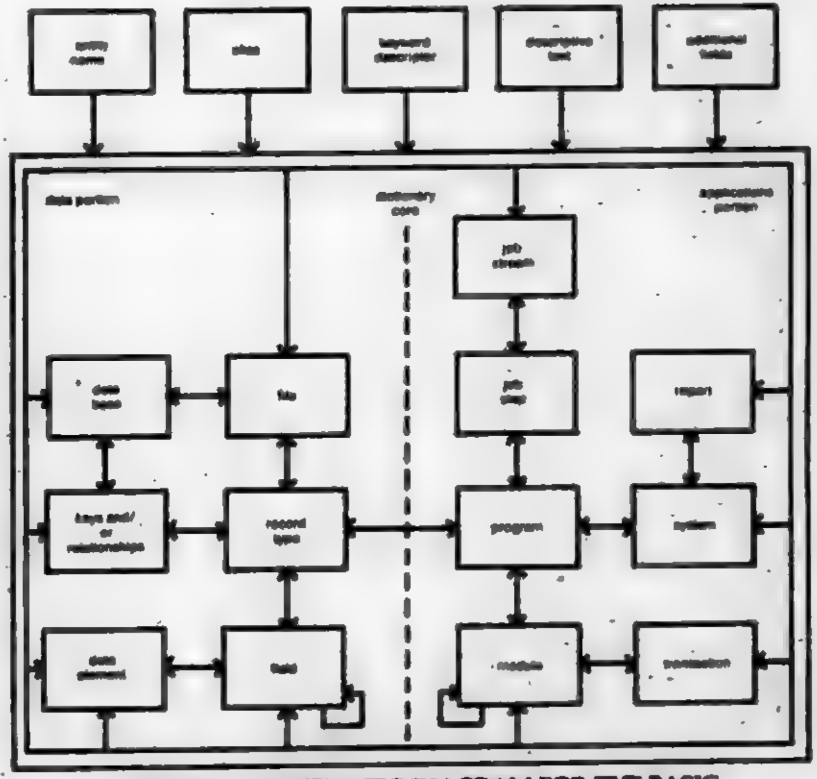

FIGURE 2. A SCHEMATIC DIAGRAM FOR THE BASIC DATA DICTIONARY DATA BASE

purports to describe. Documentation management is usually 100% manual, and all update actions are totally distinct from the actual changes occurring in the described systems.

Furthermore, in system development, the documentation task typically is the last to be undertaken. Standards and guidelines for this documentation usually exist, but whether they are followed is another question entirely.

Because of time constraints, disinterest or lack of coordination, the resulting documentation is often uneven, incomplete and disorganized. Even where standards are met, the resulting material may be too voluminous for easy use, too disorganized for ready reference or too scanty for comprehensive analysis.

An additional problem is that there is no assurance that the documentation is up-to-date at any given point in time. Keeping documentation current depends entirely on the development or maintenance personnel remembering (or being reminded) to go to the documentation library and make the necessary updates. There is nothing automatic or inevitable about this taking place.

Even if the documentation library is kept completely current with the software it describes, there is no guarantee that the information it contains will be easy to use. Answers to questions about a corporation's system resources are useless unless they can be readily formulated as the need to know arises.

This is particularly true in system design and development. Buried within existing documentation is often a wealth of information that might be used in planning how new data needs might be met. Unfortunately, existing documentation strategies are usually static and cannot satisfy more dynamic needs of this sort.

One final problem area exists with traditional documentation practices, which is particularly relevant for users migrating to a data base environment. At any given installation, documentation standards have evolved over many years, during which all system development was nondata base. Such applications, and thus their documentation, tend to be program-oriented and relatively sparse on data definition control.

In data base systems, the emphasis is necessarily reversed — *data* becomes the focal point of the system, and all other system components, including programs, revolve about it. This change of perspective is often hindered by traditional practices, rather than helped.

Problems with traditional documentation strategies can be summarized as follows:

- Management of documentation is a largely manual process, which is separated from events or changes occurring within the source or object code of the application systems it describes.
- There is no automatic guarantee that existing documentation is up-to-date, synchronized with executing system configurations or accurate in representing the data and system resources of the corporation.
- Managing and motivating the pursuit of comprehensive documentation is a difficult and time-consuming affair.
- For a number of reasons, the resulting material may be difficult to use or ineffective in meeting the dynamic needs of the corporation. Real questions arise about the authenticity of the information it contains.

How does a data dictionary system address these problem areas? The key ingredient in the data dictionary approach is the merging of those definitions used to drive actual system software with that material used to produce system documentation.

For example, if the same file description used within the object versions of programs executing in the machine is also used to produce a listing of file contents, then it can be guaranteed that this listing is accurate, up-to-date and completely in sync with the actual system. It cannot help but be totally authentic.

There are problems, of course, in using the executing object version of a file description to produce documentation, but this is an ideal that can be successfully approximated with various dictionary techniques. Distinctions can be drawn, in fact, between the degree to which various types of dictionary systems can achieve this goal, as Part II will show.

Creating the Basic Dictionary

The basic level at which a file description (FD) can be incorporated into the dictionary is by holding the source definition. Whenever a program is compiled, this source definition is extracted from the dictionary, either directly or indirectly, and included in the compilation.

Within the dictionary system itself, whenever a query about the content of the file arises, this same FD can be used to produce the necessary information.

Even more sophisticated capabilities arise where the dictionary is able to keep track of programs using the FD and, by implication, the associated file. By ascertaining which FDs a given program is using during compilation, for subsequent reporting the dictionary system can invert the information in order to show all programs by which a given file is used. This type of usage reporting is often referred to as *cross-reference* or *where-used* mapping

To take this a step farther, since files themselves are composed of many fields, or data elements, then by cross-referencing an additional level (i.e., program to file to *data element*) information can be produced about all the programs by which a given data element is used. This represents two levels of where-used reporting.

How does the data dictionary system learn what files a given program uses? In nondata base systems, this is problematic. The information is certainly known at compile time, but the compi-

> **"The data dictionary is**
> **a highly interwoven structure**
> **with many components and relationships."**

lation process generally occurs outside the realm of the data dictionary system. It can be gathered by inspection of program source code, but it is not clear how and when this inspection should be triggered. Execution-time monitoring, of course, is impractical.

In short, since there is no clear-cut point at which the dictionary can automatically learn about file usage, extraordinary methods are necessary. These methods are generally procedural in nature and involve rigorous control by the data administrator.

More Straightforward

In a data base environment, where control over data and system resources is less diffuse, the solution is more straightforward. Under a DBMS, programs do not typically make their own file or record definitions, but are instead matched with a *subschema* specification in which the definitions are made for them. Subschemas are common to the majority of DBMS, though they often parade under different labels.

The subschema declaration is an obvious source of information for the data dictionary. Not only does the subschema specify which files or record types the program may access, but often the subset of fields, or data elements, to which it is permitted access as well. This is a ready-made cross-reference mapping.

Furthermore, since the subschema is enforced by the DBMS during execution, there is no question about whether the mapping is accurate. The dictionary system is provided with a ready means of satisfying the program-to-file-to-data element mapping requirement.

Using the Basic Dictionary

Why is cross-reference information of the type described above useful? Suppose the length or "picture" of a particular data item needs to be changed. This implies that all the programs using that item must be modified, or at least recompiled. The ability to accurately determine on a momentary and automatic basis all the application software so impacted is an invaluable asset to maintenance.

A similar use is in resolving problems in data integrity. Suppose, for example, that an unknown errant program fails to conform to standards in creating or maintaining a field in a certain file. A where-used listing of all accessing programs can greatly streamline the research and correction effort.

So far in this discussion, the only type of cross-reference mentioned has been the program-to-file-to-data element mapping. A typical data dictionary has many such relationships, each serving in its own fashion to provide information needed in management of the corporation's data and system resources.

Other examples of relationships within a typical data dictionary include the following:

- System-to-program-to-module.
- User-to-report-to-data element.
- Logical terminal-to-transaction-to module.

There are many others. These examples suggest that the data dictionary is in fact a highly interwoven structure, with many components and relationships. The management of these structures, as performed by the data dictionary system, is, in fact, a complex undertaking.

Information Sources

Producing information for the dictionary about these components and relationships is not always a straightforward task. Although FDs and subschemas come, ready-made for this need, information of other types is not so readily available. Often, the dictionary user is required to complete special forms, which are then processed by special dictionary input subsystems. Dictionary involvement in these areas is only minimally automatic.

In a data base environment, however, one additional source of ready-made information exists: the schema or data base definition.

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"Dictionary terminology, unless carefully chosen, can prove unduly restrictive in accomplishing larger objectives."

about its structure. There are innumerable uses to which this information can be put, particularly for more sophisticated types of programming and access support. Besides forming a basic structural core for the dictionary itself, incorporation of the schema into the data dictionary represents one of the most fertile grounds for data dictionary evolution.

What of nondata base applications, where central and independent definition is lacking? Whereas the control potential is diminished, the need to know about the content, status and usage of data and system resources is not. The assistance the dictionary can provide in these areas is indeed valuable.

There are many additional services the dictionary system can offer, far beyond the original documentation problem discussed above. Many of these services arise from the same fundamental theme, the incorporation of data and system definitions directly into the dictionary.

The Dictionary Data Base

In the discussion above, some of the components of a typical data dictionary were mentioned — data elements, files, record types and programs, for example. These components have natural relationships with one another arising from the manner in which DP systems are themselves constructed. For example, the system components (data element, file and program) are related in certain definable ways because programs use files, which are composed of data elements.

The information about all these components, and all of their relationships make up the data dictionary data base. This data base, which may or may not be managed by a DBMS per se, has an established structure, or *data model*, under which information about the various components is stored.

Unfortunately, descriptions of this data base are often confusing. Consider, for example, that there is a data dictionary record type which contains information about application system record types — *a record type record type*. This indicates that considerable care must be taken in the choice of terms used to describe the dictionary and its structure.

Furthermore, a dictionary is often used to collect information about diverse objects within the overall resources of the corporation, not just about application systems. Dictionary terminology, unless carefully chosen, can prove unduly restrictive in accommodating these larger objectives.

For this reason, the relatively nondescript term *entity* is often chosen to denote those things about which information in the dictionary is kept. In general data base usage, an entity is simply a person, place or thing. Employees, departments, skills, orders and invoices are entities of different types.

In the dictionary data base, of course, basic entities include the various system components: files, data elements, record types, data bases and programs. All data dictionary systems support automatic collection of information about these basic entity types. Many dictionary systems also support automatic collection of information about additional entity types: modules, systems, transactions, reports, screens, forms, users, job streams and job steps.

Should the dictionary user find these entity types wanting, some dictionary systems allow definition of additional entity types, of whatever form the user desires. For example, to assist in the development of application projects, a dictionary user might define entity types for project stages, target users, operational procedures, employee time sheets, usage documentation and so forth. Once these entity types are defined to the system, automatic dictionary facilities for storage and reporting may be used to maintain and access the information.

The dictionary system may also allow the user to define relationships for these entity types, either with entity types that are basic to the system or with others that the user himself has defined. To manage the system devel-

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opment project, for instance, the user might define a relationship between the entity types "project stage" and "employee time sheet." In so doing, a basic structure for a project control system is created.

This suggests that the data dictionary system may allow the high-level definition and management of special-purpose data bases. This relatively new development in data dictionary technology, called *extensibility*, is one with significant promise for the future. It is also one that implies data dictionaries are becoming "generalized" software tools, rather than the "application"-specific tools they have been in the past.

The Basic Dictionary Structure

Figure 2 illustrates the basic structure, or data model, that might be found in the typical data dictionary. This structure is composed of a number of system-related entity types, as well as many relationships between them. This is not the only structure that one might choose for modeling the architecture of DP systems; even among commercial dictionary systems a variety of such structures exist.

The dictionary data model is surprisingly complex. This is, in fact, even a simplified version of what one might find in the typical dictionary. From a systems perspective, coordination of information for the various entity types, as well as for the relationships among them, is no trivial task. What this really suggests is that the data dictionary is actually a high-order data base problem in its own right.

Fortunately, for dictionary selection, it is not necessary to understand every implication of dictionary data base management in order to make an intelligent choice between packages. This highlights the earlier point that the emphasis in data dictionary selection rides on function rather than on internal mechanisms. For those considering their own dictionary system development, this structural complexity is reason enough to take pause.

In actual operation, the dictionary structure becomes a populated dictionary data base, as illustrated in Figure 3. In the segment of the dictionary shown, four of the 13 core dictionary entity types appearing in Figure 2 are represented by actual entity *occurrences*. A where-used report, for the field JOB TITLE, tracing various relationships between these entity occurrences, is also shown.

Figure 3 helps illustrate the critical distinction between entity *occurrences*, or information about actual system components, and entity *type*, the classification for this information. The structural diagram in Figure 2 was based solely on type; the populated dictionary in Figure 3 shows actual occurrences of these types. The term *entity* (or entities) by itself insufficiently makes this sometimes troublesome distinction and should be avoided.

PART II
Merging the Data Dictionary With Other Processes Of Data Management

As discussed in Part 1, a data dictionary system (DDS) improves upon traditional documentation strategies because it facilitates the use of the same definitions that drive production systems for the creation of actual documentation products. The quality and reliability of the documentation, as well as the precision of control that can be exercised over the data resource, are thereby greatly enhanced.

Not surprisingly, this consolidation of definitional and documentation strategies can be pursued to any of several increasingly more complete configurations. Important and unexpected capabilities arise as the consolidation tends toward the more comprehensive.

In the following discussion, three configurations of the overall data management complex, distinguished by the degree of consolidation of dictionary processes with the remainder of the software complex, are identified. These configurations respectively identify *passive*, *active* and *in-line* dic-

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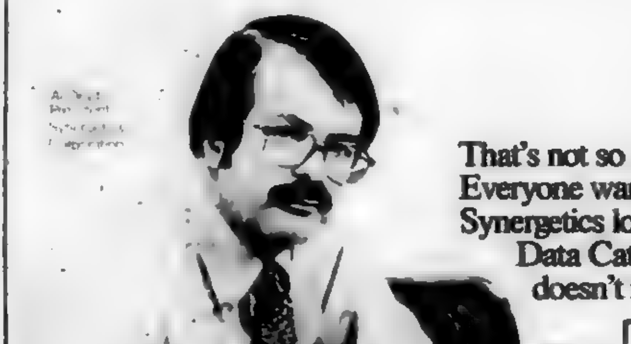

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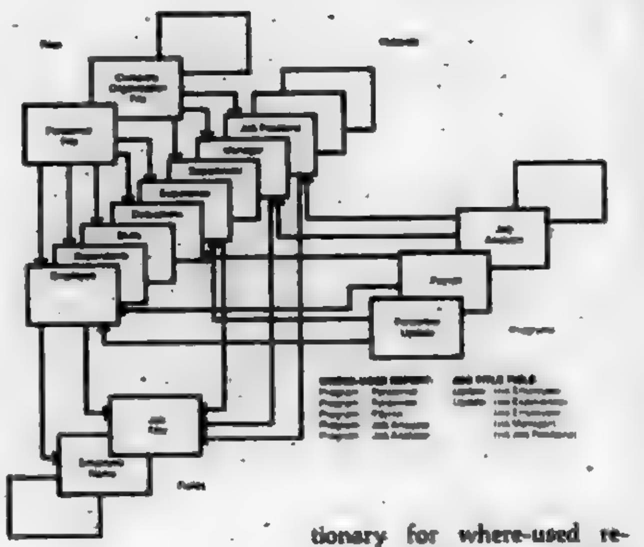

FIGURE 3. A PARTIALLY POPULATED DICTIONARY DATA BASE, WITH WHERE-USED REPORTING

tionary roles.

Whereas the first of these represents the traditional, and certainly prevalent role, powerful evolutionary forces are pushing the DDS more and more strongly toward the other two.

The Passive Dictionary Role

A *passive* data dictionary system is one that is basically unaware of other systems and processes that operate within the same overall machine environment. In other words, the DDS has no direct interaction or involvement with language compilers, the DBMS or the operating system of the machine.

The dictionary thus conceived acts in effect as a passive repository of data and system definitions, in or near source form, which are offered more or less openly to "external" needs. The appropriateness and consistency of their use in meeting these external needs are mostly determined by decisions made outside its own operational sphere.

Significant characteristics of the passive data dictionary include the following:

- Even though the dictionary is used to "hold" data base schemas and is able to produce documentation products from them, it does not ensure that these source data base definitions are always those that are compiled to produce the object defintions controlling the execution-time processes of the DBMS. Nor does any reciprocal exchange take place — the dictionary version of the schema is *not* consulted during the compilation process to ensure the continuing consistency of the definitions.

In other words, it is entirely possible to modify and compile a schema whose origin may or may not be from the dictionary without the dictionary system ever realizing that the event has taken place.

- Similarly, even though the dictionary may hold subschema definitions, it is unaware of subschema processing events. Thus the dictionary takes no overt action to ensure that its subschema definitions are actually those compiled to produce object versions for the DBMS, nor does the DBMS subschema compiler cross-verify the subschema it processes to ensure its continuing consistency with the "official" dictionary subschema version.

It is consequently possible to bypass the dictionary altogether in the rendering of a subschema to the DBMS.

- For both data base and nondata base applications, the dictionary does not become involved in the compilation (or precompilation processing) of application programs. For nondata base applications, this means that even though the dictionary may hold "official" FDs, it makes no attempt to ensure that this FD information is in fact that which is used by the application program to reference the described file(s). It is thus possible to create, modify and compile FDs within programs without any use of the dictionary's versions.

For data base applications, data definition is more stringently controlled by the intercession (at compile time or before) of the subschema although, as mentioned above, the definition of the subscheme may itself easily bypass dictionary involvement. Thus, although the probability of consistency between program data definition and the DBMS schema version is high (a considerable data base advantage), no additional guarantee of consistency exists with the respective data definition version held within the dictionary.

In other words, even in the data base environment, program and dictionary data definition versions may vary since there is no active dictionary involvement in the relevant compilation events.

The above characteristics of the passive data dictionary role suggest clearly that the burden of control in relevant definitional activities falls heavily to the using organization. If it wishes to ensure that dictionary definitions remain consistent and authentic, then the organization must establish its own practices and procedures for ensuring that dictionary definition versions are never bypassed in any of the system processes mentioned above.

If such bypassing is allowed to occur (a natural though disastrous tendency in deadline-driven system development), then the reliability of the dictionary for where-used reporting and impact assessment is dealt a considerable blow, and the value of the whole dictionary documentaion effort is made suspect.

How can these potential failings be avoided? The necessary practices and procedures inevitably involve rigorous turnover procedures for new and modified systems to operational or production status. The final compiles and link-edits are best performed by the data administration staff itself.

Often a strict coupling, via procedural strategies, is required between source and object libraries and dictionary extraction processing. The content of these libraries must be carefully controlled and coordinated with the dictionary, both directly and indirectly, by the actions of the data administrator (DA).

In short, the passive dictionary places considerable demand for overt and extensive DA involvement in many system support activities in order to ensure the dictionary's viability as an accurate system and data documentation tool.

The Active Dictionary Role

An *active* data dictionary system is one that intercedes in behalf of the using organization to ensure that dictionary content is thoroughly integrated with all relevant system activities. It takes an aggressive role to ensure that it participates in the development of all executable system configurations and that its own content is always current with those definitions used to drive production systems.

Specifically, it ensures that its own "source" data and system definitions are always consistent with those "object" definitions controlling the actions of the DBMS and/or application programs with respect to the data bases or data files of interest.

The active DDS thus remedies the isolation of the passive data dictionary from the compilation processes of the data management complex. By keeping constantly in touch with these processes, it is able to more fully ensure the authenticity of the documentation products it is used to produce, including those for cross-reference and impact assessment needs.

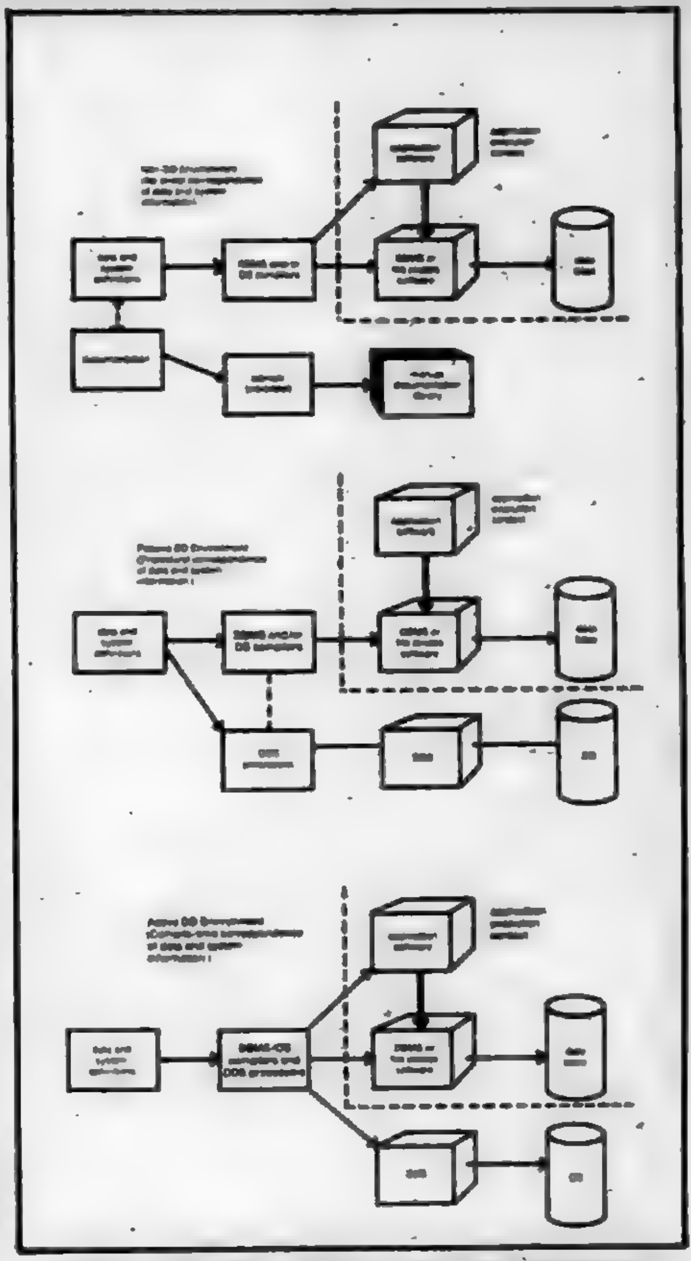

FIGURE 4. DISTINCTIONS AMONG THE DEFINITION PROCESSING SCHEMES OF THREE ALTERNATIVE INFORMATION MANAGEMENT CONFIGURATIONS

Since the active DDS pursues this involvement automatically, it assumes a significant share of the burden of control which, under the passive DDS strategy, falls heavily to the procedural designs the DA must create and enforce.

The active DDS, to fully assume this role, requires partial or complete merging of its own dictionary processing subsystems with processes of other types, in particular the schema and subschema compilers of the DBMS, and the programming language compilers of the host machine's operating environment. Thus, some of the DDS is consolidated with other types of data management processes, though strictly at compilation time rather than during any execution-time activities.

For example, the active dictionary role envisions the involvement of the DDS during the compilation of a user's application program, though not during its actual execution.

The configuration of an active DDS is illustrated in Figure 4, which contrasts the active role with both passive and nondictionary counterparts. Readily apparent in the step-by-step refinement that this figure reveals is the increasing correspondence of object definitions with those documentation products that can be produced by the DDS, as well as steady evolutionary movement of DDS processes toward the execution-time environment of the data management complex.

What other areas of the overall data management complex can be brought into the reach of active dictionary strategies? Although the discussion thus far has centered on data base applications, there is no reason a priori why similar strategies are not possible for nondata base applications. Although subsequent control would be less effective (the absence of the subschema definitional step is crucial), the resulting improvement in dictionary reliability would be substantial.

Other types of system definition processes could also be brought into active dictionary schemes. For example, the generation parameters for the DBMS itself, if contained in the dictionary, could be used on an active basis during DBMS system generation. The same is true for the teleprocessing (TP) monitor generation parameters, as well as other types of definitions for the data communications environment. Broadly defined, such an environment might include both distributed systems and word processing interfaces.

Finally, if DBMS and TP parameters can be contained in the data dictionary on an active basis; there is no reason why the same is not true for the most basic of all definitions in the overall machine complex — those for the operating system itself. Such speculation, of course, takes the active DDS far afield of its original data management role and conceives of its future as increasingly inseparable from the evolutionary development of very basic machine processes.

At this point in time, most commercial DDS are passive rather than active in nature. The strongest potential for the development of an active system, at least theoretically, is where the same vendor supplies all components of the overall data management complex, including the host language compilers, the DBMS (and its compilers) and the DDS. This, of course, normally means the hardware vendor.

A somewhat lesser potential arises where the DBMS and the DDS both come from the same vendor so that rather tight integration of at least DBMS compilation processes is possible. A program preprocessor can to some extent satisfactorily substitute for integration of the host language compiler (unavailable to these vendors), although certain limitations, particularly for nondata base files, are apparent.

The In-Line Dictionary Role

If the active DDS configuration has brought the data dictionary one step closer to the extension-time processes of the data management complex, a number of theorists have wanted to take it even further — to place it directly *in-line* with all execution-time functions. Under such an arrangement, the distinction between "source" and "object" definitions disappears altogether because precisely the *same* definitions used to drive production systems are also used to produce dictionary documentation products.

This, of course, envisions the ultimate guarantee that dictionary documentation is totally authentic. Perhaps more importantly, by completely eliminating the compilation step (a dictionary transaction immediately produces object definitions), the system is made instantly responsive to any and all definitional changes. This would have significant advantages for security and tuning, not to mention the overall administration of the data resources.

There is also speculation that the in-line role would be very useful for the development of distributed processing, where definitional parameters can fluctuate rapidly.

To understand the in-line role, it is necessary to examine the functioning of a DBMS in greater detail. Specifically, the DBMS itself has a dictionary of sorts, more properly called a *directory*, where the object counterparts of source data base definitions are kept. The purpose of this directory, which is managed by one component of the DBMS (specifically, the *DBMS Directory subsystem*), is used exclusively by the DBMS in order to translate and process users' logical requests for data.

Since the definitions it uses for this purpose are derived solely from the data dictionary, where the source is both more comprehensive and more directly usable by the corporate user, the directory may be viewed, in essence, as a shadow image of its "external" dictionary counterpart.

The existence of this "shadow" directory subsystem is illustrated in Figure 5, which is an elaboration of the "active" configuration portrayed in Figure 4. The essential feature of this elaboration is that the output of the DBMS and operating system compilers and DDS processors to the application execution context is shown as being directed to a specific component of the DBMS, the shadow directory subsystem, rather than to the DBMS as a whole.

It is the place of this component that the DDS assumes in an in-line data management configuration. This replacement is illustrated in Figure 6, which completes the steady movement of the DDS toward the execution-time processes of the data management con-

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"A customer just now committing to DBMS is not, by and large, willing to commit to a DDS simultaneously."

text that were portrayed, in step-wise fashion, by Figure 4.

In this in-line version, the DDS assumes complete responsibility for accepting, validating and translating all data referencing statements passed to the data management software complex by application programs. This, of course, was originally the function performed by the shadow directory subsystem counterpart.

Error in Reasoning

The potentials for enhanced data base support that this substitution offers are unfortunately often misconstrued by observers in the field. What is the error in their reasoning?

It is certainly true that the data dictionary contains more extensive information about data resources than does the typical directory subsystem counterpart. Alias definition, security specifications and edit information are but a few areas in which the information contained in the dictionary is superior to that which is contained in the directory.

By putting this superior definitional complex in-line to the data management system, they reason, it is assumed that substantial capabilities for improved query resolution, tightened security and enhanced data validation procedures could be easily effected.

That much is true. It is, however, entirely possible to achieve the *same* end results through an active dictionary scheme, where these advanced types of refinement in data definition are passed (in object form) from an external dictionary to an "internal" directory. The same capability is thus envisioned with or without an intermediate "compilation" step; that is, with or without an in-line data dictionary.

Thus, many of the advanced capabilities often thought to issue from the in-line configuration arise instead from enhancements to the definitional capacity for data. Whether these enhancements are rendered to the execution-time environment of the data management complex through an in-line DDS or through an appropriately enhanced shadow directory subsystem is a separate and distinct question.

Performance constraints, of course, are much more stringent in the execution environment envisioned by a DBMS than that envisioned by a DDS. It is, therefore, *unlikely* that DDS, as now perceived, will be placed in-line in the near future. Thus, the true benefits of the in-line configuration — total authenticity and instantaneous responsiveness — are unlikely to be realized soon within the data management complex.

For the types of refinement to the definitional capacity for data mentioned above, where realized by enhancement to a directory subsystem, it is possible for the vendor to bypass the "external" dictionary altogether. In other words, the vendor that views the data dictionary in a passive sense (if it occurs to the vendor at all) is likely to move directly toward enhancing the directory subsystem without worrying about how these elaborated data definitions will find their way, in a consistent and timely fashion, into a data dictionary.

In so doing, these vendors are not only guilty of repeating past mistakes (the above scenario, with slight changes in wording, could be applied to the very origin of DDS in the early 1970s), but of forfeiting the very considerable advantages of the active DDS configuration as well.

In fairness to vendors, however, it must be noted that since the customer base for DBMS lags by several years in its awareness of DDS, the commercial pressures toward keeping the DDS "separate," even if misdirected, are nonetheless relatively strong. A customer just now committing to DBMS is not, by and large, one which is also willing to commit to a DDS simultaneously. As awareness of data resource management concepts grows in the DP community, however — and there is evidence of substantial progress in this direction — this traditional difficulty may become less and less a factor.

Upon arrival at the in-line dictionary configuration, the distinction between

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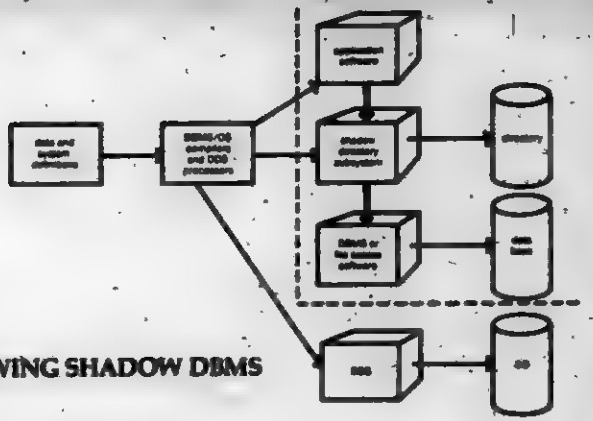

FIGURE 5. ACTIVE DDS SHOWING SHADOW DBMS DIRECTORY SUBSYSTEM

DDS and DBMS, relatively clear-cut until this point, now becomes increasingly indistinct. In fact, it may become more correct to speak of a single unitary software construct — a DDS/DBMS — rather than two distinguishable and separately operable components.

The tables have now been completely turned. With the in-line configuration, the dictionary is no longer a passive spectator of the data management game, but indeed one of its most central players. Responsibility for data base definition and control — the quarterbacking in this game — lies with the DDS, a flashy rookie, rather than the DBMS, the end of a long-standing trend. The DDS' position is unexpectedly, and perhaps ironically, ascendent.

PART III
Feature Development in DDS: A Review

The purpose of the following section is to suggest some of the areas into which DDS may be evolving, based on trends visible in the industry.

On the technological horizon are a number of innovative DDS feature developments that envision new types of processing and interface subsystems. Some of these developments include:

- *Program library management.* By using dictionary models of jobstreams for program compilation, link-editing and execution, along with version and security information contained for programs in the data dictionary, the DDS has sufficient capabilities to combine forces with a program source and object library management system to tightly control the modification of programs, as well as the configuring of executable systems. The exchange is reciprocal — extensive information about source and object programs can be gathered for the dictionary by the DDS' involvement in these areas.

In effect, this very significant administrative capability represents an important enhancement in the DDS' ability to participate "actively" in various system processes.

- *Test data base generation.* Using schema and/or file definitions in the dictionary, a DDS utility can be instructed to transfer data from existing data bases and/or files into new ones, specifically and exclusively for testing application programs. This assistance helps eliminate the chance of contaminating "production" data bases.
- *Data flow and structure diagrams.* By interfacing dictionary information to mechanical plotters, data and program flow diagrams as well as schematics of data model complex occurrences can be produced.
- *Data entry processors.* Since the dictionary includes information about the files that have been established to

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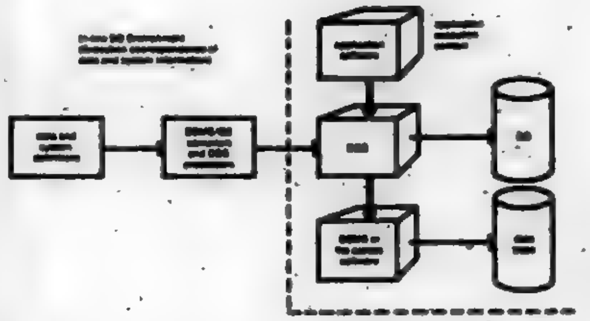

FIGURE 6. THE DEFINITION PROCESSING SCHEME OF THE IN-LINE INFORMATION MANAGEMENT CONFIGURATION

receive the given data, a utility subsystem can be built to process and transfer the input data. By informing the dictionary of edit rules for the data, the data entry processor can additionally support validation functions for the input.

- *Word processing interfaces.* Using dictionary information for defining and supporting manual forms (or their equivalent) and a corporate glossary, the DDS can be coupled with word processing systems to perform various types of prompting, editing, storage and forwarding.

Additional coupling with electronic mail systems and reprographic devices puts the DDS squarely at the center of the development of the so-called "office of the future."

Some other relevant observations include the following:

- Experience with DDS and its use for the control and enforcement of standards and conventions shows conclusively that the sooner the involvement of the dictionary with new systems, the more effective the eventual support will be. This strongly suggests that regression of DDS involvement to the system design phase has substantial potential for improving administrative control.
- Changing economics within the DP industry have begun to make people more expensive than machines. Since the system design area remains one of the most people-intensive parts of the DP enterprise — and since there now exists very little systemized support for this area — any automated tool with potential for boosting productivity in this area is being eyed carefully.
- New extensibility features in DDS have improved the flexibility of DDS by an order of magnitude of more. This feature is optimal for areas where execution performance is not a crucial factor. The system design phase is just such an area.

The clear implication of these observations is that movement to exploit the DDS for the preimplementation phases of the system life cycle is inevitable.

In spite of these rather clearly delineated trends, the DDS encroachment into the system design area is likely to be gradual — just as for any other major innovation that occurs in data processing.

Even so, the eventual outcome of this movement may radically alter the way in which applications are now conceived and implemented.

Why is this so? Once a DDS is invested with information about the *design* of systems, the next obvious step becomes assistance for the *implementation* of those designs — in other words, DDS assistance for automatic system installation.

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By Thomas F. Meurer

SOLVING THE MYSTERY OF DATA BASE DESIGN

Data base design, from the beginning, has been a mystery to nearly everyone. Regardless of the data base management system (DBMS) being used, there are few strict rules in logical and physical design.

When a data-based system goes into production, there is usually little documentation of how individual data items are related to one another and why specific physical design choices have been made. This causes great difficulty when the data administration staff grows, involving more people in the tuning and maintenance effort, and when the data base content grows and the data administration staff is required to integrate a second application with the first.

Data base designs cannot just be models of the data relationships in the company. They must be tuned to the particular business functions being executed by the processes in the programs that reference the data base.

This article will present a structured data base analysis and design methodology that is the result of several years' experience in helping users develop effective data bases. This methodology establishes a baseline data design that is independent of hardware and software and that fórces documentation of logical data relationships and the reasons for particular physical design choices.

Structured Methods

In the last few years, structured analysis, design and implementation techniques have gained wide acceptance. These techniques go hand-in-hand with the structured data base analysis and design methodology being described in this paper.

Figure 1 outlines the structured project life cycle. In the structured project analysis phase, business analysts study and model the business information flow using a top-down approach and pictures rather than text to describe that flow.

The analysis phase produces a structured specification consisting of data flow diagrams that identify processes, data stores and data flows among them. Each process is completely defined with structured business logic. This logic can take the form of decision tables, decision trees, psuedocode or tight English.

In order to produce these diagrams and definitions of the business, codification of business logic that usually occurred in the programming phase in classical development techniques must be done in this analysis phase. A data dictionary is required to support structured analysis because of the volume of data that must be recorded and cross-referenced.

Structured design follows analysis and determines the hierarchy of systems, subsystems, programs and modules to support the structured analysis specifications. Processes defined in the structured analysis are assigned to modules in the design phase.

Structured implementation follows design and includes top-down programming and testing techniques that physically implement the structured design specifications.

The combinaton of structured application development techniques and the use of data base technology gives a project life cycle profile as shown in Figure 2. Studies show that the project life cycle time is shorter using structured analysis and data base techniques. Fewer lines of code are written and major flaws are less likely to be found in the analysis or design at implementation time.

But these are small factors compared with the results of studies that show that systems implemented with structured techniques and data base technology require approximately one-third the maintenance time, effort and cost of systems that do not use these techniques. In most installations today, more that 50% of the DP dollar is spent on software (as opposed to hardware) and more than 50% of the software portion is spent on maintenance of existing systems. There is, therefore, tremendous benefit to many companies in adopting both of these methodologies.

These methodologies treat data as a corporate asset. They identify and define data elements in the business, identify dependencies and relationships among those data elements and identify how the company uses each data element.

Gane and Sarson have stated that data flows are data structures in motion and that data bases are data structures at rest. Data bases must be designed to support the frequency and turnaround time of all data flows in the business within the hardware/-software/operating system constraints.

Enterprise Surveys

A project is concerned with only a portion of the business in the enterprise. At the outset, a broader view of the enterprise is required from two perspectives:

- Identification of major processes throughout the business and the identification of the major inputs and outputs of each process.
- Identification of the major information centers in the business and their relationship to one another.

These enterprise views are required for many reasons. Automatic or manual systems already exist in every part of the business. Any new system (automated or manual) replaces a portion of that current information flow network and, therefore, must interface properly with each current system that feeds information to the new system or accesses information from it. We must know those interfaces prior to structured analysis.

Likewise, any new files or data bases developed by data administration in the support of new project development either replace or duplicate data structures at rest that will be used to support the business information network. Many relationships are inherent in the files and data bases based on the way the company does business. These relationships must also be identified at a level in the enterprise prior to any logical data base design effort.

Figure 3 depicts both of these enterprise survey efforts. These efforts can be done in a week or two of effort to the degree of detail necessary to support the follow-on steps on both the systems development side and data administration side. The global data flow diagram and data structure diagram developed by the surveys are such that they:

- Are used extensively in communications at all levels in the business.
- Do not change unless the company makes a major change in the way it does business.
- Provide focus on areas of development and maintenance.
- Can be color-coded or highlighted to identify past, present and future efforts.
- Act as a reminder of major processes that are candidates for sharing data.

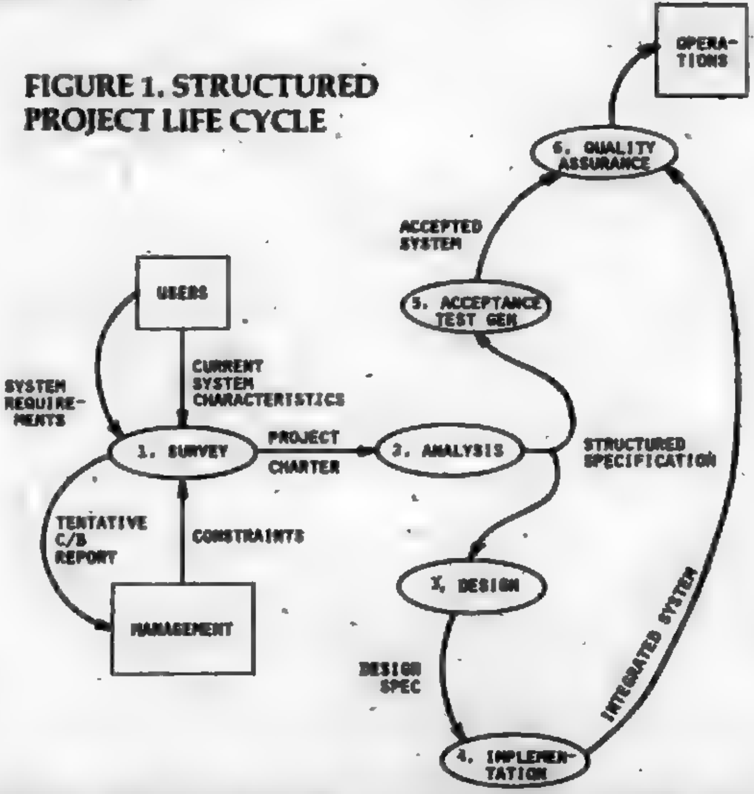
Figures 4 and 5 are examples of a global data structure diagram and a global data flow diagram, respectively. On the global data structure diagram, the boxes represent information centers and the arrows represent lines of relationship. The arrows carry a notation showing whether the relationship is a one to one (1-1) relationship, one to many (1-N) relationship or many to many (M-N) relationship. We use the same standards for numbering information centers in the global data flow diagram that are used in numbering processes in data flow diagrams.

Both of these diagrams must be contained on one sheet of paper. There is no requirement about how large the sheet of paper may be or how small the printing on them can be. Typically, these diagrams take the form of wall charts.

Once their accuracy has been validated by walkthroughs with the users, they should be sent to the printer and high-quality, poster-type charts produced with color coding to highlight sections or interfaces of major interest. These charts are used frequently in conversation, planning and education.

The data base designer uses the

FIGURE 1. STRUCTURED PROJECT LIFE CYCLE



Thomas F. Meurer is president of Eastern Technical Associates, Inc., a consulting firm in Newton, Mass.

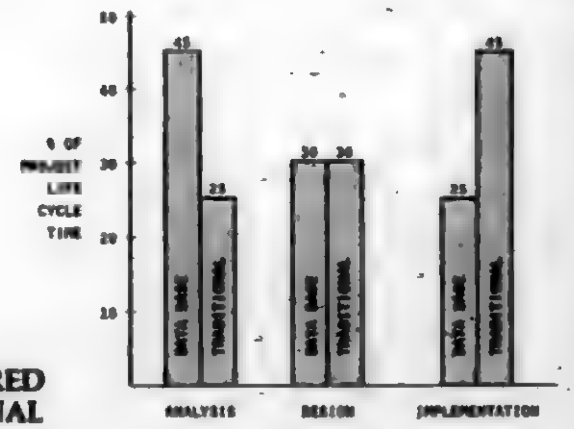


FIGURE 2. STRUCTURED DATA BASE VS. TRADITIONAL

global data structure diagram (DSD) along with the project data flow diagrams and data dictionary reports in a project entity-relationship (E/R) modeling step to produce a logical data structure diagram. This step with its inputs and outputs is shown in Figure 6.

FIGURE 3.

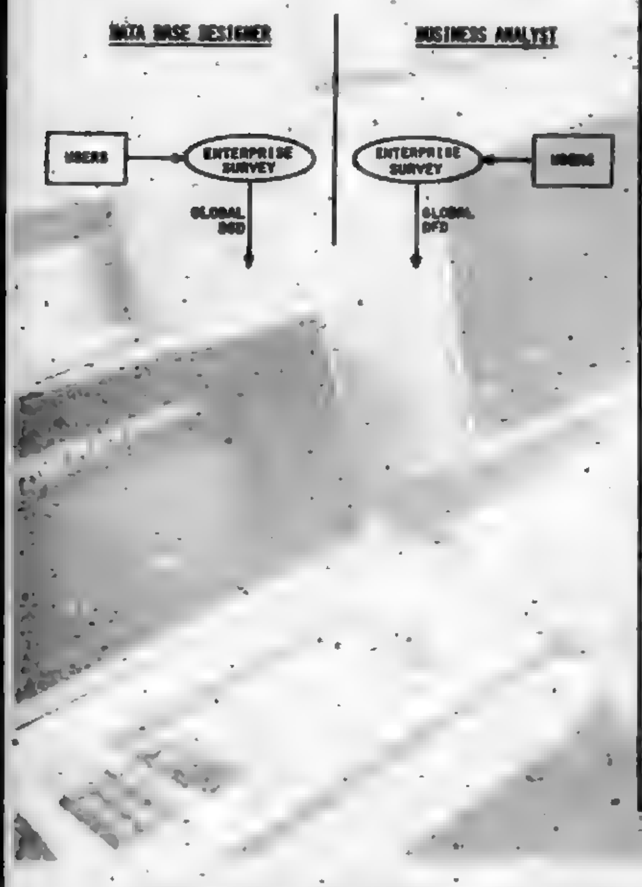
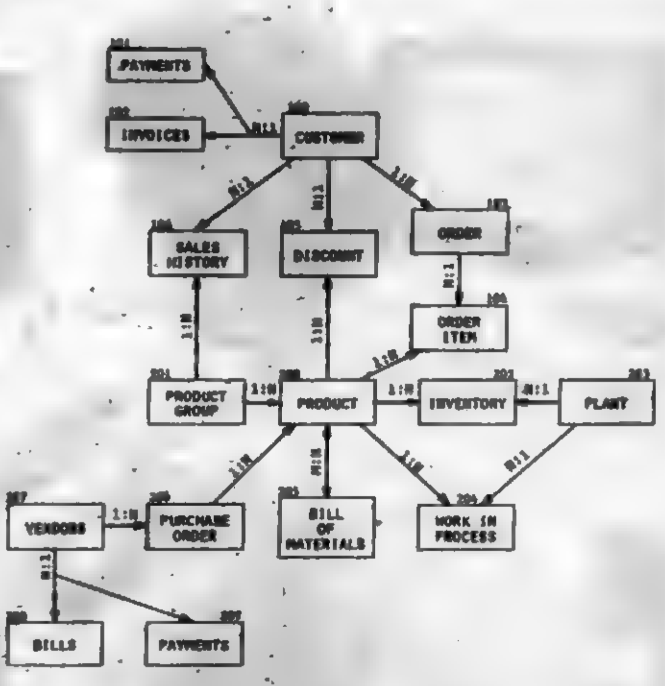


FIGURE 4. GLOBAL DSD



In the E/R modeling step, first identify the portion of the global DSD that the project addresses (Figure 7). Make sure that all concerned users and DP personnel understand the scope of the project by highlighting the information centers on the global DSD. (This same technique of highlighting should be used by the project team to draw attention to the scope of the application project in the global data flow diagram.)

The logical data base design effort consists of:

- Examining the data flows into and out of each data store.
- Forming a collection of data elements that appear to be closely related.
- Eliminating redundant elements in a single logical record.
- Identifying groups of elements that can repeat multiple times in a logical record.
- Verifying that every data element stored by a data flow is used by at least one other data flow.
- Verifying that each data element needed to support a data flow has been stored by some other data flow.

Do not worry about differences in the information centers identified in the global DSD and the data stores identified in the project data flow diagram or between the global DSD and records identified in this logical data base design step. These differences will be corrected in the next step.

A logical data structure diagram is shown in Figure 8. The blocks indicate logical records which are (adjusted) data stores from the data flow diagrams.

All access keys to a logical record are listed; these are known from the detail of how a process in a data flow diagram must access a data store. All record relationships are shown; these relationships represent a further investigation of the data relationships shown in the global data structure diagram for the collection of data elements that the project addresses. And, finally, relationships are again labeled as 1-1, 1-N, M-N.

In the past, many data base designers have gone directly from a logical data structure diagram similar to Figure 8 to a physical design process. However, several problems may remain from a data administration point of view in the logical DSD. Specifically, it might contain:

- Repeating groups.
- Duplicate data items.
- Nonunique record occurrences.
- Levels of data element dependencies.

In addition, this logical DSD is not necessarily tuned to the requirements of the processes defined in the data flow diagrams. In short, the record contents may not match the way the company actually deals with the data and the record formats themselves can be difficult for end users as well as programmers to deal with.

Therefore, this logical DSD is a temporary DSD for use as an interim working document by data administration only. It is input to the following step, called normalization.

The Normalization Step

Normalization is simply a study of the data that an organization uses and relationships and dependencies among that data. The output of normalization is a set of data table definitions which are provided to the project structured design process and are used by the data base designer in the definition of physical data structures and the construction of subset views. Figure 9 shows the normalization process.

Normalization began through the efforts of E.F. Codd of IBM toward a precise mathematical treatment of data definition and processing. Codd has done much valuable work in this area, but his work is described in his papers in such a way that few people can understand it.

Chris Date, also of IBM, has restated much of Codd's work in a language that we can understand, and he has also done additional research work of his own in this area. The normalization process can be characterized by the following:

- It is derived from a strict set of rules - there is no room for interpretation .
- It dictates no particular physical arrangement of data.
- It identifies duplication of data elements and uses that duplication to identify relationships among normalized records.
- It identifies all dependencies among data elements.
- There are several levels of normalization and the normalization process is 100% reversible through those levels.
- Normalized records are 100% independent of the process and data flow requirements identified in data flow diagrams.
- It forces unbundling of concepts such as the attributes of record relationships in most DBMS (e.g., membership and order options.)

The Rulebook

Levels of normalization are defined according to the following rules: A record is in first normal form if — and only if — it contains no repeating groups. If records in the logical data structure diagram contain repeating groups, those groups must be removed from that record and stored as another record carrying the minimum number of additional data elements besides the repeating groups that are necessary to form a key that uniquely identifies each group occurrence.

A record is in second normal form if it is in first normal form and every nonkey element is fully dependent on the primary key. If an element is not a key element in some other record, determine the element or elements on which it is dependent and add the element(s) to that record. Form a new record type if necessary.

A record is in third normal form if it is in second normal form and every nonkey element is fully dependent on the entire primary key and no nonkey

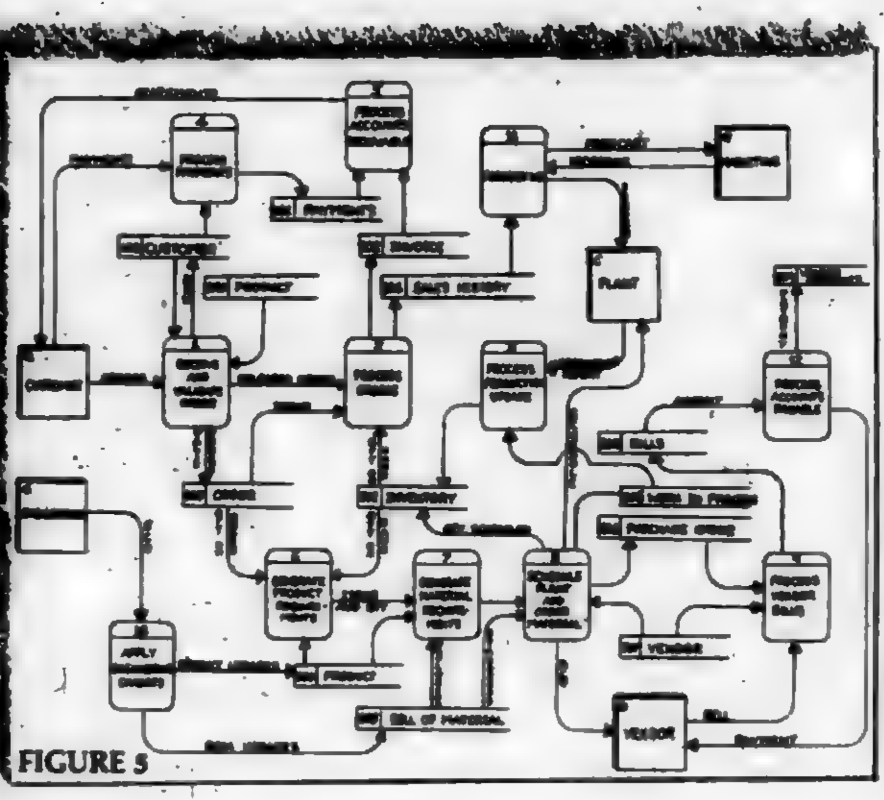


FIGURE 5

element is dependent on any other nonkey element. If there are such multiple dependencies among the elements in a record, remove those nonkey elements and, following the rules in the second normalized form paragraph above, relocate them or form additional records if necessary.

Figure 10 depicts the universe of record definitions (relationships) and their nesting effect.

Fourth, fifth and sixth normal forms have been defined, but they are of lesser importance to data administration from a data base design point of view than the first three.

The normalization process consists of using the above rules to decompose the logical data structure diagram into its normalized form (Figure 11). Lines of association are drawn from the primary key of a record to each record in which a data element which participates in that key is duplicated. Each of these lines of relationship is a one to many relationship.

A portion of the global data structure diagram represents the parent diagram according to structured leveling techniques to this normalized data structure diagram. At this point, then, adjustments may need to be made to the global data structure diagram to properly represent that parentage.

Likewise, the records in the normalized data structure diagram are numbered according to the structured leveling numbering scheme to show many normalized records may be derived from a single parent. Note from Figure 9 that some normalized records may have been defined already by data administration from prior efforts. This collection of normalized records is used as a starting point.

For each new effort, some data elements in the project data flows will be in the existing normalized records and should be properly located in those records. Some of the data elements in the current project data flow diagrams will be added to existing normalized records, and some will form new normalized records.

At the end of the normalization process for each project, the complete set of normalized records should be cataloged in the data dictionary and reports distributed to all interested data processing and user personnel.

The benefits of normalization are:

- It provides the simplest possible representation of data.
- The representation is the simplest to understand and deal with.
- All file access methods and DBMS can represent normalized records.
- The physical implementation can be changed from one set of file structures to another without impacting the normalized record definition.
- They are the foundation for relational data base systems, which are definitely coming.
- They allow the use of relational operators to define manipulation of the data stores in the structured design phase.
- They represent the perfect place to start the physical data base design process. The designer is aware of all compromises and adjustments made to the normalized records in the physical implementation.

FIGURE 6

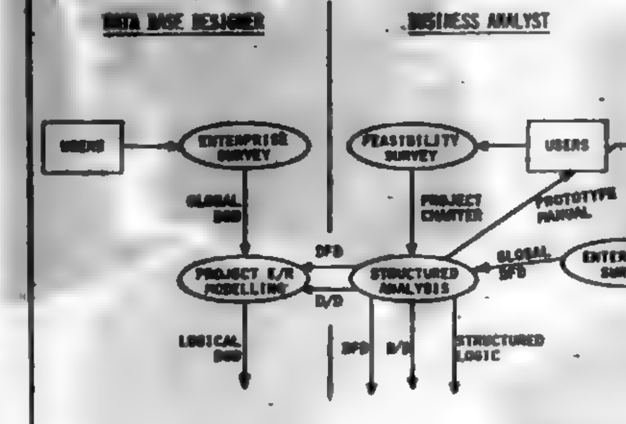


FIGURE 7. ORDER ENTRY PROJECT

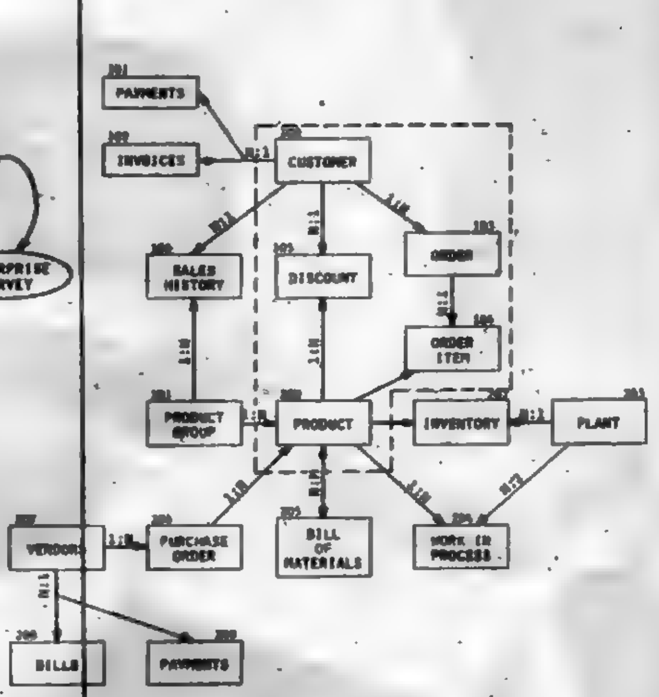


Figure 12 shows the universe of data manipulation language statements in the three major data base models in existence today. Relational data base systems have fewer DML statements than hierarchical systems, which in turn have fewer DML statements than network systems.

Since data processing in any organization might use one or more of these data base architectures, the normalized records and the smallest set of relational operators on those records form the only common baseline definition for the company's data structures and data flows.

It is possible for the structured designer to use a set of relational operators to specifically state how the normalized records are accessed by the data flows. These specifications become part of the structured design specification and can be stored in the data dictionary, where they are available to other application programmers.

Using the normalized data structure diagram, the structured designer adjusts the data flow diagrams as necessary to deal with the normalized records rather than the original data stores. The designer can then design systems and programs that deal with the normalized records. As a result, the design is independent of the physical structures chosen by data administration.

In the physical design process, there is still freedom to choose whatever storage structures are appropriate including sequential, indexed sequential, Vsam, one or more DBMS and a centralized or distributed environment.

The physical data base design is concerned with the definition of the physical storage structures to allow the normalized data structures to support the frequency and turnaround time of all data flows within the constraints of hardware, software, operating system and processing cost. The data dictionary must contain estimates for the frequency and turnaround time of each data flow for this project.

If other normalization processes and physical data base designs have been done by the organization before the current project, then the data flow requirements of the current project must be merged with those existing data flow requirements that caused the particular physical design to be chosen. The physical design is then reconstructed.

Figure 13 depicts the input to the physical design process. The particular physical design options are dependent upon the file structures and DBMS that is installed at the user site and the design and data management tools that can be used with it. From the normalized data structure diagram and the service-level requirements defined for the data flows, the designer has all the information that is needed to design physical structures to support those data flows.

The design steps include, but are not limited to, the following:

- Determining record formats and mappings to support the data groupings.
- Determining physical data element

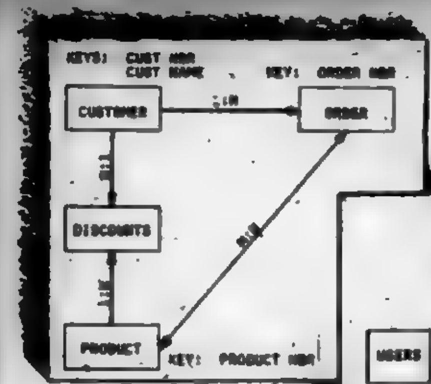

KEYS: CUST NBR
CUST NAME
KEY: ORDER NBR
CUSTOMER
ORDER
1:M
DISCOUNTS
PRODUCT
KEY: PRODUCT NBR

FIGURE 8. THE LOGICAL DATA STRUCTURE DIAGRAM (RESULT OF E/R MODELLING)

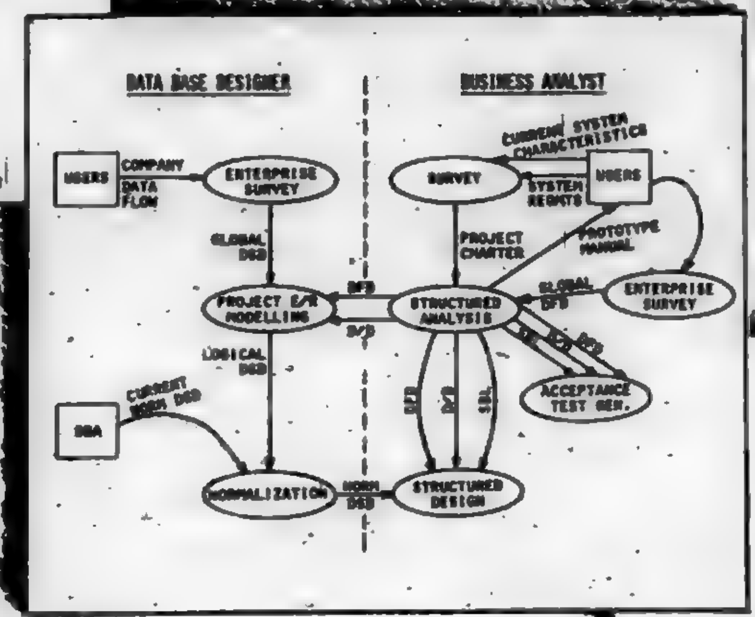

DATA BASE DESIGNER
BUSINESS ANALYST
USERS
COMPANY DATA FLOW
ENTERPRISE SURVEY
SURVEY
CURRENT SYSTEM CHARACTERISTICS
SYSTEM REQMTS
USERS
GLOBAL DSD
PROJECT CHARTER
PROTOTYPE MANUAL
PROJECT E/R MODELLING
DFD
D/D
STRUCTURED ANALYSIS
GLOBAL DFD
ENTERPRISE SURVEY
LOGICAL DSD
ACCEPTANCE TEST GEN.
DBA
CURRENT NORM DSD
NORMALIZATION
NORM DSD
STRUCTURED DESIGN

FIGURE 9

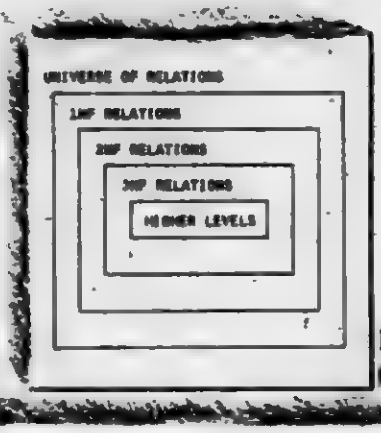

UNIVERSE OF RELATIONS
1NF RELATIONS
2NF RELATIONS
3NF RELATIONS
HIGHER LEVELS

FIGURE 10. UNIVERSE OF RELATIONS

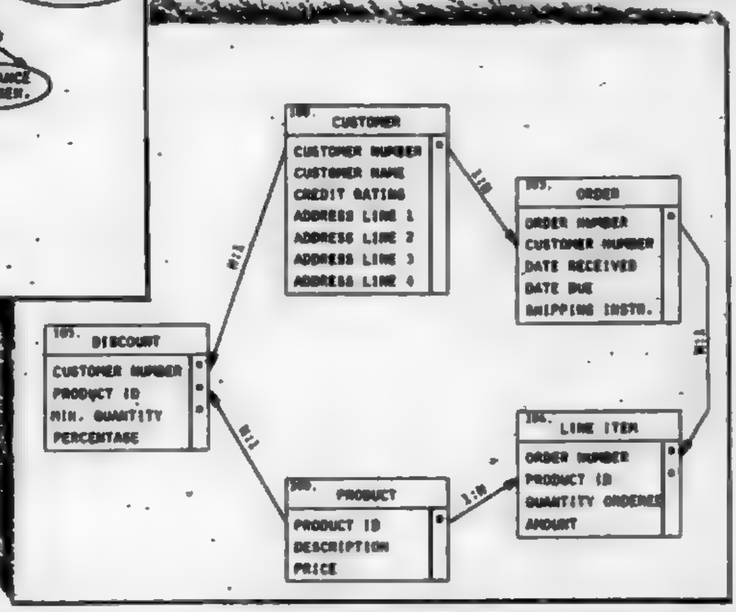

CUSTOMER
CUSTOMER NUMBER
CUSTOMER NAME
CREDIT RATING
ADDRESS LINE 1
ADDRESS LINE 2
ADDRESS LINE 3
ADDRESS LINE 4
ORDER
ORDER NUMBER
CUSTOMER NUMBER
DATE RECEIVED
DATE DUE
SHIPPING INSTR.
DISCOUNT
CUSTOMER NUMBER
PRODUCT ID
MIN. QUANTITY
PERCENTAGE
LINE ITEM
ORDER NUMBER
PRODUCT ID
QUANTITY ORDERED
AMOUNT
PRODUCT
PRODUCT ID
DESCRIPTION
PRICE
1:M
M:1

FIGURE 11. THE NORMALIZED DATA STRUCTURE

names and attributes.

- Selecting primary key access mechanisms and physical placement mode.
- Selecting alternate (secondary) key access mechanisms.
- Selecting mechanisms for record clustering.
- Determining requirements for distributed processing/distributed data bases.
- Introducing planned redundancies.
- Planning the use of the data management facilities that accompany the DBMS including report writer facilities, query and update languages and data entry and validation facilities.

All deviations from the normalized data structure diagram that are made to specifically meet the service levels defined in the data flow diagrams can be easily recorded. Therefore, the data base design function has all of the information it needs to maintain the data base structures as the service levels change, as new services are added and as additional applications are implemented which share data elements included in the physical design.

Constructing Subset Views

The purpose of subset views is to make the user or programmer as independent as possible of the physical characteristics of the data base design. The more the physical data base design deviates from the normalized data structure diagram, the less likely it is that the subset view is independent from that physical design.

One test of a DBMS' data independence is the ability it has to mask physical attributes about the data structures from the programmers and end users. No DBMS does this completely, but each offers some useful features in this area.

Figure 14 now represents the complete structured data base design process with the information flow shown between the steps in the project life cycle and data base design. The input to the construction of subset views is the physical data base design, the normalized data structure diagram and the structured design specifications which define the date element needs of each program.

Subset views are then constructed as allowed by the DBMS to provide access to just those data elements needed and in such a way that the physical placement of those data elements is not (necessarily) known to the requester.

The output of this process of constructing subset views is printed or written documentation of all information needed by the programmer to write, debug and maintain the program. This again varies with the particular DBMS.

The methods outlined in this paper have been developed for the following reasons:

- To produce a businesswide view showing data at rest in major information centers (global DSD) and in motion supporting major processes (global DFD).
- To produce a baseline normalized data design for each project that is independent of company processes and physical design considerations.
- To construct a physical design that is as close as possible to the normalized design with adjustments to support the data flow requirements and to fit within data processing limitations.
- To construct subset views that mask as much of the physical design from programmers and end users as possible.
- To force the production of documentation at each step so it is clear what the data relationships are and why design choices were made. This documentation is crucial to the follow-on quality control and maintenance efforts.☐

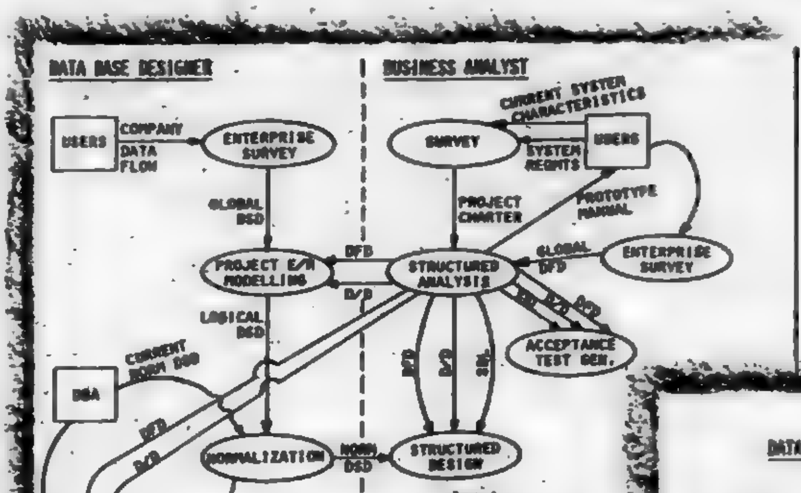

DATA BASE DESIGNER
BUSINESS ANALYST
USERS
COMPANY DATA FLOW
ENTERPRISE SURVEY
SURVEY
CURRENT SYSTEM CHARACTERISTICS
SYSTEM REQMTS
USERS
GLOBAL DSD
PROJECT CHARTER
PROTOTYPE MANUAL
PROJECT E/R MODELLING
DFD
D/D
STRUCTURED ANALYSIS
GLOBAL DFD
ENTERPRISE SURVEY
LOGICAL DSD
ACCEPTANCE TEST GEN.
DBA
CURRENT NORM DSD
NORMALIZATION
NORM DSD
STRUCTURED DESIGN
CURRENT PHYSICAL DESIGN
CONSTRUCT PHYSICAL DB DESIGN

FIGURE 13

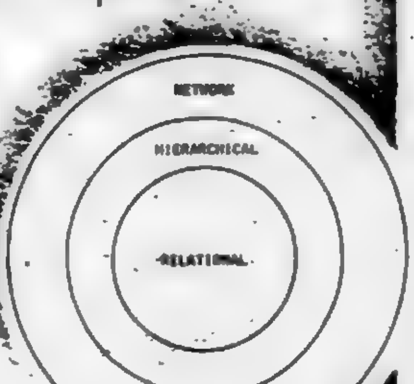

NETWORK
HIERARCHICAL
RELATIONAL

FIGURE 12. ONION-LAYER CHARACTERISTICS OF THE THREE DATA MODELS

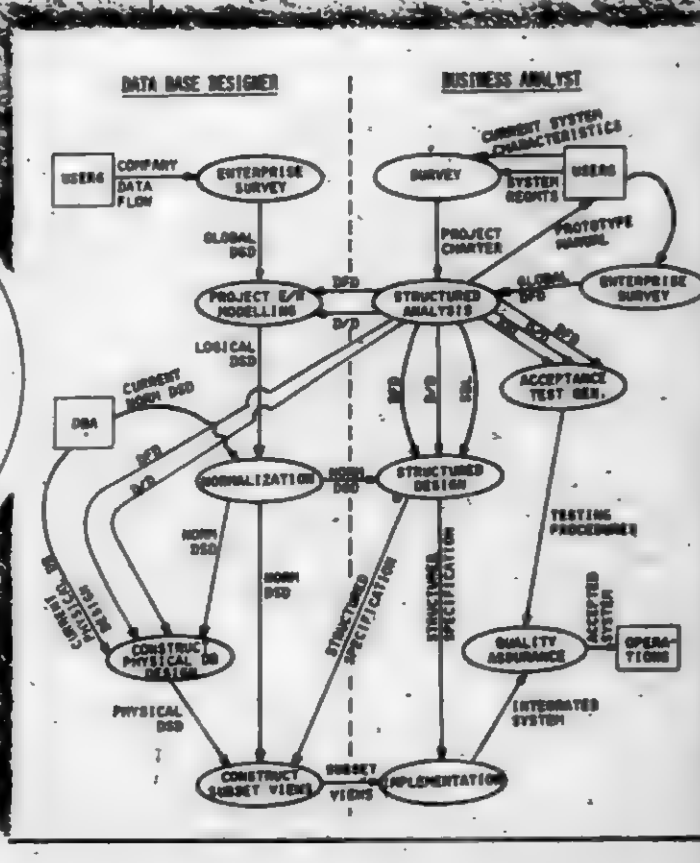

DATA BASE DESIGNER
BUSINESS ANALYST
USERS
COMPANY DATA FLOW
ENTERPRISE SURVEY
SURVEY
CURRENT SYSTEM CHARACTERISTICS
SYSTEM REQMTS
USERS
GLOBAL DSD
PROJECT CHARTER
PROTOTYPE MANUAL
PROJECT E/R MODELLING
DFD
D/D
STRUCTURED ANALYSIS
GLOBAL DFD
ENTERPRISE SURVEY
LOGICAL DSD
ACCEPTANCE TEST GEN.
DBA
CURRENT NORM DSD
NORMALIZATION
NORM DSD
STRUCTURED DESIGN
TESTING PROCEDURES
CURRENT PHYSICAL DESIGN
CONSTRUCT PHYSICAL DB DESIGN
STRUCTURED SPECIFICATION
QUALITY ASSURANCE
ACCEPTED SYSTEM
OPERATIONS
PHYSICAL DSD
INTEGRATED SYSTEM
CONSTRUCT SUBSET VIEWS
SUBSET VIEWS
IMPLEMENTATION

FIGURE 14

By Chris Gane and Trish Sarson

STRUCTURED METHODOLOGY: WHAT HAVE WE LEARNED?

We really get the users enthusiastic about a project with data flow diagrams.
— Oil company system development manager

Using hierarchical structure charts, we made changes five to 10 times faster than with traditional flow charts.
— Revenue accounting project leader

Programmers can be productive on a project sooner because the structured logic package is more complete than the traditional spec.
— Aerospace system designer

We found fewer problems during testing because the structured design document is itself testable.
— Programmer on purchasing project (IMS)

Over the last three years, a complete set of structured techniques — structured analysis, structured design, structured coding, top-down development and structured walkthroughs — has come together into a coherent structured methodology. Firms that have used the methodology on projects ranging in size from three man-months to (in one case) several million dollars are repeatedly reporting results like those described in the actual quotes above.

We asked Carl Garrison, manager of information systems for The Superior Oil Co. in Houston, what his experience with the structured methodology had been to date. "We've used the complete set of techniques over the past two years" Garrison told us. "Some projects we've gone all the way through with the structured techniques; our largest project has sections that have used structured analysis and structured design and some sections that are now in programming."

We asked Carl to tell us more about this large project.

"It's a petroleum production revenue and accounting system, with a development budget of several million dollars. It will track the production of oil and gas for Superior, from the time it comes out of the ground to the time we pay royalties on the revenue," he explained.

"I think the major impact of the structured techniques has been on the communication with the users and on the user involvement we've gotten. Every one of our users was very impressed with the data flow diagrams we showed them. To our surprise, some of them were even prepared to read the hierarchical structure design charts and tell us where we'd missed a business function!

"We've also had very good results with the changeability of our designs and the changeability of the resulting code."

Structured Analysis

What are the techniques to which Carl referred?

The key to successful structured analysis, it now appears, is the building of a graphical, logical (in the sense of "not-physical") model of the required system. Such a logical model, plus a statement of systems objectives and system constraints, constitutes an adequate requirements statement, which has two virtues.

First, it expresses what the system is required to do, while not making any commitment as to how the system should physically be implemented. Thus a systems analyst can use the logical model to express system requirements without having any detailed current knowledge of DP techniques and present the model to the systems designer — leaving the designer in no doubt as to what the system should do, but giving him the greatest possible freedom to devise a physical design which does it most cost-effectively.

Second, the logical model turns out to be a very good way of showing nontechnical users what the nature of the system is going to be and how the various parts will fit together.

Logical Model

What does such a logical model look like? Let us consider one of the simplest of all businesses, Joe's Auto Parts (slogan: "If you want it, we'll get it"). Joe holds no inventory, but takes orders for spares from his customers, promising future delivery. When he has enough orders for spares from a given car firm to earn a bulk discount, he sends the firm a bulk order and, on receiving the bulk order, gives each customer what they want, charging them the full retail price.

Figure 1 shows a very general picture of the data flow in Joe's business. Customers send in orders, and the single process block processes them, using a store of data (in some form) about parts details — price, delivery and so on — and a store of data about customers — whether they are in good credit standing, and so on.

This very crude data flow diagram (DFD) uses just four symbols, as shown in Figure 2:

- An external entity symbol (square): a source and/or destination of data outside the system.
- A data flow symbol (arrow): a pathway along which data moves into, around and out of the system.
- A process symbol (rounded rectangle): some function which transforms data.
- A data store symbol (open-ended rectangle): a place in the system where data is stored in some way.

It turns out that these four simple symbols are the minimum required to model a commercial system and that these same symbols can be used to model at any level of detail. For instance, Figure 1 is clearly rather trivial — let us expand "Process Orders" to see more detail.

Figure 3 shows orders coming from customers into a more detailed process "Verify order is valid." This process needs data about dataparts (to check that the part exists and is available) and data about customers (to check credit).

Out of the process come valid orders — one important simplification is that in high-level DFDs, we omit error paths and exception handling. The valid orders are stored in a data store of "Pending Orders" which may be a spike on the office wall or may be an IMS data base (we do not care at this stage). We just note that there is a logical requirement to store valid orders until they can be batched to make a bulk order.

The lower stream of data in Figure 3 shows the data describing the bulk shipment from the suppliers being verified (note there are no error paths shown), assigned to individual orders and delivered to customers.

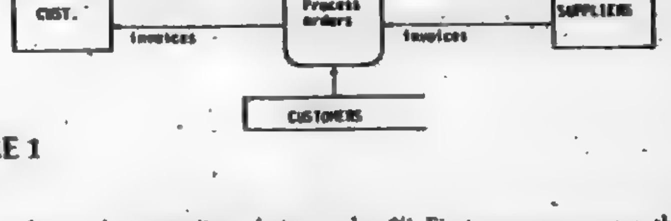


FIGURE 1

Clearly, there must be some financial flows. We must bill our customers and pay our suppliers, as show in Figure 4.

Figure 4 — a high-level logical data flow for transaction processing at Joe's Auto Parts — has several interesting features:

- It is logical, so it makes no distinction between manual processes, computer processes, tape files, disk files or any such technicality.
- Because it is logical and uses a very simple symbology, it is readily understood by non technical users, such as Joe. User managers commonly say, when such diagrams are explained to them, "That's the first thing you computer people have ever shown me that I have understood!" Or, "Now I know what that system does!"
- Though abstract, it is precise enough to be criticized. "I see what happens to payments from my customers, but what happens if they don't pay?" Joe might ask.

We would have to admit that we are missing functions to analyze accounts receivable for delinquency and send out dunning letters to customers. Of course, we are glad to find out that we are missing a desired function before we start to design and program. Although much more complicated for a real system, this is the type of data flow diagram with which Carl Garrison has had such good results.

Greater Detail

If still more detail of a process is required, we can "explode" the process box into a more specific lower-level DFD. Figure 5 is an example of such an "explosion" of the "Assemble Requisition to Suppliers" process from Figure 4.

If more detail of each data flow is required, we need to be able to express the logical nature of, say, "Orders." Since a data structure like this is hierarchical, we may give a series of more and more detailed answers to the question "What do you mean by orders?" First we may name the chief components:

```
ORDER
    ORDER-IDENTIFICATION
    CUSTOMER-DETAILS
    PART-DETAILS (iterated)
```

If that is not detailed enough, we can state the subcomponents of each component, as shown in Figure 6.

We express the data structures and data elements with honest, meaningful names chosen by the analyst. When we get down to the level of a data element (a piece of data that cannot be meaningfully subdivided), we must specify its logical (not-physical) nature. Thus we might express the North American telephone area codes as in Figure 7.

Chris Gane and Trish Sarson are the principals at Improved System Technologies, Inc., a consulting firm in New York.

If all data structures are composed ultimately of data elements and if we can (a) define each data element, (b) state the way in which they are combined into data structures and (c) state which data structures move along the various data flows and which are found at rest in the data stores of our DFD (Figure 8 diagrams these relationships), then we have provided all the data objects required for a logical data dictionary.

The logical data dictionary is the place where all detailed definitions of data objects are stored.

Defining Data Stores

Now we have to consider the definition of data stores. For every data store we must define its contents (in terms of the data structures defined in the data dictionary). In addition, for some data stores, we will have to show the immediate accesses that have to be made to it.

The definition of data store contents is in principle very simple: What comes out must go in — no more, no less.

So we look at the data flows coming into the data store, compare them with the data flows coming out, make sure that nothing is missing and that nothing is redundant, then derive the data store contents accordingly.

Suppose we had detailed data flows for Joe's Auto Parts and the complete flows in and out of "Pending Orders" were as shown in Figure 9. Assume that the detailed contents of each flow have already been defined in the data dictionary. We have some nonimmediate accesses to data (batched orders, orders for a given part) and some potentially immediate accesses which may physically be on-line inquiries: "What orders are there for Supplier X?" "What is the status of Customer Y's order?" and so on.

What must the contents of the "Pending Orders" data store be? Since it is fed by a stream of orders and streams of orders come out, it surely must contain records of the data structure "Orders," defined as in our previous list.

Is that enough? Inspection shows us that it would be. Of course with a more complex data store, with say 10 inflows and 20 outflows, the derivation of contents is far from being so easy, and the detailed logical components of each flow must be compared. It is valuable to reduce the contents of each data store to several tables, or relations, in third normal form, thus removing redundant data and getting the structures as simple as possible:

```
ORDER

    ORDER-IDENTIFICATION
       CUSTOMER-ORDER-NUM
       CUSTOMER-ORDER-DATE
```

```
       CUSTOMER-ORDER-NUM
       CUSTOMER-ORDER-DATE

    CUSTOMER-DETAILS
       CUSTOMER-NAME
       PERSON-AUTHORIZING
       PHONE
       SHIP-TO-ADDRESS
       BILL-TO-ADDRESS

    PART-DETAILS
       PART-NUMBER
       QUANTITY
       SUPPLIER
       PRICE
```

Immediate Accesses

Having defined the necessary and sufficient contents for the data store, we now have to investigate the immediate accesses required. An immediate access can be defined as one which is required faster than it is possible to search or sort the entire data store.

For example, since the supplier of each part is held as a data element in the data store, the question "What orders do we have for Supplier X?" can always be answered, given time, by scanning every record. If the question must be answered while someone is on the phone, however, we must provide for some special secondary access path (an index, a logical pointer or the equivalent).

We use an Immediate Access Diagram as shown in Figure 10 to get a consolidated view of the various immediate accesses required by different members of the user community.

The arrows connecting the boxes "Customer-Name," "Part-Number" and "Supplier-Name" to the box representing the data store are not data flow arrows — they merely represent the necessity for immediate access to a record or records given Customer-Name and so on.

When an immediate access diagram has been drawn up with volumes, file sizes, frequency of access and so on, we can use it as a data base/file design planning tool. If providing all the immediate accesses required presents no technical problem and can be done at acceptable cost, so be it.

However, if the cost of providing all the secondary access paths is unacceptable, then something has got to go. The immediate access diagram is then very useful as a tool to get the users to put some valuation on the relative importance of immediate accesses — obviously if it is very valuable to the business to be able to access pending orders by part number and only "nice-to-have" to access by customer name, then in a pinch we shall do away with the Customer-Name access.

Expression of Logic

The last tool of structured analysis we need to consider is for the expression of detailed logic. We have an

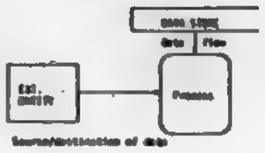

DATA STORE
Data Flow
Ext. ENTITY
Process
Source/destination of data

FIGURE 2

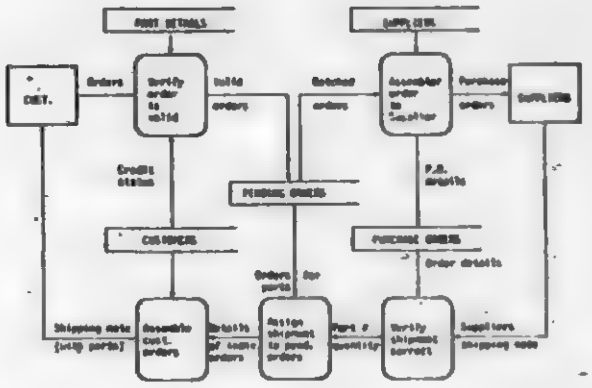

PART DETAILS
SUPPLIERS
CUST.
Orders
Verify order is valid
Valid orders
Batched orders
Assemble order to Supplier
Purchase orders
SUPPLIERS
Credit status
PENDING ORDERS
P.O. details
CUSTOMERS
PURCHASE ORDERS
Order details
Orders for parts
Shipping note (ship parts)
Assemble cust. orders
Details of cust. orders
Assign shipment to pend. orders
Part # quantity
Verify shipment correct
Suppliers shipping note

FIGURE 3

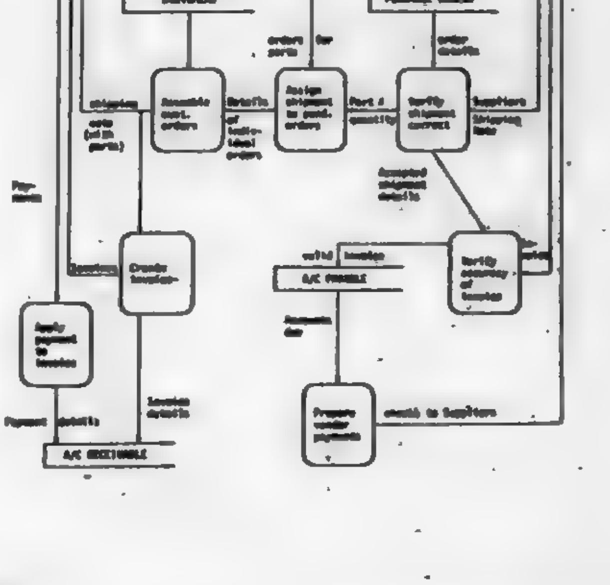

PART DETAILS
SUPPLIERS
CUST.
orders
Verify order is valid
Valid orders
Batched orders
Assemble order to Supplier
Purchase order
SUPPLIERS
Credit status
P.O. details
PENDING ORDERS
CUSTOMERS
PURCHASE ORDERS
orders for parts
order details
Assemble cust. orders
Details of individual orders
Assign shipment to pend. orders
Part # quantity
Verify shipment correct
Suppliers shipping note
Accepted shipment details
Create invoice
Verify accuracy of invoice
valid invoice
A/C PAYABLE
Apply payment to invoice
Payment details
Invoice details
A/C RECEIVABLE
Prepare vendor payments

FIGURE 4

overall DFD for the system, with typically 20 to 50 processes in it. The logic of each of these detailed processes should be expressible in one or two pages — but one or two pages of what?

Normally we write logic in natural English. For instance, suppose we exploded "Apply payment to invoice" in Figure 4 and found one of the detailed processes was "Verify discount is correct." Upon inquiring as to the detailed logic of this process, we are given the following memo:

"... Trade discount (to car dealers) is 20%. For private customers, 5% discount is allowed on orders for six items or more, 10% on orders for 20 items or more and 15% on orders for 50 or more. Trade orders for 20 items and over receive the 10% discount over and above the trade discount."

This is fairly clear as memos go; however carefully it is written, though, we must read all of it to process any one case. Thus, how long does it take to answer the question, "What discount for a trade customer with a 21-item order?"

We need a more graphic method of displaying the structure of detailed logic, such as a decision tree.

How long does it take you to answer the above question now? The decision tree is an ideal tool for representing the detailed logic of processes which are mainly decisions. In many cases, though, long sequences of actions must be carried out, sometimes repeatedly; then the decision tree cannot be used. We must use our second logic tool, structured English, as shown in Figure 12.

This is a perfectly general, strict dialect of English, using sequence, decision and repetition structures to express the detailed logic of any policy at all.

Figure 13 shows how these various tools fit together to make a logical model either of an existing or a proposed system.

Once the logical model has been developed by the analyst and the user community agrees it meets the system requirements, we can begin system design from a firm foundation. Our first concern is strategic design, sometimes known as "subsystem packaging." What will the subsystems be? What parts of the system function will be automated, and what will remain manual?

Structured Design

When we have decided on the automation boundary and carved up the computer system into subsystems (creating the minimum number of intermediate files in the process), we have to design the software within each subsystem. Obviously we want a design that works, and we also want a design that is changeable — a modular piece of software whose modules have the least necessary coupling between them to make the system work.

Changeable modular systems frequently look like military command structures, as shown in Figure 14. The system commander gives orders to and receives information from subcommanders, which in turn give orders to worker modules that do the actual reading, writing, editing, computing and so on. Note that workers do not speak to one another — no one speaks unless spoken to, and then only to their immediate superior or subordinate.

This, of course, is exactly what we need to make a changeable system.

By artificially limiting the communication between modules in this way, we are confident that we can change, for example, the logic of the Editor module and, provided the "official" interface between the Editor and the Input Subcommander is not damaged, we know that the changed system will work. In many designs, there are hidden or nonobvious connections between modules such that, if we change one part, then we introduce a bug somewhere else; changing the second part to fix the bug creates a new bug, and so on ad infinitum.

How can we derive such a modular, changeable hierarchy for a subsystem? The most reliable method, initially conceived by Constantine, is to base it on the data flow through the subsystem. (Here, of course, is the link between structured analysis and structured design.)

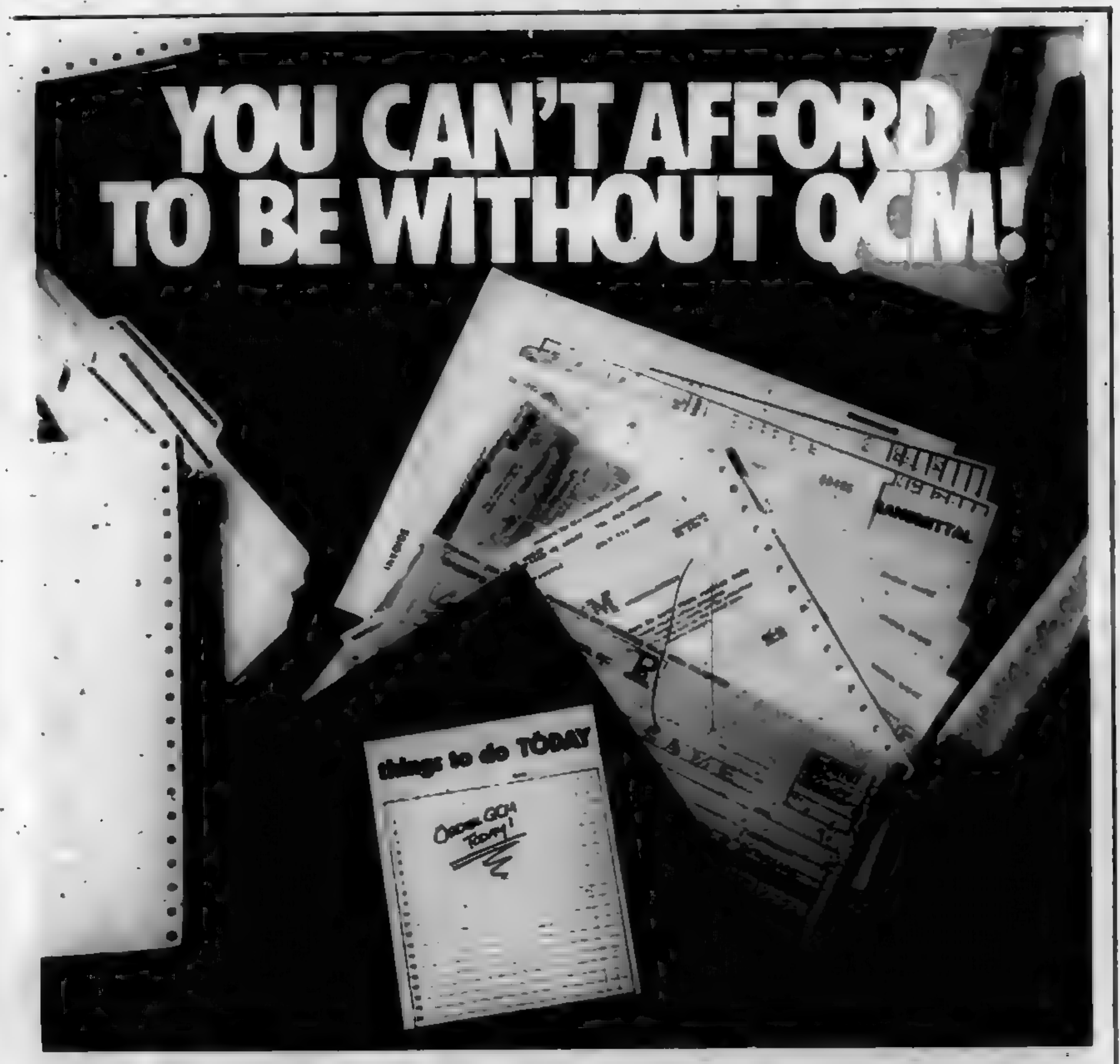


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FIGURE 6

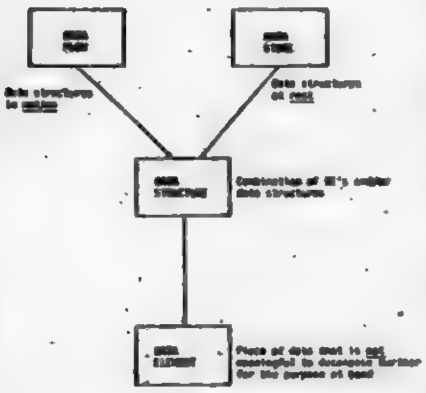

FIGURE 8

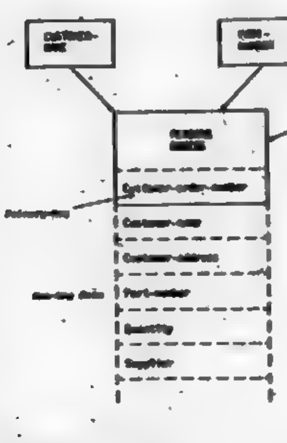

FIGURE 10

Figure 15 shows a very simple detailed DFD with a single stream of data going through it. All such diagrams can be divided into three parts — one part which is concerned with massaging input to get it into a clean processable form (the leftmost two functions in Figure 15); an area which transforms clean input into data ready for output; and an area which massages the output into the required form (the rightmost two functions in Figure 15).

Once we've identified these three areas, we can transform the DFD into a structure chart as in Figure 16, where the large arrows show invocation, the small arrows with white circle tails represent the data passed between modules and the small arrows with black circle tails represent control information such as a flag or a switch.

The structure chart tells us that "Produce Best Solution" invokes "Get Good Input." In turn "Get Good Input" invokes "Read Input," which returns with some Raw Input data.

"Get Good Input" then invokes "Edit Input," passing it the Raw Input data and receiving in return a flag (set to "Good" or "Bad" appropriately).

If the input is good, "Get Good Input" returns Control to "Produce Best Solution" along with the Good Input Data, and so on. Note that each function on the detailed DFD appears on the structure chart as a worker module at the bottom of the hierarchy.

The simple structure chart shown in Figure 16 is a prototype for systems with a single stream of data in the DFD; Constantine called this a "transform-centered" structure. Other structures correspond to more complicated DFDs.

By examining the detailed DFD, we can always use one of these model structures, or a combination of them, to derive a hierarchical design. By marking the data and control interfaces on the structure chart, we can see very clearly on one sheet of paper all the significant aspects of the design, allowing us to review it and see if there is any way it can be made more changeable. This is the type of hierarchical structured design chart to which Carl Garrison referred.

We would not normally expect users to review a structure chart — although, as Garrison said, some may be prepared to do so. Normally, users review DFDs.

User Involvement

We asked Carl what other types of projects on which Superior Oil had used DFDs and structure charts. "We're just getting into design with a geological data base system which captures technical data about geological structures", he replied. "It's a medium-sized project. About half the project team is made up of users — geologists. They've become very enthusiastic about the data flow and the logical model of the system, to such an extent that they're now using it to train geologists who come as new hires!"

McDonnell Douglas Automation (McAuto) has had similar experiences. Jay Green, the section manager responsible for development, said, "I would summarize the benefits of structured techniques as being (a) simplified communication all the way from the final end user through to the programmer, (b) less rework due to the discovery of problems late in the game, (c) more changeable designs, (d) easier estimation of implementation costs, (e) fewer problems found during testing because the structure chart is itself testable."

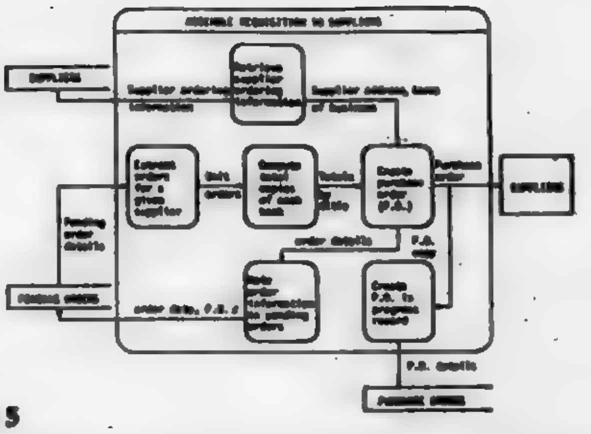

FIGURE 5

FIGURE 7

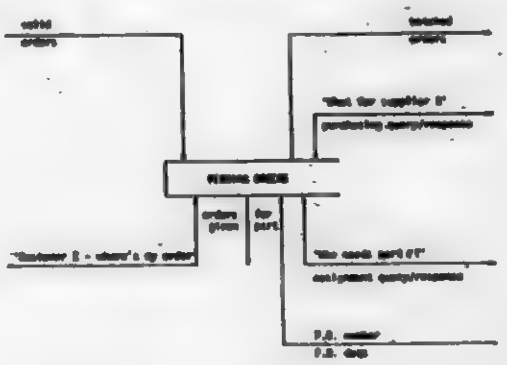

FIGURE 9

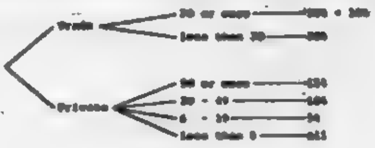

FIGURE 11

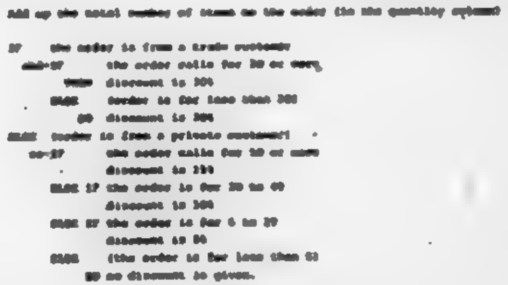

FIGURE 12

To what projects has McAuto applied structured techniques? "We have quite a number in process, but we've now completed some projects where we used the structured methodology all the way through. For instance, we did this with our Property Record for Equipment Servicing and Sharing project. This is an IMS on-line project with batch reporting that we brought live in April after 25,000 man-hours of development," Green told us.

Changeable Design

How does the changeability of a structured design work out in practice? Here's Carl Garrison:

"On the revenue accounting project, as we were starting into programming of one section, we were hit with a change in data base requirement. Because of the cut-and-paste nature of a structure chart, making the design change was easy."

How much longer would the same change have taken using conventional flowcharts?

"Very hard to say, but at least five times and maybe 10 times longer."

Words of Caution

We asked Carl and Jay what words of advice they would have for people just starting to use structured techniques.

Jay: "Users must realize that we're going to spend 25% to 50% more time

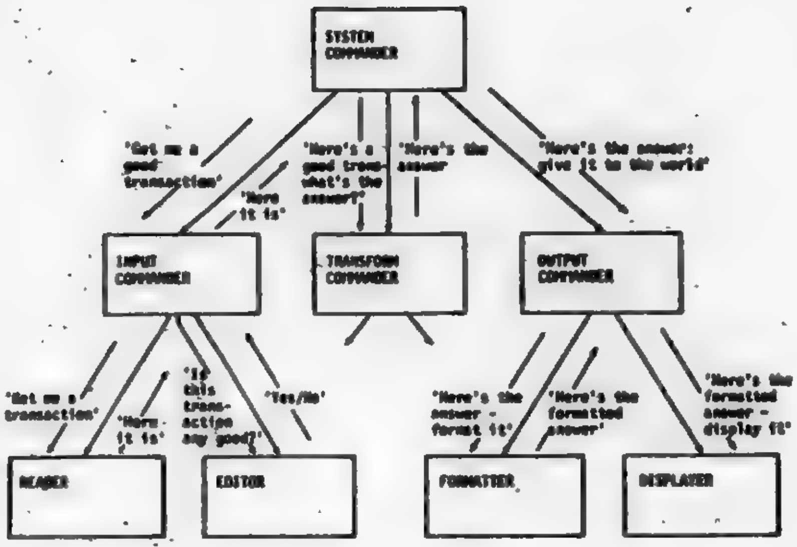
SYSTEM COMMANDER
'Get me a good transaction'
'Here it is'
'Here's a good trans- what's the answer?'
'Here's the answer'
'Here's the answer: give it to the world'
INPUT COMMANDER
TRANSFORM COMMANDER
OUTPUT COMMANDER
'Get me a transaction'
'Here it is'
'Is this trans- action any good?'
'Yes/No'
'Here's the answer - format it'
'Here's the formatted answer'
'Here's the formatted answer - display it'
READER
EDITOR
FORMATTER
DISPLAYER

FIGURE 14

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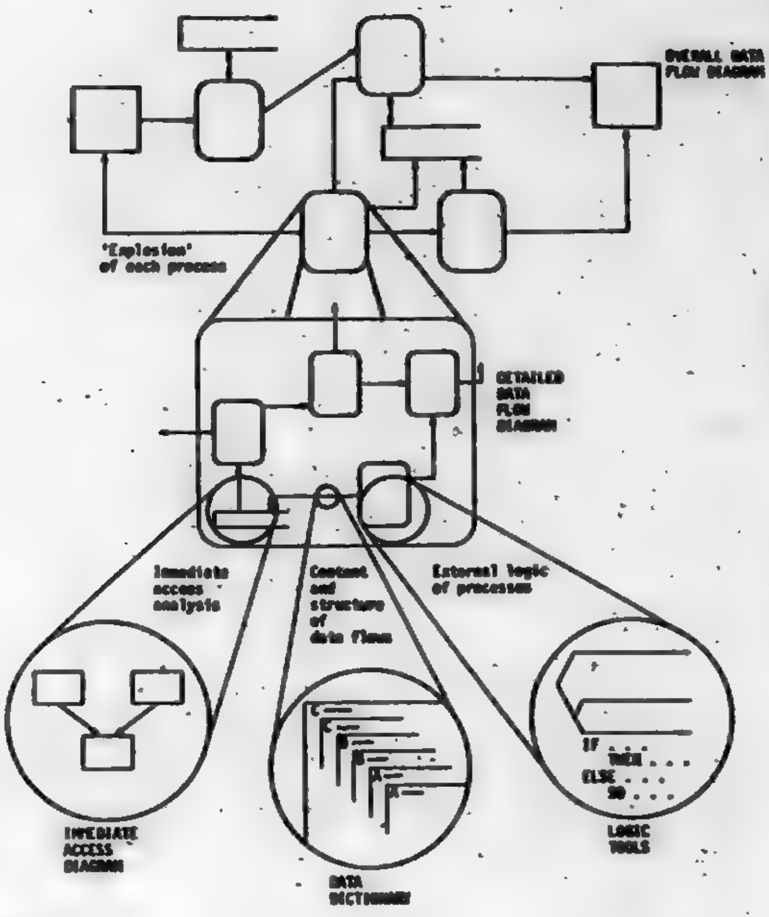
OVERALL DATA FLOW DIAGRAM
'Explosion' of each process
DETAILED DATA FLOW DIAGRAM
Immediate access analysis
Content and structure of data flows
External logic of processes
IF . . .
THEN . . .
ELSE . . .
SO . . .
IMMEDIATE ACCESS DIAGRAM
DATA DICTIONARY
LOGIC TOOLS

FIGURE 13

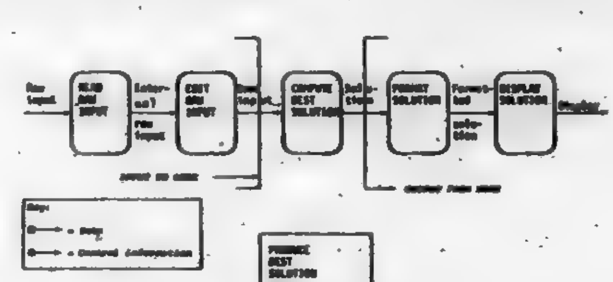

FIGURE 15

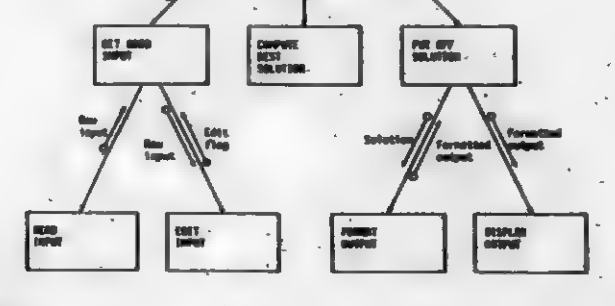
PRODUCE BEST SOLUTION
Good input
Solution
GET GOOD INPUT
COMPUTE BEST SOLUTION
PUT OUT SOLUTION
Raw input
Edit flag
Formatted output
READ INPUT
EDIT INPUT
FORMAT OUTPUT
DISPLAY OUTPUT

FIGURE 16

and money in analysis and design. Succumbing to user impatience to have programming started before these functions are complete, however, can result in more than compensating time and effort spent in difficult testing."

Carl: "Pick on a project that's large enough to be meaningful, but not so large as to be overwhelming — then use the people from that project as 'seeds' on later projects."

Carl: "It's important to develop procedures ahead of time to tie your DFDs and data structures to a data dictionary."

"We just did a labor distribution system using structured methodology. It wasn't a very large effort, three to four man-months, and it's true the people on it were good, but it was the first project recently to go in ahead of schedule and under budget - and we've had no production bugs in the last three months. A good piece of that is due to 'structured.'"

At Improved System Technologies, Inc., we are pursuing two lines of development for structured methodologies.

The first is the working out of step-by-step procedures and standards to integrate the intelligent use of data flow diagrams, logical data analysis, data dictionaries, structured design, structured walkthroughs and top-down development. This has been done in the structured analysis design and implementation of Information Systems (Stradis), whose procedures and training make up a formal system development methodology.

The second line of development is the provision of automated assistance to the analyst/designer. Several groups are experimenting with the use of automated drafting packages to assist in the drawing and maintenance of data flow diagrams, using disk storage and plotter output.

The next step, to our way of thinking, is to build a bridge between the automated data dictionary and the automated drafting package so data and processes defined on a DFD can be transferred to the data dictionary and vice versa.

If we could further integrate the data dictionary with effective text processing, we would have an "analyst's workbench" which would allow the analyst to build the logical model of a system with, say, a dedicated microprocessor, providing on-line entry of data definitions, data flows, information about system objectives, policy statements, etc. It would also permit on-line update and production of DFDs and structure charts (on a plotter) and requirements statements, policy logic, design statements, user procedures, etc., on a text printer in the project area.

While the analyst's workbench would not do any thinking for the analysts, it could speed up the clerical work of analysis and/or enable the rapid sharing of all information between members of the project team.☐

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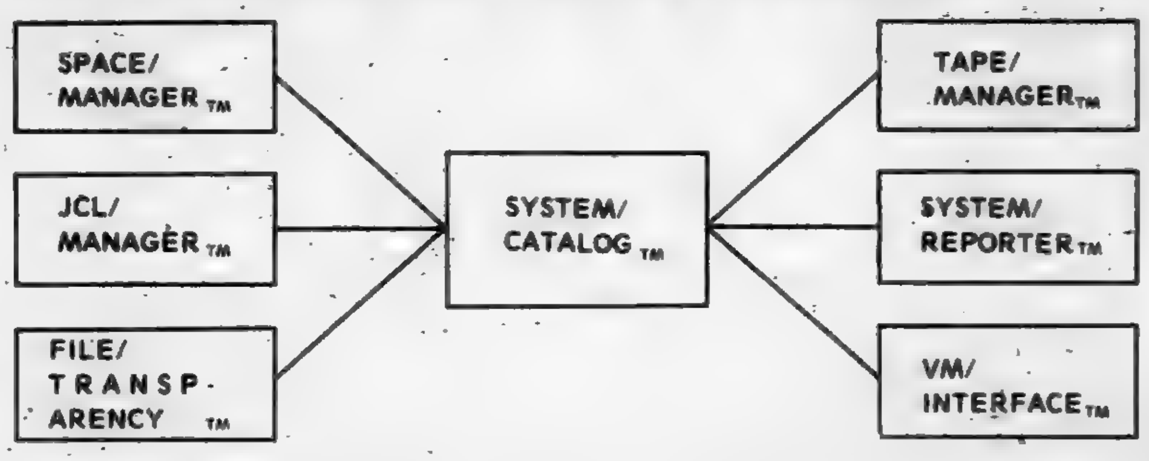

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By Dixon R. Doll

OPEN SYSTEM ARCHITECTURE & THE COMPUTERIZED CORPORATION

Software is the name of the game for the 1980s.

Ten to 15 years ago, the primary costs in a DP installation were for hardware, with only modest expenditures associated with software and people support. Chances are very good that by the middle 1980s, the costs of software development at all levels — including the people who perform application, maintenance and support, as well as ongoing development — will comprise at least two-thirds to three-fourths of the typical DP budget in major user installations.

Perhaps even more importantly, software holds the answer to some of our nation's most significant productivity problems. One of the major trends of the 1980s is expected to be the significant emphasis by the computer industry in producing new languages and software tools which facilitate the application development process. In so doing, the target is to greatly reduce the manpower time and costs associated with the process of supporting existing applications and developing new ones.

Users in the industry, in general, must get away from continuing to invest in the development of software at all levels which contains either implicit or explicit dependencies on some type of specific computer system, teleprocessing network or physical storage medium associated with the execution of that software. This is what aggravates maintenance costs and frequently causes users to spend more than half of their budget dollars simply maintaining and modifying existing applications. This adversely impacts productivity because it precludes the development of new, high-payoff applications.

The end result of this series of events and problems is continuing inflation, cost overruns in DP budgets and significant problems in the overall application productivity, both in the DP shop itself and in the end-user area.

Enter distributed data processing (DDP). As a result of these difficulties, and the plummeting cost of hardware, end users have begun to take matters into their own hands. The industry is beginning to supply them with DDP configurations that permit them to solve problems without depending on central DP shops.

At the present time, many of the application programs being developed are continuing to be developed in traditional so-called higher level languages like Cobol, PL/I and Fortran. This is not the answer for the future. The real answer lies in the development of specialized languages which will permit application development without programming.

Application development without programming will allow end users to develop solutions to their own problems and to design their man-machine dialogues in a way that closely parallels the actions of the business function. They will be able to design transactions, screen formats for input and report formats for output. They will specify through extremely high-level commands what actions are to be taken. These ultra-high-level languages will then set up all of the appropriate data base interfaces and network interfaces and generate the execution code for the processors which will satisfy the end-user requirements.

In this environment, the need for the DP shop to function as the middle man in the application development process has, at least in theory, been eliminated. Obviously, the DP department will continue to be an extremely important link in the overall chain of events, but its role will change drastically. Satisfying the needs of the thousands of end users around the world generally means increased complexity and sophistication in intermediate (under-the-cover) layers of software, layers which decode the commands of the end user and produce all the proper code that will be executed in the different application processors.

Now let's look at it from a different perspective. All of these higher level application developments without programming concepts demand cost-effective pathways between the terminals and DP machines and data bases, which the end users need to access. The industry is in the preliminary stages of developing a reference model for layered distributed processing architecture as shown in Figure 1 and Figure 2.

The purpose of these layered architectures is to identify logically independent functions and cleanly define interfaces between these different functions which need to go on in an overall DDP configuration.

As the diagrams clearly imply, the first four layers are concerned with the transportation of information from one complex to another. The higher three layers, namely Layers 5, 6 and 7, are concerned with standardizing the protocols and functional activities which go on in the DDP machines at the end points of the transport network. Clearly, software plays a vital role in both groups of layers.

Let us discuss some of the important functions in each of these two categories of layers.

Because the lowest layer, namely the electrical interface, is primarily concerned with the interfacing of a business machine and signal converter, Level 1 is not particularly interesting from a software point of view. It is primarily concerned with the physical properties for the interface.

Nonetheless, software to control the Level 1 interface is important whenever switched connections are involved because the Level 1 interface must be given the dial digits for a circuit switch connection and know how to respond to the various electrical control signals which need to be manipulated at the network interface.

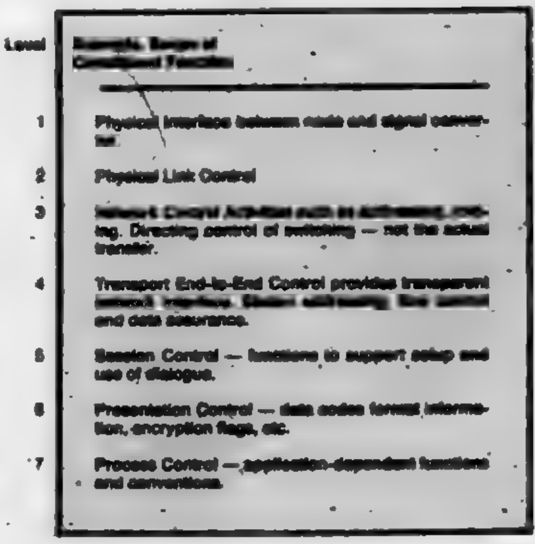
Most of the link level control (Level 2 activity) is concerned with implementing the standard types of data link control that we know as physical link control. Most systems which implement data link control perform it through a mixture of special-purpose software and hardware or through special-purpose microprocessors that are custom-programmed to implement the data link control activity on a dedicated basis.

In general, the microprocessors which perform Level 2 functions are very restricted through the software and hardware, which are implementing these activities. Thus, the software function at Level 2 is to perform and implement the specific protocols utilizing the instruction set of the microprocessor or the special-purpose hardware, which may be designed for those functions as well.

Level 3 software is concerned with the performance of network control. Virtually all Level 3 functions are accomplished through software.

This function is concerned with all the activities that control the usage of the transport network, but not the actual regulation of the flow of data itself. CCITT X.25 protocol, which has already been implemented in many configurations around the world, offers a combined capability for packet switching, network usage and interface that consolidates the functions of Level 1,

Control Levels in ISO/ANSI Effort



Level	[illegible]
1	Physical interface between [illegible] and signal converter.
2	Physical Link Control
3	[illegible] ing. Directing control of switching — not the actual transfer.
4	Transport End-to-End Control provides transparent [illegible] and data assurance.
5	Session Control — functions to support setup and use of dialogue.
6	Presentation Control — data codes format information, encryption flags, etc.
7	Process Control — application-dependent functions and conventions.

FIGURE 1

Control Levels in ISO Open System Architecture

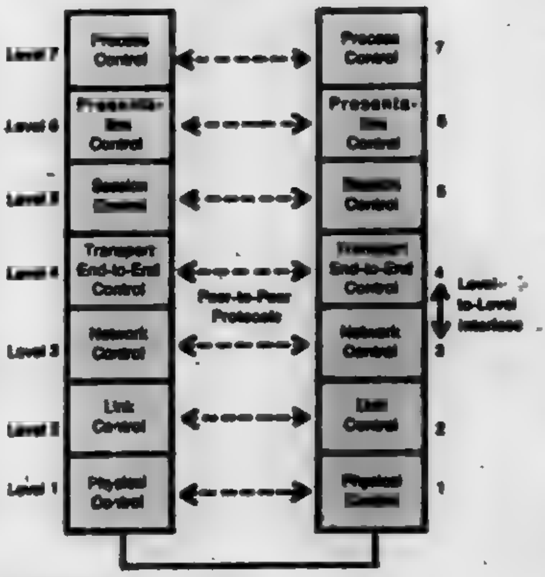


FIGURE 2

Dr. Dixon R. Doll is president of the DMW Group, Inc., a consulting firm in Ann Arbor, Mich.

"A whole new series of communications services, like the plans of Bell's ACS network, will ultimately reside in Layer 4."

Level 2 and Level 3.

Many refinements and improvements to the functionality for the Layer 3 software are still necessary before we have everything that users need. There are many areas where X.25 may be expected to be improved in the future.

These improvements will be accomplished through continual refinements to the standards which permit a full spectrum of priorities; improved sophistication in the routing schemes which can be employed; the automatic establishment of parallel virtual routes through a packet network (to provide a higher capacity end-to-end virtual circuit); improved provisions for the accumulation of traffic statistics and performance measurement; and improvements in the area of using multiple access lines to improve the overall availability of an end-to-end packet-switching network connection.

Layer 4 Software

Layer 4 software is concerned with the specific activities involved in the end-to-end transfer across the network. This so-called transport end-to-end control layer is designed to provide additional functions for the transport network which are not established at Level 3.

For example, Level 3 typically constrains the maximum packet size to a specific length of message. Layer 4 software can provide a mechanism for automatically slicing up an end-user message into chunks that would not exceed these limits.

Other important software functions which will ultimately be provided in Layer 4 involve such activities as a provision of directory assistance functions — the cataloging of data bases that permit users to find out which resources are available on the network. In addition, many enhancements in the network management and administration area will ultimately be provided by the various organizations which provide Layer 4 types of software on their different network configurations.

Layer 4 software will also have to be improved and expanded to permit transport networks which involve the judicious mixture of satellite services, packet-switching services and conventional circuit switching, as well as fast circuit-switching offerings. In addition, a whole new series of communications services, like those unveiled through the preliminary service plans of Bell's ACS network, will ultimately reside in Layer 4.

One could think, then, of software through Layer 4 as the place where the functionality will be provided for the next generation of significant service enhancements to the value-added networks we know today.

Many of these new services will be oriented toward supporting electronic mail activity and the transport of non-coded information, as well as providing user-accessible workspace to facilitate the preparation of messages and provide in-transit storage facilities for bulk data transfers that do not require a physical or virtual circuit setup.

Layers 5, 6 and 7

A comprehensive treatment of Layers 5, 6 and 7 functions would require thousands of pages. It is best to visualize the software functions which support these layers as being all of the typical kinds of activities which the mainframe and minicomputer vendors supply to their customers to support today's teleprocessing and computer network applications.

The general purpose of all of the lower four layers is to permit software that implements Layers 5, 6 and 7 to become standardized and not dependent in any way, shape or form on the specific types of transport mechanism utilized. Vendors want their users to be able to log onto a machine from a remote terminal with exactly the same machine log-on procedure, regardless of whether they are coming in through a local terminal over the public switched network, over a leased line or through a packet-switching carrier. It is important here not to confuse the functions of physical circuit setup and those of session log-on.

When we talk about Layers 5, 6 and 7, we are concerned only with activi-

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- Support for IBM DOS/VS release 31.0 up

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- Production of host formatted computer output microfilm tapes without modifying application programs
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- Backup to RJE Reader jobs in the event of Abends to avoid reloading since RJE station operators may not be available

LOADER USES

- Retrieving jobs that were backed up by the POWER/VS(E) Queue Stripper for POWER/VS(E) processing
- Reloading of jobs for multiple transmission to RJE terminals
- Reloading of jobs that were retrieved for backup or "Full Queue" conditions
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- Loading of POWER/VS(E) output tapes back into the POWER/VS(E) queues
- Producing Computer Microfilm Tapes from backup tapes for additional microfiche copies

LOADER FEATURES

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- Selection by JOBNAME, jobname PREFIX, FORMS, CLASS, PRIORITY, JOB NUMBER, RBM value, DISPOSITION, and SYSID
- Input tape in the POWER/VS(E) format, may be produced by the Stripper, or POWER/VS(E) output facilities
- User Exit may be used to format output
- No modifications to POWER/VS(E)
- Selections Report lists jobs selected, their final disposition, and vital statistics
- KEYWORD = PARAMETER control cards
- SYSIN tape supplied for easy 3 minute installation
- Execution from the Operator's console or initiation via the card reader
- Concurrent execution with POWER/VS(E) or when POWER/VS(E) is inactive
- Multiple Stripper/Loader jobs may be executing at the same time in different partitions or in different CPUs under POWER/VS(E) shared spool
- Supports all IBM POWER/VS(E) supported disc devices including FBA technology
- Transfer POWER/VS(E) jobs from one CPU to another CPU
- Automatic releasing, holding, placing of jobs in different POWER/VS(E) dispositions
- User specification of CLASS, FORMS, PRIORITY, DISPOSITION, and SYSID for jobs loaded to POWER/VS(E) queues
- User specification of Loader selection default parameters
- Negative selection criteria allowed (i.e. JOB≠PAYROLL would select all jobs not having the name PAYROLL)
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> **"The important need is for balance so that all this cost-effectively distributed processing power will not be used counterproductively."**

ties that go on once the transport mechanism has completed the successful establishment of a connection. The software provided by the DP vendors to support the activity of Layers 5, 6 and 7 will be the critical capability which determines their success in the marketplace. Layer 5 software is reasonably straightforward, so most of the action and interest and complexity will be in Layers 6 and 7.

Some of the typical functions which appear to have a high payoff and lots of user appeal in Layer 6 are the so-called virtual terminal and virtual file capabilities. Virtual terminal capability provides complementary software functions at opposite ends of a DDP transport network that permit the preconversion of terminal information from a physical device to a standardized representation for transportation through the network in the virtual terminals' standard format. At the distant end, post-conversion supplies the virtual terminal input to whatever application, program or data base is required.

At the time when the information is presented to the application program or the data base, any physical terminal dependencies have been eliminated as a direct result of the so-called presentation services function in the Layer 6 software.

Virtual file capabilities have the same objective — to remove physical storage media and file accessing dependencies from the application programs, which need to transmit or to access these files through a network. The next logical extension, then, for Layer 6 software enhancement is in the area of distributed data base management systems (DBMS). Clearly, the subject of distributed DBMS is beyond the scope of this article, except to note the importance of that type of capability in the overall scheme of DP vendor and end-user strategies.

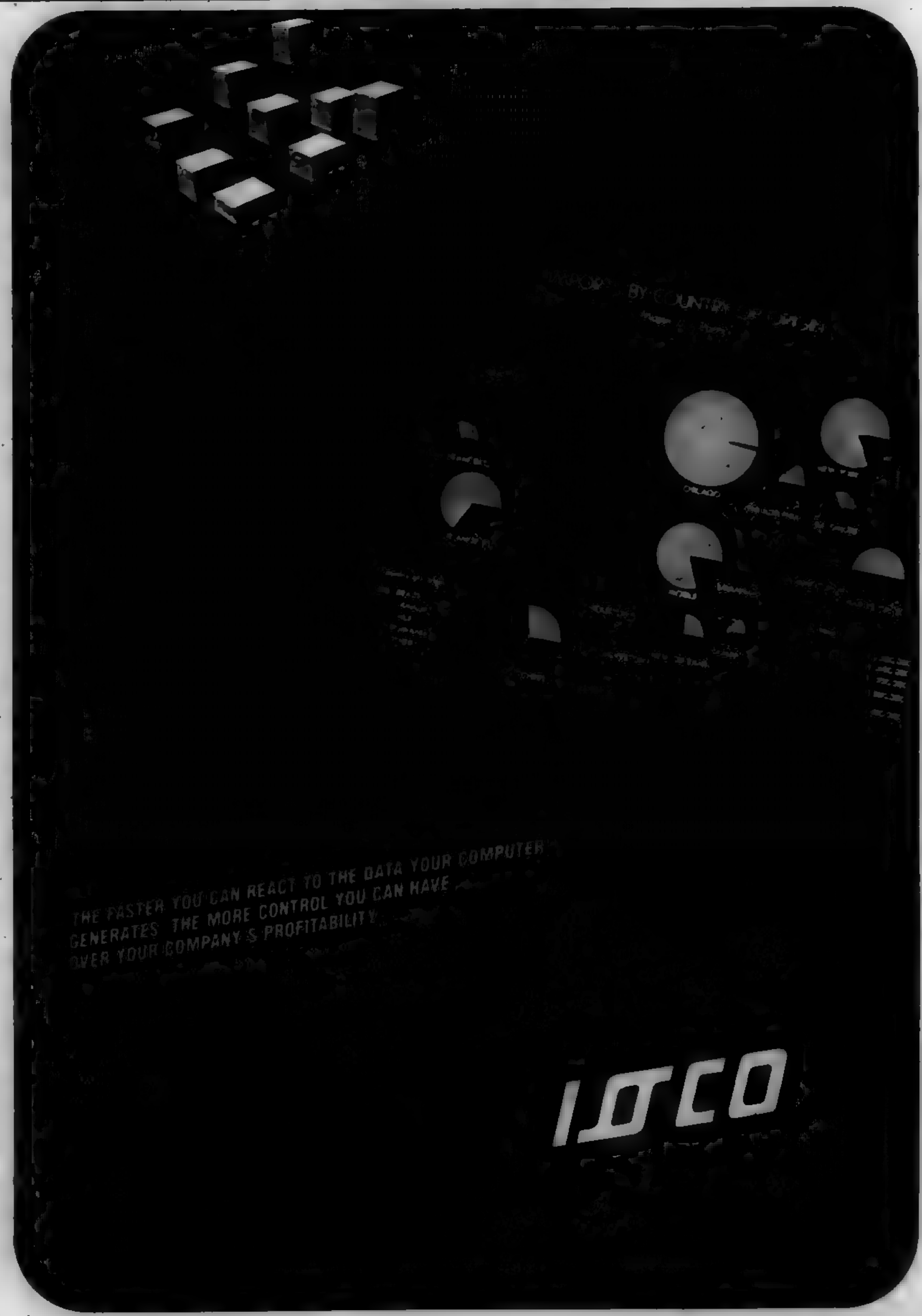
Finally, we have the application-level software and supporting protocols. There will be many thousands of types of application-dependent protocols utilized by customers which perform networking. The general objective will be to make it just as easy for an application program running on one machine to utilize all of the power in the layers of software below.

In a broad sense, all of these different layers of software are designed to make it easier for users to solve problems on the ultra-sophisticated distributed DP configurations of the 1980s. As one would expect, the important need is for balance so that all of this processing power, which can now be cost-effectively distributed throughout a corporation's locations, will not be used in a counterproductive way.

Thus, one of the most important elements will be for vendors to provide software which permits the corporation's top management to impose the right kinds of controls over what functional activities can be performed in specific locations and how they will interface and relate to functional business activities at other locations.

In general, then, the resolution of these important control issues and resource allocation decisions for establishing the completely computerized corporation will require an additional complement of software packages which facilitate the design of data, the modeling of data relationships and the modeling of the business planning process itself. Traditional structured programming techniques, as we know them today, will become obsolete. Rather, alert corporations will recognize that application design should be primarily performed to support connections between the users on one side and the data on the other.

Corporations will need to carefully model the end user's requirements for accessing data before they begin application design. Vendors will introduce ultrasophisticated intelligent DBMS that contain embedded logic as well as traditional DBMS functionality. This will have a high payoff because application programs, when developed, will no longer contain the tremendous amounts of functional redundancy which typically exists in the broad portfolio of applications that run in most corporate computer facilities. ☐


THE FASTER YOU CAN REACT TO THE DATA YOUR COMPUTER GENERATES THE MORE CONTROL YOU CAN HAVE OVER YOUR COMPANY'S PROFITABILITY
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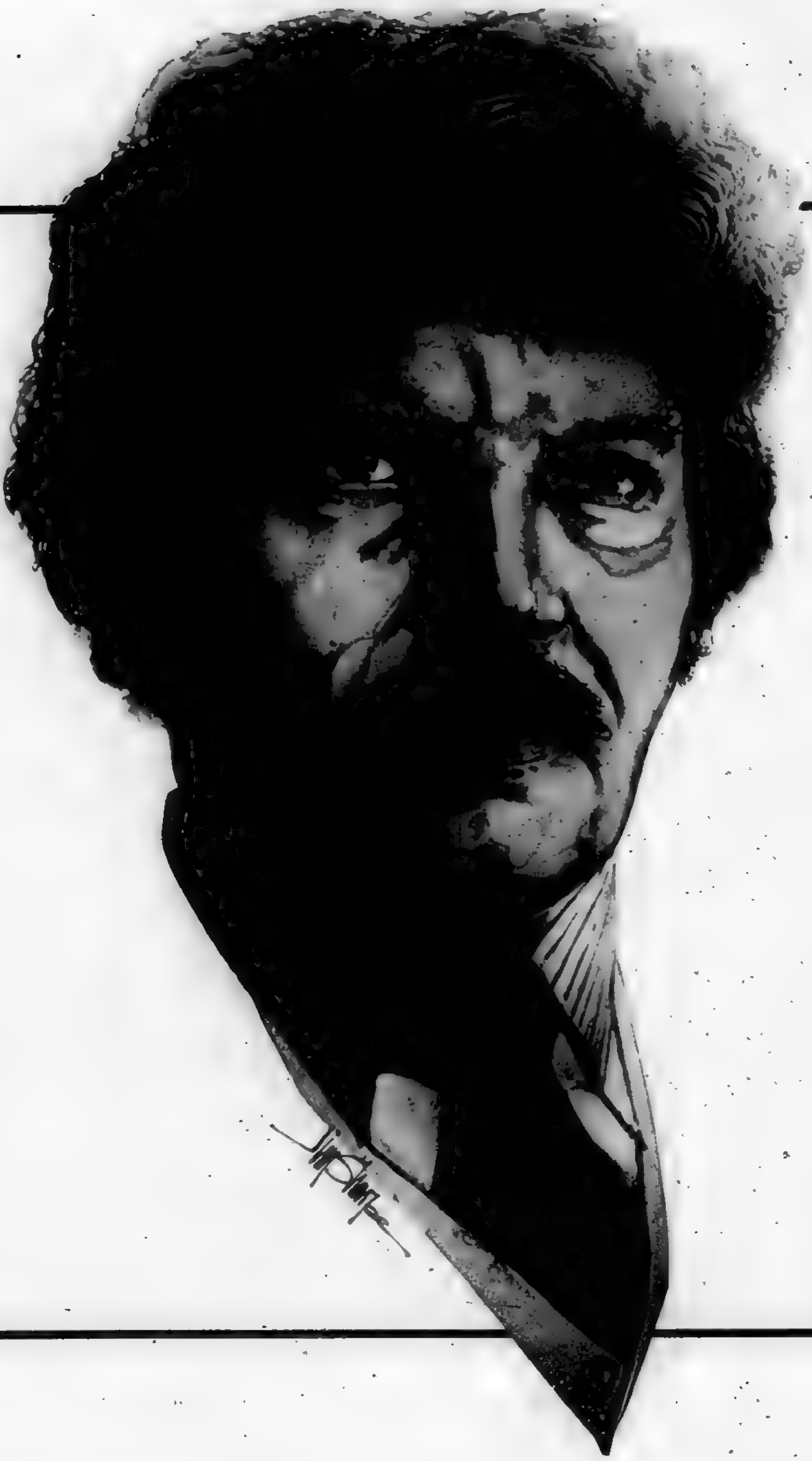

TOTAL® AND ENVIRON/1®... ACHIEVED SO MUCH, IT TOOK THE HIGHEST AWARDS TO HONOR THEM.

A Personal Message From Thomas M. Nies
President, Cincom Systems, Inc.

Recently, two Cincom Systems products were honored by International Computer Programs (ICP) with the industry's highest achievement award. These awards recognized TOTAL—our data base management system—and ENVIRON/1—our on-line control system—as the most successful products in their respective categories.

TOTAL is the "first single program product" ever to exceed the $100 million sales mark. By doing so it has become the most successful DBMS—and the most successful software product ever developed.

But, perhaps the success and recognition of our on-line control system ENVIRON/1 is even more remarkable. Because until recently, ENVIRON/1 was *only* available for our TOTAL user community.

Clearly, these awards are an exceptional milestone for Cincom and for the software industry. And in view of the support and acceptance that you, our some 3,000 users worldwide, have given our products over the past decade, we want to send special thanks and congratulations.

Because it has been you—the leaders in all areas of business, including two-thirds of the Fortune 100, —that have helped us evolve a decade of products for all applications and processing environments.

- Your suggestions for new product enhancements and guidance in long-term direction helped us know we were "heading the right way."
- Your hundreds of "references" have helped us help others.
- Your successes have helped make our successes. Because especially today, data processing professionals want to be as sure as possible of data base and on-line success *before* they choose a vendor.

In essence, your exceptional cooperation has helped us develop the foundation data base/data communications software and supporting facilitative software you need for a true data resource management environment. An environment where integrated software tools help generate the quality of information your organization needs.

You have also helped us grow to become the world's leading full-service software supplier. Today, we provide solutions from minis to mainframes *for 28 different systems*, from manufacturing packages to financial packages, from education services to consulting services.

For all this, please accept our sincerest thanks, appreciation—and congratulations. And please accept our pledge to continue doing our very best to support your suggestions and requests in the future.

For you see, Cincom received these awards. But, we know who helped us earn these honors. You did.

Thomas M. Nies

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ACF2 was developed by Schrager Klemens and Krueger, Inc.

By William B. Engle

OVERVIEW OF SYSTEMS AND UTILITY SOFTWARE PACKAGES

Spurred by the unbundling of the late '60s, the systems and utility segment of the packaged software industry grew tremendously during the '70s. The first part of the decade was marked by a great deal of technical innovation, although it was a period of somewhat uncontrolled growth as the new breed of entrepreneurs probed for their respective niches in this uncharted territory.

Fortunately for the user community, the last several years of the decade brought a much-needed maturity to the industry. Marginally valuable products disappeared from the scene, weak vendors either went out of business or, if they were marketing worthwhile products, were bought out by the more successful vendors. And the dominant vendors honed their products to a high degree of performance and quality. Successes achieved were measured in eight- and nine-figure sales records.

As the decade ended, one product — Cincom Systems, Inc.'s Total data base management system (DBMS) — became the first software package to exceed $100 million in sales, and several others went over the $50 million mark.

Consequently, the '80s have begun with a relatively stable systems software product industry, from which a prospective user can expect to obtain proven, reliable products and effective vendor support. Waiting for the industry to mature or for significant breakthroughs in basic techniques before taking full advantage of the many benefits to be gained through the use of systems software packages is no longer a valid attitude. Considering the tremendous potential for cost-effectiveness in today's systems software, DP budgets in the '80s should include adequate funds for the field, as well as for acquisition of packages for which a payout can be found.

The decade of the '80s will be characterized not so much by dramatic breakthroughs as by the evolutionary development of new products and the progressive enhancement of existing products. As has been the case with hardware developments, these changes will occur within a migratory framework, propelling users along an ever-upward path of enhanced functions.

Integrated Data Management

One of the most visible trends in the evolution of systems software will be the materialization of a concept that is already being billed as "the next generation of software." The essence of this concept is the full integration of data management functions now being performed by separately marketed products that, at best, are only loosely interfaced. This tight functional integration will be accompanied by the restructuring of the data interface to reflect the user's logical view of the data, thereby providing complete user transparency.

Integrated data management software developments have been getting much promotion lately from several leading vendors, namely Cincom, Cullinane Corp. and Applied Data Research, Inc. Others will certainly follow this lead, the most notable probably being IBM, which has made a major corporate commitment to software package development for the '80s.

Implementation of this software development strategy will mean increased ability for users to respond to the ever-greater demands for organization-wide information. Data will become more and more independent of the computer systems and data base structures in which it is processed, and information will be organized and managed in a form that directly reflects the way an organization does business, taking into account the distributed processing needs resulting from geographic dispersion. Information systems will become increasingly user-friendly in every aspect: development, implementation, access, usage, and maintenance. By largely bypassing the traditional channel of DP systems analysis, programming and testing, implementation costs will be greatly reduced.

Even more important, however, the required information will be available within the stipulated time frame, which in tomorrow's fast-paced business world will usually be "immediately." Thus, the integrated software systems now being developed will offer full support to the new corporate information resource management concept that is even now doing much to broaden the traditional DP perspec-

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William B. Engle is software editor of Auerbach Computer Technology Reports, *a publication of Auerbach Publishers, Inc., Pennsauken, N.J.*

Following are two listings of suppliers of systems software packages. The first indicates the types of packages offered by major vendors. The second is an alphabetical listing of those vendors, including their addresses and telephone numbers for those who wish to investigate further.

APPLICATION SYSTEM DEVELOPMENT
- Applied Data Research, Inc.
- CACI
- CAP-CPP, Inc.
- Decision Strategy Corp.
- IBM
- Informatics, Inc.
- Information Builders, Inc.
- M. Bryce and Associates
- Programart

DATA BASE MANAGEMENT
- Applied Data Research, Inc.
- Cincom Systems, Inc.
- Computer Corp. of America
- Cullinane Corp.
- Infodata Systems, Inc.
- IBM
- International Data Base Systems, Inc.
- Intel Corp. (MRI Division)
- Mathematica, Inc. Products Group
- MSP, Inc.
- Software AG of North America
- Synergetics Corp.
- University Computing Co.

DATA COMMUNICATIONS CONTROL
- Altergo Software, Inc.
- Applied Data Research, Inc.
- Boole & Babbage, Inc.
- Cincom Systems, Inc.
- Comm-Pro Associates
- IBM
- Intel Corp. (MRI Division)
- Kranzely & Co.
- Mathematica, Inc. Products Group
- SDA Products, Inc.
- Software AG of North America
- Turnkey Systems, Inc.
- Western Electric Co.
- Westinghouse Electric Corp.

COMPUTER GRAPHICS
- California Computer Products, Inc. (CalComp)
- Decision Graphics
- Environmental Systems Research Institute
- Escape Ltd.
- IBM
- Integrated Software Systems Corp.
- Laboratory for Computer Graphics and Spatial
- Analysis
- Structural Dynamics Research Corp.
- Radian Corp.

DATA CENTER PRODUCTION CONTROL
- Johnson Systems, Inc.
- Systematics, Inc.
- Value Computing, Inc.
- University Computing Co.

RESOURCE ACCOUNTING AND PERFORMANCE EVALUATION
- Applied Data Research, Inc.
- BGS Systems, Inc.
- Boeing Computer Services Co.
- Boole & Babbage, Inc.
- Candle Corp.
- Capex Corp.
- Computer Associates
- Comten, Inc.
- Duquesne Systems, Inc.
- IBM
- Johnson Systems, Inc.
- Marino Associates
- Performance Systems, Inc.
- SDA Products, Inc.
- Value Computing, Inc.
- Westinghouse Electric Corp.

DASD SPACE MANAGEMENT
- Allen Services Corp.
- Boole & Babbage, Inc.
- Cambridge Systems Group
- IBM
- Informatics, Inc.
- Oxford Software Corp.
- Pansophic Systems, Inc.
- SDI
- Software Module Marketing
- Tower Systems, Inc.
- Universal Software, Inc.
- Value Computing, Inc.
- Westinghouse Electric Corp.

PROGRAM DEVELOPMENT AIDS
- Adpac Computing Languages Corp.
- Applied Data Research, Inc.
- Arkay Computer, Inc.
- CAP-CPP, Inc.
- Capex Corp.
- CGA Computer Associates
- DASD Corp.
- Dataware, Inc.
- Henco Data Processing, Inc.
- IBM
- Informatics, Inc.
- Management and Computer Services, Inc.
- Micro Focus Ltd.
- MSP, Inc.
- Occidental Computer Systems
- On-Line Business Systems, Inc.
- On-Line Software International
- University Computing Co.
- Westinghouse Electric Co.

DATA RETRIEVAL, ANALYSIS, REPORTING
- Applications Software, Inc.
- Azrex, Inc.
- Cambridge Computer Associates, Inc.
- Capex Corp.
- Computer Associates
- Cullinane Corp.
- Dataman Corp.
- Dylakor Software Systems, Inc.
- IBM
- Informatics, Inc.
- McDonnell Douglas Automation Co.
- NCI
- Optipro, Inc.
- Pansophic Systems, Inc.
- Program Products, Inc.
- SAS Institute, Inc.
- SDA Products, Inc.
- Software International
- SPSS, Inc.
- System Support Software, Inc.
- Systems Development Corp.

ISAM and TEXT MANAGEMENT
- A.R.A.P.
- Applied Data Research, Inc.
- IBM

LIBRARY MANAGEMENT
- Applied Data Research, Inc.
- Capex Corp.
- [illegible] Systems
- NCI
- Pansophic Systems, Inc.
- SDI
- Tower Systems, Inc.
- University Computing Co.
- Value Computing, Inc.

OPERATING SYSTEM ENHANCEMENTS
- Comten, Inc.
- IBM
- Innovation Data Processing
- Jason Data Services, Inc.
- Nixdorf Computer Software Co.
- University Computing Co.
- Value Computing, Inc.

SOFTWARE VENDORS

A.R.A.P.
50 Washington Road
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(609) 452-2950

Adpac Computing Languages Corp.
120 Howard St.
San Francisco, CA 94105
(415) 981-2710

Allen Services Corp.
212 W. National Road
Vandalia, OH 45377
(513) 890-1200

Altergo Software, Inc.
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Boston, MA 02109
(617) 227-5100
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21515 Hawthorne Blvd.
Torrance, CA 90503
(213) 540-0111
Applied Data Research, Inc.
Route 206 & Orchard Road
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Princeton, NJ 08540
(201) 874-9000
Arkay Computer, Inc.
24 Manor House Road
Newton, MA 02159
(617) 964-1894
Azrex, Inc.
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Burlington, MA 01803
(617) 272-5750
BGS Systems, Inc.
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(617) 890-0000
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tive.

But, as stated earlier, the shape of things to come should not prevent anyone from taking advantage of the many benefits to be reaped by using one or more of today's crop of systems software packages. In this look at the current state of the art, the multiplicity of product offerings has prevented us from treating any of the products, except DBMS, individually. Rather, we have summarized product information by functional category, highlighting the typical features and benefits that can generally be expected of each class of systems software. Background information is included for those who may not be familiar with one or more of the product categories.

A list of major suppliers of systems software packages, indicating the kinds of packages offered, has been included for those who wish to investigate further.

Application Systems Development

It is not without good reason that we begin our discussion of systems software trends for the '80s with discussing the category of systems software most closely associated with applications. The cost of developing applications software is rising almost as rapidly as the cost of the hardware on which it runs is falling. This phenomenon, coupled with the continuing improvements expected in applications software products, will provide the impetus for increasingly greater acceptance of the applications package solution. In fact, it is predicted that the applications segment of the packaged software industry will grow at a significantly greater rate than the systems software segment.

We will not dwell on applications packages except to urge serious consideration of the advantages they offer even when they only meet, say, 80% of prescribed requirements. The trend toward innovative modularization and parameterization of applications packages (under the guise of "application generators") should make it more and more feasible to meet a much higher percentage of application requirements. There will, of course, always be application areas in any organization for which the packaged approach is not feasible. This is particularly true in situations involving on-line, real-time and distributed processing systems. Implementing systems of this kind is a complex and demanding task and, given the rapidly changing nature of today's world, the demands for modification and maintenance of these sophisticated systems will continue. Software that cannot only automate the repetitive aspects of programming, but can make the entire applications development process more streamlined and productive, will be much in demand.

Programmer productivity is not one of the bright spots in DP history, and it continues to be perhaps the most serious stumbling block to the growth of the industry. Programmers — especially good ones — are in short supply and will continue to be so in the foreseeable future.

Although the bidding up of salaries caused by this shortage increases programming costs, the impact on programmer productivity (and availability) resulting from the need to generate more complex programs for increasingly sophisticated applications must also be reckoned with. But, even for those sites that are well staffed with the necessary technical expertise and willing to bear the associated costs, and despite the many excellent program development aids available (which we will discuss later), the time and inconvenience of relying on high-specialty programmers for every new development, every change in a transaction description or screen format represents a major drawback in systems development.

Multitude of Functions

A quick look at the multitude of functions that must be programmed by specialists in developing and maintaining transaction-oriented, on-line applications systems should suffice to point up the need for help.

First, programs must be written for

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> "DP personnel are often reluctant to accept the idea of end-user autonomy, but tools to make it feasible are here today."

sign-on and sign-off, security code checking, generation of application screens within transactions, sequencing of transactions and the management of applications module linkage. Programming consideration must then be given to the transfer of data input from screen to screen, as well as from screens to application module and vice versa.

In addition, provisions must be made for handling the intermediate data generated, for posting data to a data collection file, for recovery in the event of a system failure, for reading and reformatting data collection files and for posting data to master files. Finally, adequate documentation and efficient maintenance procedures must be developed.

Development Packages

Systems development software packages are available to perform some or all of these functions without relying on conventional programming techniques. At the very least, these well-developed packages can minimize the need for specialized data communications expertise. The applications specialists themselves, therefore, can handle most data communications aspects of systems development transparently, without additional effort or specialized technical knowledge.

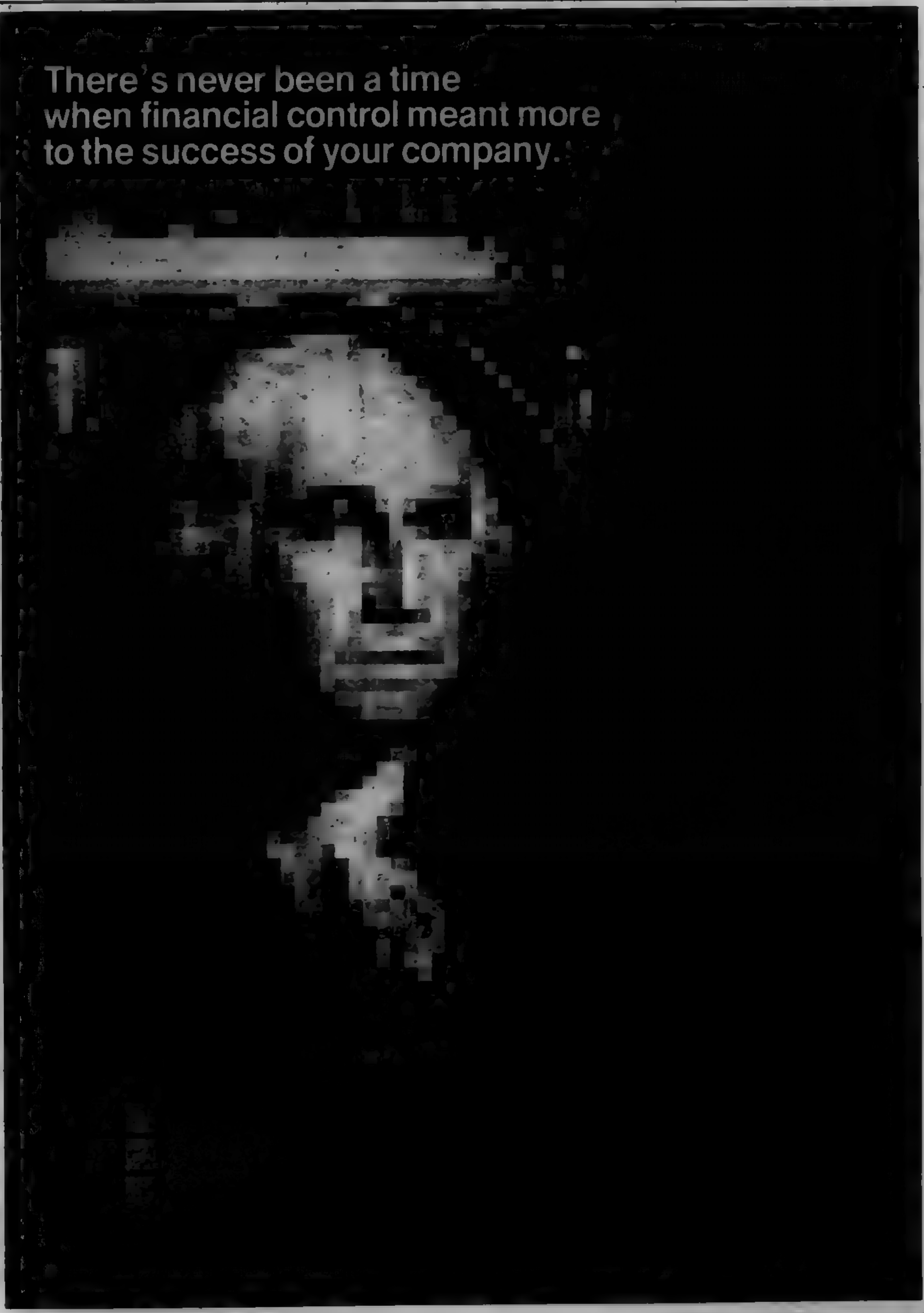
Other significant benefits can be gained, however, especially through the use of the more sophisticated systems development packages. For example, portability of application systems over a wide range of computer equipment and terminal types can be realized, and prototype application systems can readily be developed for the user (or by the user) for evaluation and modification before finalizing the specifications.

DP Reluctance

Another important advantage to an organization that uses systems development packages is user-oriented management of the entire transaction environment. DP personnel are often reluctant to accept the idea of end-user autonomy in the development and management of application systems, but the tools to make this concept feasible are here today; they undoubtedly will continue to be refined and made more adaptable to end-user requirements.

Vendors are accelerating this trend in their marketing efforts by selling their applications and systems development packages directly to end-users. The potential for considerable savings in both time and money guarantees a strong economic impetus to move in this direction.

To summarize, the technology and methodology are available today, in the form of software packages, to allow a user to make virtually a quantum leap toward increasing programmer productivity, improving applications reliability and shortening development and implementation time. Some progress has


There's never been a time when financial control meant more to the success of your company.

"There is no substitute for the laborious process of narrowing the choice to the one DBMS best suited to the circumstances."

already been made toward developing truly programmerless systems, and it is predicted that this progress will continue unabated during the '80s.

Data Base Management

The current state of DBMS is characterized by rapidly improving technology at the logical, physical and architectural levels, as well as by rapidly expanding user acceptance. This increased acceptance has come about, at least in part, because of the growing availability of low-cost, direct-access mass storage.

Although a good deal of adverse comment has appeared in the press during the past several years citing the many drawbacks of DBMS implementation, sales of DBMS software continues to set records. According to a recent survey, about half the medium- and large-scale computer systems now being procured involve data base applications. The vast market for packaged data base management software has spurred research and development to provide increasingly more effective products.

The general adaptability of DBMS software is notably difficult to assess and comparative evaulations that do not consider a user's environment are essentially meaningless. There is no effective substitute for the laborious process of narrowing the choice to the one DBMS package best suited to the individual user circumstances.

The following product overviews will serve to illustrate the differences between the leading DBMS packages on the market today. Investigation, however, should cover the entire field and not be limited to the few that are listed here.

ADABAS (from Software AG of North America):

- Employs fully inverted files in which data is retrieved by way of a multilevel index. A single file can be coupled to 80 other files, with up to five coupled files referenced by a single query.
- Permits building of network structures through specification of relationships among records.
- Provides access security down to the field level, with the additional protection of ciphering.
- Stores data in compressed form.
- Operates in serial and multiprogramming environments involving local and remote operations.
- Provides nonprogrammer interface through an easily learned query language (Adascript+) and a report writer (Adacom).
- Includes full integration with Software AG's teleprocessing system (Com-Plete); operates with most other data communications monitors.

DATACOM/DB (from Applied Data Research, Inc. [ADR] Data Communications Division):

- Uses fully inverted file structure.
- Accesses records by way of a multilevel index.
- Permits records to be ordered on a native key for high-speed, sequential batch processing.
- Interfaces with a comprehensive data dictionary facility.
- Supports CALL statements from other languages.
- Permits nonprogrammer interface through English-like, nonprocedural Dataquery language.
- Stores data in compressed form.
- Includes full integration with ADR's Datacom/DC and operates with most other data communications monitors. An Isam interface simplifies applications conversion.
- Runs on IBM mainframes.

IDMS (from Cullinane Corp.):

- Implements most Codasyl recommendations.
- Uses relative chain addressing to relate records in network and hierarchical fashion.
- Coordinates with a comprehensive data dictionary facility (IDD).
- Provides data manipulation language for most high-level languages.
- Permits nonprogrammer interface through Cullinane's optional On-Line Query System and Culprit report generator.

Bobby Harper, Manager of Information Services, Vought Corporation

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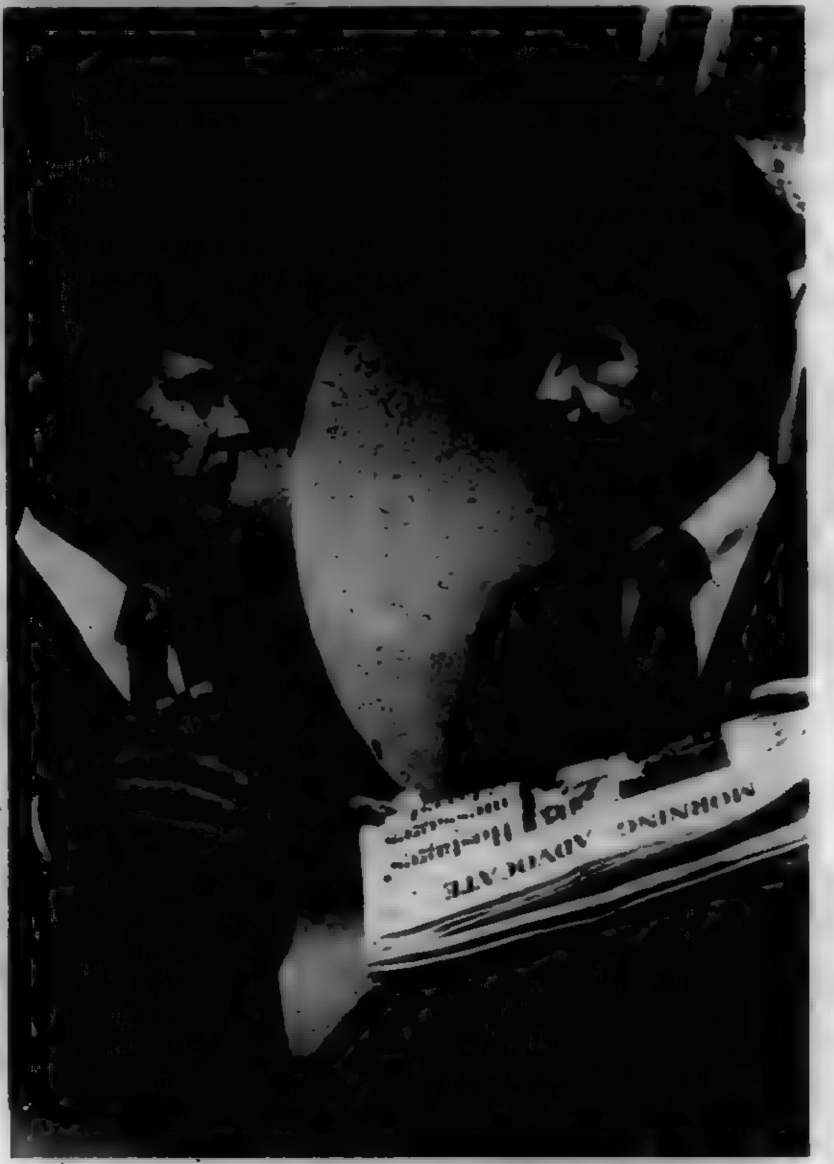

Richard Shurley (right) is Data Processing Manager of Capital City Press, Baton Rouge, Louisiana. Thomas Miller is the NCR representative.

* * *

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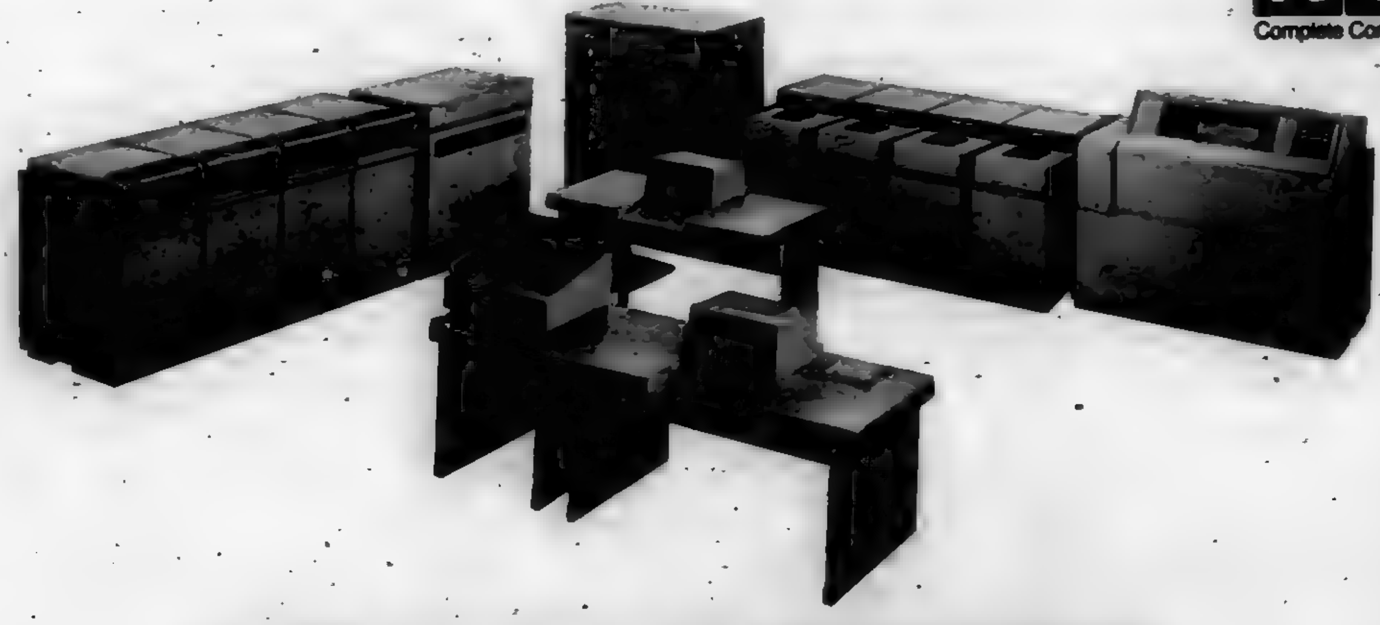

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> "IMS has a wide range of options that demand a high level of expertise in the design of data base structures."

- Provides fast sequential processing.
- Offers improved system throughput, including multithread operation, through an optional "central version" system architecture.
- Provides compatibility with any telecommunications monitor through a universal communications facility (UCF) option.
- Offers an optional data communications monitor (IDMS-DC).
- Offers an optional DL/1 interface (Escape).
- Runs on IBM mainframes.

IMS (from IBM): IMS provides generalized data base management support for direct-access data sets and is characterized by a wide range of options that demand a high level of expertise in the design of data base structures and file organizations. IMS file structures are basically hierarchies of data segments. IMS features include:

- Data organization methods for the creation, interrelation and maintenance of large data bases designed for multiapplication usage.
- Facilities for the development and maintenance of a data base in a batch environment, with the ability to easily extend data base processing to the telecommunications environment.
- A telecommunications subsystem to support the development of high-volume or rapid response on-line applications systems.
- Remote data processing center interconnection for data base and telecommunications applications.
- Program independence. IMS functions entirely on the basis of subroutine calls from applications programs, which can be written in Cobol, PL/I or assembler.

IMS is available in two versions: IMS-2 (the original product, formerly known as IMS/360) and an advanced version, IMS/VS. Both are available in two configurations, data base only (DB) and data base with data communications (DB/DC). DB configurations can optionally be tied into data communications by use of the IBM Customer Information Control System (CICS).

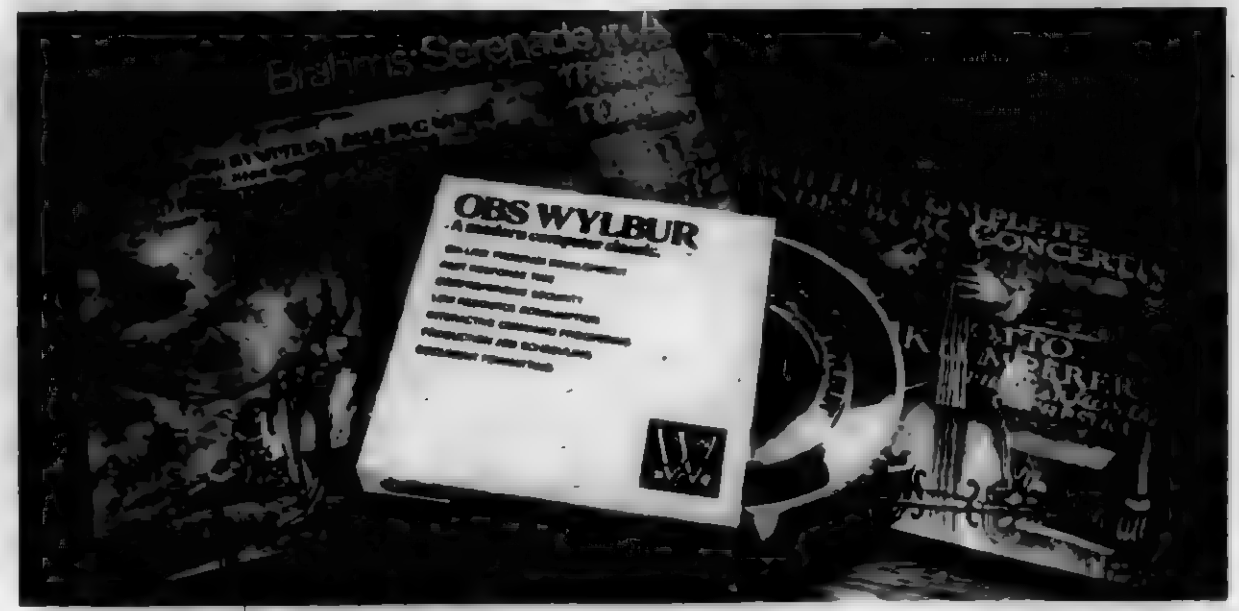
Two major extra-cost options are provided for the IMS/VS DB/DC system. The Fast Path Facility offers two simplified data base configurations and expedites the processing of high-transaction volumes. The Multiple Systems Coupling option extends message-routing facilities to include transaction input from other IMS/VS systems.

INQUIRE (from Infodata Systems, Inc.):

- Data accessed by multikey indexing in conjunction with field comparison operations.
- Data structures created dynamically when data common to two or more data bases is designated.
- A comprehensive data dictionary facility.
- A procedure language interface for Cobol, PL/I, Fortran or assembler.
- A self-contained, free-format user language for nonprogrammer interface.
- Search strategy implementation using Boolean combinations of keys, field value tests or range criteria.
- A macro feature that provides such functions as prestored routine commands and customized interactive prompting sequences with user-entered variables.
- Word/text processing capabilities, including text search and retrieval, thesaurus browsing and indexing control over single or multiple data bases.
- Backup, recovery and security at the file, record, field or command level.
- Multithreading and protection against simultaneous updates.
- Interfaces with CMS, TSO, CICS and Intercomm.
- Runs on IBM mainframes.

SYSTEM 2000/80 (from Intel Corp), formerly from MRI Systems Corp.:

- Uses a multiple-indexed (inverted), hierarchical data structure for fast retrievals and updates.
- Permits definition of complex network structures.
- Includes a self-contained data base



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*WYLBUR is a registered trademark of Stanford University

definition, query/update and administration facility that uses English-like vocabulary and syntax.

- Uses a "where" clause to support a wide range of subset processing and Boolean logic to expedite ad hoc queries.
- Includes a program language extension for interfacing with Cobol, Fortran, PL/I and assembler.
- Provides data independence and security at the field level.
- Includes integrated data dictionary.
- Features a modular design that permits selective acquisition and upward mobility.
- Includes full integration with MRI's TP 2000 and interfaces with TSO, CICS and Intercomm.
- Stores data in compressed form.
- Runs on IBM mainframes, the Control Data Corp. 6000/Cyber and Univac 1100.

TOTAL (from Cincom Systems, Inc.):

- Features the choice of a randomly organized or a bidirectional, multilist (partially inverted) file structure, either of which can be defined as a logical network.
- Permits the creation, maintenance and retrieval of data in both batch and on-line modes.
- Includes a nonprocedural data management language that interfaces with any host language having a CALL or EXIT facility.
- Achieves data independence and security through field-level addressing.
- Handles physical disconnections and resets pointers automatically.
- Provides a nonprogrammer interface through an integrated nonprocedural language (Socrates) for batch mode and a query facility (T-Ask) for on-line mode.
- Includes full integration with Cincom's Environ/1; operates with most other data communications monitors.
- Includes a comprehensive data dictionary facility.
- Runs on a variety of mainframes and minicomputers.

Some Points to Consider

Every DBMS has certain restrictions on the way in which the designer can structure the data base. These restrictions can be overcome by defining additional record types and relationships; however, this extra structure produces what is known as "clutter."

When a detailed DBMS selection study is performed along with an analysis of the applications data, the clutter that must be introduced into the data base design because of the shortcomings of a particular DBMS will become apparent and can be further evaluated.

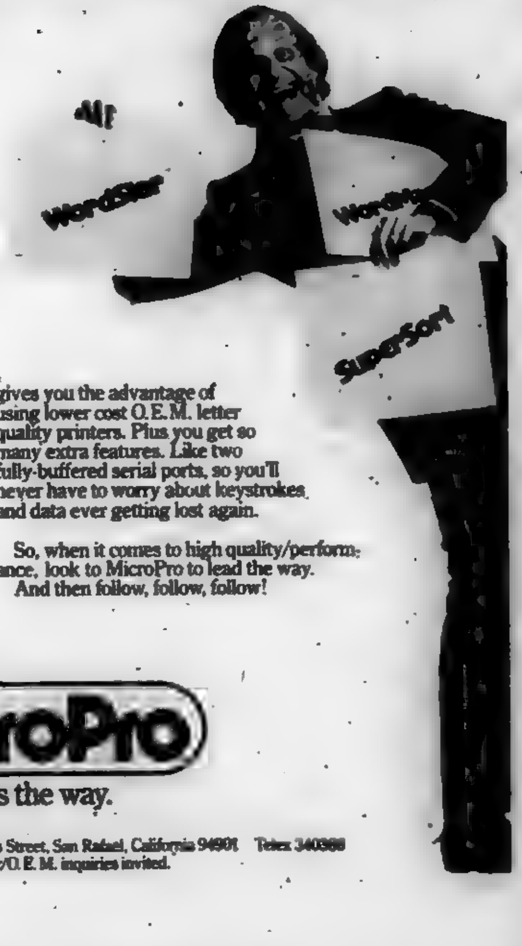
Another point to consider carefully is that DBMS vary considerably in the efficiency of their generated code. Even if the data base is reasonably well defined within the confines of the structuring facilities, it is still possible for the user to get a shock when applications program execution is measured. This is particularly true for on-line systems, in which terminal response time is so noticeable.

The basic difficulty with hidden execution time overhead is that the DBMS is designed so that applications programmers can easily write programs that are logically and functionally correct and will produce the desired results. This assumes that the applications programmer need not know what goes on "behind the scenes."

In order to write reasonably efficient code, however, the programmer must have this knowledge. Consequently, an ease-of-use advantage may not truly exist. To circumvent this problem, careful analysis of DBMS structure and code is necessary. In addition, emphasis must be placed on training programmers up to the level of expertise required to work the new system.

Although the achievement of improved data independence is frequently cited as one of the prime reasons for using a DBMS, it should be kept in mind that most systems must be extended after a certain period of use. This extension may involve designing and preparing new programs to process the existing data base.

It also may be necessary to add new items to existing record types, to add completely new record types or to create new relationships between new and existing record types. If this can be done without affecting existing applications programs, the DBMS can be said to support a reasonable level of data independence. With some commercially available DBMS, however, it is simply not possible to add new data



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"It is important to assess data independence functions when performing DBMS comparative evaluations."

items to existing record types.

The solution then is either to add extra record types and relationships, with the concomitant clutter and efficiency problems, or to undertake an extensive rewrite. Because this can be extremely expensive and negates one of the prime reasons for using a DBMS, it is most important to thoroughly assess data independence functions when performing DBMS comparative evaluations.

Packaged Support

Finally, mention should be made of the software packages that support or extend the usefulness of DBMS or that provide utility in their design and maintenance. These packages fall into the following categories:

- *Data Dictionary/Directory Systems (DD/DS).* The DD/DS is the repository for all definitive information about data in an organization: its identifying characteristics, relationships and authorities. The dictionary function informs the user of the entire content of data stored in the organization's data base; the directory function indicates the location of each data element.

Most DBMS either have an integrated DD/DS or can be interfaced with one produced by another vendor. A DD/DS can be quite valuable as a stand-alone system in regimenting an organization's data resources. In fact, installation of a DD/DS prior to DBMS acquisition can smooth the implementation process.

- *Query Languages.* Most DBMS offer their own languages for on-line query of the data base, usually as extra-cost options. A number of independent vendors market query language packages, some offering unique features, that compete effectively with those offered by the DBMS vendors.
- *Data Base Design Aids.* Packages in this category aid in the complex process of definition, design and implementation of a DBMS. They typically provide a development methodology by introducing a terminology patterned on generic data base interactions that are reflected in the data gathering processes. Data base design aids also provide computer-driven analyses with which the data base designer can interact in order to derive an optionally structured data base.
- *Data Base Maintenance Utilities.* A number of vendors have found a fruitful field in supplying innovative packages that assist the data base administrator in maintaining data base integrity. In view of the large number of IMS users and the well-publicized difficulties of maintaining this DBMS, it is not surprising that most of the maintenance packages are designed to operate with IMS.

Typical functions include space management, reporting on pointer discrepancies, assisting in data base reorganization, generating test data bases, reporting on the characteristics of the transaction workload and providing statistics for performance tuning.

Data Communications Control

When the computer is used outside the straightforward batch mode for teleprocessing or data communications, it is necessary to consider software that must perform a variety of complex tasks. Since operating in a data communications mode is rapidly becoming the rule rather than the exception, it would be helpful to review briefly the kinds of tasks that must be performed before describing the characteristics of the software designed to perform them:

- **Communications Tasks.** Communications tasks involve all network-oriented functions not assumed by the network controller or equivalent equipment. These tasks provide the message interface between the network and all the program elements of the system. Communications tasks consist of:

(1) Initiation of Network Activity — This includes polling (inviting terminals to transmit), calling (directing terminals to receive), dialing stations on switched lines, answering incoming calls on switched lines and the like.

(2) Message Assembly and Disassembly — This involves the assembly

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of incoming data blocks into complete messages and the corresponding disassembly of outgoing messages into the appropriate block structures. The message assembly/disassembly process may require the staging of message data to or from secondary storage, especially in a message-switching environment in which information recoverability is required.

Thus, message assembly/disassembly includes all conversions between standard interval message formats and terminal-oriented message formats.

(3) Protocol Functions — These are procedures required as part of the operating terminal and processor protocols. These procedures include data framing, idle character fill, redundancy checking, block acknowledgment, status reporting and terminal control.

(4) Error Detection and Recovery — These are software tasks required for recognizing and treating network errors. Both line- and status-type errors can occur on either a transient or permanent basis. Transient errors are treated by performing appropriate retry activities. An error that is not corrected after a specified retry threshold is considered permanent and is dealt with by generating appropriate notifications and then usually reducing the level of service to the malfunctioning component.

- **Message Management Tasks.** The message management facilities in a communications system provide the central core of functions that handle messages as logical information units. This core can include the full complement of message processing (as in a simple store-and-forward message switch) or can represent a foundation of services used by user-oriented applications tasks.

In either case, message management usually includes the following functions:

(1) Routing — This involves associating messages with appropriate destinations (e.g., to terminals, other computers or processing programs within the communications system.).

(2) Validation — This involves preventing erroneously formed or addressed messages from entering or passing through the communications network. Erroneous messages can be purged, routed to an intercept terminal for correction or returned to the originator for reentry.

(3) Disposition — This involves removing messages from the residence medium after completion of all required deliveries, thus releasing message space for use by arriving traffic.

(4) Queue Management — This involves maintaining and manipulating message queues within the system, including adding messages to a queue, moving messages from queue to queue and removing messages from queues. Most communications systems use queuing in message management to provide the input, nonsynchronous operation of the message input, message processing and message output tasks.

In addition, priority levels are usually provided with queue structures to ensure proper response to messages requiring rapid action.

- **Error Control Tasks.** The rate of error occurrence in a network, including lines, terminals, modems, switches and other interconnect equipment, tends to be greater than the rates usually experienced in the operation of standard peripheral devices. Consequently, communications operations require more extensive error detection capabilities (to recognize and classify errors as to type and location) and greater variation in retry procedures.

Communications network errors can be classified as follows: data errors that involve a recognized transformation between the information sent and that actually received, and data errors that can be detected by recognizing improper framing, incorrect character parity, receipt of a character illegal in the code set or receipt of a block check character or sequence not identical to that computed for the received data. Nondata errors include all other recognizable malfunctions, such as loss of incoming data carrier, modem, terminal ready status and so on.

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"The identification and diagnosis of line outages and network malfunctions can be provided by data communications software."

- **Network Supervision Tasks.** Supervisory control of a network is usually implemented by a set of operator commands that allows the selective enabling, disabling and functional modification of the network. Control commands are entered through the system console device or by way of a specially designated set of network supervisor terminals. Each command is acknowledged (either positively or negatively) in order to provide a complete record of operator-initiated action. Commands usually available to the network controller are:

1) Disabling or enabling a line or station for input or output.

2) Alternating route traffic from one station to another and changing the order and/or frequency of line or terminal service (polling, calling, dialing, etc.).

- **Applications Tasks.** The applications tasks in a data communications system handle message processing and other functions not provided by the basic software components previously described in this section. Such processes as text editing, data base inquiry, file updating and collection are applications tasks often incorporated into communications processing systems. These tasks use the facilities of the operating system, communications software and message management to obtain messages for processing and release them for eventual delivery or termination; new messages are often created as part of applications processing.

Typical applications supported by data communications software include:

1) Remote Job Entry (RJE) — This involves the collection, preprocessing, reprocessing and transmission of batches of data from a terminal workstation to a host computer. With the advent of distributed processing, most pre- and post-processing, as well as user access to data files, are performed at the point of origin.

2) Time-Sharing — This is a method of sharing the processing power of computers concurrently. Time-sharing is a terminal-oriented type of multiprogramming designed to facilitate program development, compilation and testing, as well as data base updating and retrieval.

3) Communications Monitoring and Diagnostics — When analyzing the efficiency of a network, its hardware and various supporting programs, values representing the number of characters, messages and acknowledgments/-terminations can be recorded and evaluated. In addition, the identification and diagnosis of line outages and network malfunctions can be provided by data communations software.

Access Methods

Procurement of software for the performance of the many tasks outlined in the preceeding usually begins by acquiring from the computer vendor a "telecommunications access method," which controls the transmission of data between main memory and the various data communications devices. Since the IBM telecommunications access methods are the most widely known, they are described here to illustrate the types of functions performed by this software:

- The IBM Basic Telecommunications Access Method (Btam) is an elementary program that handles the transmission and receipt of data as well as the polling and addressing of terminals. All other functions must be programmed by the user.
- The IBM Queued Telecommunications Access Method (Qtam) incorporates such additional communications facilities as scheduling and allocating resources, logging message activity and queuing messages on disk. A macro language is provided so network control functions can be performed from within the applications program.
- The IBM Telecommunications Access Method (Tcam) an enhanced successor to Qtam, includes a message control program for handling message and network control functions and providing facilities for system recovery, checkpoint/restart procedures and control procedures for system shut-

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• The IBM Virtual Telecommunications Access Method (Vtam) was designed specifically for IBM's virtual operating systems (DOS/VS and OS/-VS). Vtam not only has all the facilities of Tcam but operates across multiple partitions and provides dynamic interfacing with applications programs.

Monitor Packages

The second major software item, which offers a selection of vendors and features, is the data communications monitor package. IBM's CICS is undoubtedly the best known package of this type.

Basically the data communications monitor provides the interface with the applications programs and, therefore, with the end user.

A variety of software packages is available for assistance in network planning, design and maintenance. For the CICS user, many additional utilities are offered to help in such system design and programming areas as display management, screen formatting, resource allocation/deallocation, spooling, access control, message transmission and performance enhancement.

Computer Graphics

The old adage that one picture is worth a thousand words is as true today as it was in antiquity, although today the picture should also be related to "numbers." Graphics have long been used for important presentations in which the summarization of a lot of information must be communicated quickly and with strong impact.

However, the time and cost of preparing such material manually is great, and updating it when necessary is not always feasible. The computer is changing all that.

Through the combination of easy-to-use software packages, increased computer capabilities at reduced cost and reasonably priced digital color graphics terminals, comprehensive graphics capabilities are becoming cost effective for a great number of users which only a short time ago could not afford them. And if the decade produces low-priced color hard-copy devices, an even greater surge in computer graphics usage can be expected.

Today's computer graphics software packages fall into three main categories: computer-aided design (CAD); geographic contouring and mapping; and business analysis and statistics (including histograms, pie charts and linear curves). Computer graphics makes it possible to continuously refine the design of a model and to redraw a chart or map using new or revised data without the need to redesign from scratch.

Engineering and manufacturing applications include the design of complex devices through three-dimensional perspective representations provided by finite-element model generators, electrical and hydraulic schematics, logic diagrams and floor plans. Geographic applications include seismic, demographic, geologic, thermal and pressure maps and diagrams. Charts or graphs can include smoothed or interpolated curves, log or semilog axes, line patterns and shaded or patterned areas.

Easy to Use

Ease of use without the need for special training characterizes the new breed of computer graphics packages. Users can communicate with the packages from the viewpoint of their own disciplines or areas of interest rather than abstractly.

For example, using simple English-like commands, a manager can design and modify graphic representations quickly and easily at a display terminal and then have them printed out if desired. In some cases, modules are available that can adapt basic graphics software to meet the needs of specific industrial applications.

In addition to the new generation of low-cost color graphics display terminals, outputs of computer graphics packages can be produced on ordinary CRTs, standard terminals enhanced for graphics, drum or flatbed pen plotters; the more rudimentary bar charts or point plots can be output on high-speed line printers. Most of the packages are written in Fortran for wide adaptability among computers.

Production Control

When it comes to realizing an effective return on computer investment, operations management is caught on the horns of a dilemma. Despite pressure to achieve a high level of computer utilization, upper management will not accept the high utilization that would result from giving exclusive attention to user demand; likewise, de-emphasizing user needs in order to reach computer utilization goals is also unacceptable. Attaining 95% CPU utilization for a shift is hardly a good alibi for missing the payroll deadline.

The solution, of course, is automated job scheduling and production control, which is becoming increasingly practical for the data center through the acquisition of a software package.

Not only has comprehensive job scheduling been the exception rather than the rule in computer installations, but establishing and maintaining an effective job schedule is all too often considered an impossible task by operations management. There are hundreds, perhaps thousands, of possible job sequences that could be run with the available resources. Finding the right one is a mind-boggling task.

Although computers have been used for many years to automate factory production control, only recently have any appreciable inroads been made in the implementation of adequate production control in the data center, or even for the computer itself. The large, complex computer system, with its enormous computational and processing power, being controlled by operators (and many times by programmers) shuffling card decks (and hoping all the cards are present when needed) has long been a great anomaly in the DP industry. Fortunately, this ludicrous scenario is disappearing as more and more data center managers become aware of the answers available through software packages.

New or improved computer production scheduling packages have been receiving a good deal of attention recently, and for very good reasons. A sampling of the features offered by these packages reveals such gems as:

- Coordinated schedules for all workstations in the data center.
- Dynamic scheduling of jobs based on user-specified time intervals.
- On-line job inquiry and tracking.
- Prompting of originator if a job cannot be scheduled.
- Automatic job mix optimization.
- Automatic control of job setup, eliminating JCL handling and issuance of job setup instructions.
- Detection of abends and incorrect completions, with action taken to correct errors and continue checking for completion of data collection before processing begins.
- Automatic rerun control, coordinated with pre- and postprocessing events.
- In-depth feedback, which can result in more realistic schedules.
- Data base for production control documentation, with statistics, history and descriptive information.
- Planning and forecasting, including simulation of new hardware configurations and prediction of the effect of new applications.

It is hard to imagine a DP installation of any appreciable complexity not using at least a simple job accounting package to provide basic utilization statistics as well as user chargeouts. Users of such high-concurrency systems as MVS could not operate with any reasonable degree of efficiency without comprehensive performance evaluation and feedback facilities.

Many installations, of course, fall between these two extremes. One of the most difficult tasks for managers of these intermediate-sized installations is deciding how deeply to become involved in performance evaluation and exactly what results to expect from the process.

What is needed — and what can readily be obtained through acquisition of software packages — is a comprehensive method of resource accounting that will give the DP department control over its own environment while providing a vehicle for budgeting, cost accounting and cost recovery. The package must measure and report system resources utilization and work load characters in detail so that performance problems can be solved and the system timed for increased thoughput and improved service to users.

Extending beyond the purview of performance evaluators are the sophisticated performance prediction systems, which can answer "what if" questions occurring in such activities as computer capacity planning, performance timing and system design. These packages can be used to support projection and balancing of work loads, determining when system capacity will be exhausted, calculating the effects of alternative upgrades and evaluating alternative vendor components.

DASD Space Management

One of the most common problems confronting DP managers is the seemingly insatiable demand for more disk storage. How can these demands be met in the most effective and economical way? Given the exigencies of random data storage, it is inevitable that some disk space will be wasted; but how much of a wastage factor should be tolerated?

Certainly, everything reasonably possible should be done to assure optimal utilization of existing space before requesting additional hardware. Efficient utilization, however, is not the whole problem — security, as well as backup and archiving, must also be effectively handled.

A large number of systems software products are currently being offered to assist in DASD space management. This is probably the most heterogeneous of all the systems software categories and, therefore, presents the greatest difficulties in evaluation and selection. The DASD space management problem can be approached in various ways — no two packages solve the problem in exactly the same manner.

In the following sampling of features and benefits, it is evident that a number of advantages can be realized in addition to basic space management. DASD space management packages:

- Increase disk space availability by as much as 50%.
- Eliminate space fragmentation.
- Reduce multiple extents.
- Highly compress data.
- Automatically reorganize volumes for optimal performance.
- Automatically reblock files.
- Improve multiprogramming performance.
- Eliminate operator errors and reruns due to exceeding disk storage limitations.
- Dynamically allocate scratch disk working space from a space pool.
- Automatically migrate and recall data sets.
- Support interactive programming systems (TSO, Roscoe).
- Display a catalog on-line, reflecting the status of all archive/backup files residing on off-line volumes.
- Display a pack map graphically.
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We have looked at applications development packages that allow an all-inclusive approach to building and maintaining applications systems by reducing reliance on the traditional programming process. These systems, however, will never eliminate the need for a certain amount of skilled programming, and the predictions for an almost insatiable demand for software in the '80s clearly indicate that "traditional" programming will continue to constitute a major time and cost factor.

The wide range of program development aids currently offered by the systems software vendors can do much to streamline the programming process. For the purpose of this discussion, we will divide program development aids into the following categories:

- Conversational programming facilities.
- Cobol writing aids.
- Alternative languages.
- Testing and debugging aids.
- Translators and converters.
- Documentation generators.
- Microcomputer programming aids.

It is a well-established fact that programmer morale and productivity are increased through the use of conversational programming systems.

Particularly for those writing Cobol programs in the traditional way, Cobol coding is time-consuming, repetitive and stultifying. This condition contributes to the incidence of clerical errors, the correction of which further fuels the problem. Software packages are on the market that can reduce much of the verbiage associated with Cobol coding through the use of an abbreviated "shorthand" language and a special precompiler, producing more efficient and standardized code in the process. In addition, such features are available as a macro processor that allows the generation of entire program segments for the development of new programs, test data generation, run-time debugging, generation of performance tuning information and printing of formatted reports that replace dumps.

Using alternative languages is another solution to the programming time problem; however, this can be disadvantageous, since it often involves breaking with traditional standards and entrenched positions, and making a commitment in an entirely new direction.

Nevertheless, it may be a very worthwhile investment. Replacement languages for such high-level languages as Cobol require less expertise and only a fraction of the programming time of the original language. In addition, they compile much faster and provide better file-updating, table-handling and report-generating capabilities. DBMS interfaces are an additional benefit.

Even a high-level replacement for assembler that produces comparably ef-

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ficient object codes, can call programs written in other languages and is highly portable from one computer system to another is available.

Testing and debugging programs is one of the more onerous tasks with which programmers must contend. Ensuring that all aspects of a program are fully checked out is a very difficult and time-consuming job, yet an installation pays a high price for going into production with poorly tested programs. With the increasing popularity of DBMS, testing requirements have become more critical than ever.

One of the major problems in this process is the difficulty of developing test data that will exercise every aspect of program operation. Fortunately, there are reasonably priced software packages that generate test data and rigorously test programs, thus permitting programmers to concentrate on more productive tasks and drastically reducing the incidence of program bugs in production versions.

Typical functions that can be performed by program-testing software packages include:

- The generation of flexible test files to test programs written in any language.
- The output of reports on execution characteristics of Cobol programs.
- The generation of reports on execution activity determined by the user's symbolic procedure names.
- The checking of output files and the documentation of errors.
- The production of all types of files and record structures.
- The automatic changing of field values.
- The extraction and incorporation of data from live files.
- Interfacing with DBMS.
- The embedding of test parameters in Cobol programs.
- The use of English syntax, Cobol-like parameter statements.
- The generation of multiple formats in any order and their repetition a variable number of times.
- The testing of one or more modules any number of times during a computer run.
- Interactive debugging facilities.

For those still operating with programs written in outdated languages or with languages that are associated with a computer no longer in use and consequently are being run inefficiently through emulation techniques, it would probably be worthwhile to either acquire a translation package or have the translations performed for a fee by a software vendor. Packages and services are available for converting various assembly languages to Cobol or PL/I, PL/I to Cobol, RPG to Cobol or PL/I or from one Cobol dialect to another. The DOS-to-OS packages, which can do much to alleviate the trauma of making this conversion, also deserve consideration.

Systems and program documentation continue to be the Achilles' heel of DP. Documentation is considered an onerous, time-consuming task. Further, since it is manually prepared and maintained, documentation can rarely be relied upon as complete and up-to-date. It usually does not fulfill its purpose even if it is complete.

The only effective solution to this dilemma is to generate as much of the documentation as possible automatically as a by-product of the development and implementation process. Software packages designed to assist in the production and maintenance of documentation range from program flowcharters to generators of complete applications systems documentation.

Retrieval, Analysis and Reporting

Perhaps the most widely used systems software package is the data retrieval, analysis and reporting system. Until recently, these packages were known as report generators but, in their present state of development, this simple term no longer adequately describes them.

The basic purpose of a data retrieval, analysis and reporting package, as well as the justification for its acquisition, is the production of formatted outputs (reports or files, or both) on a quick turnaround basis, without requiring a formal programming effort. Requests for reports or for file maintenance operations can be made directly by the end user through fill-in-the-blanks forms provided with the package or through the use of nonprocedural, English-like, free-form statements. Input is usually either parameterized or keyword-oriented.

Since purchase prices range from less than $2,000 up to $40,000 and more, it is apparent that a wide range of capabilities can be expected from the various data retrieval, analysis and reporting packages on the market. Features and capabilities that extend the basic functions and can be found in one or more of these packages include:

- Multiple requests per pass.
- File updating capabilities for straightforward maintenance procedures.
- Processing and interrelating of multiple files.
- Automatic report formatting (with override).
- Extensive statistical capabilities.
- Cross-tabulation.
- Graphics output.
- On-line I/O and interactive options.
- Special features for the auditing function.
- Interface with one or more DBMS.

There are two fundamental types of data retrieval, analysis and reporting packages: the load-and-go, or interpretive type and those that require a preprocessing step. It is important to be aware of this distinction when considering acquisition of this kind of package.

In general, the interpretive type is preferred where ad hoc reporting requirements predominate. As might be expected, however, many trade-offs

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are involved. Users of several of the interpretive types of data retrieval, analysis and reporting packages feel that the products are efficient enough to be used for the majority of their production reporting.

The purpose of information storage and retrieval (IS&R) systems is to facilitate the retrieval of documents or text extracted from documents.

A typical sequence of tasks performed by an IS&R system as the information passes from originator to user follows:

- Originate – Information is generated and packaged into a document.
- Acquire – The information is analyzed and, when appropriate, a surrogate is created. The surrogate is a substitute for the document and normally contains a bibliographic citation (document number, title, author, journal, volume and date), abstract (brief summary of document contents) and extract (direct quotations from the document). The surrogate allows the user to survey the material quickly without actually retrieving the document.
- Index – A set of index terms that characterize the document is usually assigned and associated with the surrogate.
- Store – The material is stored for future use in a manner that facilitates retrieval. Creation of the index is completed by associating the location of the surrogate or document with each index term assigned to the document.
- Announce – Potential users are notified that the document is available at a specified location.
- Browse – The availability of the information can be determined by using the index or surrogates to perform preliminary interrogations.
- Search – A search is conducted based on a question posed by the user. The terms of the query are usually compared with the index terms to locate information. The query is often formulated using the results of the preceding browse.
- Select – In response to the search, specific information is physically correlated with the query and fetched from storage.
- Extract – The selected information is gathered and integrated into reports.

Functionally related to IS&R is the general class of software that can best be classified as "text management" products. Packages in this category are capable of performing functions ranging from basic word processing to comprehensive management facilities for textual data.

These products can be used as stand-alone systems when the sophisticated retrieval capabilities of an IS&R system are not needed. Alternately, they can be used as a text preparation facility for an IS&R system (at least one product is capable of direct interfacing).

Special features include graphics; a user-controlled "shorthand," or macro

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"Despite the popularity of disk and mass storage devices, many computer installations still operate with large tape libraries."

capability, for such procedures as reduction of data entry operations, standardized formatting and repetitive functions; and a scheme that allows entry of user tags in a document (the tags are resolved and special, user-specified actions performed on them at document processing time). Output can be distributed to a variety of hard-copy devices, and photocomposition interfaces are available.

Library Management

Disk-based librarians, a widely used type of systems software, are primarily designed for the management of source programs, eliminating cumbersome card decks. These systems offer much-needed security for program maintenance and storage, substantially reduce the programmer time required for program maintenance and provide good audit trails for verification of program activity and status.

Source program librarians' typical benefits include:

- OS-like library management features for DOS users.
- Data compression for high disk utilization.
- Storage of test data and JCL sets.
- Security controls to prevent updating the wrong member and to prohibit unauthorized access.
- Updating based on specified conditions, with data string and substring substitutions.
- Comparison and reporting of differences between two modules.
- Processing of a group of modules based on common features.
- Storage and retrieval of a large number of prior versions of a module.
- Storage of an unlimited number of temporary updates for program development purposes.

Tape-Based Librarians

Despite the great increase in popularity of disk and mass storage devices during the past few years, many computer installations still operate with large tape libraries. Tape volume manipulation and maintenance will always be a critical problem for the managers of these installations. Not the least of the reasons for magnetic tape use is the need for file backup and archiving, and one of the most difficult problems facing operations management is the need to verify constantly the usability of historical and archival tapes. Fortunately, well-developed software packages are available that can provide complete control over even the largest tape libraries.

In addition to the basic functions of tape library management, these packages can provide such benefits as:

- Control of movement and storage of tapes in remote locations.
- Automatic return of tape volumes to a scratch pool.
- Prevention of wrong tape mounts and inadvertent overwriting.
- Sharing of tape drives across DOS partitions.

Given the tremendous number of functions that computer operating systems must perform and the essentially noncompetitive circumstances under which those systems are developed, it is not surprising that the resultant inefficiencies have spawned a variety of extension and enhancement packages. The potential for innovative development in this area is almost limitless and the benefits to be gained by users substantial.

With only a few exceptions, operating systems are supplied by the hardware manufacturer and, as such, are not usually considered software "packages." A notable exception within the mainframe area is the availability of replacement operating systems for IBM's DOS. These replacement packages have allowed the numerous DOS systems no longer supported by IBM to remain viable, and they have enabled DOS users to benefit from the many desirable features otherwise available only by making the conversion to OS.

In the minicomputer field, several replacement operating systems are available, the most prominent being Unix, which has virtually established a de facto standard for minicomputer timesharing operating systems.

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extensions and enhancements defies precise categorization; however, for the purpose of this overview we have classified them as indicated below:

Sort/Merge Utilities. Packages that replace the sort/merge utilities of the IBM OS and DOS operating systems have achieved great popularity and success. These packages provide dramatic reductions in elapsed runtime, in channel and device busy time and in the number of I/O accesses required. Very substantial reductions in disk work space requirements and savings in programmer time and effort are additional benefits.

For on-line systems, the best executing mode for a given set of circumstances is determined dynamically. Since sorting and merging data represents a substantial portion of the computer work load in most shops, these highly developed packages often pay for themselves quickly.

Output Spoolers. In such operating systems as IBM's DOS, output spooling is used to decrease problem program execution time by intercepting supervisor calls for output devices and writing the output into storage. After the program runs to completion, the data is retrieved from storage and printed.

This technique, however, is costly in terms of the auxiliary storage space required, the amount of time needed to print the data and the overhead incurred while output devices occasionally idle as the data is spooled.

Several well-developed software packages currently available were designed to make this process more efficient. These products generally use the same techniques as conventional spooling to transfer data to and from auxiliary storage, but they differ in the way in which I/O commands are handled and records stored. The newer packages either use their own supervisor or modify the operating system supervisor.

DOS Performance Boosters. The desire of most DOS users to resist the conversion to OS as long as possible has resulted in a number of products designed to improve DOS performance. Some of the techniques used by these software packages, which can boost DOS performance by as much as 30%, are:

- Continuous dynamic partition monitoring and sharing.
- Resident transients that eliminate transient loading.
- Supervisor deactivation of jobs allowed only if it will result in improved throughput.
- Dynamic measurement of CPU time used by each partition and automatic setting of task-selection priorities.
- The cataloging of copies of programs in the core image library and their execution in any partition.
- The retention of directories in core and the fetching of multiple library blocks in a single disk revolution.
- Notification to the operator or system scheduler of the jobs that should be run together for maximum computer utilization and an alert when the system is becoming overloaded.
- Multiple transient areas provided to improve superisor performance by eliminating single-transient-area bottlenecks.
- The reduction of SYRES contention by allowing users to place any self-relocating phases, B transients or CRT transients in real or virtual memory.
- OS-like load library facilities and job accounting and performance evaluations.

Replacement Access Methods. The inefficiencies of IBM's Isam and, to a lesser extent, Vsam have provided the motivation for developing several replacement access method packages. Processing time reductions of from 30% to 50% have been reported compared with sequential Isam operation, and even greater reductions have been found when operating in random mode.

Although Vsam is more efficient than Isam, it does have a disadvantage in that a large amount of prime storage is wasted when tracks are not fully utilized and the JCL required is quite complex because of the extensive cataloging needed. In addition, the core requirements are high.

Replacement access methods compare favorably with Vsam (especially with DOS/VS) since they do not require special cataloging, are portable from one system to another and provide greater channel efficiency, resulting in better throughput for jobs contending for I/O. Transparency allows savings to be realized with little, if any, adverse impact on either present programs or future programming efforts.

Access Control. The increasing commitment of sensitive data to computer files, with the associated need for fast, convenient access, is resulting in a data security problem for both new and old users. Although loss of valuable data is a cause for concern, unauthorized access creates even greater hazards.

Some operating systems offer rudimentary access control facilities; however, much more rigorous methods are needed, and these are increasingly being supplied by software packages that permit controlling and auditing accesses to data.

One of the best approaches eliminates the usual reliance on passwords, using instead a technique that operates on the interaction between an access identification string, generated by an algorithm selected by a security officer, and a protect code that is roughly analogous to a user ID, resulting in a much tighter security scheme.

Where data sensitivity is truly critical, the best solution is a package that provides encryption of the stored data and its keys.

By Burt H. Liebowitz

THE DIMENSIONS OF DISTRIBUTED PROCESSING

	Geographical Separation	
Level Of Cooperation	Close	Distant
None	(1) Centralized Independent Processors	(2) Decentralized System
Modest	(3) Local Area Network	(4) Distributed Network
Close	(5) Locally Distributed Multiple Processor System	(6) Geographically Distributed Multiple Processor System
Intimate	(7) Multiprocessor	Not Applicable

FIGURE 1. TYPES OF DISTRIBUTED SYSTEMS

	Minis	370 Upgrade
Hardware Costs (Amortized on a Yearly Basis)		
Computer	$120K	$100K
Terminals	20K	75K
Conversion	20K	20K
Communication Cost	5K	50K
Amortized Software	87.5K	62.5K
Total Cost Per Year	$252.5K/yr	$307.5K/yr
Total 4 Year Cost	$1,010K	$1,230K

FIGURE 2. COST COMPARISON

	Distributed	Mainframe
Hardware Lease & Main	$915,106	$1,253,960
Software License Fees	67,100	
Software Conversion (in-house)	70,086	
Software Conversion (in-house)	209,882	
Training	12,650	
Operations	95,328	
Power	90,325	
	$1,480,467	$1,253,960

FIGURE 3. COMPARATIVE COSTS FOR A DISTRIBUTED VS. MAINFRAME APPROACH

Computing needs have been primarily served until recently by centralized computing organizations divorced from the main flow of operations in an organization. Even when a user required relatively modest computing resources they were provided by the shared use of a large computer.

The dissemination of computers to the point of use was discouraged because of cost. Numerous studies indicated that significant economies of scale would result from the use of a single or relatively few large computers known as "mainframes."

Even where a single application was large enough to demand a dedicated computing facility, large mainframes dominated the computing scene. Here the need for raw computing power rather than pure economics was the dominant factor.

Now, the driving force behind the use of large mainframes and centralized computing facilites has somewhat eroded. Minicomputer technology has developed to the point where it is feasible to consider locating small computers at user sites. It is also feasible to tie together several closely cooperating minicomputers or microcomputers to perform dedicated applications. These approaches are potentially economical because of the low unit cost of minicomputers and microcomputers.

Popular usage has attached the name "distributed processing" to any approach that employs more than one processor to solve a computing problem. Hence we now have a conflict between advocates of distributed (or decentralized) computing and centralized (mainframe) computing.

The conflict has been going on for years, but the recent explosion of minicomputers has brought the debate out in the open.

In this article we will explore the dimensions of distributed processing, especially its pros and cons vis-a-vis the use of mainframes. We will start with a definition of distributed processing which encompasses a broad range of system architectures. We will then identify seven distinct concepts that follow from the definition. These concepts vary widely, hence we recognize immediately that distributed processing is not a monolith. Therefore, pros and cons cannot be discussed without identifying the application context.

The issues and evaluation criteria are so diverse that we can jump immediately to the bottom-line conclusion of this paper — to wit, distributed processing (in whatever form) is just another tool available to the system architect. Its applicability depends on the project, the organization to be served, politics, support needs, corporate data processing chargeback schemes and corporate courage.

We will define distributed processing as follows:

> *A distributed system is one in which the computing functions are dispersed among several physical computing elements. These elements may be colocated or geographically separated.*[1]

We distinguish distributed systems from conventional mainframe approaches wherein all computing functions are performed with one large computer.

The spectrum of distributed processing applications can be depicted as the two-dimensional matrix shown in Figure 1. One axis represents the geographical separation of processors. The second axis represents the degree of cooperation between the processors.

Although both dimensions are continuous, for convenience we can group each dimension in finite categories. On the axis representing geographical separation, we recognize two categories: distant and close.

By "close" we mean processors that are in the same room, building or at most in buildings that are located within thousands of meters. This closeness allows us to use privately owned low-cost, high-bandwidth interprocessor links (1M bit/sec up to 50M bit/sec).

For greater distances we must use common carrier services. These allow data to be sent almost anywhere, but usually at bandwidths much lower than those available for closely located systems. Common carrier services are provided by twisted-pair wire, microwave and satellite. Propogation delay, especially for satellite links, can be significant relative to the length of the message. Elaborate networks may have to be developed to ensure reliable message delivery to large numbers of inter-connected computers.

Four Levels of Cooperation

The other axis represents cooperation between processors. By "cooperation" we mean the level of interaction between the processors. We distinguish four such levels in our model.

Burt H. Liebowitz is executive vice-president of International Computing Co., Bethesda, Md.

Portions of the material in this article will appear in his forthcoming book, Locally Distributed Multiple Processor Systems, *by Burt H. Liebowitz, to be published by Prentice-Hall, Inc., Englewood Cliffs, N.J. This material is published with the permission of Prentice-Hall, Inc.*

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dynamic creation of index fields	NO	YES
duplicate keys allowed	NO	YES
flexible disk space management	NO	YES
automatic recovery	NO	YES
built-in hash function	NO	YES
variable length records	NO	YES
special sysgen required	YES	NO
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At the first level, we have no cooperation at all. Each processor is an independent computer. On occasion a magnetic tape might be used to transport data from one computer to another, but no direct level of communication exists.

To some, this category should not be considered a distributed system. However, to many organizations the issue of whether to off-load stand-alone applications from mainframes to minicomputers is significant, so we include this category for completeness.

The next level in the spectrum is that of modest cooperation. Here the processors do communicate. However, each processor performs a self-contained function and communicates summary results to one or more of its neighbors.

Communications could be batch-oriented. The processors could be connected by very low-speed, possibly dial-up lines. The failure of any one processor would affect only its area of operations.

At the next level we find closely cooperative systems. Here each processor regularly communicates with other processors and is dependent upon their support.

High-bandwidth links may be needed. A failure in any processor could seriously affect the mission of the entire system.

The highest level of cooperation we call intimate. Here the processors share memory, I/O, programs, data and tasks. These systems are commonly called multiprocessors. Their level of cooperation is so high that they can exist only in a local configuration.

Seven Categories

From Figure 1 we see that the matrix leads to seven categories of distributed systems:

1. Centralized Independent Processors (CIP). The CIP is a collection of independent processors located in close proximity. One or more processors may be mainframes; the others could be minicomputers.

An organization would choose this approach if it determined that it was more cost-effective to off-load applications to minicomputers than to augment or upgrade its mainframe.

Multiple computers also allow backup in the case of failures. Management, operational and maintenance problems could arise because of the use of different computers and languages.

2. Decentralized Systems. Here computers are geographically distributed throughout an organization to provide computing power at the point of need. The organizational subunits are independent and hence the computers are not linked. One computer center may house a large mainframe, the others may use minicomputers. This approach would be an alternative to a shared centralized mainframe with terminals at the local sites.

The major advantage of this approach is that local computers might be more responsive to local needs than a shared, centralized system. The disadvantage is the potential for duplication of effort and proliferation of resources. These problems can be minimized by the establishment of data processing standards and the application of effective management control.

3. Local Area Network. The computers in the local area network are located in the same room or building. They operate independently, but communicate with each other on occasion; hence, the computers are interconnected by a communications network. The network mechanism could be a message switch, shared cable or a collection of serial lines.

In general, the computers and terminals are under the control of one organization, easing management problems. If the number of processors and terminals are large, the design of the local network can become a complex task — a task even more difficult if the computers are heterogeneous.

Strict communications standards are required to ensure that the computers can process data passed between themselves. A network control center may be necessary to monitor the health and performance of the system.

The local area network could provide significant advantages in reliability, growth modularity and cost-effectiveness relative to a mainframe.

4. Distributed Network. The computers are geographically dispersed. They operate independently and communicate infrequently. The computers could be operated by different organizations and could be quite heterogeneous in nature. A major motivation for this type of network is the desire to share resources.

In this situation, significant management issues arise to ensure that effective communications can take place between the independent organizations. Technical issues concerning communications, translation of data, network operations and operational procedures could also arise.

5. The Locally Distributed Multiple-Processor System (LDMPS). The LDMPS consists of physically independent CPU-memory pairs (called processors) interconnected by physical communication links. The processors are in the same room or building so that the links can be built with high bandwidth and high reliability. The processors can therefore cooperate closely to solve a single problem or closely related group of problems. The processors tend to be in the minicomputer or microcomputer class.

The LDMPS has attracted increasing interest because it has potential advantages of cost-effectiveness when applied to real-time computing systems, especially those that require high reliability.

This system architecture has been used in a wide variety of applications. In the commercial field these include

> "The pros and cons of distributed processing vary between the seven classes of systems."

on-line banking, theater and sports reservations, process control, funds transfer, message switching and wagering systems. In government, they include spacecraft control, air traffic control, vessel traffic monitoring, weapons system control and missile tracking.

Technical issues usually dominate in the design of the LDMPS.

6. *The Geographically Distributed Multiple-Processor System (GDMPS).* This architecture is similar to the LDMPS except that processors are geographically separate, even though they cooperate to solve the same problem. These systems are limited in applicability, because of the narrower bandwidths available and longer delay times associated with interprocess communications.

This architecture would be applied when the user group is geographically dispersed. An on-line banking system, for example, could be established with processors and files in local communities. The data base would be restricted to local customers.

However, all local systems would be interconnected so that an inquiry could be directed to a foreign site if the local data base did not contain the required information.

The design issues associated with the GDMPS are similar to those of the LDMPS except that communications resources are more restricted and must be provided by common carriers. Problems of maintenance may also be difficult to resolve in the GDMPS.

7. *The Multiprocessor.* The multiprocessor consists of several processors, each linked to common memory and common I/O. No processor is dedicated to a particular task. Failures of a processor usually result in loss of throughput, but not functional capability.

The multiprocessor can be used for the same applications as the LDMPS and can therefore be considered an architectural alternative to it. Multiprocessors have been around for a long time and have been extensively discussed in the literature.

Significant issues of hardware construction, operating system design and system checkout exist. It is hard to build multiprocessors and very few off-the-shelf systems exist. Most multiprocessors have been built specially for specific projects or are extensions of large mainframes. Multiprocessors have limited expansion capability because of contention for shared memory.

Pros and Cons

The pros and cons of distributed processing vary between the seven classes of systems. To focus the discussion, we recognize two major divisions covering the seven classes of systems.

The first division encompasses those systems dedicated to the support of a demanding real-time application. We call these Category A systems. These tend to be served by architectural classes 5 through 7 in Figure 1.

The second division encompasses those systems involved with shared applications. The computer architecture is designed to serve multiple users who are relatively independent of each other. We call these Category B systems.

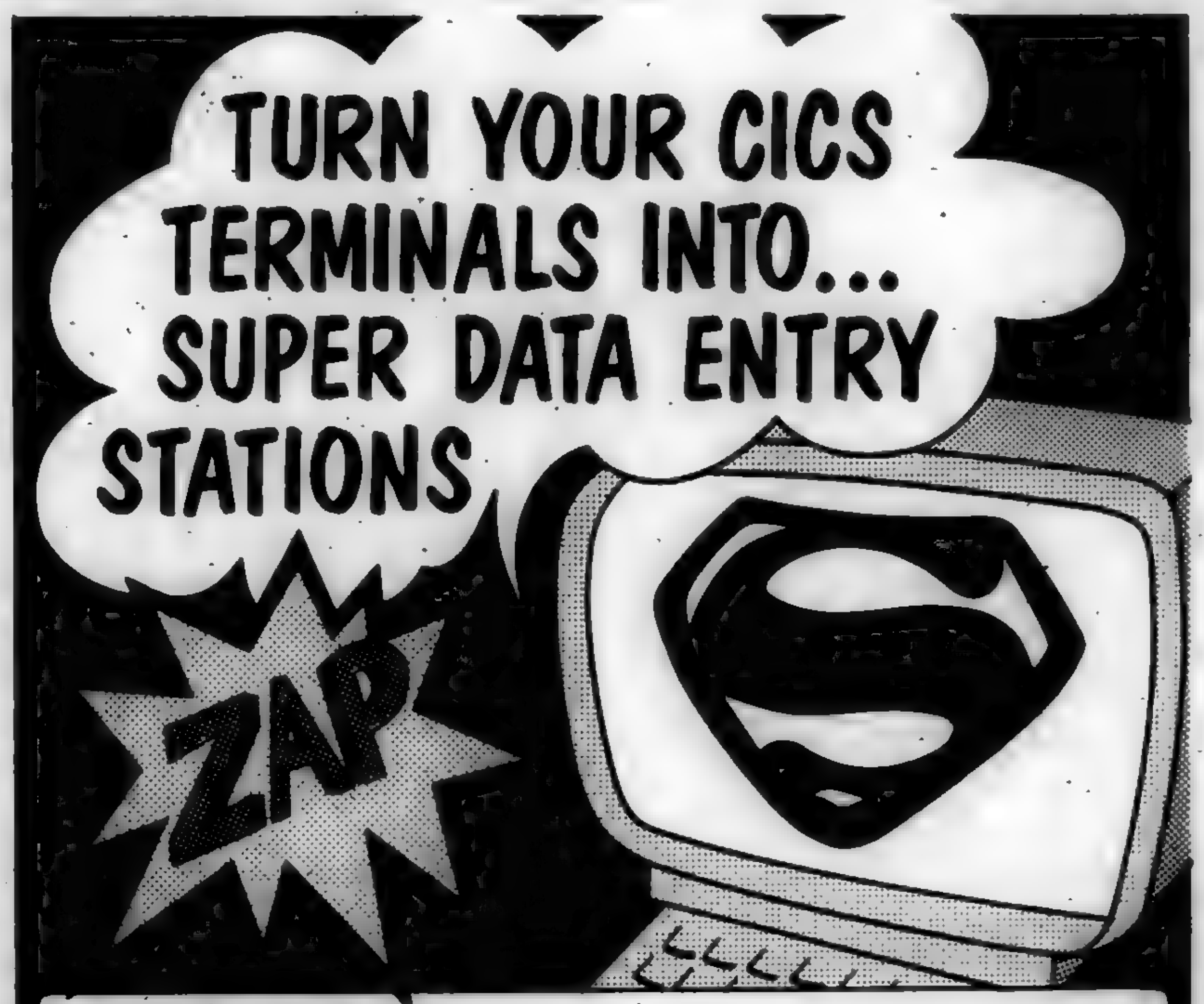
Category B systems tend to be served by architectural classes 1 through 4 as identified in Figure 1. We will consider each division separately.

Category A Systems

Category A applications are recognized to be technically demanding. They usually require fast response time to input. High reliability and high throughputs are not uncommon. So the decision has been made to dedicate a system to the application.

The system is usually under the control of one organization, most commonly the user group; thus, management issues associated with organizational structure are not a concern.

The architectural choices are to either use an adequately sized mainframe or a distributed approach encompassing either a multiple-processor system (MPS) or multiprocessor. Of the two distributed approaches, the MPS seems to be attracting great favor.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Hence we will compare the MPS against the mainframe.

Many applications of the type described as candidates for MPS solution have been implemented on mainframe architectures. By mainframe we mean large computers, exemplified by the IBM 370, Univac 1100, Control Data Corp. 6000 series and others.

In the past, a major deterrent to the MPS was cost. A collection of small computers equivalent in capability to a large computer was more expensive than the mainframe.

However, processor technology has changed. Low-cost computing power in the form of minicomputers and microcomputers presents an increasingly attractive alternative to mainframes for many computing tasks, and this trend will continue in the future.

To make this point we will discuss the advantages and disadvantages of the MPS relative to mainframes and provide some examples of the cost-effectiveness of the MPS in specific applications.

Advantages of the MPS

With falling costs, the potential advantages of the MPS can be applied to a wide array of processing problems. These advantages include reliability, response time and modularity:

- **Reliability.** All computing systems will fail. Depending upon the application, downtimes resulting from failures can be tolerated for varying amount of times. A hardware failure may take hours to fix.

Overall availability for mainframes has been estimated at 98%. In applications where higher levels of performance are required, redundant equipment must be provided. This usually entails the duplication of all equipment.

Redundancy

The MPS offers the advantage of low-cost hardware redundancy, since it may not be necessary to duplicate all the equipment to achieve the desired degree of availability. Consider a system in which 10 repairable processors are required to support system functions. It can be shown from the techniques described in the literature that the addition of just a few spares will provide extremely high availabilities and a large mean time between system failures.

Simpler Structures

In addition to hardware reliability, the MPS allows the use of simpler software structures than a mainframe with a complex multiprogramming operating system. Simpler software is more likely to be error-free than complex software and, hence, more reliable.

This simplicity follows from the dedicated nature of the MPS. Complex mechanisms are not required to protect unrelated users from each other. Because the functions are distributed between processors, the program size per processor tends to be smaller creating more manageable structures.

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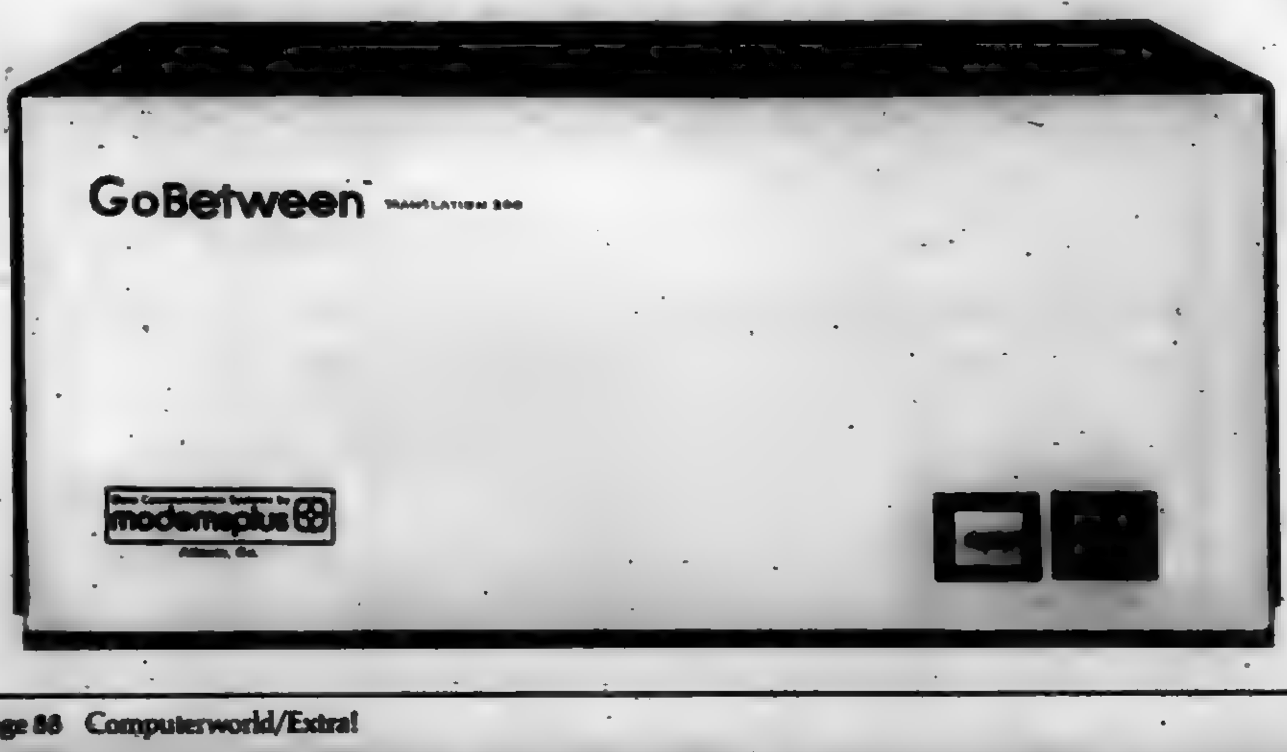

> **"MPS gives the user the ability to tailor system power to the response needs of the application."**

● **Response Time.** The concept of response time is fundamental to the design of real-time systems. The definition of response time is "the time it takes from the initiation of an action until the time the computer produces an output."

In actual practice, response time is defined in a more precise fashion according to the actual application. In a theater ticket reservation system, for example, the definition may be "the time from the depression of the 'send' button on the terminal until a ticket starts to print."

The basic advantage that the MPS provides to the user is the ability to tailor system power to the response needs of the application. Another advantage relative to the mainframe approach derives from the single-job dedication of the MPS; the user is not subject to the negative impact of unpredictable traffic loads caused by unrelated user groups.

Consider some of the ramifications of tailoring a system to user needs. A common problem in the design of real-time systems is that eventually — either because of underdesign or growth in traffic — the CPU approaches saturation. In a mainframe system this problem can be resolved only by a major redesign of software or an upgrade to a faster CPU, if one is available. In a properly constructed MPS, it will be relatively easy to add additional processors at a small incremental cost if more throughput is needed.

Another system bottleneck is disk accesses. An MPS offers the potential of distributing the data base across several processors, thereby reducing contention for disk accesses and channels.

● **Adaptability.** There exists a class of systems which perform similar or identical functions at a multitude of sites exhibiting a wide range of traffic flow. It is highly desirable to build such systems from a common architecture to minimize program development costs.

The use of a mainframe could be costly. Even if a single mainframe could support the load of the most demanding site, the same processor would be gross overkill at the smallest site. Costs are even more unbalanced if redundancy is required.

The MPS, on the other hand, could be tailored to site requirements in a cost-effective manner.

● **Physical Security.** It is desirable in some situations to distribute tasks among several processors that are separate from each other so that a physical failure in one room cannot affect processors in other rooms. Physical problems include fire damage, flood damage, sabatoge or, in the case of battlefield systems, enemy attack.

An example is a shipboard computing system used for weapons control and navigation. Instead of placing all critical computing equipment in one room, the major functions can be distributed to multiple computers located throughout the ship. The computers can be interlinked to back up each other so damage to any one computer would not affect ship operations.

An analogy in the commercial world would be to place processors in different rooms to protect against physical damage. For example, a message switch could be segmented into several small systems, each handling a part of the load. These systems can be dispersed into several rooms and interconnected by a communications link. The loss of any one room would at most affect only part of the load.

● **Program Modularity.** Certain types of MPS architecture enforce program modularity by dividing a system into functionally dedicated processors. Modularity improves program structure and programmer productivity and reduces checkout time.

Of course, modularity can be enforced in any system by means of effective management control. It is just easier where the physical design of the computing system enforces the concept.

Problems with MPS

The advantages of MPS over mainframes must be balanced by consideration of the problems associated with MPS, including the following:

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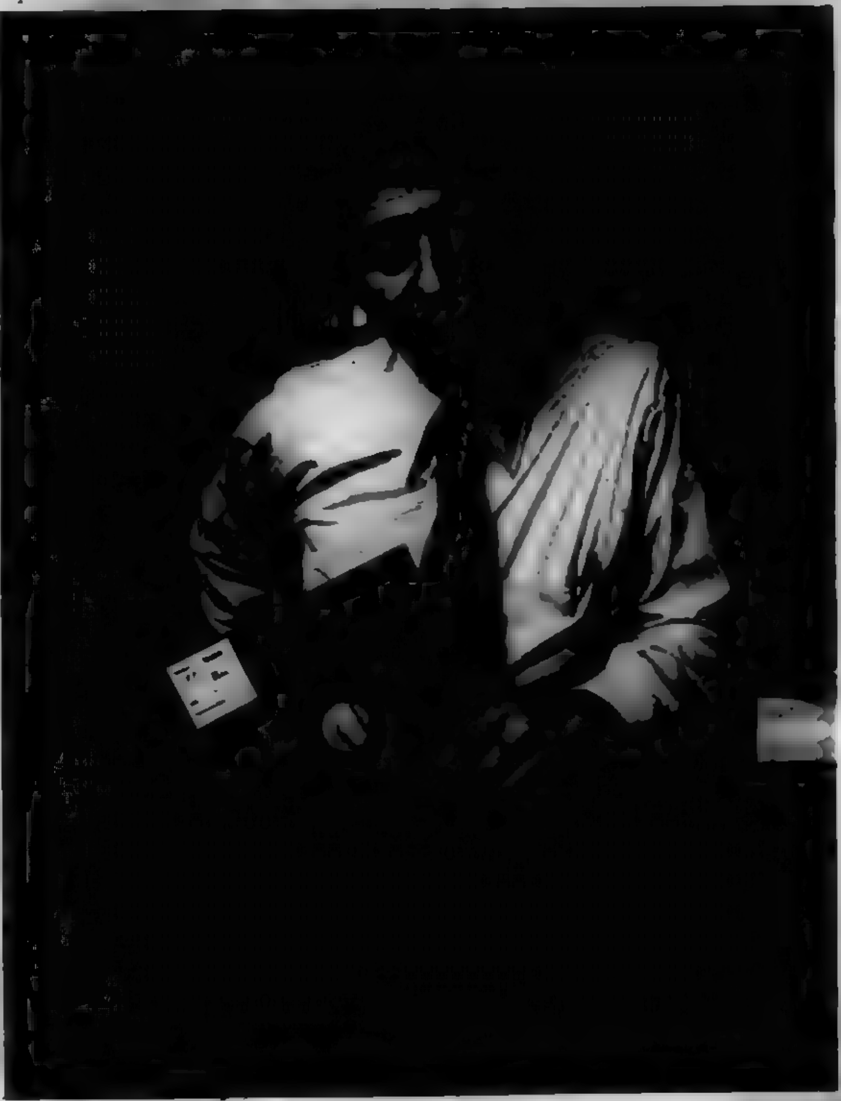

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- **System Inefficiencies** The limited address space of most minicomputers and microcomputers requires the use of memory mapping to manage large physical memories. Mapping can reduce the effective power of a processor by 5% to 20%, depending upon the processor and the application.

Increased operating system overhead caused by interprocessor communications can also reduce the effective power of the processor. This overhead is a function of the number of messages transmitted between processors per unit time and the physical transfer mechanism involved.

- **Complex Interprocessor Defects.** The MPS may be more difficult to check out and debug than a mainframe. With a single mainframe the system designer knows where to start looking when a failure occurs. In an MPS, the error could be in any one or more of several processors.

Worse yet, the symptom of failure may occur in a processor other than the one causing the failure. Couple this with the perverse nature of real-time systems — i.e., most errors show up in a transient manner and are related to unique and hard-to-reproduce traffic patterns — and we see that system checkout can be quite complex.

Although these problems can be minimized by extensive checking of interprocessor messages, it must be realized that error checking could add significant overhead to the system, thereby reducing overall performance.

- **Software Development.** More software development may be needed to build an MPS, compared with implementing the application on a mainframe. A major contributor to increased software development is the MPS operating system, which allows tasks residing within different processors to communicate with each other. Depending upon the hardware chosen, there may be little or no MPS operating system software available on an off-the-shelf basis. Even if some software is available, extensive error-checking routines may have to be written.

Also, software must be developed to allow individual processors to be checked in isolation prior to integration into a total system.

As a secondary factor, the designer may find less applications software available for small computers than for a large mainframe.

- **Lengthy Response Time.** The response time of MPS can exceed that of a mainframe even if the MPS is capable of supporting throughput requirements. This can occur for two major reasons; slower processors and inadequate interprocessor communications facilities.

- **People.** The development of a special-purpose MPS requires labor that may be in short supply. The systems aspect of the development may be quite extensive. Individuals who can understand hardware, minicomputers, communications and operating systems will be needed to successfully complete a project. It may take talent beyond that which is normally available in the organization responsible for system development.

This talent must be hired, trained or obtained by subcontract. In any case, this creates a problem of management and technical control.

- **Potential Maintenance Problems.** The maintenance of a geographically dispersed and possibly multivendor distributed system may be a significant problem. The potential for on-site maintenance is diminished as equipment is dispersed. A manufacturer may not have service centers near each site; on-call maintenance may be unreliable at best.

In some cases, these problems may be irreconcilable, so a centralized solution will be necessary. In other cases, a site failure may not be critical and slower maintenance response times can be accepted.

The multivendor problem can sometimes be resolved by employing the services of a third-party maintenance organization. In addition, the trend of the large-scale manufacturers to expand into the minicomputer field may alleviate some of the maintenance problems described above.

"Some startling breakthroughs have been made with respect to MPS cost effectiveness in the past few years."

A main consideration in the application of the MPS is its cost-effectiveness vis-a-vis the large centralized computer. Some startling claims and breakthroughs have been made with respect to MPS cost-effectiveness in the past few years.

Wirshing [2] considered a weather prediction system. He analyzed the cost-effectiveness of two computer architectures in the 1985 time frame. The first architecture was a machine designed along present concepts of pipelined arithmetic units, multiprocessors and arrays. The second architecture was an MPS network of microprocessors. Wirshing predicted a 40:1 price/performance advantage for the MPS.

Fuller [3] compared the C.mmp multiple-processor system with the Digital Equipment Corp PDP–10, a conventional uniprocessor. Fuller used two measures of comparison — millions of instructions per second (Mips) executed and processor memory bandwidth (millions of bits per second). Both measures were normalized on a per-dollar cost basis.

He concluded that the C.mmp outperforms the PDP-10 by a price/performance factor of 3.59 in instruction/sec/dollar and a factor of 2.78 in bit/sec/dollar. These estimates were made on the average performance of four benchmark programs.

McGill and Steinhoff [4] claimed an even more imposing improvement in their analysis of an aerial combat simulation program. They compared the solution of the problem on an IBM 370/168 and on an MPS consisting of a minicomputer and 10 microprocessors. They claimed a factor of 500 improvement for the MPS in cost effectiveness.

Connell [5] described an MPS used to control a network of telescopes searching the sky for manmade objects. The processing load is high — on the order of nine Mips.

The proposed solution is a 10-minicomputer MPS connected on a common bus. Connell estimated that the system could be built at 10% of the cost of a large single computer.

The off-track betting system used in New York City is an MPS comprised of minicomputers. It replaced a dual IBM 360/50 configuration. The MPS provides four times the throughput of the 360/50 system and costs the City of New York $250,000 a month less to operate [6].

The Bank of America has built a system in which "the mini-computer hardware cost per transaction per second is about $50,000. This compares to about $300,000 in hardware cost per transaction per second for our former large-scale mainframe solution designed to meet similar uptime and reliability criteria."[7]

Of course, these claims must be carefully evaluated within the context of the problems being solved. Not all problems will favor the MPS approach.

Amenable MPS Solutions

It cannot be stated definitively which jobs favor an MPS or a mainframe. However, systems with the following characteristics seem to be amenable to the MPS approach:

- A need for guaranteed and predictable response time in a real-time environment.
- A need for high availability and reliability.
- High throughput.
- Extensive amounts of relatively simple calculations that do not require computers with elaborate instruction sets.
- An application with no extensive body of existing software on a mainframe.
- A problem with a natural division of subfunctions that are easy to assign to multiple processors.
- The ability of an organization to establish a knowledgeable management and technical team capable of supporting MPS technology.
- An application that can justify a dedicated computing system.
- An application that must be applied cost-effectively across a large number of sites, with a wide, dynamic range of throughput requirements.

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"Until recently, the economic argument has favored centralized mainframes. With minis, the argument is no longer one-sided."

As system characteristics diverge from the above, a mainframe approach would be favored. This is specially true if the available work force is more comfortable with the mainframe.

Category B Systems

Category B systems support shared applications. These applications could be quite diverse. Some systems support time-sharing, batch and real-time transaction processing simultaneously. Management and organizational issues may be quite important since the user groups are usually organizationally distinct from the computer center. The organizations may have different goals, thereby creating organizational conflict.

The desire to have more control over their destinies has made distributed processing attractive to user organizations. On the other hand, economies of scale and centralized management control make centralized computing attractive to corporate staff.

Until recently, the economic argument has clearly favored the centralized mainframe approach. Now, with low-cost minicomputers, the argument is no longer one-sided. Under certain circumstances it may be more economical to split out applications and run them on stand-alone minicomputers under user control. We will look at the pros and cons of the distributed approach vs. the centralized computing center.

First, let us review the advantages and disadvantages of centralized processing. The strongest argument for centralized processing has been the economy of scale associated with the use of large-scale hardware and common software.

Centralization also provides improved efficiency in systems development programming. This derives from the homogeneous nature of the centralized computing facility. Put another way, programmers only have to be trained on one computer.

Centralization allows for better control of operations and standards because all computer resources are under the control of a single group. The use of common software makes it easier for users to share existing applications and support programs. These include data base management software, operating systems and retrieval programs.

Sharing reduces duplication of effort and enhances the value of scarce people resources. A large computer also provides capacity to process large complex applications. There may be some applications that are just beyond the capability of a minicomputer perform.

Training of new personnel is enhanced in a centralized facility. New people have to be taught fewer things. They interface with only one computer. This allows new people to be trained quickly.

In addition, it may be easier to acquire personnel trained in large computing systems compared with those trained in minicomputers.

All of these advantages must be weighed against the disadvantages of centralized computing. In general, a large centralized organization will provide less flexibility for tailoring programs to meet end users' needs. The organization would be most interested in optimizing on a global basis. This may cause inefficiencies for a particular user.

If users are geographically dispersed relative to the central facility, there may be high communications costs associated with the transmission of data.

A large computer can be expensive. It may be impractical to back up the system, so there could be a significant reliability issue associated with on-line applications.

Until recently this issue was not overwhelmingly significant. Most large facilities evolved from batch processing requirements. A user expected a long turnaround time; the additional time caused by the loss of the computing system would be hardly noticeable. In addition, batch systems are inherently recoverable because the input data always exists in the order in which it was processed.

With more and more users moving to on-line processing, however, the issue of reliability and recovery has become much more important.

Experience has shown that large computing facilities, especially those with large data base management systems, may have availabilities to a user in the 92% to 98% range even when redundancy is provided. A user which has moved from a batch environment might be willing to live with this performance for a while but, as users become dependent upon and familiar with on-line operation, the availabili-

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"The disadvantages of minis are the potential for duplication of effort and loss of control in an organization."

ties cited will prove to be unsatisfactory.

Response time can be quite poor in a large computing facility. The computer system will be shared among many users. The load may fluctuate in unpredictable ways, and some users may be served slowly because of the impact of other applications.

Although mainframe computers tend to be more powerful than minicomputers, their operating systems have significant overhead. This overhead derives from the fact that the computer must protect users from each other and must also provide efficient access to expensive hardware. A single application may run quite slowly because of this overhead.

Other levels of overhead are associated with complex data base management systems which may be used even for relatively small applications. These systems may introduce many layers of disk access that are not inherently needed in the solution of the problem.

Another disadvantage of centralized processing is that a large incremental expansion is necessary once the computer becomes overloaded. The cost and impact of upgrading a mainframe can be quite significant.

We can now compare the advantages and disadvantages of decentralized processing. By decentralized processing, we mean the use of multiple small computers, each dedicated to one or a small subset of the total work load. We do not preclude in this definition the use of a large mainframe to support those applications that cannot be handled efficiently in a small computer.

Distributed computers allow data to be captured at the local level without the need for extensive telecommunications to a central computer. This data can be error checked locally prior to transmission to the computer.

Distributed computing allows applications to be tailored to the particular user. Since a lesser number of applications exist on any individual computer, the loss of an individual computer has less impact on overall performance. In addition, because minicomputers are inexpensive, it is possible to back up those minicomputers that do support critical functions.

Although the minicomputer is less powerful than the mainframe, minicomputer operating systems tend to be simpler. Minicomputers can therefore provide more computing time for the application.

Expansion of a minicomputer complex or a geographical set of minicomputers can be done at a smaller incremental cost than the expansion of the mainframe. Minicomputers can provide specialized and highly efficient file retrieval systems.

The disadvantages of minicomputers relate primarily to the potential for duplication of effort and loss of control in an organization. Unless management's standards are strictly enforced, there could be a tendency for each group owning and using a minicomputer to go its own way.

This could lead to a diverse set of equipment, increased maintenance costs and duplication of effort in what might indeed be common functions. This leads to more difficult control of system development, programming standards and data base.

In addition, minicomputers are limited in capability. It may be difficult to expand upward on any particular application. Some applications may run so long on minicomputers as to become effectively useless.

Operations might be more difficult in the minicomputer environment. Operators might be required at more sites and might have to be trained in more than one computer type. Facilities may have to be developed in more than one area. With each facility comes the problems of air-conditioning, power and security.

Most organizations that have successfully introduced distributed processing have done so with new applications that are relatively independent of existing applications and data bases. However, when applications are closely related to existing functions, it may be necessary to set up complex intercommunications networks and modify

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existing programs.

If an organization is growing because of increased use of old applications, then decentralization may imply a significant amount of conversion. The cost and disruption of conversion may make it impractical to consider decentralization.

In summary, each case must be judged on its own merits. However, the technology is now in place and does allow distributed, decentralized computing to be considered by an organization. The ultimate decision should be driven by the needs of the organization.

Case Histories

We will discuss several case histories which illustrate some of the points made in this article. First we'll describe two Category A multiple processor systems; the Nasdaq securities quotation system and the Bank of America on-line inquiry system.

Each of these represents a successful implementation of a distributed architecture. The first illustrates the use of minicomputers to off-load a large mainframe-based multiprocessor. The second resulted from a trade-off analysis between large mainframes and multiple minicomputers.

We will also provide two Category B case studies. The first describes a distributed order entry and inventory control system. In the second, a local government computing center considered the use of centralized independent processors, but decided instead to upgrade its mainframe.

The Nasdaq System

The National Association of Securities Dealers (NASD) operates a nationwide telecommunications network that allows its members to rapidly determine the latest bid and ask quotations for over-the-counter securities. This system, called Nasdaq® — the NASD Automated Quotation System — was originally put into operation Feb. 8, 1971.

A major upgrade in 1979 enhanced the capability of Nasdaq's communications concentrators to support local data bases. This off-loads the mainframe and improves response time.

The upgrade takes advantage of the latest minicomputer technology and introduces distributed processing concepts to the network.

System Functions

Basic functions have remained constant since system inception. Each security in the over-the-counter market is assigned a group of market makers. It is the responsibility of the market makers to establish buy (bid) and sell (ask) prices for their security.

Before the introduction of the Nasdaq system, the process of buying and selling was manual. A trader wishing to buy or sell a particular security would have to telephone several market makers to determine the best price for his customer.

To shorten what could be a lengthy and confused procedure, many traders would call only a few market makers. The process was not conducive to providing the best price for the trading public. It was with the intent of rectifying his situation that the automated system was introduced.

The system provides traders with CRT/keyboard terminals. There are three grades of service provided by the system. A Level I terminal provides an inquiry capability for the current representative bid and ask price for any security in the data base.

A Level II terminal has Level I capability but is also capable of receiving the current bid and ask price for each market maker for a selected security. The broker can scan all prices for the best buy. The actual order is processed by direct telephone conversations with the selected market maker.

A Level III terminal is used only by market makers. It has all the capabilities of Level I and Level II terminals, but also allows the market maker to change bid and ask prices. The central data base is updated within seconds of the time a market maker enters a change.

From system inception until early 1980, terminals were connected to the

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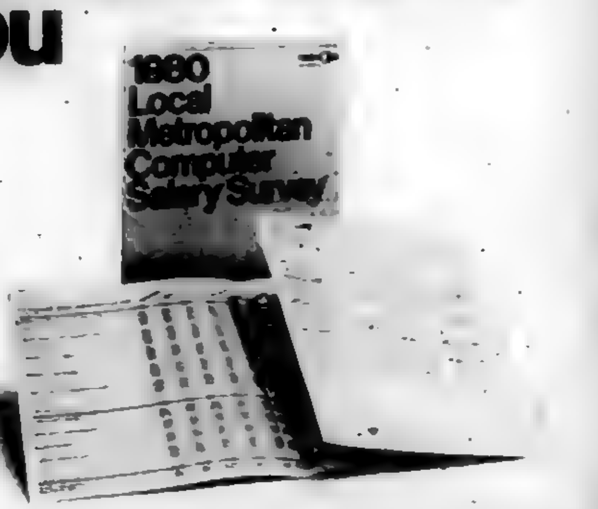

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"The team recognized that functions could be off-loaded to the concentrators, thus improving mainframe efficiency."

system via concentrators located in San Francisco, Chicago, Atlanta and New York City. (While the data is from a 1972 reference[4], it is representative of the size of the system throughout its existence.)

The host site originally contained a dual-processor Univac 1108 mainframe working in a multiprocessor mode. The mainframe maintains the central data base for securities and market makers. All critical components are duplicated for reliability.

The mainframe performs the following basic functions:

- Updates the data base, using information received from market makers.
- Formats replies to Level I and Level II inquiries.
- Reports volumes and prices to the news media and other stock exchanges.
- Receives price and volume information from other exchanges for a selected set of non-NASD securities.

The system supports a data base of 6,000 securities. The response time for inquiry processing in the mainframe is approximately 8 msec to 50 msec. A query input is approximately 15 characters in length, a typical response is 115 characters. Peak transaction rates range from 70- to 100 trans/sec. These peaks occur at the time the markets open for trading and last for about one-half hour.

System performance for response time was specified as follows: 50% of all quote requests or quote changes must be serviced within 5 sec; 90% of these transactions must be serviced within 7 sec. The quote file must be updated within 5 sec, 95% of the time.

The concentrators are responsible for all telecommunications functions. They poll the OCUs, using a limited full-duplex protocol. All communications are error-encoded and checked.

The Enhanced System

The NASD has enhanced its system several times since inception. One major change was the upgrade of the original Univac 1108 mainframe to the Univac 1100/22. A Nasdaq study team concluded in 1978 that a major upgrade to the network concentrators would be desirable. This upgrade would encompass a replacement of the concentrator hardware and software and a change in concentrator site locations.

Several factors contributed to this decision. First, the concentrator hardware was becoming obsolete. Second, the original concentrator computers could not be expanded beyond 64K bytes of memory; precluding an increase in concentrator functionality. Last, traffic flow analysis showed that the Atlanta site was not cost-effective; hence, the Atlanta lines should be incorporated into the New York concentrator.

The study team further recognized that certain processing functions could be off-loaded to the concentrators, thereby improving mainframe efficiency. Concern for mainframe efficiency was driven by several factors.

Most immediate was the recognition that the system could bog down in peak periods if one of the two processors in the Univac 1100/22 multiprocessor failed. Although this was a relatively rare occurrence, it was of concern to the service-oriented management of Nasdaq.

The second factor was the recognition that the volume and type of processing in the network would be primarily driven by government regulations and pressure for a more fully automated market system.

The first phase of a plan to upgrade the system was announced in a request for proposals (RFP) released in November 1978. The RFP requested bids for a concentrator replacement. The new concentrators would be located in Chicago, San Francisco and Trumbull, Conn. The Chicago and San Francisco replacements would handle the same lines and functions and would each consist of two minicomputers.

The Trumbull concentrator would support the regional lines previously supported by the Atlanta and New York concentrators. It would be physically colocated with the Univac mainframe.

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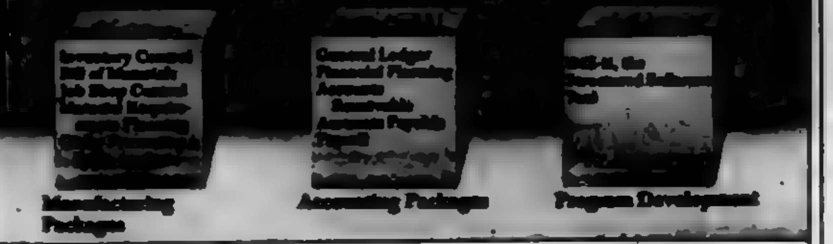

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In addition to the existing telecomminications functions, the Trumbull concentrator would contain a subset of the securities data base. Inquiries against that subset would be processed entirely by the concentrator, with no intervention by the mainframe. The mainframe would update the concentrator data base immediately upon update of its own data base.

Here's how it works. Inquiries are processed in the concentrator. If the inquiry is for the first frame of a locally stored security, the concentrator returns the response. If the inquiry is for a subsequent frame of locally stored data or for data that is stored only in the mainframe, the request is sent to the mainframe.

A response is formatted in the mainframe, sent back to the concentrator and subsequently transmitted back to the concentrator and subsequently transmitted back to the concentrator and then to the requesting terminal. Market maker transactions and non-inquiry transactions are sent to the mainframe. Data base updates are sent from the mainframe to the concentrator.

The Trumbull concentrator was specified to handle the following requirements:

1. All processing as described above.
2. 120 trans/sec peak traffic.
3. Up to 1,000 securities in the local data base.
4. No more than one hour cumulative downtime per year.
5. Sixty-four regional lines.
6. A total of 1,028 terminals.
7. Transaction processing time must be less than 10 msec.

A contract for the upgrade was awarded to International Computing Co. of Bethesda, Md., in January of 1979. Normally, input traffic is divided between two processors. A third processor acts as a roving spare and an off-line program development facility.

The processors are Univac V77-800 minicomputers configured with 768K bytes of main memory. (Univac V77-400s with 64K bytes of memory are used in Chicago and San Francisco.) This memory is large enough to store all programs, buffers and a data base for up to 1,000 securities.

Each processor has a keyboard/-printer console for entering commands and printing reports and error messages. Seven-track magnetic tapes are included for logging transaction records for those transactions processed locally. These tapes are processed by the Univac 1100/22 at the end of the day for the purpose of billing system users.

If one of these processors fails, its lines can be switched to the spare processor. If a second processor fails, all lines can be switched to the surviving processor. This may result in degraded response times. However, overall system availability is very high, since only one of three processors is required for system operation.

The concentrator is initialized by the mainframe at the start of the day. First the concentrator program is downline-loaded. Then a directory defining the local securities is transmitted from the mainframe to the concentrator.

When the markets open, a set of commands is sent from the mainframe indicating that trading can commence for each of the local securities. Data base updates can be sent from the mainframe at this point. The data base is therefore established in the concentrator over a period of time determined by the inquiry rate of the system. The initial update of the data base for a particular security will not take place until the first inquiry occurs for that security.

There are concentrator failure modes that could necessitate a recovery of the data base. One is the temporary loss of main memory; another is a hard failure that requires the switchover to the spare processor.

In either case, the recovery procedure is the same as that described above for system startup. The entire recovery procedure is controlled by the mainframe, thus simplifying the concentrator software and ensuring the consistency of the data base.

Bank of America

The Bank of America in California has installed a large multiple-minicomputer system to support on-line inquiries from teller terminals[7, 10, 11, 12]. The system was developed as an evolutionary adjunct to an existing and still functioning batch-oriented accounts posting system.

The need for the on-line system resulted from a recognition that real-time inquiry into savings and demand deposit accounts is essential to providing improved service to Bank of America's customer base..

A system study performed in 1973 determined that the existing batch system, based on IBM 370 processors, could not effectively be updated to include an on-line inquiry function. There was no manufacturer-supported software package that could operate both as an on-line system and as a batch posting system.

A follow-on study developed a system concept that would provide a front-end inquiry system to support the batch system. The system extracts an inquiry file from the previous night's batch file and loads the inquiry file into the front-end system. All real-time inquiry transactions operate against the front-end file.

System updates are captured in the front-end system and posted on a transaction log. At the end of the day, the updates are transferred by means of magnetic tape to the batch system, which posts the updates. The cycle repeats for the next day.

Early considerations for the architecture of the front-end inquiry system included the use of separate IBM 370 processors to handle this function. However, studies indicated that the

"The system has to support 6,000 terminals in 1,000 branch offices. Peak transaction rates were expected to approach 100 transactions per second."

cost of the hardware would be quite expensive, perhaps as much as $20 million to $25 million.

The study team then considered the use of a multiple-minicomputer approach as an alternative. The philosophy behind the multiple-minicomputer approach was to segment the data base into manageable subsets and have each subset supported by a minicomputer. Transactions would be directed to the appropriate minicomputer for inquiry updating.

Impressive Dimensions

The dimensions of the system are quite impressive. The system has to support up to 6,000 terminals located in 1,000 branch offices throughout the state. Peak transaction rates were expected to approach 100 trans/sec. The data base would consist of upwards to 4 million savings accounts and more than 4 million demand deposit accounts. The physical data base is estimated at 4G to 5G bytes. The system had to provide continuous uptime during the working day. The average transaction must be serviced within 3 sec and the 95 percentile of response time must be less than 6 sec.

All studies indicated that the limiting factor in building this system would be the rate of updates for the very large data base involved. CPU time was not considered to be a major factor because the transactions are relatively simple from a computational point of view. The only demanding part of the transaction would be the formatting of responses for the terminals.

An analysis of the file-handling system indicated that a moving-head disk would be capable of supporting approximately 8 trans/sec. The minicomputer approach would therefore consist of several computing modules, each operating a 8 trans/sec. Because the load was expected to approach 100 trans/sec it was concluded that a 12-module system would be required.

Each module would contain a unique segment of the data base. To this module would be attached a portion of the terminal base located in geographically contiguous branch offices.

It was expected that a customer would transact most business at a single location. However, it was also recognized that there would be exceptions to this rule; on occasion, a customer will be in a different part of the city or the state and want to access his accounts.

It is also possible that a customer may move. Therefore, a high-speed intermodule communications link was specified. Transactions arriving at the "wrong" module could be quickly shunted to the appropriate module for processing. The return message could be brought back to the original module and then distributed to the requesting terminal.

There are three types of modules. The Demand Deposit Account/Savings Deposit Account (DDA/SDA) module is the basic workhorse of the system. It processes inquiries to the data base and logs account updates.

The On-Line Data Capture (ODC) module is used to process transactions associated with the opening and closing of new accounts, changes of address, etc. These transactions are transmitted by the teller terminals connected to a DDA/SDA module and passed on the ODC module.

In addition, there is a Network Operations Control (NOC) module, which provides a facility for operator control, monitoring and statistics gathering. Critical NOC control functions are duplicated in other modules in case the NOC module fails.

The system is divided into two computing centers, one in San Francisco and the other in Los Angeles. These locations were chosen to be co-resident with the existing IBM 370 batch processing system. Communications is provided between the centers to account for transactions originating in one center that must be processed at the other.

The intercenter communications link operates at 9,600 bit/sec. Communications between modules in a center operates under IBM's Synchronous Data Link Control (SDLC) protocol at 1.2M byte/sec. The terminals communicate

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A module consists of two message-handling processors (MHP) and two file management transaction processors (FMTP). The processors work in pairs, with the load shared between them.

In the event of failure, one processor of a pair can carry the complete load. Switchover to work around a failed processor is done automatically. The computers from the original implementation of the system are 128K-byte General Automation, Inc. GA-16/440 minicomputers.

DDA/SDA processing is distributed between the MHP and the FMTP. The MHP provides all communications for the module. It provides line control, task scheduling control, message handling and routing functions.

The MHP determines if a transaction received on one of its communications lines is destined for its local data base. If not, the MHP will route that message to the appropriate module.

The MHP contains software for logging message traffic to magnetic tape. This log is used for recovery purposes and for off-line data processing to determine transactions statistics.

The MHP also supports a package for operator communications to the system and a capability to control the switchover of communication lines in case of processor failure. It also provides a data base load and unload package, transaction processing support routines, an operator communications package and miscellaneous utility routines.

Inherently Reliable

The system is inherently reliable. It is highly unlikely that any module could be lost to system operation, since no single computer failure can affect module operation. A disk failure would, at most, slow down module operation.

Even in the unlikely event that a module did fail, it would bring down only one-twelfth of the system, and this only for the time it takes to repair or replace the module. In an extreme emergency, the NOC module can be reconfigured to support a DDA/SDA role by switching lines to the NOC and by replacing disk packs in the NOC with the latest disk packs of the failed module.

Software is especially tailored to the application and consists of a relatively simple operating system software. Hence the software is expected to be highly reliable and should provide no major downtime to the system.

The system appears to have met its performance and cost goals. A vice-president of the bank has been quoted as saying, "In the cost area, the minicomputer hardware cost per transaction per second is about $50,000. This compares with about $300,000 in hardware costs per transaction per second for our former large-scale mainframe solution designed to meet similar uptime and reliability criteria.

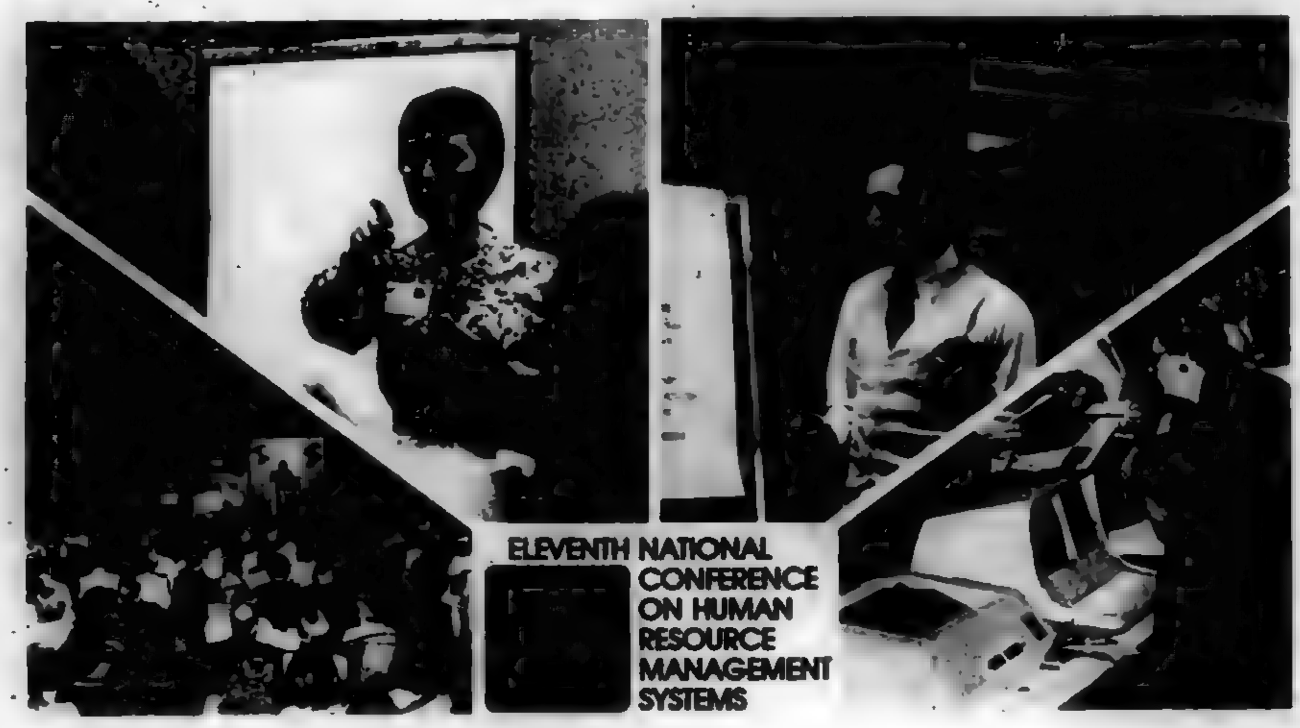
"In addition, our inherently modular design leads to easy low-cost system expansion with complete independence from geography or the size of the data base."

This same official stated that the cost of coding the more than 115,000 lines of code needed to make the system operational was about 50% less than that usually encountered in mainframe systems. He also claimed that because of the nature of the system, the communications network line cost was reduced to about 80% of what it would have cost with an equivalent mainframe system [11].

This system, when totally implemented, will consist of 14 modules containing 56 minicomputers capable of expansion to handle new functions. The limiting factor on expansion is the information carrying capacity of the intramodule SDLC links. These links can be increased in speed or in number to accommodate an expanded work load.

On-Line Order Entry System

This case study describes an on-line order entry and inventory control system built for a major manufacturer. The company is 100 years old and a leader in its field. It manufactures five major product lines, including 20,000



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That's great news for the legions of UNIX OS fans, as well as for everyone getting into the 16-bit market. But even better news is that Microsoft can offer XENIX to OEMs at very competitive prices.

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And the XENIX operating system should make life a lot easier for everyone in the business. As the standard operating system, it will eliminate the crises that normally accompany emerging technology: the relearning and rewriting needed for each new machine. The software investments that become outdated the minute hardware diversifies. The wasted efforts.

The XENIX OS (written in the C programming language) will provide long sought-after hardware independence and portability, thus protecting software investments across hardware lines. Switching to a new microprocessor will be easy, since Microsoft will support them all.

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And Microsoft's modifications and enhancements make the XENIX OS even more suitable for general commercial applications. XENIX software will fully utilize the powerful instruction sets and large addressing capability of the 16-bit microprocessors.

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IDMS...The DBMS for On-Line Systems.

Leading database consultants have stated that it is an absolute must that any organization considering on-line systems use a database management system. However, on-line systems demand a particular type of database management system, one that is capable of providing unusually high performance plus elegant backup and recovery facilities. However, users are also very interested in tools for fast application development and easy access to data by end users in an on-line environment. IDMS provides these facilities.

As a result, IDMS has proven an indispensable tool in supporting on-line systems with an extensive number of the most sensitive and important applications for business, industry, and government. From this unique experience has emerged new versions of IDMS and related facilities to support on-line systems meeting the diverse needs of application developers, end users, and processing departments. IDMS, supported by Cullinane Corporation, has been particularly successful because it meets the six key factors for success in database software. They are:

1. **Vendor Record:** Cullinane Corporation has an unparalleled record for vendor support. (Number One every year in Datapro ratings.) And with an unequaled record in system enhancement and new product development.

Cullinane Corporation is also the most financially successful database software company with the best growth record and highest earning rate of all software companies. As a result, in 1978, Cullinane Corporation was the first computer software company in ten years to have a public offering, thus providing substantial financial resources for product enhancement, new product development, and company operations.

2. **Control Via an Integrated Dictionary:** The Integrated Data Dictionary serves as the control facility for all information about the database and data communications environment. In addition, it integrates all components of IDMS facilitating easy application development, end user access to data, and efficient processing in an on-line environment.

3. **Facilities for Fast Application Development:** IDMS is the most powerful DBMS in the world. It allows applications designers to truly mirror a company's operations within the limits of the company's computer processing capabilities. However, users also want to develop applications faster with less skilled people. Simply stated, IDMS has easy-to-use tools for input processing, data management, and output processing. Traditional programming is greatly reduced via the Application Development System, On-Line Query, CULPRIT Report Generator, and the INTERACT on-line program development and word processing facility.

4. **Easy Access to Data by End Users:** In addition to the user facilities described above IDMS has On-Line English, the only true English language query facility for top management and other users. Management needs to tap the application's data flow easily; but more importantly, it needs the information immediately. On-Line English makes this a reality. Also, the user will not need to know anything about the organization of the database.

5. **Computer Processing Efficiency:** While users of on-line systems like ease of use, they demand high performance and sophisticated backup and recovery facilities. IDMS was designed to meet these requirements through its architecture which fully integrates the database and data communications facilities. IDMS DB/DC is fully multi-threaded providing for efficient processing in both the update and retrieval modes. Also, an application developed under IDMS DB/DC using the Universal Communications Facility will run under any other TP monitor without modification. In addition, IDMS includes a Shared Database System which supports multiple CPU's sharing databases, eliminating problems associated with shared DASD.

With the introduction of the IBM 4300, users want a system capable of supporting distributed database networks. IDMS is the only database system architecturally designed to support not only distributed access to a database but distributed databases, and combinations thereof.

A facility important to the IMS/DL1 user is ESCAPE which allows use of IDMS with IMS/DL1 applications without modifying the application programs.

6. **Protection:** DBMS users want two types of protection—protection that their investment in database applications will be protected from any changes in IBM hardware or software. IDMS is written in such a way as to make it virtually impossible for IBM to make any practical move that would make IDMS-based applications obsolete. In addition, Cullinane Corporation contracts state that it has the obligation to keep each user current with any new IBM developments.

DBMS users also want protection that their IDMS applications can be audited by themselves or their respective audit firms. Cullinane Corporation is the world's leader in EDP audit technology and offers user-oriented audit software including a library of audit routines especially tailored to the IDMS on-line environment. Thus, IDMS provides the user with complete protection, the only DBMS to do so.

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> "The distributed approach has the advantage that no single failure could bring down the whole system."

separate numbered products.

Over the years, a very complex discount policy has evolved. Five years ago, the company used a 25-year-old order entry system based on Flexiwriters, paper tapes and an IBM 1050. Its successful operation depended on the knowledge of key people.

Orders were entered manually through the Flexiwriter and sent over communications lines to generate a paper tape at a central site. The central computing facility was and is an IBM 370/158.

The company had a strong policy of centralized computing. Each user of the central processor was charged back a proportional cost. It was in this set of circumstances that the company considered the use of automation to lower distribution costs.

The distribution network was spread over 12 geographical locations. The process was very labor-intensive, with a high error rate.

A management consulting team was brought in to survey the problem. To reduce costs, the consulting team suggested that the company reorganize into only four distribution points. Each distribution point would be responsible for order entry, inventory control and the control of associated warehouses.

Because the reduction in distribution points would increase the work load at each point, it was determined that an automated system would be necessary for adequate service. This system would provide the capability for computer-controlled order entry, for the processing of orders on-line and for on-line inquiries against order and customer files to determine the status of an order. It would also provide an on-line inventory system.

The introduction of such a system would save $700,000 a year in distribution costs. Against this would have to be weighed the cost of automation.

Two Alternatives

Two approaches were considered for providing automation at the distribution point. The first was to upgrade the existing mainframe so that it could provide on-line teleprocessing support. Terminals supplied by the manufacturer would be located at the four distribution points. These terminals would be connected to the central computer via dedicated communications lines.

The second alternative was to locate minicomputers at the four sites. Each minicomputer would support a local data base comprised of orders, customer files and inventory appropriate to that site. The minicomputer would be configured so that all orders could be processed locally.

A trade-off study was initiated to determine which of these two approaches would be most advantageous to the company. An estimate of the cost for each of the two approaches is shown in Figure 2. These costs are amortized over a four-year period.

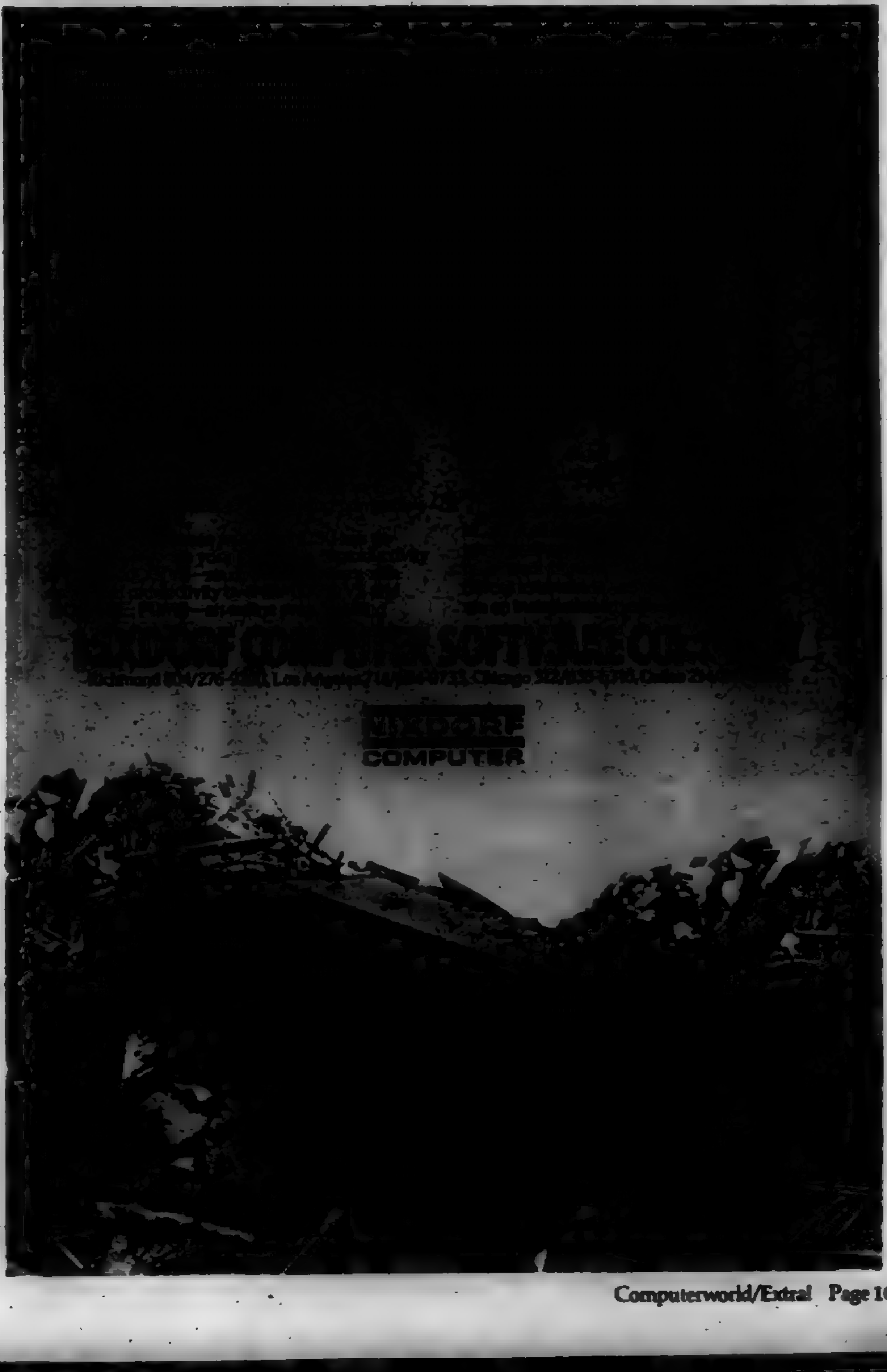
We note from the figure that the minicomputer approach was evaluated to be slightly less expensive than the mainframe approach. This advantage was not deemed sufficient in itself to determine the use of the distributed minicomputer approach.

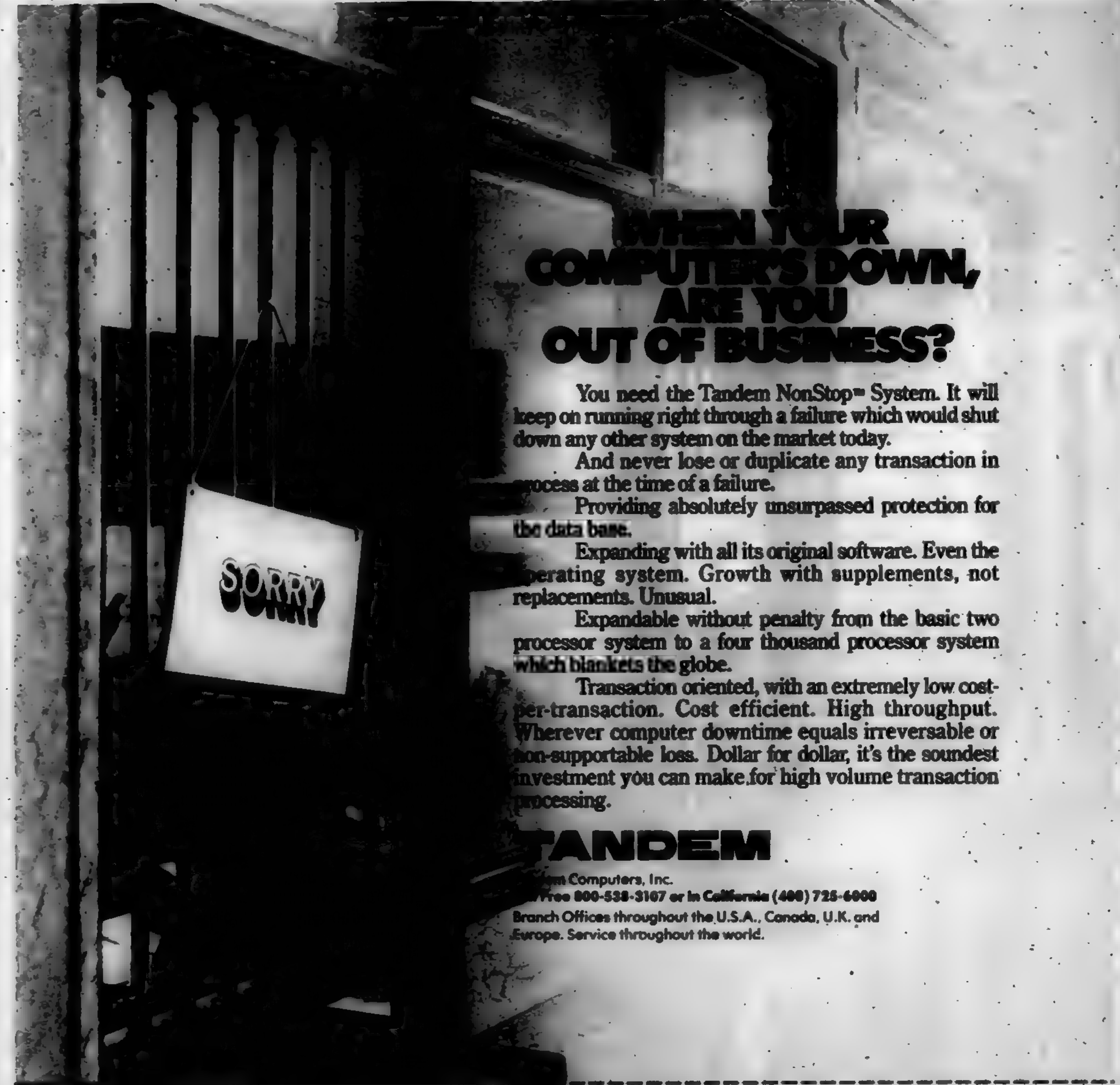
A service comparison, however, indicated that there were significant advantages to the use of minicomputers. These advantages were perceived by the distribution people — users of the system — to be overwhelming, and it was for these reasons that the distributed approach was chosen.

Three items were considered: response time, system reliability and risk. The central computing people could not guarantee or even estimate what the response time of the system would be.

With the central approach, the entire system would be dependent upon the availability of the central computer. History has shown this availability to be approximately 92%. The distributed approach has the advantage that no single failure could bring down the whole system. The user might lose a branch office or the central data base backup, but not the whole system.

The central computing people could not guarantee the delivery time or a





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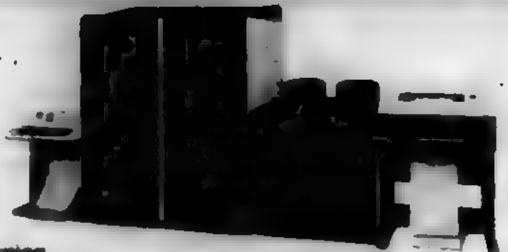

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"Distributed processing is just another tool. It is not a panacea or, as some would maintain, evil incarnate."

development cost for the system. However, several turnkey vendors were willing to guarantee the costs, delivery time and performance of a minicomputer approach.

It was based on these guarantees that the distribution people and the central computer people jointly agreed that a procurement would be held for a distributed minicomputer approach.

This system encompasses four sites, each with a minicomputer supporting from four to 16 terminals. The minicomputer chosen was the Data General Corp. Nova 830, with 64K words of main memory. The system supports dual data base recording for reliability on the disk.

Several terminals are local to the computer and support order entry and entry functions. Other terminals are remotely located in warehouses and provide inquiry and printer functions for the warehouses.

Each system is completely self-standing and can operate without support from the mainframe. The operating system is DG's RDOS. All support is standard except for the dual data base recording, which was specially provided for reliability.

A standard package provided by DG is used at night to make the computer system look like an IBM 2780 terminal to the host IBM machines. Summary files are shipped to and from the main site by means of a dial-up line.

The system went on the air in 1975 and has been upgraded once to accommodate larger data bases at some of the sites. The system has proven to be reliable and to provide adequate response time.

This last case history describes a study performed for a county government in the Washington, D.C., area. This government provides a central computing facility for its user community. The computer was an IBM 370/158-II.

In this system environment, all computing and programming support for the county is centralized in the computing center. This center supports approximately 15 different on-line operations concurrently with batch. The on-line operations run during the first two shifts of operation; batch runs all day long. It is a Cobol shop.

Significant growth was anticipated, creating the need for a system upgrade.

Several solutions were considered by the county. One was to add another IBM 370 to handle the excess work load. A second solution was to replace the existing 370/158 with a more powerful, IBM-compatible mainframe. The third solution was to augment the existing mainframe with a set of minicomputers that would physically coreside with the mainframe. This approach would require conversion of certain programs to run on the minicomputer.

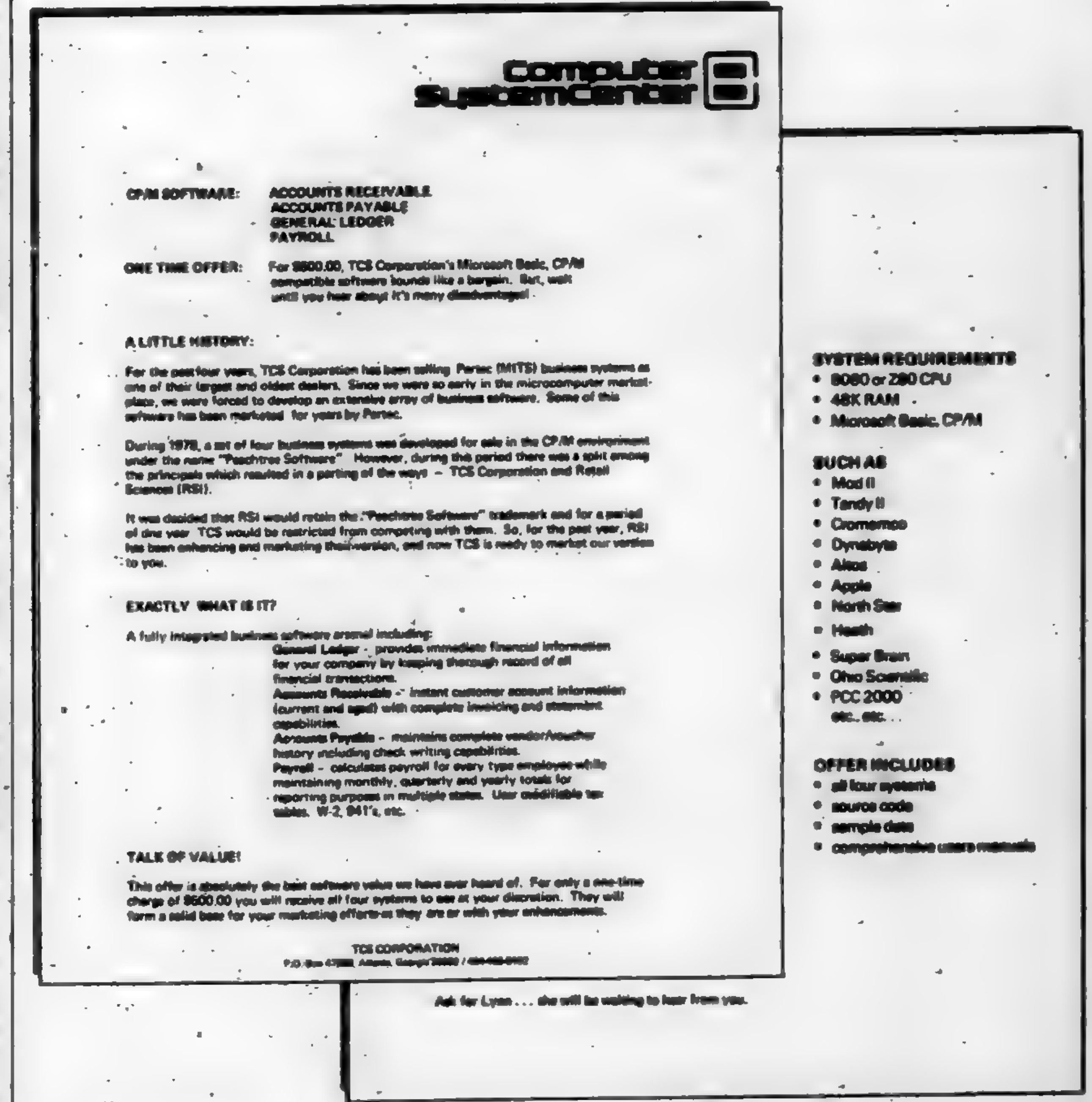
The advantages identified for the minicomputer approach included the potential for lower and more predictable response time, the use of hardware redundancy to back up critical applications and the ease of introducing lower cost incremental upgrades.

Those advantages were weighed against several disadvantages. First, it was determined that individual Cobol programs would run slower on the minicomputers than on the mainframe. This might negate the response time advantage.

Second, new applications might require hardware procurement, since the minis provided only limited computing power. Considering the procurement environment within the county, this could introduce severe delays.

It was determined that there would be a technical risk and potential disruption associated with converting existing applications to the minicomputers. Some retraining of program staff would be required. The computing center would probably have to work with multiple vendors. More operating staff would be required. More floor space would be needed and the minicomputer upgrade would provide less total computing power than a replacement of the mainframe by an IBM 3031 or equivalent. Moreover, the proposed minicomputer configuration would include no networking; any in-

The deal of 1980!



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terchange between machines would be done by manual carrying of magnetic tapes.

Study conclusions were as follows. The qualitative advantages and disadvantages were determined to balance out. The only inherent advantage of the distributed approach was reliability since a backup processor was provided.

However, reliability was not an issue with the users. The IBM 370/158 provided significant uptime and support for its customers.

Because there were no inherent advantages to either approach, it was determined that the choice would be determined by cost. If the costs were equal, it was recommended that the mainframe upgrade be chosen since it was potentially less disruptive and provided more computing power suited to the county's needs.

An estimate of the costs of both approaches is shown in Figure 3. It can be seen that the distributed approach over a five-year period would cost $100,000 more than the mainframe approach. Significant costs were associated with software conversion.

Since the cost benefits slightly favored the mainframe and since the mainframe upgrade was the least disruptive approach, it was concluded that the county should upgrade its mainframe. Based on this study conclusion, the county contracted for a mainframe upgrade.

Summing Up

We have identified two major categories of system applications. The first category requires a dedicated facility because of high throughput and low response time requirements. We call these Category A systems. The second type, called Category B systems, are more modest and could exist as part of a shared user system.

Both categories are amenable to either distributed or mainframe solutions. Each solution has its pros and cons. We conclude that each case must be judged on its merits.

It is perhaps less impactive to consider distributed processing for Category A applications since by definition they require the establishment of a dedicated computing center. Certainly the management issues are not as complex as in Category B systems.

To make the evaluation, a cost-effectiveness analysis should be made. Definitive evaluation criteria should be established. To the extent possible, quantitative measures should be used.

Above all, it should be kept in mind that distributed DDP processing is just another tool. It is not a panacea or, as some would maintain, evil incarnate. It should be used where appropriate to the organization and task at hand. ☐

FOOTNOTES

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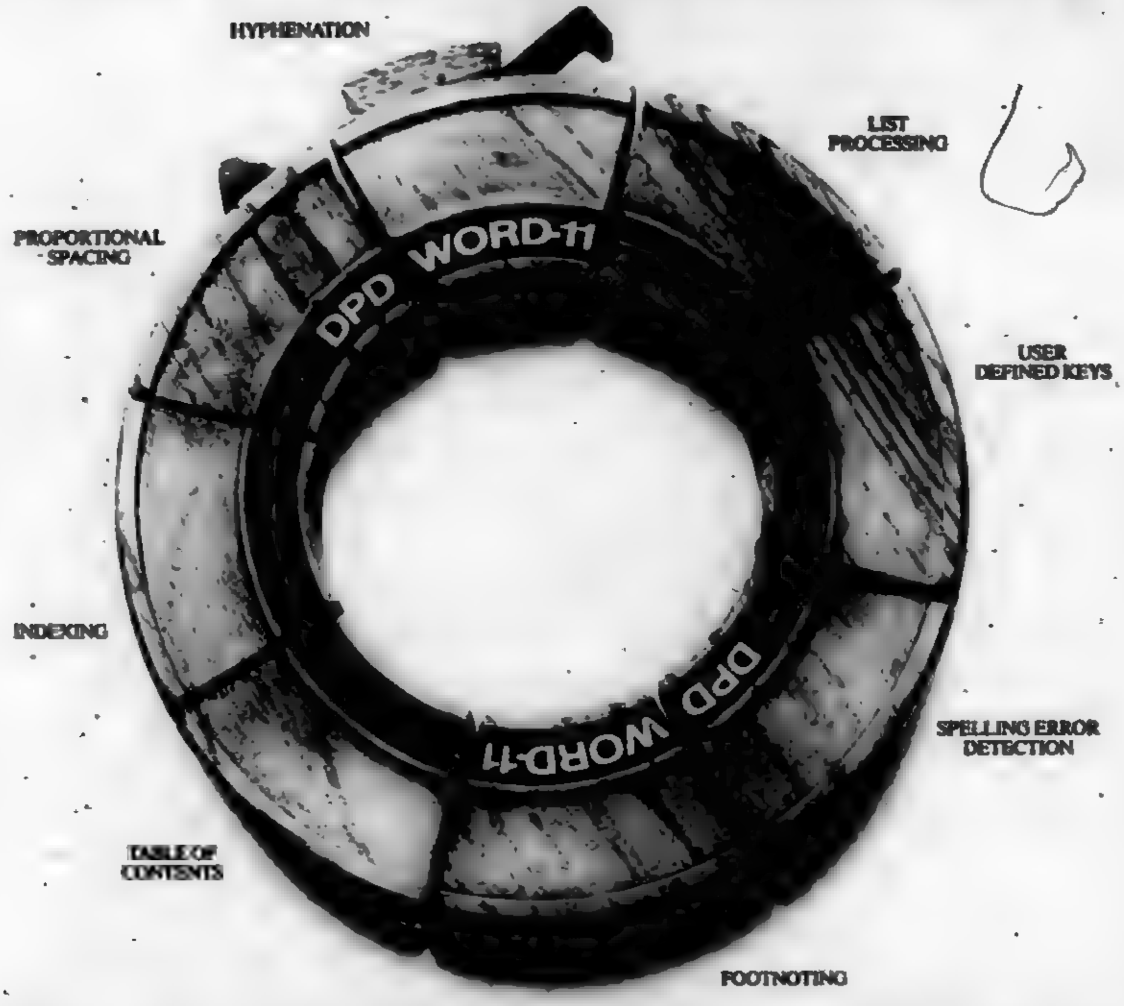
The Whole Truth About PDP-11 Word Processing.



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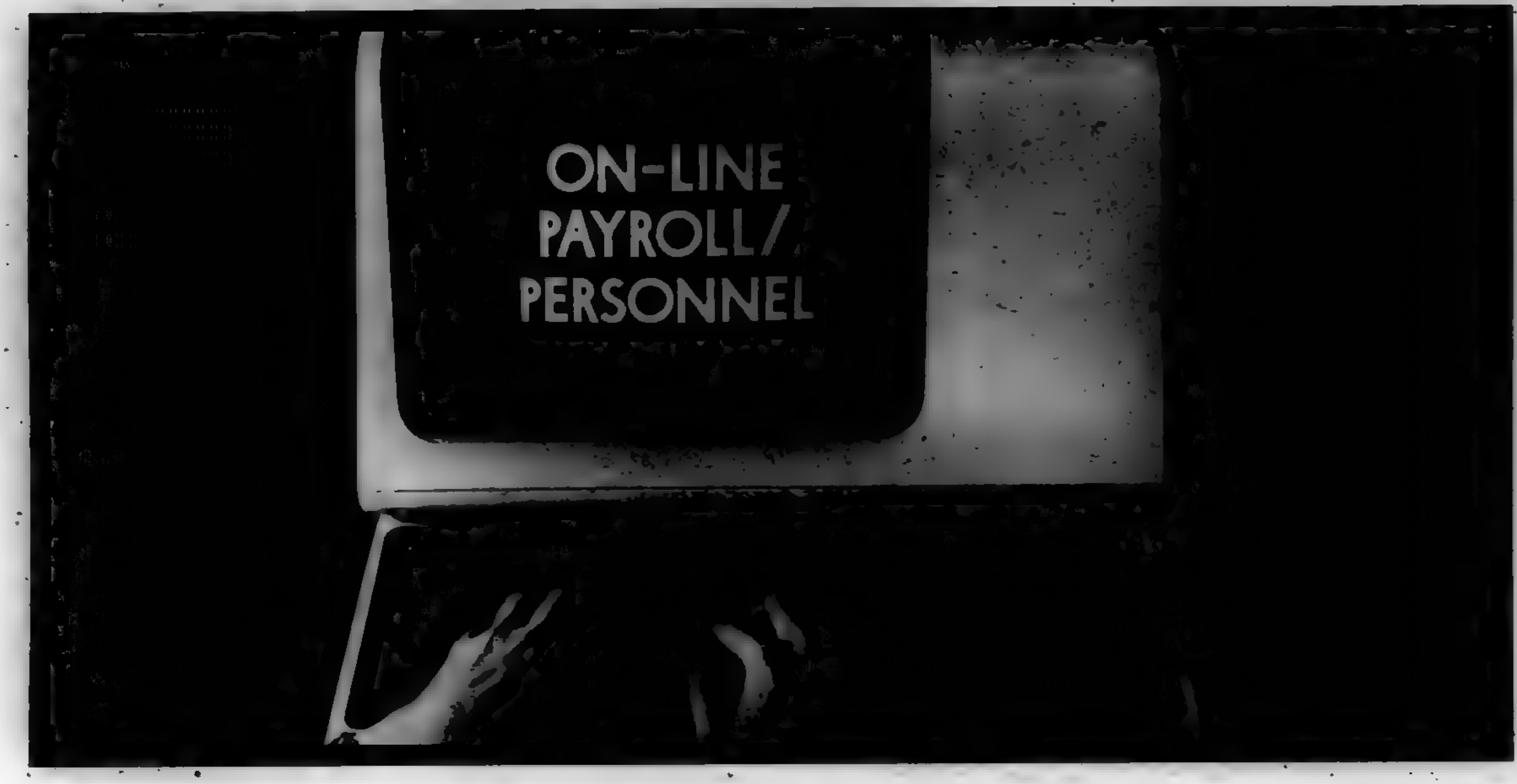

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By G. T. Orwick

THE PLIGHT OF PROGRAMMING

Technological changes in the DP industry and the tremendous growth of the application software industry will have major impacts on the individual DP installation of the '80s.

We will examine these impacts in some statistical detail, but chief among them will be the migration of programmers into application software companies as these companies grow at a projected 30% annual rate. This exodus will leave even fewer and more expensive resources available for individual DP managers to perform other development activities.

Additional software development tools are in the works. They will be used as well as marketed by application software firms so that software development can be facilitated. But an overall increase in programmer productivity is not expected to make any major change in the resources required for system development.

The data processing industry is one of the fastest growing segments of the world's economy. In the span of approximately 25 years, the industry has developed to a state of adolescence, if not full maturity in some respects. Fortunes have been made (and lost) in computer manufacturing, peripherals, services, consulting, software and even the misuse of computers through fraud.

One of the most widespread complaints within the industry today is "I can't get enough good people to support my users' needs." As we travel around the world dealing with hardware vendors, software firms, consultants, DP executives and managers at all levels in all sizes of companies, the lack of qualified systems analysts and programmers seems to be a universal problem.

We will attempt to corroborate these feelings with the scanty statistical facts available in order to determine the severity of the problem and to track the trends which will continue into the future as the applications software industry begins to realize its full potential.

G.T. (Tim) Orwick is director of product planning at MSA, Inc., Atlanta, Ga.

The number of computers installed and the number of computer sites is growing at an increasing rate. Figure 1 shows the estimated computer population in thousands of machines for 10-year increments from 1955 through 1985.

These machines are broken down into general-purpose computers and dedicated machines which are typically used in process control and manufacturing operations. Currently, there are approximately 100,000 computer sites with a total of over 150,000 general-purpose computers installed.

One reason for the increasing rate of growth in the number of machines is the well known fact that computer costs are decreasing. The average hardware cost to perform 100,000 calculations has dropped from approximately $1.26 in the early 1950s to 12 cents in 1964 (with the advent of the IBM 360 series) to 1 cent in 1979 (with the large 370 machines) and on to a current price of about .05 cent (with the IBM 3033).

This trend is continuing with the recent price cuts on large IBM machines, as well as the announcement of the 4331 and 4341 equipment. The announcement next year of the rumored IBM series H equipment should again halve the average cost per calculation.

The number of programmers available to develop software for this ever-growing population of machines has not kept pace with the growth of machine population. Programmer population was estimated at 10,000 in 1955, 80,000 in 1965 and 220,000 in 1975. The estimated 1985 programmer population is 300,000. Figure 2 represents the growth in the programmer population and its trend for the user.

This discrepancy in the number of programmers per machine, which is shown in Figure 3, indicates that although we had 10 programmers per machine in 1955 with very little software available, we can project only 1.9 programmers per general-purpose computer in 1985. If dedicated machines are included, there will be less than one-third of a programmer for each machine installed in 1985.

Alarming Trend

This trend would not be alarming were it not for the fact that computer programming has not progressed beyond the stage of a "cottage industry." There have been no significant advances in computer programmer productivity thus far in the history of the industry. Current estimates place the growth of programmer productivity at approximately 3% per year, with no foreseeable change in this pattern.

The ever-increasing salaries paid to data processing professionals plus the relatively low increases in productivity mean the average design and programming cost per computer language instruction has risen from approximately $4 in 1953 to approximately $8 today. Thus, a fairly simple system with 20,000 instructions costs nearly $160,000 to design and program. A complex system containing over 300,000 lines of code would call for a current development cost of nearly $2.4 million.

User expenditures for applications software is a fairly difficult statistic to obtain. However, IBM estimated in 1975 that the total user investment in applications software for IBM equipment exceeded $50 billion. The estimate for applications software investment for all machines would be roughly twice that number. Current expenditures are estimated at approximately $80 billion for all software and is expected to increase to $139 billion by 1985.

DP Service Industry

We have shown that the hardware business is growing rapidly and that software is growing even more rapidly. In fact, the entire computer services industry — which includes facilities management, contract programming and consulting, applications and work systems software as well as data processing services — is growing at nearly 20% per year.

The number of companies in the DP

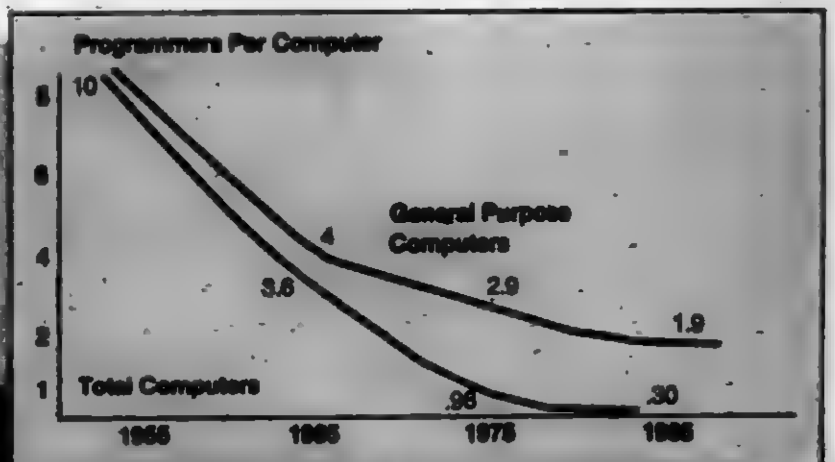
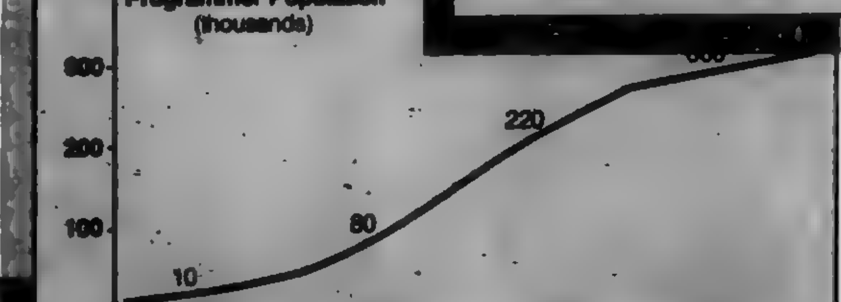
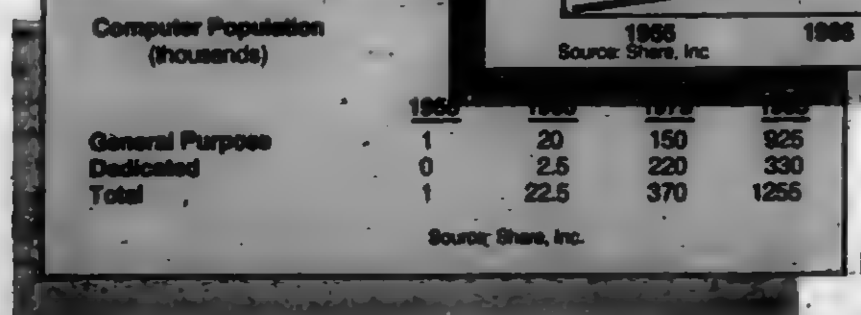


FIGURE 3



Source: Share, Inc

FIGURE 2



Computer Population (thousands)

	1955	[illegible]	[illegible]	[illegible]
General Purpose	1	20	150	925
Dedicated	0	2.5	220	330
Total	1	22.5	370	1255

Source: Share, Inc.

FIGURE 1

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FIGURE 5

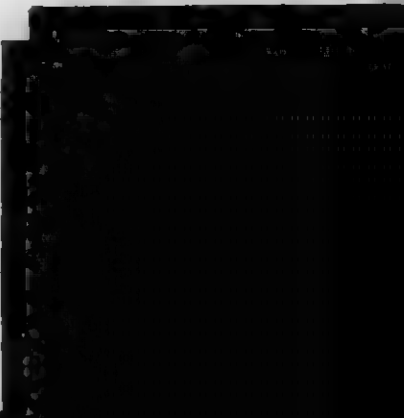


FIGURE 4

services industry is expected to decrease through mergers and business failures for the foreseeable future. Figure 4 shows the relative size and number of companies in the services industry as determined from a 1976 study by the Association of Data Processing Service Organizations (Adapso).

Within services, the fastest growing segment, according to the Adapso survey, is the applications software industry. The study projected an annual growth rate averaging 30% through 1985 for applications software. Figure 5 shows the estimated size of the applications software industry in three-year increments from 1977 through 1992, assuming both a 30% and a more conservative 25% industry growth for that period.

The reasons underlying this growth are largely economic and managerial. A Share, Inc. study developed in 1976 stated that "current estimates are that lifetime maintenance of software is twice the initial development cost." The software industry offers an alternative to the individual DP manager through continued enhancement and maintenance of products.

Another major economic benefit of packaged applications is that more accurate implementation time schedules and costs can be estimated before the project is begun than can be obtained with a complete development project.

Because packaged applications are designed for ease of maintenance by the vendor, they also make it easier for the individual user to make changes, enhancements and modifications to suit his own needs.

It is our belief that as the number of programmers per computer decreases while each person's productivity shows little increase, an even smaller number of programmers will be available to the individual installation than was projected earlier.

Why will this happen? The growth of the applications software industry will demand so many programmers that there will be even fewer left for the individual installation.

Before exploring this further, we must point out that there were some unknown factors in the earlier projections. First, the growth of the hardware population was a fairly speculative number. Although we know it typically takes seven years from drawing board to practical application, thus precluding the possibility of any major shift in hardware technology before the late 1980s, we may be forced to change the definition of "computer." Many of the installations are particularly dedicated machines so they may not be representative of the type of installation normally thought of under the description of "computer" for purposes of measuring computer/programmer ratios.

Other factors, such as minicomputers, microprocessors and the shift toward communications networks, may alter the computer population figures through a redefinition of this sector.

Another great unknown which contains a great deal of subjective and qualitative aspects is the amount and type of software which is produced.

ductivity and the effect of inflation multiplied to the original 30% annual growth estimate provided by the Adapso study.

The final column of Figure 6 shows the relative size of the application software industry compared with 1977. It indicates that the industry will be roughly five times as large in 1986, nine times as large in 1989 and over 15 times as large in 1992 as it was in 1977.

Since the application software industry is labor-intensive and since that labor is concentrated in the programming resource, it appears reasonable to assume that the industry will need three times as many programmers in 1983, five times in 1986, nine times in 1989 and 15 times as many programmers in 1992 as were employed in the industry in 1977.

Furthermore, because the industry and each company within the industry is absolutely dependent upon the production and continued maintenance of application software for their only products, these companies will be willing to pay whatever price is necessary to obtain these programmers on the open market.

In other words, because programmers are the application software company's "production line," the application software company will hire as many programmers as it needs to develop its products. If these programmers are expensive, the application software company will raise the price of its software on the market. And because the programmers are expensive, the DP community will buy the applications because it will not be able to hire enough programmers to develop in-house systems.

Figure 7 graphically depicts the projected total programmer employment and the proportion of those programmers who will be employed by application software firms. It appears that it will be a luxury (and probably a very expensive one) for an individual DP installation to have anything more than a maintenance-oriented staff by 1990.

Although Figure 7 is slightly biased toward application software firms, our projections show employment of nearly 125,000 programmers by 1985 (out of a total of 291,000). This contrasts with a total of 27,000 vs. a total population of 233,000 in 1976. The result is that the number of programmers available outside applications software firms will actually decrease over the next decade as application software firms continue to employ more programmers than enter the job market each year.

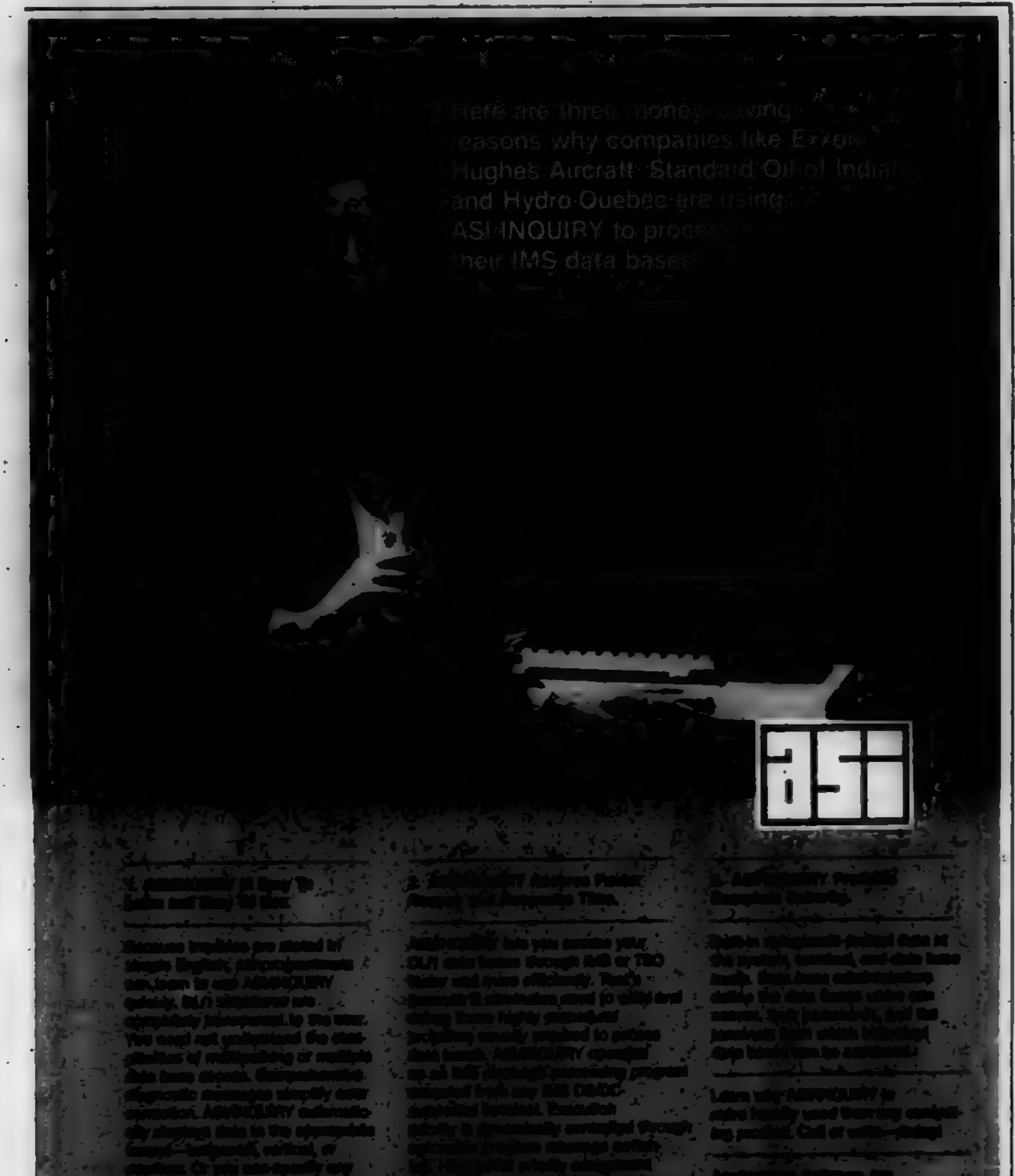
Other Major Trends

Application software firms are successful today because more and more organizations are turning to application packages. The major reason for this is that their current systems are obsolete because of changes in either accounting or DP technology; they lack resources internally to develop new systems themselves; the future direction of their hardware capabilities is often uncertain, particularly in light of the rapid changes in this technology; and, finally, management and internal user demands force the DP department into greater service levels without additional resources.

The 1976 Share study pointed out that future application trends will be led by three major items: the integration of all accounting and DP functions into sets of applications; the use of terminals for user communication directly with the application; and management involvement and demands upon the information systems of the organization.

The growth of the application software industry will provide viable alternatives in these areas as the industry matures and the marketplace grows. As a result, by the mid-1980s, there will be strong incentives for purchasing applications rather than developing them in-house.

In short, the decade of the '80s will be an exciting one for the data processing community as a whole. Naturally, we believe that our industry, application software, will remain at the forefront of growth and user involvement through this period. ☐


Here are three money-saving reasons why companies like Exxon, Hughes Aircraft, Standard Oil of Indiana and Hydro Quebec are using ASI INQUIRY to process their IMS data bases.

asi

FIGURE 6

FIGURE 7

Moreover, the number of programmers and the growth of programmer training is also difficult to estimate. It may be that we will need to change the definition of "programmer." As our children play with microprocessors at home, we may find that a programmer in the traditional sense is no longer required for many of the tasks which we today assign to this class of professional.

Finally, the measurement of programmer productivity was not entirely objective. We seem to fall back on number of instructions produced, rather than attempting to define systems in any quantitative way that could be used to measure the overall effectiveness, rather than efficiency of a given programmer or group of programmers.

It is possible that some improvements can be made in all of these areas. For instance, a new programming language such as Pascal, which has been getting a great deal of notoriety lately, might improve programmer productivity to a great extent, although "high-level" languages in the past have not made any significant gains in this area.

We have read a great deal in the past few years about "software engineering," including structured design, modularization and the use of data bases. These techniques may be capable of extensions which will increase the total productivity of programmers and systems designers. In practical application, however, we find that the gains are not as high as their proponents would have us believe.

There are a number of design trade-offs which can — and will — be made as hardware costs continue to decrease. It is really no longer necessary to write the most efficient program possible to perform a routine task. It is easier to trade off a little memory or a little disk storage to save time in the development and maintenance processes.

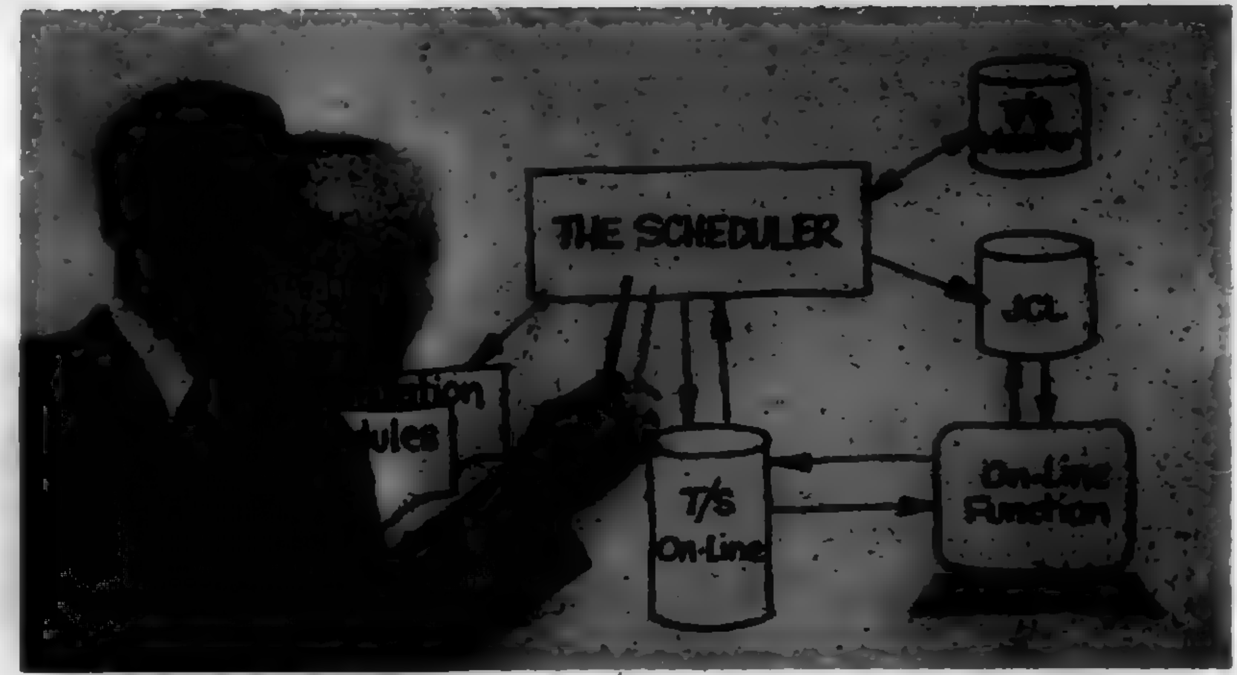
Another major area that is getting much consideration by software companies is software which itself generates application software. A growing number of development aids can be used to assist in the software development process. Some companies have developed their own "application generators" which can provide a fairly substantial core of code for routine accounting and clerical functions. These tools can increase productivity in the development of at least certain types of software.

Finally, user involvement in system design and development via terminals, query languages, report writers and the like will take much of the burden off the programmer in the future and place it on the non-technical user of DP services.

The Programmer Migration

Normal advances, as mentioned above, occur in programmer productivity, hardware technology and the like. The projection of programmer employment by application software firms through the 1980s indicates one major impact this industry's growth will have on all DP installations — mainly, major competition for programming resources.

Figure 6 is a more conservative projection of software industry growth than Figure 5. By nearly a 20% growth figure, we have factored in both a nominal increase in programmer pro-



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AT HOME WITH JAMES MARTIN

(Continued from Page 29)

So you have data base query languages, and you'd like them to be simple enough for an end user to use without having a DP professional.

Query languages flow into report generators. You'd like a language here that gives you the capability to structure reports in any form you want, either alphanumeric reports or graphics reports.

Report generators tend to flow into graphics languages, of which we have a few examples but not nearly enough.

Then we've also got application development languages, like IBM's ADF, DMS and others. There are a large number of these from different software houses. I've added up the total number of high-level languages, by which I mean something that is an order of magnitude higher than Cobol. There are more than 100 of them, and many do not come from the mainframe industry but from software houses and the minicomputer industry.

There is no one such language with which you can do everything you want. Maybe there never will be. Therefore, you have to tailor the choice of language to the type of application, and this is the whole trick in getting them to work effectively.

Does this mean the days of Cobol are numbered?

No, I don't think so. Everyone wants to know if we are going to see the demise of the application programmer in the next few years. I think it's going to be exactly the opposite. There won't be *enough* application programmers; we'll be very short of application programmers everywhere. The Cobol programmers are going to hang in there!

Returning to automatic programming, you said recently, "It's the most important area in computing right now." How does it work and what kind of realistic productivity gains can we expect?

I am going to avoid using the term "automatic programming"; the phrase I think one ought to use is "application development without conventional programming."

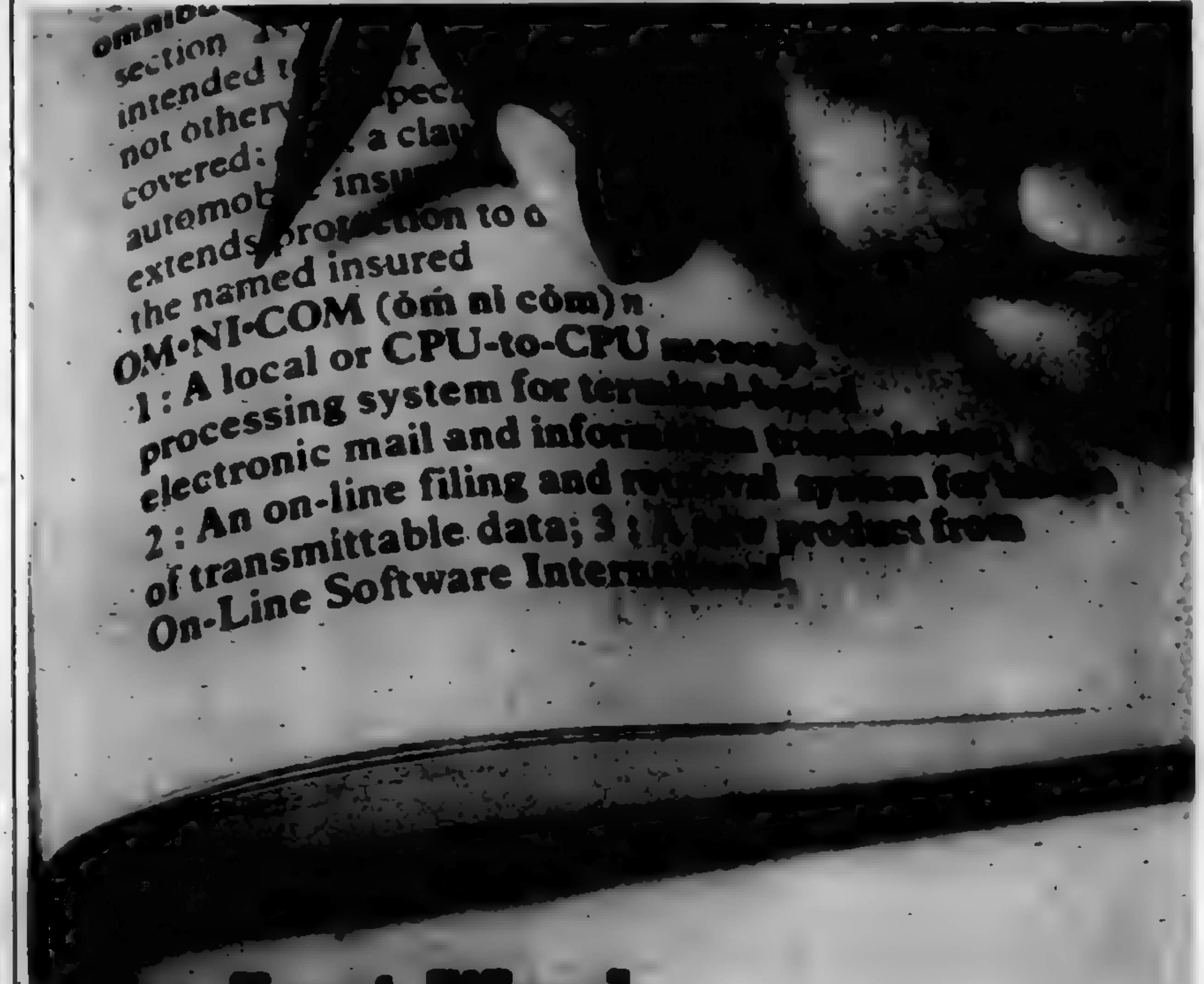
The languages work in many different ways. Some are report generators; some are query languages; some are application development facilities. But we can find very high improvements in productivity with these languages.

For example, in the generation of queries, it might have taken a Cobol programmer a week to create a query of a certain type for a user to employ at a screen. Now you can get the user doing it himself in 10 minutes.

Some corporations have measured the productivity which they've achieved with higher languages in terms of equivalent lines of Cobol — in other words, how many lines of Cobol *would* they have had to write *if* they had done it in Cobol. And some of them are quoting figures of more than 1,000 lines a day of equivalent lines of Cobol. The national average for Cobol programming is seven lines of code a day to 40 lines of code a day, varying with the skill of the programmer.

The difference between those two figures is so huge that we are forced to look at it very hard and ask, "Why hasn't that happened to everybody?" There are a lot of different answers to that question. A good part of the answers is that the high-level languages need improving — they're not yet good enough for everything one would like to do with them.

But that is understood by the mainframe vendors, the mini vendors, the micro vendors and the software houses. So I think we are going to see a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"The end user or the application developer languages become the tail that wags the whole data base dog."

huge improvement in the languages for application development without conventional programming.

In the same vein, you said recently that application development without conventional programming "is what drives IBM's data base philosophy." What are IBM's intentions in the data base area?

I think IBM wants to substantially improve its present product line. At some point in time in the future they want to introduce relational capabilities but at the same time to support their DL/1 customers so that programs built with DL/1 data bases continue to work.

IBM wants the data dictionary built into the data base facilities. They want eventually to get a higher level of hardware involvement, in other words to substantially improve the hardware for data base usage, including expanding what they've already done with the System/38 where the entire DBMS and the dictionary are built into the hardware and the microcode.

The most important part of IBM's strategy relating to data bases is to get high-level languages which will create applications in a short time with a very high level of productivity on the part of the application developer. These will be both languages for the professional and also languages for the end user.

Today they have four such languages: GIS, Query by Example, ADF and DMS. I would expect that the future will see substantial upgrading of all of those four and possibly the introduction of new ones. Certainly one can see a lot of improvements which are needed in today's ADF, but at the same time one can find examples of ADF being used with an *extremely* high productivity of application development compared with the development that would be possible in languages like Cobol.

Therefore if we look at data base systems five years in the future, I'm not sure that people will still be arguing about the internal structure of the data base. What they'll be arguing about is how the data base is perceived by the end user or the professional who wants to develop applications. That's really saying that the end user or the application developer languages become the tail which wags the whole data base dog. It becomes the thing which drives the architecture and possibly ultimately drives the machine design.

"Data base in the 1970s has not been 100% successful," you said recently. What has been its chief problem and what makes the critical difference between a successful and unsuccessful implementation?

There is not a simple answer to that because there have been several different problems.

But I think perhaps the most important is the question of getting logical data base structures which really contain the information you're going to want for present and future applications.

So the data modeling becomes absolutely critical. I use the phrase "stability analysis" and have a substantial number of steps which I would want to apply to a data model to achieve the objective of making it as stable as possible before it is cast into the concrete of IMS. You are never going to be able to create a data base which will never change, but there are certain types of changes which are going to force you to rewrite your old application programs and certain types of changes which won't. You want to minimize the changes that will force you to rewrite your old application programs.

Now, if you build a data base system which is not stable or does not meet the needs of future applications, then you suddenly find yourself faced with an agonizing decision. You want to use the data which is in the data base, but you want to use it in a new form. The present data base structure doesn't allow you to do what you want with it. So what can you do? You must either

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"The proper place for DBMS is not in software but in hardware," you have said. Is software on a chip viable? What are its constraints?

You've already got one or two machines with DBMS in hardware. They are the System/38 and Microdata's Reality.

You can greatly improve the efficiency of machine usage by building a machine which can execute data base operations. That argument becomes still stronger as you move to the powerful query languages where you'd like to have the relational data base with the capability to automatically do relational algebra operations or where you have a language which triggers many secondary key operations in which you are doing much secondary index searching. You really need hardware assistance to make that fast and efficient.

The future of data base machines is very bright. It's the way to go. But it won't all happen next week.

What effect will the rapidly changing hardware technology have on data base design and implementation?

The very important thing in data base design is to get the logical structure of the data base right, getting the data models and getting the corporate-wide planning of the data base facilities put together.

A lot of people ask what they can do to protect themselves from changing technology in data base. I would say the best thing is to get a good methodology for corporate strategic planning of the information resources you need and a methodology which translates that into the most stable, logical data base model or set of models. If you do that well, then the structure will still be valid when the hardware changes fundamentally. So it will be a relatively easy job to translate what you're implementing today into the hardware of the future and the software of the future.

I founded Database Design, Inc. in Ann Arbor, Michigan, with Dixon Doll and Bob Holland in order to help users solve these problems. The field desperately needs hard and sound methodologies for data base planning and design.

You believe in the bright future of bubble memories, calling them "one of the most important memory technologies in the future." But bubbles seem to have been accepted rather slowly in the marketplace. With the falling price of RAMs, can bubbles remain in the memory race?

Certainly. We still don't have a mass production factory. With RAMs we are very high up the learning curve, whereas with bubble memory we're very low on the learning curve.

So I would expect that bubble memory technology is going to drop in cost much faster than silicon RAMs over the next 10 years. Bubble memories also have the advantage that they are nonvolatile.

The Japanese are starting to export their own technology as they overhaul their industrial structure. They are becoming increasingly competitive in computer, telecommunications and microelectronics. Some observers say

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"America is in danger of losing part of its lead to Japan if it doesn't fight back aggressively with lots of money for R&D."

the world ought to brace itself for an onslaught of Japanese high-tech products. Is the U.S. in any danger of losing its technological edge to the Japanese?

I think it's in danger of losing part of it. The U.S. has absolutely led the world with chips for the whole history of chips. But now Japanese are talking about a memory chip of 256,000 bits. They haven't actually manufactured it yet, but they have described the technology in public. So it's beginning to look as though they are not just copying. They are going to be able to produce chip technology which *could* become better than Silicon Valley. And that is very dangerous. It means that Silicon Valley would no longer be providing the crude oil, if you will, of the electronics industry.

The Japanese are going to be very formidable competitors. They have gone a very long way in the use of industrial robots and are obviously putting a large amount of money into the technology. I think we ought to regard Japan as a major warning sign that America has got to continue driving forward in improving its research. It is in danger of losing part of its lead to Japan if it doesn't fight back aggressively with a lot of money for R&D. America should be as aggressive as it possibly can in attacking the Japanese threat.

A recurring theme in your writing is the potential abuse of technology by government. "Computers, like other inventions that change civilization, are a force for great good or great evil depending on how countries use them," you wrote in one of your books. How are governments using computers these days — for good or evil?

I think it differs very much from one government to another. The governments on the other side of the Iron Curtain are using them in quite different ways from the governments in Western societies. I don't think there is much to worry about in the way the Western governments are using computers except that they have permitted the bureaucracies to grow to much larger sizes than they would have done otherwise.

What about the invasion of privacy?

One finds occasional horror stories. There is one airline which is a government airline, as many airlines are outside the United States. Somebody sat me down at a terminal of that airline and explained to me that if, as a passenger of that airline, you are exceptionally insulting to the air hostesses, they put you on a blacklist. And that blacklist is then used so that when you try to make a booking on the airline again, the computer refuses you a seat.

At the terminal I was shown how to display that blacklist. The amusing thing was that many of the people on the blacklist were people whose names you would know! I wonder if that would happen in a profit-making airline.

We talked earlier about distributed data processing. Does DDP make a corporation easier to manage?

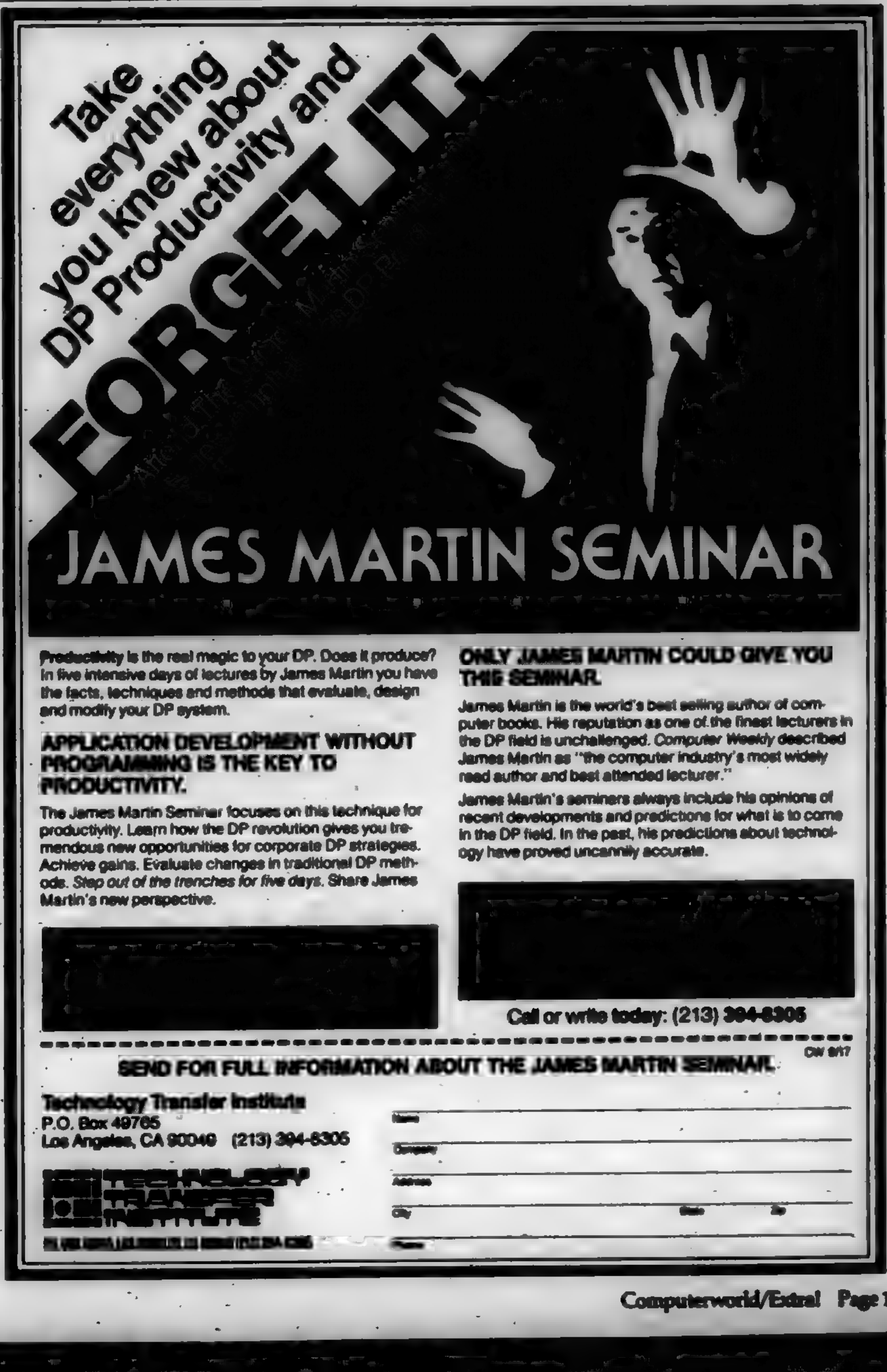
I think it will make it easier to manage if it's done well. Because DDP can follow the corporate structure.

Most computing has forced the flow of information into a structure which is quite different from the natural organization of the corporation in question. Whereas distributed processing enables you to put computers and information sources in the departments where they are used.

But we are not yet at that utopia, are we?

Not yet, but machines are dropping in cost.

Incidentally, in moving to that utopia I think the last thing you want to do is to have complete freedom of letting anybody put any data they want together in a computer system. You do need to understand that a corporation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"End users will have a lot of compatibility problems in the '80s. They're getting worse rather than better."

is one entity and it has one balance sheet; therefore you need to make sure that the different computer systems do fit together to contribute to the overall corporate good. That needs corporate-wide information engineering.

Have we reached or even neared the natural physical limits of our technology?

Oh no, nowhere near, nowhere near.

The theoretical information transmission capability of an optical fiber is thousands of times higher than what we are using today. But we couldn't possibly build circuits which are good enough to use that transmission rate. We can make an optical fiber about as thin as a human hair and so into one cable one could get many hundreds of thousands of optical fibers. In terms of telecommunications, the capability for wiring society with very advanced channels is so *enormously* greater than what we've done today that it takes the richest imagination to conceive what that would do to society and how society would use it.

If you think of the size of the brain of the micro-ant and how much logic must be in that ant, then compare it with today's chips — that gives you an indication of just how enormously far away we are from nature. Compare the protocols of SNA with the protocols of micro-ants!

Communications network architectures can provide impressive capabilities. But their drawbacks include high conversion costs, "lock-in" to the products of a single manufacturer and incompatibility with networks based on other architectures. Is there a way out of the maze for end users?

I think end users and corporations in general are going to have a lot of compatibility problems in the 1980s. Compatibility problems are getting worse rather than better.

In the long run there is a way out of the maze, and that is standardization. We've already got some good standards at lower levels, like HDLC and X.25. It's clear that X.25 needs improving, and it's also clear that we need standards at a much higher level than X.25. But as one gets those standards in an age of vastly improved chips, the standards will become converted into chips.

One of the phrases in the industry now is PHD, which (believe it or not) stands for Protocol-Handling Device. That is a microelectronics device which can handle standard protocols like X.25 or HDLC. Protocol conversion machines and protocol handling devices are the long-range solution.

IBM's SNA is probably one of the most well-known and least understood architectures. How does SNA differ from other architectures, such as DCA and Decnet?

Sometimes the differences are rather subtle. SNA is an architecture which needs a host computer to establish a session, whereas Decnet is an architecture in which you can go from any machine to any machine.

The transmission subsystem of SNA is different from the internationl standards based on X.25. The highest layers — the layers which IBM calls "function management" — have a lot of functionality and a lot of capability relating to presentation services. These enable one to employ intelligent terminals and intelligent devices to convert the data stream, to have virtual terminals, to have logical display space, to do editing, to compress the data and to encipher the data. Some other architectures don't have as much capability at the higher level layers.

On the other hand, DEC has strongly emphasized the use of remote files. So with Decnet you can have a Cobol program which says GET a record when that record is in a file 1,000 miles away.

IBM's SNA is more complex than many of the network architectures. Part of the reason for that is that it does have more functions than some of the others. But if it were reengineered

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"SNA has an enormous future. And I think we'll see very major changes in SNA as we progress through the 1980s."

today, it could be simplified.

Given the excitement that X.25 seems to have sparked among users, does SNA have a future?

Oh yes, SNA has an enormous future. One can think of SNA as a common language throughout IBM, a common set of formats and protocols which will enable one to build an almost infinite diversity of different systems from many different components.

This is very important to the future of IBM. Architectures like that are important to the future of every computer vendor. That is not to say that SNA is not going to change. And I think we will see *very* major changes in SNA as we progress through the 1980s. One wants changes which will increase the diversity of the higher level functions and one also wants changes which will make SNA conform to the international standards. I would expect that we will be seeing both of those pretty fast — in two or three years.

You are very excited about space satellites and space manufacturing. Where do satellites fit into the grand communications scenario?

If we talk about telecommunications, one important thing to say is we haven't launched any communication satellites yet which use the potential of the technology. We haven't yet seen a satellite which was designed for space shuttle launch.

What the engineering is saying to us is that there are great things you can do which you haven't yet done, and you can do them during the 1980s if the lawyers don't cripple you first.

What effect do you believe the recent MCI antitrust victory over AT&T will have on the structure of the telecommunications industry?

I imagine it will be great encouragement to MCI and the other specialized carriers in their competition with the established telephone companies. I expect much more aggressive competition.

Your predictions about technology have been on the mark for 20 years. In 1960 you predicted the growth of teleprocessing, on-line storage and real-time systems. Later you predicted the microcomputer boom, communications satellites, optical fibers and personal computers. What's next?

We've mentioned pocket terminals. We've mentioned viewdata-like terminals. The growth of business graphics is important. Data base machines and languages. Ubiquitous public data networks.

We've talked about the potential of communication satellites.

We've talked about industrial robots. This will be a *major* growth industry throughout the next 20 years. And because industrial robots become economic, product designers must redesign their entire products to take advantage of totally different manufacturing techniques.

We've talked about the growth of chips. We're going to see much more dense memory and logic chips. We're certainly going to see 10M-byte chips, though that may take 10 years or more. That means the cost of main memory is going to *plunge* down.

The military is asking for an IBM 370/158 processor on a single chip. I expect they will succeed in achieving that in the second half of the 1980s. The impact that that will have on the possible range of products that you can put on the market at low cost will be just gigantic.

The videodisk. It is slowly becoming reality. Eventually it is going to become a mass consumer product. Philips has videodisks in their laboratories which are designed to store data and to be an important component of the office of the future. The price per bit on those videodisks can be less than

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"I believe teachers will make more money than film stars because of videodisk and telecommunications technologies."

1/10,000th of the price per bit on the cheapest high-capacity magnetic disk systems of today. Not overnight, but by the second half of the 1980s the videodisk is going to become a major technology.

That will give rise to whole new industries. You suddenly for the first time make interactive television real.

I believe it has *huge* social potential in education because it gives you the capability to have education with Hollywood-size budgets in which the machine stops periodically and asks the student questions. He responds to those and then you switch videodisk track depending upon the response. It also enables the student to stop the program at any time and recap — to study the diagram he was shown two minutes ago and to make notes on it before continuing the program. When you can do that, then interactive television training becomes much more potent than it is today.

I believe that the 1980s will probably be a decade in which more Americans become new millionaires than any other decade in history — even if we adjust that remark for inflation. The reason is that the technologies I've just described open up enormous business opportunities. Many of those, unlike the past, are business opportunities which can be grasped by the small entrepreneur. The programmer, if he really thinks about the marketplace, has an opportunity now to create programming products which will have gigantic sales, and he can do it without having a big corporation. The person who is designing chips has the capability to again design products — household gadgets, toys, devices for the office of the future — with enormous potentials.

One thing now happening in the microelectronics industry is that it's becoming easy to design a new product. If you're a programmer and you write in Basic, you can then easily acquire the professional help to convert your Basic program into a chip or a microcode program so that you can put that into a mass-produced, inexpensive device.

If you look at the videodisk for television programs, the amount of software that is needed for that is just gigantic. Once again the best conventional or interactive programs are going to sell in large quantities, and you don't need a large corporation to create those.

I believe the best teachers will make more money than film stars by the end of the 1980s because of the videodisk and telecommunications technologies.

One informed observer once said that there will be no major software breakthroughs before the year 2000. Do you agree?

Oh, I disagree enormously. I think there are gigantic software breakthroughs to come. If one looks at the potential of developing applications without conventional programming, if one looks at the higher level data base languages and interactive graphics — these are indications that we have the opportunity within a relatively short period of time to greatly increase the productivity of application development.

If there is any one last message I would want to stress, it is the whole question of productivity. This is becoming more and more important; as the machines drop in cost and the chips increase in power, then the cost of people becomes so out of proportion to the cost of machines. At that point it is no good thinking of improving productivity by 10%; you've got to improve it by a factor of 10.

So all DP executives ought to be addressing themselves to the question of how we get a step-function change in productivity in application development. That's the subject of the series of seminars I will give in the fall.

Where will James Martin be in 10 years?

God knows.□

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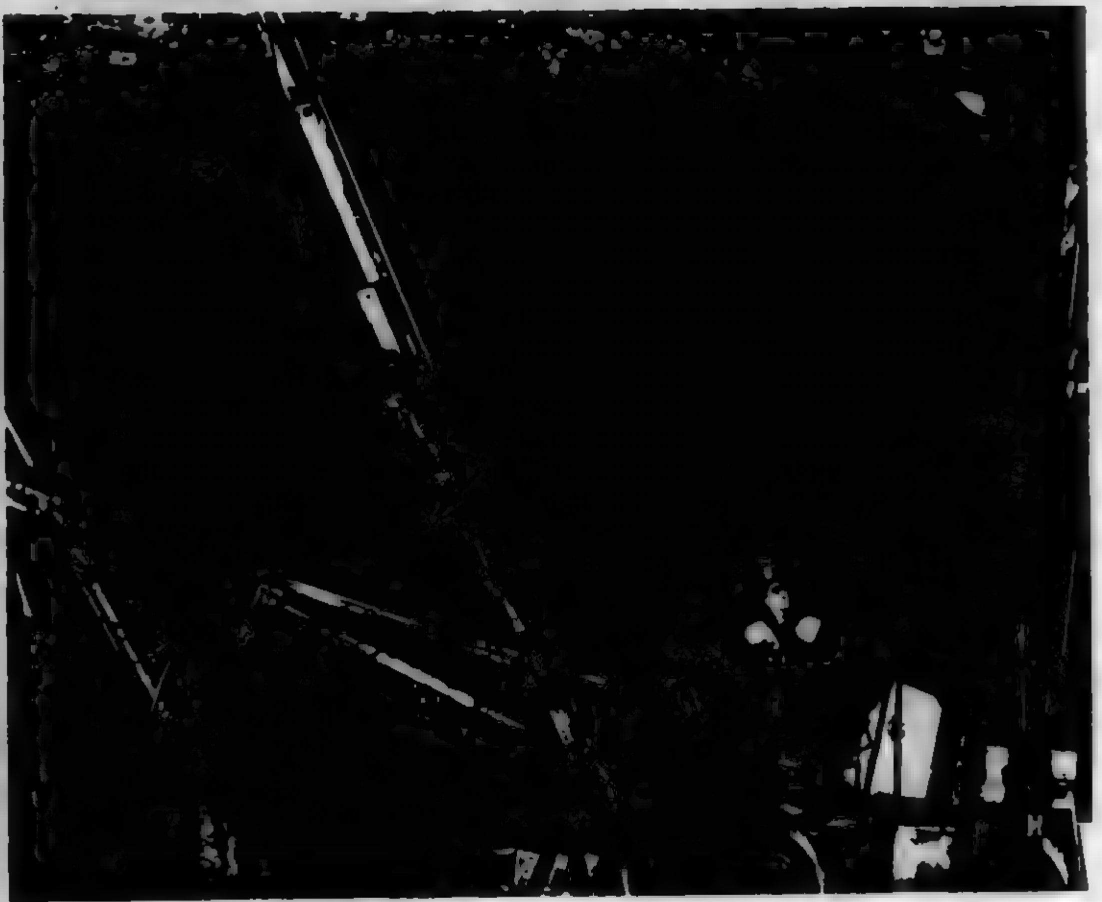

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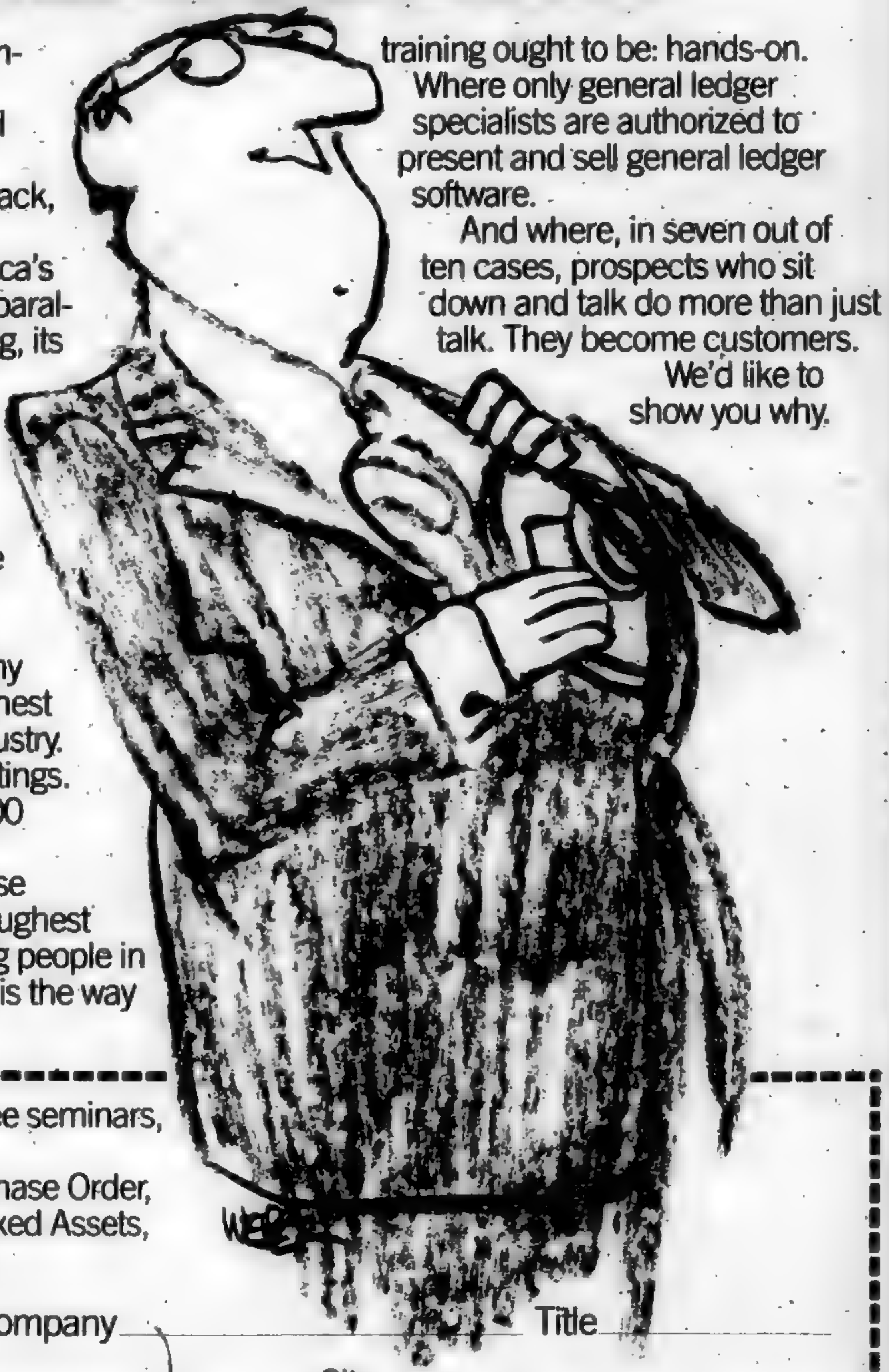

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NEWSPAPER

Systems Exec Something of a Rarity

By Jeffry Beeler
CW West Coast Bureau

SAN RAFAEL, Calif. — At a time when computing appears to be playing a more important role in corporate life than ever before, Jerry Sommerhauser remains steadfast in his belief that a system manager's business interests take precedence over his technical interests.

Sommerhauser, who heads systems operations for the Fireman's Fund Insurance Co., has never been one to downplay the contributions of a strong computing organization to a firm's long-term financial soundness and management effectiveness. On the contrary, both Sommerhauser and his colleagues regard information systems technology as one of their company's "most important strategic resources" and one of its "key competitive weapons for the future."

On the other hand, Sommerhauser likes to keep his attitudes toward business computing in perspective. As his company's senior vice-president of systems, he realizes that an information processing (IP) organization doesn't exist for its own sake but, rather, is important only to the extent that it serves as a tool of top management and furthers a company's primary business mission.

In Sommerhauser's view, a corporation should tailor its systems plan to meet the needs of its long-range business plan, not the other way around. Although computing ranks as one of an organization's chief agents of corporate change and should

(Continued on Page 11)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper   Second-class postage paid at Framingham, Mass., and additional mailing offices   ©1980 by CW Communications, Inc.
Vol. XIV, No. 39   September 22, 1980 $1.00 a copy; $30/year

CW Launched in China

The signed agreement for *China Computerworld*, the first joint publishing venture in the People's Republic of China, passes from Patrick J. McGovern, publisher of *Computerworld*, to Chang Chongping, publishing director of the Chinese Fourth Ministry. CW Editor E. Drake Lundell Jr. (center, rear) and staff members look on. Story on Page 8.

Throughput 80% Faster

High-End IBM 4341 Arrives

By Tom Henkel
CW Staff

WHITE PLAINS, N.Y. — IBM made a long-expected move last week by announcing a 4341 processor that offers 80% faster throughput and twice as much main memory as the original model.

The high-end 4341, known as the Group 2, comes with an option allowing users to run MVS/SP and VM/370 concurrently. An expanded Extended Control Program Support (ECPS) facility was also introduced to increase throughput for the combination environment.

Users of the original 4341, known as the Group 1, can upgrade to the Group 2 in the field. Both the Group 2 CPU and the field-upgrade kit will be available in the second quarter of 1981.

The Group 2 processor offers 1.5 to 1.8 times the Group 1's internal performance, IBM said. Like the Group 1, it is available in 2M- and 4M-byte configurations; however, an 8M-byte configuration is available as well.

The Group 2 CPU offers six standard channels (the Group 1 offered only three) and 16K bytes of buffer storage. It also supports IBM's 2.52G-byte 3380 disk drives and IBM's 3279 color CRT terminal and 3287 color printer.

In addition to announcing 3380 support on the Group 2, IBM also announced the same support on the Group 1 last week.

The Group 2 processor provides one byte and five block multiplexer channels. Two of the five block multiplexer

(Continued on Page 6)

Other new products: a mid-range processor from Burroughs Corp. that competes with the IBM 4341 (Page 5); 4331 Group 2 competitors from Nixdorf Computer AG (Page 6); X.25 capability for the Digital Equipment Corp. PDP-11 (Page 4); a network performance measurement system from NCR Comten, Inc. (Page 2); and an update of Datapoint Corp.'s Datashare (Page 7).

Bell Files Lower Wats Rates

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Ninety percent of AT&T's Wide-Area Telephone Service (Wats) customers will pay lower usage rates while the others will pay higher rates under a proposed tariff the telephone company submitted to the Federal Communications Commission (FCC) last week. The tariff carries a Dec. 14 effective date.

The reductions (see charts on Page 10) will amount to more than 50% for about 5% of all Wats users, range from 11% to 49% for about 48% of the users and will be 10% or less for approximately 37%, according to a company spokesman. The 10% paying higher rates are split equally between those receiving increases of more than and less than 50%.

All of these percentages, however, apply only to usage charges. Other changes in the tariff — which, for example, impose charges for items that are now bundled, such as telephone sets — could offset the proposed savings in usage charges.

The higher usage rates are being levied on the heaviest users — generally those which now subscribe to Full Business Day (FBD) Wats and pay a bulk rate for the first 240 hour/mo of usage. The reductions basically apply to Measured Time (MT) users which now pay a flat rate for the first 10 hour/mo of usage.

Other beneficiaries, the phone company said, will be "many small and medium-sized businesses" which don't have enough traffic to make present Wats rates cost-effective.

Three Options

Comments from interested parties concerning the new tariff are due at the commission Oct. 10; AT&T will then reply to objections. The FCC will then have to decide what to do. It has three basic options: acceptance, rejection or

(Continued on Page 10)

The TNF Controversy

• Most in Survey Not Concerned

By Ann Dooley
CW Staff

Two-thirds of IBM 3800 users interviewed last week apparently were not concerned that the product contains a known carcinogen.

There are so many cancer-causing agents around that it is futile to try to fight against them, 10 out of 15 users told *Computerworld* in an informal poll last week.

If, however, the 3800 laser printer's carcinogen — trinitrofluorenone (TNF) — were definitely shown to cause harm to humans,

(Continued on Page 4)

• Operators Put Jobs on the Line

By Bruce Hoard
CW Staff

ALBANY, N.Y. — Some operators of an IBM 3800 laser printer at the New York State Department of Social Services here recently put their jobs on the line when they refused to operate the machine, which employs and emits a carcinogen.

In response, the department issued smocks, gloves and masks to 25 workers, marking the latest chapter in a controversy that began unfolding at the department five months ago. Since then the 3800 has been

(Continued on Page 10)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Supports IBM Terminals

System Measures Net Performance

By Jeffry Beeler
CW West Coast Bureau

MINNEAPOLIS — Communications chiefs can reportedly improve the design, management and planning of their transmission facilities with a system that collects and reports quantitative, real-time data about networks and network modules.

The Model 5200 Performance Measurement System (PMS) from NCR Comten, Inc. gathers and displays eight types of data communications statistics that measure a network's response time, polling, message traffic, line utilization, trunk utilization, character sequences, data trace and signal trace.

With this information, communications managers can gauge their networks' current performance levels, tune and balance constituent modules, isolate performance hitches and rectify the problems by modifying their transmission facilities accordingly, NCR Comten said here last week during a press conference marking the product's formal introduction.

PMS' measurements can also form the basis of mathematical models that communications managers can use to simulate proposed changes in network configurations and project their probable impact.

Compatible with its existing product line, NCR Comten's latest system incorporates a communications adapter that permits both local and remote attachments to IBM host processors.

PMS' performance measurements apply to communications lines, cluster controllers and the trunks of NCR Comten's Communications Networking System. The product also monitors the operation of communications-oriented terminals and supports both the asynchronous and bisynchronous protocols, NCR Comten said.

In the asynchronous protocol, the system supports IBM Model 2741 communications terminal as well as Teletype Corp. models 33 and 35. In the bisynchronous protocol, it supports IBM models 2780, 3270, 3780 and 2770.

Among its key features, PMS permits communications managers to break down response-time measurements into their six constituent parts: circuit time, select time, poll-wait time, input-message time, output-message time and computer time.

NCR Comten expects eventually to upgrade their product with additional features such as a data base capability, increased line support, enhanced terminal support and an interface to the firm's Dynaprobe monitors. "Right now, PMS is at about the same stage of development as the IBM 360/20 was when it first came out during the 1960s," a company spokesman explained.

Three Elements

In essence, the Model 5200 consists of three elements: a control unit, data collection system and operating software.

Built around a general-purpose interface bus, the control unit incorporates a 32-bit, microprogrammed CPU with four direct memory access (DMA) I/O channels and a 300-nsec machine cycle. The mainframe, which offers roughly the same level of computing power as an IBM 370/155, holds 256K bytes of 600-nsec main memory and boasts the same architecture as Comten's Model 3650, 3670 and 3690 communications processors, an NCR Comten spokesman said.

The system console consists of a detachable, typewriter-like keyboard and an integrated CRT terminal that displays network performance measurements in both graphics and tabular form.

PMS' data collection system, meanwhile, consists of two elements: a variable number of communications interface probe units and a communications interface probe controller.

Two-Part Software

PMS's software, by contrast, consists primarily of two parts: a control program and three application programs, including a session-definition package for specifying the communications factors to be measured and the network configuration to be monitored; a data collection package for regulating the gathering and reporting of data; and a utility services package for managing diskette file functions. All three application programs are accessible at the system's console through NCR Comten's Measurement Definition Language.

A minimum PMS configuration with a 256K-byte processor and supports for eight communications lines costs $67,000, while a fully configured system supporting 16 lines and graphics printer sells for $89,500. Both prices exclude software, which leases for a total of $750/mo, including $150/mo for the application programs and $600/mo for the control program.

The system's first customer shipments will begin during the fourth quarter of this year. PMS is available from NCR Comten at B-2, 1950 West County Road, St. Paul, Minn. 55113.

This Week

ADVERTISERS' INDEX 118

Beginning this week, a new service for CW readers: an alphabetized listing of all advertisers (except classified) in each issue.

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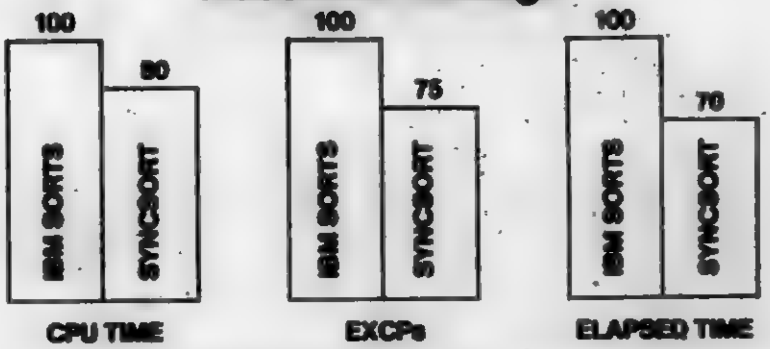

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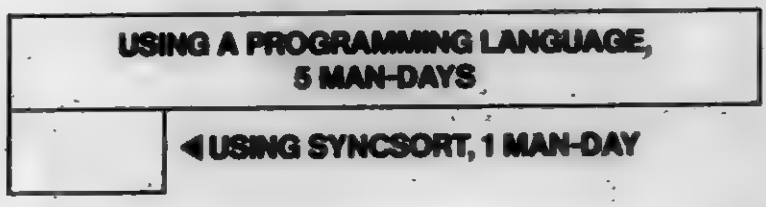

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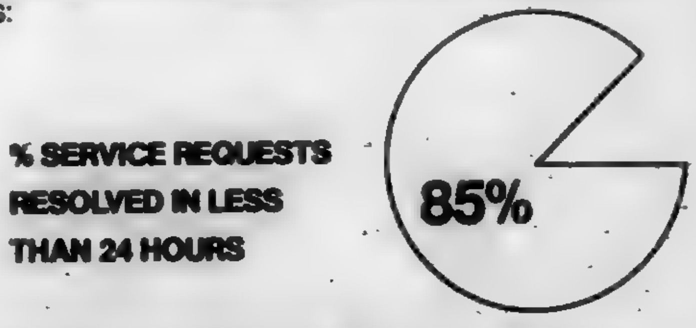

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Packages for Datapac, Transpac

DEC Software Links PDP-11s, X.25 Networks

By Marcy Rosenberg
CW Staff

MAYNARD, Mass. — Digital Equipment Corp.'s long-expected entry into the X.25 public packet-switched network market came last week in the form of software that links PDP-11 minicomputers to Canada's X.25 public data network, Datapac, and to France's Transpac.

These offerings launched DEC's Packetnet Program, through which it will eventually phase in X.25 capabilities for its 32-bit and 36-bit computers and support X.25 network implementations in four additional countries. They are Telenet in the U.S., Datex-P in Germany, PSS in the UK and DN1 in The Netherlands, according to Richard J.C. Woods, DEC's corporate X.25 product manager of distributed systems.

Specific packages for each country will enable DEC computers and terminals to communicate with each other or with non-DEC systems connected to that X.25 data network. Woods would not say when offerings for these countries will be available, though he did note that DEC has received certification to connect to GTE Telenet Communications Corp.'s packet-switched network and is in the process of testing products for the U.S.

DEC announced its commitment to support X.25 at a February press conference introducing Decnet Phase III. At that time, the firm said it would bring out software upgrades over the next two years to make Phase III Decnet compatible with various X.25 implementations [CW, Feb. 11].

Though not yet available, Packetnet Program products on the drawing board will extend X.25 capabilities to the Decnet networking software. Such an interface would allow a computer system in a Decnet-based network to interface full Decnet Phase III capabilities to other DEC computers in the packet-switched network, according to Woods.

When X.25 capabilities are so integrated with Decnet, users of Decnet-compatible processors will gain the options of using the Decnet DDCMP line protocol for private networks and/or the X.5 protocol for public networks, he commented.

Current Offerings

What is available now, however, are Datapac and Transpac software products. These currently run only on the 16-bit PDP-11 operating systems: RSX-11S, RSX-11M and RSX-11M-Plus.

DEC is offering two versions of these packages. A stand-alone version gives RSX-11 users the basic X.25 capabilities of connecting, sending, receiving and disconnecting; an optional utilities package provides additional capabilities that "resemble those in Decnet Phase II," Woods said.

With the stand-alone package, DEC processors — PDP-11s in this case — will be able to communicate with each other or with non-DEC systems connected to public X.25 data networks. Woods noted that each package conforms to its target country's implementation of CCITT X.25 recommendations.

Present X.25 recommendations relate to the first three of seven "layers" of the International Standards Organization (ISO) networking model. These — the physical, frame and packet layers — are the only parts of the model that all countries agreed to implement individually in X.25 networks.

Woods predicted international agreement to implement the fourth, or transport, level of the ISO model within 12 month and all seven levels within five years. He emphasized, therefore, that users will be able to upgrade stand-alone software versions to conform to future CCITT recommendations.

Encompassing only the first three ISO model levels, X.25 today is limited to being "a definition of how a computer attaches to a network and how to get data out the other side"; it does not give an end-to-end guarantee that the receiver actually gets the sender's message, Woods remarked.

Utilities Option

For additional capabilities in this area, DEC is also offering a utilities package as an extra-cost option for Datapac and Transpac products. It includes two utility programs: Talk, which allows any DEC terminal user to communicate with any other connected to the X.25 network, and File Transfer, which permits the transfer of entire files between any DEC processors in the network.

Another feature fully supported only in the Canadian product is multiple task-to-task communications.

Whereas stand-alone Datapac and Transpac software permits X.25 connections between DEC and non-DEC computers that support the protocol, users will be restricted to DEC-to-DEC processor connections with the optional utilities package.

Stand-alone Datapac and Transpac software licenses for $4,000 per CPU; the optional utilities package costs an extra $1,000. The software allows for up to 64 virtual circuits, where one virtual circuit is required for each logical connection. The first virtual circuit carries a 12K-word memory requirement, with lower memory incrementt required for each additional circuit, according to Woods.

Implementing X.25 software interfaces also requires the DEC DUP-11 line driver that supports speeds of up to 9,600 bit/sec per address. Existing versions of Transpac and Datapac software will be compatible with future Packetnet Program products that interface to Decnet, Woods claimed.

Future Adaptations

All Packetnet Program software will eventually run under the 32-bit VAX-11/780 operating system, VAX/-VMS, and under the 36-bit Decsystem-10 and -20 operating systems, Tops-10 and -20, as well as on the 16-bit RSX-11 versions.

In addition, Packetnet Program products will enable terminals to communicate along public packet-switched networks through implementation of the CCITT X.3, X.28 and X.29 recommendations. Available now with Transpac software, X.29 is said to allow packets of data to be converted to a form that terminals can handle to convert data from terminals into packets.

Interested in X.25 is growing, Woods maintained, partly because of the potential cost savings it offers over leasing private network lines. Leased line charges are based on time and distance, while X.25 public network charges are by volume of data sent. Therefore, low- and medium-volume users sending data to geographically dispersed nodes would likely favor X.25, he observed.

Asked why Packetnet products for France and Canada preceded ones for the U.S., Woods replied X.25 networks in these two countries are among the oldest and most established.

Further, these was more customer demand in Canada than in the U.S., probably because the U.S. offers more public networking choices than any other country, he added.

Users Not Worried Yet About 3800

(Continued from Page 1)

more than half of the 15 DP managers interviewed said they would stop using the 3800. The remainder said they would take some sort of action, although they were unsure what that action would be.

Two-thirds of the managers, however, have no plans to take any immediate action regarding use of the 3800. They indicated that either they are not overly concerned or they feel there is insufficient evidence upon which to act.

Users Take Action

Others, however, have taken action that ranged from shutting off the 3800 for up to six weeks at one site, to offering operators the use of gloves when working with the printer at another installation:

- A midwestern insurance company that closed down its recently installed 3800 for more than a month reverted to its older model printers. After conferring with IBM and several chemical companies, however, the user is again running the 3800, although it has begun investigating other vendor's equipment as alternatives.

- The New York State Department of Social Services has also shut off its 3800 twice in the last few months — once for 48 hours and a second time for several days. The machine is back in use, but one employee has filed a grievance with the state's employees union (see story on Page 1).

- Two other companies have installed exhaust fans on top of the 3800s in an attempt to draw any potentially harmful air away from the working area. Still other departments have issued masks and gloves to employees.

Among those users who feel there is little or no cause for alarm, several indicated their extreme dependence on the 3800.

"I would die without it," John Backes, computer operations manager for the Missouri Department of Social Services, stated. He would use the machine even if it were proven to be harmful to humans. "I'd take some precautions, maybe, but I'd have to use it for time and money purposes."

Several managers argued that while TNF might be harmful to laboratory animals, it would not necessarily be harmful to humans. Others said the small amounts of TNF in the printer are not enough to warrant jeopardizing their tight DP schedules. One manager of a busy New York state manufacturing installation said he would have to compare the health risk with the benefits of the 3800 — and he was not sure what the outcome would be.

In only a few shops did managers indicate that their operators are unduly concerned about the TNF issue. Some said they themselves are more concerned than some of their operators.

Four of the managers interviewed chose not to inform their operators of the possible dangers; the manager of an East Coast chemical company said he has not informed his employees because he "didn't want to start a panic."

Six of the 15 managers stated either IBM should not have marketed the machine if the company knew TNF was a suspected carcinogen or it should have informed potential clients of the existence of the chemical at the time of purchase or lease.

But Backes of the Department of Social Services for Missouri thought IBM had "no choice but to market it because it was an incredible advancement in technology." Others expressed trust in IBM, indicating they don't believe IBM would have introduced a machine that would be harmful to users. Still others chose not to comment.

Wheels Grinding Slowly

The wheels of government are turning slowly in determining whether the chemical trinitrofluorenone (TNF) — found in IBM's 3800 laser printer, Copier I and II and 3896 type-document converter — is hazardous to humans.

While the Environmental Protection Agency continues to evaluate IBM's laboratory test results, two other federal watchdog agencies are only beginning to decide whether to study the chemical:

- The National Institute for Occupational Safety and Health (Niosh) — part of the department of Health and Welfare — is currently "considering TNF as a topic for an intelligence alert to the occupational health and safety community."

- The Department of Labor's Occupational Safety and Health Administration (Osha) is considering placing TNF on its candidates list of chemicals from which 10 chemicals are selected every six months for further research relating to chemical standards.

Burroughs Introduces B5900, Rival to IBM 4341

By Tom Henkel
CW Staff

DETROIT — Burroughs Corp. last week introduced a mid-range processor that it said is both hardware- and software-compatible with its top-of-the-line B6900 and offers the same price/performance as IBM's 4341 Group 1 and Group 2 mainframes.

The Burroughs B5930, the first of what will be the 5900 series, can operate as a stand-alone processor or as a remote processor in a distributed data processing network. While it is half as fast as the B6900, the B5930 with 1.5M to 6M bytes of memory — priced at $200,000 — reportedly requires one-fourth the space and one-fifth the cooling requirements of the B6900.

In announcing the system, which the vendor considers an entry path to its large-scale systems, Burroughs Chairman Paul S. Mirabito disclosed that the company will soon announce a smaller system, the B4900, and new top-of-the-line model, the B7900, to round out the 900 line. Like the B5900, the two yet-to-be-announced CPUs will also be software-compatible with the B6900, Mirabito promised.

Alternative to 4300

The immediate target of the B5900 is large Burroughs users who want distributed processing systems. However, Burroughs plans a hard sell on IBM's System/3, System/34 and System/32 base, claiming the B5900 is an alternative to the 4300 line that offers a one-time software conversion.

Despite Burrough's attempts to offer a direct competitor to IBM's 4341, however, IBM seemed to score a slight advantage last week by announcing the larger 4341 Model Group 2 less than 24 hours before the B5900 announcement (see related story on Page 1).

Both the B5900 and the 4341 Group 2 will hit the end-user market at the same time — the second quarter of 1981.

While most Burroughs executives hesitated to compare one of their systems with IBM's counterpart, one official did say the B5900 is roughly a cross between the 4341-1 and a 3031 — and, according to industry analysts, the 4341 Group 2 appears to be a replacement for the 3031.

B5900 processors offer 40% to 60% of the throughput of the larger B6900, or about 10 times the throughput of the smaller B1800 line of minicomputers. A spokesman added the B5900 is about equal to IBM's 1.4 million instructions per second (Mips) 4341-2 processor. However, Burroughs doesn't officially support the concept of Mips as an accurate way of measuring a CPU's relative performance.

Inside the Machine

The B5900 is a multilevel, or stack, processor — similar to other Burroughs CPUs. However the new addition sports some architectural changes. It is a multilevel "function processor," meaning Burrough's concept of nesting processors has been carried one step further to form a double-nested processor, the firm said.

A basic B5930 comes with a CPU, 1.5M bytes of main memory, two operator displays, a peripheral subsystem with five data link processors, a data communications subsystem with a line support processor, four line adapters and a maintenance processor. The package costs $200,000 and leases for $6,875/mo on a one-year contract that includes 24-hour, seven-day field engineering service, Burroughs said.

Storage Increments

The B5930 can be expanded to 6M bytes of main memory in 786K-byte increments. However, a spokesman could not say how much those increments would cost.

The processor can also be expanded to up to 32 data link processors for peripheral subsystem expansion. Two line support processors handling up to 16 lines each can be added and two network support processors with up to 64 lines each are available, the vendor said.

Main memory uses 16K random-access memory (RAM) chips. However, Burroughs will soon be moving to 64K RAM chips, and all B5900 systems will be both hardware and software transparent to future 64K systems, a spokesman noted.

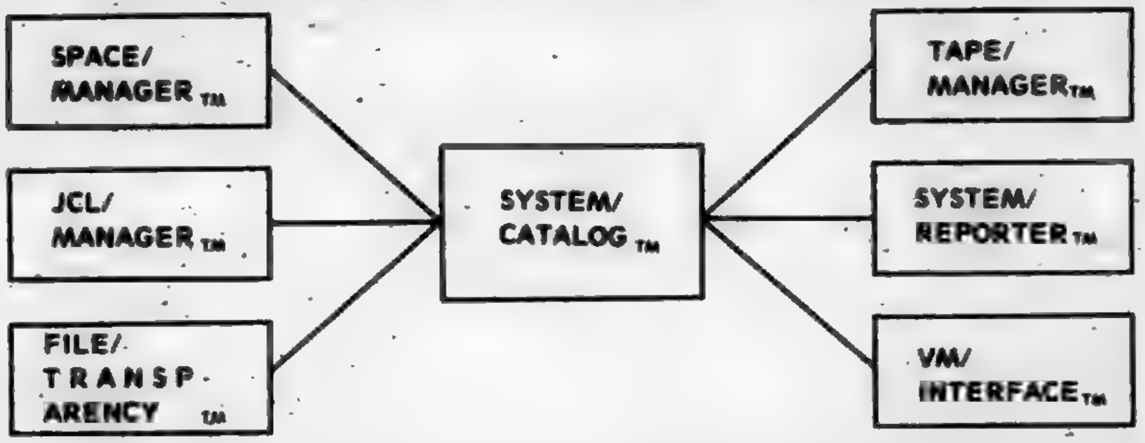
The B5930 has a maximum I/O data transfer rate of 2M byte/sec. Each peripheral or group of like peripherals is attached via a data link processor.

Basic system software, including the Master Control Program, the Network Definition Language, a Generalized Message Control System and one programming language controller, costs a $36,300 one-time charge with an annual $5,808 maintenance and update fee. The software costs $1,210 on a monthly license basis.

The Burroughs system will support most high-level languages including APL, Algol, Basic, Cobol 68 and 74, Fortran 68 and 77, PL/I and RPG. Conversion packages are available for IBM OS- and DOS-based systems, Honeywell, Inc.'s H200, H600, H2000 and H6000, the Univac 70 and 9000 and NCR Corp.'s Century CPUs.

The Burroughs spokesman said the firm has already received 100 orders for B5900 systems, mainly from existing Burroughs customers. Plans are under way to build one or two factories to churn out B5900 series, although the firm would not say when or where those plants would be built.

FRUSTRATED WITH DOS/VS(E)?



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Nixdorf Unveils 4331 Contender

BURLINGTON, Mass. — Nixdorf Computer AG of West Germany last week announced an IBM-compatible mainframe said to be in the range of the IBM 4331 Group 2. Presently available in Europe only, the Nixdorf 8890 is slated to be introduced in the U.S. as early as the 1981 first quarter.

The system reportedly has a main memory capacity of 1M byte to 4M bytes and an independent but fully IBM-compatible operating system, Nixdorf said. Designed to be used as a host CPU, a node in a distributed network or as a dedicated system, the 8890 features multiprocessing in 12 partitions and virtual storage technology, making it equally suitable for batch or interactive operations, the company claimed.

Nixdorf obtained operating system capability last May when it acquired The Computer Software Company [CW, May 26], which it renamed Nixdorf Computer Software Co. (NCSC). NCSC offers two major software products — Extended DOS (Edos) an enhanced, fully supported extension of IBM's DOS Release 26.2, and Edos/VS an enhanced, fully supported virtual storage operating system based on IBM's Release 34.

In developing the 8890, Nixdorf cooperated with Elbit Computers, Ltd., an IBM plug-compatible maker based in Haifa, Israel. Elbit, which is 37% owned by Control Data Corp., developed the CPU including the I/O channels and the integrated controllers.

IBM SYSTEM / CHARACTERISTICS	370/125-2	4331 Group 1	4331 Group 2	370/148	4341 Group 1	4341 Group 2	370/158-3	3031
Relative Performance¹	[illegible]	11	[illegible]	[illegible]	37	[illegible]	45	[illegible]
Memory Size in Bytes (Minimum to Maximum)	96K-512K	512K-1M	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Purchase Price (Memory Size)	[illegible] (512K)	[illegible] (1M)	[illegible] (1M)	[illegible] (1M)	[illegible] (2M)	[illegible]	[illegible] (1M)	[illegible] (2M)
Monthly Lease (Lease Term)	$6,045 (4 Years)	[illegible] (2 Years)	[illegible] (2 Years)	[illegible] (4 Years)	[illegible] (2 Years)	[illegible]	[illegible] (4 Years)	[illegible] (4 Years)
Memory Cycle Time (Nsec)	[illegible]	1,200 (Per 4 Bytes)	Not Available	[illegible]	714 (Per 4 Bytes)	Not Available	[illegible]	345
Machine Cycle Time (Nsec)	480	[illegible] (Per 4 Bytes)	Not Available	[illegible]	[illegible]	[illegible]	115	115
Channels (Minimum to Maximum)	1	[illegible]	[illegible]	6	3-6	6	[illegible]	6
Cache (Buffer) Size	None	None	8K	None	None	[illegible]	16K	32K
Bus Architecture?	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	Not Available	Not Available	[illegible]²	[illegible]	[illegible]³	[illegible]	[illegible]	[illegible]

1. Relative throughput based on the IBM 370/158-3's equaling 45. Performance based on manufacturers' claims.
2. Price for an upgrade from the 1M- to 2M-byte model is [illegible].
3. Price for a 2M-byte increment. Price for 1M-byte increment not available.

The Current Lineup

High-End 4341 Boosts Throughput 80%

(Continued from Page 1)

channels have a maximum data transfer rate of 3M byte/sec; the other three channels are each capable of transferring data at a maximum of 2M byte/sec, giving Group 2 users a combined maximum data transfer rate of 12M byte/sec, according to IBM.

A data streaming feature can be attached to any of the block multiplexer channels to allow the 3380s to operate on the system, IBM noted.

In addition to handling 3380 disk drives, the 4341 Group 2 can also accept intermixed configurations of 3330, 3340, 3350, 3370 and 3375 disk drives.

Faster in DOS/VSE

IBM reported the Group 2 processor is 1.6 times faster in a native DOS/VSE mode than the 4341 Group 1. It is reportedly 1.6 to 1.7 times faster in an OS/VS1 operating mode, 1.5 to 1.8 times faster under MVS/SP and 1.7 times faster under VM/370 with OS/VS1.

Users who want to run MVS in conjunction with VM/370 were urged by IBM to take the ECPS expansion feature. Using the example of relative batch throughput on a 4M-byte 4341 Group 2 processor, IBM said the system showed a relative batch throughput of .20 without the ECPS expansion and .80 with it in a commercial application.

The 2M-byte Group 2 processor costs $385,000, leases for $10,100/mo on a two-year lease and rents for $11,868/mo. The 4M-byte model costs $416,400 to purchase, $10,940/mo on a two-year lease and $12,855/mo on a rental basis. The 8M-byte model costs $479,200, $12,620/mo on a two-year lease and $14,829 to rent.

Field Upgrades

Since 4341 Group 1 CPUs offered only three standard channels with an additional three optional channels, field-upgrade packages come in two forms. For users who have already taken the three optional channels, an upgrade from a 2M-byte Group 1 to a 2M-byte Group 2 CPU will cost $110,800. An upgrade to the 4M-byte Group 2 will cost $142,200 and to the 8M-byte Group 2, $205,000.

For users with a 4M-byte Group 1, a field upgrade to a 4M- Group 2 costs $110,800 and an upgrade to the 8M-Group 2 processor costs $190,550.

For users without the three optional channels installed on a Group 1 processor, the field upgrades will cost $16,950 more.

Field upgrades can be accomplished in 15 to 23 hours by IBM customer engineers via some board switching in Group 1 CPUs, IBM said.

IBM will repossess any boards it removes from Group 1 systems, a spokesman said.

The ECPS expansion feature costs $25,000 to buy, $675/mo to lease on a two-year contract or $793/mo to rent.

Monthly maintenance for Group 2 CPUs is $760 for DOS/VSE, OS/VS1 Release 7 and VM/370 Release 6. Maintenance for MVS/SP costs $790/mo.

Analyst Sees New CPU Bridge to 'H'

Judging by the size of the IBM 4341 Group 2 processor and it's clear dedication to the MVS operating system, industry analysts are calling the CPU the new low-end bridge to the yet-to-be-announced H series, the large computers IBM is expected to announce the first quarter of 1981.

"This machine kills the 3031 and probably the 3032 also," the Gartner Group's Tom Crotty said. However, since there will be somewhat of a wait for 4341 Group 2 deliveries, an independent market for 3031 and 3032 CPUs may linger on for several more months, he noted.

The Group 2 processor basically replaces the more expensive 3031, but offers better price/performance, Crotty said.

The 3032's demand was severely weakened when IBM announced the 3033N — essentially as the same machine, but field-upgradable to the current top of the line 3033, he added.

Market research firm International Data Corp. (IDC) had predicted IBM would announce price cuts on the entire 30 series line along with Group 2 announcement. Although the cuts were not announced, both IDC and Crotty believe they are imminent. Crotty predicted 20% to 22% cuts would come later this month or early in October.

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For Datapoint Processors

Updated Datashare Eliminates Multiple Indexes

By Connie Winkler
CW Staff

NEW YORK — Datapoint Corp. announced an updated version of its Datashare time-sharing system here last week that features a file access method said to eliminate the need for index pointers, links, networks and trees.

Part of what is now called Datashare 6, the associative index method (AIM) provides access to any or all parts of records without requiring users to maintain multiple indexes, the firm said.

AIM is a content addressable file where the key is defined at the time of inquiry, not at the time the file is set up by the system designer. It does not require links and pointers nor a management system which hides links and pointers from the programmer.

Single Index Feature

Unlike conventional access methods such as Isam, AIM software requires only one index on all keys for a particular record, yet allows data files to be indexed so that each record can be accessed by a large number of multiple keys, the vendor claimed.

A single index for multiple record keys also makes index updating easier, the firm added, because only one index update is required to update all keys within AIM software.

Up to 64 fields can be defined for each record in a single file, but the AIM file is said to occupy only about 14% of the disk space occupied by the data file it indexes.

The AIM access technique was previously available on Datapoint's word processing system, the Integrated Electronic Office, announced last November. It is now available for Datapoint's 1800, 3800, 5500 and 6600 series processors.

Other Enhancements

Also added in Datashare 6 is an extended User Data Area (UDA). Almost doubled to 15.5K bytes, this larger UDA alots more working storage in programs for string and numeric variables.

In addition, the Utility Partition Supervisor can now operate with Datashare 6 to optimize the use of larger memory machines and the Datashare 6 Buffer Manager has been extended to use larger memory and handle more data types, the vendor claimed.

Datashare 6 with AIM requires a minimum of 120K bytes of memory, equal to the minimum configuration of Datapoint's $10,000 1800 series, noted Gerry Cullen, vice-president of market planning.

Datashare 6, including AIM, is available for a one-time license fee of $500 with a $10 monthly maintenance charge.

The license fee is waived when Datashare 6 software is ordered with a new system and for Datashare 5 users wishing to upgrade.

Datapoint is at 9725 Datapoint Drive, San Antonio, Texas 78284.

CPU Definitely Coming

SAN ANTONIO, Texas — Datapoint Corp. is definitely going to announce another system soon, but it will not be a competitor to the IBM 3033 [CW, Sept. 15].

The system will be a "large mini with the architecture of the 3033 but the processing power of the 8100," Gerry Cullen, vice-president of market planning, said.

Cullen confirmed that the machine will be out "well before Christmas . . . sometime in the November time frame." He also confirmed that it will have a memory of 1M byte or larger and a peripheral processor unit; that it will operate on a stand-alone basis or within a Datapoint's Attached Resource Computer environment; and that Datapoint will announce an operating system with resource transparency.

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A Computer-Generated Speech for Peoria

I'd like to take this opportunity here in Peoria to set forth clearly and specifically my position on foreign policy.

The state of our union depends on the state of the world, and freedom and peace in the world depend on the state of our union. Consequently, America's role in foreign affairs is to provide for world stability through a diplomatic combination of military power and wise negotiation.

Today's international scene is one in which the major powers have reached military parity. What we must do is manage and stabilize our relationships with each other and maintain the balance of power. In a nuclear age we cannot escape the responsibility to build a safe future through wise diplomacy.

The U.S. will continue to meet its responsibilities to its allies. However, to maintain world order, we will continue to seek and negotiate stable relationships with all nations.

The U.S. is not a crippled giant. We are still a great economic and military power. In a showdown with communism, it will be American power that will determine the destiny of free men and women.

America requires a president who is experienced in diplomacy and capable of managing world stability. The international scene demands a chief executive who carries out a coherent and consistent foreign policy that can be understood and respected by allies and adversaries alike.

The U.S. needs a president with a moral vision of promoting the welfare of mankind. America requires a leader who treats other nations with mutual respect; who promotes and encourages increased human rights and fundamental freedom; who responds consistently in a calm, cool and reasoned manner.

As with all weapons, prudent precaution should be taken in controlling the CIA. However, intelligence gathering and covert activity behind the borders of totalitarian states provide an important option between a do-nothing policy and nuclear confrontation.

America needs a tough president who is not afraid to stand up to the communists. We need a commander-in-chief who acts decisively in situations such as Iran and Afghanistan — a leader who will fight for major increases in defense spending. We need a president who will demonstrate that America remains the defender of the free world.

I don't intend to "flip-flop" on any foreign policy issues. Nor do I intend to speak in glib generalities. I came here to talk specifically about American foreign policy and that's what I mean to do. First of all, the lesson of Cuba. We will not tow boats back to Cuba. On the other hand, the U.S. urgently needs a new immigration policy that can change in response to international crises.

The aim of our Middle East policy is to underpin the security of the entire region through a strong military presence as we: 1) move toward a working relationship with the PLO without provoking a disturbance reaction by Israel; 2) achieve an overall Mid-East peace settlement; and 3) reduce the threat of a future Arab oil squeeze.

The Soviet invasion of Afghanistan is a deliberate effort by a powerful atheistic government to subjugate an independent Islamic people and is a stepping stone for possible communist control over much of the world's oil supplies. Any further expansion by the Soviets in the Persian Gulf should be met by U.S. military force.

What the administration needs is a package of balanced moves to check Soviet expansion to the Third World. We must initiate deals with the developing nations to make Soviet expansion more costly.

The administration must now decide on a long-range strategy to counter the Soviet Union's initiatives in the Third World. We must provide a package of economic and military aid to help the developing nations. If we don't, the "Big Bear" will reach out and grab them.

Detente means a state of affairs marked by the absence of significant tension that could lead the U.S. to a nuclear confrontation. Detente does not mean that all differences will be resolved or that Russia no longer will attempt to expand her influence. It does mean that peaceful co-existence is the only rational alternative.

The U.S. must again strengthen its strategic capabilities in Europe. Preventing communist expansion demands a stronger NATO force.

Preventing nuclear war is the foremost responsibility of the two superpowers. That is why we have negotiated the Strategic Arms Limitation Treaties — Salt I and Salt II. Especially now, in a time of great tension, observing the mutual constraints imposed by the terms of these treaties will be in the best interest of both countries and will help to preserve world peace.

Nato is a key element in our international strategy to balance the influence of the major powers. It provides the military shield and political unity so necessary to successful diplomacy with the Russians.

The last American hostage is just as important as the first. If the Iranians harm any hostage, the U.S. should take punitive and decisive military action against the Iranians. Let the Iranians know that American ends with "I can," not "I ran."

Securing the release of the hostages demands that the U.S. hold its tongue and temper in check. We must show a mixture of unity and maturity. If there ever was a time for diplomatic realism and restraint in American statesmanship, the hostage situation is one.

Although embargoing U.S. grain sales will not get the Russians out of Afghanistan, it is an important symbolic act to show that we will not continue business as usual.

I trust you will agree that my foreign policy is based on a realistic and mature view of how to maintain world order and peace.

John Cragan (left) and Donald Shields

NORMAL, Ill. — The computer-generated foreign policy speech reproduced here — developed by communications professors John Cragan and Donald Shields (see story on Page 9) — "is no more than symbols without substance, empty rhetoric," according to its originators.

Undertaken to dramatize the "unhealthy direction" political communication has taken in the last two decades, the speech was written to appeal especially to Peorians, since they demographically represent the U.S., according to Cragan.

As the speech's text illustrates, Peorians this year, as in 1976, leaned heavily toward a power politics stance, as reflected in 13 of the 20 issues about which they were questioned.

The only popular neo-isolationist sentiment was one calling for "a president with a moral vision of promoting the welfare of mankind." Oddly enough, the cold war position on presidential leadership is also included in the same speech, Cragan noted.

New issues in the 1980 survey included Afghanistan, Iran, the Olympic boycott, the Third World and the refugee problem, all issues that were not in the public consciousness four years ago.

"By building this speech and the one in 1976, we hoped candidates would be pushed into an open forum, into a more open debate of the issues," Cragan said. "The big mistake candidates make is in using these types of pretested speeches, which don't encourage or allow for such open debates . . . in front of the people.

"For five years it's been said that Don and I were preparing for a 1984 political speech, but our position is that the situation is worse than 1984" Cragan said.

"In Orwell's novel, it was the totalitarian government that controlled everything," he noted. "In our case today, we're freely doing this to ourselves by letting advertising agencies market and present sanitized speeches by political candidates.

"Journalists in recent years don't expect to hear anything from a candidate that really indicates how that person feels, so reporters try to get offhand, off-the-record comments," Cragan continued. "This kind of political rhetoric has helped create a nation [wherein] you have to sneak up on a politician to find out how he really feels."

'China Computerworld' to Premiere in Fall

BEIJING, China — *China Computerworld*, the product of the first joint publishing venture in the People's Republic of China, will print its premier issue in October.

The new tabloid newspaper will be published by China Computerworld Publishing and Servicing Co., a joint venture of the publishing arm of the Chinese Fourth Ministry and CW Communications, Inc. (CWCI). The final agreement for the publication effort was signed here last week by the Chinese government and CWCI Board Chairman Patrick J. McGovern.

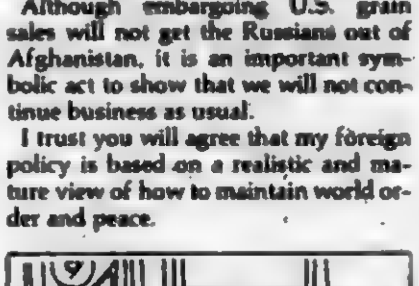
The Chinese Fourth Ministry is responsible for the computer, electronic and telecommunications industries and for the import and export of their products. CWCI publishes 12 business and technical periodicals in seven countries, including *Computerworld*.

China Computerworld will have an initial circulation of 50,000 copies. The newspaper will be issued monthly for the remainder of the year and biweekly starting in January 1981.

The People's Republic of China is expected to become a major international buyer of advanced computer systems in the 1980s and a major exporter of computer software and small computers in the second half of the decade, according to McGovern.

Based on the accelerating international trade and technology transfer, McGovern indicated *China Computerworld* "will have a paid circulation of over one million copies by the end of the decade."

Groundbreaking for the company's new office building also took place last week. The offices are at 74 Lu Gu Cun Road, P.O. Box 750, Beijing, People's Republic of China.



'Now Stop Me If You've Heard This One Before.'

Four Years Before '1984'

Machine Masterminds Speech to 'Play in Peoria'

By Marguerite Zientara
CW Staff

NORMAL, Ill. — If you live in Peoria, Ill., you will probably love the foreign policy speech on Page 8, which was computer-analyzed and generated expressly to "play in Peoria."

Four years after the concept first became reality and four years before the fictional *1984* which it presages, the computerized speech-writing methodology may have been perfected by its originators — communications professors John Cragan of Illinois State University here and Donald Shields of the University of Missouri at St. Louis.

Believing that election to public office has become more a matter of manipulating symbols than dealing with substantive issues, the two originally conceived the idea as a "satire" during the last presidential election [CW, March 21, 1977, Sept. 24, 1979]. "The point is that you can take any idiot, parade him around the country for 12 months and get him elected," Cragan observed.

Already a Reality

The "satire," however, may soon become reality — if it hasn't already.

"I'm sure that almost every [candidate] out there today is using a variation of this," Cragan contended. "I don't think it's as sophisticated or as cynical, but it's something that is used to pretest [statements and ideas] before you have a candidate saying them."

Among the current political figures who Cragan believes might be using the technology to its full advantage, are Jimmy Carter's pollster, Pat Caddell, and independent candidate John Anderson's new adviser, David Garth. Both men are "pretty sophisticated," he said.

One candidate who doesn't seem to be using sophisticated technology, however, or who may be using it badly, is Ronald Reagan, Cragan suggested. For example, if Reagan had done his technological homework, he never would have called the Vietnam War "a noble cause" when addressing the Veterans of Foreign Wars, Cragan said.

"Instead he could have safely said, 'Let's re-arm Nato. We've been sliding back and we won't be able to defend ourselves in Europe,' " Cragan said. "They would have stood up and cheered at that."

Complicated Process

The state-of-the-art in computer speech-writing embraces a complicated process that begins with months of culling from periodical publications pertinent quotations slated for future use in a political speech.

The quotations, concerning 20 foreign policy issues, were chosen to reflect three "dramatic" views of the world: Cold war, neo-isolationist and power politics.

The cold war position is based on the idea that it is us against the communist nations; the neo-isolationist position is that the U.S. should set a good example, but cannot be the world policeman; the power politics position is that the U.S. should provide world stability using the necessary combination of military power and diplomatic negotiation.

The professors' underlying theory is that, to get elected, a politician need only recognize that voters generally hold one of the three views, then he can "play" to the most widespread view.

Personal Interviews

After programming Illinois State's 6K-byte National Advanced Systems Corp. (NAS) AS5000 computer with 60 statements reflecting those views, Cragan and Shields then conducted over 200 hour-long personal interviews with Peorian voters, Cragan explained.

Part of each interview was devoted to such "standard" questions as the interviewee's age, sex, race, income, whether he had voted in the last election, for whom he will vote in the next election, whether the respondent considers himself conservative or liberal, and what part of Peoria he lives in.

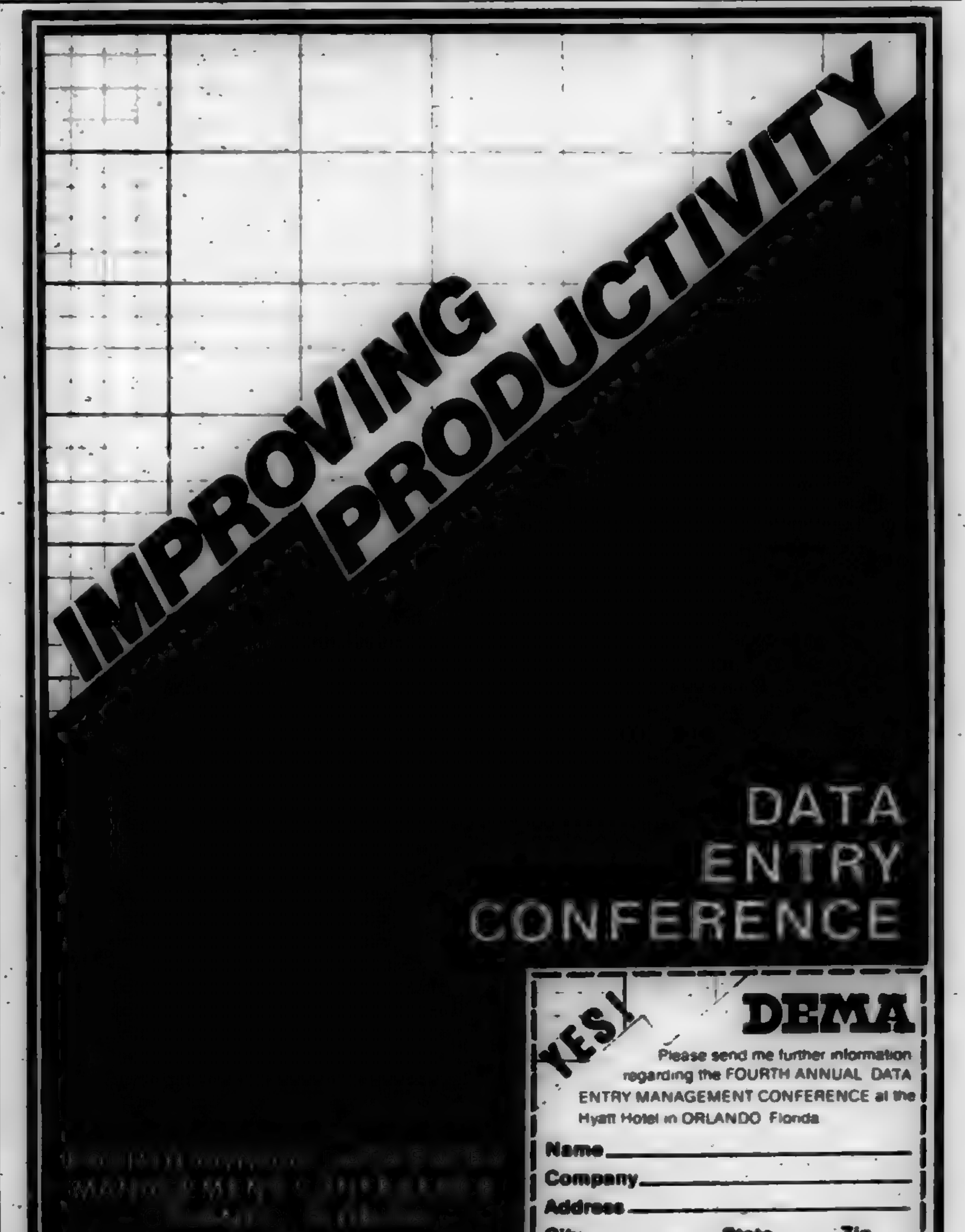
The interviewees, who remained anonymous, were then subjected to a "Structured Q-Sort" questionnaire which "forces a person's opinion along a bell curve," Cragan explained.

"[We had] a set distribution [of statements]," Cragan said. "Respondents had to eventually find the two statements they liked the most, the next three statements they liked the most, then the next six, the next 11, and then the next 16.

"Say you're the candidate, you're meeting with your advisers at six in the morning, and you're going to be interviewed by the press that day in Peoria," Cragan suggested.

"The adviser will tell the candidate, 'Okay, on Afghanistan, here's what you can say . . . Now, if pushed, you can say at least this much more,' " Cragan explained, "so instead of just delivering a speech, the candidate [could] also do question-and-answer."

And — if the fiction of George Orwell's *1984* were to become reality — the professors' system could come in handy with its built-in reverse capability of creating a speech sure to offend the most people and please the least.



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Operators Put Jobs on Line

(Continued from Page 1)

shut down twice by officials and become the subject of a union grievance.

IBM sent out a letter in late April informing its 3800 users the printer contains Trinitrofluorenone (TNF) in its photoconductor. TNF, the users were told, causes mutagens in laboratory mice and is a suspected carcinogen.

At that point, the machine was shut down immediately for "about 48 hours," according to Zachary Zambri, director of management information system operations for the New York State Department of Social Services. "We were very concerned for the safety of the workers."

Zambri turned the problem over for investigation to the state's Safety and Health Maintenance Committee (SHMC), which is composed of both state officials and representatives of the Civil Service Employee's Association (CSEA), the state workers' union.

After consulting with IBM and the Environmental Protection Agency (EPA), the SHMC declared the 3800 safe and it was reactivated, Zambri said.

However, the printer was shut down again on the evening of Aug. 28 after Zambri was notified at home that operators were concerned about a story appearing in the Aug. 25 edition of *Computerworld* describing TNF's carcinogenic potential. Again, the SHMC, IBM and a host of federal agencies, including the EPA, the National Institute for Occupational Safety and Health (Niosh) and the Occupational Safety and Health Administration (Osha) were consulted.

Employee Files Grievance

No on-site investigation was carried out, angering workers and prompting operator Nanci Moquin to file the grievance with the CSEA that led to the distribution of the protective garb.

"I didn't feel IBM should monitor its own machine under those conditions," Moquin said, referring to the vendor's input with the SHMC. After the 3800 was reactivated the second time, "We were told point-blank if we continued to refuse to operate the machine, we would be brought up for insubordination."

In her grievance, Moquin asked that the state conduct an independent study of the situation, that operators be supplied protective equipment and that the department make available the contents of the SHMC's deliberations.

"I don't know where we are right now," Zambri said of the grievance's first request. "We will take it up with the SHMC and it will be up to them."

The second request has been fulfilled with the issuance of the gloves, masks and smocks, and the CSEA has contacted the SHMC in order to obtain the requested documents, he said.

Possible Overkill

SHMC co-chairman David Rings, insisting the state has taken every possible measure to insure worker safety, said of Moquin's independent study request, "I think it's overkill."

Besides consulting IBM, the state's health department's division of laboratories and research conducted independent investigations of the problem, he added. Its finding: The 3800 poses no threat to workers.

That finding was reinforced in a letter from New York State Health Department Commissioner David Axelrod to Rings. In it, he claimed the EPA, the National Institute for Health, Niosh and Osha all agreed with health department findings absolving TNF in the 3800 as a possible threat to operators.

Differing Attitudes

Rings stated that, to his knowledge, there was also no reason to believe TNF in the 3800 posed a possible human threat through inhalation exposure.

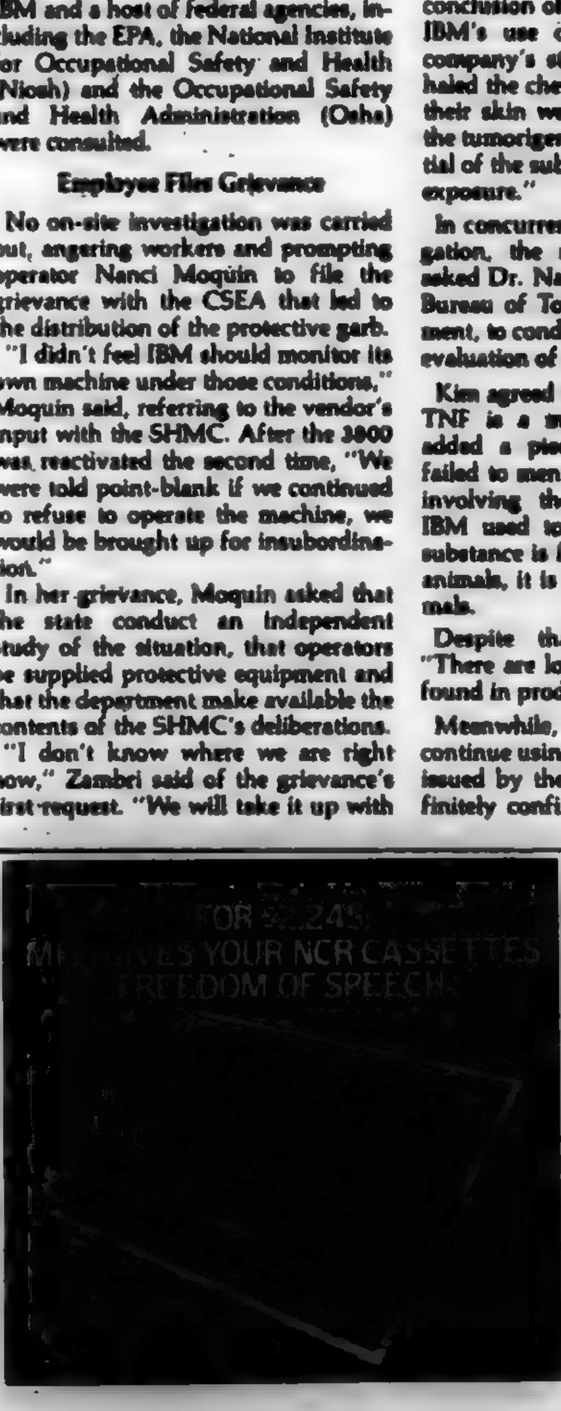
That position is at variance with the conclusion of an EPA status report on IBM's use of TNF that states the company's studies in which mice inhaled the chemical or had it applied to their skin were "inadequate to assess the tumorigenic or carcinogenic potential of the substance by those routes of exposure."

In concurrence with its TNF investigation, the state health department asked Dr. Nancy Kim, director of the Bureau of Toxic Substances Management, to conduct her own toxicological evaluation of the chemical.

Kim agreed with IBM's findings that TNF is a mutagen in animals, but added a piece of information IBM failed to mention: In 90% of the cases involving the Ames technique that IBM used to evaluate TNF, when a substance is found to be a mutagen in animals, it is also a carcinogen in animals.

Despite that, though, she said, "There are lots of animal carcinogens found in products we use everyday."

Meanwhile, Moquin has vowed to continue using the protective garments issued by the state until the EPA definitely confirms TNF's status.



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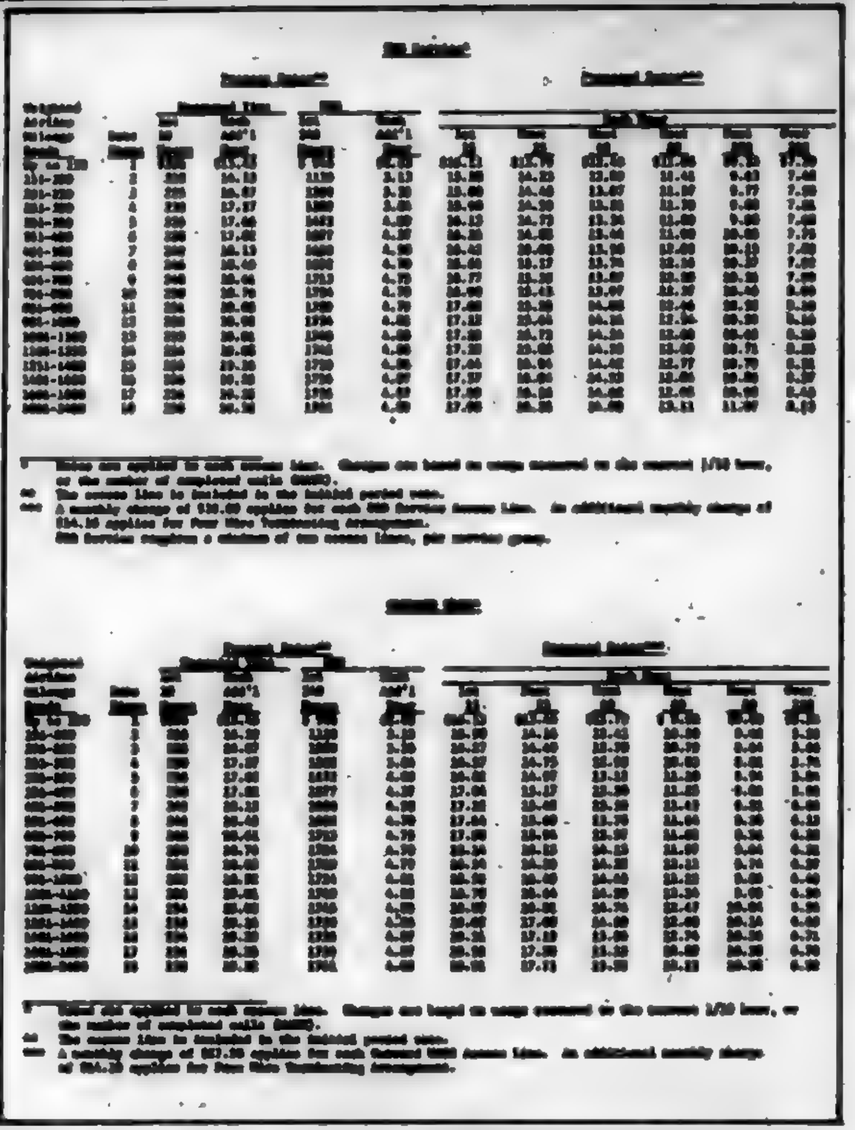

Shown above are the present and proposed Wats rates for the 48 contiguous states.

Bell Asks Wats Rate Cut

(Continued from Page 1)

suspension.

This latter option — the one seen likely to be adopted — would allow the increases to go into effect but require the phone company to keep track of the revenues collected from those customers charged higher rates so refunds could be made if the increases were ultimately found to be unjustified.

Basically, AT&T has eliminated its present, separate rate schedules for 800 service (in-Wats) and Outward Wats, along with the MT and FBD bulk rates enjoyed by both groups of customers. In their place is a single tariff that charges declining hourly rates as usage increases.

The proposed tariff, like the present one, divides the U.S. into six service areas and 22 concentric mileage bands. The hourly rates go up as the area covered by the subscriber's Wats service — in other words, the number of mileage bands — increases.

AT&T will be charging extra for some facilities presently included in the basic Wats service charge. Now, for example, inward and outward Wats users receive one access line and a telephone set at no extra charge. Under the proposed tariff, both of these items will be billed separately. In addition, nonrecurring charges — for installation, relocation and conversion of facilities, for example — as well as charges for extensions have been restructured and in many cases increased.

'Tapered Rates'

A key feature of the proposed tariff is the use of "tapered" rates.

Under the present scheme, MT and FBD users pay a nonvarying rate for each hour of usage above the bulk-rated minimum. The new scheme, by comparison, charges less per hour.

For example, an In-Wats MT user who subscribes to Mileage Band 1 service (up to 150 miles) now pays $206 for the first 10 hour/mo of usage and $15.45 for each additional hour. Under the proposed rates, he would pay $15.11 for each of the first 15 hours, $13.79 for each of the next 25 and so on, down to $7.20 per hour beginning at the 241st hour.

These tapered rates are among the changes intended "to directly reflect the costs of providing [Wats] service at various levels of usage," AT&T said. The phone company has been feuding with the FCC about this point for years. The commission has alleged basically that MT users have been subsidizing FBD users. It is not clear if the new tariff answers the commission's objections.

Another likely source of controversy is AT&T's use of a 12.5% rate of return to determine its new Wats rates. The currently authorized rate is 10.5%, but the phone company argued that the commission is now considering whether to allow a higher rate.

AT&T said that if the return on Wats is not pegged higher than 10.5%, overall earnings on interstate services during 1980-1982 will fall below the authorized rate.

The company "is actively studying the possible need to increase rates for its private line services" — an indication that if the 12.5% rate of return is shot down by the commission, an attempt will be made to recoup the lost revenue from private-line customers.

Fireman's Fund Executive Makes Business Top Priority

(Continued from Page 1)

exercise a strong voice in shaping new management policies, the main authority for deciding which policy proposals to accept and which to reject should remain squarely in the hands of a company's senior, nontechnical executives, Sommerhauser said.

Jerome D. Sommerhauser

Corporate Functions

Sommerhauser's view of computing's role in effecting corporate change is exemplified by his own function within Fireman's Fund. In interacting with his company's users, the senior vice-president of systems restricts himself to serving primarily as a technical advisor, and he scorns the thought of dictating IP policy to anyone outside the bounds of his departmental responsibilities.

"Basically, I see myself as someone who gives our firm's users computer-related guidance and assistance and leads them to the leverage points of business operations where computing can cost-effectively be deployed," he explained.

But even though Sommerhauser lacks the authority to dictate corporate-level business strategy, he still counts himself among his company's most important officers. Indeed, he enjoys the distinction of being one of only a dozen or so Fireman's Fund senior vice-presidents.

Higher Up

Immediately above him in the management hierarchy is the company's sole executive vice-president, who heads underwriting for the various Fireman's Fund property-liability and life-insurance subsidiaries throughout the U.S. Immediately below him are an estimated 30 corporate vice-presidents.

As one of his firm's 20 highest ranking executives, Sommerhauser belongs to the Fireman's Fund senior management group, which serves basically as a corporate policy-making and review organization. The group consists almost exclusively of vice-presidents and senior vice-presidents who, like Sommerhauser, report directly to the insurance company's two vice-chairmen.

In addition to serving as a member of the senior management group, Sommerhauser directs his computing organization's applications development, operations, product procurements and systems planning. His scope of authority also includes an IP staff that numbers about 700 and an annual budget that totals $30 million, excluding voice communications.

Past Experience

Now 42, Sommerhauser assumed his current position almost two years ago after serving about five years as his company's vice-president of systems.

His career as a computing professional began in 1960 when he joined Hughes Aircraft Co. after pulling a two-year hitch in the military and dropping out of San Fernando State University nine academic credits short of a bachelor's degree in business administration.

In his three years at Hughes, he laid the technical foundation for his later career by working variously as a programmer, technical support manager and application development manager.

In 1963, Sommerhauser left Hughes to go to work for Computer Usage Co., a small software house, where he was employed for seven years as a project manager, branch manager and finally as a regional manager. He stayed with Computer Usage until 1970 when he took a three-year leave of absence to become a member of a consulting team assigned to manage the Fireman's Fund systems operation.

This is another profile in Computerworld's *occasional series on DP professionals who climbed the executive ladder by beating the technician image.*

When the consulting contract ended, he accepted an offer to come to work full-time for Fireman's Fund, and in 1973 he joined the company as vice-president of systems.

Sommerhauser's approximately 20 years of experience as a computing professional have given him what he described as a very extensive technical background in his chosen field. But just as important, it has also given him a solid knowledge of business and a keen understanding of where a company's IP organization should fit into the overall corporate scheme of things.

Something of a Rarity

Sommerhauser is, indeed, something of a rarity in his highly technical specialty: an individual who is as much at home in the world of profit/loss statements and debt-to-equity ratios as he is in the realm of bits and bytes.

This combination of business sense and technical know-how has convinced Sommerhauser of the value of long-term systems planning, of the need for gaining senior management's wholehearted commitment to a company's systems effort, and of the importance of communicating with users in the everyday language of business, not in the intimidating and often unfathomable jargon of computing.

His grasp of both finance and IP has also persuaded him that success in applying systems depends on a deep-seated partnership between the people who supply technical services and those who use them.

To cultivate such a partnership at Fireman's Fund, Sommerhauser and his colleagues have brought their company's technical and nontechnical personnel together into so-called user account teams. Under the account team approach, each new system proposed by the firm's top management is first submitted to a group of nontechnical employees, who produce a detailed description of how they want the future application to work.

After the proposed system's requirements have been defined to the users' satisfaction, the project is turned over to the Fireman's Fund systems organization for implementation and management.

Univac Announces Selective Price Hikes

BLUE BELL, Pa. — Univac last week announced selective price increases on hardware products, software support and on-call service effective Oct. 1.

A spokesman for the company said the increases were necessitated by the continuing escalation of costs in the current inflationary environment.

The purchase, lease and rental price of the Univac 1100/80 mainframe and memory (with the exception of the 1100/805 model) will be increased by 9%. Maintenance charges for the 1100/60 mainframe and memory will increase 7%.

The lease and rental prices for the General Communications Subsystem (GCS), used with all 1100 series systems, will increase by 20%.

Peripheral products affected by the new pricing are the Uniservo 30 magnetic tape subsystem, increased 9% on purchase, lease and rental prices, and the 0770 printer (2,000 line/min version only) with increases of 20% in lease, rental and maintenance costs.

Among the terminal products affected by the price increase are the Uniscope 100 and 200 and the UTS 400 terminals, where monthly maintenance charges have been increased by 7%.

In the Univac MCO minicomputer series, the purchase price for the V77-800 model will increase by 5%, the V76 model by 10% and the 520/620 and V72 through V75 models by 15%.

Maintenance charges on the V77-800, V76, 520/620 and V72 through V75 will be increased by 10%.

In addition, the monthly license fee for 1100 series system support software will jump 10% and systems analyst and customer engineer on-call service prices will be raised by 10%.

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Ramo Sees Government as Technology Referee

CW at Wescon/80

By Molly Upton
Special to CW

ANAHEIM, Calif. — Government's role in the advancement of technology can be critical; the need for a referee grows as technological novelties blur previous boundaries and ways in which society operates, Simon Ramo said in his keynote address to Wescon/80.

Ramo has a lengthy background in both industry and government — including a stint as chairman of the President's Committee on Science and Technology. He is the R of TRW, Inc. and the Ramo of Bunker Ramo Corp. and is now chairman of TRW-Fujitsu.

While comments at Wescon's marketing day conference ranged all the way from advocating direct government subsidy of research and development to indirect aid through tax incentives, to hands-off attitudes, Ramo pointed out the real need for a referee in many areas that are changing, thanks to advances in technology.

Ramo urged industry to recognize that "ours is a hybrid society" in which neither government nor industry is in complete control of the economy.

Although he acknowledged that government's efforts take the piecemeal approach and often seem at counterpurposes, such as the government antitrust suits vs. AT&T and IBM while pitting the two as rivals with the second computer inquiry decision, there is a better way, he asserted.

Ramo recommended that the executive branch annually take the systems view of various emerging issues and review technology's impact on the nation and determine what needs changing and tell Congress.

If the government "regulatory role is handled better, private industry would be able to innovate better," Ramo stated.

Industry's Role

Industry, for its part, could help by accepting the idea the government role of referee is necessary; get away from anti-government attitudes and do everything possible to see government's role is the best one.

In addition, industry could put itself in government's position of asking what's best for society, not simply for its own interest, Ramo said.

The reason why all-out pursuit of technological implementation is not feasible is that this contains potential for harm, he added. Therefore comes the need for government. For instance, unregulated, uninhibited development of technology would lead to the tower of Babel, monopolies, international contests, all with a set of unworkable laws to try to contain the new situations.

Ramo listed several areas of electronic advances that have significant potential for widespread changes to the fabric of current society.

Changing Technology Base

With satellites, the need for allocation of the radio frequency spectrum assumes more importance amid a high level of international competition. Cable can change the concept of fairness in the public interest, requiring a major restructuring in regulation.

The AT&T vs. IBM situation creates a boundary of regulated and unregulated that is "way beyond anything we have had before." The government's antitrust suits, while letting AT&T into the computer industry, show the "difficulty and absurdity of tackling these interface problems," he stated.

Still another area in which technology is outstripping current regulations is electronic funds transfer (EFT). With EFT, conventional banking disappears and the question arises as to who is allowed to be in banking, and who is allowed to offer products to buyers in their homes.

There is also the potential for two-way transmission, offering possible constant polling of voters. A few years from now the issue may arise whether such electronic polling should substitute for a trip to the ballot box.

The involvement of government and technology crosses a wide range of the activities named above, and although some might advocate having one agency deal with these problems, the scope of jurisdiction is too broad, according to Ramo.

Instead, because these problems intermesh, Ramo recommended the systems approach with the executive branch surveying current happenings and then recommending changes needed by government to cope with its responsibility as referee.

Upton is editor of EDP Industry Report, *an International Data Corp. publication.*

Trade Delegation Touring U.S.

China Consolidates Electronics Efforts

By Molly Upton
Special to CW

ANAHEIM, Calif. — The Peoples' Republic of China has consolidated electronics production and trading arrangements under one organization, the China Electronics Import & Export Corporation (Ceiec) in order to facilitate advances in technology and to promote trade, according to Zhenghang Li, president of the Ceiec.

In addressing a press conference at Wescon/80, Li was accompanied by seven other executives and semiconductor engineers who are touring the U.S., visiting plants and conducting preliminary talks regarding possible joint venture arrangements.

Because the degree of sophistication of electronics is a commonly accepted measure of the development level of a country, one of China's primary goals is advancement of its electronics industry, Li said.

Currently the country is in the process of converting from the days of the cultural revolution, when attendance in universities declined because young people were sent to the countryside to work. Thus Li said he doesn't expect many electronic engineers to graduate from universities this year, but that the number will increase greatly in the next few years. The cultural revolution ended in 1977.

China's computer capabilities include production of a mainframe with a maximum capacity of 5 million operations per second, and research and development efforts are being conducted on single-chip microprocessors, Li added.

Chinese Salary Scale

There was silence in the room as Li explained the salary scale in China. He said that while rates have not been set precisely, the plan is that wages for joint venture enterprises should be more than those paid domestically but less than those prevailing in Hong Kong.

Within China, the average wage for engineers and workers is about $105 a month. Li hastened to add that engineers would be paid more. However, he could not give the starting salary of an engineer recently graduated from a university because currently there are none. Students have only been flocking to universities since 1977 when the cultural revolution ended.

The size of the industry under the aegis of the Ceiec is impressive and indicative of China's seriousness in attempting to make it easier for foreign nations to do business with it.

There are about 3,000 companies employing 90,000 engineers and one million workers in the broadly classified electronics industry under the Ceiec. The Ceiec, in turn, reports to the Fourth Ministry of Machine Building, which has total responsibility for electronics.

Prior to the inception of the Ceiec this past April, foreign companies would have had to deal with several Chinese government agencies when attempting to establish any type of trade venture.

Balanced Trade Wanted

While China's goal is to have a balanced trade, Li acknowledged that it recognizes this won't happen immediately. Basically Li wants exports to pay for imports.

Currently the Ceiec has some arrangements to perform assembly of televisions and tape recorders for companies in Hong Kong, and he said the customers are satisfied with the quality of work performed. Chinese production is manually intensive, but Li hopes to convert to more automated techniques.

To encourage joint ventures between China and other countries, the Chinese National Peoples' Congress has approved a joint venture tax structure, Li said. In addition, there are currently no restrictions on the amount of ownership that foreign companies can hold in a joint venture.

Asked the value of imports and exports, Li demurred, saying it is a trade secret, adding that the nation is in the second year of readjustment following the change in government philosophy, and planners are now drafting five- and 10-year plans. In 1981 the Peoples' Congress will vote on a five-year plan which will then be made public.

The Ceiec has branches in port cities such as Shanghai, Guangzhou, Tianjin and Shenzhen. The Ceiec delegation is touring the U.S., beginning with Silicon Valley and Wescon/80 and then heading east to reciprocate previous visits by American companies and to gain an overall view of the scope of electronics industry in the U.S.

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Spearheaded by Automated Offices

Communications Revolution Predicted for '80

By Molly Upton
Special to CW

ANAHEIM, Calif. — One aspect of the telecommunications revolution of the 1980s will be spearheaded by automated offices, specialized integrated circuits and the use of packet-switching techniques to support digital and voice networks, according to speakers at telecommunications sessions at Wescon/80.

At the session entitled "The Telecommunications Revolution of the 1980s," Kay Magleby, president of Bell-Northern Research, Inc., said the PBX will play an extended role in future office systems and will evolve into "digital business communications systems." These systems will be able to carry digital voice, data, images — either at facsimile or copier resolution — and textual information all interchangeably.

One reason why the office will be among the first areas to undergo, utilize and promote changes in communication is that "they are seen to have a cost/performance threshold which is relatively high and rapidly going higher," Magleby added.

Future office systems will have several layers of communication linkages in contrast with present systems that "tend to be organized as centralized services surrounded by 'telecommunications,'" Magleby continued.

Terminals will be personal access devices and designed in a turnkey fashion for particular vocational tasks. These personal terminals, grouped in clusters in local networks, will communicate at bandwidths measured in tens of millions of bits per second, Magleby predicted. These local nets will also be able to interconnect.

Future Capabilities

As an example of future capabilities, Magleby cited the electronic mail system at Bell Northern Research that uses corporate directories to locate people within BNR and its parent organizations of Northern Telecom, Inc. and Bell Canada and sends written messages to the correct locations where recipients can access them from terminals.

In addition to the above asynchronous system — where two people don't have to be in simultaneous communication — there are also conferencing methods. Magleby cited the "Scribblephone" originated by Gordon Thompson at Bell Northern Research.

It provides a "shared visual space between separated locations into which both parties may write or draw with the effect simultaneously visible to both."

Gunner Hurtig of Hitachi America, Ltd. outlined several steps that will ensure more appropriate circuits for telecommunication applications.

Although silicon usage in the communications industry could approach $2.5 billion by 1985 — representing more than 15% of the value of semiconductor shipments — most of the value will be in memory rather than in logic chips.

Because the volume of logic chips will be relatively small, one cannot expect the rapid decline in price that has occurred in other areas where volume encouraged price reduction, he said.

The steps that can be taken to promote better, economical chips begin with more explicit and uniform specifications. Software can be the source of needed flexibility. Hurtig sees a "hardware-specific, ROM-coded, software-flexible signal processing device" beginning to compete with stand-alone, special-purpose large-scale integrated (LSI) circuits.

CW at Wescon/80

Packet Switching

E. Bryan Garne, director of the communications products technology center at GTE Laboratories, Inc., said packet-switching techniques will be used for digital voice and data networks. This opinion was echoed by John K. Peters, vice-president of advanced network services of GTE Telenet Communications Corp. (GTE).

Garne said although the phone network appears to be going to 64K bit/sec digital synchronous operation, "this format is not particularly flexible; it will not facilitate the integration of voice and data signals in the telephone network."

He advocates packet operations since they can "accommodate a proliferation of terminals. Packet networks will be able to support integrated voice and data services by providing 4-wire, end-to-end facilities or incorporating echo cancellers on 2-wire voice communications."

Peters said voice digitization will probably first occur at the PBX but, as the cost of the key component, codec, declines, it could be feasible to digitize in the "electronic telephone." When this happens, the market opportunity for local digital networks will explode.

Upton is editor of EDP Industry Report, *an International Data Corp. publication.*

Attendance Records Shattered

Special to CW

ANAHEIM, Calif. — Wescon/80, the Western Electronics Show and Convention, broke all previous records for attendance here last week.

The show, with 1,155 booths and 626 exhibitors, filled the Anaheim Convention Center; some companies had to be turned away because of lack of space.

The previous high number of booths was 1,310 in 1969.

Attendance, including preregistration, totaled nearly 49,000 the morning the show opened, and show organizers predicted a total of 60,000.

Attendees Predict 24% Rise In 1980 Computer Sales

By Molly Upton
Special to CW

ANAHEIM, Calif. — Sales of computer equipment in 1980 should rise by as much as 24% above 1979 sales, according to a survey of attendees at the Wescon/80 marketing day.

Eighty percent of the 80 respondents said they see computer sales up by as much as 24%, with another 7.5% of respondents calling for a big rise between 25% to 49%.

Respondents included manufacturers, distributors and sales representatives holding corporate management, manufacturing and marketing positions.

Respondents were fairly evenly split — 44% and 36% — among those foreseeing only a 10% rise and those seeing a jump of between 10% and 24%.

Asked about sales of particular types of components, respondents were most bullish on integrated circuit memories and microprocessors. Forty-nine percent of the more than 40 responses indicated memory sales should rise between 10% and 24%, whereas another 31% predicted a more cautious 10% rise. Regarding microprocessors, 39% of the respondents voted for the 10% rise while another 35% voted for the 10% to 24% rise.

Sales of electronic equipment to the commercial and industrial markets during 1980 should exceed those of 1979 by as much as 24% the survey said, with 60% of the more than 100 respondents holding this opinion. Another 5% see a rise of between 25% and 49%.

In both markets, the majority of respondents indicated they anticipate only a moderate jump of up to 10% — not much when one considers inflation.

Opinion on 1980 sales of consumer electronics was more mixed, with an almost equal number of attendees predicting a 10% decline or rise in sales.

In 1981, things should be somewhat better. Eighty percent of respondents see sales rising by as much as 24% over those of 1980 in the commercial and industrial markets. However, the preponderance of attendees chose to be on the cautious side, indicating a rise of less than 10%. The optimists calling for a rise of 25% to 49% represented only 2.5% of the sample for business in the commercial sector and 5% for the industrial sector.

Attendees said the next President of the U.S. will be Ronald Reagan: Of those attendees surveyed, Reagan received 64% of the vote, Carter 26% and Anderson 10%.

Upton is editor of EDP Industry Report, *an International Data Corp. publication.*

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Equipment Must Fill New Office Needs: IBMer

By Tim Scannell
CW Staff

CHICAGO — Equipment to the office automation field is usually an offshoot or adaptation of the technology common to DP. However, new applications require that common equipment be used for uncommon situations.

For instance, although office automation relies heavily on printers to reproduce text and data, most printers do not have the print quality that people want — that of the everyday office typewriter. "The quality of print and formatting of print really do help in the information transcript," Samuel J. Kalow, a manager of office systems with IBM, said.

CW At DPMA

Speaking at last week's National Symposium on Office Automation, the first of many planned by the Data Processing Management Association's (DPMA) Education Foundation, Kalow spotlighted the various applications needs of office automation in relation to currently available hardware. For the most part, he painted a picture of the game being the same as that of DP, but the rules decidedly different.

One of the major reasons and arguments for office automation, particularly in an environment of heavy paper traffic, is for electronic document distribution. Basically, that is a way to store and forward messages using a computer as an electronic post office. However, even though the major airlines have been using a form of electronic mail for relatively short messages in their baggage retrieval systems — proving that the concept works — most office personnel still prefer to type documents and manually mail them to each other, Kalow stated.

By not investigating or developing electronic distribution systems, managers are limiting themselves to the typewriter's and typist's capabilities. Just as a chain is as strong as its weakest link, manually typing documents is restricted to the speed of the typist, which is estimated to be about three keystrokes per second, the IBM manager said.

Familiarity with the output of a standard typewriter can also breed contempt for computer output or printouts. Because some firms avoid integrating the efficiency of the DP department's computer with the quality of a word processing printer, a lot of office people usually retype the machine's printout to put it into a higher quality format. That chore is not only redundant, but wastes valuable time, according to Kalow.

In addition, most managers do not realize that people are not really too upset with a computer-produced or -generated letter. At IBM, for instance, everybody knows that the majority of interoffice correspondence is made up of form letters or authored by computers. However, people are satisfied just to have "that piece of paper stuffed into an envelope and delivered conventionally," Kalow pointed out.

Filing and Storage

Focusing on the subject of filing and storage, Kalow — who has been with IBM since it acquired the patents and developments of the Peirce dictation systems in 1960 — noted that office automation would not only save filing time, but save a great deal in storage costs.

Typically, if a user wants to store a page of text, it can either be rekeyed into the computer or scanned and converted into a bit stream by an optical character recognition (OCR) device.

Tying the office function into the computer would make the process automatic; when the document is created, its duplicate would be maintained in mass storage.

As for cost and saving the shrinking corporate buck, Kalow revealed that according to IBM it costs about $300/year to keep a standard four-drawer paper file today, considering update and maintenance time. However, using a computer's disk files to store the same amount of information costs approximately $15/year, and will be priced even less with the dawning of video disk technology, he claimed.

Two Final Areas

Finally, two other areas that are in the applications future for office automation are distributed printing and voice recognition.

Distributed printing or publishing will be an application aimed at corporations — like IBM — that issue and constantly update a great deal of documentation and manuals, or organizations — like the American Medical Association — that issue a great many bulletins and lengthy reports to thousands of members. Basically, the concept involves storing reports and the like on a disk file rather than maintaining paper copies. That technique is especially desirable with the cost of paper rising about 30% per year.

Presently IBM, considered a front runner in technology, maintains copies of all its documentation at a storage facility in Mechanicsburg, Pa. Each time a manual is updated, the previous issue — sometimes involving hundreds of copies — must be destroyed to make way for the new version. Using a computer's mass storage to save this documentation would avoid having to destroy and waste paper when later versions are released.

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Wasting 15% to 40% of Work Time

Managers Found Resisting Office Automation

By Tim Scannell
CW Staff

CHICAGO – Although studies have shown that office automation can save administrative time and boost productivity, top management today usually spends less than 2% to 3% of its time looking at computer printouts or dealing with information retrieval machines such as terminals or intelligent workstations.

In fact, most managers purposely avoid the idea of office automation and carry out company business by picking up the telephone and talking with an associate, traveling to conferences or engaging in face-to-face meetings, according to Harvey L. Poppel, a senior vice-president of Booz Allen & Hamilton, Inc. and leader of its worldwide systems practice.

Addressing a mostly management audience here at last week's National Symposium on Office Automation, Poppel cited some of the major obstacles facing full office automation and a number of its advantages, particularly to office productivity.

Wasted Time

While full office automation, integrating video, text and data, will not occur until "well into the 1990s," by 1985 large corporations could save an average of 15% in "knowledge worker's" time and in pretax income by adopting office automation into their administrative schemes, Poppel claimed. Basing his findings on a recent Booz Allen study on productivity, Poppel pointed out that professionals today are spending from 15% to more than 40% of their time on nonproductive or wasteful activities.

Completed a little more than two months ago, Booz Allen's multi-client study on managerial and professional productivity took a year to conduct and involved about 300 professionals in 15 major U.S. corporations. Actually a series of in-depth case studies, the productivity research consisted of hundreds of personal interviews and a careful recording of each manager's use of time within a company.

Each participant in the study carried a wallet-like folder containing a device that beeped at 20-minute intervals. Each time the device beeped, the manager would record what he was doing at the time and rate its importance on a scale of one to 10. The participant would also record other facts relating to work output, activities and habits, Poppel explained.

Managers Avoid Computers

Results of the year-long study showed that although office automation, as a concept and a limited actuality, has been around for quite some time, most managers still rely on standard, noncomputerized ways of conducting business. On the average, 25% of a top manager's time is spent on such nonproductive things as traveling, filing and seeking information and doing previously accomplished tasks, Poppel noted.

Forty-six percent of a manager's time is taken up by over-the-telephone or face-to-face meetings and the remaining 29% of work-related time involves creating documents, reading and other types of thought work, he added.

Results of the study showed that upper management spends too much time on nonproductive activities and not enough time on analytical and planning activities, updating professional skills or taking part in the decision-making process, the Booz Allen vice-president said.

The $1.5 million study also revealed that office automation practices could result in a time-savings of $125 billion for business on the whole by 1985 and close to $300 billion by 1990.

Cart Before the Horse

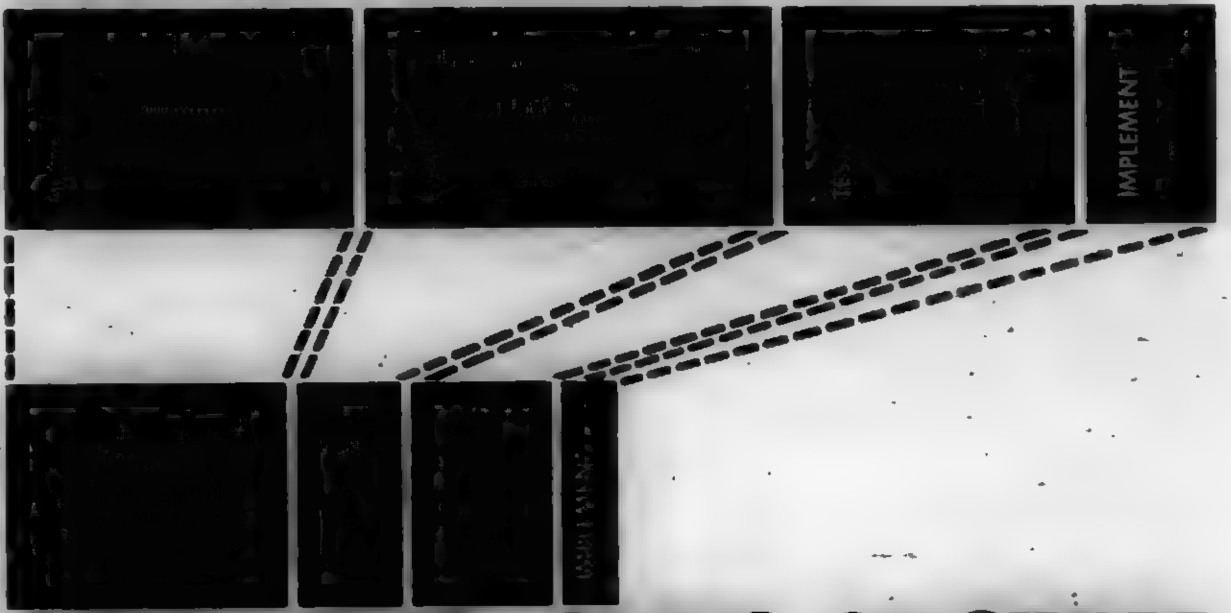
Unfortunately, most corporations are operating under a cart-before-the-horse philosophy when it comes to office and corporate wide automation, according to Poppel.

While about $80 billion is spent each year on computers and communications equipment by clerical and other nonprofessional sectors of a corporation, only about $21 billion is being spent yearly on automated tools for top management. As a result, corporate professionals are insulated from computer-based decision support and information exchange systems, which are keys to achieving success, Poppel continued.

CW
At DPMA

The bottom line is that the performance, productivity and work quality of upper management suffers when excluded from the technological attention that has been reserved for the DP department, he added, hinting at the U.S.' low level of business productivity as compared with other countries.

Presently, there is no single office automation solution. Just as each user's needs are different, each vendor is offering a product to fill a specialized requirement such as just word processing or just file storage, Poppel said.



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Focus on People Urged for Office Automation

By Tim Scannell
CW Staff

CHICAGO — To be successful, office automation strategies should be concerned with three things: productivity, technology and people. And more emphasis should be put on people since the technology will impact users "very specifically and sometimes very drastically," according to John J.Connell.

Connell is the founder and director of the Office Technology Research Group, Inc. in Pasadena, Calif., an association of data processing and telecommunications executives from major corporations who are concerned with keeping track of developments in the office automation field.

Speaking to a luncheon audience here at last week's National Symposium on Office Automation, Connell pointed out that while business spent about $210 billion on office machine costs last year, it invested about $600 billion on people. In addition, that people figure is expected to grow in 10 years to about $1.5 trillion, according to statistics supplied by Booz Allen & Hamilton, Inc., he said.

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At DPMA

'Unfeeling Black Box'

Business is currently headed into a world where "we're going to put strange machines into a nontechnological environment and we don't know what the behavioral aspects will be — positive or negative," Connell observed.

Management innately resists office automation because of fear of the technology, fear of errors and fear of looking bad. Basically, a manager's perspective of the technology is that it is "rigid, structured, unforgiving and unresponsive," Connell said.

That image is propagated by DP because those are the overwhelming aspects of most data base systems.

In a slow and careful voice, Connell warned that management has not forgotten the computer's image of being an unfeeling black box that inhibits creativity. In an effort to ignore the technology or deliberately boycott it, managers often will refuse outright to use a terminal or will practice benign neglect whereby "the hood never comes off the machine except when company comes."

The solution to swaying the nontechnical person over to the office automation court is to adapt the technology to the individual and introduce change on the basis of benefits to the user and not the company, Connell stated.

However, the greatest resisters to office automation are those involved in DP, he added. "The visionaries, the innovators of the '50s, '60s and '70s, have become the reactionaries and are in the forefront of trying to ignore everything in the office." Biased by a "Fortress mentality," DPers either claim the office automation field doesn't exist or "won't work and has to be abandoned," Connell claimed.

Solution to Productivity Problem

Office technology is being touted as a solution to the productivity problem because no one has come up with a better idea to increase productivity, he continued, adding that it "is a business problem that has to be addressed in a business way." Connell further cautioned that managers must accelerate the introduction of office automation technology, and "not proceed the way we are going."

Although professionals and managers account for a whopping 70% or more in office costs, corporations haven't invested a nickel to increase their productivity, Connell said. Recommending that managers go on an office automation crusade, the executive director of the California-based research group explained how to launch productivity improvements.

First, establish a top-down corporate game plan and set goals. Next, enlist the aid of present office personnel. Finally, accelerate the introduction of new technologies, he advised.

However, be prepared for resistance. Office automation is growing in an adversary environment with particular opposition coming from senior management, he warned. Top-level managers "sit there know-it-all and pompous and are prepared to shoot you down. And they often do."

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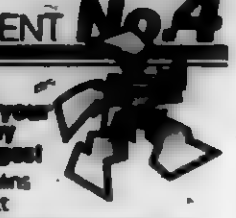

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Settles Dispute With Labor

Pru Agrees to Turn Over Personnel Records

By Jake Kirchner
CW Washington Bureau

NEWARK, N.J. – The U.S. Labor Department and the Prudential Insurance Co. of America have resolved the dispute over government access to Prudential's computerized employee records.

According to a consent order agreed to in a federal court here, Prudential will turn over to Labor all company records requested by the government in its job discrimination review of the Neward-based insurance firm.

The Labor Department, in turn, said it agreed to measures designed to protect the confidentiality of personal data contained in the employee records.

Labor had moved in July to debar Prudential from all government work until it complied with the government's request for the records. Prudential then responded by suing the Labor Department [CW, Aug. 11]. Under the consent order, signed Sept. 8 by U.S. District Court Judge Herbert Stern, both actions have been dropped.

Honest Disagreement

In signing the order, Stern said the Labor-Prudential dispute was the result of an honest disagreement. He is pleased it was resolved without the government having to "impose the most draconian measures" of revoking Prudential's federal contracts.

The consent order concluded a year-long controversy involving Prudential's refusal to give up its employee computer tapes for an Equal Employment Opportunity Commission (EEOC) investigation of the firm's New Jersey-New York area operations. Prudential had argued the tapes contained sensitive personal information outside the scope of the EEOC review and offered instead to turn over computer printouts of edited tapes of the specific information required by Labor.

The Labor Department, however, countered that its investigation would be easier and less expensive if it had copies of the complete computer files to manipulate as it deemed necessary. The dispute led to the Labor order debarring Prudential from its estimated $180 million worth of federal contracts.

Order Overturned

The dibarment order was overturned by Stern July 30. The judge ordered Prudential to turn over some of the disputed records while the final details of the consent order were being worked out.

According to those final details, Prudential said, the requested computer tapes will be provided to the Labor Department without certain employee information, such as payroll deduction, employee benefits and tax information.

In a Sept. 8 statement on the consent agreement, Prudential Chairman Robert A. Beck said, "We think it is now clear that government regulators can't go beyond certain limits." Beck said the agreement shows progress is possible "when the government invites cooperation rather than attempts intimidation."

Judge Stern, addressing the government's attempted debarment of Prudential to force it to turn over its records, said "it is a terrible thing to have to fear one's own government."

Stern commented that "in all good faith, these disagreements can occur," and added it is important that businesses "have at least a day in court without having to face the imminency of a shutdown merely because they may not be in total agreement as to how much information to give the government at any given moment."

Debarment is "the most severe sanction," Stern said, and "ought to be resorted to hesitatingly and as one of the very last, not the first" in such disputes.

Law Seminar Set for October

WASHINGTON, D.C. – "National Information Systems: Getting Ready for 1984" is the title of the Computer Law Association, Inc. (CLA) seminar that will take place here Oct. 20. Speakers will explore the legal aspects of evolving national computer-based information systems.

The following subjects will be discussed: "Securities – The National Market, Clearance and Settlement, Oversight and Surveillance Systems," "Electronic Message Services and Problems Facing the Congress," "Practical Legal Problems in Emerging Satellite/Cable Technology," and "Practical Legal Problems Implementing EFT Systems."

In the speaker lineup will be representatives from both industry and the legal community, according to a CLA spokesman.

Admission to the seminar is $30 for CLA members and $45 for nonmembers.

Further details are available from Daniel T. Brooks, secretary, CLA, 6106 Lorcom Court, Springfield, Va. 22152.

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U.S. Army Recruiting Effort Uses Demographic System To Fill Out Volunteer Ranks

By Tim Scannell
CW Staff

ROSSLYN, Va. — Hit by a lack of volunteers for the all-volunteer Army, the U.S. Army Recruiting Command has decided to use a computer-based geo-demographic marketing system to find out what areas of the country have the more desirable recruits.

Owned and developed by Claritas Corp., a consulting and publishing firm here, the system breaks down each area of the U.S. into one of 40 different socio-economic neighborhoods. The neighborhoods range from the backwoods "tobacco road" types to middle- and upper-class "furs and station wagons" and "blue-blood estates," John Anderson, Claritas' marketing director, stated. Demographic information for the system — called The Claritas Cluster System — is taken from Zip Code and Census Bureau data and U.S. Postal Department surveys.

Basically, the Army plans to take recruiting records for the past three years and compare them with the socio-economic neighborhoods of the Claritas system. By doing this, Army recruiters hope to discover which parts of the country would supply the best soldiers.

However, observers pointed out the Army-Claritas collaboration could be used just as readily by the U.S. Selective Service System to pick and choose more qualified individuals in the event of a national draft.

Basic Market Research

Normally used by such firms as the Coca-Cola Co. and Colgate-Palmolive to direct marketing campaigns, the Claritas scheme takes some of the more than 35,000 Zip Codes and sorts them according to 121 socio-economic variables such as age, number of children, salary levels and other life-style indicators, Anderson explained. The Zip Codes are then listed under one of the 40 neighborhood types.

The neighborhoods, depicting lower-, middle- and upper-class living style, are not particular to any one section of the country, but can be a part of any city in the U.S., Anderson added.

The Cluster system took nearly five years to develop at a cost of about $500,000. The system operates on an IBM 3033 mainframe at the Neshaminy Valley Information Processing Co., a service bureau located in Pennsylvania.

Declining Quality

The Army awarded the contract to Claritas to review its past recruiting successes and failures and to determine where in the country to build additional recruiting centers, Army officials said. In the past few years, the Army's recruiting records for the all-volunteer Army have shown a sharp decline in the number of qualified people enlisting. By placing recruiting centers at key socio-economic spots in the U.S., the Army hopes to direct its enlistment campaign toward a more intellectualy and educated populace.

"The point of our whole system to the Army is to avoid the necessity of going to the draft by targeting the obtainment of recruits more specifically so that they can get a better mix," Anderson pointed out. There's "nothing wrong with concentrating efforts on people more likely to volunteer."

Despite some observers' views that the system could be used to more selectively pick military candidates in any future Selective Service draft, Anderson feels that the Claritas Cluster will be solely used to bolster the all-volunteer service.

"When it comes to the draft, the Army has to concentrate on fairness and equality," the marketing director said. "If they really sought out to take people essentially against their will and use some means of discrimination . . . that would be looked on negatively."

However, "there's a great power in being able to put these Zip Codes together in a cluster to predict what's going to happen in the future," Anderson commented.

Anyway, "it's still going to be several years before we see some practical use of the nine-digit Zip," he said.

Monte Carlo To Host Meet

MONTE CARLO, Monaco — "Electronic Money and Wired Society" is the theme of Payment Systems, Inc.'s fifth annual International Symposium, which will be held here Oct. 26-29. The symposium features presentations on new electronic funds transfer projects now happening in Europe, Japan and North America.

A panel of speakers from credit card firms, traveler payment services, debit card organizations and processing companies will discuss new payment services and alternatives and how they will be integrated with traditional systems, accordingly. All presentations at the event will be simultaneously translated into English, French and German.

Registration includes three nights' lodging and all events and exhibits for $900. Additional information is available from Nancy Italia at Payment Systems, Inc., 100 Peachtree St., Atlanta, Ga. 30303.

Holland to Launch Performance Journal

AMSTERDAM, Netherlands — North-Holland Publishers will launch *Performance Evaluation* in January to serve system theorists, designers, implementers and analysts concerned with the performance of computer systems, communications and distributed systems.

The journal will include articles on theory, techniques, applications or case studies, surveys, news of state-of-the-art modeling and methodology and abstract/reviews of books or papers.

A free copy of the first issue is available from J.C. van Eybergen, North-Holland Publishing Co., P.O. Box 103, 1000 AC Amsterdam, the Netherlands.

OMB Testimonies Conflict

GAO: Computer Lags Hurting VA Health Care

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Poor computer resource management and lack of serious planning for system upgrades is critically eroding the quality of federally provided health care for U.S. veterans, the General Accounting Office (GAO) said recently.

Addressing a congressional subcommittee, Walter Anderson, senior associate director, GAO Financial and General Management Studies Division, said DP support for the 172 Veterans Administration (VA) health care centers has been "decentralized, poorly coordinated and sporadic."

Summarizing a two-year study of VA hospital automation, Anderson's report came as no surprise to members of the House Government Information and Individual Rights Subcommittee, who, like other members of Congress, are constantly barraged with constituent complaints about time-consuming and frustrating dealings with VA doctors and administrators.

Lack of Resources

The problem, according to chief VA medical director Dr. Donald L.Custis, is that the agency does not have the resources to automate the patient scheduling, pharmacy services, laboratory operations and other health care benefits the VA provides the nation's 35 million veterans.

The VA "is considerably behind the private sector in the use of automated data processing for patient care," Custis told the subcommittee. "Even where we have automated data processing systems, most would be considered antiquated by current standards."

Quoting a 1979 survey, Custis said less than 5% of VA hospitals of more than 400 beds have computer systems for admitting, pathology laboratory, outpatient and pharmacy functions. In comparison, more than 85% of similar private sector medical centers have automated these operations.

And the problems caused by this lack of automation are only going to get worse, Custic added, noting that by 1995 more than 60% of all American males over the age of 65 will be eligible for VA health care benefits.

The VA is working on a long-range plan for providing the systems support its medical centers require and has moved to institute interim solutions to its more pressing problems, but has run afoul of the GAO and the General Services Administration (GSA), the agency that oversees federal DP procurements.

Studies by the two agencies found the VA had awarded a number of DP contracts either without proper GSA authorization or not in accordance with standard federal procurement regulations. These revelations brought further scrutiny by the Office of Management and Budget (OMB) and Congress.

Adding to congressional dismay over these contracting irregularities is the VA's long-range planning for its proposed Health Care Information System (HCIS).

Estimated two years ago eventually to cost $520 million, HCIS is an ambitious proposal to automate 13 common functions at each VA medical center, such as admissions, radiology, laboratory work and nursing and pharmacy services.

By way of comparison, 1981 VA spending for medical DP support is estimated at $36.2 million, according to the GAO. But even at this relatively modest level of spending – the VA has an annual budget of about $20 billion – VA planning for use of these resources is "poor," according to GAO's Anderson. This does not bode well for the efficient implementation of HCIS, he added.

Lack of Guidelines

VA long-range planning "is not supported by comprehensive guidelines or the procedures needed to develop the documents which identify and communicate management commitment to meeting long-range ADP needs," Anderson said.

He urged Congress to withhold further HCIS funding until GAO-recommended management and planning changes are made at the VA.

The VA's Custis, however, argued the agency is on the right track and complained withholding funds is only aggravating an already critical lack of VA DP support.

"We have reestablished a close working relationship with the Office of Management and Budget in terms of both short- and long-range planning and use of computers in medical care facilities," he said.

OMB testimony at the Sept. 4 hearing indicated the VA has indeed instituted proper long-range planning practices and taken steps to correct past problems in procuring DP support for its medical centers.

OMB noted the VA is not precluded from taking interim actions to upgrade its DP resources so long as these measures do not interfere with the long-range HCIS planning process.

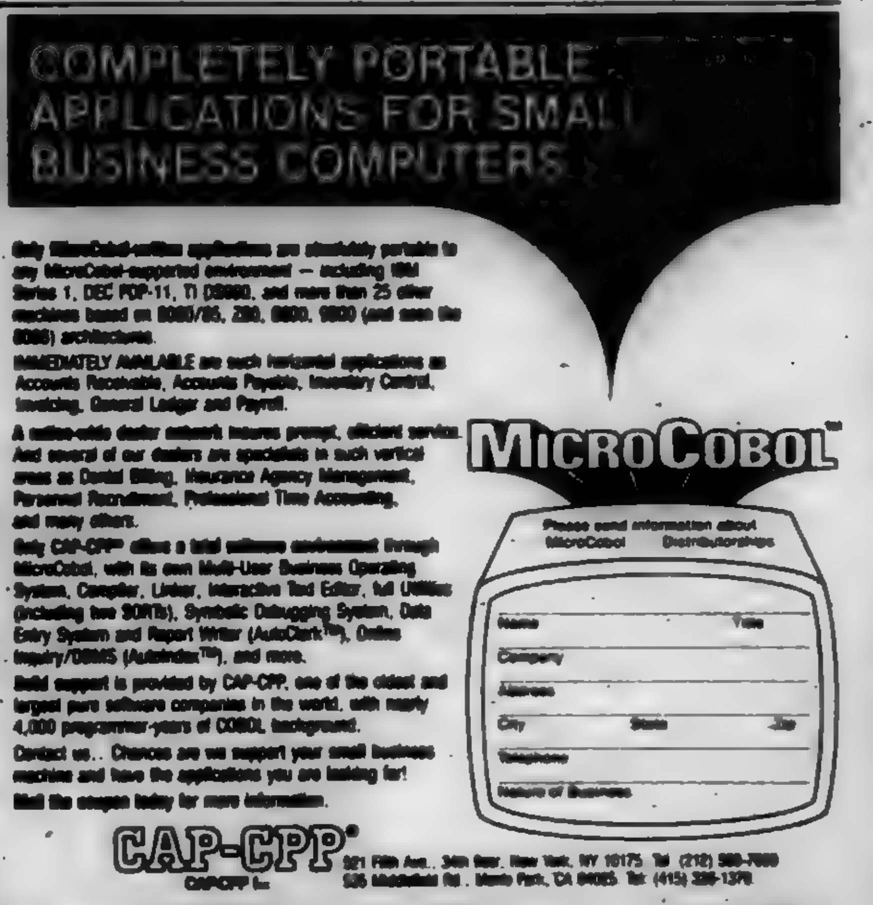
The VA's Custis said his agency is moving to institute whatever short-term upgrades and new system purchases it can afford.

NCA Expands With Subgroups

DENVER – To meet the needs of an ever-growing user contingent, the National Computer Association (NCA) is expanding its organizational structure.

In addition to offering full membership to vendors, consultants, OEMs, manufacturers and users, the nonprofit computer user outfit now features affiliated membership to other computer clubs and is encouraging the formation of subgroups to accommodate members with similar, specialized interests.

According to association director Floyd Burton, new subgroups may be sponsored by vendors or requested by any member of the NCA. The subgroup must have a potential membership of 200 to be cost supporting. Membership within the NCA ($35/year) includes membership within one subgroup. Additional subgroup membership is $15. Details are available from the NCA at 1485 E. Fremont Circle S., Littleton, Colo. 80122.



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Flex Time Found Boosting Data Entry Morale

By Tom Henkel
CW Staff

SACRAMENTO, Calif. – When data entry workers are allowed to set their own hours, they tend to be more efficient, call in sick less often and don't complain as much.

The California Employment Development Department here reached that conclusion when it sought to solve just those problems, according to Senior Data Processing Analyst Tom Adams.

The department interviewed unhappy employees and some consulting supervisors and decided the root of the problem was too restrictive work schedules. Start and finish times were rigidly set, and so were lunch and coffee breaks. Data entry employees interviewed said they wanted more individuality and a greater sense of responsibility, according to a recent report in a Data Entry Management Association (Dema) newsletter.

As an experiment, the employment development department decided to put 32 of 160 day-shift data entry operators on flex time. The other 90 workers were used as a control group, Adams said.

After 18 weeks the employees in the flex-time group were late less often and called in sick less often, and the average length of sick leave was shorter than the control group, Dema reported.

After the first 18 weeks, management was so pleased with the results it made it a policy for all 250 key data operators in the employment development department, Adams said.

Employee Response

Asked how they felt about the new system, about one-third of the data entry employees said it increased morale. Two-thirds said flex time gave them a better home life and that same two-thirds said both the employer and employee were benefiting from the program.

Eighty-seven percent of those polled said they liked flex time, and most added commuting to work was much easier.

Some employees didn't like the program, however. They said safety and security were reduced under flex time. Others didn't like the automatic time accumulator used to keep track of their working hours.

Most employees preferred to get to work earlier and leave earlier. More than two-thirds of data entry personnel were at work at or before the traditional starting time.

Under the concept of flex time, workers can set their own hours provided they work during mandatory "core time" hours, and work a fixed number of hours during a given pay period, according to Dema.

Ansi X3 and X4 Cite Overlap, Merge Efforts

WASHINGTON, D.C. – Members of the American National Standards Institute's (Ansi) Committee X3 on Computers and Information Processing, and X4 of Office Machines and Supplies, have agreed to merge the efforts of their two committees. The merger was recommended because developing technologies overlap both fields and a coordinated organization to develop industry standards is needed, the committees said.

The proposed committee, would be the American National Standards Committee X3 on Information Systems. Its objective would be "standardization in the areas of computers and information processing and peripheral equipment, devices and media related thereto; [and] standardization of the functional characteristics of office machines, plus accessories for such machines, particularly in those areas that influence the operators of such machines," according to an Ansi newsletter.

The Computer and Business Manufacturers Association (Cbema) has agreed to serve as the secretariat of the new committee.

CMG Now Accepting Award Nominations

WALTHAM, Mass. – Nominations for the 1980 A.A. Michelson Award are now being accepted. The annual award was established by the Computer Measurement Group (CMG) to recognize individuals who have made outstanding contributions to the computer performance evaluation field.

Presentation of the award will take place at the CMG XI National Conference, to be held in Boston Dec. 2-5.

Nominations should be forwarded before Oct. 15 to Dr. J.P. Buzen, BGS Systems, Inc., 470 Totten Pond Road, Waltham, Mass. 02254.

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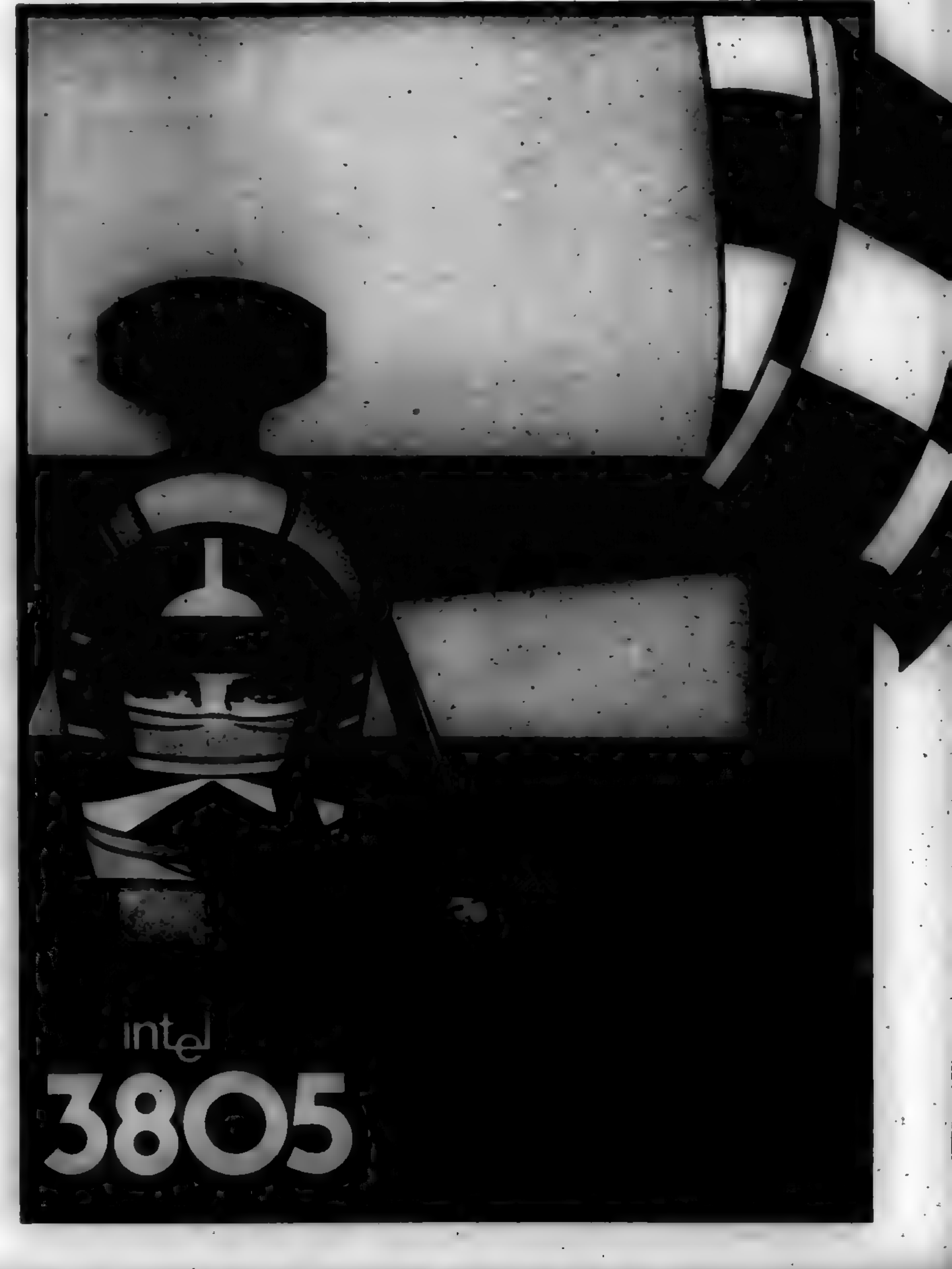

Gets Nibble From Unidentified Carrier

Bolger: Ecom May Begin Before January 1982

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The controversial Electronic Computer-Originated Mail (Ecom) service developed by the U.S. Postal Service (USPS) is likely to begin before January 1982 — the date mentioned by the Postal Service's Board of Governors when it recently authorized it [CW, Sept. 15].

Postmaster General William F. Bolger said here last week that USPS has received inquiry from an unidentified company that is interested in transmitting Ecom-type messages via its own private network to destination post offices; there they would be converted into hard copy and delivered by a postal carrier. If this service is implemented, Bolger said, it will be offered to others.

Bolger, one of the speakers at a seminar on electronic mail conducted by Cavanaugh Associates, a Washington-based consulting firm, also said he expects to complete negotiations with Canada within the next few weeks covering Intelpost: the international facsimile service proposed by the post office. If so, service to Canada could begin approximately a month later.

Charges have not been finalized, Bolger added, but he indicated that a rate of $4 to $5 per page is likely.

After Intelpost service to Canada begins, it will be extended to Europe, Bolger said — despite the Federal Communications Commission (FCC), which has so far refused to let U.S. international record carriers (IRC) provide the needed international circuits. If the FCC position does not change, the Postmaster General said, USPS will send its overseas Intelpost traffic to Canada and have it relayed from there.

Postal union leader La Penta insisted that those who benefit from the new on-line information era be taxed to pay postal workers for the loss of their jobs.

It is ironic, he added, that the U.S., which developed the original idea for Intelpost, hasn't yet implemented the service. Both Canada and the UK began their Intelpost offerings earlier this year, and if the U.S. delays much longer, it may be too late.

One reason USPS is in a hurry to establish Ecom and Intelpost is because prospective private-sector competitors are moving just as rapidly to gain a foothold in the electronic mail and message services market.

Paperless Information

Another speaker at the seminar, attorney Richard M. Schmidt Jr., reported that "1980 saw the inaugural of the paperless book" — a reference to an on-line, frequently updated book of recipes being offered by Compuserve, Inc., a data base retrieval services firm.

Schmidt quoted the publisher of the recipe book as saying " 'It may be that printing on paper is just not that efficient any more. Today every cost associated with traditional publishing — distribution, labor, silver, film, gas, freight and cloth — is going up and will continue to do so, whereas every single cost involved in [electronic delivery] — home computers, word processors, telephone and satellite transmission, silicon chips — is going down and will continue to do so.' "

Other examples of this trend, Schmidt said, are Knight-Ridder Newspapers, Inc.'s recently announced videotex demonstration in Coral Gables, Fla.; the news reports United Press is now distributing through The Source, a low-cost information retrieval service to home computer users; and the inauguration, July 1, of an on-line newspaper service by Compuserve.

The entire editorial content of the Columbus, Ohio, *Post-Dispatch* is now available in electronic form, Schmidt said, adding that several other papers are "lined up" to provide a similar service. They include the *Washington Post, Los Angeles Times, Chicago Sun Times, St. Louis Post-Dispatch* and *Minneapolis Star-Tribune*.

Meanwhile, Warner Communications Corp., which launched a two-way cable television service called Qube in Columbus some time ago, has announced plans to do likewise in Pittsburgh.

Worker Displacement Tax

These developments, according to James La Penta, a director of the postal mail handlers union, mean that end-to-end electronic message services (EMS) will be in widespread use before the end of the 1980s, rather than in the '90s, as others at the seminar predicted.

He insisted that those who benefit from the new on-line information era — starting with service providers and their customers — must be taxed to pay postal workers for the loss of their jobs. La Penta did not go into detail, except to say, in answer to a reporter's question, that the cost of this "adjustment assistance" would amount to "several billion dollars over the next 10 years."

Attorney Timothy J. May, who represents a number of mass mailers, is among those who believe the cost of

(Continued on Page 22)

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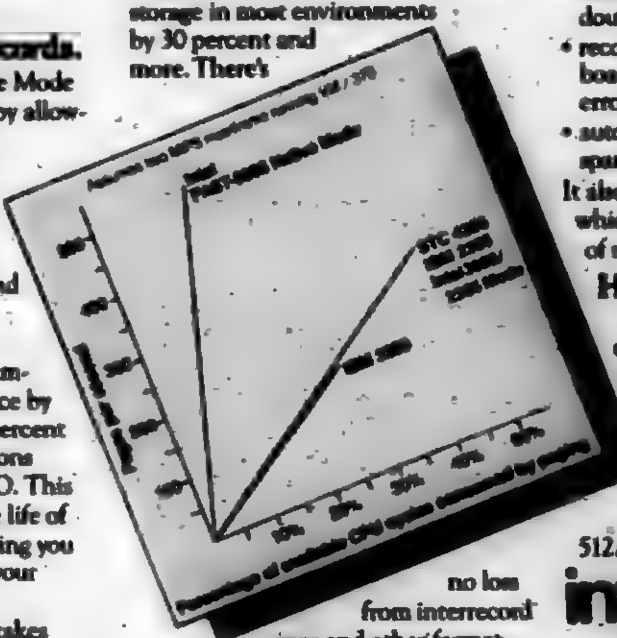

Hiring Growth Hard-Hit by Recession

Headhunters Demanding Fewer Top Managers

By Ann Dooley
CW Staff

NEW YORK — Although programmers and analysts are still in high demand, those at the top of their profession surprisingly may not be as lucky.

The hiring of top information department managers has fallen dramatically from a year ago, according to statistics of the Association of Executive Recruiting Consultants, Inc. (AERC), which showed these DP executives have a worse hiring growth record than almost any other management group.

According to statistics gathered from 135 offices of AERC's 60 member firms, the hiring rate for DP managers earning up to $30,000 fell from a total of three in the first half of 1979 to only one new position in the same period this year.

Hiring of computer managers in the $30,000 to $45,000 income bracket fell from 46 in the first half of 1979 to 23 in the same period this year. Managers hired at salaries of between $45,000 and $60,000 fell from 32 executives in the first six months of 1979 to 28 in the same period this year, the survey showed.

Those executives earning top salaries fared better, however. In the first half of 1979, 12 DP executives were hired at salaries ranging from $60,000 to $100,000, while 18 executives were hired in that salary bracket this year, AERC said. Among those computer executives earning over $100,000, two were hired last year in the first six months and a like number were hired in the same period this year.

Computer executives are not alone in their problem, however. Executive hiring during the first six months of the year was down 3.5% overall, from the record high of the first half of 1979, AERC noted.

However, the engineering/science/-research hires — of which computer management personnel are a part — were fewer (269) than any other management group except manufacturing (240). The most notable trend during the second quarter was a 36% increase in accounting and finance positions (537) which can be attributed to the traditional hiring pattern during a recessionary period, the recruiting firm noted.

USPS May Get Head Start

(Continued from Page 21)

EMS terminals will delay the widespread deployment of on-line mail and message services to the home until the 1990s. But he said that during the '80s there could be a substantial shift of business-to-business mail from USPS to private on-line networks. May predicted the loss would amount to 10% of Postal Service volume and, unless steps are taken to hold onto this business, would force rates significantly upward for the residue of Postal Service customers.

Mass mailers will be among those who have to pay these higher rates, he added, since they're unprepared to make the massive change in their operations that would be required to use EMS. Furthermore, until most homes are on-line, EMS will have little appeal. As a result, mass mail merchandisers will support postal service EMS plans — to help prevent the loss of business-to-business traffic — while opposing legislation designed to encourage commercial electronic mail and message networks.

Although the impact of EMS on postal jobs and postal revenue is likely to come up in the next Congress, David Minton, chief counsel of the House Post Office and Civil Service Committee, indicated that the problems won't get the kind of attention they deserve. Since 1970, when the postal reorganization bill was enacted — establishing USPS as a semiindependent corporation — neither the House nor the Senate has paid much attention to postal matters, he contended, and only a few of the legislators who participated in the 1970 debate will be in the next Congress.

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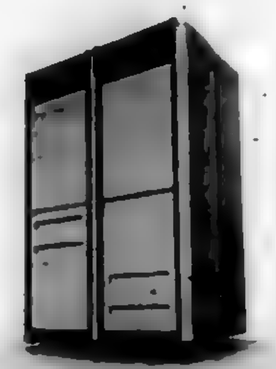

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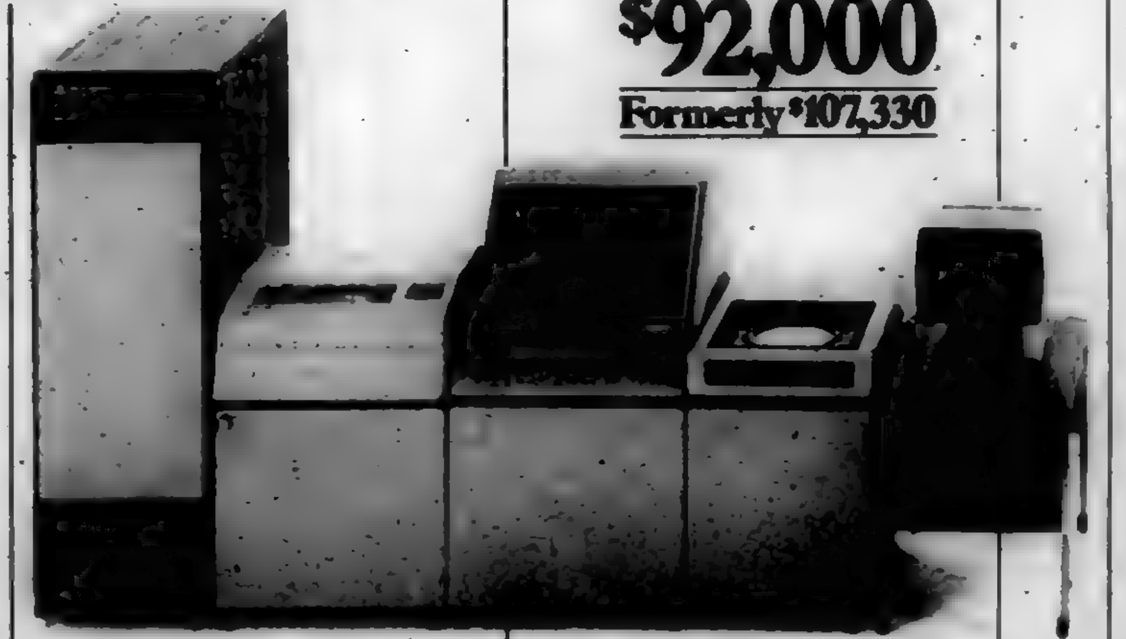

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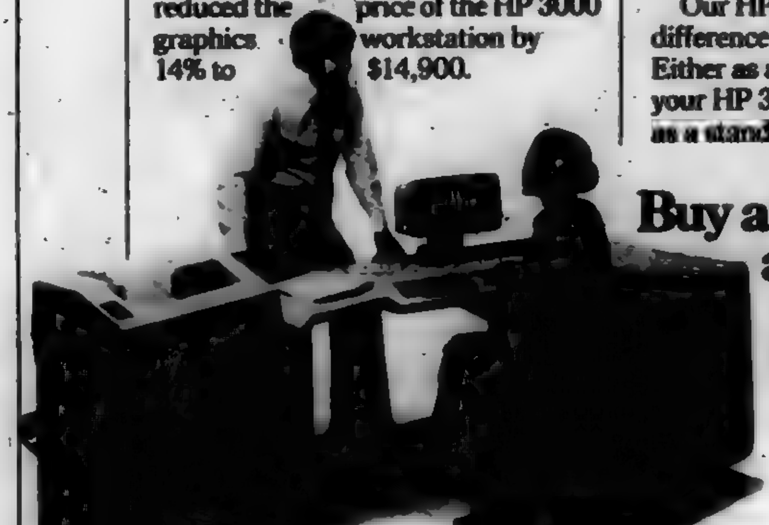

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WIP Establishing 'Old Girl Network'

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Networking, currently the most talked about concept in information processing, is now the hottest concept in the women's movement – different types of networks, to be sure, but not so unrelated as might be supposed.

Women in Information Processing (WIP), a fledgling national organization based here, is building a "feminine counterpart to the powerful old boy's network" to advance the careers of the 300,000-plus women in the information processing community.

According to WIP, the organization's network "builds a community of working women. It helps women help each other to win more clout, more pay, more know-how and more self-esteem."

The rationale for WIP, according to its president, Janice Miller, is that "women have never learned how to use networks. They've always competed with each other." Men have always been able to find mentors to help advance their careers, she noted. But this has not been the case for the young women executive.

In the recent inaugural issue of WIP's publication, *Parity*, Miller spoke of women's "frustration from not understanding corporate gamesmanship and career development. What good are brains, ambition and the taste of success if you don't know what to do next to move ahead?"

Originally an informal, living room network, WIP has evolved in less than a year into a national organization claiming over 500 members, Miller told *Computerworld* recently. Miller said she expects WIP will soon charter new chapters in several other U.S. cities.

Through its monthly meetings and forums for guest lecturers, WIP provides a network for women to make professional contacts, discuss career opportunities and develop technical knowledge.

"Information processing is an exciting field that is still in its infancy," Miller wrote in *Parity*. "More than 200,000 positions are now going begging because there is a lack of qualified staff. Let's make certain women get a share of these opportunities."

Through networks, Miller said, "we will make the 80s the decade of the women. We are the future."

More information about WIP can be obtained form Miller, WIP, 1000 Connecticut Ave., N.W., Washington, D.C. 20036.

Acpa Links Meet To Mini/Micro

SAN FRANCISCO – The Association of Computer Programmers and Analysts (Acpa) will hold its 10th annual meeting here on Oct. 12-16. All DP professionals are invited, and registration for non-Acpa members at the anniversary meeting entitles them to 12 months of free membership.

One aspect of this conference is its close relationship with the Sixth Mini-Computer/Micro-Computer Conference and Expositon also held here on Oct. 14-16. All Acpa participants will have complete access to the other conference at no extra charge.

Keynoting the Acpa program will be Professor Richard W. Hamming of the U.S. Naval Post Graduate School, who will speak on "The Life and Times of One Programmer Analyst," and Carl Amdahl, son of Gene Amdahl, who will address the interrelationship of software and system design. An extensive selection of seminars and technical panels is possible because of the Acpa/Mini-Micro conference proximity.

All-inclusive fees for the Acpa conference for Acpa members is $190, for non-members, $225. Further details can be obtained from Acpa headquarters at 294 Main St., E. Greenwich, R.I. 02818.

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Industry Is Own Worst Enemy

Design Systems for Amateurs, IBMer Suggests

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The information processing industry is bracing for an explosion of widespread computer use, but ironically one thing that could jeopardize that explosion is the industry itself, according to IBM executive Dorothy Selinger.

Believe it or not, there are millions of people "who do not get their jollies by solving problems, by 'bit wacking,' by writing GOTO statements," Selinger, an IBM corporate marketing consultant, told a recent meeting here of Women in Information Processing.

Responding to estimates that by 1990 there will be 70 million computers in use in the U.S., most of them in homes, Selinger predicted, "we're going to have to work very hard" to overcome the public's "distrust of the computer, distrust of technology."

The technology can indeed be intimidating, according to Selinger, who said, "we should weigh if we've really made this technology more complicated than it need be."

Human Interface

What can we do to encourage wider use of computer technology? Selinger asked. For one, "we've got to work at the human interfaces," she said. Too often "it's been presumed that the human can always adapt, that the machine is fixed."

Selinger offered her prescription for making computer technology more user-friendly — a term she flinched at, acknowledging it as just one more DP buzzword. The first step, she said, is to realize "what is friendly to the programmer may be downright standoffish to the secretary."

Other Selinger recommendations:

- *Seek clarity and unobtrusiveness.* The computers of the future should be "machines that are quiet and unobtrusive and out of the way," according to Selinger, who noted there are different levels of users.

There are, therefore, different agendas for computer development. Some users are more sophisticated than others and would be driven crazy by the step-by-step learning process necessary for those confronting automation for the first time. Thus her next recommendation.

- *Know your user.* But don't make value judgments about him. Avoid condescension. Remember that the changes we are making to workplaces often are counter to what the user prides most about his or her work.
- *"In most cases, they don't get paid by the page."* Enhanced productivity is not going to sell hardware and software to the average user. Emphasize, instead, "more of the soft benefits," Selinger suggested, that make jobs easier, better.
- *"They work for money, not for intrinsic satisfaction of solving problems."* New systems should not be "a very elegant solution to a nonproblem" — sometimes the result, she said, when we allow problem solvers to work on the jobs of those who don't like to solve problems.

To put it simply: "clever solutions should always be suspect."

- *Avoid abstraction.* We should try to use the user's language, according to Selinger who suggested "there ought to be a law passed that keeps us from making up words."

"We build the mystique, build the importance of our own jobs by aggrandizing the terms we employ," she said, but "we really ought to put our pride in our pockets" and "use language that really communicates."

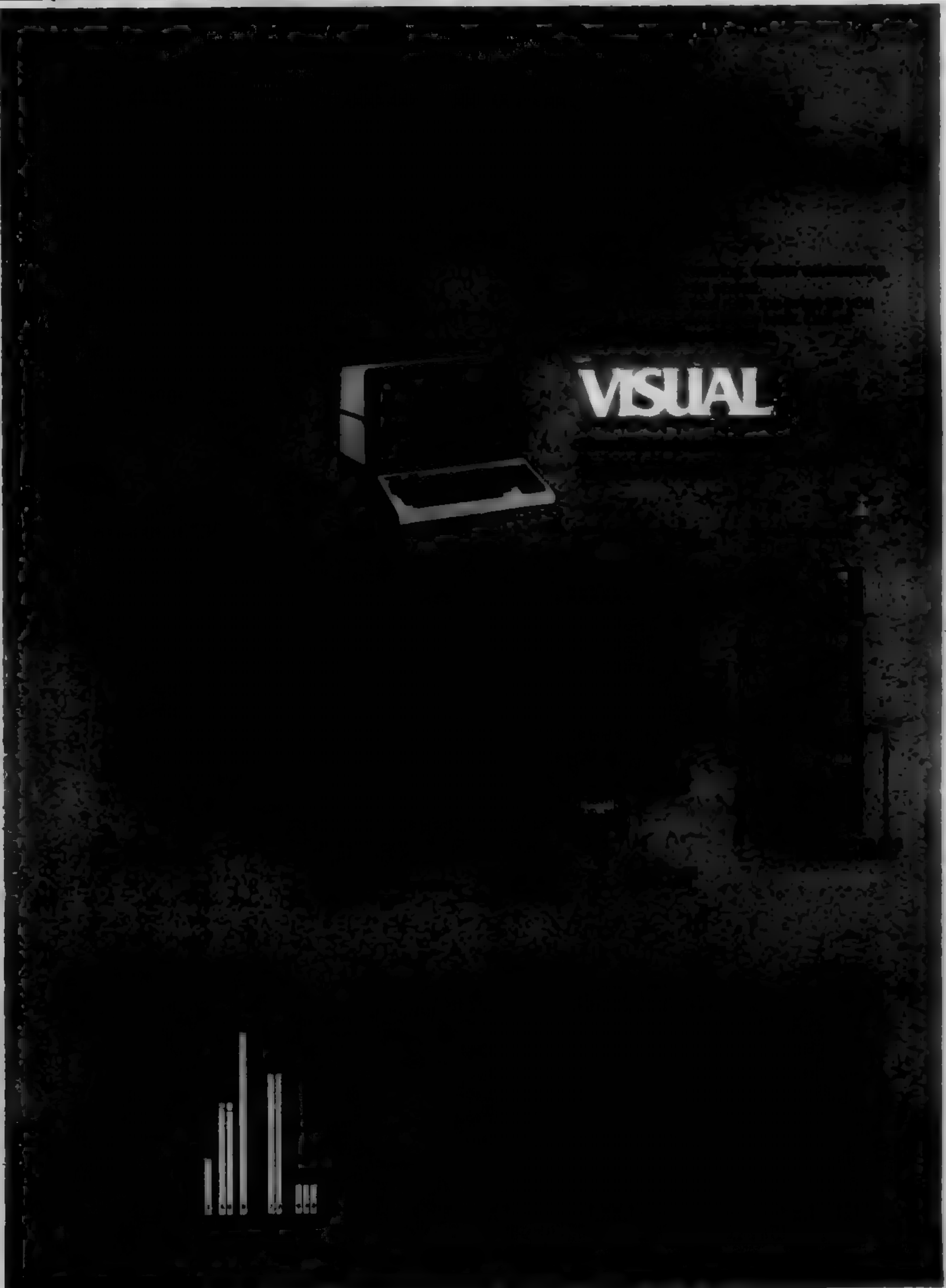
For example, why refer to documentation instead of instruction books or manuals, she asked, when users don't even know what documentation means.

The key to expanding computer usage, she said, is to "attract the casual users." Just as nearly anyone can use a copier now, in the future computers will have to be at least partially usable for everyone.

We should stop assuming that all will want to use every function a product contains, according to Selinger. Too often, she said, "we sacrifice user satisfaction to elegant machines."

For a product to work it must be usable, otherwise we've defeated the point of the technology. Selinger acknowledged that in many cases "very complex programming backs up very simple presentations, but, she added, products must become more straightforward than most systems today or the predicted technology explosion will never materialize.

"We must ease the transition," Selinger concluded, "and expose them to the benefits that hardware and software can offer."



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Managers on the Move

Donald H. Wuerfl

Herbert N. McCauley

James H. Waldrop

DONALD H. WUERFL has been promoted vice-president of information services at the Chemical Bank of New York. He will be responsible for retail systems development.

Wuerfl joined the Chemical Bank in 1975 with its acquisition of Security National Bank. He was appointed an assistant treasurer in 1976 and assistant vice-president in 1978.

He holds a B.S. degree in mathematics from Nassau College.

• • •

HERBERT N. McCAULEY has been elected vice-president of management information systems for Harris Corp. in Melbourne, Fla. Prior to the election he was director of the department.

Among his responsibilities is the operation of Harris' private satellite communications network.

Before joining Harris in 1976, McCauley held DP management posts with Digital Equipment Corp., Polaroid Corp. and IBM. He is a graduate of Boston College with a B.S. degree in finance.

• • •

ABRAHAM SPIEGEL has been named director of DP services for North American Watch Corp. of New York. He will be responsible for DP operations and the systems and programming departments.

Prior to joining North American Watch, he was manager of systems projects at Bulova Watch Corp.

Spiegel received a B.S. degree in mathematics from Brooklyn College and holds a doctorate in divinity from the Theological Institute of Brooklyn.

• • •

JAMES E. DIETZ has been appointed vice-president of ITT Electronic Travel Services, Inc., a subsidiary of International Telephone and Telegraph Corp.

Dietz has been director of operations since 1979 and in his new position his responsibilities include the administration of operations for the Marsplus service.

Prior to joining the travel service he managed telex switching operations for ITT World Communications, Inc. Dietz joined ITT in 1955 and has since held a range of technical and operating positions.

• • •

ROBERT C. ARNOLD has been appointed vice-president of management information systems for Velsicol Chemical Corp. in Chicago.

James D. Betz

Arnold comes to Velsicol from United Airlines where he held a variety of management positions including director of planning — computer services division, director of plans — corporate planning and most recently, director of distributed processing — computer services division.

Prior to United he was associated with Cresap, McCormick and Paget, Inc., General Electric Co. and McDonnell Automation Co., holding positions in corporate planning, management reporting/control and systems analysis.

Arnold received a B.A. degree in political science from the University of Missouri, later gaining an M.B.A.

• • •

JAMES H. WALDROP has joined Hamilton Brothers Petroleum Corp. as information systems director.

He was previously manager of administrative systems for Kansas Nebraska Natural Gas, Inc. in Lakewood, Colo. Prior to that he was employed by TRW Systems Group and Kroger Co.

Waldrop received a B.S. degree from Miami University in systems analysis and an M.B.A. degree in information systems from the University of Colorado. He served seven years in the U.S. Air Force as a lead programmer and analyst at Norad.

• • •

JAMES D. BETZ has been named controller of Prentice Corp., Sunnyvale, Calif.

He joins Prentice from Amdahl Corp. where he served as manager of accounting. Prior to this he was manager of accounting at Intech, Inc., Santa Clara, Calif. and began his financial management career with the CPA firm Arthur Young & Co.

Betz holds a B.A. degree from the University of Colorado and a B.S. in accounting and business from the California State University at Long Beach, Calif.

• • •

GEORGE R. HAMBY has been elected vice-president of data processing for the Credit Bureau, Inc. of Atlanta. He will direct the national information operations.

Hamby has served for 23 years within the Equifax, Inc. corporate family to which the bureau belongs; most recently as vice-president of marketing and production systems.

• • •

SPENCER HUTCHENS JR. has been appointed senior vice-president and general manager of western operations for Intertek Services Corp., California.

Before joining the company in 1979 Hutchens was deputy director of quality assurance for the Defense Contract Administration Services Region, Los Angeles. Previously he served as supervisor of training for the Midway Television Institute, Chicago.

Hutchens holds a B.S. degree in electronic engineering from the American Institute of Technology and an M.B.A. from Pepperdine University, Los Angeles.

• • •

DONALD E. BOSSI has been elected vice-president of operations of Indian Head National Bank of Nashua, N.H. He will be responsible for centralized and bank operations, security and buildings.

Bossi joined Indian Head in 1975 as vice-president of DP. In his present position he will continue as president of Indian Head Data Services, Inc. and as chairman of the holding company's retail products and planning committee.

He was previously employed as senior management consultant with Ernst and Whinney in Providence, R.I. While in Providence he was associated with Industrial National Bank and IBM.

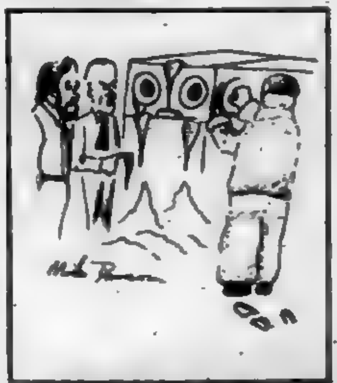
Bossi graduated from Boston University with a B.A. degree in mathematics and he has attended Bryant College, R.I., and IBM Advanced Banking School at Rutgers University, N.J.

• • •

Genrad, Inc. has appointed **JOHN W. ZAPF** director of European operations and **KLAUS D. SCHMIDT** succeeds Zapf as general manager of Genrad GmbH, the company's sales subsidiary in Munich, West Germany.

Zapf joined Genrad in 1968 as a sales engineer; later serving as product specialist, product marketing manager and U.S. western regional manager of sales and services. Zapf earned a B.S. degree in electrical engineering from the University of Illinois.

Since 1978, Schmidt has served as sales manager for the electronic manufacturing test division. He joined Genrad in 1975 as a sales engineer for test systems. Prior to that time he was a European sales representative for the Instrumentation Engineering Co. He received a master's degree in electronics from Darmstadt Technical University, West Germany.



'Time We Did Something About the Air Conditioning, Thomas?'

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STC's optional volume-interleave mapping places the logical cylinders of primary and secondary volumes into alternating physical cylinders. This approach greatly simplifies migration, tuning and management, since the high activity data sets of each volume will fall on adjacent tracks — minimizing intervolume seek contention.

Thanks to the high-speed servo, seek times will be better than those offered by single density spindles.

Given these attributes, volume-interleaved 8650 spindles are ideally suited for the majority of user DASD storage applications, on-line systems, and low-to-moderate activity data.

STC's back-to-back mapping consolidates the logical volumes in two, separate regions. This approach takes maximum advantage of the dense track spacing and high-speed servo to slash intra-volume seek to a mere 10ms. average.

With these characteristics, back-to-back mapped 8650 spindles are best for special applications which can be closely scheduled and managed. For example, use the primary volume for TSO catalogs and TCAM queues with high prime-shift activity, while allocating the secondary volume to batch data sets run second or third shift.

The Media Interchange Switch: Portable fixed media.

Industry-wide statistics show that most problems occur in the drive electronics, not in the HDA. STC's new Media Interchange Switch (MICS) reduces the impact of electronics-related problems by cross-connecting the HDA of spindle A with the electronics of spindle B (or vice versa). This means that if one spindle goes down, you can access your data through the companion spindle's electronics.

Or you can reserve one or more of your secondary logical volumes as a low-cost subsystem spare, and let MICS give you data portability that approaches that of the old disk pack in convenience.

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Backing up your STC disk subsystem performance are the uncompromising STC Systems Engineers. Using software tools, they'll examine your SMF data and assist you in placing data across channels, strings and volumes for maximum results on your job mix. Once your subsystem is up and running, they'll continue to provide ongoing consultation to assure your long-term satisfaction.

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STC's 8650 and 8360 are available for immediate delivery. For more information, including our Mapping and MICS Data Sheets, contact your local STC sales office. Or write: Storage Technology Corporation, 2270 S. 88th Street, Louisville, CO 80027. Phone (303) 673-5151.

Media Interchange Switch lets you recover data quickly in the event of hardware failure.
Average seek time is [illegible] Msec for either volume.
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Each spindle stores 635 Mbytes in two logical volumes, or 1270 Mbytes per unit.
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High-Speed Link Helps Bank Brave Storms

Special to CW

MILWAUKEE — Fierce thunderstorms and 100-mph winds could not knock out First Wisconsin National Bank's remote check processing work, thanks to a high-speed communications link.

"The storms began Tuesday, July 15, and Eau Claire's power went off at 9:30 p.m., right in the middle of processing the day's checks," said Jerry Ried, assistant vice-president of First Wisconsin.

The bank has three remote processing sites in Wisconsin — Eau Claire, Clintonville and Madison — and each site has two IBM 3890 magnetic ink character recognition (Micr) check reader/sorters linked to the Milwaukee headquarters by Paradyne Corp. PIX II communication systems.

"Because the PIX systems allow on-line remote processing, our DP people in Eau Claire loaded their unprocessed checks into two vans, drove to the Clintonville facility and picked up processing right where they had left off in Eau Claire — without missing one check.

"Also, our daily reports got out to the 80 correspondent banks served by Eau Claire the next morning — with a minimal delay from the normal arrival time."

First Wisconsin is the state's largest bank with assets of $4.5 billion, serves about 200 correspondents and processes an average 1.6 million checks daily.

Two IBM 3033 computers in Milwaukee control a total of 10 3890 reader/sorters. Four 3890s are attached locally, and two 3890s are used at each remote facility, communicating to Milwaukee via the PIX II systems.

PIX II systems use local and remote control minicomputer-based units to form a self-contained communications system for point-to-point or distributed networks. At First Wisconsin local control units in Milwaukee are attached to the 3033's byte multiplexer channel, and they communicate over voice-grade telephone lines to remote PIX II control units attached to the 3890 reader/sorters at the three remote sites.

As checks are processed their Micr images are transmitted to the 3033 and queued for overnight batch processing. Next-day status reports are prepared for each correspondent bank, then transmitted to the remote sites, printed out and delivered to individual banks before they open for business.

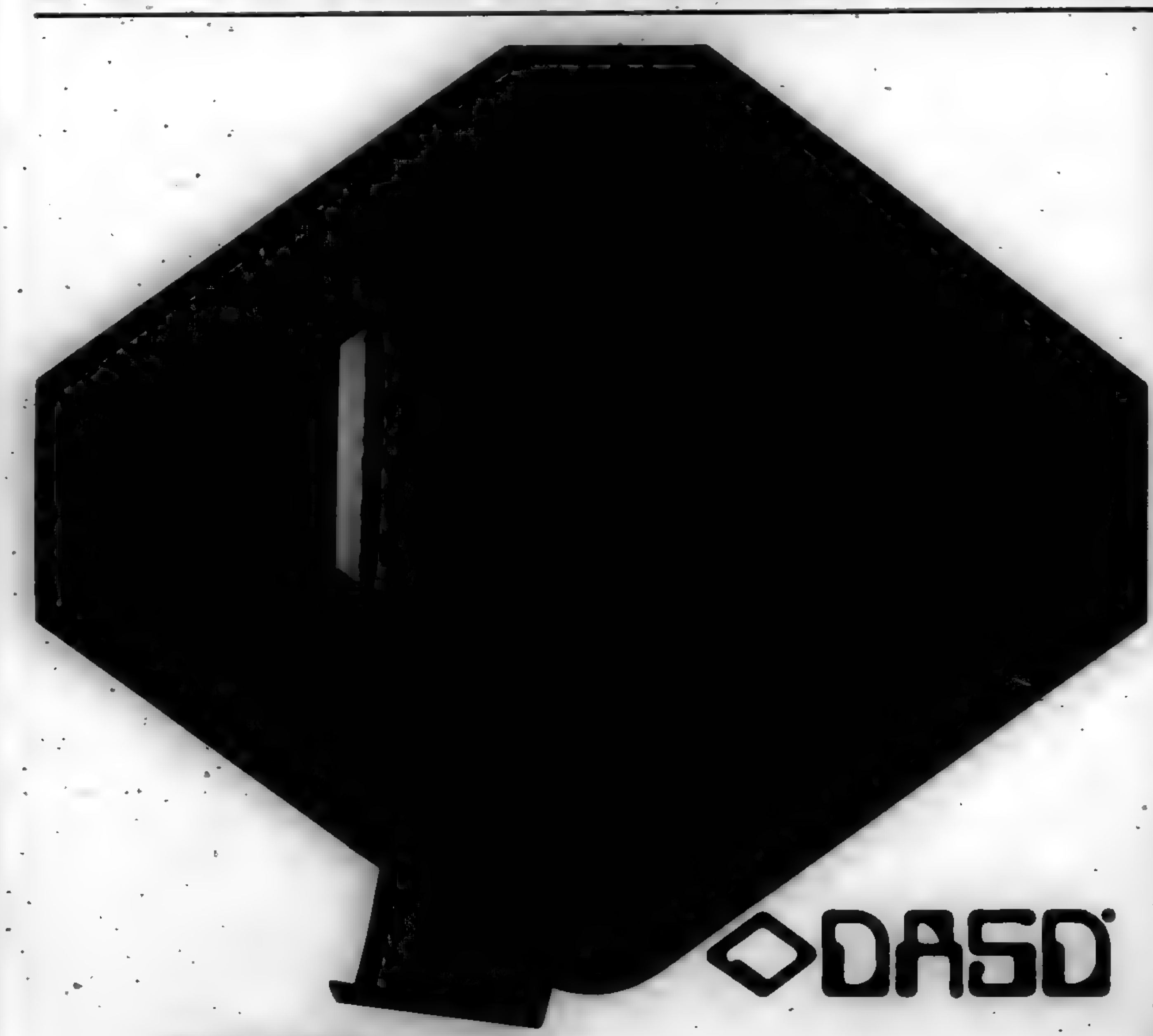
Last year First Wisconsin upgraded its check processing network by replacing remote IBM 1419 reader/sorters and 360/20 computers with the 3890s and their PIX units.

Two Reasons

"We wanted to upgrade to the IBM 3890 reader/sorters to handle our processing volume," Ried said. "But without the PIX II systems, we would have had to install IBM 4331 processors at the remote sites to control the 3890s. We wanted the PIX systems for two reasons.

"First, they're less expensive than installing remote 4331s," he said. "Second, we wanted total consistency throughout all our check processing operations and reports, so we didn't want remote 4331s running their own copies of the IBM check processing control system (CPCS).

"With the PIX communications network, we have all remote sorters running on the same copy of CPCS software and a common data base — that's on the Milwaukee mainframe," Ried said.



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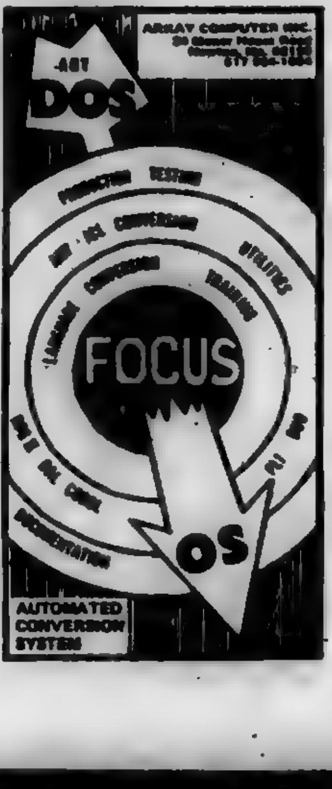

Nearly One Million Apartments

Automated Landlord Tracks New York Rentals

NEW YORK — The Rent Stabilization Association (RSA) here is currently using an automated landlord to keep tabs on nearly one million apartments and 45,000 buildings that fall under the charge of this city's rent stabilization law.

The RSA, a quasi-government organization composed of 20,000 owner/agents, is required by law to keep the public informed of any and all rule changes affecting rents.

Using a Honeywell, Inc. Level 6 minicomputer system, the RSA's finance division tracks the organization's dues, investments and other membership income, issues owner/agent certificates, maintains membership records and monitors all association expenditures, Sheldon Factor, the RSA's director of finance and administration, said.

Service Bureau

Previously, RSA relied on an outside service bureau to handle the bulk of its paperwork. However, with thousands of additional buildings coming off New York's old rent control law and on to rent stabilization each year, the volume of work had become unwieldy, Factor explained.

"The service bureau was running 45 to 60 days behind schedule. We were just one of their many clients and we didn't want to lose control of our work," he said.

RSA's Level 6 computer includes 256K bytes of memory, five CRT terminals, a 600 line/min printer and two 67M-byte disk drives. The system has been on-line since May of this year, Factor noted.

RSA decided early on that the computer operation had to be brought in-house. And after analyzing the hardware and software packages of all the major manufacturers, a special search committee decided on the Honeywell Level 6 "because of its flexibility and ease of operation."

Honeywell worked with Continental Management Services, Inc., a Miami software and systems house, to set up the RSA system.

"One of the things [RSA] didn't want was any high-priced computer personnel," Factor said. "I wanted to keep my own staff, but then again, I didn't want to spend all my time in the computer room either."

Although none of Factor's people had any previous computer experience, they were able to work with the system from the beginning without any training because of its ability to lead them through each operation and keep them from making mistakes.

Since the minicomputer's installation, Factor and his crew have a better grip on the fiscal management of RSA funds, Factor stated. Last year, for instance, it was mid-July before the finance division was finally caught up with deposits from membership dues.

This year with the system, the same job was accomplished during the first week in June. In addition, inquiries from owner/agents and tenants can now be answered in 45 seconds by operators using the CRT terminals. Previously, lookup took 10 minutes using a manual microfiche system, the RSA director observed.

The association has also cut back on mailing and postage costs by 50% with the system. Bills sent to any owner/agent with multiple units can now be mailed in one envelope, and the system can print and mail membership certificates in one operation and even customize other mailings with personal messages.

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Calendar

Oct. 15-18, Varna, Bulgaria — **Symposium on Optimization Methods — Applied Aspects.** Sponsored by the International Federation of Automatic Control. Contact: the National Centre for Cybernetics & Computer Techniques, Comm. for Science, 8 Slavyanska St., Sofia, Bulgaria.

Oct. 16-17, Worcester, Mass. — **How to Write Better Technical Reports.** Contact: Central New England College, Management Institute, 768 Main St., Worcester, Mass. 01608.

Oct. 16-18, Portland, Ore. — **Quality Control Conference,** sponsored by the American Society of Quality Control. Contact: University of Portland, School of Engineering, 5000 N. Willamette Blvd., Portland, Ore. 97203.

Oct. 19, Chicago — **Personal & Business Computer Show.** Contact: National Computer Shows, P.O. Box 678, Brookline Village, Mass. 02147.

Oct. 19-22, Denver — **DMS/OS DASD Management Conference,** sponsored by the DMS/OS User Group. Contact: Software Module Marketing, Inc., Crocker Bank Building/Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

Oct. 21-24, Jakarta, Indonesia — **SEARC '80.** Contact: the South East Asia Regional Computer Conference, P.O Box 4487, Jakarta, Indonesia.

Oct. 22-23, Mansfield, Mass. — **New England RSTS Users Meeting,** sponsored by the Southeastern New England RSTS Users Group. Contact: Ken Graves, P.O. Box 3043, Pawtucket, R.I. 02861.

Oct. 19-22, Los Angeles — **Data Processing and Retail Systems Conference.** Contact: National Retail Merchants Association, 100 W. 31 St., New York, N.Y. 10001

Oct. 19-22, Washington, D.C. — **National Conference on Computer Related Crime,** sponsored by the U.S. Department of Justice. Contact: Koba Associates, Inc., 2000 Florida Ave. N.W., Washington, D.C.

Oct. 19-23, Munich — **Computer Systems and their Application — Congress and Trade Fair.** Contact: Munchener Messe- und Ausstellungsgesellschaft mbH, Systems 81, D-8000 Munchen 12, Germany.

Oct. 19-22, San Diego — **Improving Information Systems, Profitability and Productivity in the '80s.** Contact: International Data Corp., 214 Third Ave., Waltham, Mass. 02154.

Oct. 20, Washington, D.C. — **National Information Systems: Getting Ready for 1984.** Contact: Computer Law Association, 1776 K St., N.W., Washington, D.C. 20006.

Oct. 20-21, San Francisco — **Applications in Resource Management & Planning.** Contact: Comrac Design Systems, 315 Bay St., San Francisco, Calif. 94133.

Oct. 20-21, New York — **Office Automation: Realities, Planning and Implementation.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Oct. 20-21, Washington, D.C. — **Software Engineering.** Contact: Data Processing Management Association Education Foundation, 505 Busse Highway, Park Ridge, Ill. 60068.

Oct. 20-21, San Francisco — **Data Administration/Data Dictionary.** Contact: Performance Development Corp., 1101 State Road, Bldg. M, Princeton, N.J. 08540.

Oct. 20-22, New York — **Information Technology of the '80s: The Impact on the MIS Executive.** Contact: the American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 21-23, Washington, D.C. — **Word Processing Show,** sponsored by the International Word Processing Association. Contact: Kohler Co., Inc., 15 Wilmot Lane, Riverside, Conn. 06878.

Oct. 20-22, Chicago — **Developing Computer Based Ac-**

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Calendar

counts Payable Systems. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 20-22, Washington, D.C. — **International Telecommunications Regulation & Policy Symposium.** Contact: Telecom Systems Group, Inc., 579 Pompton Ave., Cedar Grove, N.J. 07009.

Oct. 20-22, Newport Beach, Calif. — **Third-Party Lease Negotiations.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Oct. 20-23, Houston — **Instrument Conference and Exhibit,** sponsored by the Instrument Society of America. Contact: C. Douglas Hetrick, P.O. Box 12277, Research Triangle Park, N.C. 27709.

Oct. 20-23, Orlando, Fla. — **Computer Performance Evaluation Users Group Meeting,** sponsored by the National Bureau of Standards. Contact: Theodore F. Gonter, U.S. General Accounting Office, 441 G St. N.W., Washington, D.C. 20548.

Oct. 20-23, Chicago — **Forum International Meeting.** Contact: the International Association Serving Users of Singer, TRW and ICL Information Systems, 4300-L Lincoln Ave., Rolling Meadows, Ill. 60008.

Oct. 20-23, Los Angeles — **Software Acquisition/Development Management.** Contact: Software Enterprises Corp., 2239 Townsgate Road, Westlake Village, Calif. 91361.

Oct. 20-24, Los Angeles — **Computer Auditing.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Oct. 20-31, Honolulu — **Management Conference.** Contact: the Association of Data Processing Service Organizations, 1925 N. Lynn St., Arlington, Va. 22209.

Oct. 21-23, Niagara Falls, N.Y. — **Government-Industry Data Exchange Program.** Contact: Connie Kirkpatrick, Rockwell International, Space Systems Group, 12214 Lakewood Blvd. D/092 AE99, Downey, Calif. 90241.

Oct. 21-23, Orlando, Fla. — **Nastran Users' Colloquium.** Contact: Computer Software Management and Information Center, Suite 112, Barrow Hall, Athens, Ga. 30602.

Oct. 21-23, Phoenix — **Auditing, Security and Controls Seminar.** Contact: Advanced Computer Techniques, Corp., 222 N. Central Ave., Phoenix, Ariz. 85004.

Oct. 21-24, Williamsburg, Va. — **Computer in Cardiology,** sponsored by the Institute of Electrical and Electronic Engineers. Contact: Computer in Cardiology, P.O. Box 639, Silver Springs, Md. 20901.

Oct. 21-24, Dallas — **Voice Input/Output for Computers.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Oct. 22-23, San Francisco — **Service Analysis.** Contact: Performance Development Corp., Building M, 1101 State Road, Princeton, N.J. 08540.

Oct. 22-23, Hong Kong — **Controls in Computer Systems.** Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

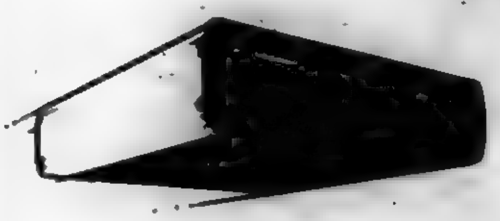
Oct. 22-24, San Diego — **The New Electronic Media.** Contact: International Data Corp., 214 Third Ave., Waltham, Mass. 02154.

Oct. 22-24, Washington, D.C. — **Systems Analysis and Design: Concepts and Effective Practices.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 23, London — **FPS Introductory Overview.** Contact: STSC, Inc., 11 Clearbrook Road., Elmsford, N.Y. 10523.

Oct. 23-24, Raleigh, N.C. — **SAS Procedure Writing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Microprocessor 14,400 bps . . .



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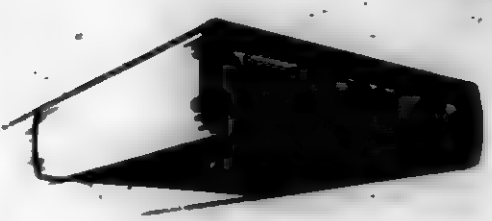
Rapid poll 9,600 bps . . .



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Limited Role of ACU's Tests

Benchmarks Can't Be Relied Upon Too Heavily

By Hillel Segal

SCOREBOX

SERIES 1 **Systems up to $15,000**	**Current Price**
Pertec PCC 2000	$12,270
North Star Horizon	6,911
Cromemco System Two	8,275
Texas Instruments 771	12,100
Vector Graphic System B	7,750
Decstation 78	11,570

SERIES 2 **Systems $15,000 to $25,000**	**Current Price**
IBM 5110	$16,435
Wang 2200VP	16,500
Texas Instruments FS990/10	22,105
Hewlett-Packard System 45	26,550
DEC PDP-11V03	16,850
Q1 Lite	20,500
Univac BC/7-810	25,450
Northern Telecom 405	15,300
Datapoint 1170	20,330**
Randal 100	*
Hewlett-Packard 250	23,660
Texas Instruments DS990/2	16,740

*No longer offered.
**Refurbished, as available.

The benchmark test results presented in this column over the past few months in *Computerworld* have enabled users to make meaningful comparisons of computer systems in the same price classes. However, they should not be relied upon too heavily. As I wish to discuss in this issue, there are many factors to be considered that lie outside the testing capabilities of any given set of programs.

The benchmark tests, conducted for the Association of Computer Users (ACU) by independent consulting firms, are a set of standard programs designed to exercise different aspects of a computer system. By running the identical programs on different systems, we can determine which systems offer the most performance for the price.

The programs are all written in Basic and are modified slightly as needed to run on the various computers. Where enhanced Basic interpreters enable improvements in the programs to be made, these are encouraged, and would be reflected in better run times. In cases where Basic is not offered, another language is substituted and the program must be translated.

The net effect of each benchmark series is to give you as complete a picture as possible of the capabilities and liabilities of the industry's most popular computers in selected price ranges. Armed with the facts and figures, you have at least a fighting chance of getting your money's worth.

In the final analysis, though, don't overlook the critical elements of a complete system: the software needed for the application, repair service and training.

Comfort Factor

We would be the first to agree that hardware capabilities and test results are only part of the evaluation process. At least as important is the "comfort factor" a buyer feels with the vendor.

The benchmark results do provide a valuable glimpse at the system in operation. Hard data based on experience is far more useful in evaluating performance than conventional measures such as CPU cycle speed, diskette access time, or memory capacity. Because hidden factors lurking in the operating system and language design do not come out on a spec sheet, benchmark tests provide a more accurate picture.

The ACU's main premise from the beginning has been that the benchmark results can be important and should not be left out of consideration. But speed tests alone cannot be the overriding factor in the purchase of a computer system. Even more important than sheer speed are the applications software (including the desired language), the service and training support and, of course, the price.

The total fit between task and system must include all these factors. While the benchmark tests indicate capabilities when running certain software under a certain language, they don't address the other factors and thus cannot be a complete indicator.

We've noticed that people tend to react in different ways to our series of reports. Some support us enthusiastically and seem to feel that the tests are the last word. Although it seems they are going too far, even ignoring other important factors, it could be because, to them, speed is very important.

Others ignore the tests completely. For them, the hallmarks of a good computer equipment vendor are the service, support and applications assistance. They want to see the hardware fit into the organization smoothly and this consideration overrides all else.

This is the 19th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

In between these attitudes is, I feel, a more complete picture of what makes a system work successfully under actual conditions.

Needed Features

A computer's speed is important, but in the business world, the computer is not often used for extremely heavy mathematics. Disk or tape storage of records and operating information may be the primary function of the computer and CPU speed or higher math functions may be of less significance.

Features such as the memory size, disk storage capacity, printers and communications capabilities play an important part in narrowing down a selection to fit a specific need. It's important to have a good estimate of the magnitude of the task before trying to evaluate possible solutions.

The computer must be capable of interfacing properly to any devices existing in the same environment. These could range from a small terminal or instrument to a large mainframe computer. It's important to ask, "Does the system work compatibly with all its neighbors?"

Generally speaking, it is also useful to standardize on one or two languages to be used throughout a system. Consideration of computers not in line with the overall language and applications philosophy should be treated with caution. They may cause difficulties in program transportability.

The general point is this: the communications, operating systems and languages of all the devices in the entire network need to be at least functionally compatible.

Beyond aspects of hardware, the approach to data processing that the vendor and buyer need to take must vary according to the circumstance. Within companies that are not part of the computer industry — those using them to do things like order entry, accounting or inventory, for instance — the right vendor of hardware is likely to be one which can invest some time and effort in the buyer's applications needs as well. In these situations, additional training, support and documentation are required, and the vendor is the most convenient source of help.

> *'Hard data based on experience is far more useful in evaluating performance than conventional measures such as CPU cycle speed, diskette access time or memory capacity.'*

For sophisticated users who can develop their own programs, there is less need for such a strong vendor relationship. Buyers able to interpret the technical writeups and use the utility software can consider buying from an entirely different kind of computer firm.

With the availability of accurate comparisons through benchmark testing, we have an idea of a given system's capabilities. But the remainder of the picture — including software, training, special features and many other factors — remains to be supplied by teamwork between the vendor and the potential user.

The benchmark results, though an important part of comparison shopping for computers, cannot by themselves serve as a basis for the final choice. At best, they will help you to narrow down your choices — from the multitude available to two or three — so that you can spend your time fully evaluating just a few, instead of only briefly examining all of them.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

Corporate Plans Should Include DP

Q To what extent should information services be included in corporate planning? My manager, who is the manager of information services, is usually the last to know of major corporate decisions and we are often the group that is most affected.

A The manager/director of the corporate entity that provides information services should be a member of the executive committee (the policymaking body). The DP function has evolved to be the operational nucleus of most corporations. Whether there is a revised personnel policy, a new introduction to the product line or an opening of a new store, your boss should be aware that these changes are being considered so their effect can be factored into information services planning.

Companies excluding DP from the corporate management planning function are not only making the implementation of most changes unnecessarily difficult, but are missing valuable input to the corporate planning process.

Q Our machine room is the picture of state-of-the-art technology. We're always first on the list to receive newly announced equipment. However, 16 swirling tape drives is the first hint to a knowledgeable DPer that there may be problems in the data center.

This company has had only one director of DP. His skills are highly developed in tape-oriented, sequential batch processing. Operationally, we are living in the 1950s, but the ever-present state-of-the-art hardware leaves the impression that we are doing all we can to stay up with new advances in hardware and software.

At present, we do almost no new development. Virtually all of our time is taken up in maintaining these tape-based monstrosities. One weekly run requires the mounting of over 150 tapes.

I've only been here about two years but others have been here considerably longer. Every single programmer in the shop is seeking employment elsewhere. I wouldn't be surprised if we were all gone within six months.

The general feeling is that we will continue buying new hardware and maintaining old systems. In short, technology is passing us by. Ironically, the operators are getting awfully tired of the physically demanding work required with card and tape processing and they are also looking at their options.

It's certainly not in our best interests to announce our departure as much as six months in advance. This leaves open the possibility that the entire programming and operations staff will leave the company within a short period of time. I don't like the idea, but if we're going to stay in the DP field, we have no option.

I wrote this letter for two reasons: to get this off my chest and as a warning to other overly hardware-oriented data centers.

A There are many installations with similar circumstances. Your letter brings home the fact that a mass exodus in such environments is possible.

You say you have no option — I disagree. Perhaps you and your colleagues can serve as agents of change. In my opinion, you have a tremendous opportunity to move through the '60s and '70s and into the '80s. You already have a nucleus of hardware.

Now you need a realignment of policies, priorities and procedures (and perhaps management), but first, you need support. To obtain it, discuss the issue with the director and if he remains intent on maintaining the status quo, a letter from the staff containing recommendations, not condemnations, sent to other high-level decision makers might stir up some interest.

Ultimately you are going to require the assistance of a competent management information systems consultant who can help with the realignment and provide guidelines for the transition into the modern era. Stick with it and you may be on the ground floor of something big.

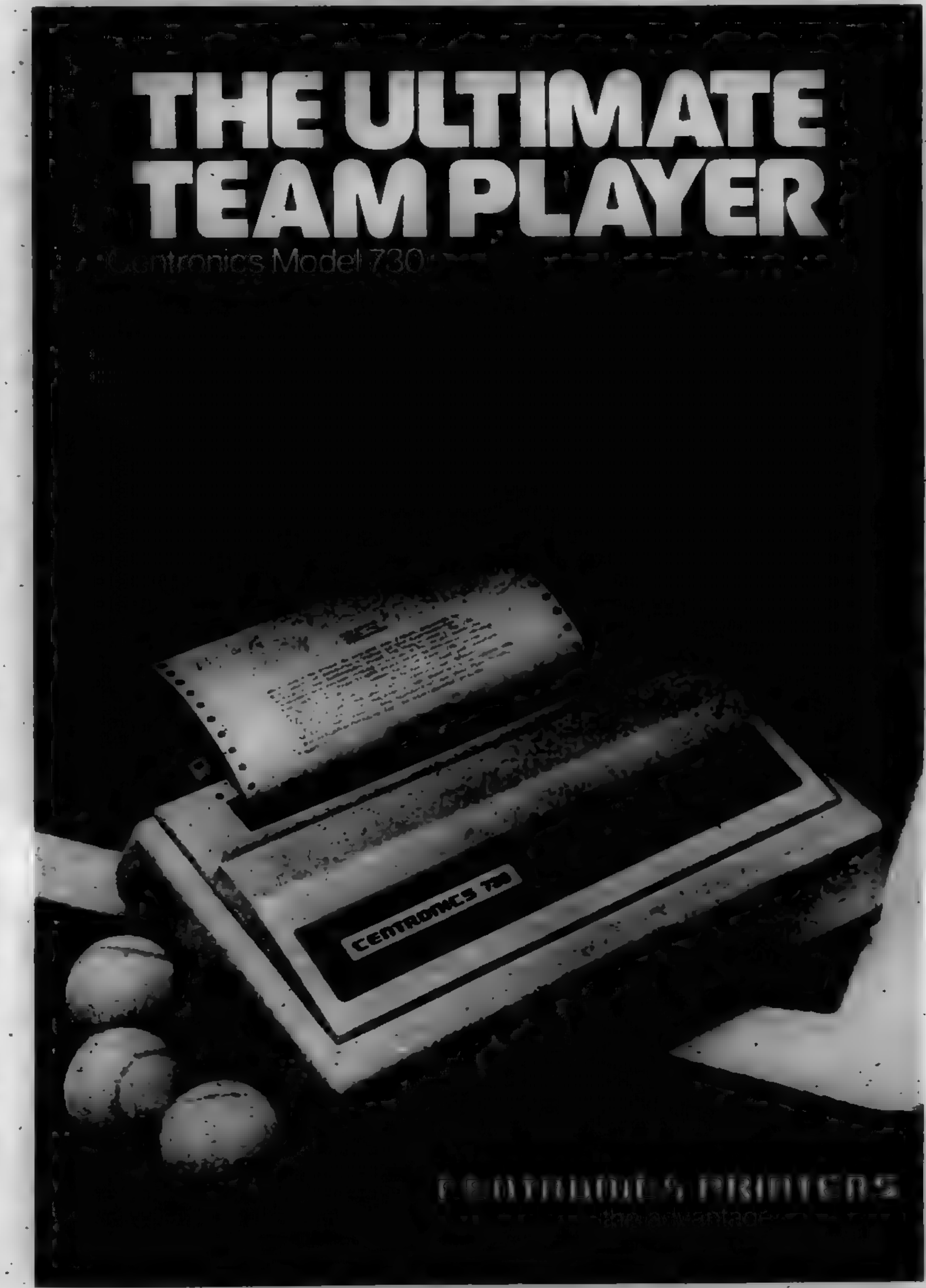
If you fail to promote change, I wouldn't blame you if you left, but each of you has an implied obligation as a professional to make sure that the existing systems are well documented and that your immediate projects can be easily transferred. Your departure could be catastrophic unless your individual departures are well planned.

rnaro d Time
By Larry E.

QA

Have question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.



EDITORIAL

Proceed With Caution

When a specialist in the molecular biology of carcinogens at Boston's Sidney Farber Cancer Institute calls IBM's mass marketing of the animal carcinogen TNF "irresponsible" and recommends that operators and service technicians avoid TNF-bearing machines, it's time to take the situation seriously.

And when a group of New York State employees put their jobs on the line rather than operate one of the machines in question, the issue takes on added significance.

Of course, IBM should have taken TNF seriously 10 years ago, when it began selling the chemical in the Copier I and II and later in the 3800 laser printer and 3896 tape-to-document converter. But it didn't, so now the rest of the DP community will have to watch out for itself, even if that means taking only stop gap measures.

Little is known about TNF — trinitrofluorenone — except that it causes tumors in laboratory rats and mice. IBM documents containing TNF test data have not satisfied experts at the Environmental Protection Agency (EPA). They have requested more data, which is expected to arrive this week.

Depending on upcoming test results, the EPA could invoke the rarely used Toxic Substances Control Act and ban the use of TNF.

In the meantime, what can you do? One way to cut down on possibly dangerous TNF exposure is to limit the amount of time any one operator spends tending the machines involved. This could be done by training other personnel (if they are willing) to operate the equipment.

Whether the use of masks and gloves will help deflect possible TNF contamination is undetermined. Experts say there's just no way of knowing what exposure route the chemical takes in people. Still, it seems, some protection is better than none at all.

TNF poses a real dilemma. Equipment like the IBM 3800 — worth $341,750 — is too expensive to throw on the junkheap. But how expensive will lawsuits be 10 years from now if employees who worked at 3800 sites show signs of cancer — whether or not the TNF actually caused the cancer?

But beyond monetary consideration are the lives of people who run the Copier I and Copier II and 3800 and 3896. If there is any question at all they may be in jeopardy through continued exposure to TNF, they should stay away from the machines.

DATA PAST

Five Years Ago
Oct. 1, 1975

WASHINGTON, D.C. — The Privacy Act of 1974 went into effect amid congressional concern over a tactic adopted by the Department of Health, Education and Welfare (HEW) to avoid keeping records on the information its own agencies shared with one another. By defining its 11 separate agencies as one agency for purposes of the Privacy Act, HEW legally sidestepped the need to keep a set of records showing when one HEW agency accessed the personal data of individuals kept by another HEW agency, critics explained.

— — —

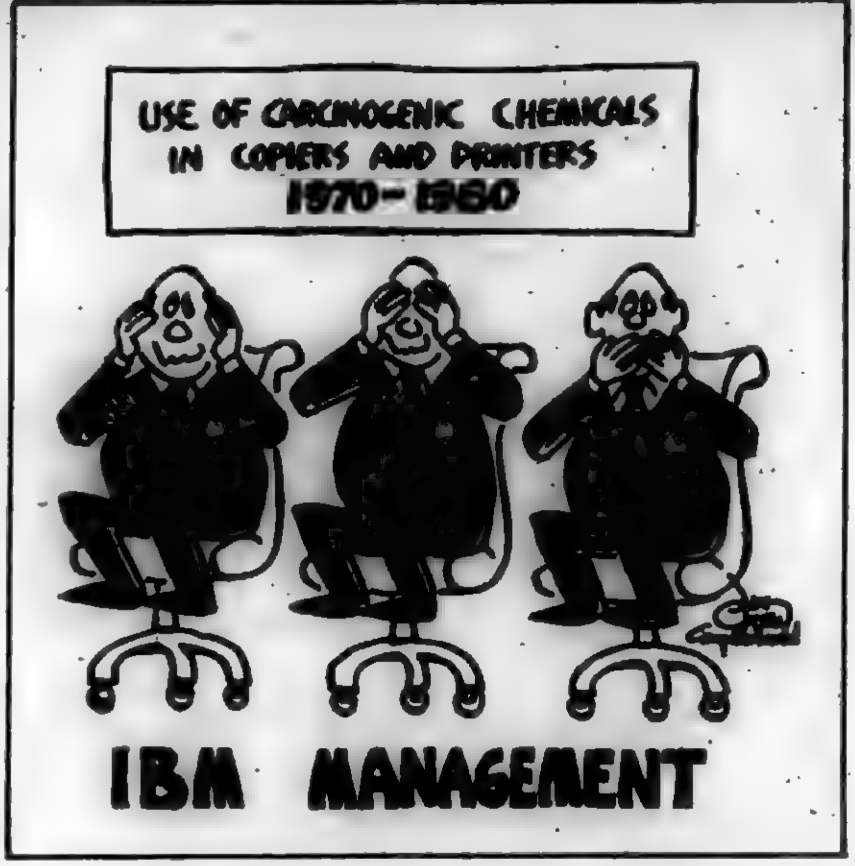
SALEM, Ore. — A three day-old privacy law was killed in a special session of the Oregon legislature because of the tight clamp it placed on all police and court records. Intended to restrict criminal history records unless a justifiable need for access was proven, the law instead made it impossible for anyone to get any information whatsoever.

Eight Years Ago
Sept. 27, 1972

WALTHAM, Mass. — Honeywell, Inc. introduced two computers to its Series 2000 family and announced major enhancements including communications facilities for its small Model 58.

— — —

DES MOINES, Iowa — A lawsuit was filed here aimed at prohibiting all Iowa law enforcement officials from keeping either computerized or manual identification files on arrested persons with no criminal convictions. The lawsuit was filed as a class action by Freeland Walker, a 20-year-old youth who once was committed to a state training school after being adjudged a delinquent and who had seven felony arrests, but no convictions.



LETTERS

Charges Are Nonsense

Computerworld's Sept. 1 editorial charging that IBM's field force does not live up to IBM's standard of conduct is nonsense.

Of course our marketing force competes vigorously. But we do that fairly, adhering to a rigorous code of business ethics. That's why IBM enjoys such a well-earned reputation for its high standard of conduct in the marketplace. Any violation of this standard is cause for disciplinary action.

Many fine men and women throughout IBM have worked hard over the years to build our reputation for superior products and service and ethical behavior. We are dedicated to maintaining that reputation.

C. Michael Armstrong
President

Data Processing Division
IBM
White Plains, N.Y.

Views on Unionization

The story concerning the takeover of Western Airlines' NIS staff by a clerical workers' union [CW, Aug. 18] has aroused considerable comment here. Out of curiosity, I conducted an informal opinion survey in this five-person shop. The following conclusions were unanimous:

1. DP-type personnel, with the possible exception of the gray area of operating staff, are *not* clerical workers; they are professionals. The union's logic was comparable to arguing that because the company's legal staff exercises "no managerial control" they are therefore equivalent to the typing pool.

2. Because of the above, it is inane to suppose that a union composed primarily of clerical workers could reasonably represent the best interests of DP personnel, if only because the latter will be such a numerical minority.

3. Despite the fact that Western's appeal to the National Mediation Board (NMB) was denied, the workers themselves have an alternative left if they are angry enough and willing to stick together: They can file a class-action suit against the union and the NMB and ask for an injunction suspending the union's control over them until the suit has been decided. Initiated by the *injured* parties, this would carry more weight than a management action.

4. Failing this possibility, there were no takers for the bet that Western will have a virtually 100% MIS turnover within the next six months. We were all agreed that as soon as the takover appeared inevitable, our first action would be to call one of the local "headhunter" firms. DP workers are at least fortunate enough to have that alternative!

Lee S. Van Deest

Nashville, Tenn.

Exemplary Cooperation

Computerworld's continual printing of columns, letters and cartoons denigrating IBM with respect to its alleged unfair practices with respect to customers who switch to other vendors is totally unfair and certainly less than objective reporting.

Our company, La Salle Industries, Inc., has recently shifted our maintenance contract from IBM to a third party for purely financial considerations. Although the revenue loss to IBM exceeds six figures per year (granted not a staggering amount) we have *never* encountered resistance, negativism or an unprofessional attitude of any kind.

The cooperation and understanding IBM has demonstrated throughout our contract has been nothing short of exemplary and far surpasses the services provided by many of IBM's competitors that I have encountered.

Robert B. Polak

New York, N.Y.

READER COMMENTARY/David A. Higgins

Fiery GOTO Debate Needs Cooling Off

The article on a "worst-case" example of the use of a structured method [CW, Sept. 1] is certain to add fuel to a fire that has been burning for years — namely the argument over the use of GOTO statements and/or nested IF statements in Cobol programs. The problem is that this particular fire has no business burning at all.

The two questions posed in the article are as follows: (1) Is structured programming synonymous with GOTO-less programming and the use of nested IFs? (2) Is such a coding technique worthwhile? Well, for a great deal of the industry, the answers are yes and no, respectively. Unfortunately, the initial question is misleading, since no one knows what "structured" programming means anymore.

What is a "structured" program? The term has been floating around for more than a decade now, and the concept of structure is even fuzzier now than it was when the term was coined. Originally, if a flowchart of a program's logic was drawn using only four basic control structures — sequence, alternation, the DOWHILE and the DOUNTIL — the program that resulted was called a structured program.

```
Paragraph-A.
    If condition-1 is true, go to
    Paragraph-B.
    If condition-2 is true, go to
    Paragraph-C.
    Go to Paragraph-A.
Paragraph-B.
    Perform Subroutine-1.
    Go to Paragraph-A.
Paragraph-C.
    Perform Subroutine-2.
    Go to Paragraph-A.
Subroutine-1.
    Add one to counter-a.
Subroutine-2.
    Add one to counter-b.
```

Figure 1

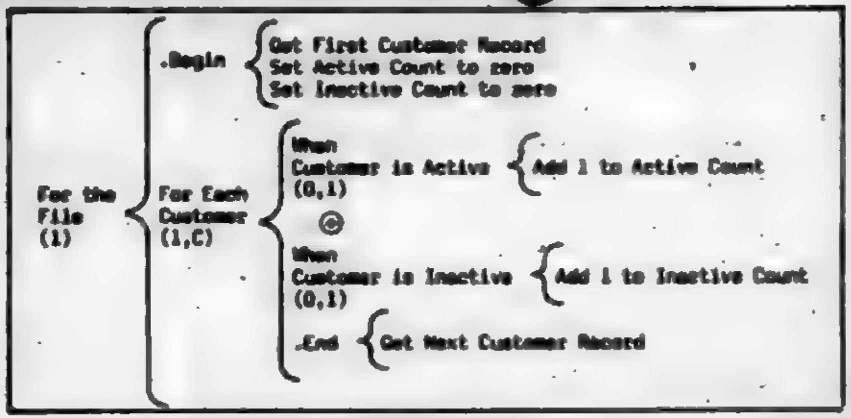


Figure 2

Virtually Meaningless

Today, the word "structured" has come to mean so many different things to so many different people that it has become virtually meaningless. Instead of being used as a description of the logic used to drive a program, many people use "structured" programming to refer to a particular coding technique: no GOTOs, nested IFs, one entry/one exit modules, meaningful data names and so on ad infinitum. As a matter of fact, the word "structured" has been so over-used that these days it seems to be just a synonym for the word "good." If we see something that we like in a program, we dub it "structured"; otherwise, it receives the ultimate condemnation of being "unstructured."

A better question to ask of people might be: What is a "good" program? Although there would be some discussion and dissension even on this matter, it seems to be clear that a good program would have two attributes. A good program works and is easily maintained. That is all.

Now, instead of asking about the relative merits of a particular coding style, we must consider this: Is there a coding technique that allows programmers to consistently write good programs? The answer is an unequivocal "no."

Coding techniques are simply building blocks — tools for constructing programs. Asking if one technique for coding produces better results than another is like asking if contractors can build better homes with wood or with brick. Taking GOTOs out of programs is treating symptoms, when the problem is failing to begin with a sound program design. Take, for example, the pseudocode program given in the article (see Figure 1).

Obviously, the intention of this passage of pseudocode is to test for two different types of records and count the number found of each type. For the sake of discussion, say that we were going to go through a customer

(Continued on Page 36)

SOCIOLOGY OF COMPUTING/Robert L. Glass

Computing's Love/Hate Relationship

The relationship between data processing and mathematics has always been a love/hate kind of thing.

You find folks in computing who just love technical papers with a preponderance of Greek and mathematical symbols; but you find an even larger group who quit reading the first time they hit a sigma or an epsilon.

It's not a matter of finding a middle ground between these particular practitioners and mathematics. There is none — at least, not one you'd notice. There's the mathematical fraternity and there's the nonmathematical fraternity. And that's pretty much it.

All of this is prelude to a "computing project which failed" story. It's a modern-day story, one that explores some of the state-of-the-art research thinking about software estimating techniques. And it's also about mathematics.

Whoa there, don't quit reading yet. This is a story about a mathematical approach to problem solving, but it won't involve any mathematics. Not one sigma or epsilon will blemish these paragraphs.

The problem to be solved by a mathematical approach is the following: Software managers and technologists everywhere are frustrated by the crummy job we do in estimating the length of time it takes to do software things. For example, how long will it take to build the manufacturing control system for the Little Wonder 100 microcomputer production line or the data log report generators for the Frammis embedded computer system?

We all have some idea about how long those jobs will take, of course, but we also know how bad those ideas usually turn out to be.

Well, then, why not just estimate a piece of the action? For instance, given a particular software project, how long will it be before all the errors are tested out of it? The question is critical, of course, especially if some large system is stalled waiting for its software part to get usable. But the problem is, we can't even estimate *that* very well.

Software systems are "95% checked out" for a whale of a lot longer than they are not. Even the best software guru can seldom guess when that last 5% of errors — whatever number that is — will be eradicated.

Bringing In Statistics

One approach a lot of researchers have been trying over the years is to apply some statistical techniques to the problem. If we know that the first three months of software testing on a large system found 312 bugs, and that in the last week of that three months only six were found, then we might be a little confident that the end is in sight.

Why not apply some mathematical curve fitting techniques to that error discovery data, these researchers say, and make a mathematical estimate of the projected completion data?

That's where Thelma Thetalambda got into the act. Fresh out of the best statistics school in the American Southwest, she was the logical person to be assigned to Wings Aloft Aircraft's software estimating group. "Thelma," her management said to her, "get out there and get some real Wings Aloft project error data and curve fit up a storm. Find a way we can estimate project completion." And Thelma, comfortable in the knowledge that her college training made her immediately useful to Wings Aloft, happily accepted the challenge.

It only took a week or so of reviewing the literature for Thelma to find out she was not alone. Statisticians all over the computing world were working the same problem. There were almost as many mathematical models as there were researchers.

Worse yet, Thelma saw, was that same proliferation of techniques that at first reassured her. Why wasn't the process of investigation iterating toward a commonly accepted solution, she wondered? Her early optimism at having plenty of peer company in her endeavors was changing to preliminary panic.

The final straw came when Thelma began trying out the candidate techniques. "Trying out" a model meant taking some known data for a known project with a known completion date and seeing if the model's predictions duplicated reality. As Thelma tried out first one and then another, her panic deepened. None of them, she began to see, really worked on Wings Aloft's data. Oh, that wasn't quite true. Some of them worked on some project data, but none of them worked on all project data. Far from "promising," the techniques were at best premature.

Not willing to believe that her findings — those of a new college graduate — were better than those of the experts in her field, Thelma called up some of those experts. The conversations did little or nothing to assuage her fears. They had had the same experiences — erratic results, a few successes sprinkled in with a lot of failures. But universally, the belief seemed to be that the expert's model was only one or two mathematical terms from success.

A couple of flashes of wisdom hit Thelma about then. The first was a flash of irony — the 95% completion syndrome had struck the very people who were exploring it. Their models had been 95% complete now for several years!

The other flash was one of technological paranoia. Mathematical modeling, encouraged though it was by software management, was also well beyond the understanding of that same management. Remember the love/hate relationship? Most managers had no intention of exploring the inner workings of those models to see if the results were indeed as promising as the experts announced.

What if, Thelma's paranoia said, the mathematicians were preying on that ignorance, working in an interesting but pragmatically nonuseful field well beyond the point where they themselves knew its value was dwindling? No, of course reputable professionals wouldn't do such a thing.

Still, Thelma couldn't help but wonder.

And, as far as I know, she still is!

HUMAN CONNECTION/Jack Stone

Is User Documentation So Much 'Fluff'?

I have been blasted.

Responding to one of my recent columns ["When Is a System Ready to Be Released?," CW, Aug. 25], Sherwin E. Pakin, executive vice-president for Sandra Pakin & Associates, Inc. of Chicago — whose letterhead states "specialists in writing for the computer community" — mailed me a letter "bomb" in which he implicitly called me a documentation dodo.

I have decided to refute his accusations publicly so that the readership will have not only the benefit of two widely divergent points of view on systems documentation, but also learn how writers for this industry use verbal stilettos to shred the works of their colleagues.

Not wanting more of his diatribe for my deleting crucial morphemes and metonyms from his missive, I have reprinted Pakin's letter as written and added a few comments of mine along the way (in parens).

"Jack, I was especially interested in you [sic] comments on user documentation. I though [sic] you might be interested in mine.

"TRUE, that all but a few user-sensitive DP managers cut corners on this documentation. Some so much that this documentation is nonexistent. Last week one DP manager told me that user documentation was 'fluff.' "

(I think that most managers don't know what constitutes high quality, cost-effective documentation. The majority of them conjure up a terrifying image of their programming staffs putting aside their coding pads and shutting down the development process in favor of a regurgitation of technical verbage that no one is ever going to read).

"FALSE, that they turned out what they knew was an inferior product. Many can't recognize an inferior product. When we ask these DP managers if their users are satisfied with their user documentation, many reply 'Sure, I haven't heard any complaints.' "

(I'll stand by my original statement. Even though DP managers may not know what a good product is, they are absolutely clear on what a bad one is. Just ask any manager to comment on the quality of vendor documentation, and he will wax eloquently on the needs for simpler writing, improved style, better packaging, directed orientation and so forth. The basic problem is that most DP managers have assigned documentation a low priority, which translates into slipshod products.)

"FALSE, that user documentation is a problem area that will be with this industry until every system is screen-oriented, menu-driven, self-directing and self-teaching. This is true only if the user is a data entry operator. It is not true if the user is:

"• A supervisor, who needs report explanations and summaries and a technical overview.

"• Management, who needs a general overview and a summary of benefits.

"• A control clerk responsible for the pre- and postsystem transaction processing."

(Again, unyieldingly, I stand by my original statement. More and more end users are interfacing directly with computer hardware — interactive workstations — to obtain information not easily accessible from hard-copy reports. By using the workstation as an instructional device and as a repository for procedural information, requirements for lengthy, narrative-based user guides are reduced.)

"FALSE, that the DP manager has a choice of having his programmers code or write manuals. Programmers should program, period. This is what they were hired for, are skilled in and want to do. Even if they had the time to write, they shouldn't. They hate it and are terrible at it.

Analysts hate it less and are less terrible writers — perhaps just awful. The solution for the DP manager is to hire an in-house software technical writer — which is what all vendors do — or engage a software technical writing consultant."

(My point is simply this: Programmers should use computer-based techniques, and not narratives, to communicate with system users. I have confidence that if the programmers try it, they'll like it.)

GOTO Debate Needs Cooling

(Continued from Page 35)

file and count the number of active customers and inactive customers. The design of a simple routine to accomplish such a function appears in Figure 2.

This design is in the form of a Warnier-Orr diagram. However, any suitably "structured" design tool would probably have sufficed for this example. Once such a design is known, the pseudocode needed is quite simple, indeed almost trivial (see Figure 3).

Note that the End-of-File condition would have to be set False in the File-Begin paragraph and set True at end in the Customer paragraph.

It is easy to see that if a "structured" design exists for a program, the code that is produced has many of the attributes that have recently been advocated: it has no GOTO statements (and never will), it has no nested IF statements (and never will), it is modular, the modules are loosely coupled and highly cohesive, and so on. In addition, this program will be easy to get and keep running and very easy to adapt to changing requirements.

As one studies various programming and design styles, it becomes apparent that no coding technique can ever allow programmers to design good programs, any more than different construction materials can allow contractors to do away with blueprints. If a design exists for a program, coding style becomes a trivial matter — if no designs exist, no coding technique can ever solve the problems that will be present.

Higgins is president of Educo, an educational data processing service in Arvada, Colo.

```
Procedure Division.
File-Processing.
    Perform File-Begin.
    Perform Customer until End-of-file.
    Stop Run.
File-Begin.
    Get first record.
    Set Active-count to zero.
    Set Inactive-count to zero.
Customer.
    If active-customer
        Then Perform Count-Active-Customer
    Else If inactive-customer
        Then Perform Count-Inactive-Customer.
    Get next record.
Count-Active-Customer.
    Add 1 to Active-count.
Count-Inactive-Customer.
    Add 1 to Inactive-count.
```

Figure 3

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THE TAYLOR REPORT/Alan Taylor

Guarantee for 98% Uptime Looks Good

LFE, a Waltham, Mass., company selling product-control computers, is now really guaranteeing its systems' uptime — and putting money ($200 per percentage point under 98% uptime each quarter) where the guarantee is. This warranty, available only on the firm's newly announced Profitmaster 5001 systems, is very, very different from other maintenance systems and was hailed in a Sept. 9 *Boston Globe* article by Ron Rosenberg. So I went to the factory to see the systems under production and find out about the warranty.

In view of the way that various premium-maintenance agreements work (you pay so much more that the penalties are trivial even when the system is down 30% of the time or more), I was particularly interested as to whether the LFE agreement was just a rather good publicity gimmick with money being added on to be taken off later.

But it wasn't a gimmick. And although the equipment is very different from that in most information departments, the LFE Profitmaster 5001 has a maintenance system that uses modern technology and prices constructively and is well worth copying by other manufacturers.

Design Choice

The designers chose to keep the system simple. Thus, 18-bit, rather than self-correcting 21-bit memories were used, power supplies were placed on each board and generally everything was done in a straightforward manner, with an eye on keeping uptime very high.

Even with this design, the company faced two choices regarding the maintenance philosophy. In one case, the idea was to tie the computers right into Waltham, so that maintenance diagnostics could be run from the main shop.

This method was tried, but dropped in favor of letting the customers' people handle the maintenance themselves if it could be done both safely and much more quickly than sending LFE service people to the site.

With the simple design and the self-maintenance policy, most of the rest of the LFE philosophy of getting satisfactory maintenance fell into place.

But the story isn't complete without a description of some of the differences between the new LFE procedures and the traditional maintenance methods for computer systems that show the impact of those basic decisions.

The most obvious difference consists of a second cabinet — six feet tall and just about the same size as the computer system. This contains a complete set of supplies.

Padded mailers, and an "800" telephone link, provide the primary LFE service mechanism, and a specific 24-hour replacement warranty is built in to monitor its enforcement. The process usually starts with a diagnostic printout (the tape is self-loading) indicating which of the boards is misbehaving.

The customer's people are then expected to open the computer, disconnect the power supply and remove the particular board, with any computer system that is on it. They then replace the faulty board with the spare from the 100% spare inventory.

If two boards have failed, after the first has been replaced, the diagnostics will indicate the second one which needs replacement. This situation, however, should be unusual, because the spares as well as the working units are checked at least quarterly and usually more frequently.

Once the system is up, the user's people inform Waltham that they are mailing out an apparently faulty board. Waltham, in turn, tests and mails out a replacement for the spare that has been put into the system. The replacement is guaranteed to be in the mail within 24 hours of notification. This is a good response situation all around.

Back at the factory, LFE finds it can handle most of the board faults, even in the computer area, but complex ones are sent to the manufacturer, in this case normally Digital Equipment Corp.

The finances of the system work out better than might be expected, according to LFE vice-president Thomas Hoffmann. By using simple computers without extensive self-correction facilities, the company LFE keeps down the cost of both the original units and the spares. Because they are not packed too densely, and because items are duplicated to some extent, a board failure is unlikely to affect anything outside the board; and the task of removing and replacing boards is easy.

Some precautions can also be seen in the precise wording of the warranty. Only essential items are covered with the 98% guarantee. In this case, this includes the Intel Corp. Motorola Corp. and DEC systems, the tape cartridge loader and the color CRT (yes, there is a complete CRT unit in the supply of spares!).

But even with these trivial points, it is clear that the LFE philosophy of a self-servicing design is one that 1980 technology can support. And, if it can guarantee 98% uptime or anything like it, then users should shop around to find other arrangements with equal promise before accepting the old standbys as still being the best possible.

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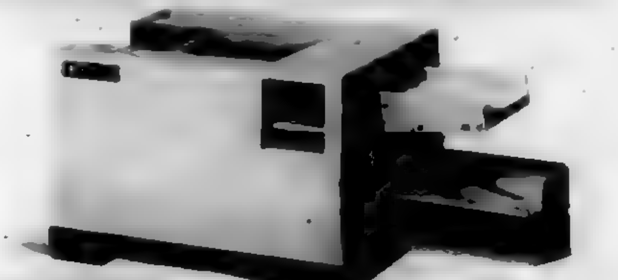

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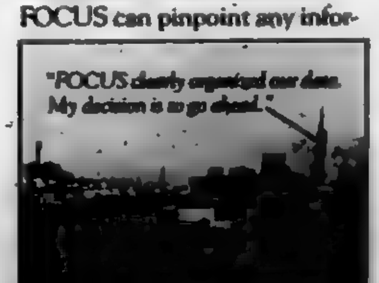
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LETTERS

Flawed Conclusion

As a nonjudicial legislative adviser for the Data Processing Management Association (DPMA), I would like to point out that DPMA takes the position that there is one right the data processing industry should not waive: As long as legislatures limit taxes to tangible property and since DP is considered intangible, revenue agencies are legally bound to exempt DP. That was the industry's general result in New York. This is also DPMA's position in Massachusetts [CW, Sept. 8].

Alan Taylor, in his Sept. 8 column, wrote: "In preparing for an Aug. 27 hearing on sales taxes, DPMA quoted a 1977 situation in which New York ended up exempting data processing and 'decided not to apply old regulatory concepts to a whole new state of art, a new business.' The association then urged Massachusetts to do the OPPOSITE by using a precedent set in 1936."

Taylor apparently did not do his homework; his conclusion is flawed. The 1936 law, which makes a tangible-intangible distinction, wasn't connected with DP until 1976. Then, the Massachusetts Supreme Judicial Court ruled that a typical service bureau wasn't entitled to a special tax exemption accorded manufacturers of tangible property, because it was an intangible service: "It may be poor policy not to assist the computer industry equally with industry which happens to qualify as engaged in manufacturing; indeed, the statute may be anachronistic, but these are matters beyond our province."

As an association of concerned data processors, DPMA deserves tribute for its courage in following through on this important position; for its insistence on equal treatment for DP with other services and professions under state tax laws; and for its strong membership participation with government in the democratic process.

Robert M. Shetin
President

Nova Computing Services, Inc.
Miami, Fla.

GOTO Not the Culprit

I found the article "Structured Path Ups Productivity" [CW, Aug. 25] incredible. I agree properly structuring a program makes it easier and faster to write, but elimination of the GOTO is asinine.

I have 16 years' experience in DP and was actively programming and doing system design for 12 years. I worked as a consultant for seven of those 12 years.

The object of structuring is to simplify problem solution to three basic constructs, not the elimination of the GOTO statement; the GOTO syntax will be limited by proper structuring to conditionals that affect repetition and sequence.

Total elimination of the GOTO construct is too confining and violates structuring principles. The PERFORM UNTIL breaks the routine from the control and allows several control statements for a routine. If an error occurs in the control, there is no indicator to the Cobol programmer of where the error has occurred. Granted, the GOTO should be contained in a routine, but proper structuring forces this.

I believe Melvin G. Faulkner will find a shorter learning curve for new employees and even faster programming speeds for his people if he recognizes that the GOTO was not the culprit, but the lack of structure was.

By the way, structuring is considerably older than five years — it was not formalized and did not have a name; it was simply good programming.

Phillip E. Paker

Fridley, Minn.

Some of the Best

While I recognize the occasional necessity to use an obviously biased source for a story, I cannot let the article in which Al Strong, head of a contract programming agency, assailed the self-employed contract programmer go without comment [CW, Aug. 18].

While he may have the necessary qualifications to make comments, his opinion is obviously personal, something I would expect to see in the editorial section, not the news section.

There are many reasons people choose to be self-employed contract programmers other than an inability to get work elsewhere. In some cases, we are self-reliant enough to make our own contracts without giving away 20% to 40% to someone like Strong. Indeed, the very best contract programmers I have met were self-employed.

Steve Brower

Encino, Calif.

So Long, DP

In my view, DP trade press deficiencies begin with the ubiquitous "SP," a monicker rooted in "data processing" ["Is Trade Press on the Right Track?" CW, Aug. 18].

Laden with connotation of a bygone era, the term's indiscriminate use today confuses more than it enlightens. It's not enough to say "DP" anymore as it may once have been in Tab and Sort times!

DP must now be qualified by context and application discipline to be meaningful. By and large, this is poorly done in DP trade media.

Media phase-out of "DP" as a catchall is in order. This would seem appropriate with the general migration toward application autonomy that comes with distributed processing strategies. Readers should benefit from the specificity of application emphasis. The retirement of "DP" from general usage could boost human communications through elimination of negative attitudes created by what some perceive as a veiled arrogance in said argot.

So long, "DP." You've served us well in your prime. Now let's get on with our specific involvements in financing, engineering, medical, personnel, planning, scientific, automation, process control and other computer applications.

Peter Kushkowski

Hartford, Conn.

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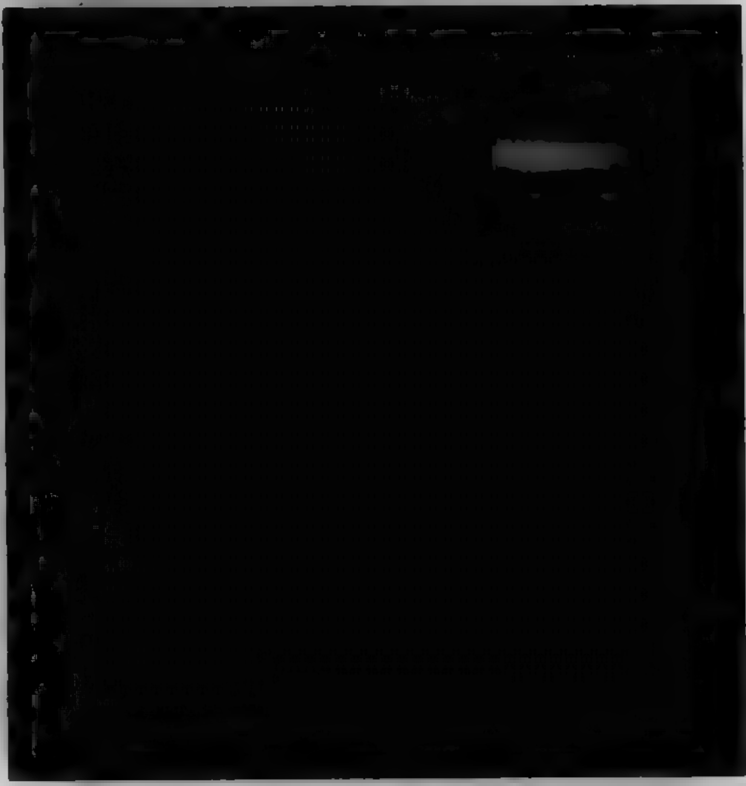

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LETTERS

Not That Bleak

As I was starting on the stories about the anniversary of the IBM 1401 [CW, Sept. 1], I was called back to our computer room to diagnose the obstinacy of our 1401 in its refusal to read cards. After removing some errant wires from the brush block, restoring good humor to old faithful, I came back to finish the stories. I don't know whether it is journalistic license, or whether you were just trying to tell a good story, but today's 1401 scene is not all that bleak.

For example, IBM will maintain the 1401 on a monthly agreement until April of next year. I have mine on a time and materials basis, because we have maintenance people in-house and because we have dismantled two CPUs and a card reader for parts. However, there are three or more experienced field people in the local IBM office. We have received prompt and effective help when we have needed it. We have never had to wait for parts from them, either.

The 1401 could be configured with either the 1311 or the 1301 disk drives. While IBM may not have offered an operating system, there were homegrown varieties. We have a modest tape operating system ourselves, with programs cataloged on tapes and called out by a master control program driven by sense switches and control cards.

I am sure that the market value of the 1401 as an operating machine is limited, but the market value of the machine is well above zero. I get calls all the time from people wanting to purchase mine.

I find it hard to believe that there are only about 10 1401s in operation in the U.S. I suspect that you will hear from a lot more installations than that.

It is not just nostalgia that keeps us in the 1401 game (although it is surely interesting to see how the faces of some old timers light up when they see our machine). We use ours for reading cards to tape for our 360 and to print out tapes created on the 360. It is far cheaper than even the present prices of 360 card reading and printing gear and costs less than $200 per month for maintenance, plus around $150 per month for power. We have been using it since October 1975. At that time, an investment of $8,000 in the 1401 saved us about $60,000 in 360 equipment.

Robert M. Clawson
President
Management Reporting Services, Inc.
Denver, Colo.

Centless vs. Senseless

Regarding Jeremy Epstein's letter concerning the unreasonability of Mountain Bell's closing bill of five cents and its refund check of two cents: My daughter received a two-cent refund check from the local telephone company here in Pennsylvania. I shared Epstein's reaction and followed up on it with telephone calls to the state public utility rate office. There I learned that the telephone company was obeying state regulations.

Probably it is the New Mexico legislature that requires being sold on "centless accounting" before Bell can cancel its "senseless" practice.

Herbert Reichlin
Harrisburg, Pa.

A Business Decision

The reasonableness checks that Jeremy Epstein used in his letter as examples (questioning cash deposits or withdrawals of more than a set limit, or checks of $100,000 where the average balance has been $500) are used to indicate possible errors. Although outside of a normal range, the transactions may be legitimate, but verification is required before processing.

However, the reasonableness check that Epstein has complained is missing from the Mountain Bell billing system is something quite different. He wants a reasonableness check to prevent a bill from being sent out for less than some set amount. He went on to state that "more programs and programmers need to be concerned that the data being processed is reasonable."

In my opinion, from the standpoint of data processing the data being processed was reasonable. Epstein did owe Mountain Bell five cents. Whether or not it is reasonable to send out a bill for five cents is a business decision which I believe does not fall within the realm of the DP department.

Lowell Ray Anderson
Cody, Wyo.

Just Speculation

As a marketing representative for a communications vendor in the IBM marketplace, I read with interest the article on IBM's "aging 370X line of communications processors" and four analysts' predictions contained within the article [CW, Sept. 1]. I was deeply disappointed.

The article's content is simply speculation. To my knowledge, IBM did not contribute directly to its writing. Although the 370X has become a staple of IBM's communications hardware, these analysts predicted several changes without providing sufficient supporting arguments. In essence, they outlined an IBM communications solution without recognizing any consequences, implementation considerations or marketing strategies.

To cite a relevent example, IBM may have created a sophisticated tape management system several years ago. However, it apparently decided that it would not be in its best interests. Several independent vendors have since supplied this need very adequately.

The current communications environment may possibly force IBM to

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LETTERS

adjust its marketing strategy by implementing a new line of front-end processors; however, this may also be a great concern of IBM users. If IBM started changing structures without extensive planning, the customer would be in serious trouble.

The largest change that IBM has come out with while 3705 has been in existence is the whole area of Systems Network Architecture (SNA). The original 3705 supported the emulation procedures as with 2701s, 2s and 3s. Only later was introduced the subject of Network Control Program (NCP). NCP introduced many new concepts, substantial new interfaces and substantial new software.

My firm, Comten, moved right in, developed the required software and the required interfaces. In fact, Comten's largest communications processor, its 3690, provides three to four times the performance of a 3705.

With its large user base, it is not in IBM's best interests to make major changes. Given the age, limited capabilities and performance of the 370X, a change would be expected; however, I feel it should be the vendor who supplies this information to the market.

Steve Vogel

Bala Cynwyd, Pa.

Computer Time Market

"Time Is Not on the Side of Time Brokers" [CW, Aug. 18] inaccurately depicted the computer time market and erroneously inferred that time brokers are in trouble.

DP Brokers was established in 1975 for the purpose of marketing computer time and equipment on a brokerage basis. While our equipment services have expanded to incorporate the entire Middle Atlantic region, our computer time services are restricted to the Washington, D.C., metropolitan area. Prior to the establishment of DP Brokers, I worked for the local Time Brokers office, marketing computer time exclusively.

The market has indeed changed drastically since the concept of computer time sales was initiated by Time Brokers in 1964; however, the smart broker has changed with the market. The dedicated, hands-on, wall clock market is virtually ancient history, but the requirement for time-sharing through terminals is alive and well.

In fact, we have noted an increase in requirements during 1980 which are the direct reflection of present economic conditions. More companies are reluctant to commit to long-term speculative hardware upgrades and are, therefore, using outside sources for development projects.

DP Brokers' mailing list for our bulletin, "Marketing Memo," contains more than 500 IBM-type data centers and is continuing to grow. Approximately 20% of those listed are available for time sales, and many of the data centers themselves are using our services for development, convertion or other special project requirements.

Joan W. Johnson
President

DP Brokers
Vienna, Va.

Response Unjustified

During the past several years, I have enjoyed reading *Computerworld*. The information and expertise in which it is presented have added much to my knowledge of the DP industry as a whole and of all aspects of computing. I have always been proud to be a part of this profession and enjoy the challenges it offers.

After reading the July 28 editorial entitled "Computers and the Draft," I was appalled that personal, almost vindictive, feelings have found their way into an otherwise fine trade journal. Each of us has our own feelings and beliefs on practically every issue known to mankind, including those of a moral, political or patriotic nature. I feel it was definitely bad judgment to respond to a news item that needed no personal response.

Now that I've had my say concerning the existence of the editorial, I would like to respond to some of the questions and accusations brought forth.

1. The Selective Service system is not commandeering resources of other federal agencies. This is a cooperative effort by several agencies to get a job done. Would you rather the government waste millions of dollars, as usual, to acquire more hardware, software and people to fulfill the requirements of a law set down by our elected officials?

2. As far as personal privacy rights, I don't feel this registration infringes upon anyone.

3. The job being done by the Selective Service system is not conscription for military service. It is registration of citizens of the U.S. in the event they are ever needed to defend our constitutional rights of a free and democratic republic. I personally feel it was a tremendous mistake to discontinue this practice several years ago. Relying on an all-voluntary military force, where low intelligence prevails and it becomes almost impossible to fill extremely technical positions, has put our defense in a vulnerable position.

4. Federal computing specialists are not being exploited. Just as in any company in this country, they were hired for a specific purpose with a specific job description. They are paid to work a certain number of hours a day doing whatever their employer requires of them.

If they do not wish to do this, it is their right to resign and seek employment elsewhere. This is the same whether it be the employees I supervise or those employed by the federal government.

Dexter Bordeau

Houston, Texas

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DATAPOINT

READER COMMENTARY/Mark Robinett

Before You Pick Up and Move . . .

In today's recession-plagued economy, the data processing specialist may tend to feel somewhat invincible. While most fields are tightening their belts, the DP industry continues to grow at a healthy pace. In fact, it is one of the few fields that actually has more job opportunities than qualified people to fill them.

Therefore, if you don't like your present position, you can just pick up and move to something better at the drop of a hat. Right?

Well, before you sell your house, it is wise not to become overconfident. True, your expertise is in demand, but there are still some guidelines in searching for another job, and failure to follow them can seriously hinder your career advancement.

The first consideration is: *Are you committed to making a change?*

You can have any number of reasons for wanting to leave your present job, but a prospective employer will want to know why you are seeking to make a change. The following are several legitimate reasons.

- The main reason for job dissatisfaction is salary. Ask yourself if you are being paid what you are worth. We all think we deserve more, but be realistic. Take into account your background and responsibilities. How much do you actually do? How much responsibility do you really have? If you honestly believe you are underpaid, do not be afraid to give this as a reason for a switch.
- In conjunction with this, do you have the responsibilities you would like? For various reasons you may be limited in your duties. Perhaps you could do more work than your present company allows. Conversely, you might be doing too much of one thing.
- Another cause for discontent is mobility. Are you stuck in one position with no chance for advancement in the foreseeable future? This could be the case, depending on the size of your organization and its internal makeup. Again, be honest with anyone who is considering hiring you.
- Last, be aware of all that is involved in relocating. The chances are very good that the position you desire will not be in your present area.

Above all, be flexible. You can hold out for the "perfect" job or you can work in your own lifetime. Look at your options honestly and they will look better.

Search Aids

The second step is: *How do you find a better job?*

Once you have decided to move on, you have several avenues open to you — and a few dead ends.

You can, for instance, try to find something on your own. This method can be successful and is perfectly logical, for what better way to sell yourself than through yourself? However, it is also time-consuming. You will have to spend time chasing down leads that go nowhere. You need to cultivate personal contacts in the computer field and answer ads in trade journals.

One of the best aids you can have in searching on your own is a good resume. It should be clear and concise. A specific opening could bring hundreds of applications, and an employer will not take the time to read a verbose resume. One word of warning: never send your resume to a blind box number. You don't know who is receiving it or what they might do with it. It is best to apply for specific openings at specific companies.

Another means of finding a job is by going through your alumni placement office. Schools maintain contact with companies and may know of openings that have not been generally advertised. But be aware that a university will probably not work actively on your behalf. They will at best keep a file, and the business of contacting a company will still be yours.

A way of bridging the gap between you and a company could be to use a professional employment agency.

First, recognize that there are good agencies and bad ones. It is up to you to discern one from the other. A poor representative will only make a bad first impression and cost you valuable time.

Next you need to know what questions to ask to determine reliability; *do not* be afraid to ask them. Find out, for instance, how long the agency has been in business. Just as in anything else, quality lasts. A newer company could be very good, of course, so you will not want to judge solely on this.

Avoid agencies that charge you a fee. Client companies will pay fees to reliable agencies and if they do not think a particular agency is worth paying, neither should you.

See if the agency specializes in data processing. If so it is of much greater value to you.

Get names and addresses and find out who their client companies are. This will enable you to get the proper feel of an agency.

Robinett is manager of DP placements at Dorsey Love & Associates, a technical placement agency in Springfield, Mo.

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NBS Asks Pros and Cons Of High-Level Languages

CW Washington Bureau

WASHINGTON, D.C. — The National Bureau of Standards (NBS) is seeking comments on the advantages and disadvantages of adopting several high-level programming languages as federal DP standards.

The government has already acted to adopt four languages as federal standards — Cobol, Fortran 77, Minimal Basic and Pascal — and now wants advice on PL/I, APL and the Department of Defense's Ada.

In a Federal Register notice late last month, NBS said it is "particularly interested in information necessary to determine the feasibility, cost and benefits" of adopting those three languages, but added that comments on "any high-level programming language are welcome."

The agency asked respondents to keep in mind the following criteria:

- The availability of an appropriate language specification.
- The acceptability of the standards to federal agencies, vendors and the general community of users.
- The present or anticipated need for a high-level programming language in application areas for which the language is suited.
- The economic importance of those applications to the federal government.

"Where an Ansi standard exists," NBS said, "the comments should be directed at the possibility of adopting that version rather than any other language variations referred to by the same or similar name."

Comments should be sent by Nov. 24 to the Standards Administration Office, Institute for Computer Sciences and Technology, NBS, Washington, D.C. 20234.

Eclipse AOS/VS Users Gain RPG-II, Compiler

WESTBORO, Mass. — Data General Corp. has introduced an AOS/VS version of its RPG-II programming language and enhanced both this and its AOS version by adding an optimizing compiler.

AOS/VS RPG-II executes on the firm's 32-bit Eclipse data systems and, like AOS RPG-II, includes an interface to the Infos and Infos II file management systems that allows users to create and maintain large data bases in an on-line, multiterminal environment, DG said.

Another feature AOS/VS RPG-II shares with the AOS version is support for simultaneous timesharing and multistream batch operations, which reportedly lets users develop and execute RPG-II programs without interrupting other work on the system.

Because both versions operate as shared processes in the programming environment, DG claimed multiple users can simultaneously access the compiler without imposing the overhead normally associated with storing and executing multiple copies of the compiler.

Two Compilers

AOS and AOS/VS RPG-II languages also include two compilers: the Data General RPG Interactive Compiler (DG/RIC) and a new RPG optimizing Compiler (DG/ROC).

DG/RIC runs interactively using an interpreter under either operating system and is said to provide interactive debugging, formatted dump facilities and dynamic paging for large programs.

Designed mainly for program development, the RIC interpreter gives feedback on user code-one command as it is entered, a DG spokesman explained.

Geared for a production environment, DG/ROC generates optimized machine-level code for producing fast executing versions of RPG program, the vendor claimed. This compiler is said to optimize execution time by reducing AND/OR logic and finding common indicators across and within statements.

Additional features of the RPG-II compilers for AOS and AOS/VS include a program analyzer

(Continued on Page 48)

Offers Remote Access

'Raps' Aids Power/VS, Power/VSE

JERICHO, N.Y. — A system software package designed to allow users of IBM's Power/VS and Power/VSE gain access to reader, punch and print queues while bypassing console control obstruction has been developed by Express Software, a division of Computer Associates, Inc.

The Remote Access Power Support (Raps) package improves programmer and machine productivity and reduces costs, the firm claimed.

Said to effectively create a remote job output facility, Raps displays information on the data within Power queues, as well as the data itself, through an IBM 3270 CRT terminal running under CICS.

Based on this information gained, the user may then issue commands to Power/VS and Power/VSE through the 3270 and Raps to alter priority, class or number of copies as well as determine which part of the print data, if any, is to be printed.

Raps is available on a three-year lease for $3,500. One-year and monthly leases are also available from the firm at 125 Jericho Tnpk., Jericho, N.Y. 11753.

Test Data Generator Tied to IDMS

VALLEY FORGE, Pa. — A software module that enables Datamacs users to use Cullinane Corp.'s IDMS data base management system (DBMS) is being offered by Management and Computer Services, Inc. here.

Available for all IBM operating systems, the interface is reportedly the first to tie facilities of an automatic test data generator to IDMS, facilitating creation of data bases which incorporate any manner of structure, including hierarchical multilevels, single owner/multimember and multimember/single owner capabilities.

Through the Datamacs/IDMS command language facility, users can extend or create a test data base from an existing live data base, and the command language reportedly provides user control of the process from the selection of a single specific record occurrence to a complete network.

The new module is incorporated into the Datamacs product, which costs $17,500, the vendor said from 74 Great Valley Corporate Center, Valley Forge, Pa. 19482.

Codasyl DBMS for Micros Gets Query, Report Writer

LAFAYETTE, Ind. — A query system/report writer for use on its network data base management system (MDMS) is being offered by Micro Data Base System, Inc. (MDBS). MDMS is the first Codasyl data base management system for microcomputers, the vendor claimed.

Called MDMS-QRS, the product furnishes a nonprocedural, English-like query language that allows a nonprogrammer to interrogate any MDMS data base on an ad hoc basis, according to a spokesman.

Armed with the picture of the data base's logic structure, a nontechnical user can begin formu-

(Continued on Page 48)

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Prime Boosts Storage, Speed of 'Information'

WELLESLEY HILLS, Mass. — Prime Computer, Inc. has enhanced its Information business computer system software to reportedly offer a greater storage efficiency and an execution speed three times faster than the previous software package.

Geared for the Information series computers — the I 500, I 1000 and I 5000 — the enhanced software also boasts a dynamic reorganization capability and several query capabilities. The latter option reportedly makes it easier for systems programmers and operators to access and work with information stored in the software's relational-like data base.

Basically, the Information software provides the Info/Basic business language, an English-like inquiry language (Inform) and an information management system (Info/DMS). Complete hardware/software systems are marketed through an international network fo Prime dealers, who add additional software before selling to end users, a spokeswoman claimed.

Like Prime's previous Information software version, introduced with the system series in 1979, the enhanced version allows users to preallocate physical disk records when a file is created.

The software lets users organize files on a "what if" basis to avoid wasted disk space, the spokeswoman continued. A record distribution report is produced, reflecting the storage efficiency or an existing file if the file type is altered.

A typical I 1000 Information system would include the software, a CPU with 96M bytes of disk memory, 16 user terminals and a magnetic tape drive. System prices range from $49,000 to $700,000. The enhanced software is free to present Information system users under maintenance contract.

Additional information on the software enhancement and the information series can be obtained from Prime at 40 Walnut St., Wellesley Hills, Mass. 02181.

Package Tracks Ad Billings For Multititle Publishers

LOS ANGELES — Neasi-Weber, Inc. has unveiled an on-line software package for use by advertising departments of multipublication firms in managing advertising and accounts receivable.

The Advertising Management and Accounts Receivable Control (Admarc) system permits the user management of, and informational access to, advertising and payment processing and account credit data, the vendor claimed.

It handles multiple editions within publication titles, maintaining records for three years or more. It accommodates monthlies, weeklies and dailies and is available in versions designed for both display and classified ads.

System capabilities include on-line entry and inquiry of advertiser and agency data, publication account assignments, insertion orders, contracts and master contracts for each advertiser, a spokesman said.

It runs on most mainframe computers, but not minicomputers.

The cost for the system ranges from $50,000 to $75,000, depending on the number of modules the vendor said from Suite 405, 6725 Sunset Boulevard, Los Angeles, Calif. 90028.

DEC Users Get Multistation WP

WEST COVINA, Calif. — Multiterminal word processing (WP) software that runs under Digital Equipment Corp.'s RSTS, RSX and VAX operating systems is available from Northwest Digital Sales, Inc.

The multiterminal WS-11 systems are said to use the same menus and function keys of the stand-alone version currently used by DEC PDP-11/03, Minc and Miniminc users.

WS-11 is compatible with VT-100 and VT-52 terminals and their equivalents.

The RSTS and RSX versions cost $3,000, with VAX version priced at $3,500. The vendor is at 668 S. Sunset Ave., West Covina, Calif. 91790.

Costing Package To Aid Truckers

LEXINGTON, Mass. — An automated shipment costing software package that reportedly lets independent carriers assess traffic profitability has been introduced by Temple, Barker, & Sloane, Inc. (TBS).

The TBS Shipment Profitability System permits the evaluation of individual and aggregate costs and profitabilities of shipments by weight class, traffic lane, length of haul, customer, commodity and type of carriage.

The software costs approximately $20,000 or licenses for $5,000/year. TBS is at 33 Hayden Ave., Lexington, Mass. 02173.

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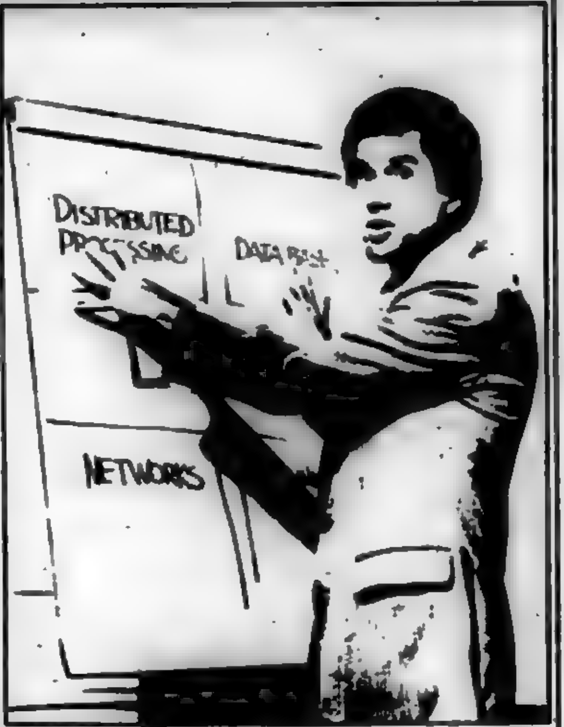

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'Diffs' Compares Files For Programmers, Auditors

ALLENTOWN, Pa. — A software productivity aid for programmers and auditors that compares two files and shows their differences is being offered by Software Consulting Services.

When files contain extra records, Diffs, the software, searches for the point where the files match again, displays the extra records and continues comparing.

For program files, sequence number fields and leading and trailing blanks can be ignored. For report and data files, selected column ranges can be compared or ignored and multiple blanks can be treated as one blank for text file comparisons. Differences in files can be printed in either character format or in hexadecimal, the firm said.

Diffs is a portable ANS Cobol program in source code and can be installed on any machine with a full ANS Cobol compiler, the firm said. Diffs costs $500 from Software Consulting Services, 901 Whittier Drive, Allentown, Pa. 18103.

Auto-Trol Updates 'GS-1000' for AD/308

DENVER — Auto-Trol Technology Corp. has announced a new release of the GS-1000 software for its AD/380 turnkey design and drafting system.

The release features an associativity capability that reportedly permits flexible graphic entity selection, entity editing (including global replacement by another entity) and improved editing of the entity's alphanumeric attributes.

The average price of an AD/380 is $350,000. Auto-Trol is located at 12500 N. Washington St., Denver, Colo. 80233.

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Human Resource Management Topic of Comshare Series

ANN ARBOR, Mich. — The first two volumes of its human resource management series, "Profiles Applications Library," have been released by Comshare Inc., an international computer services firm. The two volumes, "Human Resource Planning" and "Salary Administration," consist of a series of computerized reports and analyses.

Each report addresses a human resource management problem and is indexed and cross-referenced.

"Human Resource Planning" examines how people move in, through and out of an organization; analyzes corporate needs and employee skills; and documents resource planning programs.

"Salary Administration" handles issues of internal pay equity, external competition, employee motivation, government compliance, salary strategy and budget development.

The library is available to Comshare clients only and sells for $395 per volume. More information on the series can be obtained from the vendor at 3001 S. State St., Ann Arbor, Mich. [illegible]

Tesseract Facility Supports PMS Independently of DBMS

SAN FRANCISCO — Tesseract Corp. will now support its Personnel Management System (PMS) independently from the user's data base management system (DBMS).

The facility, available with release 1.7 of PMS, allows on-line interactive applications to operate with several different DBMS' without changing the programs. PMS application programs can, for example, operate with IBM's Vsam data access method and IMS, or with Cincom Systems, Inc.'s Total DBMS, the vendor said.

PMS now has utilities that will handle transition from one DBMS to another. This feature is said to make PMS available to any user regardless of his telecommunications monitor or DBMS environment, the vendor said.

PMS costs between $50,000 and $67,000, the vendor said from 101 Howard St., San Francisco, Calif. 94105.

Workshops Set On 'Jars,' 'Gold'

McLEAN, Va. — Fall classes on job accounting conducted by Johnson Systems, Inc. (JSI) will stress development and implementation of custom chargeback systems for data centers and remote site networking, Education Manager Jason Martin said.

The courses will be held in San Francisco, Boston, New York City and Washington, D.C., on various dates.

A workshop on JSI's Job Accounting Reporting System (Jars) runs three days and costs $395; a two-day workshop on the Graphic On-Line Display System (Gold) is $295; and the fee for both is $495. Specific dates and additional information are available directly from JSI, 7923 Jones Branch Drive, McLean, Va. 22102.

'P-Rade' Joins P-Stat System

PRINCETON, N.J. — P-Stat, Inc. has unveiled P-Rade, a random-access data enhancement to the P-Stat statistical system.

With the implementation of P-Rade, a P-Stat file can be converted to a direct access format, the P-Rade file and updated in place in a fast and efficient manner, the vendor claimed.

The key structure for P-Rade files utilizes B+ trees. This permits both a primary key and a number of secondary keys to be defined and easily maintained, a spokesman said. The trees remain well-balanced even where there are many deletions and insertions made in the file.

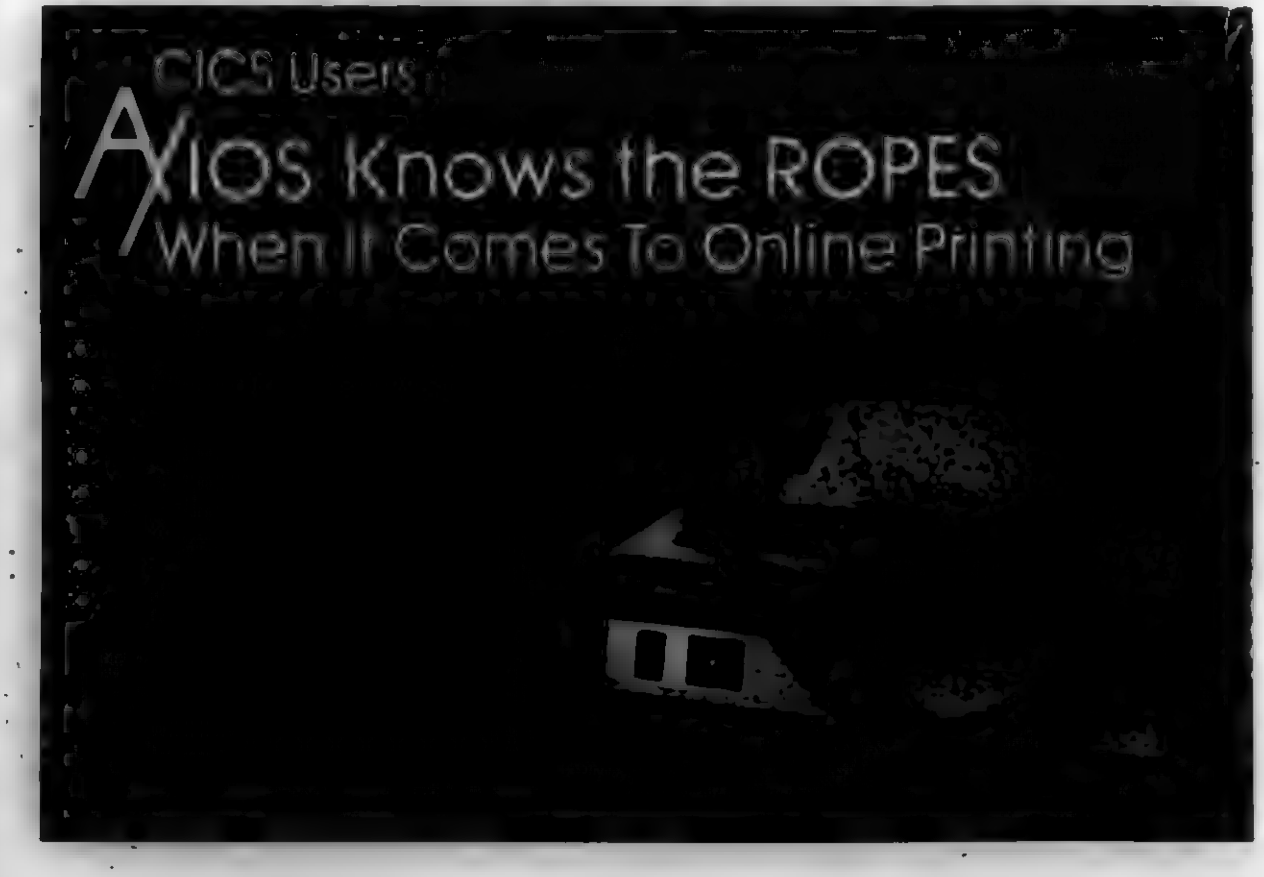
The introductory price is $5,000 the first year and $3,500 each year for renewal, the vendor said. More information is available from P-Stat, P.O. Box 285, Princeton, N.J. 08525.

MSS Free Offering Lists MRP Vendors

WILLISTON, Vt. — Manufacturing Software Systems, Inc. is offering a free, updated version of its Manufacturing Resource Planning (MRP) vendor list. The list includes more than 70 packages marketed as MRP systems, according to MSS.

The list was made available without charge because it will make the job of implementing MRP easier and encourage companies to review as many packages as possible, a spokesman said.

More information is available from MSS at P.O. Box 278, Williston, Vt. 05495.



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Package Helps Banks Speed File Conversion

PITTSBURGH, Pa. — A software package for IBM computers that is said to reduce the amount of time it takes banks to change the format of name and address records in central information file (CIF) systems has been introduced by Innovative Systems, Inc.

The Bankscrub/Conversion package reportedly cuts clerical review time by about 80% to 90% by isolating and identifying only those records in a CIF that are in error. The software is geared to run on IBM 360, 370, 30 series, 4300, DOS/OS, assembler and Ansi Cobol operating environments.

The package utilizes a proprietary heuristic technique which defines and examines each word of a record according to its meaning, the spokesman continued.

Bankscrub/Conversion identifies line types, customer types, titles and bank appendages. Records with potential errors are identified for clerical review. Records not found in error are 99% accurate, the spokesman claimed.

Bankscrub/Conversion is presently available on a service basis only. Prices of the software are dependent on the volume of CIF files, the spokesman said from the firm at 341 Fourth Ave., Pittsburgh, Pa. 15222.

NCR 250 Gets Load Module

LINCOLN, Neb. — Retail Data Corp. (RDC) has added a down-line loading program module to its line of turnkey polling systems for NCR Corp. 250 point-of-sale (POS) terminals.

Claiming the module is the first of its kind, a spokesman said the package provides for broadcasting both messages and programs in a multiline communication network.

The module is available on RDC's Topak turnkey communication system based around Perkin-Elmer Corp. computers. Systems cost between $75,000 and $500,000, the vendor said from 620 N. 48th St., Lincoln, Neb. 68504.

Multifirm Accounts Payable Runs on Burroughs' CMS

SOUTHFIELD, Mich. — An interactive, multicompany accounts payable system for the Burroughs Corp. CMS family of computers is available from Logical Design Corp.

Under the system, all payables transactions are posted through CRT terminals with a posting report provided for verification and control, according to the vendor.

Data is edited as it is entered through the interactive posting program, allowing for immediate error correction, a spokesman claimed. The system is said to allow the user to specify automatic or manual voucher numbering.

Written in Ansi 74 Cobol, the package costs $2,500, with a 10% annual license fee from the firm at 27777 Franklin Road, Southfield, Mich. 48034.

Ferguson Forms Rental Arm

MARINA DEL REY, Calif. — Ferguson Tool Co. — supplier of operating system software for IBM System/3 models 8 and 10 — has formed a Rental Maintenance Division to make available on a no-minimum-term monthly rental basis many of the firm's software packages.

For example, the monthly rental fee of $107.42 would represent an additional cost to the user of about $5/mo over existing support structures which it replaces, according to the firm.

In addition, all rental customers of Ferguson's ELIMN8 program — said to improve System/3 performance by 40% — will continue to receive system control programming support directly from Ferguson Tool after the recently announced Oct. 10 termination date for IBM support.

Ferguson's Rental Maintenance Division can be reached through P.O. Box 9964, Marina del Rey, Calif. 90291.

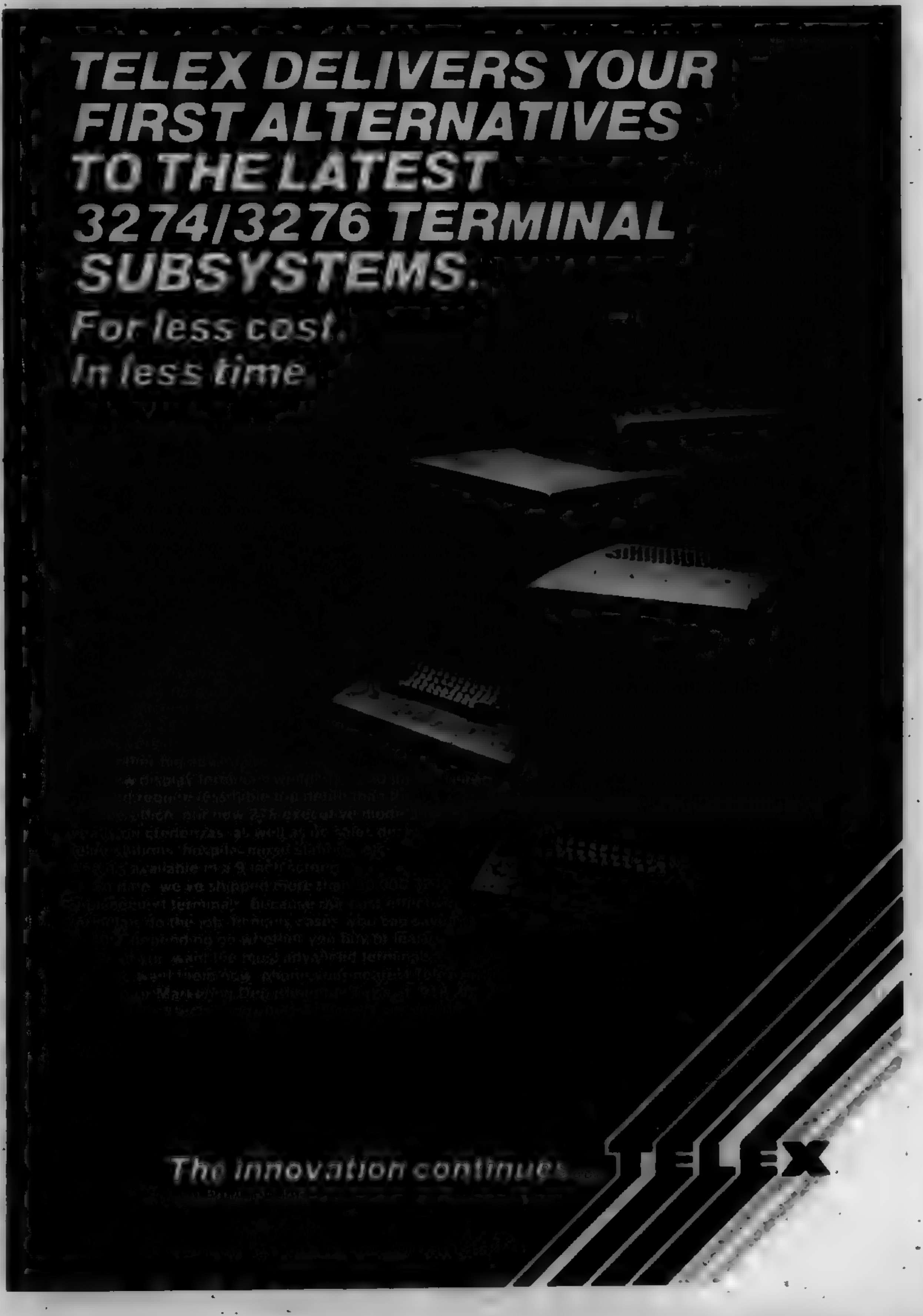
Real Estate Packages Run on System/32, 34

MACON, Ga. — Dessau Realty Services, a division of Dessau Realty and Insurance Co., has developed software packages aimed at first-time users in the real estate management industry.

The set of packages, designed for IBM System/32 and 34 users, offers receivables, payables, investor reports, general ledger and other investment analysis measurement programs, according to the vendor.

Prices start from $13,000 to $16,000 for the System/32 package with an additional $4,000 for an on-line enhancement for the System/34. The price includes documentation, source code, installation and operator training.

Maintenance contracts are available on a subscription basis, the vendor said from 555 First St., Macon, Ga. 31201.



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Accounting Package Aimed at S&Ls

GREENSBORO, N.C. – An accounting and financial reporting system designed for savings and loan (S&L) associations has been developed by S&L Information Management Systems, Inc. (Slims).

The Financial Management System, which may be powered by either Burroughs Corp. or Data General Corp. minicomputer systems, automatically generates all daily management reports, financial statements, regulatory reports, ratio analysis reports and profit-center accounting, according to the vendor.

Included in the system price of $34,000 is a DG CS/30 minicomputer with 64K of memory, 12.5 million char. on fixed disk and a 1.26G-char. removable diskette. Also included are a diagnostic display terminal linking the user with Slims, a printer and DG hardware maintenance.

Slims is at 822 N. Elm St., P.O. Box 22106, Greensboro, N.C. 27420.

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Via Time-Sharing

'Management Plus' Aids Banks

FAIRFIELD, N.J. – A time-shared management tool designed to assist senior bank management in the proper allocation of their asset and liability mix has been developed by remote computing services' vendor Rapidata, Inc.

Management Plus, which can be accessed through any printing terminal, includes a monthly management and analysis summary report tracing the institution's performance in 16 areas, a budget update model to monitor previous budget assumptions in light of current trends and an investment funds/liquidity model to review actual and forecast liquidity and evaluate alternative investment strategies.

An account profitability reporting model, a service charge analysis model and a multiyear planning model are also included in the package, which comprises the first half of Futurecash, a total bank financial management system.

The second element of Futurecash, the Investment Portfolio Analysis Service, will be released during the fourth quarter, Rapidata said.

Charges for Management Plus range from $750/mo to $2,000/mo, depending on the size of the bank and the frequency of report generation. Rapidata is located at 20 New Dutch Lane, Fairfield, N.J. 07006.

STSC Finance Service Out

BETHESDA, Md. – STSC, Inc. is offering Solution-33, an automated compliance and reporting service that reportedly produces inflation-adjusted financial statements required under Financial Accounting Standards Board Statement No. 33.

The service is available on the firm's time-sharing network and is billed on an as-used basis.

STSC is based at 7316 Wisconsin Ave., Bethesda, Md. 20014.

AOS/VS Gets RPG-II, Compiler

(Continued from Page 43)

that generates program listings in Cobol-like sentence structure format and interactive symbolic debuggers said to let programmers follow program logic flow.

Breakpoints, DG said, can be set at program line numbers so that the content of variables may be displayed and indicator settings examined or modified.

RPG-II debuggers also contain HELP files that describe debugging commands.

Current users of DG's RPG-II programming languages will receive all enhancements free of charge. First-time users can license either the AOS or AOS/VS version for $1,500.

This price includes initial license, one-year software subscription service, one-year comprehensive support service and one training credit.

Minimum core requirements are 512K bytes for AOS RPG-II and 1M byte for AOS/VS RPG-II. Deliveries are 120 days after receipt of order from DG at Rt. 9, Westboro, Mass. 01581.

Report Writer For Beginners

(Continued from Page 43)

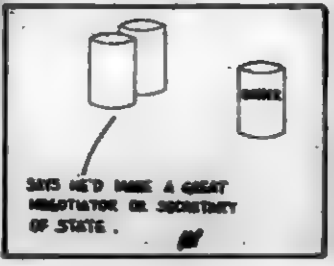
lating powerful queries for data retrieval, a spokesman said.

Utilities are provided to aid the beginner, and a capability for defining macro instruction is included with the product. In addition, the data base administrator can define titles and synonyms for the various data base entries (e.g., data items types) to make the query system more user-oriented.

The report generated in response to a query can be displayed in a standard format. Alternatively, the user can customize a report by invoking the report writer feature, which allows a user to specify control breaks in a report, with options permitting statistics – such as mean and variance – to be printed at each break and at aggregate levels.

At the user's option, a report generated by MDMS-QRS can be displayed on the screen, routed to a printer or saved on a file for later user. A user can also devise arbitrarily complex expressions.

The product costs $300, the vendor said from P.O. Box 248, Lafayette, Ind. 47902.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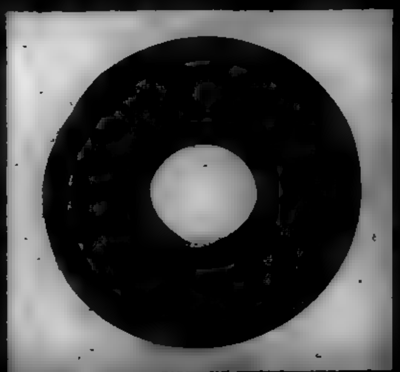

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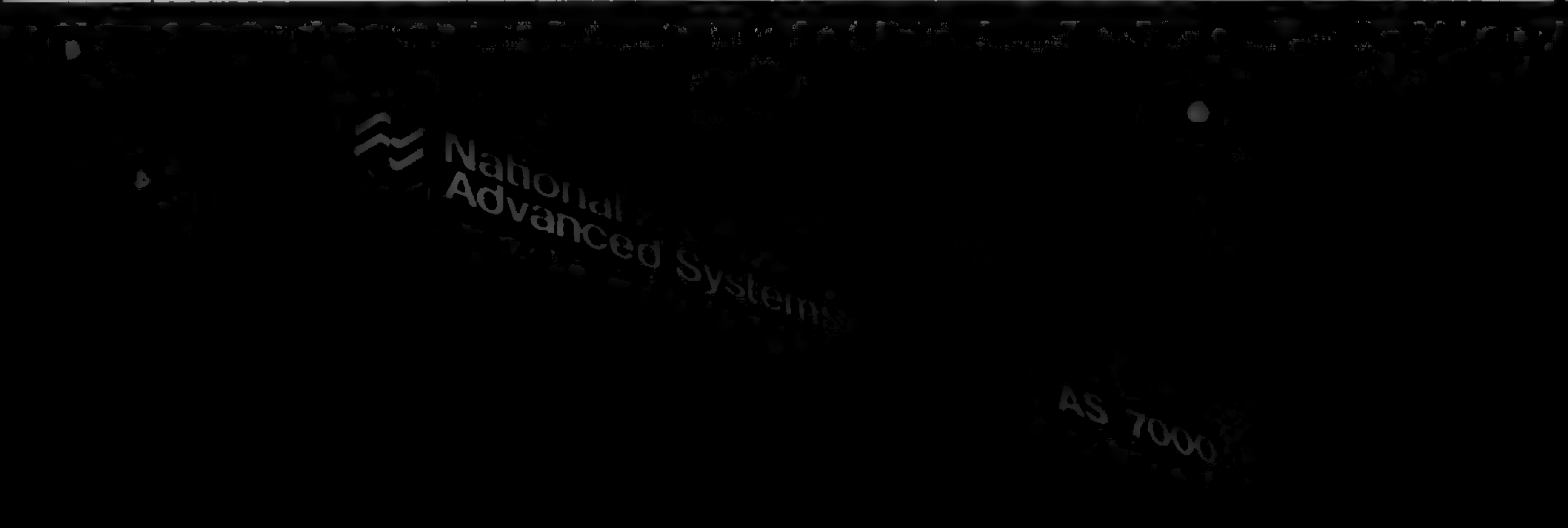


Fleet Scheduling Package Selects Vehicles, Routes

HINGHAM, Mass. — A software package for use in fleet dispatching, said to combine split-load deliveries in the most effective manner and to establish daily routes, has been developed by Information Software & Services, Inc.

After the routes are established, the Vehicle Scheduling System (VSS) uses a linear programming model to select the optimal vehicles for delivery if more than one type is available, the vendor explained.

The system is written in Fortran in modular form, so other options can be added "with a minimum of difficulty," according to the firm. Because of the differing nature of companies' products and delivery schemes, VSS is custom-tailored to each client, at a cost of $5,000.

Upon acceptance of the final package by the customer, the following basic license fee schedule is effective: $15,000 or $700/mo for one installation; $10,000 or $500/mo for the second through fifth installations; and $5,000 or $250/mo for the sixth or more installations.

The firm is at 10 Industrial Park Road, Hingham, Mass. 02043.

Baker Updates Routing Package

WHEELING, Ill. — J. Baker and Associates, Inc. has introduced Version 4.0 of its Route Distribution Applications package for beer, soft-drink and bakery distributors.

The application supports driver sell, presell or a combination of the two accounting systems, the vendor said.

The package operates on Digital Equipment Corp. PDP-11 minicomputers and costs $13,800 from the vendor at 300 Marquardt Drive, Wheeling, Ill. 60090.

Program Does General Ledger

METAIRIE, La. — A general ledger program for use in a multiclient environment is available from Datatrac, Inc. It features a transaction report, general ledger report by accounts, account balance sheets, profit-and-loss sheet, chart of accounts (for review of accounts) and a year-end trial balance sheet.

No prior knowledge of data processing is required to work the system, which is documented and comes with the source code. The source code together with the user's manual may be acquired for $195 on an 8-in. floppy disk.

The user's manual is also available for $25 with an option to buy the source code for $170, the vendor said from Suite 202, 3521 18th Street, Metairie, La. 70002.

NBS Modifies Aid For Heat Calculations

WASHINGTON, D.C. — Researchers at the National Bureau of Standards (NBS) have modified an NBS-developed computer program used to calculate the space heating and cooling loads in buildings so that it now can be used not only to simulate the energy load of an entire building, but also to make thermal performance calculations for individual building elements such as walls, windows, ceilings and floors.

This expanded output version of the computer program has been published by NBS and is available to building researchers and designers.

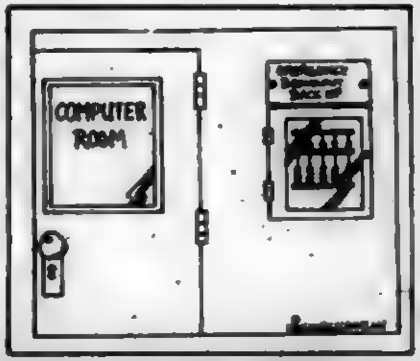
Further details on NBS research and activities are available from the U.S. Department of Commerce, National Bureau of Standards, Washington, D.C. 20234.

CMG International Confab To Open Dec. 2 in Boston

BOSTON — CMG XI, the 11th international conference of the Computer Measurement Group, Inc. (CMG), will focus on "Computer Performance Evaluation in the '80s" when it convenes here Dec. 2.

Technical sessions at the four-day event will include in-depth presentations to update the computer performance evaluation professional. Tutorial sessions by field experts will emphasize practical applications; performance management sessions will focus on management, planning and cost allocating.

Preregistration is $150; registration is $170 at the door; both fees include a one-year membership to the CMG. One-day admission is $75. Inquiries about the conference should be directed to Judith Abilock at Price Waterhouse, Office of Government Services, 1801 K St. N.W., Washington, D.C. 20006.



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'Addmatch' Profiles Customers

MINNEAPOLIS — A software package designed to provide businesses with information about customers, trade areas and site locations based on census data and mailing lists is available from Minnesota Crime Prevention Center (MCPC) Systems.

Addmatch consists of three programs: a Geographic Base File (GBF) Dual Independent Map Encoding (Dime) file strip routine, a geo-base construction routine and an addmatch routine.

Operating under the Digital Equipment Corp. RSX-11M operating system, these routines provide access to over 200 Dime files covering more than 6,000 U.S. cities, according to the firm.

The basic Addmatch system costs $5,000, with additional mapping software for block and tract level plotter displays available from MCPC Systems at 2344 Nicollet Ave. S., Minneapolis, Minn. 55404.

Loan Management System Runs on Novas, Micronovas

HICKORY, N.C. — A minicomputer-based package designed to manage installment loans has been announced by Carolina Business Computers, Inc.

The Loan Management System's operation revolves around maintenance of a customer file and an open transaction item file.

Two types of transaction entries are necessary: billing and cash payments.

The software is written in Extended Basic and will operate under DOS or RDOS on Data General Corp. Nova and Micronova computers. A one-time license fee of $2,000 covers the use of the package on a single CPU.

Carolina Business Computers is located at Oakwood Center, 350 Third Ave., N.W., Hickory, N.C. 28601.

Model Gets Solutions

ANN ARBOR, Mich. — ADP Network Services has added a simultaneous linear and nonlinear solutions feature to its financial modeling service.

Used for financial planning, budget preparation, cash flow analysis capital budgeting and credit analysis applications, users can now use a SIMULTANEOUS statement block to solve simultaneous equations using a Gauss-Seidel algorithm, the vendor said.

The feature is offered as part of ADP's data processing services and is billed on an as-used basis, the vendor said from 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Directory Lists Software Tools

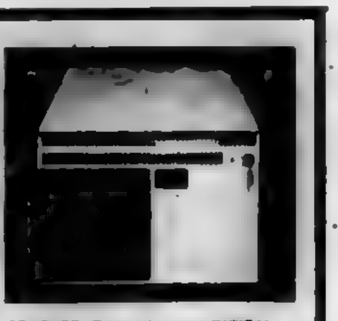
TORRANCE, Calif. — The "Software Tools Directory" from Software Management Consultants allows its readers to identify and locate software tools and products compatible to their specific needs, according to the publisher.

The reference work tells what the tools do, the systems within which they operate, their languages and their costs.

More than 300 tools are presented in the 350-page bibliography, including those used for definition, development, maintenance and management of software systems.

The preliminary volume sells for $195, which includes all first-year updates. The text will be updated at least biannually for a nominal fee.

Further information on the directory is available from Donald Reifer at Software Management Consultants, Suite 203, 2733 Pacific Coast Highway, Torrance, Calif. 90505.



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31 Manager/Supervisor Programming
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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Fourth-Generation Software

HP 1000 Networking Gains HDLC

PALO ALTO, Calif. — A revised, fourth-generation computer networking software package featuring HDLC, message accounting, dynamic rerouting and remote peripheral assignment for use on the Hewlett-Packard Co. HP 1000 family has been introduced by the firm.

Called the Distributed Systems (DS)/-1000-IV, the network is completely compatible with its predecessor, DS/1000, according to an HP spokesman.

With improvements reportedly made "at every level of the distributed systems architecture," according to the firm, the lowest level of that architecture features the replacement of the word-oriented, asynchronous protocol of earlier products with HDLC protocol.

HDLC Protocol

The HDLC protocol is implemented on the family of new, intelligent interface cards which perform all the link-level processing needed by the DS/1000-IV. In addition to their microprocessors, the cards contain 16,384 bytes of random-access memory which accommodate on-board message buffering. Frame sizes up to 1,024 bytes each are supported in both modem and hard-wired configurations.

In addition to a gain in overall throughput, the new combination is said to reduce main processor overhead associated with communications line handling. With an interrupt-per-buffer rather than an interrupt-per-character, more DS/1000-IV links can be concurrently active, the spokesman said.

Another feature of the package is a transparent, end-to-end message control scheme called Message Accounting, which has been implemented to help avoid losing messages if link or CPU failures cause the buffers to be reset.

In the transport layer of DS/1000-IV, the ability to dynamically alter the message paths throughout the network has been added. That capability is said to improve network reliability, since the topologically independent network uses store-and-forward message routing.

Enhancements to the user level include the ability to control remote computers completely, so that remote operation entirely unattended and without terminals is possible. Another added feature, Remote I/O Mapping, enables data originating at any node to be directed automatically to any unit-record I/O device in the network, according to the vendor.

In addition to the currently available Program-to-Program Communications, Remote File Access and Remote Command Processing features, DS/1000-IV is said to include a Remote Data Base Access capability. By utilizing remote Image/1000 data base management system calls, which are virtually identical to local calls, authorized users at any node can add, delete, update or retrieve information at data bases located anywhere in the network, the spokesman claimed.

Improvements were also reportedly made to the link between HP 1000 technical computer systems and HP 3000 commercial systems. In addition to user-level throughput gains, numerous user-level interface enhancements are said to provide easier transfer of information between the two families of HP systems.

An intelligent modem interface, similar to that used for HP 1000-to-HP 1000 systems, has been added to the HP 1000-HP 3000 link.

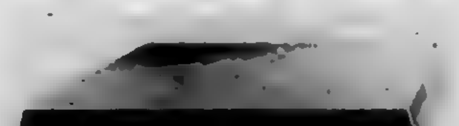
Price for the original license to use DS/-1000-IV is $4,000. Additional copies are licensed at $1,600 each. Present subscription users of earlier DS/1000 software will be upgraded without charge.

Intelligent hardware interfaces range from $1,400 to $2,000 each, depending on which HP 1000 series computer is in use, and whether hard-wired or modem connections are desired. HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Modem Transmits Up to 200 Miles

WHEELING, Ill. — An asynchronous limited-distance modem (LDM) for "mid-range" applications where short-haul units are not satisfactory but long-haul modems are unnecessary has been introduced by Gandalf Data, Inc.

The LDM 414 transmits data up to 200 miles (limited only by line conditions and the number of T Carriers) at speeds up to 4,800 bit/sec at one-third the cost of a conventional long-haul 4,800 bit/sec modem, the firm claimed. The unit operates over four-wire voice-grade 3002 lines (conditioned or unconditioned), T Carrier and most other carrier systems.



The LDM 414

Featuring simplified installation, the unit can be aligned by nontechnical personnel in minutes using a built-in tuning meter, the vendor noted.

Monitor indicators are visible with the front panel closed, including Power, System Ready, Transmit Data, Receive Carrier, Receive Data and Test. The front panel folds down to provide access to the level indicator, tuning meter, loop-back switch, equalizer and test points.

The LDM 414 costs $1,300, a split-channel version costs $1,500 and the LDM 404B, a synchronous version, costs $1,300 from Gandalf at 1019 S. Noel, Wheeling, Ill. 60090.

DDP Revolution — Part 1

Bottom-Up Network Previewed

By Chuck Steele

Special to CW

Multifunction, multiprotocol information stations, successors to today's intelligent programmable terminals, will soon play a pivotal role in the way computers communicate with one another.

Using such desk-sized, and eventually desktop, information stations — equivalent in power to many of yesterday's mainframes and today's minicomputers — the present top-down mainframe and hierarchically oriented distributed data processing (DDP) environment will be replaced.

In its place will be dispersed processing network, bottom-up structures in which the processing capability is dispersed among many nodes, equally accessible to all.

Utility Analogy

In many respects, this dispersed processing environment will resemble the standard voice telephone or the electric power utility.

Today, with the telephone, a user has only to dial a code, and he is put in virtually instantaneous communication with any other human being on the planet via a series of interrelated national telephone networks.

Unlike present hierarchical structures, the means by which the communication is established is not the telephone user's concern. In other words, in the present dispersed telephone communications environment, the interactions between various destinations are transparent to the user.

To use the electric utility analogy, any user today can instantly obtain the electric power he needs without worrying about where it comes from.

Similarly, in a dispersed processing environment users will connect themselves to one another directly; files will tend to accumulate in one place or another when reason or profit dictate it. With the numerous protocols and procedures that typify the present mainframe-dominated distributed processing environment removed as stumbling blocks, the centralized uniprocessor approach to computing will be replaced by a multiprocessing scheme in which the various information station nodes act in concert to solve the problems at hand.

Although such dispersed processing environment works against the economic interests of the mainframe manufacturers who control the present hierarchically oriented distributed processing structures, there are social and technological factors which are a

(Continued on Page 55)

Hand-Held System Uses Phone Lines

BURLINGTON, Mass. — A system using interchangeable modules that allows computer data to be entered and received over standard telephone lines using a hand-held portable data terminal is now available from Nixdorf Computer Personal Systems, Inc.

The LK-3000 personal computer can communicate with any business or private computer by means of a standard RS-232 telecommunications interface. By placing the telephone receiver on an acoustic coupler and plugging in the unit with a communications module, the user can key in data, review it on a 15-char. scrolling LED display and then transmit to the computer, the firm said. The computer can be accessed to receive stored data, too, Nixdorf said.

Convenient for traveling executives, salesmen or field service personnel, the LK-3000 with communications module (LK-2010) and acoustic coupler costs $525. Other modules available for the basic LK-3000 enable the unit to act as a language translator, filing system, calculator or programmable electronic note pad. The interchangeable modules are priced from $35 to $100.

The LK-3000 terminal operates at 110- or 300 bit/sec, asynchronous, half- or full-duplex. The terminal display is a 16-char., 16-segment alphanumeric LED with integrated MOS-LSI display controller and an 8-bit word length including parity, three stop bits and an 80-char. display buffer.

More information is available from Phil DeNapoli, National Sales Manager, at Nixdorf, 168 Middlesex Tnpk., Burlington, Mass. 01803.

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Free Brochures

• "Data Communications Products for Local Data Networks" describes Data Control Systems Access Network communications products. It is available from the vendor at P.O. Box 860, Commerce Drive, Danbury, Conn. 06810.

• A six-page booklet on "Leased Line Alternatives" outlines some cost-saving ideas and is available from the Codex Corp., 20 Cabot Blvd., Mansfield, Mass. 02048.

• Users of IBM 3600 finance system can obtain a 10-page brochure describing a loop modem series designed to operate within the system. It is offered by the Director of Banking, Paradyne Corp., 8550 Ulmerton Road, Largo, Fla. 33541.

• Lear Siegler's line of dumb CRT terminals is described in a new brochure available from their Data Products Division, 714 North Brookhurst St., Anaheim, Calif. 92803.

• "An Illustrated Handbook on Statistical Multiplexing" is a brochure designed to help management and users improve or create an effective data communications network. It can be obtained from Timeplex, Inc., One Communications Plaza, Rochelle Park, N.J. 07662.

• A brochure that details the potential savings of a new device for air conditioning systems that have outside compressors is available from Energy Spectrum, Inc., P.O. Box 93213, Atlanta, Ga. 30318.

• The 56-page "Network Management Equipment, Systems and Services Guide" which discusses the features, specifications and applications of network management components is available from Dynatech Data Systems, 7644 Dynatech Ct., Springfield, Va. 22153.

• A catalog describing the vendor's complete line of data communications equipment is available from Intertel, Inc., 6 Vine Brook Park, Burlington, Mass. 01803.

Bottom-Up Net Previewed

(Continued from Page 53)

match for the force of their institutional momentum.

On the social side, there are an increasing number of small users who:

- Want greater access to the information contained in the numerous separate data bases that already exist.
- Want greater computing power at lower cost.
- Want software that is noninvasive, which make relations between them and the network more friendly.

Fortunately, on the technological side there are forces at work which oppose the top-down structure of the present distributed processing architecture and favor the development of the bottom-up dispersed processing environment of the future.

This new technology includes advanced semiconductor products such as bubble memory devices with 1M-bit capacities, random-access memories with capacities of 64K to 256K bits, and new 16- and 32-bit microprocessors. In conjunction with this trend, disk drive technology will soon be available to provide up to 100M bytes per drive in a small-sized package.

First Step

Even without the advantages of much of this new technology, the transformation has begun in the form of systems incorporating some elements of the dispersed processing solution. These user programmer terminals are available now from a variety of firms, including Applied Digital Data Systems, Codex, Datapoint, Digi-Log, Four Phase, Incoterm, Sycor, Ontel, Ramtek, Raytheon and Zentec.

These systems, however, have two drawbacks: one relates to the way they are marketed and the other technological. In terms of marketing few if any of these systems are aimed at the multiprotocol market. Most are aimed at emulating the terminals used in various mainframe-oriented hierarchical networks. Even those which have cluster capability are still tied in some way to a specific CPU or network.

A more complete solution is available, even without taking advantage of much of the new technology. Using 8-bit microprocessors such as Zilog's Z80, 4K- and 16K-bit semiconductor memories, and 256K- to 1M-byte capacity hard and floppy disk drives, multiprotocol, multifunction information terminals are available which can emulate any protocol or hierarchical structure if preprogrammed to the exact structure and protocol to be used.

Such a system is easily field-expandable to a wide range of applications and can be equipped with any one of the standard computer communications protocols including those from Univac, ICL, IBM, Honeywell, Inc., Hewlett-Packard Co., NCR Corp., Digital Equipment Corp. and most minicomputers. Typical applications include:

- Hierarchical networking.
- Basic cluster.
- Multimainframe cluster.
- Local networking.
- Communications front ending.

Next week: CPU characteristics.

Steele is the vice-president of engineering for ECS Microsystem, Inc. based in San Jose, Calif.

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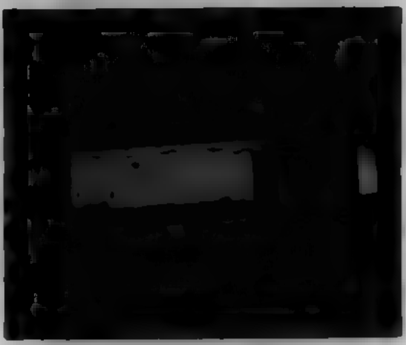

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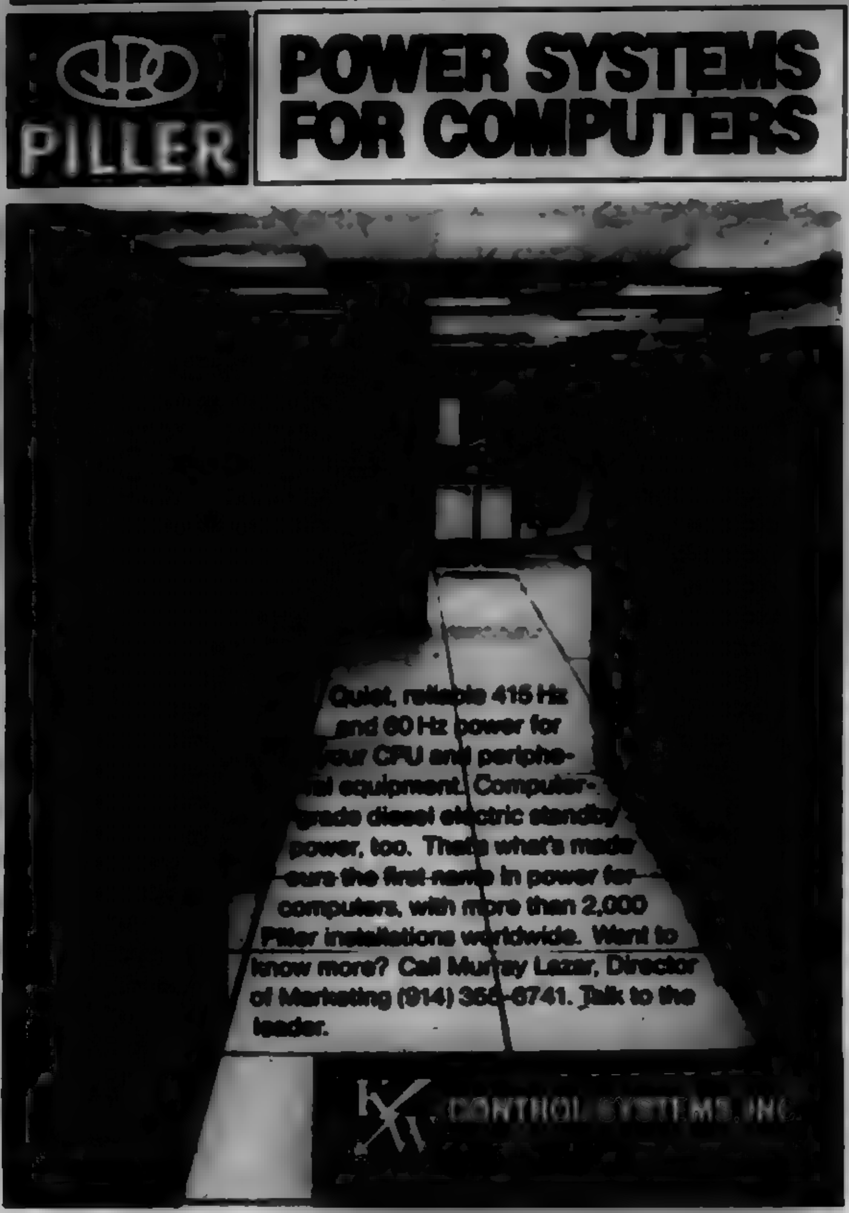
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TRI DATA

GTE Telenet Asks FCC To Adjust Dial-Up Rates

CW Washington Bureau

WASHINGTON, D.C. — A 10% to 19% rate increase for its dial-up customers was submitted to the Federal Communications Commission (FCC) early this month by GTE Telenet Communications Corp. The new tariff, which will become effective Nov. 1 if accepted by the commission, also offers some rate reductions.

The basic charge for GTE Telenet's private-packet exchange customers was cut $400/mo, and night-time discounts were extended to users of 1,200 bit/sec terminals. Previously, these discounts were available only to 300 bit/sec terminal users.

However, to qualify for the discount a user's total traffic must be at least $7,500/mo.

In one major change, Dial-up access will be added to 19 cities. In most cases, the access speed will be limited to 300 bit/sec, but in four cases, it will be 1,200 bit/sec. Concord, N.H., Des Moines, Iowa, Harrisburg, Pa., and Lexington, Ky., are among the cities.

GTE Telenet will also support Bell's Transaction II telephone, as well as synchronous HDLC terminals.

The increase in dial-up rates, the company said, is attributable to increased costs of labor, equipment and transmission facilities. "These increases, the first since April 1978, are substantially below the general rate of inflation over the past two and a half years," GTE Telenet added.

MFE Terminal Reads, Writes On NCR-Compatible Tapes

SALEM, N.H. — MFE Corp. has introduced a cassette-based terminal capable of reading and writing up to 1K byte of data on NCR Corp.-compatible tapes.

The Model 3450XL is said to be able to read and write records up to 1K byte in length. By increasing the buffer size, the vendor has reportedly made the terminal compatible with all NCR equipment. The terminal also features remote control binary and true edit operations.

In addition, the terminal can insert on the tape a record-end message which is typically a carriage return/-line feed command, a spokesman said.

The Model 3450XL

The terminal costs $2,245 from MFE at Keewaydin Drive, Salem, N.H. 03079.

Avanti High-Speed Modem System Acts as Bell 306 Replacement

NEWPORT, R.I. — A high-speed modem system offered by Avanti Communications Corp. can reportedly act as a direct replacement of the Bell 306 modem which, in conjunction with the Bell 551A Channel Service Unit, provides 1.544M byte/sec digital service.

The Avanti 2300 can also be used as an in house computer-to-computer bulk data transfer or as a satellite communications link between earth stations and user locations.

The modem operates in four-wire, full-duplex and point-to-point — internally or externally timed — over unloaded twisted pairs or coaxial cables, the firm said.

Transmission Rates

The 2300M medium-speed modem operates at data rates between 64- and 460.8K byte/sec. For transmission at higher speeds, the 2300H high-speed modem, which operates from 460.8K byte/sec to 6.3M byte/sec, is available.

Both units utilize bipolar digital transmission techniques, compatible with the Bell 551A Channel Service Unit and achieve error rates better than 10^{-6}. The units test themselves on-line and warn the operator through a front panel alarm light when a failure occurs in the data link. A scrambler makes transmission insensitive to data format. Both units are available as a stand-alone or as rack-mounted modules with a redundant power supply.

The 2300M and 2300H cost $1,250 and $1,750, respectively, from Avanti in Newport, R.I. 02840.

Conferencing Topic of Seminar

ANDOVER, Mass. — "Promise of Multimedia Teleconferencing" will be held by the Institute for Graphic Communication, Inc. (IGC) on Oct. 28-30. Chaired by IBM's Raymond Reamer, this seminar will reportedly offer an in-depth analysis of new techniques, products, applications and benefits for audio visual conferencing, featuring four user case studies.

Sessions include the nontechnical functions of teleconferencing, acceptance and implementation of teleconferencing, motivating management to use teleconferencing, Bell System teleconferencing, and conference summary.

Enrollment is limited, permitting active dialogue and maximum exchange of information among participants and leaders. The $535 fee includes accommodations, meals and materials. Additional information is available from IGC at 375 Commonwealth Ave., Boston, Mass. 02115.

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Terminal for Blind Operators Spells Speech

STUART, Fla. — An interactive CRT-type terminal that delivers spelled speech output in audible form and is designed primarily for blink operators is being offered by Triformation Systems, Inc.

The Free Scan Speech Terminal (FSST) permits the blind operator to call up pages of information and scan the material stored in the terminal, the firm said.

The function keys reportedly allow the material to be reviewed both vertically and horizontally while varying audible signals tell the operator where he is on the page of information.

The system delivers data at the rate of 10, 30, 120 or up to 480 char./sec. When the data is located, the terminal verbally reads out the data at a rate determined by the operator.

Operating at 110 bit/sec to 4,800 bit/sec, the terminal can be used on-site or remotely on-line and consists of a stand-alone unit with a built-in keyboard, speaker, controls and provision for an external headset.

The Model 1 costs $2,750 and the Model 2, which offers spelled speech and a CRT costs $3,395 from Triformation at 3132 S.E. Jay St., Stuart, Fla. 33494.

Printer Allows Hard-Copy Output From Epicom CRT Displays

ALTAMONTE SPRINGS, Fla. — Epicom, Inc. has unveiled a nonimpact dot matrix printer designed to produce copy from CRT displays.

The Model EI 430 Epiprinter uses a thermal print mechanism and sensitized paper to reproduce alphanumeric characters as well as reverse images and flawed character information. Reproduced characters are .1 in. wide by .15 in. high.

The 430 is compatible with the firm's Model 400 Episolver data communications analyzer and Model 100 or 110 Epiview data line monitors when equipped with a printer interface option.

The Epiprinter

The Epiprinter operates in a standard typewriter page format and is said to have a copying time of less than 45 sec. for a full 512-char. screen.

Available in either a desktop or rack-mountable version, it costs $4,500 from Epicom at 592 N. Douglas Ave., Altamonte Springs, Fla. 32701.

Text and Graphics Applications

Terminal Printer Fits Wang Gear

DENVER — Tallant Associates, Inc., a systems house here, has announced a plug-compatible receive-only terminal printer for Wang Laboratories, Inc. computer systems.

The Tallant Writer is a fully enhanced Ascii communications terminal designed for text preparation and graphic applications.

The unit consists of the firm's Xerox/Wang parallel interface and a Xerox Corp. 17XX series terminal. The interface is supplied on a printer circuit board which plugs directly into the Xerox terminal card cage and a 10-ft. cable which plugs into the Wang printer controller port.

The terminal printer may be purchased as a unit or the interface board can be acquired separately. The unit price for the printer is $3,155 for the Xerox 1740 model and $3,355 for a 1750 model. The cost of the interface board alone is $225.

Quantity discounts are also available from the company at Suite 308 S., 3010 W. 16th Ave., Denver, Colo. 80204.

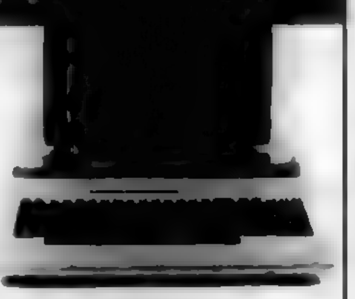
PE Updates Bantam Unit

FLANDERS, N.J. — The Terminals Division of the Perkin-Elmer Corp. has announced a version of the Bantam CRT terminal called the Model 550B.

The updated version features an audible alarm, a switchable "new line" wraparound allowing multiple data display formatted for more than 80 columns, extended numeric mode keys and dual character sets supports.

The Model 550B incorporates an enhanced Perkin-Elmer-designed large-scale integrated controller chip and allows a fully featured design with 19 integrated circuits. It has a calculated mean time between failures of five years in an office environment.

The Model 550B costs $966, the vendor said from 360 Rt. 206 S., Flanders, N.J. 07836.



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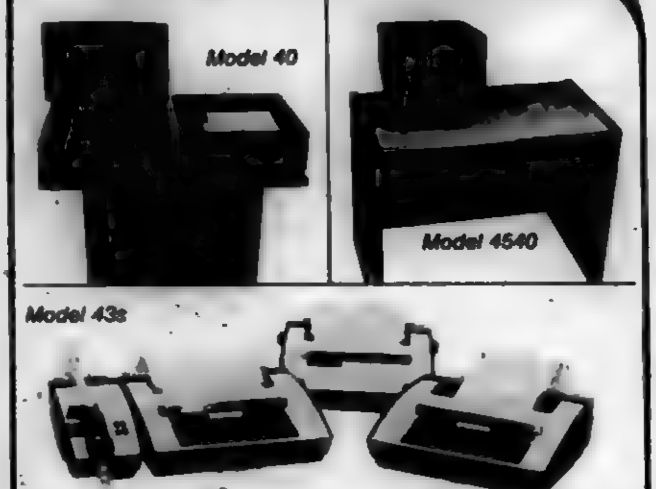

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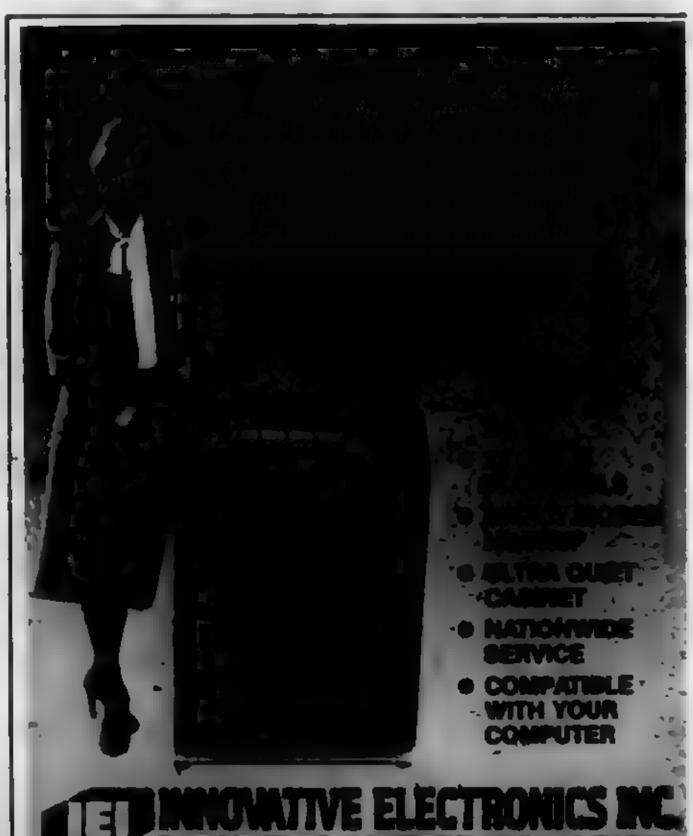

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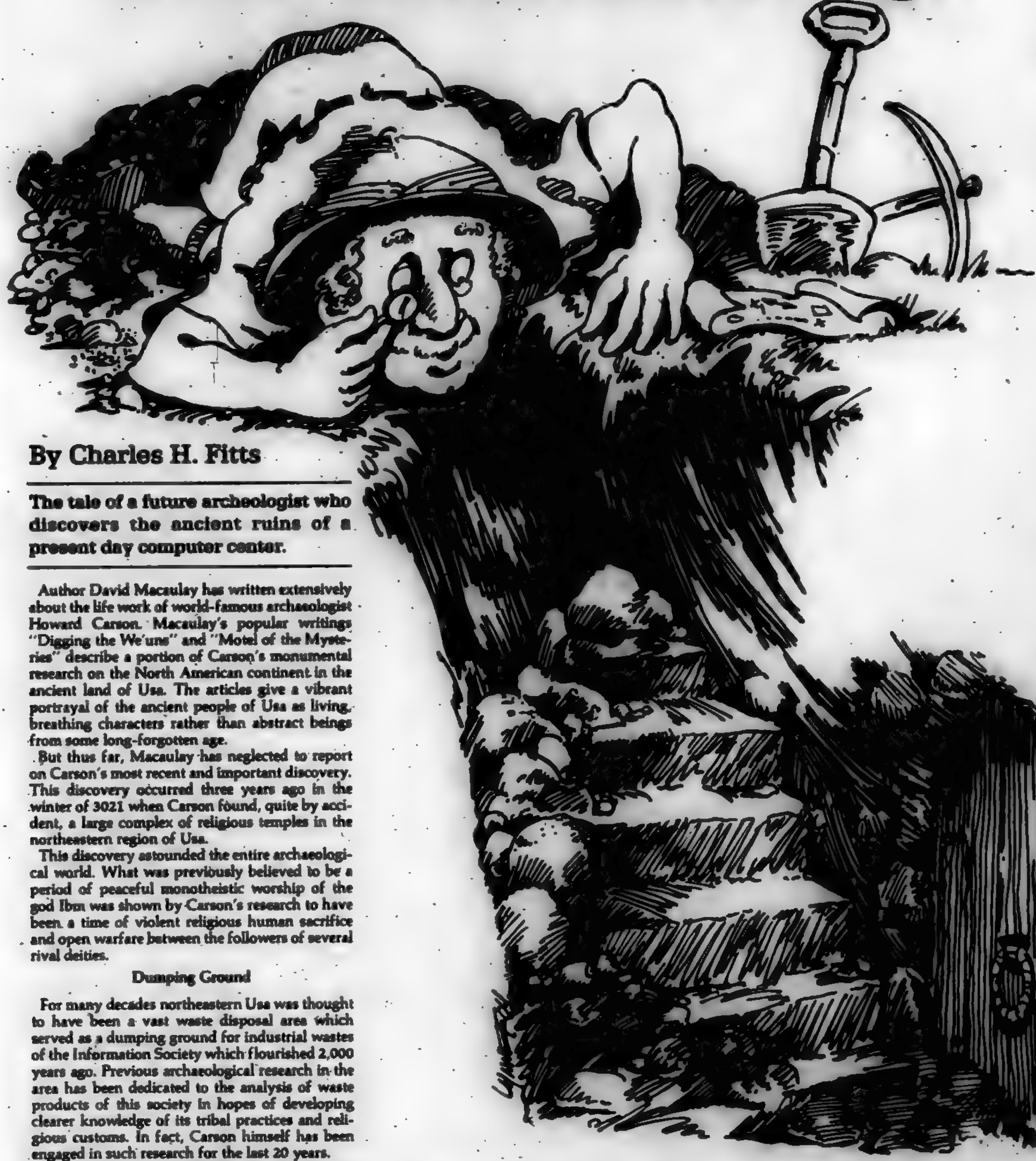
Rival Gods of the Information Age



By Charles H. Fitts

The tale of a future archeologist who discovers the ancient ruins of a present day computer center.

Author David Macaulay has written extensively about the life work of world-famous archaeologist Howard Carson. Macaulay's popular writings "Digging the We'uns" and "Motel of the Mysteries" describe a portion of Carson's monumental research on the North American continent in the ancient land of Usa. The articles give a vibrant portrayal of the ancient people of Usa as living, breathing characters rather than abstract beings from some long-forgotten age.

But thus far, Macaulay has neglected to report on Carson's most recent and important discovery. This discovery occurred three years ago in the winter of 3021 when Carson found, quite by accident, a large complex of religious temples in the northeastern region of Usa.

This discovery astounded the entire archaeological world. What was previously believed to be a period of peaceful monotheistic worship of the god Ibm was shown by Carson's research to have been a time of violent religious human sacrifice and open warfare between the followers of several rival deities.

Dumping Ground

For many decades northeastern Usa was thought to have been a vast waste disposal area which served as a dumping ground for industrial wastes of the Information Society which flourished 2,000 years ago. Previous archaeological research in the area has been dedicated to the analysis of waste products of this society in hopes of developing clearer knowledge of its tribal practices and religious customs. In fact, Carson himself has been engaged in such research for the last 20 years.

No one was more surprised than he when one of his heavy earth-moving machines caved through the bottom of an excavated trench into a mysterious structure below. Not knowing whether he had come upon a natural geological formation or a man-made structure from an earlier period, Carson used high-intensity spotlights for a closer visual inspection.

Peering into the dark void, he sensed that he was on the verge of an earthshaking discovery. There below, in the center of a huge cave-like structure, stood the unmistakable form of a religious altar of the long-vanished people of Usa. The characteristic blue color of the object, although somewhat faded by the ravages of time, gave the first clue to its origin.

Suddenly, the beam of Carson's searchlight reflected the final proof of its identity. There, on an upper corner of the object, the name of the god Ibm was gloriously emblazoned in large block letters announcing the archaeological find of the century — the main altar of a long-lost Temple of Ibm.

Carson immediately knew the significance of his great find. Many years before, he had discovered

(Continued on In Depth/2)

IN DEPTH

(Continued from In Depth/1)

several ancient scrolls which described the mysterious religious sect of Ibm. One of the scrolls contained three commandments which dictated the type of humane treatment which should be accorded to the enemies of Ibm. These commandments, which are attributed to an early prophet of Ibm called Hollerith, have been roughly translated as follows:

THREE COMMANDMENTS OF IBM

I. Thou shalt not fold.

II. Thou shalt not spindle.

III. Thou shalt not mutilate.

Certainly such a humanitarian philosophy is unprecedented in ancient history. The numerous religions of the stone, iron, machine and atomic ages hardly followed such humane practices in meting out justice to their enemies.

In many of these ancient religions, foes and dissenters were not only spindled and mutilated but suffered even more exotic tortures and treatments.

But Carson was also well aware of highly contradictory writings which had been discovered in other parts of Usa. These texts had made reference to certain "predatory practices" of Ibm. Certainly the humanitarian outlook of Ibm as expressed in the commandments contrasts sharply with the references to predatory practices contained in these other documents. Did Carson dare hope that the crypt below might hold further physical evidence which could explain this paradox? Would he be the first to explain how such a humane religious philosophy could also condone predatory practices?

Profound Paradox

Little did Carson realize that the crypt held an even greater paradox than this.

For years it had been believed in archaeological circles that the cultures of the Information Age were monotheistic and than Ibm was their one true god. Carson's findings over the next few months shook the foundations of that belief and showed the Information Age to have been a time of great turmoil and competition between the followers of rival deities.

Indeed, as a result of Carson's discoveries, the pantheon of the Information Age now includes many previously unknown gods who at various times challenged the authority and supremacy of Ibm. Amadoll, the goddess of lust, made her bid for supremacy through the leadership of her high priest, Gene. It is thought that Gene had previously been a high priest of Ibm and that he broke away from the Ibm religious hierarchy because of temple conflicts and intrigues. Gene was responsible for annunciating the principle of competibility, claiming that the precepts of Amadoll were compatible with those of Ibm.

Gene's competibility doctrine was an obvious attempt to placate the jealousies of the Ibm priesthood and to proselytize followers of Ibm to the Amadoll faith.

In spite of Gene's aggressive efforts to elevate the image of Amadoll, Ibm remained the supreme deity throughout the Information Age. Ibm's strong

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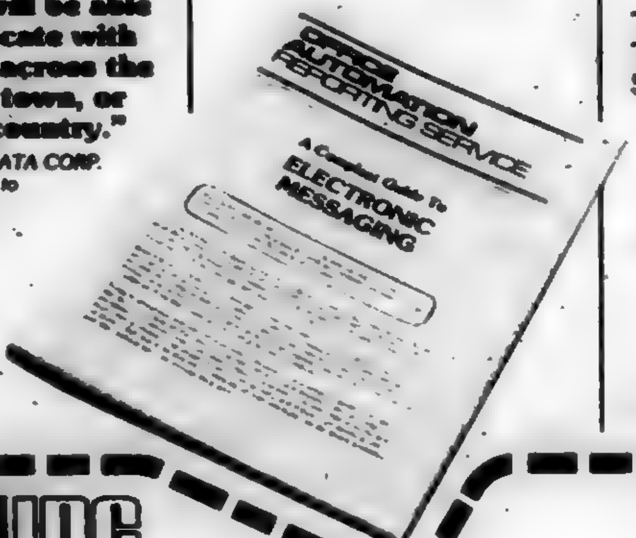

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foundations were laid during the early kingdom by the high priest Tomatson who, along with the prophet Hollerith, developed many of the principles of the faith.

Other Deities

Other competitive deities discovered by Carson in the temple complex include Honeywell, the god of food and drink, and Deck, the god of the sun. The twin deities Hoolit-Packard represent the god of fire and the god of war. It is interesting to note that the name "Hoolit" literally translates into "he who lit." It is unknown why these deities are generally represented as twins. The god Burrows is often physically depicted as a donkey.

Carson also found references to two obscure deities dating from the early kingdom. They are Generous Electric, the god of lightning, and Arcesy, whose main high priest was named Zarnoff. The name Generous Electric translates literally into "giver of electrical energy."

It is also known that the deity Arcesy was often physically represented as a white dog with one black ear. The dog is, with unusual consistency, pictured with head cocked slightly to the left. During the late kingdom, Arcesy more frequently took the physical form of a peacock, a now extinct bird with large tail feathers. Carson has been unable to explain the reason for this curious change in physical representation.

Entering the Temple

Several days were required for Carson and his associates to fully prepare for their initial entrance into the Temple of Ibm. Great care had to be taken to prevent the crowds of curious onlookers and media reporters from tampering with the site or crashing through the fragile roof of the structure.

As soon as Carson had verified the structural integrity of the temple roof and supporting walls, he and a small group of assistants descended into the crypt to begin an initial survey of the main altar room. Carson expected to find only the altar of Ibm and related religious artifacts. One can imagine his great surprise when the beam of his searchlight illuminated yet another altar. But this altar was not of the characteristic blue color nor did it give evidence of the block-lettered name of Ibm. Instead, it was an altar to the previously unknown goddess, Amadoll.

The excitement of the group quickened when one of Carson's associates found still another altar to the god Deck in another part of the room. Carson could not believe the obvious conclusion: Not only did it appear that the previously assumed monotheistic society was indeed highly pantheistic, but many deities were able to share the same temple structures!

How could such a peaceful symbiosis be maintained between these deities, especially in view of Ibm's predatory practices? Would not the basic tennets of the cult of Ibm clash so violently with those of the competitive deities that a highly warlike atmosphere would prevail within the temple complex?

To answer these questions, Carson knew that his investigations and excavations would have to be expanded beyond the walls of the formal altar room to the adjoining halls which had housed the priests and acolytes of the various deities. These same outer halls might also hold the answer to the questions Carson pondered there in the serent darkness of the temple ruins: "What horrible cataclysm was responsible for the apparently sudden demise of such an elaborately developed society and religious order?"

Upon leaving the serenity of the main altar room, Carson was aghast at the evidence of human sacrifice, warfare and violent death which existed in the outer halls. Was this horrible human carnage the result of the rival priesthoods within the temple or was some outside sinister force responsible for the atrocities? Carson has concluded that a combination of several factors contributed to the broad decline of the Information Society and the cataclysmic destruction of the temple complex itself.

Final Days

The supporting evidence for these conclusions is highly fragmentary because of the natural decay of the ages. However, archaeologists in Carson's group have extrapolated these frag-

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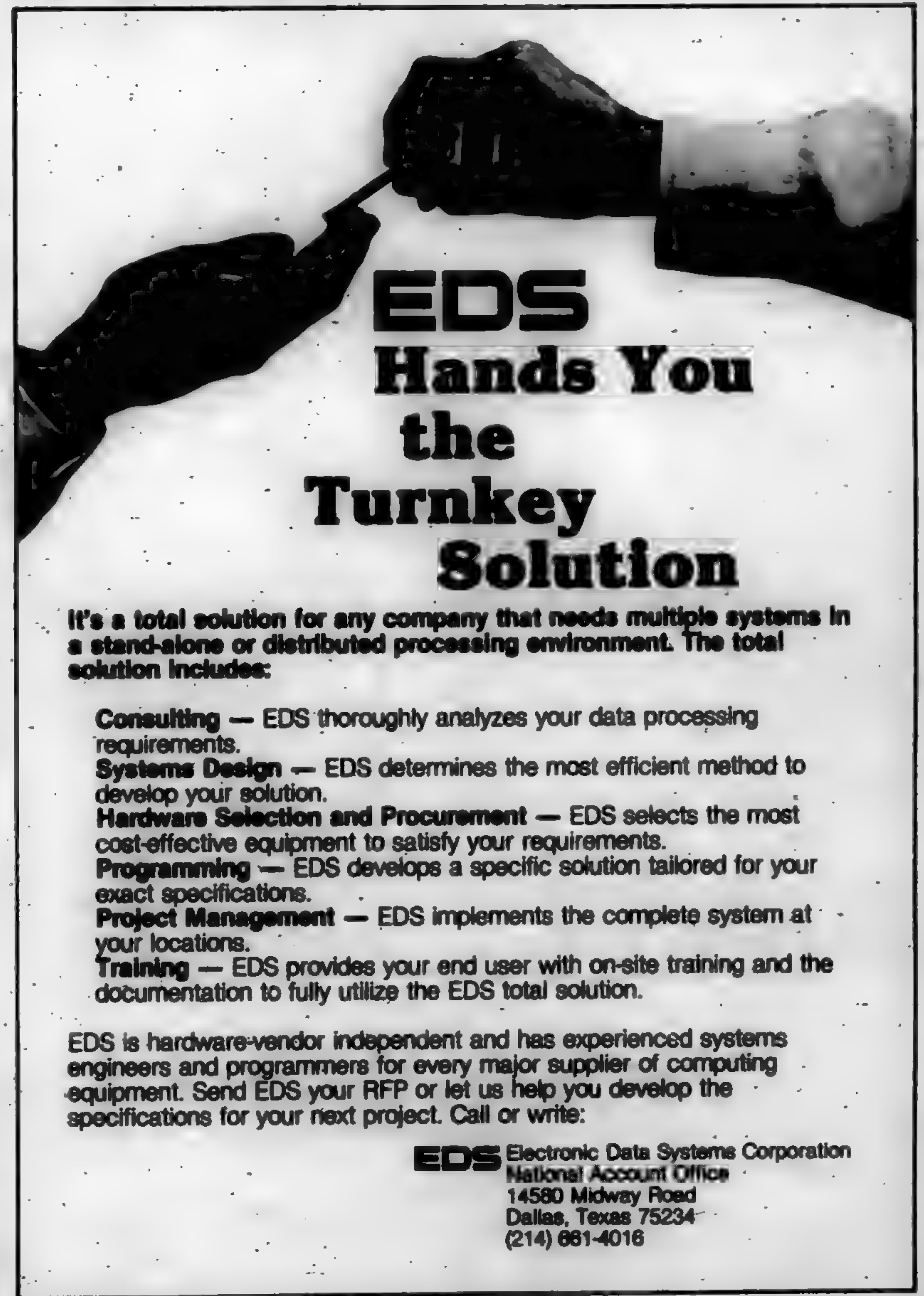

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IN DEPTH

(Continued from In Depth/3)

ments into a fairly accurate description of the final days of the Information Society and the Temple of Ibm.

They found considerable evidence that pestilence was a major contributing factor. When Carson entered a small antechamber just outside the main entrance to the temple, he found the remains of an acolyte of Ibm seated in front of a crude information device which was apparently used to retrieve the sacred scrolls and writings of the prophets and priests of Ibm. This young acolyte had been at work with his daily devotions, probably reading some of the writings of Hollerith or Tomatson, when he met his doom from an attack of some unknown insect swarm.

Just prior to his death, the victim had managed to scrawl an almost indecipherable message to posterity indicating how he died. Fate chose Carson to be the ultimate receiver of this message from the distant past. After months of intense research, the message was translated to read "I was busy debugging my program when suddenly the power failed and . . ."

Unfortunately, the hapless acolyte did not live to finish his message. Carson safely assumed, however, that the acolyte died while fighting a great swarm of insects which was attacking the temple's electrical power plant. The swarm probably caused a total failure of the environmental control systems within the temple, rendering all its occupants unconscious within a few moments. Death for all probably followed within a very few minutes.

At many other locations within the temple complex, Carson's group found many other references to the process of debugging. This obsession with insects leads to the conclusion that pestilence was a matter of grave concern in the daily lives of these people. A brief note written by one of the acolytes of the temples says, "These Brand X disk drives are driving me buggy. If something isn't done very soon, we'll never make it through the year." While pestilence may not have been the sole cause of societal decline, it was certainly a contributing factor.

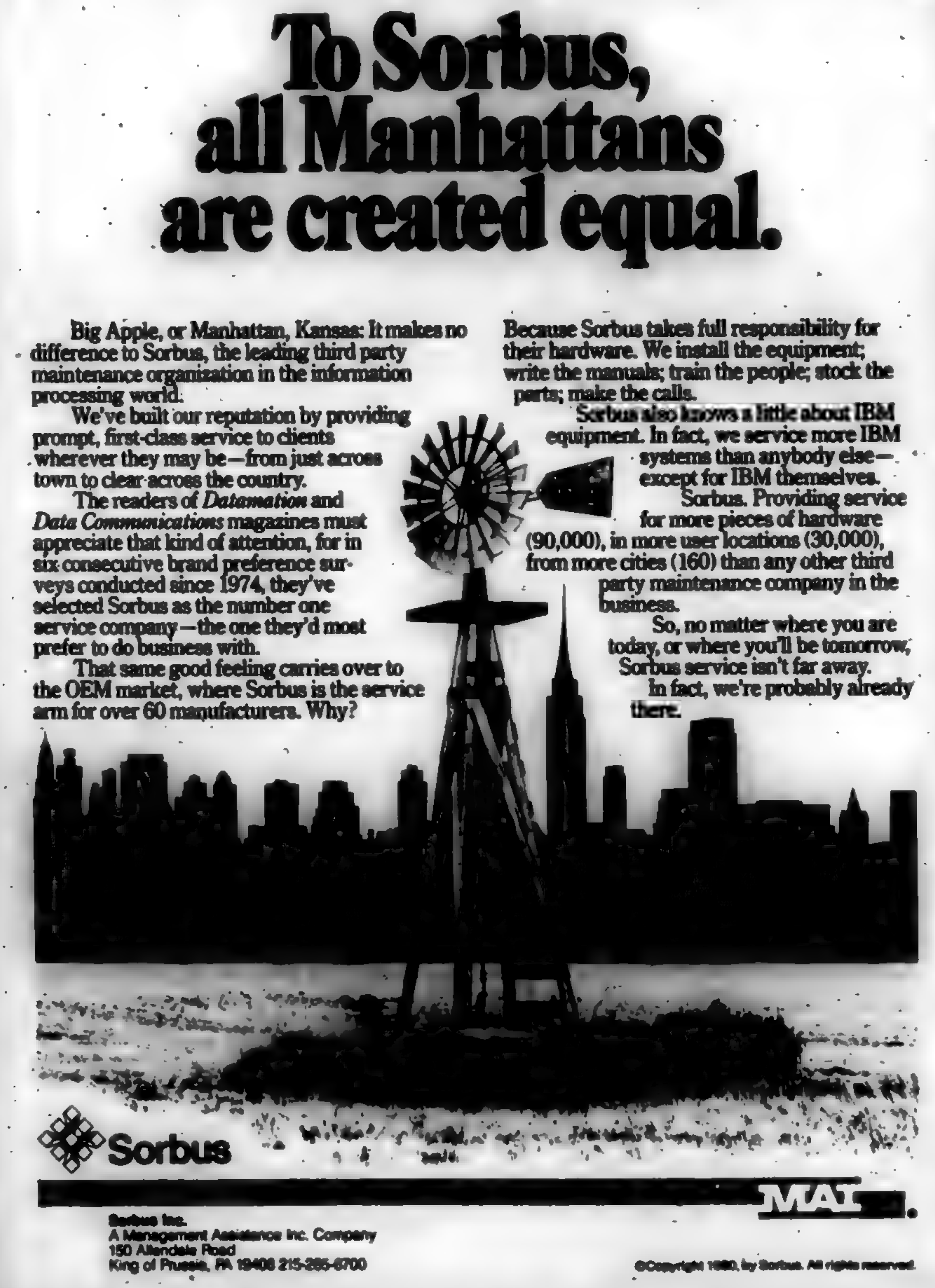
Rites of Sacrifice

As the painstaking excavations continued and each individual room of the outer hall was thoroughly cataloged, it became apparent that animal sacrifice was practiced by the priests of the several deities worshipped in the temple.

Numerous references to "scapegoats" were found which indicated that such goats were often sacrificed to placate the anger of the deities and high priests. It was not recognized that human sacrifice was widely practiced until the area of the temple which was set aside for the Misdirector was entered.

The Misdirector was apparently a high official in the temple hierarchy. The remains of the Misdirector were found face down on his desk amid signs of the desperate struggle which must have taken place during the last moments of his life. There was evidence of a massive skull fracture caused by a blow from one of the information devices of which there were numerous examples throughout the temple complex. One of these devices, with its video screen shattered, was found next to the Misdirector's skeleton.

Whether the Misdirector was sacrificed at the hands of the high priests or someone outside the temple is not known. His impending demise must have been known to him, however, for he had written a communication to some of the acolytes of the temple saying, "If you idiots don't hurry up and get that payroll debugged, I won't be



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able to make it to the end of the year."

Evidence in other archaeological sites found since Carson's monumental discovery gives some hint as to the great frequency with which Misdirectors were sacrificed. The frequency of sacrifice was of such magnitude that special organizations had to be formed in some of the larger urban areas to search out and recruit a sufficient number of Misdirectors for this purpose. These organizations were formally called "Executive Search Firms." They were used by the priesthood to recruit unsuspecting dupes to assume the largely ceremonial duties of Misdirectors for the various temple complexes until an appropriate time arrived for their sacrifice.

In this regard, it is interesting to note that the prevailing colloquial expressions for "Executive Search Firm" were "body shop" and "headhunter." These expressions are obvious references to the violence of the sacrificial ritual which would ultimately befall the hapless Misdirectors.

The final sacrifice of the Misdirector was usually associated with certain prescribed religious festivals. For example, festivals known as Fiasco and Overrun were held several times a year in each temple. The exact nature of the Fiasco and Overrun festivals is not known, but writings pertaining to them make frequent reference to an obscure temple official known as Murphy the Lawgiver. The laws formulated by Murphy were intimately associated with the Fiasco and Overrun festivals. It was usually at the end of these festivals that the sacrifice of the Misdirector took place.

Language Analysis

The complete analysis and interpretation of the findings at the Ibm temple complex have been impeded by the rather complicated system of languages used in the culture. While the prevailing spoken language was called computereze, the entire body of literature on the religious practices, commandments and prophesies of Ibm are written in a language called hexadecimal. The basic glyphs of this language are the traditional Hollerith characters which date back to the early kingdom and the time of the prophet Hollerith who invented this alphabet.

The hexadecimal language has yet to be translated. Many archaeologists still hope a so-called "Rosetta Stone" will be found which will solve the hexadecimal riddle. Under any circumstances, a great deal of knowledge about the Information Society will be gained if, and when, the mysterious hexadecimal language is deciphered.

The literary output of the culture was absolutely phenomenal. Literally tons upon tons of hexadecimal documents called "dumps" were found in the Ibm temple complex. Even if the language could be easily translated, it would take many decades before all of this literature could be cataloged and interpreted for posterity.

It has even been conjectured that these writings were produced in such huge quantities that they created a tremendous environmental problem. The space used in their storage and the tremendous amounts of energy and natural resources used in their production could have caused the society to falter as a result of an environmental catastrophe. While this possibility cannot be eliminated entirely, it seems improbable that this factor alone could have resulted in the demise of the entire culture.

It is more plausible to assume that the society collapsed under the extreme weight of the excessive tribute demanded by the priesthoods of the rival deities. These tributes were called Macplan and Termleaseplan.

Macplan and Termleaseplan were taxes exacted from the society each month which permitted the priesthoods to purchase and maintain vast numbers of expensively decorated al-

(Continued on In Depth/6)

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(Continued from In Depth/5)

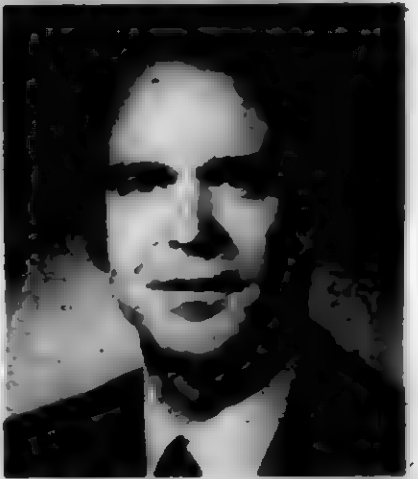
tars and to support the loyal following of acolytes and priests which they demanded.

As the priesthoods of the deities gained more and more power, they corruptly exacted greater amounts of Macplan and Termleaseplan in order to satisfy their growing appetites. The society was forced to allocate more of its labor and natural resources to the maintenance of its Macplan and Termleaseplan payments than to producing food and manufacturing goods. The society literally collapsed and disintegrated under the economic weight imposed by the deities which, ironically, had pretended to be its benefactors and guardians.

Although it was earlier thought that the Information Society crumbled as a result of continuing warfare between the priesthoods of the rival deities, this theory has lately been widely discredited. Despite numerous references to the predatory practices of Ibm, the preponderance of archaeological evidence points to the fact that Ibm and other deities were able to achieve a very stable accommodation which permitted each of them to coexist within the society and even to share the facilities of a single temple.

For example, recent diggings at a similar temple complex site near the ancient city of Baston shows that the high priests of Deck actually took over a temple facility which had been abandoned during the early kingdom by Arcosy. The priests of Deck used the very same building as their own shrine after a lengthy purification ritual. Many altars were even connected in elaborate networks or hierarchies which permitted the various deities to converse with one another. The significance of these networks and hierarchies is not fully understood largely because of the difficulties associated with translating the hexadecimal language. Carson has speculated that somewhere in the North American continent a mammoth main altar must have existed to which every other altar in Usa was connected. Several recently discovered scrolls have made mention of such a main altar which was called a "host." Clues are still being sought as to its whereabouts.

At the present time, Carson is focusing all his energy on deciphering the secrets of the hexadecimal language and interpreting the laws of Murphy. Carson believes that by unraveling these secrets he can determine the location of many other valuable archaeological sites including the "host" temple itself. Carson's already stupendous archaeological discoveries may therefore be only the beginning of a great unfolding saga. Only time will tell if the mysteries of the Information Age will ever be fully unraveled.



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Fitts began his computing career in 1957 as a programmer with General Motors Corp. He joined Budd in 1972 and is responsible for all corporate data processing and administrative services.

Fitts holds B.F.A. and B.A. degrees from the University of Georgia, an M.A. degree from the University of Massachusetts and an M.B.A. from Michigan State University.

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SYSTEMS PLANNING

A Structured Models-Based Approach

By William L. Bearley and Michael R. Wood

During the 1970s, some data processing professionals became aware that the traditional approaches to developing computer-based systems were inadequate. As on-line transaction processing environments became commonplace, user sophistication and expectations began to grow. This, coupled with significant cost reductions in hardware and cost increases in labor, stimulated the demand for more logical, consistent and quantifiable system development techniques.

The quest for better techniques began with an exploration of ways to improve the systems development effort. As a result, the concept of structured programming was created. Names such as Dijkstra, Warnier, Jackson, Yourdon and Constantine quickly became known throughout the industry. "Top down," "data structured," "coupling" and "cohesiveness" became buzzwords in the '70s. New tools such as data flow diagrams, Hipo charts and Warnier-Orr diagrams began to crop up everywhere. Yet, despite these efforts, little progress was made toward improving the quality of new systems; the promises put forth by structured enthusiasts faded into wishful thinking.

The industry began to discount the validity of structured techniques and labeled them as another fad. However, undaunted by the results of their past efforts, the structured methodologists went back to their drawing boards, and a new level of structured thinking emerged. They called it "structured design" and once again the industry looked on.

Reason for Failure

The argument given for the failure of structured programming techniques was that structured programs by themselves did not produce good systems, only structured code. Therefore, if systems were designed using structured techniques, the improvements promised by structured programming would become a reality.

This time the quality of systems improved. However, something was still missing and once again the industry was let down. Users were not satisfied; systems did not meet organizational needs; the promises fell short; and the use of structured techniques suffered another loss of credibility.

Why did the industry not enthusiastically endorse the use of structured methods? Where did structured methods fail? The answers lie in the approach taken, not the methodology. There is little disagreement with the concept of using a top-down approach to build systems. Yet, by applying structured techniques at the programming level, the structured community applied a bottom-up approach to its own methodology and violated the basic top-down concept. Structured design was an attempt to correct this error. However, if structured methodologies are valid, then the methodology should be applied to the top of the system's development life cycle, not the bottom.

Why hasn't this been done? The answer appears to be that in the industry, organizational and managerial approaches to problem solving are not used in the majority of system development efforts in progress today. So, in keeping with its technical orientation, the industry began applying the new-found tools and techniques at the level understood: programming. Little or no concern was given to the question of why these structured systems were being built. Instead, the focus was on the issue, "Is it or is it not structured?" The response from management was, "Who cares if it's structured? We want systems to meet the need of our organization."

Technicians' Response

With such unsupportive responses from management, DP technicians reacted (as they have in the past) by sheltering themselves from management with the notion that management just didn't understand. Why didn't management care about the use of all these new techniques? The answer can be found in rising costs, low productivity and, worst of all, unsatisfied information requirements. Information was the one resource management hoped to exploit through the use of computers.

Still, the top-down concept is valid. If the primary goal of an automated information resource management system is to supply the user of the system with cost-effective, timely, accurate and useful information, it stands to reason that efforts to build a system should start by assessing the needs of the organization. The question is, then, how do you apply the structured techniques of the past decade to tasks such as assessing users' needs, planning system scope, analyzing organizational problems and defining user requirements?

What follows is a discussion of an approach that has been used successfully to accomplish these tasks. The techniques presented offer the DP and user community a vehicle for identifying, defining and measuring the scope of a project.

First, it is important to identify a few basic assumptions. Since the implementation of computerized systems causes significant change in an organization, we believe any methodology must have a basis in organizational theory, change theory, management theory and general systems theory. While each of these areas is worthy of discussion, as they relate to computer-oriented systems, for our purpose we will only identify them as having a significant impact on the way we ap-

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Planning and Analysis

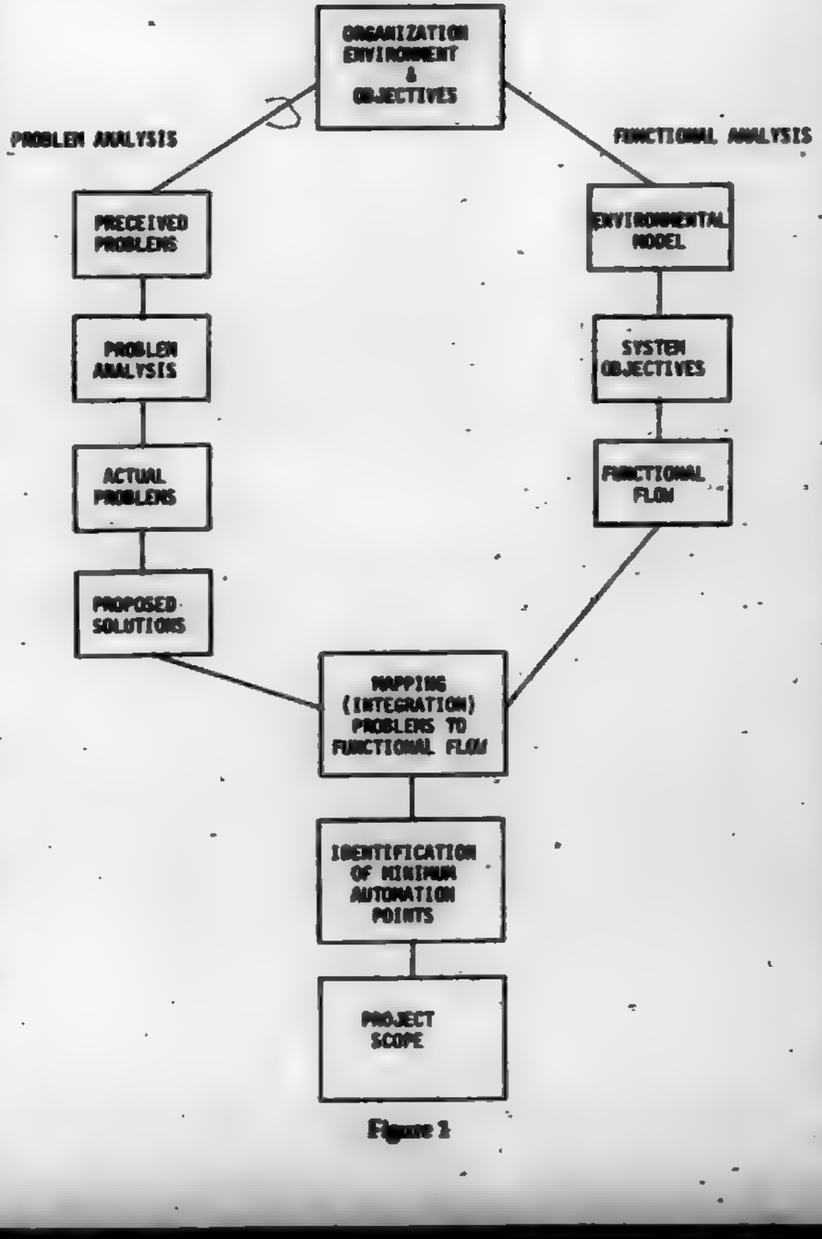

Figure 1

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IN DEPTH

(Continued from In Depth/7)

proach the design of a system in an organization.

Since today's organizations and systems are complex, it is necessary to have a model-based methodology that enables users and analysts to define, in a useful form, the components and interactions involved within the organization. We have found certain models useful not only in providing an understanding of the system, but also as aids in communicating with users.

Through significant user involvement, the analyst assumes the role of helping users in describing and defining their system needs; providing a technical interface to implement the chosen automated system; and supporting users in institutionalizing the system once it is built. Since we clearly understand the second role, we place emphasis on the other roles. Note that there is a philosophical shift in the analyst's role, from definer to facilitator, which requires a different set of skills than those normally used by analysts.

Basic to any methodology is a model of the system life cycle, and while we intend to deal in depth with only the first phase, it is necessary to keep in mind the total view. For this discussion, the life cycle consists of six major phases:

Basic to any methodology is a model of the system life cycle, and while we intend to deal in depth with only the first phase, it is necessary to keep in mind the total view. For this discussion, the life cycle consists of six major phases:

Study Phases

1. Planning and analysis.
   Initial assessment.
   Problem analysis.
2. Requirements definition.
3. Logical design (architectural blueprinting).

Development Phases

4. Physical construction and implementation.
5. Operation and use.
6. Evaluation and renewal.

These six major phases can be divided into subphases to allow logical decisions and control points within the cycle.

Although the question of which life cycle is more theoretically correct makes for interesting discussion, there is a basic order in which tasks are addressed regardless of how they are described. This life cycle was chosen because it satisfied the following criteria:

1) It is logically consistent.

2) It is divided at logical breakpoints.

3) Each phase has defined measures and results.

4) Each phase is independent of subsequent phases.

5) It reflects management's responsibility for a project.

6) It reflects a general function-sequence relationship.

7) It provides a logical basis for effective project management.

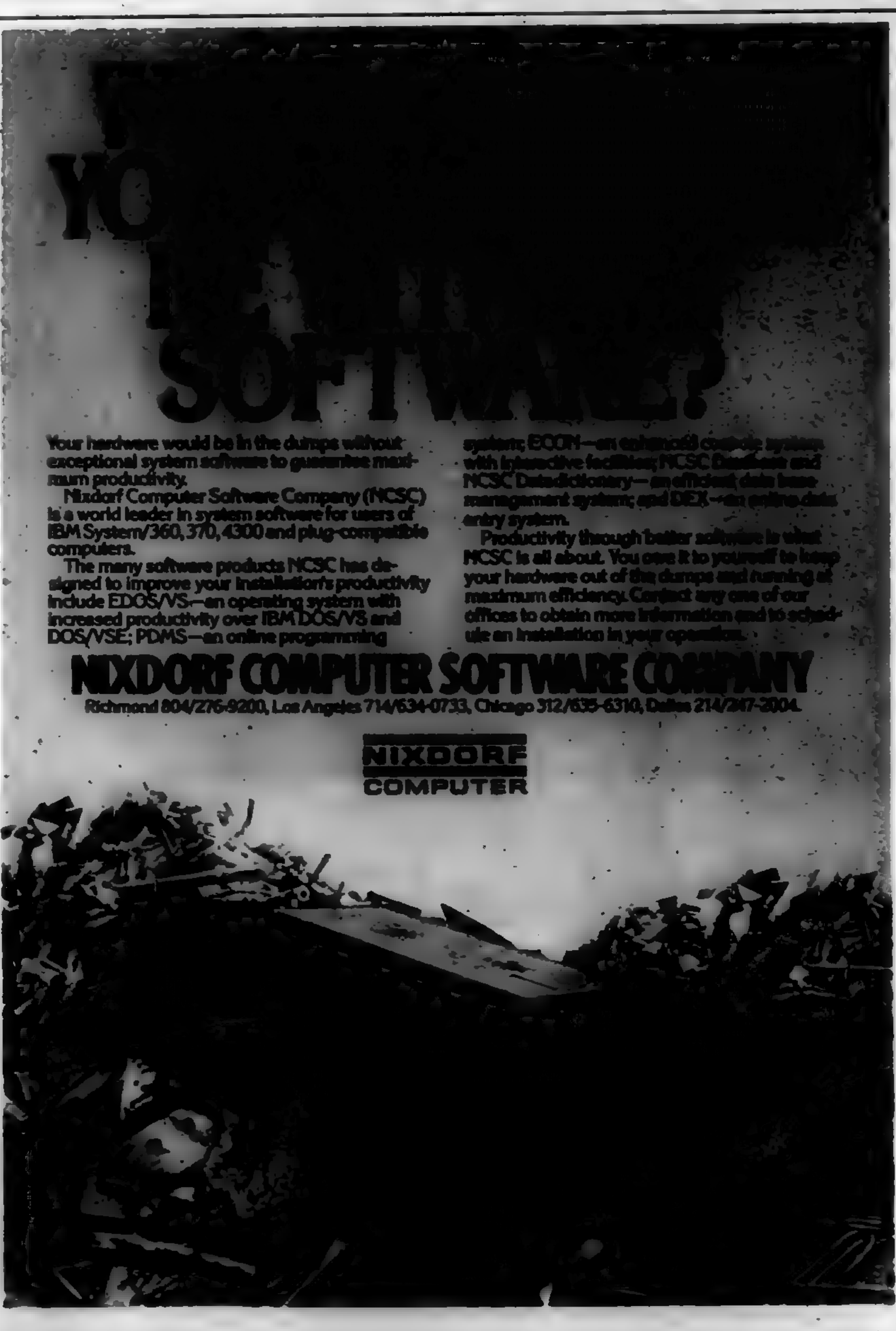
Underlining this approach is the consensus that there is a general need in the DP industry for improved productivity, documentation, technical and user training, communication and analytical techniques.

An acceptance of these fundamental assumptions leads us to the conclusion that the following problems can be associated with "traditional" methods of systems analysis and design: lack of an understood theory base; lack of uniform approaches; lack of validation and consistency of results; lack of integration into the system's life cycle; difficulty in assessing project status and results both qualitatively and quantitatively; and lack of control over user involvement.

These problems have contributed to systems which fail to meet user requirements, fail to be completed on time, fail to reflect organizational goals and objectives, fail to be properly documented and fail to reflect an approach that is consistent with management, systems and organizational theory.

By beginning at the top of the system's life cycle, it is possible to gain an understanding of a project's "real" scope, develop more effective user communication and minimize project risk. From a management standpoint, projects that involve both DP and user personnel at the planning level yield more user involvement, better education of users about DP, better education of DP personnel about users' problems, a measurable project scope and reduction of "false starts."

Figure 1 (on In Depth/7) depicts the major steps in the first phase. While



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Purchasing System Problem Analysis Form

CURRENT SITUATION	PRELIMINARY GOALS
There is no purchase to date or payment to date information kept on vendors.	Information should be available on a bi-weekly basis.
The current check register is prepared by hand and takes approximately eight hours.	Should be available within two hours of request.
There is no aging of accounts payable.	Aging of accounts payable should be available on the day prior to releasing the checks (checks are issued biweekly).
The current method for determining due-ins is not efficient.	A method is needed for keeping tract of purchase orders due-in from suppliers.

Figure 2

Environmental Model — Purchasing System

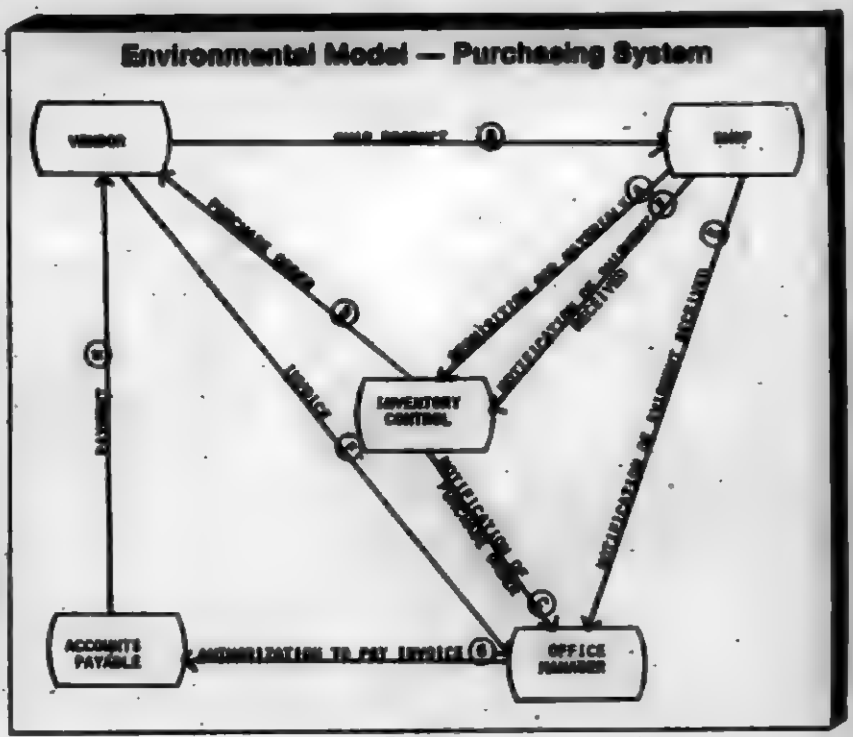

Figure 3

problem analysis and the organizational components are shown separately, they are often handled together and the analyst may start with whichever seems appropriate in a given situation. Since they support each other, it is often useful to switch as it helps unfreeze the users' thinking.

Traditionally, an organization begins to consider modifying its existing systems, whether automated or not, when there are perceived problems with the way these systems are operating. Many times these perceptions are founded in the organization outgrowing a particular system because of changes in overall organizational goals and objectives. Whatever the reason, the important element is that someone *perceives* that a problem exists.

By becoming involved with the user at this point of initial perception, the analyst can begin to lay the groundwork that will assist the user in stating these perceived problems in a clear and understandable manner. To do this requires a form of problem analysis that not only identifies the user's perceived problems, but also quantifies reasons for the problem and defines criteria by which the user, analyst and management can determine whether the problem has been resolved.

Problem resolution approaches are not new in concept; however, traditional approaches often lack certain elements which hamper their effectiveness. Figure 2 reflects some typical problem statements (current situations) and related desirable conditions (preliminary goals).

The first three problem statements demonstrate some of the attributes of good problem statement such as results orientation, measurability and user's expectation. The last statement is vague and does not allow for adequate assessment of the user's criteria for measuring the successful resolution of the problem.

A good problem statement can be tested for validity (for example, either current purchase and payment information exists or it doesn't). Likewise, proposed preliminary goals can be tested for achievement (for example, either current or up-to-date purchase and payment information is available every two weeks or it isn't).

The fourth statement lacks any measurable criteria. Instead, terms such as "not efficient" and "method" are used in place of quantifiable criteria.

Marks of Effectiveness

The use of such nonachievement-oriented statements leaves the door open for errors in communication regarding the user's true expectations. Some of the attributes of a good problem analysis are the following:

- Each problem area includes measurable criteria both as to the current and desired situations.
- Desired situations are results-oriented.
- Desired situations do not specify how to achieve results but specify the desired result.
- Persons recording problems must not impose their will on those attempting to quantify their views.
- The problem analysis is developed with the user, using appropriate techniques and visual aids.

It is important to note that facilitating problem analysis with the user is not a trivial task for those who are not adequately trained. Persons performing such information-gathering tasks need to be well versed in facilitation techniques and must possess a fundamental understanding of behavioral and organizational theory. They must be relaxed when working with people and must be able to communicate effectively at the participant's level. It is also important to remember that the purpose of problem analysis is not to design the system but to gather usable facts about the users' perceived problems along with what they believe are acceptable solutions.

In any organization whenever change is being discussed, people tend to worry about the impact that change will have on their day-to-day routine. People often do not communicate because of fears about job security. If these concerns persist, the task of determining user needs is difficult. Many systems analysts are frustrated in their attempt to extract enough information from users to develop operational or data flow diagrams.

The tendency for users to freeze up under these conditions is increased when a team of unfamiliar faces appear on the scene making inquiries as to why and how they perform their job. To reduce people's defensiveness toward outside analysts who are attempting to determine what their information needs are, it is important to deemphasize inquiries as to how and why and concentrate the user's focus on what.

For this reason, it is often useful to develop the environmental model before the details of problem analysis are pursued. This model identifies *what* information and communication tasks take place within a specific operational environment without regard to who, how or why. The goal of this model in terms of the information movement between the various entities is to identify the key steps that must take place in order to move information from its starting point to its resting point.

Typical Model

Figure 3 depicts a typical environmental model. Notice that the model does not show how or why, but depicts what takes place related to a particular function in the organization. Once completed (with the assistance of the user) this model provides an overview of what the interfaces are between the user's environment and the related entities.

This model, coupled with the prob-

(Continued on In Depth/12)

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IN DEPTH

(Continued from In Depth/11)

lem statements discussed earlier, serves as the basis for establishing the scope of a systems project. Some of the attributes of an environmental model are:

1) There must be a primary focus – such as orders, purchases, receivables and so forth.

2) Each box depicts a single entity which is a person, place or item of interest.

3) Each line is a communication (movement) of information between entities.

4) It shows the order (sequence) of communication.

5) It never shows incomplete communication.

6) It avoids complexity.

7) Communication lines do not cross.

Again, the skills required to develop this model interactively with users are founded more in organizational, behavioral and communications theory than in system theory.

When observing DP technicians attempting techniques similar to these, it becomes apparent that they are untrained to accomplish usable results. We have found that the typical analyst's initial education and experience is in programming. The title "analyst" is merely a prerequisite to obtaining a higher salary and has little or no bearing on that person's ability to work with people effectively.

> *'Today, most good analysts evolve by accident rather than by plan. We believe that part of the analyst's grooming should include training in effective communications skills, organizational theory, management theory, general system theory and some understanding of human behavior.'*

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Mapping Problems

Once the initial tasks of identifying perceived problems and the related operational environments are complete, the problems are verified in relation to the defined environment. This verification is important because it allows us to determine whether the effort expended to date is toward a common goal.

By themselves, a set of problem statements and an overview of a related environment are not particularly valuable to systems design. However, by mapping the two together through an integration process, the criteria that define the scope are identified. The most important criteria are:

- The critical path that information must take to successfully move through the environment.
- The related procedures or triggers that must exist to move information along the identified critical path.
- The points along the critical path where the identified problems occur.
- The minimum source documents, required operational results, management control results and system monitoring results that must exist to maintain system and information flow integrity.
- The minimum automation points that would allow for resolution of the identified problems.

Figure 4 lists the steps required to create a functional flow model from an environmental model, and Figure 5 shows an example of a functional flow model developed from the previous environmental model. In this model, the area between any set of brackets is called a level.

These levels are numbered sequentially and each consists of two types of information, states and procedures. Each state represents the status of an object (a purchase order, in our example) at a particular point in time within the defined critical path. Each procedure beneath a given state represents the events that must occur to the object

Taking Environmental Model To the Functional Level

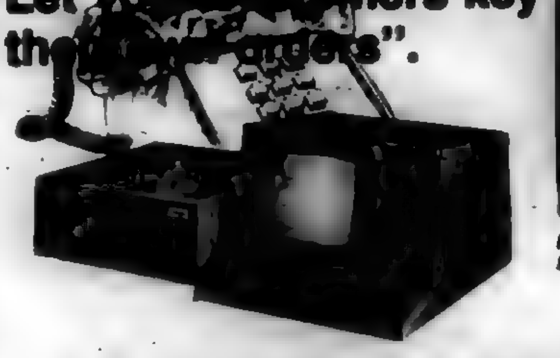
- List the lines of communication of the environmental model in the sequence of their occurrence.
- Identify the focal point of the data flow (i.e., an order, a purchase, a shipment, etc.)
- Starting with the last item, determine what procedures must take place to the next to last item so as to get to the last item and repeat until first item has been reached.

```
        Example:
                   {                            {
        Bank       {   Customer Payments        {
        Deposit    {   (Next to last item)      {
                   {                            {
        (Last      {           •                {
         Item)     {   Deposit Procedure
                   {
```

- Fine tune the functional model by performing a critical path analysis. The only non-procedural items that should remain are those critical to the points through which information must pass to move from the first item to the last. All other items are procedural and are removed.
- Perform this analysis with the user.

Figure 4

"Let yo[illegible]mers key th[illegible]ders".



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in question in order to move it from one state to the next. In our example, for a purchase order to move from a state of a "shipped order" from a vendor "to a payable invoice for purchase order," two procedures must be completed: notification by shipping of receipt of merchandise to inventory control and office manager, and an invoice-processing procedure.

Remember, at this point in the analysis we are only interested in function and it is not important to understand how or why each procedure is accomplished. The goal here is to identify the procedures and cast them into their proper perspective in terms of the total critical path.

Important Criteria

A good functional flow model must:

- Reflect the logical states of the information.
- Reflect the logical procedures that must take place to move information from one state to the next.
- Reflect the critical path.
- Become a functional map to isolating where problems occur.
- Become a focal point for identifying what types of source documents, required operational results, management control results and system monitoring results must exist for successful information flow.
- Become a focal point for identifying minimal automation requirements.
- Become a map by which operational flows can be tested.

Once the functional flow model is complete, it becomes a focal point for mapping the identified problems to their procedural counterparts. Figure 6 depicts this mapping process. Each problem is systematically related to the level where it occurs. Once this is done, it is easy to analyze where most bottlenecks are likely to occur and at what points the use of automated techniques can be employed or modified to resolve the organization's problems.

Usually where problems cluster there are major bottlenecks. However, depending upon the nature of the problems, this might not always be the case.

Before identifying the minimum automation points, it is important to identify what results users perceive they want in relationship to the functional model. Even though no attempt is made to define how these functions are accomplished, it is possible to begin defining the major results the functions identified must produce in order to satisfy the user's information requirements.

To do this it is helpful to categorize system results. We have found the four major categories of source documents, required operational results, management control results and system monitoring results to be most useful. By working closely with the user with the functional model as a focal point, the desired results can be identified. To assist the reader in understanding this process, the above categories are defined:

Source documents: forms, reports, documents or communications that serve to initiate data into the information flow of a system.

Required operational results: forms, reports, documents or communications that must be produced by a system in order to move information along the critical path under ideal conditions.

Management control results: forms, reports, documents or communications that must be produced by a system to satisfy management's information requirements and to allow management to maximize their efficiency. These often support management by exception and management by objectives.

System monitoring results: forms, reports, documents or communications that must be produced by a system so that users can determine when the system is not functioning under ideal conditions.

Note that each type of result often has multiple functions. At one level in the critical path a certain result is a required operational result, while at another level it serves as a management control result.

To identify the source documents needed in each function, a review of

(Continued on In Depth/16)

> *'Once the functional flow model is complete, it becomes a focal point for mapping the identified problems to their procedural counterparts. Once this is done, it is easy to analyze where most bottlenecks are likely to occur and at what points the use of automated techniques can be employed or modified to resolve the organization's needs.'*

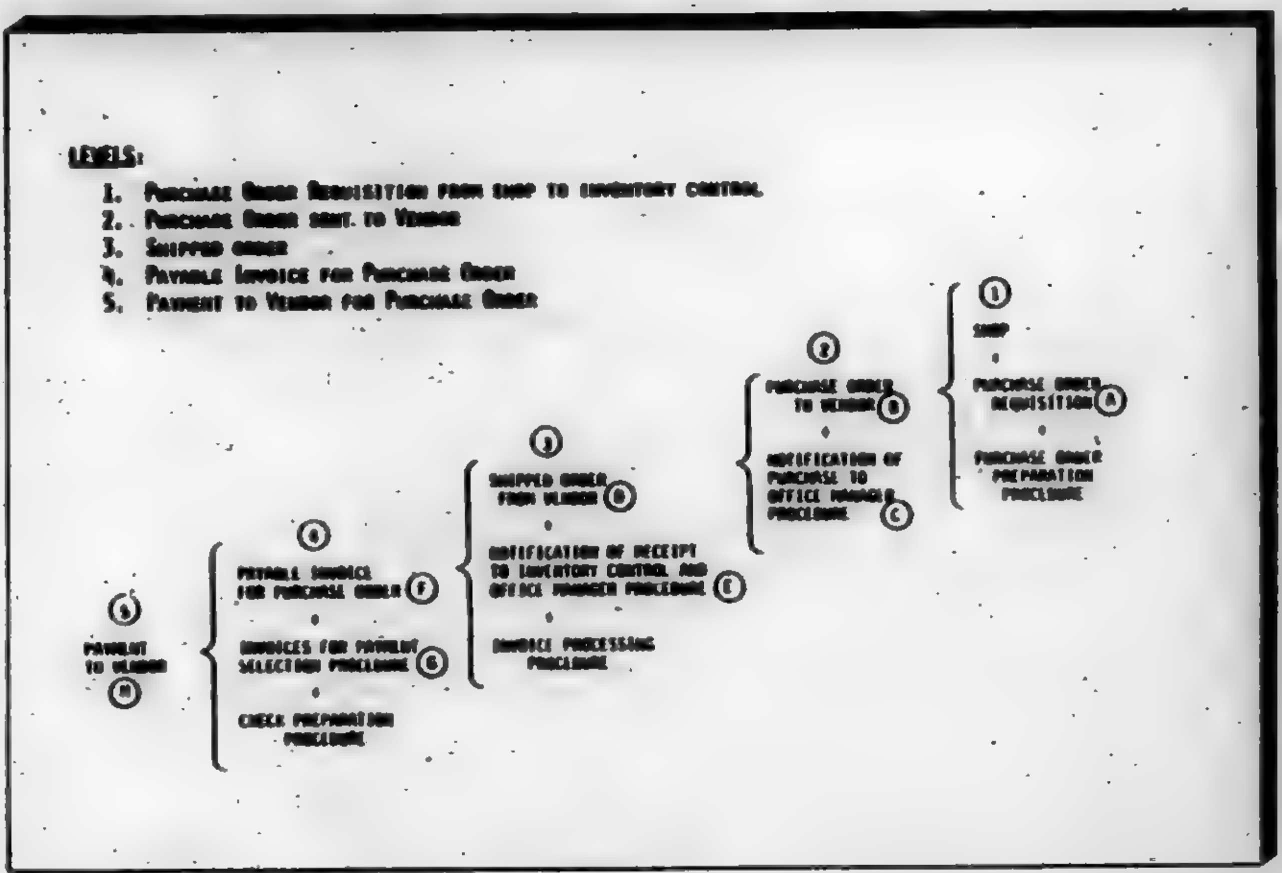
LEVELS:
1. Purchase Order Requisition from Shop to Inventory Control
2. Purchase Order sent to Vendor
3. Shipped Order
4. Payable Invoice for Purchase Order
5. Payment to Vendor for Purchase Order
①
SHOP
PURCHASE ORDER REQUISITION Ⓐ
PURCHASE ORDER PREPARATION PROCEDURE
②
PURCHASE ORDER TO VENDOR Ⓑ
NOTIFICATION OF PURCHASE TO OFFICE MANAGER PROCEDURE Ⓒ
③
SHIPPED ORDER FROM VENDOR Ⓓ
NOTIFICATION OF RECEIPT TO INVENTORY CONTROL AND OFFICE MANAGER PROCEDURE Ⓔ
INVOICE PROCESSING PROCEDURE
④
PAYABLE INVOICE FOR PURCHASE ORDER Ⓕ
INVOICES FOR PAYMENT SELECTION PROCEDURE Ⓖ
CHECK PREPARATION PROCEDURE
⑤
PAYMENT TO VENDOR Ⓗ

Figure 5

LEVEL	PROCEDURE NAME	PROBLEM #	PROBLEM STATEMENT
1	Purchase Order Requisition From Shop		
2	Purchase Order to Vendor	1 4	No purchase-to-daté or payment-to-date information kept on vendors. Current method for determining due-ins not efficient.
3	Shipped Order	4	Current method for determining due-ins not efficient.
4	Payable Invoice	3	No aging of accounts payable.
5	Payment to Vendor	1 2	No purchase-to-date or payment-to-date information kept on vendors. Current check register is hand prepared and takes approximately eight hours.

Figure 6

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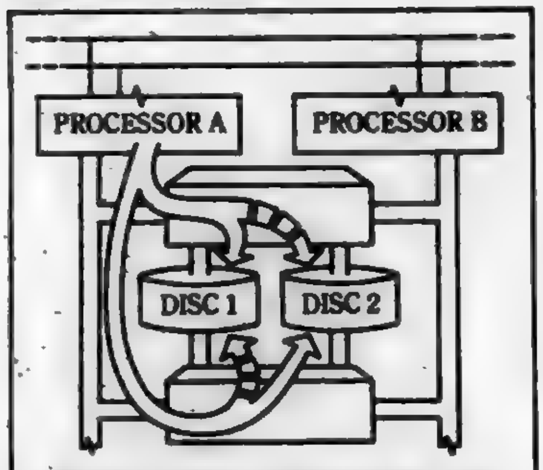

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Purchasing System — System Documents and Results

LEVEL	SOURCE DOCUMENTS	REQUIRED OPERATIONAL RESULTS	MANAGEMENT CONTROL RESULTS	SYSTEM MONITORING RESULTS
1. Purchase Order Requisition from shop to inventory control		Requisition Slip	Inventory Status Inquiry	Back Order Report
2. Purchase Order sent to vendor	Requisition Slip	Purchase Order	Purchase Advisory Report	
3. Shipped Order	Purchase Order	Inventory Card Accounts Payable Card	Open Purchase Order Listing	Back Order Report
4. Payable invoice for purchase order	Receiving copy of Purchase Order Vendor's Invoice	Accounts Payable Journal	Approved Payable RPT Accounts Payable Aging Report Cash RCPTS Report Vendor Analysis	Report on Outstanding Payables with problem needing to be solved
5. Payment to vendor	Approved Invoice	Check Check Register Cash Disbursements Journal General Ledger		

Figure 7

ACTIVITY	TOOL
PERCEIVED PROBLEMS	MEETINGS & DISCUSSIONS
	QUESTIONNAIRES
PROBLEM ANALYSIS	PROBLEM ANALYSIS FORM
ACTUAL PROBLEMS	PROBLEM ANALYSIS FORM
PROPOSED SOLUTIONS	INTERVIEWS
	GOAL SETTING
ORGANIZATIONAL MODEL	ENVIRONMENTAL DIAGRAM
ORGANIZATION'S OBJECTIVES	ENVIRONMENTAL DIAGRAM & ANALYSIS
FUNCTIONAL FLOW OF SYSTEM	FUNCTIONAL FLOW
INTEGRATION OF ACTUAL PROBLEMS TO FUNCTIONAL FLOW	MAPPING
IDENTIFICATION OF MINIMUM AUTOMATION AREAS	CRITICAL PATH ANALYSIS & IMPACT ANALYSIS

Figure 8

(Continued from In Depth/13)

the flow of information through the system is conducted with the user. The purpose of this review is to collect details on where information originates and what form it takes.

To identify the required operational results, the user must describe how he knows when the object identified in the functional flow model changes states. In every system, whether manual or automated, there exist some methods, whether formal or informal, whereby people know when to take a particular action related to a function. The items that trigger an action are usually the result of some form of source document or required operational result.

In our example, the purchase order is the required operational result that triggers a purchase from a supplier. That same document also serves as a source document during the receiving process. The requisition slip triggers the use of that same purchase order as a source document.

To identify the management control results, the functional flow model is reviewed with the user to determine what decision information and feedback is needed to allow the user to make prudent decisions related to the management of each function. For example, if products are being purchased for inventory, information should exist on how the user knows when and how much to buy. Or, if invoices are to be paid, how does the user know which to pay and when to pay them?

In many systems, it is the lack of adequate management control results that frustrates management's ability to function properly. The main question that needs to be answered by the user during this analysis is, "How do you or how would you like to make decisions related to the management of the function being analyzed?" Many of the answers to this question exist in the identified problems. A careful review of the user's perceived problems in relation to their respective occurrence in the functional flow usually isolates where management control and system monitoring results are required.

System monitoring results, the final type of results, are identified by exploring with the user where the system can fail and what types of information needs to exist to inform management of the occurrence of a failure. By analyzing each level of the functional flow model, we can begin to evaluate what safeguards exist or should exist in the system to inform the user when a point in the critical path is not reached. Following Murphy's Law, "If anything can go wrong, it will," a systematic analysis can be made in which the necessary safeguards can be identified in order to ensure the system's integrity.

Our experience shows that most ailing systems have not been designed with sufficient foresight to allow for adequate management control and system monitoring results. Figure 7 reflects the system documents and results identified in relationship to the prior examples.

Realistic Scope

By approaching the system development process from the point of view of assessing the user's needs, it is possible to establish a realistic project scope that is understandable to users, management and DP alike. Once the system's minimum automation points and the related system documents and results are identified, the scope of the project becomes evident. This assessment process provides management with information it can use to make prudent decisions about continuation of projects.

Some of the more important points are:

- Identification of the major business functions reviewed.
- Identification and description of the current business operating and reporting environment related to the functions reviewed.
- Identification of the organizations and locations responsible for performing and controlling these functions.
- Documentation of identifed operating and reporting problems.
- Identification of management's goals and objectives related to the functions reviewed.
- Recommendations on how to approach project continuation.
- Rough estimates of the cost to define system requirements and design and implement these requirements.

Using the ideas presented, we believe it is possible to apply highly structured techniques at the planning level of the systems development life cycle. When properly carried out, the plan gives the following:

- Controlled user involvement.
- Quantifiable system project scope.
- High level of willing user participation.
- Definition of the criteria needed to define the user's system requirement (documents and results).
- Highly structured documentation that can be used to test the accuracy of data flows and operational flows developed during requirements definition.
- Enhanced user, management, DP knowledge about the environment in which they work.
- Enhanced levels of constructive communication between users, management and DP.

The results we have achieved with user organizations have been dramatic. Through the use of these planning techniques, we have found that new systems development efforts have become positive influences to organizations instead of destructive influences on organizational moral.

Figure 8 summarizes the activities pursued and some of the techniques used. If management chooses not to continue with the project, the documentation that results from this phase is valuable since it documents the current environment and principal problems related to the environment.

Michael R. Wood is a partner in Andreoli, Johnson & Wood, a certified public accounting firm in Westlake Village, Calif.

William Bearley is president of Computer Information Associates, Pasadena, Calif., a software consulting firm specializing in the planning, design and implementation of custom systems for business and government.

Not a Slap at Honeywell

XCS Forsakes Sigma Line for IBM Iron

By Jake Kirchner
CW Washington Bureau

LOS ANGELES — When Xerox Computer Services (XCS) began replacing its aging Sigma mainframes with IBM equipment it was not, XCS president Haig Bazoian said recently, a slap at Honeywell, Inc. which took over the Sigma line from Xerox five years ago.

"We looked at our particular environment and who we're trying to market to and concluded the IBM made more sense," said Bazoian, whose company provides time-sharing services in almost 120 U.S. cities from its four data centers here. Two IBM systems — a 3033 and a 4341 — are now up and running.

When Xerox phased out its computer manufacturing operations in 1975, XCS knew sooner or later it would have to move to an outside source for its hardware, Bazoian recalled in a recent interview.

"We went through an evaluation of all the hardware that is on the marketplace," he said. The company concluded the IBM equipment lends itself best to the kind of services XCS provides, Bazoian said, and just as important, switching to IBM allowed the company to begin marketing the application packages it develops to, the large number of IBM and IBM-compatible users.

The firm began offering its proprietary software for license early this year and now markets some 25 different packages for such applications as billing, receivables, manufacturing controls and inventory.

Developed Operating System

What made the switch to IBM as easy as upgrading their Sigmas through Honeywell, he said, was that XCS had in 1970 developed its own operating system. "Our operating system was one that we developed, which is unique to XCS, was not a Sigma operating system; so it was not one of those you pick up and move over to a Honeywell system."

"We discovered we could get more throughput, more efficiency on the [Sigma] computer relative to the kinds of transactions, the kind of work we do by, effectively, designing our own rather than using a generalized operating system."

This is not to suggest that the Sigma environment is not suited to time-sharing, he added, saying the Sigma line and its operating system are "really quite good."

In fact, while the California data centers phase out their Sigma mainframes, the company's six "production centers" around the country still rely on Sigma 3 and Xerox 530 systems to support approximately 3,300 on-line terminals of the firm's U.S. clients.

Software Conversion

Because IBM and perhaps IBM-compatible equipment is being brought in gradually over several years, XCS has converted its software to run on both the Sigma and IBM systems. According to Bazoian it took about a year and a half to make the conversion, but now the original XCS operating system runs as a task under OS/VS on the firm's 3033 and 4341 systems.

"The new computers that come in to handle new growth will be strictly IBM or IBM-compatible and then over the next three to four years we will little by little migrate off the Sigmas onto the IBM architecture," he said.

The company is growing at a 25% to 30% annual rate, according to Bazoian, who declined to discuss XCS revenues other than to say the firm brought in "more than $50 million" last year.

XCS, which has expanded its operations to Holland and the UK, maintains "one of the largest business data bases in the country," comprising between 70G- and 80G-bytes of on-line storage, he said.

"Everything we do is on-line," he said. Marketing its time-sharing services mainly to manufacturers, distributors and cities, the Xerox unit stores its data base on "a sea of disk drives," primarily 100M- and 300M-byte models from Century Data Systems, a company acquired by Xerox last year.

Dual-Output System Combines Vector Refresh, Raster Display

SAN DIEGO — Megatek Corp. is offering a dual-output computer graphics system that uses both vector refresh and color raster displays on a single controller.

The Whizzard 7290 is said to provide computer-assisted design and computer-assisted manufacturing users high-resolution design and analysis in electrical and mechanical engineering applications, the firm said.

Based on the Whizzard 7200 graphics engine, the system is said to operate with almost any minicomputer made by Digital Equipment Corp., Data General Corp., Prime Computer, Inc. and other vendors that use high-speed parallel interfacing. Display commands are transferred between the 7290 and the host CPU in either programmed I/O or DMA modes, the vendor said.

The 7290's architecture includes dual multidirectional buses. Data transfers for vector calculations and refresh are handled by a 32-bit-wide tri-state graphics bus to provide maximum speed, flexibility and resolution, the vendor said.

To ensure that high-speed data transfers are not degraded by peripheral I/O transfers and routine interrupt servicing, a separate 16-bit-wide peripheral bus is used to handle those functions. Vector memory modules include 16K bytes of random-access memory (RAM) for display refresh. Each module contains 16K words of 32-bit RAM and can accept 2K 32-bit words of programmable read-only memory, the vendor said.

Vector memory can be expanded to a maximum of 48K 32-bit words for a total of 192K bytes, the vendor added.

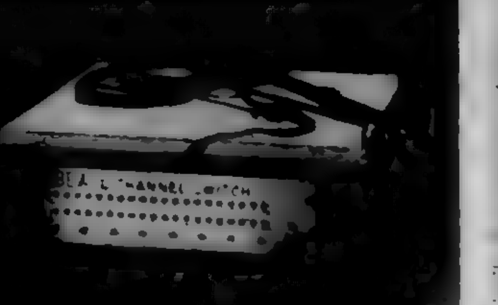
Instruction Set

The instruction set of the graphics processor includes two-dimensional and three-dimensional formats, selective erase, textured and blinking lines, 16 levels of intensity and beam penetration color control on vector refresh, 16 colors and a color lookup table control on raster displays and hardware character generation with optical user-definable symbol sets, the vendor said.

Each Whizzard 7290 plugs directly into a mother board backplane that resides in a chassis in either a rack-mountable or table-top configuration. The chassis contains its own power supply and can be expanded to accommodate various options, according to Megatek.

The unit costs between $35,000 and $55,000 depending on selected options, the vendor said from 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.

A Simon Legree for Computers



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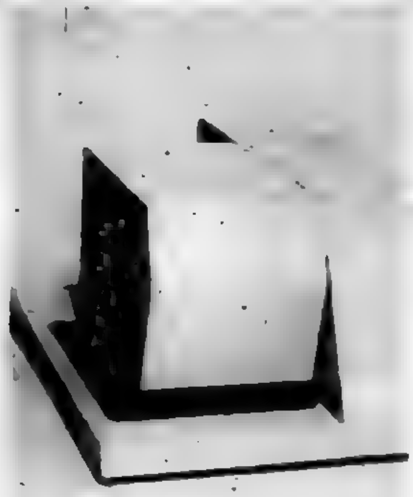
Supports up to 48 Terminals

CA Adds Double-Performance Syfa 2000



The Syfa 2000

IRVINE, Calif. — Computer Automation, Inc. has expanded its Syfa computer line by adding a distributed data processing (DDP) system that is said to offer twice the overall performance of the firm's original Syfa machine.

The Syfa 2000 is geared to top off the company's commercial systems division product line and has a CPU cycle time about 1.4 times faster than its entry-level Syfa 300 and the original Syfa 1000 computers. The system is capable of handling up to 32 CRT terminals which can be increased to a maximum of 48 depending on the user's needs for program size and transaction speeds.

Like its predecessor, the System 2000 is designed for large-scale DP networks — typically hosted by IBM mainframes — in which distributed, minicomputer-based systems perform batch, interactive processing and concurrent telecommunications activities, a spokesman said.

The system contains a 50-nsec cache memory and an improved memory management unit. The 2K-byte cache holds current or commonly accessed data, intercepting CPU executions up to 85% of the time, the spokesman continued. The CPU also has a faster memory — around 525 nsec in 256K-byte error-correcting modules — than existing Syfa machines which have a 700-nsec speed on 64K-byte board minus the error-correcting feature.

In addition, the Syfa 200 has a minimum of three microprocessor-based front-end devices — called microboosters — that provide an intelligent interface for peripheral equipment, data base management and major communications protocols, the spokesman claimed.

Protocols supported by the Syfa machines include X.25 and bysynchronous communications, as well as emulation of IBM remote job entry (RJE) protocols. The firm is also working to implement IBM's System Network Architecture (SNA), already compatible with the Syfa offerings.

Other features of the 2000 include a semiconductor disk drive which reportedly has an access time more than 10 times faster than conventional disk units with a capacity up to 2M bytes and an updated version of the firm's Sybol business-oriented programming language. The updated Sybol 3 is compatible with the current Sybol 2 version, but adds a number of instructions to enhance system programming and operation, the spokesman stated.

Finally, the 2000 is packaged in a taller cabinet that takes up the same amount of floor space as the Syfa 1000, but allows for the addition of an on-board diagnostic program in a 1K-byte read-only memory that executes when the machine is power-on.

A typical Syfa 2000 system with processor, 256K bytes of memory, cache and memory management unit, semiconductor disk, two 300M-byte disks, microboosters, two line printers and 16 CRT terminals costs about $300,000. However, the price for a fully configured system with the maximum number of terminals is more than $600,000.

Additional information on the Syfa 2000 and other Syfa systems can be obtained from the vendor's Commercial Systems Division at 2181 Dupont Drive, Irvine, Calif. 92713.

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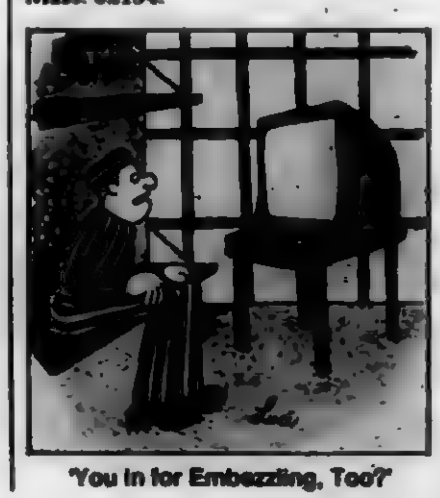
Printer Runs At 2.4 Line/Sec

ALLSTON, Mass. — A 27-column unidirectional print station which runs at a continuous rate of 2.4 line/sec is available from Capitol Circuits Corp.

The Model 270 document/slip printer allows the user to print on any size document/slip with a 96-char. Ascii set — in upper- and lowercase — printable in a 5 by 7 dot matrix format, the vendor said.

The price for the product is $670. Capitol is at 24 Denby Road, Allston, Mass. 02134.



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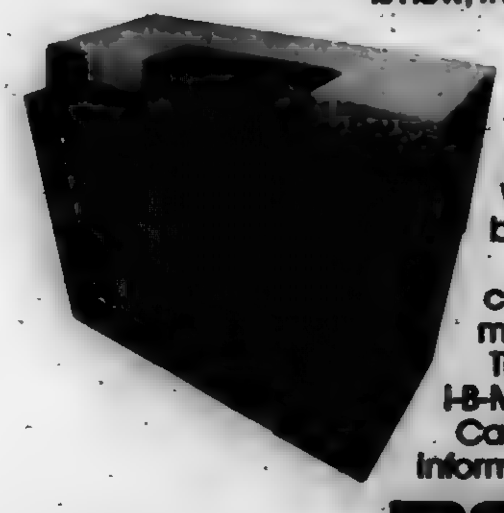

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Voice Output Units Designed for the Blind

BEL AIR, Md. — Two microprocessor-based voice output products for the blind that convert computer-transmitted data into synthetic speech have been announced by Maryland Computer Services, Inc.

Total Talk is the more sophisticated product of the two, while Speak Easy is its less versatile subset.

Consisting of a keyboard, two microprocessors, a CRT screen and a speech synthesizer, Total Talk converts computer-transmitted data into special phonetic characters, the firm explained.

These phonetic characters and rules for enunciation are fed to the synthesizer. The blind computer operator can listen to all transmitted information, a page, a selected line or a single word.

Total Talk can switch from full word to spelled speech output, enabling any word or special computer character to be verified. The speech rate (45- to 720 word/min), pitch, tone and volume are adjustable.

Based on the Hewlett-Packard Co. 2621A terminal, Total Talk is said to be beneficial in vocational and educational settings.

Speak Easy produces the same level of synthetic speech, but lacks editing and cursor control capabilities, according to the vendor. Besides helping the blind, the products can be used for computer-aided instruction, instrument control and automatic vocal feedback, the vendor said.

Total Talk costs $5,995 and Speak Easy costs $4,000, including both RS-232C and IEEE-488 bus interface capabilities. Maryland Computer Services, Inc. is located at 502 Rock Spring Ave., Bel Air, Md. 21014.

Multipass Printer Debuts

KENT, Wash. — The T-3000M Multipass High Resolution Printer, which prints 300 line/min and offers double high characters, is available from Mannesmann Tally.

The printer operates in three modes: standard 300 line/min printing, double high character printing and multipass printing. Double high printing is useful for highlighting or for printing labels. Multipass printing enhances character appearance by filling in the spaces between dots, the firm said.

The product offers host-defined font selection that allows downstream loading of character sets from the host computer. The user can define and store his own character sets, special characters or multiple languages, the vendor claimed.

Other features include a diagnostic status display that isolates and identifies fault conditions and front access straight path paperloading.

The unit's price is $5,495, the vendor said from 8301 S. 180th St., Kent, Wash. 98031.

Free Brochures

- A report on "Computer Security, Crime and Fraud" is available from Quality Systems, Suite 1621, 919 Michigan Ave., Chicago, Ill. 60611.
- A user-oriented supply catalog is available for those working with all pen plotters from the Graphics Resource Corp., 5442 Research Drive, Huntington Beach, Calif. 92549.
- "How to Carry Your Business into the '80s" is the title of a brochure on the evolution, current status and future potential of portable processing. It can be obtained from Computer Devices, Inc., 25 North Ave., P.O. Box 421, Burlington, Mass. 01803.
- A summary of on-line, distributed data processing, data entry, remote job entry and business communications systems is now available from Northern Telecom Systems Corp., Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.
- A 12-page illustrated catalog presenting basic operating characteristics, dimensional drawings and selection guidelines for Sola Electric's line of line voltage regulators is available from the firm at 1717 Busse Road, Elk Grove Village, Ill. 60007.
- Brochures on EDP systems management and planning/resource control are available from Arthur Andersen & Co., 69 W. Washington St., Chicago, Ill. 60611.
- "Center of Attention" explains a new tape/disk mounting display and control system and can be obtained by writing Telegenix, Inc., 26 Olney Ave., Cherry Hill, N.J. 08003.

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Mini Leaves Ivory Tower

By Sid Huff
CW Staff

LONDON, Ont. – For the past few years, the University of Western Ontario's Business School here has been working toward taking the computer out of its isolated ivory tower and bringing it closer to the user.

As in industry and business, decentralizing computing resources is the key concern of more and more schools and colleges. Until 1968, computing within the Business School was primarily carried out in a batch mode on the University's central IBM 7094 machine, with a small amount of additional activity through various time-sharing bureaus. The school's first dedicated machine was a batch-oriented IBM 1130, augmented a few years later by a Hewlett-Packard Co. 2000 time-sharing system.

Now, however, the school has a Prime Computer, Inc. 750 minicomputer that can be accessed from anywhere on and off the school's campus through a variety of dedicated and portable terminals.

Case-Oriented Teaching

Back in the days of batch processing, the IBM computers were used mainly in support of the Business School's case-oriented teaching. Students preparing cases frequently used the IBM 1130 or the time-sharing service to carry out analysis of data in the case, generally by using an instructor-written program. Most faculty research computing was still run on the university's more powerful central computers.

Planning for the next generation of Business School computing began in 1977 and culminated in late 1978 with the school's decision to acquire the Prime 750. The computer was purchased with the financial backing from the London-based Richard Ivey Foundation.

Computer use increased at the University of Western Ontario's Business School.

To prepare for the computer's arrival, the student work area was completely revamped. A modular layout consisting of clusters of four CRT terminals together with a receive-only hard-copy terminal was designed. The new system also included a tape drive, a 300M-byte Control Data Corp. disk drive, 1M byte of main memory, a Printronix, Inc. 600 line/min matrix printer and a card reader. The card reader, however, has found little use; almost all computing is now interactive.

The matrix printer also provides valuable graphics capability. The Prime further supports communication links to two other university computers, a CDC Cyber 172 and a Digital Equipment Corp. PDP-11/70.

(Continued on Page 66)

Basic Four Entry-Level System, Power, Memory Upgrades Bow

SANTA ANA, Calif. – Basic Four Corp. has introduced an entry-level computer to its removable-disk storage systems line and has upgraded the memory capacity and power of its System 410 fixed disk minicomputer.

The system 510 removable-disk computer offers a basic 64K bytes of memory, a 20M-byte disk drive, operating system software, a CRT and a 120 line/min printer. The system can be expanded to handle up to 256K bytes of memory, 16 terminals, 300M bytes of disk storage and a 300 line/min printer, a spokesman said.

The System 510 is geared to be a computer-compromise for those users who don't need the power of Basic Four's systems 610 and 730 or the limited capabilities of the smaller 200 and 410 systems, he claimed.

The firm also announced a power performance option (PPO) system that is said to increase the system throughput and expand the memory to 256K bytes for the System 410. The enhancement also allows the computer to handle up to 12 CRT terminals through a serial device support system, the spokesman continued. The PPOs are field-installable on any System 410, regardless of manufacture.

The Model 9153 PPO provides a performance upgrade with no increase in serial ports, while the Model 9154 provides the performance and memory upgrade in addition to adding a capability for up to eight CRT terminals.

The Model 7941 four-port terminal controller allows further expansion to support up to 12 terminals. The 9153, 9154 and 7941 cost $3,000, $3,500 and $2,000, respectively. Deliveries are scheduled to begin in June 1981.

The basic System 510 costs $44,000 with deliveries available in 90 days from the company at P.O. Box C-11921, Santa Ana, Calif. 92711.

Fixed-Disk Emulator for PDP-11 Uses Dynamic Memory Storage

IRVINE, Calif. – Plessey Peripheral Systems, Inc. has introduced a fixed-head disk emulator for Digital Equipment Corp. PDP-11 minicomputers that utilizes dynamic memory as a storage medium rather than the disk drives.

The PM-RF11 emulates DEC's RF11-A disk operating system and is said to offer a 10 to one increase in system transfer speed and a 1,700 to one increase in access time compared with the DEC system. The Plessey device includes write-lock switches for memory protection and error checking and correction circuitry. In addition, a front panel rotary switch and LED display let the user examine the unit's internal registers.

The disk emulator is available in two configurations, the RF-11A, which has 512K bytes of memory in a 5.25-in. chassis and includes extra memory slots to expand capacity to 1.5M bytes and the RF-11B, which has the same amount of basic memory in a twice-as-large chassis.

The basic RF-11A costs $9,733 from the firm at 17466 Daimler Ave., Irvine, Calif. 92714.

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Automatic Development, Inc.'s Visi-Net features provide communications capabilities to its word processing system. Visi-Net allows networking for data base use, communications and electronic mail.

WP System Incorporates Communications Capability

STONEHAM, Mass. — A word processing (WP) system that reportedly provides extensive communications capabilities has been introduced by Automation Development, Inc.

Known as Visi-Net, the system offers such communications features as networking that allows two or more users to share a data base, system-to-system communications and electronic mail. It also has automatic paragraph, page numbering and footnoting capabilities, the vendor claimed.

Depending on configuration, the system is priced from $15,000 to $25,000 for software, and the basic hardware cluster starts from $19,000, also based on configuration, the vendor said from 38 Montvale Ave., Stoneham, Mass. 02180.

Printronix Adds Enhancements

IRVINE, Calif. — Printronix, Inc. has announced four enhancements to its P300 line printers.

A half-dot plot mode which provides 50% greater density for smooth line curvature, and a self-test feature which exercises the printer to produce a predetermined pattern cost, together, $50, the vendor said.

The RS-232 interface with a transmission capability that receives and transmits from 150 to 19.2K bit/sec in eight selectable rates is now available and costs $450.

Finally, the company's P150, P300 and P600 line printers are now provided with enclosed pedestals at a cost of $595 each, the vendor said from 17421 Derian Ave., Irvine, Calif. 92713.

Pet Micros Gain Two-Way Link

BROOKFIELD, Conn. — A two-way RS-232 and parallel output interface for Commodore Business Machines, Inc. Pet microcomputers is available from Connecticut Microcomputer, Inc.

The Sadi interface is said to allow connection of a Pet to parallel and serial printers, CRT terminals, modems, acoustic couplers, hard-copy terminals and other computers.

The serial interface offers selectable transmission rates from 75- to 9,600 bit/sec; half- or full-duplex, 32-char. buffer and selectable carriage return delay. In addition, the parallel interface provides both data strobe and device ready in either polarity.

For $295, the 110-VAC Version comes with power supply, Pet IEEE cable, RS-232 connector, parallel port connector and case. A 230-VAC version costs $325 from the firm at 34 Del Mar Drive, Brookfield, Conn. 06804.

Mini Leaves Ivory Tower

(Continued from Page 65)

As well as 24 CRT terminals in the student work area, other terminals are scattered throughout the building. Dial-up lines and portable "loner" terminals are also available. All faculty offices and classrooms are hard-wired, offering a plug-in communications capability. Large screen projection displays provide an effective means for using the computer "live" in classroom settings, a technique that students find adds exciting new dimensions to case-style teaching.

Research Aid

Faculty and doctoral students have also found that the new system can support their research needs very nicely. A key research software tool, manufactured by SPSS, Inc., runs easily on the Prime, whereas the earlier computers were too limited to support it. A variety of other software packages have also been adopted, including Interactive Data Analysis, the Slam simulation language and an Interactive Financial Planning System.

Various programming languages, including Fortran, Fortran-77, Basic, Pascal and the like, are also in use.

In conclusion, the best testimony to our success is simply the rapidly growing extent to which the school's mainstream activities — teaching, research and administration — are all becoming thoroughly interwoven with our computer system.

Huff is a professor and director of the computing center at the University of Western Ontario in London, Ont.

MORE COMPUTERWORLD BOOKS

Listed below is a selection of titles from our new reader service, Computerworld *Books*.

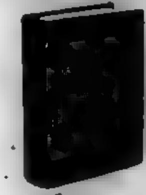
Some of the books deal with various aspects of data processing, while others cover more general management topics. All of them have been selected by our editors for their relevance and usefulness to growth-oriented computer people.

In the future, we plan to include instructional materials other than books, and we also have plans to publish books on topics we consider to be important. We welcome your comments on these plans, our current selection of titles, or on other matters concerning this new service. Send them to *Computerworld Books*, attention editorial staff.

Meanwhile, we hope you'll look over the titles below and order those which you feel can be of use to you. A coupon is included for your convenience, and we'll be happy to bill you later. Remember that all books are sent to you risk-free, with a full 15 day trial period!

WJ044. Information Retrieval Systems: Characteristics, Testing and Evaluation, 2nd Ed. *F. Wilfrid Lancaster.* This new edition is expanded, and provides broader coverage on information storage and retrieval. The focus is on the "intellectual" aspects of systems and services. It examines factors such as user-system interaction, search strategy, indexing, and vocabulary control with emphasis on design and evaluation aspects. $22.95

BP006. An Introduction to Distributed Data Processing, *Harry Katzan, Jr.* A thorough understanding of the most recent developments in data processing is provided by a graphic and comprehensive analysis of the current and future impact in planning and implementation procedures. The text is divided into three parts: Management Overview, Data Communications Concepts, and Distributed Systems Concepts with special emphasis on organizational changes, vital economic considerations, plus important selection criteria when choosing equipment. $20.00



NV007. Encyclopedia of Computer Science, *Edited by Anthony Ralston and C. L. Meek.* The first and only one-volume computer science encyclopedia, with more than 480 articles and 1,000 illustrations, tables and charts covering every aspect of the discipline. It is divided into five broad areas: computer science, information processing, information sciences, data processing and symbol manipulation. Subdivisions include software, hardware, languages, programs, systems, mathematics, networks, applications, theory, history and terminology. $60.00

NV145. Data Communications Dictionary, *Charles J. Sippl.* The only single-volume source of data processing and communications definitions. Clearly explains more than 14,000 concepts, working terms and phrases, acronyms and abbreviations. $10.95

NV018. Data Processing Contracts: Structure, Contents, and Negotiation, *Dick H. Brandon and Sidney Segelstein.* Take the risk out of buying or renting computer products and services. Here's a detailed framework for structuring and negotiating airtight contracts that clearly stipulate the responsibilities of both user and vendor. Over 250 specific contract clauses, covering the purpose of each, the types of contracts in which they are used, and their risk ratings and fallback alternatives. Learn about clauses that are essential for maximizing cost savings and minimizing the possibility of dispute and litigation. $34.50

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WJ041. Principles of Discrete Event Simulation, *George S. Fishman.* How to choose the best methods for modeling, programming and executing simulations and analyzing results. $26.50

NV001. Documentation Standards and Procedures for On-Line Systems, *Martin L. Rubin.* A Unique aid to developing new company standards, this convenient manual provides standards and procedures to replace outdated batch system procedures that can be readily adapted to a wide range of hardware and software environments. $23.50

BP009. Distributed Information Systems, *Harry Katzan.* This book breaks new ground for computer professionals, engineers, and managers of DP facilities in the way it covers the basic concepts, the technology, and the managerial intricacies of distributed information systems. $20.00

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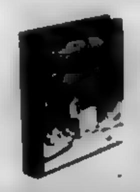

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Radio Shack's TRS-80 Color Computer

TRS-80 Color Computer Uses Any TV as Monitor

FORT WORTH, Texas — Designed for recreational and educational purposes and featuring high-resolution color graphics using a color television set as a video monitor and instant-load Program Pacs, the TRS-80 Color Computer is being offered by Radio Shack.

The computer has a 53-key typewriter-type keyboard, a screen format of 16 lines, 32 char./line, graphics array from 32 by 64 to 196 by 256, 1,500 bit/sec cassette interface and RS-232-type serial interface.

In addition to using the plug-in Program Paks, the user can program the computer in Basic and control the color graphics, sound, data manipulation and storage.

Videotex Terminal

The computer may be used as a videotex terminal utilizing its built-in RS-232 serial interface with optional software and modems.

Available from Radio Shack stores and participating dealers, the Color Computer costs under $400 for the 4K random access memory (RAM), 8K read-only memory (ROM) version. Program Pacs sell for $29.95 to $39.95 and the joystick controls cost $24.95.

The extended Basic Color Computer with 16K RAM costs $218 or can be purchased as a complete unit for $599. Radio Shack is also selling a 13-in. color TV receiver (usable as a normal TV) for $399. The firm is headquartered at 1800 One Tandy Center, Fort Worth, Texas 76102.

Wintek Updates Sprint 68 Micro

LAFAYETTE, Ind. — Wintek Corp. has unveiled a new version of the Sprint 68 microcomputer along with a set of options.

The new version is designed to function as a control computer or a development system for turnkey systems. Options include a downloader, additional backplane slots, a C compiler and parallel, analog and 488 GPIB interfaces.

Wintek's Sprint 68

The basic model includes a 6800 MPU, 48K bytes of random-access memory, RS-232C serial I/O, WIZRD multitasking disk operating system, editor, assembler and 12K bytes Basic. It costs $3,995, the vendor said from 1801 South St., Lafayette, Ind. 47904.

Calcomp Offers RAM for S-100

SUNNYVALE, Calif. — California Computer Systems, Inc. has released 32K-byte and 64K-byte random-access memory (RAM) boards for S-100 bus users.

The 64K Model 2065 conforms to IEEE standards for the S-100 bus and offers a no-wait state with a 4MHz CPU such as an Intel Corp. 8080 or Zilog, Inc. Z 80. The unit can support memory expansions up to 512K bytes through a bank selection system and costs $700, the vendor said.

The 32K-byte offering, called Model 2032, features a flexible bank scheme for S-100 bus systems.

The 32K bytes of memory are divided into four 8K-byte blocks which are independently jumper-addressable to any 8K boundary in 64K bytes, the vendor said.

The unit is available with 200, 300 or 450 nsec random-access memory and can operatz at 4 MHz without wait states. It costs $700 from 250 Caribbean Drive, Sunnyvale, Calif. 94086.

Micru International To Meet in Florida

BUENA VISTA, Fla. — Micru International, the association for users of Microdata Corp. information processing equipment, has announced that its 1981 winter conference will be held here Feb. 1-5.

In addition to conference workshops and seminars, attendees will be provided with hardware, software and service updates from Microdata Corp. and a number of other vendors.

The association has not yet determined registration fees, but further details can be obtained directly from Micru at 4300-L Lincoln Ave., Rolling Meadows, Ill. 60008.

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S-100-Compatible Tape System Out

FRAMINGHAM, Mass. — An S-100-compatible cartridge tape subsystem that provides Winchester disk backup and facilitates off-premises data base storage has been introduced by Alloy Engineering Company, Inc.'s Computer Products Division.

The Alloy Tape Interface Package (TIP) is an S-100-compatible cartridge tape subsystem and software utility that permits transfer of programs and data files from a Winchester disk to a 13.4M-byte 025-in. tape cartridge. Facilitating off-premises data base storage and shipping, the unit features menu-driven software and links to the Winchester disk under Digital Research, Inc.'s CP/M and MP/M operating systems.

With a backup/restore rate of 2 min per 1M byte, the Tip provides file-oriented backup to optimize cartridge tape utilization. TIP consists of a DS-100 controller, 6,400 bit/in. cartridge tape drive and rack or table mount power supply and plugs into an S-100 computer. Software is on a single-sided, single-density 8 in. floppy disk in CP/M format.

The Alloy Tape Interface Package

The TIP costs $2,550 with rack mount and $2,650 with table mount from Allow Engineering, Computer Products Division, 85 Speen St., Framingham, Mass. 01701.

Control System Based on PDP-11

FARMINGTON, Conn. — A manufacturing control system built around a Digital Equipment Corp. PDP-11 minicomputer to handle such things as materials inventory and factory scheduling has been introduced by Computer Covenant Corp.

The computer-based system is geared for small to medium-sized job shops and tracks bill-of-material maintenance, job costing, labor distribution and capacity planning. The system can be used to reduce material and labor costs, improve job pricing, control backlogs and aid the general job flow, a spokesman said.

For present PDP-11 users, the manufacturing application software costs less than $20,000. However, an entire system, including a DEC PDP-11/23 with 128K bytes of memory, a 20M-byte disk drive, CRT terminal and line printer, costs $50,000 or leases for under $1,400/mo.

Computer Covenant is located at 790 Farmington Ave., Farmington, Conn. 06032.

MIC Announces Office Service

CHERRY HILL, N.J. — Management Information Corp. (MIC) has announced a monthly subscription service called "Officemation Management."

The publication deals with computerized office environment administration and surveys and evaluates currently available equipment and methods.

It was written by office system consultants and office managers and comes out in December. It costs $245, but will be available to charter members who subscribe before Nov. 30 for $195. There will be a 20-day trial offer with no obligation to purchase, the vendor said from MIC, 140 Barclay Center, Cherry Hill, N.J. 08034.

Manual Advises Novice Buyers

FRAZER, Pa. — "A Survival Manual for Buying Your First Business Computer" reportedly provides advice and answers to the questions most often asked by first-time buyers or present owners updating their current systems.

Released by Infomark, Inc., the handbook illustrates features to look for, pitfalls to avoid and evaluation guidelines to outline an individual company's present and future needs.

The manual costs $2 and is available from the Marketing Services group at Infomark, 9 N. Bacton Road, Frazer, Pa. 19355.

Converter Fits Most MPUs

BROOKFIELD, Conn. — A 16-channel analog-to-digital converter compatible with "most popular microcomputers" including Apple Computer, Inc. Apples and Radio Shack's TRS-80 is available from Connecticut Microcomputer, Inc.

The AIM-16 connects to the host computer through the computer's 8-bit input port and 8-bit output port, or through one of the firm's custom interfaces.

The unit costs $179, with power supplies available at $14.95 and $24.95 from the firm at 34 Del Mar Drive, Brookfield, Conn. 06804.

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For more information on RAYNET/II or other RAYNET family members, call the RAYNET marketing director at (800) 225-9874. In Massachusetts, call (617) 339-5731.

Monthly line costs are lowered by the remote line concentration capability in RAYNET/II systems. Lowering communications overhead on host mainframes is another of the ways RAYNET/II processors can improve your network. The network is decoupled from the hosts, and communications functions are handled directly.

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Dual-Port Memory Boards Use Graphics Interface

MOUNTAIN VIEW, Calif. — Two dual-port memory boards are available from Cromemco, Inc. for use with its Model SDI color graphics interface.

Called 16KTP and 48KTP, the boards provide two sets of address and data lines, allowing them to process SDI's memory refresh requests while the CPU simultaneously and independently executes a user program. SDI can access picture information through a connector.

The 16K two-port memory board costs $795, the 48K board costs $1,785 and the Model SDI two-board color graphics interface is available for $595 from Cromemco, Inc., 280 Bernardo Ave., Mountain View, Calif. 94043.

Add-In Memory for LSI-11 Provides Error Correction

CAMPBELL, Calif. — PEBX, Inc. is offering up to 256K bytes of add-in memory with error checking and correction circuitry for LSI-11 microprocessor systems.

The Model MeccV11 consists of a controller and one or two array boards. Memory is expandable in 32K-byte increments, the vendor said.

The add-in memory also features an on-board automatic battery backup that offers power outage protection by allowing the user to attach a 12-V battery. The standby battery is float charged in the operating mode, the vendor said.

The MeccV11 costs from $677 for the 32K-byte unit to $2,638 for the 256K version, the vendor said from 501D Vandell Way, Campbell, Calif. 95008.

Single-Board Controller Gives Backup for Winchester Systems

The Rimfire 38, center, provides control to drive up to four disk drives and four tape drives in an effort to provide backup for Winchester-based memory systems.

MINNEAPOLIS — Computer Products Corp. is offering the Rimfire 38, a single-board disk and tape controller that is Intel Corp. Multibus-compatible and can control up to four Prime Corp. 8-in. or 14-in. Winchester-type disk drives and four Cipher Data Products, Inc. tape drives.

The Intel 8809-based controller executes dump and disk restore operations. In addition, it comes with programmable features that allow the user to tailor the controller to a particular Multibus system.

The unit costs $2,295, from Computer Products Corp. at 2415 Annapolis Lane, Minneapolis, Minn. 55441.

Free Brochures

- "A Strategy for Buying a Small Business Computer" outlines management decisions of potential computer users and details the vendor's authorized distributor network. It is available from the Media Response Manager, Digital Equipment Corp., 129 Parker St., Maynard, Mass. 01754.
- An illustrated educational booklet entitled "Small Business Computer I.Q. Quiz" discusses in nontechnical language first-time user issues. Also available is a brochure introducing Alpha Micro's full line of computer business systems. They can be obtained from Alpha Micro, P.O. Box 18347, 17881 Sky Park N., Irvine, Calif. 92713.
- A two-page brochure describing the I/OMaster S-100 interface from Micropro is now available from the vendor 1299 Fourth St., San Rafael, Calif. 94901.
- The Epson TX-80 80-col dot matrix printer is explained in a six-page brochure, which also describes the optional GRAFTRAX high-resolution bit plot graphics capability. It can be obtained from Epson America, Inc., 23844 Hawthorne Blvd., Torrance, Calif. 90505.
- New literature from the Data General Corp. includes "Nova 4/C: Build More Computer Speed and Performance Into Your Product," which details the vendor's Nova 4/C minicomputers for OEMs; "Complete Solutions From a Single Source," which discusses the full range of DG's Systems Division; another called "The Most Critical Component in Your Computer System: Service" that highlights all service activities; and a product brief on DG's 1.26M-byte diskette subsystem (Model 6097). Copies of the brochures are available from Data General Corp., Communications Services, M.S. C228, 4400 Computer Drive, Westboro, Mass. 01580.
- The new 36-page "Misco Minicomputer Supplies & Accessories Catalog" can be obtained from Misco, Inc., Box 399, Holmdel, N.J. 07733.
- The "Solid-State Speech Products and Services Brochure" (CL-501) provides information on the voice synthesis technology available now from Texas Instruments, Inc., Inquiry Answering Service, P.O. Box 225012, M/S 308, Dallas, Texas 75265.
- "Business vs. Personal Computers" as they apply to financial and tax consultants is an article available from V.K. Jacobs, Editor, The Financial Systems Report, Box 8137, Prairie Village, Kan. 66206.

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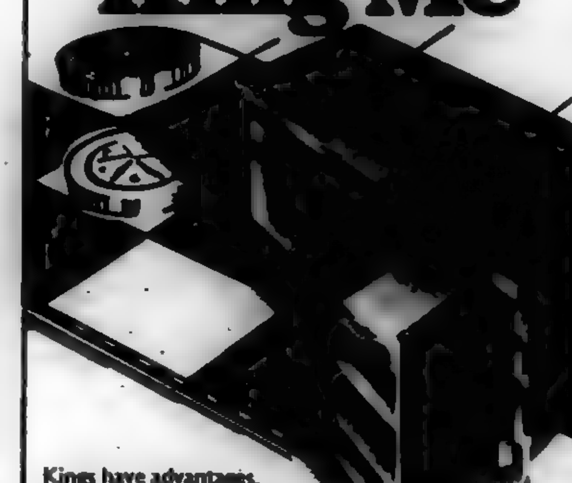

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To Counter Japanese Challenge

House Warns Chip Makers to Restructure

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Japanese semiconductor industry has caught up with and in some areas surpassed its U.S. counterpart, necessitating basic changes in American industry structures, a Congressional task force reported recently.

The alarming inroads of Japanese integrated circuits into traditionally U.S.-dominated markets mirror other U.S.-Japan trade problems — they "result less and less from Japanese import barriers and more and more from domestic, American structural problems of competitiveness and quality," according to the House of Representatives' U.S.-Japan Trade Task Force.

In a Sept. 5 report, the task force — established by the House Trade Subcommittee — looked at semiconductors and computers as well as several other high-technology areas and stated: "We believe that Japan's rate of industrial progress and stated economic goals should be as shocking to Americans as was Sputnik.

"And like Sputnik," the report continued, "we should be shocked into responding to the challenge." U.S. semiconductor firms can respond, the task force suggested, "by merging and becoming part of the corporations which are end users of semiconductors" to become more competitive with their more closely integrated Japanese rivals.

Extolling perceived benefits of "good, clean competition with Japan in high-technology innovation," the report said "we don't need protectionism — we need to make our economy better."

Task Force Findings

The task force's findings on semiconductors came from an April study mission to Japan and several hearings on the subject by the subcommittee. Basically, the task force concluded that "in the future, who controls the latest developments in the semiconductor field will be in a position similar to Opec in the energy field."

Saying Japan has caught up with the U.S. in semiconductors — each nation supplies about 5% of the other's integrated circuits — the report noted the Japanese have captured about 42% of the most advanced part of the market — the 16K random-access memory (RAM).

"This places them in an excellent position to capture the profits from this high-technology product and to compete better in the next generation

(Continued on Page 74)

Carter Orders Clampdown On High-Technology Exports

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Commerce Department said last week it has been directed by President Carter to strengthen enforcement of restrictions on U.S. high-technology exports to communist countries.

The Presidential directive backs up White House action following the Soviet military intervention in Afghanistan to curtail sales of computers and other sophisticated products and know-how to the Soviet Union.

A Commerce spokesman said the department has not found many cases of exporters violating these restrictions, but said the Administration fears loopholes in the export control regulations may be found as the restrictions remain in effect over a long period of time.

Regulations Holding Up

Recent studies by the Federal Bureau of Investigation and an interagency working group indicate the regulations are holding up for the most part, the spokesman said. He characterized the new Carter directive as preventative rather than curative.

He did note, however, that attempted diversion of hightech-

(Continued on Page 74)

M/A-COM No Longer a 'Boutique'

By Marcia Blumenthal
CW Staff

BURLINGTON, Mass. — A clear vision is behind the feverish acquisition pace that in the past year has seen M/A-COM, Inc. make bids on or acquire four companies.

M/A-COM is aiming to become a vertically integrated, one-stop supplier of products — ranging from components to intelligent earth stations — necessary for creating combined data, voice and video communications networks.

"In the past we've been a boutique," explained Joseph C. Bothwell Jr., vice-president, but now the company is well on its way to having the array of products to meet the multiple communications needs of users.

And that focus has been one reason why established firms like coaxial and fiber-optic cable maker Valtec Corp. have been willing to join the M/A-COM family.

"It took the company 20 years to achieve $30 million in sales and another 10 years to reach the $125 million range last year," Bothwell remarked.

Figuring in the revenues of acquisition candidates Valtec and Omni Spectra, Inc. and Linkabit Corp., acquired in August, MA-COM's revenues should approach $300 million this year, he added.

Omni Spectra makes connectors; Linkabit produces, among other products, packet satellite and large-scale communications networks and signal processors. Another acquisition candidate is Prodelin, Inc., a manufacturer of antennae, waveguide products and cable.

Wall Street's Darling

As a result of this broad view of the communications market, M/A-COM has become one of the darlings of Wall Street. Within the past year the price of the company's stock has risen from around $13 per share to around $44 recently.

Regulatory changes in the communications marketplace along with the reduced costs of telecommunications products makes this industry particularly attractive at the present time, industry observers agree.

The turning point in the company's growth came in the mid-1970s when Dr. Lawrence Gould, chairman and chief executive officer, began refocusing the company's activities on commercial communications systems.

Up until that time, M/A-COM, Inc., founded as Microwave Associates, Inc. in 1950 and renamed M/A-COM in 1978, was heavily committed to selling microwave and radar products to the military. While still a steady source of business, government contracts did not contribute to an attractive bottom line.

In 1975 M/A-COM's pretax profit margin was 7%. Pro forma statements for 1980, including acquisitions, show a pretax margin of nearly 13%. And, today some 70% of the company's business is in the commercial sector and 30% in the government arena, just the reverse of what it was about five years ago, Bothwell noted.

Digital Communications Corp.

To break into the integrated telecommunications network market M/A-COM two

(Continued on Page 72)

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M/A-COM Discarding 'Boutique' Image

(Continued from Page 71)

years ago acquired Digital Communications Corp. (DCC), a spinoff of Communications Satellite Corp. DCC specializes in building networks for the local distribution of digital data.

Based on market studies, 60% of communications for a company is within a single building while another 22% is within a 50-mile radius, Bothwell noted.

DCC supplies software and networking equipment such as multiplexers, high-speed digital modems, time division multiple access units, communications processors and intelligent earth stations. Its current networks are known as Capac, used for intrafacility communications, and Rapac, for interfacility transmission.

And the acquisition of Linkabit will add complementary products to DCC's line. In particular because of Linkabit's signal processor technology, the price of high-speed modems will drop probably by half within the next three years, according to Pradeep P. Kaul , vice-president and general manager of DCC's Data Communications Division.

Market Growth Predictions

Predictions by Arthur D. Little, Inc. show the market for digital transmission equipment will grow from $880 million in 1979 to $5.6 billion in 1989, Bothwell said, adding that the major growth will occur between now and 1984.

Currently each of M/A-COM's networks are custom built, but one of the company's objectives is to supply a standard network, Kaul said.

Concentration is on wideband coaxial cable, developed in conjunction with Mitre Corp., which allows the transmission of not only data but also video and voice. "Users looking forward to two decades worth of growth will need to carry multiple services," Kaul maintained. Although some vendors offer networks, these generally support the company's own line of products, but users' needs are going beyond a single vendor, he added.

While in the communications arena, M/A-COM doesn't intend to compete with Satellite Business Systems or AT&T. Rather, the company will take advantage of the opportunities that those companies will create.

Although DCC concentrates on local digital distribution, widespread use of satellite communications is becoming more feasible because of the rapidly declining cost of intelligent earth stations, Kaul noted. The cost of earth stations on buildings has dropped from $500,000 to $50,000, Kaul maintained, adding that these units can now be considered black boxes. M/A-COM's earth station is known as Dynac.

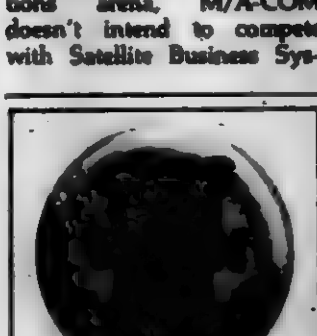
Macomnet Announcement

Recently M/A-COM announced plans for a satellite communications network, Macomnet, to connect its companies [CW, Sept. 15]. Scheduled to begin in February 1981, the network, while useful for the companies' needs, will serve as a demonstration of state-of-the-art communications technology for potential users.

While Linkabit and DCC will probably contribute some $70 million to corporate revenues this year, M/A-COM is also committed to other sectors of the communications environment. Other bread and butter products include microwave semiconductors and microwave equipment for cable television equipment. The firm is a leader in the electronic news gathering equipment.

"All the new systems being put into CATV are going to be able to carry digital transmission," Bothwell noted.

"We've got local distribution, satellite distribution, fiber optics, cable and microwave radio," he added.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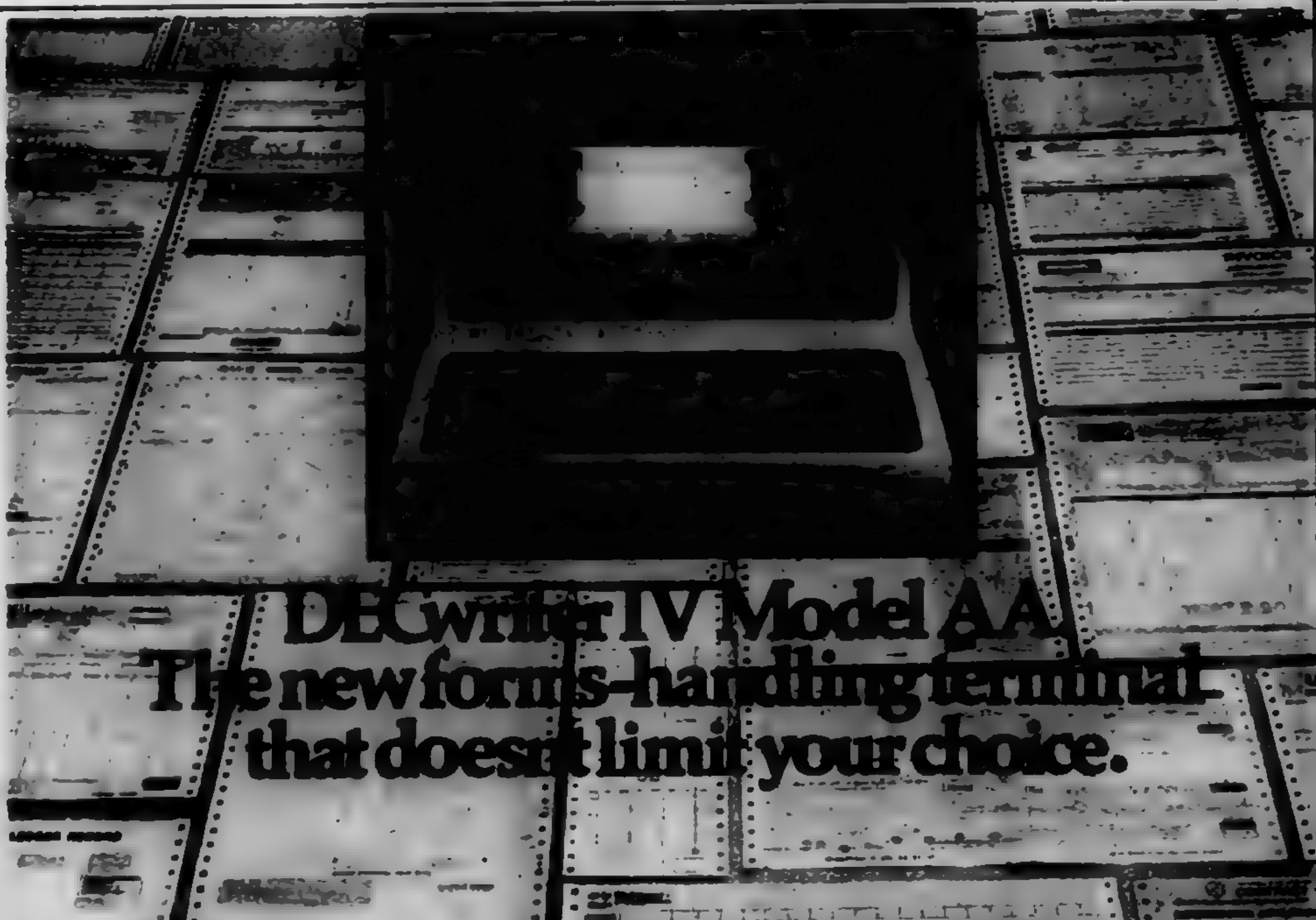
DECwriter IV Model AA
The new forms-handling terminal that doesn't limit your choice.

Gould to Acquire SEL

ROLLING MEADOWS, Ill. — Gould, Inc., an electronics and electrical products manufacturer with $2 billion in sales last year, and minicomputer-maker Systems Engineering Laboratories, Inc. (SEL) have reached an agreement in principle whereby SEL will become a wholly owned subsidiary of Gould.

SEL's 32-bit minicomputers are sold primarily for industrial process development. The proposed acquisition would represent Gould's entry into the computer industry. However, the firm is not expected to adapt SEL's products for the commercial computer market, but instead will concentrate on industrial simulation and automation markets — SEL's specialties.

Under the terms of the agreement, two shares of Gould common stock would be issued for each outstanding share of SEL stock. SEL, with revenues of $79.6 million and earnings of $5.3 million for fiscal 1980, has approximately 3 million common shares outstanding.

The electronic portion of Gould's business represents about $600 million of total corporate revenue, the firm said. In the past, Gould has also attempted to acquire semiconductor makers.

Lower Net Forecast, DG Stock Prices Drop

WESTBORO, Mass. — In the week following Data General Corp.'s announcement early this month that its fiscal 1980 earnings would probably fall short of analysts' current estimates of $5.50/share, the price of the company's stock dropped $12.

Because of recessionary trends in the U.S. economy, "A number of U.S. customers, both end users and original equipment manufacturers, are now showing some hesitation to order," DG President Edson D. deCastro reported.

He added that computer equipment revenues for the current quarter and early part of fiscal 1981 may be adversely impacted.

DG's announcement started a flurry of speculation among Wall Street analysts concerning the minicomputer industry in general.

Some were pessimistic, noting that a slowdown in the heretofore booming mini sector had arrived.

Others took the announcement in stride, noting that in the past few weeks, high-technology stocks were beginning to topple from high points reached in July [CW, July 28].

As for DG, one analyst noted its average price per system shipped of $26,300 was its lowest since 1974. Because of aggressive pricing, DG is having margin problems, he said.

Besides DG, Hewlett-Packard Co. and Wang Laboratories, Inc. noted a slack in orders for its mini products. In Wang's case, however, order growth may have been 50% rather than 70%, an analyst said.

CGA Affiliate Opens Doors

STAMFORD, Conn. — An affiliate of the giant Compagnie Generale d'Automatisme (CGA) of France, Alta Technology, Inc., opened its doors here recently.

Through cross-licensing agreements with its French affiliate, Alta will adapt CGA's systems to U.S. user needs and manufacture and market them in this country. CGA specializes in various mini-based systems such as toll collection systems and item processing equipment.

James H. Pyle, formerly president of Exxon Corp.'s affiliate, Periphonics Corp., is a founder of the new firm and will serve as its president and chief executive officer.

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House Panel Urges Semi Industry Consolidation

(Continued from Page 71)

product,' the 64K RAM."

Remarking on the relative competitive positions of the two countries; the task force said its investigation has failed to uncover "any clear evidence of the *traditional* types of unfair trade practices" in Japanese imports.

Rather, the task force found, what has had more effect on slippage of U.S. dominance in this field are problems the domestic industry has had since the last recession in raising capital to expand capacity to meet demand for integrated circuits.

"Japanese firms, on the other hand, had access to capital, concentrated resources on expansion, and have participated dramatically in meeting the recent domestic demand for 'chips.'"

Government Support

The task force also noted Japanese government supports its semiconductor industry, including preferential government procurement practices and trade protection, through "significantly higher tariffs than exist in the U.S."

The task force warned that the U.S. cannot expect Japanese government procurement practices to change and said "Japan is gradually reducing her tariffs on semiconductors, but the rate of reduction is slolw and is a disadvantage to the U.S. in the face of Japan's competitiveness."

The situation, taken as a whole, presents several "serious long-term problems" for U.S. competitiveness in semiconductors. According to the report:

- The Japanese firms tend to be large, integrated companies that manufacture chips partly for their own use and partly for sale.
- U.S. semiconductor firms, with several exceptions, tend to be smaller, "merchant companies," selling chips to others for end use.
- Research and production costs in the industry are rising rapidly, and it is easier for the larger Japanese firms to find the capital to meet these rising costs.

"As a result," the report concluded, "the domestic industry faces serious future problems as a result of the basic differences in the structure of the two nations' industries."

Therefore, it may be beneficial to U.S. industry for its small semiconductor companies to merge with large, end-user corporations, the task force said, adding that "to some extent this may be an 'evolutionary' development which is already occurring."

Although "the fantastic creativity of the small domestic companies" may be "stifled" in larger firms, the report stated that "without change in the basic structure and domestic operating conditions facing the semiconductor industry, we can expect that the U.S. firms will continue to lose world and domestic market share to the Japanese."

That conclusion is inescapable, according to the Congressional panel, because Japan is already considered equal to the U.S. in hardware and only slightly behind the U.S. in the quality of its software.

"For example," the report said, "Japan is the only nation in the world where U.S. computer firms do not have the majority of the market." The task force pointed out that in the last few months, IBM-Japan has been supplanted by a domestic firm as the number one computer seller in Japan.

By 1985, the report said citing a recent survey, Japan plans to sell approximately $1.66 billion worth of computers in the U.S., equal to 15% to 20% of Japan's total production and 60% of its total exports.

"As in small autos, the Japanese will be particularly competitive in the smaller, individual office and home-type computers, which will probably be the big growth market of the future," the task force concluded.

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Carter Cracks Down

(Continued from Page 71)

nology goods to the Soviet Union and its Eastern European allies is a constant problem.

He did note, however, that attempted diversion of high-technology goods to the Soviet Union and its Eastern European allies is a constant problem.

A Belgian DP executive, for example, was convicted of trying to illegally obtain for the Soviet Union the source code of an American company's data base management system.

Commerce last month also revoked the export privileges of a Canadian company, De Vimy Test-Lab, Ltd. of Montreal, and Excel Industries of Tel Aviv, for arranging exports of U.S.-made computer equipment worth $1.5 million to Austria in order to illegally divert it to the Soviet Union.

To prevent such activities, Commerce and the Justice Department will enhance "the investigative and enforcement process under existing export control laws" and examine current law to determine if "more stringent controls" are needed, Commerce said.

The two agencies "will give high priority to enforcement of export controls and will aggressively pursue all potential violations involving the export of goods or technology to prescribed destinations," according to Commerce.

In addition, Carter has directed the interagency working group to look for ways to improve compliance with export control laws. The working group, chaired by the Justice Department, includes representatives of the Commerce, State, Treasury, Defense and Energy departments as well as the Nuclear Regulatory Commission.

CSC Receives Kodak Award

ROCHESTER, N.Y. — Computer Sciences Corp. (CSC) of Sacramento, Calif., has received Eastman Kodak Co.'s 1980 Information Technology Award for its "major contribution in the creative and effective use of micrographic and computer technologies."

Invited by the State of California to design and implement a claims processing system for Medical, the state health care management program, CSC specialists achieved efficient information operations and managed to cut costs as well, Kodak said.

The computer program that won the Kodak award applies several hundred edit and audit criteria to each of the 200,000 claims that it received daily.

While many decisions are made automatically via the computer, the retrieval capabilities of intelligent microimage terminals expedite decisions requiring individual attention, Kodak noted.

U.S. Could Be 'Brought to Its Knees'

Senate Bill Would Set Policy To Control Critical Materials

CW Washington Bureau

WASHINGTON, D.C. — Legislation has been introduced in the U.S. Senate to develop a national materials policy. The bill stems from alarm that the U.S. must import many of the raw materials essential to the manufacture of such high-technology items as computer and telecommunications equipment and advanced weapons systems.

Introduced last Monday by Senators Gaylord Nelson (D-Wis.) and Henry Jackson (D-Wash.), the bill would create a federal Office of Critical Materials to monitor American dependence on foreign sources and develop a "coordinated national materials policy."

"It is time we recognize that the magic of our technology is dependent upon a finite supply of minerals and materials," Nelson said Monday.

"The U.S. imports more than half of its needs in 20 critical materials," according to Nelson, "and our dependence on foreign sources continues to grow as our technology advances and our needs increase.

Unstable Nations in Control

"In some cases a handful of underdeveloped, politically unstable nations control virtually all of our supplies of certain materials," he said, noting the U.S. imports 100% of its needs in mica — used in making electronic insulators and capacitors — from India, Brazil and the Malagasy Republic.

Ninety percent of U.S. requirements for tantalum, used in DP and telecommunications equipment as well as weaponry, comes from Thailand, Canada, Brazil and Malaysia, he said. In addition, the U.S. is almost totally dependent on Zaire for cobalt used in, among other things, small motors common to computer systems and jet engines.

Mineral Cartels?

There is a good possibility a number of these mineral-producing countries will form cartels similar to Opec and precipitate a crisis for U.S. manufacturing, Nelson said.

"We cannot afford this vulnerability, this potential for America's defense industry or domestic manufacturing to be brought to its knees," he stated.

The critical materials office would generate government and private-sector awareness of the problem of U.S. dependence on foreign sources and consolidate federal activities now split among more than 20 government entities, he said.

"This fragmentation creates duplication of our information and reporting, thwarts attempts to develop a cohesive body of information and inhibits development of a policy which recognizes our dangerous dependence and ways to alter or control it," Nelson said.

To make the proposed office work with urgency it would have only a three-year life, according to the Nelson-Jackson bill, during which time it would study the problem, report on it and formulate and implement recommendations for government and private actions to control U.S. reliance on foreign sources for critical materials.

Comdex '80 Sets Las Vegas Site, November Date

LAS VEGAS — Comdex '80, scheduled to take place here Nov. 18-21, has approximately doubled its 1979 dimensions, according to its sponsors at The Interface Group. Comdex, which will focus on the needs of third-party vendors, already boasts 700 reserved exhibition booths.

The premise of the show is the key relationship of current marketing objectives and current market needs, the sponsors said.

Independent sales organizations (ISO) and both big and small vendors will be on hand to expand this relationship and formulate business solutions, the climax of which will be an ISO-vendor round-table session.

Conference Agenda

The conference agenda also includes the following seminars: "ISOs and Vendors — We Can Make It Happen," "Start-up Financing in a Recession Year," "Structuring the Retail Store for Success," "ISO-Vendor-User — The Three-Way Relationship," "Selling strategies," "Forecasting ISO Futures," "Minimizing Vendor/ISO Competition," "Profiting From Inventory Control" and "Super-Retailer vs. Distributor."

Four-day conference admission is $125, which incudes the keynote breakfast; one-day admission is $65. Exhibit-only admission is $10.

A detailed list of participants and seminars is available from Peter Young at the The Interface Group, 160 Speen St., Framingham, Mass. 01701.

Fujitsu Plans Plant in Ireland

NEW YORK — Fujitsu Ltd. will establish a multimillion-dollar microprocessor and integrated circuit manufacturing plant in Ireland, the Industrial Development Authority of Ireland said.

Expecting the facility to be fully operational by 1985, Fujitsu will manufacture large-scale integrated circuits — mainly memory circuits and microprocessors — for export primarly to the European market.

The Ireland-based subsidiary is one of four projects being developed by Fujitsu's semiconductor division.

Two of these are under way in Japan and one is due to begin production in San Diego in the near future, a Fujitsu spokesman said.

Nearly one half of the Japanese giant's capital investment program for 1980 is reportedly committed to its semiconductor division. This division has increased production from $60 million in 1977-78 to $400 million for 1979-80, the IDA noted.

When fully operational, the Irish plant in Tallaght, a suburb of Dublin, will create more than 1,000 jobs.

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PC '80 West Set For Los Angeles

LOS ANGELES – PC '80 West, the West Coast's annual international printed circuit conference and exhibition, will be held here Oct. 21-23. The event is being sponsored by the Circuits Manufacturing Co.

According to PC '80's director, Robert Poggi, the exhibit area is already 95% sold out, with 69 exhibitors expected. The technical program consists of seven seminars with 44 papers, 10 workshops and four advanced courses.

Admission to the exhibition is $5, and the seminars vary in price. Further information is available from Leonard Spitz at Benwill Publishing, 1050 Commonwealth Ave., Boston, Mass. 02215.

Saudi Arabia Site of April Show

RIYADH, Saudi Arabia – Saudibusiness '81 is the name of the upcoming international business equipment show to be held here April 26-30, 1981.

Through this conference, Americans will gain direct access to Saudi government officials who will have a major hand in expending up to $250 billion in that country's third "Five-Year Plan" funds, according to conference coordinators at the U.S. Department of Commerce and at TMAC, the firm coordinating North American participation.

The Commerce Department is currently soliciting interested companies to participate in the trade show, and is sponsoring a U.S. vendor pavilion for interested parties.

Additional information can be obtained from Donald Ryan, Room 3200, U.S. Department of Commerce, Washington, D.C. 20230.

China Handbook Offered

KANSAS CITY, Mo. – A free guide for the China trader has been prepared by ITA International, Inc., a foreign language translation and typesetting firm.

The booklet reportedly contains current information for the business executive presently doing business in China or for those contemplating trade with China. It includes a directory of Chinese foreign trade corporations organized according to the commodities or services over which they have purchasing power.

ITA International's Chinese Department is at 4010 Washington St., Kansas City, Mo. 64111.

Series Documents U.S. Contracts

ARLINGTON, Va. – "U.S. Contract Awards" is the title of a recently released reference series that documents the federal contracts market, published by Washington Representative Services, Inc.

The handbooks reportedly define individual markets, uncover sources of contract support, identify competitors, reference technical reports for support and cover pricing practices.

The volumes range in price from $42 to $125; more information is available from the vendor at 4040 N. Fairfax Drive, Arlington, Va. 22203.

Industry Women To Meet Oct. 1

LOS ANGELES – The first general meeting of the Los Angeles chapter of Women in Electronics will be held here on Oct. 1.

The professional organization for women in all areas of the electronics industry has invited all interested parties to attend the $15-per-person dinner conference.

The group will develop programs and seminars designed to help women maximize their opportunities in the industry.

Additional information can be obtained from Judy Britt at P.O. Box 616, Hawthorne, Calif. 90250.

Paradyne adds the Datalyzer to its Analysis network management system!

The DATALYZER option to the Paradyne Analysis 4420 Automated Network Management System provides host computer data traffic monitoring of terminal RESPONSE TIME, CPU WAIT TIME, ADDRESS FAILURES, ERROR RATE and TRANSACTIONS PER HOUR in addition to the normal Analysis diagnostic, monitoring and test functions. Features of DATALYZER include:

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Growth Trend Continuing

VDC: Users Still Want Larger Volume Disks

WELLESLEY, Mass. – Users of hard disk drives are continuing to demand larger and larger volumes of mass data storage. This is true of all kinds of systems, from small minicomputer users to large computer data centers, according to "Hard Disk Industry," a study by Venture Development Corp. (VDC) here.

Minicomputer-based systems that utilize disk packs frequently require 80M to 100M bytes, and soon 200M to 300M bytes will be commonplace, according to the study. For large computers, drives using thin-film heads and plated disks will be developed so that 4G bytes per spindle will be available by 1984.

Although disk technology is well established, it is still developing; data capacity has been doubling every three years and the consulting firm saw this trend continuing. Although it might appear that the 8-in. Winchester disk drives run counter to this trend because the smaller disks hold less data than the 14-in. disk drives, VDC saw the main market of the 8-in. Winchester to be in upgrading systems which have been using floppy disk drives, since even the lowest cost 8-in. fixed disks hold at least 10 times the data of the floppy.

Rather than constituting a reversal of the trend toward increase data storage, the trend toward 8-in. Winchester drives is an expansion of the mass storage capability of systems that would previously have used floppy disks exclusively, according to the study. VDC did not predict a decline in the floppy market, however, because replaceable media will continue to be a requirement for many applications.

The study projected that low-cost, floppy disk replacement-type 8-in. fixed disk drive shipments will increase to 375,000 units in 1984, up from almost zero in 1979. By contrast, the higher priced high-performance 8-in. fixed disk drive shipments will total only 50,000 units in 1984.

The industry will continue to prefer 14-in. drives for storage much in excess of 10M bytes, because of better cost-per-bit ratios, except where the particular enduse presents special space or audible noise problems, the firm predicted.

Backup Problem

The problem of backup of the small Winchesters has no ideal solution, according to VDC. Backup is required just as it is in 14-in. drives, but users would like not to have to pay for it, and this is not possible.

Various solutions, including streamers, are already available and they have the same virtues and drawbacks for 8-in. drives as they had for 14-in. Winchesters, VDC said. For this reason VDC sees a developiong market for fixed disk/removable disk cartridges for 8-in. drives to fill the same niche as large cartridges do in the 14-in. drive market.

VDC divided the hard disk industry into two major segments: disks used with large computers, and disks used with minicomputer systems including desktops and small business computers.

Shipments of large computer disk drives, where IBM dominates the market, are usually valued at end-user prices, while minicomputer disk drives are usually valued at OEM prices.

If all hard disk drives are valued at end-user prices, shipments in 1979 totaled $4.5 billion, and will expand to $7.9 billion by 1984, a compound annual growth rate of 12% excluding the effects of inflation, the study found.

The report also discussed related technologies, where VDC saw the digital optical disk not as a competitor of the magnetic disk, but as an exciting new technique for large amounts of archival storage which can be readily retrieved. The impact of bubble technology, semiconductors and other storage devices such as hard disk were also analyzed.

Venture Development Corp. is located at One Washington St., Wellesley, Mass. 02181.

Contracts

Wyle Laboratories, Inc.'s Scientific Services and Systems Group has been awarded 24 separate contracts from electrical utilities for qualification assessment services to 46 nuclear power plants.

Burroughs Corp. has been awarded a $4.6 million subcontract from the Boeing Aerospace Co. for a communications processing subsystem for the U.S. Air Force's E-4B advanced airborne command post.

El Camino Bank has contracted the Bank Services Division of Boeing Computer Services Co. to provide bank information processing services.

Modemsplus, Inc. has won a $100,000 contract to upgrade the Arkansas Criminal Information Center in Little Rock, Ark.

Cray Research, Inc. announced the signing of a contract with United Computing Systems, Inc. to replace its .5M-word system with a 1M-word Cray-1 S series computing system.

Diva, Inc. won a second contract from ICL Ltd. for production of units of a proprietary disk controller for ICL's System Ten Model 320, a small business computer system designed for the U.S. market.

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Despite 8.2% Sales Decline

Data Entry Projected to Retain Market Viability

SAN JOSE, Calif. — Despite a predicted 8.2% sales decline over the next five years and the move toward distributed data processing (DDP), traditional data entry equipment — keypunch, key-to-tape, key-to-diskette and key-to-disk — will retain a viable share of the market, according to a recent market analysis by Creative Strategies International, Inc. (CSI) here.

Definite migration patterns are emerging, but the move to DDP will be more gradual than once expected, the report claimed. In addition, communications capability has prolonged the life of key-to-disk technology and some growth is still expected in that market. Keypunch replacement and cost efficiency will contribute to this growth, CSI said.

Keypunch, key-to-tape and key-to-diskette equipment will decline steadily throughout the forecast period. However, there is still a large installed base of keypunch devices, the report said.

"Many end users feel keypunch is the most cost-effective method of data entry for their particular situation and, in many instances, this is probably true," it noted.

Key-to-tape devices have been effectively replaced by key-to-diskette systems. Over the next five years, the key-to-diskette equipment will, in turn, be replaced by intelligent terminals, it continued.

The key-to-diskette installed base is expected to decline at a faster rate than keypunch because of the natural upgradability of traditional key-to-diskette end-user applications to the more advanced intelligent terminals.

Challenge for '80s

"Cost-effective and accurate data entry remains a challenge for the '80s. It is difficult to predict which technology, if any, will emerge as the ultimate method of data entry.

"The spectrum of data entry applications is extremely broad, and the end-user requirements within each application segment differ greatly. It is hard to imagine any particular data entry method or technology being universally suitable for all data entry," the report claimed.

Over the next five years, intelligent terminals will operate the largest percentage of end-user migration, followed by on-line CRT terminals. Optical character recognition will also do well and could be the suprise of the decade, the report said.

The report, entitled *Traditional Data Entry Systems*, is available for $1,195 from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

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Supershorts

Western Union International, Inc. has announced that its Data Base Access and Remote Computing Communications Service is now offered between Japan and the U.S.; that two-way digital data communications service is now available between its leased channel terminals in either New York City, Washington, D.C., or New Orleans and Germany; and that it has filed a tariff with the Federal Communications Commission to reduce its rates for alternate voice/data leased channel service between operating cities on the West Coast and Honolulu.

— — —

Generation Sciences, Inc. and Computer Systems Design, Inc. have formed Genasys International, Inc. as a joint venture to market and support the Genasys family of application system development tools.

— — —

Pergamon Press, Inc. signed a multifaceted partnership agreement with Telesystemes S.A of France to develop, process and disseminate data bases and data systems in science, technology, medicine, social sciences and economics.

— — —

Decision Data Computer Corp. and the UK's Data Recording Instrument Co. Ltd. announced plans to commence mutual assistance and joint product development programs.

— — —

After a major reorganization, a portion of Microproducts Inc. has been sold along with rights to the use of the name Microproducts. Paul Lamar of Lamar Instruments, Inc. has retained all rights to the Superkim, an industrial control microcomputer.

— — —

Rand Information Systems, Inc. announced that an agreement has been reached in principle to sell 75% of its interest in its wholly-owned British subsidiary, Rand Information Systems, Ltd., for approximately $400,000.

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RCA Global Communications, Inc. just initiated a new international data service with Japan that permits Japanese subscribers to access data bases in the U.S.

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The new HP 2626 display station will give you a view of your computer system you've never seen before.

It lets you divide the screen into as many as four separate "frames," each attached to a different workspace in the terminal's memory. You can check a program listing in one frame and access a file in another. Fill out a form in one workspace while the computer loads the next form into another. Or do text preparation and editing in adjacent frames. Right before your eyes.

That's not all. The HP 2626 has two data communications ports instead of the usual one, so you can use the split screen capability to talk to two computers at the same time. Or log onto the same computer twice for simultaneous batch and interactive jobs.

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A high resolution character cell and a glare-reducing screen coating give the HP 2626 the sharpest, clearest display of any of our terminals. And that's saying a lot.

What's more, you can set line lengths of up to 160 characters in any workspace. Then scroll horizontally to get the entire picture. (The built-in thermal printer includes a compressed mode to print up to 132 characters per line.) Scroll vertically, too, or change the size of the frame at the touch of a key.

An interactive forms drawing module makes it easy to design forms, including drawing horizontal or vertical lines with just a single keystroke. You can even program the terminal for audio tones to cue your operator to critical or non-critical errors, or other conditions within a program.

Split decisions.

Hook up the HP 2626 to two computers (or the same one twice) and it's like getting a multi-tasking capability right in the terminal. Your systems designer can now compile, execute, monitor and edit programs as if two stations were available.

While your user is filling out a form, the terminal can be sending data from the previous form to a computer. And down-loading the next form into an adjacent workspace. By smoothing out the "type and wait" of data entry, you can take advantage of less expensive, low-speed transmission lines without sacrificing the efficiency of your operator. The result? You'll get more out of the entire system.

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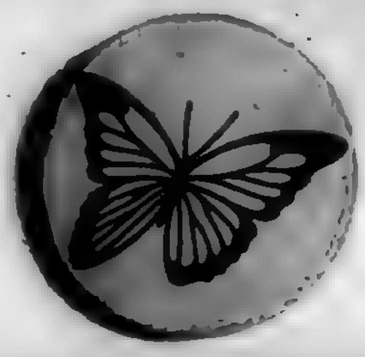

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TI Runners Out in Front At Corporate Cup Race

PALO ALTO, Calif. – Texas Instruments, Inc. captured first place in the battle for corporate supremacy at the Corporate Cup National Championships, a three-day track meet held at Stanford University this summer. Other corporations that placed in the top five with high scores were General Electric Corp., Pacific Gas & Lighting Co., Hewlett-Packard Co. and Pacific Telephone Co.

The third annual event marked the culmination of year-long regional competition, in which hundreds of amateur athletes from more than 250 companies vied for a spot in the finals. Games included the executive relay, a women's relay, a president's relay, a 3,000-meter road race and a 5-kilometer race.

The companies that collected the most points in individual events were awarded over $25,000 in prizes for their efforts.

Race Sponsor

Promoted and cosponsored by *Runner's World Magazine*, the Cup Race has reportedly spawned fierce competition for the title of "the healthiest company in America."

TI, for example, built a 2.6-mile track at its Dallas headquarters, while many companies are hiring special running coaches and are recruiting potential athletes from the job market.

The corporate olympics were cosponsored by the Brooks Shoe Co. and included opening ceremonies complete with torch-lighting.

Expansions

Graham Magnetics, Inc. has moved into corporate headquarters located at 6625 Industrial Park Blvd., North Richland Hills, Texas 76118.

Tecnetics, Inc., Boulder, Colo., has announced the move of their headquarters and production facilities to a 5.5-acre site approximately one mile from their previous building. The address is 6287 Arapahoe Road, Boulder, Colo. 80306.

Corvus Systems, Inc. recently moved into a plant located at 2029 O'Toole Ave., San Jose, Calif. 95131.

Baugh Construction Co., Seattle, has been named general contractor for Hewlett-Packard Co.'s new 172,000 sq ft electronics plant in Vancouver, Wash.

Zitel Corp. has moved to a 15,000 sq ft plant located at 235 Charcot Drive, San Jose, Calif. 95131.

Shasta General Systems has relocated its corporate headquarters from Burlingame, Calif., to 1329 Moffett Park Drive, Sunnyvale, Calif. 94086.

Digital Equipment Corp. announced that it has purchased a 150,000 sq ft printed circuit board production facility in Tempe, Ariz., from ITT Courier Terminal Systems, Inc. for an undisclosed sum.

Data Card Corp. has started construction of a 13,000 sq ft addition to its Orbitran Division in Lakeside (San Diego), Calif.

Summagraphics Corp., Fairfield, Conn., has occupied an additional 26,000 sq ft of manufacturing and office space with the expansion of its Building No. 4 on State St. Extension.

Teradyne Connection Systems, Inc. has opened its headquarters and principal manufacturing facility in Nashua, N.H. The 140,000 sq ft plant is located on a 20-acre tract adjacent to the Mine Falls Park Systems.

Amdahl Corp. has announced a major expansion program for its Irish facility that will see total investment in plant and equipment reach $13 million. Construction work on the company's 78,000 sq ft factory at Swords, near Dublin, has now been completed.

Honeywell, Inc. is planning to invest $9 million in a 140,000 sq ft, two-story facility at the southern end of the company's main computer engineering and manufacturing plant, located alongside Black Canyon Freeway and Thunderbird Road in Phoenix.

Datastream Communications, Inc. has moved its corporate headquarters from Brisbane, Calif., to 555 Ellis St., Mountain View, Calif. 94043.

AT&T Corporate Structure Caps Continuing Debate Over Inquiry II Decision

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The battle over AT&T's corporate structure droned on at the Federal Communications Commission (FCC) early this month in final comments filed by computer industry groups and others concerning the commission's computer inquiry decision, issued last May [CW, May 12].

One key issue is whether the deregulated subsidiaries authorized by that decision should be allowed to own transmission facilities. Another is whether manufacturing and research and development activities, as well as the marketing of "enhanced" services — which include computer-based on-line information offerings — should be transferred from the monopoly side of the AT&T colossus to the new subsidiaries.

AT&T said the bottom line of the position advocated by its opponents in the inquiry is "at worst an end to the integrated Bell System or complete divestiture, and at best the emasculation of the system's ability to be a more meaningful participant in the marketplace." Pointing out that the National Telecommunications and Information Administration (NTIA), the president's chief telecommunications adviser, "urges a more balanced approach ... not dissimilar to ours," AT&T said the commission should "give great weight" to NTIA's views. This was a reference to the telecommunications administration's recommendation that the subsidiary should be allowed to own transmission facilities.

All interexchange business is now subject to "vigorous price competition," Bell added, and thus the critics' fears that the telephone company will use its monopoly position to dominate the communication services market are "a red herring."

Commission adoption of the "hamstringing restrictions proposed by some parties" will lead to "a second-best communication system ... ostensibly in the name of competition, but really just to serve the interests of certain competitors," AT&T argued.

Critics Respond

According to the Association of Data Processing Organizations Inc. (Adapso), however, "the overriding issue" is whether AT&T should be required to transfer only its terminal and enhanced series marketing activities to a subsidiary, as specified in the FCC decision, or whether related manufacturing and R&D activities should also be transferred, as required in the communications act rewrite legislation now pending in Congress.

Anything less than the letter scheme "will produce neither true competition nor a lessening of regulation," Adapso said, adding that "it should by now be clear that requiring such full separation will not harm the public." Advances in technology, particularly in enhanced services, have come mostly from outside the telephone industry, the association insisted.

"Manufacturing, research and development are the most critical" components of the terminal equipment business, said the Independent Data Communications Manufacturers Association. Thus the "major components" of that business "will continue to be integrated with the carriers' basic services" unless the commission changes its May decision.

The Computer & Communications Industry Association (CCIA) also stressed the need for transferring manufacturing and R&D to the new subsidiary, as well as marketing, then added that the commission should require the subsidiary to be capitalized partly with non-AT&T money. This would "serve as an effective ... inhibition to the threat of anticompetitive cross-subsidies flowing from the monopoly parent."

This question is now being addressed on Capitol Hill in connection with the pending rewrite legislation. It is also likely to be considered during trial of the Justice Department's antitrust suit against AT&T. The trial is scheduled to begin next January.

IIA to Explore Electronic Media

WASHINGTON, D.C. — The Information Industry Association (IIA) has created an Electronic Media Committee (EMC) to provide a common ground for the interchange of ideas among companies and groups interested in business activities in viewdata, videotex, teletext, video disk, two-way cable and related electronic media. Their first meeting will take place here on Oct. 8.

The four-person executive team that comprises the EMC steering committee intends to provide the following services to EMC members: a business forum, onsite review of ongoing projects, summary progress briefs liaisons with foreign markets, policy developments and committee briefs.

A detailed agenda of the upcoming meeting and further information on EMC activities can be obtained from Paul G. Zurkowski, IIA, 316 Pennsylvania Ave., Washington, D.C. 20003.

Smithsonian Houses Shugart Floppy Drive

WASHINGTON, D.C. — The Smithsonian Institution's permanent collection now includes one of the first floppy disk drives made by Shugart Associates, Inc.

The device, donated at the National Museum of History and Technology, was the prototype of Shugart's original 8-in. single-sided floppy disk drive, the precursor of the company's SA800 series. It was the sixth floppy disk drive produced by Shugart after the company opened its doors in 1973.

On hand to present the prototype drive was Shugart President James Campbell with Don Wartner and Al Cou, two members of the original engineering team who helped develop floppy disk technology in the early 1970s.

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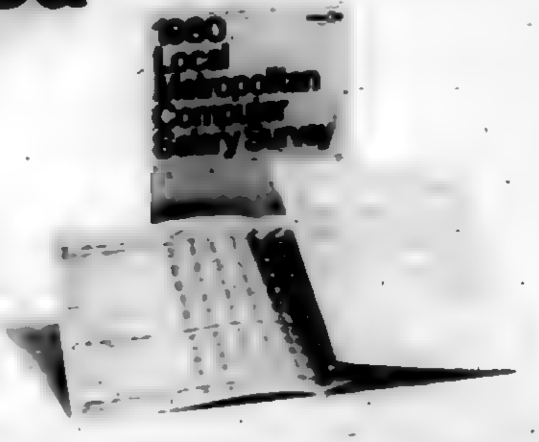

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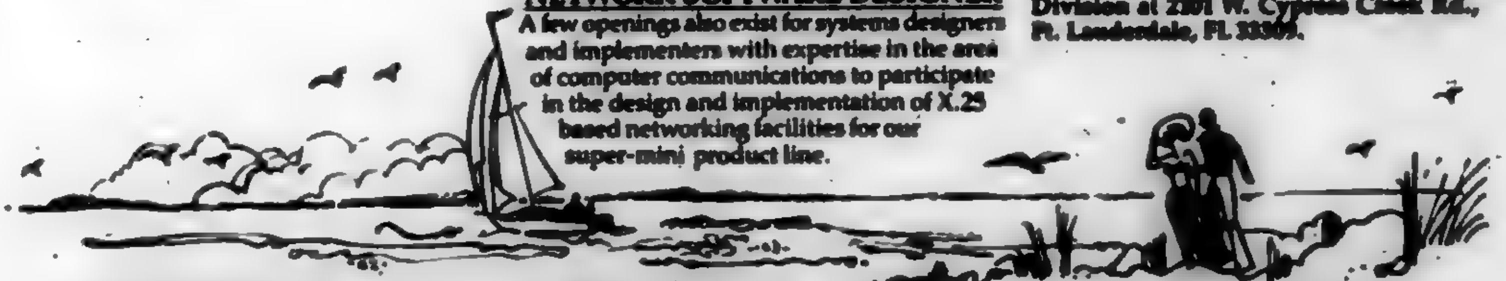

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energy

SOFTWARE PROGRAMMER ANALYST

CORPORATE STAFF
San Antonio, Texas

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Software Programmer Analysts Responsibilities include support to Management Systems in the area of system software, complex application software, vendor supplied packages and data communications network. A Bachelors Degree in Computer Science, or related fields, and a minimum of four years data processing experience, including two years system software support on Burroughs large system. Knowledge of ALGOL, ESPOL, DCALGOL, NDL, NEWP, and COBOL required. Conceptual knowledge of DMS II desirable.

If you seek a company that recognizes personal achievement and offers excellent salary and benefits, send your resume in the strictest confidence to:

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You will design, code and debug a major portion of the firmware for the new large-scale, high performance V9800 system; or you could design the system memory S/W; or you may prefer to evaluate and analyze measurement results. You can take your pick if you have a BS/CS or equivalent with related experience.

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Under direction of Senior Systems Analyst you will design, code, debug, test and document telecommunications systems S/W. A BS/CS or equivalent and knowledge of Assembly languages with Pascal training a plus.

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Responsible for support of NCR's large-scale virtual programs. Duties will include isolation and correction of field-reported problems, design of tests, development of specifications and implementation of approved changes. Experience in Assembly language and virtual memory O/S desirable. Requires BS/CS or equivalent.

CONSULTANT/ANALYST

As project leader, you will lead the design and implementation of application processor firmware which will interface with O/S Software. BS/CS or equivalent experience with eight years' programming and knowledge of O/S and computer architecture required.

Equal to the career-growth opportunities, excellent salaries, and extensive benefits that NCR offers, are the pleasures of living and working in the San Diego area. Relocation assistance will be provided.

Send your resume to: Mr. Hal Ostrander, Personnel Resources, Engineering and Manufacturing, Dept. G50, NCR Corporation, 16550 W. Bernardo Drive, San Diego, CA 92127.

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Data Processing

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TWA

Trans World Airlines
P. O. BOX 20007
KANSAS CITY, MO. 64195

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Data Processing Manager

Progressive large professional membership association in downtown D.C. is seeking qualified individual, looking for a challenge in career development opportunities, to manage computer center operations.

Responsibilities include requirements analysis, systems design and specifications, programming, documentation and interface with users. Currently in process of changing from a batch system environment to on-line processing. Ideal person for this position will have balance of technical strength, understanding of application operations and good management skills.

Skills should include experience in data base management, demonstrated supervisory abilities, COBOL programming experience. Successful candidate should possess a bachelors degree or work equivalent plus [illegible] years experience. Prefer individual knowledgeable with the Burroughs [illegible] series plus experience with [illegible] Qualified candidates must possess good oral and written communications skills.

Excellent salary and liberal fringe benefits. Benefits include health and major medical, dental, optical, life insurance and retirement plan. Send resume and salary history to Personnel Administrator, National Association of Social Workers, [illegible] Street, N.W., Washington, D.C. [illegible]

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We are implementing a distributed processing network consisting of IBM 4300 systems linked to a Burroughs B-7800 and you'll play a major role in developing and supporting the IBM-Burroughs interface.

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IMS – DMS/CICS

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●SR. SOFTWARE SPECIALIST – IBM OS/VS1 experience and/or NCR B1 B3 desired. Prefer exposure to: DYLACOR, PLAN IV, DITTO, VTAM, PANVALET and/or EZ 1. Exposure to TANDEM or PARADYNE a plus.

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SYSTEMS ANALYST

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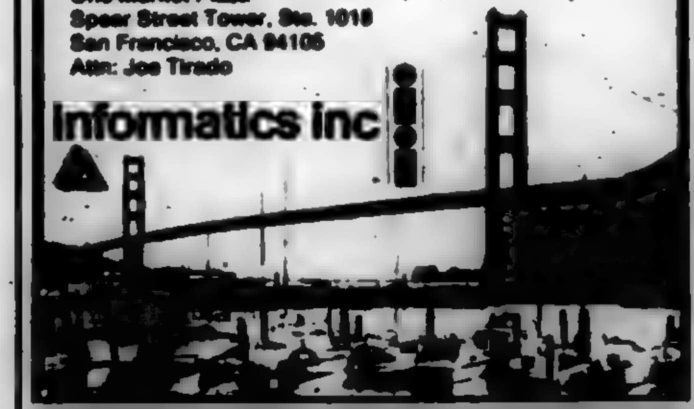
Spear Street Tower, Ste. 1018
San Francisco, CA 94105
Attn: Joe Tirado



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Excellent opportunity for a seasoned Engineering Management Professional to direct the hardware design & development program for our computer system product lines. In this position, you will report to the Director, Research & Development, and will be expected to apply your technical and managerial expertise to our continued successful growth.

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Fayetteville

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Candidates should possess the following qualifications: extensive experience in data processing, information systems and computer management in a comprehensive university environment; educational qualifications commensurate with an academic appointment; and outstanding interpersonal, verbal, and written communication skills. Nominations, applications, and resumes should be submitted by October [illegible], 1980, addressed to Dr. [illegible], [illegible], University of Arkansas, Fayetteville, AR [illegible].

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- To develop, from inception, our operating system and program products requires knowledge of operating systems and data management access method using BAL or equivalent large mainframe languages.
- Individuals needed to develop our COBOL compiler for the 370 mainframe must have BAL experience; knowledge of COBOL and internals of a compiler is an asset.
- We need individuals with BAL and 16 Bit mini and microcomputer experience; Fortran and Bisync and/or SDLC protocol experience helpful. Knowledge of Modem hardware and interface of terminal equipment also beneficial.

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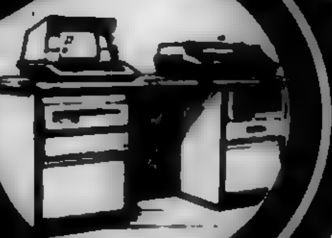

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We are looking for an experienced professional who can take full charge of administrative systems planning for a major university with eight campuses. Responsibilities will include: directing systems design and integration studies, planning long-range hardware and software design and integration studies, planning long-range hardware and software needs, acquiring software and programming services outside the university, and managing a project tracking system. We are currently operating on a 6-Meg IBM 370/168 computer and a network of 250 interactive terminals. We want to develop a multi-host distributed processing network for more efficient administrative computing. The person selected for this post will be free to build a professional staff of 30 people to carry out this task. She or he will also participate significantly in the development of administrative computing policy and budget.

QUALIFICATIONS:

A baccalaureate degree and several years of computing experience, including project management, are expected. A master's degree and administrative computing experience in a university environment are very desirable.

PROCEDURE:

This is a position of exceptional importance in the university, and we offer a competitive salary commensurate with qualifications and experience. If you have demonstrated experience in these areas and want an opportunity to make a significant professional contribution, send your resume and salary history in confidence at the earliest possible date to:

Mr. Richard [illegible]
Department of Personnel
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Indiana University
Bloomington, Indiana 47405
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Consultants

ARI is a nationwide executive search firm retained exclusively by several major firms with large, well established management consulting practices.

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These positions offer exceptional career opportunities for qualified individuals. The salaries range upward from 28K and travel, in most cases, will be less than 25%.

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ACCOUNTING RESOURCES INTERNATIONAL

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Or, for immediate information, call:

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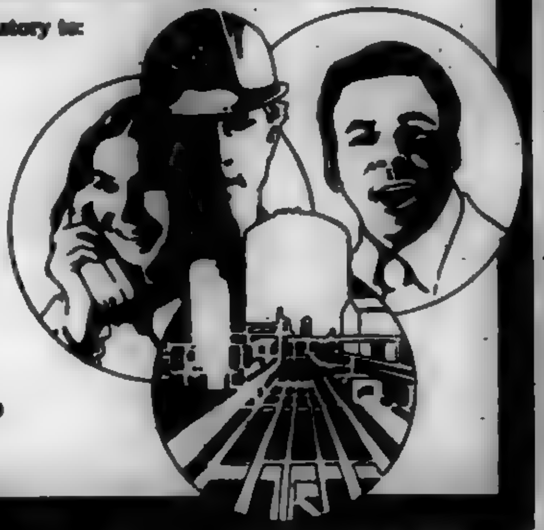

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For more details, send your resume, or call:
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CADILLAC ASSOCIATES, INC.
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What you've waited for?

SYSTEMS PROGRAMMER

Enjoy "A Job Without Walls" In An Exceptionally Desirable Organizational Setting

The responsibilities of this assignment do not fall easily into any slot — which may make it exactly what you have been hoping to find, someday. To begin with, it is with ETS, long a leader in the specialized, growing, and important field of testing, advisory, and research activities for education, government and business: A private, nonprofit, prestigious organization, ETS has superb facilities on a large, wooded tract near Princeton, New Jersey.

Your duties will be many and varied, as you consult with many users, analyze needs, and apply diverse programming concepts and design systems for complex projects. You may be called on to manage, or to plan and organize, to act as Chief Programmer for a team, to help develop proposals, to review information processing methods and equipment in use and evaluate or suggest improvements. In short, your skills will be utilized to the full in a succession of efforts, growing and maturing with this kind of experience and exposure.

We presently have two inviting "hands on" opportunities for senior staff members working with

MVS/SE2, ACF/VTAM, JES2, CICS/VS, 3800, TOTAL, TSO and NCP3705 with TWIN 3031's.

Requires in-depth knowledge of system internals, maintenance, generation and debugging of operating systems, or analytical ability in computer measurement and evaluation.

BASIC REQUIREMENTS. The requirements are implicit, but as minimums include at least 5 years applicable experience, bachelor's degree or equivalent, and extensive CS coursework in combination with consulting, management, or similar functions. You should have a good grasp of large scale hardware (preferably IBM), structured systems, data base, and the personality and depth to be effective in leadership, interfacing with users, and training.

Salaries are competitive, particularly in relation to living costs in a beautiful area convenient to both Philadelphia and New York. Benefits are distinctly exceptional and difficult to equal in total coverage and value. Vacation, for one example, begins at 4 weeks. Relocation will be assisted where required. On all counts, you may find ETS can offer an extraordinarily desirable career prospect. Please send resume, providing adequate information, in confidence to: Stan Davis, Sr. Placement Specialist.

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Call, come in, or forward your resume to
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The Computer Branch, Inc.
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MIAMI-DADE COMMUNITY COLLEGE

Systems Programmer

Salary Range: $20,707 — $26,796

This is Systems Programming work with responsibility for conducting feasibility studies of proposed systems, modifying proposed computer-related hardware/software and existing systems and also responsible for preparing procurement specifications for bids or proposals often resulting from feasibility studies. Work also includes acting as a consultant to the technical staff and operations personnel and performing systems programming tasks as related to proposed systems enhancements or perceived problems with existing systems in Computer Services and elsewhere. Position requires Bachelor's Degree in Computer Science or related field, five years experience as a Systems Analyst, Software and/or Applications Programmer and has performed for 2 of the 5 required years as a Systems Software Programmer on large IBM systems (OS/MVT, OS/MVS). Selected applicant must demonstrate ability to conduct feasibility studies and familiarity and experience with mini-and micro-computers.

Apply to: Personnel Services, South Campus, 11011 S.W. 104th St., Miami, Fl 33176.

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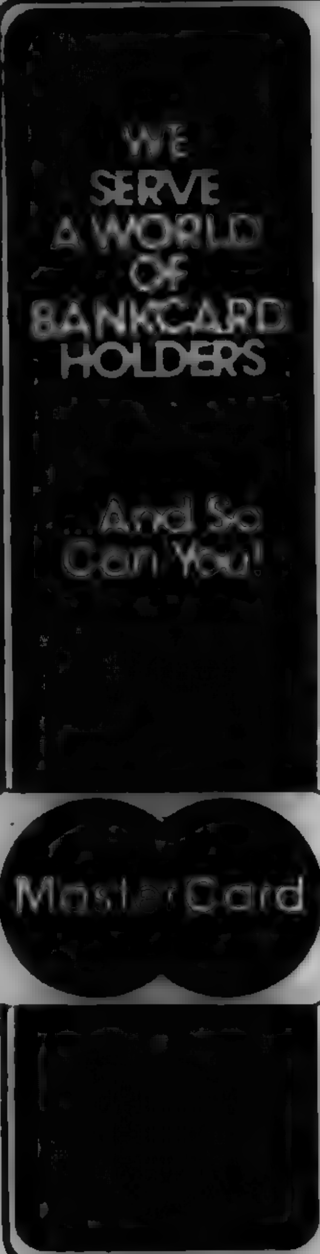

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ASSISTANT VICE PRESIDENT OF DATA CENTER OPERATIONS

Responsible for day-to-day management of computer operations, office services, and member bank services. Minimum 5 years management experience of data center. Must be able to work well with all kinds of people to coordinate, plan and schedule the activities of 40 professionals, and must have state-of- the-art operations knowledge in telecommunications, IBM hardware, and support software.

TELECOMMUNICATIONS MANAGER

Minimum of 3 years in design and implementation of telecommunication systems. Knowledge of either SNA, NCP or VTAM necessary.

SENIOR SYSTEMS ANALYST

Minimum of 6 years extensive systems design and project leadership experience. [illegible]

SYSTEMS SOFTWARE PROGRAMMERS

Minimum of 2-4 years proven systems experience including DOS/VS, OS, CICS/VS, MVS, ALC is required.

SYSTEMS ANALYSTS

Minimum of 2-4 years systems design experience in application development. On-line development and working knowledge of COBOL, incl. ALC.

PROGRAMMER ANALYSTS

Minimum of 3 years COBOL experience and practical experience with large IBM mainframe systems necessary.

PROGRAMMERS

Minimum of 2 years COBOL work experience and large IBM mainframe experience required.

We're expanding our DP center in St. Louis to increase our ability to handle our international and domestic accounts. That means you can enjoy technical growth as well as career advancement. INTERBANK's expansion is expected to continue as we build on our sound base as an industry leader. You'll discover that we also offer a highly attractive salary and benefits program. To find out more about your future with Interbank, send your resume or call Gene Alseth at (314) 434-0800.

INTERBANK CARD ASSOCIATION
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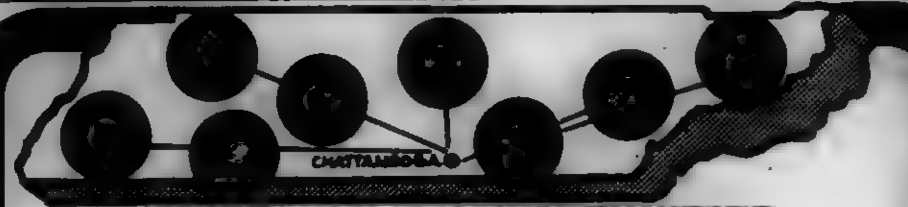

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- **join a dynamic organization that is developing to meet the needs of a growing and challenging industry.**
- **enjoy abundant recreation in a mild southern climate.**
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The Hospital Computer Center is an organization operated by Blue Cross Blue Shield to provide a full range of data processing services for a growing user community of Tennessee hospitals. We have substantially increased our technical staff in the last year and additional growth is planned.

Our plans for the 80's include:

- **evolving from an RJE-BATCH operation to an On-line interactive data base environment.**
- **implementation of a distributed processing network of IBM 4300 systems.**
- **upgrading of all applications to use state-of-the-art hardware and software technology.**

Our tools include: Twin large IBM main frames running VM/370, CMS, DOS/VS, DOS/VSE, CICS/VS, VSAM, DL/1, COBOL, PL/1, VTAM, and NCP. Our application software includes: SHAS, PCS, MSA financial software.

We are looking for individuals at several different levels. If your experience includes hospital information or other financial applications and/or familiarity with any of the above tools, you could be qualified to join our talented professional staff.

For consideration, send your resume in complete confidence to:

Recruiting and Employment
Dept. GC1-Hospital Computer Center
801 Pine Street
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YOURDON specialists train EDP professionals in structured techniques of analysis, design, programming and database design.

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As a YOURDON staff consultant you will:
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To qualify you must have:
☐ at least 1 year of professional experience as a systems analyst, designer, or programmer, or a minimum of 3 years professional experience within a database group ☐ practical experience in some of the structured techniques ☐ excellent speaking and writing skills ☐ availability to travel 2 weeks per month

This is a perfect time to begin building a career as a YOURDON staff consultant; our future is bright.

For immediate consideration, or to receive our Career Opportunities booklet, forward a resume in strict confidence to: Ms. Toni Yourdon, YOURDON inc., 1133 Avenue of the Americas, New York, NY 10036

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If you're a professional in data processing (including technical or applications programming, systems design or managerial), call or write us in confidence.

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PROGRAMMER/ANALYST (Maine). Excellent opportunities for people with 2-4 years COBOL and/or RPG II exp. To $20-24,000

SYSTEMS ANALYST (Hartford). Financial System background preferred for international distributor who will be in charge of analysis & design of system for IBM 370/148 installation. To $27,000

CICS SENIORS (Newton). Several opportunities with tech and mg't growth. Solid CICS and COBOL applications experience. To $25-30,000

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Requires degree and at least 2 years Business Application Design experience.

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Three years EDP Audit experience and a working knowledge of computer controls. Accounting and related systems is desired.

PROGRAMMER/ANALYST

Requires degree and at least 2 years Program Design and Development experience on medium to large computers. Knowledge of CICS, JCL and IMS preferred.

Work is varied, interesting and rewarding. We offer excellent salary potential and one of the most comprehensive benefit packages available.

Send resume and salary requirements to:

Mr. N.S. [illegible],
Controller
Western Operations
Phelps Dodge Corporation
P.O. Box Drawer 9
Douglas, Arizona 85607
(602) 364-7521

phelps dodge Corporation

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- Sr. Systems Engineers

Candidates must have thorough knowledge of and extensive experience with the internal structures of:

- IBM Operating Systems OS/VS1 or OS/VS2 MVS TCAM, VTAM, SNA, IMS or CICS or VM/370 (CP, CMS)

Assignments are for a period of at least 2 years. You will be located in a beautiful and scenic German city and be part of a top caliber data processing team. Paid relocation expenses.

Salaries commensurate with background and excellent benefits that include 30 working days leave per annum.

New York City interviews will be conducted for qualified individuals in October. For prompt consideration, please rush your resume, which must be received no later than October 6, in confidence to: Personnel Department SAG.

Siemens Corporation
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Equal opportunity employer, m/f

HOUSTON

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SUPVSR-PROG & SYS DEVEL to $30K

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the jarvis walker group
3050 South Post Oak Rd.
Houston, Texas 77056 (713) 961-3600

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Send resume before 10-3-80 to:

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Systems Engineers

For the Systems Engineering Group. Experience in OR, Real-Time Control,DBMS, Statistical Analysis, and Modeling. B.S. in Engineering, Math or Computer Science. Supervisory experience preferred. MBA or MS preferred, but not essential.

Systems Programmer

Experience in tuning and modification of Operating Systems, especially in network and DBMS environments. Knowledge of DEC operating systems and PDP 11-Series assembler preferred. Experience in exotic interfacing and color graphics subsystems also helpful.

Systems Analysts

Experience in Design and Documentation of Control Systems, MIS, and VLDB in a networked environment preferred. Knowledge of statistical analysis methods helpful. B.S. in Engineering or Computer Science preferred.

Engineering Programmers

B.S. in Engineering or Computer Science, with experience in Scientific/Engineering Computer Programming.

Budget Coordinator

MBA and BS engineering degrees required. Computer background preferred.

If you're ready for a challenge, Phelps Dodge can offer you the kind of challenge that leads to a rewarding career. As the world's second largest copper producing company, we have exceptional opportunities available to the qualified individual. The Morenci branch is a copper mining, milling and smelting operation located in the mountains of southeastern Arizona.

Salary commensurate with experience and education. Excellent benefits package included. Please send resume including the position applied for to: **Mr. R.P. Boland, Director of Personnel Services, PHELPS DODGE Corporation, Morenci, Arizona 85540. Telephone: (602) [illegible], Ext. [illegible].**

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RPG II OPPORTUNITY

Dallas based organization has an opportunity available for a person with experience in RPG II programming. We are presently utilizing an IBM System III Model 15D. We can offer a competitive starting salary, excellent company benefits including paid retirement and an opportunity for professional growth. If you are interested, call Houston Pickett at (214) 421-3581 or send resume including salary history to:

Manager of Data Processing
Conley Lott Nichols
Machinery Co.
1311 S. Ervay St.
Dallas, TX 75215

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for IBM 3031, DOS/VS-E, CICS/VS

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[illegible], Personnel Manager
[illegible]
[illegible]

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Computer Sales

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You will represent an extensive line of intelligent terminals, graphic systems, plotters and related peripherals to both new and established customers. If you are one of these individuals, you will possess:

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What we offer in return is:

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Columbus
Buffalo
Indianapolis

Send resume to Jane DeRolph, TEKTRONIX, INC., 2 Research Court, Rockville, Maryland 20850.

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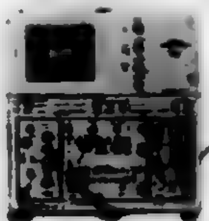

Tektronix
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NCR/Columbia, SC... participate in the leading edge of microcomputer product definition

NCR/Columbia, specializing in development and manufacturing of data communications products and systems, is currently expanding its Advanced Systems Development group.

This unique department provides early definition and systems design of future NCR communications products along with startup development of new programs. The group is characterized by working in a state-of-the-art software/hardware environment, with opportunities for individual contributions in a systems level scope of design from the conceptual stage to the finished product.

We are currently seeking individuals with a minimum of 3 years experience in software and/or hardware who desire work and have experience in one of the following areas:

- Communications Products Design & Definition
- Communications Processors & Network Architecture
- Microprocessor Based Hardware or Software Systems
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- Local Area Networks

For consideration, please send your resume and salary requirements in complete confidence to: Glenn Rennick, NCR Corporation, Advanced Systems Dept. 600, 3325 Platt Springs Road, West Columbia, SC 29169. Or call [illegible].

NCR
Complete Computer Systems

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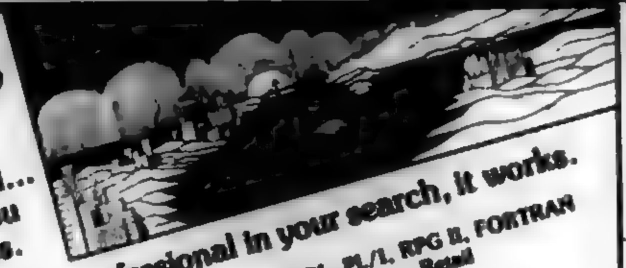

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Jerry Anderson or Bob [illegible]
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San Francisco, Ca. [illegible]
[illegible]

Jim [illegible]
2 Palo Alto Sq., Ste. [illegible]
Palo Alto, Ca. [illegible]
[illegible]

[illegible] N. 1st St., [illegible]
San Jose, Ca. [illegible]
[illegible]

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$35,000 TO $40,000 TO START

Look at this opportunity in southeastern Michigan:

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In addition to the starting salary indicated you will receive:

1. Fully paid deluxe medical and life insurance benefits for entire family.
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Please send your resume and salary history in strict confidence to
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Rapidly growing educational/software development firm needs Instructors to teach Structured COBOL programming. BA/BS degree in Bus. Adm./Bus. Ed. or six years related work experience required. Comprehensive benefits package including competitive salaries and advancement opportunities.

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Boulder, Colorado

Immediate opening for individual with the following qualifications:

- Strong COBOL background
- CICS experience (or equivalent on-line data management software)
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Send resume by Oct. [illegible], 1980 to Mr. Jim [illegible], University of Colorado Foundation, P.O. Box 1140, Boulder, CO [illegible]

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As a leader in the large minicomputer industry, we can offer qualified candidates a structured but informal environment, where you will have the opportunity to accomplish your job and increase your personal income with a minimum of restrictions and administrative tasks. What we're most interested in are the results of your sales efforts.

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Openings exist in Chicago and in the Dallas/Houston area. You must have previous sales supervisory experience plus the desire and ability to open a new region that will prove to be profitable to you and your sales staff. Your background must include the sales of large minicomputers to OEM and/or end -user accounts; knowledge of IBM operating systems; plus experience in sales forecasting, sales budget preparation and the hiring/supervision of sales representatives,

Sales Representatives

We have openings in the New York suburban area, the San Francisco Bay Area, and Los Angeles. Candidates must have successfully sold to OEM and/or end-user accounts in the area they wish to represent; have experience selling large minicomputers; and possess a working knowledge of IBM operating systems.

As a division of one of the world's largest electronic manufacturing firms, we provide an outstanding compensation and benefits program including an attractive base salary, a lucrative commission and bonus program, company paid life, health and dental benefits.

Qualified applicants should send their resume in complete confidence to:

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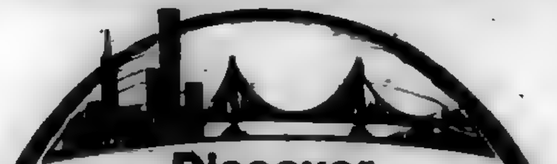

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(415) 777-3600

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All positions fee paid

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Phone: 1-800-[illegible]

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You will develop and implement marketing programs and product plans, analyze and identify major markets, coordinate development of product literature and advertising. This position requires you to provide technical marketing support to our domestic and international sales force through product training, pricing and applications information. Large-scale computer systems experience with a BS or equivalent is required, an MS/MBA is preferred.

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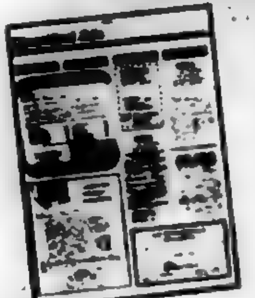

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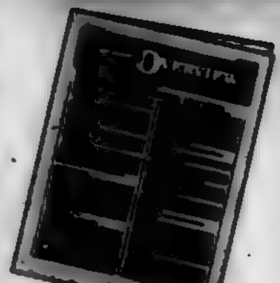

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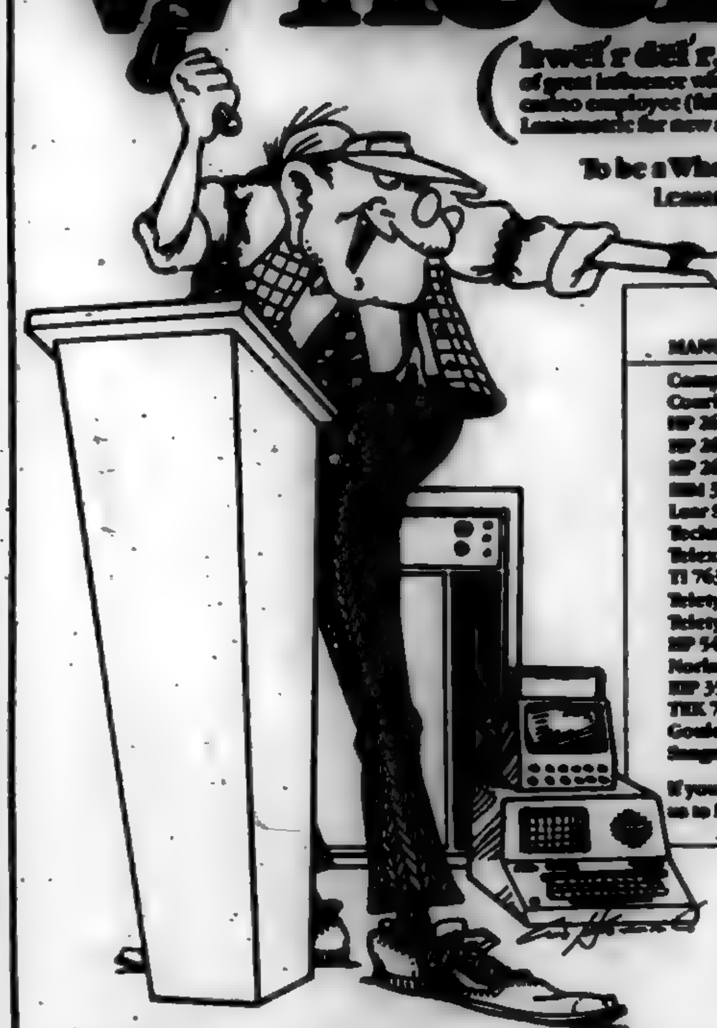

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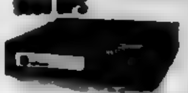
9600 BPS  9600/96	An automatic and adaptively equalized modem providing full-duplex 9600 bps data transmission. Modem 9600/96 will operate full duplex over C-2 or D1 lines, and can be configured for dial back-up and multiple channels of 2400 bps and 4800 bps.	Purchase $7990 Lease* $173/mo.	Purchase $2995 Installment Purchase $111/mo.	SAVE 63%

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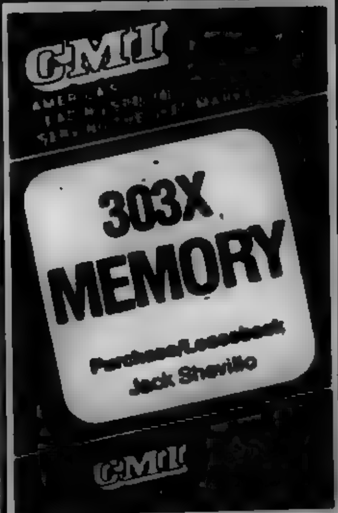

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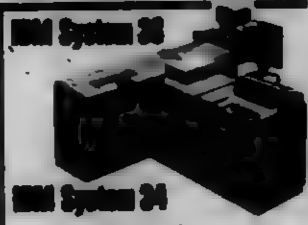

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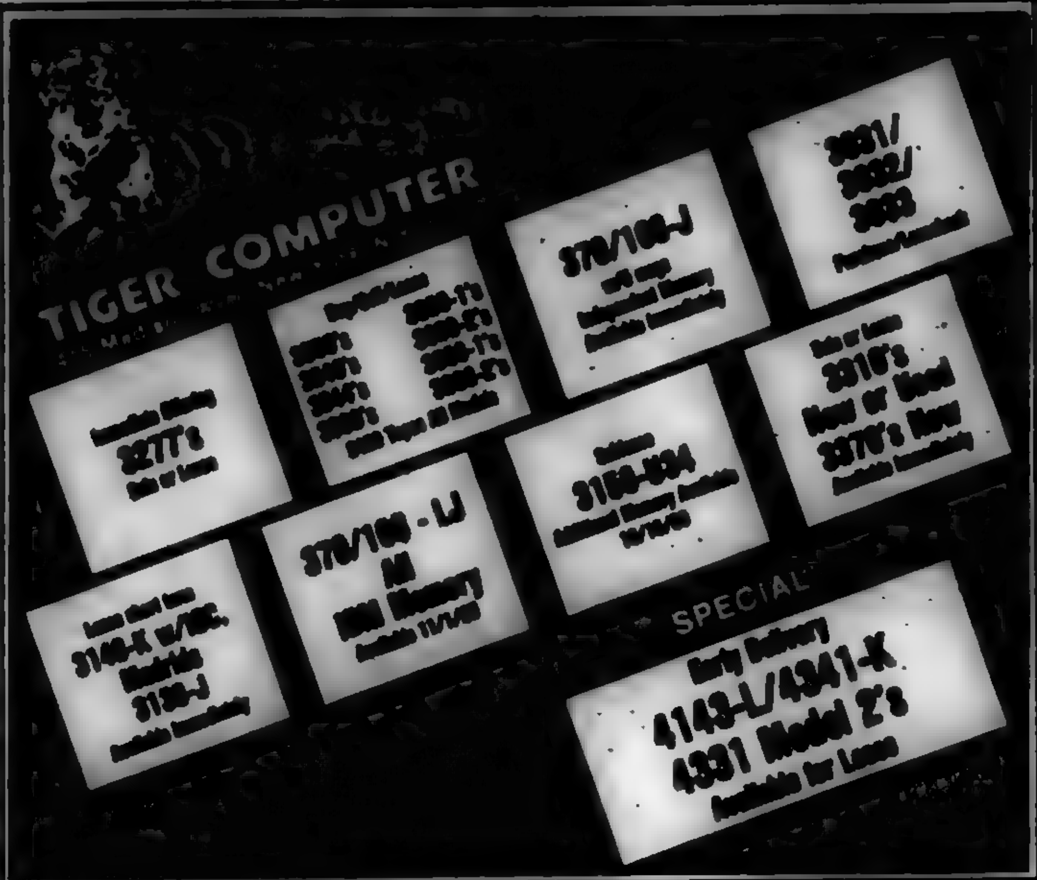

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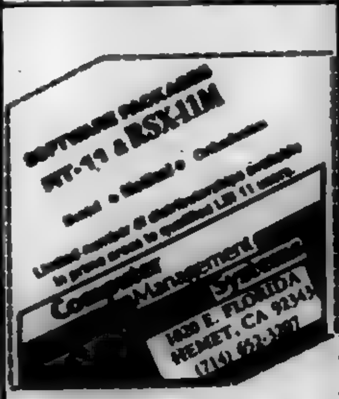

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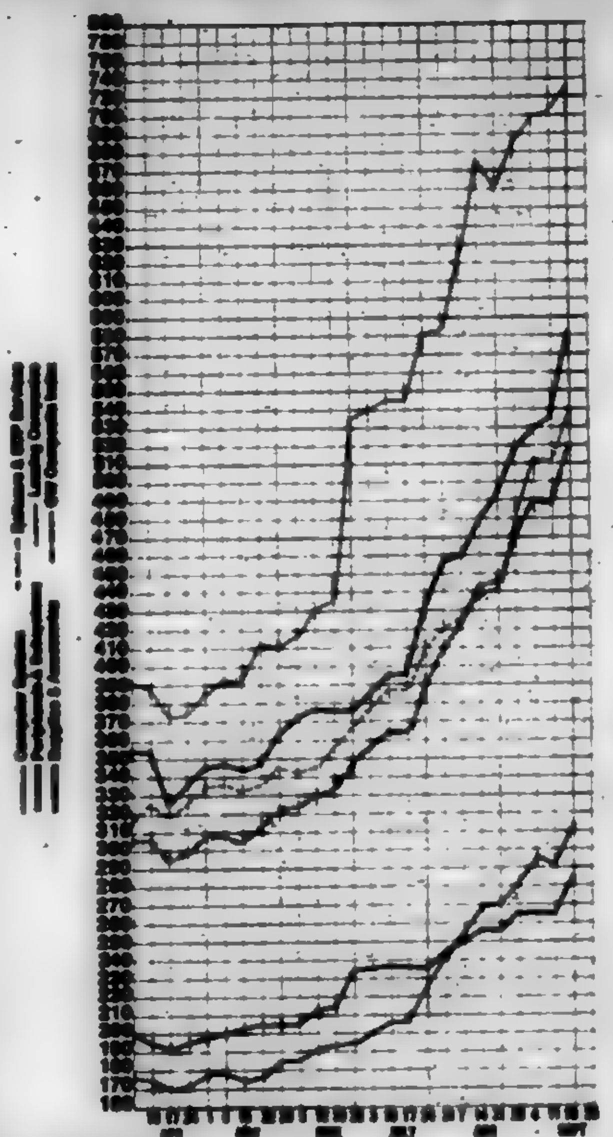

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All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		PRICE 1979-80 RANGE (1)	CLOSE SEP 17 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	14- 42	33 3/8	+5 7/8	+21.3
N	BURROUGHS CORP	60- 80	64	+2 1/8	+3.1
O	COMPUTER AUTOMATION	9- 27	24	+ 3/4	+3.0
N	CONTROL DATA CORP	55- 75	71 1/8	-1 3/8	-1.8
O	CRAY RESEARCH INC	30- 91	90 3/4	+13 1/4	+17.0
N	DATA GENERAL CORP	44- 87	73 1/2	+ 1/2	+0.6
N	DATAPOINT CORP	44- 90	87 1/2	+11 1/2	+15.1
N	DIGITAL EQUIPMENT	42- 88	80 7/8	+5 5/8	+6.7
A	EPIC INC	9- 20	20	+1	+5.2
N	ELECTRONIC ASSOC.	6- 17	11 1/2	- 1/4	-2.1
N	FOUR-PHASE SYSTEMS	20- 40	30	+1 3/8	+5.1
N	FOXBORO	31- 54	53 7/8	+1 1/8	+2.1
N	GENERAL AUTOMATION	7- 14	9 1/8	- 1/4	-2.6
O	GRI COMPUTER CORP	1- 3	1 1/4	+ 1/2	+66.6
N	HEWLETT-PACKARD CO	48- 78	73 1/4	+4 5/8	+6.7
N	HONEYWELL INC	63-101	93 1/2	+4 1/4	+4.7
N	IBM	50- 70	67 1/4	+1 1/2	+2.2
O	MAGNUSON COMP SYSTS	20- 36	36	+3 1/2	+10.7
N	MANAGEMENT ASSIST	9- 24	21 3/4	+ 3/4	+3.5
O	MANUFACTURING DATA S	27- 48	50	+8 1/2	+27.1
O	MINI-COMPUTER SYST	2- 6	3 1/2	- 3/8	-10.1
O	MODULAR COMPUTER SYS	9- 26	26	+4	+18.1
N	NCR	52- 82	72 1/2	+3 3/8	+4.8
N	PRIME COMPUTER INC	15- 47	47 1/8	+8 1/4	+21.2
N	PERKIN-ELMER	30- 60	59 1/2	+1 7/8	+3.2
N	SPERRY RAND	42- 60	53 1/2	[illegible] 7/8	+1.6
A	SYSTEMS ENG. LABS	11- 44	43 7/8	+2 7/8	+7.0
O	TANDEM COMPUTERS INC	18- 54	54	[illegible] 1/8	+12.2
N	TEXAS INSTRUMENTS	70-130	130 1/8	+9	+7.1
A	WANG LABS.	17- 54	53 3/4	+3 1/8	+6.4
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 29	28 1/2	+3 3/4	+20.0
N	COMDISCO INC	6- 18	17 3/8	- 3/8	-2.1
A	COMMERCE GROUP CORP	1- 2	2 1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	1 5/8	0	0.0
O	CONTINENTAL INFO SYS	3- 15	9	+ 7/8	+21.2
P	DATRONIC RENTAL	3- 4	4	0	0.0
A	DCL INC	3- 6	5	+ 1/8	+2.6
O	DPF INC	9- 22	8	+ 3/8	+4.9
N	ITEL	1- 15	2 1/8	+ 1/8	+6.2
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 1/8	0	0.0
N	RELIANCE GROUP INC	20- 70	70 3/8	+5 3/4	+7.0
N	U.S. LEASING	17- 29	22 5/8	+1 1/2	+7.1
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	5 3/4	+1 1/4	+27.7
O	AMACOMP INC	7- 18	17 1/2	+ 1/2	+7.0
O	ANALYSTS INTL CORP	3- 8	7	+ 1/2	+7.6
A	APPLIED DATA RES.	6- 21	20 3/4	+ 3/4	+3.7
N	AUTOMATIC DATA PROC	31- 50	40	-1 1/2	-3.6
O	COMPUTER HORIZONS	1- 9	4	+ 1/4	+6.6
O	COMPUTER NETWORK	6- 9	7 3/8	+ 1/4	+3.5
N	COMPUTER SCIENCES	11- 20	20 7/8	+1 1/8	+5.6
O	COMPUTER TASK GROUP	3- 18	19 1/2	+2	+11.4
O	COMPUTER USAGE	3- 9	9 1/4	+1 1/2	+19.3
O	COMPUT AUTO REP INC	6- 10	10	+2 1/4	+29.0
O	COMSHARE	11- 21	20	+1	+5.2
O	CULLINANE CORP	10- 41	39	0	0.0
O	DATA DIMENSIONS INC	1- 6	1 7/8	0	0.0
O	DATATAB	1- 4	3	0	0.0
O	DSI CORP	6- 9	6 3/8	+ 1/8	+2.0
N	ELECTRONIC DATA SYST	15- 17	15 3/4	+ 3/8	+1.6
O	INFORMATICS INC	9- 25	20 1/2	-2	-8.8
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	2- 4	2 3/4	0	0.0
O	KEANE ASSOCIATES	3- 9	7	+ 3/4	+12.0
O	KEYDATA CORP	2- 5	2 1/4	0	0.0
O	LOGICON	12- 26	26 1/2	+ 1/8	+0.5
O	MATHEMATICA INC	9- 18	16	0	0.0
O	NATIONAL DATA CORP	10- 25	25 3/8	+3 3/4	+17.3
N	PLANNING RESEARCH	5- 9	8 5/8	+1	+13.1
O	PROGRAMMING & SYS	1- 1	3/4	+	+0.0
O	RAPIDATA INC	4- 9	8 5/8	+ 1/2	+6.1
O	REYNOLDS & REYNOLDS	22- 34	32 1/8	+ 3/4	+1.3
O	SYSC INC	6- 16	15 1/2	+1 1/4	+8.7
O	SCIENTIFIC COMPUTERS	6- 27	25 1/4	-1 3/4	-6.7
N	TYMSHARE INC	14- 40	40 3/4	+2	+5.7
A	URS SYSTEMS	9- 15	14	+ 1/2	+3.7
N	WYLY CORP	6- 13	17 5/8	+1 1/8	+6.8
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	15- 26	17 1/2	-4 1/4	-19.5
N	AMPEX CORP	16- 29	27 1/4	+1	+3.8
A	ANDERSON JACOBSON	9- 17	17 3/8	+1 1/2	+9.4
O	APPLIED DIG DATA SYS	9- 12	11 3/4	0	0.0
O	AUTO-TROL TECHNOLOGY	10- 42	41 1/2	+6	+16.8
O	BEEHIVE INT'L	3- 17	16 7/8	+4 1/8	+33.0
A	BOLT,BERANEK & NEW	12- 29	27 1/2	+ 1/4	+0.9
N	BUNKER-RAMO	17- 41	38 3/4	+ 1/2	+1.3
O	CAMBRIDGE MEMORIES	1- 4	4	+ 1/2	+14.2
N	CENTRONICS DATA COMP	30- 55	35 1/2	- 1/2	-1.3
A	CETEC CORP	3- 7	6 3/4	- 3/8	-5.2
O	COMPUTER DEVICES INC	5- 20	9 1/2	+2 1/4	+31.0
O	COMPUTRONICS	3- 7	6 1/2	+ 3/8	+6.1
O	COMPUTER COMMUN.	6- 10	7 5/8	+1 1/2	+24.4
O	COMPUTER CONSOLES	6- 29	23 1/4	+4 7/8	+26.5
O	COMPUTER TRANSCEIVER	1- 5	3	+ 1/8	+4.3
N	COMPUTERVISION CORP	20- 52	50 3/8	+6 3/8	+14.8
O	CONRAC CORP	13- 25	20 1/2	+ 3/8	+1.8
A	DATA ACCESS SYSTEMS	6- 17	16 1/8	+ 7/8	+5.6
A	DATA PRODUCTS CORP	11- 32	30	+1 5/8	+5.7
O	DATUM INC	2- 6	3 1/4	+ 1/8	+4.0
O	DECISION DATA COMPUT	2- 6	5 3/8	+ 1/8	+2.3
O	DELTA DATA SYSTEMS	1- 3	2 3/4	+ 1/4	+10.0
N	DOCUMATION INC	7- 27	16 3/4	+ 7/8	+5.5
O	DATARAM CORP	6- 27	12 3/8	0	0.0
N	ELECTRONIC M & M	3- 8	7 7/8	- 1/4	-3.0
O	EVANS & SUTHERLAND	21- 66	66	+10	+17.8
O	FABRI-TEK	2- 6	3 1/2	- 3/8	-3.4
O	GENERAL COMPUTER SYS	1- 5	4 7/8	+ 1/4	+5.4
O	GENERAL DATACOMM IND	13- 26	25 1/2	+5 1/4	+25.9
O	GENERAL TERMINAL CR	1- 4	3	0	0.0
N	HAZELTINE CORP	12- 33	30	+3 1/8	+11.6
N	HARRIS CORP	23- 45	45 1/4	+7	+4.6
O	INFOREX INC	1- 5	1	0	0.0
O	INFORMATION INTL INC	6- 15	11 3/4	0	0.0
O	INTEL CORP	42- 96	96 1/4	+5 3/4	+6.4
O	INTERSIL	11- 33	33 3/4	+ 1/2	+1.9
A	LUNDY ELECTRONICS	4- 17	10 3/4	+1 1/4	+13.1
O	MSI DATA CORP	9- 14	14	+2 5/8	+23.0
N	MEMOREX	10- 24	14	+ 3/8	+2.3
N	MOHAWK DATA SCI	10- 27	27 1/8	+1 5/8	+6.3
O	[illegible]	2- 10	9	0	0.0
A	PARADYNE CORP	10- 50	40 3/4	+6	+16.0
A	PENRIL CORP	9- 15	12 3/4	+1	+8.5
O	RAMTEK CORP	10- 17	16 1/4	+2 1/2	+18.1
O	RECOGNITION EQUIP	9- 20	15 3/4	+ 3/4	+5.0
O	SCAN DATA	1- 5	3	+	+2.0
N	STORAGE TECHNOLOGY	18- 28	21 5/8	+1 3/4	+8.8
O	SYKES DATATRONICS	10- 30	30	+ 3/4	+2.5
N	T BAR INC	16- 23	20 1/4	- 1/4	-1.3
A	TEC INC	3- 9	6 7/8	+1 5/8	+30.9
N	TEKTRONIX INC	40- 70	66 5/8	-2 3/8	-3.5
N	TELEX	3- 6	5 3/8	+ 1/8	+2.3
O	TESDATA SYSTEMS CP	8- 26	14 1/8	+2 3/4	+24.1
O	TELEPLEX INC	7- 27	27	+1 3/8	+5.3
O	WILTEK INC	1- 5	2 3/4	+ 1/4	+10.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 15	13 3/4	+3	+28.4
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	30- 45	40 3/8	+5 7/8	+15.6
O	CYBERMATICS INC	4- 1	1	0	0.0
A	DUPLEX PRODUCTS INC.	10- 15	14 3/4	+ 5/8	+4.4
N	ENNIS BUS. FORMS	12- 21	19 1/8	+2	+11.6
N	3M COMPANY	48- 60	60 1/4	+2 5/8	+4.5
N	MOORE CORP LTD	30- 37	36 5/8	+2 7/8	+8.5
N	NASHUA CORP	30- 48	39 7/8	0	0.0
N	STANDARD REGISTER	20- 31	30	+ 1/2	+1.6
A	TAB PRODUCTS CO	13- 20	17 7/8	+1 1/8	+6.2
N	WABASH MAGNETICS	11- 18	17 3/4	+1 3/8	+10.9
N	WALLACE BUS FORMS	20- 46	46 1/2	+6 1/2	+16.2

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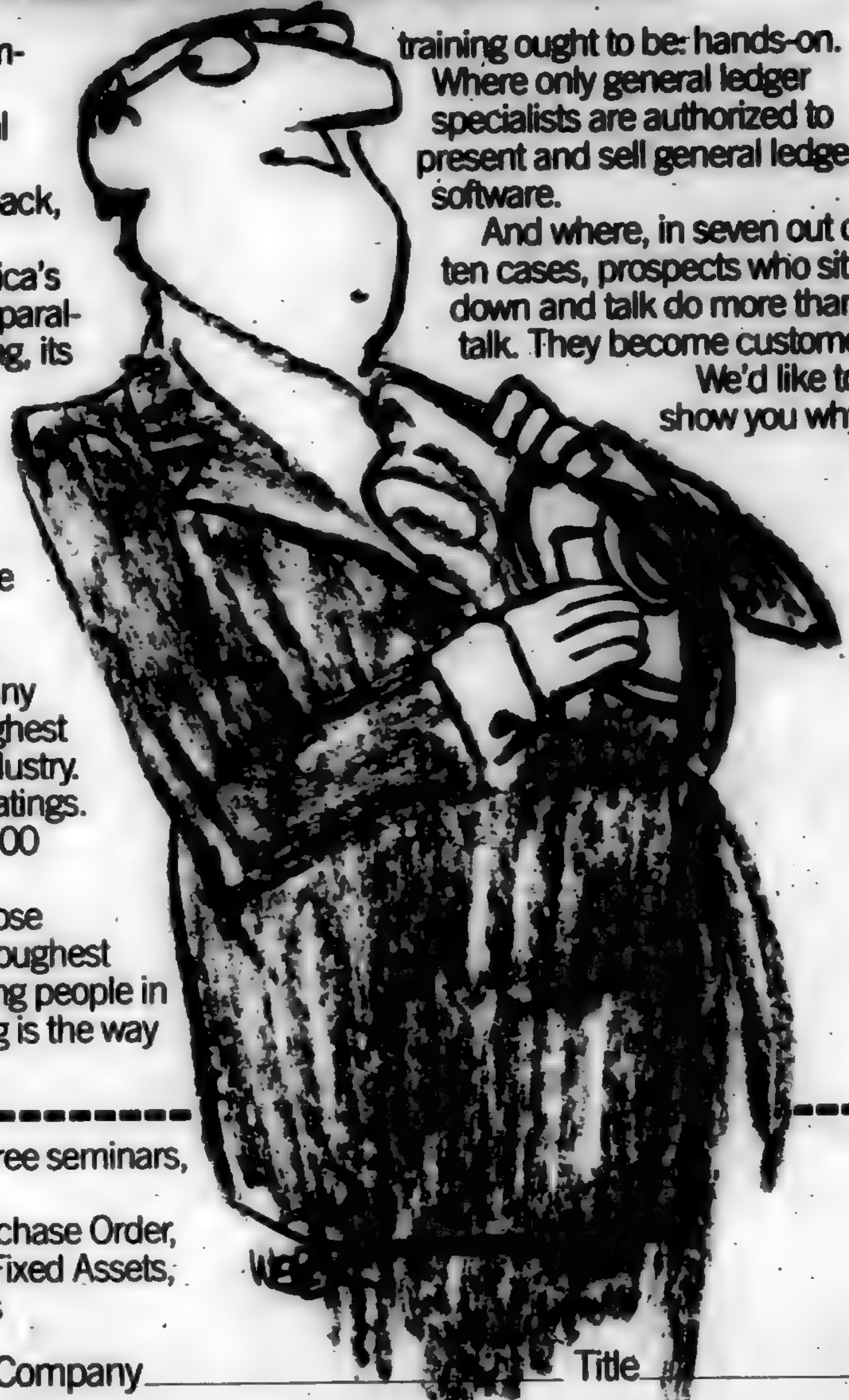

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VOL. [illegible]

ISS [illegible]

SEP [illegible] 1850

cial Report on Cost Cutting Follows Page 60

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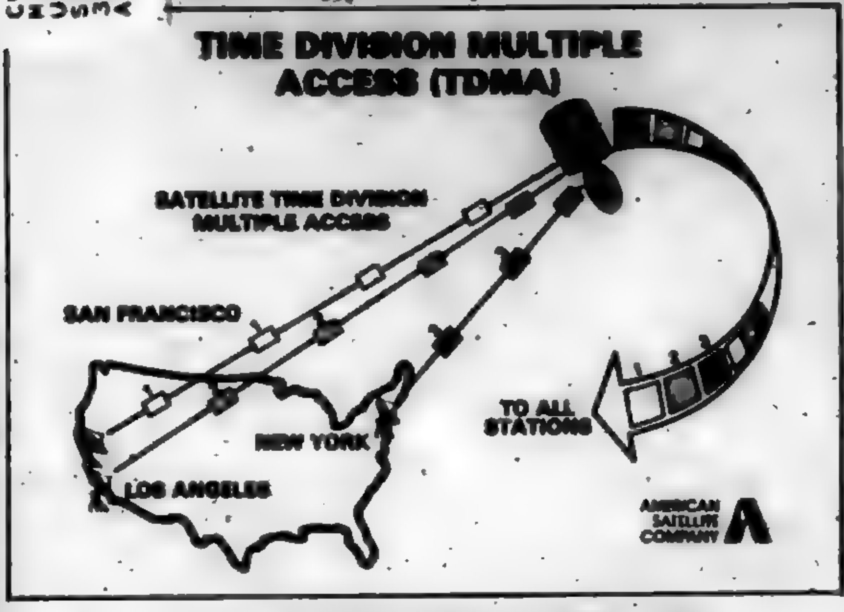
300 N ZEEB RD
ANN ARBOR MI 48106

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
kly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
September 29, 1980 $1.00 a copy; $30/year

NEWSPAPER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Amsat Public Network

Amsat unveiled the first satellite network providing all-digital transmission. Story on Page 2.

Productivity Linked To 'Knowledge Nuggets'

By John Whitmarsh
CW Staff

PHILADELPHIA – What is causing the productivity crisis in the U.S.?

The root cause, or at least a contributing one, is the "misdirected focus" of top management in its search for solutions, according to Robert M. Price, president of Control Data Corp.

"We look to information as the solution to our problems rather than examining the process and mechanics of management and the role of knowledge assistance systems in that process," Price charged in his keynote address to 350 attendees at the 12th Annual Society for Management Information System (SMIS) Conference here.

More than one million computers are used in American business today, and they churn out 220 billion pages of information every working day, Price noted. Such volume is both a blessing and a curse.

"On the one hand, American business is inundated with information about itself, its products and its economic environment. On the other hand, business is experiencing stagnation of productivity that threatens its very ability to compete," he said.

'Bring Coherence'

Price called upon his audience of MIS directors and vice-presidents "to bring coherence to this disarray, to halt the disintegration and to address head-on the enormous productivity problems of our society."

The answer, Price suggested, "lies not in the generation of more information, but in nuggets of knowledge. This will require an upshift from the management information systems of today to the computer-aided management of tomorrow."

The man who started at CDC in 1961 as a programmer and who rose to president of the company urged his col-

(Continued on Page 8)

Hardware a 'Throw-Away' Industry

Software Seen Taking the Limelight

By Rory J. O'Connor
Special to CW

CHICAGO – Hardware has become a "throw-away" industry and software has taken over the limelight, according to Larry Welke, president of International Computer Programs, Inc. Welke also told the attendees of the opening session of the first annual Software Info show here that software is now "the determining factor in solving information problems."

Additional coverage of Software Info appears on Page 4.

"If we are going to install 100,000 computers in the next few years, let's make sure we solve 100,000 problems," he urged the audience, admonishing them to recognize that communication progress is changing the way that problems are solved, as well as the nature of the problems themselves.

Welke's speech centered around two points: the software problem as it relates to the programmer and as it relates to the user. Both the huge increases in the number of people using computerized information and in the amount of that information has consequently caused a great increase in the number of people needed in an industry already short of trained personnel, he said.

"People will never give up the information they now have access to," he said. That, coupled with the "explosion" in computer use, has created a group of users "who, five years ago, could never have afforded the mistakes that computers introduce into their businesses."

More use by old users, computer use

(Continued on Page 4)

Report Generators' Popularity Growing

By Marcy Rosenberg
CW Staff

Product Spotlight

Software packages that let the DP department off-load routine MIS functions to the end user are tickling the palates of a growing number of computer-using organizations.

What makes such packages appetizing is that they free technical DP staffers to tackle critical jobs and system development. They also lessen an organization's dependence on these skilled professionals who are still in short supply, still expensive and who represent one of the biggest drains on the DP budget.

It is for these reasons that report generators became and remain popular. "DP personnel costs are going up and companies want to make the best use of these resources, such as for writing new systems," commented Kevin Cooper, manager of retrieval systems development for Pansophic Systems, Inc. "Report generation is viewed as less of a critical task and one that companies don't want to tie up their programmers' time with."

Organizations developing an appetite for report generator software can quell their hunger with a variety of flavors. There are report writer packages that can be installed stand-alone and report writer facilities that are embedded in data management or data base management systems. In addition, there are a number of file manipulation and inquiry response systems that have powerful report preparation modules associated with them.

For purposes of narrowing this broad product category, the charts on Pages 10 and 11 include only packages that fit the following description: Indepen-

(Continued on Page 12)

Office and Clerical Unions Viewed a Trend for DPers

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Recent involuntary unionization of DP personnel at Western Airlines, Inc. and Union Pacific Railroad Co. presages increased efforts to bring DPers into existing clerical and office worker unions in those two industries, according to a National Mediation Board (NMB) official.

"I suspect we will see more and more of it," David Cohen, chief hearing officer of the independent federal agency told *Computerworld* here last week in a discussion of successful attempts by the Brotherhood of Railway and Airline Clerks (Brac) to become representatives of programmers, systems analysts and other high-level DPers at Western and Union Pacific [CW, Aug.

(Continued on Page 6)

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The newsweekly for the computer community
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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701

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$1.00 a copy U.S. – $30 a year. Canada, Central & So. America – $50 a year. Europe and Near East – $90 a year, other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700 *Computerworld* is indexed. write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

All-Digital Transmission

Amsat Unveils Public Satellite Net

By Phil Hirsch
CW Washington Bureau

SAN DIEGO — The first public satellite communications network providing all-digital transmission between entry and exit nodes was unveiled here last week at the Tele-Communications Association (TCA) conference by American Satellite Co. (Amsat). Company officials reported that as a result of the system's higher throughput, they will shortly file a new tariff that offers broadband data communications service at sharply reduced rates.

This increased cost-effectiveness is obtained largely by replacing analog transmission and frequency-based channel allocation techniques with digital transmission and a time-division multiplexing/multiple-access (TDM/-TDMA) allocation scheme, the company said.

One result of the change is that Amsat's newly upgraded network can transmit 10 times as much data as its predecessor, explained Dr. Eugene Cacciamani, the company's chief engineer.

In addition, satellite channels can be dynamically shifted from one pair of nodes to another, to accommodate fluctuations in traffic.

Minimum Error Rate

The minimum error rate provided by the system is $1{:}10^{-9}$, one order of magnitude better than was available before. And through the use of software imbedded within the network, this error rate can be reduced to $1{:}10^{-11}$.

Another key feature is the system's ability to integrate disparate data streams — such as data, voice, facsimile and video — into a single high-speed data stream, thus enabling users to consolidate multiple existing networks into a single facility that costs less because it carries more traffic.

Voice signals are converted at the entry node into a 32K-bit digital data stream, half the standard rate. Amsat is thus able to accommodate two voice channels within the bandwidth needed by other networks for a single digital voice channel.

Three of the four nodes in Amsat's present general services network have been upgraded to support digital broadband transmission. The nodes are located in New York, San Francisco and Los Angeles.

Each consists basically of a central office (CO) that terminates local loops from the customer's site, and an earth station that communicates with the satellite. Connecting the central office and earth station are dual microwave channels.

The fourth node in the Amsat general services network, located in Dallas, will be upgraded early next year, the company said.

The first of the lower rates stemming from use of the new technology will encompass a CO to CO 56K-bit service. According to Amsat tariff chief Fred Reyes, this tariff will offer a coast-to-coast 56K-bit full-duplex circuit for $4,500/mo. End links connecting each CO with the user's premises will cost another $1,400/mo apiece. The total bill will then be $7,300/month. By comparison, according to Reyes, AT&T charges $9,000 to $10,000 for an equivalent Dataphone Digital Service facility.

The network handles data, voice, facsimile and video signals input in either digital or analog form. The analog signals, after being digitized, are multiplexed, together with the digital inputs, into an integrated 78M bit/sec, digitably modulated data stream transmitted over the dual microwave channels to the earth station. There, controlled by TDMA software, the bits are shot up to the satellite at a rate of 84M bit/sec.

The satellite downlink, which operates at the same rate, connects with 78M bit/sec terrestrial microwave channels at the receiving earth station; these microwave links terminate at a central office that interfaces with analog or digital facilities leading to a terminal at the receiving end of the transmission path.

Use of TDMA to allocate capacity on the satellite up and down-links permits much more efficient use of the bandwidth, Amsat explained. "In a conventional analog frequency division multiplexed/frequency modulated (FDM/FM) system, it is often necessary to operate several radio carriers through a common [satellite] transponder."

Because extra bandwidth is needed per channel to control distortion and interference, this scheme results in inefficient use of both bandwidth and power, the company added.

Each of Amsat's satellite transponders can support up to 39 asynchronous channels, each operating at 1.544M bit/sec. The maximum channel efficiency under this scheme is 96%, the company said. However, a channel efficiency of up to 99% can be achieved by a mixture of standard T1 (1.544M bit/sec) channels with nonstandard data rates.

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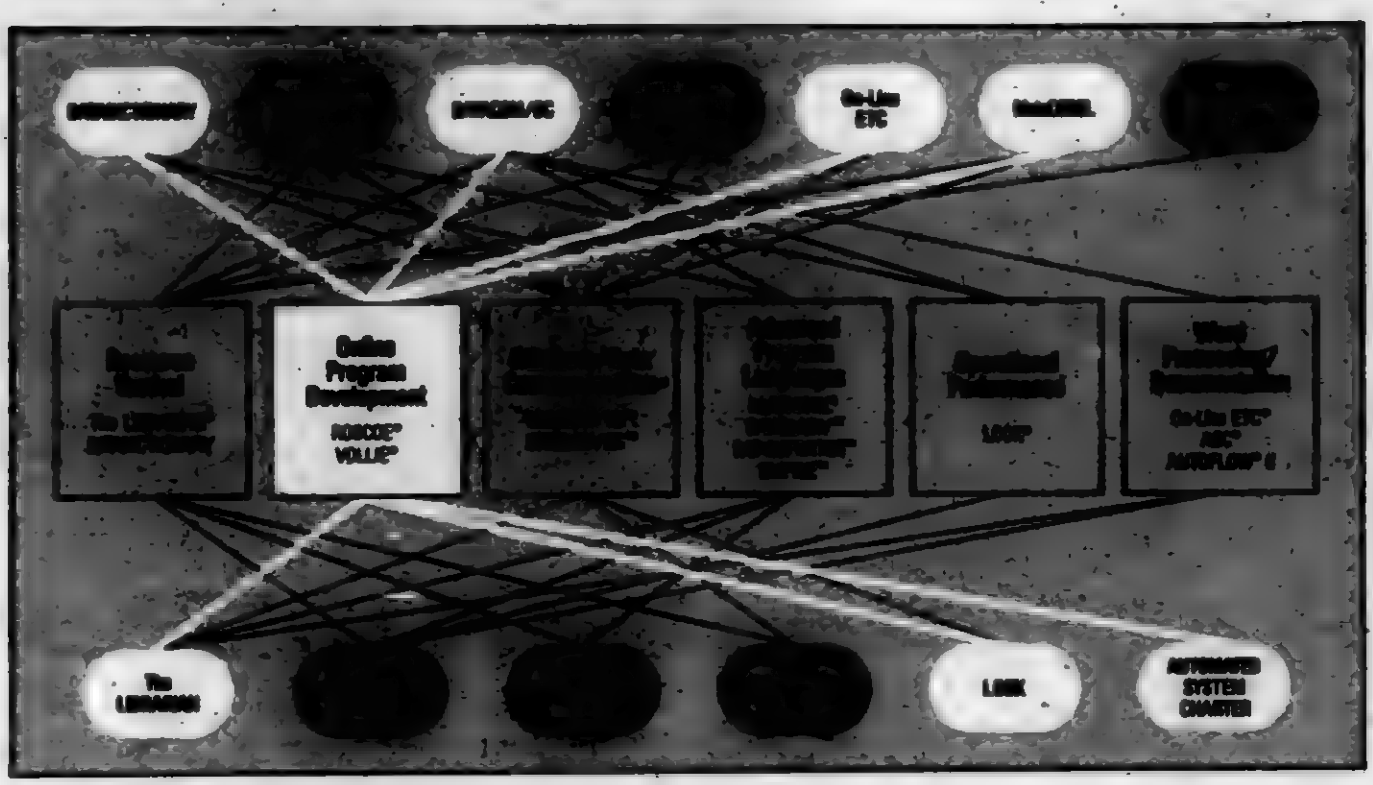

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'Software Revolution'

Failure of IBM Packages Viewed a Boost to Industry

By Rory J. O'Connor
Special to CW

CHICAGO — The failure of IBM software packages like IMS have helped give the software industry a needed push, John Imlay, chairman of the board of Management Science, Inc., said during his keynote address at the Software Info show here last week.

CW at Software Info

Stressing the software package as the glue that holds information technology together, Imlay gave the crowd his views of what would be driving the "software revolution" through the 1980s.

Among his predictions are that the case of IBM vs. U.S. will be settled within a year, and IBM will then continue to be a dominating force in the computer industry. He also sees the Japanese attack as another driving force in the U.S. software industry, although not as big as the communications revolution.

"Communications will be the biggest revolution in our industry between now and 1983," Imlay said, citing the development of fiber optics as one of two main reasons. The other will be the increased competition in the satellite business between giant IBM and the newly deregulated AT&T, bringing down the costs involved in long-distance communication.

Chip on a Typewriter

Imlay then described word processing as simply the addition of a "chip to the typewriter," but said that this has created "the terminal for the office of the future. It will force the development of packaged software for office automation," he told the gathering.

He also said that the coordination of office technology would shift soon from the administrator to the DP professional.

The personal computing market is another area Imlay warned the audience to watch. Saying that initially the personal computing arena had been viewed as "another model train market," it has since expanded with the influx of computer-assisted instruction, security and personal finance packages, along with the commonly marketed game and entertainment programs. "The electronic home will be a battlefield in the software revolution," Imlay predicted.

Besides specific market areas driving the software boom, the general money crisis has caused an increase in the importance of packaged software. Inflation has spelled trouble for those installations that would otherwise develop in-house packages,with the cost of purchasing remaining much lower than the cost of designing the building.

Imlay predicted that in a few years, it would cost nearly 10 times as much to make as it would to buy, for the average shop. The time needed to develop the package will also increase, he noted. These factors will necessitate the development of productive, profit-making, unique applications, rather than "reinvention of the wheel," he said.

As for the next decade, Imlay predicts that IBM will still be the dominant market force in 1990, with AT&T breathing down its neck. This competition between two huge firms should bring costs down, with the Japanese invasion simply fueling the price wars.

Looking to the near future, though, the two-headed beast of information and energy will remain of primary concern, Imlay believed. He did warn that "we might get ahead of ourselves" in the introduction of technology, and that without a certain amount of caution the vital person-to-person contact in both business and personal life might give way to too much computerization. But that problem is not apparent yet, he stressed; the only certainty is that "the package era is here," Imlay concluded.

Software Viewed As Key To Information Problems

(Continued from Page 1)

by new users and the introduction of computer technology into new areas of commerce have created this wealth of people, he said.

U.S. Lacks 35,000

In contrast, the U.S. is currently short some 35,000 software professionals, he stated. And while some firms respond by attempting to fill the gap with untrained personnel, the shortage will undoubtedly drive the package software market.

When positions are filled, Welke noted, the prospects are likely to be distributed along a curve with the semiskilled at one end, the "bit jockeys" at the other, and the average programmer in the middle. He cautioned that hiring from either end could present problems, since hiring the overachiever "writing palindromic code" is as dangerous as hiring the "warm body."

One of the reasons that software has become problematic is that programmers and users have been confused about solutions. "We allowed ourselves to believe that information problems are multisolution, when really it's that there are no rules or standards to programming. The question that's been asked is 'Does it work'? We should really be asking 'Is it right?' " Welke stated.

Package software must thrive, he said, because the cost of error-free code, estimated to be $100 a line, is simply too expensive for most shops. The pace of technology, as well, is a problem, causing a hardware and software investment to become obsolete in much less time than previously. "By the time your new system is up and running, it's outdated," he said.

Mainframers Dominate Software Show

By Rory J. O'Connor
Special to CW

CHICAGO — There were 80 cautious but seemingly happy vendors on the floor of the Software Info show here last week, most of them in the mainframe marketplace with a small group of mini and micro firms scattered about the hall. And the consensus appeared to be that a "software-only" show has been a long time in coming.

One of the key problems in a show such as this is how to display a product. Without the benefit of the "bell and whistle" hardware at a booth, showing software alone can present a marketing problem. The three most common solutions, used individually or in combination, were hardware running software, audio-visual presentations and the simple table of literature and handouts staffed by a smiling employee.

It might have been more confusing, but the attendees were serious business prospects, according to most vendors polled. One vendor suggested that it was the price of admission that kept the sightseers away, and suggested that the National Computer Conference might take a cue and cut down on the congestion experienced in recent years.

In keeping with the spirit of an "experimental" show, the number of new products shown was very small. Vendors preferred to use established products to keep a single variable — the show — at the top of the evaluation list. In another fairly conservative move, most vendors refrained from using flashy tactics like mimes, magicians and models to attract people to their booths.

IBM Absent

One of the biggest surprises to many was the absence of IBM from a show largely dedicated to products for that firm's processors. Other industry leaders like Digital Equipment Corp. were also notably absent.

But to many exhibitors that represented a boon — space for the next show in 1981, which many felt would be much larger, will be allocated on a seniority basis, and some of the small firms in attendence will have priority over the large companies not represented.

About 6,000 persons preregistered for the four-day show, which included three days of exhibits and a partially concurrent three-day seminar program. However, no official figures on attendance were released.

'Bill of Rights' Offered To Potential Package Buyers

By Rory J. O'Connor
Special to CW

CHICAGO — A software buyer's "bill of rights" presented by Yourdon, Inc. consultant Louis Mazzucchelli at the Software Info show here prepared potential buyers for some of the pitfalls involved in purchasing packages waiting for them just below on the exhibit floor.

"Be careful," he said, telling the listeners that the horizontal and vertical expansion of the software industry has resulted in something less than "maturity," and that the only smart way to buy was to ask the right questions.

And to ask the right questions, the buyer must know what it is that he needs and what to expect when he buys.

He cautioned against taking at face value advertising statements that imply programmers are not necessary, that a packaged product will fit a particular individual business, that no special training is required or that a product is compatible with "any operating system."

"You don't hear unqualified recommendations of many packages," he said. "Users are not saying that packages answer their needs. What a piece of software does and what its designers and users think it does are not necessarily the same thing, and what you get is not necessarily what you see in user documentation," which tends to reflect the design objectives for an ideal system operating after it was done properly and completely.

"A little knowlege is a dangerous thing," Mazzucchelli told his audience. "Know your application and your technology. Once you know what you want you can ask specific questions."

Examine Product

The fundamental principle in dealing with a particular software package is to know that it works and how it works. And to that end, he emphatically cautioned buyers not to purchase a package without examining the source code. "I won't buy a software package if I can't look at the source code. Don't buy it if you can't," he said. The burden falls on the vendor to provide a mechanism where the buyer can see the code.

In addition to an examination of the code, an examination of the business itself is in order. The company must have both a product plan and a business plan in order to ensure the buyer of some contintuity with the product.

Large-scale testing is another "right" of the buyer, one that is frequently available but ignored because of cost. Without realistic test data — both in size and complexity — a program is not properly evaluated, according to Mazzucchelli. "It's money well spent," he said.

One other area which was addressed by the Yourdon bill of rights is that of independent evaluation. Mazzucchelli advocated the development of an independent publication that would evaluate packaged products. The industry trade magazines cannot do this objectively, he feels, because of advertising income.

"Be skeptical," he said. "We are not in a mature [stage] and there are no stable products."

Draft Evader Hunt to Use Computerized Lists

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Following a plan opposed both here and across the country by the American Civil Liberties Union (ACLU), the Selective Service System will soon begin gathering high school graduation lists, drivers' license lists and any other computerized listings it can use to track down the tens of thousands of eligible American males who failed to register for the draft this summer.

"There are hosts of lists that are available to us under the law, and we will utilize them all," Joan Lamb, Selective Service spokeswoman, told *Computerworld*.

But the ACLU has begun contacting local school officials requesting they not provide computerized graduation lists to the Selective Service. The same has been done for officials of state motor vehicle departments.

Lamb said the Selective Service will follow the privacy laws in obtaining and using the lists — which will be matched against the Selective Service's basic data file of registrants, expected to be completed within the next month — but she believes the various federal and state laws allow enough leeway to gather enough files to track down most nonregistrants.

'Not Many People'

"There's not going to be that many people to identify," she said, noting the Selective Service estimates 93% of the 3.88 million draft-age males have registered and there is "a steady trickle" of completed registration forms still coming in. The rate is much higher at this stage of the registration than it was during the 1973 registration, when the Selective Service eventually claimed 98% voluntary compliance.

Those who do not show up at post offices to fill out registration forms will be identified through the data matching techniques and their names turned over to the Department of Justice, Lamb said. Then they "will probably get a vist from someone at the local FBI office," according to Lamb, who added "it is my understanding they will give them an opportunity to register" before the government decides whether to prosecute.

The maximum penalty for not registering is a $10,000 fine and five years in jail.

Selective Service refused to say how the lists will be gathered and the actual data matching done. David Cox, associate Selective Service director of management information systems, whose office would carry out the data-matching operation, would not discuss any details of the program.

Cox said no decision has been made on how enforcement of the draft registration law will be handled, nor would he confirm Lamb's statements that a data matching program is definitely in the works.

"We haven't determined the final policy on that," he said. "There are several alternatives [to enforcement], final alternatives that we'll be considering." No decision will be made until the formal registration is complete, he added.

The Selective Service is now sending out acknowledgement letters to registrants to inform them of the data the agency has on record for them. As those letters return, either confirming the accuracy of or correcting that information, the agency will complete its files and then be in a position to consider enforcement alternatives, Cox said.

Lawsuit Pending

The ACLU, however, hopes by that time — roughly mid-November — to have a decision on its lawsuit against the Selective Service. Now pending in U.S. District Court here, the suit challenges the Selective Service requirement that youths supply Social Security numbers when registering. The ACLU expects Social Security numbers to be the prime instrument for data matching, according to ACLU counsel David Landau.

Landau said the suit is based on the wording of the Selective Service law. "There is nothing in the statute that authorizes that disclosure [of registrants' Social Security numbers]," he pointed out, "and we feel it violates the Privacy Act."

According to the ACLU's reading of the Privacy Act, the draft registration effort constitutes a "new system of records and therefore we think they would have had to get a statutory exemption from the [privacy law's] prohibition on requirement of social security numbers," he said.

"And given the fact that Selective Service has stated that they'll prosecute you if you don't give your Social Security number, we think that is exactly what the privacy act was designed to protect," he said.

By forcing the Selective Service to delete those numbers from its files, data matching should be made more difficult, according to Landau. At the same time, he added, local ACLU chapters are trying to keep the lists needed for the data matching from being turned over to the Selective Service.

Landau said the ACLU has begun contacting local school officials requesting they not provide computerized graduation lists to the Selective Service. The same has been done for officials of state motor vehicle departments, "but motor vehicle departments have written back to us saying '[registration enforcement] is a worthy cause,' " Landau said.

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Electronic Newspaper Plans Spark Union Strike

By Marguerite Zientara
CW Staff

MINNEAPOLIS – About 650 members of three unions at the Minneapolis Star and Tribune Co. here have gone on strike protesting, among other things, the newspapers' entry into Compuserve, Inc.'s experimental electronic newspaper project.

The firm, which publishes the morning *Tribune* and the afternoon *Star*, announced in June that it intended to go ahead with the experiment, although contractual agreements "have not been committed to writing, let alone signed," according to business manager Lee Canning, who noted there is a "very fine line" between negotiations and a final agreement.

In the area of electronic newspaper experiment, workers are concerned about both job security and jurisdiction – "who's going to do the work and where it's going to be done," according to Newspaper Guild spokesman Robert Haygen.

In addition, "we have a clause in our present contract that now provides that our members get 25% of the profit of any material that's resold by the paper to someone else," Haygen explained. "The company has proposed striking that language from the contract so that there would be no obligation on them to pay for material sold electronically."

No Money Estimates

As for an estimate of how much money workers stand to lose in the matter, no one seems to know. "One of the problems in this whole affair is that we've been unable to get a good grasp of what the future holds in this area," Haygen said. "The company has been unable to tell us exactly what they have planned – perhaps because they don't know, I'm not sure – but it's difficult to arrive at any accurate figures on what the value of it is until we're able to figure out what they're trying to do."

Besides protesting the electronic delivery of newspapers, workers struck in a bid for higher wages, a revision of the company's seniority policy and company car expense policy and assurances of job security.

And while the strikers are bargaining for several concessions, management feels everything but the money issue is a "smokescreen," according to Canning. "They want to gouge us for more bucks," he contended, adding, "We want to treat people as employees, not as stage actors."

On strike are 450 members of the Newspaper Guild, including reporters, copy editors, photographers, circulation district managers, promotional personnel, copy aides, news technicians and clerical workers. In addition, 170 members of the mailers Union and "about 20" Machinists Union members are participating, Haygen said.

The other 10 unions represented in the plant are honoring the picket lines, Haygen said.

Meanwhile, about 600 management and nonunion personnel are rising to the "daily challenge" of publishing limited editions of the two papers, which are being sold "out the front door" because the truckers are honoring the strike, Canning explained.

Calling the effort to continue to publish "rather marginal," Haygen noted that management "is urging people to cross the picket line to buy [the paper]."

While a Compuserve spokesman would not comment on the Minneapolis situation, he noted his firm has encountered no similar problems with other papers planning to take part in the project.

A total of 13 U.S. newspapers have signed up for the experiment, all of them Associated Press members, the spokesman noted. With all of them scheduled to hook into the system one at a time "between now and July 1981," according to Compuserve, Minneapolis will join in late spring or summer 1981, Canning said.

As for whether the electronic newspaper poses a serious threat to the newspaper business, Compuserve's spokesman commented that it could not even begin to replace the newspaper.

"The project is simply an experiment to see how it works, whether people like it, to see what people want delivered electronically and to see whether it is, indeed, the up-and-coming technology," he maintained.

DPers Seen Pulled Into Office Unions

(Continued from Page 1)

18, Sept. 15].

But unionization vs. nonunionization is not the immediate issue here, Cohen explained. The question "that we're facing in all these cases is whether data processing is a sufficiently distinct group, a new group, a newly developed field of technology that's now coming into play in airlines and railroads more and more, to warrant their own representation. Because I don't think there's any question on the board's part that these people are covered by the [Railway Labor] Act.

"The only question," he continued, "is whether they belong in the office/-clerical grouping or whether they are independent of that."

According to NMB practices, "all the carriers' employees in the same craft or class have to be in a single craft or class," Cohen said. "And there has been an historical tendency not to split crafts or classes into little pieces."

Keeping that in mind, it should be noted that in the Western case, "the board determined," according to Cohen, "the community of interest of these people [DPers] was with the office/clerical craft or class."

Confusing Terms

Cohen objected to the term "forced unionization" and cautioned that the term "clerical union" should not confuse DPers who might be anxious about suddenly finding themselves represented by Brac or other "clerical" unions.

"We're not throwing $40,000-a-year programmers into a group of $10,000-a-year file clerks," he said. "There are plenty of highly paid technical people in these crafts and classes and they have historically been there."

Such unions are "not limited to clerical employees," Cohen said. "It's white collar, office units of nonmanagerial people. It includes accounts and various kinds of technicians. It might include engineers."

Cohen said the board believes it acted fairly in assigning Western's DPers to Brac membership. The board conducted hearings at which Western argued its DPers were management officials. All points of view were presented, he said.

In addition, the board felt it had sufficient expertise to judge the merits of Western's arguments. "We also have data processing within our own staff," he noted. "We have a manager of computer services, our own computer setup. So we're familiar with what they do. We're not shooting in the dark on it."

Efforts by the affected employees to reverse unionization of their shops have so far been unsuccessful, although a petition by some 40 Union Pacific DPers to be granted their own union is still pending before the board.

Whatever the outcome of that proceeding, Brac will almost certainly press its DP unionization campaign at other railroad and airline carriers, according to Cohen. "I don't see how Brac or any other organization that represents white-collar people can leave data processing out for very long," he said. "I think there are too many people there to ignore."

The prospect of Brac's success is enhanced by NMB's administration of the National Railway Act, which established the agency. NMB tends to make industrywide decisions for the two industries, so allowing Brac to represent Western's DPers could be a powerful precedent unless the board agrees to the Union Pacific DPers petition for independence from Brac, he said.

All other sectors of private industry, on the other hand, are under the guidance of the National Labor Relations Board, which tends to set up union representation by identifying "appropriate bargaining units," according to Cohen. Such units could be small crafts or groups of employees of a single company or individual plants or firms.

As for the railroads, Brac has an even greater advantage because, Cohen said, "there is a great deal of standardization" in the industry. In recent national negotiations between Brac and railroad representatives, the union demanded to represent increased numbers of white-collar employees who had previously been nonunion.

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To Intel's 'Surprise and Satisfaction'

IBM Continues VM Support for Fast-3805 FBA

By Rita Shoor
CW Staff

WATERLOO, Ont. — Customers for Intel Corp.'s version of fixed-block architecture (FBA) on its Fast-3805 semiconductor disk will not have to worry about withdrawal of IBM support for VM operating software — much to Intel's surprise and satisfaction.

Use of Intel's IBM-plug-compatible Fast-3805 with the recently introduced native mode (NM) [CW, Sept. 8] required modifications to VM, and a company spokesman had indicated that once altered, a VM operating system would not be supported by IBM. Instead, all future releases of the modified VM system would be supplied by the University of Waterloo, Ont.

That type of overall system support will not be necessary, according to Romney White, associate director of systems at the university. Citing the IBM "Information Bulletin for Customers' Alterations to IBM-Supplied Programs" (No. G120-2238-0) as his source, he indicated that IBM will, in fact, support the unaltered portions of its system control software. "Thus, our technicians will only have to provide support for the VM software modifications that we developed," he said.

'Reasonable' Interpretation

An IBM spokesman was unable to obtain immediately a copy of the specified manual. However, he agreed that White's statement was a "reasonable" statement of the position IBM's marketing staff takes with its customers.

Intel said it had misinterpreted the information it had originally received from White's group. "We'll arm our salesmen" with the correct information, Herb Oberman, product manager, said. He also stated that end users who form the customer base for the Fast-3805 operate in the type of sophisticated installation that would already be aware of IBM's position on alterations to system software.

The VM modifications were developed essentially by one person over a time period of a few weeks, White explained. The university technical staff had recognized the need for fast paging under its 370/VM operating system and had expressed interest in the Fast-3805 when it was originally announced.

Hardware Configuration

The Waterloo hardware configuration had included two IBM 2305s for several years, he noted, but contended that the 2305 was more expensive and had less available formatted space than Intel's unit. "We could only use 9.2M bytes on each of the 2305s while the 3805 with NM allows full use of 12M bytes at a minimum," he said.

The decision to begin work with the 3805 may have been precipitated by the replacement of the installation's IBM 3031 mainframe with two 4M-byte 4341s, according to White.

Since another 2305 with an additional control unit would have been required, we would have been paying more to lease three 2305 drives and two controllers than we paid for the two 4341s with associated memory, he recalled.

"We suggested to Intel that they might want to consider FBA for the 3805," he said.

After negotiations conducted during May in Phoenix, the university agreed to develop the VM software modifications required to support the 3805 under NM.

There were basically two changes that had to be made because of the difference between the 3805 and any other direct access storage device, he said. First, the channel commands for the 3805 are different from both IBM FBA and count-key-data commands, he noted. Second, a new device-type code had to be added to identify a 3805 operating in NM to the VM operating system.

We don't anticipate many problems in supporting the modifications because the changed code isn't modified by IBM very often, White pointed out, and "the modifications aren't that extensive."

The university served as a beta test site for the Fast-3805 with NM during "approximately one week in August," according to White. Intel did its own engineering testing, he explained, and "we made the software changes and debugged them one weekend. It's been running ever since."

Although the Waterloo technicians are primarily engaged in running a computing center for the university, White said the Intel 3805 project was not their first venture into joint software development projects.

Correction

In announcing plans to introduce a high-end B7900 and mid-range B4900 additions to its 900 series of computer systems, Burroughs Corp. Chairman Paul S. Mirabito was quoted as saying both CPUs would be compatible with Burroughs' existing upper end B6900 CPUs. The B4900 will not be software compatible with the B6900, a spokesman said.

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Net Standards Seen Opposing System Trends

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — "Almost all" of the computer network standards now being developed by national and international groups "fall apart when viewed in terms of contemporary system trends," according to K.J. Thurber of Univac.

In a paper presented here last week at Compcon '80, a conference sponsored by the Institute of Electrical and Electronics Engineers, Thurber contended that X.25 and the recently developed "reference model" developed by the International Standards Organization (ISO) cannot accommodate hierarchies composed of internetted local area networks. "The view of networks as a hierarchy is extremely important," he added, "because it is the only one which allows for rapid network development and isolation of design problems for future study."

Thurber indicated that until this division within the standards community is resolved it will slow the development of distributed systems.

Remotely Controlled Sites

Another presentation at the same Compcon '80 session, which was entitled "Network Architecture for Distributed Computers," described a scheme for increasing the capacity of distributed networks through the use of remotely controlled, unattended sites.

In this Distributed Machines System (DSM), explained George McQuilken of IBM, one or more IBM 370 processors, utilizing the VM/370 operating system, each runs a number of similar machines from remote locations. DSM has been implemented in IBM's Subsystem Unified Network (SUN), which consists of 328 processor nodes in 76 cities spread among 16 countries.

The original DSM configuration consisted of two 370s — a VM 370/158 at the central (host) site and a VM 370/135 at the controlled (drone) location. Attached to the drone was a microprocessor-based restart processor which served as the 135's control device. The processor was connected to the 158 by a dial-up communications link. Later, the drone system was replaced with an IBM 4331 processor with a built-in control unit, but the basic operation remained the same.

"Programmed operator" software allows the drone to be run remotely by a person located at the host site, McQuilken explained. "All the operations normally performed at the drone console can be done by the host operator. Physical services, such as mounting tapes or changing paper, have to be performed locally, but these functions are performed by semiskilled office personnel.

Included in the control software is a remote performance monitor which provides three basic functions:

- Threshold and warning messages. Whenever CPU, I/O, paging, or spool utilization exceeds a preset maximum, notice is sent to the host operator. Warning messages are also sent for missing I/O interrupts and for I/O errors.
- Performance displays. A variety of displays describing system and user status can be requested by the host operator.
- Trace display. A formatted and interpreted display of CPU trace tables can be called and used for debugging.

"We have successfully demonstrated a system that can run unattended, receiving operational and system programming services through a network," McQuilken said. "Such a system can be used to extend a large network, such as SUN, into locations too small to justify a fully staffed computer center."

Another possible application of DSM, he added, would involve replacement of a large central processor with unattended nodes at major user locations.

"We anticipate that a host operator could successfully run 20 to 25 drones," he said. "Of course, other staff may have to be increased, but there is no reason to believe that distributed machines would require more staff for system programming and user assistance than a large centralized computing center does today."

Productivity Ills Tied to Management Focus

(Continued from Page 1)

leagues to "leave behind the age of MIS" and to move forward to computer-aided management systems.

What is computer-aided management? It is a management support system that ought to be closely patterned after proven computer-aided engineering design systems, Price explained. Such design systems have four characteristics:

- As the machine and man work together, the system makes it convenient and easy for the engineer to describe the problems to be solved.
- The system automatically prioritizes and relates various data elements, then reduces the data to a form pertinent to the problem to be solved. The system helps the engineer visualize his problem.
- The system uses stored data on the physical and chemical properties of materials and algorithms based on laws of physics and mathematics to help the engineer determine the result of alternative solutions. And it will output the chosen alternative so that its implementation is easily accomplished.
- The final element of any knowledge system is feedback and self-improvement.

These characteristics are found not only in engineering design systems but also in computer-aided medical systems, Price noted. Why not in American business?

Wrong Questions

Chiefly because the managerial question is likely to be "Why?" not "What if?" According to Price, top managers are more likely to ask the question, "Why is productivity declining?" rather than "What if productivity declines?"

"The point is," Price emphasized, "that because management processes themselves are not adequately understood, computer assistance in those processes is at best simplistic and at worst it actually hinders the management process."

What then are the objectives of a computer-aided management system for top management?

First, such a system is defined only by looking at the specific management purpose to be assisted and only as a part of a total process that assists that purpose.

Second, the system, as opposed to an MIS system, does not present all data on a class of problems. Rather, it correlates and synthesizes specific data and solutions for a specific problem. That is, it generates knowledge, not information.

Third, there is a direct input to the manager via the system from the employees.

The key fact is this, according to Price: "An effective system can only be built by examining a basic management process as to its data gathering, analysis, decision-making and feedback elements. Only then can a computer process be conceived that will assist or augment those processes.

Pan Am Grounds National Air DP

By Connie Winkler
CW Staff

MIAMI — Pan American Airlines, which recently acquired National Airlines, has grounded National's DP operation here and offered most of the data center's 106 employees the choice of moving to the Pan Am data operation in Rockleigh, N.J., or leaving.

The large National reservations systems, which handled thousands of calls a day, will be shut down in mid-November. However, the commercial operation is expected to continue through mid-1981.

Because the employees have been offered generous severance benefits if they stay with National until the entire operation is down, most are still uncertain about their future plans, according to a National employee who asked not to be identified. About 10 employees are believed to have left already.

Many of the National employees want to stay in Miami because of the cost of living and climate, the employee said.

Despite the general high demand for DP employees, one recruiter, David Strasberg of Data Sciences Personnel, Inc. in Hollywood, Fla., is uncertain how easily the National employees will move to other commercial areas. The airlines' work with specialized reservations systems that are considerably different from commercial Cobol programming, he explained.

About a year ago National culminated a large hardware upgrade which included the acquisition of 26 spindles of leased Memorex Corp. 3650 high-speed, high-density disk storage and three IBM 370/158s, also leased. What will happen to that hardware is also unsure at this point.

9th Comparative Data Base Management Systems National Conference

This unique conference provides a meeting place to review and compare a significant set of the systems now available and learn about their characteristics from speakers with firsthand experience in developing and utilizing leading DBMS.

Systems presented include examples of applications of a variety of data representation and structuring techniques and examples of diverse manipulation languages such as host-based procedural or English-like nonprocedural. The products span a full range of applications and are operational on a variety of microcomputers, minicomputers and large processors. They also include completely integrated software systems such as TP Monitors, Report Generators, Transaction Processors, Data Dictionaries, and Query Languages. The systems presentations are preceded by sessions on data base fundamentals, data base architecture and new developments in data management. There is a comprehensive review of the steps and guidelines in the procurement/selection of data base management systems and of the comparative matrices of key features that summarize each product and provide the framework for the systems comparison. There is a session on recent technological advances and current problems under research.

UCLA Extension

This is no time to let up.

Each participant receives a copy of the visuals and texts of the vendors' presentations and large matrices comparing the key features of such leading **DBMS** as *ADABAS, DATACOM/DB, DATAPOINT 2200, DBMS (Prime), DBMS 10/20, DBMS 11, DBMS-990, DG/DBMS, DMS II, DMS 1100, DMS 170, DMS 90, DPL, DRS, ENCOMPASS, EXPRESS, FOCUS, GIM-II, IDM 500, IDMS, IDS-II, IMAGE, IMS, INGRESS, INQUIRE, IQ/NET, MADMAN/MADTRAN, MANAGE, MAPPER, MDBS, MODEL 204, MRDS, NOMAD, OLIVER, ORACLE, QUESTOR, RAMIS II, RIMS, SEED, System 1022, System 2000/80, TOTAL, WALOS-II.*

Coordinators:
John J. Rosati, BA, Manager, Minicomputer and Information Technology Laboratory, TRW Defense and Space Systems Group
Clay Sprowls, PhD, Professor of Computer and Information Systems, Graduate School of Management, UCLA

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Includes 32-Channel Extension

Amdahl Offers Multiple Enhancements for 470

By Rita Shoor
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. has announced several enhancements for its 470 mainframe product line that include a 32-channel extension feature, 4,096 subchannel capability and a 470 Extended Performance Accelerator, Amdahl said.

At the same time, it announced seven software products:

- MVS/Extended Channel Support (MVS/ECS).
- VM/Extended Channel Support (VM/ECS).
- Mulitple System Communication and Control (MSCC).
- Universal Timesharing System (UTS).
- MVS/SE Assist Release 2.1.
- MVS/SE Support Release 1.0.
- Airline Control Program (ACP) Support.

Additional I/O Channels

Additional I/O channels will be available on the V/7 series and V/8 computer system in 24-, 28- and 32-channel configurations, according to an Amdahl spokesman. Software support for the additional channels will be available under VM with the VM/ECS program product, he said.

The user with an MVS operating system will have software support for the channel extension feature via the VMS/ECS program product, he said.

Purchase prices for the 24-, 28- and 32-channel configurations are $425,000, $575,000 and $725,000, respectively, in addition to the 16-channel configuration price. Additional monthly maintenance costs range from $2,260 to $3,260 with two- and four-year lease plans also being offered, Amdahl said.

VM/ECS licensing costs $1,000 per processor monthly with MVS/ECS licensed for $500 per processor on a monthly basis, according to Amdahl. First customer shipment for the additional channels with VM/ECS is planned for the second quarter of 1981. Additional channels with MVS/ECS are scheduled for fourth-quarter 1981 delivery.

Amdahl is also offering a 4,096-subchannel capability for the 470/V7B, V/7A and V/8, according to a company spokesman. This option is priced at $50,000 with no additional maintenance fee and first customer shipment is scheduled for the second quarter of 1981.

The final hardware announcement was the 470/Extended Performance Accelerator. Said to increase the performance of a 470 V/7B by as much as 50% to the level of the 470 V/7 with a single operator command, this feature "allows the 470 V/7B to back up any large computer system," according to Michael Clements, vice-president of engineering.

Available only on an hourly charge basis of $300/hour so that "the user pays only for the number of hours the system is in the accelerated mode," he continued, there is an additional $2,500 factory installation charge. Field installation costs $3,000 and initial shipments are scheduled for the fourth quarter of 1981, Amdahl said.

Highlighted in the list of software offerings are Amdahl's MSCC and UTS program products.

MSCC is utilized to loosely couple two processors and provide the end user with greater flexibility in job scheduling, a spokesman claimed. Although MSCC can be used to join two Amdahl-compatible processors, it is only being marketed to installations with at least one Amdahl processor.

UTS is essentially a modified form of the Unix time-sharing operating system Version 7 from Bell Laboratories, the spokesman continued. Amdahl's version reportedly brings Unix functions to large-mainframe end users.

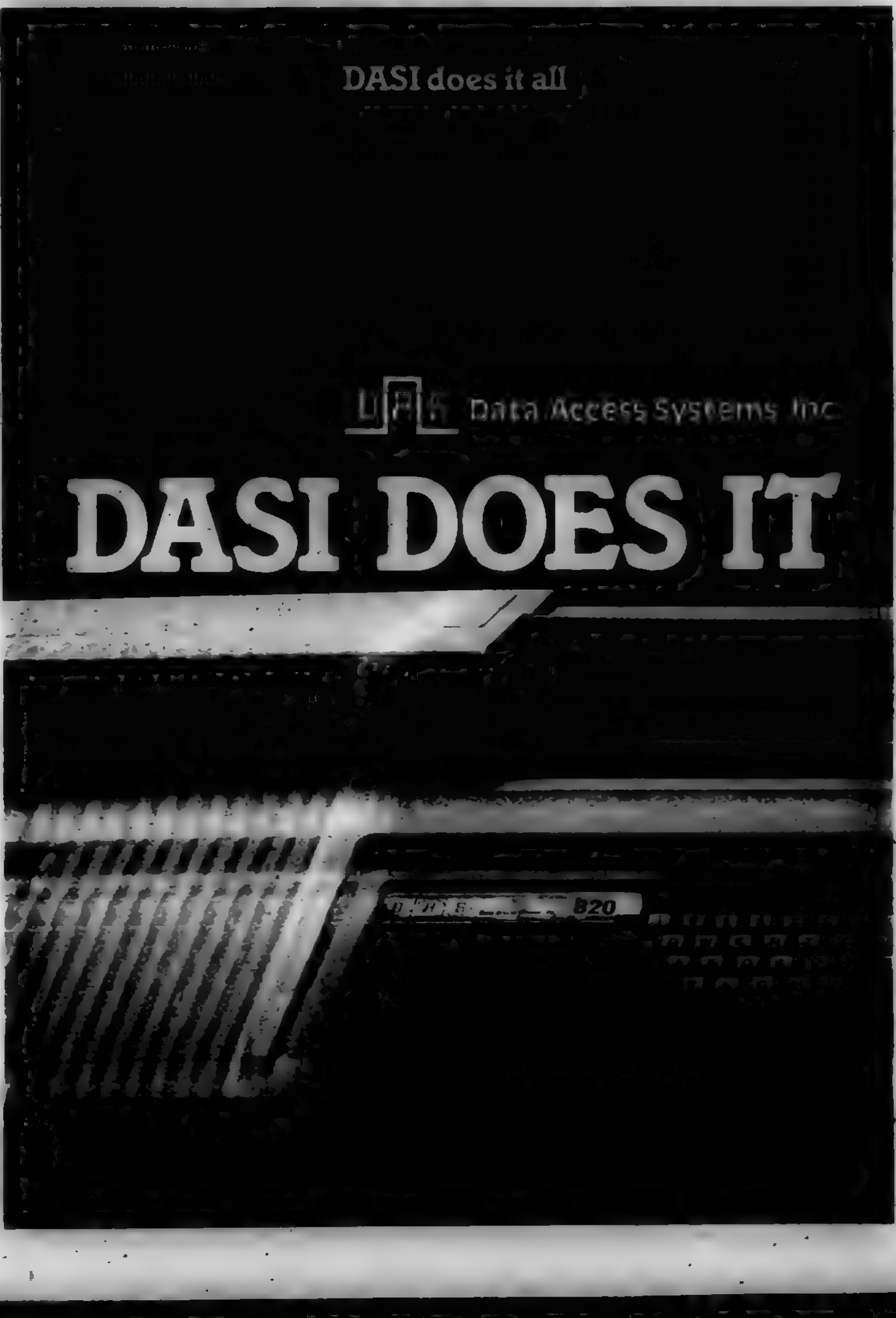
MSCC first customer shipment is planned for the first quarter of 1981 and is priced at $250 per processor on a monthly basis. Available the second quarter of 1981, the UTS monthly fee is $3000 per processor, according to Amdahl.

In line with previously announced plans to make internally developed software available to Amdahl-compatible sites without requiring that they also have 470 series hardware installed [CW, May 19], Amdahl is making its MVS/SE Assist (MVS/SEA) software available to this customer base. MVS/SEA allows IBM's MVS/-SE Release 2 to execute on Amdahl-compatible uniprocessors without the extended facility feature, a spokesman explained.

Another program product MVS/SE Support (MVS/SES), is specifically targeted toward older IBM 370 attached processor and multiprocessor system, he said. MVS/SEA and MVS/SES are reportedly functionally equivalent to additional machine language instructions in the extended facility of 370 Model 30 series and the extended feature of 370 models 148 and 168.

MVS/SEA is offered at a monthly fee of $250 per processor with the MVS/-SES monthly cost being $1,750 per complex.

Amdahl ended its announcement with a formal statement of support for ACP and backed up this statement by introducing two five-day classes for ACP users costing $900 each.



CW Product Spotlight: Report Generators . . .

System / Characteristics	ANSWER/2 Informatics, Inc.	ASI-ST Applications Software, Inc.	CA-EARL Computer Associates, Inc.	CULPRIT Cullinane Corp.	THE DATA ANALYZER Program Products, Inc.	DYL-260 Dylakor Software Systems, Inc.	EASYTRIEVE Pansophic Systems, Inc.	EXTRACTO [illegible], Inc.	MARK IV Informatics, Inc.	QUIKJOB III System Support Software, Inc.	UTILITY-CODER Cambridge Computer Associates, Inc.
[illegible]	Report generator.	Data management and reporting system.	Report generator with data management capability.	Information retrieval system and report generator.	Report generator.	File editor and report generator.	Reporting system and file management utility.	Data management and reporting system.	Data management system, nonprocedural application programming language and report generator.	Application programming language and report writer.	File and data processor with capabilities for data editing, retrieval and report generation.
CPU and Operating System Requirements	IBM 360, 370, 30 series and 4300 under: All OS and DOS versions.	IBM 360, 370, 30 series and 4300 under: OS, OS/MVS, OS/VS1, OS/VS2, OS/MVT, OS/MFT, DOS, DOS/VS, DOS/-VSE.	IBM 370, 30 series, 4300 under: OS, OS/MFT, OS/-MVT, OS/VS1, DOS, DOS/VS, DOS/VSE, MVS.	IBM 360, 370, 30 series, 4300 under: OS, OS/VS1, OS/-VS2, OS/MFT, DOS, DOS/VS DOS/VSE.	IBM 370, 30 series, 4300 under: OS, OS/VS1, OS/-VS2, VM, DOS DOS/VS, DOS/-DOS/VS, DOS/-VSE.	IBM 360/30, 370, 30 series, 4300 under: OS, OS/-VS, DOS, DOS/-VS, VM/CMS.	IBM 360, 370, 30 series, 4300 under: OS, OS/MFT, OS/-MVT, OS/VS1, OS/SVS, OS/-MVS, DOS, DOS/-VS, DOS/VSE.	IBM 360, 370, 30 series, 4300 under: OS, OS/VS1, OS/-VS2, MVS, DOS, DOS/VS, DOS/VSE, VM/-CMS.	IBM 360, 370, 30 series, 4300 under: All OS and DOS versions.	IBM 360, 370, 30 series, 4300 under: All OS and DOS versions including DOS/VSE.	IBM 360, 370, 30 series, 4300[9] under: OS, CMS, DOS, DOS/VS.
Minimum Core Requirements (in Bytes)	Nonvirtual: 75K. Virtual: 160K.	85K to 120K with IMS or Total interface.	120K	Load module: 46K. For basic run: OS: 80K. DOS: 52K.	OS: 140K. DOS: 108K. (Nonvirtual systems)	OS: 50K. DOS: 40K.	OS: 74K. DOS: 68K.	64K	Nonvirtual: 75K. Virtual: 150K.	OS: 66K. DOS: 46K.	OS and CMS: 64K. DOS and DOS/VS: 32K.
Price (Basic System)	OS: $20,000. DOS: $15,000.	$18,000 (Mini ASI-ST).	$9,000	$20,000 (stand-alone). $25,000 (with DBMS interface).	OS: $24,000[2]. DOS: $20,000[2].	$8,500	OS: $18,500. DOS: $15,000.	$10,000	OS: $60,000. DOS: $35,000.	$5,445 with Quikwrite option[7]: OS: +$3,085. DOS: +$4,085.	OS and CMS: $5,130/year rental[8]. DOS and DOS/VS: $3,762/year rental.
Source Language	Assembler	Assembler	Pascal compiler generates assembler source code.	Assembler	Assembler	Assembler	Assembler	Assembler	Assembler	Assembler	Assembler
[illegible]	Cobol, Fortran, PL/I, Assembler and any other that supports standard IBM call conventions.	Cobol, Fortran, PL/I, Assembler.	Cobol, Assembler.	Cobol, Fortran, PL/I, Assembler.	Cobol, Fortran, PL/I, Assembler and any other with normal linkage to OS and DOS.	Cobol, Fortran, PL/I, Assembler.	Cobol, Fortran, PL/I, Assembler.	Cobol, Fortran, PL/I, Assembler.	Cobol, Fortran, PL/I, Assembler and any other that supports standard IBM call conventions.	Cobol, PL/I, Assembler.	Cobol, Fortran, PL/I, Assembler.
Macro Capability?	Not Applicable	No	Yes	Yes	Yes	Yes	Yes	User can catalog a series of statements that can be called by a single symbolic name.	Not applicable	With Quikwrite	No
File Structures Supported	Automatically: Sequential (Qsam), indexed sequential (Vsam). Not Automatic[3]: Bdam.	Sequential, indexed sequential, hierarchical.	Sequential, indexed sequential, Vsam.	Isam, Vsam, sequential, direct, Rdam, DBomp, MRP-CFMS, CFO, Alis.	Isam, Vsam, sequential, direct (Bdam), tape, disk.	Sequential, Qsam, Isam, Vsam, all standard I/O devices.	Sequential, variable, variable spanned and keyed files such as Isam, Vsam, Bdam.	Sequential (Qsam), indexed sequential (Vsam), direct (Bdam), Isam.	Automatically: Sequential (Qsam), indexed sequential (Vsam). Not Automatic[3]: Bdam.	Isam, Vsam and all other IBM standard access methods.	Multiple input and output sequential.
Multiple File Processing (and Limits)	Yes. Maximum No. of input files or data bases at one time is 16.	Yes. Up to 9 master files and unlimited number of independent files.	Yes. Unlimited.	Yes. Unlimited (256).	Yes. Up to 6 files, or up to 56 files with extended table look-up facility.	Yes. 1 to 8 input files and 1 to 8 output files plus report[5].	Yes. Base system: 2 in-input files and any No. of output files and/or reports. With Unlimited Sequential Input/-Ouput option: Any No. of input/output files.	Unlimited	Yes. Maximum No. of input files or data bases at one is 11.	Yes. Up to 4 input and 4 output files.	Yes. OS and CMS: Up to 16 files. DOS and DOS/VS: Up to 6 files.
No. of Report [illegible] per [illegible] File [illegible]	255	Unlimited	63	160	80	99	Unlimited	250	255	1	Unlimited
Data Dictionary/Directory	Central library of file definitions.	User defines data structure through ASI-ST Data Dictionary.	CA-Earl source definitions.	Not required — can use Culprit input. For storing definitions, can use most commercially available source statement libraries or can use Information Directory.[4]	Own data dictionary (File Data Definition Library).	Can set one up but not required. Don't have to predefine fields for physical files.	Easytrieve macro utility.	All file definitions cataloged in Extracto dictionary.	Central library of file definitions	Quikjob III users define files in package — self-contained so no additional disk space needed. Central on-line dictionary for Quikwrite only.	No true data dictionary. Symbolic data reference, and indexing and indirect addressing capability.
Load and Go?	No — compile and go.	No — compile and go.	Yes	Yes	Yes	Yes	Yes	Yes	No — compile and go.	Yes	No — compile and go.

. . . Story Begins on Page 1

DBMS Interfaces	Automatically: IMS, DL/1, Total. Not Automatic: Adabas, System/-2000, IDMS.	With option features: IMS, Total.	IMS, DL/1 and others, if user-defined.	IDMS, IMS, Total, Adabas, System/2000, DL/1.	IMS, DL/1, Total, IDMS and others through a generalized file-handling methodology.	IMS, DL/1, Total, Adabas, Datacom/DB.	IMS, DL/1, IDMS, Total.	IMS, DL/1, Total, Model 204, Rapid[16].	Automatically: IMS, DL/1, Total. Not automatic[3]: Adabas, System/-2000, IDMS.	IMS, DL/1, IDMS. Interfaces to Total, Adabas and Datacom/DB cost extra.	None
Report Request Language	English-language fixed-form or free-form.	Fixed-form, defaulted.	English-language free-form, defaulted.	English-language free-form plus option for fixed-form coding.	Free-form, defaulted.	Fixed-form, defaulted.	English-language free-form with a default format that can be overridden with key word options.	English- (or French-) language free-form, single coding form.	English-language fixed-form or free-form.	English-language form with Quikwrite, also also defaulted.	Free-form, defaulted. Layout is user-defined.
Automatic Composition?	Yes	Yes	Yes	Yes, through Automatic Report Formatting facility.	Yes	Yes	Yes	User names fields and determines order in which they are printed.	Yes	Yes, with Quikwrite.	By user definition only.
Columnar Reports?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	By user definition only.
Totaling Capability?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	By user definition only.
Cross-Footing Capability?	Yes	Not Automatic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not Automatic	By user definition only.
Cross-Tabulation?	Yes	Not Automatic	Yes	Yes	Yes	Yes	Not Automatic	Yes	Yes	Not Automatic	No
Can System Create and Save Object Code?	No	No	Yes	No	Yes	Yes	No	No	No	No	No
Can User Define Own Arithmetic Expressions?	Yes	Yes	Yes	Yes	Yes	Yes, except for exponentials.	Yes	Yes	Yes	Limited to Add, Subtract, Multiply and Divide.	Yes
Can System Translate Codes into Meaningful Values?	Yes, through Automatic Table Look-Up facility.	Yes, through Extended Table Handling facility.	Yes	Yes	Yes, through table look-ups and logical compare and replace.	Yes	Yes	Yes	Yes, through Automatic Table Look-Up facility.	Yes	Yes
Does System Have Its Internal Sort?	Yes	No[10]	Yes	No, executes the sort package on the IBM system.	No, executes the sort package on the IBM system.	Yes	Yes	Part of Extracto's catalog procedure that invokes the sort package on the IBM system.	Yes	Yes	No, executes the sort package on the IBM system.
Maximum No. of Lines of Report Headings	Title: Unlimited. Column: 9 lines.	Unlimited	Unlimited	Unlimited	Title: 6 lines. Column: 3 lines.	Title: 9 lines. Column: 9 lines.	Title: 4 lines. Column: 3 lines.	Title: Up to 16 lines. Column: Up to 16 lines.	Title: Unlimited. Column: 9 lines.	6 lines	Unlimited
Maximum No. of Lines User Can Print per Record	132	User can retrieve 4,078 bytes of unedited information and print it on as many physical lines as required.	Unlimited	Unlimited	Unlimited	99	Unlimited up to a maximum of 25 fields on all lines.	Unlimited	132	Unlimited	Unlimited
Maximum No. of Records User Can Input per Line	Unlimited	Unlimited on a summary report where columns represent summary totals. On any given line in a detail or summary report, information from any No. of records may be represented.	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
No. of Installations[11]	About 200	About 300	400 worldwide	About 800[12]	About 400	About 1,200	About 2,500 worldwide	About 800 worldwide (U.S.: about 450)	About 1,000	About 700 worldwide	59 worldwide
Initial Installation	1978	1968	1973	1968	1971	1972	1973[15]	1969	1966	1973	1968
Interactive Inquiry and Retrieval Capabilities.	Through TSO, CMS, IMS/DC[13] and CICS[13].	Conversational ASI-ST operates under TSO and IMS/DC.	Through CMS, TSO and compatible time-sharing systems.	Through Interact[14], Roscoe, TSO, CMS and in a CICS environment.	Through TSO and CMS. On-line options for IMS/DC and CICS are available.	Batch mode only.	Batch mode only.	One option works under TSO[17].	Through TSO, CMS, IMS/DC[13] and CICS[13].	Through TSO, CMS or any other on-line library system.	Batch mode only.

1. All products listed run on IBM and compatible mainframes. Some also run on other vendors' systems.
2. System can interface to the stated application programming languages through user exits, for example.
3. User can attach a routine to access these.
4. Cullinane's Information Directory (ID) is integrated with Culprit. First shipments of ID, a subset of the firm's Integrated Data Dictionary (IDD) for other than IDMS users, will begin in October.
5. Prices include two features that used to be extra-cost options: Multi-File and Datatran.
6. A multiple report feature is available and will be formally announced in October.
7. Quikwrite, an option to Quikjob III, is strictly a report writer and designed for non-DP-trained users.
8. No current 4300 users.
9. Vendor does not offer single-charge licenses.
10. Internal sort for ASI-ST data, but report data handled by user's own sort package.
11. May include multiple copies at a single installation.
12. Includes installations of EDP-Auditor, which is a version of Culprit with audit routines.
13. Interactive query development with background execution. The report can be routed either to a system printer or to any terminal in a network.
14. A December release of Interact will be integrated with Cullinane's IDD and ID, both of which are currently integrated with Culprit.
15. The year Pansophic acquired the product from Ribek Corp.
16. Rapid is a DBMS developed by the Canadian government agency, Statistics Canada. An IDMS interface will be available in the first quarter, 1981
17. Will be able to operate under CICS and IMS/DC in March 1981.

Why Demand for Report Generators?

By Marcy Rosenberg
CW Staff

What is pumping the demand for report generators to an all-time high?

The increasing implementation of DBMS is one factor fueling the growth of report generators, according to International Data Corp.'s (IDC) *Independent Packaged Software Reference Book* due out at the end of the month.

"Clearly any DBMS requires some sort of report generation facility and the market for packages that interface with a DBMS will provide strong growth for the independents," the report stated. IDC called the market for report generation packages "the fastest growing area for independent suppliers of utility software," with revenues expected to increase at 38% compounded annually through 1984.

Audit and Access Need

What will keep demand in pace with these projections — besides the influence of DBMS — is a growing need for auditing software and for timely access to information, IDC stated.

Citing a rise in the incidence of computer fraud and embezzlement, the market research firm predicted tools to audit data will grow more attractive. There are a number of specialized report generators on the market today that are designed for auditors. Among them: Pansophic System, Inc.'s Pan-Audit, Cullinane Corp.'s EDP-Auditor and Program Products, Inc.'s The Audit Analyzer.

The growing demand for immediate access to information by non-DP management is also proving a boon for report generators and for end-user-oriented query facilities with simple, English-like commands, the report observed.

New Wave Predicted

In fact, industry watchers predict the emergence of a new wave of products — interactive report generators that essentially would combine features of report generators and query systems.

Report generators normally run in batch mode to go against a set of data and produce a report: Preparation and background execution can be done interactively, but only under on-line facilities like TSO, CICS and IMS/DC and not via the package itself, noted Cary Morrill, market research analyst for IDC's Services and Software Information program.

Query facilities, on the other hand, normally run in on-line mode to read a file and produce an answer, though not as a formatted report because there is a limit to how much information a query system can provide before sacrificing response time.

As a compromise between the two, an interactive report generator would serve what Yale Landsberg, president of the consulting firm Omnibase Corp., termed "a large middle ground of users, that don't necessarily want to look at a whole file, but not just at a small part either."

A fully interactive report generator would also allow users to obtain answers to queries on-line as well as check syntax and other errors as a program is being written, Morrill pointed out.

The beginnings of this technology can be seen as report generator systems move from providing only fixed-form report request languages to offering English-like free-form syntax, a trend Kevin Cooper, Pansophic Systems, Inc.'s manager of retrieval systems development, maintained will ultimately lead to question-and-answer dialogue systems.

Packages Allow Off-Loading of MIS Tasks

(Continued from Page 1)

dent generalized batch report generators that run on IBM and compatible mainframes under both OS and DOS operating systems.

There are several packages that run under OS, but not DOS. These include Focus, a reporting and query language with data base management facilities from Information Builders, Inc., and Harvest, a data base reporting system from International Data Base Systems, Inc. One that runs only under DOS is CA-Dart from Computer Associates, Inc., which claimed the package will support OS operating system versions by the fourth quarter.

Overview of Packages

The chart is not an exhaustive list of all commercially available products in this classification, nor does it claim to describe every technical feature or parameter to be considered in a comparative evaluation. It presents, instead, an overview of 11 representative packages. All entries are based on manufacturers' claims.

Entries under the chart category, "Vendor Classification," relate how a vendor describes its own product, indicating whether the software is a stand-alone report generator or part of a data management or other system. The difference between the stand-alone and other packages lies in the extent of capabilities offered beyond strictly report writing.

Product Spotlight

For example, a report writer can be considered a read-only system; a data management system can have report generation capabilities but can also be a utility package and program development language in its own right, commented Carole Morton, director of software development for Dylakor Software Systems, Inc.

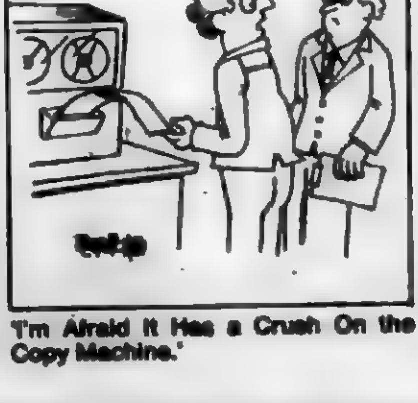
As a utility package, the data management system can perform such functions as reading files and selectively dumping records. As a program development language, it "should handle numbers of things Cobol could do — update and create files for example," she explained.

Inefficiencies Pointed Out

But as Yale Landsberg, president of consulting firm Omnibase Corp., pointed out, although data management systems allow users to generate reports without the need for programming, they accomplish this function less efficiently than would a Cobol program. "Data management systems are only as efficient in producing reports as the access method they use."

On an individual user basis, these inefficiencies are almost trivial. But, Landsberg added, as the package gains popularity in an organization and more and more individuals use it to run ad-hoc reports, "what was a gadfly of inefficiency becomes an avalanche."

Report generators grow more efficient, he said, if processed against a data base because the data is better laid out and more accessible.



'I'm Afraid It Has a Crush On the Copy Machine.'

Indeed, data base management systems (DBMS) can also provide report generation capabilities. However, those independent report generators that access only the files of their vendor's DBMS were not included in the chart because they are less "generalized" than specialized.

Examples of such data base reporting systems that run in IBM and compatible operating environments include:

- Cincom Systems, Inc.'s Socrates, which was designed to access only the files of that vendor's DBMS, Total. Cincom claims Socrates can also access non-Total sequential files and will be enhanced to also support Isam files.
- Software AG's Adacom for its Adabas DBMS.
- Applied Data Research, Inc.'s Datareporter for its DBMS, Datacom/-DB.
- International Data Base System, Inc.'s Harvest, which supports only the file structures of Seed — that vendor's DBMS.
- Arap's RPW II, the report writer option for that manufacturer's DRS DBMS.

Culprit, the report generation package of DBMS vendor Cullinane Corp., was included in the chart because it interfaces to several DBMS in addition to Cullinane's own IDMS and supports a number of non-IDMS file structures.

Besides the ability to interface to one or more DBMS, Cooper cited as another feature to look for in report generation systems the ability to produce reports in different formats — by modifying the package's default parameters, for example. As important is the ability to allow each line to have a different format, an especially valuable feature for organizations that rely more and more on preprinted forms. All products listed on the chart claim to offer this capability.

Other features these packages shared were that each lets users do conditional processing and allow multiple levels of logical expressions.

Another characteristic worth noting is the difference between "load and go" and "compile and go" report generators. Simply put, "load and go" systems can read input statements, determine what is to be done and begin the process, whereas the other type of system functions more like a compiler preprocessor — the source code generated has to be compiled into object code before processing can begin.

According to Cooper, whether or not a system is "load and go" may indicate something about its efficiency in terms of processing time and core requirements.

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Cost Factors Evaluated

Method Compares Centralized, DDP Networks

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A method for comparing the benefits of centralized vs. distributed data processing (DDP) networks was presented here last week by D.J. Sykes, of Honeywell, Inc. He was among the speakers at Compcon '80, a conference sponsored by the Institute of Electrical and Electronics Engineers.

Key factors to consider in evaluating the two architectures, Sykes said, are the costs of central and satellite processing sites, communications and queuing delays.

Regarding site costs, there may be an advantage in using a distributed architecture, he added, since the price per million instructions per second (Mips) processed tends to be less. Essentially, this is because the mid-range computers typically used as satellite processors have a better price/performance ratio than the larger machines employed in centralized systems.

"The minicomputer offers a lower entry price as a satellite [processor], but when configured with adequate memory, peripherals and communications . . . there is not a striking difference between the overall prices.

"Furthermore, a given instruction rate in a mini may or may not equate to the equivalent number in a larger machine, [and] the software differences between a mini and a larger machine can result in significant application development costs to the user," Sykes said.

While the cost/Mips ratio depends partly on the class of processor chosen, it also "can vary significantly with the instruction mix, cache hit ratio and I/O interference, which are dependent on the [processor] software characteristics," Sykes pointed out. Finally, the choice of lease or purchase . . . can substantially affect the value of this coefficient."

Because data communications costs can be compared, it is necessary to quantify "total traffic volume, the dispersion of the terminals, the bandwidth required, and the hours a user is connected per day," he added.

"For low-volume, long-distance and high-bandwidth situations, a value-added carrier usually is competitive. For high-volume systems with a high degree of natural clustering, it is usually more cost-effective to use leased circuits such as AT&T's Dataphone Digital Service (DDS)."

Delay Costs

In both centralized and distributed systems, he said, as utilization of a site processor or communications link approaches 100%, delay increases dramatically. The cost of that delay can be reduced, but only by purchasing more processor or communication capacity. Sykes' key point was that increasing one of these capacities often will produce far greater benefit than increasing the other.

"In a centralized or distributed system, there are several facilities cascaded, each contributing to the total delay at a user terminal. Each facility also contributes to the total cost, but not in the same proportion as its delay.

> *'In a centralized or distributed system, there are several facilities cascaded, each contributing to the total delay at a user terminal. Each facility also contributes to the total cost, but not in the same proportion as its delay. Consequently, by judicious selection of the value U [utilization] for each facility, the total cost can be reduced while maintaining the overall response time.'*

Consequently, by judicious selection of the value of U [utilization] for each facility, the total cost can be reduced while maintaining the overall response time," Sykes said.

To illustrate how these concepts can be applied, Sykes' paper included a comparison based on a system having the following characteristics: a peak load of 25 transaction/sec with a mean response time of 3 seconds; a data base of 1G bytes; 1,500 terminals divided into five geographic regions; concentrators or satellite processors 1,000 miles from the central host processor and connected via DDS; remote terminals in the same building as the concentrator or satellite processor; a capability of processing 80% of all transactions locally; and a cost of $15/user hour for service interruptions.

The comparison was based on a centralized network in which the host computer was connected to the remote terminals via five concentrators; a distributed system utilizing attended satellite processors instead of concentrators; and the same distributed system with unattended satellite sites.

The first step in the evaluation procedure, Sykes said, is to determine the capacities of the processing units and communication links needed to produce the required response time at the lowest cost.

"Next, the number of spindles of mass storage is determined, then the number of hours of service interruption is calculated using typical values of availability. Finally, the costs are determined using current figures for the industry," he added.

Sykes' conclusion was that the unattended distributed architecture would cost 80% as much as, and the attended distributed configuration would cost 10% more than, the centralized system. "Although the results are very specific to this case study," he noted, "the following observations can be made.

"The total cost of the distributed system is less than the centralized system only if the satellites are designed to be unattended," he added.

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SDI Knuckles Under Pressure

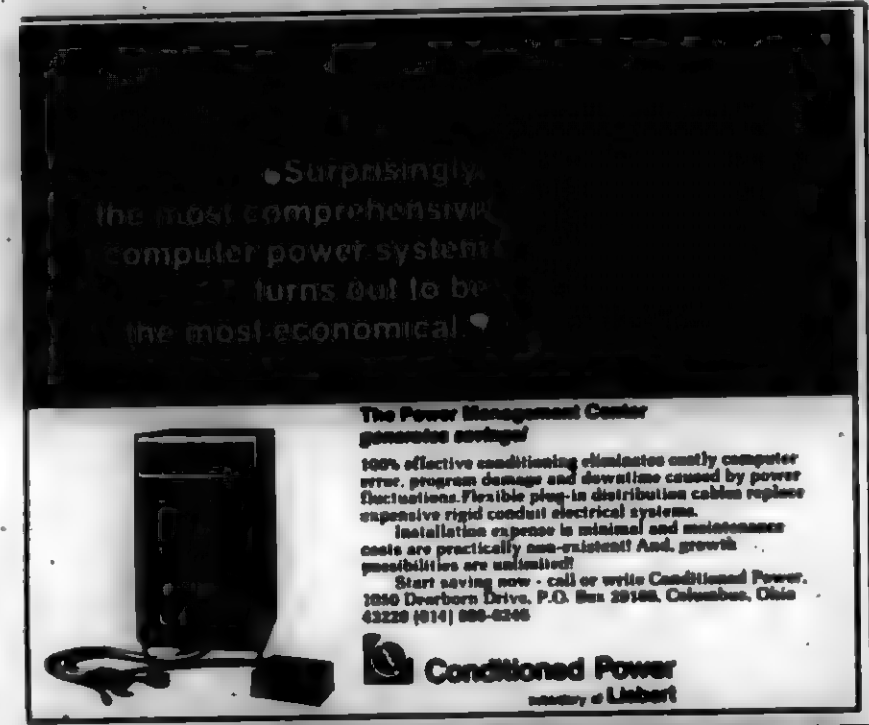
DALLAS — SDI, Inc. which, in a sudden policy change earlier this month required all users of its software to commit to two-year leases or face product expiration [CW, Sept. 8], knuckled under to one customer here.

Affiliated Foods, a user of SDI's Grasp DOS resource management system for 10 years, threatened to file an injunction andwon an extension before the grievance ever got to court.

SDI extended the user's contract to Oct. 18 so "we did not have to make a judicial complaint," Joe Vail, Affiliated's DP manager, said.

"We had been told that nobody could get an extension. I felt like SDI showed a wanton disregard [for its customers] and, until threatened with a suit, chose to take no action at all."

Needless to say, Affiliated Foods is not going to commit to a two-year lease with SDI.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System Security Termed A People Problem

By Tim Scannell
CW Staff

CHICAGO — A computer system's weakest link is the people in it.

A DP installation can have all sorts of screening devices, computer-access passwords and disruption alarms, but "once you inject people into that system you inject risk," Robert W. Edwards, manager of the systems security section at Computer Sciences Corp., (CSC) said.

Speaking at the recent National Symposium on Office Automation here, Edwards called people "the most easily subverted and most vulnerable" part of any computer system. In his address, he stressed the importance of "rudimentary" security checks such as checking on employee background and resume claims.

He also warned listeners at the Data Processing Management Association Education Foundation event to be on the lookout for signals of present or future security breeches, such as a drastic change in a worker's behavior patterns.

Unfortunately, in the automated office and most small business installations, computer security is often a "forgotten dimension," one that is "scrupulously ignored by a lot of people," Edwards said.

Fanning the flames of apathy is the fact that it is extremely difficult to detect or prosecute computer criminals. Currently, only 10 states in the U.S. have computer crime laws and three have bills churning through the governmental process, he added.

Therefore, preventing computer abuse and ensuring security is a company's internal responsibility.

Management Problem

Contrary to what many managers think, computer security is more of a management than a technical problem and will not work if "you hide your light under a bushel," he quipped. To be effective, even the most basic plan must be implemented, understood and motivated by everyone within a corporation from the janitor on up to the Chairman of the Board.

Employee screening should be a manager's first line of defense against fraud and computer-related crime. Before hiring people to work with sensitive data or operate expensive computer gear, managers should thoroughly check employee backgrounds and verify facts listed on resumes.

"There's a tremendous amount of fraud that takes place in that area," Edwards noted, adding that CSC has had a few "bad experiences" with people claiming academic training that they never had.

Prevent Easy Access

There are a number of ways to keep data from freely flowing up and down the corporate pipeline. Compartmentalization — restricting information to password-protected pockets — is one way, Edwards said. People in an office automation or DP environment should only have access to information they need to know.

Cleaning up information leftovers — whether it be a password scribbled on a piece of paper and tucked under a terminal or data left in a computer's memory — is another way to put a lid on unauthorized access, he added.

In his position at CSC, Edwards, who describes himself as a "professionally paranoid security type," often deliberately penetrates a computer system looking for residual data that may have been left in memory. Surprisingly, 13 out of 20 times, he and his security crew have found sensitive material remaining in the computer's memory after a program has run.

> *'While hardware controls such as card-entry systems, data encryption and other "mean Marine and dogs" devices are effective in bolstering computer security, the best way to spot and prevent abuse is with a keen eye.'*

Erasing memory after each job prevents the next user from coming along and looking at another person's data simply by "browsing through memory," Edwards pointed out.

While hardware controls such as card-entry systems, data encryption and other "mean Marine and dogs" devices are effective in bolstering computer security, the best way to spot and prevent abuse is with a keen eye.

Since DP, because of its nature, fosters worker insularity and inhibits close personal communications, it is important for a manager to watch for subtle and sometimes extreme personality changes. For instance, if a normally dependable worker suddenly begins to drink heavily or becomes sloppy it may be a sign of problems that could eventually lead to computer abuse, Edwards stated.

In the same vein, if a data entry clerk inexplicably shows up one day driving a $20,000 sports car, it would not be out of line to investigate where the means came from for that expensive end.

Examine Environment

Finally, Edwards told his security-conscious audience to examine a computer's future environment closely before installing a system. For instance, do not locate a computer in the path of an airport runway because the ground radar will play havoc with the system's memory. And do not place a multi million-dollar computer on an earthquake fault line.

As an example of poor planning, Edwards pointed to a large New York bank chain that was opening a branch office in Buenos Aires, Argentina. Located in the center of town in a shared building, the office would house the branch computer system and a small operations staff.

Upon closer examination, however, the bank discovered that one of its office neighbors across the hall was the bomb disposal unit of the government of Argentina. And it was not uncommon for the unit to tinker with its "little toys" back at the office, Edwards said.

Bank officials promptly rethought their plans and located the branch in a safer environment, he noted.

Need Not Wait for Brooks Act

Federal DPers Told Not to Delay Modernizing

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Legislation to streamline government DP management and procurement is now before Congress, but federal DPers should not wait for a congressional mandate to modernize their operations, a consultant said last week.

Forest W. Horton, a longtime adviser to government agencies on information systems, told the Federal Computer Conference here Tuesday that agencies need not wait for passage of the so-called Brooks Act to identify and begin correcting the "unmistakable" problems of federal DP.

The Brooks bill, designed to revamp oversight of federal DP, has passed the House of Representatives but its companion bill is stalled in the Senate because the Defense Department fears it will allow civilian agency interference to jeopardize defense intelligence operations.

Terming the bill's controversy a "turf problem" that must be worked out between Defense and Congress, Horton said agencies should begin anyway to work on the obvious deficiencies in their DP operations.

Agencies should be "moving deliberately, methodically" to institute the changes that will be needed once the bill is passed. And even if the legislation is delayed for a long time or significantly altered before final approval, there are still good reasons to begin bringing agency operations in line with the bill's provisions, he said.

Agency Inabilities

The legislation already serves to point out obvious agency inabilities "to cope with increasing problems of cost and utilization" of information resources, he said. And it is not necessary to "go right down the line" in implementing the bill's provisions.

"There are incremental steps that can be taken," according to Horton.

He expressed amazement that many agencies do not have management mechanisms to bring together the managers of different information facilities such as libraries, records management and DP departments.

"We're constantly hearing that these technologies are converging," he said, "so it is obvious we need systematic exchanges" between those responsible for these technologies within each agency. These exchanges are vital to the kinds of decisions that are already being made, such as whether to use hard copy or microfiche on a particular project, Horton said.

Noting the Brooks bill calls for agencies to prepare long-range information resource requirement plans, Horton suggested federal managers should move in that direction regardless of the outcome of the legislative debate.

CW at Federal Expo

Agencies have to put into place the machinery to "correlate" information requirements to information technology, facilities, people and other resources, Horton said.

The federal paperwork commission, whose final report was the basis for much of the proposed Brooks bill, found the public balking at supplying information to the government. The reason, Horton said, was the public was not convinced the federal government had "got its act together." There was no evidence the data being collected was needed, was being used.

Government DPers have to prove themselves to the public, according to Horton, by offering better services more quickly, by reducing waste and fraud. The government, just as any organization, must manage people; so too must it learn to manage its information resources, he said.

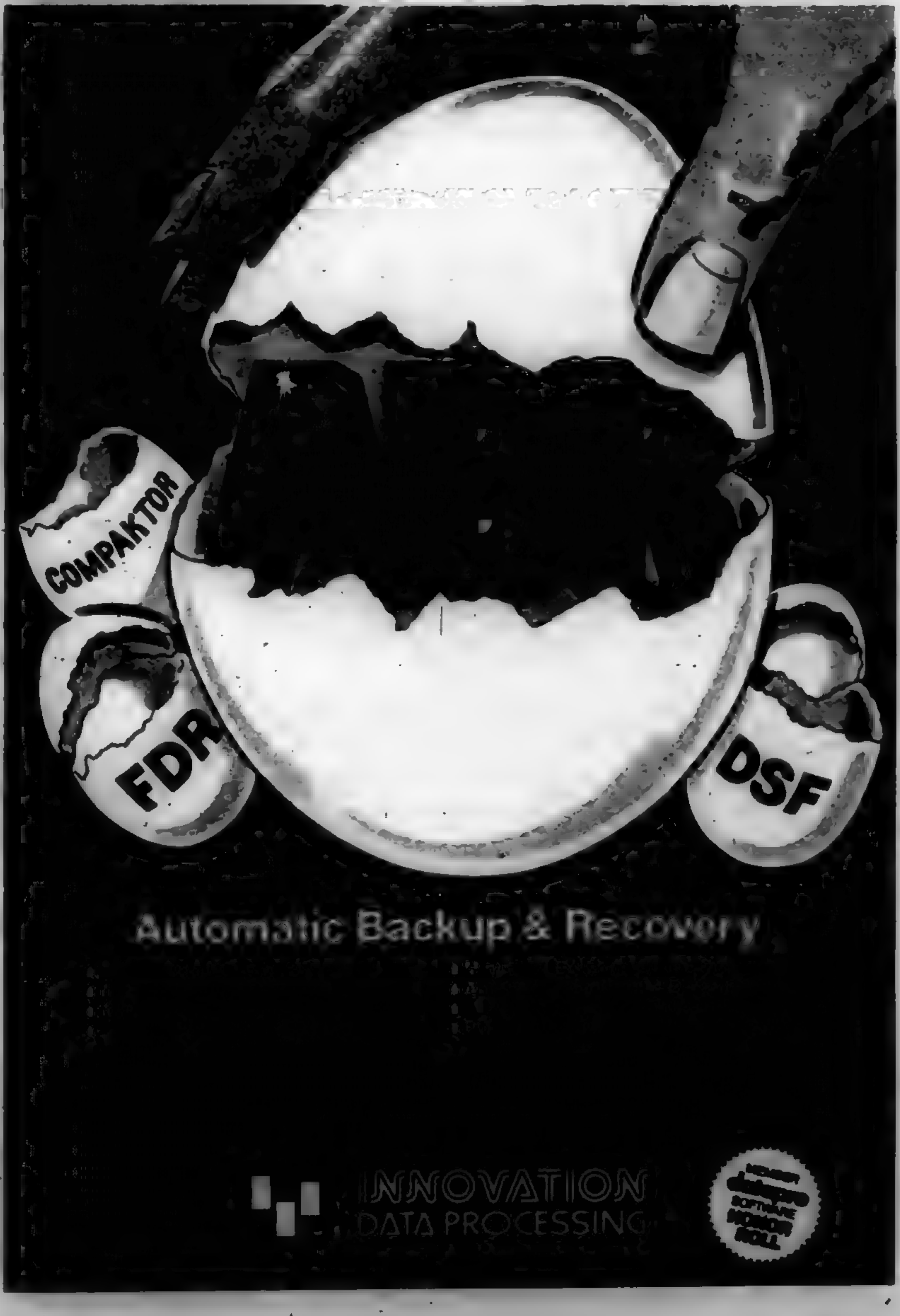
ACM Awards To Honor Two

NASHVILLE – The Association for Computing Machinery's (ACM) annual conference, to be held here Oct. 27, will honor Dr. Robert Metcalfe with the 1980 ACM Grace Murray Hopper Award, and Bernard Galler with the 1980 ACM Distinguished Service Award.

Metcalfe's award is given in recognition of computing achievements made by persons before their 30th birthday. His extensive work in the development of local networks, especially the Ethernet concept, won him this year's distinction and cash prize of $1,000.

The Distinguished Service Award is presented in recognition of an individual's long-term service to the computing community and the ACM. Galler is a former president of ACM, chairman of the Turing Award Committee and the Government Organization Committee, as well as an active contributor in several other germane boards and committees.

He authored *The Language of Computers* in 1962, co-authored *A View of Programming* in 1970 and is currently editor-in-chief at the *Annals of the History of Computing*.



To Meet Long-Range Goals

U.S. Agencies Told of Planning in 'Real World'

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Federal agencies may soon be required by Congress to produce long-range information resources requirements plans, but few government DPers are sure what the planning will entail. At last week's Federal Computer Conference here several hundred of them heard how it is done "in the real world."

At a Tuesday panel session, John M. Bonaguide described how his company, Aetna Life and Casualty, Inc., forecasts its long-range DP equipment needs using a system that, in the words of the panel moderator, is "not an event but a process" — an integrated part of the whole corporate management structure.

CW at Federal Expo

Identifying hardware requirements for Aetna has to be a priority item, according to Bonaguide, assistant vice-president, Corporate Data Processing Support. The firm's three data centers support about 70 million instructions per second (Mips) of processing power with a dozen mainframes, including eight IBM 3033s, an Amdahl Corp. 470 V/6 II, a 470 V/8 and a Control Data Corp. Cyber 170-720.

The company operates four "major teleprocessing systems supporting about 5,000 on-line terminals as well as some 500 terminals for in-house time-sharing for program development support. Throw in approximately 16,000 hours per month of batch processing and 4,000 hours per month of batch testing and you describe a company that will live or die by the applications development and hardware procurement decisions it makes year by year.

Bonaguide's staff begins its "capacity planning process" by developing a general objective or policy for the company's operations, which is followed by a detailed forecasting process. The forecasting is done by small increments of time and along the lines of separate application needs such as batch processing, printing and so on.

Reasonability Forecast

This "raw data" on what the company does and how well it does it, with projected experiences is then submitted to a "reasonability forecast" that traces past trends and projects their future course as well as scrutinizing how the forecasting was performed.

"The forecast data is great in terms of what is already there," Bonaguide continued, but what about new or changing applications? The company uses a number of forecasting methods, from the simple — consulting operating divisions to track applications changes from a hard-copy operation to CRTs, for example — to the sophisticated techniques of computer simulation.

Through this forecasting process a plan is developed that incorporates the data from individual departments into a "total view" plan. That plan is then tested — by "trial and error," according to Bonaguide — to come up with different scenarios that might evolve according to such identifiable variables as those contained in the forecasts, known changing equipment needs and the expected capabilities of hardware already on order.

By looking at the various scenarios, the firm can begin to balance the operations of their three data centers, taking into account factors such as backup requirements and disaster recovery exigencies.

One of the keys to the planning process, Bonaguide said, is predicting the impact and timing of new technology. "We maintain quite an extensive intelligence network" for the firm's IBM-compatible operations, he said, through which Aetna watches not only IBM but IBM watchers.

Aetna also works closely with IBM and compatible manufacturers to try to get some idea of what equipment will be available down the road. Although the information gathered directly from the vendors is necessarily vague, it can help in making expensive decisions, such as buy vs. lease on certain types of equipment.

And it is not sufficient just to order equipment once the planning has identified a need. The company also works up an "equipment acquisition strategy" that seeks to balance company needs against vendor offers. The competition that results for Aetna's orders "can be fierce and pretty exciting," according to Bonaguide.

Bubble Chart

The final planning process is to put together a "bubble chart" that he described as a "very simplistic view of all the equipment we have in-house and on order" and how it will eventually be used and replaced.

The bubble chart amounts to a four-year scenario that also helps top management stay informed of the company's long-term DP needs. The company knows, for example, that by 1985 the data centers, which will eventually number five, according to the plan, will support about 200 Mips and as much as 700 to 800 Mips by the mid 1990s, Bonaguide said.

He was quick to add that the bubble chart is "really just the beginning," not the end, of the planning process. Because the plan is "very dynamic" it must be changed as various business pressures — competition, unexpected growth and so on — and changing government regulations necessitate restructuring company operations.

Even with the highly structured and detailed work that goes into it, the requirements plan is merely "a base against which to test change and monitor growth," he said.

Burroughs Gets Suit Reprieve

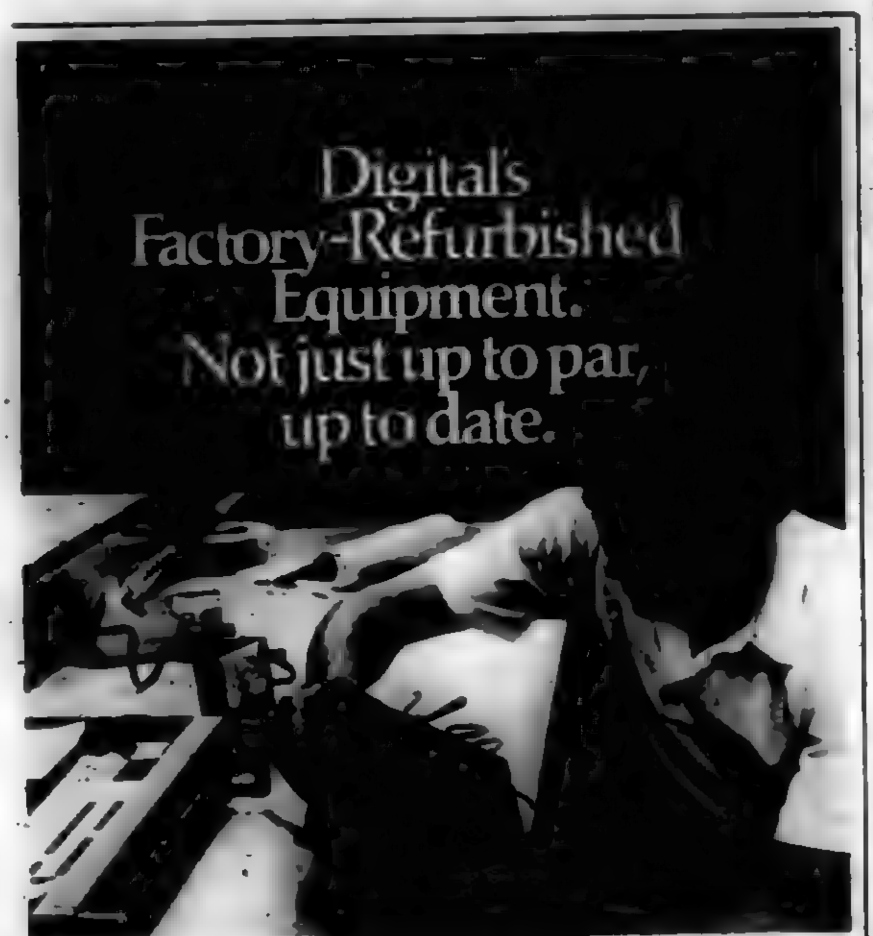
NORTHBROOK, Ill. — Quality Books, Inc. has given Burroughs Corp. until Oct. 14 to settle matters out-of-court before it files suit against the vendor for allegedly selling it a faulty computer system.

The publisher and book wholesaler originally posted a Sept. 14 deadline to answer claims that the firm sold it a defective B800 computer system, but at Burroughs' request granted a 30-day extension. If Burroughs has not made a motion to settle Quality Books' problems by that time, the company will file suit, Tom Drewes, the firm's president, said.

Quality Books contends that Burroughs misrepresented the B800 computer system sold to the company about two years ago.

In a newspaper advertisement placed by the firm in July, Quality Books claimed that it was the victim of "overly zealous computer salespeople" [CW, Sept. 8].

The ad, which ran in both the regional and national editions of *The Wall Street Journal*, brought in more than 300 replies from the "unhappy users of Burroughs B800 and similar Burroughs computer hardware and software."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Debate on Cost and Burden Of Nine-Digit Zip Code Enlivens House Hearing

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The U.S. Postal Service (USPS) nine-digit Zip Code plan will be costly and complicated for U.S. businesses' DP operations, but it will ultimately be cost-effective.

This optimistic assessment by an executive of List Processing Co., a Chicago firm specializing in computerized Zip Coding applications, was one of the few upbeat statements made about the Zip Code scheme at a recent congressional hearing.

But other witnesses were not so sanguine. One, Rep. Andy Maguire (D-N.J.) told the hearing that this "gadget-intensive" move by USPS to increase its automation will cost one company in his district more than $200,000 to update its manual and computer records.

Maguire also quoted a recent *Computerworld* article in which the Los Angeles County DP director claimed the nine-digit plan, slated for implementation Feb. 1, will require alteration of 3,000 to 4,000 programs at a cost to the county of $2 million.

"This kind of decision should never have been made without .... a convincing cost/benefit analysis justifying the decision" by USPS to go to the new Zip Codes, Maguire said.

Shared Burden

The hearing, held by the House Government Information and Individual Rights Subcommittee last Wednesday, was for the most part concerned with possible effects of the USPS plan on private citizens, but much of the testimony centered on the plan's burden on DP operations of U.S. companies and nonprofit organizations.

The cost of converting automated records to include the expanded Zip Codes clearly has many companies worried. Adding to their concerns is the fact that USPS has not produced a study of costs to businesses nor announced what incentives will be offered large mailers to make the necessary software conversions.

Despite these problems and although "major mailers must execute the development or purchase of computer software or programs to add the new code," James E. Pehta, List Processing executive vice-president, said that with "careful, detailed planning" the effort should be cost-effective. The ultimate benefits of speedier delivery and more pinpointed marketing should make the huge effort worthwhile, he told the subcommittee.

Inflationary Impact

Like Maguire, subcommittee member Rep. Peter Kostmayer (D-Pa.) is not happy about the nine-digit Zip's cost impact. He asked USPS witnesses to produce before the end of the year an "inflationary impact statement" for the plan. The conversion costs of businesses will certainly be passed on to consumers, he said.

Assistant Postmaster General Michael S. Coughlin, promised USPS will work up a report for Kostmayer and the subcommittee, but noted the Postal Service will supply large mailers computer tapes to help convert their automated address files.

Because the new Zip Codes will be phased in over a number of years and will be voluntary, the impact on the public and large mailers should not be too severe, Coughlin asserted.

What has U.S. companies worried, however, is that many rely on special postal rates offered organizations that use Zip Codes in their correspondence and that do at least some presorting of outgoing mail. For them the yet-to-be-announced USPS incentives are all important.

"Mailers simply want to know ahead of time what their investment in labor and new equipment to accommodate the new nine-digit code will return to their firms," agreed List Processing Co.'s Pehta.

"This issue, probably more than any other, will determine the priority of effort expended by mailers to implement and use the nine-digit code," according to Pehta, whose clients own more than 800 million name and address records that will be affected.

Difficult Conversion?

Beyond the incentive question, however, concerns were raised at Wednesday's hearing that converting manual and automated files will not be so easy as USPS claims.

Gerry Whiting, director of the Information Systems Division of the General Services Administration's National Archives and Records Service, told the panel "modifying computer-based mailing lists would be relatively inexpensive but complicated by problems in computer language compata-

(Continued on Page 18)

Nine Digits May Tell Too Much

WASHINGTON, D.C. – The loss of some measure of personal privacy has often been the price paid for increased computerization in society, and the U.S. Postal Service's move to greater automation through nine-digit Zip Codes may be no exception, according to one member of Congress known for his work to assure privacy in the computer age.

While the new codes are not considered by the Postal Service a great threat to privacy because they identify individual street blocks and not individual residences, Rep. Richardson Preyer (D-N.C.) has for some time expressed concern about the possible use of the expanded Zip Codes to further red-lining schemes.

Red-lining refers to the practice of identifying certain neighborhoods as bad credit risks. The present five-digit codes and census track numbers can, through computer manipulation, be used for such illegal ac-

(Continued on Page 18)

altergo

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Japanese Planning Public Facsimile Network

By Molly Upton
Special to CW

ANAHEIM, Calif. — Japan's Nippon Telegraph and Telephone Public Corp. (NTT) is establishing a public facsimile network that incorporates several steps to make wider use of facsimile more feasible, according to Takashi Ohmori of NTT.

In a Wescon/80 session entitled "Advances in Telephone Switching, Transmission and Customer Premise Equipment," Ohmori listed the pros and cons of facsimile and described the dedicated NTT net, which features editing intelligence.

The merits of facsimile are that it is rapid and accurate, reproduces as the original, can handle drawings, does not need an attendant at the receiving end, is economical because operators do not need special training and uses regular phone equipment, he said.

However, the problems faced are the need for facsimile set standardization, communication cost reduction and a variety of facsimile communication services as well as end to end communication, he continued.

NTT Net

The NTT net, whose service will be available in Tokyo and Osaka at the beginning of 1981, will enable terminal simplification, "common utilization of redundancy reduction facilities installed within the network and high-speed transmission of coded facsimile signals via low-cost digital transmission lines," Ohmori said.

The service will feature multiaddress calling and automatic answering initially. Later, more services such as a confidential communication, a facsimile box and communications between different types of terminals will be offered, he added.

Central to the operational concept is the use of "lower rank telephone networks to concentrate facsimile calls." He explained that "facsimile storage and conversion equipment provides redundancy reduction, signal storage and speed conversion."

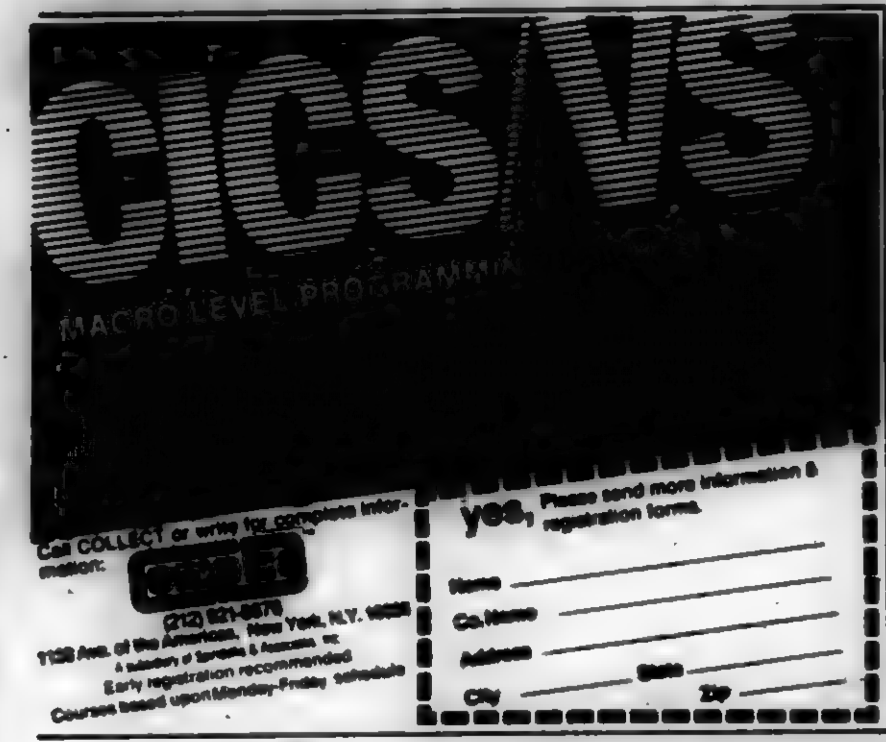
Translation System

One proposed use of the network is to convert data fed into the network in mark sense form into Japanese characters at the receiving end. This technique can be used for reservations, information retrieval, information to subscribers and opinion collection, he observed.

An intelligent document editing system is being developed that will accept documents with certain correction marks and will transmit corrected copy to the receiver. The basic principle in the editing system is that it handles correcting parts as an area, Ohmori said.

A possible further step would be to connect the facsimile network with a videotex system, he observed.

Upton is editor of EPD/Industry Report, *an International Data Corp. Publication.*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Digits May Tell Too Much

(Continued from Page 17)

tivities by credit grantors.

Testifying recently before Preyer's Government Information and Individual Rights Subcommittee, a Federal Trade Commission (FTC) official said the likelihood of the new Zips being used for red-lining is not clear, but is definitely a possibility.

Geographic Criteria

"The nine-digit Zip Code would certainly enhance a creditor's ability to make creditworthiness evaluations based on geographic criteria by allowing fairly fine distinctions to be made on narrowly drawn, standard geographical units — for example, the side of the street the applicant lives on," according to Lewis H. Goldfarb, assistant director of the FTC's Division of Credit Practices.

While the FTC has not formally analyzed the possible effects of the new Zip Codes, Goldfarb noted Zip Codes have "become the standard geographical unit for identification of parts of major metropolitan areas for many creditors and marketing organizations."

In establishing credit evaluation systems, he said, "many creditors analyze their experience with customers in particular Zip Code areas and give that fact, i.e., the Zip Code in which the applicant lives, significant weight in determining whether to grant credit."

Racial Proxy

While using Zip Codes in that way is not in itself illegal, Goldfarb said "problems arise when, because of racial housing patterns, Zip Codes also function as a proxy for the race of the applicant," which may in some cases violate the Equal Credit Opportunity Act.

Various companies, including Montgomery Ward and Amoco Oil Co., have agreed to discontinue use of Zip Codes because the FTC felt they might have led to racial discrimination in granting credit, he said.

While it is too early to say whether nine-digit Zips will lead to illegal credit practices, Goldfarb noted that "reducing the size of the geographic unit used in credit evaluation systems could make it more likely that the system will have a racially discriminatory impact because each unit would tend to be more racially homogeneous."

The possibility is "disturbing," he said, "and particularly so because of the availability of cross-correlations census data which show, on a Zip Code basis, such information as the 'dominant ethnic group' in a particular Zip Code and the percent of the Zip Code residents that are 'white,' 'Negro' or 'Spanish American.' "

Nine-Digit Code Impact Queried

(Continued from Page 17)

bility, completeness and the accuracy of tape-to-tape conversion using USPS-supplied data.

Inadequate Space

"Many computerized mailing lists do not have adequate space for an expanded Zip Code on current tape files, do not use compatible language, or are not amenable to tape-to-tape conversion for other reasons," according to Whiting.

Even where organizations, including government agencies — slated for early and mandatory conversion to nine-digit Zips — have "acceptably formatted" tape files, "mailing list errors or other differences could be substantial," Whiting said, "requiring a record-by-record edit or checking process.

"Large mailing list users maintain their mailing lists on electronic storage media, but may face substantial software costs if required to convert mailing lists to nine-digit Zip Codes," he added.

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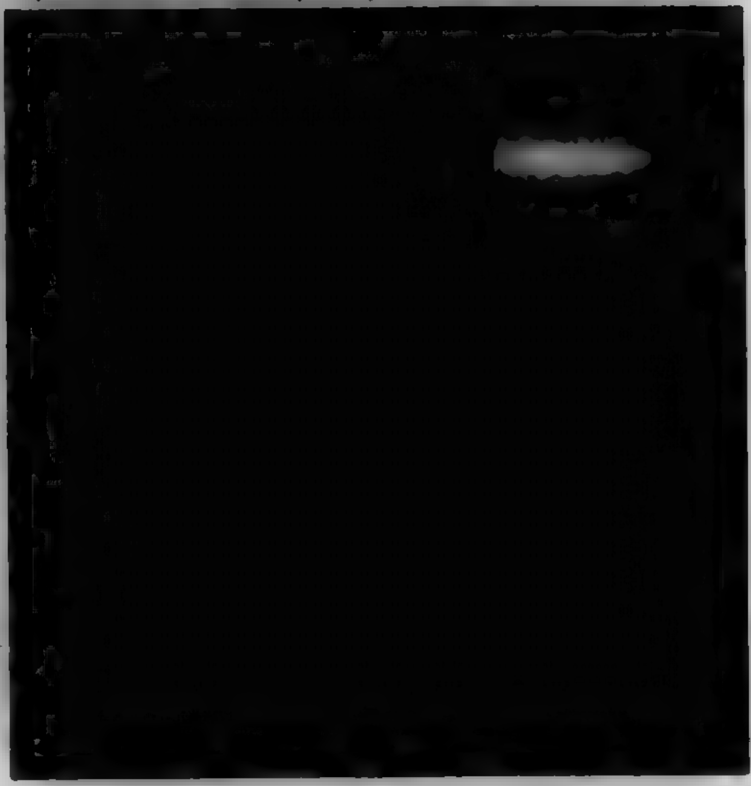

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Where you'll find the Retro-Graphics VT100, up and running, is at Info '80, New York Coliseum, New York City, October 6-9. Look for it at National Computer Communications' Booth #2132. Beginning in November, the Retro-Graphics VT100 will be sold through NCC as well as by selected other Digital Engineering distributors.

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ICP Scholarship Competition Open to Computer Students

INDIANAPOLIS — International Computer Programs, Inc. (ICP) will hold its third annual competition to award a scholarship to a computer science or computer technology student for the 1981-82 collegiate year.

The scholarship will consist of one-year's tuition plus education expenses up to a maximum of $5,000 paid to the U.S. college or university of the winner's choice.

Scholarship selection will be based on the student's cumulative grade point average in his field of study, overall grade point average, need for financial aid, participation in data processing-related activities, school activities and leadership roles and overall accomplishments and awards. An original essay will be the final test.

Last year's scholarship was awarded to Daniel J. Alion, a junior at Appalachian State University, Boone, N.C.

Applications will be available through the financial aid departments of most U.S. colleges and universities. The deadline for filing scholarships applications is Nov. 15.

Further information is available from Sheila Cunningham at ICP, 9000 Keystone Crossing, Indianapolis, Ind. 46240.

Students Must Repay Loans Made by Programming Error

By Deborah Wise
CW Staff

TORONTO — Students who received more than $1.3 million in grants to which they were not entitled because of a computer programming error will have to pay the money back — but not immediately.

In 1978, the Department of Education in Ontario produced a revised student awards program. The Student Awards Department wrote the necessary programs for its IBM 370/168 to cope with the changes, according to Bill Clarkson, the department's director.

However, student lobbying for additional changes to the program was so strong that Education Minister Bette Stephenson was forced to make more revisions. To implement these, the Awards Department had to change its initial programs in four months. It had had 12 months to produce the original version, and this time limit led to the problems.

The new programs were not fully tested and checked, Clarkson said, which led to 887 students being given more than they were entitled to. The story hit the news when these students were asked to pay the money back immediately.

Since then, the government's collection agency has softened its hard stand, requesting immediate repayment only from those students who drop out of college. Those who were wrongly allocated far above what they should have received have to start paying back a token sum of between $5 and $10 per month. Other students can wait until after they graduate before they repay the money.

Since then, the awards department has had no problems with its computer and has even changed to an IBM 3033, Clarkson said, maintaining that the limited time for proper implementation of the revisions was the major reason for the initial mistake.

Student union spokesmen resented the initial hard line of the administration, but have reconciled themselves to repaying the money.

"I think most students realize that they will probably be asked to pay at the end of their education," Anderson Knight, vice-president of McMaster University's student union, said, "It's just that they don't want to have to pay it back right away."

Time-Sharing Seminar Planned for Oct. 28

SAN FRANCISCO — A one-day seminar on "Overcoming the Barriers to High-Performance, Low-Cost, Interactive Computing" will be offered here Oct. 28 by DTSS, Inc., a subsidiary of Metropolitan Life Insurance Co.

The course was designed for those interested in marketing time-sharing services as well as in-house users. Discussion topics will include a comparison of interactive computing with batch processing and differentiation of the markets for each; growth and profitability trends; history of time-sharing and interactive computing as a management and analytical tool.

The $175 seminar fee includes the seminar, lunch and a hands-on session with the DTSS time-sharing system. Further details are available from Jack Elliott at DTSS, 10 Allen St., Hanover, N.H. 03755.

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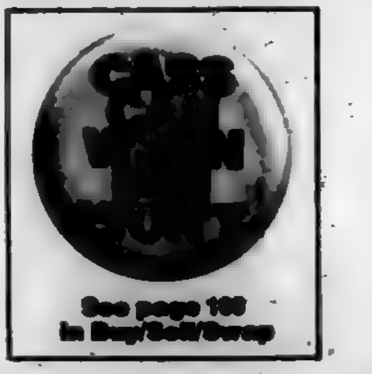

See page 100 in Buy/Sell/Swap

Following Ansi Guidelines

NBS to Give Format Standards Over Four Years

By Tim Scannell
CW Staff

CHICAGO – The National Bureau of Standards (NBS) will release over the next four years a series of format standards aimed at improving computer communications and integration and at aiding electronic mail transmissions between automated offices.

The NBS-sanctioned standards – five in all – will be voluntarily developed by the user and vendor community, following American National Standards Institute (Ansi) guidelines and processing requirements, according to James H. Burrows, director of the NBS' Institute for Computer Sciences and Technology (ICST). The ICST manages the governmentwide computer standards program and provides technical assistance to federal agencies.

At the recent National Symposium on Office Automation, sponsored by the Data Processing Management Association's Education Foundation (DPMA) here, Burrows gave a brief outline of each of the proposed protocol standards. The NBS standards will include:

- A message interchange format standard, which will allow users of one system to send and receive messages from a foreign system.
- A flexible disk file format standard to establish common file formatting and labeling patterns for flexible disks.
- A text editing directives standard that will establish a common set of user directives for text editing systems.
- A text formatting directives standards to provide directives for text formatting systems.
- A message processing directives standard establishing a common set of commands for computer-based message systems.

The latter three standards will provide a minimum level of functionality and help users switch from one text editing, formatting or message system to another, Burrows explained.

As a flagship for these five standards, the NBS is planning to release several guidelines geared to help users plan for, select and evaluate computer-based office machinery. The first guideline, "requirements analysis for office automation systems," which Burrows said will be available in late October or early November, will recommend a process to measure the benefits of office automation.

Drafts of the requirements analysis guideline have already been circulated to a number of federal agencies and vendors for comments.

One-Day Course On Mail Systems Slated for Fall

CAMBRIDGE, Mass. – An intensive one-day seminar on electronic mail for people investigating, planning, implementing and expanding computer-based message systems will be offered in seven cities this fall by the Bolt Beranek and Newman, Inc. (BBN) Information Management Corp.

"Electronic Mail: The Message System Approach" is scheduled to be presented in Boston, Oct. 14; New York, Oct. 20; Washington, D.C., Oct. 23; San Francisco, Nov. 5; Los Angeles, Nov. 7; Chicago, Nov. 17; and Dallas, Nov. 19.

The seminar will focus on how to start using today's in-place hardware and networks for electronic mail. It will be divided into two sessions. The morning session will concentrate on theory and the afternoon session on practice. The afternoon session will include a demonstration of three generations of electronic mail software developed at BBN.

Three experts on electronic mail will speak at every seminar and will be joined by a special guest speaker in each city.

The morning session will focus on theory and will include topics such as office automation and the role of electronic mail, computer communications in the office, the latest technologies and the industry's future. During the afternoon, speakers will discuss their first-hand experience.

The seminar fee, which includes a seminar notebook, is $85 for the morning session, $125 for the afternoon session and $195 for both sessions including lunch.

The seminar has been developed by BBN Information Management Corp. and is offered in cooperation with CW Conference Management Group. Questions should be addressed to CW Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

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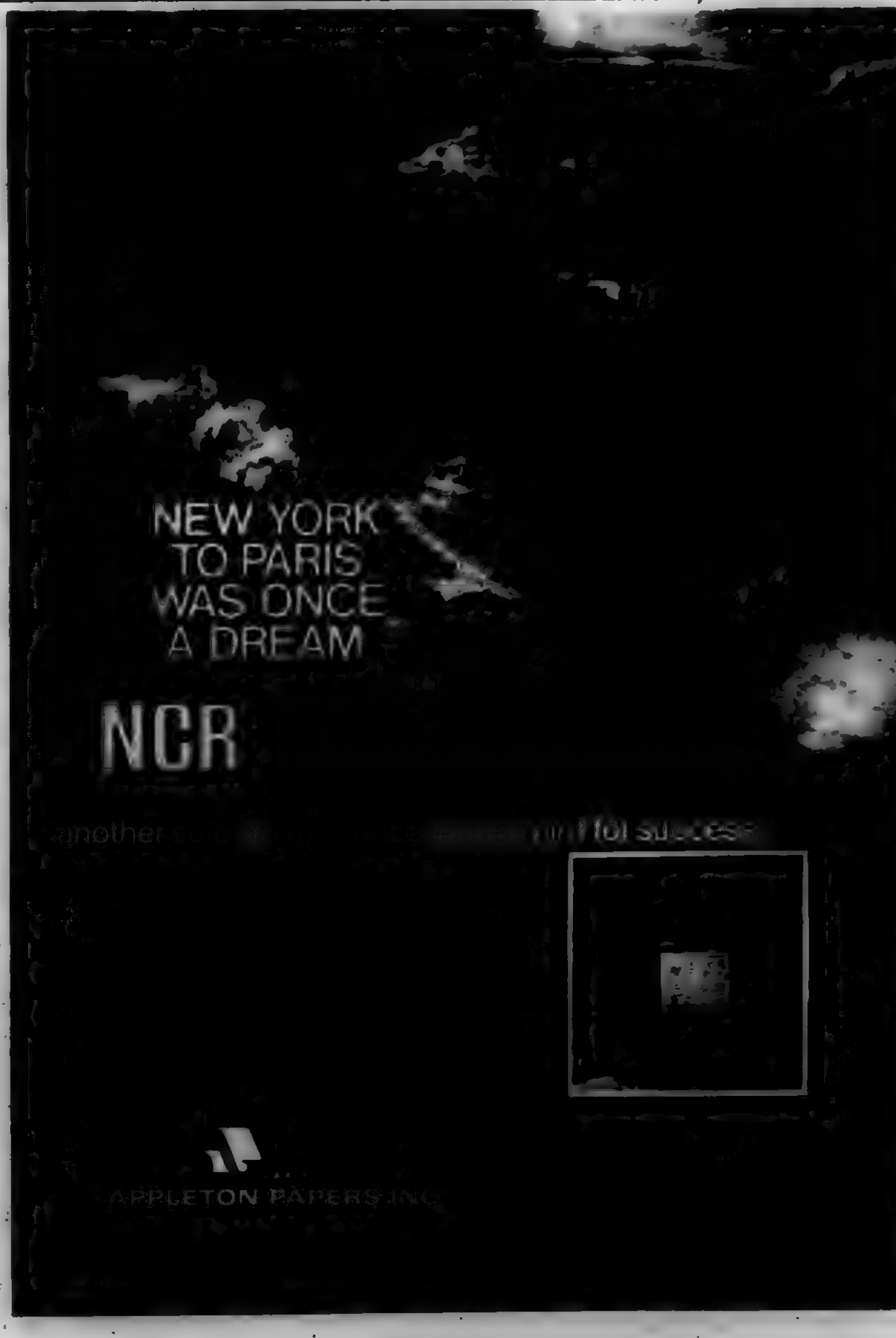

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Most Staffs Report No Generation Gap, But

By Rita Shoor
CW Staff

Is there a DP generation gap between the veterans who entered the field at least a decade ago and the computer science majors who have been pouring out of the nation's colleges in the last few years?

"Absolutely not" was the response from nine out of 11 of the people polled during a recent *Computerworld* minisurvey. Six people with 10 to 20 years of information systems experience each, but nary a computer science degree among them were included in the survey sample. The remaining five DPers had specialized in either computer science or management information systems (MIS) in college.

All of the respondents indicated a communication gap of some sort plagued the programmers and analysts in the various organizations. However, friction among staff members because of age and/or educational background differences was seen as a major contributing factor by only two of the people interviewed.

There was a definite communication gap between older analyst/managers and the younger programmers among the clients with whom Michael Smuda worked when he was a contract programmer for a now-defunct firm in Chicago. The new programmers preferred a structured programming approach while the more experienced staff members used their own programming style and favored GOTO statements, according to Smuda, who received his B.S. from Northern Illinois University in 1977.

Another respondent who graduated in March 1978 with a major in information sciences agreed with Smuda.

"The programmer trainees in our organization write beautifully structured programs," she said. "However, the older members of some of the system development teams don't think the younger ones know what they're talking about.

"The old-timers might resent the kids out of college because they perceive them as having access to all of the new concepts," Jeff Benchley speculated. However, the "seat-of-the-pants" technician who is still in the field is at least as well informed as current graduates, maintained Benchley, assistant manager at the First National Bank in Lake Forest, Ill.

Problems in communication between nontechnical user department members and the technically oriented programmer/analyst specifically were mentioned by two respondents. "Everyone [in the user area] is afraid of what the DP department is going to do to them instead of thinking about what [the programmers] can do for them," according to Kerwin Crist, DP and programming/analysis supervisor for the Oklahoma Tax Commission.

Crist, a business college graduate who majored in accounting and began working with computers in 1961, maintained that the media has served

Computer Crime Abstract Issued Under Justice Aegis

WASHINGTON, D.C. — A free compendium of computer-related crime legislation called the Legislative Resource Service (LRS) is available from Koba Associates, Inc.

Under contract with the Justice Department's Bureau of Justice Statistics, Koba collected up-to-date information on proposed, pending and enacted computer-related crime legislation. Model statutes are addressed and all legislation is indexed state-by-state in the 50-odd page document, providing access to the most recent rulings and developments in each jurisdiction.

The progress of federal legislation S. 240 is monitored, and relative appellate court decisions also appear in the LRS package.

Five hundred of the LRS packages will be available upon request on a first-come, first-serve, one-to-a-customer basis, as of November. Those who are not among the 500 will be able to buy the compendium for a fee not yet decided upon.

Koba Associates's Computer Related Crime Project is at 2000 Florida Ave. N.W., Washington, D.C. 20009

Infotech Zurich Meet to Cover Vandalism and Ergonomic Topics

ZURICH, Switzerland — The issues of industrial vandalism and rising ergonomic standards will be addressed at the Infotech state-of-the-art conference entitled "The Nonexpert User" here Sept. 22-24 by Tom Stewart of Butler Cox and Partners.

Stewart contends that equipment design must conform to high standards in order to minimize unnecessary errors and delays on the part of the nontechnical workers using the computers.

Also present to offer their views on the subject will be Brian Shackel, Leela Damodaran and Ken Eason of the University of Technology in Loughborough; David Davies of Alpha Industrial Ergonomics Consultants; and Dennis O'Brien from the Home Office's Police Scientific Branch.

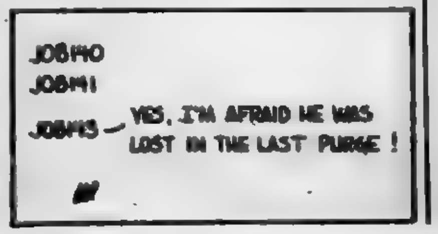
Further information on the Infotech event is available from Maureen Nichols at Infotech, Maindenhead, Berkshire, England.

ALA Series Treats Library Specs

OMAHA, Neb. — "Data Processing Specifications and Contracting" is the title of a series of regional tutorials sponsored by American Library Association's (ALA) Library and Information Technology Association (Lita). The first tutorial will be held here Oct. 28-30 and will be co-sponsored by the Mountain Plains Library Association (MPLA).

The tutorials have been developed to meet the needs of librarians installing or preparing to install varying types of automated systems. Since the degree of expertise of librarians can often vary greatly, the goals of these tutorials will be to establish a basic level of competence in developing functional specifications, evaluating technical specifications, developing and evaluating bid specifications and negotiating and administering contracts for information processing equipment and systems.

Additional information and registration forms are available from Lita/-ALA at 50 E. Huron St., Chicago, Ill. 60611.


JOB140
JOB141
JOB143 — YES, I'M AFRAID HE WAS LOST IN THE LAST PURGE !

No

Point to Other Communication Difficulties

to develop and maintain this misconception of the technical specialist. Computer-related crime is played up in the newspapers, he claimed.

The user-programmer communication gap would narrow if the media would stress the benefits of DP, he maintained.

User communication was mentioned as causing a "slight problem in the past" by another technician. "However, these have diminished with experience to the point where they're no longer a problem," he said.

High-level MIS managers also were charged with contributing to communication problems by two survey respondents, both of whom preferred to retain their anonymity.

"The lower level people are afraid to say what they think. They're afraid to get jumped on [by management]," said one programmer.

The management/staff communication "was the worst I've ever seen," said an 11-year veteran of the 60-person DP organization she had worked with. "Management didn't tell the staff anything that was happening and wasn't interested in the staff's technical opinions," she recalled. In addition, the DP managers didn't tell the user departments anything, she said. "Essentially the managers talked to themselves."

Three of the survey respondents indicated that language difficulties presented a communication problem among the programmer/analysts on their particular staffs. Although not tied to a specific geographic location, all three people mentioned some difficulty in discussing technical concepts with programmer/analysts who spoke English as a second language.

The problem is compounded by the fact that it is often undetectable during the interview and hiring process, according to an advisory systems engineer and project leader at one installation.

"You don't realize that the programmer didn't understand what you were talking about until after he or she has written a program to solve a problem that didn't exist," she explained.

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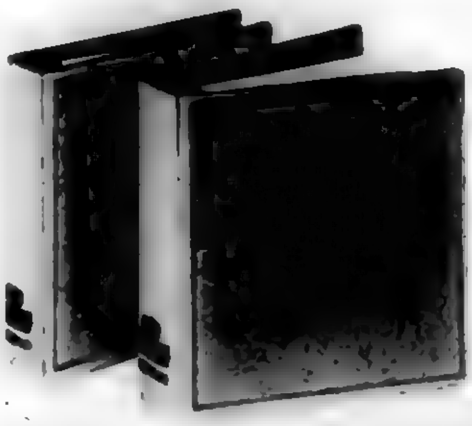

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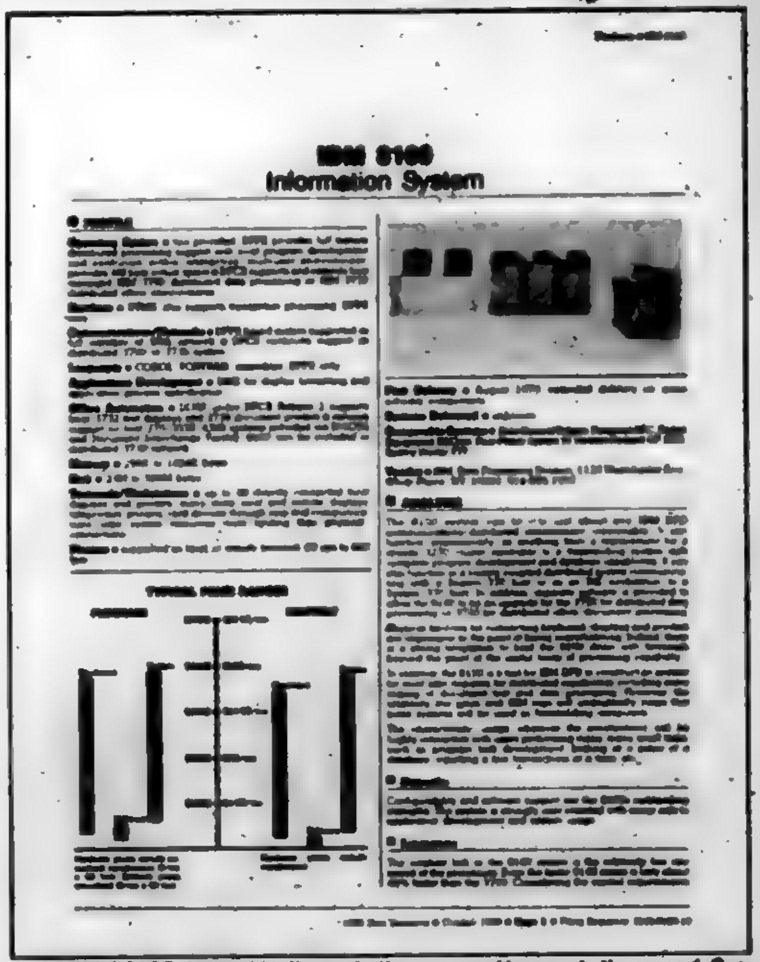

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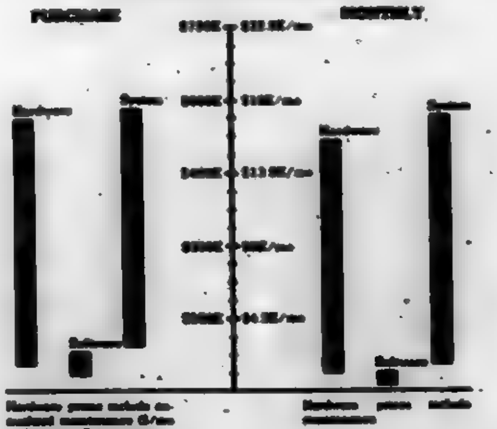

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>
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>
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> The weakest link in the 8100 system is the relatively low raw speed of the processors. Even the faster 8140 series is only about 40% faster than the 3790. Considering the control requirements"

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W 201

Small Business Computer Proves Safest Bet in House For Blackjack Promoter

Finalists in the $150,000 Sahara Summer Blackjack Classic, sponsored by the World Championship of Blackjack, Inc., get ready to place their bets. Avery Waisbren, (center) Studio City, Calif., was the winner of $50,000.

TARZANA, Calif. – The originators and promoters of Tournament Blackjack – a game played by thousands around the world – do not gamble when it comes to the behind-the-scenes organization necessary to plan, promote and track the players of each tourney.

Instead, World Championship of Blackjack, Inc. (WCBI) here relies on a small business computer for such details.

Tournament Blackjack made its debut at the Las Vegas Sahara Hotel during the week before Christmas in 1978. "That week before Christmas is traditionally the slowest week of the year for any Las Vegas hotel," noted David Fishman, vice-president of WCBI. However, "while every other casino in town was practically empty, the Sahara casino was in high gear." Since then, the tournament has snowballed to a three-city event four times a year.

With no ceiling on winnings and with losses limited to the $500 buy-in fee, Tournament Blackjack has attracted thousands of players through a diversity of promotional efforts.

A million and a half brochures are mailed each year to prospective players, while two toll-free numbers each receive close to 10,000 inquiries per tournament.

World Championship of Blackjack maintains a prospect list of about 75,000 names broken into lists of names purchased from list brokers, players who have participated in previous tournaments and people who have responded to various advertisements but have never played in a tournament.

Besides the work of attracting players, the company must keep track of all the registrants, their winnings, player profiles, hotel accommodations, travel arrangements and charter sponsors. (Previous players who sponsor new players receive cash bonuses).

In addition to the 20 or so full-time WCBI employees, there is an independent sales representative program that involves close to 100 people, mostly tournament players who work part-time to recruit new players from their hometown areas.

In addition to the normal payroll, accounts payable and receivable operations, the firm must keep count of sales representative commissions and territories.

"Before we brought in our computer, we were going through temporary help like crazy," Fishman said. "Those people get expensive and generally do poor work. We were having big problems just trying to keep our mailing list clean; we were keeping track of so much manually that nothing was being handled well. Then we hired a computer analyst to work here for six months and help us determine how to computerize our business. It was the best money we ever spent.

"At the end of six months, that analyst knew every facet of our business as well as we did. She really understood how this whole business operates, what makes us successful and what problems can really hurt us," Fishman said. "She agreed that a computer could definitely help us do more efficient mailings as well as provide a means for us to handle a vast array of detail and statistics."

After looking at small business systems from most of the major computer companies and then narrowing that group to Texas Instruments, Inc., IBM, Univac and Qantel Corp., WCBI eventually chose Qantel system because of its local Metropolitan Business Systems distributor.

"We learned they had a superior service record when we checked references," Fishman noted.

"We also found that the Qantel systems provide virtually unlimited advancement into larger storage capacity and features multitasking to let us do several kinds of work on the computer at the same time," he added.

World Championship of Blackjack signed a Qantel contract in February and had its computer by April. The first application to go up was the mailing list maintenance systems. "We do mailings every day and it is wonderful to have a computer store all our mailing lists whatever way we need them by Zip Code, individual tournament, charter members," he said.

"We can do automatic updates, add new names and drop old or duplicate names easily and each day we enter inquiries from ads, brochures and our toll-free telephone numbers. The computer generates mailing labels, each label coded so when a response to a mailing comes back, we know what mailing it came from.

"Then we run weekly reports analyzing what mailing lists or promotional efforts are receiving the most response and when the response level has been the highest," he continued. "Later, we analyze how many of these responses turn into tournament players and then into charter members. Thus, we always know how we're doing – what efforts work best and which ones may not be paying off."

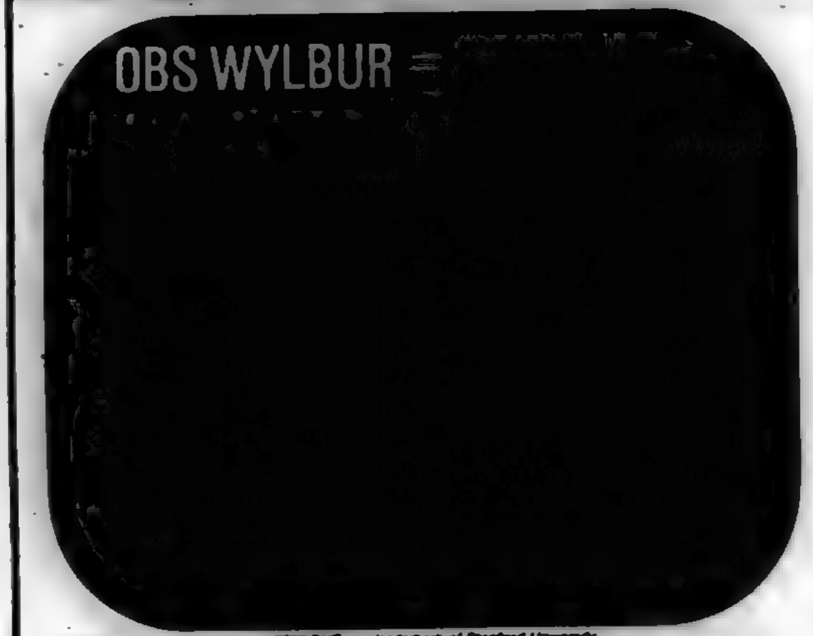
Besides sending out mailings and tracking responses, the firm keeps its charter member profiles on the computer, and all of its confirmation letters to tournament players are computer-generated.

Report Details Audit Problems

ARLINGTON, Va. – "Data Processing and Auditor Independence" is the title of a recently released publication from the Association of Data Processing Service Organizations, Inc. (Adapso) that details the potential problems and inherent conflicts of interest for public accounting firms that provide computer and other management advisory services.

The booklet raises a series of issues for clients to consider prior to retaining an audit firm to perform DP functions.

Individual copies of the brochure are free; there is a nominal fee for multiple copies. They are available from Adapso at 1925 N. Lynn St., Arlington, Va. 22209.



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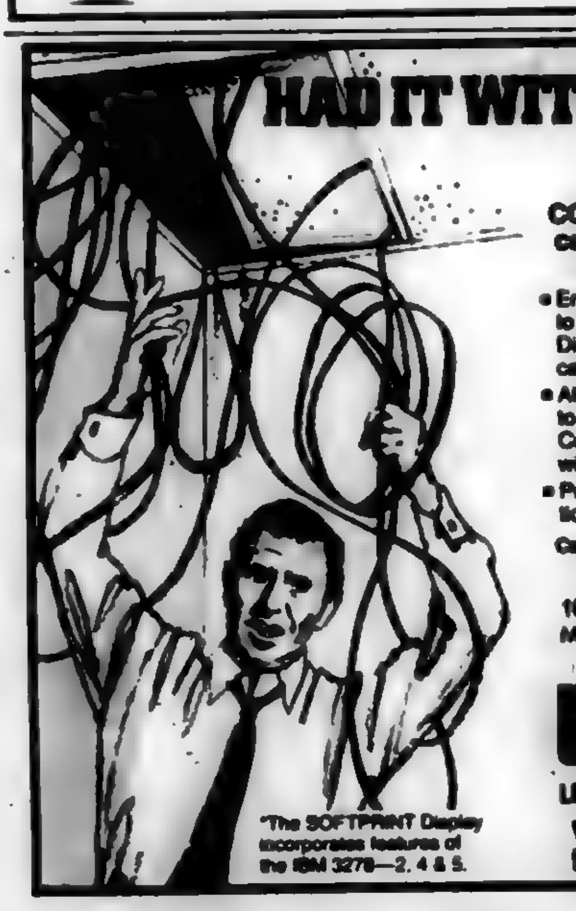

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Meet to Spotlight Systems For Personnel Management

NEW YORK — The 11th National Conference on Human Resource Management Systems will take place here Oct. 20-22.

Sponsored by Information Sciences, Inc. (Insci), this year's conference will focus on the positive bottom-line impact of effective human resource management in both the private and public sectors.

Alan K. Campbell, director of the U.S. Office of Personnel Management, will be the keynote speaker.

More than 40 in-depth workshops will concentrate on specific areas critical to an effective human resource management process — from the design and installation of efficient, responsive information systems to corporate health and fitness programs.

Further information is available from Insci at 95 Chestnut Ridge Road, Montvale, N.J. 07645.

BAI Conference Set

PARK RIDGE, Ill. — The Bank Administration Institute (BAI) will hold its third annual conference Nov. 16-19 at the New Orleans Hilton Hotel.

Devoted to automatic teller machines, the conference will be co-chaired by Linda Fenner Zimmer, a payment services correspondent, and James W. Trotter, systems specialist.

More information is available from the BAI at P.O. Box 500, 303 S. Northwest Highway, Park Ridge, Ill. 60068.

Club Formed to Discuss Productivity in Industry

SCARSDALE, N.Y. — The Productivity Forum, a newly established club to discuss productivity and efficiency in industry, will publish office automation reports and state-of-the-art reviews for its members throughout the year.

Currently under way is a review of technical innovations by Wickam Skinner and James E. Robinson of Harvard University.

Membership fees of $9,500 per year cover participation in conferences (the first one is slated for Oct. 1-3 in Chicago), use of the library facilities and access to the publications on the mailing list.

Members include Exxon Corp., U.S. government departments, General Electric Corp. and the U.S. Postal Service.

The organizers, Work in America Institute, Inc., hope that major unions will participate before the end of the year. More information is available from Rhoda Pauley, Work in America Institute, Inc., 700 White Plains Road, Scarsdale, N.Y. 10583.

McGraw-Hill Plans Seminars For Managers

NEW YORK — Two seminars for data communications and data processing managers are scheduled for November and December by *Data Communications*, a McGraw-Hill magazine.

"Standard Architecture, Interfaces and Protocols" will be held Nov. 5-7 in Toronto and again Dec. 9-11 in Dallas.

Topics to be examined include fundamentals for planning, designing, implementing and managing information systems and services to meet organizational needs.

The cost of this seminar is $650, with National Communications System senior engineers Harold Folts and Frank McClelland lecturing.

"Corporatewide Packet Data Networks," which will take place Nov. 6-7 in Washington, D.C., will focus on the technical design, economics and managerial implications of integrated, corporatewide data networks based on packet switching. Network Analysis Corp. executives who will lecture are Jeffrey Bloom, Walter Roehr Jr. and Thomas Stack.

The cost of this course is $475.

More information can be obtained from McGraw-Hill Conference & Exposition Center, Room 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

Manual Writing Topic of Course

COLORADO SPRINGS, Colo. — Progressive Communications, Inc. will hold a series of one-day DP user documentation seminars in Denver on Sept. 23; Chicago on Sept. 25; Palo Alto, Calif on Oct. 14; Los Angeles on Oct. 16; Dallas on Nov. 4; and Houston on Nov. 6.

According to the course's sponsor, the seminar will focus on writing DP user manuals that people will want to use.

Emphasis is placed on analysis of specific user needs, planning and outlining, effective writing and illustration, and maintenance and packaging of documentation.

The fee for the course is $185 for individuals, or $165 per person for multiple enrollments from the same firm; the fee includes all materials and lunch.

More information is available from Progressive Communications at the Alamo/310, 128 S. Tejon St., Colorado Springs, Colo. 80903.

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- ☐ Other IBM Interfaces – Series 1, IBM 2780 and 3780.
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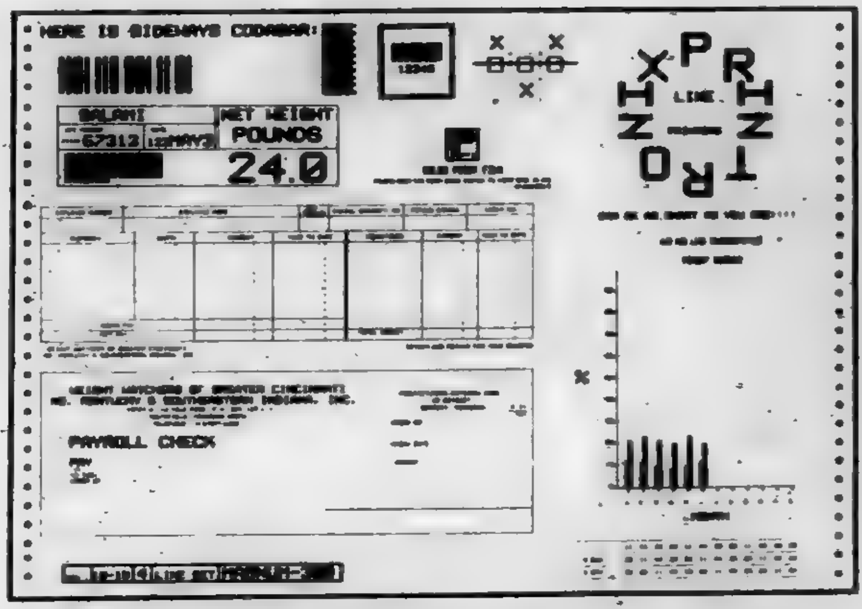
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At Civil Air Patrol (CAP) National Headquarters, Montgomery, Ala., an NCR 8350 computer system is used to automate membership and training record keeping. Comprehensive computer profiles of nearly 60,000 members help CAP assure that only qualified members are sent on search and rescue missions and that CAP cadets earn credit from the Air Force for their training if they enlist in the service.

Mini Screens Rescue Crews For Civil Air Patrol Missions

Special to CW

MONTGOMERY, Ala. — A commuter airline crashed in the Rockies two years ago during a raging blizzard, stranding 22 people in freezing subzero temperatures. Less than 12 hours later, a Civil Air Patrol (CAP) search-and-rescue team, its members screened and selected by a minicomputer, located the survivors and saved all but one life.

"When CAP responds to an emergency, the members it sends to the scene must be properly trained," Lt. Col. Joseph J. Matisak, deputy chief of staff for personnel here at CAP's national headquarters, explained. "People who don't know how to act in a crisis can injure themselves or jeopardize the safety of others."

Using an NCR Corp. 8350 minicomputer, CAP personnel run an integrated package of computer programs that give the organization and U.S. Air Force administrators accurate, up-to-the-minute data and trend analysis reports to effectively manage people, equipment and dollar resources, Matisak said. The computer helps minimize administrative and overhead costs and maximize information available to a handful of CAP and USAF supervisors to direct nearly 60,000 people in the organization's 1,900 units across the U.S.

More importantly, aided by the minicomputer, CAP rescue teams have so far saved more than 100 lives.

Defense Department Support

Although CAP is a private corporation chartered by Congress in 1946, it also is an official auxiliary of the USAF. To help meet CAP's needs, the Department of Defense (DOD) donates surplus military equipment and supplies ranging from aircraft and motor vehicles to radios and office furniture. About 200 active-duty USAF members serve as advisors to the organization, a little less than half of them working out of CAP's national headquarters.

While the CAP-USAF collaboration is mutually beneficial — CAP members receive valuable training and the government saves roughly $20 million a year on search and rescue missions — it poses some interesting administrative problems, Matisak stated. For example, CAP's accountability for all DOD-donated surplus equipment requires keeping meticulous equipment records regarding the use and, eventually, the proper disposal or sale of former DOD property.

"Everyone wants to hold the lid on administrative costs," Matisak continued. "Higher costs would mean higher member dues for individuals who already are donating time and often personal equipment to help the organization." Also, "with our computer system, we are holding down information management costs. I don't think it would be possible to return to the previous labor-intensive manual system."

Matisak is responsible for the efficient operation of the DP department. The department provides the USAF-CAP personnel section with most of the data it needs to advise CAP on programs and policies related to civilian and military personnel, reserve assistance, aerospace education and other matters. However, the department also furnishes data and reports to many other individuals and groups located in the field and at CAP headquarters.

More importantly, CAP keeps training records and can validate its members' experience levels. "If an individual transfers from a unit or squadron in Alaska to one in Alabama, his or her computerized profile transfers, too," Matisak noted.

Two Categories

Basically CAP computer programs are divided into two broad categories: (1) personnel and financial accounting

(Continued on Page 34)

Costs Cut to $1.60/Terminal Hour

Network Plan Keeps Campus Within Budget

AMES, Iowa — Inflation and a rising demand for computer services spurred Iowa State University here to reduce its academic costs to $1.60 per terminal hour by combining load sharing among several systems with an upgrade of its mainframe system.

As an added benefit, the strategy has increased student access to computing and expanding usage requirements can be more easily accommodated.

Before 1978, the Computation Center at Iowa State, an institution of eight colleges and 23,000 students, relied heavily on centralized mainframe systems for most campuswide services.

"Accessibility to computing was a problem for our students. There was a real need to extend interactive access to computers to wider segments of the academic population, but budget constraints would not allow outright replacement of our mainframes with even larger machines," Dr. Clair G. Maple, Computation Center director, said.

Five-Year Plan

To satisfy the growing demand for computing with that limited budget, the Computation Center staff developed a five-year plan to acquire computing hardware in a cost-effective fashion. The goal was to optimize the efficiency of existing resources and to raise, incrementally, the number of terminals at the lowest possible cost.

To increase student access to computer power, the center planned to place terminals in convenient locations and to use hardware with up-to-date technology for maximum performance.

The plan called for a campuswide network that would match computing capabilities to individual requirements on a job-by-job basis. This network would connect users automatically and transparently to the appropriate processors for their particular jobs, thus minimizing wasteful overhead and idle computing capacity.

To match capabilities with every job, however, required a range of systems to match the variety of jobs. The Iowa State Computation Center staff tailored its five-year plan accordingly.

Mainframe Upgrade

For the large number of long, repetitive batch jobs, the university's mainframe system was updated and enlarged. The relatively short, interactive, time-shared tasks for most students were off-loaded from the mainframe onto Digital Equipment Corp. VAX-11/780 systems equipped initially with 64 CRT and printer terminals.

For the real-time, measurement and control applications in teaching and research laboratories, the university, with help from the National Science Foundation, developed a local high-speed data net containing microcomputers and a DEC PDP-11 that connected several science and engineering departments with the central facilities.

This strategy proved so successful that when funds became available the following year, another VAX-11/780 system and 76 more terminals were added, a spokesman said. The terminals were placed in special rooms in dormitories as well as terminal rooms in various academic departments to enhance accessibility for students at nearly all hours.

The usage cost of the network was calculated by dividing total hardware and software costs, including support personnel and maintenance costs, by the number of hours of terminal utilization. The result was a surprisingly low $1.60 per terminal hour, the spokesman said.

The result of Iowa State's computer strategy has been an increasing involvement of students in computing activity for a manageable expenditure. A large percent of Iowa State's entire enrollment now uses computers. Usage on the VAX systems has reached more than 38,000 terminal sessions in a peak month, with sessions averaging more than 40 minutes each.

AIIE Schedules Two Fall Meets

CHICAGO — "Financial Information Systems: The New Generation" is the theme of the American Institute of Industrial Engineers' (AIIE) fall conference, which will be held here Oct. 8-10 and again in New York, Nov. 19-21.

The first day of the conference will be devoted to an overview of existing financial information systems. Actual case studies and new developments will be examined on the second day, followed by a financial software expo, where systems will be demonstrated with on-line terminals. The theme of the third day of the event will be "Controlling Financial Information Systems."

AIIE members may attend for $355, nonmember enrollment is $395 and multiple enrollees from the same organization may attend for $295 each. Fees include a 1,000-page conference notebook and refreshments. More information is available from the AIIE at Dept. W, P.O. Box 3727, Santa Monica, Calif. 90403.

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PDP11/34	31800	[illegible]	[illegible]	[illegible]
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4012 11 inch screen	7500	475	[illegible]	[illegible]
4013 ASCII/APL	8800	[illegible]	[illegible]	770
4014-1 19 inch screen	13450	[illegible]	[illegible]	1150
4015-1 ASCII/APL	15400	[illegible]	[illegible]	[illegible]
4016-1 25 inch screen	19500	[illegible]	[illegible]	[illegible]
4631 Hard Copy Unit	4950	[illegible]	[illegible]	[illegible]
4662 X-Y Plotter	4800	[illegible]	[illegible]	[illegible]
4663 "C" size Plotter	11000	710	[illegible]	[illegible]
4027 Color Graphics	8695	[illegible]	[illegible]	[illegible]
4052 Desk Top Computer	10950	[illegible]	[illegible]	[illegible]
4054 Desk Top Computer	18100	[illegible]	[illegible]	[illegible]

DESK TOP COMPUTERS

	Purchase Price	[illegible]	[illegible]	[illegible]
9845T—Desk Top Computer	23500	[illegible]	[illegible]	[illegible]
9872B—4 color plotter	5800	[illegible]	[illegible]	[illegible]
9895A—Dual floppy disc	6500	[illegible]	[illegible]	[illegible]

Sales Tax Not Included. Prices subject to change.

TERMINALS

	Purchase Price	[illegible]	[illegible]	[illegible]
LA34 DA—Basic Decwriter IV	$1095	[illegible]	[illegible]	[illegible]
LA34 AA—Standard Decwriter IV	1295	74	82	112
VT100 CRT	1995	[illegible]	137	[illegible]
LA120 KSR Decwriter III	2495	[illegible]	[illegible]	225
LA120 RO Decwriter III	2395	[illegible]	170	210

LETTER QUALITY PRINTERS

	Purchase Price	[illegible]	[illegible]	[illegible]
1650 KSR—Metalized Daisy Wheel	3295	[illegible]	[illegible]	275
1650 RO—Metalized Daisy Wheel	2950	[illegible]	[illegible]	[illegible]

CRTs

	Purchase Price	[illegible]	[illegible]	[illegible]
1410	850	[illegible]	[illegible]	75
1500	1095	[illegible]	[illegible]	[illegible]
1520—Buffered Printer Port	1450	[illegible]	110	125
1552—VT52 compatible	1350	[illegible]	[illegible]	115

	Purchase Price	[illegible]	[illegible]	[illegible]
743 KSR 30 cps Thermal	1145	[illegible]	[illegible]	[illegible]
745 Portable. EIA & Acoustic Coupler	1595	[illegible]	110	140
763 KSR 20k Bubble Memory	2595	[illegible]	175	[illegible]
765 Portable 20k Bubble Memory	2795	[illegible]	[illegible]	[illegible]
783 KSR 120 cps Thermal	1895	[illegible]	[illegible]	[illegible]
785 Portable 120 cps Thermal	2295	[illegible]	[illegible]	[illegible]
820 KSR 150 cps Matrix printer	2195	[illegible]	[illegible]	[illegible]
820 RO 150 cps Matrix printer	2075	[illegible]	[illegible]	[illegible]

LINE PRINTERS

	Purchase Price	[illegible]	[illegible]	[illegible]
6300—Model 2A—300 lpm	5995	[illegible]	[illegible]	[illegible]
6600—Model 2A—600 lpm	8425	[illegible]	[illegible]	[illegible]

OFF-LINE STORAGE UNITS

	Purchase Price	[illegible]	[illegible]	[illegible]
818—Single Cassette	1795	[illegible]	[illegible]	[illegible]
822—Dual Cassette	2295	[illegible]	[illegible]	[illegible]
951—Floppy Disc	1995	[illegible]	[illegible]	[illegible]
961—Floppy Disc with direct control	2395	[illegible]	175	[illegible]

	Purchase Price	[illegible]	[illegible]	[illegible]
GDC—113—300 baud	275	[illegible]	[illegible]	[illegible]
GDC—103—300 baud	405	[illegible]	[illegible]	[illegible]
GDC—212—1200 baud	875	[illegible]	[illegible]	[illegible]
CAT Acoustic coupler—300 baud	185	[illegible]	[illegible]	[illegible]

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Hospital's Future Begins With Plastic Card

ROYAL OAK, Mich. — The future at William Beaumont Hospital here begins with a plastic card.

The card is one product of the hospital's on-line hospital registration system, which in a recent emergency processed 25 victims of a chlorine gas leak within half an hour, according to Paul S. Peabody, assistant director for corporate services.

"The hospital does not consider the on-line registrations project an end in itself," Peabody said. "To Beaumont it is a beginning — the beginning of a total hospital information system in which department-to-department communications via terminals will be a reality."

Incorporating terminals, CRT screens, computer printers, and electronic embossers, the real-time system covers the main 940-bed facility in Royal Oak, Mich., and a 200-bed satellite 13 miles away in Troy, Mich.

The nation's 10th largest private hospital, Beaumont Royal Oak outside Detroit recorded 38,200 patient admissions in 1979, with an additional 8,500 at Beaumont Troy, and more than a third of a million outpatient and emergency visits to both hospitals. "At the former 20 to 25 minutes [per] registration, considerable man-hours would have been expended by hospital personnel and patients alike," said Karen V. Guenther, senior systems analyst. Admission now takes two to five minutes.

By 1976, the hospital corporation realized that even maintaining the status quo for its growing facility would require increasing registration employees and equipment. A task force of DP and registration personnel began studying alternatives to manual system with batch document processing.

Admissions personnel typed dittoed forms and keypunched plastic patient cards. This system was time-consuming and subject to error.

On-Line System

The task force recommended an on-line registration system and phase-in began in May 1977, coinciding with the opening of the Troy facility. Dual Burroughs Corp. 4700 computers at Royal Oak support the 180-terminal network and an assortment of Burroughs printers and CRT terminals.

By mid-1979, the hospital had developed the software to create 26-part computer-generated registration forms and place 350,000 patient records on three 174M-byte disks. For easy retrieval, a seven-digit permanent number was assigned to each patient file.

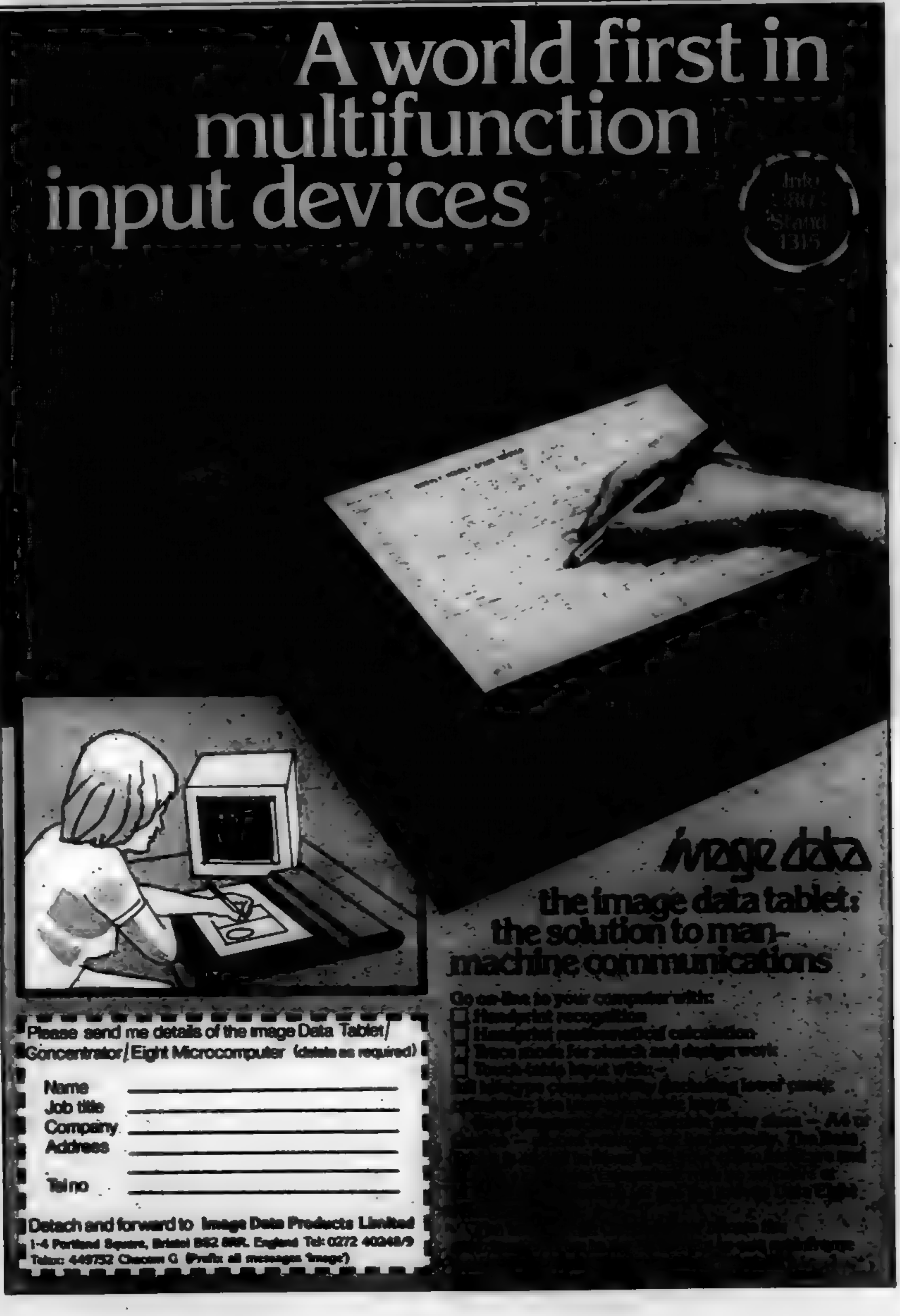
"Because user needs were considered strongly in program design, changing over the admitting, emergency room, outpatient and clinic areas at the Royal Oak facility and emergency and admitting at Troy proceeded relatively smoothly," Peabody said.

But the system was still incomplete. The plastic cards used for recording charges and other documents during the patient's stay continued to be produced manually and required additional key punching of charge codes as they accrued.

The manual operation continued until the fall of 1979 when Beaumont acquired 10 AM Addressograph Model 6600 electronic embossers and 92 Model 45 electric imprinters for the two hospitals. The necessary software was written and the embossers went on-line in December.

An electronically created four or five-line plastic card travels with each patient. Instead of the past practice of key punching charges onto the card, ward clerks need only slip the card and a form into an imprinter.

"Beaumont Hospital will experience cost savings in equipment leases and supplies of nearly $30,000 yearly," Peabody said. "And we cannot measure in actual dollars the additional time saved on the patient floors with error-free plastic cards or the public relations value in expediting incoming patients through an extended registration process."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Mini Drives CAP Rescues

(Continued from Page 32)

and (2) asset management and inventory control.

Most personnel financial programs update and tap a comprehensive membership master file or data base.

"The profiles include standard information needed by almost any professional or voluntary organization such as member, name, age, sex, membership category, mailing address and membership anniversary date for billing dues, Charles F. House, CAP's director of data processing, said. "However, in addition, it includes information regarding each member's unit of assignment, a complete record of awards, scholarships, training and experience level."

The complete data base enables CAP to automate membership billing, transfers between CAP units, and changes in membership category. For example, when a young person attains the age limit for cadet status, the computer automatically notifies the individual that he is eligible for senior membership.

Maintenance of unit and wing affiliation in the files simplifies CAP's dues rebate program, House adds. CAP headquarters collects all national and local dues. The computer system automatically tabulates each member's bill and, when paid, the amount of money to be credited to the wing.

While Selling 5,000 Toys a Day

Net Keeps Shelves Stocked for Toy Store Chain

TAYLOR, Mich. — Circus World Toy Stores (CWTS) saved time and kept its shelves better stocked when it purchased an automated order processing and inventory control system from ADP Network Services, Inc.

CWTS, a specialty chain with 104 stores in 21 states, moved from a batch system to ADP's ADP/Onsite service, an international packet-switched communications network tied to an Ann Arbor, Mich., computing center.

"I was bound and determined that we were going to control our own destiny this Christmas," said Neill Klein, CWTS vice-president. "That means keeping the shelves stocked while selling 5,000 toys a day."

Previous Purchase

Early in 1979, CWTS purchased data collection units for each store. These units allow CWTS branch managers to enter merchandise inventory information on a daily basis through a calculator-like device that automatically stores information on a tape cassette. When CWTS requested proposals from seven vendors to redesign its DP services, they stipulated the collection units would have to be incorporated in the design.

The service combines the advantages of remote computing with the benefits of in-house data processing, according to Klein. Thus, Circus World can use its local system for independent data analysis while employing ADP's network for data transmission. All systems are continuously monitored from Ann Arbor, and both hardware and software are maintained by Network Services' staff.

"Our major requirement in choosing a data processing service was that we be able to control it," Klein said. "We wanted to inquire into our files and get fast answers. For example, I can find out almost instantly how many Monopoly games I currently have in the warehouse. I couldn't do that before. I would have had to wait for a printed report to tell me a couple of days later, and by then it would probably be inaccurate."

Order Collection

Store managers write their orders based on a printout that tells them what is available during a given week. The managers record their orders on collection units that use tape cassettes. After the stores have closed for the evening, the units are connected to Bell System telephone answering devices.

Each evening, a program is initiated on the system, which signals a computer in Ann Arbor to dial the phone in each designated store. The phone in the store is automatically answered and the tape automatically transfers the accumulated data to the computer. The data is then transmitted directly from the computer to the Onsite system. It takes only three to four minutes to call all the stores.

After orders are taken from each store and processed, the system produces the actual shipping labels.

"The labels are sorted in a specific way to enable our staff to quickly pull the merchandise from its location, get it on trucks and get the trucks on the road," Klein explained.

In addition to the order entry application, the Circus World system incorporates a set of integrated applications including inventory control for over 7,000 items, purchasing, accounts payable, general ledger and sales analysis. The system automatically updates the master files common to all applications while validating the input.

"The service has been fine," Klein said. "With the full support of the ADP MOD center, it's like having my own hardware staff and system programmers — all for the same cost."

Meet to Offer Tips On Productivity

CHICAGO — "Improving the Productivity of Technical Resources" is the subject of a two-day conference to be held at the IIT Research Center Nov. 11-12. The featured speakers at the event will be Dr. Robert Potter from International Harvester and Carl Thor of the American Productivity Center.

The conference is being cosponsored by IIT Manufacturing Productivity Center, in cooperation with the American Productivity Center, and the Technological Institute of Northwestern University.

Registration costs $250, which includes lunches, a reception and all conference proceedings. More information is available from Leon Skan at IIT Research Center, 10 West 35 St., Chicago, Ill. 60616.

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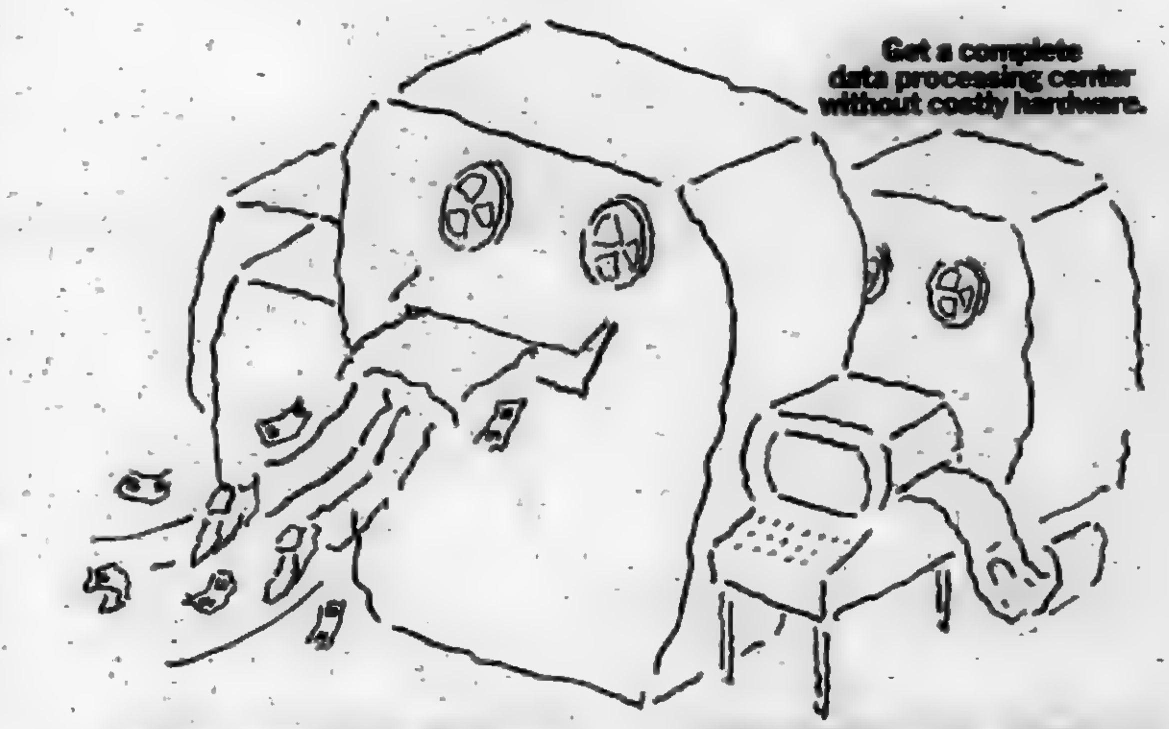
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Quadruples Productivity

Encyclopaedia Britannica Compiles 50% Savings

CHICAGO – Encyclopaedia Britannica, Inc. (EBI) has quadrupled printing productivity companywide and realized a 50% cost reduction on its largest yearbook since implementing IBM's on-line text management system, Advanced Text Management System II (ATMS II).

Historically, text for the firm's yearbooks was conventionally typed in-house, manually typeset and composed in hot metal on the outside. But, growth rendered this approach increasingly time-consuming and costly.

To speed up operations while reducing costs, EBI converted to computerized text management operations in-house and automated photocomposition on the outside, according to an EBI spokesman.

Conversion was accomplished over several years for all yearbooks except the *Britannica Book of the Year*, the largest and most complicated of the publications, he said.

Consisting of a batch operation in which original text entries and corrections were punched into cards for computer processing, this computerized system increased speed while resulting in considerable cost savings. However, as volume continued to increase, the system reached its maximum in speed and cost improvements because of limitations inherent in batch operations.

Guided by advice from its Computer Services Department, EBI decided to convert from batch to on-line text management operations with ATMS II.

Providing a single-entry, on-line method of preparing, revising and coding text for automated photocomposition, ATMS II is now being used by the publisher to enter composition codes and editorial changes, eliminating the need for complete text retyping, the spokesman claims.

In addition, the advanced text management system is now being used to process text for the *Britannica Book of the Year* which previously had still been typed in-house and manually typeset and composed in hot metal on the outside.

"Conversion to on-line text management greatly speeded up our operations," said Bob Dehmer, manager of editorial typesetting. "For example it reduced the time it takes to make editorial changes from eight days to one day or less. Typically, we can now receive editorial changes up until 3 p.m. and produce revised copy the following morning.

On-Line Efficiency

"Efficiency is also improved," Dehmer pointed out. "Formerly, four separate steps were required to make an editorial correction. Now, this four-step process is replaced by a single step," he explained.

"One person calls up text on a CRT screen, enters the change and visually verifies its correctness, all in one operation. This on-line approach not only results in greater efficiency but increased entry accuracy since it's easier to see and correct entry errors when they are made on CRT screens.

Costs are also reduced through operation of the text management system he noted. "There was an immediate 50% reduction in costs, for example, when the *Britannica Book of the Year* was converted from conventional to current on-line operations. Installation of the on-line system paid for itself in three months. In addition, since then, costs have been further reduced an additional 15%.

"We are now processing four to five times the number of pages we previously handled before computerization with the same seven-person staff," Dehmer said. "In addition, we now have the capability to increase our production in the future at minimum or less than proportional cost."

Easy Implementation

Implementation of ATMS II was relatively easy and front end costs, including additional storage and programming, were low, according to Bill Plachy, corporate computer project coordinator. Programming primarily consisted of customizing the text management system to both interface with and improve the functioning of the previously used batch system.

Operated under CICS in a DOS/VS environment on an IBM 370/148, the system communicates with seven IBM 3277 video display terminals and prints out on an IBM 3288 line printer.

Now, copy for yearbooks is received from authors and edited as before. But, instead of being retyped on copyfitting paper, proofread, sent out for composition and proofread again in galley form, the edited copy is simply entered directly in a display terminal, printed out with line counts on the line printer and proofread – eliminating second keyboarding and proofreading operations.

Calendar

Oct. 23-24, Houston – **Systems Engineering Applications**, sponsored by the International Federation of Automatic Control. Contact: Prof. Azmi Kaya, Mechanical Engineering Department, the University of Akron, Akron, Ohio 44325.

Oct. 24, Toronto – **Ethical Conflicts and Obligations in Information Processing.** Contact: Computer Communications Consulting Co., Suite 701, 17 Queen St. E., Toronto, Ontario M5C 1P9.

Oct. 26-29, Philadelphia – **International Conference & Business Exposition.** Contact: the Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

Oct. 26-29, Miami – **Cash Management Conference.** Contact: Bank Administration Institute, 303 S. Northwest Highway, P.O. Box 500, Park Ridge, Ill. 60068.

Oct. 27-28, New York – **Voice Mail Symposium.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

Oct. 27-28, Toronto – **Canadian Data Processing Education Conference.** Contact: Canadian Pacific Ltd., 20 King St. W., Toronto, Ont. M5H 1C4, Canada.

Oct. 27-29, Nashville, Tenn. – **Conference for Computing Machinery.** Contact: Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 27-29, New York – **SNA Compatibility Workshop.** Contact: Telecom Computer Technology International, Inc., 599 N. Mathilda Ave., Sunnyvale, Calif. 94086.

Oct. 27-29, Washington, D.C. – **Wideband Communications Systems.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Oct. 27-30, Atlanta – **International Conference on Computer Communication**, sponsored by the International Council for Computer Communication. Contact: Computer Communication Executive Committee, P.O. Box 280, Basking Ridge, N.J. 07920.

Oct. 27-30, Los Angeles – **Structured Systems Analysis and Design.** Contact: Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

Oct. 27-31, Chicago – **Compsac 1981**, sponsored by the Institute of Electrical and Electronic Engineers. Contact: Compsac, P.O. Box 639, Silver Springs, Md. 20901.

Oct. 27-31, Wellesley, Mass. – **Systems Design Workshop.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Oct. 27-31, New York – **Structured Systems and Analysis Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Oct. 27-31, Brussels, Belgium – **Understanding Computer and Controls.** Contact: Arthur Andersen & Co., Center for Professional Education, 1405 Fifth Avenue, St. Charles, Ill. 60174.

Oct. 28-30, Chicago – **Designing, Installing and Managing an International Telecommunications Private User Network.** Contact: Telecom Systems Group, 579 Pompton Ave., Cedar Grove, N.J. 07009.

Oct. 28-30, Los Angeles – **Interface West Conference and Exposition.** Contact: Interface West, 160 Speen St., Framingham, Mass. 01701.

Oct. 29-31, Chicago – **Computerized Office Equipment Expo.** Contact: Industrial & Scientific Conference Management, Inc., 222 W. Adams St., Chicago, Ill. 60606.

Oct. 30, New York – **Computer Graphics for Business Charting and Mapping.** Contact: AUI Data Graphics, 1701 K St. N.W., Washington, D.C. 20006.

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North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.8	2:48.0
Texas Instruments 771	22:06.4	3:36.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	22:35.6*	5:04.8*

Series 2 Results Systems $15,000 to $25,000	C-1	C-3
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.8	3:20.0
Texas Instruments FS990/10	**	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11V03	14:43.4	4:14.0
Q1 Lite	6:50.7*	5:03.3*
Univac BC/7-810	12:09.2*	10:37.0*
Northern Telecom 405	**	***
Datapoint 1170	38:27.5	8:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	**	2:48.3

*Results include both compile and run-time.

**Test could not be run because of memory limitations.

***Test could not be run because of formatting limitations.

Unexpectedly, the lower cost computers in the less-than-$15,000 price bracket equaled and even outperformed systems in the $15,000 to $25,000 range. These were the results of the accounts receivable benchmark test performed by the Association of Computer Users (ACU).

However, superior speed in mathematical calculations put the more expensive machines out in front in the scientific/engineering problem.

The benchmark reports, produced for the ACU by independent consulting firms, are a set of standard programs in Basic. As noted in last week's column, they cannot be used by themselves in selecting a particular piece of equipment from the many offerings available. Benchmark tests are a significant advance in the comparison of hardware and operating systems, but they do not address the usability of applications software which often is a main consideration when purchasing a computer system.

Having reported on a total of 18 systems in *Computerworld* so far, we are in a position to compare half of the less-than-$15,000 systems in our Series 1 with the entire group from Series 2, which covers computers in the higher price range. One caveat should be added to the standings shown in the scorebox. Some systems (as noted) used compilers or semi-compilers. Their test results would be faster if run-times only were being listed for them, rather than combined compile/-run-times.

In this column, we will briefly discuss the results of testing the six systems in the first half of Series 1. Naturally, we cannot go into much detail in this short article; and readers are referred to the actual benchmark reports for a fuller discussion of the findings.

Six Systems

• *Texas Instruments, Inc. TI 771* — The 771 gave a solid performance and was neither first nor last in any speed test. It did lead in the ease-of-use test. Users need to be technically oriented if purchasing through TI. Otherwise, an OEM-supplied unit with software should be considered. Incorporating the TMS 9900 microprocessor with 64K bytes of memory, the system is rounded out with dual floppy drives, CRT terminal and printer. TPL is offered, but Basic is the primary language. It costs $12,100.

• *Pertec Computer Corp. PCC 2000* — Users characterized this system as "friendly" — a good starter system for the first-time user. Hard disk expansion and multiple user abilities are also offered. Its speed was not outstanding, but it did better than some more expensive units. With 64K bytes memory, two mini-diskette drives, CRT and printer, the PCC 2000 is priced at $12,270. A CP/M operating system is used, allowing acquisition of Fortran, Cobol and other languages in addition to standard Basic.

• *North Star Computer, Inc.'s Horizon* — Outstanding performance in a low-cost system characterized the Horizon's benchmark testing. In accounts receivable, the system's times beat all of the higher-priced computers tested. But users need to find a separate software-oriented vendor, unless in-house expertise is available, because the Horizon is not a "ready-to-go" package system. It includes 64K memory, printer, Basic and floating-point board, dual minidiskettes and can be used with most CRT terminals. Total system cost was $6,911. Pascal is also offered, and the CP/M operating system is available.

• *Cromemco, Inc. System Two* — The System Two also showed leadership in the benchmark timings, with a second-of-six showing in two applications problems. The more expensive Winchester-disk version (the Z-2H) was also tested and topped the list in the accounts receivable problem, which uses numerous disk access steps giving the faster hard disk an advantage over floppy-equipped competitors. Basic, Fortran, Ratfor, and Assembler are available. RPG-II and Lisp have also been announced. The System Two includes 64K memory, 180 char./sec printer, dual minifloppy drives and a CRT terminal. It costs $9,275.

• *Vector Graphic, Inc. System B* — Configured with the newly available dot matrix printer at a cost of about $6,400, the System B was the least expensive unit tested. Benchmark times were respectable in this price class, and upgraded versions with 8-in. floppy disks (said to run 4 times faster in disk I/O) or 32M-byte Winchesters (running 10 times more quickly) are available without sending the price beyond $12,000. Three operating systems are offered, and languages include Basic, Pascal, APL, Fortran, Cobol and Assembler. The System B tested came with 64K memory, CRT, minifloppies and Qume Corp. printer for $7,750.

• *Digital Equipment Corp. Decstation 78* — Primary strength of the Decstation 78 was its easy-to-use operating system and business software. Users gave both DEC service and software very good reviews, and satisfaction with OEMs was also widespread. The Basic tested was a semi-compiled version, and compile times included in the result should be taken into account. On-location data entry and retrieval is a primary application for the system, and communications capabilities are good. With 32K six-bit bytes and dual diskette drives, the system came with CRT station and 180 char./sec printer for $11,570 at DEC computer stores. Price from the factory or OEMs would be higher.

Future Testing

While the results to date show that David can indeed slay Goliath — at least sometimes — the showdown between higher-priced business computers and inexpensive do-it-yourself computers is not over. In future issues of CW, we will be reporting on tests of less-than-$15,000 computers by Apple Computer, Inc., Radio Shack, Digital Micro Systems, Inc., Data General Corp., Alpha Micro, Inc. and Ohio Scientific, Inc.

Not every businessman will want to abandon IBM for the TRS-80, but for the first time we will see if the super-inexpensive systems are really all that bad in the performance category. Early findings indicate speed is not closely related to price, except in number-crunching operations.

Perhaps the most startling result of the Series 1 benchmark tests is the six-system average for the accounts receivable problem. It is lower than the 12-system average for more costly Series 2 systems.

What is more, the top performer in this same test for all 18 systems was a computer costing less than $7,000! Although these results are surprising, they reveal that only an actual test of performance can bring to the surface the combined effects of processor speed, disk access time and other factors that relate to throughput. If speed were the only criterion, there would be little reason to spend more.

In publishing these findings, we leave the reader much of the responsibility for using the results properly. But we think this is where the proper responsibility should be. Our primary concern is that the tests be accurately and fairly conducted. While good benchmark reports do not imply suitability for a given application, they provide a starting point for the comparison of systems. It is up to the user to know what features his computer must have, or to rely on trustworthy advice.

This is the 20th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

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PERKIN-ELMER

EDITORIAL

Don't Hold Your Breath

Don't hold your breath waiting for AT&T's newly proposed Wide-Area Telephone Service (Wats) rates to be implemented.

Although 90% of those who presently subscribe to the service are in line for lower charges, it is doubtful the tariff will go into effect on Dec. 14, the date specified in the telephone company's filing. That's because the remaining 10% will have to pay higher charges costing them several million dollars. Most of America's largest corporations are in this latter group, and they are certain to oppose the new Wats tariff vigorously.

The Federal Communications Commission's (FCC) rules allow for a conditional implementation of new rates under such conditions. The tariff goes into effect, but records are kept of the increased charges paid by individual customers. If the rates are ultimately reduced, the records generate refunds. But this scheme isn't likely to work in the case of the Wats tariff.

Companies like U.S. Steel, Ford Motor Co., General Motors and Westinghouse won't willingly fork over millions of dollars to the phone company, even temporarily, without a fight. It isn't just the direct outlay that bothers them. They are certain to argue that the new AT&T tariff will require substantial reconfiguration of their existing networks and massive changes in the related operations.

If the FCC isn't persuaded by these arguments and allows the Wats tariff to become effective, the companies probably will seek, and obtain, a court injunction delaying imposition of the new rates for several months.

There is some chance — but not much — that if this happens, users with relatively small traffic volumes will still be able to obtain Wats service at reduced rates.

Pending before the commission, along with AT&T's new rates, is a proposal to allow sharing/resale of Wats on a test basis. The commission was scheduled to act on this matter late last week, shortly after *Computerworld*'s press deadline. If resale/sharing is allowed on the basis of the present rates, specialized carriers like MCI Communications Corp. could lease Wats circuits at bulk rates and resell them to customers who don't have enough traffic to qualify for bulk rates on their own. The resale charges would be higher than the bulk rates, but lower than toll or leased private-line charges, in many cases.

The trouble is that AT&T violently opposes resale/sharing based on the present Wats rate structure; this was one of the reasons for filing a new tariff.

A popular pastime, when impasses like this arise, is to criticize the FCC for unnecessary red tape and delay. While the commission is hardly a model of administrative efficiency, the complaint is really irrelevant.

Delays are inevitable when communications tariffs and policies are established through an adversary process. Since this process has led, over the past decade, to substantially lower rates, many new services and much-improved technology, it has benefits as well as drawbacks — a point which the critics invariably overlook.

Maybe the red tape would be reduced if the government made the big decisions unilaterally. But it isn't likely the critics would consider that arrangement an improvement.

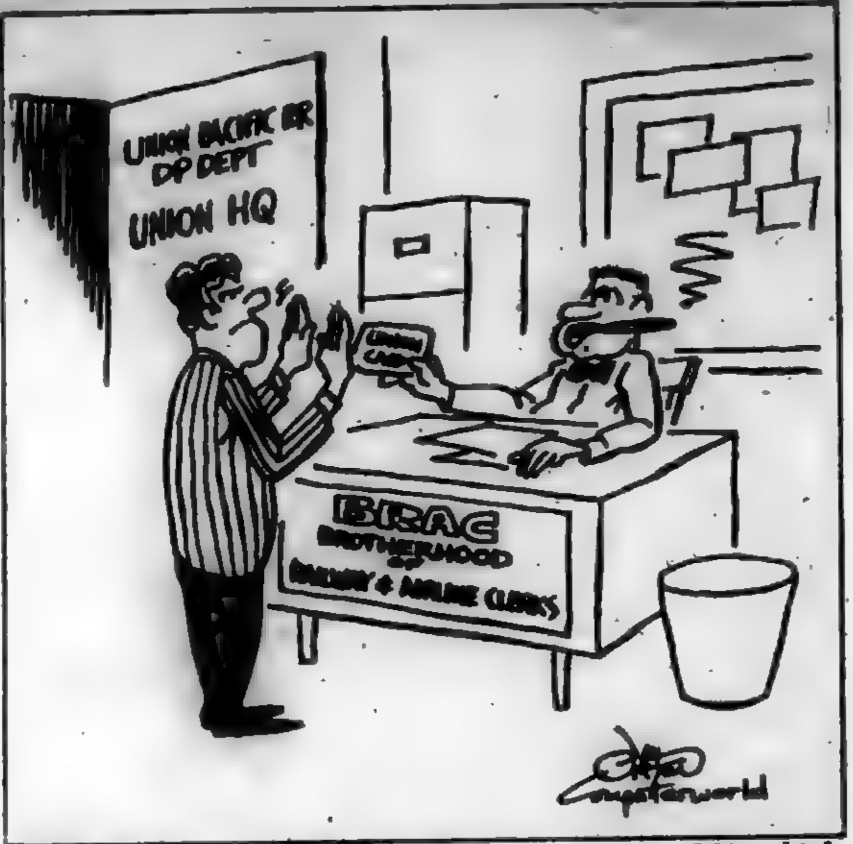
DATA PAST

Five Years Ago
Oct. 8, 1975

WASHINGTON, D.C. — Problems with a computerized payment system designed to issue checks to recipients who qualified for the Supplemental Security Income (SSI) program were blamed for more than $403 million in overpayments over a period of 18 months.

Eight Years Ago
Oct. 4, 1972

WASHINGTON, D.C. — Federal labor officials projected an excellent job market picture for systems analysts in the 1970s. According to statistics from the Labor Department's Bureau of Labor Statistics, there would be an average of 22,700 openings for systems analysts per year to 1980.



'Whaddaya mean, we can't make you join our union? You think maybe you're in Poland?'

LETTERS

Managing From Home

I read "Remote Terminals May Replace Commuting" [CW, Sept. 15] with interest because of a recent incident. As the result of an accident, my system manager found himself the subject of an extended stay at home following surgery. Things can get pretty sticky without him on the job because we have a small department and little backup capability.

The second day he was home, I sent him his CRT terminal with an acoustic coupler and a telephone credit card. He subsequently managed the system for three weeks from his home.

In this instance, everyone benefited from the arrangement. The system kept going and deadlines were met. The system manager saved his sick leave for when it might "really" be needed. In addition, his time spent watching the "tube" concentrated on the "Ascii Show" rather than "As the World Turns."

I am not sure that this could work in every instance, however. Its success in our case was dependent upon several factors:

1. My system manager is a highly motivated, intelligent individual who could be relied upon to work alone.
2. The communications system (in our case, Telenet) was in and operating at the time of the accident.
3. There was sufficient personnel backup on-site for those tasks which required "hands-on" manipulation. Tasks for which there was no backup were able to be delayed without detriment.

I am thoroughly satisfied with the way this situation worked out. I would do it again without hesitation.

Glenn S. Orenstein
Boston, Mass.

In Poor Taste

Regarding "Climate Control Malfunction Annihilates Laboratory Mice" [CW, Sept. 8], I find the comparison of the deaths of some laboratory mice to the tragic deaths of several hundred men, women and children to be in extremely poor taste and unbecoming of a newsweekly of *Computerworld*'s caliber.

Mark H. Deibert
E.Brunswick, N.J.

Substance of Structure

Congratulations on publishing the first intelligent commentary on structured coding that I can recall. I am referring to Peter Lacey's article, "Structured Coding's Twin Myths" [CW, Sept. 8].

After all the mindless babble about GOTOs, nested IFs and indentation of paragraphs — after all the examples and counterexamples of structured code and the resulting crossfire of criticism — finally, an article that demonstrates some understanding of the substance of structured coding!

I would hope that Lacey's article sinks the structured programming debate into the same obscure swamp as yesteryear's modular programming controversy.

Incidentally, structured design not only provides the foundation for structured programming, it also provides an answer to the question: "What is a module?"

Kathlyn E. Doty
Maywood, Ill.

(Other letters on pages 42 and 43.)

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

SOFTLINE/Werner L. Frank

Software Production Still a Problem

A recent report to Congress by the Comptroller General General Accounting Office (GAO) report FGMSD-80-4, Nov. 9, 1979 cited the continuing problem of developing software within the federal government. The report title summarizes the issue: "Contracting for Computer Software Development — Serious Problems Require Management Attention to Avoid Wasting Additional Millions."

The report reflected the views of 163 software contracting firms and 113 federal government project officers, as well as experience with specific contracts for software development. The indictment, as summarized herein was severe:

- Dollar overruns are fairly common in more than 50% of cases.
- Calendar overruns occur in more than 60% of cases.
- Of the nine contracts examined (admittedly eight of which were in trouble), of $6.8 million expended, the results yielded:

1. Software delivered, but never used: $3.2 million.
2. Software paid for, but never delivered: $1.95 million.
3. Software extensively reworked before use: $1.3 million.
4. Software used after changes: $198,000.
5. Software used as delivered: $119,000.

As the report concluded, "The government got for its money less than 2% of the total value of the contracts."

Can software development still be that unpredictable and troublesome in this age of enlightened practitioners who have access to higher order languages, sophisticated operating systems, a variety of implementation tools and various sfrucutred procedures and disciplines?

The report went on to cite some causes for the problems identified above:

- Lack of specific contracting skills for soliciting and subsequently administrating software efforts.
- Premature rush to develop systems before adequate requirements analysis is completed.
- Tendency to commit to the entire project without proper planning or defining check points.
- Tendency to ignore final inspection and test conditions and related acceptance procedures.

The report also identified some popular observations of the software process including:

- Projects cost more and run larger than expected.
- The production system usually ends up as a "prototype" system.
- The ultimate operational system is often achieved after fixing the prototype at a cost equal to or greater than the initial development itself.

The GAO called for action by the federal government to remedy the situation by suggesting that specific guidelines be generated which would assist agencies in custom software development. In this regard, the report provided a provisional checklist of items that can serve as a basis for a more comprehensive attack on the problem.

Is Organization Enough?

But can better organization in itself, by the federal customer or any other software purchaser, really impact the fundamentals that operate in software construction?

We regretfully conclude that the customer's organization and procurement process has little influence on these factors.

So what can be done? I submit that the single most important and influencing step that can be taken when

(Continued on Page 46)

HUMAN CONNECTION/Jack Stone

On Productivity: Truth Bears Repeating

It's always reassuring to know that some *Computerworld* readers agree with one's opinions, particularly if those opinions can be evaluated on some objective basis, like dollars — won or lost.

This was the case with William A. Delaney, president of the Bedford, Mass., software firm, Analysis and Computer Systems, Inc., who wrote a strongly supportive letter about my views on programmer productivity and efficiency [CW, Sept. 1]. He has been using the management-by-objectives (MBO) approach for years and feels it is the most cost-beneficial approach around.

Delaney first put the "lines of code" measurement into a welcome perspective:

"I am in complete agreement with you that measuring lines of coding per programmer per day and then deciding that those who produce the most are, ergo, the best, is at best an exercise in frustration and, at worst, outright misleading.

"Using this one criterion is the same as saying that the author who writes the longest article is the best writer. Indeed, in such cases, the shortest article or speech that covers the essentials and successfully delivers the message is, in my book, the best.

"As Shakespeare said, 'Brevity is the soul of wit.' Brevity is also a most desirable characteristic for any analyst or programmer. If five well-thought-out instructions will do the job, then why use 15 or 20? That is inefficient. There is no good reason unless your organization is counting your lines of coding per day and judging your performance on how many lines you write — not what you accomplish.

"We do, however, keep track of instructions per day . . . and use this information in estimating costs for new (programming) jobs and projects before we start on them. This (statistical) information can be surprisingly accurate (within 10%) when you have a large enough data base to use from which to extrapolate your costs and create schedules."

Delaney also talked to the MBO point:

"As you said, the management by objectives approach is by far the best method of getting the jobs done in the shortest time and at the least cost. At least this has been so at our company, because we have been using this method for over 15 years and we will continue to do so until someone comes up with a better way."

Delaney next summarized the basis for projecting his schedules and costs and discussed the problems of "premature" coding:

"For out work, programmers spend their time as follows: analysis and design, 40%; coding, 20%; checkout and test, 30%; documentation, 10%.

"We have learned that every day spent in analysis and design saves about five days in checkout. The tendency to rush into coding before you really know what you are doing comes back to haunt you later on. Premature coding generally results from yielding to customer (or user) pressure to 'get some work done,' because some clients don't believe that you are really doing the job unless and until they see you and your staff writing and checking out lines of coding.

"Premature coding will surely increase the number of lines of coding programmers turn out, because they will do it once, then find it needs substantial revision and do it a second time correctly. This is hardly an efficient method, but it can be most rewarding to the programmers if their performance is measured solely by the lines of coding they write."

Delaney went on to comment about

(Continued on Page 46)

SOCIOLOGY OF COMPUTING/Miles Benson

The Small Compromise

Ted R. had been purchasing computing services for Alchemy Chemical for almost 10 years.

He had bought software, hardware, keypunch support and consulting services. If it was related to data processing and it was for sale, Ted knew how to get it. And in an era when computer crime was beginning to be a concern, Ted was as clean and unbent as the Straightarrow Turnpike which ran past Alchemy's front doors.

Not that he hadn't been tempted. Marketronics had been so anxious to place a new 3PI computer at Alchemy that it had offered him a General MPG Tomcat Landau Town Car. Software Support Services wanted Alchemy to buy its Linkluster data base management system and had sent him a Rolleica camera in the mail (he'd sent it back).

But as Ted moved into his second decade in computing, the temptations began to seem unbearable.

When Alchemy decided to automate the production of one of its major product lines, process control computers were called for. Lots of them. And Ted, of course, was put in charge of the procurement.

The wooing of Ted R. began soon enough. No, I couldn't fly to Hawaii (Why not? I've never been there). Yes, I'll drink your Scotch, but no, I won't accept your case of bottles (but it's top quality Scotch).

Crisis Escalates

Wrestling with his conscience left him physically exhausted each nightfall. Locked in tandem with his psychological stress, his health began to degrade nongracefully. The crisis was escalating.

It was while the competitors from Minimax were in town that Ted began to see a way out. Minimax came from London. What if . . . what if . . . and it was hard for Ted to even formulate the thought. What if somehow Minimax managed to win the competition? Fair and square, of course. Then there would be plenty of company-paid travel to Europe. Maybe he could even take his wife along. And it would all be — er — legitimate. After all, it would be Alchemy putting up the travel money, not a vendor.

Except, of course, that Minimax had to win. It was such a small compromise, and such a large ethical payoff. And no one but Ted would ever know.

The evaluation of proposals went smoothly. Ted rated each proposal against a predefined set of technical criteria. When all the individual scores were in, weighting factors would be applied to adjust for the relative importance of the criteria and then total scores computed. Minimax, as he suspected, had an excellent proposal. Just two weighting factors had to be changed, and only by a few percent at that, to swing the competition Minimax's way.

The contract award was big enough that *Computer Trends* carried a small article on it. British statesmen, concerned about their ever-faltering economy, expressed plea-

(Continued on Page 46)

LETTERS

Whistle-Blowing

I am occasionally consulted by junior employees concerning "whistle-blowing" — that is, should the employee or "a friend of his" tell management about some observed illegal, unethical or dishonest action on the part of another employee or manager. I have not found it easy to respond to these inquiries because it is my experience that a company's high principles are not always universally respected by management practice. Often, the further down in the management chain one goes, the larger the divergence between principles and practice. Consequently I was delighted to discover an article in the MIT *Technology Review* which deals with the dangers of whistle-blowing and to which I can now refer inquirers.

Since it is likely that other *Computerworld* readers receive similar inquiries and have had the same difficulty in deciding how to give advice, I have prepared the following abstract of the article and suggest that readers consider advising whistle-blowers to read "Dos and Don'ts for Whistle-Blowers: Planning for Trouble" by Peter Raven-Hansen, *Technology Review*, May 1980.

The paper does not address the moral and ethical question of *whether* a person should blow the whistle or the legal question of his right to do so without penalty, but instead discusses how to blow the whistle once a person concludes that he is morally compelled to disclose information about fraud, corruption, mismanagement or hazards. It expands on four basic rules for defensive whistle-blowing:

- Focus on the disclosure itself, not on personalities.
- Use "channels" before going public.
- Anticipate and document retaliation.
- Know when to give up.

The article suggests that "whistle-blowing is lonely, unrewarded and fraught with peril. It entails a substantial risk of retaliation which is difficult and expensive to challenge. Furthermore, 'success' may mean no more than reinstatement to a job where the bridges are already burned, or monetary compensation that cannot undo damage to a reputation, career and personal relationships."

The best and shortest advice on how to blow the whistle has probably been given by one of the first whistle-blowers. He says that if he had to do it all over again, he would do two things at the onset: line up a good lawyer and line up a good job! The would-be whistle-blower who cannot do both should plan for trouble and blow the whistle defensively.

Eric A. Weiss

Springfield, Pa.

From Whence They Come

The last paragraph of the editorial "Standards of Avarice" read, "IBM sets high standards on a corporate level, and it's time it started enforcing them in the field" [CW, Sept. 1].

Quoting from the fourth paragraph, "IBM allegedly brought in higher level executives whose job was to pressure the DP director's boss." Where do you think they come from? Corporate, of course!

One who's been there.

Gene Framel

Tulsa, Okla.

Stress 'Real' News

Computerworld's continuous attacks on IBM and others using sensational headlines and negative attitudes does nothing but decrease CW's journalistic standing. Sensation may sell on the newsstands, but most of CW's sales are by subscription to professionals.

Don't ignore the negative stories, but make your articles more upbeat and stress the "real" news, all the fantastic new developments and products in the industry of the future. Your readership will welcome the change.

James Edwards

Shawnee Mission, Kan.

Perpetuating a Myth

I read with interest the articles on structured programming and structured methods in the Sept. 1 issue. I was disturbed to read the opinions expressed in the "worst case" example by a "technical specialist with some 10 years of application programming and design experience." Unfortunately, his opinions perpetuated the myth of structured programming meaning "no GOTOs" and therefore resulting in nested IFs.

While I concede that no GOTOs does in fact mean that the use of nested IFs becomes necessary, surely these days nobody still maintains that structured programming means an elimination of branching. Edsger Dijkstra made this clear way back in 1964 and again in 1968. It appeared that nobody understood him then and disturbingly it appears that nobody understands him now.

David King

Glendale, Calif.

If Churchill had used SPSS®, he might have saved his statistical department a lot of blood, sweat and tears

In waging war . . . and business . . . great executives know that good data analysis is a matter of life and death. Winston Churchill knew it:

"One of the first steps I took on taking charge of the Admiralty . . . was to form a Statistical Department of my own—(one that I) could trust to pay no attention to anything but realities. This group was able to present me continually with tables and diagrams illustrating the whole war. I (therefore) had from the beginning my own sure, steady source of information, every part of which was integrally related to all the rest." (*The Gathering Storm*—pp467-68)

Thanks to the honest and tireless efforts of his Department, most of the war's critical decisions were based on facts, not hunches. Had they been able to use the SPSS Data Analysis Package, the Department's analysts could have explored the legions of data more quickly, efficiently, creatively . . . with easy-to-generate tables, graphs and reports, as well as sophisticated statistical analysis.

Using the SPSS Graphics Option, Churchill might have had graphs showing The Battle of Britain in terms of German and British aircraft losses by time. Using regression analysis, Churchill would have had an excellent estimate of future losses.

As a matter of fact, Churchill might have been able to do it on his own, without the Department, because SPSS is so easy to use. Churchill himself could have learned from the excellent SPSS self-teaching manual. No special training in computer language would have been necessary—SPSS talks, listens and reports in the user's language: plain English!

When you decide which data analysis software package is right for *your* life and death decisions, consider the facts, as Churchill would have done. SPSS is sophisticated in output, yet simple to input. It's extremely portable—works in almost all computer environments. And you needn't hire any extra data processing people—your data researchers work on their own . . . with considerably less "blood, tears, toil and sweat."

If you would like to see how SPSS-generated graphs and charts would have displayed The Battle of Britain to Churchill, or for more information on SPSS, call or write:

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LETTERS

Missed the Point

No wonder Al Volpe is down on structured programming ["Worst Case," CW, Sept. 1]. He has completely missed the point! Structured programming is not writing programs without GOTOs, nor writing programs with nested IFs. Structured programming is simply writing programs in a clear and organized fashion, thereby avoiding mistakes and at the same time making the programs easier for others to read, understand and modify.

The objection to the GOTO is that it makes it too easy for a programmer to obscure the logic of his program. This doesn't mean that programs with GOTOs are bad, and it certainly doesn't mean that programs without GOTOs are good. It is, in the words of E.W. Dijkstra, who started the whole thing, "the unbridled use of the GOTO" that is harmful.

Further, the pseudocode example published with the article is a case structure; it should be implemented with a series of independent (but linked) IF statements, like this:

```
IF condition-1
   PERFORM PARAGRAPH-B
ELSE IF condition-2
   PERFORM PARAGRAPH-C
      •
      •
      •
ELSE PERFORM ERROR-HANDLER.
```

This is not a nested IF; it is a bunch of individual IFs strung together. The programmer need only consider one of them at a time. If one ignores Volpe's suggestion that conditions be arranged "in descending order of importance" and instead puts them in some logical order (such as alphabetical by transaction type) then one can string together dozens or even hundreds of IFs without confusion. The only possible penalty is a few microseconds of machine time.

Note also that this form forces the programmer to consider the "none of the above" situation, which was omitted from Volpe's example.

Volpe suggests operating "directly with the user department" as an alternative to program walk-throughs. This shows a fundamental misunderstanding of the purpose of the walk-through. Each of us has from time to time asked a colleague to review a program which was giving us trouble. The principle here is that a fresh look can often reveal problem areas which went unnoticed by someone "too close" to the problem.

By the way, Newton's work on actions and reactions was in the field of mechanics, not thermodynamics.

Bob Brown

Atlanta, Ga.

Strong Responds . . .

The recent letter "Free-Lancers Defended" [CW, Sept. 1] raised some interesting points regarding contract programmers vs. contract houses.

Aid M. Horton stated the case for free-lancers very aptly. However, there are some questions in the arguments presented by Aid.

Initially, I will restate my original position [CW, Aug. 18] that many free-lancers are excellent. However, the client cannot always be sure of that and thus, "Buyer beware."

There certainly should be a retraction of Aid's statement that contract houses send out "experienced" [average three months] programmers to serve their clients. Aid must realize that contract houses exist on multiple assignments at multiple companies, and satisfaction must be guaranteed to sustain their existence.

Should Aid's statement about not meeting a free-lance programmer who could not get or hold a job be true, then Aid professes "All free-lancers are excellent." I can only assume that to believe this, one must function in a very sheltered environment.

Regarding turnover statistics that Aid mentioned, nationally, turnover is 35% per year within data processing staffs. This statistic means that one-third of the data processing staff will turn over every year; there will not be a complete turnover every 10 months, as Horton stated.

However, companies that rely on independent contractors heavily have a much higher turnover rate than the norm. The reason for this is that in-house employees become envious of their free-lance counterparts who do not put in as many hours, do not have the same career concerns with the job and do not concern themselves with successful completion of each task. Yet, the employees make half as much money as free-lancers.

Aid further stated that it is nearly impossible to get an ex-employee back to make a correction or change to a system. It is in fact almost as hard to get an independent back during prime shift hours. Only a contract house could supply the right answer.

Finally, the Independent Computer Consultants Association (ICCA) is to be complimented on taking the first of many steps necessary to promote professionalism within our industry. However, it cannot ensure reliability of the free-lancer's product, nor can it ensure the technical competence of its membership.

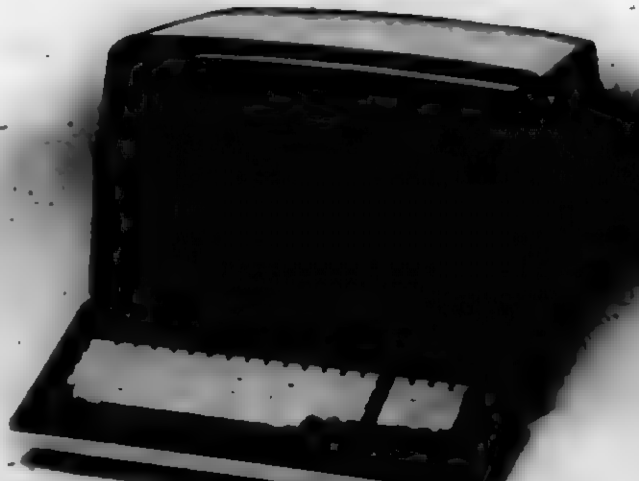
The ICCA monitors members with a code of ethics. Under "Professional Competence," it states: "A member shall not undertake or *continue* any consulting assignment which he/she cannot reasonably expect to complete with professional competence."

No doubt, this is difficult to monitor and a good reason for the old adage, "Buyer beware!"

Alan Strong
President

Contract Personnel Services
Los Angeles, Calif.

A TOTAL COMMITMENT



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THE TAYLOR REPORT/Alan Taylor

Arbitration Group's Procedures May Hurt User

The NCR Corp. arbitration clause, praised by that company as helping users, has now resulted in a vendor's employee being made arbitrator in an NCR-vendor dispute. Weak American Arbitration Association procedures permit this conflict-of-interest situation, although the user in question, Perl-Mack Enterprises of Denver, doesn't welcome it.

Further hampering Perl-Mack in being able to fully present its case against NCR is the prematurely agreed-upon timetable, which calls for any disputed subpoenas, documents and so forth to be delayed until the start of the three-day hearing in November. This is expected to be the only time that will be available to Perl-Mack. Problems could arise since witnesses not wanting to appear, for instance, can simply go out of touch for a short time, and so their evidence cannot be counted upon in the planning.

The current dispute involves an NCR contract for a computer system, including terminals, and the user is asking for printed contract terms to be overwritten by various state laws. The arbitrator, Kevin M. Mahan, revealed in a letter to *Computerworld* [Sept. 15] that he is employed by another computer terminal manufacturer. This demonstrates the dangers of the American Arbitration Association's procedures, particularly when used in conjunction with the NCR Universal Agreement.

The clauses Perl-Mack wants thrown out are a common feature in every hardware contract I know, and presumably in that of Mahan's employers. (At their request I have not investigated this point. They take the reasonable position that they do not want to be involved further.)

NCR Clause Restriction

The dangers for an NCR buyer start with the arbitration clause the vendor insists upon. It is an unusual one, calling for the arbitrator to be knowledgeable about both business and computers. However, it ignores legal knowledge, which is needed to determine if any of the contract terms are improper.

The result of this clause is that arbitrators are restricted to a group which often, like Mahan, have employers in the business or who are in the business for themselves. In either case, such people have the validity of their own form contracts to consider!

Such employer interests are not caught by the American Arbitration Association's conflict-of-interest precautions, except that during the first stages of selecting some arbitrators, the parties can object to people on the list.

This precaution is abandoned by the association quite quickly, however, and in Perl-Mack's case, after NCR had objected to the first list, Perl-Mack had only one single opportunity to object — which it did. It rejected the second list, asking for legal knowledge.

After this, under the association's rules, the arbitrator could be chosen without being reviewed by the parties.

In partial defense of the arbitration association regulations, the problems of the NCR user could be unique. The computer-and-business qualification is remarkably restrictive. But if arbitrators with apparent conflicts of interest can be appointed even once by the association, that is once too much.

In my Aug. 25 column, I did not suggest in any way that the association had blindly chosen Mahan without its own review, as he seemed to suggest in his letter. But when the group's decision was made, his name was communicated without prior warning — that is, "out of the blue" — to the user.

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Software Production Remains Large Problem

(Continued from Page 41)

contracting for software is to require a "break-in" phase by the contractor in which he is asked to review and feed back his full understanding of the requirements and the development objectives as a prerequisite to the start of the actual implementation.

This activity is best carried out within the disciplines of structured analysis. It doesn't really matter which methodology is used, as long as one performs the process under a well-defined discipline.

This procedural step — while possibly retracing earlier in-house activities which may have established the user requirements in the first place — will:

- Reconfirm and authenticate the operational requirements.
- Provide expected performance parameters.
- Establish test and acceptance procedures.
- Validate the vendor's understanding and commitment.

After this step is satisfactorily completed, schedules and prices can be established and the customer can then organize to monitor and manage the software development.

In fact, the serious buyer may well wish to purchase this initial phase of the project from two qualified sources in order to provide a check and balance. It has been clearly established that most of the serious defects in software occurring during the operation of a system can be traced back to initial design flaws and oversights. Hence, extra dollars spent early in the game are the best investment that can be made to minimize postcontract problems. And yet, it is this step which is too often expected as a "freebie" in the government procurement process.

Even More . . .

But that isn't all that matters. The report overlooked two other important points.

The first is concerned with the apparent belief that "correct" specifications at the outset, and maintaining adherence to those requirements, eliminate problems in developing software.

Unfortunately there are not many systems that can be prescribed at the outset and for which changes do not abound as development progresses.

But even more important, the client or end user often does not really know what is being sought in detail until pieces of the development become visible.

This understanding of the software construction process suggests the early need for completion of basic functions of a system in order to provide a means for the user to track both progress and direction. This step becomes, therefore, an important and measurable contractual milestone.

Finally, we caution the software buyer about another overlooked aspect. This is the postcontract, operational phase during which the maintenance activity begins. The referenced GAO report emphasized the construction and delivery phase of government contracting for software, but ignored the operational impact of the delivered software.

In other words, the problems with custom-developed software in the federal government may have been found to be even worse than reported if the maintenance experience had also been studied and evaluated.

A Compromise That Backfires

(Continued from Page 41)

sure. Alchemy expressed pleasure. And Minimax, of course, was elated.

It was three days before his first trip to London that it happened. "By the way, Ted," his boss said in a soft voice, "the top brass in contracts need to check over your figures on the Minimax contract."

"Sure, no problem," Ted mouthed, his world collapsing inside him. "I'll get the folder for you now."

It had been such a small compromise.

Productivity: Truth Repeated

(Continued from Page 41)

the physical environment for programming:

"I agree with you that programmers need peace and quiet to do their thing, and crowding them together in a big room to save floor space costs far more in the long run in lost efficiency, delays and overruns.

"What you discussed is not new. It is as old as the first line of software ever written, but the truth bears repeating form time to time for emphasis. If your article convinces only one group to think things over and make some improvements, then it is worthwhile. Perhaps you should reprint your article every six months or so."

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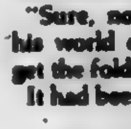

Updates Query Facilities

Cincom Makes Enhancements to 'TIS'

CINCINNATI — The addition of batch query, generic queries and query update utilities mark the major enhancements to Cincom Systems, Inc.'s latest release, 1.2, of its Total Information System (TIS).

The batch query utility is identical in functional capabilities to the existing TIS on-line query, except that users will have to describe all desired information prior to execution, according to Alex Kuli, marketing manager.

Batch query gives users the option of requesting information and executing either on-line or in batch mode; users of on-line facilities also gain the capability of sorting data by running it in batch, Kuli said. This utility was reportedly designed for situations where large volumes of data are expected in response to a query.

Generic Queries

A generic queries utility, which defines a general type of information request, is said to make stored queries more flexible. With this facility, a question is formulated, validated and stored, but specific data values are not required until the time the GO command is given.

Another enhancement, query update, ensures that previously saved queries still receive valid responses if changes are made to data relationships or descriptions in the TIS Directory, Kuli claimed.

If the stored query is no longer correct, this utility will inform users of which statements need to be changed, he explained.

Other enhancements to TIS Query include a naming conventions facility that lets users save expressions or queries only if the name obeys reasonable syntax rules, and translate tables that now allow users to ask questions using the full English word or the internal code, since it will translate the word into the code it recognizes and then give the answer in the English word.

TIS Query has also been expanded to allow alternate methods of displaying large amounts of data; instead of a partial display of information, the system will now automatically adjust the format to maximize the amount of data that can be displayed, Kuli stated.

In addition, with a resource consumption limits utility, the data administrator can set limits — for example on the number of base file reads in on-line mode and number of output print lines in batch mode — to regulate how much of system resources end-users may consume.

Directory Maintenance

TIS Release 1.2 also includes improvements to the on-line directory maintenance utility, reducing the number of steps and keystrokes required for its use and allowing users to automatically produce updates contained in TIS Product Assistance Newsletters and machine-readable patches directly from Cincom's Assistance Request data base.

The TIS Directory is sold with the TIS Data Base Manager for a one-time license fee of $99,750 or $1,995/mo on a one-year lease. The on-line directory maintenance utility must be licensed separately for $16,250 or $325/mo for one year.

License fees for Batch Query are $20,000 or $400/mo on a one-year lease; On-Line Query licenses for $50,750 or, on a one-year lease term, $1,015/mo.

Three- and five-year lease licenses are also available from Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

Top-Down Design

Structured Path Eased on VAX-11

SEABROOK, Md. — An interactive software system that is said to provide users of Digital Equipment Corp. VAX-11/780 processors with simplified access to application systems has been developed by Business and Technological Systems, Inc. (BTS).

Aimed at systems analysts, programmers and end users in commercial environments, the user-transparent Video system provides the framework for top-down structured design of application systems, BTS said.

Besides helping implement new application systems, Video can be used to organize existing programs into structured, easy-to-use application systems, a spokesman added.

Tree Structure

With Video, an application system is viewed logically as a hierarchical or tree structure wherein the nodes are either menus (which are logical decision points), instructions, programs or DEC Control Language (DCL) command procedures, the spokesman explained.

As a user traverses a path through a tree, menus and instructions are displayed and programs and DCL command procedures — which appear as leaf nodes in the tree structure — are executed.

To control the path, a user responds to each menu display by entering a number corresponding to one of the options specified in the menu. The need for user expertise in the VAX computer sys-

(Continued on Page 48)

'Omega I' Lets OS Users Create, Convert, Update Files

MANHATTAN BEACH, Calif. — A file maintenance system that reportedly gives IBM users running under OS (TSO or batch) the ability to create, update or convert data files without programming has been unveiled by De Faro Software Systems Co.

Users of Omega I, which consists of three functions, reportedly can be trained in three hours.

The CREATE function is said to give the user the ability to create physical sequential (PS) or Isam data sets with fixed or variable length records on disk or tape media.

The package's UPDATE function gives the user the ability to select and display records from a PS or Isam data set containing fixed or variable-length records.

CONVERT will give the user the ability to perform a variety of conversion jobs without conventional programming, according to the vendor.

Omega I will not access protected data sets unless proper passwords are provided by the user, the vendor claimed.

In addition, Omega I does not require pre-expansion of macro-generated code, the vendor said. It will run immediately once the user specifications are read and determined to be correct.

One-time license fee for the package is "approximately $15,000," a company spokesman said. DeFaro's address is P.O. Box 3216, Manhattan Beach, Calif. 90266.

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'ASM' Enhancements Boost Vsam Support

LOS ALTOS, Calif. – The Cambridge Systems Group is offering an enhanced version of its Automated Space Management (ASM) system that reportedly features increased Vsam support, extended preprocessing and completely rewritten documentation.

Release 2.5 of ASM2 retains the original design concept of allowing usage characteristics of data to determine the placement and type of storage medium to be utilized. It contains several improvements that increase ASM2's flexibility and usability, the vendor claimed.

Improved Vsam support includes maintenance of a last-use date, use count information and an SU60-like change flag for Vsam clusters; extended Vsam billing and reporting; and system-initiated archival and incremental backup of Vsam data sets concurrently with non-Vsam data sets, a spokesman said.

Incremental backup and recovery are more automatic and interfaces to TMF and TLMS are improved, the vendor claimed. Integrated support of ACF2 and RACF is included.

ASM2 costs $14,250, the vendor said from 24275 Elise, Los Altos, Calif. 94022.

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OSI Offering 'OSI/Airs' Via Remote Services Net

SANTA CLARA, Calif. – Optimum Systems, Inc. (OSI) is now offering OSI/Airs via its remote computer serivce network.

The introduction of the product coincides with OSI's entry into the interactive marketplace with VM/CMS. When coupled with the previously offered remote batch capability of MVS and Superwylbur, VM/CMS gives the OSI/Airs service a complete line of remote computing capabilities, the vendor claimed.

With VM/CMS, OSI also announced the availability of System 2000/80 as an interactive program product.

System 2000/80 is a user-oriented data base management system (DBMS) from Intel Corp. It allows the interactive user to create and manipulate his data base to generate reports in less time than the traditional batch-oriented DBMS, according to a spokesman.

OSI/Airs is priced according to amount of computer time used, the vendor said from 2801 Northwestern Parkway, Santa Clara, Calif. 95051.

Interactive APT Package Targets Novice Programmer

DALLAS – University Computing Co. (UCC) is offering an Interactive APT processing Package designed for the novice programmer or programmers who infrequently use a computing service.

The package was developed by Robert Drewry, president of Digital Manufacturing Systems of Wichita, Kan. UCC recently acquired the rights to the package.

Features include complete interactive processing, on-line editing and plotting capabilities. The package is upwardly compatible with UCC-APT and offers standard Ansi plus on-line error correction and graphics display of both geometry and tool motion.

The Interactive APT package runs on a Digital Equipment Corp. PDP-11/03 minicomputer. The package, with PDP-11/03, costs about $35,000, the vendor said from UCC Tower, Exchange Park, Dallas, Texas 75235.

'Hipo-11' Gives Diagrams

SCHAUMBURG, Ill. – Reicor Systems, Inc. has introduced a Hierarchical Input Process Output (Hipo)-11 package that automatically generates Hipo documentation diagrams for programs written in Basic-Plus on Digital Equipment Corp. PDP-11 minicomputers.

By using Hipo-11, PDP-11 users are able to produce consistent and accurate documentation automatically, the vendor claimed. Hipo-11 is reportedly capable of diagramming up to 255 levels with up to 255 routes per level.

The package costs $1,900 from the vendor at Suite L, 1306 Remington Road, Schaumburg, Ill. 60198.

Structured Path Eased on VAX

(Continued from Page 47)

tem and its command "is all but eliminated," the vendor claimed.

The application programs that reside at the leaf nodes of a tree structure can share information easily and efficiently by using the Video Communication Facility (VCF), BTS said.

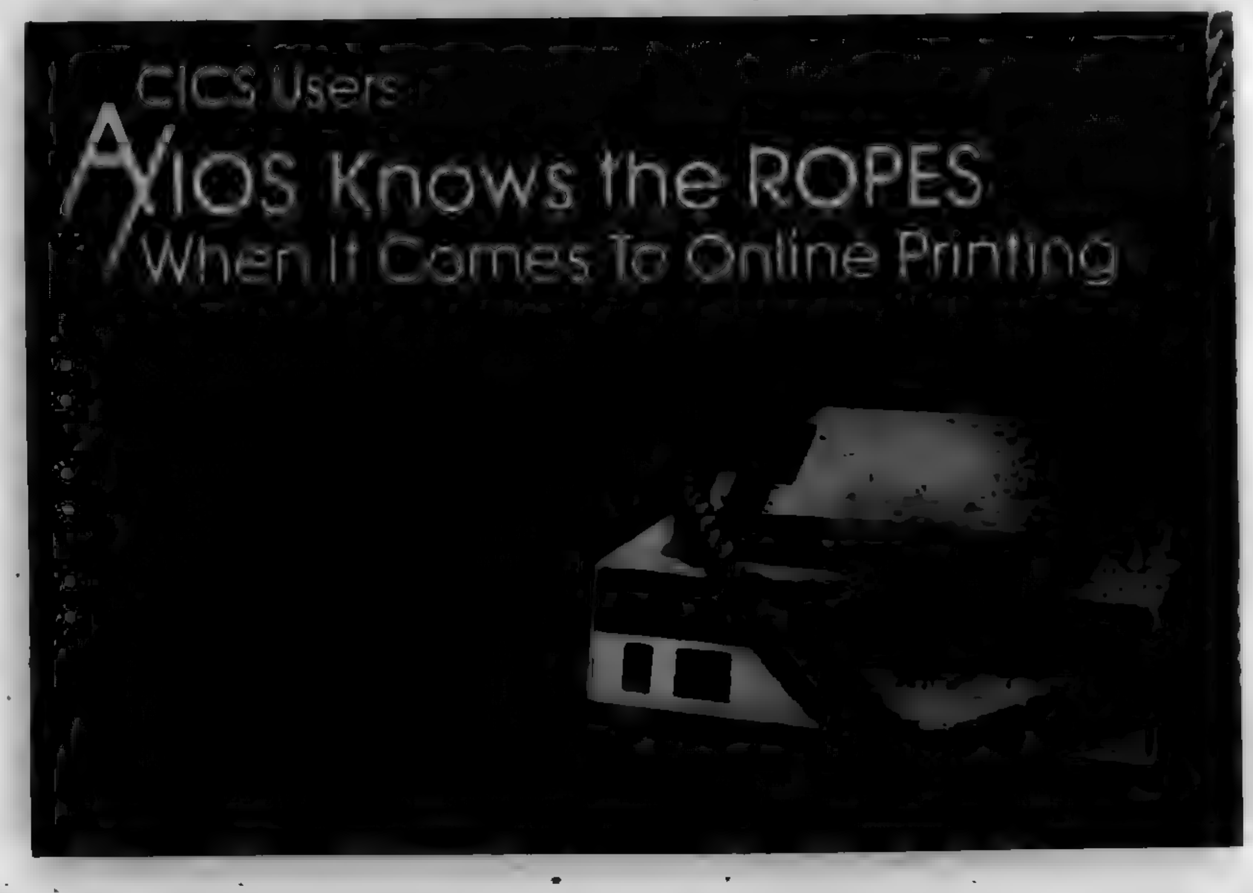
VCF permits any number of 512-byte pages to be defined as an application program communication area when the tree structure for a new application system is initialized.

Each Video interface tree can have a communication area associated with it for its application programs to use while running under Video, the spokesman said. The communication area for an application system is established whenever a Video session is initiated and is deleted upon completion of the session.

Video also provides for system security, in that any node within the tree structure, as well as the tree maintenance function, can be password protected, the firm claimed.

Video costs $6,000 for perpetual license, $560/mo (for 12 months) for a deferred payment perpetual license, $275/mo rental fee for a minimum of six months and $600/year for maintenance. Maintenance includes enhancements not provided as chargeable options and documentation updates.

BTS is located at Suite 440, Aerospace Bldg., 10210 Greenbelt Road, Seabrook, Md. 20801.



HP 1000s Get Source Management

ABERDEEN, N.J. — A source management package for the Hewlett-Packard Co. 1000 has been developed by Corporate Computer Systems, Inc. (CCS).

The package is comprised of the Scons/1000 source control system and the Delta/1000 optional file difference calculator. Scons/1000 contains the tools to manage large-scale software development projects, providing control over source module creation and change, CCS said.

Running in the RTE IVB operating system, Scons will support multiple users, multiple source control systems and multiple projects within a source control system.

The companion Delta/1000 program, although not required for Scons, is said to be useful for detecting differences between two disk files. It will calculate the minimum difference and product a file of edit commands to bring the two files into alignment. Included with Delta is the edit program Undelta.

A license for the Scons/1000 costs $5,000 for the first copy and $2,500 for each additional copy. Delta/1000 is included with Scons, but may be purchased separately for $995 per copy.

CCS offers software update services and a phone-in consultant for Scons and Delta. The firm is located at 675 Line Road, Aberdeen, N.J. 07747.

Operations Management Aid Geared to MVS Shops

NEWPORT BEACH, Calif. — Software designed to aid operations management has been introduced by Tiger Systems for IBM MVS shops.

OP-MGR reportedly gathers data on tape mounts, disk mounts, unit record intervention, printer delays and paper changes, and produces exception reports of unusual delays by shift.

OP-MGR will print shift activity summaries on a daily, weekly and monthly basis of average mount times, best response, worst response, memory waste and percent within target range. Free sample graphs and reports are available.

OP-MGR costs from $250/mo rental. Tiger Systems is located at Koll Center, Suite 3000, 4000 MacArthur Blvd., Newport Beach, Calif. 92660.

'Pills' Assists Pharmacists

LUFKIN, Texas — A software package designed to help pharmacists fill prescriptions and provide access to refill and patient history data is available from ERG Software, Inc.

Known as the Prescription Information Logging and Labeling System (Pills), the package allows prescriptions to be keyed in as the pharmacist fills them and identified as Medicaid, third-party or regular billing, the vendor claimed.

All prescriptions are assigned a unique number which will be printed on the medication label and used to recall prescriptions for refill, a spokesman said.

The package was designed to run on the IBM 5110/5120 and costs less than $18,000 for both hardware and software, the vendor said from 101 Industrial Place, Lufkin, Texas 75901.

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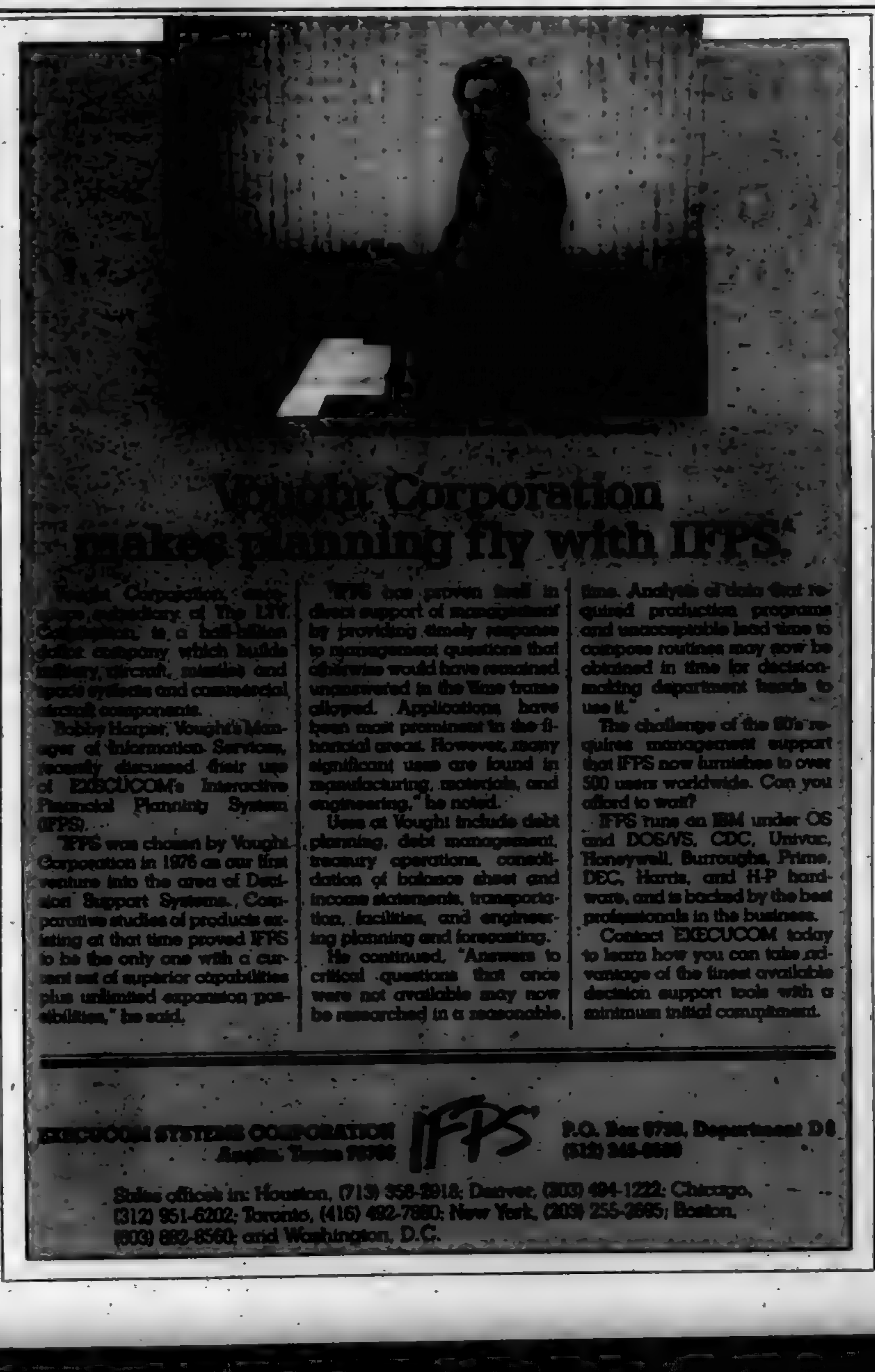
DG Minis Get Retail Tool

PHOENIX — Data Financial Systems, Inc. has unveiled its Adapt software package for use on all Data General Corp. minicomputers.

The package includes modules for general ledger, accounts receivable, accounts payable and payroll applications.

These foundation packages are functional in standard form or can be custom-tailored by nontechnical personnel using Adapt, the vendor claimed.

The price for the product is $4,800, the vendor said from 4350 E. Camelback Road, Phoenix, Ariz. 85018.



Vought Corporation makes planning fly with IFPS.

Vought Corporation, an aerospace subsidiary of The LTV Corporation, is a half-billion dollar company which builds military aircraft, missiles and space systems and commercial aircraft components.

Bobby Harper, Vought's Manager of Information Services, recently discussed their use of EXECUCOM's Interactive Financial Planning System (IFPS).

"IFPS was chosen by Vought Corporation in 1976 as our first venture into the area of Decision Support Systems. Comparative studies of products existing at that time proved IFPS to be the only one with a current set of superior capabilities plus unlimited expansion possibilities," he said.

"IFPS has proven itself in direct support of management by providing timely response to management questions that otherwise would have remained unanswered in the time frame allowed. Applications have been most prominent in the financial areas. However, many significant uses are found in manufacturing, materials, and engineering," he noted.

Uses at Vought include debt planning, debt management, treasury operations, consolidation of balance sheet and income statements, transportation, facilities, and engineering planning and forecasting.

He continued, "Answers to critical questions that once were not available may now be researched in a reasonable time. Analysis of data that required production programs and unacceptable lead time to compose routines may now be obtained in time for decision-making department heads to use it."

The challenge of the 80's requires management support that IFPS now furnishes to over 500 users worldwide. Can you afford to wait?

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Ups Response, Throughput

'OS/32 Link' Fits 32-Bit CPUs

OCEANPORT, N.J. — A linkage editor for Perkin-Elmer Corp. (PE) 32-bit computers, including models 3220 and 3240, has been introduced by that company's Computer Systems Division.

OS/32 Link is an integral component of the 32-bit operating system OS/32.

Compared to its TET/32 predecessor, OS/32 Link provides major improvements in response and throughput and also fully exploits the memory architecture of the PE 3200 computer systems, permitting programs of up to 16M bytes to be created in up to 256 individually protected, relocatable segments, a spokesman said.

The product is downward compatible to the company's models 7/32 and 8/32.

Economies in the use of system resources can be achieved with the tree-structured automatic overlay scheme of the OS/32 Link, the vendor claimed, adding it manages the loading of overlays at run time without placing constraints on the programmers.

Optimization of resources can be achieved through experimentation with the structure, by working with the linkage editor, and with no reprogramming, the spokesman said.

OS/32 is priced at $6,000 for 9-track magnetic tape and $6,700 for 10M-byte disk, the vendor said from 2 Crescent Place, Oceanport, N.J. 07757.

'Explain' Aids Documentation

MINNEAPOLIS — A Documentation Development Methodology (DDM) package that provides users with the tools needed to develop their own documentation has been announced by Writing Laboratories Group.

Explain — an "organized and disciplined approach" to writing for an organization or business — comprises two writing cycles, according to the vendor.

The Development Cycle describes, in general terms, the procedures to be followed to produce new documentation. The Updating Cycle describes steps toward updating existing documentation.

The major sections of Explain include a resource planning guide, a control guide, a writing and editing guide, a documentation content guide, a production guide and a guide to specialized terms.

Besides the guides and their accessories, Writing Laboratories Group personnel provide a series of orientation classes.

The Explain package costs $15,000 from the firm at Suite 810, 730 Hennepin Ave., Minneapolis, Minn. 55403.

Protocol Eases Data Base Tasks

NASHUA, N.H. — Functional Automation/Gould, Inc. has unveiled a "software protocol" that permits data base entry, storage, manipulation and retrieval. Functional Automation File Zero resides in all F64 Cyblok computing and I/O processing modules and allows preparation and use of software programs regardless of the type or mix of memory storage media, the vendor claimed.

With an identical message interface for all media, languages and users, it simplifies access to and expansion of the data base stored throughout a loosely coupled Cyblock network, a spokesman said.

Facilitating system expansion with no program changes, the product provides an inherent memory sharing and write-protect mechanism. Memory portions are assigned to individual owner Cyblocks, and only owners have write-access and ownership transfer privileges.

The product is a free and fully supported feature of F64 Cyblock building block computing and I/O processing modules, the vendor said from 3 Graham Drive, Nashua, N.H. 03060.

Cross-Assemblers For Micros Run On DEC PDP-11

BEDFORD, Mass. — A line of microprocessor cross-assemblers which run on the Digital Equipment Corp. PDP-11 series under Western Electric Co.'s Unix operating system is now available from System Kontakt, Inc.

The line includes cross-assemblers for the 8048, 8086, 8085, Z80, Z8000, M6800, M6809, MC68000, 6502 and 9900 microprocessors.

The products are available in either relocatable or absolute version. They are written in Macro-11 assembly language and sources are available from System-Kontakt under single-unit licenses. Unix versions of the Macro-11 assembler are also offered.

Prices range from $2,000 for the 8085 cross-assembler to $3,500 for the 8086 version, the vendor said from 6 Preston Court, Bedford, Mass. 01730.

Z8000 Cross-Software Tool Gives PDP-11s Source Code

CUPERTINO, Calif. — Zilog Inc.'s cross-software package that allows Digital Equipment Corp. PDP-11 users to develop code for Zilog's 16-bit Z8000 microprocessor is now available with source code. Previously the package was only available with object code.

The package runs on Western Electric Co.'s seventh edition of the Unix time-sharing system and costs $10,000 for the first CPU and $3,000 for each additional CPU.

The Unix software runs on PDP-11/44, PDP-11/45 and PDP-11/70 systems, the vendor said from 10340 Bubb Road, Cupertino, Calif. 95014.

'Computers Won't Replace Some Jobs! Damn!'

Correction

Softool Corp.'s Software 80 is also available off-the-shelf for Systems Engineering Laboratories, Inc. users [CW, Sept. 15].

Candle announces a new generation of software monitors

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The CICS Response Time Analyzer is an optional add-on to the OMEGAMON/CICS software monitor. Response can be monitored in real-time in two ways: time slots (for example, 8 AM-10 AM, 1 PM-3:30 PM) and time intervals (such as the last 15 min, 30 min, 60 min).

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China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. and it includes among its 25,000 subscribers the key government officials and computer managers who have EDP purchase decision authority.

China Computerworld will have three monthly issues in 1980, and will be published twice a month beginning in January, 1981. It has tabloid size and a newspaper format, and gives you a unique opportunity to introduce your products and services to this sleeping giant of a marketplace.

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'SDSI' Lets VS1 Users Prevent Concurrent Updates

SACRAMENTO, Calif. — Software Module Marketing, Inc.(SMM) is now offering its Shared Data Set Integrity (SDSI) system to multiple CPU users in a VS1 environment.

SDSI prevents concurrent updates on those data sets which are shared between multiple CPUs, the vendor claimed, adding it can intercept any ENQ or RESERVE request and convert it into a global ENQ. This allows an installation to have a global data set integrity protection and eliminate hardware device reserves, a spokesman said.

The price for the product is $12,000 on two CPUs and $15,000 for more than two CPUs. The price includes maintenance and support for the first year, the vendor said from Crocker Bank Building/Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

'Flexifile 21' for DDP Use Gives Prompted Data Entry

MOUNTAIN VIEW, Calif. — Tri-Data Corp. has released an enhancement to its Flexifile 21 intelligent floppy disk subsystem that reportedly allows it to handle prompted data entry in distributed data processing (DDP) environments.

The prompted data entry program gives the user the tools to format input data on an interactive, step-by-step basis. The vendor claims the package can be used by inexperienced users and programming is faster.

The package costs $200 on diskette and is available through all Tri-Data distributors, the firm said from 505 E. Middlefield Road, Mountain View, Calif. 94043.

For Users Spending $20,000/Mo

TSR System Freezes Costs

GREAT NECK, N.Y. — In an effort to secure a portion of the corporate time-sharing market, Time Sharing Resources, Inc. (TSR) has announced Fixed Price Time-sharing, which it says could cut the bill of a $150,000/mo user to $25,000/mo.

By freezing costs for three years, the company said it can provide an inflation-beating package provided the user spends a minimum of $20,000/mo on time-sharing facilities, a TSR spokesman said.

The service is IBM software-compatible and the company says it gives technical service and support. TSR uses two Perkin-Elmer Corp. V32 systems and plans on expanding a spokesman said from 777 Northern Blvd., Great Neck, N.Y. 11021.

System/34s Get Inquiry Package

RESEARCH TRIANGLE PARK, N.C. — An inquiry package for IBM System/34 users who have selected the general ledger module of IBM's Mapics and DFAS applications software is being offered by RLB Systems, Inc.

The package will display closed or open account balances, current balances vs. history or budget and all open detail entries in an edited, easy-to-use format for one or all unclosed months. The module will preclude running various and sometimes large reports now required to generate the same information, and allows reconciliation of accounts during the month, the firm said.

The module can be customer installed in approximately 20 min and costs $375. The vendor can be reached through P.O. Box 12764, Research Triangle Park, N.C. 27709.

Real Estate Package for IBM 5100

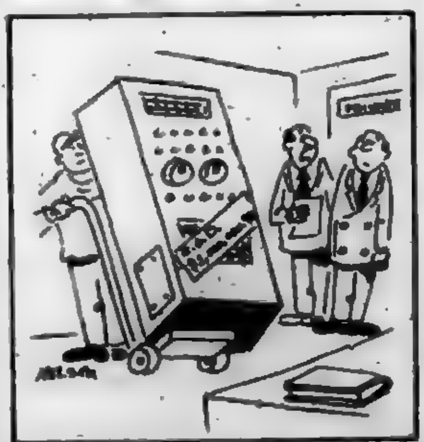
TRAVERSE CITY, Mich. — Stafford Management Systems, Inc. is offering accounting and property management packages for real estate firms using IBM's 5100 series small business systems.

Real-Pro is a real estate brokerage accounting, marketing and management package that offers payroll, accounts receivable and general ledger with budgeting and ratio analysis. Agents can process real estate sales, print seller and purchaser statements and closing reconciliation letters and checks. The package costs between $4,750 and $9,700 depending on features chosen, the vendor said.

Stafford is also offering Property-Pro, a property management package that reportedly allows property managers to track up to 1,800 units on a single diskette and generates monthly rent, maintenance and other statements.

It also monitors cash receipts and generates seven-day notices, the vendor said.

Property-Pro costs $6,350 from the vendor at 3298 Wysong Road, Traverse City, Mich. 49684.



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Pacific Tel Charges May Make Waves

By Phil Hirsch
CW Washington Bureau

SAN FRANCISCO — An attempt by Pacific Telephone and Telegraph Co., AT&T's California affiliate, to impose access charges on its private-line customers has started what looks like a major battle.

Interstate private-line customers whose circuits terminate within Pacific Tel territory would initially pay approximately $11.75 more per month for each termination. Ultimately, the charge would go as high as $33.90 per month.

If Pacific Tel is allowed to impose these surcharges, California's other telephone carriers — the major ones are General Telephone Co. and Continental Telephone Co. — will be permitted to do likewise.

National Campaign

According to those fighting the access charge proposal — which includes the airlines and other user groups, as well as most of the specialized carriers — Pacific Tel's move is part of a nationwide campaign by telephone carriers. The opponents cited a similar move in New York [CW, Aug. 11] and rumors that the Missouri regulatory commission is considering a surcharge on private-line services.

Pacific Tel's proposal was inspired by a 1979 ruling of the California Public Utilities (CPUC) ordering the state's telephone companies to restructure their private-line rates. Among other changes, the companies were told to develop a separate charge for the local exchange costs related to these services. Interstate private-line services became involved at this point because they also use local exchange facilities in most cases.

(Continued on Page 56)

HP Plugs Hole in 2620 Terminal Line . . .

PALO ALTO, Calif. — Hewlett-Packard Co. has plugged a hole in its 2620 CRT terminal family with an additional model that reportedly improves data integrity, cuts system overhead and boosts system throughput during data entry.

The Model 2624A, which bridges the gap between HP's character-mode Model 2621A terminal and its multiscreen Model 2626A, reportedly comes with editing, formatting and data verification features not found in either of the other two products. Each of the features is geared principally to enhancing data entry productivity, a company spokeswoman said.

The 2624A comes in two versions: one with an integrated 120 char./sec thermal printer and the other without such a printer.

Data Verification

As an aid to data verification, the latest addition to the 2620 line provides local data-checking features like protected, unprotected and transmit-only fields. Together, the features ease a host mainframe's processing burden by allowing users to detect input errors off-line, the spokeswoman said.

To further safeguard data integrity, the 2624A performs both field and edit checks of all characters whether alphabetic, numeric, integer, signed decimal or implied decimal. Edit checks reportedly allow the terminal to spot data entry errors and then alert an operator of their existence.

The 2624A also aids data verification by providing required fields and total-fill fields, which in effect guard against incomplete entries or total omissions of crucial input like sales order numbers, the spokeswoman explained.

In addition, the terminal performs various preprocessing steps like justification of lines, numeric fills and implied decimal edits without interacting with its

(Continued on Page 56)

. . . And Upgrades 2645A CRT Unit

PALO ALTO, Calif. — Enhanced editing capabilities, simplified forms design and a dedicated file system reportedly highlight the latest addition to Hewlett-Packard Co.'s 2640 family of CRT display stations.

The Model 2642A, although compatible with HP's previously announced Model 2645A, sports several performance features not available with the older terminal.

One of the 2642A's purported enhancements is increased mass storage capacity. Unlike the 2645A, whose integrated mass storage was limited to 220,000 bytes, the latest member of the 2640 series accommodates a total of 540K bytes. Moreover, the 2642A uses two nonintegrated 5.25-in. floppy diskettes as its storage medium, whereas the older 2645A uses dual minicartridges.

Compared with the 2645A, the 2642A reportedly boasts improved text editing features, including the ability to rearrange paragraphs, justify lines, copy paragraphs and perform search-and-replace operations. The 2642A also offers a "word wrap-around" capability that allows the terminal to transfer a word from the end of one line to the beginning of the next, rather than hyphenating the word at the right margin.

A third performance advantage of the 2642A over the 2645A is a software module that reportedly simplifies forms design. Con-

(Continued on Page 56)

SDLC Capability Added To Raytheon's PTS-2000

NORWOOD, Mass. — Raytheon Data Systems Co. has added IBM Synchronous Data Link Control (SDLC) capabilities to its PTS-2000 information display system, introduced in April as an emulator for small-cluster IBM 3276-type display systems.

The SDLC announcement means the PTS-2000 system can now use IBM's Systems Network Architecture (SNA)-based terminals, the firm said. Also added to the PTS-2000 system's capabilities were a 3,440-char. screen capacity and support for 9,600 bit/sec data rate communications.

The PTS-2000 consists of an intelligent microprocessor-based controller that supports up to eight devices, either operator display/keyboard terminals or a 120 char./sec printer, Raytheon said.

The addition of the 3,440-char. (43-line by 80-char.) capability

(Continued on Page 56)

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Tool Analyzes 3270-Type Nets

NORWALK, Conn. — A data collection instrument that determines the performance level of data communications networks utilizing IBM 3270 or equivalent and NCR Corp. 501 terminals has debuted from Datacomm Management Sciences, Inc.

The Response Time Analyzer (RTA)-327 can make measurements at the CPU or remote controller site via a bridged (in-service, noninterfering) basis on the RS-232 interface between the communications controller and modem.

The RTA-327 was designed for use with binary synchronous communications protocols.

It costs $4,875 from the firm at 181 Main St., Norwalk, Conn. 06851.

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Proposed Surcharges May Make Waves

(Continued from Page 53)

As subsequently proposed by Pacific Tel, the access charge would apply to all interstate foreign exchange (FX) services, all telephone company-provided access lines connected to dedicated switching systems — such as CCSA and EPSCS — and to tie lines and others "which terminate at other than a nonkey telephone set at both ends."

The charge would apply not only to circuits supplied directly to the end user by Pacific Tel, but also to those supplied indirectly, via specialized carriers.

It would also apply to wideband and Telpak private lines connected to local exchange networks, as well as to similar, privately owned microwave or satellite network facilities.

The charge, in each case, would be imposed only on those circuit terminations within Pacific Tel territory.

The carrier proposed a monthly access charge of $33.90 per termination for off-net access lines, FX and private arrangements. For all other private lines, the monthly charge would be $32.50. To assure an orderly transition, the company said the charges would not become effective until 12 months after they were accepted by the California commission, and then only 35% of the full amount would be levied.

However, six months after this Phase I charge went into effect, it would be increased to 70% of the full amount, and six months after that the full rate would be imposed.

According to a spokesman for the CPUC, a final commission decision on Pacific Tel's proposal is likely to be announced next month. If the proposal is accepted, Pacific Tel probably will file a tariff in late October or early November. The commission would act on it "soon afterward," which could mean that the new rates will become effective before the end of next year.

The spokesman added that if the Federal Communications Commission (FCC) insists on reviewing the access charges before they go into effect, California won't object. But such a review doesn't guarantee rejection.

While the FCC has turned down the surcharge proposed earlier in New York, it did so primarily because that levy was imposed only on interstate private-line users.

In California, by comparison, the charge would apply to both interstate and intrastate users — although the latter group, because of proposed changes in mileage rates for intrastate private-line services, would end up paying less, in most cases, rather than more.

The FCC is now reviewing the access charge issue on a national scale. If a number of states propose increases like the one pending in California, it could have a decisive impact.

HP Plugs Gap in 2620 Terminal Family . . .

(Continued from Page 53)

host processor.

If a flawed data entry is detected by the terminal itself, a message explaining the error is displayed across the bottom two lines of the unit's video screen.

If an error is spotted instead by a host processor, a message again appears on the bottom two lines, and after the mistake has been corrected, a built-in "read/modify" feature can be used to transmit only the modified fields back to the mainframe.

To ease the creation of entry forms, the 2624A provides a standard 64-char. line-drawing set, with math sets and large characters optional.

Among its other features, the terminal offers eight user-definable "soft keys" that allow data entry clerks to execute several local or remote functions with the push of a single button. Each soft key can be labeled on the unit's display screen with up to two 8-char. lines.

Though intended primarily for data entry and data retrieval, the 2624A can also be used by programmers for software development, the spokeswoman said. A standard version of the terminal comes with four pages of display memory, which can be used for scrolling or paging through lines of code, and an additional five pages are available as an option.

The unit permits programmers to enter or edit their code in either character or line mode, the spokeswoman added.

Equipped with a standard RS-232C or an optional 20 mA current loop interface, the 2624A communicates point-to-point at up to 9,600 bit/sec in either full- or half-duplex asynchronous mode.

The terminal's optional built-in printer operates in various modes, including a compressed print variety in which 132 characters are squeezed into each line of hard-copy text.

Excluding integrated printer, the 2624A costs $2,750. A printer adds another $1,150 to the price. Other options include additional display memory, which costs $200, and European character sets, which sell for $100 each.

Deliveries of the 2624A take eight to 10 weeks from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

. . . While Adding 540K-Byte Display Unit

(Continued from Page 53)

trolled by screen-labeled function keys, the forms design module allows users to create unprotected or transmit-only fields and specify alphabetic or numeric field checks.

The module also allows users to take advantage of various display enhancements, including features like inverse video, blinking and underscoring.

By virtue of its forms design module and text editing capabilities, the 2642A can perform many keyboard applications like data entry and document preparation locally and then transfer the jobs to a remote host mainframe for processing. With the 2645A, by contrast, most of these same kinds of jobs had to be done on-line, an HP spokesman explained.

To a host processor, output from the 2642A's floppy diskettes looks exactly the same as output from the 2645A's minicartridges, HP said. As a result, users whose programs have previously been stored on cartridge tapes can now transfer them to diskettes without having to make any software changes.

The 2642A, which HP describes as filling the gap between smart and intelligent terminals, incorporates 88 80-char. lines of internal memory, a 24-line by 80-char. video screen and a choice of interfaces, including a standard RS-232C or an optional 20 mA current loop. The station also comes with an optional "shared peripheral interface" that accommodates up to eight other 2642As or serial printers.

A single-diskette version of the terminal costs $6,750; a dual-diskette version, $7,750. Both models require eight to 10 weeks for delivery from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

PTS-2000s Gain SDLC

(Continued from Page 53)

brings the number of screen capacities within the PTS-2000 family to four. The other capacities are 960 char. (80 by 12), 1,920 char. (80 by 24) and 2,560 char. (80 by 32).

Any combination of the four screen capacities can be mixed within a single PTS-2000 system, including support of up to eight-operator displays and printers, according to the firm.

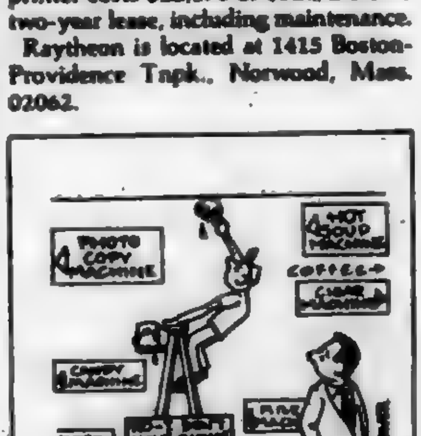
The 9,600-bit/sec data rate support feature is in addition to the existing three speeds of 2,400-, 4,800, and 7,200 bit/sec.

The SDLC capacity is a no-charge option, and delivery will begin in December.

The 9,600 bit/sec data rate capability is also free, but users must install modems that operate at that rate when installing PTS-2000 systems on a 9,600 bit/sec-rated communications line. The 3,440-char. display feature costs $396 or $11/mo for each screen in a configuration.

A typical PTS-2000 configuration with four display screens, one controller and one 120-char./sec dot matrix printer costs $22,170 or $529/mo on a two-year lease, including maintenance.

Raytheon is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.



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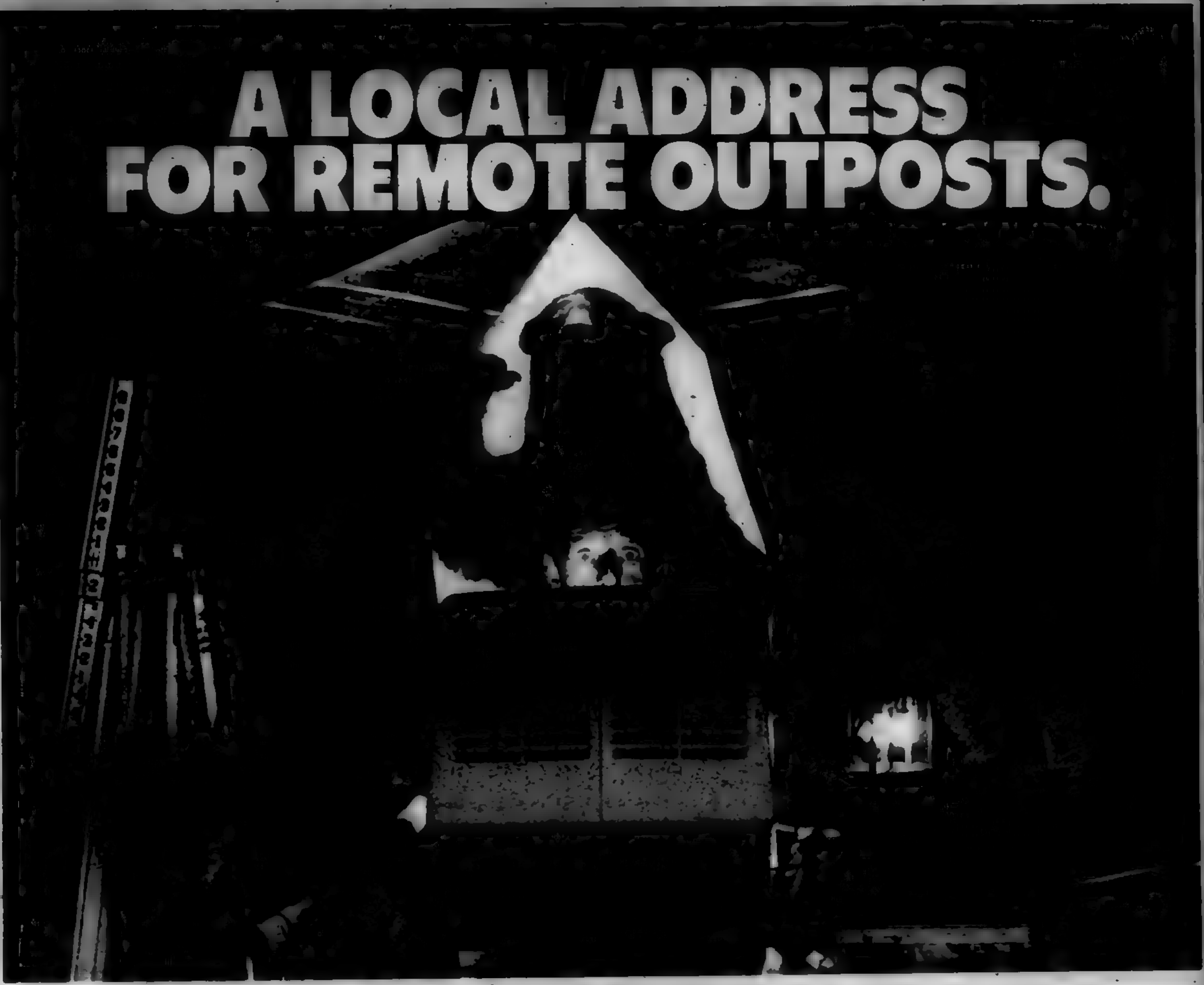

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DDP Revolution — Part 2

Future Terminals Must Give User-Transparency

By Chuck Steele
Special to CW

For dispersed processing to become a reality, the information stations that succeed the present multiprotocol terminals must be designed such that the means of communication is completely transparent to the user, automatically analyzes what is coming over the transmission line, automatically catalogs the protocol and automatically switches into that mode.

The information stations that will serve as the nodes in this dispersed processing structure will have the following characteristics:

- Ease of use for programmers and end users.
- Easy user expandability; that is, I/O drivers do not have to be assembled into the system for each additional peripheral.
- Modular with transient functions which are memory-resident only as required.
- System features allowing for easy maintainability and upgradability.
- Transportability to different hardware with relatively little assembly code rewriting.
- Device independence.
- Multiuser, real-time and multiprogramming modes of operation.
- High-level language support.
- Automatic job control capability.
- Editor, copy, dump and debugger.
- Diagnostics.
- Data base management featuring multiuser access to data sets, index sequential capability with multiple index file capability, volume ID controls, bidirectional relational data sets and variable length records.
- Transparent mode for terminal usage with a host system.
- System language that is extendable, structured, compact and efficient.
- Compilers written in OS language.
- Multiprocessor operation.
- Devices equally accessible from all tasks and users.

This is the last half of a two-part article on the future of dispersed processing.

CPU Characteristics

Many of the limits to the ability of present multiprotocol information terminals can be overcome with the use of a processor of sufficient power.

Specifically, such a processor should have 15 generic operations; one address and three field instruction formats; a single internal data bus comprising separate address and data lines; all registers, data paths and primary store locations 16 bits wide; a primary store read/restore cycle of 1 microsec; and 16 general-purpose registers.

In addition, the CPU should have an average instruction time of 2 microsec; a primary store organized in blocks of 256 words; addressing modes of indexed, indirect and segmented; a vectored interrupt mechanism; a multiplexer channel; and a direct to primary store selector channel capable of operating in block or word mode.

Present terminal configurations based on 8-bit CPUs such as the Z80, 8085 and 6800 require extensive upgrading to match these specifications. However, recent developments in 16-bit microprocessor design are approaching the basic functional features assumed here.

For example, the Z8000 from Zilog, Inc. along with its support chips incorporates all other necessary features. With the exception of general-purpose registers, the Motorola Corp. 68000 with its support chips also qualifies. Another candidate is the NS16000 family from National Semiconductor Corp.

The next-generation information station will also incorporate data link control protocols into hardware — either into seperate microprocessors or into data link control ICs.

As a result, the next-generation successors to today's multiprotocol terminals will see much of the software-supported data link control function taken over by hardware, specifically any one of a number of protocol chips available from a number of semiconductor manufacturers.

Most are programmable and can thus support more than one data link protocol. Also, some of these chips can support data rates up to 2,000,000 bit/sec and several protocols such as Bisync.

In the dispersed processing environment there is the problem of memory. Because local memory is usually connected to the specific terminal CPU via a dedicated bus link, contention usually occurs in relation to the global memory. It is apparent that as the number of global memory accesses (terminals) increases, contention increases and throughput decreases.

As memory prices drop and new high-density devices, such as 64K- and 256K-bit NMOS dynamic random-access memories and 256K-, 512K-, 1M- and 4M-bit bubble memories come into production, replication of global memory programs can be done throughout local memories, rather than single copies in global memory, thus eliminating a major source of contention.

What this will mean to the user is that, ultimately, mainframe CPUs may soon be completely unnecessary in many applications, being replaced by multiprocessors of various sorts. As technology fuses more systems onto the chip, information stations incorporating the latest in semiconductor technology will cost little more than today's intelligent terminals.

Steele is the vice-president of engineering for ECS Microsystems, Inc., based in San Jose, Calif.

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With Honeywell Level 6

Insurer Cuts Claim Processing Time 80%

MADISON, Wis. — Installing a $200,000 mainframe enabled Wisconsin Life Insurance Co. to slash its "typical" claim processing time by approximately 80%, according to a company spokesman here.

Most of the time reduction is credited to the group insurance company's recently installed Level 6 Model 43 computer from Honeywell, Inc., he said.

The firm's immediate objective in ordering the Level 6 with .5M bytes of main storage was to off-load the majority of the communications burden then being carried by a 256K-byte 2040A Honeywell mainframe, John Sonderdgger, Wisconsin Life Insurance president, noted. He described the 2040A as "a real workhorse," but said the company's growth was forcing the older machine "to perform certain operations that it simply wasn't designed to do."

Broken Pencils

When operating in the 2040A environment, a good claims examiner might need as long as five minutes to enter 10 lines of data, Leonard Lane, DP vice-president, said.

That examiner can now enter those same 10 lines in just .50 seconds, he claimed. Pointing out that it can be "psychologically nerve-wracking" to wait for the CRT terminal to respond to an inquiry, he observed that "a lot less pencils are being broken out of frustration around here since we've installed the Level 6."

Wisconsin Life also looked at equipment from Data General Corp before making its final hardware selection. However, "we were familiar with Honeywell, and we were interested in the TPS-6 transaction processing system which runs on the Level 66," Lane said. TPS-6 runs under Model 4 of the Level 6 operating system and is not compatible with DG hardware.

The hardware now operates in three distinct environments, according to a company spokesman.

- Linked to a 45-terminal network, it expedites a variety of clerical operations including file searches, claims entry and claims validation.
- Tied to six additional CRT terminals, it is used to facilitate new applications development by the 11-person systems and programming staff.
- Connected to four other terminals, it controls a data entry facility that results in reduced overall system maintenance costs.

With the Level 66 installed in January 1980 and the claims application system brought up during the first week in March, the insurance firm is currently producing approximately 600 claims checks each day, according to Lane.

The terminals are used to verify criteria indicating that both the claimant and the illness are insured, that the policy is a valid one and that the claim has not been paid before.

Approximately 30 unique formats or routines are handled via these terminals.

Turnaround Goal

After an examiner has determined that the claim is a valid one, the amount of the claim, the insured's name and that of the payee are entered. A check is printed that night and mailed out the next day, according to Lane.

"We're finding that 24-hour turnaround is possible in those cases where the identity, address and policy number of the claimant are known and the claim is recognized as valid. "Providing such rapid service to our policyholders would be ideal, but, realistically, we'd like to get our average turnaround time down to 72 hours," a goal he described as clearly within reach with the Level 66.

Wisconsin Life's programmers are developing applications on the Honeywell system by utilizing the vendor's Screenwrite software through the CRT terminals and by writing Cobol programs, Lane added.

Work is currently being done on a program that will enable the firm to process all new business in on-line mode. Approximately 1,000 new business applications are processed on a monthly basis, he said.

The firm is satisfied with Honeywell's maintenance and service; future plans include installing a DPS/8 system from the same vendor to replace the 2040A, he said.

Bits & Pieces

Calcomp Controller Interface Gives Remote Plotting

ANAHEIM, Calif. — A bisynchronous interface for California Computer Products, Inc. models 907, 918 and 922 controllers is said to provide remote plotting for most Calcomp plotters.

The interface — which uses bisynchronous protocol — emulates the IBM 3780. The unit offers such 3780 features as Ebcdic code, multipoint, circuit assurance, auto answer and modem simulator direct connection, Calcomp said.

Serial data in the bisync mode is input at rates up to 19.2K bit/sec, and the unit can be operated in either point-to-point or multipoint configurations.

The interface costs $3,300 for the 907 controller and $4,300 for the 918 and 922 controllers. The 907 costs $4,620, and the 918 and 922 each cost $18,420. Calcomp is located at 2411 W. LaPalma Ave., Anaheim, Calif. 92801.

Program Diskettes Enhance 3M's Micrapoint System

ST. PAUL, Minn. — Two program diskettes containing a check-digit program and an IBM converter program have been developed to enhance the performance of 3M Co.'s Micrapoint System, which files and retrieves microfilm.

The check-digit program mathematically verifies the accuracy of numbers input to the Micrapoint unit. The diskette will be created according to the specific mathematical formula required by the user.

The second diskette contains a program which converts Ascii-coded Micrapoint diskettes to Ebdcic-coded diskettes suitable for use in IBM 3740, 3741 and 3742 data entry systems.

The check-digit program costs $700 and the IBM converter program costs $500 from 3M at P.O. Box 33600, Department M180-34, St. Paul, Minn. 55133.

Bidirectional Print Station Performs Financial Tasks

ALLSTON, Mass. — A 40-column bidirectional financial transaction print station that runs at 3 line/sec has been introduced by Capitol Circuits Corp.'s Printer Products Division.

The Model 400T provides a receipt and stored journal; a single-line validation slot is available for check validations.

The unit costs $735 to $750 from the firm at 24 Dunby Road, Allston, Mass. 02134.

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COMPUTERWORLD

Laser-Scanning Terminal Handles Periodical Returns

HAUPPAUGE, N.Y. — A desktop laser-scanning terminal engineered to process magazine, paperback and newspaper returns and that can interface with most computers via an RS-232C port has been introduced by Symbol Technologies, Inc.

Laserscan 550 optically decodes Universal Product Code (UPC) and European Article Numbering (EAN) symbols with issue codes that appear on periodical covers, providing an alternative to manual data entry methods. Presorting of returns by manual keystroke entry is also eliminated by using the device, a spokesman said.

The device employs a scan-above configuration that allows the operator to properly align the UPC or EAN symbol printed on a return. The scanner head provides visual indication via three LED indicators, as well as an audible signal. Additional features are a remote 16-key numeric keypad, 16-digit data display and a 21-column alphanumeric printer.

The Laserscan 550 costs $9,500. Another version of the device is also available which does not include the remote keypad, data display or printer. This model, the Laserscan 500, sells for $8,500.

Further information on both products can be obtained from the company at 90 Plany Ave., Hauppauge, N.Y. 11787.

Free Brochures

- A brochure has been produced for utilities that must comply with government regulations to offer residential energy audits. It describes the services of the Enercom System — consisting of customized computer software, processing and trained technicians — and can be obtained from General Electric Information Services Co., Department MCL, 401 N. Washington St., Rockville, Md. 20850.
- A revised version of "Static Electricity," a pamphlet explaining how to identify static problems and what to do about them can be obtained from Static, Inc., P.O. Box 414, Lee, Mass. 02138.
- "Everything You Always Wanted to Know About Computers But Were Afraid to Ask" summarizes and defines the most often used computer terms. It is available from Computer Furniture Systems, 266 Summer St., Boston, Mass. 02210.
- A low-cost security system with control capabilities and a capacity for 999 cards is described in the Programmable Voicing Reader booklet, available from Cardkey Systems News Bureau, 20660 Bahama St., Chatsworth, Calif. 91311.
- "Turning Installation Problems into Profit Using the Computer Power System" is a pamphlet that can be obtained from the Computer Power Systems Corp., P.O. Box 6240, Carson, Calif. 90749.
- A noise-control product catalog of sound-absorption, damping and barrier materials for use with office and DP equipment can be ordered from the Soundcoat Co., 175 Pearl St., Brooklyn, N.Y. 11201.
- The IPS 5000 series microprocessor-controlled dot matrix printers are described in a brochure available from Dataroyal, Inc., 235 Main Dunstable Road, Nashua, N.H. 03061.
- A brochure that outlines the advantages of half-inch streaming tape as a data storage medium is available from Cipher Data Products, Marketing Department, 10225 Willow Creek Road, San Diego, Calif. 92131.
- A catalog of specs, charts and ordering information on the Analog Data Acquisition Systems complete line can be obtained from Phoenix Data, Inc., 3384 W. Osborn Road, Phoenix, Ariz. 85007.
- A brochure on the 3000 Series, T-Bar, Inc.'s adaptable matrix switching systems, can be ordered from the vendor at 141 Danbury Road, Wilton, Conn. 06897.
- Rental equipment, including DP peripherals, communications systems and general-purpose test instruments, is described in a 170-page handbook from Leasametric, Inc., 1164 Triton Drive, Foster City, Calif. 94404.

Spur Controllers Get Fast-Skip Capability

LOS ANGELES — Spur Products Corp. has modified its printer controller for the IBM 1403 to speed line skipping, reducing the time necessary to print most forms, the firm said.

The feature will be included at no extra charge in all new models of the Spur 1403 controller, which Spur said is the only product that permits 1403 series printers to be driven by non-IBM computers or by the IBM Series/1 minicomputer.

The 1403 controller costs $20,000. Controllers currently in use can be field-retrofitted for $1,000 a unit.

Spur is located at 1904 Centinela Ave., Los Angeles, Calif. 90025.

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The Dwindling DP Dollar: Getting More for Your Money

COMPUTERWORLD

By Replacing 'Full Coverage' Terms

Third-Party Leasing Beats IBM Hardware Costs

By Charles Greco
Special to CW

One way IBM users can hedge inflation is to replace leased IBM hardware with the same equipment supplied through a third-party lessor. This can sometimes save users money because third-party lessors generally charge according to the current market value of IBM hardware — IBM does not.

For example, my firm considered buying an IBM 2821-1 control unit. IBM listed the control unit as costing $47,383, or $1,000 a month to rent. We found the same 2821-1 control unit on the third-party marketplace for $7,000.

Some shopping around can clearly save users money, but what about installed equipment? There is an answer there, too.

We were renting a 2821-1 form IBM until we found we could get a better deal from a third-party lessor if we were willing to take the machine on a longer term agreement.

This transfer can be done rather smoothly. We notified IBM that we no longer wanted the hardware. We then made arrangements with IBM for its customer engineers to take out the controller. We then had the IBM customer engineers install the third-party controller at the same time; thus, no down time was experienced.

We took the 2821-1 from the third-party vendor on a 36-month agreement and paid IBM an additional $101 a month for "prime-time" maintenance — meaning service would only be provided five days a week between the hours of 9 a.m. to 5 p.m.

The switch to the third-party lessor saved us $624 a month. IBM charges $1,000 a month to rent a 2821-1. The third-party from charges $275 a month. That, added to the $101 monthly maintenance charges, comes to $376 a month. If you subtract this form the original $1,000 IBM charged, the difference is $624 a month or an annual savings of $7,488.

Two Differences

There are two distinct differences between the original IBM lease and the new third-party lease.

First, we extended the terms on the new lease to further reduce our payments to 36 months.

And secondly, we elected to go prime-time maintenance instead of the full coverage to reduce our maintenance costs.

The exercise just explained is by no means limited to a 2821-1 control unit and may be applicable to other installed hardware as well. "Bumping" hardware for less expensive used units can save users thousands of dollars by reducing payments to current market value rates.

Except for the 4300 series and for some 8100 CPUs, IBM rental rates will generally include 24-hour, full-time maintenance coverage whether or not you want it. In most instances on units such as control units, disk drives, card readers and terminals, prime-time day shift coverage is adequate.

However, in order to reduce your maintenance costs by reducing your coverage, the units in question must be purchased. IBM will not allow reductions or changes to full-time maintenance agreements as long as it owns the equipment.

IBM Purchase Credits

IBM purchase credits can also be used to cut costs. The credits represent a percentage of your monthly rental payment to IBM which can be applied towards the purchase of that particular unit.

For example, if you have leased or rented a 3350 disk drive from IBM over the last 12 months, you have, in effect, accrued 12 months of purchase credits which can be applied and deducted from the purchase price of that disk drive should you elect to purchase. In some cases, these credits (and they vary with the hardware) can accrue in value to as much as 50% of the original purchase price over a period of time.

Purchase credits are great for those organizations who wish to purchase installed equipment and can afford to do so despite a tight borrowing climate and high interest rates. But for those who wish to take advantage of what in some instances can be "true" bargain prices without the cash outlay, consulting a third-party leasing company and exploring the possibilities of purchase leasebacks on the more highly accrued hardware is the best alternative.

Be cautious and do not be fooled by seemingly bargain purchases on your own or by the use of third-party per-

(Continued on SR/4)

Survey Sights 'Opportunity Value'

Office Tools Salvage 15% of Users' Time

NEW YORK — Managers and other professionals can achieve productivity gains with an "opportunity value" of more than $100 billion by 1985 if they make full use of automated office tools, according to a recent Booz Allen & Hamilton, Inc. study.

The study revealed that an average 15% of managers' time can be saved through office automation, resulting in a significant boost in both private and public sector white-collar productivity.

"In terms of dollars, the annual opportunity value of this time savings is equivalent to 15% or more of operating income before taxes for the average large manufacturer, bank or insurance company," according to a Booz Allen spokesman.

"Instead of simply reducing staff, executives will likely be driven by their business strategy to reinvest this 'opportunity value' into expanding and raising the quality of output, avoiding future costs and enhancing the quality of work life," he added.

Year-Long Study

The year-long "Multi Client Study of Managerial and Professional Productivity" also found that managers and other professionals — "knowledge workers" — are spending anywhere from 15% to more than 40% of their time on less productive activities which they consider wasteful.

Such activities include doing clerical tasks, finding and screening the "right information," waiting idle while traveling, expediting previously assigned tasks and scheduling and organizing work.

The study probed the activities, output, working habits and attitudes of some 300 professionals in 15 major U.S. manufacturing, banking, insurance and government organizations.

Its purpose was to determine just how well justified automated office systems can be in terms of boosting the performance of the decision makers and professional workers in business and government.

"Mounting demands on managers and professionals and the impact of inflation could easily push their compensation cost to $1.35 trillion by 1990," the spokesman said.

"However, the study shows that time savings with an opportunity value of close to $300 billion can be realized annually by 1990 through the proper use of automated office equipment and services throughout the private and public sectors. And, the annual opportunity value of time saved by 1985 can amount to $125 billion."

Here are some of the major conclusions that were reached:

- For those ready to move ahead aggressively, time savings of more than 9% annually appear achievable within the next 18 to 24 months, with a potential payback within slightly more than a year based on the opportunity value of time saved.
- Newer automated support tools can also significantly enhance the quality of work when incorporated into an overall program of upgrading existing office support resources and improving certain professional practices.
- Business strategy will dictate the form in which benefits are taken. Therefore, full realization will require thorough top-down planning of the benefits sought and a thoughtful program to measure the gains.
- Certain office automation tools will contribute far more significantly to savings than others.
- The general receptivity to an office productivity automation program should be high since the work improvement goals of both management and knowledge workers appear to be reasonably similar.

Generic Departments

The study focused on departments generic to almost every industry, including marketing, personnel, purchasing, operations, information sys-

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Training Method Gets New Hires Up to Speed

By Pamela R. Pfau
Special to CW

Most people think we spend most DP dollars on hardware and software. But in reality, a large portion of most DP budgets is allotted for people.

The myth that DP systems will save labor costs has been disproved in recent years. Most DP departments have brought their companies not only higher costs for people, but also excruciatingly high turnover rates which compare poorly with other operating departments.

While some maintain turnover is healthy, and new people bring new ideas and thus upgrade the department, the bottom line of employee turnover is an expensive one for employers.

Salary and compensation plans have created the need for the professional DPer to frequently change jobs. The figure depicts the increments available to those people who change jobs and the pattern and potential loss for those who remain in place.

Compare the career paths of two hypothetical programmers. Programmer 1 and Programmer 2 started on the same job but Programmer 2 had a strategy of working each job only long enough to get the normal 10% salary increase each year. Then he would look for a new job and an average 20% raise.

The chart suggests where Programmer 2 would be with some luck and skill and perseverance to the game plan. In the real world, 18 months might be required to get a raise, assimilate a few buzz words and commit to the next job.

With a high turnover situation, it becomes even more important that the DP manager prepare the new hire for productivity. The manager must realize the new hire might not be around long enough to complete a project.

Time can not be spent letting a new hire read manuals for a couple of weeks and then attempt a little maintenance programming to learn the systems. There is also no time for him to follow a veteran around. The buddy system has been a popular training mechanism, but all it leads to is two people being nonproductive instead of one.

Better Way

A better way exists, but is seldom implemented in the small to medium-size shops and probably not at all where minis are in use. This better way is in-house training built around real-world case studies relevant to the jobs in that particular DP environment.

Let's start with the premise that documentation has been maintained. Procedures have been written for everything from operating the TSO terminal to creating test data and filing paperwork.

The object is creating a test case to take the programmer through the gauntlet of procedures during his first week on the job. The new hire will be assigned a monitor who provides guidance only when problems arise beyond the scope of the test case study. The test case should be completed in one week.

Completion should be measured against the previous performance of others as well as the correct results. More than one test case study may be developed if the work suggests different levels of training.

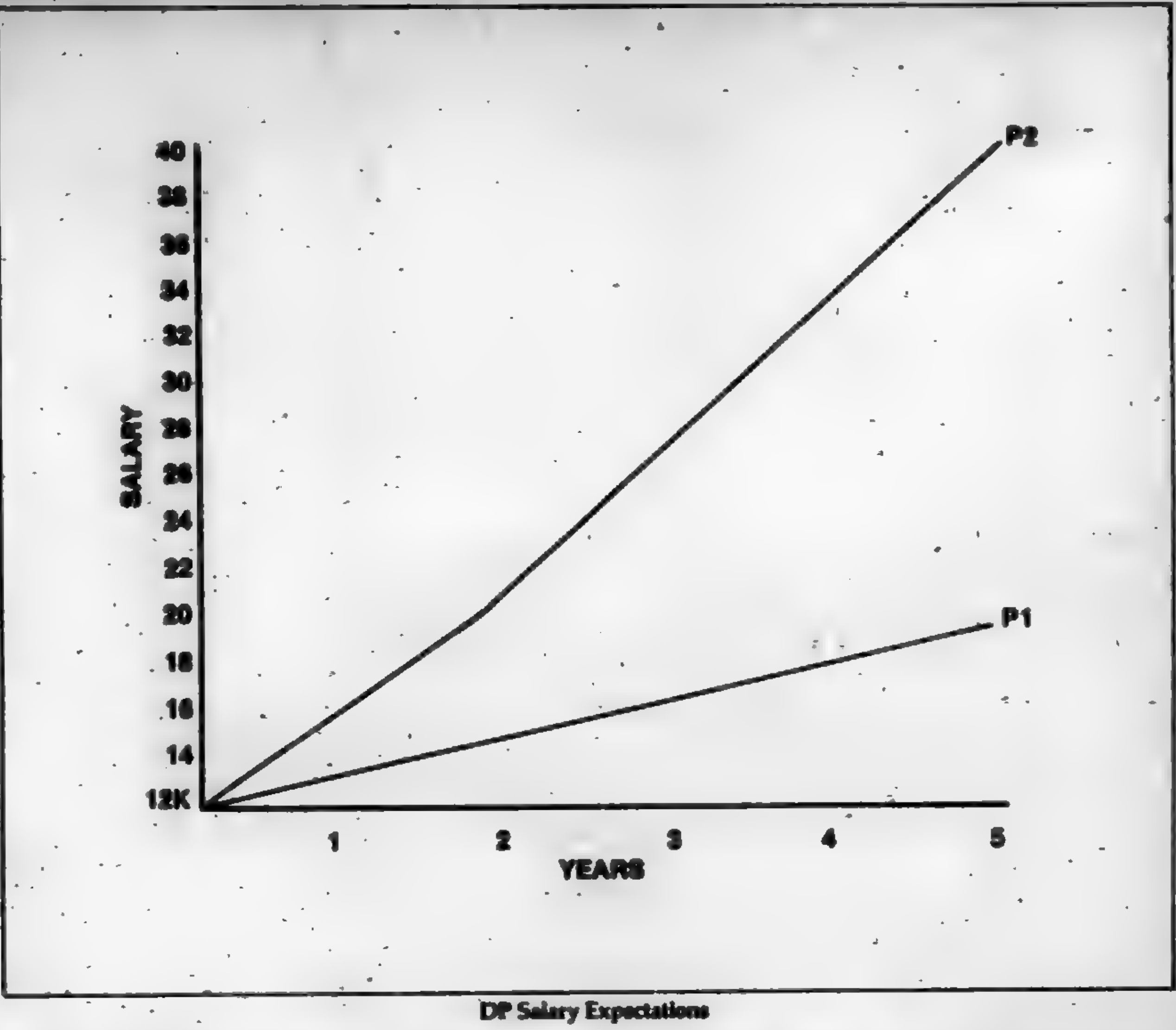
Study of a test case will bring a new hire up to speed faster and give the DP manager an opportunity to make a faster judgment on his capabilities.

Training done by on-the-job osmosis, through vendor schools or at local institutions is now augmented by generalized video programs. While these methods have some value, they typically require careful scheduling, excessive time and provide only generalized information. In addition, they usually do not provide the practical experience necessary for getting a job done in a particular environment.

The test case study approach is fairly easy to implement. It should be started with a task that has already been performed and typical of the type work the new hire will be expected to accomplish. A folder of all materials required to complete the job — when it was a real job — should be prepared. It should be readily available the next time there is a new hire.

Using test case studies, employers can maximize productivity by minimizing the time it takes to acclimate new employees.

Pfau is a consultant in New York City.



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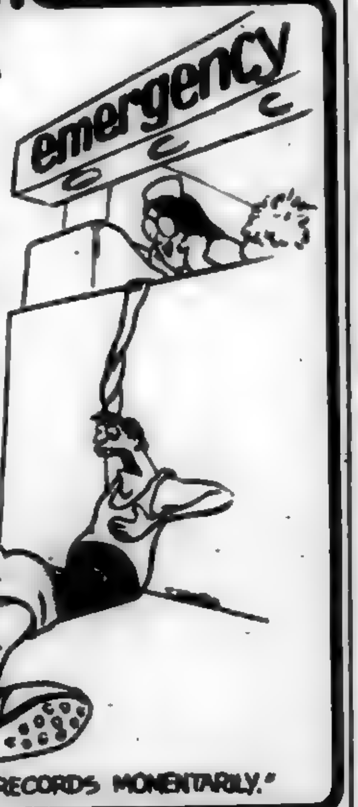

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Third-Party Leasing Slashes Hardware Costs for Users

(Continued from SR/2)

ticipants. As in our previous example of the 2821-1 control unit, the original purchase price was $47,383.

Even when utilizing the maximum 50% of accrued purchase credits, the control unit's new cost would still be a whopping $23,732 and still $16,732 above market value! Purchase of this installed unit would obviously not be recommended. Its replacement with a market value unit would be the best course of action.

In some instances, however, when the supply of some equipment in the used marketplace dwindles and the demands increase, accrued purchase credits on installed equipment may become valuable.

For example, 3330 disk drives have been in great demand in recent months as reflected in the increases of lead times for IBM deliveries and dwindling inventories in the used market. Purchase prices for these drives have been hovering around 80% of IBM's original purchase price.

An individual who has had 3350s installed for a reasonable length of time and whose accrued purchase credits exceed 20% of the purchase price now has the ability to capitalize on his credits by executing a purchase leaseback transaction on the installed equipment.

Purchase Leasebacks

To demonstrate a typical purchase-leaseback transaction, let us assume for a moment that the purchase credits accrued on our 3350 amount to 50%: The IBM list purchase price for a 3350 B2 is $31,680 and the same unit will lease for $941/mo including maintenance.

When we apply our credits to the list price, the new cost for the box becomes $15,840. Instead of replacing these drives as we did with our 2821-1 control unit, it now becomes advantageous to have a third-party lessor purchase our installed drive and lease it back to us.

The following is a list of items which will help illustrate this purchase leaseback transaction.

- The initial lease term of the new third-party lease is 48 months.
- The 3350 B2 disk drive is not replaced and an IBM purchase of install contract is executed.
- The third-party lessor pays IBM's invoice for the new amount of $15,840.

In the purchase-leaseback example, we took the 3350 from the third-party lessor on a 48-month agreement. The drive was not replaced by IBM and a purchase of install contract was issued. The third-party lessor payed off the new $15,840 purchase price for the drive, and we asked IBM to place the drive on prime-time maintenance.

We saved $325 a month on the deal because the original IBM rental rate was $941. The third-party rental rate is $488 a month plus an additional $128 for prime-time maintenance. We pay $616 a month, saving $3,900 annually.

Again, the two major differences between the original commitments to IBM and the new third-party lease is the extended 48-month Prime-Time maintenance is used instead of the usual full coverage.

Greco is data processing hardware coordinator for Stop and Shop, a chain of grocery stores in the Northeast. He is also director of the Boston chapter of the Data Processing Management Association.

Office Tools Save Time

(Continued from SR/2)

tems, legal and customer service. Also studied were a variety of office situations, ranging from those where virtually no automation had been used to those where very sophisticated stages of automation had already been achieved.

In addition to identifying specific ways to attack less productive acitivities, the study identified and quantified significant opportunities for improving the quality and raising the productivity of more skill-related managerial and professional activities, such as meetings, telephone calls, reading, creating documents and analyzing.

For each of these activities, the study evaluated some specific gains that can be achieved through certain types of automation.

Advanced forms of word and image processing, for example, can enable knowledge workers to review and edit their work more efficiently, and new forms of personal computing can speed the process of making decisions and analyzing quantitative data.

Other forms of automation — retrieval of both internal and external information, various forms of electronic mail and several activity management aids — were also cited as potential productivity boosters.

The study is available from Booz Allen & Hamilton, 245 Park Ave., New York, N.Y. 10017.

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Cost Cut Choices Counted

Plug-Compatibles Give Budget-Crunch Solution

By James D. West
Special to CW

PALO ALTO, Calif. – With the current tight money supply, many DP executives are leery of the large down payments, higher monthly charges and the possibility of lower trade-in values involved with buying new hardware.

In these times it is more important for users to carefully select hardware that provides the best overall value.

As costs go up and budgets either remain the same, or are cut, DP managers are faced with two choices in order to maintain services.

The first option is to cut back on staff. This decision allows for increased cost of compensation and education without increasing expenses. However, this approach will also severely impact the quality and variety of services that are normally provided by the DP department.

The second alternative is to save money on equipment. This approach allows for continued development and maintenance without increasing expenses.

One of the better ways to cut back on hardware costs is to look at plug-compatible manufacturers' (PCM) offerings.

The cost of DP equipment is made up of two general components – purchase price minus resale value and cost of operation (all costs associated with the continued utilization of a product). In comparing the purchase price of equipment with the IBM alternative, the PCM vendor can save the customer from 10% to 50%. But the resale value of the PCM product is usually lower.

Cost of operation encompasses both hardware and software support, power usage for processing, power usage and equipment required for cooling, and personnel to operate the product. PCM vendors sometimes offer alternatives using less power for processing and cooling, less equipment for cooling, the same level of operations personnel, and equal or better support of hardware and software for virtually the same price.

Resale Value

The last part of evaluating DP equipment cost is resale value. There are four major factors that determine resale value – product characteristics vs. alternative available products; support characteristics of the product vs. support characteristics of the alternative; the level of availability vs. demand; and suppliers' reputation in the market. These four factors can be further subdivided into definable characteristics that will determine a relationship between various products.

The first factor, product characteristics, includes items such as original purchase price, a measurement of performance, the reliability of the product, the compatibility with other products, the availability of predeveloped software and the cost of operation, to name a few. These items, and more, determine the relationship of PCM products to their alternatives.

As the result of the natural lag between the announcement and delivery of an IBM product and the announcement and delivery of a compatible product, the PCM is sometimes able to take advantage of newer technology developed during that time. By using the newer technology, PCM vendors can often offer products with equal or better characteristics.

The second factor, support characteristics, includes service availability, service cost, software support, software enhancements, software support costs and so on. In an effort to provide the best available support at reasonable rates, PCMs have concentrated their efforts in certain geographic areas and created teams of specialists who may be contacted by their service representatives for service. In some cases this concept provides better customer satisfaction for virtually the same cost as IBM maintenance.

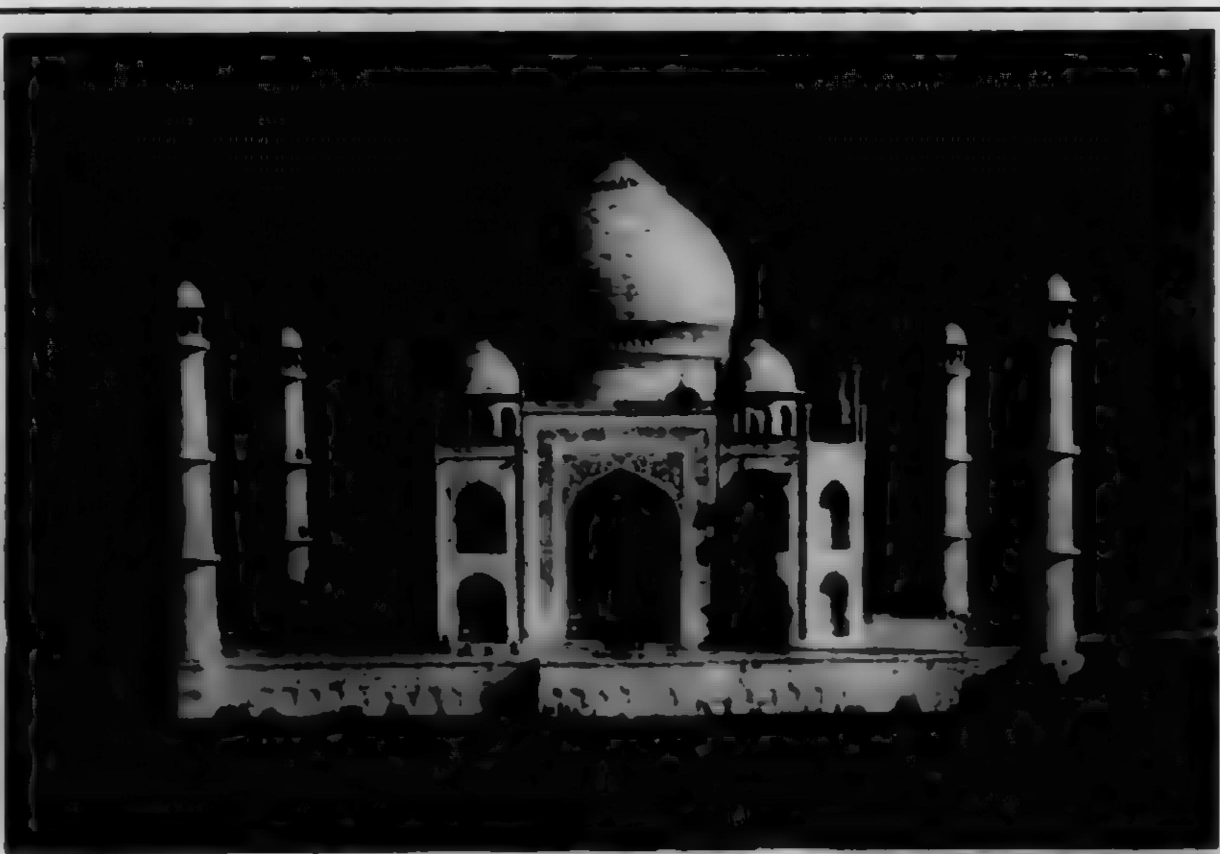
The third factor in determining resale value is product availability. It plays a primary role in holding a resale value artificially high only as long as acceptable alternatives are not available. Acceptable alternatives, provided by the PCM in a timely fashion and at lower cost, reduce the importance of this factor. Only when the supply of the product (or an acceptable alternative) becomes equal to the demand for the equipment will this artificial constraint stop establishing high resale values.

The fourth factor that determines hardware resale value is the vendor's reputation. So far, this has been the hardest hurdle for the PCM to overcome.

Many feel the PCMs have made strong headway in the other areas by offering good products at lower prices and by giving a sense of stability through good business practices. But only by continuing that philosophy will PCMs manage to become accepted in the IBM marketplace.

In the years to come, this should happen. Residual values of PCM hardware should start to pick up to offer users not only a 10% to 50% savings on the purchase price, but a higher trade-in value as well.

West is a financial analyst for National Advanced Systems Corp. in Palo Alto, Calif.



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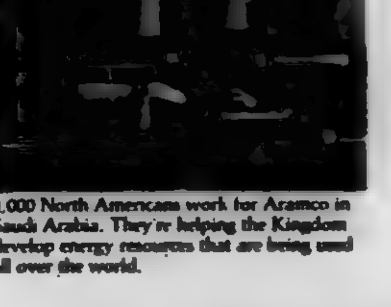

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Borrowing Software Eases Development Burden

By James M. Clark
Special to CW

Most firms eventually reach a point in the software development cycle where they must decide whether to develop applications programs in-house or continue to buy packages from software developers. There are advantages and disadvantages to both methods, and there is an alternative – borrowing software from someone who already has developed a similar application.

Developing their own software gives users the opportunity to develop the application exactly to their firm's needs. It will completely satisfy the user, the maintenance staff and the operations people. And it will also keep the development staff busy.

An in-house-developed application will be built to fit the system and can be adapted to the current system; it also holds provisions for future upgrades. In addition, since the programming staff built it, they know it intimately and will know how to quickly change or modify the package.

Some Drawbacks

But building your own applications has some pitfalls, too. It will probably take longer, cost more and involve more staff than you ever dreamed. You will probably wind up expending your staff to complete the project, and the finished package probably won't work as well as originally conceived.

When you buy a package from a software house, it will probably cost less than developing it from scratch. And those packages can usually be implemented and operational in a very short time.

But a firm must also make some changes and confessions to its manual procedures to conform to an outside package's requirements. Those changes may turn the DP manager into a sort of company Benedict Arnold.

Software house package code is often generalized, archaic and inefficient. The only way to get a state-of-the-art package from a vendor is to buy the first one it makes. In the 100th copy, the code will be so basic that it will run on the lowest level Cobol compiler and will probably contain things like hand-coded binary searches for table lookups.

Also, vendors' package program code and documentation may not fit your shop's standards, and someone from the DP staff will have to identify, evaluate and select the appropriate application.

Maintenance is also difficult on a vendor's package since no one in-house is familiar with it.

Another Route

If a user can't decide whether it's better to build a package from scratch or buy a software house's, there is an alternative. Wait until someone else develops a similar package and borrow it.

Start by calling someone with your job at another company in the same industry. Ask what the other firm is doing for an order entry program, for example, and offer to take the DP manager to lunch.

You'll probably find the competition's DP manager is more than happy to talk about his research, progress and problems with his software.

Once you get the details from the other DP manager, you've got the basis of a good customized application program. Get copies of the I/O layouts and forms from similar packages commercially available and try to glean the best from all the options you see. Then call your favorite contract programming house.

Borrowing software is the best of both worlds. The package is developed essentially in-house, using your own project team, with the help of some contract analysts and programmers. The package will be built for you, but with a breadth and vision not always obtainable from your staff. Bids can be let for fixed-price development and control costs. And end product responsibility can be assigned to the contracting firm to ensure well-tested and acceptable software.

Clark, an account manager for Technalysis Corp., has been in the DP business for the past 13 years as a programmer/analyst, project manager and account manager.

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When Packages Don't Deliver

In-House Development Targeted for Cost Cut

By Gary Guttman
Special to CW

NEW YORK — Application system development, maintenance and enhancement often account for more than half of the typical DP budget. On that basis alone, it's clear that improving the application development/-maintenance cycle is the most effective way to get more DP for the dollar.

Packaged software is one way to save both money and time for many applications. Yet there are business situations that just can't be handled by packages. That still makes in-house development an important part of most DP operations — and the part that needs the most help.

When the traditional approaches to developing applications are used, DP frequently doesn't deliver what it promises. Too often, system development projects are difficult to manage and behind schedule. The program development and testing process quickly becomes a frustrating bottleneck and documentation becomes an unwanted stepchild that never gets a fair share of attention. Final products often don't meet user specifications or expectations and computer-based programs sometimes turn out to be costly, nonstandard maintenance problems, instead of efficient, smooth-running links in the production chain.

In short, it repeatedly costs too much and takes too long to develop what turn out to be disappointing DP systems.

As the logic of DP applications becomes more complex, traditional system development methods become even less acceptable. The old techniques mean that applications programming is becoming more labor-intensive at a time when skilled programmers and analysts are getting harder to find and more costly to hire and keep.

Reinventing the Wheel

Improvements in software production have been made over the years — by introducing structured methods and by making programs as modular as possible, for example, and by developing table-driven systems and by relying more on data base management systems — but many of the same DP problems are still being solved over and over and many of the same mistakes are being made over again.

Today it is more important than ever to make the best use of available talent by focusing that talent on the most critical software development problems. Experience shows, however, that typical business applications have as much as 80% to 95% commonality in program code and that programmers spend much more time in routine, essentially redundant, coding than in addressing the smaller but unique portion of each program's logic.

One of the recurring problems in software projects is the lack of good solid analysis in the beginning. Because DP organizations are costly to maintain, there is often a rush to get into coding without sufficient user involvement, without a clear system definition or the appropriate level of specification and without clarity about the system design itself.

Traditional approaches to system development often fail to include adequate system design or programming standards. As a result, they promote higher maintenance costs and problems in continuity. Even when standards are called for — perhaps especially with structured programming — they become goals in themselves and distract program builders from user needs.

Attention to Whole

An uneven, nonstandard approach to software development that does not address the entire life cycle of an application system is invariably costly. About half of any software effort is spent removing defects, and the cost to make corrections increases exponentially as the system life cycle goes on. It costs nearly 40 times as much to remove a defect during testing as it would if it were caught in system definition and design. Removing defects after a system is operational can cost more than 100 times the cost of earlier detection.

It's often the maintenance portion of the system life cycle that is the most frustrating. Maintenance developed in the traditional way often locks good people into systems they developed and requires redundant, uninteresting work offering little challenge for skilled, experienced people. Typically systems are poorly documented and systems and program structures do not follow any consistent standards.

Management typically relies on oral communication among technicians and hopes knowledgeable people can be retained. It's clear that controlling and reducing maintenance costs and problems can have a significant economic benefit to a DP organization.

Today's business environment needs an approach to DP systems that enhances management control over the application development process, increases programmer productivity and lowers the cost of developing software while shortening its production time, improving its quality and simplifying

(Continued on SR/8)

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Small Business System an In-House Alternative

ELLICOTT CITY, Md. — There is an alternative to traditional in-house systems and remote processing services. The small business computer has skyrocketed in popularity over the past five years and decreasing hardware prices can only bode well for their future, according to the recent Newton-Evans Research Co. survey.

Chiefly designed for use in accounting and other general business applications, small business computers are generally found in firms with annual revenues of $500,000 and up.

Small business computer proponents cite increased labor productivity and improved management efficiency as two benefits, the survey maintained. Improved customer service was also mentioned.

"With automated records, customer records and information are more readily accessible than manual files and often the computerization permits timely handling of customer inquiries," the survey said.

Look Before Leap

While some remote processing services users who have moved in-house have successfully implemented more applications at a lower cost than if they stayed outside, others have plowed ahead on the small business computer course without first analyzing where it would take them.

In order to avoid an ill-advised small business computer purchase, it is advisable to undertake a feasibility study to measure the potential costs and benefits of a small business computer vs. remote processing services.

Turnover and training of computer personnel, space requirements, management reporting relationships for the DP department, decisions on upgrading the system and who uses it and when are points to consider.

Installation and implementation time is one factor frequently overlooked by would-be small business computer users. Under optimal conditions, that period can range between one and two years. "These hidden costs of an in-house computer capability and the tendency to use the systems for more applications of marginal value simply because it is there, mean careful cost considerations must be made," the survey reported.

"More often than not, remote processing services will prove to be less expensive than the small business computer when all these costs are taken into consideration," it concluded.

The applications and systems software problem must also be taken under advisement. Unless software is available or can be developed to satisfy the user's needs, the most expensive and sophisticated piece of hardware will be of little or no use to the firm.

Ways Out

One way out of that dilemma is to rely on systems houses and turnkey software vendors to write the application packages, the survey notes.

Another is the standard application package approach. However, such a tack is dependent on finding a pre programmed application package that will totally satisfy the user's needs.

The potential user may want to evaluate a flexible software package in which users can alter parameters to fit particular requirements. The problem is, most software applications have limited flexibility.

The standard application package may also have gross operating inefficiencies regarding use of computer system resources and throughput time. If these inefficiencies are substantial, a potential small business computer user may be compelled to purchase a larger configuration than originally required just to accommodate a certain package.

"As a way to gain first-time exposure to computerization with minimum investment and relatively low cost, a remote processing services offering may be a better alternative," the survey declared.

"A Guide to Planning, Selecting and Managing Remote Computing Services" is available for $395 from Newton-Evans Research Co. at 10318 Globe Court, Ellicott City, Md. 21043.

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In-House Plans Reduce Costs

(Continued from SR/7)

its maintenance. Such an approach should address the entire system life cycle, from design and development through maintenance and enhancement, and should provide clear and easily maintained documentation of an entire application.

A project should start with an analyst and a user working together to identify what the user wants out of the system, what information is needed to produce that output and what files and programs are needed to transform the input into the output. When that data is entered, a hard-copy design manual describing, in detail, the proposed system is generated.

Analyst and user should review and revise the manual until they agree that the system described is the system they want. The system then creates most of the common logic and provides the coder with good sophisticated tools to define the remaining application-specific portions of the required programs.

Guttman is president of Genasys International, Inc., which offers an applications development package called Genasys.

Good Through the '80s

COM Price/Performance Leads Storage Media

By Bud Salter
Special to CW

Although in 1967 doomsayers predicted computer output microfilm (COM) would soon be replaced by electronic storage and retrieval, nearly two-thirds of all computer sites in the U.S. currently use COM as an output medium in one form or another.

A close look at COM vs. competing processing and storage media reveals COM has considerable staying power and will remain the most cost-effective medium through the late 1980s.

Comparative factors should be taken into consideration to determine whether or not one technology has the potential to replace another:

- The frequency of updates of the data.
- Whether the medium is volatile or nonvolatile.
- The length of the storage period required for the data.
- Whether the technology is read-only, or read/write.
- The size of the data base.

The cost of storing data is perhaps the most significant basis for comparison and the most easily understood. The costs compared in this analysis are end-user hardware and media costs for the different technologies and include all elements of each technology that are required to store and retrieve data locally (i.e., no communications costs are required or included). The costs of the technologies which follow are shown on Figure 1 on a per megabyte basis.

Random-access memory (RAM) is the most expensive storage medium as indicated by starting at the top of the hierarchy shown on Figure 1. The semiconductor cost per megabyte of data stored represents the present cost for 64K-bit chip density on very large-scale integrated metal oxide semiconductor circuits, and the cost projection through 1990 represents a continuation of the trend over the last 10 years of increasing density and lower costs: 1982 — 128K bit per chip; 1990 — 1M bit per chip.

Variations on this technology, such as electronically programmable read-only memories (Eprom), offer similar performance at the same order of magnitude of cost, but offer other features. In the case of Eprom, for example, the data is not lost when the power is turned off as it is with ordinary random-access memory.

Ebam Technology

Electron beam accessible memory (Ebam) is a 30-year-old technology, but there are presently no commercially available units. These electron beam devices are miniature cathode ray tubes that store bits of data randomly on a silicon dioxide target. The data is read back at a lower power.

Even though Ebams are fast access devices, their cost effectiveness is limited to large memories due to the high costs of overhead or access circuitry and the cost of fabricating the Ebams themselves.

Charge-coupled devices (CCDs) are commercially available from Fairchild Camera and Instrument Corp., Texas Instruments, Inc. and others, and are relatively cost competitive with semiconductor RAM today. These devices store data as charges on small capacitive nodes. Increasing areal data densities will result in lower costs during the 1980s.

Bubble memories in chip and board form are also being sold today in products such as the TI 765 terminal or the Rockwell International, Inc. POS/8 terminal. TI is producing chips today, for example, with 92K bits of storage capacity per chip. This technology is less expensive than semiconductor RAM and is projected to continue to increase its cost advantage through the 1980s.

Winchester Devices

The magnetic disk line represents IBM 3370 Winchester level of technology as announced in 1979. Winchester, or thin film, technology goes back to the early-to-mid-1970s, and the IBM 3370 is the latest device in this line of hardware evolution.

The projected reductions result from increasing areal densities. The presently accepted theoretical areal density achievable in the thin film magnetic domain is somewhere below 10[illegible] bits per square inch. The current state of the art is IBM 3370 density, which is greater than 10[illegible] bits per square inch. The improvements represent increases in density to the presently accepted theoretical limit.

The magnetic tape costs in 1980 represent current 6,250 byte/in. densities on one-half-inch magnetic tape. Improvements in cost per megabyte are forecast because of increases in areal densities to 25,000 byte/in. over the next several years. The future appears bright for magnetic tape storage systems as a result of the favorable economics and the advent of such techniques as streaming to provide magnetic disk backup.

Magnetic mass storage represents the IBM 3850 cartridge tape storage system. The data cartridges in the 3850 contain 3-in. wide magnetic tapes that are each 770 in. long, each of

(Continued on SR/10)

COMPETITIVE STORAGE TECHNOLOGIES

A	B	C	D	E	F	G	H	I	J
TECHNOLOGY	COST PER MEGABYTE				STORAGE SIZE (MEGABYTES)	ACCESS TIME (SECONDS)	VOLATILE OR NON-VOLATILE	STORAGE LIFE (YEARS)	READ-WRITE OR READ ONLY
	[illegible]	[illegible]	[illegible]	[illegible]					
SEMICONDUCTOR	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	V	[illegible]	[illegible]
EBAM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CCD	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	V	[illegible]	[illegible]
BUBBLE	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]
MAGNETIC DISK	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAGNETIC TAPE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MAGNETIC MASS STORE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OPTICAL DISK	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OPTICAL DISK PACK	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
OPTICAL DISK MASS STORE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
COM [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
COM [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
COM [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
COM [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Figure 1. Hierarchy of storage needs shows significant cost differences for the different performance characteristics of technologies shown. Even with the spectacular cost improvements in semiconductor, the cost of semiconductor remains several orders of magnitude greater than tapes, disks or COM.

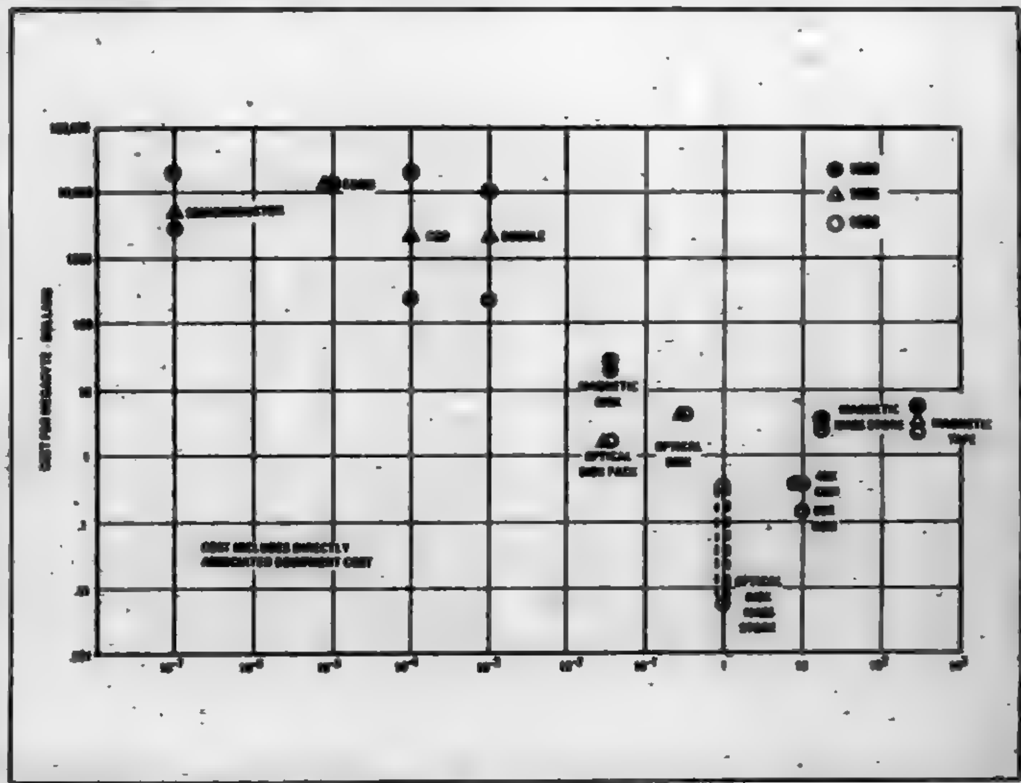

Figure 2. Note that the only technology with potential to achieve the cost performance of microfilm is optical disk mass store.

TYPICAL FICHE DATA BASE

A ACCOUNT	B APPLICATION	C NO. OF FICHE IN DATA BASE	D VOLATILITY
SMALL BANK	BRANCH LEVEL CUSTOMER INFORMATION FILE	1-3	DAILY
SMALL BANK	TOTAL CUSTOMER INFORMATION FILE	12-15	DAILY
MED./SIZED BANK	BRANCH LEVEL CUSTOMER INFORMATION FILE	4-6	DAILY
	TOTAL CUSTOMER INFORMATION FILE	[illegible]	DAILY
	LOAN FILE	20-40	WEEKLY
	YEAR END HISTORY FILE	[illegible]	YEARLY
INSURANCE CO.	AGENT LEVEL CUSTOMER FILE	1-2	WEEKLY
	DISTRICT LEVEL CUSTOMER FILE	[illegible]	WEEKLY
U.S. NAVY	LISTINGS FOR SUBMARINES	20-40	QUARTERLY
MOTEL CHAIN	MOTEL LISTINGS	1-2	BI WEEKLY
	RESERVATION CENTER MASTER LISTS	5-6	BI WEEKLY
BUS COMPANY	PAYROLL, AP, AR GEN'L LEDGER	2-4	DAILY

Figure 3. COM Microfiche (or microfilm) data bases tend to be relatively small. More than 90% are less than 100 fiche (200 M bytes).

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M4008/M4180	CMXII-DD	5	6
6M4020	CMIII	9	10
M4050	CMCX-FF	4	5
M4130	CMVIII	9	10
M4190	CX-3D-C	9	10
M4451	CX-DD-166	9	10
MSU164/165 9323, 9324	CMIII-75	9	10
IBM			
1310, 2310, 2315	CMII-LD	9	10
5440, 5444	CMIII	9	10
1311, 2311	CMVI	5	6
2314, 2316, 5445	CMXI	5	6
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3330-11, 3336-11	CX-DD Std CX-DD-FF	3 4	4 5
3340-70	CMXL	9	10
NCR			
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657	CMXII-FF	5	6
SINGER FRIDEN			
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TI			
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UNIVAC			
BC7 System	CMIII	9	10
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8440	CMXII	5	6
8430	CMCX-FF	4	5
8433	CX-DD-236	9	10
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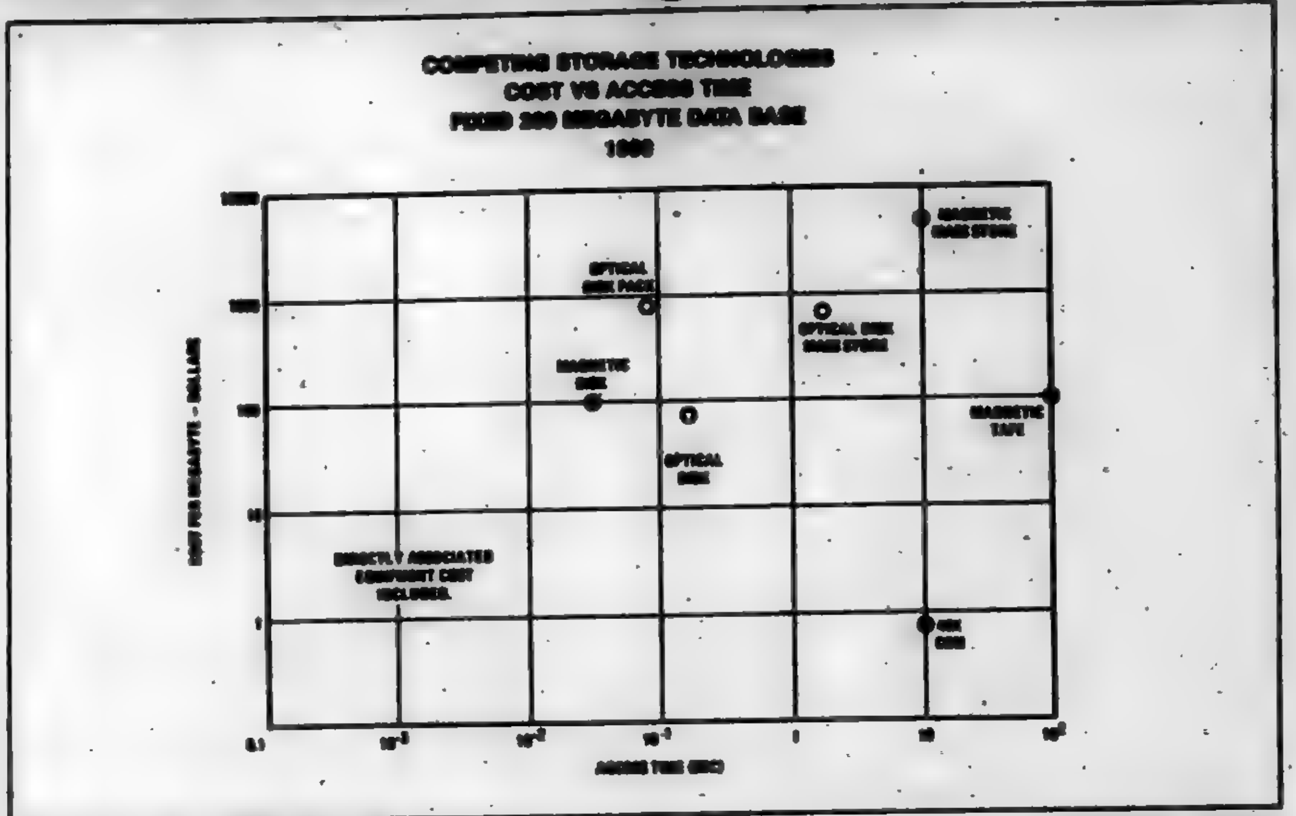


Figure 4. Even for a large COM data base (250 M bytes), COM is projected to be nearly two orders of magnitude less costly through 1990 than optical disk or magnetic tape.

(Continued from SR/9)

which holds up to 50M-bytes of data. Up to 9,250 of these cartridges can be arrayed in one 3850, resulting in a total usable storage capacity of 462,500M bytes.

Increasing areal data density and hardware developments are responsible for the cost improvement through 1990. These mass storage units fulfill a need in the hierarchy of storage technology requirements, but their slow speed may require intermediate dedicated magnetic disk drives to read data in and out at speeds acceptable to modern CPUs.

Optical Digital Data Disks

Optical disks, disk packs and optical disk mass storage devices are not available today. However, North American Philips Corp. and other companies are developing prototype systems that will be available as early as 1981. These systems will record data in concentric patterns of dots on 12-in. disks similar in format to magnetic disk products.

The storage capacity of these laser-based devices must be considered when comparing the economics of optical disks with other technologies. These optical disk capacities are large, and a large data base size is essential to the cost competitiveness of this technology.

A single 12-in. optical disk platter can store in excess of 1,200M bytes per side (up to 2,500M bytes per disk). These data densities are presently being achieved by companies such as Drexler Technology Corp., one of the early leaders in media development, and North American Philips.

Economically viable systems based on optical disk technology are not expected to be a factor before 1984.

Computer Output Microfilm

COM will continue to have improved economics based on the established trend toward higher data densities. The practical optical limit that can be maintained in a production COM environment is expected to be a 96X reduction ratio, and the utility of this reduction ratio has been demonstrated by laboratory tests. The predominant densities are 42X and 48X (shown).

Specialized two-step image reduction processes in use today resulting in 210X or higher reduction ratios on microfilm require expensive laboratory environments to produce microfilm and are therefore not projected to be the ultimate COM reduction ratio in widespread use.

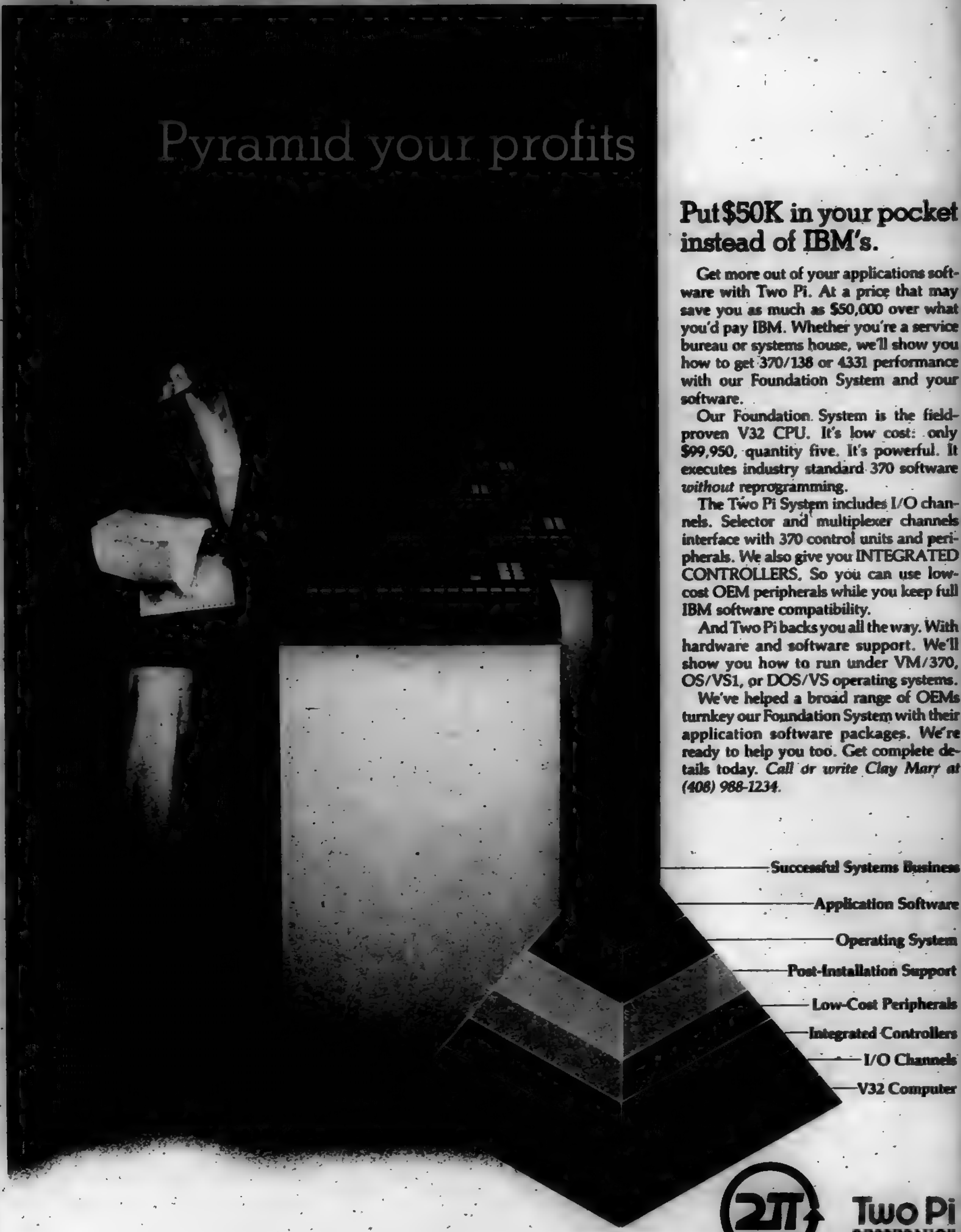
The more conventional COM re-

(Continued on SR/12)

SMARTEN UP Teletype 43s

Slip in a TSU

TRI DATA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COM Price/Performance Leads Storage Media

(Continued from SR/10)

corders with 42X to 48X reduction capability are widely used today in large data processing centers around the world. At Dec. 31, 1979, more than 5,000 such systems were installed, and this base grew at over 16% in 1979.

COM mass storage systems have not been included in this analysis because COM data bases of sufficient size to justify mass storage are almost nonexistent.

Graphing the Cost Comparison

When the cost/speed data from Figure 1 is plotted on a semilogarithmic graph, the results are as indicated on Figure 2. This graph clearly shows the hierarchy of storage technology costs versus access time, and shows that for large data bases the only technology that may become cost competitive with COM is the optical disk mass storage system.

Other technologies will remain at least one order of magnitude more costly, and in the case of semiconductor RAM storage, will remain at least four orders of magnitude more costly than COM through the 1980s.

However, competing technologies should be compared on the basis of a typical end-user data base size for specific applications rather than on the theoretical capacity of a hardware device.

Typical examples of COM data bases are described in Figure 3. On two or three 42X fiche, one can easily store 4M to 6M bytes of data at 2M bytes per fiche, and a large number of COM applications fall into that size range.

For example, one small bank with less than $100 million in assets has a branch-level customer information file of 2 to 3 fiche which is updated daily. Our research has shown that more than 90% of all COM data bases are less than 100 fiche (200M bytes).

Spread Will Increase

However, even a large COM file of 125 fiche, such as the total customer information file at a medium-sized bank, is a relatively small file when comparing storage capacities of the alternative technologies. If a 125-fiche data base (250M bytes) is compared with the apparently cost competitive optical disk, COM is projected to be nearly two orders of magnitude less costly by 1990. This is shown dramatically in Figure 4.

When the cost of duplicates and the distribution of duplicates is considered, the cost differential between COM and optical disk will become even larger. The cost of COM duplicates compared to originals drops by a factor of three due to the lower cost of diazo and vesicular media for duplicates as opposed to the silver-based media for originals.

The optical disk duplicate cost is projected to be equivalent to the original cost since the replication process and media cost are identical to the process for recording the original. The average number of duplicates on a COM-generated data base today is approximately four and is increasing, which will increase the cost advantage of COM.

The optical disk will clearly not displace COM during the 1980s for today's COM applications. Applications for optical disks will be extensive and growing through the late 1980s, but will be oriented toward very large data bases (1G to 2G bytes or more). For example, large source document data bases which are relatively unchanging: insurance company records, federal government weather records, radiographic files, land title records; and perhaps as replacements for large magnetic tape files.

In summary, all of the technologies discussed have advantages or disadvantages that dictate a set of applications for which each technology is most appropriate.

Computer output microfilm is suitable where low cost is important; where rapidly changing data bases are used; where the need for long-term storage is required; and where data bases are relatively small (under 500M bytes).

Suiter is director of planning at Datagraphix, Inc.

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Why call in a dozen different companies
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For Multivendor Shops

Third-Party Upkeep Proves Equitable Solution

By Stephen J. Keane
Special to CW

It used to be, when you bought or leased a computer system, you took everything, CPU and peripherals, from the same vendor. And that vendor was always called upon to maintain the system, too. To do otherwise was considered a sort of DP heresy.

But the computer industry is changing. More users are building systems from several vendors' offerings. And as many systems grow older, users are finding the OEM charges too much for maintenance. Others have found their DP sites are too far from the nearest OEM office to receive the kind of service they need.

Some users have found that contracting for maintenance from a third party is an equitable solution. The big advantage is that third-party maintenance costs an average 8% to 20% less than the same service from the OEM. And a centralization of maintenance responsibility eliminates the finger pointing that sometimes occurs in a multivendor configuration.

Balanced Combination

The service provided by independent firms should be a balanced combination of two types of maintenance: remedial and preventive.

Most users readily appreciate the value of fast and reliable remedial maintenance. When something fails, they want it fixed — immediately. Some companies, however, still consider preventive maintenance unnecessary and a waste of machine-time.

Actually, the opposite is true. Preventive maintenance ensures against equipment failure and helps prevent repair expenses. And in light of the sophistication of today's DP equipment, guarding against equipment problems is equal in importance to being able to solve them quickly when they do occur.

> *'The big advantage is that third-party maintenance costs an average 8% to 20% less than the same service from the OEM. And a centralization of maintenance responsibility eliminates the finger pointing that sometimes occurs in a multivendor configuration.'*

The complexity, maintainability, failure ratio and type of system to be serviced determines the fees charged by independent maintenance firms, as well as the extent of maintenance responsibility assumed. In most cases the independent firm will thoroughly inspect each end-user system and arrive at an annual service fee, usually paid in monthly installments.

Most third-party maintenance contracts cover complete systems (components, peripherals, auxiliary equipment and so on) and provide price protection to the user for one year.

When contracting for maintenance, the customer and the independent maintenance firm should work closely together to determine the scope of services to be provided. For example, determining exactly what equipment will be covered and whether the customer requires service protection beyond the normal workday; i.e., whether the independent maintenance firm should have servicemen on call eight, 12, 16, 20 or 24 hours a day. Extended hours protection usually carries a premium rate.

The service firm should be knowledgeable of the company's work routine to ensure that preventive maintenance can be scheduled so it will not interfere with processing deadlines.

Also, consideration must be given to such factors as the proximity of service and support locations, each firm's average response time to service calls, the extent of spare parts on-hand at service locations, the range of services provided, and the types of test and diagnostic equipment available.

Training is also a key. As new, increasingly more sophisticated equipment is introduced, the task of maintaining and servicing systems is more demanding. The prospective customer should carefully examine the training programs of each independent maintenance firm.

If training is not an ongoing process or a high-priority activity with sufficient funding invested in modern training tools such as closed circuit television and video tape playback units; and if the firm does not keep pace with manufacturer changes and modifications; the end user should consider another vendor.

Keane is president of Sorbus, Inc., a third-party maintenance firm.

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Remote Service Selection Procedure Outlined

ELLICOTT CITY, Md. — Once the decision has been made to employ the services of a remote computing service, users should perform an eight-step procedure for planning, selecting and managing the service's activities, according to the results of a Newton-Evans Research Co. survey on remote computing services.

The first step is the development of an overall policy. This statement of policy should specify each level of management responsibility pertaining to the remote computing service's evaluation and selection process and to the usage of the service within the organization, the study said.

The statement need not be lengthy, but it should be formalized by having it written and published as part of the organization's policy guide.

Selecting an administration is the next step. Someone within the organization must assume responsibility for coordinating the monitoring of all remote computing-related activities, the study said.

"The person assigned to the position should be familiar with DP fundamentals, comfortable working with user department representatives, able to understand and apply budgeting techniques and able to discuss organizationwide or project-based remote computing needs intelligently with vendors," the survey noted.

Project Definition

Next in line is the development of a project definition statement. This starts with a determination of user requirements within the organization generally and should include current usage patterns, current computing resource available and forecasted computer application requirements.

Once the list of requirements is complete, an evaluation of alternative sources of data services should be done. Finally, general recommendations and an impact statement should be prepared, according to the study.

User requirements of a specific nature, for a specific application, must also be defined. At a project level, the requesting user working with the remote computing service administrator should develop a project definition statement by answering the following:

- What is the problem or opportunity?
- What are the objectives, expected results and benefits of the project?
- What is the plan of action to solve the problem or take advantage of the opportunity?

The fourth step involves searching out vendors. The Yellow Pages are a good place to start and professional organizations such as the Data Processing Management Association and the Association of Time-Sharing Users are also good sources, the research firm suggested.

Once a list of vendors is in hand, the user should prescreen the vendors and their capabilities. Then a candidate slate should be compiled based on answers to questions on hardware compatibility, operating systems, applications libraries, support resources and training and documentation, plus other pertinent areas, Newton-Evans said.

Load Profile

Step five calls for the construction of a load profile of the organizational work load and/or the proposed system. On an organizationwide level, service requirements can be developed using a questionnaire process to determine the nature of additional computing service requirements, the study claimed.

The nature of such requirements could be of two types: supplementary to existing computing resources or complementary to existing DP resources.

Taken into consideration should be the spectrum of users who need to access the computing service, professional or nonprofessional computer programmers, the need for interactive or remote batch services and the languages required. In addition, applications software requirements and the overall level of self-sufficiency in using DP services should be considered, the report maintained.

"Once completed for both an organization generally and the specific project, the detailed load file will provide much of the information on which to base a cost estimate for remote computing service usage. At this point, it will also be possible to determine suitability of services under consideration, the study said.

Request for Proposal

Step six is the preparation of a request for proposal (RFP). The RFP should reflect input made to the load profile but phrased to present service needs as minimum requirements, leaving responding vendors some degree of upward flexibility in the RFP.

The user should pay particular attention to vendor statements on data and program integrity, security and systems backup capabilities, the report noted. Questions of program ownership (if the vendor will be involved in development of programs) should also be addressed.

Prepare, run and evaluate a benchmark for step seven. This is an important, but often overlooked, procedure, according to the study, because it requires the time, resources and energy of both the service's administrator and users. This step contains three major activities areas:

- Writing or formulating the set of

(Continued on SR/10)

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The source. Of course. ANDERSON JACOBSON

Newton-Evans Survey Finds

Users Win and Lose With Remote Computing

ELLICOTT CITY, Md. – The rapid growth of the remote computing services industry has created a plethora of opportunities to save – or lose – money in DP. A recent survey conducted by the Newton-Evans Research Co. details this growth area and suggests guidelines for participating in it.

Back in the salad days of computing, the DP manager often reigned supreme. Endowed with the rare knowledge of computers, he called the tune to upper management when it came time to buy, and his budget was often open-ended.

The stark economic realities of the late '60s and early '70s brought an abrupt end to the "fat cat" days of data managers, and shrunken budgets put the pinch on big spending. Combined with the heavier and more sophisticated demands for computing, these factors forced more users to look outside for their processing needs.

Seeking Outside Help

There are several reasons for going outside the company for computing services. As the Evans survey noted, "By its very title, the remote computing services industry has a different perspective on its product. The product is not hardware, software or systems, but services.

"This service organization – one in which users enjoy the benefits of computerized applications without the problems of ownership – is the industry's greatest strength."

And, in the eyes of some users, a weakness. Just as there are plenty of happy-ending vignettes in which beleagured user meets opportunistic service bureau and both live happily ever after, there is also no dearth of literature on users who have freed themselves from usurious service contracts and saved scads of cash by bringing it all back to the shop.

Questions Raised

The question is, where is the fine line and what are the basic criteria for making a decision? The Evans survey raises some questions for the user to answer before moving either way.

- **Is there a proper amount of expertise in the users problem area?** In many cases it is found that an in-house computer organization does not have specialists in many areas requested by user organizations," according to Evans.

Sometimes, the DP department can train someone to fit the bill. However, in many cases, the problem is too complex and requires a prohibitive amount of training.

- **What is the risk in developing programs?** "If the organization does not have experience with an application area, it becomes extremely difficult for the user to accurately plan the cost and time required to develop programs," the survey said.

One thing to consider here is that cost may appear less when plans are fashioned to keep the application in-house, but the risk of overrun is higher.

- **What is the internal situation?** "The user should attempt to gain an understanding of the attitude held by DP management and staff about his particular organization and their experience working with his function on similar efforts in the past," according to the survey.

The questions that need to be asked here are: What is the prevalent attitude on this project? Do the necessary capabilities exist to complete it? Are applications packages obtainable for use on the internal DP system? If not, can the DP staff provide the development resources required for the project?

Two-Sided Argument

Following are some good reasons for staying in, and some equally compelling reasons for farming the job out.

By staying within, the user stands to place himself on the black side of the bottom line. Internal costs are frequently "extremely attractive" and become even more so if the DP cost is absorbed in overhead or administrative budget.

On a more personal and less tangible note, taking a project outside may ruffle the feathers of DP personnel who will be called on to perform other jobs in the future.

On the flip side, an outside service can provide secrecy. With the exception of immediate management, the user may not want anybody to know a sensitive, experimental project is being worked on until it is successfully completed.

"In many cases, these are one-time projects," the survey noted. "With them, you are able to justify your approach using an outside service based on the fact that you are only testing an idea. It is just an experimentt, that's why you don't want to interrupt the in-house organization."

Remote computing also provides a great deal of flexibility. If something goes wrong, the outside service is obligated to fix it. An internal organization may be less willing.

The survey, entitled "A Guide to Planning, Selecting & Managing Remote Computer Services," is available for $393 from Newton-Evans Research Co., 10318 Globe Court, Ellicott City, Md. 21043.

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While Boosting CPU Accessibility

University Cuts Costs to $1.60/Terminal Hour

Special to CW

AMES, Iowa – Inflation, a limited budget and an increasing demand for computer services just don't mix. But Iowa State University here has found a way around the inflation crunch. It is using minicomputers, microcomputers and a National Advanced Systems Corp. AS/6 mainframe to boost student access to the school's computer system, while cutting computer costs to $1.60 per terminal hour.

Prior to 1978, the school's computation center relied heavily on its AS/6 for campuswide computing services.

"Accessibility to computing was a problem. There was a real need to extend interactive access to wider segments of the academic population. But budget constraints would not allow outright replacement of our mainframe with larger machines," according to Dr. Clair G. Maple, director of the computation center.

Computer Growth

To satisfy the growing demand for computer services, the school developed a five-year plan that involved buying two Digital Equipment Corp. VAX-11/780 and 40 PDP-11 minicomputers.

The goal was to increase the number of available terminals and make them more accessible for students. Starting out with 64 terminals in 1978, Iowa State now has 72 and hopes to have 104 installed by the end of the year.

Terminals were installed in convenient locations, such as special rooms, dormitories and in academic departments.

Budgetary Constraints

Since its systems budget was in the neighborhood of $2.5 million a year, the school could not afford a full-blown reassessment of its computer system. Iowa State wanted to develop a campuswide network that would match computing capabilities to an individual student's requirements on a job-by-job basis. This network, the school hoped, would connect users automatically and transparently to the appropriate processors for their particular jobs. This would minimize wasteful overhead and idle computer capacity. But it also required a range of computers that would match almost any job.

To meet this goal, the school's computation center developed a five-year plan for putting its various computer systems into use.

The plan called for the AS/6 to be enlarged to handle repetitive batch jobs. For short, interactive time-shared tasks, the VAX-11/780s were used. And for real time, measurement and control applications, such as teaching and research done in laboratories, the PDP-11s were used, Maple said.

To help implement the program, Iowa State received a $243,000 National Science Foundation grant, Maple added.

The usage cost of the network was calculated by dividing total hardware and software costs, including support personnel and maintenance costs, by the number of hours the terminals were used. The result was a surprisingly low $1.60 per terminal hour.

The result of Iowa State's computer strategy has been an increasing involvement of students in computing activity for a manageable expenditure. Most Iowa State students now use computers. Users of the VAX systems have reached more than 38,000 terminal sessions in a peak month, with sessions averaging more than 40 minutes each.

Eight-Step Plan Outlined

(Continued from SR/14)

benchmark programs.

- Running the benchmark programs under varied conditions.
- Preparing the report and recommendations.

Benchmark size and complexity should be relevant to the user's needs, the report emphasized. Generalized benchmarks are often unsatisfactory and can yield results which can be misleading insofar as they may or may not pertain to the particular applications environment and project.

Last, step eight calls for negotiation of the contract. Remote computing service contracts are often let on two levels, the study noted. The first is the organizationwide or master contract. These may be prepared for a few "preferred" vendors.

The prospective user should be sure to become cognizant of the existence of any such master agreements within the organization prior to negotiating what could be a separate, redundant or even less favorable contract, Newton-Evans said.

The administrator (and policy guide) should be of assistance in determining the existence of any master contracts.

If the user is seeking to negotiate a project-oriented contract for his specific needs that is outside the scope of any existing remote service contract or which may be negotiated with a vendor with whom no agreement is currently in effect, he needs to work with the service's administrator, legal counsel and possibly a contracts analyst, the study said.

The study, entitled *A Guide to Planning, Selecting & Managing Remote Computing Services*, is available from the Newton-Evans Research Co., 10318 Globe Court, Ellicott City, Md. 21043.

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Small Businesspeople Guided on First

By Tom Henkel
CW Staff

NEW YORK — The small businessperson buying his first computer system is often baffled over exactly what kind of system will best suit his company's needs.

While Arthur Young & Co. recommended potential users seek the advice of computer specialists before buying a computer system, the firm offered some preliminary steps businessmen can take before actively getting into the computer market.

The first step is simple, but important. The potential user must first take a good hard look at how his company works. How inventory is planned, controlled, identified and costed; how and when customers are invoiced; how and when bills are paid; how costs are figured; how shipments are made; and how production is handled are all important factors that could influence a company's decision on a particular system, the firm said.

Need for Computer

Once the company has determined exactly how it does business, it's time to figure out whether a computer — in the case of a small company, probably a minicomputer — is really what the firm needs. The prospective buyer should make a list of what reports he wants from his system, how often he wants them and what information should be included in the reports.

Another factor that should be considered is what type of format the reports should take. Will they list information by product, salesman, territory or document number? And how will special information be handled?

How data will be entered into the system is also an important consideration. While many prospective users are convinced computerization is a panacea for all their problems, they often fail to realize buying a minicomputer may mean some drastic changes in the way the firm operates.

For example, inventory items may have to be identified by a six-character code in which the first three characters are letters describing the product and the second three are numbers that indicate the size. While some firms may already employ a similar inventory code, some firms may have to revamp their entire operation.

'That Program Has Such a Sad Ending.'

Documentation Factor

Firms should also consider what kinds of documents they want a computer system to produce. How many copies of each document and what information should be on each are also factors, Arthur Young said.

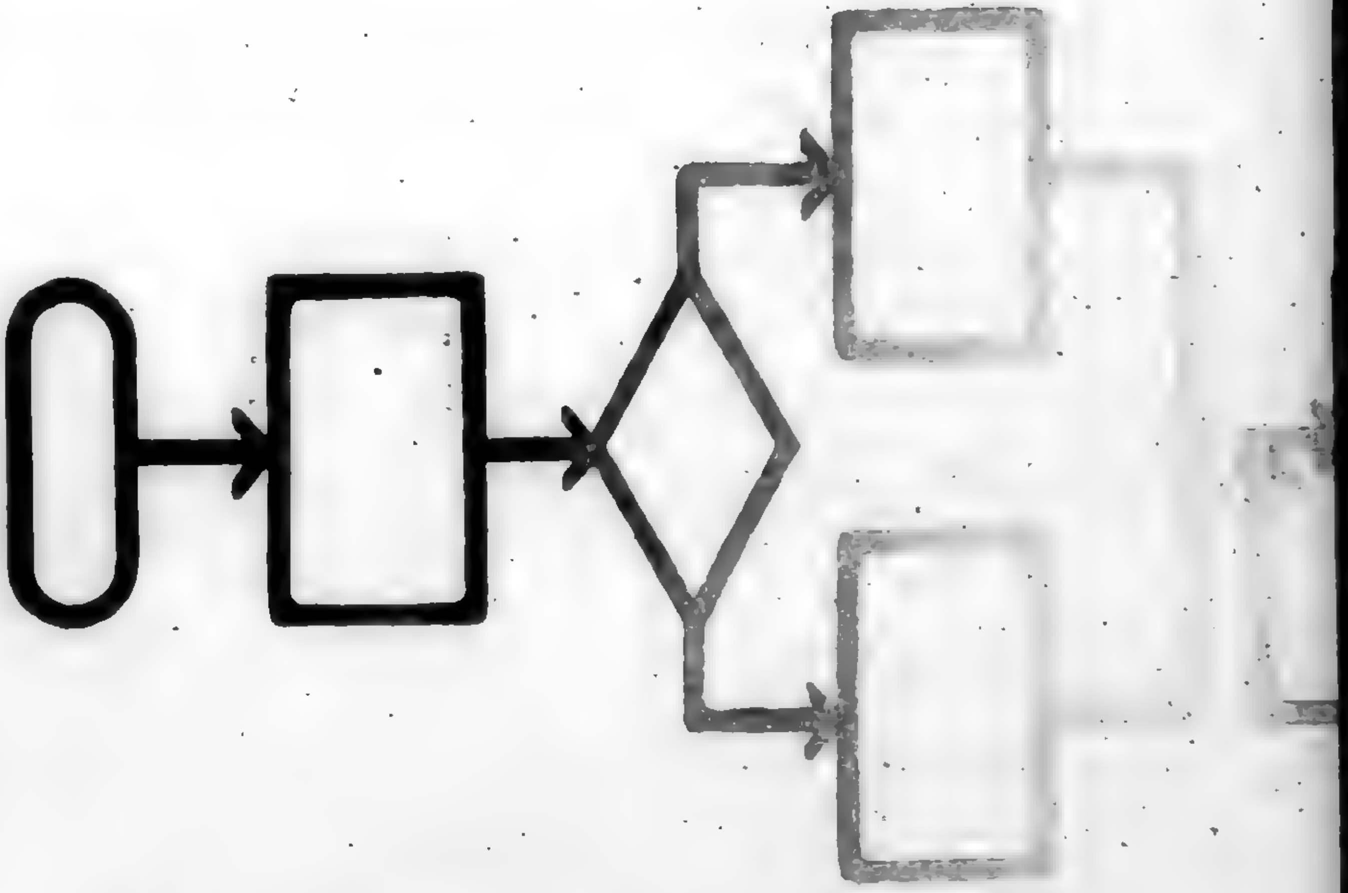
How a firm keeps its books is another important factor. The company's flow of accounting information from the system to the general ledger has to be determined. Once completed, the firm can decide what entries are to be made, when and from what source. It must also decide how that procedure can be audited by leaving a series of checks, or audit trails, to verify the accurecy of entered data.

Potential users must also figure out whether they want to be able to ask their computer questions, or whether they just want it to perform predefined tasks. If inquiry is desired, which would usually be done through a terminal, the user must decide how often inquiries are to be made and what information will be available to what employees, according to Arthur Young.

Once all those decisions have been made, the prospective user should have a good idea of the type of system he wants, how much it will cost and which vendors are offering acceptable systems.

Hard Part

Then comes the hard part — narrowing down the hardware



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Acquisition in Computer Market

vendors to the best system and choosing software.

"It is almost impossible for a businessman to make a comprehensive technical evaluation of a minicomputer," Arthur Young said. However the firm added some things such as literature from private analysis firms such as Auerbach Publishers, Inc. and Datapro Research Corp. often supply an unbiased report on the technical aspects of various systems.

"It is possible to develop a minicomputer system using the equipment from more than one vendor. For example, it is possible to have a system where the CPU, CRT terminals, printers controllers and mass storage units are all manufactured by different companies.

"Such systems are most often designed by engineering-oriented firms. The advantage of missing components is that it enables you to obtain features which might not be available in a given price range from one manufacturer," the report noted.

However, the firm warned prospective customers to check with manufacturers to see who will be responsible for checking and diagnosing problems in a multivendor installation.

Finding the right software may be the hardest decision for novice users. There are many vendors offering packages that look alike, but may not offer the same performance. Making a value judgment is further complicated by the fact that, unlike hardware, software packages can't be as clearly compared with each other. Some offer features that others lack.

"If you find a package which fits your system needs and your price range — take it," advised Arthur Young. However the firm warned few companies find a software package that perfectly fits their needs.

"A great deal of work will still be required even if [the software] fits exactly, but you will have a much better chance than if you design your own system," the firm said.

Make sure the software fits your needs by asking to see it in operation without a salesman. And determine what level of expertise is needed to operate and control the software.

"Beware of [software] which needs only 'a few minor changes.' If they are really minor, suggest they be made on a working system so you can see them in operation," according to Arthur Young.

It is doubtful that the novice user will find a package that exactly fits his needs. Specialized packages are available for specific applications, but most are designed as general packages to meet the needs of diverse types of businesses, the firm noted.

Package Limitations

Many packages can be tailored to meet a company's specific needs, but users should beware of a package's limitations.

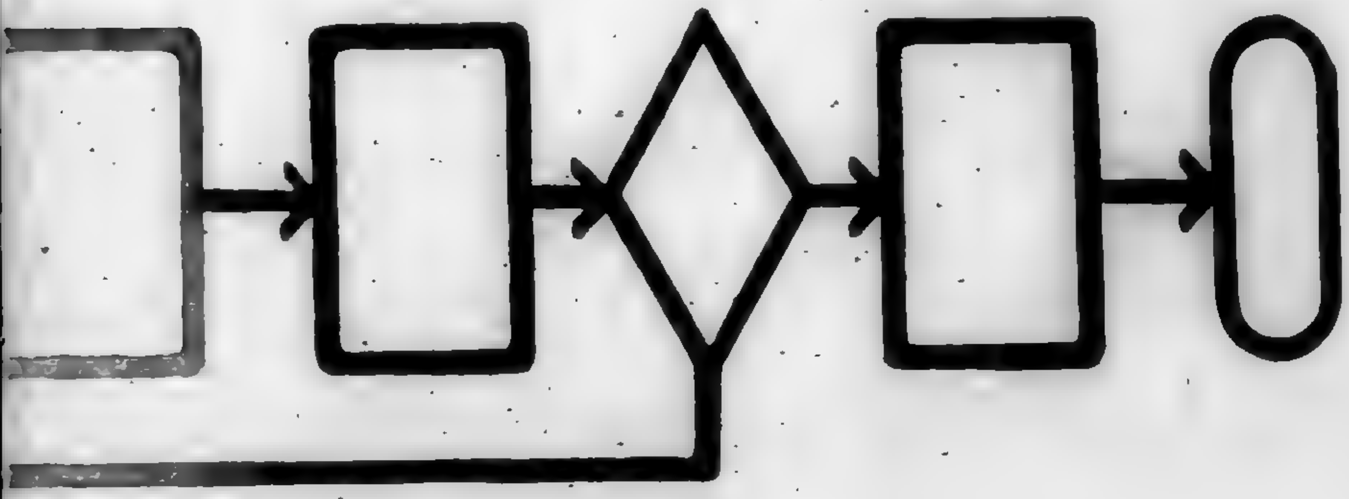
"It is not advisable to accommodate exceptions which have a direct impact on accounting information, but exceptions impacting management information can be worked around," Arthur Young said.

An example of this philosophy is a hypothetical package that can only associate one salesman with an invoice. Occasionally two salesmen make one sale. This can be circumvented by identifying the two salesmen as one, i.e., Jones/-Smith, the firm said. That would be an acceptable modification.

An unacceptable package would be one where a hypothetical user occasionally adds a 15% surcharge to an invoice if the customer has not purchased a sufficient volume in the past month. If the package could not handle that change, it may present a problem because it would require a clerk to manually type in the surcharge — a process that could introduce errors into the system, the firm noted.

If a user can't find software to meet his needs, he has another option. He can prepare a request for proposal and send it to selected vendors and turnkey systems houses asking what they have to meet the user's specific needs and how much it will cost, the firm noted.

The Arthur Young & Co. report is available from 277 Park Ave., New York, N.Y. 10017.



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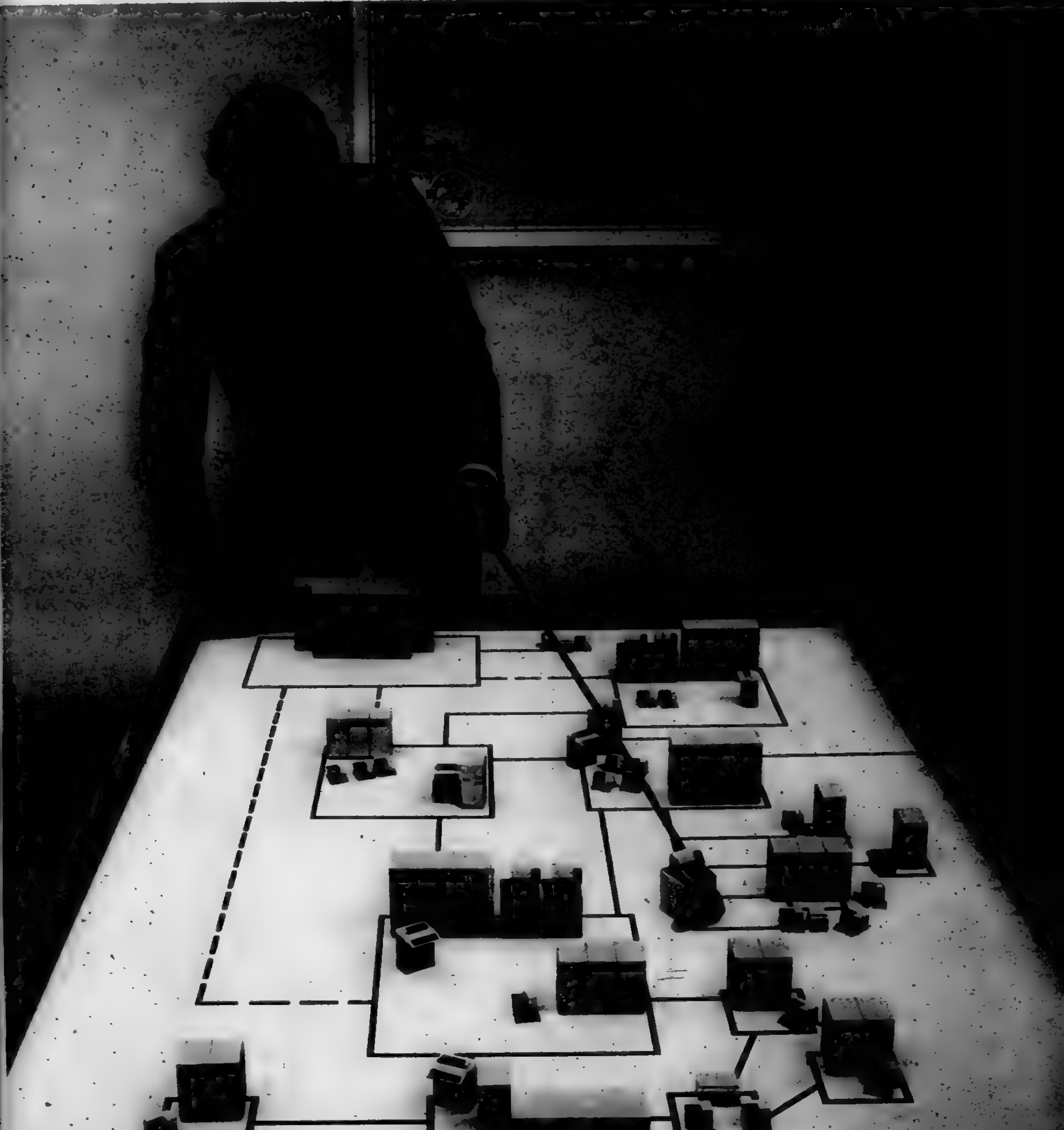

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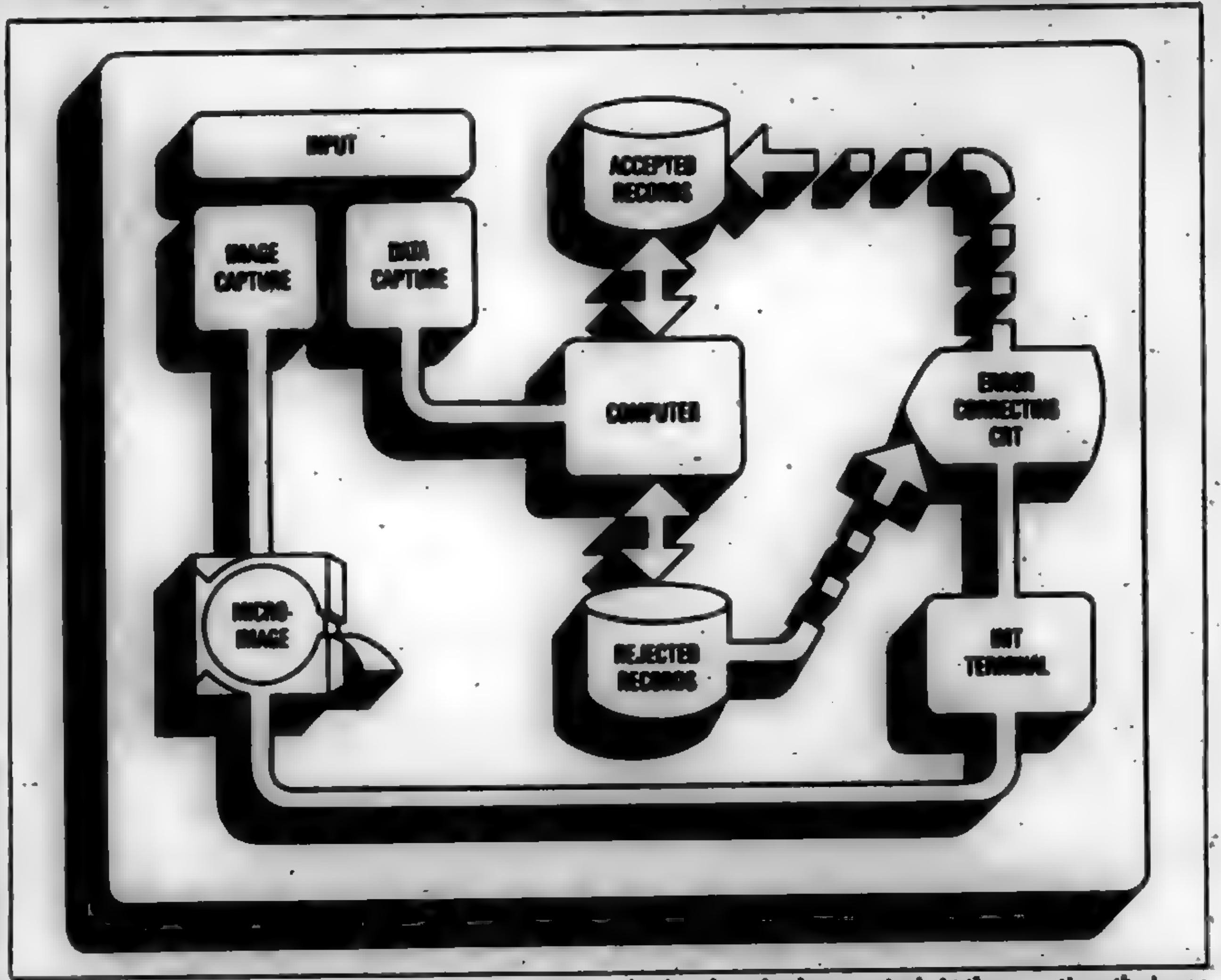

With a microimage terminal linked to the data correction CRT terminal, digital records rejected by the computer are displayed on the data terminal. At the same time, the image of the document is displayed on the microimage terminal.

By Dennis Neary
Special to CW

ROCHESTER, N.Y. — The idea that more is better is not always true — especially when it comes to buying bigger, faster and more expensive CPUs. Often higher capacity CPUs create a sort of DP overkill, where the user winds up with computing power far beyond his projected needs.

An alternative to adding CPU horse power is to take advantage of interfacing technology to improve those functions that are not accomplished efficiently by computers. Data storage on microfilm is one example.

The CPU captures and processes data very efficiently, but it cannot handle images as efficiently because storage costs are too high. Microfilm, on the other hand, is a very efficient and cost-effective way to store images, but retrieval from a magnetic file is faster than from a film file.

The idea is to blend the two technologies and use each to its best advantage. When the CPU and micrographics are interfaced, the result is synergistic.

Cost Comparison

Consider the cost comparison for data storage between disk and micrographics, for example. It is about 1,000 times cheaper to store images on microfilm than it is on disk. A 300M-byte disk pack, such as is used on an IBM 3350 disk drive, costs about $2,000 and will store the images of about 2,500 letter-size documents. That's a cost of about 80 cents per document just for the medium on which it is stored.

At a photographic reduction of 50:1, the images of 25,000 letter-size documents can be stored on one roll of 16mm microfilm. That costs about $20, or 10 times the capacity at 1/100 the cost. So, the cost of micrographic media to store one document image works out to about 8/100 of a cent, or about 1/1,000 the cost of disk storage.

There are trade-offs, however. Even at the high cost, an advantage of storing images magnetically is they already are in bit form and can be immediately sent by wire to a remote CRT terminal. The microimage has to be converted to bit form, but micrographics is catching up here, too.

Microfacsimile equipment that is capable of scanning and digitizing microimages for electronic transmission is now becoming available. In the next few years, it will become common for images to be retrieved from a microfilm file, scanned by a microfacsimile machine and transmitted like data. The terminal at the other end will recreate it on a CRT terminal, print it on paper as a full-size document, or on film as a duplicate microform.

Computer-Assisted Retrieval

Today, DP managers can take advantage of the synergism provided by in-

(Continued on SR/26)

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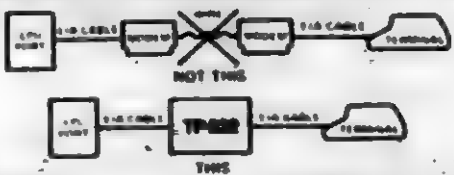

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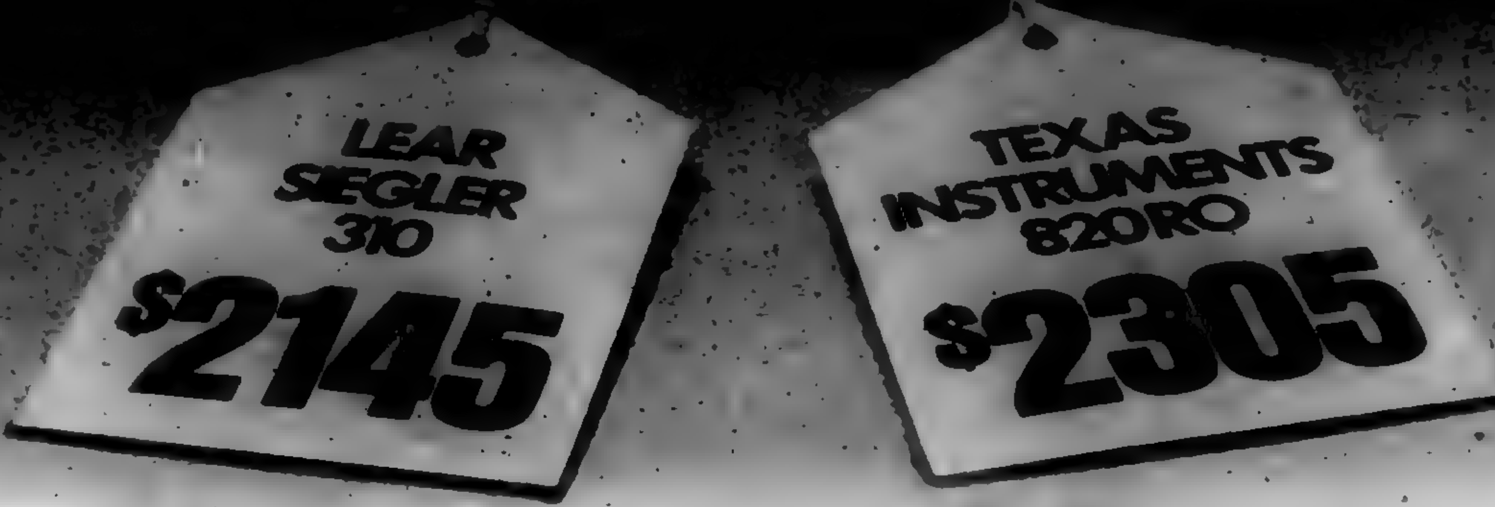

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Feature	LSI 310	TI 820RO
Speed	180 cps	[illegible] cps
Dot Matrix	9-wire head (9 hi x 7 wide)	7-wire head (7 hi x 9 wide)
Lower Case	Standard, with descenders and underlining	Standard, but no descenders or underlining
Buffer	512 expands to 2048	Fixed [illegible]
Space/Blank Compression	Yes	No
Interface	Serial and parallel	Serial only (parallel not available)
Current Loop	Standard	Optional
Forms Control	[illegible] settings standard	Optional
Elongated character mode	Standard	Optional
Price	Base Price [illegible] Expanded buffer [illegible] Price as shown [illegible]	Base Price [illegible] Options [illegible] Price as shown [illegible]

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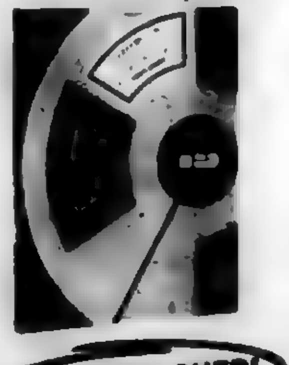

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CPU, Micrographics a Synergistic Blend

(Continued from SR/24)

terfacing the two technologies by letting the computer help the microfilm equipment retrieve the image with computer-assisted retrieval (CAR).

The idea with CAR is to capture data magnetically and images micrographically. Many data-capture devices on the market now are equipped with microfilm cameras to do this.

The data file in the computer then contains summary information about the document, and it also lists a microfilm roll and frame number address (or pointer) for the document image.

For the 80% of retrievals that can be satisfied with summary data, only a computer terminal is used — taking advantage of the speed of the CPU. For the remaining 20%, for which more complete data is needed, both the computer terminal and the micrographic terminal are used.

With an intelligent terminal, attached on-line to the CPU, retrieval time is shortened substantially. The operator only has to insert the proper roll of microfilm as instructed by the computer terminal, and let the CPU drive the film to the proper image.

Two Factors

The extra speed of microfilm retrieval comes from two factors. One is that the CPU automatically presorts the required retrievals into the order in which the documents appear on the microfilm. The other is the operator addresses only the computer terminal, instead of operating both terminals.

There is no need to key index numbers or codes into the microimage terminal because the computer already knows what they should be and automatically downloads them into the microimage terminal.

If several retrievals are to be made from the same roll of microfilm, the operator simply puts that roll into the terminal and touches an "advance" key on the computer terminal to go on to the next document. The image then appears automatically on the micrographic terminal screen.

Recent advancements in microfilm coding make retrieval even more efficient. Intelligent microfilmers can be programmed to expose up to three different-sized image marks on the edge of the film beneath each document image. The difference in sizes of these marks effectively divides the file into block, batch and item sequence at the time of microfilming — more closely matching the indexing of the computer file.

Reject Reentry

The flowchart in the figure is descriptive of blending of computer and micrographic technology to improve suspense file reject reentry. In this case, digital records rejected by the CPU are displayed on the data terminal. The operator has previously selected the proper rolls of microfilm from the file, and inserts them into the microimage terminal in order.

As the data is displayed on the CRT, the image of the document that generated that error is displayed on the screen of the microimage terminal. Displaying both images simultaneously significantly improved the productivity of the operator, who no longer has to key any code into the microimage terminal.

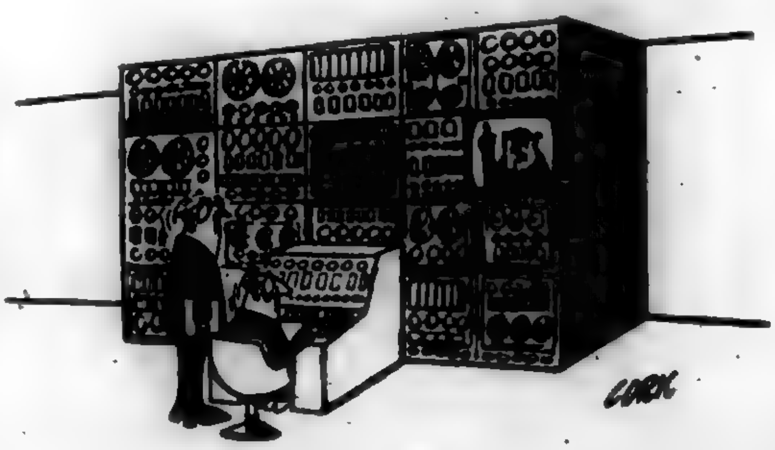
This same reject reentry method is part of an automated system that is saving significant amounts of time for a service bureau that processes more than 200,000 health insurance claims daily. The earlier system involved examiners looking at each claim upon receipt, then making decisions as to its validity. They then checked boxes on a form telling the computer whether to pay the claim, reject it, or issue a turnaround document requesting clarification from the provider.

Under the automated system, a CPU makes most of its decisions by checking the claims against 200 different evaluation criteria. For claims such as for drugs, 70% are handled in the computer, which generates a magnetic tape for payment, rejects the claims, or asks the provider for additional information.

The other 30% are suspended in the CPU because some human judgment is needed. Data may have been captured incorrectly; it may have been entered in the wrong place on the form; or some other problem may exist. Only these exceptions are kicked out for human examination.

Instead of trying to recover data from the million-or-more pieces of paper received daily, the examiners can refer to the document images in a microfilm file. When the claims are received each day, they are given only cursory sorting. During microfilming, they are assigned roll, batch and claim numbers, and this address is part of the data entered in the computer.

Neary is an industrial engineer for Eastman Kodak Co., in Rochester, N.Y.



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In order to meet this demand for data, Reserve Fund has turned to Honeywell's transaction processing system, TPS-6.

Together with four Level 6 computers, TPS-6 makes it possible to do immense amounts of production work while simultaneously developing new programs.

Their four Level 6 Systems give Reserve Fund all the flexibility and back-up they need. Information flows easily.

For example, terminals are used to enter purchase orders and to provide quick answers to customer inquiries.

At the same time, the system is also maintaining an on-going record of all transactions.

As you'd expect, security is a great concern. But thanks to features built into TPS-6, Reserve Fund has developed effective safeguards.

Every operator has an ID number, a password, and a specific security clearance. Access is carefully regulated.

As a further precaution, the system has a built-in time-out feature that automatically clears the screen after a specified period.

Thanks to capabilities like screen data formatting and multiple key access to files, Reserve Fund has been able to tailor a system that's both effective and efficient.

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For more information, write Honeywell, 200 Smith Street (MS 487), Waltham, MA 02154.

Honeywell

Lab System Revives Clinic's Billing Activity

LYNCHBURG, Va. — The clinical laboratory at Virginia Baptist Hospital here is reportedly saving $60,000 yearly in automated billing expenses and realizing a 119% productivity increase through the use of IBM's Laboratory Data Management System (LDMS).

Virginia Baptist's experience with LDMS shows that small and medium-size facilities can benefit from computer-assisted lab systems previously found only in larger hospitals.

Each year, Virginia Baptist admits 12,000 patients, who are cared for by some 125 doctors. As physicians have come to rely more heavily on laboratory data for patient diagnosis and treatment, laboratory test volume at the hospital has increased an average 20% a year over the past five years. Last year alone, the laboratory performed over 730,000 tests.

As the test volume grew, so did the clerical work load. Errors inherent in a manual reporting system began to increase, problems with accountability arose and responses to inquiries slowed. Clearly, the laboratory needed a better method for handling all this data — and LDMS looked like a promising solution.

The system helps manage lab data for all tests performed from the time a patient enters the hospital until the patient is discharged. Test orders and results for major laboratory sections may be entered on-line through CRT terminals. Lab sections supported include blood bank, microbiology, serology, chemistry, hematology and urinalysis.

Entries for orders and results are made either by menu selection from a display screen or by keyboard. To enter orders on the screen, a terminal operator touches a light pen to desired test names and assigns a status (Routine, Today or Stat) to each test. On completion of an order entry session, the system displays a summary screen listing all tests that have been ordered for final review by the operator.

Specially formatted screens for various test types help speed result entry and reduce errors. Operators simply fill in the blanks on each screen by keyboard entry.

Terminal Distribution

The laboratory organizes these on-line operations around four display terminals — one in the central receiving area, used primarily for order entry; one each in hematology and chemistry, used mainly for result entry; and one at the lab secretary's desk for responding to inquiries about test results.

As soon as an order is entered, LDMS records a charge for the procedure. This automated billing feature has produced an unexpected and welcome increase in laboratory revenues. Although part of the additional revenue is the result of increased test volume, more can be attributed to recovery of charges that previously were lost.

Gene Davis, chief medical technologist at Virginia Baptist, estimates that automated billing is recovering $60,000 a year in charges that were lost under the manual system. "We've more than offset the cost of the system," he said. "By the most conservative estimate, we've saved thousands of dollars more than the system has cost us."

Productivity Up

Not only is the system generating additional revenues, it is also proving cost-effective in terms of improved productivity and better utilization of laboratory personnel.

"Our productivity has increased considerably since we installed LDMS," observed Davis. "Using the work load recording system of the College of American Pathologists, we've set a target of 55 productive minutes per hour of work. With this system, we've gotten as high as 119% of that, better than 60 productive minutes per hour."

The system has also enabled the laboratory to absorb a bigger work load without a corresponding increase in personnel. Since 1976, the year before LDMS was installed, the laboratory has absorbed a 30% increase in test volume with three additional employees.

With LDMS, filing, storage and retrieval of test results is an automatic by-product of daily system usage.

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Five Generations of Computer Use

Subscription Service Finds IBM 3032 Delivers

Special to CW

WESTWOOD, Mass — A periodicals subscription agency here has increased its productivity and improved throughput by switching from an IBM 370/158 to a 3032.

The product the firm handles is serial publications — and its files contain listings of some 110,000 magazines, newspapers, journals, periodicals, proceedings and yearbooks published in 140 countries.

The customers are libraries — 20,000 of them: university and school libraries, public libraries, medical, corporate and special libraries throughout the U.S. and worldwide. Delivering many of those products to the customer is the F.W. Faxon Co. — a 99-year-old firm that continually updates, refines and expands the subscription service it has been providing libraries for more than 60 years.

Why a subscription agency? You have to think big. A university library administrator can be faced with the need to acquire some 30,000 serial publications annually, a potentially overwhelming procedure. It requires effective selection, efficient ordering for uninterrupted delivery, prompt claims for missing issues and a comprehensive budgeting and payment system: Faxon — claiming to be the only independent subscription agency in the world that devotes its entire effort to library accounts — expedites all of these functions on an IBM 3032.

Five Generations

Albert H. Davis Jr., chairman and chief executive officer of Faxon, introduced automation to the library periodicals subscription field more than 20 years ago. Beginning with a 305 Ramac in 1958, five subsequent generations of IBM computers with increased capacities have brought the company to its recent selection and installation of the 3032.

"We have so many CRTs on-line — nearly 200 — that we needed a faster response time," Richard R. Rowe, Faxon president, explained, "and that's what we're getting with the 3032. This will enable us to increase our service substantially, especially as we go into direct on-line services with libraries.

"We can process about 2-1/2 times our former volume," added N. Bernard Basch, the company's vice-president for operations. "On the 370/158, we were handling about 65,000 transactions per day — 1.3 million a month. Reducing the time it takes for a transaction has increased our throughput.

"And our requirements are such that we know we will need more terminals; we're adding terminals at the rate of 10 to 20 a year," he added.

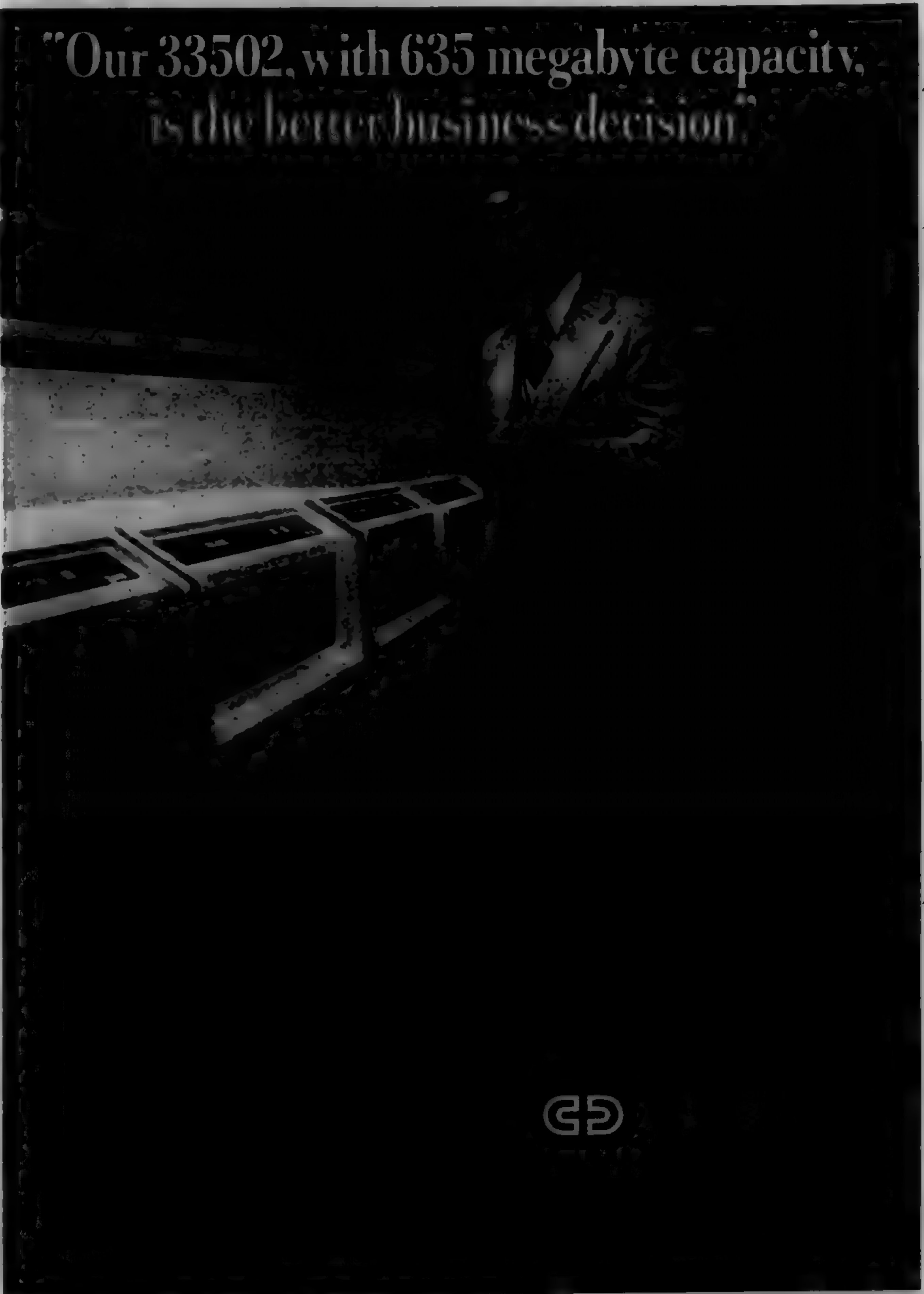
Gratification Factor

The CRT terminals are important for the staff, too, said Basch. "I think there's a psychological factor. People seem to be more enthusiastic about the work they're doing — probably because they're able to address a problem, take an action, and get something done. They don't have to put it down and pick it up again later."

With the move to the 3032, the company has upgraded operating systems from DOS/VS to MVS. "This allows us to do practically everything we want to do," Albert Davis explained. "The service departments always must have their necessary portion of the operating system. Because of seasonal variations in the work load, this occasionally meant that other key departments had restricted time.

"But now, with our increased capacity, we can channel the work flow according to the priorities we want to appropriate — not according to the variations in the work load," he said.

F.W. Faxon maintains a large application staff, but depends on IBM's software systems. In Basch's assessment, "the overall reliability and service of the system have been excellent." The system is in 24-hour operation five days a week.



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October 23-24 (English Language)
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Deere Uses Third-Party Programs Tailored to In-House Training

By Dan Hines

Special to CW

MOLINE, Ill. — Computers and the software to manage them are a major investment for most companies. But the people who run the computers represent a major investment, too. And keeping them trained and productive can prove one of the biggest cost-saving measures a company can take.

Deere & Co., makers of John Deere tractors and other farm machinery, has found third-party training courses, similar to those offered by such firms as Advanced Systems, Inc. and Deltack Corp., offer a better training program than Deere could ever muster, at a far lower cost.

An IBM OS/MVS shop, running 10 3033 CPUs at two DP centers here and in Waterloo, Iowa, Deere takes vendor-produced training courses and tailors them to its own environment.

By using prepared training programs implemented through video-assisted methods, the firm can train personnel in several locations at one time. In addition, since everyone receives the same training program, the company is assured training is consistent.

Deere holds its regular classroom training sessions at the company headquarters here. In 1979, more than 7,000 student-days of training were completed at that site.

Course leaders are not professional instructors, but on-the-job company people acting as advisory instructors using the video and course materials as necessary. Supplementary course material is modified to meet the firm's specific needs. And video tapes are used to support those modifications.

Average courses cost about $65 per student including course rental, a three-person full-time coordinating staff, the computer time, material and advisers.

On-Site Training

Some training also occurs outside the Moline classroom. For noncorporate locations such as factories and marketing locations, Deere publishes a catalog of available courses. Deere has developed recommendations of what courses should be completed by specific job titles. In addition, advisers from corporate headquarters talk with employee supervisors to determine what new courses are needed to meet specific training needs.

Deere uses more than 250 training tapes each month from Advanced Systems in addition to courses from other vendors.

So far, Deere is pleased with the quality of courses it has received from professional training firms. Courses are shipped on time and the vendor's personnel are usually on hand to iron out any problems.

As far as results go, the firm is pleased. It has been using video-assisted training since 1970, and top company brass feel they have succeeded in developing a systems staff that has been trained specifically for the Deere environment. In addition, the courses keep already trained personnel up on current trends in the information processing business, and helps them make the best of Deere's resources.

Hines is systems education administrator at Deere's home office in Moline.

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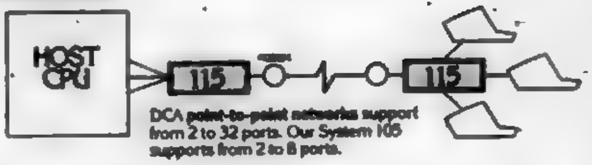
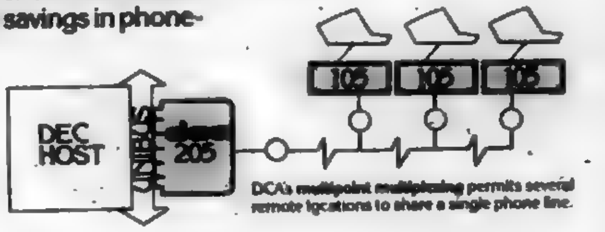


DCA point-to-point networks support from 2 to 32 ports. Our System 105 supports from 2 to 8 ports.

DCA's multipoint multiplexing configuration serves a number of remote terminal locations with just a single telephone line, for substantial savings in phone-line and hardware costs. DCA users have benefited from multipoint multiplexing since January 1979.

DCA's System 205 is a statistical multiplexor designed for DEC UNIBUS*-based computers. The 205 requires only one UNIBUS slot to emulate up to 16 DEC DZ11 modules and a 128-port stat mux. This greatly lowers hardware costs and improves response time as well.



DCA's multipoint multiplexing permits several remote locations to share a single phone line.

Because of DCA's unique modular design, all of the above networks could easily expand into larger, more powerful networks. As the master network processor, System 355 gives terminal users access to any host computer anywhere in the network. In addition, the 355 supports up to 126 ports, 62 of which can be high-speed synchronous trunk links. Several 355's can be combined to greatly expand this support. Features include port contention, switching, unlimited routing, X.25 support and a wide array of network management tools.

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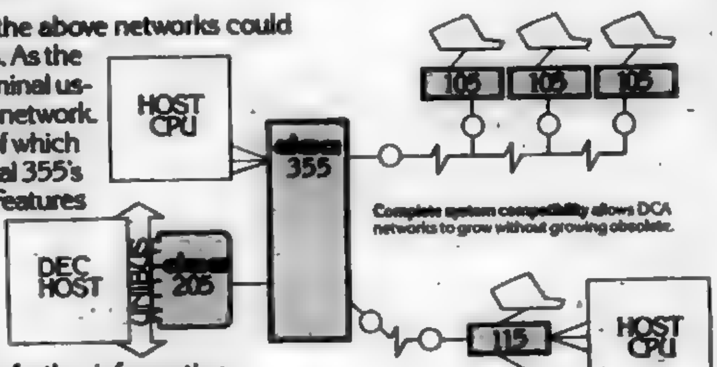

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Drops Service Bureau

Housing Office Finds Savings Under Own Roof

KNOXVILLE, Tenn. — The housing and redevelopment authority here is saving $40,000 yearly after dropping a service bureau in favor of a minicomputer-based public housing system.

The Knoxville Community Development Corp. (KCDC) is the beneficiary of the system. It is using it to track the individual costs of operating 18 public housing developments.

The need for individual monitoring of costs was brought about by the U.S. Department of Housing and Urban Development (HUD) in late 1978 when it unveiled the Project Based Budgeting (PBB) demonstration project as part of its Public Housing Urban Initiatives Program (PHUIP).

A major objective of PBB is to provide a vehicle for planning and monitoring income and expense on a project-by-project basis, involving input from project-level management and responsible resident groups as well. The end result is a management tool for improving authoritywide administration and for reinforcing the decentralized management concept.

Presently, because of inadequate financial feedback, there are limited incentives for either project-level staff or KCDC's 12,000 residents to be cost conscious, according to a KCDC spokesman. While the consolidated method of planning and tracking required by HUD is a valuable tool in determining overall performance, it does not measure the financial impact of project-level maintenance, management, and resident support; nor are overhead income and expenses adequately shared, he said.

The sophisticated system needed to accomplish the various elements of PBB and the demands of modern public management in general led to the acquisition of an in-house, interactive minicomputer system.

It was deemed to be the most acceptable solution to KCDC's administrative dilemma.

Service Bureau Drawbacks

Currently, KCDC utilizes dated financial application software run at a local service bureau. This method of operation has significant drawbacks although it was warmly welcomed when it was introduced about 10 years ago.

First, the general ledger system is consolidated according to HUD's reporting requirements; thus, the software cannot be revised without incurring substantial additional expense with only minimal return.

Second, payroll, tenant accounting and fixed assets were the only other functions that had been successfully developed and applied to KCDC's environment.

Furthermore, all systems are essentially stand-alone systems which do not interface with the general ledger system.

Most importantly, the use of the service bureau prevented the generation of information on a timely basis — an absolutely essential need for a decentralized operating environment and PBB.

Additionally, the method of operation and the systems design did not employ the latest advances in hardware or systems technology.

In choosing an affordable system with the necessary capabilities to carry KCDC through the demands of the '80s, KCDC selected Kent Watkins and Associates, a Washington, D.C.-based management consulting firm. Currently, 19 housing authorities with varying geographic locations, sizes and needs have been introduced to its turnkey minicomputer-based public housing system.

The hardware selected and currently in use consists of a Mini Computer Systems, Inc. (MCS) Micos 200 with extended memory (128 K bytes), a decimal arithmetic board for enhanced throughput, dual 80 M-byte disk drives, a 600 line/min. printer, and seven CRT terminals.

Within the next few months, KCDC will discontinue use of the service bureau in favor of the in-house PBB general ledger system, the spokesman said.

Besides this system, other applications include tenant accounting and reporting, Section 8 accounting and reporting, Section 23 accounting and reporting, homeownership accounting and reporting, resident application and selection and warehouse inventory, among others.

All subsystems interface with each other and employ an integrated data base and are programmed in Micos' Extensive Basic. Most of the subsystems are operational or in their final parallel testing mode. The conversion and start-up process has gone well since it was initiated last March and KCDC is several months ahead of its schedule, according to the spokesman.

The provision of timely, accurate financial data is a vital element in KCDC's overall management strategy, according to Richard T. Dulaney, KCDC's finance and administration director. "With our new in-house system, we finally have the ability to budget, control, and report detailed accounting and cost center allocations on a project-by-project basis without sacrificing the essential agencywide consolidated reporting system," he said.

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Savings of $1,000/mo

System Gets Auto Parts in Gear

ANAHEIM, Calif. – Computerizing management and sales order processing functions is saving American Brake Supply (ABS) almost $1,000 a month, half a person in the warehouse, valuable management time and untold dollars from accurate pricing.

However, more benefits of computerization are still to be realized, according to Steve Jones, general manager of this 15-year-old, million-dollar-a-year business here.

> *'The company can tune its parts supply to items that are popular and move well, rather than rely on impressions or annual inventories.'*

In April Jones installed a Pertec Computer Corp. PCC 2000 small business system running applications programs designed specifically for the auto parts market.

Gene Watkins, owner of Pacific Microsystems of Laguna Hills, Calif., one of 100 authorized small computer dealers for Pertec, developed the modular software for parts distribution firms.

Watkins, who calls the system Parts Inventory Management System (Pims), is customizing each module prior to releasing it to ABS. Currently, he said, the auto parts distributor is running the inventory management and sales order processing modules with a high degree of success.

"Our 30,000-item inventory of brake components, shock absorbers and front-end chassis parts is totally on the PCC 2000, our first computer," Jones said. "Once Pims was up and running, following the month it took to list all current inventory; we noticed an immediate improvement in customer service."

Jones feels that the better information now available through computerization nets ABS about $1,000 a month, "an amount equal to a new account." This better level of information relates to a reduction in lost sales because the company can tune its parts supply to items that are popular and move well, rather than rely on impressions or annual inventories.

Additionally, Jones said pricing errors, which he estimated cost untold sums of money, have been almost eliminated and shipments with the correct quantity increased.

Half Person Saved

"Price/quantity checks take place immediately for back office personnel when phone orders are taken and for the counter staff who deal with walk-in customers," he said. "The half person we've saved is me because I spent part of my day tracking down quantities and/or prices rather than running the business.

"As a consequence, our operations are now a lot smoother and I have more time for customer service and new business development."

Jones receives inventory and stock order reports on demand as well as sales and pricing information by item. Financial reports of sales and returns, cash and charge accounts — including average costs and gross profits — are prepared daily, monthly and annually.

Pims also assists ABS by totaling and printing the invoice along with any discount each customer is entitled to, according to Watkins. After Jones or another member of his staff has checked price and quantity, the inquiry can be converted to a sale without reentry of data.

Pims was designed to allow high speed data entry of up to 500 part numbers at a time, a feature that Jones used when the system was installed earlier this year. Presetting of common part number prefixes avoided repetitive entry requirements and allowed backing up to previous entries.

"Ease-of-use features such as the inventory prefix and an extensive selection of menus and prompts let us add 4,000 part numbers and almost 30,000 parts to the system in a month," he said. "It took less than eight hours to learn how to use the PCC 2000 using instruction manuals and the guides within Watkins' software."

Through passwords, Jones' staff can use the Sysgen module to update customer names, passwords, sales tax rates, taxes on labor, sales taxes on parts, markups to list prices and definition of names for ten cash-paid-out categories.

System Expansion

Eventually, as ABS' inventory and customer lists grow, more flexible disk drives can be added which would double the data capacity of the PCC 2000; or, through a series of hard disk enhancements, mass storage can be increased to 80M bytes.

The priority list of Pims module additions beyond inventory management and sales order processing includes brake cores processing, accounts receivable and payable and general ledger. All are integrated with each other under the system's software.

Pims operates under Pertec's Multi-Terminal Operating System (MTX) which, in addition to the 80M bytes of hard disk, can also operate up to four separate I/O terminals.

"We selected the PCC 2000 and Pims because of their ease of installation and use, the modular approach to software and, most importantly, the availability of hardware and software support," Jones stated. "If we had selected a competing system of similar capabilities, we would have had to knock out a wall and set up a special room full of elaborate air conditioning equipment to keep the computer cool."

The PCC 2000 consists of the CPU, CRT screen, detachable keyboard and dual flexible disk drives in one unit. A separate station printer stands alongside the desktop system.

According to Watkins, Pims can be applied to almost any inventory and sales order processing situation involving automotive parts, electrical distributors, electronics suppliers, tire centers and hardware stores.

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DBMS Lets Bank Save Money and Cut Waste

LOS ANGELES — United California Bank (UCB) here is doing one of the things banks do best — saving money. The firm says it will save an estimated $3 million over the next five years thanks to a recently installed integrated data base management system (DBMS) in its Work Measurement Department.

The department has 11 people and is responsible for developing and maintaining staffing and costing standards for UCB and its 308 California branches. Every operation performed by 5,000 of the more than 12,000 bank employees is scrutinized here to help reduce time and money spent on unnecessary and repetitive work.

The average job or standard performed by an employee involves as many as 10 tasks and each task requires between 10 and 15 elements or motions. Thus, hundreds of individual motions — everything from picking up a pencil to rolling a piece of paper into typewriter — may be involved in a single job.

By measuring such tasks in minute detail, the UCB Work Measurement Department has reportedly saved the bank countless dollars in operating waste within the past seven years, bank officials said.

Manual System Inefficient

Three years ago, UCB had about 400 standards broken down into time measurement units of .036 seconds each. The standards were constantly under review, manually updated and filed in large cabinets.

However, as the UCB Work Measurement Department began to develop new areas for measurement, it realized it could easily develop well more than 2,000 standards, or more specifically, become responsible for studying more than 20,000 tasks. Keeping manual records on this amount of information now became impossible.

"If someone wanted to know how much time was spent in our branches for microfilming items, we had to go through thousands of task files manually to determine which ones were included in the microfilming work and compute the totals of each task," Carl Jensen, manager of Work Measurement Support for UCB, explained.

"It got to the point where the manual work for producing reports was making our response time so slow that the reports were often worthless by the time they were completed. Other reports required so much work to produce they were impossible to do. Even those reports which were finished in time to be useful were subject to massive human error.

"We knew we needed something other than a manual system, and we thought computerization would help. More specifically, we thought a data base system could be the answer to their problems. I was hired to find the solution."

Feasibility Study

Jensen's first job was to perform a feasibility study to determine whether a data base could help UCB with its time measurement program and, if so, whether a commercial system was available to put the manual system on the computer.

"First, I contacted several of the largest banks, insurance companies, financial institutions and even work measurement associations to see if any of them had a program similar to what we were looking for," Jensen said.

"We wanted to avoid reinventing the wheel if we could. But we couldn't find a system to interrelate tasks and elements within standards. The closest thing I could equate to our needs was a bill-of-materials system used by manufacturers to keep track of the many parts and steps in manufacturing an item. But we also needed a system which could perform modeling to help us plan for change and produce ad hoc reports," he said.

"Our next step was to write a description of our current work measurement system and list our criteria for computerizing the work. We sent this information to some 20 DBMS vendors with systems which could run on our dual IBM 370/168s. We asked for bids and received five responses."

Asked what criteria were important, Jensen said, "User language facilities became a major criteria because none of the people in our department have any DP training. Ease of use was absolutely critical to the success of computerizing the department.

"The system also had to be extremely flexible to accommodate the constantly changing environment in a bank. And no matter how good the front-end data base system we bought would be, we knew we'd need a lot of initial support. As far as we could tell, no one had ever tried this kind of application before so the data base vendor had to be willing to create a brand new system," Jenson added. NCB decided to buy Infodata Systems', Inc. Inquire. "The other vendors were not willing to commit enough time to help us get our system up and running properly and were not able to give us concrete costs either. Infodata came in with a maximum figure for implementing the system and gave us an extremely accurate estimate of how much time would be needed to complete the job," Jensen said.

"We estimated that with the initial purchase price of less than $85,000, we could reduce standard development time in our department by 25% because analysts would not be doing manual calculations," Jenson noted.

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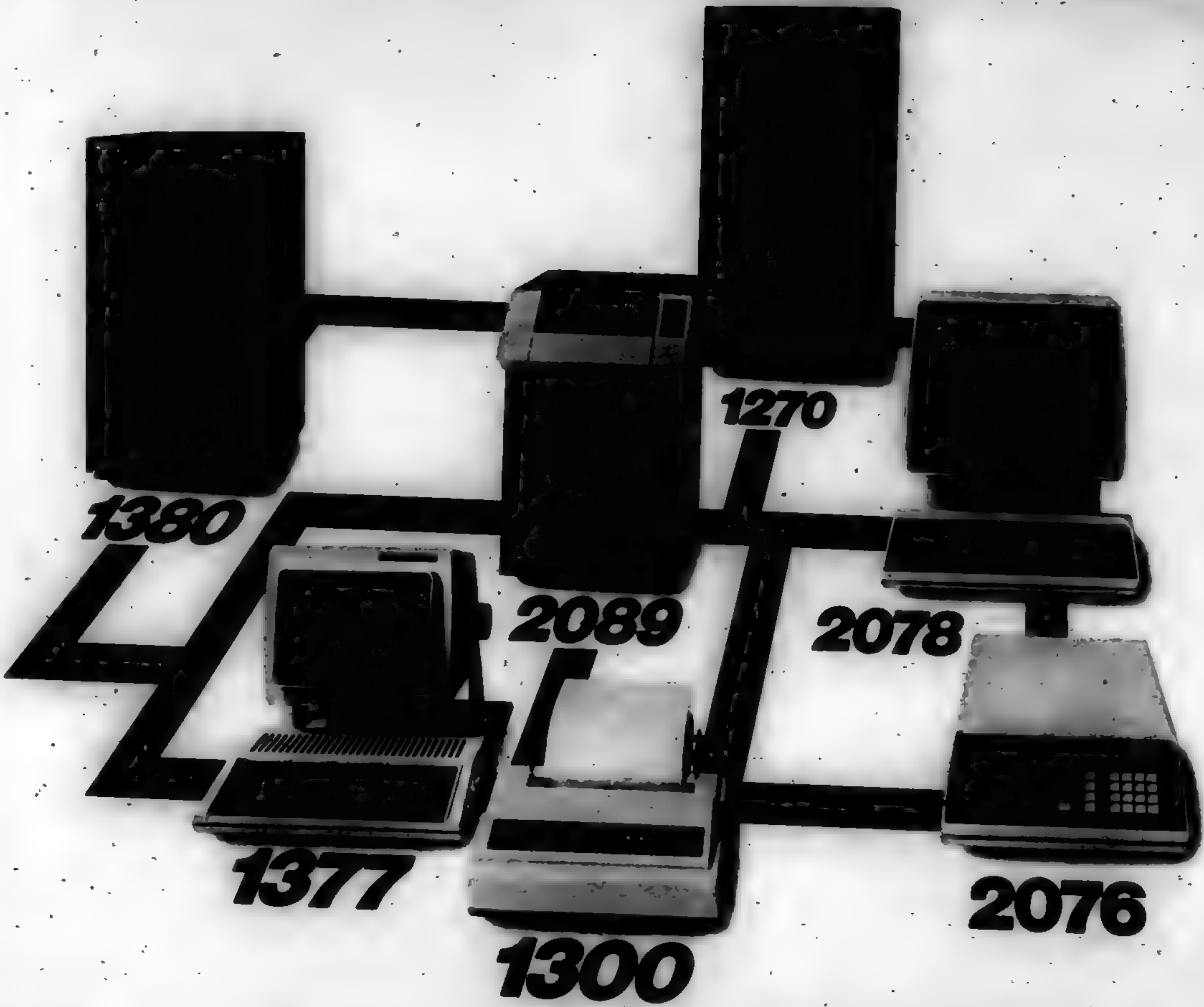

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Picks Dual-Mini System

R.I. DOT Moves From Batch to On-Line

By Tim Scannell
CW Staff

PROVIDENCE, R.I. — Rhode Island's Department of Transportation (DOT) moved last week from a card-based batch-oriented computer system to an on-line dual minicomputer-based system to keep track of the state's 650,000 active motorists.

The Data General Corp. Eclipse dual M/600 system is not only geared to cut down on vehicle registration delays — which previously consisted of waits of from six to 12 business days — but also eliminates 37 different forms that motorists had to deal with under the old system, according to Frank Perry, chief of data operations at the department's computer headquarters.

Basically, the double-minicomputer system allows Rhode Island registry officials to adopt a staggered registration procedure whereby 10% of the state's drivers register their cars each month, Perry said.

Under the old system — which was operated on the state's administrative IBM mainframe — all vehicle registrations expired March 31, causing an annual rush to process automobile forms.

System Makeup

Located in a specially constructed room at the Transportation Department, the registration system consists of two Eclipse M/600 minicomputers, each with 1M-byte of main memory, 37 Dasher CRT terminals and 13 TP2 printers.

The computers are operated by the department's 11 DP employees, who process in excess of 2,000 transaction/day, and handle close to two million active vehicle records. The system also maintains a three-year history file of both active and inactive registration records, Perry explained.

The DG system also gives the department an expanded capability to handle name variations and can accommodate a 256-char. vehicle registration record. Previously, the department could only input and manipulate files that were 164 char. in length, Perry pointed out.

It took about eight days to convert six 2,400-ft magnetic tapes of IBM-oriented data to the DG minicomputer format, Perry added.

The IBM system, which is currently used by the state for payroll, municipal expenditures and other administrative duties, consists of a 3031, 4341 and 370/168 mainframes.

The Transportation Department will continue to use the IBM system via a remote job entry batch terminal to perform "a substantial amount" of engineering and in-house administrative work.

Only the First Step

Vehicle registrations are only the first step in the department's plans for the DG computers, Perry noted. By the end of the year, the department hopes to have the system linked to other registry offices throughout the state as well as to various police networks.

At the moment, if another branch or the police want registry information they have to request it through a terminal which

(Continued on Page 62)

And 20M-Byte Disk Drive

V77 Gains Double-Speed Tape Drive

BLUE BELL, Pa. — A double-density magnetic tape drive said to have approximately twice the speed of units currently available for the Univac V77 minicomputer family, as well as a 20M-byte cartridge disk drive for that machine, has been introduced by that vendor's Minicomputer Operations.

The Model 0876 is a 9-track device rated at 125 in./sec. It features operator-selectable recording density, according to a spokesman.

At a density of 800 bit/in., the transfer rate is 100K byte/sec; at 1,600 bit/in., the transfer rate is 200K byte/sec, he added.

The Model 0876 is packaged in a low, free-standing cabinet. The controller for the Model 0876, which is mounted with the CPU, will accommodate up to four magnetic tape drives.

The Model F3339 cartridge disk drive features 15M bytes of fixed disk storage and an additional 5M bytes of removable storage. The cartridge drive is said to increase current on-line storage on V77 systems by 100%.

The Model F3339 includes a 312.5M. byte/sec transfer rate and an average access time of 40 msec. Up to four drives, packaged in a rack mount, can be accommodated by a single controller, the vendor said.

Available in the third quarter of 1980, the dual-density magnetic tape drive with controller is priced at $28,215. The cartridge disk drive costs $18,000. Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

Bank System Tied to IBM, Burroughs

DAYTON, Ohio — NCR Corp. has introduced a microprocessor-based management system for financial institutions that can communicate with IBM and Burroughs Corp. computers, as well as NCR Century and 8000 series systems.

The Financial Terminal Management System comprises operating software, application programs and hardware including the NCR 3250 series microcomputer system.

The system provides communications with IBM computers using bisynchronous 3270 protocols and with Burroughs and NCR computers using asynchronous ISO protocols.

With both on-line and off-line capabilities, the system can reportedly support a combination of up to 16 NCR 2261 terminals or printers. Step-by-step instructions guide the teller through each transaction.

The one-time license fee for the Financial Terminal Management System software, which includes operating software and applications, is $700 to $950 per controller, depending on features.

The purchase price for a basic hardware system, including 128K microcomputer system, cassette unit and communications adapters, with four NCR 2261 terminals, is $22,945. Monthly rental under a one-year agreement costs $1,023.

PDP-11 Memory Boosted

WALTHAM, Mass. — A semiconductor main memory expansion for Digital Equipment Corp. PDP-11 users has been introduced by Cambex Corp.

Configured as a hard disk, Expandastor-11 is said to combine the access time and data transfer rate of main memory with the capacity of disk storage.

Access time for the Expandastor-11 is 350 nsec. compared with 70 msec for the RK05 and 8.3 microsec for the RS04 fixed-head disk. The transfer rate is 231 microsec per 256-word sector, or more than 2M byte/sec, according to the firm.

Prices for 1M byte range from $9,512 to $14,750 for add-on and from $8,577 to $11,720 for add-in configurations.

Cambex is located at 360 Second Ave., Waltham, Mass. 02154.

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Add-In for 7/32, 8/32 Offers Four Times PE's Memory

LOS ANGELES — An add-in memory board for Perkin-Elmer Corp. (PE) 7/32 and 8/32 processors that reportedly offers nearly four times as much memory as host-supplied core memory modules has been unveiled by California Minicomputer Systems, Inc. (CMS).

The CMS module offers 256K bytes of random-access memory as opposed to PE's memory boards of only 65K bytes each. In effect, the memory addition allows the 7/32 user — previously limited to a total of 512K bytes of memory — to expand memory capacities. In addition, the 8/32 user can add 256K bytes of memory in a single board at a 25% lower cost than four host-supplied 65K-byte modules, a CMS spokesman said.

The CMS boards are completely hardware- and software-compatible with PE's 7/32 and 8/32 minicomputers and can be intermingled with PE memory boards. Memory timing is compatible with standard 65K-byte 750 nsec core memory, the spokesman claimed.

Finally, the CMS additions provide local MOS memory operation and will reportedly slave all MOS memories during refresh periods.

The memory add-in costs about $12,000 per 256K-byte board depending on the user's configuration from the firm at 5534 Westlawn Ave., Los Angeles, Calif. 90066.

R.I. DOT Moves to Mini

(Continued from Page 61)

is not connected to the machines.

One of the Transportation Department's workers then rekeys the information into an on-line terminal there and relays the data back through the stand-alone terminal to the requesting party, Perry stated.

A second phase of the program, due early next year, will put driving license records into the dual-computer system, followed by the addition of driving violation records. Future expansion plans also include linking a third Eclipse minicomputer to the double-barreled system.

Rhode Island officials decided to move from a batch-type vehicle registration system and set up a dedicated computer because the previous card-oriented method was "showing its age," Perry observed. The IBM system lacked the flexibility needed by the motor vehicle department.

The department did, however, consider adding to the existing IBM hardware to handle Rhode Island's vehicle traffic — which increases at a rate of about 9% to 10% per year — but decided against it, Perry continued.

"After we studied it and looked at the impact it would have on [the IBM system] it was determined that the interests of the state would best be served by having a separate piece of hardware," he added.

The Transportation Department considered a variety of vendors in its acquisitions search, the DP chief noted, virtually calling "everybody in the Yellow Pages."

The department received proposals from six vendors: IBM, Computer Automation, Inc., Wang Laboratories, Inc., Control Data Corp., Univac and DG. The Westboro, Mass.-based DG was eventually selected, based on the advice of a local consulting firm.

Unfortunately, the department's request-for-proposal was issued prior to IBM's announcement of its 4300 series computer which may have added to IBM's favor if that machine was considered during the selection process, Perry claimed.

Hard Disk Drives Offered for LSI-11s

OAKLAND, Calif. — Peritek Corp. has announced a line of Winchester-type disk drives that offer 21M to 280M bytes of formatted storage to users of Digital Equipment Corp. LSI-11/2 and LSI-11/23 microprocessors.

The interface and electronics were designed to allow users to purchase storage units that suit immediate requirements while still retaining the ability to add on memory in 35M- or 70M-byte increments.

The units cost between $6,550 and $9,350, Peritek said from 3014 Lakeshore Ave., Oakland, Calif. 94610.

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Bundled HP Desktop Units Offer Savings Up to 23%

PALO ALTO, Calif — Hewlett-Packard Co. is offering two desktop computers in "bundled" configurations at prices as much as 23% below the total list price of the individual elements.

At the same time, read-write memory prices for the same computers have been cut by as much as 44%.

Stemming from company savings in the areas of sales, administration and inventory resulting from its bundling of some of the "most-requested combinations of options," the price reductions are associated with Series 9800 System 45 and System 35 configurations.

Performance Option 190 gives the monochromatic 9800 System 45B 449K bytes of user-available read/-write memory, a second cartridge tape drive, an internal printer and capabilities in graphics, data base management-I/O control, mass storage, advanced programming and asynchronous data communications.

The 9800 System 45B Option 190 costs $33,500, a 23% reduction from the sum of the individual list prices. For the color graphics System 45C, Option 190 gives similar capabilities for a price of $49,500, an 18% reduction.

In addition, three 9800 System 35 configurations are now available for problem solving in specific application areas. Each configuration is based on the 9800 System 35A with an extra 64K bytes of read/write memory, totaling 128K bytes.

The problem-solving bundled systems are:

- I/O system (Option 110) which includes assembly language execution and development and I/O capabilities. The system costs $12,400, a $3,000 (19%) saving over separate prices.
- Data communications system (Option 120) which includes data communications, I/O, advanced programming and structured programming for a $2,950 price reduction to $13,400 (18% less).
- Statistics system (Option 130) with HP software for general statistics, numerical analysis, regression analysis, analysis of variance and nonlinear regression analysis. The system costs $12,400 — a $2,750 or 18% saving.

The System 35 can accept up to three additional 64K-byte memory boards at $2,250/board, and the System 45B can accept three additional 128K-byte boards at $4,500/board.

Additional memory for the System 45C and the "T" configuration of the System 45B costs 2.5 cent/byte, factory-installed. Up to two additional 128K-byte boards can be added to these systems for $3,200/board.

HP is headquartered at 1507 Page Mill Road, Palo Alto, Calif. 94304.

System 45B Gets Color Kit

PALO ALTO, Calif. — Users of Hewlett-Packard Co. Series 9800 System 45B desktop computers can now convert their monochromatic display computers to System 45Cs with full color graphics features.

An upgrade kit, ordered as product number 98771A, is said to enable a user to convert any System 45B to a System 45C. The kit includes a CRT with 96K bytes of graphics displays refresh memory, an interactive light pen, read-only memory containing color graphics firmware and all manuals.

The kit costs $19,500; removed parts and assemblies associated with the monochromatic display are returned to HP, 1507 Page Mill Road, Palo Alto, Calif. 94304.

System Backs Draftsmen

ANN ARBOR, Mich. — A two dimensional, computer-aided drafting system designed to increase the productivity of draftsmen when creating, editing and storing mechanical engineering drawings has been introduced by Manufacturing Data Systems, Inc. (MDSI).

Comdraw IV eliminates repetitive drawing tasks and produces standardized formats, and individual lines and text can be erased selectively, without waiting for the drawing to be displayed. Features include standard graphics symbols, automatic crosshatching, interactive prompting messages, layering in which portions of graphics and text can be isolated, automatic inch-to-metric conversion and zoom/magnification.

The stand-alone unit includes a perpetual license to use the Comdraw IV application software, a formal training class, a system warranty, a minicomputer with moving-head disk, a 500-line graphics CRT system, an alphanumeric CRT terminal and keyboard and a 12-by-12-in. resolution digitizer for graphics input. The system will be offered in multiple user configurations with added CRT terminals and systems.

The system costs "less than $60,000" and is also available with a standard drum plotter in either a 22-in. or 34-in. width for less than $70,000, MDSI said from 4251 Plymouth Road, P.O. Box 986, Ann Arbor, Mich. 48106.

Price Tags Cut On Controllers

SAN DIEGO, Calif. — Datasystems Corp. has separated the price of its line printer controllers from the price of the cable attachments, thereby cutting prices by between 4% and 6%.

For example, a DLP 11 line printer controller for Digital Equipment Corp. equipment formerly cost $750 including a 15-ft cable, but it now costs $625. The customer can choose between a 15-ft cable for $100 or a 25-ft cable for $125.

Similarly, the DLP 2200 data channel line printer controller for Data General Corp. equipment used to cost $1,500 and now costs $1,300 without a cable. Datasystems is at 8716 Production Ave., San Diego, Calif. 92121.

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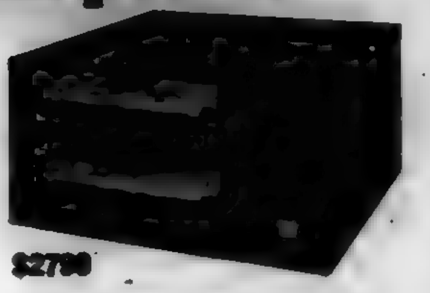

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Datapoint Expands 1500, 1800 With Cartridge Disk Drives

SAN ANTONIO, Texas — Datapoint Corp. is offering expanded 1500 and 1800 small business systems with the addition of models 9310 and 9320 cartridge disk drives.

The Model 9310/9320 removable cartridge disk drives provide up to 40 times more storage than previously available on the 1500 and up to 10 times more on the 1800, the vendor claimed.

In addition, the 9310/9320 increases the I/O speed of the 1500 and 1800 while the products extended storage capabilities allow increased file and program storage — important for the support of both word processing and electronic mail, a spokesman said.

The 9310 drive consists of a disk drive and controller. The 9320 includes a disk drive, controller and four-terminal serial interface. The integral serial interface permits either the 1500 or 1800 to be used as the central processor in a multiuser Datashare system.

The 9310 is available at a purchase price of $10,000 and a three-year lease price of $275/mo.

The 9320 costs $10,500 for purchase and $290/mo for lease over three years.

There are monthly maintenance fees of $80 and $88 for the two systems, respectively, the vendor said from 9725 Datapoint Drive, San Antonio, Texas 78284.

TDX 75 In./Sec Tape System Geared to End Users, OEMs

HALESITE, N.Y. — A 75 in./sec tape system suitable for end users and OEMs is available from TDX Peripherals, Inc.

Obtainable densities with the system include 800 bit/sec NRZ, 1,600 bit/sec PE and NRZ/PE dual density. Minicomputer interfaces are available to the Data General Corp. Nova and Eclipse and Digital Equipment Corp. PDP-11 minicomputers and DEC LSI-11 microcomputers, the vendor claimed.

In addition, RS-232, IEEE-488 and dual buffered I/O interfaces are available within the TDX enclosure. The PDP-11 interface requires only one quad peripheral controller, while the LSI-11 interface requires two dual slots and therefore fits LSI-11/2 systems, a spokesman said.

The DG interface is contained on one standard 15 in. by 15-in. board requiring one slot on its computer chassis.

The single unit price for a TDX, 75 in./sec tape system with any of the above interfaces is $6,985 for 800 bit/sec NRZ, $7,485 for 1,600 bit/sec PE and $7,865 for dual density, the vendor said from 150 New York Ave., Halesite, N.Y. 11743.

Floppy Doubles RX02 Storage

HARTFORD, WIS. — A floppy disk system said to have twice the capacity of the Digital Equipment Corp. RX02 floppy disk configurations is being offered by General Robotics Corp.

The RX03 floppy disk system records data on both sides of each diskette in double-density format yielding storage capacity of 1M byte/drive.

The RX03 is a superset of the DEC RX02 and is capable of reading and writing RX02 or RX01 formatted floppy diskettes, the vendor said.

The RX03 comes in the vendor's Gemini floppy disk package and includes an LSI-11/2 MPU, 64K bytes of random-access memory, DLV11 serial RS-232 port, hardware bootstrap, two RX03 floppy disk drives and controller for $9,500. The firm is also offering the RX03 in its Tristar package which costs $11,000 from General Robotics at 57 N. Main St., Hartford, Wis. 53027.

Timer Circuit Boosts MPUs

COLUMBIA, Md. — Two series of microcomputers that utilize a counter timer circuit containing four separate timer devices for flexibility are available from Columbia Data Products, Inc.

The Commander 500 and 900 series include dual Z80 MPUs with up to 80K random-access memory (RAM) and 320K disk storage, CRT display, full keyboard, four RS-232 ports and parallel bus.

The basic 532 system with 32K RAM, 14K programmable read-only memory (Prom), 5-in. CRT, four RS-232 ports and 160K-bit disk costs $3,995. The 932 basic unit with 32K RAM, 4K Prom, 9-in. CRT, four RS-232 ports and 160K-bit disk also costs $3,995 from 9050 Red Branch Road, Columbia, Md. 21045.

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Suit Filed to Halt NCR Bid for Adds

WILMINGTON, Del. – A shareholder of Applied Digital Data Systems, Inc. (Adds) has filed a class action suit in court here to enjoin NCR Corp.'s tender offer for the outstanding common and preferred shares of Adds.

Moreover, the attorney general of the state of New York has ordered an investigation to determine whether the tender offer complies with the state's Security Takeover Disclosure Act.

The suit charges that the tender offer of $12 per share for common stock and $27 per share for preferred stock is inadequate. Furthermore the complaint alleges that certain members of Adds management entered into an agreement with NCR for the tender offer for their own personal benefits. These benefits include the preservation of their positions with Adds and the securing of stock options previously not approved by Adds shareholders according to the suit.

The suit was filed by Martin Lensman against NCR; its subsidiary, NCR Development Corp., which is making the tender offer; Adds; and eight individual directors of Adds.

At press time, NCR was studying the suit and preparing an answer, a spokes-

(Continued on Page 66)

IBM 4341 Group 2 Stirs Few Rivals

IBM's recent announcement of the 4341 Group 2 processor [CW, Sept. 22] caused little stir among plug-compatible manufacturers.

Pointing to the expansion of its AS/5000 family, National Advanced Systems (NAS) said the 4341 Group 2 is exactly what the company expected. Although NAS beat IBM to the punch on the introduction date by about three weeks, an NAS spokesman said his firm would not have to make any changes to its latest offering.

A spokesman for Magnuson Computer Systems, Inc. said that firm will be responding to IBM's announcement within "the next week or so."

Among other features, the IBM 4341 Group 2 reportedly offers throughput 60% faster than that of the Group 1 4341 and has up to 8M bytes of main memory.

European PCM Market: Wide Open, Competitive

By Marcia Blumenthal

CW Staff

Nixdorf Computer AG's recent introduction of an IBM-compatible system for the European market [CW, Sept. 22] may muddy the waters for IBM and U.S. plug-compatible manufacturers (PCM) in Europe, but opportunities for PCMs abound in Europe, according to industry observers.

Nixdorf is the fourth European company to offer IBM-compatible systems. Rather than manufacturing their own systems, European PCMs are largely importing them from Japan.

In Nixdorf's case, Elbit Computers Ltd. of Haifa, Israel, is supplying the technical know-how and components. Nixdorf, however, said it has committed 200 people and some $18 million to the plug-compatible venture. In addition, the firm, through the acquisition of the Computer Software Co. last May, has a captive supply of IBM operating software. The company said it expects to introduce the 8890 into the U.S. market during the first quarter of 1981.

On the hardware side, Elbit, founded in 1966, was owned in part by the Israel Defense Ministry. In 1979, the government share of the company was sold to Control Data Corp., and Elbit began turning its military computer-expertise toward the commercial sector.

Elbit first entered the plug-compatible business in 1976 by offering an IBM-compatible 3277-2 terminal, according to Shabtay Levy, general manager of Elbit, Inc., the Israeli company's wholly owned U.S. subsidiary.

Nixdorf is orienting its two 8890 systems specifically to the mid-range market, the IBM 4331 and 370/148 performance range for now and will be fairly successful in Germany, John Curran, director of European marketing for National Advanced Systems (NAS), remarked.

However, Curran does not think Nixdorf or any other European PCM vendor will significantly impact U.S. PCMs already doing business in Europe. He said the European installed base of NAS/Itel Corp. machines stands at 170 and Amdahl Corp. has 29 systems installed. Both these companies already have established networks of sales and service personnel.

The impact, if any, may come on newer companies, such as Magnuson Computer Systems, Inc. which recently established a European distributorship in the UK, Curran said.

Presently in Europe Siemens AG of West

(Continued on Page 66)

Insac Seeking Mini House

By Connie Winkler

CW Staff

NEW YORK – Insac, Inc., the UK-backed company that this year acquired a stateside IBM systems software house, is looking to add a minicomputer operating systems house in the next year.

"The strategy is in place," Peter Dine, president of Insac, Inc., said here recently. Insac would begin with systems software for Digital Equipment Corp. processors and then expand to other mini systems, he said. The company is looking at West Coast firms and the acquisition could come by mid-1981, Dine said at a press briefing here announcing the final touch on Insac's acquisition of Altergo Software, Inc.

Altergo, acquired in March, changed its name to Insac Software, Inc., and moved its headquarters from Boston to Atlanta, said Altergo president and founder Joseph Ganem.

Insac, Inc., a New York-based U.S. company, is backed by the British National Enterprise Board, which Dine described as "a billion dollar investment corporation." The Enterprise Board is an "arm's length venture capital" effort with the British government, Dine explained.

Insac here will not only be looking for mini systems software houses, but also specific products and may encourage the development of those products, Dine said.

Insac Software's most popular products are Shadow II, a teleprocessing monitor, and Systems/Manager, a resource management and control system, both with about 200 installations. Other products are: Quota II, Conversational Program Generator, Guts (a time-sharing, remote entry and text editing system), Improve/Mon, Improve/CICS, Improve R/T and Improve/DS.

Insac has about 50 employees and sales of about 4 million annually, Dine said.

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DDP Market Expected to Hit $37 Billion by '88

NEW YORK — The distributed data processing (DDP) market is expected to reach $37 billion over the 10-year period through 1988 for minicomputers, terminals and data communications controllers necessary to implement the DDP systems, according to a two-volume market study by Frost & Sullivan, Inc. (F&S).

The market report indicated that business minicomputers will reach $12 billion in sales from 1979 to 1988. Data entry processing terminals will garner $9.3 billion in sales over the 10-year period, alphanumeric display terminals will sell $6 billion worth of equipment and data communications minis and micros will account for some $9 billion in sales by 1988, F&S said.

The DDP market reached $2.1 billion in 1979 and will increase to $2.6 billion in 1981 and then shoot up to nearly $6 billion in 1988, the report said.

Although an attractive market, competition is also very intense, according to the market report. Five types of suppliers are jockeying for position: mainframe vendors, minicomputer makers, small business system vendors, data entry terminal suppliers and data communications terminal producers, F&S noted.

IBM will be the major supplier with a current 11% market share which will climb to 19% in 1983 and to 30% by the mid-1980s, according to the research firm.

"IBM is coming on very strong" with its Series/1 mini, F&S maintained and "will become stronger as the 4300 series is delivered." Digital Equipment Corp's. current 30% market share, on the other hand, is projected to decline to 16% by 1985, according to the report, which noted that DEC will be hit hard by IBM's onslaught.

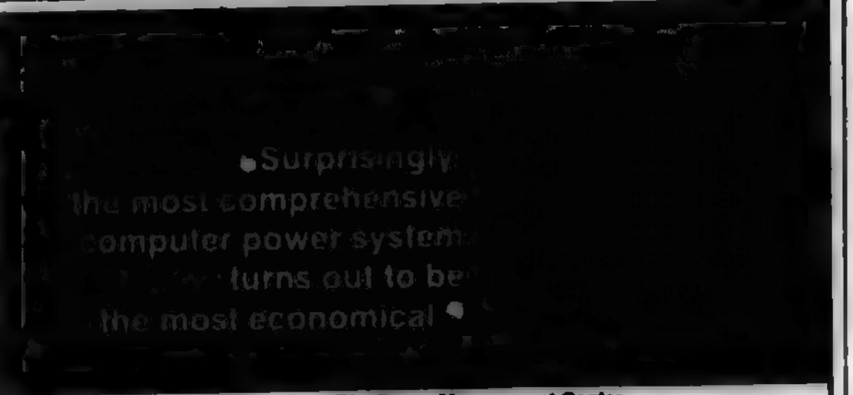
Other companies projected to make big gains include Univac, going from a 3% market share to 9% by the mid-decade; Wang Laboratories, Inc. from 1% now to 4% over the same time period and Mohawk Data Sciences Corp. from 12% to 14% in the data net entry/processing terminal segment of the marketplace, F&S said. The report added that Wang could be a "dark horse in this market," exceeding all expectations.

Users surveyed in the report indicated they intend to continue to increase their use of DDP. Some 80% of the responding users intend to employ DDP technology with lease vs. purchase in a 1.6:1 ratio, F&S reported. Users indicated they were concerned about systems software, interfacing and data communications.

Nothing less than "a complete reorganization of the DP system is required," F&S warned. Implementation directly affects the mainframe, all peripherals and data communications facilities and also requires intensive controls, training, support and service. Security is even more important, F&S stated.

F&S contended that the enormous amount of effort required is the reason why the trend toward DDP is proceeding "at a much slower pace than originally expected," but the report noted that "DDP implementation will appreciably pick up speed over the next three years."

The Distributed Processing Systems Market report costs $900 from F&S at 106 Fulton St., New York, N.Y. 10038.



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Europe Turning to PCMs

(Continued from Page 65)

Germany offers a Fujitsu Ltd. IBM-compatible system, although some observers note the machine may not be truly compatible. In recent months both Olivetti of Italy and BASF of West Germany signed agreements with Hitachi Ltd. to market that firm's high-end M200H system. It is believed these firms are also selling less powerful Hitachi mainframes. Like its European counterparts, NAS is marketing the M200H in Europe, Curran said.

Olivetti is also marketing a PCM system from IPL Systems, Inc., the maker of the Omega line for CDC.

This activity in the European PCM marketplace appears to signal a growing acceptance by European users of an IBM-compatible alternative. International Data Corp. (IDC) of Europe estimated that by the end of 1981 there will be some 725 compatible systems installed in Europe.

By the end of this year, PCMs are expected to hold a 22% share of the high end of the 370 market in Europe, IDC Europe noted. The growth in share is due to estimates that 69% of the 360 base and 67% of the European 370 users will change CPUs this year.

Unlike the U.S., IBM is far more constrained from retaliatory tactics against users considering PCM alternatives. The governing body of the Common Market strictly forbids practices such as moving up delivery dates for users considering PCMs, Curran observed.

After interviewing more than 200 users, IDC Europe concluded that 38% of IBM users with low-end 370s would consider changing vendors while 83% of users with IBM 168 systems would consider a switch.

While loyalty to a national vendor is strong in European countries, one informed source, who asked not to be identified, doubts that BASF or Olivetti will be successful with their PCM alternatives. In Italy, Olivetti, Europe's largest office equipment vendor, sold only 4 PCM machines in eight months, the observer said.

Yet the entry of PCM vendors on the European scene has given the IBM-compatible alternative credibility.

Europe is a conservative market, Curran said, noting that only 25% of a sale has to do with the actual hardware. The other 75% is emotional, involving trust between the vendor and user. "Users don't even benchmark, they believe you," he noted.

ICS Wins Software Dispute

IRVINE, Calif. — Interactive Computer Systems, Inc. (ICS) has received a favorable ruling by a U.S. District Court in New York in its complaint against Three Star Programming Systems, Inc. for misappropriation of and copying a copyrighted and trade secret business application package, CBS III.

ICS, a subsidiary of Management Assistance, Inc. (MAI), produces software for Basic Four Corp., another MAI subsidiary that joined ICS in the suit filed last April.

Although the terms of the consent judgment were not revealed, Three Star may not market or use CBS III and must return to ICS all such software and documentation and all software or documentation derived from that package.

Suit Filed to Halt NCR Bid for Adds

(Continued from Page 65)

man said.

The tender offer was made Aug. 26 and is in effect until Oct. 1. As of Sept. 15, only 188,562 of Adds 4.6 million outstanding shares of common and 3,573 shares of more than 160,000 shares of preferred stock had been tendered.

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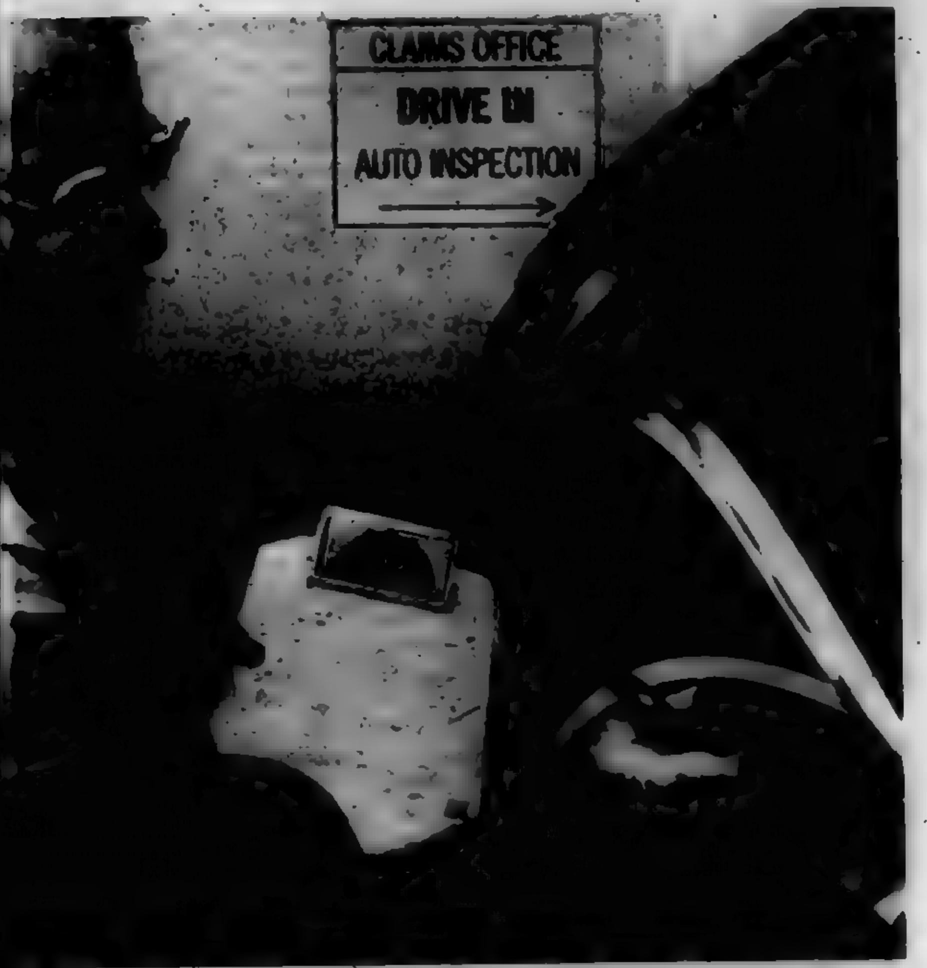
DP Dialogue

Notes and observations from IBM that may prove of interest to data processing professionals



Good Policy for Farmers Insurance: DDP With the 8100

"The simplicity of operation and maintenance of the 8100 is important to us," says Lewis J. Bohache of the Farmers Insurance Group of Companies. "Clerical employees in our regional offices have learned to operate it with only one or two days of training.

"The 8100 is easy to install—it plugs into a standard wall outlet. In fact, we were able to set up and start our system by ourselves. Since it does not require a special computer room, it is located in the policy service area."

Farmers uses the IBM 8100 Information System in a distributed data processing (DDP) network to provide better service to its property and casualty insurance customers. It has meant much quicker response and a much lower error rate.

In each of Farmers' 11 regional offices, operators enter the details of new and revised policies into an 8100. Preparing the specifics of insurance coverage for entry requires the use of a complex code, which clerks formerly consulted in a printed manual. Today, the 8100 prompts the operator through the terminal display, providing guidance in the coding of input.

"The result," Bohache notes, "has been improved productivity as well as much greater accuracy. The prompting system has enabled us to reduce the operator training period to three to four weeks, from a previous three to four months."

Stands Alone During Day

Each 8100 operates as a stand-alone processor for data entry during the day, and then batches the policy data over a WATS line to an IBM 3033 Processor at Farmers' Los Angeles headquarters at night. The next day, the 3033 transmits the formatted policy data back to the regional office, and a printer there produces the complete policy under the control of an IBM 4331 Processor.

"We're installing an online inventory control system to run on an 8100 here at headquarters, to manage supplies and equipment," Bohache adds. "This is feasible only because the 8100 is simple and 'user-friendly' for online applications. We can train people from the purchasing department to use it."

A Farmers Insurance claims inspector examines damage to a policyholder's automobile. With distributed data processing on the IBM 8100, Farmers speeds up policy changes which assist its personnel in prompt verification of coverage for claims handling.

Federal Express is 'One Large Integrated Real-Time System'

"It's easy to use our air courier service: just pick up the phone," says James Barksdale of Federal Express Corporation. Behind that simplicity is the management of two fleets—vans for door-to-door pickup and delivery, and aircraft which fly nightly round trips between Federal's 132 full-service stations and a "hub" facility in Memphis.

Barksdale, senior vice president, continues: "As a company, Federal Express is one large integrated real-time system. And our data processing reflects that; every one of our applications relates to almost every other. Weather reporting affects flight planning and operations, which affects dispatching and crew management. Flight hours logged under the engineering and maintenance system have an influence on parts inventory, and so forth. Many different computer systems must communicate with each other to keep this 24-hour operation tightly integrated."

With IBM's Information Management System/Virtual Storage (IMS/VS), all related data is under one master, Barksdale explains. "Any number of programs can access the same record," he points out. "Today's data bases are compatible with any future applications, and we can add and subtract fields of information. All data related to one customer, for example, is under one master, so that all spellings are the same and data is consistent."

The most crucial application is customer order processing, which puts more than 30,000 transactions per day through the IBM 3031 Processor in Memphis. Representatives take calls from customers across the U.S. and enter orders for service through IBM 3277 Visual Display Stations in two telephone centers. The 3031 prints out each order in the nearest station to the sender, where a dispatcher radios the driver of a van to make the pickup.

"IMS made these applications much easier to implement," Barksdale adds. "We put together these online systems—950,000 lines of code—in 20 months. Once our staff had one or two IMS systems behind them, they put new ones online very quickly. IMS/VS lets us concentrate on the applications rather than data base management and teleprocessing."

At night, sorting and loading of packages into outbound aircraft is done swiftly at Federal's "hub" in Memphis. IMS/VS helps the company's computer applications communicate with each other.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

System/34's Popularity Changes Bureau's Style

By Rita Shoor
CW Staff

MILWAUKEE – The popularity of IBM's System/34 among Harris Data Service, Inc. (HDS) clients has had a major effect on the company's services, according to Randy Cain, HDS marketing manager.

When HDS started up eight years ago, it essentially functioned as a service bureau for the majority of its customers, he recalled. "Approximately 70% of our resources went towards processing information for our clients on an HDS in-house system. The remaining 30% of our business involved contract programming, software development and DP consulting work."

Increasing numbers of HDS clients have set up their own system, however, and the split is now closer to 50-50, he estimated.

Programmer Scarcity

Cain also felt that the System/34 was drying up the available labor market in terms of experienced RPG-II applications programmers.

While some industry observers have indicated that DP trade schools tend to offer higher level languages such as Cobol or Fortran rather than RPG, the Milwaukee area is moving in another direction, according to Ken Morris, an HDS project coordinator.

In fact, one technical institute has made room in its regular curriculum for an RPG course by dropping the second semester of the assembler language course to the evening division, he said.

With the increase in customer-owned equipment, Cain has noticed a burgeoning interest in standardized software packages.

"Rather than having HDS develop a tailored system for a particular end-user, the customer will opt for one of our software packages that can be tailored to meet his requirements," he said.

Cain felt that awareness and interest in software packages has almost "doubled in the last six months. As recently as one year ago, we detected very little interest in software packages among the attendees at various shows and conferences.

"Our customers get so excited by the prospect of running their own in-house systems that one of our main concerns is to maintain file integrity," he said. This type of system makes it much easier for the user to "blow away files."

IBM Involvement

Future plans for the DP support center call for adding an IBM System/38 during the first half of 1981, Cain said. He appeared interested in the concept of the 38 as a data base machine although he stressed that he didn't "want to have IBM experimenting" with the HDS installation.

"We had the first System/34 in this area in spring of 1978," he said, "and IBM was actually calling us to find out what was happening with the system."

For one year, HDS utilized its own 128K-byte System/34 for research and development. "Now, the entire third shift is devoted to production processing." Cain described the processor as a "real workhorse."

HDS also has three System/3 Model 10s, each with 32K bytes of main memory, at the same installation, Cain said. Two Model 5445 plug-compatible disk drives and three printers from Memorex Corp. are among the peripherals hooked up to those processors.

When asked whether there were any special maintenance problems caused by tying the plug-compatible peripherals to the System/34, DP manager Herb Harris summed it up by stating that "Memorex treats us like gold" while rating the IBM service as mediocre.

He indicated that IBM's response to service calls became sluggish about a year after HDS went from a standard service agreement to "status three mode." This is a situation in which HDS pays a third party – Computer Maintenance & Leasing corp. (CMLC) – a monthly contract fee and CMLC, in turn, pays IBM its hourly rate when service is required for HDS equipment.

Basic Four, Sorbus Get Division Status

NEW YORK – Management Assistance, Inc. (MAI) is taking action to operate its wholly owned subsidiaries Basic Four Corp. and Sorbus, Inc. as divisions of MAI beginning next month.

The move was designed to reduce the company's domestic taxes and the number of financial reports required, the firm said.

The redesignated operating entities will be named Basic Four Information Systems Division and Sorbus Service Division of MAI.

The existing management structures will continue.

one for the files.

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Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

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CW at Wescon/80

Faster Intel 8086, Zilog Z-Lab Lead Debuts

By Molly Upton
Special to CW

ANAHEIM, Calif. — Microprocessor-related products unveiled at Wescon/80 included a faster 8086 and a math coprocessor from Intel Corp.; Zilog, Inc.'s Z-Lab, which links development systems via its Z-Net local architecture; and other assorted hardware and software features from most of the major microprocessor vendors.

Intel's 8086-1, a 10 MHz version of the 8086, is said to be 15% to 20% faster than competitive 16-bit devices, and Intel is calling it the fastest 16-bit microcomputer now available.

The 8086-1 features an execution time 100% faster than the original 8086, a spokesman said. Available in sample quantities now, 8086-1 production quantities are scheduled for fourth quarter 1980.

Intel is also working on an as-yet unannounced member of the 8086 family, a memory management unit on the CPU that will be five times as fast as the original 8086, a spokesman hinted.

In addition, another device will reportedly incorporate more of the surrounding components on the same chip. These developments will be announced in 1981.

Available now is the 86/20, a two-chip set with the 8086 and the 8087 math coprocessor. The 86/20 performs 32-bit floating-point multiplies in 19 microsec — said to be 10 to 100 times faster than previous microcomputers using software or partial hardware floating-point support.

Prices in lots of 100 are $465 for the 86/20 and $410 for the 88/20.

New Names

Intel is renaming its products. The 8086 falls in the category of IAPX advanced processors and the IAPX 86/10 is the 8086, while the 86/11 is the same CPU with additional I/O processing; the CPU with numeric coprocessor is the 86/20, while the unit with both the extra I/O and numeric coprocessor is called the IAPX 86/21.

Intel also unveiled what it calls the fastest 64K-bit erasable programmable read-only memory with a worst-case access of 250 nsec.

The device, called the 2764, costs $163 in lots of 100. Volume shipments will begin in the first quarter, 1981.

Zilog Announcements

Zilog also had a raft of announcements, including a description of one of the first systemwide applications for its Z-Net.

The Z-Lab was designed for users developing products based on the Z8, Z80 and Z8000 and is implemented on three products: Zilog's Z80A-based Z-lab 80 program development station; the Shared Data Station 2/01 and the Network Station Transceiver.

Zilog said it plans to add the 16-bit Z8000-based program development station.

Zilog's Z-Net uses a single-channel, packed-switched, local computer network with fully distributed control.

The Z-Lab 80 program development station, priced at $13,750, is scheduled for delivery by January 1981, with networking capability available by May 1981.

In attempts to enable Z800 programs written in any language to call Z8000 programs written in any other language, Zilog has established standard calling conventions that specify parameter-passing and register usage practices.

Other Zilog announcements include the Z F10 buffer circuit that synchronizes devices that operate independently or at different data rates, Zilog said.

It was designed to operate both with Z-Bus-compatible CPUs and non-Z-Bus-compatible CPUs, the company said.

The Z-F10's buffer is said to improve I/O overhead by up to two orders of magnitude. It costs $39 in lots of 100 with samples available in November.

Zilog added some 6 MHz versions of new peripherals to its Z80B; previous units are 2.5 MHz and 4 MHz.

S2200 Micros

American Microsystems, Inc. showed its S2200 family of single-chip microcomputers and its Phoenix-1 development station, which sells for $5,495 and includes CRT, keyboard, 48K random-access memory, three small floppies, two RS-232C ports and software.

Mostek Corp. unveiled a number of add-on, add-in memory cards for Data General Corp. and Digital Equipment Corp. systems. The Eclipse model, compatible with all Eclipses except the S-140, has 128K by 21 and costs $5,810. The PDP-11 add-in cards with 128K by 18 and less than 100 nsec write access time, sells for $3,150.

Mostek also announced an add-in memory card for DG's Nova 4 with a capacity of 128K words and word length of 16 or 21 bits. Write access time is 200 nsec. The MK 8018 card is priced at $5,700.

The Mostek 37000 is a 64K read-only memory with a 250 nsec access time that costs $25.65 in lots of 1000.

Upton is editor of EDP/Industry Report, *an International Data Corp. publication.*

RCA Shows Peripherals For Micros

By Molly Upton
Special to CW

ANAHEIM, CALIF. — RCA, which exited the mainframe business several Septembers ago, showed several products designed for use with its microprocessor development system that can also be used as peripherals to other systems.

A dot matrix printer CDP 18S050, costing $2,995, can be used with any system having a Centronics Data Computer Corp.-type parallel interface, the company said.

Speeds range from 200 line/-min with 72 char./line to 300 line/min with 40 char./line. The character font is a 7 by 7 dot matrix, and the head is said to have a life of one year of normal operation.

Cosmac Terminal

Another product from RCA's Solid-State Division is the Cosmac CRT terminal, CDP18S040, a general-purpose intelligent terminal that can also be used with RCA's Cosmac microprocessor systems.

The 24-line by 80-char. display includes 14 full-screen edit function keys such as cursor positioning, character or line insertion/depletion, scrolling and windowing. The terminal costs $1,195.

RCA expanded its family of microboard computers with the CDP18S604, which cost $129 in quantities of 100 or $199 in small quantities. The single board includes a CDP1802 Cmos microprocessor, a clock, 512 bytes read-write memory, parallel I/O ports, room for interface and sockets for user-selected read-only memory.

With the terminal and printer, RCA featured a Cosmac Development System IV that costs $12,000 for microprocessor systems designed around the RCA CDP1802 and 1804/5 devices.

Contracts

The Rath Packing Co. and Creative Data Services have ordered the 90/40 system from Univac, and Century Manufacturing Co., Retails Systems, and The Banca Popolare di Bari (Italy) have all ordered Univac's 90/30 systems.

Japan Steel Works of Tokyo has ordered a Univac large-scale computer system, the 1100/60 processor.

Integral Business Computing (IBC) has received the International Computer Programs $1 Million Award for sales over $1 million, of IBC's Travel On-Line Universal Reservation System, Tours.

Evans Products Co. ordered $1.3 million worth of computer-based retail data processing systems from International Computers Ltd.

Lambda Biosystems, Inc. will install a multiuser computer system in the laboratory of St. Joseph Mercy Hospital in Mason City, Iowa.

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CW at Wescon/80

In Power, Versatility

Mainframes Challenged by 16-Bit Micro Makers

By Molly Upton

Special to CW

ANAHEIM, Calif. — Microprocessor makers have set their sights on rivaling mainframes' power and versatility, according to speakers at the Wescon/80 session on "Benefits of Advanced Concepts of 16-Bit Microprocessors."

A corollary to the increased capabilities being offered by the new 16-bit processors and their families of associated devices is that buyers are being compelled to select one vendor: The days of mixing and matching components may be over, speakers said.

Some microprocessor manufacturers seem to have looked at the limitations of some minicomputer architectures and directed their efforts toward architectures that would support capabilities associated with mainframes or at least superminis.

In addition to supporting high-level languages efficiently and boasting an improvement in throughput, the 16-bit micros offer operating system support through instruction extension via auxiliary processors, virtual memory, protection of memory space and multiprocessing, according to Subhash Bal, product marketing manager at National Semiconductor Corp.

Auxiliary Chips

One means of increasing the processing power available is the addition of other intelligent chips that are either coprocessors or intelligence dedicated to specific tasks such as peripheral controllers.

"The concept of auxiliary chips [variously called slave, coprocessor, extended processor] attached to main processors allows a graceful extension of the instruction set," Bal stated.

There is some various semantic confusion surrounding various types of coprocessors. Heather Bryce, microcomputer engineer at Motorola, Inc., distinguished between the master-slave system in which one master processor controls the system, and symmetric or anonymous processors in which identical processors share common memory and I/O and are treated the same.

Master-slave devices are most appropriate for applications in which each slave has special purpose requirements, Bryce remarked.

In the symmetric or anonymous processor scheme, the executive "floats" from one processor to another and tasks can be allocated to processors on an "as available" basis. However, software to protect common system resources, allocate tasks, and float the supervisor can be quite complicated. The MC68000 can support this organization, but Bryce did not give any examples.

Another method of organization is to let each microprocessor have its own supervisor routines in local memory, Bryce added. However, semantic confusion arises when one considers the intelligent support circuits, such as those controlling peripherals. These can "share the instruction stream and can take control of the host CPU's local bus, are actually extensions of the CPU's architecture and instruction set and are functionally like a coexisting processor to the host CPU," Dave Bursky of *Electronic Design Magazine* explained. This type of circuit has been called the coprocessor by Intel Corp., the extended processing unit by Zilog, Inc. and the slave processor by National Semiconductor Corp., he said.

Virtual Memory

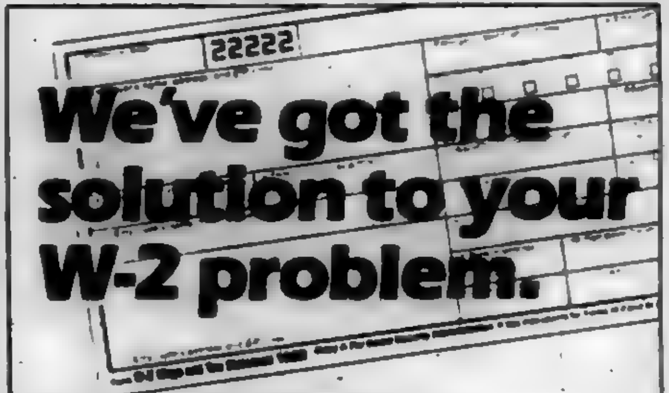
Some 16-bit CPUs have virtual and some do not, but those that do not, such as Motorola's MC68000, have support circuits designed for virtual.

Intel's 8086 offers physical addressibility of 16M bytes with virtual addressibility of 1G byte per application, according to Richard Markowitz of Intel. The Intel 8086 has a 20-bit physical address.

The Advanced Micro Devices, Inc.'s (AMD) AMZ8000 has a 24-bit physical address and can access up to 8M bytes of logical memory residing in 16M bytes of physical memory, according to Steven Dines and Krishna Rallapalli of AMD.

The new breed of 16-bit CPUs offer various forms of memory protection or separation of operating system from user programs.

Upton is editor of "EDP Industry Report," an International Data Corp. publication.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Panelists Find Bubble Memories Suitable for Harsh Environments

By Molly Upton

Special to CW

ANAHEIM, Calif. — Despite their currently high price tags compared with other types of memory, bubble memories have found a home, according to panelists at a Wescon/80 session on "Bubble Memory Applications in Harsh Environments."

Bubbles are appropriate for use in harsh environments, such as factory numerical control applications where dust and moisture can be fatal to other types of memory such as cartridge and disks, panelists indicated.

Philip Spiegel, customer marketing manager for Intel Magnetics, Inc., said his company estimates the total worldwide market for bubble memories will reach $30 million in 1980 and is capable of growing to $1 billion by 1985.

The prediction is based on the premise that low system costs will be achieved by 1985 through production of 4M bit devices and the resultant reduction of support circuits per system.

Because of lower costs, wider use of bubbles will occur outside of the harsh environment, he said.

Intel Magnetics projects the cost/bit bubbles by 1985 should come close to equaling that of floppy disks. The cost of bubbles is dropping by a factor of at least two every year.

Bubbles are suitable for use in environments such as process control, robotics or numerical control, oil exploration, aircraft data recording, portable instruments, telecommunications and point of sale terminals, he said.

These environments impose various requirements and/or problems such as contamination, radiation, temperature, vibration and handling, he continued.

David Behner, project engineer at Honeywell, Inc. LISD, supports of bubble memory. The closest alternative to bubble is the 8-in. Winchester disk, he said, but the bubble obviates the need for bootstrapping a system should an element fail, he indicated.

Honeywell uses bubbles as storage for microcomputer controllers in numerical control applications in both sheet metal and printed circuit fabrication shops. Bubbles satisfy several requirements, he said. They are self contained and immune to contaminents such as oil droplets. In addition, the density permits adequate storage capability. In some applications Behner said he needs up to 500K bytes.

Bubbles' access time is faster than cassettes and thus comes closer to matching the potential speed of the board tester of up to 180K/min.

Behner also sees access speeds of bubbles in 1981 being twice as fast as floppies.

The return on investment is a bit difficult to calculate, he said, since there is little data available. However, if the manufacturers make their goals regarding cost reduction, "we should see a 30% to 50% price decrease in the first half of 1981," he said.

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CW at Wescon/80

Semi, Mini Makers Seen 'Passing in the Night'

By Molly Upton
Special to CW

ANAHEIM, Calif. — Representatives from semiconductor houses and a minicomputer firm, given the chance to be open about whether they are on a collision course or merely ships passing each other in the night, said they are simply passing in the night.

However, none denied that there are areas in which their products overlap. Prompted by questions submitted in advance, from a press panel, panelists concurred that the principal dividing line between the mini makers and the semiconductor suppliers is that the mini makers take a more comprehensive systems approach emphasizing software and service.

If there is a conflict, it would be in the area of boards commented Pierre Lamond of National Semiconductor Corp. But although mini makers are supplying boards, they have not yet gone into the components business, he observed.

When customers' volume needs are high enough, they normally convert from boards to components, he added.

Need for Standards

Jack Carsten, vice-president and general manager of Intel Corp.'s Microcomputer Electronics Division, said that Intel and Digital Equipment Corp. only share one customer among their top 10 buyers.

Carsten stressed throughout his responses the need for industry standards and said that if microprocessor vendors face diminishing shares of the market, it will be because of the absence of standards and very large-scale integration production constraints.

Bill Long, vice-president of corporate marketing for DEC, observed that relationships between mini makers and semiconductor houses can be complex. For instance, DEC is a customer, supplier, competitor and partner to Intel, all at the same time. "Perhaps there's a collision of sorts, but it's not much more than a glancing blow," he said.

Panelists felt the market is plenty big enough for all, including IBM.

However, the press representatives had no difficulty recalling instances that would seem to indicate conflict, such as suits filed by DEC and Data General Corp. against National Semi and Fairchild Camera & Instruments Corp., respectively, when the semi makers came out with microprocessors that were compatible with the minis.

Asked whether they foresee cross-licensing between semi and mini makers, panelists tended to say no. Long said it is not likely DEC would license its basic architecture, but that there are cooperative efforts such as its Ethernet project with Intel.

Carsten indicated that as business becomes more software-intensive, it is less likely the manufacturer will license because of the additional software investment involved.

Severe Competition

Panelists acknowledged that there is severe competition among all types of vendors for software and hardware engineers, and gave some insight as to how they think the industry will progress despite this shortage.

DEC's Long indicated his company is moving toward standardized applications directed at vertical markets, such as dentists.

Carsten said Intel is working to encapsulate operating systems and high-level languages on chips. He foresees the ability to supply more complete, high-level-oriented solutions over the next decade.

These advances, coupled with the passing acquaintance the public is getting through home computers, should know enough software to get by and exist as parasoftware engineers in the industry in five to 10 years, Carsten added.

As semiconductor suppliers' products become more complex, the days of second sourcing, a traditional practice among purchasing agents, may become a thing of the past, panelists indicated.

Lamond explained that although the purchasing manager sees semis as components with several sources, as integration increases the products get closer to the type of business purchasers do with DEC and DG, where there are not second sources.

Carsten added, as "systems become complex and the software/hardware becomes less hard, it's difficult to second source" because the traditional cookie cutter approach has changed.

Moderator Tony Hamilton, chairman of Avnet, commented that his firm has expanded to handle peripherals as well as components and that it is logical it could expand still further with software to glue various parts into a system. The software could be both off-the shelf as well as a type of custom, he added.

Upton is editor of EDP Industry Report, *an International Data Corp. publication.*

Strategic Business Services Offers 10 R&D Reports

SAN JOSE, Calif. — In keeping with its newly expanded R&D effort, Strategic Business Services, Inc. announced the release of 10 major research reports.

The reports are: "IBM's New Office Automation Strategy"; "Local Area Networks (Lans) — Market & Opportunity"; "Switching Systems in the Office of the Future Vol. II"; "Strategic Analysis of Software & Hardware Maintenance" (Large Systems); "Winchester Disks in Emerging Office Systems";

"Distributing Display & Hard Copy Terminals New Directions & Strategies for the '80s"; "Impact of Gallium Arsenide on MOS, SOS and Bipolar Technologies"; "Nonimpact technologies for Distributed Printing"; "Impact of Videodisk Technology on Existing Media and Equipment Vol. II"; and "Issues & Opportunities in Color/Graphics."

The reports range in price from $950 to $1,500, and customers who have varied areas of interest or require multiple copies are entitled to a subscription service at a 35% - 50% discount. Additional information is available from Susanne Sonnabend at Strategic Business Services, Suite 215, 4320 Stephens Creek Blvd., San Jose, Calif. 95129.

R&D Plan Aimed At Small Firms

WASHINGTON, D.C. — Currently being considered by the Department of Defense Research and Engineering is a new program aimed at increasing the participation of small, high-technology businesses in defense-related research and development.

The department feels that some of the most innovative technology frequently originates in the smaller R&D firms, and now hopes to tap this previously excluded sector.

Firms interested in receiving additional information about this program may contact the director, Hal Felsher, at the Office of the Under Secretary of Defense for R&E, Room 2A 340, The Pentagon, Washington, D.C. 20301.

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U.S. Electronics Edge Challenged

Progress Won't Ensure Dominance: Consultant

By Molly Upton
Special to CW

ANAHEIM, Calif. – "Technological progress does not ensure dominance" in electronics markets, Jerry Wasserman of Arthur D. Little, Inc. told attendees at Wescon/80's marketing day program.

Although the U.S. electronics industry represented 3.5% of the gross national product in 1979 and has grown to $80 billion in sales, its market dominance is being challenged.

While technological progress in the electronics industry has been significant – in 15 years the density of semiconductors has improved by 10⁴ and even more if one includes the 256K and 512K chips discussed in recent technology conferences – Wasserman urged attendees to change their ways in order to meet the new challenges imposed by other nations' proficiency.

"Successful management policies for the '70s are not appropriate for the '80s and need modifications," he stressed.

Wasserman outlined the steps other nations are taking to enhance their positions in the electronics markets, why the U.S. is not addressing the challenges of the growing markets, and the remedial steps needed to grab a larger share of the pie.

In Japan, after concluding the highly publicized, government-supported very large-scale integration development program, companies have continued working together and have started a Japan Software Association.

In other areas, the nation is far advanced with its use of fiber optics in wired cities, and has also developed 512K read-only memory.

Fujitsu has associations with Amdahl Corp. and with TRW in this country, and Japanese components have obtained a reputation for high quality.

In Europe, Siemens bought Threshold Technology, a U.S. company active in voice recognition; Philips pioneered the work on the videodisk, and there are such things as Viewdata, the British Post Office's attempt to package data bases for public consumption.

France has coined the term "telematique" that treats telecommunications, information systems and electronics as an integrated unit, and has embarked on its Antiope project that aims to put a terminal in every home by the end of the decade.

CW at Wescon/80

Wasserman said the French are moving so fast we won't recognize France in three years.

And the UK has, among other projects, earmarked $125 million for a program to increase management awareness of microprocessors.

Germany is known for its cooperative ventures between government, industry and universities and also for its complex robots.

In all, the European Economic Community is developing as a coherent whole that accounts for the production of one-third of the world's consumer, DP and office equipment, Wasserman observed.

Why isn't the U.S. taking a more active role in the world electronics scene? Wasserman listed four reasons:

- The U.S. companies are focused on business within the U.S.
- U.S. industry is technology-driven. "If in doubt, introduce a new product" regardless of whether it is what the market wants or needs.
- Government constraints, generally viewed as antagonistic.
- U.S. companies tend to ignore social responsibilities such as automation's effects on unemployment.

"These attitudes were prevalent in the '50s. They weren't disastrous, but now could be," Wasserman commented.

The challenge can be approached by various routes:

- Develop market focus – ask what does the customer want?
- Deal with foreign ownership in the U.S.; work with the foreign companies to mutual advantage.
- Develop government support, for example, via lobbying.
- Be able to thrive in an environment of short product lifetime.

Management must be more flexible, and take more risks, he added.

Wasserman listed six steps the government should take to fortify the electronics industry, although there was later debate with others preferring government help via tax incentives rather than direct aid.

Wasserman advocated the government subsidize research and development, revise antitrust laws, increase export financing, institute investment credits, decrease taxes for individuals living abroad, and establish trading companies along the European model.

Upton is editor of EDP/-Industry Report, *an International Data Corp. Publication.*

New Companies

Worldwide Software Associates, Inc. has been formed to provide marketing and technical support for a variety of computer software products. The international firm is located at Suite 301-S, 2625 Butterfield Road, Oak Brook, Ill. 60521.

K and S Data Services, Inc. has been established to provide computer services in the clothing and related industries. The company is located at 3535 S. Broadway, Los Angeles, Calif. 90007.

Information Integration, Inc. is the name of a consulting service formed to aid both manufacturers and users of text, data, voice and photocomposition equipment. It is located at 24 Pinecone Lane, Southboro, Mass. 01772.

Spur Products Corp. has formed a consulting company to help print circuit board and integrated circuit designers utilize the Calma computer-aided design system. The newly established Interactive Graphic Systems group is located at 1023 Fourth St., Santa Rosa, Calif. 95401.

Datapro, DRI Join Forces On Data Base

DELRAN, N.J. – Datapro Research Corp. and Data Resources, Inc. (DRI) have started a joint project to offer subscribers on-line access to a data base providing product reports.

The project was designed to capitalize on Datapro's library of product information and DRI's on-line telecommunications network.

Although pricing and availability for the new service have not yet been determined, Datapro said users will be able to access the data base from portable or desktop terminals.

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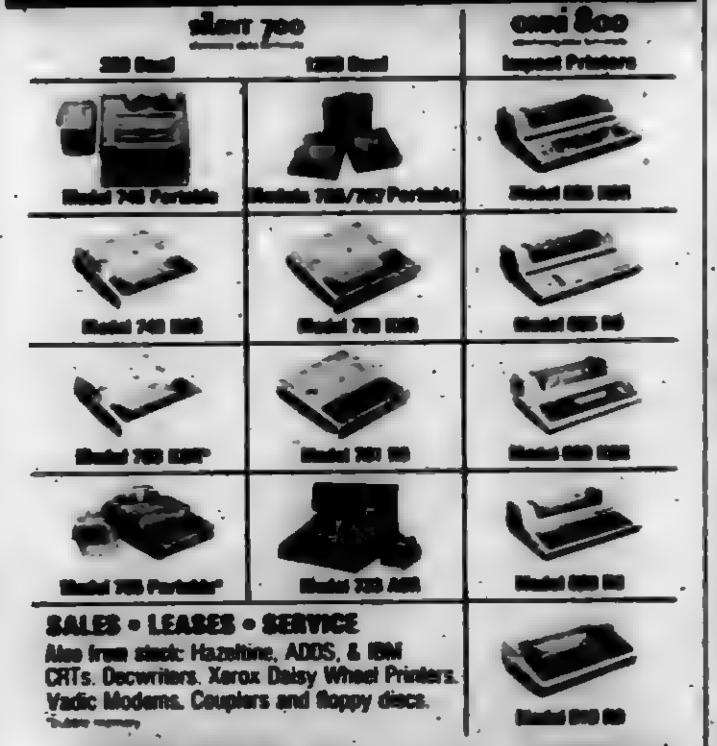

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Western Union Seen an Acquisition Candidate

NORWALK, Conn. – Although Western Union, Inc. has modernized its communications transmission system and reduced its dependence on the declining telegram business, the firm has not yet achieved the market success it needs to be safe from potential acquirers.

That is the conclusion of a report published by International Resource Development, Inc., a market research and consulting firm, as part of its Directions Intelligence series on major companies.

Western Union's extensive communications network could be "a very attractive asset" to a major DP company seeking to become a significant factor in telecommunications, the report noted.

Over the past 15 years, the report noted, Western Union's modernization efforts have allowed it to offer modern digital data and voice communications services.

However, the company's freedom in configuring novel computer/communications services has been somewhat constrained by government regulations.

The Federal Communications Commission's Computer Inquiry II decision and other liberalizations of telecommunications regulations raises the possiblity that Western Union could become a very competitive factor in the growing computer/communications services market, possibly through a joint venture, the study found.

However, there is also a strong possibility that, as the industry becomes less regulated, Western Union will become a more attractive acquisition target for DP companies that want to expand rapidly in the communications market.

The Western Union report discusses the development of the company's corporate expansion and diversification strategy, its financial resources, possible new areas of expansion and diversification and the methods to be used – acquisitions, joint venture or internal expansion.

Besides Western Union, International Resource Development has done studies of such Fortune 500 companies as AT&T, General Electric Co. and IBM.

Further information on the report is available from the firm at 30 High St., Norwalk, Conn. 06851.

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Executive Corner

- Gary R. Long has been appointed vice-president and general manager of Talos Systems, Inc.
- Daniel Tierney has been promoted to the position of vice-president of product support and services at Amdahl Corp.
- Douglas Davidson has been named president and chief operating officer of Display Data Corp. in Hunt Valley, Md.
- David Pava has been promoted to general manager of Byte Industries, Inc., and Bob Miller has been promoted from controller to secretary-treasurer, thus expanding the board of directors to four members.
- Larry Holswade has joined Plantronics/Santa Cruz, Inc. as vice-president of marketing and will assume both domestic and international marketing and product support responsibilities.
- James Vance has been elected vice-chairman of the board of directors of General Automation, Inc.
- Richard Furnival has been named vice-president of operations at Cylix Communications Network, Inc., where he will construct the satellite network and oversee its operations.
- James Ashbrook has been promoted to vice-president of systems marketing for National Advanced Systems.
- James Bloom, former senior vice-president of manufacturing, has been elected by the board of directors to the position of executive vice-president at Documentation, Inc.
- David R. A. Steadman has been named president of Raytheon Data Systems, which produces intelligent terminals, minicomputers, word processing and microwave communications systems.
- Charles Weiss has been appointed vice-president of information systems at Dataquest, Inc., a Cupertino, Calif., research and consulting firm.
- John D. Logue has been named vice-president of engineering at Datasystems Corp., manufacturers of line printer controllers for minicomputers.
- Dieter Heuer will assume the presidency of BASF Systems on Nov. 1 after major internal reorganization.

Expansions

Rixon, Inc. has purchased 13 acres and buildings adjacent to the home office and manufacturing plant at 2120 Industrial Parkway, Silver Spring, Md. 20904.

Cipher Data Products, Inc. has occupied its new 67,378-square-foot headquarters building at 10225 Willow Creek Road, San Diego, Calif. 92131.

Computer Pacific Corp. has moved into larger quarters in the recently renovated historic Arts Building in the heart of the financial district in Vancouver, Wash. Its address is Suite 300, 1104 Main St., Vancouver, Wash. 98660.

Standard Microsystems Corp. has opened a semiconductor facility in Hauppauge, N.Y. The six-acre site, valued at $3.8 million, is called the Olof Hedquist Technology Center.

Datapoint Corp. has announced plans to expand its San Antonio, Texas, operations on a newly acquired 120-acre site. The multiyear project to consolidate the company's development and support operations is estimated to cost more than $50 million.

Magnuson Computer Systems, Inc. has broken ground for a two-story, 64,000 square-ft building adjacent to its present headquarters in San Jose, Calif.'s Orchard Technology Park.

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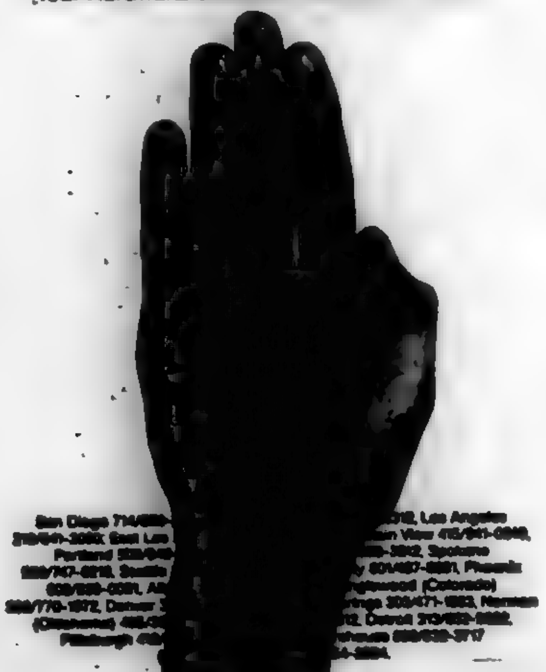

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Although Not a Technology Leader

Prentice Carving Niche for Rapid Sales Growth

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — By its own admission, it is hardly the technological leader in its chosen field — short-haul data communications. Several of its most important competitors — particularly Codex Corp. and Paradyne Corp. — long ago left it in their technological wake.

Nor does it boast a particularly envious financial and management track record. Six years ago, it was forced to file for bankruptcy after failing miserably in an attempt to strike out in a radically different market direction.

But despite its many apparent limitations, Prentice Corp. is entering the 1980s with its business hopes at perhaps its highest point in the firm's 11-year history.

Reasons for Optimism

The reasons for the company's optimism are myriad. First, as a supplier of short-haul data communications equipment, Prentice has had the good sense and fortune to pick the fastest-growing sector of the rapidly expanding networking field as its main area of market specialization.

During the coming decade, the market for short-haul data communications hardware is expected to balloon by 50% per year, compared with an estimated 25% to 35% per year for the data communications business as a whole, according to Prentice's marketing vice-president William Myers.

As demand for short-haul data transmission equipment grows, so too will Prentice's anticipated revenues and earnings, Myers and his colleagues reason. This year, the company expects to gross about $7.5 million, with a 10% after-tax profit, and during 1981 its sales are projected to rise at least 25% to reach or exceed $10 million.

Another major reason for Prentice's optimistic business picture is that the company expects to incur only minimal research and development expenses through the rest of the decade, in striking contrast to many of Silicon Valley's other high-technology outfits.

"The basic framework of our product line for the next 10 years is already firmly in place," Myers explained. "Through the 1980s, we expect to be developing few if any new products from scratch. Instead, we'll simply be modifying and upgrading our existing product line to accommodate new technological developments as they become available."

Prentice's intention to keep its current product line basically unchanged lies at the very heart of the company's guiding management strategy: to minimize its business risk by carving out a market niche that promises dynamic sales growth and yet at the same time demands only evolutionary product changes and thus scant R&D investment.

At the moment, Prentice's offerings can be grouped into three basic product categories: low-speed, Bell-compatible modems; limited-distance modems; and statistical multiplexers. Each of the categories accounts for roughly one-third of Prentice's total revenues, Myers said.

In none of its three major product areas is Prentice considered the U.S.' dominant vendor, either in technological sophistication or in sales volume — a fact Myers readily concedes.

But what Prentice lacks in product depth it more than makes up in product breadth. "We may not rank as the top vendor in any one area, but we're the only company in the industry whose product line spans the entire spectrum of the short-haul data communications field," Myers boasted.

The breadth of Prentice's product line makes the company's offering peculiarly suitable for local-area distribution (LAD) networks, which are usually limited to a radius of 40 miles, and for "campus-type" networks, which are typically minicomputer-based and cover a radius of only two or three miles.

Success in either the LAD or campus-type network markets requires a product line that includes precisely the types of short-haul data communications equipment that Prentice offers. Because it holds the distinction of being the only company that embraces all three categories, Prentice feels it enjoys a distinct advantage over all the other contenders in its chosen field, Myers said.

To maintain that competitive advantage, Prentice will eventually have to enhance its existing product line to accommodate short-haul data communications protocols like Xerox Corp.'s Ethernet.

Specifically, the company will have to redesign its current products to accept emerging technologies like coaxial cable, radio frequency and fiber optics, all of which are likely to form the backbone of Ethernet-like facilities, Myers said.

Supershorts

National Semiconductor Corp. and Harris Semiconductor have reached an agreement on a cross-licensing arrangement to cooperatively produce integrated circuits for the telecommunications market.

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Vector Graphics, Inc. plans to expand its nationwide marketing campaign. The increased support and sales thrust will be aimed at domestic dealers, OEMs and systems houses.

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Burroughs Corp. has formed an energy/utility marketing group for the New England area. The Boston-based outfit will focus on utility-related customer service and program products.

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Compuscan, Inc. has sold its marketing and manufacturing rights for its Start, Comap and Scandisk graphic arts products to Electronic Information Technology, Inc., a new company formed and staffed by former Compuscan employees. Reporting substantial fiscal-year losses, Compuscan intends to concentrate on its optical character recognition business as a principle recovery strategy.

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Edward Uhl, chairman of the board of Fairchild Industries, and Mason Phelps, president of VSI Corp., announced that their companies have executed a definitive merger agreement. The agreement is now subject to governmental review, normal closing conditions and shareholder ratification.

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Three of the largest distributors of Ohio Scientific hardware, Cybertronicx, Tek-Aids and Tri-Comp, have established Software Federation, Inc. to distribute software to the Ohio Scientific community.

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A study by Gnostic Concepts, Inc. shows U.S. production of fiber-optic data links will advance from about $20 million in 1980 to $392 million in 1990. Over one-third of this production, $7.4 million in 1980, will be by independent producers for the available market.

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3M Co.'s Business Products Group has granted division status to the 3M Business Communication Products Department. The newly created division markets a variety of facsimile products including the 3M 9600 facsimile transceiver.

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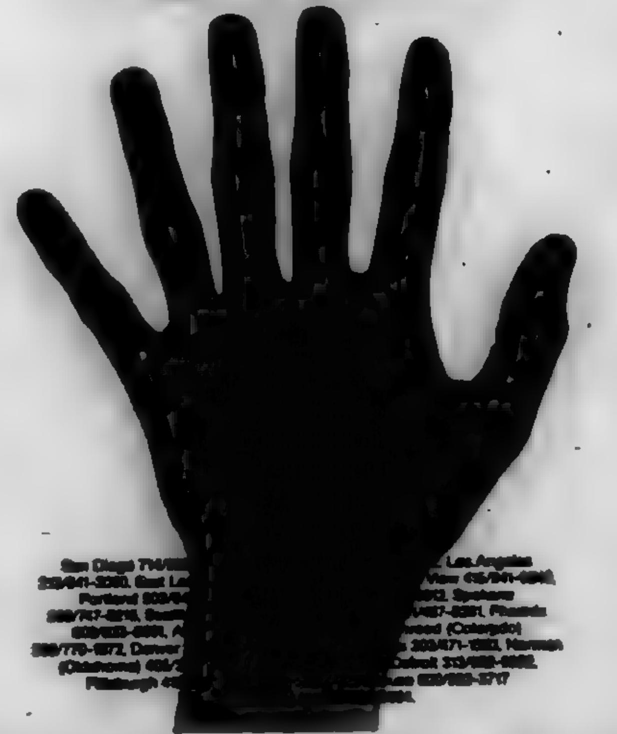

ITT Software Center Guides In-House Professionals

NEW YORK – Its increasing internal use of computers has caused International Telephone and Telegraph Corp. (ITT) to establish a software center. The center provides policy guidance, training and control for the 6,000 software professionals employed by ITT, the company chairman Rand V. Araskog recently told security analysts here.

"We recognize software utilization as the technological challenge of the future and are mobilizing to meet it," Araskog told a luncheon session of the New York Society of Security Analysts, Sept. 18.

Also in ITT's long-range thinking the company, now strong in telecommunications, intends "to be a leader in semiconductors, in component technology, in connectors, in fiber optics, in digital equipment and displays, the chairman, president and chief executive said.

Araskog also predicted a positive financial picture for 1980, including improvement in ITT's European consumer electronics operations. ITT has a $6 billion order backlog for telecommunications equipment, he said.

Foreign Orders & Installations

The Bridlington College of Further Education in the Humberside area of Yorkshire, England, has expanded its program of commercial computing courses with the recent installation of a Univac V77 minicomputer and five UTS 10 display terminals. The college now offers an on-line, dial-up service to neighboring schools that are already equipped with communications terminals.

Quebec Telephone recently became the 10th division of GTE, Inc. to install the ASI-ST data management and report writer system, under a contract between GTE Data Services, Inc. and Applications Software Inc.

Orders & Installations

Fleetguard, Inc., a division of Cummins Engine Co., has ordered a computer system valued at more than $1.2 million from Univac.

United Services Automobile Association has ordered more than $4 million in dispersed data processing equipment from Datapoint Corp.

Systems Associates, Inc. of Charlotte, N.C., has ordered 100 Trident disk drives from Century Data Systems, Inc.

The Nassau Library System in Uniondale, N.Y., has installed the Mini Marc Automated Cataloging Resource System, developed by Informatics, Inc.

Standard Gage Company, Inc. of Poughkeepsie, N.Y., has ordered minicomputer systems valued at $1 million from Univac.

The Colony Beach and Tennis Resort in Sarasota, Fla., and the Mansion on Turtle Creek in Dallas recently installed Encore Lodging Systems, Inc.'s The Performer office system, which runs on Datapoint Corp. hardware.

Ford Motor Co. has ordered Prime Computer, Inc.'s 450 and 550 systems for a pilot computer graphics program at its research and engineering facility in Dearborn, Mich.

Central Michigan University has installed a Control Data Corp. Cyber 172 computer system, the first large-scale computer at the school devoted exclusively to student use.

Avantek Inc. of Blue Bell, Pa., has ordered $1.2 million worth of Univac computer equipment, including the 1100/60 system and Unis software package, to be used for manufacturing control and financial applications.

Microform Data Systems has signed a contract with Security Pacific National Bank for a computer-assisted records management system.

Nickels & Dimes

Cullinane Corp. has filed a registration statement with the Securities and Exchange Commission covering an offering of 275,000 shares of common stock that will be offered for the company's account.

$$$

Modular Computer Systems, Inc. announced that trading in its common stock commenced on the New York Stock Exchange on Sept. 17. The company is concurrently redeeming all of its $9.1 million principal amount of 8½% junior convertible subordinated debentures due July 1, 1994, at a redemption price of $1,020 for each $1,000 debenture, plus $24.56 of accrued interest. Debenture holders can sell their holdings through brokers or convert them into the company's common stock on or before the close of business Oct. 13.

$$$

Advanced Micro Devices, Inc.'s board of directors has approved a two-for-one split of the company's stock. Newly issued stock will be distributed by the semiconductor firm in October to all shareholders of record as of Sept. 22.

ALA to Hold 1981 Meet in Dallas

DALLAS – The Association of Legal Administrators (ALA) is planning to hold their 1981 conference here on April 1-4, enabling vendors and other industry representatives to come face-to-face with key administrators from successful law firms.

ALA sponsors report that much of the exhibition booth space is already booked.

Additional information on the ALA event is available from their headquarters at 1800 Pickwick Ave., Glenview, Ill. 60025.

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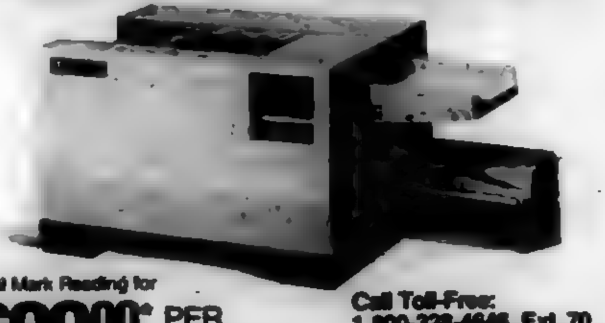

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SC086. Fundamentals of Data Structures.
Ellis Horowitz and Sartaj Sahni.
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IS055. Videotext: The Coming Revolution in Home/Office Information Retrieval.
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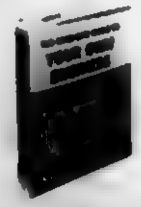

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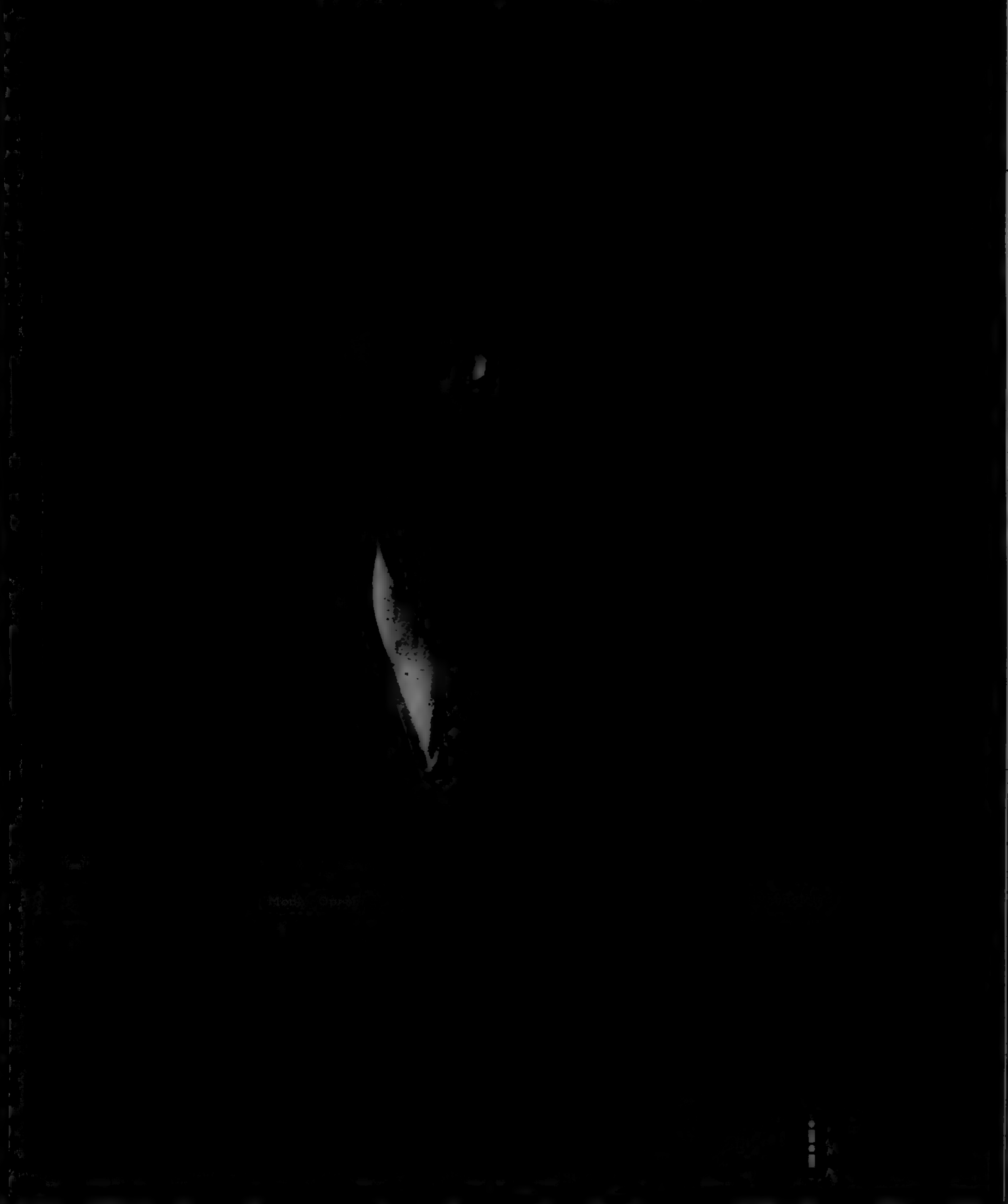

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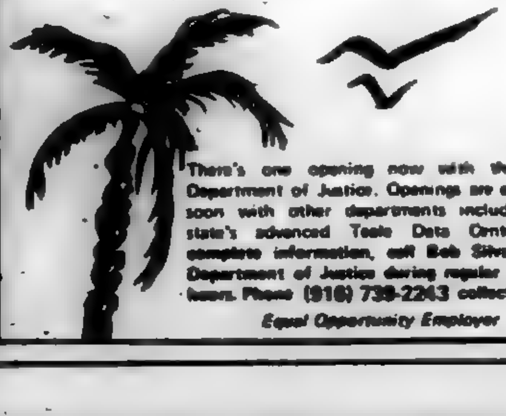

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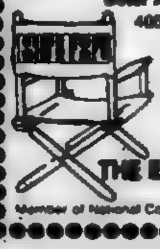

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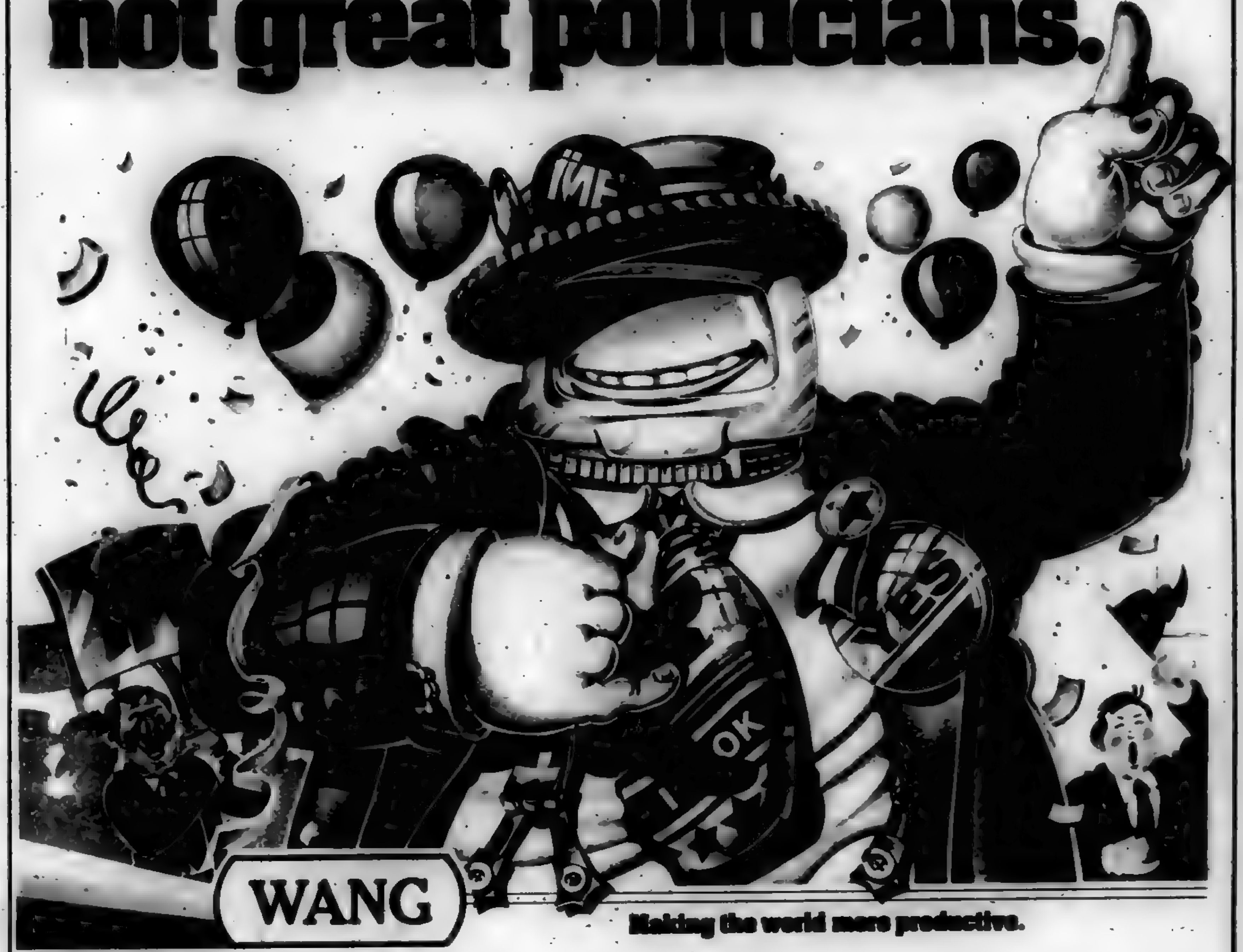
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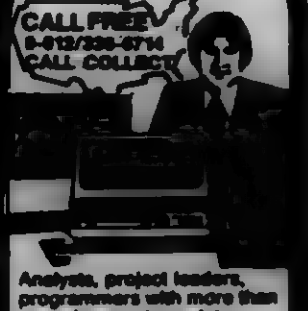

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These positions include administrative and technical responsibilities for groups of 7-12 software engineers and requires telephony software development background (5 or more years desirable) coupled with supervisory skills.

Get in early on this far-reaching telephony system technology.

Major telephony system programs that will extend far into the future are being launched at the ITT Advanced Technology Center. A new system, designed around the ITT 1240 switch, will involve all-digital switching with fully distributed control—a telephone industry "first". Then will come other systems and the eventual conversion of telephone switching and transmission to the new technology.

If you can take a leading role in the development of realtime software for this system, you will become one of the first experts in a technology that will be the industry's standard. Your personal growth potential will be exceptional as this program expands.

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Also immediate openings for software technical staff positions in maintenance, data base and call processing development.

Great living plus wide-range assistance in relocating.

You'll enjoy working at our campus-like facilities in the Connecticut countryside. You'll enjoy Connecticut living with its freedom from urban pressures and pollution, housing to suit all tastes, full range of year-round recreational and cultural attractions within easy reach—plus freedom from state tax on earned income. And we'll make relocating easier with benefits that include:

- a third party buying service bridge loan
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- most costs associated with sale of residence
- most costs associated with purchase of new residence
- mortgage interest differential allowance
- one month's new base salary settling-in allowance
- house-hunting assistance by professional consultants

Please send resume, including salary history, in full confidence to Jack Erle, Professional Recruiting Specialist.

ITT Advanced Technology Center

One Research Drive, Shelton, Connecticut 06484

An Equal Opportunity Employer, M/F

PROGRAMMER ANALYST

Your Houston Career Advantage Is Joy Petroleum Equipment Company

There are many advantages to Houston, but when it comes to exceptional career opportunities, Joy Petroleum Equipment is its greatest advantage. A division of the worldwide operations of Joy Manufacturing, Joy Petroleum Equipment has made a significant contribution to the development of the petroleum industry.

We are currently seeking a PROGRAMMER ANALYST with 2-3 years COBOL and CICS experience plus a degree in Computer Science or related work experience. Responsibilities will include: preparing program specifications, coding, testing and de-bugging COBOL programs, some exposure to systems analysis and design, plus an opportunity to work with our new IBM 4331 computer equipment.

Take advantage of Houston, the nation's fifth largest city, and its near perfect climate, its booming economy, its close proximity to Gulf Coast recreational activities and the benefit of favorable tax structures.

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JOY

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and
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BATTELLE, one of the world's leaders in research and development has immediate openings for staff in the COMPUTER SYSTEMS SECTION.

- CAD SYSTEMS, ANALYSIS AND DESIGN SYSTEMS - experienced to work on user needs, analysis, systems design problem definition and implementation. Entry level positions require B.S. degree and a minimum of 3 years' experience. Senior level requires M.S. and a minimum of 5 years' experience. Excellent oral and written communication skills a must.
- APPLIED GRAPHICS - experience in the design, development and extension of user oriented graphics systems - primarily engineering and scientific. Strong mathematical background and knowledge of FEM analysis techniques a plus. M.S. and four years' experience, or a Ph.D. in computer science or mechanical engineering.

The Computer Systems Section is an aggressive group of professionals working across the spectrum of computer technology. Successful candidates enjoy a competitive salary and comprehensive benefits package. Please send resume, in confidence to: [illegible]

CW Box [illegible]
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

Battelle
Columbus Laboratories

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Our electronics manufacturing firm is moving to more advanced manufacturing and control systems using a number of IBM System 34 Computers. We will utilize both purchased and in-house software to support several local and remote divisions. Our objectives are well supported corporately.

You should be experienced in shop floor reporting, MRP and Standard Cost Accounting through at least three years work as a Systems Analyst in a manufacturing environment. Thorough documentation and simple, modular designs are essential.

For a mature company our growth rate is phenomenal and we will utilize your talents and satisfy your ambitions. Salary and benefits are very competitive. Submit your resume, salary history and documentation aligning your experience with our specific requirements. We want to see what you have done, not just what you have read about.

Reply to J.A. [illegible], Personnel Manager
[illegible] CORPORATION
P.O. Box [illegible]
CHANDLER, AZ. [illegible]

Computer Science
Assistant/Associate/Professor

Tenure track position available immediately. Applicants should have a PhD in Computer Science. Duties include teaching undergraduate courses in computer science, graduate courses in the Master of Software Design and Development Program, and appropriate research. Interested applicants should contact the following on or before 15 November 1980.

Dr. A.A.J. Hoffman
Director Computer Science
Texas Christian University
Fort Worth, TX 76129
817/[illegible]

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BANKING-
SENIOR PROGRAMMER

One of the city's leading financial institutions has an opening for a highly qualified candidate to do ASSEMBLER coding and problem solving for complex technical systems. Successful candidate will train, guide and lead junior programmers in testing and debugging, as well as assist in developing new concepts and procedures. Two or more years of formal training in programming or equivalent plus 2 or more years programming experience using ASSEMBLER and COBOL. Banking systems background is a plus. The bank offers a competitive salary and benefit package.

Qualified individuals should contact:

Personnel Department
[illegible] E. Wayne St., Ft. Wayne [illegible]
Phone: (219) [illegible]
Lincoln National Bank

An Equal Opportunity/Affirmative Action Employer

CULLINANE

CULLINANE CORPORATION, the most respected company in the computer software industry, is the leader in introducing state-of-the-art software products.

Our continued rapid growth, as reflected by a greater than 44% increase in revenue and profits this past year, provides the challenge and environment required by skilled software professionals.

If you are among the many professionals who are looking for the visibility and recognition that a growing company can provide, you may be interested in some of the new positions that our growth has created.

SOFTWARE DEVELOPMENT — Development and enhancement of our database management and audit packages.

Requires minimum 3 years experience in database, data communications, data dictionary or query systems.

QUALITY ASSURANCE TECHNICIANS — Test installation of all new procedures for software and documentation evaluation.

Requires IBM systems background with strong database and teleprocessing skills. Experience with COBOL or Assembler essential.

TECHNICAL WRITER — Develop and maintain end-user documentation for our database, data communications and data dictionary systems.

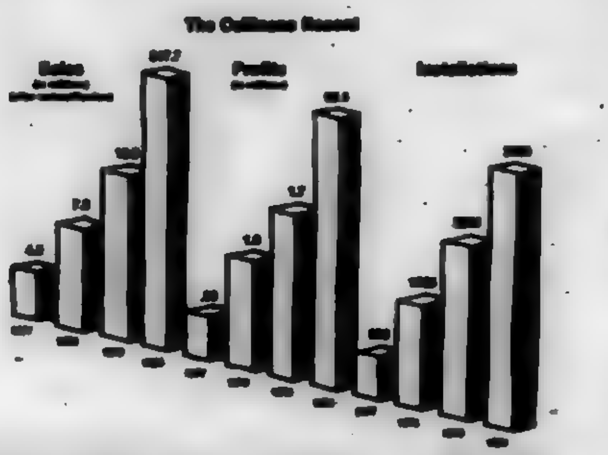
Requires excellent communications skills and at least one year's experience as software technical writer. Familiarity with COBOL, PL/1 or Assembler and IBM systems desirable.

TECHNICAL EDITOR/COORDINATOR — Coordinate and verify technical input to documentation; participate in technical review meetings for drafts of manuals; prepare sample programs/applications as needed.

Requires systems programming background in database or data communications environment; editing, writing and communications skills mandatory.

TECHNICAL SUPPORT/Headquarters — Provide phone support to customers for technical/non-technical problems.

Requires minimum 3 years experience as systems programmer in operating or control systems. Familiarity with DB, DC, or Data Dictionary systems desirable.



TECHNICAL FIELD SUPPORT/AUDIT & RETRIEVAL — Install products, conduct training classes, and provide on-site support to current and prospective customers.

Requires experience with COBOL, Assembler or other high level report generator; familiarity with OS/DOS and JCL required; auditing or accounting background preferred.

TECHNICAL FIELD SUPPORT/IDMS — Install products, conduct training classes, provide phone and on-site support to current and prospective customers.

Requires medium/large IBM mainframe and various O/S background. 3 years minimum experience in programming, DC or DB administration. Positions available in several field locations.

SALES REPRESENTATIVES — Requires proven success in software sales to users of medium/large scale IBM compatible equipment; technical background, data communications and/or database management systems exposure desirable. Positions available in several regional territories.

CULLINANE CORPORATION offers a fully paid employee benefit program including a Revenue Sharing Plan. If you qualify for any of the above positions, please send your resume, including salary history to:

M.E. Collins
Personnel Manager
Cullinane Corporation
20 William Street
Wellesley, MA 02181
(617) 237-6600

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Systems Professionals

We can not imagine a finer place to work. Our offices, situated on the eastern fringe of Springfield, Massachusetts allow extreme ease of commuting from a nearby, reasonably priced residence. Our continuous, successful growth allows us to offer you steady professional and personal growth in a first class environment, plus a fine package of fringe benefits, competitive wages and annual pay increases.

If your background includes industry work experience with IBM 370 series, DOS/VS, CMS, high proficiency in COBOL, and some college education, you may qualify for these fine growth opportunities within our Corporate Headquarters.

DATA BASE ADMINISTRATOR

Requires IDMS design and implementation experience, along with use of the IDD and background with IBM 370. Prefer at least 6 years MIS experience and BS degree or equivalent.

SYSTEMS ANALYST

Prefer minimum 2 years programming/analyst experience with heavy emphasis on implementing financial reporting systems, particularly general ledger.

Please reply by resume stating salary history to:

Personnel Representative
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ICE CREAM CORP.
Wilbraham, Massachusetts 01095

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CAREER OPPORTUNITIES IN CENTRAL FLORIDA IN DATA PROCESSING

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SENIOR PROGRAMMER

Degree or equivalent experience and 5 years experience in manufacturing information systems.

SYSTEMS PROGRAMMER

Degree or equivalent experience and 3-5 years with DOS/VS/VSE.

All applicants should be experienced in CICS, DL/1, COBOL, BAL and DMS.

Qualified applicants are invited to send resumes in confidence:

MCDONNELL DOUGLAS
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Titusville Division
P.O. Box 880
Titusville, Florida 32780

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The Department of Industry, Labor and Human Relations, Bureau of Systems and Data Processing has a unique vacancy for a manager of its computer technical support section. A major state computer center, the agency has two IBM 158 installed with data communications network of over 400 terminals [illegible]. Duties include supervising technical staff and directing the installation and maintenance of all computer software. Experience in installing and maintaining MVS, CICS, NCP/VTAM, TSO, IDMS or JES-VS is preferred. Wisconsin residence is not required. Starting salary between $26,146 - $35,304 per year depending on qualifications. Call or send a letter of interest to:

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(608) 266-[illegible]
Department of Industry,
Labor and Human Relations
201 E. Washington Ave.
Madison, WI 53702

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Palo Alto, Ca. 94304
(415) 493-[illegible]

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STC is making a major commitment to software development for new software & disk products. This is your opportunity to be in on the ground floor of a new, rapidly expanding systems organization.

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To develop and maintain IBM VM, MVS, VSI operating systems. Will work with IBM 4341 and MSS/48. Must have knowledge of JCL and BAL. BSEE/CS and at least 5 years systems experience preferred.

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Key role in evaluating and integration of complex systems products consisting of hardware, microcode and large software components. Knowledge of MVS and DOS necessary. BSEE/CS and at least 5 years experience in MVS systems development or integration preferred.

[illegible]

To assist in the definition and development of large systems integration tests. BS/MSCS with knowledge of MVS, DOS and Pascal preferred. VSI knowledge highly desirable.

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Assist in systems integration of VS subsystem; test planning, results analysis and problem determination. Must have knowledge of IBM/370 & OS with Pascal. Assembly language and/or PL/1 a plus. Degree and at least one year experience a must.

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Lead effort for integration of new systems products. Involves large systems, hardware, microcode, and software integration. Will assist in the development of subsystem interface modifications. Knowledge of large operating systems, MVS & JES2/3 necessary.

STAFF ENGINEER

Experience in storage management microcode design, I/O subsystem architecture, systems design and programming required. Five to eight years experience preferred.

STC offers an excellent compensation package including health and insurance benefits, stock purchase plan and more. If you qualify for any of the above positions and would like additional information concerning them and other software openings, please call or write [illegible]. STORAGE TECHNOLOGY CORPORATION, Dept. CW9/29, 2270 South 88th Street, MD#3, Louisville, Colorado 80027. Phone TOLL FREE 1/800-525-[illegible], Ext. [illegible]. We are an equal opportunity employer.

Storage
Technology
Corporation

ADVANCED SYSTEM PRACTICES CONSULTANTS

Leading international public accounting and consulting firm seeks experienced personnel with expertise in advanced systems and data processing skills. The positions are in the World Headquarters research and consulting group. Responsibilities include consulting with our personnel and clients on high technology engagements and conducting research in advanced system practices. Candidates should have substantial (4-5 years) technical experience with credentials in one or more of the following areas:

- Detail knowledge of CICS with ability to generate CICS and do performance timing.
- Detail knowledge of IMS DB/DC and thorough understanding of logical and physical design.
- Data communications with a detailed knowledge in communications hardware and experience with IBM's SNA.

Candidate must have a college degree, preferably in computer science, MIS, business or engineering. Demonstrated technical skills must be combined with exceptional written and verbal communication skills.

Starting salary will be from high $20's and up, depending on qualifications plus relocation. An opportunity for rapid advancement exists in our organization, with a full employee benefit plan available.

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San Francisco

Our San Francisco based client has several openings for Programmer/Analysts with Bank Check Processing applications experience. Positions require a minimum of 1 year in Data Processing, and exposure to CPCS and ALC is desired. Positions include relocation, and offer excellent career potential.

We are consultants to management. For immediate and confidential consideration, please send resume and salary history to: Career Consultants

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Framingham, Mass. 01701

BAL SPECIALIST

Major on-line service org. requires detail-oriented BAL prog./Analyst to design, code & implement on-line sys. IBM 370 OS or DOS bkgrd. pref. Solid career oppty. in fast-paced environ. Salary $24,000 (fee paid). Contact Garry [illegible].

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

CITY OF OKLAHOMA CITY

SOFTWARE SYSTEMS ANALYST: Significant experience with one or more of the following: GCOS, TDS, IDS, DMIV, GMTS II, MPS. Outstanding opportunity to broaden knowledge of advanced Honeywell Data Base/Communications Software. Salary Range $21,[illegible] to $28,[illegible].

SYSTEMS ANALYST - PROJECT LEADER: To implement new Computer Graphics System. Require PDP 11-70 and Fortran experience. Exposure to RSX helpful. State of the art project with great career potential. Salary Range $21,[illegible] to $28,[illegible].

SYSTEMS ANALYST II: Experience in Systems Design and Project Management required. Need knowledge of Cobol, Data Communications and Data Base Facilities. Exposure to Large Scale on-line Honeywell hardware/software a plus. Salary Range $20,[illegible] to $26,[illegible].

Call 405/231-[illegible] or send resume to Okla. City Personnel, 201 Channing Square, Room [illegible], OKC 73102. [illegible]

FORT HAYS STATE UNIVERSITY ASSISTANT DIRECTOR, COMPUTING CENTER

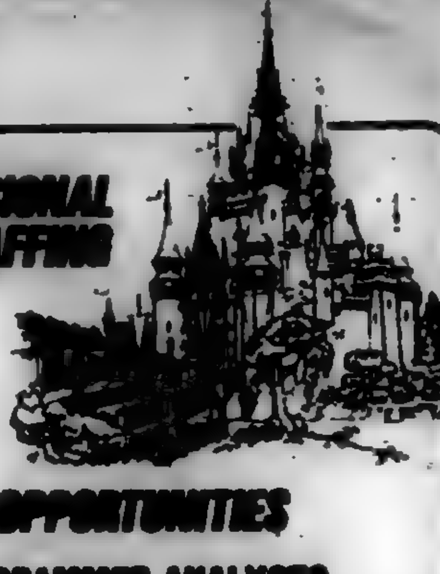
The major responsibilities are to direct the activities of a staff of systems and application programmers in the design and implementation of administrative systems, system software, and academic and research applications; direct the installation and program development of interactive terminals for administrative, academic and research activities and participate in the policy making and allocation of computer resources of the center. Installed system is IBM 370/148. Qualifications include a Bachelor's degree, work experience in COBOL, programming management and expertise with interactive hardware and software, preferably CICS. For full consideration send resume and salary history, prior to October 15, 1980 to, Computing Center, Fort Hays State University, Hays, KS 67601. FHSU is an Equal Opportunity, Affirmative Action Employer.

SYSTEMS ADMINISTRATOR

World Vision, an evangelical humanitarian organization, needs a Systems Administrator to lead a small technical support staff responsible for system software installation and maintenance, and applications software installation. Requires 5 yrs exp as systems analyst, prefer min of 1 yr exp with DEC-SYSTEM-10 or -20.

Send resume to John [illegible], World Vision, 919 W. Huntington Dr., Monrovia, CA 91016.

[illegible]



PROFESSIONAL STAFFING

CAREER OPPORTUNITIES

PROGRAMMER ANALYSTS

WALT DISNEY WORLD has immediate opportunities for innovative and talented Programmer Analysts. Qualified individuals will take an active role in the design of batch and on-line business systems using COBOL as primary language.

Interested candidates possessing recent systems development experience on large scale business computers should send resumes including salary history, in confidence, to:

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P.O. Box 40
Lake Buena Vista, FL 32830

Walt Disney World.

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[illegible]

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SRZ SOFTWARE SERVICES, INC., the national leader in MARK IV consulting, has openings for experienced programmers and analysts skilled in the design and development of MARK IV or MARK IV/IMS systems. Permanent full time positions are currently available in:

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SRZ Software Services
61 North Maple Avenue
Ridgewood, N.J. 07450
(201) 444-[illegible]

STEVE COMEAU
SRZ Software Services
The Jenney Building
Route 101A
Amherst, N.H. 03031
(603) [illegible]

TONY LAMIA
SRZ Software Services
99 West Hillcrest Drive
Thousand Oaks, CA 91360
(805) 497-6875

JACK HEMPSTEAD
SRZ Software Services
3320 Crossbend Road
Plano, Texas 75023
(214) 867-[illegible]

NOTE: Additional considerations made to those who are capable of extended or frequent travel.

MANAGER BUSINESS SYSTEMS

$[illegible] - $[illegible]

Fortune 100 Corporation has a new position for a person to manage the development of corporate level FINANCIAL AND HUMAN RESOURCE SYSTEMS. The ideal candidate will have approximately 10 years of large scale database systems development experience and FINANCIAL/CASH MANAGEMENT AND EMPLOYEE RELATIONS (pensions, training, O.D.) systems. Excellent communication skills. TEAM MANAGEMENT position with superior benefits and relocation package.

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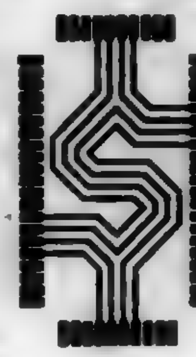
SNA Systems Programmers

Bank of America is expanding the capabilities of its large network of branch computing facilities. We are seeking top professionals to play a leading role in this effort.



The network will be SNA with Multiple system/370 IMS host systems. You will develop software for over 1000 remote computers. The terminals include 10,000 CRT's and an expanding network of Automated Teller Machines (ATM). Programmable controllers are employed.

You should have a broad background in these areas:

- Communications programming for SNA/IMS
- System generation problems/solutions
- Maintenance of software for multiple systems
- Mini-computer environments
- MACRO-11, PL/1, COBOL, Pascal

Specific knowledge of at least one of the following is required:

- SNA (IMS-SLU-P)
- Bunker Ramo Banktran, ATM
- IBM 3600, 8100
- Burroughs CP9500, NDL, MCS

A B.S. Computer Science will be considered a plus. Salary will be commensurate with your experience. Benefits are excellent. You will work in metropolitan San Francisco which offers a wide range of cultural and recreational activities.

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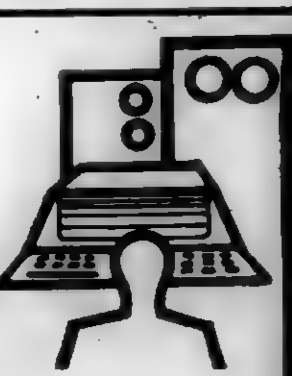
BANK OF AMERICA

EDP AUDITOR



Warner Bros. Inc., offers a professional career opportunity with increased responsibility in EDP Systems.

Requires familiarity with systems, large IBM main frame, TSO on-line systems, data base and audit Software. 3 years Data Processing experience with at least 1 year Internal EDP Auditing. BS and/or MS in Computer Science or Information Systems preferable. Consideration given for CDP, CCP, CIA credentials.

We offer a salary of $26 to $30K with a review in February and an excellent benefits package.

Please send resume to the attention of the Personnel Manager:

WARNER BROS. INC.
4000 Warnter Blvd.
Burbank, Ca. 91522

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M/F/H

ENGINEERING

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Since our beginning in 1968, Delta Data has been rapidly expanding in the field of intelligent display terminals and distributed systems. We are seeking a qualified candidate for this key position reporting directly to the Vice President of Engineering. Responsibilities include directing a staff of 11 professionals with substantial growth planned as well as ensuring utilization of the latest state-of-the-art software technologies. Will introduce, maintain and control software standards and procedures. The successful candidate will manage the development of specific software products, i.e., Executives, Disk Operating Systems, High Level Languages and specific communication protocols.

Computer Science or Engineering Degree required, advanced degree preferred. Five to ten years experience managing a Software Development Group engaged in software development of terminals, data processors or related products and/or systems is also required.

We offer a salary commensurate with experience as well as an excellent benefits package. Interested candidates should send resume, including salary requirements to:

A. SIDNEY
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Woodhaven Industrial Park
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A REAL opportunity in this rapidly growing data center. 3+ years DEC, COBOL and BASIC or MUMPS programming with supervisory responsibilities. Will be responsible for staff management and design through implementation of business applications. A professional environment. $[illegible]

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An excellent career advancement. 3+ years in design through implementation of financial systems with experience in evaluating commercial software packages. Background in Dual 370/168 OS, VS, CICS, DL 1. Excellent growth potential. $[illegible]

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[illegible] (agency)

Banking

SR. PROGRAMMER ANALYST

Burroughs Medium System
Knowledge of Cobol Required.

Send Resume to:
Personnel Dept.
Santa Clarita National Bank
Box [illegible]
Newhall, CA 91321

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DATA PROCESSING POSITIONS

Southern/Central N.J.

SOFTWARE MGR .... $[illegible]
Fortune 50 co. Micro processor based electronic business sys. Managerial exp a must. Design & implement complex sys-hwy micro exp. Local networking & distributed proc.

PROJECT MGR .... $[illegible]
Heavy exp designing data base utilizing DL-1 & CICS. 370/DOS environment.

MANAGER TECH SUPPORT .... $[illegible]
Heavy exp DOS & OS 370, CICS, communications networking a must.

SYSTEMS ENGINEER .... $[illegible]
Shirt-sleeve individual with 370/OS exp. CICS (MACRO level) & heavy assembler. 3-5 years a must.

PROGRAMMER/ANALYSTS .... $[illegible]
370/OS CICS (command & MACRO), COBOL & assembler. Communications a plus.

Call collect or send resume in confidence
C. KING ([illegible]) 771-[illegible]

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Lawrenceville, NJ [illegible]

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CALSPAN CORPORATION has several excellent positions available at facilities in Lexington, Massachusetts.

The work involves: the development of Software using modern techniques for Radar Systems Mission Planning, Data Reduction and Analysis.

We seek: Individuals with BS / MS in Computer Science, Physics of Electrical Engineering and experience in either of the disciplines outlined below:

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• structured software development • FORTRAN / IFTRAN / PL-1 • large systems — IBM 370 / CDC 6600 • familiarity with Radar Systems Simulation, and Data Reduction Systems desirable.

RADAR ANALYSTS

• generation of automated test plans for the control of radar operations and data collection • understanding of phased array radar systems, missile systems, radar data on reentry vehicles, radar observables and coherent waveforms is desirable.

The BOSTON TECHNICAL CENTER is a division of the Advanced Technology Center of Calspan Corporation which has, for over 35 years, been a world-recognized leader in Research, Development and Engineering.

We can offer you a professional environment, good work to do, career development, and excellent salary and benefits.

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DR. ROBERT B. SOLOSKO — PROGRAM MANAGER

Calspan CORPORATION | **BOSTON TECHNICAL CENTER**

P.O. Box 9X, Lexington, Mass. 02173

U.S. Citizenship Required
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[illegible]
Personnel Services
University of Missouri-Columbia
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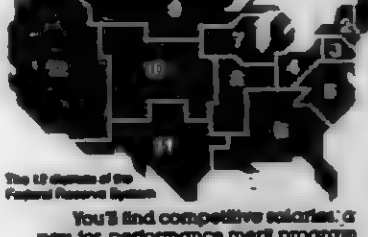

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Personnel Manager - CO
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Please send resume and salary history to Carl P. Fell or call him at (603) 882-2711, Ext. 2964.

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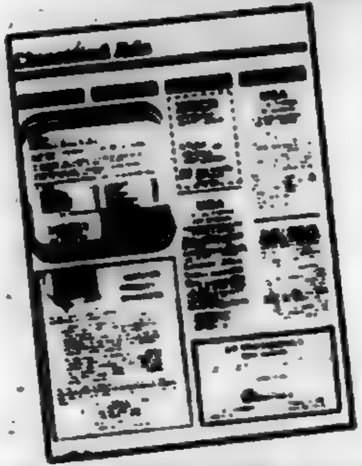

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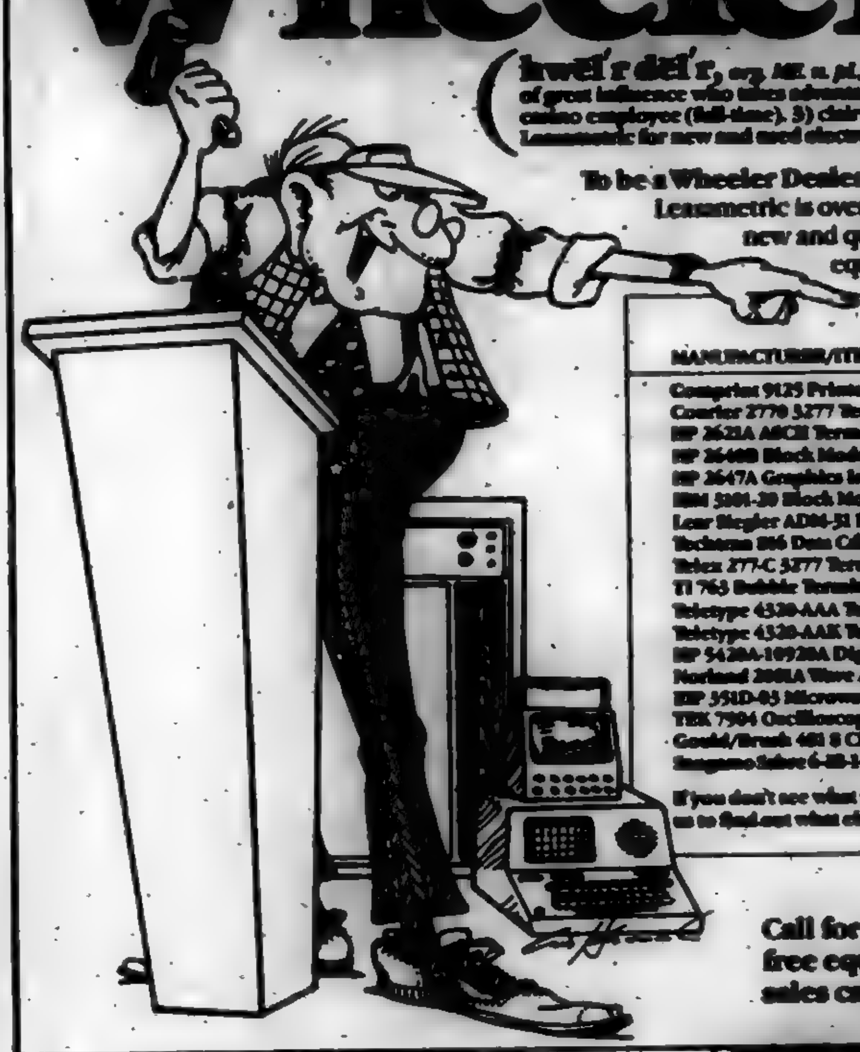

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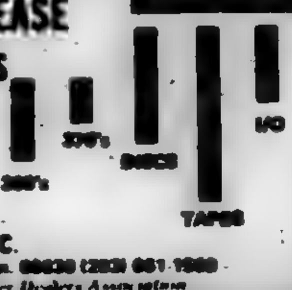

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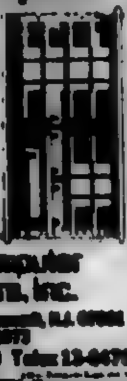

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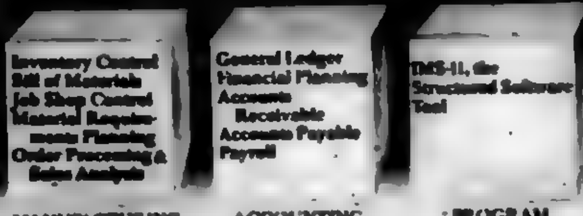

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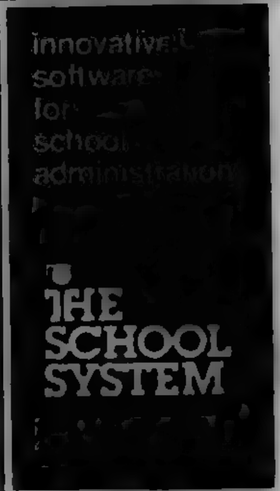

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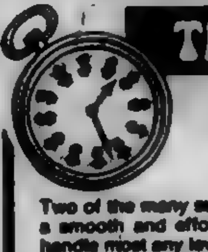

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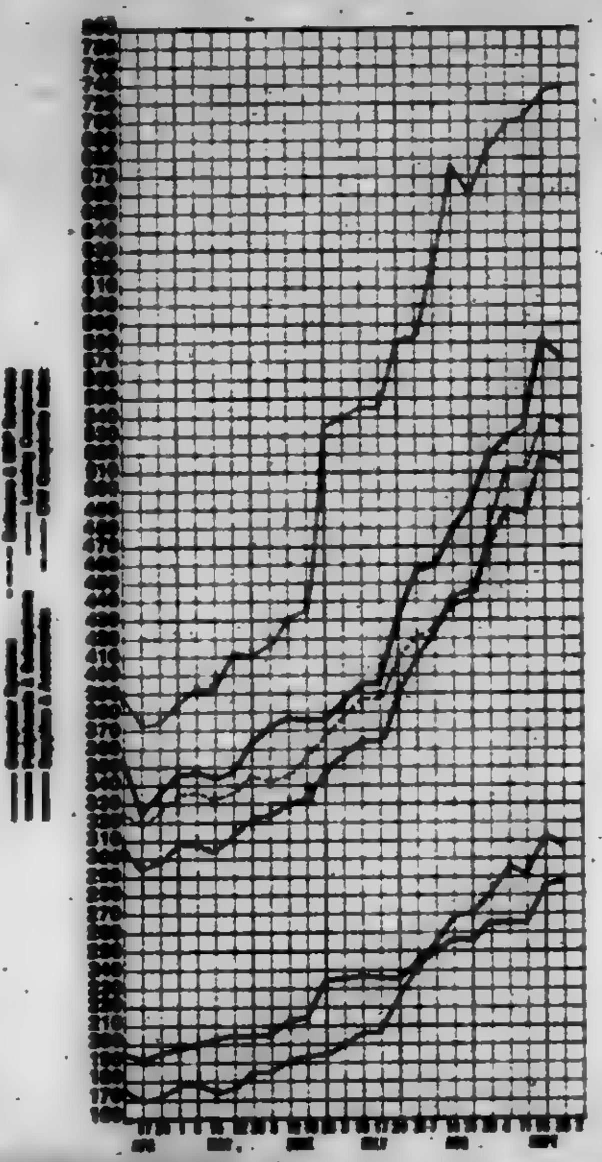

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 24, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

EXCH		1979-80 RANGE (1)	CLOSE SEP 24 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	15- 42	30 1/2	-2 7/8	-8.6
N	BURROUGHS CORP	60- 88	66 7/8	-4 1/8	-5.9
O	COMPUTER AUTOMATION	9- 27	22 1/2	-2 1/2	-10.0
N	CONTROL DATA CORP	50- 70	70	+2 7/8	+4.0
O	CRAY RESEARCH INC	30- 91	85 1/2	-5 1/8	-5.7
N	DATA GENERAL CORP	40- 87	76 3/8	+2 5/8	+3.5
N	DATAPOINT CORP	40- 60	60 1/2	-4	-6.2
N	DIGITAL EQUIPMENT	52- 98	90 3/8	+5 7/8	+6.4
A	ESCO INC	9- 20	18 1/2	-1 1/2	-7.5
N	ELECTRONIC ASSOC.	6- 12	10 3/8	- 3/8	-3.5
O	FOUR-PHASE SYSTEMS	20- 40	30 3/8	+2 3/8	+8.4
N	FOXBORO	28- 38	32 1/8	-1	-3.0
O	GENERAL AUTOMATION	7- 19	9	- 1/8	-1.3
O	GRI COMPUTER CORP	1- 3	1 1/8	- 1/8	-10.0
N	HEWLETT-PACKARD CO	40- 90	90 1/8	+4 7/8	+5.6
N	HONEYWELL INC	60-102	95	+1 1/2	+1.6
N	IBM	50- 70	67 1/2	+ 1/8	+0.3
O	MAGNUSON COMP SYSTS	20- 30	25 1/4	-1 3/8	-5.0
N	MANAGEMENT ASSIST	9- 24	20	-1 3/4	-8.0
O	MANUFACTURING DATA S	28- 90	90 1/8	+ 1/8	+0.2
O	MINI-COMPUTER SYST	2- 6	3 1/8	- 1/4	-7.1
O	MODULAR COMPUTER SYS	9- 30	28	+2	+7.6
N	NCR	53- 82	72 1/8	- 3/8	-0.5
N	PRIME COMPUTER INC	15- 49	46 1/4	+2 7/8	+6.1
N	PERKIN-ELMER	26- 40	38 7/8	-3 5/8	-8.5
N	SPERRY RAND	42- 60	52 5/8	+ 5/8	+1.1
A	SYSTEMS ENG. LABS	11- 45	42 7/8	-1	-2.2
O	TANDEM COMPUTERS INC	13- 56	52 3/4	-1 1/8	-2.3
N	TEXAS INSTRUMENTS	79-146	138 1/2	+3 3/8	+2.4
A	WANG LABS.	17- 40	36	+2 1/4	+6.1
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	15- 23	22 1/4	- 1/4	-1.1
N	COMDISCO INC	6- 18	16	-1 3/8	-7.9
A	COMMERCE GROUP CORP	1- 2	2 1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	2 3/8	+ 1/4	+11.1
O	CONTINENTAL INFO SYS	2- 13	5 1/2	+ 1/2	+10.0
N	DATRONIC RENTAL	2- 4	3 5/8	- 3/8	-9.3
A	DCL INC	3- 6	3 1/8	+ 1/8	+4.3
N	DPF INC	6- 12	7 3/8	- 1/8	-1.6
N	ITEL	1- 10	2 1/8	- 1/8	-5.5
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER-TEX CORP	2- 4	2 7/8	- 3/4	-20.6
N	RELIANCE GROUP INC	30- 70	70 3/8	0	0.0
N	U.S. LEASING	15- 23	22 1/4	- 3/8	-1.6

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EXCH		1979-80 RANGE (1)	CLOSE SEP 24 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	4 1/2	-1 1/4	-21.7
A	ANACOMP INC	5- 20	18 1/8	+ 5/8	+3.5
O	ANALYSTS INTL CORP	3- 8	7	0	0.0
A	APPLIED DATA RES.	6- 21	19 5/8	-1 1/8	-5.4
N	AUTOMATIC DATA PROC	31- 52	51 5/8	+3 5/8	+7.5
O	COMPUTER HORIZONS	1- 7	6	0	0.0
A	COMPUTER NETWORK	4- 9	6 7/8	- 1/2	-6.7
N	COMPUTER SCIENCES	11- 30	20 1/8	- 3/4	-3.5
O	COMPUTER TASK GROUP	1- 20	17	-2 1/2	-12.8
O	COMPUTER USAGE	3- 10	8 1/8	-1	-10.9
O	COMPUT AUTO REP SVC	4- 10	9 1/2	- 1/2	-5.0
O	COMSHARE	11- 21	18 1/8	-1 3/4	-8.7
O	CULLINANE CORP	10- 61	52 3/4	-2 1/4	-4.0
O	DATA DIMENSIONS INC	1- 6	3	+ 1/8	+4.4
O	DATATAB	1- 4	1	0	0.0
O	DSI CORP	4- 9	7 1/2	+1 1/8	+17.6
N	ELECTRONIC DATA SYST	20- 37	28	- 3/4	-2.6
O	INFORMATICS INC	4- 25	21 3/8	+ 7/8	+4.2
O	INSYTE CORP	1- 3	2 1/8	+ 1/8	+6.2
O	IPS COMPUTER MARKET.	1- 4	3	+ 1/8	+4.0
O	KEANE ASSOCIATES	3- 9	6 1/8	- 3/4	-10.7
O	KEYDATA CORP	2- 5	2 1/8	0	0.0
A	LOGICON	12- 27	26 1/8	+1 3/8	+5.6
O	MATHEMATICA INC	5- 18	17	+1	+6.2
O	NATIONAL DATA CORP	10- 25	23 1/8	-1 1/2	-5.9
N	PLANNING RESEARCH	5- 9	8 5/8	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 9	8 3/4	+ 1/8	+1.4
O	REYNOLDS & REYNOLDS	21- 30	29	+2 3/8	+12.3
O	STSC INC	9- 17	16 1/2	+1	+6.4
O	SCIENTIFIC COMPUTERS	6- 27	29	- 1/8	-0.4
N	TYMSHARE INC	20- 71	69 3/4	+1	+1.4
A	URS SYSTEMS	5- 15	13 3/4	- 1/4	-1.7
N	WYLY CORP	4- 18	16 5/8	-1	-5.6
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 20	16 3/4	- 3/4	-4.2
N	AMPEX CORP	10- 29	26 7/8	- 3/8	-1.3
A	ANDERSON JACOBSON	5- 18	17 1/8	- 1/8	-0.7
N	APPLIED DIG DATA SYS	9- 12	11 1/2	- 1/4	-2.1
N	AUTO-TROL TECHNOLOGY	20- 62	53	-8 1/2	-13.8
O	BEEHIVE INT'L	3- 17	15 3/4	-1 1/8	-6.6
A	BOLT,BERANEK & NEW	12- 30	30	+5 1/2	+20.0
N	BUNKER-RAMO	17- 41	39	+ 1/4	+0.6
O	CAMBRIDGE MEMORIES	1- 4	3 3/4	- 3/8	-9.3
N	CENTRONICS DATA COMP	20- 55	32 7/8	-2 5/8	-7.3
A	CETEC CORP	3- 7	6 5/8	- 1/8	-1.8
O	COMPUTER DEVICES INC	5- 10	8 1/8	-1 1/8	-12.1
O	COGNITRONICS	1- 7	6	- 1/2	-7.6
O	COMPUTER CONTROL	4- 10	6 3/4	- 3/4	-9.8
O	COMPUTER CONSOLES	6- 29	21	-2 1/4	-9.6
O	COMPUTER TRANSCEIVER	1- 4	3	0	0.0
A	COMPUTERVISION CORP	30- 92	68 3/4	+5	+9.0
N	CONRAC CORP	13- 25	19 3/4	- 5/8	-3.0

EXCH		1979-80 RANGE (1)	CLOSE SEP 24 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 17	13 3/8	+1 1/8	+9.7
A	DATA PRODUCTS CORP	11- 30	31 5/8	+1 5/8	+5.4
O	DATUM INC	2- 6	5 3/4	+ 5/8	+12.2
O	DECISION DATA COMPUT	2- 6	5 1/8	- 1/8	-2.4
O	DELTA DATA SYSTEMS	1- 3	2 1/2	- 1/4	-9.0
N	DOCUMATION INC	9- 27	24 3/8	- 1/2	-2.0
O	DATARAM CORP	9- 37	11 1/8	-1 1/8	-10.1
N	ELECTRONIC M & M	3- 8	7 1/8	- 5/8	-7.9
N	EVANS & SUTHERLAND	28- 72	69	+3	+4.5
O	FABRI-TEK	1- 6	3 1/8	- 1/4	-7.1
O	GENERAL COMPUTER SYS	1- 6	5 1/8	+1	+20.0
O	GENERAL DATACOMM IND	12- 27	20 3/8	+1 1/8	+5.8
O	GENERAL TERMINAL CP	1- 4	2	0	0.0
N	HAZELTINE CORP	12- 31	29 5/8	- 3/8	-1.2
N	HARRIS CORP	25- 60	60 1/8	-1 1/8	-2.6
O	INFOREX INC	1- 4	1	0	0.0
O	INFORMATION INTL INC	6- 15	12 3/8	-1	-7.2
O	INTEL CORP	40- 55	49 1/8	-3	-5.3
O	INTERSIL	13- 30	32 1/2	- 1/4	-0.7
A	LUNDY ELECTRONICS	6- 12	10 3/8	0	0.0
O	MSI DATA CORP	5- 16	16 1/8	+ 1/8	+0.6
N	MEMOREX	10- 36	30 1/2	-1 1/2	-4.8
N	MOHAWK DATA SCI	10- 28	25 3/4	-1 1/2	-5.5
O	QUEX	2- 10	9 1/2	+ 1/2	+5.5
A	PARADYNE CORP	10- 50	45 5/8	-3 1/8	-6.4
A	PERTEC CORP	9- 15	12 1/2	- 1/4	-1.9
O	RAMTEK CORP	10- 17	16 1/4	0	0.0
O	RECOGNITION EQUIP	5- 10	10 3/4	+ 3/8	+8.4
O	SCAN DATA	2- 9	2 3/4	- 1/4	-10.2
N	STORAGE TECHNOLOGY	12- 33	22 3/4	+ 3/4	+3.4
O	SYKES DATATRONICS	10- 39	37 3/4	- 1/4	-0.6
O	T BAR INC	10- 21	19	+ 3/4	+4.1
A	TEC INC	3- 9	6 5/8	- 1/4	-3.6
N	TEKTRONIX INC	42- 70	68 5/8	+1	+1.5
N	TELEX	3- 6	5 1/8	- 1/8	-2.4
O	TESDATA SYSTEMS CP	4- 26	13 3/8	- 3/4	-5.3
A	TIMEPLEX INC	7- 29	26 1/2	+ 1/2	+1.8
O	WILTEK INC	1- 3	2 5/8	- 1/8	-4.5
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 15	14 5/8	- 5/8	-4.0
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	15- 44	42 3/4	- 5/8	-1.4
O	CYBERMATICS INC	1- 1	1	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	15	+ 1/8	+1.0
N	ENNIS BUS. FORMS	13- 21	19 1/4	+ 1/8	+0.6
N	3M COMPANY	40- 62	60 7/8	+ 5/8	+1.0
O	MOORE CORP LTD	27- 37	36 1/4	- 3/8	-1.0
N	NASHUA CORP	20- 38	36 1/8	-1 3/4	-4.6
O	STANDARD REGISTER	22- 30	33 1/4	+3 1/4	+10.6
A	TAB PRODUCTS CO	13- 31	30 1/2	+2 5/8	+9.4
N	WABASH MAGNETICS	11- 18	15 3/4	-1 7/8	-10.5
N	WALLACE BUS FORMS	25- 45	40 1/8	+3 3/8	+9.0

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
No. 41 October 6, 1980 $1.00 a copy; $30/year

Programmers Number 1 In Employer Demand

By Ann Dooley
CW Staff

NEW YORK – Computer personnel are at the top of employers' most wanted lists, beating out 103 other occupations, according to a technical and managerial recruitment firm survey.

Of the more than 100 occupations listed, programmers were the Number 1 job in demand, according to survey respondents. Second highest in demand were systems analysts and Number 3 on the list was electronic circuit design engineers, whose job it is to design the circuitry of computers and other equipment, the survey noted.

Respondents ranked mechanical engineers who, according to the survey, are the people who maintain and suggest improvements on computers and other machinery, as fourth most in demand. Next highest were technical salesmen, then cost accountants and electrical engineers.

Survey results were obtained by asking managers at National Personnel Associates' network of 237 agencies in 145 cities to rank job titles that have increased in demand over the last six months.

A variety of reasons were attributed to the large proportion of computer job categories at the top of the most wanted positions. The advent of the microcomputer, which has enlarged the areas in which computers can be used, has been one factor, and the growth of service bureaus, which has increased the need for programmers, is another, respondents noted.

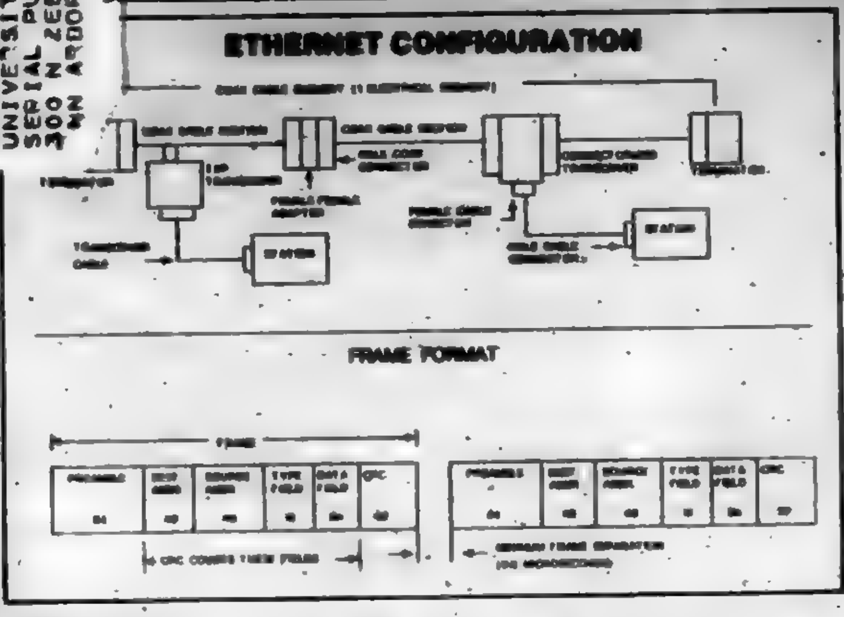
Hiring Edge

The survey found that programmers with two to five years of experience have a strong hiring advantage over recent graduates, since companies are looking for people who can become productive right away. Programmers with a knowledge of several different languages and who have developed a background in general management information systems are also high in demand.

An excellent growth path is available for personnel to go from programmer to systems analyst to management. "The sky's the limit in advancement because employers like a programming background," one respondent said.

The best jobs for DPers are in manufacturing because that industry offers higher salaries than service firms, such as insurance companies, and therefore provide a better jumping-off point for future jobs, respondents noted.

Computer personnel should also keep abreast of technical developments by subscribing to at least two technical journals and spending at least two to three hours a week reading about advances in the technology, National Personnel Associates suggested.



DEC, Intel, Xerox Announce Specifications for Ethernet

By Marguerite Zientara
CW Staff

Digital Equipment Corp., Intel Corp. and Xerox Corp. have announced the long-awaited specifications for their jointly developed local-area data communications network, Ethernet [CW, May 26].

Ethernet is a passive, coaxial cable-based transmission bus to which a wide variety of smart and dumb terminals can be attached via transceivers. The system also accommodates digitized voice transmission.

Because the medium is passive, the network has no switching logic and is not controlled by a central computer, according to the developers. It simply accepts transmissions from system elements attached to it, such as computers and distributed peripherals.

The Ethernet Specification is a design reference document that describes the required physical, electrical and procedural attributes of network elements.

(Continued on Page 9)

Initial IBM Filing To EPA on TNF 'Insufficient'

By Bruce Hoard
And E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — IBM's initial filing with the Environmental Protection Agency (EPA) regarding the possible carcinogenicity of chemicals in the 3800 printer was "insufficient," an EPA spokesman said, and the followup filing indicates IBM scientists had shown the mutagenic effects of those chemicals two years earlier.

The original filing consisted primarily of results from "Ames" tests of the chemical in question conducted for IBM in 1980 by SRI International, Inc. and older tests conducted on mice in the late 1960s and early 1970s.

(Continued on Page 8)

SNA Viewed Part of Strategy To Lock Users Into IBM Fold

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Most IBM users still fail to grasp the full significance of Systems Network Architecture (SNA), and their ignorance threatens "to lock them into an all-IBM environment," according to the head of a Sunnyvale, Calif.-based telecommunications consulting firm.

For the vast majority of users, SNA remains as much of a "mystery" and a "gray fog" today as it was when it first arrived on the data communications scene five years ago, said Telecom Computer Technology (TCT) International, Inc. President Saroj Kar.

Many users still mistakenly believe SNA is just another IBM data communications protocol, an enhanced successor to old standbys like "bisync" and start-stop. In truth, however, SNA goes far beyond either the bisynchronous or start-stop protocols in both its technological complexity and user implications, Kar said recently during a TCT International-sponsored seminar on the subject of "Compatibility with IBM's SNA."

SNA lies at the very heart of IBM's master product strategy for the 1980s and will serve as the "technological foundation" upon which all of IBM's future system and network offerings will be based, Kar said. Thus, IBM users who want to take advantage of the industry giant's next generation of advanced hardware will have little choice but to migrate to SNA sooner or

(Continued on Page 7)

IBM 3270 Market Profiled

Industry Spotlight

By Marcia Blumenthal
CW Staff

By doubling production capacity for its 3270 CRT terminal line last year, IBM gave 3270-compatible terminal vendors fair warning that it intended to regain the market share it has lost to these competitors during the past few years.

As of last December, approximately 720,000 3270-type CRT devices were installed, representing nearly 24% of the total installations of data entry equipment, according to International Data Corp. (IDC). These CRT devices will represent nearly 30% of terminal installations by 1984 — 2.3 million devices.

IDC pegged IBM's share of the 3270 market at 51.5% last year. However, at one time IBM held more than 65% of the market, noted Paul Klein, vice-president of marketing for Memorex Corp.'s Communications group. In the past couple of years IBM has lost considerable ground to approximately 14

(Continued on Page 4)

★ *Info 80 Starts Today — See Stories on Pages 12-14* ★

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W. Germany: Eckhard Utpadel, CW Publikationen, Friedrichstrasse 31, 8000 Munich 40, Phone (089) 34-90-61. Telex: 5215350.

Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141 Phone: (03) 445-6101. Telex: J2424461

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road Framingham -Mass. 01701

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$1.00 a copy. U.S. – $30 a year. Canada, Central & So. America – $50 a year. Europe and Near East – $90 a year, other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor Mich. 48106 Phone (313) 761-4700. *Computerworld* is indexed; write to Circulation Dept. for subscription information.

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POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Rewrite Bill Delay a Bell Setback

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – AT&T suffered a significant setback last week when the House Judiciary Committee decided not to approve pending legislation that would replace the 1934 Communications Act. Earlier, the Senate Commerce Committee came to essentially the same conclusion regarding a related bill.

For the phone company, the major virtue of these measures was that they did not break up the Bell System, as demanded by the Department of Justice in its pending antitrust suit. If either measure had passed, it probably would have persuaded the presiding judge in the antitrust case that the government's demand for divestiture was unnecessarily harsh.

But AT&T's loss is tactical, not strategic. Essentially, it means Bell lawyers must now succeed where the company's lobbyists failed.

The Justice Department, however, will almost certainly cite the failure to pass a communications act rewrite bill this year, – after four years of intense discussion – as evidence that Congress has doubts about letting AT&T offer "competitive" services and products through separate subsidiaries on a deregulated basis. This could help persuade the judge that more stringent measures, closer to the divestiture proposed by the government, are necessary.

Last week's House Judiciary committee vote also will weaken AT&T's leverage on Capitol Hill if another attempt is made next year to pass a rewrite bill.

There is some doubt about this at the moment. Rep. Lionel Van Deerlin (D-Calif.), chief sponsor of H.R. 6121, indicated last week that he is not particularly eager to try again. And since the antitrust case is scheduled to go to trial next January, there are probably other legislators in both Houses who would prefer to wait and see what happens in the hopes that the record established during the trial will make their job easier.

But if legislation is introduced next year, the Judiciary Committee will get involved earlier than it did this year. Since the members of the committee appear to be sympathetic to the concerns of computer industry groups which opposed H.R. 6121, that development is likely to reduce the phone company's leverage.

This year, the Judiciary waited until the House Commerce Committee, whose members include Van Deerlin, passed H.R. 6121, before requesting referral of the legislation. When Judiciary completed its review last week, members asserted their right to consider any legislation introduced next year. Later a staff member added that the committee intends to ask for referral when the bill is introduced.

Among those likely to be active in the 1981 telecommunications debate is Rep. Peter Rodino (D-N.J.) who chairs a Judiciary subcommittee. Last summer, shortly after Van Deerlin and his colleagues on the Commerce committee passed H.R. 6121 by a 34-7 vote, Rodino requested referral of the measure to the Judiciary.

ADR Eases Application Design

PRINCETON, N.J. – An application development system designed to improve productivity and cost-effectiveness during the development cycle of on-line and batch commercial applications has been introduced by Applied Data Research, Inc. (ADR).

Ideal (Interactive development environment for an application's life cycle) provides powerful, integrated facilities for accelerating application development in an interactive, user-friendly environment, the vendor claimed.

The product also offers an interactive data dictionary/directory base environment.

It is supported on IBM 370, 30 series and 4300 series and equivalent systems operating under DOS/VSE, VS1 and MVS, a spokesman said.

The system's language is simple enough for end users and powerful enough to build sophisticated commercial applications, he said, adding that it is marked by structured organization, relational-like data base reference and update and automatic screen handling.

Interactive Validation

Another feature is interactive validation, compilation and execution of applications. With on-line dictionary-driven validation of applications, programs are compiled with immediate effective feedback and means for user correction of problems, he said.

Also included in the system are:

- Full support for ADR's Datacom/-DB data base management system.
- Support for Vsam data sets.
- User-transparent support of Datacom/DC, Roscoe and CICS/VS.

First delivery will be in the fourth quarter 1981 and the price will be approximately $50,000, exclusive of integrated software components, the vendor said from Rt. 206 & Orchard Road CN-8, Princeton, N.J. 08540.

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I.Q.

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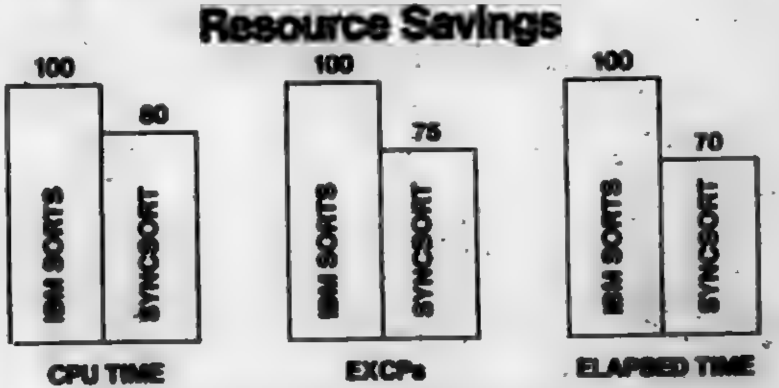
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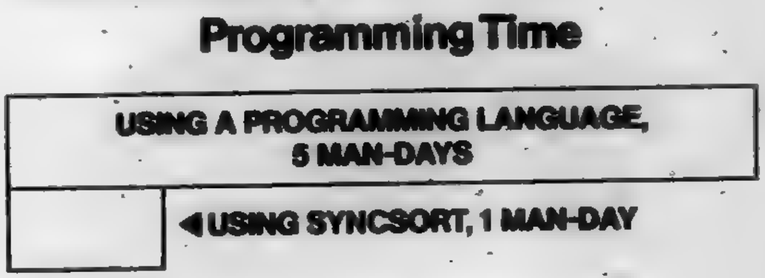
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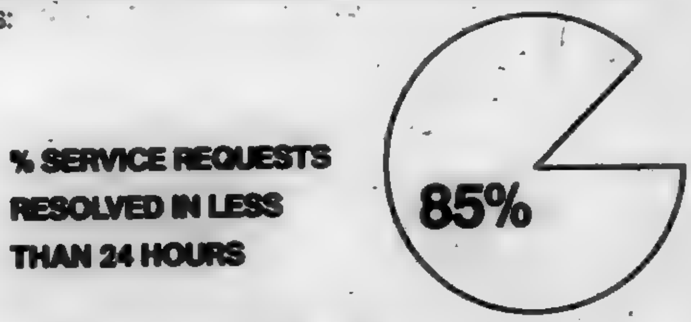

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Market Profiled For IBM 3270s, Top Competitors

(Continued from Page 1)

3270-compatible manufacturers.

However, after IBM doubled its 3270 production capacity last year, most products are now on a reasonable delivery schedule, IDC noted. While user demand will remain strong for these products, IDC forecast rough going for some 3270-compatible manufacturers during 1980 and 1981. The advantage these vendors had in being able to deliver products more quickly than IBM is diminishing, as are the price differentials on IBM's newer 3270 products, IDC maintained.

Industry Spotlight

Although top 3270 competitors are concerned about IBM's newborn aggression, particularly for 3276 and 3278 models, those interviewed by *Computerworld* recently cited healthy order rates at their firms.

The top six vendors account for 35% of compatible 3270 installations of CRT devices, according to IDC. These top six vendors are Raytheon Data Systems (76,000 units); ITT Courier (57,000 units); Telex Computer Products, Inc. (39,000 units); Memorex Corp. (35,000 units); Harris Data Communications Division (24,000 units); and Teletype Corp. (23,000 units).

IBM's 3270 product family spans two generations. The oldest products are the 3271 and 3272 control units and the 3277 display. Then, in 1977, IBM began Phase II of the product family with the introduction of the 3274 controller and 3278 display units.

The new group of products were designed to operate within IBM's System Network Architecture (SNA) and were 20% to 40% less expensive than former models, explained Terry Schmidt, product marketing manager for Harris Data Communications, a division of Harris Corp.

SNA compatibility is virtually a must for vendors who want to compete successfully in the 3270 marketplace.

Of the top six vendors, Harris Data Communications and Memorex have yet to adapt their product to an SNA environment. However, Schmidt said Harris' 9220 models, now in beta test, will feature SNA compatibility. Memorex's Klein said that firm is also considering SNA for its product line.

"Users are just starting to accept SNA. It's taken IBM a long time to put the parts together," noted Bert Hochfeld, Telex's director of planning and strategy.

Two Hot Buttons

Two other hot buttons in 3270-compatible machines today are increased functionality or "intelligence" and color terminal capability.

While IBM introduced its color display, the 3279, last year, to date none of its competitors has introduced a color display. However, all leading vendors interviewed said they were exploring color. Both the cost of making a color display and the relatively low demand level the product now has are deterrents to adding a color terminal to their product lines.

However, as the size of the screen is increased, users have to have a way of coding the information displayed, and one way is color, noted Barbara Ells, product marketing manager at ITT/-Courier.

Besides color, functionality, or increased intelligence, is an option vendors are contemplating. Most agreed that IBM's next generation of 3270 products, expected to be introduced next year, would offload more processing function on the terminal subsystem.

Those vendors whose products are device-compatible – devices that can be interchanged with IBM's 3270 products – have generally not added functionality to their replacement products.

However, vendors like Harris Data Communications and Raytheon Data Systems, which offer subsystem-compatible products, generally have built functionality into their offerings to gain a competitive edge over IBM. For example, by adding intelligence to its systems, the PTS-100 and the PTS-2000, Raytheon is able to sell into specialized markets such as airline reservations.

Users who opt for subsystem-compatible 3270 products must buy both the controller and the display from the same vendor.

Despite added functionality, 3270 vendors still essentially compete on price. Depending on the type of unit the user desires, prices are generally 10% to 50% less than comparable IBM 3270 products.

Price competition for leased equipment is less marked than for purchased equipment, vendors agreed. They do not see IBM putting the squeeze on lease prices. In fact, IBM has raised its lease prices, explained Milt Cooper, vice-president of marketing and sales for Raytheon's Intelligent Terminals Division.

The purchase price is where IBM exerts the greatest pressure, most recently offering users up to a 15% discount on volume purchases.

However, IBM's emphasis on making purchases attractive is bound to have a minimal impact on its competitors. The 3270 market is 62% lease and 38% purchase, just the reverse of other segments of the terminal market, Venture Development Corp. (VDC) noted. To remain competitive, vendors must offer comprehensive lease packages.

From a market standpoint, the 3270 market has passed its halcyon days. While remaining strong in terms of the number of units shipped, the market will grow more slowly than in previous years, VDC forecast. Instead, the fastest growing segment of the terminal market is now clustered processing stations, growing at 28% a year.

Moreover, the 3270 arena is experiencing healthy competition from Honeywell, Inc., Univac and Burroughs Corp., all of which combined are producing terminals in volumes larger than the 3270. IDC terms this the HUB market and notes opportunities for vendors who wish to offer terminals compatible to these mainframers.

IBM	HARRIS DATA COMMUNICATIONS DIV.[1]	ITT COURIER[2] TERMINAL SYSTEMS, INC.	MEMOREX CORP.[1]	RAYTHEON DATA SYSTEMS[1]	TELEX CORP.[2]	TELETYPE CORP.[1]
3271 Control Unit	8171, 8181[3]	2711	1271	PTS-100	271	40/4, 4540
3272 Control Unit	8172, 8182[3]	2721	1272	PTS-100	272	—
3274 Control Unit	8171, 8181[3] 8182[3], 9210	7411	—[6]	PTS-100 PTS-2000	274	—
3275 Display Station	8175	2780	—	—	275	40/4
3276 Control Unit Display Station	8171, 8181[3]	7801	2076	PTS-2000	276	—
3277 Display Station	8171, 8172 8181, 8182 8175, 9210	2770[4] 2700, Model 3[5]	1277	PTS-100	277	40/4 4540
3278 Display Station	9210	2780[4] 2700 Model 13[5]	2078	PTS-100 PTS-2000	278	—
3279 Color Display Station	—	—	—	—	—	—

1. Vendor's equipment is subsystem-compatible. This means individual components of the 3270-compatible system cannot be interchanged with IBM 3270 devices.
2. Vendors equipment is device-compatible. This means individual components of the 3270-compatible system can be interchanged with IBM 3270 equipment.
3. The 8181 and 8182 models support special enhancements not found in comparable IBM equipment. This includes queued transaction handling, local format storage and spooled print.
4. Device-compatible.
5. Subsystem-compatible.
6. Under development.

IBM 3270 and Major Competitors' Compatible Offerings

	IBM	HARRIS DATA COMMUNICATIONS DIV.	ITT COURIER TERMINAL SYSTEMS, INC.	MEMOREX CORP.	RAYTHEON DATA SYSTEMS	TELEX CORP.	TELETYPE CORP.
SDLC	All Controllers	All Subsystems	7411 A&C 7801, 2711	Displays can operate with SDLC devices, but Memorex's controllers do not run under SDLC.	All Subsystems	271 276 376	4540
SNA Compatibility	—	9210, 9220 models will be SNA-compatible. To be introduced in the near future.	7411 A&C 7801, 2711	No — currently under consideration.	All Subsystems	276	4540

SNA and SDLC Compatibility

Competition Looks Ahead, Sees Intelligence Added

By Marcia Blumenthal
CW Staff

What will IBM's new generation of 3270 products look like next year?

Most 3270-compatible vendors agree IBM will add functionality to its control unit, making the products more tuned to the distributed processing environment. Other changes will primarily be human engineering refinements.

IBM will add more off-line functions, Terry Schmidt, product marketing manager of Harris Data Communications Division, predicted. Moreover, he expects IBM will offer a range of screen sizes for its terminals. The 3270 screen is still pretty large and does not allow for applications where space is limited, he said.

While agreeing that IBM would pursue added functionality, Bert Hochfeld, Telex Computer Products, Inc.'s director of planning and strategy, has a hunch IBM will also try to incorporate its inexpensive 3101 dumb terminal into the 3270 environment. And IBM will try to introduce a different printer technology, he said, adding that the printer is the key constraint in terminal systems.

At Teletype Corp., Charles Pedler, vice-president of strategic planning, speculated that IBM would gear its terminals to the word processing function, hoping to become a major player in the office automation market.

A recent study by Venture Development Corp. noted that for the next five years, terminals will be used for pretty much the same user applications except for word processing, which will account for 12% of applications by 1984 — up from 4% last year.

However, IBM will not add so much functionality that it will jeopardize its second generation of 3270 products now being shipped in record numbers, noted Milt Cooper, vice-president of marketing and sales for Raytheon Data Systems' Intelligent Terminals Division.

Industry Spotlight

Raytheon Data Systems

NORWOOD, Mass. — Raytheon Data Systems (RDS), with an estimated installed base of 76,000 IBM 3270-compatible systems at year-end 1979, is second only to IBM in this marketplace, with a market share of 10.6%, according to statistics compiled by International Data Corp.

Part of the $4.3 billion Raytheon Co., RDS produces two products that are subsystem-compatible with IBM's 3270 line. Its two major systems are the PTS-100 and the PTS-2000.

The PTS-100 emulates IBM's 3271, 3272 and 3274 controllers and can operate in a Systems Network Architecture (SNA) environment, Cooper said. Although the PTS-100 is currently the firm's mainstay 3270-type product, its newer PTS-2000, also SNA-compatible, is the architecture for the 1980s, Cooper said. It will be the basis of all product extensions such as use for word processing.

The PTS-2000 system is a small cluster configuration similar to the 3276, but can be field-upgraded to larger clusters, accommodating 32 devices. Besides adding its own functionality to the system, Cooper said, RDS will follow all key functional enhancements made by IBM.

On a two-year-lease basis, RDS' systems are priced 23% to 25% less than IBM's 3270 products, Cooper claimed. All PTS products can be delivered in 30 days, he added.

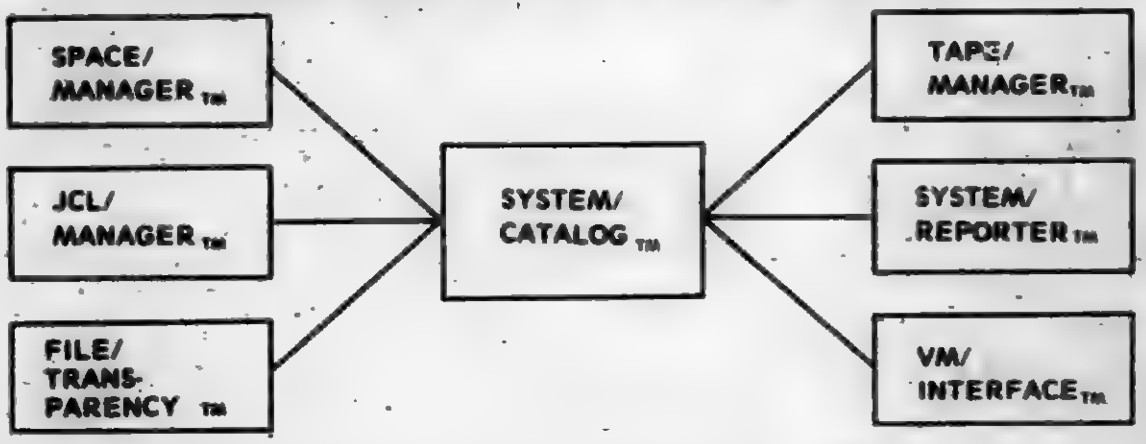
3270-TYPE CRT DISPLAYS INSTALLED YEAR-END 1979

IBM	370,000
Raytheon Data Systems	76,000
ITT Courier Terminal Systems, Inc.	57,000
Telex Corp.	39,000
Memorex Corp.	36,000
Harris Data Communications Div.	24,000
Teletype Corp.	23,000
Honeywell, Inc. (Incoterm)	19,000
Management Assistance, Inc. (Wordstream)	19,000
Computer Optics Corp.[1]	11,000
Mohawk Data Sciences Corp.	11,000
Northern Telecom Systems Corp.	11,000
General Telephone and Electric	8,000
Bunker Ramo Corp.	7,400
Four-Phase Systems, Inc.	6,000

[1] Acquired by Four-Phase in April 1979.

Source: International Data Corp.

FRUSTRATED WITH DOS/VS(E)?



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Industry Spotlight

• ITT Courier •

TEMPE, Ariz. — ITT Courier Terminal Systems, Inc. produces a complete range of IBM 3270-compatible products. In addition, the firm manufactures synchronous terminals that support Honeywell, Inc.'s VIP protocol and supplies the point-of-sale terminals for 25% of 16 stoves in McDonald's hamburger empire.

Aquired by the $22 billion ITT Corp. in April 1978, ITT Courier has sales estimated in the $100 million to $150 million range. Among 3270-compatible makers, the firm ranks second with a total of 57,000 CRT displays installed at the end of last year, according to International Data Corp. (IDC). IDC estimated the firm holds a 7.9% share of the 3270-compatible market.

The company's strategy is simple and direct — to match IBM's entire 3270 product line with device-compatible equipment. "As long as the IBM host does not support additional functions, we will not," noted Barbara Ellis, product marketing manager.

IBM is pushing color capability, she observed, adding, it would be reasonable to assume ITT Courier would offer a 3279 type product.

Handsome Payoff

The firm's product strategy has paid off handsomely. The company grew at a 50% rate last year, but for the previous five years grew 70% annually, she noted.

Some 75% to 80% of the firm's business is from add-on equipment, with the remainder coming from new customers.

ITT Courier is part of ITT Telecommunications and Electronics Group, comprising 40% of ITT's total revenues.

• Telex Computer Products •

TULSA, Okla. — Within the past year, Telex Computer Products, Inc. has rounded out its 3270-compatible product line and now offers device-compatible replacements for IBM's entire 3270 family.

In addition, Telex has added Systems Network Architecture (SNA) compatibility to its 276 (IBM 3276) control unit and will be extending SNA compatibility, Bert Hochfeld, director of planning and strategy, noted.

Telex gained its footing in the 3270-compatible market through its 1976 acquisition of Terminal Communications, Inc.

Since then it has installed 39,000 CRT displays, garnering 5.4%, of the 3270 market, the third highest of IBM 3270-compatible vendors, according to International Data Corp. (IDC).

Costs associated with the introduction of a slate of new 3270-type products in the past year contributed to the negative impact on Telex's earnings. For its latest fiscal year ended March 31, Telex had sales of $165.9 million, up from $148 million in the prior year. However, earnings dropped to $991,000, down from $5.3 million in the prior year. Telex contributes about two-thirds of the total revenues of the parent company, Telex Corp.

While Hochfeld was candid about the damage IBM price decreases could do to Telex and other vendors, he noted IBM has recently raised lease prices. Nonetheless, "a rental of $70 per month for a device is a number which is hard to get under." Telex currently leases its displays for $63 on a two-year plan, he said.

The Terminal Communications Division contributes 60% of Telex's revenues. Its 3270 product shipments are growing at 30% annually, Hochfeld estimated. These products are the backbone of the division.

Although Telex's 270 product line is device-compatible with IBM's 3270 products, Hochfeld is particularly bullish about the distinguishing characteristics of the company's 3287-type 287 printer introduced at the National Computer Conference in May.

Telex's prices are 10% to 30% below IBM's levels. Its 276 (IBM 3276) and 278 (IBM 3278) can be delivered within 45 days. However, the wait for printers is somewhat longer, he said.

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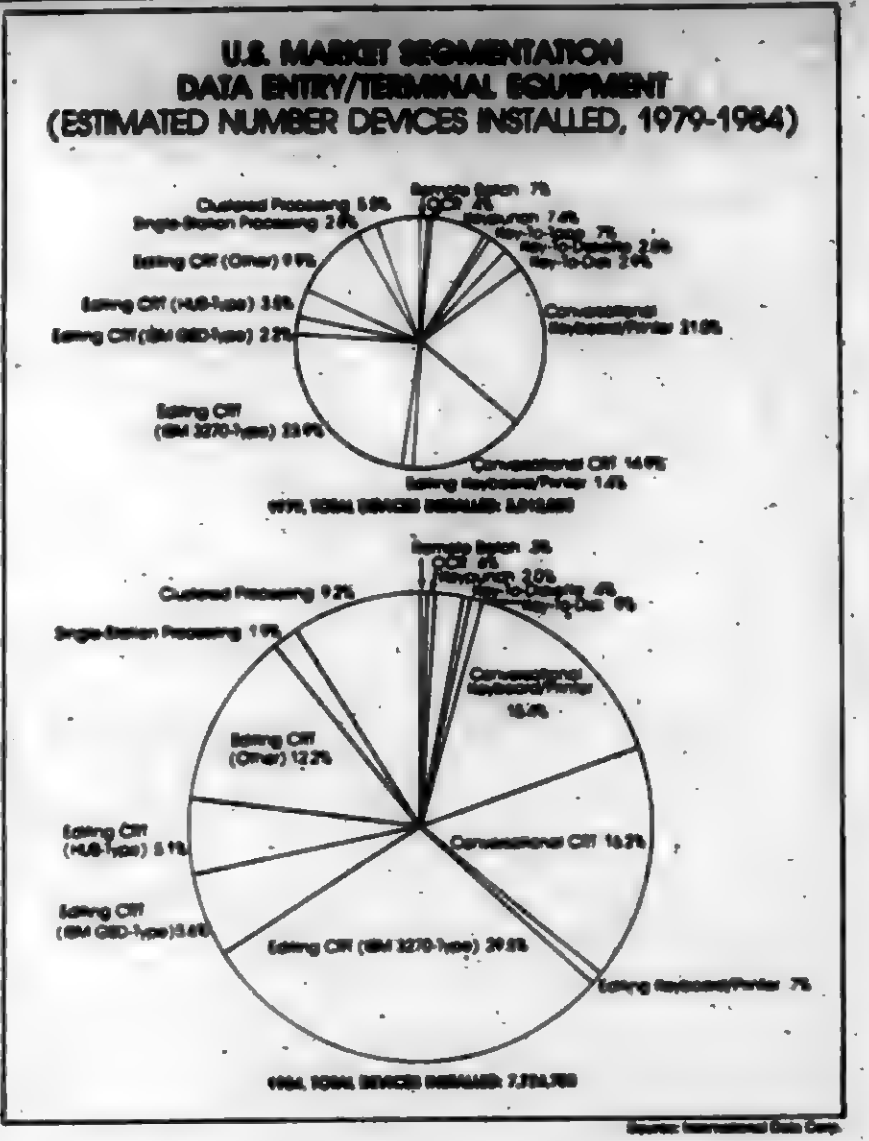


Source: International Data Corp.

• Memorex Corp. •

SANTA CLARA, Calif. — Of the top three device-compatible 3270 vendors, Memorex Corp. is the only firm not to offer users a 3274 control unit, a 3275 display unit or Systems Network Architecture (SNA) compatibility.

While Memorex probably will not offer a 3275 product, its 3274-compatible product is under development, according to Paul Klein, vice-president of marketing within the Communications Group. Moreover, the firm is working on SNA compatibility, he noted.

Although interested in marketing a color terminal, Memorex is waiting to see how the 3279 models will evolve, George Everhart, manager of product planning, explained. Memorex expects a lower price version of the 3279 in the not-too-distant future.

Despite lapses in product line and capability, Memorex as of last year had 35,000 of its 3277-type 1377 CRT displays installed, according to International Data Corp (IDC). Memorex introduced this product in 1976.

With a $21 million loss for the first two quarters of its current fiscal year, industry analysts have repeatedly questioned Memorex's ability to compete in IBM-compatible markets.

But Memorex's 3270-type products account for 60% of the Communications Group's revenue, Klein noted.

On a price basis, Memorex's lease terms are 95% of those of IBM, and purchase prices are 25% below IBM's. The company's 3277-type 1377 display is on immediate delivery status.

• Harris Communications •

DALLAS, Texas — Harris Data Communications is the largest division within the Information Systems Group of the $1.3 billion Harris Corp. The firm entered the 3270 market in 1977 through the acquisition of Sanders Data Systems, a division of Sanders Associates, Inc.

Harris produces two major 3270-compatible subsystems — the 8000 and 9200. Its 8000 line is targeted towards IBM's first-generation 3270 bisynchronous transmission products, which currently represent the major portion of the market, Terry Schmidt, product marketing manager, explained.

However, this market will shift to the Systems Network architecture (SNA) environment during the next five years and the firm's newer 9200 product line will target the SNA environment. Its first entrant in the SNA world, the 9210, is currently in beta test.

Aside from enhanced functions not found on IBM 3270 equipment, such as local format storage, Harris early on decided to increase production capability, knowing this was a key tactic for making inroads on IBM. Currently the firm can deliver its systems in 45 days.

At the end of last year, Harris had 24,000 3270-type CRT displays installed, taking fifth place among IBM's competitors, with a 3.3% share of the market, according to International Data Corp.

Although Harris' delivery time is highly competitive, its prices are higher than most other 3270-compatible vendors, generally 10% to 12% below IBM.

FAA May Dismiss Controller for Tampering

By Marguerite Zientara
CW Staff

NEW YORK – The Federal Aviation Administration (FAA) has moved to dismiss an air traffic controller for allegedly removing data from computerized radarscopes and contributing to the "potential endangerment" of a Soviet jetliner approaching Kennedy International Airport last January [CW, Feb. 11].

Gerald F. O'Brien is the first controller ever to be charged with tampering with air traffic control equipment, according to an FAA labor relations spokesman. A second controller, Richard E. Kelsey, faces a possible 30-day suspension on charges that he was "negligent by not controlling the use of equipment" under his jurisdiction, according to an FAA spokesman.

The announcement of the FAA action indicated that "important flight data" concerning a Soviet Aeroflot airliner, on which Ambassador Anatoly Dobrynin was a passenger, had been "deliberately erased" as the aircarft approached Kennedy on Jan. 18.

The announcement said that "precise deliberate keyboard entries" had been made "at a specific control position" during the incident.

The occurrence came at a time when the local chapter of the Professional Air Traffic Controllers Organization (Patco) was publicly opposing the handling of Soviet or Iranian planes because of the Soviet intervention in Afghanistan and the holding of American hostages in Iran.

The incident reportedly occurred during a shift change at Kennedy's Common Instrument Flight Rules (IFR) Room, when the supervising controller became aware that the Aeroflot jet's radar blip carried no computer-generated alphanumeric identifying data block, indicating airline, flight number, altitude and ground speed, according to the FAA spokesman.

When the supervisor called the Air Route Traffic Control Center (ARTCC) in Islip, L.I., to clarify the situation, center personnel indicated the air sector in which the Aeroflot jet was flying.

"But there was another plane [in that sector]," the spokesman explained. "[The supervisor] punched back the data block, but he put it on the plane that was closer in, and because it was closer in, he ordered it to descend."

Jet Descended Early

That error resulted in the Aeroflot jet's descending 10 miles too early in the normally crowded skies over Long Island. "There was no other traffic in the area, so there was no danger," the spokesman noted, "but if there had been other traffic in the area, there possibly could have been some danger."

After a Federal grand jury in Brooklyn decided in August that there was no probable cause for bringing criminal charges against O'Brien, Common IFR Room Facility Chief Russell Shedd requested that a special FAA committee investigate the matter, resulting in the recent charges.

Legal experts stressed that the burden of proof is less stringent in a civil administrative proceeding. The accused men have 20 days from notification to reply "before final decisions are made by the agency," the FAA spokesman said.

The two controllers, who reportedly have served notice of their intention to appeal the charges, were not available for comment.

SNA Viewed Trap for Users

(Continued from Page 1)

later. SNA compatibility will also be a prerequisite for users who want to avail themselves of the latest versions of IBM's most widely used software products like IMS.

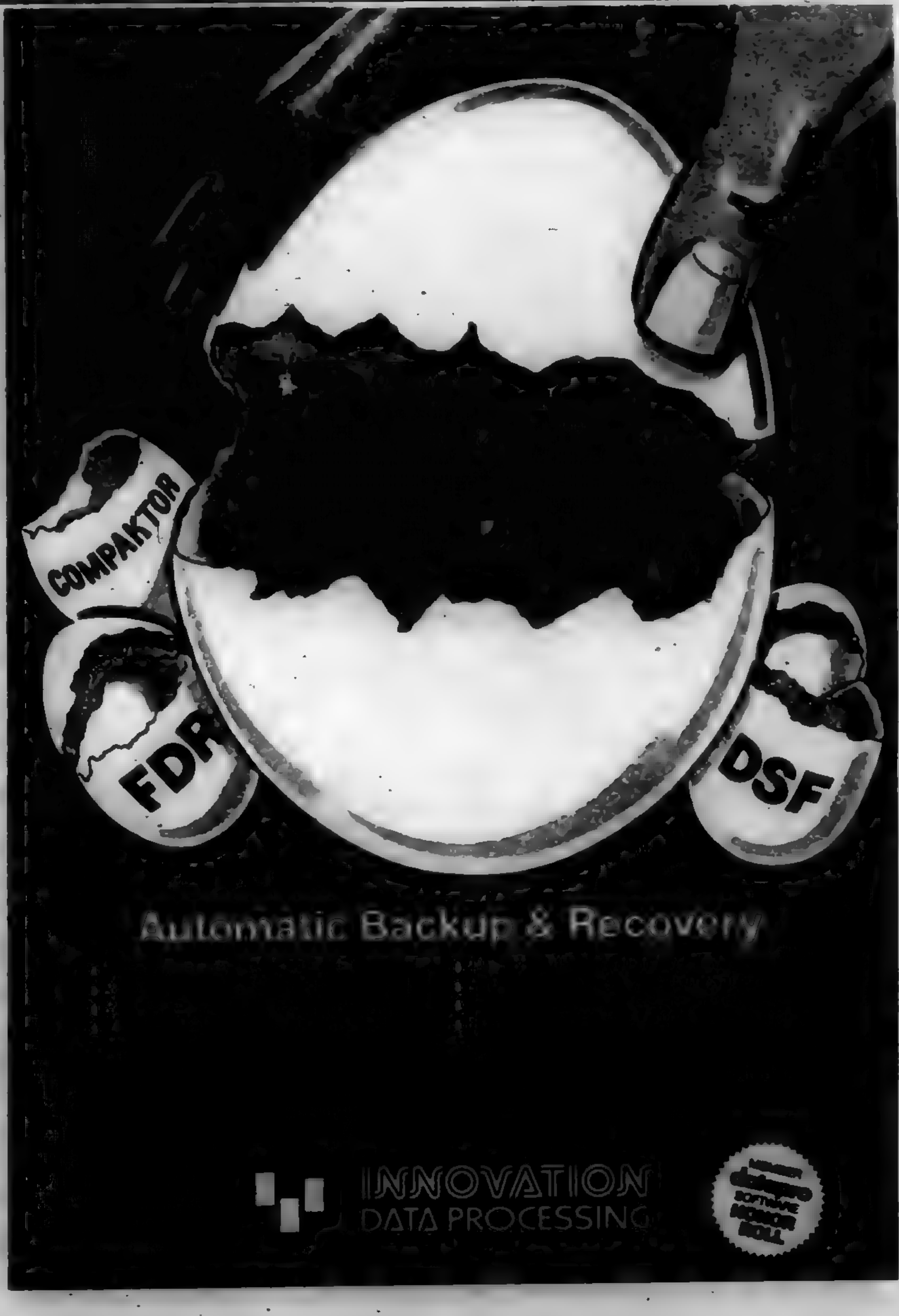
"For most users, the question of whether to convert to SNA is no longer an issue," Kar said. "The only question left is when the conversion will take place. IBM long ago put its customers on notice that they would eventually have to switch to SNA if they wanted to continue to operate within an IBM environment."

One of IBM's main objectives in introducing SNA is reportedly to make life difficult for plug-compatible manufacturers (PCM).

In response to what it apparently sees as a major PCM threat, IBM during the last few years has embarked on a new business and technological strategy that it hopes will reverse its recent market setbacks and propel it toward its goal of becoming a single-source vendor.

One of the cornerstones of IBM's plan to "lock" users into its own product line is SNA. In the past, PCM peripherals required little more than compatibility with IBM's Synchronous Data Link Control (SDLC) to communicate with the company's mainframes.

But in today's SNA environment, the interfacing requirements for non-IBM hardware modules are infinitely more difficult and complex. True, plug-compatible peripherals operate just as effectively in an SNA network as they do with the bisynchronous or start-stop protocols. But under SNA, existing PCM equipment has to be significantly modified and upgraded before it can be connected to an IBM-based network, Kar said.



Between 1967 and 1971

Doctor Says IBM TNF Tests 'Poorly Designed'

By Bruce Hoard
CW Staff

DURHAM, N.C. — Tests on trinitrofluorenone (TNF) commissioned by IBM and conducted by Hazelton Laboratories, Inc. between 1967 and 1971 were "poorly designed" and "inconclusive," according to Dr. Hans L. Falk, assistant director of health hazard and assessment at the National Institute of Environmental Health Sciences (NIEHS). NIEHS is a division of the Department of Health, Education and Welfare.

The Environmental Protection Agency (EPA) has also issued a highly critical evaluation of the Hazelton tests. IBM refuses to release scientists at Hazelton from their vow of confidentiality so they might be questioned about the tests.

Falk was asked to evaluate the carcinogenicity of TNF by Dr. David Axelrod, New York state commissioner of health. The request came after employees at that state's Department of Social Services refused to operate IBM's 3800 laser printer — which contains TNF — until the machine was certified safe [CW, Sept. 22].

In his reply to Axelrod, Falk complained that he had been supplied with a paucity of relevant information and had solicited more from IBM, which he received.

The director was anything but timid in denouncing the Hazelton tests. "The information given me makes it apparent that the tests were poorly designed and even if the full report had been available, it would not have led to the conclusion that TNF is noncarcinogenic," he wrote.

"I am very disappointed in the fact that apparently Hazelton carried out these inconclusive studies. The conclusion that can be reached is that carcinogenicity of TNF could not be demonstrated because of faulty design of experiments or reporting of results.

"The time period of the tests was too short to come to any conclusions. You can't cut the experiment off, you have to go on," Falk said. Comprehensive carcinogenicity tests in animals should take at least two years, he added.

Hazelton's longest tests were 18 and 21 months, respectively. From there, they dropped to one year, six months, four months and 24 to 72 hours. In Falk's opinion, that was not enough.

"As it is now, IBM has no data to prove TNF is not a carcinogen," he said.

EPA Concerned

NIEHS is not the only federal agency to express concern over IBM's Hazelton tests.

Referring to a negative six-month Hazelton inhalation study in one of its two TNF status reports, the EPA said "Because of the relatively short duration of the exposure and the use of only the mouse as the test species, this study does not provide an adequate basis to judge the carcinogenic or tumoregenic potential of TNF or CTC via inhalation exposure."

The agency went on to request more information from IBM in seven categories, including "Ames" tests results, inhalation test results and the fate of TNF after being transferred onto the 3800's hard-copy output. The Ames test is a short-term study used to determine mutagenicity.

The EPA received the latest round of IBM documents on Sept. 21 and has confirmed that new information in all its areas of concern was included. It has not, however, yet evaluated the documents.

Computerworld also acquired the recent IBM release and through examination has discovered the company upped its estimation of the amount of TNF found on hard-copy output by 25%. (See accompanying story.)

EPA Calls IBM Initial Filing On TNF Data 'Insufficient'

(Continued from Page 1)

However, when pressed for more information, IBM recently submitted documents that showed its scientists conducted Ames tests in 1978 with the same basic conclusions as those found in 1980 by SRI.

In addition, IBM admitted in its follow-up submissions that it had underestimated the amount of trinitroflourenone (TNF) that would be left on copies from the 3800 printer by 25%. The released data indicates TNF is also found in the air around the operator stations of that machine.

First Tests

TNF was originally identified as a possible carcinogen in the '50s and IBM conducted a series of tests (see related story) in the late '60s on the chemical leading it to the conclusion that TNF would not pose a health hazard in its copier products that used the chemical.

However, the same Charge Transfer Complex used in the copiers was later put into the laser printer — the 3800 — in a "geometry" that "is considerably different." Therefore, in 1978, the firm began testing the printer for the presence of TNF around the machine and on the output paper.

The tests were apparently conducted by different groups within IBM with some groups unaware of work by other groups. For example, tests reported in April 4, 1978 memos reach different conclusions than those reported a week earlier by a different group.

In addition, in its latest filing to the EPA, IBM claims a May 2, 1978 memo was the earliest "documented use of the Ames test as a quantitative method," but the filing itself contains a memo that shows such a use by IBM scientists two months earlier — with a finding that TNF was detectable around the machine in question.

The Ames test is a quick method used to determine if chemicals are mutagenic. Experts say 90% of the chemicals found to be mutagenic are also carcinogens.

In the March 1978 memo, IBM scientists reported that "in the course of screening many chemicals using the Ames . . . test, it was discovered that [TNF is] highly mutagenic."

Moreover, that study indicated that the test "can be used as a quantitative analytical tool for detecting TNF in various components and samples collected from the 3800 printer."

Finding that TNF was a "potent mutagen," the researchers went on to show that "TNF can be detected on the [copier] and also in all used toner samples."

Then, in 1980, IBM had the same Ames tests run by SRI with the same results — except in one important discrepancy.

SRI found that TNF was positive in the tests, but more importantly it found that "the response for a given concentration is approximately twice that obtained by IBM."

SDI 'Extension' Denied by Firm

By Marguerite Zientara
CW Staff

SAN MATEO, Calif. — SDI, Inc., which recently changed its software leasing policies to compulsory two-year contracts instead of the previous month-to-month lease option [CW, Sept. 8], did not grant Affiliated Foods, Inc. here an "extension" of the generally required 30-day notification period, an SDI spokesman said.

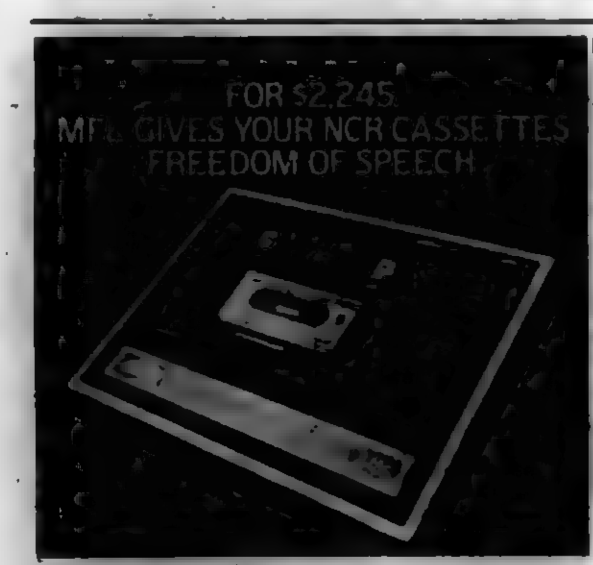
While it was reported that SDI "knuckled under" to Affiliated under the threat of a legal injunction [CW, Sept. 29], that was "not really" the case, according to SDI's Michael Miller, manager of advertising and promotion.

"Affiliated Foods was an old customer, and they had a 1974 contract including 'General terms and Conditions' which required 60 days' notice by either party [before termination of the contract], and the new 'General Terms and Conditions' states 30 days.

"[Affiliated Foods'] attorney sent us a letter explaining the situation, that he had discovered that under the old 'General Terms and Conditions' they had 60 days, and we said fine, we'll certainly honor that," Miller added.

Affiliated's DP manager, Joe Vail, contended, however, that while SDI did eventually honor the 60-day contract upon receipt of a letter from Affiliated's lawyer, Affiliated had previously notified SDI of the oversight by telephone.

While it was previously reported that Vail felt SDI "showed a wanton disregard [for its customers]" [CW, Sept. 29], Vail stressed that the disregard extended only to Affiliated.



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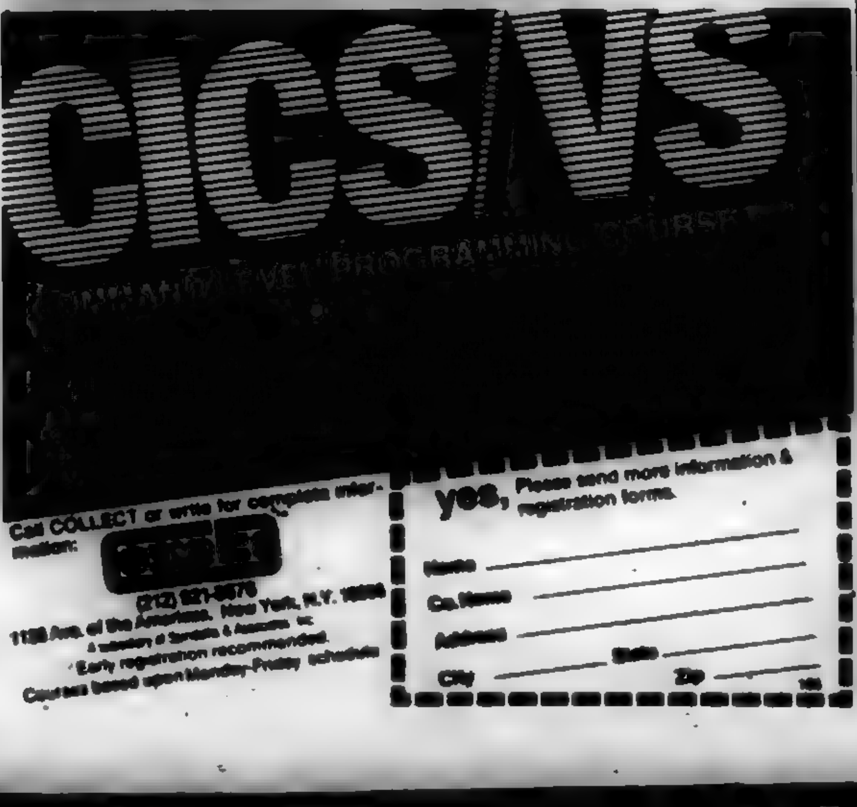

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HP 9825A Helps Sail Freedom to Cup Victory

By Tim Scannell
CW Staff

NEWPORT, R.I. — Aided by a computer-based navigation system and years of sailing savvy, the U.S. 12-meter yacht Freedom successfully defended the America's Cup title recently, beating the Australian entry four times in a seven-race series.

Although sailing purists may scoff, the Hewlett-Packard Co. 9825A desktop computer installed in the cockpit of the yacht and linked to virtually every one of Freedom's navigation instruments, had a lot to do with the American victory. The computer tracked apparent wind speed and direction, true wind speed and direction and advised the yacht's captain, Dennis Conner, on what course to take.

During the more than 24-mile race, the seagoing computer may be used as often as 100 times per hour, according to Halsey Herreshoff, Freedom's navigator. One day "all serious contenders will use computers, because they allow us to do more work in a given time with more precision," Herreshoff said, calling the machine his "constant adviser" during the America's Cup campaign.

Most of the software for the shipboard system was developed by Herreshoff and Peter Lawson, a heralded navigator and computer programmer. Lawson started writing programs for the America's Cup races in 1977 when he discovered that computers used then had only a 60% reliability. All of the programs used in this year's trials and final races were adapted for the design and sail characteristics of the Freedom yacht.

Lawson also had a hand in selecting the HP computer, which is basically just off-the-shelf hardware. The computer is shielded from the elements by a plastic bag and sits below deck within reach of navigator Herreshoff.

The computer shows information via 16 Rochester Instruments Co. liquid crystal displays on the machine's console. Those particular displays were selected because liquid crystal readouts are easier to see in the water's glare, Lawson stated.

"The biggest complaint I have against the 9825 is that the damn thing isn't waterproof," Lawson said.

While the computer does analyze data more quickly than the navigator can and determines, for instance, the correct time to tack, Freedom's crew strongly insists that the America's Cup is not a race between computers. However, there are some people who believe that computers should not play so heavy a role in the races.

At the end of the America's Cup trials, for instance, when Courageous was defeated, the yacht's captain, Ted Turner, vowed never to participate in the races again because they had become too wrapped up in technology and did not concentrate enough on traditional techniques of sailing.

Specs Unveiled For Ethernet

(Continued from Page 1)

The means to apply maintenance and diagnostic software to Ethernet equipment are expected to be specified by "early next year," a spokesman said.

During the summer, project members have been meeting with an Institute of Electrical and Electronics Engineers (IEEE) subcommittee, which is developing standards for local-area networks [CW, Aug. 25].

The Ethernet Specification is said to be similar to the Class I service that has been discussed by the IEEE committee. The three companies will submit the specifications for the committee's consideration at IEEE's October meeting.

Unique Address

In the Ethernet system, each system element has a unique 48-bit address. Information is transferred serially in groups of bits called frames. The frames include the data to be sent, the address of the unit that will receive it and the address of the unit sending it.

Each transceiver monitors the cable before transmission to be sure it is not in use and during transmission to detect interference, the spokesman said. If there is interference from a transmission by another element, the frame is sent again when the cable is clear. To receive data, each element recognizes its own address, accepting frames with that address and ignoring the others.

Under the specifications, Frame Format features include a Preamble that enables bit synchronization and marks frame boundaries; Destination Address, consisting of a 48-bit field with 2^{47} physical addresses, one broadcast and $2^{47}-1$ multicast group addresses; and Source Address, in the same format as destination address.

The Frame Format also includes a 16-bit field to designate higher-level protocol types; an Info Field including 46- to 1,500 bytes of user data; and 32-bit Cyclic Redundancy Check (CRC) to protect destination, source, type and information fields.

An End-of-Frame feature guarantees cessation of the carrier after the last data transition and the Minimum Frame Spacing is 9.6 microsec, providing time for receivers to reset.

Copies of the Ethernet specifications may be obtained from the Ethernet Literature Departments of any of the three firms: DEC at 1925 Andover St., Tewksbury, Mass. 01876; Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051; and Xerox at 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

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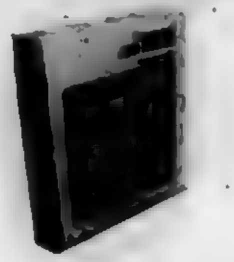

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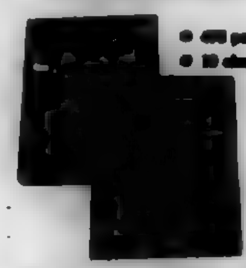

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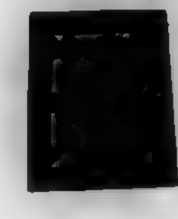

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CO8-1

Threat to U.S. High-Tech Leadership

Drive to Split IBM a 'Dumb Move,' TCA Told

By Jaffry Beeler
CW West Coast Bureau

SAN DIEGO — Efforts to split IBM into several smaller independent firms threaten to do the U.S. more harm than good and can be described fairly as a "dumb move," a top executive with a leading aircraft manufacturer warned here recently.

Not too many years ago, the U.S. enjoyed unquestioned world supremacy in most of its heavy bellwether industries like steel and autos. Today, however, the country's dominance in those key industries is being whittled away steadily by its more productive foreign competitors, particularly Japan and West Germany.

Only in computing, telecommunications and a few other isolated fields does the U.S. still maintain a position of international leadership, if not preeminence. But now, the country's computing and high-technology base appears to be heading toward the same sad fate that has already overtaken its steel and auto manufacturing companies.

Ironically, much of the threat to the nation's high-technology competitiveness is originating, not from overseas, but from forces operating right here in the U.S., according to Jaime Oaxaca, vice-president and assistant general manager of Northrup Corp.'s Electromechanical Division.

As a case in point, Oaxaca cited the federal government's persistent efforts to break up IBM into several independent and, therefore, comparatively weak divisions. IBM undoubtedly forms the cornerstone of the U.S.' high-technology might, and to slice the company into several competing entities would severely hamper the domestic computer industry's ability to meet stiff overseas competition, the Northrup executive warned.

Champion of Free Enterprise

Oaxaca, an electrical engineer by training and a self-described champion of the free-enterprise system, aired his views at the Tele-Communications Association's (TCA) 18th annual conference, here.

That show was billed as the largest and most heavily attended in TCA's history. During its four-day run, an estimated 3,500 visitors, including some 2,700 walk-ins, were expected to jam the conference's product-exhibit area, where approximately 90 hardware and services vendors displayed their wares in nearly 200 booths.

Exhibitors represented both the voice and data sides of the rapidly expanding telecommunications field.

In keeping with its overall theme — "Telecommunicators' Key to the Future: Education Plus Technology Plus Management" — the show complemented its product exhibit with a limited program of educational seminars. Altogether, the program consisted of six seminars covering such topics as future systems, goal setting, the need for educating top management, international communications, communications security and telecommunications management.

Rounding out the technical seminar program were five panel sessions dealing with government regulation of the communications field, educators, automated office systems, future telecommunications offerings and teleconferencing. Both the panel sessions and the educational seminars were restricted to TCA members only.

Final Highlights

One of the show's final highlights was a post-conference election in which TCA members were scheduled to vote on a petition to add a San Diego chapter to the group's existing organization. If approved as expected, the proposal would increase the TCA family of chapters to five and would expand membership to 1,175.

TCA currently includes some 900 members divided among four chapters, one each for the Arizona, Northern California, Southern California and Pacific Northwest regions.

As their keynote speaker, TCA conference organizers selected Oaxaca, who reminded his audience that telecommunications and telecommunications managers are heading rapidly into what he termed an "information age." The advent of the so-called information age will bring continued high inflation rates and an increased volume of minicomputer-based data communications between large firms.

The information age will also lay the technological foundation that will allow growing numbers of telecommunications managers and others to work at home instead of commuting each day to offices miles from where they live, Oaxaca said.

To prepare themselves for the problems and rigors of living and working in an information age, telecommunications managers should begin now to create a personal "market plan" detailing their long-term career objectives. They should then use the market plan as a yardstick against which to measure their future professional progress, he explained.

Telecommunications managers should also keep themselves professionally up-to-date through continuing education and make sure their companies improve efforts at career counseling, Oaxaca added.

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County Cuts Annual Election Costs by $75,000

By Marguerite Zientara
CW Staff

RIVERSIDE, Calif. – Because of declining hardware prices, more and more local governments are buying their own minicomputers for processing election returns in a move away from sharing a district's central CPU.

The benefits of such a switch from shared to dedicated computing power include greater local control of operations, faster job turnaround and new capabilities for information management, according to those who have made the change.

In addition, there are economic benefits. One such user, California's Riverside County, has reportedly reduced its election DP costs by $75,000 annually – from $200,000 a year to $125,000, according to Robert G. Morgan, chief deputy registrar of voters for the county.

Until early 1979, all of Riverside County's election data processing was done in batch on the central county system – an IBM 370/158 and a 3031. Such processing consumed about 3% of the total system resources except at election times.

"Election departments and DP departments are sometimes at odds with one another," Morgan said. "For one thing, elections are too unscheduled for DP departments, compared with the rest of their work.

"With elections, it's quiet for six months and then we want to monopolize the machine for three weeks; it complicates scheduling," he added. "At the same time, you can't postpone an election or rerun it. There's no such thing as not being ready or making serious mistakes."

Old Systems, New Laws

Because of those issues, Morgan eventually began to look into the possibility of acquiring his own system for the county election data processing.

"We had a requirement to upgrade the voter registration and election officer system," Morgan recalled. "The old system didn't do all it should and new laws kept forcing us to do more [information processing] in less time."

The county contracted with DFM Associates, Inc. of Costa Mesa, Calif., to develop a system tailored to the county's needs and to help procure the appropriate hardware.

The result was the Election Information Management System (EIMS), a 15-function software system designed to manage election information from voter registration through polling place management and ballot counting.

As for hardware to run it on, "we needed a minicomputer with a good data base management system [DBMS] and an interactive Cobol programming capability that would meet both ours and the county's requirements, which included handling up to 300,000 registered voters," DEM's Curt Fielder explained.

DFM finally settled on a Data General Corp. Eclipse C/350 with 750K bytes of main memory for the county, along with two 192M-byte disk drives, one dual-density tape drive, a Dasher 100 char./sec printer and a 600 line/-min printer, 10 Dasher terminals and the Infos data management system.

The heart of EIMS comprises five major files: voter file, street index file, precinct data file, election officer file and polling place file. Using the information in these files, the system can:

- Identify voters' precincts, election districts and Zip Codes from their addresses.
- Identify each precinct's congressional district, state senatorial and assembly district, school district, water district and so on.
- Generate mailers and lists for elections.
- Print ballot style and quantity requirements for all precincts.
- Provide accountability statistics for affidavits used in voter registration.

Riverside County uses EIMS to generate the differing ballot styles required for each election, Morgan explained. In California's June 3 primary, because of the variety of parties, districts and elections involved, a total of 238 different ballot styles were used within the county.

Election 1980

In addition, EIMS can automatically issue and keep track of absentee ballots, send candidate-supplied information to the proper voters and keep track of the polling places and election officers for election day.

Since the installation of the hardware in January 1979, the software functions have been implemented gradually, with the last function – election ballot counting – currently being readied for the presidential election Nov. 4.

For the primary, all capabilities except election ballot counting were on the system, while election ballot counting remained on the IBM equipment, Morgan explained. In November, however, all functions will be on the DG equipment and the IBM computers will serve as backup.

With "nothing we don't like" about the system, according to Morgan, Riverside County is well on its way to DP independence. "From a managerial standpoint, EIMS is probably the most valuable tool I have," he observed.

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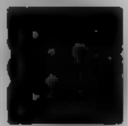

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CW Oct. 6, 1980

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Spotlight on the Human Side

Info 80 Preview

By Ann Dooley
CW Staff

NEW YORK — The human side of DP will rate special attention at Info 80, which opens today at the New York Coliseum.

"Productivity Improvement in the DP Organization — A Systems Problem," Session 5.1 on Monday from 11:00 a.m. to noon, will focus on systematic methods for setting productivity objectives as well as the structure of a management control system to define goals and measure white-collar productivity.

John Konvalinka, partner in Administrative Services for Arthur Anderson & Co., will chair the session. Alonzo Grace Jr., president of A.G. Grace and Co., will speak on how to apply structured practices to local problems.

Monday afternoon's Session 5.2 from 1:30 to 4:30 p.m. will focus on the "People Side of EDP — A Major Consideration for Productivity Improvement in the DP Organization." The session will focus on the psychology of personnel productivity and consider the "psychological profile" of the DP person in evaluating the factors that control his motivation and drive.

Chairman John Konvalinka and Dr. Norman Gekoski, president of Management Scientists, Inc., will also speak on how the organization views the DP personality and the career paths that suit the individual's self image and the organization's expectations.

Productivity Session

Chairman Hugh Ryan, manager of Administrative Services for Arthur Anderson & Co., and speakers Winslow Hill, manager of Home Office Information Services, Bethleham Steel Corp., and Robert Miller, chief systems engineer for the Chicago Police Department, will present Session 5.4 on "Increasing Productivity in the System Development Process" from 9:00 a.m. to noon on Tuesday, Oct.7. This session will examine various approaches to productivity improvement and how the methodologies affect design changes and other conditions in system development.

On Tuesday from 1:30 to 4:30 p.m., Session 5.6 will deal with "Trends in User-Oriented Command Languages to Improve Programmer Productivity."

Programming trends will be discussed by chairman Thomas Harris, chairman of the Codasyl Committee on Command Languages, Digital Equipment Corp., and speakers Gary Nelson, senior consultant at Control Data Corp.; John McKeehan, language support manager, IBM; and William LaPlant Jr., director of DOD Computer Standards Program, U.S. Air Force.

System Design

"Human Factors in Interactive System Design," Session 5.7, will be held from 9:00 a.m. to noon on Wednesday and will include chairman Melvyn Bergstein, partner-in-charge of the Technical Services Organization, Arthur Anderson & Co., and speakers William Kiedaisch, director of Information Systems, General Foods, Corp., and W. Grant Annable, managing director of Information Systems and Services, American Can Co.

The panel will examine the approaches to effective interactive system design and discuss first-hand implementations in context with human factor considerations.

Registration is at the door and costs $295 for the four-day conference.

The sponsors Clapp & Poliak, Inc. are located at 245 Park Ave., New York, N.Y. 10167.

PROGRAM AT A GLANCE	INFORMATION MANAGEMENT			OFFICE AUTOMATION		
	Keynote: Session 1.1 Enterprise Systems—A Concept for the 80's			Keynote: Session 1.1 Enterprise		
MONDAY AM	Session 1.2 page [illegible] Information Resource Management—A Prerequisite for an Effective Information System			Session 2.1 page [illegible] Office Automation for the 1980's—Realistic Objectives Whose Times Have Come		
MONDAY PM	Session 1.3 page [illegible] Long Range Planning for the Information Resource—An Essential Component of Information Systems Planning			Session 2.2 page 15 Current Experience in Office Automation		Session 3.1 page 17 Computer Branch Exchanges in the Office of the Future
TUESDAY AM	Session 2.4 page [illegible] Planning for the Automated Office—System Considerations	Session 8.1 page 27 Financial Reporting in the 1980's—A Ledgerless World Session 8.2 page 27 Financial Reporting and Control Concepts in a Multi-National Corporation	Session 9.1 page [illegible] Marketing Information Systems for Marketing Management	Session 2.4 page [illegible] Planning for the Automated Office—System Considerations	Session 2.3 page [illegible] Computer-Based Conferencing—A Systems Approach to the "Office-less Office"	Session 3.2 page 17 Optical Scanning—Its Role in Office Automation
TUESDAY PM	Session 1.5 page [illegible] Information Systems Planning for the "1980" Corporate Environment	Session 8.3 page 27 Decision Support Systems for Budgeting in Financial Analysis	Session 9.2 page [illegible] Decision Support Systems for Marketing Management		Session 2.5 page [illegible] The Manager's Use of the "Management Work Station"	Session 3.3 page 17 Microfilm Systems in the Office of the Future
WEDNESDAY AM	Session 1.6 page 14 Computer-Assisted Decision Tools for Planning, Analysis, and Decision-Making	Session 8.4 page [illegible] Information Systems for Cash Management	Session 9.3 page [illegible] Systems for Marketing and Sales Analysis	Session 2.6 page [illegible] Planning for the Automated Office—Organizational Considerations		Session 3.4 page [illegible] Report on 1980 Word Processing Systems Session 3.5 Security Techniques in Office Automation
WEDNESDAY PM	Session 1.7 page 14 Decision Support Systems for Tactical and Strategic Planning			Session 2.7 page [illegible] Planning for the Automated Office—The Vendor's View		Session 3.6 page [illegible] Intelligent Copiers—A New Approach to Document Distribution
THURSDAY AM	Session 1.8 page 14 Planning and Management Considerations for the Distributed Information Resource	LAW OFFICE AUTOMATION Session 17.1 page [illegible] Law Office Automation—A Fully Integrated Approach		Session 1.8 page 14 Planning and Management Considerations for the Distributed Information Resource	Session 2.11 page 17 The Impact of Office Automation on the Human Resource	
THURSDAY PM	Session 1.9 page 14 Integration of Office Systems with Data Processing	Session 17.2 page [illegible] Alternative Approaches to Law Office Automation, and the Applications		Session 1.9 page 14 Integration of Office Systems with Data Processing		

Industry Pundits and Seers Look Ahead to '80s

Info 80 Preview

By Ann Dooley
CW Staff

NEW YORK — The Information Resource Management Exposition & Conference (Info 80), which opens today at the New York Coliseum, will spotlight advances in DP technology for the '80s.

Among the sessions will be "Information Systems Technology for the '80s and Its Impact on the User," which will detail the probable effects that rapid hardware, software and personnel changes are making in the relative costs of powerful information processing systems for their users.

Examples given by chairman John Kirkley, editor of *Datamation*, and speaker Dr. John McCredie, president of Educom, Inc., based on trends of currently available systems will illustrate some of the likely impacts. Session 6.1 will be given Monday 11:00 a.m. to noon.

John Gantz, director of publications for International Data Corp., and his panel of industry experts will examine "Distributed Data Processing — Current Experience and Plans for the 1980s" at Session 6.2 on Monday 1:30 to 4:30 p.m.

The concept of distributed data processing (DDP) is evolving and will eventually spread to every area of an organization. But the development of a successful DDP environment requires sophisticated planning, well-designed products and competent system development strategy.

This session will focus on user experience with DDP — what the users have accomplished, with what results and what are their plans for the future.

Closer Look

"Distributed Data Processing — Implementing Strategies and Organizational Implications" will take a closer look at the involvement of the user in the definition of requirements, the sophistication of the particular system and the independence of the user in applications development; all of which can heavily affect the long-term results.

Dr. James Emery, professor of decision sciences at the Wharton School, and a panel will consider the requirements, organizational behavior, ease of applications development, staff turnover, training, career planning and other criteria for the various distributed architectures and the alternative implementation strategies in relation to their impact on the viability of the operation. The session will be held Tuesday from 9:00 a.m. to noon.

"User Perspectives for Data Communications in the 1980s" will be the subject of Session 6.4A Tuesday from 1:30 to 4:30 p.m. This session, chaired by John Donovan, director of corporate data processing, Aetna Life & Casualty Co., will focus on the implications for business strategy and information systems planning of integrated data, voice and image transmission networks. Also discussed will be how users can make best use of these networks, what are the applications and the panel's own personal experiences in setting up such systems.

An overview of salient developments in data communications and the impact on user planning will be presented by session chairman Kenneth Bosomworth, president of International Resource Development, Inc., Wednesday from 9:00 a.m. to noon.

Session 6.4B, "Progress Report on Data Communications Networks," will also include a brief look at trends and developments in common and value-added carriers, equipment and considerations in integrating equipment and services into a total communications network.

Also examined will be the architecture of future business communications networks and high-speed multimedia information distribution systems for the office of the future.

A two-part session entitled "Data Base Management — Organization and

(Continued on Page 14)

WORD PROCESSING	EDP MANAGEMENT		ADVANCES IN DP TECHNOLOGY	SMALL BUSINESS SYSTEMS	INDUSTRY-ORIENTED SESSIONS			
					MANUFACTURING	BANKING	INSURANCE	HOSPITALS
Systems—A Concept for the 80's					Keynote: Session 1.1 Enterprise Systems—A Concept for the 80's			
Session 4.1 page 19 Introduction to the Word Processing/Administrative Support System	Session 5.1 page 20 Productivity Improvement in the DP Organization—A Systems Problem		Session 6.1 page 25 Information Systems Technology for the 80's and Its Impact on the User	Session 10.1 page 29 MINI or MICRO—Which Is for You?	Session 12.1 page 30 Manufacturing Productivity in the 1980's—The Value of Integrated Information	The Seventh International INFORMATION MANAGEMENT EXPOSITION & CONFERENCE NEW YORK COLISEUM OCTOBER 6-9 1980 info 80		
Session 4.2A page 19 Implementing Word Processing/Administrative Support—Getting Started—Part 1 of 2	Session 5.2 page 20 The "People Side" of EDP—A Major Consideration for Productivity Improvement in the DP Organization	Session 5.3 page 23 Computer-Generated Graphics for Managerial Analysis, Planning and Control	Session 6.2 page 25 Distributed Data Processing—Current Experience and Plans for the 1980's	Session 10.2 page 29 Getting Started with a Small Business Computer	Session 12.2 page 30 Manufacturing Planning and Control Systems—Current Experience and Planning for the 1980's CONDUCTED BY THE AMERICAN PRODUCTION AND INVENTORY CONTROL SOCIETY REGION 2 NEW YORK			
Session 4.2B page 19 Implementing Word Processing/Administrative Support—Preparing for the Installation—Part 2 of 2	Session 5.4 page 20 Increasing Productivity in the System Development Process	Session 5.5 page 21 Management Approaches to Computer Capacity Planning	Session 6.3 page 25 Distributed Data Processing—Implementation Strategies and Organizational Implications	Session 10.3 page 29 Using Small Computers for Manufacturing Planning and Control	Session 12.3A page 31 Manufacturing Control Systems Fundamentals for the Information Systems Executive—Part 1 of 2			
Session 4.3 page 19 Increasing Productivity of the Word Processing/Administrative Support System	Session 5.6 page 24 Trends in User-Oriented Command Languages to Improve Programmer Productivity	Session 5.6 page 24 Trends in User-Oriented Command Languages to Improve Programmer Productivity	Session 6.4A page 25 User Perspectives for Data Communications in the 1980's	Session 10.4 page 29 Marketing Systems for the Small Business	Session 12.3B page 31 Manufacturing Control Systems Fundamentals for the Information Systems Executive—Part 2 of 2			
Session 4.4 page 19 Re-evaluation to Increase Productivity of Word Processing/Administrative Support Session 4.5 Data Processing Basics for the Word Processing Professional		Session 5.7 page 24 Human Factors in Interactive System Design	Session 6.4B page 26 Progress Report on Data Communications Networks	Session 10.5 page 29 Computer-Aided Financial Analysis and Control for the Business Executive	Session 12.4 page 32 Productivity Measurement Systems in the Manufacturing Environment	Session 16.1 page 34 Automating the Bank Branch—Approaches Responsive to Management Style	Session 14.1 page 32 Automation of Branch Offices in Insurance	SPONSORED BY THE NEW YORK CHAPTER OF THE HOSPITAL FINANCIAL MANAGEMENT ASSOCIATION Session 15.1 page 33 Data Processing Alternatives to Provide Cost/Performance Reporting Based on Diagnosis-Related Groupings
Session 4.6 page 20 Doing More than Word Processing with your Word Processor		Session 5.8 page 24 Long Range Planning for Management Information Systems	Session 6.5 page 26 Applications of Video Technology in Information Management	Session 10.6 page 30 Problems and Pitfalls in Automating a Small Business	Session 12.5 page 32 Advances in Manufacturing Automation	Session 16.2 page 34 Office Automation in Banking	Session 14.2 page 32 Office Automation in the Insurance Industry	Session 15.2 page 33 The Data Base Medical Information System—A Reality for the 1980's
			Session 6.6 page 26 Advances in Speech Processing, Storage and Transmission		Session 1.8 page 14 Planning and Management Considerations for the Distributed Information Resource	Session 16.3 page 35 "What If" Planning for Bank Executives	Session 14.3 page 33 Microcomputers in Insurance—A Step to Integration	Session 15.3 page 34 Information Needs for the Quality Assurance Program
			Sessions 6.7A, B page 27 Data Base Management—Organization and Control of Data in the 1980's: Part 1 and 2		Session 1.9 page 14 Integration of Office Systems with Data Processing	Session 1.9 page 14 Integration of Office Systems with Data Processing	Session 1.9 page 14 Integration of Office Systems with Data Processing	Session 15.4 page 34 Advances in Hospital Information Systems

Info 80 to Focus on Management Information

NEW YORK – Three sessions focusing on management information as a corporate resource will highlight the seventh international Information Resource Management Exposition & Conference (Info 80), at the New York Coliseum here this week.

Each of the three sessions was designed to fit in with Info's "conference-within-a-conference" format and will be supplemented by six other management information sessions during the four-day meeting.

Info 80 Preview

The first session, slated to take place on the opening day of the conference, will be headed by Harold Uhrbach, president of DBD Systems, Inc., and will tackle the subject of what is involved in an information management system.

"Information Resource Management: A Prerequisite for an Effective Information System" will detail how such a system is dependent on the development and coordination of data bases, conventional files, data communications and automated office and administrative facilities.

The second session, "Long-Range Planning for the Information Resource: An Essential Component of Information Systems Planning" will deal with the hardware and architectural framework that supports each organization's information system.

Directed by Joseph Judenberg, vice-president of Chase Manhattan Bank, the session will cover that planning necessary to implement an information systems in conjunction with regular business strategies.

System Integration

The third session will be aimed at the "Integration of Office Systems with Data Processing."

Chaired by John J. Walsh, director of communications services and facilities at Avon Products, Inc.; William R. Synott, senior vice-president of the First National Bank of Boston; and R. Dennis Wayson, director of corporate information systems at Sun Co., Inc., this session will address the feasibility and practicality of management structures.

Info registration fees are $295 for the four-day conference plus admission to the show floor, $110 for one-day at the conference and show and $60 for a half-day. The cost for just attending the exhibitor's show is $10, or $5 with advance registration.

The conference is sponsored by Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Industry Seers Glance Ahead To '80s Advances

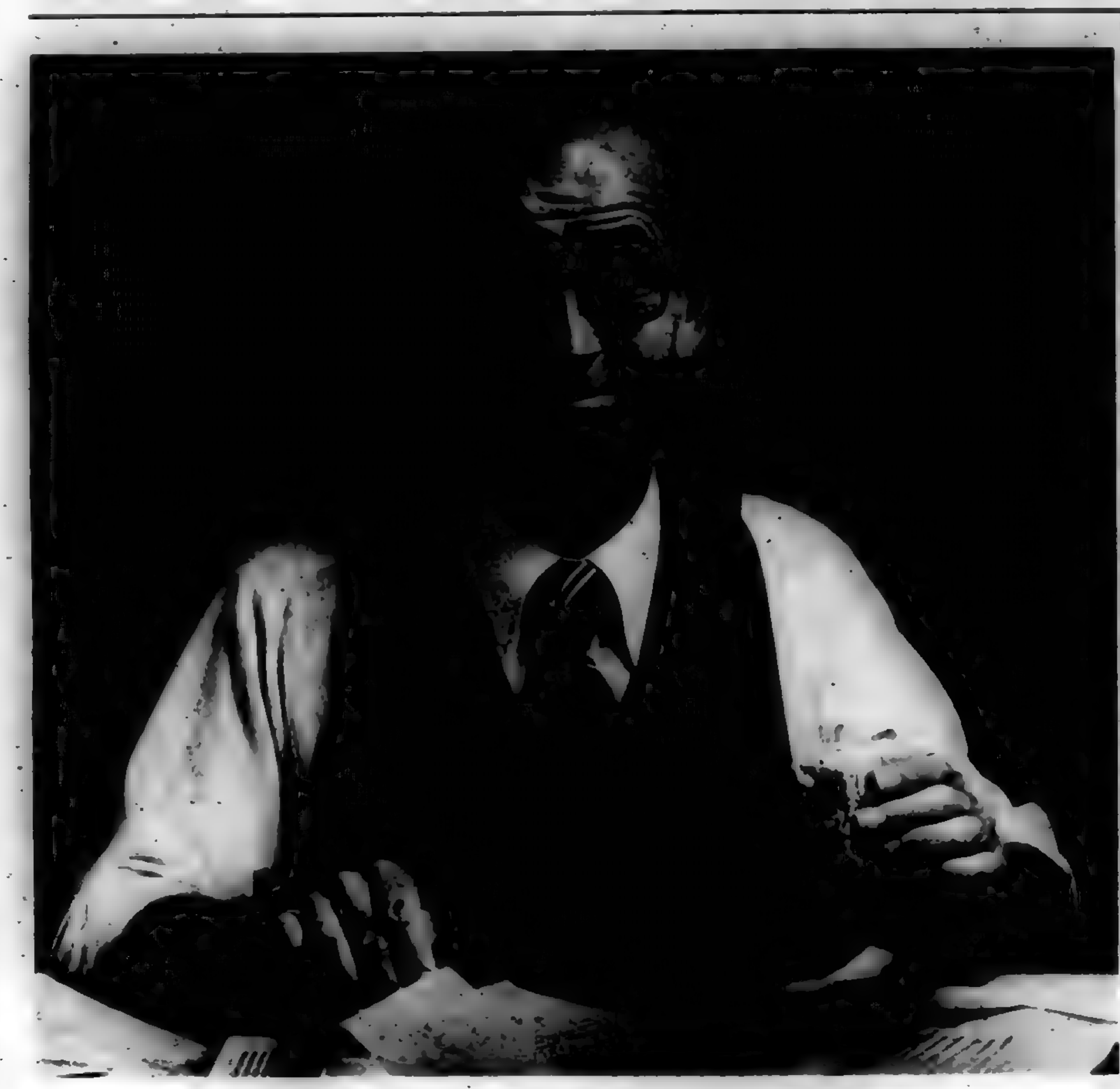
(Continued from Page 13)

Control of Data in the 1980s" will be presented Thursday from 9:00 a.m. to noon and from 1:30 to 4:30 p.m. and will be chaired by Harold Uhrbach, president of DBD Systems, Inc.

Session 6.7A will focus on data base concepts — the nature and characteristics of data base operations and supporting data base management systems and system architecture for the 1980s.

Session 6.7B will examine how to design effective data bases and look at why some data base implementations fail and how to counteract such failures.

Registration is at the door only and costs $295 for the four-day conference. The show's sponsors are Clapp & Poliak, Inc., located at 245 Park Ave., New York, N.Y. 10167.



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Awaiting Bids on Ecom

USPS Begins Two-Way Intelpost With Canada

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Two-way Intelpost service, the first in a series of projected U.S. Postal Service (USPS) electronic mail offerings, has begun operation.

Meanwhile, the agency issued an invitation for bids on Electronic Computer-Originated Mail (Ecom), another of its new on-line services. The contract, basically, involves design and installation of a communications network, and supporting terminal hardware and software, to interconnect 25 U.S. cities.

For $5 per page, the new Intelpost facsimile network transmits messages between New York or Washington and Toronto. Normally, messages are delivered the following day, but same-day delivery is available in some cases: a message can be picked up at the receiving post office, or the user can obtain special delivery service for an additional charge — $2.00 per message in the U.S., $2.50 in Canada.

Postal Service headquarters here and the World Trade Center in New York are the U.S. terminals of the new network. They are open 8 a.m. to 5 p.m. Monday through Friday.

Intelpost messages can be transmitted to any point in Canada. At the moment, Toronto receives all of the traffic, but a USPS spokesman said the Canadians are planning to add additional terminal cities shortly.

Besides text, Intelpost handles statistical cables, "creative artwork" and correspondence written in a language other than English. Banks, government agencies and multibranch, multinational industrial organizations are expected to be the prime users.

Dispute With FCC

Although proposed several months ago, Intelpost had been hung up in a dispute between USPS and the Federal Communications Commission (FCC). The commission refused to let U.S. international record carriers (IRC) lease the circuits needed to transmit Intelpost messages overseas.

The reason, basically, is that USPS would be reselling this capacity to its Intelpost customers and the FCC said this resale privilege must be extended to all other international data communications users if it is granted to the Postal Service. The IRCs, worried that unrestricted resale will shrink their revenues, will not accept the commission's terms.

The Postal Service has gotten around the FCC by going to Canada via domestic circuits extending from New York and Washington to the U.S. border (largely unrestricted resale of domestic U.S. communication circuits began some time ago).

Although the present Intelpost offering provides service only between the U.S. and its northern neighbor, European extension is on the way, with or without the FCC's blessing. In the latter case, overseas messages will be transmitted to Canada and relayed across the Atlantic from there.

Ecom has also been embroiled in controversy.

Basically, this service was designed for mass mailers. It will permit them to send messages on-line from their premises to serving post offices (SPO) in 25 cities. There the bits will be converted to hard copy, and each message will be *delivered* by postal carrier — typically within two days after being dispatched by the sender. Initially, USPS plans to charge 30 cents for a one-page Ecom message and 40 cents for a two-pager.

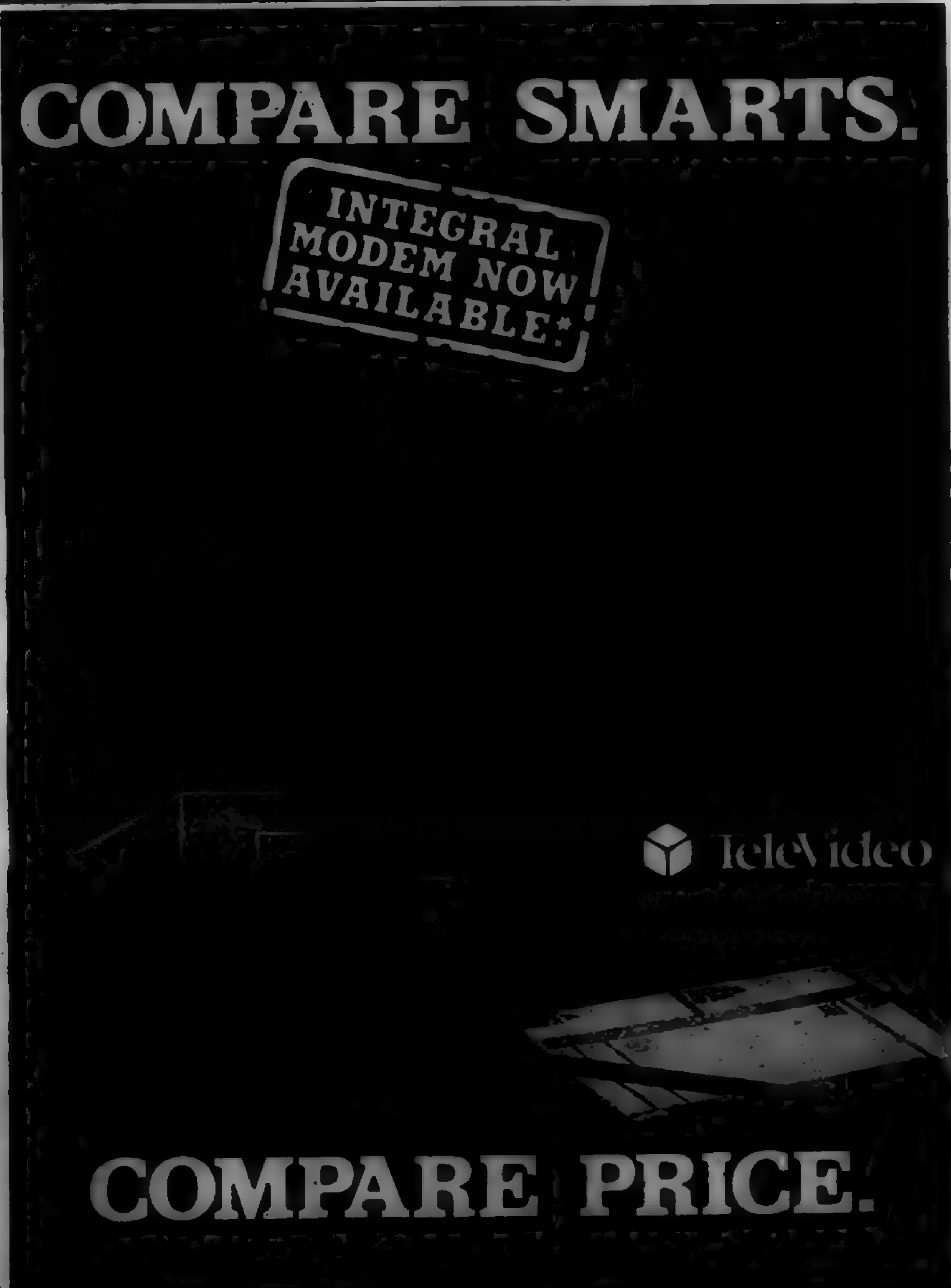
Commercial vendors of electronic mail and message services, fearing government competition, want Postal Service participation in Ecom restricted to hard-copy conversion at the SPO and delivery from that point. USPS, however, insists on offering a competing end-to-end service that would include transmission.

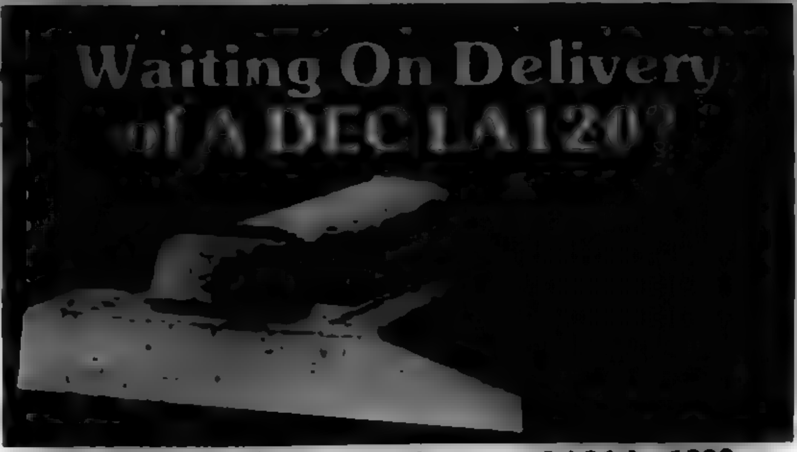
Although the initial Ecom offering will rely primarily on commercial vendors for transmission, the Postal Service apparently is planning to serve two groups of end users directly — those who bring magnetic tapes to their local post offices for input to the network at that point, and those who operate private communications networks. Both types of access are among the "optional requirements" in the recently issued Ecom bid invitation.

> *'Besides text, Intelpost handles statistical cables, "creative artwork" and correspondence written in a language other than English.'*

At a seminar on electronic mail earlier this month, Postmaster General William F. Bolger said his agency had received an inquiry from an unidentified company interested in transmitting Ecom-type messages, via its own private network, to SPOs. If this service is implemented, Bolger added, it will be offered to others.

He also indicated that such a limited offering would begin before January 1982, the projected startup date for the public Ecom service.





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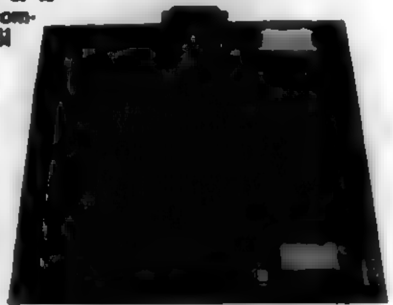

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Unregulated Bell Arm Expected in a Year

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A new communications common carrier, capitalized at several billion dollars, will begin commercial operation within the next year or two, a former Federal Communications Commission (FCC) official said here last week. It will be able to provide many new and innovative services and products to data communications users, but it will also pose a number of problems for both regulators and competitors. The resulting arguments could delay introduction of the services.

The speaker — Philip Permut, former chief of the FCC's common carrier bureau and now a private attorney — was referring to the unregulated Bell System subsidiary mandated by legislation now pending in Congress and by the commission's decision in the Second Computer Inquiry.

Although both the commission and Congress have devoted much attention to the structure of this new entity, as Permut explained in a speech to the 1980 Electronics and Aerospace Systems Conference (Eascon), a key question remains to be resolved — how to establish the Bell Unregulated Subsidiary (BUS) so that its opportunity to innovate is maximized while its ability to engage in anticompetitive practices is minimized.

He expects this issue to dominate the communications debate in Congress and at the FCC during the coming year and possibly beyond.

USPS Speaker

Another Eascon speaker, Postmaster General William F. Bolger, said the U.S. Postal Service (USPS) expects to complete negotiations with Canada "within the next few weeks" to expand its intelpost facsimile service to Europe.

The service began last month between the U.S. and Canada. (See story on Page 15.) The overseas operation has been delayed by the FCC's refusal to let USPS resell to its Intelpost customers circuits leased from the U.S. international record carriers (IRC).

If this refusal continues, Bolger said, USPS will route Intelpost overseas messages to Canada and have them relayed across the Atlantic from there. He added, however, that the agency has asked one unidentified IRC to go back to the FCC and ask again for permission to lease international circuits to USPS, which could then be resold to Intelpost customers.

Bolger indicated that the commission's computer inquiry decision, which deregulates enhanced communication services — Intelpost is one example of such a service — suggests that the FCC may now be more amenable to the RGSMF idea than it was several months ago when the initial IRC applications were rejected.

Additional Details

Bolger also provided some additional details concerning Postal Service plans to provide Intelpost, along with another new offering, Electronic Computer-Originated Mail (Ecom), through a separate subsidiary.

This new subsidiary, he said, will be capitalized with funds borrowed from the U.S. Treasury, enabling it to obtain money at less than the prevailing commercial rates. He also said that the start-up capitalization will be "at least $25 million."

Bolger reiterated Postal Service intentions not to compete with commercial providers of electronic mail and message services. Specifically, he said:

- Revenues earned from conventional mail operations will not finance the new electronic mail services. (This is the main reason for establishing the new subsidiary.)
- USPS will not solicit congressional subsidies to support its electronic mail offerings.
- "We will avoid providing point-to-point — sender directly to recipient (Generation 3) — electronic message transmission services." Instead, the agency will rely on its letter carriers to provide the final link in the electronic network and use on-line transmission only to connect the message sender with the post office in the city to which his message is addressed.

However, despite these assurances and several others in Bolger's Eascon remarks, all of which have been stated a number of times in the past few months, commercial vendors of electronic mail and message services are not likely to slacken their opposition to Ecom.

The Postal Service's plan to borrow startup money from the Treasury is likely to be one source of conflict. Another is the agency's intention to contract with commercial firms that wish to supply Ecom service. From what Bolger said at Eascon, it appears the postal service will develop the service terms and conditions, as well as specifications for interfacing commercial communication networks to post office terminal equipment, and then impose them on its prospective commercial "partners." They have made it clear that such a subordinate role is unacceptable.

Another Eascon speaker — Dr. William J. Perry, undersecretary of defense for research and engineering — said recent complaints about the expense, complexity, maintenance and operational difficulty of military electronic systems is misplaced.

While these shortcomings exist, he said, the critics are wrong to demand simpler, cheaper systems.

What is needed, according to Perry, is more electronics — not less. Many of the missiles, aircraft, early-warning radar systems and similar weaponry in the U.S. arsenal is based on technology developed many years ago. It also relies too much on mechanical and electromechanical components that, with today's technology, could be replaced with integrated circuits.

Developments in consumer electronics during the past decade prove that the way to build more reliable more cost-effective and more operable systems is to use more electronics rather than less, he contended. Pocket calculators, for example, are generally recognized as being far superior, on all of these counts, for many applications which formerly were performed exclusively by electromechanical calculators.

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Salaries Volatile in '79, AMA Survey Reports

By Bruce Heard
CW Staff

NEW YORK — Although in most cases DP salaries rose predictably from 1978 to 1979, a comparison of median salaries for the two years made by the American Management Associations (AMA) reveals some surprising and precipitous changes.

In the AMA's study, entitled "Supervisory Management Report," three job areas in five regions of the U.S. and Canada were investigated.

The job areas were applications programming, systems software and operations. The regional areas include the Northeast, Southeast, North Central, South Central, West Coast, Canada and the U.S. as a whole. Three levels of authority within each job area were examined.

Most Volatile

The systems software area was the most volatile over the two-year period, with two sharp salary increases and two seemingly inexplicable drops.

On the up side, the Northeast reflected an encouraging $6,300 increase for top, or Level III, supervisory personnel, from $25,200 in 1978 to $31,500 last year. The West Coast experienced a similar increase, with Level III salaries moving up in the form of a $6,900 leap from $25,000 to $31,900.

The down news came in the North Central area, where Level I people suffered a $2,600 drop from $23,000 to $20,400. Nationwide Level I salaries were also down, this time $2,200, from $22,600 to $20,400.

However, results in this category should be considered inconclusive because the nation as a whole and the North Central were the only areas in which Level I salaries were reported.

Upward Curves

Applications programming and operations both followed a more predictably upward curve, with a couple of exceptions.

The biggest gainers in applications programming were Level III supervisors in the North Central. Their salaries escalated $4,600, from $24,600 to $29,200. More modest increases ranging from $3,000 to $4,000 were posted in the Southeast, Canada and the overall U.S.

There were few significant year-to-year shifts in operations salaries, which showed steady, upward movement. One area of relative stagnation was Level I in the Southeast, where the rise was a meager $600, from $13,300 to $13,900.

Canadian salaries were measured in Canadian dollars, which means the comparatively lean earnings there are even less impressive than at first glance. In two of the four areas where figures were available, salaries dropped.

No Set Sample

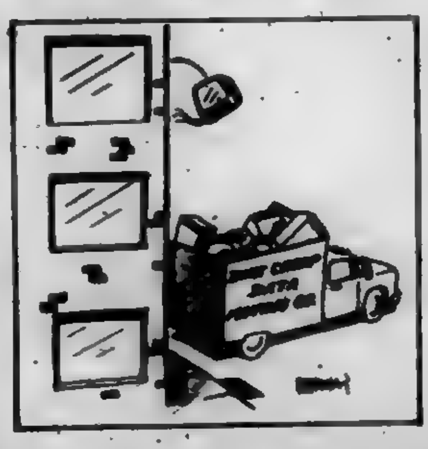
The most likely explanation for reduced salaries is the variation of the survey participants from one year to the next, according to Martin Harper of the AMA.

"The problem is, we're not locked into a set sample," he said. "When you get down to a finite level, you have to look at it with some considerable questions as to its absolute validity and you're going to have some leeway."

Despite the fact that hundreds of companies were interviewed in the course of the survey, many of them were not DP firms, and in the case of some locations and some jobs, there may have been a very small response, Harper said.

Under such circumstances, one salary could have a disproportinately large impact on the overall results, he added.

"So what we usually try to do in looking at a set for a location or region is go after what we call the key of benchmark jobs and base our analysis on them," he said. "Key" or "benchmark" jobs are those most commonly found in similar organizations.



Carnegie Press Offers Training

MADISON, N.J. — Carnegie Press, Inc. is now offering two- and three-day on-site seminars in four main areas: data communications, data processing, documentation and microprocessing. The programs are being produced in cooperation with the American Institute for Professional Education.

Carnegie Press reportedly presents custom-designed curricula to meet particular organizational needs. The courses are given on a prorated basis contingent on the length and scope of the course and the number of employees the company enrolls.

Most of the Carnegie courses include a six-month follow-up. Additional information is available from Carnegie Press, 100 Kings Road, Madison, N.J. 07940.

Xerox Schedules Seminar Series

LOS ANGELES — Xerox Computer Services has scheduled a 14-city series of seminars on how computer-based management systems can improve productivity for managers.

Production control, master production scheduling, material requirements planning, cost planning and control and planned inventory management are among the subjects that guest speakers will discuss.

The seminars will occur through Oct. 22 and vary in price. Further information is available from John May, Xerox Computer Services, 5310 Beethoven St., Los Angeles, Calif. 90066.

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'Poor or Nonexistent Management'

GSA Head Pans State of Federal Computing

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The federal government has taken the tool offering "the highest hope for efficiency" – the computer – and managed it in the most inefficient way, General Services Administrator Rowland G. Freeman III, said last week.

Delivering the keynote address to the Federal Computer Conference here Monday, Freeman said "accountability in ADP is as poor as anything in the government. The level of our ADP efficiency is even lower."

Coming from the head of the General Services Administration (GSA) – an agency with broad DP oversight responsibilities – Freeman's remarks on the state of federal computing were particularly pessimistic. When he became GSA administrator last year, he said, "lack of accountability was one of many symptoms of years of poor or nonexistent management" at the agency.

Noting the conference theme of "applying computers to make government more efficient and accountable," Freeman said "accountability and efficiency form the bedrock for managing the government in the '80s.

Hallmark of Decade

"Increased use of computers to achieve that accountability and efficiency must become the hallmark of this decade," he said. Unfortunately, according to Freeman, "most of you know enough about the state-of-the-art in government to realize we have a long way to go before we can maximize the computer's influence on accountability and efficiency in government."

Expanding on the need for accountability, Freeman said the concept is "a special management style that includes establishing goals, objectives and standards and measuring performance. It's a high ideal that must be shared by every employee," he said, adding it is a goal that can be reached. "I think we can correct some of our sins of the past," he said.

Because GSA oversees federal DP and telecommunications procurements, Freeman related accountability to acquisitions by remarking that "if you know who to reward and who to fire at the end of an acquisition you have a good system."

The government's acquisition process "is far from that," however. According to Freeman, "by the time an ADP acquisition goes through the oversight process of GSA, GAO [General Accounting Office], OMB [Office of Management and Budget] and congressional committees, who do you blame if something is wrong?

"Chances are excellent," he continued, "that by the time the process is completed, the project manager and all the other players have changed. It's clearly a case of too many cooks spoiling the broth."

These acquisition difficulties "have contributed directly to technological obsolescence in government ADP," according to Freeman, who noted half the federal computers are over seven years old. "That alone," he said, "contributes to inefficiency.

"What's worse is the second order of fact. Old machines fail to attract the best computer scientists. That leads to poorly designed software."

Horror Stories

Compounding his gloomy assessment of federal DP, Freeman went through a list of "horror stories" of mismanaged federal information resources. Recognizing the problems is not necessarily knowing how to solve them, however. Some problems, according to Freeman, are rooted in the peculiarities of government management.

Because the government spends public money, it "must be visible and stand public scrutiny and audit" and has consequently developed "extensive regulations and the complex oversight roles," Freeman explained.

"These complexities have caused mission program and agency managers to leave critical, strategic decisions related to ADP to information technicians. The information technicians often have deferred to contracting officers in order to negotiate the narrow pathway to successful acquisitions."

Beyond that, he said, "in government there is a lack of knowledge and experience in ADP planning and acquisition," leading to unnecessary time and resources being spent on acquisitions. The resulting uncertainty over procurement authority leads to "adversary relationships among the acquisition project managers, oversight groups and vendors." The "net effect," according to Freeman, is that "we spend more of our effort on the loops than we do on getting to the target."

Proposed Steps

So, what can be done about all these problems besetting government procurement and use of DP technology? Freeman asked. A few steps have already been taken, he said, noting that most DP procurement and management regulations have been rewritten "to improve clarity and meaning."

Also, more acquisition responsibility and authority is being given individual agencies in an effort to cut down the complexity and time of the process.

Besides the various steps GSA has taken or can take, Freeman said individual agencies must get involved in managing DP "much better throughout the entire life cycle. This includes day-to-day capacity planning or configuration management" as well as requirements forecasting and long-range planning.

Factory Model

"We should manage ADP like any other production facility," Freeman said. "Too many people believe ADP is so unique that it cannot be managed like a factory.

"Well it can. Systems engineering, industrial engineering concepts, production threshholds, standards of performance can be set. Cost accounting can be implemented and the ADP service function can be managed much more professionally," Freeman claimed.

Although GSA and other federal oversight agencies are working to streamline acquisitions and improve standards of information resource management, the real changes must come from those who operate the systems and manage them on a day-to-day basis, he said.

"It is up to you system professionals," he told his audience, "to concentrate on finding, evaluating and using those tools and techniques that will not only contribute to efficiency in the use of computers, but to efficiency in the design, documentation and production of application software."

"If we work together," Freeman concluded, "we can bring about a revolution . . . the potential use of computers to promote accountability and efficiency in government is limitless."

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Federal DP Ills Viewed Unlike Private Sector's

By Jake Kirchner
CW Washington Bureau

GAITHERSBURG, Md. — You hear it all the time: If only federal agencies ran their DP operations as large corporations do, all government information problems would be solved.

Well, said Robert V. Head of the Brookings Institution, it isn't that simple.

The idea has some "built-in problems," Head told a recent government symposium on information resource management. "Realistically there is no way some of [the government's] practices and procedures can be changed to be more consonant with private industry," according to the Brookings Federal Executive Fellow.

He did allow that if government could be more like private industry in the use and management of information resources, federal agencies "probably would not have the same degree of obsolescence in computer hardware" — the average age of federal systems is now over seven years, he noted.

And, he told the meeting sponsored by the National Bureau of Standards here and the Office of Personnel Management, agencies could "avoid some of the horrendous conversion problems" now plaguing federal computer acquisitions.

Insurmountable Differences

However, there are several insurmountable differences between federal agencies and private corporations, he said.

One of those differences is size. Head noted that in some agencies, information systems are significantly larger than anything in the private sector. The DP budget of General Motors Corp., one of the largest in the private sector, is about $300 million a year, Head noted, who said that makes GM's DP operation roughly equal to many mid-sized federal agencies.

"We have some intrinsic problems of size" and a related degree of complexity in the government "that simply is not present in the private sector." Head pointed to the vastly complex command, control and communications systems operated by the Defense Department, for which there is no analogue in private industry.

Lack of Autonomy

In addition, federal agencies are never going to have the autonomy that private organizations have in procuring and using information resources, Head said. He ascribed to federal DP oversight agencies a "rogue agency" syndrome: the fear that if agencies are not carefully watched "they will do terrible things, like sole sourcing."

Head noted the move in the federal government to give agencies more autonomy in acquisitions once they have proven themselves worthy of such trust, but said federal DP managers will never have the freedom of their private sector counterparts.

Although there is legislation pending in Congress to streamline federal DP practices and policies, the "Brooks Bill," assuming it gets through Congress, may not be that much help, according to Head.

The bill, now awaiting Senate approval, may "mandate some things that aren't going to work too well," he said. For one, the bill calls for a high-level official in every agency to be solely responsible for his agency's information resource management.

'Realistically, there is no way some of [the government's] practices and procedures can be changed to be more consonant with private industry.'

Agency VP Information

While the concept is "superficially appealing" and similar in several respects to a vice-president for information management position in private industry, it may not work so well in the government, he said.

When a private organization appoints VP of information resources management, it does so voluntarily, presumably with the intention of giving the person appointed some authority and input into upper management decisions, he pointed out.

That may not be the case in the federal bureaucracy, in which if there is such a position established, it will be by Congressional fiat. If an agency head is not interested in the activities of that new official, that position will not have much real authority, Head said.

"It would be fairly easy for an agency simply to finesse" that portion of the Brooks Act, according to Head, simply by not allowing the new information official much input into agency decision making.

In addition, the bill proposes the development of agency long-range plans for information resource requirements. But no one seems to know what should go into that kind of plan, according to Head, who expressed skepticism that the planning process would be all that effective.

But given that federal agencies cannot operate like large corporations and given the numerous problems with federal information management today, then "regardless of the potential difficulties of [the Brooks Act] I think it is only fair to conclude that at this point it is our best hope" for substantive changes to federal information resource management, Head said.

Federal information managers should take a "realistic attitude" toward how effective the legislation will be in helping update their operations, according to Head. He noted there is much that can be done to help in this area beyond legislation.

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Courts May Extend Cutoff Date For AT&T's Telpak Termination

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Although AT&T has requested permission to terminate its Telpak service Dec. 21 it was far from clear last week that the end is in sight.

Telpak users, who include the U.S. government, have gone to court in an attempt to prevent Telpak's demise. They face an estimated 28% increase in their line charges. According to Aeronautical Radio, Inc. and the Air Transport Association, two of those involved, the increase will amount to "well over $100 million per year."

Meanwhile, AT&T has also gone to court. It wants to overturn the Federal Communications Commission (FCC) policies that led to the termination request, essentially because those policies affect virtually all of its other communication services.

Whether Telpak ends will depend on the outcome of three pending court cases, and on FCC acceptance of the AT&T petition.

Last June, the U.S. Circuit Court of Appeals decided that the commission erred in 1977 when it accepted an earlier phone company request to terminate Telpak. Termination of the service was stayed temporarily by the appeals court later in 1977, which is why Telpak remains in operation.

Last June, the court said basically that the phone company had failed to supply adequate justification in 1977 for ending the service. Now, the FCC has to decide whether the data submitted by AT&T with its latest termination request is adequate.

The phone company, however, contended that its 1977 justification was sufficient, and it has requested reconsideration of that part of the court's June decision.

Anticompetitive Issue

In another part of that decision, the court found that Telpak rates are anticompetitive, thus upholding the position enunciated by the FCC in 1976 when it declared that then-existing Telpak rates — still in effect — were anticompetitive.

This 1976 decision was one of the reasons AT&T decided to terminate Telpak the following year. The other reason was a related FCC decision that permitted sharing and resale of Telpak circuits.

At the root of the anticompetitive issue is the question of whether Long Run Incremental Costing (LRIC) — the method traditionally used by the phone company to allocate its expenses — is anticompetitive.

The FCC says it is and has ordered the phone company to employ Fully Distributed Costing (FDC) instead. AT&T's competitors favor FDC because it loads more costs on private-line offerings, thereby forcing the related rates upward and giving competitors more of an opportunity to compete.

Although the appeals court, last June, agreed that LRIC is anticompetitive, it was a split decision — one of the three judges who heard the case, Malcolm R. Wilkey, indicated that LRIC is not anticompetitive.

The Justice Department agreed with Judge Wilkey, pointing out that this part of the verdict, if allowed to stand, will "force AT&T's private-line rates higher than they would otherwise be, enabling AT&T's competitors to find shelter under this high price umbrella. The impact on ratepayers will be highly significant, with likely increased costs to the federal government of hundreds of millions of dollars each year."

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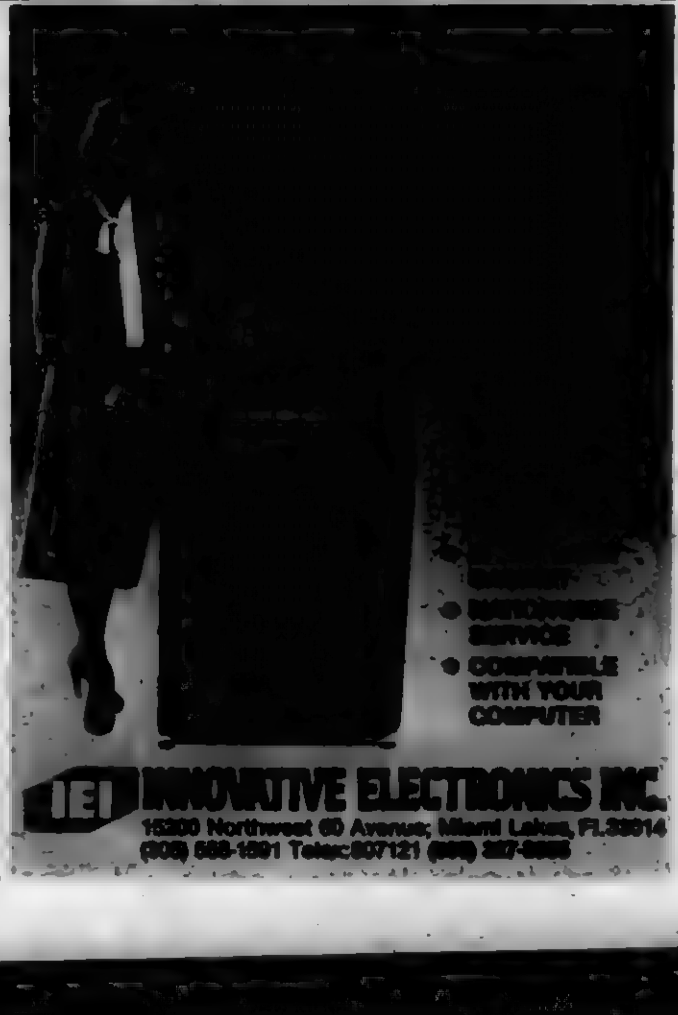

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Port Selector Solves Heavy Traffic Problem For Contract House

LA JOLLA, Calif. – By automating terminal access to the firm's computer's, Science Applications, Inc. SAI went from busy signals on the phone to quick access for computer users.

Using an intelligent port selector, "our computer port utilization increased substantially without adding computer hardware and we gained considerably in our effort to control telephone charges," according to C.E. Burgart, assistant vice-president and manager of the Computer Services Division.

Before SAI turned to automation, terminal access was through dial-up telephone lines, except for a few hard-wired terminals at the computer center in La Jolla, Burgart explained. But as the company grew the load eventually reached the point where more than 150 terminals were competing for computer ports, and telephone access was busy eight hours a day.

And growth has been one of SAI's most outstanding characteristics. From a small beginning in 1969, SAI today fields a team of 3,300 people and handles 1,000 contracts per year in complex fields such as national security, energy, the environment, health, systems engineering and software.

Controlled Access

To alleviate the situation, an intelligent port selector was installed between SAI's computer system and the terminal network.

This unit controls and coordinates terminal access to the computers, providing orderly connections between a large number of incoming lines and a smaller number of computer ports at the same time that it allows selection of specific classes of ports from the terminals.

Once the user enters the class designation, the port selector makes the required connection and displays a GO message on the terminal. Or, if the connection cannot be completed, the port selector indicates the reason with messages such as UNAVAILABLE, UNAUTHORIZED, WRONG SPEED and so on.

And if all of the ports in the requested class are in use, the port selector responds with a BUSY message and tells the terminal user how many others are ahead of him so he can elect to wait, in which case he is put in queue and connected automatically when a port becomes available, or he can disconnect and try again later.

Network Heart

The heart of SAI's network is a Micom Systems, Inc. Micro600 port selector that is equivalent to a solid-state version of the cross-bar switches used in most conventional telephone exchanges. The unit operates under direction of a microcomputer that controls all connections and disconnections.

Once a connection is established, the Micro600's operation is totally transparent to the user as the switch transfers data directly from the line to the port at high speed. And the microcomputer controller is only activated again, when the connection needs to be broken.

Typically, the microcomputer controller operates according to instructions entered via a command console. Thus, for example, an operator in the computer room can reassign class designations to ports if some are overloaded while others are unused. Or he can alter the messages that the microcomputer uses to communicate with users at the terminals.

Any asynchronous terminal can be connected to the Micro600. It is not necessary for its speed to be known in advance – the Micro600's Autobaud feature provides automatic terminal speed detection up to 9,600 bit/sec.

To the computer port, the Micro600 appears either as a dedicated terminal or as a modem emulating the automatic answering sequence of a Bell 113 CCITT V.21.

Each port interface has a class defined in the Micro600's control memory and, as noted earlier, this class can be modified whenever necessary from the command console.

Interface Combinations

Line and port interfaces can be selected in any combination in the Micro600 – the same card module handles both and a front-mounted thumbwheel switch is used to select the operating mode.

In its present configuration, SAI's Micro600 can handle up to 248 lines and ports. This is expandable to 992 lines and ports as the company's requirements grows.

This capacity is used to control terminal access to the company's Digital Equipment Corp. Decsystem-10 and VAX-11/780 systems in La Jolla, a second VAX-11/780 about five miles away and a PDP-11/70 about eight miles from La Jolla.

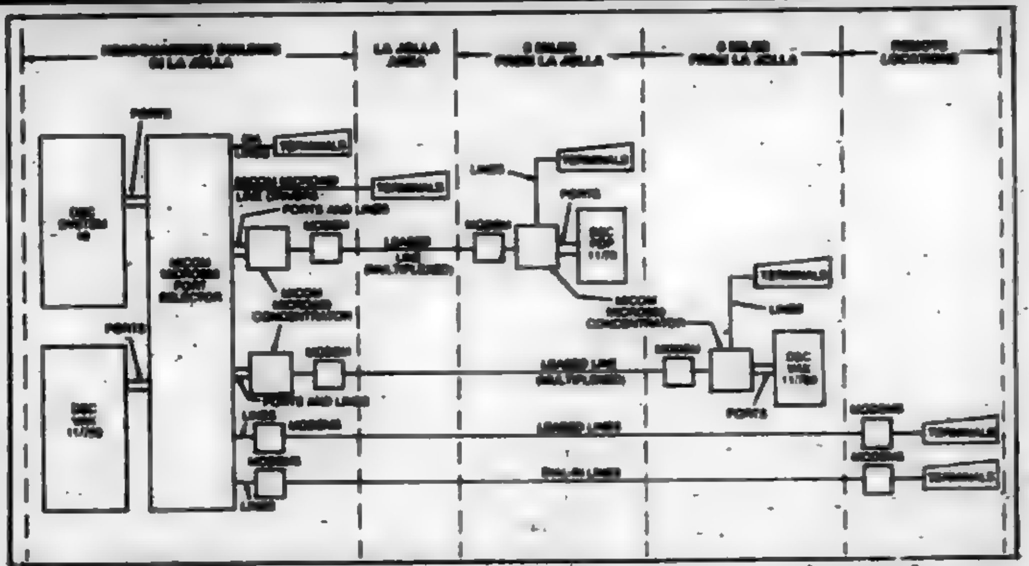

Diagram shows the arrangement whereby a Micro600 port selector controls terminal access to four computers at Science Applications, Inc.

C.E. Burgart, assistant vice-president, points out the line and port interfaces that can be altered by thumbwheel switches.

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Provide Needed Links

'Old Girl Networks' Help Women Get Ahead

By Connie Winkler
CW Staff

NEW YORK — Networks are not just for data communications; they also help women get ahead, said Mary Scott Welch, author of *Networking*. Welch was the kickoff speaker at a networking session sponsored here recently by Women in Data Processing.

The networking session was an opportunity for women to meet other women in DP, to trade information, exchange cards, increase contacts and get to know what others in the field are doing, said Denise L. Haseman, president of the women's group.

"Networking is not an extra," Welch said. "It is every bit as important as being qualified or working hard — which women used to think was all that was important."

Help With Problems

If women have a network of other women both in and outside the company, they can call them for help with problems. "Women should work 80% as hard and spend 20% of their time finding out what others are doing," Welch continued.

Women have always used other women to help solve their problems, finding a doctor, for instance. What is new about networking is that it is now career-focused, Welch said.

Today a 27-year-old woman with two children will work 34 years of her life, and if that women is divorced she will work an average of 42 years. So, Welch said, "we might as well get up there and get paid what we're worth."

Old Boys Club

Men have always practiced networking in what is sometimes called the old boys club, Welch said. She gave the example of men helping their fellows find another job.

"Men have always met at conventions, on the golf course, at clubs, schools and colleges. They don't see why we now have to make a big deal about getting together," Welch said.

"We know — we have been isolated from one another. And, the higher you go in a job the more isolated you become. Too often the 'only woman' is a lonely woman."

A woman asking a male colleague for advice is not networking because the male probably is not sensitive to the female's perspective. A man would not understand the woman's concern over being the only woman at a meeting and being asked to take notes.

To use other woman contacts most effectively, Welch suggested several techniques — for example, dropping a third woman's name to an unfamiliar woman you are calling: "I'm calling at the suggestion of Mary Doe." Then, be sure to call Mary Doe back and tell her how the contact went, Welch explained.

Networking Groups

Recently women's groups have been formed just for the purpose of networking. There are both internal networks of women within one company and external networks of women across many industries. Sometimes the internal networks are sanctioned by the companies.

Women should belong to both and realize that the same confidences cannot be shared in each. Special networks for female managers are also starting, Welch said.

A second networking session is planned Oct. 31, 5:30 p.m. to 7:30 p.m. at the Women in Data Processing office, Suite 2008, 310 Madison, Ave., New York. It is free to Women in Data Processing members and costs $5 for guests.

Fifth ICPR Set For Miami Beach

MIAMI BEACH — The Fifth International Conference on Pattern Recognition (ICPR), cosponsored by the International Association for Pattern Recognition and the IEEE Computer Society, will be held here Dec. 1-5.

A preconference tutorial on image processing and introductory pattern recognition concepts will be featured. Among conference speakers are King-Sun Fu and Keinsuke Fukunaga of Purdue University, and Robert Haralick of Virginia Polytechnic Institute and University.

Registration prior to Nov. 11 is $245 for members and $265 for nonmembers, while late registration is $285 and $305 respectively. Additional information and a complete preliminary program can be obtained by writing 5 ICPR, P.O. Box 639, Silver Springs, Md. 20901.

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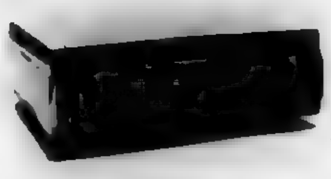

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Do-It-Yourself Service Cuts IBM 1403 Costs

GREENVILLE, S.C. – A do-it-yourself service contract can reportedly save a user as much as $294 per month in maintenance charges on an IBM 1403 printer.

If you have a 1403 that requires a controller in order to operate with non-IBM mainframes, a new application in use here at Bob Jones University could well cost you significantly less than $369 per month maintenance cost.

The university has a Burroughs Corp. B1800 and printer but needed the higher quality typefaces available on the IBM 1403 to process applications that required optical character recognition (OCR) scanning.

The university's electrical engineer, Brent Reed, found that with a Spur Products Corp. controller and the 1403 printer, servicing could be done simultaneously by slight modification to the controller and by using Spur's tester/-exerciser program at a cost of $75 per month.

The maintenance program includes the use of the tester/-exerciser to check the controller, a kit of spares and unlimited telephone advice from Spur's electronics staff.

"You don't need a great deal of expertise to manage the do-it-yourself program," Reed said. "It is not a very complicated system, and it's so convenient. It is really somewhat idiot-proof."

A former IBM employee on the university's staff who specialized in 1403 printer maintenance taught Reed how to service the printer, and Spur provided a training course for the do-it-yourself program.

The controller modification that Reed designed for "operational convenience" may be incorporated into Spur's new controller design, Spur president Ray Lorenz said.

The modification can prolong the life of the printer chain by automatically stopping if it does not receive signals from the computer for 20 seconds. This saves on wear to the chain and on energy, according to Spur.

Spur provides training for site personnel at the time of the controller's installation or at its Los Angeles office at a cost of $500.

Instead of leasing the tester/-exerciser and spares kit, both can be bought for $2,530 and $4,250 respectively. The controller costs $20,125, the vendor said from Spur Products Corp., 1904 Centinela Ave., Los Angeles, Calif. 90025.

Bell System Gets Honeywell DPS For Training Site

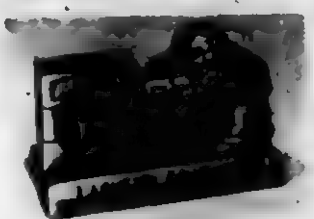
LISLE, Ill. – A Honeywell, Inc. Level 66/DPS/C5 dual processor computer system has been installed at the Bell System Center for Technical Education (BSCTE) here.

Valued at about $2.4 million, the Honeywell configuration runs under the CP-6 operating system, which the vendor developed as a growth path for users of the Sigma series computers originally made by Xerox Corp. but backed by Honeywell since 1976. The Level 66/DPS/C5 replaced a three-processor Sigma 9 that ran under CP-V.

Able to accommodate 200 users simultaneously, according to a Honeywell spokesman, the Level 66/DPS/C5 has eight 200M-byte disk drives, three 6,250 bit/in. tape drives, a 1,050 card/min card reader and a 1,600 line/min printer.

The BSCTE is the main technical training facility for the Bell System's 23 operating companies and is said to provide about 40,000 student weeks of education per year.

The center plans to upgrade the Level 66/DPS/C5 to a C7 system later this year, boosting its capacity to accommodate 280 users simultaneously by the addition of about $1.2 million worth of equipement.



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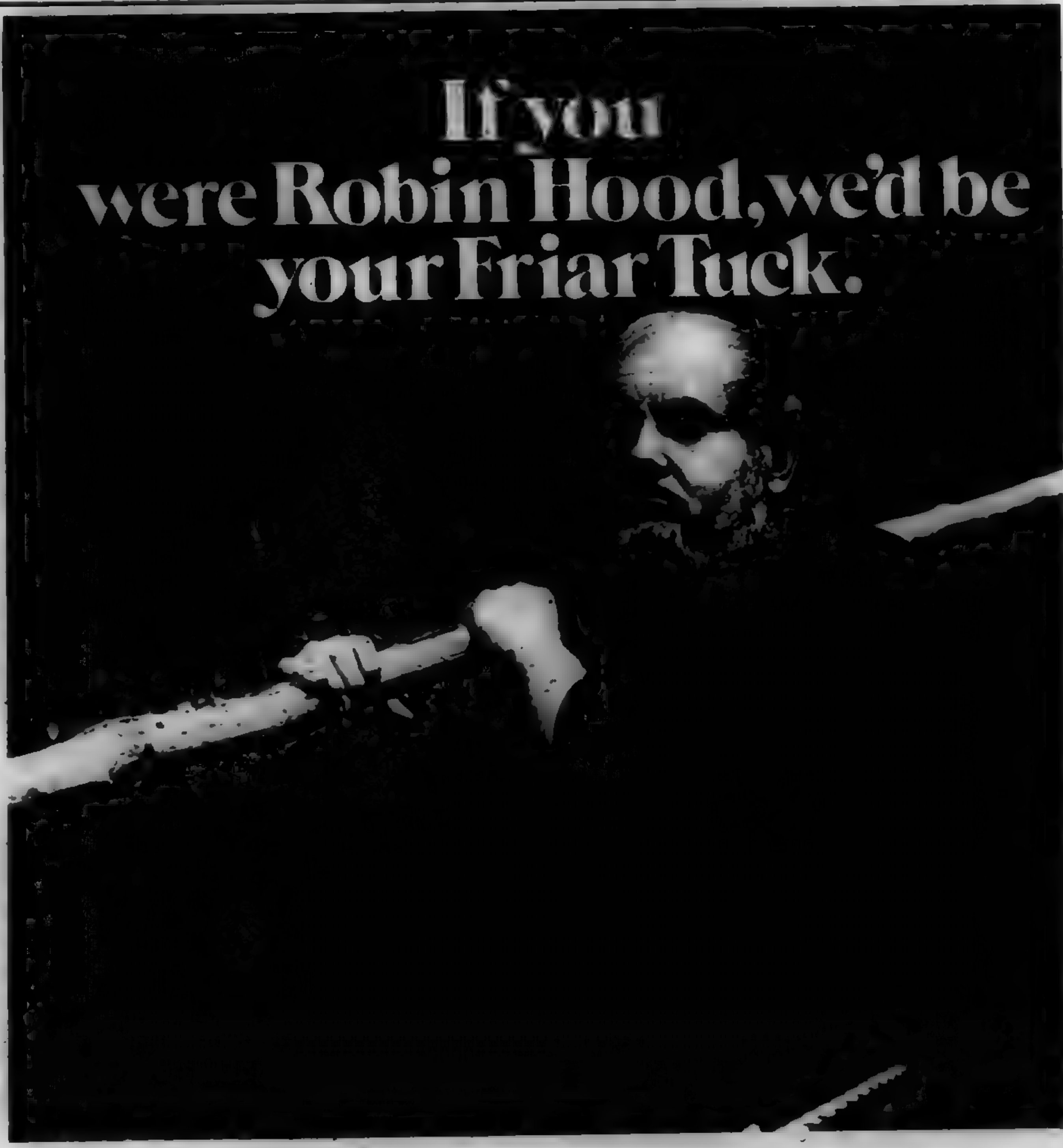
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Net Doubles University's Computer Capacity

IOWA CITY, Iowa — The Weeg Computing Center at the University of Iowa here is using four interactive computer systems grouped in a network to process both academic data and several business applications for the university.

More than 9,000 students, faculty members and university staff representing 10 different colleges within the school use the Weeg Center for applications spanning ophthalmology research and radiation protection analysis to career guidance and test development and administration for the Iowa Testing Program.

The University of Iowa began offering free access to instructional computing in 1962 when it opened the University Computing Center, renamed the Weeg Computing Center in 1976. By 1977, with more than 23,000 graduate and undergraduate students, the university had run out of computing capacity and was purchasing 20% of its computing time from outside services at a cost that was stifling.

The University of Iowa's Weeg Center, housed in the school's Lindquist Center for Measurement, is used by more than 9,000 students, faculty and staff members for applications spanning ophthalmology research to career guidance development.

The existing vendor's system did not have the software necessary to allow the university to develop its own programs, James Johnson, director of the Weeg Computing Center, explained. Every application had to be custom-programmed.

The university needed a system that was both interactive and had state-of-the-art software, a data management facility and interactive data analysis and development capabilities. The system also had to be compatible in an IBM environment that included an IBM 370/168 system. Because the university has a heavy investment in software development and trained users on the IBM system, Johnson had to find a system that would protect that investment.

Prime Picked

"After assessing the systems of several vendors, we found Prime Computer, Inc.'s networking approach and an attitude toward system compatibility that was close to our own," Johnson said.

"And because Prime adheres to standards in its language compilers and X.25 packet-switching network, we could be less concerned with software conversion problems in the future."

The University of Iowa purchased four Prime 750 systems to replace a Control Data Corp. Cyber 70/71 that had been used in-house for four years. The Prime systems are connected to each other in a local ring network and to the IBM 370/168. This ring network enables file transfer among systems and access to software on other computers on the ring.

Each Prime system is configured with 2M bytes of main memory, three 300M-byte storage module disk drives and two additional 300M-byte disk drives for system backup. In addition, the four Prime systems are connected to two line printers, two tape drives and other peripheral equipment accessed through the IBM 370/168.

The university has over 300 terminals — clustered and individual — located throughout the 15-sq-mile campus and plans to increase that number to 500 by the end of 1982. Users are assigned to individual Prime systems in order to balance the computing load and access them using a communications switch. Each Prime 750 system can support up to 63 users simultaneously running different applications.

The Prime network is, in many cases, totally transparent to the user. If a student logs onto one Prime system and later has to change over to another, the network performs the file transfer.

This multiaccess capability significantly increases the ease-of-use and reliability of the Prime systems. And the computational power the network delivers approaches that of the IBM 360/65, he maintained.

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Diebold Receives 1980 DPMA Sciences Award

John Diebold

PHILADELPHIA – John Diebold, internationally known authority on management as well as automation and information technology, has been selected as the 1980 recipient of Data Processing Management Association's (DPMA) Distinguished Information Sciences Award.

The award will be presented to Diebold during the DPMA's international conference in Philadelphia Oct. 26-29. The presentation will take place at the award luncheon Oct. 29.

First given in 1966 when it was known as the Computer Sciences Man-of-the-Year Award, this honor is bestowed in recognition of outstanding contributions to the field of information processing. The selection is made by DPMA's executive council from nominations submitted by DPMA chapters, but is not limited to DPMA members.

Diebold is chairman and founder of the management consulting firm, The Diebold Group, Inc. of New York. He has served or is management counsel to such organizations as Xerox Corp., Westinghouse Corp., IBM, General Electric Corp., DuPont and Eastman Kodak Co., as well as hundreds of other foreign and domestic firms.

According to the DPMA, Diebold was so enthralled by the precision of remote-controlled antiaircraft guns during his Merchant Marine assignment in World War II that automation became a major focus in his life. He studied commercial applications of automatic-control mechanisms at Harvard and published *Automation* when he was 26.

Business Record

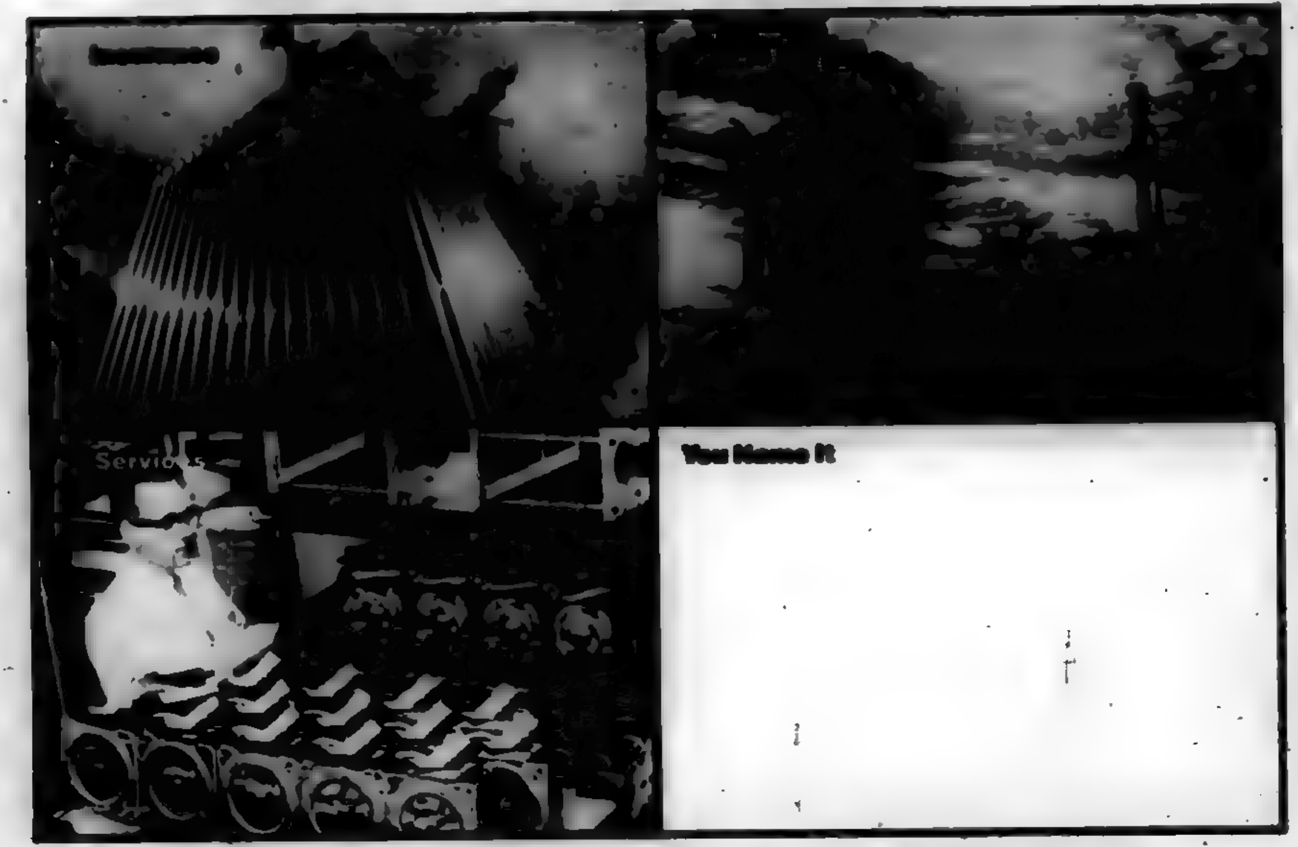
After a brief internship with the oldest U.S. management consulting firm, Griffenhagen & Associates, Inc. of Chicago, founded in 1911, Diebold established his own company in 1954. He bought out Griffenhagen in 1957 and began operations in Europe the following year. Today, The Diebold Group has more than 600 employees and offices in the U.S., Frankfort, West Germany, Paris, Vienna, Austria and London.

Through a partnership with Rothschild Freres in France (Diebold France S.A.) and its other European operations, the Diebold organization has roots in Europe and the UK.

Diebold holds honorary doctorate degrees from three colleges. Among his honors are the U.S. Junior Chamber of Commerce Award winner as one of the Ten Outstanding Young Men of 1961, and one of *Life* magazine's 100 up-and-coming "Take-Over Generation" in 1962.

He is a founder and leader in various societies and foundations concerned with the growth and development of management and technology. He has addressed a large number of U.S. and international professional, business and governmental meetings.

When it comes to companies...



companies come to Cyborg.

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We picked a few areas to highlight above, but as you can imagine, virtually every type of business, industry and organization; banking, transportation, food processing, retailing, government, service bureaus ... organizations of all kinds have come to Cyborg for our system's efficient, speedy general payroll and personnel handling capabilities.

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Human at Fault, Not Computer

MINNEAPOLIS – Although the initial reaction was to blame the computer, it was human error that caused about 1,300 glass panels to be made 3 in. too long for their aluminum frames in the 17-story Lutheran Brotherhood Building under construction here.

The Pittsburgh-based glass manufacturer PPG Industries, Inc. realized its mistake after 128 oversized opaque spandrel panels were delivered to the building site. Unfortunately, the glass cannot be cut to size, so the panels will have to be remade.

"It's hard to figure out how the mistake occurred, but it wasn't a computer error. The wrong dimensions were given to the machine," a PPG Industries spokeswoman said. The job entailed making 8,277 panels out of which 1,278 were too long.

BGS User Group To Meet Dec. 1

BOSTON – The first meeting of the BGS Systems, Inc. Users' Group will be held here Dec. 1 – which coincides with the Computer Measurement Group (CMG) national conference also scheduled in Boston Dec. 2-5.

Group members include domestic and international users who have installed Best/1 on compatible IBM, Univac, Burroughs Corp. and Honeywell, Inc. mainframes. Fifty members of the group are IBM MVS installations which have also installed Capture/MVS.

Additional information can be obtained from Dr. Robert Goldberg at BGS Systems, Box 128, Lincoln, Mass. 01773.

Settlement Status Uncertain

'Paper Chase' Escalates in IBM Antitrust Trial

By Connie Winkler
CW Staff

NEW YORK – Both sides in the U.S. vs. IBM antitrust trial are chasing each other with paper while the status of the settlement negotiations remains uncertain.

IBM's latest paper wad was about 4,000 pages in statements by its four expert economic witnesses, the seventh installment of which was delivered recently. Now the Justice Department wants 30 days to decide what to do with these weighty statements, although it is also expected to respond in writing.

Even though the last settlement discussion was June 9, Justice Department spokesman Mark Sheehan said he does not believe the talks have broken down.

No Comment

IBM would not comment on the status of the settlement talks. "We are not going to comment or speculate," a public relations spokesman at Armonk, N.Y., said. This has been IBM's practice in the past, he added.

"These narratives go beyond what one would reasonably expect an economic witness to do and to say. These are lawyer-like arguments," said Robert J. Staal about IBM's economists' statements.

At a robing room meeting with Judge David N. Edelstein, the head Justice Department lawyer said he had many problems with the statements and wanted to reserve his options to make objections or cross-examine the experts.

The statements are not available to the public because they have not been introduced as exhibits in court.

As it stands, the government will probably respond through its own economists' narratives in the coming rebuttal case which will also be in writing, Staal said.

IBM's head counsel Thomas D. Barr said he could not complete his affirmative case until the government decides on the economists' statements.

Negotiations are still under way to present previous testimony in West Coast case antitrust cases by Patrick J. McGovern, chairman of International Data Group, in lieu of live testimony in this case. McGovern would be a government rebuttal witness.

The government is also working with Gene Amdahl for his direct rebuttal testimony.

Acpa Seminar Fee Covers Admission To Mini-Micro

SAN FRANCISCO – Three information processing seminars will be offered at the 10th Annual Conference of the Association of Computer Programmers and Analysts (Acpa) here on Oct. 12-14.

"Improving the Programmer's Efficiency" is the title of James Towsen's session; "It's All in the Way You Look at Things," given by Robert Kuehne, will deal with strategies, structures and systems theory; and "Software Maintenance" will be addressed by Girish Parikh, Cris Miller and Michael Lyons.

Seminar registration for non-Acpa members is $225, which includes a year's membership to that organization. For members, seminar enrollment is $190.

Fees include admission to the Mini-Micro conference that immediately follows the Acpa event. Further details are available from Acpa headquarters at 294 Main St., E. Greenwich, R.I. 02818.

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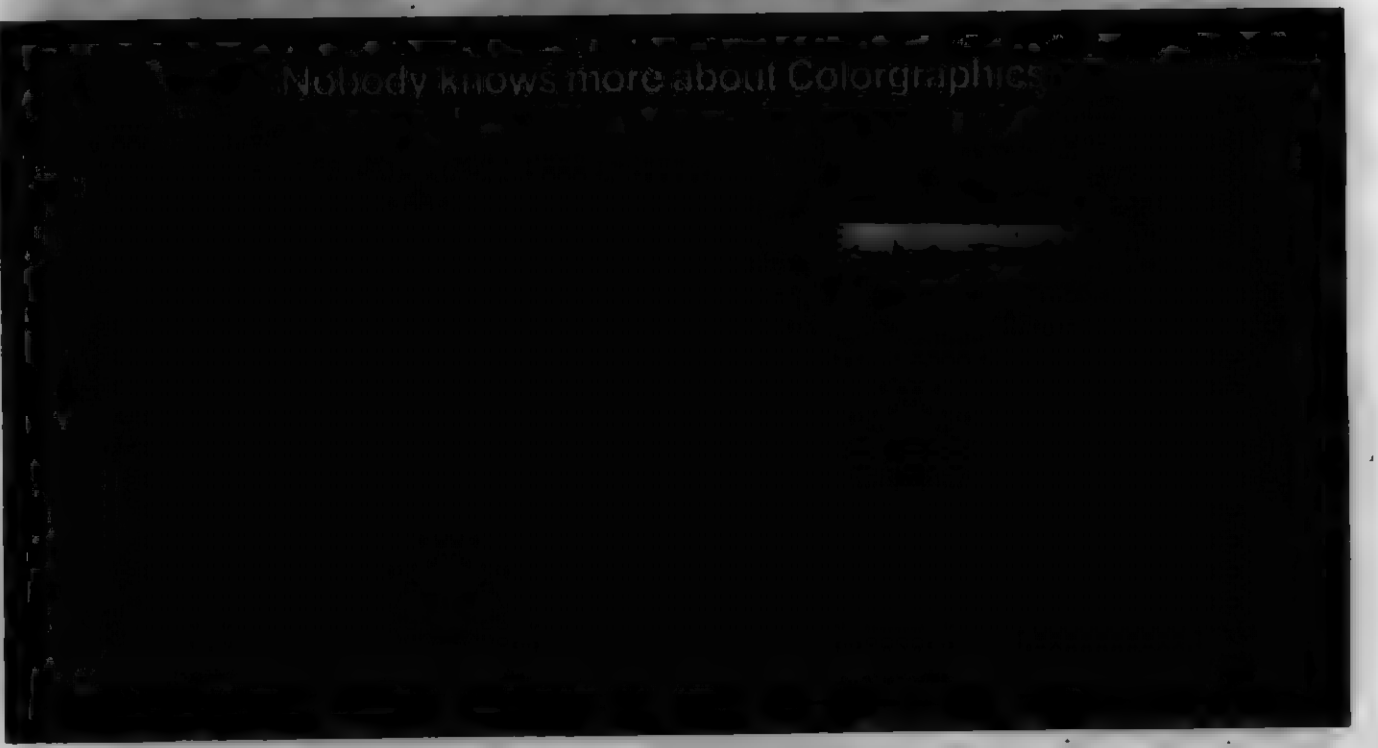

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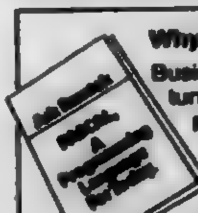
For MIS, computer-aided design or any application that requires high resolution, high-performance color graphics, look into Ramtek's 6214 colorgraphic computer. To get more information, write: Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050.



Why is Pascal better for business?

Business, industry and education are turning to Pascal for their interactive programming needs. To find out what Pascal offers and how it can benefit you, request "Pascal, A Programming Language For Today." It's Issue Number 1 of Ramtek's "USE OUR EXPERIENCE" series.

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University, Firms Join in Systems Ed Venture

ST. LOUIS — In an effort to meet the needs of local industry for data processing staff, Washington University and 23 corporations have joined forces to establish the Center for the Study of Data Processing here.

"About five years ago I began talking with DP managers in St. Louis, and out of those discussions came the conviction that some kind of cooperation would be possible and would be helpful. So in the spring of 1976 we began running a seminar series," said Robert Benson, assistant vice-chancellor of Washington University and director of the center.

By 1978 the center formally brought together under one roof the degree programs in DP offered by the university and the new seminars.

New programs added to the curriculum catered to the concept of corporate affiliation. A 20-day intensive Cobol course was introduced specifically for corporate staff wishing to change positions in their companies.

An intensive two-year, part-time degree course is geared to people wishing to change professions and enter the information processing field.

The year's budget of $250,000 is made up from corporate affiliates' subscriptions, some fees for the four-credit degree courses offered and the fees paid for seminars, which are open to anyone interested.

Two-Way Relationship

"It is very much a two-way relationship with the corporate affiliates. They benefit from having access to the programs and we can draw upon the experience and the values of the 23 companies, which has a tremendous impact on the quality of our course," Benson said.

The companies come from all areas of industry ranging from banks and chemical companies to information services, social services and consumer product manufacturers.

Since the center's inception, it has graduated 130 B.S. candidates and 34 masters of data processing, 65 from the intensive degree course, and 95 people have completed the 20-day program.

Univac's Joseph To Address Meet On Benefit Plans

LAS VEGAS — Among the 13 speakers that will address the International Foundation of Employee Benefit Plans' 1980 EDP Institute on Oct. 13-15 are Earl Joseph, staff scientist-futurist at Univac; Richard Kaimann, professor and chairman of the Management Department at Marquette University; Ken Miller, administrator of the Carpenter Funds Administration Office; and Jerone Deverman, president of Medical Data Systems.

The conference was designed for employee benefit plan trustees, salaried and contract administrators and administrative personnel with DP responsibilities.

Registration fees are $300 for foundation members and $375 for nonmembers. Additional information can be obtained from the foundation at P.O. Box 69, Brookfield, Wis. 53005.

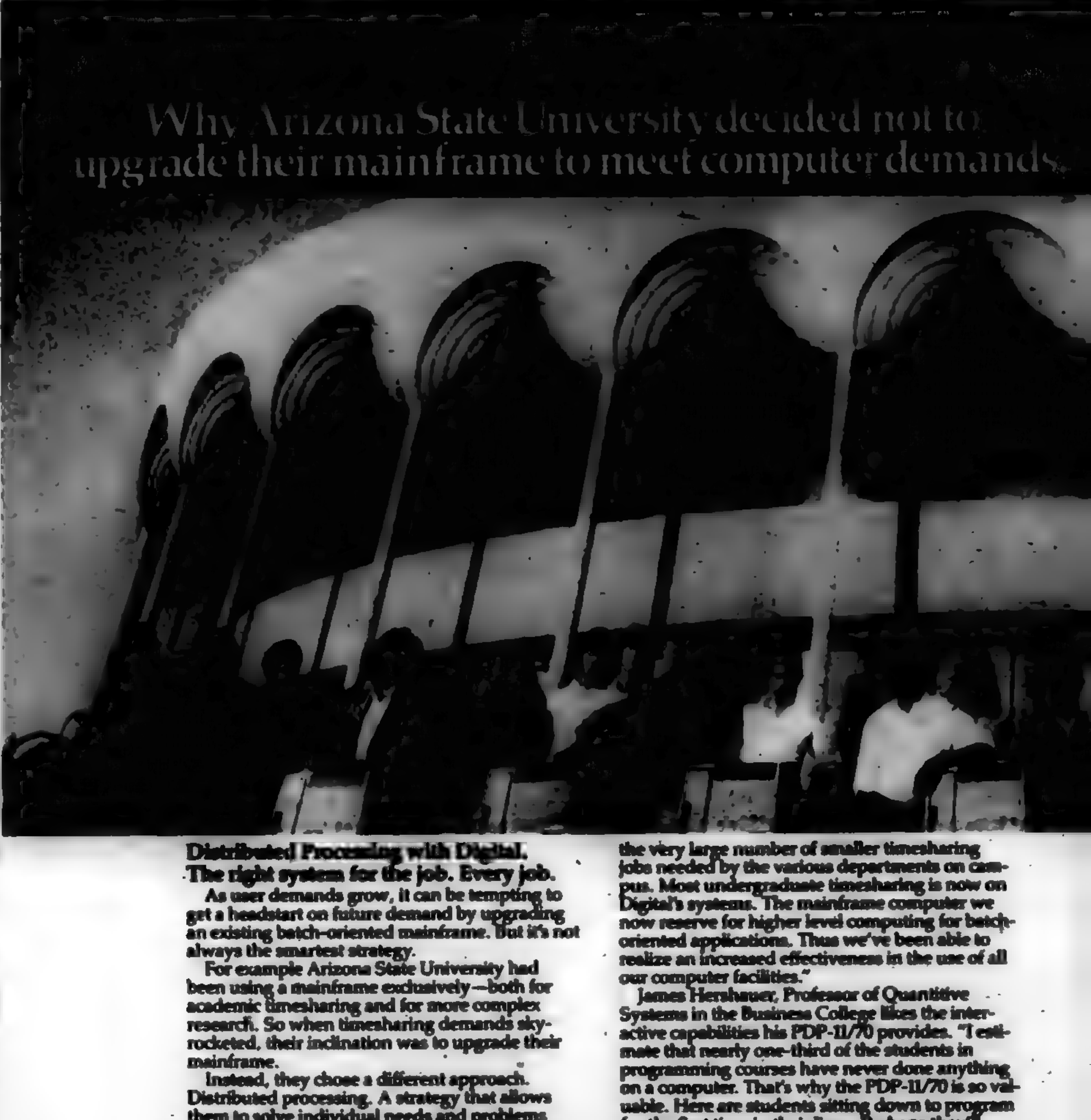
Clinic to Focus On Improvements In Data Handling

SAN FRANCISCO — Cost reduction and productivity improvement will be the central topics of a clinic organized by Information Architects, Inc. here Nov. 17-19.

The program will be conducted by Information Architects' president, Al Tauber, who specializes in combining graphics (the technology of microfilm and microfiche) with computer technology to achieve cost-efficient information storage and retrieval.

Participants will complete a survey before attending the Tauber clinic, citing their specific problems in information handling. These cases will serve as course material for which solutions will be formulated during the program.

A company can enroll up to three employees in the clinic for $1,000, which includes all materials. Further information is available from the sponsor at 582 Sand Hill Circle, Menlo Park, Calif. 94025.



Why Arizona State University decided not to upgrade their mainframe to meet computer demands.

Distributed Processing with Digital. The right system for the job. Every job.

As user demands grow, it can be tempting to get a headstart on future demand by upgrading an existing batch-oriented mainframe. But it's not always the smartest strategy.

For example Arizona State University had been using a mainframe exclusively—both for academic timesharing and for more complex research. So when timesharing demands skyrocketed, their inclination was to upgrade their mainframe.

Instead, they chose a different approach. Distributed processing. A strategy that allows them to solve individual needs and problems with individualized systems. Rather than one single upgrade, they added three dedicated, interactive PDP-11/70 computers. One each for their colleges of Engineering, Business and Liberal Arts. This distributed approach was a much more functional solution to their problems. Not only did it allow them to tailor each unit to its specific application, it gave them flexibility for the future. Now they can add and reassign computers effectively and cost efficiently.

Distributed Processing with Digital means not wasting your mainframe.

"We don't use the PDP-11/70 systems for all our academic applications," explains Darel Eschbach, Director, Computer Center. "But we use them for the very large number of smaller timesharing jobs needed by the various departments on campus. Most undergraduate timesharing is now on Digital's systems. The mainframe computer we now reserve for higher level computing for batch-oriented applications. Thus we've been able to realize an increased effectiveness in the use of all our computer facilities."

James Hershauer, Professor of Quantitive Systems in the Business College likes the interactive capabilities his PDP-11/70 provides. "I estimate that nearly one-third of the students in programming courses have never done anything on a computer. That's why the PDP-11/70 is so valuable. Here are students sitting down to program for the first time in their lives. Perhaps they'll make 10 passes before they have a successful program. It helps them to have the immediate response of the timesharing system."

Distributed Processing with Digital means more availability.

Max Ivey, Director of Academic Computing Services, sees the PDP-11/70 systems solving future demands too. "We do see some probable areas of growing use as in research and statistical applications. Availability is what makes these systems so appropriate for academic use. They're perfectly suited to do the type of work that students do," he concluded.

So when Arizona State opted for distributed

The TI Omni 800 terminal provides league reports.

Terminals Roll Perfect Scores For Professional Bowlers

HOUSTON — While bowling is for most enthusiasts a leisure sport, the statistics of the game are serious business for the professional bowler.

In recent years, many bowling centers across the nation have converted to computerized score-keeping systems, but AMF, Inc., an equipment supplier to the bowling industry, is using Texas Instruments, Inc. data terminals to provide a system specialized for bowling called Datamagic.

By integrating a microprocessor with the Texas Instruments Omni 800 Model 820 Keyboard Send Receive (KSR) data terminal, Datamagic enables the bowling center proprietor to provide scoring information to bowlers.

In addition, AMF offers the owner several opportunities to manage and promote his business more efficiently.

"League bowlers used to wait a week for printouts, which are used to keep track of bowling averages, high and low games, team standings, handicaps and scratch averages.

"With Datamagic and the 820 KSR, bowlers can have scoring printouts within minutes," Bill Bogard, AMF's director of product engineering, said.

Manager Access

When a bowler completes a game, the Magicscore unit transmits the information from the bowling lane to the Datamagic data base in the manager's office. The scoring data is retrievable by keying in a request on the 820 KSR, and the bowling center owner or a league secretary can receive a scoring printout.

The 820 KSR Data Terminal can provide up to five legible copies simultaneously at 150 char./sec printing speed, Bogard said.

In addition; the TI data terminal has a 1,280-char. buffer which helps Magicscore to transmit figures for league reports. The buffer, a "short term" data storage, ensures that all transmitted data will appear on the printout, Bogard noted.

"We chose the 820 KSR for the Datamagic system because, with its compact size, it easily adapts to the bowling manager's office," Bogard said.

"But, most significantly, Datamagic can be used as a marketing tool to increase business. One important marketing function Datamagic performs with the assistance of the 820 KSR is recording demographic information about bowlers," Bogard said.

Once the demographic data is entered into Datamagic, the operator can access the host computer through the terminal to target specific markets. The manager can then take the information and inform bowlers of upcoming tournaments and special events.

processing, they got several advantages.
First, the PDP-11/70 systems were tailored to their tasks. With interactive capabilities that made it easier for new students to learn. The university was also able to use their new and existing systems in a much more cost-efficient manner, and subsequently installed 3 additional units.

Distributed Processing with Digital means more flexibility.

Distributed processing lets universities like Arizona State evaluate and meet their needs on a simple, year-to-year basis. They can purchase different capabilities as required by different applications, adding and reassigning computers to meet their demands. Which means they'll never have to commit to more (or less) computer than they need.

This is just one example of how Digital is committed to making the computer a practical, economical and accessible tool for education. We offer the industry's broadest and most widely used family of educational computers—from entry-level minis to 36-bit mainframes. Plus the networking tools to tie them together.

Our upward compatibility lets you grow in manageable, logical steps instead of awkward, costly leaps. It also lets you steadily increase services while protecting your basic investment.

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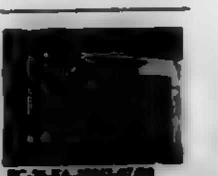

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Systems House Misjudged 'Shortcuts'

Early User's Series/1 Phase-In Not So Smooth

BRIARCLIFF MANOR, N.Y. — When a systems house suggests a newly introduced product to a client, it may encounter teething troubles. The benefits can be substantial, however, when the problems are worked out.

What happens, though, when the guinea-pig user is not quite so happy? When, for example, the system is expected to be installed in nine months, but it takes two years?

The IBM Series/1 was in its infancy in 1977 when the Systems Guide, Inc. suggested that Commodity Research Bureau (CRB), a Wall St. publisher specializing in commodity information, install the machine. Although the minicomputer was not specifically suggested by IBM for CRB's particular environment, the Systems Guild "felt that the possible advantages outweighed the disadvantages. However, we underestimated the difficulties in taking the shortcuts," Charles Chriss, president of Systems Guild, recalled.

Phase one of the system installment involved rewriting 40 Cobol programs from an IBM 370 time-sharing facility. According to Systems Guild, this has already proved cost-effective.

Phase two, which is nearing its end, is the conversion of a mail order and subscription fulfillment operation from a service bureau to the in-house minicomputer. Additions and further applications to the project have caused delays, but the deadline is now almost a year overdue.

First Problems

The first problems came with establishing an operating system that would facilitate the use of PL/I under RPS. Systems Guild eventually turned to IBM for help, and a systems engineer came up with what the guild called a "primitive version of EDX."

The Systems Guild was delighted." Since it is IBM policy "not to act as a development arm with a third-party programmer," according to an IBM spokesman, the guild was getting more than the usual third-party contract allows for. IBM generally provides a list of tasks for the third party and will participate in regularly scheduled planning reviews, if desired.

The Systems Guild, after the initial aid, was therefore left on its own to solve the problems. It developed support programs such as a screen support, decimal arithmetic and an indexed access method (IAM).

According to marketing manager David Silver, the initial headaches "were worth it in a lot of ways. Aside from being able to handle our clients' work, we sold IAM to other users."

So eventually CRB got what it wanted and the Systems Guild found a new product to market. However, CRB thinks it may encounter more problems in the future.

"The Series/1 is sometimes a little small for our purposes," a CRB spokeswoman said, "and perhaps we could use a bigger machine. In the future I think we will have to get another one."

Which gets back to the Systems Guild's first concern that the minicomputer may not have been the right system for the CRB environment. It did make its choice work, but CRB suffered and may now have to expand its system sooner than anticipated.

Oil Rig's On-Board Micro Sizes Up Data on Drilling

HOUSTON — Each morning, Occidental Petroleum Corp. in Houston receives a drilling report prepared by a personal computer. The report comes from Transworld 61, the largest semisubmersible oil rig in the world, in the Gulf of Mexico, 100 miles south of New Orleans.

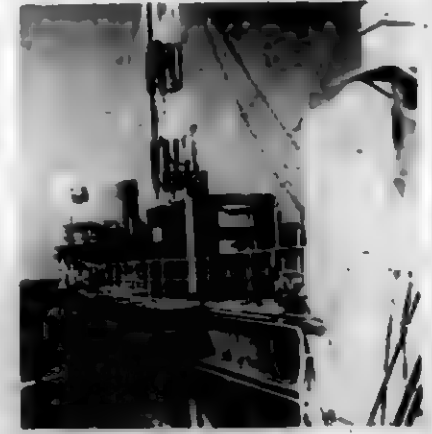
The Apple Computer, Inc. Apple II, selected by Geotech, Inc. of New Orleans, collects and analyzes drilling data from instruments and sensors placed throughout the rig.

Sensors on the mud pumps — used to drive the drill bit — monitor flow rate, mud temperature and density. Other sensors measure drill pressure and drill location as well as pressure build-up in the drill hole area, which could lead to blowouts. In addition to continual tracking of subsurface data, the computer also monitors instruments in the laboratory on the rig's platform: gas-liquid chromatographs, PH meters and ion-measuring devices.

Most measurements are accepted directly by the computer using its built-in analog inputs. However, Geotech has added an Applesoft language card, a printer controller, a real-time clock and an interface to some of the specialized laboratory instruments.

The computer runs 24 hours a day, seven days a week, as does the oil rig. Downtime can cost $3,000 an hour, so reliability is crucial. In the hostile environment of the off-shore rig, minicomputers have tended to die out. The line frequency may not always be 60 Hz, and line voltage can vary ±20V. The microcomputer, however, has resisted power problems.

Oil-rig monitoring by microcomputer is described by Phil Roybal in "An Apple in the Oil Fields: Computer Power Where You Need It." Roybal's article appears in the fall issue of *onComputing*, available in computer stores and selected newstands and bookshops and costs $2.50. The publication's offices are at 70 Main St., Peterborough, N.H. 03458.



Laboratory on rig contains an Apple II personal computer which monitors drilling data.

Show to Feature Communications

NEWTON, Mass. — Lake Systems Corp. (LSC) will hold its "Communications 80" Exhibition and Open House on Oct. 8-9, where it will showcase new products in audio, video and security systems.

Factory representatives will be there, along with the LSC staff, with information and hands-on demonstrations. Exhibitors include Hitachi, Adda, Sony Broadcast, JBL, Neotek, RCA and National Controls.

Admission to the open house is free to industry people. Further information is available from LSC at 55 Chapel St., Newton, Mass. 02160.

No

T-Shirt Maker 'First' to Link Minis by Satellite

BUTLER, Wis. — A personalized T-shirt manufacturer here said it is the first firm to link two IBM minicomputers via a Bell Telephone satellite communications link.

Holoubek Studios, Inc. has linked via SDLC Protocols an IBM System/32 with 13.9M bytes of main memory in its Wisconsin office to a 128K-byte System/34 located in the firm's London office.

"It's unique," said Ron Pierner, president of Computer Resources & Technology, Inc., a Milwaukee-based consulting firm that helped Holoubek develop the system. "It's the first time a small computer has talked with another small computer through a satellite."

Inventory Control

The $5 million Holoubek Studios uses its 120 employees to produce various types of customized T-shirts and uses the computer system to check inventory and send required shipments to the London office.

"They rely on us for everything," company President Verne Holoubek said, "[because] you really can't afford to ship it back."

The computer-satellite linkup allows the London office to send daily orders to the Wisconsin manufacturing center. "When they give us the information, we know what to send them," Holoubek said, noting, sometimes before the satellite linkup the London office was sent products it couldn't sell.

If the London experiment, which costs about $12 a day, is successful, the firm will establish similar satellite links with offices in California and Hong Kong.

Pierner said IBM is watching the project with bated breath in hopes that, if successful, the idea can be marketed on a broader scale.

Holoubek, on the other hand, hoped the idea will increase his annual revenue by $1 million this year and to $20 million by 1985. He also said the satellite linkup will help him increase his export business from about 15% of total sales to around 50% by 1985.

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Airport-Based POS Units Cater to Duty-Free Shoppers

By Deborah Wise
CW Staff

LOS ANGELES — As the number of international travelers increases, so does the demand for duty-free merchandise. Communications technology has been introduced to cope with the former growth and now technology can help satisfy the latter, too.

With a network that links shops to the warehouse and keeps track of flight times and inventory levels, both passengers and merchandisers can do more business more efficiently.

Host International, Inc. has nine duty-free shops at Los Angeles Airport and one downtown store here. It used to use an electromechanical device to process orders. Sales personnel wrote tickets using an electrosensitive pen that simultaneously reproduced the order over low-voltage telephone lines.

Problems of legiblity led to mistakes in deliveries to the airport, and the increased volume of business led to delays. All transactions had to be summarized independently for sales and stock-level information, and U.S. Customs reports had to be batch-processed by an outside bureau.

To keep competitive, a system had to be devised to speed up the process and make it consistently efficient.

By installing a computer and 30 point-of-sale (POS) terminals, Host can now process more sales faster, create management reports and keep up-to-date with U.S. Customs requirements as well as create benefits for sales staff who can concentrate on selling rather than processing orders, according to Stephen Izant, director of administration for Host's merchandise operation.

Initial Problems

But initial problems with high-cost telephone communications between the airport and the downtown outlet had to be solved.

Host installed an HP-3000 Series 3 system with 1M bytes main memory and 33 telephone lines for the airport stores and 23 lines for the downtown location. Since the CPU was at the airport, only the cost of leasing the downtown lines proved great. At $75 a line per month, Host felt it necessary to seek an alternative method.

Moxon Electronics, an Anaheim, Calif.-based company specializing in solving data communications problems, came up with a solution that condensed the number of telephone lines from 23 to two using two sets of Micom Systems, Inc. concentrators and Racal-Vadic, Inc. modems for 18 POS terminals.

Although the initial expense for the equipment was more than the cost of the leased lines, "we envision a savings over the life of the lease — say 6 years — of about $50,000," Izant said.

Los Angeles Airport is expanding with a new terminal due for completion in two to three years, and Host will then upgrade its system which now includes HP 3075 POS terminals, HP 2624B CRT terminals and HP 2631 printers.

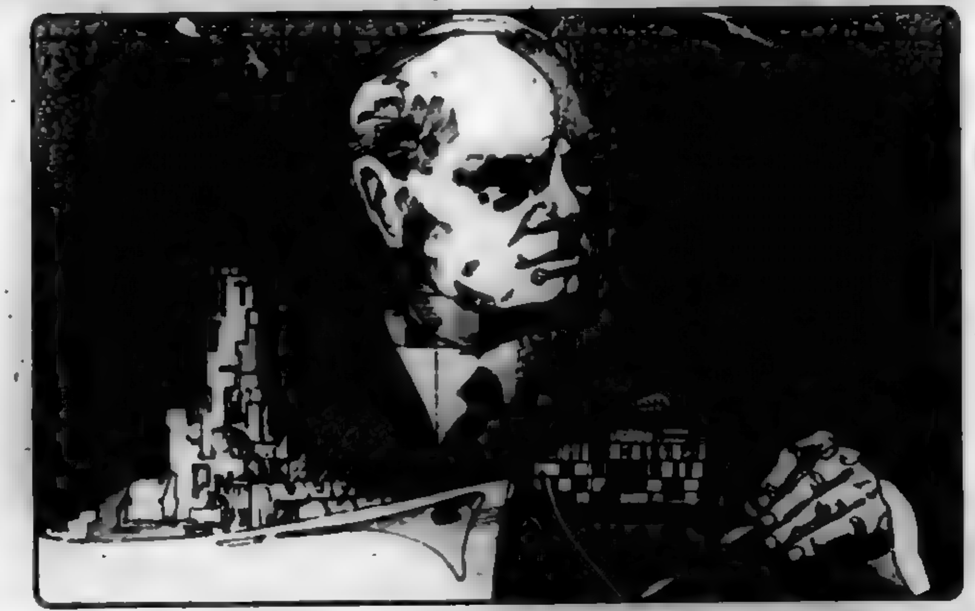
Kansas DPMA Plans Fall Meets

SHAWNEE MISSION, Kan. — The Data Processing Management Association (DPMA) in Kansas City has announced its fall series of executive and management seminars to be conducted here.

Cosponsored by Univac, all programs will be workshop in format and will include film studies of sample problems. The first in the series is "The Effective Executive," which will run Tuesday and Thursday afternoons from 4:30 p.m. to 6 p.m. The $50 fee includes all texts and course materials.

Further details and course reservations can be obtained from Leo Hertz at Univac, Suite 200A, 4210 Johnson Drive, Shawnee Mission, Kan. 66205.

If Churchill had used SPSS®, he might have saved his statistical department a lot of blood, sweat and tears



In waging war... and business ... great executives know that good data analysis is a matter of life and death. Winston Churchill knew it:

"One of the first steps I took on taking charge of the Admiralty... was to form a Statistical Department of my own—(one that I) could trust to pay no attention to anything but realities. This group was able to present me continually with tables and diagrams illustrating the whole war. I (therefore) had from the beginning my own sure, steady source of information, every part of which was integrally related to all the rest." (*The Gathering Storm*—pp.467-68)

Thanks to the honest and tireless efforts of his Department, most of the war's critical decisions were based on facts, not hunches. Had they been able to use the SPSS Data Analysis Package, the Department's analysts could have explored the legions of data more quickly, efficiently, creatively... with easy-to-generate tables, graphs and reports, as well as sophisticated statistical analysis.

Using the SPSS Graphics Option, Churchill might have had graphs showing The Battle of Britain in terms of German and British aircraft losses by time. Using regression analysis, Churchill would have had an excellent estimate of future losses.

As a matter of fact, Churchill might have been able to do it on his own, without the Department, because SPSS is so easy to use. Churchill himself could have learned from the excellent SPSS self-teaching manual. No special training in computer language would have been necessary—SPSS talks, listens and reports in the user's language: plain English!

When you decide which data analysis software package is right for your life and death decisions, consider the facts, as Churchill would have done. SPSS is sophisticated in output, yet simple to input. It's extremely portable—works in almost all computer environments. And you needn't hire any extra data processing people—your data researchers work on their own ... with considerably less "blood, tears, toil and sweat."

If you would like to see how SPSS-generated graphs and charts would have displayed The Battle of Britain to Churchill, or for more information on SPSS, call or write:

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IBM-compatible computers explained–by the leader in IBM-compatible computers.

In these times of recession, inflation, and high interest rates, it's important to get the most for your money when expanding your computer installation. Especially when you're under pressure to increase productivity within your current budget limitations.

At National Advanced Systems, we offer the industry's broadest range of inflation-fighting IBM-compatible computers. In fact, we have the largest installed base in the entire industry. That's why it makes sense to consider a compatible computer from the leader in the field.

The IBM-compatible industry is here to stay.

To understand the compatible computer industry requires an appreciation of the commitment users have made to software designed to run on IBM mainframes. When you realize that over $300 billion worldwide has been spent on IBM software and training, it's obvious that a hardware revolution resulting in the incompatibility of existing software will never happen.

This fact has allowed manufacturers such as ourselves to provide superior price/performance alternatives to IBM users. As a result, the IBM-compatible segment is now growing twice as fast as the rest of the data processing industry. In fact, last year was a record growth year for the compatible industry, outpacing even IBM.

Compatible computers are here to stay. And National Advanced Systems will remain in the forefront – because we understand your need to increase productivity while protecting your investment.

We offer a full line for your consideration.

Our Advanced Systems product family is backed by a $1 billion multinational corporation, offers unequaled price/performance, and boasts higher residual values over time than even IBM. Our family ranges in size from our medium-scale AS/3000 to our AS/7000 DPC which outperforms the IBM 3033. And each system is backed by the finest service and support in the industry.

For more information, contact your local National Advanced Systems sales office, or contact Marketing Dept. AJ, 3145 Porter Drive, Palo Alto, CA 94304, 415/856-5000.

National Advanced Systems. In economic times like these, it's nice to know there's a company compatible with today's budget realities.

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On Oct. 24
Boston to Host Legal Conference

BOSTON — The Northeast Computer Law Institute, a conference aimed at attorneys in and out of the information processing industry, will be held here Oct. 24.

Sponsored by the Massachusetts Continuing Legal Education — New England Law Institute, Inc. (MCLE-NELI), the program is designed to provide lawyers with an up-to-date perspective on legal problems likely to be encountered in the acquisition and use of computer systems.

Moderated by Peter Marx, secretary and general counsel at Interactive Data Corp. of Waltham, Mass., the one-day seminar will feature such speaker/lawyers as Thomas Christo on "Litigation"; Jerry Cohen and Thomas Franklin on "Legal Protection of Computer Programs and Computerized Data Bases"; and Robert Bigelow on "Government Regulation."

Registration fees are $75 for lawyers admitted to the bar before July 1, 1977; $60 for Boston or Massachusetts Bar members; and $55 for MCLE-NELI members. For those admitted after that date, fees are $50; $40 for Boston or Massachusetts Bar members; and $35 for MCLE-NELI members.

More information is available from MCLE-NELI at 133 Federal St., Boston, Mass. 02110.

Datatraining '80 Set for Dec. 7-10

CAMBRIDGE, Mass. — *Northeast Training News* will sponsor the Datatraining '80 conference Dec. 7-10 here. Sessions include cost justification of DP training; making new programmers productive quickly; computer-based instruction; and future trends of educational measurement and instruction.

The keynote speakers are Richard Nolan, chairman of Nolan, Norton & Co.; Joseph Ferreira, vice-president of the Diebold Group; and Dr. Chip Bell of Lead Associates.

Registration costs $300 before Nov. 14 and $340 after that. *Northeast Training News* is at 176 Federal St., Boston, Mass. 02110.

Eggert Receives Federal Honor As Top Employee

CHICAGO — George R. Eggert, director of the Office of Planning and Management for the Defense Contract Administration Services Region, Chicago, has been named the Outstanding Supervisory Employee of the Year by the Federal Executive Board in the 23rd annual Federal Employee of the Year awards program.

Eggert was honored at a recent luncheon ceremony. Long active in the field of information privacy, computer crime and ethics, he has served on the advisory council of the Information Privacy Research Center at Purdue University, and is a member of the editorial boad of *Information Privacy* magazine.

He is also a former president of the Data Processing Management Association and is an active member of the Executive Board of the American Federation of Information Processors.

Currently heading up an office that serves Wisconsin, Indiana and northern Illinois, Eggert dispenses management services on approximately 18,500 contracts.

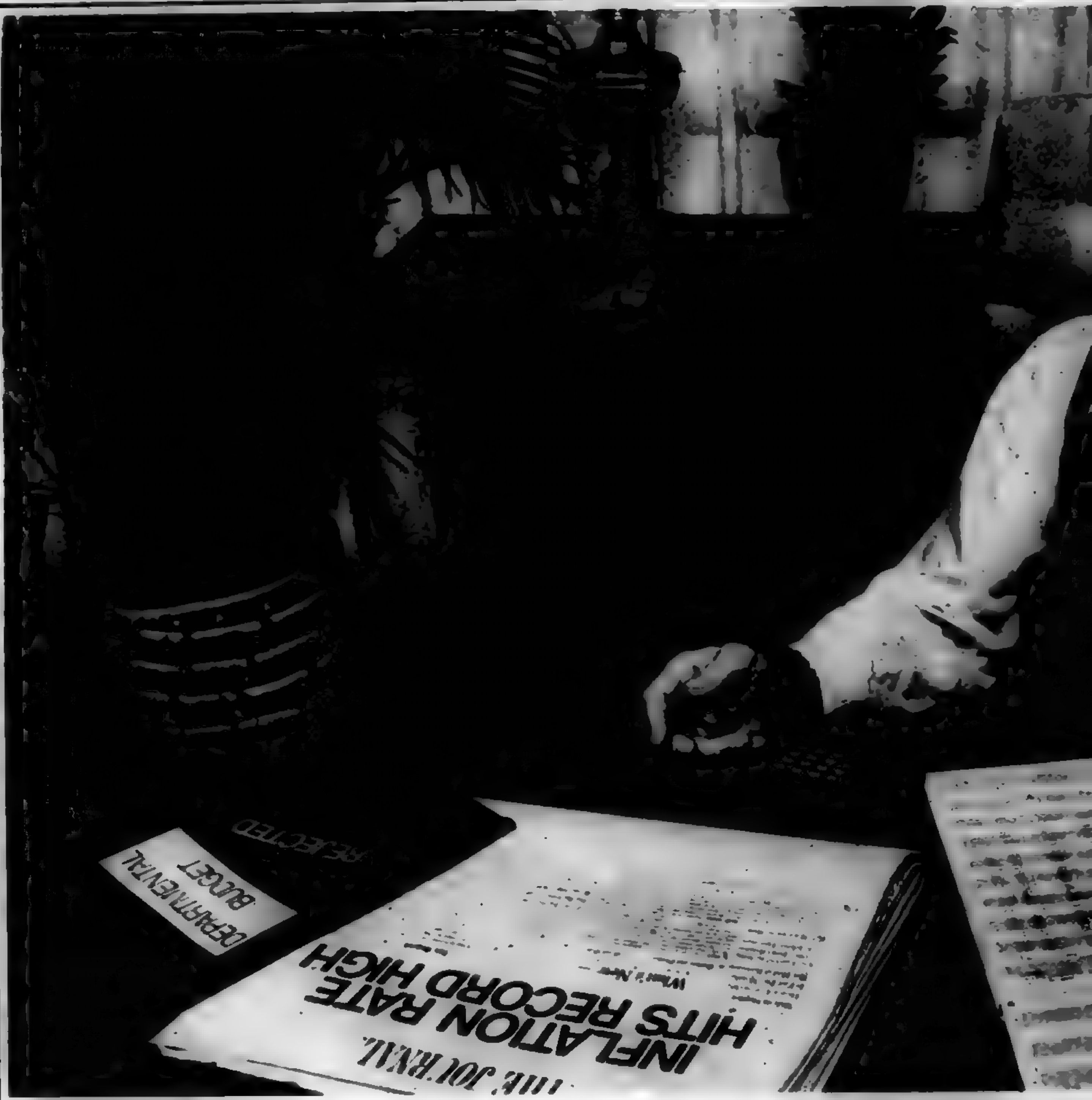
Audiocassettes Hold Lita Papers

CHICAGO — The papers presented at the Library and Information Technology Association's (Lita) institutes on "Automated Acquisitions Systems" are now available on audiocassettes.

The titles of the cassettes include "The Functions of Acquisitions"; "Local Systems — Design and Costs" and "Vendor Systems — On-Line Ordering."

Recordings are unedited and sell for $4.25 each. The full set of nine is priced at $35. Lita members and institute registrants receive a 10% discount.

Cassettes may be ordered from Information Yield, 311 Stonecrest Drive, Syracuse, N.Y. 13214.



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How to Fight Inflation at 4800 bps

Under our inflation fighter program, you get the first 60 days free when you lease our MPS 48 modems. And there's no charge for either installation or maintenance.*

Mini Cuts Supplier's Paper Overload, Ups Sales

HOUSTON — Volumes of paper work threatened a business supplies company's efficiency in handling orders, but the introduction of a minicomputer cut the overload and helped increase sales.

Five years ago when Russell K. Brown, now administrative vice-president, joined Moore Paper Companies, Inc. here, he saw the need for automation but "waited until the new minis had come onto the market and had been tested."

Brown chose a Wang Laboratories, Inc. system over other makes for cost-effectiveness, its ability to fulfill the company's requirements of a data base programmable in Cobol, its real-time capability and its immediate availability, he said.

A comparable IBM system today — the System/3 series for example, or the 4331, 4341 or 370/138 — would cost 40% more, and there are lengthy delays on delivery, according to Brown.

Schedules 3,500 Orders

Moore installed a Wang VS with two 75M-byte disk drives a year and a half ago. The system handles pricing, invoicing and orders. It allows for immediate information retrieval and status reports on the production schedules of 3,500 orders.

The VS system has had only four hours mainframe or disk drive downtime during the 18 months it has been installed, according to Brown, who praised the support services of Wang in restoring the power when this occurred.

Brown said the machine's only limitation is in actual memory size. When new jobs are introduced in the future the system will spend more time accessing file information, thereby lessening on-line response time.

An upgrade is planned within a year that would add 10 workstations to the 14 already in use.

"When an order is called in to our City Sales Department," said Russell Brown, vice-president, "the person handling it can simply move in front of the screen, push a button and obtain data on any of 2,000 inventory items."

Brown also wants to install Wang phototypesetters and word processing units and sees future communications possibilities with Moore's two branch offices located in Texas.

The software for the system is provided by a local firm, Delphi Data Systems, Inc. and Moore employs two full-time computer room personnel.

Company sales have increased 33% per year over a five-year period and Brown foresees automating more parts of the business with the new workstations.

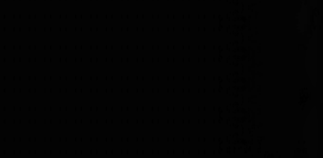
Plans for the future include using four of the new workstations to automate the companies paper container business, with the remainder of the machines being used for budgeting and job costing applications.

The phototypesetters will be used to expedite forms manufacturing. "The data for standard items such as an invoice, purchase order or bill of lading will be retained on magnetic media," Brown said.

"For future orders, our composition group will be able to bring the design out of storage and fine-tune it at a workstation to suit the customer's specific needs.

At the moment, the minicomputer saves the company time on routine tasks. "When we took our fiscal-year inventory, after entering counts into the system, we were able to hit a button, lean back and drink a Coke while the computer added and extended the inventory and generated the report," Brown said.

Moore's present system, including workstations, disk drives and printers, would cost approximately $115,000. Each additional workstation, at today's prices, costs $3,080.



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Land Base System Pinpoints City's Problems

HARTFORD, Conn. — A Land Base Planning Information System (LBPIS) using information from city department files and organized by property addresses is helping this city serve residents better by pinpointing problems by neighborhood.

"For example, we used LBPIS in 1979 to determine by neighborhood how many city residents would have problems paying their heating bills," Anthony N. Yaeger, the city's DP manager, explained.

"Because of overlapping information from the city assessor, police, registrar of voter's data and social service departments, very accurate projections were made. With detailed reports in hand, we made a request to the state government for aid. We believe some 30,000 city residents had heat they might otherwise not have been able to afford," he said.

LBPIS has also been very effective in other areas, including police work, Yaeger said. "Using information provided by police applications, we have pin-pointed neighborhoods plagued by particular crimes.

"We have been able to determine, for example, areas where purse snatchers and car thieves tend to operate most, and police have instituted crime reducing programs for those particular areas; and just as important, we can then use information from other data sets to develop a neighborhood profile that can address not only the crime but why the crime probably takes place," he said.

Files from the city assessor's office were used as a base for LBPIS because the entire city is geographically defined in his office, he added.

The system is also used to administer Comprehensive Employment Training Act (Ceta) programs, funded by the Department of Labor, for 22 neighboring cities with program budgets totaling $24 million.

The city's Ceta work includes tracking over 10,000 clients from first interviews, through training, to job placement, Yaeger said. The system also handles all Ceta payrolls in 22 surrounding cities while managing the financial activities of each program.

In addition, it supports applications that both save the city money and generate revenues. One is a Lost Time Statistics application that interfaces with payroll activities to determine, by department, how many and which employees frequently miss work.

Using information from voter registration files, it creates voter lists arranged by age, location, political affiliation and other selected topics. The lists are sold to politicians and public interest groups so they can reach specific segments of the population. "This program generates quite a bit of revenue for the city, and it generates it from an area that would otherwise go untapped," Yaeger said.

Future plans call for bringing more city departments into the LBPIS program to broaden the information base for the city planners. This will allow city administrators to determine population changes within the city so they can better plan the city's future.

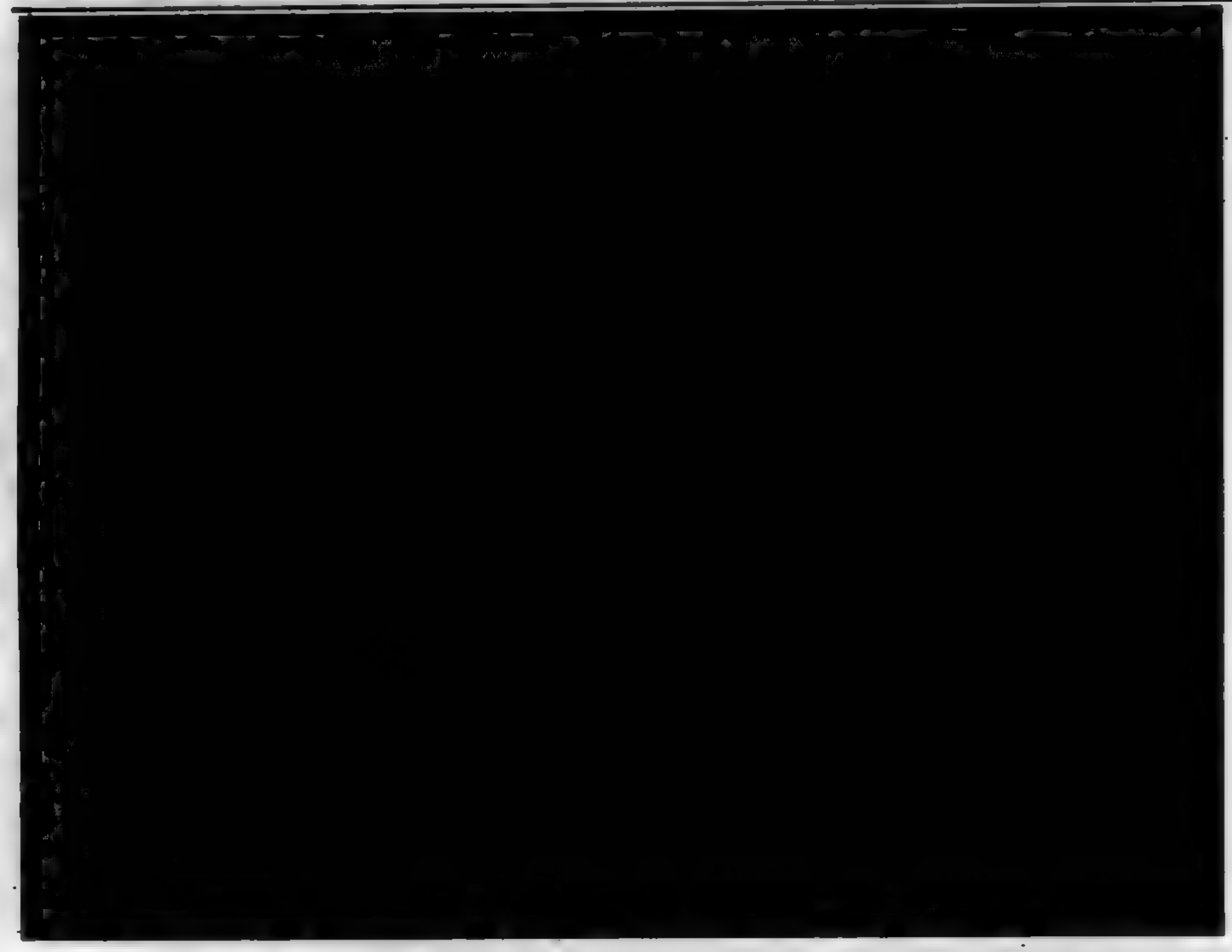
The software runs on a 3M-byte Burroughs B6800 linked to 1.5G bytes of removable disk pack storage, 56 Burroughs TD 830 display terminals in 12 city departments and three line printers.

Course Set On Writing

LOWELL, Mass. — "Effective Written Communication" is an intensive two-day course that will be offered at the University of Lowell on Nov. 19-20. The program will be conducted by Louis J. Visco, communications consultant at Arthur D. Little, Inc.

Intended for newcomers to the corporate world, the program outlines new techniques for the presentation and interpretation of statistical and other complex data.

Included in the enrollment fee of $275 are all materials, lunches and refreshments. Discounts are available for multiple enrollments. Registration is being handled by Michelle Fournier, University of Lowell Continuing Education, Lowell, Mass. 01854.



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Commonweal or Common Criminals?

Henry VIII's Justices on the Take? CPU Checks

CLAREMONT, Calif. — Were 15th century justices of the peace in England true spokesmen of the people or were they a bunch of local politicians on the take? And after almost 500 years, can one arrive at the truth today?

Dr. Robert L. Woods Jr., history professor at Pomona College here, expects to find out with the help of a 20th century tool — the college's mainframe.

After almost seven years of research, much of it among England's centuries-old archives, Woods has amassed some 100,000 records on 2,800 justices of the peace who served between the years 1485 and 1537. The names of these individuals popped up over 34,000 times in the archives, and Woods expected these figures to double before he completes his work, which is in the final stages.

Early Renaissance Period

Among the first social scientists to recognize the power of the computer as a research tool, Woods described his study as an attempt to reveal the past and the human condition in England's early Renaissance period. He felt not enough work has been done in this important area of transition.

"Justices of the peace represented a central institution of law and politics," he explained, adding that his study "should shed light on modern ideas of political bodies and also contribute to an understanding of how modern democracy and the law evolved."

Already Woods sees some indication that the justices — widely held as natural leaders of the people and early spokesmen for democracy — may have been bought off by the Tudor monarchy.

The period being studied followed 100 years of war, a time when the king and his court wanted stability and peace and were willing to pay the price through a system of what may have been "one hand washing the other."

Hunting Indicators

The computer, an IBM 4331, helped Woods focus on individual justices and reconstruction of their records over two decades. The idea is to flush out the indicators that suggest shifts in the justice's income or property holdings.

It is similar to the skepticism one might feel today when a newly elected politician suddenly shifts his life-style from an economy car and a modest home in town to a limousine and a mansion in the country.

Advanced computer programming made possible the storage interconnection of the massive number of records. This technology permitted the researcher to address the computer in English language statements and immediately get answers that otherwise involved tedious and lengthy efforts.

The sheer volume of these records, manipulation of them and the many cross references would have discouraged many scholars from undertaking the task.

Typical Questions

Here are some questions Woods posed in his research: Who received royal commissions to be justices of the peace? During what dates? With what powers? What were the educational and social prerequisites? Were justices selected based on their landed wealth or liquid wealth? How did Henry VIII's government recognize a qualified justice? Did the real power of the justices derive from their social influence or from the king's authority?

Citing the advantage of the computer, Woods said, "You can reach into the middle of a record to get at information. You can see relationships between records, as for example, the existence of a marriage, which further helps to identify a particular justice of the peace."

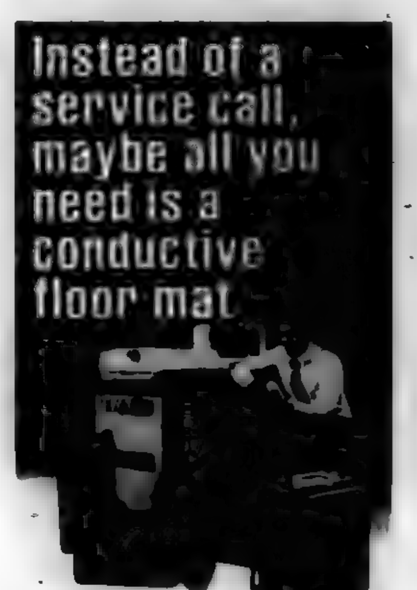
Also the computer can automatically correct calendar differences. The Regnal calendar, for example, expressed years in terms of the king's reign. Such references are more meaningful when expressed in today's Gregorian calendar.

Another major research hurdle involved the carelessness in spelling of names. The same Smith might appear in archives as Smyth, Smithe, Smeth or Smethe.

Using an IBM CRT terminal with a keyboard, Woods could display from computer records all the various spellings along with further identifiers.

"Only the unique characteristics of one man can separate or link those of similar spelling, such as a daughter named Mary or a wife named Anne," Woods explained.

"The new technology let me display the data and rapidly modify it to get at the true situation," he said.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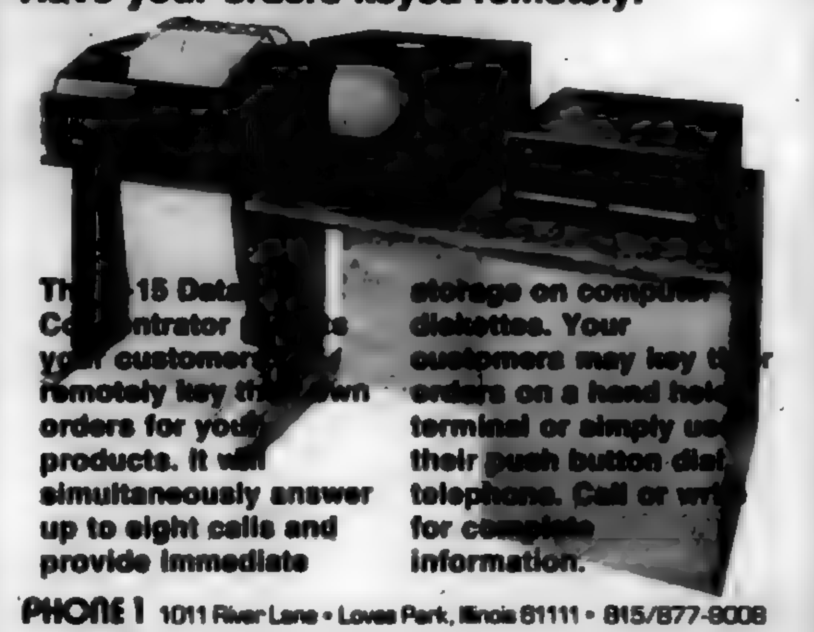

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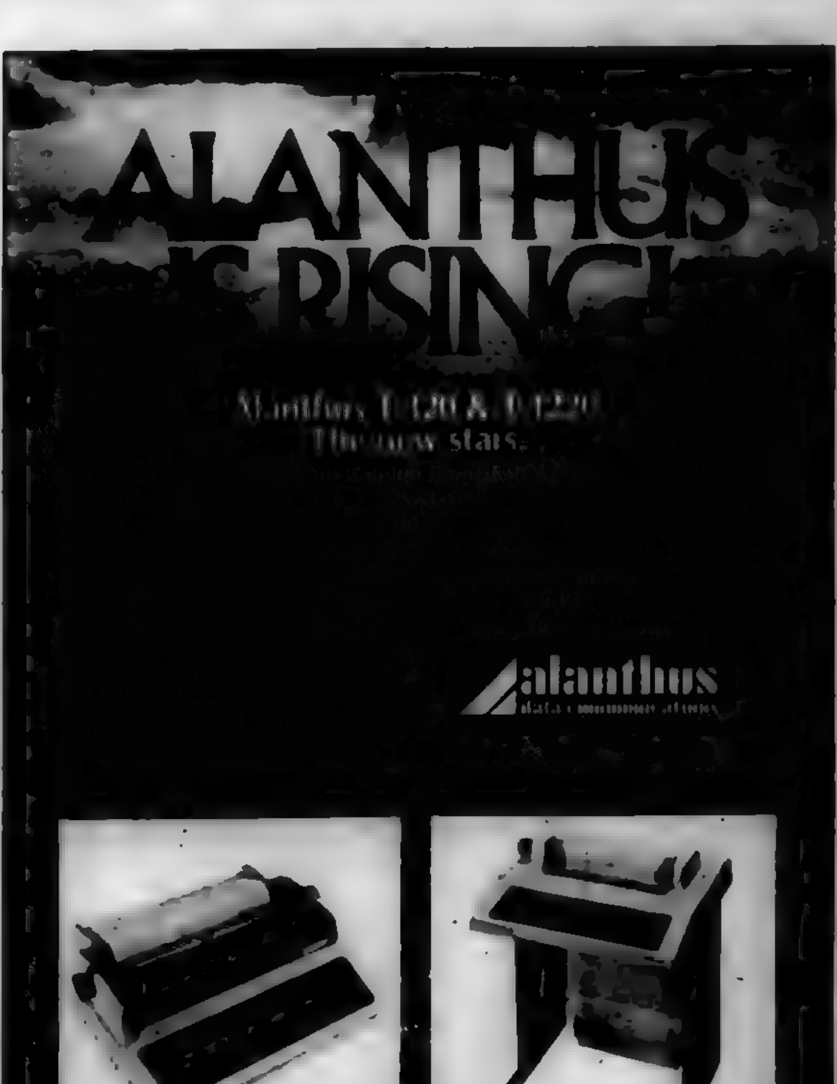

Saving 10 Cents Per Barrel

Minis to Supervise U.S. Deepwater Oil Port

Special to CW

NEW ORLEANS — A network of minicomputers will perform the supervisory functions for the first deepwater oil port in the U.S., scheduled to operate off the coast here sometime next year.

Controlled by minicomputers, the Louisiana Offshore Oil Port (Loop) will allow the unloading of oil-carrying supertankers more than 18 miles offshore.

The port will be capable of offloading oil at rates up to 100,000 barrels per hour at a cost savings of about 10 cents per barrel.

The oil will then be pumped along 44 miles of pipeline to underground storage cavities at the Clovelly Salt Domes, a spokesman said.

The master controls for Loop's Supervisory Control and Monitoring (Scam) system are at the port's operation center in Galliano — three miles from the salt dome storage area.

At the heart of the operations center are two Data General Corp. Eclipse M/600 minicomputers with 640K bytes of memory.

The computers share a 10M-byte dual-ported storage disk and are supported by a model 4218 300 line/min line printer and dual Model 6067 50M-byte storage disks.

Dual Eclipse S/130 minicomputers will be used at each of the system's three remote computer locations: The platform complex, a booster station onshore and the Clovelly Dome Storage Terminal.

The remote computers are called facility control processors (FCP). A separate, single Eclipse S/130 minicomputer will be used for scheduling and system monitoring at the port's New Orleans headquarters.

Five Functions

The computers provide five basic functions: (1) high levels of automation for minimum manpower requirements, (2) system operation from one location, (3) leak detection, (4) use of distributed processing to minimize the length of critical control loops and (5) a high-level of operational data acquisition for maintenance, scheduling and accounting.

Briefly, here is what will happen to the oil in the Loop system. At the unloading complex 18.5 miles offshore, a supertanker will hook up to one of the three single anchor leg mooring (Salm) buoys.

Two flexible, floating hoses, each about 1,050 feet long, will carry the oil from ship's cargo manifold to a fluid swivel unit at the base of the Salm.

From the Salm's base, the oil enters an underwater pipeline. This pipeline extends 8,000 feet from the buoy's base to the Loop pumping platform complex.

When the oil reaches the platform, it will be boosted to shore by three pumps connected in parallel, driven by three 7,000-horsepower electric motors. This pumping system will move the oil at rates up to 100,000 barrels per hour through a 48-in. diameter pipeline.

When the oil reaches Loop's Fourchon Booster Station, four 6,000-horsepower pumps will pump the oil through a buried 48-in. diameter pipeline to the Clovelly Salt Dome Storage Terminal.

Eight Cavities

Eight cavities at the salt dome, each with a storage capacity of four million barrels, will house the incoming crude. Since Loop will be handling an estimated six different segregations of crude from abroad, the individual cavity system is essential.

Oil from the various cavities will be pumped in and out on an almost daily basis, just as is done with a traditional above-ground tank farm at a refinery.

Installation of the computerized supervisory control system is being managed by Control Applications, Inc. (CAI) of Houston.

Because the successful operation of the Loop requires that all the minicomputers act almost in unison, the system will have a communications capability. Three microwave communication circuits operating at 1,200 bit/sec will link each FCP.

Each main computer in the Loop complex talks to its backup through a DG Multiprocessor Communications Adapter (MCA). The MCA transfers data blocks from one computer to another through their direct memory access channel, permitting concurrent data transfers between computers at rates up to 1M byte/sec.

In addition, each S/130 computer has a data control unit (DCU/50), which provides a high-performance data channel interface to the M/600s and field data interfaces.

The DCU/50 supports synchronous and asynchronous line multiplexers by performing all character-level operations while providing a data channel path to the computer.

The unit controls multiplexer operations in parallel with noncommunications activities, significantly reducing computer overhead. Handling of character type data by the M/600 computers is facilitated by the high-speed Input/Output Processor (IOP).

About 70 programmable Gould, Inc. Modicon controllers are used to interface between the computers and the actual hardware such as pumps, valves and turbine engines, the spokesman added.

Each remote computer system is hardwired to all programmable controllers located at that particular site. Operating independently of the computer, the programmable controllers collect operational data, execute programmed sequence logic and perform other local control functions.

When the oil reaches the Fourchon Booster Station, it comes under the control of two more Eclipse S/130s.

Through the programmable controllers, the S/130 computer manages the four 6,000-horsepower electric motor-driven booster pumps. The computer also manages the 4-in. diesel pipeline which supplies diesel fuel to the turbine-generator sets on the offshore pumping platform.

A dual set of Eclipse S/130 computers also controls the injection and delivery of the oil into the cavities at the Clovelly Salt Dome Storage Terminal.

All of the computers run under DG's Real-Time Disk Operating System (Rdos) except the two M/600 computers at the Operation's Center and the S/130 computer in New Orleans, which runs under DG Advanced Operating System (AOS).

The oil companies participating in Loop's ownership are Ashland Oil, Inc., Marathon Pipe Line Co., Murphy Oil Corp., Shell Oil Co. and Texaco, Inc.

Survival strategies for EDP executives

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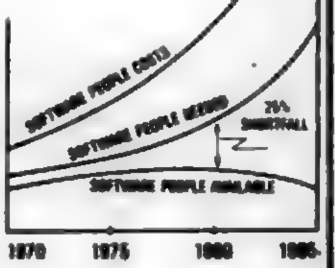

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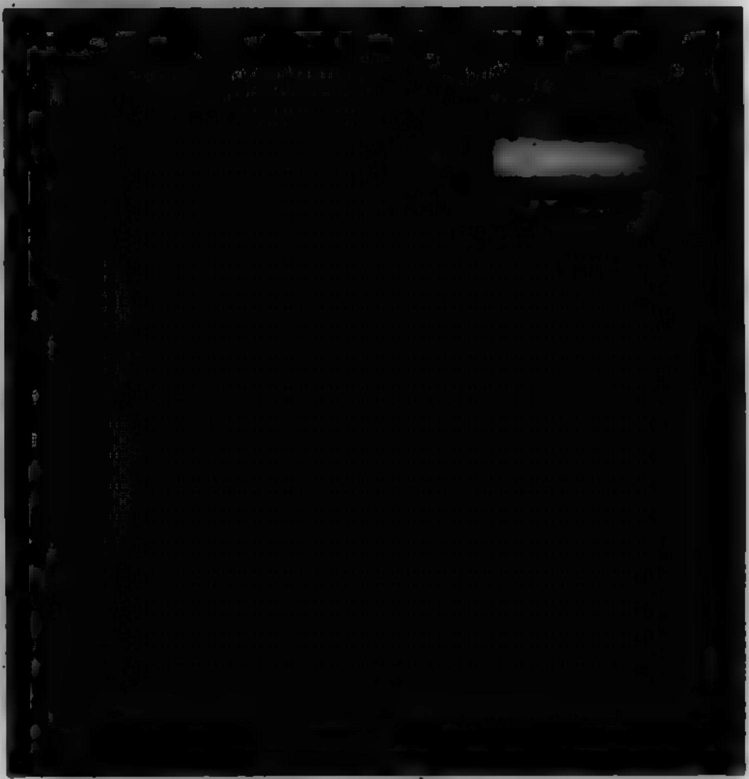

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Direct Mailer Seals Profit on In-House Package

ROCHESTER, N.Y. — When a small direct mail distributor here found it couldn't find a software package to meet its somewhat specific needs, the firm's president decided to build his own. Not only did the in-house-developed package cost the firm less, the firm is now selling the package to similar users.

The Tenny Co., Inc. serves as a catalog distributor of tools and equipment to automotive, rental and farm wholesalers in the eastern 34 states. Its business has evolved from a local distribution outlet serving New York State with a traditional sales force, to a multi-state direct mail distribution network with most sales handled by phone through a network of six toll-free Wats lines, Tenny president Ron Tenny said.

In 1972 the company made a decision to change its method of sales. It eliminated the outside salesmen and converted all sales to the direct mail concept. Since a list of present customers was available and printing facilities were already in-house, the company could embark in this new direction with a minimal disruption of service.

A catalog was produced listing all of the company's products and two more Wats lines were installed. Tenny realized inventory control ultimately would play an important role in the company's future success and the ADP (National Inventory Control System) service bureau was engaged to automate the inventory and purchasing in 1973.

This proved the value of DP and the company gained an insight into the changes needed to computerize. The problem of timeliness and a lack of total control began to become more apparent as the company's growth demanded up-to-the-minute inventory control and customer accounting.

In 1975 the firm decided to investigate the possibility of installing an in-house minicomputer. Design specifications for the system centered around the requirement for an interactive, on-line software application that would allow every person in the company to access data relative to their job function, Tenny said.

While multiterminal systems are commonplace in this era of computer growth, in 1975 the concept was slowly awakening and the choices were sparse. Tenny looked at IBM, NCR Corp., Burroughs Corp., Singer Co., Microdata Corp., Wang Laboratories, Inc. and Digital Equipment Corp. in search of a suitable hardware/software combination.

IBM was quickly eliminated because its minicomputer hardware was limited to batch-oriented machines and were more costly than could be justified, Tenny said. NCR and Burroughs were eliminated from the running because the vendor's canned software was restrictive and not easily modified.

Singer had a good offering but rumors of its pending demise from the DP market were a cause of concern. Wang and Microdata looked like good hardware products, but, Tenny said, service and software support centers were too far from Rochester, N.Y. to be practical.

DEC was almost bypassed because its closest software vendor was located in Connecticut and close software support was determined to be necessary in the start-up period. After closer investigation into the DEC hardware, Tenny decided the vendor offered the best system despite the problem with software support.

DEC 356 Datasystem

The firm installed a DEC 356 Datasystem with dual 20M-byte disk drives, a floppy drive, two terminals, a 165 char./sec matrix printer and a PDP-11/10 processor with 64K bytes of main memory in February 1976.

While preparing for delivery Tenny had talked to many lo-

CASS
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WHEN
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WON'T
See page 123
in Buy/Sell/Swap

While they were thinking
hardware and software,
we were thinking
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32K SUPER RAM
16K MEMORY MASTER
24K MEMORY MASTER
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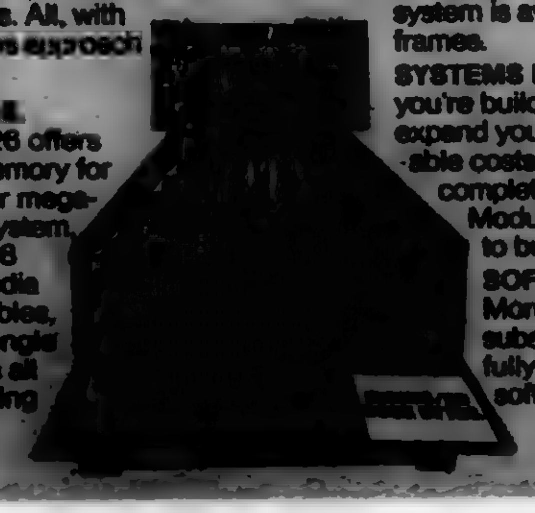

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With Minimum Disruption of Mail Service

cal first-time computer users and found the largest problem they encountered was that management was not in control of the business — the computer was! Another complaint was that management had purchased the computer as it would have any other piece of office equipment, such as a typewriter, and had not dedicated itself to working closely on the implementation.

To avoid a similar problem jeopardizing his installation, Tenny began transferring the majority of his daily job functions to his managers so he could devote his entire schedule for as long as necessary to bring the system up, Tenny said.

Tenny laid out the design around many of the features that had been useful in the service bureau system. He documented the information that was to be carried in each record field, designed report formats and described the applications required and their data flows. He then took a seven-day course at the DEC training facilities near Boston. With this background in the Dibol programming language and the basics of system design he began to work with the analyst to lay out the system, the company president recalled.

It soon became apparent that the project would be severely limited by three factors. First, the supplier's analyst was not familiar with the complexities of the direct-mail business and as time progressed the ability to translate the need for new applications contracted for and modifications to existing programs degenerated.

Second, the distance between Tenny's Rochester offices and Connecticut became a real barrier to keeping the system operational.

These first two factors forced Tenny to begin making changes in the code to keep the system running, he said.

As time progressed, his proficiency increased to the point where he was rewriting entire programs to eliminate problems with poorly written code.

The third problem with the system was that it had been sold to support a maximum of seven terminals with a memory expansion option. Not only did the memory not become available from DEC, but it discontinued the processor from its line of active products, making any future expansion impossible. This put a limit on the system of three or four terminals and then only if the larger programs were completely rewritten with complex program overlays, according to Tenny.

Purchase Contract

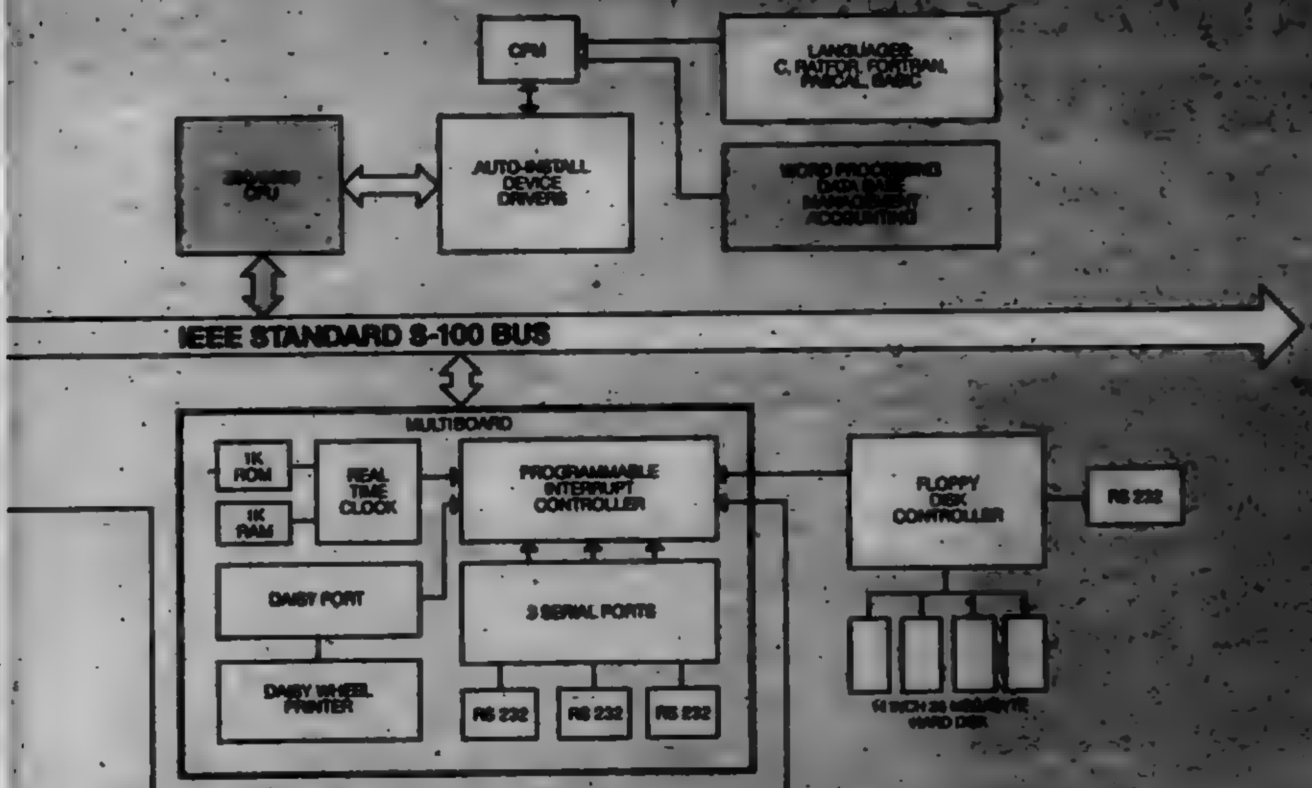
With these three major problems facing the company, Tenny decided to negotiate a contract for purchase of the PDP-11/34 CPU supporting up to 256K bytes of main memory in return for cancellation of any future obligations to the vendor and exclusive rights to any software already delivered, he said.

By the time the new CPU was installed in December 1977, Tenny had finished the first phase of a major overhaul of accounts receivable and pay history tracking. Vendor purchasing and mailing list maintenance and label print programs were finished. Order entry, order maintenance and invoicing programs were rewritten from the ground up, Tenny said.

Since that time an economic order quantity (EOQ) algorithm has been developed and installed in the purchasing module. It takes the majority of guesswork out of the buyer's hands by taking into account the past 13 months' sales history, vendor ship lag, package quantities and activity codes.

An information system has also been developed so that every salesman's terminal allows him to access data on any part file, vendor order, customer file, customer backorder and customer shipment. All these files are accessed in less than one second.

systems.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Managers on the Move

Facit, Inc. has promoted **TOM KOONTZ** to vice-president and general sales manager of western operations. He will be responsible for office and data products sales at Facit's offices in Gardena, Calif.

He joined Facit in 1963 as retail manager for typewriters and adding machines at the Oakland, Calif., branch. When Facit opened its Data Systems Division in 1966, Koontz was appointed sales manager of the western division. Since then he has been western OEM data sales manager and most recently western manager of the Data Products Division.

• • •

Radio Shack has named two divisional computer marketing managers, **JOHN E. ROY** for the Southeast and **HOWARD D. ELIAS** in the Midwest market area. They will be responsible for developing and coordinating the marketing efforts for the computer centers in their respective locations.

Before his promotion, Roy was manager of Radio Shack's center in Tampa, Fla. He joined the company as a store manager trainee in 1977. Prior to that he was employed at Burroughs Corp. in minicomputer systems sales. Roy is a graduate of the University of South Florida in Tampa with a B.A. degree in business management.

Elias was manager of the Detroit computer center. He joined the company as a salesman, then became manager of the Radio Shack store in Ferndale, Mich., in 1976. Prior to that, Elias was with the Board of Education of Southfield Schools in Michigan.

• • •

GTE Automatic Electric, Inc. has appointed **KATHARINE R. HARRISS** supervisor of public information at the company's Northlake, Ill., headquarters. Harriss is responsible for planning, preparation and dissemination of GTEs information to the public and news media.

She recently served as GTE's public affairs coordinator, developing and implementing communications programs for the Automatic Electric Laboratories.

Prior to that, she was employed by AT&T Long Lines in Chicago and Bell Laboratories in Naperville, Ill.

Harriss has a B.A. degree in English/communications from Denison University in Granville, Ohio.

• • •

GERRY W. TRICHEL has been named manager of corporate data processing at Zurn Industries, Inc. in Erie, Pa.

Trichel assumes responsibility for the direction of Zurn's DP activities: planning, implementation, coordination and supervision functions throughout the company.

Prior to joining Zurn, he served the Hammermill Paper Co. of Erie as general manager for field support, manager for technical services, manager for systems and programming and operations research analyst. Prior to that, he was employed as an industrial engineer with Reynolds Metals Co., Corpus Christi, Texas.

Trichel received a B.S. degree in industrial engineering from Southern Methodist University, Dallas.

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JACOB L. KATZ has been named director of systems and programming at Certainteed Corp., headquartered in Blue Bell, Pa. He will be responsible for systems development at the company's U.S. locations.

Prior to joining Certainteed, Katz was director of data processing for Commodore International, Ltd. and held a number of management positions at Macmillan, Inc.

Katz has a B.S. degree in industrial management and an M.B.A. in management science and information systems from La Salle College, Philadelphia, Pa.

• • •

St. Paul Financial Services has named **THOMAS W. McKEOWN** senior vice-president in the Executive Division of St.Paul Fire and Marine Insurance Co. and **JOHN C. FIELD** succeeds McKeown as head of information systems at St. Paul.

McKeown joined St. Paul in 1977 as vice-president and head of its computer operations. Previously he was employed by Honeywell, Inc. for 17 years as director of the internal systems and services operation of Honeywell Information Systems and in other managerial positions.

Field has been with St.Paul since January, joining the company from Tonka Corp., where he was head of management information systems and corporate planning. Prior to that, he spent 11 years with Honeywell in its systems and data processing operations.

• • •

AM International has named **FRANK X. MULLIGAN** vice-president of finance and administration for AM Jacquard Systems in Santa Monica, Calif. and **ROY W. TILSLEY** has been appointed vice-president of finance for AM ECRM in Bedford, Mass.

Mulligan will be responsible for the planning and analysis, accounting and order administration of the division's financial activities. He will also oversee employee relations and facilities management.

Mulligan recently served Intel Corp. as corporate controller and president of the Lease Administration Division.

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Finally, there's a computer system that lets you grow by plugging in resources, instead of by changing models — the BTI 8000.

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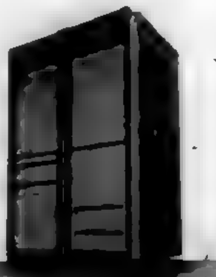
— Task oriented assignment of hardware and software.
— Simultaneous use of ANS COBOL 74, ANS FORTRAN 77, PASCAL, and BASIC/8000.

As for reliability and support, they're established BTI traditions, proven by over 2,500 other BTI computers operating in the U.S., Canada and Europe. For full details about the BTI 8000, contact the BTI office nearest you.



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Katharine R. Harris

Tom Koontz

Previously he spent 15 years with Litton Industries as group controller and vice-president of finance for the Professional Services Group. He graduated with a B.A. degree in economics and received an M.B.A. from Stanford University.

In his new position, Tilsley is responsible for AM ECRM's financial forecasting and budgeting, inventory control, general accounting and credit and collections.

Tilsley recently served as management information systems vice-president and controller for Waldorth Corp. He was previously employed by Coopers & Lybrand, Relief Printing Corp. and Studley Shupert Co. Tilsley graduated from Boston College with a B.S. degree in accounting.

• • •

JOSEPH L. SCHWARTZ, M.D. has been named medical director of Comprehensive Medical Systems, Costa Mesa, Calif. Schwartz is a practicing general surgeon in Huntington Beach.

He will serve as a consultant to Status users, and his opinions will also be sought on any modifications or changes proposed for the software packages. Schwartz worked with the developers of Status, the company's physician practice management system, and is the author of several programs included in Status.

Schwartz received his Ph.D. from the University of Virginia.

• • •

JAMES P. WALLACE has been named director of management information systems for the Optoelectronics Division of General Instrument in Palo Alto, Calif.

Wallace will be responsible for data processing activities, including the operation of the computer center and development of information systems.

He was previously employed at Itel, Ampex and Varian.

Garry W. Trichel

He received an M.B.A. from Santa Clara University and a B.S. in business administration from Woodbury University.

• • •

JOSEPH CHATTINGER has been named director of systems development at the American Automobile Association of Michigan.

He joined the Dearborn operation in 1966 as a programmer, later becoming systems and programming supervisor, general supervisor of member and policyholder services, Maps assistant manager and collection manager.

• • •

JOSEPH T. McNALLY has been elected manager and vice-president of data systems at Stone & Webster Management Consultants, Inc., New York.

He will direct consulting and appraisal services to business, industry, utilities and government agencies.

McNally has been with Stone & Webster since 1969 and was previously employed by Todd Shipyards and General Dynamics Corp. as a consultant.

He is a graduate of Pace University, New York, with a B.B.A. in accounting.

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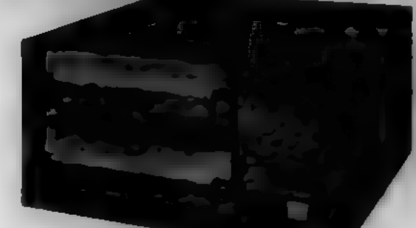

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With Electronic Phone Directory

French Let 'Fingers Do Walking' on Keyboards

SAINT-MALO, France — Some residents of this popular coastal resort area of France no longer "let their fingers do the walking."

Instead, their electronic telephone directory promptly displays the number they need on a screen in their home or office. Rather than searching through the pages of a bulky telephone directory, they "instruct" the electronic directory by typing the required information on an alphanumeric keyboard.

Dozens of Saint-Malo residents and businesses last summer became pioneers in the first large-scale test of France's plan to eliminate conventional telephone directories and the telephone information service. The electronic directory, according to the French telephone company, is easier to use, faster — and cheaper.

In lieu of telephone directories, the phone company will provide every customer — private or business — with an electronic terminal. Over the next 10 years, it expects to distribute more than 30 million free terminals.

It will still be cheaper than publishing conventional telephone directories and updating them yearly, the phone company said. It will also be more efficient, because the electronic directory will always be completely up-to-date.

Started in mid-July, the Saint-Malo test is the first of several throughout France. By next year, some 250,000 terminals will be installed in the Ille et Vilaine region, around Saint-Malo.

'Makes Life Easier'

So far, the customers seem to like it. A 63-year old retired woman, Mme. Rochard, told an interviewer, "For the time being, the service is a little bit limited, but I think it's going to improve. I'm all for that. We should have access to all the things we need, the things that make life easier."

A wine agent who carries on business throughout France, M. Laine, who is 50, can not wait to see the day when he can call for telephone directory information anywhere in the country.

"I'm extremely fascinated by the information display capabilities of the terminal," he said. "For this initial testing period, I rely on this device to lighten my office records.

"But what will be fantastic in the future is to have access to all the daily information which is relevant to my business. I shall then have at my disposal an extraordinary tool," he added.

One Surprise

One surprise of the test was the comparative ease with which consumers adjusted to the new device.

Commented M. Germa, director of the Havas Sociological Research Center, which monitored the trial:

"The terminal was immediately accepted in the home or office. The participants in the trial had no trouble operating it. Obviously, a little training has to be done, but the essential fact is that the electronic telephone directory is no more complicated than a pocket calculator."

French teenager participating in the Saint-Malo project tries out the electronic directory.

Here's how it works. Supposing you need the number of a waffle restaurant (a regional speciality). You would type in "waffle restaurants" and an index of those in the area appears on the screen.

You can then further define the restaurant of your choice by typing in its name, which will result in a display of that specific menu, complete with prices, closing time and other pertinent information. Then, call the number and make your reservation. Simple as that.

But one of the most useful features, according to residents, is the listing of emergency numbers for hospital, ambulances, police, fire and other services.

Instructions for use and for helping those who have misdialed are also displayed on the screen. And if the user is really confused, there is still a human backup system.

Altogether, there are 30,000 entries in the data base being tested in Saint-Malo. The test will help to define the most acceptable form of access and also the effectiveness of the dialogue employed.

The electronic directory is one of several new telecommunications projects being developed under a national program known as Telematique. Others include Teletel, the French two-way videotex systems of which the Electronic Directory is the simplest form; two-way facsimile service for the home; a free-form telewriting system; smart-card technology and complete teleconference facilities for corporations.

These systems will be mass marketed at a relatively low cost as a result of new developments in microprocessors and digital technology.

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The annual examination for the Certificate in Computer Programming (CCP) will be held on December 13, 1980, at selected test centers throughout the world.

Specific requirements for this year's examination are detailed in the "Certificate in Computer Programming Examination Announcement and Study Guide." The study guide and application form for the 1980 examination are available on request from ICCP.

Deadline for Filing Application is October 15, 1980

Please forward the "Certificate in Computer Programming Examination Announcement and Study Guide" along with application and test site list.

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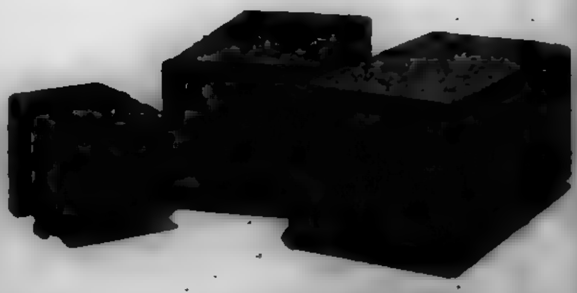

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Calendar

Oct. 13-14, Chicago — Auditing Procedure for NCR Computer Applications. Contact: EDP Audit Associates, Inc., P.O. Box 366, Summit, Ill. 60501. Also being held Oct. 20-21 in Boston and Oct. 30-31 in Houston.

Oct. 23, St. Louis — Business Information Systems, sponsored by the Data Processing Management Association. Contact: Vicki James, Washington University, Center for the Study of Data Processing, Campus Box 1141, St. Louis, Mo. 63130.

Oct. 23-24, Miami — Data Base Management Systems, Concepts and Modeling. Contact: SCS International, P.O. Box 344010, Coral Gables, Fla. 33114.

Oct. 24, Boston — Northeast Computer Law Institute. Contact: New England Law Institute, Inc., Massachusetts Continuing Legal Education, 1387 Main St., Springfield, Mass. 01103.

Oct. 29-30, Chicago — Recovery/-Restart. Contact: On Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Oct. 30-Nov. 1, New York — National Small Computer Show. Contact: Ralph Ianuzzi, 110 Charlotte Place, Englewood Cliffs, N.J. 07632.

Nov. 2-5, Washington, D.C. — Computer Applications in Medical Care, sponsored by the Institute of Electrical & Electronic Engineers. Contact: H. Orthner, George Washington University Medical Center, Dept. of Clinical Engineering, Washington, D.C. 20037.

Nov. 3-4, Richardson, Texas — Data Courier On-line Training. Contact: Data Courier, Inc., 620 S. Fifth St., Louisville, Ky. 40202. Also being held Nov. 6-7 in Houston.

Nov. 3-5, Cambridge, Mass. — Computer Graphics in CAD/CAM Systems. Contact: Prof. David C. Gossard, MIT, Department of Mechanical Engineering, Room 3-445, 77 Massachusetts Ave., Cambridge, Mass. 02139.

Nov. 3-6, New York — Telecommunications Management for Profit. Contact: MCI Education Center, 1301 Ave. of the Americas, New York, N.Y. 10019. Also being held Nov. 8-11 in Cincinnati.

Nov. 3-7, Philadelphia — Computer Auditing. Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Nov. 3-7, Toronto — MVS Internal Logic, Systems Design and Performance. Contact: Computer Research Systems, Inc., 195 W. Main St., P.O. Box 45, Avon, Conn. 06001.

Nov. 3-7, Boston — Structured Data Base Design. Contact: Improved Systems Technologies, Inc., Suite 4500, 888 Seventh Ave., New York, N.Y. 10106. Also being held Nov. 10-14 in Montreal.

Nov. 3-7, Detroit — CICS/VS Application Programming. Contact: On Line Software International, 65 Route 4 E., River Edge, N.J. 07661.

Nov. 4-6, London — Compec, sponsored by *Computer Weekly, Practical Computing* and *Data Processing & Systems International.* Contact: IPC Exhibitions Ltd., 40 Bowling Green Lane, London EC1R 1, UK.

Nov. 4-6, Washington, D.C. — Federal Office Automation Conference, sponsored by Federal Office Institute. Contact: Federal Office Automation, P.O. Box E, Wayland, Mass. 01778.

Nov. 4-6, San Jose, Calif. — Word Processing and Office Business Equipment Trade Show. Contact: Cartlidge & Associates, Inc., Suite 1014, 491 Macara Ave., Sunnyvale, Calif. 94086.

Nov. 4-6, Phoenix — Auditing, Security and Controls. Contact: Advanced Computer Techniques Corp., 222 N. Central Ave., Phoenix, Ariz. 85004.

Nov. 4-6, London — Computer Peripheral and Small Systems Exhibition. Contact: British Information Services, 845 Third Ave., New York, N.Y. 10022.

Nov. 4-6, Dallas — Midcon/80 Electronic Show and Convention, sponsored by the Institute of Electrical and Electronic Engineers. Contact: Electronic Conventions, Inc., 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Nov. 4-6, Kakuku, Hawaii — Data Entry Productivity. Contact: Data Entry Digest, 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

Nov. 4-7, San Diego — Decus Symposium, sponsored by Digital Equipment Computers Users Society. Contact: Paula Morin, 1 Iron Way, MR2-3/E55, Marlboro, Mass. 01752.

Nov. 4-7, Boston — Voice Input/Output for Computers. Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 4-7, Wellesley, Mass. — Human Relations: Productive Working Relationships. Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Nov. 5-6, Boston — Digital PABX: What It's All About. Contact: the American Institute for Professional Education, Carnegie Building, Hillcrest Road, Madison, N.J. 07940.

Nov. 5-7, Indianapolis — Distributed Computing Systems. Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Nov. 5-7, Chicago — Data Base Management Systems: A Comparative Analysis of General-Purpose Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in San Francisco.

Nov. 5-7, Washington, D.C. — Audit & Control of On-Line Systems. Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 5-7, Atlanta — International Telecommunications. Contact: Telecomm Systems Group, Inc., 579 Pompton Ave., Cedar Grove, N.J. 07009.

Nov. 5-7, New York — Distributed Systems: Effective Approaches and Applications. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 5-7, Boston — Managing the DP Professional - The Challenge of the 80s. Contact: UBI Enterprises, 30 Milbank Ave., Greenwich, Conn. 06830.

Nov. 5-7, Bedford, Mass. — Military Communications Systems Control. Contact: Mitre Corp., P.O. Box 208, Bedford, Mass. 01730.

Nov. 5-7, Chicago — Automating Your Office Today: Planning and Implementation Methods. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 17-19 in Los Angeles.

Nov. 5-7, San Francisco — Word Processing. Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 5-7, San Francisco — Effective Data Systems Development. Contact: Arnold Barnett, Barnett Data Systems, Inc., 19 Orchard Way N., Rockville, Md. 20854.

Nov. 5-7, New Orleans — Analyzer Users Conference. Contact: Liz Toronto, Program Products, Inc., 95 Chestnut Ridge Road, Montvale, N.J. 07645.

Nov. 5-7, Washington, D.C. — Data Communications Systems. Contact: American Institute for Professional Education, Carnegie Building, Hillcrest Road, Madison, N.J. 07940.

Nov. 5-7, Chicago — Data Base Management Systems: Concepts & Facilities. Contact: University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 5-7, San Francisco — Introduction to Teleprocessing Software. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in New York.

Nov. 5-7, Chicago — Data Communications: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 17-19 in Los Angeles.

Nov. 6, London — CMCS Introductory Overview. Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 6-7, Washington, D.C. — Data Processing for Secretaries and Administrative Support Personnel. Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151

Nov. 6-9, Washington, D.C. — Computer-Micrographics Interface Computer Output Microfilm and Computer Assisted Retrieval. Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Nov. 6-7, San Francisco — Data Processing Resource Management. Contact: Brian F. Crynes, Price Waterhouse & Co., 1251 Ave. of the Americas, New York, N.Y. 10020.

Nov. 6-7, New York — Computer Law: Purchasing, Leasing and Licensing Hardware, Software and Services. Contact: Practicing Law Institute, 810 Seventh Ave., New York, N.Y. 10019.

Nov. 6-8, Paris — Systems Dynamics and the Analysis of Change. Contact: Association Francaise Pour la Cybernetique Economique et Technique, 156, Blvd. Pereire, F. 75017 Paris, France.

Nov. 7-10, Madrid, Spain — Introductory APL. Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Nov. 11-13 in London and Nov. 24-28 in Dusseldorf.

Nov. 8-10, Hamilton, Bermuda — Computing '80. Contact: Rick Gerhardt, Computer Society of Bermuda, P.O. Box 1479, Hamilton 5, Bermuda.

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TI 820 PKG.	2295	384	100
TI 825 PKG.	1795	252	95
DEC LA 34	1095	168	65
DEC LA 120	2495	360	130
DEC VT 100	1695	187	105
VISUAL 100	1095	187	80
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LSI 31	1370	288	75
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HAZELTINE 1500	1450	240	85
GE 2030	1495	230	[illegible]
DIABLO 630	2430	[illegible]	120
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TWX # [illegible] GSA Contract # GS-00C-[illegible] 3-31-81

How to Increase Productivity?

Turnaround Time
By Larry Long

Q As the newly appointed supervisor of corporate systems development, I am very interested in increasing the productivity of my staff and would like to obtain information on techniques for improving programming productivity.

I would appreciate any information you might have and any recommendations on publications and how they can be obtained.

A The "I-want-it-yesterday" syndrome surrounding DP activity has delayed many attempts to increase general productivity and specific programming.

But attention to a few basic concepts, tools and techniques can render enormous increases in programmer productivity. These include:

- Mode of program development — benefits of interactive program development are overwhelming.
- Choice of programming language — match to application requirements; use interpreter-based languages for "quick and dirty" programs; use state-of-the-art compilers.
- DBMS — to make programs independent of data structure.
- Other software aids — inquiry languages, report writers, judicious use of existing software.
- System development methodology — integrated procedures for structured analysis, design and documentation.
- Library of reusable code — modules that are indexed and cataloged for easy reference.
- Chief programmer teams — flexibility to relocate line programmers to priority projects.
- Structured walkthroughs — peer reviews to insure the accuracy and quality of the end product.
- Scheduling — to level work load and keep individual assignments at or above 100%.
- De-emphasis on extremely efficient code — savings of 2 msec/transaction does not merit the expenditure of 2 man-months of effort.
- Recruiting practices — all programmers are not created equal, 10% more salary may yield 100% more production.
- Retention — one person retained may result in a man-year of effort saved in the recruiting and training of a replacement.

The above list is not exhaustive but should provide a starting point for self-examination.

Column space precludes listing the many good books which deal with the general topic of programming productivity.

Q If I was to characterize the greatest deficiency at our installation, it would surely be project estimation.

Do you know of any project-estimating formulas with proven accuracy for various levels of programmers and analysts?

A I am not an advocate of the use of formulas for making estimates. The key to successful project estimation — and subsequently management — is simplicity.

These formulas require numerous subjective evaluations such as programmer capability, system complexity, probability of completion by a certain date and so on. Some require an estimate of lines of codes before the number of programs is known.

Although the formulas provide a rigorous approach to estimation, the substantial requirement for subjective input tends to negate the effect of the rigor.

The work required to produce the input and the quality of the resulting estimates do not justify the effort.

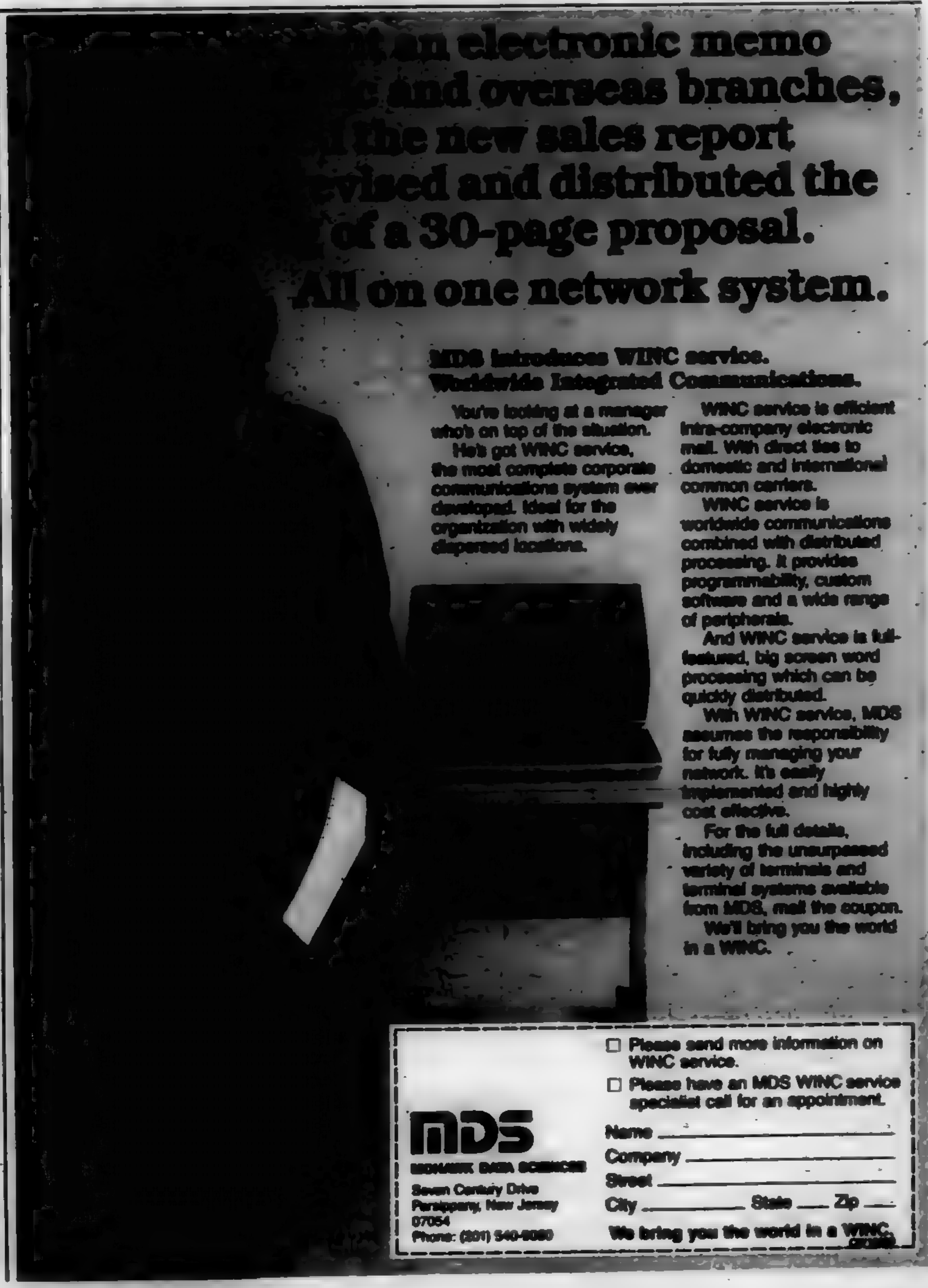
There is no secret to making good estimates. However, the proper setting for good project estimating can be created by the existence of a preliminary general design (vs. a concept) — a system development methodology with phases and milestones and experienced DP professionals.

The design defines the scope of the project and provides the detail necessary to identify logical system modules. The methodology provides a vehicle for making intermediate estimates and gathering historical statistics. I am convinced that experienced professionals can subjectively factor in such variables as system complexity and level of programmer and analyst better than formulas.

With historical statistics, a preliminary general design and other subjective variables such as input, experienced DP professionals can use the Delphi and Nominal group techniques to arrive at reasonably accurate consensus estimates of time, manpower and costs.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

Long is a professor at Lehigh University, a DP consultant and author.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EDITORIAL

Conference Conflicts

Telecommunications managers in San Diego . . . MIS managers in Philadelphia . . . federal DPers in the nation's capitol . . . software gurus and purchasers in Chicago.

The fall conference season arrived with a vengeance two weeks ago with those four major conferences overlapping as well as several other smaller shows.

All of the shows are valuable; they are meeting grounds for professionals to exchange views and ideas. But they shouldn't all come at once — many MIS managers have duties that span several interest areas and would benefit by being able to attend more than one show.

The American Federation of Information Processing Societies (Afips) maintains a list of scheduled events in the computer community. All show organizers should try to keep duplication to a minimum.

With that in mind, here are some thoughts on two of the recent shows and their contents:

- **Software Info.** For years the marketers of software products have felt they needed a special show to promote their wares — a show where they did not have to compete with the flashy hardware — and hardware exhibits found at such gatherings as the National Computer Conference.

Infosystems magazine has obliged with the Software Info show, and the first edition was a great success from both the exhibitors' and attendees' point of view.

Less flashy and more straightforward exhibits marked the show part of the event, and most of the industry leaders were on hand to pontificate.

But while the show was clearly a success for a first effort, the sponsors need to provide more promotion for future gatherings — and perhaps more emphasis on down-to-earth topics rather than industry prognosticating at its major sessions.

All in all, though, this is a show that will be around and one from which many MIS managers could benefit.

- **Annual SMIS Conference.** The Annual Society for Management Information Systems (SMIS) Conference also deserves note.

This conference is not a newcomer; this fall's was its 12th edition. The meeting is strictly a conference without the distraction of an exhibit and offers MIS managers a chance to discuss common goals and strategies.

The conference is an excellent forum for such an exchange, but most of the discussions do focus on global issues facing information systems and services executives. It would be improved with a dose — but just a dose — of practial advice on the day-to-day production processes that are needed to implement the global plan.

It is another event to put on your agenda for next year.

Hopefully there won't be five or six conferences competing for your attention — and travel dollar — during the same week.

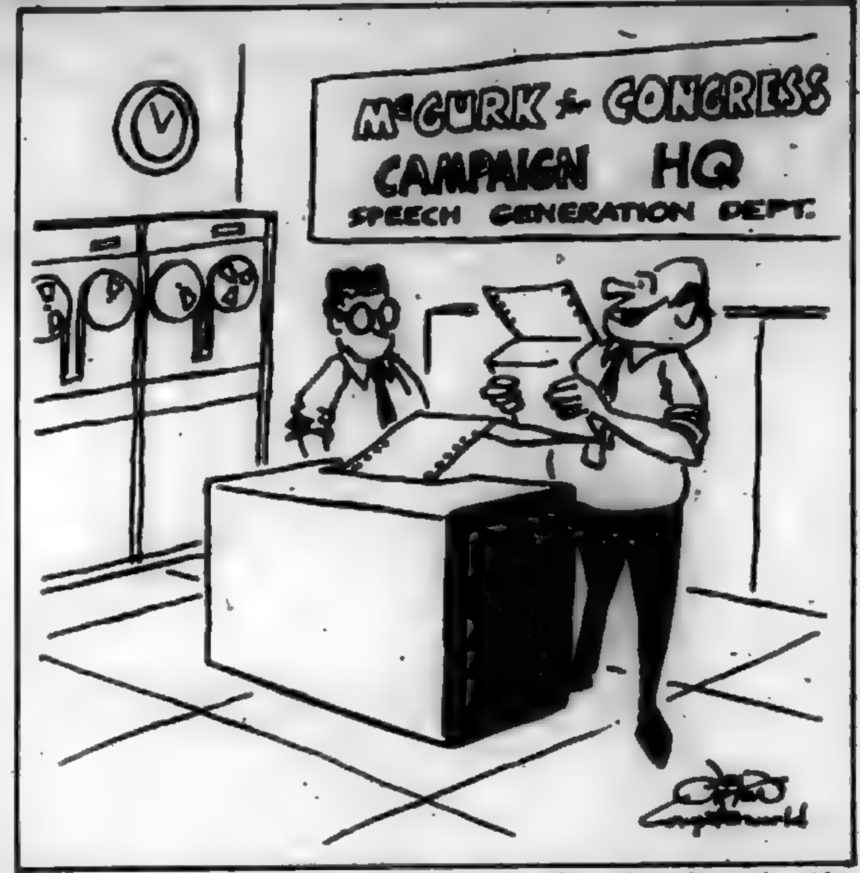
DATA PAST

Five Years Ago
Oct. 15, 1975

TULSA, Okla. — Telex negotiated a settlement of its antitrust suit against IBM just 72 hours before the Supreme Court was to hand down its decision on whether it would hear the case. The settlement called for no payments of any kind between the parties. IBM released Telex from an obligation to pay $18.5 million as the result of IBM's countersuit on trade secret charges, and Telex agreed not to pursue its antitrust claims.

Five Years Ago
Oct. 11, 1972

PARK RIDGE, Ill. — A Computer Foundation to promote and develop personnel certification programs for all computer users was under discussion by two major societies in the computer community. The Data Processing Management Association and the Association for Computing Machinery were jointly sponsoring the initial development to outline the charter and structure of the proposed Computer Foundation.



'Not bad — except for a couple of issues where the other side of his mouth is still silent.'

LETTERS

Scratching the Surface

In case you were not aware, *Computerworld* may be falling short in its coverage of the IBM 3800 TNF controversy. The parade of dramatic headlines, articles, interviews and opinion polls has merely scratched the surface of this story's potential.

True, you have the alarmists frothing at the mouth, but don't stop there. Your fascination with the subject notwithstanding, you could be doing us a great disservice by not exploring even deeper into avenues of extracting additional mileage from the issue.

I mean, overkill is all well and good, but what becomes of us readers, come the inevitable letdown — when you run out of angles from which to pound it into the ground? I bet that with a little extra effort in the Sensationalism Dept., you could jockey this story to horizons beyond our wildest dreams — maybe even drag it out another six months!

Jennifer Summerlin
Buzzards Bay, Mass.

Australian Venture

The article "IBM Venture Spawns SBS Clone Down Under" in the Sept. 15 issue misinformed readers about the nature and purpose of Business Telecommunications Services Pty. Ltd. (BTS) in Australia.

BTS is a research company formed by 11 large DP users, including IBM Australia, all of whom have a strong interest in defining the long-term telecommunications needs of Australian business. It will provide the members with research and consulting services to explore the requirements for advanced telecommunications services.

There is growing recognition in Australia of the need for more interaction between government and industry on this question. Results of the BTS research will enable the participants to contribute more effectively to that dialogue.

A cooperative entity with an anticipated life of some 18 months, BTS in no way resembles Satellite Business Systems, a common carrier which will provide communications services directly to users.

Arnold Lerner
Director of Communications
IBM World Trade Americas/-
Far East Corp.
N. Tarrytown, N.Y.

Intimidating Tactics

The editorial "Standards for Avarice" [CW, Sept. 1], regarding IBM's alleged use of intimidating tactics against customers who ordered peripheral equipment from plug-compatible manufacturers, was of particular interest to us because, in connection with our federal antitrust monopoly lawsuit against IBM, we intended to present to the jury considerable evidence of such unfair marketing practices on the part of IBM.

We found plenty of cases where such intimidating tactics were said to have been employed, but the irony was, as was so correctly pointed out in the editorial, the individuals involved were reluctant to testify against IBM because they feared the result would be certain further retribution from IBM.

We expect to have the opportunity to retry our lawsuit against IBM and would be pleased to hear from any CW readers who were deterred from ordering products from Memorex because of the use of intimidating tactics against them by IBM employees. Letters should be addressed to me at San Tomas at Central Expressway, M/S 12-33, Santa Clara, Calif. 95052.

Foster A. Markolf
Counsel
Memorex Corp.
Santa Clara, Calif.

THE TAYLOR REPORT **Alan Taylor**

Questioned Benchmarks: An Issue of Trust

Benchmarks are easy to falsify in the same way that demonstrations are. The people running the benchmark may not know that anything is wrong; the changes often crop up in the salesman's description. Still, benchmarks can be very persuasive, as Robert G. Baker Jr. of Saginaw, Mich. can testify.

Baker is now looking for two former Data General Corp. employees who are thought to have run a benchmark using some of Baker's IBM System/3 RPG programs on a DG Eclipse, back in 1975. The two are Paul Fassbender, formerly of Westboro, Mass., and Richard Cook, formerly of Stow, Mass.

Baker's company is suing for damages for breach of contract by DG. A benchmark was used to convince Baker, according to papers on file in the court, that the 1975 Eclipse RPG was totally compatible with IBM System/3 source programs — and also that it ran 10 times faster for some situations.

While it was being processed, Baker signed a contract with a standard boilerplate-type clause disclaiming any warranty of merchantability on an Eclipse that DG would deliver in 1976. The disclaimer was buried in many pages of material. Another clause stated that the laws of Massachusetts would control.

Objection to Clause

It so happens that the laws of Massachusetts don't normally permit vendors to hide such widespread and important disclaimers — as U.S. Judge James Harvey recently pointed out when DG tried to have Baker's claim on this ground dismissed. So when you see one of those clauses setting the law, don't think it is unimportant.

Baker says that when the 1976 Eclipse system was delivered, the program wouldn't work as the benchmark indicated. Indeed, it later took months to get anything out, and Baker lost his clients and was eventually sued by DG for nonpayment. This is not an unusual story in our industry, unfortunately.

Having some technical background, Baker just cannot see how, if the software was able to handle the System/3 program in 1975, it couldn't do the same in 1976. The times Baker thought that benchmark took now seem impossible to him, assuming that they ran on the hardware model DG delivered to him.

I have to agree that Baker has a real question here. Computers nowadays are not built as they were in the '50s and '60s, and the label on the outside is little evidence as to what is under the covers. Printed lines giving time data can also be misleading. Benchmarks rely upon trust and this reliance is something the laws of this country try to protect. However, some vendors would like buyers to forget that.

Baker's Suspicions

Baker suspects there was some manipulation of the compiler to make it accept his program, or of the hardware to make it run faster, or both. And to try to find out what happened in time for the trial, he wants Fassbender and Cook to be located. (Any information on how to reach the two is being sought by D.A. Wilson of the law firm Van Benschoten, Hurlburt and Van Benschoten, P.O. Box 1837, Saginaw, Mich., (517) 790-3222.) Apparently DG does not know their whereabouts either, although they have been included on DG's witness list, Wilson tells me.

It is more important that the facts be made known so that Baker's suspicions can be proved or else set to rest and DG cleared.

But what is the importance of this story to users in general?

Many computer sales are based on trust between technicians, and system performance is described and represented by salesmen. The industrywide belief that this trust was being abused by the computer vendors and that the abuse was then more or less successfully hidden by legal tactics (which themselves might be improper) is gaining more and more support from court actions covering 1970s cases.

The Baker/DG case shows how this might work, technically, and (through Judge Harvey's order) how improper legal tactics can be both tried and caught out.

It may not be just the great big firms that are involved, as is sometimes argued, but improper marketing may be operating generally! And the problem

(Continued on Page 52)

READER COMMENTARY/Agnes M. Love

Managers Could Tap 'New' Personnel Source

In "The Personnel Crunch" [CW, Sept. 15], Harold S. Bott stated, "Many older women, having reared their families, will reenter the workforce. These women often will have college degrees, but in fields other than those in which they choose to reenter."

Most of us completing a career in parenthood do not look upon ourselves as "reentering" the workforce, but rather embarking on another career.

College-educated women look upon the years spent at home as a total career — one of projection, execution and finally completion. We would have been foolhardy not to recognize that change and growth are life and we are part of that process.

Working with a career consultant to define my goals for the next 20 years, I have become appalled with the emphasis placed upon personal packaging, presentation, method and so forth.

I am not a stranger to the media world, having worked in advertising and public relations before my marriage. However, I am overwhelmed by the deification of personal stylists, social scientists, career counselors and personnel people — while content is almost totally ignored!

I also see discouraging indications in the data processing field:

1. A lack of foresight on the part of managers who fail to recognize the ultimate edge to be gained by reassigning some DP personnel for educational purposes (capable people are waiting to be trained!).

2. A lack of foresight on the part of employees, who are complacent in their jobs (with low productivity and company loyalty). The ultimate answer here may very well be displacement by their very own creations.

Many of us are waiting to get "in," and we are educated, intelligent, accomplished and enthusiastic.

There is enormous resistance to accepting the inexperienced — regardless of desire, intent and commitment — but I believe a virtual army of women exists who would gladly sign contracts with companies in exchange for training and education.

The first company that will open its doors in this way will reap tremendous rewards!

HUMAN CONNECTION/Jack Stone

Attitudes Make Difference to End Users

Have you ever had the opportunity to play the role of an end user and experience, firsthand, how DPers relate to you?

If you haven't, you really ought to try it — it may just be a wild eye-opener. Recently I did — and it was. I want to first describe the incident, then give some of my impressions about the DPer involved and make several observations.

I happened to be studying a custom, on-line system as part of a writing project. After some time at the terminal, I had figured out how to access and update the master file, but I couldn't get myself out without losing the input data. By luck, the software developer happened to appear on the scene; so I introduced myself and asked for a few minutes of his time to resolve my problem. (I should note that I didn't mention my two decades of DP experience, and he didn't ask.)

His response was certainly a cooperative one because he said he had been around the terminal room for a while doing some system chores and would be pleased to assist me. "All you have to do is ask," he commented. So after waiting a polite three minutes or so, I went over to ask my question on how to get out of file update mode, and this is what happened:

A stream of verbiage poured out of his mouth, and it came so fast and furious that I didn't have the remotest idea of what he was saying. Since there was no way I was going to suffer the embarrassment of requesting a retransmission, I thanked him instead, returned to my terminal, restarted my system and hoped that I could find some answer on my own. (It dawned on me that I was dealing with a DPer cloned from the traditional technical mold.)

Somehow I stumbled onto a combination of control keys that got me out, so I went back in again. This time the system asked me to supply a code number which I didn't know, so I put in a bunch of different ones, hoping to get past the field. But the system wouldn't let me, so I trundled over to my leader a second time and asked if he knew the bypass code.

This time he told me to check the documentation. Of course, I didn't have a copy with me and there wasn't any in sight. So I gave up on the master file and decided to check out a secondary file. I recalled that the file entry sequence was a little complicated, and as you might have guessed, I got stuck. My mentor walked by at that moment, and I asked if he could get me going.

With what I perceived to be a supercilious and disdainful smirk, he flashed his hand across the keyboard and socko! I was in the right screen. Naturally, he went so quickly that I couldn't follow the sequence of events. I left the room a few minutes later and the next day decided to give up the project.

I certainly had no reason to doubt the developer's technical competence; I would expect that an experienced operator, after a little training, would be able to handle the terminal just fine. However, I had every reason to doubt the developer's effectiveness, because he was so completely oblivious to the fundamental precepts of human communication.

Although I grant that he was sincere in offering to help me bungle through the system operation, his actions conveyed a spirit of arrogance and superiority. And all I wanted was the answer to a few questions.

Of course, I'm not saying that all the old-line DPers are that bleak in their user relationships, nor am I saying that the new-line M.B.A.s are technical heros. But what is to be learned from this story — and verified by many, many end users — is this: The attitudes, sensitivities and common-sense business communications are what impress end users about DPers, not their technical competencies.

LETTERS

On 'Twin Myths'

I must take some exceptions to the article "Structured Coding's Twin Myths" by Peter Lacey [CW, Sept. 8].

On his first point, Lacey presumes that all programs and their subunits can be broken into initialize, process and terminate phases and that the processing phase is always at least one loop.

A real-time program might well have no termination at all. (Ever get a terminated run from your operating system? Did you like it?) Interactive programs can mix the process of checking a user response to a prompt with the initialization of the variable. Further, a null module is quite possible in a set of conditional statements; a mathematics major would consider "doing nothing," but most people would not view this as a process.

Lacey then implied that PERFORM verbs are the way to write structured code in Cobol. The current wisdom of Yourdon et al is that the CALL verb should be used, since the goal of structured code is to isolate the variables from any global effects. In Algol, PL/I or Pascal, this can be done with local declarations; in Cobol (like Pascal), this must be done with procedure calls. Investigations show that the DATA DIVISION is the most error-prone.

The lack of GOTOs in the block structured languages, where structured programming began, was a way of forcing one entry and one exit point in the flow between modules.

The lack of GOTOs for the sake of readability is a bit debatable. I have the feeling that GOTO-less programs are easy to read because anyone who was trained to think that way can pick it up and have no adjustment to make to the style of the original programmer. You can also transform a GOTO-less program to reverse the logic in the IF-THEN-ELSE statements and so forth to make it look more like "a program I would have written."

The nested IFs are a bother. They are generally the result of (1) not having a Case statement in the language, (2) not having a programmer who knows enough Boolean Algebra to reduce the depth of nesting or simplify the expressions or (3) tack-it-on-the-end style maintenance procedures. No one seems to teach decision tables any more and they are really needed. Maybe *Computerworld* could do an In Depth article on this lost art form.

I really feel that Lacey's dislike of the GOTO-less code is due more to the language (Cobol) than to the practice itself. Algol and Pascal people tend never to use their GOTOs simply because they have enough control structures to clearly do the job.

A further advantage is that GOTO-less code can be optimized by fairly simple algebraic transforms inside a compiler or at the source code level.

Lacey's remarks on planning are very much on target. I have worked in too many places with a "code first, design later" approach. My point is that planning can make even Cobol with GOTOs work better than any language without any planning at all.

Joe Celko

Atlanta, Ga.

Focus on Maintenance

Congratulations for publishing the In Depth article "Attacking Maintenance Costs" by Larry M. Singer [CW, Sept. 8]. The focus in the 1980s (and perhaps the '90s also) will be on software, and the high cost of software maintenance is in the spotlight. The article made DP managers aware of the maintenance problem and offered some solutions worth considering.

I woud like to comment on two points:

1. Programmer participation will be invaluable in the design of time activity reports and personal logs. Welcoming their feedback would also encourage them to collect accurate data.

2. The possible correlation between high maintenance activity and programmer turnover is worth studying.

Such In Depth articles provide valuable guidelines for managers as well as technicians. I hope *Computerworld* will also publish some case studies of reducing (or increasing) maintenance costs in the future.

Girish Parikh

Chicago, Ill.

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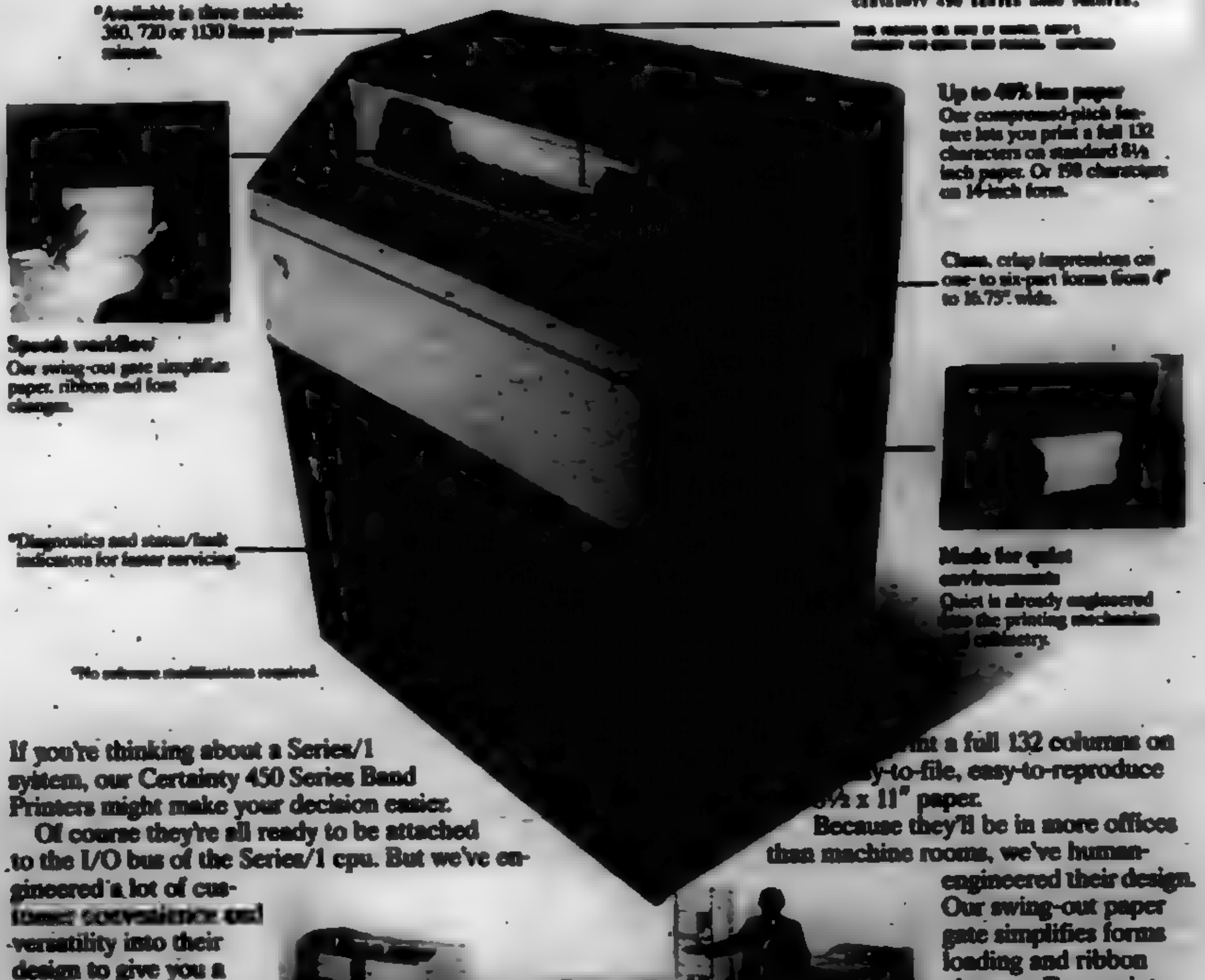

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LETTERS

Passing the Word

"Suit Filed Against Worker for Erasing Programs" [CW, Sept. 8] stated, "Checking the computer's log ... Leeds & Northrup people learned that Hershman had entered the system." It would be more accurate to say that the log indicated Hershman's access privileges had been used to enter the system; one might allege that Hershman was in fact the user. For the time being, we are not our passwords.

Richard L. Klair
Berkeley, Calif.

Using Athletic System?

We are interested in locating an athletic system that can handle multiple citywide events, multiple leagues, multiple locations and multiple games per day at each location.

We will be replacing our Burroughs Corp. B3700 computer system and installing a B3950 during the first quarter of 1981.

Although we prefer a system operating on a Burroughs medium system, we would like to talk with anyone having such a scheduling system in operation.

Robert W. Crow
Assistant Director of Data Services
City of Tallahassee
Tallahassee, Fla.

Graphics at Harvard

In regard to the Aug. 18 article "Graphic Week '80 Draws Few Exhibitors," please note that Harvard Computer Graphics Week is not a hardware show and that all space allocated for exhibits was sold out weeks before the conference. The Cambridge Hyatt Regency Hotel has limited exhibition facilities, hence only a select number of vendors whose products and services are directly applicable to computer graphics are invited to exhibit. Instead, we place primary emphasis on developing informative and stimulating sessions.

Second, the article failed to mention many of our exhibitors such as ABT Associates, Houston Instrument (which is *not* part of Trilog), J&J Associates (sales representatives for Intelligent Systems, Soltec and Trilog — all of which were represented at the show), Polaroid and Tektronix, Inc. In addition to the exhibits, Summagraphics Corp. hosted a hospitality night which included new equipment demonstrations.

Third, Prime Computer, Inc. was not an official exhibitor, although a Prime computer was used in conjunction with the Xerox display.

Lorrie Irish
Exhibits Coordinator
Laboratory for Computer Graphics and Spatial Analysis
Graduate School of Design
Harvard University
Cambridge, Mass.

More on Free-Lancers

As a member of the Independent Computer Consultants Association (ICCA) and as an individual who has been effectively a self-employed contract programmer for several years, I am disturbed by the article "Managers Warned of 'Contract Programmers'" [CW, Aug. 18]. I am not actually concerned that such an article will affect the contract programming field adversely, but I am surprised that such weak, unbased and probably erroneous criticisms would be made by the president of a firm presumably trying to sell such services.

Of course, one should always exercise caution when hiring any person to work on their staff, but I believe that to add the word "extreme" or to say that it is "somewhat like struggling to find a lost object in the dark" is not saying much for the judgment of the managers themselves. Any manager who cannot evaluate a contract programmer or check references on him or her won't have much better success in hiring employees.

As far as the loyalty of a free-lancer vs. a permanent employee goes, I would like to leave that to the manager who has seen his employees jump to other companies or perhaps hired one away with a salary increase. As a general rule, I feel that the employee who announces that he is leaving in two weeks is more apt to leave without writing that document that he was going to have ready when he had time between projects and fires than the contract programmer who has an express responsibility to provide that documentation within the period of the contract.

If a contract programmer regards repeat customers as his bread and butter, I doubt that he will cut any corners, let alone as many as the overworked employee next to him or the person from the contract services firm whose company is responsible for securing his next job.

Obviously the nuances of each firm's procedures would be a consideration in employing an outsider for short-term help. However, many contract programmers are seasoned in adapting quickly to new environments.

Any person who wants to get a task done in a "foreign" environment knows that it is important to be accepted by the other members of the team he works with. Self-employed programmers who "stir up staff resentments" or contribute to staff turnover in any way should be dealt with immediately.

I challenge Al Strong to tell us the arguments he uses to sell his services; perhaps his customers should also heed the adage, "Let the buyer beware," as well.

Richard J. Tett
Software Support International, Inc.
Shoreview, Minn.

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LETTERS

Poor Results

Al Volpe's experience does not in any way detract from the utility of structured programming ["A Worst Case Example," CW, Sept. 1]. It does, however, point out quite clearly that a poor program can be designed and produced in spite of the excellence of the design philosophy.

His model of "controlled loop logic" is in fact an example of one way to implement the "Case statement" construct in Cobol. The Case construct was invented for use in precisely these circumstances and generally solves the problem of deeply nested IFs.

Surely structured programming is as much an attitude and a refined approach to problem solving as it is a methodology for producing source code, and I feel quite strongly that its detractors must argue against the tenets of structured programming if these detractors are to be taken seriously. These tenets, I might add, do not stop at the prohibition of "GOTO" statements in a program.

Finally, let me say that I have sympathy for Volpe. The inheritance of a monster program is not a joyous event. However, whether it is a structured monster or just a plain monster in no way establishes or reflects the claims of either school of thought.

J.S. Bond

Toronto, Ont.

Means Vs. the End

The accounting system described in "Structured Methods: A Worst Case" certainly qualifies as a worst case, but not as far as structured methodology is concerned. It is, in fact, a perfect example of the kind of software that results from confusing the means of obtaining structure with the end, that is, a structured program.

The various "rules" that make up the structured approach to software development, such as no GOTOs, exist only as the means of producing a desirable end product, namely, a program that gets written quickly, is robust and, if necessary, easy to modify. Because of the "rules," the structured approach is often depicted as a black box that automatically cranks out wonderful software. Unfortunately, this is not the case and the idea that by eliminating GOTOs one can produce structured software is ludicrous. You cannot dissect out one small part of the system and expect it to function like the whole.

Effort, ingenuity and a clear idea of what good software looks like must exist hand in hand with structured methodology in order to produce a structured program.

Structured methods *can* work wonders, only if approached in the right perspective. To paraphrase Alexander Pope:

"A little structure is a dang'rous thing,
Drink deep, or taste not . . ."

William A. Stafford

New Brunswick, N.J.

Laughter or Tears?

One hardly knows whether to laugh or cry after reading "Worst Case Example", a confused entry in *Computerworld's* series on structured methods. Technical specialist Al Volpe railed against structured programming, which he fuzzily supposed to prohibit GOTOs and mandate IF nesting. How did he know this? "Everyone I've ever worked with takes the position that in order to have a structured program you have to get to nested IFs." The only thing this remarkable statement would appear to prove is that in a closed system, ignorance is conserved as well as matter and energy.

The genuine irony came next when Volpe suggests a strategy of program construction using hierarchies of PERFORMed paragraph pairs with the second of each pair being just an EXIT. Don't look now Al, but you — yes *you* — seem to be a structured programmer without knowing it. Check the guidelines for structured Cobol in an appendix of the book "Managing the Structured Techniques" by Ed Yourdon (Mr. Structured himself). Any resemblance to your preferred coding style is strictly structured.

No mention was made of whether or not the 6,000-line "structured" program Volpe tangled with used PERFORMed paragraphs in a sensible way or even at all. If it did not, I submit that the author was in no sense an author of structured programs, he just had a fetish for nesting IFs.

Volpe is quite right in opposing excessive IF nesting in Cobol as the Cobol IF is "crippled" relative to the IFs the structured programming theorists usually refer to. Cobol IFs nest "in" well enough, but they don't always "un-nest" back out gracefully as one can't terminate an inner IF without terminating any outer IFs in the nest as well. Sensible structured Cobol actually *requires* GOTOs (forward only) to preserve logic clarity in a lot of cases.

The pseudocode example supplied appeared somewhat at odds with the sentiments expressed by Volpe in the text and with the accompanying caption. Reference was made to an AT END check, for example, but no READ was shown.

At the five-story mark in the "Structured Methods: Pro and Con" series, I make it four successes (one with a misleading headline) and one nonsequitur. It's going to be interesting to see whether the CW staff can actually find a bonafide structured flopperoo to write about. I would also welcome any comments Volpe would care to make, as the somewhat murky style with which CW rendered his story may well have garbled some of his intent.

Richard Eagleson

Los Angeles, Calif.

User Questions Benchmark

(Continued from Page 49)

may well be a technical one, stemming from computer technology rather than from monopoly powers, as is often argued.

This new case indicates the possible depth of the problem and may also indicate the way ahead for users and vendors alike.

The future of the American computer industry worldwide depends upon the quality of its products, rather than any successful defense of overselling by U.S. lawyers. Unless we want the industry to go the way of the American auto industry (remember how difficult those car manufacturers made it to recover on a lemon — and what happened to quality?), vendors must start planning for, and backing up, quality delivery.

Terms such as LFE's 98% uptime guarantee [Taylor Report, Sept. 22] should replace the standard, perhaps illegal, disclaimers.

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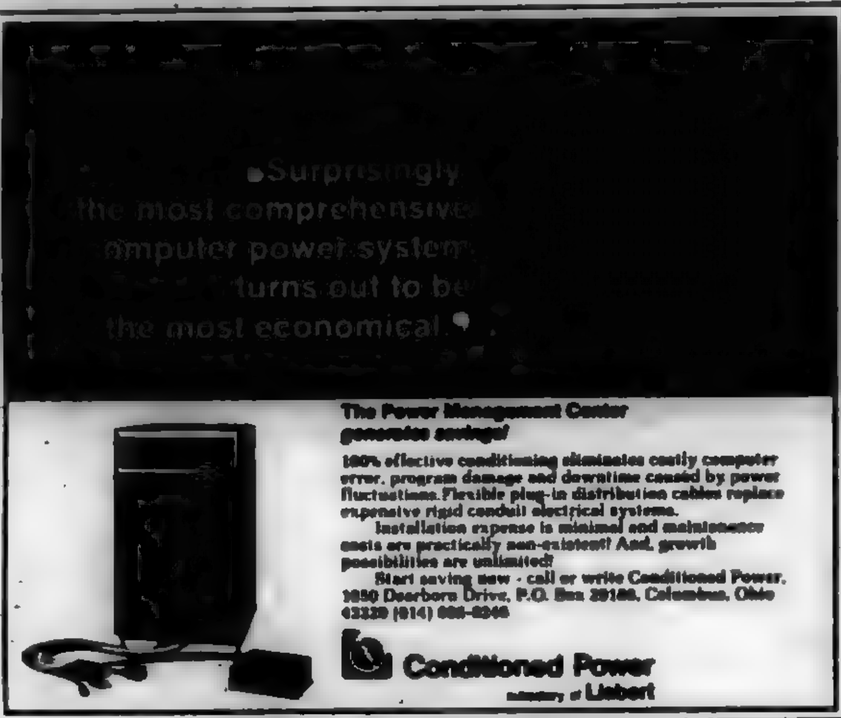

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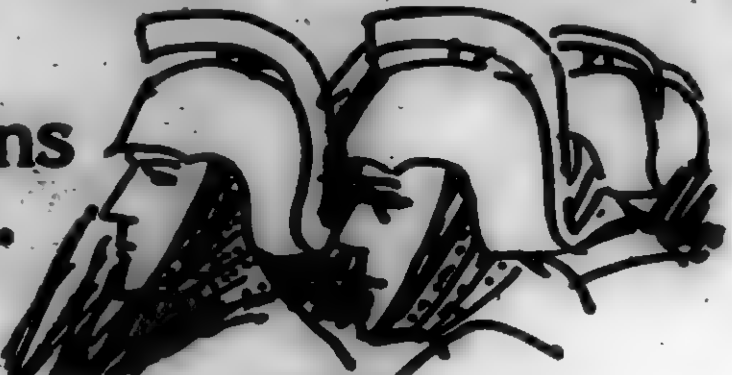

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READER COMMENTARY/Harold Gluck

Security More Than Secret Code

Frank E. Vescio, former Commissioner of Public Safety of Yonkers, N.Y., is an expert in the field of security. He was my boss during his tenure of office. This is what he had to say for your consideration:

"We are approaching an era in business where everything will soon depend upon computer technology. That means that in order to protect your business, you have to give the computer complete protection.

"But the idea of complete protection demands that you know just what it is to be protected," he said. Here are the situations he suggested taking into account:

- *Burglary protection.* The computer and its components can be sold on the black market. An expert gang can rip out the computer within a matter of minutes and load it into a waiting panel truck or even into a large 18-wheeler.

That means that in addition to the electronic devices for the business and the specific area, there should be special protective devices for the computer area and the computer itself. Under the best conditions there should be a computer room. If this is not possible, then the computer should be in a section whereby entrance cannot be obtained by breaking through the wall section.

Infrared as well as vibration detection units should be used for protection. Under ideal conditions, closed circuit television should be connected to police headquarters or a security responding service or monitored by a hired guard.

Entrance to the place of business by burglars may be through the front door. It must have a strong bolt lock with a pick-resistant cylinder. The door should be strong enough to resist brute force trying to push it open. And the door itself has to be set in a good frame. A face plate can be added to protect the cylinder.

- *Fire protection.* The top emergency fire-fighting apparatus should be in the computer area. But in use, it may also damage the computer. And if there is a sprinkler system, that too may wreak havoc with computer equipment. Consider the use of portable asbestos shields or blankets to protect the equipment itself.

It is simplest to say that prevention is best here. That means a constant check on situations that can cause a fire inside the area and that includes the smoldering cigarette in the trash basket to a faulty electrical connection.

- *Vandalism.* It is also known as sabotage. Internal vandalism may be caused by a disgruntled employee who wants to hit back at his employers. He may wipe out very important data or may even substitute other data for the original data.

You must control access to the computer area. If it is within its own housing, that makes it simple. If the computer area is connected openly with the rest of the business section, there should be a setup so that only those who have to use it can get to it. You may even have to block off the surrounding area.

- *Blackout.* It happened in one of the leading cities in this country, and looting took place almost unchecked. The blackout can be the result of a power failure or a malfunction of an important portion of the electric power setup. It might also be deliberately caused to enable looting, vandalism and other objectives to take place.

> *'The computer has been given the list of all customers. This makes it nice and easy to send out specials for a forthcoming sale. But that list of customers is worth money in the right market.'*

Contingency plans are needed for this possibility. You have to consider the use of attack dogs as well as the use of chemical sprays. You need a list of people you can count on to help you. If the phone system is also out, then you have to look ahead and use CB battery-powered communication.

You should also consider having a small emergency generator ready for use in this situation, along with a supply of battery-powered "bright light" equipment.

- *White collar crime.* You keep your inventory control on the computer. Wonderful! But the "computer criminal" in your firm is trying to figure out how to change the inventory records. Once done, stealing becomes easy, and you may never realize what took place unless they become too greedy.

The computer has been given the list of all customers. This makes it nice and easy to send out specials for a forthcoming sale. But that list of customers is worth money in the right market. And you may never know that a trusted clerk got the record of it and sold it for a nice sum of money.

And accounting procedures are now handled by the computer. A hard-working but crooked bookkeeper could slip in several fictitious accounts that get paid regularly every month. He can even erase and change the amounts due from debtors and get paid for that bit of larceny.

From time to time there must be independent checks on data used by the computer — for example, by picking at random three names of companies to which money is owed for services or merchandise. What merchandise? When was it delivered? Who used it?

- *Ransom demands.* We are waking up to the fact that kidnapping for ransom has already come to this country. You have to look ahead to this possibility — but you may not be the one who is kidnapped!

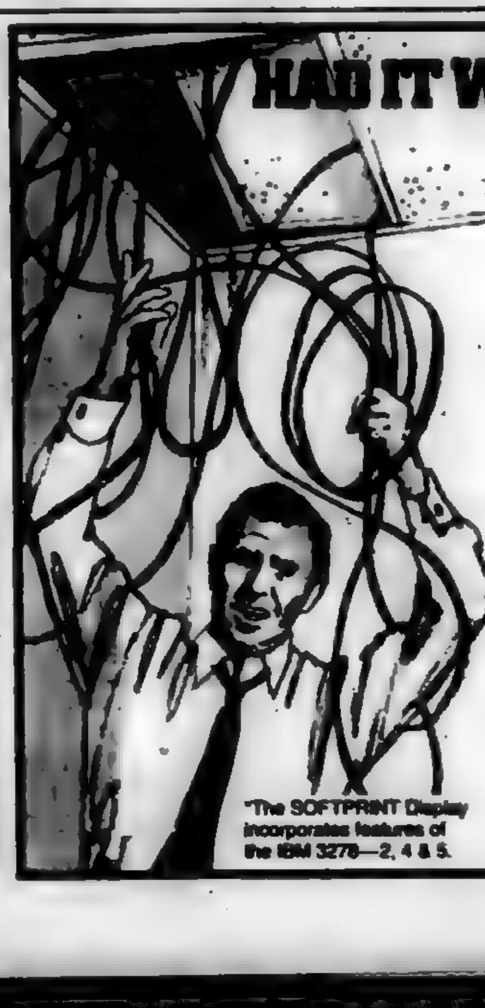
Important tapes are missing. Then comes a call asking for a sum of money for the return of those tapes. How did they vanish in the first place? Could anyone inside do this during a lunch break? Was a substitution made? If it happens to you — notify the authorities at once!

- *Disaster planning.* Would you be able to state now what possible disasters — flood, snowstorms, raging forest fire spreading into town or even an earthquake — could hit your area? If the computer were severely damaged and the primary sources wiped out, how would you function?

The idea of a depository in another area where duplicates can be safely stored has to be considered. This should now be taken into your calculations. I know, you may never have anticipated that a tornado could hit your area. But it did! Were you prepared for it?

From a practical business viewpoint, the entire computer setup may be more valuable than diamonds. And it does demand even more protection than that set up for diamonds.

Gluck is an attorney and criminologist based in New York.



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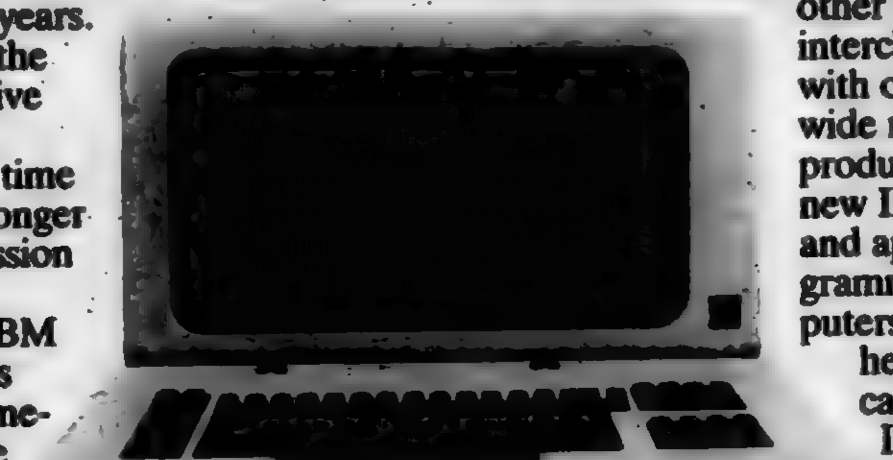

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SOCIOLOGY OF COMPUTING/ Robert L. Glass

Boom and Bust: A Sociological Trauma

I've known a lot of computing failure stories in my time. But I think this story contains the fastest boom and the fastest bust of any I can remember.

It all began at Fallout and Crosswind Nucleonics (F&C) in the late 1970s. Peter Proton, one of the up-and-coming F&C software engineers, was the key figure in the story. And the subject of the story was F&C's attempt to develop a generalized nuclear power plant control system.

Fallout and Crosswind had poured a great deal of time and technical talent into the control system for the Whiffenpoof, Wis., reactor. Not only had they done the predictably well-structured and modularized job of coding the control software, but both the hardware and the software were supported by a superior-to-the-state-of-the-art fault tolerance package. Redundant computer hardware units stood ready to take control if the software controller identified any hardware component malfunction; and the software monitored its own performance, with dual-coded modules available to be given control if needed.

Dual coding, if the term is new to you, is the act of programming two unique solutions to the same set of requirements, typically using two noncommunicating teams. A software fault-tolerance system can then turn control over to the backup code if the foreground code produces measurably inconsistent results.

Not only was the F&C fault tolerance approach impeccable by contemporary standards, but the simulation support system was accurate down to a gnat's proverbial eyelash. Do you want to know the impact if three unlikely human errors are committed in a two-hour period (just to pull a hypothetical figure out of the air)? F&C's simulator could produce predictably consistent and apparently accurate results, to the nearest nanorem of fallout.

F&C's Fair-Haired Boy

Peter Proton was the architect of this elegance. He had designed the system, been chief programmer for the team which built it and written several papers on both fault tolerance and simulation techniques. When it came to software solutions, Peter was F&C's fair-haired boy.

It came as no surprise to anyone at F&C, when word spread that the government was looking for someone to design a general-purpose nuclear control system, Peter was put in charge of the F&C preproposal team. Rumor had it, from those sources who always seem to know those not-yet-known things, that a request for proposal (RFP) would be out in six months. Peter's job was to do the spadework necessary — the initial design confrontations, the tough problem analysis — so that when the RFP did come out, F&C would be in their Nikes and ready to run.

Peter's first problem was to pick a starting point. He could produce a whole new design, tailored to the generic problems; or he could start with the highly successful Whiffenpoof system and design generic modifications. He chose the latter — familiar ground always seems like safer ground.

The six months went by quickly for Peter. His preproposal efforts were a technical challenge, and that made it a good time; and there was no hard and fast schedule, which made it better.

As usual, the RFP had a short fuse. The proposal had to be written and delivered in nine weeks. The comfortable pace of the preproposal phase suddenly vanished.

F&C management did a quick back-of-the-envelope calculation and realized that to write a credible propsal would require a team of about 45 technologists!

Have you ever participated on a project where the manning curve was vertical? There's a feeling of societal severance; all of the normal ground rules are suspended until stability is reached. The ambitious move swiftly to carve out ever-increasing territory in the newly forming management hierarchy; the lazy vanish for hours at a time, with no one responsible for keeping them on the job; the meek hole up and wait for it all to blow over.

And so it was at F&C. Peter Proton's one-man band began to take on the attributes of uncontrolled chaos. Forty-four more people joined the team and Peter, used to leading no more than four or five, gave up trying to organize and holed up to read the newly arrived RFP.

It was in the midst of this already disastrous environment that Peter suffered another devastating blow. His whole predesign approach, you may recall, had been to modify the Whiffenpoof system. But as he turned the pages of the RFP, it became more and more painfully clear that a far more ambitious solution than Whiffenpoof was called for, one that required a start-from-scratch new design.

There were a lot of possible reactions Peter could have had. Stunned by this new and unpleasant turn of events, he chose one of the worst possible. He made the spur-of-the-moment decision to go with his original thorough but inappropriate predesign efforts and concentrate on the task of organizing people. And, gradually, he created a superficial order out of the chaos.

It wasn't until the proposal team was organized and given assignments that the truth began trickling out. Technologists who compared the RFP against Peter's technical assignments realized they were in mid-nowhere. The RFP and what they were asked to do were totally out of sync.

It was three weeks into the nine-week proposal effort that F&C upper management finally understood what was happening and pulled the plug. The 45 team members were scattered back to where they had come from and Peter, no longer the F&C fair-haired boy, did some time on the corporate carpet.

And to those of you who thought that boom and bust on a nuclear project had to do with physical explosion, I hope you are not disappointed to find instead a sociological one. For the 45 people on this project that failed, it was traumatic enough as it was.

LETTERS

Six of One . . .

Three cheers for the commentary "Structured Coding's Twin Myths." I have always believed that a program can be just as structured with GOTOs as with PERFORMs [CW, Sept. 8].

Lacey pointed out some things that programmers tend to overlook — every program, no matter how large, still has only three phases: initialization, processing and termination. Even the smallest loop, be it a GOTO or a PERFORM, has these same three phases.

The statement of Lacey's I was most happy to see concerned nested IFs. He said "nested IFs (which should be avoided like the plague in any programming method) . . . " are just multiple GOTO or PERFORM statements. I would much rather write a few more lines of easily understood code using two or three GOTO or PERFORM statements instead of one nested IF which looks like a foreign language.

Once again, thank you, Peter Lacey, for pointing out that half a dozen GOTOs are equal to six PERFORMS.

Roger A. Graves

Salt Lake City, Utah

Not for Money

Some time back, you printed an article in which you stated that money wasn't the most common reason that a DP person resigned from a job.

After being a programmer for 4-2/3 years and a systems analyst for all but 6 months remaining in my 7-1/2 year DP career, I agree with you.

I had the misfortune to have had a six-month assignment as a consultant. I had designed two systems, was heavy in IBM OS JCL, Cobol, Vsam and TSO-SPF and was highly regarded by previous companies.

At the consulting assignment, I was treated terribly. Whenever I asked a question, the answer was "Well, what do you think?" I was given no backup by my consulting firm and worked 60 to 80 hours each week in an assignment for which I was highly overqualified.

After six months, I had all I could take and submitted my resignation. I was pressured into staying on, but refused. No amount of money could have kept me. I find that many other people shared my experience at consulting firms and vow never again to work for one.

The second most common reason for resigning that I encountered involved working for a DP manager who either (1) wrote a Cobol program at one time and now feels he knows everything about DP, or (2) a DP manager who knows nothing about DP.

In both cases, the manager would insist on impractical ideas and could not be talked out of them. Other times, ridiculous schedules would be imposed.

I firmly believe that a DP manager should have DP knowledge. I certainly don't expect the manager to be the best coder or have the highest technical skills in the shop, but I do believe that DP management should have DP knowledge to be able to impose practical suggestions, set workable time frames and be able to say "No" to a user when necessary.

Ken Mitchell

Newburgh, N.Y.

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With 10-Year-Old Package

Ship Builder Sails Structured Course

By Rita Shoor
CW Staff

PASCAGOULA, Miss. – Old means obsolete in the vocabulary of many MIS specialists, but at Ingalls Shipbuilding here a 10-year-old software package has led to a 60% increase in programmer productivity, according to J.F. Davidson, manager of the 31-person business application staff.

"Work Ten [the software package] is our alternative to traditional structured methods," Davidson said after performing several benchmark tests. The only drawback may be that Work Ten programs are intended for a batch environment and cannot be utilized for on-line data base applications, he noted.

In one test, for example, the same program definition was given to two programmer/analysts. One had about two years of experience and the other was an eight-year veteran. The relative newcomer used the Work Ten package; the "old hand" coded in Cobol.

The problem was a "very comprehensive edit program," Davidson said. In this case, the Work Ten programmer finished the job 60% faster than the experienced programmer/analyst, he said.

An average time savings of 40% is "a very conservative estimate," he maintained. Up to 80% of the programmers' time normally required to write, test and implement a Cobol program can be saved if the same program is coded in Work Ten, he claimed.

In addition, he maintained, we can make a

(Continued on Page 64)

Honeywell Updates 'Multics' With Mail, Text Editing Facilities

PHOENIX – Honeywell, Inc.'s Information Systems Division has announced enhancements to its previously announced Release 8.0 of the Multics operating system – the Multics extended mail facility and Emacs text processing facility.

The Multics operating system functions on Honeywell Series 60 Level 68, Level 68/DPS and DPS8/70 large-scale computer systems.

With the extended mail facility, geographically dispersed users operating different types of terminals reportedly can selectively list, print, delete, store and forward messages. Users need not log on to the system to receive mail.

The message format is similar to the structure of an interoffice memo with header information and body text. The header may contain such additional features as automatic transmission of acknowledgment to senders upon receipt, and allows for replies to destinations other than the sender's.

Users can also create multiple secondary mailboxes where both incoming and outgoing mail can be logged for manipulation outside the mail facility, a company spokesman said. Mailboxes are protected by standard Multics hardware security mechanisms and security software.

Text Editing

The Emacs text processing facility is an integrated editing, text preparation and screen management system. While technically an editor, the text processing facility continuously interacts with text as a text processing subsystem, according to the firm.

Developed at Honeywell's Cambridge Information Systems Laboratory (CISL), Emacs is said to provide complete management of the video terminal screen. The screen can be divided into two or more areas, enabling simultaneous display of logically different blocks of data on the same screen without affecting the editing process.

Emacs subsystems are said to allow programs in PL/1, ALM and Lisp to be entered into the system and edited with correct indentation, comment placement and declarations supplied "immediately."

Both the Multics extended mail facility and the Multics Emacs text processing facility are available for a monthly lease fee of $292 and $787, respectively, with a required license of not less than 12 months. Honeywell is at P.O. Box 6000, Phoenix, Ariz. 85005.

Maintenance Tasks Simplified

• Input Smoothed For 360, 370 Users

WHEATON, Ill. – Generated Systems, Inc. has unveiled a software package designed to simplify system maintenance and development for IBM 360 and 370 users. Dataryte was developed to allow organizations to apply successful report writing concepts to the input function, the vendor said.

Historically, edit routines have tended to be the least manageable and least documented programs in an application system. Dataryte solves that dilemma by placing edit criteria on a table file external to project logic, the vendor claimed.

Non-DP and DP personnel alike can therefore implement edit changes without recompilation and debugging of programs, a spokesman added.

Dataryte is available in batch or on-line mode, runs on computers compatible with the IBM 360 and 370 instruction set and costs $10,000, the vendor said from 209 N. Hale, Wheaton, Ill. 60187.

• Package Meshes Design, Upkeep

PHILADELPHIA – A software package designed as a framework for designing, developing and maintaining systems has been announced by Atlantic Software, Inc.

SDM/70 Version II is both a design methodology and a project management methodology, according to the firm, and offers a software option to automate the creation of project time and cost estimates.

The package reportedly offers structured analysis, design and programming with step-by-step guidelines for all three; data base administrator guidelines; auditor interfaces with information systems for data control, audit trail construction and security; quality assurance guidelines; and purchase package evaluation and acquisition guidelines.

SDM/70 Version II costs $30,000 including full documentation, training and installation from the firm at 320 Walnut St., Philadelphia, Pa. 19106.

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English-Like Language Added to 'Model'

NEW YORK — A high-level, English-like language has been added to Model with Release 4.3, according to its vendor, Lloyd Bush & Associates.

Model was developed to provide a modeling capability to business people who have little or no programming knowledge.

It is written in Fortran IV and runs on IBM; Digital Equipment Corp., Prime Computer, Inc., Data General Corp. and other computers, the vendor said.

Addressable Applications

Addressable application areas include financial analysis, general-purpose reporting, scientific/engineering problem solving and consolidated financial statements.

Model is also available on several commercial time-sharing services, a company spokesman added.

The one-time license fee runs between $22,000 and $42,000 depending on facilities and features desired, the company said from One Battery Park Plaza, New York, N.Y. 10004.

Package Boasts Mapics Interface

SANTA ROSA, Calif. — An on-line Master Production Schedule System which has been developed to interface with Mapics on the IBM System/34 and System/38 has been introduced by Data 3 Systems, Inc.

The MRPS 34/38M package consists of modules featuring such production schedule applications as capacity planning and shop floor control.

The complete package costs $70,000 from the software and systems house at P.O. Box 441, Santa Rosa, Calif. 95402.

'UFO' Update Compatible With DOS/VSE, FBA Units

HASBROUCK HEIGHTS, N.J. — Oxford Software Corp. has released Version 2.3 of User Files On-Line (UFO), making it compatible with DOS/VSE and Fixed Block Architecture (FBA) storage devices.

In addition, system compile procedures reportedly have been enhanced internally to improve execution speed of UFO transactions 40% to 60% over previous versions.

Support for CICS intersystem communications has been built in so that applications may be developed centrally and then shared with other CPUs via Vtam/SNA, according to the vendor.

Other UFO improvements include seven new UFO utilities; an ATTACH command that provides the support for asynchronous initiation of a CICS/VS task from a UFO procedure; and expanded execution inquiry facility.

The system costs $16,500 for DOS and $21,500 for OS and lease terms are available.

The firm is located at 174 Blvd., Hasbrouck Heights, N.J. 07604.

Accounting Tools Fit DG Users Of CS/Cobol

BIRMINGHAM, Ala. — Programmed Systems, Inc. has released both a public accounting and time/-expense billing software package for computers using Data General Corp.'s CS/Cobol operating system.

The public accounting package has modules for client write-up, payroll with check writing, fixed-asset accounting with investment tax credit summary and utilities such as amortization schedules.

The time/expense billing software is an integrated open-item work-in-progress and modified balance-forward accounts receivable system offering complete user flexibility, a spokesman claimed.

Both software packages were developed by the firm about two years ago, but were never offered as a general release.

Prices for the software start at $1,000, the spokesman said from the firm at Suite 305, Centennial Building, 90 Bagby Drive, Birmingham, Ala. 35209.

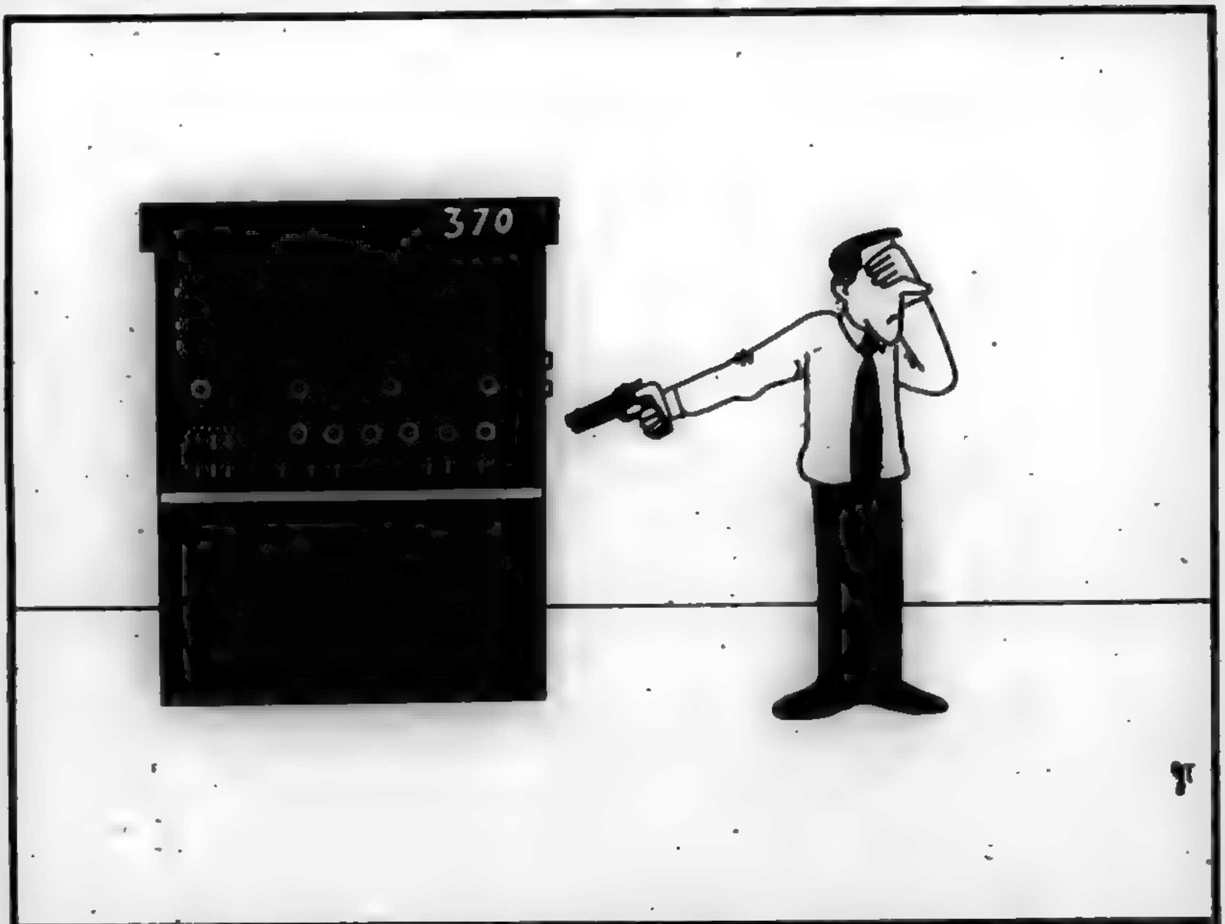
CICS Users Get Sysout Aid

CENTEREACH, N.Y. — Axios Products, Inc. is offering the Ropes Spool Transfer Utility (RSTU), which operates under IBM's CICS to transfer Sysout data from the Spool subsystem (JES) to the Remote On-line Print Executive System (Ropes).

The Sysout data is generated by application programs for printing by the Spool subsystem. RSTU copies print data from the Spool subsystem to Ropes for printing by CICS printers.

Sysout data is selected and transferred to Ropes by RSTU transactions operating under CICS. After transfer, the data may be printed using all the features of Ropes. The original Sysout data may be requeued or deleted from the Spool queue.

The price for RSTU is $100/mo rental or $2,500 for purchase, the vendor said from 2364 Middle Country Road, Centereach, N.Y. 11720.



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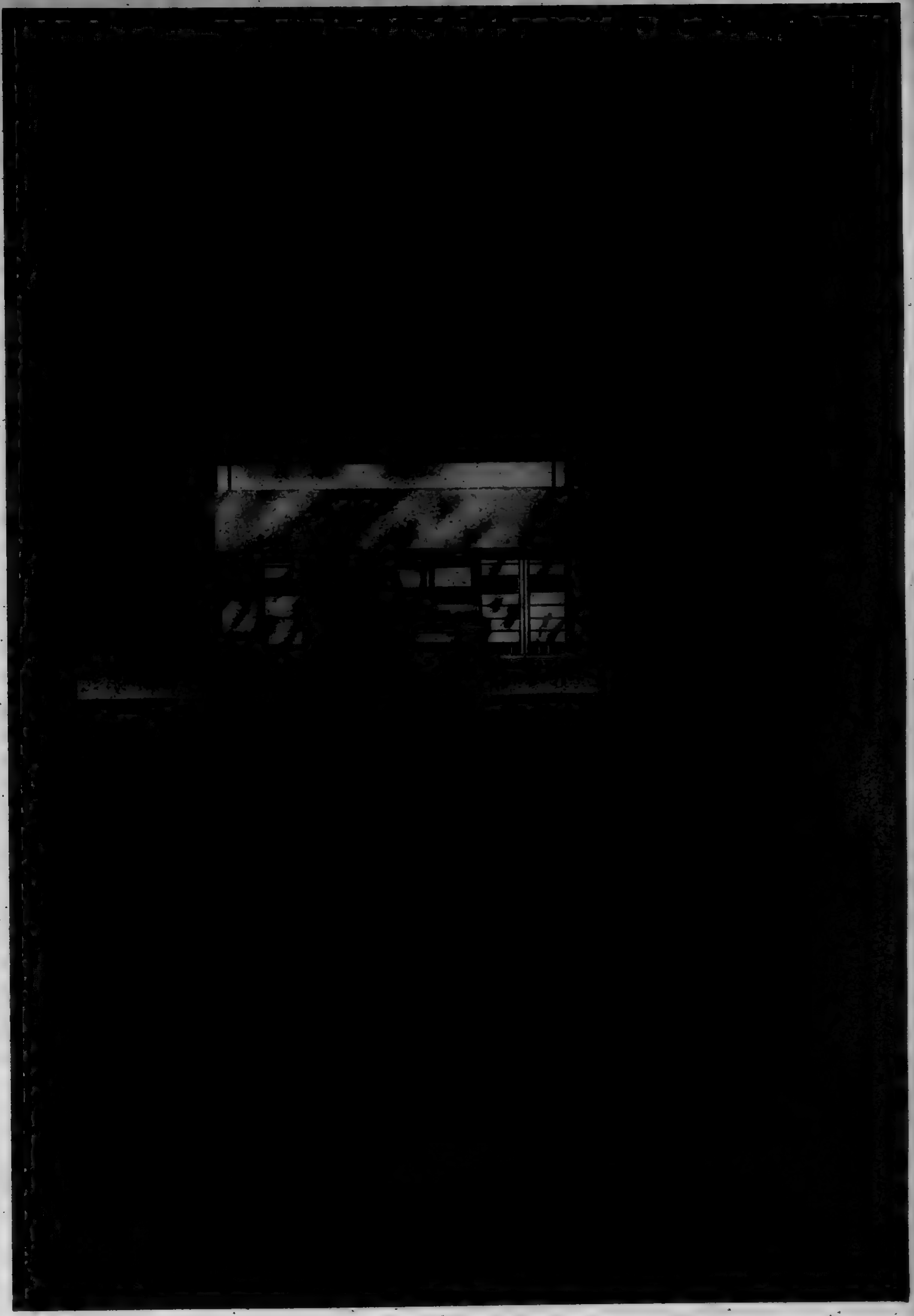

HP 3000 Gets Debugger

MORRISTOWN, N.J — Systems of the Future, Inc. is offering a Cobol debugger for Hewlett-Packard Co. HP 3000-II, III, 30 and 33 systems.

The package allows the programmer to use either 1968 or 1974 versions of Ansi Cobol to interactively set breakpoints at specified Cobol source lines, display and modify variables, trace execution paths, step programs one statement at a time and stop execution at a breakpoint, the vendor said.

The package costs $2,500 for a single CPU; a demonstration tape is available for $30.

Systems of the Future is located at 161 Washington St., Morristown, N.J. 07960.

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Five-Option System

Modular System Maps in Fortran

SAN DIEGO — Integrated Software Systems Corp. is offering a mapping software system that is reportedly capable of analyzing geographic data, selecting the best cartographic formats and generating publication-quality thematic maps.

Designated Odyssey, the Fortran package comes in modules, as a basic system with five options, so users can purchase only those features necessary for their particular application, a spokesman said.

The system combines geographic data files with cartographic data bases — counties, census tracts and soon — to produce a variety of two-dimensional shaded polygon maps and related annotation in high-quality type fonts, the vendor claimed, adding a starter kit of cartographic data bases is included.

Maps can be drawn with line or dot shading, black and white half toning or color shading, the spokesman said.

The system automatically identifies color or shade values with a legend or histogram and gives the user control over the size and scale of the map.

The product costs $20,000, the vendor said from Suite G, 4186 Sorrento Blvd., San Diego, Calif. 92121.

Routines for Series/1 Serve Subscription Fulfillment

CEDAR FALLS, Iowa — United Software Associates, Inc. is offering a number of software routines designed to operate on the IBM Series/1 minicomputer as part of a subscription fulfillment system.

The first offering is a series of subroutines that will convert a date from Gregorian to Julian format and also generate a numeric value signifying the day of week.

With this software, a user can determine the number of days between any two dates by subtracting one date factor from another, a spokesman noted.

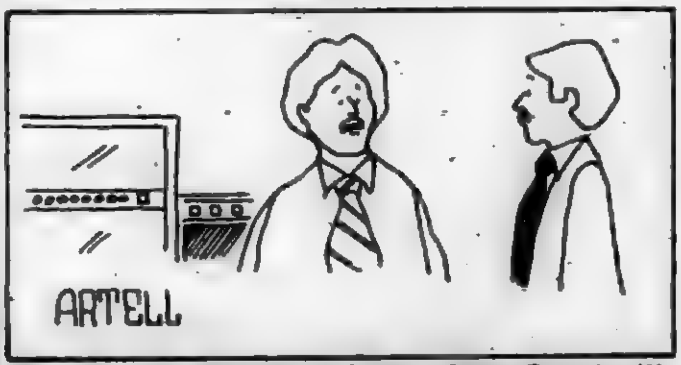
The routines are written in EDX and provide for leap years and the turn of the century. They cost $35 for a one-time perpetual license fee.

The second set of routines is geared to compare two character strings for high, low or equal and branch to a user-specified address depending upon the results, the spokesman continued.

Useful for comparing character strings and written in Series/1 assembler, the compare routines cost $25, he said.

Finally, United Software is offering a documentation list program that formats user prepared documentation and, if specified, will create an index of information located in the document. This program costs $50.

All of the routines are available immediately, but will only be sold if the user agrees in writing not to distribute the software, the spokesman said. The firm may be reached at P.O. Box 743, Cedar Falls, Iowa.



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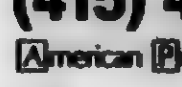

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PDP-11s Get Credit Data

WRENTHAM, Mass. – An on-line credit information retrieval system for Digital Equipment Corp. PDP-11 minicomputers that is said to provide in-house automated credit reporting services has been introduced by Trafalgar Square Associates, Inc.

Geared to run under DSM-11 Mumps programming, the On-Line Credit Exchange (Once) software allows users to access a credit data base from either local or remote terminal locations.

System Options

The system utilizes passwords and locates credit profiles by keying a subject's name. Options include a system timer to handle low-volume subscribers.

Also, system security is built on a tied terminal concept that limits users to only those functions allowed by the systems owner.

Finally, the system keeps track of subscriber usage by performing accounting functions and generating reports, a spokesman said.

The Once package costs $25,000 from the vendor at 15 Trafalgar Square, Wrentham, Mass. 02093.

Econalyst Gives Report Service On ADP Net

ANN ARBOR, Mich. – Econalyst, an economic information and computing service, has announced that Townsend-Greenspan & Co., Inc. reports are now available on-line through Automated Data Processing, Inc.'s (ADP) worldwide teleprocessing network.

The reports, which appear about three times weekly, discuss the U.S. economy and interpret the effect of current economic trends on specific industrial segments.

A key-word indexing system allows the corporate economist to search current and historical reports to select and print topics of interest.

The price for the service ranges between $2 and $5 per report. Reports are usually 10 to 70 pages long, the vendor said from 175 Jackson Plaza, Ann Arbor, Mich. 48106.

System Provides Linear Programs

DENVILLE, N.J. – HS/LP, a general-purpose linear programming system reportedly capable of solving large-scale models on small and medium-size computers, is available from Haverly Systems, Inc.

The system can be executed interactively or in batch mode through a control language interface or may be invoked under user program control.

Written in Fortran, the initial implementation is for Data General Corp. Eclipse computers running under the Advanced Operating System. Implementation on other computers is scheduled, the vendor noted.

The one-time license fee for HS/LP is $15,000, Haverly said from 78 Broadway, Denville, N.J. 07834.

Vector Automation Offers On-Line Graphics Package

BALTIMORE – A device-independent interactive graphics software package has been unveiled by Vector Automation, Inc. for its Graphicus-80 intelligent refresh graphics terminal.

The G-Core software is compatible with the 1979 Siggraph/ACM Core standard and aimed at applications requiring high resolution and a large number of vectors. The software reportedly differs from other similar systems because it resides in the terminal rather than the host computer.

The only programs resident in the host are Ansi Fortran routines containing Core-compatible entry points and message formatting routines to pass user requests to the terminal, a spokesman stated.

Geared as a bundled package, the software operates through the Graphicus-80 terminal controller to execute user requests, maintain the display file and control all graphics devices, including the terminal's display. In addition, the 1,000-line host package can be transported to a variety of systems, the spokesman claimed.

G-Core is provided at no charge to present terminal users or sold with the Graphicus-80 system for $24,500.

Additional information on the graphics system can be obtained from the vendor at Village of Cross Keys, Baltimore, Md. 21210.

'Library' Open To Prime Users

HOUSTON – An updated version of International Mathematical & Statistical Libraries, Inc.'s (IMSL) Library for users of Prime Computer, Inc. models 450, 550, 650 and 750 that reportedly provides the entire set of 495 Fortran subroutines has been announced by IMSL.

The IMSL Library Edition 8 is said to allow users to utilize the Fortran codes as building blocks in the development of scientific and engineering application programs.

The package costs $1,600 for use on large mainframes, $1,400 for use on minicomputers, from NBC Building, 7800 Bellaire Blvd., Houston, Texas 77036.

Bobby Harper, Manager of Information Services, Vought Corporation

Vought Corporation makes planning fly with IFPS.

Vought Corporation, aerospace subsidiary of The LTV Corporation, is a half-billion dollar company which builds military aircraft, missiles and space systems and commercial aircraft components.

Bobby Harper, Vought's Manager of Information Services, recently discussed their use of EXECUCOM's Interactive Financial Planning System (IFPS).

"IFPS was chosen by Vought Corporation in 1976 as our first venture into the area of Decision Support Systems. Comparative studies of products existing at that time proved IFPS to be the only one with a current set of superior capabilities plus unlimited expansion possibilities," he said.

"IFPS has proven itself in direct support of management by providing timely response to management questions that otherwise would have remained unanswered in the time frame allowed. Applications have been most prominent in the financial areas. However, many significant uses are found in manufacturing, materials, and engineering," he noted.

Uses at Vought include debt planning, debt management, treasury operations, consolidation of balance sheet and income statements, transportation, facilities, and engineering planning and forecasting.

He continued, "Answers to critical questions that once were not available may now be researched in a reasonable time. Analysis of data that required production programs and unacceptable lead time to compose routines may now be obtained in time for decision-making department heads to use it."

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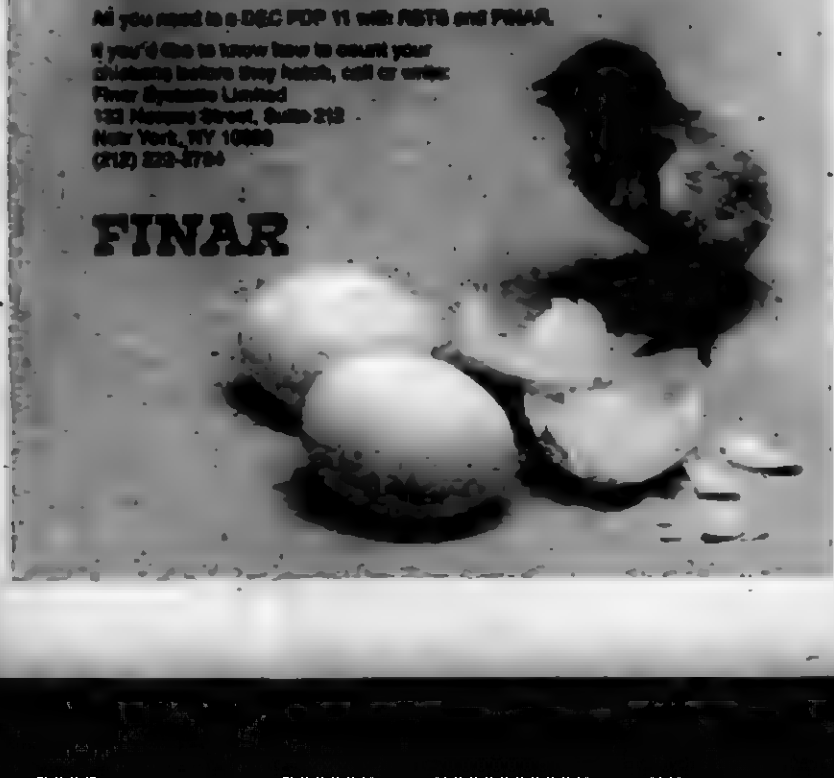

Ship Builder Plots Course With 10-Year-Old Package

(Continued from Page 59)

college graduate who majored in computer science productive in terms of writing Work Ten programs in three to six weeks, he said.

Automatically Structured

Work Ten is automatically a structured type of language, he explained. The software produces the necessary coding for standard file manipulation functions (READ, WRITE, OPEN and CLOSE statements and end-of-file checks).

Logic for file matching, control breaks, editing and reformatting is also automatically generated, Davidson said, with the result that "the programmer is relieved of repetitively designing logic to access, match and/or write records."

> *Davidson speculated that the package may no longer be marketed because of a negative reaction from experienced programmer/analysts. Work Ten was no challenge to them, he said.*

Informational parameters describing file, record and storage characteristics are input to the Work Ten compiler and the output is a Cobol source program, which is then compiled via a standard Cobol compiler, he said.

If you're working strictly with Work Ten, you don't need to know Cobol, he claimed, "but it helps."

With a configuration that includes two IBM 370/158s operating under MVS/JES3, the staff is maintaining some 250 systems consisting of approximately 3,000 programs, Davidson said. Almost 2,500 of these programs were written in Work Ten.

The Ingalls staff has been exposed to coding techniques such as the mainline concept, nested IF statements and limited GOTOs with some unsatisfactory results, Davidson said.

Approximately six years ago, the firm installed a System 2000 data base management system, he recalled. Consultants from MRI Systems Corp. (later acquired by Intel Corp.) were brought in to write data base applications. These consultants utilized structured coding techniques, according to Davidson.

The Information Systems staff has rewritten the majority of this code, he said. "We removed all of the nested IF statements and made the system more modular."

The recoding effort should not reflect negatively on the MRI consultants, but on the coding techniques they used, according to Davidson. As a result of this experience, he described himself as being in "deadly opposition" to using structured programming techniques at any future time.

And why should he when the current Ingalls staff of 31 programmer/analysts (including himself) is maintaining "twice as many programs" as the 65-person staff did in 1973?

If an acceptable definition of programmer productivity is to provide information systems technicians with the tools that will enable them to code and maintain more programs in less time, then the technical staff at this U.S. Navy shipbuilding contractor has definitely increased its productivity, he said.

Based upon records of the man-hours charged to each project, the staff has also succeeded in completing projects within 10% of the original man-hour estimate, he continued.

Although in opposition to generally recognized structured coding techniques, Davidson's staff does conduct design walk-throughs for new systems and major revisions to on-going systems.

These walk-throughs include representatives from both the information systems and user department staffs. Described as "very informal sessions", the walk-throughs are not based on any particular structured methodology, he noted.

The technician who is most knowledgeable about the system goes through it with the section manager from the involved user departments. Program code walk-throughs are only carried out on a "limited basis," according to Davidson.

Work Ten Unavailable

Now comes the bad news. The Work Ten software which has contributed so heavily to these favorable statistics is no longer marketed, according to Bruce Forsberg, executive vice-president of NCI, the software vendor which provided Ingalls with Work Ten under a long-term leasing agreement.

NCI is now engaged in marketing a package designed for on-line program development. Competing with such packages as IBM's time-sharing option with the structured programming facility (TSO/SPF) or Panvalet on-line from Pansophic Systems, Inc., NCI's Owl software runs under both OS and DOS operating systems, he explained.

The firm, a wholly owned subsidiary of Quanex Management Sciences, has shifted its area of concentration from the batch to the on-line market, Forsberg said.

Davidson speculated that the package may no longer be marketed because of a negative reaction from experienced programmer/analysts. Work Ten was no challenge to them, he said.

However, he maintained that the Ingalls technicians were very happy with Work Ten software. "This language encourages programmers to concentrate on overall objectives instead of details," he said. It was designed "to take the mechanical aspects out of the programmer's hands and enable them to concentrate on the creative aspects."

Asked whether he had run into any problems in maintaining the package, Davidson's response was "absolutely none." In fact, he said, the shop quit using NCI's maintenance service approximately six years ago because there was no need for it.

Correction

Manufacturing Software Systems, Inc., which is offering a free updated version of its Manufacturing Resource Planning vendor list [CW, Sept. 22], is located in Vermont, not Virginia. Its full address is P.O. Box 278, Williston, Vt. 05495.

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ANN ARBOR, Mich. — Software that processes call traffic data to produce minimum cost, long-distance service information is being offered by the DMW Group, Inc.

The Teletraffic Optimizer Program (TOP) processes data from the usage of Wats, FX, DDD, tie lines and specialized carrier offerings in combination with automatic route selection systems, queuing and other control alternatives, the vendor explained.

Results are based on processing actual call data rather than on estimates or summary data derived from an analytical model.

Additionally, simulations of proposed new configurations can be run prior to installation, which allows selection of the configuration that best handles the actual call traffic before it is purchased, the firm said.

TOP costs between $15,000 and $20,000, depending on the hardware configuration.

The DMW Group is located at 2395 Huron Parkway, Ann Arbor, Mich. 48104.

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'Master File Update'

Model Program Course Issued

ARVADA, Colo. — Educassettes, Inc. has released Master File Update, the third course in its Model Program Series.

The self-study audiocassette course uses the Warnier-Orr design technique to develop a model structure for the Master File Update program.

Topics discussed in this course include the development of the basic master file update logic and the generalization of the design to allow the updating of sequential or direct master files by any number of input transaction files, the vendor said, adding, the model structure is adapted for the on-line master update function.

The course is presented in two half-hour segments and is accompanied by over 50 illustrations. It costs $109, Educassettes said from Suite 102, 6777 Wadsworth Blvd., Arvada, Colo. 80003.

Nixdorf Ties WP, DDP Systems With 'The Link'

BURLINGTON, Mass. — Nixdorf Computer Corp. has announced The Link, a hardware and software package that links its 8840/5 word processing (WP) system with the firm's 600 series of distributed data processing (DDP) systems.

The Link uses the Distributed Processing Executive (Dpex) or, in the case of 480 data entry systems, the Advanced Data Entry Executive (Adex) operating systems.

Communications between the two systems is concurrent with other system functions, the vendor said.

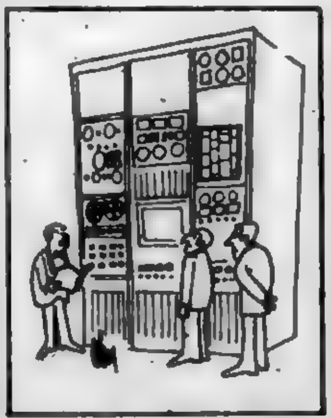
The Link costs $50, Nixdorf said from Ohare Plaza Mall, 5725 E. River Rd., Chicago, Ill. 60631.

Astrocom Adds WP Capability For Series 760

ST. PAUL, Minn. — Astrocom Corp. has announced a word processing (WP) capability for its Series 760 small business computer.

The feature, called Astrotype 1, was designed to be used with the Dataproducts Corp. Model D50 bidirectional 47 char./sec printer.

The software package costs $1,000 from Astrocom at 120 W. Plato Blvd., St. Paul, Minn. 55107.



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Security Timing Service Offered on Rapidata Net

FAIRFIELD, N.J. — Rapidata, Inc., the nationwide remote computer services firm, will begin offering security timing analysis programs from Securities and Commodities Corp. (SCC) of Northport, N.Y., through its network.

SCC will market and maintain its proprietary computer programs and data bases utilizing Rapidata's network and computer service.

The SCC programs require no prior computer knowledge, according to the firm. The service allows users of terminals and small computers, such as the Radio Shack Corp. TRS-80, to build, update and maintain their own securities data bases using programs developed and tested by SCC.

Programs for fundamental analysis, stock timing and stock charting are available, particularly in the area of option trading.

Rapidata is headquartered at 20 New Dutch Lane, Fairfield, N.J. 07006.

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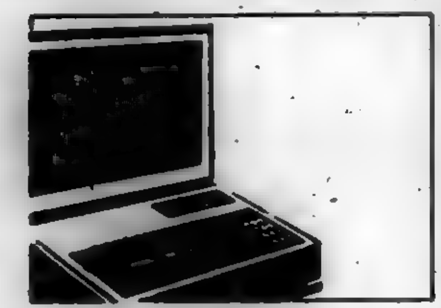
Management And Distributed Computing

By Robert W. Shirey



Part 1: Origins and Viewpoints

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications.

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

"Decentralization, as the term is usually understood, means division of labor and is nothing new."

— Peter Drucker, 1960

"Distributed processing is not a new idea."

— David J. Farber, 1974

Distributed computing means dispersing a single, logically related set of tasks among a group of geographically separate yet cooperating computers.

The distributed computing concept is the result of trying to increase computer productivity by applying ages-old management ideas to new technology. One idea is division of labor, which increases productivity through parallelism. Another idea is specialization of labor. Distributed computing uses the fact that, like people, different computers do best at different kinds of work. A third idea is delegation of responsibility. A distributed computer system (DCS) delegates computing responsibility, and it may also delegate authority by decentralizing system control. In principle, therefore, distributed computing is not a totally new idea.

Although distributed computing seems familiar in principle, it is not simple in practice. Distributed computing means putting computing units where the work is and then connecting them so that they communicate. That sounds easy — like putting in a telephone — but it's not. At least, no one claims to find it especially easy to design, build and operate a DCS.

The main problem is the richness of the DCS concept. Distributed computing involves much more than just new arrangements of computer hardware and data communications. It also affects the design of operating systems, applications and their data bases, and the institutional organizations of DCS developers, operators and users. In short, distributed computing seems to touch on all the computer sciences and most of the management sciences, and it raises their complexity.

Managers Vs. Technicians

When an organization builds a DCS, two groups must work together, management generalists and computing specialists. This is true for any computing system, but it's especially important to the success of a DCS. Some of the strongest forces behind the DCS concept are economic or psychological in nature. The analysis of such forces in DCS design takes more active participation from managers than in traditional, centralized systems.

Unfortunately, managers and technicians often do not cooperate well on a DCS design because they see the objectives differently. Also, each group lacks knowledge and understanding of the other group's role and methods. For instance, computer technicians are generally unfamiliar with management theories of organizational design [Frnz76]. In short, one person rarely has training in more than one field, so most people "look at the broad area of information systems from a single — and too often a single-minded — perspective [Keen78]."

Professional managers see distributed computing as an old organizational concept applied to a new productive resource. They are trained to break large or complex tasks into smaller, simpler, more manageable jobs that can take advantage of specialized skills and tools. To them, computers are powerful new tools with many skills.

Computing technicians see distributed computing as a new architectural concept for systems of hardware, soft-

(Continued on In Depth/2)

IN DEPTH

(Continued from In Depth/1)

ware and data communications. They are trained to select and configure hardware and software elements that optimally meet the users' requirements. To them, distributed computing greatly expands the repertoire of system possibilities.

To improve cooperation, both groups need to add to their own knowledge. For general managers and system users, DCS design is full of new technical principles and cost relationships. For technical specialists, there are theories of organization and behavior to be learned. Furthermore, it is important for the two groups to establish a common core of understanding concerning what a DCS is and what it's good for.

This four-part series addresses both groups, managers and technicians. It tries to explain the distributed computing concept to the managers, to define management issues in DCS design and to survey methods for analyzing those issues. However, the series also seeks to expose technicians to themes of management thought that can play a major role in DCS design. In this context, a manager is a business generalist, a person charged with making decisions and carrying them out to achieve an organizational goal. The manager is not a technician in the sense that he doesn't need to be able to program or operate a computer. However, he must understand the productive capability of his equipment.

Technical, Management Origins

Distributed computing is the direct result of a revolution in computer prices and performance. Modern, solid-state electronics continue to shrink computers in size and cost. At the same time, reliability and capability increase. These changes enable system designers to consider several attractive alternatives to the traditional, centralized computer center. The new choices involve decentralizing the computer and distributing its power to where it is needed. This also means distributing the work to where it can be done best.

However, distributed computing also has management origins. Even before computers began to shrink so rapidly in price and size, there already were good reasons to decentralize. First, large centralized systems are becoming too complex to manage well. Second, large systems have large consequences if they fail. Third, smaller users of large systems often become dissatisfied because they can't get service tailored to their needs. Later in Part 1 we discuss these problems in more detail.

Terms and Variations

Spreading computer power and system control outward toward the users can improve service while reducing risk and complexity. That is a basic idea behind distributed computing. But there are many ways to distribute a system. Physically, for example, a single large regional computer can be replaced by several smaller, local office computers. Going further, one can replace a local office computer by intelligent terminals located at individual workstations.

Functionally, there are several choices for managing data. Local computers could connect to a regional data base, or a regional machine could access several locally maintained data files. Finally, the manager can distribute the organization by decentralizing the work of planning, building and operating a system.

Thus, the term distributed computing is used today in many ways. It denotes all sorts of combinations of computing equipment and functions.

The term has no single correct definition. Later in Part 1 we review some of the most popular terminology and describe several dimensions along which a system can be distributed.

Advantages and Disadvantages

Regardless of how they define distributed computing, people generally agree on why they like it. As mentioned above, they want to improve service while reducing risk and complexity. They want to control the data base needed to do their job. They want to control their own computing costs. They want a high level of computing capability at the places where data is created and used. They want to avoid moving data from a local to a central site for processing and then moving the results back again. They want to enable local sites to share their local

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IN DEPTH

data bases and computers when needed.

Potentially, a DCS has many different functional, economic and psychological advantages over a centralized system. Functional advantages can include greater continuity of service, smoother growth, better performance, easier restructuring and simpler development. Economic advantages can include reduced costs for communications, staff and initial investment. Psychological advantages can result from being able to match the form of a DCS to that of the human organization that must use it. Part 2 will discuss all of these potential advantages in detail.

Part 2 will also discuss potential disadvantages, many of which stem from the newness of DCS technology and may yet be corrected. There are several major problems. First, multiple-processor systems are harder to design than single-processor. Second, a DCS has many more interfaces to match and manage. Third, modularity restricts local application size and complexity. Fourth, decentralization can lead to overcomputerization. Fifth, every newer technology has added unknown risks that trap the pioneer.

In general, distributed computing is an active research area. Many questions remain unsettled in the areas of system management, data base structure, processor architecture and communication.

Three general management topics have special importance in distributed computing. They are organizational design, strategic planning and cost-benefit analysis; and they arise as follows. First, a DCS should match the form of the organization that uses it, and the essential modularity and flexibility of a DCS makes this possible in most cases. This raises the question of what the proper organizational and system forms are. The question's key issue is centralization vs. decentralization. Personal preferences, styles and emotions strongly affect the choice of organizational design, so quantitative analysis is difficult.

Organizational design in turn affects the long-term success of an enterprise, which means that DCS design overlaps with strategic planning. In a 1979 Booz, Allen & Hamilton Survey, more than 500 U.S. corporate-level business executives were asked where corporate responsibility should lie for handling strategic issues in information processing [Popp79]. The respondents agreed that the responsibility should be shared among the topmost corporate officers, and 81% mentioned a chief information/computer executive.

Management Concerns

In forming strategic plans, the manager deals with broad design issues rather than implementation details. In addition to internal organization, the DCS strategic planner must consider external, environmental factors and the trend of future computing technology. Again, since these three contain uncertainties, analysis is difficult. To relate and compare the choices, the planner needs a common basis. In most cases, managers reduce the options to equivalent dollar costs and use return on investment as the key decision factor.

Few subjects have more importance for a manager, especially a top manager, than organizational policy, strategic planning and investment analysis. An extensive literature exists for all three, and the part dealing directly with computing resources has grown rapidly. However, little methodology has emerged so far for making management decisions on distributed computing systems.

Part 3 of this series will introduce the management problem in distributed computing. From the experiences of four managers, it shows the importance of the centralization vs. decentralization (C-DC) issue. Then it reviews three papers that tell how to rationally decide the C-DC issue for computing systems.

Next, the discussion broadens to cover more aspects of strategic planning. We will review five papers on strategic planning, all of which apply to DCS design. The papers cover the purpose and content of a strategic plan, stages of computing growth, application control vs. functional control, computing staff reorganization and work unit technology.

Then, Part 4 will look at investment payoff analysis for distributed systems. It contrasts preliminary cost-

(Continued on In Depth/4)

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(Continued from In Depth/3)

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Systematic Design Methods

Because of the many potential advantages, both managers and technicians have begun to apply the DCS concept. Their results have been mixed. Part of their problem is that no widely accepted standard or method of design exists for distributed systems. Today's technology offers such a wide spectrum of design alternatives that it seems almost impossible to properly analyze the trade-offs.

Contributing to the problem are active debates over DCS definitions and over DCS advantages and their counterpart disadvantages. This confusion comes on top of older, still unsolved, costly problems such as software reliability, data security, system maintainability and equipment standards. With so many problems to consider together, designs frequently fail. Even if a system doesn't fail, its designer can't be sure his choice is optimal. What he needs is dependable design methods and guidelines.

Part 4 will present guidelines for DCS design and development methodologies. It will begin with criteria for selecting or assembling a system design methodology, a model list of steps for design at a strategic level and an example of a high-level DCS strategy analysis. Next, it will present two comprehensive, quantitative design methodologies for a DCS. Finally, it will examine the idea that DCS design is best treated as an iterative, experimental process.

Technical Subspecialties

This series discusses distributed computing from general management viewpoints, particularly the viewpoint of a strategic planner. It does not discuss design tactics for the many technical aspects of a DCS. Details of the technology are beyond the scope of this survey. The following guidelines are offered for managers and technicians who wish to read beyond this series.

Distributed computing presents many challenging technical problems, and DCS research is proceeding rapidly in many areas. Publications seem to fall naturally into one of three areas: multiprocessor architecture, data communications and data base management. Software design could become a fourth area, but today it is nearly impossible to pull it away from the other three.

- **Multiprocessor Architecture.** This category, particularly hardware architecture, covers what many people call "distributed processing." It includes hardware capabilities and interconnection strategies, both intra- and interprocessor. It also includes process partitioning for both operating system and application software. Software distribution is developing into two separate new research areas — distributed or network operating systems and program decomposition.
- **Data Communications.** This category covers the exchange of data between processors as opposed to manipulation of the data. The division between data processing and data communications in a distributed system is fuzzy and may not be desirable in the long run. However, today's designers commonly treat communications functions as a subsystem of a DCS.
- **Data Base Distribution.** Distributed data base management may well be the most difficult area of the three. Each separate part of a distributed data base has all the problems of a centralized data base, and these are well known to be many and difficult. When the data base is separated, there are the additional problems of where to store data, how to find data and how to synchronize the parts.

Several tutorials and surveys cover one or more of these three areas. The following are most complete: Apfe78, Bern78, Chan79, Chu79, Hard78, Info76, Info77, Lars79, Lieb77, Mart79, McQu78, Moha78, OnCL76, Roth77 and Thur79.

Origins

This section has explained the need for better understanding between managers and technicians in order to improve the design, development and operation of distributed computing systems. The next section explains the dual, technical and management origins of distributed computing.

"The conclusion drawn here is that

computers possess large economies of scale. This was stated in the late 1940s by Herb Grosch: The ratio of speeds of two computers is proportional to the square of their costs."

— Martin B. Solomon, 1966

"Grosch's Law has been repealed."

— Robert L. Patrick, 1976

There have always been strong reasons to distribute or decentralize computer systems. Until recently, distribution was blocked by the cost advantage of large central hosts and, in some cases, by a lack of technology. Now, the facts of technology and costs have changed. Computer system architecture is being pushed by technology and pulled by user requirements from centralization toward decentralization [Apfe78].

Microelectronics

Many agree that the push behind distributed processing is the revolution in computer prices and performance made possible by microelectronics. Four separate but related effects are involved:

- **Relative Cost.** Decline in processor cost relative to total computer system costs.
- **Absolute Cost.** Decline in absolute cost of processor power.
- **Applicability.** Increase in applicability resulting from physical changes such as size reduction and better reliability.
- **Capability.** Increase in capability because of greater circuit speeds and use of parallelism. The first effect is strong enough by itself to move computer system architecture toward decentralization. The other three effects accelerate the trend.

Prior to 1970, economies of scale in computer hardware usually dominated design decisions. Analysis and empirical studies supported the popular belief that computer power was approximately proportional to the square of computer cost (Grosch's Law) [Calc79, Shrp69, Solo66, Stre74]. So it was economically advantageous to centralize as much computing as possible on a single, large machine.

Today, nothing as simple as Grosch's Law can adequately describe the relationship between the cost and performance of computers. When processor costs decline as a percentage of total system costs, centralization becomes less advantageous. Computers still exhibit some economies of scale, but other effects also strongly influence design decisions. New communications technology and subsequent networking of computers can achieve some of the advantages of centralization without physical consolidation. Examples of such advantages are integration of function and resource sharing.

User Requirements

Even without changes in price-performance ratios, the growth of large central systems would continue forever. All economies of scale eventually reach growth limits. Centralized computer systems are approaching three limits:

- **User Resistance.** Increasing centralization leads to service stagnation because no computer can be all things to all kinds of diverse users. The user loses control of the computing resource and must accept a general class of service rather than service tailored to his specific needs.
- **Complexity.** System complexity has risen faster than our ability to manage it. This has happened despite a large investment in tools and techniques for computer performance analysis.
- **Risk.** The consequences of failure of certain central systems have become unacceptable, but the cost of protecting or backing up the systems is also unacceptable.

User resistance develops whenever a computer facility is shared among dissimilar applications. A shared, centralized facility can penalize its users in four different ways [Stre74]:

- **Decreased Throughput and Response.** A shared system may be too crowded for really big jobs, too slow for some interactive jobs and too insensitive to the needs of low priority jobs.
- **Decreased Reliability.** Streeter believes that unscheduled service interruptions occur more often in shared systems than in dedicated ones.
- **Increased Overhead.** Users must

(Continued on In Depth/6).

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(Continued from In Depth/5)

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- Increased Regimentation. Centralization means standardization or operating procedures and the working environment.

As centralization loses its economic advantage, its disadvantages become more apparent. Increased centralization means applying the computer to more different kinds of work. So the differences between users grow and emphasize the four disadvantages.

Complexity and risk are the prominent limiting factors when a centralized computer facility is dedicated to one application. For example, McNeil discusses the case of the classic on-line system such as airline reservations [McNe79]. Such a system typically has had a single central computer accessed by remote terminals. The central computer performs or assists the functions of data capture, information retrieval, interterminal communications and access to software resources.

As McNeil says, "Many systems in current operation are of this type, not because it offers the best (or even a good) solution but because it was seen as the only feasible approach at the time they were implemented." In the case of airline reservations, apparent centralization of data remains an essential requirement today. In many other cases, centralization of data is unnecessary and causes problems:

- Complex Design. "Complication of the data base as a result of assembling in one place individual sets of data which, by themselves, may not be particularly complex." However, a computer dedicated to one application, such as the airlines case, may be able to use a simplified operating system.
- Concentrated Risk. Failure of the central computer means total system failure. A backup system is expensive.
- Unnecessary Communication. Data is transported to the center, even when it is needed only at the point of capture. Data is transported immediately, even when it is not needed until much later.

This section has described distributed computing's dual origins in microelectronic technical advances and management limits to the growth of centralized systems. From these origins have emerged differing viewpoints on what comprises a distributed system. The next section analyzes these viewpoints in order to establish a common view between managers and technicians as to what distributed computing is.

Definitions

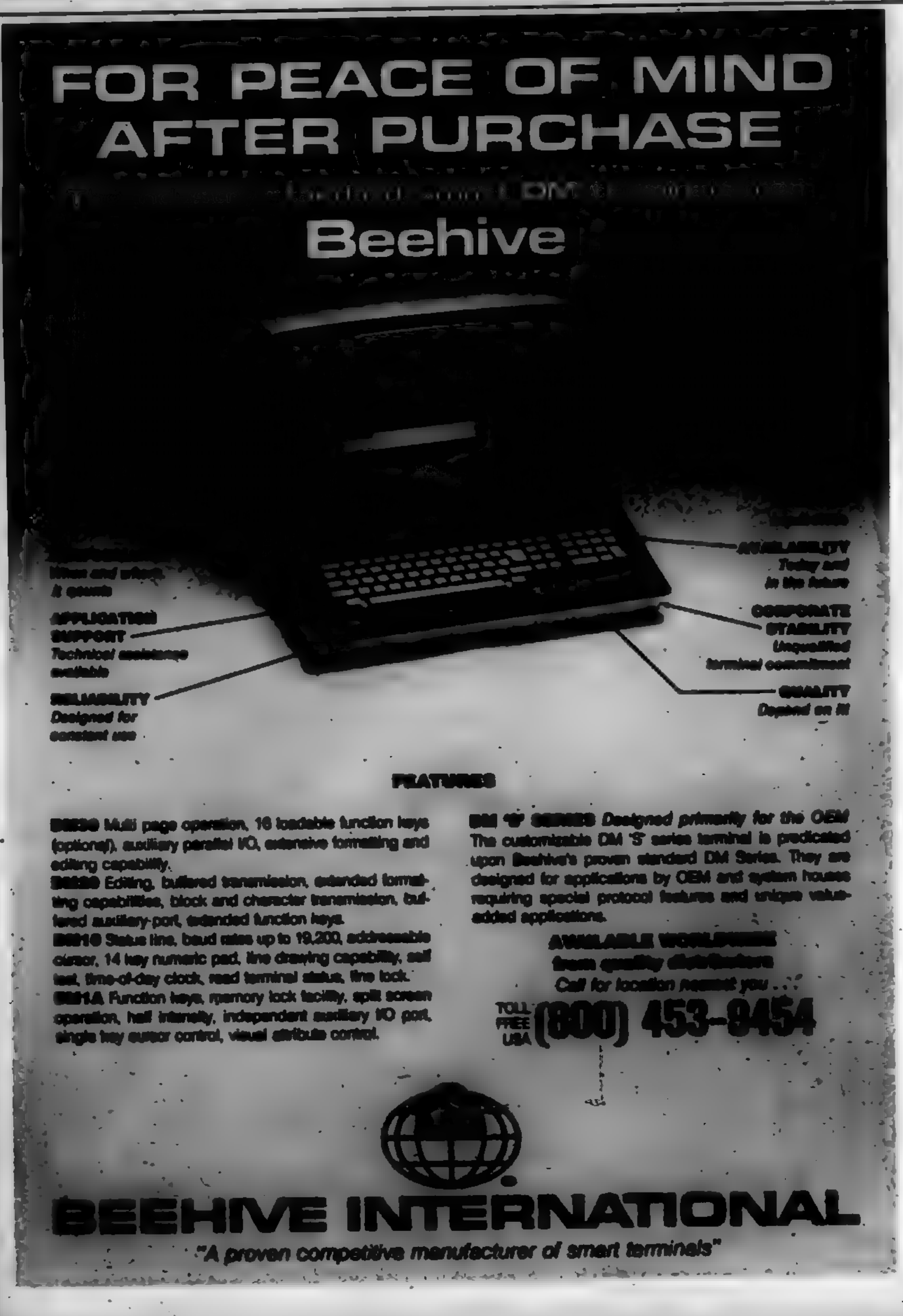
"He admitted there is a lot of confusion as to what distributed processing means, but said that vendors are aware it allows them to sell a lot of components under one umbrella buzzword [Yasa76]."

"How is distributed computing like pornography? We can't define it, but we know it when we see it.[Semm79]!"

There is no universally accepted definition of a DCS. Worse, there isn't even agreement on terminology. For example, as used here, the term distributed computing is fairly new. Instead, most people still say "distributed processing." But that term is too narrow because the processor hardware is only one of the many system design elements that can be distributed. We need a term that can encompass all the distribution possibilities.

Universal adoption of any one definition is unlikely. Distributed computing cuts across so many computer and management sciences that no one definition could serve them all. Many groups, particularly computer vendors, have their own specialized definitions. Still, computer science researchers and others recognize that better DCS definitions are needed to improve communication within the computing community. "A consensus seems to exist that it does not pay to get 'hung up' on definitions. In an academic sense, this is probably true. However, if individuals are going to use terminology like 'distributed systems,' 'distributed computing,' 'distributed processing' and the like, it would do well for those individuals to define what they mean by those terms before using them indiscriminately [Wals78]."

There are some basic ideas about what makes a DCS that seem to be widely accepted, even though people disagree at a more detailed level. So, this section gives two kinds of definitions. First, it gives a general DCS def-



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inition, and then it states several specialized ones. The first definition contains the logical intention, or general concept, of a DCS.

The other definitions extend the general definition into four special interest areas. These four special viewpoints might be described as those of the traditional systems analyst, the general manager or system user, the system technician or computer scientist and the management scientist. These viewpoints, of course, overlap considerably.

Geography and Communication

This section states a basic conceptual definition of a DCS and then discusses some of its implications and corollaries. The definition combines four published ones [Boot76, Lieb77, Ravi76, Sche78]:

- **Distributed Computing System Basic Conceptual Definition.** A system in which a single set of related logical computing tasks (programs, applications) is dispersed across two or more separate but cooperating physical computing devices (processors, computers, agents, nodes).

This definition has two important aspects:

- **Geography.** A distributed system has several physically separate parts that are spread over an area [DEC78].
- **Communication.** The parts are related in that they share or pass data among themselves.

The basic definition also implies that each physical node of the system can store data and execute programs, so it can do some jobs by itself. *That is also the rule for determining what is a node of a DCS as opposed to just a component of a node.*

A DCS can be spread over a large or a small area. At one extreme, there are continental and global systems that support tens or hundreds of nodes. Some examples are the Worldwide Military Command and Control System and the U.S. air traffic control system. At the other extreme, a DCS can fit within a single building or a single room, within a single ship or a single airplane. No doubt there will soon be a DCS contained on a single, miniaturized circuit chip. We will concentrate here on the more prosaic business systems that fall somewhere between the extremes.

The nodes of a distributed system communicate with each other. Also, in many cases they communicate with people and may communicate with other systems. The nodes may communicate over either homogeneous or heterogeneous links that vary in capacity and delay. In some cases, communication may be continuous; in others, it is infrequent [Cham79].

Between Extremes

Some authors characterize a DCS as lying somewhere between the extremes of centralization and decentralization. In fact, the geographic spread of a DCS distinguishes it from centralized systems:

- **Centralized Computer System.** A system that has either a single processor or multiple processors so closely coupled that there is essentially no physical separation between them.

At the other extreme, the communication between nodes of a distributed system distinguishes it from decentralized systems:

- **Decentralized Computer System.** A system with physically separate processors that either do not communicate or communicate trivially.

Communications between DCS nodes requires them to be interconnected. Usually the nodes form a network:

- **Computer Network.** A system in which physically separate processors are connected to each other and their users by data communications channels.

The terms computer network and DCS have similar meanings, but they have a distinct difference in emphasis. The term computer network emphasizes the internodal communication and all but ignores the computing tasks to be done. The term DCS, especially the term distributed processing, reverses that emphasis.

In designing a DCS, it is common practice to think of having two subsystems, one for processing and one for communications. For example, Thurber defines a "computer communications network" as "a collection of host computers (that provide services to either another host or an end user)

(Continued on In Depth/8)

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(Continued from In Depth/7)

and a communications subnetwork that provides communication links between hosts, users or both [Thur79]."

A reason for treating the communications subsystem separately is that it is incidental to the performance of the logical tasks performed by the DCS. Ideally, the communications subsystem should be "transparent" to the users and the application programs. That is, to do their work, they should not have to be knowledgeable about how the communications subnetwork operates.

This two-part functional decomposition — applications processing vs. communications — is an example of a taxonomy, a classification scheme to aid in understanding, analyzing and designing a DCS. Another example comes from Booth. She distinguishes three subsystems: "information processing facilities [central processors and data bases], data communications facilities [concentrators and multiplexers], and endpoint facilities [terminals and local processors]. Together these support the movement of files, programs, data, messages and transactions [Boot 76]."

In summary, this section has defined the distributed computing system concept and discussed some of its simpler implications. However, these simple definitions and classifications are only introductory. They are not adequate for dealing with actual systems. So the following sections present more detailed and specialized ways of describing such systems.

A systems analyst is the closest thing to a neutral party that can be found in the computing community. A systems analyst writes down the functional requirements of a system. That document provides a basis of mutual understanding between system users, designers, developers, vendors and operators. So, for the first of four different detailed DCS taxonomies, this section takes a neutral, functional viewpoint.

Cypser defines two ways to distribute a function across nodes [Cyps78]:

- **Duplicate Function.** Two or more nodes can independently perform the same function.
- **Split Function.** The function is performed piecemeal by separate nodes, but no single node can perform the whole function.

Cypser divides the distributable functions into six sets. Each set is "potentially located within any node" and "potentially related to like functions in other nodes by a set of internode protocols." The six are as follows;

- **Processing Management.** The main operating system controls the execution of applications programs (and other system programs) and their consumption of physical resources.
- **Data Base Management.** An extension of the main operating system controls access to the applications data files and to the hierarchy of devices on which they are stored.
- **Communications Management.** Another operating system extension controls communications between nodes and also between a node's computer and its attached user terminals.
- **Applications Processing.** Applications programs perform the user tasks for which the DCS was designed.
- **Applications Management.** An applications class may be controlled and serviced by an applications subsystem which is functionally an extension of the operating system but runs totally outside it as an applications program.
- **Input/Output Processing.** A node may have attached to it a device that can compute and store data, but is totally dependent on the node, especially for communications between nodes. Such a semi-independent device usually does specialized data entry and retrieval. Examples include intelligent terminals, remote job entry stations and graphics consoles. Booth would classify these as endpoint facilities.

In Cypser's scheme, any node can perform some or all of the six functions. Any function, except perhaps the last one, can be either duplicated, split or both. He visualizes a DCS as an "archipelago of islands of many shapes and sizes."

Classification schemes like Cypser's are needed for stating and analyzing functional requirements when a DCS is being designed. Part 4 will give the details of a functional breakdown proposed by Hal Becker. In contrast to Cypser's horizontal separation of function, Becker's scheme has six vertical levels of function, from the uppermost network level down to the

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component level. Becker also classifies functions by six characteristics: topology, volume, processing, response, availability and security.

Given the functional requirements, the question is how to distribute the functions. Booth and others describe two basic strategies for distributing functions across the nodes of DCS [Boot76]:

- **Vertical Distribution.** The nodes interconnect in a hierarchy where each node is at least partly controlled by a node at a higher level. (Also called *master-slave* distribution.)
- **Horizontal Distribution.** The nodes interconnect to cooperate as equals. (Also called *peer-peer* distribution.)

Research projects using minicomputers, such as the Defense Department's Advanced Research Projects Agency network (Arpanet) [Thur79], tend to be horizontally distributed. Commercial systems using large mainframes and associated native networking software are usually vertically distributed [Berg78]. However, many designs blend these two types. Also, the choice of strategy has usually been dictated by other factors, such as equipment availability and staff experience.

In many cases, a systems analyst's preoccupation with functional islands has left the end user either high and dry or adrift at sea. This can happen when the analyst fails to properly identify the information needs of the user manager, the manager of the business application that the computing system is supposed to support. So the next section lists features that such a manager might expect in a DCS.

Service Distribution

User managers talk about distributing computing services within the organization. Thierauf's textbook teaches the use of distributed computing in business to information specialists, systems analysts and programmers [Thie78]. He says, "Distributed processing can be defined as 'an approach to placing low-cost computing power, starting at the various points of data entry, and linking these points, where deemed necessary, with a centralized computer via a distributed communications network.'" He states seven "essential characteristics" of a DCS:

- **Three Service Levels.** A three-step implementation approach:
  - *First.* Install local, operating-level data entry and inquiry.
  - *Second.* Extend to local transaction processing and report generation.
  - *Third.* Extend to a network where data transmission interconnects local processors and a central, headquarters facility.
- **Two Processing Modes.** A choice of interactive and batch services to meet user needs at each service level.
- **Smart Terminals.** Preprogrammed or programmable input/output terminals to perform local tasks.
- **Timely Reports.** Management information to meet real-time operational requirements.
- **Data Base Distribution.** Files stored as close as possible to where they are used.
- **Ease of Use.** Simplified programming and interfaces to allow operation and maintenance by nontechnical personnel at local service levels.
- **Local Autonomy.** Operational and management independence and flexibility.

Technicians might argue that these seven points are not essential to every DCS, that they are merely features of some such systems. The user managers might reply that any DCS without these features is not worth discussing, that service of this kind is the object of having a DCS, no matter how the system is built physically.

Physical Distribution

Technicians talk about distributing physical components of a computing system. In contrast to Thierauf's seven essentials, Enslow lists five necessary parts of a working research and development definition of distributed computing [Ensl78]:

- **Multiple Resource Components.** Multiple general-purpose, dynamically assignable physical and logical resources.
- **Components Physically Distributed.** Separated physical and logical components that communicate through a network using a two-part cooperative protocol.
- **Integrated System Software.** A high-level operating system that uni-

(Continued on In Depth/10)

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(Continued from In Depth/9)

fies the components.

- **Simple User Interface.** Transparent system organization where users can request services without naming serving components.
- **Cooperative Component Autonomy.** Highly autonomous physical and logical resources that together follow a master plan.

The last two points are similar to Thierauf's last two.

Management scientists talk about information resource management and organizational design. A distributed computing system should be designed to match the organization it supports. Poppel, a management consultant, defines the general DCS design problem as how to place computing resources and management control at selected levels within the organization so as to best match the information flow and reporting requirements [Popp79]. This requires a view from the top of the organization. Someone must check that the design supports the organization's long-term strategy.

The three DCS viewpoints presented above — those of the systems analyst, user manager, technician or computer scientist — are each too limited by themselves to see the entire problem. Systems analysts often fail to understand the business and organizational environment. Users can select a good design for their local environment. But because they lack technical expertise, they often select a design that eventually proves to be incompatible with other systems in the larger organization. Technicians become involved in complex hardware and software selection questions that obscure important human issues.

Management scientists seem to come closest to taking the viewpoint of top management. They tend to agree that a business organization's key resource is information. They try to design systems to improve the content, accuracy, timeliness, accessibility and usability of information. In the context of distributed computing, management scientists focus on how to distribute the data base.

Slonim, Schmidt and Fisher define a taxonomy for data base distribution [Slnm79]. They divide distributed systems into 11 forms. First, there are three basic forms:

- **Centralized.** The organization maintains its entire data base at a single location, a single DCS node.
- **Partitioned.** The organization decentralizes its data base, dividing it among several nodes.
- **Replicated.** The organization duplicates its data base, in total or in part, at some or all of the system nodes.

The centralized form assumes that data base management software and hardware is homogeneous at that node and that data definitions are compatible among applications software. These conditions might or might not also hold in the partitioned and replicated forms. Thus, the authors distinguish four overlapping real-world cases:

- **Heterogeneous Software.** The organization uses a number of different data base management systems (DBMS) involving different data models, data definition languages, data manipulation languages and data formats.
- **Heterogeneous Hardware.** The organization uses different computer architectures at different nodes, and probably different hardware vendors.
- **Homogeneous Software, Heterogeneous Hardware and Data Compatibility.** The organization uses the same DBMS on different computers. But the existence of standard internal representations, such as Ascii and Ebcdic, make code conversion easy.
- **Heterogeneous Software, Heterogeneous Hardware and Data Compatibility.** The organization has a very complex system.

The authors discuss each of these four cases for both the partitioned and replicated forms, giving eight more forms, for a total of 11.

Product Positioning

To position computing products in the marketplace, vendors use loose definitions that blend the management and technical viewpoints. For example, Fusco defined distributed processing as "the ability to perform processing functions at many locations in a variety of ways, ways that are tailored to suit each user's special applications [Fusc78]." To Fusco, "distributed" meant "an intelligent device with com-

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munications linked to a host processor in a network." Of course, it has been suggested that some mainframe manufacturers see a DCS only as a bridge to an even larger centralized site, but that strategy seems very weak today.

The many minicomputer vendors see distributed computing as an alternative to a single centralized computer. They argue that large computers are good for batch work but are inefficient and expensive for interactive and real-time work. They say that small computers do best at time-sharing and transaction-processing activities such as order entry and inquiry handling. To these vendors, distributed computing means minicomputers.

Some take a middle position and define distributed processing as "two or more processors altering or managing data in a cooperative manner [Span78]," where both large and small processors are used. They say that large, centralized, batch systems will continue to dominate, but also that minicomputers are ideal for off-loading selected functions from a central computer and distributing them to work units. This is a likely position for a manufacturer of both large and small computers.

Berglund tried to cut through the confusion that results from different vendors using different labels for the same parts of a distributed system [Berg78]. He compared three network architectures: IBM's Systems Network Architecture (SNA), Univac's Distributed Communication Architecture (DCA) and NCR Corp.'s Distributed Network Architecture (DNA). He was unable to find many equivalents because the vendors' design concepts are different and few labels match. But he found many similarities and provided a good tutorial.

Saxton and Edwards note the tender-trap nature of network architectures. "By providing a uniform and standard structure for all present and future elements of a computer-communications system, network architectures allow users to expand their data processing operations — whether centralized or distributed — in a controlled, evolutionary manner. Since it gives users a reason to stay with one vendor's products systemwide, network architecture is also a useful ploy for mainframers who are increasingly feeling the pressure from independent vendors of intelligent and multi-function terminals . . . In fact, despite the user benefits promised by network architectures, vendors have embraced the concept much more rapidly and completely than users [Saxt78]."

Today, DCS brings to mind computers, computer peripherals and communications networks. But the concept will expand to office equipment for word processing, facsimile transmission, copying, photocomposition and other message handling [Wals78, Yasa75]. These products use the same micrologic technology as computers, but they are not yet fully integrated with computers. Their vendors talk about "office automation" instead of distributed computing. But the convergence of office equipment and computers is inevitable because it enhances the capabilities of both.

We see now why there is no single, simple definition. With only a simple definition, talk about distributed computing can get very confused. The confusion comes from the dimensions or degrees of distribution. A complete DCS definition needs two sets of dimensions, one for managers and one for technicians.

Managerially, the organization that builds and runs a DCS can be either centralized or decentralized. Rockart states three dimensions for organizational design of the information system function [Rock77]:

- **Management.** Strategy, planning, standards and supervision.
- **Development.** Design, implementation and installation.
- **Operation.** Execution, maintenance evaluation and change.

Each dimension has the same range, from total centralization to complete decentralization. Design, implementation and control make up a similar trichotomy. Technically, Enslow distributes a system along three physical dimensions [Ens178]:

- **Hardware.** From a single processor with only single control, logic and memory units to multiple computers with multiple units.
- **Control (the Operating System).** From a single fixed control point to

(Continued on In Depth/14)

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IN DEPTH

(Continued from In Depth/11)

multiple, heterogeneous, migratory control points.

- **Data Base.** From a single centralized file and directory to partitioned file with no central directory.

Enslow rejects some parts of his technical space as not really being distributed computing. However, not everyone is so particular. Some say DCS for nearly any system that is neither completely centralized nor completely decentralized.

The common factor is "the use of multiple cooperating computing elements to perform jobs that were heretofore performed on [single] large [centralized] computers or not at all [Lieb77]." The "key element is . . . the communication that goes on between programs [Sche78]." When the communication level reaches a certain threshold, that makes a DCS.

Next week: Advantages and disadvantages.

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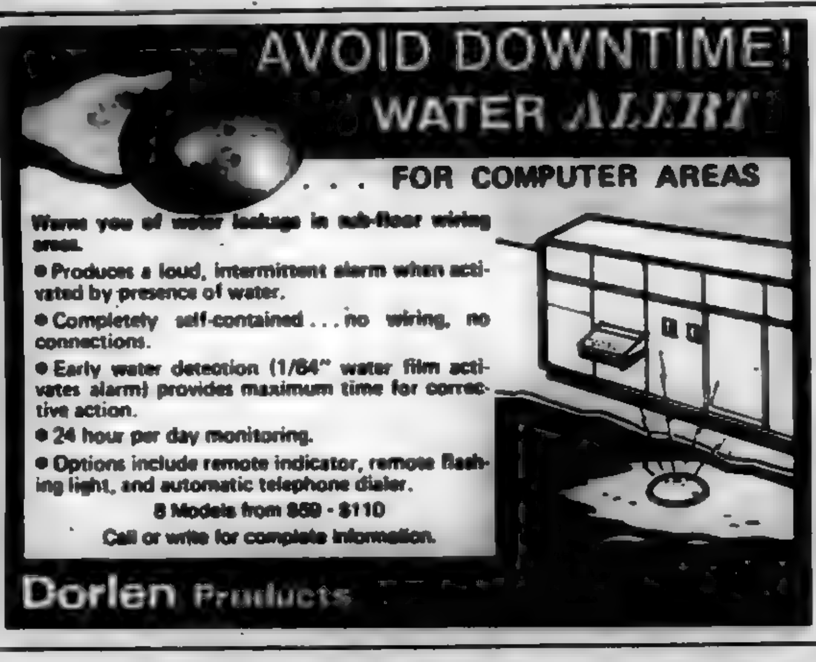
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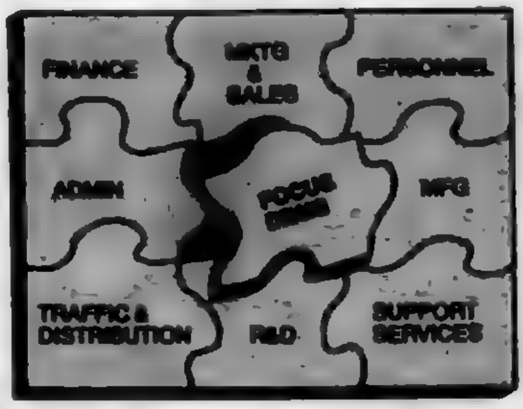

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Management Aspects Of Structured Design

By Meilir Page-Jones

Structured design is a system development technique that has an impact not only on those who use it but also on those who manage it.

However, the topic of management is a monumental one. There are library shelves filled with fat volumes devoted to management problems, such as how to estimate this, coordinate that and determine the critical path of the other. So here I will concentrate on how to manage structured design and, more specifically, how structured design can help with the thankless task of managing a software project.

Structured design makes its first impact on an organization simply by being introduced. It will require everyone to adapt to the structured approach and to abandon long-established habits. This change in design procedure tends to provoke one of three reactions in people:

- Inertia, fear of inadequacy and unthinking rejection of the new ideas (better the devil you know than the devil you don't know).
- Wild and uncritical espousal of the new ideas (better the devil you don't know than the devil you do).
- A circumspect and cautious acceptance of the new ideas.

Interestingly, all three of these reactions can be summarized as, "Well, you know, *I've* been using all these techniques for years; I just didn't have a name for them." This is never completely true and is usually almost totally false.

The third attitude, that of benign skepticism, is the one all people — technical and managerial alike — should adopt. Innovations are not always good; and not all new techniques will be applicable to your shop. A good manager should encourage the third attitude in his technicians and he should offer them the chance to accept or reject structured design for themselves without heavy managerial pressure. People don't like to have anything foisted upon them, so if you provide an opportunity to review new ideas, you will increase the chances that the ideas will be palatable.

There are two further tangible benefits: People learn better voluntarily, and they will probably weed out any truly inapplicable ideas during their review.

A managerial decision that is crucial to the acceptance of structured design is the choice of a good pilot project. Here, first of all, are some guidelines for a good pilot:

- Choose a small, fairly simple project. A good candidate for a pilot project is one that requires four person-years and lasts six months to one year. The project has to be long enough to be respectable, but short enough to provide reasonably early feedback.
- Choose a system that is not critical to the well-being of your organization. A sword of Damocles hanging over the designers' heads is likely to send them scurrying to the safety of their old

(Continued on In Depth/18)

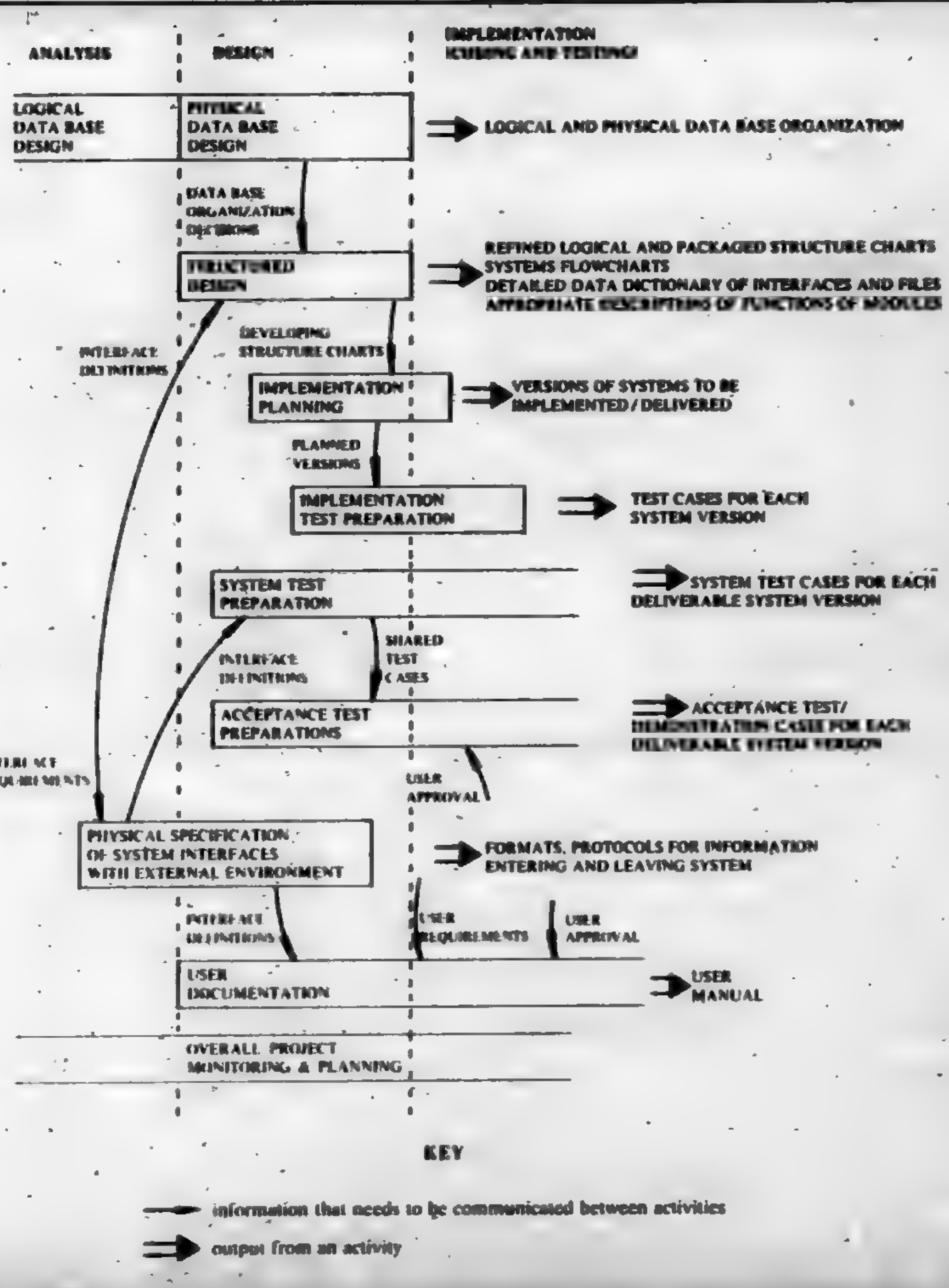
ANALYSIS
DESIGN
IMPLEMENTATION (CODING AND TESTING)
LOGICAL DATA BASE DESIGN
PHYSICAL DATA BASE DESIGN
LOGICAL AND PHYSICAL DATA BASE ORGANIZATION
DATA BASE ORGANIZATION DECISIONS
STRUCTURED DESIGN
REFINED LOGICAL AND PACKAGED STRUCTURE CHARTS
SYSTEMS FLOWCHARTS
DETAILED DATA DICTIONARY OF INTERFACES AND FILES
APPROPRIATE DESCRIPTIONS OF FUNCTIONS OF MODULES
INTERFACE DEFINITIONS
DEVELOPING STRUCTURE CHARTS
IMPLEMENTATION PLANNING
VERSIONS OF SYSTEMS TO BE IMPLEMENTED / DELIVERED
PLANNED VERSIONS
IMPLEMENTATION TEST PREPARATION
TEST CASES FOR EACH SYSTEM VERSION
SYSTEM TEST PREPARATION
SYSTEM TEST CASES FOR EACH DELIVERABLE SYSTEM VERSION
INTERFACE DEFINITIONS
SHARED TEST CASES
ACCEPTANCE TEST PREPARATIONS
ACCEPTANCE TEST/ DEMONSTRATION CASES FOR EACH DELIVERABLE SYSTEM VERSION
INTERFACE REQUIREMENTS
USER APPROVAL
PHYSICAL SPECIFICATION OF SYSTEM INTERFACES WITH EXTERNAL ENVIRONMENT
FORMATS, PROTOCOLS FOR INFORMATION ENTERING AND LEAVING SYSTEM
INTERFACE DEFINITIONS
USER REQUIREMENTS
USER APPROVAL
USER DOCUMENTATION
USER MANUAL
OVERALL PROJECT MONITORING & PLANNING
KEY
information that needs to be communicated between activities
output from an activity

Figure 1

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More Channels

The M80/31 provides a lot more channel capacity: one byte channel and five additional channels—two standard and three optional—that can be configured in any [illegible] block and selector channels. The Group 2 gives y[illegible] channels—all optional.

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High channel speed means high throughput. All those standard M80/31 channels run at 2.5M bytes/second. The best a 4331 Group 2 can do is 1.85M bytes/second, and that's only on an optional block channel. The rest run at half the M80/31's speed.

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DIFFERENCE

IN DEPTH

(Continued from In Depth/15)

habits if things go awry. Using a new technique is nerve-racking enough without the developers' knowing that if their project fails, so will their careers.

- Don't put your people on too many simultaneous learning curves. I remember a project to develop a property and machinery financial accounting system, which was to run on an IBM 370 using CICS, IMS and Cobol. The development techniques were structured analysis, structured design and structured programming.

Not only was there almost no prior experience with using structured anything, but there was very little familiarity with IMS, CICS or on-line systems in general. Many of the Cobol programmers were erstwhile assembler programmers who were hurriedly retrained. In addition, none of the analysts had much knowledge of taxation and depreciation.

You can guess the denouement of that project. However, before it fell over the cliff, a panicked management doubled the development staff by hiring consultants specializing in each of the unfamiliar territories (they even hired a Cobol consultant!). However, adding too many diverse consultants to a project has the same effect as pressing down an automobile gas pedal. Whichever way the project is going, hiring the consultants will make it go faster in the same direction. So the project accelerated over the edge while everyone wondered who should be in the driver's seat.

A debacle is usually followed by a search for a scapegoat, which in this case was the newest technique, with the fewest consultants to defend it: the structured development techniques. The final report — the epitaph — on the project said, "Clearly the structured development methods are inapplicable to our environment . . . We recommend that structured programming henceforth be banned [sic!] from the DP Applications Development Section."

- Choose normal people for the pilot project. If you pick a team comprising all the hottest designers and programmers in your shop, people will think that structured design is only for superstars. Also, when the project is over, structured design will receive little credit for any success.
- Choose committed people who won't throw up their hands at the first obstacle. The people on the team should be prepared to persevere with structured design even though, as is the case with most new techniques, its application might not always go perfectly smoothly.

Duration of Structured Activities

Although it is hard to generalize, these are the proportions of time you can expect each major activity of development to take: structured analysis, 40%; structured design, 25%; with structured programming, implementation and testing filling the remaining 35% of the development time. (These percentages were obtained in studies conducted by two large utility companies and a major insurance company.)

In a very complex project, analysis may take more than 40% in a large but straightforward project, analysis and design together may take only 50% of the total time.

These figures indicate that structured development is a very front-loaded process, since more than half the time allotted to the project may have elapsed before one line of code has emerged. If this worries you, remember what I said in Chapter 12 about implementation: When code is at last written, it should be good, working code.

Activities of Structured Design

Although as a manager you may not be involved in the detailed techniques of structured design, it is important that you have a solid overview of the chief activities of this phase and what deliverables should be produced. The major activity of structured design is the derivation of the structure chart. The designers are unlikely to accept the first structure chart produced.

The normal practice is to sketch out three or four skeleton structure charts for each job step in the system. The designers review them and determine which charts can be most easily refined into a good design and then make some modifications and refinements based on structured design criteria

(Continued on In Depth/20)

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Joseph A. Dee (left) is president and chairman of Brooks Cameras, Inc. in San Francisco. Jim Sweeney is his NCR Account Manager.

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NCR's SWEENEY:
So you went to your own NCR system.

DEE:
Yes, but not directly. First, we selected a competing vendor's newly announced system. But as we started to plan, we began to see problems ahead. No tape drive. Perhaps no COBOL. Perhaps no match-up with our sales terminals. And all we could get from the supplier were vague assurances that the problems would somehow disappear. So we switched to NCR. Very fortunately, as it turned out, because our NCR system is up and running. While the other vendor is still not delivering the other system.

NCR's SWEENEY:
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We had a shirtsleeve session with the NCR software people that was refreshing. They told us exactly where they stood. What we could expect and when. And that's the way it's turning out. They gave us the hard answers.

NCR's SWEENEY:
You liked Migration Path Engineering, too.

DEE:
Our requirements are too unique for us to expect off-the-shelf application software from any supplier. We have every kind of sales transaction. We accept all the regular charge cards as well as our own. We have rentals, repairs and layaways. And our own special promotions. So once we made the investment in our own specialized programs, we wanted to protect it. Even when our growth forces us to move to a larger system. With Migration Path Engineering, NCR can give us that protection.

NCR's SWEENEY:
And finally, you wanted one supplier who would assume responsibility for the entire system from A to Z — including the terminals.

DEE:
You're absolutely right, Jim.

In the NCR office nearest you, there is an account manager like Jim Sweeney who knows both NCR systems and your industry. To learn more about what an NCR system can do for you, phone him at your local office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

NCR
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(Continued from In Depth/10)

such as coupling and cohesion.

If classical analysis rather than structured analysis has preceded structured design, then the designers will probably want to draw some fairly high-level DFDs before they approach development of the structured chart. First, it will give them a better grip on the problem. Second, it may bring to light errors, holes or inconsistencies in the functional specification. Third, it will ease the technical transition from analysis to design.

By the end of design, the function of each module in the structure chart must be described. For a simple module, this description may be in the form of a specification of its inputs and outputs, with a brief statement of what it does to its inputs to obtain its outputs. If structured analysis has been performed, the mini-specifications of the DFD bubbles in most cases will be enough to tell the programmers what the modules do. Where that isn't so, the designers will have to provide further descriptions, probably in pseudocode.

The data dictionary developed during analysis must also be kept up to date with any new data introduced at design time.

An activity of all phases of a structured project that is crucial to the success of the project is the walk-through, which is a review by a small group of people of a product presented by its author(s). The product in a design walk-through, in most cases, would be part of a structure chart. To the project technicians, the purpose of a design walk-through is to anticipate as many problems in the design as possible while they are still only paper tigers. A problem discovered during design can be as much as 10 to 100 times cheaper to correct than the same design problem discovered during production. A walk-through can be thought of as the practical implementation of "a stitch in time saves nine."

To the manager, the purpose of a walk-through is to assess the project based on the reports generated. In the past, a manager has had to determine the progress of a project by measuring the quantity of documents produced. However, as I pointed out in Chapter 2, measurement of quantity is futile if quality is not ensured. The walk-through is not only a tool to improve system quality, but also to communicate the current quality of every part of the system under development.

Parallel Activities

A good manager, like a good cook, has to successfully coordinate many simultaneous activities. In this section, I will briefly describe the major development activities that go on at the same time as structured design and illustrate how the activities relate to one another. The activities are: data-base design, implementation planning, implementation test preparation, system test preparation, acceptance test preparation, physical system interface specification, user documentation and overall project planning. They are shown in Figure 1. (Activities that end before design or begin after design are not shown; neither are hardware activities.)

Physical data-base design. Physical data-base design is the determination of how the required access paths through data are to be implemented. For example, an access path may be implemented by chains, pointers, physical adjacency, or another mechanism. The physical paths are derived from the logical paths, which are discovered during analysis, and from physical constraints, such as volume, response time and security, which are known by the end of analysis.

The data-base designers cannot serve the interests of any one application, however. Their job is to satisfy the data-base needs of all applications in the organization. Therefore, the people designing an application will have to take advice from the data-base overlords on how best to access the data they want. Since data-base design for an application may go on in parallel with the structured design of an application, it is crucial that both sets of designers converse regularly about the area in which they meet — the interface to the data base.

Implementation planning. You can often glean some tentative ideas about how many and which versions of the systems should be implemented at the end of analysis. However, you will have to wait until at least the top levels

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of the structure chart emerge before you can confirm these notions. Then implementation planning has to proceed apace, because the plans and test cases for implementation will be required surprisingly soon after programming begins.

Implementation test preparation. For each version of the system that you implement, you should include specific tests for each function that version carries out. If possible, you should partition the package of test cases by function to give yourself flexibility in the order in which you implement and integrate modules.

System test preparation. There is a system test for each version of the system to be delivered. System testing is different from implementation testing in that you must do it *after* all the programming and implementation testing for the system version is completed. The test cases must cover every facet of a system in production: operations, user interface, internal functions and so on. You can compose a test case as soon as the aspect of the system being exercised by that test case is known in sufficient detail. You don't have to wait until just before system testing to create all the test cases.

Acceptance test preparation. There is an acceptance test for each version of the system to be delivered. Acceptance testing involves putting the system through its paces so that the user can see that he has not been sold a shambling old nag when he paid for a sprightly young filly.

Acceptance testing is technically similar to system testing. Politically, however, it's very different. System testing allows you to excise bugs in the system discreetly while no one is watching. But acceptance testing is carried out under a spotlight in the presence of the user, his audit representatives — wearing black suits, white ties, Fedoras and shades — and possibly even his carnivorous contract lawyer. At acceptance time there is only one thought in your mind: "I wish I'd done more and better system testing!"

Acceptance test preparation may be completely in the user's hands. But more often the preparation is shared between the analyst and the user. The criteria for acceptance should be included in the structured specification before it is signed. If they are not, you should include a definite plan for agreeing on the criteria in the specification.

In that case, you can do acceptance test preparation completely in parallel with system test preparation. Since you can probably share test cases between acceptance testing and system testing, you can make your system test a dress rehearsal for the acceptance test. The more problems you uncover during the dress rehearsal, the more likely it is that everything will go right on opening night.

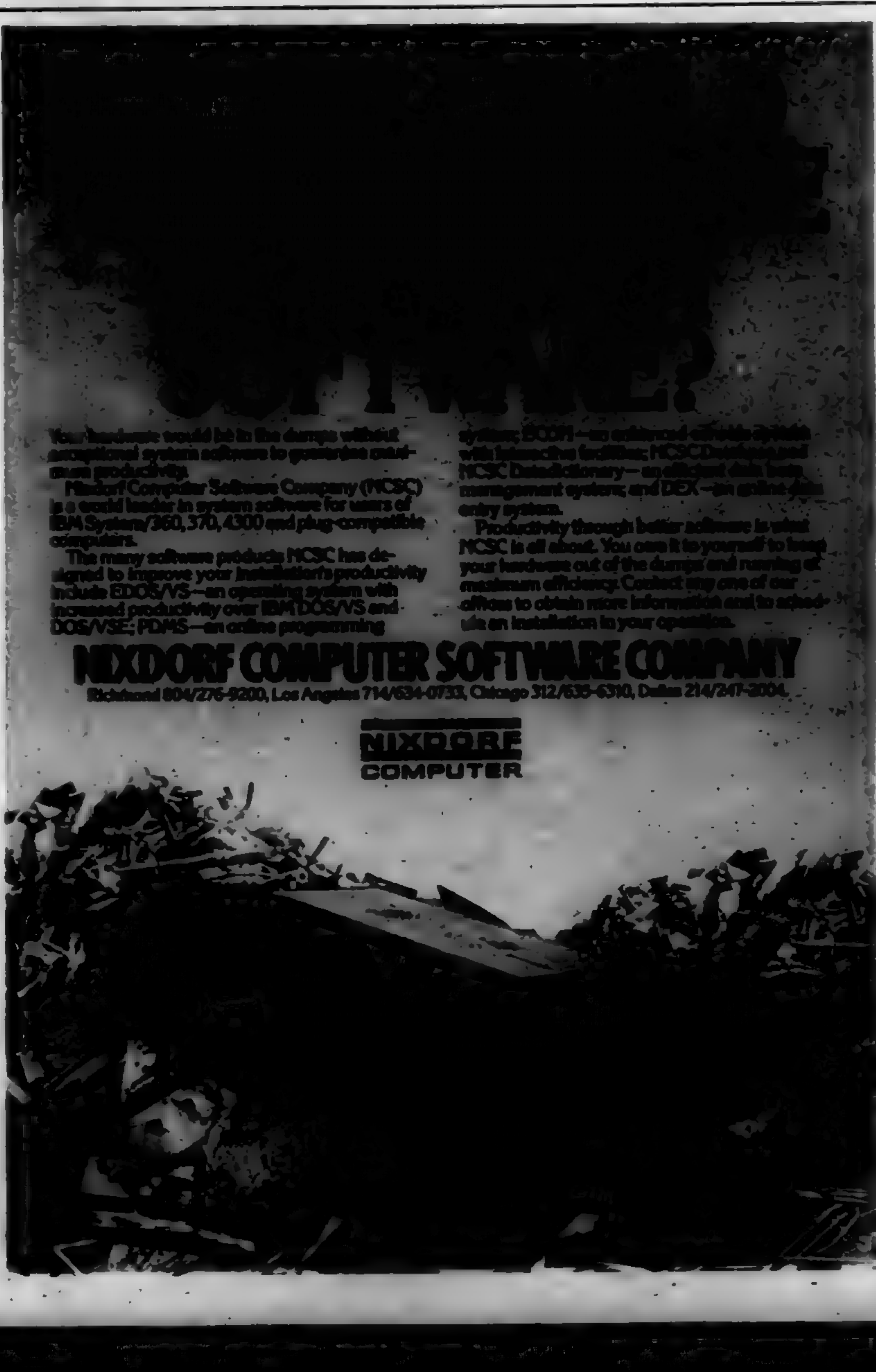
Physical system interface specification. At the end of analysis, during the new physical stage, the analysts and the designers discuss with the user how information should enter and leave the system. The analysts offer the user a range of options: For $1.98, he can have the toggle-switch and magnetic-wire data-entry system, whose output will appear as a hexadecimal core dump; for $12 million, he can have the distributed multitypeface optical-character-recognition direct-data-capture system, whose output will be delivered in spoken English (with a Finnish translation simultaneously relayed by satellite to the Helsinki branch office).

Thenceforth (not necessarily by the end of analysis but well before the end of design), physical decisions have to be made about the system's interfaces. Once the user has chosen his system, formats have to be agreed on, machine-machine protocol has to be defined, human-machine conversational protocol has to be worked out . . . and so on. These physical details will affect the bottom-most levels of the structure chart.

User documentation. At the end of analysis, you can begin to write a brief description of the internal functions of the system. However, much more important to the user is the external view of the system, for he sees the system only through its interfaces.

The documentation given to a user when he buys a system is similar to the operator's manual you'd give him if he bought a car. For a computer system, the documentation should provide instruction on how to install the system,

(Continued on In Depth/24)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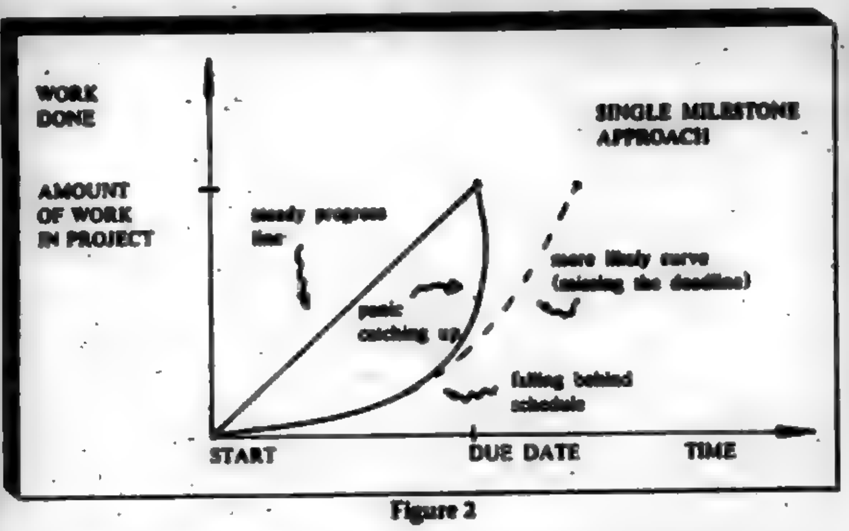

Figure 2

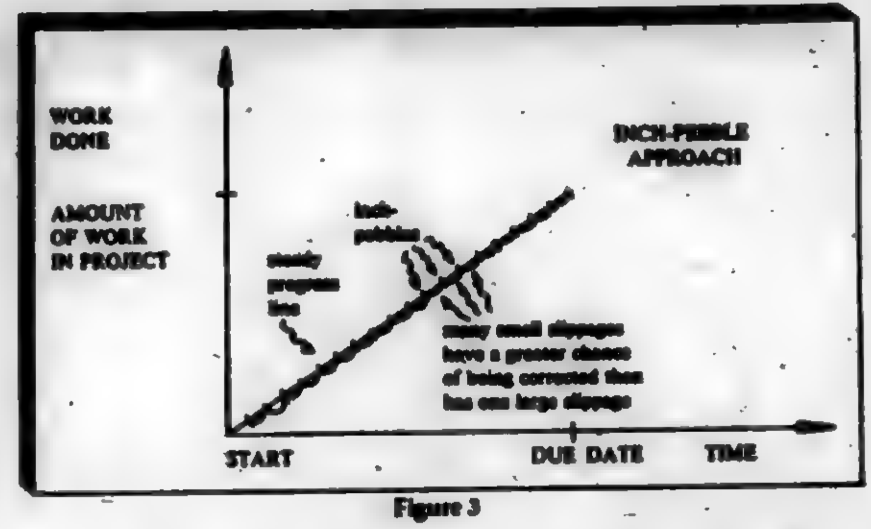

Figure 3

(Continued from In Depth/21)

how to operate it (start it, close it down, keep it running, check it periodically), how to prepare its input, how to use its output and how to care for it generally. However, much of this documentation cannot be produced until the operations documentation is written, a task that follows design.

Overall project planning. It is a poor general who goes into battle without a plan. It is a worse general who won't change his battle in the light of events. I never fail to derive cheap amusement from the offices of some managers, where beautifully typeset, chronologically scaled Pert charts look down from the walls in mocking obsolescence at their conscientious young authors. Had Robert Burns been alive today, he would perhaps have said: "The most neatly drawn Pert charts of rodents and people frequently depart from their initial layouts."

Managers and their planning tools should be flexible. During design, some parts of the structure chart are developed more quickly than expected — and other parts more slowly. User changes will arise and possibly will require a whole new subsystem to be added. One should be able to adapt one's plan to new goals, new estimates, new schedules and new budgets.

Estimating

Project estimating has two parts: the first is estimating the work to be done (*requirements estimating*). The second is estimating the resources available (*constraints estimating*).

A simple example of a requirements estimate is, "From the project survey, I estimate that the development of the system will require 16±3 person-years with a minimum elapsed time of 20 months." A simple example of constraints estimating is, "We have up to 12 people of suitable skills available for this project. We have 30 months to get the system up; after that, the vendor of our current Lemming system will withdraw its support."

Never allow the estimate of a constraint to influence the estimate of a requirement. In the small examples above, all is well: The requirements fit within the constraints. But what if you had only five people available for the project? Then clearly you couldn't implement the system, for there would have been only 12 1/2 person-years (five people for 30 months) available for this 16 person-year project.

It is very tempting to say, "Well, Joe said that it might be possible in 13 person-years. That's pretty close to 12 1/2 person-years, so I guess we're OK." And I guess they are not OK! Never alter an estimate to make it fit another estimate.

If the requirements for a project don't fit within its constraints, you have four options: Increase the available resources; decrease the amount of work to be done; do both of the above; or do neither and give up the whole idea.

Constraints are usually easier to estimate than are requirements. Why? First, they can be — and should be — estimated after requirements, so all that is needed is a lower bound on each constraint to see whether each requirement can be fulfilled. Second, constraints are usually more tangible than requirements. They are defined in terms of the number of programmers in your shop, the amount of money the user is willing to spend and so on.

Estimating requirements is difficult because it means finding out *before* the work has been done how much work will be done, how long it will take, how many people it will need and how much it will cost. As a species, we are blessed with 20-20 hindsight, but we are not so fortunate with regard to foresight.

Concrete Basis

Although you can never know precisely how much programming and integration effort will be required until it is actually completed, the structure chart provides a concrete basis for an estimate. It is a complete charter of everything to be implemented, conveniently split into small units that have minimal interactions with one another. Large problems are difficult to estimate because of their mind-boggling complexities. The structure chart presents a means of estimating the whole as the sum of its parts. It will never be exactly correct, but it will come tolerably close for a set of modules that are loosely coupled.

There are few factors more likely to make reality depart from an estimate than parts of a system obstinately refusing to work until the twentieth iteration of testing and debugging. Small, loosely coupled, well-walked-through modules are less likely to suffer from this complaint than are large, tightly coupled modules. Therefore, a system developed using structured design will be rather more likely to bear out that vision of Utopia that somehow always afflicts an estimator just before he makes his estimate.

Incremental top-down implementation enables management to spot slippages in a schedule earlier than if you had to wait for a momentous milestone to pass by before you can tell that anything is amiss. This inch-pebble approach not only helps you to make an estimate, but also allows you to revise an estimate early. (The inch-pebble concept is set forth in E. Yourdon and L. Constantine, *Structured Design: Fundamentals of a Discipline of Computer Program and Systems Design*, New York: Yourdon Press, 1978, p. 367.)

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That information is necessary to the manager for monitoring and planning the project, and it is also valuable for keeping faith with the user. If you can see that you're going to slip the deadline, it's only fair to give the user as much advance notice as you can. He won't thank you for the warning, but you'll be less likely to wind up in the ocean wearing cement shoes than if the user himself discovers the slippage at the 11th hour.

At this point, you might complain that the end of the design phase is a little late to be making and revising estimates. I quite agree. Structured design helps most with estimating the requirements for the activities following design. However, the DFD of structured analysis is a partitioning tool that will help in the estimation of design requirements. In fact, many shops use high-level DFDs in the project's survey to rough-estimate the work that the whole project will entail.

An inch-pebble approach is also likely to facilitate smoother progress. For instance, imagine that we have a project with only one checkpoint — the final deadline. It is likely that we can slip a long way behind schedule before we notice that anything is wrong, because the deadline is distant. Figure 2 illustrates the point.

Inch-pebble monitoring is likely to allow steady progress. Slippages can be corrected more easily without undue panic (see Figure 3).

It is a very good idea to keep a comprehensive log of every project that you manage. The log should record at least who did what, and for how long, and how that tallied with your estimates for that task. The log won't help you tremendously on the project being logged, but it will be a great source of estimating wisdom for your next project.

Personnel Allocation

In the past, there has been a notorious tendency on the part of management to let loose a horde of programmers on every medium-to-large-size project. Presumably, this was in the hope that, with more brute force than finesse, the masses would sweep all before them.

Unfortunately, the system that such a mob produces is usually a piece of encapsulated chaos that bears little relationship to the problem to be solved. This phenomenon has been immortalized as the Thousand Programmer Law, which I have rephrased as follows: If you assign 1,000 programmers to a system without a prior design, they will produce at least 1,000 modules — even if it is only a 100-module system!

With the completed structure chart available before programming begins, you have a realistic outline of the programming work to be done. Programmers can be assigned to fit the work load, rather than the other way around.

But *how* do you assign people to program from parts of a structure chart? The criteria for packaging a system for people are very similar to those for packaging a system for the machine. Give each team of programmers a subsystem that is strongly cohesive and loosely coupled to other subsystems. Minimal interfaces between subsystems will ensure minimal interfaces between teams.

Given that each team will be responsible for a subsystem, how should you allocate roles within a team? Many organizations find the most successful way is to give the original designers the job of coding the topmost modules in the subsystem, assigning more junior programmers to code the lower modules. The designers, of course, oversee the work of these extra programmers.

Schematically, then, Figure 4 shows

(Continued on In Depth/26)

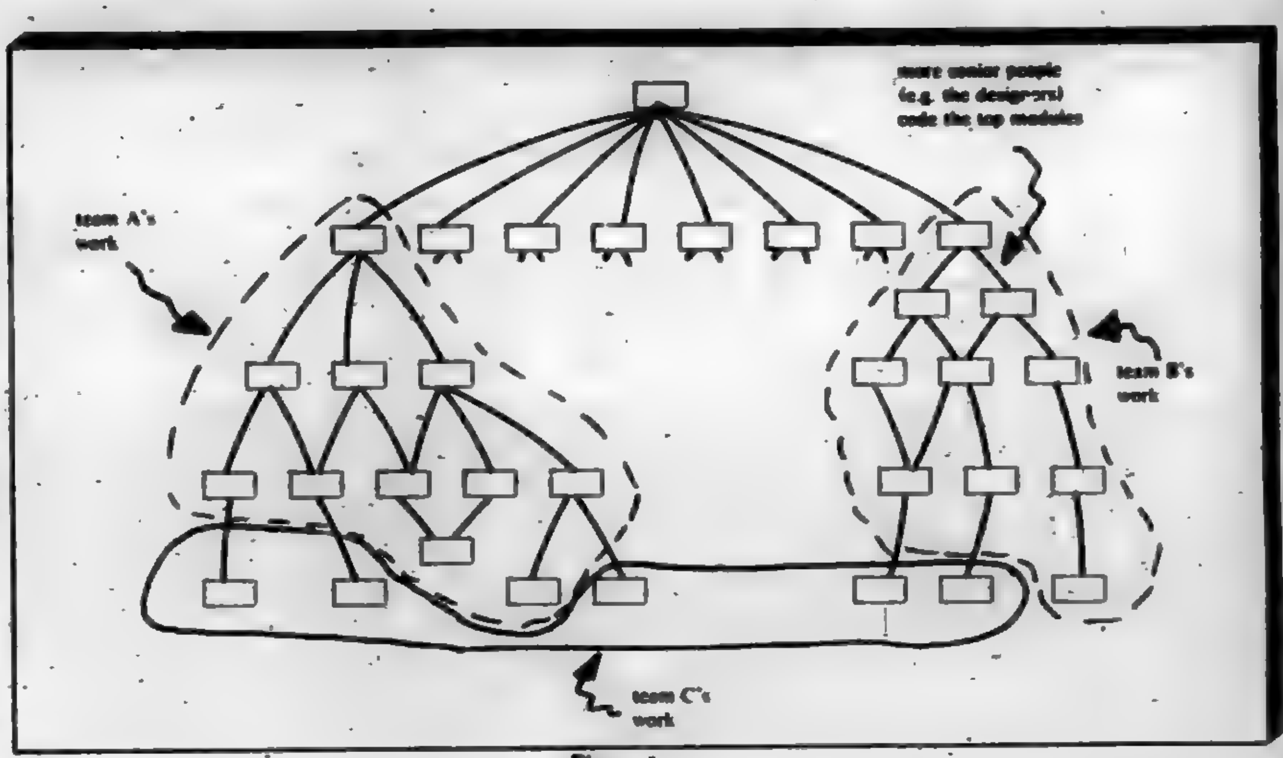
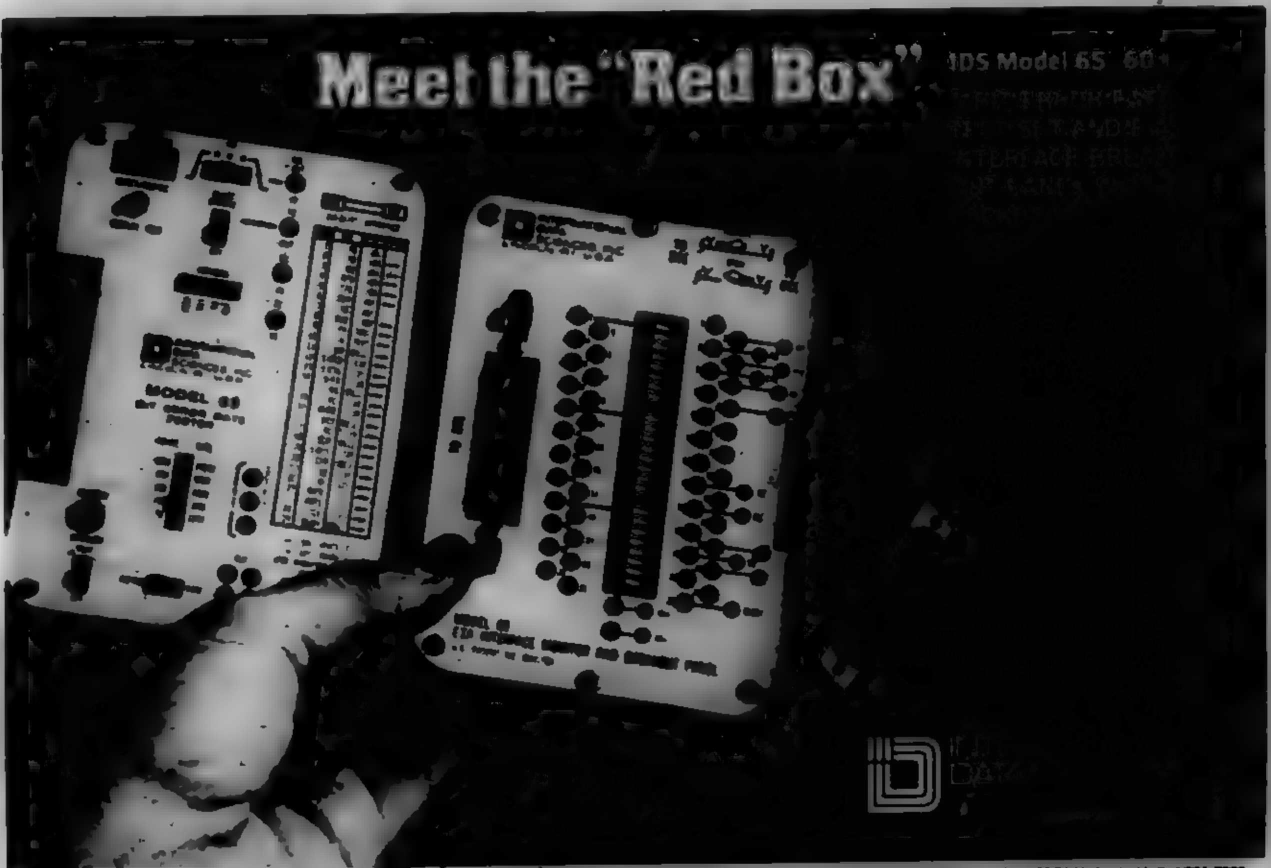


Figure 4



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IN DEPTH

(Continued from In Depth/25)

how a structure chart might be assigned.

Notice that I have departed from vertical slices in one place: I have made a horizontal cut across the bottom and assigned most of the lowest modules to one team (team C). What's so special about the lowest modules? Typically, modules at the bottom will be utility modules and data-base accessing modules. It is often a good idea to allocate them to a team with special skills. But there's a more important reason: The modules at the bottom also represent the whole user interface. If too many people work on the user interface, fearsome inconsistencies might be introduced.

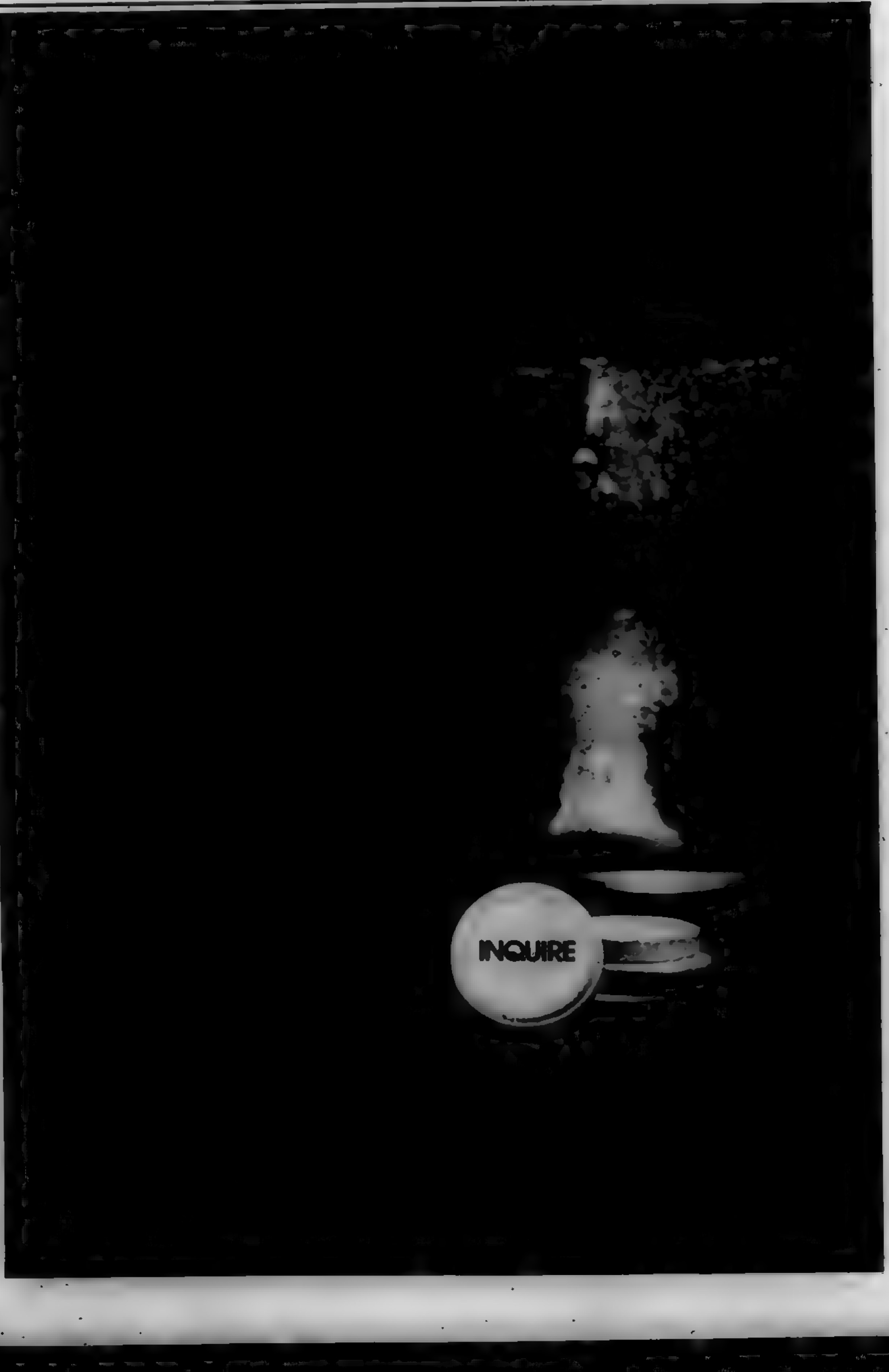
I remember fighting with an operating system that had obviously been developed partly in Bhutan and partly in Bulgaria. For some job-control commands, the system parameters had to be entered in one order; whereas for other commands, they were required in a different order, probably because the two teams that developed the system had not talked to each other. For some commands, spaces were significant; for others, only commas were recognized. That system was an example of Conway's Law (M.E. Conway, "How Do Committees Invent?" *Datamation*, April 1968 pp. 28-31): The structure of a system reflects the structure of the organization that built it.

Allowing the user to perceive a homogenous system is also an example of what Brooks calls *conceptual integrity* (F.P. Brooks, *Mythical Man-Month*, Reading, Mass.: Addison-Wesley, 1975, Page 42) and what the Germans splendidly term "benutzefreundlichkeit," which translates as "user-friendliness." Thus, the sensible assignment of people to the development of a system will benefit not only management and technicians but also, very often, the user.

A manager owes it to his subordinates to provide them with the most modern and most apt tools for their job. If he doesn't provide such tools, then he should not be surprised if his people become unhappy or tend to move on to other positions. However, a DP manager in a large metropolitan bank pointed out to me the opposite side of this argument: "How do you keep 'em down on the farm once they've learned S.D.?" The answer to this question is that not only must a manager make good tools available, he must also make the *opportunities* to use the tools available to his staff.

Philip Metzger (P.W. Metzger, *Managing a Programming Project*, Englewood Cliffs, N.J.: Prentice-Hall, 1973, pp. 103-144.) says that a good manager "carries the water" to his subordinates: Whatever the product you are building, it's your people who put it together. Your job is to provide them with the environment and the tools they need to perform . . . All a business is is its people. Take care of them.

Structured design will never replace good old hard work, either for managers or for technicians. However, it should ensure that every effort that is expended contributes to the final success of the project rather than being wasted through lack of overall direction.



Page-Jones is a New York-based senior-systems consultant for the Boston firm of Softech, Inc.

Born in Wales, he began his computing career in 1973 as a programmer/-physicist at Cern, Geneva, Switzerland, before returning to Britain to work at an engineering and commercial software house and later at the University of London as a lecturer.

Page-Jones came to the U.S. in 1977 and served for three years as a staff consultant for Yourdon, Inc.

Page-Jones holds a B.A. degree in mathematical physics from Essex University, England, and an M.S. degree in computer science from London University, England.

THE SOFTWARE PACKAGE GENERATION

The generalized software package has enabled computers to become cost-effective for the companies that use them. Without packages, computers might have wreaked havoc on users.

By Martin A. Goetz

Many analogies in history can be used to discuss the effects of technology on human behavior, on workers, on employers, on businesses and on governments. Certainly, the discovery of electricity, the telephone, the steam engine, the automobile, the airplane, radio/TV and the general-purpose computer have each significantly changed the world.

Many of these monumental events, however, were not heralded as earth shaking. It is only in retrospect that we can comprehend what these technologies have accomplished over the years and can analyze what actually contributed to their success.

General-purpose computers are different from the other technological developments. I believe that, by themselves, they would *not* be viewed as a major technological advance. After all, computer hardware is essentially an incomplete hunk of metal which requires a computer program to drive it. And the *custom* program is not the ingredient which makes computers a cost-effective and practical commercial business tool.

Rather, it is the *generalized* software package that has enabled computers to become cost-effective for the masses of corporations, companies and governments that are using them. In fact, without software packages, computers might have wreaked havoc on the typical business user. Let me explain the basis for this somewhat radical viewpoint.

Computers as we know them today were developed during the mid to late 1940s and were first used commercially during the early 1950s. Now, in 1980, we have 30 years of computer experience behind us. What have we learned and observed? As a viewer of the scene since 1954, this is what I believe has happened to the industry and the computer user.

Early Computers

In the 1950s and early 1960s, the use of computers emulated the punch card applications. Most applications were restricted to the limitations of the first- and second-generation computers, which were batch processing and sequential processing machines.

Software packages were limited to those provided "free" by manufacturers: such as assemblers, basic utility programs, I/O subroutines, sort programs and report program generators. In addition to the manufacturers' packages, there were user-donated program libraries, but they were largely ineffective.

Only a few thousand companies used computers during this period, and their applications were relatively simple. Both programming cost and program reliability were concerns for these companies, but were not considered major problems. While computer usage was still not cost-effective, users believed it was just around the corner.

Third-Generation CPUs

Computers in the 1960s became more complex and faster. With increased internal and I/O capacities, more than one job was processed at a time. Operating systems became an essential requirement.

The sophisticated programming applications for third-generation computers were more than most companies could cope with. Thus, while computers were getting faster and cheaper, the programming problem was growing out of control. It became apparent for the first time that the critical element in the use of computer hardware was the programming. Ironically, this critical function was usually performed by users with only six weeks or less of formal training! Computer science college graduates were few and far between.

During the 1960s, a few more software packages were provided by hardware manufacturers and some independent software companies. For the most part, however, there still was little use of software packages. Those that were available were given away free in a noncompetitive environment.

Most companies in the 1960s considered computers more of a curse than a blessing: complexity, cost and reliability became overwhelming problems. A majority of studies in the 60s showed that computers were not cost-effective and were contributing to a great deal of customer dissatisfaction and even loss of company profits.

The 1970s saw third-generation computers evolving and becoming less expensive. However, with the advent of unbundling in 1970, more than 2,000 software products quickly appeared on the market, and most users began to *purchase* their basic as well as optional software products. It was also during the 1970s that computers became cost-effective for many companies.

More than 1,000 software packages are being offered today by computer manufacturers and more than 2,000 packages are being marketed by independent software product companies. If we look at the origin of the instructions executed in a computer, we would probably see 50% to 75% of CPU cycles spent executing instructions from standard software products. This is significant because it means software products are an integral and essential part of most users' operations.

Let's look at today's typical medium to large-scale computer user. He is dependent on the operating system and its many components; on a large number of programming tools; on teleprocessing monitors, data base systems and sorts; on application packages; and on his own custom programs which operate independently in the computer or along with software packages. Anyone scrutinizing his computer operation will see the heavy dependence today on software packages.

The moral of the story is that, without software packages, today's user might still be floundering like he was in the 1960s. And while today's typical DP user still has a multitude of problems, the problems would be significantly greater without software packages.

Competitive Environment

The software products business — which includes independent software companies, hardware manufacturers and industrial organizations (such as banks and insurance companies) — is today approaching $2 billion in annual revenues. Software product growth is estimated to be 27% per year for the next five years.

Users can choose from a wide variety of competitive software packages. The Datamation/Datapro Research Corp. survey reflects a sampling of user rat-

(Continued on In Depth/30)

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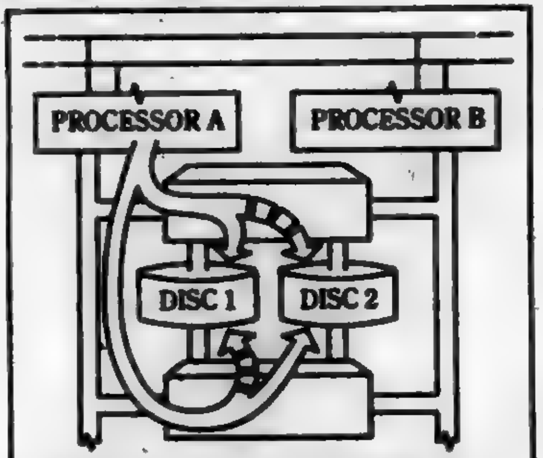

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IN DEPTH

(Continued from In Depth/27)

ings of many software packages. By and large, the survey shows overall satisfaction with the rated packages.

There is no substitute for a competitive environment. As in any business, the customer is king: He must be satisfied or he will go elsewhere. Competition has served to improve the quality of software products, the features of the products and the price.

Software packages today provide the best return on a dollar-per-dollar investment. With the cost of custom programming increasing dramatically and with the shortage of qualified programmers, the software package is an unbelievable bargain. Not only can a user buy a package that has been fully tested and is operational in hundreds of sites, but he can also receive full maintenance against errors.

Additionally, the user receives improvements over the years and can begin using the package in a matter of days. In general, users do not have the expertise to even build such packages, let alone afford the enormous expense.

More important, however, a package takes years to build, great expense to debug and document and even more time and money to maintain.

Another important consideration is human engineering. This intangible element is critical to effective user interaction with a program and ultimately reflects the ease of use and features of a package. It is extremely difficult for the large majority of users to develop a custom program which adequately fulfills important human engineering needs.

Additional Benefits

Packages have also brought many psychological as well as productivity benefits to the typical software product user. Studies have shown that programmers are more productive and morale is higher when state-of-the-art packages are introduced into a company.

Finally, many software products increase the effective throughput of the computer and increase the reliability of operational user programs.

Software product companies have provided other, less obvious benefits to the user as well. For example, today's packages have undergone testing for years and the code, although perhaps not bug-free, represents the most stable type of software available.

Additionally, since packages are built in a competitive environment, they tend to be more efficient than custom programs. They also reflect a great deal of actual experience by the time they are installed by the average user.

All in all, there really is no substitute for a software package if it meets the needs of a user.

Caveat Emptor

Craftsmanship, workmanship, quality, service, efficiency, reputation, guarantees and warranties are all areas explored in choosing and evaluating products — both in and out of the computer field. A prudent buyer, however, is a cautious buyer.

There have been many articles on how to evaluate software products. Such articles should be read carefully, for products vary considerably in capability, price and usability. The key is to compare.

Buyers who don't compare are doing their company a disservice. In today's competitive environment, buyers who "sole-source" the purchase of software or simply buy from their hardware manufacturers without looking at alternate sources will, in the long run, *not* benefit from the competitive nature of today's software products industry.

Ingredients for Success

At last count, software packages numbered in the thousands. There is no doubt that the catalyst for this rapid growth was the unbundling of software back in 1970. Prior to that time, there was only a very small handful of successful software products; today there are hundreds.

While unbundling did increase the opportunity for software product success, there are still literally thousands of unsuccessful — or marginally profitable — software packages which have been built by both hardware manufacturers and independent software suppliers. On the average, the actual chance for success is only about one in 10.

Because of this, questions continue to linger in many people's minds: What

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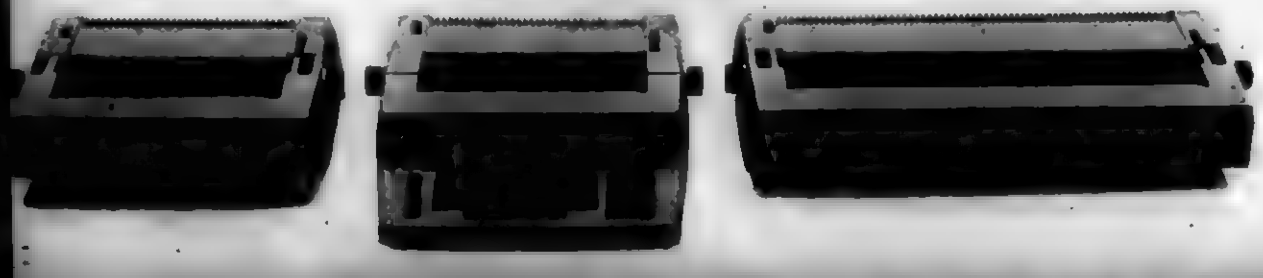

makes a successful software product? How do you go about selecting the right type of product to build? Which will be successes and which will be losers? Which will have long lives? Which will quickly become obsolete?

Then: How do you go about developing and marketing a software product? To what degree does luck play a part in a product's initial success? And how can you ensure its continued success in the future?

The answers depend on the size of the software company, its history, its user base and its key management people. In addition, the decision on which new product(s) to develop could vary from a systematic marketing survey by an outside group or organization to a "gut instinct" by the software entrepreneur. In most cases, the decision is made somewhere between the two extremes.

Regardless of the type of package, however, many of the following ingredients are definitely necessary to produce a successful product:

Technical Factors. There are six important technical factors that are the key to success:

(1) Advanced Technology. Build that better mousetrap. Today's users are knowledgeable enough to objectively compare competitive products. Currently, successful products are usually the most technically advanced. The day of buying "pig-in-a-poke" software is gone forever.

(2) Ongoing Enhancement Program. Both users' requirements and operating environments are forever changing in today's rapidly evolving technology. Products that are continuously enhanced not only provide a viable product to the user for many years, but also help the software products company stay ahead of its competition.

(3) Expertise. Most successful software products have been built by companies with key personnel who have strong and concentrated experience in the specific areas addressed by each product. Acquiring a company with a proven product, user base and experienced personnel can provide the needed expertise. But hiring personnel with the expertise usually won't work by itself.

(4) Engineering Disciplines. Most products are targeted for long lives and must be continually enhanced to remain competitive and viable. A soundly designed and constructed product will go a long way toward ensuring success. Build your product to last, to be continuously modified and to be systematically tested in a variety of environments.

(5) Programmer Dedication. Very profitable products usually owe their success to a programming team that did more than simply implement the specifications. More often than not, there was a team effort reflecting total involvement with the product and resulting in continued product concern on a permanent and personal basis.

(6) Ease of Use. Programming management places much emphasis on a product's ease of use because of training problems, personnel shortages and inexperienced users. Thus, ease of use should be one of the primary technical goals for any product.

Marketing Factors. There are seven marketing factors that contribute to a successful product:

(1) Marketing Power. A strong, seasoned sales force is a must in today's selling environment. Without it, even the most promising product is almost doomed to failure. Of course, some products lend themselves to direct mail advertising, but this is the exception rather than the rule.

(2) Service. The really successful products have a history of being well-supported after they are sold. Users want and expect good service — and they are prepared to pay for it.

(3) Popular Pricing. A formula for determining an optimum price to maximize profits is difficult to find. In general, the most successful products are priced less than $50,000 and generally between $5,000 and $30,000. Most successful products have a cost savings ratio of at least 50 to 1 between building and buying.

(4) Meeting the Need. There are many basic problems that software products can solve. The more obvious the need, the better the chance for success. Today's successful products all meet very basic needs.

(5) Know your Competition. There is no doubt that your competitors are closely tracking you — but are you tracking them? You will not only be more successful if you know your competition, but they will stimulate and provide ideas for your enhancement program. One-upmanship is both legal and healthy, for the end result benefits both the user and the software company.

(6) Highly Demonstrable Benefits. If you can easily demonstrate the benefits of a product's use, this will contribute significantly to its positive reception. If you can't, you might consider developing a procedure for stimulating the product's practical applications. Nothing can be more effective than a live and concrete demonstration.

(7) Documentation. The successful product usually rates very highly relative to the quantity and quality of its supporting documentation. Documentation spans the spectrum from marketing literature to detailed user and installation/operation manuals.

Other Important Factors. The list of important factors for success can be never-ending, but there are five I believe are especially important to success:

(1) Resources. A good deal of money, personnel and computer power is always needed. Most products will require several years before becoming profitable (usually a two or three year wait from the start of development).

(Continued on In Depth/32)

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DATA SYSTEMS FOR INDUSTRY

IN DEPTH

(Continued from In Depth/31)

Be prepared for cold winters — it's a cold world out there. Between the powerful hardware manufacturers and the hungry software company, you will probably face lots of competition.

If you start out on a shoestring, you may end up with little else.

(2) Management Conviction. Intuitive insight and complete commitment on the part of management are usually necessary to direct the overall development and marketing of the product. This backing will provide the vital support needed to survive those inevitable rough periods. If you don't have your management fully behind you, your chances for success will be nil.

(3) User Participation. Most successful programs cannot be built in a vacuum. Using selected users as a sounding board for new developments will help ensure the continued success of any product. User groups can also provide valuable input. In addition, feedback from salespeople based on their experience can be of great assistance in the enhancement of packages.

(4) Competition. Provided that you have a good product developed from a sound concept, always encourage and enjoy any competition which may develop. Rather than resenting or resisting this competitive environment, remember that it stimulates the market and makes users receptive to buying. Most of today's successful products are actively competing with either unbundled or bundled software.

(5) Luck. Finally, the successful software product always acknowledges luck as a factor in its success. For the most part, however, dedication, patience and foresight make a greater contribution than luck.

While the factors associated with the success of a software product may appear somewhat axiomatic, never underestimate the effort needed to assure this success. Combining and balancing the various ingredients discussed above is no simple job. In many respects, these ingredients are part of a chain — and even the smallest weak link can make the difference between success and failure.

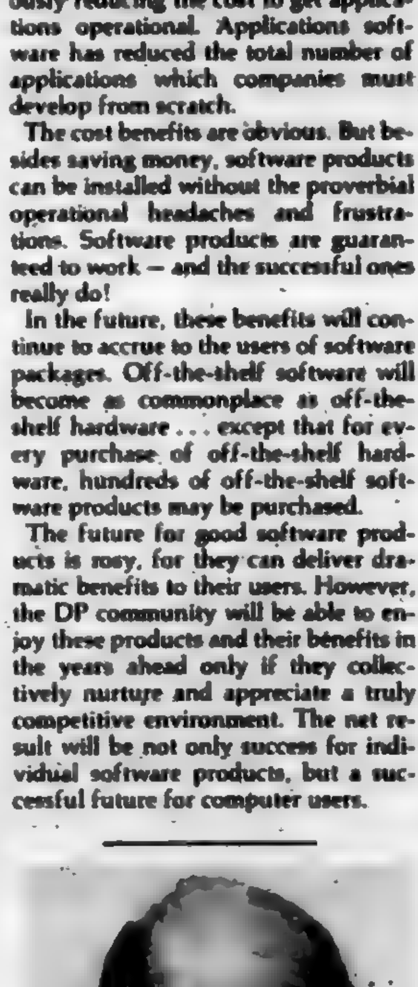
The Future

As stated earlier, the last several years have dramatically demonstrated the benefits of successful software products — in both the systems and applications areas. Successful system software has significantly improved the productivity and disciplines of program development, while simultaneously reducing the cost to get applications operational. Applications software has reduced the total number of applications which companies must develop from scratch.

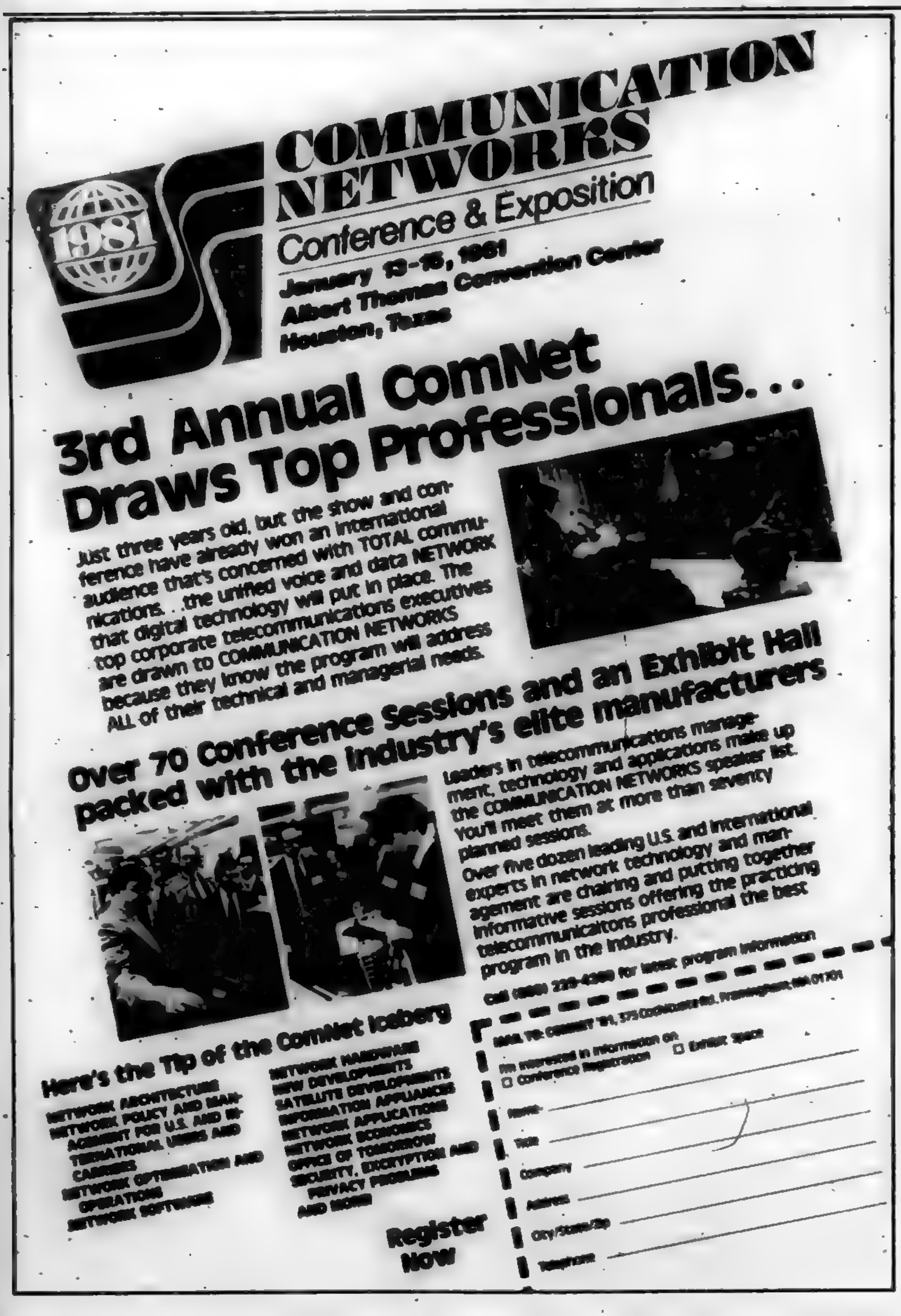
The cost benefits are obvious. But besides saving money, software products can be installed without the proverbial operational headaches and frustrations. Software products are guaranteed to work — and the successful ones really do!

In the future, these benefits will continue to accrue to the users of software packages. Off-the-shelf software will become as commonplace as off-the-shelf hardware . . . except that for every purchase of off-the-shelf hardware, hundreds of off-the-shelf software products may be purchased.

The future for good software products is rosy, for they can deliver dramatic benefits to their users. However, the DP community will be able to enjoy these products and their benefits in the years ahead only if they collectively nurture and appreciate a truly competitive environment. The net result will be not only success for individual software products, but a successful future for computer users.



Martin A. Goetz is senior vice-president of Applied Data Research, Inc., Princeton, N.J.



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Datalyzer System Measurement

Net Management System Among Paradyne Offerings

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Six additional hardware and software offerings — including four modems, a network management system and an optional planning program — have joined the data communications side of Paradyne Corp's product line.

The offerings, all of which were introduced at the 18th annual Telecommunications Association Conference here recently, included:

- Datalyzer, an optional network management aid that allows system managers at a central site to monitor data traffic and evaluate communications performance as though they were users in a remote location.
- The Microprocessor 14400 modem, which operates at 14,400 bit/sec over standard phone lines.
- The Microprocessor 9600 rapid-poll modem, which both sends and receives at 9,600

(Continued on Page 70)

Xerox Printer/Copier For Ethernet Users Has Link to IBM Gear

By Connie Winkler
CW Staff

NEW YORK — The Xerox Corp. 5700, an electronic printer/copier that can be used as a remote computer printer to communicate with IBM systems, was recently announced here. The electronic printing system offers an electronic mail and typesetting alternative and will also compete with facsimile products, according to Robert V. Adams, president of Xerox Printing Systems Division.

The 5700 is the second product to be announced by Xerox for use with the Ethernet local data communications network. The first is the Xerox 860 information processing system announced last December.

The 5700 system features a touch-control screen that sits atop the microprocessor-based controller. The display screen shows sets of labeled boxes that the operator touches to direct the machine through preprogrammed procedures.

The 5700 has an RS-232C interface that allows it to communicate with another 5700 or with an IBM 2770 communications controller for remote printing, job entry and word processing. The 2770 allows communication with IBM 360 and 370 mainframes.

The Xerox 5700 can also communicate with the IBM 6670, a similar communicating laser printer/copier announced by IBM last year.

As Word Processor

For word processing applications, the 5700 accepts either tape cassettes from the Xerox 800 electronic typing system or magnetic cards from the Xerox 800, IBM magnetic card typewriter or IBM Office System/6. It also takes floppy disks from the Xerox 850 display typing system, Xerox 860 information processing system or the IBM OS/6.

The 5700 is basically a Xerox 3600 copier in which the line lens has been modified with a laser. The laser writes on the printing drum so that within one square inch there are 90,000 controlled dots, Adams said. A Xerox-developed 16-bit microprocessor controls the laser.

Xerox has 200 font choices for the 5700, but only 16 can run on one 5700; only four fonts can be on one page. The controller allows numerous options for how the page will be printed, including type or artwork, type size, margins and single- or double-sided printing.

The 5700 produces 43 page/min, approximately 2,800 line/min. (Xerox's giant 9700 computer printer produces about 18,000 line/min.) Xerox will also digitize company logos for use on the 5700.

Electronic Mail Use

For electronic mail applications, a network of 5700s can be set up and programmed to send documents automatically to locations selected by the operator.

Using 9,600 bit/sec communications facilities, a page can be sent in about three seconds with actual dialing and transmission handled automatically. At the receiving end, no operator is needed and about 1,000 pages can be stored in the system for later retrieval.

As a regular copier, the 5700 has a recirculating document

(Continued on Page 73)

Monitoring, Restoral Features

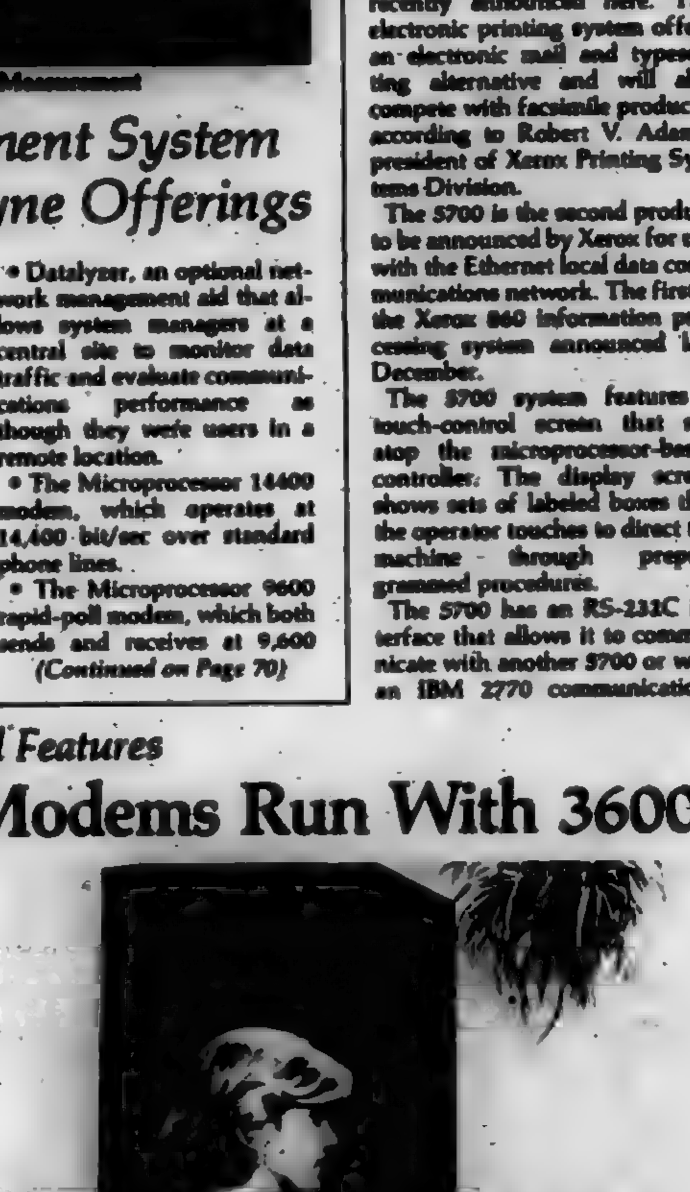
Diagnostic Modems Run With 3600

ANDOVER, Mass. — Two diagnostic loop modems operable in IBM's 3600 Finance Communications System have been announced by Intertel, Inc.

The DLM1200 and DLM2400 modems are said to address critical downtime problems by offering network monitoring and restoral features.

The modems work in conjunction with Intertel's EMS-One Network Control System and provide the link between IBM 3600 controllers and "any number of" remote terminal loops, according to the firm.

Operating at data transmission rates of 1,200- and 2,400 bit/sec, the DLM modems are said to provide "full-range network control" from a single central site without interruption to customer service at main banking offices, branch offices, drive-ins, walk-ups and automated teller machines.



Intertel's DLM1200 and DLM2400 run in conjunction with the EMS-One.

Automatic Monitoring

During on-line hours, each DLM in the loop is said to continuously monitor up to 13 critical network parameters. A change in status of any of these parameters causes an alarm to be generated on the central site EMS-One console.

In addition to automatic monitoring, EMS-One's Automatic Preventive Maintenance routinely runs DLM and line tests during off hours. These tests reportedly can often identify network problems before they affect data flow.

A third EMS-One feature, manual mode, allows manual

(Continued on Page 73)

Teletype 43 Fits Multipoint Systems

SKOKIE, Ill. — Teletype Corp. has unveiled a Model 43 teleprinter for multipoint private-line systems.

The microprocessor-driven terminal is compatible with a variety of Ansi 3.28 protocols and features flexible station arrangements for varying traffic and printing requirements and error controls.

The product also includes 16K-byte buffer for editing, sending and receiving; independent local and line operation; priority storage capability; full formatting controls; and convenient remote options load routine to simplify and speed station programming, the vendor claimed.

Other features include:

- Eighty keyboard selectable options for tailoring the terminal to the customer's system.
- Auxiliary port to accommodate an optional Teletype character or line printer.
- Longitudinal redundancy error checking.

The price of the printer is $2,662, the vendor said from 5555 Touhy Ave., Skokie, Ill. 60077.

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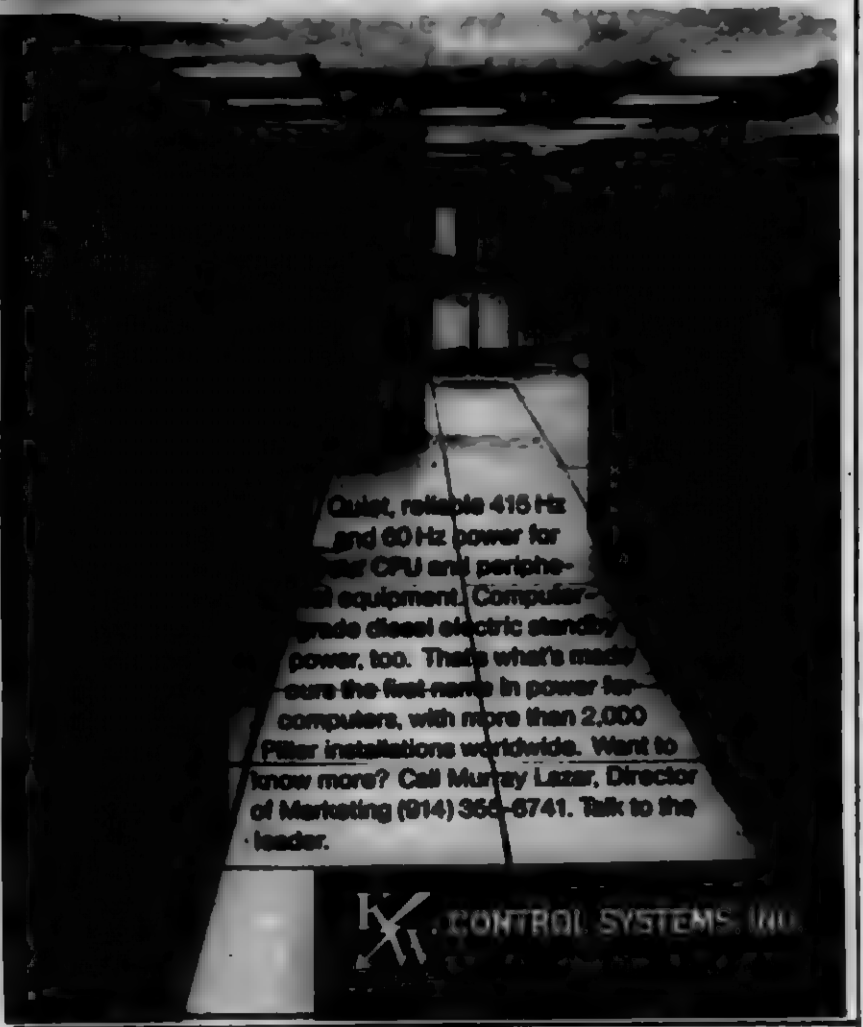

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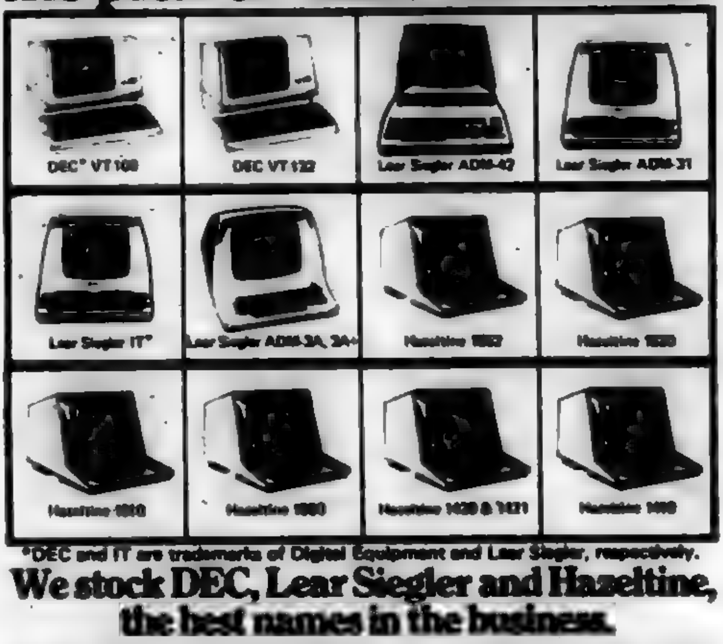

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Multiplexer for HP 1000s Takes up to Eight Terminals

PALO ALTO, Calif. — A microprocessor-controlled eight-channel asynchronous multiplexer subsystem has been introduced by Hewlett-Packard Co. for its HP 1000 series minicomputer.

The 12792A multiplexer subsystem handles as many as eight terminal or electrically compatible microprocessor-based devices. An optional multiplexer panel can be located up to 300 ft away from the host computer breaking the typical 50-ft barrier for standard RS-232C specifications, a spokesman said.

The multiplexer subsystem operates in the HP 1000 M-Series, E-Series and F-Series processors. Program development and program execution are supported on the RTE-IVB operating system. Application program execution is supported on the RTE-MIII memory-based operating system.

Each of the unit's eight full-duplex channels are separately buffered and all communications from the interace memory to the host computer backplane are under direct memory access control, the spokesman noted.

The subsystem costs $2,000 including software. The multiplexer panel is priced at $600.

HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Paradyne Adds Six Products

(Continued from Page 69)

bit/sec.

- An optional vertical and horizontal coordinates software package that automatically computes the least cost configuration for each of a network's multipoint communications lines.
- The LSI-2400LP, a 2,400 bit/sec modem that enables personnel at a central site to isolate and correct bugs anywhere in an IBM 3600 financial control loop network without requiring help from remote terminal operators.
- The Microprocessor 208B modem, a Bell 208B-compatible product that operates at 4,800 bit/sec in two-wire switched telephone networks.

Except for the 208B-compatible modem, all the products announced at the conference operate with Paradyne's Analysis 4420 network management system, a company spokesman said.

Datalyzer Option

Among the most important of Paradyne's six latest offerings is the Datalyzer option, which performs monitoring, diagnostic and test functions not previously supported by the Analysis 4420 system, Datalizer permits host mainframes to monitor terminal response times, CPU wait times, address failures, error rates and transaction/hour.

The option then automatically flashes an alarm message if any of the observed data-traffic variables exceed preset, user-defined limits, the spokesman said. Like the Analysis 4420 system, Datalyzer displays multiple alarm conditions simultaneously.

Combined with the performance measurement functions already offered by Analysis, Datalyzer's monitoring features reportedly allow operators at a central computing site to pinpoint system faults.

Datalyzer consists basically of a minicomputer, 10M-byte disk unit and CRT terminal.

MP-14400 Modem

Another product that ranks high in importance among Paradyne's six latest offerings is the Microprocessor (MP)-14400 modem, which its manufacturer described as the only commercial modem able to operate at 14,000 bit/sec over standard phone lines. Competing products can operate no faster than 9,600 bit/sec over the same kind of lines, the spokesman said.

One advantage of the Paradyne unit's 50% boost in throughput is said to be decreased communications costs. In the past, users needing to exceed the 9,600 bit/sec performance ceiling were forced to lease multiple transmission lines and use multiple pairs of modems.

Now, because of the Microprocessor 14400's increase operating speed, users can replace those multiple-line and multiple-pair configurations with a single line connected to just one pair of modems. The resulting reduction in communications links means that a single-line transcontinental network equipped with 14,400 bit/sec modems costs 35% less than its dual-line counterpart operating at 4,800- or 9,600 bit/sec and 76% less than a six-line configuration operating at 2,400 bit/-sec, the source said.

MP-9600RP Modem

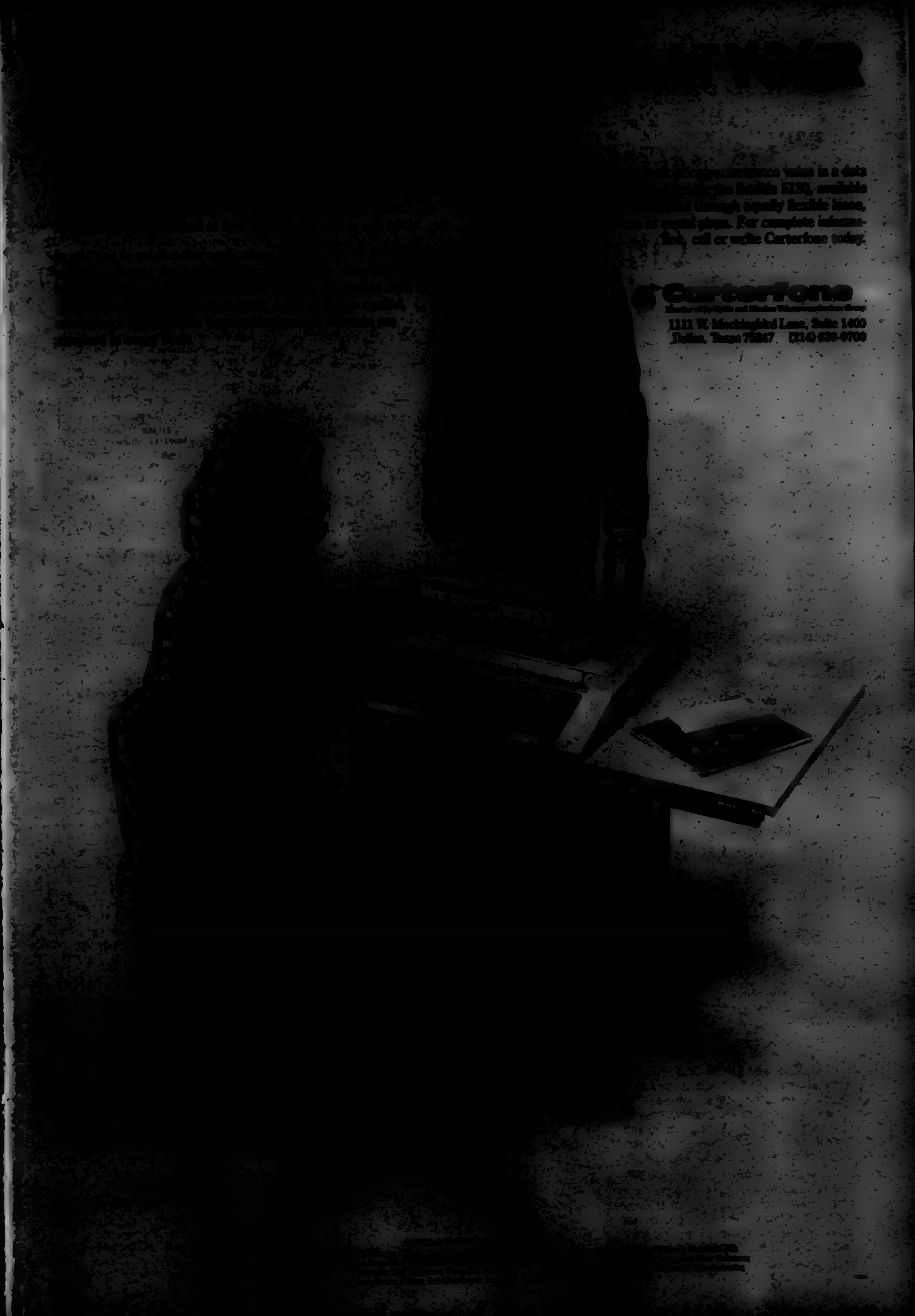
The MP-9600RP modem, meanwhile, reportedly holds the distinction of being the only product of its sort to operate at 9,600 bit/sec both forward and backward. Other modems, by contrast, typically transmit at 9,600 bit/sec, but receive at significantly slower speeds, usually 4,800 bit/sec.

The combination of 9,600 bit/sec symmetrical operation and a 20-msec train speed enables the MP-9600RP to resist significant degradation in terminal response times even during peak periods of multipoint network activity, the spokesman explained.

Elsewhere in its product announcement, Paradyne credited the vertical and horizontal coordinates program with lowering the monthly cost of using multipoint networks. The option achieves this end by automatically finding all possible communications paths between two specified points, calculating the leased-line tariff for each path, comparing the resulting figures and indicating the least cost route.

For a 32-line conformation, Datalyzer costs $110,000 compared to $14,400 for the MP-14400, 6,800 for the MP-9600 RP, $2,500 for the vertical and horizontal coordinates software package, $1,400 for the 2,400 bit/sec modem and $3,400 for the MP-4800/208B Bell-compatible modem.

Shipments of all six products take 90 days, except for the 14,400 bit/sec modem, which won't become available until the second quarter of next year. Paradyne can be reached at 8550 Ulmerton Road, Largo, Fla. 33541.



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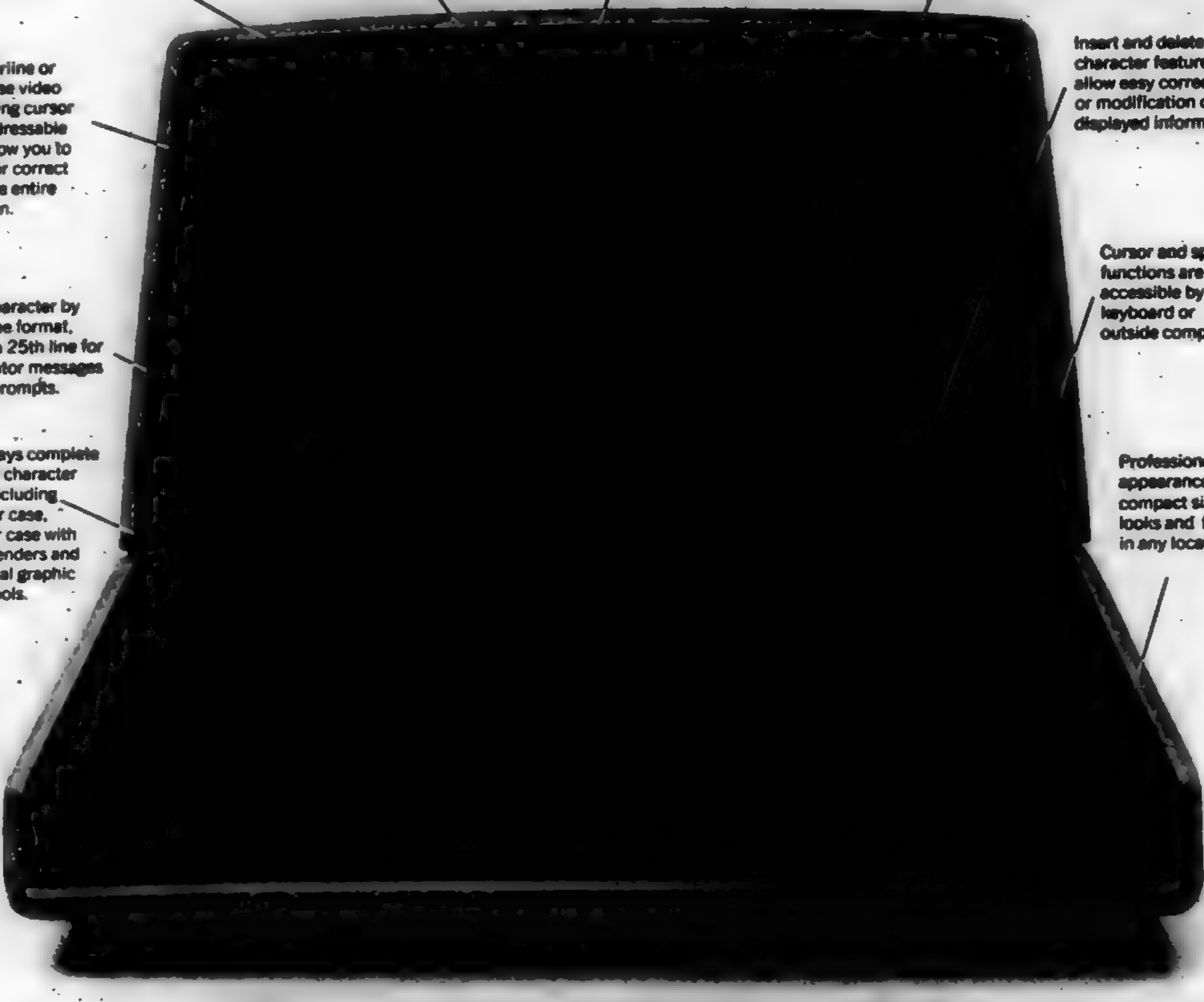

Reverse video by character can be used to emphasize words, lines, phrases or paragraphs.

High Resolution CRT reduces eye strain and operator fatigue.

Z80 Microprocessor-control brings easy editing, cursor flexibility and reverse video highlighting to your on-line system.

Professional touch keyboard follows standard typewriter layout with 72 keys, including 12 special function keys, (8 user programmable) plus 12 key numeric pad.

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80 character by 24 line format, plus a 25th line for operator messages and prompts.

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For under $1000,* the Zenith Z19 smart terminal is a very smart buy. It can be utilized with almost all commonly available computer systems and provides the most advantageous features for data entry, editing, inquiry, and transaction processing—wherever you need a top-of-the-line, general-purpose terminal.

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Network Processor Offers Host Selection Feature

NORCROSS, Ga. — A communications network processor that is said to feature host selection and port contention has been developed by Digital Communications Associates, Inc. (DCA).

The System 335 Master Network Processor reportedly can be used in three applications: point-to-point statistical multiplexing, multipoint multiplexing and full-function, multinode data communications.

The host selection feature allows terminal users who have asynchronous terminals to access their choice of any host computer in the network.

Port contention allows terminal users to contend for host ports on a first-come first-served basis, reportedly reducing the need for expensive host port connections for each terminal.

Base price for the processor is $10,000, with delivery in 45 to 60 days from DCA at 135 Technology Park/-Atlanta, Norcross, Ga. 30092.

Probe to Sponsor Office Seminar

NEW YORK — Probe Research, Inc. is sponsoring a two-day seminar here Nov. 18-19 on "The New Office Communications Capabilities."

Subjects to be covered include "Advanced PBX Features," "Linking and Integrating Terminals" and "Voice Message Systems."

The seminar will cost $595 per attendee. More information is available from Rita Tannenbaum at Probe Research, Inc., P.O. Box 251, Millburn, N.J. 07041.

IBM 3600s Get Loop Modems

(Continued from Page 69)

network testing from the central site, where any of eight tests can be initiated to isolate and test a particular data channel or DLM in the loop.

Two major options are said to provide maximum network uptime. The first option, an automatic, downline-loaded dial restoral option, allows the central site operator to initiate a two- or four-wire dial backup operation from the central site.

The second option, the Internal Spare Modem, allows the user to install a second modem card in the basic package, according to the vendor. Then if the primary modem should fail, the central site operator can remotely switch over to the spare modem.

DLM Series modems are available on a purchase or lease basis. The DLM1200 is priced at $1,990 or $48/mo on a three-year lease, and the DLM2400 costs $2,465 or $63/mo. Prices include the diagnostic module.

Intertel is located at Six Shattuck Road, Andover, Mass. 01810.

Ethernet Users Get Xerox 5700

(Continued from Page 69)

handler that flips the originals for the operator and also has a collator and an automatic stapler. Copies from originals (such as artwork) can be mixed with text from word processors, although not on the same page, a spokesman explained.

The first 5700 deliveries will begin in December in Los Angeles.

Exact system price depends on the features chosen. A typical system, including two magnetic media stations, communications, copying facilities, forms compiler and automatic stapler, has a purchase price of $91,050 and a lease price of $2,040 monthly on a one-year lease. The lowest cost system is $66,300, or $1,400 a month.

GTE Telenet POS Terminal Gives Credit Authorization

VIENNA, Va. — A point-of-sale (POS) credit authorization terminal for organizations with credit card and check guarantee services needs will be available from GTE Telenet Communications Corp. in spring.

Micro-Fone has been selected by Visa for participation in a nationwide pilot project to evaluate a low-cost, dial-up terminal network for authorizing card transactions. Visa hopes the system can help reduce fraud, eliminate paper-based bulletins and expedite the merchant authorization process.

The microprocessor-based device combines a telephone hand set, magnetic card reader and Touch-Tone key set with 10 special function keys. It permits the merchant to automatically dial as many as 14 different organizations, transmit card numbers through the magnetic stripe reader and complete the authorization in as little as 20 seconds, the vendor claimed.

The Micro-Fone operates through the public telephone system or through the Telenet packet-switched network and similar networks. It will cost between $350 and $750 depending on quantity ordered and the conditions of agreement, the vendor said from 8330 Old Courthouse Road, Vienna, Va. 22180.

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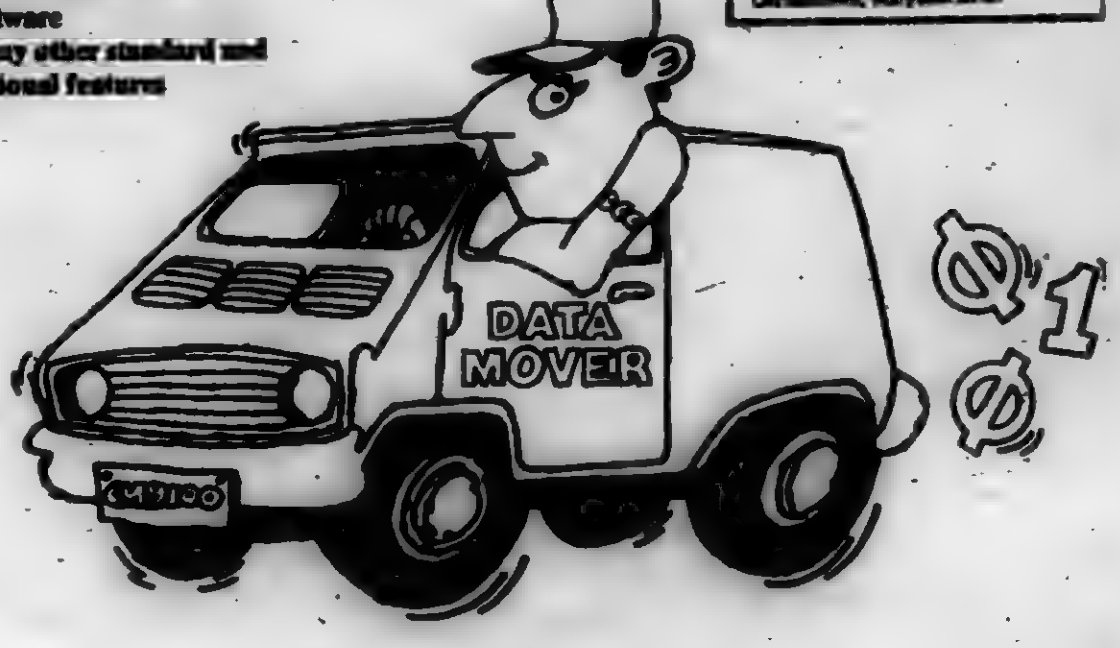


Package Lets Naked Minis Act as RJE Terminals

IRVINE, Calif. — A package that allows Computer Automation, Inc.'s Naked Minis to function as remote job entry (RJE) terminals to any host CPU that supports IBM's 2770, 2780 or 3780 protocols is available from CA.

The emulators execute under the NM4 real-time executive on NM4/10, NM4/30, NM4/90 and NM4/95 processors equipped with an I/O distributor card.

The three emulators are available on diskette for $1,000. This price includes a user's manual.

CA is located at Suite 420, 1600 Dove St., Newport Beach, Calif. 92660.

Point-to-Point, Multipoint

T-Bar Offers Digital Alarm Panel

WILTON, Conn. — A digital alarm panel for point-to-point or multipoint networks is said to automatically detect fault conditions in EIA RS-232C circuits has been introduced by T-Bar, Inc.

The 5977 digital alarm panel — billed by the company as the first of its kind — is geared to detect carrier failures in point-to-point networks and for streaming modem conditions in multipoint setups.

The unit allows continuous monitoring of one RS-232C-type circuit from any one of 16 modems or up to 16 circuits within a single RS-232C interface, a spokeswoman claimed.

Options for the alarm panel include adjustable mark and space signals and the ability to mix different types of data communications circuits that can be monitored from the same panel.

The firm is also offering a remote monitoring unit for the 5977 called the 5977R, which allows for remoting one alarm circiut or group of up to 16 alarm circuits from each 5977.

The 5977 panel sells for $1,295, and the remote monitoring unit costs $395. Quantity discounts are available, T-Bar said from 141 Danbury Road, Wilton, Conn. 06897.

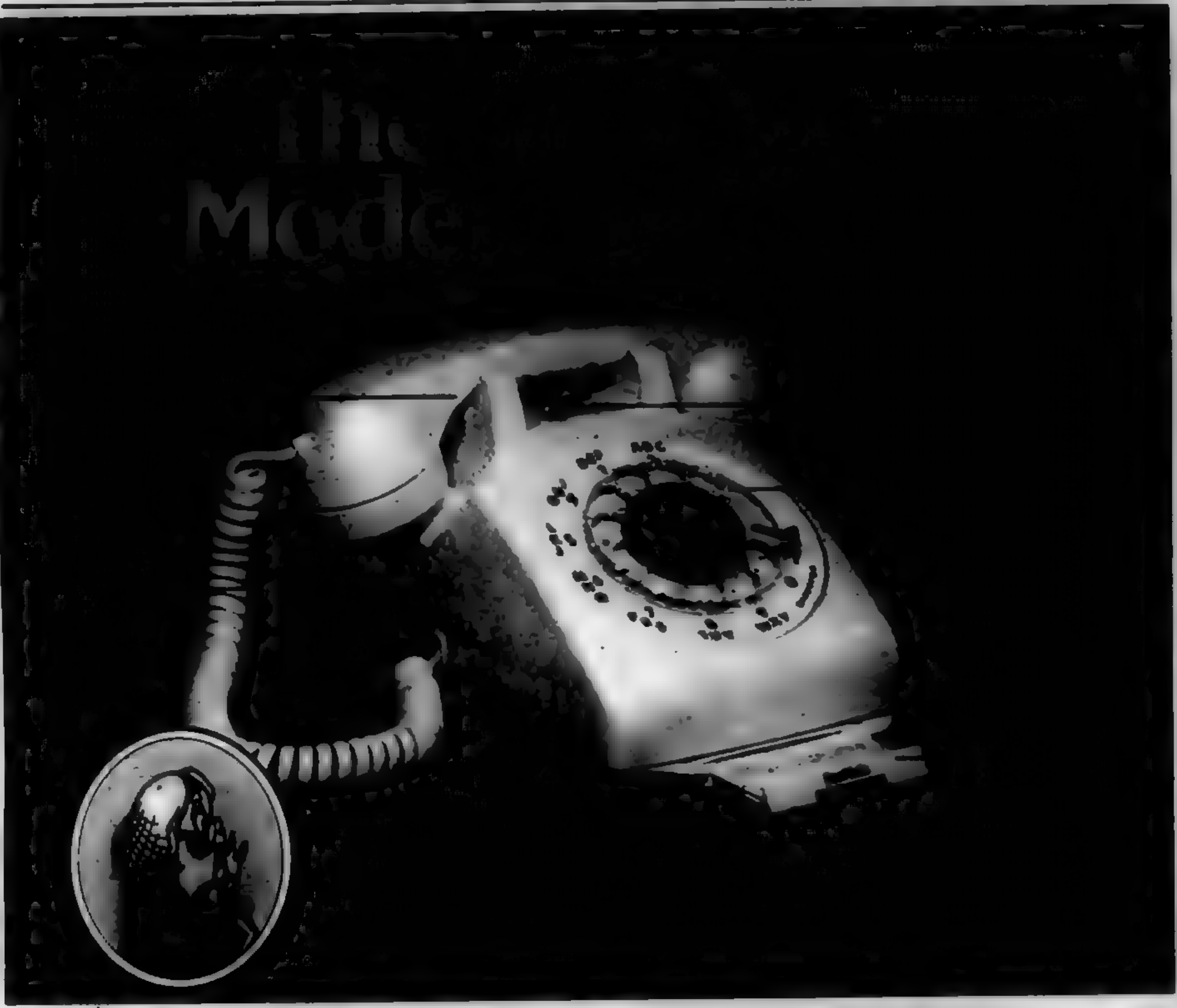
PTC '81 Set For Jan. 12-14

HONOLULU — Roger Vallo, president of GTE Communications Network Systems, and Frank Yung, chairman of the Telecommunications Authority of Singapore, will keynote the opening plenary session of the third Pacific Telecommunications Conference (PTC '81) here on Jan. 12-14.

Featuring a variety of roundtable discussions, panels and paper presentations, the conference is being organized by the newly formed Pacific Telecommunications Council and sponsored by eight organizations, including Hawaii's Dept. of Planning and Economic Development, The University of Hawaii and the Hawaiian Telephone Co.

Sessions will include "The Information Economy," "Social Effects of Telecommunications" and "Uses of New Technology and New Services from the Perspectives of Japan, France and the U.S.A."

Further details are available from PTC Director Richard Barber at P.O. Box 23148, Honolulu, Hawaii 96822.



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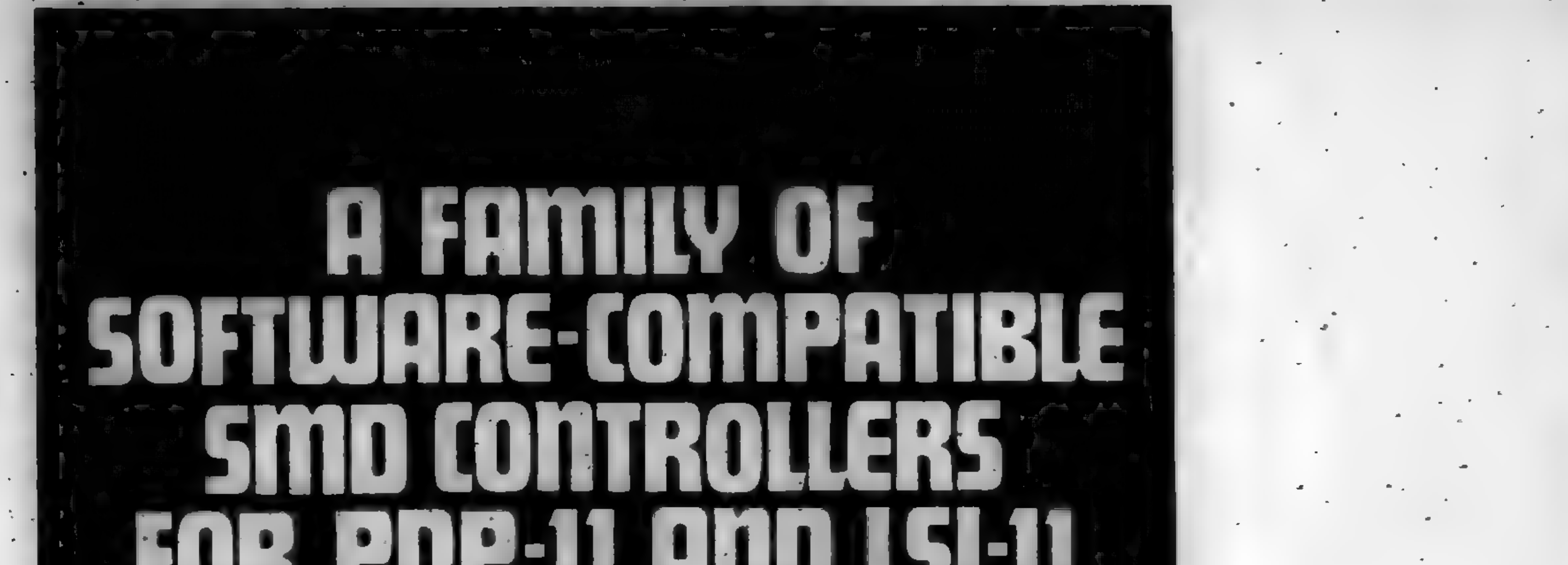

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Z-Lab Links Development Stations on Z-Net

CUPERTINO, Calif. — A method of physically distributing hardware and software development stations while keeping them a part of an integrated system has been introduced by Zilog, Inc. for users of its Z-Net local computer networks.

At the same time, the company also unveiled an asynchronous bidirectional first-in/first-out buffer circuit that is said to provide elastic buffering between a CPU and peripheral circuits.

The Z-Lab linking system was designed for users developing products based on the firm's Z8, Z80 and Z8000 microprocessors and is implemented via three products: a Z80-A-based program development station; a previously introduced SDS 2/01 shared data station; and a network station transceiver.

The development station includes 64K bytes of random-access memory, 4M bytes of floppy disk storage and RS-232C ports for CRT terminals, printers and other peripheral devices, a spokeswoman said.

The user also receives software development packages for all three previously mentioned microprocessors, she added.

Basically, the development systems are linked along Zilog's single-channel Z-Net system architecture. Each development station is connected to a coaxial cable by a transceiver unit.

The shared data station provides a common data base, expandable from 10M to 40M bytes, for the various stations on the network.

The stand-alone Z-Lab 80 program development station costs $13,750 and will be available in January 1981. The networking capability for Z-Lab will be available from 90 to 120 days later.

The SDS 2/01 shared data station sells for $13,750; the network transceivers cost $950 each; and the network protocol software costs $700 per station.

Zilog's Z8038 I/O interface unit (Z-Fio) was designed to operate with both Z-Bus-compatible CPUs and non-Z-Bus compatible processors. The device is said to synchronize peripherals or equipment that operate independently or at different data rates.

The Z-Fio can operate in interlocked or IEEE-488 handshake port mode and has 128-byte by 8-bit expandable organization.

The unit generates seven sources of vectored/nonvectored interrupts and can manage direct-memory access transfers of up to 1M-byte/-sec and can transfer data to and from memory during every machine cycle.

Housed in a 40-pin dual-in-line package, the Z-Fio costs $39. Sample quantities will be available next month, the spokeswoman claimed.

Zilog, an affiliate of Exxon Enterprises, Inc., is located at 10340 Bubb Road, Cupertino, Calif. 95014.

Device Reduces Coax Dependence

MINNEAPOLIS — The Coax Eliminator, a product that enhances the capabilities of its Series 300 family, is available from Lee Data Corp. (LDC).

The Coax Eliminator reduces dependence on coaxial cable for connecting displays to an LDC controller and provides the ability to connect up to eight LDC displays (or printers) to one coaxial cable or one twisted wire circuit from any LDC 3274-compatible controller, the vendor claimed.

The unit is useful in configurations where large amounts of coaxial cable are used, where distances greater than 5,000 ft are required or where only twisted wire circuits are available, a spokesman said.

Available in three models, the units sell for $880 to $1,040 depending on configuration, the vendor said from 10206 Crosstown Circle, Minneapolis, Minn. 55344.

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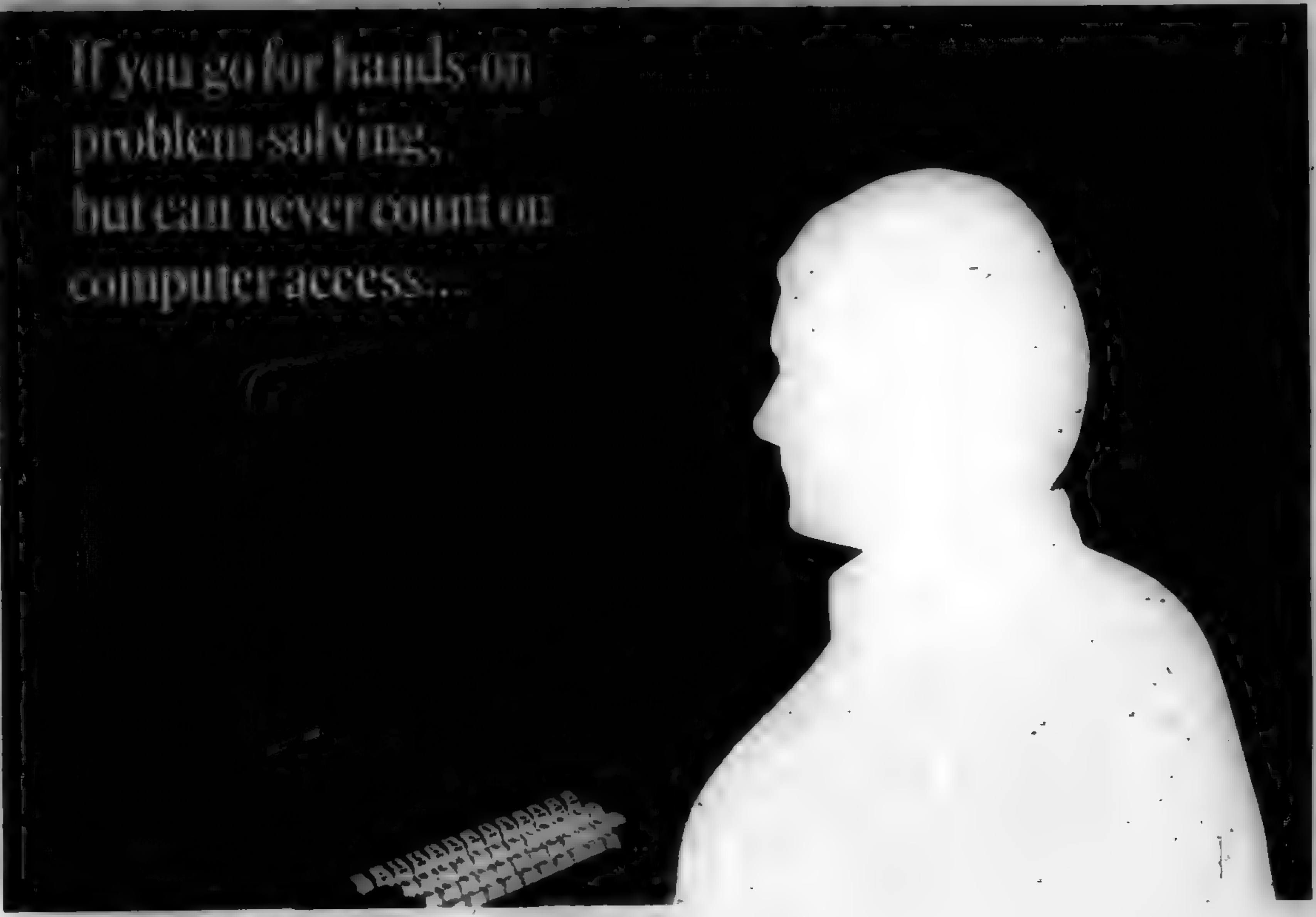

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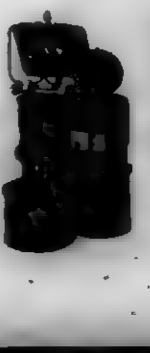

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Interface Systems Offers Printer for IBM 3270s

ANN ARBOR, Mich. — Interface Systems, Inc. is offering a printer for users of IBM's 3270 CRT terminal.

The Model 2120 demand document printer provides immediate access to the last printed document. The unit comes with a tear-off bar and forms tractors below the print head that reportedly allow forms to be torn off the printer as they are printed, the vendor said.

The unit was designed for tickets, receipts, admitting slips, bills of lading, tags and check printing. It is available in type B for IBM's 3271 or 3272 control units or type A for IBM's 3274 or 3276. The unit will accept IBM's SDLC protocol and is available in all buffer sizes, Interface said.

The 2120 costs $5,450, the vendor said from 462 Jackson Plaza, Ann Arbor, Mich. 48103.

Micro 800 Concentrator Lets One Port Handle 16 Channels

CHATSWORTH, Calif. — Micom Systems, Inc. has announced a port concentrator for users of its Micro800 data concentrator that is said to allow one computer port to communicate with up to 16 channels.

The Micro200 port concentrator utilizes an asynchronous or synchronous protocol and is aimed at minicomputer users who might be limited in the number of hardware ports available to their systems. Some user programming is reportedly required to communicate with the port concentrator.

The Micro200 costs $1,000; however, OEM discounts are available, a spokeswoman said.

Micom is located at 9551 Irondale Ave., Chatworth, Calif. 91311.

Intelligent Controller Offers Text Editing Program

SAN JOSE, Calif. — Digicom Data Products, Inc. has introduced an intelligent communications controller that allows users to connect various terminals and modems.

Digilink offers text editing through an assigned terminal port, interactive communications through a modem control port and data collection via the printer control port, the vendor said.

The controller costs $995 including the text editing program, 4K bytes of memory which are optionally expandable to 16K bytes, and a user prompter program. Additional memory costs $125 per 4K-byte increment. The vendor is at 1440 Knoll Circle, San Jose, Calif. 95112.

System/34s Tied To Peripherals

AUSTIN, Texas — KMW Systems Corp. is offering the BAC-34, a data converter that reportedly allows users to attach non-IBM peripherals to an IBM System/34 minicomputer.

The BAC-34 sends and receives Ebcdic data via IBM's binary synchronous protocol, performs all error-checking functions, translates data to Ascii and outputs in serial asynchronous format to and from user-attached devices, the vendor said.

Data may be transferred at user-selectable rates of 75-, 110-, 150-, 300-, 600-, 1,200-, 2,400-, 4,800-, 9,600- or 19.2K bit/sec. The unit costs $3,950, the vendor said from 8307 Highway 71 W., Austin, Texas 78735.

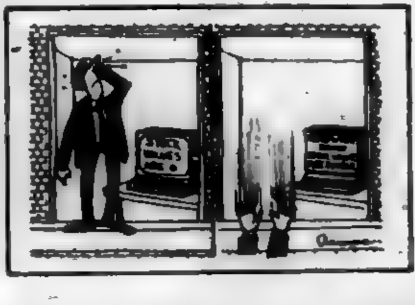
Bizcomp Adds To Modem Line

MENLO PARK, Calif. — Business Computer Corp. (Bizcomp) has released a Bell 103-compatible intelligent modem that features auto-dial, auto-answer and a three-wire RS-232C interface.

Modeled after the firm's Series 1030 intelligent terminal modem, the 1022 modem is aimed at computer applications and has a Federal Communications Commission registration for direct connection. The unit's built-in auto-dialer has both tone and dial-pulse capabilities and is controlled by Ascii characters code-multiplexed over the RS-232C port.

Applications for the device include computer and terminal networking, off-hours automatic polling, store-and-forward message routing, remote data base access and remote computer diagnostics. The 1022's tone dialing capability also makes the unit suitable as a CPT-TWX network interface, a spokesman claimed.

The intelligent modem costs $595 from the company through P.O. Box 7498, Menlo Park, Calif. 94025.



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Bits & Pieces

Welch Allyn Division Unveils Terminal to Read Bar Code

SKANEATELES FALLS, N.Y. – A data entry terminal designed to provide bar code reading capability to existing computer-based data collection systems has been introduced by Welch Allyn, Inc.'s Industrial Products Division.

The HBD series terminal provides a wide range of data collection applications, including blood processing, production control and material handling, in-process manufacturing data collection and computer assistance peripherals. Data communications to and from the key entry terminal and the mainframe uses a serial Ascii format and has RS-232-compatible signal levels.

The HBD series costs $815 from the vendor at 99 Jordan Road, Skaneateles Falls, N.Y. 13153.

Text, Plotting Interface Available for Qume Printers

SAN LEANDRO, Calif. – The Qume Commander CS-1, an interface designed to provide Qume printers with text processing and plotting capabilities, is available from Data Capital Co.

Word and character manipulation capabilities include multilevel, auto-subscripting, multilevel auto-superscripting, auto-boldface, auto-showprint, auto-underline, auto-overstrike and word wraparound.

The product costs $695, the vendor said from 702 Whitney St., San Leandro, Calif. 94577.

Sola Line Voltage Regulator Helps Supply Clean Power

ELK GROVE VILLAGE, Ill. – A series of static/magnetic line voltage regulators has been introduced by Sola Electric to help computer power centers supply clean power requirements.

Sola's Solatron/Acuvolt line voltage regulator was designed to improve power center performance by stabilizing voltage at the power center's input, attenuating noise and providing brownout protection, a spokesman said.

The regulating systems output a stabilized 480 Vac, the typical input voltage for most power centers. The Solatron/Acuvolt regulator is priced starting at $6,500.

Sola Electric, a unit of General Signal Corp., is at 1717 Busse Road, Elk Grove Village, Ill 60007.

Mini Complex Rivals Processing Speed of 370

NEW YORK – Program Resources, Inc. (PRI) has introduced a minicomputer complex it said rivals IBM's 370/158 in terms of processing speed.

The system consists of a 32-bit scientific supermini from Systems Engineering Laboratories, Inc. (SEL) linked to the Attached Resource Computer (ARC) minicomputer network from Datapoint Corp., according to a PRI representative. PRI designed the hardware necessary to connect the two systems and installed the first working network at Shearson Loeb Rhoades, Inc. a New York-based stock brokerage.

The minicomputer complex at Shearson reduced turn-around time from three hours to five minutes while increasing the number of dial-up ports to eight from the previous two, the PRI spokesman claimed.

Hardware at Shearson's installation includes an ARC network with one 40M-byte file processor and four application processors with eight CRT terminals and eight dial-up ports. The SEL Model 32/77 supermini is configured with 512K bytes of main memory and 600M bytes of peripheral disk storage, according to PRI.

Connection between the business and scientific minis is accomplished via an RS-232C interface at 9,600 bit/sec with two channels, PRI said.

Targeted toward the financial community, the complex can satisfy requirements varying from 20-terminal configuration up to a maximum of 1,000 terminals, he claimed.

Three Available Systems

Three configurations are currently available – and all of them offer throughput up to 1.2 million instructions per second, according to Kalman Toth, PRI vice-president.

A small configuration consists of a Datapoint ARC with:

- One file processor and three application processors.
- Ten CRT terminals.
- Disk storage of 20M bytes.
- One 160-char./sec printer.
- Six dial-up ports.

And an SEL Model 32/27 with:

- Main memory of 512K bytes.
- Disk storage of 32M bytes.
- One 300-line/min printer.
- One console CRT terminal.
- One diskette unit.

One channel is also included in the list price of $161,528, PRI said. The three-year lease price is $4,946/mo and monthly maintenance is $1,395, according to the vendor.

A medium-size system would upgrade the previous configuration from three to five application processors, 10 to 30 CRT terminals, 20M bytes to 120M bytes of disk storage and includes a 300 line/min printer and 18 dial-up ports on the ARC side, PRI said.

The scientific portion of the system would be based on an SEL Model 32/57 with 1M byte of main memory, 300M bytes of disk storage, one 600 line/min printer, one console CRT terminal and a 45-in./sec tape unit, PRI explained. With two channels, this system costs $333,590 and is available with a three-year lease at a monthly rate of $10,914, PRI said. Monthly maintenance for this system costs $2,999.

A large system includes two file processors and 15 application processors, 100 CRT terminals, 360M bytes of disk storage, two printers, 60 dial-up ports and a 25 in./sec tape unit on the ARC side, according to PRI.

The 4M-byte SEL Model 32/77 would be tied to 2,400M bytes of peripheral storage, one 900 line/min printer, one console CRT terminal and two 75 in./sec tape units. Five channels are in this configuration that costs $1,065,210 or $34,831/mo with a three-year lease. Monthly maintenance for this system is $9,693, PRI said.

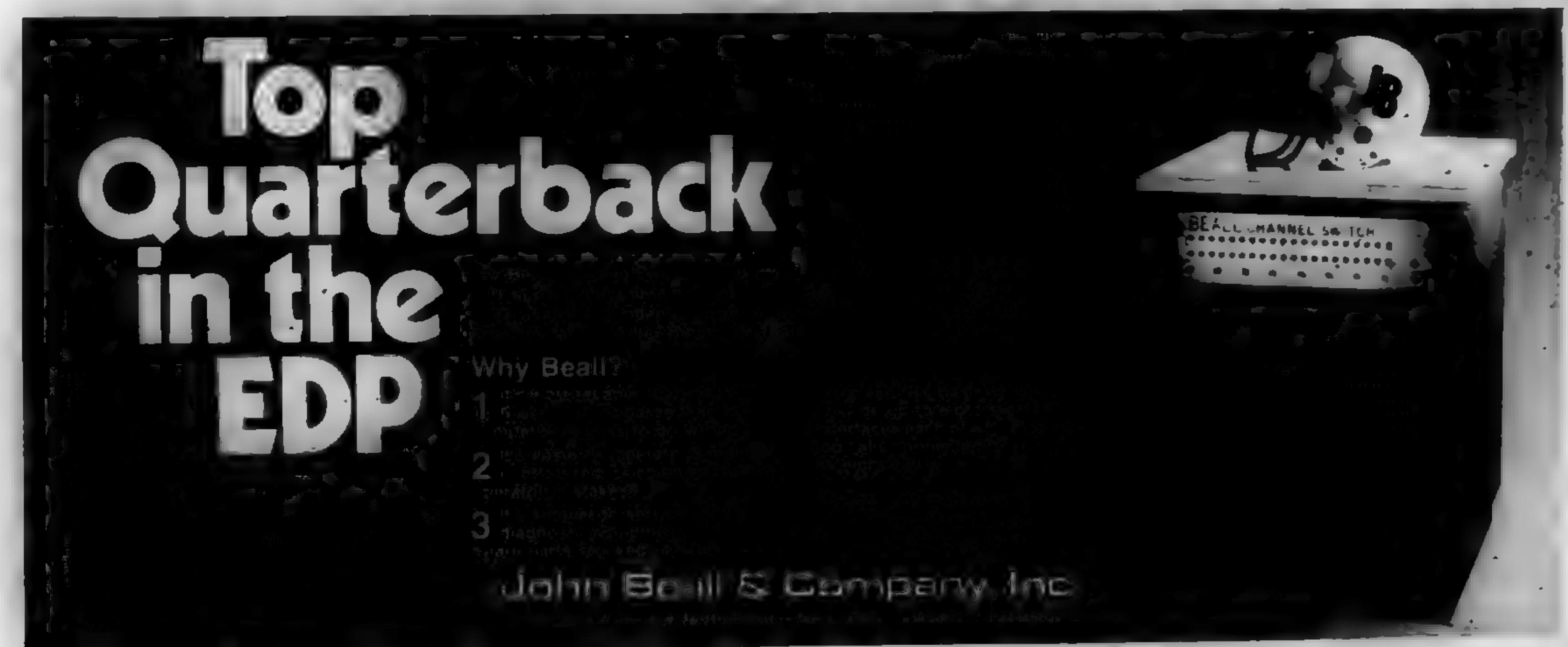
The sytems are available in 90 days from PRI at 369 Lexington Ave., New York, N.Y. 10017.

Course to Cover Univac Execution

WASHINGTON, D.C. – An intensive five-day course that will describe the tools and techniques for improving the performance and productivity of large-scale Univac 1100 computer systems is being offered here Nov. 17-21 by Datametrics Systems Corp.

Accounting systems, software monitors and hardware monitors to diagnose performance problems on the 1100 will be covered in the program, with special emphasis on the Software Instrumentation Package and the Performance Analysis Routine applications.

Tuition is $695 per person. Further information can be obtained from Datametrics Systems Corp., 5222 Dunleigh Drive, Burke, Va. 22015.


Top Quarterback in the EDP

Why Beall?

1

2

3

John Beall & Company, Inc

38 delivers

The productivity advances of IBM's new System/38 are being confirmed in early installations.

IBM has started delivering System/38's to customers.

And customers have started delivering comments like these to IBM.

"I created a special equipment report in 15 minutes flat. Before, it would have taken a day and a half of programming."—Chuck Petter, Data Processing Manager, Road Machinery and Supplies Company, Minneapolis.

"System/38 makes our programming staff more productive. We've developed applications in weeks instead of months. And they're more effective."—Norbert Gottenberg, V.P.-Planning & Management Information Systems, United Merchants and Manufacturers, New York City.

"The System/38 significantly reduced the amount of code necessary to write a program and the time and effort required to move into new applications. We're extremely enthusiastic."—Larry Petterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

And we're enthusiastic, too.

Because the IBM General Systems Division's versatile new System/38 is a compact system with many large computer features. Such as distributed online work stations so users don't have to go to the computer; a central data base that makes information easier to retrieve, revise and use; the Control Program Facility, which automatically monitors and manages the flow and processing of data; online program testing, so programs can now be debugged as normal processing continues.

And System/38 has advanced features rarely found in any computer, large or small. Like Single Level Storage, which treats all storage as a single unit and automatically keeps track of it.

And thanks to System/38's streamlined architecture, many functions that previously required programmers' time have been absorbed into the system itself.

The result of these IBM innovations? A computer that lets you do much more, much more simply.

We're pleased that System/38 is already helping business function with greater cost-efficiency, productivity and profitability.

In short, System/38 delivers. And it can deliver for you.

For more information call your IBM General Systems Division representative or write us at P.O. Box 2068, Atlanta, GA 30301.

IBM

General Systems Division

Costs Less Than Single Workstation

Burroughs OCR Page Reader Boosts WP Tasks

BURLINGTON, Mass. — An optical character recognition (OCR) page reader claimed to triple the productivity of a word processing (WP) center at less than the cost of a single workstation is being offered by Burroughs Corp.'s OCR Systems arm.

The Burroughs 1205 text input device will sell for $10,900, far below competitive systems that cost from $16,000 to over $50,000, the firm said.

Although aimed at the WP user, the 1205 can also be used to feed digitized data to a mainframe computer system. The 1205 reads typed or printed documents electronically, translates the words and formats into digital form and automatically transfers the digitized documents to a word processor or computer for editing and final formatting.

The page reader can reportedly input 250 pages per hour into a word processor or CPU with less than one error in 100,000 characters scanned.

The 1205 features straight-through paper feed and scanning techniques. Standard-weight paper up to 8-3/4 in. wide and up to 14 in. long can be fed into the scanner from a 100-page-capacity paper stacker. Up to 300 sheets of paper per hour travel at a constant speed of 1.3 in/sec over the 1205's conveyor belt transport mechanism, under the scanner and out the other side of the reader in a straight line.

The unit detects both horizontal and vertical text formats, recognizes new paragraphs, automatically signals tab positions and provides for corrections during the preparation of drafts.

The page reader also detects unrecognizable characters and automatically transmits an error code to the WP workstation without operator intervention and without interrupting the high-speed scanning process, according to the vendor.

The 1205 transmits scanned copy in the on-line mode using the Ascii asynchronous communications protocol or bisynchronous protocol such as IBM 2770 and 2780.

Burroughs OCR Systems is located at 9 Ray Ave., Burlington, Mass. 01803.

Fonts Added to Label/300

ATLANTA — Technical Analysis Corp. has expanded the list of standard character fonts and optional special character fonts for its Label/300, a microcomputer-based 300 line/min printer.

In standard fonts, the compressed print increases the value of the product's applications in areas such as grocery wholesaling, the vendor said.

The bar code and OCR-A fonts are currently useful for inventory control and order entry from the field. Compressed print, with 12 char./in., allows more complete information to be added on shelf labels.

Optional special character fonts now include vertical bar code and vertical print as well as alternate character sets, a spokesman said. They represent pluses for plants such as furniture or appliance production, where a product may need labels that can be read either horizontally or vertically.

Technical Analysis Corp. is located at 129 W. Wieuca Road N.E., Atlanta, Georgia 30342.

Time Station Added To GA Transactor Line

ANAHEIM, Calif. — A ruggedized time and attendance station has been added by General Automation, Inc. to its Transactor factory data collection system.

The Transactor 2811 is part of a full line of standardized terminals designed for computer-based collection of production, material and labor data on the shop floor. The station communicates with remote host computers over four-wire, full duplex lines at rates up to 9,600 bit/sec.

The 2811 costs $2,800 from the vendor at 1055 S. East St., Anaheim, Calif. 92803.

The Whole Truth
About PDP-11 Word Processing.

HYPHENATION
LIST PROCESSING
PROPORTIONAL SPACING
DPD WORD-11
USER DEFINED KEYS
INDEXING
DPD WORD-11
SPELLING ERROR DETECTION
TABLE OF CONTENTS
FOOTNOTING

When you explore word processing systems, you'll find a number of systems that offer part of the package. And frankly, if you're only looking for text editing, almost any system will do.

But if you're looking for full word processing capabilities, you should insist on a system that can handle all of the tough tasks you'll encounter.

For starters, a good system will have list processing, the vital function that generates correspondence, reports, even statistical analyses. It should have user defined keys to simplify repetitive operations.

And a good system can handle the details. Like spelling error detection, automatic renumbering of footnotes, tables of contents and indexes. And proportional spacing and hyphenation for professional looking documents.

A good system can be shared. It should be able to support up to fifty terminals. And it must be backed up by successful installations and a strong service team.

After you've examined the options, we think you'll select WORD-11, the only system with all the sophisticated features you could want.

For the details, please call Data Processing Design at (714) 993-4160. 181 W. Orangethorpe, Suite F, Placentia, CA 92670.

Data Processing Design, Inc.

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A computer disaster plan can be essential to the survival of your business. Disaster Plan/80 provides you with a well thought-out model and specific procedures to follow in developing, testing, and maintaining an effective disaster recovery plan for your company. Call or write today for details.

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The Kodak IMT microimage terminal. It's the brains behind Electronic Filing from Kodak.

Your office already has electronic typing.

You probably have electronic data processing, too.

Then isn't it about time you looked into Electronic Filing from Kodak?

The Kodak IMT microimage terminal, for example, is so intelligent it practically thinks for itself. Thanks to its own built-in microcomputer, an IMT terminal can perform on-line information lookups in seconds. At the touch of a button. Without tying up your mainframe.

An IMT terminal pinpoints images so precisely, in fact, that it practically eliminates lookup errors, which increases office productivity. In the meantime, your computer is left free to process data—not search for it.

Find out how many other intelligent things an IMT microimage terminal can do. Send in the coupon for more information. Or contact your Kodak representative for a demonstration of the Kodak IMT microimage terminal.

Either way, the move you make will be a smart one.

1880 Kodak *1980*

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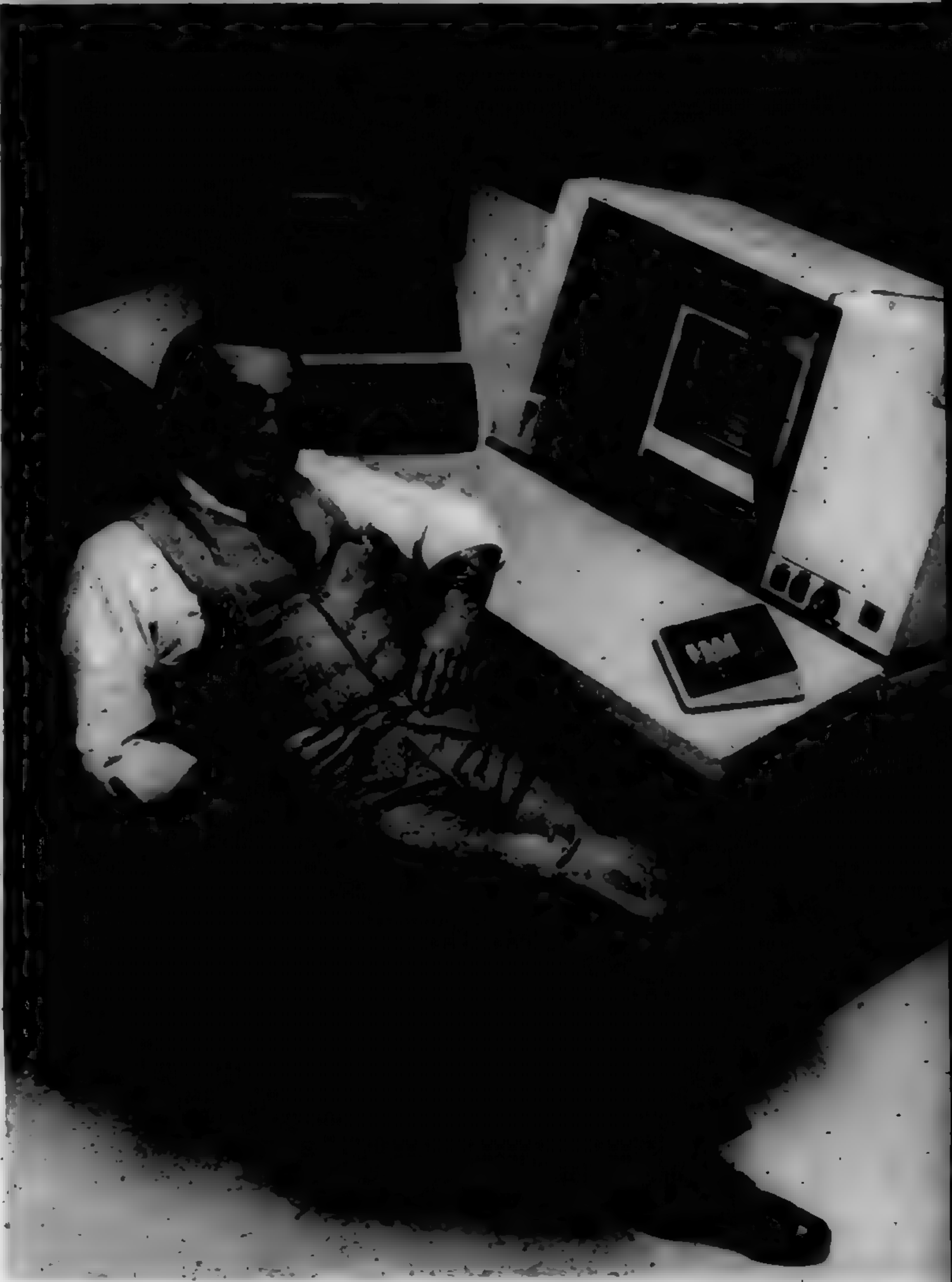

EASTMAN KODAK COMPANY • Business Systems Markets Division
Dept. DP0615, Rochester, NY 14650

☐ Please send me more information about the Kodak IMT microimage terminal.

☐ Please have a Kodak representative contact me.

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COMPANY

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STATE ZIP PHONE

Board Ties Printronix Printers, Tektronix Terminals

IRVINE, Calif. – Trilog, Inc. has unveiled its high-resolution Graphics Adapter Board (GAB). The board interfaces the Printronix, Inc. line of printer/plotters with the Tektronix, Inc. 4025 raster terminal, Trilog said.

The GAB produces high-resolution hard copies on plain paper and extracts up to six high-resolution copies from the 4025.

Its technology allows two raster CRT terminals to be served automatically and provides for the multiplexing of CRT data with no waste of CPU time, Trilog claimed.

The product has a built-in self-test feature, which can be selected by using a switch on the module, allowing checks on both graphics and character printing, a spokesman said.

Output measures 10.3 in. by 10.7 in. in the normal mode. To accommodate a paper size of 8.5 in. by 11 in., the truncated mode produces output 10.2 in. high by 7.3 in. wide.

The GAB sells for $1,200. Trilog is at 17391 Murphy Ave., Irvine, Calif. 92714.

Decollator and Burster Unveiled

LAWRENCEBURG, Ind. – Financial Stationers, Inc. is offering a decollator and a burster for minicomputer users, satellite operations or as a backup for peak load situations in large applications.

The decollator costs $275 and the burster costs $798. Both are available for $1,050 and were designed for use by one unskilled operator.

The vendor is located at 318 Walnut St., Lawrenceburg, Ind. 47025.

U. of Arizona, Honeywell Plan Engineering Course

TUCSON, Ariz. – The 18th Annual Reliability Engineering and Management Institute will be offered here Nov. 10-14 by the University of Arizona in conjunction with Honeywell, Inc.'s Information Systems. Conducted by Dr.Dimitri Kececioglu of the Aerospace and Mechanical Engineering Department at the University, the short course earns participants three continuing education units.

The course will cover reliability engineering theory and practice; mechanical reliability prediction; reliability testing and demonstration; maintainability engineering; life-cycle costing; product liability; and reliability and maintainability management.

A fee of $575 includes all materials, lunches and refreshments. Enrollment and fees must be completed by Oct. 31.

Further details are available from Kececioglu at Building No. 16, Room 200B, University of Arizona, Tucson, Ariz. 85721.

Air Filters Fit Disk Drive Use

MINNEAPOLIS – The Donaldson Co., Inc. has announced a line of custom-designed air filters in a variety of filtration efficiencies for disk drive applications.

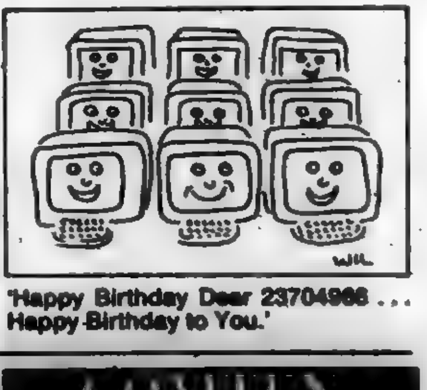
The filters are offered in a range of filtration levels to catch particle sizes of .3 microns or larger. Several glass fiber filter media types are also available to meet various efficiency and pressure drop requirements.

The filter housings are constructed of injection-molded plastic and equipped with leak-proof seals.

Costs of the filters usually range from $1.70 to $6 each, but prices vary because most of the units are custom-designed for a particular system, Donaldson said from 1400 W. 94 St., Minneapolis, Minn. 55431.

Free Brochures

• A description of the Ragen 95 information management system is found in "Breakthrough in Information Management," a six-page brochure available from Ragen Information Systems, 500 Belleville Turnpike, N. Arlington, N.J. 07032.



'Happy Birthday Dear 23704968 . . . Happy Birthday to You.'

COMTEN
users
[illegible]

The new VISUAL 200 terminal has the features of competitive terminals and will code-for-code emulate them as well. A flick of a switch on the rear panel programs the VISUAL 200 for compatibility with a Hazeltine 1500, ADDS 520, Lear Siegler ADM-3A or DEC VT-52. This allows you to standardize on the new, reliable VISUAL 200 for virtually all of your TTY compatible video terminal applications, with no change in the software you've written for the older, less powerful terminals. And you're not limited to mere emulation; you can outperform them at the same time by taking advantage of the additional features and human engineering of the VISUAL 200, such as:

- Detachable Solid State Keyboard
- Smooth Scroll
- Tilt Screen (10° to 15°)
- Large 7 x 9 Dot Matrix Characters
- Others in the Feature Comparison Chart

For a pleasant surprise on prices, call or write us today.

FEATURE COMPARISON CHART

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24 x 80 Screen Format	STD	STD	STD	STD	STD	STD	STD	STD
7 x 9 Dot Matrix	STD	STD	NO	NO	NO	NO	NO	NO
Background/Foreground	STD	STD	STD	NO	NO	NO	NO	STD
Insert/Delete Line	STD	STD	NO	NO	NO	NO	NO	STD
Insert/Delete Character	STD	NO	NO	NO	NO	NO	NO	NO
Clear End Line/Field/Page	STD	STD	NO	NO	STD	NO	NO	NO
Blink	STD	NO	STD	NO	NO	NO	NO	STD
Security Mode	STD	NO	STD	NO	NO	NO	NO	STD
Columnar and Field Tab	STD	NO	STD	NO	NO	NO	NO	STD
Line Drawing	STD	NO	NO	NO	STD	NO	NO	STD
Upper/Lower Case	STD	STD	STD	OPT	STD	NO	STD	STD
Numeric Pad	STD	STD	STD	OPT	STD	NO	NO	STD
Composite Video	STD	NO	NO	NO	NO	STD	NO	NO
Current Loop	STD	STD	NO	OPT	OPT	STD	STD	STD
Serial Copy Port	STD	STD	OPT	STD	OPT	NO	STD	STD
Hold Screen	STD	NO	NO	NO	STD	NO	NO	NO
Detachable Keyboard	STD	NO	NO	NO	NO	NO	NO	NO
Solid State Keyboard	STD	NO	NO	NO	NO	NO	STD	STD
Typematic Keys	STD	STD	STD	NO	NO	NO	STD	STD
Cursor Addressing	STD	STD	STD	STD	STD	STD	STD	STD
Read Cursor Address	STD	STD	STD	NO	NO	NO	NO	STD
Cursor Control Keys	STD	NO	STD	NO	STD	NO	NO	STD
Secondary Channel	STD	NO	NO	STD	NO	STD	NO	NO
Self Test	STD	NO	STD	NO	NO	NO	NO	STD
Baud Rate to 19,200	STD	STD	NO	STD	NO	NO	NO	NO
Smooth Scroll	STD	NO	NO	NO	NO	NO	NO	NO
Microprocessor	STD	STD	STD	NO	STD	NO	STD	STD
Tilt Screen	STD	NO	NO	NO	NO	NO	NO	NO
Switchable Emulations	STD	NO	NO	NO	NO	NO	NO	NO

The new VISUAL 200 obsoletes competitive terminals without obsoleting the software.

VISUAL

Printer, Disk Drives Among Additions To MDS Series 21

PARSIPPANY, N.J. – Mohawk Data Sciences Corp. (MDS) has unveiled four enhancements to its Series 21 line of distributed processing systems.

The first is a family of fixed/removable disk drives ranging in capacity from 26M- to 78M bytes. The drives combine both fixed platters and a removable platter on a single spindle, the vendor claimed.

The following configurations are available for the Series 21, System 2150: Model 2175-1 with 13M bytes fixed and 13M bytes removable, Model 2175-2 with 39M bytes fixed and 13M bytes removable and Model 2175-3 with 65M bytes fixed and 13M bytes removable.

Series 21, System 21/40 will support the 13M byte fixed and 13M byte removable drive, a spokesman said.

Purchase prices for the three models are $14,720, $21,680 and $28,680, respectively. Twelve-month rental prices are $368, $542 and $717 per month, respectively.

Station Printer

The Model 2141-1 station printer is the second enhancement and can be located with a display station up to 2,000 ft from the controller.

Four printers, each associated with its own display station, can be supported by a single System 21/50, in addition to the system printer, for a total of five.

The product is priced at $4,960 or $125 per month. A prerequisite station printer controller, Feature 192, costs $800 for purchase or $20 per month, rental

The third enhancement is the availability of Cobol on the MDS Series 21 line, where it joins Mohawk Business Oriented Language (Mobol). As a complement to Mobol, MDS Cobol facilitates batch processing, report editing and general output data manipulation.

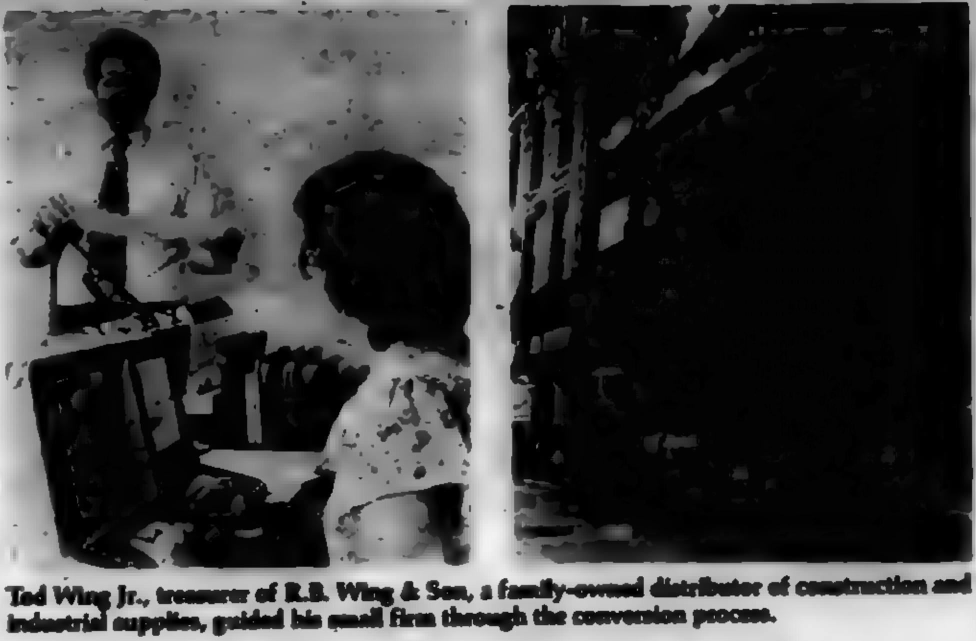
The license fee for Cobol is $2,500 or $65 monthly, with an initial installation charge of $200 per system. Cobol maintenance and update has a monthly charge of $20 per system.

Enhancement four is Extended Data Entry (EDE), which provides Series 21 users with the ability to utilize disk storage in their data entry operation.

The EDE program provides a range of functions and capabilities that allow users to adapt this standard software package to their unique requirements, the vendor claimed.

EDE is an optional, no charge software package with the Series 21.

Mohawk Data Sciences is located at 7 Century Drive, Parsippany, N.J. 07054.



Tod Wing Jr., treasurer of R.B. Wing & Son, a family-owned distributor of construction and industrial supplies, guided his small firm through the conversion process.

Five-Generation Family Business Takes Plunge Into DP – Slowly

Special to CW

ALBANY, N.Y. – How does a small company with no DP experience take the plunge into an interactive computer system? In many cases, one step at a time.

R.B. Wing and Son Corp. is a five-generation family business here that deals in the distribution of industrial supplies and construction equipment. The company serves more than 2,000 customers from warehouse locations in Albany and Rensselaer, N.Y.

Until recently the firm processed accounts receivable and payroll on an electromechanical bookkeeping machine with magnetic stripe ledger cards. The company now uses a Digital Equipment Corp. Datasystem 356, but got its first exposure to computing by initially using a remote workstation tied into a turnkey vendor's DEC computer.

Unlike some turnkey vendors, Concept IV Computer Systems, Inc. in West Albany – the company that supplied Wing's system – lets many of its future systems customers use a DEC computer and telecommunications to learn the DP ropes. In Wing's case, Concept IV trained the firm's staff in the computer's operation and allowed managers there to evaluate the hardware and software before making a major investment.

Two Choices

The family-owned company began looking at alternative accounting methods in 1977. The firm's investigation became more intense when the bookkeeping machine's manufacturer announced that the unit's maintenance service would end in January 1980. Faced with a deadline to replace the equipment, Wing's management had two basic alternatives: purchase a new bookkeeping machine to use as a one-on-one replacement, or take the major step of acquiring a computer system. After examining the alternatives, the company chose the computer route.

"A computer offered much greater capability in terms of the relative investments. For instance, with a computer we could establish the long-range objective of controlling our large inventory," Tod Wing Jr., treasurer, explained.

However, the basically unautomated company faced some tough hurdles with its deci-

(Continued on Page 88)

Entry-Level System Joins DG Synergists

WESTBORO, Mass. – An entry-level version of data General Corp.'s Synergist line of business systems has been announced by the company.

The Synergist M1000 was designed for such business applications as order entry, warehouse management, business accounting and financial management, according to the vendor.

The M1000 models 10, 15 and 30 are said to support up to four Dasher display terminals, up to 52.4M bytes of on-line data storage and several printer and communications options.

Based on a 64K-byte Micronova processor, all three models run interactive Synergist Basic under DG subsidiary Digital Computer Controls, Inc.'s Extended Operating System (EOS).

Synergist Basic reportedly features a direct

(Continued on Page 88)

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Our GT-400 is General Terminal Corporation's most highly advanced data display terminal. It's Z-80 based and uses ANSI 3.64 standard, as well as being EIA RS-232C compatible. Features include block or character mode, reverse video field, 8 user-programmable function keys and switch-selectable transmission speeds from 50 to 19200 bps.

For more information, send this coupon to GTC, 14831 Franklin Avenue, Tustin, CA 92680. Or call toll-free. In California: 800-432-7006. Elsewhere in the U.S.: 800-854-6781. Ask for Sharon Mills. In Canada, contact Lanpar Limited, 85 Torbay Road, Markham, Ontario, L3R 1G7. 416-495-9123.

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The System 8020

Handles 256 Users

Multiuser System Based on Z80

MOUNTAIN VIEW, Calif. – Echo Communications Corp. has introduced a multiuser computer system that can reportedly be expanded to handle up to 256 independent users without significantly impacting the system's throughput.

The basic System 8020 features three microprocessor modules, four independent user terminals, 20M bytes of disk storage, an 8-in. floppy disk drive and a cartridge tape backup. The unit is based on the Z80 microprocessor which is said to have a throughput clock rate of six MHz.

The system handles up to 256 users by distributing independent microprocessor modules throughout the system to maintain an even balance of power, a spokesman claimed.

One processor module handles the system mass storage functions while pairs of processor modules perform terminal and general computing functions for groups of four users, the spokesman explained.

The user terminals feature a detached keyboard and 15-in. CRT screen containing more than 3,000 software-definable characters and graphics, the spokesman explained. The system is expanded by adding more processor modules.

The basic System 8020 costs $60,000 from the firm at 1708 Stierlin Road, Mountain View, Calif. 94043.

DG 132-Column Display Gives 79% More Screen Area

WESTBORO, Mass. – Data General Corp. has unveiled a 132-column large screen display that reportedly provides 79% more active screen area than standard 80-column displays.

The Model 5210 was designed for DP and text editing applications. It can also be used for communications applications, the vendor said.

Screen Dimensions

The 15-in. diagonal screen displays 33 lines of 132-column text, or 4,356 characters. This represents a full-width, half-page in length of line printer output.

An optional screen buffer memory stores an extra 33 lines of text, or a full page, and also provides up and down scrolling.

Full-size 5 by 8 dot matrix characters combined with the 15-in. green-phosphor screen provide enhanced display reading, and the product has 96 upper- and lowercase Ascii characters plus 32 special graphics characters, the vendor claimed.

The 5210 sells for $4,500, a spokesman said from Rt. 9, Westboro, Mass. 01581.

LSI-11 Users Get Tape Controller

TUSTIN, Calif. – The Western Peripherals Division of Wespercorp has unveiled a single-board tape controller for Digital Equipment Corp. LSI-11 microprocessors.

The TC-151 universal magnetic tape controller provides 9-track NRZ format on a single quad board, according to the vendor.

PE or dual density is available by addition of a two-slot board; boards fit into a standard Q-bus, a spokesman explained.

The product can mix 9-track NRZ, PE or dual-density tape units in any combination of up to eight units, a spokesman said.

A 33-word buffer is included for greater flexibility in assigning priorities to the computer.

With NRZ only, the product is priced at $2,450; with PE and NRZ, $3,150, the vendor said from 14321 Myford Road, Tustin, Calif. 92680.

Correction

California Computer Systems, Inc. was mistakenly called "Calcomp" in a headline on Page 68 of the Sept. 22 issue.. Calcomp refers to California Computer Products, Inc. California Computer Systems is at 250 Caribbean Drive, Sunnyvale, Calif. 94086.

Our international publications can put you in direct contact with computer people around the world.

As the world's largest publisher of computer-related newspapers and magazines, we own or provide US representation to leading local computer publications in the major computer markets of the world — those that account for the vast majority of all computers in use today (measured by value). These countries import well over $2 billion a year in US-made computer products and services, according to Commerce Department figures. And our sister publications around the world can put you in touch with the people who make the buying decisions on these imports.

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INFONET is Computer Sciences Corporation's worldwide remote computing network. But it functions more like the fabled crystal ball.

Unlike systems patched together from existing parts, INFONET's design started with the ultimate task it was to perform. And then CSC created it from that architectural plan, choosing each component and building every link with only one criterion, optimum performance.

As a result, it's the most completely integrated system anywhere. Internal data exchange is far simpler and it is a substantially better base to assimilate technical advances.

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System/34 Gets Letter-Quality Printer

TUSTIN, Calif. – General Business Technology, Inc. has announced a letter-quality printer for IBM System/34 that is compatible with the 5250 information display system.

The GBT 5200WP consists of a Nippon Electric Co. Spinwriter printer and a GBT controller. It accepts single or multipart forms and operates at 55 char./sec with a 96-character set, the vendor said.

The GBT controller also provides compatibility with IBM 5256 printer software.

The unit costs $7,000, from the vendor at Suite A, 2630 Walnut Ave., Tustin, Calif. 92680.

Phased Conversion Succeeds

(Continued from Page 85)

sion to install a computer. First of all, Wing's managers had very little knowledge of computers, but had heard a lot of problem-strewn horror stories of unsuccessful systems.

The company also was not sure what size machine to buy or what other resources might be needed. Finally, with more than 2,00 steady customers to serve, the possibility of a disruption because of the automated switch was frightening.

After considering a number of computer vendors, who put more emphasis on hardware than on a total approach, Wing discovered Concept IV and its phased implementation plan.

The turnkey vendor proposed a plan for the interim installation of a remote workstation at Wing's to do its processing. The company would accomplish its order entry, inventory control and accounts receivable on a DEC system similar to the one it would eventually buy via telecommunications.

The last step of phased implementation is the purchase of the computer system.

While using the terminal-accessed system, Wing employees learned how to operate the computer and a lot of the program conversion bugs were worked out before the final system was installed.

Software programs were tailored for Wing's requirements and all of the customer master files were keypunched.

"When we actually converted to the new system, we had the confidence to go ahead without any parallel processing on the old equipment," Wing pointed out.

The industrial and construction equipment distributor's Decsystem 356 computer was delivered and switched on several weeks ago.

One of the problems ironed out during Wing's terminal-oriented introduction to the DEC computer was becoming operationally proficient and developing an adequate response to process up to 150 orders a day, Wing stated.

However, on the average, the company was never more than a few days behind. When the company's system was delivered it was simply a matter of transferring files and programs.

As for expansion, R.B. Wing and Sons plans to add three more CRT terminals and a faster printer. The company will also add accounts payable and general ledger to its software repertoire.

DG Expands Synergists

(Continued from Page 85)

execution (calculator) mode, facilities for handling strings, matrices and interactive program editing and debugging.

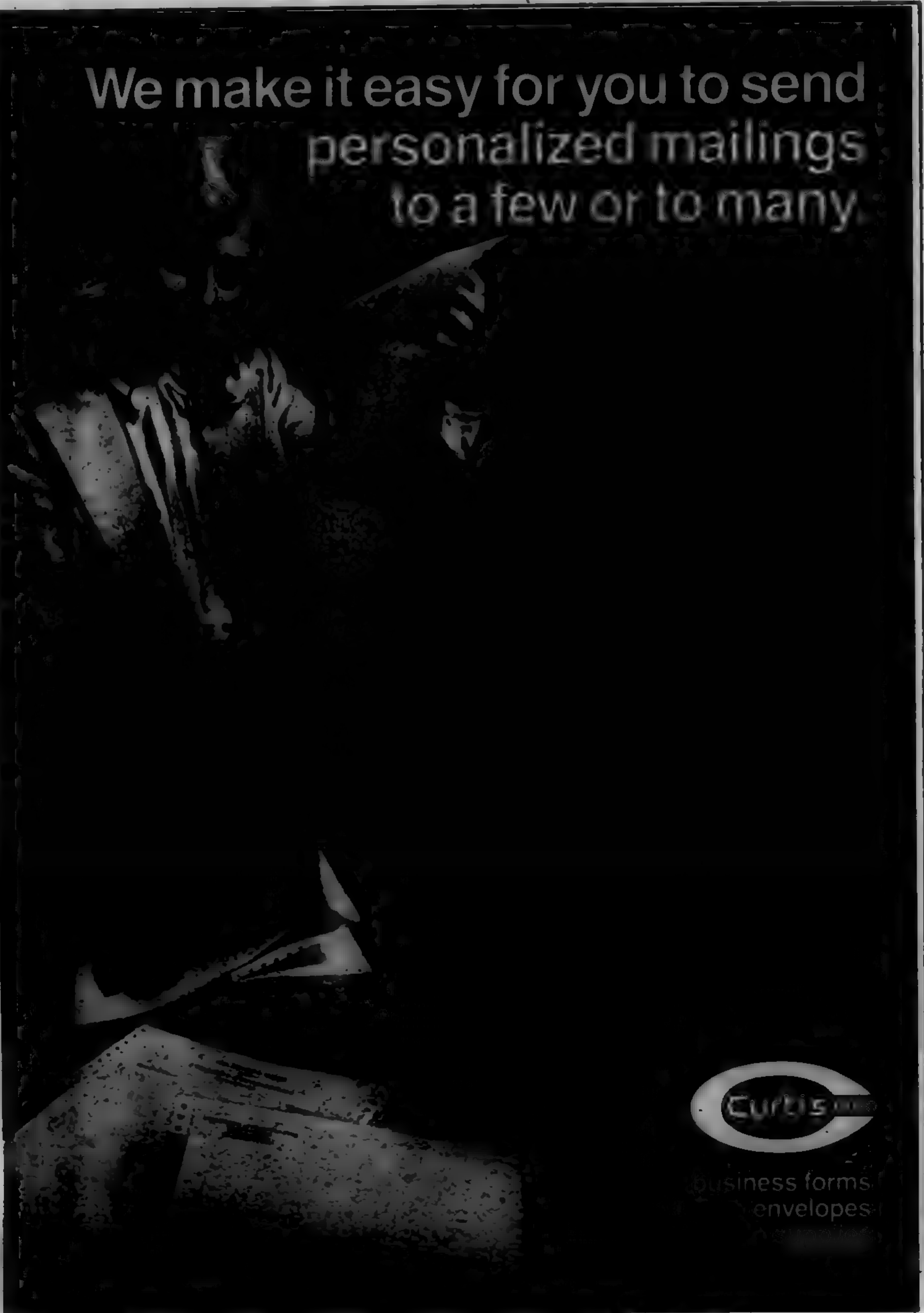
Language Extensions

Language extensions include extended precision arithmetic, Print Using, chaining, error branching and special functions.

The language also implements sequential, relative and indexed sequential (Isam) data access methods.

Synergist Business Systems are sold through the DG General Distribution Division's independent sales organization, which can change or enhance application software to meet the individual users needs and provide training.

Synergist M1000 systems range in price from $10,950 to $25,000 from the firm at Rt. 9, Westboro, Mass. 01581.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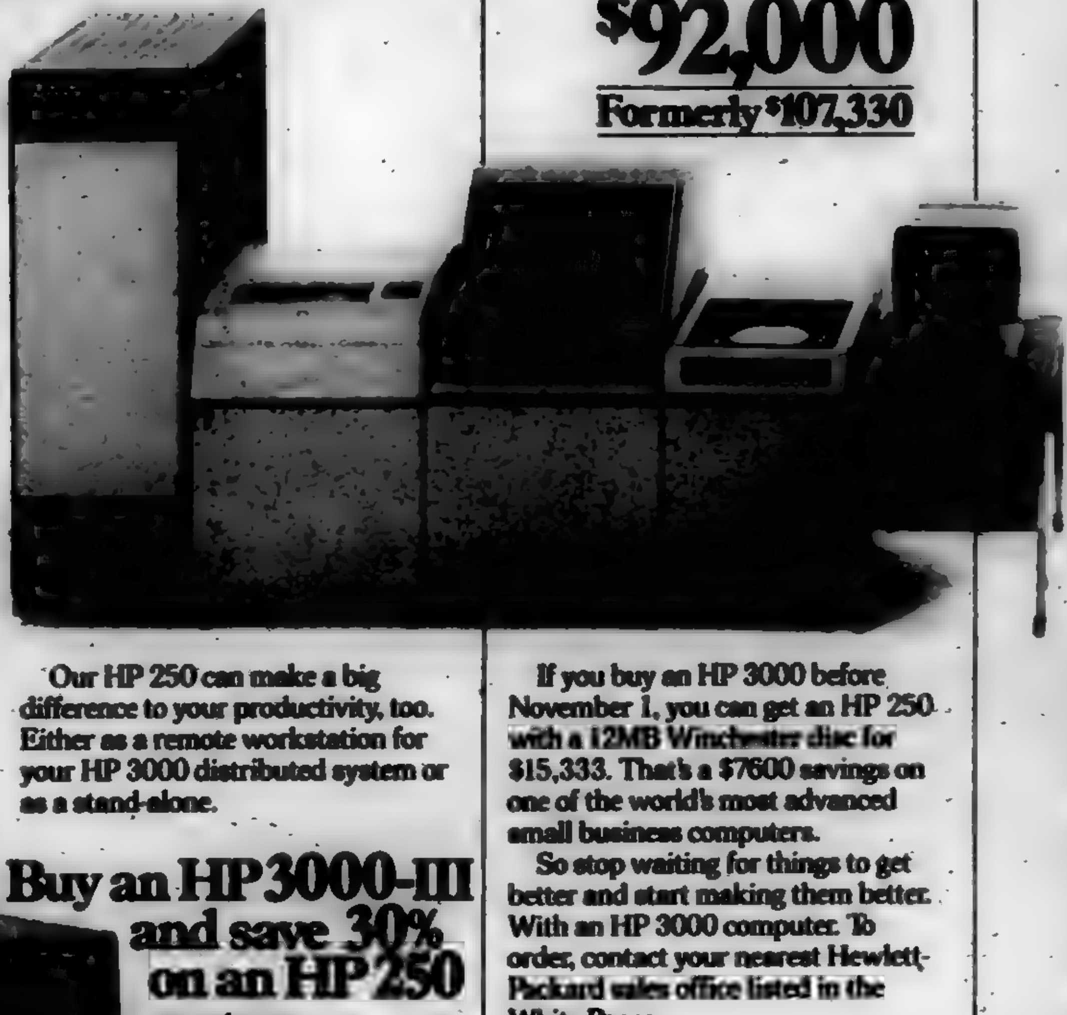

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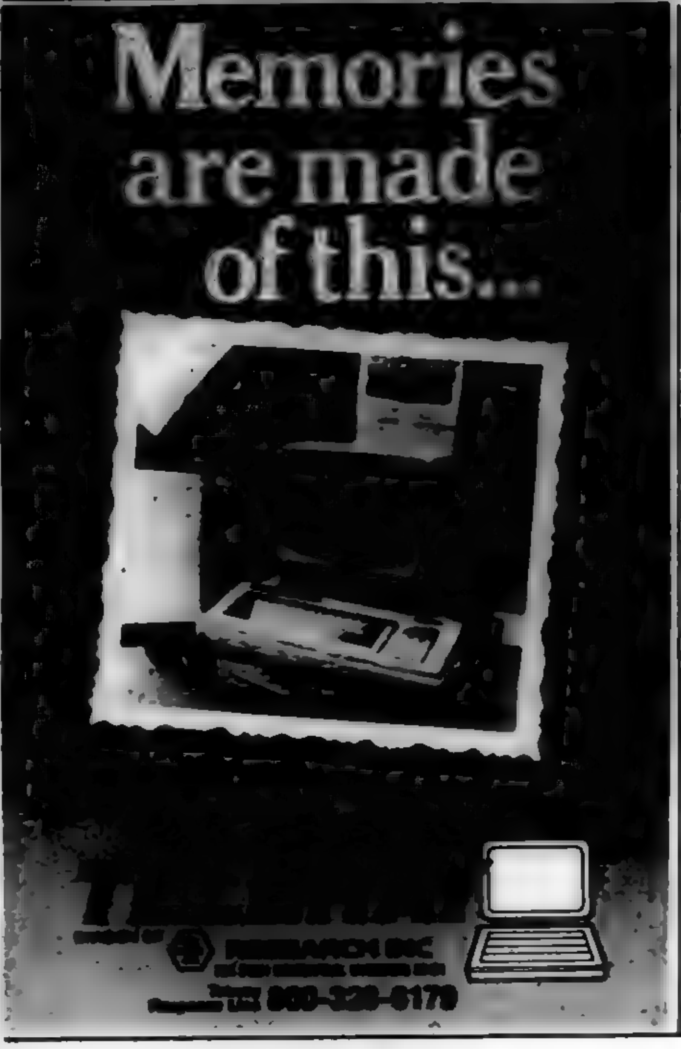
All prices are U.S. domestic. TDP/3000, graphics workstation, COBOL II and HP 250 offers expire October 31.



Based on Eclipse

Manufacturing Turnkey Debuts

HAMDEN, Conn. — A Data General Corp. Eclipse-based manufacturing and distribution system that includes programs for sales, order processing, invoicing, sales analysis, product inventory, purchasing and accounts receivable is available from Computeristics, Inc.

The turnkey system, known as Custom Control, features on-line, real-time order entry, on-line credit checking, multiple warehouse inventory control, on-line inquiry of inventory and customer records, automatic processing of back orders, invoicing of all orders shipped, audit trails and data security.

Each of the system's integrated manufacturing and distribution modules can be implemented selectively as the user requires, the vendor claimed, adding that extensive reporting capabilities are available with each of the modules.

The price for Custom Control ranges between $125,000 and $500,000 depending on hardware configuration, the vendor said from 2 Skif St., Hamden, Conn. 06154.

Basic Four CPUs Get Test Box

KING OF PRUSSIA, Pa. — A microdiagnostic test device called Uptime has been developed by Sorbus, Inc. to detect and isolate malfunctions in Basic Four Corp. 400, 600, 200, 410 and 610 processors.

Once installed, the test equipment enables a computer operator to make a preliminary diagnosis of the problem in two or three minutes, according to Sorbus.

The printout from the diagnostic device will tell the operator in English whether it is a hardware malfunction or some other type, where the problem is located and the type of service required, the vendor said.

Uptime is included with the maintenance cost, which can range between $175 and $750 monthly depending on the system configuration.

Sorbus can be reached at P.O. Box 428, 150 Allendale Road, King of Prussia, Pa. 19406.

Dual-Sided Minifloppy Boosts Micro Storage

WALTHAM, Mass. — Dennison Kybe Corp. has unveiled a dual-sided minifloppy diskette said to provide twice the storage of conventional disks for users of Radio Shack Corp. TRS-80, Apple Computer, Inc. Apple and other microcomputers.

The main feature of the 5.25-in. diskette is that it allows users to record on both the front and the reverse side, the first time such a feature is offered in a mini format, a Kybe spokesman claimed. The disk contains two recording surfaces as well as two sets of write enable and index holes.

Rated for more than 12 million successful passes, the disks cost $5.95 each from the firm at 132 Calvary St., Waltham, Mass. 02154.

Single-User Micro Updated

OAKLAND, Calif. — A Z80A-based single-user system has been announced by Digital Microsystems, Inc.

A direct replacement for the firm's DSC-2 single-user system, the DCS-3 is said to offer technical and engineering improvements, including expandability to multiuser and network systems.

The basic DSC-3 includes a processor with 64K bytes of memory, four RS-232 serial I/O ports, two 8-bit parallel I/O ports, selectable single-density IBM 3740 or double-density System/34 disk formatting, bootstrap and diagnostic read-only memory, real-time clock and two 8-in. floppy disk drives.

The price of $5,495 includes Digital Research, Inc.'s CP/M operating system. Oasis is also available from the firm at 4448 Piedmont Ave., Oakland, Calif. 94611.

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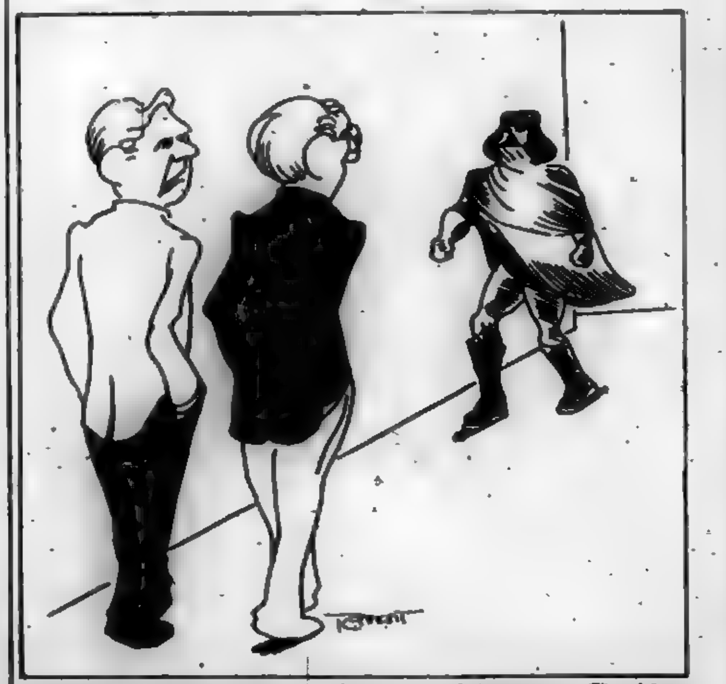

'I'd Like to Introduce You to Our New DP Manager. The Man Is Dynamite!'

Ti-Mix Seeks Presentations

AUSTIN, Texas – Texas Instruments, Inc. Minicomputer Information Exchange (Ti-Mix) has issued a call for presentations for its TI equipment users conference to be held in New Orleans, March 8-11.

Thirty-six sessions – consisting of individual presentations, panel discussions and workshops – are planned. Presentation abstracts are being solicited until Nov. 1.

The conference will feature two exhibit rooms – one for TI equipment and one for Ti-Mix member exhibits.

The event's guest speaker will be Daniel D. McCracken, author, consultant and past president of the Association for Computing Machinery. More information is available from Ti-Mix, M/S 2200, P.O. Box 2909, Austin, Texas 78769.

Univac Offers Printers for V77s

IRVINE, Calif. – Three line printers that reportedly deliver increased output at a price 11% below that of previous models were introduced today by Univac's Mini-Computer Operations (MCO).

Designated the Model 0789 printer series, the line printers for the V77 family of minicomputers are available in three different print speeds – 180-, 300- and 640 line/min, compared with 300- and 600 line/min for previous printers.

The three latest printers offer operator-selectable print spacing of 6- or 8 line/in. and up to 132 print positions.

All three printers use a flexible etched steel band which is available in several languages, including English, Finnic, Spanish and Katakana.

Various character sets ranging from 48 to 192 characters are available on the print bands. The bands are interchangeable among the printers.

The 180 line/min printer can be upgraded in the field to 300 line/min for those customers whose needs expand beyond original system requirements, Univac noted.

Prices, including controller, are $10,584 for the 180 line/min printer, $12,500 for 300 line/min model and $15,650 for the 640 line/min unit. They will be available in the fourth quarter.

Controller Ties Floppy, Multibus

CHAMPAIGN, Ill. – A double-density floppy disk controller that allows the user to hook from one to four double-density standard size floppy disk drives to an Intel Corp. Multibus system has been introduced by Central Data Corp.

The board uses the industry standard FD1791 controller and is adaptable to single and double-sided drives. All write data is precompensated for reliability, according to the firm. All data transfers to and from memory are done by DMA and logic is included for full multimaster capabilities.

The controller costs $415 from Central Data at 713 Edgebrook Drive, Champaign, Ill. 61820.

Subsystem Gives Disk Backup

WILSONVILLE, Ore. – Architape, a 14M-byte cartridge tape subsystem providing disk backup and file transport for Perkin-Elmer Corp. minicomputers and Tektronix, Inc.'s 4081, is being offered by Scientific Enterprises, Inc.

The Z80-based, half-card controller is compatible with MUX and Selch buses. Read-while-writing capability using CRC error-checking guarantees data integrity, the vendor claimed.

The product comes with software that performs "wild card" file save and restore and costs $4,800, the vendor said from 9375 S.W. Commerce Circle, Wilsonville, Ore. 97070.

Pilgrim Power Center Guards Minis, Micros

PLAINVIEW, N.Y. – An ac power conditioner/distribution center from Pilgrim Electric Co. is said to protect minicomputers and microcomputers from induced lightning effects, inductive load-switching transients, ac power line Radio Frequency Interference (RFI) and electro-magnetic interference (EMI).

The Voltector Series 7 includes a 15A- rated, bidirectional Comtrans filter, circuit breaker on/off switch, elapsed time meter and eight, 10 or 12 independently RFI isolated ac receptacles.

For eight outlets, the model R150-8 costs $448; the R150-10 costs $475; and the R150-12 costs $497 from the firm at 29 Cain Drive, Plainview, N.Y. 11803.

HD-11 Gets Option

NATICK, Mass. – Charles River Data Systems, Inc. is offering a 17M-byte cartridge tape backup option for its 20.8M-byte HD-11 Winchester-type disk drives.

The tape option reportedly allows the user to back up Winchester disk drives and transfer software between systems.

The tape backup option costs $2,200 or $8,700 with the HD-11 disk drive, the vendor said from 4 Tech Circle, Natick, Mass. 01760.

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James Martin

This volume explains real-time systems from the points of view of management, systems analysis, programming, and sales. The book discusses design, programming, testing, and implementation of real-time systems. In defining "real time," Martin goes beyond a mere discussion of a real-time computer's essential characteristic (i.e., direct and immediate response to rapidly changing situations). Program testing and system build-up, which are particularly difficult on real-time systems, are discussed in detail. **$21.95**

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Systems Analysis for Data Transmission

James Martin

The most comprehensive and up-to-date treatment of the design and analysis of data transmission systems. This indispensable handbook is in six sections: System Considerations, User Considerations, Terminal Considerations, Network Considerations, Software Considerations and Design Calculations. The last section occupies more than half the book and contains many worked examples. Many organizations with data transmission networks could halve their cost if all of the design alternatives were considered and appropriate computations were performed to select the best. With this in mind, the book lists the alternatives and provides programmed algorithms for comparing them and for optimizing network layouts. **$39.95**

NP837

Introduction to Teleprocessing

James Martin

This volume presents an introduction to teleprocessing which is both comprehensive and enjoyable to read. The book discusses data transmission and how it is used. It explains the nature of the communication links and the hardware that is attached to them. It describes the codes, modems, terminals and methods of line organization. It explains the need for multiplexing and the types of network structures that are used. Software is explained, and the design techniques needed to implement the system are discussed. **$21.95**

NP836

Future Developments in Telecommunications, 2nd Ed.

James Martin

Few fields offer such spectacular business opportunities as the new telecommunications environment with its recent change in political constraints. It is vital that all corporate planning is done with an understanding of the new communications resources. This volume is written for the layperson as well as the technical reader. The book will be studied closely by computer and telecommunications persons but it is perhaps more important that what it has to say is understood by sociologists, businesspersons, corporate strategists, politicians and all thinking people. **$24.95**

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Programming Assembler Language

Peter Abel

This book is a concise, detailed analysis of ASSEMBLER, the efficient language that provides an alternative to languages like COBOL or PL/I. Each chapter covers a separate area of ASSEMBLER and includes sample programs, end-of-chapter exercises, and debugging tips to help newcomers to ASSEMBLER develop effective programming strategy. **$16.95**

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George K. Chacko

This book offers a unified treatment of the use of data to influence prespecified outcomes in the behavior of entities in the public as well as private sectors. Dr. Chacko, one of the great authorities in the field of management information systems, avoids the indiscriminate automating of data processing in the name of "information" and stresses evaluation by management based on the insights that are generated. **$27.00**

[illegible]

Communications Satellite Systems

James Martin

The potential of satellite communications is so great that it can change the entire fabric of society. As petroleum costs rise, large-screen tele-conferencing, interactive education, and new electronic networks will change working and living patterns. Communications satellite technology is often misunderstood. In some ways it is fundamentally different to terrestrial telecommunications. This book attempts to explain the subject, the tradeoffs, and the implications for system design. It is desirable that there should be widespread comprehension of what large satellites could do, so that corporations, the public, and the economy are not robbed of the immense benefits. **$37.50**

[illegible]

Computer Optimization Techniques

William Conley

This book takes a greatly simplified approach to optimization problems and thus lets the computer produce the solution with ease. Computers have become so fast and computer time so inexpensive that it is now possible to state an optimization problem—whether linear or nonlinear—as a highly accurate reflection of reality, then let the computer search all the possible solutions and produce the optimum regardless of the functional form of the problem. This book demonstrates that a nearly optimal solution will be produced for practical problems that necessitate a random search. **$25.00**

[illegible]

Information Management Systems/Virtual Storage

Myles E. Walsh

This practical new DP management guide brings you straight talk on IMS/VS, with hard facts on how to plan, implement, and manage this technologically exciting data base management system. See how to establish a DBMS, get it operational, plan staffing and education, and much more! **$19.95**

[illegible]

The Viewdata Revolution

Sam Fedida and Rex Malik

The Viewdata revolution will change radically the dissemination of information in society and will affect the development of a wide range of business, especially but not exclusively, in the information and communications industries. The authors examine the Viewdata technology, explain what Viewdata is and how it works and they consider the impact of this revolutionary new system on the individual and society. **$24.95**

[illegible]

Ethnotechnical Review Handbook

Daniel P. Freedman and Gerald M. Weinberg

This book describes the "hows" and "whys" for performing formal technical reviews of systems and procedures and their related documentation. The text is directed at system developers and maintainers who are familiar with structured development approaches, walk-throughs, meeting facilitation techniques, and objective problem solving techniques. The contents are organized into five major sections, with a short annotated bibliography and comprehensive index. **$25.00**

WL941

Computer System Reliability

Roy Longbottom

This book explains the practical aspects of reliability, availability, serviceability, and maintainability of computer systems for all those interested in the design, manufacture, maintenance, or use of computers. Numerous examples are given based on reliability and down time as seen by the end user. Areas covered include mainframes, mini-computers, microprocessors, peripheral equipment, communications sub-systems, and software. **$51.95**

NP224

Management Fraud: Deterrents & Detection

Robert K. Elliott and John Willingham

The authors define fraud by classes of perpetrators, by classes of victims and means of perpetration. They discuss the role in detecting fraud and their responsibilities to the public and various government agencies. Also included are viewpoints by various experts such as Myron Uretsky, David R. Saunders, Martin M. Greller, James E. Sorensen and Thomas L. Sorensen, on aspects of auditor's control, deterrents and detection of management fraud. **$25.00**

NP227

Understanding Executive Stress

Cary L. Cooper and Judi Marshall

This pacesetting new book is the first work on executive stress to be based on research with executives and their spouses. The authors discuss the need of some executives for certain amounts of stress, stress from the job environment and from within executives themselves, the beneficial and destructive effects of stress. Three broad strategies are proposed to help individuals and organizations cope with stress and special emphasis is placed on the role adopted by the executive's spouse. **$14.00**

NP216

Successful Data Processing System Analysis

Thomas Gildersleeve

Here's a convenient one-stop reference helping you through every major area where smooth operating management and consulting is essential. Included in this volume are cost benefit analysis, development of functional specifications, creative thinking, data collection, communication, and much more. You'll see how to determine how well the functions in your system are presently being performed. Plus, you'll get scores of real life models, practical guidelines, checklists and on-target pointers. **$18.95**

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U.S. Exports Aiding, Abetting Soviet Military?

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Because sophisticated Western electronics technology shows up in commercial, exportable products long before it does in weapons systems, the Soviet military may be obtaining and applying the technology faster than the U.S. military, according to a Texas Instruments, Inc. executive.

As a result, Charles H. Phipps recently told a Senate committee, the Soviet Union can, through imports, compensate for an electronics industry several years behind that of the U.S., and the two countries could end up deploying weapons of equal sophistication.

Testifying late last month on legislation to restructure U.S. export administration, Phipps, TI assistant vice-president and manager of strategic development, said there has been "a marked shift" in initial application of electronics resulting in commercial uses preceding military applications by as many as seven to 10 years.

"Because of this shift in the driving force behind technological innovation," Phipps said, "militarily critical technologies for future military systems are now making their way to potential adversaries through commercial trade."

He asserted the present U.S. export control system is not well-equipped to tackle this problem but stopped short of endorsing legislation, sponsored by Sen. Jake

(Continued on Page 94)

IBM Tightens Squeeze on 3033 Exporters

By Marcia Blumenthal
CW Staff

U.S. third-party vendors exporting IBM 3033 systems were virtually shut out of this limited but lucrative trade venture last week.

IBM began putting the pincers on the brisk export market last July, when it informed customers that when they chose to "initially install a machine in a country other than the country of delivery and purchase such a transaction may be subject to an Installation and Warranty service charge." The charges were waived for users signing purchase agreements prior to June 30 for equipment shipped no later than Sept. 30, IBM said.

IBM generally made no distinction about the geographic origin of the products, according to several third-party vendors interviewed.

Target of Directive

While ostensibly the IBM user advisory was applicable to all IBM products, third-party vendors agreed that the directive was really aimed at the 3033 system. It is really the only profitable system to export, said George H. Heilborn, president of IPS Computer Marketing Corp.

Although a relatively small number of third-party vendors were involved in exporting, one executive estimated nearly 50% of the 3033s installed in Europe were imported. As of last month, a total of 430 of these systems had been installed outside of the U.S., International Data Corp. said.

IBM said the growing volume of these transactions subjects the firm to significant additional costs in providing such services and in planning for production and the level of support services.

IBM's move is a reaction to the fact that non-U.S. production levels for the 30 series are not being met, Kenneth Pontikes, president of Comdisco, Inc., noted.

With the continuing deflation of the U.S. dollar in Europe in recent months, the savings between a 3033 bought in the U.S. and one purchased in the UK, for example, could be as high as $1 million, one vendor noted. Generally U.S. prices were 25% below those in Europe, another vendor estimated.

Exporting to the UK was particularly prevalent. To combat this practice, IBM UK Ltd in June announced an 11% reduction on the purchase price of Series 30 processors and memory.

Shortly thereafter, IBM advised customers that either they or the third-party exporter would have to obtain a Request for a Price Quotation (RPQ) for systems not purchased in the same country in which installed. This, however, does not apply to transferring systems within the European Economic Community.

In most cases, the RPQ resulted in a surcharge of 10% to 12%, Pontikes estimated. In addition, import duties average 7% and foreign users must adjust the system's power from 60-cycle to 50-cycle for European use.

The price reduction in the UK, the RPQ surcharge and the various duty charges have wiped out any price advantage, causing this export market to dry up, vendors agreed.

Gartner: IBM Readying Assault On Its Eroding Market Share

By John Whitmarsh
CW Staff

PHILADELPHIA — The computer industry is on the eve of the big push by IBM to reverse its eroding market share and to recapture its market position, according to Gideon Gartner, president of The Gartner Group, Inc.

All the evidence suggests that IBM will force the market share issue as early as 1981, Gartner recently told attendees at the 12th annual Society for Management Information Systems (SMIS) conference here.

IBM's strategy is multipronged, in Gartner's opinion, and will include the long-awaited introduction of the H series at the high end supported by a powerful showing in low-end small business computers.

"This will have startling ramifications for the industry," according to the IBM watcher.

Here is Gartner's evidence of the lull before the storm:

Trading of IBM securities has been subdued. "IBM stock has been static over the past four years, while the competition has been very active," the analyst noted.

At $65 per share, the price of IBM stock is $10 below the selling price of 12 years ago,

(Continued on Page 94)

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Senate Told Exports Bolstering Soviet Military

(Continued from Page 93)

Garn (R-Utah), that would establish an independent Office of Strategic Trade to replace the Commerce Department's export administration system.

Garn introduced the legislation in late April, claiming the Commerce Department has failed to protect national security in controlling export licenses of sophisticated technology. The "export promotion bias" of the department has "overwhelmed" its national security responsibilities, according to Garn [CW, May 5].

Although the export administration system was revamped just last year with passage of the Export Administration Act of 1979, Garn claimed the system "has failed miserably" in its mandate to both promote exports and defend national security.

Administration officials at the recent hearings, including Commerce and State Department representatives, defended their export control activities and suggested the proposed bill would only add an additional layer of bureaucracy to an already complicated export licensing system.

Phipps agreed with Garn that "the United States cannot afford to continue muddling through" with its present export control policies and practices, but said the administrative problems of restructuring the system should not be underestimated.

> *'Militarily critical technologies for future military systems are now making their way to potential adversaries through commercial trade.'*

"I suspect it is more a question of will and resource dedication than structure," Phipps said. "On balance, it seems worthwhile to make one final push to get policy implemented within the existing structure. If that fails," he added, an Office of Strategic Trade would have merit."

Stressing the need for quick action to prevent leakage of sophisticated technology to the Soviet Union and its East European allies, Phipps said the number of "commercial technologies with potential military applications, or the so-called 'dual-use' technologies is increasing.

"The control of the 'dual-use' technologies is likely to be more difficult in the 1980s," according to the TI executive, who noted "semiconductor technology in particular, is the driving force for the information revolution, and it will be applied to an increasingly wider spectrum of products.".

Emerging very large-scale integration technology, "if applied to Western weapons systems on a timely basis, can give the West a dramatic lead in sophisticated weapons, military communications and controls," he said.

But "if these technologies are exported to adversaries for commercial use before their military applications are operational at home," Phipps warned, "the Western alliance could soon face an enemy who possesses weapons of equal techological capability."

IBM Readying for Big Push To Regain Market Share

(Continued from Page 93)

Gartner said, but earnings per share have quadrupled in the same period. "From the Wall Street point of view, that makes IBM very elusive," Gartner said.

IBM's share of the domestic market is only 32%, according to a 1979 Gartner study. To IBM management, 31% share of market is absolutely intolerable," Gartner stated.

Comedy of Errors

IBM has suffered a "comedy of errors" in its recent product introductions. "The company could not deliver the 4331, couldn't build the System/38 and couldn't support the 8100 — all of which put great pressure on IBM revenues and earnings," according to Gartner.

User independence, stimulated by plug-compatible manufacturers, did not go unnoticed by IBM, and user independence is now a structural factor in the industry," Gideon said.

IBM has been gearing up for "a major upheaval in information systems" since the early '70s, and Gartner said the company felt it would face its biggest crisis in the early '80s. The crisis would be precipitated by the commodity-like nature of cheap hardware and the domestic and foreign competition it encourages, according to Gartner.

In addition, IBM seriously wondered if the price of technology in terms of millions of instructions per second (Mips) was not coming down too fast for the user community to absorb. IBM apparently still wonders if the market is ready for the 10- to 20-Mips H series, Gartner speculated

Behind all of these developments has loomed the federal antitrust suits against IBM. IBM signed consent decrees in 1931 and 1956; a settlement in the current antitrust suit may come in 1981, Gartner believes.

The settlements at precise 25-year increments have produced what Gartner calls "supercycles" in the computer industry.

"Forget the five- to 10-year product life cycles of the past," Gartner urged his audience. "The latest 25-year supercycle is ending, and we are about to embark on another. It's time for IBM to again change the structure of the industry."

IBM total revenues have climbed 12% per year since 1975; but the company's capital expenditures have shot up more in the same period, Gartner noted.

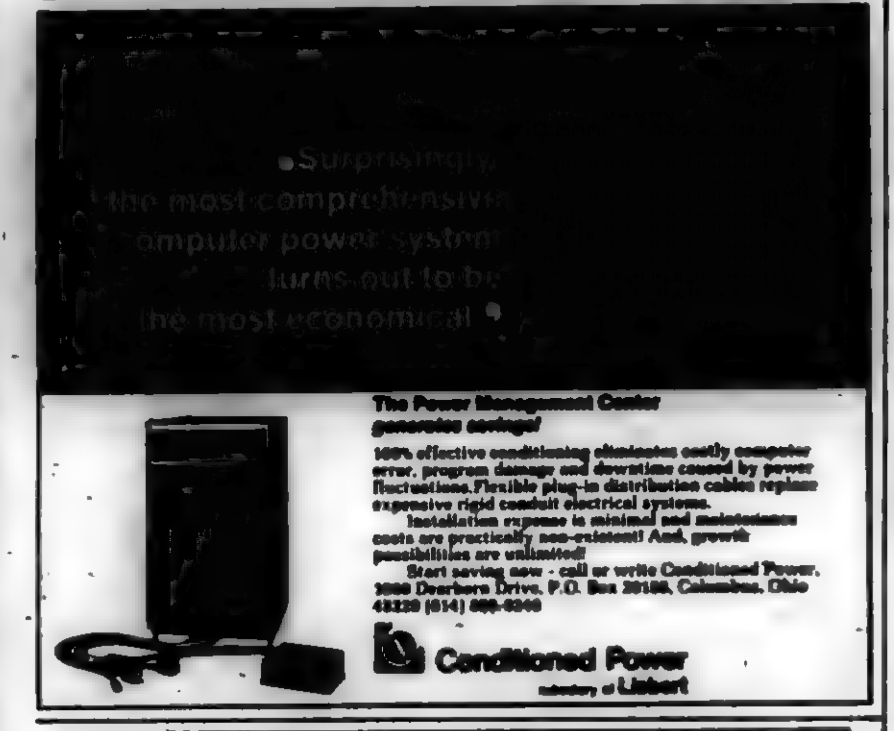
Conclusion: "IBM is now building capacity in anticipation of demand in order to regain market share. Once the current antitrust suit is out of the way, IBM wants to be ready with plant capacity."

In Gartner's view, IBM will apply more muscle in small business systems.

"In small systems, IBM has come from nowhere in 1974 to an overwhelming position in 1979 with the System/38, the 8100 and new customer support centers. IBM is incredibly active in the low end, and small systems are the key to IBM's market share strategy," Gartner emphasized.

As one show of strength, IBM currently has a small systems backlog of $8 billion, more than three times the latest revenues of Digital Equipment Corp., Gartner noted. Additionally, Gartner said, IBM's small systems product line "pretty well overlaps that of DEC."

Gartner also predicted IBM will add a personal computer to its small systems line. Smaller than the IBM 5120, the new processor will be made in Japan and designed to penetrate the Apple Computer, Inc. and Radio Shack microcomputer markets, Gartner concluded.



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Taking Cue From Foreign Rivals

Long-Term Industry Strategy Prescribed for U.S.

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. — The U.S. will have to take a cue from its overseas rivals and develop a comprehensive, long-term industrial strategy if it hopes to counter the threats of stiff foreign competition, declining productivity and growing capital-investment requirements, according to Honeywell, Inc.'s chairman Edson Spencer.

Although the U.S. hardly can be expected to emulate the national strategies of countries like Japan and France, it does need to abandon its short-sighted economic policies and adopt a long-term view toward industrial planning, Spencer said.

Speaking at a dinner meeting sponsored recently by the American Electronics Association (AEA), Spencer urged executives in the high-technology field and other industries to increase their level of involvement in the U.S.' political processes. The country can succeed in implementing a comprehensive industrial strategy — but only if business leaders take an active role in the strategy's formulation, he said.

"We have to turn government into our ally rather than our adversary," Spencer told an audience composed primarily of managers from Silicon Valley's high-technology companies

One of the main vehicles through which business can influence the course of U.S. economic policy is the so-called political action committee (PAC). "Employees at many companies can contribute to a PAC, which in turn actively supports political candidates," Spencer explained. "The AEA has a PAC, and I urge those of you who don't have your own to support it."

Spencer's comments came in an address during which he posed — and attempted to answer — the question of whether the U.S. can cure its pressing social and economic ills and remain "solid-state" as a nation.

Strong Dose of Medicine

Earlier during his talk, the Honeywell chairman took exception with the widespread view that the high-technology field needs increased government protection from foreign competition. Contrary to popular belief, overseas rivalries probably represent more of a boon to the domestic computer equipment and semiconductor trade than a hindrance, Spencer said.

"Foreign competition is like doses of medicine," he explained. "Even though it may not taste good, its long-term benefits far outweigh the initial negative response. Protection only supports our weak industries and costs American consumers in higher prices. Ultimately the inefficient producer loses out, even when protected."

The threat of strong foreign competition promises to keep the U.S.' high-technology field from succumbing to the same complacency and market myopia that have already overtaken the domestic auto industry, among others.

"We [in the computer and microelectronics field] will continue to have to take risks, invest, develop new products and remain competitive because we see great opportunities in front of us and because we know that a strong competition is hard on our heels," Spencer said.

> *'Foreign competition is like doses of medicine . . . Even though it may not taste good, its long-term benefits far outweigh the initial negative response. Protection only supports our weak industries.'*

To maintain their competitive edge in world markets, U.S. computer-equipment and semiconductor manufacturers need to overhaul fundamentally their philosophies and methods of managing people, Spencer said.

During the last few years, employees both inside and outside the electronics field have begun to demand an augmented voice in the way their companies are run. Specifically, they've begun to demand the right to play an important role in deciding, not just what products their firms will make, but also how and where those wares will be made, according to Spencer.

Executives of high-technology companies need to recognize the increased demand for participative management and modify their administrative practices to accommodate those demands, Spencer said.

"Traditional hard-driving, production-type management may not be the best answer to motivating people in the service industries and the main industries like electronics," the Honeywell executive said.

Unfortunately for the U.S., domestic high-technology firms have enjoyed much more success in advancing the technological state of the art than they have in upgrading their management practices, and the consequences of their management shortcomings are visible everywhere.

In Silicon Valley, for example, personnel turnover rates are typically very high, whereas in Japan, employees usually remain with the same company for their entire working lives, according to Spencer.

"No wonder the Japanese semiconductor industry produces such high-quality and cost-effective products," Spencer observed.

In their search for "new, more humanistic ways of managing people," domestic computer-equipment and semiconductor firms would do well to emulate the practices of Japan and other countries whose productivity rates are rising faster than the U.S.', Spencer added.

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Seven Out of Eight Agree

Informal Poll Finds Racism Felt by Black DPers

By Bruce Heard
CW Staff

WASHINGTON, D.C. — Seven people out of eight at the second annual meeting of the Black Data Processing Associates agreed racism exists in the U.S. DP industry, according to a poll conducted there by *Computerworld*.

However, all eight indicated they feel DP job opportunities are abundant for blacks and seven said blacks in DP are doing at least as well as those in other vocations.

Asked whether black-owned DP businesses can compete on an equal footing with white-owned firms, their opinions were more qualified, but said they believe black businesses can compete.

As for the most desirable work locale Washington, D.C., was mentioned most frequently.

Finally, on the best and the worst companies to work for, results were mixed because pollees had ambivalent reactions to most vendor companies.

Individuals polled who were familiar with Public Law 95-507, which requires firms receiving government contracts of $1 million or more to hire minority firms as subcontractors, said that law is frequently skirted by majority companies.

'Still a Lot of Racism'

"There's still a lot of racism, by force or company policy," said Jack Bullock, AM International, Inc.'s district sales manager. "We [blacks] can get in if they have a need for us, but it depends on who you work for. The way the laws are, larger companies in areas like the Northeast Corridor provide a pretty good opportunity if you're qualified."

Like several others, Bullock agreed DP jobs for blacks are more abundant simply because the industry as a whole is growing rapidly and there are more and more government contracts to be filled.

Bullock expressed a negative opinion when asked about the chance of a black-owned DP firm competing equally with a white-owned company. "Both companies being equal in technical and managerial expertise — no," he said. "The black company can operate, but the system won't give them a break."

A former Xerox Corp. employee, Bullock said that firm was good at hiring blacks, but not at promoting them into management jobs. Of PL 95-507, he said, "A lot of companies don't realize the law is there, and a lot don't enforce it unless somebody tells them to."

Carey Moore, marketing representative for Pertec Computer Corp., was the only person who did not affirm the existence of racism in the DP industry: "My basic belief is I haven't experienced racism as such." However, "in the DP area, I do find very few blacks in my position."

Moore said black businesses can compete equally with whites, voiced no opinion on worst job areas or companies to work for, and although he was not familiar with PL 95-507, said, "The conscientious companies will comply with the law."

But Bennie McLeod, manager of data services at Lettercom, Inc., disagreed with Moore about racism: "Without a doubt, it's not a very good situation. Often people are overlooked for certain positions because it's who you know, not what you know."

(Continued on Page 98)

BDPA Meet Spotlights Minority-Owned Firms

Black Data Processing Associates

CW Photo by B. Heard

Newly elected officers of the BDPA are (left to right) Earl A. Pace Jr., president; Myra Anderson, corresponding secretary; Melonease Shaw-Taylor, recording secretary; Wilbur McReynolds, treasurer; and Norman R. Mays, vice-president.

By Bruce Heard
CW Staff

WASHINGTON, D.C. — The advancement of minority-owned DP businesses and the election of national officers topped the bill at the second annual meeting of the Black Data Processing Associates (BDPA) here Sept. 20-21.

Washington, D.C., Mayor Marian Barry kicked off the meeting Saturday by telling the 50 attendees that DP "is an area that has been controlled by nonblack people. It is a field that is growing and, therefore, you have to be there. I learned a long time ago, you have to be there or decisions will be made for you."

Anthony Goode, business development specialist at the Small Business Administration (SBA), told BDPA members at the Minority Business Roundtable on Sunday that the SBA has programs to help minorities obtain federal loans, but the process is an arduous one.

Loan Program

The key to minority loans at the SBA is the "8(a) Program," an effort to promote equal access for socially and economically disadvantaged individuals to participate in the business sector of the nation's economy, he said.

"We have the largest number of 8(a) firms in the nation here in Washington, D.C.," Goode noted, adding the Carter Administration has set a goal of allocating $2 billion for 8(a) procurement.

"We are going to reach that, but I consider it a pittance compared to what companies like Chrysler have received," he said.

Boon to Business

The passage of Public Law 95-507 is a boon to minority businesses, as long as it is enforced, the business development expert commented. PL 95-507 requires majority businesses that receive government contracts in excess of $1 million to seek out minority firms to use as subcontractors.

Asked about enforcement of the law, Goode replied, "It's something we have to look at very closely because we know it will be used against us. You must realize we still live in a racist society."

In an effort to make sure the law is complied with, "small and disadvantaged advisers" are at all federal agencies monitoring $1 million contracts, he said.

Another aid to minority businesses is the Minority Business Administration, a nationwide organization that

(Continued on Page 98)

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Informatics Inc

Blumenthal Takes Burroughs Reins Early

Paul S. Mirabito

DETROIT – W. Michael Blumenthal took over as chief executive officer of Burroughs Corp. late last month after Paul S. Mirabito stepped down three months earlier than expected. Blumenthal will also succeed Mirabito as chairman of the board on Jan. 1. Until then, Mirabito will continue as board chairman.

In disclosing the surprise move, Mirabito said Blumenthal's early election to the top slot at Burroughs would facilitate a more orderly transition.

Since Blumenthal left Bendix Corp. to join Burroughs last February, industry observers have anticipated a management shakeup at the firm.

Perhaps signaling the start of other changes to come, Mirabito also announced that Jerome Jacobson was named vice-chairman and a director of the firm. A long-time associate of Blumenthal, Jacobson, who until recently was executive vice-president of Bendix Corp., will spearhead Burroughs' strategic planning activities.

These management changes come at a time when Burroughs is experiencing some difficulty with earnings and production. Although a tightly managed and profitable firm, Burroughs in its second quarter announced an earnings drop of 12%, the first time in 17 years earnings did not top a previous quarter.

In addition, Burroughs has reportedly experienced some production problems with its new 900 series.

W. Michael Blumenthal

Cbema Reports Exports Rise 35% In Last Quarter

WASHINGTON, D.C. – Exports of computers and business equipment during the second quarter rose 35% to $2.1 billion from $1.5 billion in the same quarter a year ago, according to statistics recently released by the Computer and Business Equipment Manufacturers Association (Cbema).

Exports of computers and related equipment led the quarterly surge, accounting for $1.8 billion, up 41% from last year's second quarter. This represented 85% of total business equipment exports.

Computer and business equipment imports totaled $701 million – only 5.8% more than 1979's second quarter, Cbema reported.

For the year to date, exports of computers and parts rose 37% to $3.5 billion while imports totaled $524 million, up 6.9% from the first half last year.

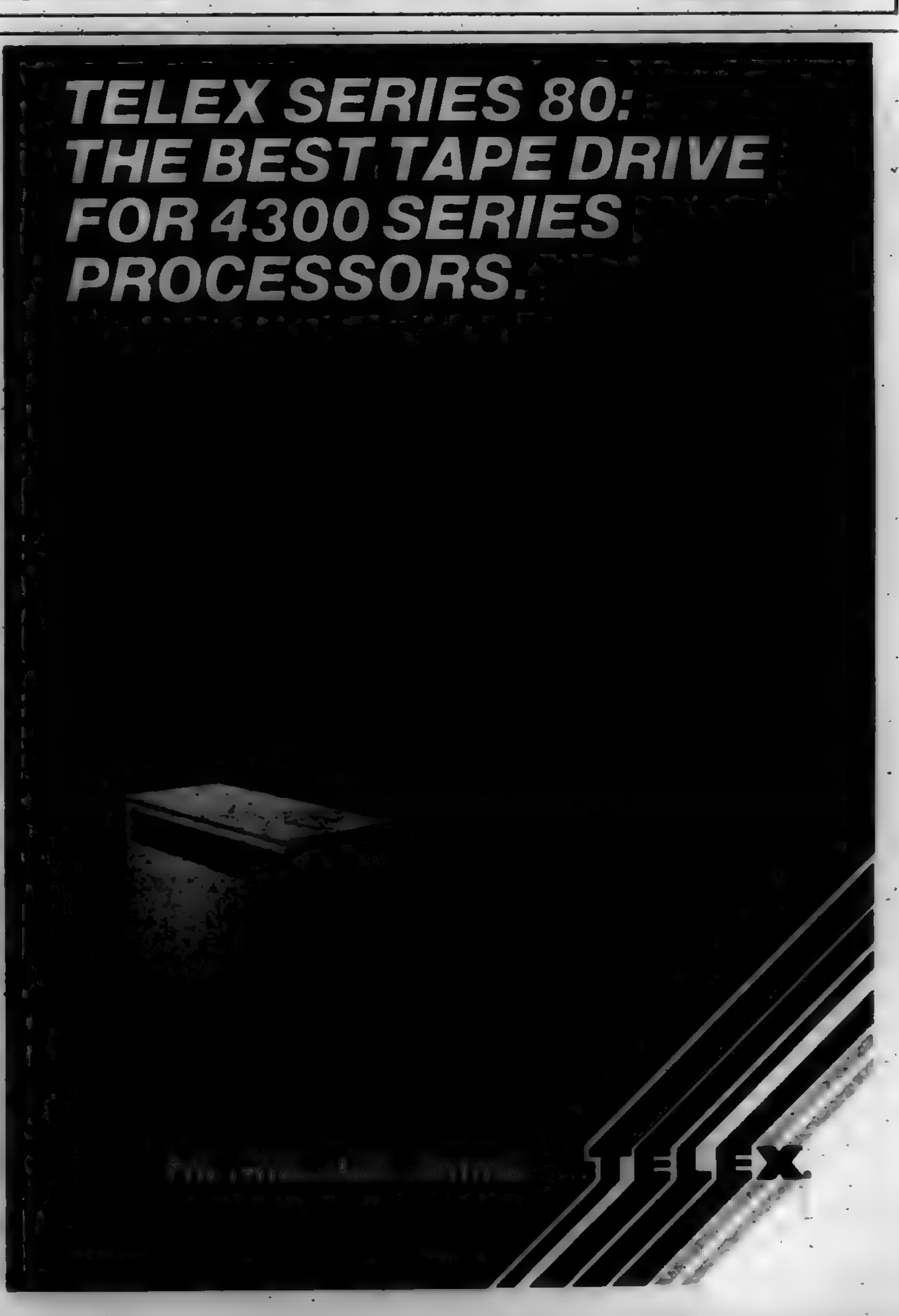
As a result, the positive balance of trade for the computers and business equipment industry was more than $850 million ahead of last year's favorable trade balance. Cbema expects a favorable trade balance for 1980 of at least $5 billion.

TRW to Service Dataproducts

WOODLAND HILLS, Calif. – Dataproducts Corp. has signed a five-year agreement with the Customer Service Division of TRW, Inc. that makes TRW the exclusive authorized U.S. field service representative for Dataproducts printers.

Until now, all Dataproducts service had been provided by its own customers. Although Dataproducts sells primarily on an OEM basis, many of its customers did not have service capability, the firm noted.

TRW's service will include on-site installation, contract and per call maintenance. TRW will initially offer its service from eight locations in six cities, but the agreement calls for TRW to expand its capability to a minimum of six new cities each quarter. That will make service for Dataproducts printers available from 50 cities within two years.



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Poll Shows Racism Widely Felt by Black DPers

(Continued from Page 96)

McLeod acknowledged the increase in minority job opportunities, but expressed concern over the low number of black managers in DP. On the question of PL 95-507, he said some companies are hiring more minority companies than the law requests.

'It Exists'

An assistant underwriter for the Federal Home Loan Mortgage Corp., Maxine Diggs said, "It exists," when asked about racism, and related her experiences at Digital Equipment Corp., her former employer.

"They like to keep blacks on a low level," she said of DEC. "Their excuse is they want to hold them back until they can place them. I must say, they do a very good job of hiding it."

A senior analyst who asked to remain anonymous did not mince words when discussing racism: "It certainly exists and you can see it in all phases of data processing," he said. "Whites receive special educational favors and learn new advanced techniques."

He predicted whites will be the first to "get into the nuts and bolts" of IBM's H series and thus "gravitate to the top" while blacks are left behind.

Racial Unity

Whites employ racial unity to push other whites up the job ladder and stifle unfavorable conversations about whites, the analyst maintained, adding they frequently confer before meetings in order to present a united front at the meetings.

"IBM and Computer Sciences Corp. are the best and the worst when it comes to employing blacks," he said, adding they are good at hiring, but not at advancing blacks. Stewart could not work at IBM because "I would train the young people to go out to war, so to speak."

Univac is not a desirable place for blacks to work because "they have a high percentage of uneducated people in management," he said.

Joseph Stroy Sr., installation specialist with DEC, called racism in DP "subtle" and no more prominent there than in the country as a whole. DEC is a good company to work for "if you qualify" and, given equal resources, black DP firms can compete with white ones, he said.

Elections Held At BDPA Meet

(Continued from Page 96)

helps minority businesses formulate loan requests, Goode said.

Herbert Byrd, owner of Computer Based Systems, told round-table attendees he has trouble finding technically and managerially qualified minority members. Despite that difficulty, he persists in the search.

"I feel the management should reflect the minority ownership," he said, adding minorities should attempt to acquire management skills such as proposal writing early in their careers. "People have to see you want to be a manager," he said.

Like the other speakers, Charles Stewart, a senior analyst with the D.C. government, stressed the availability of DP jobs in the D.C. area. "I have identified 50 job openings from GS-14 to GS-5 levels," he said.

An abnormal number of early retirements has opened the door to minorities seeking employment, he noted. "Get into the District government and get a foothold," he advised. "There is lots of mobility among district agencies."

BDPA Growth

Before the election of officers, Earl A. Pace Jr., who was subsequently elected BDPA president and chaired the business-like meeting, reviewed the growth of the BDPA and presided over the adoption of national bylaws. Of their adoption, he said, "This makes us a truly national organization."

As a result of an article in *Computerworld*, the BDPA has received inquiries from several states, including Louisiana, where 15 people have expressed an interest. "That's a chapter in itself," Pace noted.

There were also status reports from two of the group's three chapters in Philadelphia, Cleveland and Washington, D.C.

Norman Mays of the Cleveland chapter said members there are riding along on the coattails of the city's revitalization and hope to cash in on some substantial city and federal contracts. Such has not been the case, so far, he said, because "One of the things we lack is we don't know what's going on when those big contracts are being made."

However, like other members, he stressed the fact the BDPA is not lamenting past or present failures, but rather working optimistically toward future successes. Mays was elected vice-president.

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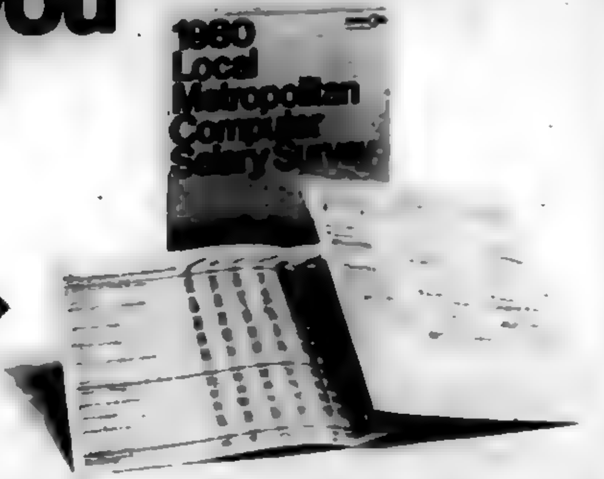

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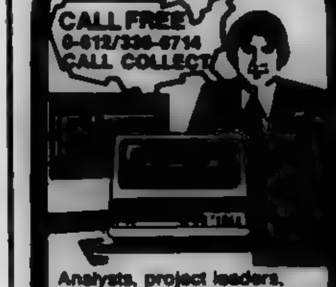

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Interested applicants should send resume in confidence to: Gary Sprehe/P.O. Box 10508, M.S. 5890/Lubbock, TX 79408.

TEXAS INSTRUMENTS
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An equal opportunity employer M/F

Director of Computer Systems

A rapidly-growing, profitable consumer soft goods company located in the New York metropolitan area, we seek a dynamic professional to manage our new computer systems.

To qualify for this position, you must know MUMPS language, and you must have 2-5 years of prior business experience using MUMPS in computer programming. At first, you will supervise our staff of programmers with excellent opportunity for your career to advance further within one year.

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Please reply in confidence, furnishing us with your employment history and present compensation, to

CW Box 2460
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PROGRAMMER ANALYSTS AND PROGRAMMERS

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You can see your ideas grow into complete systems because the minicomputers we design and produce are *total systems*—complete with hardware, firmware *and* fully integrated software. We are expanding. We have current openings in 15 software categories ranging from very senior positions with heavy operating system architecture responsibilities, to entry level positions for programmers. All have at least 3 things in common.

(1) They offer defined career paths and progressions that can take you to the top of your profession.

(2) They position you in an operation that shortly expects to command an impressive 12% of the *overall* micro/mini market.

(3) NCR/Wichita offers a flexible methodology and informal taskforce approach to problem solving. Nobody gets locked into a specialty. We provide 100% tuition reimbursement for Master's Degree Program at local university.

Match your qualifications to specific opportunities in these areas:

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- Operating system architecture
- Logical, physical, communication I/O

Senior Programmer Analysts
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- Design/program manufacturing control systems
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- Design hardware design aids
- OS enhancements, support, maintenance
- Virtual system installation/maintenance
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- Integration/test software products
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Learn more. Send confidential resume and salary history to:
Paul Coudron, Professional Placement, Dept. J60
Engineering & Manufacturing, NCR Corporation, 3718 N. Rock Road,
Wichita, KS 67226.

NCR
Complete Computer Systems

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Paradyne Corporation has secured a key role in the future world of Data Communications through innovative engineering and design concepts. Our professionals today are continuing our sound, successful growth with creative, dedicated approaches to the challenges of tomorrow. We are seeking:

SOFTWARE DESIGNERS

- Designers working on our IBM 370 front end extenders need experience on 16 Bit minicomputers in real time, I/O, handlers, drives and/or systems environment using BAL; IBM Systems experience a plus.
- Experience with the design and development of Systems software, for the UNIX Operating System and the C Language.
- To develop, from inception, our operating system and program products requires knowledge of operating systems and data management access method using BAL or equivalent large mainframe languages.
- Individuals needed to develop our COBOL compiler for the 370 mainframe must have BAL experience; knowledge of COBOL and internals of a compiler is an asset.
- We need individuals with BAL and 16 Bit mini and microcomputer experience; Fortran and Bisync and/or SDLC protocol experience helpful. Knowledge of Modem hardware and interface of terminal equipment also beneficial.

PROGRAMMER/ ANALYST

- Experience with RPG II in an on-line environment using the IBM SYSTEM 34 and business applications background.

As a respected member of our dynamic growth picture, you will receive a salary commensurate with experience, a full benefits package and unlimited growth potential. Please forward your resume, outlining work history and salary requirements, in confidence to:

paradyne

John E. Zoff
Director of
Professional Recruitment
PARADYNE CORPORATION
8550 Ulmerton Road
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ADVANCED SYSTEM PRACTICES CONSULTANTS

Leading international public accounting and consulting firm seeks experienced personnel with expertise in advanced systems and data processing skills. The positions are in the World Headquarters research and consulting group. Responsibilities include consulting with our personnel and clients on high technology engagements and conducting research in advanced system practices. Candidates should have substantial (4-5 years) technical experience with credentials in one or more of the following areas:

- Detail knowledge of CICS with ability to generate CICS and do performance timing.
- Detail knowledge of IMS DB/DC and thorough understanding of logical and physical design.
- Data communications with a detailed knowledge in communications hardware and experience with IBM's SNA.

Candidate must have a college degree, preferably in computer science, MIS, business or engineering. Demonstrated technical skills must be combined with exceptional written and verbal communication skills.

Starting salary will be from high $20's and up, depending on qualifications plus relocation. An opportunity for rapid advancement exists in our organization, with a full employee benefit plan available.

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SYS.ANAL.(2)-Univac	[illegible]
SYS.ANAL.-Ins., PMS,IBM	[illegible]
SYS.ANAL.-Distribution	[illegible]
PROG.ANAL.-Cobol, Burroughs	[illegible]
PROG.ANAL.(5)-Ins. apps.	[illegible]
PROJ LEADER-Bank,IMS,D.B.	[illegible]
SYS. DESIGNER(2)-IDMS,IBM	[illegible]
SR.PROG.-NCR,Mission	[illegible]
PROG.ANAL.-MRP,CICS	[illegible]
DATA BASE ADM.-Total, IMS	[illegible]
PROG.ANAL.-Cobol,Burroughs	[illegible]
PROG.-DEC PDP11,Fortran	22K
JR.PROG.-IBM 3033,Ins.	18K
JR.PROG.-Cobol,Fin.apps.	18K
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E.D.P.

Sr. Prog. — IBM, COBOL, CICS	mid 20's
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P/A — FORTRAN	to 20K
P/A — Honeywell, COBOL	to 20K
Sys. Prog. — IBM, BTAM, CICS	hi 20's
S/A — Burroughs, COBOL	to 24K
S/A — IBM 3 or 34, RPG II	to 20K
S/A — Univac	to 20K
Proj. Mgr. — COBOL, data base	mid 20's
DP Mgr. — IBM 3 or 34, RPG II	to 30K

Contact Betty [illegible]
(Call Collect) — Phone 615-[illegible]
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Nashville, Tennessee 37203

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(404) 955-4221

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Design, implement comm'l and industrial programs in BASIC IV and IDOL database system. Analyze programming needs; negotiate sales and service contracts; assist management. Needs M.S. Computer Science; 3 yrs exper. comp. systems analysis incl. 1 yr accounting systems; know BASIC IV language, eqpmt, IDOL system. 40 hrs/wk + O.T.; $1,800/mo. + 1 1/2 O.T. Resumes to General Universal Systems, 6161 Savoy #1034, Houston, Tx., 77036.

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DEPARTMENT OF OPERATIONS RESEARCH and INFORMATION SYSTEMS
COLLEGE OF BUSINESS
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Responsibilities include administration of twelve (12) faculty members and the department's computer laboratory, as well as developing industrial relationships, promoting professional activities and classroom teaching.

Applicants should have a Ph.D. or D.B.A. and a strong background in computers or operations research in addition to demonstrated research capability, leadership potential, and commitment to teaching excellence. Salary $[illegible] - $47,181, commensurate with qualifications and experience, plus a comprehensive fringe benefits program. Starting date July 1, 1981.

Completed applications are requested by November 14, 1980; however, the search shall remain open until the position is filled. To be considered for the position a standard application may be obtained and MUST be returned with a resume and three (3) references to:

Eastern Michigan University
Personnel Office
112 C.W. Welch Hall
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(313) 487-3430

Affirmative Action/Equal Opportunity Employer and Educational Institution

Apply yourself at National Advanced Systems.

At National Advanced Systems, we're looking for talented computer professionals with the energy and initiative to fully utilize their technical expertise in advancing their careers. And, as a dynamic young company, we can provide just the right kind of environment for career advancement — one that encourages and rewards individual achievements.

So take the first step in proving your initiative. Apply yourself by calling Ursula Shepherd toll-free at (800) 227-1966, to discuss these immediate openings:

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We need self motivated individuals to consult and provide technical support to field sales and marketing. Candidates must be able to write and present technical materials and be knowledgeable in the internals of IBM virtual operating systems (MVS, SVS, VS1, VM or DOS/VS). College degree or equivalent experience is required. Openings are available in Tampa, Los Angeles and points in between.

Field Engineers

If you have the skills and ability to excel in field engineering, you'll be recognized for it at National Advanced Systems. We have field engineering openings nationwide which require an AA degree in electronics or equivalent military experience on IBM 370/158 or larger CPUs or associated peripherals experience.

Field Support Representatives

These positions offer the opportunity for people with a dynamic approach to problem solving to resolve problems in customer systems software, provide an interface between the support organization and IBM, assist field engineering with problem determination, and assist systems support representatives in running benchmarks. Candidates must be experienced in problem solving with systems control programming.

If you can't call, send a letter of inquiry or a resume to Ursula at National Advanced Systems, 3145 Porter Drive, Palo Alto, CA 94304. We are an affirmative action/equal opportunity employer m/f/h.

National Advanced Systems

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L.D. Schreiber Cheese Company Inc., a fast growing national, private label food manufacturing company with sales in excess of $500,000 per year, is rapidly expanding the corporate data processing staff to meet the needs of the 80's.

We offer challenging opportunities in an expanding on-line data base environment for experienced:

- **PROGRAMMER/ANALYSTS**
- **DATABASE ADMINISTRATORS**
- **SYSTEMS PROGRAMMERS**
- **MANUFACTURING DATABASE MANAGERS**

These positions require a BS degree or the equivalent, plus several years experience.

Currently we are running a 370/148 under VM with CMS, SCRIPT/370, RSCS, and OSE with a 4341 on order. The on-line database portion consists of OS/VS1, IMS, CICS and DMS. We are establishing a local and nationwide network of the latest teleprocessing hardware.

We can assure a future filled with growth, opportunity and challenge by sending your resume and current earnings to:

Corporate Staffing Director
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Computer applications will continue to play a central role in our success. Those who join us will discover a professional environment and team approach that promotes broadened technical exposure and significant career advancement.

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SENIOR PROGRAMMER/ANALYST — MARKETING & SALES

Lead a project team in developing and/or enhancing interactive decision support systems for our Marketing and Sales divisions. Responsibilities include systems analysis and translation of requirements into logical, economical and practical systems designs. Also preparation of detailed specifications, including interface and data-movement diagrams, formats of files and reports, computer resources requirements and documentation.

Requires at least 5 years solid experience as a programmer/analyst or systems analyst, as well as bachelor's degree, preferably in Computer Science or Business Administration specializing in marketing/sales. MBA a plus.

PROGRAMMER/ANALYST — MARKETING & SALES

As a project team member, you'll develop and implement interactive decision support systems for our Marketing and Sales divisions. Responsibilities will include preparing detail program specifications, designing and testing program logic, coding and installing programs in computer operations. You'll also assist in system analysis and translation of requirements into logical, economical and practical system design.

Requires bachelors degree or equivalent preferably in Computer Science or Business Administration specializing in marketing/sales plus at least 3 solid years as a programmer or programmer/analyst.

Both of the above positions require excellent command of COBOL, and working knowledge of statistics. IBM background with knowledge of MVS, JCL, TSO/SPF, FOCUS or Ramis, and programmable TSO CLIST preferred. Background in a consumer products business and/or a marketing/sales development function a plus.

SENIOR PROGRAMMER/ANALYST — INVENTORY & DISTRIBUTION

Initial assignment will be to support development/implementation of an inventory management system. You'll then develop a practical, economical warehouse control system. Will work with users to optimize control and data security as well as efficiency of resource usage. You'll also design forms and reports, data-collection procedures, high level control logic modules and system documentation, as well as providing technical leadership to other MIS team members.

Requires BSCS or equivalent, at least 5 years of directly applicable experience, at least 2 or 3 of which must be in the use of COBOL for development of IMS/Teleprocessing/Batch processing.

PROGRAMMER/ANALYST — INVENTORY & DISTRIBUTION

As a project team member, you'll develop and implement phases of an inventory management system. Responsibilities will include preparing detail program specifications, designing and testing program logic, coding and installing programs in computer operations. Following this system development will then proceed in the area of warehouse control systems design.

Requires BSCS or equivalent and at least 3 solid years as a programmer or programmer analyst with use of COBOL for development of IMS/Teleprocessing/Batch processing systems.

To arrange for a personal confidential interview, please call (302) 674-6133 COLLECT, or mail your resume, including salary history, to Paulette Peterson, Recruiting Manager:

IPI International Playtex, Inc.

Box 631, Dover, Delaware 19901
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PROGRAMMER/ANALYST

Req. 6 mth. training and two years experience in planning, producing and documenting standard application software under COBOL and BASIC and the development of utilities under Assembler. Experience in installing minicomputers and troubleshooting of hard- and software is also required. 40 hr/week, AC office, 1200$/mth. Contact DESIGN COMPUTER, 444 S STATE, SLC, UTAH 84111/(801) 531-[illegible].

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If you have a BSEE, BSCS, BS in Physics or equivalent, we have many openings in Arizona, California, Texas, and Florida.

Your name, resume & present employer will not be given out without your permission.

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Don Pullman — [illegible]

PULLMAN PERSONNEL
[illegible] N. Central, Suite 1700
Phoenix, AZ [illegible]

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PULLMAN PERSONNEL
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Phoenix, AZ [illegible]

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Bank of America is expanding the capabilities of its large network of branch computing facilities. We are seeking top professionals to play a leading role in this effort.

The network will be SNA with Multiple system/370 IMS host systems. You will develop software for over 1000 remote computers. The terminals include 10,000 CRT's and an expanding network of Automated Teller Machines (ATM). Programmable controllers are employed.

You should have a broad background in these areas:

- Communications programming for SNA/IMS
- System generation problems/solutions
- Maintenance of software for multiple systems
- Mini-computer environments
- MACRO-11, PL/1, COBOL, Pascal

Specific knowledge of at least one of the following is required:

- SNA (IMS-SLU-P)
- Bunker Ramo Banktran, ATM
- IBM 3600, 8100
- Burroughs CP9500, NDL, MCS

A B.S. Computer Science will be considered a plus. Salary will be commensurate with your experience. Benefits are excellent. You will work in metropolitan San Francisco which offers a wide range of cultural and recreational activities.

If this opportunity interests you, please send your resume and salary history to Bank of America, Charles B. Smith, Dept. 3411N, P.O. Box 37000, San Francisco, Ca 94137. We are an equal opportunity employer.

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We have multiple openings available for D.P. sales professionals with an extensive knowledge of the D.P., telecommunications and computer service marketplace with an established record in the D.P. sales field. Must be an excellent communicator. Some supervisory skill a real plus.

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Sun INFORMATION SERVICES COMPANY

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Salary commensurate with qualifications and experience.

Send resume to: Perpetual Systems, Inc.
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or call John Ford collect at (212) 363-3715.

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AERO SERVICE
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EOE M/F

SYSTEMS ADMINISTRATOR

World Vision, an evangelical humanitarian organization, needs a Systems Administrator to lead a small technical support staff responsible for system software installation and maintenance, and application software installation. Requires 5 yrs exp as system analyst, prefer min of 1 yr exp with DECSYSTEM-10 or -20.

Send resume to John [illegible], World Vision, 919 W. Huntington Dr., Monrovia, CA 91016.

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Rapidata offers attractive compensation packages for these positions, including base salaries, performance oriented incentives and full benefits including 100% tuition refund program and employee stock purchase plan.

To learn more about Rapidata and career opportunities in sales call Howard [illegible], Coordinator, Professional Recruiting, (201) 227-[illegible], or forward your resume including salary history and requirements to: Rapidata Inc., 20 New Dutch Lane, Fairfield, New Jersey 07006.

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rapidata

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data processing

SENIOR SYSTEMS PROGRAMMER

Red Lobster Inns of America currently has a challenging position available for a talented professional in a dual 4341 processor environment operating under VM OS/VSI utilizing CMS for time sharing network.

Candidates must have a Bachelor's Degree, at least 3-5 years experience having responsibility for hardware, software and telecommunication network.

We are offering the successful candidate an excellent salary, full and complete benefits package, plus an Orlando, Florida progressive working environment.

If you qualify, send your resume with salary history to:

Donna Provenzano
Red Lobster
Inns of America
P.O. Box 13330
Orlando, Florida 32859
(800) 327-1048 - TOLL FREE

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PROCEDURES ADMINISTRATOR

Universal-Cyclops Specialty Steel Division has an immediate opening at our Division Headquarters for a Procedures Administrator. Candidate should be degreed, or equivalent, and have a minimum of 3 years' of EDP experience in a business environment, and possess strong verbal and written communications skills.

The successful candidate will be involved with the development of EDP Standards, administrative procedures and disaster recovery plans. Knowledge of distributed data processing, COBOL programming, word processing, and EDP job scheduling is desirable, but not required.

For immediate consideration, submit resume, salary history, and expectations, in complete confidence, to:

UNIVERSAL-CYCLOPS SPECIALTY STEEL DIVISION

cyclops
CORPORATION

Industrial Relations Department
650 Washington Road
Pittsburgh, PA 15228

An Equal Opportunity Employer M/F

DATA PROCESSING

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Dallas, Texas 75231 (214) 696-1900

2900 North Loop West, Suite 1300
Houston, Texas 77092 (713) 680-2100

Informatics Inc
Professional Services Operations West
Equal Opportunity Employer M/F

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WE'VE MADE OUR MOVE-NOW IT'S YOUR TURN!!!
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These services include EDP management consulting, systems analysis and design and programming support. CHC's technical staff, has developed and implemented On-Line systems, as well as major commercial batch systems.

Due to continuing growth and recent staff promotions, Computer Horizons Corp. is seeking to increase our already existing staff in New York, New Jersey, Chicago, Miami, Houston, Oklahoma and San Francisco, with EDP professionals who:

1. Have a strong drive to succeed
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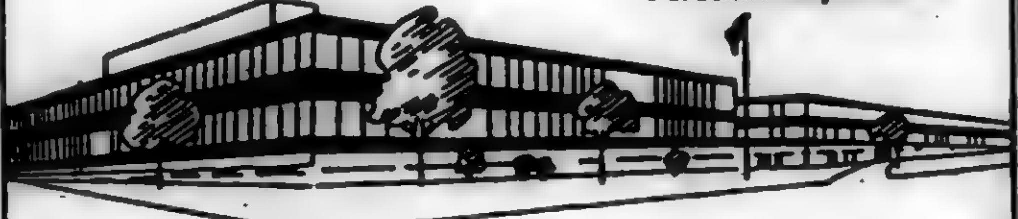

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A manufacturing firm in north west Pennsylvania has immediate need for Systems/Analyst. An innovative individual needed to assume responsibility in developing computer systems to solve business problems. Ability to interact with all levels of management is important. Excellent communication skills are essential. BA/BS degree in Business, Finance or related field required. Three years experience in the design and implementation of computer systems built in a DB/DC environment required. Salary is open and company offers an excellent benefits program with relocation. Please forward resume and history of earnings in confidence to:

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New department of Data Processing is being created to support a hospital-wide health information processing system.

We are a progressive 315 bed referral center located in Traverse City, Michigan. Due to continued growth we are looking for an individual interested in challenge, opportunity and a satisfying work life to supervise the activities of our newly formed data processing department.

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Leading international public accounting and consulting firm seeks an experienced user-installer of large scale IBM 370 general ledger application software. The position is in the World Headquarters software research group in Chicago. Responsibilities include monitoring package status of various vendors, evaluating new packages and releases and assisting our personnel and clients in evaluating and implementing application software.

Candidate should have an MBA or MS in computer science or a bachelor's degree with an accounting major. A minimum of 3-4 years experience in accounting systems including substantial recent package implementation is required. Demonstrated technical skills must be combined with exceptional written and verbal communication skills.

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Requires IDMS design and implementation experience, along with use of the IDD and background with IBM 370. Prefer at least 6 years MIS experience and BS degree or equivalent.

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Prefer minimum 2 years programming/analyst experience with heavy emphasis on implementing financial reporting systems, particularly general ledger.

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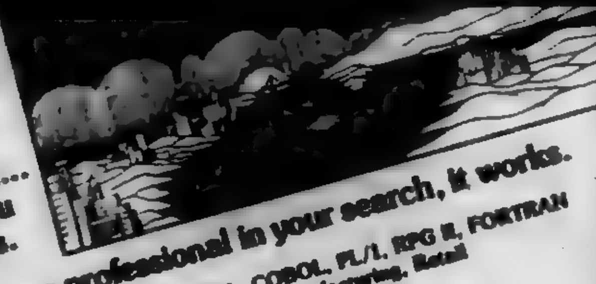

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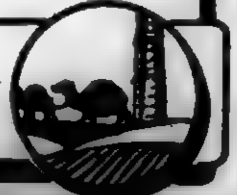

TECHNICAL WRITER

Excellent opportunity for an individual with a minimum of 2 years technical writing experience to join a growth oriented Data Processing company located in Dayton, Ohio. Position will report directly to the Supervisor of Technical Publications. Must be able to write user-oriented documentation for software systems in clear and concise language. Must have IBM mainframe experience.

If you feel you might be qualified for this opportunity, please submit a resume or descriptive letter in confidence to:

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SR. SYSTEMS PROGRAMMERS

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System Hardware: Amdahl 470/V8, ITEL AS/6, IBM 4331, 3330 and 3350 Shared DASD, COMTEN Communications Controller, BSC State-wide Communications Network.

System Software: MVS 3.8A, VS1, JES2, TSO, CICS/VS, IMS/DL1, TCAM, BTAM, Complete, ADABAS, COMTEN NCP, RESOLVE, CMF/RT.

Successful applicants will be responsible for the installation, maintenance and integrity of the system software.

Minimum requirements are a Bachelor's degree in Computer Science plus a minimum of 4 years experience in programming with at least 3 years in systems programming. An equivalent combination of education and/or employment may be substituted. Starting salary is negotiable depending on education and experience. Please send resume by October [illegible], 1980 to **Office of Personnel Management, Attn. [illegible], 130 State Capitol, Salt Lake City, Utah 84114. Phone 801/533-[illegible].**

FLORIDA PROGRAMMER ANALYST

International Corp. located in S. Fla. offering outstanding opportunity. Position requires 370/OS, COBOL background with strong financial business design experience. You will interface at various dept. levels within the Corp., participate as a Sr. Analyst on financial projects. Full relocation package to out-of-town applicants, excellent benefit program. This Corp. has emerged as one of S. Florida's finest D.P. centers. Experience in manufacturing is a plus! Salary to $[illegible]

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Please call or rush resume and salary history in confidence to:
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USA Interviews During October

Write:
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[illegible] Cochituate Rd., Rte. 30
Framingham, MA 01701

DATA PROCESSING MANAGER

Teaching hospital in Kansas City Missouri is seeking an experienced individual to head up a data processing department of 20 employees. Position reports directly to associate executive director. Systems include IBM 4341 and many on-line programs. Hospital management experience and college degree preferred. Hospital committed to full implementation of HIS. Submit resume and salary requirements to:

[illegible]
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Use your technical knowledge and expertise to train our PDP-10 and PDP-11 Hardware Maintenance Personnel.

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You will apply your PDP-10/11 Software experience to integrate existing Diagnostics into Exerciser, then code and create a Diagnostic Operating System.

For more information call Pat or Diane at 408/446-7611, or send your resume in confidence to:

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10231 Bubb Road
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Attn: Pat/Diane

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Test Equipment Design Engineer

We currently have an opening in our Test Equipment Design group for an individual with three years' experience in computer test equipment design. The qualified candidate will be responsible for the design and/or updating of ringout and power supply testers, auto burn-in racks, and other analog/digital devices, as well as provide work direction to 2-4 technicians. A BSEE or equivalent experience plus the ability to work with minimal supervision are required. Salary will be $20,000 per annum.

Interested candidates should forward their resume, with salary history, in confidence to L. J. Doherty, HONEYWELL SSTD, 300 Concord Road, Billerica, MA 01821.

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For immediate consideration, or to receive our Career Opportunities booklet, forward a resume in strict confidence to: Ms. Toni Yourdon, YOURDON inc., 1133 Avenue of the Americas, New York, NY 10036

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Hardware — IBM 370/MVS/COBOL

PROGRAMMERS — $18-20,000

PROGRAMMER/ANALYSTS — $18-24,000

ANALYST — $20-26,000

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Applications — DDA, Savings, Trust, MSA, G/L, Payroll, I/L, C/L, Credit Cards
Hardware — IBM 370/MVS/COBOL

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Experience — Manufacturing
Applications — Inventory Control, Order Entry, MRP, Billing, etc.
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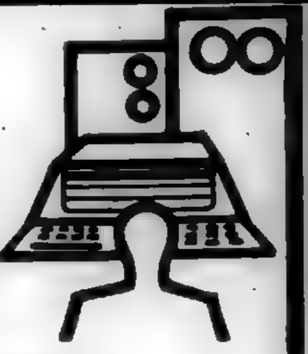
Hardware — IBM 370/MVS/IMS/COBOL

Call JIM FLEMING collect at 713/[illegible]-1000 for further information or send a copy of your current resume to:

ROBERT HALF
OF HOUSTON, INC.
720 N. Post Oak Rd. — Suite 228
Houston, TX 77024

EDP AUDITOR



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Requires familiarity with systems, large IBM main frame, TSO on-line systems, data base and audit Software. 3 years Data Processing experience with at least 1 year Internal EDP Auditing. BS and/or MS in Computer Science or Information Systems preferable. Consideration given for CDP, CCP, CIA credentials.

We offer a salary of $26 to $30K with a review in February and an excellent benefits package.

Please send resume to the attention of the Personnel Manager:

WARNER BROS. INC.
4000 Warnter Blvd.
Burbank, Ca. 91522
Equal Opportunity Employer M/F/H

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Salary up to $40,000

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The position involves extensive interaction with decision-makers of a large manufacturer and design and implementation of user-friendly marketing information systems.

Candidates must have at least two years business experience developing computer-based systems in corporate environment, and proficiency in programming, interactive and graphics packages, and statistical methods. Marketing or operations research applications desirable. Track record in marketing computer applications projects a definite plus.

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C.A.C.I.

Dr. [illegible] Spector
Vice President
CACI, Inc.-Federal
1815 North Fort Myer Drive
Arlington, Virginia [illegible]

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Dallas

System Software Personnel

Billion dollar electric utility company with centralized data center has immediate need for persons within the rapidly expanding corporate Information Services Department to test and install new or modified systems software.

Positions at multiple levels offer growth potential for professionals demanding challenge and opportunity. Present staff expanding to support installation of second 3033 with MVS/SP1 and 2 as well as 4300 distributive process network.

Present state-of-the-art IBM 3032 environment is MVS/SE2, ACF/VTAM with 600 CICS, ROSCOE and TSO terminals.

Mail resume and salary history to Employee Relations Division, Management Recruiting Department.

Central and South West Corporation
[illegible] One Main Place • Dallas, Texas 75250

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COORDINATOR OF DATA PROCESSING CAPE COD, MA

EDUCATION: (1) Bachelor's degree in business administration or accounting, education, mathematics or computer science, or (2) Graduation from an accredited educational institution with intensive course work in computer programming.

EXPERIENCE: (1) At least two (2) year's supervisory experience in either business or educational computer operation and programming (2) Program and systems analysis experience (3) Classroom experience desirable (4) Demonstrated ability in RPG, BASIC AND COBOL computer languages (5) A variety of experience in the operation of computer equipment including Data General. Salary: [illegible]

Forward resume to: DENNIS-YARMOUTH REGIONAL SCHOOL DISTRICT, [illegible], Director of Fiscal Affairs, [illegible] Station Avenue, South Yarmouth, MA [illegible]

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Mgrs. EDP Auditing
Mgrs. Technical Support
Mgrs. Data Processing/[illegible]
Mgrs. IBM System 3/34/38

For more details, send your resume, or call
Mark Fuller
CADILLAC ASSOCIATES, INC.
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(312) 346-9400

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Enjoy challenging work in "state of the Art" installation and your leisure time with a lifestyle that blends with the climate. Our client, Fortune 500 firm establishing a new facility in Research Triangle Park seeking qualified IBM software support persons (3) with minimum one year in OS/MVS; JES II internals. Highly visible advancement opportunity. Send Resume in confidence to [illegible], CPC., c/o 3101 Guess Rd., Suite C, Durham, NC 27705.

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Attn: Gerald Stanley
V.P. Marketing

apollo computer

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ALAN-MITCHEL ASSOCIATES, INC.
1620 South Federal Hwy., Suite 901
Pompano Beach, FL 33062
(305) 785-6290
(8:30 am - 5:30 pm M-T & 8:30 am - 5:00 pm F)
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NEW OS/MVS INSTALATION

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Gained experience with state-of-the-art technology, data base, and teleprocessing systems. IBM and commercial systems experience desirable. Minimum requirements: BS/BA degree or equivalent work experience. Individuals must have knowledge of Cobol. Experience with OS/MVS, IDMS, and/or CICS helpful.

Submit resume and salary requirements in strict confidence to:

Employment Supervisor
PUBLIC SERVICE COMPANY OF N.H.
P.O. Box 330
Manchester, N.H. 03105

PSNH PUBLIC SERVICE Company of New Hampshire

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PACIFIC N.W. CALIFORNIA

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Technical Openings

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(206) [illegible]

Foote-Waldron

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For interview, call
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In Illinois 312/[illegible]

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An expanding social service agency in Brooklyn is seeking a qualified individual for a challenging and rewarding career opportunity.

Responsibilities include developing systems from the feasibility stage through implementation and documentation, liaison with users, technical systems maintenance and staff supervision.

A knowledge of COBOL is essential; 3-5 years experience in systems and programming is also required. Experience on interactive systems is desirable but not required.

Excellent fringe benefits include health and major medical, dental and life insurance, one month vacation and 13 paid holidays. Salary to $[illegible]K. Please send resume and salary history to: Catholic Charities, Diocese of Brooklyn, 191 Joralemon St., Brooklyn, N.Y. 11201. Attn: [illegible]

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COMPUTER CENTER MANAGER

This is a new position, available November 17, which provides the opportunity to manage the computer operation of a small college. Responsibilities include the coordination of data entry, training of personnel, development of end-user manuals, collection of data, and supervision of student employees.

Requirements: Bachelors degree and experience or an equivalent combination of education and experience; computer training, a working knowledge of BASIC, and experience in systems design and modification.

Starting salary: $17,[illegible]

Deadline for applications: October [illegible], 1980

Apply: Personnel Office
La Roche College
9000 Babcock Blvd.
Pittsburgh, PA 15237

An Equal Opportunity/ Affirmative Action Employer

DATA PROCESSING INSTRUCTOR

Teach Data Processing classes in A.A.S. degree program in 2 year community college program using an IBM 370 DOS/VS computer system. Bachelor's Degree and post secondary teaching experience required. Preference given to masters degree, CDP and experience in business. Closing date Oct. 31, 1980. Send letter of application and resume to Personnel Dept., Prairie State College, 202 So. Halsted, Chicago Heights, IL 60411.

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Tomorrow-minded

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Martin Marietta Aerospace, NASA's Contractor on the Space Shuttle External Tank, has immediate openings for Univac Application Analysts.

Position requires designing and programming a variety of engineering and scientific programs utilizing ANS/COBOL for application on Univac 11XX equipment.

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We offer competitive starting salaries and fully paid company benefits. These opportunities exist at the Michoud Assembly Facility located in Suburban East New Orleans. Qualified candidates interested in learning more about these opportunities at Martin Marietta the tomorrow-minded aerospace people, should forward resumes including salary history to: Ms. Dottie McCann, Martin Marietta Aerospace, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

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- Provide technical assistance to operations and programming staff
- Document and record all systems software and hardware changes
- Develop in-house routines as required
- Assist in data base preparation
- Plan, develop, and install communication network in related software
- Optimize software performance

QUALIFICATIONS

- Graduate education desirable
- Five to eight years in data processing with at least five years in systems programming
- COBOL, CICS, FORTRAN, DL 1, Assembler
- Strong intra-personnel skills

Starting Salary - $22,740 to $28,840

Send resume to: Personnel Dept.
City of Shreveport
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Shreveport, Louisiana 71130

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If this exciting personal opportunity appeals to you, send your resume and salary history in confidence to: P.J. Jongeward, Dept. PJ/11-01, Washington Public Power Supply System, P.O. Box 968, Richland, WA 99352.

For a rapid review of your credentials, call collect to our Data Processing Manager at (509) 372-[illegible]. An Affirmative Action Employer.

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2 cols x 5" - 735
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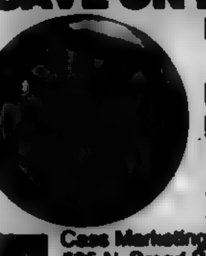

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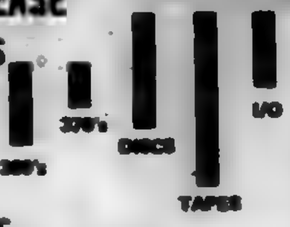

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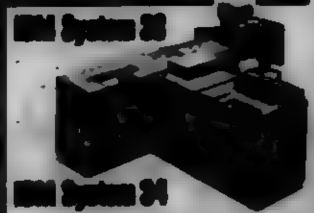

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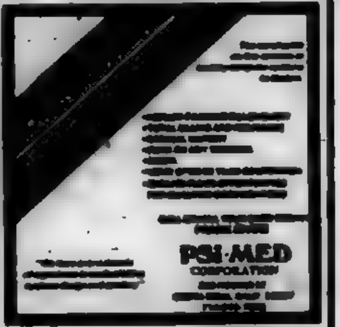
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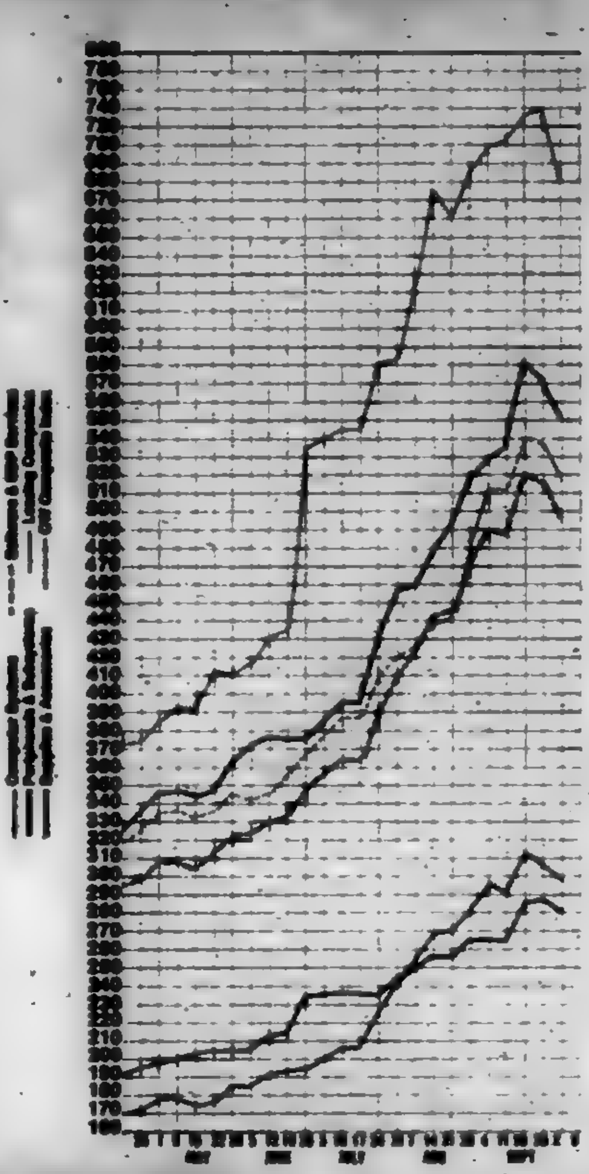

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	COMPUTER SYSTEMS				
A	AMDAHL CORP	15- 42	31	+ 1/2	+1.6
N	BURROUGHS CORP	60- 88	62 7/8	-2	-3.0
O	COMPUTER AUTOMATION	9- 27	22 3/4	- 1/4	-1.1
N	CONTROL DATA CORP	35- 76	69	-4	-6.7
O	CRAY RESEARCH INC	15- 51	42	-2 1/2	-6.0
N	DATA GENERAL CORP	44- 87	73 3/8	-2 3/4	[illegible]
N	DATAPOINT CORP	[illegible]	64 3/4	+1 1/4	+1.6
N	DIGITAL EQUIPMENT	45- 99	90 3/4	-6	-6.2
A	EECO INC	9- 20	18 1/2	0	0.0
N	ELECTRONIC ASSOC.	6- 12	[illegible]	+ 3/4	+6.9
N	FOUR-PHASE SYSTEMS	20- 45	28 1/2	-1 7/8	-6.1
N	FOXBORO	31- 45	49 3/8	-3 1/2	-6.6
O	GENERAL AUTOMATION	7- 19	8 5/8	- 3/8	-4.3
O	GRI COMPUTER CORP	1- 3	7/8	+ 1/4	[illegible]
N	HEWLETT-PACKARD CO	44- 90	86	-2 1/8	-2.7
N	HONEYWELL INC	69-101	88	-7	-7.3
N	IBM	50- 70	61 5/8	-1 7/8	-2.7
O	MAGNUSON COMP SYSTS	20- 36	31 3/4	-2 1/2	-7.2
O	MANAGEMENT ASSIST	9- 26	19 1/2	- 1/2	-2.5
O	MANUFACTURING DATA S	21- 50	50 3/4	+ 5/8	+1.3
O	MINI-COMPUTER SYST	2- 6	3 3/8	+ 1/8	+3.8
O	MODULAR COMPUTER SYS	9- 30	25 3/4	-1 1/8	-4.4
N	NCR	57- 82	66 1/4	-4 7/8	-6.9
N	PRIME COMPUTER INC	15- 49	41 1/4	-3	-6.7
N	PERKIN-ELMER	26- 40	50 3/8	+2 1/2	+6.6
N	SPERRY RAND	42- 65	[illegible] 3/8	-3 3/4	-6.2
A	SYSTEMS ENG. LABS	11- 49	42 1/8	- 3/4	-1.7
O	TANDEM COMPUTERS INC	15- 56	56 1/2	+1 3/4	+3.3
N	TEXAS INSTRUMENTS	70-144	131 1/2	-7	-5.0
A	WANG LABS.	17- 60	53 1/2	-3 1/2	-6.4
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	15- 73	20 1/2	-1 3/4	-7.8
N	COMDISCO INC	6- 16	11 1/2	- 1/2	-3.1
A	COMMERCE GROUP CORP	1- 2	1 1/8	-1	-47.0
A	COMPUTER INVSTRS GRP	2- 6	2 1/8	- 1/4	-10.5
O	CONTINENTAL INFO SYS	2- 15	5	+ 1/2	+9.0
O	DATRONIC RENTAL	2- 4	3 5/8	- 1/8	-3.3
A	DCL INC	1- 4	1	- 1/8	-7.8
N	DPF INC	4- 12	7 7/8	0	0.0
N	ITEL	1- 15	2	+ 1/8	+6.6
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	2 7/8	0	0.0
N	RELIANCE GROUP INC	24- 38	36 7/8	+1 1/2	+1.9
N	U.S. LEASING	12- 28	21	-1 1/8	-4.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
OTC: PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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E X C H		1979-80 RANGE (1)	CLOSE OCT 1 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	[illegible]	+ 1/2	+21.1
O	ANACOMP INC	7- 20	17 1/4	- 7/8	-4.8
O	ANALYSTS INTL CORP	5- 8	7 1/8	+ 1/2	+7.1
A	APPLIED DEV. CS.	5- 21	19	- 5/8	-3.3
N	AUTOMATIC DATA PROC	31- 52	47 1/4	-4 3/8	-8.4
O	COMPUTER HORIZONS	1- 9	7 3/4	- 1/4	-3.2
N	COMPUTER NETWORK	6- 8	6 5/8	- 1/8	-1.8
N	COMPUTER SCIENCES	11- 30	27 3/4	- 3/8	-1.3
O	COMPUTER TASK GROUP	1- 20	17	0	[illegible]
O	COMPUTER USAGE	3- 11	7 1/4	-1	-12.1
O	[illegible] DATA REP SVC	6- 10	8 1/8	- 5/8	-6.5
O	COMSHARE	11- 21	18	- 1/4	-1.3
O	CULLINANE CORP	18- 61	52 3/4	0	[illegible]
O	DATA DIMENSIONS INC	1- 4	1 7/8	- 1/8	-6.2
O	DATATAB	1- 4	1	0	0.0
O	DSI CORP	6- 9	7	- 1/2	-6.6
N	ELECTRONIC DATA SYST	16- 37	32 1/2	-2 1/2	-7.1
O	INFORMATICS INC	5- 25	20	-1 3/8	-6.4
O	[illegible]	1- 3	2 1/8	0	[illegible]
O	TPS COMPUTER MARKET.	2- 6	5	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/2	- 3/4	-12.0
O	KEYDATA CORP	2- 5	2 1/4	0	[illegible]
A	LOGICON	12- 27	25 5/8	-2 1/2	-9.9
O	MATHEMATICA INC	9- 18	15	-2	-11.7
C	NATIONAL DATA CORP	10- 25	23 3/8	- 1/8	-0.5
O	PLANNING RESEARCH	5- 15	9 3/8	+2 1/8	+19.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	6- 8	7 [illegible]	- 7/8	-10.0
O	REYNOLDS & REYNOLDS	21- 36	28 1/2	-1 1/2	-5.0
O	SYSC INC	6- 17	15 1/2	-1	-6.0
O	SCIENTIFIC COMPUTERS	6- 27	22	-2	-8.0
N	TYMSHARE INC	[illegible]- 71	65	-6 3/8	-8.9
[illegible]	[illegible] SYSTEMS	5- 15	13 3/4	0	0.0
N	WYLY CORP	6- 18	13 1/4	- 3/8	-2.7
	PERIPHERALS & SUBSYSTEMS				
O	AM INTERNATIONAL	15- 26	18 1/4	-1 1/2	[illegible]
N	AMPEX CORP	16- 30	25 3/4	-1 1/8	-4.1
A	ANDERSON JACOBSON	4- 18	15 1/2	+1 3/4	+10.1
O	APPLIED DIG DATA SYS	4- 12	11 3/4	+ 1/4	+2.1
O	AUTO-TROL TECHNOLOGY	10- 62	50 1/2	+1 1/8	+2.0
O	BEEHIVE INT'L	3- 17	16 1/8	-1 3/4	-7.0
A	BOLT BERANEK & NEW	12- 33	28	-5	-15.1
N	BUNKER-RAMO	17- 41	37 1/2	+1 1/2	+4.0
O	CAMBRIDGE MEMORIES	1- 9	3 1/2	- 1/8	-3.4
N	CENTRONICS DATA COMP	20- 45	38	-2 7/8	-6.7
A	CETEC CORP	3- 7	6 1/2	- 1/8	-1.8
O	COMPUTER DEVICES INC	4- 10	8	- 3/8	-4.0
O	COGNITRONICS	1- 7	5 5/8	- 3/8	-6.2
O	COMPUTER COMMUN.	[illegible]	6 5/8	- 3/8	-5.4
O	COMPUTER CONSOLES	[illegible]- 25	22 3/4	+1 3/4	+8.3
O	COMPUTER TRANSCEIVER	1- 5	3	0	0.0
A	COMPUTERVISION CORP	20- 57	47 3/8	[illegible]	-6.9
N	CONRAC CORP	15- 25	18 3/8	-1 1/2	-7.9

E X C H		1979-80 RANGE (1)	CLOSE OCT 1 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 17	14 1/8	- 7/8	-5.7
A	DATA PRODUCTS CORP	11- 30	29 5/8	-2	-6.3
O	DATUM INC	3- 4	3 7/8	0	0.0
O	DECISION DATA COMPUT	3- 6	4 7/8	- 1/8	-2.5
O	DELTA DATA SYSTEMS	1- 3	2 3/8	- 1/8	-5.0
N	DOCUMATION INC	7- 27	27	- 1/4	-1.4
O	DATARAM CORP	6- 17	10 5/8	- 1/2	-4.6
N	ELECTRONIC M & M	3- 8	7	- 1/4	-3.4
A	EVANS & SUTHERLAND	21- 72	68 1/2	+ 1/2	+0.7
O	FABRI-TEK	1- 4	3 3/8	+ 1/8	+3.8
O	GENERAL COMPUTER SYS	1- 6	3 1/4	- 5/8	-16.6
O	GENERAL DATACOMM IND	12- 27	24	-2 3/8	-10.2
O	GENERAL TERMINAL CP	1- 4	2	0	0.0
N	HAZELTINE CORP	12- 31	27 3/8	-2 1/4	-7.5
N	HARRIS CORP	25- 46	43 1/2	- 5/8	-1.4
O	INFOREX INC	1- 6	3	0	0.0
O	INFORMATION INTL INC	6- 19	13 1/4	+ 1/2	+3.9
O	INTEL CORP	44- 95	90	+ 3/4	+0.8
O	INTERSIL	11- 33	32 3/8	- 1/8	-0.3
A	LUNDY ELECTRONICS	6- 12	10 3/8	0	0.0
O	MSI DATA CORP	5- 16	16	- 1/8	-0.8
N	MEMOREX	10- 26	24 1/8	- 5/8	-2.4
N	MOHAWK DATA SCI	10- 28	27	+1 1/4	+4.8
O	QMS	2- 10	9 1/2	0	0.0
A	PARADYNE CORP	10- 50	46 7/8	+1 1/4	+2.7
A	PENRIL CORP	4- 14	11 1/2	-1	-8.0
O	RAMTEK CORP	10- 17	15 1/2	- 5/8	-4.0
O	RECOGNITION EQUIP	9- 18	15 3/8	-1	-6.1
O	SCAN DATA	1- 5	2 1/2	- 1/8	-4.8
N	STORAGE TECHNOLOGY	13- 33	31 1/4	-1 1/8	-3.0
O	SYKES DATATRONICS	16- 46	46 1/8	+6 1/2	+17.2
O	T BAR INC	14- 21	19 3/4	+ 3/4	+4.0
A	TEC INC	3- 9	6	- 5/8	-9.4
N	TEKTRONIX INC	43- 70	64 1/4	-1 3/8	-2.0
N	TELEX	3- 6	5 1/4	+ 1/8	+2.4
O	TERMIDATA SYSTEMS CP	6- 26	13 1/2	- 7/8	-6.0
A	TIMEPLEX INC	7- 29	26 3/4	-1 3/4	-6.6
O	WILTEK INC	1- 3	2 1/2	- 1/8	-4.7
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 19	13 1/2	-1 1/8	-7.6
O	BALTIMORE BUS FORMS	1- 2	3/8	0	0.0
N	BARRY WRIGHT	19- 44	40 1/4	-2 1/2	-5.8
O	CYBERMATICS INC	1- 1	1 1/8	+ 1/8	+12.5
O	DUPLEX PRODUCTS INC	11- 16	14 3/4	- 1/4	-1.6
N	ENNIS BUS. FORMS	15- 21	20 3/8	- 7/8	-4.1
N	3M COMPANY	46- 63	59 1/4	-1 5/8	-2.6
O	MOORE CORP LTD	31- 37	36 1/8	-1 1/8	-3.0
N	NASHUA CORP	20- 35	27 5/8	+ 1/2	+1.7
N	STANDARD REGISTER	22- 35	31	-2 1/4	-6.7
N	TAB PRODUCTS CO	10- 23	20 1/2	+1	+5.2
N	WABASH MAGNETICS	11- 20	15 1/8	- 3/8	-4.7
N	WALLACE BUS FORMS	26- 45	41 1/2	-1 3/4	-4.0

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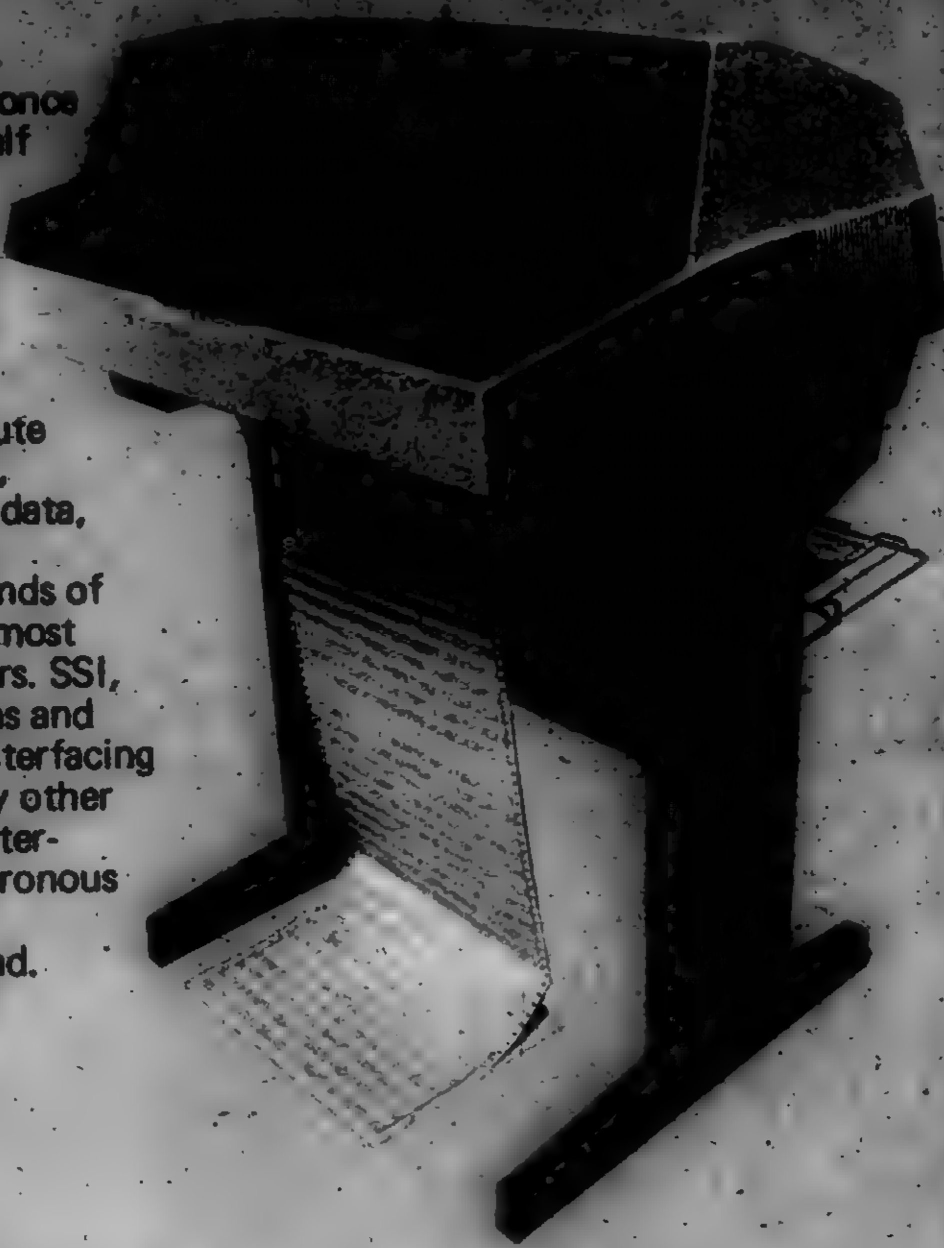

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
ekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
42 October 13, 1980 $1.00 a copy; $30/year

W at
ip 80

Computers Hit For Killing Jobs

By Nancy French
CW Staff

TOKYO – Computers are job killers and the sooner we accept this, the sooner we will start to deal with the implications effectively, a noted Canadian computer scientist said here last week.

Delivering an invited paper at International Federation for Information Processing's (Ifip) Congress 80, Calvin C. Gotlieb, a professor from the University of Toronto's Computer Science Department, backed up his contention with citations from dozens of studies, reports and surveys published in the last 10 years or so. For example:

- At one U.S. Western Electric Co. switching division, the number of employees was reduced by 50% – from 39,200 to 19,000 – over a six-year period with a corresponding doubling of productivity.
- In Japan, seven color television factories raised their production volume by 25% from 1972 to 1976, with a corresponding decrease of more than

(Continued on Page 4)

CW at
Info 80

SNA Called Key To Future Office

By Marcia Blumenthal
CW Staff

NEW YORK – "Enterprise systems" is the name IBM has given to its approach for the merger of DP, office systems and communications, and Systems Network Architecture (SNA) will be its foundation.

"IBM is in the office-of-the-future business to stay, and our concept of enterprise systems is an important framework of our solution," according to Allen J. Krowe, IBM vice-president and president of the Systems Communication Division. Delivering the keynote address at the seventh international Information Management Exposition & Conference (Info 80) here last week, Krowe described IBM's enterprise systems concept, pointing to the company's public commitment to that direction made last June.

At that time, IBM announced its Displaywriter, record support for the 5520 and the Distributed Office Support Facility (DOSF) for the 8100 [CW, June 23]. In-house, IBM is now

(Continued on Page 4)

Four Big Users Complain

Bell Charged With Inflating Prices

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – Four of the country's biggest companies have accused AT&T of using an illegal pricing scheme to increase sales of newly developed terminals and services.

If AT&T is actually using this scheme, it is charging as much as the traffic will bear – which is illegal. A long line of Federal Communications Commission (FCC) decisions have firmly established that the phone company's rates must be based on actual costs.

The attack on the pricing scheme, known within Bell as the Installed Base Migration Strategy, is contained in a complaint recently submitted to the FCC by the Ad Hoc Telecommunications Users Committee on behalf of Ford Motor Co., General Electric Co., U.S. Steel Corp. and Westinghouse Electric Corp.

According to this complaint, the Installed Base Migration Strategy consists essentially of setting a target price for a new terminal or service – such as the Horizon or Dimension PBX – estimating the price customers are willing to pay for the new features embodied in that product, then subtracting that amount from the target price. The remainder becomes the new, increased price for the existing product or service – e.g., a Model 700 PBX.

For example, if the target price for a new product is $100/mo, Bell might determine the customer's willingness to pay for the new features to be $25/mo. If the present price of the existing comparable product is $50, Bell would file a tariff asking that the existing product's price be raised to $75.

The four companies are unhappy about a proposed tariff change AT&T filed last August that would raise rates for Common Control Switching Arrangement (CCSA) local access lines from $7.95/mo to $35/mo, effective next month. A CCSA uses switching facilities in telephone company central offices, on a dedicated basis, to link voice and/or data terminals connected to a large private network. It is now being superceded by a computer-controlled switching system known as

(Continued on Page 8)

Honeywell X.25 Architecture Allows Multivendor Nets

By Brad Schultz
CW Staff

MINNEAPOLIS – Honeywell, Inc. released its "blueprint for products in the 1980s" last week – an X.25-compatible Distributed Systems Architecture (DSA) for integrated communications between multivendor networks.

Honeywell also announced a set of system and hardware products to go with the architecture, including a front-end network processor, distributed network supervisor software and a satellite system based on the Level 6 processor (see story on Page 6).

Differing from IBM's Systems Network Architecture (SNA), which imposes subservience to master systems within a network largely supplied by IBM or plug-compatible vendors, DSA is called the first architecture based on the International Standards Organization (ISO) "open systems connection" reference model.

That model comes from an ISO subcommittee chaired by 1973 Turing Award winner Charles Bachman, a Honeywell senior consultant who recently said, "The rigidly hierarchical approach of master/slave computer relationships is fundamentally wrong [if] all computers . . . are going to have to cooperate with everybody else's computers."

With DSA, the computer configura-

(Continued on Page 6)

Outdated Gear Could Help Spark Air Controller Strike in March

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. – Will the Professional Air Traffic Controllers Organization (Patco), which has lobbied unsuccessfully in recent years for updated air traffic control computer equipment, stage a strike when its present contract runs out next March 15?

In the face of growing suspicion on the part of the Federal Aviation Administration (FAA), Patco members around the country adamantly insist that a strike is not planned.

Unofficially, however, some controllers have hinted that a strike is not an impossibility. "There's a lot of frustration, anger and resentment built up across the country," one Patco member said recently. "It doesn't appear that anybody in the [position] to correct the things we see wrong is willing to do it so far."

Among the things Patco sees as

(Continued on Page 8)

Dues-Paying Analysts Denied Benefits

By Jeffry Beeler
CW West Coast Bureau

TOPEKA, Kan. – More than 30 of the Santa Fe Railway Co.'s systems analysts are reportedly being forced to pay union dues, but are being denied all the benefits of union membership.

This apparent contradiction in the employees' union status was made possible several years ago by a little-publicized agreement between the Santa Fe's management and representatives of an international labor union known as the Brotherhood of Railway and Airline Clerks (Brac).

In essence, the agreement reversed an earlier management-Brac compact that had exempted the railway's systems analysts from paying union dues. Under the new agreement, which was forged without the employees' prior knowledge, all Santa Fe workers promoted to systems analysts after Jan. 1, 1978 have been required to contribute part of each paycheck to Brac's union fund.

One of the agreement's most curious wrinkles, however, is that although it compels the systems analysts to pay union dues, it stops short of placing them under Brac's direct control. Instead, it has plunked them squarely within the authority of the Santa Fe's management.

In effect, then, the agreement disqualifies the systems analysts from receiving any of the union benefits that their dues and paychecks are helping to underwrite.

The agreement also has the effect of placing the employees in a kind of occupational "no-man's-land": as dues payers, they are unquestionably being treated as members of a union, but in practically all other respects

(Continued on Page 9)

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701

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Computerworld can be purchased on 35 mm microform through University Microfilm Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106 Phone (313) 761-4700 Computerworld is indexed; write to Circulation Dept. for subscription information.

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But CPU Costs $55,000 Less

IPL 'First' to Rival 4331 Group 2

By Rita Shoor
CW Staff

WALTHAM, Mass. – IPL Systems, Inc. has introduced what may be the first plug-compatible processor to compete with IBM's newly announced 4341 Group 2 – for a purchase price some $55,000 less than the IBM model.

Designated the 4446, a 2M-byte version of the processor will be offered for approximately $330,000, according to Steve Ippolito, IPL president. A comparable 4341 Model 2 is quoted by IBM at $385,000.

The processor is the high-end product in IPL's 4400 series of mid-range mainframes and marks the firm's entry into the end-user market-place. The low end of the series is a Model 4436, which is pitched against IBM's 4331 Model 2 but offers double the 4331's channel capacity, IPL claimed. The mid-series 4443 is supposedly comparable to IBM's 4341 Group 1, while offering twice the memory capacity and faster instruction execution.

Incorporating a reloadable control storage design to allow for modification to the systems as IBM's 4300 series architecture changes, the mainframes provide from 1M to 8M bytes of main memory, 1M byte and from two to five block multiplexer channels, according to a spokesman. The maximum channel data transfer rate is reportedly 2M byte/sec.

Series specifications allow for attachment of all peripheral devices which can be connected via 4300 I/O channels, he said, and also include an enhanced service processor with a remote data link that allows machine maintenance to be performed over telephone lines.

Microcode Added

Microcode has been added to handle DOS/VSE operating system Extended Control Program Support (ECPS) with single level addressing and virtual channel addressing. The 4400 family is also fully compatible with VM/370 and VS/1 operating systems.

System architecture includes a central data transfer bus with a reported internal data transfer rate of 80M byte/sec, a main storage bus and a control storage bus, IPL said.

Three levels of support will be offered to 4400 users. On the first level, a microcomputer-based internal service processor assumes control of the system immediately after malfunction. It initiates recovery and diagnostic activity by notifying the program and operator of the problem and performing tests to isolate system faults, an IPL representative explained.

The second level of support is provided by IPL's field service organization with a central diagnostic center available at the third level for handling system problems via telephone through the service processor, he said.

Ippolito acknowledged that the 4443 was essentially an enhanced and repackaged version of the Omega 480 Model 3 manufactured by IPL and marketed by Control Data Corp. However, he described the 4446 as an "entirely new product."

"Each of the three models in our product family is field-upgradable to the next performance level," he stressed. "That means users upgrading from a 4331 performance range machine to 4341 range don't need to replace their existing processors as they would if they had IBM machines."

End-User Market

IPL will be marketing these products to the end-user customer base in addition to its OEM business, and the firm's end-user marketing would be confined to the U.S. There should be no effect on the IPL product line being marketed by Olivetti Corp. in Europe, he maintained.

With a 60-day availability, a typical 1M-byte 4436 is priced at 175,000 and a 2M-byte 4443 costs $225,000, according to the vendor. First customer shipment of the 4446 is slated for the third quarter of 1981 and a 2M-byte version of the system is priced at $330,000, Ippolito said.

Two- and four-year lease plans are also available but he declined to quote specific lease prices. IPL is located at 360 Second Ave., Waltham, Mass. 02154

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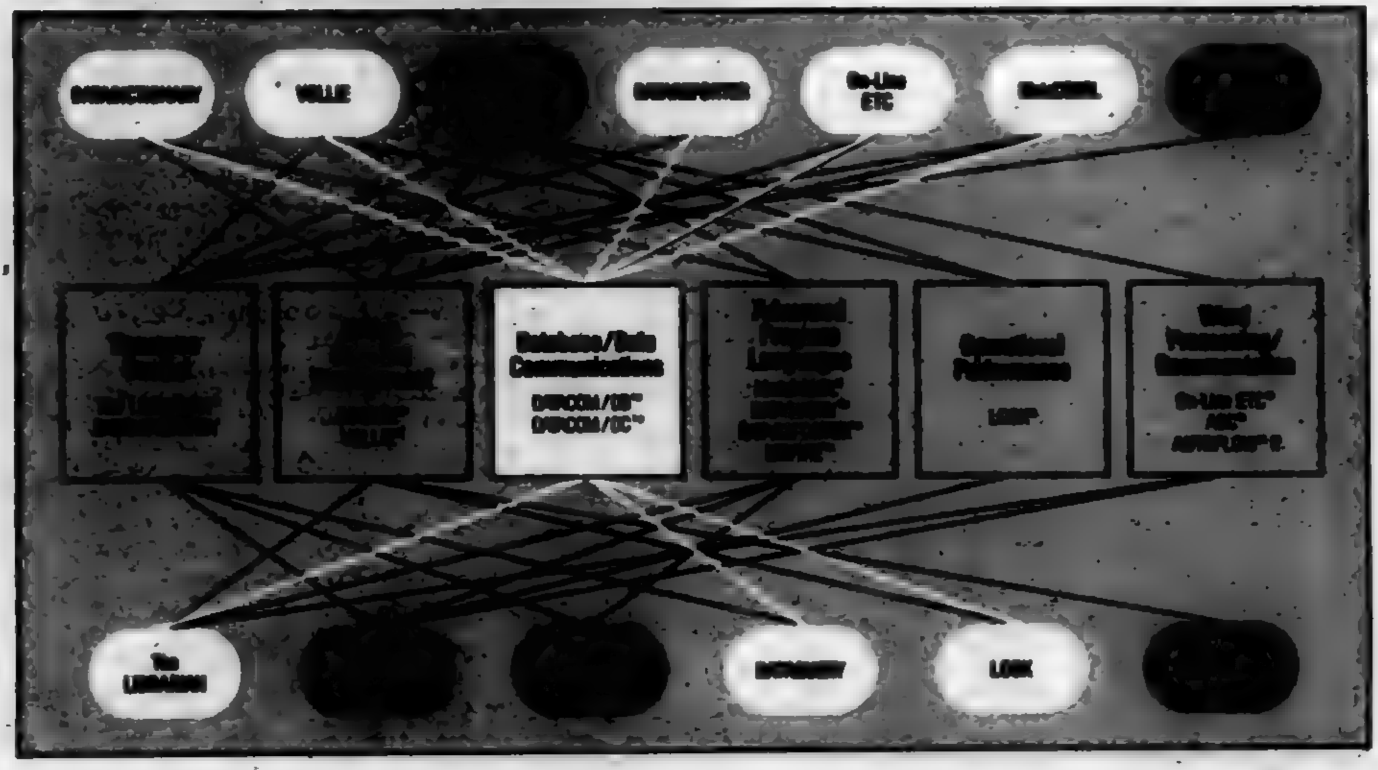

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Canadian Expert Calls Computers Job Killers

(Continued from Page 1)

50% in the number of employees.

Gotlieb defined the term "computer" as including everything from the type of microelectronics that are built into autos and washing machines to large electronic funds transfer networks. The kind of computer involved makes no difference, he said. The person who loses his job because of a computer is still out of work.

Judgment Time

"The time for judgment is now," Gotlieb said. Although much more study remains to be done, "We now have results we can begin to trust. The effects have reached a scale which does allow us to delay in making plans on how to promote these consequences of computers we went to see come about – and how to inhibit the side effects which are socially destructive."

Gotlieb also disagreed with those who argue that computing has increased the number of jobs, saying, "the extra jobs created by the computer industry itself do not begin to make up for the jobs which are lost."

Gotlieb made these additional points:

- Distributed data processing does not necessarily imply distributed control.
- It is too simple to say we cannot stop progress by moving to the precomputer age. We can control the dissemination of the technology in such a way that we do not create massive unemployment and job dislocations or subject ourselves to other undesirable side effects.
- Just as we have an environmental impact study before a large plant is built or a pipeline is approved, we could have an employment impact statement before a computer system is approved.
- It is not uncommon for physicists to refuse to work on certain nuclear problems for reasons of conscience. We are not far from the day when individual computer scientists and engineers will have to consult their consciences the same way before working on an application that will undoubtedly cause labor disruption, he said.

Ifip 80 coverage continues on Pages 34, 35 and 36.

The responses of trade unions to the introduction of computers are hardening and will continue to do so, he predicted. In the UK, for example, the Trade Union Congress has adopted two principal points for future action:

- No technology that has major effects on the work force should be introduced unilaterally – full agreement on the range of negotiating issues must be a precondition to the change along with full job security for the existing work force.
- Technological change should be linked to a reduction of the work week and working lifetime – or job sharing.

Moving from levels of employment to kinds of employment, Gotlieb cited experiences reported by factory workers and union leaders. "Their view is that the arrival of process control machines and robots has left them with jobs which are more routine, less interesting and less skilled."

As an example, Gotlieb cited the experience of the Canadian Postal Service with the introduction of postal codes that allowed virtually automatic sorting – and a corresponding announcement by management that remaining work had become less skilled and worth less pay.

Gotlieb called attention to Swedish efforts aimed at returning to workers some level of decision making and helping overcome the fragmentation of work in the manufacture of automobiles. Although much has been written about these experiments in the decade since they've been implemented, the idea has not been widely adopted by auto makers in general.

Indeed, with the advent of microprocessor-driven assembly equipment, "Volvo has said it can now design a plant in which 12 people could produce the present output of 1,200. The implications are enormous," he said.

Gotlieb also pointed to the work of Klaus Lenk in the Federal Republic of Germany, who found that computers generally make things more formal, more routine, more bureaucratic and inevitably lead to a less humane treatment of people.

With irony in his voice, Gotlieb also noted that a law is on the books in the Federal Republic of Germany that says once a decision is made by a computer, no one is permitted to challenge it.

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IBM Foresees Future Office

(Continued from Page 1)

using the 8100 with DOSF and will connect it to a central processor running a host-based proprietary application called Disoss that provides document creation, storage and retrieval. After the installation of such a system, secretaries, managers and professionals will be supported by the same system, he noted.

A CW photo feature on Info 80 is on Page 11. Other Info coverage can be found on Pages 10, 12, 13 and 14 and Pages 24 through 33.

SNA is the framework for the enterprise systems. "The 1980s will see us bring enterprise systems to life," Krowe said. During the last decade, every IBM research laboratory was involved in adapting the company's products to the SNA framework concept.

By contrast, today's office systems are a hodgepodge of dissimilar unconnectable machines, grown out of the need to distribute paper more efficiently, and the overall solution has lacked a systems approach, Krowe charged. To combat that, IBM is currently in a "buildup of such scale not seen since the mid 1960s," he added. In particular, Krowe said IBM had not spent enough time on software. Krowe described the key elements of the enterprise systems as numerous "buzzwords flying around the industry." These include:

- A central computer complex.
- Operating systems.
- Data base/data communications programming.
- Access methods.
- Network control programs.
- Distributed processors.
- Multifunction microprocessor-based terminals.
- Office functions.

Moreover, such a system must establish a communications link – a high-speed, wideband communications inside the enterprise and the capability of interconnecting computer networks of unconnected organizations via common-carrier facilities.

The interconnection of these information processing functions is a formidable barrier to systems' designers because of the different data streams, protocols and systems designs currently in use.

Gateway Function

IBM's enterprise systems includes the concept of a gateway function – the ability to integrate all types of information, voice, data, text, facsimile or image. This gateway function is "clearly evolving toward an integration of hardware and software products into increasingly powerful, flexible and efficient gateway nodes," Krowe said.

However, Krowe warned against "the siren song" of being able to attach "any device to any other device" through a communications link. "The problem of myriad product designs and their anomalous and increasingly complex establishment link designs is as significant today as the anomalous network design problems between establishments was in the early 1970s," Krowe said.

Communications Problem

This is an area in which IBM and other vendors will be concentrating a great deal of effort in this decade, Krowe said, adding that many of the concepts behind SNA will fuel IBM's attempt to solve the problem of communications systems.

Driving the solution to these problems is the lack of office productivity, particularly among managers. Krowe maintained there really has not been an increase in office productivity since the turn of the century.

The need for productivity improvement is compounded by the projection that while today in the U.S. there is one terminal installed per 46 workers, by 1986 there will be one terminal for every 10 workers.

Attendees from 44 Nations

Two-Part World Congress a Tactical Challenge

By Nancy French
CW Staff

TOKYO — More than 2,000 people from 44 countries gathered here last week for the first part of the International Federation for Information Processing's (Ifip) Congress 80, the Eighth World Computer Congress.

A message of welcome by His Imperial Highness, the Crown Prince Akihito, along with a rousing keynote delivered by Michio Nagai, senior consultant of the United Nations University and former Japanese minister of education, opened the congress.

After the presentation of all the invited papers and about half of the submitted papers, the congress — along with its equipment exhibition — moves on to Melbourne, Australia, where the invited papers will be repeated and the other half of the submitted papers will be presented.

Ifip 80 marks the first time Ifip's triennial congress has ever been held in the southern hemisphere, and the first time a congress has been split between two nations, Ifip President Pierre Bobillier said at the opening ceremonies last Monday.

Small Profit

Whether a two-part congress will ever be repeated remains to be seen. Although this conference offers Western attendees — who virtually bubbled around the recently completed Sunshine City Prince Hotel and import mart complex — a rare opportunity to visit locales they would seldom have a chance to visit otherwise, it represents considerable tactical and operational challenges, added expense and very little profit in the end for Ifip, sources said.

Despite its venue, Ifip 80 in Tokyo drew only about 1,500 Japanese and a grand total of 2,300 attendees, sources said, compared with 7,000 in Toronto three years ago.

Exhibit attendance, which was expected to be 30,000 a day, turned out to be about that number.

Addressing the overall Congress 80 theme, "Challenges of a Computer Presence," the 113 papers selected for the congress were culled from more than 600 papers from 47 different countries, F.H. Sumner, chairman of the program committee, said at the opening.

Bobillier reminded participants that Congress 80, which falls on the 20th anniversary of Ifip, gives Ifip members a good opportunity to reexamine the role and purpose of Ifip. "Is Ifip playing the role it should in today's environment?" he asked.

Nagai observed in his keynote remarks that two revolutionary developments — satellite communications and microinformatics and the merging of the two — have opened up an entirely new world of applications in an era of mass diffusion of information.

"It is no exaggeration to say that these technological breakthroughs have resulted in informatization of communication and that we are now living in the age of information explosion," he said. "Yet it should not be forgotten that the basic decisions to forge a better future for men and women in all countries do not lie principally in the field of technological development. What is needed is for every society to find answers to the basic questions of social development and human fulfillment.

"In spite of the great possibilities now accessible as a result of the scientific innovations in the field of communication, millions of people, especially in developing nations, still struggle under the unbearable conditions of subsistence. While it is necessary for the governments and people of developing nations to take the initiative in reforming their basic political, economic and social conditions, the people and governments of industrialized nations also must try their best to cooperate with the Third World.

"It is a great mistake to assume, however, that the citizens of industrialized nations benefit automatically from the growing advancements in communications, for the control of the production and utilization of information processing and telecommunication systems is at present mainly in the hands of government and of major industries.

CW at Ifip 80

"Not only should communication resources be made available to all citizens, but these citizens themselves should be encouraged to participate in the production and utilization of these resources," he said.

"Entire nations must be planned and shaped in ways that invite all their citizens to become full-fledged members of the learning society which aims at utilizing communications for human benefit. Such a society does not yet exist," he said.

Nagai called on members of the audience to help plan and shape learning societies throughout the world to make the wisest use of these technological innovations for the realization of human dignity and peace.

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Honeywell Offers Gear for Value-Added Nets

By Brad Schultz
CW Staff

MINNEAPOLIS — A set of entry-level products aimed mainly at new data communications users and current users needing ties to value-added networks was announced by Honeywell, Inc. here last week to go with the Distributed System Architecture (DSA).

A front-end network processor called the Datanet 8 was introduced as operating asynchronously under firmware control to handle communications in a DSA network. The Datanet 8 attaches to Honeywell's DPS 8 or Level 64/DPS mainframe under the Gcos 8 or Gcos 64 operating system, respectively.

Employing the technology of Honeywell's Level 6 small system, the Datanet 8 network processor can execute up to one million instructions per second and pass data at up to six milion bytes per second through its high-speed bus, a spokesman said. The bus connects to a controller for the console and network processor diskette, he added, as well as to a host interface adapter and to channel interface bases through which peripherals access the host.

Memory Subsystem

Accepting up to 16 communications lines, the Datanet 8's memory subsystem features single- and double-word fetch, self-contained initialize and refresh logic and standard error detection and correction, the spokesman continued. An automatic control function provides a programmable read-only memory extension to the 256K-byte main memory, a system timer and a set of control settings for failure detection and restart.

The network processor accepts two, eight or sixteen channel interface bases and communications with data terminals and subsystems at up to 56,000 bit/sec. Two Datanet 8s may be configured on a single host.

Honeywell also announced the Distributed Network Supervisor (DNS) software, which supports DSA's four communications management layers as well as the terminal management function in a secondary network attached to the Datanet 8.

DNS software supports remote job entry, file transfer to and from a distributed satellite system, time sharing and transaction processing. The software also supports a distributed satellite system's distributed concentration, file transfer, distributed transaction processing and remote batch facilities, as well as local functions such as data entry.

The distributed satellite system (DSS) software was a third DSA announcement. DSS allows a Level 6 processor to function as a satellite system that communicates with a host through a DSA network. Under the Gcos 6 Mod 400/DSS operating system, the DSS is said to offer full, DSA standard communications between satellite applications and Honeywell Level 64/DPS or DPS 8 host applications, using the High-level Data Link Control (HDLC) protocol on leased lines.

Datanet 8 Costs

With a 120 char./sec console, the Datanet 8 network processor costs $45,000 for 16-line support or may be leased on a five-year plan at $1,334/mo.

With options, the Datanet 8 can accept up to 128 lines and cost $88,000 or be leased for five years at $2,625/mo.

The monthly license fee for the DNS software is "approximately" $600, Honeywell said, with a software support service available for another $150/mo.

DSS software is available on an initial license fee at the following schedule: Primary network software, $1,800; node administration, $450; network operator interface, $450; file transfer facility, 64/DSS, $990; file transfer facility, 8/DSS, $990; and distributed concentration facility/-DSS, $1,350.

Honeywell Brings Out SNA Alternative

(Continued from Page 1)

tion does not distort the customer application, according to Bachman. "Technology can and should adapt the computer system to fit the business of an organization," he said.

Layered Architecture

Like the ISO model [CW, June 16], DSA is a layered architecture intended to optimize support for networks that employ the X.25 and X.21 interface protocols for packet- and circuit-switching, respectively. X.25 packet networks include GTE Telenet Communications Corp. and Tymnet, Inc. in the U.S., Datapac in Canada, Transpac in France and Datex-P in West Germany.

DSA's debut marks a major advance in development of Honeywell's Distributed Systems Environment (DSE), a spokesman stated, explaining that DSE is the "overall distributed processing framework within which the company's products function cooperatively."

Honeywell will continue developing products that allow its systems and peripherals to communicate with computers under SNA, the spokesman pointed out.

Within a DSA network, processing systems can work as peers without supervision by a central host, although the architecture allows hierarchical control and hybrid systems configurations. DSA comprises seven functional layers: Four communications management layers at the bottom, two message management layers directly above them and an application layer at the top.

Management Layers

The communications management layers handle data transfers across private or public networks. The lowest of these four layers is designated "physical control"; it defines interfaces between data terminal equipment, whether terminals or computers, and data communications equipment such as modems or links.

The physical control layer of DSA supports the RS-232C and RS-449 modem interfaces in the U.S. as well as V.24 and V.25 interfaces in Europe.

The next highest communications management layer handles data transfers over point-to-point or communications links such as between a host's front-end network processor and a satellite processor. Above this "link control" layer is the "network control" layer, which routes traffic onto the correct links of the physical network, according to Honeywell.

Transport Control

"Transport control" is the fourth and highest communications management layer, providing end-to-end control during transmission within the network. This layer multiplexes data received from the lowest message management layer — "session control" — onto lower communications management layers. Transport control also demultiplexes data flowing in the reverse direction, from lower communications management layers to session control.

Among the message management layers, session control establishes and manages the sessions between two cooperating processes within the same system or in separate systems, Honeywell continued.

The highest of the two message management layers — "presentation control" — reformats or transforms data when necessary so that applications processes can access terminals, devices and other processes in a transparent or virtual mode.

Finally, DSA's topmost layer, the application layer, coordinates such user-visible tasks as transaction processing, file transfers, terminal concentration and remote batching.

Evolutionary Development

When introduced in January 1977, Honeywell called DSE a phased, evolutionary development, the spokesman noted. Now "well along in implementation," DSE's first phase is the common base for what Honeywell gives DP users, he said.

The introduction of DSA initiates the second phase of DSE and lays down the rules by which Honeywell customers with data communications resources may adapt to the integration of computing, telecommunications and office systems technologies, the spokesman indicated.

Honeywell will now support "enhanced distributed processing," he declared, allowing customers to put dispersed facilities on an equal footing. The following phase will allow partitioning of a logical data base across processors — "placing each partition where it is most often used but providing automatic access from all locations."

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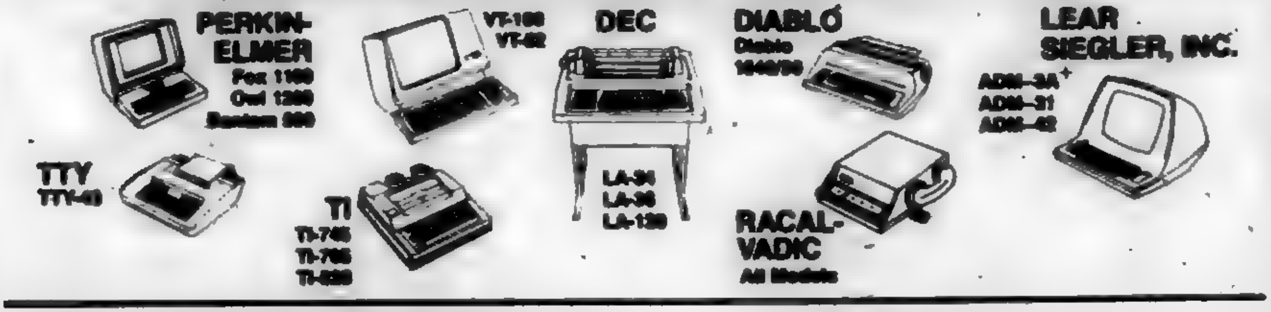

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'Very Basic Matters' Unresolved

Bipartisan Group Asks Nine-Digit Zip Delay

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A bipartisan group of more than 100 congressmen has asked the U.S. Postal Service (USPS) to delay implementing its proposed nine-digit Zip Code.

Citing unanswered questions of cost and the possibility of public confusion over the new codes, the Oct. 2 letter to Postmaster General William F. Bolger asked that the plan be held up "until the Postal Service and the Congress have examined fully the impact of this proposal."

According to Rep. Richardson Preyer (D-N.C.), who initiated the request, there remain "some very basic matters" concerning the plan to add four digits to every existing Zip Code. Implementation of the scheme to increase postal automation is currently scheduled for early next year.

Preyer explained the congressional request to Bolger, saying recent hearings on the new Zips by his Government Information and Individual Rights Subcommittee produced "more uncertainties than answers" from USPS officials.

Preyer said he and his colleagues asked the new codes be delayed "in an effort to get some of these [questions] answered before the Postal Service is irrevocably committed to a costly and complex venture."

The letter said, "We sense great concern in the business community about the cost of changing mailing lists to nine-digit Zip Codes." Testimony before the Preyer subcommittee pointed out possible costly difficulties in adopting the new codes, including expensive expansion of computerized address lists [CW, Sept. 29].

The letter cited "valid" business worries that the new codes might cause "needless confusion." And noting the recent USPS testimony that public cooperation is essential to the new Zip plan, the letter added "It is our considered opinion that you will have neither the help nor confidence of the public if you proceed with the plan as proposed."

Besides sending the letter to Bolger, Preyer and most of the signers also sponsored a Congressional resolution calling for a halt to the Zip Code expansion until its impact can be better assessed and until "other means of improving productivity in the sorting of mail" are considered.

The resolution cited an estimated cost of $1 billion for new USPS equipment to handle the expanded Zip Codes and claimed the Postal Service "has chosen not to examine the cost to businesses, nonprofit organizations and institutions as well as to all levels of government to convert their mailing lists and make other changes" necessary to the plan.

But the strongest criticism of the USPS planning process was in the letter to Bolger, which said, "To date, there appears to have been little if any consideration by the Postal Service of the social impact of the plan, nor real consideration of the cost to mailers and no coordination with existing, presort business mail programs."

According to the Postal Service, Bolger responded to the Oct. 2 letter the next day. Neither the contents nor the substance of Bolger's reply to Preyer had been disclosed at press time last week because Preyer, who is in North Carolina campaigning for reelection, had not had a chance to see the reply.

IBM Cuts Costs On Older Gear

WHITE PLAINS, N.Y. — IBM has announced substantial price cuts on the attached processor (AP) and remote system console for its 370/158 mainframe. The announcement is one more in a continuing series of selective purchase price reductions on the vendor's older equipment.

The firm's Data Processing Division (DPD) slashed some $85,000 from the 3056 AP purchase price by setting the new figure at $200,000. The cost of the 3052 console was cut from $21,840 to $15,290.

Maintenance for the 3052 was lowered from $2,200 to $2,090, but the 3056 maintenance charge was not affected, the spokesman said.

DPD's latest announcement followed in the wake of volume discounts on older models of the 3270 CRT terminals [CW, Aug. 4] and price cuts on both the 3211/3811 printer/controller combination and certain models in the 3420/3803 tape drive/controller family.

Effective Aug. 22, IBM reduced the purchase price of a 3211 from $53,440 to $40,080 and the 3811 controller went from $23,580 to $17,685, a representative said. Just 10 days later, on Sept. 1, the vendor lopped a significant amount from the purchase price of 3420 tape drive models 4, 6 and 8. The Model 4 was cut from $23,050 to $18,440; the Model 6 went from $26,930 to $21,540 and the high-end Model 8 price was reduced from $29,860 to $23,890.

The price of associated 3803 Model 2 controller was cut from $41,390 to $33,110, the spokesman added.

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Logic Argues Against AT&T Pricing Scheme

Analysis

By Phil Hirsch

CW Washington Bureau

Logically, there are several reasons why AT&T's Installed Base Migration Strategy should not work.

For one, competing suppliers would be able to take customers away from Bell if prices are made arbitrarily high. But that presupposes that competing suppliers exist. The Ad Hoc Telecommunications Users Committee contends that in the case of the Common Control Switching Arrangement (CCSA), for example, there are no viable alternatives except other Bell products — in this case, EPSCS, the computer-based private network switching arrangement.

The same is true of private line services and terminal products in general, according to a knowledgeable source. Existing private-line facilities — terrestrial as well as satellite — are already leased out, and the specialized carriers are not building any more, he explained.

This is partly because high interest rates have made such investments too expensive and partly because the carriers are more interested in the switched dial-up services market, he added.

Further Impediment

Another theoretical impediment to the pricing strategy is the Federal Communications Commission (FCC) and state regulatory bodies. They have to accept the phone company's cost justification for all tariffs before those tariffs can become effective.

However, as the Ad Hoc Committee pointed out in its complaint to the FCC, the "entire cost support package" AT&T submitted in the CCSA case "is inherently unauditable." It "relies totally on the subjective judgments of [AT&T] account, market, and group managers."

This same basic complaint has been made repeatedly during the past several years by those opposing Bell tariff filings, and the commission has often agreed with the complaints. The FCC's typical response has been to defer final approval of a new rate, but in the meantime allow it to go into effect while investigating the related costs. (This was how AT&T's 1978 CCSA rate increase was handled.) But the investigation tends to drag on, however, so the rates tend to become permanent.

Four U.S. Giants Cry 'Foul' Over Bell Pricing Scheme

(Continued from Page 1)

the enhanced private Switched Communications Service (EPSCS).

The proposed CCSA rate increase follows one filed by the phone company in December 1978 and subsequently accepted temporarily by the FCC, pending the outcome of an investigation. Since the investigation is still under way, the earlier increase remains in effect.

If the new rate is granted, the Ad Hoc Committee said, it will raise CCSA rates a total of more than 440% within a period of less than two years.

If the new rate is granted, the Ad Hoc Committee said, it will raise CCSA rates a total of more than 440% within a period of less than two years.

But CCSA represents only part of the story.

According to the Ad Hoc Committee, several states have granted AT&T rate increases for PBXs and other terminal equipment during the past few years. Attached to the committee's recent complaint filed with the FCC are documents from two of those proceedings — in Texas and Ohio — that indicate that the installed Base Migration Strategy was used to set the new rates.

"The similarities between the migration strategy which Bell System companies seem to be pursuing for terminal equipment in the states and AT&T's recent CCSA rate increase filings are so striking that any conscientious regulatory body must question whether a migration plan exists for interstate services such as CCSA and EPSCS, and whether [the pending] CCSA rate increases are part of such a plan," the Ad Hoc Committee said.

Meanwhile, both New York Bell and Pacific Bell are trying to raise their charges for CCSA and other long-established private-line services [CW, Aug. 11, Sept. 29]. The New York filing has been shot down, but the Pacific Bell proposal is still pending before the California Public Utilities Commission, and Bell operating companies in a number of other states reportedly are planning to file similar increases if and when the California charges are implemented.

Significantly, this increase would be imposed on virtually all interstate customers leasing private-line facilities from Pacific Bell; the New York filing, by comparison, involved only CCSA and foreign exchange (FX) services.

Morevoer, AT&T last month requested permission to shorten drastically the depreciation rates for its PBXs and other widely used terminal equipment. One part of this proposal calls for depreciating electronic PBXs differently from older versions of the same equipment.

The depreciation "represcription" proposal, if adopted, will increase the company's revenue requirement — i.e., the amount that has to be recovered from interstate customers — by $100 million in 1981. Another result will be to narrow the gap between the prices of new and existing terminal products.

The relationship between "represcription" and the installed Base Migration Strategy is indicated by one of the documents the Ad Hoc Committee cited in its FCC complaint.

According to an Examiner's Report included in the Texas rate case, "The migration plan would entail shortening the economic lives assigned to older generation equipment and repricing such equipment relative to the rates for Flagship products so as to make the latter much more attractive to existing and prospective customers."

'Irrelevant,' AT&T Says

WASHINGTON, D.C. — "An irrelevant allegation" is what an AT&T spokesman labeled the Ad Hoc Telecommunications Users Committee's charge that his company is using an illegal pricing scheme to make its customers replace their existing Bell terminals and services with newer, more expensive ones.

"It's an irrelevant allegation which is simply a last-ditch effort by the Ad Hoc Committee to try to keep the full cost-based rates for [Common Control Switching Arrangements] local access lines from becoming effective," the spokesman told *Computerworld*.

The AT&T representative added that he was "not aware" of the pricing scheme, known as the Installed Base Migration Strategy. "We do no attempt to manipulate customers to migrate to more sophisticated and expensive alternate services," he said.

"However, we certainly do market our new services, just as you'd expect us to. And we do our best to make customers aware of how new and innovative services and products can be of benefit to them."

Will Patco Go on Strike?

(Continued from Page 1)

"wrong" in the present ATC environment is alleged understaffing of both controllers and technical maintenance personnal and undercompensation and antiquated computer equipment linked to their air traffic control (ATC) radarscopes.

Controllers have long decried the lack of modern computer equipment in their facilities — which in the 24 U.S. Air Route Traffic Control Centers (ARTCC) is based on third-generation IBM 360/65 computers.

And although controllers have often blamed computer failures for near midair collisions that endangered air passengers' lives, the FAA steadfastly maintains it is the controller's job to separate air traffic, and if that means dealing with computer outages, so be it. The agency maintains, furthermore, that the equipment's reliability has improved over the last seven years.

That issue may remain a debatable question, but one thing both sides agree on is that any strike action by Patco would be clearly illegal. Patco members are federal employees and, as such, cannot legally strike or stage a traffic slowdown.

Strike 'Common Knowledge'

Nevertheless, the FAA is convinced that is just what will happen next spring. FAA chief Langhorne Bond recently called it "common knowledge" that the controllers plan a walkout. "There are all kinds of clear indications that they are planning a strike," agreed FAA spokesman Jerry Lavey, who noted that Los Angeles controllers have been seen wearing T-shirts reading "One in '81."

In addition, Lavey cited a "detailed strike plan" that is circulating among controllers around the country. Patco Executive Vice-President Bob Meyer, however, called the document "educational" — for use only in the event that Congress should ever change the existing law barring strikes.

Also pointing to a possible strike action, according to the FAA, is the existence of Patco's two-year-old "subsistence fund," bluntly called a "strike fund" by FAA officials.

A strike fund only in the sense that "we've set aside certain dues for use in the event we get the right to strike," Meyer explained. The purse was investigated by the Department of Labor — at the FAA's urging — and found to be "not improper and not illegal," Meyer said. "If we used it [in a strike], that would be a different story."

FAA Appeal

The FAA has appealed the Department of Labor's decision, however, and expects a new ruling from the Federal Labor Relations Board "fairly soon," according to Lavey.

Patco, which wants the right to strike and negotiate on wages and working conditions, would like to see the FAA's regulatory and promotional responsibilities split up into two separate agencies because "we feel there's a conflict between the two," Meyer said.

Such a split could be accomplished through making the FAA a semiindependent agency like the U.S. Postal Service, which would then allow walkouts. "It is our wish and our hope that someday we might have the same rights [to strike] as the workers in Poland," Meyer remarked, adding that such a split is "inevitable" because the FAA is presently "running on yellow lights and an occasional red light in the areas of equipment and personnel."

Although the FAA continues to insist it runs not on red or yellow lights but green ones — that there are no safety, overtime or staffing problems ("except maybe at O'Hare") — the agency has taken Patco's strike threat seriously and has a contingency plan just in case.

If all 15,000 Patco members strike next March, the FAA would be forced to call for a sharp cutback in private plane traffic at most large airports, a possible halt in military training flights and a severe reduction in the number of commercial flights, according to Lavey.

A crew of 5,826 FAA supervisors and staff would try to fill in for the present staff of 17,000 controllers. While the FAA does not expect all controllers to join in a strike, even if one is staged, there is reportedly some concern on the part of the FAA that militant union members may harass nonparticipants and possibly sabotage FAA radar and computer equipment.

Brac Collects Analysts' Dues, Denies Benefits

(Continued from Page 1)

they continue to be classified as part of the Santa Fe's management.

The dual status that the employees apparently are being forced to accept has led to considerable ire and confusion among at least some of the 33 systems analysts that have joined the Santa Fe's computing staff since the latest union agreement took effect almost three years ago.

The experience of Sally Dinkle is a case in point. Last April, Dinkle and several of her Santa Fe colleagues were promoted as a group from programmers to systems analysts. As a programmer, Dinkle had always fallen within Brac's scope of authority and thus had been required to pay union dues.

But when she finally learned she had become a systems analyst, she honestly believed her need to pay dues and remain a Brac member had ended, she said. Dinkle based her conclusion on her belief that the Santa Fe's pre-1978 agreement with Brac was still in effect and that the company's systems analysts were therefore still exempt from union control.

What she failed to realize, of course, was that the agreement had long since been scrapped and had been replaced with the updated version that in effect had brought the railway's systems analysts for the first time within the union's sphere of influence.

Blames Brac

Today, Dinkle recognizes her mistake, but she continues to blame her ignorance on Brac and the Santa Fe's management, neither of which informed her of the company's revised union agreement until many months after it had already taken effect, she said.

The alleged breakdown in communications is also reported to have affected several of Dinkle's colleagues.

Dinkle wasn't officially notified of the change in the railway's union agreement, she said, until late this summer when she and some of her coworkers received a letter reminding them of their obligations to Brac and of their need to continue paying union dues.

The letter, dated last Aug. 16, reportedly came from R.M. Champion, vice-president of the Santa Fe's computing operations.

A spokesman for the railway's management, however, offered another possible explanation for why certain employees were apparently misinformed about the union responsibilities of the company's systems analysts. The spokesman theorized that news of the Santa Fe's revised union agreement did indeed get passed along to Brac's membership, but that a few of the company's systems analysts were inattentive and thus failed to heed the notice.

Regardless of who is ultimately to blame for the misunderstanding, however, Dinkle and most of the other Santa Fe systems analysts have already resigned themselves to the prospect of having to continue to pay union dues. Under the current agreement between Brac and the Santa Fe's management, failure to pay dues can result in an employee's automatic dismissal.

On the other hand, Dinkle and some of her coworkers remain just as adamantly opposed to their current union status as they ever were. Why, she asked, should any employees be compelled to sacrifice part of their take-home pay to help defray the cost of union benefits that they themselves are ineligible to enjoy?

In her view at least, such a requirement is "ridiculous," and apparently her conviction is shared by some of her associates. During the last few weeks, a group of the Santa Fe's disgruntled systems analysts has been conducting an informal poll to find out whether the employees favor seceding from Brac and forming their own independent union.

Thus far, the results of the poll are still inconclusive, but if the proposed secession wins majority approval, the employees' next step would be to seek a hearing before the Washington, D.C.-based National Mediation Board (NMB), an independent federal agency that regulates Brac's authority and administers the Railway Labor Act.

Not the First

The Santa Fe Railway Co. is not the only firm where information systems professionals have found themselves compelled to join a labor union by the Brotherhood of Railway and Airline Clerks (Brac).

Similar instances of forced unionization are being reported at Western Airlines Co. [CW, Aug. 18] and the Union Pacific Railroad Co. [CW, Sept. 15].

Brac's recruiting practices at these and other transportation providers suggest the international labor union has embarked on a nationwide membership drive.

Behind Brac's recruiting push lies the union's apparent belief that the transportation field's rapidly growing management information systems ranks represent a major opportunity to extend its control into what has previously been a nonunionized domain.

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BDS

IBMer Pans JCL, Eyes Command Languages

By Tom Henkel
CW Staff

NEW YORK — IBM made a mistake when it created its job control language (JCL).

Speaking before attendees at the Info 80 conference here, John B. McKeehan, IBM's language support manager, said JCL, which is a translator that changes a user's code into something the CPU can understand, is too big and too inhuman to be of much good. Given the chance to do it all over again, McKeehan said, the control language would have more human qualities and it wouldn't be quite as structured as it is now.

"If it's too easy, the user gets bored," McKeehan said, adding that control program developers must develop a system that is a balance between the supermachine and the total human — both concepts are impossible, he noted. The ideal control program would be something the user could outwit, thus giving the user the same sort of control available in early systems — before there was a buffer between the user and the operating system.

Today's systems, he continued, only offer users a slice of computing, such as time-sharing or resource sharing.

All Antiquated

But not only IBM's JCL is behind the times. McKeehan said every vendor's command language is antiquated — and was released that way. Speaking as a member of an International Federation of Information Processing (Ifip) committee to study the control language problem, McKeehan said the answer to an improved control language will have to come either from universities or from private study groups, such as the Ifip committee.

CW at
Info 80

But while vowing, "We will never do anything like JCL again," McKeehan noted there are always new problems cropping up to throw roadblocks in the face of groups trying to improve command languages. The current roadblock is the trend to distributed data processing, a concept that causes "frightful" problems for control languages, he said.

Chairman of the command language panel, Thomas J. Harris, representing Digital Equipment Corp. and currently chairman of the Codasyl committee on command languages, said standardization of command languages is a must, but who will determine what command languages are best is a difficult question. He added that other groups, including the National Bureau of Standards, and Ansi are working to build a command language standard.

Codasyl wants a transportable command language, while other committees have yet to make firm recommendations.

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Info 80

A CW Photo Feature
By Ann Dooley

Info 80 attendees get down to their shirt sleeves in order to study all the equipment on the exhibit floor.

Lillian Wolfe and George Smith work on Exxon Information Systems, Inc. Vydec word processing system.

Qantel's business package holds the interest of (left to right) Dick Alve, Mike McCorry and Bill Sterling.

Hazeltine Corp.'s Les Roden discusses the merits of Opus 80.

As Info 80 proceeds inside, the New York City beat goes on outside.

A Bird's Eye View

Registration Crowd Awaiting Opening of Info 80

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Panel Suggests Ways of Hanging Onto DPers

By Connie Winkler
CW Staff

NEW YORK — Managing DP personnel in the 1980s will require new thinking — options on fringe benefits and retirement, bonuses or perhaps income counseling so that high salaries do not go down the inflation tube. Businesses will also have to develop what one company calls a human resource management system that includes a football-like draft.

"It is obvious management must focus upon better and more innovative ways to cope with the unrelenting demand for computer people," Charles D. LaBelle said. "The old ways will not suffice."

LaBelle was a panelist on "The 'People Side' of EDP — A Major Consideration for Productivity Improvement in the DP Organization" session at the Information Management Exposition & Conference (Info 80).

CW at Info 80

Companies of all sizes not only need to have a career progression program, they need to try innovative ideas to keep employees happy, said John W. Konvalinka, a partner at Arthur Andersen & Co. H suggested an income counseling program so that employees can deal with their incomes in an inflationary environment and are able to buy a home in the area they want to live.

Konvalinka said he was talking more and more with people about the stresses of the job, those things that get in the way of the employee working and functioning professionally. "There are more things going on in people than the code they write," the consultant said.

Individualized Benefits

Pulling an idea from Peter Drucker, LaBelle also endorsed individualized fringe benefits. The benefits policy should be options from which the individual chooses the total package giving the most for the money available. "The choice as to which benefits are the right ones for this or that individual is then best made by the individual alone," LaBelle said.

And when it gets to traditional retirement time, "employees themselves in developed countries are going to insist that they be given . . . freedom of choice on second careers, freedom of choice as to whether to retire at a given age or to stay on working, freedom of choice largely in their job assignments as well."

LaBelle, vice-president of human resources, operations division, at Manufacturers Hanover Trust Co. (MHT), pointed out another bank, Bankers Trust Co., is offering DP employees bonuses.

"I feel individuals will gravitate to those companies that show creativity in their remuneration methods," LaBelle said.

Structured Systems

But, the really critical factor to retain good employees is what LaBelle dubs the "proper people environment," and to grow that at MHT he has introduced a structured human resource management system that is automated at MHT.

Behind the system at MHT is a human resources management support group that acts as the clearinghouse for DP employees and the managers who need them. The football-like draft comes into play with a job requisition from a project or product manager. Human resources then determines the best way to secure the employee — either an entry employee, present employee or consultant.

A list of the potential employees within MHT is compiled and they are ranked; then beginning at the top of the list they are approached about the new job. Initially managers did not want to give up their present employees, but that has changed, LaBelle said. "The draft counteracts the employees' feeling that they're doing their job in a particular area and no one knows about it," the vice-president said.

Managers can veto a draft of one of their present employees, but they have to come up with a succession plan for that employee in six months, LaBelle said.

Additionally, in the MHT scheme there are definite career paths within the company, a skills glossary and each employees skills are tracked. There are at least annual career counseling sessions with managers so that careers can be evaluated and additional education made available.

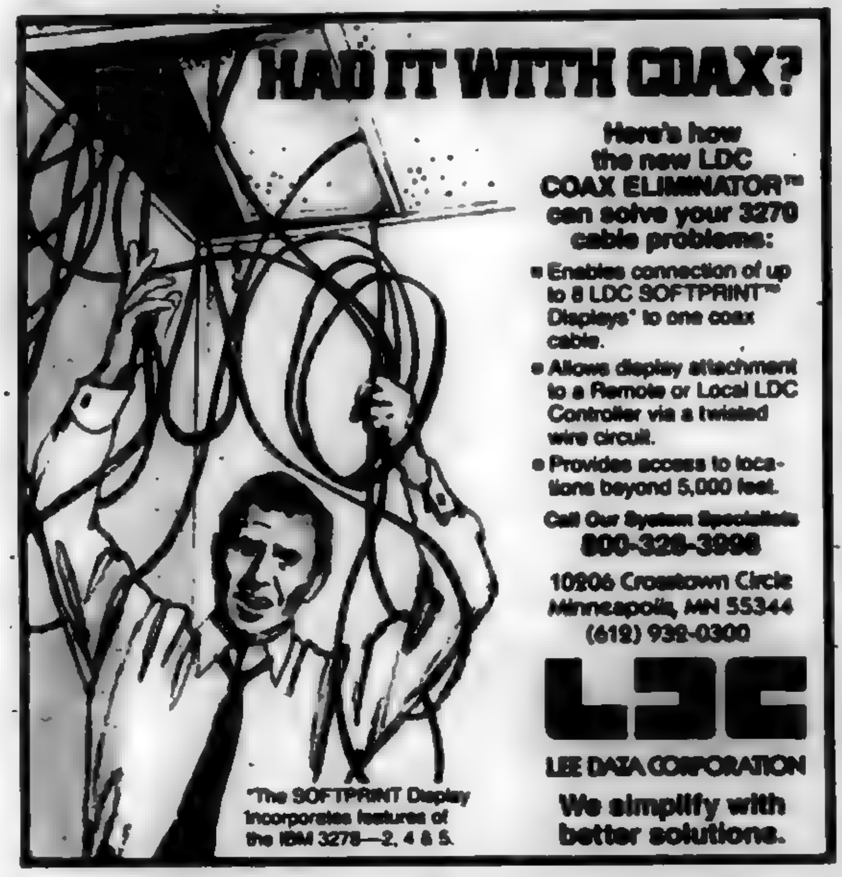
Such a system, LaBelle said, allows MHT to reach people in a "personalized way, through a system, without relying solely on the style of the manager."

Managerial Accountability

For managers, LaBelle recommended managerial accountability. "A manager is entrusted with a total dollar value of human resources. His or her job is to accomplish work and, I submit, to enhance the total value of those human resources," LaBelle said. Along this reasoning the human resource value is enhanced by retaining good performers, educating them, adding new resources to the organization and minimizing turnover.

This value is decreased by losing good performers, neglecting education, making poor assignments, not being able to add new people and not controlling turnover.

The costs of keeping good people can be compared with the costs of replacing them — agency fees, consultant premiums, separation pay and lost productivity, LaBelle said.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Datapro Issues Directory Update

DELRAN, N.J. — The newly updated *Directory of DP Suppliers*, containing profiles of nearly 1,000 companies that supply all types of products and services of interest to computer users, planners, designers, vendors and operating staff, is now available from Datapro Research Corp.

This 200-page directory was designed to help DP management choose suitably qualified vendors by describing each company's location, size, management, financial status, product line and sales and service organization.

The 1980 *Directory of DP Suppliers* is available for $25 per copy from Datapro at 1805 Underwood, Blvd., Delran, N.J., 08075.

Targets First-Time User

Basic Four System Meshes DP, WP Functions

By Marcia Blumenthal
CW Staff

NEW YORK — Building on its strategy to offer systems that perform both DP and word processing (WP), Basic Four Information Systems Division introduced its Spectrum 80 system here recently. First shown at the seventh International Information Management Exposition & Conference (Info 80), the Spectrum 80 is the first Basic Four system to offer users full data and word processing functions within the same system, the company said.

The Spectrum 80's architecture consists of a central File Management Computer (FMC) as well as Infocenter workstations which include a processor and peripheral equipment capable of handling both WP and DP functions.

The FMC does no application processing. Instead, it manages and schedules the resources of the system. It performs functions such as disk access, spooling and caching of disk, according to David Seigle, vice-president of planning.

This system includes a CPU with 64K bytes of main memory, 2M-byte fixed disk and 1.2M-byte diskette drive.

Up to four Infocenters, 17M bytes of fixed disk and an additional 1.2M-byte flexible disk and two additional printers can be configured with the FMC with minimal impact on processing performance, the vendor said.

Infocenters Featured

The system features three basic types of Infocenters and a fourth optional Infocenter. The DP Infocenter, designed to handle general accounting functions, features a multifunctional processing computer (MPC) with a 12-in. screen, 64K bytes of main memory and an 80 char./sec bidirectional printer.

The Word Processing Infocenter also has an MPC with a 15-in. full-page display screen, 65K bytes of main memory and a 45 char./sec letter-quality printer. The WP Infocenter uses Dataword II, Basic Four's word processing software.

The Information Processing Infocenter allows both WP and DP functions to take place concurrently within the system. This workstation features an MPC with 65K bytes of main memory, a 15-in. full-page display and a 120 char./sec bidirectional printer.

CW at Info 80

Prospective users of the Spectrum 80 are first-time users and those Basic Four system users, or other host system users, who want to distribute applications from their existing systems via communications to one or multiple Spectrum 80s.

Although not necessarily geared to the low-end user, the basic Spectrum 80 configuration priced at $15,990, is the company's lowest priced system offering.

The FMC and Infocenters are priced separately: The price for the FMC is $6,790; the DP Infocenter $9,200; the WP Infocenter $10,690; and the Information Processing Infocenter $11,150.

Most features of the system are currently available, with others due to be available no later than the second quarter of 1981. The system can be delivered in 90 days, Basic Four said.

Basic Four, a division of Management Assistance, Inc., is headquartered at 14101 Myford Road, Tustin, Calif. 92680.

IEEE Sets Committee On Micro Interface

SAN FRANCISCO — The Institute of Electrical and Electronics Engineers (IEEE) has formed a standards committee to establish a Microprocessor Operating System Interface (Mosi).

The charter of the committee is to provide for portability of higher-level software upon microprocessor operating systems.

The initial meeting of the Mosi committee will be held here Nov. 13-14. Further details are available from Jack Cowan, Intel Corp., 5200 N.E. Elam Young Parkway, Hillsboro, Ore. 97123.

Drucker to Speak At ASI Conference

CHICAGO — Peter F. Drucker, the management consultant and author of the recently published *Managing in Turbulent Times*, will be the featured luncheon speaker at Advanced Systems, Inc.'s (ASI) 12th annual users conference here Nov. 18-19.

Because Drucker lives in California and "prefers not to travel," ASI said, his presentation will be beamed by satellite to the banquet hall of the Chicago Marriott.

The theme of the conference is "Spectrum '80: Delivery Systems of the '80s." The registration fee is $250 in advance or $295 at the door, ASI said from 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

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'Specifier' Allows On-Line Application Designs

NEW YORK — Genasys International, Inc. has introduced Specifier, a system design tool that allows systems analysts and users to create application designs on-line.

Announced during the seventh international Information Management Exposition & Conference (Info 80) here recently, the package can be used with the company's Genasys system or purchased as a stand-alone package.

On a stand-alone basis, Specifier allows users to create applications on-line through the design documentation level, according to Bruce Tarr, vice-president of marketing.

CW at Info 80

The package features a tutorial and help facility including prompting on the details of the reports and the screens that are desired, where the data needed for these outputs can be found and what files, data base segments and procedures are needed to transform the data into the desired design.

Currently the system can run only in an IBM Command Level CICS/VS environment and requires a Cobol compiler. In the near future, the firm intends to offer versions of Specifier for other on-line environments, according to Gary Guttman, the company's president.

Used in conjunction with the firm's Genasys system, Specifier adds on-line capability to the batch-oriented basic Genasys product. Genasys, a product marketed by the firm for the past seven years, produces not only design documentation, but generates Cobol or PL/1 source programs and produces final documentation once those programs are tested and debugged. Moreover, Specifier used within Genasys can also be used to build a data base.

Genasys works most efficiently when it has access to Assembler H under IBM's OS/VS, but it can also be used with assemblers in the DOS/VS environment, Tarr noted.

Specifier costs $52,500 when licensed as a stand-alone support package. It is not available on a lease basis. When licensed as a front end to the complete Genasys development system, Specifier's purchase price is $12,500 and leases for $6,000 monthly bundled with the Genasys system.

The vendor is located at 17 E. 45th St., New York, N.Y. 10017.

Meet Slated On Security

BOSTON — The Seventh Annual Computer Security Conference and Exhibition will take place here Nov. 10-13. Participants may choose from 48 workshops at the four-day program, which is being conducted by the Computer Security Institute.

Speakers at the event will include IBM's Robert Courtney, Univac's Director of Computer Science Carl Hammer and David Dobkin of the University of Arizona. Sessions will span the establishment of a security program through advanced risk-analysis for small and large businesses.

Registration costs for the program vary. More information is available from the Computer Security Institute, 5 Kane Industrial Drive, Hudson, Mass. 01749.

Seminars Planned On Managing IP

BUFFALO, N.Y. — A series of six seminars on information processing (IP) management will be conducted by the Computer Task Group, Inc. (CTG) this fall. "Distributed Systems" will be held here on Oct. 14-15, in New York City on Oct. 20-21 and in Philadelphia on Nov. 13-14.

"Data Management" is scheduled in Pittsburgh, Pa., on Oct. 30-31, Washington, D.C., on Nov. 10-11 and Chicago on Dec. 4-5.

The registration fee for these seminars is $295. Further details are available from Midge Woolley at CTG, 800 Delaware Ave., Buffalo, N.Y. 14209.

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Twenty-Five Cases, $83,742

Matching Uncovers Two-State Welfare Fraud

By Ann Dooley
CW Staff

HARRISBURG, Pa. — Twenty-five cases of welfare fraud totaling $83,742 in illegal payments have been uncovered by matching state welfare rolls in Pennsylvania and Ohio.

All those involved in these cases allegedly applied for welfare payments in one state and at the same time received money from the other state, according to the Pennsylvania auditor general's office here. Only after a state computer here was used to match the names, birth dates and Social Security numbers of medical assistance recipients from the two states were the double payments discovered, Executive Auditor General John Kerr stated.

All of the cases involved the Aid to Families with Dependent Children (AFDC) program. Of the total illegal payments, $45,481 was collected from Pennsylvania and $38,261 from Ohio. Ten cases involved children who were claimed by one adult in one state and a different adult in the neighboring state. In the remaining 15 cases, the recipients allegedly "double-dipped," meaning they collected assistance from both states.

Individual instances of fraud were reported to have ranged from $195 to $4,431 and occurred from August 1968 to the present. More than 787,000 recipients were on public assistance in the state as of June 1980, accounting for 6.7% of the state's population.

The automated match was a special effort coordinated through the auditor's offices of both states, according to Joe Theurer, Pennsylvania's deputy auditor general.

Pennsylvania currently has no regular matching program for welfare fraud, although the state is now setting up a new computer system to monitor Medicaid fraud. The department wants to perform another match with welfare data from the Delaware-Maryland-New Jersey-Philadelphia region, Theurer said.

The auditor's office would like to find as many ways as possible to cross-match welfare data so that matches can eventually be implemented on a regular basis and is encouraging the Welfare Department to take a more active role, Theurer said. Since the auditor general's office functions as a monitoring body, it has no power to prosecute.

The evidence collected from the match was turned over to the various county boards of public assistance, which must either challenge the findings or forward the cases for prosecution within 30 days to the Welfare Department's Bureau of Claim Settlement, Theurer noted.

If the recipients involved are brought to trial and found guilty, Theurer expects restitution and/or sentences.

Credit Records Illicitly Accessed At DP Center

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — The privacy of scores, perhaps even hundreds, of northern California residents may have been seriously compromised earlier this year when their confidential credit records were fraudulently retrieved from a local credit bureau's computing center.

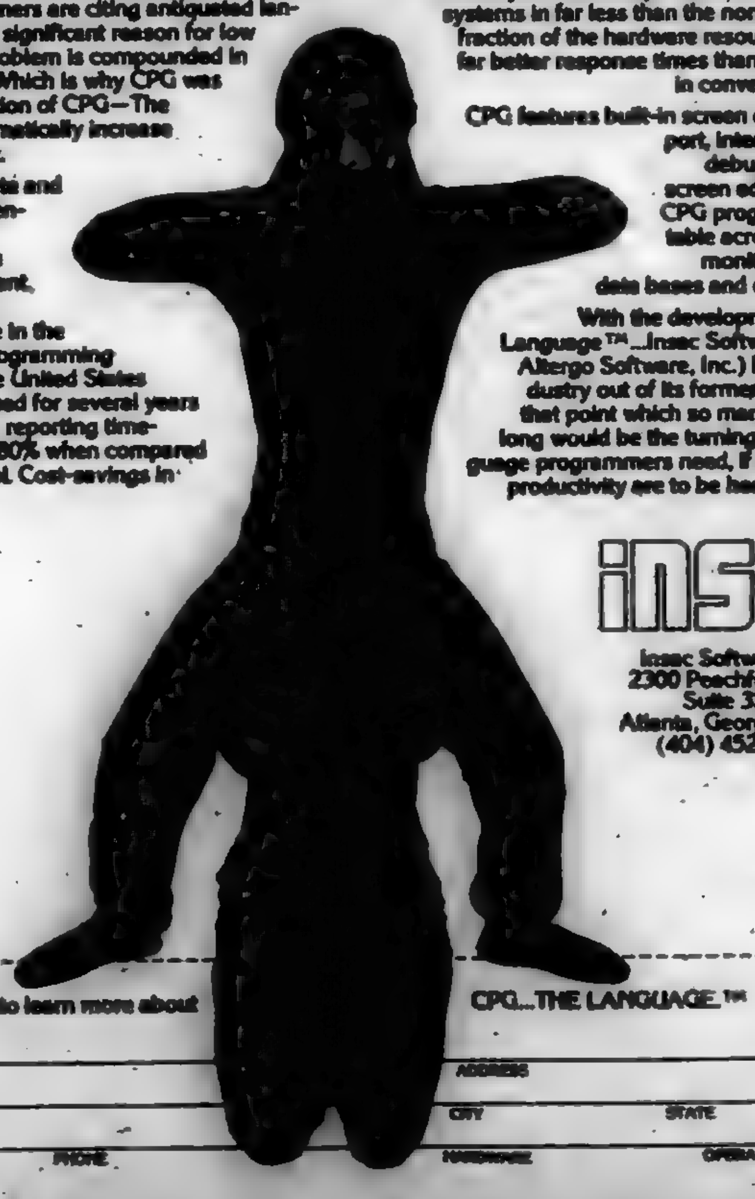
Through a ruse that still is not fully understood, at least one unauthorized individual apparently gained possession of a password that permits access to TRW Credit Data, Inc.'s data base, which lists the charge account numbers, Social Security numbers and similar information for thousands of credit card holders. The password belonged to the southern California offices of Beneficial Finance Co.

All the unauthorized inquiries were apparently received over the telephone and were fielded routinely by TRW employees.

As a result of the illicit scheme, an unknown individual earlier this year gained illegal access to four charge-account numbers belonging to a northern California couple named Alan and Clare Kahn. The individual then used the numbers to fraudulently order more than $2,000 worth of merchandise over the telephone [CW, June 23]. Were the Kahns the only people whose charge account numbers were illegally used, or did the scheme claim many other victims as well? At this point, no one can say for sure.

But an ongoing investigation of the Kahn case has uncovered "literally hundreds" of possibly suspicious phone inquiries into TRW's credit profiles, according to Larry Anderson, a Beneficial Finance field supervisor based in southern California. All the inquiries were apparently made under the same Beneficial Finance account number, and all the targets of phone inquiries were apparently charge card holders living in the San Francisco Bay area.

Earlier this summer, an investigation was launched in an attempt to trace the unexplained inquiries back to their source, but thus far, the effort has made little headway.



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Violence Mars Minneapolis Newspaper Strike

Marguerite Zientara
CW Staff

MINNEAPOLIS — Violence erupted at the picket line of striking Minneapolis Star and Tribune Co. union members last week [CW, Sept. 29], resulting in the hospitalization of an 18-year-old man.

Steven Turseo was allegedly struck on the head "by the temple" by a male picket while carrying an armful of newspapers he had bought to sell in his family's convenience store in Cedar, Minn., according to his mother.

The strike, in which about 650 members of three unions are disputing salary, fringe benefits and electronic newspaper production issues, entered its fourth week last Sunday, the day of the alleged incident.

Since the workers struck Sept. 13, the Turseos' store had been without Sunday papers, causing "a big dip in business," according to Turseo's mother.

"When they announced on the radio that people could go down there and buy the papers, we discussed it and Steve decided to go," she recalled. "It was his last trip out [of the plant], he had his arms full of papers, and he was hit from behind by a man's fist."

Unconscious "off and on" for "about 10 minutes," Turseo was hospitalized for two days and "at this point he's all right" she said last week. "They also banged his glasses up pretty well, and he has to get new ones because he can't see without them."

Declining to say whether a formal complaint has been or will be filed against a union or an individual in the case, Turseo's mother added that it is a "very hard decision to make" whether or not Turseo should go back to buy more papers for the store. At the time of the reported incident, he was attempting to buy 150 papers, all of which he did procure.

Union Unavailable

While union spokesmen were not available for comment on the incident last week, management spokesman Lee Canning confirmed the incident, but declined to comment on it.

When asked if a settlement was near, business manager Canning replied, "I hope so. I thought we had [a settlement] last night, but we're not quite there."

On strike are 450 members of the Twin Cities Newspaper Guild, including reporters, copy editors, photographers, circulation district managers, promotional personnel, copy aides, news technicians and clerical workers. In addition, 170 members of the Mailers Union Local 4 and about 20 Machinists Union members are participating.

The other 10 unions represented in the plant are honoring the picket lines.

Meanwhile, limited editions of the morning *Tribune* and the afternoon *Star* are being published by 600 management and nonunion personnel and sold "out the front door," according to Canning.

The controversy surrounding the papers' plan to enter Compuserve, Inc.,s experimental electronic newspaper project next spring or summer concerns both job security and profits.

The Newspaper Guild's present contract calls for members to get 25% of the profit of any material that is resold by the paper to a third party. "The company has proposed striking that language from the contract so that there would be no obligation on them to pay for material sold electronically," a Guild spokesman said recently.

MSI Winners To Programs Test

COSTA MESA, Calif. — The winning application programs entered in MSI Data Corp.'s competition to devise applications for its Omega generation of portable data entry terminals will be put into practice by their creators.

Mike Rabin, a 22 year-old management systems analyst from Tennessee, will be flown to Tokyo and San Francisco to measure the performance of those citie's subway systems using a MSI/88f user-programmable portable data entry terminal.

Standing on the platform, Rabin will measure passenger loading and enter a percentage estimate of how many are sitting as opposed to standing. While waiting for trains he will survey commuter reactions to the service provided.

Rabin will telephone the data collected to MSI's computer in Costa Mesa for processing and comparison to other studies completed on transit systems.

The second winner, Dr. Ralph Grams, will stay in his hometown of Gainesville, Fla., where he will test his application to save time for nurses processing patient information at the University of Florida's College of Medicine.

Grams has devised a plan whereby on-duty nurses enter patient data on the terminals as they perform their rounds. The information is formatted and printed at a nurse station.

MSI received 500 entries for the competition, which had as its prize a test of the winning applications at MSI's expense. Imaginative programmers suggested such trips as data collection on the physical attributes of sun worshippers on the world's beaches or surveying the business practices of prostitutes in European cities.

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Regional Conferences Planned

DPMA Steps Up Efforts on Model Curriculum

By Jeffry Beeler
CW West Coast Bureau

POMONA, Calif. – Starting late this month, the Educational Foundation of the Data Processing Management Association (DPMA) will sponsor a series of five regional conferences that will mark another step forward in efforts to develop a model curriculum for undergraduate business computing instruction.

The one-day conferences will provide an opportunity to review and revise the work accomplished thus far in a curriculum development project that began early last year and is scheduled for completion late next spring.

The first in the series of regional conferences will take place Oct. 23 in St. Louis, according to Dr. Thomas Athey, chairman of the Information Systems Department at California State Polytechnic University. Four similar conferences will then follow on Jan. 7 in Dallas, Jan. 9 in Miami, March 18 in Toronto and March 20 in Washington, D.C.

Participants are expected to represent a broad cross-section of the computer-oriented community and will include computing professionals from industry, academic and textbook publishing circles. All qualified representatives from any of these three backgrounds are invited to attend the regional conferences and express their views on the question of what an undergraduate business-computing curriculum should consist of and how it should be taught, Athey said.

Uniform Guidelines

The main purpose for holding the five regional conferences is to lay the foundation for a course of study that will provide junior and senior colleges throughout the U.S. with a set of uniform guidelines for teaching business computing during the 1980s.

Such a model curriculum is based on the premise that business computing should be taught differently from scientific computing and is geared primarily to preparing information systems students to enter the commercial work force as entry-level programmers and analysts, Athey said.

Efforts to implement the model curriculum were originally spearheaded by Athey and several of his colleagues at Cal Poly. Since then, however, the main driving force behind the curriculum's development has reportedly shifted from Cal Poly to the DPMA's Educational Foundation, headed by Don Price, dean of Sierra College's Computing Information Services in Rocklin, Calif.

Early Milestone

One of the first milestones in the curriculum's gradual emergence came late last January when Cal Poly hosted a two-day workshop to sketch the proposed model's preliminary framework. The workshop attracted more than 100 representatives from businesses, colleges and textbook publishing outfits throughout the U.S.

By the end of the conference, the attendees had defined the preliminary requirements for 10 "core courses" they believed would be prerequisite for any effective undergraduate business computing curriculum.

After the workshop delegates finished their business and went home, the model curriculum's six-member executive committee mailed the conference's preliminary findings to a selected audience of several hundred expert advisors and asked them for their comments. Some 200 of the advisors responded to the inquiry and noted their recommendations on an accompanying questionnaire.

The executive committee then interpreted the responses and incorporated the best of the suggestions into the original model to produce a revised curriculum.

Next Step

The next step in the curriculum's ongoing development is to present the results of the first workshop to the participants at the five regional conferences, where the revised model will undoubtedly undergo still more scrutiny and refinements. At the same time, the executive committee plans to distribute a second round of questionnaires to solicit additional reaction to the revised curriculum's form and content.

As before, the best of the recommendations from both the regional conferences and the second round of questionnaires will then be added to the curriculum's current version to produce a final model that is expected to be ready for formal presentation early next May at the National Computer Conference, Athey said.

Athey described the executive committee's curriculum development strategy as a "top-down" approach in which the model's basic framework is established first, and its details are filled in later.

More information about the model curriculum for undergraduate business-computing instruction may be obtained from Dr. Thomas Athey, Information Systems Department, California State Polytechnic University, 3801 W. Temple Ave., Pomona, Calif. 91768.

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CW 10/13/80

Take It Easy at First, New Managers Told

NEWINGTON, Conn. — When a newly appointed DP manager takes over his crew, his initial interactions should be productive to avoid tension and resentment within the ranks. Those are the recommendations set forth in the August issue of *Getting Ahead in DP*, published by The Meld Publishing Co. here.

In meeting the employees he will be managing, a DP manager should try to make a good initial impression, the newsletter counseled. "Expressing pleasure at being able to work with them and confidence that they are going to provide valuable contributions will help," the article said.

In addition, the manager should express his commitment "to do all [he] can to help them succeed in their jobs," according to the article.

Furthermore, "It is important for the employees to understand why the organizational change has taken place," the newsletter observed. To that end, the DP manager should explain the knowledge and experience he hopes to contribute to the unit's efforts.

In addition, he should tell each employee, in detail, the role each will play toward achieving the unit's goals. "Asking the employee for recommendations on how the unit's goals can be accomplished, and asking for help in creating a smooth implementation will further enhance the initial contact."

Show Concern

To alleviate possible antagonism toward himself, the new manager should allow employees at the start to express concerns they may have about the organizational changes. Such action "establishes up front, an open relationship between you and the employee, and creates a comfortable, productive environment," the article said.

A new supervisor should also set consistent, measurable work standards so that employees will know they will be evaluated and treated fairly. "Ask for the employee's ideas on standards for their work, consult with them to create a mutually acceptable group of standards."

A regular review schedule should be established, which also provides an opportunity for ongoing discussions about how both management and employees feel about the situation.

As the supervisor makes his first delegation of work to the group, he should describe both the task to be accomplished and the reason for it. This will "increase the likelihood that the work will be done correctly and that the employee's awareness of the rationale will help them to feel better about doing the work," according to the article.

Lastly, the manager should ask the employees for ideas on how the work can be done and "look to them for a plan to accomplish the tasks," the report concluded.

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Managers on the Move

Dr. GEORGE G. DODD has been named head of the Computer Science Department at General Motors Research Laboratories at Warren, Mich.

Dodd has been a member of the labs for 16 years, most recently as assistant head of the computer Science Department.

He received his B.S. degree in electrical engineering from the University of Kansas at Lawrence and his M.S. and Ph.D. degrees from the University of Illinois at Champaign-Urbana.

George G. Dodd

• • •

MARTIN J. SPRINZEN has been promoted director of technical services for Candle Corp. He will be responsible for product development, technical support and internal DP at the Marina del Rey, Calif., headquarters.

Prior to joining Candle, Sprinzen was in charge of the operating system support group at Southern California Edison.

He earned his B.S. degree in electrical engineering from Cooper Union University in New York.

Martin J. Sprinzen

• • •

JOY WESSON and JO ANN JOHNSON have been named systems managers for GTE Data Services, a subsidiary of General Telephone & Electronics Corp.

Wesson began her GTE career in 1975 as a systems analyst in Tampa, Fla., and was later made systems supervisor. She will now be responsible for developing and coordinating a productivity management program for the telephone systems group.

A native of Oak Ridge, Tenn., Wesson holds a B.A. in business administration for Georgia State University.

Johnson joined GTE in 1973 from Pratt & Whitney Aircraft Corp. She was named senior analyst prior to her recent appointment. She will be managing a project team that is designing a financial business information system to serve GTE telephone companies.

Johnson, originally form Rockville, Conn., earned a B.A. from The University of Connecticut and an M.B.A. from the University of Tampa.

NCR Corp. has appointed HUGH J. LYNCH assistant vice-president of computer systems at NCR's Columbia, S.C., site. He was general manager of the engineering and manufacturing facility prior to promotion.

Lynch will be responsible for development and manufacturing operations at the Columbia facility, which produces microprocessor-based small computers, terminal controllers and communications products for NCR.

Lynch joined NCR in 1961 as a project leader in on-line software development in San Diego, Calif. He was later promoted to manager of software development and director of engineering.

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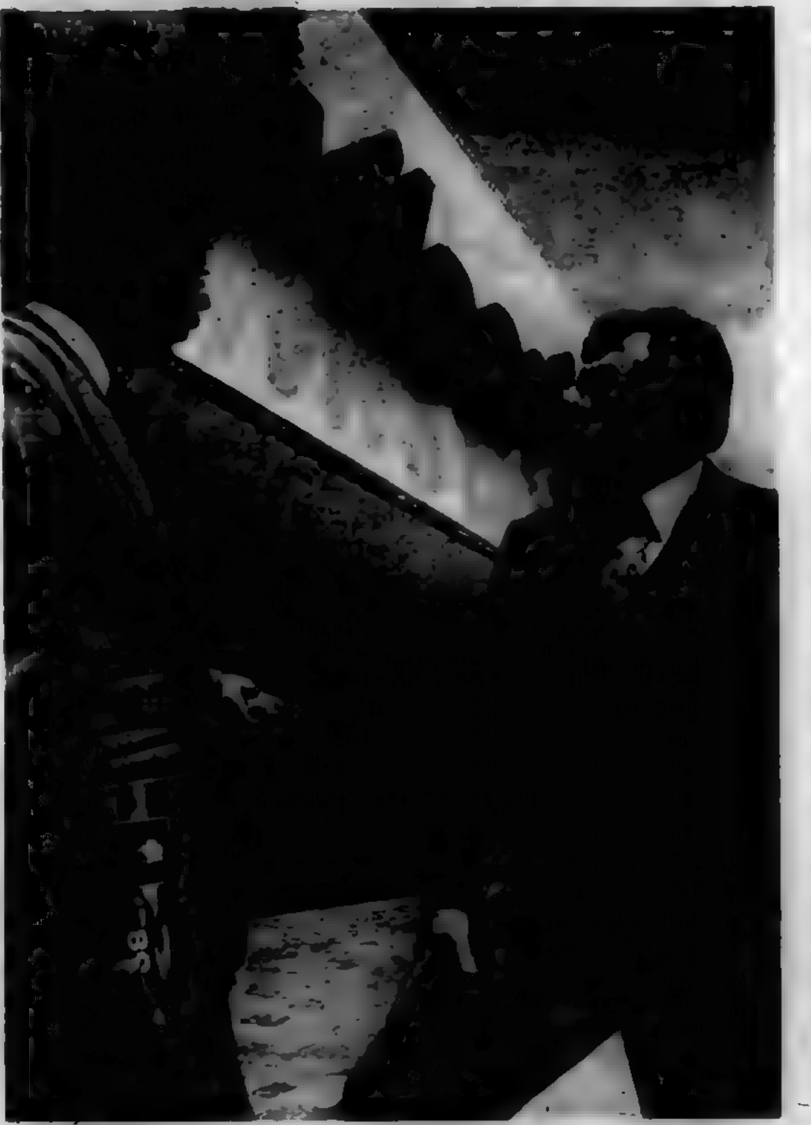
Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

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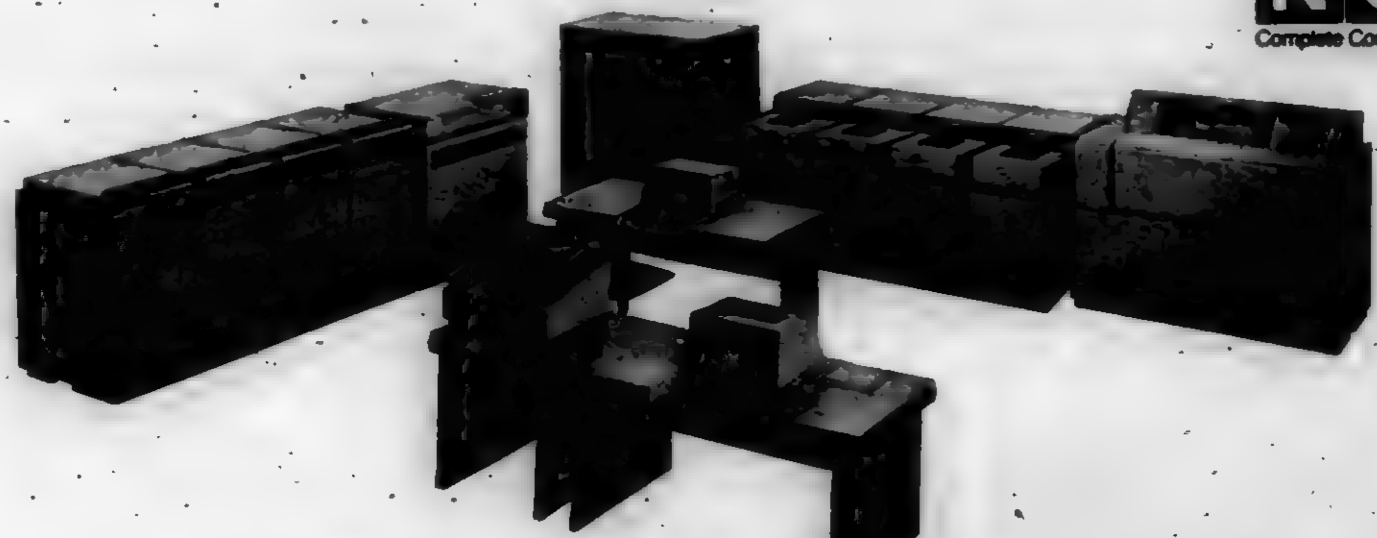

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Four Task Forces

Software Commission Seeking Public Assistance

CW Washington Bureau

WASHINGTON, D.C. – The Commission on Software Issues in the '80s is seeking public assistance for the research efforts of its four newly established task forces.

The commission, a federation of 18 information industry associations, has organized task forces on four issues: education and training of software professionals, software taxation, software standards and software protection.

The software commission said public contributions to the work of the task forces are in keeping with its primary objectives to "identify an industry-wide consensus on the nature of the problems associated with software and to stimulate actions intended to resolve current controversies."

December Deadline

It asked interested parties to submit written comments and materials on any of the four issue areas by Dec. 15.

Because of the nature of its work, the commission said it cannot treat submissions as confidential or proprietary.

The Education and Training of Software Professionals Task Force will seek public comments to define and report on issues and controversies in education and training. The chairman is Tommas Koehler, director of systems development, Montgomery County Public School System, Maryland and a representative of the Association of Educational Data Systems.

The Software Taxation Task Force will study issues of local, state and federal government taxation of software and will research model tax provisions. Chairman is Jay T. Westermeier, a Washington, D.C., attorney specializing in computer law and a representative of the Data Processing Management Association.

The Software Protection Task Force will study issues affecting proprietary interests in software, including copyright, patent, trade secret and other forms of software protection. The chairman, Michael S. Keplinger, a representative of the Computer Law Association, is chief of the Information and Reference Division, Library of Congress and former assistant director of the Commission on New Technological Uses of Copyrighted Works.

The Standards Task Force will define issues relating to development of standards applicable to software and its use. The group is chaired by Donald Leavitt of the Strayton Corp. Leavitt, former *Computerworld* software editor, represents the Conference on Data Systems Languages to the software commission.

The commission requested submissions to any of the four task forces be sent to its secretary, Steven J. Jost, Commission on Software Issues in the '80s, Suite 116, 1301 20th St., N.W. Washington, D.C. 20036. An additional copy should be sent to the commission's chairman, Daniel T. Brooks, 6106 Lorcom Court, Springfield, Va. 22152.

Seminar to Focus On Acquisitions

LOS ANGELES – A two-day seminar on software acquisition management sponsored by the Education Foundation of the Data Processing Management Association (DPMA) will tour four West Coast locations in November and December.

Jack D. Cooper, president of Anchor Software Management, Ltd. of Alexandria, Va., will present a series of lectures.

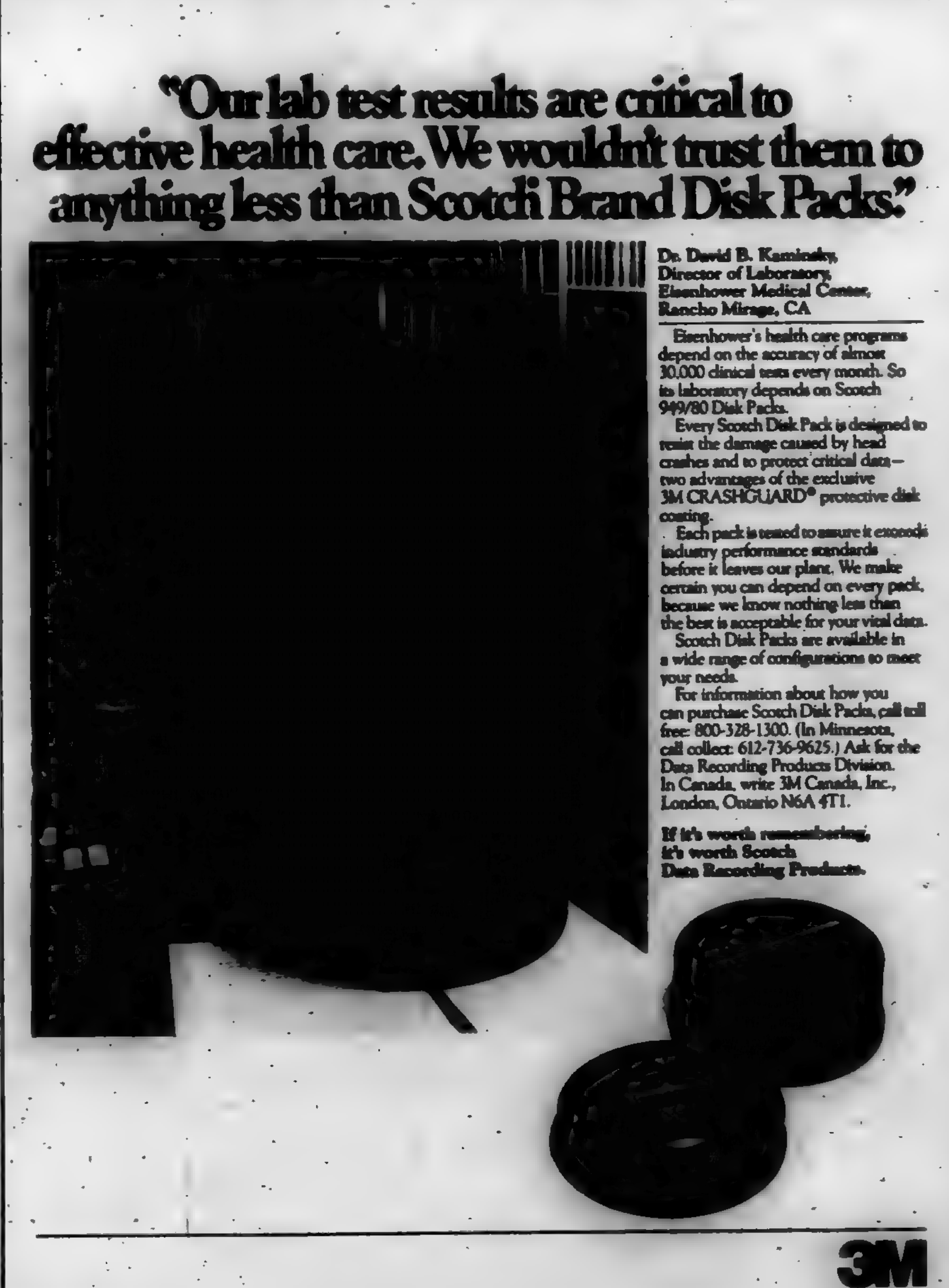
The seminars are slated for Seattle, Nov. 3-4; Los Angeles, Nov. 6-7; and San Francisco, Dec. 8-9; San Diego, Dec. 11-12. Registration costs $395 per person, $375 per DPMA member and $330 for members of parties of three or more, government or university personnel. For more information contact EF-DPMA Seminars, Department SAM, Suite 1016, 5959 West Century Blvd., P.O. Box 91295, Los Angeles, Calif. 90009.

Law Institute Slated For Boston Oct. 24

BOSTON – The Northeast Computer Law Institute will be held Oct.24 to provide attorneys with an up-to-date understanding of legal problems that are likely to be encountered in the acquisition and use of a computer system.

Secretary and General Counsel for the Interactive Data Corp. Peter Marx will chair the program, which will span the following areas: acquisition of hardware and software, enforcement of computer users' rights and remedies, procedural problems when using computerized information in trials, the protection of programs and data bases, computer security, crime and audits.

Admission prices vary for this event. Further details can be obtained from Ronald Jordan at the institute's sponsor, Massachusetts Continuing Legal Education-New England Law Institute, Inc., 133 Federal St., Boston, Mass. 02110.



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IP Held Natural Adjunct to Business Planning

CW at Info 80

By Marcia Blumenthal
CW Staff

NEW YORK — Planning for information processing (IP) systems must be recognized as a natural adjunct to the business plan of a company.

That was the underlying message delivered by three executives who sketched their companies' IP planning techniques at a recent panel at the seventh international Information Management Exposition & Conference (Info 80) here recently.

An information system should be viewed no differently than a product, observed Joseph Judenberg, a vice-president of the Chase Manhatten Bank. In the case of IP, that product is answered questions.

Chase Manhatten's planning process is a three-tiered effort.

The tactical plan has a one- to three-year horizon. In this planning environment, planners know what resources and what technologies will be available during the planning period.

The bank's long-range planning, on the other hand, is a four- to seven-year projection and is largely in the realm of assumptions, Judenberg noted. At Chase Manhatten, long-range planning is driven by senior executives who develop the major goals for the organization and disseminate them to the lower managerial levels.

Bridging the gap between these two modes of planning is the strategic planning function, which ties both tactical and long-range planning to the business environment of the bank, Judenberg explained.

One reason management at the institution created a strategic planning function was because major systems at the bank were being "reautomated" — often with no framework in mind.

Ironically, while the need for centralized use of information was becoming more acute among managerial ranks, the bank was giving more autonomy to its various IP operations, Judenberg said.

Strategic Framework

The strategic planning function provides the bank's IP management and user departments a framework for evaluating which systems must be developed to meet the overall goals of the bank. The strategic framework is written out in great detail and used as a planning tool for managers. The framework can be updated as needed.

The flexibility to update a plan is a key feature of the planning method used by the Hartford Insurance Group. This is done religiously every six months, according to David H. Berg, a vice-president with Hartford.

The Hartford's planning process was evolutionary, beginning in 1977. At the time, there was no separate IP planning staff. Nor was there any focus on a "corporatewide response to automation" or the future technology, Berg said. These weaknesses were overcome at the Hartford within the last year or two.

Today, the $4.3 billion insurance company has several IP plans including an overall DP plan that is a three- to five-year applications-oriented strategic plan, a hardware/-software plan, a staffing plan and a DP section of the corporate business plan.

The long-range DP plan identifies both internal and external variables the company faces, describes existing systems and looks at the future DP environment.

In analyzing its existing systems, the Hartford identifies four general IP functions — data acquisition and validation, operational support, data storage and management reports. Futhermore, this plan-

(Continued on Page 27)

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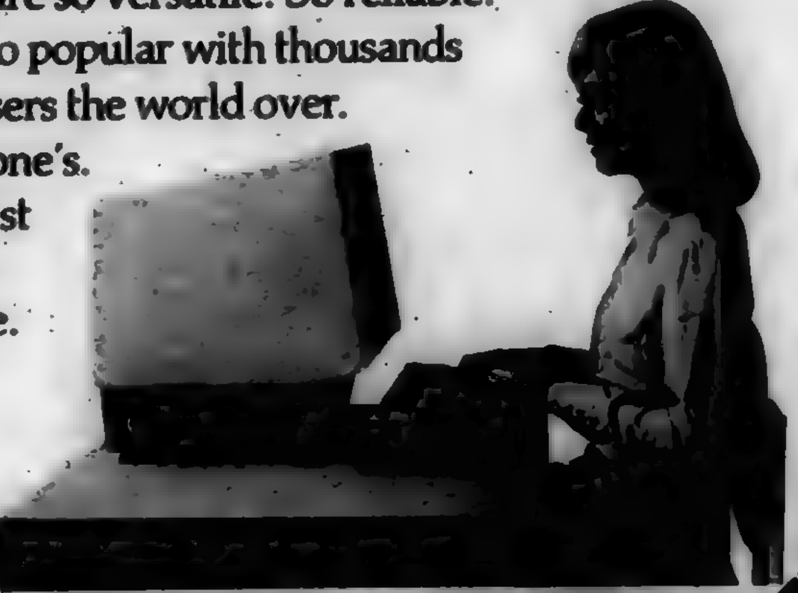

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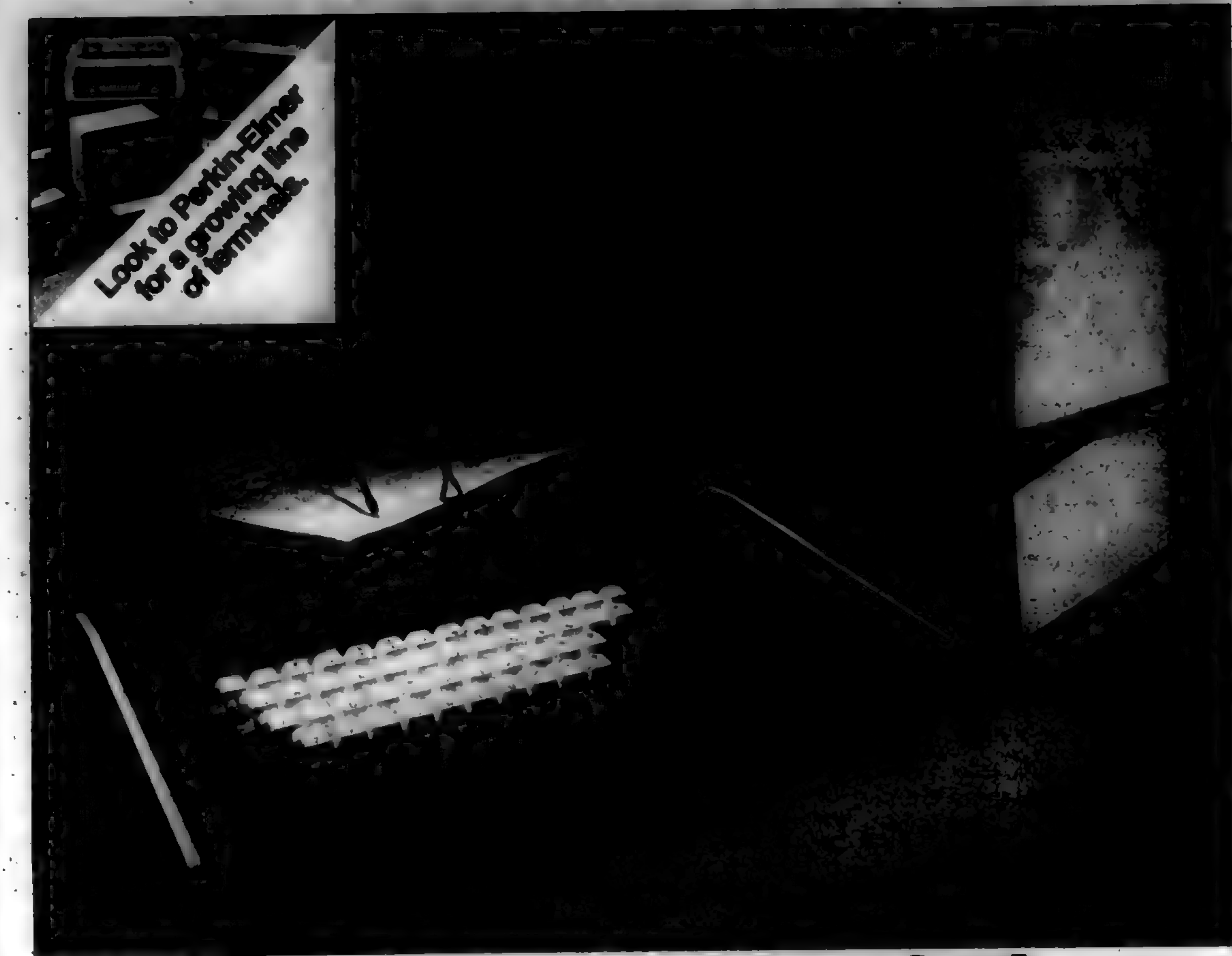

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Corning Glass Combines Automation, Ergonomics To Bolster Productivity

By Bruce Hoard
CW Staff

NEW YORK — After a comprehensive study of the way 800 engineers and secretaries at the Corning Glass Works spend their work time, that company's manufacturing and engineering (M&E) division decided to automate its new building.

Dorothy E. McConnell, operations manager for M&E, said the department is combining automation techniques with ergonomic factors to ensure maximum productivity from Corning workers. She made her remarks at the Information Management Exposition & Conference (Info 80) here last week.

Originally given a charter to decrease M&E budget by 15%, McConnell assembled a unique team of 11 interviewers to spend 2-1/2 hours with each of the 800 employees to find out how they spend their time and what their needs are.

Besides the inordinate amount of time spent on each interview, the process was also unusual in that it had peers interviewing peers. Secretaries were employed to question secretaries and engineers interviewed engineers, McConnell said.

The questionnaire was revised 21 times before it finally satisfied her. It asked people such questions as what they thought they should be doing and what would they do if available work time was cut by one-half.

There was a stated objective with each question, so interviewees would understand the line of questioning. "We needed to monitor the process," McConnell noted. "You get people off on a tangent and it's hard to draw them back in."

Realistic Interpretation

She took a realistic approach to interpreting the results of the survey, which indicated productivity would suffer initially with the installation of automated office equipment. She felt the initial sag would be more than compensated by future gains.

McConnell also insisted that management take the results seriously. Despite the fact top managers disagreed with workers on some issues, she told the executives that the workers' perception of their situations is reality and must be addressed as such.

CW at Info 80

In order to ease the stress period associated with the change to a new building and an automated ambiance, the manager stressed the need for ergonomic considerations such as skylights and window space.

"If we care about what happens in the workplace, we should also care about the work environment," she stated.

Once the results of the survey are in hand, the best way to impress top management with the usefulness of automation is to introduce a pilot program in a section of the company where employees are overworked and in need of help, McConnell said.

And it is top management that must be impressed if automation is to catch hold. They are primarily concerned with "hard dollar" savings and need visible proof that something new is worthwhile.

D. Patrick Gatton, principal, Gatton, McNally Associates, Inc., concurred with McConnell in her assessment of top management and hard dollars.

"Top management isn't interested in office automation," he said. "Top management is interested in the benefits of office automation."

In describing the future of office automation from the viewpoint of a manager, director or vice-president, he said there are many hurdles that must be cleared. Among them are paper files, inefficient mail distribution systems, in-house print shops, general lack of direction for employees and the lack of measurements for costs and services.

Gatton called on executives to get involved in the push toward automation, saying they must organize their strategies so that line functions meet user needs and staff functions support line functions.

The principal posed several questions to be answered during the transition to automation. Among them: What is the proper rate of evolution toward new systems?

In his estimation, it depends on the nature of the organization. If it has few advanced services, he suggested rapid technological growth. If some automated services are already in place, more controlled growth would be appropriate.

In either case, the decision to upgrade should be made with the knowledge and approval of internal divisions, including labor relations, personnel, DP, legal and others.

IP Seen a Must To Business Plan

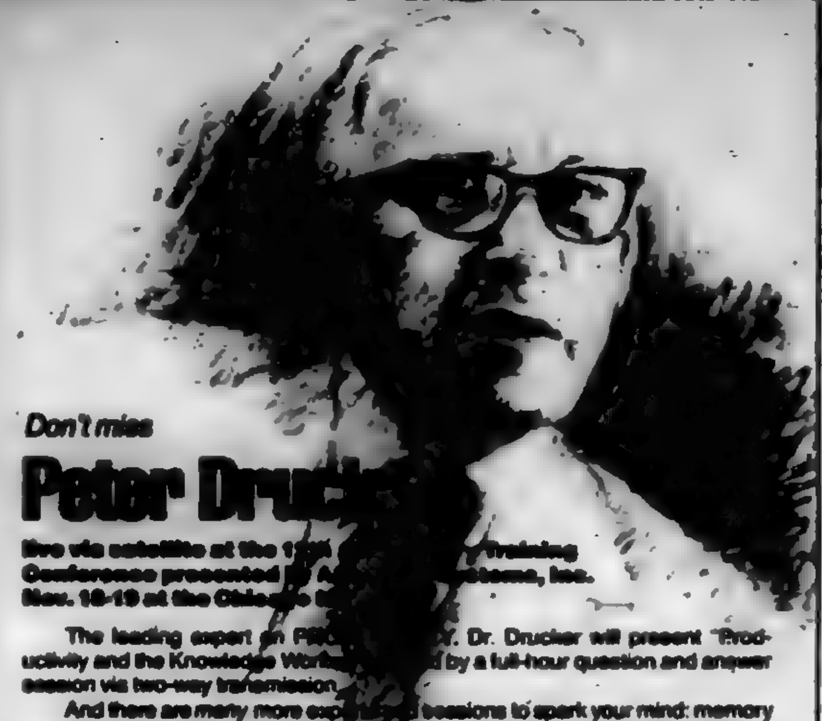
(Continued from Page 24)

ning takes into account how the systems' functions, such as processing of premiums, and claims and losses operate according to the four IP functions, Berg said.

While the planning process does not result in any quick changes, its implementation has taken steps to integrate the IP systems with the company's overall strategic position.

Although seemingly a much more structured and complex planning system than Hartford's, ITT Courier Terminal Systems, Inc.'s planning method has the same goal — dovetailing systems development with the overall objectives of the company.

A critical element of ITT Courier's IP planning is the identification of basic business processes and the measurement of those processes, according to Barbara Gates, vice-president of administration. Once identified, each process and measurement is further broken down and analyzed.



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Never Say 'We Can't Do That'

Get Used to Change, Data Base Users Advised

By Connie Winkler
CW Staff

NEW YORK – "Change has to become the normal mode of operation" for large data base systems users, according to Harold Uhrbach, a data base management consultant. No longer can users be told, "We can't do that," Uhrbach told about 140 attendees at a session of the Information Management Exposition & Conference (Info 80) here last week.

CW at Info 80

Only by developing this kind of adaptable, changeable, easy-to-understand-and-use information management system will data processing become part of the business, the president of DBD Systems, Inc. of Rockville Center, N.Y., told the session on information resource management.

Uhrbach sees this new information resource management era as a further evolution of data base management systems, which actually date back to 1959.

He explained how to begin establishing an information system that places information as a resource within the company.

First, he said, organizations should define the way in which users are going to get the information they need, or "users' architecture." Then they should define the support components, both hardware and software, and whether there will be a data dictionary.

Uhrbach was enthusiastic about the data dictionary idea, noting the concept has grown from the original idea of a depository for all information about data in the data base. Today the data dictionary has information about the entire environment including where the data is located, what medium it is in, where it is stored and what protocols retrieve it.

Human Interface

The information resource management plan also has to provide for ongoing support which includes data collection and entry, data base design and implementation, he said.

To do all this, Uhrbach recommends a data administration group "to make the human interface happen." This data administration group would support the central data resource, provide project management and control, and coordinate and control the development of systems with shared data resources. All of this, he estimated, takes five to seven years.

"Information top management needs for decision-making is generally not available," the consultant said. "What's more, 80% of the information they require is not really predictable – the form changes or it is external to the organization."

On the office automation front, word processing equipment has been brought into organizations because it is cost justifiable. Now they want to add processing capability to these distributed systems, Uhrbach said.

"If we are going to move into a world where data is going to be available at any location, then we had better get hold of this; we had better manage it," he said.

FCC Chairman To Keynote Meet

LOS ANGELES – Charles D. Ferris, chairman of the Federal Communications Commission (FCC), will be keynote speaker at the Intelcom/80 conference here Nov. 10-14. The event is sponsored by Horizon House.

Bringing together international authorities on telecommunications and computer technology is the goal of the four-day conference and exhibit.

One-site registration for Intelcom's conference program is $200. Admission to exhibits only is $15, and discounts are available to groups of 10 or more.

Additional information can be obtained from Horizon House, 610 Washington St., Dedham, Mass. 02026.

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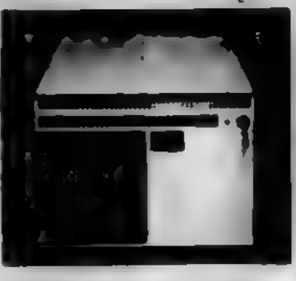

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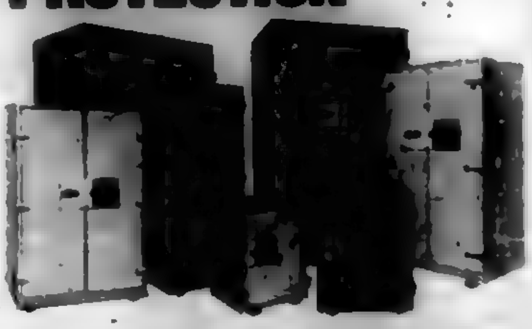

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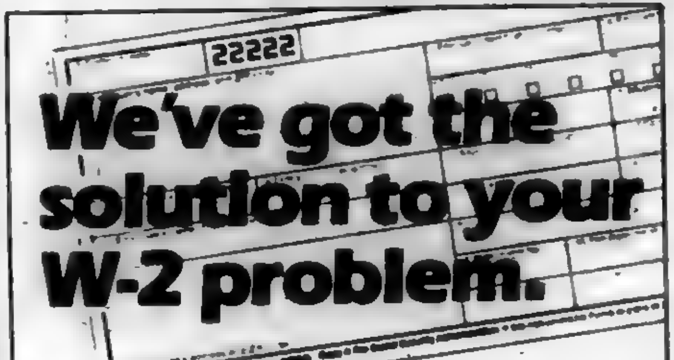

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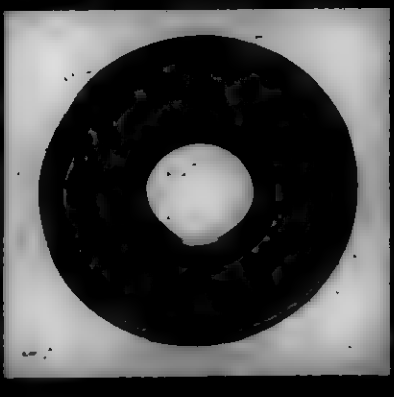


Planning, Timing Held Key to Successful DDP

By Tom Henkel
CW Staff

NEW YORK — The key to building a successful distributed data processing (DDP) system is to plan your moves very carefully and to try not to do too much too fast.

That was the advice of two representatives of International Data Corp., a Waltham, Mass.-based market research firm and three DDP specialists who recently implemented DDP systems in major firms.

The five panelists spoke at the Information Management Exposition & Conference Info 80 here last week.

Dave Dillman, manager of user information services for IDC, said the firm recently completed a study of both user and vendor attitudes to DDP.

Four Key Areas

Asking various firms in the DDP systems and support business along with users from banking, health care, manufacturing industries and the federal government, IDC identified four key areas to building a successful DDP system. Who decides to build a DDP network, what hardware is purchased and how it is used, how and by whom applications software is developed and education and support for the DDP system are all of vital importance.

Each member of the personnel involved with a DDP system is involved in some part of the decision-making process. Corporate management tends to play a big part in getting a DDP project off the ground, but the management information systems vice-president has a key role in conceptualizing the system and selecting the hardware.

The DP manager is responsible for implementing the system and the DP manager's assistant or liaison is in charge of operations, IDC said.

According to the study, the end user has little responsibility in the decision-making process, but IDC sees that role changing to involve the end user more in operations, Dillman said.

Important DDP Features

Asked what features are important in a DDP system, users said data entry and inquiry/response were tops in importance. Cobol processing was rated low and word processing, storing and forwarding were unrated.

Predicting how DDP systems will develop within the next few years, Dillman said both data entry and inquiry and response features would still top the list. Users will find more use for Cobol processing, making it of medium importance, and store and forward will also become popular, moving up to medium importance.

CW at Info 80

Word processing will become merely an added feature on DDP equipement, and will not be an important factor, IDC predicted.

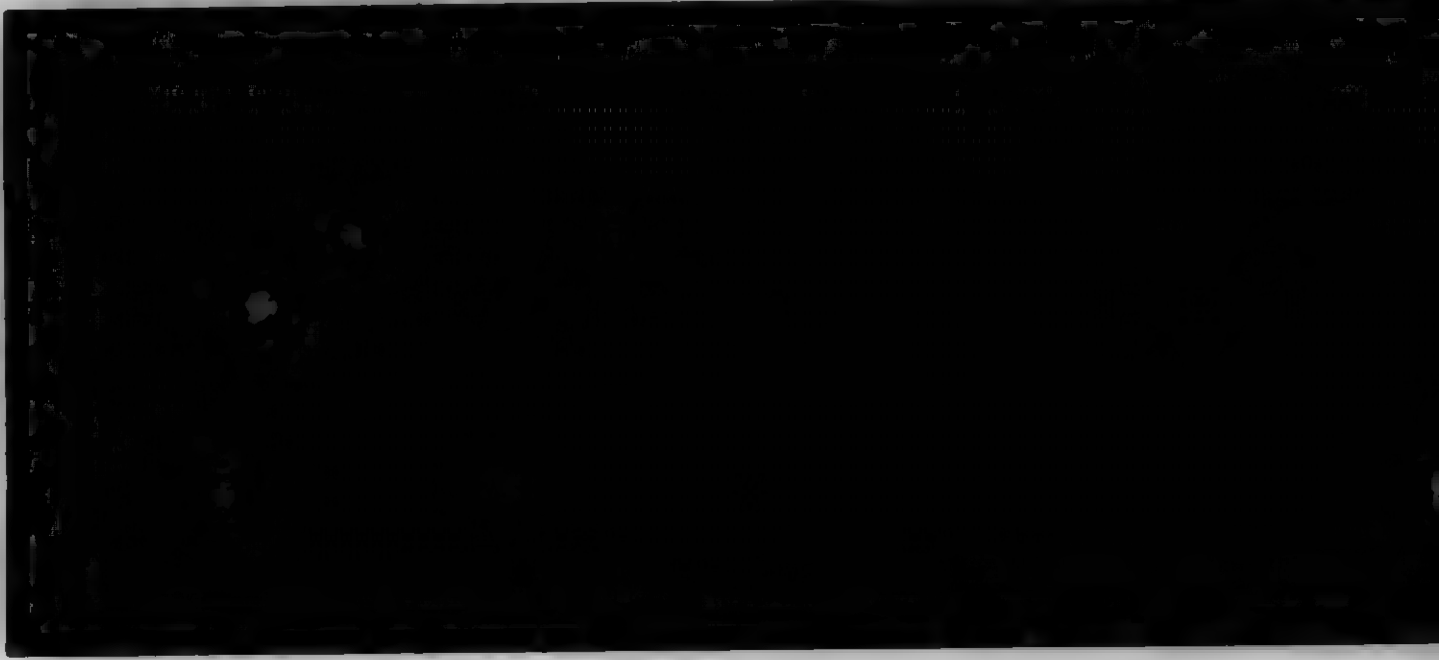
Already an important factor — and destined to become an even more important part of the DDP system — are the applications. Each of the DPers who built his own DDP system — Charles A. Lupein, Combustion Engineering, Inc.; William Zilliox, General Electric Corp.; and Frank Korahais, Chemical New York Corp. — all said applications took more time and cost more to develop than originally expected.

Learning by Osmosis

User training appears to be the most neglected factor of DDP development. IDC reported osmosis — or learning from doing — is the most popular form of user education. Some firms have moved one step up from the osmosis method and have employees learn from each other.

More sophisticated shops have developed their own manuals, which are prepared by the DP department and issued to the end users, and others have gone as far as developing formal training sessions for end users, Dillman said.

John Gantz, IDC's director of publications, was chairman of the session.



Information management's expanding vistas.

Emphasis on Individual Tasks

Structured Approach to Productivity Advised

By Bruce Hoard
CW Staff

CW at Info 80

NEW YORK – Productivity is a control systems problem that should be addressed by a structured approach featuring strong emphasis on individual "tasks," according to Alonzo Grace, president of A.G. Grace Co.

Speaking at the Information Management Exposition & Conference (Info 80) here, Grace condemned past efforts at increasing productivity and claimed most organizations have a blurred picture of their internal workings.

The individual to which he referred should be assigned after a careful plan is constructed toward improving productivity, he said. Such a plan must be less simplistic than previous efforts which have sought the easy way out when reaching for internal improvement. "It's time we began looking in the right place," the president said.

That means forming a review committee, architectural team and working group to meet the needs of the workers involved, or "concerned universe," as Grace put it.

The review committee is the key element and must be headed up by a high-level manager from the component of the organization to be improved. That responsibility cannot be delegated to underlings or the effort will be subverted and undermined, he said.

The job of the review committee is to provide careful walk-through and review of architectural designs developed by the architectural team. "It may be composed of the sponsoring manager and zero or more numbers of his staff," Grace said.

The architectural team is charged with constructing a workable productivity plan that is acceptable to both the users and the implementors. While the review committee may have little time to devote to the project, the architectural team works full time on it.

The working group may or may not have any members, the president noted, adding it is responsible for helping the architects develop a cost-effective plan.

A control system typically consists of several elements, including life cycle management, financial controls, product controls and work controls, he said. In the past, several of them have been overstressed.

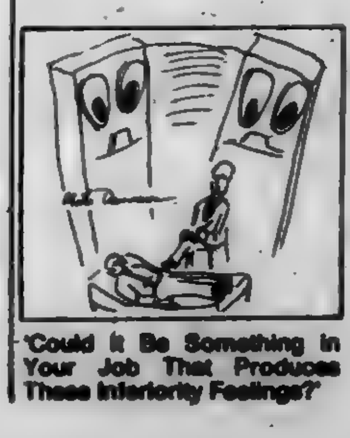
Of life cycle management, he said, "You never get out a new product if people are calling meetings all over the place."

Counterproductive Controls

Financial control can also be overdone, he continued. In fact, if managers do not understand what white-collar people are doing, financial control can almost be counterproductive.

In order to tie the control system to the organization it is supposed to serve, work controls must be applied. These controls, in the form of individual tasks, pinpoint improvement needs and assign them to individual people.

A specific task will appear only once in an overall productivity flow chart, although parts of it may be noted under other tasks, creating a sense of uniformity. "The only real work that gets done is that done by individuals," Grace noted.



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Stepped-Up Computer Instruction

Three Universities Tackling Software Challenge

By Tom Henkel
CW Staff

NEW YORK — Despite major hardware advances, software and the programmers to develop it will be the major challenge of the next decade: To meet that challenge, at least three top U.S. universities are taking drastic steps to make more students familiar with computers, according to Dr. John McCreedie, president of Educom, a Princeton, N.J.-based consortium of information processing talent from about 400 universities.

Speaking recently at the Information Management & Conference (Info 80) here, McCreedie cited figures showing a hundredfold improvement in chip development in the past 10 years. CPU relative performance has jumped by a factor of 10 in the same time frame, McCreedie said, and hardware costs have plummeted — while software costs have skyrocketed.

Viewing those developments in light of a decreasing labor force, the information processing industry will be even harder hit by a programmer shortage in the next few years, he indicated.

At a session chaired by *Datamation* Editor John Kirkley, McCreedie noted that many high schools are buying microcomputers and offering courses in programming languages. However, while many potential programmers are starting earlier, they may also be starting off by learning the wrong programming techniques, he added.

Ambitious Plan

Pittsburgh's Carnegie-Mellon University (CMU), ranked by some as one of the top three computer science departments in the country, may have the most ambitious plan for getting would-be programmers on the right track. The school has vowed that within five years, every freshman — including business, arts and humanities students — will be issued a microcomputer as part of the university's orientation package.

Each microcomputer will be able to access the school's network of eight Digital Equipment Corp. VAX-11/70 and Decsystem-20 computer systems from virtually any location.

CMU eventually hopes to build the microcomputer for every student concept into an interactive graphics system accessible from campuswide intelligent terminals, McCreedie said.

The groundwork is already set for the CMU system. The university has already switched to an all-DEC system, with each distributed part sharing a common operating system. This, McCreedie said, allows any student to access various computer systems, programmed for different applications, without a tremendous amount of programming expertise.

CW at Info 80

Stanford University wants to develop its campuswide computer system along similar lines, but the school is taking a more conservative approach. Stanford is starting off by putting terminals in its top administrators' offices and gradually expanding the system to serve more and more people — both students and administrators.

Stanford already has installed terminals in about 30 top administrators' offices, McCreedie added.

Harvard University commissioned the Arthur D. Little Co. (ADL) to analyze what it should do to improve computing skills.

The ADL report recommended the school spend an estimated $10 million to revamp its computer system — basically along the lines of the CMU and Stanford systems, McCreedie said.

The unusual part about the three schools' system development plans is the same basic plan seems to be the answer for three very diverse schools.

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Computers Viewed Helping Blind Into Schools

By Nancy French
CW Staff

TOKYO — Although blind children are just as intelligent as those who can see, they don't have the same chance of going to college.

Nor does being unable to sign his name on a rental application or a check do anything for a blind person's sense of self-esteem.

Both of these handicaps can be eased with help from computers, according to two papers prepared for the International Federation for Information Processing's (Ifip) Congress 80 here last week.

CW at Ifip 80

Integrating blind students into the school in his home town rather than a specialized school for the blind is the educational solution for most blind children, according to Germany's Waltraud Schweikhardt, whose paper described a microcomputer-based system that allows a public school teacher to prepare braille materials automatically on an everyday computer terminal keyboard.

This computer-based Learning and Working Environment for the Blind (LWEB) sponsored by the Deutsche Forschungsgemeinschaft at the University of Stuttgart is based on a portable IBM 5110 that usually works as a stand-alone machine, he said.

Peripheral devices such as displays and printers have been adapted to the special demands of the handicapped at the LWEB. The standard keyboard is recommended for use in preparing the alphanumerical documents. It is technologically more feasible since braille cannot be retranslated uniquely, and it is more economical, since sighted students can use the terminals, too, he said.

As for graphics, a device called an optacon is used. This device contains a miniature camera, which moves across the front of the display. The image under the lens is simultaneously reproduced on a tactile array by miniature vibrating rods, he said.

For peripheral storage, Schweikhardt recommended floppy disks because of short access time and easy handling. For a device that produces tactile hard copies, the experiment used a braille display (BD) 64, which operates at 9,600 bit/sec.

Here drawings are plotted on an IBM 5130 printer and copied off-line by an optical to tactile converter, which gives a tactile output, he said.

A wide variety of educational software is already available for these systems, particularly in mathematics.

Handwriting Instruction

As for teaching handwriting, Ian D.G. MacLeod from the Australian National University in Canberra, described a system based on a Digital Equipment Corp. PDP-11/34. It involves loudspeakers, a graphics display, a console terminal, light pen and a wrist cuff along with basic peripherals.

Blind students learned to form the letters in groups according to their method of construction, and digits were learned as a group, the paper said. Students learned how to keep their pen on the correct path and on target with feedback from the loudspeakers and with vibrations from eight small vibrators mounted in the wrist cuff.

A key feature in the system was the capability to calculate how much the writer would overshoot the intended character-forming area and left-to-right path. This enabled the system to minimize response delay.

The paper showed vast improvement for two trainees — one who had been blind since five years of age, and another, since birth.

The computer-aided system is better than existing methods in several key respects, MacLeod indicated. First, it breaks complex tasks into relative simple steps, where tracking operations are not confused by preceding or succeeding strokes. Trainees receive immediate and continuous feedback, whether or not their performance is satisfactory, and if not, why not.

After practicing on this machine, trainees advanced to paper and pencil and continued to improve, although both write slowly without guides.

This method of tactile and auditory stimulation could be used to teach other motor skills to trainees with perceptual and cognitive handicaps as well as visual ones, MacLeod predicted.

'Belle' Carries Bell Researchers To Chess Victory

LINZ, Austria. — At the sixth attempt, a program that took two computer science researchers from Bell Laboratories more than eight years to develop won the World Computer Chess Championships here.

Ken Thompson and Joe Condon, whose program runs on a Digital Equipment Corp. LSI-11 microcomputer with additional home-built hardware, won five games and a tiebraker to take the 1980 title.

Although computer chess is becoming big business with over $100 million spent each year, according to Thompson, this competition was for the experts. "No one ever comes up out of the blue to win," said Thompson, who was expecting to do well this year.

The competition is sponsored by the International Computer Chess Association, which has about 400 members, and the human chess association Fide.

The program written by the New Jersey pair, called Belle, beat entries from Queen Mary College in London, McGill University in Montreal, Duke University in North Carolina and Northwestern University, before taking on and defeating a program developed by the University of Michigan in the final.

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Human-Machine Relations Addressed

CAD/CAM Held Too Complex for Engineers

By Nancy French
CW Staff

TOKYO — Today's computer-aided design/computer-aided manufacturing (CAD/CAM) systems are so complex that many engineers don't want to take the trouble to learn to use them, according to Jakob Vliestra of Philips Gloeilampenfabrieken, the Dutch electronics and appliance firm.

As an example, Vliestra cited his own corporation where only about 2,000 out of 19,000 engineers use computers in their work. "The others don't want to take the time to learn the complex language needed to use them, only to get their jobs kicked back because of language [not engineering] errors," he explained.

He was setting the stage for a panel discussion on human-machine relations in computer-aided design here at the International Federation for Information Processing's (Ifip) Congress 80 last week.

Future Systems

What should the relationship between the user and the machine be? What is the future for these systems?

Vliestra believes the secret to better, easier to operate systems involves greater use of a variety of input methods, such as voice and pattern recognition, accompanied by more sophisticated editing capabilities. This way, the engineer can work and think like an engineer rather than an information processor.

After the engineer does his mental work and his drawings, Vliestra said, let the machine extract from the drawing the information needed for further processing.

For instance, a very large-scale integration designer has a mental picture of how he's going to design something — he knows how he's going to pick up his registers, and he knows what kind of gates he wants to use. The work is very high-level and abstract, Vliestra explained.

With better input devices, he could draw all this in his office and then present the drawing to a reading device. Only then would the dialog between the engineer and the computer begin. Then, perhaps through voice recognition or simple editing commands, the engineer can correct how the computer has interpreted his work.

In support of this type of thinking, Ernest Warman, with Perkins Engines, the British diesel engine manufacturer, pointed out how easy communication could be, using as an example the scene at a microcomputer hobby show. "A young school boy, with no knowledge of how a computer works, can begin playing micro-based board games immediately, merely interacting with the computer in everyday language," he said.

CW at
Ifip 80

Jose Encarnacao, of the Technische Hochschule in the Federal Republic of Germany, disagreed with the simplification idea, saying engineers should be happy to learn the necessary languages if the payback is high enough.

Instead, panelist Encarnacao suggested that greater emphasis be placed on more and better models and what tools are needed to tune the systems so they work better.

One attendee observed that the marketplace would force systems to improve. "Systems and languages that are too complex will die because no one will use them," he said.

Warman indicated that the future of CAD/CAM would depend in part on what systems were being used for. A system for a fabric designer should have the capability of generating color and texture. Perhaps the designer of a seat should be able to create the feel of a seat.

Situation feedback should be built into a system, Warman said, adding "there's no reason why you couldn't clamp headsets on a designer and get his [mental] inputs into the system."

Tandem Users Elect Board of Directors

SAN DIEGO — Delegates at the third annual international Tandem Users Group (TUG) conference elected Dr. David Mishelevich of the University of Texas Health Services Center to head the users organization for the next year. Mishelevich was one of the original founders of TUG.

The 1980 board of directors also welcomes its new vice-president, Bob Strand of the Hocomco in Des Plaines, Ill.; symposia director Ellen Van Landingham of Commodity News Service in Kansas City; secretary/treasurer Nancy Trankle from Tandem Computers, Inc.; newsletter editor Dick Ward from Network Concepts in New Jersey; directors-at-large Bill Braithwaite of the University of Colorado, Denver; and Marilyn Page of Dash-Data in New Jersey.

The TUG meeting was held Sept. 14-17 and offered two dozen workshops along with special interest group sessions.

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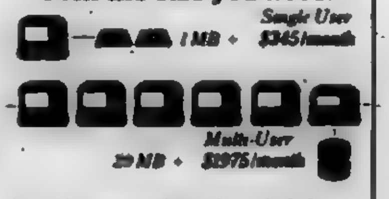

3-year lease prices shown do not include printers (many types available), maintenance, installation or training charges.

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DATAPOINT

Accelerating Education

Computer Seen as Pencil in Child's Learning

By Nancy French
CW Staff

CW at Ifip 80

TOKYO — Children can learn to write at the same time they learn to speak.

That's the view of Seymour Papert, an MIT professor. Speaking on the first day of the International Federation for Information Processing's (Ifip) Congress 80, Papert said he based his theory on the work of Jean Piaget, who demonstrated that children learn remarkably complex concepts — like conservation of number, for example — without actually being taught.

A child learns almost everything he knows from his environment, and if a computer designed to allow a child to manipulate pictures and objects were a part of that environment, he could learn to read and write almost by himself, Papert said.

Education could be vastly accelerated, Papert maintained, if children learned, through computer-based play, that mathematics is easy, and that they are not impotent — rather, they are powerful. His paper described an experiment in Dallas where a nursery school teacher wrote a number of programs that enabled three- and four-year-olds to manipulate brightly colored objects on a computer screen by hitting a small number of special keys marked with arrows to indicate directions of movement and colors to indicate color change.

The children loved these games, he said, but soon learned that the teacher was playing a more complex game by typing more detailed instructions into the keyboard. Soon they asked to learn this game. "Very soon the children were pecking their way about the whole keyboard, spelling out the logo commands that would interrupt one game and set up the next. They were on their way toward two new worlds of intellectual endeavor: writing and programming," he said.

Self-Confidence

Children's self-confidence is eroded by being dependent and infantile for so many years. This condition impedes learning, eventually creating the "learning problems" that beset almost all children in school, Papert said.

With a foundation of self-confidence in mathematics and awareness of basic concepts, children could easily learn more complex tasks — such as programming — that more and more people will need to know in the future.

The computer becomes the equivalent of a pencil for such youngsters.

Papert did not go into detail about how the ability to use the colored and directionally marked keyboard was actually translated into writing logo commands in the Dallas experiment or whether the children learned English or logo first.

Papert cautioned that such preschool learning could have the most tremendously positive effects on the learning ability of future generations, but at the same time destroy what we consider to be most human. "It is easy to fantasize a scenario in which it gives rise to an epidemic of psychoses," he admitted.

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Info/MFG Set To Highlight Manufacturing

CHICAGO – The first Information Management Exposition & Conference for Manufacturing Companies (Info/-MFG) will address 12 major aspects of manufacturing when it is held here Nov. 18-20, according to its sponsor, Clapp & Poliak, Inc.

The areas to be discussed are materials management, manufacturing planning and control, closed-loop manufacturing systems, financial systems, marketing systems, purchasing systems, engineering systems, office automation, human resources, advances in manufacturing information systems, material-handling systems and plant engineering systems.

Daniel T. Carroll, president and chief executive of Hoover Universal, Inc., will deliver the keynote address, "Strategies of Productivity."

The exhibition at Info/MFG will emphasize equipment, programming and software. Among the exhibits will be computers and peripherals, programming tools, word processing equipment, telephones and communications gear, dictation equipment for the plant and office, records storage and retrieval systems, copying and duplicating machines and electronic mail, inhouse typesetting and graphics systems.

The fee for the full, four-day conference and show registration is $295. The two-day conference and show charge is $110 and the half-day package costs $60. For the exhibition only, there is a $10 charge without a ticket and a $5 charge with ticket, Clapp & Poliak said from 245 Park Ave., New York, N.Y. 10167.

Computer/Law Issues Spotlight Crime

LOS ANGELES – The *Computer/-Law Journal* has published the first issue of a two-issue set on computer crimes with a foreward by Sen. Abraham Ribicoff (D-Conn.).

The issues contain articles by Donn Parker, Susan Nycum, John Taber and Rob Kling and are edited by Jay Becker, director of the National Center for Computer Crime Data. Part 2 documents case studies, federal and state statutes and bills addressing computer crimes.

The set costs $16 per issue and can be ordered from the Center for Computer/Law, 10th floor, 530 W. Sixth St., Los Angeles, Calif. 90602.

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Cpeug 80 to Open Monday

ORLANDO, Fla. – Computer performance evaluation (CPE) in an era of smaller, cheaper hardware and improved digital communications will be the topic of the 16th meeting of the Computer Performance Evaluation Users Group (Cpeug 80) when it opens here next Monday.

Sponsored by the National Bureau of Standards and the Department of Commerce, the four-day event will feature a preconference workshop running concurrently with a preconference tutorial.

The workshop topic will be "Performance Prediction for Large Software Systems," led by Dr. James Browne and Dr. K.M. Chandy of Information Research Associates. "CPE – Concepts, Definitions and Techniques" will be taught by Donald R. Deese of the Federal CPE and Simulation Center.

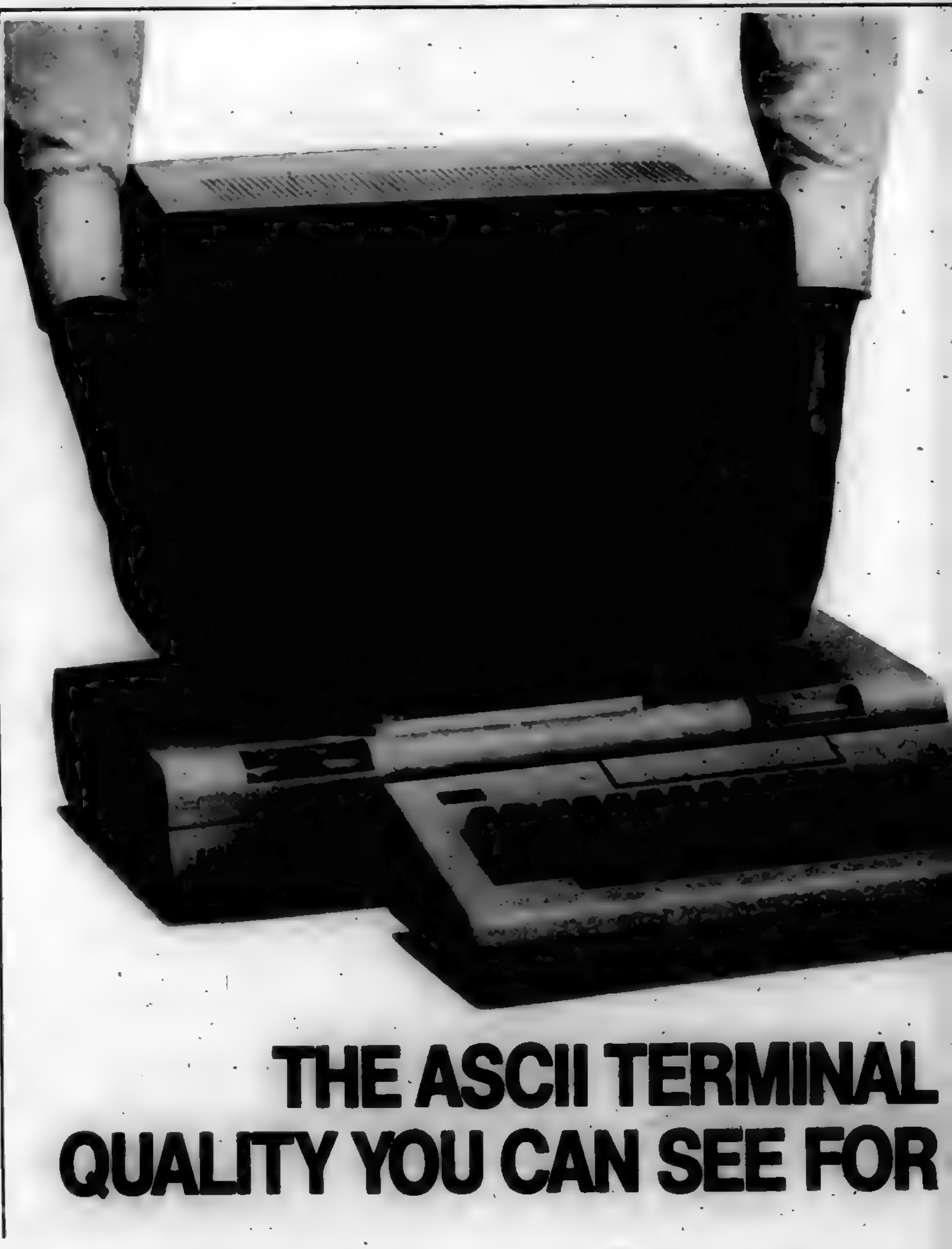
The keynote speaker, Rowland G. Freeman III, administrator of the General Services Administration, will deliver a speech entitled "Toward a More Efficient ADP Procurement Process in the '80s."

The technical program for this year's conference emphasizes new technology areas, procurement issues in the '80s and new approaches in traditional CPE areas.

Six relatively new areas will be covered in this year's program: data base management system performance, software improvements, human interfaces, security, fraud and audit.

Other areas to be discussed include data communications, computer network performance, performance prediction techniques and capacity planning. A highlight of the program will be a panel discussion on "Federal ADP Procurement," chaired by Tom Giammo of Fedsim.

The conference fee is $70, payable at the door since the preconference registration deadline is past. More information is available from Ted Gonter, publicity chairman, General Accounting Office, 441 G St. N.W., Washington, D.C. 20548.



Consecutive Events in San Diego

Meets to Cover Productivity, Electronic Media

SAN DIEGO — Two consecutive conferences, "Profitability and Productivity in the '80s" (Oct. 19-22) and "New Electronic Media — Convergence and Diversity" (Oct. 22-24), will be held at the Hotel Del Coronado here.

The first conference is sponsored by International Data Corp. (IDC) and the second by its subsidiary, Link Resources Corp. of New York, both market research and management consulting firms.

The "Profitability and Productivity" conference was designed to provide an overview of the productivity problem, noting specific developments in technology, as well as hardware and software products and services aimed at systems application enhancement. What users want in productivity aids and what the vendor community now has and will have to offer will be discussed.

Specific topics to be addressed include executive stress and fitness, technology's impact on information systems productivity, managing information resources for greater productivity and hard vs. soft productivity.

One of the conference's three keynote speakers, Ira Gottfried, will speak on Tuesday on "Motivating MIS People in the 1980s." Also that day, Dr. Werner L. Frank, executive vice-president of Informatics, Inc., will speak on "The New EDP Economics: People/Software Trade-Offs."

The "New Electronic Media" conference is intended to teach users to relate to new electronic information developments and also how to capitalize on current business products and markets by using the new electronic media as distribution channels or to enhance the user's product line.

Designed to inform equipment manufacturers, systems operators, information providers, service companies and users, the conference will include presentations, panel and open discussions, demonstrations and guest speakers.

The afternoon of Oct. 22 will feature demonstrations of representative systems and the information they currently offer or are poised to launch. Demonstrations will include video disks, on-line data bases and personal computers.

The Friday morning session, entitled "Transmedia Analysis," will study the interrelationships among various types of information and the new electronic media.

Registrants may attend either conference for $350 or the week-long IDC-Link fall conference for $750. For additional full-week registrations, the fee is $495/person. More information is available from Christine Donovan, vice-president of marketing and operations at Link, 215 Park Ave. South, New York, N.Y. 10003.

Phoenix Confab On Productivity Opens Feb. 23

PHOENIX — "Improving Productivity Through Performance Management" is the theme of the 1981 DP Performance Management Conference sponsored by Applied Computer Research and Performance Management Associates. The event is slated to take place here Feb. 23-26.

The areas to be addressed at the conference will include measuring DP productivity, productivity in development, management of change, pricing DP services, fulfilling user service objectives, the role of planning in performance management, problem resolution and using performance management to improve DP productivity.

The audience will be comprised largely of top DP managers, and the atmosphere of the conference will be more interactive than most conventional meetings of this kind, the sponsors said.

Registration is $350 per person, which includes breakfasts, lunches, one dinner, cocktail receptions and all handout material. Further details are available from Jim Christensen at Applied Computer Research, Suite 3, 3003 W. Northern, Phoenix, Ariz. 85021.

Seminar on Data Base Set for Three Cities

SEATTLE — "Data Base Management, Administration and Control: An Approach for the 1980s" is a two-day seminar being offered in the Battelle Seminars and Studies Program. The course will be conducted here Oct. 27-28, in Boston Dec. 15-16 and in Houston Jan. 19-20.

The seminar was designed for information center managers, administrators, designers and systems analysts.

It will be directed by Ronald B. Batman, a manager of system design at Univac.

Attendance is limited, and enrollment is $495, which includes course materials and coffee breaks. More details are available from Renate Lammermann at Battelle Seminars and Studies Program, 4000 N.E. 41st St., Seattle, Wash. 98105.

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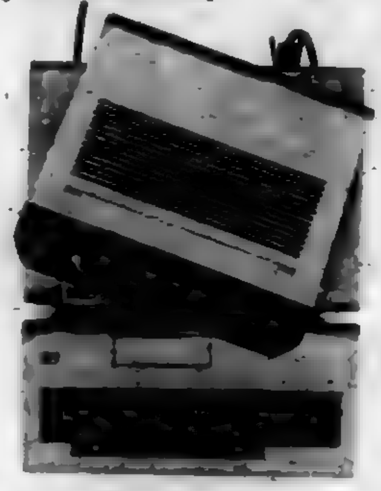
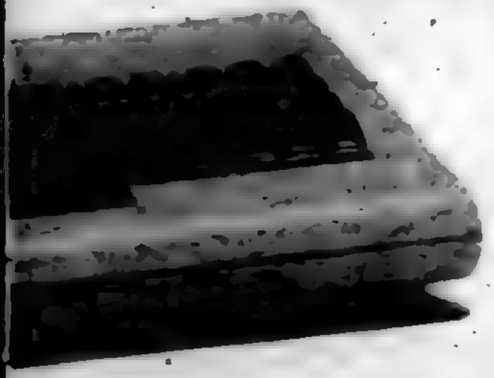
When the 3101 arrives, you simply connect three modular elements—the display, the logic element and the keyboard—plug it in, position the setup switches and put it into operation. It takes just a few minutes. Accessible setup switches in the keyboard let you select functions such as line speed, parity, scroll and reverse video. The 3101 weighs 38 pounds so you can move it easily.





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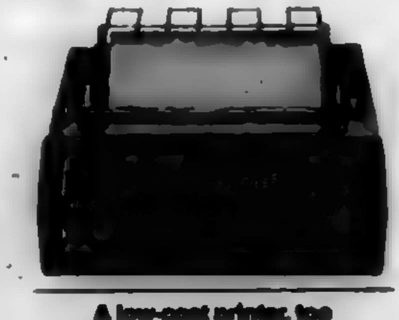

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There are two 3101 configurations: character transmission and block transmission. Character transmission lets you use it like a teletypewriter. Block transmission provides sophisticated editing capabilities, such as insert/delete and full cursor control, along with field functions like blinking, high intensity and protected fields.

The prices for the display terminal start at $1,295 for the character transmission model, and $1,495 for the block model. Volume procurements can save you up to twenty percent for either configuration of the terminal. Prices and current schedules subject to change.

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Nov. 9-11, Danvers, Mass. — Automated Office of Tomorrow. Contact: Institute for Graphic Communications, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Nov. 9-11, Washington, D.C. — Politics, Payments, Pricing & Productivity. Contact: Electronic Money Council, Suite 215, 1775 K St. N.W., Washington, D.C. 20006.

Nov. 9-13, Charleston, N.C. — Computer Related Crime: Training Workshop for Prevention, Detection, Investigation and Prosecution, sponsored by the U.S. Dept. of Justice. Contact: Koba Associates, Inc., 2000 Florida Ave., N.W., Washington, D.C. 20009.

Nov. 10, San Juan, Puerto Rico. — The Minicomputer Hardware/Software Decision. Contact: Brian F. Crynes, Price Waterhouse & Co., 1251 Ave. of the Americas, New York, N.Y. 10020.

Nov. 10-12, New York — Advanced DP Management: Methods and Techniques in the 80's. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10-12, Winston Salem, N.C. — How to Make Manufacturing Systems Happen, co-sponsored by M.W.L., Inc. and Arista Education & Consultanting, Inc. Contact: M.W.L., Inc., Suite 254, 3655 Thousand Oaks Blvd., Westlake Village, Calif. 91361.

Nov. 10-12, Honolulu — Computer Controls. Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121. Also being held Nov. 17-19 in St. Louis.

Nov. 10-12, New York — Word Processing: Effective Operations Management. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in New York.

Nov. 10-12, New York — Managing the Word Processing Function. Contact: Media Systems Corp., Management Systems, 757 Third Ave., New York, N.Y. 10017.

Nov. 10-12, San Francisco — Word Processing Supervision Workshop. Contact: the National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 10-12, San Francisco — Data Base Management Systems: General Concepts & Planning Guidelines. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 17-19 in Washington, D.C.

Nov. 10-12, San Francisco — Data Processing: an Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10-12, Rio de Janeiro, Brazil — Structured Programming and Software Engineering. Contact: Long & Associates, Inc., 820 Tioga Ave., Bethlehem, Pa. 18018.

Nov. 10-12, Chicago — DP Operations Today: Effective Scheduling and Console Operation. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10-12, Washington, D.C. — Data Communications: Effective Network Design. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in Houston.

Nov. 10-13, Orlando, Fla. — Data Entry Management Conference. Contact: Data Entry Management Association, P.O. Box 3231, Stamford, Conn. 06905.

Nov. 10-13, Houston — Basic Project Management: Planning, Scheduling and Control. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-13, Los Angeles — International Telecommunication and Computer Exposition. Contact: Horizon House International, 610 Washington St., Dedham, Mass. 02026.

Nov. 10-13, Philadelphia — Senior Project Management. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-14, Houston — IMS/VS Data Base Design. Contact: Data Base Management, Inc., 281 Hartford Turnpike, Vernon, Conn. 06066.

Nov. 10-14, Boston — Improving Office Productivity: Analysis & Design Techniques for Manual Systems. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-14, Atlanta — Structured Systems Analysis and Design. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-14, Honolulu, Hawaii — Productivity Through the DP Revolution. Contact: Technology Transfer Institute, P.O. Box 49256, Los Angeles, Calif. 90049.

Nov. 11-12, Andover, Mass. — Managing 'Performance' Breakthroughs. Contact: University of Lowell, Continuing Education, One University Ave., Lowell, Mass. 01854.

Nov. 11-12, Rosemont, Ill. — Manufacturing Productivity Solutions Conference. Contact: Society of Manufacturing Engineers, 1 SME Drive, P.O. Box 930, Dearborn, Mich. 48128.

Nov. 11-13, Toronto — Canadian Computer Show & Conference. Contact: Canadian Information Processing Society, 243 College St., Toronto, Ontario M5T 2Y1, Canada.

Nov. 11-13, Dayton, Ohio — NCR Educational Users Conference. Contact: Jim Davies, Evangel College, Springfield, Mo. 65802.

Nov. 11-13, St. Charles, Ill. — Manufacturing Planning & Control. Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

Nov. 11-13, Dallas — Man & Computers: Partners in Manufacturing. Contact: Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Tx. 76011.

Nov. 11-13, Los Angeles — Interactive Computer Graphics. Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 11-14, San Francisco — Pacific 80 Distributed Processing, sponsored by the Association of Computing Machinery, Inc., Contact: Dr. Robin Williams, Manager, Database & Distributed Systems, IBM K55-282, 5600

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Nov. 11-14, Dallas — **CICS/VS Application Design.** Contact: On Line Software International, 65 Route 4 E., River Edge, N.J. 07661.

Nov. 11-14, San Francisco — **Computer Network Design & Protocols.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 11-14, Boston — **Programming in Ada.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov, 11-14, Sunnyvale, Calif. — **Hands-On Pascal Workshop.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 11-Dec. 2, Summit, N.J. — **IMS/DLI.** Contact: Advanced Training Center, Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

Nov. 12, Los Angeles — **Advanced APL Programming Techniques.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Nov. 24 in London.

Nov. 12-13, Toronto — **Introduction to APL.** Contact: Numetrix Ltd., Suite 600, 3 Church St., Toronto, Ont. M5E 1M2, Canada. Also being held Nov. 25-26 in New York.

Nov. 12-14, Arlington, Texas — **Data Communications Networks.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Nov. 12-14, New York — **Introduction to Micro Personal Computers: Application, Selection and Usage Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Washington, D.C. — **CICS/VS Command Level Programming.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Nov. 12-14, Wellesley, Mass. — **On-Line Systems Design.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181. Also being held Nov. 24-26 in Philadelphia.

Nov. 12-14, San Francisco — **Integration of Word Processing and DP Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in Washington, D.C.

Nov. 12-14, Amsterdam — **Facsimile in Tomorrow's Organization.** Contact: Institute for Graphic Communications, Inc., 375 Commonwealth Ave., Floor 4, Boston, Mass. 02115.

Nov. 12-14, Washington, D.C. — **Minicomputer Systems: Guidelines for Successful Selection, Acquisition and Operation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Washington, D.C. — **Office Automation Systems.** Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 12-14, Philadelphia — **Business & Personal Computer Sales Expo '81.** Contact: George Pachter, Produx, Inc., S.W. corner of Roosevelt Blvd. and Mascher St., Philadelphia, Pa. 19120.

Nov. 12-14, Washington, D.C. — **Auditing Data Base Systems.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Nov. 12-14, Denver — **Introduction to Word Processing: Concepts, Systems and Application.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Washington, D.C. — **Office Automation Systems & Methods.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Nov. 13-14, Raleigh, N.C. — **SAS Statistics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 13-14, Boston — **Software Engineering.** Contact: Data Processing Management Association Education Foundation, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Nov. 13-14, Washington, D.C. — **Electronic Mail.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Nov. 16-19, New Orleans — **National Conference on Automated Teller Machines.** Contact: Bank Administration Institute, P.O. Box 500, 303 S. Northwest Highway, Park Ridge, Ill. 60068.

Nov. 16-19, Morgantown, W. Va. — **User Services Conference,** sponsored by Association of Computing Machinery. Contact: Rita Seplowitz, Information Services WVNET, 837 Chestnut Ridge Road, Morgantown, W. Va. 26505.

Nov. 17-18, New York — **Successful Selection of Minicomputers.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Nov. 17-18, Washington, D.C. — **How to Manage Data & Information as a Resource.** Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way, N. Rockville, Md. 20854.

Nov. 17-18, Cambridge, Mass. — **Word Processing: Concepts and Guidelines.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Nov. 17-18, Atlanta — **EDP Project Management.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Nov. 17-19, New York — **Auditing the Systems Development Life Cycle.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Nov. 17-19, Houston — **DP Disaster Recovery Workshop.** Contact: EDP Security, Inc., 400-2 Totten Pond Road, Waltham, Mass. 02154.

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Automated Taxi Dispatch System Sends Cab to Caller in 30 Seconds

MONTREAL – A computer program said to be the first of its kind may be about to put an end to one of the psychologically abrasive aspects of urban life – the seemingly interminable and often futile wait for a taxicab.

A computerized taxi dispatch system, developed by Association Taxi LaSalle here, can send a LaSalle cab on its way to a caller in 30 seconds or less. The system handles about 15 million calls per year – more than eight times the population of the entire city, the company said.

The program, developed by the staff of the association in cooperation with outside program specialists, runs on the company's Honeywell, Inc. Level 62 small business computer. Prior to its implementation, LaSalle's operations in Montreal often approached the chaotic, according to Gerard Brunet, head of Brunet LaSalle Corp., with which the Association is affiliated. "With thousands of streets, hundreds of taxi stands, 1,200 taxicabs to control and administer, manual controls were becoming increasingly inefficient," he recalled.

How It Works

Here is how the computerized system works. At Taxi LaSalle operational headquarters there are eight workstations, each with a telephone board of 120 lines and a Honeywell VIP CRT terminal. The stations are also equipped with radio transmitting systems and connected via telephone lines to the Level 62, which is located in the heart of Montreal's financial district, several blocks from Taxi LaSalle.

When a customer calls LaSalle, the call is registered on one of the eight screens. The computer verifies the zone and address and sends the information to the dispatcher assigned to the area from which the call originated.

The driver of the first taxi at the stand identifies himself at this point by pressing his microphone button – he need not say anything.

By merely pressing his microphone button, his taxi number appears on the terminal screen at the headquarters workstation and is automatically recorded on paper and sent to the computer.

The computer instantly verifies this taxi number – to determine whether the owner of the taxi is in "active" standing. If verified, the dispatcher gives the driver the customer's pick-up address.

All this is accomplished in less than 30 seconds. The old manual process took as much as an hour, particularly during the rush hours.

Other Features

The computer program stores all the streets, individual street addresses and public buildings' addresses of Montreal, and a zoning system divides the city into numbered zones. With this system, no taxi can be sent to a nonexistent address, saving the driver from making useless trips.

For special occasions like conventions, sports events, concerts and the like, the number of taxicabs required can be estimated in advance.

From an administrative point of view, the system provides communications capabilities with all 1,200 taxis at the same time. Thus it is known which or how many cabs have worked at what time of the day or night.

Permanent records are made available for review and, most importantly, training time is drastically reduced by about 90% of the time it used to take when the old manual method was used.

Brunet says that under the old system the dispatchers were the only ones who knew all of Montreal's zones, streets and buildings and which taxis served which areas. A sick dispatcher was a cause for alarm.

"But with the Honeywell Level 62 system we can do today what we only dreamed of in the old days. It is a modern miracle," he said.

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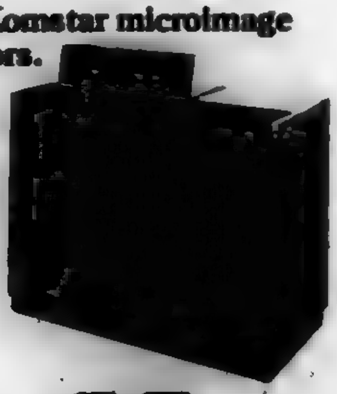

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EDITORIAL

Rise to the Challenges

The productivity crisis that confounds Corporate America provides a golden opportunity for DP and MIS managers.

Clearly, top management is looking to MIS and DP managers for answers — not just assistance, but factual answers and strategies. One answer, in the words of Robert Price, president of Control Data Corp., "is knowledge, not just information. Computer-aided knowledge must be in the business lexicon."

The productivity crisis represents a change for MIS and DP managers to move to the head of the corporate class. Computers are increasingly recognized as the best game in town for improving productivity, and more and more MIS and DP managers are being asked to provide leadership in resolving productivity problems.

MIS and DP managers face two challenges. One lies within their own departments. The task there is to manage the staggering changes in technology and its proliferation throughout the corporation. Computers are sprouting up everywhere, and the internal challenge is to control and coordinate their spread, while merging them with the emerging technologies of telecommunications and office automation.

Other internal challenges demand attention: shortages of qualified personnel, snowballing demands for applications development from end users and increased competition from nontechnical management for control of corporate information resources.

Monolithic centralization is not the answer to these problems; nor is the uncontrolled proliferation of technology throughout the corporate structure. One answer, in the words of Ted Withington, Arthur D. Little consultant, may lie in the centralization of MIS control with the decentralization of applications development.

The second challenge comes from top management. MIS and DP managers can expect increased pressure for more quantifiable results, better performance of present systems and increasingly flexible systems to meet the changing conditions of the marketplace.

If MIS and DP managers are to be held accountable for providing these things, they in turn should expect management to provide the tools to produce them.

DATA PAST

Five Years Ago
Oct. 22, 1975

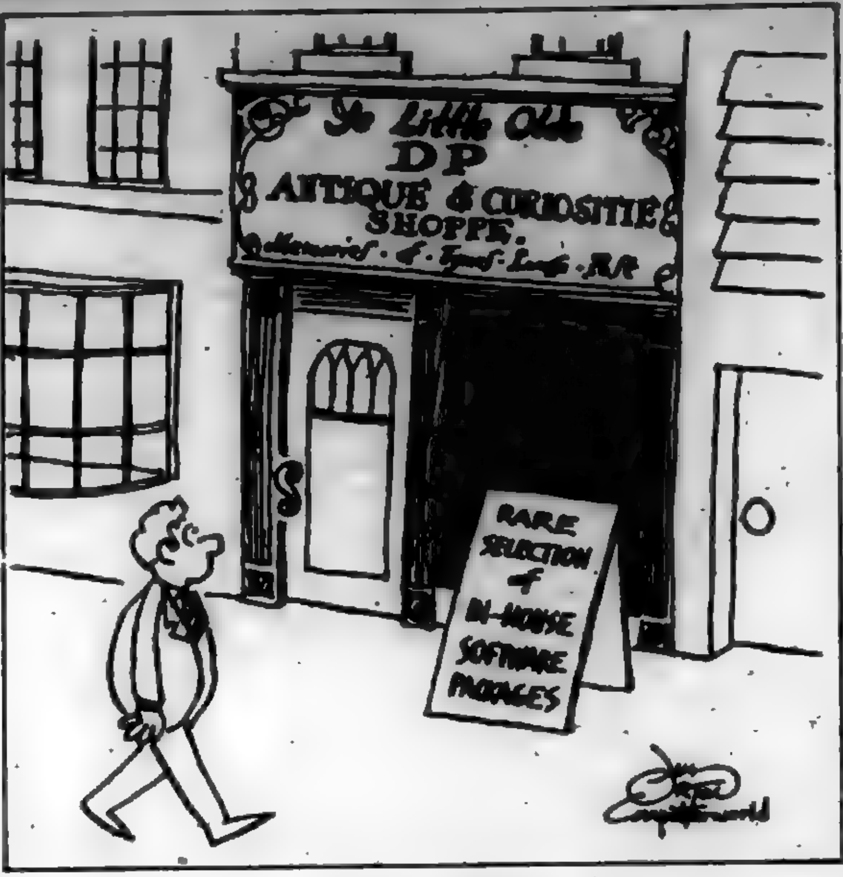
BOSTON — The number of jobs for clerks and unskilled workers would decline faster in New England than in the U.S. as a whole by 1980, largely because of increasing automation in the area, according to a report published by the Department of Labor. But while the report predicted a grim job market for clerical workers here, it forecast a healthy growth in opportunities for computer programmers, analysts, operators and other DP specialists.

MINNEAPOLIS — Under a proposed agreement, Honeywell, Inc. would handle all contacts with Xerox computer customers and provide continuing marketing, sales and maintenance support to Xerox computer users. In a joint statement, the firms said the arrangement would become effective Jan. 1.

Eight Years Ago
Oct. 18, 1972

NEW YORK — The value of computerized voter registration lists was proven here as errors were corrected in tens of thousands of records. A candidate for local election had charged that thousands of voters would become disfranchised, since they had received erroneous notices, telling them to go to polling places that would not have their names.

NEW ORLEANS — The Federal Bureau of Investigation regulation that law enforcement computers had to be dedicated to that application was more a "power play" than a security consideration, computer experts and criminologists agreed here. The FBI required that access to its Computerized Criminal History file be through computers operated and managed by criminal justice agencies.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LETTERS

Outraged by Power Grab

I am outraged by the "raw" power grab by Brotherhead of Railway and Airline Clerks (Brac) to force unionization of DP professionals [CW, Sept. 15]; forced unionization is the most obnoxious form of tyranny. I have no objections to individuals choosing to form a bargaining unit and then affiliating with a larger union, but the reverse can not be condoned.

Closed shops, dues checkoff and so forth are other tools of these power-hungry organizations which do not trust or have the support of their so-called members. Such organizations should not be tolerated in a "free" society, and I certainly do not want to see them increase their power by "stealing" the power of DP professionals. I call for a concerted effort by all DP professionals and their organizations (where are you when we need you?) to stop this process *now.*

I think it would be appropriate to get all current candidates for Congress to firmly and clearly state their position on this issue and for us to vote accordingly. Also let us use our own lobbying power to eliminate this threat. Finally, I think our professional organizations should file in support of the DPers protesting this action. If we do not stand together now . . .

Leo Winck-Myers
Mill Valley, Calif.

How About Ramis II?

While fully appreciative of the variety of report generators available and the need to choose a representative sample, I feel the exclusion of Mathematica, Inc.'s Ramis II data management and reporting system precluded a complete survey as it excells in many categories listed in the chart [CW, Sept. 29].

As a proficient user of Pansophic Systems, Inc.'s Easytrieve, I have repeatedly chosen Ramis II over Easytrieve for a multitude of reasons. I believe Ramis II report-generation capability makes it a formidable rival of any selected for comparison. Ease of using the free-format report language has allowed even non-DP personnel to quite successfully develop dozens of parameter-driven reports.

The simplicity of the language, coupled with the capability to directly access IMS, Total and Vsam as easily as it does Qsam attests to the fact that it merits consideration as a representative package.

Christopher J. Finegan
Meriden, Conn.

Excellent Issue

I just finished reading *Computerworld Extra.* It answered "everything you ever wanted to know about data base management but were afraid to ask."

I was enthralled when I finally had my hands on a periodical I had been looking for. *Computerworld Extra* was excellent.

Douglas N. Gabel
Collegeville, Pa.

Nobody Is Neutral

Several years ago, after many heated pro- and anti- IBM letters, CW published a letter of mine. Immediately thereafter, readers returned to their jobs rather than to their typewriters. Perhaps it is time to rehash my idea/-letter.

Many newspapers and magazines publish regional editions. I suggest that CW publish two editions: one pro-IBM, the other con. Subscribers and advertisers could choose between the two. There would be no need for a neutral IBM issue because, in the intervening years since my original letter, I *still* have not met anyone who is neutral on IBM!

D.C. Stultz
Satellite Beach, Fla.

SOFTLINE/Werner L. Frank

The IBM Software Line

How does the IBM Data Processing Division (DPD) represent its software line and what does IBM reveal about its future software plans? To achieve some insight, we examine the public document reflecting the DPD offering, "Keyword Index and Program Information," which has recently been reissued in the form of a 13th edition (publication reference number is GB21-9949-13).

First we note a shift in coverage. In the 12th edition, reflecting information announced through Sept. 30, 1977, the compendium title was modified by the delimiter "System/370." This restriction is conspicuously absent in the title of the new edition dated June 1979, which reflects product announcements as of March 31, 1979.

A second difference worth noting is the inclusion of a "new" category of covered programs. In the 13th edition, system control programming (SCP) is added to the prior edition's contents which included program products, field-developed programs, installed user programs and programming RPQs.

The most noteworthy difference in the two successive editions is the increased size of the catalog from 146 pages to 377 pages. Software is getting to be more and more important at IBM!

The product count, inclusive of the SCP, rose from 783 to 1,080, or an increase of 38%. The growth in listed programs is predominantly in the application software area. Ignoring the SCP, the increase in application software and systems software is 34% and 19% respectively.

And there is a first to be recognized. IBM has gone one step beyond simply marketing *nom de plume* software under the neutral term "installed user program." The catalog points out that the computer-aided design software, Cadam, is actually a registered trademark of Lockheed Corp.

Expanded Presentation

But this increase in number of pages is not only the result of more available products. The bulk of the new pages are devoted to expanding the presentation itself.

In the older catalog, two sections were provided. The first one was the Keyword Index, consisting of 91 pages. The second section of 47 pages listed the programs according to the classification scheme shown in Figure 1.

In the current catalog, a new indexing scheme has been introduced, replacing the eight category codes by 45 "cluster index" titles. Programs are, therefore, now listed according to their affinity for one or more of these cluster titles. Section two of the 12th edition has now become two new sections in the 13th edition — a listing of programs by cluster (86 pages) and a numeric listing of programs by their program identification number in 47 pages.

The cluster index reveals the new direction and emphasis of the catalog. Fourteen of the indexes are directly related to applications, 12 of which are specific to individual industries. One of these, Distributed Office Systems, is specified but no products are yet included. The application clusters and

(Continued on Page 48)

CATEGORY CODE	CATEGORY NAME	NUMBER OF ENTRIES
1	Generalized Applications	165
2	Industry Applications	192
3	Industry Systems Support	27
4	Systems Support	69
5	Productivity Aids	114
6	DB/DC	65
7	Conversion Aids	32
8	Languages/Sorts/Utilities	96

Figure 1

INDEX TITLE FOR APPLICATIONS	NUMBER OF LISTED PROGRAMS
Cross Industry	120
Scientific & Engineering	16
Distribution	58
Education	14
Finance	101
Health	33
Insurance	11
Manufacturing	71
Media	5
Process	13
State, Local Government	9
Transportation	24
Utility	4

Figure 2

HUMAN CONNECTION/Jack Stone

How's Your Internal Communications Program?

While I was preaching the gospel on effective writing at a seminar on human communications for DPers, a student interrupted the proceedings with this rather devasting question: "Granting that it's very nice to learn these personal skills, what happens in my case where the communications within the DP organization are so bad that they minimize my opportunities to apply these new skills?"

I decided to avoid a direct answer and successfully did so by taking up a discussion of what constitutes an effective management communications program. It turned out that the students seemed interested in my views on this subject, so I decided to summarize them here.

An effective management communications program is one that not only informs the staff of matters of importance to the business and provides a channel for the staff to speak up, but also encourages the staff to understand and accept the organization. The program is intended to build a sense of pride and accomplishment within the staff and to encourage the staff to identify with the goals and programs of the information systems department. General information disseminated in the program could include the following:

- The goals, objectives and general operating plans of the department in the context of the broader goals of the business.
- The functions, responsibilities and interdepartmental relationships of each organizational unit within the department.
- The accomplishments that are expected from the staff by management.
- Factors used in measuring individual performance.
- Individualized career plans, which combine job assignments, training and education to expand staff capabilities.
- A statement of how management communicates with personnel to keep them informed and to listen to their suggestions and ideas.
- Support facilities, services and information systems to aid the staff in performing their assignments.

The program can be further described in terms of documentation that could be developed. Here are some examples:

1. **Organization Manual.** This is a formal reference document which contains official information on the department. Sections might include:

- Mission, goals and objectives.
- Organization and reporting relationships.
- Functional statements of operating units: summary and detail.
- Position descriptions: summary and detail.
- Personnel policies.
- Career plan models.
- Support services.
- Information systems.

2. **Operations Handbook.** This document provides general information about the information systems department in an easy-to-read, easy-to-understand style. Basic information from the organization manual is extracted, rewritten and supplemented with related subjects. Sections might include:

- Letters from the director.
- Department philosophy.
- History of accomplishments.
- Organization.
- Management.
- Responsibility, authority and interrelationships.
- Operating plans and programs.
- Personnel plans and programs.
- Support services.
- Information systems.

3. **Personnel Plans and Programs.** This is a package of forms and procedures to aid supervisors and managers in the development of comprehensive plans and programs for each member of the staff. In addition, several model packages are included to illustrate how they would appear when completed. The packages might include:

- Functional statement: summary and detailed.
- Objectives for coming period.
- Criteria for performance measurement.
- Performance evaluation.
- Career plan.
- Training/education plan.

4. **Staff Meetings.** These forms are intended to improve the effectiveness of the staff meetings. They are designed to focus on organization performance (as measured by accomplishments vs. projection), identification of major problem areas, assignment of responsibilities to correct the problems and reporting on progress toward resolution. Topics include:

- Short- and long-range objectives.
- Operating plans.
  - Tasks.
  - Schedules.
  - Milestones.
- Progress reports.
- Problem areas.
  - Problem statement.
  - Background.
  - Alternate solutions.
  - Recommendations.
- Organization announcements.
- Personnel actions.

5. **Special Communications.** This group of projects might include the following:

- Regular letters from the information systems director on progress toward meeting goals.
- Bulletin board announcements.
- General meetings of all personnel.
- Social and recreational events.

THE TAYLOR REPORT/Alan Taylor

IBM Contract Method Conceals 'Fine Print'

IBM claims that its contracts' fine print is easy to read — but does so while planning to conceal from buyers the contents and even whereabouts of the fine print.

The "easy-to-read" claim appears in large print at the top of a contract outline in a recent advertisement. The form is supposed to be signed by the buyer and sent in.

The equipment concerned is not described in the outline, but IBM offers information via an 800 telephone number, and it provides a reference to some other unidentified documents, called "IBM's official published specifications."

It would have taken all of 10 words to identify the publication number of the specifications, but IBM doesn't give it. This means that a buyer might never see the specs, although they form the only contractual definition of the goods.

IBM does not suggest that a buyer might like to know, when he is speaking to that 800 number, whether the facts given him are really reliable — or whether facts half-claimed in the advertisement are reliable enough for the company to stand behind them.

The "facts" in the ad are all given as questions. For instance, IBM suggests that prospects ask, "Is this the most economical display ever offered by IBM?" This is something for which, if claimed and not true, I would excpect IBM to take full responsibility.

Trick Clause?

What IBM does say is that in the terms it will send *after* accepting the pig-in-a-poke order, there will be "Limitation of Remedies and other General Provisions." I wonder if these include a clause preventing reliance on the advertisement or on 800 information. Certainly there is some more hidden fine print that is not easy to read, although that not-so-easy fine print may permit IBM to disown its own claims. Buyers should know before they sign up.

The trick here is that, by some neat maneuvering in the published outline, the potential buyer is made to feel that he has seen the fine print when he hasn't. The *real* IBM fine print isn't even sent until it's too late! Under this setup, it is the buyer who offers to accept, sight unseen, IBM's terms if IBM will accept his order.

IBM only permits the buyer to get out of the acceptance if he claims — accurately, in writing and within 10 days — that a change in the outline's uninformative terms or in the prices has occurred. If IBM, for instance, has made it a condition that nothing it says in the advertisement or on that 800 line is to be binding, that would not be a "change" but simply a condition in the fine print that wasn't made available to the buyer! So that wouldn't entitle the buyer to reject the new fine print!

No Performance Specs

There are a number of other reasons this particular contract method is not good. The published fine print does say that IBM will provide some warranty services for three months to keep the equipment in "good working order." But it doesn't define what that means. (In one contract I praised recently, LFE promised 98% uptime, but no figure at all appears in the IBM document.)

Nor does the form indicate where the units and their contents are made. They are cheap; but if that means spares have to come from the Far East, the bold print should explain that and provide some idea of future costs. (LFE gave a five-year control on maintenance costs. Does IBM give anything in the "easy-to-read" fine print?)

Contract rights are only as important as the remedies are effective. IBM doesn't tell what the warranty or other rights are, or what limitations it has placed in the fine print on a buyer's rights to recover if the contract is broken. That again is something the buyer finds out after he has been hooked.

But it would not have taken much room to set these rather important things out. The references to the undisclosed "full terms" use some 140 words, including more than 100 words of repetition. In fact, with rewording and asterisk references, there would be more than enough room to include most of the real fine print.

All in all, this is the worst claim I have ever seen any computer company make. To pretend that the fine print is easy to read when it isn't even made available to the buyer until after the contract is in force, and to make an advertising point of it, isn't overselling. It is just covering a con game.

A company that would make such a claim deserves suspicion, rather than respect, when it speaks about fine print, computers or carcinogens.

IBM is at least showing some sensitivity about its customers' fear of fine print. That, at least, is a slight step forward. But now let's give the customer a fair deal in the fine print.

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And in addition to word processing functions, the 5520 does arithmetic functions and has files processing capabilities, too.

The 5520 even files documents on diskettes. So you can retrieve them in no time at all.

Which not only saves you time, it saves you space. And makes it easy for you to make inserts from one document to another.

What's more, the 5520 is compatible with other IBM systems. It can interchange information with other 5520's and a wide range of IBM office products (including the new IBM Displaywriter) and appropriately programmed System/370 computers. Which means it can help you enhance the capabilities of other IBM office products you may already be using.

The IBM 5520 Administrative System. It helps you improve the flow of business information, putting it in the hands of people who need it, when they need it. And saving valuable time in the process.

For more information, call your General Systems Division representative or write us at P.O. Box 2068, Atlanta, GA 30301.

H.G. Wells' time machine was a fantasy. IBM's is a fact.

IBM
General Systems Division

The IBM Software Line

(Continued from Page 45)

associated product listings are shown in Figure 2.

The remaining index titles cover the usual utility and systems programming categories supporting the operating systems, languages and peripherals. Hardware-specific programs are listed for the 3790, 8100 and 4300 series in addition to the implied software for the 370 and 30 series.

Program prices vary from a few for which there is no charge to those with a perpetual license fee ranging from less than $100 to more than $1,000 per month. A number of programs are available for a one-time installation fee and many are obtainable for a monthly fee which becomes a paid-up license after 12 or 24 such payments have been made.

The catalog prices between successive editions show a remarkable stability. A spot check shows most prices remaining the same, although a few were moderately increased and some even decreased.

Generally speaking, IBM program product prices remained constant during the '70s. However, there are notable exceptions as, for example, with cirtical software such as CICS and IMS. The VS versions of these systems have had price changes three or four times for a total increase of approximately 35% over a seven-year period.

But it is not the price of a single product that determines the expenditure. Rather, it is the growing family of products and their interdependency that leads to increasing commitment to IBM software.

Thus the IMS data base and data communications shop will probably have as a minimum software rental:

IMS/VS Data Base	[illegible]
IMS/VS Data Communications	$1,1[illegible]
Cobol Compiler	[illegible]
Application Development Facility	[illegible]

Price and product availability are, of course, dynamic. Periodic information is provided through IBM announcements of product changes and new releases. This information is made available through direct information mailers, the *Monthly DPD Support Bulletin*, inserts to the *IBM Consultants Manual* and the special distribution for software houses through the Software Information Exchange Program. There are often 10 to 20 such announcements per month.

As an example of recent events, some 50 cataloged products were withdrawn the beginning of 1980. Effective April 1, 1980, price increases of 10% were announced for roughly half of the products and all of the SCP monthly support charges.

Implications for Sales

It is, of course, interesting to speculate on the annual sales of IBM from the software represented in the catalog. Excluding the presently available free SCP, the balance of the software, renting at an assumed average of $300 per month and with six packages per installation, would yield revenues of more than $400 million for the 20,000 worldwide installations represented by the DPD family of computers.

As already noted above, this edition introduces the listing for SCP. There are 89 such line items introduced in the catalog, none having, at the moment, an associated charge. Nevertheless, the SCP products are listed, all set and ready to become part of the fee structure, if and when. And using the same assumptions as already stated for the non-SCP products, IBM could readily double it annual sales in software.

What is the "book" value of this software? We take a clue from Series/1 software pricing, where IBM permits one-time purchase as well as monthly leasing. Such software typically has a 60-to-1 ratio in price. Hence, five years of monthly payments are roughly equal to the purchase value of a software product by a single user.

Assuming that the ratio of unit purchase price to original development cost is the often-used commercial marketplace ratio of 1 to 25, then the ascribable value of all IBM software, including the SCP, would be close to $500 million. However, given the special situation of market dominance by IBM, it is more likely that the operative ratio of unit cost to development is the more favorable 1 to 50, in which case the listed software would carry a marketplace value of up to $1 billion.

At the time IBM unbundled hardware and software in 1968, the subsequent pricing suggested that the software component of the total monthly rental of hardware and software was a paltry 3%. Today, the software component is readily 10% to 20%, and for the newer systems, such as the 4300 series, it can easily go to more than 50%.

Software is big business at IBM and it's getting bigger.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

'Your Access Code Tom, Input Your Access Code!!'

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formation
responsive computer systems

[illegible] system to H-Series [illegible]

[illegible]

[illegible] is [illegible] Again, STC is [illegible] of both, [illegible] at the [illegible]

[illegible] the [illegible] problems.

By [illegible] memory with STC's 3700 Universal Memory System, you will experience an immediate improvement in both throughput and terminal response time. This is true, because [illegible] to [illegible] research [illegible] higher level of multi-programming. [illegible] Up to a point, that is. But there are some significant bottlenecks which memory cannot resolve.

Over-utilization is a case in point. As you add batch jobs or log-on more TSO or CMS users, the increased job load will eventually result in page thrashing and resource conflict. That threshold can be reached long before your CPU is 100% busy.

As illustrated in the graph, a high-speed paging device, such as STC's 4305 Solid State Disk, will dramatically broaden your system's performance range by decreasing [illegible] on your [illegible]

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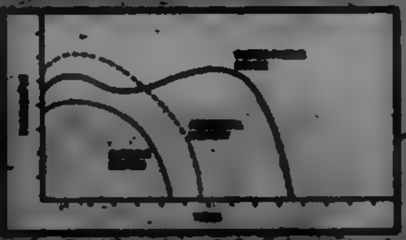

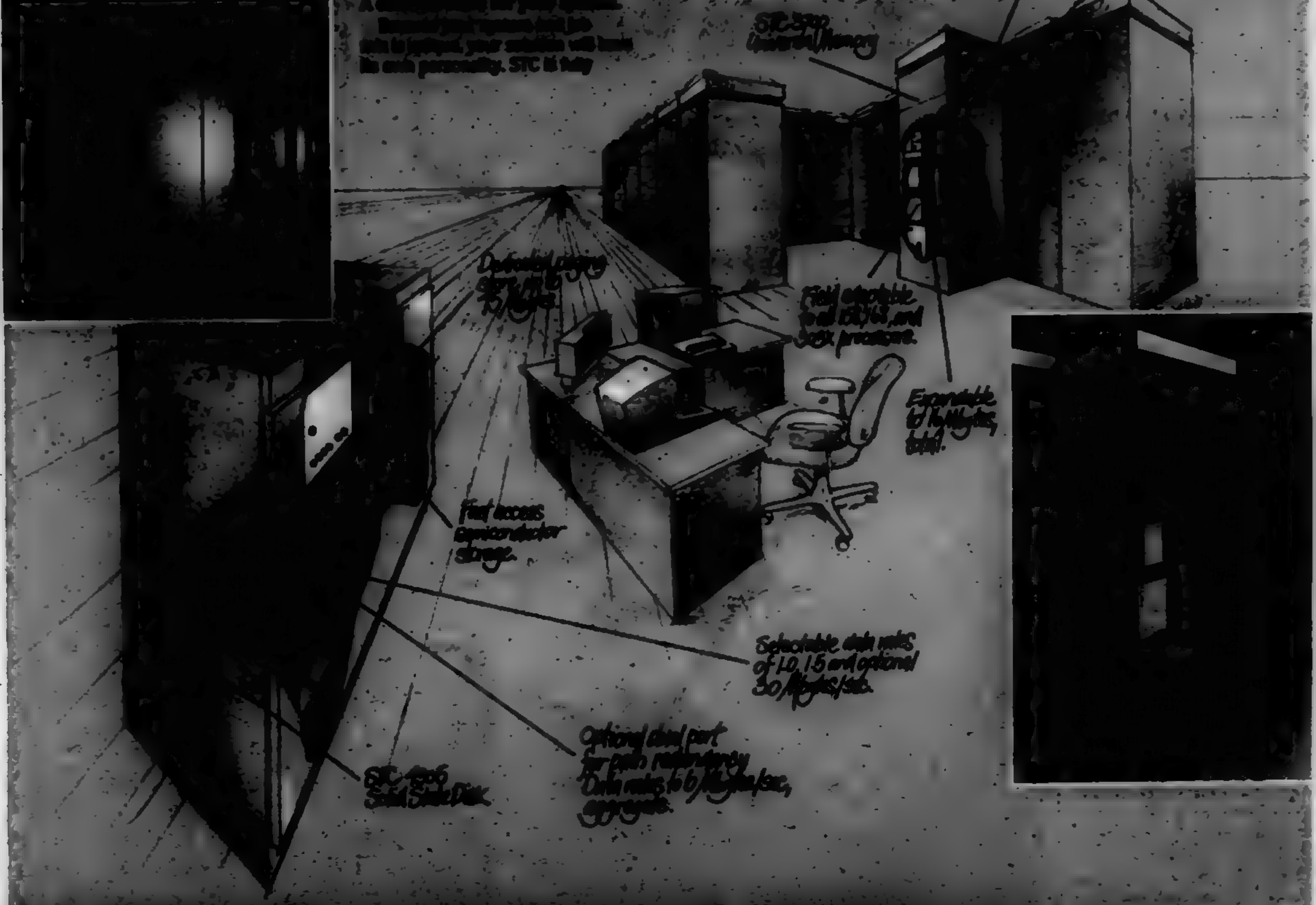
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Fast access semiconductor storage.
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STC 4305 Solid State Disk

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LETTERS

Zip Suggestion

The article on the nine-digit Zip Code in the Sept. 15 issue listed the implications to existing computer programs in making the change from five digits. Has the Postal Service considered getting the greater Zip resolution it needs, but without patron trauma, by remaining at five positions and changing to alphanumeric?

The present Zip provides 10^5 = 100,000 possibilities, not enough considering that much smaller countries such as Italy and Israel also need five digits. But five alphanumerics would provide 36^5 = 60,466,176 possibilities. Granted, not all of them would be usable — certain four-letter words in Zip codes would be Not Nice; but there would be more than enough Zip resolution left to meet all postal requirements.

Changing to five alphanumerics would only require minimal program changes, mainly to editing parameters. No changes at all would be needed for preprinted forms.

Proof that this proposal is workable: England and Canada have been using alphanumeric Zip successfully for years.

Rudolph E. Hirsch
Chicago, Ill.

Overstated His Case

The author of "Put It in the Contract" [CW, Sept. 15] overstated his case, both with respect to the software products industry generally and to the software contract process.

Most observers agree that the industry got its start with the "unbundling" of IBM software in 1969. Since that time — only 11 years — the industry has taken off, promising to surpass the hardware industry in this decade.

Like any growing, dynamic industry, software products has had and will continue to have its share of failures. However, the industry has had more than an ample share of successes as well.

Analysis of the record reveals that well over half of software companies now belonging to the Association of Data Processing Service Organizations, Inc. (Adapso) have been in existence for 10 years or more. These companies have not only survived but have prospered in a highly competitive market because of a commitment to innovation and the superior quality of their products and services.

Similarly, the author overstated his case with regard to the allocation of risks between vendor and user. No business could survive long if it did not in some way limit its liabilities; moreover, unlimited liability would certainly result in significantly higher costs to the user. The best contract is a fair contract — one that equitably allocates risk, liability and responsibility between both parties. Anything less is just bad business.

Ronald J. Palenski
Attorney
Adapso
Arlington, Va.

'How-Tos' Helpful

I was thoroughly impressed with William Harding's "Bottom-Up Documentation Best Bet" [CW, Sept. 15]. It is a pleasure to see a straightforward, step-by-step description of how to document a virtually undocumented system.

Articles such as this are a great help to us analysts who are continually faced with cleaning up old, well-worn systems. They are also very helpful when trying to determine what an old system did so the new one being developed will not leave out any necessary functions.

I most heartily encourage *Computerworld* to continue articles that are "how-to"-oriented.

Annelise Pedersen
Palo Alto, Calif.

Writer Blighted

Jack Stone was so right in his Sept. 22 column to ridicule Sherwin Pakin; to highlight the obvious typos in this man's letter; and to use "verbal stilettos" to shred this man's statements. After all, how *dare* this man — who, as I read it, makes his living as a DP software writer — tell the *infallible* Stone that he *might* be wrong.

In his opening remarks, Stone said, "I have been blasted." But reading Pakin's letter, sandwiched between Stone's scathing remarks, I would say that it's Pakin who has been blighted.

J. Van Duyn
Loomis, Calif.

LETTERS

Bravo for Humor

Re Charles Fitts' "Rival Gods of the Information Age" [CW, Sept. 22]: Bravo: Our field needs more insightful, delightful humor like this.

Robert L. Glass

Seattle, Wash.

Library System

The Integrated Library System (ILS) addressed in the article "Library System Targets Health Science Users" [CW, Sept. 15] was not, as indicated, developed by the National Technical Information Service (NTIS). ILS is an ongoing development of the Lister Hill National Center for Biomedical Communications of the National Library of Medicine in Bethesda, Md.

ILS Version 1.0 is presently being distributed by NTIS and available under the number identified in the article. While ILS has been designed as a totally integrated system, Version 1.0 offers circulation control, serials check-in and bibliographic file creation and maintenance among its major modules.

Other subsystems for catalog access, authority file control, acquisitions, cataloging and so forth are in process or planned.

Charles M. Goldstein
Chief, Computer Technology Branch
Lister Hill National Center for Biomedical Communications
Bethesda, Md.

No Simple Micro

Since no one from the Desktop Computer Division has spoken up, I must respond to the headline "Fastest Boat, Simplest Micro Win Cup Trials" [CW, Sept. 8].

The article greatly underestimated the sophistication of a Hewlett-Packard Co. desktop, which was probably the most sophisticated and powerful computer of the three, especially for the application. The HP 9825 is optimized for speed, compact size, ruggedness, instrument control and data gathering, not to mention ease of use and programming.

None of the others can compare to the 9825's true desktop size, NMOS 16-bit processor speed, HP-IB hardware/software and the HPL interpreter/programmer interface.

The 9825 is still the premier standard instrument controller, even though Digital Equipment Corp. PDP-11s and Data General Corp. minis reign in the minicomputer market. Just because the DEC and DG products have larger and more sophisticated siblings doesn't make the HP 9825 the "simplest micro."

Arthur Hu
Engineer
Hewlett-Packard Co.
Cupertino, Calif.

Final Say?

Is the shortest distance between two points a straight line in a programming language? Does every beginning have an end? When is a loop not a circle? The answer to questions such as these is not the answer itself since most questions are adjectival in a programming language.

Logic, as applied to design and development, is either true or false and at best, can only produce the desired results. Results then must rely upon an approach which directly reaches a point that is the end and not continue in circles from the beginning.

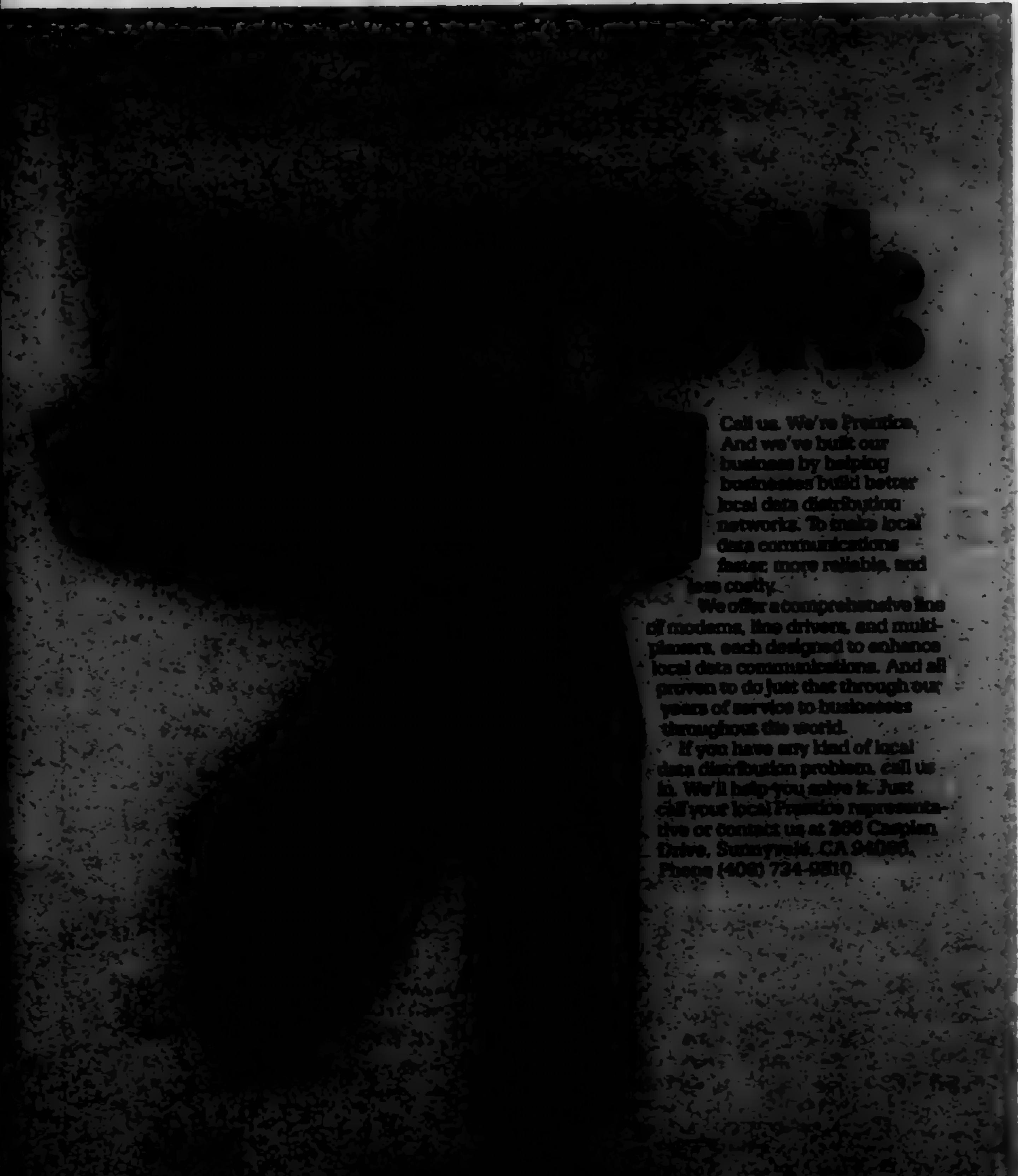
Perform if you must and go to "wherever" when needed, circling when required, dropping in at times, or dropping out where possible only ends upon completion and are tandem to the program at best.

The circle that starts must end and so must a program, but the results are the end product and must not reflect any circumjacence programming. STRUGOTO adheres to all programming rules and is the topic of conversation at most Italian restaurants.

I hope this letter puts an end to the "GOTO/structured" argument.

Frank Shiner
McLean, Va.

Computerworld welcomes comments from its readers. Preference will be given to typed, doublespaced letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.



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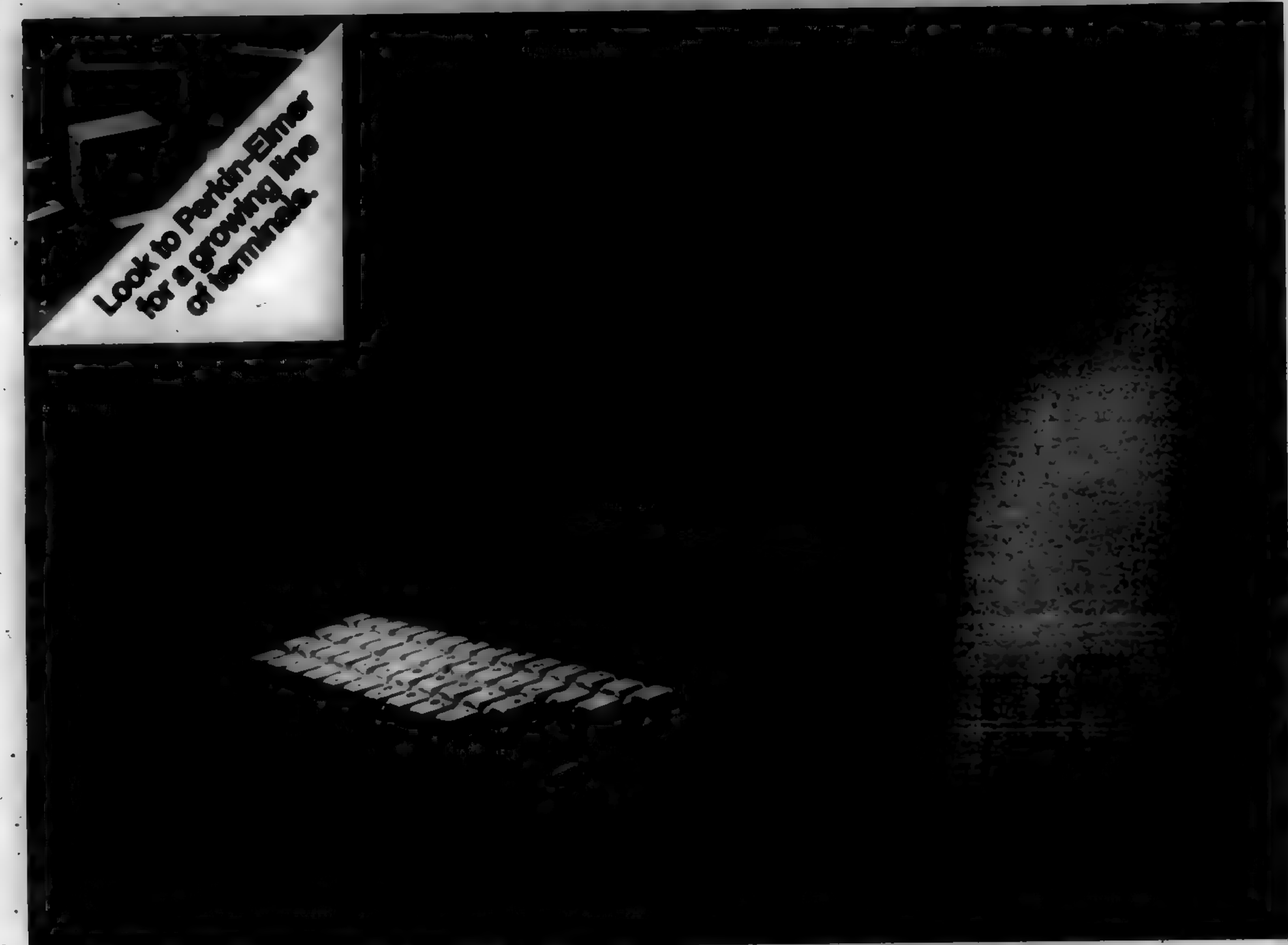

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The 550B's 7 x 10 dot matrix provides an easy-to-read screen with higher resolution and true descenders on lower case letters. Compare that with the 5 x 7 dot matrix of the ADM-3A. And the 550B screen is switchable, black on white or white on black.

When your computer transmits data formatted for 132- or 160- column line printers to the 550B, its switchable wraparound lets it display the data on two lines. And the 550B's bell is a standard feature.

The 550B has an unusually complete keyboard too. It includes dedicated keys for repeat, on/off line, print, tab, shift lock, backspace, an all-case "DEL" (delete) key and a control-protected clear. And an embedded numeric pad with +, –, /, and * as well as 0-9, decimal point and comma.

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The 550B is the latest in our growing Bantam series of low-cost terminals. We're a Fortune 500 company and a leading supplier of data communications terminals. Sales offices are located in Atlanta, Boston, Chicago, Los Angeles, New York, San Francisco, and throughout Europe. Or contact one of our authorized distributors: Arrow Electronics, Inc. • Computer Peripheral Technology, Inc. • Computer Peripherals of New England, Inc. • Data Terminal Mart • The David Jamison Carlyle Corp. • Digital American Computers, Inc. • Selecterm, Inc. • The Thorson Company • U.S. Robotics, Inc.

For more information on the 550B write: Perkin-Elmer, Terminals Division, Flanders, NJ 07836. **Or call toll free: (800) 631-2154. In NJ, call (301) 594-1400.**

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Well-Drawn RFP

Questionnaire Eases Selection Trauma

By Christine J. Cobb
Special to CW

GREENSBURG, Pa. — The Allegheny Power System, Inc. (APS), a large electric utility, determined a need for a comprehensive materials management system two years ago. Functional specifications were developed with the active help of affected users.

Although APS intended to purchase a software package for the computerized portions of the system, the functional specifications were developed in great detail in order to ensure that user needs were defined for the software evaluation.

A request for proposal (RFP) was developed from these specifications and included:

- A conceptualization of the information flow.
- Resource documents to further detail the proposed system including formatted screens and reports, a dictionary of terms and data elements and record layouts of interfacing systems.
- A detailed questionnaire (Figure 1) for the vendor to complete.

The RFP instructions emphasized that failure to complete the questionnaire would invalidate the bid. Vendor response ranged from a refusal to complete the questionnaire to enthusiasm for the method. Of the seven vendors who bid, five completed the questionnaire.

Two Sections

The questionnaire consisted of two sections. The first contained 419 questions on functional design, the second was a checklist of major data elements desired in the software package.

The functional design questions were quite specific — for instance, asking not only if the software system performed a specific function, but if it was performed in a way conceptualized by APS; asking not only if a type of report or on-line screen was available, but if certain main elements of information were included.

The vendor was asked to answer yes or no to each question, to provide the cost of contractual services to modify his system to include the item and to reference where information about the item appeared in the vendor proposal. An example of the questionnaire is shown in Figure 1.

		Yes	No	Cost of Contractual Services to Include Item:	Specifics Referred to in Proposal On Page:
2-18.	Can an on-line inquiry be made to the requisition file listing those requisitions which have not be placed on inquiry, purchase order or canceled?				
2-19.	Can this listing (2-18) be arranged first by user location number and then by requisition date?				
2-20.	Can a listing be made available of all requisitions which are open for more than three days and have not been placed on inquiry, purchase order or canceled?				
2-21.	Can a report be produced of multiple line requisitions that have at least one item which has not been acted on?				
2-22.	Can on-line inquiry be made to see the status of each item on a multiple requisition?				
2-23.	Can this inquiry (2-22) be made by different numbers (requisition number, inquiry number, purchase order number) each unique to a particular item?				
2-24.	Can these unique numbers be linked so that all information for that item is accessible by either of the numbers?				
2-25.	If 2-23 and 2-24 are yes, can all requisitions involved on a particular inquiry or purchase order be listed by entering that inquiry number or purchase order number?				

Figure 1. RFP questionnaire details functional items considered essential to users' needs. Vendors' responses form the material for a major part of the software evaluation.

Interpretation of the results involved four main steps:

- Users weighted the relative importance of the questions for their functional area. A scale of one to four was used. A four represented an item that must be answered "yes" to make the software package acceptable and was limited to three or four questions such as, "Is source code provided?"
- Spread sheets were prepared, listing each question, the weight for the question, the response of

(Continued on Page 56)

'Control/IMS' Gets Warning Option

SUNNYVALE, Calif. — Boole & Babbage, Inc. has released an option for its Control/IMS Realtime software that is said to feature automatic early warning of problems with IBM's IMS data base management system, automatic performance monitoring, rate of activity calculating and historical plotting.

The Control/IMS Realtime base product is an on-line, realtime system for detecting and diagnosing problems and evaluating performance in the IMS data base and communications environment. It runs on IBM 370 and compatible mainframes under the SVS, VS1 and MVS operating systems.

For automatic problem detection, the Asynchronous Services option enables the user to select potential IMS problem areas for monitoring and specify thresholds of activity and resource utilization for each area.

When these thresholds are exceeded, a warning message is automatically issued to the originating Lterm, IMS master terminal or the OS console.

The operator can then investigate the cause of the problem with Control/IMS Realtime's information services before IMS performance is impacted, Boole

(Continued on Page 58)

Cincom Adapts 'Total' to Run In Dibol Under DEC RSTS/E

CINCINNATI — A data base management system (DBMS) for users of the Dibol programming language running under Digital Equipment Corp RSTS/E operating system has been announced by Cincom Systems, Inc.

Minicomputer Total is said to combine the capabilities of data structuring with ease of use and low memory requirements.

The DBMS operates in the central mode, permitting multiple terminals, users and programs to access the data base simultaneously. Additional features of Total include systemwide recovery capabilities and data independence, said to allow record layouts, operating systems or computer hardware to be changed without impacting existing application programs.

Total costs $22,000 or leases for $975/mo. Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

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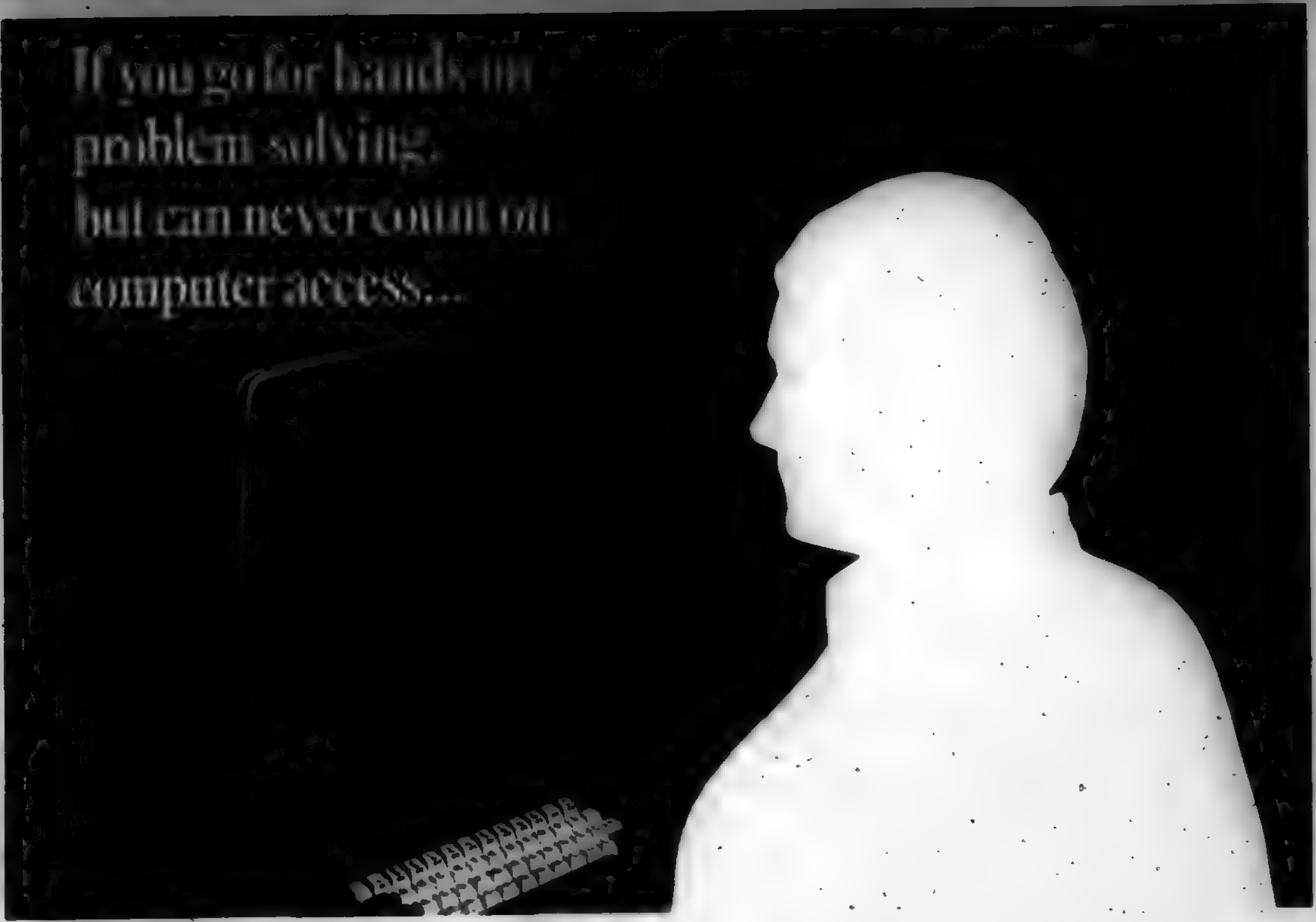
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You need to know how often you'll be left high and dry. So you ask, "Are there really enough computing tools to go around?"

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Our programmers, analysts, software engineers, and others tap into the most advanced minis and micros. And they use hundreds of terminals wired to giant CPU's and strategically placed for ready access by our project groups.

Now, about those groups: Hughes may be big, with more than 1,500 current projects in its $4 billion backlog. But we team professionals into small technical groups. This gives you the visibility and upward mobility of a little company. At the same time, you get the benefits of a giant corporation.

Including real job security. Thanks to worldwide demand for our unique expertise in space communications and exploration — past, present, and future.

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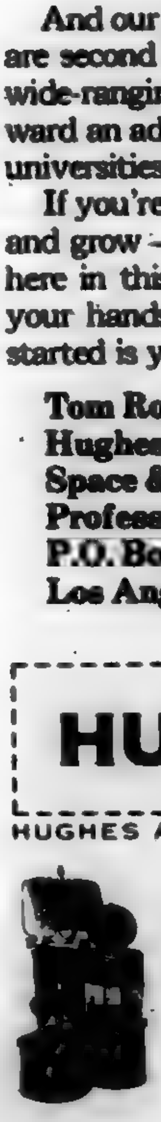

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'CICS/Inform' DOS Version Speeds Retrieval, Updates

BOSTON — Communication Software Aids has released a DOS version of CICS/Inform, designed to enable users to instantly retrieve and receive updated information internal to CICS.

The software is said to contain both global and specific monitoring facilities.

For global monitoring, the software displays the status of terminals, files, transactions, programs, tasks, dynamic storage, Vsam strings, Vtam and system control information.

Specific Monitoring

For specific monitoring, it displays memory and any disk records available through CICS access methods.

CICS/Inform is available with any IBM operating system and any release of CICS.

Available on a free trial basis, CICS/Inform also has rental, lease and purchase plans starting at $175/mo. The firm is located at Suite 618, 80 Boylston St., Boston, Mass. 02116.

Message System For CICS Users

RIVER EDGE, N.J. — A proprietary on-line electronic message processing system for users of IBM's CICS and CICS/VS teleprocessing system on single or multiple CPUs has been introduced by On-Line Software International.

The Omnicom software will send messages to one or more destinations and will search all terminals in a network for a specific user if necessary. Messages may be tracked, stored for future reference or displayed at recipient terminals either automatically or upon request, the vendor noted.

Omnicom may also be keyed into existing application programs to generate messages during the program run, a spokesman noted.

All messages are security-protected and the message network is fully managed, according to the vendor.

Omnicom costs $18,000 for OS and DOS installations from the vendor at Rt. 4 East, River Edge, N.J. 07661.

Business Applications Geared to IBM 5280

ORANGEBURG, S.C. — Ziegler and Co., Inc. has introduced business applications packages for the IBM 5280 distributed data system.

Accounts receivable and payroll are ready for installation, while Accounts Payable is due for release in December, according to a company spokesman.

Prices for an IBM 5280 and a Ziegler Application Package (ZAP) start at $400/mo from the firm at 1173 Boulevard N.E., Orangeburg, S.C. 29115.

CICS, 'Shadow' Support Added to Tone's 'FSO'

ANAHEIM, Calif. — Support for IBM's CICS and Shadow has been added by Tone Software Corp. to its Full Screen Output (FSO) product.

Prior to this, FSO ran only with the firm's Tone time-sharing system for IBM VS1 and MVS operating systems and with Applied Research, Inc.'s Roscoe monitor, a Tone spokesman explained.

With FSO, users may look at input as well as output data sets, search for character strings, set note points for later direct reference, page backward or forward, delete and spooled output, requeue it for later review or print in on the system printer.

The output commands act directly on the JES queue and no intermediate file is necessary, the Tone spokesman said.

Command Set

In addition to the output facilities, FSO provides commands which perform the functions of IBM's IEHPROGM utility interactively. A complete set of commands is also included to aid the systems programmer.

FSO is available on a free 30-day trial period. The one-time license fee is $7,500 with rental plans available from Tone at 1124 N. Gilbert Ave., Anaheim, Calif. 92801.

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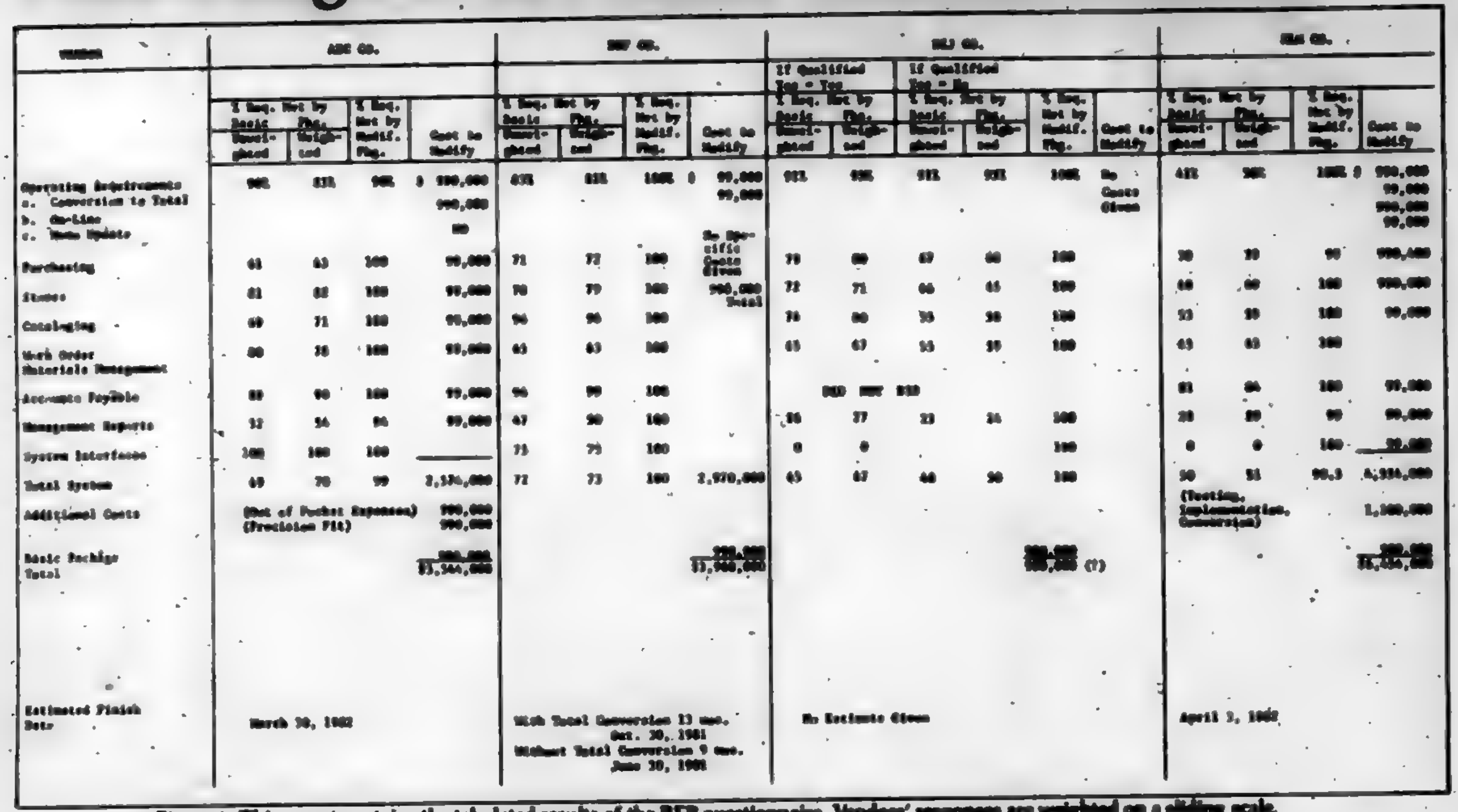
Well-Designed RFP Eases Selection Trauma



VENDOR	ABC CO.				DEF CO.				GHI CO.						JKL CO.			
									If Qualified Yes = Yes		If Qualified Yes = No							
	% Req. Met by Basic Pkg.		% Req. Met by Modif. Pkg.	Cost to Modify	% Req. Met by Basic Pkg.		% Req. Met by Modif. Pkg.	Cost to Modify	% Req. Met by Basic Pkg.		% Req. Met by Basic Pkg.		% Req. Met by Modif. Pkg.	Cost to Modify	% Req. Met by Basic Pkg.		% Req. Met by Modif. Pkg.	Cost to Modify
	Unweighted	Weighted			Unweighted	Weighted			Unweighted	Weighted	Unweighted	Weighted			Unweighted	Weighted		
Operating Requirements	90%	83%	98%	$ 190,000	63%	83%	100%	$ 99,000	93%	93%	93%	93%	100%	No Costs Given	41%	36%	100%	$ 990,000
a. Conversion to Total				990,000				99,000										99,000
b. On-Line																		990,000
c. Memo Update				ND														90,000
Purchasing	61	63	100	90,000	71	72	100	No Specific Costs Given	79	80	67	60	100		30	30	90	990,000
Stores	81	82	100	90,000	70	79	100	990,000 Total	72	71	66	65	100		60	60	100	990,000
Cataloging	69	71	100	90,000	96	96	100		76	80	55	50	100		53	50	100	90,000
Work Order Materials Management	80	78	100	90,000	63	63	100		65	67	55	55	100		63	63	100	
Accounts Payable	88	90	100	99,000	96	99	100		DID NOT BID						81	86	100	99,000
Management Reports	52	56	96	99,000	67	90	100		36	37	23	24	100		28	30	90	90,000
System Interfaces	100	100	100		73	73	100		0	0			100		0	0	100	90,000
Total System	69	70	99	2,136,000	72	73	100	2,970,000	65	67	44	50	100		50	51	98.3	4,334,000
Additional Costs	(Out of Pocket Expenses) (Precision Fit)			190,000 990,000											(Testing, Implementation, Conversion)			1,100,000
Basic Package Total				990,000 $3,344,000				990,000 $3,960,000					990,000 990,000 (?)					990,000 $5,434,000
Estimated Finish Date	March 30, 1982				With Total Conversion 13 mos. Oct. 30, 1981 Without Total Conversion 9 mos. June 30, 1981				No Estimate Given						April 3, 1982			

Figure 2. This report contains the tabulated results of the RFP questionnaire. Vendors' responses are weighted on a sliding scale.

(Continued from Page 53)

each vendor for his basic system and his answer to whether his system could be modified to include the item. There was a column named, Acceptable Alternative, marked "yes" when the vendor described an acceptable way of handling the function.

If a vendor answered "no" to one of the questions considered vital to the package, the answer to that question was investigated further through vendor literature and personal contact. If the "no" answer was confirmed, the vendor was disqualified and not investigated further.

- The percentage of "yes" answers to total possible "yes" answers for both the basic package and the modified package was calculated. Both weighted and unweighted percentages were calculated, and in all cases came to within one percentage point of each other.

Percentages were calculated for each main functional area — such as purchasing or inventory control — and for the total system. An example of the resulting report is shown in Figure 2.

- A list of functions marked "no" was compiled for each vendor. Prices for modifying these functions were included where provided by the vendor. Although this pricing-by-function was difficult for the vendors since they tended to group functions differently from APS, it did enable APS to develop a shopping list of modifications.

The questionnaire forced the vendor to talk in the evaluator's language. Since the vendor presumably knows his system well and is expert in the functional area addressed by the software package, he should be qualified to translate his system into another's terms. This results in fewer errors in intepretation than if the evaluator performed this function on the basis of vendor literature.

In addition, vendors who fail to evaluate an RFP but return a bid with a collection of vendor literature and standard prices are effectively eliminated by the requirement to complete the questionnaire.

The evaluator saves time spent reading the vendor literature, trying to interpret it and discussing unclear items with the vendor.

Compiled results allow quantified analysis of the bid packages and provide additional insights that might not be immediately discernable upon reading the vendor literature. It is possible to rank vendors on the match between their packages and the functional specifications.

The list of "no" answers provides a focus for exploring literature and questioning the vendor during presentations.

Weighting of questions establishes the relative importance of each item to the user. This weighting and the shopping list of modifications can serve as a basis for balancing the relative costs and benefits when deciding which items will be authorized for modification.

The questionnaire also offers the vendor the advantage of judging the degree of fit of his system in the same manner that the software buyer will be evaluating it.

Future Evaluations

Several enhancements will be added for future software evaluations. One calls for developing a method of quantifying a qualifed "yes." Estimating the degree that the vendor performs the function by using percentages is a possibility.

Another will expand the weighting scale. A one to 10 scale rather than a one to four scale would provide more latitude for user discretion. It will probably provide more differentiation between the weighted and unweighted results than the 1% achieved with the one to four scale.

The most important change will be the grouping of questions into functional categories. The questionnaire was developed by following the RFP closely and asking step-by-step if the vendor performed a function as stated.

However, there should have been a further level of refinement for grouping and consolidating questions. For example, since APS had conceptualized an on-line system, many of the questions asked if a specific function was performed on-line. If further refinement had been made, the questioning would have been "Is this functional area performed on-line?"

One vendor received a low percentage rating, even though his system functionally addressed many of the questions, because his system was totally a batch system. Therefore, interpretation for this vendor required more of the evaluator's time.

Despite mistakes made, the results and the benefits received from the use of the detailed questionnaire greatly outweighed the time spent in questionnaire development.

Cobb is systems analyst, information services, for Allegheny Power System, Inc. in Greensburg, Pa.

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Pro-Long Sponsors Contest On MPU Subroutine Design

MONTERREY, Calif. — Pro-Log Corp. is sponsoring a software design contest with more than $15,000 worth of prizes. The three top winners will receive Pro-Log M980 programmable read-only memory Programmers with personality modules to program 2716s, RS-232 interfaces and erase lights.

The contest closes Dec. 31. Contestants must submit a software routine "that performs a specific, professionally useful function," ProLog said.

The subroutine must be operable on an STD BUS system having an 8080, 8085, Z80 or 6800 MPU.

Those who wish to enter the contest should write Dick Thomas, Pro-Log Corp., 2411 Garden Road, Monterey, Calif. 93940.

Micro Notes

The Electronic Gradebook, The Grade Program and the Counsellor Element are school administration packages for Apple Computer, Inc.'s Apple II and II Plus. Price: $49.95 for Electronic Gradebook and $89.95 for Counsellor. The Grading Program elements are $259.95 each. Vendor: Compusoco, 26251 Via Roble, P.O. Box 2325, Mission Viejo, Calif. 92690.

The Software Fitness Program is written in Cobol and runs under the Oasis operating system on Z80-based computers. It performs accounts receivable with billing and sales analysis, accounts payable, general ledger, inventory, payroll and job cost functions. Price: suggested retail, $500; and dealerships are available. Vendor: Open Systems, Inc., Suite 409, 430 Oak Grove, Minneapolis, Minn. 55403.

The Pascal Reference Card reportedly simplifies and condenses programming in Pascal, and the Autodialer II allows Apple Computer, Inc.'s Apple II users to easily dial ABBS, CBBS and Forum 80. Price: $2 for the card, $15 for Autodialer II. Vendor: Modular Software, Inc., P.O. Box 12883, San Antonio, Texas 78212.

Whatsit is a cross-referencing, self-indexing file system for micros running under Digital Research, Inc.'s CP/M, Northstar Co.'s micros and Apple Computer, Inc.'s Apple II and II Plus. Price: $150. Vendor: Hardhat Software, Inc., Box 14815, San Francisco, Calif. 94114.

The RA68000ML Resident Assembler and the Link 68000 Linking Loader (part of the assembler package) were designed for the M68000 family of micros. Price: $350 for the set. Vendor: Hemenway Associates, Inc., Suite 206, 101 Tremont St., Boston, Mass. 02198.

The Class Scheduling System operates on Apple Computer, Inc.'s Apple II and Apple II Plus. Price: $249.95; documentation manual only is $25. Vendor: Charles Mann & Associates, Inc., Micro Software Division, 7594 San Remo Trail, Yucca Valley, Calif. 92284.

'Control/IMS' Gets Option For Early Warning

(Continued from Page 53)

& Babbage said.

For performance evaluation, Asynchronous Services enable the user to specify the area of IMS that will be monitored automatically. The user specifies resource or condition to be monitored, the type of measurement to be performed and the sampling rate, a spokesman said.

The user also specifies when an asynchronous service will be activated and the sampling interval. The collected data can be graphically displayed in short- or long-term plots.

In addition, rates of activity can be calculated and the frequency of IMS events graphed automatically, a spokesman said.

The Asynchronous Services option is available for $6,000. The complete Control/IMS Realtime product with the option costs $19,000, Boole & Babbage said from 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

Cincom now offers a complete DB/DC system for your 4331.

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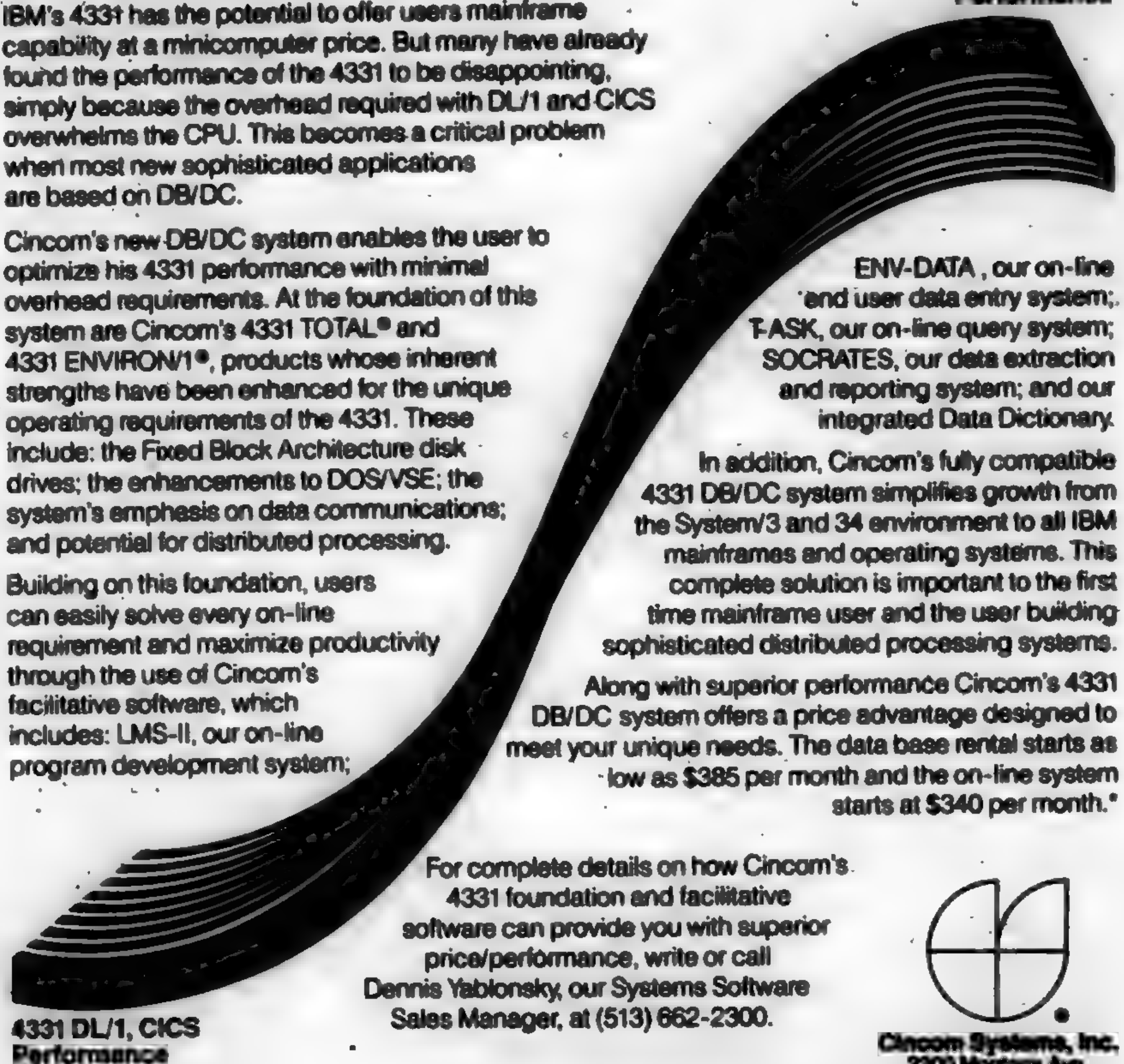

IBM's 4331 has the potential to offer users mainframe capability at a minicomputer price. But many have already found the performance of the 4331 to be disappointing, simply because the overhead required with DL/1 and CICS overwhelms the CPU. This becomes a critical problem when most new sophisticated applications are based on DB/DC.

Cincom's new DB/DC system enables the user to optimize his 4331 performance with minimal overhead requirements. At the foundation of this system are Cincom's 4331 TOTAL® and 4331 ENVIRON/1®, products whose inherent strengths have been enhanced for the unique operating requirements of the 4331. These include: the Fixed Block Architecture disk drives; the enhancements to DOS/VSE; the system's emphasis on data communications; and potential for distributed processing.

Building on this foundation, users can easily solve every on-line requirement and maximize productivity through the use of Cincom's facilitative software, which includes: LMS-II, our on-line program development system; ENV-DATA, our on-line end user data entry system; T-ASK, our on-line query system; SOCRATES, our data extraction and reporting system; and our integrated Data Dictionary.

In addition, Cincom's fully compatible 4331 DB/DC system simplifies growth from the System/3 and 34 environment to all IBM mainframes and operating systems. This complete solution is important to the first time mainframe user and the user building sophisticated distributed processing systems.

Along with superior performance Cincom's 4331 DB/DC system offers a price advantage designed to meet your unique needs. The data base rental starts as low as $385 per month and the on-line system starts at $340 per month.*

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2300 Montana Ave.
Cincinnati, Ohio 45211

*These prices apply only to the U.S. and Canada.

PDP-11 Gains Graphics Program

MANHATTAN BEACH, Calif. — An interactive graphics program that reportedly enables users with little programming experience to construct and annotate graphs from data stored in a computer file is being offered by Sycon Design, Inc.

DL100 is available for Digital Equipment Corp. PDP-11 computers using the RT-11 or TSX operating systems and is compatible with Tektronix, Inc. graphics terminals.

The DL100 accepts English-like, one-word commands with up to four arguments. It is fully self-documented, so that the user can ask for the valid commands available or the description and syntax of a particular command at any time, the firm said.

The DL100's Executive mode allows the user to define the part of the graphics area to use and also the range of values to be plotted from the user's data. Plotting functions such as moving to a point, drawing a line and displaying text horizontally or vertically may be performed and the position of the graphics cursor may be controlled interactively from the keyboard. The Symbol mode allows the user to define a figure and the Plot mode allows the user to define the graph particulars.

The DL100 costs $650 for a single-system license from Sycon Design, Suite F, 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

'Abend-Aid' Update Backs Assembler, Fortran, PL/I

SOUTHFIELD, Mich. — Tamark, Inc. has announced Release 3.0 of its Abend-Aid package, including new support for assembler, Fortran and PL/I, as well as increased support for Cobol and IMS.

Release 3.0 is said to require no special programmer action or additional overhead. The product reportedly will take control only after all special error handling has been completed.

Once in control, Abend-Aid acts like a programmer and analyzes computer storage to determine the cause of the problem. It then provides the programmer with an English explanation, along with pertinent data for correction.

A permanent license for Abend-Aid is available for the MVT, SVS and VS1 operating systems for $6,475 and the MVS operating systems for $9,475. The IMS option costs $1,500 from the firm at 29433 Southfield Road, Southfield, Mich. 48076.

Graphs Package Fits HP 3000

GAITHERSBURG, Md. — Arens Applied Electromagnetics, Inc. has adapted its Management Information Graphics and Engineering Charts and Graphs package to run on Hewlett-Packard Co. 3000 series minicomputers.

Originally announced for Honeywell, Inc., Digital Equipment Corp. and IBM mainframes, the package is said to produce multicolor, camera-ready visuals or overhead projection transparencies.

The HP 3000 version costs $15,000 for the full package, $6,000 for a query and draw module and $3,000 for a draw module only, the vendor said from 435-A E. Diamond Ave., Gaithersburg, Md. 20760

Disk Backup For Univac VS/9

DARTMOUTH, Nova Scotia — A utility program developed to give disk backup and recovery capability to Univac VS/9 systems has been released by Cosmopolitan Software Services Ltd.

Powerdump/Restore operates in disk-to-disk and disk-to-tape backup modes.

The program licenses for $3,500 for the first CPU and $2,500 for each subsequent one, the vendor said from Suite 806, Queen Square, 45 Alderney Drive, Dartmouth, Nova Scotia B2Y 2N6.

BIMSPOOL
Retrieves batch print from POWER/VS queue, converts and prints on 3270-type terminal printer via CICS or SHADOW. May be used to eliminate RJE printers. $4000 or $200/mo.

BIMSERV
Displays directories and entries in all DOS/VS(E) libraries, plus Label Area and VTOC's. (CICS) $1480 or $74/mo.

BIMDSLOG
Used by operators or programmers to review DOS/VS messages via CICS or SHADOW without tying up system console. $720 or $36/mo.

BIMMONTR
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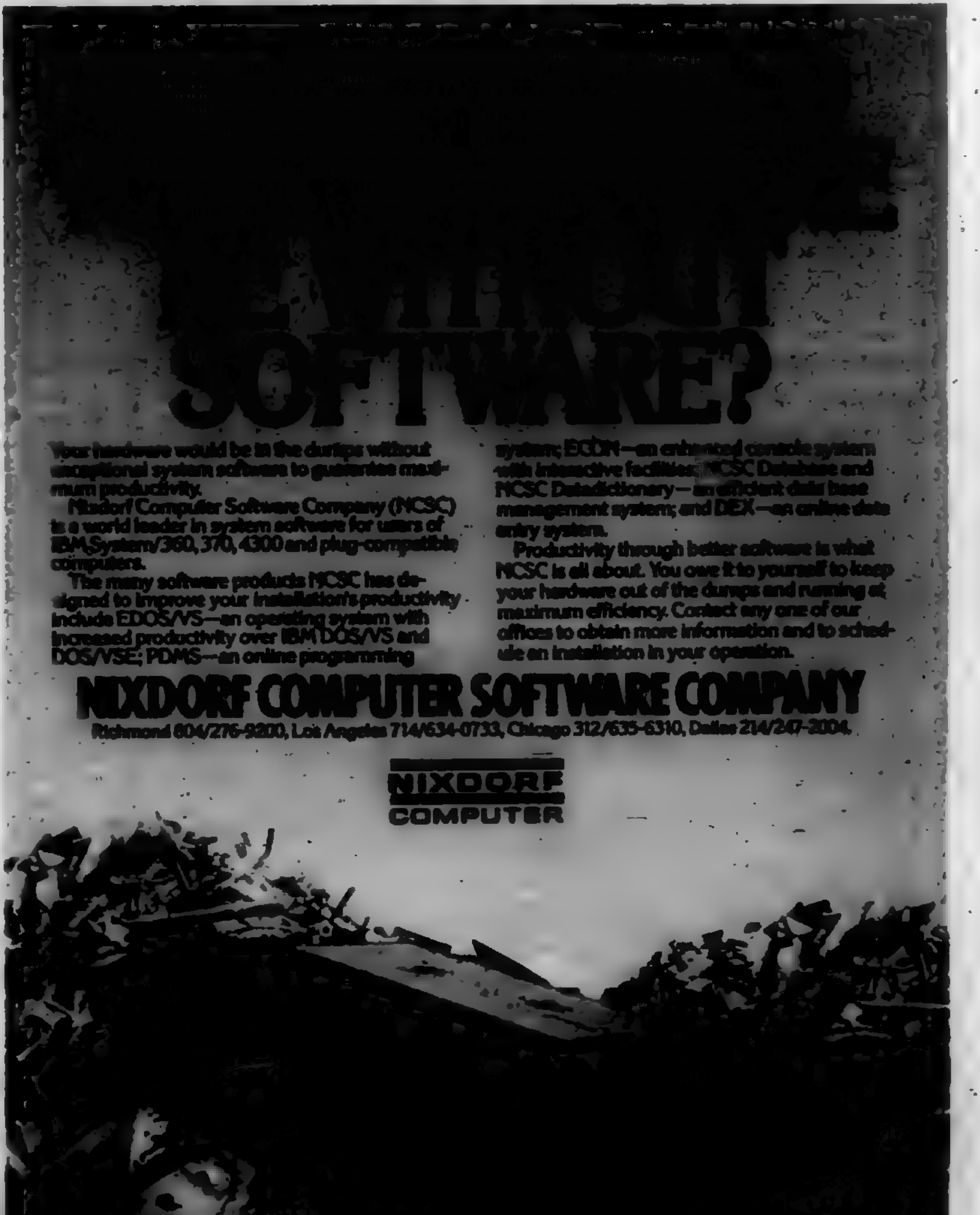

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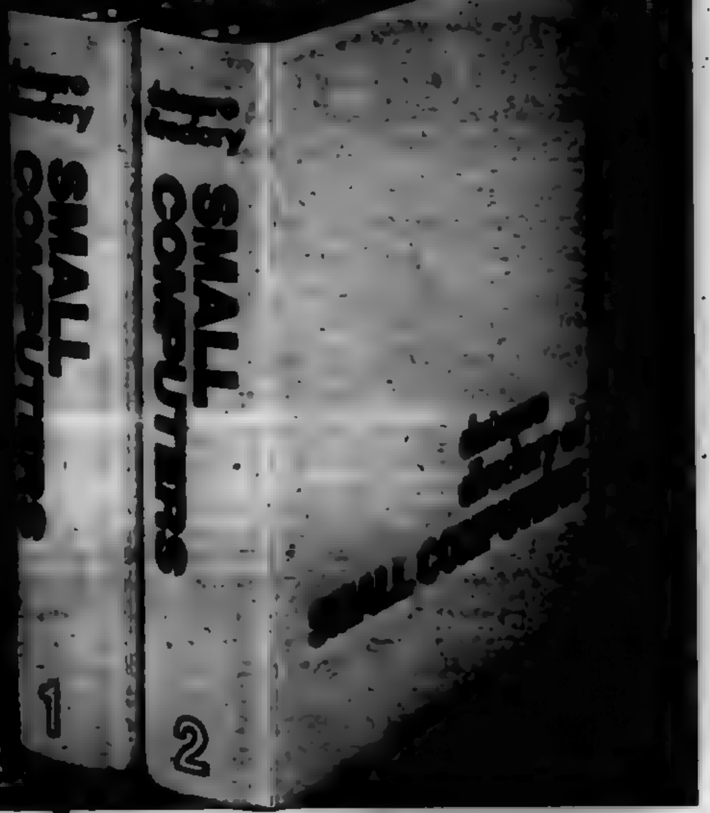

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To help you find everything relevant in the service to each of 24 applications areas—(e.g., Manufacturing: all companies, products, services, software, advice, and more.) Included are:

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"How-to" in nature and business-oriented in perspective these Datapro reports will show you:

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- How to identify potential computer systems suitable to your business and economic requirements.
- How to evaluate these systems.
- How to determine whether to "make or buy" your software packages.

Personal Computers
Definitions, history, market insights, applications and future trends are summarized to help you better evaluate specific product reports in the service.

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Hundreds of brief, easy to read reports on individual small computer systems. Each system report includes:

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  - Typical List Price
  - Primary Uses
  - Popular Options
  - Principal Applications
  - First Shipments
  - Number Installed
  - Availability
- Background Information
- System Characteristics
- Hardware/Packaging
  - Processor/Memory
  - Display
  - Keyboard
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- Support Services
  - Documentation
  - Support
  - Terms and Conditions

Company Profiles
Uniform, easy to compare descriptions of over 900* companies involved in the manufacture, marketing, and servicing of small computer systems, including peripherals, software, maintenance and others. Included are industry leaders as well as many new, fast-growing entries to this burgeoning industry. Each profile includes:

- Company name
- Address
- Telephone
- Principal business
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- Date founded
- Number of employees
- Sales volume
- Primary customers
- Sales concentration
- Product line description

Directories
Extensive listings of the thousands of companies involved with the small computer industry. Full names, addresses and phone numbers are listed alphabetically and by zip code. Cross-referenced to appropriate reports and profiles in the service to help you quickly locate additional information about their products and services. Included are:

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  - Zip Code Listing
- System Vendors and Stores
  - Alphabetical Listing
  - System Listing
- System Distributors
  - Alphabetical Listing
  - System Listing
  - Zip Code Listing
- Software Vendors
  - Alphabetical Listing
  - System/Processor Listing
  - Zip Code Listing
- Peripherals Vendors
  - Alphabetical Listing
  - Peripheral Type Listing
    - Add-on Memory
    - Cartridge/Cassette Magnetic Tape
    - CRT Display Monitors and Terminals
    - Data Communications Devices
    - Disk Drives
    - Diskette Drives
    - Printers
    - Other Peripherals
  - Zip Code Listing
- Computer Services Vendors
  - Alphabetical Listing
  - Zip Code Listing
- Maintenance Companies
  - Alphabetical Listing
  - Zip Code Listing
- Other Vendors
  - Alphabetical Listing
  - Vendor Type Listing
  - Zip Code Listing

* Figures change with monthly updates.

Fact-packed with Hundreds of System Reports and Company Profiles.

Here's a small representative sample of the System Reports and Company Profiles you'll find in the Directory of Small Computers:

System Reports

Apple II, III
Mattel Intellivision
Megatek Whizzard 5000, 7000
NCR 7500, 8100, 8200
North Star Horizon
Ohio Scientific Challenger, I, II, III Series
Point 4 Computer
Qantel 100, 200, 300, & 900 Systems
Radio Shack TRS-80 Model I, II, III
Smoke Signal Broadcasting Chieftain
Texas Instruments DS990, 99/4
Wang 2200 Series
Plus nearly 200 others.

Company Profiles

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Centurion Computer
Cincom System Inc.
Condor Computer Corp.
Cromemco Inc.
Digital Equipment Corp.
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With 'Fastcopy'

IBM's IEBCOPY Replaced

SAN FRANCISCO — A replacement software package for the IBM utility, IEBCOPY, has been announced by Idaps.

Fastcopy is said to provide all the services of IEBCOPY but uses "up to 95% less" of the system resources.

In addition to the reportedly improved performance, two additional utilities are included in the Fastcopy package: A PDS member cross-reference report program and a compress utility to compress all PDS data sets on specific volumes.

Fastcopy costs $2,500 for the first copy, with multiple copy discounts available. A 30-day free trial of the product is also available from the firm at 311 California St., Suite 700, San Francisco, Calif. 94104.

System/34 Finance Tool Out

FARMINGTON HILLS, Mich. — Software designed for financial planning and modeling on the IBM System/34 is now available from Accountech Systems, Inc.

The Small Business Financial Planning and Modeling System (Finplan) features a variety of projection reports including balance sheet, income statement, cash projection and ratio analyses. The system is menu-driven for all processing functions, a spokesman said.

'What If'

Finplan allows the business planner or accountant to express results in thousands, hundreds or whole dollars. Its 12 account relationship functions allow the user "what if" capability, the spokesman noted.

All reports may be printed on letter-sized paper.

The package is available for an introductory fee of $950, which includes a 30-day warranty, source and load programs and user documentation. Accountech Systems is at Suite 108, 28104 Orchard Lake Road, Farmington Hills, Mich. 48018.

Package Tracks System/34 Modules

LANSING, Mich. — Davidson Software Systems, Inc. is offering a source/procedure control package that reportedly keeps track of modules inside an IBM System/34 CPU.

The package records when modules such as menus, procedures or screens are changed. All the information is collected during normal programming maintenance.

The source/procedure control package supports RPG, Auto, WSU, SDA, SFGR, Cobol and Fortran and costs $500, from the vendor at P.O. Box 21002, Lansing, Mich. 48909.

Cobol Program Package Allows Transportable Code

WILMETTE, Ill. — David R. Black & Associates, Inc. is offering a Cobol program development package that allows users to develop transportable Cobol code.

The package develops code in Ansi '74 Cobol. Modules include a data dictionary, a screen generator, a program generator and a report generator. The package also offers master system menu control and source-code control and data base management system support, the vendor said.

The package costs $27,500, the vendor said from 218 Charles Place, Wilmette, Ill. 60091.

Software Buyers' Seminar Slated

DETROIT — A free seminar for prospective buyers of manufacturing application software packages will be held here Oct. 29, by Software International.

Subsequent sessions in the free series are scheduled on Oct. 30 in Cleveland, Nov. 12 in San Francisco, Nov. 14 in Dallas and Nov. 25 in Chicago.

Software packages will be discussed in relation to inventory reduction, improved customer service and various other business modifications.

Further details can be obtained from Software International, Elm Sq., Andover, Mass. 01810.

McAuto Users Offered GE Printer

ST. LOUIS — Remote processing customers of McDonnell Douglas Automation Co. (McAuto) now can lease a 300 line/min printer directly from McAuto and receive a consolidated monthly bill that includes both DP costs and hardware charges.

The printer, which is a General Electric Co. Terminet 9610/340, contains a microprocessor that emulates the IBM 3780 terminal and provides automatic sign-on into McAuto's data communications network, a McAuto spokesman explained.

The printer can be obtained from McAuto under a one-year lease for $300/mo or a three-year lease for $270/mo, plus installation and maintenance charges.

McAuto is located in St. Louis, Miss. 63166.

TCI Programs Cover Phone Applications

SOUTHFIELD, Mich. — Telephone Cost Management, Inc. (TCM) has announced programs for telephone cost allocation, reporting and control.

The TCM-I programs start at $150/mo for service bureaus, while a single-location license starts at $7,500, installed, from the firm at 25800 Northwestern Highway, Southfield, Mich. 48037.

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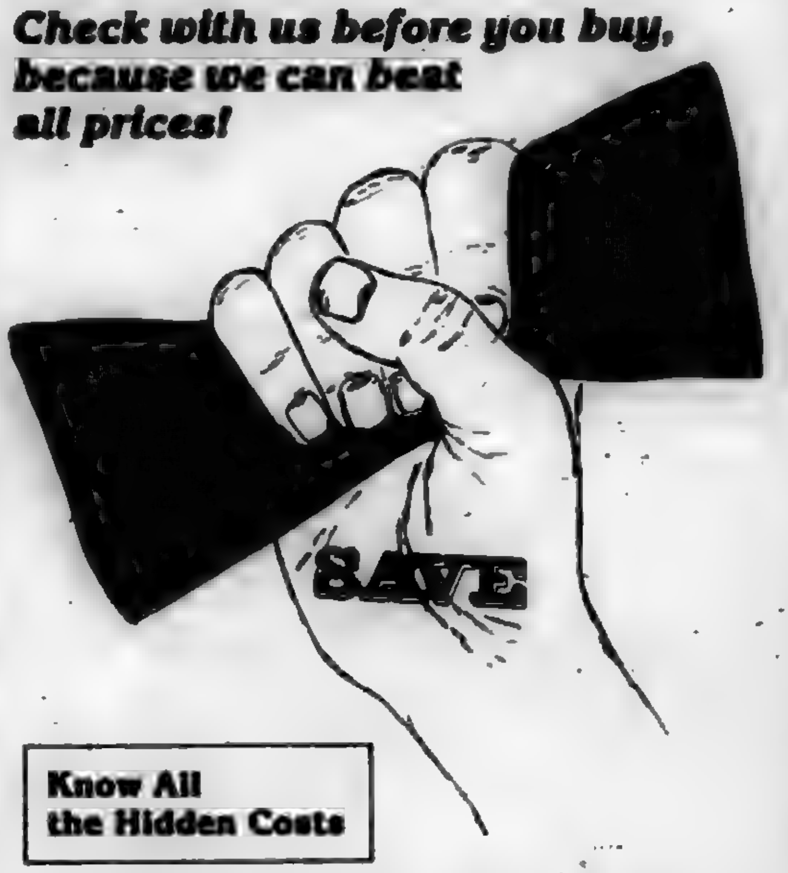

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Tool Compares Programs Without Line Numbers

WASHINGTON, D.C. — The Text Compairator, a program that compares two versions of a source program or entire libraries and reports on the differences without need of line numbers, is available to IBM VS1 and MVS users from Yingling Associates, Inc.

With the product, a user can keep an automated audit trail of all changes made to source programs, Yingling claimed.

The Text Compairator runs on any IBM 370 under VS1 or MVS and costs $3,000 for a one-time license fee after a free 90-day trial, the vendor said from 2208 Wisconsin Ave., N.W., Washington, D.C. 20007.

Designed for NCR I-8000s

Account Package Lets Users Grow

MINNEAPOLIS — An interactive accounting system for NCR Corp. I-8140 computers is available from Open Systems, Inc.

Known as the NCR Financial Accounting System, the software application allows total data base compatibility through NCR's I-8000 line as an end user grows, the vendor claimed.

Seven applications are included: accounts receivable with billing and sales analysis, accounts payable, general ledger, inventory, payroll, sales order processing and job cost. Using a building block approach, each application can stand alone or be used in any combination to provide an interactive system, a spokesman said.

The one-time license fee for the product is $1,000, the vendor said from Suite 409, 420 Oak Grove, Minneapolis, Minn. 55403.

Series/1 Gets Wanding

LUDLOW, Mass. — Computer Technologies, Inc. has announced software said to allow OCR-A wanding on the IBM Series/1 minicomputer.

Usable in inventory control environments, the package includes the following reports: activity by wand, inventory location and/or status, received and removed inventory.

The OCR-A print may be printed on the 4974 matrix printer or the 4973 line printer. Hardware required includes either a 4952 or 4955 CPU with 96K bytes of main memory, 9.3M bytes of disk on diskette memory, a printer and a CRT terminal.

The package costs $1,500. The firm can be reached at P.O. Box 259, Ludlow, Mass. 01056.

IBC System 40 Gets Finance Tool

CARSON, Calif. — IBC/-Integrated Business Computers, Inc. and Sage Consulting, Inc. have introduced their Business Management Systems applications software for the IBC System 40.

Packages include general ledger, accounts payable, accounts receivable, payroll, order entry/inventory, apartment management, construction management, mortgage management, escrow management and manufacturing management.

The System 40 supports up to five users, 128K bytes of main memory and up to 22M bytes of disk storage.

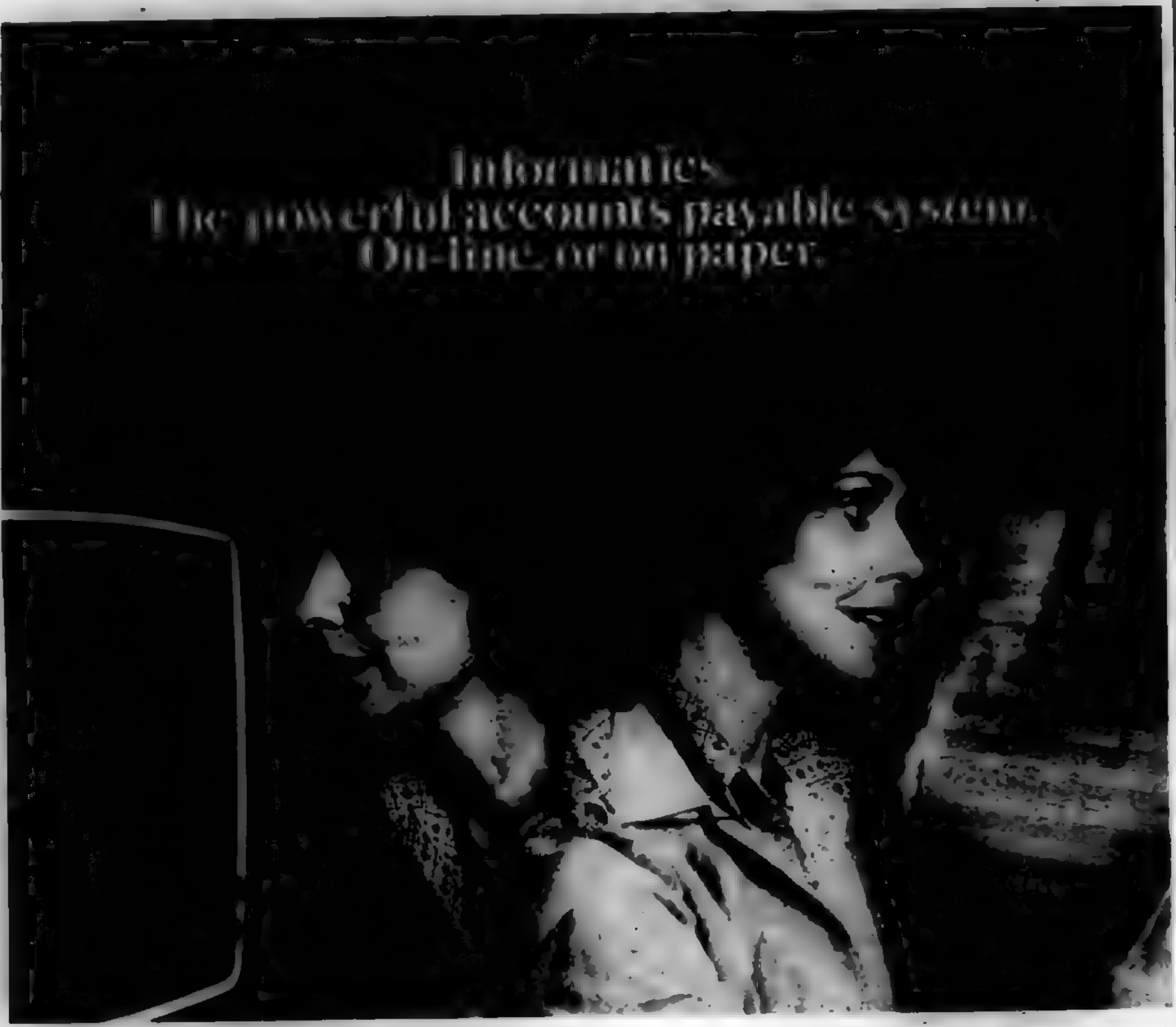
Four Modules

The four-module package including general ledger, accounts payable, accounts receivable and payroll costs between $4,000 and $5,000.

Order entry/inventory, apartment management and construction management cost $1,500 each; manufacturing management costs $2,000; mortgage management costs $3,000 and escrow management sells for $5,000 from the firm at Suite 306, 22010 S. Wilmington Ave., Carson, Calif. 90745.

Correction

Time-Sharing Resources, Inc.'s Fixed Price Time-Sharing Service [CW, Sept. 29] runs on V32 systems from Two Pi Corp.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IDMS Meets the 6 Key Factors for Success in Database Systems

Find out why at a Free IDMS Seminar

Leading database consultants have stated that it is an absolute must that any organization considering on-line systems use a database management system. However, on-line systems demand a particular type of database management system, one that is capable of providing unusually high performance plus elegant backup and recovery facilities. However, users are also very interested in tools for fast application development and easy access to data by end users in an on-line environment. IDMS provides these facilities.

As a result, IDMS has proven an indispensable tool in supporting on-line systems with an extensive number of the most sensitive and important applications for business, industry, and government. From this unique experience has emerged new versions of IDMS and related facilities to support on-line systems meeting the diverse needs of application developers, end users, and processing departments. IDMS, supported by Cullinane Corporation, has been particularly successful because it meets the six key factors for success in database software. They are:

1. **Vendor Record:** Cullinane Corporation has an unparalleled record for vendor support. (Number One every year in Datapro ratings.) And with an unequaled record in system enhancement and new product development.

Cullinane Corporation is also the most financially successful database software company with the best growth record and highest earning rate of all software companies. As a result, in 1978, Cullinane Corporation was the first computer software company in ten years to have a public offering, thus providing substantial financial resources for product enhancement, new product development, and company operations.

2. **Control Via an Integrated Dictionary:** The Integrated Data Dictionary serves as the control facility for all information about the database and data communications environment. In addition, it integrates all components of IDMS facilitating easy application development, end user access to data, and efficient processing in an on-line environment.

3. **Facilities for Fast Application Development:** IDMS is the most powerful DBMS in the world. It allows applications designers to truly mirror a company's operations within the limits of the company's computer processing capabilities. However, users also want to develop applications faster with less skilled people. Simply stated, IDMS has easy-to-use tools for input processing, data management, and output processing. Traditional programming is greatly reduced via the Application Development System, On-Line Query, CULPRIT Report Generator, and the INTERACT on-line program development and word processing facility.

4. **Easy Access to Data by End Users:** In addition to the user facilities described above IDMS has On-Line English, the only true English language query facility for top management and other users. Management needs to tap the application's data flow easily; but more importantly, it needs the information immediately. On-Line English makes this a reality. Also, the user will not need to know anything about the organization of the database.

5. **Computer Processing Efficiency:** While users of on-line systems like ease of use, they demand high performance and sophisticated backup and recovery facilities. IDMS was designed to meet these requirements through its architecture which fully integrates the database and data communications facilities. IDMS DB/DC is fully multi-threaded providing for efficient processing in both the update and retrieval modes. Also, an application developed under IDMS DB/DC using the Universal Communications Facility will run under any other TP monitor without modification. In addition, IDMS includes a Shared Database System which supports multiple CPU's sharing databases, eliminating problems associated with shared DASD.

With the introduction of the IBM 4300, users want a system capable of supporting distributed database networks. IDMS is the only database system architecturally designed to support not only distributed access to a database but distributed databases, and combinations thereof.

A facility important to the IMS/DL1 user is ESCAPE which allows use of IDMS with IMS/DL1 applications without modifying the application programs.

6. **Protection:** DBMS users want two types of protection—protection that their investment in database applications will be protected from any changes in IBM hardware or software. IDMS is written in such a way as to make it virtually impossible for IBM to make any practical move that would make IDMS-based applications obsolete. In addition, Cullinane Corporation contracts state that it has the obligation to keep each user current with any new IBM developments.

DBMS users also want protection that their IDMS applications can be audited by themselves or their respective audit firms. Cullinane Corporation is the world's leader in EDP audit technology and offers user-oriented audit software including a library of audit routines especially tailored to the IDMS on-line environment. Thus, IDMS provides the user with complete protection, the only DBMS to do so.

Attend a free seminar in your area on the DBMS for On-Line Systems.

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16 White Plains, NY
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28 Cleveland, OH
28 Columbus, OH
28 Grand Rapids, MI
28 Newport Beach, CA
28 Syracuse, NY
29 Montreal, QUE

NOVEMBER
4 Saskatoon, SASK
5 Albany, NY
5 Southfield, MI
6 Green Bay, WI
6 Salt Lake City, UT
6 Springfield, MA
6 Westbury, NY
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12 Ft. Wayne, IN
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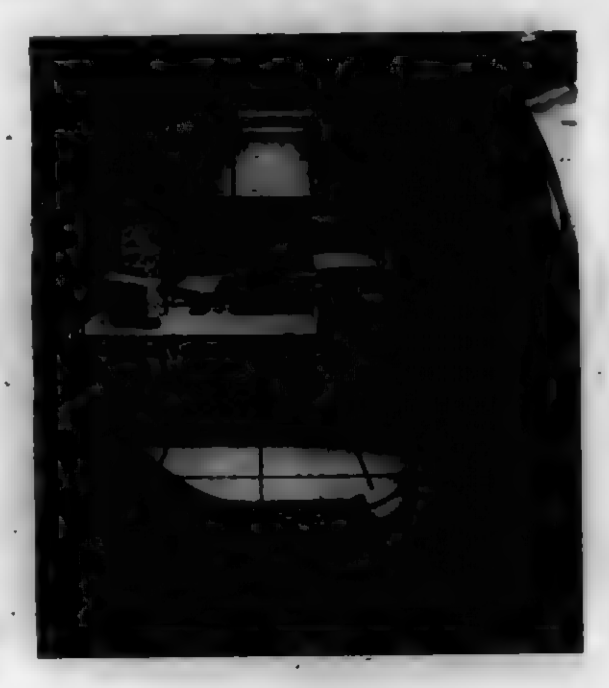

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Tool Prints CRT Image

GREENSBORO, N.C. — The Innovators, Inc. has announced Inno-Print, a package that reportedly gives Datapoint Corp. 1500, 1800 and 3800 minicomputer users the ability to print an exact copy of the image that appears on a CRT terminal screen.

The package costs $500 for a single-site license and $2,500 for an unlimited site license. The Innovators is at P.O. Box 13635, Greensboro, N.C. 27405.

Video Service For Home Use

BAY CITY, Mich. — An in-home video-based interactive information service that is expected to offer video shopping, video funds transfer, video publications and video mail has been developed by the Software Publishing Division of Olamic Systems Corp.

The heart of Datavision is the Demand 90 software language, said to give viewers the capability to converse with information transmitters. The language reportedly gives users "a virtually unlimited choice of data to receive or send to another Datavision user," according to the developer.

The first data bases expected to be available to users are realty listings, Yellow Pages listings and a Telephone Directory Information Channel. Both phone lines and communications satellite services, such as Telenet or Tymnet, are currently being used to deliver the service.

For end-user commercial channels, the subscription price is $25/mo and 5 cent/min, a spokesman said from 503 N. Euclid, Bay City, Mich. 48706.

System-80 Runs On Tandem CPUs

PITTSBURGH, Pa. — Phoenix Systems, Inc. has announced that System-80, its on-line Cobol program generation system, is now available for use on Tandem Computers, Inc. computers.

System-80 works off key words in a data dictionary to produce Ansi 74 Cobol code to perform necessary program functions.

Using the product, a typical program in any application can be written in no more than 30 minutes, the vendor claimed.

The system is available to Tandem users for $19,500. The vendor can be reached at P.O. Box 7849, Pittsburgh, Pa. 15215.

Instruction Modules Cover Structured Program Design

TOPEKA, Kan. — Langston, Kitch and Associates, Inc. is offering a Structured Program Design Video series of instructional modules on the Warnier-Orr approach to structured system design.

The series covers the concepts and skills of structured design and includes a methodology for designing computer programs, with theories and tools to help the programmer solve most data processing problems, the vendor said.

The video-text format of the series lends itself to either individual or group instruction, the firm noted.

The program costs $9,800 and a three-module trial package is available for $50, which is deductible from the purchase price, the vendor said from 715 E. Eighth St., Topeka, Kan. 66607.

Package Offers Transport Analysis

LOS ANGELES — Informatics, Inc.'s Data Services Operation (DSO) has introduced a user-oriented, multimodal transportation analysis and reporting package called Transyt IV.

The package was designed specifically for transportation-related industries using DSO's coupled VM/VS systems.

The package is capable of analyzing, reporting and customizing information in specific data bases.

Full graphics capabilities are also provided as aids in network maintenance and development of plots, the vendor said.

Transyt IV is billed on an as-used basis, the vendor said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

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You will have all the timesharing you can use, at one fixed monthly rate — considerably under your present timesharing costs. You will receive the highest level of technical service and support.

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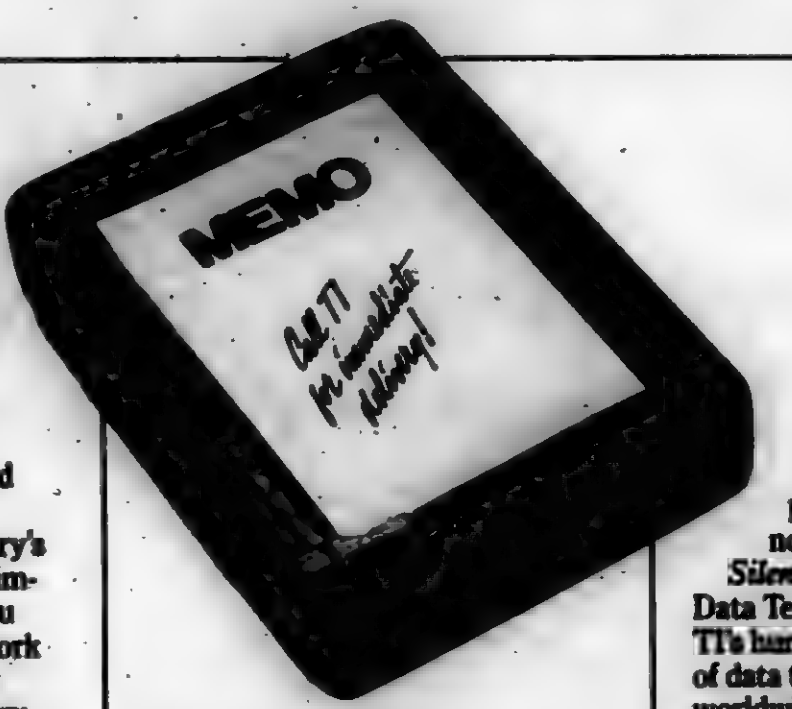

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TI is dedicated to producing quality, innovative products like the *Silent 700* and OMNI 800 Data Terminal Families. And, TI's hundreds of thousands of data terminals shipped worldwide are backed by the technology and reliability that come from 50 years of experience.

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Operators who use video display terminals all day know what a pain in the neck it can be.

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Meet the Ergonomic Terminal™ video display from Lear Siegler. The terminal that makes working conditions easier on the worker.

Ergonomics is the successful physical interaction between man and machine. It's the reason the Ergonomic Terminal was designed. For the most comfortable work environment possible and the convenience of the operator.

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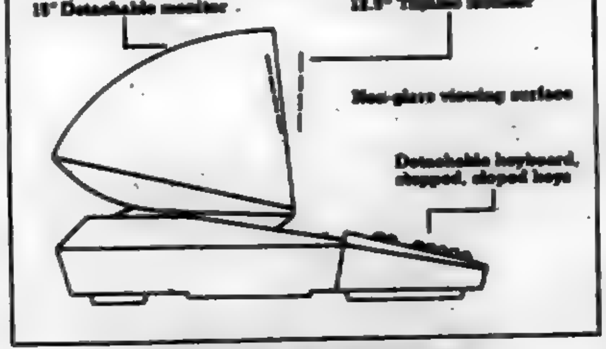
With the Ergonomic Terminal ADM-42, you get a large, non-glare 15" screen to cut down on sore eyes, tearing, and blurring. You get a high-resolution monitor (7 x 11 dot matrix characters) for the sharpest picture available. You even have separate contrast and brightness controls. A tiltable monitor lets you reposition the Ergonomic Terminal, so you don't have to reposition yourself. You can separate the keyboard and video display and locate them in any position you like. And the control base portion of the terminal can be remotely positioned out of the way.

Farewell, eyestrain. So long, backaches. Good-bye, headaches.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The ADM-42 isn't just another pretty face. It's the smartest terminal in its class with full editing capabilities, a full array of visual attributes, flexibility of format, security, interface, and transmission. Not to mention four-page display as standard equipment. With an optional extended memory capable of adding data space up to a maximum of 8 pages.

The Ergonomic Terminal has a bright, easy-to-read 1920 character display (24 x 80), 128 ASCII character set, and 16 function keys (optionally programmable) that store 32 or 64 characters each.

It also comes with a 25th line established and reserved for status indicators and messages of up to 78 characters.

As if all this isn't enough, the ADM-42 comes with options. Galore.

So if you think the terminal you're using now is a real eyesore, consider the Ergonomic ADM-42.

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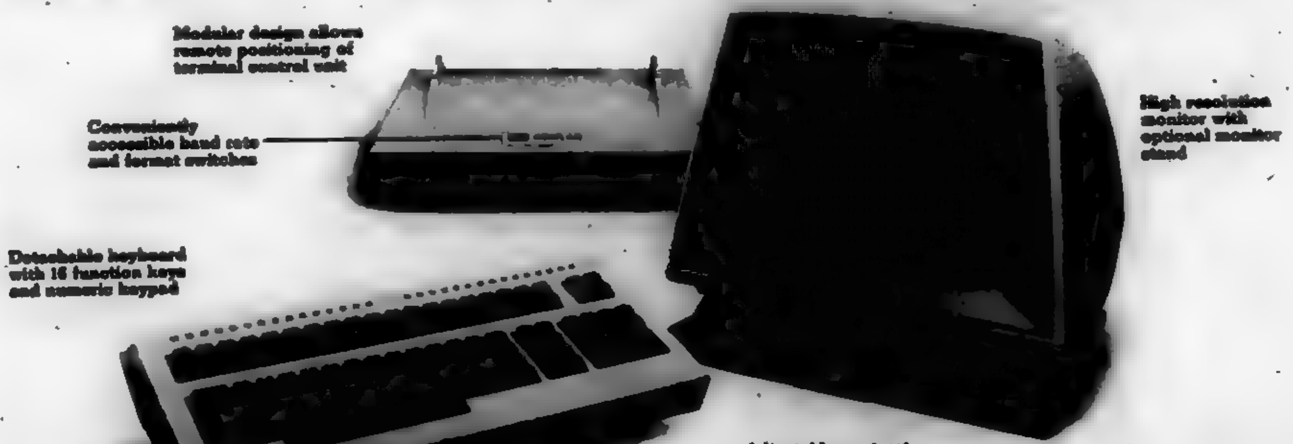
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Conveniently accessible baud rate and format switches
High resolution monitor with optional monitor stand
Detachable keyboard with 16 function keys and numeric keypad
Adjustable contrast and brightness controls

The Ergonomic Terminal™ from LSI.

Capacity Changes Dynamically

Satellite Network Connects Univac Sites

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Increased flexibility is a key benefit of the broadband satellite network that Univac has been using for the past two years to interconnect its headquarters in Blue Bell, Pa., near Philadelphia, with plants in Roseville, Minn., and Salt Lake City, Utah.

"We can transfer transmission capacity dynamically from one site to another to accommodate changes in demand," System Manager Nate Pearlman explained. "With terrestrial facilities, such as Bell's Dataphone Digital Service [DDS], this is difficult and far more expensive.

"Also, the broad bandwidth of our satellite network allows applications to be added which might be hard to justify otherwise — teleconferencing, for example."

Higher throughput is another important benefit. Univac's satellite network, leased from American Satellite Co., provides an average bit error rate of $1:10^{-9}$. That is at least one order of magnitude better than telephone company-provided terrestrial facilities, Pearlman said, adding that uptime is also significantly better.

For the past four months, Univac's system, which runs around the clock, has had no unscheduled downtime. There were some problems earlier, but they related to modems, not transmission links, Pearlman explained.

Univac's satellite network consists basically of 5 meter earth stations — at Blue Bell, Roseville and Salt Lake City — linked to multiple 56K bit/sec, full-duplex transmission channels. There are two such channels between each pair of earth stations.

Users interface with the earth stations through Univac's DCP communications processor; among other functions, it acts as a packetizer/depacketizer. The earth station is within a few hundred feet of the DCP.

Besides data, the network supports high-speed facsimile transmission at 19.2K bit/sec, freeze-frame video teleconferencing at 4 frame/min over a 56K bit/sec channel and digital voice communication typically at 32K bit/sec, but as low as 19.2K bit/sec. The data transmissions operate at 9,600- to 56K bit/sec, and utilize a variety of Univac products — such as Uniscope Model 200 and 400 CRT terminals, UTS 700 batch terminals, V77 minicomputers, Series 9000 and System 80 processors.

Teleconferencing Use

The network is used about two hours a day for teleconferencing. "Although it has reduced our travel expenditures somewhat," H.J. Corning, director of communications and distributed systems, explained, "the major advantage of teleconferencing is that it increases productivity of our senior technical and administrative people. It's far superior to the telephone or the mails in any situation where people who are physically separated have to discuss text or graphic materials. They can look at the material simultaneously and work out changes in minimum time."

A typical application of teleconferencing at Univac involves the development of new communications software. This process re-

(Continued on Page 74)

Datapoint Makes Additions To ARC Applications Systems

SAN ANTONIO, Texas — Datapoint Corp. recently announced two additions to its Attached Resource Computer (ARC) applications systems.

The 3812 and 3822 workstation processors are said to provide ARC users with a more cost-effective means of performing data processing, word processing, program generation and electronic message services. The workstations incorportate most of the features offered in the firm's 3800 series processors, but have an internal Resource Interface Module (RIM) for interconnection to an ARC system.

The internal RIM eliminates the need for both the I/O bus and telecommunications adapter, a spokeswoman explained.

Datapoint will still offer the external RIM for users of its 3810 and 3820 processors and continue to use this type of ARC attachment where necessary, she added.

CRT Display

Like its predecessors, the 3812 and 3822 workstations feature an 80-char. by 24-line CRT display, with char.-by-char. inverse video and page mode and blinking cursor. Using the present or previous systems, users can create, edit, modify, format and manipulate documents and perform electronic mail functions over the ARC's electronic message system.

Purchase prices for the 3812, with 60K bytes of memory, and the 3822, with 120K bytes, begin at $5,950. One-, two- and three-year leasing terms are available, the spokeswoman said from the company at 9725 Datapoint Drive, San Antonio, Texas 78284.

Sycor Users Get IBM Link

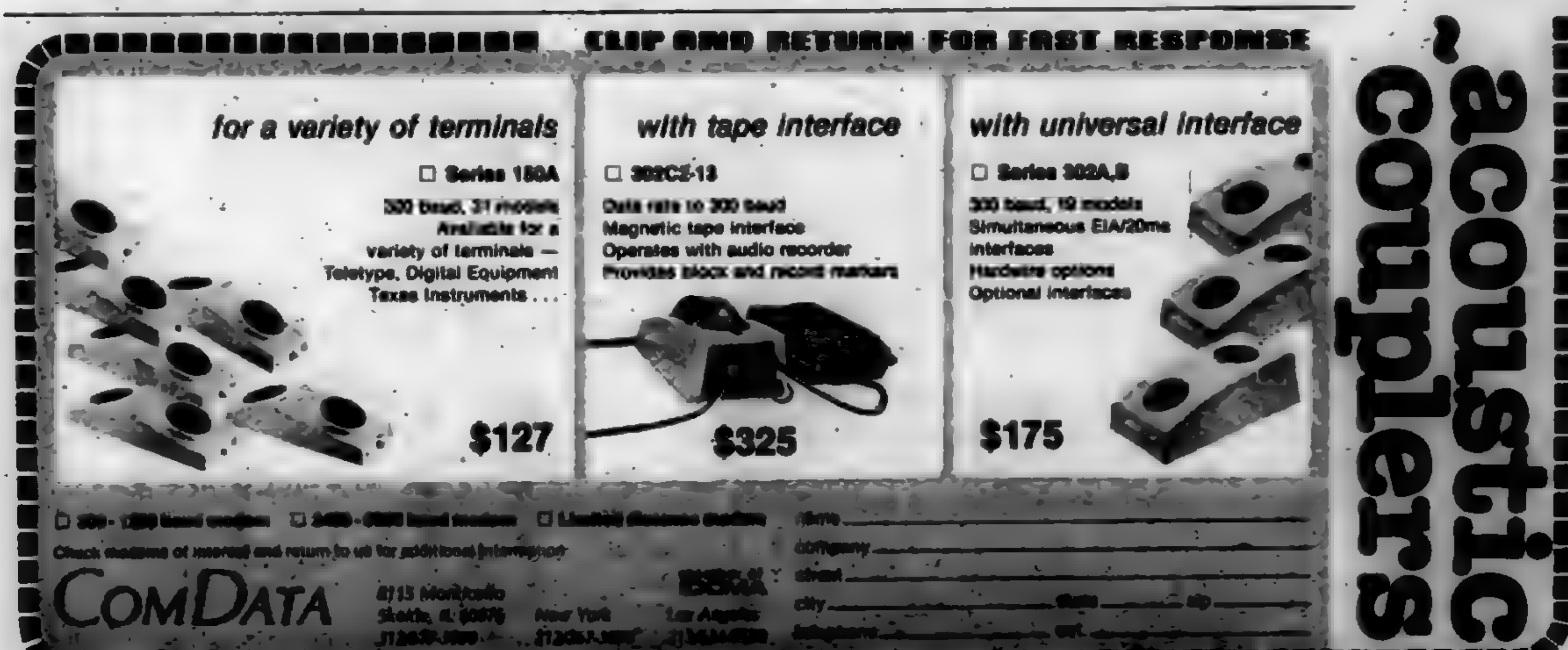
NEW YORK — A multitasking communications program that permits transmissions between IBM 360, 370, 30 series and 4300 line of mainframes and remote Sycor, Inc. terminals has been introduced by Computer Dynamics, Inc.

The facility enables the Sycor Communications Program to transmit data over four communication lines simultaneously, the firm said.

The program runs under all versions of IBM operating systems including DOS, DOS/VS, DOS/VSE, OS, OS/VS1 and OS/VS2. It operates over switched or nonswitched lines and at rates varying from 1,200 bit/sec to 4,800 bit/sec and requires the use of a communications controller at the host computer.

Data is transmitted in an unattended mode, which enables communication to occur at off hours and eliminates the need for operator control, the firm said. On the Sycor side, the program communicates with the BSCAUT or $CC program.

The Sycor Batch Communications Program costs $12,000 for the multitasking version and $8,000 for the single-line version. Computer Dynamics is at 10 E. 39th St., New York, N.Y. 10016.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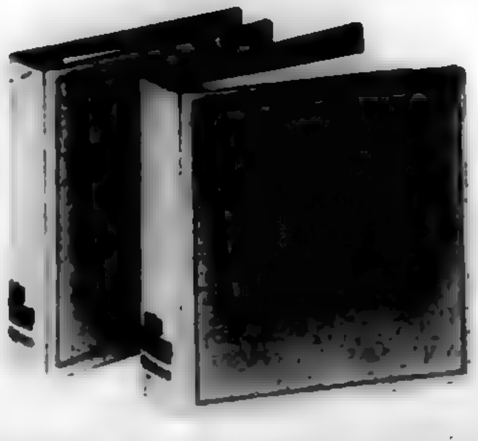

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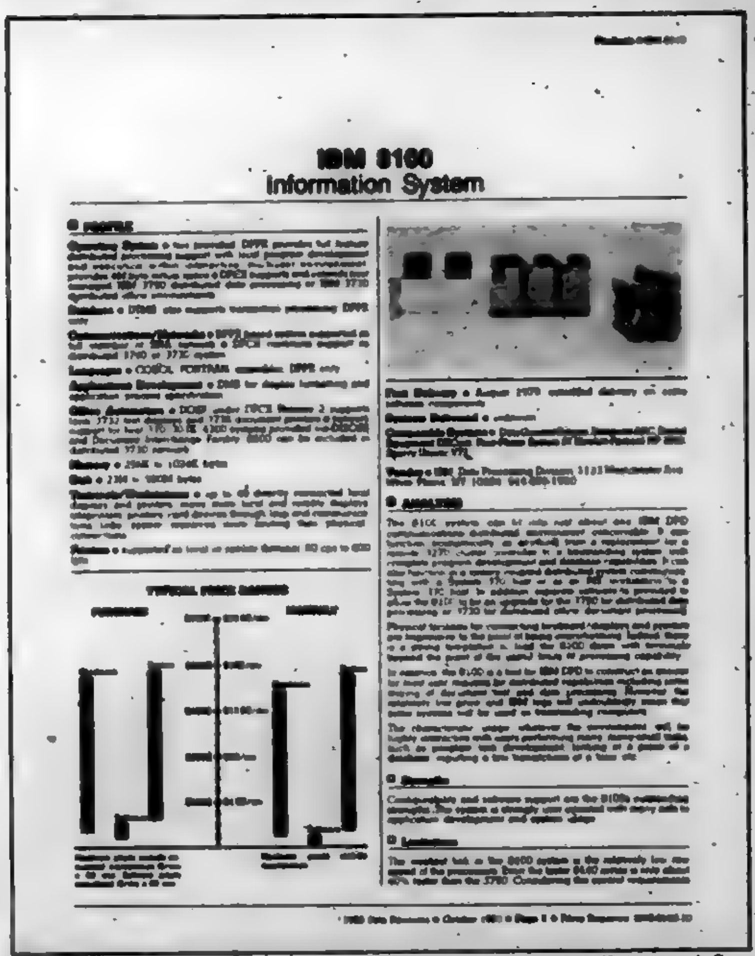

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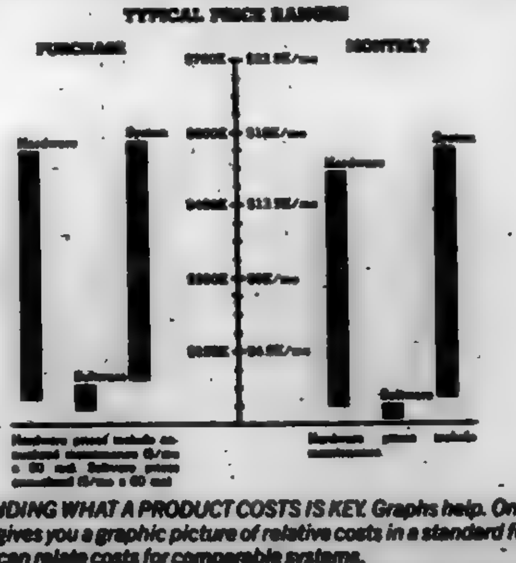

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Limited-Distance Modem, Test Set, CRT Switch Debut

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has introduced three communications products — a limited-distance modem, a data communications test set and a CRT selector switch.

The Model 6000 limited-distance modem, designed for synchronous operation over Telco or private 2- or 4-wire nonloaded metallic (twisted-pair) conductors, is available in two versions.

The 6000L operates at selectable speeds of 2,400-, 4,800- and 9,600 bit/sec, while the 6000H operates at 4,800-, 9,600- and 19.2K bit/sec. The modem can be used in point-to-point and multidrop network configurations for local data distribution up to 11 miles using 26-gauge wire. The Model 6000 modem costs $635.

Portable Test Set

The Hawk 4010 Datatrap — a portable, diagnostic data communications test set — is said to monitor and interactively communicate with data appearing at the EIA RS-232 interface. Data traffic is displayed on a 5-in., 512-char. CRT display.

The microprocessor-based 4010 operates with synchronous data rates up to 19.2K bit/sec in both half- and full-duplex modes. Asynchronous operation is provided by 16 internally-generated clock speeds ranging from 50- to 19.2K bit/sec. The Model 4010 costs $7,500.

The Model 8544-D A, B, C and D CRT selector switch reportedly allows the user to switch any two-wire input to any one of four two-wire outputs. The Model 8544-D costs $190.

Besides the products, the firm is offering a free catalog of recent additions to the 6000 series of products. The firm is located at 7 Wellington Road, Lincoln, R.I. 02865.

Expander Gives Modem Sharing

SAN MATEO, Calif. — Kapusi Laboratories has released the ME4, a modem expander that reportedly cuts data communications hardware costs by allowing several polled remote terminals to share a modem.

The ME4 uses point-to-point modem operation that can be retained in a multipoint network.

The ME4 is code-transparent to synchronous or asynchronous data up to 19.2K bit/sec. It meets EIA RS-232C and CCITT V.24 and V28 specifications.

Available as a stand-alone unit or mountable in a 19-in. rack, the unit costs $876, the vendor said from 2121 S. El Camino Real, San Mateo, Calif. 94403.

Transfer Unit Remote-Switched

NORWALK, Con. — Datacomm Management Sciences, Inc. is now offering a dial transfer unit which provides remote control switching of a modem when used in conjunction with two dial telephone lines and two automatic Data Access Arrangement (DAA) units (CBT type).

The DTU-10 Dial Transfer Unit features "wrong number" protection, diagnostic indicators, self-test and a reset capability.

The DTU-10A allows for unattended transfer of a "standby" modem to replace an on-line modem on the same private line.

The price for the DTU-10 is $425, and the DTU-10A costs $525, the vendor said from 181 Main St., Norwalk, Conn. 06851.

Terminal Allows Character Recall

MINNEAPOLIS — A microprocessor-controlled interactive terminal that allows the user to recall or "replay" up to 7,680 characters or the equivalent of four full pages of previously displayed data is being offered by the Teleray Division of Research, Inc.

The Model 14 — Teleray's newest addition to its Series 10 CRT terminals — offers trailing-space and trailing-line suppression features, forward and backward scrolling through 200 or more previous lines of data, limited block-mode capability and function memory of 1,920 characters reserved for up to 32 programmable functions.

The Model 14 also features transmit and print terminator codes that may be selected, stored and transmitted to the mainframe or printer at desired points. Transmission stop-codes may also be selected. Also included are programmable I/O and peripheral data rates, programmable tabs and cursor symbol selection, wide character display and space-over-data modes. The Model 14 costs $1,890 from Teleray, Box 24064, Minneapolis, Minn. 55424.

Network Links Univac Sites

(Continued from Page 69)

quires frequent interaction between the designers, located in Salt Lake City, and technical staff at the manufacturing site, which may be either in Roseville or Blue Bell. According to Corning, the teleconferencing system frequently allows new software design and implementation questions to be resolved in a few hours or days, which otherwise would require weeks or months to settle.

There are drawbacks to using broadband satellite transmission that don't seriously impact Univac, but may cause problems for others. One is the propagation delay inherent in satellite transmission. Special protocols, software and hardware have been developed to overcome the delay, but they add to the user's system costs.

Another difficulty is that satellite broadband networks, like similar terrestrial networks, do not offer interfaces to all types and makes of terminals. The user therefore may have trouble exploiting the economies of broadband through consolidation of multiple existing facilities into a single integrated network.

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Short-Haul Optical Modem Includes RS-232C Assemblies

GENEVA, Ill. – An RS-232C-compatible short-haul optical modem has been developed by Belden Corp.'s Fiber Optics Group as part of a stand-alone optoelectronic data transmission system.

The Model 222001 Bit-Driver is said to provide asynchronous simplex and duplex data transmission at speeds up to 56K bit/sec. Depending on the type of standard Belden fiber optic cable selected, transmission ranges to 3,280 ft reportedly can be achieved.

The Bit-Driver system, which includes RS-232C molded cable assemblies, was designed for in-house and in-plant data communications between computers and peripheral units and for experimental use, according to the firm. The short-haul modems, used in pairs, are said to replace conventional telephone company equipment, eliminating equipment leasing and line charges.

The rear panel of Model 222001 incorporates an RS-232C interface using a 25-pin Type D connector. Also located on the rear panel are two AMP fiber optic transmission line receptacles.

The Model 222001 costs $280 from the firm at 2000 S. Batavia Ave., Geneva, Ill. 60134.

Modem Runs On Coax Cable

RIDGEFIELD, Conn. – Computrol Corp. has unveiled a modem that reportedly transmits and receives high-frequency synchronous clock and data on coaxial cable at rates to 1.5M bit/sec.

The Model 30-0080 makes possible the implementation of a single high-speed data path for processor-to-processor communication, remote multiplexing of distributed I/O functions, networking of terminals and computers and moving large packets of data in local area networks, the vendor claimed.

No adjustments are necessary for the modem to operate at any bit/sec rate up to 1.5M bit/sec and it can transmit over distances up to 27,000 ft without amplifiers or repeaters, a spokesman said. The price for the unit is $360, Computrol said from 15 Ethan Allen Highway, Ridgefield, Conn. 06877.

Kit Details Fiber Optics

PHOENIX – A fiber-optic evaluation kit to make systems designers familiar with the technology is available from Motorola Semiconductor Products, Inc.

Link II reportedly provides TTL transmitter and receiver modules which permit installation of a simplex link in excess of 1,000 meters. The kit includes the MFOL02T transmitter module, MFOL02R receiver module and 10 meters of fiber cable, preterminated with AMP connectors.

The components are supplemented by literature describing specifications, theory of operation and concepts.

Link II features the combination of Motorola ferrule fiber-optic semiconductors and AMP-compatible connectors, a company spokesman said.

The Link II kit costs $124.99 from Motorola at P.O. Box 20912, Phoenix, Ariz. 85036.

Halcyon Cuts Price Tags

SAN JOSE, Calif. – Halcyon Communications, Inc. has announced price reductions on its 800 series of data analysis equipment.

The 802A data link monitor, with optional real-time recording capability, now costs $4,995, down 34% from its former price tag.

The 803A Micro-Fox data link analyzer has been reduced 33% and is now available for $7,995.

SDLC and HDLC

In addition, both products now include SDLC and HDLC protocols, which were previously only offered as optional features, a spokesman stated.

Finally, Halcyon cut the price of its 804A microprocessor-based on-line data recorder by 17%. The device now costs $6,295.

The current price reductions were reportedly spurred by the firm's increased commonality in the 800 series circuit board design. Additional information on the products can be obtained from the company at 1 Halcyon Plaza, 2121 Zanker Road, San Jose, Calif. 95131.

Micro750 Takes Wideband Paths

SAN DIEGO – Micom Systems, Inc. has announced the Micro750, a time-division multiplexer (TDM) designed to operate on wideband data circuits operating at up to 250K bit/sec.

The Micro750 can divide bandwidth in several ways to let the user derive synchronous channels at lower speeds like: 2,400-, 4,800- or 9,600 bit/sec, the vendor said.

The unit can be used on 56K bit/sec DDS links or private microwave or laser communications links. It also incorporates several intelligent features such as single-ended configurations selection from a central site, the vendor said.

The Micro750 supports dial-up synchronous terminals as well as directly connected terminals. It also supports leased lines point-to-point and multipoint tail circuits, according to the vendor.

The unit is priced from $3,800, the vendor said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

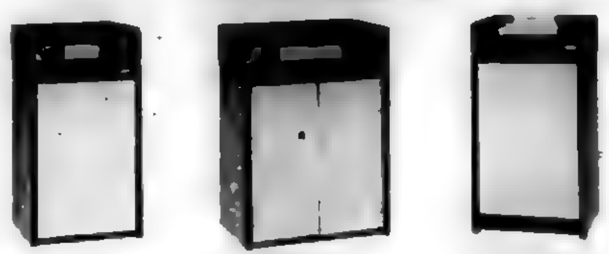
Optical Bus Extender Transmits 16 I/O Lines

CANOGA PARK, Calif. – Canoga Data Systems is offering a fiber-optic bus extender that transmits 16 parallel I/O lines over a single duplex optical fiber cable in a full-duplex mode.

The CBE-100 has a maximum I/O data rate of 200K 16-bit words. It offers an optional addressing feature and provides electrical interfaces for a full handshaking protocol.

Options include a single-ended tri-state or differential I/O separate lines for Transmit Data and Receive Data or a single bidirectional I/O bus.

The CBE-100 ranges in price between $2,500 and $3,000 the vendor said from 6740 Eton Ave., Canoga Park, Calif. 91303.



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Cluster Controller Links DEC Terminals, IBM CPUs

ROCKFORD, Ill. — Phone 1, Inc. is offering the PI-5-3271, a cluster controller that will connect a Digital Equipment Corp. VT-52 or VT-78 terminal directly to an IBM mainframe.

The controller will simultaneously control eight local or remote terminals via cable or auto-answer modems. Communications from the PI-5-3271 to the IBM mainframe is bisynchronous, the vendor said.

Phone 1 claims the DEC terminals look exactly like IBM 3277 terminals to the mainframe.

The PI-5-3271 costs $9,200 from the vendor at 1011 River Lane, Loves Park, Ill. 61111.

Decwriter Tied to Bisync 3270

GRANDVIEW, Mo. — The BC-34 controller introduced by Computerwise, Inc. provides a means of connecting a Digital Equipment Corp. LA34 Decwriter acting as a receive-only device emulating a 3280 printer to an IBM 3270-compatible Bisync data link.

The BC-34 is a Bisync protocol controller designed to be internally installed in a DEC LA34-AA Decwriter IV terminal.

The BC-34 communicates with a host mainframe in accordance with standard IBM 3270 Remote BCS protocol, converts received data from Ebcdic to Ascii and transfers the data to the LA34 in serial asynchronous form utilizing the X-On/X-Off response from the LA34 to prevent data overrun, the firm said.

The controller with a LA34 Decwriter and Bisync data link costs $2,125 from Computerwise at 6006 E. 137th Terrace, Grandview, Mo. 64030.

Teletype 32, 33 Replaced

NEW YORK — Link Communications, Inc. has announced two models of tape punch/reader to be used with Teletype Corp.'s Model 43 Teleprinter as replacements for Teletype's Models 32 and 33.

The LPRM 800 is meant to replace Teletype's automatic send/receive (ASR) 33, and the LPRM 500 replaces the ASR 32 punch/reader.

Both units feature keyboard-programmable answerback, operation in either half- or full-duplex mode and built-in test capability. Interconnection with the Model 43 is said to require no special modifications.

The 8-level LPRM 800 is operable from a standard Ascii keyboard and is used with a modem for unattended (automatic answer) operation. It can be controlled either manually or by automatic reader and punch drive codes.

Each unit costs $2,350 from Link Communications, 161 Ave. of the Americas, New York, N.Y. 10013.

RS-232 Printers, System/34 Linked

PITTSBURG, Pa. — Expandor, Inc. is offering a printer interface that allows any RS-232 printer to be attached to IBM's System/34 minicomputer.

The Model PQ protocol converter is available for twinaxial cable installation. The Model PQ emulates an IBM 5256 printer and has internal device address select switches.

The converter automatically converts Ebcdic data to Ascii for the standard graphics character, a spokesman said.

The unit costs $2,995 from Expandor at 400 Ste. Claire Plaza, Pittsburgh, Pa. 15241.

NBS Book Covers DES Upkeep Tests

WASHINGTON, D.C. — Four maintenance tests for the federal Data Encryption Standard (DES) are described in a new National Bureau of Standards (NBS) publication entitled "Maintenance Testing for the Data Encryption Standard."

The 29-page publication describes the tests as independent of implementation.

The booklet (No. 003-003-02225-0) is priced at $2 and can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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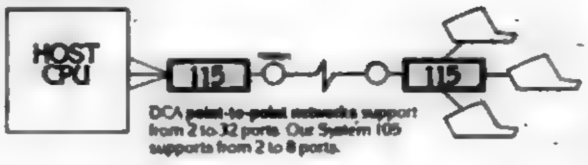

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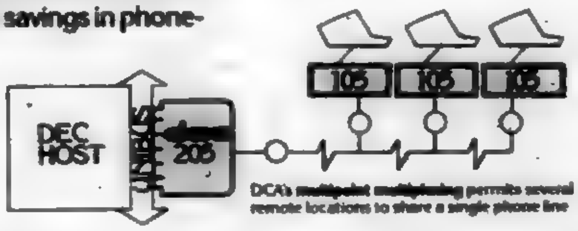

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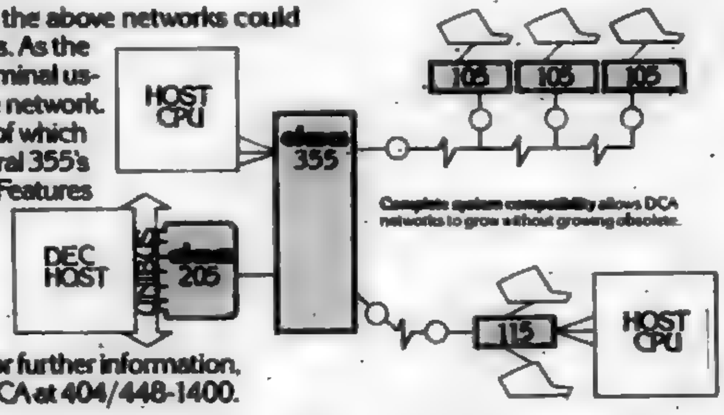

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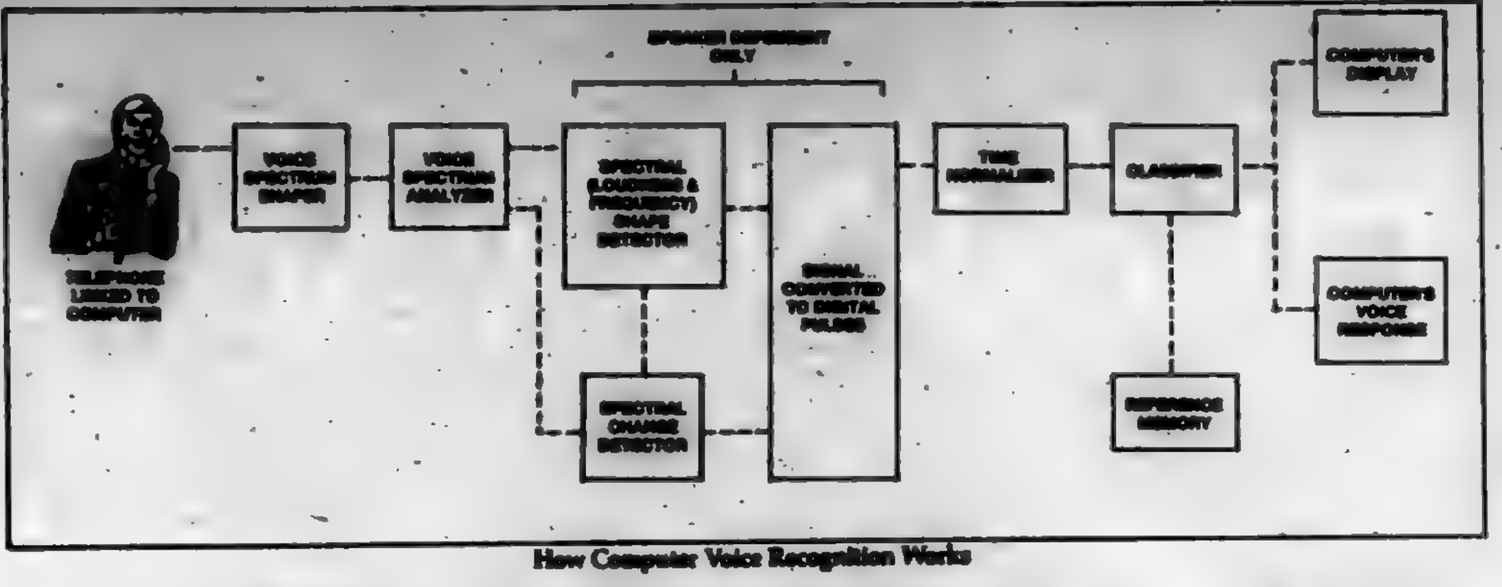

How Computer Voice Recognition Works

Natural Speech Recognition? Not til '90

By Rita Shoor
CW Staff

BOSTON — Computer voice systems have come a long way in the last four decades, but don't look for voice recognition of natural speech until about 1990. That prediction was made by James Waite of Verbex, Inc. during a recent speech before members of the Massachusetts chapter of the Data Entry Management Association (Dema) here.

In the 1940s, automated voice recognition was essentially a scientific curiosity, according to Waite. There was increasing research activity through the next decade with computer technology utilized in the research programs conducted during the '60s, he said. Among these were the experiments conducted on communication signals between humans and dolphins and the development of the Arpa network.

It was not until the first half of the '70s that speaker-dependent voice data entry systems were developed, Waite continued.

A speaker-dependent system is one that requires the speaker to train the system to his particular voice pattern, he explained. This might mean that the speaker would repeat one word — a number, for example — from three to 10 times while being careful to allow a significant pause between each repetition.

The next phase was the development of a speaker-independent system, according to Waite. This type of system allows the speaker to be recognized immediately with no preliminary system training required.

Verbex, which was known as Dialog Systems, Inc. until August and is now a member of the Exxon Information Group, has several working speaker-independent systems spread among its customer base. However, there are problems to overcome before total automation of verbal input that will result in a written document becomes a reality, Waite said.

Development Problems

One problem is the differences among various accents and dialects, Waite explained. A standard data base containing voice patterns would have to be broken into the following four segments — northern male, northern female, southern male and southern female — if it were to be used on a national basis in the U.S.

The higher frequency range of many female voices also causes confusion on the recognition graph, he said.

Another problem is caused by line noises, line switching bumps, echo suppressor effects and frequency distortion when the voice input is coming across on telephone lines, according to Waite.

All of these factors can cause difficulty in recognizing words such as "nine" and "five," particularly if the first sound in the word — the "f" or the "n" — is distorted or suppressed.

While it's evident how "nine" and "five" wind up sounding alike, Waite indicated that "six" and "eight" are also often incorrectly identified. "We haven't determined the reason for this yet," he acknowledged. He also pointed out that numbers are preferable to words when designing the vocabulary for a speaker-independent system.

Isolating and identifying the problems inherent in computer voice system technology is the first essential step to solving them, Waite maintained, and that step has already been taken. IBM and Texas Instruments, Inc. [CW, June 2, June 9] are among the companies currently involved with what he described as "strong research activity" on voice data entry products.

In fact, quantum leaps in the development of these products are a possibility within the next decade, he claimed. However, he admitted that current technology limits the vocabulary of almost all speaker-independent systems to between 20 and 40 words — and that's a long way from the natural speech input envisioned for the office of the future.

Add-In Unit Quadruples Density Of IBM Memory at Half Price

SANTA CLARA, Calif. — The use of 64K-bit memory chips enables an IBM-compatible add-in unit to offer four times greater density than its IBM counterparts for a price roughly 50% to 60% lower, according to a spokesman for the product's developer, Locom Corp.

The LCM Series 300 add-in memory fits entirely inside the "card cages" of large-scale IBM processors and boasts exactly the same cycle times and access width as the IBM mainframe memories it was designed to replace, the spokesman said.

Each of Locom's Series 300 memory boards plugs directly into the backplanes of IBM's largest mainframes, including the 370/158, 370/168 and 30 series models. Because they can be totally integrated in their associated CPUs, the add-in units occupy no floor space. This is in sharp contrast to the typical add-on, which operates externally to its processor and constitutes a separate subsystem.

Minimum Configuration

A minimum Series 300 configuration starts at 2M bytes and can reportedly expand to a maximum of either 8M- or 16M bytes, depending on the processor model involved. For the 370/168, 3032 and 3033, the add-in memory's maximum capacity totals 16M bytes; for the 370/158 and 3031, it totals 8M bytes.

Although it hardly qualifies as the only IBM-compatible add-in memory available today on the market, the Series 300 is believed to be possibly the first such product to take advantage of the same technology incorporated in 4300 series mainframes.

At the the heart of the Locom product lies a 64K-bit random-access memory (RAM) chip, which offers four times the density of the 16K-bit modules that still form the foundation of IBM's 370- and 30 series-class main memories.

Locom's 64K-bit dynamic RAM, which is supplied by Fujitsu Ltd., boasts a 150-nsec operation that makes the Series 300 as suitable for IBM's relatively fast 3033s as it is for "slower" machines like the 370/158 or 370/168. Thus, the same Series 300 memory board can operate in all of IBM's large-scale processors, the spokesman said.

The price of the Series 300 depends on its configuration. For a typical 3032-type processor, for example, a 3M-byte add-in module costs $56,000.

Deliveries of the LCM Series 300 add-in memories typically take 30 days from Locom at 1500 Norman Ave., Santa Clara, Calif. 95050.

Two OCR Products Join Typereaders

MANCHESTER, N.H. — Hendrix Electronics has added two optical character reader (OCR) products to its Typereader family of page readers, while simultaneously cutting by almost 30% the price of a previous model.

One of the two new offerings, the Model TR3, features recognition of typestyles including Courier 12, Courier 72, Letter Gothic, Prestige Elite, Prestige Pica, OCR-A, OCR-B and Hendrix Gothic. The TR3 reportedly can be configured with up to four styles of type and it automatically determines the style and pitch without operator intervention.

The second new model is the TR2S, which reads OCR-B and Hendrix Gothic types in both 10 and 12 pitch. The TR2S is similar to the price-reduced TR2, except that the latter includes an automatic sheet feeder.

The TR3 costs $18,900, and the TR2S costs "less than $10,000," according to the firm. The TR2 has been reduced in base price from $15,900 to $11,495. Hendrix is located at 670 N. Commercial St., Manchester, N.H. 03101.

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Winchester, Storage Module Drives Tested

ORANGE, Calif. — Testing and exercising of most Winchester- and storage module-type disk drives is provided by the SX-530 Disk Exerciser, according to its vendor, Wilson Laboratories, Inc.

Pluggable adapter modules permit testing of storage module disk drives of Control Data Corp. models 9448, 9760, 9762, 9764 and 9766; Kennedy Co. 5300; and Trident Co. Series T-25 through T-300.

The SC-530 automatically reads and writes data in five formatted modes using a selection of three data patterns, including data composed by a bank of 16 switches, a 16-bit random data pattern and a cyclic pattern continuously varying throughout the data field, according to the firm.

Self-contained with its own power supply, the SX-530 costs $1,995 including one adapter module.

Wilson Laboratories is headquartered at 2237 N. Batavia St., Orange, Calif. 92665.

Disaster Recovery Tailored

TREVOSE, Pa. — Neshaminy Valley Information Processing, Inc. (NVIP) is offering a disaster recovery service called Safe.

Designed for IBM users, the service is tailored to a company's DP needs. The service will provide both short-term and long-term disaster recovery via time-sharing and shared access facilities. Monthly fees are credited against NVIP's time-sharing capabilities.

With Safe, users can have critical files back on-line in a matter of minutes, the vendor claimed.

Safe costs between $50 and $4,500/mo depending on CPU size and the percentage of backup needed. Peripherals coverage is extra, NVIP said from 4850 Street Road, Trevose, Pa. 19049.

Generator Cuts Power Problems

LOS ANGELES — Sweinhart Electric Co., Inc. is offering Power Conditioning System II, a motor generator that is said to eliminate power-related computer problems.

The product is a second generation of the firm's Isolation Motor Generation Set. It provides protection against all utility and building power problems including sags, surges, spikes, transients and brownouts, the vendor said.

The power generator is available for all computer systems and costs between $9,795 and $39,995, the vendor said from 2900 E. Olympic Blvd., Los Angeles, Calif, 90023.

UPS Controls 60-Hz Output

SAN GABRIEL, Calif. — Clary Corp. is offering a 15-KVA uninterruptible power system (UPS) for computer power interfaces, telecommunications, security, medical laboratory and process control applications.

The UPS features low harmonic sine wave distortion (2.5%) and controls output frequency at 60 Hz (±.5Hz) and maintains voltage to ±2%. The unit includes a static bypass switch with a 4-msec transfer time and is available in a 60-Hz three-phase output or single-phase output modes, the vendor said.

The UPS costs $21,050 not including battery packs from the vendor at 320 West Clary Ave., San Gabriel, Calif. 91776.

Correction

The 4,096-subchannel capability recently announced by Amdahl Corp. [CW, Sept. 29] is available for the 470V/7 as well as the V/7A, V/7B and V/8. In addition, the 470/Extended Performance Accelerator will be available in the fourth quarter of 1980, not 1981, a company spokesman said.

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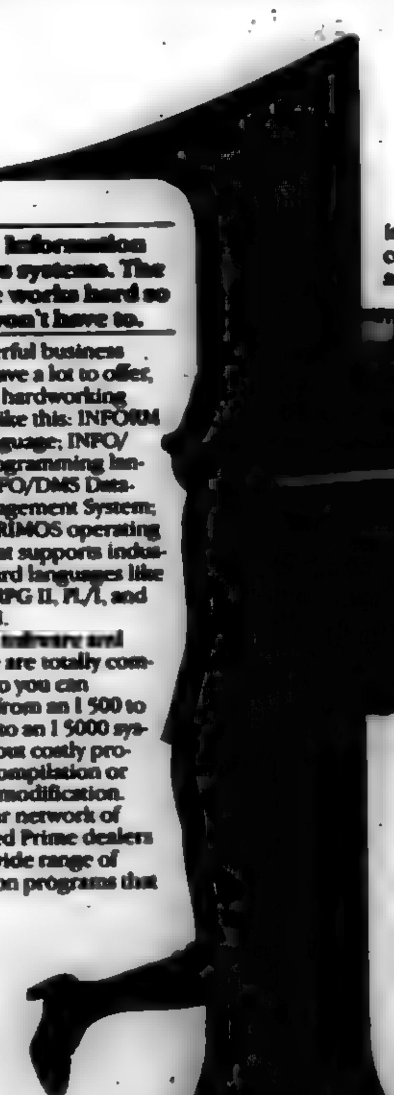

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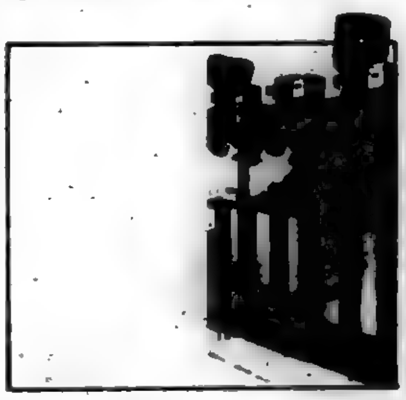
Management And Distributed Computing

By Robert W. Shirey



Part 2: Advantages and Disadvantages

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications.

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

> *"The price elasticity of computation is so great, and the costs of computation are decreasing so dramatically, that the effect is overwhelming to the point where the elasticity effect is no longer noticed in the excitement of chasing opportunities."*
>
> — Einer Stefferud, 1978

Most *distributed computing system* (DCS) definitions that we saw in Part 1 talk about *how* a system is built rather than *why* it is built, as if the why were obvious. Most of them talk about features rather than advantages or benefits. An exception is Thierauf's list of seven essential DCS characteristics. He lists four features: three service levels, two processing modes, smart terminals and data base distribution. But he also lists three advantages and benefits: timely reports, ease of use and local autonomy.

Advantages and benefits are the forces behind the creation of distributed systems. Everyone who defines a DCS probably has in mind certain desired advantages and benefits to be achieved by their system. Confusion between features, advantages and benefits causes much of the confusion over DCS definitions.

Features make possible advantages, and advantages can yield benefits. A feature is a part, trait or property — an observable fact. For example, a handle is a feature of a suitcase.

An advantage is a favorable circumstance or means for coping with competition or difficulty. The advantage created by a suitcase handle is that the suitcase can be grasped easily in one hand. A benefit is any valuable, useful or helpful gain, anything that is good for a person or thing. The benefits of a suitcase handle are reduced lifting effort, fewer baggage charges and happier trips for the suitcase owner. Part 1 of this series was about DCS features, but this part lists advantages and benefits.

D'Oliveira analyzed more than 40 case studies to find the forces behind decisions to distribute computer systems [D'0177]. She found three kinds of force:

- **Functional Force.** An advantage that enhances the ability of a DCS to accomplish computing tasks.
- **Economic Force.** An advantage that reduces the cost of accomplishing computing tasks.
- **Psychological Force.** "One whose source is an emotion, a philosophy, a preference, or a perception" of a DCS user, operator or developer.

These three inexact categories overlap. For example, the functional advantage of increased throughput indirectly yields the economic benefit of reduced operating cost. Still, the framework is helpful, and this section uses it to sort out the many publicly claimed advantages and benefits of a DCS.

Functional Advantages

Pyke points out that "distributed computing implies modularity [Pyke 76]." By "modularity" Pyke apparently means that a DCS is planned or constructed in a pattern of standardized parts, using units (modules) that are easily joined to or arranged with other parts or units.

Modularity lies at the root of most of the claimed functional advantages of DCSs. But the modular flexibility of a DCS is a two-edged sword [Sche78]. Almost every advantage listed below can be shown to have a counterpart disadvantage.

Five categories of functional advantages can result from the modularity feature of a DCS. Several authors discuss these advantages [D'0177, Farb74, Jose74, Lieb77, Pard77,

(Continued on In Depth/2)

IN DEPTH

(Continued from In Depth/1)

Pyke76, Rama76, Schw78, Stat78, Thie78].

- **Greater continuity of service.**
- **Smoother growth.**
- **Better performance.**
- **Easier restructuring.**
- **Simpler development.**

Partitioning, redundancy and simplicity can improve reliability, availability and survivability. System service continuity has three interrelated aspects:

- **Reliability.** Refers to component error rate and failure/repair record.
- **Availability.** Refers to being ready when needed.
- **Survivability.** Refers to robustness when damaged.

DCS modularity has three advantages that can benefit operational continuity:

- **Partitioning.** The natural compartmentalization can reduce the scope of errors, failures and damage.
- **Redundancy.** First, when a module is out of action, remaining modules might be able to do its work. Second, inexpensive, incremental backup is possible. Third, a module can be repaired even while the system runs.
- **Simplicity.** Modules can be individually less complex than a centralized system and have fewer failure modes.

Growth can occur in smaller increments with less disruption. A problem with large-scale, centralized systems is the stepfunction nature of capacity growth, with only large steps possible, accompanied by massive disruption during upgrade and conversion. A DCS avoids the problem in several ways:

- **Smaller Steps.** The finer granularity of growth increments smooths the step-function to match capacity to requirements.
- **Wider Range.** Modularity avoids single-system size and complexity limits, permitting expansion over a wider range of capacities.
- **Limited Conversion.** Older modules and their users are affected very little as new modules are added. Modules can be replaced or modernized individually so that each conversion effort is of easily managed size.

Parallelism and reduced overhead can improve throughput and response. System productivity depends on both equipment performance and user effectiveness. Equipment performance has three aspects:

- **Availability.** The percentage of time the system is available.
- **Throughput Rate.** The volume of work that can be performed during a fixed time interval.
- **Response Time.** The interval between the time an item of work is submitted and the time the system delivers the result.

DCS modularity has five advantages for throughput and response:

- **Local Processing.** Transaction processing at local nodes with local data bases can avoid communication delays and queuing, thus improving responsiveness.
- **Parallelism.** Modular, local processing can improve throughput by exploiting parallel processors. Also, speed can be increased by replacing software with specialized hardware units.
- **Lower Overhead.** The complex operating systems of large mainframes need a large percentage of available computing capacity to manage shared resources, protect multiple users and

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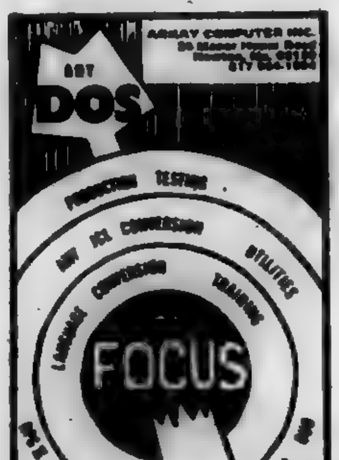

recover from failures.

- **Balanced Loads.** A DCS naturally limits the number of applications per machine, avoiding bottlenecks and avoiding squeezing out low priority jobs.
- **Structured Design.** The mandate to partition in a DCS leads to the use of techniques such as top-down design. Better design techniques can result in better system performance.

Modularity can improve reconfigurability. The functional effect of decentralization can be summed up as flexibility [D'0177]. Another advantage of that modular flexibility is the ability to reconfigure a DCS, either statically or dynamically. A system may be reconfigured to allow growth, to meet new and changing requirements, to balance the work load, to exploit new technology or to bypass failed components.

Systems can be more easily designed and developed. The simpler and smaller machines used in a DCS might require less complex software. This in turn can reduce the costs of design, programming, installation, testing, debugging, tuning, education and other work related to the software. In addition, it might be possible to implement a small pilot or experimental version of a DCS before expanding to a full system. In some cases, just a few DCS modules can realistically exhibit the same behavior as the full system. With large centralized systems, one must resort to simulation.

Economic Advantages

All of the functional benefits listed above can result indirectly in various economic benefits. For example, better throughput implies less cost per unit of work, and simpler development can mean less expensive development and earlier installation. However, distributed computing also produces more direct economic benefits:

- **Reduced communications costs.**
- **Reduced personnel costs.**
- **Reduced duplication of resources.**
- **Reduced initial investment cost.**
- **Increased cost competition.**
- **Economics of specialization.**

Local processing can reduce communications costs. This is one of the most frequently mentioned advantages of a DCS. Computing costs are decreasing faster than communications costs [Stef78]. On-site processing, perhaps using a local data base, can eliminate or greatly reduce communications that would otherwise be exchanged with a centralized processor [Sche78, Stat78, Thie78]. However, this greatly depends on whether data base items referred to in a transaction are found at the module to which the user originating the transaction is connected [Bucc79].

The simple claim here is that the inherent modularity of a DCS reduces communications costs. Feldman reasons in reverse. He says, "A distributed computation is spread among several computers which are assumed to be connected by some communication paths. For the foreseeable future, these communication paths will be less reliable and have lower bandwidth than is available in the processors themselves. This leads us to expect that [distributing computing] programs will be made up of largely self-contained *modules* which will share very little information directly [Feld79]."

Local processing can reduce personnel costs. A DCS can reduce personnel costs by increasing, perhaps dramatically, the productivity of the users, particularly operators of data entry terminals [Do1177]. The productivity gain comes both from the improved system response mentioned above and also from the fact that error correction is much more efficient and effective when it is done at the same place and time as data entry [Thie78].

Sharing can reduce duplication of resources. The need to share resources is a primary reason for computer networking [Lick78]. A DCS can enable local sites to share cooperatively each other's resources and avoid resource replication [Rama76].

Modularity can reduce start-up costs. At first this looks like an indirect benefit that arises because system growth can occur in smaller increments. However it directly affects economic decisions in four ways [D'0177]:

- **Lower Entry Barrier.** Available resources may be sufficient to implement the first modules of a distributed system, but insufficient to install a large centralized system.

(Continued on In Depth/4)

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(Continued from In Depth/3)

• **Higher Return on Investment.** Even when sufficient funds are available to build a centralized system, it may not be built because the high initial costs make it compare unfavorably to other possible investments.

• **Lower Decision Level.** In many organizations, spending decisions are decentralized for smaller amounts. So the smaller initial capital requirements of a DCS mean that acquisition is easier at lower management levels.

• **More Alternatives.** The smaller initial investment requirements of a DCS make it a viable alternative to upgrading or expanding a centralized system. Instead, a DCS can be developed in parallel with the central system, and the DCS can absorb both new work and overflows of old work from the centralized system. In other words, "you do not junk your old computer, you merely add some simple inexpensive computers to work with it and lessen its load [Parg78]."

Modularity can increase procurement competition. A DCS can use equipment from many different vendors more easily than a centralized system. This increases the designer's choices and promotes competition between vendors [Pyke76]. It has been shown, for example, that pricing is much more competitive for small business computer systems than for larger, general-purpose systems [Cale79].

Modularity can improve cost-performance ratios. Although a DCS may lose some economies of scale, it gains economies of specialization, what Harold Lorin of IBM calls "economics of dedication." A DCS module can address the immediate needs of a specific user group rather than complex needs of a diverse group [Stat78]. The cost-performance ratio is optimized when the computer architecture matches the application complexity [Sche78]. In a DCS, the match can be made for each module.

Psychological Advantages

Users often seem to accept a DCS better than a centralized system. In addition to the functional and economic factors, four psychological factors are at work:

- **Previous computing experience.**
- **Satisfaction of needs.**
- **Sense of control.**
- **Congruence with organizational patterns.**

Some users have had bad experiences with centralized systems. This is often true in organizations that pioneer and make lots of early mistakes. The users believe that a central system is necessarily unresponsive, inflexible, slow-reacting and expensive. Instead of fixing the central system, they reject it for a DCS.

Modularity encourages tailored services. The modules of a DCS can be application-oriented rather than system-oriented. Information output can be tailored for and delivered directly to the end user [Rama76, Thie78]. Special features can be added to meet immediate local needs [Jone74, Stat78]. In fact, tailored DCS modules can replace or absorb isolated, growth-limited special-purpose systems.

The user has control of the computing resource. Who has control is a powerful psychological issue. To many, having control is more important than getting good service. Of course, having control implies the ability to regulate service quality and other aspects of a computing system [D'0177]:

• **Cost Control.** In a DCS, the local user pays a fixed or closely controlled charge for the local module rather than an uncontrolled variable charge imposed by central management. The user can regulate hardware and software upgrades. Thus, upgrade disruptions are less frequent, and the user does not pay for upgrades that do not benefit him.

• **Priority Control.** The local manager can regulate system response time to match work priorities. He can quickly give one user emergency preference.

• **Security Control.** Does a DCS have better security features than a centralized system? In a DCS, the local user can share data as necessary while protecting the privacy and integrity of the dedicated local node. Some people believe that a dedicated machine implies tighter control of data resources, so they argue that distribution increases security through compartmentation. Others argue that it weakens

(Continued on In Depth/6)

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20 NEXT X
25 M = X - 1
30 M = INT(M/2): IF M = 0 GOTO 107
40 J = 1: K = X - M - 1
50 I = J
60 BEEP 1: L = I + M: IF (A(I + 100)) <= A(L + 100))
   GOTO 100
70 T = A(I + 100): A(I + 100) = A(L + 100):
   A(L + 100) = T: I = I - M: IF I<1 GOTO 100
80 GOTO 60
100 J = J + 1: IF J>K GOTO 30
105 GOTO 50
107 BEEP 5: INPUT "PRESS ENTER FOR LIST"; A
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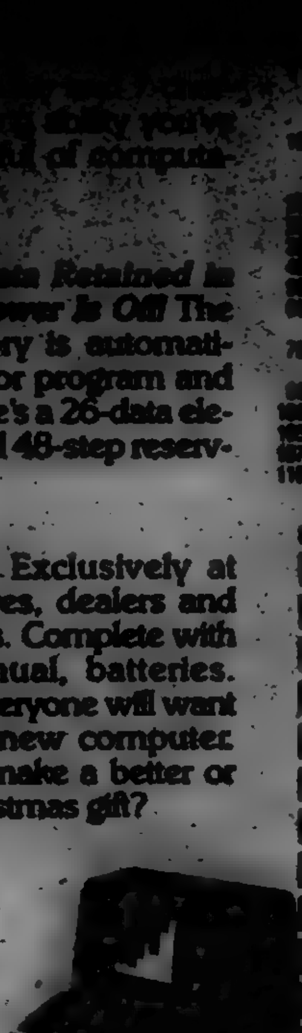

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IN DEPTH

(Continued from In Depth/4)

security by creating too many gates to guard.

The system can be aligned with organizational patterns and goals. Distributed computing makes the local profit-center manager responsible for the success of the local system modules. At the same time, it eliminates most of the political and priority conflicts that prevent a local manager from effectively utilizing a central system. Local optimization is possible, both functionally and philosophically.

Technical Disadvantages

Many of the disadvantages stem from the newness of DCS technology and may yet be corrected. Open issues include: system control, data base distribution, processor architecture and communications media. All of these issues are too complex to survey here. The remainder of this section only tries to define the nature of each problem.

Distributed computing requires more planning and controlling than does centralized computing. "Because minicomputers have miniprices, and often implement applications quickly and painlessly, little attention is given to their widespread implementation in a company or organization until after the fact. Then certain difficult intersystem problems arise that could have been handled had planning entered the process at an early stage [Falo78]." Among the areas that should receive early attention are:

- **Efficiency of information flow and distribution.**
- **Cost effectiveness.**
- **Security/privacy/fraud and abuse.**
- **Standards for data elements and interfaces.**

Component integration becomes the key to successful development when a computing system is distributed. All the modules of a DCS must act as one to serve the end user. Also, the modules must fit together in a maintainable and operable way. As yet, there are no structured programming techniques tailored for DCS development and integration problems.

Data base design might be the most difficult area in distributed computing. A distributed data base has four big design problems [Eckh78, Pard77].

- **Data Allocation.** Where to store data.
- **Query Processing.** How to find needed data.
- **Concurrency Control.** How to keep data synchronized.
- **Security and Integrity.** How to protect data.

The general problem of optimally allocating data among several dispersed processors is one for which the best known algorithms have execution times that grow exponentially with problem size. So, for any significant computing system, optimal data allocation can't be guaranteed except under very restrictive assumptions.

The problem of how to locate needed data is really another allocation problem: where to store the data directory or index. The trade-offs involve access delays and the costs of updates, communications and storage. The choice depends on the number of updates and the number of times a location needs data not stored there. The three basic alternatives are:

- **Partitioned.** Partial, local directory at each location.
- **Centralized.** Full directory at a central location.
- **Replicated.** Full directory at each location.

Concurrency control is the problem of how to keep files and programs synchronized when either a program updates files at more than one location or a file is updated by programs running at more than one location. The solution is to lock — that is, reserve — files or parts of files before updating. How-

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ever, locking leads to the problem of deadlocks between programs and how to prevent, detect and resolve them.

Processor architecture mixes hardware, operating systems and interconnection topology. Most DCS design work to date has probably been devoted to selecting and connecting hardware components. Even so, no dominant architectures have emerged upon which the designer can lean. This is because, first, hardware development will not stand still, so the cost and performance relationships keep shifting. Second, the problem of how to build a distributed network operating system is still a research area. Third, analysis of the properties of interconnection schemes — hierarchies, rings, buses and others — involves combinatorial complexities for which there are no efficient algorithms. It seems safe to say that this area will not be settled for a very long time.

Data communications has matured earlier than other parts of distributed computing. Even though rapid development continues in the fields of data communications, there are already standard international protocols and public utilities. This is because communications media are heavily regulated by governments while management style, data base and machine architecture are not. After the very largest firms enter this market, and after the regulatory structure catches up, the DCS designer will probably find communications to be the simplest area of the four.

Management Disadvantages

The management disadvantages of distributed computing arise from the absence of an omnipotent central authority. Although it is too late to outlaw minicomputers, "distributed" doesn't have to mean "random" [Falo78]. A DCS needs lots of central planning to make effective use of its great flexibility. There are at least five major management trouble areas:

- Design problems.
- Design risks.
- Interface problems.
- Capacity problems.
- Duplication problems.

Multiple-processor systems are harder to design than single-processor systems. Each individual module of a DCS may be less complex than a centralized system, but a DCS is still collectively very complex. Also, the computing industry has much less experience with the DCS form of complexity. Relatively little software is now available to support distributed computing, and partitioning tasks and files among processors is still more of an art than a science. These are technical design problems also, but the technical work can't begin until after basic management strategy is set.

New technology also has added risk. The advantages of distributed computing are not guaranteed; they are only potentials. A poor DCS design can produce an inflexible and inefficient system that, once it is built, is much harder to correct than a centralized design. Among the design risks are undetected errors or fraud, inability to rebalance after growth and too many different subsystems for the user to remember how to use them all.

There are many more interfaces to match. Distributed computing involves interfaces that previously didn't exist. Technically, for example, computer communications protocols are an active research area. Managerially, most of the interface problems involve relations among multiple equipment vendors in a mixed, dispersed computer/communications environment. Execution of engineering changes is quite difficult, as is assigning responsibility for failures.

Modularity restricts local application size and complexity. Unfortunately, "every industry has a few big jobs that won't fit on anybody's mini [Patr76]." For example, some tasks need large

(Continued on In Depth/8)

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(Continued from In Depth/7)

number crunchers that don't fit easily into the usual commercial DCS design. This problem leads to networks such as the Advanced Research Projects Agency Network, through which users can share specialized equipment.

Decentralization can lead to overcomputerization. "The trouble with minicomputers is that they refuse to stay mini; they grow just the way any computer grows [Patr76]." Without centralized management control, distributed computing could lead to uncontrolled growth of local computing empires. The result could be greatly higher total costs resulting from duplication of hardware, software, data, space and people.

Next week: Structure and Strategy.

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What Management Should Know About IRM

By Theodore W. Ziehe

The United States issued its first patent for an electric motor to Thomas Davenport, a blacksmith from Brandon, Vt., in 1837. Patent No. 132 is for a battery-driven motor that achieves continuous rotation of one set of electromagnets relative to a fixed set by using an automatic commutator switch.

When steam-driven electric generators replaced batteries in about 1870, motors using Davenport's principles became practical and set the stage for the first commercially viable electric motors.

Now, 100 years later, we take for granted an ability to transform electricity and other forms of energy into physical power.

During the 1920s and 1930s the groundwork was laid for another major energy change — transforming electricity into mental power or information. The computer as we know it today emerged during the 1930s and 1940s.

After several decades of limited access to computer-based information, the 1970s brought data base management systems (DBMS) which offer, in a commercially efficient form, combinations of a computer's capabilities for handling data and executing logical processes. During these same years the microprocessor won its place in the market, lowering the cost of processing power. These accomplishments opened the door to the 1980s, a decade for progress in processing information and providing powerful solutions for many kinds of users.

In the wake of these developments, what applications for intelligent electronics are waiting to be uncovered? The potential generates excitement among entrepreneurs throughout the world, and a scramble to discover opportunities is spreading.

As a commercial enterprise, the corporation attracts the interest of many prospectors looking for applications of information electronics. Many corporations have grown by recognizing the significance of information and by meeting primary information needs aggressively, often with ingenuity but at times with brute force or guesswork.

A brute force that many organizations made in recent years was to enormously expand their capacity for processing data. Facilities to compute, process and communicate data are now installed in virtually all large and medium-sized organizations and in many small ones. Yet it is not uncommon for an organization to be swamped with data, while the information necessary to the ongoing success of the enterprise, to the well-being of its employees or customers, or to the preservation of the environment remains unavailable or too costly to deliver.

Once a data processing facility is in place and working, proliferation of hardware and software develops an inertia of its own. With the achievements in microelectronics during recent years, this proliferation is accelerating at an increasing rate.

Organizations on this treadmill have a difficult task before them. They must move from processing data to producing information.

The answers to some key questions are revealing:

- What information is needed? In what context and medium? Who needs the information? When?
- How do people and the DP facility work together to produce the information needed? What part can be automated? What role do people play?

There is no formula, no fail-safe procedure for making the transition. Each organization is unique and must consider different factors. The point of this article is that the transition can be made without overdoses of hardware, software or data specialists of one kind or another — that information can be managed so as to eliminate excesses of data litter.

To move an organization from processing data to producing information requires action on two fronts:

- Upper management, in fact all of operating management, must commit to do it and make the adjustments required.
- The planning function, appropriately chartered, must determine how to do it and see that it is done.

Information resource management (IRM) is a suitable label for this kind of action program.

Management Commitment

The commitment required of management is sometimes characterized as "recognizing that information is a resource." Finances, people, raw materials and capital equipment are some of the resources management commonly deals with. The information resource is often overlooked in preparing for success and working to achieve it.

Information is a resource and the business itself is the process that converts this resource into assets. Operating management is responsible for that conversion, and each manager must know the information requirements of his position. Each manager should be

(Continued on In Depth/10)

INFOR-
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SOLUTION

IN DEPTH

(Continued from In Depth/9)

asked what information he needs to get his job done. This is essential in converting to the idea of information as a resource.

In addition to knowing what information is needed, each manager must recognize the nature of the information required, be it facts and evidence, an estimate based on facts or a judgment based on experience. Does the requirement call for details or a summary? For a summary or an estimate, what range of facts is needed?

These considerations help clarify which sources to tap to meet the information requirements. Data litter may result from an ill-advised application that uses too few facts to produce summaries or estimates, when a judgment based on experience is required.

Such misguided attempts to meet requirements for information are revealed by another test of an organization's commitment to manage the information resource. This test involves the organizational structure used to capture, produce and use various types of information.

This test can be compared to the approach an organization uses in money management. Typically, money is divided on a percentage basis among functional areas such as cost of sales, marketing and research and development. Expenses are also distinguished by type such as personnel, travel, facilities and raw materials. Such structures reflect the organization's goals and macro-conditions. Managers use this structure to prepare budgets and to make decisions about particular expenditures.

A similar need for structure exists in the case of producing and using information. First-line managers must gather facts and report them. Many summaries, estimates and projections can be done best, or only, by using the computer. Judgments, while they may benefit from computer-produced information, can rarely be replaced by the results of a computer-based process.

Briefly, an organization's culture and operating structure express its commitment to information as a resource. Fact-gathering and judgment-making are important parts of information production that have their proper place with computer-based processes. All information, of whatever type, should be significant to some activity. Organizational structures and processes either facilitate or hinder the availability and proper use of information.

Planning Commitment

The second aspect of IRM is planning. Management's commitment to information must be expressed in terms of the specific events and processes needed to satisfy requirements for information formation and use. This requires an integrating approach throughout the organization and applications of electronic media — uses of computers and various types of information appliances — wherever appropriate, but only where appropriate.

The charter of the planning function must support its goal to provide high-quality information — that is, data provided in a meaningful form and context, when and where it is needed, using means that are practical and cost effective. The planning function's scope encompasses the art, or science, of organizational management and a blend of overlapping technologies related to data, image, voice and text processing.

The primary means used to span this scope and to achieve the goal is easy-to-use software that provides information solutions for nontechnical end users. A secondary means is to use specialized hardware devices that plug into the processing facility.

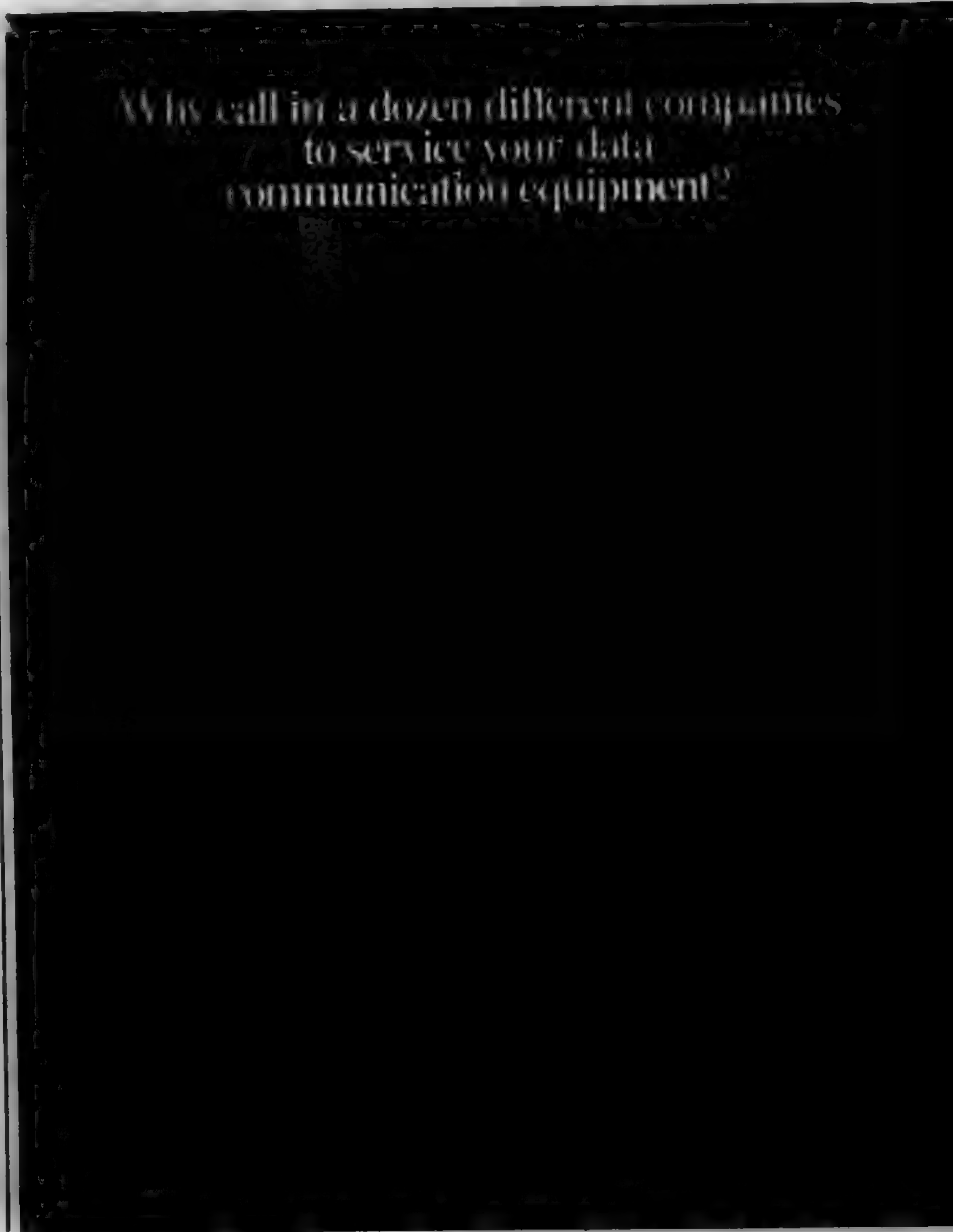
Central Issue

Within the goal, scope and methods provided, planning resolves the central issue of IRM: what data to put into a computer-based repository and how extensively to relate the data deposited there. Resolutions of this issue must take into account three dimensions of an organization's operation:

Functions: what data to include from the organization's various functional areas.

Time: what data to include related to past achievements, present actuals and future plans/forecasts.

Level of Detail: what detailed and explicit data to include, vs. data summa-


Why call in a dozen different companies to service your data communication equipment?

ries and combinations for particular purposes.

To interrelate data within computer-based devices, the computer itself becomes an accomplished data manager. Increasing the diversity of records and the richness of associations makes this automated facility more and more "knowledgeable" about the business.

A decision to create a computer-based pool of knowledge about the business, or just one aspect of the business, raises a series of questions about what processes must interface with the pool. For example:

Application Processes. The integrated data base is used to support particular application processes instead of each application maintaining its own separate files of data.

Distribution Processes. Data communications facilities are interfaced to the data base, making it possible to acquire data from, and distribute it to, geographically distant points.

Information Processes. By drawing on the data base, the computer performs various information formation and presentation processes, some of which cannot be carried out practically in any other manner.

User-Interface Processes. To give people ready access to the pool of knowledge about the business, the computer facility interacts extensively with people, not only in the form of data exchanges, but in situations that require the system to handle text, voice and image impressions.

Documentation/Control Processes. The repository of data is expanded beyond knowledge of the business to include data about the repository itself and the processes and people that use it.

Planning should consider and resolve these various aspects of information processing to create an integrated data base for the business.

Drawing Up Plans

A plan for IRM begins with a statement of information requirements. This statement has its origins in the goals and objectives of the organization, just as the allocation of expense dollars must be consistent with organizational goals and objectives.

The statement cannot anticipate every need for information, because many needs are ad hoc. It can identify a body of primary needs and specify information that meets those needs. These specifications indicate the nature of the information, distinguishing among:

- Facts, or evidence, and who supplies them.
- Summaries, or results of other computational processes, and what processes are used.
- Judgments and their computational support.

The specifications also describe the organization's operational structure — the events and processes that produce and use the body of primary information. Finally, the specifications define the composition and capacity of the data processing facility required.

Change Through Software

Typically, organizations move into information resource management through evolutionary changes in their commitments to data processing. Planning determines what changes are required and when. Software is an efficient way to effect many of the necessary changes.

Joseph Ferreira has identified some characteristics of the processing environment that distinguish IRM as a discrete stage in the handling of data (IRM: An Evolutionary Mosaic, *Infosystems*, Vol. 26, No. 10, October 1979, p. 66):

- Information resource systems will be opportunity-driven, rather than technologically or functionally driven.
- They will be user-dominated, not user-oriented.
- They will be dynamically structured, rather than rigidly (system) structured.
- They will be administratively constrained, not technically limited.
- They will be result-oriented, not process-oriented.

Taken collectively these characteristics suggest a radically new way of regarding data, and changes made to the data processing facility must support this new view of data.

A DBMS provides many of the necessities for managing information resources:

- Language for data definition.

(Continued on In Depth/14)

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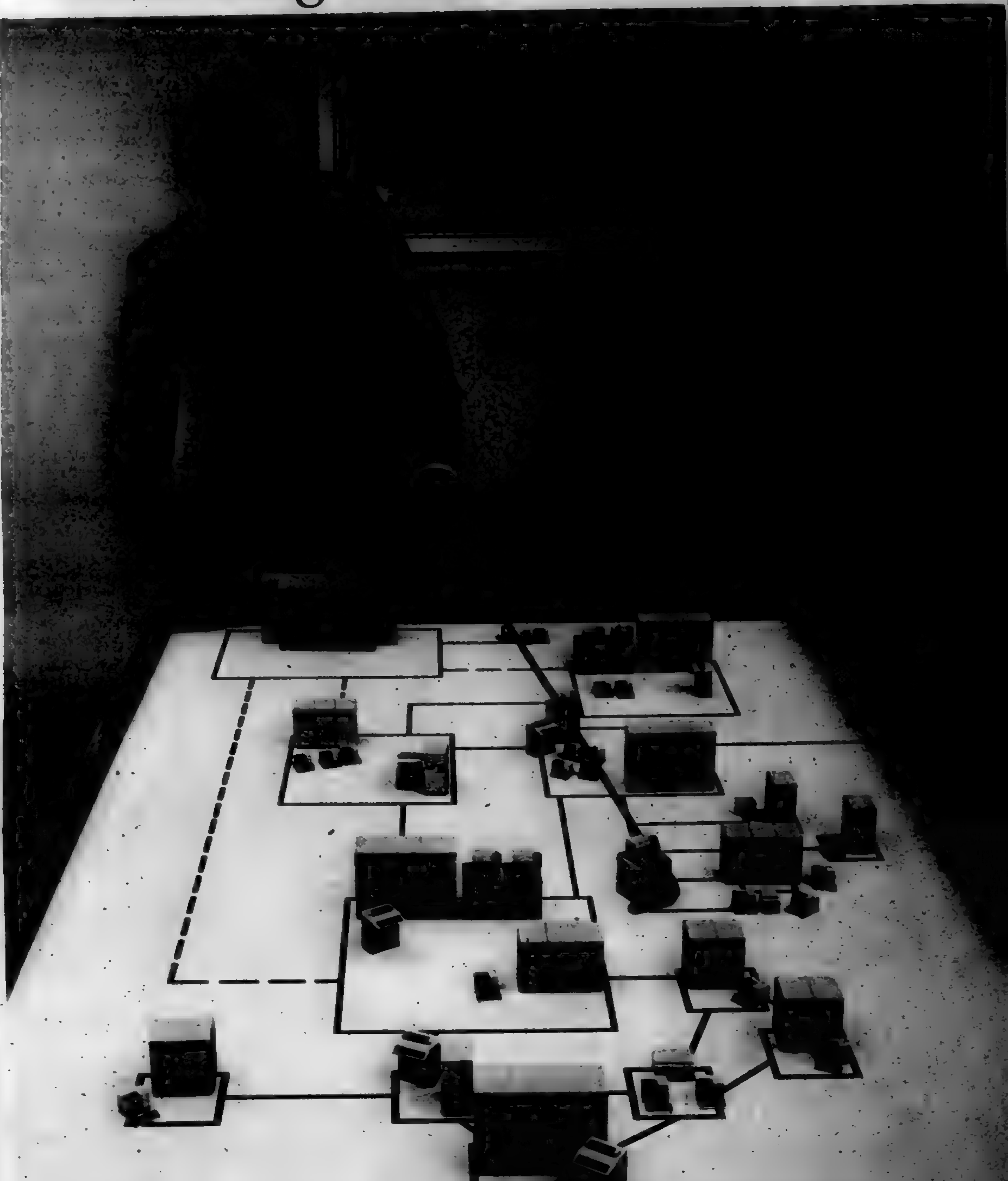

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IN DEPTH

(Continued from In Depth/11)

- Facilities for acquiring and storing data.
- Data model for integrating applications.
- Facilities for ad hoc browsing in the data base.

A second important software package is a data dictionary and directory. Closely integrated with the DBMS, this package is used to document and control the information resource, to monitor data uses and users and to analyze the impact of change.

Solution software is a third important type. These packages are ready for nontechnical users, interface directly to the data base and provide processes and processing options for such varied applications as order entry, OEO reporting and production line balancing.

A fourth type of software provides aids for information system development. Tools for designers, programmers and administrators help to define the role the computer will play in information formation and communications processes. Beyond the initial development effort, these tools are used to make system revisions and extentions; to audit system operations, monitor performance and balance the use of resources; and to attend to troubleshooting when problems occur or to error correction when a problem has been isolated.

'DBMS (at the functional level) and microprocessors (at the cost-of-performance level) have filled the void into which MIS fell. Successes denied MIS can now be achieved.'

Other types of software important in information processing are interfaces between the data base/DBMS and the data communications facilities, existing applications software, software utilities and user interface software and hardware devices such as plotters, graphics terminals, and text, voice or image processors.

In the 1960s the management information services (MIS) function undertook to supply the information that management requires. That is also a main theme today in information resource management — but only one theme among several. The multiple themes are appropriate because information for managers must be formed using a broad base of data from various parts of the operation.

MIS was visualized as a computer-based system for producing information. Such systems are an important means for achieving the goals of information resource management — but an appropriate joint effort between people and computer systems is more important. For example, an interactive decision-support system is the IRM equivalent of what an MIS was touted to be — a system that made answers available at the touch of a key.

MIS set out to achieve a goal before the groundwork for achieving that goal was adequately in place. MIS literally repeated the experience of Thomas Davenport. He had a worthy goal — to develop an improved source of power. The engine he developed in pursuit of that goal was an advance, but fell short of success because the source of electricity was not commercially suitable. Steam-driven electric generators solved that problem — but after Davenport's time.

DBMS (at the functional level) and microprocessors (at the cost-of-performance level) have filled the void into which MIS fell. Because that void has been filled, successes denied MIS can now be achieved.

However, one important issue is still unresolved. It relates to our incomplete understanding of the origins of information. But being realistic about the limits of our knowledge on that subject guides planners to an appropriate balance between people and computers in processes that form information.

While the 1880s was a decade of progress in the history of motors, the 1980s will be a decade for progress in the history of information processing. Some major technical issues have recently been resolved. The issues now are human ones — an adequate commitment to progress and the insight that progress requires.

The need for insight related to this matter was accurately perceived in 1810 by Goethe:

"The modern age has a false sense of superiority because of the great mass of data at its disposal. The valid criterion of distinction is (not the quantity of data available but) rather the extent to which man knows how to form and master the material at his command."

The commitments that information resource management requires must come from the top levels of management in an organization. Those commitments are properly based on three insights:

- Skillful use of information as a means of improving work and production processes.
- Computers together with specialized machines, software and related technologies offer opportunities for providing information not otherwise practical.
- Communications processes in which computers participate are not likely to be improved if the attempt to do so is based on intuition or on superficial judgments.

Today's computer technology requires a reorientation to organizational planning and operations, to information and to managing the data, the machines, the people and the processes involved in forming information and communicating it to appropriate points throughout the organization. This new orientation is the essence of information resource management.

Theodore W. Ziehe is director of planning for Intel Systems Corp., a subsidiary of Intel Corp., Austin, Texas.

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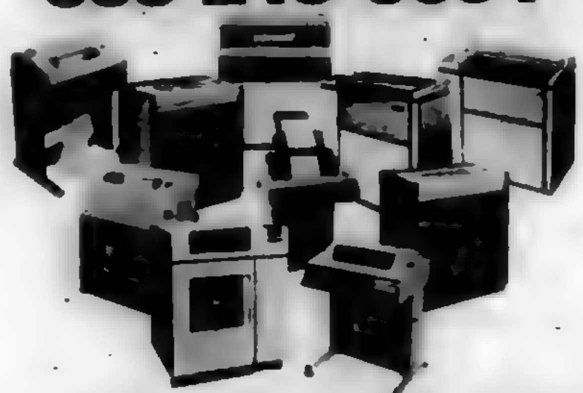

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Formation Offers Planning System For Manufacturers

MT. LAUREL, N.J. – Formation, Inc. has introduced a resource planning system for medium-sized manufacturers that it said not only tracks present production and inventory operations, but can be used to project future materials and equipment needs.

The Forman manufacturing resource planning (MRP) system runs on the firm's F/4000 32-bit minicomputer, introduced earlier this year. Unlike most other MRP systems, Forman offers on-line, real-time transaction processing which allows the manufacturer to update the company's entire MRP file with each data entry.

The system's closest competitor is a configuration offered by Scientific Time Sharing Corp. that is said to cost nearly three times as much as the Formation system.

Typical Forman

A typical Forman system includes the 32-bit F/4000 minicomputer with 512K bytes of main memory, two 70M-byte disk drives, a magnetic tape drive, printer and operator's CRT terminal console. The system can also be expanded to handle up to eight disk drives for a total of 560M bytes of data storage.

(Continued on Page 84)

Mini Screens, Tests Engines For Space Shuttle Flights

Special to CW

NSTL STATION, Miss. – When the U.S. astronauts begin commuting on the Space Shuttle sometime next year, they will be propelled by rocket engines that have been screened by computers and virtually been to the edges of space and back.

The three 512,000-lb thrust Space Shuttle engines are currently being tested at the National Space Technology Laboratories (NSTL) here by Rocketdyne, a division of Rockwell International. The tests involve checking hundreds of individual parameters – from the rate of fuel flow to the timing between the opening of one valve and the closing of another – and generate millions of bits of data, an NSTL spokesman said.

All of this data is processed and analyzed by four complete Data General Corp. minicomputer systems located at the space laboratory.

Under a contract with the National Aeronautics and Space Administrations and the Marshall Space Flight Center, Rocketdyne puts the engines under a wide variety of environmental extremes. These extremes are necessary because of the wide range of temperatures and pressures that will be impacting the engines during an actual space flight. For instance, the rocket's liquid nitrogen fuel clocks in at minus 423°F while the exhaust flames push the mercury to 6,000°F, the spokesman noted.

Two-System Arrangement

The DG minicomputers used by Rocketdyne are arranged in two systems. The first system consists of two Eclipse S/130 computers and is used for redline or maximum value calculations. It is this system that determines how far an engine can be pushed before it reaches a critical stage of operation.

During testing, the redline system continually analyzes data of various previously set performance limits and watches for hardware failures, the spokesman explained. The system is also occasionally used for post-test data analysis.

In the second system, an Eclipse S/130 minicomputer is used as a data acquisition processor (DAP) and does the main body of after-test analyzing. This system is backed up by two Nova 4/S computers that are positioned directly at the engine test stands and used for additional data collection.

Peripheral equipment includes DG dual-density magnetic tape drives, Dasher CRT terminals and hard-copy printers, dual-density diskettes and a number of hard disk drives, the spokesman said.

Prior to using the DG computers, testing events were recorded on strip charts which were manually examined after each test phase. The manual methods were replaced because time interval measurements between events were usually cumbersome and subject to error, the spokesman added.

'Roadmap' Used

Because of the complexity of engine testing, the engineers use a special configuration control document called a roadmap. The roadmap, which is stored in a DG Model 6070 20M-byte cartridge disk, contains information describing how the mea-

(Continued on Page 84)

Prime 50 Gets GCR Tape System

NATICK, Mass. – Prime Computer, Inc. has announced a 75 in./sec group code recording (GCR) tape subsystem for its 50 series of general-purpose systems. The Model 4550 magnetic tape unit allows Prime users to record information at 6,250 bit/in., approximately four times the density previously available, Prime said.

The 4550, which operates at 75 in./sec, can process information in both 6,250 bit/in. GCR format and 1,600 bit/in. phase-encoded (PE) format, preserving compatibility with other tapes and with tapes recorded on systems without the GCR feature, a spokesman noted.

"Data reliability is achieved by the error checking feature of GCR technology as well as the vacuum column transport which ensures the integrity of the tape media, even during high speed rewind when vacuum and capstan control are maintained," he added.

The 4550, which can be configured with all members of the 50 series family of processors, will be available in early 1981. The subsystem, including controller, transport, formatter, cabinet and cables, is priced at $49,500. Additional units (transports, cabinet and cables) are available at $24,500.

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Mini Screens, Tests Engines for Space Shuttle

(Continued from Page 83)

surements get to the recording system from the engine.

For a single-engine test, the roadmap describes the paths and connection points of 400 to 300 channels, and for the three-engine test stand of the main propulsion test unit, up to 1,000 channels are used.

The roadmap contains data reduction information such as equations and calibration data used for engineering display programs. This allows the conversion of the raw data or analog signals into engineering units. In addition, the roadmap describes the individual sensors, where they are mounted on the engine, and what the redline limit is, if any.

The crucial redline information is provided by up to 60 channels, depending on the type of test. Should the redline limits be exceeded during a test, the engine and facility systems are safely shut down.

CSVD System

A Computer Set Voting Device (CSVD) is a major piece of instrumentation that uses the Eclipse S/130 computer-controlled acquisition system. Rocketdyne built the system to compare measurements to set values. Any time the measurement exceeds the set value, a cut- or shutoff is produced.

Within the CSVD system are hardware comparators. The analog voltage set limit is compared against the measurement with a digital analog converter (DAC). Redline values are fed into the DAC by the Eclipse S/130-controlled acquisition system.

During the test, analog signals are sampled at a rate of 10 KHz. The CSVD has an analog and a digital read-back capability to the computer so that the computer can check the values it has set up.

Off-Line Duty

In addition to setting up and monitoring the CSVD system, the computers do off-line duty with data processing tasks. For example, the Measurement System Analysis data is put on magnetic tape and processed by computer to see how the measurement system is performing.

Another computer check involves the Flight Readiness Test, which plots engine valve positions and other parameters. This is done from magnetic tape and read into the Eclipse computer.

Formation Offers Planning System

(Continued from Page 83)

The system features MRP software that is transaction-driven and therefore updated on a real-time basis. The F/4000 is an IBM 370-compatible machine which allows the user to select from a vast library of IBM programs that do not have to be altered to run on the computer.

The MRP software — which runs under the system's VM/370 operating system and RTMS data base and transaction management system — is modular in nature, the Formation spokesman explained. It was also designed to be used by the non-DP executive, incorporating a training mode that allows the user to access the data base without disturbing the operations at other terminals, the spokesman explained.

The system is said to handle capacity and materials requirements simultaneously and enables users to review the impact of schedule changes on material availability and resources. For instance, if a manufacturer receives an order for a certain product, the system can determine each day if enough materials are on hand to complete the job.

The system's perpetual inventory feature and cycle counting capability is reportedly accurate about 95% of the time and offers a more cost-effective alternative to semiannual or annual "wall-to-wall" inventory techniques, the spokesman observed.

Other features of Forman include on-line editing for immediate error detection and correction, a security and control system and an audit trail that allows the user to trace changes in data and protect its integrity.

Shipments of turnkey Forman systems and Forman software will begin next month. The software will not be sold to run on computers other than the F/4000, the spokesman said.

Additional details on the MRP system can be obtained from Formation at 823 E. Gate Drive, Mount Laurel, N.J. 08057.

Office Meets Begin Oct. 15

WASHINGTON, D.C. — Micronet, Inc.'s "Paperless Office" demonstration facility here will be the site of two-day office automation workshops beginning Oct. 15, Nov. 12 and Dec. 10.

The training program was designed for automation planning teams, managers of records, information processing and systems designers, as well as executives interested in obtaining an understanding of the impact of automated technologies on industry and government.

The workshop costs $395, which includes lunches, a hands-on demonstration and all materials. Additional information is available from Judy Taylor at Micronet, Inc., Watergate Mall, 2551 Virginia Ave., N.W., Washington, D.C. 20037.

Wang's New 2200 LVP: The multi-user computer that stands alone.

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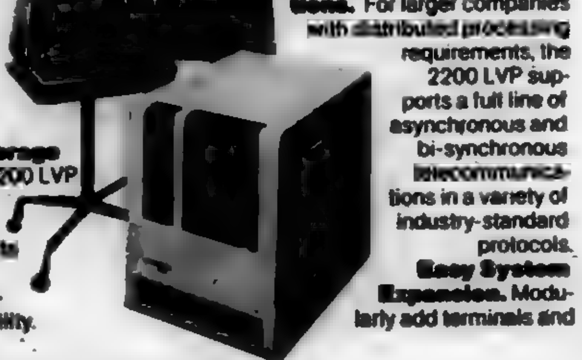


DG Slates User Courses In Four Areas

WESTBORO, Mass. — Data General Corp. is offering user education courses in four regional centers throughout the U.S. between October and March.

With the exception of the Northeast Education Center in Southboro, Mass., which will provide hardware and software classes, only software classes will be offered.

The Southeast, Midwest and Western education centers are located in Norcross (Atlanta), Ga., Arlington Heights (Chicago), Ill.; and Los Angeles, respectively.

Focus on Minis

Focusing on minicomputer systems, the software classes include preparatory, operator training, language extensions and implementation, systems programming and advanced topics. Most of the classes last for five days and cost $675.

The hardware courses in the Northeast include preparatory, processor familiarization, processor maintenance, peripheral familiarization and advanced topics. Prices for these classes vary somewhat, with most costing between $500 and $750 and being offered over a three to five day span.

As with the software courses, frequently there are prerequisite courses that must have been completed before entering classes.

Each training credit earned with selected initial software licenses or software-service packages is valid for one year in exchange for one student-week of software training at any DG education center.

Training credits may also be used to reduce the cost of a software on-site course — each one is worth $475 for this purpose.

More information, may be obtained from Linda Spinney or Kathy Shea in the Northeast at (617) 485-7270, Dan McGowen in the Midwest at (312) 264-3045, Bill Cole in the Southeast at (404) 448-9224 and Mari Schroeder in the West at (213) 670-4011.

Winchester System Emulates RL01 Disks

SAN JOSE, Calif. — A 20M-byte Winchester disk system that emulates Digital Equipment Corp. 3.75 RL01 disks in an LSI-11 microcomputer is available from Corvus Systems, Inc.

Designated the 11L, the plug-compatible disk system has an interface that is transparent to the RL01 I/O drivers and operating system, the vendor claimed, adding that it appears to the LSI-11 bus as a DEC RLV11 controller with 3.75 RL01 drives attached.

Smaller Version

A 10M-byte version of the Corvus disk is also available and serves as a plug-compatible replacement for two RL01 drives. Rack mounting on table-top configurations is available.

A back-end network option called the Corvus Constellation allows up to eight LSI-11 computers to share the same disk, a spokesman said.

The price for the disk system is $5,950, the vendor said from 2029 O'Toole Ave., San Jose, Calif. 95131.

First Two of Series

Desktop Business Systems Debut

HORSHAM, Pa. — Digilog Systems, Inc. has unveiled the first two systems in a series of desktop computers designed to perform financial analysis, inventory control, order entry and other tasks for businesses with annual revenues from $250,000 to $10 million.

The System 2000 is the mid-range member of the computer line and features 650K to 1.3M bytes of diskette storage, 48K to 64K bytes of expandable user memory and Digital Research, Inc.'s CP/M operating system. Expansion capabilities include up to 5M bytes of Winchester disk storage and the addition of from one to three microprocessors per computer, a spokesman said.

Applications support for the machine provides for accounts payable, accounts receivable, payroll, general ledger, inventory control and order entry.

WP Functions

The 2000 can also be optionally equipped to handle word processing WP functions or can be used in a data communications fashion for remote computing or distributed processing, he added.

The mid-range system costs from $8,500 to $11,995 and is scheduled for delivery in January.

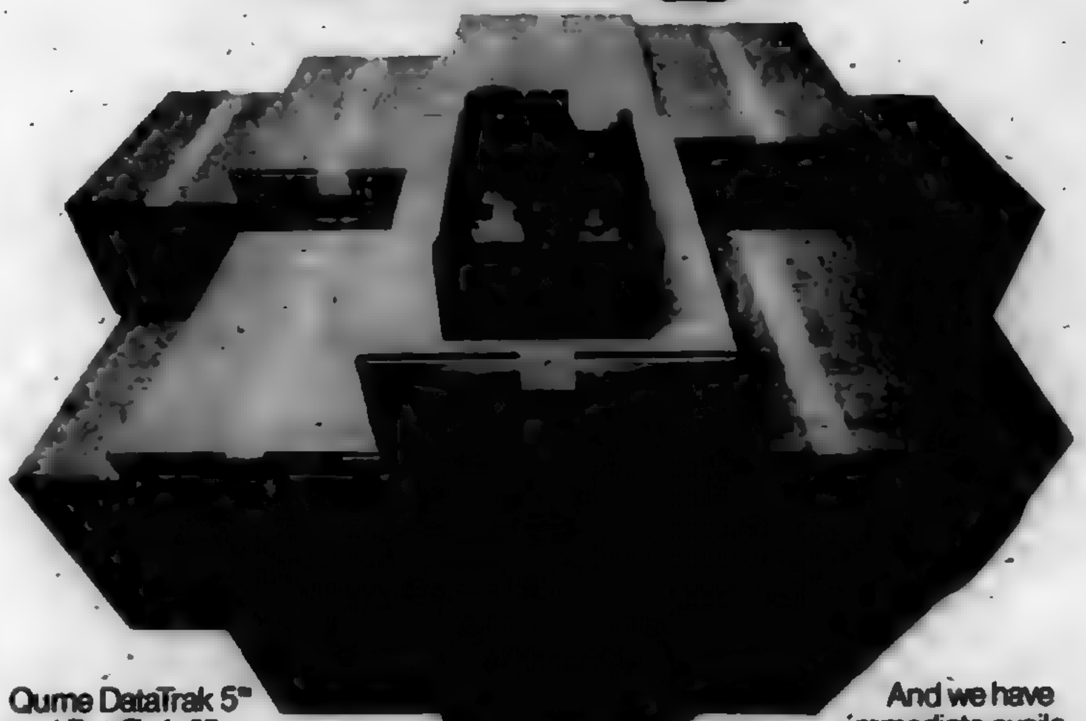
The second system, an entry-level member that will be available the following month, has basically the same attributes of the 2000, but is scaled down for smaller businesses. The System 1000 features a minimum of 325K bytes of floppy disk storage and a minimum of 32K bytes of main memory.

Like its mid-range brother, the 1000 can be expanded to fit user needs, the spokesman claimed.

The entry-level machine also uses the CP/M operating system and can be equipped for data communications chores.

The System 1000 costs from $3,995 to $6,595. Digi-Log Systems, Inc. is located at Babylon Road, Horsham, Pa. 19044.

More tap-tap on tap.



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Durango Line Expanded; Norango Adds Software

DON MILLS, Ont. — Norango Computer Systems, Inc. has announced the expansion of its Durango F-85 business computer line to include the 700 and 800 series, as well as the availability of three software packages and three operating systems for the F-85.

The 700 series — designed for the single user but upgradable for multiuser operation — includes models 710, 720, 730, 740 and 750. The 800 series — for multitasking operations — includes the models 810, 820, 830, 840 and 850.

The Model 710, the smallest model in the Durango family, includes 64K bytes of main memory, a 1,920-char. CRT terminal, a 165 char./sec bidirectional matrix printer and two floppy disk drives each storing 512K bytes. The 710 costs $16,900 (Canadian dollars).

The top of the product line, Model 850, features 128K bytes of main memory, up to five operator terminals supported by full multitasking software and 26M/bytes of file storage. The Model 850 costs $56,500 (Canadian), including five CRT terminals and a printer.

Software Packages

The three vertical market application packages are Star-Text Word Processing, Client Write-Up and Professional Time Reporting. All are operable on the 700 and 800 series of computers.

Client Write-Up is said to allow accountants or bookkeepers to produce a set of financial statements including tax returns for their clients. Professional Time Reporting maintains records of employee activity in order to charge hourly or per diem fees to their clients.

The software ranges in price from $1,000 to $2,500, Canadian.

The operating systems, supporting more than 100 application software packages on the F-85, are the Durango DX-85/M, CP/M and Microcobol.

The Durango DX-85/M is said to allow the F-85 to operate up to five different tasks simultaneously. It functions on the 800 series and supports Star Basic, Durango's proprietary Basic compiler-interpreter.

Microcobol, which includes its own operating system called Business Operating System, contains an interactive text editor and a display mapping feature.

In Canadian dollars, the DX85/M operating system costs $1,500, MicroCobol costs $1,220 and CP/M is priced at $500 from the company at 801 York Mills Road, Don Mills, Ontario M3B 1X7.

Disk Controller, Tape Unit Offered for LSI-11, PDP-11

GARDEN GROVE, Calif. — Distributed Logic Corp. (Dilog) has released a hard disk controller and a magnetic tape coupler for Digital Equipment Corp. PDP-11 minicomputers and LSI-11 microcomputers.

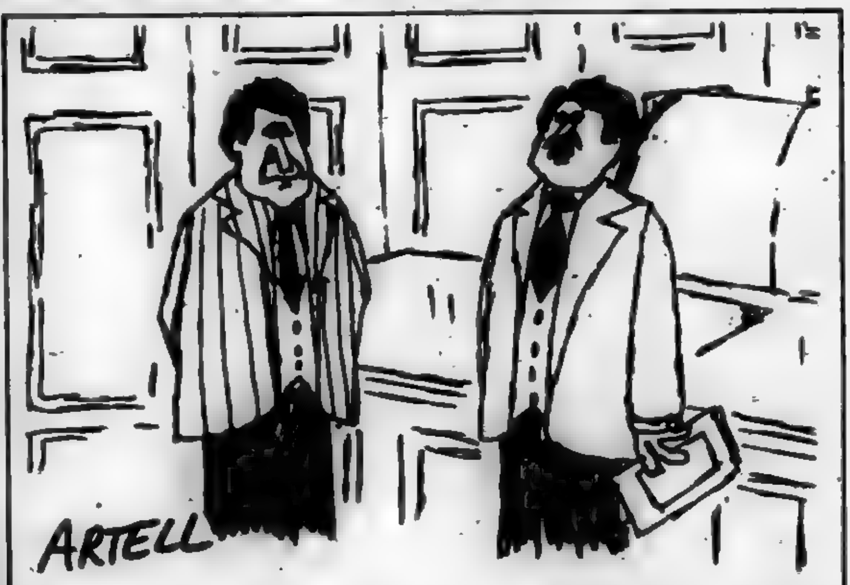
The hard-disk controller will accept up to two 8-in. or 4-in. Winchester-type disk drives. It offers up to 160M bytes of disk storage and tape backup with standard 7- or 9-track IBM, Ansi or DEC-compatible 800- to 1,600 bit/-in. drives with speeds up to 152 in./-sec, the vendor said.

The magnetic tape couplers interface with up to eight common dual-density NRZI/PE formatted magnetic tape drives. The couplers emulate TM-11 and are RT, RSX-11 and RSTS-compatible with software or switch-selectable density controls.

In quantities of 50, both modules — which plug into slots on the DEC CPU — cost $2,972, the vendor said from 12800-G Garden Grove Blvd., Garden Grove, Calif. 92643.

Correction

Computer Products Corp.'s Rimfire 38 [CW, Sept. 22] controls up to four disk drives from Priam Corp., not Prime Corp.



'As I Understand It, Marketing Says It's an Engineering Problem, Quality Control Says It's a Parts Planning Problem, and "60 Minutes" Says It's My Problem.'

Software Investors Hear Good News

By Marcia Blumenthal
CW Staff

BALTIMORE — Investment banking firm Alex, Brown & Sons didn't expect a standing-room-only crowd at its recent Computer Services Seminar here.

But that's just what happened as some 200 venture capitalists and institutional investors stood shoulder to shoulder to hear the good news about the industry.

"The software and services industry has been around 20 years and we are just coming into our infancy," industry toastmaster John P. Imlay, chairman of Management Science America Inc., wryly told the group at lunch.

Infancy or not, the industry is turning a lot of heads on Wall Street, spurring unprecedented interest among institutional investors.

Two-Step Process

The development of a firm in this industry is usually a two-step process, explained Henry F. McCance, vice-president and treasurer of venture capital firm Greylock Management Corp.

Venture capital firms have long invested in software and service firms, but it's taken 10 years for a substantial number of companies to reach the point where they are attractive on the public market, he noted.

In particular, McCance sees

(Continued on Page 94)

Europe, Canada Hit With IBM Price Hikes

ARMONK, N.Y. — IBM raised its purchase, lease and maintenance charges effective Sept. 30 by 5% to 12% in five European countries and by 2% to 17% in Canada.

In addition, services, program products and maintenance were raised 3% to 11%, depending on the country.

The European countries hit by the increases were the UK, France, Italy, Spain and Sweden. The UK and France were subject to increases only for those produts offered by IBM's Data Processing Division (DPD).

Purchase prices increased 5% and lease prices were hiked 8% to 12%, depending on the country.

Purchase prices were raised for the 8100 Information System, the 3800 laser printer, the 3262 and some retail and text systems, a spokesman said. Lease prices were hiked for 370s and 4300 Group I processors (except in the UK), the 8100, 3270 CRT terminals and some industrial systems.

Products from the General Systems Division (GSD) hit by increases were the System/3, System/32 and the 3740.

January Move

Last January, IBM raised prices for DPD and GSD products in most European countries.

In Canada, IBM hiked rental, lease, purchase and maintenance prices for GSD and DPD products by 2% to 16%. Charges for licensed program products and program support were raised 9% to 17%.

Unchanged were prices for the 3380, 3694, 3814 and 5995 and the 4341 Group II. While prices for 30 series processors were not raised, the cost of their maintenance was raised.

Purchase prices for GSD products were not raised, but rental and lease charges for the 5280, 5225, 5250, 5340, 5381 and 5520 were increased.

IBM also raised prices in Canada for GSD products last June and last December for GSD and DPD products.

Says Federal Systems Imperiled

GAO Slams Ruling on DP Services

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Federal computer maintenance and repair is seriously threatened by an industry-disputed Labor Department ruling to place DP equipment services under the Service Contract Act, the General Accounting Office (GAO) said recently.

The GAO report strongly supported the industry position, voiced most prominently by the Computer and Business Equipment Manufacturers Association (Cbema), that maintenance of government DP, telecommunications and scientific equipment should not be subject to Labor-dictated national wage scales.

In June 1979, Labor expanded the 1965 labor law to cover such services, a move the GAO said "is not supported by the act's language or legislative history."

The department "made no feasibility, cost/benefit or impact studies to support its ruling," the GAO continued, saying the ruling "will impose an undue financial and administrative burden on the affected companies" and "may cause federal agencies to eliminate or curtail many crucial programs and services."

The ruling "seriously jeopardizes the nation's defense and security," according to GAO. But the department has steadfastly insisted on it despite industry refusal to enter service contracts under the terms of the act.

The congressional auditors found industry reaction to the act has already caused the Army to shut down a $12 million com-

(Continued on Page 98)

IIA, Commerce Settle Wits Dispute

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A two-year dispute over a Commerce Department international trade information system is nearing a resolution that one party to the disagreement, the Information Industry Association (IIA), termed "almost ideal."

The IIA and Commerce have agreed on a method to ensure that the Worldwide Information and Trade System (Wits) takes full advantage of the private sector and does not put the government in competition with export on-line data base services already on the market.

Wits, now in a pilot stage linking five U.S. cities and five foreign countries through the Control Data Corp. Cybernet system, will eventually link 47 Commerce offices in the U.S. with its Foreign Commercial Service offices in 65 countries.

Wits provides U.S. exporters with data on foreign buyers and markets as well as export information such as trade show schedules and market research data [CW, Aug. 27, 1979].

The IIA and several of its member companies, including Dun & Bradstreet Corp., lobbied Congress against the early Wits plans arguing Commerce ignored existing information services and would harm U.S. data base vendors by undercutting their sales

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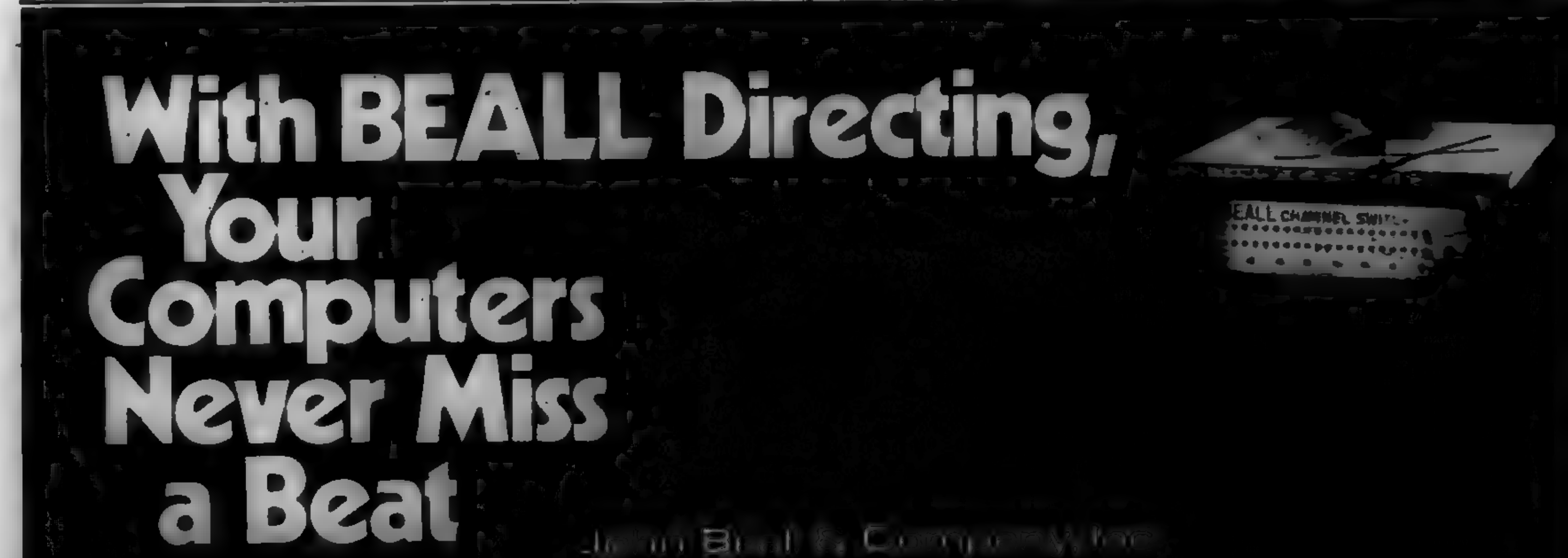
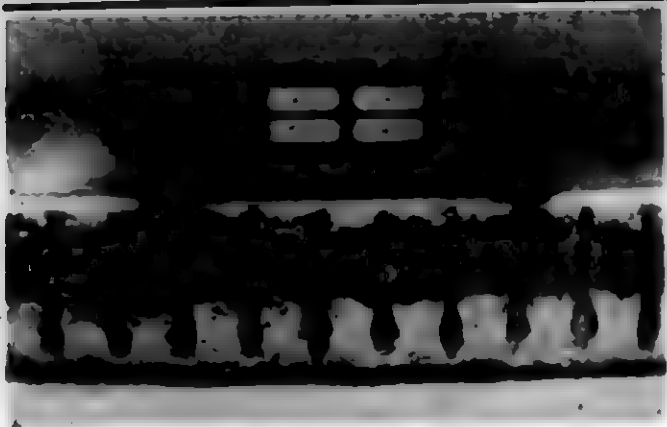




Resting on a dime in this magnified photograph is a Memorex thin-film head for use in the company's new high-performance disk storage unit.

In Wake of STC Offering

Memorex Building 3380 Rival

SANTA CLARA, Calif. — Seemingly out of step with the company's conservative policy on preannouncements of new products, Memorex Corp. recently said it is developing a high-capacity, thin-film technology disk storage subsystem that will compete with IBM's 3380 disk storage devices introduced in June.

The announcement may have been precipitated because of Storage Technology Corp.'s (STC) official introduction of a 3380 comparable product expected later this week, one observer noted.

The Memorex disk drives will be attachable to large IBM 4300 systems, 370 models and Series 30 equipment, Memorex said. Although at the time IBM announced its 3380, company executives hedged on whether Memorex would offer a comparable product, the decision to build the system resulted from a market study performed by the company.

This study projected that on-line data storage capacity in the U.S. is growing at a compound rate of 45% annually. This means that many of the larger computer system users will double their on-line storage every two years.

During the past three years Memorex has intensified its thin-film technologies and has already developed operational thin-film read/write heads, servo heads and matching integrated circuit amplifiers, the firm noted.

To match the performance of its planned thin-film technology disk drive, Memorex is also developing a control unit utilizing state-of-the-art architecture.

Memorex declined to estimate the date of the new disk system announcement.

In the meantime, James Simpson, president of Memorex's Storage Systems Group, said, "We foresee that all customer requirements can be met with our current 3650 and 3652 disk subsystems."

Memorex Forms Media Division From Disk Units

SANTA CLARA, Calif. — Memorex Corp. has formed a Rigid Media and Components Division from its two rigid disk divisions, CFI in Anaheim, Calif., and the Recording Components Division in Santa Clara.

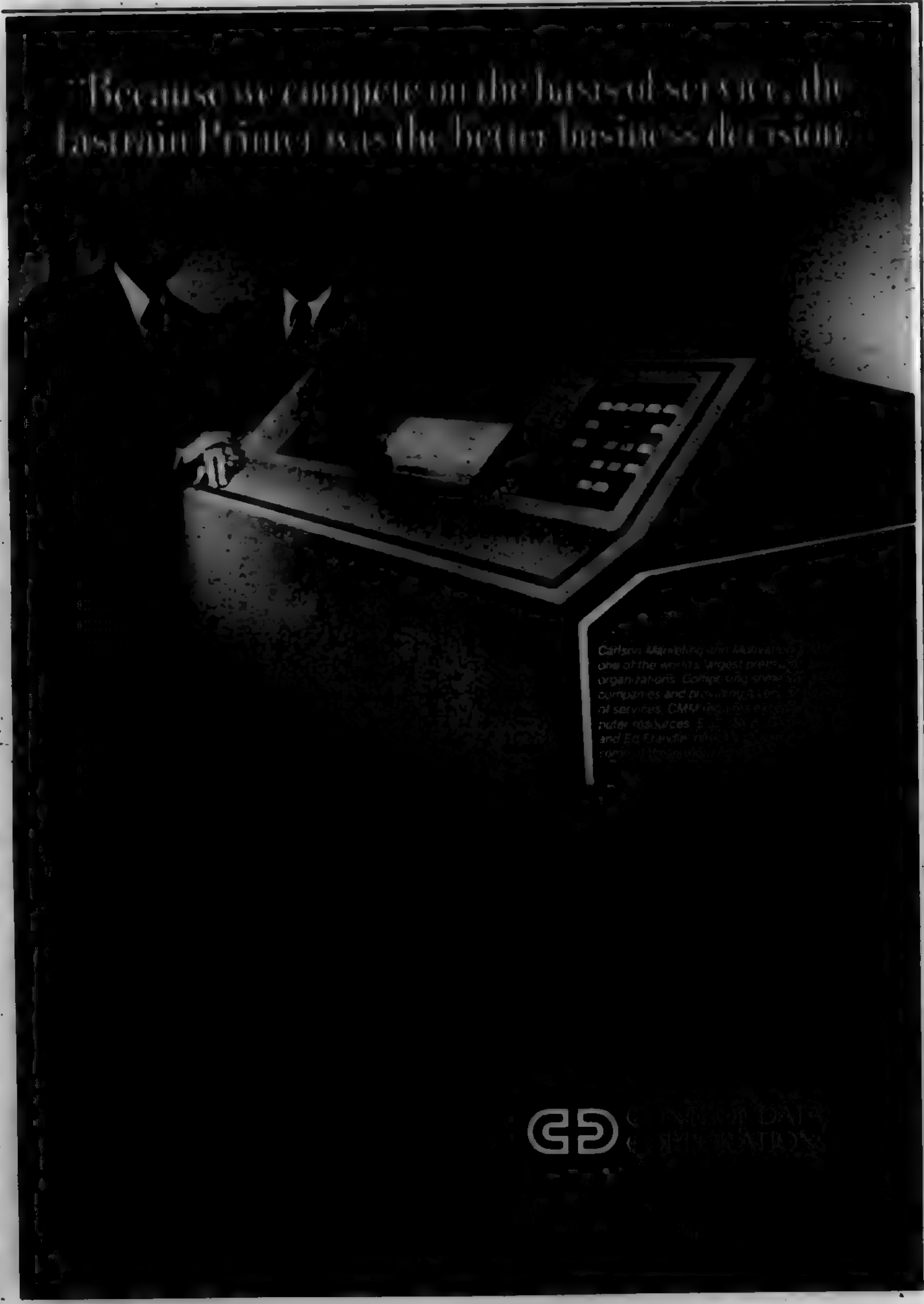
The CFI and Recording Components facilities will both remain in operation in a complementary role.

CFI, acquired by Memorex in 1977, has concentrated on low-capacity OEM products, non-IBM packs and cartridges, while the Recording Components Division has been responsible for high-capacity disk products for all markets.

William P. Sousa, vice-president and general manager of the Recording Components Division, is now vice-president and general manager of the Rigid Media and Components Division. Prior to joining Memorex in 1977, Sousa held executive positions with other computer companies.

Raymond E. Valle, vice-president and general manager of of CFI, will continue as a vice-president of the Computer Media Group and will explore the development of potential activities in the rigid disk test equipment field.

The Rigid Media and Components Division is part of Memorex's Computer Media Group.


"Because we compete on the basis of service, the Fastrain Printer was the better business decision."
CONTROL DATA CORPORATION

Bells Are Ringing for System Maker Formation

By Tim Scannell
CW Staff

MT. LAUREL, N.J. — The first thing a visitor notices upon entering Formation, Inc.'s headquarters here is a shiny brass-bell hanging conspicuously from the wall. Placed there as a kind of metallic cheerleader, the bell is rung when computer sales at the firm total more than a million dollars.

Workers at the 10-year-old company are no strangers to the bell's peal; the privately-owned company's latest earnings figures total $20.6 million, with an after-tax profit of $1.3 million.

A relative newcomer to the computer manufacturing playground, Formation sells small to large multiprocessing systems as well as a variety of peripheral controllers and communications systems. While the firm's most familiar product — and its flagship system — is a more powerful alternative to the RCA Corp. 3301 computer, the company broke new ground earlier this year when it unveiled a 32-bit minicomputer with the processing power of an IBM 370/138 and the ability to run 370-compatible programs.

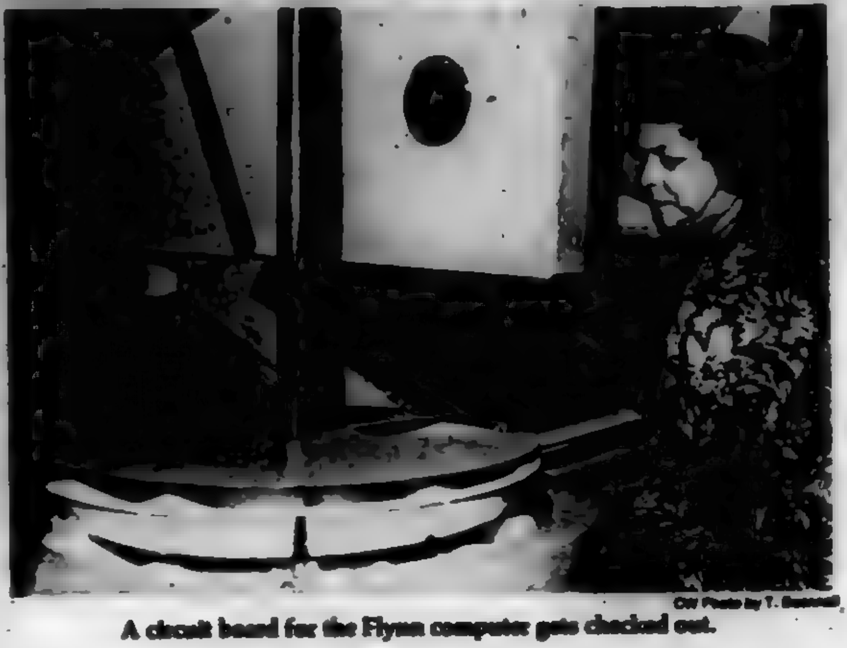
Formation's officers (left to right): Robert Jenkins, vice-president of engineering; Arthur Beard, president; and Barry Kessler, vice-president of operations.

Humble Beginnings

Formation presently consists of two buildings or 62,000 sq ft of administrative and manufacturing space among such recognizable neighbors as 3M Corp.'s Graphics Division and Okidata Corp., but the company had humble beginnings.

It was founded by Arthur Beard, now Formation's president and chairman of the board, and three other engineers who left RCA in 1970. Beard was employed by RCA as chief engineer of its Computer Systems division and was an engineering manager of RCA's Defense Electronics Products division.

In its first year, Formation was basically a consulting firm operating out of a small office in nearby Cherry Hill, N.J. Working with a limited support staff, the four founders — relying heavily on their RCA engineering backgrounds — consulted for large mainframe users and designed complete systems for other companies.



CW Photo by T. Scannell

A circuit board for the Flynn computer gets checked out.

As the company grew, Formation branched away from just telling customers what to buy and how to arrange it to actually building peripherals. One of its first products was a high-speed controller for Digital Equipment Corp.'s PDP-11/45 that was one to two years ahead of anything DEC was working on, Barry Kessler, one of Formation's founding fathers, said.

The firm's research on peripheral attachments later evolved into the development of the 9903 processor, which established the firm as a full-fledged computer manufacturer. The 9903 is reportedly the more powerful clone of RCA's 3301 computer and is described by Formation as being an IBM 370/158-class machine. Since the 9903's first installation in the spring of 1978, the company has delivered about 26 of these systems and currently has 12 on order.

Throughout its evolution from a consulting firm to a computer manufacturer, Formation focused on developing "customer-responsive computer systems," Kessler said. The company initially concentrated on developing high-speed peripherals for RCA, Hon-

(Continued on Page 90)

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Formation Continues Quest For 370-Compatible Niche

CW Photo by T. [illegible]

Formation 9903 processors are lined up, ready to ship.

(Continued from Page 89)

eywell, Inc. and DEC computers. Now, however, the favorite target is IBM and the continued quest for 370 compatibility.

In fact, to further its IBM compatibility research, the company has installed an IBM 370/138 and will shortly have a 4331 processor. The IBM machinery is constantly tested and matched against Formation's own computers for processor performance and program compatibility.

Most of Formation's products were born out of the needs expressed by users who came to Formation to solve their problems, which mainly concerned outdated or inadequate computer systems.

To reinforce its vendor-customer relationship and its claim that customers are actually "partners," Formation never insisted on payment until the product was delivered, Kessler stated. That way, it was "our money up front if something went wrong."

All of the computers and products sold by the firm were designed to ease the user's sometimes rudely awakening experience with computer technology and to go along with the trend of locating a system out of a closed DP shop.

Name of the Game

"The name of the game is not to maximize large systems, but to maximize the efficiency of the operations or office worker," president Beard commented. Formation's current developmental philosophy is make small but powerful computers that are easy to operate. Today, "you just don't have enough programmers to program all the applications and if you did, you wouldn't be able to afford them."

Beard also claimed that the growing number of white-collar workers and shrinking blue-collar force makes it imperative that computers be simple to operate.

About two years ago, Formation decided to tackle head-on the business systems marketplace with a 32-bit minicomputer system, the F/4000. While the system is technically in the same class with other 32-bit machines offered by such firms as Perkin-Elmer Corp. and Prime Computer, Inc., Formation is not riding its system solely on the 32-bit crest. Rather, the F/4000 is being hyped for its 370-compatibility and its ability to take advantage of a circus of IBM-oriented computer programs.

The company's latest product, unveiled at its first press conference here a few weeks ago, is an on-line, real-time manufacturing resource planning system that is based on the F/4000.

Canadian Volker-Craig Opens U.S. Branch

TORONTO — Volker-Craig Ltd., a Canadian manufacturer of alphanumeric terminals and related peripheral equipment, has entered the U.S. market, opening a subsidiary in Rochester, N.Y.

Volker-Craig expects to generate three million dollars in sales in its first calendar year of operation and 10 million in the second year, according to Robert Abernathy, director of U.S. operations.

M/A-COM to Acquire Two More Firms

BURLINGTON, Mass. — M/A-COM, Inc. has reached agreements in principle to acquire Microwave Power Devices, Inc. of Hauppauge, N.Y., and Power Hybrids, Inc. of Torrance, Calif.

Microwave Power Devices is a supplier of solid-state RF and microwave power amplifiers and related subsystems. Power Hybrids is a supplier of RF and microwave transistor products.

Both acquisitions will be effected by a merger of M/A-COM subsidiaries into the two companies.

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Cites 'Incredible Opportunity'

AT&T President Urges Cooperation With Nata

By Phil Hirsch
CW Washington Bureau

HOLLYWOOD, Fla. — The rapidly growing telecommunications market provides "incredible opportunity for all who will participate," AT&T President William M. Ellinghaus said here last week.

Addressing the annual convention of the North American Telephone Association, (Nata), Ellinghaus said "the Bell System has decided . . . there is no part of that industry in which we intend to come in second."

He returned to this theme at the end of his speech and talked about the need for "cooperation" between AT&T and Nata members who manufacture and supply telephone terminal equipment that competes with many Bell products.

Granting cooperation "has not always been the case," Ellinghaus added that Nata and AT&T recently have reached "some important agreements" — notably, a standardized, centralized procedure for handling circuit orders from users of "interconnect" equipment. "We need, and sincerely want, more such points of agreement wherever possible, and toward that end we must keep the lines of communication open."

Additional Controversy

Regarding another point of controversy — the differing views of Nata and the phone company about national telecommunications policy — Ellinghaus, after assuring his audience that AT&T will "abide by both the spirit and the letter of the rules laid down to guide us," said Bell still is uncertain about those rules.

Specifically, there are "numerous points" in the Federal Communications Commission's Second and so-called final Computer Inquiry Decision "we would like to see clarified . . . Moreover, we would like to see Congress speak on the matter, since we feel Congress ultimately would provide the most authoritative and conclusive voice in the establishment of new policy for our industry," he said.

Ellinghaus also said that "our internal deliberations no longer are dominated by the political issues that face our business. Rather, we are concerned these days with organizational and operational matters that will affect our ability to perform successfully in the largely competitive future."

A logical implication of this comment is that AT&T has stopped fighting efforts to promote greater competition in the telecommunications marketplace. It is a point which phone company officials have been stressing recently.

One sign of Bell's acceptance of competition, Ellinghaus pointed out, is the corporate reorganization announced last August. Basically, the company was split into two entities — one concerned with regulated services and the other with the unregulated "competitive" offerings mandated by pending but presently comatose legislation that would revise the Communications Act of 1934.

Further organizational changes are planned within AT&T operating companies which will divide the entire Bell System into separate entities offering regulated and unregulated services, Ellinghaus said. He is in charge of the regulated side of the house, while Vice-Chairman James Olson heads up the unregulated services operation.

Regarding the unregulated subsidiary, Ellinghaus said "we'll be aiming to serve a global information market . . . not just the telephone, or even the telecommunications business, but rather the business of moving information — whether voice, data, graphics, or pictures — from just about any place in this nation to any other, or throughout the world.

"The business of this separated subsidiary, or subsidiaries, will be hardware . . . software [and] systems. Its products will include those developed in its own laboratories and manufactured in its own plants. They also undoubtedly will include those manufactured and distributed by others — like yourselves," he added.

Honeywell Forms Arm For In-House Needs

MINNEAPOLIS, Minn. — Honeywell, Inc. has established a Corporate Information Service Department (CIS) to meet the firm's internal demands for DP and telecommunications.

The department, which reports to Jim Berrett, vice-president of corporate planning, will develop and implement new information services to help increase productivity within Honeywell through the use of computers and telecommunications.

Director of the CIS operation is Joseph Timpe, who will be responsible for the day-to-day operation of the information services. He formerly served as director of corporate telecommunications.

Irma Wyman was named director of CIS development and will be responsible for creating plans for the development of systems and human resources necessary for internal networking, information processing and office automation functions. She was formerly director of Honeywell Information Systems central staff.

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CI Notes

NCR Extends Tender Offer Of Adds Shares to Oct. 15

DAYTON, Ohio — NCR Corp. extended until Oct. 15 its tender offer for the common and preferred shares of Applied Digital Data Systems, Inc. Adds even though 81% of Adds' common stock had been tendered as of Oct. 1, the expiration date of the original tender offer.

NCR said it extended the offer to allow those Adds shareholders who had been hesitant to tender their shares because of two recently filed shareholder suits to take advantage of the tender offer.

The two class-action suits, filed by Martin Lansman and Salvatore and Hilda Laurenzano, charged, among other things, that the $12/share offer for Adds common and $27/share for the preferred satock was "grossly unfair." As of October 1, 4.1 million of Adds common and 70,370 of the preferred stock had been tendered.

To date, NCR has not taken any action relative to the two shareholders suits, a spokesman said.

The proposed acquisition of terminal maker Adds, one of NCR's major OEM suppliers, is also being investigated by the attorney general of the state of New York to determine whether the offer complies with the state's Security Takeover Disclosure Act.

Honeywell, Sesa Join Forces Eyeing U.S. Network Mart

MINNEAPOLIS — Honeywell, Inc. has joined forces with Sesa S.A. to pursue the data communications network market in North America.

Called Sesa-Honeywell Communications, Inc., the Herndon, Va.-based firm is 51% owned by Sesa and 49% owned by Honeywell. Former president of Sesa's U.S. operations has been named president of the new company, a spokesman said.

Sesa, which is headquartered in Paris, has been developing packet- and message-switching technology for Europe including the Transpac public packet-switching network and its new DPS 25 packet-switching system from the European Railroad Association.

In this country, Sesa-Honeywell will market the DPS-25 and an unspecified message-switching system. A spokesman could not give more details on either product.

Xerox Ethernet Patent Available for License

LOS ANGELES — In conjunction with the publication of specifications for Ethernet, a local-area communications network [CW, Oct. 6], Xerox Corp. has made its basic patent for the network, USP 4,063,220, available to all parties for a one-time payment of $1,000 per license.

The single payment will cover any number of local area network products of the licensed companies, a Xerox spokesman said.

All worldwide counterparts of the patent are also available for license. The Japanese counterpart application is available for license from Fuji Xerox. All other non-U.S. counterparts are included in the basic Xerox license.

A second Ethernet patent, USP 4,099,024, that covers an Ethernet repeater is also available for license on similar terms. Ethernet repeaters are used to transmit digital information signals by reinforcing them as they move long distances on the Ethernet cable.

Exxon Corp. Establishes Office Systems Co.

NEW YORK — Exxon Enterprises Inc., the new ventures development arm of Exxon Corp., has announced the establishment of the Exxon Office Systems Co. to manage business operations serving the office products market.

The new company will consist of QWIP, QYX and Vydec; the Office Systems Marketing Division for domestic marketing, sales and service operations; the international Division; certain Exxon Enterprises staff functions; and advanced product development activities.

Robert A. Contino has been named president of Exxon Office Systems Co. Contino joined Exxon Enterprises in February from the IBM Office Products Division, where he was vice-president of plan and requirements.

Exxon Office Systems Company has chosen Stamford, Connecticut, as its future headquarters. The site in Stamford will be ready for occupancy in summer of 1981.

Manufacturing and product development facilities of the three major product areas, QWIP, QYX and VYDEC, will remain at their respective sites in Orlando, Florida; Lionville, Pennsylvania and Florham Park, New Jersey.

QWIP Systems Division manufactures and markets telephone facsimile transceiver devices.

QYX Division manufactures and markets electronic typewriters which use microcomputer components that can be upgraded by the addition of electronic modules.

VYDEC, Inc., manufactures and markets visual display word processing systems. Text may be stored, retrieved, changed or formatted on the text editor and printed out on a high speed printer.

Supershorts

Signetics Corp. took the first step in a planned $100 million facilities and equipment expansion into Albuquerque, N.M., at a recent groundbreaking ceremony. The initial facility is expected to be completed in 1982, when production of MOS large-scale circuits and bipolar analog integrated circuits will commerice.

Intelsat will buy an additional Intelsat V satellite to provide 12,000 two-way telephone circuits and two TV channels. It can accommodate maritime users as well.

Daniel Schorr of Cable News Network has been selected as the keynote speaker for Scientific-Atlanta's sixth annual Satellite Earth Station Symposium on Oct. 27-29. A CBS News veteran and current chief Washington correspondent for Cable News, Schorr will address the 600 symposium participants on "The Electronic Media in a Democracy."

JMR Systems Corp., Derry, N.H., became known as Gentex Electrocoustic Group effective Oct. 1. The voice communications-electronic component manufacturer changed its name to reflect its "broadening corporate identity."

Former Itel Corp. marketing and software development exec Don Owens has joined forces with Brigham Young University experts to form a new company called Satellite Software International. The new organization will offer a word processing system for use on all Data General Corp. computers.

No

Services Acquisitions Found Heavy

ARLINGTON, Va. — For the first half of 1980 there were 42 merger and acquisition announcements valued at $164 million in the computer service industry, according to the index compiled jointly by the Association of Data Processing Service Organizations, Inc. (Adapso) and Broadview Associates, Inc.

While last year's first half saw 56 such announcements valued at $383 million, two large transactions made up nearly 70% of that total, Bernard Goldstein, a partner of Broadview, said.

These were Dun & Bradstreet, Inc.'s purchase of National CSS, Inc. for $167 million and McGraw-Hill, Inc.'s $103 million acquisition of Data Resources, Inc.

Bolstered Trend

"The trend of such cash-rich corporate giants eyeing the computer services industry is further buoyed by the just announced proposed acquisition of Manufacturing Data Systems, Inc. by Schlumberger Ltd. for $190 million," Goldstein said. This is the largest acquisition ever within the industry.

Goldstein pointed out that the high interest rates during the first half of the year had some negative influence on proposed consolidations. Despite this cash crunch, cash continues to be the major medium of exchange. In contrast with the Adapso/Broadview index, W.T. Grimm and Co. reported 25 announcements in the computer services industry for the first six months of 1980.

Japan to Host Exhibition

TOKYO — The third International Microcomputers, Minicomputers, Microprocessors/Data Communications Exhibition (IMMM/Datacomm) will be held here Jan. 28-31.

According to sponsors at the Kiver Organization, 90% of the available display space has already been reserved.

Details on the show are available from Industrial & Scientific Conference Management, Inc., 222 W. Adams St., Chicago, Ill. 60606.

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Software Market Turning Heads on Wall Street

(Continued from Page 87)

both the packaged software and service sectors driving the demand among investors. Packaged software is now perceived as a tangible product — "you can resell it in volume," he explained.

Moreover, service firms with repeat business are viewed as annuity-producing.

Basic Requirements

Examining the prospect of companies' going public, investment experts generally agreed a firm in the computer services industry must have at least:

- Solid management
- Excellent financial reporting techniques that will stand up to scrutiny by the Securities and Exchange Commission.
- A niche in the market.
- About 20% to 30% growth per year.
- Revenues of at least $10 million to $12 million.
- After-tax profit of $1 million or 10%.

The early to mid-1970s was often called the "software depression" because of the aftermath of an accounting rule change that no longer allowed software companies to carry development costs as assets. As a result, these companies looked as if they were worth very little.

But today, many firms are approaching or surpassing the $10 million to $20 million critical mass requirement.

In the past two years, at least seven firms in the industry have made initial public offerings. Cullinane Corp., which went public in August 1978, was the first exclusively software firm to go public in 10 years.

That well-received offering was followed by Auto-Trol Technology, Informatics, Inc., Triad Systems Corp., STSC, Inc., Applicon, Inc. and American Management Systems, Inc.

And within the next two years probably double that number will go public, Richard L. Franyo of Alex Brown estimated. Sought-after candidates for initial public offerings are Pansophic Systems, Inc., Software International, Inc., Software AG and McCormack & Dodge Corp., among others.

The prices at which these newly public companies are trading is impressive. Applicon made its initial offering in July at $22 per share and on the day of the seminar closed at $48.75.

Success Stories

You need a couple of success stories to drive the market, Alfred R. Berkeley of Alex, Brown noted. Berkeley edits the "Computer Services Monthly," a report sent to more than 2,000 investors.

Within the institutional investors ranks right now, growth company investors are hot on service industry stocks. These investors consider software and service companies good buys because they are not capital-intensive or really very labor-intensive, he explained. "A software business can get a dollar of sales by spending less than a dollar."

And the industry exists because of changes in hardware. With hardware prices so low, the base of users is expanding monumentally. These smaller users cannot afford to hire programmers, so they rely on packaged software products.

Van L. Brady of Presidio Partners based in San Francisco was one of the growth company investment firms listening to the presentations made by executives of 18 industry firms.

Cullinane Shares Snapped Up

WELLESLEY, Mass. — Two years ago, Cullinane Corp. was the first software company to "go public" in 10 years.

Last month the company went to the equity market again, offering 300,000 shares priced at $53 each. Eager buyers snapped up the shares in 40 minutes.

Cullinane will use most of the $15 million raised to acquire other software companies and application packages, both cross-industry and industry-specific, according to company president John C. Cullinane.

The packages acquired will be integrated with Cullinane's IDMS data base products.

Moreover, the firm is opening an IDMS Data Center, a joint venture with Avco Computer Services. The center will offer services for IDMS users awaiting delivery of a new system or those which have an overload situation on their current system, Cullinane explained.

The center will also offer a Catastrophic Recovery Service. Under this arrangement, IDMS users can store copies of their programs at the center, updating files daily.

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To Ease Trade Relations

Japan's NTT Negotiating With IBM for 5280s

By Marguerite Zientara
CW Staff

TOKYO — In an apparent attempt to solve one of Japan's thorniest trade problems with the U.S., the Nippon Telephone and Telegraph Public Corp. (NTT) recently announced it is negotiating to buy data entry equipment from IBM.

A spokesman for the Japanese government-sponsored concern said NTT "is negotiating with IBM in the direction of buying IBM's 5280 data entry equipment" and is likely to conclude a purchase agreement.

While not specifying the dollar amount involved in the negotiations, the spokesman disclosed that the two concerns are also negotiating on a possible "cross-licensing" agreement. He would not elaborate on the technology that is the subject of those talks.

In Mt. Pleasant, N.Y., an IBM spokesman acknowledged that two sets of unrelated talks have been taking place between the two concerns, but he declined to give details of either development.

By pursuing an arrangement with IBM, NTT apparently hopes to ease U.S. pressure on Japan to open its telecommunications market — estimated at $3 billion in value and dominated by NTT — to competitive bidding by foreign companies.

The IBM 5280 intelligent terminals under consideration would reportedly be used by NTT to calculate telephone charges to consumers. NTT currently uses Japanese equipment for that function.

In the past, NTT has argued that foreign-made equipment generally is inferior to its domestic gear. But in the aftermath of its potentially far-reaching policy change, NTT said it made a "comprehensive assessment" of the IBM equipment and found it "technically superior."

In the event an accord is reached, delivery could begin as early as April. The companies are said to be talking about an initial purchase of about 40 sets of the equipment, although the exact quantity is a point of negotiation. NTT might subsequently buy an additional 400 sets within several years, observers noted.

The NTT/IBM talks have been underway for three months. While IBM reportedly proposed similar contracts 10 years ago, the Japanese firm did not accept the offer at that time, according to NTT.

If completed, the transaction could have wide implications for U.S. manufacturers of semiconductors, computers and telecommunications equipment in Japanese markets.

Besides their business significance, however, the new developments appear to have even more political and diplomatic meaning. They came as U.S. trade negotiator Reubin O. Askew and his Japanese counterpart, Saburo Okita, prepared to meet in Washington to discuss the NTT controversy.

HP Takes Option On Plant Land

PALO ALTO, Calif. — Hewlett-Packard Co. said it has obtained an option to purchase 315 acres in Longmont, Colo., as a site for a future electronics plant and also announced plans to begin start-up manufacturing operations in a leased facility near Lake Stevens, Wash., by the summer of 1981.

W. Bruce Wholey, HP vice-president of corporate services, said the Longmont property, if purchased, will be used to accommodate long-term expansion from the company's Loveland, Colo., Instrument Division.

He said the property "probably will not be developed for several years."

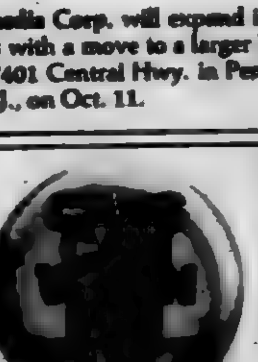
Expansions

Other Moves

Electronic Data Systems Corp. has leased a 33,660 sq-ft building at 9085 Aero Drive in San Diego Business Center to house its check processing center. Occupancy is expected in November.

NCR Corp. has announced plans to construct a 96,000 sq-ft addition to the company's engineering and manufacturing facility in Wichita, Kan.

Datamedia Corp. will expand its operations with a move to a larger building at 7401 Central Hwy. in Pennsauken, N.J., on Oct. 11.



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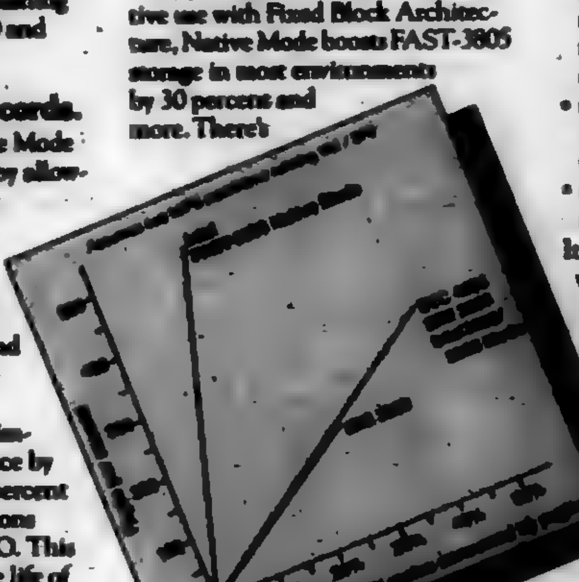

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Native Mode FAST-3805 takes advantage of the inherent characteristics of semiconductor random access memory to achieve a paging rate of up to 530 4k-pages per second per controller. That's almost double the maximum paging rate of a 2305—and triple that of the 3350—while using less than half the CPU cycles.

Native Mode utilizes Fixed Block Architecture—a simple and highly efficient addressing scheme—which further increases the semiconductor disk's already exceptional performance. Data transfer is started with a sequence of only two commands (in contrast to six commands for a rotating disk).

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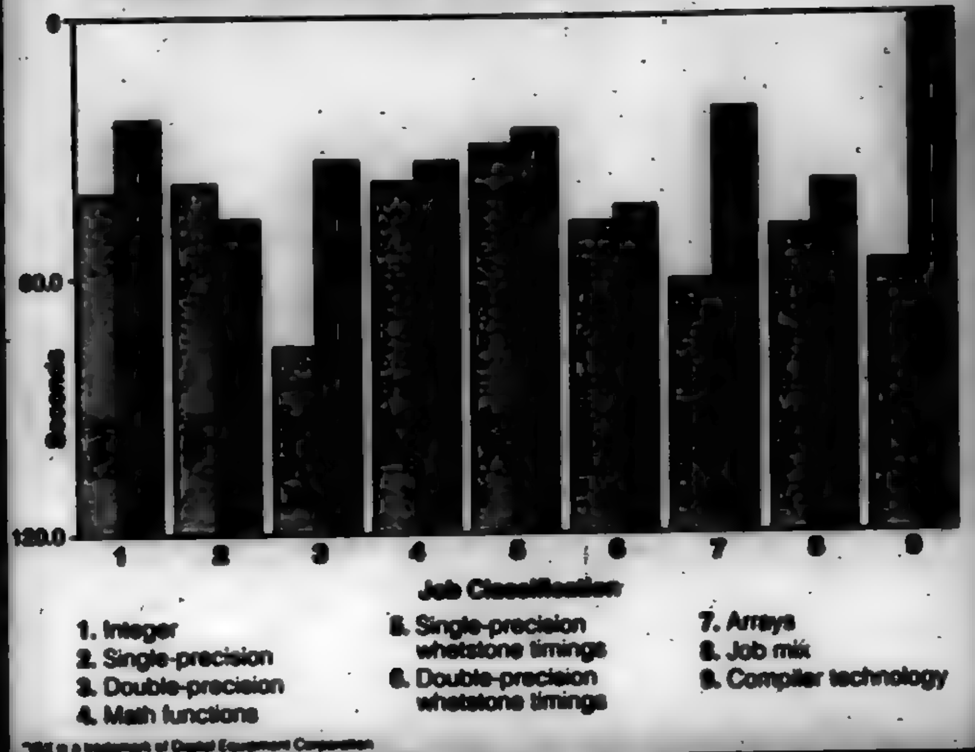
1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.486	1.05
PMS0354	9.160	8.990	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0684	1.610	1.350	1.19
PMS0754	7.040	6.679	1.05
PMS0884	13.730	13.370	1.03
PMS0964	86.830	86.066	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.306	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.005	0.98
PMS1724	52.550	53.135	0.99
PMS1807	50.160	34.766	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.264	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.810	137.587	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2706	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.180	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	158.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.060	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.764	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4504	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5008	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5208	0.900	0.917	0.98
PMS5308	0.330	0.029	11.38
PMS5409	2.080	1.697	1.23
PMS5502	1.130	2.160	0.52
PMS5602	207.140	198.685	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

*Performance Ratio = $\frac{\text{VAX 11/780 CPU time}}{\text{Perkin-Elmer 3240 CPU time}}$

2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



*VAX is a trademark of Digital Equipment Corporation

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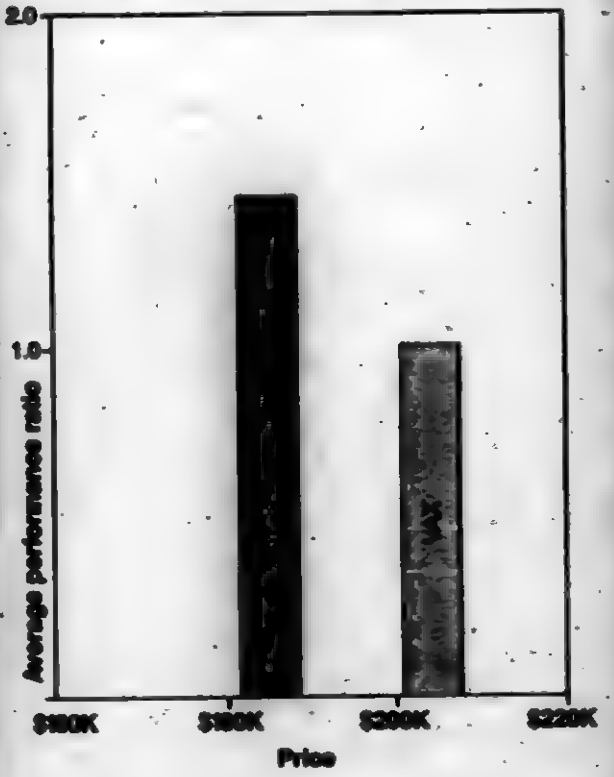

The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

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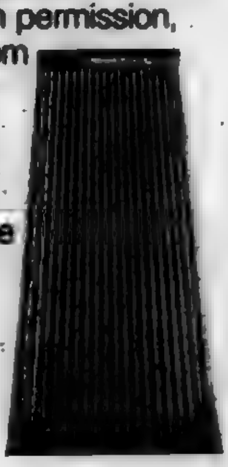

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PERKIN-ELMER

Services Policy Hurts Federal DP: GAO

(Continued from Page 87)

puter system and threatens a number of high-priority government programs, including the space shuttle program and development of the F-15 and F-16 fighters and the B-1 bomber.

Purpose of Law

The 1965 Service Contract Act protects service workers' wages on contract whose principal purpose is to provide services to the federal government.

The law, meant to protect these employees from wage reductions by companies competing for federal contracts, provides that service workers must receive wages and fringe benefits equal to those being paid workers performing similar tasks in their locality.

Cbema has lobbied vigorously against the ruling, arguing it will adversely affect industry merit pay plans, thereby harming the firms' ability to compete in the nongovernment marketplace or force them to set up expensive duplicate service organizations for government-only contracts [CW, July 30, 1979].

Several large computer vendors, including Digital Equipment Corp., Hewlett-Packard Co. and Honeywell, Inc., have reportedly turned down government service contracts because of unwillingness to follow the wage system dictated by the Labor Department.

In its report, prepared for Rep. Jack Brooks (D.-Texas), chairman of the House Government Operations Committee, the GAO said industry response to the law's provisions "could seriously affect maintenance and support of the government's computers — more than 14,300 computers valued by the [General Services Administration] at more than $5.4 billion.

"The loss of continued operation of these computers, through discontinuance of preventative and remedial maintenance services provided mainly by the equipment manufacturers, would shut down major agency operations and programs, and seriously jeopardize the nation's defense and security," the report concluded.

GAO Recommendation

The audit agency recommended Congress amend the act to exclude coverage of DP and other high-technology commercial product support services. Pending that action, the Secretary of Labor should temporarily exempt from the act's coverage contracts for such services, the GAO said.

The GAO came down squarely on the side of Cbema and other high-technology vendor representatives in finding the act "was not intended to cover maintenance services related to commercial products acquired by the government."

Service contracts of this kind, "where government sales represent a relatively small portion of a company's total sales, do not have the same characteristics or incentives for contractors to deliberately pay low wages to successfully bid on government contracts."

Therefore, the GAO said, Labor's application of the act to DP and other high-technology product services is "inappropriate."

Acquisitions

The Monchik-Weber Corp. has acquired **Wall St. Concepts**, a computerized recordkeeping service for the financial community.

Hayden Publishing Co., Inc. announced the acquisition of **Programma International, Inc.**, publisher of entertainment, utility and business software for microcomputers.

Semi Processes, Inc., a wafer fabrication and semiconductor manufacturing company, has acquired **MSMasks, Inc.**, a supplier of computer-aided mask design services for integrated circuit manufacturers and custom design firms.

ICE, Inc. has announced the acquisition of **Northrop Data Systems, Inc.**'s assets and obligations in Carson, Calif., for an undisclosed amount.

Northern Telecom, Inc. has acquired a 45% interest in **Avant-Guarde Computing, Inc.**, manufacturers of the NET/Alert system.

The Reader's Digest Association, Inc. has acquired a majority interest in **Source Telecomputing Corp.**, a pioneer in electronic information services.

Anacomp, Inc. has completed the acquisition of a majority interest in **Eikon Technology, Inc.**, a micrographics company based in Manchester, N.H.

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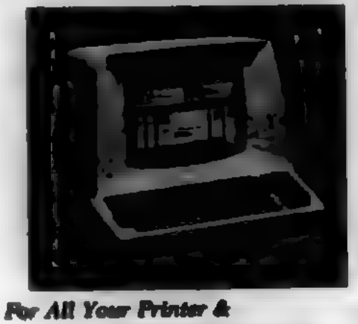

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End of Space Shuttle Program?

Contract Act Seen Threatening Site Shutdowns

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. – Numerous federal computer installations, serving millions of Americans and supporting critical government research and development programs, are facing shutdown or impaired efficiency because of a Labor Department policy on service contracts, the General Accounting Office (GAO) said recently.

A GAO survey of 114 federal installations found 42 have experienced difficulties in contracting for data processing and other high-technology product maintenance and repair services because contractors balked at honoring the wage systems mandated under the Service Contract Act.

The GAO urged that vendors of these high-technology commercial products be exempted from the 1965 law that sets minimum wage scales for service workers. The law was never intended to apply to these areas, the GAO said, and Labor's insistence on applying it seriously jeopardizes national security.

The GAO survey, covering agencies with 98% of the government's computers and manufacturers who provided 81% of the federal systems, found a number of installations already affected by industry reluctance to enter service contracts under the terms of the act.

Permanent Shutdown

A U.S. Army facility in Vicksburg, Miss., for example, had to shut down permanently its $12 million computer system because the sole-source contractor would not accept a follow-on maintenance contract with Service Contract Act provisions.

The system is expected to be scrapped, GAO reported, and "replacement computer services are being obtained from sources at much higher costs and considerable inconvenience."

The report pointed out other "programmatic impacts" expected if DP and other maintenance services under contracts expiring now are discontinued and not renewed.

- "Complete stoppage" of the space shuttle program and loss of the base-level support system at the Johnson Space Center, Houston, Texas.
- Delay or discontinuance of the test and research programs of the space shuttle, F-15 and F-16 fighters and B-1 bomber at Edwards Air Force Base, Calif.
- Inability to monitor and record vital signs of critically ill and post-surgical patients at a Veterans Administration hospital in Los Angeles.
- "Serious programmatic impact" on design, development, test, production and retirement of nuclear weapons, including weapon technology, provisioning, stockpiling and transportation at an Energy Department installation in Albuquerque, N.M.
- Loss of administrative base-level support systems at Fort Sam Houston, San Antonio, Texas, including support to Health Service Command activities through the world.

Based on its survey, the GAO concluded its findings were "highly representative of what would be found nationwide."

Fiber-Optic Unit Formed In GTE Lenkurt Branch

SAN CARLOS, Calif. – General Telephone & Electronics Corp. (GTE) has formed a new business unit in its GTE Lenkurt subsidiary, exclusively for the development of fiber optics communications systems. Arthur R. Kraemer has been named vice-president/general manager of this division.

The new operation will initially be based in company headquarters here, but will relocate soon to its own facility, now under construction, in Mountain View, Calif.

The building will provide a centralized unit for developing the fiber optic systems, and it will eventually house an anticipated 300 employees. It is expected to be ready for occupancy in mid-1981.

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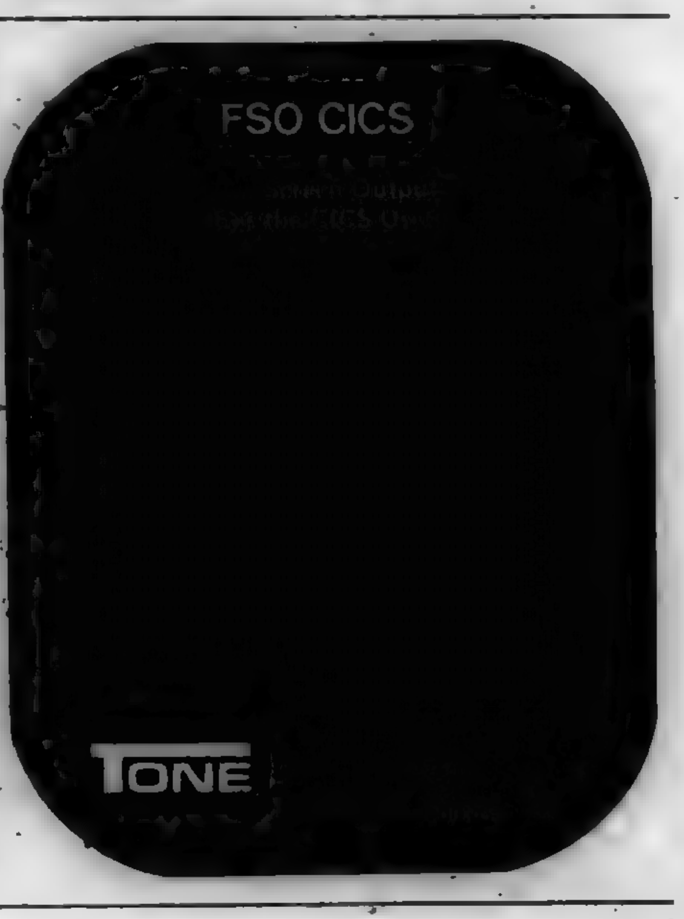

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IIA, Commerce Nearing End to Wits Dispute

(Continued from Page 87)

[CW, April 14].

After the association pressed its case during Commerce appropriations hearings on Capital Hill this year, a House subcommittee initiated discussions between Commerce and IIA that eventually led to a mutually satisfactory Wits design process.

Commerce has begun the contracting process for an eventual Wits design that will use the worldwide State Department Telecommunications system supported domestically by commercial vendors of communications, timesharing, programming and data base services.

The department issued a "request for information" Sept. 29 seeking possible suppliers of Wits data bases. According to Maurice Kogon, Wits program manager, the responses will help Commerce determine what information can be gathered from the private sector and what it will have to produce itself.

'Sunset Provision'

The final decisions on data gathering will be made by a panel to be named within the next few months. The panel, to consist of about a half dozen neutral parties with expertise in exporting and the information industry, will also periodically review Wits to make sure it lives up to its mandate to supplement, not supplant, private-sector services.

This last, "sunset" provision" is one of the most important parts of the arrangement, according to Robert Willard, IIA vice-president, government relations. If the government offers a service without some provision for terminating it "they effectively chill the private sector from ever doing it because they have set up themselves in that business," he said.

Willard said this industry-government cooperative approach to designing federal information systems is a good way to fill government data needs without harming the private sector and can be used in similar situations by other federal agencies.

Recommended Procedure

Whenever an agency decides it needs to generate an information product it should follow this process of determining private-sector capabilities and then design the system to take advantage of the private sector and augment that only with what is not offered in the marketplace, Willard argued.

If the agency then "passes that before an independent advisory body of some sort and, finally, has a built-in sunset review for the future, that strikes us as a close to ideal way because we're never going to argue that the government has no information requirements" that industry cannot fulfill, he said.

While pleased with the resolution of the Wits controversy, Willard said the IIA "will still have to maintain a very strong involvement, to make sure that we don't drop our guard because it's still an important policy issue.

"But," he continued, "the approach they've taken not only makes sense from a Wits point of view, it makes sense from a government information policy point of view. We're anxious to see it work in the case of Wits so we can start talking about applying it wider."

Orders & Installations

Electronic Realty Associates, Inc. recently ordered 1,500 additional Xerox Corp. Telecopier 400 transceiver units. The national outfit uses facsimile equipment to show its clients pictures of houses in other cities via 3,000 affiliated real estate offices.

Broomall Industries, Inc. has ordered 10 V77 minicomputers valued at $2 million from Univac; and CPT, Inc., a Minneapolis-based manufacturer of word processing equipment, has ordered a Univac 1100/60 to expedite its operations.

The First Federal Savings & Loan Association of Columbus, Ohio, has placed a $1 million order for the Univac 1100/60 System.

New Companies

Advanced Computer Concepts, Inc. has been formed by former Schlumberger employees Charles M. Gilmore and Beverly J. Kitaoka. The new company will draw heavily upon top-down and structured programming techniques in its software ventures. The firm is located at 1921 Ivanhoe St., P.O. Box 15710, Sarasota, Fla. 33579.

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Minority Firm Gets $10.5 Million FAA Contract

WASHINGTON, D.C. – The Federal Aviation Administration (FAA) has awarded a $10.5 million contract to a Waltham, Mass., firm – the largest minority business contract the FAA has ever granted.

Under the contract, made through the regional Small Business Administration in Boston, Input Output Computer Services, Inc. will provide minicomputer-based maintenance subsystems to remotely monitor the accurate operation of distant radars, navigation aids and radio links serving the FAA's 24 Air Route Traffic Control Centers (ARTCC) in the U.S.

Air traffic controllers at these 24 centers, which include Alaska, Hawaii and San Juan, Puerto Rico, are responsible for the separation of aircraft between airport terminals.

Since each center is responsible for hundreds of thousands of square miles of airspace, the numerous navigation and communication aids for pilots and controllers are currently kept in top operating condition by routine visits of FAA maintenance personnel, an FAA spokesman explained.

With many of the aids located on mountain tops and other remote areas, the use of mini-based monitoring devices will preclude the necessity of actual visits to each site.

The minority firm was selected for the contract from three minority-owned computer specialty companies. In signing ceremonies here recently, FAA Deputy Administrator said, "We believe that this contract will relieve our maintenance personnel of countless hours of time in transit and will result in increased safety of air travel throughout the United States."

The terms of the contract call for some centers to be operating with the monitoring systems by next spring, with completion of all 24 sites by 1984, the spokesman said.

Contracts

Pertec, REI Sign Contract For Data Entry Systems

IRVINE, Calif. – Pertec Computer Corp. has signed a three-year contract with Recognition Equipment, Inc. (REI) for the production of a special distributed data entry system.

Under the terms of the agreement, Pertec will provide REI with an enhanced configuration of a distributed data processing system, including a new technology package. Pertec's system will be incorporated into REI's optical character recognition (OCR) systems such as the Input 80 page reader, high speed Trace system, Trim system and the OCR wand reader.

The Pertec distributed processing system will be used to enter data not suitable for OCR entry, as well as to enter characters which are not OCR readable. The system will also be used to perform field edits, validation and balancing of both OCR and key entered data, according to Roberto Maldonado, Pertec division vice-president for international and private label systems marketing.

With the new contract, REI joins Scan Data, Univac, TRW, Inc., and ICL as private label customers of Pertec.

Other Awards

General Robotics Systems, Inc. (GRC) has signed a contract with Plessey Peripheral Systems, Inc. to provide a large quantity of GRC's SDV11 semiconductor disk emulator for Digital Equipment Corp. LSI-11-based microcomputer systems.

Norden Systems has been awarded a $7.9 million U.S. Navy contract for a computerized defense system. The Integrated Automatic Detection and Tracking System will be used by the Navy's missile-firing fleet.

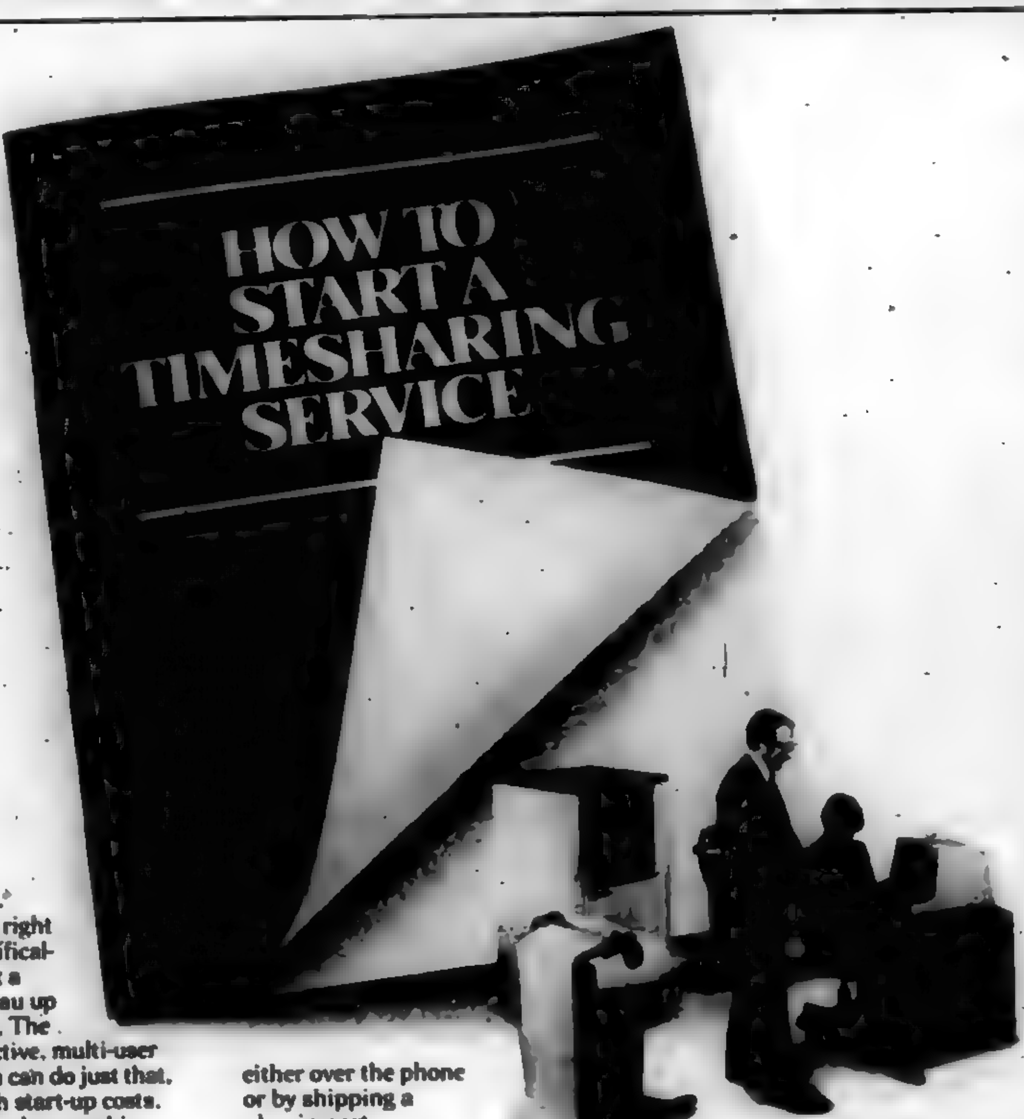
The Hamilton Standard Division of United Technologies has received a $1 million contract to provide computerized aircraft diagnostic systems to Garuda Indonesian Airways and Egyptair.

E-Systems, Inc.'s ECI division has received a U.S. Air Force contract valued at $2.7 million for full-scale engineering development of the digital non-secure voice telephone. A parallel development contract has been awarded to Magnavox Corp.

United Computing Systems, Inc. has signed a contract with Cray Research, Inc. for a Cray-1 S series computer with a capacity for one million words of memory. Terms of that agreement are for a lease, with an option to purchase.

Scientific Systems Services, Inc. (SSS) has recently been awarded more than $1,800,000 of new contracts for software required in computer-based monitoring and control systems for power plants. The largest single contract was a parallel procurement from Duquesne Light Co. and Allegheny Power System, whereby SSS will replace the respective computer systems in two identical fossil fuel plants in the Pittsburgh area.

GTE Telecommunications Corp. received a $190 million U.S. Army multiyear contract to produce electronic telecommunications switches for the nation's army, air force and marine corps' tactical communications programs.



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Design and implement microprograms for high level language virtual machines, I/O processor, and memory hierarchy management. Assembly language experience required.

O/S PROGRAMMER/ANALYST

Responsible for development and support of NCR's large scale virtual programs. Duties will include isolation and correction of field-reported problems, design of software modules and tests, development of specifications and implementation of approved changes. Experience in Assembly language and virtual memory O/S desirable. Requires BS/CS or equivalent.

CONSULTANT/ANALYST

As project leader, you will lead the design and implementation of application processor firmware which will interface with O/S Software. BS/CS or equivalent experience with eight years' programming and knowledge of O/S and computer architecture required.

Equal to the career-growth opportunities, excellent salaries, and extensive benefits that NCR offers, are the pleasures of living and working in the San Diego area. Relocation assistance will be provided.

Send your resume to: Mr. Hal Ostrander, Personnel Resources, Dept. K50, Engineering and Manufacturing, NCR Corporation, 16550 W. Bernardo Drive, San Diego, CA 92127.

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If you have a minimum of 1 year of experience, call collect (or send resume) to: Betty [illegible]

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(615) 329-1771

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Senior System Analysts
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System Programmers
EDP Auditors
Hardware/Software Analysts
Mini/Micro Specialists

Project Mgrs./Leaders
Data Base Administrators
Mgrs. Systems/Programming
Mgrs. EDP Auditing
Mgrs. Technical Support
Mgrs. Data Processing/MIS
Mgrs. IBM System 3/34/38

For more details, send your resume, or call:
Mark Fuller

CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

EDP OPPORTUNITIES
COAST TO COAST

Robert Half, staffed by EDP professionals for EDP professionals with 70 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

NEW ORLEANS

EDP MANAGER

Sub of Fortune 500 firm is seeking responsible person to fill this newly created pos. Candidate must have 3 yrs as prog mgr plus on-line sys dev. COBOL bus appl bkgd. To $[illegible]

PROGRAMMER/ANALYST

Many pos are available for persons with 1+ yrs COBOL/RPG/PL1/FORTRAN exp. To $16-20,000

ROBERT HALF
of New Orleans
135 St. Charles, Suite [illegible]
New Orleans, LA 70130
(504) [illegible]

DAYTON

SYS PROGRAMMER

Ohio Co seeking 3-5 indiv's with solid IBM mainframe operating systems internals bkgrd. This wealthy org is rapidly expanding its data processing dept to accommodate recent Co growth. Co now has most comprehensive relocation package ever. Super benefits! $25-35,000

ANALYST/PROGRAMMER

Prestigious Dayton firm needs indiv w/2-3 yrs exp in IBM Assembler & COBOL. Data base is a definite + but Co will train. Benefits are tops. $18-27,000

ROBERT HALF
of Dayton, Inc.
One First National Plaza
Dayton, OH 45402
(513) [illegible]

ATLANTA

TECHNICAL ANALYST

Leading Corp. Data Center seeks person with strong technical skills and supervisory exp. Pref'd are: Strong COBOL, ALC, OS and CICS Macro's. Shop currently running 3033, 370/168. Good location, liberal benefits and relocation package $[illegible]

PROGRAMMER/ANALYST

Top-rated company adding to staff. Person will be involved in new appl design and programming. COBOL, OS/VS1 and General Business application exp. BAL is a plus. Excellent opportunity to work with top professionals. $[illegible]

SYSTEMS ANALYST

Fast-pace, exciting atmosphere waiting for you. Unique opportunity with long-term growth potential. Need creative thinker, seasoned professional to handle varied projects. Should have large IBM, COBOL, System Design and ability to communicate with users. $[illegible]

[illegible]
ROBERT HALF
of Atlanta, Inc.
[illegible] Peachtree Rd. N.E.
Atlanta, GA [illegible]
(404) [illegible]

PORTLAND

PROG/ANALYST

Excellent Portland firm requires 3-4 yrs assembler on large scale CPU. Application background is open. Growth opportunity. Salary $18-24,000

PROG/ANALYST

Progressive company seeks 3-6 yrs exp in 370-OS. Requires COBOL and/or assembler. Should have "hands on" exp with IMS or other DBMS. Familiar with on-line development tools. Salary $[illegible]

EDP AUDITOR

Fortune 500 company requires 3-5 yrs Big 8 MAS staff exp with manufacturing background. Utilizing large scale IBM CPU. 20-30% travel in US 4 day work week. CPA and/or MBA preferred. Salary $27,000+

PROG/ANALYST

Corp Headquarters requires 3 yrs + FORTRAN, COBOL, MARK IV exp. Must have good analytical skill & strong business background. Prefer MBA. Salary $20-30,000

Bob [illegible]
ROBERT HALF
of Portland, Inc.
One S.W. Columbia
Portland, OR [illegible]
(503) [illegible]

SEATTLE

Prestige Seattle consulting firm seeks programmer/analyst with 4+ years HP3000, DEC or PRIME experience in financial/business applications. Some travel in Northwest area to install mini-computer financial software. To $24,000

SEATTLE DP shops are eager to interview experienced IBM COBOL & RPG II programmer/analysts. If you have 1+ years experience and plan to visit here, call me collect or send resume ASAP.

[illegible]
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite # [illegible]
Seattle, WA [illegible]
(206) [illegible]

PHOENIX

SYSTEMS PROGRAMMER

Play a key role developing software products for IBM OS/VS environment. Two years ALC experience required. Design background and a familiarity with DASD protocol helpful. Starting salary to $27,000

PROGRAMMER ANALYST

Prestigious Int'l Inst. seeks several assembler programmers with on line experience. IBM 370, 3033, OS/MVS shop. Starting salary to $22,000

[illegible]
ROBERT HALF
of Phoenix, Inc.
[illegible] N Central Ave #[illegible]
Phoenix, AZ [illegible]
(602) [illegible]

NORTHERN CALIFORNIA
PALO ALTO SAN JOSE

RPG II MANAGERS OR PROG

System 3/15D or System 32, 34 installations. To $25,000

SOFTWARE MANAGER

IBM 370/OS experience Supv small staff. To $30,000

SYSTEMS PROGRAMMERS

IBM OS & DOS, needed immediately. To $32,000

COBOL PROGRAMMER/ANALYST

IBM or Burroughs experience in a manufacturing of financial environment. To $30,000

EDP AUDITORS

IBM OS & DOS environments require EDP Auditors at all levels. To $30,000

DATA BASE ANALYST

Experience with DMS, DL1, ADABAS, IDMS or CICS. To $32,000

Over 1000 positions in Northern California are currently open. If you have experience in:

- Banking
- Manufacturing
- Retail
- Insurance

Client companies pay interviewing and relocation expenses. Call us collect today.

Jim [illegible]
ROBERT HALF
of Northern California, Inc.
2 Palo Alto Sq, #[illegible]
Palo Alto, CA [illegible]
(415) [illegible]
or
675 N. First St. #[illegible]
San Jose, CA 95112
(408) [illegible]

DENVER

MANAGER

Rapidly growing Colorado manufacturer is redefining their data processing requirements. They have a ground floor opening for a manager with proven experience. Must be able to handle the implementation of large online manufacturing applications on an IBM 370 DOS-VS online system. Prior supervisory exposure necessary. Start $30,000 range

PROGRAMMER ANALYST

Large energy firm is expanding their Denver operation and is currently seeking a programmer analyst with large scale IBM 370 DOS or OS hardware experience. Must have a working knowledge of COBOL and be able to work on large online accounting systems. Excellent growth potential. Start $27,000 range

[illegible]
ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO [illegible]
(303) [illegible]

MIAMI

OS MVS SYSTEMS PROGRAMMER

Major S. Florida Corp offers "State of the Art" position. Opportunity to join leading division of Fortune 500 at a Sr. level. Full relocation, excellent benefits with a career path leading to management. Minimum two years experience with MVS system generation and maintenance. Working knowledge of COBOL, Assembler, JCL and utilities required. Experience desirable in data base systems (IMS), data communications and computer performance evaluation. Salary to $[illegible]

Chuck [illegible]
ROBERT HALF
of Miami, Inc.
[illegible] N.W. [illegible] Street
Suite 100
Miami, FL [illegible]
Call Collect
Dade (305) [illegible]
Broward (305) [illegible]

KANSAS CITY

DATA PROCESSING MANAGER

Johnson County recently acquired subsidiary of Fortune 100 company seeks a Data Processing Manager. Must be capable of coming in and taking over a System III Model 15 shop with CCP installed. The ability to dig in and bring systems and standards up to date is essential. Job reports straight to the General Manager. Salary to $32,000

DATA BASE ANALYST

Expanding 3032 shop under MVS with IMS DB/DC needs an innovative data base analyst. Prior experience with IMS required. Salary to $31,000

MANAGER

Sr P/A, lead analyst, or Programmer leader move up to your first management position. 100 million Midwest Manufacturing seeks a manager of systems and programming. Take over staff of 7 in 2 MEG 370/148 OS/VS, environment with two 4331's due in November. Excellent MBO package and opportunity to move to Data Processing Manager in two years. Salary to $[illegible]

SENIOR PROGRAMMER/ANALYST

Get involved in a top-notch K C manufacturing concern looking for a person with two plus years experience in business applications. Opportunity to learn CICS and DLI as well as move in to Systems area. High visibility. Present configuration is 370/148 DOS/VS and moving up. COBOL is essential. Salary to $27,000

MANUFACTURING PROGRAMMER

Expanding suburban Fortune 500 firm has a position for a solid manufacturing applications programmer. IMS/DB in an OS environment a plus, mfg application experience a must. Will work in project teams with heavy user contact. Challenging position affords an excellent career with an industry leader. Salary to $[illegible]

PROGRAMMER

Expanding DOS/VSE shop seeks an experienced COBOL programmer. CICS and DLI training provided. Solid corporation with good growth potential. Good benefits. Salary to $[illegible]

George [illegible]
ROBERT HALF
of Kansas City, Inc.
[illegible] W. 10th
Kansas City, MO [illegible]
(816) [illegible]

NEW YORK

OS COBOL

STATE-OF-ART environment insures virtually unlimited growth potential. 3+ years OS COBOL programming experience. IMS experience is a plus. Applications are marketing and financial with the emphasis on analysis. Management possibility in VERY NEAR future. $27,000

PL/I OS MVS SENIOR LEVEL

Challenging position for DP pro with high aspirations. 2+ years PL/1 programming experience. Financial applications experience is a definite plus. Environment is 370/168 OS MVS CICS. Outstanding training program will continually upgrade state-of-art knowledge. $[illegible]

DP MANAGER SYSTEM 34

Take over management of newly installed SYSTEM 34. 2+ years RPG II programming experience and management responsibility. Applications are A/R, A/P, INVENTORY and CASH DISBURSEMENTS. Ground floor opportunity. $[illegible]

FORTRAN CMS

Extraordinary opportunity to aid in conversion from outside time-sharing to IN-HOUSE. 1+ years FORTRAN and VM 370 experience. PL1 programming experience is a definite plus. Ground floor opportunity in pleasant working surroundings. $[illegible]

PDP 11/45 DP MANAGER

A REAL opportunity in this rapidly growing data center. 3+ years DEC, CDMS and BASIC or MUMPS programming with supervisory responsibilities. Will be responsible for staff management and design through implementation of business applications. A professional environment. $[illegible]

FINANCIAL SYSTEMS ANALYST

An excellent career enhancement. 3+ years in design through implementation of financial systems with experience in evaluating commercial software packages. Environment is Dual 370/168 OS, VS, CICS, DL1. Realistic growth potential. $[illegible]

[illegible]
ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY [illegible]
(212) [illegible]

MILWAUKEE

ASS'T DIRECTOR EDP

The president of this aggressive company is willing to directly support you with the planning and directing of EDP activities. Your expertise in teleprocessing & a solid DP background to evaluate and recommend hardware and software upgrades will provide you with a winning challenge. $30,000+

DATA BASE ADMINISTRATOR

IDMS experience! You will be totally responsible for integration of Data Bases, Data Relationship and Data Structures. This is a dynamic career path step. $28,000+

ROBERT HALF
of Wisconsin
777 E. Wisconsin Avenue
Milwaukee, WI [illegible]
(414) 271-HALF (271-[illegible])

SAN ANTONIO

PROGRAMMER/ANALYST

Degree preferred, Honeywell exp a MUST. COBOL language primarily used with Burroughs On-Line environment. Bonus plus benefits package growth/earnings potential with this Fortune 500 Company. $20-24,000

SYSTEMS PROGRAMMER

Education in DOS — IBM 370 environment DOS, CICS, COBOL, RPG II, utilities, On-line prog. Candidate must have 7 plus years in DP field with the last three being in systems work. Hardware evaluation exp a real plus. $[illegible]

PROGRAMMER

Degree preferred — 2 plus years of COBOL exp preferably in IBM/OS environment VS/VM, CMS, CICS, with financial exp a plus. Good growth and advancement with this Gulf Coast Company. $[illegible]

PROGRAMMER

Degree preferred, Burroughs COBOL and banking exp a MUST. On line and conversion expertise a real plus. Fast track company expanding staff. $[illegible]

Bob [illegible]
ROBERT HALF
of San Antonio, Inc.
First Natl Bank Bldg #[illegible]
San Antonio, TX [illegible]
(512) [illegible]

ALBUQUERQUE

IBM LARGE SCALE

Several financial institutions in New Mexico have immediate openings for senior prog/analysts and systems analysts. IBM 370 OS or DOS in COBOL and/or Assembler. CICS and Tele-processing. To $[illegible]

IBM SYS 3, 34

Several positions in this area ranging from P/A to Asst Manager to Director. Extensive knowledge of RPG II, CCP. Salary $18-30,000 dependent upon qualifications.

[illegible]
ROBERT HALF
of New Mexico, Inc.
P.O. Box [illegible]
Albuquerque, NM [illegible]
(505) [illegible]

SAN FRANCISCO

Bank Check Processing
Multiple openings
Programmers
Analysts
Project Leaders

SYS PROGRAMMERS IBM

DOS/VS, CICS, OS/VS, MVS, IMS. All relocation costs paid.

COBOL PROGRAMMERS

IBM DOS/VS, OS/MVS, IMS, CICS, Burroughs, Mini's

EDP AUDITORS

2-4 years in place. IBM, Extract, TSO ground floor opportunity.

SYSTEMS ANALYSTS

Several excellent opportunities in Manufacturing, Finance, Banking and Distribution applications in large IBM through Mini.

[illegible]
or
[illegible]
ROBERT HALF
of Northern California, Inc.
111 Pine Street
San Francisco, CA [illegible]
(415) [illegible]

ROBERT HALF

BOSTON

[illegible]

Leading electronics mfr seeks highly motivated indiv who thrives on responsibility, to manage small prof software staff of 10. Prior supvry & mfg apps exp desired. Rpts to the MIS Director. Hvy corp cmte interface. Salary $30,000 range

WORK STANDARDS ANALYST

Internal consulting staff of major fin'l svcs org seeks analytical indiv with work measurement & design exp for manual sys review & design. Large IBM mainframe & distributed processing environ. Proj leadership & automated sys exposure offered. Salary $23,000

DATA BASE ADMIN

Nat'l recognized elect mfr seeks take charge self-starter to manage DB/DC function. Hvy sys planning with fin'l, mfg & sales apps knowl desired. Opply to move forward in executive climate. Salary $[illegible]

PRODUCT ANALYST

Major mini vendor seeks mktg pro to develop new business products from concept through prototype. Will supv field tests, analyze results & rec further development. Exp in mini hardware & software pref. Salary $30,000 area

TECH WRITER

Major computer vendor seeks innovative, dynamic software writer to support user & systems documentation. Will work on small, prof staff. Hvy user interface coordinating with all mgmt levels. Salary $23,000

RETAIL SYSTEMS ANALYST

Leading retail chain seeks sr. systems analyst to lead in the design of new apps. Large IBM VM COBOL CICS environ. Retail or POS exp pref. Hi-visibility position leading to mgmt. Salary $28,000

MRP PROJECT MGR.

Fortune 500 mfr seeks software devel ldr with in-depth mfg & materials control exp to direct revitalization of corp systems. Major project admin exp in mainframe environ desired. Need tech mgr with VP potential. Salary $32,000

Gary [illegible]
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

MINNEAPOLIS/ ST. PAUL

SR MAS CONSULTANT

Large regional CPA firm has a newly created ground floor oppty. If you have 3-5 yrs CPA MAS bkgd you may qualify. Additional exp with the mini mkt and client contact will be very helpful. Excellent promotion possibilities. Salary to Low $30's

SR SYSTEMS ANALYST

Excellent position within Fortune 500 firm. Included in your 5 yrs DP bkgd you should have large scale Honeywell and data base exp, pref DM IV. Will be responsible for fin'l applications. Degree very helpful. Salary to Low $30's

[illegible]
or
Kathi Grant
ROBERT HALF
of Minneapolis/St. Paul, Inc.
2220 IDS Center
Minneapolis, MN 55402
(612) 339-[illegible]

PROVIDENCE

COPICS ANALYST

Dynamic hi-tech mfr seeks sr analyst for COPICS system devel. DL/1 CICS skills desired. Project mgmt potential. $30,000

PROGRAMMING SUPERVISOR

Prominent RI computer products mfr seeks D P pro. Supv med size staff, schedule projects, estab program stds & maintain software control. Systems analysis, COBOL, CICS & TOTAL bkgd. $28,000

PROJECT LEADER

Aggressive fin'l svcs co desires sr prog analyst to lead proj team in design & installation of major fin'l apps. Knowl of OS JCL COBOL BAL. Project planning & control + on-line systems exp req. $25,000

SYSTEMS PROGRAMMER

Ind leading mfr seeks indiv with strong tech & communicative skills. 3031 DOS/VS, CICS & DMS CMS pref. Career growth to tech support mgmt. $25,000

PROGRAMMER/ANALYST

Prestigious ins co desires skills app programmer with heavy CICS & IBM Assembler exp. Solid D P apply in excellent project environ. $22,000

Robert Laffey
ROBERT HALF
of Providence, Inc.
400 Turks Head Bldg.
Providence, RI 02903
(401) 274-8700

LOUISVILLE

MAS CONSULTANT

If you are traveling a great deal with your current position and would like to get off the road, two CPA firms in the Louisville area are interested in someone with 3+ years consulting experience with mini computers. Manufacturing or healthcare background preferred. Relocation and interview expenses paid. Degree a must, higher a plus.
Starting salary to $28,000

SYSTEMS PROGRAMMER

Louisville based manufacturing firm is seeking a heavy systems programming type. IMS, DL/1 background is a must. Co is installing a 4331. A degree is a plus not a must. Excellent benefits and relocation plan. Call me collect today.
Starting salary to $30,000

PROGRAMMERS

Louisville based firms are looking for COBOL and Assembler programmers. If your background is banking, mfg, retail or hospital 1 or more years working experience is all that is required.
With degree salary to $24,000
With no degree salary to $21,000

Tom Williams
ROBERT HALF
of Louisville, Inc.
444 South Fourth St.
Louisville, KY 40202
(502) 584-1751

W. MICHIGAN

SYSTEMS PROGRAMMER

Exciting "ground floor" opportunity in smaller shop ready for major EDP expansion. Install new 4331, head up future tech support. Must be familiar with DOS/VS operating systems, CICS. Salary negotiable to high $20's.

Joseph [illegible]
ROBERT HALF
of Western Mich., Inc.
100 Division N. Suite 302
Grand Rapids, MI 49503
(616) [illegible]

HARTFORD

CONSULTANTS-EUROPE

Opptys in Europe, Africa for indiv's with design exp in harbor/airport automation, traffic, routing, ship-building, etc. 2 yr assign with salary $37+ with expenses & housing.

SYSTEMS MANAGER

Conn insurer seeks indiv to direct all sys devel proj. IBM exposure along with current mgmt exp req for this very visible, promotable situation. Salary to $37,000

EDP AUDITOR

Conn opening for indiv with industrial D P Sys exp & exposure to the audit process. Cand will work in small unstructured environ in div of lge nat client. Salary to $30,000

SALES SUPPORT

Lg data comm vendor seeks indiv's for multiple U.S. locations to provide IBM-compatible TP product support. Network design, SNA, VTAM, etc exp. Salary to $32,000+

SR D B SPECIALIST

Major fin'l corp seeks exp analyst to install & maint D B software. Knowl of MVS, CMS, & CICS. Hi-visibility pos w/heavy exp & vendor interface. Salary $30,000+

SR ANALYST PROG

Diversified fin'l firm desires proven COBOL exp to participate in analysis & design of on-line, interactive system. DMS/CICS highly desirable. Multi-user environ. Premier corp. Salary $25,000

TECH ADVISOR

Outstanding Conn based corp seeks exp D B or Telecomm pro with strong IBM OS hardware/software knowl to research & plan develop tech to support major app sys. Salary to $28,000

Stan [illegible]
Paul [illegible]
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

LONG ISLAND

SYSTEM 38 ASSISTANT MANAGER

Attend IBM 38 School this fall. Move up to DP Mgr in 2 yrs. Receive unbelievable benefits including Medical, Dental, Bonus, Profit Sharing, and Cost of Living increases ... and the salary will go to Mid $20's

All this for 2+ yrs System 3 RPG II and some CCP knowledge

[illegible]
[illegible]
ROBERT HALF
of Long Island
400 Jericho Tpke.
Jericho, NY 11753
(516) [illegible]

CHICAGO

PROGRAMMER/ANALYST

Excellent opportunity. Exposure to sophisticated state-of-the-art equipment (hardware and software). Two plus years experience with IBM software: IMS, structured, COBOL, and IBM hardware: IBM 370/158, OS/MVS. Outstanding company benefits. Salary to mid $20's.

[illegible]
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) [illegible]

BUFFALO

SR SOFTWARE PROG

Exp at an advanced level required to fill this software position. Should be creative & competent in software eval & selection, analysis of software problem solution, & writing operational specs. Able to do SYSGENS. $30,000

MFG SYSTEMS ANALYST

Leading industrial mfr will employ a mfg systems pro to head up ambitious implementation program. Key is heavy involvement in production control, order entry, & MRP. Strong planning skills req + bkgrd in large scale remote systems implementation. $30,000

DATA BASE MGR

Corp level position req technically competent analyst to take resp for start up & staffing of DATA BASE dept. Must have excellent knowl of IMS. Will estab data dictionary & develop DATA BASE Toolkit enough to service nation-wide system. $40,000

EDP AUDIT

Large well known WNY co w/both domestic & internat business needs unique pro for EDP audit spot. A CPA with a min of 5 yrs combined exp in auditing & fin'l controls + strong skills in D P will satisfy this requirement. Must be a qualified fin'l sys analyst to handle this high visibility pos. $35,000

Pam Siegel
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) [illegible]

COLUMBUS

SYSTEMS ANALYST

BS in Computer Science, Statistics, or math. 3 plus years IBM OS-JCL experience. CICS-Command Level, USAM-Librarian a plus. N E Ohio. Salary $24,000+

PROGRAMMER

2 years experience with COBOL in manufacturing. MRP Inventory Control a plus. HONEYWELL 6-6-20 A progressive new mfg system. Mid Ohio. Salary $19-22,000

PROGR/ANALYST

370/158 OS/MVS Environment with IMS, CICS, ROSCOE. Structured COBOL a must. A well organized professional shop with room for growth. Salary $23,000

[illegible]
ROBERT HALF
of Columbus, Inc.
88 E. Broad St. [illegible]
Columbus, OH 43215
(614) 221-[illegible]

BALT / WASH

SYSTEMS PROGRAMMER

Key position with a blue chip corporation! Hands on experience in a challenging, classic systems programmer's position. Need a trouble shooter! Much room for growth as company is expanding! Required: 2 years' experience DOS, VS, POWER, (CICS is helpful). $30,000

ROBERT HALF
of Baltimore, Inc.
217 The Quadrangle
Baltimore, MD 21210
ask for Carol
(301) 323-7770

ROBERT HALF
of Washington, Inc.
7316 Wisconsin Ave.
Washington, DC 20014
ask for Bobbi
(301) [illegible]

DALLAS

SOFTWARE SPECIALISTS

We are currently filling key positions for several NYSE listed clients. All require IBM, OS or DOS systems background. Specifically, positions require one or more of the following: IMS, CICS, MVS, DOS-VS, DL-1, or assembler. To $32,000

PROGRAMMER/ANALYST

Rapidly expanding shop looking for programmers interested in development work. Must have IBM-OS, COBOL background. Excellent career advancement potential. To $24,000

PROJECT LEADER

Excellent career position. Client needs people with leadership ability. You will be working on leading edge technology. Requires OS/COBOL, analytical skills. To $28,000

NEW DEVELOPMENT

Need Systems Analysts, Project Leaders and Programmers for involvement in a credit reporting system. Requirements include OS JCL, COBOL and/or assembler programming skills. To $28,000

PROGRAMMER/ANALYST

Shop converting from DOS to OS. Will train in on-line programming if needed. Outstanding relocation policy. Small town environment. Requires one or more years COBOL. To $22,000

John [illegible]
ROBERT HALF
of Dallas, Inc.
Two North Park East
Suite 710
Dallas, TX 75231
(214) [illegible]

SOUTHERN CALIFORNIA LOS ANGELES

PROGRAMMER ANALYSTS

Requires 4+ yrs DOS VS-COBOL, good analysis and solid CICS. Background in BAL a+. To $32,000

Mini computer Sys Prog with BAL, FORTRAN, T/P & data base. Maintain software. To $30,000

[illegible]
ROBERT HALF
of Los Angeles, Inc.
3600 Wilshire, Suite 2000
Los Angeles, CA 90010
(213) [illegible]

COMMERCE

SYSTEMS ANALYST

Fast growth firm in oil related field. Management potential the key. Consulting services experience a plus. To $35,000 base

[illegible]
ROBERT HALF
of Los Angeles, Inc.
[illegible] E. Telegraph Road
Commerce, CA [illegible]
(213) 721-[illegible]

ORANGE COUNTY

DATA PROCESSING SYSTEM ANALYSTS, PROGRAMMER ANALYSTS, OPERATIONS

Many career opportunities in beautiful Orange Cty business and manufacturing opps. Exceptional long term potential. To $30,000

[illegible]
ROBERT HALF
of Orange County, Inc.
2000 N. Broadway, [illegible]
Santa Ana, CA 92706
(714) [illegible]

ST. LOUIS

OPERATIONS SUPERVISOR

Leading financial institution has immediate opening for "hands on" operator large hardware with 2 years minimum supervisory experience. Familiar with banking procedures and item processing. To $20,000

COBOL PROGRAMMER

Strong programming skills with 2-4 years experience qualifies you for this exceptional salary and growth oriented firm. Excellent fringes. To $20,000

PROGRAMMER/ANALYST

Interested in small town country living? Position located 100 miles east of St. Louis. IBM Systems 3/15D CCP looking for 1 year minimum experience with RPGII, all applications. Systems 38 on order. Unique position! Our exclusive client. To Low $20's

DP PROJECT MANAGER

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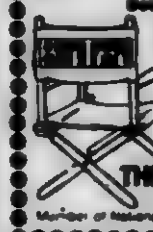

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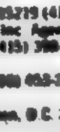

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Pasadena, CA 91107
(213) 351-8686

An Equal Opportunity Employer

OLE'S HOME CENTERS

Data Processing

SYSTEMS PROGRAMMERS

Are you looking for a challenging position in systems with an exceptional opportunity for professional growth. Hunter College is seeking two qualified individuals with experience in systems programming to provide technical support services for an IBM 370/145 (1 MEG) OS/VS1 operation, currently implementing an on-line database management system utilizing IDMS DB/DC, and planning to upgrade to an IBM 4341 next year.

Responsibilities: Maintenance of all operating systems software. Technical support for operations and programming staff. Systems performance analysis and tuning.

Requirements: Solid IBM Assembly and OS JCL background. VS1 Sysgen and maintenance experience preferred. IDMS DB/DC experience desirable. Baccalaureate degree or equivalent years of education and/or experience.

Competitive salary and excellent fringe benefits including 5 weeks vacation. Send your resume and salary history in confidence to Mr. John P. McGrath, Director, Computing Center, Box 291, Hunter College, 695 Park Ave., New York, N.Y. 10021.

An Affirmative Action/Equal Opportunity Employer.

DIRECTOR HOSPITAL INFORMATION SYSTEMS

Join our expanding national health care consulting facilities management firm. We are a multi-technology firm servicing over [illegible] hospitals across the U.S. with financial and on-line clinical computer systems. We are seeking individuals with hospital experience with large scale [illegible] Systems and a proven record of achievement. The following positions are available:

Director of Information Systems

Programming Manager

Present location is in the midwest. We offer top starting salaries, comprehensive benefits and excellent growth potential. Reply with resume and salary history to:

[illegible], Inc.
1970 Chain Bridge Rd., Ste. [illegible]
McLean, VA 22102
703/821-[illegible]

Offer of Employment to Experienced Personnel

SR. PROGRAMMER

Opening for Sr. Programmer experienced in EDL and FORTRAN languages, with IBM Series/1, EDX, operating system.

Full responsibility for design and implementation of programs. Attractive salary and benefits. Outstanding opportunity for ambitious applicant.

Please forward resumes directly to:
Director, Commodities Division
Servest Corp.
[illegible] Madison Ave., [illegible] Floor
New York, N.Y. [illegible]

MINNEAPOLIS

Never A Fee. Salaries $15-40K. Needs in all areas. Our staff totals 40 years DP exp., including 12 years continuous DP placement in Minn. Contact us in Confidence.

Systems Search (612) [illegible]
The DP People
[illegible] Office Park Building
Suite [illegible]
[illegible] Ave. North East
Minneapolis, MN 55421

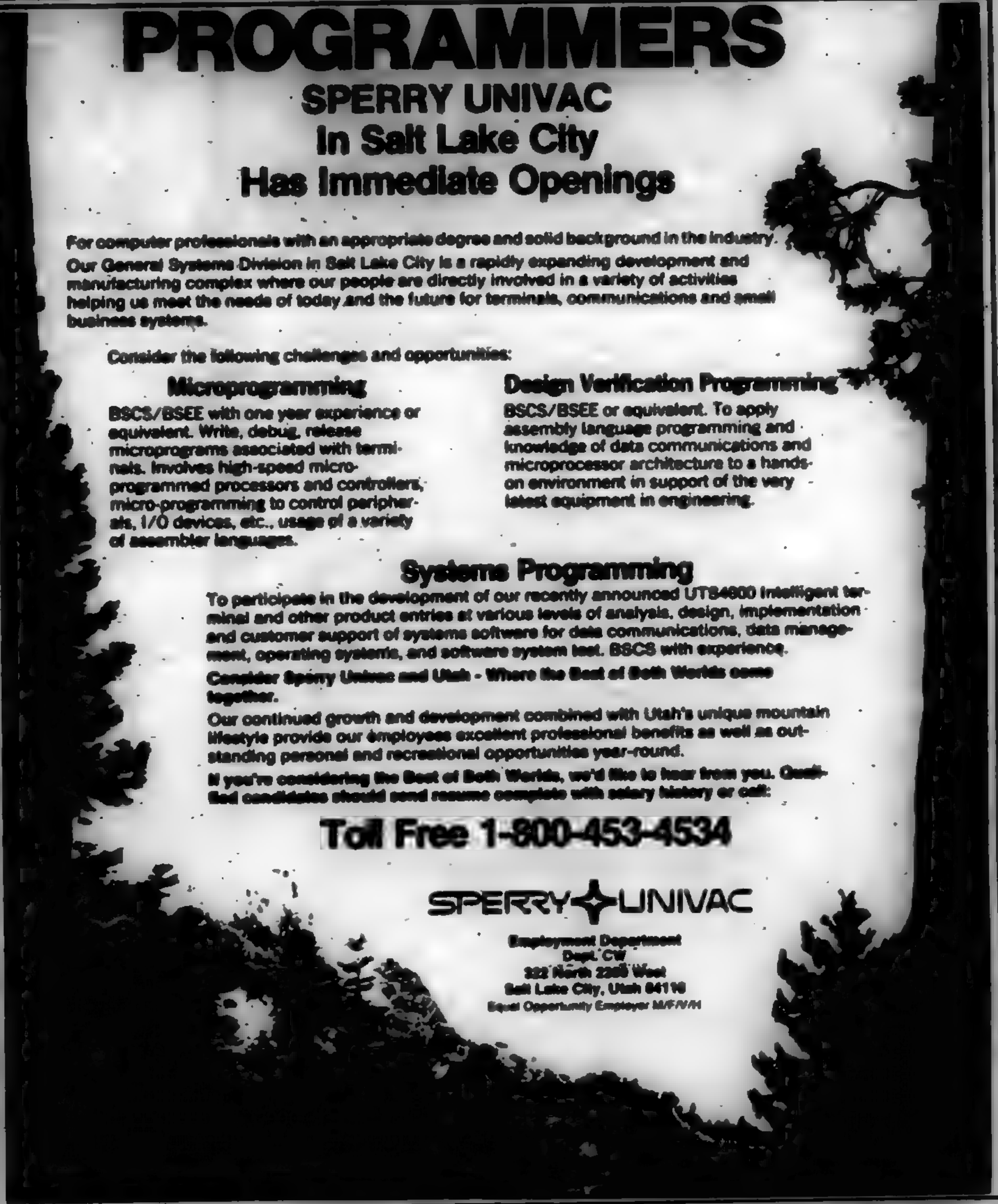
PORTLAND, OREGON

The nation's livable city has several openings in Data Processing. Among them are:

[illegible]

To investigate your future in the beautiful Pacific Northwest, call (503) [illegible] or send your resume to:

DP DEPARTMENT
[illegible] AND ASSOCIATES, INC.
[illegible] S.W. ALDER ST. SUITE 711
PORTLAND, OR. [illegible]



PROGRAMMERS

SPERRY UNIVAC In Salt Lake City Has Immediate Openings

For computer professionals with an appropriate degree and solid background in the industry.

Our General Systems Division in Salt Lake City is a rapidly expanding development and manufacturing complex where our people are directly involved in a variety of activities helping us meet the needs of today and the future for terminals, communications and small business systems.

Consider the following challenges and opportunities:

Microprogramming

BSCS/BSEE with one year experience or equivalent. Write, debug, release microprograms associated with terminals. Involves high-speed microprogrammed processors and controllers, micro-programming to control peripherals, I/O devices, etc., usage of a variety of assembler languages.

Design Verification Programming

BSCS/BSEE or equivalent. To apply assembly language programming and knowledge of data communications and microprocessor architecture to a hands-on environment in support of the very latest equipment in engineering.

Systems Programming

To participate in the development of our recently announced UTS4000 intelligent terminal and other product entries at various levels of analysis, design, implementation and customer support of systems software for data communications, data management, operating systems, and software system test. BSCS with experience.

Consider Sperry Univac and Utah - Where the Best of Both Worlds come together.

Our continued growth and development combined with Utah's unique mountain lifestyle provide our employees excellent professional benefits as well as outstanding personal and recreational opportunities year-round.

If you're considering the Best of Both Worlds, we'd like to hear from you. Qualified candidates should send resume complete with salary history or call:

Toll Free 1-800-453-4534

SPERRY UNIVAC

Employment Department
Dept. CW
322 North 2200 West
Salt Lake City, Utah 84116
Equal Opportunity Employer M/F/V/H

CENTRAL FLORIDA DIRECTOR OF DATA PROCESSING

Headquarters for a multi-state corporation is seeking a professional manager to direct expanding scope of data processing functions. The person in this position will direct all data processing activities for the company.

Responsibility includes supervision of computer, operations, data communications, systems analysis, programming and support functions, feasibility studies, planning for short and long-range systems design and development.

Successful candidate will have a strong commercial management and technical background. Other key attributes for this position include a degree in business and recent experience in distributed on-line processing, formalized departmental reporting and control, and knowledgeable about data security.

Information submitted for consideration must be complete and contain salary history. Write: CW Box 3419, 375 Cochituate Rd., Rte. 30, Framingham, Mass. 01701.

SENIOR PROGRAMMER ANALYST

The Department of Physics and Astronomy of The University of Iowa has an immediate opening for a Senior Programmer Analyst to prepare and develop computer scientific programs for processing of space physics data received from several instruments on NASA spacecraft. Programming will be for a UNIVAC 418 system, IBM 370/168, and/or on a remote time-shared basis via a high-speed data link with a NASA computer system. Requires a bachelor of science degree in Computer Science, Mathematics, or Physics or an equivalent combination of education and experience; a master's degree is desirable. Requires knowledge applicable to scientific programming; requires a knowledge of Fortran, Machine Language and Assembler Language. Management experience is desirable. Salary: $16,410 - $[illegible] commensurate with education and applicable experience. Applications should be submitted to T.S. [illegible], Department of Physics and Astronomy, The University of Iowa, Iowa City, Iowa [illegible]. The University of Iowa is an Equal Opportunity-Affirmative Action employer.

Prestigious NYC based firm is seeking experienced individuals to fill positions in their MIS department.

Qualified candidates will utilize their expertise in an expanding state-of-the-art environment. Requirements are as follows:

- **PROGRAMMER**
- **PROGRAMMER ANALYST**

At least 1-3 years OS/COBOL, OS/JCL, TSO. To $22K.

SENIOR ANALYST

At least 3 years analysis and design in on-line or batch environment. Must have ability to interface with upper management. To $30K.

TECH SUPPORT

IMS-fully trained in BAL and MVS software. At least 1 years of IMS internals. CICS-Assembler and macro coding, CICS/VS facilities. At least 2-3 years experience. To $34K.

Please send resume or contact:
Dave Wilson
30 Lansdowne Avenue
Box 137
Lansdowne, Pennsylvania [illegible]
An Equal Opportunity Employer M/F

Modern, Progressive University in a beautiful college town is looking for a

SYSTEM PROGRAMMER

with MVS or JES2 experience. 20 days paid vacation per year. Additional liberal benefits. Salary open. Contact:

Personnel Officer, Computer Services
BOWLING GREEN STATE UNIVERSITY
Bowling Green, Ohio 43403
BGSU is an Equal Opportunity/Affirmative Action Employer.

DALLAS

SR. PROG/ANALYST

This could be your chance for project responsibility with 2-3 person team. Degree required with 3+ yrs. exper. [illegible] in MVS, COBOL, Command Level CICS, & [illegible]. To [illegible].

Suite 1100, Stemmons Tower W
Dallas, TX 75207 (214) 637-4290

DATA PROCESSING CAREERS inc

ATTENTION: DATA PROCESSING PROFESSIONALS

Walt Disney productions, in conjunction with its many divisions, is seeking additional qualified professionals to join us in meeting the challenges of unprecedented growth and expansion.

PROGRAMMER/ANALYSTS

Successful applicants will have 3 or more years of solid application experience in COBOL on UNIVAC Series 90 or IBM mainframes. IMS/90 Action Programming experience is a plus.

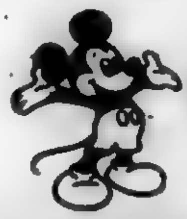
We now have, and will be developing, major on-line and sophisticated batch systems. Because of our unique business position, we are involved in nearly all areas of applications expertise, including financial, marketing and sales, travel agency operations, manufacturing, and a full range of employee-related systems, including group insurance.

SYSTEMS PROGRAMMERS

In this challenging position, as member of the Technical Support group, you will be responsible for developing software utilities, for maintaining operating systems, and for supporting major telecommunication networks in a multiple UNIVAC 90/80 environment. The position requires UNIVAC Series 90 or IBM assembly language programming proficiency with a minimum of 1-2 years experience in one or more of the following areas:

Virtual Memory Internal
VM Systems General/Maintenance
Technical Support
Performance Analysis

If you want to join the Disney team of professionals who work in an interactive program development environment, on large-scale virtual systems, please send us your resume and salary history to Andy Heck:



WALT DISNEY PRODUCTIONS
Professional Staffing-
500 S. Buena Vista St. Dept. 39C
Burbank, CA 91521

Equal Opportunity Employer

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HOUSTON EDP PROFESSIONALS

Relocation to HOUSTON is easier than before. I have some companies that pay real estate agent fees on both ends, will pay interest differentials, total household move including packing and unpacking and expense-paid house-hunting for you and spouse.

Experience needed in:

1. IBM 370/OS or 370/DOS/VS.
2. COBOL or Assembler Language
3. Financial or business or Accounting or manufacturing applications experience.
4. PLUSES ARE: IMS/CICS

Positions Available: (Several of each)

IMS DATA BASE ANALYST. . .to $35,000
SYSTEMS PROGRAMMERS. . .to $33,000
SR. ANALYSTS. . .to $31,000
ANALYSTS. . .to $28,000
PROGRAMMER ANALYST. . .to $25,000
PROGRAMMERS. . .to $24,000

Good benefits in all companies some include DENTAL.

For further information on the current Houston job market, call JIM FLEMING (collect) at 713/[illegible].

ROBERT HALF
OF HOUSTON, INC.
720 N. Post Oak Rd. — Suite 220
Houston, TX 77024

Programmers

SYSTEMS PROGRAMMER

Makro is part of S.H.V., one of the largest holding companies in Holland. We have proved our concept of "Cash and Carry" wholesale marketing to trade customers in Europe, South Africa and South America. Now, we are opening in the United States. This is a ground floor opportunity!

The job requires 2-5 years experience in a DOS/VS environment with knowledge of COBOL and POWER.

Experience with ICCF and CICS is a plus. Requires some program development. Will be working with an IBM 4331 DOS/VSE system. Individual capable of working with minimal supervision.

We offer excellent salary and benefits and the chance to move up quickly with an international leader in Self-Service wholesale marketing. For immediate consideration send your resume with salary history to:

makro
Personnel Director
P.O. Box 2780
Landover Hills, MD
20784

MAKRO IS NEW IN TOWN ...BUT NOT IN BUSINESS

makro

PROGRAMMERS - ANALYSTS NATIONWIDE TO $40,000

Scientific, Engineering and Manufacturing applications with companies committed to professional development. Send resumes, salary history and geographical preference to:

BILL STEIN
CORPORATE RESEARCH
3540 Secor Rd.
Toledo, Ohio 43606
(419) 536-1941

Computer Science Faculty Position:

Teaching 12 hrs. per week, lower and upper division undergraduate computer science courses with emphasis in M.I.S. M.S. in Computer Science or M.B.A. with current expertise in Computer Science; college teaching experience desirable. Available Jan. or Sept. 1981. Rank dependent upon qualifications. Salary competitive. Primary computer DEC System-10. Submit letter of application, vita, list of references, and transcripts to [illegible], Director of Personnel, [illegible] College, [illegible], PA 17[illegible]. Continuous screening of applications until Dec. 1, 1980. An affirmative action/equal opportunity employer.

UNIVERSITY OF WISCONSIN OSHKOSH

Applications are invited for a tenure track position in a rapidly growing computer science department. The department offers a B.S. degree program and invites applicants to participate in the program. All specialties in the computer sciences will be considered. Applicants should have a Ph.D. in computer science or a closely related field. Those in the final stages of their Ph.D. requirements will be considered. The starting date for the position is Jan. [illegible], 1981 and the application deadline is Dec. 15, 1980. Applicants should include a resume, a copy of graduate transcripts, and three letters of reference with the letter of application to: Dr. [illegible], Computer Science Department, University of Wisconsin-Oshkosh, Oshkosh, WI [illegible]. UW-Oshkosh is an affirmative action/equal opportunity employer.

DATA PROCESSING INSTRUCTOR

San Francisco Bay Area

An innovative training institute for foreign technicians has an immediate opportunity for a Data Processing instructional professional.

Systems Programmer/Instructor

You will maintain a Magnuson M80/3 computer system operating CICS and CMS and will instruct students in IBM assembler programming. Applicants must be experienced in IBM OS/VS systems and be a fluent assembler programmer. Some instructional experience required.

Salary for this position is commensurate with experience and competitive within the Data Processing industry. Excellent benefits program including attractive relocation assistance. Send resume (salary history required) to Harry T. Dalk, Director of Personnel Dept.

SYSOREX INSTITUTE

An educational service of
SYSOREX INTERNATIONAL, INC.
10050 N. Tantau Avenue
Cupertino, CA 95014
(408) [illegible]

An equal opportunity employer

MANAGER, TECHNICAL SERVICES

Corporate MIS Organization

We are a Fortune 500 international corporation offering a highly diversified range of products to industrial and commercial organizations in both domestic and foreign markets.

Steady growth requires us to seek a talented and innovative individual for a key management position.

If you have the following qualifications, we want to talk to you!

- College degree required, with an M.S. in Computer Science desired
- 7-10 years demonstrated experience with large-scale Burroughs operating systems
- At least 3 years successful EDP management in a systems environment
- Additional background in computer operations on a supervisory level
- Good working knowledge of data base structures in an on-line/real-time environment
- Good understanding of data communications

This management position offers excellent salary and benefits as well as career advancement. Please send confidential resume including position and current earnings to:

CW Box 3011, 375 Cochituate Rd., Route 30,
Framingham, Ma. 01701
An Equal Opportunity Employer, m/f

Programming

SYSTEMS PROGRAMMER
and
SCIENTIFIC PROGRAMMER

KMS Fusion, Inc. in Ann Arbor has an opening for a Systems Programmer (Code 80-019). Successful candidate must be a degreed individual who desires to take on responsibilities in the design and implementation of software to support a DECNET data acquisition network. Experience with DEC operating systems and PDP 11 assembler is essential; knowledge of FORTRAN preferred.

We're also seeking a Scientific Programmer (Code 80-018) with a math/physics background (Masters or equivalent experience) to assist in the development of software to simulate inertial fusion phenomena. Knowledge of FORTRAN and numerical analysis preferred.

Candidates for these positions must be United States Citizens and be able to obtain a Security Clearance. Send resume/application with salary history/requirements to:

Personnel Office - Code 80-018 or 80-019

kms
fusion
inc.
P.O. Box 1567
Ann Arbor, MI 48106

[illegible] Employer M/F

TROPICANA
OPPORTUNITIES IN THE 80's

Dramatic growth has created a need for staff expansion. Challenging opportunity to join in state-of-the-art development in large Burroughs environment.

SYSTEMS ENGINEER

Professional Engineer with BSEE and 1 or more years microprocessor, process control system experience in a large complex manufacturing environment. Good communication skills.

BUSINESS SYSTEMS ANALYST

Creative people with a degree in computer science or related field combined with 1 or more years experience interfacing with various aspects of Accounting and Human Resources within a manufacturing environment.

To investigate these opportunities, submit resume and salary history to:
C. Dowell, Dept. 978.

TROPICANA PRODUCTS, INC.
P.O. Box 338
Bradenton, Fl. 33506
An Affirmative Action Employer M/F

SOFTWARE SUPPORT PROFESSIONALS

ARE YOU A SOFTWARE
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- PROBLEM SOLVER
- CONSULTANT
- TEAM PLAYER
- INNOVATOR?

If so, call Digital's Telephone Support Center in Colorado Springs, 1-800-525-7101 or 7429.
IN COLORADO CALL US COLLECT AT 1-599-4111 x2470.

Our Telephone Software Support Center has set new precedents in software customer service. Staffed by teams of software professionals and equipped with state-of-the-art computer systems, the center provides round-the-clock software support services to our customers in the U.S. and Canada. And it's been so successful in maximizing systems productivity that we'll be significantly increasing our staff in Colorado Springs over the next 9 months.

We want to talk to you if you have: The communication skills to consult with our customers on a one-to-one basis; the ability to work as team player — while researching and structuring innovative solutions to complex software problems; and the energy to take advantage of the managerial and technical growth opportunities our expansion will create.

We will also want you to have the know-how to work in one of many openings at the following levels:

SENIOR SOFTWARE SPECIALIST

VAX/VMS TEAM: Requires at least 4 years in computer operating systems as a systems programmer (maintenance consulting or development) with at least 1 year VAX/VMS experience. MACRO language experience plus operating systems concepts are necessary.

RSX 11M/M PLUS TEAM: Requires at least 4 years RSX-11M experience in operating systems as a systems programmer (maintenance consulting or development). Operating concepts plus MACRO language experience is a must.

SOFTWARE SPECIALIST

RSX 11M/M PLUS TEAM: Requires at least 2-4 years experience in operating systems support, consulting or development, with 2 years experience with RSX-11M. MACRO 11 experience and a working knowledge of operating systems concepts are needed.

VAX/VMS TEAM: Requires at least 2-4 years experience in operating systems support, consulting or development. VAX/VMS experience is not required but would be a plus. ASSEMBLY language experience and a working knowledge of operating systems concepts are a must.

All positions offer competitive salary/benefits package, relocation assistance to Colorado Springs; an area with clean air, a reasonable cost-of-living and a wide variety of recreational and cultural attractions.

Our lines will be open 8 a.m. to 6 p.m. (MST). Ask for Larry Crockett. If you are unable to call, please send your resume with salary requirements to: **Larry Crockett, Digital Equipment Corporation, Dept. 1013 3007, 301 Rockrimmon Blvd. South, Colorado Springs, Colorado 80919, c/o TSC/DDC Personnel.**

We are an equal opportunity employer, m/f/h.

digital

We change the way the world thinks.

NIGERIA COMPUTER PROFESSIONALS

Nigerian Nationals Are Required By The Shell Petroleum Development Company Of Nigeria Ltd.

SYSTEMS ANALYST/DESIGNER

Requires a BS or equivalent in a technical or commercial discipline plus at least 2 years COBOL or FORTRAN programming experience and 1 year Systems Analysis or Design experience. Knowledge of on-line programming and mini-computer applications a plus. Starting salary: ₦10,000.

SENIOR PROGRAMMERS

Requires a BS or equivalent in a technical or commercial discipline plus at least 2 years COBOL or FORTRAN programming experience. Starting salary: ₦9 000

THE PROFESSIONAL ADVANTAGES: You'll work in an IBM 370/145 environment under DOS/VOS, in our Lagos office. Should you be transferred to our Eastern Operations Division in Port Harcourt you'll find an equally progressive IBM 370/135 installation, and an IBM 3780 RJE Terminal in our Western Operations Division in Warri, linked via microwave to Port Harcourt. Throughout the entire operation you'll deal with the latest concepts in interactive processing and mini-computer applications plus a wide range of commercial and technical systems development, for stimulating and interesting variety.

***ELECTRICITY ALLOWANCE**
Staff earning less than ₦9,033 p.a. will be paid ₦35 p.m. Staff earning ₦9,033 p.a. and above will be paid ₦50 p.m.

LEAVE ALLOWANCE
Leave allowance is the equivalent of one month's basic salary free of tax.

LEAVE TIME
Senior Staff are entitled to annual leave of 36 consecutive calendar days. Public Holidays falling within the leave period may be added to the annual leave.

MEDICAL
The Company runs medical insurance schemes for in-patient and out-patient treatment.

PROBATIONARY PERIOD
All new staff will have to undergo a probationary period of one year.

PROVIDENT FUND
An Employee becomes eligible for membership of the Fund on confirmation of his appointment. The employee contributes 5% of that part of his salary which is in excess of the level of salary on which contributions are payable to the National Provident Fund. The Company contributes into the Fund 7.5% of his annual basic salary on his behalf.

PENSION SCHEME
Members of the Shell-Nigeria Provident Fund are automatically members of a non-contributory pension scheme. Pension age is 55 years for men and 50 years for women.

HOME OWNERSHIP SCHEME
On confirmation of his appointment the employee is eligible to join the Company's Home Ownership Scheme which assists staff to obtain mortgages from the Federal Mortgage Bank to purchase or build a house for their own occupation.

AMOUNT OF HOUSING SUBSIDY
Staff earning less than ₦6 956 per annum
Staff earning ₦6 956-₦11 082 per annum
Staff earning ₦11 083-₦14 985 per annum
Staff earning above ₦14,985 per annum

LAGOS		WARRI PORT HARCOURT	
₦150 per month	₦210 per month	₦135 per month	₦185 per month
₦175 per month	₦260 per month	₦155 per month	₦225 per month

STAFF IN COMPANY ACCOMMODATION
Staff in Company provided accommodation will not receive the Housing Subsidy. Other staff temporarily occupying Company provided bachelor accommodation in outstations and those on short term transfers will both normally be eligible for Housing Subsidy provided they are not retaining a Company house.

Should staff in Company provided accommodation vacate such accommodation the appropriate rate of Housing Subsidy will apply.

*Taxable

Interested applicants should submit resume to Recruitment Department 102

SCALLOP CORPORATION
1 Rockefeller Plaza, New York, N.Y. 10020
Scallop Corporation is a
Royal Dutch / Shell Group Company
An Equal Opportunity Employer M/F

Supervisor of Technical Support

Challenging position for an innovative technical specialist to provide support of a medium scale Burroughs Medium System. Knowledge of B-4000 architecture, the MCP operating system, RJE, CANDE, DMSII, NDL; and Utility software is essential. Candidate should have 4-6 years experience, degree preferred.

Badische Corporation is a multi-plant manufacturer of chemicals, fibers and yarns. This is an immediate opening in our central computer facilities at **ANDERSON, SOUTH CAROLINA.**

If interested, please send resume, including salary history, to: Manager, Professional Placement

Badische Corporation
P.O. Drawer D
Williamsburg, Va. 23185

Member of the BASF Group
an equal opportunity employer m/f

SUNY Two-Year College Data Processing Faculty

Tenure track position for January 1981. Knowledge of Basic, Fortran, Cobol, RPG, Systems/Assembly req. Master's preferred, teaching/industrial exp. desirable. Salary and rank negotiable. Excellent fringe benefits. For info/applic. write before October 31 to: Mr. Frederick [illegible], Business Division, SUNY Ag. & Tech. College, Cobleskill, NY 12043. EEO/AA.

PROGRAMMER

Ohio University is currently expanding its staff and needs a programmer with experience in an academic or university computing environment to assist in the development of computer graphics and plotting capabilities.

Outstanding employee benefits include paid insurance, vacation, sick leave, tax paid holidays, tuition reimbursement, and other University benefits.

Salary range [illegible] to [illegible].

Send resume to Larry [illegible], Director, Ohio University Computer Center, [illegible] Hall, Athens, Ohio 45701.

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(That's why you see so many of them.)

COMPUTERWORLD

DATA PROCESSING

Career Perspective in American Banking

The Federal Reserve System. We work so closely with the Government to insure stability in the American banking system, that some people think we're a branch of the Government. Actually, we're not. We're the banks' Bank. We can offer you unique perspective in your career as a computer professional.

If you are an experienced programmer/analyst, systems programmer, data base analyst or a project leader, The Fed has a lot to offer you. To meet our money management goals, we use sophisticated computer applications for everything from pure economic research to electronic funds transfer. The majority of our banks have advanced telecommunications systems using the latest in SNA architecture, state-of-the-art technology (most locations have IBM hardware utilizing IMS or TOTAL/D) and unique applications development work. Opportunity at The Fed can be found in some of the country's most exciting cities: Boston, New York, Philadelphia, Cleveland, Richmond, Atlanta, Chicago, St. Louis, Minneapolis, Kansas City, Dallas, San Francisco and Washington, D.C.

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The 12 districts of the Federal Reserve System

You'll find competitive salaries, a pay-for-performance merit program, excellent benefits, relocation assistance. And plenty of opportunity for training so you can grow with an organization that's growing to meet complicated economic needs. If you're a computer professional, doesn't it make sense to put your career in perspective with The Federal Reserve System? Call our toll-free number 1-800-821-7700, ext. 103 (in Missouri call 1-800-892-7656) and we'll send you more information. Or, if you prefer, you may send your resume to The Federal Reserve System-DP, P.O. Box 7702, San Francisco, CA 94120. The Federal Reserve System is an equal opportunity employer.

Federal Reserve System

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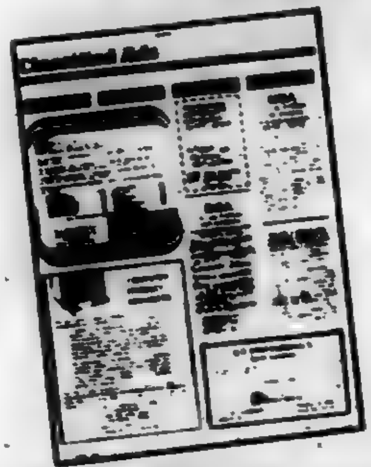

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Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

DATA PROCESSING CAREERS IN PHOENIX

American Express in Phoenix, Arizona has exceptional opportunities for data processing professionals. Our EDP facility houses state-of-the-art systems and hardware, including the latest IBM mainframe and peripheral devices, as well as MVS, ACP and IMS software. If you're interested in a career that offers both professional challenge and the relaxed outdoor lifestyle of sunny Phonix, consider the following positions:

SYSTEMS PROGRAMMER - ACP

Requires knowledge of ACP systems generation; ACP control program internals, maintenance, tuning and debugging techniques; and proficiency in Assembler language.

SYSTEMS PROGRAMMER - VTAM/IMS

Specifically needed is knowledge of VTAM and IMS DB/DC generation, operational, maintenance, and tuning parameters and techniques; expertise in use of SMP for IMS DB/DC.

PRODUCTION CONTROL COORDINATOR

Candidate must have 2 years applications programming experience, proficiency in Assembler or Cobol language and thorough knowledge of OS/MVS, JCL and IBM utilities. Indepth knowledge of production control methods and techniques also necessary.

SYSTEMS ASSURANCE ANALYST

Requires knowledge of production control techniques, extensive knowledge of OS/JCL, familiarity with TLMS and TSO, and experience in a large data processing facility, specifically in production control, systems or program analysis.

We offer an outstanding compensation package which includes generous fringe benefits and full relocation assistance. For more information call (602) 954-1733 or send your resume.

American Express
P.O. Box 13781
Phoenix, Arizona 85002

An Equal Opportunity Employer M/F

Amdahl... The Large-Scale Alternative In Software Careers

Amdahl is the progressive computer company that offers an alternative in large-scale systems. The success of our first decade prompted Business Week to call us the "ultimate computer hardware company." In the years to come we intend to reach the ultimate in software systems as well. With a software R&D budget that has doubled in the last three years, we're generating advanced concepts like the "Programmer's Workbench" approach and our unique Amdahl-UNIX* (GOLD) system.

From exciting projects in software engineering, programmer tool development and telecommunications work to material control and data management systems design and support, career opportunities for experienced programmers and analysts are expanding rapidly at Amdahl. Bachelor's Degree in Computer Science or Business Administration preferred, or equivalent experience. If you have a background in both high-level and Assembler languages as well as some combination of MVS, TSO, PL/I, IMS, UNIX*, VM, TCAM, VTAM, NCP,SMP, CMP, and/or COBOL, you'll find a large-scale career as a:

Systems Programmer Applications Programmer
Systems Analyst

If you're attending the ACPA Conference in San Francisco, call (408) 746-6170 for more information or to arrange for an interview. Or send your resume to our **Employment Department/68-2222, Amdahl Corporation, P.O. Box 470, Sunnyvale, California 94086.** We are an equal opportunity employer through affirmative action.

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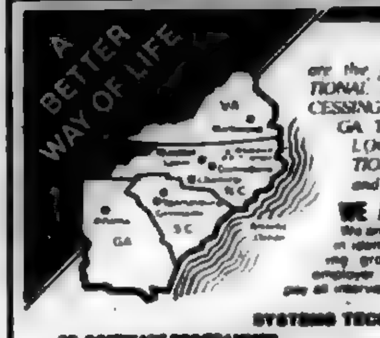
amdahl



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SR. SYSTEMS PROGRAMMER [illegible]
4 yrs maintenance, tuning, debugging DOS/VS in VM370 environment. CICS expertise required. Degree preferred, will substitute exp.

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4+ yrs large scale IBM exp. 3+ yrs systems programming, tuning, debugging, maintenance of software products: MVS, JES-2, TSO, or IMS/TOTAL. Will advise applications development staff. [illegible] preferred.

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Min. of 4 yrs exp in financial systems design & analysis in mfg. company. Large scale IBM expertise preferred. COBOL and OS/JCL required. IMS/DL1 a definite plus.

MARKETING/SALES SYSTEMS ANALYST [illegible]
4-6 yrs design exp in sales analysis & forecasting. Order processing & marketing systems. Open on language/machine background. Degree required in applicable field.

PROGRAMMER/ANALYST [illegible]
Min. 2 yrs COBOL programming with some design work. OS/MVS, IMS/DB, TOTAL, TSO, ROSCOE all will help. Degree preferred.

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Min. 4 yrs exp MVS environment, COBOL required. ADABAS preferred, will consider other DBMS. Inventory systems in manufacturing company a requirement.

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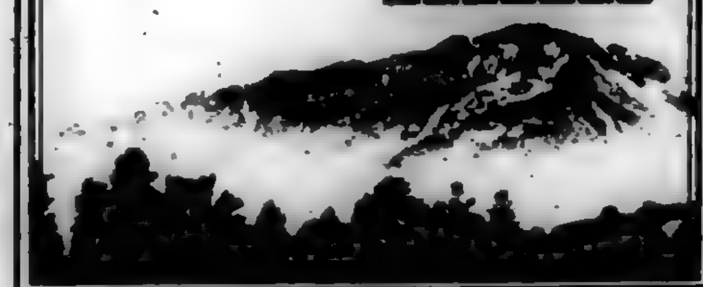

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Arecibo Observatory, a part of the National Astronomy and Ionosphere Center, is operated by Cornell University, an Equal Opportunity Employer. If interested, please send a resume to, or call:

Peter G. S. [illegible]
Head, Computer Department
Arecibo Observatory
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University of Wisconsin-La Crosse
AA/EOE

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Attn: Pat/Diane

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Ad closing is every Friday, 10 days prior to issue date.

Rates: Open rate is $73.50 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $147 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

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William J. Mills,
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- I/O PROGRAMMING & REAL TIME PROCESSING SOFTWARE DEVELOPMENT
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(408) 496-6232

HOUSTON
1900 West Loop South
Suite 1180
Houston, TX 77027
(713) 623-6300

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Dr. Robert S. [illegible], Chairperson
Department of Mathematics
and Computer Science
Millersville State College
Millersville, PA 17551

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Walnut Creek, California 94596
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(415) 934-7082

ETHAN ALLEN PERSONNEL AGENCY
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Poughkeepsie, New York 12601
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Lakewood, Colorado 80228
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Richmond, Virginia 23229
(804) 288-8375

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Columbus, Ohio 43221
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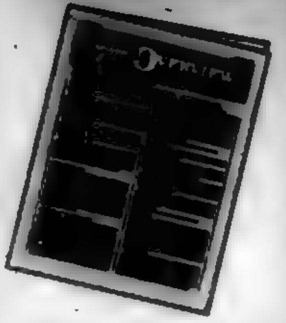

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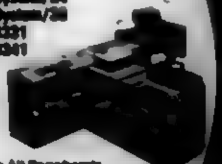

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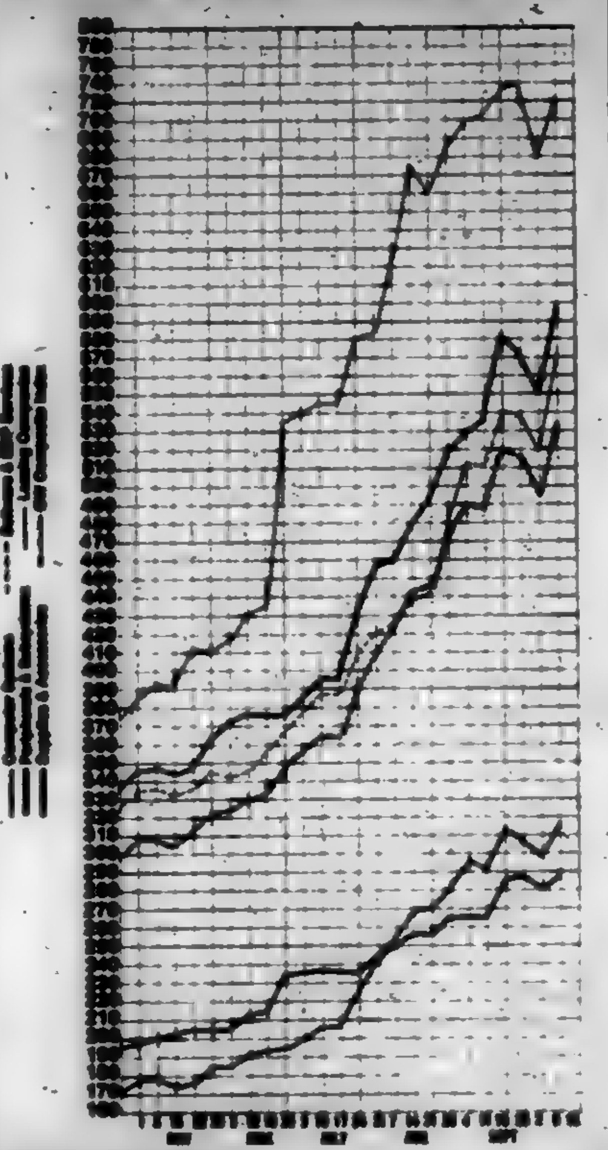

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1. Title of publication: Computerworld
2. Date of filing: October 7, 1980
3. Frequency of issue: weekly, except semiweekly the third week in September and a single issue the last week in December and the first week in January.
3a. No. of issues published annually: 52
3b. Annual subscription price: $30.00
4. Location of known office of publication: 375 Cochituate Road, Rte. 30, Framingham, MA 01701.
5. Location of the headquarters of general business offices of the publishers: 375 Cochituate Road, Rte. 30, Framingham, MA 01701.
6. Names and addresses of the publisher, editor and managing editor: Publisher, Patrick J. McGovern, 60 Austin St., Newtonville, Mass. 02160. Editor, E. Drake Lundell, 375 Cochituate Road, Rte. 30, Framingham, MA 01701. Managing Editor, Nancy French, 375 Cochituate Road, Rte. 30, Framingham, MA 01701.
7. Owner: International Data Group, 60 Austin St., Newtonville, Mass. 02160.
8. Known bondholders, mortgagees and other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities: International Data Group, 60 Austin St., Newtonville, Mass. 02160.
9. For completion by nonprofit organizations authorized to mail at special rates: Not applicable.
10. Extent and nature of circulation:

	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
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B. Paid circulation		
1. Sales through dealers and carriers, street vendors and counter sales	None	None
2. Mail subscriptions	106,715	108,284
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A	AMDAHL CORP	13- 32	20 7/8	- 1/8	-0.6
N	BURROUGHS CORP	60- 86	62 3/8	- 1/8	-0.1
N	COMPUTER AUTOMATION	9- 27	25 3/4	+3 1/2	+15.7
N	CONTROL DATA CORP	38- 77	77 3/8	+8 3/8	+12.1
O	CRAY RESEARCH INC	30- 90	90 1/2	+11 1/2	+14.6
N	DATA GENERAL CORP	46- 87	75 3/4	+2 3/8	+3.2
N	DATAPOINT CORP	40- 97	95	+9 1/8	+10.9
N	DIGITAL EQUIPMENT	50- 98	95 1/2	+6 3/8	+7.2
A	EECO INC	9- 20	19 3/8	+ 7/8	+4.7
N	ELECTRONIC ASSOC.	6- 22	20 1/2	- 1/2	[illegible]
O	FOUR-PHASE SYSTEMS	20- 40	38 1/2	+4	+10.0
N	FOXBORO	36- 55	50	+ 5/8	+1.2
O	GENERAL AUTOMATION	7- 10	8 1/8	- 3/8	-4.3
O	GRI COMPUTER CORP	1- 3	1 1/8	+ 1/8	+12.5
N	HEWLETT-PACKARD CO	40- 81	82 1/8	+5 1/8	+6.7
N	HONEYWELL INC	60-101	93 5/8	+5 1/8	+5.8
N	IBM	50- 70	70	+4 3/8	+6.6
O	MAGNUSON COMP SYSTS	23- 36	35 1/8	+3 1/2	+11.0
O	MANAGEMENT ASSIST	9- 20	23 1/8	+3 5/8	+18.5
O	MANUFACTURING DATA S	20- 41	42	+2 1/8	+5.3
O	MINI-COMPUTER SYST	2- 4	3 3/8	+ 1/8	[illegible]
O	MODULAR COMPUTER SYS	9- 30	29 1/8	+2 1/2	+9.3
N	NCR	53- 82	75 3/8	+9 1/2	+14.3
O	PRIME COMPUTER INC	15- 49	46 3/8	+5 1/8	+12.6
N	PERKIN-ELMER	25- 65	64 3/8	+6 3/8	+10.9
N	SPERRY RAND	42- 60	58	+2 7/8	+5.2
A	SYSTEMS ENG. LABS	11- 49	43 3/8	+1 5/8	+3.8
O	TANDEM COMPUTERS INC	19- 60	63 1/2	+6	+10.5
N	TEXAS INSTRUMENTS	79-144	142	+10 1/2	+7.9
A	WANG LABS.	17- 60	57 7/8	+4 3/8	+8.1

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE OCT 8 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	19- 23	22	+1 1/2	+7.3
N	COMDISCO INC	9- 18	17 7/8	+2 3/8	+15.3
A	COMMERCE GROUP CORP	1- 2	1 1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	2 1/8	0	0.0
O	CONTINENTAL INFO SYS	2- 13	9 1/2	+ 1/2	[illegible]
O	DATRONIC RENTAL	2- 4	3 3/8	+ 3/8	+11.1
A	DCL INC	3- 6	3 1/8	+ 1/8	+4.1
N	DPF INC	5- 12	8 5/8	+ 3/8	+4.5
N	ITEL	1- 15	2	0	0.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 5/8	+ 3/8	[illegible]
N	RELIANCE GROUP INC	20- 70	72 3/8	-4 5/8	-6.0
N	U.S. LEASING	12- 23	21	0	0.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		1979-80 RANGE (1)	CLOSE OCT 8 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	2- 6	5 5/8	+ 5/8	+12.5
A	ANACOMP INC	7- 28	16	+ 3/8	+2.3
O	ANALYSTS INTL CORP	3- 8	8 3/8	+ 3/8	[illegible]
A	APPLIED DATA RES.	6- 26	26	+5	+23.5
O	AUTOMATIC DATA PROC	31- 52	49 1/2	+2 1/8	+4.7
O	COMPUTER HORIZONS	2- 9	9 3/8	+2	[illegible]
O	COMPUTER NETWORK	4- 9	6 7/8	+ 1/8	[illegible]
N	COMPUTER SCIENCES	11- 30	27 5/8	- 1/8	-0.4
O	COMPUTER TASK GROUP	2- 20	19 1/2	+2 1/2	+14.7
O	COMPUTER USAGE	2- 10	8 3/8	+1 1/2	+20.0
O	COMPUT AUTO REP SVC	4- 10	9 1/8	+ 3/8	+4.2
O	COMSHARE	11- 25	25	+2	[illegible]
O	CULLINANE CORP	20- 63	63	+10 1/8	+19.0
O	DATA DIMENSIONS INC	2- 6	5 3/8	- 1/8	-2.2
O	DATATAB	1- 4	1	0	0.0
O	DBI CORP	6- 9	8 1/8	+1 1/8	+17.0
N	ELECTRONIC DATA SYST	20- 37	33 5/8	+1 1/8	+3.4
O	INFORMATICS INC	9- 25	22 3/8	+2 3/8	+11.8
O	INSTYTE CORP	2- 3	2 3/8	0	0.0
O	IPS COMPUTER MARKET.	2- 4	4	0	0.0
O	KEANE ASSOCIATES	3- 9	9 1/2	0	0.0
O	KEYDATA CORP	2- 3	2 1/8	0	0.0
A	LOGICON	11- 27	25 5/8	+2	[illegible]
O	MATHEMATICA INC	3- 10	15 1/2	+ 1/2	+3.3
O	MATHEMATICAL APP GRP	7- 30	32 1/2	+5 1/2	+20.3
O	NATIONAL DATA CORP	13- 30	28 1/8	+4 1/2	+18.9
O	PLANNING RESEARCH	5- 12	11 1/2	+1 3/8	[illegible]
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	4- 9	7 7/8	0	0.0
O	REYNOLDS & REYNOLDS	21- 34	34 1/8	+ 3/8	+1.1
O	SYSC INC	6- 19	18 3/8	+3 1/8	+20.4
O	SCIENTIFIC COMPUTERS	6- 27	25 3/8	+2 3/8	[illegible]
N	TYMSHARE INC	30- 72	71 1/8	+4 1/8	[illegible]
A	URS SYSTEMS	6- 15	14 3/8	+ 5/8	+4.5
N	WYLY CORP	4- 20	19 1/2	+3 1/8	[illegible]

PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE OCT 8 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	19 3/8	+ 3/8	[illegible]
N	AMPEX CORP	16- 29	29 1/8	+3 1/2	+13.6
A	ANDERSON JACOBSON	9- 18	16 1/8	+ 3/8	[illegible]
N	APPLIED DIG DATA SYS	5- 12	12	+ 1/8	[illegible]
O	AUTO-TROL TECHNOLOGY	30- 62	57	+2 1/2	+4.5
O	BEEHIVE INT'L	3- 17	15 7/8	+1 3/8	+9.4
A	BOLT,BERANEK & NEW	13- 32	31 1/8	+3 1/8	+11.1
N	BUNKER-RAMO	17- 41	36 3/8	-1 1/8	-3.0
O	CAMBRIDGE MEMORIES	1- 9	4 5/8	+ 5/8	[illegible]
N	CENTRONICS DATA COMP	23- 55	52 3/8	+2 3/8	+4.7
A	CETEC CORP	3- 7	7 1/8	+ 5/8	[illegible]
O	COMPUTER DEVICES INC	5- 10	8 5/8	+ 5/8	+7.8
O	COGNITRONICS	2- 7	6	+ 5/8	[illegible]
O	COMPUTER COMMUN.	4- 10	6 3/8	- 1/8	-1.9
O	COMPUTER CONSOLES	6- 29	23 3/4	+1	+4.3
O	COMPUTER TRANSCEIVER	1- 3	3	0	0.0
O	COMPUTERVISION CORP	24- 92	88 5/8	+10 7/8	+13.9
N	CONRAC CORP	19- 25	18 1/2	+ 1/8	+0.6
A	DATA ACCESS SYSTEMS	5- 17	15 1/8	+1	+7.0
A	DATA PRODUCTS CORP	11- 30	30 1/8	+3 1/2	+13.0
O	DATUM INC	2- 4	3 3/8	- 1/8	-3.2
O	DECISION DATA COMPUT	2- 6	5 3/8	+ 1/2	+10.2
O	DELTA DATA SYSTEMS	1- 3	2 5/8	+ 1/8	+5.0
O	DOCUMATION INC	7- 27	15 3/8	+1 3/8	+9.8
O	DATARAM CORP	5- 57	15 3/8	- 1/8	[illegible]
N	ELECTRONIC M & M	3- 8	7 1/8	+ 1/8	+1.8
O	EVANS & SUTHERLAND	21- 72	71	+2 1/2	+3.6
O	FABRI-TEK	1- 4	3 1/2	+ 1/8	+3.7
O	GENERAL COMPUTER SYS	1- 6	5 1/2	+ 1/8	[illegible]
O	GENERAL DATACOMM IND	13- 25	25 1/2	+4 1/2	+20.7
O	GENERAL TERMINAL CP	1- 4	1 3/8	- 1/8	-8.3
N	HAZELTINE CORP	12- 32	31 1/2	+4 1/8	+15.0
N	HARRIS CORP	25- 46	47 1/2	+4	+9.1
O	INFOREX INC	1- 6	1	0	0.0
O	INFORMATION INTL INC	8- 15	14	+ 3/8	[illegible]
O	INTEL CORP	40- 90	90 3/8	+6 3/8	+7.5
O	INTERSIL	15- 30	30	+ 3/8	[illegible]
A	LUNDY ELECTRONICS	6- 12	12	+ 1/8	[illegible]
O	MAI DATA CORP	5- 16	14 3/8	+ 3/8	[illegible]
N	MEMOREX	10- 30	16 1/8	+ 1/8	+0.8
O	MOHAWK DATA SCI	10- 36	34	+4	[illegible]
O	OMEX	7- 18	12	+2 1/2	+26.3
A	PARADYNE CORP	10- 58	51 1/2	+4 5/8	+9.8
A	PENRIL CORP	3- 15	12 1/8	+ 5/8	+5.4
O	RAMTEK CORP	10- 18	17	+1 1/2	[illegible]
O	RECOGNITION EQUIP	5- 18	17 1/2	+2 1/8	+13.8
O	SCAN DATA	1- 5	2 1/2	0	0.0
N	STORAGE TECHNOLOGY	12- 25	23 3/8	+2 1/8	+10.0
O	SYKES DATATRONICS	10- 67	65 1/8	+1	[illegible]
O	T BAR INC	10- 21	19 1/2	- 3/8	[illegible]
A	TEC INC	1- 9	6	0	0.0
N	TEKTRONIX INC	43- 70	60 1/2	+2 1/8	[illegible]
N	TELEX	3- 6	5 5/8	+ 3/8	+7.1
O	TESDATA SYSTEMS CP	5- 16	14 1/8	+1 5/8	+13.0
A	TIMEPLEX INC	7- 29	26 3/8	+2	[illegible]
O	WILTEK INC	1- 3	2 1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE OCT 8 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	9- 18	14 3/8	+ 7/8	[illegible]
O	BALTIMORE BUS FORMS	1- 2	3/8	0	0.0
N	BARRY WRIGHT	9- 22	21 3/8	+1 5/8	+8.0
O	CYBERMATICS INC	1- 1	1 1/8	+ 1/8	+11.1
A	DUPLEX PRODUCTS INC	11- 16	14 3/8	0	0.0
N	ENNIS BUS. FORMS	10- 21	18 1/8	- 1/8	[illegible]
N	3M COMPANY	46- 63	57	-2 1/8	-3.7
O	MOORE CORP LTD	27- 37	34 1/8	+ 1/8	+0.3
N	NASHUA CORP	22- 36	28 1/2	-1 1/8	[illegible]
O	STANDARD REGISTER	22- 35	30 1/8	- 3/8	[illegible]
A	TAB PRODUCTS CO	13- 36	36 1/8	+4 3/8	[illegible]
N	WABASH MAGNETICS	11- 18	15 1/2	+ 3/8	[illegible]
N	WALLACE BUS FORMS	23- 45	44 3/4	+1 1/8	[illegible]

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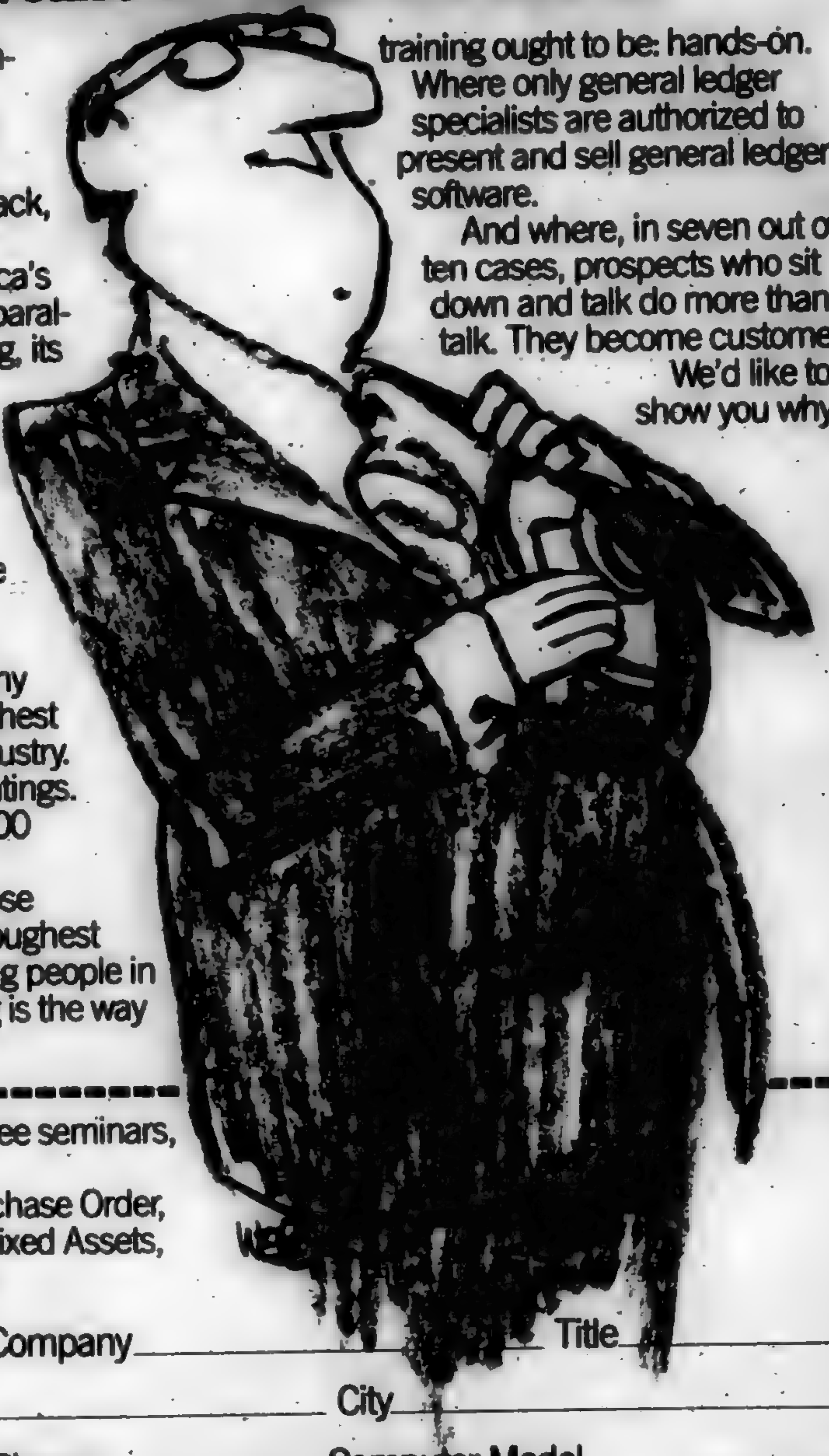

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IBM Expected to Plug Hole

By Tom Henkel
CW Staff

IBM has a hole in its product line, and how and when it will plug that hole has industry analysts buzzing.

The gap in IBM's product line is a system that would provide an entry path to the company's biggest processor, the 3033, currently the top of the 30 series line. What IBM needs, the analysts agree, is a machine that will:

- Provide two million instructions per second (Mips).
- Support the MVS operating system.
- Be cheap enough to lure customers to IBM's upper end mainframes.
- Offer a painless migration to the soon-to-be-announced H series of processors, expected to offer even greater processing power than the 3033.

3031	4341-2	3033E or 4341-2 AP	3032	3033N	3033
1.1	1.4	2-2.5	3.0	3.9	4.5

Mips Ratings for IBM's Upper End Processors

According to IBM watchers, IBM has two viable alternatives. It can announce a scaled-down version of the 3033, the 3033E ("E" for "entry-level"), that can be field-upgraded to a full-blown 3033. Or it can bring out a bigger version of its 4300 series processor that would offer the required 2 Mips plus a bridge to the low end of the H series.

The latter option would virtually eliminate the 3033 from IBM's long-range processor line-up, severely impacting the residual values of installed systems and making their owners very unhappy. The former option would appease the 3033 owners, but it would mean the entry path to the H series would be mired in 370-era

(Continued on Page 6)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
Vol. XIV, No. 43 October 20, 1980 $1.00 a copy; $30/year

NEWSPAPER

Product Spotlight

Why Pick Tape Drives?

By Rita Shoor
CW Staff

If disk drives can store more data and are easier to maintain than magnetic tape drives, why would anyone choose tape as a mass storage recording medium?

Even if one ignores the necessity for backup on disk subsystems, the fact remains that it would simply cost too much to convert the many large tape installations already in existence to an all-disk environment. Conversion costs in terms of machine time, manpower and media are substantial, Datapro Research Corp. said in a survey report entitled "All About Plug-Compatible Tape Drives."

So tape drives will be with us for some time to come. While they are around, many vendors will provide alternatives to the mainframers' — especially IBM's — own offerings, Datapro maintained.

The charts on Pages 10 and 11 detail the price, performance characteristics and availability of certain key features of tape drives available from representative plug-compatible manufacturers (PCM).

Although there is a veritable host of IBM tape drive models, most of which have inspired imitation, many users of large-scale IBM systems are concentrating on the IBM 3420 family; the charts therefore focus on 3420-type drives.

The five tape drives contrasted with IBM in the charts come from Storage Technology Corp. (STC), Memorex Corp., National Advanced Systems (NAS), Telex Computer Products, Inc. and Braegen Corp.

(Continued on Page 10)

Programmers Slammed For Not Keeping Up

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO - Most programmers have done such a poor job of keeping themselves technologically up to date they probably constitute more of a liability to their employers than an asset, according to one of the computing field's most honored software experts, Dr. Richard Hamming.

"In many cases, employers would probably be much better off if they simply got rid of most of their programmers or paid them full salary and told them to stay home," Hamming said last week during the 10th annual conference of the Association of Computer Programmers and Analysts (Acpa).

Like their counterparts in most other highly technical specialties, programmers often start their careers at the technological forefront, but they seldom stay there for long. Before they know it, they begin to fall behind the times technologically, and as the years pass, they become more and more obsolete.

In the end, "the technological frontier simply passes them by," Hamming said as he reminisced at the conference about his long and distinguished computing career at Bell Laboratories and elsewhere.

Who's to Blame?

The blame for the generally low level of programmer competence lies squarely with the programmers themselves, Hamming added. Most members of the programming field barely lift a finger to keep themselves at the leading edge of technology, where they belong.

"There are hundreds of thousands of programmers working out there in the field, but it's probably been at least five years since most of them did anything outside their companies [to upgrade their professional skills], except attend local sociabilities and beer drinks," Hamming said during a private interview following his Acpa con-

(Continued on Page 8)

French Bring 'Smart' Credit Card to U.S.

By Phil Hirsch
CW Washington Bureau

NEW YORK — A "smart" credit card that appears impossible to counterfeit was unveiled here last week by promoters of Intelmatique, an integrated family of interactive information systems that the French hope to sell to the U.S. and other countries.

Embedded in the card is a microprocessor with a 4.5K-bit memory. Among other functions, it stores a detailed record of the owner's purchases.

The French have also developed a quick response scheme for protecting merchants and users when a card is lost or stolen. Within 24 hours after the loss is reported, the card number is transmitted to a "negative file" kept within each participating merchant's point-of-sale terminal. If the card is used afterward, it is automatically destroyed.

An electronic directory terminal and

(Continued on Page 8)

Application Software Tied to IDMS

By Rita Shoor
CW Staff

WELLESLEY, Mass. — Cullinane Corp. recently tied application software to its Integrated Data Base Management System (IDMS), then announced a service that provides such support as an alternative disaster recovery center for the application-IDMS combination.

The Integrated Application Service (IAS) also includes four other components:

- The application products themselves — all of which have been previously announced.
- An Application Development System (ADS).
- Various data access tools.
- Application audit tools.

"Basically, applications solve the end-user's problems," President John Cullinane pointed out as he enumerated the reasons behind the firm's integrated concept. He indicated that the provision of appropriate applications

(Continued on Page 4)

At Presidential Forum
Carter Rep Urges Greater Privacy

By Marguerite Zientara
CW Staff

NEWTON, Mass. — Privacy safeguards must be increased through legislation in the face of increasing government and business data banks, according to Stuart Eisenstat, assistant to President Carter for domestic affairs.

Representing Carter at a Presidential Forum here last week sponsored by the Associated Industries of Massachusetts, Eisenstat made the statement during a question-and-answer period following his 15-minute presentation.

After stressing the present lack of adequate privacy safeguards, Eisenstat noted, "That's why we submitted to Congress earlier this year five packages of legislation, along with a privacy message." Noting that the proposed legislation covered "medical, personnel, insurance and several other areas," Eisenstat postulated that the bill dealing with medical records "may be passed in the post-election period."

He emphasized that the Carter administration worked very closely with companies and businesses in writing the legislation — "It wasn't a fiat."

As further proof of Carter's dedication to guaranteeing citizens' rights to privacy, Eisenstat cited *The Stanford Daily* legislation signed last week that "protects the sources used by any newspaper so that no unreasonable searches and seizures can be made without a subpoena."

While energy, the economy and foreign policy were the real topics of the day, Dr. Alton Frye, director of policy planning for Rep. John Anderson, addressed the question of whether the U.S. should export high technology systems to the Soviet Union.

"In view of the Soviet-American relationship, Mr. Anderson strongly supports limits on such exports, just as he supports the grain embargo [against the Soviet Union]," Frye said, "because he does not wish to condone, even by indirection, the Soviet aggression in Afghanistan.

IBM Suit Irks Reagan Rep

NEWTON, Mass. — The Reagan administration would apparently be unfavorably disposed toward the protracted antitrust actions against IBM and AT&T, judging from comments made last week by a high-level Reagan representative.

Speaking at a Presidential Forum sponsored here by the Associated Industries of Massachusetts, Sen. John Chafee of Rhode Island said the antitrust actions "bother me." Admitting that he was not aware of "all the intimate details" of the cases, Chafee noted nevertheless that the IBM case "was brought the last day [Attorney General] Ramsey Clark was in office."

Chafee, who contrasted Reagan's belief in government-industry "cooperation" with Carter's alleged policy of "confrontation" during his formal presentation, suggested the suit against IBM stemmed from the same motivation as the unsuccessful "Milk Fund" suit against then-Secretary of the Treasury John Connally during the Nixon administration.

"If his name hadn't been John Connally, that action would never have been brought," Chafee said.

"And if that company's name weren't IBM, that suit would never have been brought," he added.

Computer-Based Modeling Wins Economics Nobel for American

PHILADELPHIA — Dr. Lawrence R. Klein has won the Nobel Memorial Prize in Economic Science for his work in computer-based econometric modeling.

The Benjamin Franklin Professor of Economics at the University of Pennsylvania, Klein is reportedly one of the first econometricians to draw up a model of the U.S. economy. He started working on modeling while at MIT from which he received his Ph.D. in 1944.

Based on the models he developed, Klein founded Wharton Econometric Forecasting Associates, a firm producing econometric studies for corporations and government. Although the firm was recently sold to Ziff Corp., Klein still serves as its chairman.

Using variables such as strikes and new trade agreements, four times a year Wharton Econometric Forecasting makes two-year and 10-year predictions of the economy.

Klein has also directed the development of a large international econometric model called Link.

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-127-420) is published weekly, except semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701

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Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106 Phone: (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

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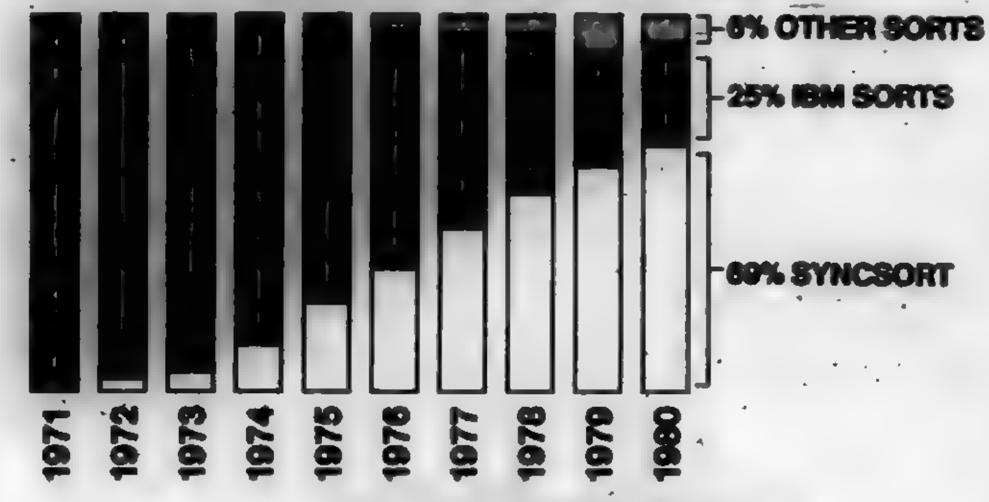
GROWTH

In 1971, *nobody* used our sort.

THE FACTS: Back in 1971, SyncSort had no users, except for a handful of beta-test sites. Today, according to the 1980 independent sort survey conducted by the International Data Corporation, SyncSort is the most widely used sort program in America on large IBM computers.

Just how rapid and pervasive this growth has been can be seen in the following illustration:



In 1980, 69% use SyncSort!

From IDC's OS Sort Studies

USERS OF	1977	1978	1979	1980
☐ SYNCSORT	43%	54%	62%	69%
■ IBM SORTS	53%	42%	29%	25%
▨ Other SORTS	4%	4%	9%	6%

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THE REASONS: In less than a decade, SyncSort has asserted unrivalled leadership in every phase of sorting technology. Virtually every advance in sorting has appeared first in a long line of SyncSort releases.

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Adds Processor, Terminals, Modems

Codex Unveils Support for Multivendor Nets

By Brad Schultz
CW Staff

BOSTON — Codex, Inc. made its case for integrated, multivendor data networks last week by releasing a communications processor, a series of intelligent terminal systems, four modems and other products intended to make networks "friendly mediators, transparent to all computer architectures, protocols and software packages."

Able to statistically multiplex data and digitized voice transmitted through a network at speeds up to 64K bit/sec, the Codex 6050 Distributed Communications Processor (DCP) is said to support any mixture of asynchronous, bisynchronous and High-Level Data Link Control protocols and give access to public data networks by meeting the X.25 interface standard.

Joining the 6050 DCP is the CDX-68 series of intelligent terminal systems, which endows a single terminal, running alone or in clusters, with multiple office functions. Available in three models, the CDX-68s can be programmed by users in Cobol, Basic and macroassembler, Codex stated.

The Motorola, Inc. subsidiary also introduced the CS 48FP, CS 96FP, CS 4800 and CS 9600 data modems. All four units run at 4,800- and 9,600 bit/-sec for point-to-point and multipoint links and optionally handle voice over leased circuits.

Finally, Codex unveiled the NA 1296 Network Adapter, which allows all modems not equipped with the vendor's network control capability to become part of its Distributed Network Control System (DNCS).

Problem Areas

Each of these products addresses one of three broad problem areas in what Codex defined to be its "integrated communications" approach. They are *exchange*, getting information into the network; *transport*, getting information through the network to its destination; and *command*, controlling the network from a central site.

Codex's CDX-68 series of intelligent terminal systems and the vendor's digitized voice products address exchange, senior vice-president Gerald J. Murray told the press here. "By digitizing voice at low data rates . . . voice conversations can be transmitted over the same facility as data traffic to save on-line costs," he said.

The CDX-68s can handle office documentation or act as local data entry terminals, Murray said. Supporting batch, interactive and teletypewriter protocols, the user-programmable terminals feature a number of diagnostics and performance monitoring capabilities.

The low-end Model 10 was designed for interactive communications compatible with IBM's 3271, 3275 and 3276 bisynchronous protocols. The CDX-68/10 supports a variety of IBM systems programs, including CICS, IMS, TSO and CMS, a spokesman noted, and can be configured as a single station or in a cluster of up to eight terminals and two printers.

The Model 20 CDX-68 intelligent terminal supports IBM 2780 and 3780, multileaving and teletypewriter protocols in addition to the 3270 protocols and provides an auto answer capability for unattended operation in batch mode, the spokesman stated. The high-end Model 40 offers up to 40M bytes of data storage in addition to the CDX-68/20 features.

As for transport, the second component of the Codex integrated communications approach, Murray said the 6050 DCP "will route communications from any source to any source in a completely transparent fashion." Supporting up to 250 terminals per network node, the processor has an adaptive routing capability that automatically bypasses congested or failed lines in getting information to its destination.

Moreover, the user can select a particular routing and reduce transmission costs with the 6050's data compression feature. A protocol intervention scheme compensates for the transmission delays that arise from satellite links, Murray added. Those delays inevitably result from the enormous distances involved in bouncing data off objects in outer space.

Under command, the area of Codex's integrated communications approach concerned with control from a central site, the CS series "Network Control" modems report the condition of network's lines to the DNCS. This gives "the user the right kind and amount of information necessary to ensure the highest possible network availability," Murray noted.

Another product announced under the rubric of command last week was Codex's NA 1296 Network Adapter, which is coupled with each modem required centralized control by the DNCS. The adapter adds the independent secondary channel through which all network management is accomplished, a spokesman said.

Initial shipments of the 6050 Distributed Communications Processor are slated to begin next July. The 6050 costs between $40,000 and $80,000, depending on configuration.

The CDX-68 series intelligent terminals are available within 60 days of order and cost between $4,000 and $25,000, Codex continued. The CS series modems cost $7,975 and $7,475, respectively, for point-to-point and multipoint versions of the 9,600 bit/-sec models, and $4,675 and $4,175, respectively, for point-to-point and multipoint versions of the 4,800 bit/-sec models.

Two-year leases for those four modems, taken in order, cost $195, $175, $120 and $100 per month. With an estimated mean time between failure of more than 30,000 hours, those modems will ship beginning this January. The NA 1296 Network Adapter will be shipped, starting next month, at a cost of $820.

Codex is located at 20 Cabot Blvd., Mansfield, Mass. 20248.

Application Software Tied to IDMS

(Continued from Page 1)

packages to IDMS users would result in better market control for Cullinane than could be obtained by "working through a middleman."

Full Compatibility

The company's applications products will be fully compatible with IDMS and all other Cullinane software. "Our users will have an integrated set of software programs that can cross-reference each other, providing types of information that were previously very difficult to obtain," Robert Goldman, senior vice-president, maintained.

Most of the applications offered through IAS applications will be acquired from the existing customer base or through acquisition of companies in the software business, according to Cullinane, and the $15 million in proceeds from the firm's recent public stock offering will be utilized in this acquisition campaign.

Among the software products currently being offered to what Cullinane described as "a ready market for applications both within industries and across industry lines" were:

- *Customer Information System (CIS).* Based on a product developed by Boatmen's National Bank in St. Louis, it ties name and address information to various financial applications.
- *On-Line English (OLE).* This tool reportedly allows the nontechnical manager to access data via simple, English-like commands.
- *On-Line Query.* This is a more highly structured inquiry/response system than OLE.
- *Culprit.* A data retrieval package, it was designed to generate user-specified reports.

An application data center that will function as both an alternative development and processing center for Cullinane customers and — in a different direction — as a disaster recovery site for installations with critical DP operations is a major component of the integrated service concept, Cullinane said. He described the disaster recovery service as similar to that provided by Philadelphia-based Sun Information Services Co.

Executives are aware of what can happen in the event of a major data center breakdown, but "what top management hasn't seen is an intelligent response to the disaster recovery problem," he said.

"A number of our clients are so dependent on computers that if they lost their processing power for even a day, they could lose a critical edge over their competitors," Edward Somol, general manager of computer services, noted. Cullinane customers that subscribe to the service will be able to use the data center in the event of installation breakdown caused by a natural disaster.

The data center will also provide current and prospective IDMS users with a fully compatible computer environment in which to develop their own applications, the vendor said. Clients are offered the use of an IBM 3033 mainframe, technical support, IDMS integrated software and necessary machine time.

Cullinane's applications users will also have access to ADS, which reportedly automates the process of developing update applications for their respective data bases. This tool is available in both on-line and batch versions, the firm said.

Application tools offered as part of IAS include EDP/Auditor, a package that combines report-generating capability with a library of audit routines to perform tasks such as file footing, sampling and exception and summary analysis, Cullinane said.

IAS pricing depends on what is already in place at the customer's installation, according to Cullinane. IDMS and CIS are priced together at about $200,000 and the purchaser of IDMS and all of the application packages and tools will spend more than $300,000, he said. These figures do not include subscription to the disaster recovery service, the fee for which has not been released.

Cullinane Corp. is at 20 William St., Wellesley, Mass. 02181

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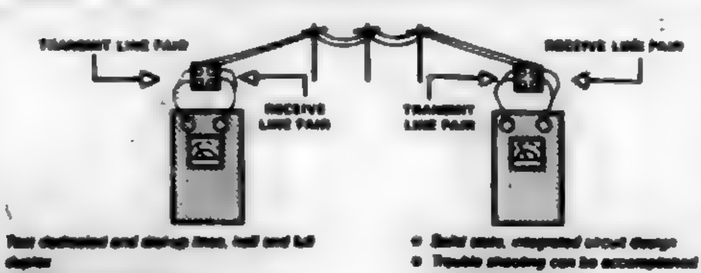

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- Trouble shooting can be accomplished by unskilled personnel

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STC Brings Out Competitors for 3380, 3370

By Rita Shoor
CW Staff

LOUISVILLE, Colo. — With a double-barreled flourish, Storage Technology Corp. (STC) last week announced plug-compatible disk drive alternatives to IBM's large-capacity 3380 and its Fixed-Block Architecture (FBA) 3370.

Designated the 8380, the count-key-data (CKD) device offering more than 2.5G bytes of storage is fully compatible with the 3380 and attaches to 370/158, 370/168 or 30 series and compatible systems via STC's recently announced 8880 control unit, according to a company spokesman.

The drive is a two-spindle unit with two independent actuators and separate supportive electronics for each spindle, he said. Storage capacity per actuator is approximately 630M bytes and the 8380 is said to transfer data at the rate of 3M bytes/sec with an average seek time of 16 msec.

Although essentially identical to the 3380 in terms of these specifications, the 8380 is claimed to offer a 10% performance improvement over its IBM competitor. The improvement is attributable to STC's dual-port option, which compared favorably to IBM's dual path selection during testing, according to Jim Fleming, disk product manager.

Disk storage capacity has increased by a factor of 20 since IBM's 2314 was introduced, he pointed out, while performance has only improved by a factor of two.

Therefore, STC's concentration is on increasing performance and one step in this direction is the reported reduction in queuing time through its dual-port option, Fleming explained.

In conjunction with the 8380, the vendor introduced its FBA Model 8370 as a plug-compatible replacement for IBM's 3370 drive.

Said to offer a storage capacity of 571.3M bytes, the fixed-media 8370 has one spindle with two independent actuators, a company representative said. Specifications include FBA formatting with a data transfer rate of 1.86M byte/sec and an average seek time of 20 msec.

In addition to its two-pronged product introduction, STC announced data streaming channel support for its solid-state Model 4305 disk. This feature allows customers to choose between data streaming or 2-byte-wide modes in order to attain a 3M-byte transfer rate, according to the vendor.

While offering channel protocol support of both 3M-byte transfer rate methods, the 4305 provides standard 1.0M-byte/sec and 1.5M-byte/sec data rates and is said to be fully compatible with IBM 370/135 or larger systems and their equivalents.

Six models of the 8380 drive are being offered and four of them contain the associated drive controls, STC said. All models include the storage media and offer dual port accessing and 5.6M-byte fixed-head capacity as options, the vendor noted.

The 8370 is available in four drive models designated A1, B1, AA1 and BB1, STC said. Models A1 and AA1 contain storage media and associated controls and the dual-port option is offered on models AA1 and BB1, the vendor said. All models are said to be supported on IBM 4300 series and compatible CPUs.

First customer shipment of the 8380 is scheduled for the second quarter of 1982 and prices will range from $79,380 to $139,630, according to a company representative.

With first customer shipments set for the fourth quarter of 1981, the 8370 will cost between $25,270 and $46,330, he said.

The data streaming channel support for the 4305 is also scheduled for first customer shipment in the fourth quarter of 1981. Current price for the 4305 utilizing either the 2-byte mode or data streaming mode is $84,735, STC said from its headquarters at 2270 S. 88 St., Louisville, Colo. 80027.

Amdahl Unveils Rival to 3705-11

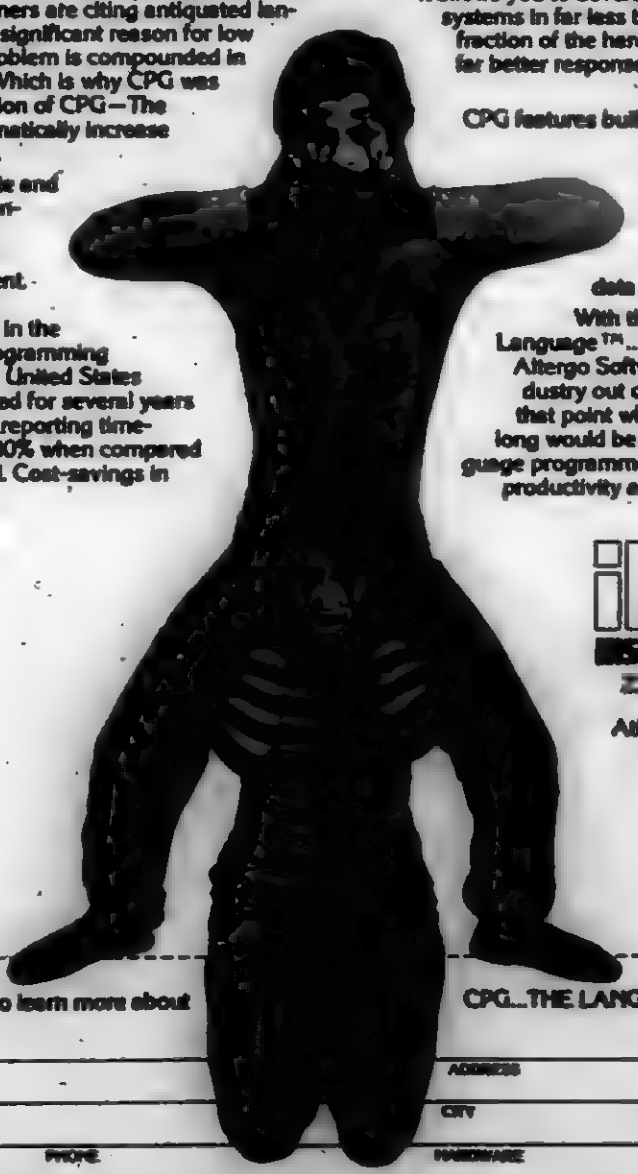
SUNNYVALE, Calif. — Amdahl Corp. last week announced a programmable communications processor called software-compatible with its IBM counterpart, the 3705-11.

Amdahl's Model 4705 communications processor is claimed to offer improved price/performance over the 3705-11. At the vendor's benchmark center here, the 4705 registered 1.8 times as much throughput capacity, a spokesman maintained, as a "similarly configured" 3705-11 Model F8, while costing 10% to 15% less.

The 4705 comes in four models — the 4705-5, -6, -7 and -8 — with accommodation for 64, 160, 256 and 352 communications lines, respectively. Each basic model has 64K bytes of memory, the spokesman continued, and may be enhanced or field upgraded to a larger model at the customer site.

First customer shipments are scheduled for the remaining months of 1980 in the U.S. and Canada, and a European plan will be announced later this year with shipments expected to begin in third quarter 1981.

A typical 4705-5 communications processor configuration costs about $60,000, the spokesman estimated. A typical large 4705-8 system will go for about $350,000. Monthly maintenance will range from $300 to $1,500 and two- and four-year leases are available, he confirmed.



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How Will IBM Bridge Mips Gap In 30 Series?

(Continued from Page 1)

technology, a rather expensive and somewhat outmoded means of computing.

Why a Hole?

The hole in the IBM product line was created by two events in the past year. In November 1979, IBM announced its 3033N processor, a smaller version of the 3033 that is field-upgradable to the larger processor [CW, Nov. 5]. That move virtually eliminated IBM's 3032 processor because the 3033N is slightly more powerful — 3.9 Mips compared with 3 Mips.

Moreover, although it is more expensive — $1.8 million compared with $1.6 million — the 3033N is a better deal in the long run because of the field upgrade capability. Therefore, it is more attractive to users.

Then, last month, IBM announced the 4341 Model Group 2, a 1.4-Mips processor that offers slightly more performance at about half the price of the $800,000 1.1-Mips 3031 [CW, Sept. 22]. The Group 2 CPU makes the 3031 an unlikely choice for the user looking to migrate up the IBM line.

With the 3031 and 3032 processors virtually knocked out as serious contenders in the large mainframe marketplace — even though both are still available — IBM users are faced with a big gap in processing power. They must choose between the 1.4-Mips 4341-2 or the 3.9-Mips 3033N.

The gap opens a fertile market for plug-compatible mainframers such as Amdahl Corp. with its 470 V/5 and National Advanced Systems (NAS) with its AS/7000 line to steal some potential IBM customers looking for a 2-Mips processor.

Since it may be losing out on some business, IBM won't let the performance gap stand for long, most IBM watchers agree. Robert Fertig, vice-president of Advanced Computer Techniques Corp., believes IBM will close the gap in about three weeks by announcing the 3033E along with the first one or two models of H line.

The announcement, Fertig predicted, will be for a 10- to 12-Mips mid-range H series machine and possibly a larger 14- to 15-Mips processor and the 2- to 2.5-Mips 3033E.

In addition, IBM will announce a scaled-down version of the MVS operating system that will appease 4341-2 users because it will consume less memory, he said.

'Crippled 3033E'

Fertig characterized the 3033E as "a crippled 3033 which is field upgradable to give the full [3033] power. That should fill the price/performance gap between the 4341-2 and the 3033N. This entry-level 3033 will come in at roughly $1 million."

Other IBM watchers such as The Yankee Group's Gerard Hallaren, International Data Corp.'s John Rehfield and Kidder, Peabody & Co.'s William Easterbrook agreed with Fertig's scenario, but were less committal on the announcement date. While Fertig said the announcement will come within 30 days, the others said it will probably come before the end of the year or possibly in January 1981.

Opposing View

But Tom Crotty, an analyst with The Gartner Group, maintained they are wrong. His firm is predicting that IBM will wait until mid-1981 and announce an attached processor version of the 4341-2 that will offer in the neighborhood of 2 Mips and will run the MVS operating system more efficiently than the current 4341-2 processor.

Crotty contended IBM's current product line really hasn't changed that much in light of the 3033N and 4341-2 announcements. IBM has replaced two processors with two others, so the gap may not be as significant as other analysts say.

Crotty admitted there is a need for an IBM 2-Mips processor, but he said IBM is not urgently trying to bring such a machine to the marketplace.

There seems to be a plan within IBM for a 3033E processor, but IBM decided not to go through with it, Crotty said. Rather, IBM will proceed with plans to announce the H series in late October or early November and announce a 2-Mips 4341-2 AP around mid-year, he forecast.

SYSTEM / CHARACTERISTICS	3031	4341-2	[illegible]	[illegible]	3032	3033N	3033
Relative Performance[1]	54	60.7	105	105	124	192	223
Memory Size in Bytes (Minimum to Maximum)	2M-6M	2M-8M	4M or 8M	2M-8M[3]	2M-3M	4M or 8M	4M-16M
Purchase Price (Memory Size)	$800,000 (2M)	$385,000 (2M)	$1,900,000 (4M)	[illegible]	$1,642,000 (2M)	$1,800,000 (4M)	$2,870,000 (4M)
Monthly Lease (Lease Term)	$25,130 (4-year)	$10,100 (2-year)	[illegible] (4-year)	$20,200 (2-year)	$43,630 (4-year)	$53,840 (4-year)	$75,070 (4-year)
Memory Cycle Time (nsec)	345	Not Available	285	Not Available	320	285	285
Machine Cycle Time (nsec)	115	120-240	57	120-240	80	57	57
Channels (Minimum to Maximum)	6	6	6-12	6	6-12	6-12	12-16
Cache (Buffer) Size	32K	16K	64K	16K	32K	64K	64K
Bus Architecture?	No	No	[illegible]	No	No	No	No
Price per 1M Byte Of Main Memory	$50,000	$15,700[2]	$50,000	$15,700	$50,000	$50,000	$50,000

1. Relative throughput based on the IBM 370/158-3's equaling 46. Performance based on manufacturers' claims.
2. Price for an upgrade from the 1M- to 2M-byte model is $15,500.
3. Some analysts say IBM will enhance the main memory options on the 4341-2 prior to announcing a 4341-2 AP.
4. Figures represented for the possible 4341-2 AP and 3033E processors are estimates of what IBM is likely to announce. Since either processor would be an enhancement of an already-announced CPU, characteristics like memory cycle time, machine cycle time and cache (buffer) size will probably not be changed. Other figures such as relative performance, memory size, pricing and available channels are variable. Those figures are based on industry analysts' predictions and IBM's historical marketing strategies.

IBM's Upper End Processors — And Where Anticipated Models Would Fit

Electronic 'Experiment' Continues

Newspaper Staffers Vote to End Strike

By Marguerite Zientara
CW Staff

MINNEAPOLIS — Striking members of three unions at the Minneapolis Star and Tribune Co. here have voted to end a 27-day strike which protested, among others things, the newspapers' entry into Compuserve, Inc.'s electronic newspaper experiment [CW, Sept. 29, Oct. 13].

The firm, which publishes the morning *Tribune* and the afternoon *Star*, still plans to join the Compuserve network in the late spring or summer of 1981.

"We're so damned glad [the strike] is over, "Lee Canning, the firm's business manager, declared last week. "We feel the settlement provides us with the opportunity to proceed with the experiment on electronic delivery of information — and I emphasize *experiment* — which will be useful and beneficial to both the company and our skilled news gatherers."

Stumbling Block

On the issue of electronic distribution of news, a major strumbling block in negotiations, Twin Cities Newspaper Guild members agreed to forego a 25% share of profits gained from articles that will be distributed electronically.

When asked whether striking Guild members were satisfied with that compromise, Guild spokesman Bob Haygen stated, "We've said all along that we had flexibility on that issue and were willing to negotiate.

"We decided it was an appropriate action to give it up," he added.

The new three-year contract, however, retains a 25% payment on the traditional resale of articles, according to Haygen.

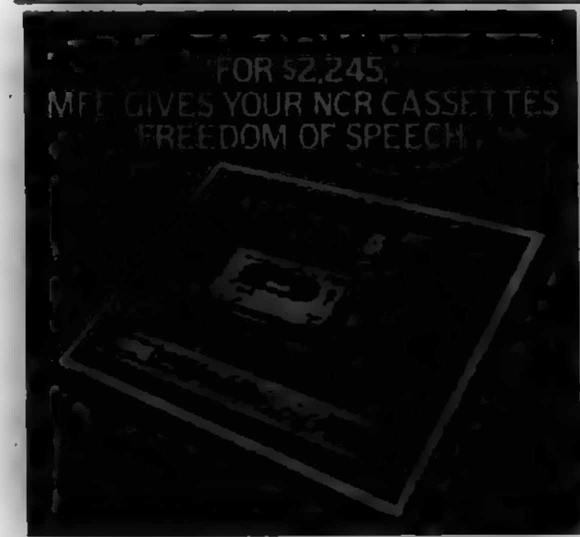
Concessions Made

While the strikers did win higher wages and a revision of the company's seniority policy, they did not obtain a return to its earlier company car expense policy or the job security assurances they desired in the face of the firm's entry into electronic newspaper delivery.

Contract language was improved, however, in the area of jurisdiction — "who's going to do the work and where it's going to be done" — another concern stemming from the newspapers' entry into the Compuserve network, Haygen noted.

On strike from Sept. 13 through Oct. 9 were 450 members of the Newspaper Guild, including reporters, copy editors, photographers, circulation district managers, promotional personnel, copy aides, news technicians and clerical workers.

In addition, 170 members of the Mailers Union Local 4 and about 20 Machinists Union members participated. The other 10 unions represented in the plant honored the picket lines.



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ACT Briefing Slated On Possible 3033E

MONTREAL — Advanced Computer Techniques Corp. (ACT) will hold a briefing session on the competitive position of a possible IBM 3033E processor at a seminar here Dec. 1-3.

The Seminar is sponsored by ACT in cooperation with Whitstead Publishing Co., based in Toronto.

More information is available from ACT at 437 Madison Ave., New York, N.Y. 10022.

To Meet Needs of Novice Users

New Peripherals Stress 'Human Engineering'

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO – Terminal and printer vendors are becoming increasingly sensitive to the need for "human engineering," and their efforts to respond to that growing customer demand were clearly in evidence at last week's Mini/Micro Conference and Exposition.

To a certain extent, hardware manufacturers have long sought to make their products approachable by lay users, easy to operate, suitable for business-office use and "considerate" of human comfort.

Recently, however, peripheral suppliers' efforts to simplify their "human interfaces" have acquired a new urgency as minicomputer-based systems have grown in popularity and found their way into the hands of more and more technically unsophisticated end users.

Today, ease of operation and user comfort are fast becoming as much a part of a terminal's or printer's design criteria as more technical considerations like transmission rate or print speed.

The peripheral business's increased emphasis on "ergonomics" was apparent last week among several of the Mini/Micro show's exhibitors, including Lear Siegler, Inc., Ampex Corp. and Televideo, Inc. Each of the three vendors used the sixth annual conference, which attracted about 150 exhibitors and reportedly drew an opening-day crowd of some 2,100, as an occasion to introduce products or enhancements packaged to suit the special needs of novice or office computer users.

Intermediate Terminal

Lear Siegler, for example, announced an additional Intermediate Terminal family member that reportedly combines ergonomic packaging with the capabilities of the firm's existing ADM-21 terminal. Designated the ADM-32, the latest Lear Siegler CRT terminal provides a detachable keyboard whose front edge extends forward and is rounded to serve as a hand rest.

The terminal's antireflective screen surface and 10° display angle reportedly minimize glare and eye fatigue, while its 15.5-in. height allows most operators to position their line of sight within 15° of the unit's central axis.

Available in either 12-in. or 15-in. screen versions, the ADM-32 also sports an optional tilt mechanism that positions the display surface at any one of six angles ranging from 10° backward to 5° forward. Both the terminal's brightness-control and transmission-rate settings are mounted in front.

CW at Mini/Micro

Lear Siegler also used the Mini/Micro conference as a forum to introduce an acoustic-quieting cover for the firm's existing Model 310 Ballistic printer. Made of clear Plexiglas, the optional cover fits over the serial dot-matrix printer's paper exit. The covers cost $100 each.

Among some of the other human-engineered products introduced at the Mini/Micro show was Ampex's DM-9300AQ disk system, a plug-compatible replacement for Control Data Corp.'s Model 9766. The 300M-byte Ampex unit comes in a "quietized," foam-insulated cabinet.

A front-end opening lid and an "optimal" height of 30 in. ease insertion and removal of the DM-9300AQ's disk packs, Ampex said. The system also complies with recent Federal Communications Commission standards for electromagnetic radiation and costs $10,000 in small quantities.

DPers Contribute Big To Afghan Aid Fund

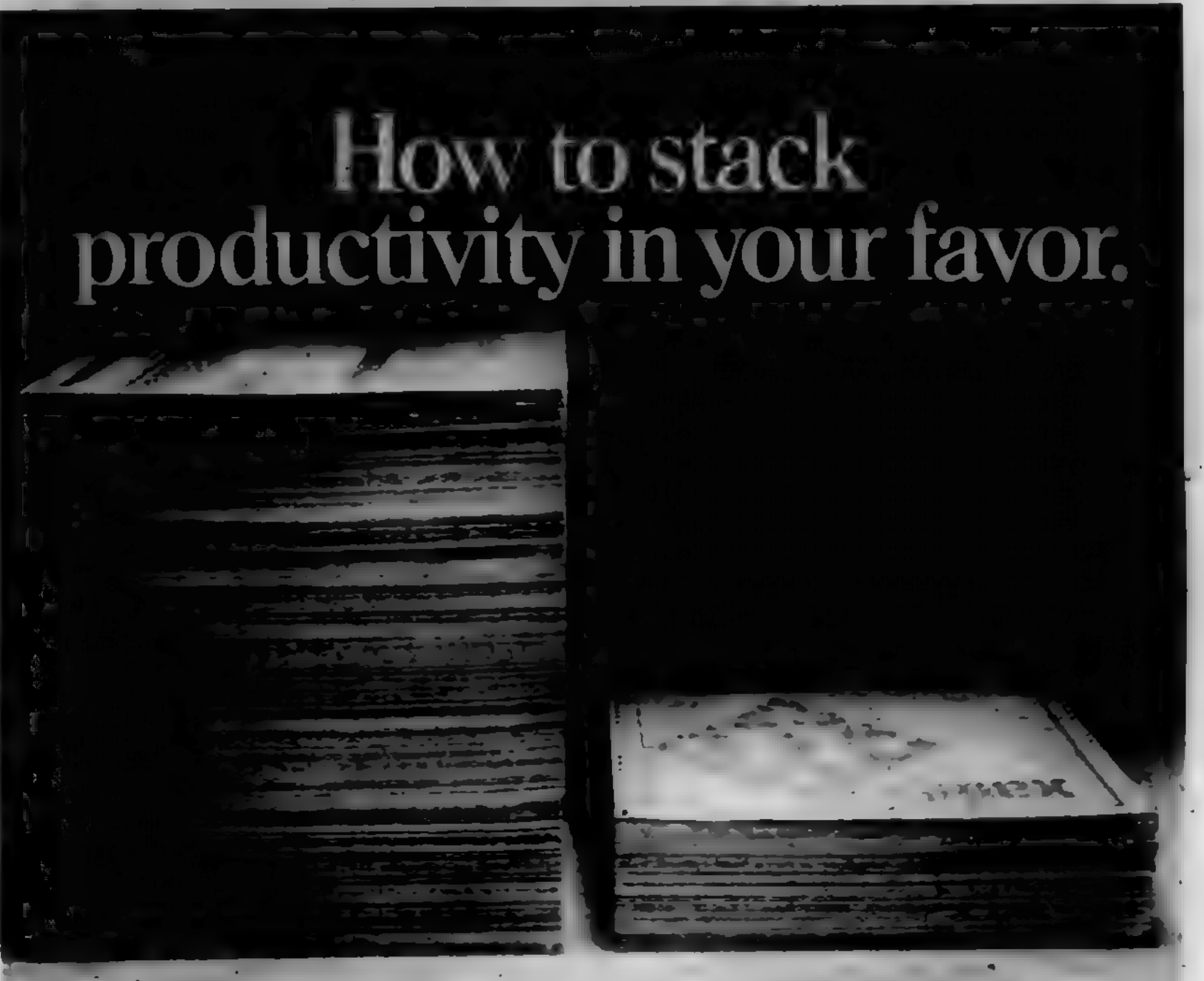
PORTLAND, Ore. – DPers here reportedly have been the most generous contributor to American Aid for Afghans, Inc., a nonprofit organization supplying food and medical relief to Afghans displaced by the Soviet invasion of Afghanistan.

Don Weidenweber, founder of the organization and president of Computer Concepts, Inc., got involved with the Afghanistan situation because "like a lot of other people, I was upset by the Soviet invasion of Afghanistan and wanted to do something about it."

After exhausting the more conventional avenues of protest – such as writing to his congressman – Weidenweber decided to take direct action. He gathered together some people who were familiar with Afghanistan, then organized a board of directors from among the Portland business community and began seeking funds.

DPers were the most responsive to Weidenweber's appeal, and he has a theory why: "Computer people seem to have a better sense of internationalism."

American Aid for Afghans, Inc. is based at 6443 S.W. Beaverton Highway, Portland, Ore. 97221.



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Programmers Slammed for Not Keeping Up

(Continued from Page 1)

ference keynote address.

Hamming, who formerly headed the Association for Computing Machinery and who now serves as adjunct professor at the U.S. Naval Post-Graduate School, cited professional obsolescence as one of the main reasons for the computing field's generally low level of programmer productivity.

Hire the Best

To compensate for their programming staffs' often paltry output, many computing department managers simply hire additional programmers, but that practice usually only makes the productivity problem worse. "If you've got a project that falls behind schedule, putting more people on it only slows you up," Hamming said.

"It's better to have a few programmers who are very good and pay them well than it is to have a whole acre of second-rate people. It'll cost you far more in time and everything else to have second-rate programmers than to have a few who are really first rate."

The only effective antidote to the problem of low programmer productivity is for computing personnel to follow a strict regimen of professional development that includes reading books, attending meetings and studying trade journals, Hamming said.

Hamming's own regimen of professional development includes teaching university courses at night to force himself to keep pace with his fast-moving field's technological developments. He also periodically reviews books and technical articles.

"I put myself on the firing line regularly and let people take shots at me," he said. "I get out there where the action is. I don't hide where it's safe."

In addition to preventing themselves from becoming professionally obsolete, programmers should strive to make their systems easy to use, debug and modify so nontechnical users can do their own jobs without turning for support to their companies' computing departments.

"Programmers should constantly be trying to make themselves obsolete, to write their programs in such a way that a system can be used without them," Hamming said during his keynote address. "Unfortunately, most programmers are afraid to let users be independent of them and, as a result, their lives are constantly full of business, and they hardly ever find time to think."

In a similar vein, Hamming urged programmers to strive constantly for simplicity in their work. Most programs, he said, are "vastly overcomplex."

Hamming also urged programmers to rethink their projects at regular intervals during the product-development cycle — and he practices what he preaches. While he was still working at Bell Laboratories, for example, he reserved each Friday afternoon as a time when he would "think only great thoughts" and banish all the distractions of the workaday world.

French Firms Bring 'Smart' Credit Card to U.S.

(Continued from Page 1)

a videotex system called Teletel were among the other products displayed and discussed at last week's U.S. introduction of Intelmatique technology.

The directory terminal will be given away free to all French telephone subscribers during the next several years. One aim is to eliminate printed telephone books; another is to equip all French households with a terminal capable of accessing a variety of on-line information services. A third aim is to create the volume needed to make the price of the related systems attractive to foreign purchasers.

A large-scale field trial of the new directory terminal is scheduled to begin in Brittany late next year. By April 1982, Intelmatique Marketing Director Roy Bright explained, about 200,000 terminals will be installed.

Electronic message service is among the applications that will be supported by the directory terminals. Users will be able to compose their own messages, using the keyboard or order standard ones that include both text and graphics.

The telephone company will charge the users of its electronic directory service, as well as the service providers. Charges have not been worked out yet, but Bright said a basic fee of 40 centimes — about 12.5 U.S. cents — will be imposed on the user. It will buy him five minutes of connect time. In some cases, the user will also have to pay an additional fee to the service provider.

Teletel Videotex

Next January, the French plan to begin a field trial of their Teletel videotex system. The hardware consists of a standard color TV set, telephone, full alphanumeric keyboard and a decoder — an interface that converts the received information from binary code into a TV display.

Some 2,500 households in Velizy, a Paris suburb, will participate in the trial, along with some 200 information providers. Among them is La Redoute, the nation's biggest mail-order retailer.

Possibly the most interesting feature of the La Redoute application is the way merchandise will be delivered after it has been ordered.

In Paris, the company has installed microprocessor-controlled lockers within a number of metro and railway stations. When an item is placed inside a locker by the company's deliveryman, he inputs the customer's account number into the microprocessor. The customer retrieves the item afterward by feeding a company-issued credit card into a reader connected to the microprocessor. If the codes on the card agree with those previously input by the deliveryman, the locker opens automatically.

During the upcoming Velizy test, La Redoute plans to maintain a list of delivered orders and the related locker numbers in its Teletel data base. This will allow customers to use the system to find out when their purchases are ready to be picked up.

A major goal of the French program is to develop on-line systems for small business firms, Bright explained. The inverted file structure developed for the electronic telephone directory application, he pointed out, can be used without major changes to support inventory control and order processing applications.

Several peripherals are being developed that are intended to make the directory terminal even more useful for business applications. These include a facsimile photocopier, communicating word processor and a telewriter — a device for converting handwritten text and graphics into a binary code that can be transmitted by a standard voice-grade telephone circuit.

All of these devices are scheduled to be available in France within the next year, Bright said, and marketing opportunities in other countries are being intensively explored. The 3M Co. has already acquired marketing rights to one of the facsimile machines; developed by Thomson-CSF, it transmits a full page of text in 40 seconds to two minutes and will cost about $500.

Two French firms — Flonic Schlumberger and CII Honeywell Bull — are developing the "smart" credit card. It is expected to become commercially available late next year.

AT&T Slates Third EIS Test

By Phil Hirsch
CW Washington Bureau

AUSTIN, Texas — AT&T will begin its third test of the on-line Electronic Information Service (EIS) here next summer. Besides providing information now found in printed telephone books, the system will allow subscribers to set up their own data base files and access the information at will.

Recipes, frequently called telephone numbers and personal reminder notes are among the items that could be input, according to a spokeswoman for Southwestern Bell Telephone Co., which is cosponsoring the trial with AT&T.

The Austin test is the latest of three Bell System ventures utilizing videotex technology, which connects a computerized central data base to a home or office CRT/TV terminal through standard voice-grade telephone lines.

Besides AT&T, several other suppliers are attempting to develop videotex and a related system called teletext into a nationwide, on-line home information system. Other countries — notably France, Canada and the UK — are doing likewise.

The first AT&T EIS trial run, in Albany, N.Y., began last fall [CW, Sept. 3, 1979]. The second — a joint venture with Knight-Ridder Newspapers, Inc. in Coral Gables, Fla., a Miami suburb, began last July [CW, July 28].

The upcoming Austin trial will last 14 months and involve about 900 subscribers; the data base will encompass a million name and number listings from the 512 area code and 100,000 TV display frames of other information — most of it taken from the Austin Yellow Pages and those of other cities within the 512 area code. As a result, the Austin trial will be considerably larger than the one in Albany.

Also, unlike Bell's first Electronic Information System trial, this one will use a standard color TV set, rather than a CRT. And the Austin trial will be the first in the series to allow the user to input personal information.

Viewtron Terminal

AT&T said the terminal to be used in Austin will be like the one employed in the Coral Gables Viewtron test, but no additional details were provided.

The Viewtron terminal has two input devices — a full Ascii keyboard, capable of accommodating both keywords and full-text messages, plus a hand-held keypad about the size of a pocket calculator.

A hierarchical search strategy is used. The viewer first punches a base code into the keypad and gets back an index listing the major subject areas in the data base — each of which is individually numbered. He then inputs one of these numbers and receives a display showing the subtopics within the subject area.

Generally, after repeating this process once or twice more, he reaches the information desired. Typically, it would consist of restaurants within a given geographic area serving a particular cuisine within a given price range.

Viewtron Applications

Viewtron supports a wide variety of applications — restaurant and theater listings, home shopping services enabling the viewer to compare prices offered by competing stores and order items on-line, travel and theater ticketing services, home banking, news, weather and sports reports. The Austin trial, at least initially, will provide only the last of these, in addition to telephone directory and personal data base services.

A major goal of the test, apparently, is to determine whether an electronic information service can supplant printed telephone books and information operators — both of which are becoming increasingly expensive, the phone company said.

In France, an electronic directory terminal providing access to subscriber names and numbers — as well as supporting services like those included in the Viewtron trial — is being given away, free to telephone subscribers.

Sees 'Disastrous' Consequences

Group Blasts Ruling Forcing Union on DPers

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — A nationwide organization of programmers and system analysts last week formally condemned a recent federal government decision forcing nonsupervisory management information systems (MIS) personnel at Western Airlines, Inc. to join a labor union.

The Association of Computer Programmers and Analysts (Acpa) warned the decision could have "disastrous" consequences for a wide range of large businesses and urged the government to reconsider its position in the Western Airlines case.

The organization, which claims 574 members throughout the U.S., voiced its dissent in a three-page statement drafted by its board of directors and formally approved here during the opening day of the association's tenth annual conference.

Based in E. Greenwich, R.I., the Acpa is believed to be the first professional trade organization to take a formal position in the Western Airlines controversy, which erupted last summer when an independent federal agency known as the National Mediation Board (NMB) ruled that programmers and system analysts qualify as clerical or office personnel and therefore deserve to be unionized [CW, Aug. 18].

NMB's ruling was prompted by a petition filed last May by the Brotherhood of Railway and Airline Clerks (Brac), an international labor union that had sought for months to extend its control to Western Airlines' formerly nonunionized computing shop.

In its petition, Brac argued that nonsupervisory MIS personnel belong to the "clerical class or craft" as described by the Railway Labor Act, which was written in part to define the scope of the union's authority. NMB agreed with Brac's argument, OK'd its petition and thus opened the way for the Western Airlines computing staff to be unionized — all of which was apparently undertaken without the employees' prior knowledge or consent.

Since then, the Acra has drafted a resolution "deploring" NMB's lack of consultation in the case and "strongly" opposing its recent decision on several grounds. In the long run, the statement warns, the federal agency's ruling could have a "disastrous" effect on the ability of many business computing departments to hire and retain skilled MIS professionals.

"The market demand for competent, professional analysts and programmers, coupled with their independent nature, is such that they would be hesitant to work for any employer who required them to submit to a union agreement," the association said. "Employers are well aware of the reputation analysts and programmers have for leaving a company if they are not satisfied with working conditions."

CW at Acpa

The Acpa's statement also disputed NMB's contention that programmers and system analysts exercise little or no management authority and therefore belong in the same job category as clerical and office workers.

"No clerical and few nonsupervisory positions have the potential for as much impact on the success or failure of a business as has the analyst or programmer," the statement argued. "Many analysts or programmers are either explicitly or implicitly charged with responsibility for effective management and utilization of the corporate information resource. This is not a light responsibility."

Another reason Acpa opposes NMB's recent decision is that it is allegedly based on ignorance of basic analyst and programmer psychology. The statement cites recent motivational studies that show computing professionals have an unusually strong drive for professional growth and on-the-job stimulation.

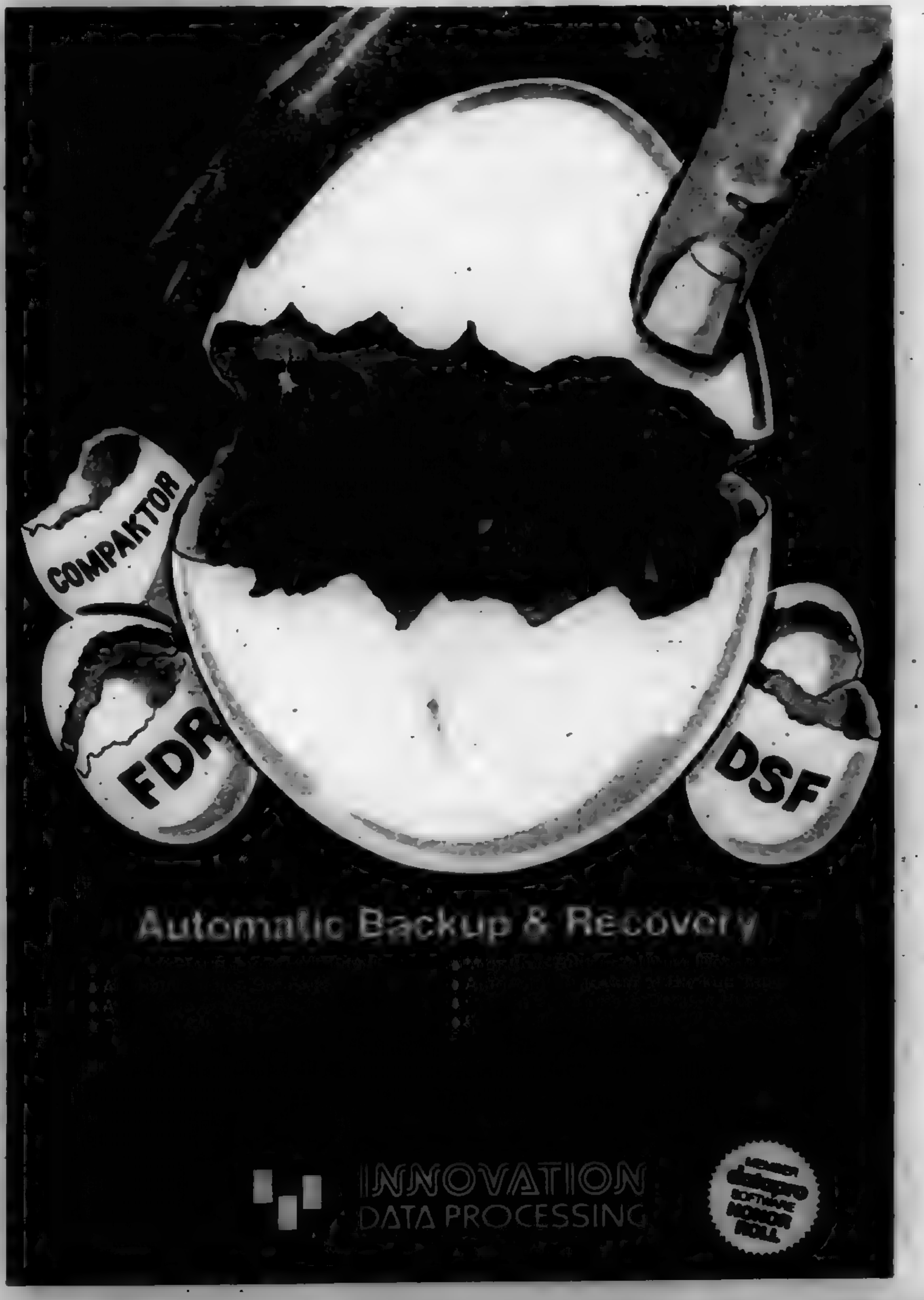
Postal Service Nixes Zip Delay

WASHINGTON, D.C. — The U.S. Postal Service intends to go ahead with its nine-digit Zip Code plans despite the protest of more than 120 members of Congress.

In an Oct. 3 letter to Rep. Richardson Preyer (D-N.C.), Postmaster General William F. Bolger said it would be detrimental to the Postal Service and its customers to delay implementation of the new codes, scheduled for February. Preyer and his colleagues had asked for the delay Oct. 2, saying the Postal Service has not supplied sufficient information on cost to the postal service and the public of the new codes [CW, Oct. 13].

Bolger's response stated his belief "the Postal Service has carefully studied the impact of our plan to expand the Zip Code, including the financial, technical and social aspects.

"While some problems may develop as we move further into our expansion program, I believe that the advantages for this nation far outweigh any disadvantages espoused," Bolger wrote.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Why Choose Tape? 3420-Type Units Profiled

(Continued from Page 1)

A potential tape drive purchaser has a broad choice to select from, Datapro observed. In some ways this makes the final decision more difficult since some independent-produced drives not only match the performance of the various IBM models but also offer different standard features, the report noted.

For example the dual-density feature is standard on various drives from Memorex, NAS, Braegen and Telex while STC and IBM specify that dual density is an option.

Variations are also present among the number of controller switch options and channel switch options offered by IBM and its plug-compatible competition.

Both of these features can provide flexibility and, possibly, economy if utilized correctly, according to the report.

Controller Switch Option

The controller switch options permit a degree of flexibility by switching a group of drives among several controllers, Datapro noted. Thus, reconfiguration in mixed-format or mixed-speed environments can take advantage of the computer's I/O paths. The first number used in the chart notations identifies the number of controllers that can be in the switch group and the second number shows the maximum number of drives that can be switched.

A tape subsystem can be switched under program control between multiple processors via the channel switch options, according to the study. This allows operating economies to be achieved in some cases by sharing tapes among multiple processors in the same facility, Datapro noted.

Another standard feature available from Memorex addresses the problem of identifying a tape that has become contaminated to the point where it cannot be read and the stored data is, in effect, lost. In order for tape operations to function effectively, Datapro pointed out, constant operator vigilance is required to keep the tape itself in good condition.

The Memorex tape maintenance monitor automatically stamps a red mark on the back of the reel after a predetermined number of unsuccessful write attempts have been made. The maximum number of write errors is 32 for 1,600 bit/in. density and 96 for 6,250 bit/in., according to a Memorex spokesman.

The red mark alerts the operator to the fact that the data on that particular reel should be copied to a new reel. While the process is still somewhat operator-dependent, it has merit when compared to IBM's system of printing this type of information on the system log record, he claimed.

Subsystem Compatibility

Another factor to keep in mind when shopping among PCM wares is that none of the five vendors shown in the charts offers a drive compatible with the mainframe controller. It is necessary in every case to purchase the PCM's controller along with its associated drives, and this naturally involves a considerable expense.

Why this insistence on subsystem compatiblity rather than, as Datapro described it "component compatibility"? Basically, the PCMs are selling the controller electronics, a Datapro representative said. And, given the maintenance problems that plague this medium, tape drive component compatibility may be more difficult to successfully achieve than it is for disk drives.

The study warned that although all of the PCMs' products adhere to IBM's standards, this does not guarantee in and of itself that the tapes recorded on an IBM drive can be read on an independent drive nor that the converse is true. However, all drives that use a particular recording format can normally be adjusted to be compatible with one another, Datapro said. The report recommended specifying this compatibility adjustment in the contract if it is critical to an operation.

Listed prices are subject to change. Since IBM recently announced a significant price reduction on three members of its 3420 family, models 4, 6 and 8 [CW, Oct. 13], industry observers expect most PCMs to follow suit. Datapro felt that hard negotiation could often result in paying less than the amounts shown, particularly if the user representative is in an easy-to-service geographical area or represents a prestige account.

Device / Characteristics	IBM 3420 Model 3[1]	Storage Technology Corp. 3430[2]	Telex Computer Products, Inc. 8020-3
Attachment via Mainframe Controllers	3803-1	No	No
Attachment via Independent Controllers	—	STC 3800-III	Telex 8803-2
Drive/Controller	1-16	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	2 Channels	2 Channels
Recording Characteristics	7-Track: 556- or 800 bit/in.; 9-Track: 1,600 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 200-, 556 or or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	9-Track: 800- or 1,600 bit/in.
Mode Compatibility?	No	Optional	Optional
Transfer Rate (byte/sec)	7-Track: 41.7 or 60; 9-Track: 60 or 120	7-Track: 15, 41.7 or 60; 9-Track: 60 or 120	60 or 120
Rewind Time (2,400 ft)	60 Sec	65 Sec	60 Sec
Purchase Price	$14,340/Drive; $24,850/3803-1	$16,610/Drive; $23,200/3800-II	$12,640/Drive; $21,040/8803-2
Monthly Lease Charges (2-Year Lease Incl. Maintenance)	$410/Drive; $713/3803-1	$407/Drive; $600/3800-II	$525/Drive; $913/8803-2
Maintenance Included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 5 Day/Week

1. Dual-density and seven-track features are optional.
2. Dual-density is optional.

Tape speed for all models is 75 in./sec, and all models offer read backward capability.

Device / Characteristics	IBM 3420 Model 4[1]	Storage Technology Corp. 3630[2]	Telex Computer Products, Inc. 8020-4
Attachment via Mainframe Controllers	3803-2	—	No
Attachment via Independent Controllers	—	STC 3800-IV	Telex 8803-2
Drive/Controller	1-8	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	2 Channels	2 Channels
Recording Characteristics	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.
Mode Compatibility?	No	Optional	Optional
Transfer Rate (byte/sec)	120 or 470	120 or 470	120 or 470
Rewind Time (2,400 ft)	60 Sec	65 Sec	60 Sec
Purchase Price	$18,440/Drive; $33,110/3803-2	$23,700/Drive; $38,635/3800-IV	$15,320/Drive; $21,040/8803-2
Monthly Lease Charges (2-Year Lease Incl. Maintenance)	$572/Drive; $1,037/3803-2	$526/Drive; $870/3800-IV	$503/Drive; $913/8803-2
Maintenance Included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 7 Day/Week

1. Dual-density is optional; seven- and nine-track features available with 3803-2.
2. Dual-density is optional.

Tape speed for all models is 75 in./sec, and all models offer read backward capability.

Tape Beats Disk in Some Environments

By Rita Shoor
CW Staff

Portability.

System-to-system compatibility.

The ability to store large volumes of data.

Combined with the increasing need for permanent backup on large-capacity fixed disk drives, these are the factors that make tape storage media preferable to disk drive storage in certain environments, according to a specialist in capacity planning for large systems.

For a comparison of Model 7- and Model 8-compatible versions of the IBM 3420 — and an idea of when IBM will announce its next tape drive family, code-named Ocotillo — turn to Page 12.

Bob Monnette, a consultant with Cheshire Associates in Chicago, did agree with Datapro Research Corp. that, compared with tape, disk does have performance advantages. Enumerated in a Datapro study entitled "All About Plug-Compatible Tape Drives," these advantages include the facts that sequential file updating plays a less dominant role in DP systems now and disk packs provide a recording medium that is easier to maintain than tape.

However, "until most installations have implemented common data communication," the requirement remains for a storage medium such as tape that is easily portable, Monnette maintained.

Diskettes are not necessarily an acceptable alternative in all cases because they usually can not hold a large volume of data, he observed. Diskettes are often limited to carrying several kilobytes of data as opposed to one volume of tape which can easily store 100M bytes on one 2,400-foot reel.

Easy Disaster Recovery

One other advantage of this medium is that it is archival in nature, which makes for easier disaster recovery, according to the consultant. While mass storage systems such as the IBM Model 3850 fill this need for some installations, they were built around an older technology and could result in floor space problems because of their large "footprint."

The apparent industry commitment to relatively new data base concepts may ironically increase the acceptance of tape as a backup medium. "The information stored within a data base requires a lot of space, Monnette said. Until a data base concept is developed that involves lower volumes of data, there is "no way to get away from tape."

The physical constraints involved in either speeding up today's tape drives or packing the data more closely led Monnette to indicate that he did not predict any "radical changes" in the near future involving tape technology.

The drive functions to move a flexible medium across the read/write head at such a speed that air is actually treated as a fluid. Speeding up today's drives to move the tape faster across this head would mean a significant breakthrough, he said.

Device / Characteristics	IBM 3420 Model 5[1]	Braegen Corp. 348[2]	Storage Technology Corp. 3450[3]	Telex Computer Products, Inc. 8020-5
[illegible]	3803-1	No	No	No
[illegible]	—	Braegen 1040, 1040A	STC 3800-III	Telex 8803-2
Drive/Controller	1-8	1-8	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	Optional, 2 Channels	2 Channels	2 Channels
Recording Characteristics	7-Track: 556- or 800 bit/in.; 9-Track: 1,600 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 200-, 556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 200-556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	9-Track: 800- or 1,600 bit/in.
Mode Compatibility?	No	Standard	Optional	Optional
Transfer Rate (byte/sec)	7-Track: 69.5 or 100; 9-Track: 100 or 200	7-Track: 25, 69.5 or 100; 9-Track: 100 or 200	7-Track: 25, 69.5 or 100; 9-Track: 100 or 200	100 or 200
Rewind Time (2,400 ft)	60 Sec	60 Sec	55 Sec	60 Sec
Purchase Price	$19,230/Drive; $24,850/3803-1	$2,500/Drive; $2,500/Controler	$21,270/Drive; $23,200/3800-III	$14,200/Drive; $21,040/8803-2
Monthly Lease Charges (3-Year Lease Incl. Maintenance)	$551/Drive; $713/3803-1	$315/Drive; $342/Controller	$520/Drive; $600/3800-III	$484/Drive; $913/8803-2
[illegible]	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 5 Day/Week

1. Dual-density and seven-track features are optional.
2. Seven-track feature is optional.
3. Dual-density is optional.

Tape speed for all models is 125 in./sec, and all models offer read backward capability.

Device / Characteristics	IBM 3420 Model 6[1]	Memorex Corp. 3226	Storage Technology Corp. 3650[2]	Telex Computer Products, Inc. 8020-6
Attachment via Mainframe Controllers	3803-2	—	No	No
Attachment via Independent Controllers	—	Memorex 3221, 3222	STC 3800-IV	Telex 8803-2
Drive/Controller	1-8	1-16	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	2, 3 or 4 Channels	2 Channels	2 Channels
Recording Characteristics	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.
Mode Compatibility?	No	—	Optional	Optional
Transfer Rate (byte/sec)	200 or 780	200 or 781	200 or 780	200 or 780
Rewind Time (2,400 ft)	60 Sec	50 Sec	55 Sec	60 Sec
Purchase Price	$21,540/Drive; $31,110/3803-2	$26,810/Drive; $39,420/3221; $78,840/3222	$27,385/Drive; $38,635/3800-IV	$16,440/Drive; $21,040/8803-2
Monthly Lease Charges (3-Year Lease Incl. Maintenance)	$662/Drive; $1,037/3803-2	$683/Drive; $925/3221; $1,650/3222	$584/Drive; $870/3800-IV	$588/Drive; $913/8803-2
Maintenance Included With Basic 3-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 5 Day/Week

1. Dual-density is optional; seven- and nine-track features are available with 3803-2.
2. Dual-density is optional.

Tape speed for all models is 125 in./sec, and all models offer read backward capability.

IBM's Ocotillo — A Glimpse Into the Future

By Rita Shoor
CW Staff

What can we expect to see in the new family of tape drive products expected to be announced by IBM before the end of the year?

Code-named Ocotillo [CW, Aug. 18], the new series could represent "a straight replacement for the 3420-type drive with a higher density and speed," speculated a representative of International Data Corp. (IDC), the market research firm in Waltham, Mass.

Another possibility is a tape streamer device; still a third possibility is a wide-track drive that might handle as many as 18 tracks with up to 20,000 bit/in., he said.

When does he expect the formal IBM announcement? Perhaps as early as the fourth quarter of 1980, although he felt the first quarter of 1981 is a stronger probability.

One thing the new drives probably won't be is a continuation of the 8809 tape unit, the IDC spokesman said. The 8809 is generally viewed as a limited-use drive designed for fast dump and restore capabilities to back up fixed disk drives, he explained.

IBM seems to have recognized this; it began deemphasizing the 8809 with its announcement of the 4331 Group 2 processor in May, the IDC spokesman noted.

[illegible]	IBM 3420 Model 7[illegible]	[illegible] Corp. [illegible]	[illegible] Corp. [illegible]	National Advanced Systems 7480-77	Storage Technology Corp. [illegible]	Telex Computer Products, Inc. [illegible]
[illegible]	3803-1	No	—	—	No	No
[illegible]	—	Braegen 1040, 1040A	Memorex 3221, 3222	NAS 7800-21	STC 3800-II	6800-1
[illegible]	1-8	1-8	1-16	1-8	1-8	1-8
[illegible]	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2, 3 or 4 by 16	1 or 2 by 8 or 16	2, 3 or 4 by 16	2 by 16
[illegible]	Optional, 2 Channels	2 Channels	Optional, 2 Channels	2 Channels	2 Channels	2 Channels
[illegible]	7-Track: 556- or 800 bit/in., 9-Track: 1,600 bit/in., 9-Track: 800- or 1,600 bit/in.	7-Track: 200-, 556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	9-Track: 800- or 1,600 bit/in.	9-Track: 800- or 1,600 bit/in.	7-Track: 200-, 556- or 800 bit/in., 9-Track: 800- or 1,600 bit/in.	7-Track: 556- or 800 bit/in., 9-Track: 800- or 1,600 bit/in.
[illegible]	No	Standard	—	—	Optional	Optional
[illegible]	7-Track: 111.2 or 160; 9-Track: 160 or 320	7-Track: 40, 111.2 or 160; 9-Track: 160 or 320	160 or 320	160 or 320	7-Track: 40, 111.2 or 160; 9-Track: 160 or 320	7-Track: 40, 111.2 or 160; 9-Track: 160 or 320
[illegible]	45 Sec	45 Sec	52 Sec	45 Sec	45 Sec	60 Sec
[illegible]	$21,540/Drive; $24,680/3803-1	$3,000/Drive	$30,000/-Drive; $68,400/-3221; $78,840/-3222	Not Available	$23,300/Drive; $23,200/-3800-II	$7,500/Drive; $[illegible]/6800-1
[illegible]	$663/Drive; $712/3803-1	$306/Drive; $306/-Controller	$774/Drive; $625/3221; $1,880/-3222	Not Available	$600/Drive; $680/3800-II	$240/Drive; $404/6803-1
[illegible]	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	Not Available	24 Hour/Day, 7 Day/Week	8 Hour/Day, 7 Day/Week

Tape speed for all models is 200 in./sec, and all models offer read backward capability.
1. Dual-density and seven-track features are optional.
2. Seven-track feature is optional.
3. Tape maintenance monitor is standard.
4. Dual-density is optional.
5. This model is no longer manufactured, but refurbished units are available.

[illegible]	IBM 3420 Model 8[illegible]	Memorex Corp. [illegible]	National Advanced Systems 7480-[illegible]	Storage Technology Corp. [illegible]
[illegible]	3803-2	—	No	No
[illegible]	—	Memorex 3221, 3222	NAS 7800-21	STC 3800-IV
[illegible]	1-8	1-16	1-8	1-8
[illegible]	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	1 or 2 by 8 or 16	2, 3 or 4 by 16
[illegible]	Optional, 2 Channels	2, 3 or 4 Channels	2 Channels	2 Channels
[illegible]	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.
[illegible]	No	—	—	Optional
[illegible]	320 or 1,250	320 or 1,250	320 or 1,250	320 or 1,250
[illegible]	45 Sec	45 Sec	45 Sec	45 Sec
[illegible]	$23,880/Drive; $32,110/3803-2	$31,800/Drive; $39,420/3221; $78,840/3222	Not Available	$30,120/Drive; $38,[illegible]/3800-IV
[illegible]	$786/Drive; $1,087/3803-2	$774/Drive; $625/3221; $1,880/3222	Not Available	$880/Drive; $870/3800-IV
[illegible]	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	Not Available	24 Hour/Day, 7 Day/Week

1. Dual-density is optional.

Tape speed for all models is 200 in./sec, and all models offer read backward capability.

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Navy's Pay System Seen Taxpayers' Nightmare

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – A classic example of "garbage in, garbage out," is costing American taxpayers millions of dollars per year in overpayments to U.S. Navy personnel.

The Navy's error-riddled centralized automated pay system, developed and operated over the last 12 years at a cost of $150 million, is "largely unreliable and inefficient," the General Accounting Office (GAO) reported recently.

The problem, according to the auditing agency, has nothing to do with the hardware or software of the system, but instead involves the human operations supporting it.

"Most of the pay computed by the system is based on erroneous and/or outdated information" that must be double checked by "an expensive, unapproved parallel manual system" to assure the Navy's 522,000 active personnel are paid correctly, GAO found.

Every payday, the manual backup system finds more than 50% of the centrally computed payments are in error and have to be overridden at Navy disbursement offices. Despite these overrides, however, many errors are still found in paychecks, GAO said.

Errors Mean Millions

The errors, while including numerous underpayments to servicemen, are costing millions, the GAO said. On a systemwide basis, the agency said, a March 1979 sampling of Navy pay accounts found an estimated $27.5 million in errors. In fiscal 1978 alone, overpayments to about 17,000 selected personnel totalled approximately $4.2 million, the report said.

The "major problems of the system" are blamed by GAO on "the lack of timely and accurate input data from field organizations to the central computer."

Approximately 400 disbursing offices located worldwide collect and transmit pay change information in the form of optical character recognition documents, which are batched and mailed from local field administrative offices. Large facilities transmit the data to the computer center in Cleveland on magnetic tape.

Most of this data takes an average of 23 days for input, including 12 days of preparation and seven days in the mail. The system design originally called for only three days of preparation, GAO noted.

"Besides being late, the quality of the input is very poor," the audit report added. Approximately 250 clerks at the central site resolve an average of 38,000 errors rejected by the system every month – costing the Navy $3.4 million per year.

This amounts to about 8% of pay change transactions submitted every month, the report said. "And in 17% of those cases, the corrections made by the clerks are rejected and the errors must be corrected again."

The obvious answer to most of these problems, GAO pointed out, is to speed up preparation and input of pay data. The Navy assured the GAO field activities are being reorganized to that end, a reorganization set for completion by the end of this year.

In addition, beginning in the fall of 1981, the Navy will have its major domestic installations transmit pay data electronically rather than through the mail. And by 1984, a more sophisticated telecommunications network will allow about 60% of the data to be transmitted electronically.

The GAO said it approves of these changes but recommended the Navy immediately step up management oversight of the field operations to reduce input errors so it can reduce reliance on its manual backup to eliminate the expensive parallel operation.

N.Y. Marathon: System Gets Set

NEW YORK – An estimated 13,000 runners are expected to cross the New York Marathon finish line next Sunday in what is being billed as the largest athletic event ever scored by a computer.

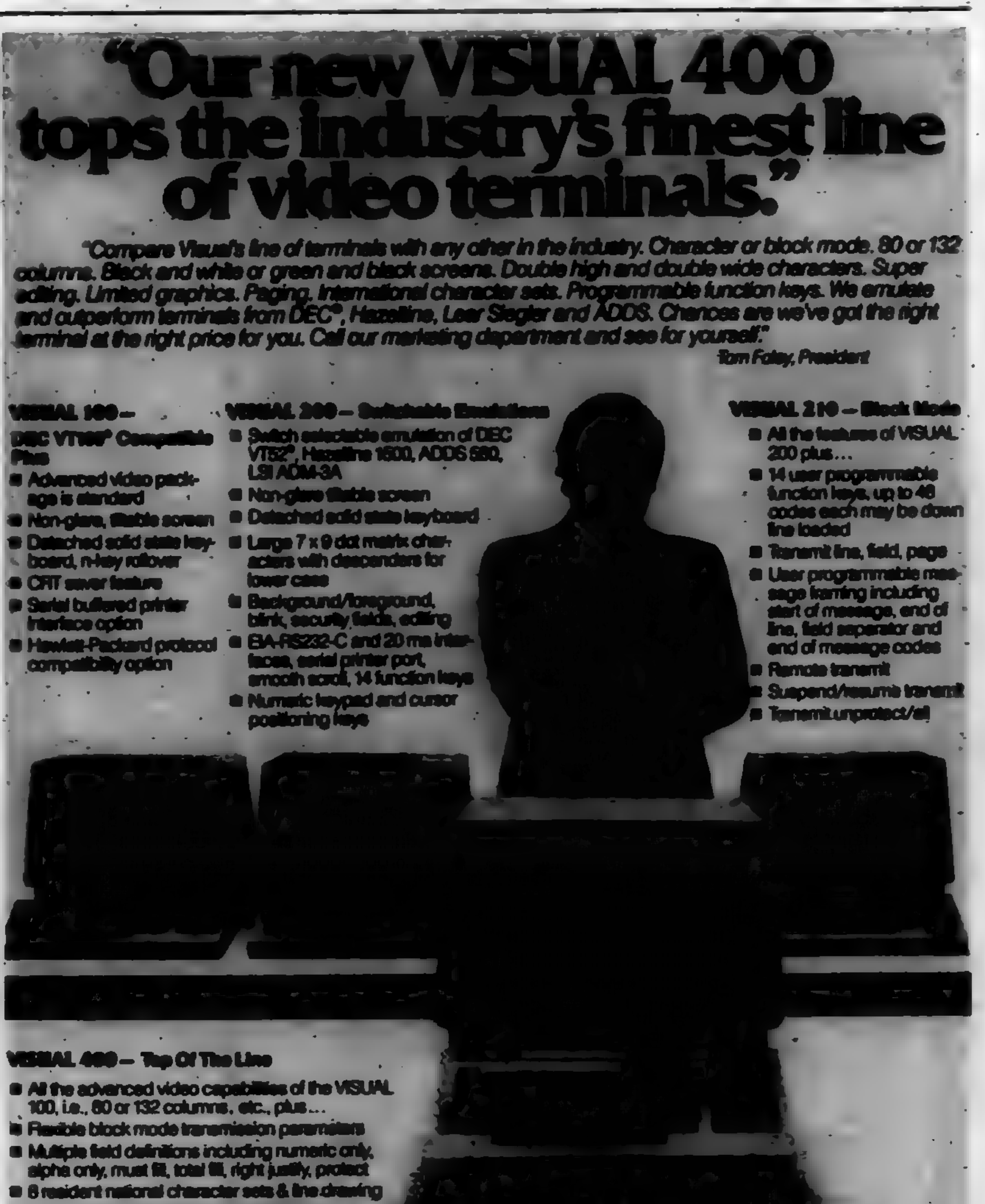
The scoring system – a mixture Intel Corp. of microcomputers and Data General Corp. minicomputers – is capable of tracking more than 100 runners per minute as they cross the finish line and gives times accurate to the nearest hundreth of a second, a spokeswoman said.

When a runner crosses the finish line on Oct. 26 in one of three lanes, a race official will push a button recording the exact moment. This information is transmitted to one of two microcomputers located in a van parked close to the finish in Central Park.

In case of a heavy surge of runners at the finish, a second official will be on hand to enter data on a hand-held terminal linked to both micros, the spokeswoman explained.

The runners' times will also be recorded by a third official who will also have a button connected to both microcomputer systems.

The microcomputers will store the finishing data in nonvolatile memory and also send it via a private line to a DG Eclipse C/350 minicomputer located at Personnelmetrics, Inc. A pair of Timeplex, Inc. multiplexers will handle the micro-to-mini transmissions and the main minicomputer will be backed up by a DG Eclipse C/330 system.



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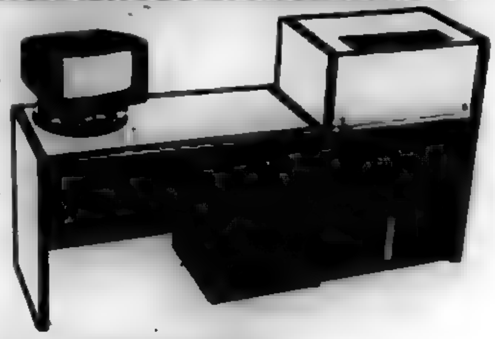

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Computers Seen Displacing Jobs Faster Than Creating Them

By Nancy French
CW Staff

MELBOURNE, Australia — Although new jobs are being created as a direct result of computer automation, they are in nowhere near the same number of those eliminated in four categories studied by U.S. computer scientists, according to a paper prepared for the Eighth World Computer Congress of the International Federation for Information Processing (Ifip 80) here last week.

Prepared by Dr. Bruce Gilchrist of Columbia University's Center for Computing Activities, the paper is aimed in part at trying to describe ways in which employment problems caused by computers are being mitigated, Gilchrist said.

On the positive side, the number of U.S. jobs created directly in the manufacture and use of computers probably approaches three million — or close to 3% of civilian employment, he said.

At the same time, however, serious job displacement is occurring. Of four industry areas surveyed — telephone, telegraph, typesetting and supermarkets, typesetting jobs have been affected most, Gilchrist contended.

CW at Ifip 80

Between 1966 and 1978 in New York City alone, he said, the number of journeyman typesetters declined from 7,993 to 3,851, and the number of apprentices declined even "more precipitiously" from 498 to 11.

Of the 1,000 typesetters who lost their jobs in a recent two-and-one-half year period, one third retired, leaving the other two thirds to find jobs in other fields.

Telephone Industry

In the telephone industry, for example, between 1972 and 1977 "the average number of telephone calls handled by the Bell System increased 21% from 420 million to 510 million, while the number of operators declined by 32%, from 149,000 to 102,000, Gilchrist said.

Because of the relatively high turnover rate in these jobs, however, the reduction was accomplished through attrition, he said.

In the telegraph industry, the number of telegraphists represented by membership in the United Telegraph Workers has been cut in half since 1967, from 20,000 to 10,000.

The principal reason was Western Union's move to computer-based operations and its reduction in the number of telegraph workers.

Here, most of the laid-off workers have been married women and most of those retained are computer technicians and console controllers, he said.

Supermarket Scanners

Supermarket employees, where scanners have been installed, have been affected less, according to Gilchrist's data. But as many as 45,000 to 60,000 out of a possible one million full-time equivalent jobs could be lost by 1987 or 1988, he estimated.

The high turnover rate and extensive use of part-time employees in this industry "makes it unlikely that anyone will actually be laid off due to scanners," he said.

"Instead, the impact will be felt by individuals who find it harder to obtain the relatively unskilled jobs typical of supermarkets, such as minorities and young people where unemployment is already high," he pointed out.

Going back to typesetters, Gilchrist said most of those displaced have been "unable to find jobs comparable to those they had lost," and many had to take pay cuts of 50% or more.

These workers found unemployment difficult to endure for several reasons — they were middle-aged, they had mortgages to pay and families to support and were laid off from relatively high-salaried unionized positions, and they had skills that were outdated and unwanted, he said.

Approaches to Problem

Gilchrist's review of the four basic approaches to the problem — job protection, redundancy payments, retraining programs and public asitance payments — was gloomy at best.

Job protection, called for in union contracts, tends to endanger the viability of the businesses involved, he said. If an enterprise is forced out of business because its labor costs are higher than those of its competitors, a "no layoff" clause is of little use, he added.

Redundancy payments also can cause a business to become less and less competitive with the same result as the no layoff clause.

Retraining programs sponsored by the government have never actually been used to retrain middle-aged workers, he said. However, one program operated by the International Printing and Graphics Communications Union in Seattle did successfully train printers in small equipment repair and surveying.

Register Set To Match DPers, Job Prospects

ST. LOUIS, Mo. — The Ninth Annual Employment Register will be conducted at the 1981 Computer Science Conference here on Feb. 23-26.

The conference is being jointly sponsored by the Association for Computing Machinery (ACM) and the computer science departments of several universities.

The Employment Register strives to match computer scientists and information processing specialists with employment opportunities.

Registration forms should be filed by Jan. 26.

Details can be obtained from Orrin E. Taulbee, the Department of Computer Science, University of Pittsburgh, Pittsburgh, Pa. 15260.

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		San Francisco	12/9-10
IMS/VS Advanced Programming	$325	Dallas	12/4-5
		San Francisco	12/11-12
Programming for MFS	$500	Houston	12/10-12

Even though it's December, we expect these classes to fill up fast. To reserve seats, call Chuck (214-696-1900); Shirley (713-680-2100), Clay (415-777-1536), or Delfina (415-964-9900). If it helps your budget, we'll bill you in January.

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Especially on Jobs

Australians Seen Worried by Computers' Impact

By Nancy French
CW Staff

MELBOURNE, Australia – The fact that Australia and its all-powerful unions are afraid of the impact of computers on society – primarily jobs – was nowhere more apparent than in the keynote address delivered at the opening of the International Federation for Information Processing's (Ifip) Eighth World Computer Congress here last week.

In his remarks, His Excellency, Sir Zelman Cowen, governor general of the Commonwealth of Australia (appointed by the Queen of England), related that fear to a lack of public understanding of computers, their potential benefits and the skills needed to use them.

At the same time technology is making demands for new expertise, the education system here is failing to produce computer-literate individuals, he told an audience estimated at 1,200.

The crowd had gathered here for Part 2 of this triennial world conference sponsored by Ifip. Part 1 was held in Tokyo the week before.

Committee on Change

Referring to the findings of a study published recently by the Australian Committee on Technological Change, Cowen noted that a high proportion of secondary school students choose to take few or no physical sciences courses. The typical primary school teacher has a poor mathematical background and thus turns out poorly prepared pupils, he said.

In his speech, Cowen also called on Australian firms to become aware of and take advantage of computer technology to regain or retain their international competitiveness and to ensure they are handling their information economically and efficiently.

He also warned that Australia is rapidly becoming totally dependent on imported computing gear. Such a dependency could leave the country seriously vulnerable at a time of international crisis, he pointed out.

While Cowen was speaking here, reporters at the Sydney, Australia, *Herald* newspaper were staging a work stoppage to underscore their demands for greater pay in the face of automation. Since the typesetters' jobs were eliminated by the installation of CRT terminals, the reporters' union believes its workers should be paid more for performing functions on the terminals that previously occurred in the typesetting operation.

The lack of understanding of the importance of mathematics and science has obvious significance in the context of the training and education of a community dependent on a computer technology, Cowen said.

It is also important to a general community understanding of the significance and impact of computing, he added.

The impact of the computer revolution on society has been universal, he said, adding that few areas of human activity have, so far, been untouched.

Quoting the report, he said, "Industrial processes will increasingly be controlled by computers. Work is already performed by robots. Even farming can be automated.

"The commercial world of banking, insurance and retailing is being transformed. Transport and communications are undergoing computer-generated changes. Government and administrative activities are now different.

"Even education and medicine are not unaffected. Moreover, wherever man is standing on the frontiers of science, computer power is assisting in the making of new discoveries," Cowen said.

Once established, computer systems are effectively irreversible, he said. The impact on employment and on the character of employment is very important.

CW at Ifip 80

Citing the account of the introduction of computers at Qantas Airlines by Sir Lenox Hewit, Cowen said, "Widespread use of computerized information systems could attract significant opposition. Bitter industrial disputes have been brought about by the introduction of new technology and a fear of the unknown. A little extra effort in educating staff can pay enormous dividends in the effectiveness of the ultimate system.

"At the earliest [the design] stage, those slated to use a computer system in Qantas and particularly their supervisors were consulted. A supervisor who knows the details of the proposed system, has been consulted in its design and is convinced of its value, can usually convince his staff. If a supervisor is not convinced of the merits of a new system he looks for errors in its design."

CPU Failure Halts Trading

NEW YORK – Trading at the New York and American Stock Exchanges was halted for the longest period in more than five years last week when a computer failure brought activity on the Big Board to a standstill for 54 minutes.

The hardware malfunction, which ocurred at 10:58 a.m. last Monday, caused the system to automatically switch to a backup system, which also failed. Both exchanges shut down at 11:11 a.m., and the Chicago Board Options Exchange was halted two minutes later. Action was resumed at 12:05 p.m.

Although trading was disrupted, the breakdown occurred on Columbus Day holiday, when trading was not particularly heavy.

The problem stemmed from "multiple hardware failures" in the market data system, which controls the stock tickers and reports on trades as they occur, according to a New York Stock Exchange spokesman. Usual recovery time is one-and-a-half minutes, but because the normal indicators did not work because of the dual set of failures, extensive checking was needed before the system was operational.

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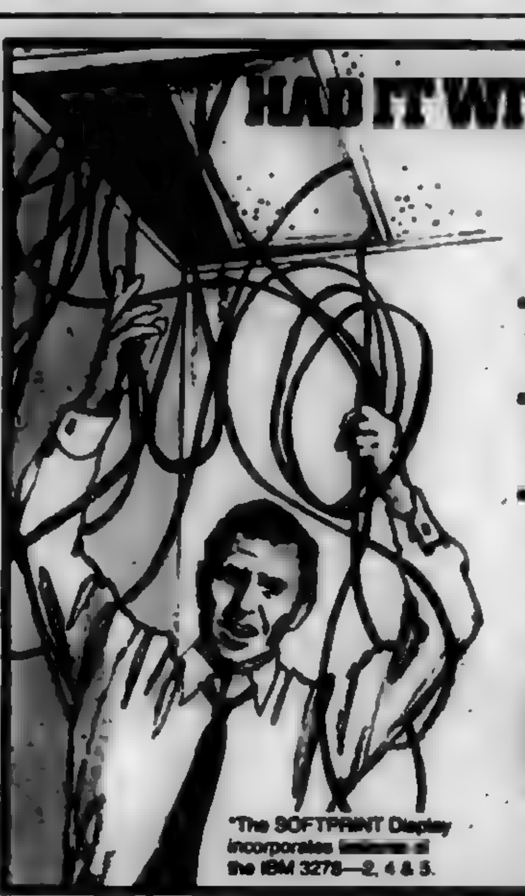

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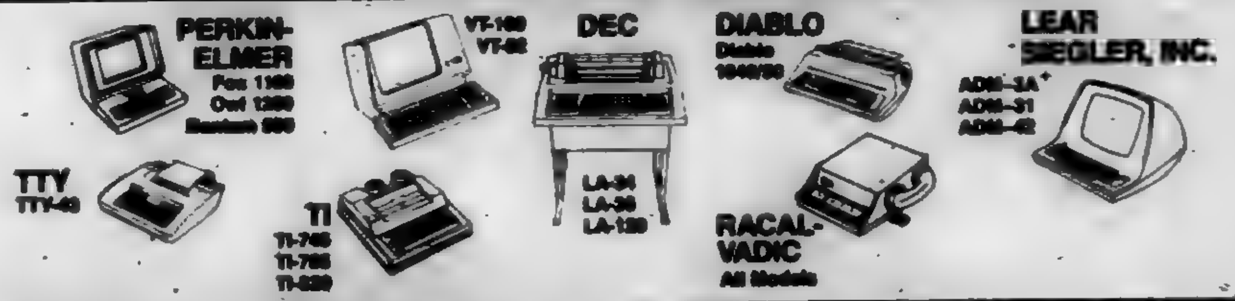

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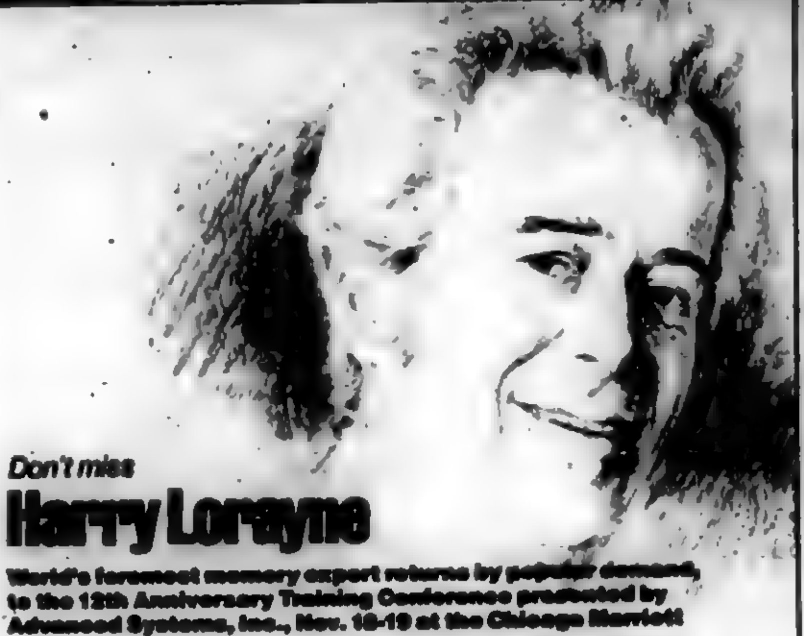

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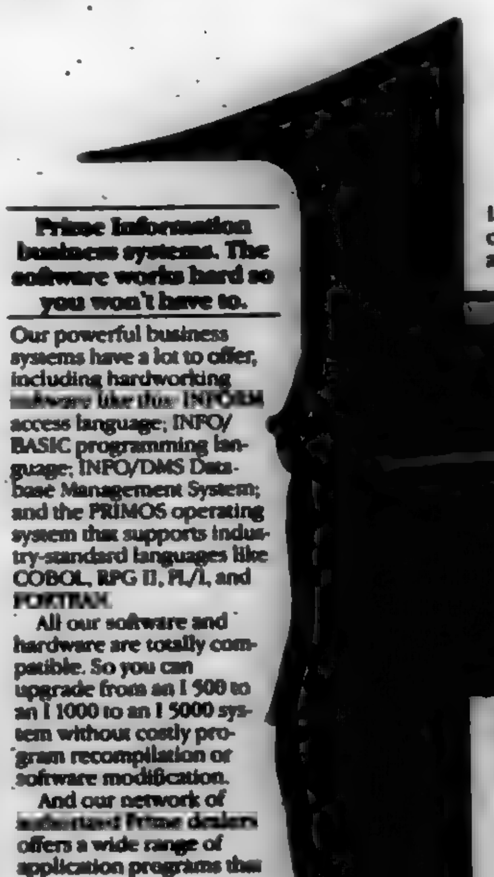

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Patco Drumming Up Strike Support: FAA

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Aviation Administration (FAA), fearing a controller walkout next March [CW, Oct. 13], has charged that recent publicity about air traffic control (ATC) computer failures is simply an attempt by controllers to shore up public support in case of a strike.

The Professional Air Traffic Controllers Organization (Patco), however, denies that accusation. "The FAA is leveling charges that our actions in reporting computer problems are simply motivated because we're trying to put the heat on them with reference to getting into our contract negotiations," according to Patco member Ron Levesque at Tampa (Fla.) Airport.

"That is an out-and-out bald-faced lie," Levesque claimed. "The problems we're having with our computer at Tampa are real; our reporting them was prompted by nothing other than the fact that we had a bad situation and didn't want to live with it anymore, and wanted to do something to get it fixed."

Public Issue

Tampa went public last winter with problems associated with its prototype Arts III-A system, installed in May 1979 [CW, Feb. 11]. Besides claiming the system failed far too often, controllers complained about its propensity to track not only airplanes, but in some cases highway trucks and railroad trains.

As evidence that controllers' public complaints were "no union ploy," but rather dealt with "safety, period," Levesque noted that the Tampa group went public on Jan. 8 and "the next day we had a troupe of about 20 high-powered specialists from Univac, the National Aviation Facilities Experimental Center, all levels of the FAA, Magnavox and a whole bunch of other gee-whiz kids down there.

"They were there almost around the clock for two months — it took them that long to find out what the problem was," Levesque recalled. "And only because they came did the computer even improve at all, because the local folks just didn't have enough training or knowledge to search out and investigate what the problems were."

Levesque also noted that the Tampa group had no help from its regional Patco office or from national headquarters.

O'Hare Slowdown

A recent traffic slowdown at O'Hare International in Chicago that, according to controllers, was caused by windy conditions, a bad runway configuration, low staffing and heavy traffic, has been legally challenged by the FAA as an international action aimed at manipulating the agency.

"Prior to negotiations with the FAA, Patco has been involved in a number of actions — it's absolutely nothing new," FAA spokesman Jerry Lavey maintained. "[Patco] may say they are pointing out certain problems, but we can interpret the [O'Hare] slowdown in no other way."

Back in 1975, 63 O'Hare Patco members filed a lawsuit against the FAA, the Civil Service Commission and the Department of Labor, seeking a new ATC computer backup system and new software testing procedures [CW, March 20, 1978].

Other demands included a 32-hour workweek (O'Hare controllers now work six-day weeks), a halt to understaffing of journeymen controllers and an update of the training program. The trial took place in January 1978 and a decision is still pending.

Reached last week, a law clerk for Judge John Powers Crowley, the judge who presided over the trial in Federal District Court of the Northern Illinois District, said she didn't know when a decision will be made in the case.

"My face is red," the law clerk said. "It's out of my control; there's no information I can give you on that. The judge decides things in the order he feels is appropriate. There are explanations, but I don't know what they are."

While O'Hare controllers are highly dissatisfied with conditions that have remained nearly the same as before they filed suit, they deny the August slowdown had anything to do with their demands or contract negotiations.

"The FAA is looking for ghosts that are not there," contended O'Hare Patco president Richard Scholz. "They finally decided they found a ghost, and then they charged us with all these illegal job actions." A trial on the illegal slowdown charge will be held in December.

"The FAA would like nothing more than to cover up the shortcomings of the [ATC] system by blaming safety-related issues on the fact that Patco does have contract negotiations coming up," commented Dominic Torchia, Patco's Western Region vice-president.

"When I talk labor/management relations and contracts, that's what I'm taking about," he added, "and when I talk about safety, that's what I'm talking about.

"You can't totally divorce air safety from some of the problems we face as far as working conditions go, but the problems are real, the computer failures are documented and I've testified myself in front of four different congressional or senatorial hearings," he added.

"The FAA is hell-bent on destroying our union," Torchia claimed.

'Corporate EFT Report' Begins Publication

NEW YORK — "Corporate EFT Report," an independent newsletter for bankers and cash managers, recently began publication here.

The eight-page bimonthly is a companion to the "EFT Report," a three-year-old electronics funds transfer newsletter. While the new publication will continue to deal with issues involving consumer electronic banking, Editor Sid Goldstein said that "Corporate EFT" will specialize in electronic banking services for corporate customers.

Yearly subscription to the "Corporate EFT Report" is $450. Details are available from the publisher at 51 E. 42 St., New York, N.Y. 10017.

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FCC, Congress Powerless To Hold Bell Accountable, Former FCC Chief Warns

By Phil Hirsch

CW Washington Bureau

HOLLYWOOD, Fla. — Neither Congress nor the Federal Communications Commission (FCC) has ever been able to "hold the Bell System accountable either to its customers, its competitors or its regulators," and the prospects for the future are not very encouraging, according to Walter R. Hinchman, former chief of the FCC's Common Carrier Bureau.

Addressing the annual meeting of the North American Telephone Association (Nata), which convened here recently, Hinchman said "the monopolistic ambitions and predatory practices of the telephone industry cartel continue to constitute a grave threat to the evolution of truly competitive markets in telecommunications and information services and equipment."

But "some public officials seem unable or unwilling" to recognize this threat, and the FCC "seems to have lost the will and perhaps the ability to continue holding the cartel at least partly accountable for predatory practices."

Call for Divestiture

The only "realistic" means of protecting consumer interests and preserving competitive opportunities in telecommunications is to break up the Bell System through divestiture, Hinchman contended. The "fully separated subsidiary" scheme incorporated into the legislation Congress considered this year won't work, because the subsidiaries will continue "to receive policy direction from and owe allegiance to the AT&T holding company management."

Furthermore, by allowing AT&T to operate these subsidiaries free of regulation, both the FCC — in its Computer Inquiry II decision — and Congress have given AT&T an incentive to transfer many of its existing monopoly services to an unregulated subsidiary, he said.

The phone company will be able to do this "simply by inventing a 'new' service or equipment classification — to be introduced by the unregulated subsidiary — that just happens to encompass all the important features of an existing regulated offering," Hinchman added.

Afterward, attractive pricing will encourage customer migration from the old regulated service to the new unregulated one, he said, pointing out that the phone company's Telpak and Hi-Lo tariffs represent two of "several occasions" when AT&T has done the same thing in the past.

Through these tactics, "AT&T could transfer its 95% share of the intercity private-line market and over 75% share of the equipment market to its unregulated subsidiary virtually at will, Hinchman charged.

He wants the Bell System broken up into "one or more equipment manufacturing and marketing companies, a long-line or interexchange telecommunications service company, approximately 20 independent local exchange telecommunications service companies comprised of the existing Bell operating companies, and perhaps an information services company built around the Yellow Pages directory services and advertising operation."

These firms "would still dominate their respective markets to a substantial extent and would still be among our largest corporations, but they just might be sufficiently independent from one another to permit effective regulation of any monopolistic tendencies and effective competition from other reasonably sized firms," he said.

Divestiture isn't very likely, however, because both Congress and the FCC believe lesser remedies will be adequate, Hinchman said. In addition, "AT&T is working diligently and thus far very effectively" to defeat the divestiture idea.

Barring "successful completion" of the Justice Department's pending antitrust suit against AT&T or a similar change in the political and regulatory climate, Hinchman indicated there will be little to threaten AT&T's present monopoly for the next several years.

Even if the FCC's emphasis on competition works, it will be some years before either the legality or the effectiveness of its approaches are known, he pointed out. During that time, "AT&T will be relatively free to resurrect discredited practices or invent new ones."

The FCC "has already abandoned some hard-won tools for ensuring cost, pricing and performance accountability, and seems likely to further abandon its conventional techniques and responsibilities," he added.

Hinchman said a new schedule of local exchange access charges will undoubtedly be established by the FCC, but it "may well" price the private-line and switched services offerings of the specialized carriers out of the market unless a court intervenes.

French Official Issues Appeal

PARIS — France has called for international cooperation to prevent a Big Brother-type misuse of computerized information, *The Wall Street Journal* reported recently.

The appeal, issued by French Industry Minister Andre Giraud, also called for international cooperation to avoid world domination by a few highly advanced nations in the field of computer data transmission.

Giraud issued the appeal at the opening of a special conference of the 24-nation Organization for Economic Cooperation and Development (OECD) dealing with tighter cooperation in the field of computerized information transmission, the *Journal* reported.

The Western countries must protect citizens against the invasion of privacy by computerized information that would have "neither brakes nor controls," the *Journal* quoted Giraud.

The OECD includes the U.S., Canada, Japan, the UK, West Germany, France and 18 other industrialized non-Communist nations.

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Network World No Longer Three-Tiered: Panel

By a CW Staff Writer

NEW YORK — Two years ago the data communications network world was a neat three-tiered package, suggested Kenneth G. Bosomworth, president of International Resource Development, Inc.

Today, however, AT&T's Advanced Communications Service (ACS), Xerox Corp's Xerox Telecommunications Network (Xten) and Satellite Business Systems (SBS) are a lot different than originally conceived, and new networks are on the horizon, he noted.

In addition to seeing the rapid change in networking concepts, users now have to understand the network architecture of vendors and identify the impact of that architecture on vendor-supplied operating systems, added David C. Russell, SBS manager of voice and data market development.

Bosomworth and Russell, along with other panelists, gave their views on the progress of data communications networks during a wide-ranging session at the International Management Exposition & Conference (Info 80) held here recently.

Civil War

"Today we are looking at problems approaching civil war within AT&T," Bosomworth emphasized, noting the reasons behind AT&T's withdrawal of its ACS filing.

ACS' "anything to anything" network concept has vanished, he continued. "Users must look outside Bell to a greater degree than expected and sooner than expected," he maintained. For example, the Antelope system seems to be in trouble and key personnel in ACS and the Antelope effort have left AT&T, he claimed.

In addition, the SBS concept has changed radically, he charged, with new options being added to bring the service a wider range of users.

Networks such as Graphnet are poised to compete with the original triumvirate, and Telenet Communications Corp. has announced it will use Xten-type terrestrial digital microwave links and store-and-forward switching, Bosomworth added.

The local network scene has become more bubbly in the past weeks. Even IBM is becoming interested in local distribution. A joint venture between IBM and Millicom, Inc., a company involved with cellular radio, is "100% certain," Bosomworth maintained.

By the mid-1960s there will be six or seven competing local distribution techniques, he forecast.

These methods include cellular radio, cable TV and fiber-optics infrared systems as well as telephone company circuits, SBS' Russell noted.

Besides assessing the vendor's network architecture and its impact on the installation's operating system, Russell urged users to consider the impact of the network on specific applications.

If the changes taking place today are bewildering to users, the next two years may "change the ballgame altogether," Bosomworth concluded.

Lower N.Y. Gets Buyer's Guide

SHRUB OAK, N.Y. — A directory reflecting the burgeoning computer industry just north of New York City has been published here.

The pocket-sized book was designed as a buyer's guide to make it easier for computer users to locate nearby vendors of computer-related products and services.

The "Directory of the Computer Industry in Connecticut, Westchester and the N.Y. Mid-Hudson Valley" costs $10 a copy with a shipping and handling charge of $1.35 — and sales tax for New York residents. It is available from its publisher, William E. Meyer, Box 444, Shrub Oak, N.Y. 10588.

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Chuck Anastasi, Manager, Timesharing Services, 3M, St. Paul, Minnesota.

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"Our price/performance ratio is outstanding. The in-house service on the DECSYSTEM-2060s costs 30% of what it would cost to do outside. That's a cost savings of 70%, which is even more than we expected."

Versatility.

"The University of D.C. was created in 1976 as a consolidation of three colleges in the area.

"Initially U.D.C. had a batch system, but since it was already overloaded with administrative work, neither the faculty nor the students could get any computer time. We decided to get another system to share the workload and to improve services to the students and the faculty.

"We wanted a distributed system that could be used on all three campuses, and that meant an interactive DECSYSTEM-2060.

"Now we can use our DECSYSTEM-2060 any time day or night because our uptime is over 98%. Our applications range from word processing for producing proposals to sophisticated graphics, which we use extensively in our Physics, Chemistry, and Engineering departments. And response time is six times faster than with our batch system."

Dr. Daryao S. Khatri, Associate Professor, Physics Dept., University of the District of Columbia, Washington, D.C.

Structured Solutions Offered

Productivity Problems a Real 'Steal' Experience

By Connie Winkler
CW Staff

NEW YORK – The program said the session would cover "The Bethlehem Steel Experience."

The typo was appropriate because panelists at "Increasing Productivity in the System Development Process," – a recent Information Management Exposition Conference (Info 80) session – said they begged, borrowed and bought aids, particularly applications development generators, to increase systems productivity.

Winslow S. Hill, manager of home office information services for Bethlehem Steel Corp., told of his company's success with structured design and related methodologies. He admitted that what Bethlehem finally did was a combination of different vendors' approaches.

Robert A. Miller, chief systems engineer for the Chicago Police Department, told how he uses applications generators and related software packages so extensively that one system was built in two hours. Miller now has detectives and police from the Chicago's gang crimes and narcotics investigation group building their own system – with the help of only one DP project manager.

"We found we were hung up over making decisions to use the computer or not to use the computer – the computer is not the answer to every problem," Hill said. Bethlehem now does both an external and internal DP analysis.

Once it becomes a DP question, Bethlehem implements structured design techniques drawn from the work of Yourdon and Constantine. "Too often in the past we were laying code before people really knew what direction we were going," Hill said.

Since 1977 Bethlehem has completed three large projects of 18,000 hours each and three medium projects of 7,000 to 10,000 hours, using about 20 employees and eight contract programmers. The next step is to extend structured techniques to all 60 Bethlehem programmers, Hill said.

Feeling of Satisfaction

The benefits of structured design methods have been much less measurable than expected, Hill said. "However with one-to-two-week projects there's a tremendous amount of satisfaction. People experience completion of activities they are working on."

One of the biggest benefits has been the fewer maintenance personnel required on structured programs.

Miller said he ran to the application generator software packages after spending $5 million building a payroll personnel system for the Chicago Board of Education.

By moving to packages, particularly applications generators – Miller uses User Files on On-Line from Oxford Software, Inc. – the company has:

- Eliminated on-line systems training. Typically employees would leave shortly after the training, Miller complained.
- Saved much time on documentation and maintenance, although Miller said he is not satisfied with the documentation available from the applications generators.
- Saved consultants' fees. For the Police Department payroll system consultant fees were only $160,000.
- Set up a standard design system because all on-line applications fall into the basic design structure of the generator.
- Cut program debugging time.
- Established a system prototype methodology.

DECSYSTEM 20

Productivity.

"The USRA was created by an act of Congress in 1973 to reorganize bankrupt railroads in the Northeast corridor.

"We were using service bureaus, but it became so expensive that we decided to get an in-house computer.

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Bill Kelleher, Chief, Computer Facility, United States Railway Association, Washington, D.C.

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Manager Must Be Superman, Conferees Told

By Connie Winkler
CW Staff

NEW YORK — The manager of information systems in the 1980s has to be Superman — retaining his technology cape, but doffing the technical suit for a business suit and becoming one of the chief executives of the firm.

William R. Synott, senior vice-president at the First National Bank of Boston, has done that and told a standing-room-only crowd at the recent Information Management Exposition & Conference (Info 80) how to switch suits.

Superman has to be pro-active (instead of reactive) and has to soar to become the chief information officer of the company, a role Synott called the new career path for the DP manager.

For the 150 attendees at the "Integration of Office Systems with Data Processing" session, the banker identified techniques and strategies for the DP manager to become super information manager.

"Information management is not another word for the same old thing," Synott explained. "It's a departure from the old orientation; the DP manager has to come out of the back office into the business areas."

Information as Resource

Information has to be recognized as a resource of the organization, a resource that must be recognized and managed, Synott argued. "If knowledge is power, then information is power because knowledge is information."

The job of chief information officer (CIO) — equal in rank to chief executive and chief financial officers — does not exist today. But the CIO will identify, collect and manage information as a resource, set corporate information policy and effect all office and distributed systems. The CIO will bring all information together as a resource, the vice-president said.

The key, Synott said, is integration not just of office systems and DP, but of all information resource from minicomputers to telephones. The key is the integration of planning, people and systems. Synott believed a computer terminal on every desk will be as ubiquitous as the telephone today. "Data processing has to be integrated with business planning and with the business itself," Synott said.

In this information era DPers will have to change their orientation from a technical one using hardware to a business one using information.

Implementation Strategies

What are the strategies to do this, according to Synott?

Business systems planning must be pro-active, where the DP manager aggressively goes out and learns the business, determines how to apply technology to the business, and gets involved in the business. A reactive DP manager just sits back, feels overburdened with work and waits for someone to ask him to do something, Synott said.

To do successful business planning, the pro-active manager has to identify the critical success factors of any executive's job and then figure how to get that information, or pick it up where it exists in the organization.

Synott also suggested management by strategies — the determination of strategies to reach the objectives of the organization. "Every corporation is different," Synott said. "It's a matter of asking: What are the needs of this company? What would it take to fill those needs? How can the solutions be put in place?"

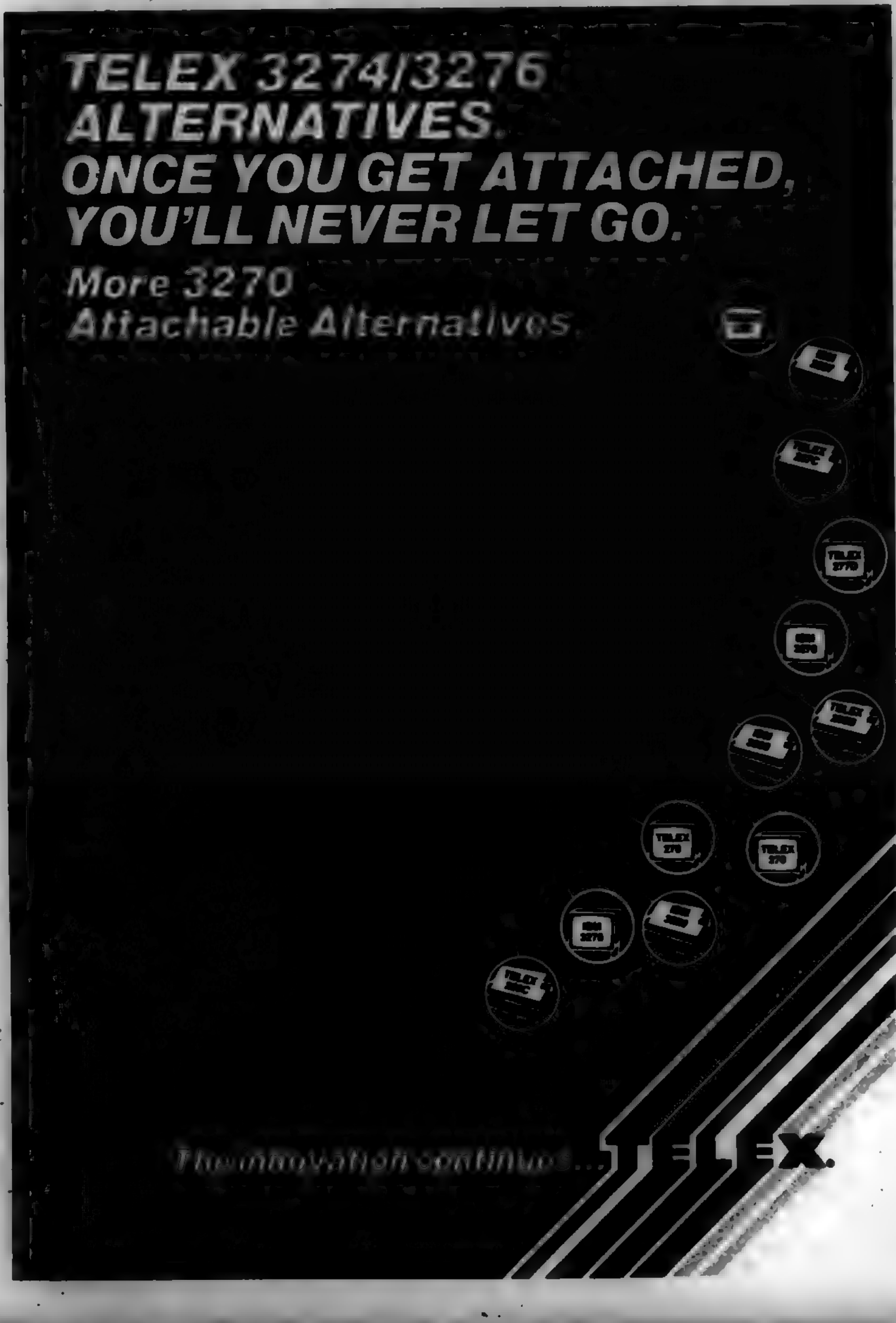
Forecasting Rejected

The banker rejected the need for extensive technological forecasting, but at the same time recommended keeping top management abreast of technological developments. In banking, for instance, spending $1 million for 10 new branch offices is not a good business decision when a competitor puts $2,000 point-of-sale terminals in 100 supermarkets, Synott noted.

The Superman manager must also integrate information and people, specifically with users and senior management. "Shared management of information is the key to the future," Synott said.

He acknowledged more and more users will want their own processing systems. For users who are reluctant to enter the information era, Synott proposed the Trojan horse technique — moving a talented systems person into the user group.

Once the project is on, there should be no work without joint systems and user involvement. Synott said he gets the users' most talented person for a new systems project.



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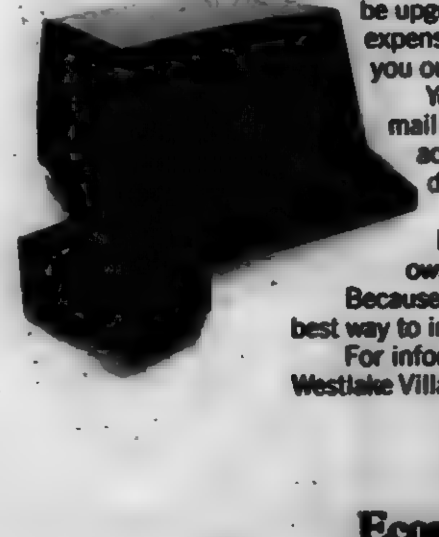

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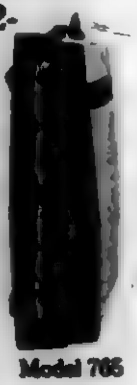

Model 765

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If you would like more information on the Model 765, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001 or phone (713) 937-2016.

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For Career of Predictor

Capacity Planning Called a Hazardous Business

By Tom Henkel
CW Staff

NEW YORK — Predicting systems needs is a tricky business that can have hazardous effects on the career of the predictor.

That was the sentiment expressed at a conference session on systems capacity planning held here at the Information Management Exposition & Conference (Info '80).

Dr. Robert P. Goldberg, vice-president of the Lowell, Mass.-based BGS Systems, Inc., said there are three basic ways to plan ahead.

Benchmarks tend to be accurate, but take a long time to complete — often too long. Simulations also take a long time to develop, cost a lot and are seldom believed. Analytic modeling, which Goldberg said is the best way to attack the capacity planning problem, uses logic and mathematical equations to develop a model of the current system. Variables can be changed to give the DP manager some idea of his systems future needs.

But just plugging variables into a model is not good enough. There are a lot of hidden computer system time wasters that should be evaluated. How much of the CPU is actually being used for processing, for example, is one such area that should be studied, Goldberg said.

Goldberg cited an example of an IBM 3033 processor running Time-Sharing Option (TSO), a batch mode, a transaction processor and a catchall group of "other" things going on inside the processor. Initial studies revealed the 3033 was working at 97% of its capacity.

However, further tests revealed only 73% of the processor was being used for processing. The other 25% or so was going for nontask work such as paging and file swapping.

Goldberg pointed out that TSO takes up most of the nonprocessing space, followed by the batch operation, the transaction processor and then the "other" category.

Time Consumers

Knowing how computer time is being spent is vital to the manager responsible for developing a computer system and keeping up with the growing demand placed on it.

One key to evaluate how the system is being used is to build software that looks at what is going on inside the CPU. If the user can identify bottlenecks by looking at where system queues are developing, theoretically that manager will have a much easier time finding a solution to the problem, Goldberg said.

Comparing a work-load analysis to a sort of shell game, Goldberg said many computer vendors are overselling hardware to solve problems that could be resolved by other methods.

However, one member of the audience noted that even buying a new CPU may not solve the problem. "The work load seems to grow to fill the space available," he said, noting that the added capacity of a larger CPU is often consumed by a stampeding effect from areas of the firm wanting more service.

BGS Approach

Speaking specifically of BGS' approach to the capacity planning problem, Best/1, Goldberg said the model takes an integrated approach to capacity modeling. Oriented mainly to large IBM MVS users, Goldberg claims the package identifies the hidden processing costs and helps the manager make educated guesses as to what his hardware needs will be in the future.

A user of Best/1, John T. Pantagoos, manager of capacity planning and performance evaluation for Equitable Life Assurance Society of the U.S., said the package has helped him predict future needs and, consequently, keep his job.

Claiming to have come to his current position by decree rather than choice, Pantagoos said the first rule of being a company's sytems decision maker is to cover your tracks.

Most decisions to expand systems will come from management. And the reason for that decision may be spawned by something as trivial as one of the top brass having to wait two hours for a report — even if the computer system is not at fault. At this time, the systems adviser must be able to come up with an intelligent and accurate plan to expand the system.

Several Strategies

There are several ways to tackle the problem. First, the systems adviser must keep accurate records on how much of the system is being used. If, in the example of the delayed report to a

(Continued on Page 24)

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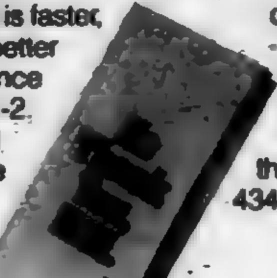

Affects All Performance Aspects

Ergonomics Focus Seen Vital to System Design

By Connie Winkler
CW Staff

NEW YORK — As more and more users in the 1980s develop strategic planning and control systems, increased emphasis on human factors is needed. What is necessary from the data processing professionals is control and security for those systems' data bases.

It is all "uncharted waters where the pressure is building," according to consultants at an Information Management Exposition & Conference (Info 80) panel on "Human Factors in Interactive System Design."

Ergonomics, the man-machine interface, is what academics call it, observed Mike Stadther of the Arthur Andersen consulting group. It is the person in front of the machine who affects all aspects of the system performance, Stadther underlined.

"We must recognize that people operate differently than computers," he said. "We must recognize the importance of the system operating the way the user wants and expects."

Interface Areas

Human interface areas to consider in system design are:

- Eye movement, especially in screen design. It is important to remember that the human eye moves best left to right and top to bottom.
- Data clustering. Humans perceive data in clusters of two to seven items because it is easier to retain.
- Natural languages such as query-by-example. Stadther acknowledged this is a difficult area where much work needs to be done.
- Response time considerations. Human performance is dependent on systems performance so that a user gets bored if the response time is too slow, or inefficiently hurried if it is too fast.
- Simplicity for ease of use.

Ergonomics is going to be crucial to systems development, but a possible pitfall is the business-computer interface, particularly the control question, Melvyn E. Bergstein, partner in charge of the technical services organization at Arthur Andersen, said.

"Who's going to control the data bases as they become recognized as critical resources? Can we afford uncontrolled data base maintenance even with reasonable security?" Bergstein asked.

Because of ambivalence and inaction over the control question, Bergstein predicted there will be business disasters because of poor data base caretaking. Security and control considerations are what data processing professionals are going to have to bring to systems design.

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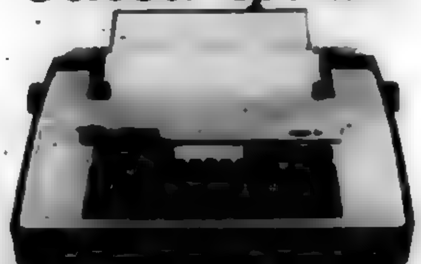

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DP Planning Has Pitfalls

(Continued from Page 23)

top manager, the computer system was clearly not at fault, the adviser could prepare a report pointing out that a systems upgrade is not needed.

However, when an upgrade is in order, Pantagcos said there are two basic ways to go about it. First is the scientific method. The adviser can pull together all back data on how the system has developed, add some analytic predictions from BGS' Best/1, for example, and prepare a proposal.

The second method is more mystical. What Pantagcos calls the "priest" method involves basically playing hunches. Hunches can be based on a variety of things from knowledge of the system and the computer market to simple predictions.

Best Method?

Which method is best? Pantagcos says the best method is a combination of the two. He recommends the systems adviser get as much information from management on what it wants in a system.

The more variables that can be given a constant value in a modeling system like Best/1, the more chances of making the right decision.

And when it comes down to making a pitch for a particular upgrade, it is best to let the vendor come in and give an "expert" presentation on how the upgrade will improve the system, Pantagcos said.

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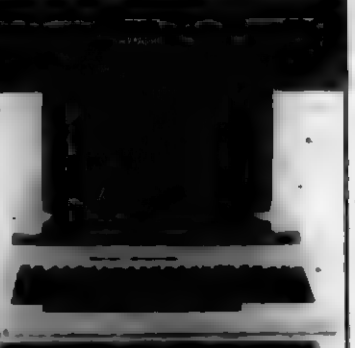

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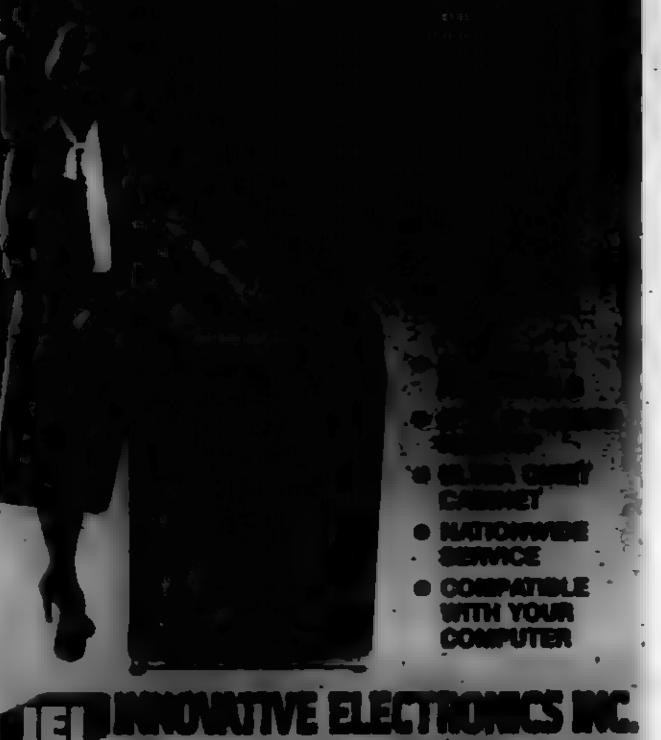

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Univac Eyes Tomorrow's Computer Technology

By Tim Scannell
CW Staff

ORLANDO, Fla. — The basic hardware and software structures of today probably will not work well in building the computers of tomorrow, according to Dr. Michael D. Godfrey, a research director at Univac.

In the future — described as being as near as four to five years from now — computers will incorporate high-speed logic and rely heavily on such devices as Josephson Junctions, gallium arsenide circuitry and very large-scale integration (VLSI) technology, Godfrey predicted. And software will become less machine-dependent and more human-oriented, with less of a need for time-consuming, difficult and error-prone testing procedures.

However, getting all the development roads in the right place at the right time on the route toward this technology will be difficult, he observed.

Speaking to nearly 1,000 people here at the recent semiannual meeting of Use, Inc., an organization of Univac 1100 mainframe users, Godfrey gave a brief overview of how Univac sees the future of computer technology.

Like most other vendors in the industry, Univac is basically concerned with squeezing more millions of bits of information per second (Mips) out of future machines and reducing each component's size. However, the firm is also researching ways to ensure that the computer's form follows its basic function, Godfrey claimed. In other words, a computer should perform in a natural fashion rather that be locked into traditional technological methods.

Godfrey claimed that current methods of computing are based primarily on the operating habits of the early Eniac processor. For instance, in a standard computing operation, data to be processed is usually taken out of a storage medium and brought to a set of instructions kept in the processor.

This method of operating was fine when instruction sets took up more space than the data, Godfrey stated. However, in today's environment of highly packed data bases it might be a good idea to take the instructions and bring them to the information.

In the same vein, Univac's research director and former instructor at the University of London also foresees the day when centralized systems that sometimes take up an entire room will be replaced with decentralized logic systems — each one applied at a point where the data exists.

Primitive Software

Flanked by more than 40 speakers at the Use meeting, Godfrey observed that tomorrow's user will want a computer system that does not depend on "run-stream and algorithm" software to step through a program. Future systems should operate according to the conditions of the user's data base and not be limited to strict flow-charted procedures.

Current software is even more primitive than hardware, the Univac spokesman said, noting that if computing were compared to the printing industry it would be one step before the advent of movable type.

"We haven't yet achieved what Gutenberg achieved in 1450," Godfrey said.

Software vendors today are "carving software out of blocks" and have not yet produced viable software that can be manipulated and composed into operating units without a great deal of labor. Users should not need to know everything about a computer's operation or a software program before carrying out certain software steps. Although a great deal of progress has been made, there is still a need for well-designed hierarchical structures, Godfrey pointed out.

In addition, vendors should not be so quick to make their software totally dependent on a particular type of computer. Independence not only enhances the software's importance, but furthers development and fine-tuning by the users and other vendors.

"As long as software is tied to a particular machine, its economic value is in doubt because it is dependent on that machine," Godfrey added.

'Use' Meet Well-Attended

ORLANDO, Fla. — Nearly 1,000 people representing 361 Univac 1100 sites around the world jammed into the Hyatt Orlando hotel complex here recently to listen to speeches involving everything from capacity planning to software engineering.

The reason for the get-together was the semiannual Use, Inc. conference, staged by the users group to generate "new ideas, listen to new concepts and learn about new capabilities," Jack Farber, a Univac representative, said.

Approximately 200 Univac people attended the four-day affair and delivered 46 of the 110 scheduled presentations. While most of the sessions were technical in nature — with a few closed to the press because of their proprietary nature — there were many that focused on general topics such as office automation and program debugging.

The Use meetings give users a chance to confront Univac officials in such areas as maintenance and documentation and express their views. Attendees are encouraged to make suggestions to Univac during the conference.

Thus far, 38 user recommendations have been implemented by Univac since the start of the meetings a few years ago. Approximately 51 other suggestions will also be acted upon in upcoming software releases from the computer manufacturer, a spokesman stated.

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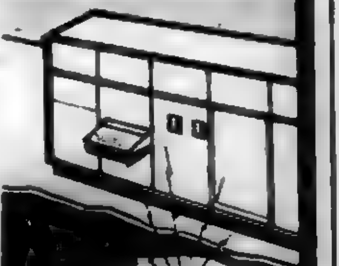

Calendar

Nov. 17-18, Cambridge, Mass. — **Computer Graphics: In-Depth Seminar on Applications and Technology.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Nov. 17-19, Boston — **Developing DP Systems for General Ledger and Financial Statement Preparation.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 17-19, Washington, D.C. — **Understanding and Using Computer Graphics.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Nov. 17-19, San Francisco — **Computer Performance Measurement: Tools & Techniques for Increased Systems Productivity.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 17-19, New York — **Advanced Data Communications: Techniques for Systems Analysis and Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 17-19, New York — **Minicomputers and Distributed Processing.** Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 17-19, San Francisco — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 17-19, Washington, D.C. — **DP Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 17-20, Boston — **Computer-Aided Design & Manufacturing.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 17-20, Madison, Wis. — **Computer Energy Programs for Buildings.** Contact: University of Wisconsin-Extension, 432 N. Lake St., Madison, Wis. 53706.

Nov. 17-20, Syracuse, N.Y. — **Telecommunications for 1981,** sponsored by E.C. Hunter Associates, Inc. and Communications Analysis Corp. Contact: E.C. Hunter Associates, Inc., 132 Atkinson Ave., Syracuse, N.Y. 13207.

Nov. 17-20, Anaheim, Calif. — **Autofact West.** Contact: Society of Manufacturing Engineers, P.O. Box 930, Dearborn, Mich. 48128.

Nov. 17-21, Denver — **Structured Analysis & Design.** Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 17-21, New York — **Understanding Computers and Controls.** Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

Nov. 17-21, Chicago — **CICS/VS Application Programming.** Contact: On-Line Software International, Inc., 65 Rt. 4 E., River Edge, N.J. 07661.

Nov. 17-21, Washington, D.C. — **Structured Programming.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Nov. 17-21, Chicago — **Structured Programming: Design, Coding and Implementation Techniques.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 17-21, Short Hills, N.J. — **Structured Design and Programming.** Contact: Advanced Training Center, Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

Nov. 18-19, Detroit — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 18-20, Chicago — **Introductory APL.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Nov. 18-20 in Denver.

Nov. 18-20, Raleigh, N.C. — **Structured Programming Workshop.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181. Also being held Nov. 12-14 in Indianapolis and Nov. 3-5 in Arlington, Texas.

Nov. 18-20, Washington, D.C. — **DP for Managers & Professionals.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Nov. 18-20, Chicago — **Information Management for Manufacturing Companies.** Contact: Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Nov. 18-21, Washington, D.C. — **Computerized Robots.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 18-21, Las Vegas — **National Conference & Exposition for Dealers, Distributors and Reps.** Contact: The Interface Group, Inc., 160 Speen St., Framingham, Mass. 01701.

Nov. 18-21, Rio de Janeiro, Brazil — **Distributed Processing & Computer Networks.** Contact: Long & Associates, Inc., 820 Tioga Ave., Bethlehem, Pa. 18018.

Nov. 19, E. Brunswick, N.J. — **Small is Beautiful and Other Programming Strategies,** sponsored by the Association of Women in Computing. Contact: Grace Shen, Bell Laboratories, Room IK 205, 50 Cragmore Road, S. Plainsfield, N.J. 07080.

Nov. 19-20, Cambridge, Mass. — **Strategic Planning for Information Systems.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

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Nov. 19-21, Washington, D.C. — **How to Build and Use a Data & Information Resource Directory.** Contact: Arnold Barnett, Barnett Data Systems, Inc., 19 Orchard Way N., Rockville, Md. 20854.

Nov. 24-25, Gaithersburg, Md. — **Data Communications Host-to-Host Protocol Standards,** sponsored by the U.S. Dept. of Defense. Contact: Mr. Fran Nielsen, National Bureau of Standards, Room B-212, Technology Building, Washington, D.C. 20234.

Annual DPMA Meet to Feature 130 Exhibitors

PHILADELPHIA – The annual international conference and business exposition of the Data Processing Management Association (DPMA) will feature educational seminars, workshops, special sessions and 130 exhibitors here Oct. 26-29.

Three preconference workshops to be held next Saturday and Sunday will kick off the meeting. "Distributed Processing," "Avoidance of Computer Crime" and "Data Processing Contracts" workshops offer in-depth study into some of the major areas of concern for information processing professionals.

The DDP workshop will include an introduction to DDP and the management considerations for planning it. It will then delve into networking, system hardware and DDP implementation strategies.

The session of avoiding computer crime will propose practical security methods and discuss deterrences, detection and prosecution.

"Data Processing Contracts" was designed to address all phases of negotiating and contracting for acquisition of computer hardware and software.

The student program on Sunday from 1 p.m. to 5 p.m. was designed for undergraduate and graduate students who are planning careers in DP. It is free of charge for students and focuses on career development.

Five Tracks

The seminar program consists of five tracks, with seven separate sessions in each track: management, personal growth, integrated office systems, trends and directions and assessing technologies.

Among the specific subject areas in the various tracks will be "Techniques for Increasing Productivity," "Motivation of DP Personnel," "Personal Obsolescence," "Effective Communications," "Personal Career Planning," "The Office of the Future," "Future Communications Systems," "Impact of the 4300 Technology" and "Software – Right the First Time."

Nido Qubein will give the keynote address at the conference. He claims there are three types of people in the world – the immovable, the movable and those who move.

Those who move are the successful people who apply their utmost creativity, increase their productivity and achieve the highest personal potential.

The total conference registration fee is $235 for members and $285 for nonmembers, the DPMA said from 505 Busse Highway, Park Ridge, Ill. 60068.

Six All-Day DP Seminars To Highlight Interface West

LOS ANGELES – Data communications, distributed data processing and small business automation systems will be the focus at the fourth annual Interface West here Oct. 28-30.

Up to 100 vendors are expected to show the wares at the show, which will be highlighted by six all-day seminars tailored for DP and data communications professionals.

The seminars include "A Conceptual Basis and Framework for Office Automation Planning," "Optimizing the Net Control Function," "Integrating Voice and Data Networks," "Users Strategies for SNA Implementations," "Implementing the Large-Scale Word Processing Network" and "A CBX: A Quantum Leap." Enrollment in the all-day seminars will be limited, and there is a $50 surcharge per seminar tacked on to the regular conference fee of $95 for three days admission to the regular sessions plus the exhibit floor.

Conference and exhibits admission for one day is $60. Registration for exhibits only is $10.

The show is cosponsored by the Interface Group and Datamation magazine. More information is available from Interface West at 160 Speen St., Framingham, Mass. 01701.

Trade Show Set For Nov. 4-6

SAN JOSE, Calif. – The 1980 Word Processing and Office/Business Equipment Trade Show and Conference, slated for Nov. 4-6 at the Convention Center here, will combine a trade fair of more than 200 exhibits with a five-session symposium.

Speakers at the symposium will cover three umbrella topics: office automation to improve productivity, today's electronic office system and new technology and implementation in phototypesetting.

The keynote speaker at the first session, Dr. James H. Carlisle, president of the New Jersey firm of Office of the Future, Inc., will address the topic of management decisions in the automated office.

The role of management will be discussed at length on day two, which will include a lecture by Edward W. Scott Jr., assistant secretary for Administration at the Department of Transportation, entitled "A Multifunction Office System – A Case Study."

The final session will be hosted by members of the phototypesetting industry who will discuss the commercial uses and types of equipment involved in their field.

Admission to the Conference Center for preregistrants is free, otherwise a $5 fee will be charged at the door. Registration for the symposium sessions costs $45 per session, $80 per day or $175 for the whole conference. A discount of $25 per session will be given to additional registrants from the same company.

Further details can be obtained from Bonnie L. Crystall at the office of the show organizer, Cartilidge and Associates, Inc., Suite 1014, 491 Macara Ave., Sunnyvale, Calif. 94086.

One-Day Meet Set For Data Flow Update

NEW YORK – A one-day seminar updating the ongoing issue of transborder data flows will take place on Wednesday, Oct. 29, at the Barbizon Plaza Hotel here.

Sponsored by Information Gatekeepers, Inc. and Transnational Data Reporting Service, Inc., the course will include talks by speakers from around the world, including Philippe Lemoine, Ministry of Industry, France; Edmund F.M. Hogrebe, consultant, West Germany; G. Russell Pipe, president of the Transnational Data Reporting Service; and representatives from the U.S. Department of State and various multinational corporations.

The attendance fee is $225 per person or, if more than one person from a single organization attends, $175.

Further information is available from Information Gatekeepers at Suite 111, 167 Corey Road, Brookline, Mass. 02146.

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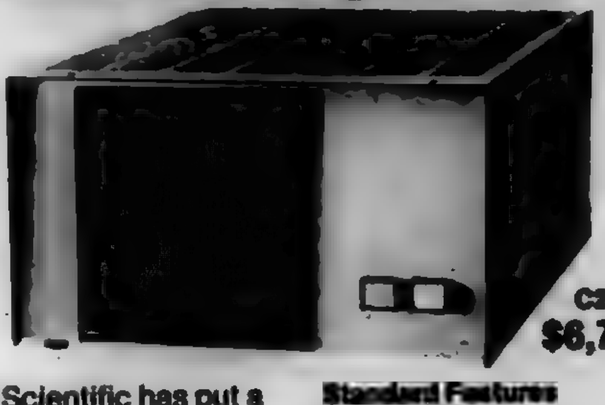
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Wang Institute Opens in January

TYNGSBORO, Mass. — The Wang Institute of Graduate Studies — the first private, nonprofit, educational corporation to combine the practical applications of the professional marketplace with the educational standards of the academic environment — will open its doors to students this January.

The first school within the institute will be the School of Information Technology. Its initial program, leading to the degree of Master of Software Engineering, is targeted at relieving the lack of qualified first-line software engineers and architects.

During a recent dedication ceremony, the establishment of the first endowed chair was announced with funds furnished by the Wang family. A gift of $100,000 from the Warner & Swasey Co., Cleveland, to be used to sponsor a distinguished lecturer series, was also announced.

The institute has been the result of support from numerous area and national businesses, Wang noted. Digital Equipment Corp. and Prime Computer, Inc. as well as Wang Laboratories, Inc. have provided state-of-the-art computer systems so students can become versed in all methodologies and "work in a noncompetitive brotherhood of computer scientists," Wang said.

The institute, incorporated in April 1979, is not affiliated with Wang Laboratories, Inc.

Interdepartmental Courses Mesh Computers, Business

By Deborah Wise
CW Staff

BLOOMINGTON, Ind. — To cater to the increased need for business people who understand computers and computer scientists who comprehend business, the University of Indiana has introduced interdepartmental course sequences.

Business majors in the School of Business can take a concentration of courses in computer science in the College of Arts and Sciences and computer science majors can minor in business.

The university has also announced a new bachelor of science degree in computer science which requires a business studies course sequence that includes accounting, marketing and production.

Major Technology

"Computers are one of the world's major technologies, and many computer science graduates will go into business, so it makes sense for those students to learn something about business," Ronald Stephenson, professor of marketing and chairman of the undergraduate program in the School of Business, said.

The computer science concentration for business majors includes programming, data structures and information systems design courses.

The new programs were also designed to help incoming freshmen who are unsure whether to major in business or computer science. As the prerequisite courses and sequences are similar for the first two years the decision can be put off until the junior year without fear of taking courses that will not be relevant to either major concentration.

In developing the new bachelor of science program, Wise said the department could specify its own language course requirements which had until then limited the number of business courses that could be taken. "We married the two goals [of business and computers] and succeeded in selling the idea to the arts and business colleges."

Honeywell Plans 'Top Secret' Meet

PHOENIX — "Top Secrets '81" is the name of Honeywell, Inc.'s seventh annual computer security and privacy conference, which will be held here April 6-7.

Chaired by Jerome Lobel, Honeywell computer security manager, the symposium will reportedly bring together about 20 national authorities from the field of data security to discuss the business and legal impact of the latest in computer crime and abuse.

Session topics will include computer center disaster recovery programs, state-of-the-art in security systems and investigation techniques.

The conference is $500 per person, including lunch and program proceedings. Additional information is available from Honeywell Information Systems, Security Symposium Registrar, M/S T-99-4, P.O. Box 6000, Phoenix, Ariz. 85005.

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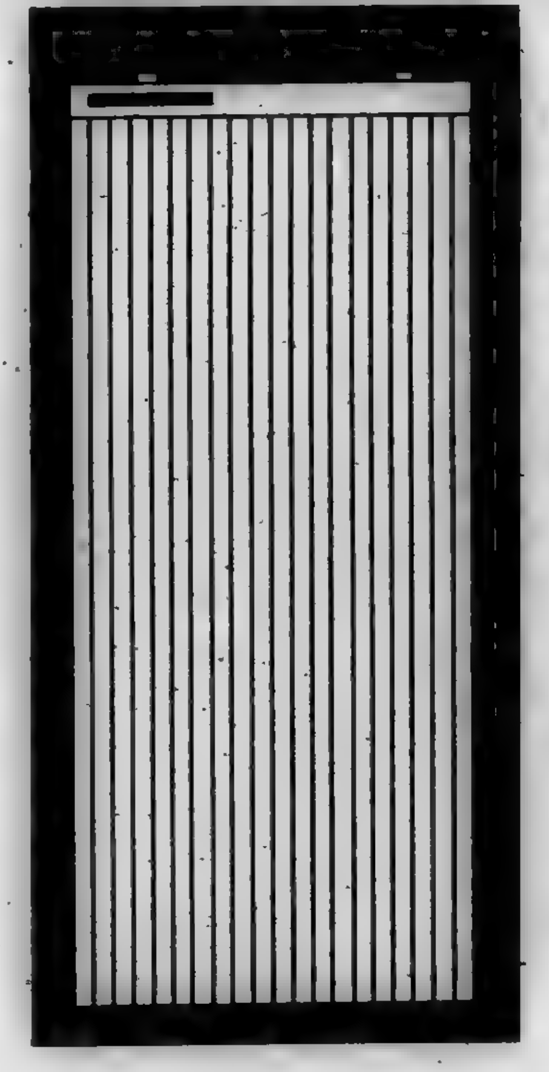

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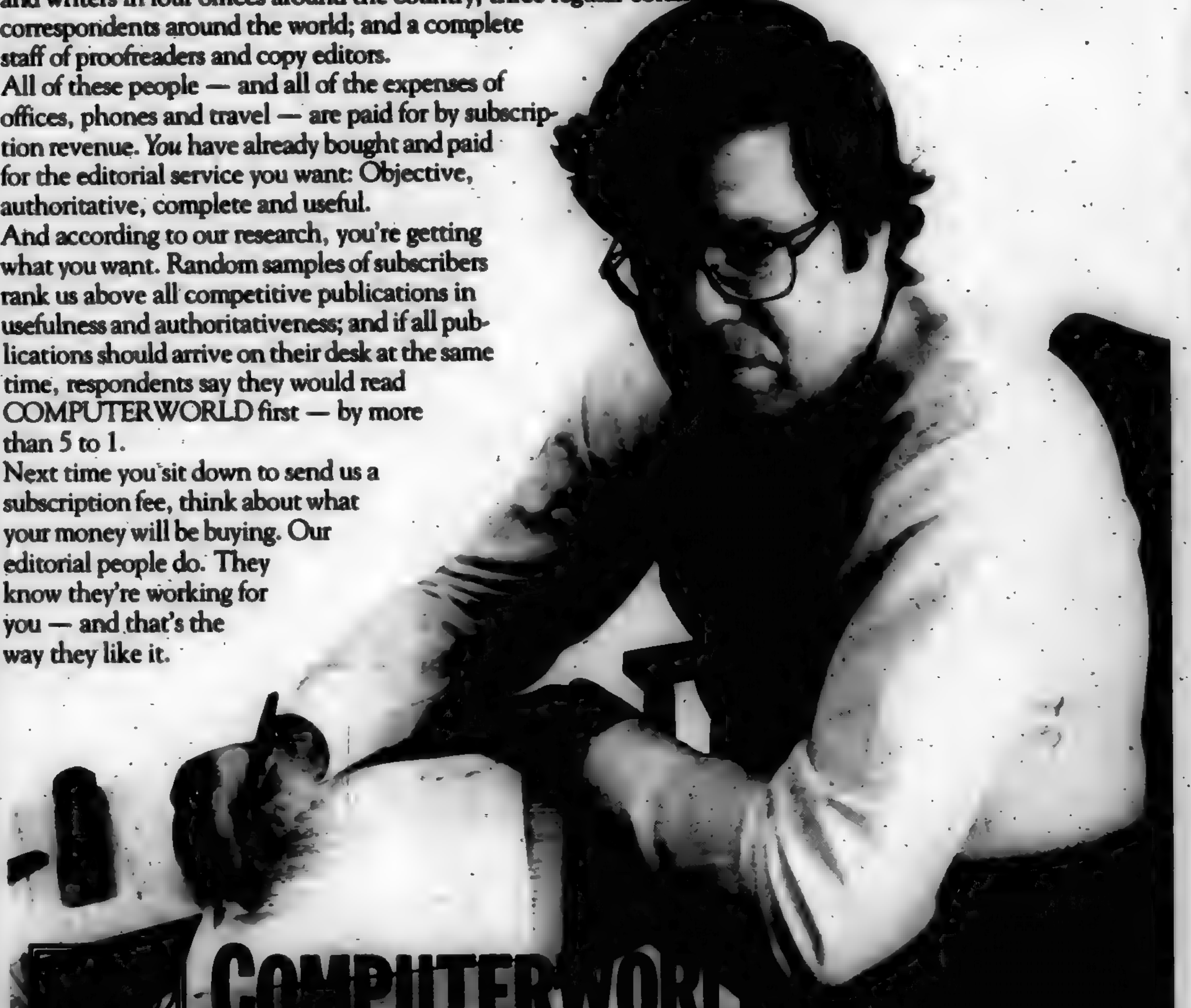

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Amid High Turnover

What's a Programmer Worth?

Turnaround Time

By Larry E. Long

Q I have several years of Cobol experience. I was out of programming for several years in another department, but I came back. Now I see ads for programmers with six to 12 months of experience within a few percentage points of my salary. A year ago my project leader told me I was his highest paid employee; some others in his group had two to three years of experience.

Obviously, I am now looking for better employment. Are there any ordinary presumptions against me, in view of my low salary? How can I counter them?

A Your experience speaks for itself and has a market value which will be recognized by potential employers and probably by your company if they were to hire someone with commensurate skills. There are no presumptions against you.

The compression of salaries caused by the combined effect of inflation and an ongoing seller's market have forced DPers to job-hop in order to increase real income.

For the most part, corporate compensation policies have not been adjusted to accommodate the market value of the DP professional who is currently on the staff. Until corporations recognize the necessity to adjust compensation packages for high demand professions, compression will continue to be a major contributing factor to the very critical turnover problem in DP.

Q In a recent "Turnaround Time" column you advocated the use of a chargeback system. Our users simply request an allocation of so much money and, with very few exceptions, are granted their request. If users overspend, they are notified and are reallocated enough to cover the overexpenditure.

Our users refer to their computing services allotment as "funny money." Although we try to downplay the term funny money and emphasize the importance of budget control, our users know that overspending has no real effect on their operation or their internal budget and, therefore, pay little attention to our chargeback system.

Have you had any experience with such systems and can they be made to work?

A What may be "funny money" to users may very well be real dollars to the data center director who must juggle limited resources to meet the ever-changing needs of users. This method of user accounting is common in your environment (universities), where educational accounts pay with funny money and research accounts pay with real dollars. Research accounts make the existence of a chargeback system necessary.

In order for such systems to be effective in controlling educational accounts, rigorous guidelines must be followed when making the initial allocations to each account. Users should be penalized for loose budget control by charging real dollars for overexpenditures. The user's pocketbook must be affected before this system will work.

Personally, I question the worth of any chargeback system which does not involve the transfer of real dollars, except on a temporary basis. A company in the process of converting to a chargeback system might consider the use of funny money as an interim step. This would provide the user with an idea of the cost of computer services and perhaps soften the effect of having to transfer real dollars to the computer center for services rendered.

Q Are there standards for the number of pages of documentation which should be developed for each 10,000 lines of code (page/10,000 LOC) for general business systems applications written in Cobol or Basic? By documentation, I mean the total system documentation, including the operator and user manuals.

A No — nor should such a standard exist. Standards are a necessary ingredient to successful DP operation, but too many standards can impede creativity and productivity. Page/10,000 LOC is a perfect example of a standard that is not only unnecessary but counterproductive.

Too many variables exist in a given system to base the volume of documentation on page/10,000 LOC. System complexity, extent of user involvement, on-line or batch, and many other variables would combine to make this standard unmanageable.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.

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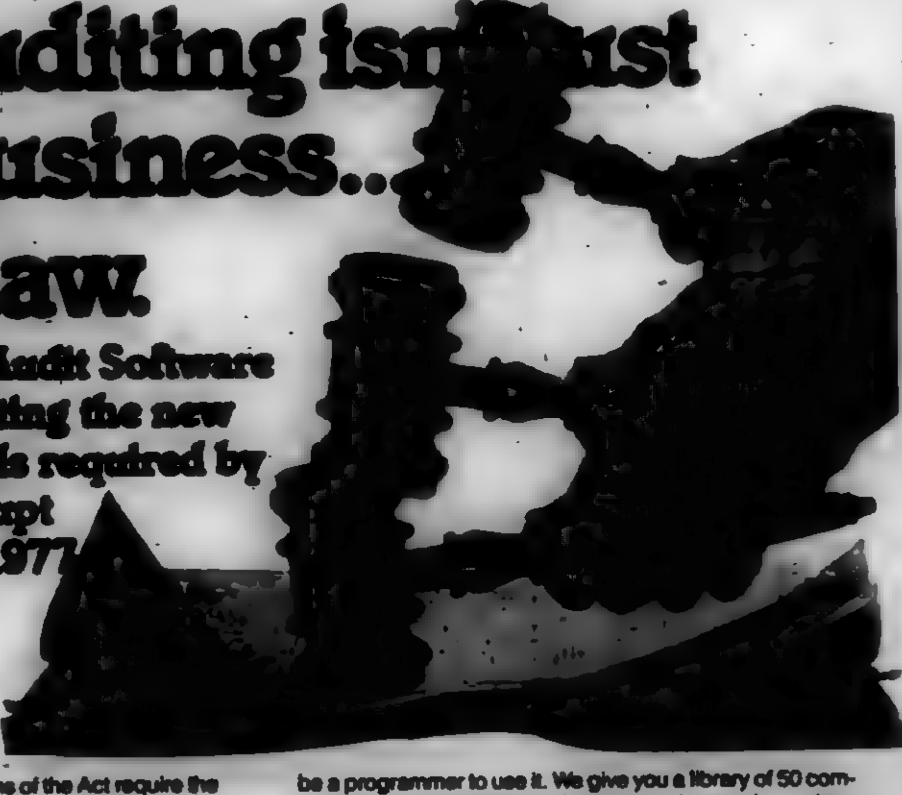

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EDITORIAL

Can FCC Curb Ma Bell?

If AT&T is really charging as much as the traffic will bear, as the Ad Hoc Telecommunications Users Committee recently charged [CW, Oct. 13], troubling questions arise about the new communications legislation now gestating on Capitol Hill.

Not only would that legislation — an updating of the Communications Act of 1934 — reduce regulation and thereby make it easier for AT&T to implement schemes like the Installed Base Migration Strategy, it would also legitimize such practices.

Last month, the phone company asked the Federal Communications Commission (FCC) to approve greatly reduced depreciation schedules for its terminal equipment. This change would add $100 million to the company's 1981 "revenue requirement" — the amount which has to be collected from ratepayers.

In an accompanying letter, AT&T said the change in depreciation rates was dictated by the commission's new emphasis on competition. Further, AT&T said that during recent meetings with FCC staff, the commission "recognized that terminal equipment lives should be shortened significantly."

All of this suggests that if the pro-competitive legislation introduced in the House and Senate this year is ultimately enacted, Ma Bell will be able to maintain her present monopoly.

There is a simple answer to this problem, logically.

It is reflected in FCC chairman Charles Ferris' comments to the House Judiciary Committee last month. Basically, he advised the legislators to delay restructuring AT&T until the Justic Department's antitrust suit is settled and, in the meantime, to allow the phone company to offer terminals and "enhanced" — that is, computer-based — services "subject to safeguards proposed by the FCC."

Walter Hinchman, former chief of the FCC's Common Carrier Bureau, pointed out last month in a speech to the North American Telephone Association (Nata) that "under its present leadership . . . the FCC seems to have lost the will and perhaps the ability to continue . . . the task of holding the cartel . . . accountable for predatory practices."

Specifically, he chastised the commission, in its Second Computer Inquiry Decision, for allowing AT&T to offer enhanced services on a deregulated basis "despite the fact that many of AT&T's existing monopoly services and operations may be transferred to the unregulated subsidiary through which such market entry is accomplished."

Ferris, in his House testimony, admitted that the remedy prescribed in the Computer Inquiry decision may not be perfect. His point was that the FCC, if given a congressional mandate, could make adjustments over time.

Anyone who believes the commission can do what Ferris promised the House Judiciary Committee should look at the history of Wats and Telpak, for starters.

Spare the Compliment!

Imitation may, indeed, be the sincerest form of flattery, but when it comes to trademarks, spare the compliment!

Computerworld has been this publication's trademark since 1967. It has been registered in the U.S. Patent Office, and that registration has now become incontestable.

Nevertheless, various retail establishments have begun operating under this name, and CW has been forced to take legal action to protect its trademark rights.

To date a polite notice of infringement was sufficient to induce a Texas concern to give up using the trademark as its name. However, CW encountered less reasonable people in other instances.

CW brought suit against a concern in Connecticut and achieved a consent decree in accordance with which the defendant changed its name. A similar result was achieved in another civil action brought in New York.

Another suit in California has reached the stage where a settlement has been agreed upon in principle.

Finally, a suit is pending in Tennessee. Thus far that suit has not been settled and may go to trial.

CW has recently learned of similar infringements in other locations and will take whatever action is necessary to stop the misuse of its name and trademark.

Computerworld has attained worldwide acceptance and circulation. CW is proud of the name and will take whatever action may be necessary to preserve its reputation and put an end to activities by others that tend to dilute its value.

This is printed not from a desire to be rough and tough, but rather to spread the word so that in the future, those who might plan to use CW's name as their name, whether innocently or not, will be on notice.

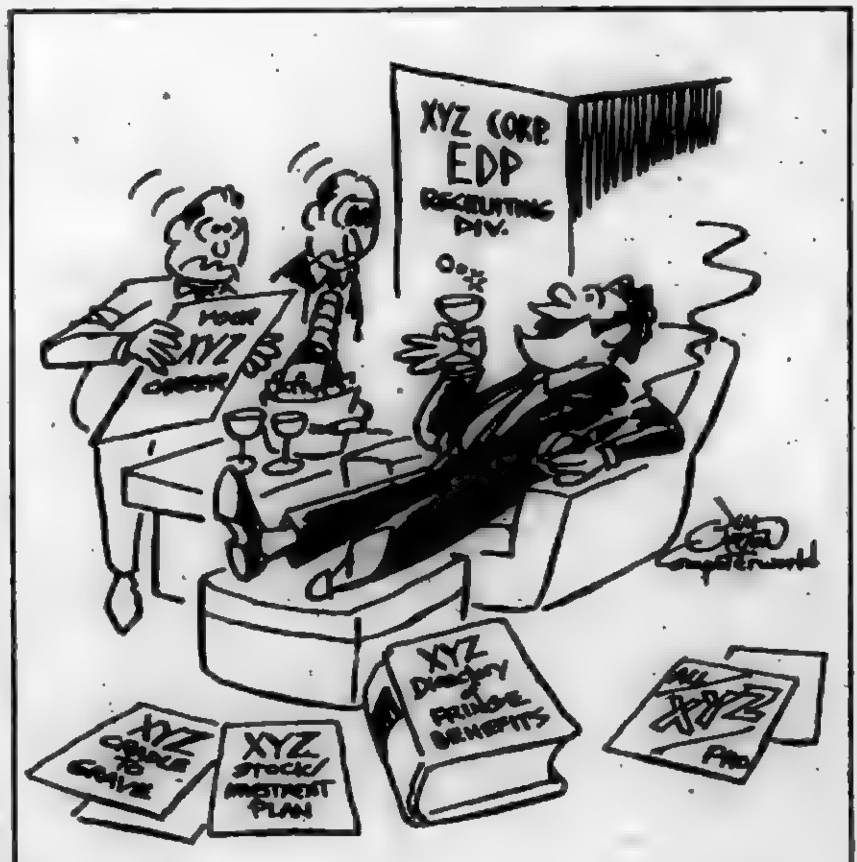
DATA PAST

Five Years Ago
Oct. 29, 1975

MINNEAPOLIS — Automation had been a dismal failure in corporate board rooms and in creating public policy, several speakers said at the annual conference of the Association for Computing Machinery here. They said computers had failed as tools in aiding high-level decisions.

Eight Years Ago
Oct. 25, 1972

NEW ORLEANS — AT&T said it would introduce an alphanumeric CRT terminal sometime in 1973. The unit, called the Dataspeed 40 service, was undergoing final product trials, AT&T vice-president Theodore Simis announced at the annual Digitronics Users Association meeting here.



'You don't have to sell me, guys — "executive director of personnel" sounds great to start . . .'

HUMAN CONNECTION/Jack Stone

Long-Range Planning: One Formula for Success

"The biggest problem we have in our installation is the inability of our DP management to say 'no' to requests from users. And it's driving us crazy.

"Oh, I know the old story about how we are supposed to come back to management when they try to unload more work on us and tell them 1) we have limited resources, 2) the resources are totally committed and 3) if we take on any new work, some project or other will have to slip. But do you know what they do? They come back and say, 'Times are tough. Do it all anyway.' Our management is absurd — they have no common-sense, long-range plan!"

The DP project leader who made these statements made me wonder if there are any major installations with a decent long-range development plan.

To find some answers, I thought it useful to move beyond DP for a change. I decided to look at how high-technology firms manage their research and development and found one that seems to have a particularly tight grip on it. United Technologies Corp. (UTC), headquartered in Hartford, Conn., spends a vast sum of money on R&D. In 1978, for example, it spent more on R&D as a percentage of sales (7%) than any U.S. industrial firm, including IBM (6%).

I had occasion to chat with some of its managers on the subject and was very impressed with their approach, which they call "bottom-line technology" (a descriptive booklet with this title is available from the company). I will highlight a few of their philosophies and strategies here (readers are invited to compare them with their own).

First, UTC suggests that people should acquire a better understanding of what technology is before they can expect to manage it successfully. UTC believes the answer depends upon one's point of view. Quoting from the booklet:

"To our thousands of customers worldwide, technology means products of high technical content that can meet specific needs and solve their particular problems. . .

"To our design engineers, technology is the know-how to create superior products that fill our customers' requirements. . .

"To our production engineers, technology is the capability to manufacture reliable, cost-effective products that perform as required. . .

"To our researchers, technology is synonymous with innovation and knowledge-building."

Common Focus

But UTC has found the need to apply good management practices to bring these various perspectives into a common focus, which turns out, ultimately, to be the "bottom line" of the corporate financial statement otherwise known as "profitability."

One such practice is the use of a "matrix diagram" which plots proposed R&D technical programs against cor-

(Continued on Page 36)

THE TAYLOR REPORT/Alan Taylor

Users May Search in Vain For Expert Witnesses

Users who have been oversold by vendors of hardware and software alike not only have problems in procedure and in finding witnesses, as reported here earlier, but they also have trouble presenting expert evidence.

For instance, I had a phone call last week from a West Coast user of some NCR Corp. hardware and software — the NCR 8200 and Spirit software. His problem was in getting people who were ready to review and report on the way the system was working. He had found it impossible to locate outside witnesses who would stand up to NCR.

This is not a new problem in the courts. Medical malpractice cases for years were held back by doctors' unwillingness to give evidence against other doctors. But the new computer technology has added some significant barriers to the standard social pressures — problems that are national in scope and seem to be particularly present with the smaller companies (including ones the size of NCR).

While this West Coast user *has* found some Spirit experts, they are apparently not willing to speak. Among the reasons:

- NCR is giving them work.
- NCR is recommending them to the NCR users.
- Acting as a witness is not a particularly pleasant type of work, and there is plenty of other work about for experts who keep up to date.

A perceived threat to continued employment and continued necessary education can easily produce the same results as if there were an official blacklist. The potential witness quite reasonably feels economically threatened.

Users do not have to fear such problems in every area, though. Software packages, or hardware/software combinations that are demonstrated in their final form, for instance, can be evaluated by experts in the application area without economic problems. It is the general-purpose type of software that needs modification and incorporation with other hardware and software items that is endangered by the lack of available outside experts.

Inadequate Support

There are both short- and long-term effects of users' inability to rely on being able to get experts to speak up. On the one hand, it will and does encourage both overselling before the sale and inadequate support afterwards.

In one recent case involving another vendor, a user's system had simply not been able to get on the air and support was requested. The internal comment leading to a denial of support was simply, "We have spent enough on this account."

In the longer term, this scenario will lead to abandonment of hardware vendors in favor of software vendors at an ever-increasing rate. Software vendors — particularly ones that sell operating systems and compilers for several

(Continued on Page 36)

SOCIOLOGY OF COMPUTING/Robert L. Glass

Hiding One Failure Behind Another

Failure — especially computing failure — comes in a lot of disguises. This is a story that moves from failure to success to . . . well, let's not give away the ending just yet.

As the story opens, the contractual relationship between General MPG and Automotive Automation is strained, at best. The new model Pussycat Purr sports car is ready to roll off the assembly lines, and Automotive Automation's computerized carburetor for the Purr is about as reliable as vapor lock.

General MPG is climbing all over Automotive Automation to try to figure out why. Well, actually, it not only wants to figure out why. It wants the problem fixed, too.

Automotive Automation isn't helping much. Its digital computer hardware people are pointing at the software people. The software applications people are pointing at the software executive people. And the executive people are pointing back at the hardware people. It's a round robin of irresponsponsibility.

To try to get a clearer view, MPG has sent Cliff Keylock to live on-site with the Automation people. Looking over their shoulders, poking around their listings, shuffling through their circuit diagrams, maybe Cliff can figure out what's wrong. At least, that's the plot.

But it's not good enough. Weeks have passed since Cliff changed office buildings, and there's still no carburetor for the Purr. It's time, say the Wheels at MPG, for a full-blown subcontractor audit.

Now there's a term to strike terror into a subcontractor's heart. "Audit" ranks right up there close to "default" and "litigation." Who wants someone else telling you what you did wrong? Certainly not Automotive Automation.

But an audit was scheduled anyway, conducted by the most aggressive MPG manager around, Hob Ratchet, and a team of hand-picked subordinates.

"Move on Automation" is the word from the Wheels to Hob. "Use Cliff Keylock in any way you can, identify the problem and fix it!" The last three words were almost a shout. Wouldn't you be upset if you were the Purr project manager and your announcement date had already slid five weeks?

When Hob first got together behind closed doors with Cliff, he learned a lot. The hardware was shaky, but so was the software. *All* the finger-pointers were right. The whole project was in trouble, up to its butterfly valve. Now the question was, where to start?

Strategic Error

At this point, Hob and Cliff made what became a strategic error. The support software used to build the application code — the assembler, the linker, that sort of thing — looked especially bad, said Cliff. It was slow — so slow that the application programmers had been patching like crazy to avoid the time lag and cost of rebuilding from source after a change. And those patches had been a plague of unreliability.

The support stuff should be fixed first, Hob and Cliff decided.

It was when the audit team laid this preliminary conclusion on Automation that the strategic error was exposed. "No, the assembler's no problem," said the application programmers. "Right on," said the executive team. "No problem there," agreed the computer hardware group. It was the first time in the history of the project that the Automation crew had agreed on anything!

Hob and Cliff backed away, quickly. Hob even apologized to the Automation support software lead. "Sorry," he said, sheepishly, "I got some bad information." And he glared at Cliff.

It wasn't too long after that that the apparent culprit was exposed. The computer, by contractual agreement, had to run at a blazing fast speed. And the problem was, that was *too* fast. The hardware was running at the ragged edge. Sometimes it was OK, and sometimes nothing worked.

The fix was even easier. The contractual requirement was eased, the computer was slowed down and everything else began playing together much more reliably. Even the finger-pointing, for the most part, came to a halt. There were still problems, but the Purr came out only a couple of months off schedule.

Happy ending, right? Failure converted into success?

Well, sure. Cliff still wondered, though, how he could have been so wrong about the support software.

It wasn't until a couple of months later that Cliff heard what had really happened. Yes, the contractual/hardware change *had* solved a lot of the problem. But so had the new, faster assembler that Automation had secretly put into use about the same time!

Why the secrecy? Why the lie? Because it was politically smarter, Cliff began to realize, for Automation to pin the problem on the contract than on

(Continued on Page 36)

Firm Succeeds at Long-Range Technical Planning

(Continued from Page 35)

porate business objectives, long-range business strategies and operating plans. This diagram helps provide a broadened perspective to technical planners and corporate managers who work together to forecast payoffs from R&D spending. These people are asked to find out which projects lead to maximum utilization of resources and minimum risk of failure. They ask such questions as (from the brochure):

"Do planned R&D projects support corporate strategy?

"Are those company activities that need technical support receiving it?

"Are important R&D projects being postponed or overlooked?"

Another management practice is the use of a financial planning and control system which is based on "return on assets" (ROA). ROA is the ratio of financial return to corporate assets: profits/assets. ROA is also the product of two other ratios: profits/sales (return on sales) and sales/assets (asset turnover). In other words, ROA reflects both profitability and the efficiency of asset utilization.

Usable, Understandable

One of this system's advantages is that it is usable and understandable by nonfinancial managers and does not depend on complex accounting procedures.

Another is that only a relatively small number of financial parameters need be monitored by top management. And the monitoring is accomplished in a simple but highly effective manner. A table called the "ball chart" is prepared to plot variances from plan for 10 financial indicators on the horizontal and name of operating division on the vertical. An empty box signifies acceptable variances; unfavorable variances are indicated by circles.

The UTC approach to technology management is far more comprehensive than I have described in this limited space. But I wanted to write about it anyway to encourage DP managers to believe that there are some firms that are dealing successfully with long-range technology planning.

One Failure Hides Another

(Continued from Page 35)

the software. After all, MPG had participated in writing the contract. It could be argued by Automation that it was partly MPG's fault, if it ever came to that.

It didn't. MPG was just glad to get the Purrs rolling off the assembly line. No one wanted to rock that boat.

But back to the theme of this story. Failure, you remember, comes in a lot of disguises. In this story, one failure was deliberately disguised — by hiding it behind another!

Search Might Be for Naught

(Continued from Page 35)

manufacturers' computers — have to see that their systems are in operation as described. Equally, the secondary software developers who themselves rely on the transportable operating systems will no longer have to rely on single-sourced (and therefore compromised) hardware supplies.

For most users, however, this scenario is in the future. For the present, users trying to drive a good bargain with combination hardware/software suppliers should remember that no contract is stronger than the ability of the user to enforce its terms, economically. And that may require locating experts who are willing to talk.

Meanwhile, for the West Coast reader, if you know of a potential NCR 8200 expert who, preferably, knows Spirit, please contact him through me at *Computerworld*. Thanks for your help.

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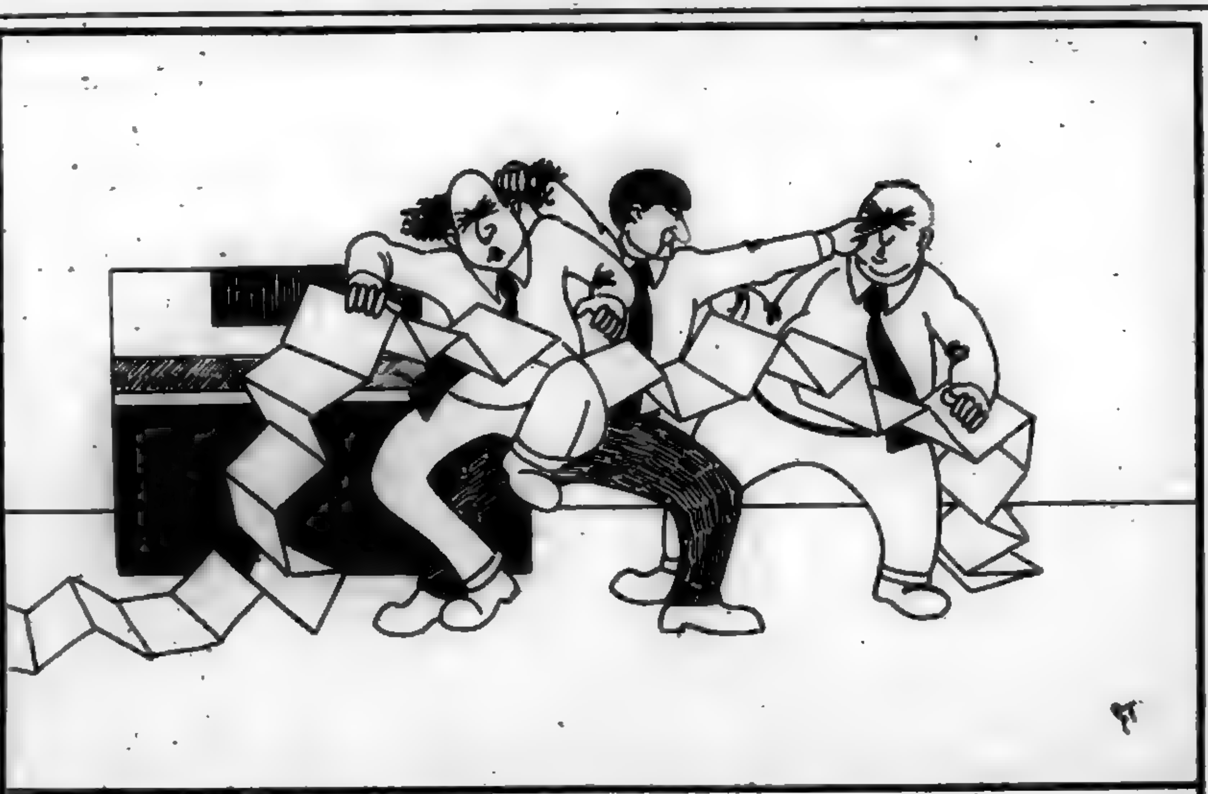

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LETTERS

Difficult Situation

I must say I was sorry to read the article in the Aug. 18 issue regarding Digital Equipment Corp. revenues.

The article failed to mention the numerous price increases placed upon both OEMs and users during the past few months. As a broker, I find this makes things very difficult when I quote prices to an end user, only to find two or three weeks later DEC has announced another price increase.

It was my understanding several months ago that DEC was *not* expanding production facilities. Now, the article said DEC is in the process of further expansion, and I find it difficult to believe the $209.8 million figure that was said to have been spent on equipment and so forth.

Early this year, I ordered a large number of processors and was given a delivery date more than 20 months away. This lead time was out of the question to my client, and I was forced to purchase the equipment from dealers in other parts of the country.

I have all but discontinued handling DEC equipment in favor of IBM General Systems Division computers, since the equipment can be readily found, and end users are more familiar with IBM. Also, IBM has been much more cooperative in supplying my company with information, supplies and parts with virtually no delay.

Three cheers for IBM!!!

Donald J. Sanderson Jr.
President

Adtec Systems, Inc.
Tampa, Fla.

Helpful Directory

I appreciate Larry Long's admonition to look for consultants among those who have authored books and articles [CW, Aug. 25]. But there is another source of consultants: The Computer Consultant Directory, advertised in *Computerworld*, which may be ordered from Battery Lane Publications, P.O. Box 30215, Bethesda, Md. 20014.

I've been happy with the directory; it helps me to keep an eye on the competition and there seem to be three to four listings in almost every conceivable speciality. (Now if I can just persuade the directory to publish my articles, I'll be a consultant's consultant.)

Phillip Good

Mattawan, Mich.

Developed by Microsoft

In reading *Computerworld Extra* [Sept. 17], we were very pleased to see Herbert Gepner's citing of the Softcard peripheral for the Apple II computer as an approach to solving the software portability problem that exists between different kinds of microcomputer systems. We were less enthused, though, by this attribution of this product to Apple Computer, Inc., and we'd like to set the record straight.

The Microsoft Softcard was developed and is sold by Microsoft Consumer Products of Bellevue, Wash. In addition, the Softcard does not just emulate a Z80 environment, it actually *is* a Z80 environment. The circuit card contains a Z80 processor and is supplied with both Digital Research, Inc.'s CP/M operating system and Microsoft's Basic interpreter in a package that retails for $349. And while the Softcard allows Apple owners to utilize the Z80, it in no way hampers normal operation of the Apple in 6502 mode.

Interestingly, the idea for the Softcard arose from our own software portability problem. Since Microsoft has invested years of effort in developing a complete line of system software products for Z80/8080-based microcomputers, we were anxious to market those products to the ever-growing Apple computer base. But rewriting the packages for the 6502 processor would have entailed practically reinventing the wheel and we knew there had to be a better way.

It was one of the founders of Microsoft, Paul Allen, who hit upon the idea of putting a Z80 processor into the Apple. The product has been on the market several months now, and response has been excellent not only from Apple owners but also from developers of Z80 software who can now sell their products to Apple owners.

We feel it is this kind of innovative approach to software problem-solving that will enable us to realize Gepner's very complimentary projection that Microsoft will be among the "few leading mini/micro software houses [that] will clearly rise above all the rest" within a few years.

Vern Raburn
President

Microsoft Consumer Products
Bellevue, Wash.

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SHADOW II is even more compatible. And well it should be. INSAC Software's business is, after all, exclusively software. So all our energies are put toward developing, improving and enhancing systems software to make the best use of IBM hardware. In short, in this area, we can out IBM IBM.

For those who reason that it's simply easier to buy and install a TP Monitor from the same people you buy the hardware, we'd like to point out this.

SHADOW II's technical consultants know IBM hardware as well as IBM technical consultants. And because SHADOW II is such an advanced TP Monitor, it can typically be installed in less than one hour. Compare that to the time it takes to install CICS.

And while there seems to be a great deal of wisdom in reasoning that technical support and maintenance will be better for CICS by virtue of its being an IBM product, consider the reality of the matter.

SHADOW II has, in the first place, far lower technical support requirements than CICS. But when such support or maintenance is required, an ample and highly capable support team stands ready on a moment's notice to provide necessary service. In fact, present users and objective evaluators alike cite this area as one of SHADOW's greatest strengths. In addition, our technicians provide four days of intensive, on-site, classroom education in using the SHADOW package.

Finally, for those who reason that despite the problems which CICS has become notorious for, it is still a risk to buy a TP Monitor from a company other than IBM, we would like to summarize by saying this:

SHADOW II has long continued to outperform CICS on virtually every important criteria. And while IBM has made attempts at correcting problems, CICS performance still falls dramatically short of SHADOW II in memory usage, CPU utilization, response time, application development time and programmer training time. In short, no matter how IBM has added to, taken away, or otherwise repackaged their system...it's still CICS. And therein lies the problem.

So if we haven't already given you reason enough to consider SHADOW II for your TP Monitor, we welcome the opportunity to give you more. And it just doesn't seem reasonable not to let us.

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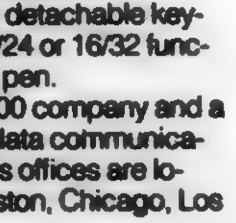

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Random Notes

'Key/Master' Supports FBA, Offers Enhanced Statistics

NORWALK, Conn. — Turnkey Systems, Inc. has announced support for IBM fixed block architecture (FBA) devices as one component of a new release of Key/Master, the firm's on-line data entry package for CICS.

Release 2.2 of Key/Master is said to support FBA devices through Turnkey Systems' Bdam/E access method. Bdam/E will allow the program to run on the IBM 4300 series with 3310 and 3370 disk devices without using IBM emulators or Vsam, the vendor claimed.

The release also offers users an enhanced statistics package designed to increase user productivity, one component of which consists of an on-line display allowing supervisors to monitor key files maintained by Key/Master.

Key/Master costs $18,000 for the DOS version and $20,000 for the OS version. Lease plans are also available. Turnkey Systems is located at 50 Washington St., Norwalk, Conn. 06854.

Sorting and Report Generation Added to 'CA-Sort' Package

JERICHO, N.Y. — Computer Associates, Inc. has announced two new features for its CA-Sort package that allow multiple concurrent sorting and report generation.

The multiple concurrent sorting feature — now standard with the package and free of charge with the release of Version 6.1 — reportedly allows up to nine different sorts as output from one pass of the input data set.

The second feature, the optional CA-Dart, allows the generation of reports from the output stage of the standard sort utility.

CA-Dart, which requires 18K bytes of storage, may also be used with an IBM-compatible sort, according to the firm. The CA-Dart option costs $2,000 for a CA-Sort user and $4,000 for a nonuser. The firm is located at 125 Jericho Tnpk., Jericho, N.Y. 11753.

Package Links DG Systems For Direct Communications

BATON ROUGE, La. — A package that links any two Data General Corp. Nova, Eclipse or Micronova CPUs for direct communications is available from Data Systems of Baton Rouge, Inc.

Blast runs under DG's RDOS and DOS operating systems and can simultaneously transmit and receive data files, programs and commands.

Blast costs $1,100 for the first copy and $110 for each additional copy, the vendor said from 8939 Jefferson Highway, Baton Rouge, La. 70809.

HP 3000 Relational DBMS Touts One-Day Training

MOUNTAIN VIEW, Calif. — A relational data base management system (DBMS) designed for Hewlett-Packard Co. 3000 series computers has been introduced by Computer Resources, Inc. (CRI). The Relate/3000 DBMS provides a data structure that can be visualized as two-dimensional tables rather than a highly structured format that can require extensive programming and technical training, according to a CRI spokesman.

This allows the nontechnical user to manipulate the information contained in the data base via a set of tools that includes an interactive language, a set of interface routines and a comprehensive message subsystem, he explained.

While conceding that "nonrelational data systems may work well within large companies that can afford the high training costs," he indicated that Relate/3000 was targeted toward the companies that could not afford these costs and had not purchased a DBMS. The training time for Relate/3000 is claimed to be approximately one day and the elimination of the high training price tag leads to a good return in costs efficiency and labor savings, he said.

This labor cost savings is illustrated in the time requirement for writing, testing and maintaining application programs, he continued. CRI claimed that an 80% cost reduction for writing and testing Relate/3000 application programs is possible when compared to the same program being written in Cobol or Fortran.

File Management

Primarily designed for file management environments, the DBMS is at least initially targeted at the end user who is involved in business or engineering applications. Potential applications can run through all organizational levels, and diversification is provided for via a three-part user manual that corresponds to three different levels of interaction, the vendor spokesman said.

These levels begin with a clerically oriented data entry task and end with the complete language description that would be required by an installation's programming staff.

The system can, however, be used for that class of operation research problems that involves complex relations between various mathematical entities and CRI also predicted that the provision for converting the message system into non-English languages would make Relate/3000 suitable for multinational organizations.

Relate/3000 is available immediately for a $10,000 licensing fee from CRI at 2570 El Camino Real, Mountain View, Calif. 94040.

Runs in Native Mode

System 2000 Adapted for VSE

AUSTIN, Texas — Intel Corp. introduced System 2000/VSE, a version of its data base management system (DBMS) for IBM 4300 users.

DOS/VSE Release 2.90 reportedly was designed to function as a native mode DOS/-VSE product and to utilize both IBM's microcoded Extended Control Program Support (ECPS) facility and fixed block architecture (FBA). Complete Vsam support is integrated into the DBMS, which is available for 4300 series hardware operating under DOS/VSE or VM DOS/VSE, Intel said.

Specifically designed to respond to production application requirements, System 2000/VSE allows programmers and end users to address application backlogs through the development of application solutions, Intel claimed.

Licensing for the basic System 2000/VSE software starts at $45,000, Intel said from 12675 Research Blvd., Austin, Texas 78766.

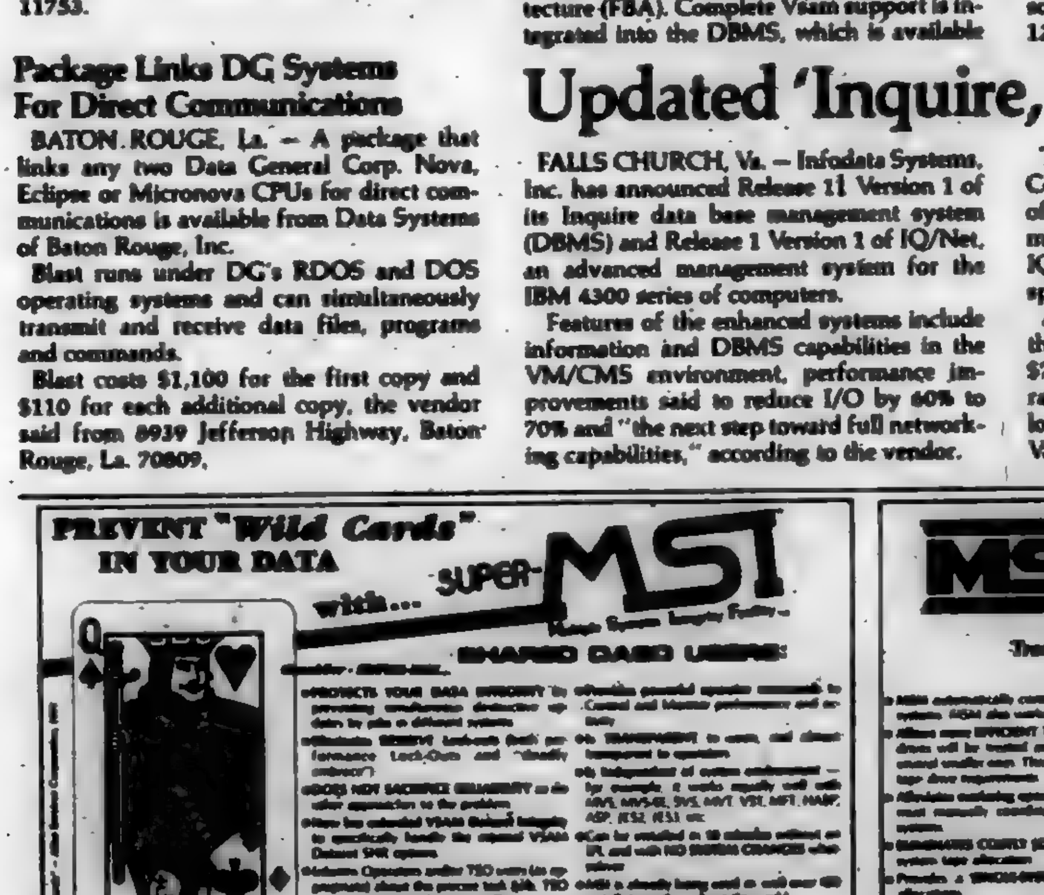
Updated 'Inquire,' 'IQ/Net' Bow

FALLS CHURCH, Va. — Infodata Systems, Inc. has announced Release 11 Version 1 of its Inquire data base management system (DBMS) and Release 1 Version 1 of IQ/Net, an advanced management system for the IBM 4300 series of computers.

Features of the enhanced systems include information and DBMS capabilities in the VM/CMS environment, performance improvements said to reduce I/O by 60% to 70% and "the next step toward full networking capabilities," according to the vendor.

The networking feature, known as the Communications Task, appears in versions of the Data Management Supervisor — multithreaded central copy — of Inquire and IQ/Net, operating in a CMS environment, a spokesman explained.

All new releases are free to subscribers of the Infodata field service. Inquire costs $70,000 to $150,000 and IQ/Net prices range from $50,000 to $85,000. Infodata is located at 5205 Leesburg Pike, Falls Church, Va. 22041.



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Unix, SCCS Supported by PE 32-Bit Supermini

REDWOOD CITY, Calif. — A software product that combines the latest version of Bell's Unix operating system with its associated Source Code Control System (SCCS) is now said to be supported on Perkin-Elmer Corp.'s line of 32-bit superminicomputers.

The product, known as Edition VII Workbench, marks the first time Bell Laboratories' SCCS has been available with Version 7 of the Unix operating system, according to a spokesman for the Wollongong Group, the Workbench's developer and supplier.

SCCS is a software development and management facility that provides audit trails for program modules and allows programmers to record changes to source files, documentation and data. With the facility, users can recreate previous versions of a program or manage different versions of the same program at the same time.

SCCS was already available with Version 6 of the Unix operating system. But the program development and management tool had never before been offered with the operating system's latest release until the Wollongong Group added the facility to a Version 7 Unix operating system the company bought from the University of Wollongong in Australia.

The Wollongong Group, formed last June, has begun supporting its combined SCCS-Unix Version 7 product on Perkin-Elmer's Models 7/32, 8/32, 3220 and 3240 superminis, all of which are 32-bit machines. The Wollongong Group will also support its product on all members of Digital Equipment Corp.'s PDP-11 minicomputer line, especially the PDP-11/70, the company spokesman said.

System Support

For both the DEC and Perkin-Elmer hardware families, the Wollongong Group's support will include installation of the Unix operating system and its accompanying SCCS as well as documentation and ongoing software maintenance. Support will also include a weeklong user-training session during installation and additional instruction after the installation is complete, the source said.

Although the Wollongong Group claims to be the only form to offer Unix Version 7 with SCCS, other forms of the widely used operating system are already said to be supported by several other companies. The main reason such suppliers have arisen is that Unix's developer, Bell Laboratories, is prohibited from supporting the operating system itself.

The Wollongong Group chose to focus its initial support efforts on Perkin-Elmer's machines partly because they are said to outperform other processors in the same product class and because they reportedly constitute the largest share of the 32-bit supermini market, the spokesman said.

A single-user version of the company's Edition VII Workbench costs $12,000, with additional users supported on a per-port basis. The price covers all support items, including binary license, system generation and 90 days of software support.

An optional one-year support contract costs $450/mo. Support for Unix Version 7 with SCCS is available immediately from the Wollongong Group at 652 Bear Island Road, Redwood City, Calif. 94062.

'Tolstar' System Aimed at Firms Doing Shareowner Recordkeeping

CHERRY HILL, N.J. — American Accounting Software, Inc. has released Tolstar, an on-line stock transfer and recordkeeping system designed for major corporations doing their own shareowner recordkeeping, as well as bank trust departments.

The system features full on-line data capture and edit and account lookup utilizing an automatic account assignment technique, the vendor claimed, adding the on-line entry employs a conversational mode with effective operator prompting and control.

Optional features available include dividend reinvestment, correspondence control, tender offer exchange and transfer.

The system is operational on IBM-compatible hardware under MVS and utilizes CICS for data communications and Vsam or Cincom Systems, Inc.'s Total for file management, a spokesman said.

The basic Tolstar costs $125,000. The dividend reinvestment option licenses for $15,000; the transfer module, $10,000; the correspondence control module, $5,000; and the tender offer exchange module $10,000, the vendor said from Suite 13, 1864 E. Marlton Pike, Cherry Hill, N.J. 08003.

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Effective Computer Operations Management	Dec. 15-17	Oct. 27-29	Sept. 15-17	Oct. 22-24		Nov. 19-21 ATLANTA Dec. 8-10 DALLAS
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Introduction to Word Processing: Concepts, Systems and Applications	Oct. 29-31	Oct. 1-3	Oct. 20-22	Sept. 15-17 Dec. 15-17		Nov. 12-14 DENVER
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For example, if you compare an STC 4800 with today's streaming tape devices, there's no comparison at all. In data mode, a streaming tape will typically transfer data at a rate of about 20 kb per second, while the STC 4800 offers a data rate of 480 or 780 kb per second. When you use the STC 4800 to backup a high-[illegible]

[illegible] the STC 4800 — like a 4300 processor — is designed for use in any office environment. As you can see from the accompanying chart, this means a reduction [illegible] or more in space, power, and air [illegible]

[illegible]	[illegible]	[illegible]	40%
[illegible]	14,000	[illegible]	40%
[illegible]	19.4	11.6	40%

Features you get only from STC.

The new STC 4800 also gives you several important features you'll find on no other [illegible]

For one thing, the 4800 is a tri-density subsystem. [illegible] eliminates the need for a separate, additional 1600 bpi drive. This helps reduce your initial investment, as well as your total cost-of-ownership.

STC's new 4800 tape subsystem can be diagnosed either on-site or remotely. In either event, if one 4800 drive goes down, it can be diagnosed in-line, and serviced off-line without affecting the remainder of the subsystem's operations. Powerful, built-in diagnostics also help assure enhanced data availability. In fact, the STC 4800 has microprocessor-based diagnostics designed to make fault isolation faster and more effective by permitting the subsystem to be exercised in-line. And special "wake-up" diagnostics will exercise the memory, microprocessor, and interface at power-up to assure proper operation.

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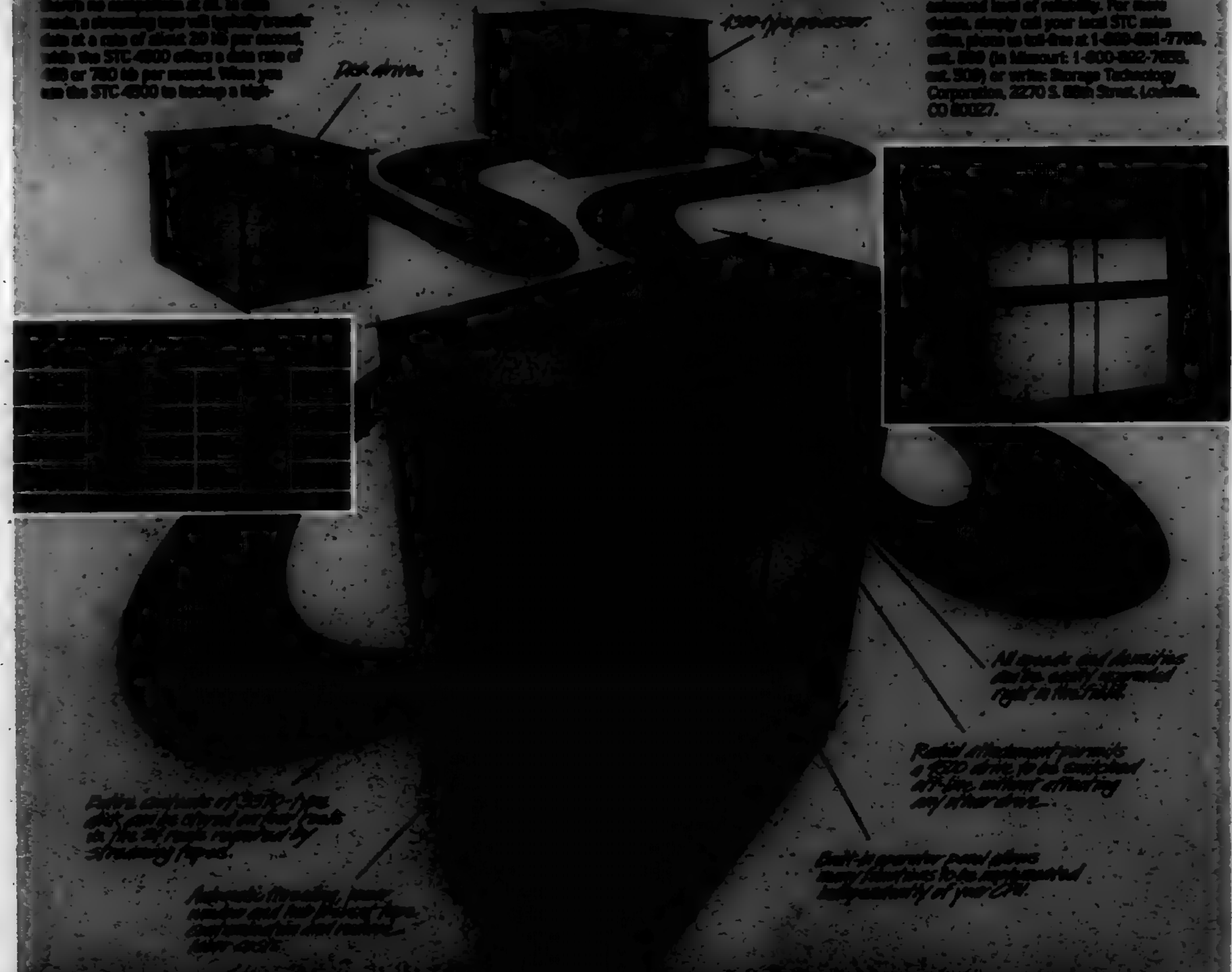
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Automatic threading, power window and hub [illegible] tape. [illegible] and reduce labor costs.

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Development Software Tool Runs On PDP-11/34 and 11/70 Minis

McLEAN, Va. — Planning Research Corp.'s Program Products Group has announced a release of its Central Software development tool that will run on Digital Equipment Corp. PDP-11/34 and 11/70 minicomputers.

Originally designed to run in the IBM CICS environment to ease programming tasks and data throughput, Central Software is said to reduce development time and costs for on-line interactive systems by up to 90%.

Central Software reportedly includes up to eight levels of security controls, screen formatting, automatic edits, a data base manager and programmer and user aids such as on-line application programming debugging, diagnostic aids and message switching.

For users in a mixed hardware environment, applications software operating with Central Software under IBM/-CICS is said to be directly transferable to the DEC system, and vice versa.

Available free on a 30-day trial basis, including installation, training and technical assistance, the PDP-11/34 version sells for $14,300 and $122/mo for maintenance after the first year, or $518/mo on a three-year lease, including maintenance.

The PDP-11/70 version costs $21,200 and $186/mo for maintenance after 12 months, or $755/mo on a three-year lease including maintenance from the firm at 1764 Old Meadow Lane, McLean, Va. 22102.

HP Micro Runs 'Image'

PALO ALTO, Calif. — Hewlett-Packard Co.'s Image data base management system (DBMS) has been extended to the HP 1000 L-Series microcomputer.

The new version of Image/1000 software, HP 92073A, when used with the RTE-L real-time executive operating system, has a maximum data base size of 200M bytes.

The HP Image/1000 92073A costs $2,500 with the right to duplicate for use on another computer available for $1,000. HP is at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Tool Fits VAX, PDP-11

BEDFORD, Mass. — Clyde Digital Systems, Inc. is offering a package for the Digital Equipment Corp. VAX-11/780 and PDP-11 that provides financial management functions and offers process ordering in distribution operations.

The package uses self-prompting commands that allow quick access to the package data base, the vendor said.

Clyde's package costs between $15,000 and $45,000, the vendor said from 6 DeAngelo Drive, Bedford, Mass. 01730.

U.S. Companies Offered Tool To Fight Inflation

ANN ARBOR, Mich. — Large U.S. companies facing complex inflation accounting disclosures as required by the Financial Accounting Standards Board Statement 33 now have access to an enhanced version of Comshare, Inc's. VSCOM-33.

VSCOM-33 allows users to inform both shareholders and investors of the effects inflation has had on the financial information contained in annual reports. The enhanced features include:

- A data entry validation routine that will screen component input for errors.
- A maintenance system that allows users to alter their data base structure on their own.
- A processing capability enables users to compute current costs and/or constant dollar one record at a time.
- A series of additional internal reports and an audit trail system that allows users to track data step by step.

The cost for VSCOM-33 would vary with each system but would typically run between $10,000 to $15,000 for the first year of use and be reduced in price thereafter. The vendor is located at 3001 S. State St., Ann Arbor, Mich. 48106.

NCR Gives CIF Users NOW Account Processing

DAYTON, Ohio — Software that allows commercial banks using NCR Corp. central information file (CIF) systems to implement negotiable orders of withdrawal (NOW) account processing, without having to convert existing CIF files or expand current hardware configurations, is available from NCR.

As a result of recently enacted legislation, NOW accounts, which accrue and pay interest on demand deposit funds, can be offered by all U.S. financial institutions beginning next year.

The software calculates NOW and demand deposit account interest based upon a rate specified by each bank, using current balance or current balance minus float.

Either straight daily accrual or daily interest compounding methods can be employed, and a supplemental rate may be applied to particular accounts to increase the total interest rate, the vendor claimed.

The interest crediting cycle may be independent of an account's statement cycle or synchronized with it. Users options include minimum amount of interest to be earned paying or forfeiting accrued interest when an account is closed.

The one-time license fee for the software ranges between $3,000 and $10,000, depending on the number of accounts, the vendor said from Dayton, Ohio 45479.

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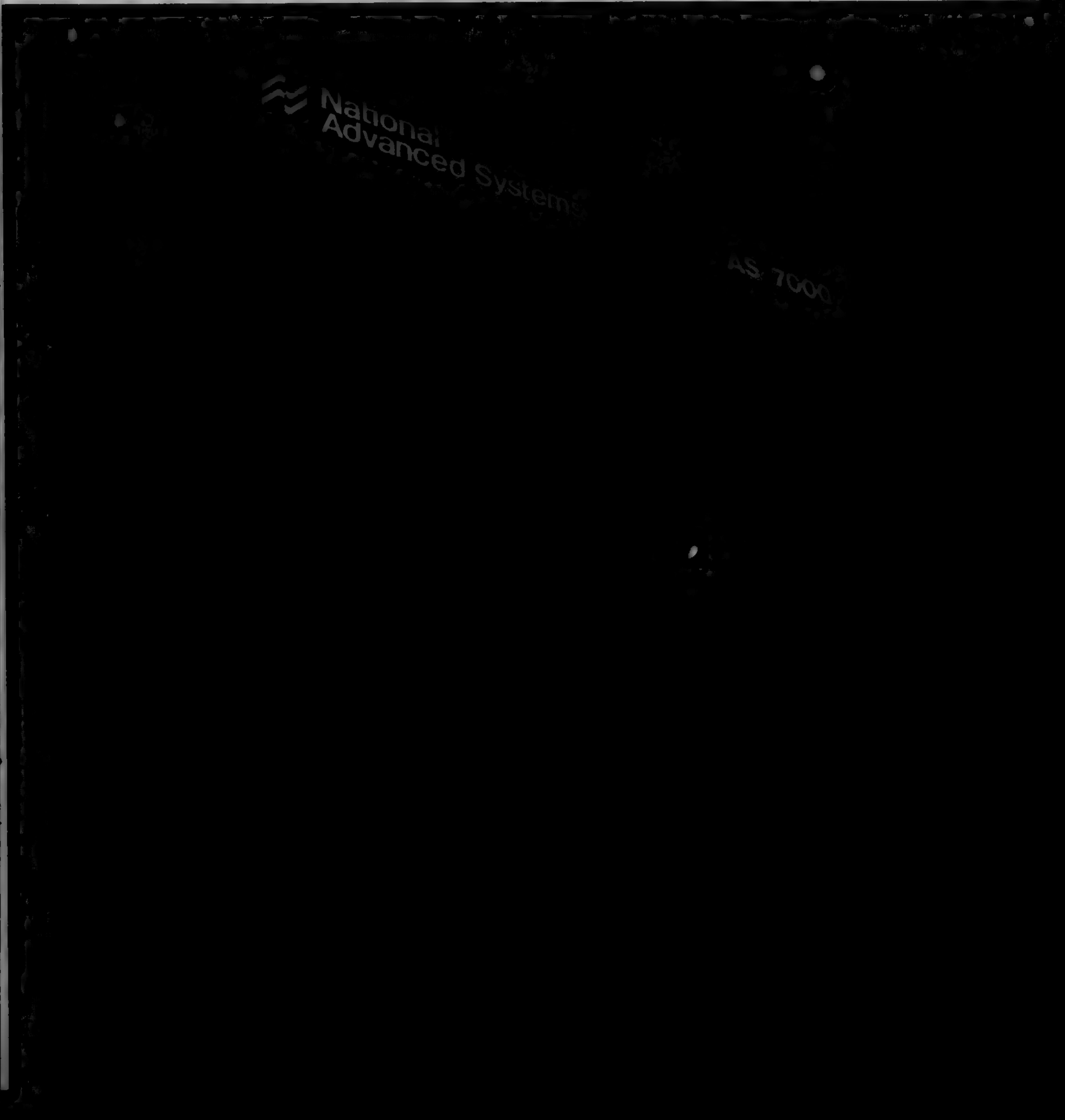

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'Conman' Console Manager Gets Enhancement Package

MISSION VIEJO, Calif. – A package of enhancements and new features has been added to the Conman console manager from Jason Data Services, Inc.

Conman provides users of IBM's DOS and DOS/MVT, DOS/VS and VSE and Nixdorf Computer Software Co.'s Extended DOS (Edos) with a console spooler. It supports all direct-access storage devices; 1052, 3215, 125D 3270-type CRT terminals up to 48 lines; 370/138, 148, 158 and 158 system consoles; 30 series system consoles; and 4331 and 4341 systems consoles.

With the new additions, if the CRT terminals become inoperable, the user may now continue operation with only his 1052 or 3215 until the terminals are back on-line, the firm said. Conman now requires no changes in either the user's operating system or applications programs. Multiple responses for each partition may be preanswered, and complete message routing is now included based on any text in the message and coded in boolean algebraic format.

Conman has special spooler forms mount interfaces for Power, ESF and Sage as well as a VM interface. Now 36 PF keys are supported instead of 24 and main storage requirements will average 26K- to 30K bytes instead of 20K- to 30K bytes, the vendor noted.

The file dump program may now be run in any partition at any time and Conman uses no transients except at start-up time and EOJ time if Syslst must be opened, the firm said.

Several enhancements have also been added to the console manager, which has a monthly rental charge of $200 per month and a perpetual license of $6,500 with $600 annual maintenance from the vendor at 24871 Pylos Way, Mission Viejo, Calif. 92691.

Memorex Offers Utility Geared to MVS Shops

SANTA CLARA, Calif. – Memorex Corp. is offering MRXPrint, a utility software package for the IBM MVS environment that reportedly allows users to reduce printing work load at the central computing site while also improving output turnaround at remote I/O locations.

The package allows computer output printing on IBM 3284, 3286, 3288, Memorex 2089 and equivalent printers at local or remote sites. Output can be queued from TSO terminals, JES2 and user-written programs.

The product costs $7,500.

Memorex also announced that MRX-DASM, a utility that provides backup, recovery and space management functions for high-capacity disk drives, is now available on a 30-day no-charge plan. It then costs $6,500 before Dec. 1 and $8,500 after that date, the vendor said from San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Software Guidelines Out

RYE, N.Y. – *Improving DP Software Production* is the title of a Reymont Associates, Inc. report that provides guidelines for effective project management and quality control in developing, installing and maintaining computer programs.

Directed at managers responsible for software projects, the report outlines typical problems in development and offers guidance on design and development, testing, maintenance, documentation and the use of software production tools.

The goal of the study is to eliminate those undetected errors in business computers that often cause significant financial loss and raise questions about computer negligence, Reymont said.

Improving DP Software Production is available for $5. Reymont is located at 29 Reymont Ave., Rye, N.Y. 10580.

Macro Assembler in ISO Pascal

NEW YORK – Advanced Computer Techniques Corp. (ACT) is offering a macro assembler written in ISO standard Pascal.

The assembler can be modified to run on an arbitrary host while assembling code for the target machine. Moreover, the assembler can be modified to run as a cross or native assembler, ACT said.

Dependencies on number formats in both the host and target CPUs have been separated from the main body of the assembler, making the product portable, the vendor said.

The macro assembler costs between $40,000 and $50,000 depending on the level of modification required, the vendor said from 437 Madison Ave., New York, N.Y. 10022.

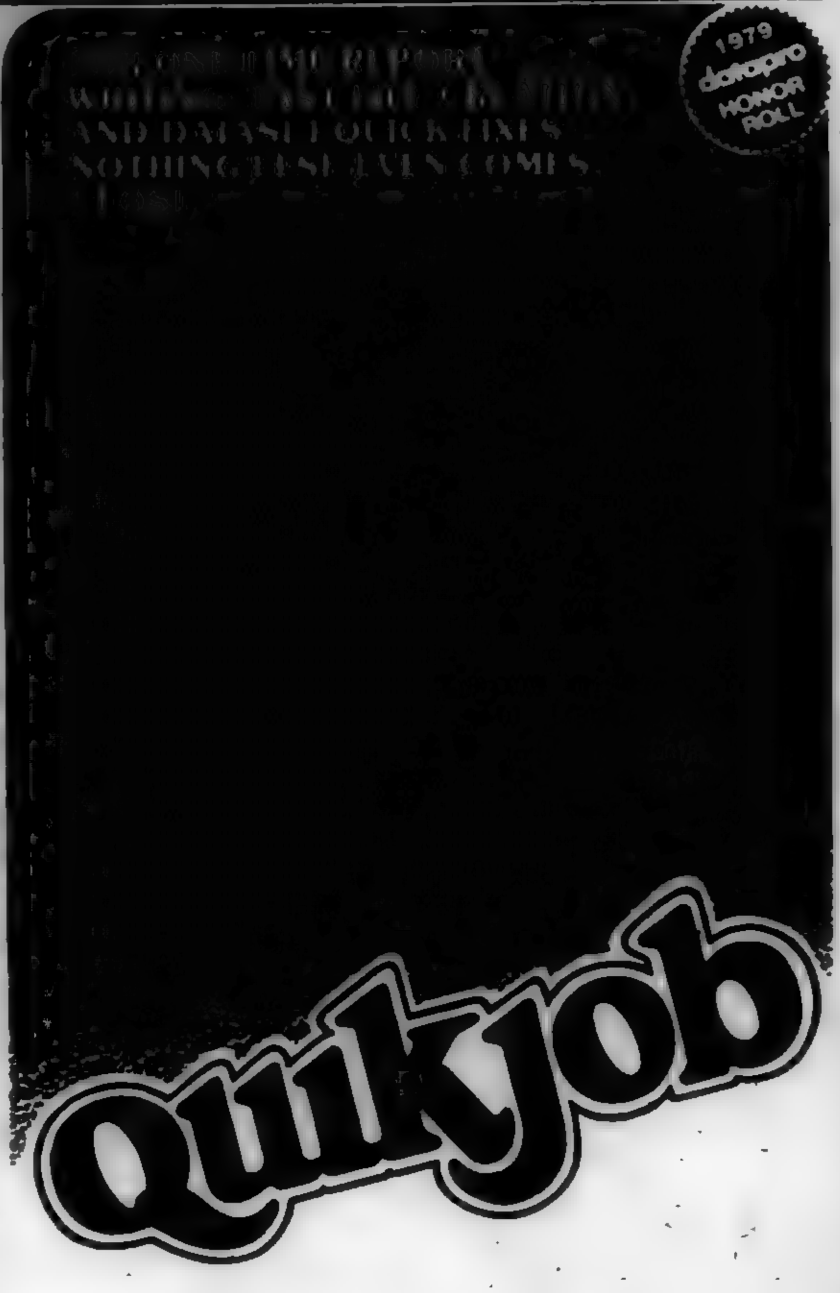
'IDA' Provides Statistical Analysis

CHICAGO – The Interactive Data Analysis & Forecasting System (IDA) – a Fortran package for statistical analysis in business and economics – is now being licensed, supported and enhanced by SPSS, Inc.

The package emphasizes regression analysis and time-series methods and a high level of user-computer interaction required to carry out such techniques.

Developed in 1972 at the Graduate School of Business at the University of Chicago, the package was originally aimed at classroom statistical instruction before its practical applications became apparent.

The package licenses on an annual basis: $5,000 for the first year and $3,000 for each renewal year. SPSS is at 444 N. Michigan Ave., Chicago, Ill. 60611.



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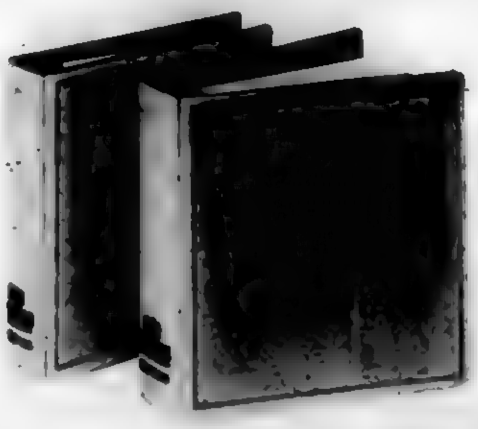

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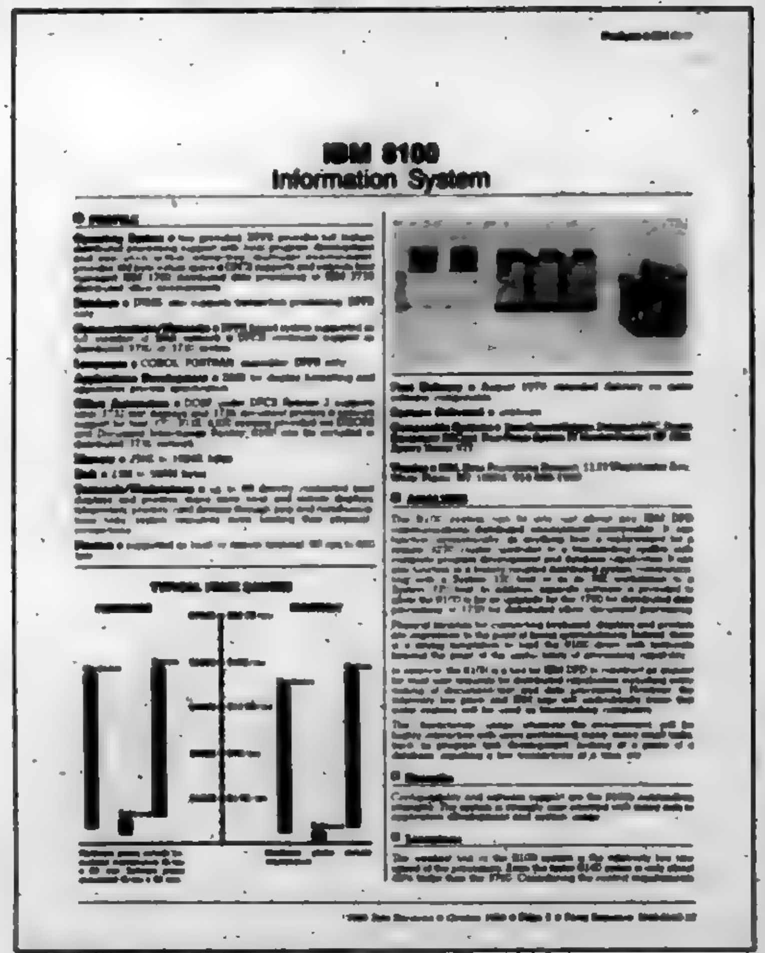

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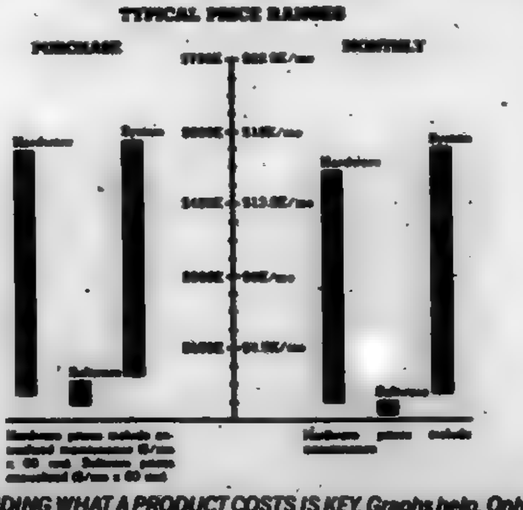

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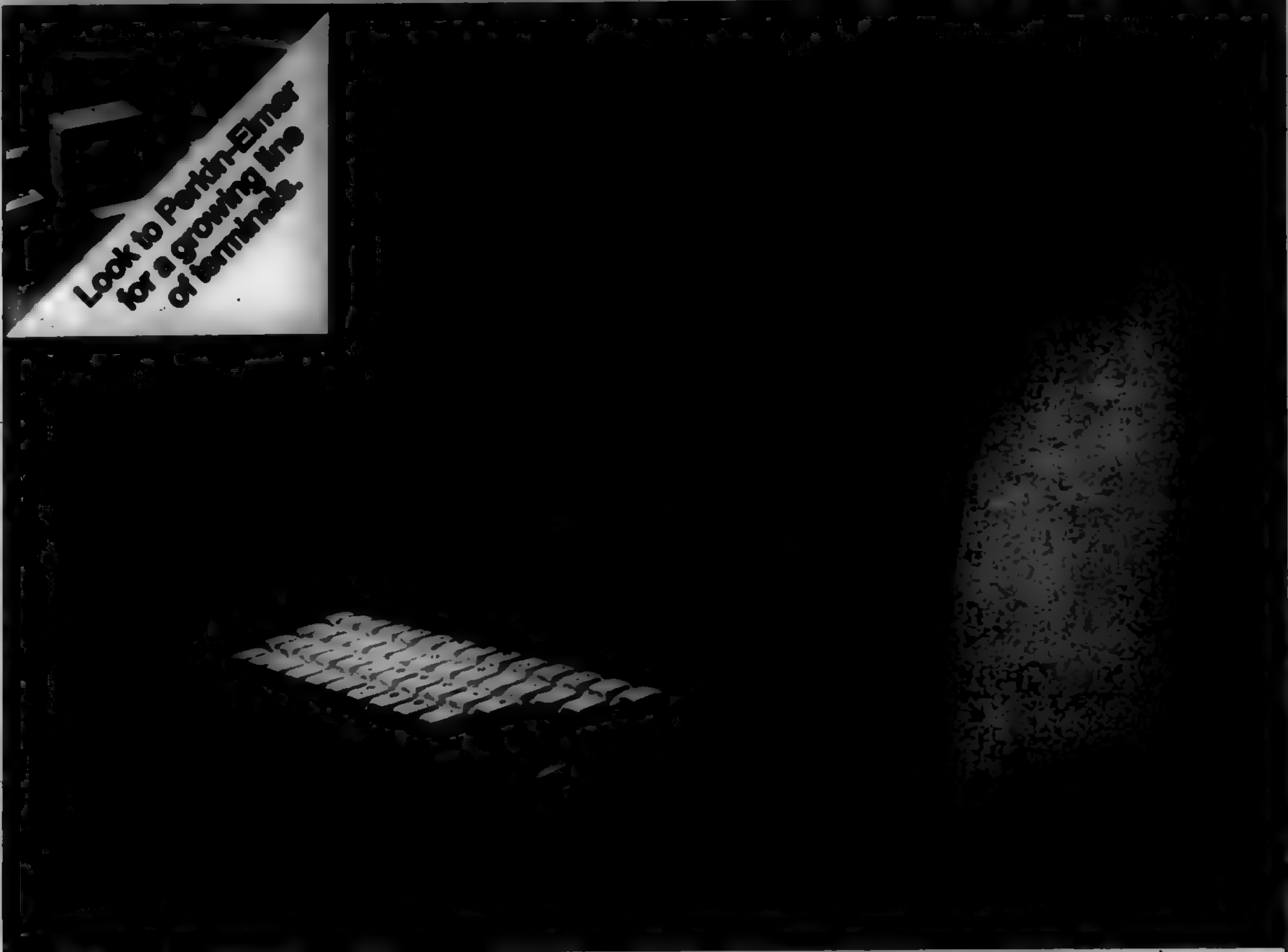

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Aetna Network 'A Mess'

By Bruce Hoard
CW Staff

NEW YORK — The skyrocketing growth of data and voice communications has left the Aetna Life and Casuality Co.'s communications network in a "mess," according to John J. Donovan, director of corporate DP for the firm.

The recent AT&T revision to its Wats tariff [CW, Sept. 22], which will cost Aetna 35% more on all its long-distance telephone dialing, is just one more piece in the company's large and complex communications puzzle, he asserted.

"Data communications is the life blood of Aetna," the director said. "We spend one dollar per policy per year on communications and that comes out to $37 million."

Speaking at the recent Information Management Exposition Conference (Info '80) here, Donovan described the problems associated with maintaining a large communications network and spoke optimistically of satellite communications in the near future.

The recent AT&T revision to its Wats tariff [CW, Sept. 22], which will cost Aetna 35% more on all its long-distance telephone dialing, is just one more piece in the company's large and complex communications puzzle, he asserted.

Breaking down cost areas, Donovan noted that 69% of the firm's data communications expenses are incurred at its home office in Hartford, Conn., while 31% is expended in field operations.

The company is experiencing a 40% yearly growth rate in its number installed terminals and the ratio of terminals to employees has moved from one to 45 to one to six, he said. Such a rapid growth rate is a prime contributor to the unwieldy network "mess."

(Continued on Page 55)

In Datapro Survey on Teleprinters

Users Rate Teletype 43, Xerox 1700 Tops

By Brad Schultz
CW Staff

DELRAN, N.J. — Teletype Corp.'s Model 43 and the Xerox Corp. 1700 series were the teleprinters rated highest by users in a Datapro Research Corp. survey just published in a $15 report, "All About Teleprinter Terminals."

Western Union Telegraph Co. was rated lowest in overall performance and ease of operation by five users of six unspecified models. The Teletype 43 took first place in overall performance, tied for first place in ease of operation and came up third in hardware reliability and keyboard feel and usability.

On the usual Datapro scale of four points for "excellent," three points for "good," two points for "fair" and one point for "poor," 16 users of 102 Model 43s gave that teleprinter a 3.8 average score in performance, while six users of units in the Xerox 1700 series gave those products a 3.7 average in performance.

Ease of Operation

The half-dozen Xerox customers also had the 1700 series turn up a first place tie in ease of operation — 3.5 average — first place in keyboard feel and usability — 3.7 average — and second place in both print quality and hardware reliability — 3.8 and 3.7 averages, respectively.

A Xerox subsidiary, Diablo Systems, Inc., won the survey's only perfect score, getting a 4.0 average in print quality for its Model 1620 teleprinter. Diablo's 1640 series took third place in print quality with an impressive 3.7 average.

The Texas Instruments, Inc. Model 810 teleprinter won averages of 3.5 or better in overall performance, ease of operation, print quality, hardware reliability and maintenance service. And TI's 743/745 models and the 765 tied for first place in ease of operation and keyboard feel and usability, respectively.

Other high-scoring models were Computer Devices, Inc.'s Miniterm 1203, which garnered a 3.5 average in performance and a

(Continued on Page 55)

Terminals Give Access to T/S Net

McLEAN, Va. — An intelligent terminal system that gives the user time-sharing network access but handles the bulk of local processing tasks was announced recently by Innovative Technology, Inc.

The Powernet system features a cluster controller that serves as concentrator, message editor, manager of Powernet dialog and supervisor of the user interface, a spokesman stated. The system is based on Applied Digital Data Systems, Inc.'s (Adds) Regent 300 terminal.

Up to four CRT terminals can be attached to the cluster controller along with one or more printers, plotters and other I/O devices, the spokesman said. A version of Powernet based on Adds' Multivision Intelligent terminal will reportedly be available soon after Multivision is released this November.

Able to write and execute Basic and Fortran, the local Powernet cluster features 32K bytes of random-access memory and dual diskette drives under a CP/M-

(Continued on Page 54)

FCC Proceedings Pending To Open More MDS Channels

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Multipoint Distribution Service (MDS) is the "touchstone for development of future spectrum policy," Federal Communications Commission (FCC) Chairman Charles Ferris said here last week. He was referring to three proceedings now pending before the commission aimed at making more channels available to MDS.

Data communications users would be directly impacted, since the new channels could provide broadband local loops in most of the nation's major cities, eliminating the shortcomings of telephone company-provided analog access circuits for many users.

Ferris was the keynote speaker at the annual meeting of the Common Carrier Association for Telecommunications (CCAT), which has just changed its name

(Continued on Page 56)

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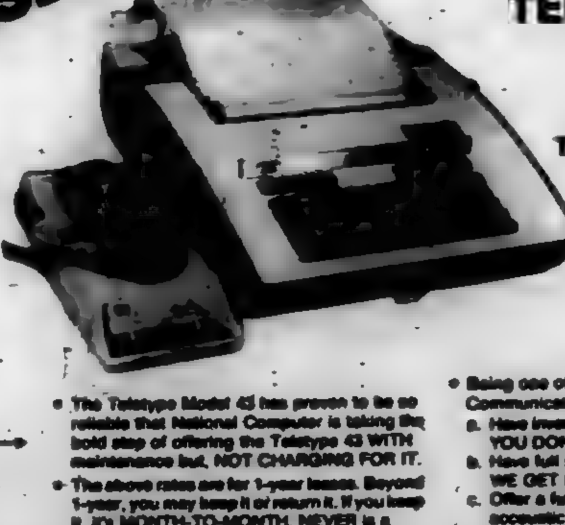

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CRT Terminal Family Offered to OEMs by DG

WESTBORO, Mass. — Data General Corp. has given OEMs the MPT family of intelligent CRT terminals, calling them software-compatible with DG processors ranging from the 16-bit Micronovas to the 32-bit MV/8000.

The MPT/80 terminal provides 60K bytes of dynamic random-access memory, a 12-in. CRT with 25 80-char. rows and an 83-key board. In the same cabinet, which is 22 in. wide by 12 in high by 20 in. deep, the MPT/83 terminal adds a 358K-byte floppy disk drive to the MPT/80 features, while the MPT/87 model has two drives for 5.25-in. dual-sided, double-density floppies totaling 716K bytes of storage.

The keyboard for the three user-programmable terminal models offers the full 96 char. Ascii set, a spokesman said, with a 14-key cursor control/-numeric keypad and 10 user-definable function keys.

All MPTs execute a run-time version of DG's MP/OS real-time, multitasking operating system for support of Pascal, Fortran IV and assembly languages. Each terminal has two RS-232C ports able to handle serial traffic at user-selected speeds as fast as 19.2K bit/sec, the spokesman stated.

MPT software reportedly includes disk formatters, a diskette copy routine, a bootstrap for programs residing in the floppies, a disk verification utility, a screen menu driver/editor, an asynchronous file transfer program, emulation of DG's Dasher D200 terminals, asynchronous interface routines and power-up self-diagnostics.

The MPT/80, 83 and 87 cost $4,800, $6,000 and $7,100, respectively, and deliveries will be within 90 days of order, DG announced from Rte. 9, Westboro, Mass. 01581.

Applications for the MPT family include OEM-designed distributed processing networks, industrial data collection, sensor I/O handling, laboratory and educational data processing.

Decision Data Offers First CRT

HORSHAM, Pa. — Decision Data Computer Corp. has unveiled the 3751-11, the first CRT terminal to be offered by the company.

The terminal is plug-compatible with the IBM 5251-11 and was designed to run on System/34 and System/38. It is less expensive than its IBM counterpart, costing $2,800 compared to $3,315, Decision Data claimed.

The 3751-11 has several features not found on the 5251-11, a spokesman added. These include a tiltable screen, adjustable key click, document holder, keyboard palm rest, automatic dimming, cursor position display, field-convertible numeric pad arrangement and expanded error message display.

Decision Data is located at 100 Witmer Road, Horsham, Pa. 19044.

LSI-11 Gains Serial Interface

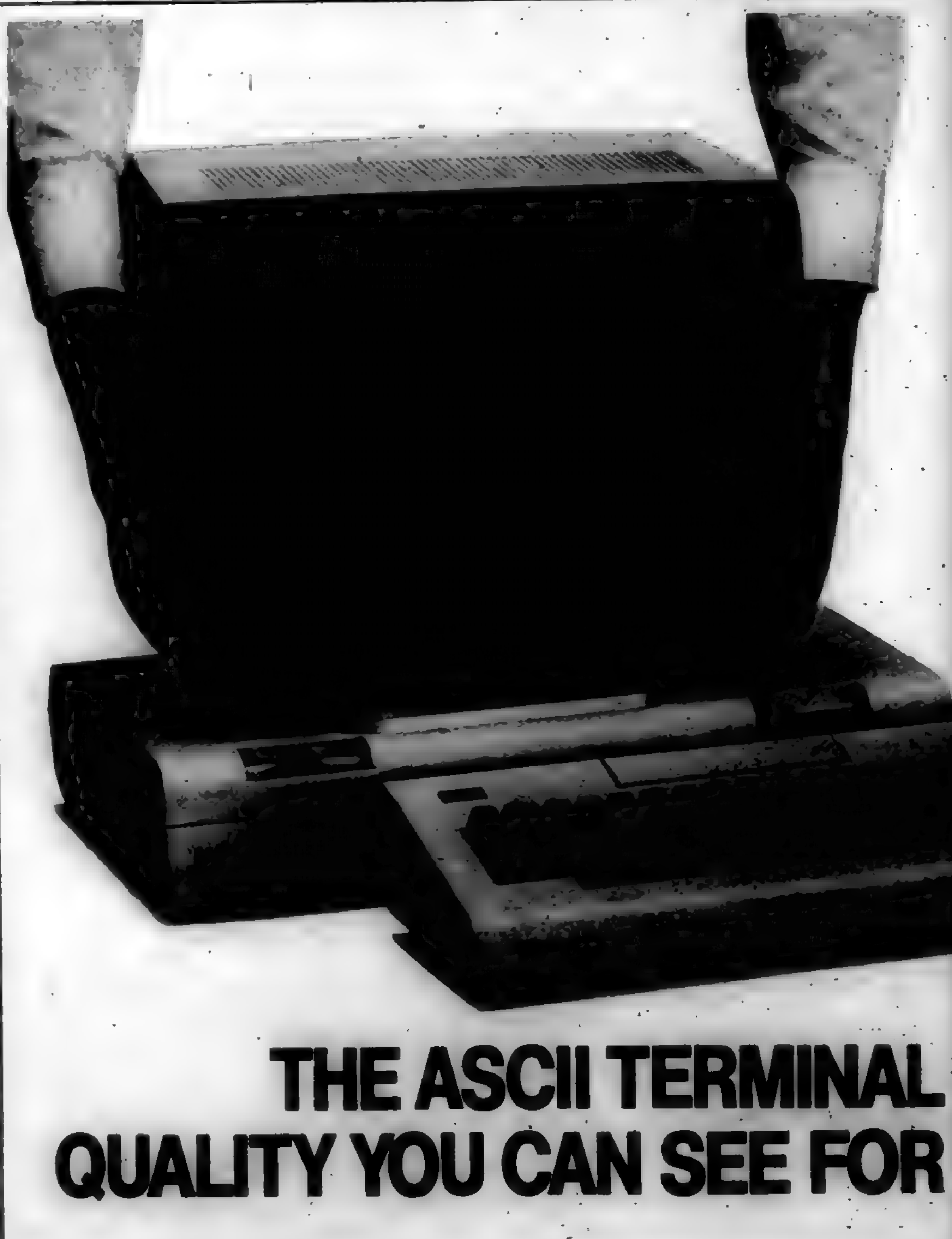
MERRIMACK, N.H. — A serial synchronous data communications interface designed for use with its LSI-11 microcomputers is available from Digital Equipment Corp.

The DPV11 interface can be used with any of DEC's microcomputer-based products with an LSI-11 bus, including the PDP-11/03 and PDP-11/23 computers, the vendor claimed.

The product is a double-buffered program-interrupt interface that couples on LSI-11 bus with a serial synchronous modem using RS-232C or RS423 interface standards.

Protocols for the DPV11 are DDCMP, HDLC, SDLC and Bisync. The interface also enables users to develop X.25 links between LSI bus-based systems and public packet-switched networks, a spokesman said.

The price for the unit begins at $550, DEC said from Maynard, Mass. 01754.



Formation 4000 Gets Adapter

MT. LAUREL, N.J. — Formation, Inc. has announced the addition of communications capabilities to its Formation 4000 minicomputer system introduced earlier this year.

The F4700 Communications Adapter is said to enable the Formation 4000 to be used in a distributed data processing (DDP) environment, acting either as a host or as a node in a network of systems.

The adapter emulates the IBM 270X SDA Type II and supports standard IBM software, according to the firm.

The F4700 costs $3,000 from the firm at 823 E. Gate Drive, Mt. Laurel, N.J. 08057.

Handles 20 Message/Sec

Message Switch Runs on DG Nova

NEW YORK — Conversational Systems Corp. has announced availability of the SC/80 message switch, which has run at ITT for more than two years.

Based on Data General Corp.'s Nova minicomputer line, the SC/80 switch was called suitable for line concentration and front ending of larger communications systems. More than 20 messages averaging 500 characters in length may be switched in a single second, a spokesman maintained.

Modularity of the switch's software facilitates extensions of protocol support and throughput capacity with no sacrifice to accountability and performance features, he claimed.

The SC/80's stand-alone operating system supports a variety of disk offerings and can be configured for 16 to 128 asynchronous or synchronous lines.

Priced in the $40,000 to $60,000 range, the SC/80 joins Conversational Systems' MS/80, which reportedly handles one-fourth the New York Stock Exchange's daily order volume [CW, Feb. 18], in the company's message switch product group.

The firm is at 132 West 31 St., New York, N.Y. 10001.

Micro-Based Unit Measures Response Time on 3270 Nets

HANOVER, N.H. — DTSS, Inc. has unveiled a microprocessor-based response time monitor for IBM 3270-based networks that reportedly records true computer system response time and transmits its summarized reports to the host computer.

The Tempo unit attaches directly between the 3270 keyboard and CRT.

The Tempo response time monitor attaches directly to the IBM 3270 CRT terminal and intercepts signals passing between the keyboard and host computer. Based on those signals, Tempo measures the response time — the time that elapses from the pressing of any enter-related key at the terminal until the host computer unlocks the keyboard — and makes it available for entry of the next transmission.

The individual response time measurements, as well as summaries of groups of response times, are reported on a small strip printer attached to the unit.

The device costs $2,450, the vendor said from 10 Allen St., Hanover, N.H. 03755.

Walk-In Maintenance For Lear-Siegler CRTs

ANAHEIM, Calif. — Lear Siegler, Inc. is offering a walk-in service facility for CRT terminals in 28 cities.

The Express Depot service allows Lear Siegler users to bring terminals in need of repair to a central site. The service can be performed while the user waits or within 48 hours, the firm said.

The repair service costs $65/year, the firm said from 714 N. Brookhurst St., Anaheim, Calif. 92803.

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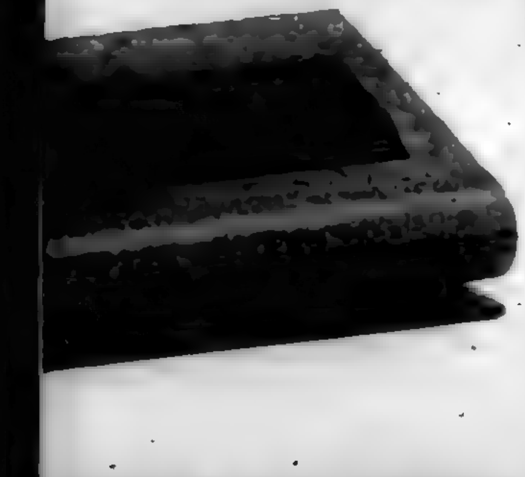
You can order a 3101 by just calling our toll-free number. In the continental USA, call 800-431-2670. In New York, call 800-942-1918. In Alaska, Hawaii and Puerto Rico, call collect [illegible]. You'll talk to a specialist who can take your order or answer your detailed questions. Delivery of the 3101 can be as soon as 15 days.

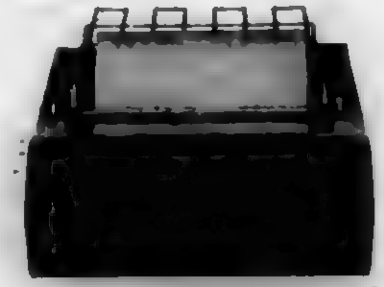
Out of the carton and into operation

When the 3101 arrives, you simply connect three modular elements—the display, the logic element and the keyboard—plug it in, position the setup switches and put it into operation. It takes just a few minutes. Accessible setup switches in the keyboard let you select functions such as line speed, parity, scroll and reverse video. The 3101 weighs 38 pounds so you can move it easily.



Human engineering inside and out

The 12-inch diagonal screen can be swiveled and tilted to cut interference from overhead lighting. It displays a maximum of 1,920 characters in 24 lines. You can see and feel the quality, from its comfortable, solid keyboard to its crisp, easy-to-read display.



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You can couple our 3102 printer to the 3101. You'll have the double convenience of displaying all your information, while capturing a hard copy of the data being displayed. The 3102 printer is lightweight and priced at just $1,295, and is also available for a 15-day trial.

Selected specifications and prices

There are two 3101 configurations: character transmission and block transmission. Character transmission lets you use it like a teletypewriter. Block transmission provides sophisticated editing capabilities, such as insert/delete and full cursor control, along with field functions like blinking, high intensity and protected fields.

The prices for the display terminal start at $1,295 for the character transmission model, and $1,495 for the block model. Volume procurements can save you up to twenty percent for either configuration of the terminal. Prices and current schedules subject to change.

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The source. Of course. ANDERSON JACOBSON

Ampex Launches CRT Terminal With Two Modes

EL SEGUNDO, Calif. — Ampex Corp. has entered the CRT terminal market with the general-purpose Dialogue 80, a buffered editing terminal that operates in either conversational or block mode.

Dialogue 80 features a nonglare screen, detachable keyboard, brightness control and lowercase descenders, a spokesman noted.

The unit has an RS-232C asynchronous interface that operates up to 19.2K bytes, half- or full-duplex, as well as a standard serial printer interface.

The Dialogue 80

The Dialogue 80 costs $1,149 from Ampex's Memory Products Division, 200 N. Nash St., El Segundo, Calif. 90245.

Z80s Act as IBM Terminals

DEXTER, Mich. — Winterhalter Associates, Inc. is offering a Remote Batch Terminal Emulator (RBTE) that lets Z80 microcomputers emulate IBM 3780, 2780, 3741 or 2968 remote batch terminals.

The RBTE allows users to transfer data files to and from mainframe computer systems or other batch terminals.

Data rates can reach 19.2K bit/sec; data integrity is provided using IBM's binary synchronous protocol for error detection and retransmission, the vendor said.

The RBTE costs $500 and an operator's manual costs $25 or $15, the vendor said from 3825 Zeeb Road, Dexter, Mich. 48130.

Powernet Gives T/S Access

(Continued from Page 51)

compatible operating system supported by applications software such as payroll, general ledger, accounts payable and accounts receivable programs.

WP Capability

Innovative Technology also offers a word processing (WP) capability with Powernet augmented by two software packages for real estate users, an automated escrow closing system and a mortgage loan origination system.

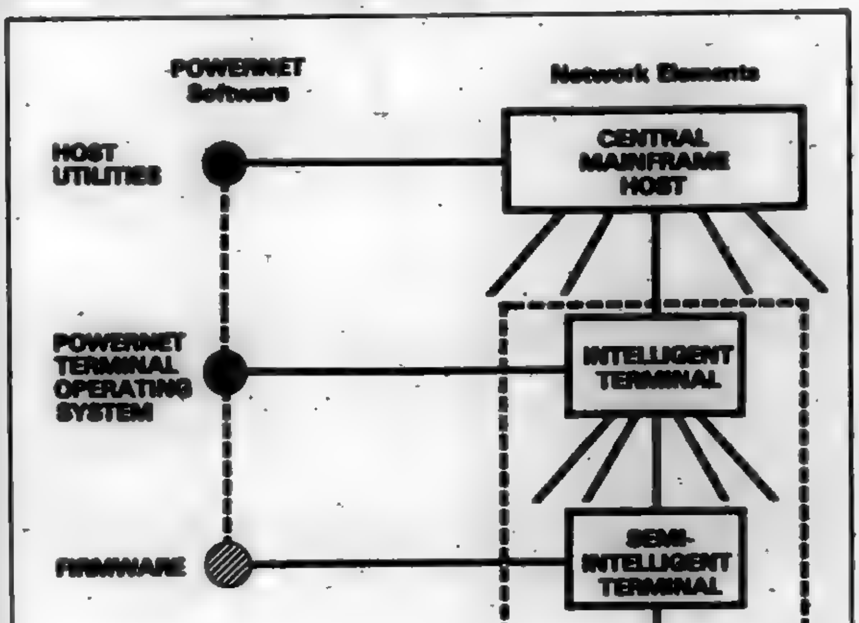
With Powernet, the user can function off-line, entering data from multiple terminals to the diskette, the spokesman continued.

The cluster controller will edit the data and branch from entry screen to entry screen, and data can be batched automatically to the host computer for overnight processing.

But Powernet can also reduce a typical user's time-sharing costs by up to 80%, the spokesman claimed, and represents an alternative to purchasing a minicomputer for combined standalone and time-sharing capabilities.

A single Powernet terminal costs $5,000.

Innovative Technology's address is 7927 Jones Branch Drive, McLean, Va. 22102.



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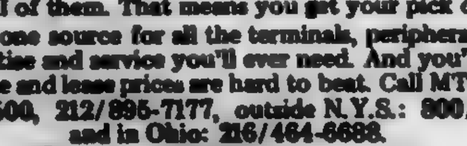

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Teletype 43, Xerox 1700 Teleprinters Rated Tops

(Continued from Page 51)

first-place 3.8 average in hardware reliability, and IBM's 3767, which achieved a 3.6 average in both performance and hardware reliability.

Only two product groupings did very well in maintenance service, according to the Datapro report. Both TI's 810 and a group of unspecified Computer Devices teleprinters tallied 3.5 averages in that category, but the median of maintenance averages was 3.1 with Diablo's models faring worst of all at 2.2 for the 1620 and 2.3 for the 1640 series.

Responses Used

Datapro received 285 usable responses from 132 users of 10,657 terminals by the survey's editorial cutoff date of April 25, the report stated. Many users employed a number of different teleprinters from a number of different vendors.

About two-thirds of the terminals canvassed are keyboard send-receive configurations, Datapro noted, a fifth are automatic send-receive and the rest are receive-only.

Nearly 70% of the units handle half-duplex communications, while close to half handle full-duplex (some handle both modes), a Datapro spokesman explained.

Datapro found that 15% of the teleprinters transmit faster than they print; 91% employ the Ascii transmission code; 70% use dial-up facilities; and 45% connect to acoustic modems.

According to the report, 70% of the users polled indicated plans to replace soon their existing teleprinters with other teleprinters while 9% said they had imminent plans for replacement by CRT terminals and 11% did not plan any replacements in the near future.

Datapro defines a teleprinter terminal as "any device that combines a low-speed printer with a communications interface."

USERS' RATINGS OF TELEPRINTER TERMINALS

Terminal Supplier and Model	No. of User Responses	No. of Terminals in Use	Weighted Averages and Response Counts																														
			Overall Performance					Ease of Operation					Keyboard Feel and Usability					Print Quality					Hardware Reliability					Maintenance Service				
			WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
Anderson Jacobson—																																
830 Series	17	401	3.3	4	13	0	0	3.3	6	10	1	0	3.2	5	11	1	0	3.4	7	10	0	0	3.1	7	7	3	0	3.0	4	9	4	0
Other models & unspecified	3	10	3.3	1	2	0	0	2.7	0	2	1	0	*	0	1	1	0	3.3	1	2	0	0	3.0	1	1	1	0	3.0	1	1	1	0
Subtotals	20	411	3.3	5	15	0	0	3.2	6	12	2	0	3.2	5	12	2	0	3.4	8	12	0	0	3.2	8	8	4	0	3.0	5	10	5	0
Computer Devices—																																
Miniterm 1200	4	45	3.5	2	2	0	0	3.3	1	3	0	0	3.3	1	3	0	0	2.5	0	2	2	0	3.5	3	1	0	0	3.3	1	3	0	0
Other models & unspecified	5	15	3.2	1	4	0	0	3.0	1	3	1	0	3.3	1	3	0	0	2.4	0	2	3	0	3.8	2	3	0	0	3.5	2	3	0	0
Subtotals	9	60	3.3	3	6	0	0	3.1	2	6	1	0	3.3	2	6	0	0	2.4	0	4	5	0	3.6	5	4	0	0	3.4	3	6	0	0
Computer Transceiver Systems, all models	6	160	3.4	3	1	1	0	3.5	3	3	0	0	3.3	3	3	0	0	2.7	0	4	2	0	3.3	3	2	1	0	3.2	2	2	1	0
Diablo—																																
1620	6	15	3.5	4	1	1	0	3.0	2	2	2	0	3.2	1	5	0	0	4.0	6	0	0	0	3.2	3	1	2	0	2.2	0	2	2	1
1640 Series	3	3	2.7	0	2	1	0	2.7	0	2	1	0	3.3	1	2	0	0	3.7	2	1	0	0	2.0	0	0	3	0	2.3	0	2	0	1
Subtotals	9	18	3.2	4	3	2	0	2.8	2	4	3	0	3.2	2	7	0	0	3.9	8	1	0	0	2.8	3	1	5	0	2.2	0	4	2	2
Digital Equipment Corp.—																																
LA 34	4	53	3.0	0	4	0	0	3.0	0	4	0	0	2.8	0	3	1	0	2.8	0	3	1	0	3.3	1	3	0	0	3.0	0	4	0	0
LA 36 DECwriter II	35	688	3.4	14	20	1	0	3.2	11	22	1	0	3.3	15	23	1	0	2.8	2	23	10	0	3.4	15	19	1	0	3.2	12	15	4	0
LA 120 DECwriter III	27	2,226	3.6	16	9	1	0	3.4	13	13	1	0	3.2	10	15	2	0	3.0	5	16	6	0	3.3	10	16	1	0	3.3	11	9	4	0
Other models & unspecified	7	1,000	3.3	2	3	1	0	3.1	1	3	0	0	2.7	2	2	0	0	2.7	1	3	3	0	3.1	3	3	0	1	3.1	3	4	1	0
Subtotals	73	3,966	3.4	35	35	3	0	3.3	25	46	2	0	3.3	28	43	4	0	2.8	8	44	20	0	3.3	29	41	2	1	3.2	26	31	9	0
General Electric—																																
Terminet 300 Series	6	80	2.8	2	2	1	1	2.7	0	4	2	0	3.0	2	1	2	0	2.6	0	3	3	0	3.0	2	3	0	1	3.0	2	3	0	1
Terminet 1200 Series	5	28	3.0	1	3	1	0	3.0	1	3	1	0	3.0	1	3	1	0	3.2	2	2	1	0	2.8	1	3	0	1	3.2	1	4	0	0
Terminet, unspecified	5	36	3.2	1	4	0	0	3.2	1	4	0	0	3.2	1	4	0	0	3.2	1	4	0	0	3.2	1	4	0	0	3.2	1	4	0	0
Subtotals	16	142	3.0	4	9	2	1	2.9	2	11	3	0	3.1	4	7	3	0	2.9	3	9	4	0	3.0	4	10	0	2	3.1	4	11	0	1
IBM—																																
2740/2741	2	25	*	0	1	1	0	*	0	1	1	0	*	0	1	1	0	*	0	0	2	0	*	0	1	0	1	*	0	1	0	1
3767	5	117	3.6	3	2	0	0	3.0	1	3	1	0	3.2	1	4	0	0	3.0	0	4	0	0	3.6	3	2	0	0	3.4	2	3	0	0
Subtotals	7	142	3.3	3	3	1	0	2.9	1	4	2	0	3.0	1	5	1	0	2.7	0	4	2	0	3.1	3	3	0	1	3.0	2	4	0	1
Sperry Univac DCT 500	4	8	2.8	1	1	2	0	2.5	0	2	2	0	2.8	0	3	1	0	2.3	0	1	3	0	3.0	1	2	1	0	3.3	2	1	1	0
Teletype—																																
Model 33	4	30	2.8	1	1	2	0	3.0	1	2	1	0	2.5	1	0	3	0	2.8	0	3	1	0	2.8	1	1	2	0	3.3	1	3	0	0
Model 43	16	102	3.8	12	4	0	0	3.5	8	8	0	0	3.5	8	8	0	0	3.3	4	12	0	0	3.6	10	6	0	0	3.4	8	7	1	0
Other models & unspecified	3	76	3.3	2	0	1	0	3.3	2	0	1	0	3.3	1	2	0	0	3.0	0	3	0	0	3.0	1	1	1	0	2.7	0	2	1	0
Subtotals	23	208	3.5	15	5	3	0	3.4	11	10	2	0	3.3	10	10	3	0	3.1	4	18	0	0	3.4	12	8	3	0	3.3	7	13	2	0
Texas Instruments—																																
733	4	130	3.3	3	4	0	0	3.3	2	4	0	0	3.0	1	6	1	0	2.7	1	3	1	0	3.2	3	3	1	0	3.0	2	2	0	1
735	6	27	2.8	1	3	2	0	3.3	3	2	1	0	3.0	1	4	1	0	2.3	1	1	3	1	2.8	1	3	2	0	3.2	3	2	0	1
743/745	25	606	3.3	13	11	4	0	3.0	10	12	1	0	3.2	10	14	3	0	2.5	4	7	15	2	3.1	10	10	7	0	3.4	13	8	4	0
765	3	5	3.2	1	3	0	0	3.3	1	2	0	0	2.7	2	1	0	0	2.7	0	2	1	0	3.3	1	2	0	0	*	0	2	0	0
Other 700 Series models	3	101	3.0	1	1	1	0	3.1	1	3	0	0	3.0	1	1	1	0	2.8	0	6	4	0	3.0	1	1	0	0	3.1	3	5	0	1
810	4	104	3.5	2	2	0	0	3.5	2	2	0	0	3.3	1	3	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.5	2	2	0	0
820	13	162	3.4	6	6	1	0	3.3	5	6	1	0	3.5	9	2	1	0	3.4	6	6	1	0	3.3	6	4	1	1	3.2	4	2	2	1
Subtotals	60	1,258	3.3	30	34	8	0	3.4	25	28	3	0	3.3	25	34	7	0	2.7	16	27	24	4	3.1	26	29	13	1	3.3	30	18	9	4
Trendata—																																
4000 Series	6	17	3.0	1	4	1	0	2.8	0	5	1	0	2.7	0	5	0	1	3.2	2	3	1	0	3.0	0	6	0	0	2.8	0	5	1	0
Western Union—																																
All models	5	6	2.4	0	2	1	1	2.6	0	3	1	1	2.6	0	4	0	1	2.8	0	4	1	0	2.4	0	3	1	1	3.0	0	5	0	0
Xerox 1700 Series	6	142	3.7	4	2	0	0	3.5	4	1	1	0	3.7	4	2	0	0	3.8	5	1	0	0	3.7	4	2	0	0	2.8	2	2	1	1
All Others	32	4,300	3.1	11	13	7	1	3.0	9	17	4	2	2.9	7	11	6	2	3.0	12	10	9	1	3.0	8	16	8	0	2.8	6	15	6	3
Grand Totals	285	10,657	3.3	115	131	31	3	3.2	84	160	27	3	3.2	84	104	26	4	2.9	65	144	70	5	3.2	104	125	38	8	3.1	87	73	24	12

Chart Courtesy of Datapro Research Corp.

Weighted average (WA) is based on assigning weights of 4 to each "excellent" (E) response, 3 to each "good" (G) response, 2 to each "fair" (F) response and 1 to each "poor" (P) response. When an asterisk appears under the WA column, it means fewer than three responses were received, which Datapro regarded as invalid.

Fast Growth Leaves Aetna's Network 'A Mess'

(Continued from Page 51)

With a claims network consisting of 41 sites across the country and no distributed processing to handle them, Aetna chalks up a large telecommunications bill each year while spending two cents per physical message.

On the voice communications side, expenditures flip-flop, with 84% coming from field operations and only 16% from Hartford, Donovan noted, adding that 43% of Aetna's telephone calls are made within the organization.

SBS in Its Future

Looking toward future communications environments, the director spoke of Satellite Business Systems (SBS) a joint venture of Aetna, IBM, and Communications Satellite Corp. The company's first satellite is scheduled for launch Nov. 7.

"If it works, we will start using it in September 1981, primarily for voice communications," he said. "We will have earth stations in Hartford, Chicago, Houston and San Francisco." By the second quarter of 1982, SBS hopes to have added 56K bit/sec connecting lines to additional cities.

One of the big uses planned for the satellite is teleconferencing, a practice that is "terribly expensive all by itself," according to Donovan. However, when coupled with the other uses Aetna has planned for the satellite, it becomes a more lucrative proposition, he added.

Donovan expressed an opinion about teleconferencing: "It's more effective for nonemotionally charged meetings than for gatherings where somebody's performance is going to be evaluated."

Following the national trend, the company is making a move toward more distributed processing. It has installed IBM 8100s in "at least 69 offices" so far, he said. Aetna uses IBM equipment throughout the organization and its communications network employs Systems Network Architecture (SNA).

American Express

David Charles Jones, acting senior vice-president of the Systems and Communications Division of American Express Co., also spoke about his company's large data network.

With a host of subsidiary companies such as Fireman's Fund Insurance Co. and the International Banking Corp. to support, American Express counts on its private, nationwide network to do the job.

That network entails some 200 terminals in over 30 countries and is used for electronic funds transfer, as well as voice and data communications, Jones said. It uses eight multihost IBM processors. Like Aetna, American Express also relies heavily on IBM for most of its hardware and software, including SNA.

"Our IBM salesman has been laughing all the way to the bank for the past two years while we put together our new network," Jones said. That network is consolidating six earlier networks into one master system.

That network developed from the "quick and dirty" operation patched together by the company in 1967 that eventually grew to include 6,000 terminals for the verification of credit cards and 35 interfaces with non-American Express nodes.

Dual Acoustic Coupler Provides Both 1,200- and 0- to 300 Bit/Sec

SUNNYVALE, Calif. — Racal-Vadic Inc. has introduced a dual acoustic coupler that it said provides both 1,200 bit/sec and 0- to 300 bit/sec full-duplex asynchronous operation and is fully compatible with VA3400 and Bell 103/113-type modems.

The VA3413 is a portable unit that transmits over a two-wire switched network. Remote terminal users can step up to 1,200 bit/sec full-duplex mode using Bell 103-type protocols and still operate at 0- to 300 bit/sec as well, the firm said.

The VA3413 is microprocessor-controlled and automatically detects the called modem.

The VA3413 is compatible with Racal-Vadic's VA3400 modems including the VA3405, VA3415, VA3455, VA3450 and the VA3467. The unit costs $895 and is available from the vendor at 222 Caspian Drive, Sunnyvale, Calif. 94086.

FCC to Rule on Opening More MDS Channels

(Continued from Page 51)

to The MDS Association.

Ferris explained that one of the three pending FCC proceedings — Docket 80-112 — involves reallocation of the 2,500 to 2,690 MHz frequency band now allocated to educational broadcasters and private microwave users on an exclusive basis.

The educational broadcasters, who provide what the commission calls Instructional Television Fixed Services (ITFS), have 28 channels, while the private microwave users have three. The latter systems are known officially as Private Operational Fixed Microwave Systems, usually abbreviated OFS. MDS carriers presently operate in a different frequency band (2,150 to 2,162 MHz).

Under the FCC's proposed scheme, MDS would keep its present allocation while sharing the 2,500 to 2,690 MHz band with ITFS and OFS. But the exclusive allocations now granted the latter two services would be replaced with a "primary" allocation system.

Eleven of the 31 channels would be reserved for educational broadcasters, and 10 each for MDS and OFS. In each case, if the channels were not used by a primary grantee, they could be reassigned to either or both of the other two groups.

Giving additional channels to MDS could lead relatively quickly to provision of multiple broadband local loops throughout the country. According to the FCC, MDS operations have been licensed in 131 locations, including most of the nation's major cities, and some 400 applications for additional networks are pending.

Data submitted to the FCC in Docket 80-112 by Microband Corp., the largest of the MDS carriers, now a subsidiary of Tymshare Corp., indicates that these networks can support two-way data transmission at speeds of 500M bit/sec or higher, depending on network configuration. MDS is now used primarily to distribute pay TV programs.

'Ripe for Decision'

In his speech to The MDS Association, Ferris said that Docket 80-112 would be "ripe for decision" by the end of 1980.

While he remains "open" on the question of whether ITFS should have exclusive use of its existing frequency allocations, the FCC chairman made it clear he favors the idea. This is significant because ITFS broadcasters are violently opposed to sharing their frequencies, and have mobilized substantial support in Congress and within the new Department of Education for their view.

"In at least 25 of the top 50 metropolitan areas," Ferris said, 10 or more of the presently allocated ITFS channels are unassigned. "And in each of these cities there are at least two mutually exclusive applications for an MDS channel."

He admitted that the actual use of ITFS may not accurately reflect demand for the service, echoing a point stressed by the educational broadcasters who point out that it is more difficult for them, than for MDS carriers, to raise the money needed to get on the air.

But Ferris added that a low-power TV service proposed earlier this month by the FCC — which would permit additional use of UHF and VHF television channels — may be "a cheaper, more effective way to satisfy some of the educational TV demands" than the present exclusive allocation of channels to ITFS.

A related proceeding, Docket 80-113, proposes a number of changes in existing FCC rules designed to prevent TV stations from interfering with each other. If adopted, Ferris said, these rule changes will permit at least two MDS channels, rather than one, in virtually every major city.

Application Procedure

The commission is also proposing to simplify the procedures by which it chooses among contending applicants for the same local frequency.

"The average delay caused by our present comparative hearing procedure in MDS is three years," Ferris explained. "The legal fees to MDS applicants exceed $50,000, and the FCC's own administrative costs soar past $5,000 per hearing.

"More important, the MDS channel goes unused while the process is grinding to its ultimate resolution. This process benefits no one, except possibly those entrenched firms most capable of using technical barriers and delays in administrative processes to their own advantage," he added.

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IN DEPTH

Management And Distributed Computing

By Robert W. Shirey

By Robert W. Shirey

Part 3: Structure and Strategy

> *"In the development of information systems, the technical interests of staff experts must be submerged to the interests of managers, but the two must cooperate in developing systems. Staffs must avoid rushing into informational systems design without management participation and approval. Managers must not abdicate their responsibility to staff in this work."*
>
> —George A. Steiner, 1969

The forces behind distributed computing arise from more than just technological innovation. They also arise from human desire to avoid the bureaucratic inefficiencies inherent in large, centralized organizations. Designing a distributed computing system (DCS), therefore, involves more than just technical issues and physical dimensions. Sometimes the biggest design problems are technical, but other times technical issues are secondary to organizational ones. In some cases, the two classes of issues can be separated, but in no case should either be ignored.

So DCS design requires several specialized viewpoints. But to integrate the specialties, it also needs a broad, general viewpoint, the viewpoint of top management. Top management means one or more of the senior executives who are accountable for the organization's total efforts and total results [Stei69]. Top management must orchestrate the DCS components to make the system support the organization's style and goals.

Our society puts great pressure on everyone, regardless of rank, to be up-to-date and use the latest technology. In the 1960s, when computers were the latest management fashion, this pressure caused wasteful spending. Today, the distributed computing trend could also lead to uncontrolled and uncoordinated growth unless procurement and development are controlled. Uncontrolled innovation is proper at a certain stage of organizational evolution, but only top management can judge this.

Top Management Role

Top management should participate directly in the design of distributed computing systems. Top management guidance is needed to avoid problems that arise when dispersed systems are allowed to grow in ad hoc fashion:

- **Intersystem Incompatibility.** Two kinds of mismatches occur:
  1) Between information systems.
  2) Between an information system and the work system or process it supports.
- **Cost Ineffectiveness.** A system may be cost effective from a local viewpoint but be suboptimal for the organization as a whole, or vice versa.

Intersystem incompatibility limits an organization's productivity and growth. Two incompatible systems cannot be joined to communicate or to share resources. The problem is usually a difference in either machine architectures or data definitions. These differences arise when there are no organization wide standards for data elements, software or other system components.

The other kind of incompatibility, between an information system and its working environment, is the common result of lack of user involvement in the system design. This second kind of incompatibility leads not only to inefficiency but sometimes to rejection of the system (and its sponsors!) by the intended users. When this happens, even a technically well-designed system must be considered a failure.

Some fairly general but still quite useful guidelines for DCS design have

(Continued on In Depth/2)

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications.

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

IN DEPTH

(Continued from In Depth/1)

emerged from the experiences of the many organizations that already use some form of distributed computing. The next section reviews the experiences of four practitioners in private industry.

Organizational Congruence

Designers of new systems often are tempted to build an ideal system. This urge takes many forms. Sometimes, the designers try not only to fix all the faults in the old system but also to reform the organization that uses the system. In other cases, the designers seek a universal solution, the "common system" approach.

Both approaches can be very expensive. Reynolds says: "I have found that it is indeed true that making systems fit the special requirements of the individual organization is considerably more cost effective than trying to change the organization to fit some data processing operations. This is true even in cases where the programming itself is quite expensive [Reyn77].

Sharma says it more directly: "The goal of a designer should be to fit [distributed computing system] to the organization and not vice versa, as many case histories show [Shar78]."

Even within a single organization, different applications may need different approaches. For example, field offices might be geographically dispersed with decentralized management, while accounting and payroll are centralized at headquarters. So the organization might require several systems, each distributed to a different degree.

Hewlett-Packard Co. is an example of a multisystem organization. It has built a variety of coexisting systems — centralized, decentralized and distributed — including a 110-node worldwide teleprocessing network. Van Rensealear summarizes HP's DCS experience: "The most significant lesson we have learned . . . is that there is no one best way to process data [VanR79]." He also names the "10 big problems" HP had to face to evolve from totally centralized computing to its present mix. His list has been rearranged here to emphasize key DCS design issues.

- **Centralization vs. Decentralization.** Establishing centralized planning to coordinate decentralized development work. Adapting to local needs while keeping companywide compatibility.
- **Flexibility and Growth.** Designing for each response to organizational change, system expansion and new information needs without losing control of costs.
- **User Involvement.** Involving user-managers in system design and operation. Educating users to treat data as an important, shared resource.
- **Resource Balance.** Training and assigning the computing staffers. Avoiding unnecessary duplication of effort.
- **Control and Coordination.** Setting, promulgating and enforcing standards that are companywide. Maintaining security and privacy throughout a dispersed organization.

The experience of the Vickers Engineering Group contrasts sharply with Hewlett-Packard's. Vickers began with totally decentralized data processing: each of 20 autonomous divisions did its own computing [Shep78]. While HP evolved from centralized computing to largely decentralized DCS design and operation, Vickers did the opposite. HP puts "data close to the source of the information and the control of processing close to the manager responsible for the function being performed."

But Vickers doesn't believe that "hardware and software have reached the stage where [data] is generally usable" when distributed to the place where it is most used. Also, Vickers avoids decentralized operational control and development of computing in order to avoid coordination problems. Even when dispersed and decentralized systems have a local manager, "we have found it works best if the local [computing] managers are people who see their prime career path in the central organization."

Vickers' approach is similar to one suggested by Kelsch for combining central and distributed computing systems [Kels78]. "The end user should have responsibility in a distributed system [only] for local, nontechnically complex operational and application functions . . . Technical responsibility [should] be centralized."

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HP believes instead that decisions should be made by people who are closest to the problems. Organizationally, this might imply either centralization or decentralization depending on the kind of problem.

In summary, the issue of centralization vs. decentralization appears again and again, and the next section discusses why. Even among those who agree that a DCS should match the organization, there is still disagreement on three points:

(1) What does or should the organization look like?

(2) How should a DCS be managed as opposed to how it is functionally designed?

(3) How much of a match is feasible technically, economically, psychologically and politically?

Part 1 of this series pointed out that in DCS design there are so many alternatives it is almost impossible to analyze them properly. In fact, "With the continuous inundation of products and technological advances, it turns out that almost anything we want to do as a manager can be implemented technically [Sher79]." So DCS design is constrained not by technology but by management philosophy.

The centralization-decentralization (C-DC) issue boils down to personal preferences. Glaser listed four major organizational issues facing management in its use of computers in 1970 [Glas70].

(1) Decentralization of personnel, hardware and control.

2) Organizational placement of data processing management.

3) Organizational structure of data processing staff.

4) Procedures for allocating data processing costs to users.

Glaser said that the C-DC issue was the most controversial of these, and it remains so today. The controversy feeds on two causes:

- **Complexity.** The degree of centralization has many strong tangible and intangible effects — functional, economic and psychological — on computing systems and on the people who build, operate and use them. So it is seldom possible to prove that one approach is better than the other.
- **Emotion.** Organizational design involves questions of style, and style is a constantly changing and very personal matter. So it is seldom possible to find one design that suits everyone and will stay in fashion.

Designers must not ignore the cognitive differences between centralist and decentralist positions. "You actually *think* differently when you do your planning while standing at the central processing unit . . . than you do if you put yourself at the source of the data [Vick77]." Any organizational design, therefore, must effect a compromise in order to be successful. "No organizational structure or policy will work unless accepted by the majority of people affected by it as logical, satisfactory and workable [Glas70]."

The general management literature can help computing specialists gain perspective on system design issues. The management literature on organizational design tends to discuss the decentralization issue in terms of who has authority and how that affects decision making. This emphasis serves to balance the computing literature which discusses the issue in terms of where resources are located and how that affects costs.

Luthans puts the centralization vs. decentralization issue in three successively larger contexts [Luth73]. First, the C-DC issue is only one aspect of the vertical analysis of organizations; another aspect is flat vs. tall, or how many layers there are. Second, there is another dimension, horizontal analysis. It concerns the amount of departmentation or specialization and split between line and staff functions. There can also be vertical vs. horizontal design conflicts. Third, there can be different types of structure: geographical, functional and decision-making.

Dale names the classical principles of organization design that underlie Luthans' distinctions [Dale67]:

- **The Objective.** The organization and each subunit need one.
- **Coordination.** Always required.
- **Specialization.** Similar functions should be grouped.
- **Unity of Direction.**
- **Unity of Command.**
- **Authority and Responsibility.** Should be commensurate.
- **Delegation.** To the lowest compe-

(Continued on In Depth/4)

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IN DEPTH

(Continued from In Depth/3)

tent level.

- **Span of Control.** Between three and eight.
- **Chain of Command.** Short as possible.
- **Balance.** No function emphasized at expense of others.
- **Change.** The unchanging characteristic.

His delegation principle especially applies to the C-DC issue: "Each decision should be delegated to the lowest competent level — that is, to the lowest point in the organization where the incumbent of the position may be expected to be aware of all the factors pertinent to the decision and where the results on which he is judged will encompass all its consequences."

Division of Labor

The specialization principle is often called division of labor. Drucker says, "Decentralization, as the term is usually understood, means division of labor and is nothing new [Druc60]." He says that decentralization at a macro level has three purposes or claimed advantages:

1) Faster decisions with less confusion over authority.

2) Less conflict of interest between headquarters and subunits.

3) Less "edict management" (dictatorship).

Dale states another advantage: "The ultimate result of the decentralization of decision-making . . . tends to be an increase in the profitability of the investment in administrative expense [Dale67]." He says this occurs in three steps:

- **Positive Short-Term Effect.** Subunit morale improves and raises profits.
- **Negative Intermediate Effect.** Profits decline because some subunit administrative costs increase.
- **Positive Long-Term Effect.** Overall profits increase after a new equilibrium is achieved.

Measuring the effect of decentralization is difficult unless there is a control for comparison. It is also difficult to measure the degree of decentralization, although Luthans states four objective criteria [Luth73]. Decentralization is greater when:

- More decisions are made lower down the management hierarchy.
- Important decisions are made lower down.
- More functions are affected by the decisions made lower down.
- Fewer approvals are needed for decisions.

Luthans also gives seven guidelines for determining the optimum degree of decentralization of decision-making.

- **Information Access.** Decisions should be made where the relevant facts are available or can be most easily assembled.
- **Executive Ability.** Decisions should be made by those who have the required skills.
- **Time Horizon.** Decisions should be made lower down when local conditions require speed.
- **Interaction.** Decisions should be made higher up when a local activity interacts with outside activities.
- **Significance.** Decisions should be made higher up when their importance and consequences increase.
- **Executive Load.** Decisions should be made lower down as executives become busier.
- **Staff Efficiency.** Decisions should be made lower down to improve initiative and morale.

Decision Methods

It is not possible to pick one organizational design that will apply in all computing situations. Yet there do exist systematic means for deciding the C-DC issue for each separate part of an information system. This section describes three papers that take a comprehensive, systems approach to the problem. Glaser's paper, exceptional for its clarity, is rather short and gives only broad design criteria and guidelines [Glas70]. Still, only a few statements in it have been overtaken by events of the last 10 years.

In a longer paper, building on Glaser's work and on other studies [Rock76a, Rock76b], Rockart, Bullen and Leventer present a detailed, qualitative decision model [Rock77, reviewed in Saxt78b, Saxt78c]. Their model is long on human factors, but short on technical issues. In contrast, Slonim, Schmidt and Fisher have a quantified decision model that deals

(Continued on In Depth/6)

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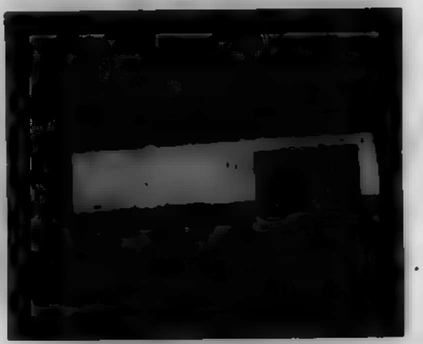

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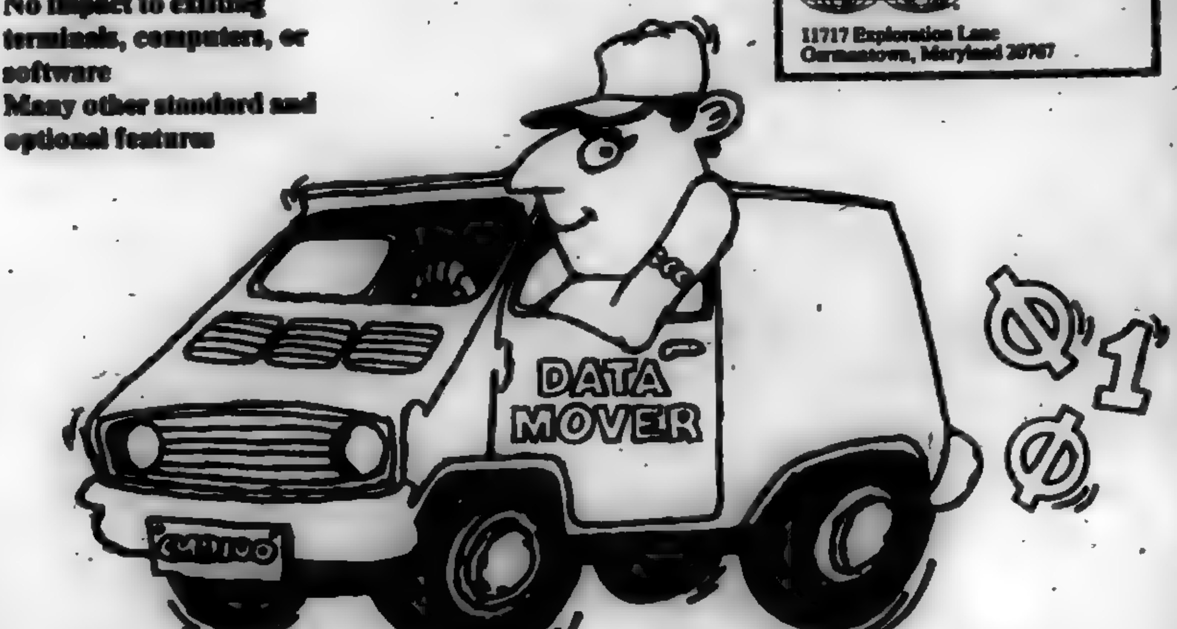

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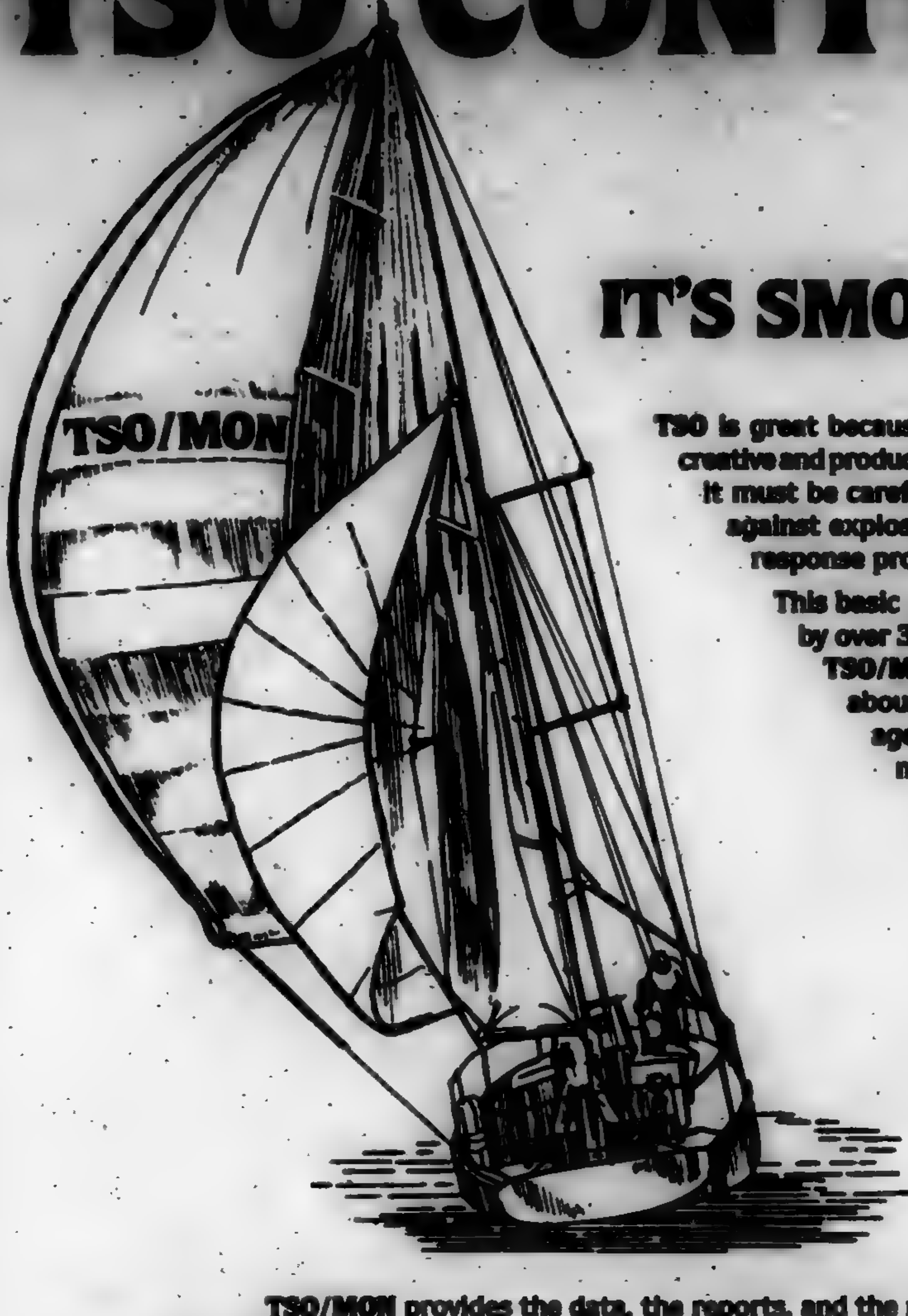

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IN DEPTH

(Continued from In Depth/4)

directly with data base distribution [Sinn79].

The system approach can be applied. Glaser used it in a short paper that clarified the C-DC debate on computer resources. His paper begins like many others by presenting the popular pros and cons. The usual management arguments for centralization are:

- Reporting Requirements. Makes data consolidation easier.
- Economies of Scale. Reduces hardware and development costs.
- Personnel Shortages. Reduces impact of specialist turnover.
- Global Standards. Enhances executive control. Similar points are mentioned elsewhere [Reic68].

The usual arguments for decentralization are:

- Local Solutions. Better problem familiarity.
- Response Times. Faster for local needs.
- Management Responsibilities. Local profit centers.

As Thierauf comments, "The reasons advanced for centralization are generally based on *efficiency*. In contrast, the arguments for decentralization stress *effectiveness* [Thie78]."

Three Elements

Rather than debating these points, Glaser suggests dividing the C-DC issue into three major elements:

- Equipment. Choice, location and custody.
- Staff. Skills, availability and motivation.
- Decision Authority. Clear responsibility for questions of (1) long-range planning, (2) project approval, (3) system design, (4) personnel management and (5) outside-contractors.

Then he discusses seven primary decision factors:

- Total Cost. Development, operations and maintenance.
- User Satisfaction. Services and benefits.
- Personnel Utilization. Scarce technical talents.
- Personnel Hiring. Attraction and retention.
- Project Selection. Rational decision mechanism.
- Resource Sharing. Opportunity for common system.
- Future Adaptability. Technical and economic changes.

As secondary factors, he lists information flow requirements for organizational subunits, need for timely operating data, data communications availability, state of the art in data processing and uniformity of current organizational practices.

Glaser concludes with a guideline for how to allocate tasks between a company's centralized corporate office and decentralized division offices. "Work should be done locally whenever possible; it should be done centrally only when the economics or some other performance requirement dictates so." He reasons that computers exist to solve problems — quickly, unobtrusively and inexpensively. To do so requires close, direct cooperation with those who confront and understand the problems and who are dedicated to solving them. Such people are usually decentralized.

Ready-to-Use Method

A qualitative decision tool exists. Glaser's paper provides many useful insights, but Rockart's paper goes on to provide a packaged, ready-to-use decision method. Rockart's group saw a need for a tool, a "rigorous, preferably quantitative, model" for deciding the decentralization issue. As a start, they built a qualitative model that might be further developed into a quantitative tool. The model has two main features:

- Decomposition Strategy. A three-dimensional approach to breaking the decentralization decision for an entire organization into a series of smaller decisions for organizational subunits.
- Factor Tables. A collection of decision guidelines based on the notion that there are certain universal principles affecting the decentralization decision.

Rockart got his decomposition strategy and factor tables primarily from empirical work — interviews and case studies — but also from management literature. Like Glaser, he made a list of advantages and disadvantages, but with two differences. First, Rockart's list has more than 100 items, broken into categories [see either Rock76b or Rock77]. Second, he lists pros and cons not only for centralized and decentralized systems, but also "distributed systems," defined as "interconnected computers (CPUs) with their own mass storage, each at a different organizational location" and also defined as "partly centralized and partly decentralized."

His decomposition strategy divides an organization's information systems functions into smaller, independent subfunctions for which the C-DC decision is easier to make. The strategy's three dimensions are:

- System Activities. The work of creating and maintaining an information system includes three activities:

  Management. Planning and controlling the system.

  Development. Designing, implementing and installing.

  Operation. Running the system: input, processing and output.
- Organizational Subunits. These might be divisions or departments in a company.
- Application Areas. These are tasks such as inventory, production control, payroll and billing that are performed by nearly every organizational subunit. Rockart terms these "logical application groups (LAGs)."

Each of the three system activities has a different nature, so a decision to decentralize one does not force decentralization of the other two. However, Rockart believes that management is the "overriding process" with primary influence on all of an organization's information systems. So the management process should be indivisible, not separated across LAGs and subunits. But development and operation activities are closely tied to each other and to LAGs and subunits by the need for maintenance and enhancements.

Each LAG in each subunit may need a unique organization for its development and operation. Each LAG is supposed to be a logically separate, cohesive task with only minimal, well-defined information transferred between LAGs. Each LAG has its own

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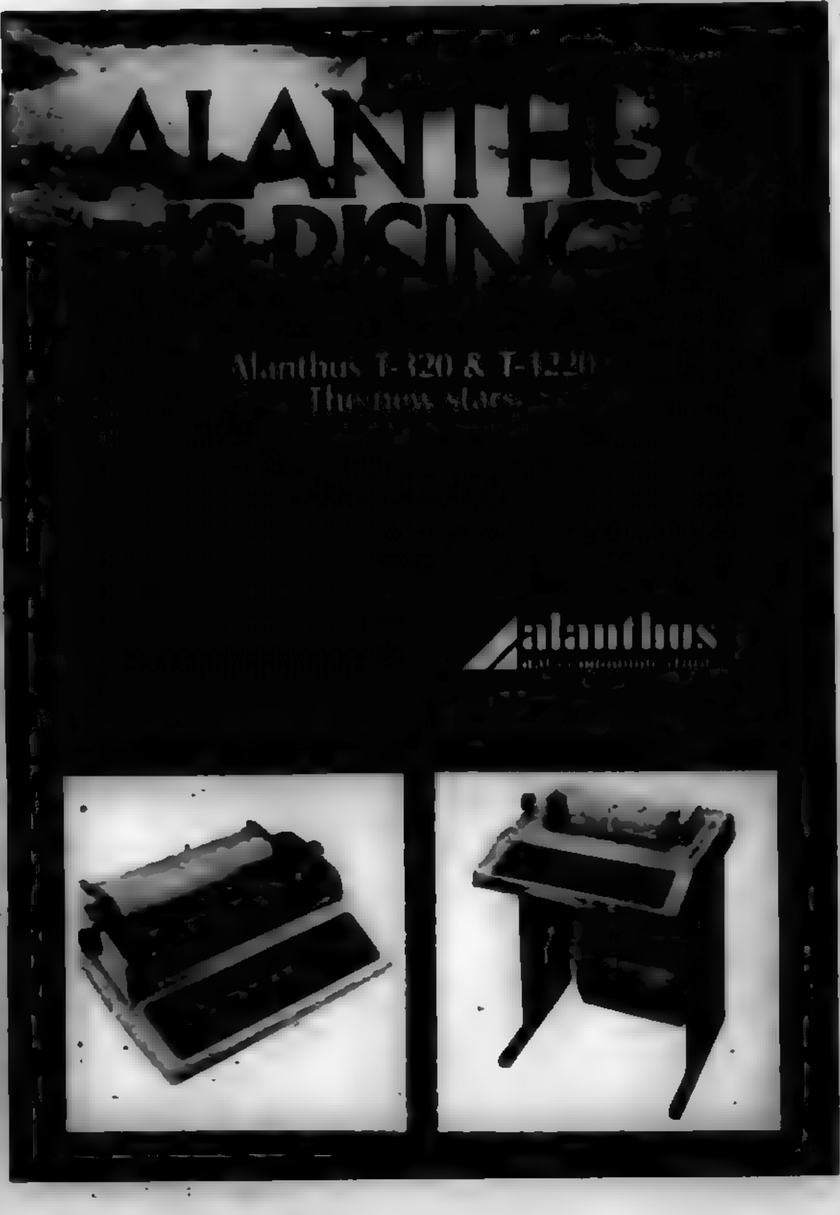

characteristics and requirements. Similarly, organizational subunits are each different and deserve separate consideration.

Rockart's decomposition strategy thus divides the C-DC problem into these independent subproblems:

- **One Management Decision.** A single C-DC decision for all system management activity.
- **Many Development/Operation Decisions.** A separate C-DC decision for the combined development and maintenance of each LAG in each organizational subunit.

Rockart's model then considers each subproblem in greater detail, including resources and subprocesses. For each part, the model determines a range of effective alternatives by applying the factor tables. These tables judge characteristics of each decision unit in terms of direction and strength of tendency toward centralization or decentralization. Finally, the factor tables are "visually integrated" to reach a decision. If the decision maker could assign weights to Rockart's factors, this method could be quantified.

Although Rockart's model has more detail and structure than Glaser's simple guidelines, it also has several weaknesses as a decision tool:

- **Subjective Judgments.** Application of the factor tables is subjective. No metrics or range guidelines are given.
- **Management Bias.** The factors seem to favor the management viewpoint. Important technical issues could be slighted.
- **Overlapping Criteria.** The factor table categories are overlapping. Functional, economic and psychological issues are mixed together and aggregated at several different levels.

> *'A successful decision method for the centralization-decentralization question in distributed computing must solve two unavoidable problems. One is the bewildering complexity of DCS components and design issues. The other is the conflict between viewpoints, such as the performance vs. economics conflict between technicians and managers.'*

The next section presents a decision method that partly avoids these problems.

A quantitative decision tool exists that balances several viewpoints. A successful decision method for the C-DC question in distributed computing must solve two unavoidable, real-world problems. One is the bewildering complexity of DCS components and design issues. The other is the conflict between viewpoints, such as the performance vs. economics conflict between technicians and managers.

Slonim, Schmidt and Fisher explicitly recognize both problems and propose a decision method to solve them [Slon79]. First, to reduce the multidimensional complexity of a DCS, they focus on the data base dimension. To distinguish between degrees of centralization or decentralization, they define the 11 types of distributed data base systems that were listed in Part 1 of this series.

Second, they organize DCS characteristics into seven evaluation groups. Each group contains several factors. Each factor in each group is weighted on a five-point scale. The purpose of their scheme is to reconcile the differences between managers and technicians "by providing a common meeting ground for determining priorities and trade-offs." The seven evaluation groups are:

1) Operational characteristics.
2) Performance characteristics.
3) Update characteristics.
4) Retrieval characteristics.
5) Economic characteristics.
6) Data base size.
7) User characteristics.

The authors then combine the 11 system types and seven evaluation groups in a series of matrices. For each evaluation group, they present a rectangular matrix that has the several factors along one axis and the 11 system types along the other. Each matrix position contains a value between zero and five that indicates to what degree that particular type of data base distribution enhances the evaluation characteristic. Finally, the factor weights are applied, and scores are totaled for each system type.

This quantitative decision method has the advantage that the weights and scores can be adjusted for the circumstances of particular applications. But the method has the disadvantage that there can be substantial disagreement

(Continued on In Depth/8)

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IN DEPTH

(Continued from In Depth/7)

over those values. The weights can be disputed when system objectives are disputed.

The matrix values depend on interpretation because, as mentioned in Part 2, for each DCS advantage, there seems to be a counterpart disadvantage. Furthermore, the group and factor definitions in the paper are often ambiguous. They need clarification before the method can be widely used.

Using the particular weights and matrix values in the paper, the authors reach some interesting general conclusions:

- **Partitioned systems are best balanced.** Their strong areas are operations, updates, economics and user characteristics.
- **Replicated systems work best in special cases.** They have many strengths, but should be avoided when data base size is volatile.

Distributed computing bypasses many points of the C-DC debate. Kaufman points out that by combining new technology and new design concepts, distributed computing makes possible data processing configurations that, in a classical sense, are neither centralized nor decentralized [Kauf78]. He says distributed computing "seems to offer the opportunity to gain the advantages of centralized processing in an environment that has a decentralized personality."

If Kaufman is right, if distributed computing can suit many organizational styles at once, then the decentralization debate will subside and become more rational. The element of emotion will be removed, and decisions will be made on functional and economic grounds.

Kaufman goes further. He argues that even when a straightforward economic analysis is unfavorable to distributed computing, the analysis can be outweighed by the ability of distributed computing "to create happier relationships." He says that local computing is happier for the users than centralized computing, even when the former is less efficient or slightly more expensive.

To achieve that happier state will require changes in most organizations, and organizational change requires strategic planning. "The key to the successful use of distributed information systems will involve the proper blending of centralized controls and decentralized responsibilities [Wins-78]."

There are four ways to manage computing resources and applications [Stat78]:

- **Classic Monolithic Approach.** This approach centralizes both the management of computing resources and the management of computing applications. Data processing facilities are totally centralized, using mostly batch processing and central data entry.
- **Service Bureau Approach.** This approach keeps resource control centralized, but decentralizes management of computing applications. Computing facilities are accessed by either over-the-counter job submission, remote batch job entry or dumb terminals.
- **Vertical Distribution Approach.** The approach reverses the previous one. Management of computing resources is distributed, and local processing is supplemented and extended by a central computer facility. Applications management is centralized. Users access central master files through smart terminals and satellite computers.
- **Horizontal Distribution Approach.** In this approach, computing resource management is distributed and application management is decentralized. The systems have an end-user orientation and use distributed data bases and networking.

Of these four, the classically centralized approach applies to most organizations, and some have set up service bureaus or are evolving through vertical distribution. But almost none have achieved a mature, horizontal DCS.

This section has suggested how to analyze the key strategic design issue of centralization vs. decentralization. The next section goes on to discuss other aspects of the general process of strategic planning for distributed computing.

> *"With technology having reached its present state, I think every corporation should have a task force at the highest level to determine its strategy in distributed processing."*
>
> — James Martin, 1978.

(Continued on In Depth/14)

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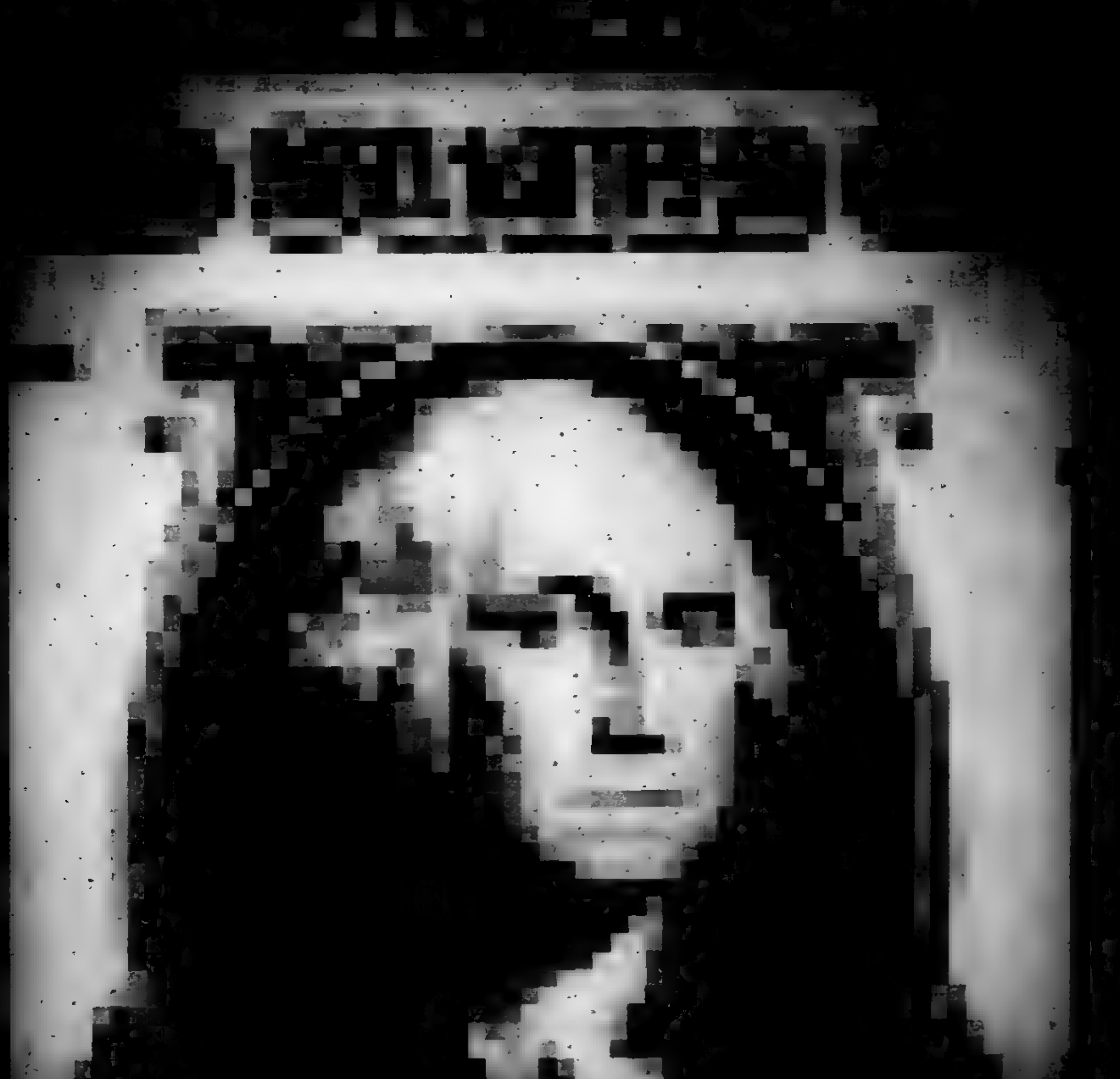

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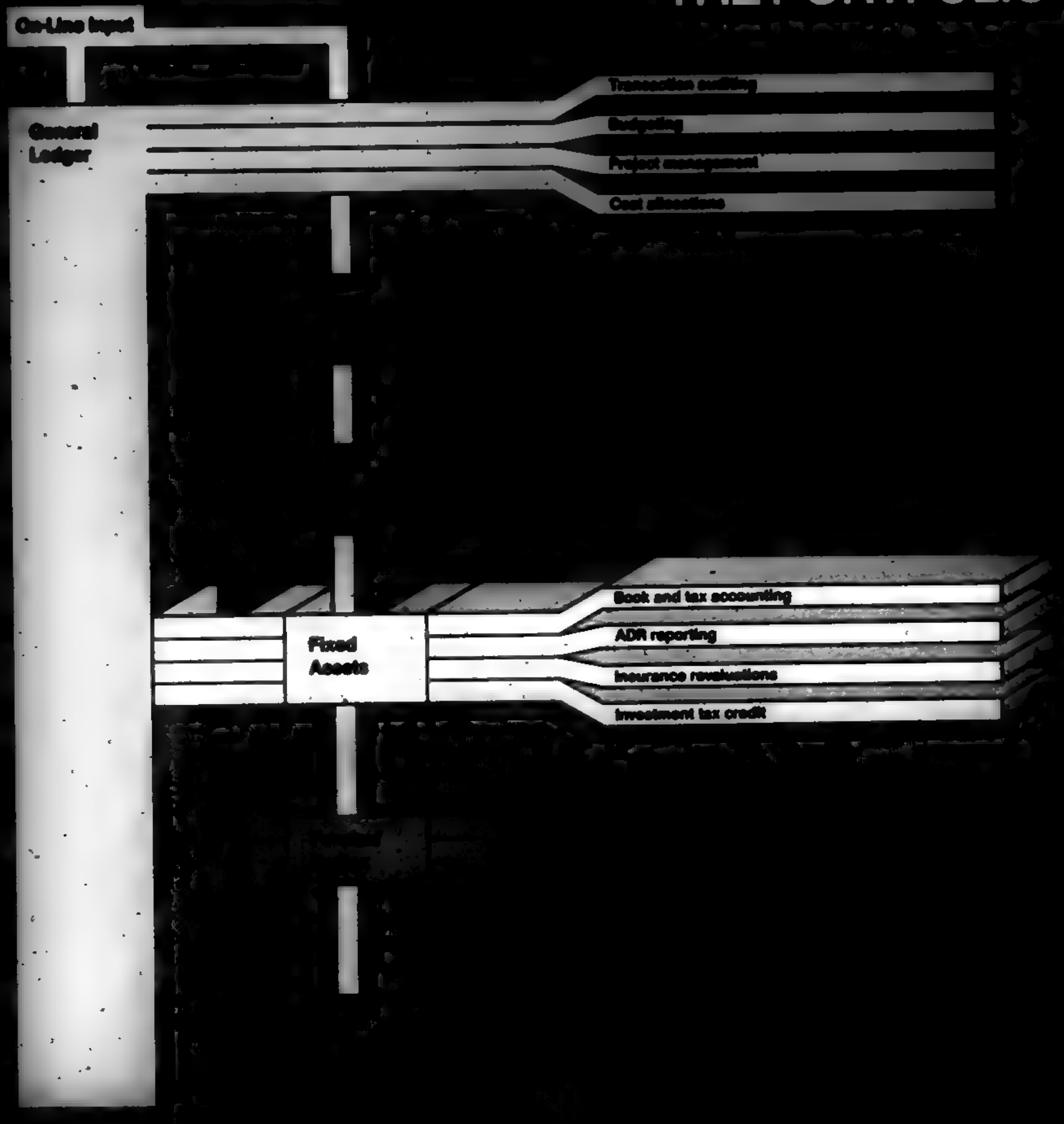
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IN DEPTH

(Continued from In Depth/8)

Rockart identifies the setting of strategy and standards as the key management task. Strategic planning, more than any other process, determines the long-term success of an organization's computing systems. Rockart's decision method for centralization vs. decentralization is a tool for part of that strategic planning process.

Other authors have the same thought about strategy. They say that, although it seems obvious, organizations must make an effort to plan, because usually nothing turns out well without a plan.

In most cases, the authors do not say how to make strategic plans. Computing literature contains planning methods for handling the details of software engineering rather than global organizational issues. Management literature, until recently, did not focus closely enough on computing problems to be applicable to designing distributed computing systems.

This section reviews five recent articles by professional managers who are deeply involved in computing. Each article tells how to do some part of strategic planning for distributed computing.

Head outlines what should be in a strategic plan for information systems and how to organize the planning effort [Head 78].

Nolan outlines the organizational stages of growth in data processing and gives explicit benchmarks for determining what stage a particular organization reached [Nola79].

Appleton analyzes the two basic strategic approaches to managing distributed computing systems [Appl78].

Statland details how distributed computing changes the roles and staff requirements of the user and MIS organizations [Stat78].

Macintosh and Daft present research findings that offer a way to understand user information needs at a strategic level [Maci78].

These five sets of planning guidelines, when merged with the cost-management guidelines that follow in Part 4 provide the basis of a strategic planning method for DCS. An overall structure, into which the various guidelines could be assembled, can be found in the extensive text by Steiner [Stei69]. His book "presents actual how-to-do-it programs on starting and maintaining better long-range planning."

In Head's view, strategic planning sets the basic, long-range direction a system should take, anticipating the type and volume of computing in the next five to 10 years. In contrast, a short-range, tactical plan concentrates on ensuring that sufficient computing resources will be available to get the work done in the next budget year or two. Put another way, strategic plans deal with the overall problems of broad-scale designs as opposed to immediate implementation problems in the field.

To set strategic plans, the system planner must study three things, all of which contain uncertainties:

- **Organizational Policy.** Since a system must match the organization it serves, the planner must consider the goals of management, employees, stockholders, constituents or users.
- **External Forces.** The system plan must anticipate changes in the environment due to many causes: competition, laws, fashions and innovations.
- **Future Technology.** The planner must gauge what systems tools and building blocks will be available during the planning period.

Head outlines the contents of a strategic systems plan, and similar outlines are found in Steiner. Head also lists 10 ideas that contribute to sound strategic planning:

- **Small, Rapid Steps.** A series of payoffs and checkpoints rather than one grand, ultimate target.
- **Alternative Courses.** A range of options to counter uncertainty.
- **Organizational Interfaces.** A link that synchronizes with other plans.
- **Top Management Briefings.** A document format intelligible to decision-making executives.
- **Formal Reviews.** A mechanism for reiterating the planning process.
- **Utilization Forecasts.** A system for determining the useful life of installed equipment.
- **Fixed Responsibilities.** A structure that focuses and motivates planning efforts.
- **Rotating Assignments.** A way to expose key people and gather fresh insights.
- **Research and Development Budgets.** A program to evaluate new equipment and techniques.
- **Intelligence Activities.** A review of comparable and competitive systems.

Six Growth Stages

Before setting a strategy, an organization should determine where it is and what lies ahead. Nolan has a method for this. He defines six stages of growth from first usage to maturity.

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The stages are defined in terms of four computing growth areas: the applications mix, the data processing organization and control structures, and user awareness. The key step is the stage 3 "transition point" from computer management to data resource management. Quickly summarized, the six stages are:

1) **Initiation.** Building low-level, cost-reduction systems.

2) **Contagion.** Widespread, uncontrolled user innovation.

3) **Control.** Reorganizing to professionalize computing.

4) **Integration.** Rebuilding with data base and telecommunications tools.

5) **Data Administration.** Sharing data resources.

6) **Maturity.** Matching completed systems with organizational information flows.

'Appleton contends that a DCS should use functional management control. "Given the complicated interlinkage and interdependencies of networks, the appropriate management strategies are not applications-oriented. Indeed, to use an application approach is to be counterproductive to the basic objective, which is to construct systems that can survive the natural dynamics of the business."'

To reveal the current stage, Nolan gives two sets of benchmarks. The first set, which looks at the overall organization, uses two measures: the historical ratio of DP expenditures to organizational growth, and the mix of DP technologies in use. The second set seperately characterizes each of the four growth areas.

Nolan's benchmarks are important for two reasons. First, they can be quantified and objectively applied. Second, as Nolan reminds us, managers know that "if you can't measure it, you can't manage it."

Finally, Nolan has a strategy for how strongly financial and performance management controls should be applied to computing and data resources at each strategic growth stage. The balance between control and "slack" (lack of control) determines the rate of computing growth. The proper balance at each stage enables the four growth areas to evolve together.

Process-Oriented Strategy

Nolan's stage theory is a method for planning how much management control to apply and when to apply it. Appleton complements Nolan by analyzing two strategies for how or where to apply management attention:

- **Project-Oriented Strategy (Application Control).** Views the computing environment as a set of unique, customized, nearly independent applications, developed to meet distinct sets of information needs. Each application is seperately engineered, developed and maintained.
- **Process-Oriented Strategy (Functional Control).** "Attempts to ignore the individualities of computer applications in favor of their similarities." This strategy develops standard processes to perform input, output and storage and processing (i.e., data base) functions. These three functions are necessary to accomplish any application. Yet these three differ in needed skills, technology and resources, and each requires individual management attention to perform well.

Appleton contends that a DCS should use functional management control. "Given the complicated interlinkage and interdependencies of [DCS] networks, the appropriate management strategies are not applications-oriented. Indeed, to use an application approach is to be counterproductive to the basic objective, which is to construct systems that can survive the natural dynamics of the business. Actually, the ultimate objective of distributed data processing is not just to survive, but to help the business respond more quickly and cost-effectively to natural forces for change. Applications strategies have difficulty just surviving."

Appleton implies that process-oriented management control is what enables a DCS to achieve the best of both centralization and decentralization. His arguments can be summarized as follows:

- **Cost Control.** Functional control allows standard costing through identification, isolation and separation of overhead expenses and direct expenses for services. Consequently:
- Overhead can be centralized for economy of scale.
- Direct services can be decentralized for better use.
- All planning can use comparable standard cost units.
- **Change Control.** With change management as a design criterion, a system with standard input, output and data base processes can provide:
- Rapid implementation or customization to satisfy decentralists.
- Compatibility to satisfy centralists.
- Easier maintenance to satisfy all users.

Realignment, Retraining

Evolution from centralized to distributed modes of computing management strongly impacts staff assignments and skill requirements. Statland describes how he would realign the computing staff. In the traditional centralized mode, the computing manager has four responsibilities. Two are line functions:

- **Development.** Design, programming and maintenance for applications.
- **Production.** Data entry, job control and computer operation.

The other two are staff functions:

- **Technical Support.** System software maintenance, data communication and procurement.
- **Quality Assurance.** Definition and enforcement of development standards.

As computing is distributed, Statland's strategic plans place development and production "with the user when it is appropriate, yet still provide overall coordination and control through a central MIS function that promulgates standard procedures for systems development, testing and operating practices and exercises annual budgetary approval over all development projects." There are two main results:

- **Line functions decentralize.** Production functions either disappear or are done by users:

Data Entry. Done by the user at his terminal.

Job Control. Incorporated in software.

Computer Operation. Done by local

(Continued on In Depth/19)

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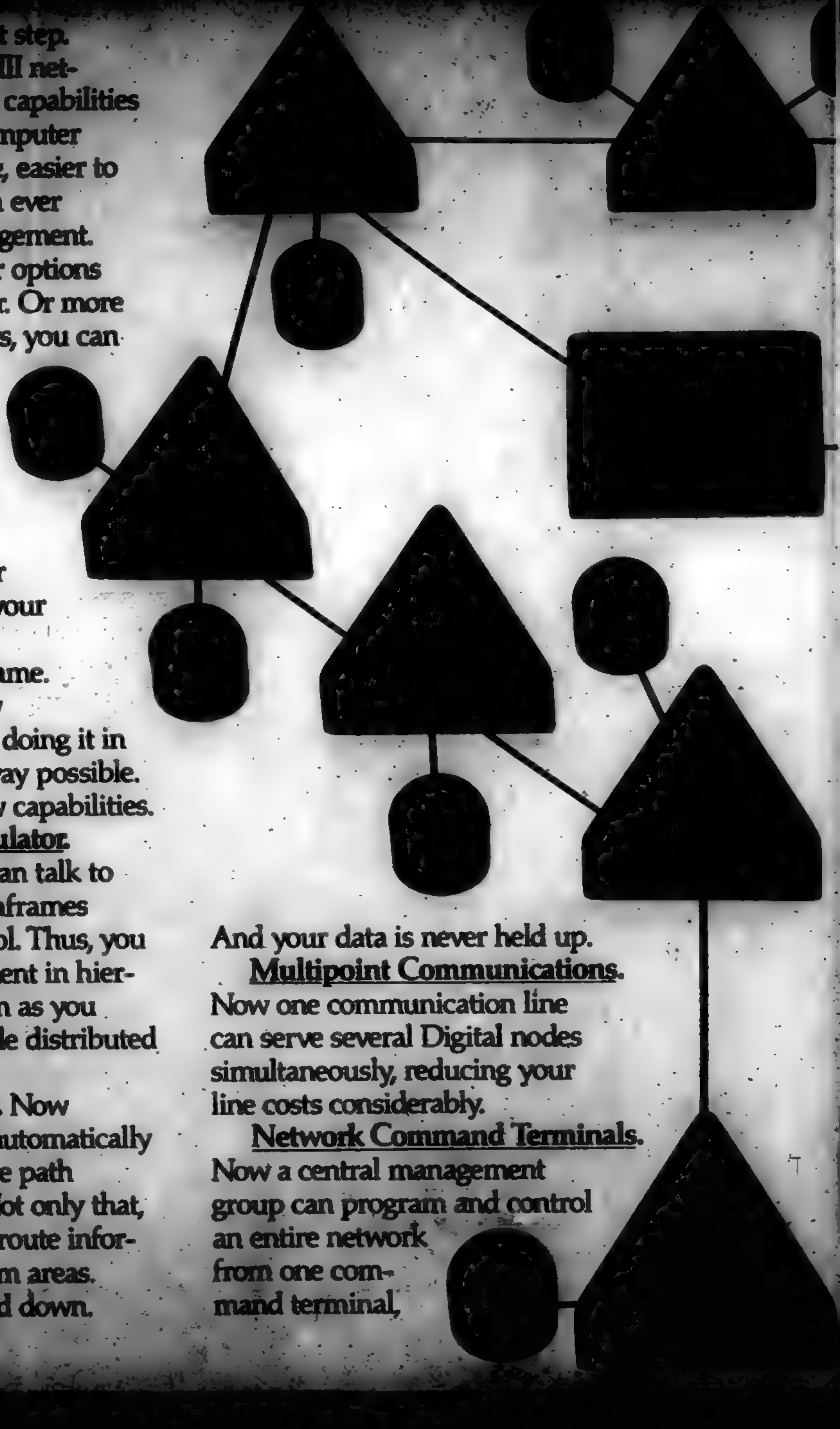

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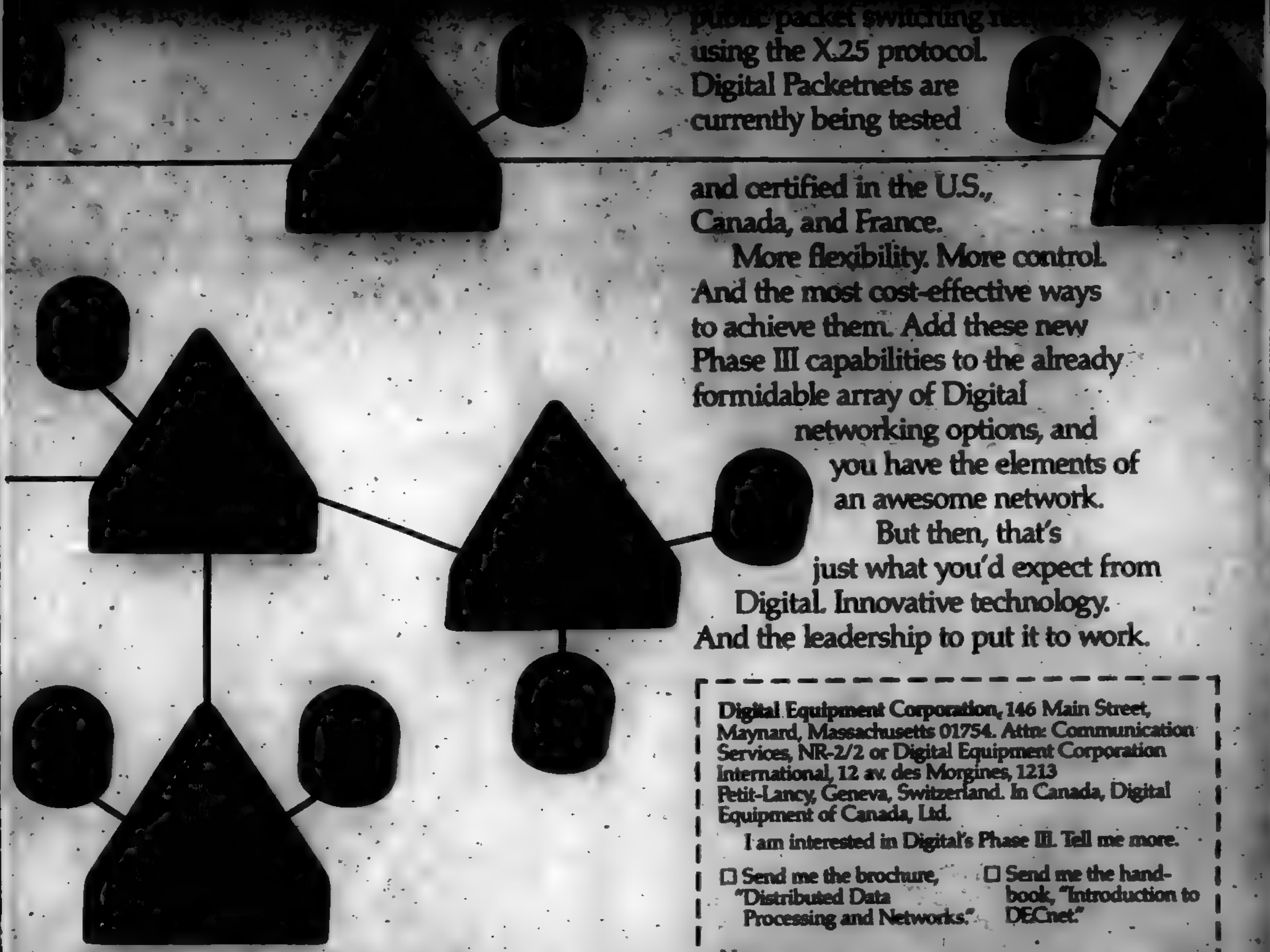

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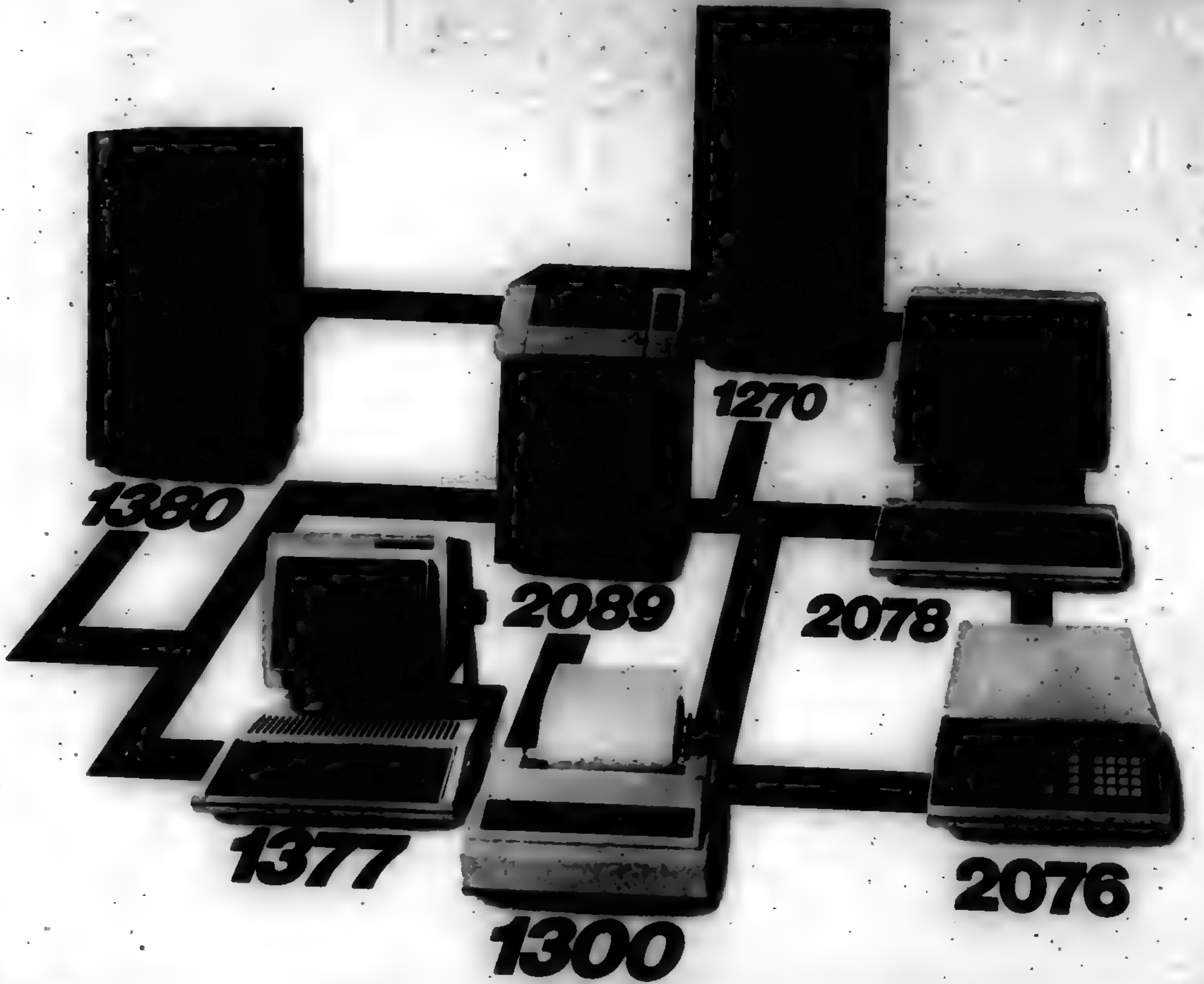

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IN DEPTH

(Continued from In Depth/15)

personnel.

- **Staff functions intensify.** The old central organization shrinks in size but becomes more skilled. It focuses on technical specialties, system evaluation and overall planning.

Wenig advocates sending everyone — line and staff people, managers and technicians — through a common course of "awareness education" in distributed computing [Wen179]. His goal is a common basis of knowledge among the professional staff and the elimination of popular misconceptions. For the technicians, he recommends additional, detailed training. For this training, he suggests a blend of professional seminars, vendor training, professional and vendor literature, visits to distributed computing users, attendance at professional conferences and self-study materials.

Work Technology, User Needs

Although most experts agree that an information system should match users' needs, matching is usually approached in terms of organizational structure. Macintosh and Daft feel that this approach overlooks "the relationship between the technology of a work-unit and the amount and type of information it requires to perform effectively." By technology, the authors mean "the knowledge, procedures and techniques used to perform a given organizational task." So they present a way to classify work-unit technology and pick a matching information support strategy.

They use two dimensions for work-unit technology. *Task knowledge* means how well the work is understood — either *well* where there are objective procedures, instructions manuals or standards; or *not well* where accumulated experience and judgment are relied upon. *Task variety* means the frequency of unexpected problems — either high or low. This yields four categories:

- **Programmable** (well understood/-low variety). Routine work such as assembly line and payroll.
- **Professional** (well understood/high variety). Technical work such as accounting, engineering and law.
- **Craft** (not well understood/low variety). Creative work such as glassblowing, winetasting and music.
- **Research** (not well understood/-high variety). Exploratory work such as high-energy physics and policy analysis.

Three Dimensions

Macintosh and Daft use three dimensions to characterize information conveyed to work unit by a system. *Amount* means how much is needed to execute work unit tasks — either large or small. *Focus* means how imprecise the information is or how many interpretations it can have — either single or multiple. *Massage* means how much the work unit deliberates over the information or the pace of use — either quick or slow. In their paper, the authors overlap amount with massage and distinguish four categories:

- **Concise** (small amount and quick use, single focus).
- **Elaborate** (large amount and slow use, single focus).
- **Cursory** (small amount and quick use, multiple focus).
- **Diffuse** (large amount and slow use, multiple focus).

Macintosh and Daft empirically verified that the amount of information used increases with both task variety and task knowledge, that information focus becomes sharper as task knowledge increases, and that information massage slows as task variety increases. Thus the proper match between the basic information system design and the work-unit technology is concise for programmable, elaborate for professional, cursory for craft and diffuse for research. Based on their research, Macintosh and Daft offer several design guidelines, which can be summarized as follows:

- **Technology Over Style.** Focus on work-unit technology rather than individuals. Technology endures while managers come and go.
- **Technology Over Change.** Focus on matching the information system to work-unit technology before worrying about organizational change.
- **Big Mistakes.** It can be difficult to identify and understand precisely the user needs. However, even in difficult cases, the work-unit technology concept should be applied to avoid major

(Continued on In Depth/20)

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IN DEPTH

(Continued from In Depth/19)

errors of underbuilding or overbuilding.

Next Week: Analysis and Synthesis.

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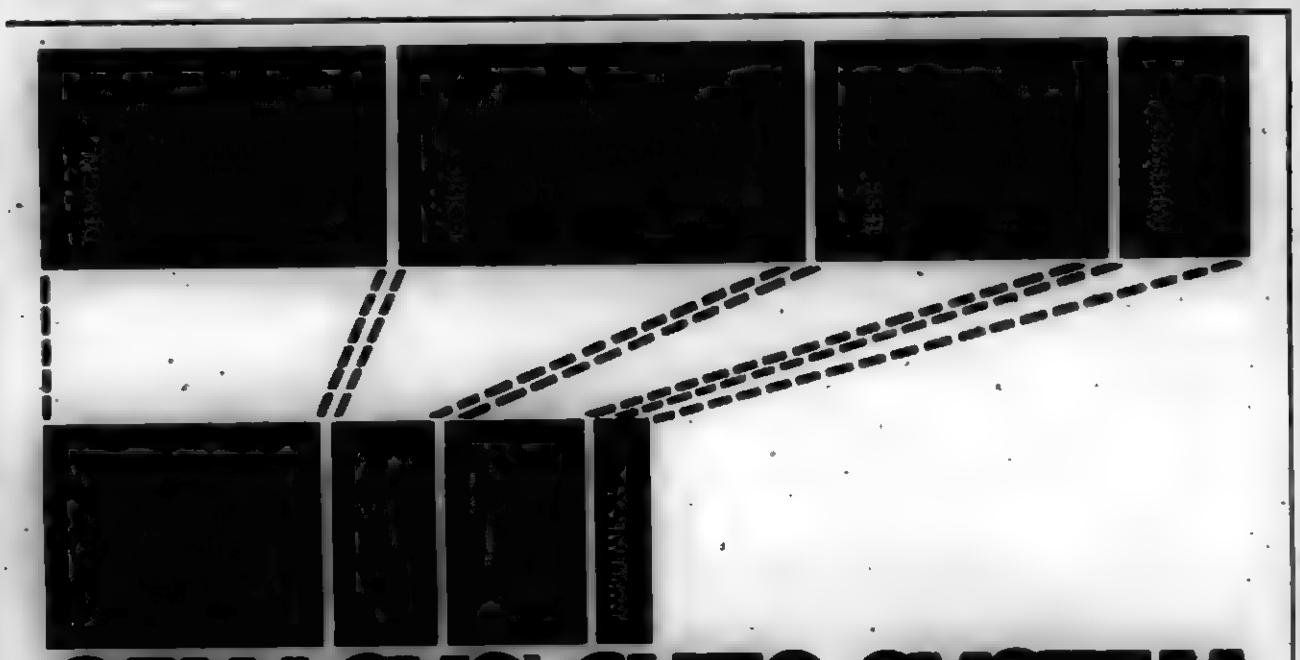
In addition to his responsibilities at Mitre, Shirey teaches in the Management Science Department of George Washington University.

Shirey holds B.S., M.S. and Ph.D. degrees from the University of Wisconsin and an M.B.A. from the University of Southern California.



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Magnuson CPU Outruns 4341 In Benchmark

By Jeffry Beeler
CW West Coast Bureau

BERKELEY, Calif. – A prototype of Magnuson Computer Systems, Inc.'s two most powerful IBM-compatible processors reportedly ran 25% faster than an IBM 4341 Group I in a recent Magnuson-supervised benchmark test.

During the same evaluation, the prototype machine also reportedly provided as much as twice the throughput of Magnuson's own low-end M80/4 CPU, which belongs in roughly the same performance class as IBM's 370/148.

The benchmark test took place at Magnuson's San Jose, Calif., headquarters and involved an experimental version of the company's M80/42 and 43 mainframes, which are slated for first customer shipments late this year. Results from the test appear to confirm Magnuson's original performance claims for the two machines, both of which were announced in March 1979.

DLA Assignment

Magnuson conducted the benchmark test for the University of California's Division of Library Automation (DLA), an administrative body whose main mission is to automate the library services for the state's nine-campus university system. The DLA's chief assignment at present is to implement a "public union catalog information system" that is expected to integrate the university's vast and widely dispersed bibliographic holdings into a single, centralized data base accessible from any of the nine campuses' more than 100 libraries.

Tentatively scheduled to be implemented by 1982 or 1983, the proposed intercampus library system will represent a significant upgrade from the DLA's existing configuration, which is built around dual 8M-byte M80/4s supported by IBM's OS/360 operating system. The current configuration also embraces six 200M-byte Control Data Corp. 3330-type disk units and 14 of CDC's 625M-byte 3350-type disk units.

In an attempt to gauge how much processing power the university's future centralized library system will require, DLA

(Continued on Page 58)

Honeywell DPS-8 CPUs Gain Mid-Range Models

PHOENIX – Honeywell, Inc. has added to its large-scale DPS 8 processor line two mid-range computer systems that can be used as modular additions by current system users or high-performance entry points by future users.

The DPS 8/62 is a single-processor machine which offers approximately 30% more power than the firm's DPS 8/52, introduced last October, the vendor said. However, the 8/52 can be field-upgraded to an 8/62 and the 8/62 can, in turn, be boosted to the company's top-of-the-line 8/70.

The 8/62 is a free-standing central system and consists of a CPU with from 1M byte to 8M bytes of main memory, a system control unit (SCU) and an I/O multiplexer (IOM) with 35 channel function slots expandable to 54 slots.

Field Upgrades

The DPS 8/44D is a dual-processor system that can reportedly be field-upgraded to a full tandem system. The double-CPU system offers 76% more power than a single DPS 8/44 which is part of the firm's established line. The two CPUs share the same memory up to 4M bytes, as well as the SCU, and IOM.

By adding another SCU and IOM, the 8/44D becomes a full tandem system operating under a single copy of the separately priced Gcos III or Gcos 8 operating system. In the tandem configuration, components of each of the two complete central systems are present and interface with each other, reportedly boosting system power.

Both the DPS 8/62 and 44D make extensive use of microprocessors, large-scale integration circuitry and enhanced logic packaging techniques, a spokesman said.

The DPS 8/62 with 1M byte of memory costs $759,135 or can be rented monthly on a five-year lease for $20,816. The processor will be available for delivery in the third quarter of 1981.

The DPS 8/44D with 1M byte of main memory sells for $424,00 and rents for $10,520/mo. This machine will be available in the first quarter of next year.

Additional SCUs and IOMs sell for $27,050 and $81,380, respectively, the spokesman said from the firm at P.O. Box 6000, Phoenix, Ariz. 85005.

Univac 1100 Uniprocessors Bow

BLUE BELL, Pa. – Univac recently expanded its 1100/60 mainframe line by adding uniprocessor versions of its multiprocessor E1 and E2 computers, introduced in March.

Like the 1100/62 E1 and E2, the 1100/61 E1 and E2 both have an 8k-byte cache memory. The processors also have 2M bytes of main storage, an I/O processor and a system support processor with maintenance controls, a spokesman said.

The uniprocessor E1 is said to provide a 45% performance improvement over the firm's entry-level C1 machine, while the E2 with its extended instruction set boasts a 40% greater performance than the C2. The C1 and C2 processors were launched in June of last year to kick off the 1100/60 series line.

Although the recent uniprocessor additions are reportedly capable of reaching new performance heights, the machines also carry prices 50% to more than 60% higher than the entry-level computers. The E1 is priced at $11,343/mo, including maintenance, or can be bought for $518,975. The E2, in a similar hardware configuration, leases for $12,139/mo and sells for $555,545.

Both the 1100/61 E1 and E2 are scheduled for delivery in the first quarter of 1981. The processor additions bring to 10 the number of computers in the 1100/60 series.

Further information on the processor series can be obtained from Univac at P.O. Box 500, Blue Bell, Pa. 19424.

Remote Service

ORLANDO, Fla. – Univac has announced a remote system maintenance service for users of its 1100 series mainframes.

The Remote Support Center, located in Roseville, Minn., is staffed 24 hours a day, seven days a week. Software specialists are on line Monday through Friday from 7 a.m. to 9 p.m. Central Standard Time.

Currently, the service is available only to 1100/60 users, but it will eventually be available for all 1100 systems, the vendor said.

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NBS Seeking Comments On Magnetic Tape Standard

WASHINGTON, D.C. — Comments on a proposed federal standard for a magnetic tape cassette used in information interchange are being solicited by the Commerce Department's National Bureau of Standards (NBS).

Proposed for issuance as a Federal Information Processing Standard (Fips PUB), the standard covers "Magnetic Tape Cassette for Information Exchange, Dual-Track Complementary Return-to-Bias (CRB) Four States Recording on 3.81 mm (0.150 in.) Tape." It is based on a proposed voluntary industry standard that has been developed and passed by Technical Committee X3B5 of the American National Standards Institute.

Before submission of the proposal for review and approval by the Secretary of Commerce, the views of manufacturers, federal agencies, the public and state and local governments will be considered.

A copy of the draft standard's technical specifications can be obtained from the Standards Administration Office, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234. To be considered, comments on the proposed standard must be received by the above office on or before Nov. 25.

Magnuson Prototype Shown 35% Faster Than IBM 4341

(Continued from Page 57)

officials recently commissioned Magnuson to benchmark its prototype M80/42 and 43 processors in a test that consisted of multiple runs of three jobs. Two of the jobs were compute-bound and one was I/O-bound.

One of the compute-bound jobs came directly from the division's production stream and involved reformatting and reducing bibliographic data that is stored archivally on tape and then loaded into a data base, according to the DLA's computing resources manager, Clifford Lynch. The task entailed the compiling and execution of a PL/I program.

The other compute-bound job involved a Snobol IV program designed to count character strings. At the DLA, such a program would typically use variable-length character encoding to compress the division's huge bibliographic data base and thus conserve disk space and minimize mass-storage costs, Lynch explained.

The I/O-bound job, meanwhile, basically involved transferring data from tape to disk at a rate that closely matched the benchmarked processor's channel speed, he explained.

In the compile-and-execute and the I/O-bound jobs, the benchmark test measured the amount of time the prototype Magnuson machine took to complete the assigned tasks. In the job involving character-string counts, by contrast, the test measured the number of records the CPU counted in exactly one hour.

Magnuson's test supervisors then noted the results from the three jobs and compared the figures with performance specifications they had derived earlier from a similar benchmark of IBM's 4341.

The comparisons revealed that the prototype Magnuson processor delivered 35% more throughput than the 4341 Group I and 5% less performance than the 4341 Group II, a Magnuson spokesman said.

Details Unavailable

In a subsequent *Computerworld* inquiry, Magnuson was asked to supply performance figures that showed specifically how the elapsed times for the prototype mainframe and the 4341 compared for each of the three test jobs. The company was unable, however, to make the requested details immediately available.

Comparison of the benchmark test results also revealed that, in the two compute-bound jobs, the prototype Magnuson machine boasted significantly greater power than the DLA's existing M80/4. In the I/O-bound job, however, the two processors proved roughly equal in performance, Lynch said.

Here are the specifics of how the two Magnuson machines compared in each of the three test categories:

- In the compile-and-execute job, the experimental processor's elapsed time totaled 24 minutes, compared to 42 minutes for the DLA's M80/4.
- In the I/O-bound job that involved restoring a disk volume from tape, both CPUs took roughly eight to nine minutes to perform the same assigned task.
- In the compute-bound job emphasizing character-string counts, the prototype mainframe counted 13,300 records during an hour, whereas the M80/4 counted 7,100.

The results of the recent benchmark test proved of considerable interest to the DLA's computing officials, who have reportedly ordered two M80/43s to supplement or perhaps even replace their dual M80/4s. The Model 43s are expected to play a key role in the functioning of the DLA's proposed universitywide cataloging system.

When the system becomes fully operational two or three years from now, users will be able to consult the bibliographic holdings at any of the nine campuses from a single location.

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For Stand-Alone or Network Use

Datasystem 300s Get Entry-Level Model

MAYNARD, Mass. – Digital Equipment Corp. recently introduced an entry-level member to its Datasystem 300 small business computer line that can be used as a stand-alone system, network node or store-and-forward terminal.

The Datasystem 315 is based on the firm's PDP-11/23 microprocessor and is available with a choice of six programming languages and two operating systems.

The unit has 64K bytes of memory, expandable to 256K bytes, and employs a VT100 CRT terminal and dual RX02 double-density floppy disk drives for 1M byte of mass storage, a spokesman said.

Two Operating Systems

The Datasystem 315 is supplied with either the firm's commercially oriented CTS-300 operating system or with the RT-11 general-purpose operating system.

CTS-300 includes the business-oriented Dibol-11 programming language, Decform program package for CRT screen operations and sort and file-handling utilities, the spokesman continued.

RT-11 offers a choice of five programming languages, including Fortran IV, Basic, Focal and APL, and can be used for real-time applications.

Geared for future expantion, the system can accept additional floppy disk drives and terminals, as well as communicate with other computer systems.

The system can utilize Decnet, DEC's networking software, and can also communicate with IBM mainframes by using RDCP 2780/3780 or 3721 Dicam emulation packages.

Finally, both the CTS-300 and RT-11 operating systems are said to enable users to develop software that can migrate to larger systems as needs dictate, the spokesman pointed out.

The 315 can be fitted with an optional wheeled stand that allows users to stack system components or move the entire system from one area to another.

Prices for the Datasystem 315, including an LA120 180 char./-sec printer and CTS-300 operating system, start at $17,600. Initial deliveries are scheduled for next month, the spokesman said from the firm at 146 Main St., Maynard, Mass. 01754.

Memorex Adds Two Flexible Disks

SANTA CLARA, Calif. – Memorex Corp. has announced two additions to its flexible disk product line: a double-density 5.25-in. mini disk and a single-density 5.25-in. mini disk with hub rings.

While the double-density version is available in both single- and double-sided format, the single-density, single-sided version with hub rings was developed as an answer to drive-related hubbing problems on some 5.25-in. drives, according to a company spokesman.

Such problems include improper centering and hub hole damage, he explained. Each product is available in either soft sector (unformatted) or in 10 or 16 hard sector versions.

The single-sided double-density version costs $4.75/disk, while the double-sided double-density version costs $5.50. The single-sided single-density version costs $4.70.

Memorex is located at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Show Theme: Minis, Micros

NEW YORK – The fourth annual National Small Computer Show, opening here Oct. 30 and running through Nov. 1, will feature minicomputers and microcomputers of interest to business people and hobbyists alike.

According to show manager Ralph Ianuzzi, this year's show looks like it will be 20% larger than last year's.

Registration fees are $10/day for show and lecture admission. The five-hour tutorial is $220, which includes three-day show registration and all course materials. The tutorial will be offered Oct. 29-Nov. 1.

Further details and a complete tutorial outline are available from the show office at 110 Charlotte Place, Englewood Cliffs, N.J. 07632.

Microtek Printer Priced Under $1,000

SAN DIEGO – Microtek, Inc. has entered the less-than-$1,000 printer market with its MT-80 series, 125 char./sec, 80- and 132-column bidirectional printer.

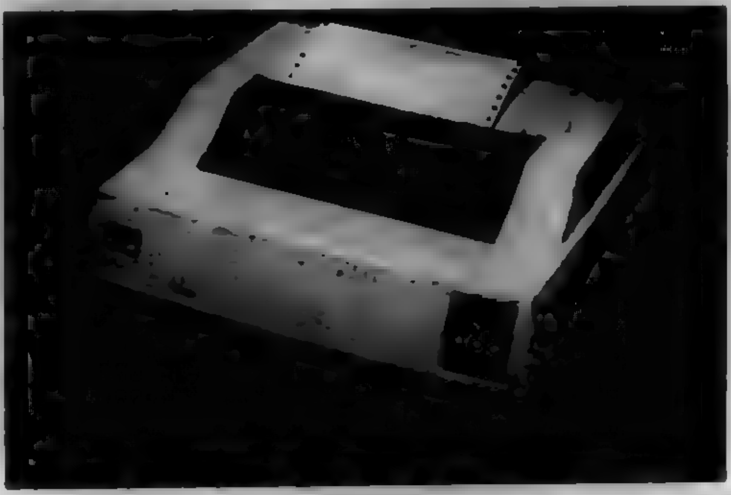
The MT-80 series printer supports the 96-char. upper- and lowercase Ascii set in three software-selectable fonts – of 5, 10 and 16.5 char./in. – on original plus three copies.

The microprocessor-controlled printer contains a 240-char. buffer, with additional data buffers to 3K optionally available in 1K increments.

In addition, a self-diagnostic program is automatically run on power up.

Life expectancy of the print head is 100 million characters with a mean-time-between-failures of one million lines, according to the firm.

The MT-80 series printer comes in two versions: the MT-80P Centronics-compatible parallel interface version for $795 and the MT-80S serial RS-232 version priced at $895. Microtek is at 9514 Chesapeake Drive, San Diego, Calif. 92123.



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R.W. Bare, Assistant Corporate Controller, J I Case, A Tenneco Company, Racine, Wisconsin

The IBM Series/1 is a family of small, powerful, general-purpose computers for both distributed processing and standalone use. At over 50 company-owned stores nationwide of J I Case, a leading manufacturer of construction equipment and farm machinery, Series/1 systems are resulting in greater customer satisfaction through faster service on crucial parts orders.

"Through a visual display at the parts counter, a store clerk can gain full information on the availability of a part in that store," says R.W. Bare, assistant corporate controller. "If the part is ordered, the Series/1 prints a picking ticket and produces an invoice to accompany the order.

"By speeding order handling and accounting procedures, the system has cut related workloads in half in some stores, helping to support a 10% to 20% growth in parts sales in the stores in which it is used. This productivity benefit alone justifies the system for us. Most important, by transmitting consolidated data daily to Case headquarters, it gives management greater control over financial and production planning."

The IBM Series/1 is small enough to fit almost anywhere, flexible enough to manage a variety of data processing tasks and powerful enough to handle both remote terminal and central information processing. It features online capability so that information is available to

"Our IBM Series/1 network helps meet growing customer needs for parts and service while increasing productivity up to 30%."

you at any terminal just as quickly as it's processed. And because it's modular, Series/1 is ready to grow when you are. What's more, Series/1 is supported by an extensive service organization that enables IBM to respond promptly to your service needs, even in remote areas.

To learn more about the Series/1, get in touch with your nearby IBM General Systems Division office. Or write IBM, P.O. Box 2068, Atlanta, GA 30301.

The remarkably flexible IBM Series/1 offers a range of modular features that allows you to build the data processing system you need at a low cost.

IBM.

A small computer can make a big difference.

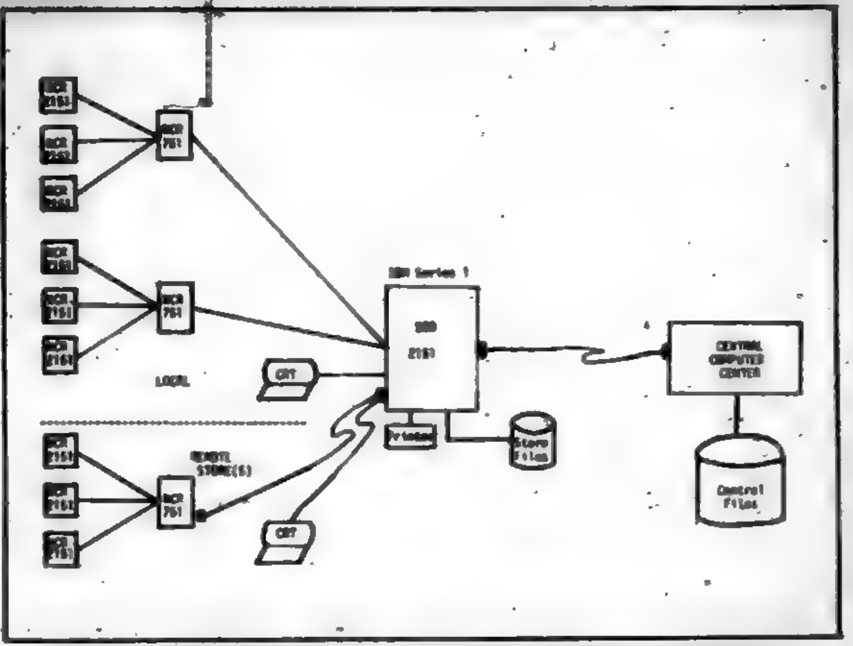
Series/1-Based POS System Runs NCR Retail Terminals

BOULDER, Colo. – An IBM Series/1-based point-of-sale (POS) information system that handles inventory control, sales analysis, sales productivity, commissions, credit billing, sales tax, profit and loss is available from Systems Design & Development Corp.

The SDD 2151 system uses the firm's proprietary software to operate NCR Corp. 2151 cash registers on-line, according to the firm. Data entered into the 2151 Retail Terminal is sent through in-house communications lines to an NCR 751 Digital Concentrator that sends the data to the 2151 CPU.

Cobol application programs in the SDD 2151 can process the data according to the type of data in the message. Besides NCR 2151 or 2152 cash registers, 3270-like devices may be attached to the system, which also communicates with an IBM host CPU – System/3, System/34, 370, 4300 or 30 series.

Hardware for the system costs $25,000; software costs $15,000; and an additional $2,500 buys a Cobol compiler to allow third-party programmers to write additional reports. The firm is located at 2355 Canyon Blvd., Boulder, Colo. 80302.



SDD 2151 feeds financial activity of NCR cash registers to IBM CPU.

Megasoft Offers Retail Turnkey

SAN MATEO, Calif. – Megasoft Computer Systems, Inc. has introduced a turnkey computer system for average and small independent retail stores.

The Retail Sales and Profit Builder can be used for processing handwritten invoices after the sale or for writing sales invoices at the counter, the vendor said.

The system also automatically collects clients' names and prepares mailing lists, prints retail sales invoices, performs cash register functions, maintains daily accounts receivable and produces daily reports on items sold, the vendor said.

The system is available on a lease/-purchase option for $420 a month. Megasoft may be reached through P.O. Box 6121, San Mateo, Calif. 94403.

Lamda Has Desktop For Feed Store Use

WATERVILLE, Kan. – A desktop microcomputer with software developed for grain and fertilizer businesses is available from Lamda Systems, Inc. The product is called Lamda.

The unit displays operating instructions on its CRT monitor and responds instantly with "advice" when incorrect entries are made, the vendor claimed. It can be used in a normal office environment to manage and print accounting records.

Lamda can maintain accounts payable and receivable, general ledger, cash receipts, payroll and inventory data. Individual access codes ensure confidentiality and power failure will not affect stored information.

Users can get up-to-date replay of financial reports for the month, year, or any month of the previous year.

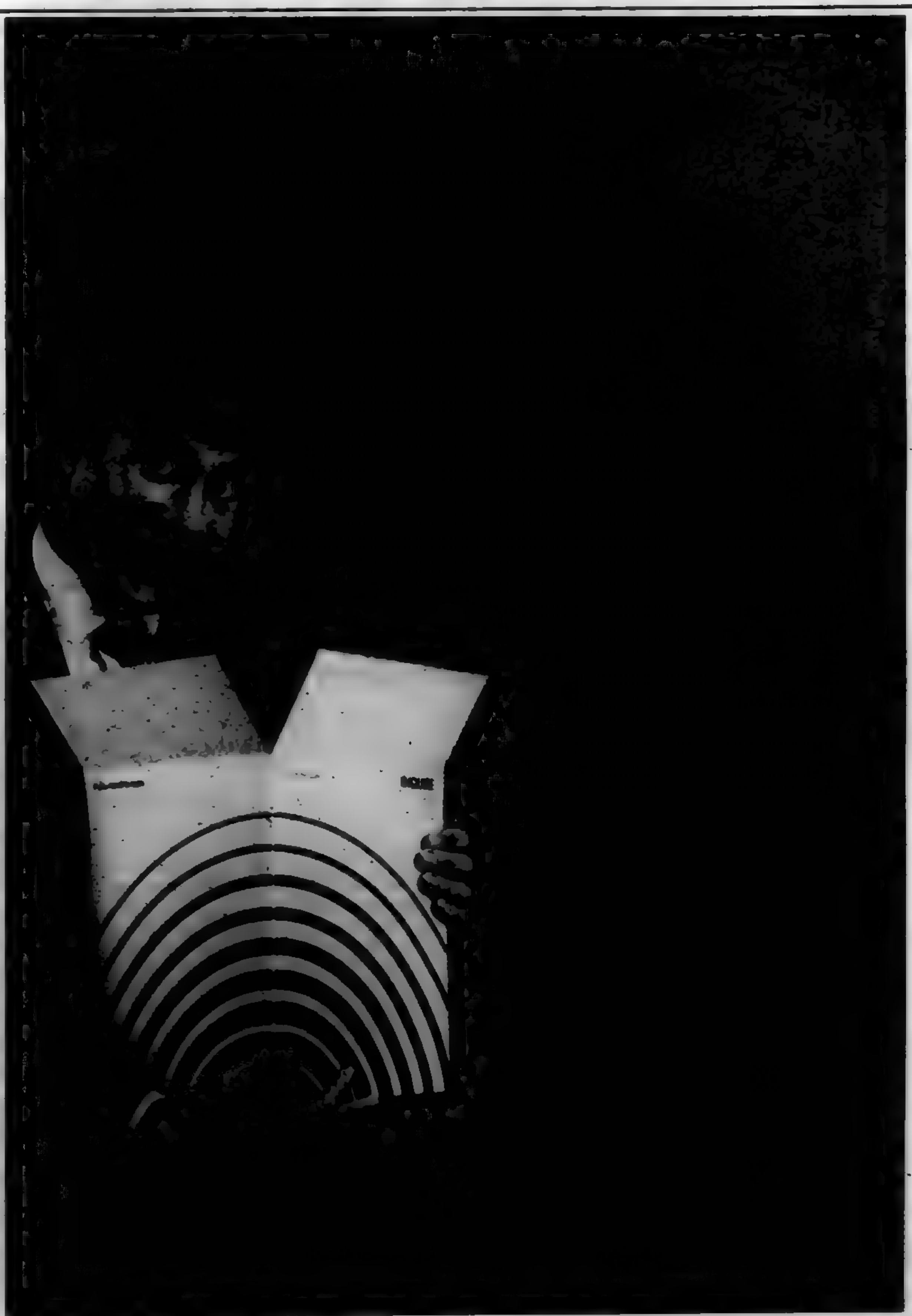
The price for the system ranges between $8,500 and $20,000 depending on configuration. The vendor may be reached through P.O. Box 113, Waterville, Kan. 66548.

Apple Gets Bar Reader

SARATOGA, Calif. – Advanced Business Technology, Inc. is offering Barwand, a modified Hewlett-Packard Co. Heds 3000 reader for Apple Computer, Inc. microcomputers.

The unit enters data from bar-coded documents and costs $195.

Advanced Business Technology is at 12333 Saratoga-Sunnyvale Road, Saratoga, Calif. 95070.



HP Upgrades 1000 L-Series

PALO ALTO, Calif. – Hewlett-Packard Co. has reportedly transformed its HP 1000 L-Series computer into a 512K-byte two-board microcomputer by combining 64K-byte random access memory chips with newly enhanced memory management capabilities.

The new member of the L-Series offers the DMA per-channel I/O capabilities, software features and memory capacity associated with larger computers and is well suited for communications, the vendor claimed.

Other applications include industrial automation, instrumentation and process control.

Compatible with all other HP 1000s, the L-Series now has a complete Image data base management facility, the vendor noted.

The HP 1000 L-Series microcomputers are available as boards, rack-mountable processors or in systems.

A 2103LK board-level processor costs $13,250; the HP 2103L rack-mountable computer costs $15,450.

The HP 1000 Model 10 system with CRT terminal, 1.2M-byte flexible disk drive, cabinet and 12M-byte HP Winchester technology disk costs $33,500, the vendor said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

Two Plessey Systems Based On PDP-11/23s, PCS-001

MARLBORO, Mass. – Digital Concepts, Inc. has unveiled two Plessey Peripheral Systems, Inc. computers based on Digital Equipment Corp. PDP-11/23 CPUs and featuring PCS-001 time-sharing software.

Syst 13VC is a 10M-byte system with one removable and one fixed disk expandable to 20M bytes. The cost is $19,900. Syst 13VF is a 27M-byte system with one removable and one fixed disk expandable to 100M bytes. The cost is $23,900.

The software package is designed to produce a multiterminal operating environment expressly suited to business DP needs on a small machine, according to the vendor.

The system is offered as an alternative to the DEC CTS-300 commercial operating system. It features several enhancements, including time-sharing of the operating system rather than only Dibol application programs and fully automatic line printing spooling, the vendor claimed.

Digital Concepts, Inc. is located at 45 Maple St., Marlboro, Mass. 01752.

Controller Links Winchester Drive To GPIB Systems

SUNNYVALE, Calif. – A controller that reportedly links Shugart Technology, Inc.'s ST-506 micro-Winchester disk drive to host computers using the general-purpose interface bus (GPIB) standard has been introduced by Microcomputer Systems Corp.

The MSC-9305 is said to provide an on-board interface to ST-506 disk drives and to incorporate the GPIB interface standard (IEEE-488 and HP-IB) for hookup with computers using the GPIB standard bus.

First application of the MSC-9305 will be in systems incorporating the ST-506 5.5-in. disk drives and the Hewlett-Packard Go. HP-85 desktop computer.

Besides interfacing with other GPIB computers such as the Commodore Pet, Inc., Xerox Corp. 1350 and HP machines, the unit can be used with computers that can accommodate GPIB adapters, according to the vendor.

Such computers include those from Digital Equipment Corp., Apple Computer, Inc., Prolog Corp. and those using Intel Corp.'s Multibus bus.

Price of the MSC-9305 is $700. The company is located at 432 Lakeside Drive, Sunnyvale, Calif. 94086.

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CSC Indicted for GSA Contract Fraud

By Jake Kirchner

CW Washington Bureau

ALEXANDRIA, Va. – Computer Sciences Corp. (CSC) and five former or present employees have been indicted here for racketeering, bribery and fraud in connection with a large federal teleprocessing contract.

In a 57-count indictment handed down by a federal grand jury here Oct. 8, CSC, its five employees and an independent consultant were charged with bribing a federal contracting officer to help CSC win its 1972 Infonet teleprocessing services contract.

The contract, which expired in 1977, reportedly earned CSC's Infonet operation over $100 million. During the life of the contract, the company provided the majority of federal time-sharing services.

Reacting to the indictment, a CSC spokesman at company headquarters in El Segundo, Calif., said there has been some confusion between the government and CSC over "several highly technical and complex provisions" of the contract, but said the charges are "unwarranted."

Besides the firm itself, also named as defendants were John W. Luke, a CSC vice-president, member of the board of directors and former president of the Infonet Division; Erwin L. Allen, former Infonet vice-president; Peter C. Loux, a former CSC branch manager; and company employees Thomas A. Marti and Norman W. Derrick.

Also indicted was Herbert G. Blecker, president of Icarus Corp., a Maryland subcontractor to CSC on the Infonet contract.

Second Indictment

For Loux and Blecker this was their second indictment for activities relating to the contract. Last January Loux was found innocent in federal court here of charges he received kickbacks from Blecker for steering Infonet consulting work to Icarus. Blecker, who was convicted of those charges, is appealing

(Continued on Page 70)

DEC, Tektronix Deny GSA Charges

CW Washington Bureau

WASHINGTON, D.C. – Digital Equipment Corp. and Tektronix, Inc. have reacted with a loud cry of "foul" to recent allegations the two companies bilked taxpayers for millions of dollars by overcharging the federal government for DP equipment.

The firms termed "premature," "inappropriate" and "absurd" charges by a Senate subcommittee and the General Services Administration (GSA) that the companies illegally failed to offer federal agencies their lowest customer discount rates.

GSA auditors told the Senate Federal Spending Parctices Subcommittee Oct. 2 they had found the two vendors hid the fact they charged significantly lower prices to some commercial customers than those offered the federal government.

Initial Stage

A GSA official told *Computerworld* the agency is looking into the possibility of bringing criminal charges against the two companies, although the investigation is now only in its "initial stage."

To qualify for a multiple award schedule contract with GSA, the federal purchasing agency, companies by law must agree to offer government agencies their best prices. Routine GSA audits, however, allegedly found the DEC federal discount of 14% was as much as 6% lower than discounts to some private-sector buyers.

Tektronix was said to also have offered greater discounts to commercial customers, some of whom bought less equipment than did federal agencies. In its most damaging charge, GSA also claimed both companies attempted to hide the discount disparities.

These deliberate and concealed practices led to federal overbillings of $1.3 million by Tektronix and $1.2 million by DEC in 1978, GSA said. Subcommittee Chairman Sen. Lawton Chiles (D-Fla.) said the audit information indicated the possibility of fraud by the two corporations.

Chiles' reaction was mild, however, in comparison to the responses of the two companies. Both claimed they have not wrongly overbilled the government and objected to Chiles' statement that they refused to

(Continued on Page 73)

CDC Settles DP Course Dispute

CW Washington Bureau

ST. PAUL, Minn. – Control Data Corp. and the Federal Trade Commission (FTC) have resolved the acrimonious seven-year dispute over advertising practices of CDC's DP instruction business.

In a proposed consent agreement filed earlier this month in U.S. District Court here, the company agreed to not misrepresent the potential benefits to students of courses offered through its Control Data Institute operations.

In return, CDC dropped its suit charging the FTC violated its rules and procedures during the protracted case.

CDC throughout has denied using deceptive advertising practices. The company's agreement to the terms of the consent order do not constitute an admission it violated the law.

The FTC complaint, made in 1973, alleged that between 1969 and 1971 the firm's instruction centers exaggerated the value of its vocational instruction and overstated its success in placing graduates in industry positions.

In Washington, D.C., the FTC said the company agreed it will not:

- Misrepresent the qualifications for obtaining a job in the computer field, such as by stat-

(Continued on Page 74)

Industry Complacency Slammed

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. – While the federal government has been slow to help U.S. businesses fighting for world market shares, American technology companies should also be faulted for complacency and rigidity in international business, according to NCR Corp.'s chairman, William S. Anderson.

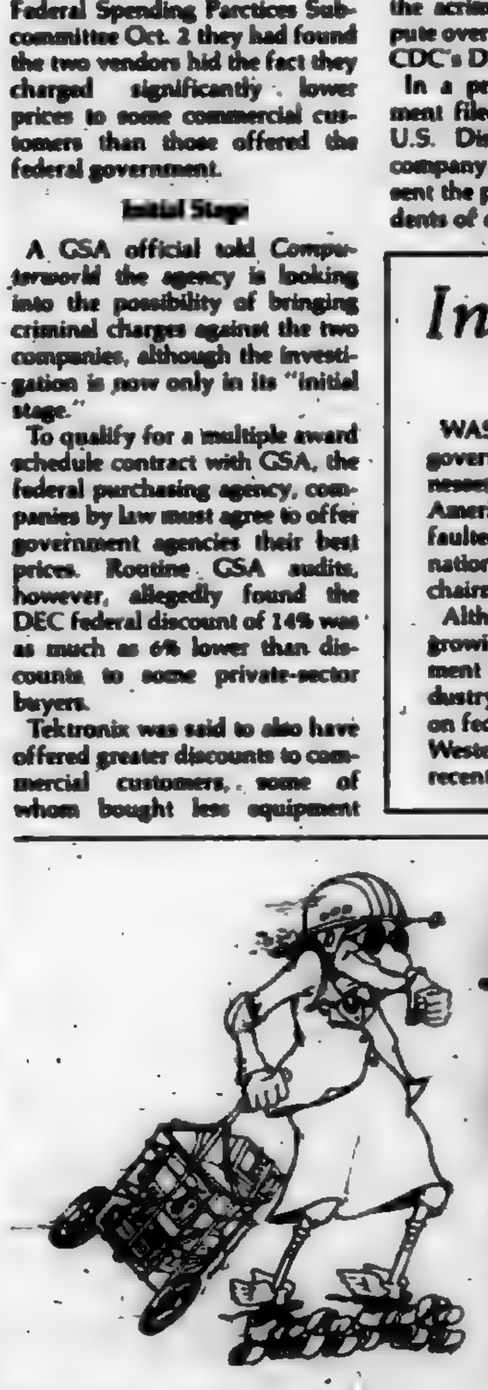
Although much can be done to spur the growing relationship of business and government to maintain the preeminence of U.S. industry, American companies cannot rely solely on federal assistance to overcome Japanese and Western European challenges, Anderson told a recent meeting here of the Computer and Business Equipment Manufacturers Association.

"We've been quick to unmask the folly of much of the legislation, regulatory excesses and bureaucratic red tape imposed on the economy in recent years," he told the Oct. 9 gathering of industry executives. "But we've often been slow in preparing our own companies for the winds of change that began sweeping through most industries in the 1970s."

'Spirit of Enterprise'

The success of the U.S. information industry came from managers "driven by a spirit of enterprise, a willingness to take risks and a determination to make their products the best they

(Continued on Page 74)



Lickety Brindle

(**lik 'etē brind'l,** *orig. OE liccian, ME brende, n.* 1) an efficient worker who performs with blinding speed. 2) a real trouper who's everywhere at once 3) a very busy person who needs electronic equipment fast and calls Leasametric to rent it now.)

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Data Services Subsidiary Questioned

Citicorp's Response to Fed Seen a Concession

ARLINGTON, Va. — Citicorp's response to the Federal Reserve Board's request for further information about Citishare, its proposed subsidiary to offer DP services appears to be a concession that Citishare's anticipated DP offerings may go beyond the scope of existing banking laws, according to the Association of Data Processing Service Organizations, Inc. (Adapso).

The Fed asked Citicorp early this summer to explain its proposed Citishare operation in further detail after the bank applied to expand its proposed services to include electronics funds transfer, Adapso said.

In explaining its Citishare proposal in a letter, Citicorp said that while Regulation Y of the banking laws would encompass the activities of Citishare, "the language of that section may not be sufficiently flexible to accommodate the diverse ways in which such DP services [are] offered today and may be offered in the future.

"Nor does the current language anticipate the technological development and changes in the marketplace that have occurred in the 10 years since the board conducted the rulemaking proceeding on DP activities or those that lie ahead."

The letter, written by Patrick J. Mulhern, Citicorp's senior vice-president and general counsel, asked the Fed to clarify Regulation Y, Adapso noted.

This regulation governs nonbanking subsidiaries of bank holding companies.

Fierce Opposition

Adapso has been a fierce opponent of the bank's Citishare application, arguing that it allows the bank entry into the DP services industry, which is prohibited by federal banking laws.

Last June the Fed granted Adapso's request for a formal trial-type hearing on the Citishare application [CW, June 23].

Adapso has argued that Citicorp's services are outside the realm of normal banking activities. For example, Citicorp offers a municipal parking violations service in New York City and a financial data base service that can be used for investment analysis rather than banking, an Adapso spokesman maintained.

STC and Documation Modify Agreement On Proposed Merger

LOUISVILLE, Colo. — Storage Technology Corp. (STC) and Documation, Inc. have modified the letter of intent related to the merger of Documation into STC.

The updated arrangement stipulates that .72 share of STC will be distributed to Documation shareholders at the time of the merger, with the remaining .13 share of STC held in escrow to cover contingent and undisclosed liabilities of Documation.

The original agreement in early September called for a payout of .85 share of STC common stock for each share of Documation common stock.

The two firms expect a definitive merger agreement will be reached shortly.

Fujitsu Extends Hold On U.S. Market With Winchester Line

SANTA CLARA, Calif. — Fujuitsu has made another move into the U.S. marketplace with the introduction by Fujitsu America, Inc. (FAI) of a family of 8-in. Winchester disk drives it claimed offers the highest capacities to date for the OEM market.

The Model 2311 at 48M bytes and the Model 2312 at 84M bytes achieve high performance because of a permanent magnet rotary actuator using closed-loop servo systems.

Complete head positioning specifications are 5 msec track-to-track, 20 msec average and 40 msec maximum, FAI said.

Evaluation Units

Evaluation units will be available in December and large production quantities in April, according to a spokesman.

The 2311 will cost $3,195 at OEM quantity 100 and the 2312 will cost $3,795 on a stairstep OEM price schedule, he added.

FAI also released a family of low-cost 8-in. Winchesters, the 11.7M-byte Model 2301 for $1,660 and the 23.4M-byte Model 2302 for $2,095 in OEM quantities of 100.

FAI is based at 2945 Oakmead Village Court, Santa Clara, Calif. 95051.

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Quarter Earnings Rise 32% at IBM, 15% at NCR

IBM's third-quarter earnings rose 32% and NCR Corp.'s earnings rallied, increasing 15% after a decline last quarter.

For its latest quarter, IBM's earnings were $884 million or $1.51/share, up from 1979's third-quarter earnings of $669 million or $1.14/share. Pretax earnings for the period rose 10.4%.

Revenues for the period rose 20%, advancing to $6.5 billion, up from $5.4 billion in the corresponding period a year ago.

For the year to date, IBM's earnings totaled $2.3 billion or $3.99/share, up 16.3% from just over $2 billion or $3.43/share earning in the same period in 1969.

Revenues reached $18.4 billion, up 14.8% from revenues of just over $16 million reported for the first nine months of last year.

Commenting on the earnings, IBM Chairman Frank T. Cary noted purchases of equipment were considerably higher than in the comparable periods last year. However, because of the heavy volume of purchases in the fourth quarter last year, it is unlikely earnings growth rate in the first nine months will be sustained for 1980, he added. Outright sales represented $2.5 billion of IBM's third-quarter revenue — a 25% increase over sales in the third quarter of 1979.

"The growth in net earnings for the nine months and for the third quarter, compared with the corresponding periods of 1979, was enhanced by a reduction in the effective rate for U.S. federal and non-U.S. income taxes. This reduction was primarily in the non-U.S. operations and results, in part, from adjustments of certain prior periods' tax liabilities," Cary commented.

NCR Figures

At NCR, third quarter revenues totaled $792.3 million, up 12% from revenues of $706.7 million in the third quarter of 1979. For the year to date, revenues passed $2.2 million, an 11% increase over last year.

Third quarter earnings at the firm rose to $54.4 million or $2.03/share compared with last year's net of $47.2 million or $1.74/share. For the year to date, earnings totaled $136.7 million or $5.11/share up slightly from the $136.2 million or $5.08/share for the first nine months last year.

NCR's Chairman William S. Anderson said incoming business for the quarter showed a slight gain over 1979's third quarter, and that increased order volume from overseas continued to offset declining U.S. order rates.

Comdex Slated For Nov. 19-21

LAS VEGAS — Dr. Federico Faggin, president of Zilog, Inc., and Sandy Sansing, president of Digital Systems of Florida, Inc., will keynote the second annual Comdex conference and exhibition here for dealers, distributors and reps on Nov. 19-21.

Dr. Faggin headed up the design team at Intel Corp. in the early 1970s that produced the world's first microprocessor. He founded Zilog in 1974, where he still presides over the production of large-scale integration and very large-scale integration circuitry, as well as micro-based systems.

Sandy Sansing, former salesman with the Burroughs Corp., organized Digital Systems of Florida in 1975.

Conference admission is $10 to floor exhibits only and $125 to the four-day conference. Additional information is available from the organizers at the Interface Group, 160 Speen St., Framingham, Mass. 01701.

Informatics Buys 'Taps' Software

LOS ANGELES — Informatics, Inc. has completed the purchase of the Transaction Application Processing System (Taps) from Decision Strategy Corp. for an undisclosed amount.

The product, which forms the basis of a new Informatics Division, is expected to generate approximately $2.5 million a year in revenues for Informatics and give the company a software entry into the interactive terminal applications segment of the minicomputer market, according to Informatics' president, Dr. Walter F. Bauer.

Michael J. Parella, former chairman of the board of Decision Strategy, was named vice-president and general manager of the Informatics' Taps Division, to be based in New York.

Taps, which consists of a communications manager, applications manager and a relational data base manager, runs on minicomputers made by Prime Computer, Inc., Hewlett-Packard Co. and Digital Equipment Corp. as well as IBM mainframes, Bauer said.

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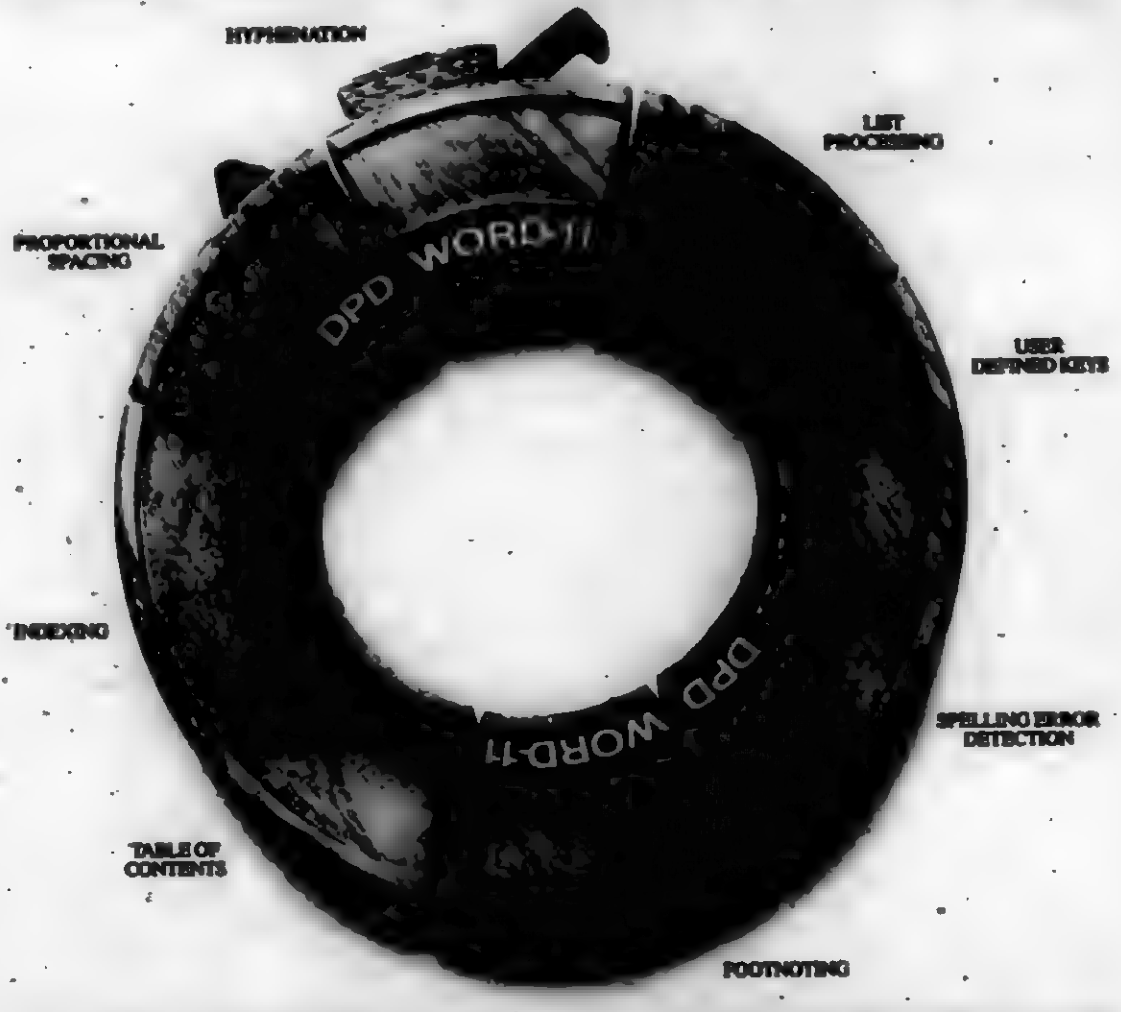

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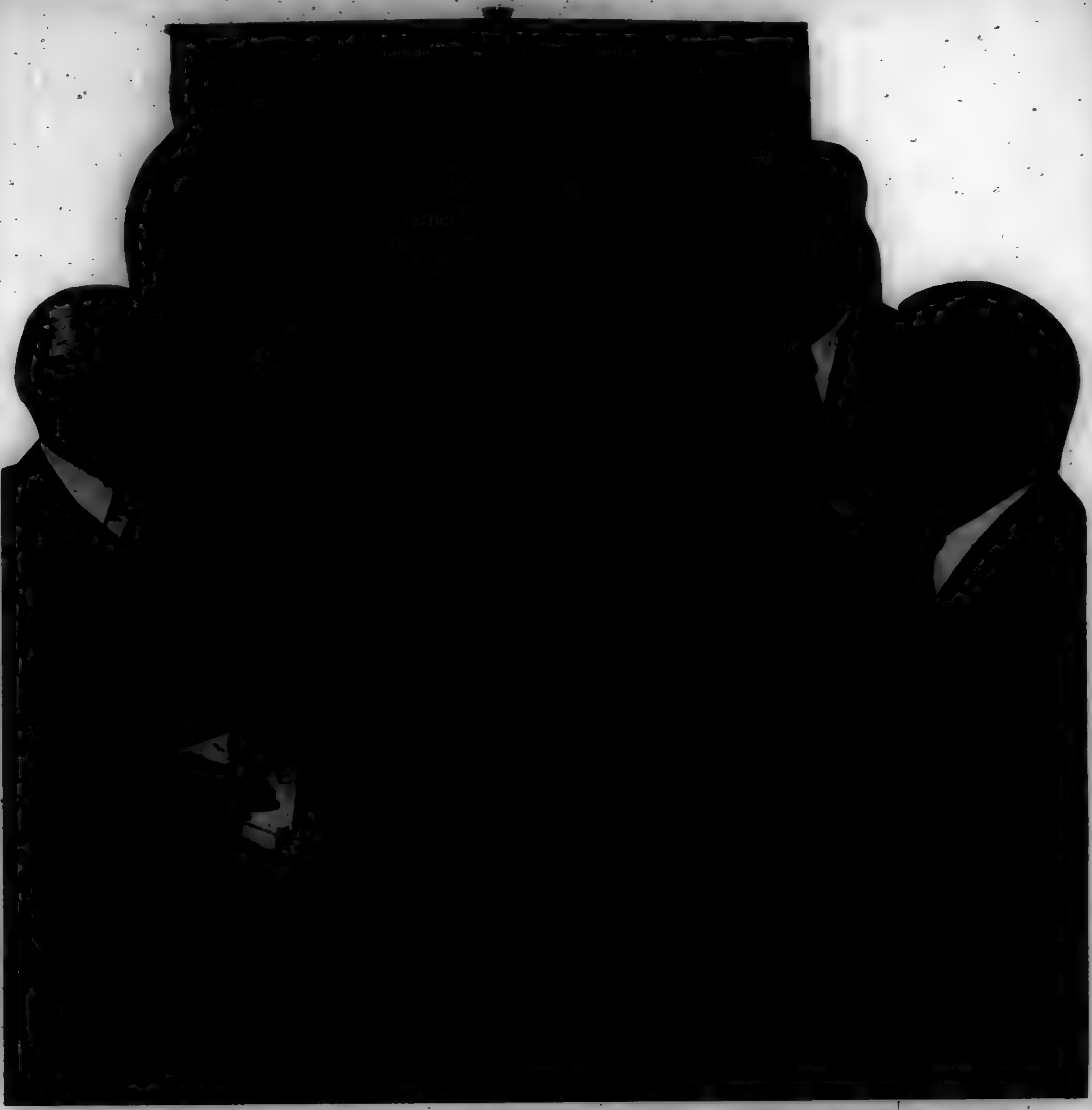

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CSC Charged With 57-Count Graft Indictment

(Continued from Page 65)

that decision [CW, Jan. 14].

The Oct. 8 indictment said CSC and John Luke conspired to bribe General Services Administration (GSA) contracting officer James C. Lindsey to help the firm win the teleprocessing services contract.

Lindsey was allegedly paid $34,000 and given a job with CSC through a separate corporation set up to hide the fact CSC was the real employer. In return, Lindsey, who was not indicted, gave CSC inside information about the contract to help the firm win it, according to the indictment.

Other Charges

Other charges include allegations CSC charged federal agencies a higher rate for time-sharing services than commercial customers, while hiding the rate differences.

CSC also fraudulently allowed the government to perform benchmarking tests on the Infonet system at lower usage rates than the company had already quoted GSA, the grand jury said.

In addition, the indictment said the firm increased the charge to one federal agency for use of CSC's Cost software by 50%, an increase the grand jury said was fraudulent because CSC knew the supposed new version of Cost was neither new nor improved.

The 57 counts cover charges against the defendants of conspiracy, racketeering, mail fraud and making false claims against the government.

Maximum Penalties

Maximum penalties for the charges are 20 years in prison and $25,000 in fines for conspiracy and racketeering, five years and $1,000 for mail fraud and five years and $10,000 for false claims.

The defendants were scheduled for arraignment in federal court here Oct. 17. Trial date was to be set at that time.

Years of Negotiations

GSA and CSC have been negotiating for several years over alleged overcharges to the government by the firm for services rendered under the contract.

Several GSA audits of the contract were turned over to a special GSA-Justice Department task force that has been investigating cases of fraud against GSA, the federal purchasing agency.

CSC's response to this second indictment involving either the company or its employees in connection with the Infonet contract was that the firm "intends to defend itself vigorously against the charges."

Charges 'Unwarranted'

In the statement released from CSC headquarters, the firm said "based on the company's knowledge of the facts, the charges are unwarranted and CSC believes that the company and the employees charged will be vindicated.

"There are differing views as to the meaning of several highly technical and complex provisions of this contract. But CSC believes there is no basis for criminal charges.

"The company cooperated fully with the grand jury in its two-year investigation," the statement added, and "CSC believes it acted properly in its dealings with GSA."

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Office Automation Exhibits Dominate Info 80

By Marcia Blumenthal
CW Staff

NEW YORK — It looks as though the Information Management Exposition & Conference Info 80 held here recently is becoming an office automation exhibition.

While a few vendors that seemed out of place at Info said they are reconsidering continued participation in the show, others said the show was the only one in New York this year and was a good opportunity to meet with clients.

In all, Info drew 227 exhibitors, up from 172 last year. Some 22,115 people browsed through the exhibits at the Coliseum this year. Last year, the Coliseum had 16,900 visitors.

The vendors displaying office automation as well as business systems reported satisfactory traffic through their booths. IBM gathered a lot of attention with it Displaywriter and Hewlett-Packard Co. and Exxon Information Systems received a steady flow of onlookers.

Notable Absentee

Most notably missing was Wang Laboratories, Inc., which reportedly withdrew from the show at the last minute.

On the other hand, Computer Automation, Inc., showing its Syfa products, said there was a strong possibility that the Commercial Systems Division would not exhibit at Info.

Qume said the National Computer Conference and Syntopicon were better shows for the company. Info is turning into a local show, with most people traveling no more than 300 miles, one marketing executive noted. The company prefers to exhibit at a conference that draws a more geographically diverse base, he added.

Agreeing with Qume was BTI Computer Systems, Inc., a vendor of 32-bit minis and other mini products. If the company exhibits at Info next year, the booth will be handled from the company's New York office rather than marketing personnel from all over the country, a spokesman noted.

Another 32-bit mini maker Formation, Inc. said it couldn't judge the results of the show because Info was the first show in which the firm had exhibited.

Qantel Corp. and Nixdorf Computer Corp., both displaying a wide range of products, said most visitors were primarily interested in low-end word processing-type products. But both firms said they would most likely continue to participate in Info.

Another vendor seemingly out of place at the exhibit was McCormack Dodge Corp., a supplier of general ledger software packages for large IBM and Burroughs Corp. systems. However, a spokesman said the firm wanted to get its name circulated and let people know it was expanding its software development into the mini arena.

Nickels & Dimes

The Board of Directors of Cullinane Corp. has declared a two-for-one stock split, payable on Nov. 10 to shareholders of record as of Oct. 20.

$ $ $

National Semiconductor Corp. has filed with the Securities and Exchange Commission a registration statement for a public offering of 1.5 million shares of common stock.

$ $ $

Harris Corp. and Quotron Systems, Inc. have filed a registration statement covering the secondary offering and sale of 528,122 shares of Quotron common stock owned by Harris.

$ $ $

Wavetek has declared a three-for-two split of the company's common stock. Certificates respresenting the additional shares will be mailed on or about Oct. 20 to stockholders on record as of Sept. 27.

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Datapoint Corp. has filed a registration statement with the Securities and Exchange Commission relating to a proposed public offering of 1.5 million shares of common stock.

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American Research and Development, a division of Textron, Inc., has joined with a private group to invest over $1 million in the Image Resorce Corp. of Westlake Village, Calif.

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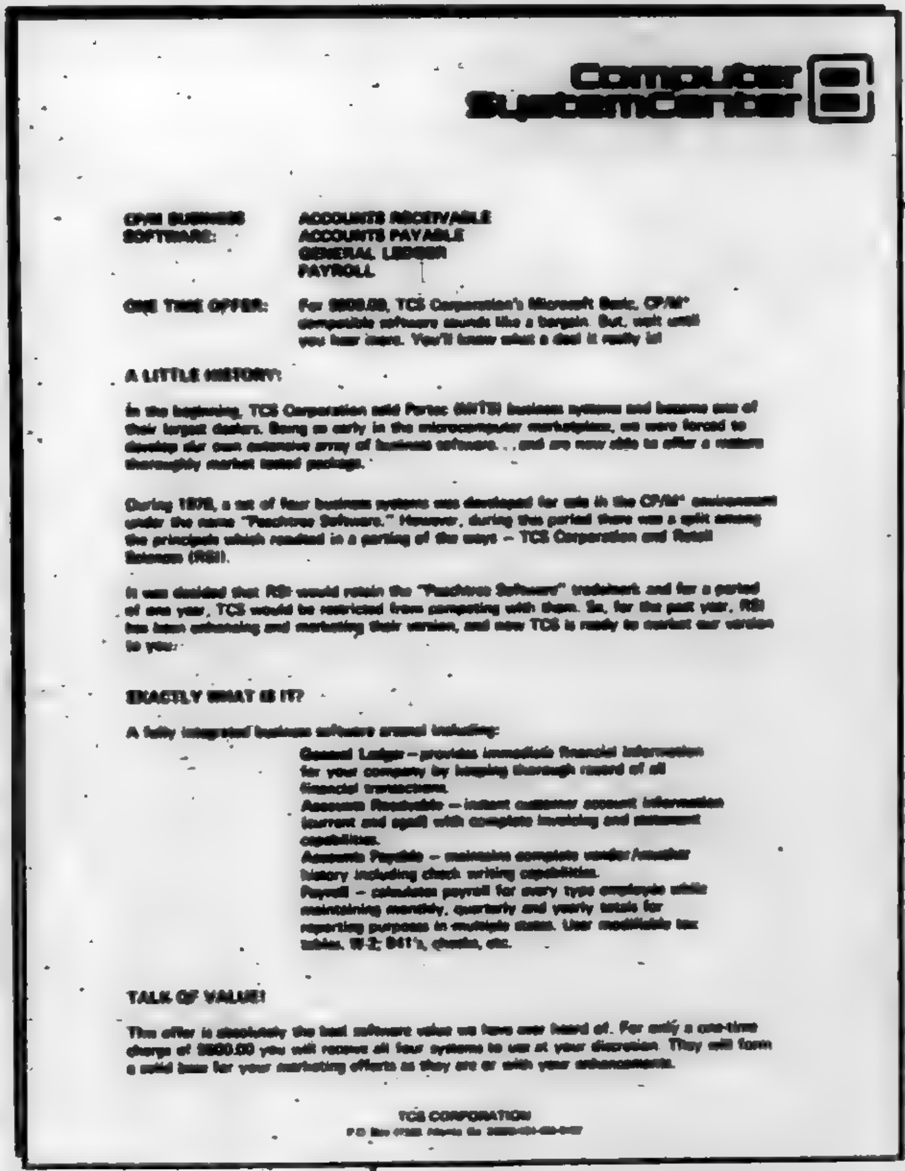

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Amdahl's Firm Named Acsys

SAN JOSE, Calif. — Acsys Ltd. is the name of the computer company started last month by Gene M. Amdahl, the founder of Amdahl Corp. Acsys was incorporated in Bermuda.

Although the firm's first product will not be ready until 1985. Amdahl said it will be targeted at both the general-purpose and scientific computer markets and compete with IBM's expected H series.

Executive Corner

• Jack D. Kuehler, president of IBM's System Products Division, has been elected a vice-president of IBM.

• James J. Byrne has been promoted to vice-president of the North America Marketing Group at Mohawk Data Sciences Corp. Brian Gaylord has been moved up to vice president of marketing support for that group, and John H. Crawford has been made vice-president of U.S. sales.

• Donald E. Lewis has been promoted to vice-president of manufacturing at Lear Siegler, Inc.'s Data Products Division.

• Bruce Crockett has been elected treasurer and vice-president of finance of Comsat General Corp., where he will be responsible for all finance and procurement functions of that organization.

• Merrill Newman has been named vice-president of finance at Convergent Technologies, Inc.

• Dr. Donald R. Haring has been appointed vice-president of research and development for General Automation, Inc.

• Elliot Wassarman has been elected vice-president of marketing at North Star Computers, Inc.

• Richard Guthman Jr. has been named vice-president of Computer Management, Inc.

• Hal Georgens is chairman of the board and chief executive officer as well as president of Data Electronics, Inc. The board increased five to seven members with the recent addition of Tommy Davis and Tom Stephenson.

• James Jamfrey has been appointed vice-president of European marketing at Dataproducts Corp. His territory will include Europe, the Middle East and Africa.

• Mark Brown has been named vice-president of corporate development and marketing for the DMW Group, Inc. Product planning, acquisitions and new business opportunities for the firm will be Brown's responsibilities.

• Jason Stewart has been elected president of NEC Electron, Inc., a subsidiary of the Nippon Electric Co. of Tokyo.

• Arthur L. Schimel has been appointed vice-president of sales at Digital Associates Corp.

• C. Art Lasch Jr. has joined Machine Intelligence Corp. as president, and Peter Szasz has joined that company as director of marketing.

• Richard A. Cortese has been named vice-president of operations at General Automation, Inc.

• Richard Charlton has been appointed vice-president of advanced planning and technology at Century Data Systems, a Xerox Corp. subsidiary.

Acquisitions

STSC, Inc. has acquired 87.5% of Societe de Traitements et de Services Conversationnels, a French corporation.

National CSS, Inc. has announced its acquisition of Program Products, Inc., which will now operate as part of National CSS' software products group.

International Microfilmers, Inc. has reached an agreement in principal with NLT Computer Services Corp. for the purchase of assets and operations of International by NLT for an undisclosed figure.

NLT Computer Services (NLTCS) recently acquired Itel-PAS of Miami, a part of Itel Corp. NLTSC renamed it Medical Services Division, which will provide billing, insurance, claim processing and medical management report services.

Shareholders of Phoenix Corp. and Baldwin-United Corp. completed an agreement in principle by which Baldwin-United would acquire 100% of the outstanding shares of Phoenix Corp. for a package of notes and cash aggregating $8.25 million.

Datum, Inc. announced the acquisition of the AACOM Products operations from Systron-Donner Corp. for an undisclosed cash amount. The acquisition includes the transfer of the associated key management, engineering and production personnel who will occupy a new facility in Concord, Calif.

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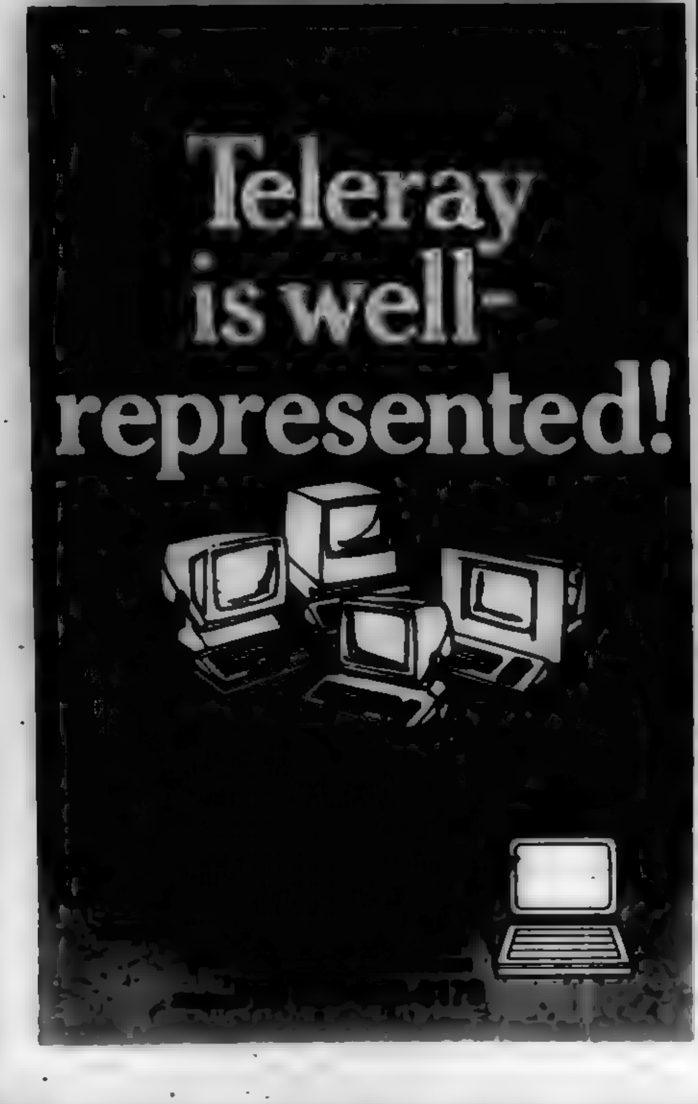

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Houston	Jan. 19 & 20	322 Marlboro Road
New York	Jan. 21 & 22	Newport News, Virginia 23602
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Contracts

Datacrown, Inc. has been awarded a six-year, $8.8 million contract to provide information processing services to the U.S. Department of Housing and Urban Development.

Century Data Systems, Inc. will deliver 500 of its Intelligent Marksman disk drives to the Konan Corp. under the terms of a recent contract.

Tracor, Inc. has received a $4.2 million contract from Magnavox Corp. to proceed with the development, preproduction and testing of Tracor's microminiature central processor, for use in defense equipment, especially designed for the Navstar Global Positioning System.

Computer Software Analysts, Inc. has been retained by the U.S. National Guard with a $24 million contract, to install Burroughs Corp. B1955 information processing systems. These systems will be placed in National Guard headquarters in each of the 50 states, Puerto Rico, the Virgin Islands and the District of Columbia.

E-Systems' ECI Division has received a $2.4 million contract from Lockheed-California Co. for deliveries of high-speed thermal printers and electronic keyboard sets. They will be used with the avionics system on Lockheed P-3C Orion antisubmarine warfare aircraft by the U.S. Navy and allied nations.

Supershorts

Worldtech, a technology marketing service of Control Data Corp., will open computer-related companies in Lulea, Sweden, as a result of a recently signed agreement with the Swedish Ministry of Industry. One company will provide microprocessor education and service, and the other will develop courseware for Control Data's Plato education system.

Harris Computer Systems announced a joint marketing agreement with Comprehensive Computing Systems and Services, Inc., to make the Tegas logic simulation and test generation software available to users of Harris computer systems.

An agreement has been signed between Applicon, Inc. and Structural Dynamics Research Corp. (Sorc) that provides for the incorporation of Sorc computer-aided engineering software into Applicon computer-aided design and manufacturing systems, as well as the development of future joint projects.

Dash Industries, Inc. plans to enter the retail computer market through its subsidiary, Cascade Data, Inc. which will provide end-user support, education and maintenance for the various retailers in their respective territories.

Timberline Systems, Inc. has signed an OEM agreement with Hewlett-Packard Co. to develop software for three models of HP graphic plotters: The 7225A, 7220S and 7220A.

Univac announced an agreement with Walt Disney Productions to sponsor a major computer technology exhibit at the new $800 million "Experimental Prototype Community of Tomorrow" center project now underway at Disney World in Orlando, Fla. The center is due to open in October 1982.

J. Phillip Carlson has been appointed director of government liaison for the American National Standards Institute (Ansi). Developing, strengthening and maintaining Ansi's relations with the executive and legislative branches of the federal government will be Carlson's primary responsibilities.

Cullinane Corp., a producer and marketer of computer software, has adopted the name, Cullinane Database Systems, Inc. The company also announced plans for a product line of applications software.

The board of directors of the Computer & Communications Industry Association has elected Ryal R. Poppa chairman of the association's board. Poppa is the president and chief executive officer of Pertec Computer Corp.

Information Science, Inc. has sold its subsidiary corporation, Program Products, Inc., to National CSS, Inc., a subsidiary of Dun & Bradstreet, Inc., for an undisclosed amount.

Prime Computer, Inc. recently opened its newest wholly owned subsidiary, Prime Italy, in Milan, Italy.

DEC, Tektronix Cry 'Foul'

(Continued from Page 65)

appear before the subcommittee to answer the allegations.

The subcommittee did not give enough notice to put together a rebuttal, according to Tektronix spokeswoman Susan Stone; the panel also refused to give the company the audit findings so it would know what the allegations were.

The audit report, only preliminary at this point, has not been made available to the company, even though a request for the information has been made under the Freedom of Information Act, according to Stone, Tek's corporate communications manager at company headquarters in Beaverton, Ore.

Because the audit is still incomplete, Chiles' "insinuations of fraud and misconduct are absurd. They're just ridiculous," Stone said. The firm has "absolutely abided" by the terms of its GSA contract to offer its best discount rate to federal agencies, she said.

"He's certainly made some pretty damaging innuendos," Stone said of Chiles, and said making unsubstantiated allegations in a public hearing is not "an appropriate way to handle a topic as serious as this."

DEC Dismayed

Similarly, DEC said it was dismayed by the allegations and that "the committee chose to make them in the form of a public hearing," according to Richard Berube, DEC director of corporate public relations in Maynard, Mass.

The company has not violated the law in its sales through its multiple award contract, he said. "We are confident we have dealt with GSA fairly at this point," Berube said.

"We don't fully understand why the committee chose to go ahead when it did," he continued, saying that DEC had asked the Chiles panel to wait until the firm's negotiations with GSA over the contract dispute were concluded.

Continued Talks

Unlike Tektronix, DEC has received a copy of the audit report and the company is continuing talks with GSA over several of its aspects, according to Berube. "I understand they [GSA] are seeking a refund," the DEC spokesman said.

Berube declined to discuss the allegations in detail, saying DEC does not want "to wage a war of words with a Senate committee through the pages of the media."

"We obviously have disagreements arising out of the audit report, but we were angered by the fact that it was raised in public hearings, due to the fact that we were involved in negotiations with GSA," he said.

In Washington, D.C., last week, the GSA said the audit activity will continue. At the same time, the agency is beginning an investigation "to discern whether or not we have a matter here that is capable of referral to the Department of Justice," according to Michael Eberhardt, GSA deputy inspector general.

Because of the large amount of money involved in the two contracts, "we're putting high priorities on both," Eberhardt said. However, the agency has not ruled out trying to resolve the disputes through negotiations, perhaps leading to refunds by the two companies to the federal government, he said.

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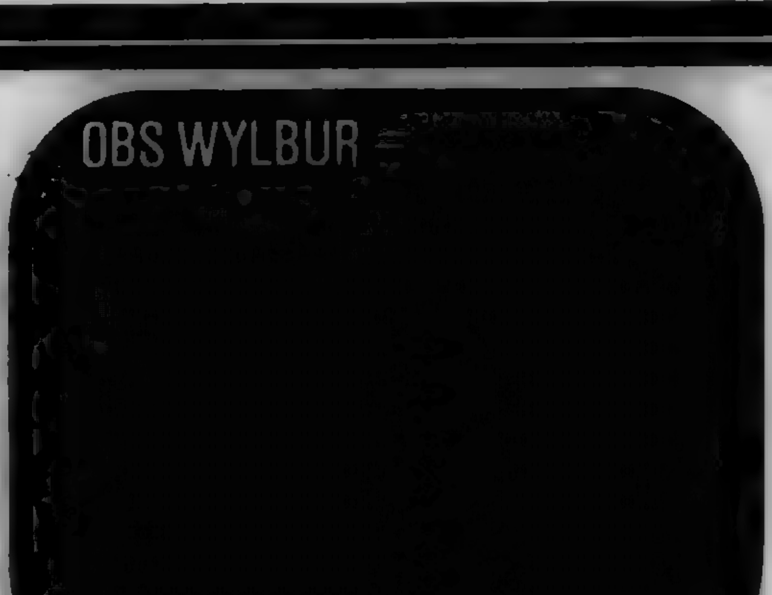

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R&D Meet Set For December

RESTON, Va. — "How to Successfully Keep Your Research and Development on Track" is the title of the American University's Center for Technology and Administration conference, to be held here Dec. 10-12.

More than 80 senior persons from research and development organizations will lead the conference's 40 workshops. They include Dr. Alan Altenau, director of research at Firestone Tire and Rubber Co.; Louis Carrese, director of planning and analysis at the National Cancer Institute; and R.H. Caulk, coordinator of petroleum refining research and development at Exxon Research and Engineering Co. The American Chemical Society and the Institute of Electrical and Electronics Engineers are participating.

Conference admission is $250. Further details can be obtained from the Center for Technology and Administration at the American University, Washington, D.C. 20016.

NCR Exec Attacks Complacency

(Continued from Page 65)

could manufacture," he said. Today's management, however, may have forgotten some of those basic principles.

'Not Flawless'

"Certainly the record is not flawless," Anderson said, assessing the competitiveness, or lack of it, of U.S. industry today.

"In contrast with some of our international competitors, we have frequently subordinated long-range planning to short-range expediency. We have too often been more interested in where our companies will be next year, than in where they could be five or 10 years from now.

"We have also devoted too much time and too many resources to shoring up eroding markets and too little time and too few resources to penetrating emerging new markets.

"We have poured billions of dollars into the development of new products but have broken little new ground to improve distribution methods, marketing skills and administrative efficiency.

"Under the pressures — whether real or imagined — from shareholders and the investment community in general, we have subscribed to the belief that unless a company reports improved profits with clockwork regularity, quarter after quarter, it is not a well-managed company.

Tarnished Label

"We have allowed the 'Made in USA' label to become tarnished in many markets by inadequate quality control and overly zealous attempts to slash costs.

"We've preached about the need to keep the spirit of enterprise alive, but too often when it came time to actually put our chips on the board, we've been excessively cautious."

In sum, Anderson concluded, "the United States has created most of its current economic problems and it is only the United States which can solve these problems." Clamoring to Washington for help is not the way to go about it, he added.

The business-government relationship has been one of "suspicion and distrust," he claimed. On one hand, the government has "consistently overlooked the fact that this country's leadership in information processing is one of its greatest national assets."

Half-Hearted Tries

Business, on the other hand, has made "only half-hearted attempts to understand the pressures under which government officials function and to try to achieve workable compromises within those constraints."

There is a lot to be done by both sides, according to the NCR chairman, "but it's going to take more than a change of attitude if this country is to regain the international competitiveness it enjoyed in the 1950s and 1960s."

The problems of promoting U.S. products and services abroad is not as worrisome as the basic problem of "the lack of a practical and consistent industrial strategy designed to unshackle this country's potential competitive strengths."

International Thinking

U.S. businesses must begin to think internationally and Congress must establish "appropriate export incentives" and remove current disincentives, he said.

As a necessary beginning, current tax laws should be amended to encourage greater research and development expenditures and to permit more rapid depreciation of investments in plant and equipment.

"To my knowledge, no one in the American computer and business equipment industry is asking for taxpayer subsidies," Anderson said. "Nor do we expect government to protect us from the high risks inherent in a fast-moving, highly competitive industry.

"But we are a capital-intensive industry, and we're becoming more so every year. Quite literally, the future growth of this industry depends on the availability of billions of dollars of private capital over the next several years and," he said.

"That capital will not be available in the amounts required unless current tax laws are substantially modified," Anderson added.

CDC, FTC Settle Dispute On DP Course Advertising

(Continued from Page 65)

ing a college education or other post-high school training is not an advantage;

- Misrepresent the significance of the company's aptitude tests by claiming they determine whether a person will qualify for computer-related work;
- Falsely state that to obtain work, graduates can rely entirely on the job placement services offered by the company or misrepresent that the services are free.

In addition, the company agreed to provide prorated refunds to students who drop out of the firm's courses. An outside arbitration service will be available to students with complaints about the courses or tuition. The arbitrator will have the power to order partial or full refunds to the students, according to the FTC.

Finally, CDC agreed its course salesmen will clearly identify themselves as "sales representatives" so prospective students will know they are not vocational counselors.

CDC View

The company issued a statement from its headquarters in Minneapolis saying "We're greatly pleased at the resolution of this long-standing complaint. It concludes eight years of costly negotiations.

"It is for the most part," CDC added, "a recognition of practices we instituted nearly a decade ago, which now are industry standards."

Begun in 1972

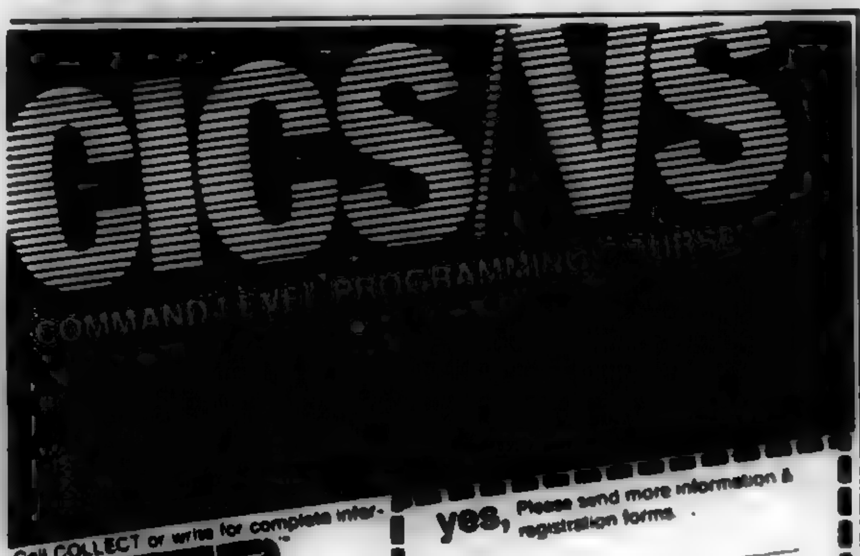
CDC spokesman William Shaffer said the terms of the agreement correspond to practices the company started in 1972, when its training operations were restructured.

The firm's 22 U.S. training facilities place from 90% to 100% of their graduates, numbering some 5,000 a year, he said.

Placement records are open to prospective students and those who do not finish the programming, operations or maintenance courses offered are given a prorated refund of their tuition, according to Shaffer.

The agreement with the FTC came after three offers by the company since 1973 to reach a settlement in the case. In May 1978 CDC filed suit in U.S. District Court charging the FTC allegations were obsolete, damaging to the company and that the government had unnecessarily delayed settling the case.

According to the FTC, the proposed consent agreement will be subject to public comment for 60 days. After Dec. 8 the commission will decide whether to make it final.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SENIOR PERFORMANCE ANALYST

Position involves providing technical guidance and support in the planning, development, and implementation of hardware and software systems as they pertain to defined user service levels from the performance and capacity planning perspective. The successful candidate will be thoroughly familiar with the use of performance/capacity tools such as TESDATA hardware monitors, PLAN IV, MVS, RMF II, CUE, TSA, DSO, PPE and RESOLVE in a large multiple CPU/multi-datacenter environment using MVS 3.8/JES3 and VM/370 6.0 software. The ability to define, conduct, and present performance studies to technical and management personnel and to interface effectively with user representatives is required.

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- EBCDIC and ASCII
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  - c2) are two wild and crazy guys
  - c3) are twin cities
  - c4) beat two pair
  - c5) are two robot movie stars
- How do you spell Edager Dijkstra's name?
- What is an OAG?
- Recursive code is
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- Sketch the layout of O'Hare.
- Bohm and Jacopini
  - a) are an Italian bobsled team
  - b) make designer jeans
  - c) is a vermouth
  - d) shot J.R.
- Which Sharpie color runs out first?
- DFD is a commonly used abbreviation for
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- What is the area code for Avogadro's number?
- Pick which one doesn't belong:

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- In how many languages can you say Holiday Inn?
- Who said "We'll teach no course before its time"?

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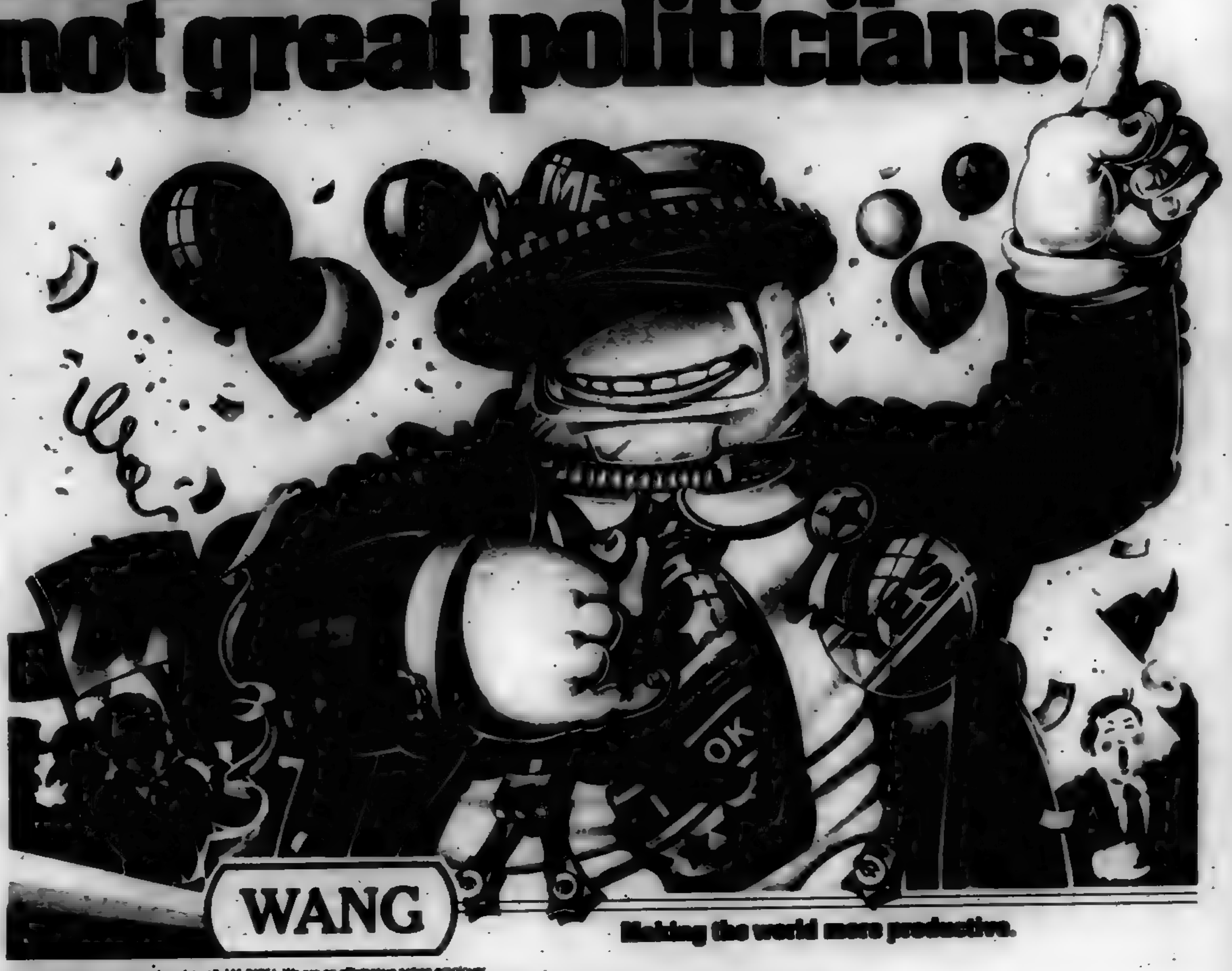

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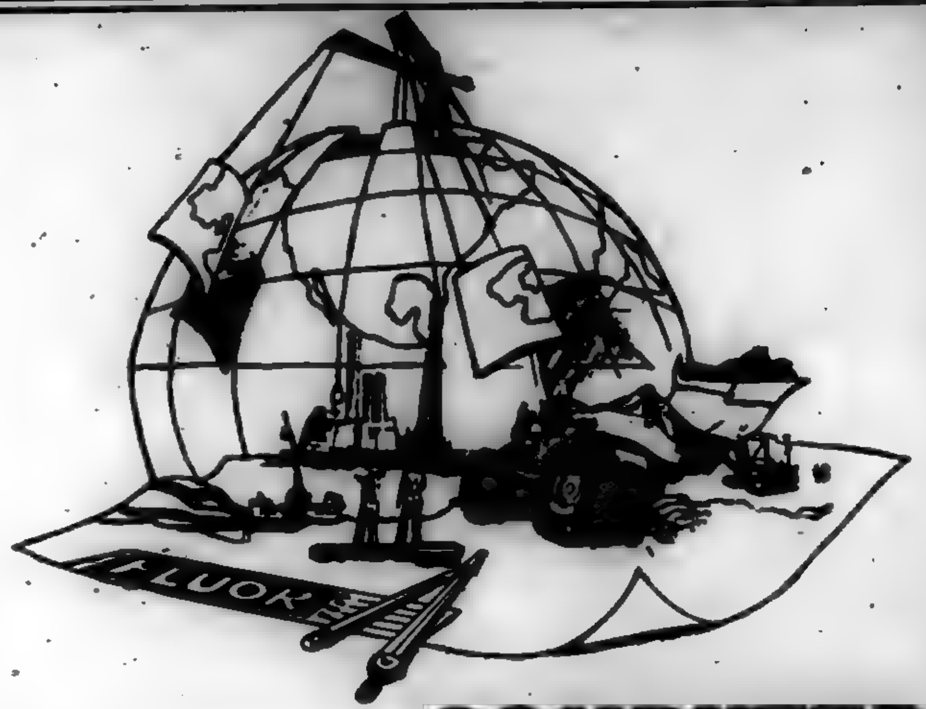

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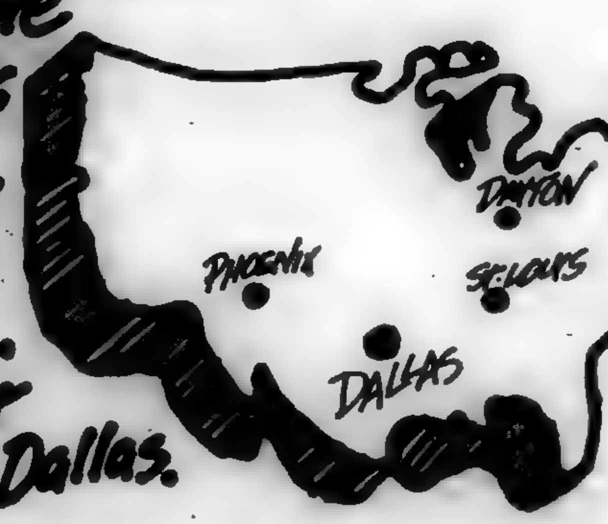

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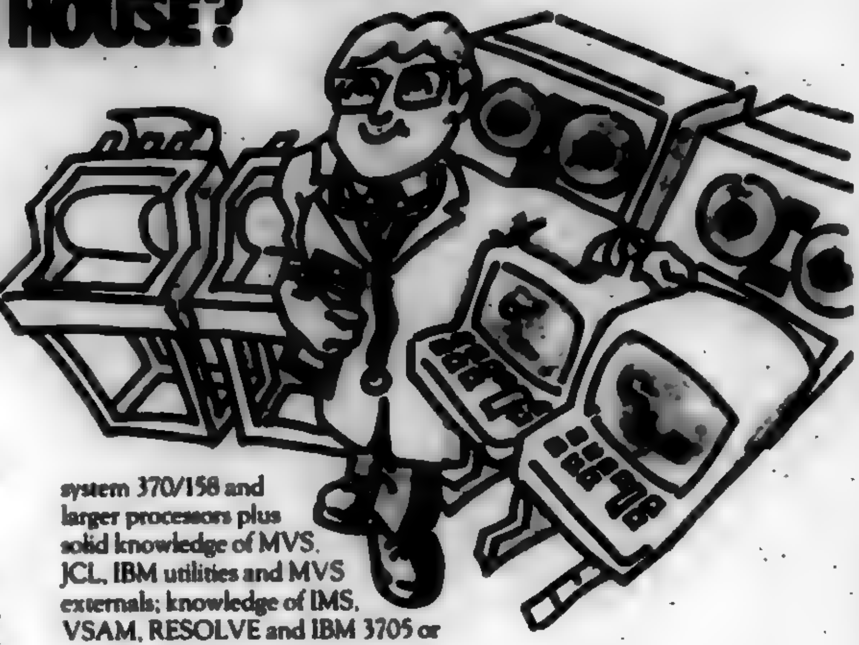

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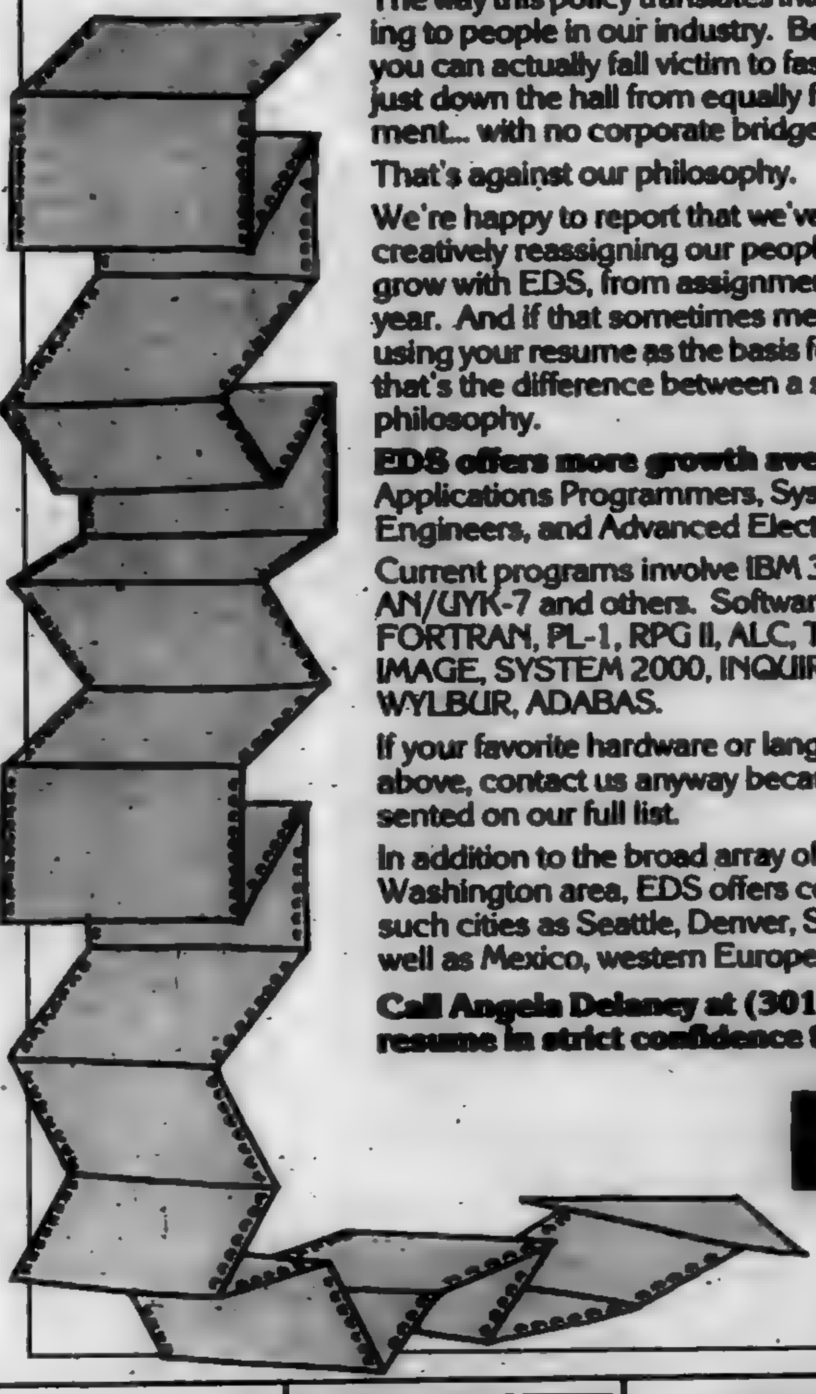

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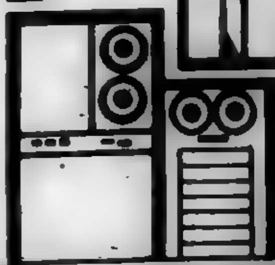

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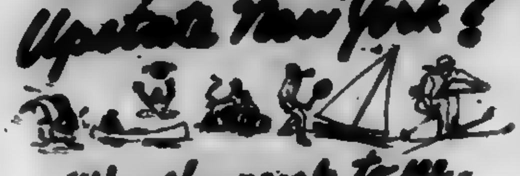
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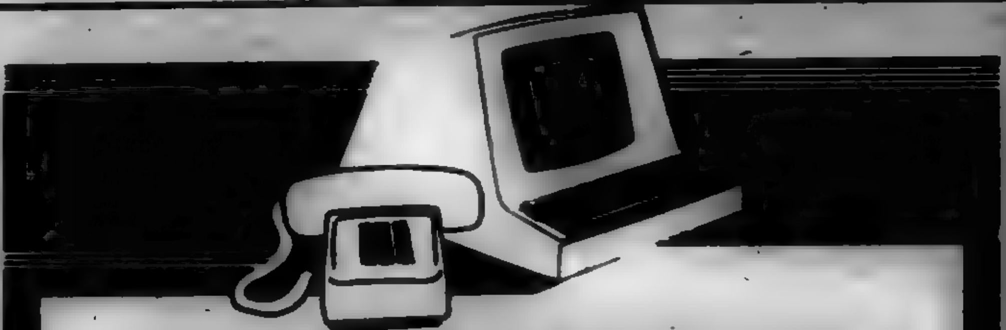

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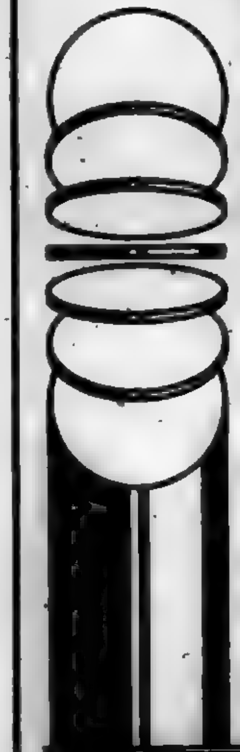

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Irvine, CA 92717

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Requirements include: Heavy COBOL experience, distribution application experience, mini-computer background, medium or large-scale mainframe experience.

This position offers excellent growth opportunities in a rapidly-expanding hardware, software, & applications environment.

Parties interested should forward resume and salary history to:

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Project HOPE, located in the beautiful Shenandoah Valley, seeks an experienced programmer/analyst to assist in the development of new computer applications. Candidate chosen must have a college degree or equivalent experience and be thoroughly familiar with Burroughs hardware and software. Other requirements include six years programming and one year systems analysis and design experience, proficiency in COBOL and experience in structured programming. HOPE offers a salary based on experience and an excellent benefits package including: paid life and health insurance, retirement, etc. For more information send a detailed resume with salary history and requirements to:

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Data Processing Director
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Needed at Odessa College, a comprehensive community college in West Texas. Applicant must have bachelor's degree in computer science or related field and minimum of 3 years non-teaching experience in data processing. Preference given for teaching experience and second teaching field. Instructor may be asked to teach COBOL, FORTRAN, etc. Nine months salary ranges from $17,000 up, depending on qualifications and experience. Many fringe benefits also provided. Applications should be sent to the Assistant to the President, Odessa College, 201 West University, Odessa, Texas 79762, before November 21; or call 915/337-5381, Ext. 352. An equal opportunity employer.

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Fairfax, Virginia

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Candidates should possess the following qualifications: experience in data processing management, experience in a college or university environment, experience with data base management systems and telecommunications network. Outstanding interpersonal, verbal and written communication skills. Salary in mid 30's, negotiable. Resumes should be submitted by Oct. 31, 1980 to Donald T. [illegible], Director University Computing Services, George Mason University, 4400 University Drive, Fairfax, VA 22030.

AA/EOE

UNIVERSITY OF VERMONT
DEC Senior Systems Programmer

The Academic Computing Center requires a systems programmer to help maintain a DEC 2060 system running under TOPS-20. Responsibilities include maintenance of the operating system, system utilities, and language compilers. Some experience with graphics hardware and software and telecommunications is also needed. Applicants should have a B.A. in computer science or a related field, 5 years experience with a time sharing computer system, 2 years experience with Fortran, and 3 to 4 years experience with TOPS-10/20 at the system level. Salary is high teens to low twenties. Excellent fringe benefits package, friendly academic atmosphere, and an agreeable living environment in the Burlington area. For further information contact Dr. David Whitmore, Academic Computing Center, University of Vermont, Cook Building, Burlington, Vermont 05405.

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Public, Two Year Technical College

Faculty position opening in the Business Technology Department to teach in the Data Processing Program. Courses include Systems Analysis and RPG on an IBM System/3. Bachelor's Degree in Computer Science or related area (master's degree preferred), and 3 years experience in the Data Processing field. Position available Jan. 5, 1981. Academic year contract. Salary ranges: Instructor $16-18,000; Assistant Professor $18-19,000; Associate Professor $19-22,000, commensurate with qualifications. Resume deadline is Nov. 7, 1980. Send resume to Personnel Office, Jefferson Technical College, 4000 Sunset Blvd., Steubenville, Ohio 43952.

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position announcements

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- Research & analysis of Automated Traffic Control Systems
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Software Systems Programmer

DOS/VSE generation and maintenance, VSAM tuning, POWER/VSE/RJE and JCL/JECL knowledge desired. IBM 370 shop going to twin 241 group 2 hardware. IBM 3800 family knowledge helpful. Will recommend and implement hardware/software improvement in excellent working environment. Comprehensive benefit package. Mail resume to First National Bank of Akron, Personnel Dept., 106 South Main St., Akron, Ohio 44308.

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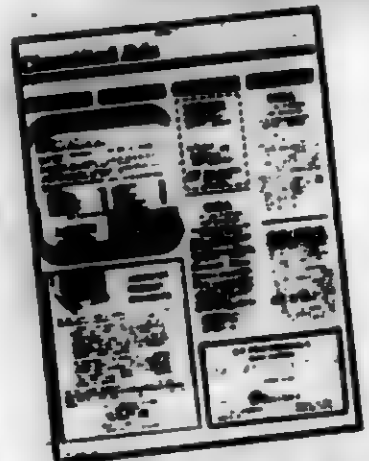

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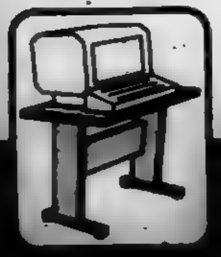

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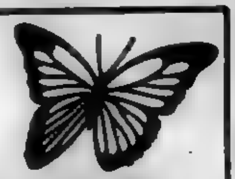

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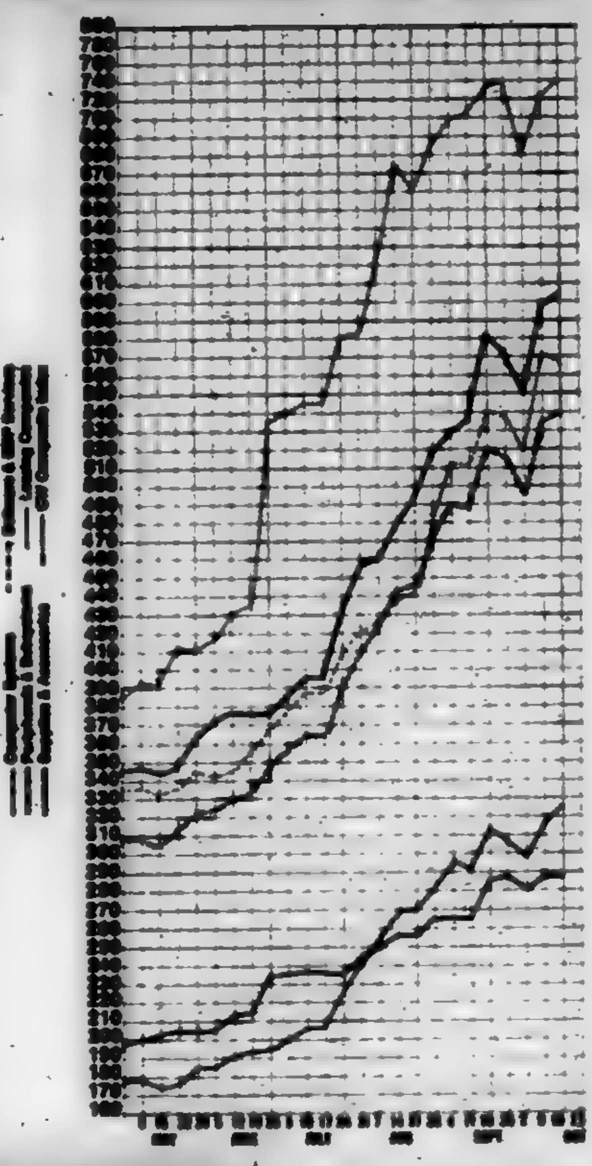

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 15, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES INC.
Cambridge, Mass. 02139

E X C H		PRICE 1979-80 RANGE (1)	CLOSE OCT 15 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	16- 42	33 3/8	+2 1/2	+8.0
N	BURROUGHS CORP	57- 88	59 1/8	-3 1/2	-5.5
N	COMPUTER AUTOMATION	9- 27	22 1/4	-3 1/2	-13.5
N	CONTROL DATA CORP	38- 77	75 1/4	-1 3/8	-2.1
O	CRAY RESEARCH INC	30- 99	94 1/2	+1	+1.0
N	DATA GENERAL CORP	44- 87	80 3/4	+4 1/2	+5.9
N	DATAPOINT CORP	40- 67	60 3/4	+1 3/4	+1.8
N	DIGITAL EQUIPMENT	52- 96	93 1/4	- 1/4	-0.2
A	DECC INC	9- 21	21	+1 3/8	+6.3
N	ELECTRONIC ASSOC.	6- 12	10	- 1/2	-4.7
N	FOUR-PHASE SYSTEMS	20- 45	31	+1 1/2	+4.6
N	FOXBORO	31- 36	32 1/2	+2 1/2	+8.0
O	GENERAL AUTOMATION	7- 19	9 3/8	+1 3/8	+16.6
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	46- 82	81 1/2	+ 3/8	+0.4
N	HONEYWELL INC	65-101	91 3/4	-1 3/8	-1.4
N	IBM	50- 75	70 3/8	+ 3/8	+0.5
O	MAGNUSON COMP SYSTS	20- 37	36	+ 3/4	+2.1
N	MANAGEMENT ASSIST	9- 25	20 7/8	+1 3/8	+7.3
O	MANUFACTURING DATA S	21- 61	64 3/4	+3 3/8	+6.1
O	MINI-COMPUTER SYST	3- 6	3 3/8	- 1/4	-6.8
O	MODULAR COMPUTER SYS	9- 21	20 3/4	+ 1/2	+2.7
N	NCR	53- 83	76	-1 3/4	-2.3
N	PRIME COMPUTER INC.	19- 49	46 7/8	+ 1/2	+1.0
N	PERKIN-ELMER	30- 40	40 3/8	+2 3/8	+6.3
N	SPERRY RAND	42- 60	52 3/8	- 5/8	-1.1
A	SYSTEMS ENG. LABS	11- 45	43 3/4	0	0.0
O	TANDEM COMPUTERS INC	13- 60	57 3/4	+4 1/4	+8.0
N	TEXAS INSTRUMENTS	78-144	130 3/8	-3 3/8	-2.5
A	WANG LABS.	17- 60	57 3/4	- 1/8	-0.2
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	12- 27	26 1/2	+4 1/2	+20.4
N	COMDISCO INC	6- 18	18	+ 1/8	+0.6
A	COMMERCE GROUP CORP.	1- 2	1 1/8	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	1 7/8	- 1/4	-11.7
O	CONTINENTAL INFO SYS	2- 13	6	+ 1/2	+9.0
O	DATRONIC RENTAL	2- 5	4 1/8	+ 3/8	+10.0
A	LCL INC	3- 6	3 1/8	0	0.0
N	PPS INC	9- 12	9 3/4	+ 1/8	+1.4
N	ITEL	1- 15	2	0	0.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TAX CORP	2- 4	3 3/8	0	0.0
N	RELIANCE GROUP INC	26- 70	72 7/8	+ 3/8	+0.5
N	U.S. LEASING	12- 23	22	+1	+4.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

E X C H		PRICE 1979-80 RANGE (1)	CLOSE OCT 15 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	5 1/8	- 3/8	-6.8
O	AMACOMP INC	7- 20	19 1/4	+1 1/4	+6.9
O	ANALYSTS INTL CORP	3- 9	9	+ 3/4	+8.6
A	APPLIED DATA RES.	6- 24	22 3/4	-1 1/8	-5.2
N	AUTOMATIC DATA PROC	31- 52	48	-1 1/2	-3.0
O	COMPUTER HORIZONS	3- 9	6 3/4	+1	+17.3
O	COMPUTER NETWORK	4- 9	6 3/4	+ 1/8	+1.8
N	COMPUTER SCIENCES	11- 30	20 5/8	-7	-25.3
O	COMPUTER TASK GROUP	2- 20	20	+ 1/2	+2.5
O	COMPUTER USAGE	2- 10	8 1/4	0	0.0
O	COMPUT AUTO REP SVC	4- 10	9 1/8	- 1/8	-1.3
O	COMSHARE	11- 21	20 1/2	- 1/2	-2.5
O	CULLINANE CORP	18- 65	64 3/4	+1 3/4	+2.7
O	DATA DIMENSIONS INC	1- 6	1 7/8	+ 1/8	+7.1
O	DATATAB	1- 4	1	0	0.0
O	DSI CORP	4- 9	8	- 1/4	-3.0
N	ELECTRONIC DATA SYST	14- 27	25	- 3/8	-1.0
O	INFORMATICS INC	9- 25	22 5/8	+ 1/4	+1.1
O	INSYTE CORP	1- 3	2 1/8	0	0.0
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/2	0	0.0
O	KEYDATA CORP	2- 5	1 3/4	- 1/2	-22.2
A	LOGICON	12- 27	26 1/4	+ 5/8	+2.4
O	MATHEMATICA INC	9- 18	15 1/2	0	0.0
O	MATHEMATICAL APP GRP	7- 23	20 1/2	-2	-8.8
O	NATIONAL DATA CORP	10- 29	27 1/2	- 3/4	-2.6
N	PLANNING RESEARCH	9- 12	12 3/8	+ 7/8	+7.6
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	6- 9	8	+ 1/8	+1.5
O	REYNOLDS & REYNOLDS	21- 36	36 1/2	+ 1/4	+1.0
O	SYSC INC	6- 19	17 3/4	-1	-5.3
O	SCIENTIFIC COMPUTERS	6- 27	25 1/8	- 1/2	-1.9
N	TYMSHARE INC	30- 76	70 1/4	+7	+9.8
A	URS SYSTEMS	9- 15	14 3/4	+ 3/8	+2.6
N	WYLY CORP	6- 20	10 1/2	-1	-9.3
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 24	15 1/8	- 1/2	-3.2
N	AMPEX CORP	14- 34	33 5/8	+4 3/8	+14.9
A	ANDERSON JACOBSON	9- 18	16 1/2	+ 1/8	+1.5
N	APPLIED DIG DATA SYS	5- 12	11 7/8	- 1/8	-1.0
O	AUTO-TROL TECHNOLOGY	18- 62	54	-3	-5.2
O	BEEHIVE INT'L	3- 18	17 3/4	+1 7/8	+11.8
A	BOLT, BERANEK & NEW	12- 30	30	+3 1/4	+12.0
N	BUNKER-RAMO	17- 41	36	+1 5/8	+4.4
O	CAMBRIDGE MEMORIES	1- 9	7 7/8	- 3/4	-8.0
N	CENTRONICS DATA COMP	20- 55	29 1/2	-2 7/8	-9.8
A	CETEC CORP.	3- 7	7 1/8	+ 1/8	+1.7
O	COMPUTER DEVICES INC	3- 10	8 3/8	- 1/8	-2.0
O	COGNITRONICS	1- 7	6 7/8	+ 7/8	+14.5
O	COMPUTER COMMUN.	6- 10	8	+1 5/8	+25.4
O	COMPUTER CONSOLES	6- 30	28 1/2	+ 3/4	+3.1
O	COMPUTER TRANSCEIVER	1- 5	3 1/2	+ 1/2	+16.6
N	COMPUTERVISION CORP	24- 62	67	-1 5/8	-2.3
N	CONRAC CORP	13- 25	18	- 1/2	-2.7

E X C H		PRICE 1979-80 RANGE (1)	CLOSE OCT 15 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 17	16 3/8	+1 1/8	+7.3
A	DATA PRODUCTS CORP	11- 25	32 5/8	-1 1/2	-4.2
O	DATUM INC	3- 5	5	+1 1/4	+33.3
O	DECISION DATA COMPUT	3- 6	5	- 3/8	-6.9
O	DELTA DATA SYSTEMS	1- 3	2 1/2	- 1/8	-4.7
N	DOCUMATION INC	7- 27	16 1/2	-1 7/8	-10.2
O	DATARAM CORP	8- 37	30 3/4	+ 1/8	+3.0
A	ELECTRONIC M & M	5- 8	7 3/8	+ 3/8	+5.1
O	EVANS & SUTHERLAND	21- 72	64	-2	-3.0
O	FABRI-TEK	1- 4	3 1/8	- 3/8	-10.7
O	GENERAL COMPUTER SYS	1- 6	5 3/8	- 1/8	-2.2
O	GENERAL DATACOMM IND	13- 30	29	+ 1/2	+1.7
O	GENERAL TERMINAL CP	1- 4	1 1/2	- 1/4	-13.7
N	HAZELTINE CORP	15- 33	31	- 1/2	-1.5
N	HARRIS CORP	29- 61	51	+3 1/2	+7.3
O	INFORMATION INTL INC	6- 15	14	0	0.0
O	INTEL CORP	43- 99	48 1/4	-7 1/2	[illegible]
O	INTERSIL	13- 33	32 7/8	- 1/8	-0.3
A	LUNDY ELECTRONICS	4- 17	16 3/4	+3 3/4	+27.2
O	MAI DATA CORP	9- 16	14 3/8	- 3/8	-2.5
N	MEMOREX	10- 26	16 1/2	+ 1/4	+1.7
A	MOHAWK DATA SCI	10- 21	20 1/2	- 1/4	-1.0
O	OMEX	2- 10	12	0	0.0
A	PARADYNE CORP	10- 52	51	- 1/2	-0.9
A	PENRIL CORP	6- 15	12 5/8	+ 1/2	+4.1
O	RAMTEK CORP	10- 18	17 3/4	+ 3/4	+4.4
O	RECOGNITION EQUIP	5- 21	20 1/2	+3	+17.1
O	SCAN DATA	1- 5	3 3/8	- 1/8	-7.3
N	STORAGE TECHNOLOGY	16- 26	23 7/8	+ 1/2	+2.1
O	SYKES DATATRONICS	14- 47	42 1/2	+2 3/4	+6.0
O	T BAR INC	14- 22	21 5/8	+2 1/4	+11.5
A	TEC INC	3- 8	5 1/8	+ 1/4	+5.1
N	TEKTRONIX INC	43- 70	68 3/4	+ 3/4	+1.0
N	TELEX	3- 6	6 1/8	+ 1/2	+8.8
O	TESDATA SYSTEMS CP	6- 16	16	+1 7/8	+13.2
A	TIMEPLEX INC	7- 30	30	- 3/4	-2.4
O	WILTEK INC	1- 3	2 1/2	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 15	13 3/4	- 5/8	-4.3
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	6- 22	20 3/4	-1	-4.8
O	CYBERMATICS INC	1- 1	1 1/8	0	0.0
N	DUPLEX PRODUCTS INC	11- 16	14 1/8	- 3/8	-2.5
N	ENNIS BUS. FORMS	15- 21	16 1/8	0	0.0
N	3M COMPANY	48- 61	57	0	0.0
O	MOORE CORP LTD	27- 37	36 1/8	- 1/8	-0.3
N	NASHUA CORP	20- 35	27 1/2	+1	+3.7
O	STANDARD REGISTER	22- 30	30 1/2	+ 1/4	+0.8
A	TAB PRODUCTS CO	13- 36	33 3/4	- 1/2	-1.4
N	WABASH MAGNETICS	11- 18	16 3/8	+1 1/8	+7.3
N	WALLACE BUS FORMS	32- 44	45 1/8	+ 1/2	+1.1

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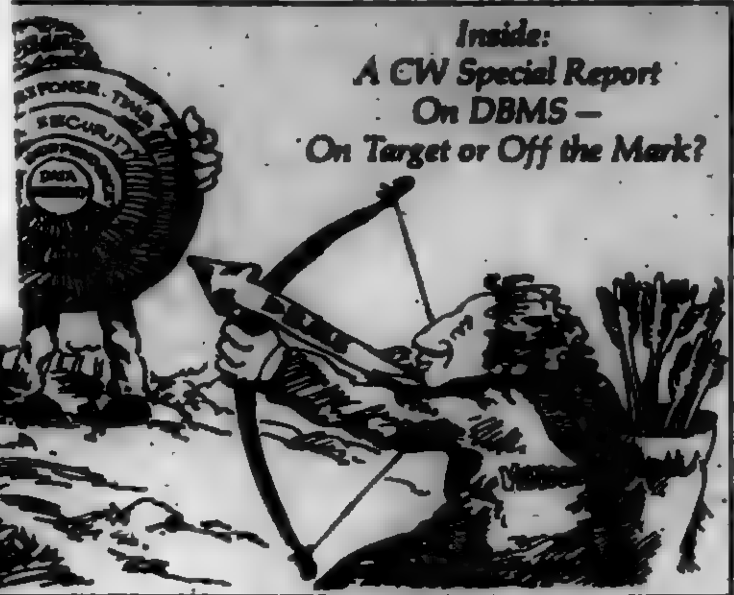
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices
©1980 by CW Communications, Inc.
No. 44 October 27, 1980 $1.00 a copy; $30/year



Inside:
A CW Special Report
On DBMS –
On Target or Off the Mark?

Adabas Vendor Offers Data Base Machine

By Rita Shoor
CW Staff

NEW YORK – A data base management system (DBMS) has been married to a hardware processor and the result of the union was the Data Base Machine (DBM) introduced here last week by Software AG.

The DBM combines the firm's Adabas DBMS with an IBM plug-compatible processor from Cambex Corp. It runs under VS1 and can be tied to any IBM 360, 370, 30 series, 4300 or plug-compatible mainframe in all OS and MVS environments.

Designed to function as a back-end processor, the DBM allows users to off-load data base management functions from their mainframes, thus avoiding what John Maguire, Software AG's president, referred to as "resource saturation" within the installation. "A DBMS invariably uses up a great deal of a machine's resources," Maguire explained, so a mainframe will often be loaded to capacity once the DBMS has been installed.

Third Alternative

In the past, a user that found itself in this situation was required to either upgrade its mainframe or install another machine, Maguire said. The DBM offers a third alternative costing between $300,000 and $400,000 and, in addition, provides maximum performance improvement in terms of transaction throughput of 25% over a DBMS running on a nondedicated mainframe, he claimed.

Components of the DBM include the Adabas DBMS, and Externally Supported Processor (ESP) that is fully dedicated to the data base functions and Channel-to-Channel Communications System (CTCS) to facilitate the transmission of commands, data and status information between the computer and the back-end machine.

The 2M-byte ESP's processing speed is reportedly .75 million instructions per sec (Mips). It has one byte and two block-multiplexer channels and an integrated channel-to-channel adapter.

Said to support a machine cycle time of 50 nsec, the hardware allows for field upgrading of CPU, memory and I/O channels via printed circuit board

(Continued on Page 4)

SBS Planning to Link Local Nets

By Brad Schultz
CW Staff

McLEAN, Va. – Satellite Business Systems (SBS) intends to give users satellite interconnections between local-area networks presently able to pass data at up to 50 million bit/sec over distances of 5,000 feet or less with a device called Hyperchannel.

Network Systems Corp. of Minneapolis markets Hyperchannel and will deliver prototypes of a "satellite link adapter" and "maintenance adapter" to SBS under a deal the companies announced jointly last week.

SBS plans to begin testing these prototypes in the third quarter of 1981, a few months after inaugurating a group of integrated private network services the firm has said will feature switched, all-digital communications among geographically dispersed sites.

A Network Systems spokesman explained that dispersed Hyperchannel installations will employ the satellite link adapter in bouncing traffic off the satellite SBS hopes will be orbiting by then. The maintenance adapter is supposed to aid detection of malfunctions along the links.

Network Systems is developing a local network architecture called Hyperbus that would operate at 1M bit/sec and provide for multidrops over distances of several thousand feet, according to Ivan Frisch, senior vice-president of Network Analysis Corp.

Hyperbus was designed for intercon-

(Continued on Page 5)

DEC Adds Scaled-Down VAX And Two 32-Bit Datasystems

By Tim Scannell
CW Staff

HUDSON, Mass. – Digital Equipment Corp. last week unveiled a scaled-down version of its VAX-11/780 minicomputer that uses bipolar gate array technology to achieve 60% of the original VAX performance at 40% of the cost.

At the same time, the firm announced 32-bit additions to its Datasystem commercial systems line and its first Winchester technology disk drive.

Introduced here at DEC's Hall of the White Mists – a name inspired by a "Dungeons and Dragons"-type computer game – the VAX-11/750 is said to have the performance of IBM's 4331 Group 2 processor, based on benchmarks DEC ran on the 32-bit processor and an IBM 4331 Group 1 in a batch environment. The recent DEC arrival is completely software-

(Continued on Page 6)

MIS Executives Face Changing Times

• 'Playing Ball With Users' Called Route to Survival

By Marcia Blumenthal
CW Staff

NEW YORK – Management information services (MIS) managers are going to have to come out of the locker room and play ball with users if they want to survive in the corporate organization of the 1980s.

But making the move from the safe, clubby environment of the locker room to the turbulent playing field is like constantly running into a 50-pound marshmallow, suggested Richard Dooley, vice-president of RHS & Associates. This is because user departments view MIS departments as soft and think MIS products are elusive, Dooley said during a hard-hitting session at an American Management Associations conference for MIS execu-

(Continued on Page 8)

• Careers at 'Crossroads'; Choices Seen Clear-Cut

By Tim Scannell
CW Staff

NEW YORK – Management information services (MIS) executives, barely accustomed to their new titles and still warming to the job, have come to a crossroads in their careers.

The choices are clear-cut. They can become technological experts, wrapped up in hardware and software and, for the most part, invisible to the user. They can focus on the business angle and actually influence the growth of the information processing field. Or they can become obsolete.

To add to the dilemma, there is only about a 50-50 chance at best that present MIS professionals will take the right road and not wind up being the latest dinosaurs of the information-glutted business

(Continued on Page 8)

• Managing Data Called Challenge of the Decade

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO – A shift in management emphasis will present information processing chiefs with a major professional challenge during the next decade because, although they already know a lot about managing technology, they still have a lot to learn about managing data, an IBM consultant said here last week.

The shift will also force computing managers to reexamine and possibly even redefine their fundamental corporate roles, according to John Zachman, a systems planning consultant with IBM's Western Region.

Is an information systems executive's main responsibility to manage technology, or is it instead

(Continued on Page 4)

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.00 a copy: U.S.— $30 a year, Canada, Central & So. America – $80 a year, Europe and Near East – $90 a year; other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

'More Than Light at End of Tunnel'

IBM Trial Stage May End by Feb. 1

By Connie Winkler
CW Staff

NEW YORK — IBM could rest its case and the Justice Department could complete its rebuttal in the U.S. vs. IBM antitrust trial by Feb. 1, the contending parties indicated last week.

"We see more than the light at the end of the tunnel, no question about it," Judge David N. Edelstein said at a meeting in his robing room Oct. 20, the first in a month.

Robert J. Staal, head of the government team, said the Justice Department would work hard to respond by Dec. 15 to IBM's latest volley of written testimony from its four economists. That written response will also include the government economists' rebuttal testimony.

"The Department of Justice wants to end this at the earliest possible time," Staal said.

Thomas D. Barr, IBM's lead counsel, then said IBM would respond to the government's economic narratives by Feb. 1. "I would hope that we might find ourselves in a position by Feb. 1 where, in one form or another, we could bring the case entirely to an end," Barr added.

It currently appears IBM does not intend to call any more witnesses.

Questions Still Hanging

All this, however, is contingent on several yet-to-be-answered questions, including whether the government will be allowed to depose IBM's economists before submitting its economic narratives and whether either side will seek in-court cross-examination of the economic experts (there has been no live court since June 7). Edelstein said he would rule soon on the deposition question.

The exchange of written narratives was agreed to in a Feb. 7 stipulation. Both sides are now arguing the other wants to change the ground rules of that stipulation.

Staal has also strongly criticized the 4,000 pages of the IBM economists' statements. He called them "rife with lawyer-like arguments of the facts."

So far the statements have only been exchanged between the parties and the court.

Barr argued the statements should be made public to demonstrate the truth. This led to several lively exchanges in the 90-minute conference, which was attended by members of the national press.

Edelstein, as he has through much of the trial, again chastised the lawyers for "personal animosity and emotional involvement that doesn't belong in the courtroom."

The judge also believes the exchange of written statements by experts will prove to be an innovation and will be used in future complex cases.

IBM's economists are Richard B. Mancke of Tuft University's Fletcher School of Law and Diplomacy, Franklin M. Fisher, professor of economics at MIT, Carl Kaysen, who has been at Harvard and Princeton Universities and is now at MIT, and James W. McKie, chairman of the Department of Economics at the University of Texas.

The government economists are Dr. Alan K. McAdams of Cornell University, Leonard Weiss from the University of Wisconsin and Lee Preston from the State University of New York at Buffalo.

'Times' Report Denied

NEW YORK — Both IBM and the Justice Department have denied a report in the *New York Times* last week that settlement talks in the U.S. vs. IBM antitrust case have been suspended.

"They haven't been suspended as far as we are concerned," Mark Sheehan, a Justice Department spokesman, said. And, according to IBM spokesman Edward Nanas, "The talks technically are still on."

Sheehan said the two sides are in telephone contact and the talks, which began Oct. 9, 1979, could be resumed at the appropriate time, although no further talks are scheduled.

The last meeting, which the government described as preliminary, was held June 7.

The *New York Times* said that neither side was willing to take responsibility for suspension of the talks and that the talks had never gotten beyond procedural questions.

This Week

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A message from John R. Bennett,
President, Applied Data Research,
to firms considering DB/DC systems.

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John R. Bennett, President of Applied Data Research, at ADR's new corporate headquarters in Princeton, N.J. This is one of the world's largest facilities dedicated exclusively to the design, development and marketing of systems software for IBM computers.

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Data Base Machine Debuts

(Continued from Page 1)

changes, according to a Software AG spokesman.

The CTCS consists of a user-machine communication module that resides in the host computer and a DBM communications module in the back-end processor joined by a high-speed, channel-to-channel link, he added.

Thus, the Adabas functions are distributed between the host mainframe and the DBM. Data base updates, finds, adds, deletes and disk management are controlled by the Adabas nucleus in the DBM. Applications programs that reside in the host computer call the DBMS through the communications interface module and are translated for transmission to the DBM through the CTCS.

Communications Transparent

Communications between the mainframe and the DBM are user-transparent, Maguire claimed, without affecting either data base activities or applications software.

Configuration possibilities allow for an unlimited number of host machines to communicate with one DBM or for an unlimited number of DBMs to communicate with one or more host mainframes. The first option allows multiple locations to access the same data base and the second provides for specialized data base applications on separate DBMs, Maguire explained.

The DBM provides the foundation for Software AG's concentration on distributed data processing (DDP) and decentralization of function to various geographical locations, he said.

Remote support for both the hardware and software will be provided by Software AG via dial-up lines. "If something goes wrong, we [Software AG] are the first line of contact," the spokesman said. Hardware failures can supposedly be isolated to the chip level and remote console capabilities are provided, he said.

Adabas requires approximately 256K bytes of resident memory in the DBM, and the CTCS software utilizes less than 20K bytes in each mainframe, according to Software AG.

When asked for an opinion as to how IBM might respond competitively to the DBM announcement, Maguire responded that "IBM is still primarily hardware-oriented" and that its motivation to compete with "this software-hardware combination" might be relatively low because of that hardware orientation.

"In large measure, it's the architecture of Adabas that helped Software AG to go this way," a spokesman continued. He said IMS, IBM's data base management system, is "ill-suited" to the DBM concept.

Available in 60 to 90 days, the DBM including all hardware, channels, communications software and a licensed copy of Adabas will cost current Software AG clients about $307,000. New customers will pay $395,000 for the same features from Software AG at Reston International Center, 11800 Sunrise Valley Drive, Reston, Va. 22091.

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Magnuson Working On IDMS Assist

By Rita Shoor
CW Staff

SAN JOSE, Calif. — There are several ways to intertwine hardware and software to increase system throughput and cut down on the overhead involved with data base management systems (DBMS).

One way is to develop a DBMS back-end processor like the one Software AG announced last week (see story on Page 1). Britton-Lee, Inc. had announced one last spring [CW, March 24], but that product is available only to OEMs.

Magnuson Computer, Inc. Systems here said last week it is going in a different direction by working on a microcode assist (MA) feature for Magnuson customers who use Cullinane Corp.'s Integrated Data Base Management System (IDMS).

Described by a spokesman as "being under development and on schedule," the IDMS/MA feature will supposedly add several instructions to the IBM 370 instruction set, replacing frequently used IDMS routines.

The IDMS/MA will be the first in a series of microcode assist packages planned by Magnuson, Kevin Anderson, Magnuson's vice-president of software, informed attendees at a recent IDMS users conference in Las Vegas.

While Cullinane technicians did "isolate the parts of the system [IDMS] that were most used" and, therefore, candidates for conversion to microcode, the microcode will actually be developed and marketed by Magnuson, according to spokesmen for both firms.

Based upon the assumption that IDMS/MA development will continue to be "on schedule," the feature will be available in the first quarter of 1981 and is expected to carry a unit price of $5,000.

Challenge of '80s Described

(Continued from Page 1)

to manage data as a corporate resource?

Efforts to resolve that thorny issue are likely to preoccupy information processing professionals for much of the coming decade, Zachman said at an International Data Corp. executive conference on "Improving Information Processing Profitability and Productivity."

Six Stages

Zachman likened the typical systems evolution to a learning curve consisting of six stages: initiation, expansion, control, integration, data administration and data resource. Each phase lasts approximately four to seven years.

The first two stages are characterized by systems installation, initial success, user enthusiasm and rapid applications deployment. By the time a system reaches the third stage in its evolution, top management has become so alarmed at the explosive growth in its computing expenditures that it has clamped a moratorium on further applications development.

The imposition of a moratorium places a user's information systems department in a classic bind between shrinking development resources and galloping user demand.

To ease the budget pinch, the computing department typically acquires a data base management system in the hopes of consolidating its many applications and possibly freeing some of its otherwise committed resources to new project development, Zachman said.

Somewhere at about this point in stage 3 of its systems evolution, a user's management emphasis begins to undergo a subtle but highly significant shift. Prior to the change, a company's systems department typically stressed the management of hardware and technology, but afterwards, the focus of its professional attention turns instead to management of data.

The transition from managing technology to managing data marks an evolutionary turning point and lies roughly midway in a user's journey toward full systems maturity, when a company begins managing its data like any other major corporate resource.

By the time it reaches the final phase of its systems evolution, a company's computing department has ceased to exist as a DP organization in the traditional sense of the term. Most of the classic DP services have long since been distributed and placed in the hands of the nontechnical people who need them.

The only functions that remain directly under the computing shop's control are responsibility for maintaining hardware and responsibility for managing data, Zachman said. At this point in its evolution, the systems organization is doing roughly the same thing for a company's data that a corporate finance department does for the firm's cash.

Just as the finance department designs a companywide chart of accounts and sets policies for managing money, so does the information processing organization develop a uniform systems architecture and create policies for controlling data, Zachman explained.

Because of the computing field's comparative youth, no user organization has yet had an opportunity to reach the final phase of its systems evolution. In fact, even today's most advanced users — a group that includes about 50% of the Fortune 500 — have progressed only as far as Stages 3 or 4, Zachman said.

The cost, risk and difficulty involved in scaling the upper reaches of the learning curve might convince some users that they would probably be better off not attempting the climb at all, the consultant said.

For the time being, users are unlikely to suffer any serious consequences if their systems evolution temporarily stalls at the third or fourth stage of the six stages. But sooner or later, external factors such as growing resource shortages will force reluctant users to abandon the status quo and resume their slow progress up the systems learning curve, Zachman said.

Univac Climbs on X.21/X.25, ISO Bandwagon

By Brad Schultz
CW Staff

BLUE BELL, Pa. — Univac last week joined Honeywell, Inc. in declaring support for the X.21 and X.25 communications interface standards and the International Standards Organization's (ISO) open systems interconnection reference model.

Univac announced it has completed pilot testing of certain X.21/X.25-compatible products using Canada's Datapac, a public packet-switched network. The Sperry Corp. division will now commence a phased implementation of both hardware and software X.21/X.25 products over the next two years, a spokesman stated.

Besides giving customers access to North American packet-switched networks such as Datapac and those offered by GTE Telenet Communications Corp. and Tymnet, Inc., Univac plans to offer interfaces to public packet nets in Europe and Japan, where IBM already offers X.21 and X.25 compatibility.

The Consultative Committee for International Telephone and Telegraph's (CCITT) X.21 and X.25 standards address the three lowest levels of the ISO's open systems interconnection model and are not presently supported in the U.S. by IBM. That vendor's Systems Network Architecture (SNA) imposes more centralized control than the ISO model and has been criticized as "locking" network users into sole-source dependence on IBM — even to the exclusion of plug-compatible vendors [CW, Oct. 6].

Meanwhile, Honeywell has called its new X.21/X.25-compatible Distributed Systems Architecture (DSA) the "blueprint" for Honeywell DP products in the 1980s [CW, Oct. 13]. And a top Univac executive has remarked that "support of these [packet-switched network] standards will be part of our Distributed Communications Architecture (DCA), which provides our customers with the guidelines and capabilities to employ communications networks that best fit their organizational needs."

The ISO model allows users to interconnect different network architectures serving multivendor networks. This approach defines seven functional layers of standardization ranging from the "nuts-and-bolts" physical control layer of connections between devices to the application layer, which would concern end users as the context for program execution and data base access.

While application (layer seven) would engage the end user's attention, the lowest levels — physical control, data link, network and transport (layers one through four) — would typically be user transparent, and the next higher levels — session (layer five) and presentation (layer six) might only concern systems planners and network managers in the user organization.

While the ISO continues to develop layers four through seven of its open systems model, only Univac's DCA among architectures announced to date by major vendors specifically includes the model's first layer in its definition, one analyst has concluded. At the second layer, where data is passed across network links, only DCA and Burroughs Corp.'s architecture appear to fully support the High-Level Data Link Control (HDLC) protocol, he said.

The Synchronous Data Link Control protocol within SNA forms a functional subset of HDLC, the analyst explained.

Another analyst has remarked that the ISO model, in contrast to SNA, permits the network manager to better remove problems of routing data from one end of a network to another from local problems like managing multiple paths between particular nodes.

SBS Link Ahead For Local Nets

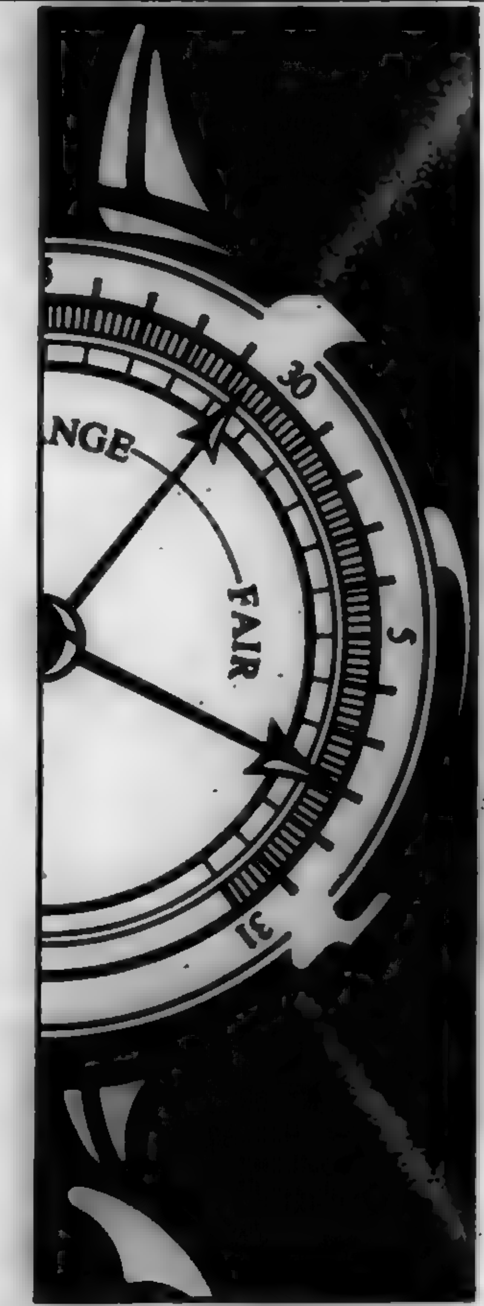
(Continued from Page 1)

nection of terminals or computers of different vendors through devices called bus interface units, Frisch told *Computerworld*. The Hyperbus access protocol is quite different, he said, from those featured by two other local net schemes, Mitre Corp.'s Mitrenet and Ethernet, the joint offering of Xerox Corp., Digital Equipment Corp. and Intel Corp.

Until recently, the Institute of Electrical and Electronics Engineers' (IEEE) Data Link Media Access Committee (DLMAC) appeared ready to adopt as the industry standard for local nets something very similar to Ethernet, whose specifications were recently made public [CW, Oct. 6]. But the access protocol and other issues, such as whether to integrate video with data communications (Ethernet excludes video), suddenly appear far from resolution by the committee, Frisch noted.

The DLMAC recently voted to delay submitting recommendations on a local net standard pending further investigation of these issues. Delay probably hurts Xerox more than the other backers of Ethernet, Frisch surmised, because Xerox has moved farther in preparing an Ethernet-based product line on the assumption that Ethernet would essentially be the standard.

For "proprietary reasons," SBS and Network Systems declined to say how much development of the service will cost. The latter company's address is 6820 Shingle Creek Parkway, Brooklyn Center, Minn. 55430.



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DEC Unveils Scaled-Down VAX

(Continued from Page 1)

compatible with the VAX-11/780, introduced by DEC a little more than three years ago.

The VAX-11/750 incorporates low-power gate array circuitry rather than the TTL and integrated circuits used in the 780 machine. The 750 is reportedly the first 32-bit minicomputer to take advantage of existing large-scale integration (LSI) gate array designs.

The gate array chips in the 750 — 55 in each processor and 90 in each full system — are said to each perform the function of 25 integrated circuit boards. However, the arrays use only half the power of the printed circuits and reportedly have four times the reliability.

Using gate arrays also reduces the number of printed circuit boards from 12 in the 780 to only five in the 750, according to Don McInnis, the computer's product manager.

While the 750 shares many of the same features of the 780 — such as the same 32-bit word length, 4.3G-byte virtual address space and 2G-byte maximum program size — the systems do have some distinct differences. For instance, the 750 has a 4K-byte integral bipolar cache memory while the 780 has an 8K-byte cache.

The 750 also boasts a 5M byte/sec I/O bandwidth as opposed to its older brother's 13.3M byte/sec bandwidth, and the newest VAX has an optional 80-bit word size, 1K-byte random-access user control store while the 780 has a 99-bit word size, McInnis said.

Distributed Target

While DEC forecast that the VAX-11/750, like its predecessor, will have its largest impact on the scientific processing arena, the firm also hopes the machine will find a solid niche in the commercial area, "where smaller CPU costs and hardware are called for," McInnis observed. In particular, the minicomputer maker is aiming the 750 — which, in laboratory conditions, has "comfortably" handled up to 32 concurrent users — at the distributed processing marketplace.

However, a DEC representative at last week's announcement declined to define what the company meant by "distributed processing" except to say that such an ability would bring "more power of the computer out to where the job is being performed."

One drawback, however, is that neither VAX processor has a data base management system (DBMS).

The VAX-11/750 is geared to take advantage of the firm's Decnet networking facility and IBM's 2780 protocol. Also, as previously announced, DEC has committed itself to adhere to IBM's Systems Network Architecture and the X.25 protocol in planning for future systems and integrations.

Winchester Drive

At the same time it made its VAX-11/750 introduction, DEC also unwrapped a 124M-byte Winchester-technology disk drive designed for the firm's 32-bit computers. The RM80 has sealed read/write heads, platters and spindle to eliminate outside contamination.

The disk has an average seek time of 25 msec and an average access time of 33 msec. The unit's data transfer rate is 1.2M byte/sec.

The RM80 is available with single-port or optional dual-port access. In addition, up to eight RM80s or other DEC disk drives can operate on a single VAX controller.

Datasystem 700

Caught up in VAX fever, the minicomputer manufacturer also unveiled 32-bit versions of its Datasystem 700 series commercial computer line. The D750 and D780 join the Datasystem 300 and 500 series and are capable of up to four times the performance of the previous systems, a spokesman said.

The D700 series boasts the 4.2G-byte virtual address space and 2G-byte user program space of the VAX architecture as well as the information management capabilities common to the 300 and 500 series machines. A standard D780 configuration consists of 1M byte of memory, the RM80 disk drive, a high-speed tape drive, VAX-11 Basic, VAX-11 FMS and Datatrieve.

All of the recently debuted systems utilize DEC's 32-bit Fortran, Cobol, Basic, PL/1, Pascal, Coral 66, Bliss-32 and PDP-11 programming languages and utilities.

CW Photo by T. [illegible]

Don McInnis, DEC's 11/750 product manager, uses a clear-plastic paneled processor to show off the bare VAX.

The entry-level 11/750 package with two RK07 28M-byte disk drives and VAX/VMS operating system costs $69,900. A larger system with 1M byte of memory, the operating system, a TS11 1,600 bit/in. tape drive and the RM80 disk drive costs $120,000. An OEM version is available for $47,000.

Initial deliveries of the 11/750 begin next month. However, volume shipments of the entry-level machine will not start until April and not begin until two months later for the system with the RM80 drive.

Prices for the Datasystem D750 with 512K bytes of memory, two 28M-byte disk drives, VAX-11 Basic, VAX-11 FMS, Datatrieve and the firm's customer support package start at about $100,000. The larger D780 system with the 124M-byte Winchester disk is priced from $250,000. Deliveries of both systems will commence in April and January respectively.

Finally, the RM80 disk drive and controller costs $29,900 and add-on units cost $19,900. Deliveries of the unit will start at the beginning of next year.

Why DEC Went This Array

HUDSON, Mass. — The bipolar gate array chip was not the only technology considered by Digital Equipment Corp. before it began building the VAX-11/750 processor introduced last week. Researchers at the firm's manufacturing plant here investigated most other popular circuitry before deciding on the gate array design.

MOS technology was eliminated because it did not meet performance goals set by DEC in the initial VAX-11/750 planning phase. TTL circuits were scratched because they would have added too many boards to the processor and would negate the whole idea of a smaller machine.

The gate arrays were finally chosen because they occupy only 20% of the space on a printed circuit board, cost less than half as much as the other technologies and are said to be four times as reliable. As a result, the 750's cabinet size matches that of DEC's PDP-11/44 and PDP-11/23 systems.

The custom-designed gate arrays are one of the first products to come out of DEC's intergrated circuit manufacturing facility here in Hudson, Mass. However, because of anticipated demands for the new VAX system, DEC has contracted with two unidentified independent chip manufacturers to produce the arrays.

IBM Updates Displaywriter With Math Support, Storage

FRANKLIN LAKES, N.J. — IBM has enhanced its four-month-old Displaywriter text processing system so that the system can perform basic mathematical calculations and expended text processing operations and also provide increased "electronic dictionary" functions and storage capacity.

The math, text processing and expanded spelling capabilities are made possible by two new licensed programs on prerecorded diskettes called Textpack 3 and Languagepack. The increased storage is provided by two new diskette units that can store more than three times as much information as previously available disks — up to about two million characters of information, IBM said.

Textpack 3 enables a typist to change in one operation a word or term used throughout a document, to automatically merge standard and variable information and to assemble documents from previously stored information. It also provides support to enable an operator to verify addition, subtraction, multiplication and division and automatically rearrange stored statistical data, IBM said.

Languagepack features a verification aid that checks the spelling of documents typed in French, French Canadian, Spanish, German, Italian and Dutch, as well as forms of English commonly used in the U.S. and the UK.

Increased storage is provided by a dual-sided, double-density diskette, the Diskette 2D, which can be used with new single and double diskette units that can be attached to the Displaywriter by the user.

The monthly fee for Textpack 3 is $25; deliveries will begin next September. Languagepack costs $15/mo and deliveries will begin in May.

The single and dual diskette units are, respectively, the IBM 6360 Diskette Unit Model 20, which costs $1,700, and the Model 22, which costs $3,300. Deliveries are scheduled to begin in June.

IBM's Office Products Division is at 400 Parson's Pond Drive, Franklin Lakes, N.J. 07417.

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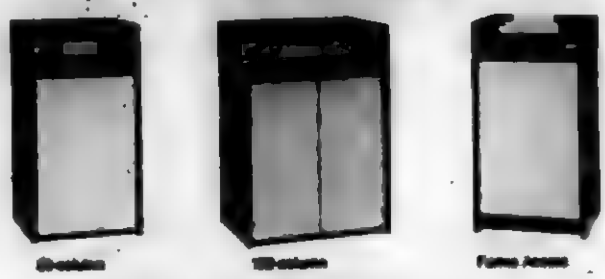

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52% Attracted by Price/Performance

Most VAX-11/780 Users Pleased, Survey Finds

[redacted]

CW Staff

NEW YORK — Sixty-seven percent of the users of Digital Equipment Corp.'s VAX-11/780 would unconditionally recommend the system to others, a recent survey found.

Today, about 80% of VAX systems are used primarily for scientific, engineering or educational applications, but some 50% of new VAX installations will be for commercial purposes, predicted MSRA, Inc., the firm here that performed the survey.

That prediction appears to be on the right track. Last week, DEC introduced its VAX-11/750, which is expected to be aimed at commercial users. The 780 is too big for commercial applications, one DEC executive noted at the firm's press conference announcing the addition to the VAX family.

Of the 39 surveyed VAX-11/780 users representing 56 systems, 52% chose the VAX because of price/-performance, while another 28% rated compatibility with other DEC system and/or software and the virtual memory operating system as selection determinants. The virtual memory operating system was judged by 41% of the users surveyed as the most attractive feature of the system.

In assessing the advantages of a 32-bit system, 44% of the users cited address space as the principal advantage and 31% mentioned speed, the MSRA survey noted.

Although users had some complaints about the system, MSRA concluded the beefs were more directed at DEC as a vendor than at the system.

Availability 'Fair to Poor'

Sixty-seven percent of the respondents rated DEC fair to poor on availability of hardware and/or software. While users were highly satisfied with the VAX's operating system and compilers, 72% called the applications software "poor."

About one-third of these users said they would like applications packages for business, computer report instruction packages, a Cobol manufacturing system package and a graphics package. Ninety percent of the users surveyed now do nearly all of their own applications packages.

Those surveyed would also like to see DEC improve software compatibility between the VAX and other DEC systems, better networking software and a faster Fortran compiler.

The reason most frequently cited (56%) for installing a VAX was for expansion or new applications. When the replacement of other equipment was involved, the VAX displaced Control Data Corp. hardware in 13% of the cases and IBM's equipment and DEC's own equipment in 8% of the cases.

Other Systems Evaluated

Although 74% of the users installing VAX systems were already DEC users prior to selecting the VAX, 46% of the respondents said they evaluated Prime Computer, Inc.'s systems. Moreover, 26% examined IBM's offerings and 23% considered Systems Engineering Laboratories, Inc.'s (SEL) system or hardware from Hewlett-Packard Co.

While ultimately rejecting Prime, many users surveyed noted the high-end Prime 750 was not available at the time. However, 50% of the respondents who mentioned Prime as an option concluded that the VAX outperformed the Prime system overall.

IBM systems evaluated were the 4300, System/34 and 370/138. One reason users gave for rejecting IBM's systems was their batch-oriented architecture.

In classifying users, the MSRA survey found that 36% of the VAX users were at universities, 23% in corporate research and development departments and 13% at OEM sites.

Contrary to the growing preference among users for leasing equipment, 77% of the VAX users surveyed purchased their systems.

This trend toward purchase did not seem to be related to the size of the user's annual DP budget, which varied widely. Some 51% of the users had budgets in the less than $250,000 to $1 million annual range, while 31% had an annual DP budget of between $1 million and $10 million. The average breakdown of expenditures was 44% for hardware, 29% for software and 27% for maintenance.

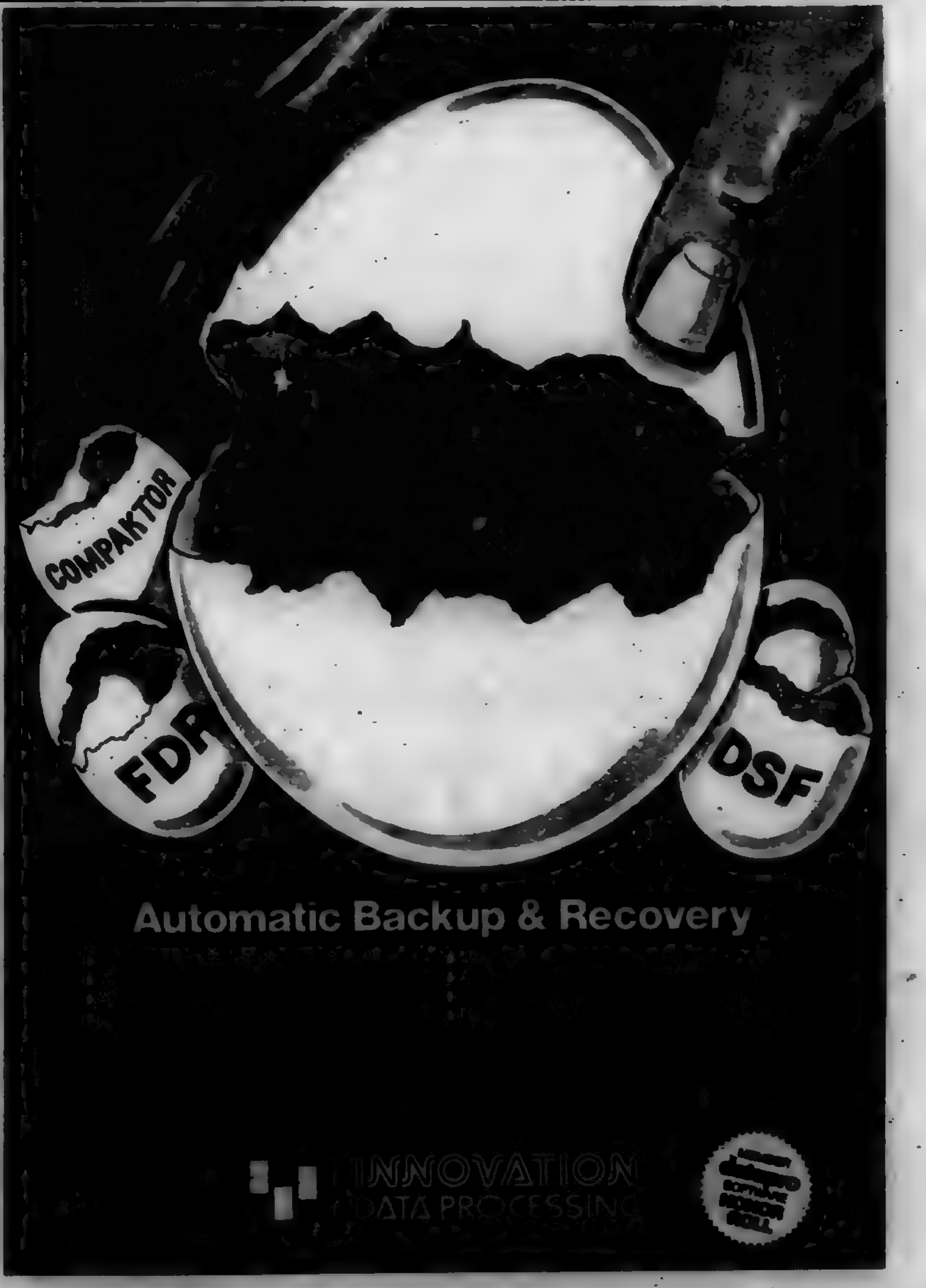
Major Competition

At the present time, DEC's major competition in the 32-bit market comes from Prime, SEL and Perkin-Elmer's Computer Systems Division. However, as 32-bit systems become more oriented to the commercial sector, VAX will compete more with IBM systems, as well as HP's anticipated 32-bit mini offering, MSRA predicted.

Currently, 1,600 VAX-11/780s are [redacted]

Many users noted the VAX system would be appropriate for commercial applications because of its price/-performance relative to mainframes, its Cobol compiler, speed, instruction set and DEC's support.

The 127-page survey is available for $600 from MSRA at 115 Broadway, New York, N.Y. 10006.



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Managers Advised to 'Play Ball' With Users

(Continued from Page 1)

tives here recently.

The corporate executive sees total expenditures for MIS going up and considers this a con game because the benefit of information processing to the company's bottom line is not evident.

"We haven't done a good job of making it clear how the benefit of what we do gets to the bottom line. Instead, we look like overhead or a bureaucracy to management," he contended.

Moreover, MIS departments have standards they don't want to alter to support what users need, which in turn makes users think systems professionals are throwing obstacles in their way, Dooley observed.

"Most of the stuff run in the MIS department isn't touched by users. So the secret is pushing more IP (information processing) power out to the user," Dooley asserted.

This isn't easy for most IP professionals, he admitted, but urged his audience to remember "your company is not in the data-processing business." And, although it may be hard to swallow, MIS is nevertheless a staff function, not a line function in the organization. MIS managers are going to have to stop giving directives to users, he warned.

The resistance of users to systems professionals is already seen today in many organizations as user departments bypass the central DP operation for purchasing. Vendors like the telephone companies and micro and mini vendors are selling directly to user departments. Even the hobby shops are targeting managers of small units within the company that do not want to deal with the central DP unit, Dooley suggested.

"This makes it look like our function is simple," Dooley contended.

Equal Responsibility

While he stressed the need for IP professionals to improve communications and service with user departments, Dooley placed equal responsibility on user groups within the organization.

Users of MIS services must set priorities for their own departments and assess the benefits of the applications they want, including cost justifications, Dooley maintained. "Up until now the user wasn't on the hook for benefits."

Moreover, user departments should be in on some of the technical reviews of applications and should take responsibility for implementing and promoting them within their departments. It has been all too easy to blame the IP department when things go wrong, Dooley observed.

And, things will go wrong.

Expect problems. "The systems business is a flow of problems asking for solutions," he pointed out.

Although Dooley conceded that poor communication between systems personnel and user departments won't change overnight, he suggested some steps toward removing friction between the two departments.

MIS departments must have a link to users. "Identify an IP liaison in each division," Dooley suggested, adding that an M.B.A.-generalist type would be the ideal link.

Instead of killing the user departments with data, MIS staffs should try to understand the feelings of people in these departments, he suggested. "If you want to optimize communications, you must increase trust."

MIS Adapting, Managers Say

NEW YORK — Are management information services (MIS) departments changing with the times? "Yes" is the answer based on spot interviews with some of the 30 MIS managers attending an American Management Associations conference here recently.

Wallace Smith, director of DP for Home Box Office, said his company is so new that the information processing function has not had time to become rigid. The company is getting user departments involved, especially by using nonprocedural languages.

Some analysts complain about losing control, Smith noted, but they must change.

At New Jersey Bell, the total MIS function is being reorganized based on a recommendation of the parent company, AT&T.

User departments will become more involved with application design specifications, conversion and implementation. Using matrix management, one large system has already been installed, the company's MIS director reported.

Robert Beatty, MIS director at Cincinnati Electronics Corp., said his department's liaison with the manufacturing, finance and purchasing departments have been reorganized. One staff person from each of these functions now works with the MIS staff.

MIS Careers Considered at Crossroads

(Continued from Page 1)

world, according to A. Jackson Forster, director of corporate systems and data processing for the New Jersey-based Ingersoll-Rand Co.

Speaking last week at an information technology seminar held by the American Management Associations (AMA) at its headquarters here, Forster offered a glimpse of the MIS executive's changing role in business and laid out some basic groundrules for corporate survival. He was aided in his presentation by Samuel B. Harvey, senior vice-president of RHS & Associates, Inc., also in New Jersey, who detailed some expected technological developments.

Attendees at the two-and-a-half day conference included MIS professionals from such firms as Eastman Kodak Co., Univac and the Bank of America.

While Harvey described computer hardware as almost a giveaway, dropping in price an average of 10% a year, he stressed that communications, particularly fiber optics, will be the moving force in the information processing arena. Likewise, such software developments as independent data base management systems — set apart from applications programs — and nonprocedural programming languages will serve to give the user more control over a local system.

It is important, then, that MIS professionals not be tied too tightly to the technological end of an information system, Harvey said — particularly since the technologies, protocols and multiple "standards" are so volatile.

Managers locked into the technology mold are controlled by the user and are slaves to the equipment. Eventually, these managers will be relegated to maintaining old applications, Forster pointed out, continuing with Harvey's theme, the MIS future.

On the other hand, MIS executives who travel the right path and focus on business will have a chance to work with users toward information resource goals and coordinate the technology specialists. They will also be better able to justify meeting MIS costs, which are rising 15% to 18% per year, Forster noted.

By adapting to the business mold, MIS executives could regain lost territory in the business field, "where we have tried and failed for 10 years," Harvey stated.

Ten-Point Plan

Wrapping up his MIS pep talk and warning, Harvey offered a 10-point strategy for surviving on the often-stormy information management seas:

1. Understand the changing situation.
2. Be aware of technology trends.
3. Understand the controlling factor in an organization.
4. Recognize this factor's significance to MIS activities.
5. Obtain strategic direction and guidance from top management, lest you be shot down early in the game.
6. Develop a strategic systems plan involving a business slant, with user control and all the information capabilities at your disposal.
7. Utilize the newest application development tools, such as nonprocedural programming languages, to impact systems development work.
8. Organize the department to meet any new requirements. This involves coordinating the business specialists, the technology and the planning departments.
9. Develop an effective relationship with the business sector.
10. When the capabilities exist and are proven, push into the business mainstream with a passion, but be constantly aware of new and developing technology.

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Memo Surfaces in Australia; Reportedly Tells IBM Reps How to Discredit Users

By Brad Schultz
CW Staff

CANBERRA, Australia — A document that reportedly tells IBM salespeople how to discredit users who recommend against buying IBM equipment has surfaced amid charges that IBM got preferential treatment from Australia's Federal Department of Housing and Construction (DHC) in winning a computer contract worth more than $40 million.

The charges were leveled not long before Australia's recent national elections by Tom Uren, the DHC shadow minister and a high-ranking member of the Australian Labor Party. Uren told fellow members of his country's House of Representatives that IBM got the DHC deal as a "sop" because the vendor failed to land a $23.4 million computer contract from the Australian Bureau of Statistics last November.

The award went to Fujitsu Ltd.'s subsidiary, Facom Australia Ltd., instead and was considered a major blow to IBM's prestige in Australia.

The DHC minister, Raymond Groom of the Liberal party, has denied Uren's charges that he showed favoritism toward IBM. If the Liberals had not won the recent elections, Uren would theoretically have taken Groom's job.

Uren has presented Parliament with a document he claims is a summary of IBM's marketing strategy for handling DP users whose procurement staffs decide to buy from a competitive vendor. Without explaining how he obtained the document, Uren said it was sent to IBM Australia by IBM Canada.

IBM Counters

However, IBM Australia, managing director, A.G. Moyes, countered that the document appears to be advice to buyers of capital equipment on how to defend their selection decision rather than a marketing strategy. "We have been unable to identify the source of the material," Moyes claimed. "But we are confident it was not produced by IBM."

The document sets forth tactics a vendor sales representative might use to discredit in the eyes of user management a person or staff that recommends against buying from the rep's company. But IBM is not mentioned by name. "All marketing personnel must recognize that there is never a technical or cost reason for the selection of competitive equipment," the document began. "The reason for the loss of any sale is a marketing error.

"The intent of this strategy is to expose marketing errors and correct them before the prospect makes a potentially damaging mistake," the document continued.

"An important part of this strategy is to occupy management's time, to worry the [procurement] recommender and evoke displays of emotion from him, thereby giving proof positive of his loss of objectivity. The recommender's management is cast in the role of the older, wiser head who must now bring the errant child back into line."

Uren called the document "a remarkably frank if crude statement of corporate manipulation of government bureaucracies." The Labour shadow minister indicated that IBM Australia applied the tactics outlined in the document to DHC administrators in the course of securing the $40 million deal.

Moyes has denied Uren's claim that IBM Australia plans to close its office in Canberra, Australia's national capital, because of a poor sales record there. IBM holds the largest market of total computer sales to Australia — a share estimated to be roughly 40% — but the vendor presently holds only a 3.6% share of sales to the nation's federal government, according to a recent survey.

The thrust of Uren's allegations about IBM in Canberra was that termination of an office here would make the Australian federal government's IBM installations less important, in terms of priority for service and support, to IBM. This would undermine the quality of DP at those sites, the shadow minister indicated.

Service Provides System Details

CHERRY HILL, N.J. — A DP information service that is updated monthly for managers of small, medium and large DP systems has been announced by Data Decisions, Inc.

"Computer System" provides detailed reports, specifications and prices on all currently marketed hardware, software, office automation and data communications products from major vendors. The reports are contained in two loose-leaf volumes and emphasize current information, ease of use and wide scope of product coverage.

Each report includes a product overview, an analysis of strengths and weaknesses, a hierarchical description of features and prices, user reactions, vendor profiles, product comparisons and alternatives. Charts and graphs are designed to help subscribers compare typical purchase/lease prices for complete systems, hardware or software.

Subscribers to the service also receive:

- Twelve monthly supplements of recently announced features and options, updated prices and analyses of technological trends.
- Twelve monthly newsletters covering late-breaking news, corporate mergers, acquisitions and reorganizations and a calendar of trade shows and seminars.
- A "dedicated hot line" telephone service offering unlimited consulting support for those with specific questions about products or applications.

"Computer System" is the first of a line of information services planned for release by Data Decisions, an affiliate of Ziff-Davis Publishing Co. Available on a charter subscription basis, the package costs $590 through the end of 1980 or $635 thereafter.

For more information, contact Data Decisions, Inc., Suite 312, 20 Brace Road, Cherry Hill, N.J. 08034.

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REGION	POSITION	COMMERCIAL PROGRAMMERS AND PROGRAMMER ANALYSTS				SYSTEMS (SOFTWARE) PROGRAMMERS			SENIOR ANALYSTS, PROJECT LEADERS AND CONSULTANTS		
		Experience:				Experience:			Experience:		
		6 Mo-1 year	1-2 years	2-4 years	More than 4 years	1-2 years	2-4 years	More than 4 years	2-4 years	4-6 years	More than 4 years
[illegible]											
NEW ENGLAND	Boston	16,800	19,800	22,900	27,600	24,100	30,600	33,700	26,800	29,700	32,600
	Hartford	15,300	18,700	21,500	25,500	21,500	26,700	31,100	24,300	28,500	28,300
	New Hampshire	14,700	17,400	18,500	22,000	19,800	22,000	26,900	21,000	23,500	26,700
MIDDLE ATLANTIC	New Jersey (Central & Northern)	15,000	18,500	21,800	25,800	21,500	26,200	31,400	26,400	27,800	31,500
	New York City	16,700	20,300	23,500	29,500	22,800	27,000	33,800	25,500	30,300	37,100
	Philadelphia	15,000	17,700	21,100	23,800	20,500	23,900	29,000	23,400	26,300	29,800
EAST NORTH CENTRAL	Chicago	16,400	18,300	21,200	24,800	21,100	24,600	29,600	24,400	27,500	31,500
	Cleveland/-Columbus	14,200	17,100	20,700	23,400	20,900	25,300	30,400	23,900	26,900	30,500
	Columbus Detroit	15,300	18,500	21,500	25,000	20,900	24,900	26,400	24,600	28,500	31,700
WEST NORTH CENTRAL	Kansas City	15,500	18,600	21,400	24,600	20,600	24,800	29,200	24,100	27,200	30,500
	Minneapolis/-St. Paul	15,400	18,500	21,300	24,400	20,200	24,100	29,000	24,100	26,900	30,300
	St. Louis	15,700	18,600	22,600	24,800	20,300	26,800	33,500	25,600	29,200	33,700
SOUTH ATLANTIC	Atlanta	14,900	17,400	20,300	24,200	20,100	24,200	29,100	24,600	27,800	31,400
	Miami	14,000	17,400	19,500	24,200	20,200	23,700	28,500	23,500	25,800	30,500
	Washington, D.C.	16,500	18,800	22,100	25,300	23,400	28,600	34,200	26,900	29,500	33,200
SOUTH CENTRAL	Dallas/-Ft. Worth	14,900	17,900	20,400	23,800	19,800	23,400	28,500	22,700	26,500	29,800
	Houston	15,400	18,500	21,200	25,100	20,800	25,100	29,800	24,500	28,000	30,800
	New Orleans/-Baton Rouge	13,800	16,100	18,900	21,900	19,100	22,400	26,700	22,100	25,100	27,800
MOUNTAIN	Denver	14,500	17,100	20,600	24,100	20,400	23,700	28,500	22,600	26,000	29,900
	Phoenix	14,700	17,200	19,900	23,300	19,400	22,300	28,500	22,600	26,000	29,900
PACIFIC	Los Angeles	16,600	19,500	22,300	26,700	22,000	25,800	31,100	25,400	28,600	33,200
	San Francisco Bay Area	15,700	19,300	22,700	26,200	21,500	25,100	30,200	24,700	27,900	33,800
	Seattle	15,600	18,200	21,500	23,800	20,900	23,500	27,900	23,700	26,500	29,200

By Ann Dooley
CW Staff

CHICAGO — They do the same work, but computer personnel in some parts of the country are paid as much as $20,000 more for the same job than their counterparts elsewhere.

That's the finding of a salary survey done by Source EDP, Inc., a professional recruitment firm, that covers the period from June 1979 to June 1980.

Professionals in the larger metropolitan areas of the East, such as New York, Boston and Washington, D.C., earned the largest salaries. Rural areas like New Hampshire or those in the South such as the New Orleans and Baton Rouge area were found to pay some of the lowest DP salaries in the country.

In upper management and senior-level staff positions, New York City was the highest paying. The median salary for an informations systems director at a large installation in New York was $63,000, for instance, while those in the same job in New Orleans/-Baton Rouge earned $42,100 last year — a difference of more than $20,000.

However, the salary figures by themselves can be misleading. Most of the wages corresponded to the cost of living index in each particular location, so that while the earnings may be higher, the dollar amounts earned might not necessarily buy as much in New York or Boston as they would elsewhere, Source EDP explained.

What's more, the salary figures found by Source EDP's "1980 Local Metropolitan Salary Survey" are not necessarily representative of the computer population as a whole and represent only the more mobile part of the DP population that contacted one of the recruitment firm's offices in the last year.

Base of 30,000

The survey, based on an analysis of 30,000 computer professionals and 14,000 client organizations, showed that managers' salaries increased according to the size of the installation and nonmanagement salaries were tied to the length of an employee's professional experience.

Source EDP defined a small organiza-

Professionals in the larger metropolitan areas of the East earn the largest salaries, according to a survey that covers the period from June 1979 to June 1980. That doesn't mean, however, that their dollars buy more.

Mobile Part of Population Sampled •

According to Region, Survey of U.S. Finds

REGION	POSITION	SYSTEMS AND PROGRAMMING MANAGERS Size of Firm: Small	Medium	Large	OPERATIONS MANAGERS Size of Firm: Small	Medium	Large	INFORMATION SYSTEMS DIRECTORS Size of Firm: Small	Medium	Large
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NEW ENGLAND	Boston	32,000	36,400	40,500	24,000	28,500	34,900	33,200	41,800	52,100
	Hartford	28,500	34,500	38,200	23,200	26,200	34,100	28,600	37,600	46,300
	New Hampshire	24,000	29,800	33,500	18,200	22,000	27,100	27,000	31,200	44,300
MIDDLE ATLANTIC	New Jersey (Central & Northern)	30,200	34,500	39,700	24,800	27,400	33,100	34,300	43,500	51,500
	New York City	32,900	40,000	45,500	27,900	32,500	40,800	40,500	50,500	63,000
	Philadelphia	29,000	32,300	36,800	22,600	26,700	32,400	32,300	46,100	51,300
EAST NORTH CENTRAL	Chicago	29,300	34,800	39,000	23,500	28,100	33,200	32,000	39,200	47,800
	Cleveland/Columbus	26,700	32,700	37,900	21,900	26,300	31,900	31,900	38,600	46,200
	Detroit	29,100	33,700	38,400	23,100	25,200	32,600	31,000	39,200	48,300
WEST NORTH CENTRAL	Kansas City	29,000	33,800	38,100	23,300	26,600	31,600	30,200	36,100	43,800
	Minneapolis/St. Paul	27,900	33,300	37,800	23,100	26,000	32,500	30,200	39,600	46,800
	St. Louis	26,600	33,900	38,900	25,100	29,300	35,100	30,400	42,700	55,000
SOUTH ATLANTIC	Atlanta	28,100	33,500	37,000	19,200	24,400	30,400	29,600	37,500	46,800
	Miami	27,500	29,400	35,500	21,700	25,000	28,000	29,100	34,200	42,500
	Washington, D.C.	29,500	35,200	40,400	19,700	26,000	31,800	32,900	39,000	52,600
SOUTH CENTRAL	Dallas/Ft. Worth	27,600	32,700	38,300	22,700	25,400	31,600	29,900	37,000	45,900
	Houston	29,700	34,100	38,500	21,900	26,800	33,100	29,200	38,700	46,800
	New Orleans/Baton Rouge	27,500	29,400	34,000	18,800	22,600	27,800	27,400	34,000	42,100
MOUNTAIN	Denver	28,100	32,200	37,300	22,800	24,900	31,900	30,300	36,600	45,200
	Phoenix	28,000	32,900	38,900	20,700	25,600	31,700	27,900	36,700	43,800
PACIFIC	Los Angeles	30,100	35,200	39,800	24,000	28,700	35,500	33,900	41,400	51,700
	San Francisco Bay Area	30,200	35,100	39,800	23,100	28,100	35,100	34,400	42,700	53,400
	Seattle	27,500	33,200	37,100	22,300	25,800	30,900	28,700	36,400	43,500

tion as one using IBM 370/125 or smaller systems, medium as one using systems ranging from an IBM 370/125 to a 370/145 and a large installation as one using systems bigger than the 370/145.

As an example, salaries in San Diego were generally lower than the median salary for the nation as a whole. The San Diego median for systems and programming managers over the last 12 months was $28,200 in small installations, $33,500 in medium shops and $36,100 in large installations.

Operations managers in the San Diego area earned $22,800 at small sites; $27,000 at medium firms and $32,500 at large installations. Information systems directors in small San Diego DP shops garnered $30,200 last year while those in medium installations earned $37,100 and $43,800 in large sites.

Information systems directors at large installations in New York earned a median salary of $63,000. New Orleans residents with the same position earned $42,100 — a difference of more than $20,000.

In nonmanagement positions, commercial programmers and programmer analysts with up to one year's experience earned $14,700 in San Diego. Those with one to two years' experience earned a median salary of $17,600, those with two to four years of experience earned $19,800 and DPers with more than four years of experience garnered $23,800.

Last year, systems programmers in San Diego with one to two years of experience earned $19,700. Salaries reached $23,500 for those with two to four years of experience, topping off to a median salary of $29,000 for more than four years of experience.

Senior analysts, project leaders and consultants with two to four years of experience earned a median salary of $21,800 in San Diego last year. Those with four to six years of experience earned $26,600 and those with more than six years of experience earned $30,600. More salary information by city can be found in the accompanying charts.

All salary figures are based on median figures with the upper and lower 15 percentiles in each category eliminated.

The survey is available free of charge from Source EDP at 100 S. Wacker Drive, Chicago, Ill. 60606 or from any of its regional offices.

Quality Books Hits Burroughs With Fraud Suit

By Tim Scannell
CW Staff

NORTHBROOK, Ill. — Quality Books, Inc. has filed suit charging Burroughs Corp. with fraud, breach of warranty and violation of the state's Deceptive Business Practices Act. The suit asks $655,000 in actual damages and $1 million in punitive damages plus assorted fees and costs.

Quality Books, a publisher and wholesaler, attracted international attention earlier this year when it placed an advertisement in a *Wall Street Journal* claiming that Burroughs had misrepresented the B800 computer sold to the company more than two years ago [CW, Sept. 8]. In the ad, Quality Books charged that it was the victim of "overly zealous computer salespeople" and asked to hear from similar "unhappy users."

To date, more than 400 users have written or called Quality Books from such far away spots as Monaco, France, Italy and the UK. A small percentage of people responding to the unconventional ad have been "intimately connected" with Burroughs as former employees, and their input will be used as evidence to back up the publisher's suit, according to Tony Leisner, Quality Books' vice-president and general manager.

Busy on Phone

"We're still spending as much time on the phone with other disgruntled Burroughs users as we are doing our own book business," he added. "A bad Burroughs B800 is just as bad in Italy as it is in Chicago."

Filed in federal district court, the suit was initiated by Quality Books when Burroughs allegedly did nothing to solve the user's system problems by an Oct. 14 deadline.

The original deadline was Sept. 14, but at Burroughs' request it was extended by 30 days to give the vendor a chance to investigate the problems.

Request Rebuffed

Burroughs then requested a second deadline extension, but was rebuffed because "we see that as a delaying tactic," Leisner said. Burroughs reportedly has a clause in its sales contract with the book publisher that limits any legal action to two years after a system is delivered; the B800 was delivered nearly a year ago, according to Leisner.

Presently, Quality Books has the inoperative computer stored in a corner of the office "gathering dust," he added. The company is continuing to make payments for the machine to a third-party leasing firm.

When contacted, a Burroughs attorney declined to comment on the suit or Quality Books until he could review the court documents.

Arson System To Put the Heat On Landlords

CHICAGO — A Computerized Arson Prevention System (Caps) set up by the Department of Public Safety here may help take the heat off Chicago's buildings by putting it on the landlords and property owners.

"We are working on the premise that arson is at least in part a predictable offense. Buildings that burn are different from those that don't," said Mark Iris, senior operations research analyst at Chicago's Department of Public Safety.

To help identify torching candidates, information such as outstanding building code violations, property tax assessments and information concerning previous fires will be collected from other city departments. Iris said the police, fire, housing, law and inspection services offices are cooperating.

This information will be processed by the city data center's IBM 370/158 using software developed by SAS Institute, Inc. of North Carolina.

When fully staffed, the experimental Caps program, funded for one year by a $150,000 federal government Community Development Program grant, aims to have four community research specialists in the field who will collect and verify data and approach landlords of properties the computer has identified as potential fire hazards.

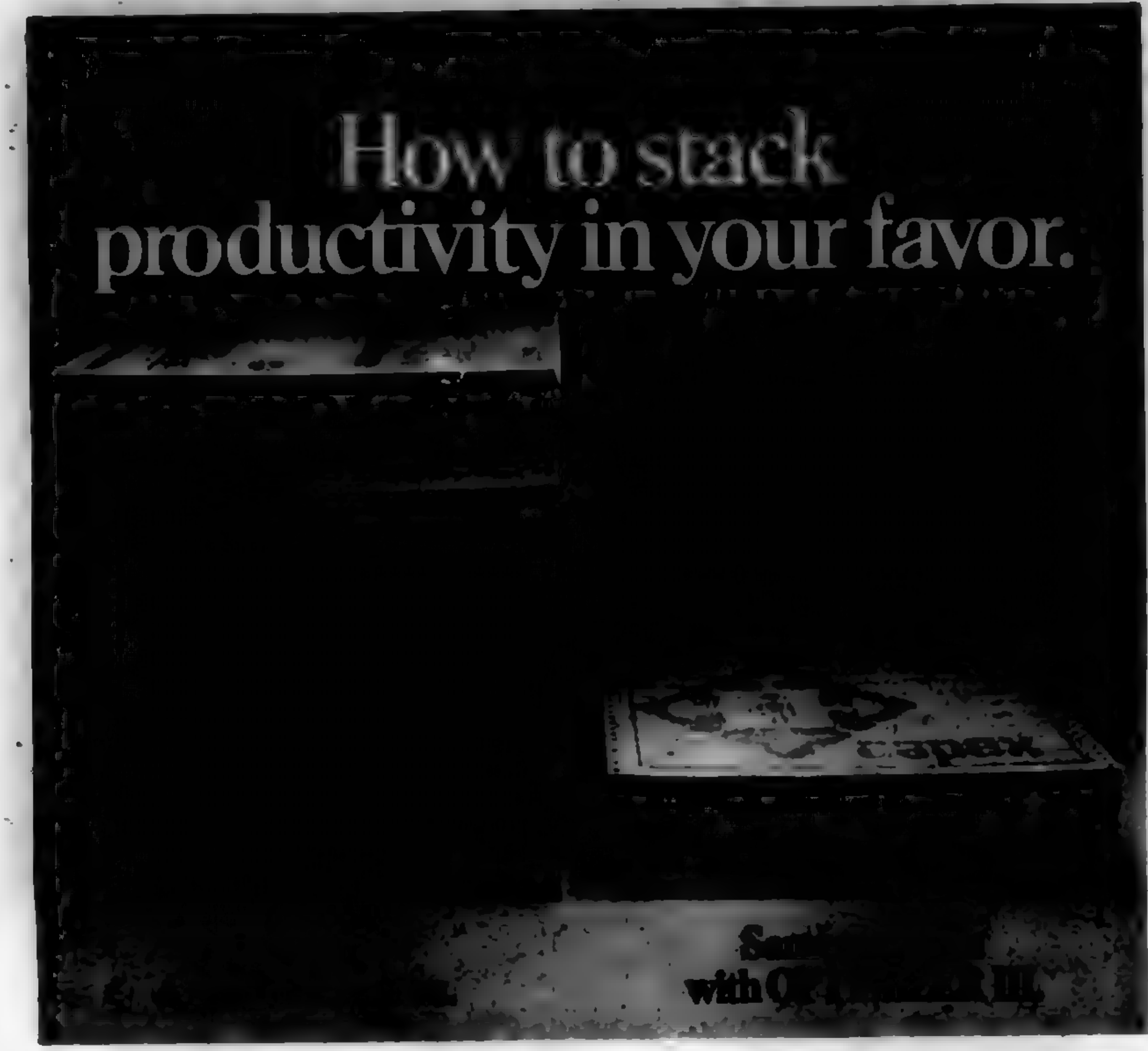
Two Test Areas

The experiment is being tested in two areas pinpointed for their high-risk nature, Uptown Edgewater and West Town. Last year Chicago had 12,000 fires citywide, of which 2,000 were officially attributed to arson.

Iris insisted that the fieldworkers are not an accusatory task force; they cannot bring about any criminal proceedings themselves, but only hand the information over to the police. However, he did acknowledge that "there is an unwritten component in the fact that simply by meeting with the landlord, one is essentially letting him know that the city knows there is a problem."

The landlords are given incentives to protect their property because by an arrangement with the housing department the buildings are put on a high-priority list for housing rehabilitation funds.

If the landlords fail to heed the advice given by the fieldworkers who "inform them of the risk," they may find that their buildings come up for reinspection sooner or the prosecution for neglect of property process is accelerated, Iris said.



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Offenders Using Employers' CPUs

Program Bootlegging on Rise, Instructor Says

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Growing numbers of programmers are illicitly using their employers' mainframes to develop bootleg software for the home and commercial microcomputer markets, a university instructor and consulting firm executive said here at a recent conference.

"Programmers are moonlighting and bootlegging more than ever before," according to Dr. Robert Stumpf, a faculty member at California State Polytechnic University in Pomona. "If someone were to conduct an audit of some of the large computing installations in Southern California and elsewhere, I suspect you'd find a lot of processing time that couldn't be readily accounted for."

Many of the low-cost software packages currently available from the U.S. home and hobby computer stores are probably being produced by unscrupulous programmers who already hold down full-time jobs but who have decided to moonlight to earn extra income, Stumpf said during a presentation at the recent Mini/Micro Conference and Exposition.

Such programmers usually develop their bootleg software with the help of computing time they steal from their unsuspecting employers' mainframes. They then sell the finished programs, which are often produced during regular working hours, on the open market.

Stumpf regards the growth in the number of bootleg programs — many of which are allegedly inferior in quality — as a "danger signal to the software industry that it had better start soon to clean up its act."

Stumpf — who, in addition to teaching at Cal Ploy, helps run a Southern California consulting and software firm — made his remarks as one of the speakers at a Mini/Micro session entitled "Small Business Systems: the Next Five Years."

In other comments, Stumpf predicted the imminent emergence of a new generation of sophisticated macro languages that will allow users to generate large volumes of code with just a handful of instructions. The macro languages, which are expected to appear no later than 1985, will represent a significant technical advance over their modern-day counterparts and promise to boost programmer productivity by drastically streamlining the production of software packages.

Stumpf also predicted a significant growth in maturity for the mini- and microcomputer-based software business during the 1980s, especially in the area of program maintenance. In the past, he said, users and vendors alike have tended to underestimate the importance of trying to predict software maintenance costs and have lumped them together with other major expense items like development and overhead.

Today, however, the mini and microcomputer software field is beginning to show some sophistication and is not only figuring maintenance costs into its initial price quotations, but is also listing the costs as separate expense items in its contracts. The trend toward quoting maintenance costs separately is expected to continue well into the future, Stumpf said.

But although the mini and microcomputer software industry is expected to come of age during the next few years, the field still faces some major challenges that have yet to be fully addressed.

One such problem is that many users have grown so accustomed to high-reliability hardware that they have allowed themselves to become slipshod about backing up their files.

Stumpf urged users not to let the seeming indestructibility of their hardware lull them into a false sense of security. To the contrary, file backup remains as crucial a user concern as it ever was.

Sooner or later, even the most reliable hardware breaks down, and users have to prepare their systems thoroughly for such a contingency or run the risk of facing disaster, Stumpf said.

Meet to Discuss Upping Quality Of Applications

CHICAGO — "Assuring Quality in DP Applications" is the title of a conference the Data Processing Mangement Association's (DPMA) Education Foundation will hold here April 1-3.

With tutorials that cover the establishment of the quality assurance function, tools and techniques for improving application performance, the management of structured design and the design implementation and enforcement of application standards, the conference planners hope to provide an understanding of the "how-to's" of improving applications.

Registration fees and details are available from 12611 Davan Drive, Silver Spring, Md. 20904.

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Rise Expected in International Circuit Costs

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The leasing of international private-line circuits is likely to become more expensive — and complex — in the next few years, according to a recent study discussed here last week.

The study, conducted by Telecom Systems Group, Inc. of Cedar Grove, N.J., reflects information collected from some 60 foreign telecommunications administrations.

About 10% of the respondents reported they have transborder data flow regulations and restrictions now in effect, according to Leonard Elfenbein, president of Telecom Systems Group, and about 7.5% of the sample "classify" or specify the kind of traffic that can be carried over their private-line service. Elfenbein expects both types of restrictions to increase substantially in the immediate future.

There is also a trend toward basing communications rates on the gold franc and requiring payment in local currency — which has the effect of increasing rates during periods of inflation.

Other Findings

The study also revealed that 76% of the responding carriers allow data to be transmitted on their public telephone networks, 70% do not allow an international circuit to be terminated within their countries in PBX/PABX equipment (thereby preventing a foreign user from accessing the country's entire domestic telephone network through a single circuit), 21% allow use of digitized voice equipment on an international circuit (increasing the amount of traffic it can carry), 17% offer "hubbing" discounts (which tend to reduce termination charges), and although surcharges are imposed in most cases, and 30% permit shared use of circuits leased to multinational on-line service bureaus.

Elfenbein discussed the study at a conference on international telecommunications policy sponsored by his company. The meeting included speakers from the Federal Communications Commission (FCC) and the U.S. State Department, who expressed sharply differing views about formulation of this country's international telecommunications policy — particularly the FCC's recent proposal to remove restrictions on resale/sharing of international circuits.

The proposal has been loudly criticized by foreign telecommunications carriers, U.S. international record carriers and many of their customers. The only major supporter, aside from the FCC, is the National Telecommunications and Information Administration (NTIA), the President's chief telecommunications adviser.

Michael Cummings, chief of the FCC's International Facilities Planning Division, stressed that the proposal is tentative and that comments from interested parties will be carefully considered before any final action is taken. Cummings added that the commission "recognizes" it can not act unilaterally, that the views of foreign carriers must be weighed.

However, Arthur Freeman, director of the State Department's Office of International Communications Policy, thought it "would have been advisable" for the commission to solicit and consider foreign carriers' views before, rather than after, proposing to do away with international resale/sharing restrictions.

Pointing out that "there have been any number of instances where we and others in the Executive Branch have been discomfited by FCC actions," Freeman indicated that the State Department intends to push for corrective action next year, when Congress is scheduled to consider new international telecommunications policy legislation.

Specifically, the department wants the FCC to be required to weigh the foreign policy implications of its decisions. Now, the only standard is "public convenience and necessity," which has not been adequately defined, Freeman said.

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GAO Urges Computer Role In Federal Building Design

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — With the issuance of a recent General Accounting Office (GAO) report, Congress has begun prodding federal agencies to use more computer-aided design methods in government building projects.

"Federal officials and agency procedures and practices often limit and/or hamper the use of computers on federal projects," the congressional auditing agency said.

"In comparison to manual methods," the GAO noted, "computers can enable designers to produce higher quality, more effective facility planning and architectural designs" as well as "reduce the amount of energy consumed by buildings."

The problem, according to the GAO, is that agencies "generally have not created an environment wherein the efficient use of computers is possible" in building projects.

In fact, the report stated, computer-aided design is rarely even discussed during contract negotiations. This was attributed to lack of understanding of these methods on the part of agency officials and "the restrictive procedures and actions in contract negotiations and project management."

Accordingly, the GAO recommended changes in procurement procedures "to create an environment more conducive to greater, more efficient use" of computer-aided design methods by:

- Educating agency personnel about the capabilities and use of computers in design.
- Requiring that computers be used for those analyses and design functions that can be done efficiently only with computers.
- Evaluating computer expertise when selecting architects and engineers for federal projects.
- Discussing planned computer use during negotiations.
- Revising fee proposal formats to recognize the role of computers in design and clearly identify the services that will be provided under the contract.

The GAO said its survey of architectural and engineering firms "indicates that the number of firms having computer capability or access to computer services is sufficient to provide adequate competition should agencies actively seek computer expertise for federal projects."

But Big Users Face Wats Rate Hike

FCC Bans AT&T's Resale/Sharing Restrictions

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission (FCC) last week ordered AT&T to eliminate tariff restrictions barring the resale/sharing of Message Toll Service (MTS) and Wide-Area Telephone Service (Wats) — the phone company's two major long-distance telephone services. The commission's major aim is to promote competition and thereby make market forces rather than government regulation determine prices.

Under the order adopted last week, the resale/sharing restrictions can not be lifted for at least five months. In a discussion that preceded last week's vote, the FCC commissioners made it clear they want resale/sharing of Wats to be based on new rates — recently filed by the phone company and scheduled to become effective next month — rather than on existing rates. However, since these new rates increase charges for heavy usage of Wats circuits, while reducing charges for smaller volume users, the opportunities for resale and sharing will be reduced.

The reduced rates for smaller volume customers are also in jeopardy.

Objections Filed

Several large Wats users filed objections to the new tariff last week and have made it clear, unofficially, that they will take their case to court if the FCC allows the new tariff to become effective next month.

The objectors include Avis, Inc., Budget Rent-A-Car Corp. and National Car Rental Systems, Inc. They said the new tariff will increase telecommunications costs of the car-rental industry by $8 million to $18 million a year and will raise the cost of a car-rental transaction by 50 cents to $1.

Objections were also filed by several firms using computer-based services. GTE Telenet Corp., which operates a nationwide packet-switched network, objected to basing charges on the average usage of each Wats line in a service group. Under this scheme, the company said, a customer who subscribes to nationwide (Rate Step 18) Wats service, has 240 hours of Wats traffic a month and employs two access lines pays less than another customer subscribing to the identical service who leases three access lines.

If the commission allows AT&T to base its rates on average instead of actual usage per lines, said GTE Telenet, the bigger Wats users will lease fewer access lines, causing queuing delays that will impact all Wats customers.

'Unreasonable Discrimination'

MCI Telecommunications Corp., which was largely responsible for forcing AT&T to draft a new Wats tariff, said the phone company's proposed rates create an "unreasonable and unjust discrimination" between Wats and MTS.

The company's key contention was that because the two services use identical facilities and have been found by the commission to be "like," the phone company can not charge less for Wats than for MTS — as it does in the proposed tariff — without showing that the costs of the former are less than those for the latter service.

Although AT&T has filed 37 volumes of backup material with the new tariff, it has failed to provide this justification, MCI added.

The General Services Administration (GSA), commenting on behalf of several federal Wats users, said the proposed tariff does not reflect the demise of Telpak, which is scheduled to occur next Dec. 21. That development will reduce the phone company's costs while increasing its revenues — by causing Telpak users to shift to more expensive private-line circuits, GSA said. If, in addition, the proposed Wats tariff becomes effective, AT&T's overall rate of return will exceed 10.5% and thereby violate a commission order issued last June which limited the phone company's profits to that level.

An FCC official, asked what would happen to resale/sharing if the newly proposed Wats rates are delayed by a court stay or injunction, said the commission would "put off resale/sharing. They definitely won't permit it on the basis of the present tariff."

Rewrite Bill Seriously Flawed, Judiciary Committee Reports

CW Washington Bureau

WASHINGTON, D.C. — Much-debated legislation to amend the Communications Act of 1934 was torpedoed by the House Judiciary Committee last month because the bill (H.R. 6121) contained serious flaws and there wasn't enough time left in this Congress to correct them.

So said the committee in a recent report.

To make the bill effective would have required increasing the authority of the Federal Communications Commission to regulate AT&T, "truly" separating Bell's regulated and deregulated activities to prevent cross-subsidies and preserving a 1956 consent decree which bars the phone company from offering nontariffed services.

In a separate statement, Rep. Jack Brooks (D-Texas), a member of the Judiciary Committee, called H.R. 6121 "nothing more than a mechanical restructuring of the common carrier industry."

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But Not Without Problems

IRM Seen Cure for Unwieldy Management

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The federal government trend to more centralized information management, while not without problems, may be the best hope to overcome the unwieldy management structures of many modern, information-dependent organizations, both public and private, according to a Library of Congress researcher.

In a number of federal agencies and private corporations there are typically too many people responsible for too many different information resources with too little coordination between the various information fiefdoms, Louise Becker told a recent National Bureau of Standards (NBS) symposium.

"We lack effective and democratic exchanges" in information management, she said. "Library people talk to library people, the DP people will only talk to God; managers talk to managers."

The increasingly popular management concept of information resources management (IRM) might solve some of these problems, might "bring us all closer together," according to Becker, an information sciences analyst with the Library's Congressional Research Service.

While lacking a precise, universally accepted definition, IRM generally refers to a management structure coordinating authority over traditionally independent functions such as DP, telecommunications, word processing, data base management, standards making, paperwork management, systems development, library and other information resources, as well as privacy and security, to name just a few.

"Historically, information management has been a fragmented activity shared among the traditionally independent elements of an organization," Becker noted in a recent study presented to the NBS symposium on IRM.

"With merging technologies, exemplified by the integration of computer-communications and other information technologies, the requirement to examine all aspects of information handling as a cohesive whole becomes critical," she said.

A more coordinated approach to IRM by federal agencies has been suggested in the last few years by several commissions and study groups looking at federal paperwork management and DP policies and practices.

Also, the pending "Paperwork Reduction Act of 1980," which would mandate centralized agency management of information facilities, had added impetus to the move to IRM techniques in the federal government.

Several Implementations

Several offices, including the Interior Department and the Defense Intelligence Agency, have already adopted some IRM concepts in their management structures, Becker noted.

Interior, for example, has reorganized to establish an Office of Information Resources Management with three divisions: DP and Telecommunications Management, Systems and Analysis, and a Center for Information and Library Sciences.

These divisions are responsible, she said, for management and operation of automated and nonautomated information systems, departmental DP and associated technologies, operations and planning functions, library and related information services, word processing, micrographics, paperwork management and telecommunications activities.

While the precise method of IRM implementation will vary from organization to organization, the concept typically involves coordinating the functions of policy management, budget, procurement and technical services, bringing together in one office responsibility for, among other things:

- Developing information objectives;
- Developing and planning for reporting requirements;
- Establishing, interpreting and managing information policy;
- Allocating resources and support;
- Planning for immediate-, middle- and long-range information requirements.

Assessing the benefits of IRM, Becker said "it may provide a framework in which information policies and practices may be consistent with the requirements and needs of the organization."

It is also "believed to be more responsive to changes in statutory, regulatory and other policy considerations," she said.

But, she added, "it may fail to bring about democratic exchanges and sharing of responsibility necessary by distinct statutory language or specific authorization." In addition, "concentration and consolidation of critical management functions within an organization causes some problems.

"The centralization of information management responsibilities in an IRM office may concentrate too much power there and may usurp prerogatives traditionally reserved for key decision makers."

Therefore, Becker warned, "if the IRM concept is interpreted broadly to include activities associated with budget, procurement, policy and information-support services, it could represent a special danger to managers of existing organizational units."

Also, "the concentration of power, while serving the interest of efficiency, may not be in keeping with other values of an organization."

A "clear articulation of the goals and objectives, as well as [an] understanding of the mission of an organization" is necessary to "striking a working balance" in instituting IRM, Becker said.

Monthly Covers Communications

MILLBURN, N.J. – "Competition & Strategy" is the title of a new monthly publication devoted to the subject of emerging competition within the telecommunications industry.

Published by Probe Research, Inc., the publication reportedly offers its readers both news and interpretive articles on telecommunications and related competition, including company news, technological changes, market analysis and legal and regulatory development.

A one-year subscription to the service is $140. Further details are available from Sharon Schackel at Probe Research, Inc., P.O. Box 251, Millburn, N.J. 07041.

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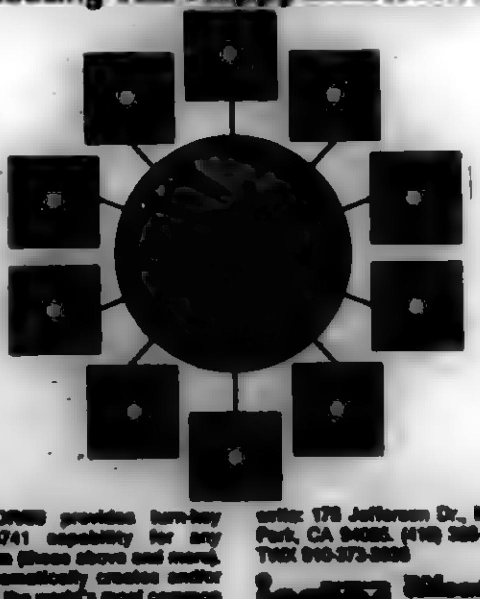

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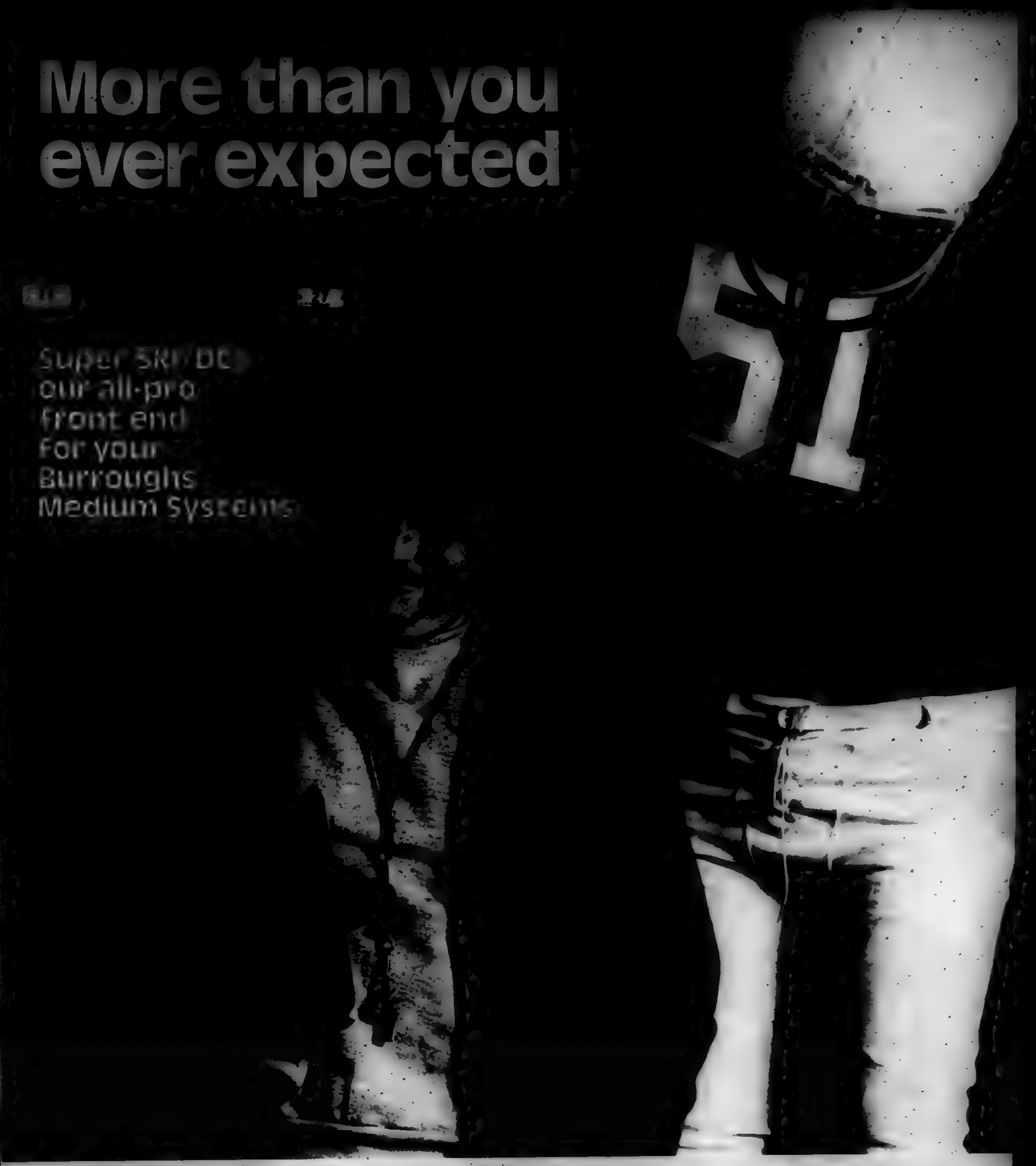

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'No More Overtime'

Analyst Lands in Jail for Making Extra Effort

By Ann Dooley
CW Staff

HANOVER, N.H. — Wayne Christian doesn't plan to work overtime anymore. He made that decision while spending a night in jail.

Christian, an analyst at Dartmouth College's Medical School, was arrested in his office late one recent Friday night on charges of criminal trespass. Christian, who lives 30 miles away from the Dartmouth campus, was working late and decided to spend the night in his office since he planned to meet his employer there the next morning.

"That's the last time I'll do that again," Christian vowed. At 1 a.m., the systems analyst was awakened by two campus police who informed him it was improper to stay in offices after hours. Christian was subsequently arrested and spent the night in the Hanover city jail.

Although other cell mates — arrested for violent crimes — were allowed to leave on personal recognizance, Christian was forced to spend the night in jail and was only released when his employer came the next morning to vouch for him, he said.

Not Over Yet

Christian's ordeal did not end there. A trial date was set and Christian found himself facing the possibility of one year in jail and/or a $1,000 fine.

However, Dartmouth dropped the charges against him, a move which in Christian's opinion was probably done because the college decided there was no benefit in pursuing it. Dartmouth is currently considering revising its regulations against working late, Christian noted.

Christian, who was unaware of the overnight regulation, stated his only purpose in staying in his office was to assist in his work the next day: "I thought I was doing them a favor in coming in on the weekend."

Christian is a specialist in the construction of large statistical and mathematical models. His work involves determining the nature of the distribution of demand for medical care in New England towns throughout econometeric analysis of epidemiological data.

The whole affair was "bizzare," Christian said. "You hear so many complaints about declining productivity, and when someone puts in an extra effort they get arrested."

A Dartmouth spokesman called the incident "unfortunate."

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Lecht Wonders What He Said To Cause Ouster

By Connie Winkler
CW Staff

PHOENIX — It is not unusual for an audience to walk out on a speaker, but it is rare for a speaker to walk out on his audience — especially at the sponsor's request.

"I don't know what it was I said unless it was that IBM was going to go into the communications business competing with AT&T and American Express," panned Charles Lecht, president of Advanced Computer Techniques Corp., an IBM pundit and a regular speaker on the computer talk circuit.

Whatever it was Lecht said, American Express Corp. brass didn't like it. Well into Lecht's talk to top American Express data processing executives in Phoenix Oct. 15, he was asked to leave.

According to Lecht, while the lights were dimmed for his slide presentation, T. Michael Ball came up on the stage, took Lecht's arm, turned him aside and said: "You've offended enough people. Terminate your talk."

Ball came to American Express about three months ago as senior vice-president in charge of worldwide computer and communications systems after 21 years with IBM's Data Processing Division, most recently as a vice-president for new product development.

Quick Synopsis

Lecht said he turned to the audience, apologized if he had offended anyone and offered a 30-second synopsis of what he would have said in the remaining 10 minutes of his talk. He then left the predinner gathering.

When he was interrupted, Lecht said he was predicting the downfall of the computer industry as it is now and the emergence of a new and highly regulated information industry. Lecht, who addressed a similar American Express group two years ago, also predicted "IBM would plunge headlong into the computer service bureau business, competing with many of its own customers."

IBM has been banned from entering the service bureau business because of consent decrees obtained by Control Data Corp. and Univac. However, in 1981 IBM will no longer be bound by the decrees.

Lecht remains puzzled about why he had to terminate his presentation. "Maybe," he mused, "it was that I said the IBM System 138 had been held hostage in Sri Lanka for nine months."

Advertisement

DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals

At Pioneer, Order Processing Is High Fidelity Too

Pioneer Electronics Corporation books 80 percent of its business in the last week of each month.

"Before we had an online computer system," says Adrian Robichaud, "it took a week after the peak period to catch up on invoicing and other paperwork. Now customers are invoiced promptly, resulting in a significant cash-flow gain.

"We no longer need temporary help for the rush, and there are far fewer invoicing errors." Robichaud is director of management information systems for the U.S. importer and distributor of Pioneer stereo and home electronic equipment. "Each order is handled manually once, when it is keyed into the terminal at the branch office," he notes. "An automatic computer edit immediately notifies the operator of any keying error."

The system verifies that the item is available in the warehouse nearest the customer, reserves inventory, and checks the credit status of the customer. An IBM 4341 prints the warehouse picking and shipping documents remotely, in the warehouse.

There are four stocking locations, in Illinois, Texas, California and at company headquarters in Moonachie, New Jersey. "If the nearest warehouse is out of stock on critical merchandise," Robichaud adds, "the system can locate it at another site and redirect the order. This has improved customer service and saved us a lot of telephoning around."

After the order is picked, the computer calculates the shipping weight and prints the bill of lading, extends the invoice, and prints it remotely at the branch office. "There are fewer inquiries regarding errors in shipments or invoices," Robichaud continues, "and fewer payments held up while disputes are resolved. The system has facilitated the processing of back orders, and helps us consolidate back orders with current shipments."

The online system has also become an important management tool, he explains. A marketing executive can use a terminal inquiry to see current inventory at any location, or current sales throughout the company.

Accurate data for sales forecasting is now readily available, and a specific query (for example, how many of one type of speaker are at each location) can be keyed into a terminal. One five-page report on orders and shipments that formerly took many hours to compile is now done in five minutes.

"Corporate management has more confidence in the operating data," Robichaud points out. "They make decisions based on current reality. If a marketing program is not working as it should, they can make immediate adjustments."

A Pioneer stereo turntable is tested functionally and inspected for surface flaws. Online order processing at Pioneer improves customer service, increases cash flow, and yields better decision-making information for management.

Accelerating Vehicle Design at Clark Equipment

Clark Equipment Company is a leading maker of lift trucks. To shorten the time required for design of new model families, Clark adopted CADAM for design and drafting.

"It has brought in enthusiasm and taken the drudgery out of design." Jack Squier of Clark Equipment Company is describing the Computer-Graphics Augmented Design and Manufacturing (CADAM*) system. "Under the old method, when you got an idea, you stopped thinking for 4½ hours while you drew a picture."

Squier is manager of new product development for Clark's Industrial Truck Division, headquartered in Battle Creek, Michigan, which makes lift trucks and related vehicles. The division wants to accelerate the design on new model families. "CADAM has cut the cycle by at least a third," he states. "We can make a layout in one day that would have taken five or six.

"CADAM enables us to build better engineering prototypes. It eliminates most drawing and arithmetic errors, and gives us more flexibility in trying alternatives and modifying a design."

To illustrate, Squier cites the case of an assembly drawing of a truck which had to be lengthened by one inch. "It would have taken 15 weeks to lengthen all the tubing, wires and frame members," he points out. "With CADAM, the designer made the changes with a few strokes of the light pen and touches to the keyboard."

Another interesting design problem is a wheel that moves up and down as it is steered, in order to keep the truck horizontal. To verify that there were no interferences, they needed to define the external envelope of its motion, and this required plotting its geometry at half-inch increments.

This was completed in three hours at the IBM 3251 Graphic Display Station by a man with two weeks of CADAM training, Squier states. "It would have taken 2½ weeks at the drafting board.

"We can do more accurate layouts, showing more details. It's easy to duplicate and erase a drawing, creating multiple copies of a basic layout for different purposes. CADAM helps us assure that parts can be assembled."

Adds Jim Bauer, vice president of engineering for the division: "CADAM is so productive we can't afford *not* to extend it to other industrial truck engineering locations in Kentucky and Germany."

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*CADAM is a registered trademark of the Lockheed Corporation

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
Data Processing Division

Managers on the Move

ROBERT M. HORTON has been named senior vice-president and head of Trusco Data Systems (TDS) administration by the directors of the Trust Company of Georgia, Inc., an Atlanta-based bank holding company.

Following service in the U.S. Army, Horton joined the staff of TDS as a junior programmer. He was elected an operations officer in 1968, elevated to assistant vice-president in 1972, and promoted to vice-president and general manager in 1974.

Horton attended Emory-at-Oxford, Covington, Ga., later receiving his B.A. degree in literature from Emory University in Atlanta.

•••

Ethyl Corp. of Baton Rouge, La., has elected **KARL F. CAST** as vice-president of engineering, central systems and DP. Cast has been manager of these departments since 1975.

Cast joined Ethyl in 1952 as an economic analysis engineer in research and development (R&D) at Baton Rouge. Over the years he has held the positions of assistant superintendent of projection coordination, engineering department; superintendent of R&D technical services; and general superintendent of R&D, engineering services.

From 1962 to 1964 Cast was associated with Bechtel Corp.'s refinery and chemical division. He returned to Ethyl as general manager of operations, and was later named director of central systems and DP.

Cast has a B.S. degree in chemistry from Lawrence College, Appleton, Wis., and an M.S. degree in chemical engineering from MIT.

•••

SERGIO MASSA has been appointed vice-president of DP for Cardinal Marketing, Inc. in Miami.

Prior to joining Cardinal, Massa was associated with Jefferson/Ward, Inc. of Miami and Ideal Toy Corp. of New York, holding positions in telecommunications, DP management and systems analysis.

Massa received a B.S. degree in business administration from New York Institute of Technology.

•••

ARTHUR C. BROWN has joined Health Data Network, Inc., Louisville, Ky., as manager of systems and programming. He will be responsible for designing medical data processing systems, developing staff expertise in health care information systems and information requirements of medical professionals.

Brown was previously manager of the systems group at Cybernetics and Systems, Inc. a subsidiary of Seaboard Coastlines, Inc. Prior to that he was a systems analyst with Univac, Greenville, S.C.

Brown received a B.A. degree in physics and business administration from George-

(Continued on Page 22)

Robert M. Horton

Karl F. Cast

See page 160
in Buy/Sell/Swap

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Managers on the Move

Sergio Masse

Arthur C. Brown

(Continued from Page 20)

town College, Georgetown, Ky.

Health Data is a subsidiary of Baptist Hospitals of Kentucky, Inc., serving five hospitals and several physicians in a multistate area.

• • •

JOHN L. DEAN has joined National Advertised Brands Scanning Reports, Inc., New York, as vice-president of information services. He will be responsible for input from retailers who supply data based on readings of the universal product code on items going through the cash register checkout and the continuing development of information systems for clients.

Dean was formerly corporate vice-president of management information systems for the Great Atlantic & Pacific Tea Co. (A&P), where he was responsible for organizing and administrating DP and telecommunications capabilities. Before going to A&P in 1975, Dean was senior vice-president of planning and research for Beneficial Management Corp. He joined Beneficial in 1953 as a research analyst.

Dean holds a B.S. degree in business administration from Lehigh University and received M.B.A. degrees from Fairleigh Dickson University in economics and finance and New York University in marketing and quantitative methods.

• • •

KENNETH M. KING has been elected provost for computing at Cornell University. He will be responsible for all academic and administrative computing at the university.

Prior to the appointment he was vice-chancellor for university systems at the City University of New York, where he was responsible for computer and information systems as well as for television systems and institutional research and reporting at the 20-college system. From 1971 to 1978 he was professor and university dean for computer systems at the university, later appointed deputy director of operations and director of the office of computer plans and controls. Prior to this he managed the central computer facility at Columbia University.

King received a B.A. in physics from Reed College and a Ph.D. in theoretical physics from Columbia.

• • •

LANDIS MACINTOSH has been elected staff vice-president in charge of computer management and information services at the Scott Paper Co.

MacIntosh has been director of the organization since 1972. He joined Scott in 1966 as a systems analyst and has held several positions in information services during his tenure with the company.

He graduated from Montclair State College, N.J. and currently resides in Lansdowne, Pa.

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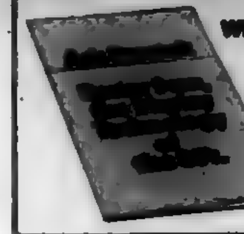

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Pictogram Output the Rage at Ifip in Japan,

Part 1: Tokyo

By Nancy French
CW Staff

TOKYO — The buzzword on the exhibit floor here at the first half of the International Federation for Information Processing's (Ifip) Congress 80 was "Japanese information processing." And the term wasn't being used to represent Japanese computer products, but rather products that allow Japanese users to print output in Japanese Kanji pictograms.

For about a year now, DP and word processing (WP) vendors have been announcing software, laser printers and high-resolution dot-matrix printers that allow users to print the complex Kanji along with Katakana, used to represent imported words; Hiragana, a kind of simplified pictogram-like character used to represent pronouns, conjunctions and tenses; and finally, the Western alphabet — for English and European languages. Output has been a serious problem.

The advent of Japanese information processing reflects recent advances in very large scale integration technology, low-cost laser printers, 16 by 16 and 24 by 24 dot-matrix printers and displays needed for Kanji input and output, a Japanese industry observer explained.

Ranked next in user interest at the show were the word processing and office automation systems. These also represented a kind of breakthrough for the Japanese office traditions. Except for the largest international trading firms, which employ standard international business practices and English-language typewriters, the typical Japanese office is small and populated with many clerks rather than secretaries — with no keyboard tradition. This may pose some problems for the Japanese as they leapfrog from handwriting to WP without stopping for typewriters.

Traditionally, if a business needed something printed a clerk would take a hand-written document to a Daisho, where professional typists, trained in operating the Wabun typewriter with 2,000-plus Kanji characters, would type Kanji to Kanji. Aside from the Daisho, only newspapers had the Wabun machines, a Japanese observer explained.

Other Notables

Other products notably numerous were color graphics terminals, plotters, small turnkey business systems and 32-bit minicomputers for use primarily in networks.

The vendors with U.S. ties that displayed their gear at the show will not be left behind when it comes to Japanese information processing. Nearly all have signed agreements with Japanese firms for printing subsystems that will allow them to compete.

As for the plug-compatible market, it hardly exists in Japan. One observer explained that the Japanese have a tradition of single-vendor shops, although the influence of the multinationals may be changing that attitude.

Protocol Hodgepodge

As for distributed processing, the Japanese do it their own way. Most large companies have large DP centers with heterogeneous minis in remote locations.

This resulting communications protocol hodgepodge evolved from local autonomy in the acquisition of inexpensive equipment. And users were assured communications would be no problem. A trend toward homogeneous minis is emerging, an industry observer said.

The exhibition was jointly sponsored by Ifip 80, Medinfo 80 and the Data Show, Japan's biggest annual computer exhibition, which has been held every autumn since October 1973.

Shuttle buses ferried Ifip 80 attendees diagonally across the city of Tokyo half a dozen times each day to see the exhibition.

The displays, which numbered about 110, filled three buildings.

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While DDP Benefits Appeal to Australians

Part 2: Melbourne

By Nancy French
CW Staff

MELBOURNE, Australia — As a continent and a nation, Australia represents less than 1% of the world's computer market, yet it is one of the most competitive markets in the world.

Despite its small size and the logistical problems involved in servicing Australia, most U.S.-based mainframe and mini makers, independent software companies and peripheral makers compete for users' dollars here against both Japanese and German firms.

As one might expect, IBM's market share here is put at only 37%, compared with nearly double that percentage in the U.S. and a bit less on a worldwide basis.

Because of the vast distances between cities and the high communications costs, Australian users are interested in the benefits of distributed DP (DDP). All are looking forward to the launching of a geostationary satellite here next year, and nearly all the DP, WP and office automation system vendors doing business in this country were represented at the second half of the eighth World Computer Conference, sponsored by the International Federation for Information Processing (Ifip) here recently. The exhibition covered 16,000 square meters of space and included more than 170 vendors.

Biggest Ever

"This was the largest and busiest exhibition ever held here," said Ashley Goldsworthy, chairman of Ifip's Australian organizing committee.

Australians were comparing the show to the National Computer Conference. It was rated five to eight times bigger than the last biennial Australian Computer Society Conference and Exhibition in Canberra, the capital.

While last week's show was not the place to see a raft of new product introductions, the displays were extensive and well staffed.

Attendance was well up to expectations, according to Goldsworthy, who said by week's end that paying delegates numbered almost 1,800 and exhibition visitors totaled more than 30,000. About 162,500 free trade passes were distributed in advance by participating vendors.

Despite huge expenses involved in the two-part congress, both Ifip and the Japanese and Australian computer societies will have earned significant profits, he claimed. However, he declined to estimate how much.

The equipment displayed here was not the same gear shown in Tokyo, as was previously reported.

Meet to Address Government DP

WASHINGTON, D.C. — A national conference on government information systems will be held here Dec. 8-10, conducted by the Center for Policy Research. It will be geared toward government executives and managers with program delivery responsibilities.

Areas of interest the conference will address include how H.R. 6410 will change federal information collection requirements; access to public and commercial data bases; and computer fraud.

Further information is available by writing to Government Information Systems, 12611 Davan Drive, Silver Springs, Md. 20904.

Correction

In the article, "Petco Drumming Up Strike Support: FAA" [CW, Oct. 20], a recent traffic slowdown at O'Hare International Airport was described as being regarded by the Federal Aviation Administration (FAA) as "an international action aimed at manipulating the agency." The sentence should have read, "an intentional action . . ."

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Compumart's new 36-page catalog is devoted entirely to DEC LSI-11/2 and LSI-11/23 systems. Besides DEC, this catalog offers a wide range of proven DEC compatible hardware and software to configure your system, from manufacturers like

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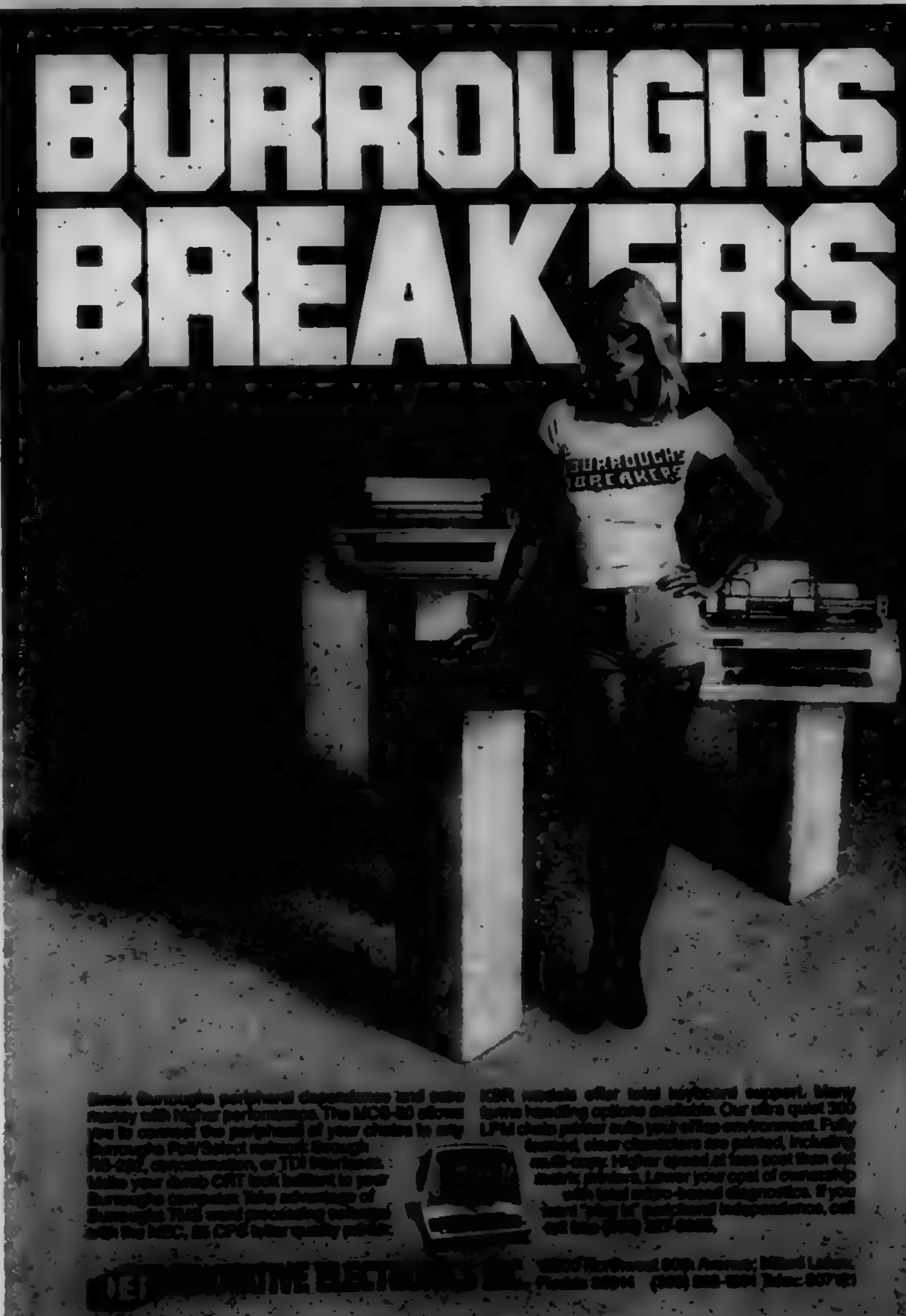

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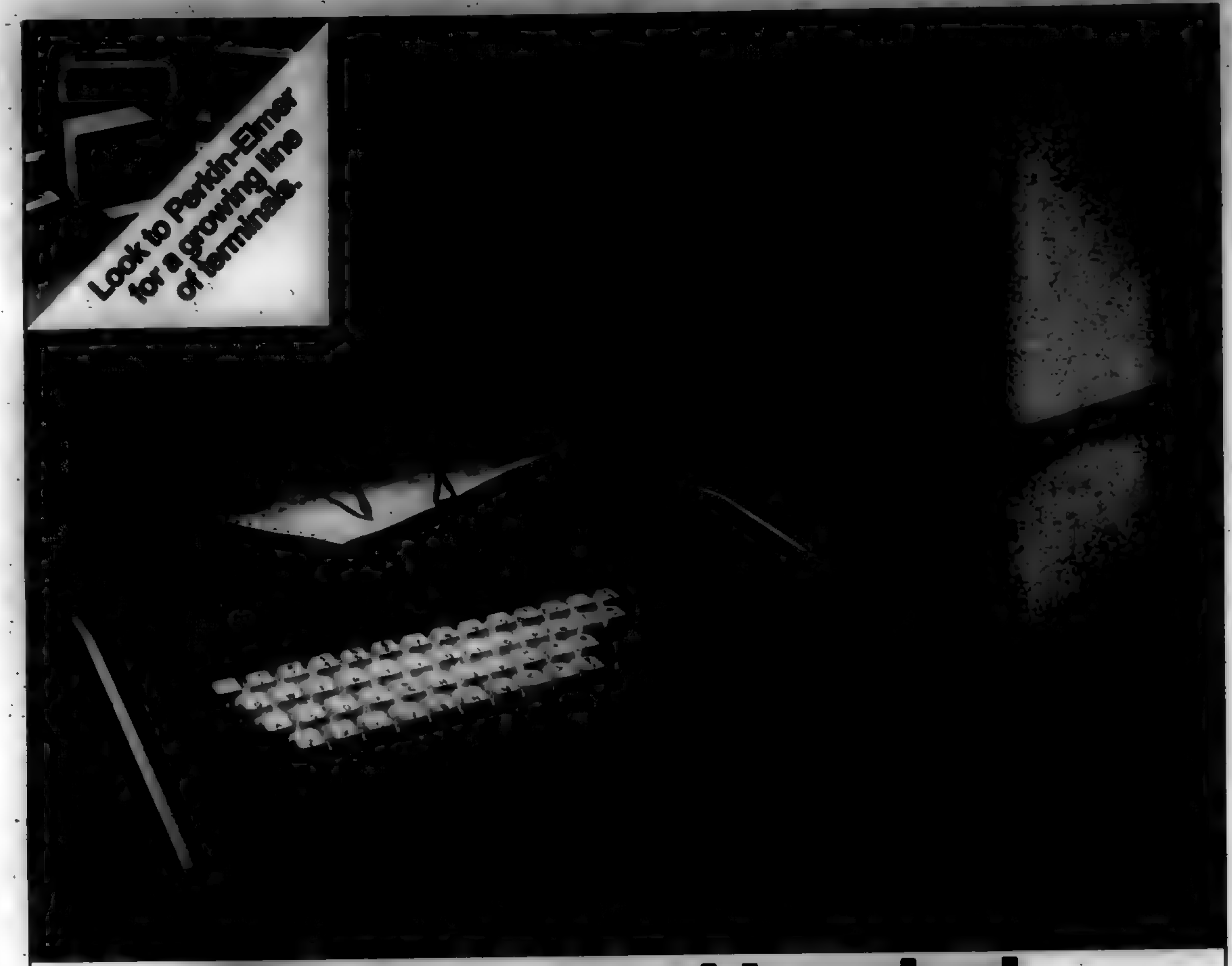

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Contradicts Earlier Announcements

IBMer Admits 'System R' Bridge Not Possible

By Susan Coleman
Special to CW

MELBOURNE, Australia – An IBM researcher last week conceded the promised bridge that would allow IMS users to move to IBM's anticipated relational data base management system (DBMS) cannot be built.

This contradicts all IBM marketing announcements which have been used to prevent a migration of potential DBMS users to other data base systems.

Dr. Frank King, an IBM researcher at the firm's San Jose (Calif.) Research Center, made his surprising statement during a question and answer period following the presentation of a paper on relational data base systems.

Speaking at the International Federation for Information Processing's (Ifip) Congress 80 presented here last week, King further said that the performance of IBM's relational DBMS, code-named System R, is restricted by the CPU and not by I/O. "I am not optimistic that the availability of a super-fancy disk system would affect its performance," he added.

No Release Date

IBM's much vaunted DBMS is still unable to provide functionality at a satisfactory performance, King said, refusing to give a date when System R would be released.

While the data model embodied in airline control program (ACP) could achieve transaction times up to 100/sec and hierarchical models are achieving 20 to 80 transactions/sec, implementations of System R, which runs on IBM 370 and 30 series architecture, are restricted to between one and 20, he said.

Greater transaction times could be achieved, King said, but these would be at the expense of functionality. Since this was the primary purpose of the relational DBMS, there was little point in considering this option.

"To increase the performance of the relational DBMS up to that of hierarchical models will take time and clever programming," King said. "There is a tremendous amount of additional work to be done."

King said the performance was not restricted by I/O but rather by the CPU capability. "It is not I/O bound at all. In order to achieve reasonable performance, a multiprocessing system must be used," King said.

System R has been under test in "real" environments for several years. These tests had revealed that a simple select instruction which returned four records would require the execution of 167,000 instructions on a 370 machine. "You can handle 30 of these in a second on a 3033 type of machine," King said.

Adapso Offers Guide To Contract Dilemmas

ARLINGTON, Va. – "The Contracts Reference Directory" from the Association of Data Processing Service Organizations, Inc. (Adapso) is a series of installments covering the various types of agreements between vendors to, and clients of, computer services providers.

The first installment of the volume that attempts to solve all contract problems is entitled "A Program License Agreement with End User;" the second segment is called "A Professional Services Agreement;" and the third is "Computer System Agreement With End User." The work is loose-leaf bound and approximately 130 pages.

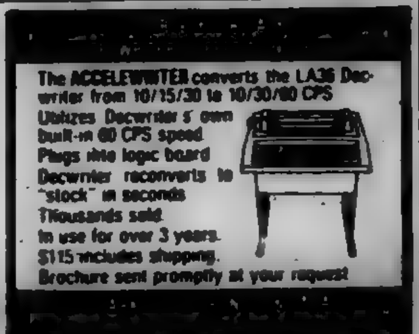
The directory costs $400, but installments are available separately for $150. Further details are available from Adapso at 1925 N. Lynn St., Arlington, Va. 22209.

Seminar to Cover DASD Management

SAN FRANCISCO – A free Direct Access Storage Device (DASD) Management Seminar will be held here Nov. 19 by Software Module Marketing, Inc. (SMM).

Arnold M. Roberts of ADS Associates, Inc. will discuss some of the problems facing the data center management team in dealing with information storage, accessing, backup and restoring. Formerly of Mastor Systems Corp. and the American Broadcasting Co., Roberts has an extensive background in data set management, having served as group manager of the MSS User Group in Guide International, Inc.

More information on the seminar is available from Don Murphy at SMM, Crocker Bank Bldg., 1007 Seventh St., Sacramento, Calif. 95814.



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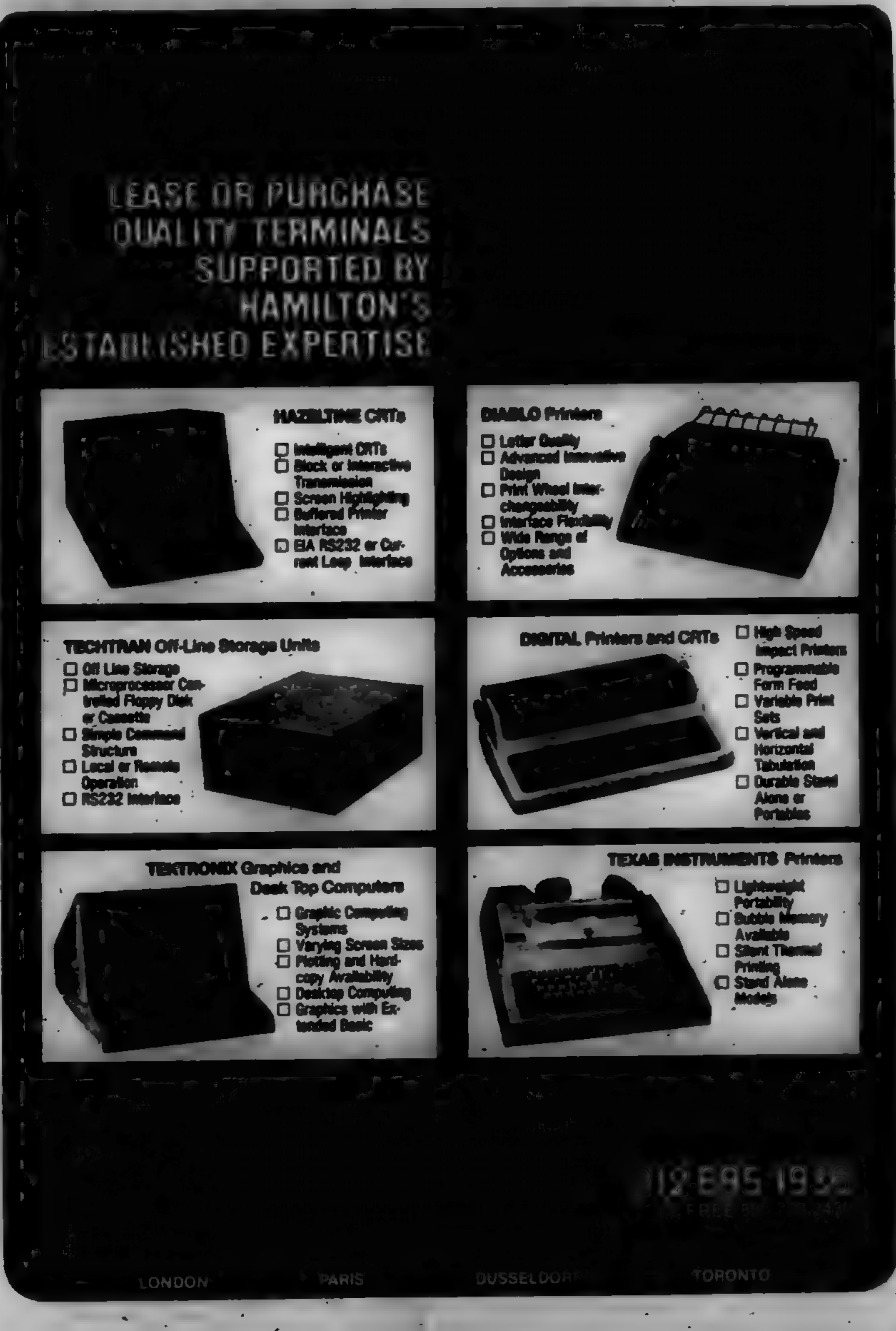

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Facom Reliability Draws Users

Only IBM Led Fujitsu in '79 Australian Sales

By Nancy French
CW Staff

MELBOURNE, Australia — Users here last year bought more systems from Facom Australia Ltd. — Fujitsu Ltd.'s Australian subsidiary — than from any supplier other than IBM, according to a recent local newspaper report. They are buying for several reasons:

- Price/performance.
- Reliability.
- Software (not plug) compatibility.

All Facom systems come bundled. The company offers users software, education, hardware, manuals and maintenance at a better price. In addition, like Japanese cars, most options are standard.

Facom offers a 2,000 line/-min laser printer that prints a range of different fonts and graphics for just slightly more than an ordinary line printer. Three-color terminals are also standard, a sales representative said.

Known for Reliability

But reliability is the factor that everyone here is talking about. Fujitsu builds its systems "from the ground up" using a 100% testing philosophy that includes chips and subassemblies as well as a 30-day test of each full system.

As for software compatibility, the Facom systems allow users to run their IBM applications without conversion under Facom's own operating systems.

The built-in reliability of the systems allows the firm to sell its Facom V-830 minicomputer through distributors that will write applications programs for Australian users.

Market Share Of Vendors By Installed Value

IBM	37%
Burroughs	11%
Honeywell	11%
ICL	8.9%
Univac	8.8%
Control Data	7.2%
NCR	3.9%
DEC	3.8%
Facom	3.9%
Small Business Systems	
IBM	11%
DEC	10%
Wang	10%
Datapoint	8%
Quantel	7%
Honeywell	7%
Microdata	7%
Hewlett-Packard	7%
Nixdorf	4%
Data General	4%
Burroughs	3%
Basic Four	2%
ICL	2%
All others	18%

Figures courtesy of IDC Australia

The above figures show the major vendors' share of the current installed base.

The system is expected to make an appearance in the U.S. sometime next year with applications software for small business users available through Martin Marietta Data Systems, Inc. and written by a British firm.

According to Mike Rydon, the Australian managing director, Fujitsu is testing its ability to run a "service business" — which the computer business is — in the Western world.

"Serving computer users is far different from delivering a product like a television," he pointed out, and it is this type of experience that Fujitsu needs before moving into the U.S.

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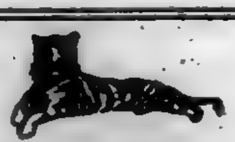

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The Model 745 allows representatives to access the full capabilities of the host computer with its interactive communication features for reliable, responsive results. With the Model 765, utility auditors can speed up the audit process using the data terminal's editing feature, built-in bubble memory data storage and Data Entry Validation Option capabilities.

Once the data has been collected, these portable data terminals can calculate the various energy parameters, and supply customers with a required hardcopy printout of the results and suggestions for energy-saving improvements. Additional on-site reports can be generated for customers that request recalculated summaries utilizing varied energy rating factors.

Both the Model 745 and the Model 765 offer virtually silent 30 characters-per-second thermal printing, an easy-to-use typewriter-like keyboard, and a built-in acoustic coupler for transmission to the host computer. These, and other features on the Models 745 and 765, can eliminate handling and postage costs as well as time delays incurred with other audit methods, and reduce communications costs and time.

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TEXAS INSTRUMENTS

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Interactive TV Pictured as Data Base Access Aid

By Nancy French
CW Staff

MELBOURNE, Australia — Someday data base users may be able to browse through a data base and locate needed information using ordinary TV monitors equipped with a touch-sensitive feature and a joystick instead of formal query languages.

This system was one of several presented at a session on interactive TV at the International Federation for Information Processing's (Ifip) Congress 80 here recently.

The Spatial Data Management System (SDMS), described by Christopher F. Herot of Computer Corp. of America in Cambridge, Mass., allows the user to interact with the data base looking for data with pictorial and color clues much the way one would look for items on a desk, Herot explained.

Herot's prototype system requires three monitors: One to provide a kind of world map through pictures of the data; a second to draw or make notes on the data displayed; and a center monitor, equipped with a joystick to zoom deeper and deeper into the file. The data base is its own data dictionary, he pointed out.

Objects in the system are represented by pictures arranged on a flat data surface which indicate the presence of information or programs.

Zoom In Feature

By twisting the joystick, the user can zoom in for a closer look which the system implements in either of two ways. It can give a more detailed representation of the original picture, such as the weight and dimensions of the pictured Russian ship, or it can execute a program that carries out some activity, such as displaying a document or retrieving a picture from a video disk, he explained. The user need not know the difference.

The system can be used in conjunction with pictures in a personnel data base, Herot said. Data can include pictures and graphs, as well as the typical textual representations of data.

The SDMS allows the user to see large quantities of data on a small screen by partitioning the graphical data space into multiple data surfaces. He can view a data surface at any level of detail. The main display of the SDMS user station functions as a window onto the data surface.

Herot's system permits graphical data space to be partitioned into multiple data surfaces linked together in a network. The user merely moves from one data surface to another by zooming closer and closer to the data and going through a port to the next data surface, he said.

The system runs on a dedicated PDP-11/70 running on a modified version of the Unix operating system. The system has a 1.25M-byte memory, which is used primarily for manipulating the graphical data surfaces and staging them to the display. Data surfaces are stored on a moving head disk as bit arrays known as image planes, he said.

Teleconference in Virtual Space, now under study at the Department of Defense's Advanced Research Projects Agency, is aimed at eliminating many of the limitations of today's teleconferencing technology as well as providing additional features, such as a shared workspace or blackboard that any of the conferees can write on, according to Clinton Kelly, who described a prototype system being built under contract with Decision and Designs, Inc., of McLean, Va.

A virtual space teleconference consists of three or more sites that may teleconference simultaneously with as many other sites as it has conferee surrogates. A surrogate consists of a visual display, a camera pointing the same way as the display, a microphone and a speaker sup-

(Continued on Page 30)

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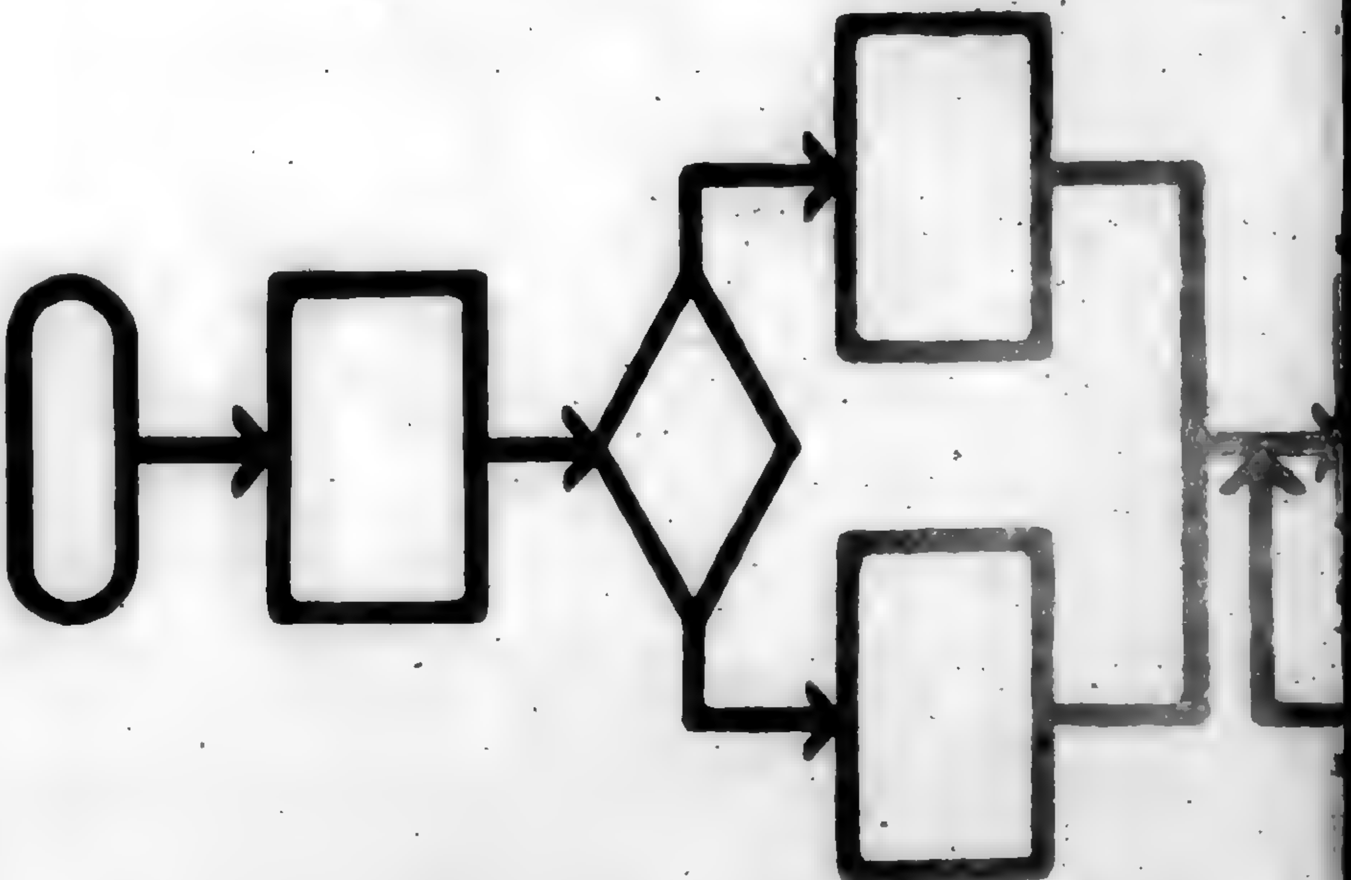

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Cobol to Stay on Top, Experts Predict

MELBOURNE, Australia – A variant of today's Cobol will still be the dominant language in industry and commerce in 1985. Algol and Pascal will have that stature in the university area, according to a recent survey of college professors and industry practitioners.

Compiled by Dr. H. Maurer of the Institute for Information Processing at the Technical University of Graz in Austria, the survey gives a quick snapshot of current thinking on the quality of programming and programmer training. Of 204 responses, 98 agreed that more programmers would be needed throughout the '80s, and 72 thought more probably were needed.

One hundred and sixty-four agreed a computer science degree does not make one qualified as a programmer, but 132 agreed programmers should have a university degree.

However, 144 respondents believed programmers could be trained below the university level, while 113 suggested training at the high school level.

The results were presented here at the recent International Federation for Information Processings's (Ifip) Congress 80.

Panel Disagrees on Ways To Prepare Programmers

By Nancy French
CW Staff

MELBOURNE, Australia – More programmers will be needed in the '80s, a panel of prominent computer scientists here agreed recently – but they did not agree on what kinds of people should be recruited, how they should be prepared and trained or what they will be doing.

The problem is a multifaceted educational one, panel chairman Dr. Heinz Zemanek, an IBM fellow in Vienna, Austria, said. The young and the old must be trained to work with computers, and they must be prepared for change, he said.

A good university education would help programmers adapt to the change that will be inevitable in their lifetimes, while those who were merely trained may not have developed their internal resources in a way to permit this.

Maintenance – like the poor – apparently will always be with us. For that work, according to Dr. Herbert R.J. Grosch, a consultant and former president of the Association for Computing Machinery, people could be recruited off the street and given a quick training course.

For the more creative work, however, university graduates with a good theoretical foundation are needed, the panel seemed to agree.

"Programming is no different from any other intellectual activity," Prof. W. Turski of the Warsaw Institute of Informatics said. "To do it well, you have to learn it," he said. However, he decried work like software maintenance as "unfit for human beings. Some jobs should go unfilled," he said.

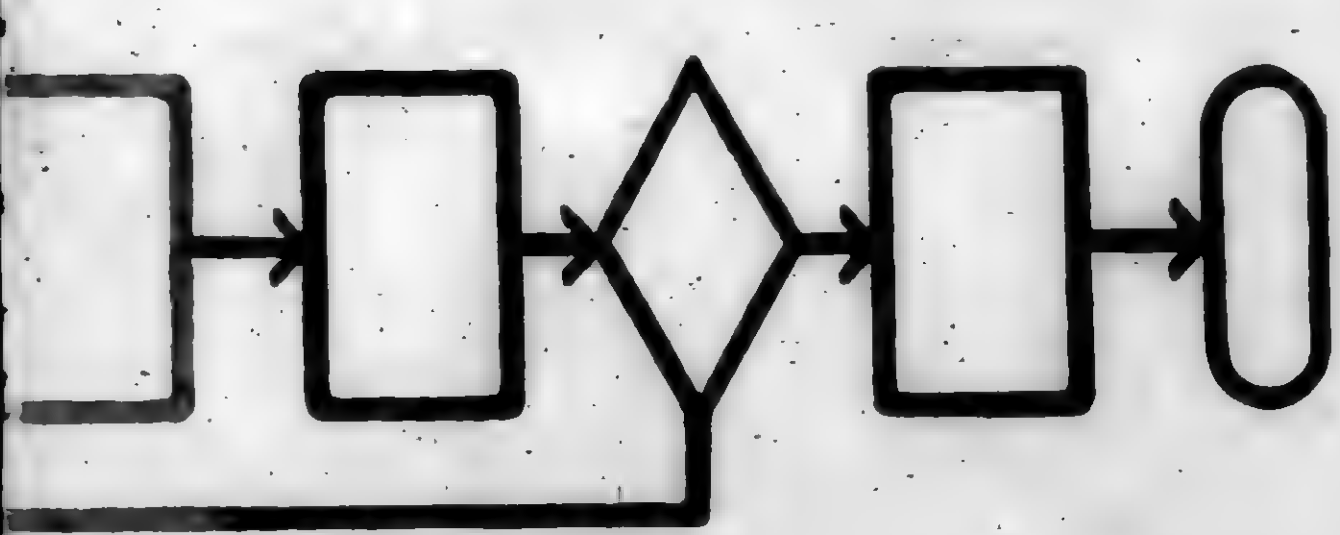
Although several members of the audience posed questions concerning the use of packaged software and other technical solutions – such as report generators and query languages to reduce the amount of Cobol coding needed to perform certain types of tasks – only H. Remus of IBM's Teresa Laboratory addressed that idea.

Simple Programming

Computer programming should be made easy enough for end users to do without any special training. It takes eight months for a computer science graduate to become productive – six to eight weeks in the classroom and the rest from on-the-job training.

As part of the solution, Re-

(Continued on Page 30)



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Panel Disagrees on Future Programming Scene

(Continued from Page 29)

mus argued that "interest in programming should start at the high school level." He also called for reuse of programs and program parts.

As for the contribution of packages, Groech said it will be "20 years before we're able to select good packaged software" in sufficient quantity to reduce the need for programmers. Many packages are poor — designed to make money rather than provide real solutions, he indicated after the session.

Groech also decried today's overspecialization. There are some people, he said, who are specializing in a small part of a vendor's operating system. "What happens to a person when the vendor throws out that operating sytem?"

His view of some programming work in the '80s was that it would be done by a bunch of "do-it-yourself" programmers, each doing his own tasks on his own microcomputer. However, this type of approach would require an overriding staff function to impose a healthy protective blanket on things.

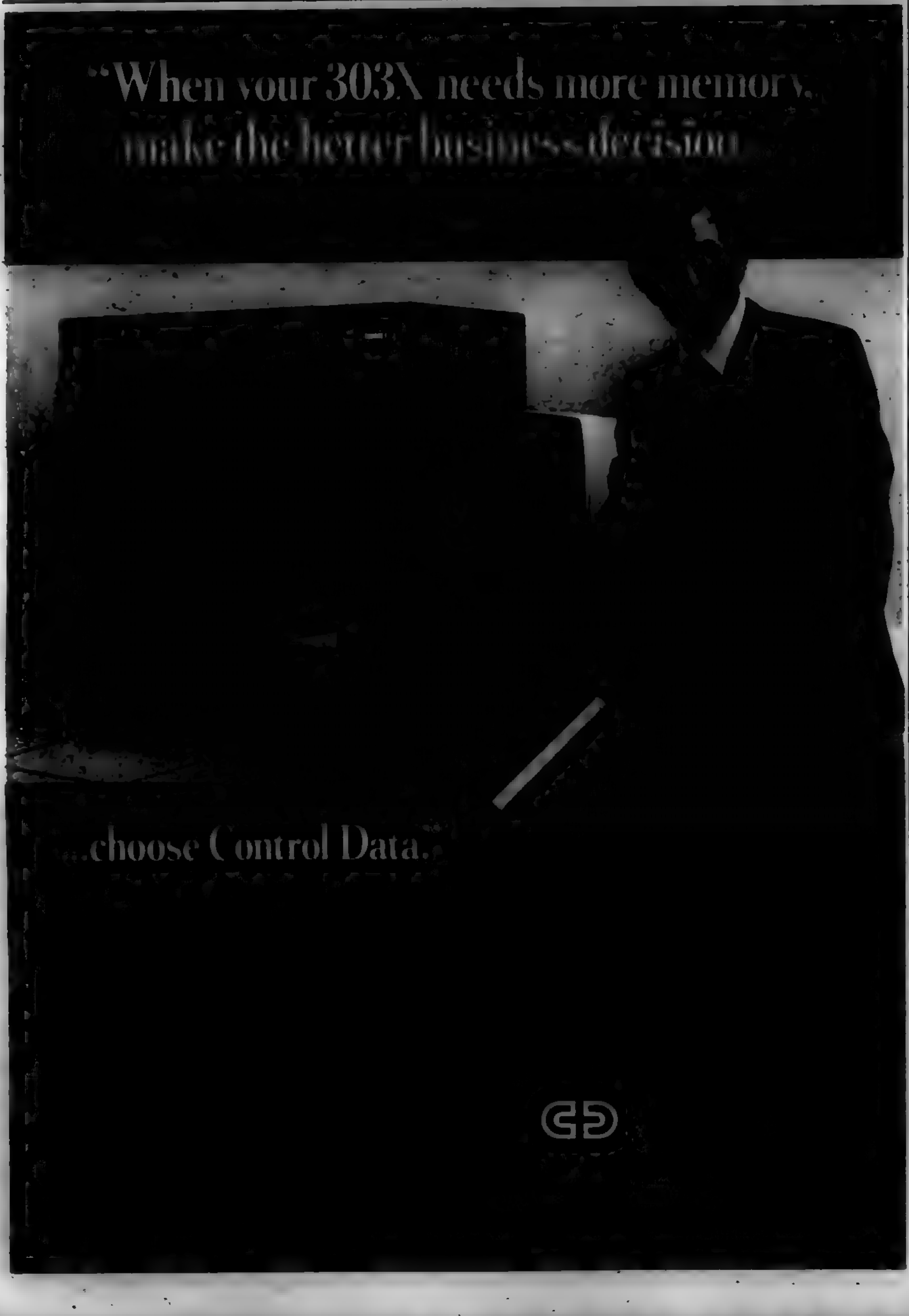
Without this, things could go seriously downhill. When we need them to become professionals, they will remain amateurs, Groech remarked.

H. Bauer of the University of Munich argued for greater care in the specification of program solutions — a formalized style of native languages. Turski agreed that a clear statement of the problem provides its own solution.

The failure of the universities in preparing computer science students to be productive programmers also came under fire.

Some members of the audience, however, argued that a university was a place to teach people to think. "We can't produce people who know Cobol because you can't think in Cobol," a professor from Cornell University quipped.

Several panelists agreed that industry should be willing to play its part in preparing people to be productive.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Monitor Tool Within View

(Continued from Page 28)

plying audio from the same site from which the display provides the image.

This system is also being designed for "generals and six-year olds" whose common characteristic is being too impatient to learn how to use complex equipment, Kelly remarked.

According to Kelly, the system produces a new picture at the rate of 7.5 frames per second — which, when integrated over time, produces a "pretty good image."

In addition, the surrogates enable the teleconferee to see when his conferees are looking at one another or directly at him.

Future goals include being able to allow note passing, asides and a larger workspace or blackboard, Kelly said.

At present, the system transmits over ordinary telephone lines at 9,600 bit/sec and is being designed for use by military personnel in times of crisis.

Another use of interactive TV, described by Andrew Lippman of MIT, illustrated how an ordinary home TV screen with optical video disks can be used to create an "experiential map." Using Aspen, Colo., as the locale, the speaker demonstrated how a user of the system could experience what it would be like to drive through the town and where he would end up if he turned right or left at any given landmark. Films were stored on video disk, and a touch-sensitive panel allowed the user to select turns.

With two disks, the second disk could run ahead to the next intersection, for example, and prepare the next sequences. This cuts the search time to zero, Lippman said.

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Project Works Since '71

Hospital Takes Long Road to 'Utopian' System

By Bruce Hoard
CW Staff

NEW YORK — Building a computer system for a hospital is a long, arduous task that requires painstaking communications among all concerned parties, Carl Fargiano, vice-president of management information services (MIS) at Norwalk Hospital, told attendees at a recent conference here.

The Health Services Data System at the Connecticut hospital was started in 1971 and is still not entirely implemented. It is composed of three subsets: the clinical management system, patient management system and financial management system.

Prior to 1971, DP at the 427-bed facility fell under the control of the finance department and was regarded as an unwanted stepchild by hospital management, Fargiano said.

New Regime

However, after management was shuffled in 1971, a new group, less antipathetic to computers, came to power. "Our task then was to find out what, if any, computer applications we could use for the hospital," Fargiano commented.

He, along with 14 other DPers, started an ambitious project that would eventually include representatives from every area of the hospital.

The first step was the formation of five study committees that would determine computer needs in specialty areas of the hospital. Directors, nurses, hospital management, MIS people and trustees were all included.

The study committees met regularly once or twice a month and reported progress to the steering committee, composed of the hospital president and trustees. "The steering committee told us to build a utopian system and not pay any attention to the costs," Fargiano said.

The five study committees represented administrative systems, medical monitoring and instrumentation, diagnostic systems, data base confidentiality and clinical data base. Many people were on more than one committee to ensure good communications among them.

First Application

After two years of working and planning, the scope of the system's first major subset, the patient management system, was defined and approved by the steering committee. The hospital then hired the consulting firm of Arthur Andersen & Co. to do an eight-month study, which culminated in a 700-page report.

At that point, MIS got the go-ahead to hire a manager in hospital administration and a project leader to firm up plans. By the end of 1977, two more reports were compiled and the search for a vendor was on.

"We came down to four vendors," Fargiano said. "We did not start the search earlier because we didn't want the committees to be influenced by what was on the market."

After deliberating on the pros and cons of various systems for a month and a half, the hospital selected IBM. With a 370/148 already in place, it seemed logical to build a system around it, Fargiano recalled.

However, the $5.5 million IBM wanted to put the system in place was prohibitive in the eyes of the steering committee. So Fargiano and Arthur Andersen went back to the drawing board.

Three-Step Plan

After nine months, they came up with a "modularized, phased," three-step plan toward computerization. The first step would affect between 50 and 100 people, the second, another 150 and the last, the rest of the hospital's 1,400 employees.

Fargiano's group started programming in 1978, and the initial, basic system was completed in December 1979. That was phase "A." Phase "B," the result reporting system, is nearly complete. The first terminal is slated to be installed at a nursing station Nov. 15.

After that, phase "C" will consist of placing terminals at all nursing stations at the hospital over the next 2 1/2 years, Fargiano said.

The clinical management system — the second major component of the overall system — consists of several minicomputers reporting from disparate areas, such as radiology and nuclear medicine, to the 370/148 and newly installed 4341.

The third and final major component is the financial management system. "It is a by-product of the patient management system," Fargiano explained, adding that it takes over after tests and other services are rendered.

To date is "utopian system" has cost $800,000 for hardware and $1.2 million for software. Fargiano's staff has saved on software by writing many of its programs in-house, he claimed.

What was previously a five-day-a-week, two-shift operation has now been converted to a seven-day, 24-hour shop.

Although he admitted to making several mistakes along the way such as waiting too long before involving private doctors in the plan, Fargiano expressed overall satisfaction with progress to date.

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Panel Looks at Office Automation, DP Linkup

By a CW Staff Writer

NEW YORK – "DP is very structured and has a lot of rigidity," Garry Cullen, vice-president of marketing at Datapoint Corp., stressed.

But now DP is moving out of the central part of the company, gaining new users that are not as rigid, he continued. The fact that a record is a fixed length is meaningless for a growing number of new users within the organization.

Cullen and other system suppliers expressed their views on what the integration of office automation and DP means for vendors at a recent conference session here.

Right now Datapoint is adding office functions to its standard DP systems. Any system should be capable of doing anything, Cullen asserted. "The day of the single-purpose machine is over."

Cullen called Datapoint's present activities a preparation for the next phase of its development that will extend the use of terminals to the shop floor.

However, the proliferation of terminals to new nooks and crannies of the organization is not a guarantee of productivity, the panelists agreed.

"Automation probably won't increase productivity in the office in the near-term future," offered Duncan B. Sutherland Jr., an office automation consultant with Wang Laboratories, Inc.

"People have to want to manipulate the system," he emphasized. "The user organization must have the proper attitude [toward automation]. It isn't a magic hoe."

Moreover, "turnkey applications cannot be applied to the office, because the office is not as structured as the DP environment," stressed Jack Barry, manager of information processing systems in the Strategic Business Unit of Xerox Corp.

Currently, word processing applications are only nibbling at 7% of the expenditures for the office, according to Jack Gilmore, corporate manager for Office Information Systems at Digital Equipment Corp.

The automated office system will have to perform word processing, communications, administrative and DP functions. The "knowledge worker" or professional will use the full range of these functions, whereas executives and other workers will use a narrower scope of capabilities, he maintained.

In the near term, office automation systems will handle electronic mail, conferencing, scheduling, hard-copy mail scanning and reminder services. By the late 1980s these systems will build in voice security, voice recognition for dictation, graphics and broadband transmission, resulting in a broad reduction in paper use, he predicted.

WDP Schedules Data Base Talk

NEW YORK – "Data Base – Structured Techniques for Design, Performance and Management" is the title of a text and seminar by Shaku Atre, and both are available through Women in Data Processing, Inc. (WDP).

The full-day seminar, slated to take place here Nov. 1, encompasses the areas of information sources, environment, independence, data base administration, data dictionary, design models, storage, access and implementation. Atre's recently published book will provide the basis for her lecture, and course participants will be able to purchase the work at a 40% discount, WDP said.

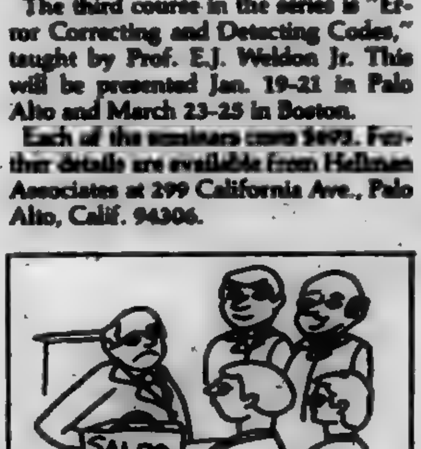
Cost of the course is $105 for non-WDP members, $95 for members and $55 for full-time students. The Atre book will be offered for $16.95. Further details, including future dates for the seminar, can be obtained from WDP at 310 Madison Ave., New York, N.Y. 10017.

Courses Slated On Security

PALO ALTO, Calif. – Winter 1981 course offerings have been announced by Hellman Associates, Inc. "Cryptography and Data Security" will be held here Feb. 2-4 and in Washington, D.C. March 23-25. The program will be conducted by Prof. Martin E. Hellman, as will the "Cryptography and Data Security Executive Summary," a one-day version of the above. The summaries will take place in Los Angeles Jan. 19, in Chicago March 19 and in Boston March 20.

The third course in the series is "Error Correcting and Detecting Codes," taught by Prof. E.J. Weldon Jr. This will be presented Jan. 19-21 in Palo Alto and March 23-25 in Boston.

Each of the seminars costs $495. Further details are available from Hellman Associates at 299 California Ave., Palo Alto, Calif. 94306.



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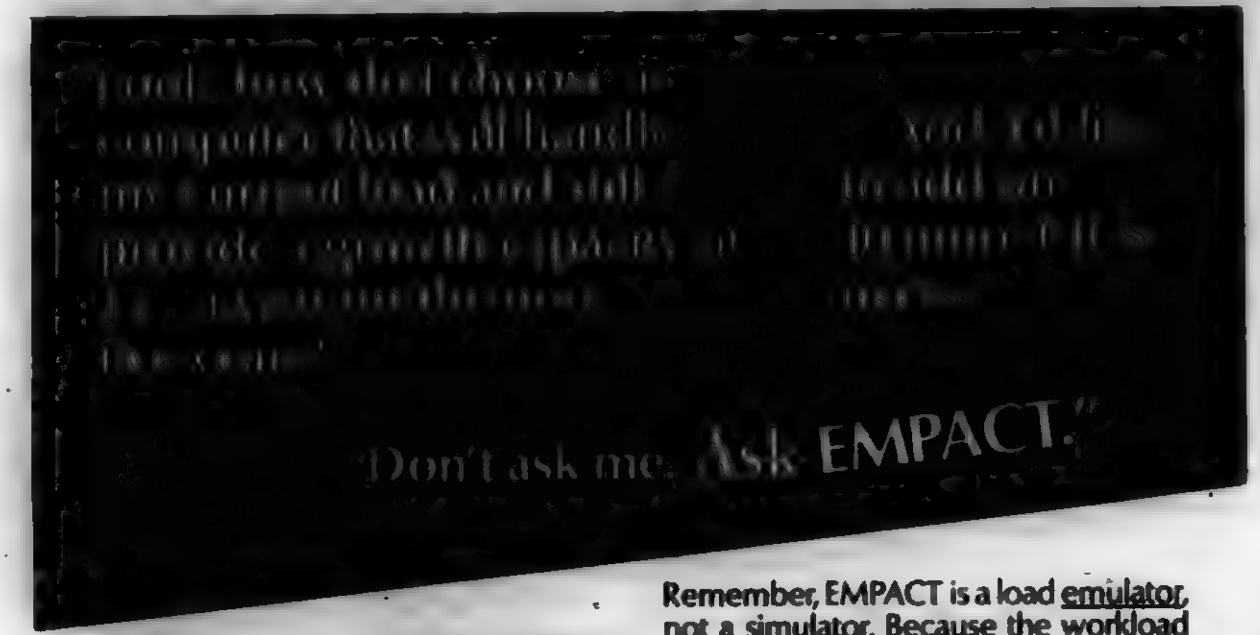

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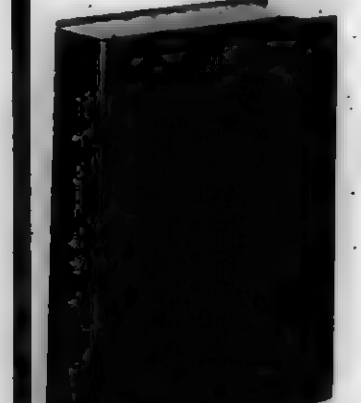

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Mass. Supreme Court Upholds Ruling on UPC

By Deborah Wise
CW Staff

BOSTON — The Supreme Judicial Court of Massachusetts has upheld a ruling that the Universal Product Code (UPC) cannot be used as the sole means of pricing consumer goods. As a result, each item must be clearly marked with its individual price.

Purity Supreme, a supermarket chain here that used a UPC checkout method, challenged a Massachusetts Attorney General's regulation that it is unfair and deceptive to "fail to affix to any goods offered for sale to the public the price at which the goods are to be sold."

Purity lost its case and will now have to price, as well as bar code, the items in nine of its 41 stores that used UPC. Before the ruling, Purity had provided its customers with pencils to write the prices in themselves, but these were not often used.

"As far as I am concerned, it was 100% accurate," Thomas Manning, manager of systems and programming for Purity, said of the UPC system. He maintained the store carried out a complete inventory verification check once a month and that no unfairness or deception occurred.

"It is a plus we won't be able to avail ourselves of anymore," Leo Kahn, president of Purity, said. "When we installed the UPC systems we knew of the Attorney General's regulation and we took it to court and lost. We have gone as far as we are going to go."

The savings gained by not having to mark each item cannot be realized though the POS terminals. The terminals, however, will be able to handle inventory control functions and checkout.

Purity has an IBM 370/138 mainframe with 1M byte of main memory, and in the stores that were using UPC, it had National Semiconductor Corp., Sweda International, IBM and Data Terminal Systems terminals.

Other states have now followed Massachusetts by requiring that every consumer item be clearly marked since the Attorney General's regulation was upheld.

However, in trying to protect the consumer from incorrect pricing, the regulation defeats the cost-cutting premise behind UPC. The court maintained that "some additional cost of item marking may be reflected in increased prices to the consumer. This extra cost of the dual system does not support Purity's claim of unreasonableness."

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Nov. 10-11, Boston — Structured Documentation. Contact: Carnegie Press, Center for Documentation Resources, 100 Kings Road, Madison, N.J. 07940. Also being held Nov. 13-14 in New York.

Nov. 13-15, Chicago — National Software Protection Conference. Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 14, Dallas — How to Achieve Manufacturing Control With Software Packages. Contact: K. Faria, Software International, Elm Sq., Andover, Mass. 01810. Also being held Nov. 25 in Chicago.

Nov. 18-20, Kansas City — Planning for Computer Security. Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20014.

Nov. 18-19, Chicago — Advanced Systems User Conference. Contact: Lee Mulder, Advanced Systems, Inc., 2340 S. Arlington Heights Road., Arlington Heights, Ill. 60005.

Nov. 19-21, Phoenix — Simulation Modeling & Analysis. Institute for Professional Education, Inc., Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 19-21, Atlanta — Effective Computer Operations Management. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 19-21, Washington, D.C. — Fiber-Optic Communications Systems. Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 20, London — FPS Introductory Overview. Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 20, Chicago — Software Maintenance Seminar. Contact: Shetal Enterprises, Inc., 1787 B W. Touhy, Chicago, Ill. 60626.

Nov. 20, New York — Financial Decisions: Choosing a Financial Decision Support System. Contact: Real Decisions Corp., 123 High Ridge Road, Stamford, Conn. 09605.

Nov. 20, London — APL* Plus Ltd. Introductory Overview. Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 20-21, Middlebury, Conn. — Software Reliability Seminar. Contact: Computing Trends, Inc., 6925 56 Ave. S., Seattle, Wash. 98118.

Nov. 20-21, San Diego — Educational Computing in the '80s. Contact: Ron Langley, Computer Center, California State University, Long Beach, Calif. 90840.

Nov. 20-21, Washington, D.C. — Computer-Aided Graphics. Contact: Data Processing Management Association Education Foundation, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Nov. 20-23, Boston — Personal & Business Computer Shows. Contact: National Computer Shows, Inc., P.O. Box 678, Brookline Village, Mass. 02147.

Call for Papers

INTERNATIONAL FIBER OPTICS & COMMUNICATIONS EXPOSITION, Boston, March 24-26, 1981.

Papers are being invited on any of the following subjects: data communications; computers; entrance links; automotive; power/energy; local data networks; nondestructive testing; light transmission; medical; imaging; graded index optics; CATV; variable message signs; MATV; sensors; aircraft; industrial control; machine tools; transportation; robotics; printers; security systems; office of the future; word processing; copiers.

Authors are requested to submit a 200-abstract on potential papers by Nov. 1 to Ellen M. Bond, Director, Expositions & Publications, Information Gatekeepers, Inc., 167 Corey Road, Brookline, Mass. 02146.

INTERNATIONAL CONGRESS ON MEDICAL INFORMATICS, Strasbourg, France, April 27-29, 1981.

Some of the topics of interest for this conference are hospital information systems; data bases and medical records; microcomputers; technology trends; medical informatics teaching; analog data acquisition and processing and long-term data storage.

Authors are requested to forward the original version, along with four copies of their abstract by Dec. 15. Abstracts should be one page only, camera-ready, 21 cm wide by 29.7 cm high with 2 cm margins.

The title of the work must be in capital letters, followed by the author's name, underlined.

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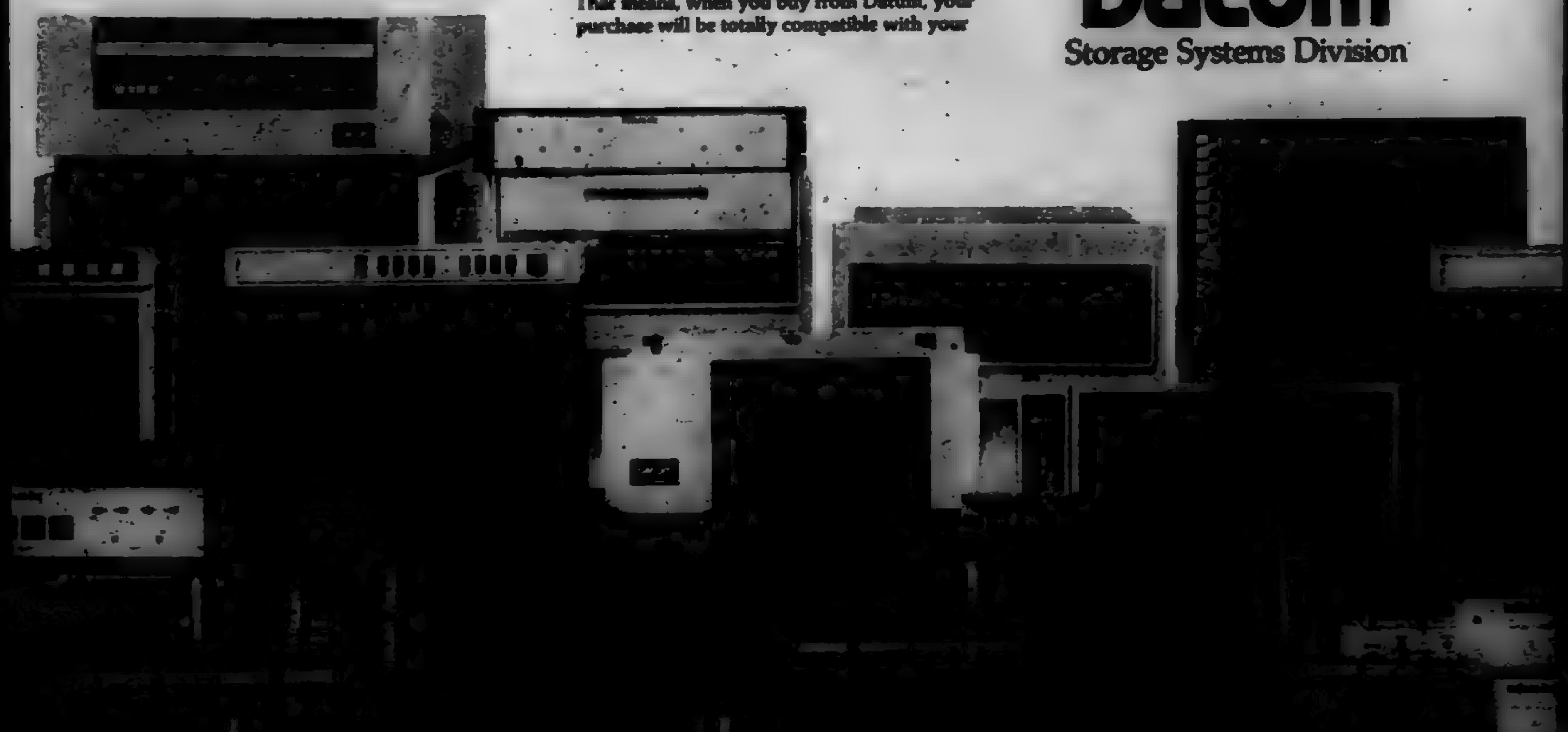


EDITORIAL

FAA Must Act Now

If the Professional Air Traffic Controllers Organization (Patco) stages an illegal strike when its contract runs out next March 15, the Federal Aviation Administration (FAA) will have only itself to blame.

In the face of growing FAA suspicion that just such a strike will occur [CW, Oct. 20], the agency continues to spout its party line that the problems repeatedly cited by controllers simply do not exist. Those reported problems include understaffing, undercompensation, antiquated computer equipment and a training program that strains the limitations of journeymen controllets.

On the matter of allegedly outdated computer equipment connected to controllers' radarscopes, the FAA steadfastly insists the equipment's reliability has improved over the last seven years.

Whether statistics can show such improvement or not, a rundown of recent outages around the country — as reported in the general press — certainly illustrates the need to reevaluate a system on which air travelers' lives and safety depend.

On Sept. 5, according to the *Minneapolis Tribune*, a computer outage at the Minneapolis Air Route Traffic Control Center (ARTCC) in Farmington, Minn., was exacerbated by the subsequent failure of the backup system.

On Sept. 23, problems at both southern California's Palmdale ARTCC and Georgia's Hampton ARTCC caused delays in those locations. The California outage was another example of the main and backup systems failing simultaneously. Those stories appeared in the *Los Angeles Times* and *The Atlanta Constitution*, respectively.

Sept. 24 brought similar delays at Boston's Logan International Airport, stemming from a computer outage at the ARTCC in Nashua, N.H. While no near mid-air collisions were reported, one controller confused the identities of three of his radar blips, so he did not know which planes they represented, according to the Manchester, N.H., *Union Leader*.

Oct. 3 again brought double trouble, when failures at Palmdale, Calif., and Miami's ARTCC caused delays, reported by the *L.A. Times* and *The Miami Hearald*, respectively. In the case of the Palmdale failure, which again involved both main and backup systems, Vice-President Walter F. Mondale reportedly took off from L.A. International Airport nine minutes before computer service was restored.

In every case cited above, FAA officials were quoted as saying the outage posed no danger to air safety because of the backup systems. In three cases, however, the backup systems also failed, increasing the chance of controller confusion in converting to a "manual" system and the possibility of a mid-air collision.

And while the FAA worries that the flying public will suffer in the case of a strike next spring, it would be far better to endure a temporary inconvenience than a permanent disaster. The FAA should act now to avert both inconvenience *and* disaster — by acceding to controllers' demands for state-of-the-art equipment *before* they decide to strike.

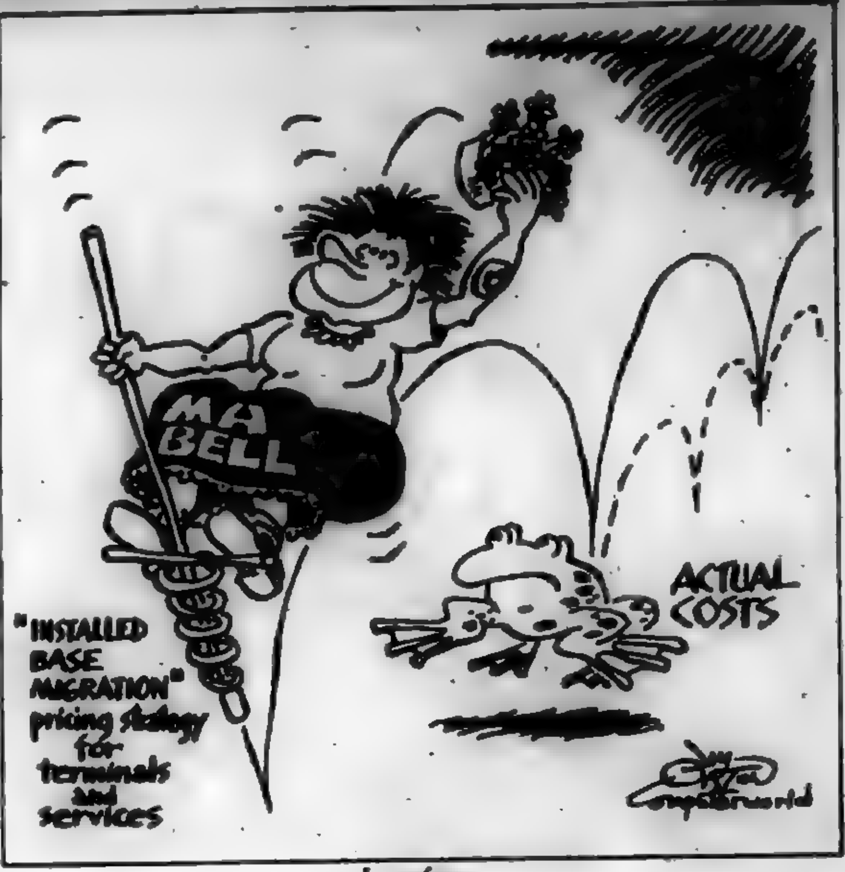
DATA PAST

Five Years Ago
Nov. 5, 1975

CAMBRIDGE, Mass. — There might be serious errors in official computer predictions used as a basis for licensing large-scale nuclear power plants, Carl J. Hocevar, an engineer with the Union of Concerned Scientists, said here. Tests performed at Aerojet Nuclear Co.'s Idaho National Engineering Laboratory raised new doubts about the safety of reactors, Hocevar said.

Eight Years Ago
Nov. 1, 1972

WASHINGTON, D.C. — The specialized needs of data communications users might require the establishment of "value-added" networks, according to Clay T. Whitehead, director of the Office of Telecommunications Policy. Whitehead described the networks for an audience at the first International Conference on Computer Communication.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LETTERS

Conceptual Fog

Computerworld's report of Robert M. Price's keynote address to the annual conference of the Society for Management Information Systems ["Productivity Linked to 'Knowledge Nuggets,'" CW, Sept. 29] did not deserve Page 1 treatment. And assuming that the report was accurate and essentially complete, I question whether Price's comments deserved any mention at all.

Certainly, the productivity issue is important and timely. And certainly, the design of management information systems (MIS) has a direct bearing on this issue. But how did Price's comments advance our understanding of the relationship between productivity and MIS? If anything, he has muddied the waters by introducing needless neologisms and fuzzy distinctions.

Although Price is president of a corporation that purports to control data, he is evidently confused about the distinction between data and information. Whether these terms are used in ordinary or technical language, they are not considered synonymous.

Data that is endowed with intelligible form is information. In ordinary language, the term "information" refers to data that has been organized according to some interpretive scheme. In technical language, "information" is understood as a function of message probability. Thus, the statement that American business churns out "220 billion pages of information every working day" is simply false.

Clear distinctions among the terms "data," "information" and "knowledge" are critical for the topic Price wanted to discuss. But by failing to conform to the conventions of standard usage, Price leads us into a conceptual fog with statements like "(a computer-aided management system) correlates and synthesizes specific data . . . it generates knowledge, not information." We are lost in a thicket of new critters like "knowledge nuggets" and "knowledge-assistance systems." Are these terms anything more than examples of the gobbledygook that is rife in the computer industry?

By drawing spurious distinctions and through unwarranted deviations from ordinary word usage, Price contrives a new and improved system that will assist management knowledge by producing nuggets of it. But we are not given even one example of a "knowledge nugget," and we begin to suspect that it is nothing more than a good, old-fashioned piece of information. Is the whole thrust of Price's address simply that all the data that glitters is not gold?

Joseph K. Corrado
Seattle, Wash.

To Pay or Not to Pay

I read with interest the article by Mark Robinett, "Before You Pick Up and Move" [CW, Sept. 22]. I must, however, take issue with his statement that "client companies will pay fees to reliable (employment) agencies, and if they do not think a particular agency is worth paying, neither should you."

I would simply like to point out that there are some companies and government agencies that will not pay a service fee. This is a matter of company policy, often with regard to entry-level positions, and has nothing whatsoever to do with the reliability of the agency.

Also, an agency might be able to negotiate a better salary than the applicant could get for himself, in which case he should let the agency work in his behalf even if he does have to pay his own fee. This is particularly true with recent college graduates who have little or no work experience.

Glynn T. Raines
DP/Textile Consultant
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SOFTLINE/Werner L. Frank

Will the Real Application Generator Stand Up?

"Application generator" is one of the more recent buzzwords to make the rounds in data processing circles. Is this term a modern-day version of the older concepts of automatic programming, implicitly programmed systems or program generator? Or is it another cut at a nonprocedural language or perhaps an attempt to achieve the ultimate higher order language in the form of a report writer, user query system or parameter-driven program?

One of the earlier uses of the term appeared in the book *Data Processing in 1980-1985* (John Wiley and Sons, 1976) where the application generator is described in terms of desired objectives in enhancing the productivity of application development by:

(1) Minimizing the percent of total software in a new application that is new software.

(2) Extending the life-cycle time of a line of code.

(3) Permitting new software to be reusable in other development.

(4) Reducing skill-level requirements of implementations.

(5) Significantly increasing productivity of implementations and quality of resulting products.

(6) Permitting more direct and unambiguous statement or design of problems to be solved.

(7) Eliminating variability in system design by different individuals.

Perhaps the following can serve as a definition of the application generator as presented in the aforementioned book: A tool for implementing an application via user-terminal interaction, in a dialogue setting, where selection choices and responses to posed questions lead to the automatic tying together of hierarchically organized sets of building blocks into executable programs for solving a specific problem.

> *'We have at least three views of what an application generator is and does. As in many areas of data processing, words by themselves do not necessarily tell the story nor are they consistently used. The term "application generator" is another one of those buzzwords that floats around and has not settled.'*

Two New Concepts

IBM has recently introduced two new concepts in connection with providing more implementation capability for the computer user: Application Enabling and Data Systems. Both of these terms advance the notion of application generator.

Application Enabling offers three choices for enhancing new application development. One is the purchase or lease of off-the-shelf packaged software. The second includes certain licensed software designed for non-DP personnel to assist in problem solving — as, for example, query systems, report writers and special-purpose financial planning tools. The key operating theme for this software is an English-like language that purports to make easy the exercise of a functional program by users who have no DP knowledge.

The third member of this enabling capacity is the application generator. IBM describes this software productivity enhancer as a "simple fill-in-the-blank technique to specify preprogrammed functions, instead of writing in a procedural language."

Two products are specifically identified to illustrate the application generator: the Application Development Facility (ADF) and the Development Management System (DMS). The former is used in conjunction with building applications for operation with IMS and the latter is for use in construction of programs in CICS or 8100 information system environments.

The Data Systems concept encompasses the same objectives as Application Enabling, but is limited to the construction of programs that are heavily dependent upon data base and data communications (DB/DC). The overall environment starts with a data dictionary focal point, adds the DL/1 or IMS/DB data base, is inclusive of CICS or IMS/DC for data communications and provides a "data delivery" capacity for constructing an application solution. Again, as in the enabling viewpoint, the ADF and DMS program products are classified as application generators that are part of the data delivery portion of Data Systems.

In use of the term "application generator" within both Application Ena-

(Continued on Page 46)

HUMAN CONNECTION Jack Stone

What Makes a DPer A Real Professional?

Are you *sure* you know what a DP "professional" is?

I thought I did, but I learned recently that my understanding of DP professionalism was superficial and confused. Since then, I think — or at least I hope — I have sorted things out. Because I suspect many readers may have problems in this area, I thought it worthy to discuss here.

It all started several weeks ago, when I was invited to a gathering of a small group of DPers who were planning the annual meeting of their professional association. One of the program modules that was discussed dealt with the development of professional skills, and the feeling of the group was that some stiff injections of advanced technical methods during seminar times would help build the professionalism of the members.

I was bothered by this reasoning, but was not really sure why at the time. At first I thought the knowledge of advanced techniques should enhance the professionalism of DPers — but does it really? Does being current with up-to-the-minute technology make a DPer a professional? That doesn't seem right — and, of course, it isn't; knowledge of facts and figures *alone* doesn't make a person professional.

And I have the same kind of problem with the whole argument about certifying the DPer as a professional through a pass/fail examination. The cold reality is that there is room for an awful lot of professionalism in our industry that absolutely does not relate to the knowledge of advanced technology. As one example close to home, my 17-year-old son, Joe, owns and operates a data processing service bureau using a fairly archaic micro and a whiz printer (and a little help from papa), and his customers tell me he is the most professional in the area.

I checked Webster's *New World Dictionary* for some definitions and, curiously, found no reference to knowledge per se, but rather skills:

"Professional — noun . . . a person who engages in some art, sport, etc., for money, especially for his livelihood, rather than as a hobby . . . a person who does something with great skill."

"Amateur — noun . . . a person who engages in some art, sport, etc. for the pleasure of it rather than for money."

I can't accept these definitions as completely applicable to our people because I also don't believe that technical skills are enough to make a DPer a professional. Surely we all know analysts and programmers who are red hot with a Hipo diagram or a programming terminal but, for example, won't relate to users or prepare documentation or help teammates; they are technically skilled, but don't deserve the label "professional."

And I thought back on how many DPers I have met in recent years (as I'm sure you have, too) who expressed, quite openly, this kind of opinion on the data processing business: "This stuff is great! Running these programs and machines is just wonderful! It's not a vocation — it's an avocation. And

(Continued on Page 42)

THE TAYLOR REPORT/Alan Taylor

Printer Studies Point Up Additional Noise Factors

Printer and terminal rooms have been a noise problem for users for years — and often the trouble seems to be getting worse rather than better. Two reasons for this noise pollution are found in some surprising results from studies prompted by earlier Taylor Reports on the subject — although by hindsight the reasons may now appear obvious to anyone who owns a stereo set and knows what woofers and tweeters are made of.

The fact is that one secret guilty party is the paper, which on its way out and in has been acting as a broadcast speaker, amplifying and spreading the already considerable noise of the printing. Stereo speakers actually are paper that has been hung and allowed to vibrate, and the same situation is set up by the various paper transports.

Of course, as with speakers, distance has made a major impact on the volume of noise emitted by paper; the nearer the printing action, the noisier the broadcast operation. But the broadcast noise persists, quite audibly, to more than 20 inches on each side of the printing mechanism.

The persistence of this broadcast noise makes the appearance of the standard paper transport designs misleading. In the normal design, the actual area around the printing is more or less shielded, so the noisiest part of the paper is shielded with it. Here the broadcast simply adds to the amount of noise involved in the printing operation.

The serious part is the unshielded noise that occurs at the unshielded areas of the paper path some 20 inches on either side of the operation. Very frequently, the paper passes through the surrounding box less than 10 inches after the printing — and then really is acting as a speaker.

Users should watch the paper paths and check them out for shielding until the paper has had time to stop vibrating.

Another item users have to watch is sex-related. It seems that terminals sound noisier to women than to men. And as printing speeds increase, the difference is becoming greater and greater.

The higher the printing speed and the number of cycles per second of effective noise, the more noise occurs in the 15,000 cycle/sec frequency and above. In this area, men are normally deaf, while women hear a shrieking sound. Matrix printing is prone particularly to producing high-frequency noise. Tests of noise acceptability should take the sex factor into account.

When choosing printers and terminals, users can and should look for these two factors in addition to the normal noise abatement requirements such as close control of all openings and use of quiet fans.

(The tests for these studies were performed by Smart Products, Inc., 52 Irving St., Framingham, Mass. 01701.)

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LETTERS

Not Always True

In reference to Bob Brown's letter [CW, Sept. 29] regarding Al Volpe's "Worst Case" [CW, Sept. 1], his statement that "the only possible penalty [for cascaded IFs] is a few microseconds of machine time" is true only if the cascaded IFs are not enclosed in a heavily used loop.

As an example, I witnessed the cannibalization of a once beautifully operating file search program, which was ruined by the inclusion of the "trickle-IF." The programmer had added a "what-if" test for a selected set of 120 contract numbers against the master file. As there were few records out of the hundreds of thousands that would match any element in the trickle-IF, most records failed *all* of the tests.

Without the trickle-IF, the program efficiently searched the master file in about 10 minutes (I/O bound). With the inclusion of the 120-element trickle-IF, the same program was still running three hours later (processor bound)!

Two fixes were possible, one in the Procedure Division only and one which shared the work load with the Data Division. The example below shows the latter as it is the more general. Both brought the run-times back below 15 minutes.

With the Data Division approach, the list of possible field values was coded as a table of search KEYs in Bob Brown's "easy-to-maintain" alphabetic order, as in:

```
01 SEARCH-TABLE.
    02 FILLER PIC X(20) VA "[illegible]
    02 FILLER PIC X(20) VA "[illegible]
        etc.
01 ACTUAL-SEARCH-TABLE REDEFINES SEARCH-TABLE.
    03 TABLE-ELEMENT     OCCURS nn TIMES.
        05 CASE-CODE     PIC 999.
        05 KEY-ELEMENT   PIC X(17).
01 TABLE-SIZE            PIC 999 VA nn.
```

Within the Procedure Division, more general code was generated, as in:

```
    PERFORM BINARY-SEARCH-AGAINST-KEY-ELEMENT.
    GO TO specific-handler-label-list
        DEPENDING ON CASE-CODE(SEARCH-RESULT).
    PERFORM ERROR-ROUTINE.
COMMON-RETURN-POINT.
```

The complexity of the search and the optimization of any reordering to improve the "heuristic" efficiency has been relegated to the Data Division. The alphabetization to improve maintenance also permits use of the tried-and-true binary search as opposed to a linear SEARCH. The simplicity of performance and expansion capability have been retained in the Procedure Division.

New elements can be added to the SEARCH-TABLE so long as they preserve the binary searchable property of the table. The index of *where* the key was found is not as important as the value of the CASE-CODE it carries with it. This permits synonyms to be added to the table and still reach the same procedural code. It also permits new KEYs with new CASE-CODEs as long as they do not select a previously existing index.

As for the "none-of-the-above" problem, the GOTO ... DEPENDING ON construct is defined to "fall out the bottom" if the index value does not correspond to a valid element in the label-list.

For the sake of a GOTO-less program structure, we are at a loss. The PERFORM paragraph-thru-paragraph-list DEPENDING ON construct does not exist. It would have provided automatic return. Reality of the present dialect(s) requires the use of a GOTO COMMON-RETURN-POINT explicitly in each of the case-specific routines.

From a maintenance standpoint, sharing complex path selection with the Data Division not only makes the program easier to understand, it also makes simple any alteration to the structure of the program.

Larry McQuown

Santa Clara, Calif.

Unfortunate Condemnation

Concerning the letter "Not for Money" [CW, Oct. 6], it is unfortunate that Ken Mitchell resorted to condemning the computer consultant industry based on a single six-month experience. Consideration of the vast experience in the industry makes the remarks seem unprofessional.

Assignments are not always readily tailored to an individual's talents and expertise. Also, the ultimate project can not always be made a reality.

I do agree that money should be secondary to things such as company operating and personnel policies!

Currently a consultant with a highly reputable firm, I have been fortunate to have always had 110% support from management as well as from fellow members of the technical staff. This support is truly welcome when difficulties arise with client management or when technical problems bog you down to the point of lengthy overtime periods.

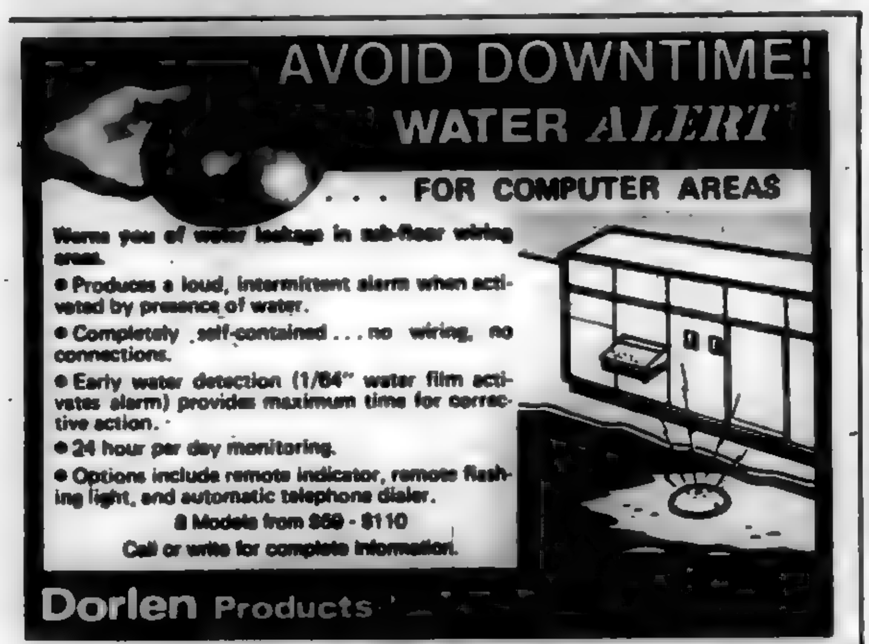
It is my feeling that consultant firms should be separated from the so-called "body shop," where individuals are sent out primarily to keep the profits column healthy. This is contradictory to the true main concern: to provide the client with what it is paying for, quality service.

The best and simplest advice to all potential clients is to be aware.

Fred Eng

Kendall Park, N.J.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.



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What Makes DPer a Pro?

(Continued from Page 41)

can you believe this? I'm even getting a great salary for all of my fun and games!" Based on Webster's viewpoint, I would have to conclude that such people are paid amateurs.

My point is this: technical knowledge and skills *appropriate to the data processing job* are necessary *but not sufficient* conditions for professionalism. There are other mandatory conditions. DP professionals do the following:

- Search out and apply new tools, techniques and methods to improve the quality of their work and the efficiency with which it is accomplished.
- Tune and retune their own operating processes to optimize their performance.
- Understand, prepare and implement their own training and education plans to build *all* the knowledge and skills required for their job.
- Direct all their efforts toward the serious goal of supplying effective business systems to end users, not to the goal of fooling around with hardware and software as hobbyists do.

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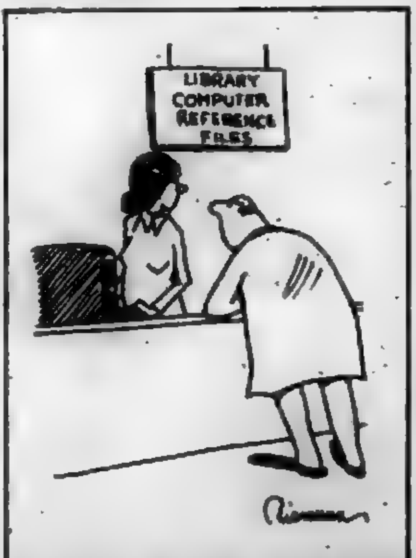

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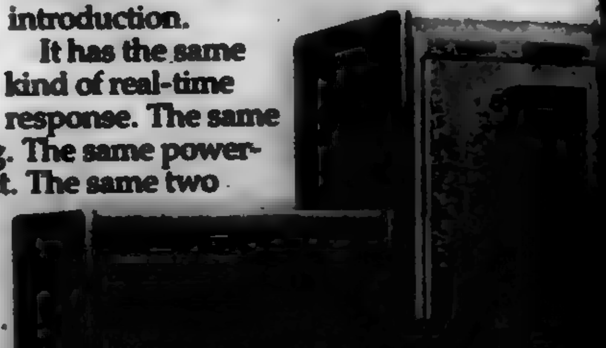

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LETTERS

Sexual Inequality?

Black Data Processing Associates is against racial inequality [CW, Oct. 6], but doesn't seem to be against sexual inequality. The newly elected national president, vice-president and treasurer are men. The two secretaries are — of course — women.

Sherwin E. Pakin

Chicago, Ill.

Advice Rethought

David A. Higgins should rethink his advice in connection with the example of "structured" pseudocode [Reader Commentary, CW, Sept. 22]: "... the End-of-File condition would have to be set False in the File-Begin paragraph . . ."

Would it? What if the file were empty? If the condition is set False, the File-Processing paragraph would still execute the Customer paragraph, where there's another GET. Instant abend! (Sloppy programming, too.)

The End-of-File condition should not be set False in the File-Begin paragraph; it should be tested — and then appropriately set True or False — at initial-GET time.

William O. Takacs

Manila, Philippines

'Stay Around, DP'

While I can understand Peter Kushkowski's urging a more specific expression than "DP," I do not agree that general usage of the term should be phased out ["So Long, DP," CW, Sept. 22].

When accountants retired their green visors for computer posting and reporting, they did not also retire the term "accountant." Neither have lawyers dropped the designation of their learned profession, despite the proliferation of specialized legal areas.

It has taken all these years in the state tax situation for us to be recognized as the DP industry, deserving of equal treatment with other services and professions. Not to mention, among a multitude of other uses, the Certificate in Data Processing (CDP): What would it mean without "DP"?

Hello, DP. Here's hoping you'll be with us a long time!

Robert M. Shorin

Miami, Fla.

Unreliable Indicators

The June 9, 1980 issue of Computerworld contained an article entitled "Users Rate Front-End Software Faulty," which was an editorialized description of the January 1980 Datapro Research Corp. survey of communications processors. During the past few months, Computer Communications, Inc. (CCI) has received several inquiries concerning its standing in the survey, prompting this letter.

Since many computer equipment users are anxious to select the best equipment, software and technical support for their needs, a survey like the Datapro effort could be of use. However, the usefulness of any information depends on its accuracy and validity. Accuracy and validity, in turn, depend on the care with which the information is selected, gathered and presented.

In the case of the Datapro survey, a large number of questionnaires on communications processors/controllers was mailed to Datapro subscribers; a total of 245 users filled out and returned the questionnaire. This group of 245 purports to be a sample of the population of users.

The purpose of a sample is to approximate the measurement or description of the population well enough for the intentions of the user of the survey. The surveyor attempts to create a sample which permits generalization from its findings, within acceptable limits of doubt, and for which costs are minimized. Sometimes these criteria are difficult to apply.

Notwithstanding these difficulties, there are obvious dangers in construct-

Will the Real Application Generator Rise?

(Continued from Page 41)

bling and Data Systems concepts, IBM has proposed software that is a useful and powerful implementation tool, but hardly a significant step in the direction of making application development easier for any but trained DP practitioners. Neither ADF nor DMS was designed to take advantage of precoded application submodules nor are they tools easily learned by novices.

Other Offerings

Another alternative to seeking the meaning of the term "application generator" is to review other software offerings that claim the label.

Consider first the American Management Systems product, Generation 5. This software is contrasted by its producer with procedural languages, and its scope is limited to the development of financial applications. The authors claim that this application generator achieves initial development and lifetime maintenance cost improvement of 60% or better over conventional programming methods.

The components of Generation 5 are said to be five: a specialized language oriented to financial systems, a design methodology, a data management capability, a screen generation facility and precoded functional components common to the application. Included, for the latter, are an automatic audit trail, maintenance of data integrity, data entry efficiency, controlled access to data and data retrieval facilities.

This software system achieves its productivity-enhancing objectives by employing specialized features that accommodate implementation of the financial application. For example, edit and validation processes are automatically invokable and were designed to support accounting needs. Reporting can be requested in form and content that are financially oriented, as in the case of requesting an "aging" report or a cross-footed presentation.

AMS makes another distinction for the application generator by contrasting it with four prior implementation technologies beginning with machine language, assemblers, compilers and finally parameterized languages or precompilers.

Presumably the last three of these methods could be called program generators to distinguish them from application generators, the latter being directly tied to a specific user requirement or function. In this sense, the terminology of application generator is at odds with the IBM usage, where the products ADF and DMS are application independent and more procedural in nature.

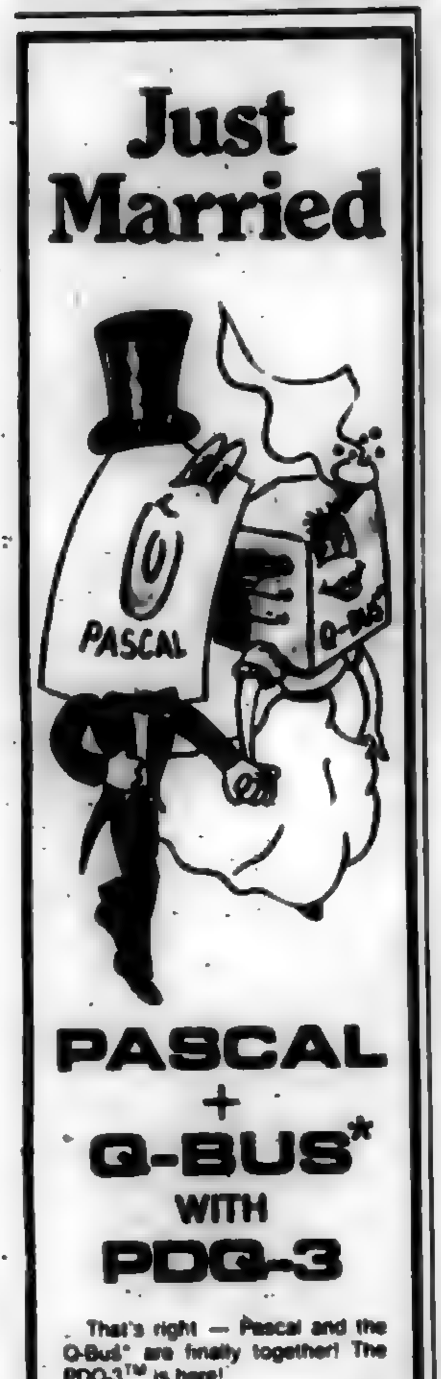
In Contrast

A contrast to AMS is another company's offering — the Automatic Information Management System (Aims), made available by Aims-Plus.

Aims is also called an application generator, but its authors claim generality of usage, stating that "it was not designed to solve any specific application." The software has five components: file creation, data maintenance, report generation, file query and data base management.

The system is screen-oriented and users interact by either answering posed questions or making menu selections. The structure and capability of the system is, therefore, preset and limited to whatever generalized features and functions have been implemented by the supplier.

We therefore have at least three different views of what an application generator is and does. As in many areas of data processing, words by themselves do not necessarily tell the story nor are they consistently used. The term "application generator" is another one of those buzzwords that floats around and has not settled. In any event, we see the need for better terminology to distinguish systems such as DMS, Generation 5 and Aims.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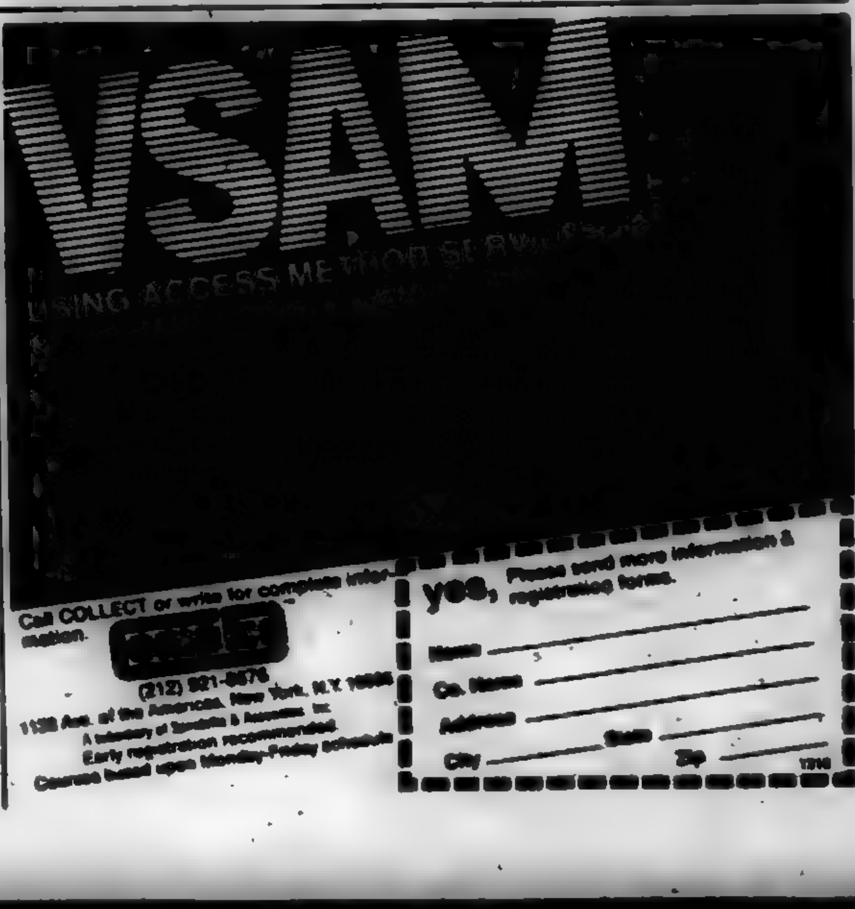
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LETTERS

ing small-sample surveys which are easily avoided. A rough but effective rule of thumb for determination of sample size is to ask whether the conclusion would be different if a negligible number of responses (say five or less) was changed. If such a change would affect the conclusion, the sample is probably too small for the purpose.

If the purpose of the Datapro survey is to provide a reasonably reliable aid to the purchase of computer equipment (if the aid is not intended to be reasonably reliable, Datapro should make that clear; it does not), one would not expect to see evaluations based on five or fewer responses. However, the Datapro survey evaluated 13 of 19, or 68%, of the processor/controller categories in its survey on the basis of two to five responses, which, if changed, would alter the evaluation score for those models.

Small samples, then, provide data which is inherently unstable; whether or not the evaluations are "correct" or "incorrect" is entirely due to chance as opposed to being reflective of a real-world situation. In essence, evaluations produced from small samples have as much real-world validity as evaluations based on the flip of a coin.

This lack of real-world validity is not only unfair to those managers who rely on Datapro's reputation for industry savvy to back up the validity of a survey; it is also unfair to those vendors who receive a negative rating based on a small sample. For example, CCI's CC-8 communications processor received less than desirable ratings for technical support based on *four* user responses, hardly a sample upon which to base part of a purchase decision. Moreover, CCI has more than 600 systems installed. Four user responses are not a realistic reflection of user satisfaction or dissatisfaction.

Datapro would undoubtedly contend that its survey sample is not intended to meet the standards of statistical validity, but rather to serve as an evaluation based on some number, even if small, of user responses. (Datapro's rule that the weighted average is considered invalid if based on two or less responses is hardly helpful.)

However, given that current and potential users read and react to the Datapro survey (CCI received several inquiries about its negative standing on technical support), it is incumbent on Datapro either to publish evaluations only when backed up by a sufficient number of responses, say a dozen, or to publish a caveat that evaluations backed up by an insufficient number of responses, in this case 68% of the survey, are not reliable indicators of product or service quality.

James K. Sullivan
Manager
Market Research & Development
CCI
Torrance, Calif.

Education Pinch

It was with mixed feelings that I read the article "Some Workshops Feeling Pinch of Recession" [CW, Sept. 15]. As the largest independent provider of classroom education in our industry, QED Information Sciences, Inc. can shed some light on the reasons some workshops are being "pinched" and others are flourishing.

As support for my comments, I refer readers to the timely In Depth article "The Personnel Crunch," by Harold S. Bott, also appearing in the Sept. 15 issue.

To cope with the coming "personnel crunch," Bott emphasized that "additional training is required in the DP department." He further stated that "much of this training must be technical (but also) equally important, DP management must be trained in new management techniques . . . systems planning, operational auditing . . . business fundamentals . . . project management . . . effective presentations, report preparation and leadership."

Thank you, Mr. Bott. You have just summarized what QED has been saying for years! For the last several years, QED has been operating cooperative DP education programs at regional education centers throughout the country.

QED has provided companies with face-to-face education by bringing programs to easily accessible locations. Our programs are growing because our members are able to project their needs, make advance plans and rely on consistently high-quality instruction, regardless of where their personnel take courses.

We are delighted that companies are finally "blowing the whistle" and becoming serious about improving the planning and delivery of continuing professional education. We are pleased that they are finally realizing that high-quality, relevant, person-to-person education need not bankrupt the training department.

Stewart L. Stokes Jr.
Manager
Educational Programs
QED Information Sciences, Inc.
Wellesley, Mass.

Not Mutually Exclusive

Peter Lacey's Reader Commentary [CW, Sept. 8] eloquently and (I hope) finally dissolved the myth that GOTOs and structured programming are mutually exclusive. They are not. Reducing the number of GOTOs may often be desirable, but their total elimination will usually result in near total obfuscation of program logic.

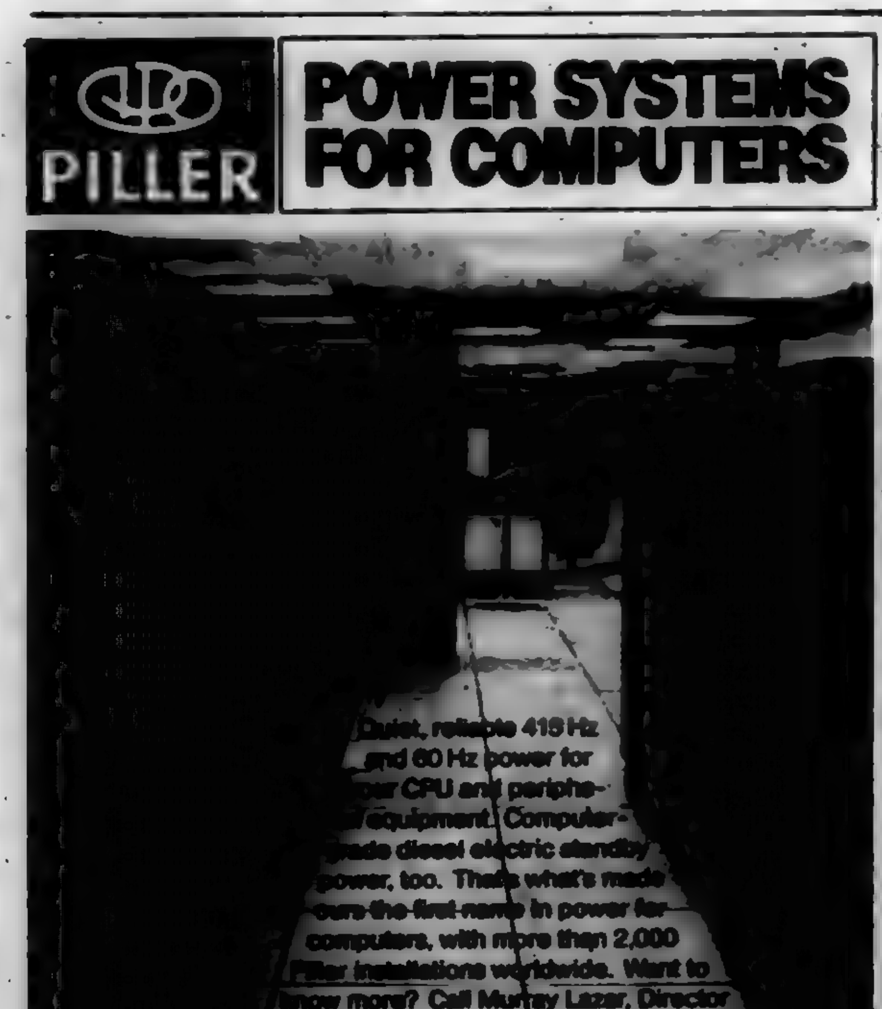
Planning, as Lacey pointed out, is the key to good software. With proper systems planning, program specifications become trivial; with proper program planning, coding becomes trivial — at least nearly trivial in most cases.

But it's so easy to sit down and start coding! Planning, on the other hand, requires that the entire system development process itself be planned. Any methodology that leads in this direction is desirable.

Then there's the economic conflict. "Quick-and-dirty" techniques produce nearly immediate benefits, while an investment in planning yields most benefits in the long term. The art of our profession lies in striking a balance between these extremes. The goal should be the "best" system consistent with economic cost restraints.

Charles W. Hammond
Manchester, N.H.

'This System Should Save Us Time — If We Ever Decipher the Instructions.'



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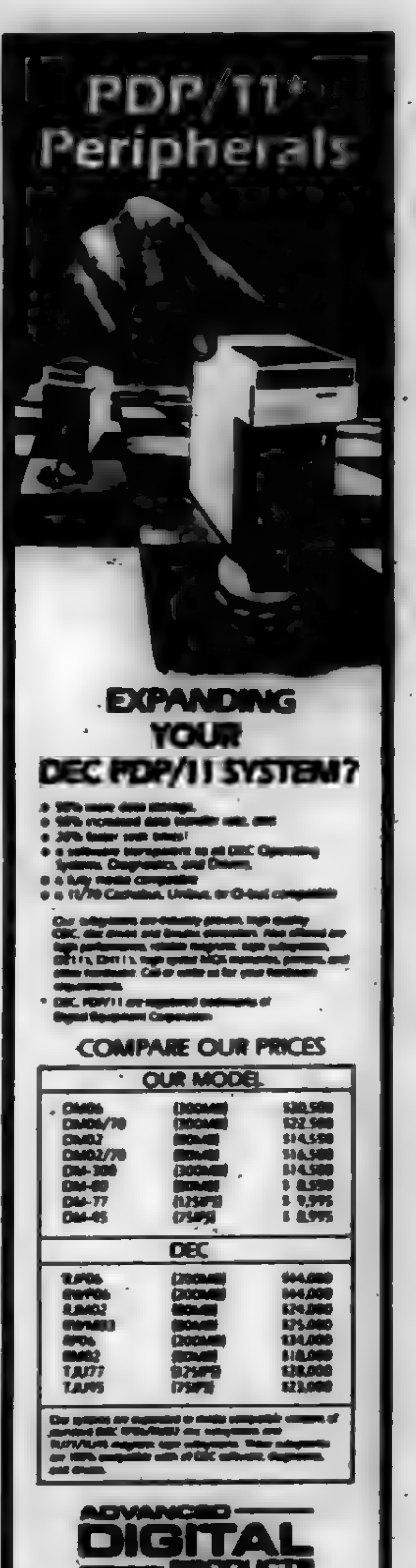

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Prime's 'Taps' Halves Development Time

By Rita Shoor
CW Staff

NATICK, Mass. – A version of a Terminal Application Processing System (Taps) said to cut program development and maintenance in half was announced here last week by Prime Computer, Inc.

The claim of a 50% reduction in program development and maintenance is based on studies conducted by Auerbach Publishers, Inc. and backed up by real-life experience, according to Michael D. Harries, Taps product manager. "The time required to develop and maintain a Cobol application without Taps was reduced by about 50% when we developed the same application using Cobol with Taps," he maintained.

Prime/Taps will be marketed and supported directly by Prime and is available on the vendor's Series 50 equipment. It is a table-driven system designed to aid in application design, development and execution by allowing users to define tables via interactive utilities, a Prime spokesman explained.

In addition to increasing programmer productivity directly, Prime/Taps will have a more subtle positive effect on productivity because it allows nontechnical personnel to perform ad hoc inquiries and generate reports for themselves, claimed Steve Andelman, software systems manager.

IBM Impetus

There was also an impetus to allow Prime systems to fit more easily into an IBM environment and to promote application transportability for Prime customers, he said.

For example, by utilizing Prime's remote job entry, distributed processing terminal executive and Primenet, "IBM users can distribute data developed using Taps without geographical restrictions," he maintained.

This emphasis on "coexistence with IBM" is reflected by the vendor's hookup plans for Prime/Taps. "Prime systems already offer support for 3270 terminals and Prime/Taps is now available on our systems," Harries said. "The hard part is done." And future plans call for tying 3270's together with Prime/Taps.

Prime/Taps consists of three basic modules – a communications interface, a program manager and a data manager. The data management function contains precoded commands to perform the following functions, according to a spokesman:

- Extract records based on search criteria.
- List the records on the terminal in a default or specified format.
- Add, update and/or delete records from a file.
- Print records in default or specified format.
- Search for the occurrence of specific field values in a file.

User-defined tables developed interactively include screen formats, files, application processing flow and security tables.

If the user opts for writing his own command procedures, the user-written code can be inserted at exit points in the precoded functions. This type of addition does not affect the Taps module and, thus, the portability feature is maintained, he said.

With 90-day availability, the communications interface and program manager module combination is priced at $12,000 and the complete package costs $20,000. Volume discounts and monthly leasing terms are also offered from Prime at Prime Park, Natick, Mass. 01760.

All 'Tapped' Out?

Feel as if you've been tapped out? Some people call it Terminal Application Processing System, others refer to it as Transaction Application Processing System, but by any name it is the application development system fondly known as Taps.

Prime Computer, Inc.'s announcement of its Prime/Taps package makes the Natick, Mass.-based vendor the latest in a series of firms that are making this software available to their various customer bases.

Originally developed by Decision Strategy Corp. (DSC), Taps was recently sold to Informatics, Inc. for an undisclosed amount [CW, Oct. 20]. And assorted vendors such as Intel Corp. have been offering versions of what is touted as a programmer pro-

(Continued on Page 50)

System/3 Gets DOS/VSE Translator

BUFFALO, N.Y. – A Cobol-to-DOS/VSE Cobol translator for the IBM System/3 has been announced by Dataware, Inc.

The syntactical Cobol differences between the System/3 Cobol and the DOS/VSE ANS compiler "are minimal and can be handled automatically," according to the vendor.

In the Identification Division, the Program-ID is interrogated and modified to an acceptable syntax format.

In the Environment Division, the SOURCE/OBJECT-COMPUTER clause will be changed to the target computer. The SPECIAL-NAMES clause 'SO3/-SO4/SO5 IS' mnemonic-name will be changed and flagged for post review. The SELECT-ASSIGN implementor name format is different, so SYSNUM will be added and the syntax reformatted.

Also, 3284 printer will be changed and flagged, noting that print spacing will be different. In addition, the 3741 diskette will be changed and the 5444/5445 will be changed to a DOS disk

(Continued on Page 50)

Level 6 Gains Tools for Business

WALTHAM, Mass. – Honeywell, Inc. has introduced the Interactive Business System consisting of five applications modules that will operate on the firm's Level 6 minicomputers.

Written in Cobol, the modules – sales order processing, accounts receivable, accounts payable, payroll and general ledger – run under Honeywell's Gcos operating system. The modules can be implemented individually or used simultaneously.

All applications are on-line and use menu-drive screen processing and tutorial techniques to guide the user through the application with "a minimum of training," the vendor said.

The five modules together cost $22,500; an optional maintenance feature is available. Priced separately, sales order processing costs $10,500 with an annual maintenance fee of $1,050 and accounts receivable, accounts payable, payroll and general ledger cost $3,000 each with a $300 annual maintenance fee.

IDMS Tied to 'Datamacs'

VALLEY FORGE, Pa. – Management and Computer Services, Inc. (MCAS) has added to its Datamacs test data generator an interface to Cullinane Corp.'s IDMS data base management system.

Macs, which also offers interfaces to IBM's IMS and Cincom Systems, Inc.'s Total, claims its recent addition is "the only test data generator facility available for IDMS users."

Datamacs/IDMS reportedly will create a new data base, extend a data base or unload and change a data base. Datamacs is said to handle hierarchical, multilevel, single owner/multimember, multiple member, single owner or network capabilities.

With a 30-day free trial available, the IDMS package costs $17,500 for a 12-month license, including maintenance and updates. Maintenance for subsequent years costs 10% of the purchase price, a spokesman said from Great Valley Corporate Center, Valley Forge, Pa. 19482.

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Programming Aids Aimed at Series/1 With EDX

JACKSON, Miss. — Four programming productivity aids for the IBM Series/1 using the Event Driven Executive (EDX) have been introduced by Conway Computer Consultants, Inc.

Variable-length decimal arithmetic and editing routines for EDL have been added. The EDL CALL instruction is used to access one of five routines: add, subtract, multiply, divide or edit.

It supports up to 14 digits with up to nine decimal places. Data is stored in standard text format allowing easy conversion from or to native binary formats, the firm said. The one-time license fee is $400.

Cobol static screen access routines have been added to provide processing of screen images prepared by $Image. These routines provide all functions to define the screen being used, to write or read variable screen data and to erase the screen. Upon screen read, the value of the program function key is returned, allowing the Cobol user to have full utilization of the *4978/4979* workstations that has otherwise been unavailable, the vendor noted. The one-time license fee of $400 is required.

A disk utility program that utilizes $Diskut3 to provide data set RENAME, ALLOCATE or DELETE has also been added. The program can be invoked in JOBUTIL jobstreams to perform one or two of these functions in one invocation. The one-time license fee of $70 is required.

A Session Manager Cobol Compile, Link, Update option does not execute the program, but automatically deletes the intermediate object modules suffixed #8, #0 and #1. The one-time fee is $40.

Conway Computer Consultants is at 4785 Old Canton Road, P.O. Box 12801, Jackson, Miss. 39211.

Are You All Tapped Out?

(Continued from Page 49)

ductivity tool to their end users [CW, Aug. 4].

But, Prime maintained that the Prime/Taps product is unique in that it will be supported by Prime rather than by Informatics.

"We also have the latest version of Taps," Product Manager Michael Harries claimed. When DSC first came out with the software, it was essentially marketed to software houses as a tool for the batch-to-on-line system conversion process, he recalled. "Then, DSC added end-user capabilities to the package and began marketing it themselves," he said.

Since that time, various enhancements have been added to the point where Prime/Taps offers such capabilities in the data manager module as incorporating multiple record types in a single file and permitting multiple levels of search, he said.

Prime is also entitled to all future Taps enhancements, he maintained.

So, Prime is the latest addition to the Taps bandwagon. And if the product increases productivity to the degree claimed by its vendors, it might be reasonable to expect the sound of Tapping in your future.

System/3 Gets DOS/VSE Link

(Continued from Page 49)

device and the device change noted.

Indexed and direct files will be changed to Vsam format, ACTUAL KEY will become RELATIVE KEY and NOMINAL KEY IS______ will be deleted and flagged, noting that the data must be moved to the record key.

In the data Division, the RECORDING MODE clause will be added to FD statements. Computational clauses will be changed to Display. In all divisions, the "/" in Column 7 will be changed to an EJECT in Column 12. Reserved word differences are automatically identified and qualified according to the VSE specifications.

The system was designed to provide a high percentage of conversion — 90% to 100% of the original program syntax according to the vendor.

Being table driven, the package reportedly can be customized to specific in-house standards. A conversion worksheet is generated and includes diagnostic aid messages to help the programmer determine problems prior to program implementation.

Character set conversion features are also available depending on the type of Cobol-to-Cobol being performed.

Aimed at the IBM 360, 370 or compatible environment running under DOS/OS, with 90K ANS Cobol, the software has a standard annual license fee of $4,000 including maintenance.

Dataware, Inc. is located at 2565 Elmwood Ave., Buffalo, N.Y. 14217.

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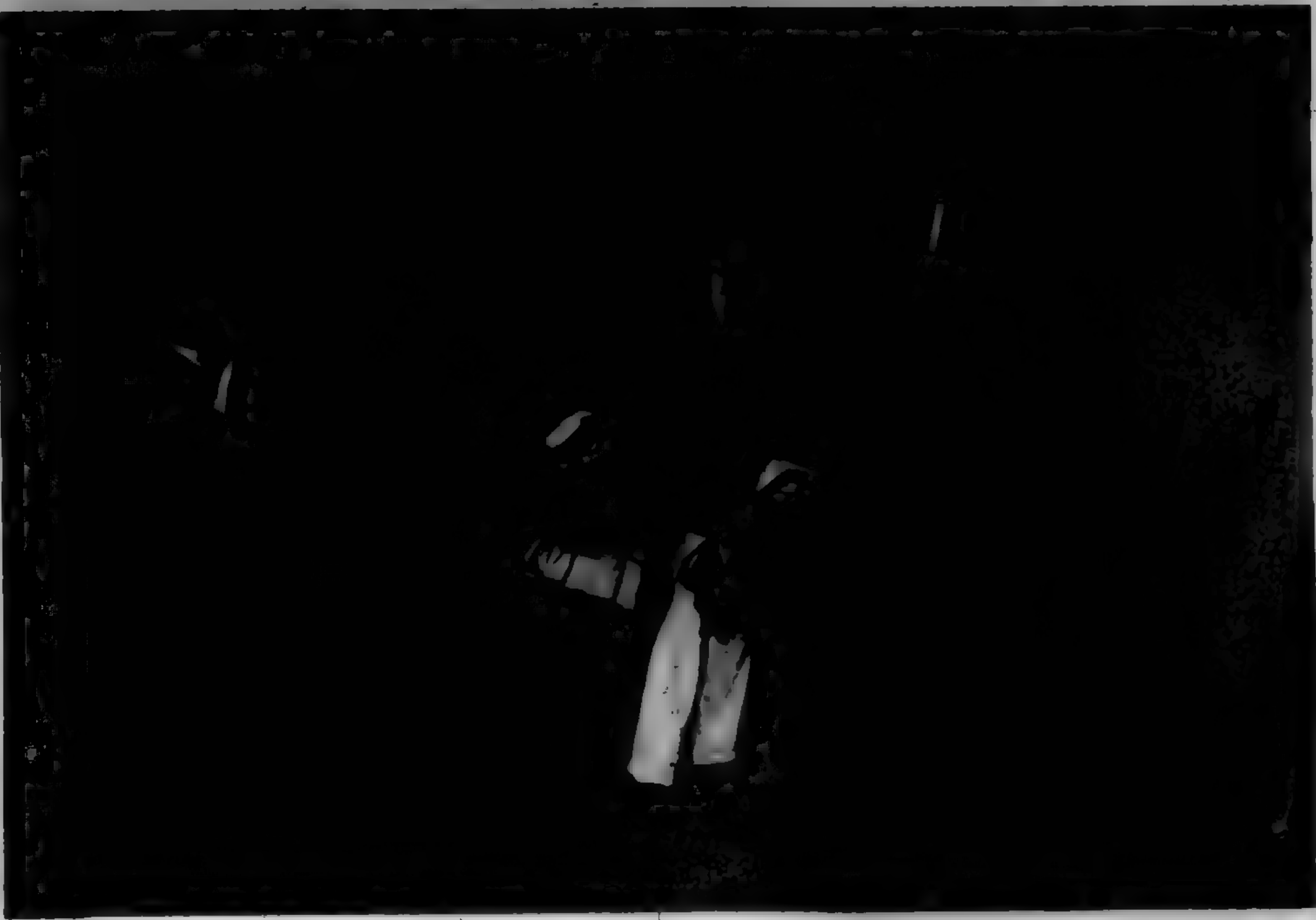

Can Japan's rapid transit efficiencies work in the U.S.A.?

Mike Rabin is using MSI's Handheld Computer to find out.

Measuring rapid transit performance. Chosen as the winner in the End-User Category of MSI Data Corporation's recent YOU CAN DO IT Sweepstakes, Mike Rabin is gathering performance data for San Francisco's Bay Area Rapid Transit (BART) and Tokyo's Teito Rapid Transit Authority (TRTA) with MSI's programmable portable terminal.

Waiting for the train. On the scene in subway stations, Mike is entering actual arrival times directly into the terminal's solid state memory, using the terminal's built-in real-time clock. This data will be used to determine "headway"—the actual time between trains that would-be passengers must wait.

The loading factor. Also being monitored and recorded is the degree of crowding aboard the trains—in Japan at rush hour, loading of trains sometimes exceeds 350% of seating capacity, thanks to the use of "people pushers."

Passenger satisfaction. Between trains, the terminal prompts Mike through a second program to document passenger attitudes about service—which are being correlated with waiting time and crowding to determine perceived performance levels for the two rapid transit systems.

YOU CAN DO IT. MSI's new portable terminals can be used in a wide variety of expanded data entry applications, thanks to program-loadability and the computing power of a built-in microprocessor. Now both calculations and data editing can be performed right at the source—and with 32K bytes of solid state memory, full alphanumerics and bar code scanning, you can do it! Contact Stan Altice, Market Manager, at (800) 854-3897; in California call (714) 549-6328.

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Arkay Offers DOS-to-OS/VS Aid

NEWTON CENTRE, Mass. — Arkay Computer, Inc. is offering a DOS-to-OS/VS conversion aid that is said to be an automated inventory planning and management control tool for the full conversion.

With Conversion Manager, the user only has to enter DOS job streams and partition standard labels into the package. Conversion Master will then create a master file of all DOS JCL and standard labels, the vendor said.

The package costs $1,500 and is compatible with any IBM or compatible processor, the vendor said from 24 Manor House Road, Newton Centre, 02159.

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With Four Additions

Honeywell Beefs Up TPS-6

WALTHAM, Mass. — Four enhancements to increase functionality have been added to Honeywell, Inc.'s TPS-6, the real-time transaction processing system for Gcos 6 MOD 400.

The new features in Revision 3.0 include:

- A screenforms system that works in page rather than character mode and supports both synchronous and asynchronous displays.
- Support for the Level 6 Cobol-A computer for on-line and batch transactions.
- Ghost, a two-level interactive transaction link to a DPS 8, Level 66/DPS or Level 6 host.
- Secondary keys in the IFS data base plus access security through passwords down to field level and a data base reconstruction tool.

The minimum memory required is 128K words and a typical memory size for an application requiring 15 to 25 terminals is 256K words, allowing for Gcos 6, TPS-6 and user programs. The terminals supported include, in any combination, VIP7700R, VIP7200/7205, VIP7801/7802 and VIP7804/7805.

The TPS-6 executive enhancement costs $7,700, Screenwrite translator costs $2,860 and Cobol run-time director costs $660 and will be available in the first quarter of 1981 from Honeywell, 200 Smith St., Waltham, Mass. 02154.

J.R. Blank's 'Dumper' Released in Version 5.0

GLENVIEW, Ill. — Version 5.0 of the OS/VS utility program Dumper has been released by J.R. Blank & Associates, Inc.

Added features include updating in place of all access methods; the ability to create up to 99 data sets simultaneously from a single input while encompassing any access method mix and record formats; member selection from partitioned data sets based on data content; and unlimited relational selection based on record position or data content to the bit level.

Other features reportedly include the ability to print, list or dump portions of records to eliminate unnecessary printing of large records and the addition of a powerful edit parameter to the current record-altering parameters of move and replace, thereby giving Dumper the full range of record and data manipulation.

Dumper also features a data check handler and abend processor to eliminate unnecessary program stoppage and increased TSO processing with the addition of user prompting and multilevel attention handling, Blank said.

Dumper costs $4,750 for a one-time license fee or $200/mo to lease from the vendor at 2021 Covert Road, Glenview, Ill. 60025.

Cincom Courses Geared To Boosting Productivity

CINCINNATI, Ohio — A program of training courses designed to increase employee productivity in the DP industry is being offered by Cincom Systems, Inc.

The Employee Productivity Program stresses a curriculum approach that enables the student to gain skills and perspectives not possible when individual courses are taken at random, according to Cincom.

Using the Curriculum Planning Guide, a company can take individual employees along a straight line of education and training to reach the desired goals of improved skills and increased job proficiency, Cincom stated.

The content of each curriculum can be tailored to each employee — from new hires through top executives, Potter noted.

Cincom maintains education centers in most metropolitan centers and offers a variety of courses over a 12-month period.

Cincom's schedule of classes is available from the registrar, Cincom Systems Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

'Stop Knocking Those Terminals, Stoop ... They're Ours!'

Software Targets Parts Dealers

GRAND RAPIDS, Mich. — Cascade Data, Inc. has introduced a vertical software package designed for fluid power (hydraulics/pneumatics) parts distributors.

The package runs on Cascade Data Concept III minicomputers using the vendor's CDES operating system.

The package joins three other Cascade vertical software packages: a route accounting system, municipal accounting system and a parts release accounting system.

The price of the fluid power distribution package is $4,500, the vendor said from 6300 28th St. S.E., Grand Rapids, Mich. 49506.

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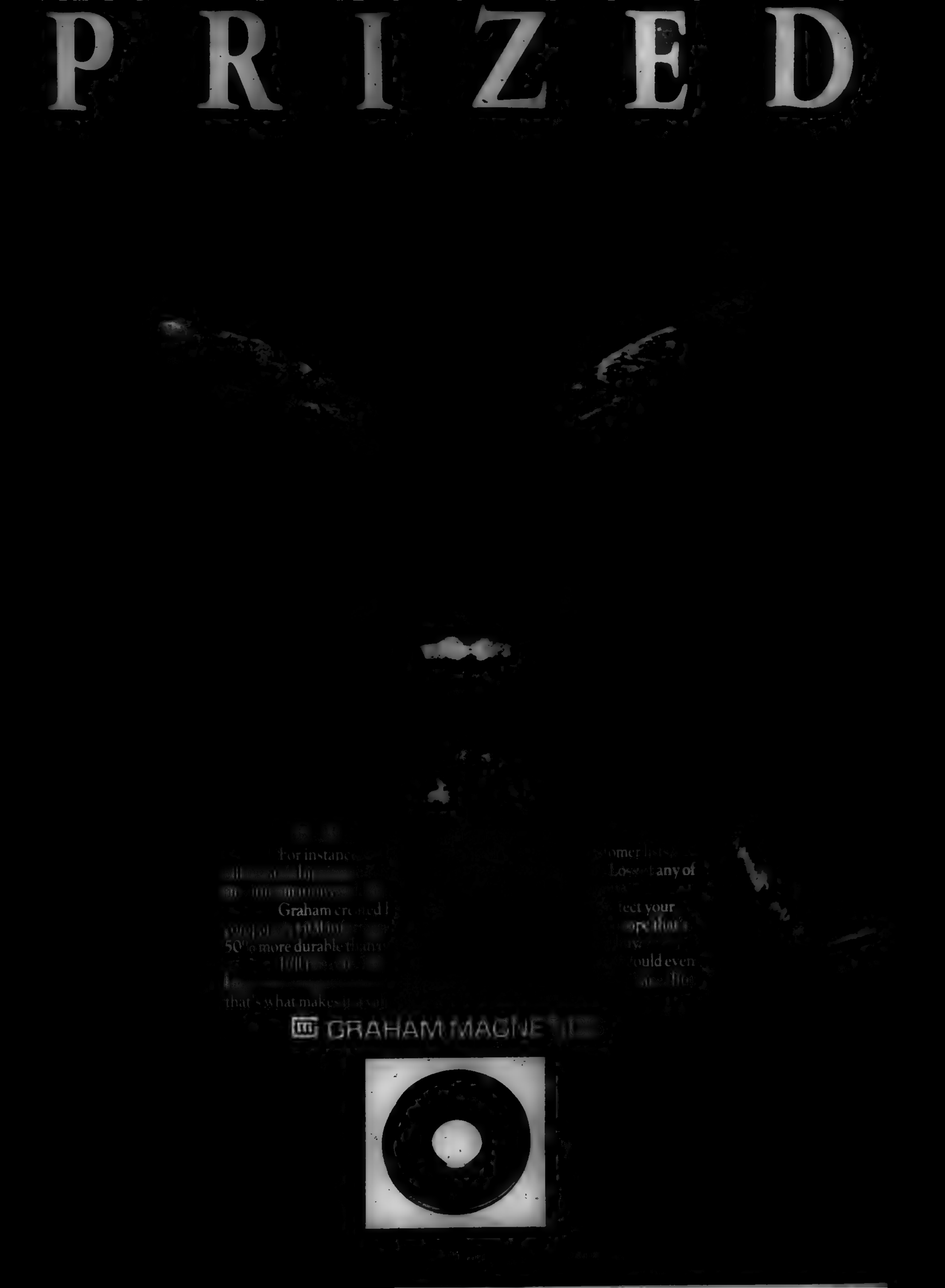

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Work-Load Emulator Aids Planning for OS/VS Sites

MAHWAH, N.J. — A software work-load emulator that reportedly allows users to answer capacity-planning questions empirically is available from Decision Systems, Inc. The product is supported on IBM and equivalent systems operating under OS/VS.

Empact defines anticipated background loads, resources to be drained at specific rates, TSO and CICS loads in their native terminology and determines and defines installation-specific instruction mixes, the vendor claimed.

The product offers the capability to synchronize multiple Empact-defined work loads which can be executed concurrently with the user's ongoing systems, a spokesman said.

Some applications include:

- Computer benchmarking.
- Determining the impact of new work loads.
- Capacity measurement.
- System tuning.

The facilities available in the product are all parameter-driven such that a conclusive set of tests, be it "stress testing" a computer or emulating an additional work load, can easily be constructed, executed, altered and reexecuted within minutes, the spokesman claimed.

Empact costs $15,000, Decision Systems said from 200 Route 17, Mahwah, N.J. 07430.

'JCLcheck' Gains Five Reports

SANTA CLARA, Calif. — Triangle Software Co. has announced Release 2.0 of JCLcheck, said to emphasize JCL production documentation and to detect non-JCL errors that can cause run-time abends in systems running under OS/VS.

JCLcheck is a system utility that validates a job stream's JCL before submission for test or production runs by detecting and diagnosing all JCL errors, a company spokesman said.

Release 2.0 adds five more reports to the package's original two dedicated to production documentation. One is a program cross-reference listing. The second lists all reports created by a job.

The remaining three are summary reports for multijob production systems of the data-set cross-reference listings, program cross-reference listings and complete report listings.

JCLcheck costs $11,400 from Triangle at 2651 Kentworth Way, Santa Clara, Calif. 95051.

System Backs Manufacturers

NEW YORK — A fully integrated manufacturing management system designed to provide comprehensive control and a unified approach to manufacturing management is available from Qantel Corp.

Designated QMRP, the system allows the phasing in of different levels of control. It is capable of performing material requirements handling and, in its full configuration, automates the order planning process and recommends scheduling, a spokesman said.

Other features include Master Scheduling, which provides a coordinated commitment between marketing and manufacturing and customer order processing.

The price for the basic system is $15,000. Three additional modules, available for $6,000 each, cover order processing, purchasing receiving and planning/labor. A monthly license fee is based on the number of modules configured, the vendor said from 4142 Point Eden Way, Hayward, Calif. 94545.

Software Firm Kicks Off With DBMS

BOSTON — American Computer Group, Inc., has formed American Used Software Co. and announced it is offering a data base management system (DBMS) for Digital Equipment Corp. PDP-11 and VAX-11/780 users.

Originally developed by Aeronautical Research Associates of Princeton, N.J., DRS is said to be an application implementation system with complete development capabilities.

A perpetual license for the package starts at $22,000 and with all available options sells for $39,500 from the firm, which can be reached through P.O. Box 68, Kenmore Station, Boston, Mass. 02215. A "substantial" price increase is expected "within six months," according to a spokesman.

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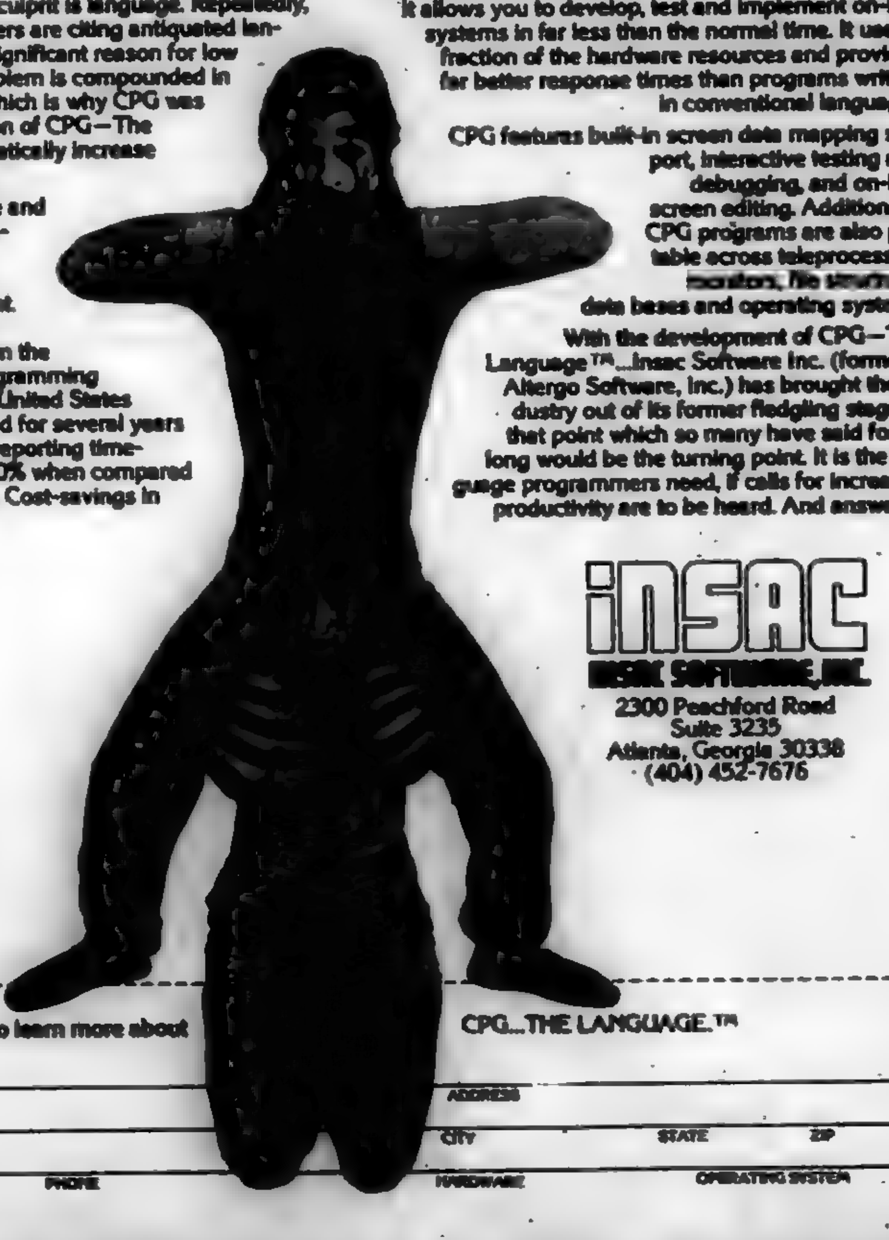

Programmer productivity. It's the cry of the decade. Even programmers themselves are crying for it. Because while present efficiency levels are counter-productive and costly for a company, they're also frustrating, tedious and boring for programmers. And the culprit is language. Repeatedly, knowledgeable programmers are citing antiquated language as the single most significant reason for low performing levels. The problem is compounded in an on-line environment. Which is why CPG was created, and why installation of CPG—The Language ™ can so dramatically increase programmer productivity.

CPG is in short, a complete and thorough language for generating efficient, on-line application programs in a teleprocessing environment. And it is clearly the most significant advance made in the area of teleprocessing programming in years. While new to the United States market, CPG has been used for several years internationally with users reporting time-savings as significant as 80% when compared to the cumbersome Cobol. Cost-savings in the areas of data-processing budgets, CPU and memory upgrades, education and support are equally impressive.

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CPG features built-in screen data mapping support, interactive testing and debugging, and on-line screen editing. Additionally, CPG programs are also portable across teleprocessing monitors, file structures, data bases and operating systems.

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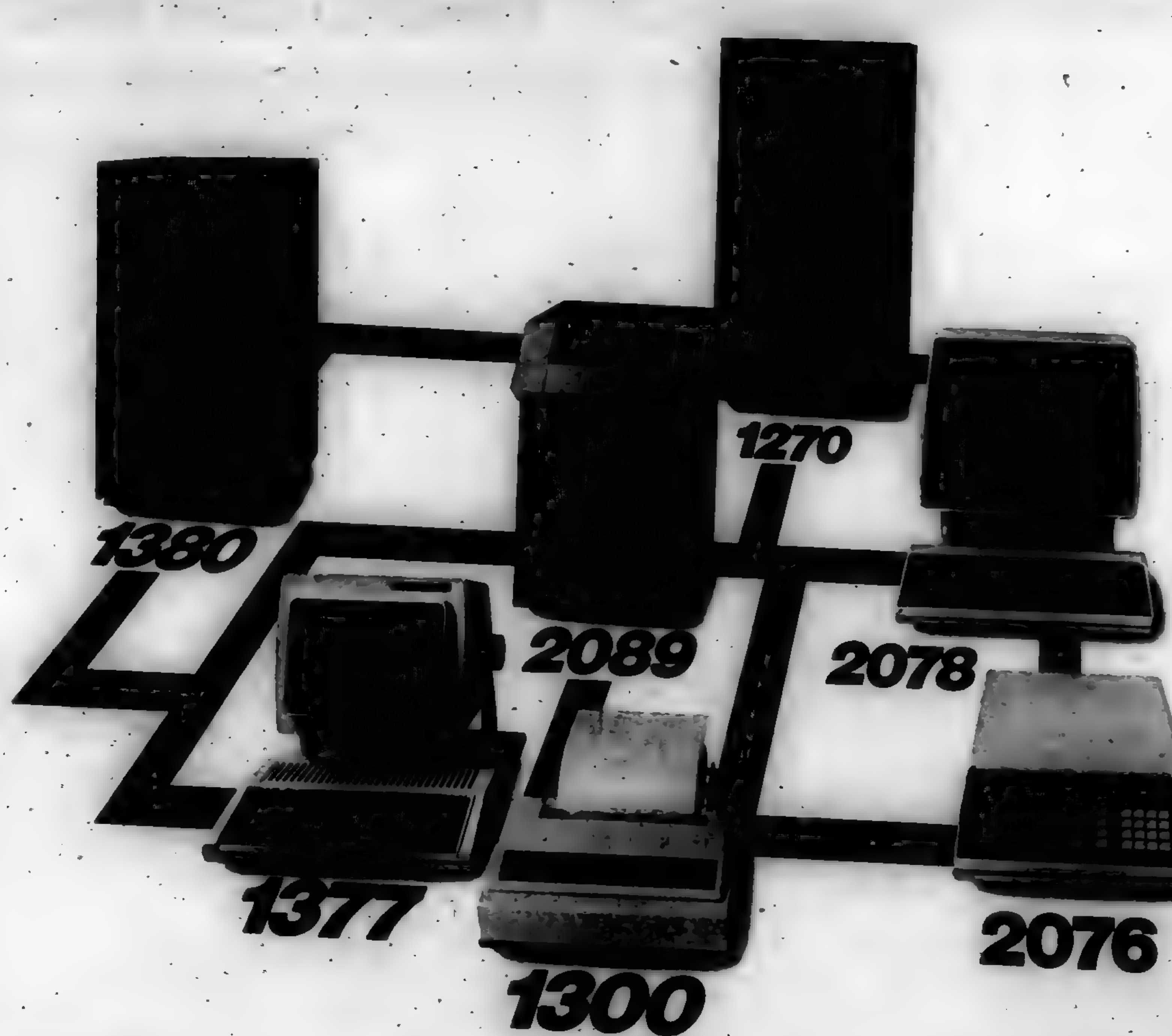

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Package Brings System/34 'Closer' to Large Mainframes

OAK BROOK, Ill. – A data base information system designed to bring IBM's System/34 "one step closer to the large mainframe computers" has been announced by Professional Computer Resources, Inc.

Factfinder is said to eliminate simple- to medium-difficulty inquiry and reporting requests from the System/34 applications backlog, "thereby freeing technical staffs to concentrate on the more complex problems associated with the new system's development," the firm said.

The package allows nontechnical users to create on-line displays, information reports or histograms using information existing on the system. Data integrity is maintained because users are not allowed to update files, a spokesman explained.

Confidential information access is said to be restricted through Factfinder security. Other features of the package include multiple file indexes and four-function arithmetic.

Factfinder costs $6,000 including installation, support and documentation. An annual update fee, which the spokesman declined to disclose, includes future enhancements.

The company is located at 2021 Midwest Road, Oak Brook, Ill. 60521.

System/34 Gains Vtocs

• Computer Tech

LUDLOW, Mass. – Computer Technologies, Inc. is offering an alphabetized volume table of contents Vtoc for the IBM System/34.

The software has the following features: automatic flagging of duplicate file names; segregation of librafiles, libraries and systems into separate groups; the ability to selectively catalog files based on partial names, such as those beginning with "AR" or ending with "GL"; a tally of space unoccupied by "T" or "F" files; a single listing of all files in one or two magazines; and page numbering.

The product costs $100. Computer Technologies can be reached through P.O. Box 259, Ludlow, Mass. 01056.

• Assurance Systems

BANGOR, Maine – A volume table of contents (Vtoc) for IBM System/34 users that prints files and libraries alphabetically, by block location, by creation date, decreasing by percent or decreasing by size is available from Assurance Systems.

With the S/34 Vtoc Manager, "information is produced on the number of blocks used by individual files and libraries regardless of their creation keyword parameter, the vendor claimed.

Unnoticed data about how full files are is shown, pinpointing both those files that are close to capacity and those that are overallocated and wasting disk space, a spokesman said.

The one-time license fee for the product is $100, Assurance Systems said from 64 Congress St., Bangor, Maine. 04401.

Package Backs Move to S/38

IDAHO FALLS, Idaho – HK Contractors, Inc. is offering an IBM System/34 to System 38 RPG conversion utility package that reportedly includes the provision to convert programs to use externally described files.

That ability allows the programmer to respond more quickly and efficiently to changing user needs, the vendor claimed.

The menu-driven system includes:

- RPG-II to RPG-III conversion.
- System/34 "SFGR" specs to System/38 display.
- File DDS conversion.
- Data file conversion aids.
- Validity checking of data during file loading.

The package licenses for $2,900. HK Contractors can be reached at P.O. Box 90, Idaho Falls, Idaho 83401.

'Insight' Undergoes Change in Pricing

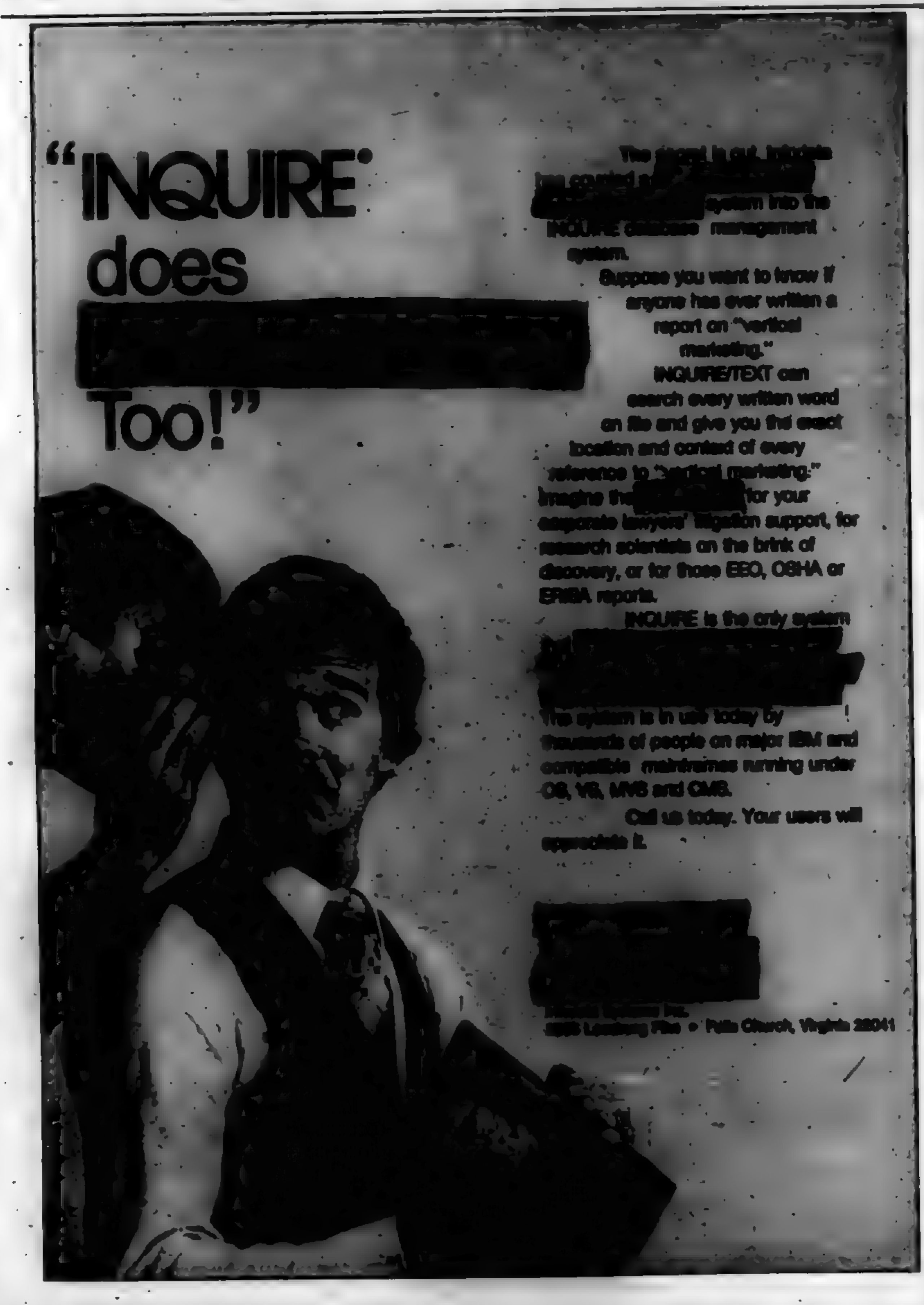
MOUNTAIN VIEW, Calif. – Computing Capabilities has announced a new pricing structure for Insight, its software package designed to implement and execute on-line data base transaction processing applications with no programming on Hewlett-Packard Co. HP 3000 computers.

The package provides an intelligent link between HP's V/3000 CRT forms management system and HP's Image data base management system.

The software was previously priced at $10,000 for all modules included in the total package, with additional copies available for $3,500. The new pricing structure has unbundled the major modules to provide users with increased flexibility, the vendor claimed.

The basic Image transaction definition software now costs $6,000. The custom programming facility, which permits the use of custom-coded programs, sells for $2,000. TPMGR, which provides start-up, shut-down and message broadcasting for terminals running Insight, licenses for $1,500. TP/3000, the execute-only version of Insight, costs $1,500.

Computing Capabilities is located at Suite 412, 1101 San Antonio Road, Mountain View, Calif. 94043.



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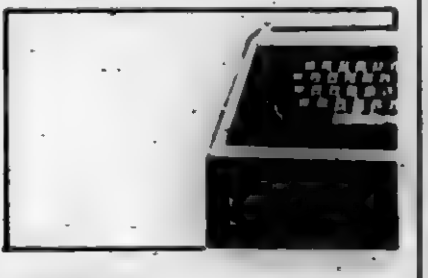
Management And Distributed Computing

By Robert W. Shirey



Part 4:
Analysis and Synthesis

"Distributed processing is not invariably cheaper than centralized processing."

— Felix Kaufman, 1978

"It would be nice to have a cost model which enabled the optimal 'degree of distribution' in particular circumstances to be calculated [Down76]."

In life-cycle terms, strategic planning takes place during a system's initiation phase [FIPS64], before the development and operation phases begin [FIPS38]. The initiation phase includes establishing objectives and general requirements, identifying feasible alternatives and estimating the consequences of strategic choices by analyzing costs and benefits.

Cost-benefit analysis in computer-based systems depends on identifying and analyzing all the design alternatives. The multiplicity of alternatives is what makes the analysis difficult for a distributed computing system (DCS). However, the problem can't be avoided, because for top management, return on investment is usually the key decision factor.

For smaller systems and early strategizing, a rough, preliminary payoff analysis may suffice. The next section reviews some guidelines for such cases. Other cases require rigorous, detailed, life-cycle models as discussed in the sections that follow.

Cost-Benefit Analysis

Often it is the cost-benefit analysis of an operational problem that leads to the idea of building a DCS. For gross strategic planning, the analysis need not be very complicated. Simple budget comparisons, ignoring technical details, can often indicate whether a system should be distributed.

This section reviews guidelines for performing a preliminary DCS cost analysis. The guidelines include:

1) What costs to consider.

2) How costs relate to the degree of distribution.

3) What direction costs will take in the future.

Sternberg describes a preliminary cost study for a system to service 125 agency locations for a large insurance company [Ster77]. Six alternative configurations were analyzed, two centralized and four distributed. The study estimated one-time and ongoing costs for development and operation:

- **Operational Costs.** Remote hardware, central site hardware, data communications, installation, maintenance and operations.
- **Development Costs.** Training, system support; standard and specialized system software and testing.

Thierauf's book also has case study examples of cost-benefit analysis [Thie78]. To estimate savings and incremental costs for each design alternative, he suggests three cost categories, as summarized here:

- **Savings.** Reduction in personnel and associated wages, benefits and taxes; elimination of unnecessary equipment and associated space, utilities, repairs, insurance and taxes; elimination of outside services.
- **One-Time Costs.** Feasibility study and its documentation; programming, integration and testing; training; conversion of data base and operations; parallel operation during transition; equipment and supplies.
- **Operating Costs.** Equipment rental, depreciation and upkeep; software maintenance; support personnel; supplies and miscellaneous.

Charles P. Lecht suggests two cost categories — one-time and repetitive.

(Continued on In Depth/2)

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications.

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

IN DEPTH

(Continued from In Depth/1)

Lacht claims that, in general and in total [and in constant dollars], one-time costs are falling and repetitive costs are rising.

- **One-Time Costs.** System design, system development, application development, hardware, conversion, training, installation and testing.
- **Repetitive Costs.** System software support, application software support, hardware maintenance, communications, operations, data entry, downtime and recovery.

Naturally, the cost-benefit methodology must suit the problem at hand. King and Schrems have surveyed techniques for cost-benefit analysis in information systems development and operation [King78]. For further background, Mishan's book is valuable [Mish76]. But no matter what cost categories and methodology are used, the goal is to discover whether a DCS can provide service at a lower cost than some comparable centralized system.

Building Rough Models

Down and Taylor show how to build and use rough models that relate the cost of system components to the degree of computing distribution [Down76]. Degree of distribution for system components is calculated from a weighted average of several factors, such as input, output, processing, file volume and rate of access. For each factor, degree of distribution is defined by comparing local functions with total system functions. For example, the degree of distribution of terminal input could be the number of characters entered and used locally divided by the number of characters entered.

Factors and weights are selected arbitrarily for a given analysis. "Increasing the degree of distribution in the system will increase certain costs and decrease others and it is necessary to consider these trade-offs in order to decide the optimum solution."

Down and Taylor discuss and graph the relationship between degree of distribution and three component areas: local processing capability, central processing capability and data transmission facilities. Their generalized cost model and their three case studies all tend to support the conclusion that "the lowest cost system is a partly distributed one." That is, distributed computing solutions tend to cost less than centralized or decentralized solutions to the same problem.

This conclusion is similar to one drawn by Ein-Dor and Seger [EinD78]. They say, "It appears there is an optimal balance of advantages and disadvantages" between centralization and decentralization. "This leads to an observed tendency to regionalize rather than centralize data processing capability."

In addition to establishing cost categories and relationships, a preliminary cost-benefit analysis needs to consider the direction of future cost trends. Stefferud estimates these directions along with other trends in computation, communications and word processing [Stef78]. His assumptions include the following:

- Hardware costs will decrease by a factor of 100 every decade. However, as Amdahl points out, "Even if the cost [of hardware] went to zero, the price wouldn't [Amda78]." Micrologic is only a part of a system, systems are also adding new functions and marketing costs are rising as competition increases.
- Software costs will decrease by a factor of 10 every decade.
- Communications costs will decrease by a factor of 10 every decade.

Detailed Analysis

Although cursory analysis may be enough to begin a project, continuation to implementation requires more sophisticated thinking. This section reviews three papers which, when contrasted with the previous section, show how much more detailed cost-benefit analysis can become. The first difference is in what costs are examined. Preliminary analysis can get by with considering only a few key variables. At later stages, the analysis must broaden to consider, and to manage, all costs associated with information processing.

All cost must be identified. Strassmann discusses why a broad analysis is needed and presents a nine-step method for identifying, measuring and managing information costs [Stra76]. He describes three information processing cost sectors extending far beyond the computer hardware, where most DCS design attention is focused.

- **Data Processing.** "Aside from the costs of computers, terminals and peripherals, this sector includes expenses for such things as computer services, time-sharing, data processing suppliers, data communication, programming support, operating labor and consulting."
- **Administrative Processing.** "Everything from typewriters, word processors and dictating equipment to tel-

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Budget Process

The first three steps of Strassmann's method, as practiced at Xerox, Corp. establish an adequate accounting and budget process.

1) *Cost Categories.* Identify and classify — by function, technology and organizational unit — all components of information processing costs. This can take years.

2) *Unit Costs.* Track unit costs for system work items and outputs. Define the unit measures at a low, working level so that problems can be traced to their origin.

3) *Standard Costs.* Establish predetermined targets for what unit costs should be.

Cost Management

The next four steps focus the organization on cost management.

4) *Accountability Centers.* Set up teams that have accountability and responsibility for well-defined, operational, information processing tasks.

5) *Competitive Pricing.* Set market prices for services rather than pricing at cost. This simplifies accounting, encourages use of new technology and motivates managers through profits.

6) *Long-term Planning.* Fund investments on a multiyear basis and tie budgets to long-range contracts with users.

7) *User Control.* Put the system development and control staff in the user's planning area where trade-offs can be made between information processing and other functions.

Human Work Needs

Finally, Strassmann calls for redirecting planning emphasis toward human work needs.

8) *Deemphasized Technology.* Reorient technical managers to take a broader, balanced view that encompasses the people sector just as much as the data processing and administrative processing sectors. The goal is increased productivity of information resources.

6) *Job Enrichment.* Design systems to include elements of computer-aided instruction that can help to expand task content and job scope for users such as terminal operators. The goal is increased productivity through greater job satisfaction.

Benefit interrelationships must be understood. Although cost identification and control is difficult, identification and reconciliation of desired benefits can be more difficult.

Mariani proposes a way to formalize and make tractable the analysis of DCS design trade-offs [Mari77]. His method uses tree structures to represent payoff measures and their relationships. A claimed advantage of the method is that the trees, although they quickly become very complex, can be automated using a general-purpose data base management system.

Three-Step Process

Mariani's method can be restated as having three formal steps.

1) *Definition.* Development of payoff measures. The fundamental measures used in Mariani's example are performance, reliability/availability, growth, deployability, life-cycle cost, survivability, fault tolerance and [physical] form factor.

2) *Description.* Incorporation of payoff measures and their relationships into the design process.

3) *Solution.* Selection of a design from among the alternatives.

Mariani's paper primarily addresses the definition and description steps. He formalizes the DCS design procedure as a sequence of design activities. Each activity is defined by stating its objectives, constraints and decision points. The objectives, constraints and decisions are parameterized by a common set of design variables. The cost-benefit payoff measures are defined with these variables and included in the objectives and constraints.

Mariani uses a top-down method to

(Continued on In Depth/4)

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IN DEPTH

(Continued from In Depth/3)

decompose payoff measures into quantifiable factors. After defining the payoff trees, it is necessary to quantify the relationship between a factor on one level and its contributing subfactors on the next level. He notes that several decomposition approaches are in use:

- **Subsystems.** Decomposition by functions such as data entry, data base storage and report generation.
- **Hierarchies.** Decomposition by organizational levels such as networks, subnetworks, nodes and processors.
- **Viewpoints.** Decomposition by "levels of abstraction" such as functional, virtual and physical.
- **Programs.** Decomposition by software elements such as communications software, operating system and application system.

Some Complications

Mariani points out that several problems complicate his method and reduce "the feasibility of deterministic design using payoff measures." Problems include:

- **Incomplete Definition.** Not all design factors are known. Those that are known are too numerous to manage well.
- **Incomplete Description.** Relationships between factors are not well understood. Interaction data is sparse.
- **Incomplete Solution.** Better algorithms are needed for manipulating the trees.

Costs and benefits must be merged with other issues. Just as costs and benefits are interrelated, management must integrate cost-benefit analysis with other planning and development processes. Bloom and Knapp describe "a computer-assisted planning and development methodology which attempts to fully integrate the requirements data base, the analysis and evaluation models, the resource optimization routines and the performance monitoring and evaluation subsystems [Bl0078]." Although their paper talks about data communications networks, their methods apply to any DCS.

Bloom and Knapp recognize that typical computing systems do not have fixed requirements. The requirements continually change – from conception through inception to termination. Designers thus require life-cycle models, and these models must have a variety of subsystems to address various design issues.

Analytical Tools

Bloom and Knapp discuss the analytical tools and techniques listed below. The list includes the kinds of tools needed to study the costs and benefits identified by the accounting and payoff tree methods of Strassmann and Mariani.

- **Application Profile.** Bloom and Knapp differentiate between strategical (or qualitative) and tactical (or quantitative) design parameters. Their strategical parameters are compatibility, availability, reliability, maintainability, flexibility, expandability, security, reutilization, sharing and cost impact. Their tactical parameters are topology, traffic, processing and performance.
- **Capacity and Performance Models.** These use analytic solutions and discrete event simulations in an iterative design procedure to produce preliminary configuration estimates.
- **Component Cost and Life-Cycle Cost Models.** Preliminary, general designs are compared with empirical assessments. All development, acquisition, installation, operation and maintenance costs are summarized in a total life-cycle budget. Cash flows are discounted to present values to allow comparison of alternative designs on an investment basis.
- **Optimization and Monitoring Systems.** Software packages balance performance against cost and select least-cost solutions from among alternatives. Hardware and software systems gather operational data to validate and improve designs.

This section on payoff analysis has concluded with the thought that cost-benefit analysis should be integrated into a comprehensive design methodology that covers the whole DCS life cycle. The next section begins by establishing criteria for assembling or selecting such a methodology. Then it reviews some candidate methods and techniques.

"We have not found a single, existing design approach which adequately

treats the extremely complex and varied goals of distributed computing design [Mari79]."

In 1977, a group of DCS experts reviewed the state of the art and "agreed that the field is so young that little formalism and few fundamental principles have emerged [Eckh78]." They concluded that, "as more experience is gained, and the field matures, more attention will presumably be paid to methodology and the systematic study of design trade-offs."

Their prediction was already coming true when they made it. Business and government were already spending heavily on distributed systems. Technicians were struggling to invent ways to make the systems easier to assemble and operate. Managers were running to catch up with the growth of usage, which seemed to be out of control.

This section reviews some general approaches to DCS design — approaches that both managers and technicians can use at several different levels of design detail.

Eckhouse outlined many open areas in DCS research [Eckh78]. Two of them are relevant here.

One problem he posed takes a technician's view of DCS design: "No complete systems analysis or synthesis methodology exists, either for distributed processing or for simpler, centralized systems — although there does exist a small collection of tactics in the areas of physical and logical interconnections, resource allocation and fault tolerance, detection and isolation. We also know some of the advantages and disadvantages of different topologies, restricted almost exclusively to hierarchies, stars, buses and rings (loops)."

Technicians want a method that can pick and put together computing components to solve a given problem. Managers take the more general posture represented by another of Eckhouse's problems: "What attributes of a problem make it suitable or unsuitable for distributed processing? How does one weigh the advantages and disadvantages of distributed vs. centralized systems?"

Not So Bad

The actual situation in both the technical and management areas is somewhat better than the quotations indicate. True, there are no "complete" methods, no cookbooks that get along without subjective human judgments. But partial methods abound, and several have been presented in this series. Many other design tools exist that can be gathered together into a DCS design toolbox. In general, it is necessary to push together the previously seperated knowledge of technicians and managers.

A design methodology is not just a collection of techniques. Before assembling or acquiring a DCS design methodology, managers and technicians should stop to consider the design of the methodology itself. They should think about what they want the methodology to do and should establish criteria to evaluate it.

Bryce did this for commercially offered, packaged methodologies for software development [Bryc78, Bryc79]. His main ideas, which carry over nicely to DCS design, are summarized here.

For Bryce, a system design methodology (SDM) is not just a bunch of technical guidelines for computer system performance. An SDM is a complete logical method, with precise decomposition rules "for developing effective systems to meet the information requirements of an organization."

In other words, Bryce insists on the same broad organizational perspective that Part 3 of this series called the top management view. His reasons are similar; a narrow perspective tends to develop systems that "solve the wrong problems." A limited technical perspective ignores personnel and administration, making implementation difficult, unpopular and costly.

On the other hand, an SDM, no matter how broad, can neither replace good managers nor make good ones out of bad ones. An SDM is simply a tool that can play a powerful role when properly used.

Criteria for Evaluation

Bryce lists 48 explicit evaluation criteria for SDMs and their vendors. His criteria stress management aspects of the methodology in order to force a broad perspective that can recognize and satisfy fundamental organizational needs.

(Continued on In Depth/6)

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IN DEPTH

(Continued from In Depth/5)

His criteria that carry over to DCS design can be grouped as follows:

- **Scope and Completeness.** An SDM should use a structured method, one built upon a small set of basic items and measures. The method should take a comprehensive approach, concentrating on organizational problem-solving rather than data processing technology. The method should make logical design decisions before selecting physical hardware or software. The method's basic units should also extend and apply to system development and maintenance decisions.
- **Usage Flexibility.** Because computing technology changes rapidly, an SDM should be independent of the design techniques it uses and be able to make use of new ones.
- **System Documentation.** Complete, up-to-date documentation should evolve out of the SDM as a normal by-product of the design process. The language and formats used should be standardized and commonly and easily understood by managers and technicians.
- **Development Control.** An SDM should encourage a dialogue between managers and technicians and between developers and users that extends beyond design into development and implementation. User managers should play an active part in a design process that has frequent checkpoints for review and approval. The design process should permit, but control, design changes and should project system acceptance criteria.
- **Resource Management.** An SDM should produce economic and schedule data. It should support cost-benefit analysis and leave a project audit trail.

This list of functional criteria can be further summarized by two statements. First, Bryce seems to say that an SDM should support and be guided by the organization's strategic planning process. Second, he says an SDM should contribute to estimating, analyzing and controlling the consequences of the design choices, both strategic and tactical.

Organizational issues must be resolved before successful implementation can take place. That is the essence of the previous section. As an example of an approach that meets Bryce's criteria, consider Poppel's list of 10 steps to successful system strategic planning [Popp79]. Some steps have been restated here for generality.

1) *State functional strategy.* The top managers of each major functional unit of the organization explicitly agree on strategy and assumptions.

2) *Find critical success factors (CSFs).* Within the basic strategy, determine these factors: key decision points; key activities and how to measure their level; key resources and how to measure their consumption; and how to evaluate results against objectives.

3) *Match CSFs to information flows.* Define sources, users, content, timeliness, accuracy and form of information needed to support critical decisions and measurements.

4) *State information technology assumptions.* Estimate availability, price and performance of hardware, software, data communications and key resources.

5) *Design systems and meet information needs.* Merge information flow definitions and technology assumptions and categorize them according to application type: conferencing, information transfer, information retrieval, transaction processing, personal processing and activity management. Pick a set of systems that solve information flow needs and adjust system architectures for compatibility.

6) *Prioritize solutions.* Use qualitative impact estimates and building-block interrelationships to order the selected designs for implementation.

7) *Estimate resource needs.* Estimate the quantity and quality of people, equipment and financing required to develop and operate each proposed system.

8) *Determine resource constraints.* Survey the quantity and quality of human, technical and financial power available within the organization.

9) *Set implementation schedule.* Adjust solution priorities to conform to organizational resource constraints.

10) *Design management processes to support new systems.* Upgrade the organizational structure and management techniques to fit with new system solutions and achieve their intended benefits.

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Familiar techniques are still applicable. Teeples, Shirey and Henderson incorporate ordinary systems analysis techniques in a methodology similar to Poppel's in order to study federally sponsored employment security (ES) operations [Teep79]. These include the U.S. Employment Service, U.S. Unemployment Insurance Service and related work. These operations, mainly performed by the states, use many highly automated systems. The study goals are as follows:

- **DCS Management Roadmap.** Guidelines for development and evolution of ES systems as technology turns toward distributed computing.
- **DCS Evaluation Standard.** A qualitative model for judging the completeness and appropriateness of state automation proposals for distributed systems.
- **DCS Progress Plans.** Specific suggestions for the near future for proceeding into distributed computing.

The study work plan also has 10 steps:

- **Define functions.** Name and describe the ES functions to be accomplished, rather than the means of accomplishment. Build a successively more detailed hierarchical structure where each function at any level is a subset of the function above it. Be fresh and objective; avoid mimicking the organization or computing system structures.
- **Define flows.** At each hierarchical level, define the information flow requirements in terms of inputs, processing and outputs. (This and the preceding step used the Hipo technique [IBM74].)
- **Define processes.** With functions as building blocks, use ordinary flowcharts to diagram the major systematic arrangements for doing work.
- **Define decisions.** Within the processes, name and describe the decision points.
- **Define systems.** List existing and planned systems available to support the functions, flows, processes and decisions.
- **Define opportunities.** Cross-reference functions, flows, processes, decisions and systems to find deficiencies and redundancies.

Parallel Viewpoints

The next three steps examine the ES functions from three parallel, independent viewpoints:

- **Analyze computing requirements.** For each function, determine needed access modes, throughput volume, response time and data base scope.
- **Analyze organizational factors.** For major functions, use Rockart's decision model to analyze centralization vs. decentralization issues.
- **Analyze technology potential.** For major functions, estimate the impact on ES effectiveness of the DCS characteristics listed in Part 2 of this series.

The final step summarizes the conclusions for the previous three and makes strategic recommendations for managing development plans, organizing for standards planning, undertaking pilot projects and selecting functions with the largest expected payoff.

Quantitative Design Methodology

The foregoing study of ES systems uses only qualitative methods, and such methods suffice for many strategic management choices, such as the degree of organizational decentralization. However, even at a high, strategic level of DCS design, quantitative methods soon become necessary.

First, management needs quantitative estimates to support trade-off decisions regarding costs, risks and benefits.

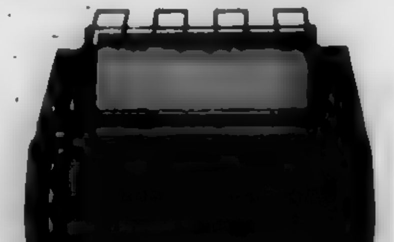
Second, to satisfy Bryce's criteria, quantitative estimates are needed as bridging between the planning and development processes.

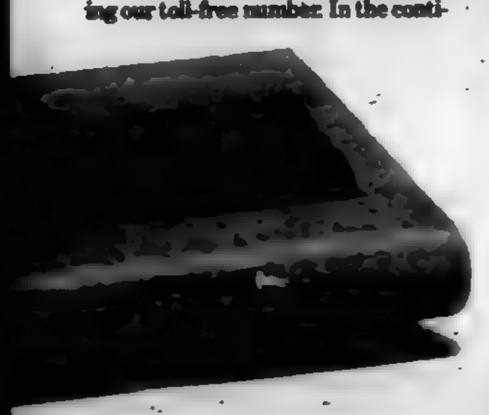
This section describes two methodologies, one proposed and one implemented, that favor automated, quantitative techniques.

Multiple viewpoints are useful in analyzing DCS functional requirements. But the differing perspectives must be synthesized. Becker argues for a unified "frame of reference" from which all types of distributed computing systems can be defined and designed [Beck78]. As his basic building blocks for stating system requirements, he takes three kinds of functions:

- **Information Processing.** Manipulation of information to produce a desired result.

(Continued on In Depth/8)





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IN DEPTH

(Continued from In Depth/7)

- Network Processing. Movement of information between DCS nodes.
- Data Base. Storage of information in forms convenient to system users.

High-Level Objectives

Given these functions, the objectives of high-level system design work are as follows:

- Select functional distribution. Determine the nodes at which each of the three kinds of functions should be performed.
- Select functional density. Given a functional distribution, determine how much capacity should exist for each function at each node.
- Select hardware and software. Given a functional distribution and density, determine the best combination of equipment to perform the functions.

Muftic and Husovic state similar concepts but do it more formally [Muft78]. As background, they name three kinds of distribution: functional, topological and organizational. They say, "The main criterion for any distribution is the frequency of usage of the particular function, so that each of them should be located and executed as close to the transaction source as possible."

For them, the key DCS design issues are:

- Functional Distribution. Determine which functions to distribute and which to centralize.
- Functional Density. Determine where to locate the distributed functions.
- Requirements Primacy. Determine how to design a DCS with the operational requirements as a starting point and not as an achieved result.

Almost a Joke

The last issue is almost a joke at this stage in computing technology. But Becker, too, feels it is a problem. He says, "To solve a problem, first define

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it. That's the idea behind a network planning philosophy that reverses *the traditional sequence of first selecting hardware and software models and then configuring the network* [Beck77, emphasis added]."

Instead, the sequence should start with the definition of the users' requirements for information processing, network processing and data base functions. Then a system should be fit to the requirements.

Becker suggests six characteristics to use in defining DCS functional requirements [Beck76]:

- **Topology.** Quantitative geographic identification of system nodes and constraints such as "buildings, cities, states, telephone area codes, time zones, countries, continents."

> *'Bottom-up analysis is hard to avoid. To analyze quantitative details, it could be necessary to work at the component level, the bottom level in Becker's six-deep hierarchy. Only at that level can we understand timing relationships that cause delays and bottlenecks. The problem in working at such a low level is in relating the analysis to high-level objectives.'*

- **Volume.** Information flow descriptions and distribution profiles.
- **Processing.** Physical and logical description of existing processing facilities and those that need to be located within the DCS.
- **Response.** Statement of required response times per application class.
- ***Availability.*** Profile of each application class in terms of what percent of each day, week or other period the application needs to be in operation and at what nodes.
- **Security.** How well the functions of each application class must be guarded.

To further classify functional requirements, Becker outlines a third taxonomy [Beck73]. This one is the skeleton for a six-level, top-down decomposition of DCS functions. His six levels are:

1) *Network Level.* State the whole problem in general terms.

2) *Processing Level.* Separate the problem into functional areas such as information processing, network processing and data base processing.

3) *Macro Level.* Further separate processing level functions into hardware functions and software functions.

4) *Micro Level.* Further separate macro level functions into generic tasks.

5) *Element Level.* Select specific task forms for each micro level function.

6) *Component Level.* Select specific hardware devices and software techniques for each element.

Four-Level Example

Becker illustrates this six-level structure with a four-level example:

Level 1. Information Network Function (a DCS).

Level 1.1. Information Processing Functions.

Level 1.1.1. Information Processing Hardware Functions.

Level 1.1.1.1. Includes processing, storage, interactive input/output, noninteractive input/output and switching.

Level 1.1.2. Information Processing Software Functions.

Level 1.1.2.1. Includes languages, applications, utilities, file management, task management, resource management, integrity, statistical recording and supervisory control.

Level 1.2. Network Processing Functions.

Level 1.2.1. Network Processing Hardware Functions.

Level 1.2.1.1. Includes concentration, coupling, distribution, switching and source/destination interfacing.

Level 1.2.2. Network Processing Software Functions.

Level 1.2.2.1. Includes routing, integrity, journaling, statistics, utility and supervisory control functions.

Feasible Configuration

Equipped with three schemes to classify DCS functions, Becker lays out a six-step sequence for analysis and design. Given a user's requirement statement as input, his process aims to produce a feasible, optimized equipment configuration.

1) *State functional requirements.* Convert topology, volume, processing, response, availability and security parameters into computer-readable form.

2) *Derive candidate configuration.* Analyze requirements and attempt to determine optimum functional distributions and densities. Perform physical design by specifying hardware devices and locations. Perform logical design by specifying software modules and locations.

3) *Predict candidate's performance.* Use step 1 load specifications to stress model of configuration from step 2. Repeat step 2 as necessary to acceptable result. Produce final candidate design and prediction of its performance.

4) *Install and operate.* Use the final candidate design to create or identify equipment lists, carrier facilities, operations manuals, protocols, resource mappings and software procedures. Assemble components and start system.

5) *Measure system performance.* Gather statistics from operational system and compare to step 3 performance prediction. If actual performance is poor, either repeat earlier steps to produce alternative configurations or correct step 3 prediction algorithms.

6) *Evolve and adapt.* Use this six-step sequence to respond to changing requirements during the system life cycle.

Becker wants to automate most of his sequence. He says, "Within the current state of the art, there exists no visible, single computer program to which a requirement statement is fed, and the best possible solution, complete with formal proof, results [Beck76]." But he also says there are many tools, both automated and manual algorithms, that could be combined.

Hard to Avoid

Bottom-up analysis is hard to avoid. To analyze quantitative details, it could be necessary to work at the component level, the bottom level in Becker's six-deep hierarchy. Only at that level can we understand timing relationships that cause delays and bottlenecks. The problem in working at such a low level is in relating the analysis to high-level objectives. This section illustrates that problem.

Stack describes a quantitative DCS design methodology intended to provide data for both strategic long-range plans and tactical development specifications [Stac79]. For example, it has been used for a study of electronic mail in the 1980s [Twee79].

The methodology characterizes the relationships among hardware and software architectures, projected work loads, performance and life-cycle costs. It uses a collection of automated modeling techniques to rapidly examine relational sensitivities. "The methodology characterizes the cost and performance trends of preliminary designs so that bottleneck sensitivities can be surfaced, design corrections can be investigated, alternatives can be compared and financial plans can be programmed."

The methodology has five major inputs and five steps. The inputs are as follows:

- **Architecture Primitives.** The methodology uses an analytic model based on queuing theory. The model sup-

(Continued on In Depth/10)

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IN DEPTH

(Continued from In Depth/9)

ports analysis of four different vertically distributed structures. They range upward in complexity from a host with simple terminals to a host and several cluster processors each supporting several intelligent terminals.

- **Development Philosophy.** This includes both a strategy for when and how to upgrade hardware capacity and a set of financial assumptions on residual hardware values.
- **Cost and Performance Trends.** In multiyear analyses, the methodology's cost model uses financial and technical trend assumptions to compute life-cycle costs for application software, computer and communications equipment, facilities and personnel.
- **Application Work Load.** The methodology's performance model analyzes the steady-state operation of one of the architectural primitives under a specified work load. A work load is specified as a set of application functions, their occurrence rates and their distribution in the total work-load mix.

Each function is described as a single thread of activity through a series of system nodes. A full description for each function includes the mean value and distribution of each of the following at each host, cluster processor and intelligent terminal:

- Application instructions per transaction per node.
- Executive requests per transaction per node.
- Storage requests per transaction per node.
- Characters moved per storage request.
- Communication requests per transaction per link.
- Characters moved per communication request.
- **Capacity Parameters.** The methodology's performance model requires initialization estimates of the mean value and distribution of each of the following for each node:
- Instructions-per-second executed per node.
- Instructions executed per executive request.
- Instructions executed per storage request.
- Instructions executed per communication request.
- Number of storage servers per node.
- Accesses-per-second executed per storage server.
- Operating system storage requests per application storage request.
- Characters-per-second moved per server.
- Characters moved per operating system storage request.

Also, for each communications link between a pair of nodes, the model requires data on distance, transmission rates and other performance characteristics.

The methodology uses these inputs to produce as output a collection of preliminary, technically feasible designs and associated life-cycle costs. The methodology uses analytic performance modeling and cost projection techniques in a five-step structure:

1) **Analyze requirements.** This step records current and future needs in a form that aids in evaluation of design alternatives. The major source documents are the statement of operational requirements (SOR) and the functional description (FD). The FD describes the system from the user's view, defining capabilities, imposing constraints and forecasting changes with time.

2) **Formulate criteria.** This step defines a basis for consistent evaluation of alternatives. It qualitatively defines the significant factors to be analyzed, the quantitative measures to be used and the sensitivity factors, or how results vary with assumptions in the five input areas above.

3) **Select alternatives.** This step picks preliminary designs to be examined for

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feasibility and compared. This step has five qualitative substeps:

3-1. Propose structures. List and classify the architectural alternatives that are likely choices.

3-2. Identify objectives. Derive design objectives from functional descriptions.

3-3. Identify problems. See whether objectives are thwarted because of work load distribution of preliminary structural choices.

3-4. Assess applicability. See how well current and proposed systems support the projected work load.

3-5. Select candidates. Based on the foregoing analysis of qualitative factors, choose designs to be studied further.

4) Model behavior. This step uses manual and automated tools to predict performance and cost of the designs selected above. This step has eight quantitative substeps to predict performance:

4-1. List events. Compute relative frequency of functions and service requests.

4-2. Total events. Produce aggregate work-load figures.

4-3. Measure service. Determine mean service times at each node for each transaction.

4-4. Count visits. Determine number of transactions per node per design alternative and life-cycle time point.

4-5. List branches. Calculate probability tree of system evolution possibilities.

4-6. Count arrivals. Calculate transaction arrivals per second at each node as a function of desired throughput rate, number of active terminals and evolution branching probabilities.

4-7. Measure delays. Calculate service delays at each node.

4-8. Calculate response. Use visit counts and delay values to calculate response times as a function of throughput rate.

This step also computes the present-value cost of each alternative at each time step, interest rate and inflation rate specified. This step's chief outputs are curves of response time vs. throughput rate and cumulative costs vs. time for a given design.

5) Evaluate alternatives. This step uses the evaluation criteria from step 2 to compare the feasible designs. Managers use the finding of this step to form conclusions and make recommendations on a final design selection.

Strong Points

Although new and not fully developed, this methodology described by Stack and Tweedy is significant for several reasons. First, it demonstrates the feasibility of assembling a DCS design process that quantitatively considers cost and performance factors at a strategic level. Second, it shows that Bryce's criteria for a system design methodology can be met when designing a DCS.

This methodology does integrate with the strategic planning process — in fact, it partly parallels Poppel's steps — and it does estimate, analyze and support control of the strategic and tactical consequences of a design. Finally, it is comprehensive and independent of particular analysis techniques.

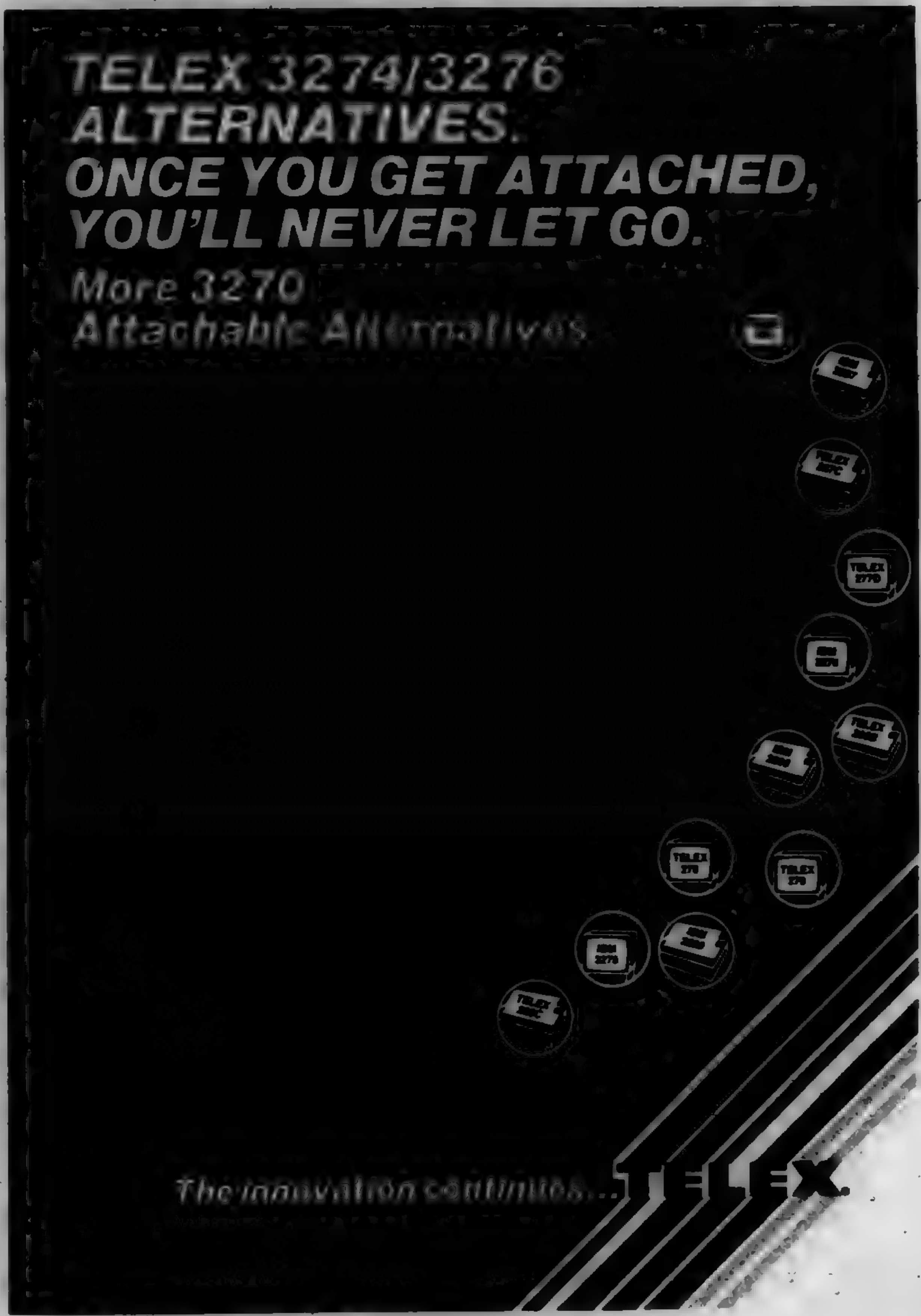
Besides its significant strengths, this methodology also has serious weaknesses. First, for a methodology that claims to support high-level planning, it seems strangely bottom-up. The five basic inputs to the design process — architecture primitives, development philosophy, cost and performance trends, application work load and capacity parameters — are mostly detailed, low-level specifications.

Second, as described by Stack and Tweedy, the methodology seems to concentrate on the hardware dimension. Data base distribution and system control are pushed well into the background. Many distribution decisions must already be made in order to specify the application work load as an input.

Third, the methodology does not suggest new system configurations. It can only analyze those suggested by the designer, and it can not yet analyze the important class of horizontally distributed systems.

Fourth, the authors present no taxonomy for functions that is independent of predefined hardware architectures. No techniques are described for analyzing functions independent of the architectural primitives.

(Continued on In Depth/12)



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IN DEPTH

(Continued from In Depth/11)

The best methodology is not always linear. For the foreseeable future, even the best design and development methodologies will not be able to guarantee an optimum DCS on the first try.

Hodgson reminds us that, because a DCS design has so many degrees of freedom, even a small mistake at an early stage of design can preclude the achievement of important system requirements [Hodg76]. He proposes a three-step design approach: analysis; first-shot, hypothetical solution; solution tuning. As Wenig puts it, "Experience is the only valid teacher" in learning to design and operate a DCS [Weni79].

So this section on design methodology closes by reviewing two papers that closely examine the idea that, as Becker suggested, design and development must be an iterative process [Beck76]. The first paper discusses why the traditional, methodical engineering approach works poorly [Shif78]. The second discusses some alternative approaches [Ball77].

Faulty Assumptions?

Traditional methodology may depend on faulty assumptions. The paper by Shifflett, Hofland and Schultz "addresses and questions the fundamental theories inherent in the traditional way in which large, complex software systems have been built." The authors claim that the traditional approach to getting technical work done makes four commonly accepted assumptions. They argue that these assumptions are incorrect for software systems, and they propose a new approach that views the development of large-scale systems as experimental in nature. This section summarizes their views.

Four commonly accepted convictions are inherent in software development or have arisen from it:

- **State-of-the-Art Assumption.** "Nearly all new software systems to be developed are within the state of the art and are, therefore, production rather than experimental efforts."

If a complex system were not experimental, it could be bought off the shelf rather than built from scratch. The history of cost and schedule overruns in the computing industry show that nearly every big system is unique and that the state-of-the-art assumption is invalid.

- **Detailed Requirements Assumption.** "Requirements should be defined and documented in detail before proceeding with design and implementation, and design must be fully specified before the start of coding and testing."

For a large system, complete prior specification is impossible for three reasons. First, end users only understand their current situation and can't imagine how work will be changed by a new system. Second, accurate quantification of many requirements must await completion and measurement of the new system. Third, requirements are not static; Becker calls this the "vanishing problem" syndrome [Beck78].

- **Positive Control Assumption.** "Large complex software systems can be managed and controlled by traditional methods of defining activities in advance, making detailed schedules and budgets and carefully monitoring progress."

It follows from the foregoing points that this is naive. "No one can successfully manage a group of people engaged in trying to do impossible tasks."

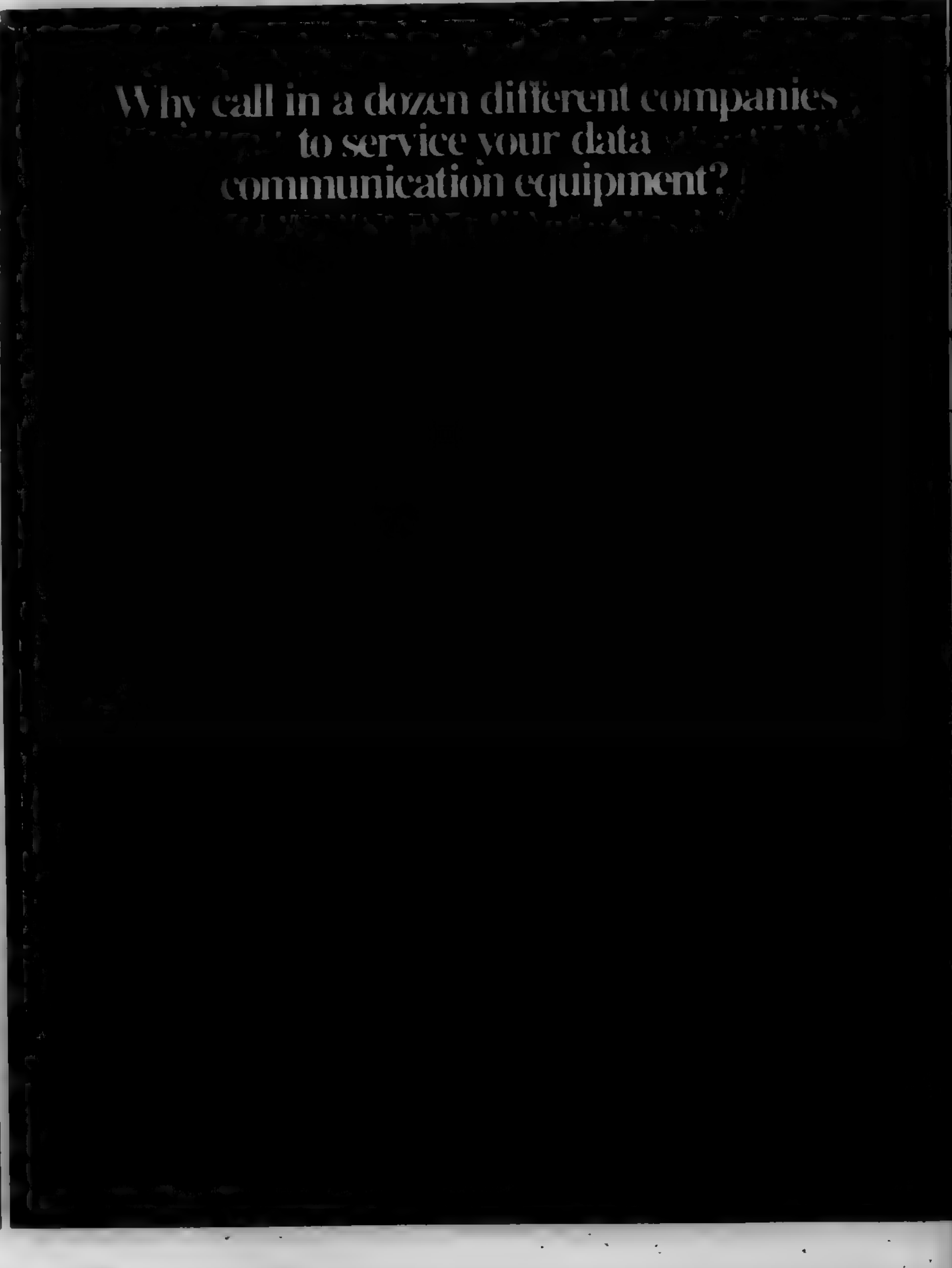
- **Bell-Shaped Staffing Assumption.** "The way to staff such [large, complex software] projects is to aim for a bell-shaped curve covering the definition, design, implementation and testing activities."

This staffing scheme leads to early compartmentalization as the management pyramid builds upward, which fragments the design and inhibits communication. The people added at the peak work inefficiently because they don't understand the design rationale. Hence, the curve never can turn down again until the project is almost over.

Alternate Method

To replace the traditional approaches based on these four assumptions, the authors propose an iterative, three-phase process.

1) *Skeletal System Phase.* This phase includes definition, design and limited implementation, and they are done concurrently and iteratively. Specifica-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tions are constantly revised as needed in cooperation with end users. This phase produces:

- A detailed functional specification in terms understood by end users and managers.
- A working skeletal system that provides a solid base for further development.
- A schedule and cost estimate for completion, supported by a risk analysis and based on experience with the skeleton.

At the end of this limited implementation phase, management can decide whether to continue and to commit to major expenditures.

2) Operational System Phase. This phase would implement the final design from the first phase, complete all documentation, install the system and begin production operation.

3) Maintenance Phase. This phase would be strictly limited to corrections and enhancements. It "would not include doing the system over to make it work as it was supposed to" as often happens under the traditional approach.

This iterative three-phase process is not always superior to the traditional one-pass process. Sometimes all the key decisions can be made correctly at the times they are needed in the design and development sequence. Nor is this proposed process the only alternative to the traditional one. Others are in use.

Trial and error may be necessary. Bally, Brittan and Wagner outline four different strategies they call the linear strategy, the loopy linear strategy, the plug-in strategy and the prototype strategy. All four use the same nine steps in the same sequential order, but they differ in how steps are repeated. The nine steps are:

1) **Conception.** Make initial project proposal.

2) **Study.** Review feasibility, costs and benefits.

3) **Definition.** Establish requirements.

4) **Analysis.** Investigate alternatives in detail.

5) **Design.** Specify a system.

6) **Implementation.** Build to specifications.

7) **Testing.** Test the system in a trial environment.

8) **Acceptance.** Install the system in actual conditions.

9) **Operation.** Run the system in production mode.

The *linear strategy* assumes each step is done once in the order given. Minor looping is allowed in the early stages, but extensive looping implies unsatisfactory deficiencies in those stages. The linear strategy seldom works well unless the developers have experience with similar systems and the users correctly understand their own needs.

The *loopy linear strategy* proceeds in a series of haphazard and short-term loops. This strategy is the unintended result of attempting a linear approach. It occurs when user requirements change often or when testing reveals design inadequacies. Any project will have and can stand some loops. But excessive looping overruns schedules and budgets and creates conflict between developers and users.

The *plug-in strategy* proceeds linearly from conception through analysis, creating a general design divided into subsystems. Then the subsystems are completed sequentially; each subsystem is taken from analysis to operation before the next is begun.

The *prototype strategy* completes the conception and study steps for the whole system, but then activity is scaled down.

Requirements are defined for a simplified prototype rather than the entire intended system. That prototype is then taken through the rest of the steps and into operation. When enough experience has been gained running the prototype, the steps from definition through operation are re-

(Continued on In Depth/16)

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IN DEPTH

(Continued from In Depth/13)

peated for a second, revised or expanded prototype. The cycle repeats until a full system emerges.

Some Disadvantages

The prototype strategy also has disadvantages. First, it appears to cost more than the linear or plug-in strategies. But the risk is that one of those can turn into a loopy strategy that costs far more than building prototypes.

Second, the incompleteness, simplicity or reduced scale of a prototype might cause it to operate in a very different way from that of a full-scale system of the same design. So incorrect design inferences might be made.

The authors emphasize the prototype strategy because it is less widely used than the others and because it has important advantages. It copes well in fluid situations. It avoids getting bogged down in the early steps if information is hard to get. Third, it generates user confidence because users can adjust to change gradually and are not forced into big, high-risk decisions.

Most Important Plus

The authors believe this third advantage is the most important because "any information processing system must achieve both 'technical' and 'psychological' success." These are defined as follows:

- **Technical Success.** "The degree to which the actual performance of the system matches its specifications."
- **Psychological Success.** "The degree to which the end user has confidence in the final system." Technical success is necessary but not sufficient for psychological success.

With the mention of psychological success vs. technical success, this series returns to its central theme: the need for cooperation between general managers and computing technicians during DCS design and construction. What general managers should know about distributed computing is that they can't build a DCS without computing technicians.

What computing technicians should know is that without general management guidance, their DCS may turn out to be only a laboratory success serving no useful organizational purpose.

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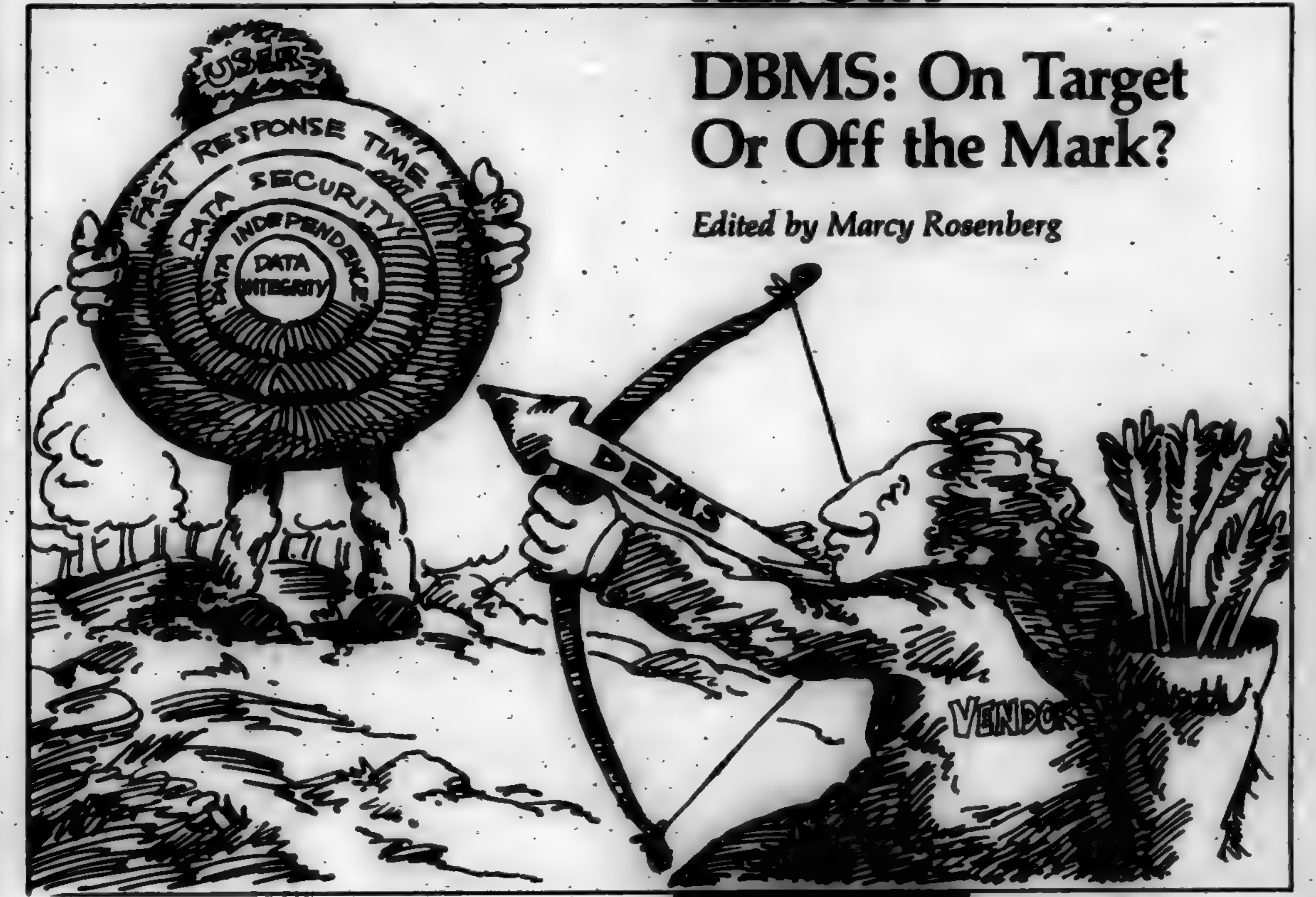
REPORT

DBMS: On Target Or Off the Mark?

Edited by Marcy Rosenberg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As Many Failures as Successes

Basic Facts About DBMS Separated From Fancy

By Yale S. Landsberg
Special to CW

By now, thousands of companies have installed a data base management system (DBMS) and each year, hundreds more begin considering this new mode of data organization and usage. Yet any impartial examination of the results shows as many notable disappointments as successes.

When data base projects bog down or fall short of expectations, usually the DBMS and the DP professionals involved get the blame. Some of these disappointments may indeed be caused by errors in DBMS selection, poorly thought out implementation plans or undertrained project teams.

But we have also found that the very assumptions about data base technology and use which most people now take for granted may actually put both DBMS package and implementer at a serious disadvantage and make ultimate data base goals unrealistic and even unattainable.

These assumptions are:

- Accept the high costs and risks of going data base.
- Perform an expensive, well-documented corporate study.
- Select the one best DBMS for all company requirements.
- Phase in the data base over several years in well defined stages.

If this viewpoint — which attempts to answer the question, "How to go about building a corporate data base?" — has proved to be a limiting factor for many companies, is there a realistic alternative? We think there is.

Short-Term Orientation

By inverting this question to ask instead, "Where to apply data base technology to overcome conventional DP deficiencies?" a more controllable, short-term orientation emerges that does not necessarily have to be shortsighted.

This broader and deeper view of data base technology as a set of diverse tools has the potential for transforming the data base administration function along lines envisioned for data administration.

It gives companies the freedom to apply DBMS products more flexibly and to tailor individual data base solutions to the diverse centralized, stand-alone and distributed DP problems that exist in the real world.

Data Base Requirements

We believe companies should consider using data base technology instead of conventional approaches any time there are requirements for:

- Extremely automatic and efficient
- Unified management of
- Potentially very large
- Highly accessible and sharable
- Evolving collections of interrelated records
- Stored without harmful redundancy.

By examining this long and seemingly convoluted set of requirements, a number of valuable insights about this view of data base technology become easy to understand and apply. Taken one by one, these requirements are:

- *Records.* Contrary to popular opinion, data base technology is principally involved with the management of records — logical and physical — and not with individual pieces of data somehow floating around in the data base waiting to be accessed.
- *Collections of interrelated records.* While file usually means a collection of records of a single type or form, data bases may contain many different record types, some directly and others indirectly related to each other.
- *Evolving collections.* Part of the advantage of storing data in data bases is that this type of organization can support different kinds of growth. For example, growth can occur in the data base, itself — new data elements, additional record types and relationships between types — or in the needs and variety of applications — new views of the data using different keys and sort sequences.
- *Stored without harmful redundancy.* Having the same data stored in different places can cause different problems — first, extra storage costs and, second, the often more embarrassing problem of inconsistent reporting. The same data stored in several files is likely to be out of sync due to differences in update schedules.
- *Highly accessible.* When stored in a true data base organization, data must be highly accessible for a number of different purposes. Consequently, it is normally assumed that the data base is stored on direct-access devices, usually disk.

With the development of multikey loons and interactive report writers, some of the distinctions between files and data bases tend to blur, especially for beginners. Yet from a data base point of view, high-speed access extends not only to data retrieval, but also to high-speed updates and deletions.

- *Highly sharable.* Data stored in data bases potentially may be processed by many different users in many different ways, possibly all at the same time. Consequently, certain functions are needed to support the especially complex and varied accessing and enqueuing inherent in data base usage. Conventional file structures do not generally support a very high level of sharability.
- *Potentially very large.* When collections of records are small, a data base organization may not be required. But as the number of records, record types and interrelationships grows, the once simple and acceptable performance can become extremely cumbersome. Data base organizations with their support techuologies fill the access speed and resource management gaps left by conventional methods.
- *Extremely automatic.* As applications and data management requirements increase in size and complexity, program and file maintenance costs often limit future development. Data base technology provides cost saving mechanisms — for example, logical and physical data independence for automatically supporting additions and changes to the data base as applications evolve, without requiring changes to other existing programs.
- *Extremely efficient.* As applications requirements increase for faster response and turnaround times and as management pressures grow for more productive use of personnel and equipment resources, data base provisions for making optimal use of designer, programmer and user time gain in importance. Such provisions include tuning aids, high-level languages, ad hoc facilities and best use of CPU, memory, I/O and disk.
- *Unified management.* True DBMS manage access, buffer and space, directory, security and recovery functions on a unified, centralized basis. The results are economies of scale and coordination needed to support the often conflicting and incongruous requirements typical of complex management information systems and line-oriented applications.

No Inherent Conflict

This data base view doesn't inherently conflict with the old concept of the single corporate data base. In fact, when the set of potential applications grows large enough, it closely resembles the requirements for a single corporate data base managed by a single corporate DBMS.

However, differences between these two views arise out of problems that occur when trying to implement data bases that go beyond the natural boundaries of the DBMS package and data base administration (DBA) function involved. The new approach merely accepts these natural boundaries the way architecture and engineering do in the physical world.

This way of looking at potentially multiple DBMS acquisitions and implementations is analogous to using alloys to give metals extra strength or using differently designed multistage rockets to overcome weight and structural limitations.

There is no longer any valid reason for those who opted for using data base technology on a down-sized instead of a corporate basis to feel ashamed of not using a DBMS properly — especially if enough of the above requirements dictated its use.

Years ago, a prominent pioneer in data base consulting very aptly described a data base as a growing community of data shared by a growing community of users.

Today, however, it is becoming increasingly apparent that this growing community of data shared by a growing community of users may at times be best managed by a growing community of central and local DBA functions using a growing community of mainframe- and minicomputer-based DBMS products.

Sticking to traditional DBMS acquisition and usage concepts for the sake of neatness, then, will only continue to cause unneccessary data base failures and disappointments to occur with greater frequency and losses.

Landsberg is president and principal consultant for Omnibase Corp., a data base research and development firm in Palisades Park, N.J.

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Most Talked About, Misunderstood Topic

Definitions Needed for Understanding DBMS

By V. Venkatakrishnan
Special to CW

What is the one topic that is tossed around most either at DP management or technical circles? The answer is a combination of any of the words in the string, "data base management system" (DBMS).

There are several reasons for this – both technical and philosophical. First, the technical.

A few years ago I attempted to characterize a DBMS [CW, May 8, 1978]. The rather nebulous use of the term has contributed to misconceptions as to the very nature of what a data base is or should be. The multitude of software products with the label "DBMS" has not helped either.

One disturbing consequence of such misconceptions is the exacerbation of the communication among DP personnel at all levels. And communication with the legendary end-user has been frustrating partly because of communication problems among DP people themselves.

The scope of this article, then, is to:

- Define access method (AM), file management system (FMS) and DBMS in unambiguous terms.
- Emphasize the roles played by each of the above in the management information system (MIS) environment.
- Try to find a harmony in the chronology of information evolution.
- Do all of the above in a way that both technical and managerial personnel can relate to and agree upon.

File access has been known from the time homo sapiens learned to read and write. The data set was probably a set of characters inscribed on a scroll, capable of being understood by a select group of learned men who interpreted it to emperors and commoners. Note that all the elements of an access method were present, although in a primitive manual form.

In more modern times, any system function has three basic components – input, process and output. Functionally, two-thirds of these components – input and output – are performed by access methods, without which there can be no meaningful interaction between the computer and the external world. Also, certain types of access methods demand specific data storage organizations while others may be more forgiving.

The formal definition of an access method is, then, a technique for *physically* organizing data sets and transferring data between storage in computer (core) and an external medium.

A few examples of AM are Bsam, Isam, Qsam and Vsam. Some AM, such as Vsam, may have more capabilities than simpler ones, such as Qsam. The role of AM in the MIS environment is depicted in Figure 1.

The goal of FMS is to provide the user with a tool more powerful and compact than the commonly known programming languages. Some commercially available FMS are easily usable by non-DP end users for simple applications. In general, they are not suitable for designing large production systems. FMS may be procedural or nonprocedural (query).

We can define FMS as follows: It is a self-contained system capable of performing a number of straightforward processing and maintenance tasks relating to *physical* files.

Example of FMS are Culprit, Easytrieve, Mark IV and RPG. The place of FMS in MIS is shown in Figure 2.

Just what is a data base? In its simplest generic form, the term is often used to denote any collection of physical data records – disk, tape, box of punched cards or even a ledger! However, it is this interpretation that leads to confusion even among professionals.

The term, data base, is to be reserved for that collection of data records which lends itself to being manipulated by tools designed to manage data as a corporate resource. This implies that a data base must:

- Support elimination of unplanned redundancy.
- Support minimization of program/data dependence.
- Support relationships between its various components.

The third characteristic is known as logical relations – typically a many-to-many relationship that is required in a surprisingly large number of instances.

Consider the situation where we want to locate a book in a local library that is not yet automated. The approximate title is known so we find it by searching through the Subject Index stack. After glancing through the book we find it absorbing enough to want to read other books written by the same author. Fortunately, there is the Author Index stack that gives precisely this information. We have thus manually established a logical relation between Subject Index file and Author

(Continued on SR/4)

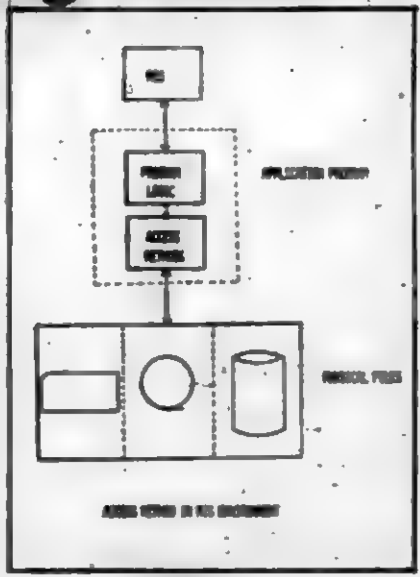

Figure 1

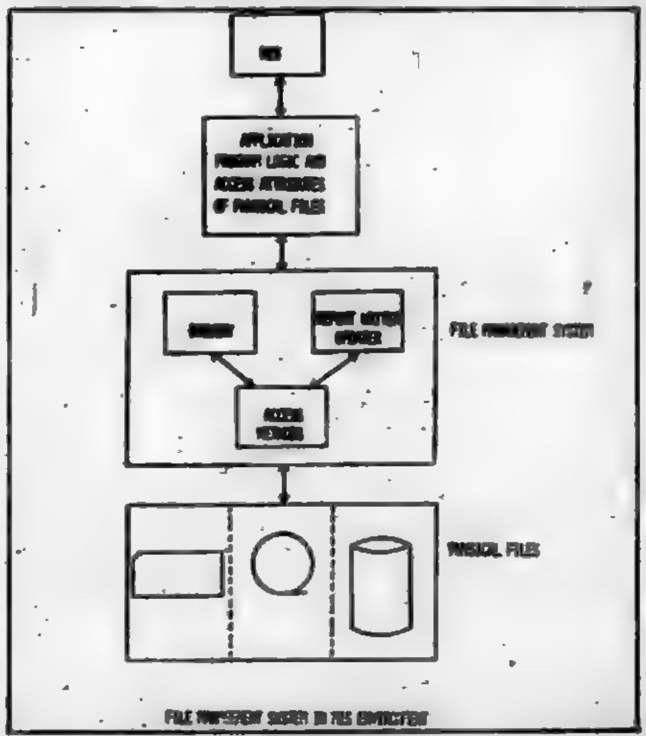
MIS
APPLICATION PROGRAM LOGIC AND ACCESS ATTRIBUTES OF PHYSICAL FILES
INQUIRY
REPORT WRITER UPDATER
ACCESS METHODS
FILE MANAGEMENT SYSTEM
PHYSICAL FILES
FILE MANAGEMENT SYSTEM IN MIS ENVIRONMENT

Figure 2

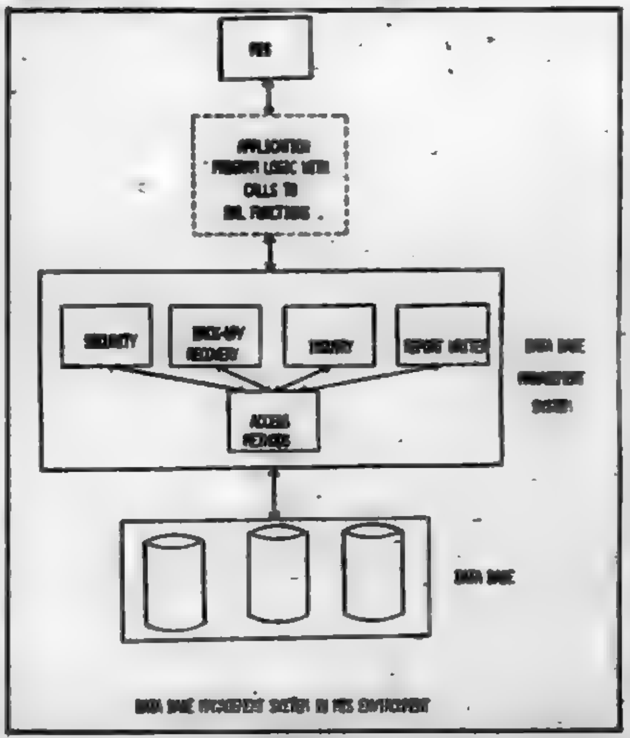
MIS
APPLICATION PROGRAM LOGIC WITH CALLS TO DBMS FUNCTIONS
SECURITY
BACK-UP RECOVERY
INQUIRY
REPORT WRITER
DATA BASE MANAGEMENT SYSTEM
ACCESS METHODS
DATA BASE
DATA BASE MANAGEMENT SYSTEM IN MIS ENVIRONMENT

Figure 3

DECsystem-10 DECsystem-20

DPL

data processing language

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- TEXT EDITOR
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DBMS: Tossed-Around Topic Needs Definitions

(Continued from SR/3)

index file.

Data bases must provide for automating the logical relations through appropriate software (DBMS). Hence, the following succinct definition of DBMS: It is a system that provides facilities for organization, access, control and monitoring of the data base whose components may be logically related but are distinctly different from its physical data set.

Some commercially available DBMS software are Adabas, IDMS, IMS and Total. There are different philosophies in the design of a DBMS — network, hierarchical or relational. The relational approach deserves special attention for two reasons:

- It led to the development of implementation-independent data base analysis, which is absolutely necessary if data bases are to live up to their expectations.
- It led to the development of backend data base machines. These are hardware/software combination DBMS and are designed for the specific purpose of efficient data base handling. They can be backended to a variety of large and small host systems. One example of a commercially available data base machine is the Britton-Lee Intelligent Database Machine (IDM). Data base machines have great future potential.

CHARACTERISTIC	AM	FMS	DBMS
DATA COMPRESSION	MAY BE	MAY BE	YES
DATA INDEPENDENCE	NO	NO	YES
DATA INTEGRITY SAFEGUARDS	SOME	SOME	YES
COMPREHENSIVE SECURITY FEATURES	NO	NO	YES
SUPPORT NONUNIQUE KEYS	PARTIAL	PARTIAL	YES
LOGICAL VIEW OF DATA	NO	NO	YES
LOGICALLY RELATING COMPONENTS	NO	NO	YES
INTEGRATED EDIT FEATURES	NO	MAY BE	YES
INTERACTIVE QUERY FACILITY	MAY BE	MAY BE	YES
SUPPORT CENTRALIZED DATA MANAGEMENT	NO	NO	YES

Figure 4: Differences Between AM, FMS, DBMS

A DBMS usually has other features such as security, utilities and query. How DBMS fits into the MIS environment is shown in Figure 3. Figure 4 is a table comparing AM, FMS and DBMS. The contents of this table may be paraphrased as follows:

Information has two attributes — a quantity attribute characterized by volume, completeness and accessibility, and a quality attribute characterized by timeliness, relevance, accuracy, availability, reliability and flexibility. The basic difference between AM, FMS and DBMS is the extent to which these attributes are satisfied.

Now for the philosophical reasons for interest in DBMS. The question of whether AM, FMS, DBMS or a combination is to be used for a given application can be approached rationally if there are no guidelines in the installation. Admittedly, the DBMS is the most complex and expensive to maintain. But, for a variety of reasons, such as long range benefits and on-line requirements, there is an increasing tendency toward expanding the use of DBMS.

The real benefits, even the long-range ones, of DBMS can be realized only through efficient enforcement of well-defined data administration policies and procedures. As has been said so often, this requires a durable commitment by senior management. At the same time the need for the existence of a sound technical infrastructure cannot be overemphasized.

In the absence of such a commitment and the technical infrastructure, the use of DBMS degrades it into an expensive version of AM and can hardly be cost-justified.

As a final note, what does the transition from AM to FMS to DBMS signify other than technological achievement?. To me, it reflects the human being's unending craving for freedom and individuality.

Venkatakrishnan is software adviser, data base/data administration, for Aetna Life & Casualty in Hartford, Conn.

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MDBS-RTL. As an add-on to MDBS, the RTL (Recovery Transaction Logging) logs all data base transactions, so that in the event of a system failure, the data base can be recovered with minimal loss of information.
- The recovery processor permits selective [illegible]

MDBS-QRS. An interactive Report Writer/Query-System for HDBS/MDBS data bases. Features...
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- complex retrieval conditions may be specified
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- wildcard and "match-one" string specifications [illegible]

HDBS and MDBS Package Includes
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- [illegible]
- [illegible]

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OASIS
TRSDOS and NEWDOS (Model I and II) with Disk BASIC
North Star DOS with North Star BASIC
Apple DOS and Applesoft BASIC
Machine Language Interface available on all above systems.
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In Data Base Environment

Do-It-Yourself Applications the Best Solution

By Leo J. Cohen
Special to CW

Have you heard vendors use these lines: "All you have to do is install our application package and you'll have your application running under data base in two months"?

Or, "With our application package, implementing your payroll as a data base system is a snap"?

Or, "Our data base system application package lets you knock off inventory management in no time flat — and best of all, *you don't even have to know anything about data base.*"

When you hear them, alarm bells ought to go off in your head.

Reading ads and listening to vendors, I sometimes get the feeling that the primary function of DP is to pay for the computer and keep it dusted. In my view, even in these days of modern whiz-bang EDP and data based DP, there's still no such thing as a free lunch. There are no easy routes to data base success, packaged data base systems included.

Package Limitations

The vendor of a data base application program package starts out by identifying an industry and an application area within it for which a worthwhile market seems to exist. The vendor then develops a system that satisfies a statement of requirements for that particular application area across that industry in general.

However, since the breadth of the market is of paramount importance to the vendor, the requirements statement on which the system is built is often strong on generality, but weak on detail. The vendor tries to hide the complexity of the problem environment by covering it with a basketful of DP gimmickry: on-line this and that; interactive, open-ended, user-friendly everything and complete data base organization and support.

Nowadays, the sale of such applications packages depends so much on whether they "run under data base" that if they don't they're obsolete even before their ads hit the papers. But building *any* application "to run under data base" is suspect, commercial applications packages not excepted.

After all, the application "problem" as defined by the vendor does not account for problems that the prospective purchaser may have in other areas. For example, there can be little or no planning for interfaces to other systems.

In other words, the data base architecture prepared by the vendor as its solution to the application requirements will be relatively inaccessible to the non-data base systems of the client's environment, should those systems be interested in the package's data base data.

The vendor does, of course, face the legitimate problem of maximizing performance in the general application system it is building. Experience has shown that much of the performance of data base systems depends on architectural structuring. As a consequence, the vendor's architecture is suited to performance achievement in the application problem as the vendor has perceived it.

Furthermore, the vendor structures its application programs so that they use the data base in the optimal manner.

Up Against Problems

But this is where we run into problems, because the application programs are heavily vested with the architecture of the data base. This means that even light tinkering with the data base architecture by the client's DP organization can have quake-like effects throughout the vendor's application system.

This is wholly unacceptable for a variety of reasons, not the least of which is that packaged software is supposed to be maintenance-free, at least for the client DP organization.

In any case, the result of the vendor's efforts is to produce a stand-alone application system. Its data base does not interface readily with anything outside of it, meaning that the data it contains is relatively inaccessible. Since you dare not change the architecture, the only way to access the data is by brute-force spin-off. The packaged system becomes a stand-alone system, but only in the worst sense.

This message often gets hammered home when the client authorizes an enhancement in the purchased data base system. Because of the architectural dependence of the application programs, such operations often cause bleeding far beyond the doctor's prognosis.

In-House Route

The purchase of a data base-interfaced application program package for some particular business area might seem at first glance to be straightforward, logical and, above all, efficient; by contrast, building an in-house application system for that functional area appears to be difficult, expensive and, above all, dangerous. Managers often perceive immense risks associated with the in-house route, and the fact that that translates into potentially deadly personal possibilities does not escape them.

Unfortunately, many such managers have never been down the road of package acquisition, installation, operation and maintenance. They see the dangers of the in-house route looming large and inevitable. What they don't realize is that the lack of a complete requirements statement from the end user — what the in-house route can offer and what the vendor does *not* have in building its package — is an even bigger risk.

All the choices the designer makes for a data base architecture come from one of two places — his imagination or an end-user requirements statement. The former we can dismiss, since we know it to have a dismal track record in implementing effective systems.

The latter — gathering requirements from end users — is a necessarily large effort, but the rewards are large as well. The key ingredient is that the users' voice has been heard. That is what's often ultimately missing in the packaged data base application systems.

How Much Commonality?

The basic premise of the data based application package industry is that primary business functions in a particular industry are essentially standard or, if not, subject to standardization through DP measures. Indeed, it is certainly the case, for example, that all banks have common major functions. After all, all banks handle demand deposit accounts, savings, mortgages and small loans.

In this basic functional sense, one can certainly allow that "a bank is a bank is a bank," and this also holds true for many other industries.

But how deep does this commonality really go? Two points of variance can be easily spotted. First, when you decompose the allegedly "common" functions into detailed subfunctions, you will inevitably find significant differences between any two given corporate environments.

In other words, the specific roles and responsibilities defined by the functional decomposition for, say, mortgage loans in one bank, will show significant variation in their detailed definition from those of the supposedly common function "mortgage loans" in a second bank.

Second, the organizational structure which contains the so-called common functions and their procedures will be inevitably different. Since the detailed decomposition of functions maps onto the organizational chart in any definition of how an organization's procedures are carried out, this second source of divergence has a multiplicative effect — rather than simply an additive one — in increasing the functional variation between two companies of the same industry. In other words, at the detailed level, "a bank is *not* a bank is *not* a bank."

What are the implications for DP? For some time we have known that the pillars of a requirements statement for a data based system are information, organization and function. ("Function" defines *what* is done; "organization" defines *who* does it and "information" defines what *data types* are needed to accomplish it.)

Now if a major function of a given enterprise is done differently in its detailed subfunctions across each company that pursues that "common" enterprise — *and* if each company has its own particular organizational structure to carry out those subfunctions — then even though the data types in the requirements/-statement for the enterprise might be the same for each company will be very different.

Not Close Enough

What this really says is that the requirements statement for a data based system is a direct reflection of the nature, personality and working efficiencies of the organization. Like it or not, the requirements statement that is produced by the vendor of a data based application package hasn't any hope of coming within a mile of what the statement *should* look like for a particular company.

The strongest attraction of the package approach is that it seem so easy. Installation is merely a matter of writing a check. The vendor provides training. Lead time is next to zero. But is all this glitter really gold?

Invariably, the outputs and services that anybody's DP system delivers must be modified. No system is perfect — and, if we indulge ourselves a little, even if it *were* perfect, users still wouldn't be completely satisfied.

So we must change a system that we either build or buy. If we are the ones that built it, then certainly we know how to change it. If we bought it, we must learn how to change it so as to avoid disastrous consequences. Besides the fact that venturing into vendor software is a peril-laden and essentially illogical action, there is the unavoidable fact that if you *do* try to change it, the architectural inertia of the system will put formidable

(Continued on SR/8)

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Data Base Potential Wasted by Poor Planning

By Richard C. Parkinson
Special to CW

It is data base technology that will make it possible for management to tap the total data resources of an organization. However, the problem is that data base has not yet lived up to its potential.

In most organizations, data base is only used to automate existing systems, incurring, as a result, all of the overhead, but not producing 100% of the benefits. At this point, data base is being used as nothing more than a glorified access method.

Here's an appropriate analogy. One would never consider designing a railroad without a plan — one would never lay a track here, a track there, nor build a station without first determining the paths from place to place and the natural population centers.

However, DP professionals have been laying track all over the landscape. When we require communication from one track (system) to another, we must hope we do not encounter a river gorge or mountain range requiring elaborate bridge building or extensive tunnel blasting. It is essential, then, to anticipate future changes and incorporate them into current design.

Departmental Subsets

Each functional area in an organization operates with a subset of the total data resources of that organization. Different departments require different versions of the same data. For example, the sales department, the manufacturing department and the accounts department may all require information regarding each customer order.

But while each department requires specific information relating to that order, other order information may be universally required by all departments. Data redundancy results when the same data exists in different functional versions used by different departments.

One problem is synchronization of data. If the manufacturing department changes the design of a product, this information is of interest to all other departments. What are the changes in materials? What are the costs? How will the change affect sales? Each department's subset of information must be updated in order for the impact of a change to be reflected throughout the organization.

Functional Separation

Functional separation of data creates another problem. While it is fine for individual departments to function with subsets of information, it is imperative that management have access to a broader spectrum of data from which to make its decisions.

From an operational standpoint, an organization may handle this data flow well. However, raw data is not information. Information is data combined in logically arranged groups. Birthdates, names, addresses and employee numbers are data, but a matched set of birthdate, name, address and employee number is information. Thus, if data resides in separate files it cannot become useful until it is combined into an information set.

In general, management requires information summaries of activity in order to make decisions. While the order department may be concerned with the status of a particular order, management is concerned with the status of orders for a week, a month or an entire year.

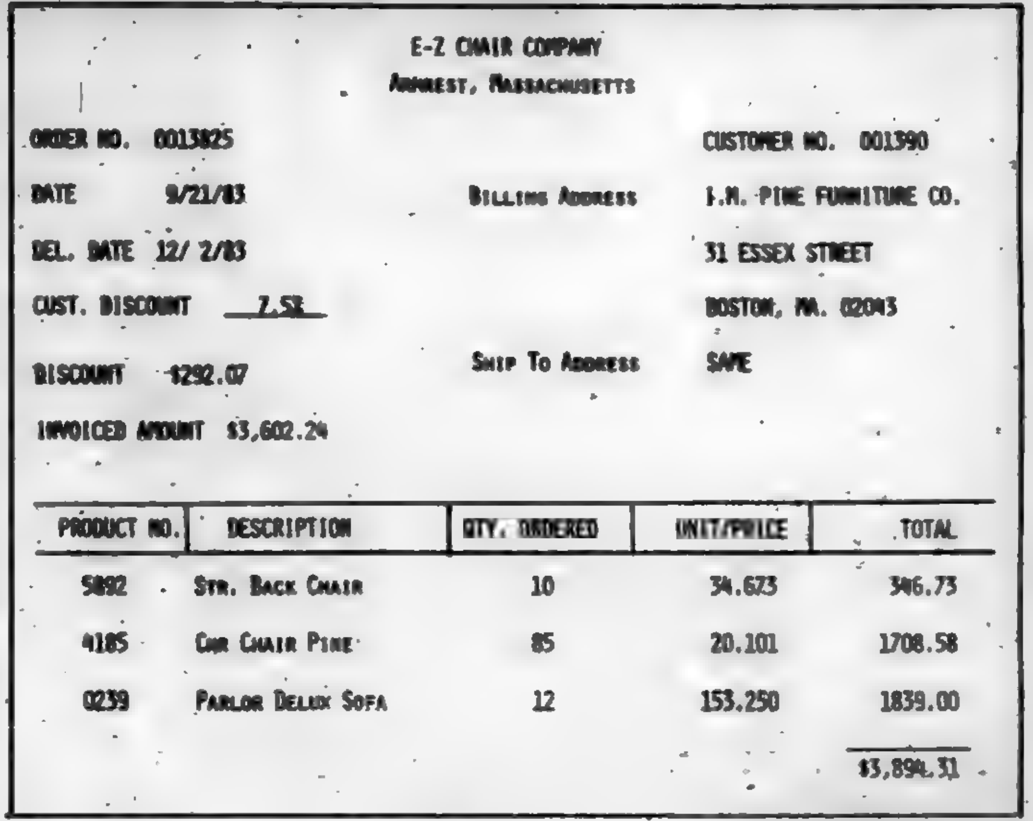
Thus, while subsets of data work well in the functional departments, this separation of data can prevent top management from gaining an overall appreciation of the status of the entire organization.

Data base failures in this regard and the seeming inflexibility of some data base systems are not a technological problem at all. The problem lies in the analysis and design approach designers currently use to implement data base systems.

Data Analysis Solution

Data analysis is the key to establishing a data plan, and the key to data analysis is normalization. What is normalization? It consists of three steps: First, second and third

(Continued on SR/8)



E-Z CHAIR COMPANY
AMHERST, MASSACHUSETTS

ORDER NO. 0013825
DATE 9/21/83
DEL. DATE 12/ 2/83
CUST. DISCOUNT 7.5%
DISCOUNT $292.07
INVOICED AMOUNT $3,602.24

CUSTOMER NO. 001390
BILLING ADDRESS J.M. PINE FURNITURE CO.
31 ESSEX STREET
BOSTON, MA. 02043
SHIP TO ADDRESS SAME

PRODUCT NO.	DESCRIPTION	QTY. ORDERED	UNIT/PRICE	TOTAL
5892	STR. BACK CHAIR	10	34.673	346.73
4185	CHR CHAIR PINE	85	20.101	1708.58
0239	PARLOR DELUX SOFA	12	153.250	1839.00
				$3,894.31

Chart by QED Information Sciences, Inc.

Figure 1

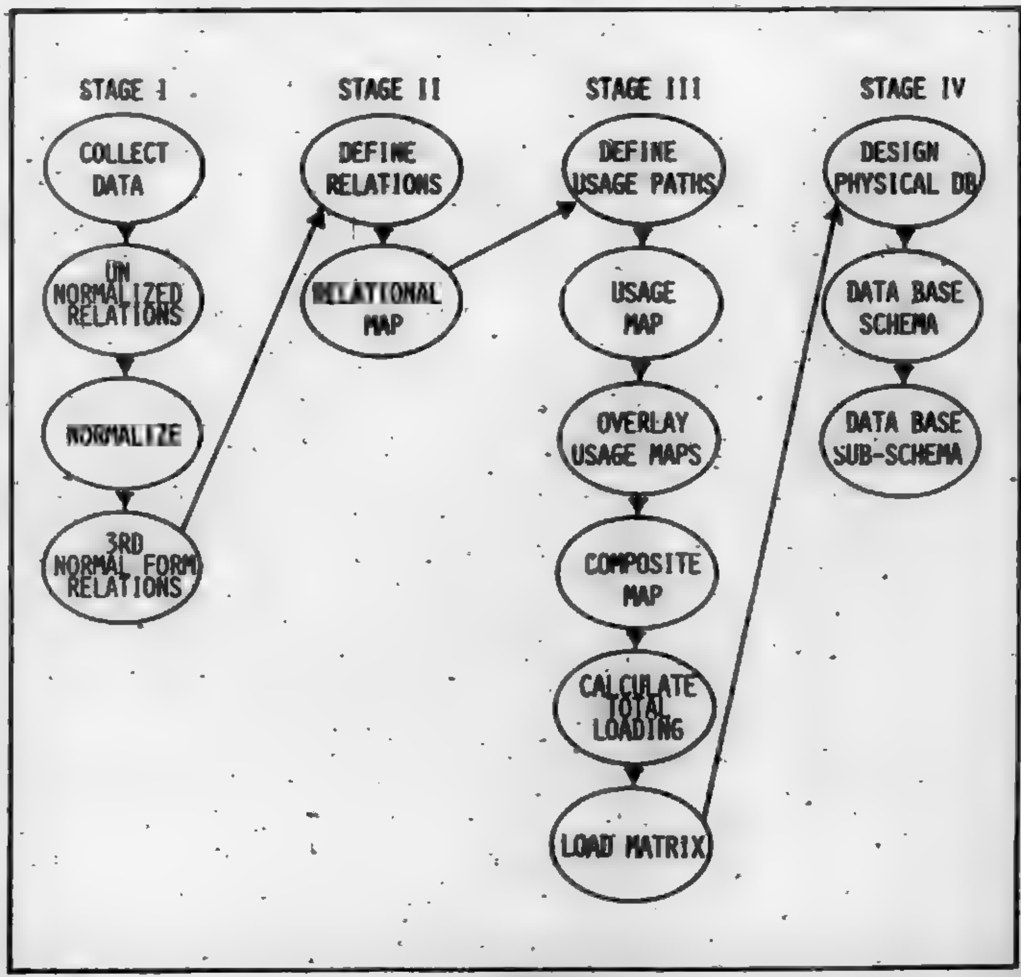
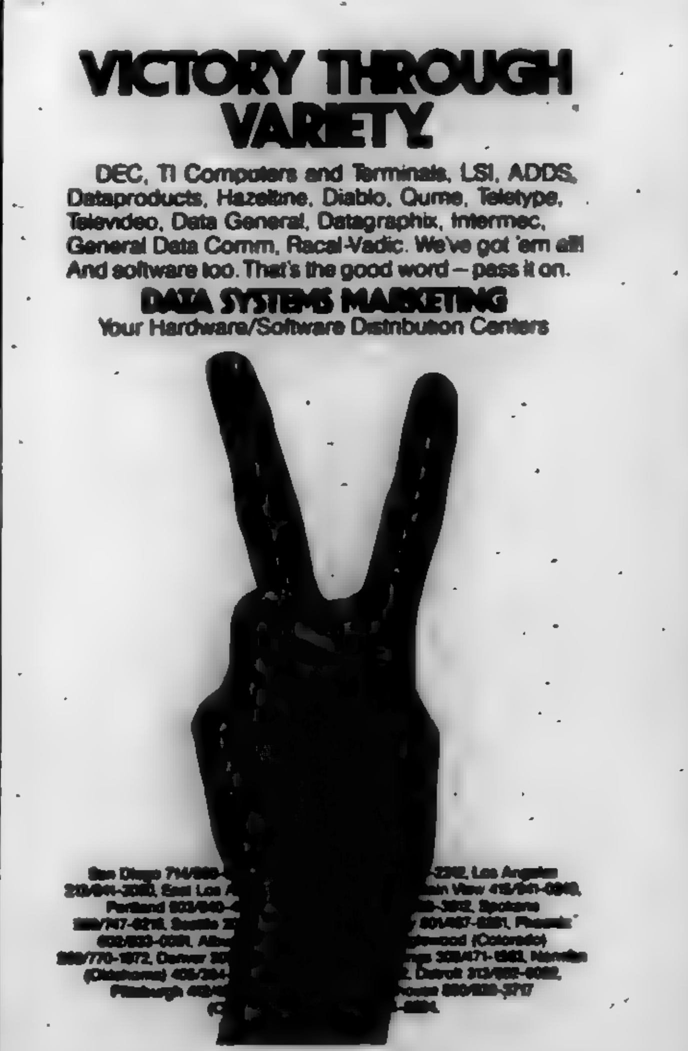


Figure 2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(Oklahoma) [illegible] Detroit [illegible]
Pittsburgh [illegible]
[illegible]

Foresight Keeps DBMS Design on Right Track

(Continued from SR/7)

normal form. Normalization is a step-wise refinement of an entity — a collection of associated fields — into multiple, stable, logical data units. Stable data units promote data independence, are minimally affected by change and are essential to good data base design!

Figure 1 is a sample order form for the E-Z Chair Company. This example provides us with a preliminary order entify consisting of the following unnormalized relations:

ORDER — (ORDER NO., CUSTOMER NO., ORDER DATE, CUSTOMER'S NAME, CUSTOMER ADDRESS, DELIVERY ADDRESS, DELIVERY DATE, *PRODUCT NUMBER, PRODUCT NAME, PRODUCT QUANTITY PRODUCT UNIT PRICE, ORDER SALE PRICE,* CUSTOMER DISCOUNT RATE ORDER TOTAL PRICE.)

The italicized fields are product values which recur throughout the order.

Through analysis of the physical order form we have produced the unnormalized ORDER entity.

FIRST NORMAL FORM requires the identification of repeating groups. Therefore, the first rule of normalization is to remove repeating groups into a new entity.

In this example, we have *PRODUCT NUMBER, PRODUCT NAME, QUANTITY PRICE, TOTAL PRICE* as a separate entity LINEITEM. We must uniquely define each entity occurrence of LINEITEM. PRODUCT NO. alone is not sufficient to uniquely qualify LINEITEM. There is no way to identify the parent order for each product quantity ordered — that is, to differentiate it from other lineitems on other orders. In order to uniquely identify LINEITEM we require a compound key of ORDER NO. and PRODUCT NO.

Thus, the two entities, ORDER and LINEITEM (ORDERED-PRODUCT), can be illustrated as follows:

ORDER: (ORDER NO., CUSTOMER NO., ORDER DATE, CUSTOMER NAME, CUSTOMER ADDRESS, DELIVERY ADDRESS, DELIVERY DATE, CUSTOMER DISCOUNT RATE, ORDER TOTAL PRICE.)

LINEITEM: (ORDER NO., PRODUCT NO., PRODUCT NAME, QUANTITY, UNIT PRICE, TOTAL PRICE.)

SECOND NORMAL FORM, the next step in the normalization process, calls for identifying those attributes which are only partially dependent on the primary or compound key of the entity in which they reside. Thus, the second rule of normalization is to breakout attributes which are only partially dependent on the primary key or primary compound key into a separate entity.

Let's apply this rule to the two entities we have extracted in first normal form. In the ORDER entity, none of the attributes is partially dependent upon the ORDER NO. key; they are all descriptive of this order.

However, the LINEITEM entity is another matter. This ordered-product entity is a compound key, and certain attributes of this entity depend solely on PRODUCT NO. Attributes such as unit price and name describe PRODUCT NO., and they are not dependent on ORDER NO. PRODUCT NAME does not change every time the order changes. Thus, a new entity call PRODUCT results from second normal form analysis as follows:

ORDER: (ORDER NO., CUSTOMER NO., ORDER DATE, CUSTOMER NAME, CUSTOMER ADDRESS, DELIVERY ADDRESS, DELIVERY DATE, CUSTOMER DISCOUNT RATE, ORDER TOTAL PRICE.)

LINEITEM: (ORDER NO., PRODUCT NO., QTY., TOTAL PRICE.)

PRODUCT: (PRODUCT NO., PRODUCT NAME, UNIT PRICE.)

THIRD NORMAL FORM, the last step in normalization, identifies those attributes in an entity which do not depend upon the primary key — whether singular or compound — of that entity, but on some other key within the entity. Thus, the last rule of normalization is to remove attributes wholly dependent upon another key within an entity into another entity.

Attributes not totally dependent on the primary key of the entity in which they reside are "transitory dependents." Customer name, customer address, delivery address and discount rate are totally dependent on the foreign key CUSTOMER NO., not the primary key ORDER NO. Therefore, remove them into a separate entity called CUSTOMER. Third normal form analysis gives us a fully normalized set of entities as follows:

ORDER: (ORDER NO., CUSTOMER NO., ORDER DATE, DELIVERY DATE, ORDER TOTAL PRICE.)

CUSTOMER: (CUSTOMER NO., CUSTOMER NAME, ADDRESS, DELIVERY ADDRESS, DISCOUNT RATE.)

LINEITEM: (ORDER NO., PRODUCT NO., QTY., TOTAL PRICE.)

PRODUCT: (PRODUCT NO., NAME, UNIT PRICE.)

By normalizing the original ORDER entity, we have four stable logical data units. Now if a product price changes, only the PRODUCT entity changes, not every LINEITEM that utilizes that product.

If the customer discount rate changes, update only the CUSTOMER entity instead of every ORDER of that customer.

Normalization is only the first stage in data analysis. Subsequently, the designer can easily link fully normalized entities together using relational mapping techniques, such as Bachman diagrams, to create a logical data model.

Then designers can apply the techniques of usage mapping — transaction analysis — load mapping and load matrix calculation to produce a logical schema suitable for converting the data model into a real data base for any DBMS on the market.

Figure 2 illustrates the remaining three stages. Space does not permit a complete breakdown of the process in this article. However, "The Handbook of Data Analysis and Data Base Design" provides sample forms and design exercises to be carried through to their natural conclusion.

The final point in data analysis and design is to thoroughly document the analysis. Keep the relational and usage maps up-to-date. Be sure to record the business functions and their analysis.

The primary concern in any design is to minimize the effect of change. Therefore, derive the logical structure of a new system from the data itself, using third normal relations.

Perkinson is a principal consultant for QED Information Sciences, Inc., an educational training and publishing firm in Wellesley, Mass.

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(Continued from SR/6)

barriers in your path.

But there is another factor often overlooked. For some reason, the installation of data into the data base of the purchased package is almost always a painful process. It is at least almost always more work, and more time-consuming, than anybody anticipated in the beginning. This is especially true if the package was purchased as a quick means of getting something on the air for a user who has virtually no prior DP experience.

So the big question in installations for this type of user becomes finding data to put into the system in the first place. The data will not be in existing systems, but rather somewhere out in the "field."

Slowly, but surely, corporate managers have begun to recognize that data base offers a long-term road to revamping the way the corporation goes about its data processing.

There is no doubt that the successful data base system project three years down the road makes the DP shop look as if a revolution has occurred. A data resource will have been created; new systems will have been built out of it; expansion of these systems will take place naturally and painlessly; the data dictionary will provide a focal point for definition and control; and perhaps most important, the new systems that emerge from all this will have a homogenous and standardized structure that makes them understandable, maintainable and, above all, usable.

These, unfortunately, are results that cannot be purchased.

Let's face it. Anything worth having a real future in the corporation requires deliberate intention, intelligence and discipline. The do-it-yourself route is the only way to get there.

Cohen is principal consultant of Performance Development Corp., a data base consulting firm in Princeton, N.J.

Recipe for Data Base

User Packages Cut System Development Pitfalls

By Harvey M. Weiss
Special to CW

System development failures have been a common event since computers became a part of systems design. The reasons for failure can be traced to a number of factors:

- The average DPer is not fully educated in the system being designed.
- The average DPer considers the system to be only the automated portion of what is being developed. Little concern is given to the total user environment and how the computer portion fits into the total system design.
- The DPer believes the user cannot define system requirements, and so performed this task himself, usually incorrectly.
- When systems development time frames are too long, requirements are likely to change during the development cycle, and thus delay system delivery.
- Many systems are too big to be completed soon enough to be useful before modifications become necessary.
- System flows are often developed that define the systems' components in such an integrated fashion that modifying one component without requiring additional changes to the others becomes impossible.

The question of how to design, develop and implement computer-based systems without running into these problems becomes even more important when a data base management system (DBMS) is involved. DBMS is often considered the solution to a company's information storage needs and developing corporate management information systems (MIS), then, becomes a common project. However, DBMS system devlopment failures also are common and more apparent to everyone since these projects often involve large staffs, many systems and a long delivery cycle.

What is required to successfully develop computer-based data base systems, is the ability to:

- Define user requirements in terms of specific products or services rather than in terms of the sum of these products or services.
- Develop the components of the system separately rather than as a total package of products.
- Coordinate systems development on a product-by-product basis, rather than on a system-by-system basis.

DBA and DA

A step in the right direction came when the DP community identified a new organizational position, the data base administrator (DBA), and a new function, data administration (DA). The DBA assumed the responsibility and the control of corporate data, including its definition and usage. Now, here was an opportunity for DP organizations to use data base technology to view systems development in a new light.

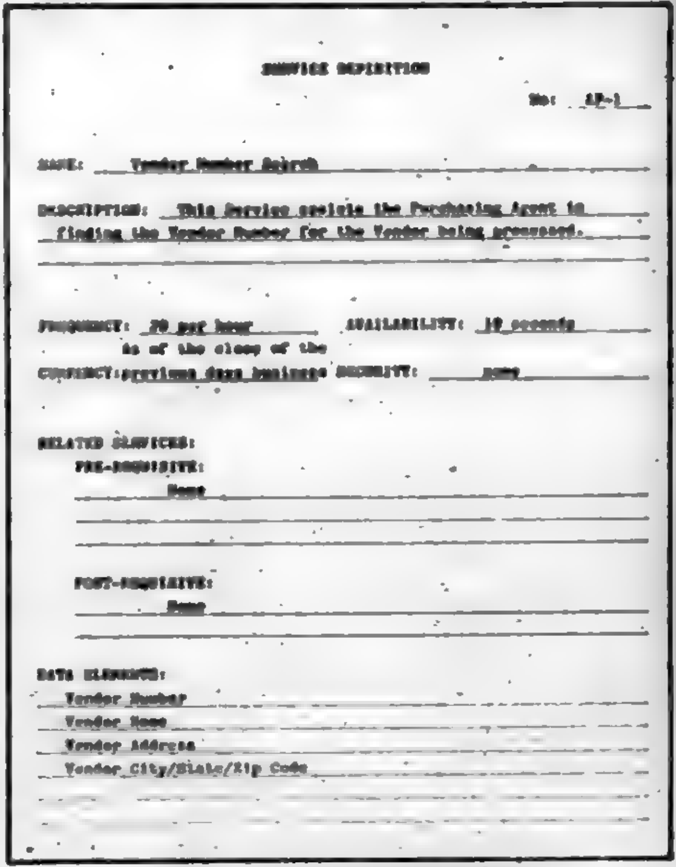
Yet, in many organizations, this position and function was given little, if any, authority to control data or the development process. Further, the person fulfilling the DBA role often brought to the position traditional systems design concepts, and so did not view data base design as anything other than the development of another file access method.

These two factors caused the DBA function to evolve into a passive position — go for data definition but don't control the data base system development process.

Data bases were created by application programmers at will, with little regard for a standard data base development methodology. No visible change to the traditional system development life cycle appeared as data base design projects grew. And the result was an improvement in data control, but not in the crucial area of systems development.

A breakthrough toward improving system development occurred when a methodology was implemented to identify the attributes of each product in a data base system. This process, appropriately, has been called service analysis[1]. Service analysis creates a product that identifies the ultimate deliverable and its at-

(Continued on SR/10)



SERVICE DEFINITION

No: AP-1

NAME: Vendor Number Search

DESCRIPTION: This Service assists the Purchasing Agent in finding the Vendor Number for the Vendor being processed.

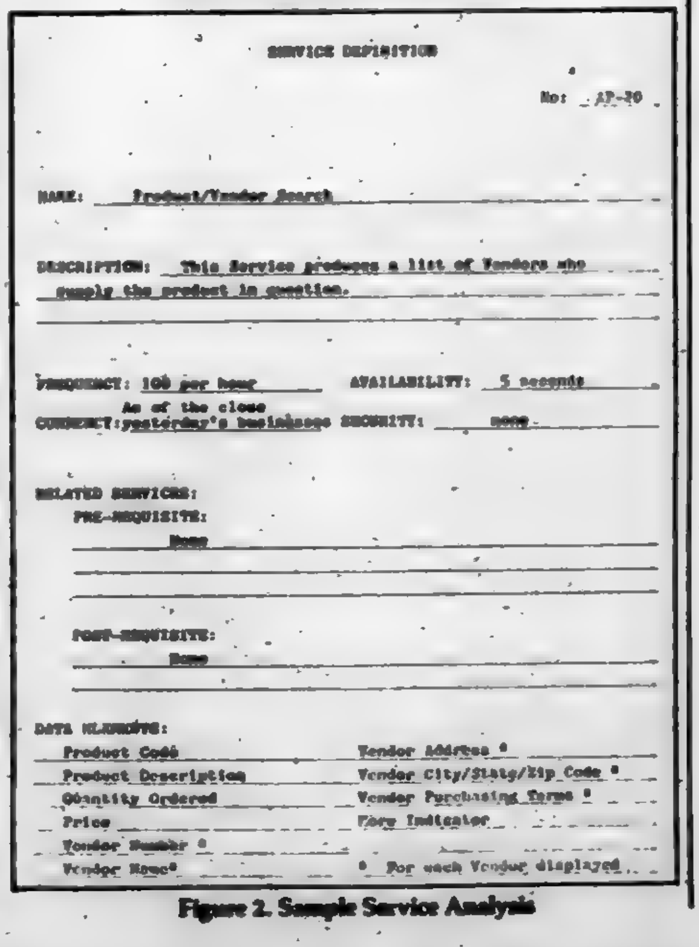
FREQUENCY: 20 per hour AVAILABILITY: 10 seconds

CURRENCY: As of the close of the previous days business SECURITY: none

RELATED SERVICES:
PRE-REQUISITE:
None
POST-REQUISITE:
None

DATA ELEMENTS:
Vendor Number
Vendor Name
Vendor Address
Vendor City/State/Zip Code

Figure 1. Sample Service Analysis



SERVICE DEFINITION

No: AP-20

NAME: Product/Vendor Search

DESCRIPTION: This Service produces a list of Vendors who supply the product in question.

FREQUENCY: 100 per hour AVAILABILITY: 5 seconds

CURRENCY: As of the close yesterday's businesss SECURITY: none

RELATED SERVICES:
PRE-REQUISITE:
None
POST-REQUISITE:
None

DATA ELEMENTS:
Product Code
Product Description
Quantity Ordered
Price
Vendor Number *
Vendor Name*
Vendor Address *
Vendor City/State/Zip Code *
Vendor Purchasing Terms *
Fore Indicator
* For each Vendor displayed

Figure 2. Sample Service Analysis

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(Continued from SR/9)

tributes, including:

- Data elements required by the service.
- Estimated volume of the service, in terms of the number of times it will prepare per standard unit of time.
- Estimated time for its delivery (response time), in terms of a standard unit of time.
- Preceding services
- Succeeding services.
- Security, audit and processing characteristics.

Figures 1 and 2 illustrate the types of data obtained during this service analysis effort.

This philosophy allowed the data base system designer to relate the ultimate user requirement to database processing on a product-by-product basis. The significance service analysis had to the system development process was lost, however, because the methodology addressed only the analysis phase. No data base system development plan could be found for implementing services — only for implementing the system in which the services resided.

What is needed, then, is to modify the data administration function to include the service analysis methodology. In addition, the data administrator's job description should reflect the responsiblity for data base development. This would assure that:

- A standardized methodology for data base processing be established and maintained in one group.
- Data base design be centralized also within one group to ensure that system development enhanced rather than hindered the DP facility's ability to meet development schedules and processing requirements.
- Systems as defined under this data base/data processing philosophy not become the cumbersome objects they were under traditional system design philosophies.

User Orientation

The result is a user-oriented data base/data processing methodology whose object is to design and, if necessary, modify the computer-based portion of the total system so that products can be delivered to the user quickly and accurately. To do so requires the following alterations.

A DP organization so designed to meet users' needs is shown in Figure 3. The diagram identifies the systems group as the organization responsible for performing service analysis. The product of this effort, the service analysis document, is then delivered to the data administration group, whose responsibility would be to design the required data base, establish the deliverables and develop the data base access processes.

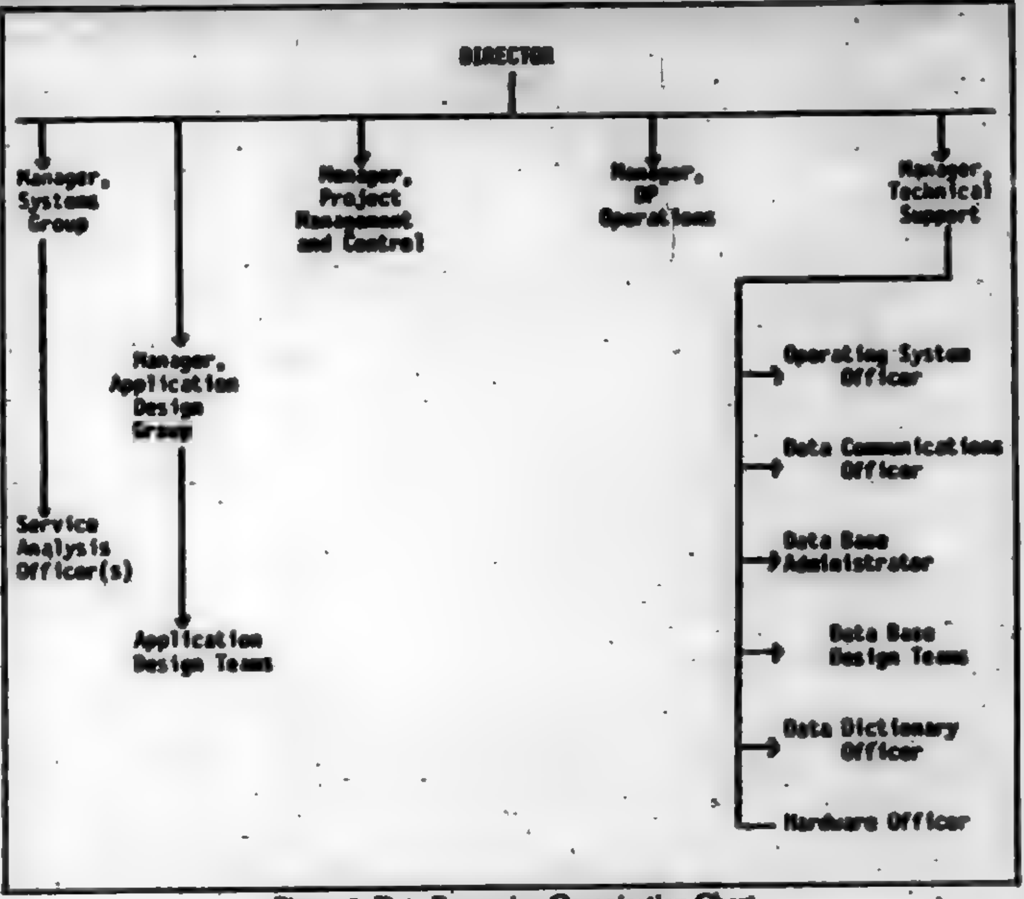


Figure 3. Data Processing Organization Chart

The third group, the application design team, would be responsible for developing the code and procedures for the deliverables, as described by the data base administrator and the data base design teams.

The technical support organization serves as the primary control group for data base development. Technical support will receive user requirements for DP support and direct the systems group to perform service analysis. (This includes the cost/benefit analysis normally performed to determine if automation is justified.)

The technical support group could utilize the expertise it gains in data base, data communications, operating systems and hardware to develop the user deliverable packages. Implementation would then be controlled by the project management group.

An example of such a set of user deliverable packages is shown in Figure 4. The package could be defined by using the data dictionary, service analysis documents and tools such as an information flow analysis document and logical data base architecture document. Knowledge of current data usage, data base access methods and data bases currently in place is critical to this effort

Activity: Accounts Payable*

Package One:	Vendor Inquiry
Services:	Vendor Number Search
	Vendor Identification Search
	Vendor/Product Search
Package Two:	Purchase Order Processing
Services:	Product/Vendor Search
	Purchase Order Inquiry
	Purchase Order Entry
Package Three:	Purchase Payment Processing
Services:	Individual Vendor Payment Request
	Cash Requirements Report
	Check Writing Process
	Check Reconciliation Process

* A partial list of Packages/Services for example purposes only

Figure 4. User-Deliverable Package

Once Defined

Once the package is defined, the data base design team and the application design team can begin work. The data base design team's role will be to develop and modify those data base processing routines required for the package. The application design team's responsibility would be to develop and modify those applications programs needed to process the package's required data.

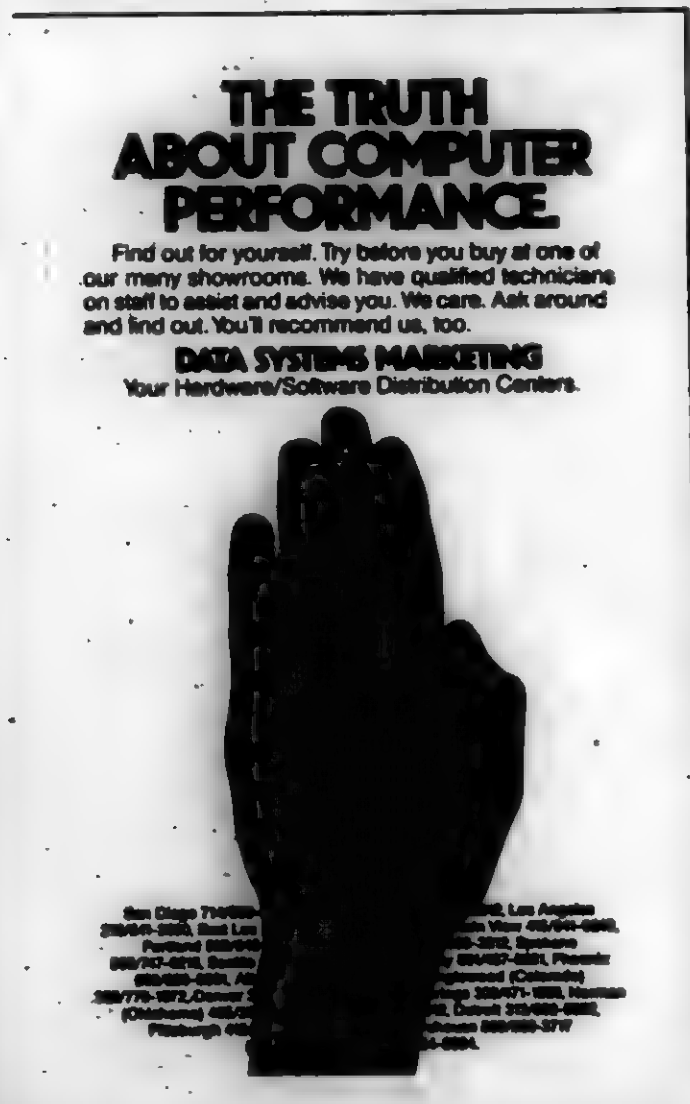
The fruits of these efforts are, first, a set of data base processing functions — data base calls — developed and controlled by a group familiar with the corporate data elements, the data bases in which they reside and the level of effort needed to implement new processes or changes to meet user requirements.

A second result is a unit of work — the user package — that addresses one specific user requirement and can be developed or changed at will without affecting other requirements or packages.

The third product of these labors is a set of application programs free from the intricacies of the data base processing activity that is developed and controlled by a group familiar with the package's processing requirements and capable of modifying the programs quickly and accurately.

Now with a standard set of data base calls, the technical support group could manage user changes to the data base processing portion of the system, while the application design team could manage user changes to the processing programs.

Weiss is president of Weiss & Associates, a management consulting firm in Aurora, Colo.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For Tried and True Strategy

Data Base Planning Entails Return to Basics

By Dr. Robert H. Holland
Special to CW

Various well-conceived processes are available for systems planning, but very few exist for data base planning, one of the most critical areas in corporate planning today.

Companies all over the world are struggling with the development of data base plans, and while a few learn to do it correctly and reap great rewards, others fail miserably in their search for the "holy grail."

How, then, can organizations lay the foundation for a tried and true data base planning strategy?

The foundation of both systems and data planning is the business plan. Business planning produces information about the following items:

- Business growth expected.
- Diversification of products and services.
- Reorganization of business functions.
- Acquisitions planned.
- Changes in operating philosophy.

> *'Companies that do not superimpose a data model of the company over their systems plan are throwing money away . . . Many war stories about failures in data base exist in the industry.'*

Any business organization may be generally viewed as depicted in Figure 1. In this diagram all the business functions are represented in the broadest sense. Arrows between the major business functions indicate information flow and dependency between the various functions of business.

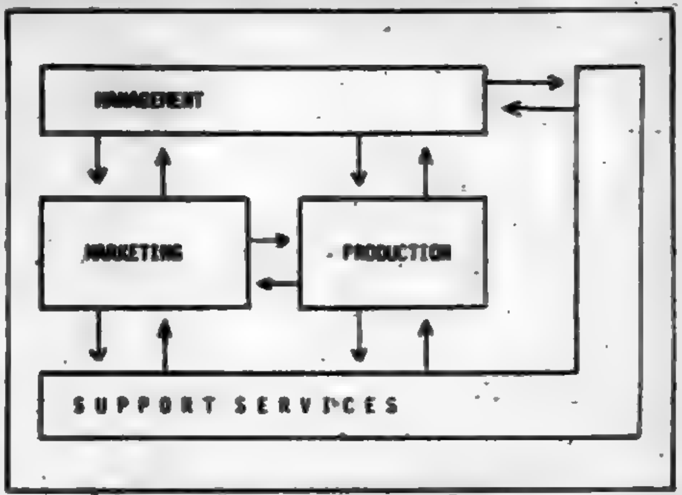
MANAGEMENT
MARKETING
PRODUCTION
SUPPORT SERVICES

Figure 1. Overview of Business Functions

Business Systems Planning

Many companies have developed their own business systems planning methodology. Even the mainframe computer vendors have developed such methods to support their clients. IBM, for example, supports its clients through Business Systems Planning.

The major thrust of such methods is to integrate business plans with systems plans in order to generate priorities, schedules and resources required for major systems development efforts. Corporate experience has shown that one serious omission, leading ultimately to operating discrepancies, is the lack of a data model of the corporation. No data model leads to:

- Ill-defined systems projects.
- Fuzzy thinking about data base planning.
- Sets of independent data bases which cannot possibly be integrated.
- Continuous restructuring of data bases and application programs. This is called "maintenance" in most companies, and often comprises 80% of the data processing dollar.
- Isolated applications which cannot be easily combined with others within a reasonable development horizon.

In short, companies that do not superimpose a data model of the company over their systems plan are throwing money away.

The objective of the data planning and modeling process is to provide a subject data base plan for the corporation. Many war stories about failures in data base exist in the industry, primarily because of a lack of data planning.

Data planning requires the development of a data model which must be fully integrated with the systems planning process. Figure 2 shows how the pieces of the puzzle fit together. In this strategic planning process the business plan feeds the business systems plan, which in turn develops requirements for the data base plan.

Under the business systems plan we develop a description of each business process, the activities which occur under the process and supporting

(Continued on SR/12)

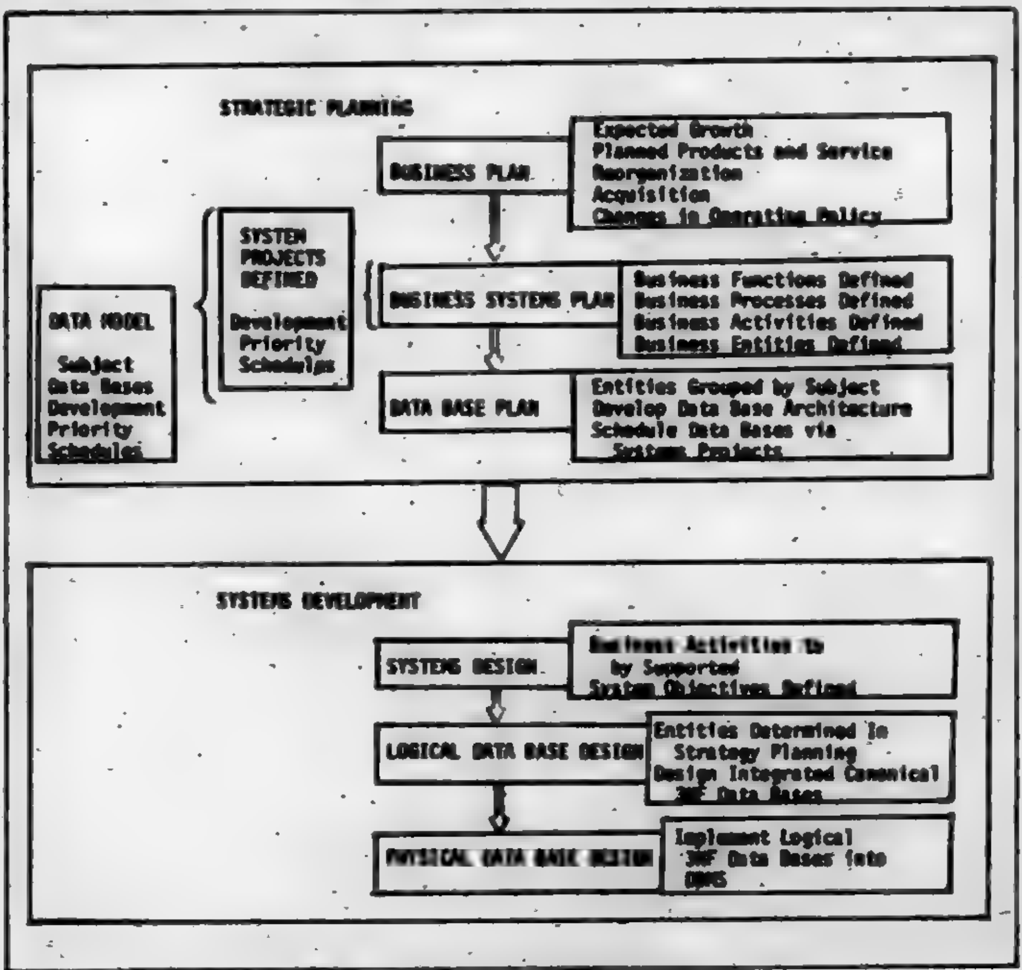
STRATEGIC PLANNING
BUSINESS PLAN
Expected Growth
Planned Products and Service
Reorganization
Acquisition
Changes in Operating Policy
DATA MODEL
Subject
Data Bases
Development
Priority
Schedules
SYSTEM PROJECTS DEFINED
Development
Priority
Schedules
BUSINESS SYSTEMS PLAN
Business Functions Defined
Business Processes Defined
Business Activities Defined
Business Entities Defined
DATA BASE PLAN
Entities Grouped by Subject
Develop Data Base Architecture
Schedule Data Bases via
Systems Projects
SYSTEMS DEVELOPMENT
SYSTEMS DESIGN
Business Activities to
by Supported
System Objectives Defined
LOGICAL DATA BASE DESIGN
Entities Determined In
Strategy Planning
Design Integrated Canonical
3NF Data Bases
PHYSICAL DATA BASE DESIGN
Implement Logical
3NF Data Bases into
DBMS

Figure 2. Overview of Data Modeling

Business Function:	PRODUCTION
Business Process:	MANUFACTURING PRODUCT "A"
Activity:	DETERMINING QUANTITY PURCHASING RAW MATERIALS SCHEDULING PRODUCTION DETERMINING PRODUCT SPECIFICATIONS
Entity:	CONTRACT PRODUCT EMPLOYEE SUPPLIER INVENTORY

Figure 3

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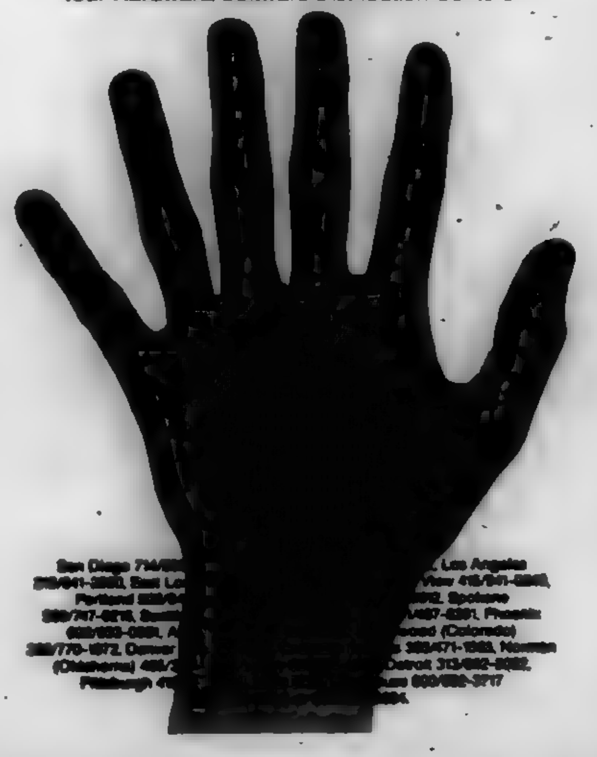

Crawl Before Walking in Data Base Planning

(Continued from SR/11)

entities for the activities based on the business functions defined in Figure 1. For example, these terms might be determined for a production function, as in Figure 3.

Industry experience has shown that most companies define approximately 25 major systems projects from their BSP effort. After determining that the resources are not available to concurrently tackle 25 systems, they normally settle on half of those for concurrent project team development. This is a mistake. The majority of companies should only have three or four systems development efforts under way at any point in time.

The data model consists of establishing the entities necessary to support business activities and, in turn, processes. Entities should be thought of as an information group needed for a business activity. Both systems projects and the data model are passed to the actual systems development process once the strategic planning is complete.

Systems Development

As shown in Figure 2, three major design efforts occur during systems development. The systems design effort is bounded by the set of activities defined in the strategic planning process.

It is not unusual in medium to large corporations to find that several systems projects have been established with the same objectives. This results in wasted resources that could have been directed toward the achievement of other systems objectives. Therefore, one purpose of the strategic planning process is to define the blocks of business activities that represent the support requirements of an information system.

The logical data base design effort that occurs during systems development is bound by the business activities, entities and data base plan developed during strategic planning. This process requires detailed analysis to establish the inter- and intraentity relationships which formulate the logical data base design.

Data Architecture

There are 12 steps necessary to complete a data architecture. First, represent the organization as business functions at the highest level possible — for example, production, marketing, management, support service.

Second, identify the business processes and activities that occur within the business functions described in Step 1. (Activities within processes within functions.)

Third, establish specific decisions, questions, transactions and informational education required in each of the activities described in Step 2.

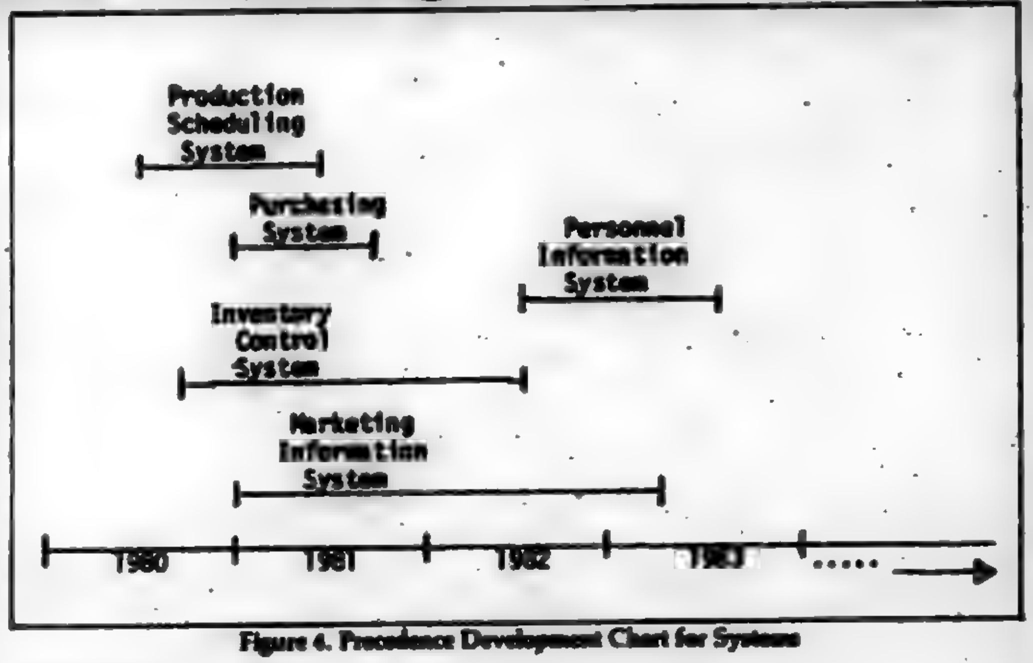

Figure 4. Precedence Development Chart for Systems

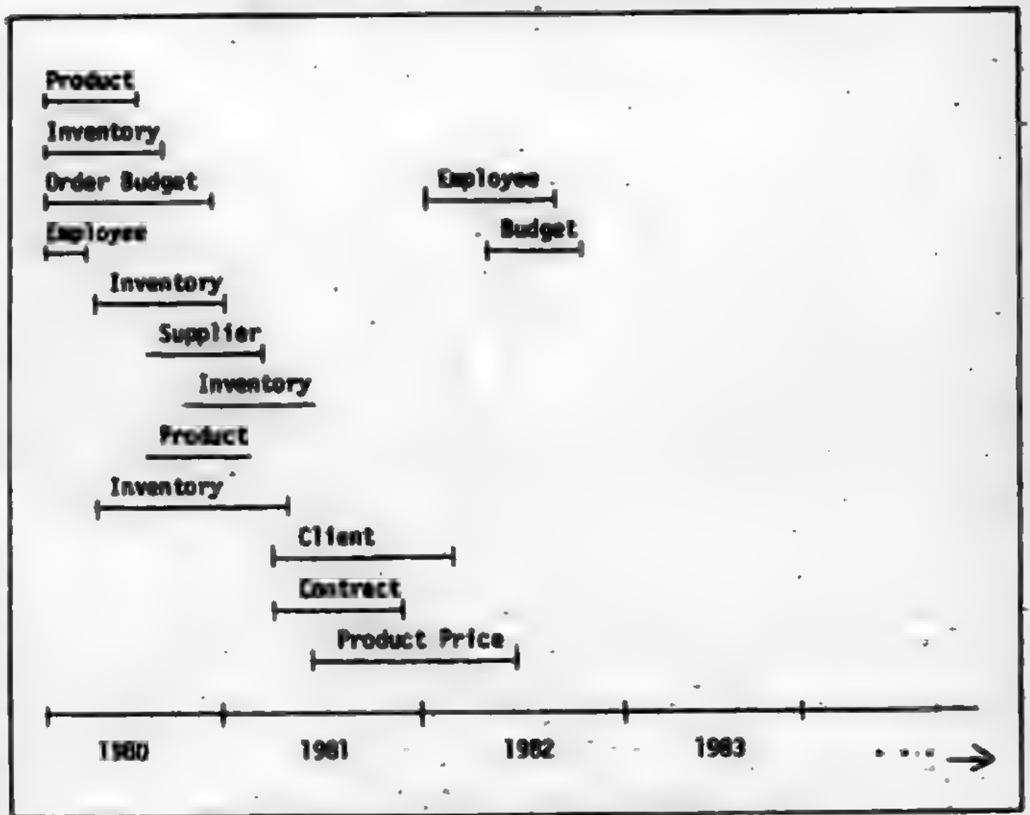

Figure 5. Precedence Development Chart for Data Bases

Fourth, determine the entities required to support the business function activities (by decisions, questions, transactions, and informational education) developed in the previous steps.

Fifth, develop a set of entity matrices to display the information developed in the previous steps. The necessary matrices are as follows:

- Business Function Decisions vs. Entities.
- Similar Decisions vs. Entities.
- Business Function Questions vs. Entities.
- Similar Questions vs. Entities.
- Business Function Transactions vs. Entities.
- Similar Transactions vs. Entities.
- Information Education for Management and Control vs. Entities.
- Business Function Supplying vs. Entities.
- Business Function Changing vs. Entities.
- Business Function Deleting vs. Entities.

Sixth, group and name related activities by business function into systems projects with well-defined objectives — for example, which activities will be supported by each systems project. List these projects by name.

Seventh, determine a priority of development for the systems projects determined in Step 6. Show the result of steps 6 and 7 in the form of a precedence development chart, as in Figure 4.

Eighth, group the previously defined entities into related subjects necessary to provide the data to support the activities that occur in each of the systems projects defined in previous steps. The matrices developed in Step 5 will aid in completing this step.

Ninth, establish data base names for the subject entity groups determined in Step 8.

Tenth, determine the time requirements for developing each system defined in previous steps. Display the result of this step as a precedence development chart.

Eleventh, develop a set of data base matrices which indicates their association with systems projects. They are as follows:

- System Project vs. Supporting Data Base.
- Systems Data Bases by Systems Project vs. Entities Required.

Last, complete the association of subject data base development to systems projects by drawing a data base precedence development chart over the planning horizon of the systems projects, as shown in Figure 5. Thus, the chart developed in this step must be coordinated with the one developed in Step 10.

This step displays the time frame for data base development. Previous steps establish the subject entities necessary for business process support. As a result, the company has a set of interrelated data bases that will evolve to the future support of all systems. A data architecture is provided for future building of data structures.

Systems projects are defined and resources must be allocated for systems development as a result of the above steps. Many corporations attempt the development of 10 to 13 systems projects concurrently. This represents the impossible since most companies do not have the resources to attempt such an effort.

It is generally recommended that a company attempt no more than three to four concurrent developments of systems. Looking at Figure 4, you will note that through 1983 a maximum of three systems are being designed at the same time.

However, upon inspection of Figure 5, you will note that more than three subject data bases are being designed within the same time frame. All such designs must be funneled through and controlled by data administration and data base management in order to be successful.

Strategic Plan

Some organizations today are not developing a strategic plan for data bases. Only luck and a static business environment will save these companies from ultimate loss of data base integrity.

Many corporations do recognize the significance of a business systems plan; however, they do not realize that they must also have a data base plan.

Using a systems plan without a data architecture will lead to application-oriented data bases and force the corporation to spend approximately 80% of its DP dollar on "maintenance."

A very few organizations are superimposing a data architecture model over their business systems plan. These are the electronic organizations of the future that will significantly reduce their maintenance costs, provide program and data independence, add new applications with ease and enjoy an effective user environment.

Through strategic data base planning and designing normalized data bases, we will finally enjoy the true advantages promised by the data base environment.

Holland is president of Database Design, Inc. in Ann Arbor, Mich.

Survey of Users Turns Up Range Of Strategies For Data Base

By Jeffrey A. Hoffer
Special to CW

Many information system professionals feel that a data base is essential for the realization of a true management information system (MIS). If this is so, proper data base design methods are necessary for the delivery of an efficient and effective MIS.

Proper data base design goes beyond the mere mechanics of file design. It also includes roles for various individuals in the design process and a recognition of the redesign process.

In an effort to better understand this process for inverted file data bases, 71 users of six data base management systems (DBMS) with secondary indexing capabilities participated in a survey. Questionnaires were completed by individuals with MIS positions ranging from data base administrator to MIS manager to programmer. The results indicate a wide range of experience, data base design strategies and perceptions among the surveyed firms. (A comprehensive review of this study is contained in "Methods for Primary and Secondary Key Selection," QED Information Sciences, Inc., Wellesley, Mass., Monograph No. 9, 1980.)

What to Index?

The primary decision to be made in designing an inverted file is what to index. Who has the proper information to make this decision?

The accompanying table (with results for Software AG's Adabas, Applied Data Research, Inc.'s Datacom/DB, Computer Corp. of America's Model 204 and Intel Corp.'s System 2000) indicates that individuals close to and including the user are most likely to identify and select keys for indexing. However, for users of Model 204, the technical expertise of systems programmers is also sought.

A more detailed analysis of the survey data indicated that the most likely team for data base design was the systems analyst-user pair. Further, this same data showed that this analyst-user team preferred, more than other possible teams, *not* to seek the advice of systems programmers.

Data base design does not occur once; rather, useless key indexes are purged, new indexes are created and temporary indexes are created to meet transient needs. Data base design, then, is an adaptive and evolutionary process.

More than half of all those surveyed indicated that they systematically redesign their data bases by purging indexes that are no longer necessary in order to conserve file space. Index purging was most popular among System 2000 users, where even infrequently used indexes were deleted.

New Indexes

Even more popular (more than 66% of those sampled) is the creation of new indexes after the data base goes into operation. Frequently this is done to meet an originally unanticipated data selection requirement, although general data base access performance improvement also contributes. Again,

(Continued on SR/18)

WHO IDENTIFIES POTENTIAL KEYS

% of Respondents Where Particular Job Categories Are Identifiers of Potential Keys

Person Identifying	ADABAS	Datacom/DB	Model 204	System 2000	All Respondents*
Data Base Administrator	83.3	61.9	40	62.5	62
Systems Programmer	5.6	47.6	100	12.5	22.5
Application Programmer	44.4	38.1	40	37.5	40.8
User	61.1	52.4	70	56.3	54.9
Systems Analyst	94.4	90.5	90	93.8	85.9

*These figures include data from users of two other packages which, individually, had too few responses to be analyzed separately.

Survey Results on Key Selection

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Basis for Comparison

Proprietary Software Often Right for DBMS

By Phyllis R. Briller
Special to CW

If you have an application that requires processing under a data base management system (DBMS), the proprietary software industry can frequently provide the system to satisfy your application. The basics of the application and the technical architecture can be explained in a few hours by a competent vendor sales representative.

There are a few critical areas that might provide a meaningful basis on which to compare the several DBMS products on the market that appear to fit the application.

Look for "all-purpose" design criteria which can be readily redefined for specific usage — those needs defined today and those that are deemed necessary a few years from now. Examples of this include:

- Multipurpose keyed segments. The ability to easily redefine a segment and edit the incoming data based on the segment key adds a dimension of flexibility to the type of data that is to be retained.
- Exit Routines. A well designed system plans for the norm and anticipates the unexpected. Exit routines are a means of achieving that special calculation or of reading that extra file that makes your environment so special. Look for a vendor who builds into DBMS design specific places to exit from the mainstream programs, allowing you to satisfy your own requirements and then return.

Proper use of this aid should not degrade system performance and will not require the technical staff to unnecessarily touch — that is, reprogram and test — the vendor's system.

- Directories. Look for a balanced usage of directories, tables and other user convenience tools. A directory will allow the application user to define many criteria in the system. If well designed, this eliminates hours of programmer maintenance on a continually changing system. If poorly designed, it can degrade processing time because the system is continually looking up user-defined criteria in tables peripheral to the mainstream processing.

Evaluate the purpose of the documentation that is supplied with the programmed DBMS. Good documentation defines the commonly accepted DBMS vocabulary in the terms of the specified application. Manuals should be written on two levels.

One level is for the application specialist, who is rarely conversant in DBMS jargon and requires computer assistance only to achieve his performance evaluation on the job. This means that DBMS user documentation must address the needs of the application; it should offer illustrations, examples and suggest alternate or additional ways of using the system.

Look for instructions that can step the newly hired input clerk through a transaction and augment a harried supervisor, under pressure to meet a deadline in the wee hours of the morning.

Insist that user documentation define applicable DBMS jargon and discuss the advantages and limitations of the system's architecture on a level that the user can understand.

The second level is for the data base administrator (DBA) and the application technical support staff, who are entitled to an overview of the application, comprehensive flow charts and program listings in addition to program narrative.

Look for helpful hints in the narrative. If a vendor's technical writers have hands-on experience, they will anticipate the potential enhancement of the system and include directions and suggestions. Inspect the program listings for similar comments sections.

Original Design

Investigate the purpose of the application's original design. The analysis, development, testing, documentation and marketing of a comprehensive product requires substantial financial commitment over several man-years.

An application that was designed in a vacuum or, conversely, designed around a specific industry may prove too limiting as a general purpose product and impossible to retrofit in your custom environment.

Determine that the preprogrammed product makes the best use of technologies available under DBMS for your application. The bells and whistles and hoopla that accompany the announcement of a DBMS release are enticing and meet the criteria of some applications.

But scrutinize the bells and whistles in the vendor's product to determine that they are required on the application, that any peripheral equipment can be cost-justified and that programmer maintenance loads will not be impacted by unfamiliar techniques or volatile programs.

Consider the long-range plans in DBMS evaluation — to the extent that they can be predicted — and determine that this corresponds to your firm's long-range goals. Consider the ease or difficulty of converting the vendor's file structures from the DBMS under consideration to another DBMS that may be a replacement within a few years.

(Continued on SR/18)

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Proprietary Software Can Fill DBMS Needs

(Continued from SR/15)

An aid in this evaluation might be to determine the degree of modularization employed in the design. A good system designer can extract sections of the overall architecture to meet a specific application without impinging on the integrity of the remainder.

Conversion of a module from one DBMS to another — however monumental that task may be — is infinitely simpler than attempting the conversion of a major system in toto.

Investigate the DBMS development history — the pedigree of the vendor. Weigh equally the applications and the data base experience of the firm. Its data base commitment should represent a substantial percentage of a research and development budget.

Determine also its commitment to adjunct state-of-the-art development — such as on-line terminal access and distributed processing — which is indicative of the interest of the firm in maintaining a strong leadership.

Is your firm honestly prepared for a data base management system? Is there DBMS management experience in-house? Determine, in the evaluation, the extent of a vendor's commitment to training the firm's staff.

The vendor may be ready, willing and able to assist in the implementation and operation of its system, but may draw the line at developing your in-house operating procedures or writing the job description for the DBA.

Other Questions

Other questions to ask: Is the preprogrammed system so designed as to be compatible with existing systems in-house? Are the DBMS technologies consistent with those already in operation? What has been the firm's success rate in modifying DBMS programs to run compatibly?

And finally, investigate a continuing working relationship with the vendor. Will you invalidate the warranty if you modify your version of its product? Look into a commitment that the vendor's technical staff will be available to you during installation, modification and during the first crucial months of operation.

During the two to five years after installation, if your firm follows a typical pattern, modifications and enhancements will be system requirements. Without a doubt, there will also be support staff turnover.

Retraining Ability

Investigate the ability — and the past performance — of the vendor to retrain staff and to consult with the technical group on the impact of additional changes.

Choosing a preprogrammed product for a specific environment is never a simple task. The complexities of a data base management system impact further on the requirements.

After convincing your user that the application needs can be satisfied, verifying the integrity of the design concept and determining that the quality of the programs meet your firm's internal standards, satisfactory answers to these additional criteria will assist in selecting the system for your application.

Briller is special projects consultant for Information Science, Inc. in Montvale, N.J.

Survey Shows Data Base Strategy Range

(Continued from SR/15)

dynamic index creation was most popular (93%) among System 2000 users; 90% of Model 204 users actively create new indexes.

The temporary creation of indexes is not, however, very popular, cited by only 14% of the sample. When it does occur, it meets a one-time requirement such as an infrequent report, access to a sample/test data base or to sort data.

Design Parameters

In general, the survey results indicated that keys and associated indexes are usually chosen early in information systems development, when the user is still closely associated with the project. Although no one criterion dominated consideration of indexes at that time, various index maintenance costs were important. Surprisingly, fully indexing on all possible keys was very unpopular — only one surveyed firm claimed to do this — even with the significant user involvement. Also surprising was that more than half of the sampled users said that ease of programming was a major reason indexes were created.

Design Information

Finally, information for data base design is primarily drawn from experience and intuition. The most popular source of objective information was vendor-supplied manuals. Although several data base management texts were referenced, no "frontier" sources — monographs, scholarly or society publications, for example — were mentioned.

The survey has shown that, for one type of DBMS, data base design is adaptive, ongoing and utilizes much user and experiential data. It is conservative in that maintenance costs are important.

Yet, approximately 50% of those sampled were discontented with current data base design practices and sought more systematic manual or automated tools to assist in the process. The tools described in published literature have not, in great measure, been utilized.

Hoffer is an associate professor of operations and systems management in the School of Business at Indiana University, Bloomington, Ind.

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Learning the Hard Way

Dictionary Needed Before DBMS Conversion?

Special to CW

SAO PAULO, Brazil — Should a user acquire a data dictionary before installing a data base management system (DBMS)?

Yes, said Jair Rodrigues da Silva, data base administrator at the Bank of Sao Paulo in Sao Paulo, Brazil. And da Silva is in a good position to know because his bank, otherwise known as Banespa, did the opposite. It acquired IBM's IMS DBMS first and then purchased Data Catalogue 2 from Synergetics Corp.

If Banespa had taken the dictionary route first, the DP department could have seen what the data really was, da Silva noted. "With the dictionary, we could have seen the uses of data and then developed standards for the users and for applications. By using a dictionary before installing a DBMS, we would have resolved the problems of sharing data."

Da Silva is a strong believer in data sharing despite the problems posed by his bank's needs for security. As it stands now, much of Banespa's data is still on a file system and not entered into the dictionary. Each file is independently owned by a different person.

While this method of ownership does solve security needs, it often produces embarrassing results. Frequently the same information is in more than one file, and when the data changes, all the related files are not necessarily updated.

As a result, different reports using the "same" information are often out of sync with each other, he noted.

Documentation Need

But it was not the conflicting reports that forced Banespa into buying a data dictionary. It was the need for documentation, a must with any DBMS, according to da Silva.

At first, Banespa — an operation with 400 bank branches, a central DP department, 10 satellite installations and a DP staff of 500 — tried to develop its own dictionary. The attempt was unsuccessful, and the in-house product was never used.

Realizing the need to purchase a dictionary, da Silva headed a study of five dictionaries: IBM's dictionary for IMS, Pride-Logik from M. Bryce & Associates, Inc., Lexicon, Cullinane Corp.'s Integrated Data Dictionary, and Data Catalogue 2.

The IBM dictionary was difficult to use, according to da Silva. Its tie-in to IMS created problems. At the time, Banespa was having difficulty with IMS and was considering switching to Adabas, a change that would require purchasing a new dictionary.

Independent Dictionary

In the area of independent dictionaries, da Silva noted that to install Lexicon at Banespa, a consultant would have to be hired. It was an option the bank wanted to avoid, he explained.

As for Pride-Logik, it lacked an IMS interface when the matter was under study over a year ago, and used a difficult methodology, da Silva recalled.

In the end, Data Catalogue 2 was selected because it is an independent dictionary that supports IMS and because it is very easy to use, he noted.

Once Data Catalogue 2 was installed, the decision was made to enter only DBMS applications into the dictionary. The standard file applications were overlooked at this step because they were, in general, nearing the end of their life cycles.

No Data Changes

The DBMS information was entered without making any changes in the data, da Silva explained, adding, this task is nearing completion. The next step calls for developing and implementing standards for data names, lengths, use of dates and job counts, if management approves of the project.

Once the plan is approved, the data bases will have to be changed accordingly. But this step could have been eliminated if the dictionary had come before the DBMS.

The dictionary system could have been used to help develop standards as a preliminary step to choosing and installing a DBMS.

At Banespa, only the data administrators use Data Catalogue 2, but da Silva expects that in the future, programmers and designers will use it as a tool in development.

Decreased Training Time

One of the side benefits of Data Catalogue 2 is a decrease in training time. While staff turnover is not as common at this bank as it is in the U.S., it does present a problem because most programs are only documented when they are first developed; therefore, updates are not generally reflected in the documentation.

If the application has been around for any length of time, new programmers must talk to the individual doing the maintenance work. Hopefully, he has some notes available, notes that are probably only on scratch paper, da Silva lamented.

Training can take up to six months, he continued, adding that for individuals learning the DBMS applications that are entered into Data Catalogue 2, training is cut by approximately 50%.

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Evolutionary Process

Data Base Viewed From a People Perspective

By Paul R. Hessinger
Special to CW

The DP manager moved cautiously down the hall of the executive office area, followed closely by a technical consultant he had hired less than six months before to analyze the direction of DP technology and what was available to help the operation of their rapidly expanding manufacturing firm.

The two men approached the secretary's desk and the DP manager asked if the president was available. "Oh yes," she replied. "He's been waiting for you — go right in." In recent months, there had been many meetings discussing the DP function between the vice-president of finance, other vice-presidents and the president. On occasion, the DP manager was invited to participate. But never had he been summoned directly to the president's office.

The fact that the president was waiting did nothing to calm the man's nervious system, especially since he was aware of the high turnover rate of DP managers.

In recent weeks, DP had come under pressure to explain serious inconsistencies in management reports dealing with the financial aspect of the business. The DP manager had involved the consultant in the problem and was taking a gamble that his cohort could assist in explaining the problem, if not offering a solution, to top management.

The president came directly to the point: For the month just ended, they had no accurate idea of the firms' financial performance. "Our revenue forecast indicates one set of numbers, our financial statements another and our accounts receivable don't agree with either," added the vice-president of finance. "The accounting department's manual records do not agree with the computer reports either."

The DP manager attempted to outline the various reasons for the difficulties just discussed. Among them:

- A system failure which destroyed a portion of the general ledger file which was then restored, but after financials were printed and before forecasts were run.
- A batch of accounts receivable which were not posted to the A/R file — they missed the keypunch deadline.
- A program bug which he believed resulted from a "unique" — not documented — file-handling technique coded by a programmer no longer with the firm. That file was now stored in a different key sequence and the systems staff had not had time to prepare the sort logic necessary.

Mercifully, the chief executive put up his hand to stop the dissertation.

"I won't pretend I understand all of that — it does seem quite legitimate and logical, but isn't there a fundamental problem we can address to get us on the track to more accurate and timely information. I'm willing to invest time and money if necessary."

Consultant's View

At this point, the DP manager introduced the consultant and asked him to provide his analysis of the situation.

The consultant's reply: "In my investigation of your applications portfolio I've applied canonical synthesis to the logical data structures employed and have discovered a very high frequency — approximately 93.286% — of data embedded in application program logic which is largely responsible for the integrity and synchronization problems currently being encountered.

"As a solution, I would recommend the design of a master data base each of which would employ relational technology to reduce the data base to the third normal form. This would eliminate the possibility of semantic disintegrity upon querying the data base."

Before any questions could be asked — could any be expected? — the consultant excused himself to attend a meeting with a vendor offering a data base management system. The consultant was quick to point out to the executives that while this may not be the answer to their problems, "it is really quite a simple solution — data base."

Left alone with the executives, the DP manager tried to clarify the data base concept. "A single storage facility for all of the data upon which our information is based," he explained. "A software package which manages all of the data we use."

"How much will it cost?" they asked.

"It will be substantial," the DP manager replied. After a lengthy discussion, the executive concluded by addressing the DP manager. "It is your decision. If you think it will help, then get us a data base. But we need to solve the problem, and quickly."

Final Thoughts

As the DP manager walked back down the hall, he had two final thoughts. One was the plaque he noticed on the chief executive's wall as his eyes wandered during their meeting: "An ounce of *application* is worth a ton of abstraction." He knew the ounce would have to be produced quickly.

His other thought was that given even his limited understanding of data base at this point, he sensed the tremendous impact it could have on the people in this business.

Variations on the above events have occurred hundreds of times in many organizations over the last 10 to 12 years and could still occur today. The result described above — a "commitment" to data base — was a common one. Because of many such commitments, we are in position now in 1980 to assess the impact of data base management systems by looking at what the impact *actually* was. In addition, as the data base methodology continues to be implemented, we can accurately predict what its impact will be.

One measure is the impact of data base on those individuals involved with computer systems at various levels — management, DP staff and user personnel. Our overall assumption is that data base has had a significant impact on the information systems community. It has been an evolutionary process.

In the early days of data base technology implementation, the objective of the effort was still largely abstract to those involved with it. Data base was often viewed as a messiah for other DP concerns — development of management information reporting systems — alias MIS — successful implementation of on-line systems and reduction in system development time and costs.

Early DBMS

The early DBMS software products through no fault of their developers did not directly address these concerns. But in attempting to sell the data base concept, various individuals emphasized these potential areas of benefit rather than the fundamental objective of DBMS — effective data management.

To say that data base and its primary implementation tool, DBMS, was slow in having a widespread impact should not receive an argument. By the mid-1970s, improvements in major DBMS like Total and IMS/VS, the availability of various new approaches to data base such as Adabas and IDMS, and a growing understanding that DBMS was part of an overall program meant that data base was established as an integral part of the DP function.

At the close of the 1970s, there had been improvements in the accuracy and timeliness of information systems in many organizations. How many people actually attributed such improvements to data base is an interesting question.

'Back Office' Operation

First consider top management. In the early stages of DP growth within a business, the function was viewed as a "back office" clerical operation which provided little tangible benefit directly to executives. However, as the need for better information grew, DP was looked to as a vehicle to provide such facts and figures.

Top management at first believed it still was not their concern — "the computer would take care of it." And as our example pointed out, executives saw difficulties in utilizing the computer, not necessarily better and faster information. Data base (and DBMS) was one of the earliest "state-of-the-art" technologies aimed at significantly advancing DP's contribution to a business.

But it cost money and because of the technology, a top executive was no longer able to apply cost/benefit analysis in order to make the decision to go data base. The result: Over a long period of time, a top level awareness of the DP function grew and manifested itself in many ways. The existence of vice-presidents of data processing (or other such titles) is another indication of the level of awareness DP has at-

(Continued on SR/22)

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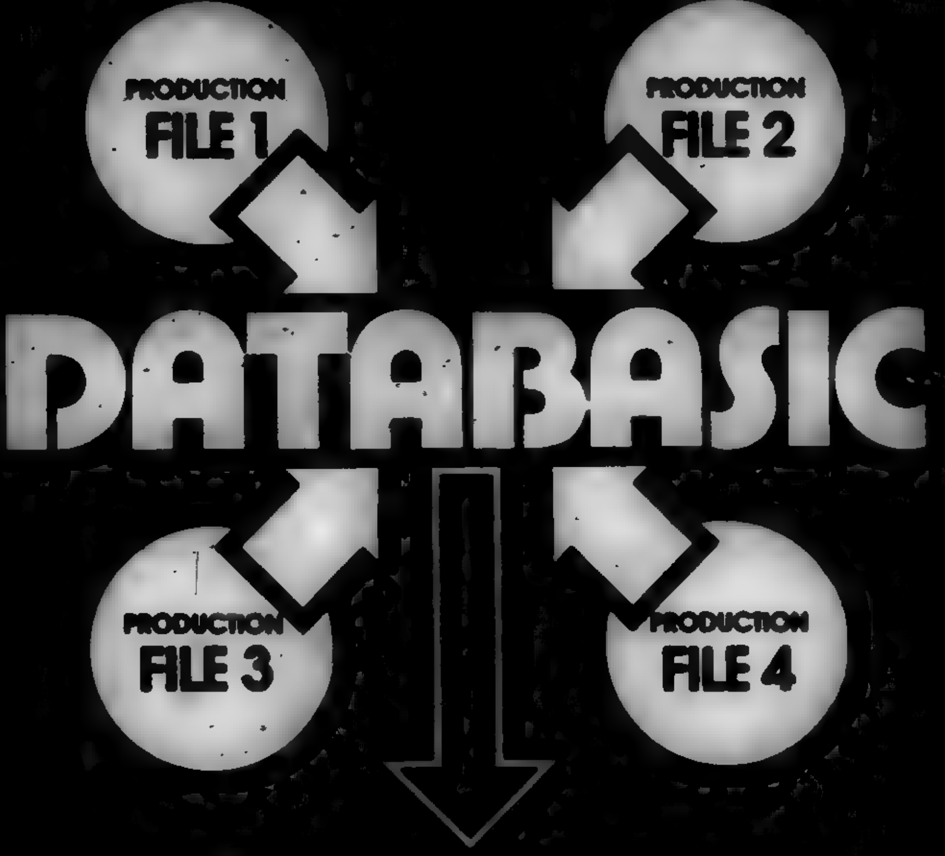
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People's View Of DBMS Given

(Continued from SR/20)

cended to.

How did data base affect the DP technical staff? Simply stated, DBMS provided the ability for the vast majority of programmers and analysts to be less involved with the "internals" of the computer system and more concerned with effectively providing necessary information to users.

To be sure, "heavy" technical personnel were still required to guide the computer and the DBMS, but the personnel that users were required to interact with could be less technical and, in a sense, "more people-oriented." Data base had the impact of altering the role of those individuals called programmers.

Growing Pressure

Before leaving this area, another point is worth noting. While the role of the development staff began to change towards a less technical orientation, the pressure on this group to produce information systems as quickly as possible grew.

This was a "Catch-22" aspect of data base — it provided a capability which allowed for better information systems, but it did not directly allow the development of these systems. Programmer productivity became a major concern. Data base helped to focus attention on the need for automated development aids.

What we have seen is the evolution of a more "aware" community of users for which data base provides a community of data. It is now common to find users who are comfortable in describing their data requirements as well as their information needs to systems analysts and data base designers.

Finally, there are two individuals whose roles developed out of a need to shepherd the data base effort: The data administrator (DA) and the data base administrator (DBA). The DA has evolved more recently and is the representative of top management and the user community — "a policy maker."

The DBA is the technician responsible for the DBMS and the data base itself. The existence of these positions is an indication of the impact of data base.

If we were to return to the DP manager of our earlier example, what might we find? Top management which is committed to an effective DP unit employing technology like data base. Concentrated efforts in the data management area with the DBA overseeing development. Users who are more knowledgeable in the use of information systems and their role with these systems.

Given the proper blend of expertise, time, money, commitment and luck, it is not unreasonable to expect all of the above. Data base has played a large role in making these developments possible. But where people have been involved with the effort, an old Chinese proverb applies to their reaction to data base:

- I hear and I forget.
- I see and I remember.
- I do and I understand.

Hessinger is a technical consultant and manager of information systems for Computer Task Group, Inc., in Buffalo, N.Y.

At INCO,

ADABAS

Inco's DBA tells why ADABAS, Software AG's data base management system, was chosen for the expanding needs of this international firm.

"Five years ago, we chose ADABAS from Software AG as our data base management system. We demanded a highly flexible, end-user oriented DBMS that would facilitate the development and operation of our business systems. We did not have the time to design our own DBMS, or the luxury of selecting a system that would require a large staff to implement and support. We needed an easy-to-use package with the design phase already accomplished. The available studies indicated to us that ADABAS would be the best choice for our needs. Five years of experience showed us that the studies were right – and so were we in choosing ADABAS."

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"During the development stages of our many application systems, the specifications often changed. We were constantly adding fields and files, or changing their locations in the data base. With ADABAS, these changes are very simple to make. There are no cumbersome chain pointers, so relationships can change according to need.

"In fact, we are continuing to modify our systems to meet our expanding corporate requirements. And with ADABAS, we can make these necessary changes with little or no impact on the hundreds of batch and online programs supported by the DBMS."

Cost-effective new program development

"In planning new applications, we do not have to include the high cost overhead for restart/recovery, security, or data base

we demand adaptability and ease-of-use in our DBMS delivers!

Michael Berman, Corporate Data Base Administrator

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loading. These utilities are all included in ADABAS already. Applications programming is faster and easier, too – because ADABAS provides the tools. This means we can concentrate on the application problem – not the data base."

"ADABAS gave us a powerful end-user query language – ADASCRIPT+, an interactive report generator – ADACOM, and an online Data Dictionary all in the same package. And recently we have added NATURAL, Software AG's instant applications language, which we expect will decrease development time. Furthermore, the ADABAS system can be fully installed in a single day!"

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ADABAS: Datapro Honor Roll winner for three years

At Inco, ADABAS has cut both program development time and cost. In fact, the exceptional ease-of-use of ADABAS, combined with its outstanding throughput efficiency and adaptability, helped give this product such a high user rating that ADABAS has been nominated to the Datapro Honor Roll for three consecutive years.

If you'd like to know more about how ADABAS met Inco's demand for a truly adaptable DBMS, send for Software AG's ONLINE report today. You may find that ADABAS is the ideal data base management system for a demanding company like yours, too.

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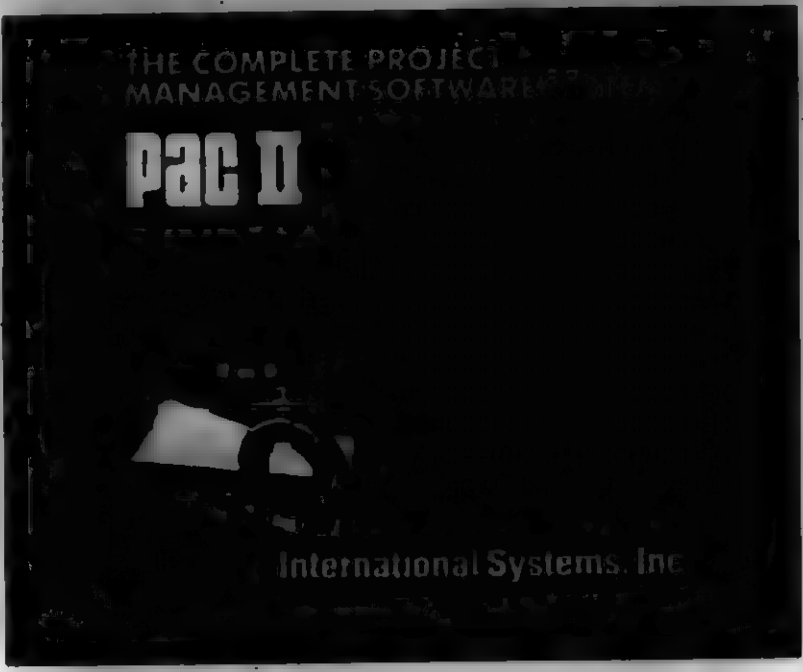
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Why are there not more consultants around? Simple. Working as a full-time employee is safe and secure. Being a consultant can involve risk, especially if one doesn't know anything about the business. All consultants have a different "horror story" to tell about the trials and tribulations they faced in breaking into the consulting business. And, there are many consultants who are still struggling to get enough work. In truth, although the demand is great for their services, there is more to becoming a consultant than just printing a business card, quitting a full-time job and waiting for the phone to ring.

COMPUTERMONEY: And How To Make It In Data Processing Consulting is a tape recorded manual that will guide the more capable programmer/analyst toward the formation of his own consulting business — where the real money is in the computer industry.

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- What a consultant should charge
- What a contract should include
- Tax matters: Keeping what you earn
- Increasing your income via sideline sales
- The risks you will face
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Mr. Canton has spoken to hundreds of consultants from all over the country to research the ingredients that go into the successful start-up and practice of computer consulting. The material as presented is not simply "one man's idea" of how to do it, but rather the condensed thoughts of many highly successful consultants.

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Internal System Runs Dim, So Power Company Plugs Into Commercial DBMS

By Steve Fronsberger
Special to CW

CHARLOTTE, N.C. — Duke Power Co.'s decision to look into commercially developed data base management system (DBMS) was spurred by one of our user departments that was using an internally developed file maintenance system. The facility was not responsive to their increased usage and growing requirements for concurrent batch and on-line operations.

To find a solution to this problem, the computer services department formed a committee to analyze user experiences with our in-house file maintenance system, evaluate its performance, define user requirements and determine the overall effect of the DBMS approach on Duke's DP needs.

The committee included eight users and two members of the DP staff. After five months, the committee recommended that a second group be formed to determine if it was feasible to upgrade the in-house system and to evaluate commercially available DBMS for use at Duke.

This second committee also consisted of users as well as computer services personnel. We concluded that upgrading the internal file maintenance system was not a viable solution. We also evaluated Intel Corp.'s System 2000, a DBMS used by another Duke department and found that it did not meet our needs.

DBMS Candidates

Efforts then focused on selecting viable DBMS candidates. Our "academic" evaluation included reviewing literature on available DBMS and attending a Datapro Research Corp. seminar on "Comparative Analysis of Data Base Systems." Using guidelines, techniques and information from this seminar, we defined our evaluation criteria.

These included facilities and characteristics of the DBMS, ease of use and installation, vendor support and resource requirements.

Having decided to research Software AG's Adabas and IBM's IMS in greater detail, representatives from these vendor firms were invited to describe their systems to us in depth. We also interviewed users of each product who provided a considerable amount of insight and information.

We found that while IMS offers a wide variety of facilities, its resource requirements were excessive for our environment. Some IMS users reported long learning curves and extra personnel resource usage.

Adabas showed itself to be easier to install, maintain and learn — with modest resource requirements. So, we concluded that Adabas was the DBMS most consistent with our environment. This phase of evaluation took seven months.

Final Phase

The final phase of evaluation was our in-house testing of Adabas. Four people were involved in this effort, along with representatives from the programming staff that maintained the in-house system. We found that Adabas performed as specified. After three months, we purchased the system.

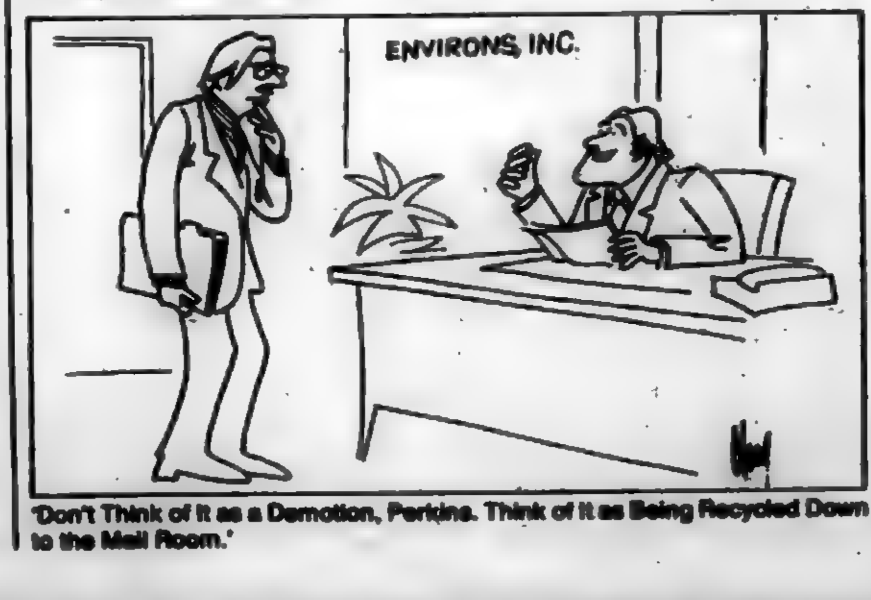
Since Duke had already established a data administration function in the technical services division, the newly created DBA function fit easily into this area. The DBA group's responsibilities were defined to include file and data base design, consulting with applications groups, handling system security, training new users, tailoring vendor training materials to meet Duke's needs, maintaining the data base and data dictionary, monitoring data base usage and coordinating changes made to applications systems and hardware systems that affect the data base.

There are currently two data base analysts assisting the DBA in these tasks. All of us were recruited from Duke's applications area. Our staff will grow as needed.

A full range of supporting utilities is available with the Adabas system. We take a daily backup of our files, and restore and recovery functions are performed when needed.

Our system currently operates 22 to 23 hours daily, servicing users well. Adabas performance and resource usage has met our expectations. New users and new systems are added regularly with little change in the performance level.

Fronsberger is data base administrator for the Computer Services Department of Duke Power Co. in Charlotte, N.C.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'Why Me?' Approach Ineffective

Structured DBMS Training Approach Advised

By Dorothy V. Fisch

Special to CW

Many DP professionals feel they don't know very much about determining data base management system (DBMS) training requirements and usually respond to an assignment of this type by holding their heads and repeating "Why me? Why me?" Their area of expertise, designing and implementing information processing systems, hasn't taught them much about selecting training courses.

But by applying the techniques they use to determine system requirements to the training task, DPers could do a more effective job of determining training requirements.

Most people think they have determined training requirements once they identify the broad categories of people — for example, designers, analysts, and programmers — who will require training. Then, after searching for and selecting some available course which sounds like it will meet the needs of each identified group, they hope it will really teach what those people need to know.

This approach is analogous to believing that an application system's requirements have been clearly defined once it can be stated which departments within the company will be supplying data to it and using information produced by it. In system design it would be readily recognized that the system requirements process had only been started. The same is true when determining training requirements.

Deciding who needs to be trained is not enough information from which to select a training course. It is also necessary to know what the user will do on the particular job for which they will require training.

Application Programmer
System Designer
Data Base Administrator
System Programmer
System Analyst
Programming Manager
Upper Management

Figure 1

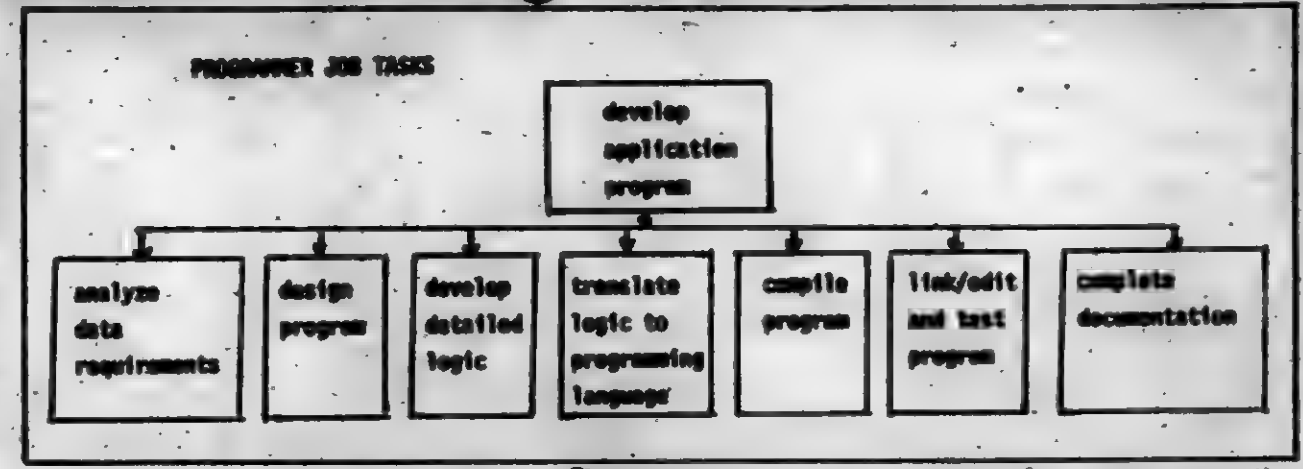
Structured Approach

Figure 1 contains a partial list of job categories for which some training in the use of a DBMS would be required. The first step in a structured approach to determining training requirements is to select one of these job categories and document what tasks those people do in their jobs.

This approach uses the technique of stepwise refinement to determine the job tasks done, and also uses the structure chart as a documentation tool to denote the job tasks. Figure 2 shows a high-level structure chart of tasks an application programmer might do on the job.

The second step calls for breaking down these high-level, global tasks into the subtasks of which they are comprised. This process continues un-

(Continued on SR/28)


PROGRAMMER JOB TASKS
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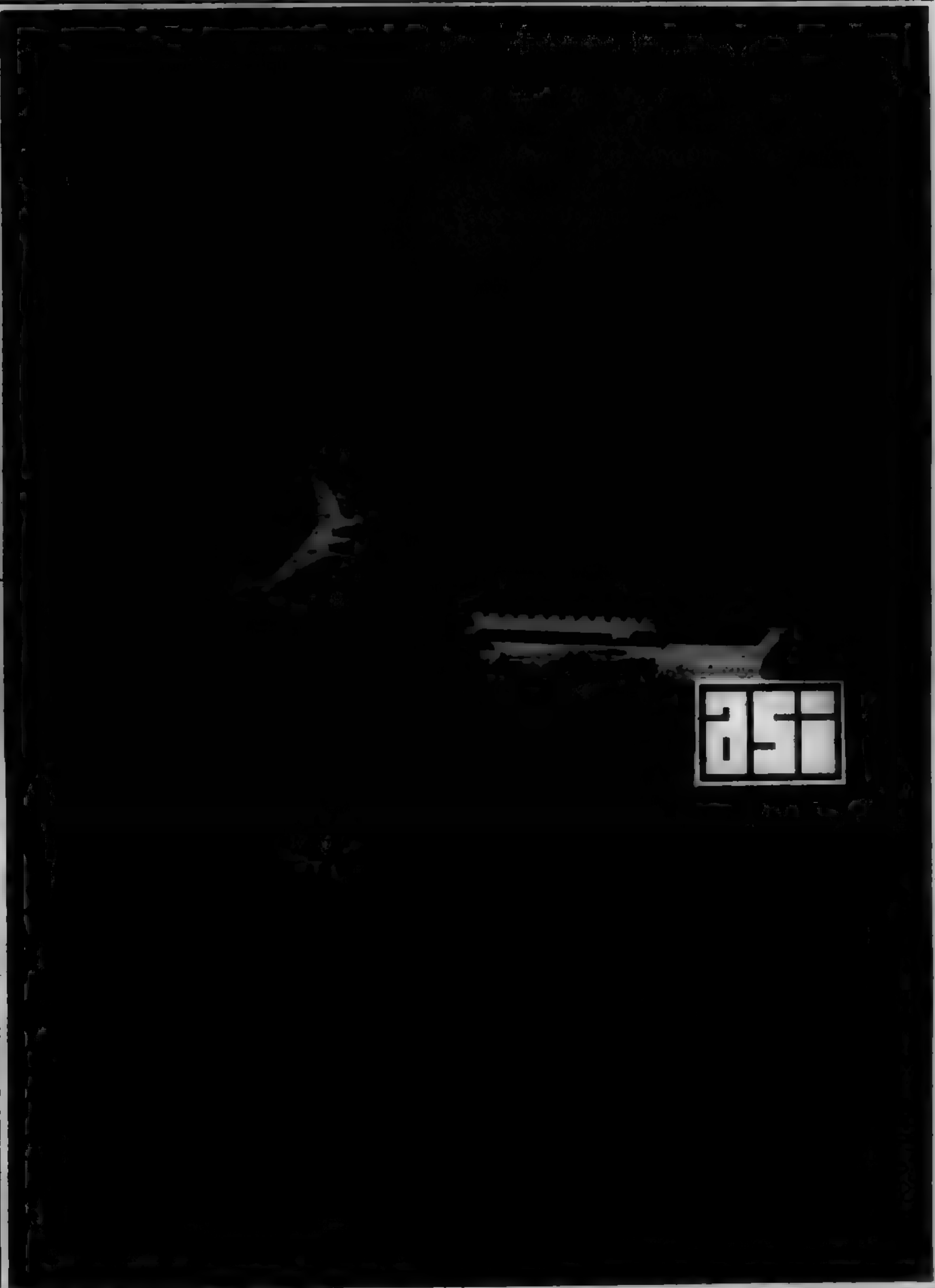
design program
develop detailed logic
translate logic to programming language
compile program
link/edit and test program
complete documentation

Figure 2



• Interactive, On-Line Abilities

Codasyl DBMS on Minis Offer

By Dave Field
And Roy Schulte
Special to CW

Cost-effective Codasyl-based data base management systems (DBMS) for minicomputers are not only a practical reality today, but they also offer some distinct advantages over traditional mainframe DBMS.

The myth that DBMS is only applicable to a large mainframe installation with a huge monolithic data base is rapidly being dispelled with the introduction over the past five years of a new range of superminicomputers and the development of sophisticated on-line interactive techniques and operating system tools for them.

Today, all the benefits such as data integrity and data independence obtained with mainframe DBMS are also available on minicomputer data bases. Minicomputer DBMS, however, extends those advantages by providing its user with a greater capability to handle interactive on-line environments, perform distributed data processing, and improve programmer productivity — generally at significantly less cost than mainframe DBMS.

In the early 1970s minicomputer vendors tended to be hardware- and engineering-oriented organizations with very limited expertise in commercial languages and sophisticated system software. In addition, disk capacities were very much smaller than they are today and thus not geared to data base systems that are generally applied with extensive use of large-capacity direct-access disk.

The great strides made over the past several years in hardware speed and performance capacity, and the development of sophisticated software tools and techniques have made today's minicomputers more powerful than most mainframes of 10 years ago. The minicomputers of 1980 are interactive, on-line-oriented systems with considerable capacity and flexibility. Also, it's now quite common to see minicomputers with close to 300M bytes of storage capacity per disk drive.

Data Base Pioneers

Data base management techniques were primarily pioneered by end users, some software suppliers and the large mainframe vendors in the late 1960s. Over the next 10 years, many new developments in data base technology were introduced. The minicomputer vendors, entering the field at a later date, were able to capitalize and improve upon the DBMS technology that emerged from the mainframes environment.

At the same time, the minicomputer suppliers have also improved their operating systems and I/O capability. In many respects, particularly in the handling of interactive applications, minicomputer operating system architecture is superior to most mainframe operating systems. Minicomputer vendors also have become much more sensitive to the needs of end users who, in turn, have gained more sophisticated understanding of their system requirements.

Mini makers are seeking, among other things, to give their users the traditional advantages available through DBMS — primarily, data integrity protection and data independence. Data integrity means that data bases are protected against accidental or deliberate destruction or alteration. Integrity protection measures in a DBMS generally include logging and recovery utilities, the ability to roll back logical update transactions and automatic restartability after an interruption in processing.

Data independence supported by a DBMS implies that several application programs can access the same data and obtain it in different formats for use in different ways.

Programmer Productivity

The emphasis in modern minicomputer DBMS, however, is not strictly on the generic DBMS advantages. Originally, data bases were promoted to imply centralized files and reduced data redundancy. Although data bases certainly do reduce data redundancy, this has become a secondary consideration to the vital problem of programmer productivity.

Since DBMS has built-in support for direct access by multiple application programs by handling all the mapping to and from the disk files for the user application programs, no special programming is required to control concurrent updates. Also, much of the application systems maintenance that formerly had to be performed in non-DBMS shops is virtually eliminated.

Without DBMS, up to 80% of programmer time is spent on maintenance in traditional DP environments. The greatest advantage in using a data base system lies in increased programmer productivity.

Increasing numbers of computer users are realizing this as they switch to minicomputer DBMS. Indeed, studies show that while the minicomputer market is growing at a rate of about 30% per year, the overall DBMS market is increasing at about 40% to 45% per year, and the minicomputer DBMS market is growing even faster — perhaps 50% to 55% per year.

Inherent Advantages

Minicomputers incorporate certain inherent advantages for data base capability that do not exist on mainframes. Since their inception, minicomputers have always been oriented to the on-line interactive environment, whereas most mainframes have traditionally been batch-oriented.

Data base operations also tend to be oriented to the on-line interactive environment. For example, users of data bases enjoy the advantages of being able to update files on-line and to interrogate the data base through an interactive query facility.

Obviously, if the hardware architecture and the operating software is interactive, then interactive data base operations are a natural function for the minicomputer. It can be generalized that it is easier to run batch oper-

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Advantages Over Mainframes

ations on an interactive system than it is to make a batch system run interactive applications.

Another advantage of minicomputer DBMS is that typical installations do not require a large DP staff to run them. Also, logical retrievals and reports can be generated from the data base by authorized clerical and other non-DP personnel using simple keyword commands supported by a query facility.

Another aspect that makes minicomputer DBMS so attractive today is that the initial investment is lower both in hardware and software. A user can get into data base operations incrementally, without the risk of having to implement a very complex system all at once. Commitments to the data base concept can be made in stages instead of all at once.

Distributed Operations

Minicomputer DBMS is especially valuable for its use in distributed data processing operations. For instance, most minicomputer manufacturers who offer DBMS have developed peer-coupled networking capabilities. Peer-coupled networks consist of individual nodes of equal importance to other nodes in the network.

By contrast, hierarchical networks have distributed sites of very limited intelligence communicating to a centrally-located, large "mother" mainframe.

Peer-coupled networking with minicomputers is usually a more cost-effective way of implementing communications between remote sites because each site can perform most of the processing locally, reducing the communication load.

A few minicomputer vendors, notably Data General Corp. and Prime Computer, Inc., offer Codasyl DBMS along with sophisticated communications and X.25 networking capabilities that are directly compatible with Telenet in the United States, Datapac in Canada and packet-switching telecommunications networks on other continents. Digital Equipment Corp. also offers a Codasyl DBMS and recently announced X.25 networking.

'Today, all the benefits such as data integrity and data independence obtained with mainframe DBMS are also available on minicomputer data bases. Minicomputer DBMS, however, extends those advantages by providing its user with a greater capability to handle interactive environments.'

Existing networking communication capabilities, when used in conjunction with DBMS, allow for easy distributed access and updating to data bases at remote sites.

Control Factor

One of the major reasons why so many computer users are moving to minicomputers and minicomputer DBMS is to obtain more control over DP — particularly where the user formerly had to share a single large DP source. In many instances, the end user was losing control over its data, its applications and its budget.

With the implementation of minicomputer DBMS and well-defined system standards established by corporate guidelines, the user has its own minicomputer and, therefore, more control over data base, applications and budget. Minicomputers also are ideal for high-security environments since they can be physically unplugged from the network while extremely sensitive data is being processed.

A corollary to Codasyl standards compliance is that minicomputer vendors are now offering data bases that are compatible with those of mainframes. It is quite feasible in many instances to take a mainframe data base-designed application and convert it to run on a minicomputer.

True DBMS

Finally, a word of warning. Some of the so-called DBMS packages on minicomputers (and now even microcomputers) are not true data base management systems. They are often merely file management systems or sophisticated access methods. Therefore, a potential user of DBMS should investigate available data base systems very carefully.

Basically, a true minicomputer DBMS should perform the following functions:

- Maintain data structures and the internal logical organization of the data and internal indices.
- Log transactions and perform backup and recovery.
- Control access to data for security purposes.
- Make programs independent of data record layouts.
- Automatically compress data for storage.
- Allow concurrent updates by multiple on-line and batch programs.
- Help centralize data to reduce redundancy.

Full-scale cost-effective minicomputer DBMS is now available with all the features and benefits of mainframe DBMS. Minicomputer DBMS is on-line, interactive-oriented, incorporating all the advantages of the interactive environment. It is particularly effective for distributed data processing in networking systems, but can also be used efficiently in stand-alone configurations.

Above all, minicomputer data base management systems offer an opportunity to achieve significant improvements in programmer productivity.

Field is regional systems engineering manager for Data General (Canada) Ltd.; Schulte is product manager for Data General Corp.

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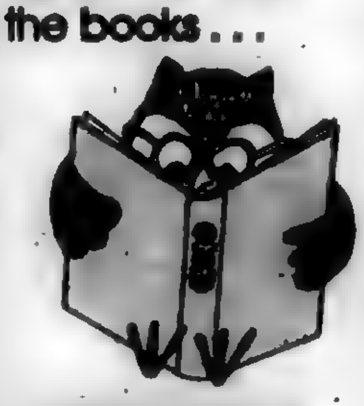

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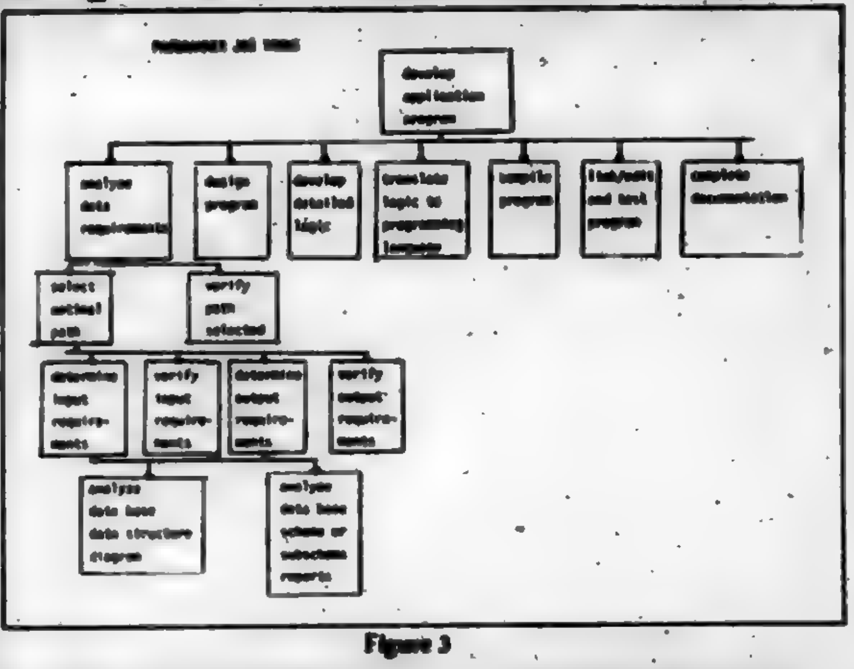
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analyze data requirements
design program
develop detailed logic
translate logic to programming language
compile program
link/edit and test program
complete documentation
select optimal path
verify path selected
determine input requirements
verify input requirements
determine output requirements
verify output requirements
analyze data base data structure diagram
analyze data base schema or subschema reports

Figure 3

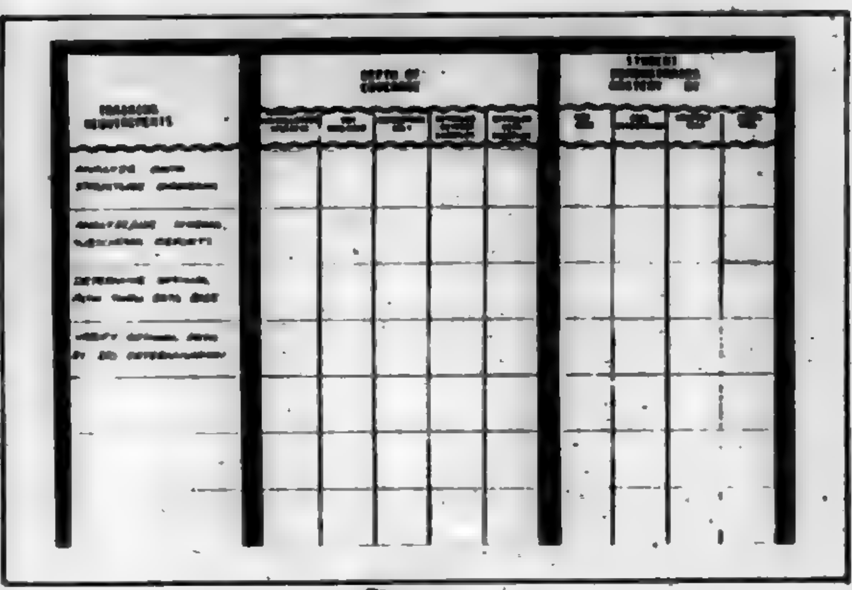

Figure 4

(Continued from SR/25)

til each low-level box on the chart represents one clearly defined task. This is the same technique of functional decomposition used to design application systems.

Figure 3 illustrates how to break down the global task, "analyze data requirements." The subtasks noted could be further refined, but this is a sufficient level of detail to illustrate how to use this approach. The resulting detailed structure chart is used in the third step, which requires that each box on the chart be studied to determine what the person must know in order to perform that task.

Training Needs

From the structure chart shown in Figure 3, several distinct training requirements can be found. The person doing the task of analyzing data requirements must be taught to:

- Analyze the data structure diagram that represents the data base.
- Analyze and use the various available schema and subschema reports.
- Determine an optimal path through the data base given some definite requirement.
- Verify that the optimal path has been selected by determining the I/O operations involved.

This process, when completed for every global task, yields a complete list of what a person must know to do that job. This list is the training requirements.

Course List

Once training requirements have been determined for each job category, this list can be used to evaluate the various courses available. Make a check list of the identified requirements and use it to document which requirements are met by a specific course offering and which are not. Figure 4 illustrates this type of check list, which will provide all the material needed to determine which vendor's training package most closely meets your needs.

Rarely will any one course meet every identified requirement, especially when requirements are installation specific.

For example, at your installation the programmer may have to fill out a specific form or execute a specific cataloged or command procedure to obtain the schema or subschema reports.

No outside vendor will have included this type of training in its course materials.

Selecting the most effective training is not an easy task, but it can be much easier when the time is taken to determine all of the specific things personnel must be taught to do.

Fisch is educational consultant at DBMS, Inc. in Lombard, Ill.

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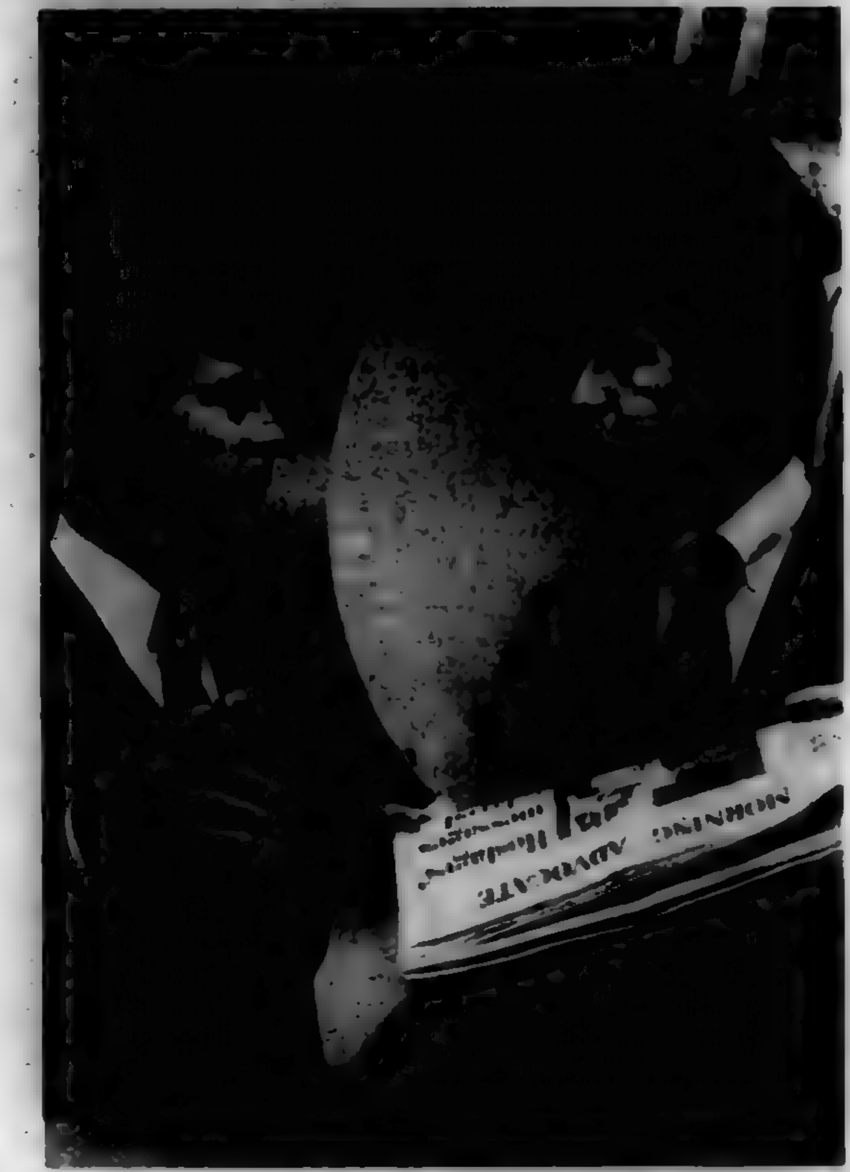

Richard Shurley (right) is Data Processing Manager of Capital City Press, Baton Rouge, Louisiana. Thomas Miller is the NCR representative.

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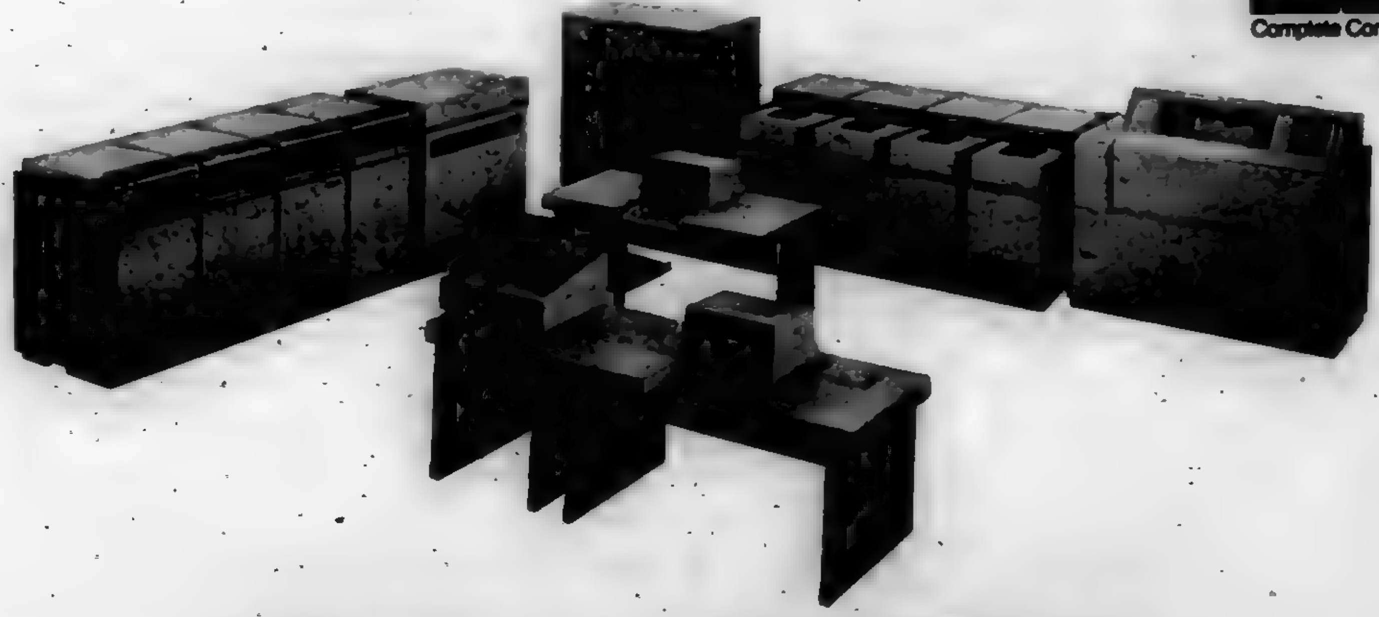

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Managers Are Not Robots

Data Base Theories, Practices Do Not Coincide

By Durward P. Jackson
Special to CW

Management research points to fundamental differences between management theory and what is achieved in practice. Studies have found that managers are not the reflective, calculating robots found in the textbook. Rather, they are firefighters — action-oriented people who have little time for formal planning and control activities.

Indeed, the studies show that the better managers spend most of their time interacting with their environment, not sitting at desks reviewing computer-generated reports.

Similar differences between theory and practice are surfacing as the result of studies of data base management and data administration. While the literature is hawking the idea of information as a corporate resource, the practitioners entertain a very different perception.

The literature calls the data administrator a person who is more attuned to management than technical issues. The reality is that the typical data administrator is first a technical person whose primary concerns rest with operating problems, data base design and technical issues.

The literature says that information is a corporate resource to be managed for the benefit of the whole corporation. In reality, each functional or divisional manager jealously guards his data resources. No rational manager wants his peers or boss to see information about his organization before he does.

The literature advises that the data administrator be a senior vice-president in order to wield the power necessary to make information a corporate wide resource. The reality is that while a few organizations have followed this approach, most companies bury the data administration function within their technical staffs.

The literature hints that the corporate data base is a single physical data base with no data redundancy. In the real world, this feat is impossible for all but the smallest organizations given the state-of-the-art of hardware and software. In fact, the inefficiencies of most data base management software dictate many physical data bases with a great deal of data redundancy even within the same functional areas.

Why the Gaps?

Why do these wide gaps between theory and practice exist? First, it is easier to tell someone how to do something than it is to actually do it. The theorist is unencumbered by the human problems, the organizational environment and the problem of maintaining a disciplined approach. In short, he does not match his prescriptions to organizational requirements.

Second, theory precedes practice, often by years or even decades. The theorist performs a valuable service by advancing human knowledge, but the world is slow to adapt. We knew the essentials of strategic planning a century before it became widespread in business. The theory of data administration is likewise ahead of its time. Organizations will need time to adapt and assimilate these new ideas.

In the meantime, data administration and data base management do have a place in modern organizations. But their introduction and use must conform to the needs and social structure of the corporation. To blindly "go data base" is to invite disaster.

Organizational Placement

Data administration may be an idea whose time has come, but some currently held management perceptions may lead to its early demise. The most common of these perceptions is that data administration is simply another empire-building scheme. Why should the chief executive officer want to increase his span of control simply to accommodate another empire? Why should senior executives give up power for the same purpose?

If the data administrator cannot achieve his objectives through persuasion and through the director of information systems (who is usually a senior executive), why should he be given the sledgehammer of a vice-presidential title?

Perhaps more to the point, the data administrator's function is really just another dimension of systems planning. If the information systems department has been doing systems planning all along, most of the functions of the data administrator already exist. The problem then becomes one of introducing a new technology rather than a whole new organizational entity. Maybe the solution is to simply change the title of systems planner to data administrator.

If the administrative side of data administration should be retained in the information systems department, so should the technical aspect. Again, only a new technology is involved.

Procedural Changes

Of course, some procedural changes would be required. New skills would be needed. A closer working relationship between the programming group and systems planning is certainly in order. But a new organization paralleling the current one is redundant.

Another issue that arises when a data base management system is acquired is the consolidation of master files into functional data bases (or at the extreme, into a single data base). The design and implementation of the corporate "data base" is a lengthy job that will not be done overnight. While the planning and detailed design are proceeding, much can be done to put the DBMS to work immediately. It is neither necessary nor desirable to wait until the master plan is completed — it never is — to gain benefits from the DBMS software.

Other Function

Data base management software is usually sold as a solution to the overall data resource management problem: Indeed, Intel Corp. has cleverly repackaged System 2000 as "the information resource management family of products" to take advantage of the latest buzzwords. However, DBMS has another function — productivity improvement.

It is no secret that programming is the major contributor to information systems costs. These costs — especially the cost of writing information retrieval programs — can be greatly reduced by using the inquiry facilities of some DBMS software. Whether part of the grand design or not, new retrieval software should be written using the DBMS query language to improve the organization's productivity.

So much has been written about the evils of application-oriented data bases and the need for a highly-placed data administrator that many information systems executives are shy about admitting to variations on these themes. Yet, the research indicates that most data base implementations are somewhat less comprehensive than normally prescribed.

Simple Explanation

The explanation of the reality is simple. The successful information systems executive is a businessman first and more concerned about meeting user needs than in the elegance of the approach. His main goal is short-range productivity, but he recognizes that both short and long-range planning are necessary if all the pieces are to fit together. Therefore, the corporate data base is something for tomorrow. *Using* data base management systems to improve productivity is for today.

After all, productivity is not a bad buzzword in these inflationary times.

Jackson is a management information systems consultant practicing in Lancaster, Calif.

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By J.F. Davidson

Special to CW

PASCAGOULA, Miss. — In July 1973 Ingalls Shipbuilding, Inc.'s Information Systems Department formed a task force consisting of three people who were responsible for reviewing available data base management systems (DBMS). Information Systems was, at that time, interested in a DBMS which could be easily implemented for on-line inquiry processing to reduce the number of hard-copy reports required to support Ingalls' offshore oil rig production process.

Other reasons for desiring a DBMS were to reduce data redundancy, increase data integrity and provide more timely response to customer reporting requirements via inquiries.

Once the decision was made to acquire a DBMS, the Intel Corp. System 2000 plans were established on how to administer the system. A data base administrator (DBA) function was established that reported to the Applications Planning manager who, in turn, reported to the Information Systems director.

The primary user of the DBMS for application development, Business Applications, also reported to the information systems director.

This concept was used initially, but it gradually evolved to where Business Applications took over a majority of DBA functions; currently there is no formal DBA.

Along with developing a procedure for administering the DBMS, plans were being made as to which programmer/analysts were to be trained on the newly acquired DBMS. All key programmer/analysts were trained on-site by the DBMS vendor, MRI Systems Corp., but it became readily apparent that this training alone would not suffice to produce knowledgeable DBMS programmer/-analysts.

Because of the large systems targeted to be rewritten using the DBMS, Information Systems decided to contract portions of the application design and programming to the DBMS vendor. This turned out to be an excellent decision as it allowed Ingalls' programmer/analysts to work with experienced DBMS personnel.

Upon implementation of two major systems in 1975 using a DBMS, Ingalls' programmer/analyst personnel became familiar enough with the DBMS package that no further DBMS application subcontracting was necessary. Additional DBMS training classes have been conducted on-site as the requirement for DBMS applications expanded; presently more than 60% of the Business Applications staff is proficient in the use of DBMS.

Two Inquiry-Only Systems

The first two systems implemented using a DBMS were for inquiry only and were updated in the batch environment. This approach made the backup and recovery relatively simple to control.

The Purchase Order Status system was initially housed on two IBM 3330 disk packs that were backed up by dumping the packs after each update. The Work Authorization Plan system was initially housed on six IBM 3330 disk packs, backed up in the same manner. This approach worked very well and few problems were encountered in the backup and recovery area.

As previously mentioned, the DBA function evolved from a single DBA to where it is now primarily controlled by Business Applications.

Since 1973 eight major applications, including the Purchase Order Status and Work Authorization Plan systems, have been implemented using DBMS.

Prior to the system design phase of a potential DBMS application, existing DBMS applications are reviewed to ensure there is no duplication of data in the proposed system.

As each new DBMS application is implemented a considerable amount of time is spent reviewing the overall application performance. The primary areas reviewed are inquiry response times, disk space utilization and update process times, whether in the batch or on-line environment.

Inquiry performance reports are available on a monthly basis that contain performance data on all production DBMS inquiries; this is very closely monitored to ensure optimum teleprocessing performance.

Elaborate Controls

All DBMS applications have elaborate controls to ensure data integrity, whether they are updated on-line or in the batch environment. The types of controls vary from application to application, depending on the type of data contained on the DBMS application data bases.

Prior to anyone making inquiries to a DBMS application data base they must first be assigned a user ID and CICS password. This procedure is required for all data base applications whether System 2000 data bases or CICS data bases. The security procedure allows users access to only those inquiries, and through only those terminals, authorized at the time the user ID is established.

Monthly reporting is available containing statistics on terminal utilization, user activity and inquiry activity. Reports also are generated containing all security violation attempts by the various users. All user IDs are validated annually in order to keep security records current.

A number of problems were encountered in implementing the major applications using System 2000. Upon ac-

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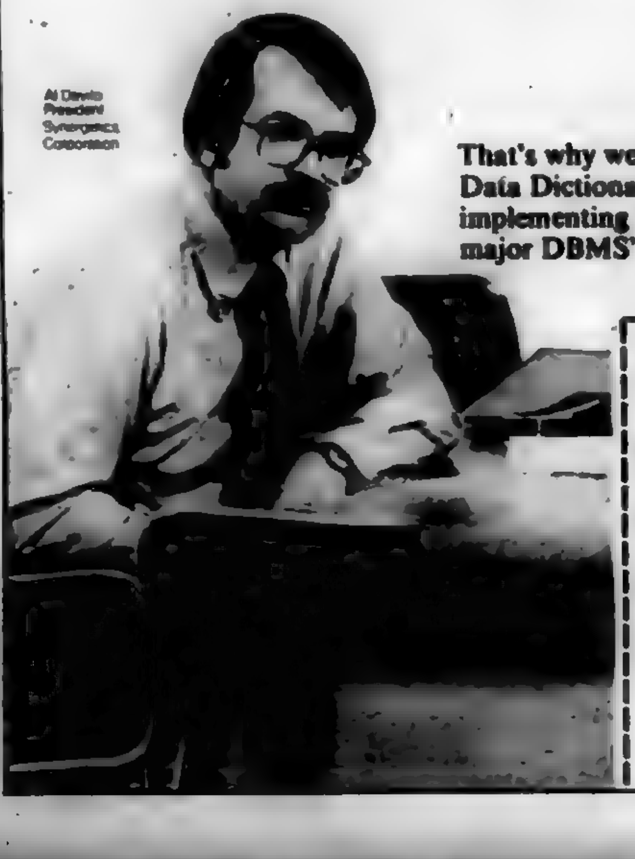

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. . . Application System Starts Small, Works Up

quiring a DBMS, Ingalls' Information Systems Department elected to implement two large major systems under the DBMS, rather than starting out with a small DBMS application. It is recommended that organizations using a DBMS for the first time implement a small application because if problems are encountered there is little or no impact to the overall organization or company.

Very late in the design phase of the Work Authorization Plan system, it was discovered that the hard copy reporting requirements could not be supported by the DBMS since the size of this system's data base was approximately one billion characters. To overcome this problem a Work Authorization Plan system parallel tape data base was established and used for hard copy reporting.

In order to ensure data integrity between the disk data base and the parallel tape data base, very complex and elaborate controls were implemented. The parallel tape concept worked extremely well and it has been used in lieu of the disk data base for many special processes.

Upon implementation of the Work Authorization Plan system and Purchase Order Status system using DBMS the batch update processes were found to use an excessive amount of computer time. Also, the inquiry response times in many instances were poor.

To overcome these problems, many hours were spent reviewing program code and data base designs. Through enhancing the program code and data base designs, the long run-times were reduced considerably. This problem highlighted the importance of experienced DBMS programmer/analysts being assigned to DBMS applications.

Initially it was believed that the use of a DBMS would decrease the amount of programmer/analyst time required to support systems under a DBMS. This turned out not to be entirely true as DBMS applications require highly skilled programmer/analysts and normal maintenance on DBMS systems is more complex than on non-DBMS systems.

System Improvements

After implementing the Purchase Order Status system in August 1975 and the Work Authorization Plan system in December 1975, no additional DBMS applications were implemented until September 1979. From January 1976 through late 1978, inquiry response times, batch update processing times and system controls were enhanced and history (retirement) file capabilities implemented.

Once the performance of the two DBMS applications was deemed satisfactory, work commenced on developing additional DBMS applications. Since mid-1979, six major systems have been implemented using a DBMS and very few problems were encountered because of our previous experience.

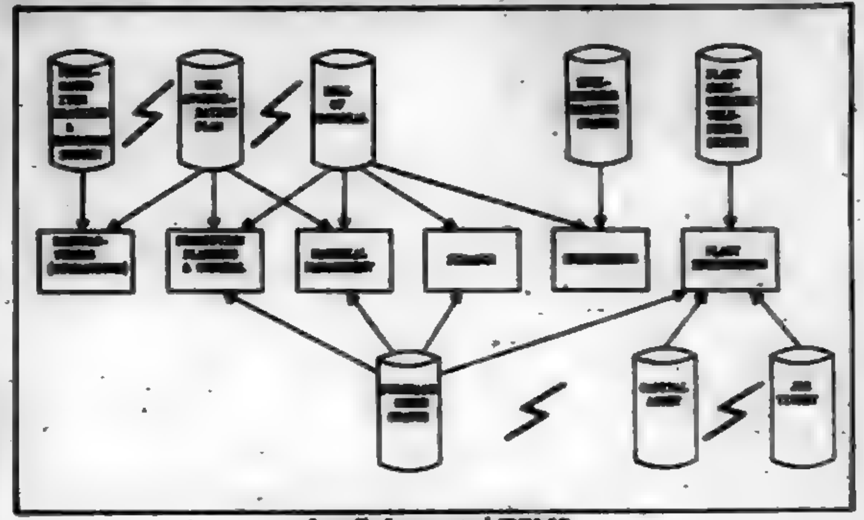
In November 1979, the Fabricated Item Tracking and Inventory system was implemented using a DBMS. This was the first DBMS application at Ingalls that provided on-line update capabilities. Since implementation, very few problems have been experienced. Recently the Work Authorization Plan system was also enhanced to provide on-line update capabilities.

Implementation of DBMS on-line update applications did present a problem in regard to backup and recovery procedures; however, it has been handled with relative ease. To date no problems have been encountered where it became difficult to recover due to system failures. This performance is attributed to a great deal of planning prior to implementation of DBMS on-line update applications.

Most Objectives Met

Ingalls has met a majority of its objectives in acquiring and implementing a DBMS. Hard-copy reporting has been reduced considerably through the use of on-line inquiries and data re-

(Continued on SR/36)



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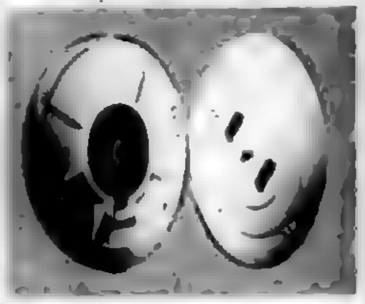

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'Order!' the Cry? 'Data Dictionary' the Reply

By Dana K. Allison-Goeke
Special to CW

What are the qualities that make a software package attractive? Most would agree a package should assist in application maintenance and aid in application development, while maintaining cost-effectiveness and providing immediate benefits and success.

There will never be one software package that is capable of handling all processing needs, but a link can be established across systems such that data redundancy is decreased, duplication of programs and files is eliminated, standards are documented and easily accessible and people's development and maintenance efforts are not duplicated. A data dictionary proves to be such a link.

Data dictionaries provide the data documentation and intracorporate communication that are essential for successful software solutions.

What can extensive data documentation offer? It provides a greater awareness of the available data and, for a specific data item, indicates how and by whom data is accessed, who is responsible for the data and, more important, how the corporation is impacted if the data item changes (requiring maintenance efforts). A focal repository for documentation can facilitate timely answers to questions such as these.

Consider intracorporate communication. It is difficult for a large organization to ensure that maintenance and development efforts are not duplicated, that data is not duplicated and that maintenance strategies are accurate in the event of changing data. The questions of who owns what and what is owned by whom become very critical. Such an omniscient view is made possible with the aid of a data dictionary.

Barrage of Questions

Consider one small example: one data base which is accessed by one program. Then consider the barrage of questions that could be asked of this unrealistically simple situation. These would include:

- What is the data base name?
- What is the program name?
- What is the program's function?
- What records/items from the data base does the program access?
- Are the item names consistent between the data base and program or are aliases/synonyms used?
- What are the synonyms?
- How is the data base accessed?
- What programming language is used?
- Who wrote it?
- Who maintains it?

As an organization's information grows, so its information systems grow; thus, control management, documentation and impact of change become increasingly difficult to monitor. Using a data dictionary as a documentation/control tool allows an organization to collect information more easily. This facilitates corporate decision-making.

Programmer Productivity

As for how a data dictionary's management and documentation capabilities can assist in application development and maintenance, the core of these issues is programmer productivity.

Demands for new applications and for application changes will always exceed the available data processing staff and time schedules. If demands increase and staff number remains constant, then time becomes critical. If the time for each phase of maintenance and/or development is reduced, productivity increases.

Some of the phases involved in application development would be:

- Identifying the function of the application.
- Identifying the magnitude of the project — projecting the necessary resource requirements, for example.
- Estimating the time schedules.
- Coordinating the systems development phases such that efforts are not duplicated.

The more coordinated a project, the less time will be spent informing the left hand of what the right hand is doing. A data dictionary provides the coordination essential to trimming development time which, in turn, contributes to overall productivity.

Primary Function

One of a data dictionary's primary functions is the documentation of data. With accurate documentation, time that was previously spent locating data and determining data usage is now available for actual development. In short, knowing what data exists helps in projecting resource requirements and time schedules.

If the identification of an application's function is pursued without a coordinated development effort, poor communication between those developing the application and those using the application often results in "bad starts" and wasted time.

A staged and documented development allows for user/programmer checkpoints such that the programmer can ensure that the application he develops meets the user's needs. If the application's function is reaffirmed with each stage of development, the programmer is assured that the developed application is functional.

In addition to these benefits of a coordinated and staged development, there are the time benefits of knowing that efforts are not being duplicated since all efforts are documented within a central repository, the data dictionary.

In summary, the dictionary provides the capability of documenting the data, the systems requirements, the time schedules and the development phases such that a continuity between development stages exists, thereby reducing development time.

Managing Changes

Maintenance efforts are also trimmed by increased awareness of data and data usage, enhanced intracorporate communication and overall coordination of efforts. Maintenance is the result of change and the impact of the change can be critical to an organization.

A data dictionary offers an accurate method of determining the impact of changing requirements, data items and data relationships. With this information initially documented within the data dictionary, the dictionary can, in turn, provide an impact analysis of any change specified. This impact analysis can help in estimating the overall systems modifications required.

For example, consider the Zip Code. If the data item, "Zip Code," exists within an information system and its format is altered, what is the impact upon the information system? The data dictionary provides not only an analysis of the local impact (on a department of an organization), but of the global (corporate) impact as well.

A complete understanding of the corporate impact facilitates "better" planning of when to implement the change and is essential in understanding the true magnitude of the change. Determining the impact of change without the aid of a data dictionary is at best time-consuming and is likely to be inaccurate.

A data dictionary provides the capability of quickly and accurately determining the impact of any given change, thereby contributing to the timeliness of the change and the ability to immediately implement a consistent change across the information system.

In considering both development and maintenance efforts, one factor was allowed to be constant: staff. In the presence of new and/or changing personnel, however, a dictionary offers additional benefits. The dictionary increases productivity in a training capacity by acquainting the new person(s) with the data resources available and the person(s) to contact when additional information about the data is needed.

Active Dictionary

The data dictionary which has been discussed so far has been assumed to be passive — one that is primarily a report facility whereby information about one's data processing environment can be retrieved and/or updated. If an active data dictionary were to be considered, there would be additional programmer productivity aids.

The active data dictionary has the capabilities of the passive one, but in addition is integrated into the entire information flow. Active data dictionaries provide for data collection (collection bridges) and data generation (generation bridges).

Through collection and generation, standardization of approved naming conventions, data usage and data descriptions can be better maintained. This controlled standardization helps to establish a continuity of data items.

Generation of data structures also reduces maintenance and development time in that the need for data validation is eliminated and less code is written. The result is less chance of error. In short, everything that contributes to the coordination of systems development phases translates into less development time.

By its very nature, a data dictionary will ensure a more coordinated effort for both maintenance and development of applications.

Allison-Goeke is a member of Intel Corp.'s Commercial Systems Division's marketing staff in Austin, Texas, specializing in data base management.

Felt First by MIS Staffs

Data Dictionary Benefits Defined From A to Z

By Frank P. Novak
Special to CW

Webster's definition of a dictionary is "a reference book listing alphabetically terms or names important to a particular subject or activity along with the discussion of their meanings and application." Its definition of a directory is "1. a book or collection of directions, rules or ordinances; 2. an alphabetical or classified list."

Applying these definitions to the data dictionary, the "subject" is the data management needs in the daily routines of running a corporation and the "activities" are the roles this data takes in making decisions.

With these definitions, a data dictionary system is a software package designed to help control and coordinate data resources. It is a repository of definitive information about data that a corporation needs to effectively utilize and maintain its data resources so that management can rely on the data in its managerial duties.

Multilevel Support

The scope of the data stored in a data dictionary covers all areas of the business and, therefore, needs the support of all levels of management. A basic assumption many users of a data dictionary make is that once it is installed, it automatically provides instant control and benefits to the corporation.

This assumption is true only if the data dictionary is faithfully maintained, evolves with the corporation and is supported by users and management alike. If the data is not kept timely and the effort to use it is mediocre, the benefits are not just reduced, but can be drastically hindering to the corporation.

When the data dictionary is correctly utilized, many benefits can be obtained. In the beginning, the benefits will be apparent in the MIS department and not in user departments.

As these benefits are applied in MIS, user departments will see the effects of these benefits in better system design, quicker project development and a more comprehensive and integrated system. In time, user departments will enjoy benefits directly — such as a complete awareness of all the data they have at their disposal and of how it is being utilized.

With this information, they can determine ways this data can be applied and eventually realize more expedient development of their own ad hoc reports utilizing the data stored in the data dictionary.

Benefits derived initially from the data dictionary fall into one of four categories: standards, system integrity, system development and documentation.

Standards:

- Can automatically be controlled.
- Allow controlled changes to programs, systems, files and data elements.
- Provide standard verification procedures.
- Provide standard definition and descriptions.
- Aid in resolution of terminology.

System Integrity:

- Reduces and points out redundancies.
- Indicates interrelationships of resources between systems.
- Provides auditors with information on system functions.
- Creates a repository of all system information and integration.
- Allows for utilization of standard data definition and descriptions.
- Reduces the amount of information that is lost because of turnover of staff personnel.

System Development:

- Utilizes a central repository of data to help reduce the time needed to gather information.
- Indicates impact on existing systems.
- Utilizes descriptions of data elements to reduce program development time.
- Uses standard verification procedures.
- Provides the means to centally develop test data.

Documentation:

- Creates a central repository of data.
- Provides for system, subsystem, program and file documentation.
- Provides report descriptions.
- Provides for record layouts.
- Identifies users of data resources.
- Provides consistent documentation.

In summary, the benefits derived from the data dictionary are very diversified and, when administered correctly, will form a very powerful tool for management. This tool can be used by all levels of management and its staff to perform required tasks.

Facilities Categories

The facilities of a data dictionary can be separated into three categories, report, control and excerpt:

The reporting facility is the vehicle used to indicate the contents of the data stored in the data dictionary. It shows the interrelationships of the data and their attributes.

There are many types of reports that can be produced, so at this time it is better to just define the three areas into which these reports fall. The first area, detail reporting, consists of consolidated reports on individual data critieria such as systems, files, users and data elements.

The second area, cross-reference reporting, is used to indicate interrelationships of the data stored in the data dictionary, such as files to programs; programs to systems; and users to systems.

The last area, summary reporting, is used to summarize data entities stored in the data dictionary. This facility is a very powerful tool that can be used by all levels of management.

The control facility, a very powerful vehicle in the MIS environment, can be used to detect MIS standard exceptions, user authority and documentation requirements.

Standards exceptions can take the form of making sure standards validation procedures are being followed for specific data criteria during update functions.

User authority is the ability to give control of updating data to specific areas that will be held responsible for that data, and in the data base environment, of restricting access to the ability to view or update the data base.

The documentation requirements will be in the form of an automatic function of documenting specific systems and system components, such as automatic program code documentation. These control facilities will help to standardize and maintain a uniform environment which, in turn, will increase productivity and confidence.

The excerpt facility is where data is directly retrieved or utilized from the data dictionary. Using this facility, code can be created from the data dictionary and copied directly into programs.

Code can take the form of work areas, file definitions, record descriptions or even procedure code to perform specific tasks. Utilizing the data directly will create test data from descriptions stored in the data dictionary or create interactive fields for on-line query languages.

A last feature of the facility is the ability to automatically copy documentation into source code. These features will help enforce standards and reliability by extracting from a standard pool of data.

Potential Users

A data dictionary user is anyone responsible for providing or needing to use data dictionary data. Users can consist of both MIS and non-MIS personnel, at either the staff or management level.

In the MIS area, all levels will use the data dictionary in one way or another.

(Continued on SR/36)

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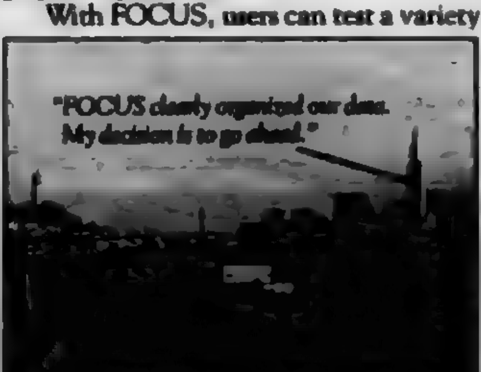
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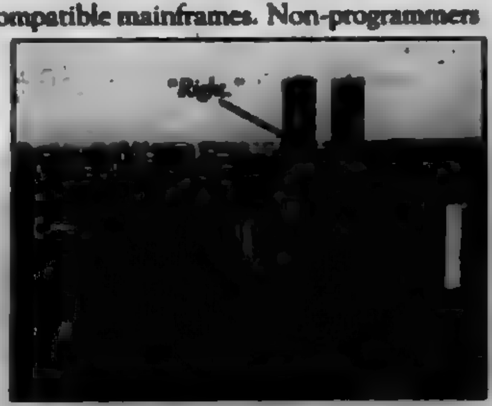

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Data Base Integrity Protected

Test Data Bases Expedite Application Design

By James Bando
And Paul Meier
Special to CW

MADISON, Wis. — An objective of every organization is to put an application that is well-tested into production. Applications developed using traditional file access methods are difficult to test thoroughly, but when using a data base management system (DBMS), it is often more complicated because of the many interrelationships between the data items.

At Verex Assurance, Inc. here, the operating environment consists of running a production DOS/VS operating system and a testing DOS/VS operating system under VM on an IBM 3031. Verex uses Software AG's Adabas, as the DBMS. The on-line production data base contains four major files and several minor files totaling about 1.1 million records (600M bytes). The off-line data base is comprised of four major files containing about 500,000 records (200M bytes).

As more fields were added to files and more files were added to the data bases, it became increasingly difficult to maintain a test data base that contained up-to-date data representative of the production environment. This was due in part to the difficulty in moving a representative amount of data from the production data bases to the test data base.

In addition, all of the files on the production data bases are interrelated, making it necessary to recode programs to extract the records every time files or fields were added or changed. Consequently, the test data base was not often maintained, leaving applications to be tested using the production data bases, a very dangerous practice, or inadequately tested using the test data base. Verex realized that there were significant problems in this area.

Verex decided to implement a formal Test Data Base System (TDBS). After researching other organizations, it was determined that they were little better off. So, Verex decided to develop its own.

There were several objectives to be accomplished by the TDBS:

- Provide a good representation of the production environment.
- Provide up-to-date data.
- Make the test data easily available to the applications staff.

The system developed consisted of three parts:

- Three active test data base areas: These are the disk areas allocated to contain the test data bases. This allows up to three test data bases to be available at all times.
- An unlimited number of test data bases backed up on tape. The application programming staff keeps track of their own test data bases. They are restored on one of the three test data base areas as needed.
- Six procedures to maintain the test data bases.

One of the active test data base areas contains a standard test data base that can be used to test many applications. The other two are available for the application programming staff to create specialized test data bases. This keeps the standard test data base clean. Specialized test data bases can be used to test update programs or create test data bases for a new version of the DBMS without impacting other testing.

The application programming staff is allowed to have an unlimited number of test data bases backed up on tape. When needed, they can be restored to one of the two special test data base areas for use. Of course, this means only two at a time can be used.

The six procedures are used to manipulate the test data bases. They consist of manual actions, programs written at Verex and utilities distributed with Adabas. The procedures are controlled by data base administration and are run upon requests from the application staff. The procedures are:

- Set up a data base. This allows a new test data base to be created from any existing production or test data base. Specific records and files can be selected to test specific applications, or records can be selected randomly. The main component of this procedure is a program that selects data from any file. It needs no reprogramming when files change characteristics.
- Select data. This allows files to be replaced on a test data base with a new test file; files to be added to an existing test data base; and sequential extract files to be created from any data base to be used in a test or production environment.
- Modify data. This allows data on any test data base to be modified and is especially useful for testing new applications for which there is no data currently available.
- Maintenance. This allows maintenance to be done to any test data bases, whether active or backed up. Maintenance includes adding new fields to files and installing a new version of the DBMS.
- Backup. This allows an active test data base to be backed up and lets many users use the same active data base areas on disk for their data base.
- Restore. This allows a backed-up test data base to be restored to one of the active test data base areas at any time.

The system has been in production for only a short time and has shown encouraging results. All of the objectives have been met. The system uses no more resources than were used before.

Bando is technical support manager, in charge of systems programming and data base administration, at Verex Assurance, Inc. in Madison, Wis. Meier is a data base analyst for the mortgage and insurance firm.

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Dictionary Benefits Defined

(Continued from SR/35)

Project managers can use it to keep track of all their systems and their statuses. System analysts will use it for documenting systems and system components and for evaluating information when designing new systems. Programmers will be utilizing it to copy code into their programs.

If additional attributes are added to entities stored in the data dictionary, operations can use it to help in scheduling. Upper management can use it to gather information on projects and systems needed for presentations.

Non-MIS users are DP auditors; user department personnel responsible for specific systems; and business analysts.

DP auditors will use the data dictionary whenever they need information on systems, programs or controls. User departments can use the data dictionary to keep control, review, document and monitor systems. Business analysts can use it in research in developing ideas of using or enhancing the data they have.

It is not the intent of this article to portray a data dictionary as a quick solution to many of the problems all MIS departments have. The installers of the data dictionary in a corporation have numerous jobs ahead of them. They have to develop data dictionary standards, procedures and schedules that will efficiently utilize the data dictionary and conform to the MIS standards within the corporation.

They have to win the support and enthusiasm of the MIS staff, which will now use the data dictionary. Finally, they have to deal with the political entanglements that occur when crossing departmental boundaries when data is to be placed into the data dictionary.

Novak is data base designer analyst for Cadence Industries Corp. in West Caldwell, N.J.

Shipyard Charts Data Base

(Continued from SR/33)

dundancy has been eliminated in DBMS applications.

In 1979 a Plant Engineering Maintenance system was successfully implemented and through its use, the plant engineering maintenance department was able to save a considerable amount of money annually. This multiple data base system helped the department place first in the American Institute of Plant Engineers' "Outstanding Plant Engineering Program of the Year" in the large plant category.

Data integrity has greatly increased by elimination of data redundancy and by provision of timely information to DBMS system users. Through the use of DBMS applications the users are able to obtain immediately, via inquiries, timely information.

Information Systems' computer configuration consists of two IBM 370/-158 processors coupled that run under MVS JES3. More than 100 terminals tie into the mainframes using TSO and CICS.

Davidson is manager of business applications at Ingalls Shipbuilding, Inc. in Pascagoula, Miss.

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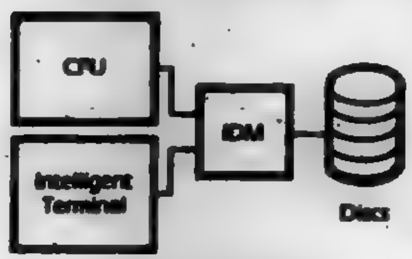

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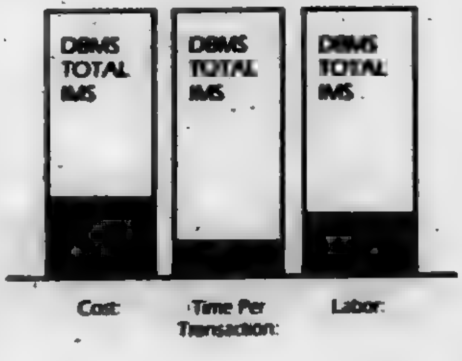

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FCC Investigating Bell's Unbundling Of Service Charges

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – AT&T's practice of charging separately for servicing private-line and Dataphone Digital Service (DDS) customers who provide their own terminals became the subject of a Federal Communications Commission (FCC) investigation early this month.

The investigation was launched after Aeronautical Radio, Inc. (Arinc), which operates a large private-line communications network for most of the nation's airlines, protested a 600% increase in those charges. The increase, which the commission allowed to become effective this month, raises per/-visit charges from $11.35 to $80 for private-line users and from $27 to $80 for DDS customers whenever an AT&T repair technician finds customer-provided equipment responsible for service difficulties.

The FCC said AT&T's practice of bundling service charges for its own private-line and DDS terminals precludes ascertaining whether "unreasonable or unlawfully discriminatory charges are being levied against non-AT&T equipment customers for the

(Continued on Page 58)

Battle Looming Over Custom Calling II

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – Another bitter battle appears to be developing between AT&T and providers of on-line information services. The subject this time is Custom Calling II, a computer-based voice store-and-forward service Bell recently unveiled in Pennsylvania and plans to tariff in several other states during the coming year.

Last April, in its "final" Second Computer Inquiry decision, the Federal Communications Commission (FCC) explicitly listed such offerings as one kind of "enhanced" service Bell would have to provide through a separate subsidiary. Early this month, in a letter to FCC Chairman Charles Ferris, the phone company asked the commission to reinterpret its definition so that Custom Calling II can be offered directly by AT&T operating companies.

The new service is an "integral part" of the telephone network, AT&T Vice-President James R. Billingsley told Ferris. The value of Custom Calling II comes in part, he added, "from the universal availability of the network." Also, the phone company has commited $70 million to development of Custom Calling II ser-

(Continued on Page 60)

Users of CRT Terminals Blast Burroughs' Technical Support

By Brad Schultz
CW Staff

DELRAN, N.J. – Users rated several CRT terminal models low in technical support, but gave high marks for overall performance to a number of models in a recently published Datapro Research Corp. report, "All About Alphanumeric Display Terminals."

Burroughs Corp. was blasted by 21 users of 1,099 terminals in the technical support category of Datapro's survey, which assigned four points for "excellent," three points for "good," two points for "fair" and one point for poor. Burroughs' TD 800 series earned a 1.3 average in technical support from three users of 347 terminals – the worst average for any category the survey considered.

Burroughs' TD 700 and TD 830 series terminals had averages of 2.0 and 2.4, respectively, in technical support. However, the TD 700 series also won perfect scores for display clarity and keyboard feel and usability – getting 4.0 averages in those categories from four users of 181 units – as well as a 3.8 average in ease of operation.

Hazeltine Corp.'s Model 2000 terminal pulled a 1.8 average for technical support. In that category, 2.0 averages were tallied for Applied Digital Data Systems, Inc.'s (Adds) Regent 100; unspecified Digital Equipment Corp. models; unspecified Teleray, Inc. models; and Telex Terminals' TC 277.

Other terminal models with technical support averages less than 2.5 were DEC's VT-05 and VT-52; unspecified Hazeltine models; unspecified ITT Courier Terminal Systems, Inc. models; Univac's Uniscope

(Continued on Page 60)

Microform Processor Family Resolves Net Incompatibilities

MOUNTAIN VIEW, Calif. – A series of processors designed for the management of remote networks has been developed by Microform Data Systems, Inc.

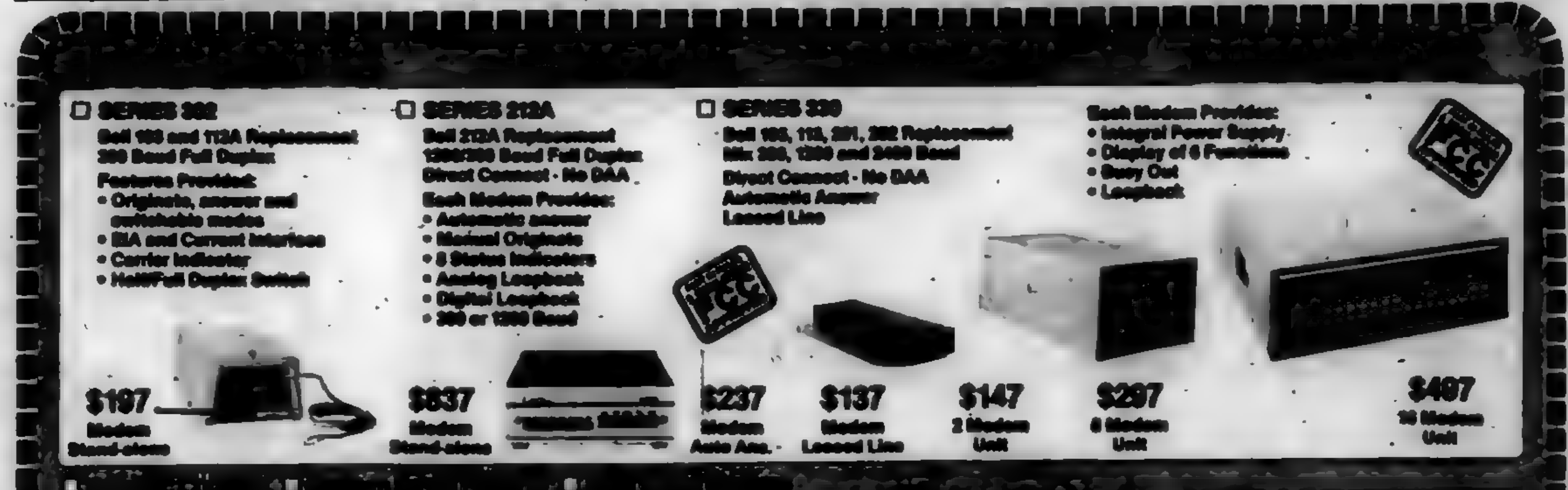
The Icot 257 series' microprocessor-per-line architecture and Icobus busing are said to enable users to solve network incompatibilities, build "smarter" networks and match processing power to network size and needs. Icobus provides interconnection, scheduling and data transfer between microprocessor ports, thereby acting as an intelligent link between any two network lines, according to the vendor.

Protocols exchangeable through Icobus include Bisync, Uniscope, Ascii Teletype, X.25/HDLC, SNA/SDLC, Pars and P1024. Other protocols are available by request.

As a remotely positioned communications processor, the 257 reportedly performs such network management functions as polling, message editing and processing, queuing, priority scheduling, diagnostics and error recovery, statistics gathering and security. The 257 accommodates data rates up to 9,600 bit/sec and accommodates up to 13 full duplex I/O lines on the standard unit, or more optionally.

There are three levels of firmware within the 257 series: physical control level, message protocol and application level. Hardware for the 257 Series includes 48K bytes of random-access memory (RAM) system memory, timing boards and up to 13 communications processor boards. Each processor board has 6K to 12K bytes of read-only memory (ROM) or programmable ROM, 2K bytes of RAM, an interrupt processor and a serial line interface.

Prices range from $13,000 to $30,000 from the vendor at 830 Maude Ave., Mountain View, Calif. 94043.



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$147 2 Modem Unit
$297 8 Modem Unit
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DEC Enhances DMC11 Controller

MAYNARD, Mass. – An enhanced version of Digital Equipment Corp.'s DMC11 communications controller has been announced by the firm.

The DMR11 is a synchronous unit able to interface to the new EIA RS449, RS423 and RS422 standard communication channels as well as the existing RS-232-C standard, according to the firm. The microprocessor-controlled unit also conforms to the latest release of the Digital Data Communications Message Protocol (DDCMP) Version 4.0.

The DMR11 is said to provide a point-to-point link between PDP-11 computers based on Unibus architecture and also VAX-11/780 minicomputers, according to the spokesman. The controller can be configured for high-speed operation using coaxial, biaxial or triaxial cables for computers located in the same facility.

The DMR11 is software-compatible with the DMC11 for such DEC software systems as VAX/VMS, RSX-11M, -11M-Plus, -11S and RSTS/E operating systems. It is also compatible with PDP-11 and VAX-11/780 versions of Decnet. Prices start at $4,200 from the company in Maynard, Mass. 01754.

Micro-Based Unit Allows Store-and-Forward Tasks

ROCHESTER, N.Y. – Sykes Datatronics, Inc. has unveiled a microprocessor-based unit for data store-and-forward applications, paper tape replacement and data logging from instrumentation.

The Comm-Stor I unit is compatible with any asynchronous RS-232 terminal, printer modem or instrument and is expected to fill the needs of users not served by the larger and more sophisticated Comm-Stor II family.

As a store-and-forward device, the Comm-Stor I unit allows retail outlets, warehouses, banks or any business relying on the slow, steady collection of data, to enter and edit transactions off-line. A day's transactions can then be transmitted at one time.

As a paper tape replacement, the unit is said to offer an 8-in. diskette in place of "hundreds of feet" of tape.

As a data logger, the Comm-Stor I can receive batched data at speeds up to 9,600 bit/sec and features automatic power failure recovery and an end-of-disk alarm feature.

The Comm-Stor I unit costs $2,395 from the firm at 375 Orchard St., Rochester, N.Y. 14606.

Bell Charges Investigated

(Continued from Page 57)

performance of similar maintenance functions. The commission pointed out that AT&T has not filed an increase in its bundled rates corresponding to the one proposed for users of non-Bell terminals.

This may indicate that "comparable charges are not being assessed," the commission said, but in any event, "the ability to determine whether and to what extent this is the case is impeded by AT&T's selective rate element bundling practice which prevents tracking of maintenance function costs."

The FCC added that it must make sure "tariff practices such as selective imposition of a separate maintenance charge do not become a vehicle against customers who provide their own equipment."

Initial comments from parties that wish to participate in the investigation (Docket 80-604) are due Nov. 7.

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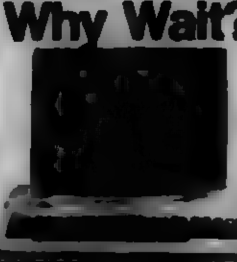

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AMERICAN TERMINAL

Concentrator Selects Host, Multiplexes, Routes

CHERRY HILL, N.J. — An intelligent network data concentrator said to provide multitrunk statistical multiplexing, alternate routing and host computer selection capabilities has been introduced by Infotron Systems Corp.

The Supermux 790 also reportedly offers centralized control of all resources in multinode networks and ensures error-free data transmission.

The Supermux 790 can be configured in various multipoint network arrangements with other 790 units and with Infotron Supermux 480, -680 and -780 statistical multiplexers, according to the firm.

The unit can be expanded in size and capability to handle switching, port selection and contention. It accommodates any combination of synchronous and asynchronous, dial-up and dedicated inputs at speeds up to 9,600 bit/sec, the vendor claimed.

Using statistical techniques, the unit concentrates up to 448 inputs for transmission to as many as eight different remote nodal locations at speeds as high as 72K bit/sec.

From the 790 console, an operator can reroute traffic, control all channel and link parameters, monitor input and initiate test and diagnostic routines to pinpoint problems in local or remote, unattended sites.

The Supermux 790 also accumulates system statistics that provide the quantitative data necessary to plan system expansion.

For the unit, cabinet, controller nest with power supply, expansion nest with power supply, on link module, 20 channels and a dual interface module, the price is $14,600 from the firm at the Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Supermux Gains Modem

CHERRY HILL, N.J. — Infotron Systems Corp. has integrated a full-duplex 4,800- and 9,600 bit/sec modem with its 32-channel Supermux 680 statistical multiplexer.

There is no external box, no cable and no division of responsibility, the firm said. The microprocessor-controlled modem operates over four-wire Type 3002 unconditioned telephone lines and features an adaptive equalizer that automatically compensates for changing line conditions.

The 9,600 bit/sec model also includes provisions for automatic fallback to 7,200 or 4,800 bit/sec.

The multiplexer provides error protection, priority control, data compression, flow control, down-line loading and hard-copy system status reports. Inputs may be any combination of synchronous and asynchronous, dial-up and dedicated with mixed protocols and speeds to 9,600 bit/sec.

The Supermux 680 uses statistical techniques to transmit only active data inputs, conserving bandwidth so that the throughput is double or better that of conventional multiplexers, the firm claimed. Every input has a priority/no priority switch that establishes the priority of that input for bandwidth on the high-speed output line, which also increases throughput, the vendor noted.

Users can reconfigure remote, unattended units from the central site and monitor system status with front-panel displays.

The multiplexer costs $4,000 from Infotron Systems Corp., Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Tran Multiplexers Now Sold in U.S.

MARINA DEL REY, Calif. — Tran Telecommunications Corp. is now marketing its multiplexers in the U.S.

The models M2111-1 to -4 Multitran multiplexers are built to support all common input speeds, interface types and trunk speeds. In addition, they are available in configurations to support as few as two low-speed channels and can be upgraded to support large numbers of input channels with aggregate data rates as high as 460K bit/sec., the vendor claimed.

The M2111-5 handles up to 460K bit/sec. and trunk rates of 1.5M bit/sec. Other features include synchronous and asynchronous inputs and multilevel loopback testing.

The products range from $4,000 to $8,000, depending on configuration, the vendor said from 2500 Walnut Ave., Marina Del Rey, Calif. 90291.

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CRT Terminal Users Blast Burroughs' Support

(Continued from Page 57)

200; and 2,872 units unidentified by 59 users.

Overall Performance

Overall performance, however, was a different story.

Perfect 4.0 averages went to Hewlett-Packard Co.'s 2640 and 2645 and the Teleray 1061 in that category. Not far behind were unspecified Tektronix, Inc. models (3.9); HP's 2621 (3.8); ITT Courier's 770/7750s (3.8); Ramtek Corp.'s 8025/8025As (3.8); Datagraphix, Inc.'s 132A/132B (3.7); DEC's VT-05 (3.7) and VT-100 (3.7); all Delta Data Systems Corp. models (3.7); the IBM 3276 (3.7); and Tektronix 4023 (3.7).

In overall performance, 209 IBM users gave their 7,869 terminals a collective average of 3.5. The collective averages for IBM were greater than 3.0 in every category.

The Datapro survey's maintenance service category gave Burroughs' TD 700 series a tie with the Telex TC 277 for last place at 2.0 and the unspecified group of Teleray terminals did not fare much better with a 2.3 maintenance service average. In contrast, HP's 2640 scored a perfect 4.0 average in the category and 3.7 averages went to the Datagraphix 132A/132B group and Tektronix's 4023.

Besides reaping a low average in technical support, Univac's Uniscope 200 had measly 2.4 averages in the categories of keyboard feel and usability and hardware reliability.

In the latter category, the unspecified Telerays also had a 2.4 average, but users showed great confidence in the reliability of the Datagraphix 132s, DEC VT-100, HP 2640, IBM 3270s, the Tektronix groups and Teleray's 1061.

In display clarity, Honeywell, Inc.'s VIP terminals had mediocre averages from 11 users of 209 units, while high averages went to a number of competitive products

Three Categories

In its $15 report, Datapro noted that CRT terminals fall into three general categories: dumb, smart and user-programmable [CW Special Report, March 31]. Usually compatible with Teletype Corp. teleprinters, dumb terminals offer a limited number of functions, Datapro observed.

Smart terminals, on the other hand, offer extended functions such as editing and formatted data entry, the report said. User-programmable terminals, which are often called intelligent (as opposed to smart), feature software support.

The report's user survey presents usable responses from 308 users of 18,119 installed CRT terminals, Datapro stated. Received by March 1, the responses totaled 549 because many users reported on more than one model.

Datapro asked the users whether their terminals served as plug-compatible replacements for another vendor's terminals. Of the 549 responses, 276 indicated emulation of either Teletype's Model 33 and 35 teleprinters or one of the following terminal families: IBM 3270, IBM 2260, Burroughs TD, Honeywell VIP and DEC VT.

Among single-station configurations, nearly two-fifths of the represented terminals have remote connections via communications lines with host mainframes, Datapro found. But less than 30% of clustered configurations had remote links. These clusters averaged five terminals per controller, the report stated.

Datapro is located at 1805 Underwood Blvd., Delran, N.J. 08075.

USERS' RATINGS OF ALPHANUMERIC DISPLAY TERMINALS

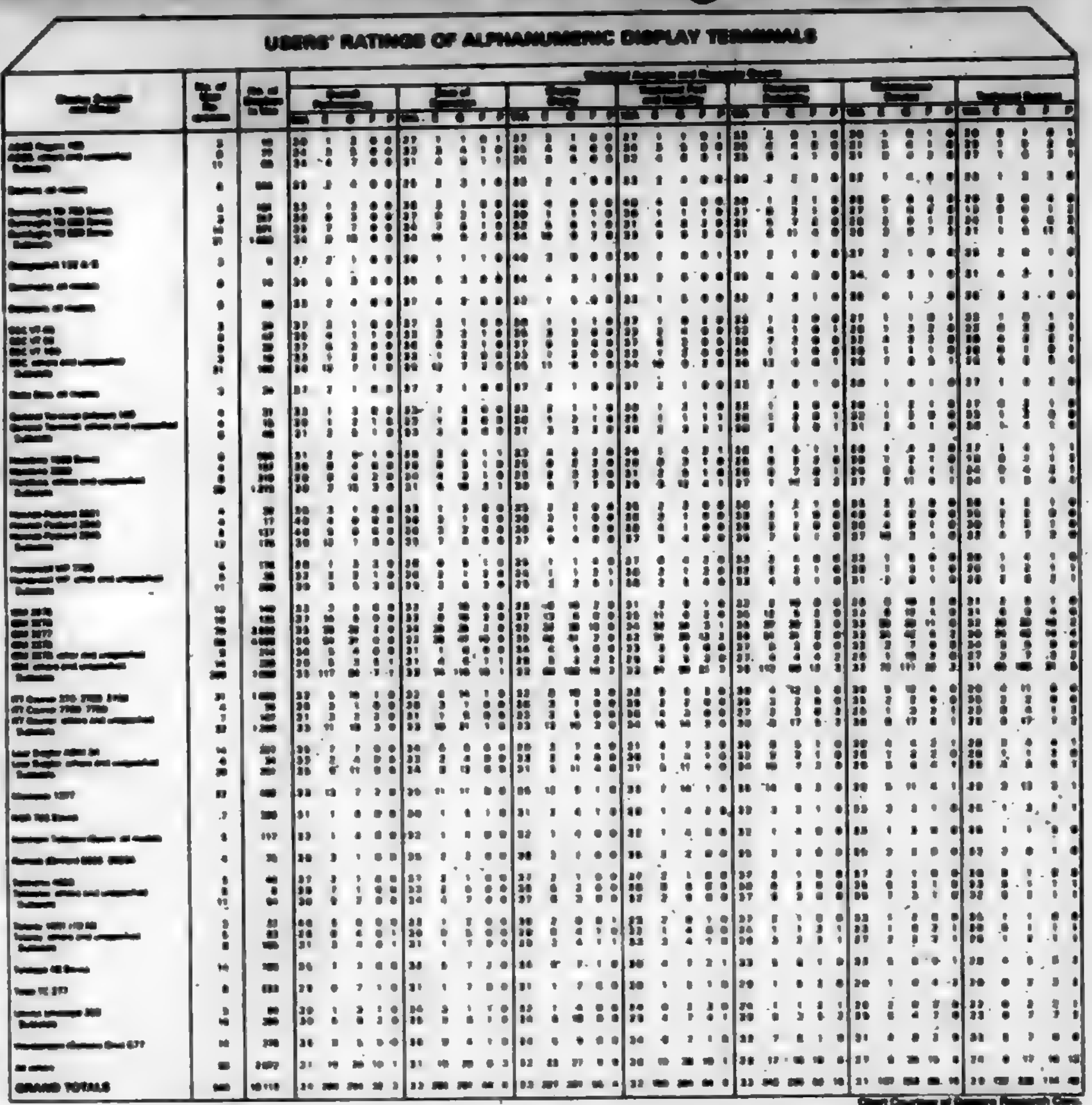
GRAND TOTALS

Chart Courtesy of Datapro Research Corp.

Weighted average (WA) is based on assigning weights of 4 to each "excellent" (E) response, 3 to each "good" (G) response, 2 to each "fair" (F) response and 1 to each "poor" (P) response.

Bell Asks Custom Calling II Tariff

(Continued from Page 57)

vices through 1981, plus "years of effort and planning," all of which have been "put in question" by the computer inquiry decision — particularly since "our Custom Calling II services cannot readily be redesigned . . . as enhanced offerings."

Two Options

The service consists essentially of two options, which AT&T refers to as "Call Answering" and "Advance Calling." The former allows a subscriber who is away from his phone, or who doesn't wish to receive calls, to have them stored in digitized form within the network on high-density disks.

Later, by dialing specified codes, the subscriber can retrieve these messages. Advance Calling allows the subscriber to store an outbound message within the network and have it delivered at a specified time.

Key features of Custom Calling II are its simplicity, universality and expandability. No special terminal equipment is needed, and stored messages can be received from or delivered to any telephone in the U.S. Thus, Custom Calling II leapfrogs existing electronic message systems, which are too expensive for most homes.

Voice-based teleconferencing is one of many possible extensions of the new service: messages could be input from several different senders, who, after reviewing each other's comments, could input new entries.

Through the Advance Calling option, a store could announce a "private" sale, then use the Call Answering option to collect responses from those who wanted to order or obtain additional information.

A Custom Calling II tariff is pending in Pennsylvania. It has been deferred by the Pennsylvania Public Utilities Commission until January, in response to objections from several telephone answering services. They have also protested to the FCC.

In his recent letter to the commission, Billingsley reported that similar tariffs "should soon be filed in New York, Illinois and Texas. We also have plans to file in Indiana, Wisconsin and Ohio by year-end 1981. Service offerings in the 1981-82 time frame are being planned as well."

ST[illegible]tems turn capacity problems in[illegible]nce opportunities.

[illegible] features which not only deliver high capacity, they incorporate architectural features designed to provide you with enhanced system performance.

Consider the 8650 high-capacity disk drive where, for even more responsiveness to your configuration and uptime needs, we offer three powerful enhancements. One provides you with a choice of mapping options for greater flexibility in data set placement and subsystem tuning. Another, STC's optional Media Interchange Switch, reduces the period of time data is inaccessible during hardware outages. Then there is STC's Dual Port feature, which [illegible] both performance and [illegible].

[illegible] 8380 High-Performance Disk Drive [illegible] 16ms access speed with Dual Port to make your [illegible] the fastest available today.

[illegible] way to higher performance.

STC's optional volume-interleave mapping places the logical cylinders of primary and secondary volumes into alternating physical cylinders. This approach greatly simplifies migration, tuning and management, since the high activity data sets of each volume will fall on adjacent tracks — minimizing intervolume seek contention.

Thanks to the high-speed servo, seek times will be better than those offered by single density spindles.

Given these attributes, volume-interleaved 8650 spindles are ideally suited for the majority of user DASD storage applications, on-line systems, and low-to-moderate activity data.

STC's back-to-back mapping consolidates the logical volumes in two separate regions. This approach takes maximum advantage of the dense track spacing and high-speed servo to slash intra-volume seek to a mere 18ms. average.

With these characteristics, back-to-back mapped 8650 spindles are best for special applications which can be closely scheduled and managed. For example, use the primary volume for TSO catalogs and TCAM queues with high prime-shift activity, while allocating the secondary volume to batch data only run second or third shift.

The Media Interchange Switch: [illegible]

Industry-wide statistics show that most problems occur in the drive electronics, not in the HDA. STC's new Media Interchange Switch (MICS) reduces the impact of electronics-related problems by cross-connecting the HDA of spindle A with the electronics of spindle B (or vice versa). This means that if one spindle goes down, you can access your data through the companion spindle's electronics.

Or you can reserve one or more of your secondary logical volumes as a low-cost subsystem spare, and let MICS give you data portability that approaches that of the old disk pack in convenience.

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STC's Dual Port option provides path redundancy and improves accessibility. It permits your CPU to access data from any two spindles simultaneously, regardless of their location. This produces a data availability factor of 94% and virtually eliminates disk subsystem single point failures.

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Backing up your STC disk subsystem performance are the uncompromising STC Systems Engineers. Using software tools, they'll examine your SMF data and assist you in placing data across channels, strings and volumes for maximum results on your job mix. Once your subsystem is up and running, they'll continue to provide ongoing consultation to ensure your long-term satisfaction.

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STC's 8380 and 8650 are available for immediate delivery. For more information, including our Mapping and MICS Data Sheets, contact your local STC sales office. Or write: Storage Technology Corporation, 2270 S. 88th Street, Louisville, CO 80027. Phone (303) 673-5151.

Media Interchange Switch lets you recover data quickly in the event of hardware failure.
Average seek time is [illegible] for either volume.
Volume interleaved mapping alternates cylinders of primary and secondary logical volumes to minimize seek contention.
Average intra-volume seek time is 18msec.
Each spindle stores 635 Mbytes in two logical volumes, or 1260 Mbytes per unit.
Back-to-back mapping places logical volumes in two contiguous regions.

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Interactive Communications

TI DS990 Gets Remote Controller

HOUSTON — A remote terminal controller (RTC) for use with Texas Instruments, Inc.'s DS990 models 4 through 30 has been announced by the firm.

The RTC reportedly provides the DS990 general-purpose computers with interactive remote communications via leased or switched common carrier lines.

Designed to provide a cost-effective solution for installations that require remote terminals multidropped off the same communication line, the RTC can support multiple Model 911 CRT terminals, Model 810 printers, Model 810 KSR terminals and Model 743 KSR terminals.

The RTC is based on a TI 990/3 microcomputer with 64K bytes of memory and includes a Model 911 CRT terminal. It supports rates up to 9,600 bit/sec.

The controller uses the binary synchronous communications protocol provided by the remote terminal subsystem (RTS) communications software, which must be purchased separately.

The tabletop RTC costs $10,600 with a TI synchronous internal modem and $8,600 with a Bell data set interface. The pedestal version of the RTC is $12,450 with a TI synchronous modem and $10,400 with a Bell data set interface. The RTS communications software license is available for $1,100 and includes one year of software updates and support.

TI's Digital Systems Group can be reached through P.O. Box 1444, M/S 7784, Houston, Texas 77001.

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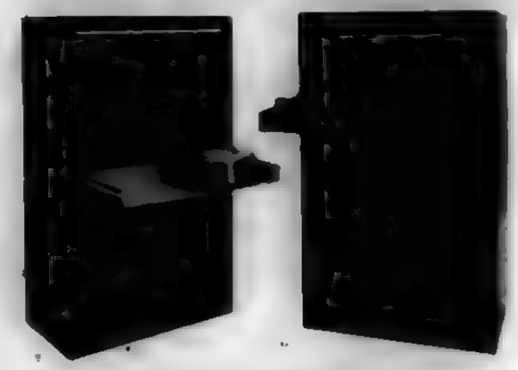

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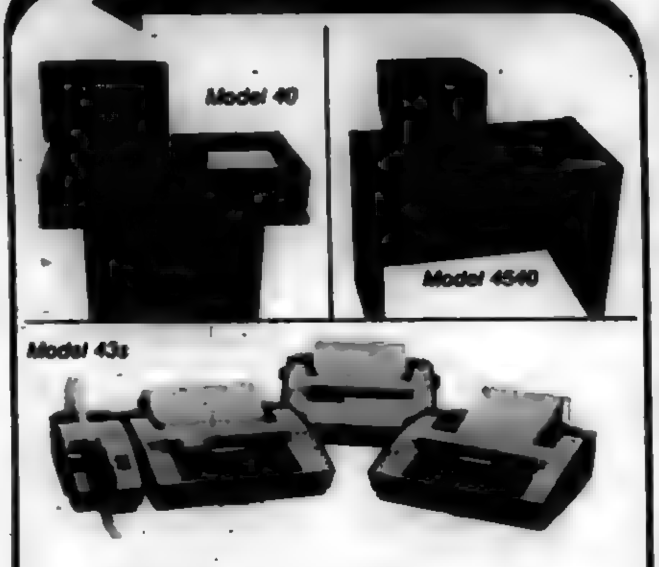

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Modem Acts As Bell 103A

BOULDER, Colo. — A 300 bit/sec Bell 103A-compatible modem is being offered by Komda Corp. as a replacement for the acoustic coupler. The Model HS2500 modem was designed for multiline use.

Komda is the sole licensee under a pending patent application covering the concept of a plug-in handset modem for use with modular telephones, the vendor claimed.

An automatic signal level compensating circuit, in conjunction with a high-quality active filter circuit, permits operation under varying and marginal conditions, including long-distance connections, a spokesman said.

The price for the product is $285, the vendor said from 2500 Central Ave., Boulder, Colo. 80301.

Rixon Adds Data Set

SILVER SPRING, Md. — An originate-only 0- to 300-bit/-sec full-duplex acoustic coupled modem designed to transfer data over normal voice-grade lines using the most commonly available telephone sets is being offered by Rixon, Inc.

The ACM300 requires a receiving unit capable of operating in the answer mode, such as a Rixon T103A, T103J, T113B, T113D, T212A or equivalent. Both voltage — EIA-RS-232C — and current — 20 mA — interfaces are provided in each modem.

The unit provides positive mechanical locking of the handset, noise isolation and a vibration technique using direct microphone-handset coupling, the vendor said, and costs $295 from Rixon at 2120 Industrial Parkway, Silver Springs, Md. 20904.

The Model 607

Aydin Set Tests Transmission Systems

FORT WASHINGTON, Pa. — Aydin Monitor Systems has unveiled its Model 607 data transmission test set, designed to test, evaluate and maintain data transmission equipment and systems operating in the range of 10 bit/sec to 100M bit/sec.

The unit measures bit error rate, block errors, second errors, block and second throughput and presents the measurement results on a formatted 5-in. CRT display, the vendor said.

Control of the unit can be accomplished from the front panel or via the IEEE 488 bus. A printer may also be connected to the bus to provide hard copy of test results and unit setup parameters.

The price of the unit is $14,500, the vendor said from 502 Office Center Drive, Fort Washington, Pa. 19034.

Monitor Bus Controller Joins Digi-Log System

HORSHAM, Pa. — Digi-Log Systems, Inc. has added the MBC-1200 monitor bus controller to its Network Supervisory System.

The MBC-1200 facilitates local or remote — up to 300 feet — diagnostic monitoring of any line within a data communications network without physically changing any connections and without interrupting normal network operation, the vendor claimed.

The product addresses and selects for monitoring any of up to 256 lines or channels via a thumbwheel dial and select button on its front panel. The selected line or channel is connected to a monitor bus that electronically isolates the line to eliminate failures that may result from loading by the diagnostic equipment, a spokesman said.

The AM/20 Alarm Module is also available. It plugs into the network supervisory system and produces a continuous audible and visual alert to abnormal conditions that occur within a data communications system, he added.

The monitor bus controller costs $675 and the alarm module, $240, the vendor said from Babylon Road, Horsham, Pa. 19044.

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For more information, contact your local National Advanced Systems sales office, or contact Marketing Dept. [illegible], 3145 Porter Drive, Palo Alto, CA 94304, 415/856-5000.

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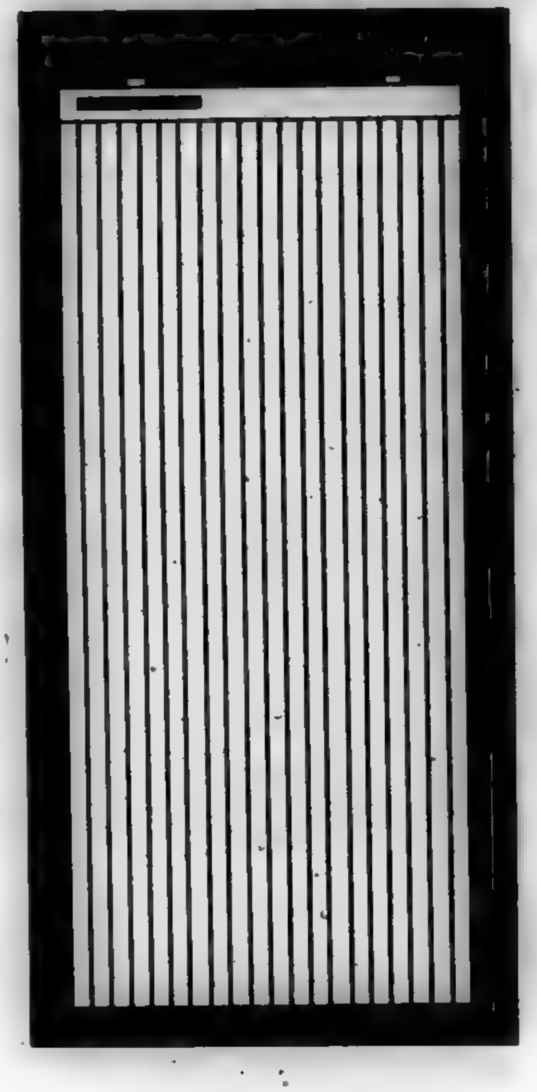

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You want throughput power. With the 3220, you can attach more than 1,000 devices on its multiplexor bus with a throughput of 400K bytes per second. An extended direct memory access bus includes seven ports, each of which can serve 16 controllers, providing high-speed direct memory access with a throughput of 8 million bytes per second.

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Bits & Pieces

HP Combines Drives In 240M-Byte System

PALO ALTO, Calif. — Hewlett-Packard Co. has combined two HP 7925S add-on disk drives to form a 240M-byte disk system.

The HP 7925T can increase storage on HP 1000 and 3000 systems by 12%. The combined add-on drives list at $29,950, $4,050 cheaper than the cost of the two drives separately, the vendor said.

The combined drives, called the HP 7925T, have an average random seek time of 25 msec and a track-to-track seek time of 8 msec, the vendor said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Impact Printer Offers 'Quick Cancel' Feature

SALT LAKE CITY, Utah — Micro Peripherals, Inc. has unveiled its general-purpose Model 88G impact matrix printer.

The printer features 100 char./sec bidirectional or unidirectional printing with a short-line "quick cancel" feature, giving throughput rates of up to 150 line/min, the vendor claimed.

The product costs $799 with a high-resolution dot-addressable graphics option and $749 without, from 2099 W. 2200 S., Salt Lake City, Utah 84119.

DMA Transfer Board Runs Four Disk Drives

CHAMPAIGN, Ill. — A cartridge disk controller board said to allow DMA transfers to or from as many as four standard cartridge disk drives with capacities of 2.5M to 20M bytes is available from Central Data Corp.

The board contains a CRC generator that detects any errors and allows overlapped seeks on up to four drives, reportedly increasing throughput on large systems.

The board, Part No. B-1016, costs $575 from 713 Edgebrook Drive, Champaign, Ill. 61820.

Diesel Generator Sets Back Up Large Users

MIDDLETOWN, N.Y. — A line of diesel electric generator sets designed to supply standby power for large computer installations is available from KW Control Systems, Inc.

Available in ratings from 125- to 1,000 kW, the Piller Diesel Electric Generators are designed expressly for installations that experience long-term power interruptions as well as being usable as power backup for an overall energy management system, according to the firm.

Prices for the sets range from $22,800 to $138,000, a spokesman said from R.D. No. 4, Box 114C, S. Plank Road, Middletown, N.Y. 10940.

Daisy-Wheel Unit Uses Text Output Processor

TUCSON, Ariz. — A hardware/software combination implementing a text output processor for use with daisy-wheel printers has been introduced by Scroll Systems, Inc.

The Retroscroller works with any host computer and any host text editor, the firm stated. Text can be proportionally spaced, words can be underlined, boldfaced or printed in various combinations. Mnemonic control sequences can be entered into print text using any editor on any computer supporting RS-232 serial communication links according to the firm.

The Retroscroller costs $750 from Scroll Systems at 6930 E. Acoma Place, Tucson, Ariz. 85715.

Versatec Plotter Updates Include Backplates

SANTA CLARA, Calif. — Versatec, Inc. is offering enhancements to its Series II electrostatic plotters that include electrically biased backplates, hybrid nib drivers and a centralized cooling system.

The backplate reduces toner signature during mid-plot pauses, improving stop-start and remote output quality. The hybrid nib drivers replace discrete components for less heat and greater reliability and the centralized cooling system reduces operating temperature for longer component life, the vendor claimed.

Versatec Series II plotters are priced from $20,000, the vendor said from 805 Bowers Ave., Santa Clara, Calif. 95051.

User's 8100-Based DDP Means Reorganization, New Business Methods

By Connie Winkler
CW Staff

NEW YORK — In moving to a large, IBM 8100-based distributed data processing (DDP) operation, Royal Insurance started two new departments — and changed the way the company does business.

The departments, one to review subsequent DDP architecture and one to troubleshoot hardware and software operations problems, are just two of the changes Royal made as a result of a massive effort to distribute DP capability to its offices around the country and yet maintain central control, Robert F. Dadd told a session on DDP sponsored by the Association for Women in Computing (AWC) here recently.

The effort, a cooperative one with IBM, is Field Office Network Development (Fond). Envisioned in 1973, development began in 1975 and is expected to continue through the mid-1980s, said Dadd, director of DP for systems and programming.

Fond was initially eight IBM 3790 controllers, but those were replaced after IBM announced the 8100 in October 1978.

Today there are 14 Royal locations serviced by 8100s including 10 processing centers at either large branches or regional offices and four downstream operations that are supported by those 8100s. The 8100s will be replaced by the coming 8100Bs, Dadd said.

The main regional 8100s with 387K bytes of memory run 12 to 14 terminals and one printer, while there are six terminals and a printer at the downstream offices. Royal trained employees at the regional offices to operate the 8100s, Dadd said.

SDLC Employed

The 14 8100 locations communicate with the company's headquarters here via leased lines employing IBM's Synchronous Data Link Control (SDLC), a feature of Systems Network Architecture (SNA).

The host processors are an IBM 3033 with 6M bytes of memory and as backup, the 370 Model 168 AP running 8M bytes and MVS/OS. Royal in New York has 128M bytes of disk storage.

"Our contacts when we were looking at the 3790 showed we were looking at the beginning of a long line of DDP equipment," Dadd said. "We didn't want to get locked into a particular technology.

"It was a business decision that got us looking at distributed processing," Dadd recalled. Since the 1960s Royal had been running a centralized operation with IBM 3270 dumb terminals.

(Continued on Page 66)

Crepe Soles and Polyester Computer's Worst Enemies?

By Tim Scannell
CW Staff

ORLANDO, Fla. — Synthetic fiber sweaters and crepe shoe soles may be a computer's worst enemies. A person wearing them in a dry room can generate enough static electricity to destroy a computer's printed circuit boards or MOS memory devices.

In fact, insulated shoe soles, synthetic fiber clothing or carpets and even plastic envelopes and bags are probably the single biggest cause of both soft and hard data errors in most computer installations, according to Jim Palmer, a researcher at Univac's Roseville, Minn., facility.

Not only can static electricity not be prevented totally, but it is a universal problem that is growing worse as the computer technology becomes more compact and sophisticated, Palmer observed.

Speaking at a recent gathering of Univac 1100 series computer users here, Palmer began by giving a brief "high school rundown" on the physics of atoms and electrons and then plunged into a description of the hidden static electricity dangers lurking within even the most sterile computer room.

Simple Phenomenon

First of all, he explained, static electricity is caused either by rubbing two insulators together, which would happen if an operator with crepe soles shuffled across a synthetic fiber carpet, or by pulling two insulated surfaces apart. The latter case might simply involve lifting a magnetic tape reel from a plastic-topped surface.

The physics of static electricity are simple. For instance, when a crepe-soled operator shuffles along the rug he is picking up negative charges, Palmer said. When he reaches the processor, which is usually positively charged, electrons will jump from the machine to his body.to equalize the positive and negative charges. Generally, a spark will be seen and felt by the operator during this equalization process.

What can't be seen, however, is the internal damage that could be done to the processor. The operator in the above case can potentially generate a charge of up to 40V. Most MOS transistors and memory devices contain wafer-thin parts, particularly glass, that can be destroyed by as little as 30V, Palmer noted. And the effects of static electricity are even worse if the processor's cabinet door is ajar at the time of the electrical mishap.

Adding to the dilemma, Palmer explained that static electricity can destroy printer circuit boards or other internal devices at the manufacturing stage, resulting in new but faulty computer equipment.

Recent Recognition

Although static electricity is a very real problem, especially for newer machines that have shorter data pathways and therefore a shorter distance for the charges to travel, vendors have only recently acknowledged its effects. In fact, Univac didn't start to tackle the problem se-

(Continued on Page 66)

Unit Captures Handwriting

CHICAGO — A peripheral that captures handwritten data at the time of writing as well as alpha, numeric and special characters and translates it directly into machine-readable form has been introduced by Micropad, Inc. The unit incorporates both RS-232C/V.24 and 20-mA current-loop interfaces and can be connected to any kind of computer, the firm said.

Micropad consists of a writing station with an integral 40-char. line display, expandable by optional connection to a full CRT terminal. Character recognition takes place within Micropad; all that is transmitted to the computer is the Ascii character plus its position, the vendor explained.

Micropad costs $2,950 from the vendor at Suite 1510, 35 E. Wacker Drive, Chicago, Ill. 60601.

Extinguisher Geared To DP Room Fires

SANTA CLARA, Calif. — A fire extinguisher designed to fight computer room fires without damaging hardware or data is available from Inmac Corp.

The Data Rescue uses Halon 1211, a chemical agent more effective than CO^2 in fighting fires but safe for electronic equipment, the vendor claimed.

The extinguisher comes in three portable models ranging in price from $62 to $230, the vendor said from Department 1026, 2465 Augustine Drive, Santa Clara, Calif. 95051.

DDP Changes Business Methods

(Continued from Page 65)

However, the intensity of the paperwork involved in the fire and casualty insurance business, the geographic spread of the company and the complexity of the applications — some requiring 100 clerical tasks — prompted Royal to look seriously at DDP.

Further the average record size is 3,000 to 5,000 characters and the insurance business imposes a high level of maintenance because of outside regulations and requires a high level of systems availability. The assembly line at Royal is putting together pieces of data to provide processing information, Dadd said by analogy to manufacturing operations.

Task Force

A Royal task force of users, beginning in 1973, studied the needs of the company's next system for 18 months. Once the system characteristics were defined, systems designers went to work and came up with Fond, which is a combination batch processing system running under IMS, and the on-line DDP system, Dadd said.

"Royal was adamant about maintaining centralized control of programming and software," Dadd said. What it came up with is a flexible but huge system of 1.5 million lines of production code and "it's still growing."

Incorporating DDP into the system added complexity because designers had to answer the question where the data would reside and which of the 275 system functions should be distributed, the DP manager said.

"In answering those questions tradeoffs had to be made. We needed to develop something we never had before, a cohesive architecture," Dadd said. Thus the architecture design department that endures today.

For those decisions to centralize or distribute function, Royal maintained thorough documentation. That has proved beneficial since decisions can be reevaluated later, Dadd said.

And there have been some major changes to the system, Dadd noted. Initially the rating of policies, which required complex arithmetic calculations, was done centrally. With the increased memory of the 8100, however, that function has been distributed.

There were also numerous data base considerations, although Royal basically wanted the data base centralized, and the remote locations now have subsidiary data bases.

Royal had to develop its own control software for its remote operations, Remote Operations Control Software (Rocs), in a joint effort with IBM. IBM has since released its over version, Display Management System.

Would Royal go through this again? "Not an easy question to answer," Dadd said. "A large part of what we have done was analyzing the business. The analyses we did we would have done anyway, and we think we would utilize the same hardware answer."

Crepe Soles May Be Enemy

(Continued from Page 65)

riously until about three years ago when it began having problems with its own machines, Palmer stated.

This ignorance is why most standard DP articles such as plastic magnetic tape sleeves, disk pack covers and plastic and Styrofoam packaging material are tremendous insulators and therefore capable of carrying charges of sometimes up to 100 kV, Palmer continued. The research on static electricity could be compared to a quart bottle "where we don't even have the first ounce yet," he added.

While static electricty can not be totally eliminated, the voltage of the charges can be reduced to negligible amounts. Users can protect a system against static electricity damage by keeping the computer room's humidity at vendor-recommended levels, banning all unnecessary plastic, and using air ionization devices that stabilize the balance between an area's negative and positive electrons. Conductive wheels should be used on any type of cart or dolly and maintenance personnel should not use any kind of waxes or aerosol sprays within the computer room, Palmer said.

In extreme cases, a user can install grounded false floor grids or conductive tiles, he added.

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System/3 Comes in Next

Microdata Takes Top Slot in User Survey

By Bruce Hoard
CW Staff

CHERRY HILL, N.J. – Microdata Corp.'s small business computers and peripherals came out on top in Management Information Corp.'s MIC fifth annual Small Business Computer Users Survey.

The survey, conducted to determine how well computer products are meeting users' needs, drew more than 600 responses from companies using 900 small business computer systems and 1,446 peripheral devices.

Each respondent was asked to evaluate his equipment bsed on performance, reliability, ease of use, maintenance and manufacturer support. The survey's rating code awarded a 4 for excellent, 3 for good, 2 for fair and 1 for poor.

In the small business computer area, 41 respondents representing a total of 84 Microdata Reality systems rated them high in performance, reliability and ease of use with scores of 3.8, 3.8 and 3.9 respectively. Ratings for service and support were somewhat lower at 3.4 and 3.2, however, giving Reality an overall tally of 18.1.

Breathing down the leader's neck with a 3.6, 3.8, 3.6, 3.7 and 3.3 – a total of 18 – was the IBM System/3 Model 15. This sample was drawn from nine respondents, representing nine units, significantly fewer than the sample for Reality.

The IBM System/3 models 6 and 10 and the System/32 were the only other small business computers to average better than 3.

As for Peripherals . . .

With respect to peripherals, Microdata was first in disk drives, beating out Wang Laboratories, Inc. 18.9 to 18.3. The leader scored high throughout and was rated 4 in ease of use. Wang racked up 4s in performance and reliability.

The Microdata CRT beat the Qantel Corp. product, its only competitor, receiving 4s in three of five categories: performance, reliability and ease of use. Combined with a 3.7 in service and 3.8 in support, it scored a near-perfect 19.5. Qantel accumulated a respectable 18.5, falling down only in support, where it garnered a 3.

It was more of the same in tape drives, with

(Continued on Page 68)

A Look at the Sites

CHERRY HILL, N.J. – Besides rating small business computers, peripherals and software, Management Information Corp.'s (MIC) Small Business Computer Users Survey also unearthed other germane information about the small business computer market.

In profiling its respondents, the survey learned that 25.5% of them had between $1 million and $5 million in annual sales, while 21.3% took in from $500,000 to $1 million. Seventeen percent took in between $5 million and $10 million; 10.6%, between $10 million and $20 million; and 10.6%, more than $20 million. Firms with less than $500,000 in sales also represented 10.6% of the total sample.

Twenty-eight percent of the respondents were associated with services; 22%, manufacturing; 14%, wholesaling; 9%, retailing; 5%, finance; and 2%, transportation. Twenty-two percent were listed as being associated with other industries including computer sales, installation and support; industrial distribution; education; association gasoline dealers; and consulting.

(Continued on Page 68)

Multifunction Family Boasts Desktop to 16-Station Setups

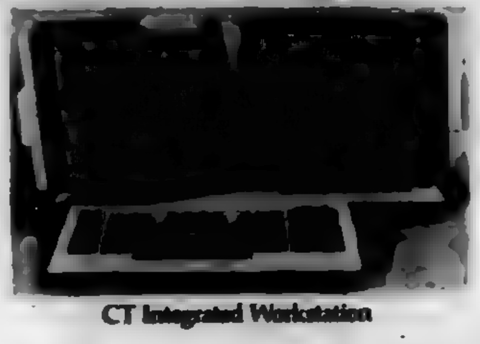
SANTA CLARA, Calif. – A multifunction-workstation-based line of computers that range from a desktop unit to a 16-station system with 50M bytes of Winchester and floppy disk storage has been unveiled by Convergent Technologies.

The CT family, consisting of six standard versions, is the year-old firm's first product offering and was reportedly designed to distribute processing power and data storage capacities into clusters of multifunction workstations and storage modules. The systems are geared for single-board computer users upgrading from dedicated to user-programmable applications and large end users requiring single- and clustered-distributed processing systems.

The CT-1111-1, the flagship machine, is a desktop computer with 128K bytes of memory expandable to 1M byte and 1M bytes of dual-floppy storage. Features include a fully programmable CRT display that is said to permit a variety of screen formats and an Ascii character set along with bit-map graphics, commonly used symbols and some foreign characters. Additional character sets are random-access-memory loadable, a spokesman explained.

The system can handle five programming languages, including Assembly, Basic, Pascal, Cobol and Fortran. The unit's CTOS operating system is a multitasking design

(Continued on Page 72)



CT Integrated Workstation

C Language Turnkey Doubles As Station or Network Node

CAMBRIDGE, Mass. – A microprogrammable turnkey software development system that operates in the C language and doubles as a computer network node or distributed station has been introduced by BBN Computer Corp.

The C/70 system uses C language functions and microroutines rather than assembler code and was reportedly designed to execute that language up to three times faster than other systems in its price range.

The unit features 20-bit addressing and has 16 times the single-program space of traditional minicomputer processors. It also has a real-time memory-only operating system for nondisk environments that can be used for data communications or real-time process control applications that do not require time-sharing, swapping or disk access, a spokesman said.

C/70 processor components include an 8K- by 32-bit micromemory, a 1K- by 12-bit dispatch memory, an arithmetic-logic unit, as well as a source and a destination bus. The computer also contains an instruction mapper and a memory management unit, the spokesman said.

(Continued on Page 72)

Lickety Brindle

(lik ete brind'l, org. OE liccian, ME brinde, n. 1) an efficient worker who performs with blinding speed. 2) a real trouper who's everywhere at once 3) a very busy person who needs electronic equipment fast and calls Leasametric to rent it now.)

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MIC Survey Profiles Small Systems Operations

(Continued from Page 67)

The respondent companies reflected a fairly even mix in terms of numbers of employees, ranging from 15% with less than 10 to 10.6% with more than 500.

Popular Applications

Accounts receivable was revealed as the most popular application among the users; it was used by 70.2% of the respondents. Following it were billing at 59.5%; payroll, 57.4%; accounts payable, 57.4%; general ledger, 57.4%; sales analysis, 53.2%; inventory, 46.8%; management information, 40.4%; and cost analysis, 29.8%.

Among its other findings, the survey discovered that ease of use and training topped the list of most important criteria in choosing a system. Eleven respondents chose ease of use and training as most important, eight said it was second most important and five ranked it third.

Thirteen tabbed reliability as the number one criterion, five said it was number two and five number three, to place that category close behind the leader.

Although only three people listed service as their number one criterion, it received enough number two and three votes to edge out the next finisher, software availability, for third place.

The others, in order of finish, were cost, expandability, manufacturer's reputation, processing capability, ease of programming and peripherals.

Asked which three computer manufacturers they would consider first if switching vendors, users most often mentioned Microdata Corp., Digital Equipment Corp. and Data General Corp. But 69.6% expressed content with their present systems and 26.6% felt their systems contained more capabilities than they could use.

Problem Areas

Among problem areas, interfacing with other systems and manufacturer support tied with 20.4% of the responses each.

Following those problems were program languages, flexibility, data capacity, reliability, costs and equipment design.

"Other" received 4.8% of the responses, putting it just ahead of equipment design. "Other" areas included application software availability (including across vendor lines), price competition in software and programming to meet users' needs.

Wish List

The "features, capabilities or characteristics" the users said they would most like to see on the next generation of small computer systems include:

- Communications between other computers.
- Faster processing speeds.
- Less expensive core and disk; hard disk storage.
- Simpler programming languages.
- Multitasking.
- Data base management.
- Better services.

"Judging from this listing and others we read on the surveys, it seems that small business computer users want those qualities taken for granted in larger computer systems to be implemented on smaller models," the survey concluded.

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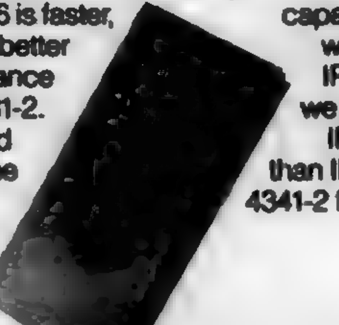

Microdata Tops In User Ratings

(Continued from Page 67)

Microdata topping out at 19.5 again. This time it registered perfect scores in performance, reliability and support. The Hewlett-Packard Co. magnetic tape drive was the only competition, checking in with scores ranging between 3.3 and 3.5.

Printronix, Inc. was the only firm to loosen Microdata's stranglehold on the peripheral market, bulling its way into a first-place standing in printers. The company accumulated a total of 18 based on 3.6, 3.8, 3.4 and 3.4 scores. Microdata was second at 17.7.

Overall in peripherals, Microdata averaged a total of 18.8, with an individual high average of 3.9 for ease of use.

In software, Microdata was outranked by Mini-Computer Systems, Inc., which rated a 19.3 total, compared with Microdata's 18.6 and Systems Management, Inc.'s 17.1. Those three vendors were the only ones that averaged ratings higher than 3. However, as the survey indicated, the "Microdata software" was not written by that hardware-oriented company, but software houses that distribute its computer products.

The survey is available for $15 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

TRS-80 Mod II Users Set Up Association

AUSTIN, Texas — To promote use of Tandy Corp. TRS-80 Mod II computer for processing problems and record-keeping for small businesses, the National Association of the TRS-Two Users has been formed.

Vernon and Gina Smith of Computersmiths, Inc., along with Don Bennett of Bennett's Business Services, Inc., formed the group, which is headquartered here.

Membership dues are $30 per year. More information can be obtained from association headquarters, which may be reached through P.O. Box 14091, Austin, Texas 78761.

LSI-11 Gains Configurations

MARLBORO, Mass. — Digital Equipment Corp. has added five configurations to its LSI-11 line of microcomputers. Four of the configurations were added to the LSI-11/23 family and one was added to the LSI-11/23 family.

The LSI-11/23 addition is an entry-level component package that consists of a central processor, 32K bytes of random-access memory (RAM), two serial lines, a clock and provisions for 8K bytes of read-only memory (ROM) or erasable programmable read-only memory (Eprom).

A package is also available that includes an LSI-11/2, 64K bytes of RAM, four serial lines, a clock, ROM/Eprom provisions and a software license for DEC's RTT run-time package, the vendor said.

The LSI-11/23 configurations offer 160K-K, 192K-, 224K- or 256K-byte memory units and enable users to establish logical growth patterns for their systems, DEC said.

The LSI-11 processors range in price from $3,000 to $5,900, and the LSI-11/2 models cost between $1,050 and $2,290, the vendor said.

Unibus Interface Emulates TM-11

JESSUP, Md. — Digi-Data Corp. is offering the Unibus Compatible Interface (UCI), designed to connect Digi-Data Series 40 formatted magnetic tape transports to Digital Equipment Corp. PDP-11 Unibus minicomputers.

Because the product emulates the DEC TM-11, it is compatible with standard DEC software. It offers the advantage of dual-density NRZI/-phase-encoded operation — without software modification, the vendor claimed.

Extent of Support

The board also supports 9-track 800 bit/in. NRZI, 9-track 1,600 bit/in. phase-encoded and dual-density 800/1,600 bit/in. operation. Tape speeds from 12.5- to 75 in./sec can be utilized.

The interface is compatible with any Digi-Data Series 40 tape transport with imbedded microprocessor controlled formatter. Multiple transport systems of up to three slave transports daisy-chained to a formatted master transport can be configured, a spokesman said.

The price for the board is $1,500, the vendor said from 8580 Dorsey Run Road, Jessup, Md. 20794.

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Tape Controllers Offered For PDP-11, LSI-11s

CRANBURY, N.J. — Dataram Corp. has announced the T04 and T34, a family of dual-density tape controllers for Digital Equipment Corp.'s PDP-11 minicomputers and LSI-11 microcomputers.

Dataram's T04 is compatible with the LSI-11 and the T34 is compatible with the PDP-11, the firm said.

The T04 and T34 use a packaged approach. For example, for an NRZI mode, one quad board is required. For the phase-encoded mode, a dual-size phase-encoded mode is added, the vendor said.

The phase-encoded board draws 5V and ground from the backpanel of the host minicomputer, but does not use any of the bus signals on the backpanel. This allows the board to be inserted in any available minicomputer slot, Dataram said.

Dataram's tape controllers, compatible with DEC's TM11 and TU10, operate with industry standard tape drives and support 7- or 9-track, NRZI or dual-density drives, the vendor said.

Up to four drives can be daisy-chained to one controller, and 64 bytes of data buffering is provided.

The T04 and T34 cost $2,600 each. The dual-density versions cost $3,300, Dataram said from Princeton-Hightstown Road, Cranbury, N.J. 08512.

Disk Targets DEC Users

SANTA CLARA, Calif. — Data Systems Design, Inc. has added an 8.8M-byte-capacity disk system to its line of Digital Equipment Corp.-compatible disk memory systems.

The DSD 880 is said to combine an 8-in. Winchester disk and an 8-in. floppy disk in a 5.25-in. rack-mountable unit. Both LSI-11 and PDP-11 interfaces are offered with the product.

The DSD 880 reportedly is an alternative to users of both the DEC RX02 floppy system and the DEC RL01 cartridge disk system.

The DSD 880 costs $7,495, with quantity discounts available from the firm at 3130 Coronado Drive, Santa Clara, Calif. 95051.

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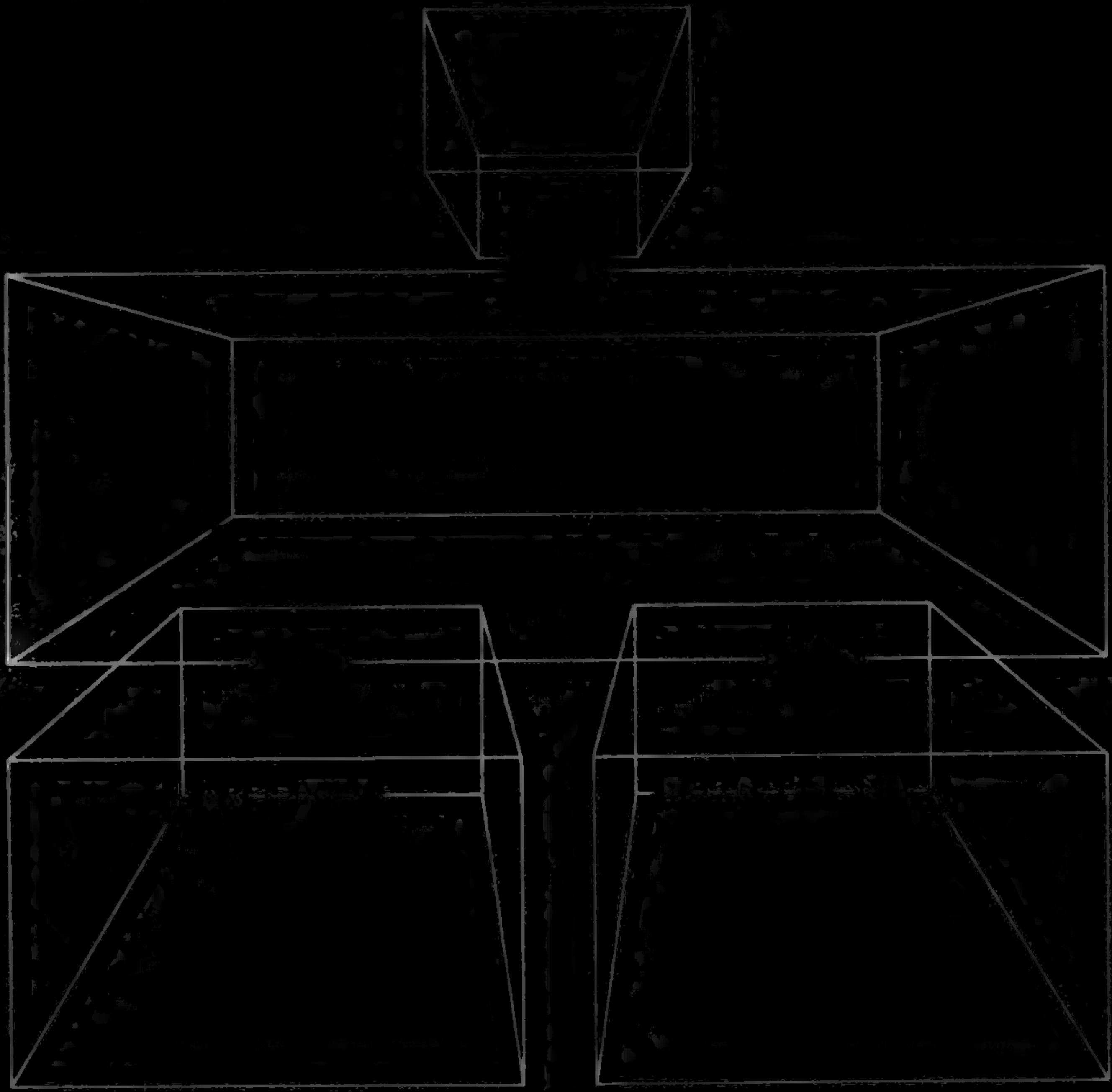
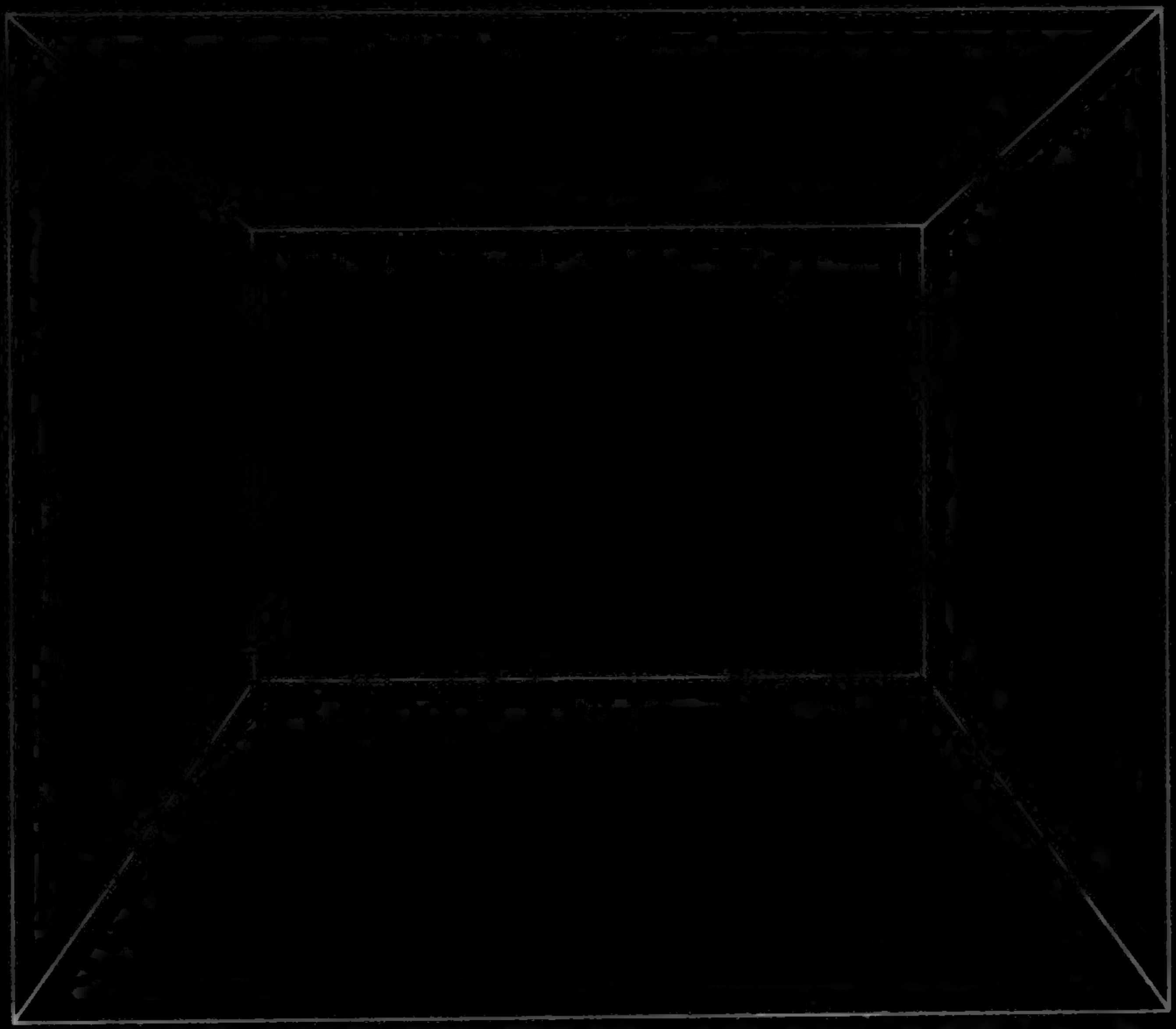


CONTROL SYSTEM



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The SBC-1 Shoebox

Portable 16-Bit CPU Bows

HAUPPAUGE, N.Y. – The SBC-1 Shoebox, which marks North Atlantic Industries, Inc.'s expansion from peripherals to complete computer systems, may be the industry's smallest self-contained 16-bit digital computer, according to the vendor.

The 5-1/2-in. by 8-in. by 11.75-in. enclosure contains power supplies, front-panel operational controls, cooling fans and Q-bus backplane fully wired for dual-height 5.5-in. by 8.5-in. logic cards. It includes a Digital Equipment Corp. LSI-11/2 processor, two RS-232C interfaces, 8K bytes of random-access memory (optionally expandable to 32K bytes), a 60Hz crystal clock and space for 8K bytes of read-only memory.

The enclosure includes two vacant card slots that accept additional logic cards if needed to configure the computer for different applications. The unit may be moved from job to job.

The SBC-1 can be hardwired to associated equipment or can be supplied with an acoustic coupler for data transmission over telephone lines. It can be used in distributed intelligence applications, in conjunction with a host computer to relieve some of the processing load or to record data in the field.

The SBC-1 costs $2,560 from North Atlantic's ACS Division at 60 Plant Ave., Hauppauge, N.Y. 11787.

Family Boasts Six Models

(Continued from Page 67)

that utilizes a building-block approach to software development. The operating system includes process management and message facilities, system service processes, system common procedures, object module procedures, device handlers and interrupt routines, the spokesman noted.

Dual-Bus Architecture

The computer also boasts a dual-bus architecture, called CT-Bus, that provides Multibus-compatible card slots for systems designers. Optional features include a high-speed Intel Corp. 8087 mathematics processor for large engineering, scientific and business applications, the spokesman pointed out.

Other members of the CT group that have those features are: the CT-1121-1, a single workstation with a 10M-byte, 8-in. Winchester drive and one floppy disk; the CT-1111-2, a two-station cluster with 1M byte of floppy disk storage; the CT-1121-4, a four-station system with the 10M-byte Winchester and floppy drives; the CT-2123-8, and eight-station setup featuring a shared resource processor (SRP), 30M bytes of Winchester storage and 500K byte of floppy storage; and, finally, the CT-2132-16, a 16-station computer system with SRP, 58M bytes of 14-in. Winchester storage and one floppy disk.

A streaming cartridge tape drive can also be fitted to the last system for off-line data backup, the spokesman explained.

The units cost from $11,990 for a single-station setup to $133,500 for the full-blown clustered version. The CT-1111-1 and -1121-1 are available now; the models CT-1111-2 and -1121-4 will be available toward the end of this year; and the CT-2123-8 and CT-2132-16 will be unwrapped in the first and second quarters 1981, respectively.

All of the smaller versions can be upgraded to a more powerful version and the software is said to be completely portable.

Additional information on the systems can be obtained from the firm at 2500 Augustine Drive, Santa Clara, Calif. 95051.

Turnkey Runs In C Language

(Continued from Page 67)

In addition, the C/70 implements many I/O functions in microcode and is said to incorporate a disk controller that makes 89% of disk space available to the user, rather than the typical 80%.

Unix Provided

The C/70 is provided with a fully supported, tailored version of Western Electric Co.'s Unix operating system written in C that includes a network capability to support Arpanet protocols, the spokesman added.

A typical C/70 system with 256K words of memory, 32 asynchronous lines, a storage module disk controller and cabinet costs $47,500 with OEM discounts available.

BBN is at 33 Moulton St., Cambridge, Mass. 02238.

Portable Unit Reads Bar Codes

LYNNWOOD, Wash. – Interface Mechanisms, Inc. has unveiled a portable bar code reader designed for in-house data collection by mini users.

The Model 9400 has a capacity of 20,000 alphanumeric characters and is organized into variable-length records up to 63 characters long.

The price for the basic unit is $1,695. The optional Model 9401 charger/-interface unit costs $340 and a real-time clock is available for $150. The vendor can be reached at P.O. Box N, Lynnwood, Wash. 98036.

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Say Software Not Delivered

Three Sue Honeywell Over Level 6 Mini

By Connie Winkler
CW Staff

NEW YORK — At least three systems houses are suing Honeywell, Inc. for failing to deliver promised system software for the Level 6 minicomputer. One of the companies nearly went bankrupt, and another said its business was set back two to three years.

"Everybody and God is getting ready to sue Honeywell," a former Honeywell executive said of the Level 6 situation. *Computerworld* has uncovered three lawsuits, filed by Accusystems, Inc. of New York City, Basic Computer Systems, Inc. of Long Beach, Calif., and Computer Accounting, Inc. of Tacoma, Wash.

The Level 6 is a small system that the company announced in 1977 and began marketing on an OEM basis to small systems houses. Those involved in the lawsuits claim the software, particularly the TL-6 transaction language and a Basic compiler, never worked.

A Honeywell spokesman in Waltham, Mass., said he could not comment on the Level 6 situation because two of the suits are in litigation and the company has yet to receive the third.

One of the companies charged Honeywell with poor management for acquiring a minicomputer manufacturer, forming a separate marketing division within Honeywell known as Minicomputer Marketing Organization (MMO) and putting MMO under the direction of Honeywell's Manufacturing Division.

There was never enough software support for Level 6, and the operating systems were developed outside the standard software development channels, the former Honeywell executive said.

When Honeywell saw the Level 6 was in trouble, the software — an orphan already — was turned over to Honeywell's regular Data Products Operation, which had no interest in the project, he added.

Computer Accounting

Computer Accounting is a service bureau that specializes in handling travel agencies. When it decided to package a system for travel agencies based on Honeywell's Mutual Airline Reservation System (Mars), it "committed heavily" to the Level 6, but had a great deal of trouble getting TL-6 to run, according to its president, Roger Brewington.

Moreover, Honeywell subsequently sold Mars to International Telephone & Telegraph

(Continued on Page 74)

Burroughs, Honeywell Profits Dip

Both Burroughs Corp. and Honeywell, Inc. reported third-quarter earnings below those of comparable 1979 earnings, while Control Data Corp.'s earnings for the latest quarter were flat.

Earnings for Burroughs' third quarter were $42.1 million, or $1.02 per share, down from earnings of $61.9 million, or $1.5 per share, in the same quarter a year ago. Burroughs also reported a decline in earnings for its second quarter, the first such drop in 17 years.

Revenues for the period were $699.3 million, a slight 4% increase from revenues of $672.3 million in the 1979 third quarter.

Year to Date

For the year to date, earnings were $150.7 million or $3.65 per share, down from the $173 million, or $4.22 per share, earned for the first nine months of 1979. Burroughs' Vice-Chairman and Chief Executive Officer W. Michael Blumenthal said the firm does not expect to build profit momentum in the final quarter and expects earnings for the year to be approximately $6 per share.

Incoming orders softened during the third quarter, he noted.

Revenues for the nine-month period reached $2.1 billion, up 8% from $1.9 billion in the prior year.

At Honeywell, consolidated earnings for the third quarter were $47 million, or $2.11 per share, down from $54.5 million, or $2.49 per share, earned in the third quarter of 1979.

Delivery shortfalls of large computer systems damaged the revenue of both Honeywell and its European associate, CII Honeywell Bull, and were the major cause of the third-quarter earnings decline, according to Ed Spencer, chairman and chief executive officer.

Spencer said the firm had solved its large computer production problems and expected 1980 earnings to meet or exceed those of 1979.

Revenue for the third quarter totaled $1.2 billion, up from just over $1 billion in the same quarter a year ago. For the first nine months, Honeywell's revenues were $3.5 billion, compared with $2.9 billion a year ago.

Nine-month earnings reached $150.7 million, or $6.70 per

(Continued on Page 76)

Memorex Loss $26 Million

SANTA CLARA, Calif. — Memorex Corp. posted a $5.6 million or 88 cents per share loss for its third quarter, bringing to $26.2 million the company's total loss for the year.

For its third quarter, Memorex's revenues rose to $189.9 million from $185 million in the third quarter a year ago.

The company posted a pretax loss of $6.2 million, of which $2 million was attribut-

(Continued on Page 76)

CSC and Five Employees Plead Innocent to Fraud

ALEXANDRIA, Va. — Computer Sciences Corp. (CSC) and five employees pleaded not guilty to charges of defrauding the government in obtaining a federal teleprocessing services contract in 1972.

The pleas and request for a jury trial were entered in U.S. District Court here Oct. 17 by attorneys for CSC and three present and two former employees. A consultant to CSC, also charged in the 57-count indictment, pleaded not guilty as well.

The indictment, handed down by a grand jury here Oct. 8, alleged CSC and its employees bribed a federal contracting officer to help the firm win the governmentwide time-sharing contract.

The contract reportedly earned the company more than $100 million before it expired in 1977. CSC also fraudulently overbilled the government for certain services offered under the contract, the grand jury said [CW, Oct. 20].

District Judge Albert V. Bryan Jr. set the trial date for Feb. 2.

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Honeywell Blamed for Missed Opportunity

By Connie Winkler
CW Staff

NEW YORK — "I saw a window in time," the grayed William M. Selden recalled. "Now we may have missed our opportunity."

Selden, one of the developers of Cobol, foresaw the move to small, customized systems by small businesses that had formerly gone to service bureaus for payroll processing, for instance. So in 1977 he decided to move from a large service bureau in Rochester, N.Y., to New York City, where he would not only operate a service bureau, but would develop and market systems, especially for restaurants.

Selden was sold on Honeywell, Inc.'s then-new Level 6, and Accusystems, Inc. ultimately became a beta test site for Level 6 multi-user software, TL-6.

Today Selden and Cynthia Mason, his wife, are bitter. They have yet to sell a payroll system, have invested all their family savings in the operation and have lost the $750,000 they raised by selling stock. Their Level 6 machine is hobbling along processing only one program at a time, and they have turned to marketing other OEM systems to survive.

Long Out of Control

How did the problems with the Level 6 go on so long and get so out of control?

"They kept telling us it was our fault," Mason recalled about the innumerable times when the system wouldn't work. "They impugned our honor."

Selden and Mason were doing the programming from scratch and believed it would work. But the programs wouldn't run. "Sometimes we would load them, press start and they would abort. Sometimes we couldn't even load them," Mason said. "This drove one of our men close to a nervous breakdown."

Honeywell in response would say the programs were too big, whereupon Accusystems would keep breaking them into smaller pieces, Selden said.

"What size can the system accommodate?" Selden recalled asking Honeywell.

"We can't tell you," the Honeywell representative answered.

Accusystems was constantly on the phone to Honeywell headquarters. "All we knew is that when we kept calling, we found someone else was in charge," Mason said.

More Memory

In late 1978, when the transaction language (TL-6) software still didn't work, Selden and Mason were told they had not ordered the right equipment. They added an additional 32K bytes of memory, although they were initially told 32K was adequate.

They had also been told their Level 6 would support a tape drive. Only by reading technical documents in mid-1978 did they discover that TL-6, now called MOD 200 by Honeywell, would not support tapes, and was never intended to. Accusystems had a tape drive sitting there.

After the Accusystems programs were successfully run on a Honeywell test machine, Selden was told his machine needed an additional piece of hardware known as the Multiline Control Board (MLCB). In March 1979, an MLCB was installed in the machine. It didn't work, but it remained in the machine.

The system continued to work only haphazardly despite work by Honeywell systems engineers on the system and despite Selden's numerous pleas, letters and telegrams to the corporation, he said.

Experience Chronicled

Selden and Mason chronicled their experience with TL-6:

"21 February 1978. The software did not seem to work exactly. The diagnostic routines could not be read from the disk (the one that had been delivered to my home). Replacement will come tomorrow from Boston via Federal Express."

"14 April 1978. More work accomplished, but system occasionally locks up and has to be restarted. No files lost. Began to be plagued with aborts. Discovered that we could use either terminal fairly reliably, but couldn't use both at the same time."

Finally, in July 1979, an Accusystems employee found the disabled MLCB still in the CPU. He pulled it out and put it on the floor; the system worked — processing one program at a time. That MLCB had been taking up memory, although not working.

Accusystems this month filed suit against Honeywell in U.S. District Court for the Southern District of New York.

Selden and Mason are now working hard to market other OEM systems and have switched to MOD 400 operating software, which works "pretty well," according to Selden.

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Three Users Sue Honeywell

(Continued from Page 73)

Corp. Questioning whether the sale was under way at the time Computing Accounting ordered the Level 6 to run with Mars, the firm's lawyer, Thomas West, noted that the Computer Accounting vs. Honeywell suit covers possible antitrust violations as well as charging breach of contract, fraud and misrepresentation.

Computing Accounting "managed to survive. We're still hanging in there," Brewington said, largely because of an NCR Corp. 101 it kept running and because it switched to screen-handling software developed for the Level 6 by the Paul Hoberg firm of Los Angeles.

Basic Computer Systems

To Basic Computer Systems of Long Beach, Calif., a Basic language compiler is basic. "The language we use is Basic. We took contracts with end users that were going to code in Basic," President Richard L. Paulsen recounted.

Basic Computer Systems signed an order with Honeywell in late 1977 to purchase 40 Level 6 systems over a 24-month period. The firm intended to remarket to four or five vertical markets, including CPA, accounting, advertising and stationery firms.

However, Honeywell never produced the Basic capability, according to Paulsen. Basic Computer Systems has installed six or seven Level 6 systems, but "for each and every one we have had tremendous losses. We've had to reprogram them in Cobol," Paulsen said.

Honeywell also promised, according to Paulsen, that a Level 6 with 32K bytes of main memory could handle four terminals. "It can't do that today," he maintained.

"It put my business back two to three years," he added.

Asking $38 Million

Basic Computer Systems is asking $38 million in damages in its suit, filed in April in California Superior Court in Los Angeles. It is seeking both compensatory and punitive damages, alleging misrepresentations in Honeywell's marketing techniques, according to Walter Lack of the Los Angeles firm of Engstrom, Lipscomb and Lack.

Basic Computer Systems is also claiming Honeywell has been "selective and discriminatory" in its distribution of Level 6s, sending them to large OEM customers and its international divisions.

When its Level 6 effort bombed, Basic Computer Systems had to start over again building systems, Lack said. He is perturbed with Honeywell's argument that the statute of limitations on the OEM agreement signed by Basic Computer Systems has run out and therefore the firm cannot sue.

The OEM agreement would have punished Basic Computer Systems for not selling a system that was unavailable, Lack said.

Basic Computer Systems has requested a jury trial, but Lack does not foresee any court proceedings on the case for 12 to 18 months.

Accusystems Suit

Accusystems, Inc., a service bureau that in 1977 wanted to get into the payroll systems business, and its principle, William M. Selden, are seeking more than $1.5 million in compensatory damages and $6 million in punitive damages for Honeywell's alleged failure to deliver working TL-6 software. Selden and his wife, Cynthia Mason, strongly contend that their business has been set back immeasurably.

Accusystems charged it was promised software with on-line processing capability and was assured the Level 6 Model 36 with 32K bytes of memory — it ultimately had to be boosted to 64K bytes — would support tape drives, none of this happened, according to its suit.

Accusystems' lawyer, Thomas K. Christo, called the Level 6 situation an "old story" of an intercorporate Honeywell fight between MMO and the regular Data Products marketing group. "They decided in midstream not to develop a product [that] they said had already been developed," Christo said.

The Accusystems action has been brought in Federal District Court for the Southern District in New York.

U.S. Policy About-Face Allows Firms to Sell China Military Support Gear

By Bohdan O. Szuprowicz
Special to CW

Since Secretary of Defense Harold Brown's visit to China in early 1980, there has been a shift in U.S. policy with regard to export controls on strategic technology and products to that country. Until recently China was included under the Warsaw Pact country group "Y," but it has now been moved to a new country group — "P" — in the U.S. Department of Commerce Export Controls Administration.

What this means is that the U.S. has formally abandoned the principle of "evenhanded" treatment of trade with China and the Soviet Bloc countries.

As a result, certain types of military support equipment and advanced technology products with potential military applications may now be sold to China. These include air defense radars, radio and tropospheric communications equipment, helicopters, truck tractors and electronic countermeasure devices.

The official position is that the U.S. still has no intention to sell lethal military technology to China, but high-level delegates from the Chinese military establishment have already begun to visit American manufacturers and research centers engaged in military technology development and production.

Included on the itinerary of Chinese military experts recently were also such computer manufacturers as Honeywell, Inc. and IBM, as well as military equipment production facilities of Westinghouse Corp., General Electric Co. and AM General Corp.

Dual-Use Technology

The name of the game is now "dual-use technology," which includes such previously embargoed products as computers with metal-refining and petrochemical applications and security communications equipment. In fact, computers appear to be the main dual-use technology products that China wants to purchase at the present time, and some manufacturers have already entered into negotiations for precedent-setting sales in this regard.

Leading among those is Burroughs Corp., which applied for a license to export a B6800 computer system for installation in Beijing under the United Nations Development Program. This sale is unusual because the B6800 system's processing data rate (PDR) is nearly twice as large as those of the few large computers previously licensed for export to China.

Chinese End Users

In addition, it is the first application to license a system that will have multiple Chinese end users. This is significant because under such conditions it is almost impossible to demand end-user statements guaranteeing that the system will not be used for strategic purposes by some of the users.

An even more interesting proposal is being advanced by Honeywell, Inc. It involves the transfer of manufacturing, software and training capabilities for a licensed production in China of about 60 Honeywell Level 50 large-scale computers and some Level 200 minicomputers per year.

Valued at about $100 million, this proposal is being readied for presentation in Beijing in late 1980, as soon as technical data export licenses are granted by the Export Controls Administration.

For Aircraft Design

Another computer that has never been exported to a communist country is the Prime Computer, Inc. 650, whose manufacturers are now awaiting an export license for shipment to the Beijing Institute for Aeronautics and Astronautics. This contract is valued at $400,000, and the Chinese end user is taking great care to provide end-user statements to support its intended use of the machine which is slated for educational training in aircraft design.

At the same time, China's aerospace industry is planning to phase in new supersonic fighters, organize research and development of a cruise missile and further develop the existing strategic missiles of China.

On top of these developments comes the announcement by the Xinhua News Agency of China recently that China is embarking upon a program to establish a national input/output analysis system.

Six economists at the Institute of Systems Sciences of the Chinese Academy of Sciences are drawing up proposals for compiling the first national input/output table by 1981. This will require additional and powerful computers, which will undoubtedly be used to compute the impact of military modernization on China's economy.

All the signs are pointing to the fact that if Sino-Western rapprochement continues on its present course, there is little question that vast new markets will be shaping up in China for all types of information processing technologies and products.

PE Reorganizes Marketing Unit

OCEANPORT, N.J. — Perkin-Elmer Corp. has reorganized the marketing group of its Computer Systems Division, splitting the former marketing department into two specialized functions.

As restructured, the marketing operation is composed of the Marketing Department and the Product Management and Planning Department.

Heading the Marketing Department is Barry Rosenbaum, who joined the Computer Systems Division from the company's U.S. Sales Division.

The department is responsible for establishing and implementing the division's worldwide strategies within its target markets.

The Product Management and Planning Department is responsible for planning, specifications and management of all the division's products. A director for this department has not yet been named.

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CDC Third-Quarter Earnings Flat; Honeywell, Burroughs Profits Dip

(Continued from Page 73)

share, down from $175.4 million, or $7.86 per share, earned for the first three quarters of 1979.

CDC Up Slightly

At CDC, consolidated earnings edged up slightly, reaching $40.2 million, or $2.31 per share, compared with earnings of $37.8 million, or $2.19 per share, in the same quarter a year ago.

For the year to date, corporate earnings totaled $114.4 million, or $6.59 per share, up from the $100.4 million, or $5.82 per share, earned in the comparable 1979 period.

Revenue from the computer portion of the firm's business totaled $698 million, up 23% from revenue of $566 million in the third quarter a year ago.

For the year to date, revenue from computers was just over $2 billion, representing about 73% of the total corporate revenues of $2.7 billion. Last year computer revenue for the first nine months totaled $1.6 billion, or about 70% of total corporate revenues of $2.2 billion.

CDC said the gain in revenue from the computer operation during the third quarter was primarily from strong OEM sales of peripherals.

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Amdahl Net Up 300%

SUNNYVALE, Calif. — Amdahl Corp. reported a 300% gain in earnings for its third quarter, but earnings for the year so far are roughly half of those reported for the corresponding 1979 period.

For its latest quarter, Amdahl's earnings were $5.8 million, or 31 cents per share, up from $1.9 million, or 11 cents per share, in the same period a year ago.

Year-to-date earnings totaled $8.6 million, or 47 cents per share, compared with $16.6 million, or 94 cents per share, for the first nine months of 1979.

Revenues for the third quarter totaled $99.7 million, up from $78.3 million a year ago. For the nine-month period, revenues reached $286.3 million, compared with $233.3 million last year.

All results are restated to include Tran Telecommunications Corp., acquired by Amdahl during the latest quarter.

"Third-quarter shipments continued at a high level, which, with a greater percentage of outright purchases, resulted in a substantial increase in revenues and earnings," said John C. Lewis, Amdahl's president.

Memorex Posts $5.6 Million Loss

(Continued from Page 73)

able to inventory charges resulting from a reduction in scheduled production of the firm's disk cache product.

By comparison, earnings for last year's third quarter totaled $7.1 million, or 87 cents per share.

For the year to date, Memorex's revenues reached $560.5 million, up 3% from revenues of $544.2 million a year ago. The loss of $26.2 million, or $3.93 per share, compared with a gain of $29.4 million, or $3.67 per share, for the first nine months of 1979.

The company's operating results were impacted by continuing high manufacturing costs and inventory charges, start-up costs on new products and reduced equipment sales to third-party financing institutions, Clarence W. Spangle, chairman and chief executive officer, said.

Sales to third-party financing institutions were down 14.5%.

However, Spangle said the third-quarter results represent a reversal of the earnings downtrend during the past year and a half. "Particularly encouraging was the measurable reduction in selling, general and administrative expenses," he noted.

Nickels & Dimes

Timeplex, Inc. announced that its registration statement for a public offering of 500,000 shares of common stock for the company and another 69,288 shares of common stock for selling stockholders was declared effective by the Securities and Exchange Commission.

$ $ $

Control Data Corp. has filed a registration statement with the Securities and Exchange Commission for a proposed offering of 1.5 million common shares.

$ $ $

MSI Data Corp. has been approved by the American Stock Exchange to list 2,281,278 common shares of company stock.

$ $ $

NBI, Inc. announced the filing of a registration statement with the Securities and Exchange Commission for a public offering of 400,000 shares of common stock.

$ $ $

The Board of Directors at **Cray Research, Inc.** have declared a three-for-one common stock split in the form of a stock dividend. The action is subject to shareholder approval, and a subsequent meeting is scheduled on Dec. 9.

$ $ $

Leasco Corp. intends to purchase up to an additional 1,250,000 shares of common stock of Reliance Group, Inc. at prevailing market prices. Formerly a subsidiary of Reliance Group, the Leasco computer leasing business presently owns 250,000 shares of Reliance Group's common stock.

$ $ $

The board of directors at **Computer Horizon Corp.** declared a two-for-one stock split of that company's common stock payable Nov. 7 to shareholders of record Oct. 17.

$ $ $

Rogers Corp. reported third-quarter profits of $58,000, or 2 cents per share. Profits were down from the 37 cents per share in the same quarter in 1979.

$ $ $

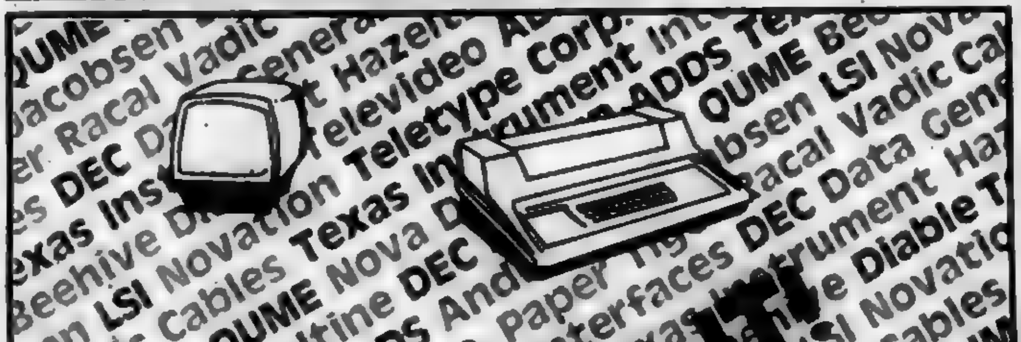
M/A-COM, Inc. has announced plans for a public offering of 4.4 million shares of company stock.

$ $ $

Network Systems Corp. has filed a registration statement with the Securities and Exchange Commission for an initial public offering of 800,000 shares of common stock.

$ $ $

National Semiconductor Corp. has filed a registration statement with the Securities and Exchange Commission for a public offering of 1.5 million shares of common stock.



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As you'd expect, security is a great concern. But thanks to features built into TPS-6, Reserve Fund has developed effective safeguards.

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General Systems Division

Supershorts

Century Data Systems, Inc. has developed a new assembly and test area for its small Trident disk drives. The facility improvements include the installation of a material transporter system.

The National Academy of Sciences has established an Initiatives in Research Award to honor William O. Baker, retired chairman of the board of Bell Laboratories, Inc. The award will be presented annually "in recognition of the promise shown by young scientists" and to assist them "in carrying out research likely to lead toward new capabilities for human benefit." Sponsored by Bell Laboratories, the award will include a $15,000 grant.

Nitron, Inc. is starting development of a high-performance silicon gate CMOS technology. When developed, this advanced process will rival HMOS, Nitron said.

The Institute International de Promotion et de Prestige of Geneva, Switzerland, has selected Canada's Northern Telecom Ltd. to receive its International Industrial Award for its emergence as a successful multinational corporation.

Automatic Data Processing, Inc. will be providing computer services for banks installing Bunker Ramo Corp.'s on-line teller terminal systems. In-bank software provided by Bunker Ramo enables transition from manual procedures to on-line processing.

Mitsubishi Electronics America, Inc. (Mela) has been formed to handle Mitsubishi Electronic Corp.'s marketing in the U.S. The company will be based at 2200 West Artesia Blvd., Compton, Calif. 90220.

Executive Corner

- New Senior vice-presidents at STSC, Inc. are Robert Cook, vice-president of market development; Robert Fick, vice-president of finance and treasurer; John Myrna, vice-president of development; and Allen Rose, vice-president and technical director.

- John H. Clark has been appointed president and chief executive officer of Micom Data Systems, Inc. The former president of the Data Products Group at Itel Corp. will head up Micom operations at company headquarters in Dallas.

- Joe Schneider has been elected vice-president of finance at Data Electronics, Inc., where he will be responsible for all financial activities within the company.

- Atlantic Research Corp. has elected William Borten president and W. Gerald Hamm executive vice-president of the corporation. Other promotions include Charles Henderson's move to senior vice-president and the election to vice-presidency of Christopher Robertson, Keith Britton, James Sides, George Summers and George Oss.

- Gregg W. Pace has been named president of Florida Software Services, Inc. and Thomas D. Rogers has been appointed executive vice-president of marketing strategies of the Kirchman Corp., the parent company of Florida Software Services.

- Jack McKittrick has announced his plans to resign as chairman of the board of directors at Plantronics, Inc., effective Oct.31.

- Herbert C. Katzman has been elected to the newly created position of vice-president of general mechandise systems at Data Terminals Systems, Inc.

- Newly named regional marketing vice-presidents at Northern Telecom Systems Corp. are James Lee III, Southeast region; William Vandervoort, Southwest region; Armond Newton, Great Lakes region; and Gary Sapp, Midwest region.

- William N. Levin has been elected Pertec Computer Corp.'s Peripherals Division vice-president for finance and administration.

- Carl Jeremias has joined Microdata Corp. as group vice-president of domestic marketing and sales.

- Rodger D. Hoff has been elected president of Integral Systems, Inc.

- Vincent F. Titolo has joined Tymshare, Inc. as senior vice-president and chief financial officer.

Contracts

Telex Computer Products' OEM division announced a multiyear contract valued at $10 million with Prime Computer, Inc. Telex will supply Model 6250 dual-density 75 in./sec tape drives and Model 6850 formatters with multidrive capability.

Northern Telecom Systems Corp. has been awarded a $3.6 million order from Cobra of South America, under which Northern Telecom will provide kits for the assembly of the 400 series of distributed data processing systems.

Burroughs Corp.'s Federal and Special Systems Group has been awarded a $12.4 million contract from the Defense and Space Systems Group of TRW, Inc. for an information storage, retrieval and processing network utilizing a number of large-scale Burroughs B6900 and B7800 information processing systems.

GTE has won a $190 million contract from the U.S. Army to produce electronic telecommunications switches for the nation's tri-service tactical communications program.

Systems Development Corp. has won a $5.5 million contract to provide a Meteorological Data Utilization Center for the government of India.

Century Data Systems, Inc. has received a two-year contract from George Foldvary and Associates to provide a combination of 200 Trident and Hunter disk drives.

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At Introduction of Micro-Plato

Norris Attacks Churches' Criticism of CDC

By Connie Winkler
CW Staff

NEW YORK — Control Data Corp.'s chairman and chief executive officer, William C. Norris, chastised U.S. church groups for protesting CDC's presence in South Africa but doing nothing to address the apartheid problem.

At a press announcement for CDC's latest educational product, Micro-Plato, Norris challenged the churches "to get off the sidelines of the South African issue and find a new game where just talk may have benefit."

Norris also proposed a three-year effort to educate one million disadvantaged American youths via Plato.

CDC selected Plato education in South Africa as a priority area and looked to the churches for support, assuming they would be anxious to help poor blacks gain education and training. Church support for education has not materialized, Norris said, and instead church groups are picketing stockholders' meetings.

"They have been advocating various methods of eradicating apartheid that range from investment restrictions and withdrawal by American business to full trade embargos," Norris said. "They stand on the sidelines urging others into action, but are unwilling to get in the game themselves.

"It's the black church and community leaders in South Africa who are most enthusiastic about Plato's potential," he said.

Norris also faulted Wall Street analysts and leading business publications that criticize CDC's business strategy of addressing unmet societal needs as business opportunities.

"My friends," Norris said, "you have a couple of years in which to back off gracefully. By doing so, you will have less crow to eat before Control Data profits become highly visible from serving society's greatest need — better, more available and less costly education."

Norris predicted that Plato, CDC's giant 18-year-old computer-based education effort, will become profitable in 1982-83. After that it will become the largest producer of profit for the company which manufactures mainframes and peripherals and includes Commercial Credit Corp.

Training Plan for U.S.

Besides the effort in South Africa, where 60 blacks are now enrolled at Control Data Institute, Norris predicted Plato and now Micro-Plato can provide high school training and job training for one million disadvantaged American youth.

CDC proposes a three-year program. "By the end of the third year, the stream of disadvantaged students leaving the nation's high schools without an adequate education would be shut off," Norris said.

Outlined by Walter H. Bruning, CDC vice-president of retail marketing, this ambitious education effort would be conducted through four delivery systems: through CDC's approximately 100 learning centers, subsets of the company's business centers, which sell and finance computers for small businesses; through CDC's present large systems marketing staff to other corporations for their employees; through federally funded Fair Break centers, where CDC trains electronics and computer personnel; and through learning centers at Control Data Institutes, which train computer operators and technicians.

Any high school student can take the basic skills course for several hundred dollars at the institute, Bruning said.

The Plato basic skills course will center around preparation for the high-school equivalency exam, General Educational Development.

Norris also announced:

- Increased Plato emphasis on engineering instruction. The increased demand for engineers, which will be aggravated by the massive synfuels program, could be addressed by Plato, which can deliver most of the first two years of instruction, he said.
- A Plato bank teller training program for the 250,000 tellers expected to be needed by the nation's 15,000 banks

Micro-Plato is an off-line, stand-alone microprocessor teacher, whose "books" are flexible disks. It is expected to counteract the high communications costs of using the on-line Plato.

The basic hardware is a Plato Information Systems Terminal [IST II], which contains 32K bytes of random-access memory, a master flexible disk drive and a modem to allow central Plato system access.

Price Says Move to Minis No Threat to CDC

By John Whitmarsh
CW Staff

PHILADELPHIA — Does Control Data Corp., traditionally a large mainframe manufacturer, feel vulnerable because of the move among users to distributed DP [DDP] and minicomputers?

And is CDC, which has unbundled more software from its hardware than perhaps any other vendor, about to rebundle its offerings?

CDC President Robert Price answers "no" to the first question and "maybe" to the second.

Responding to questions after his keynote address at a recent conference here, Price said distributed processing has always been a part of the CDC culture. "We are very much at home with the distributed computing concept.

"I believe there is now, and will continue to be, a need for massive computational power to solve the problems of energy and economics in the decade ahead. So we intend to get on with the business of making bigger and bigger computers and offer more value-added products to go with them," Price said.

The transition of mainframe vendors from simple sellers of cheap hardware to suppliers of value-added commodities is a trend that may accelerate in the 1980s, according to Price.

"Hardware has become commodity-like and more companies will add value — by which I mean software for computer-aided management systems of all kinds — to those commodities," he said.

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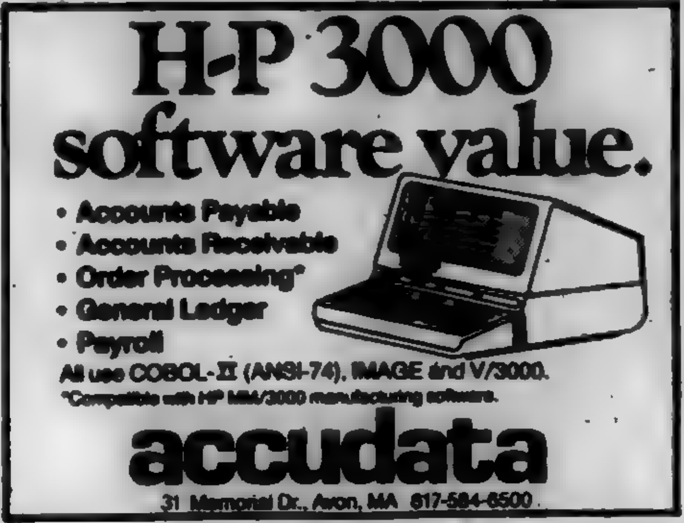
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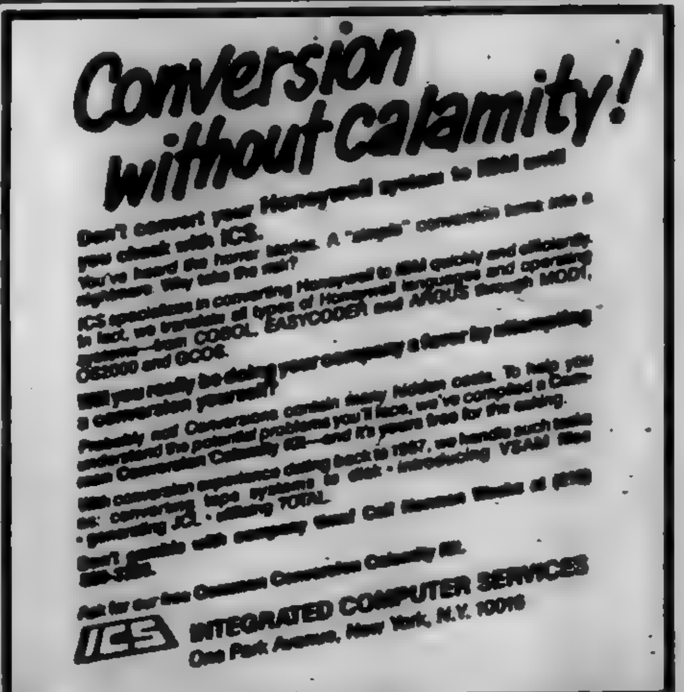
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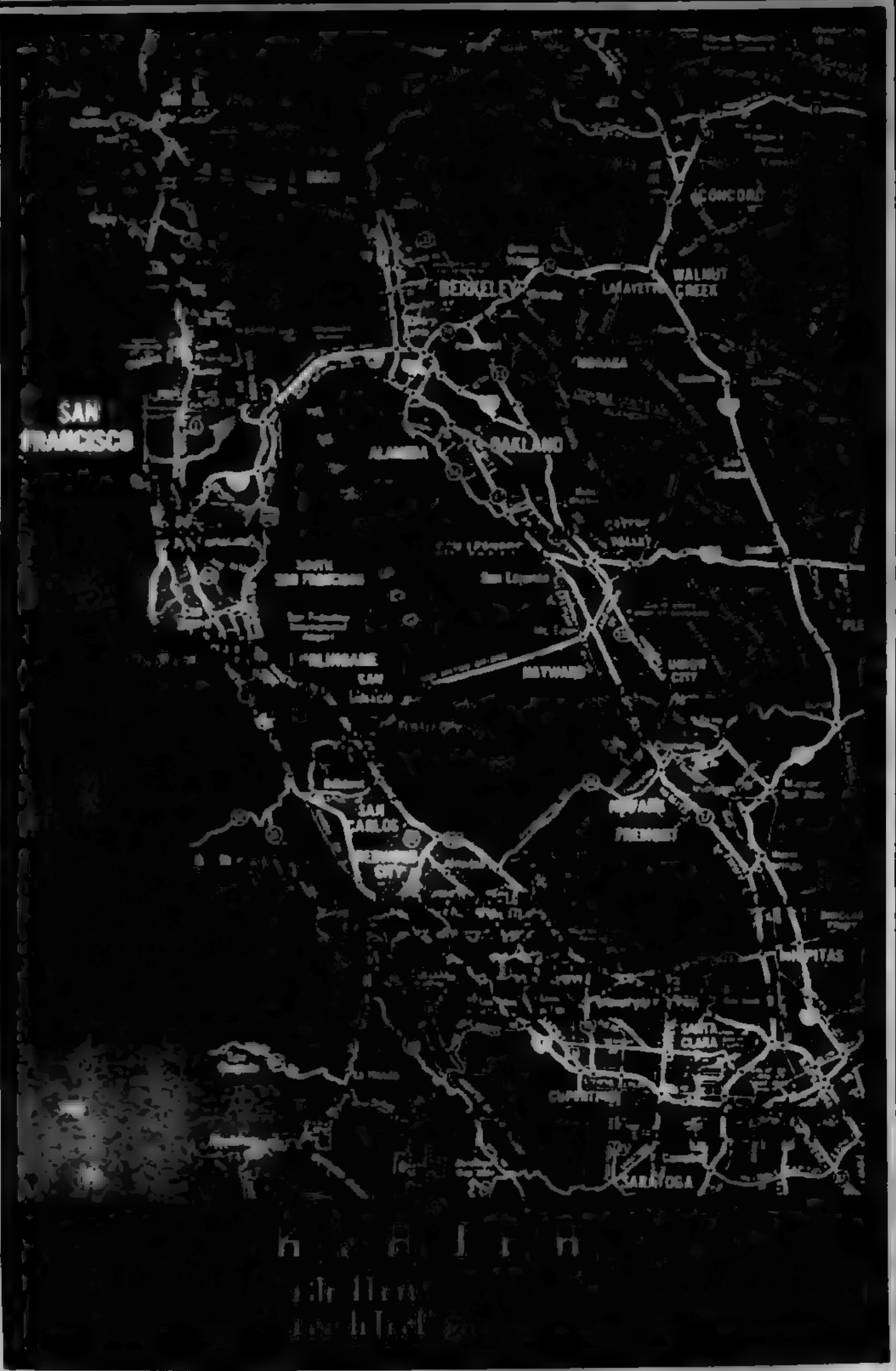

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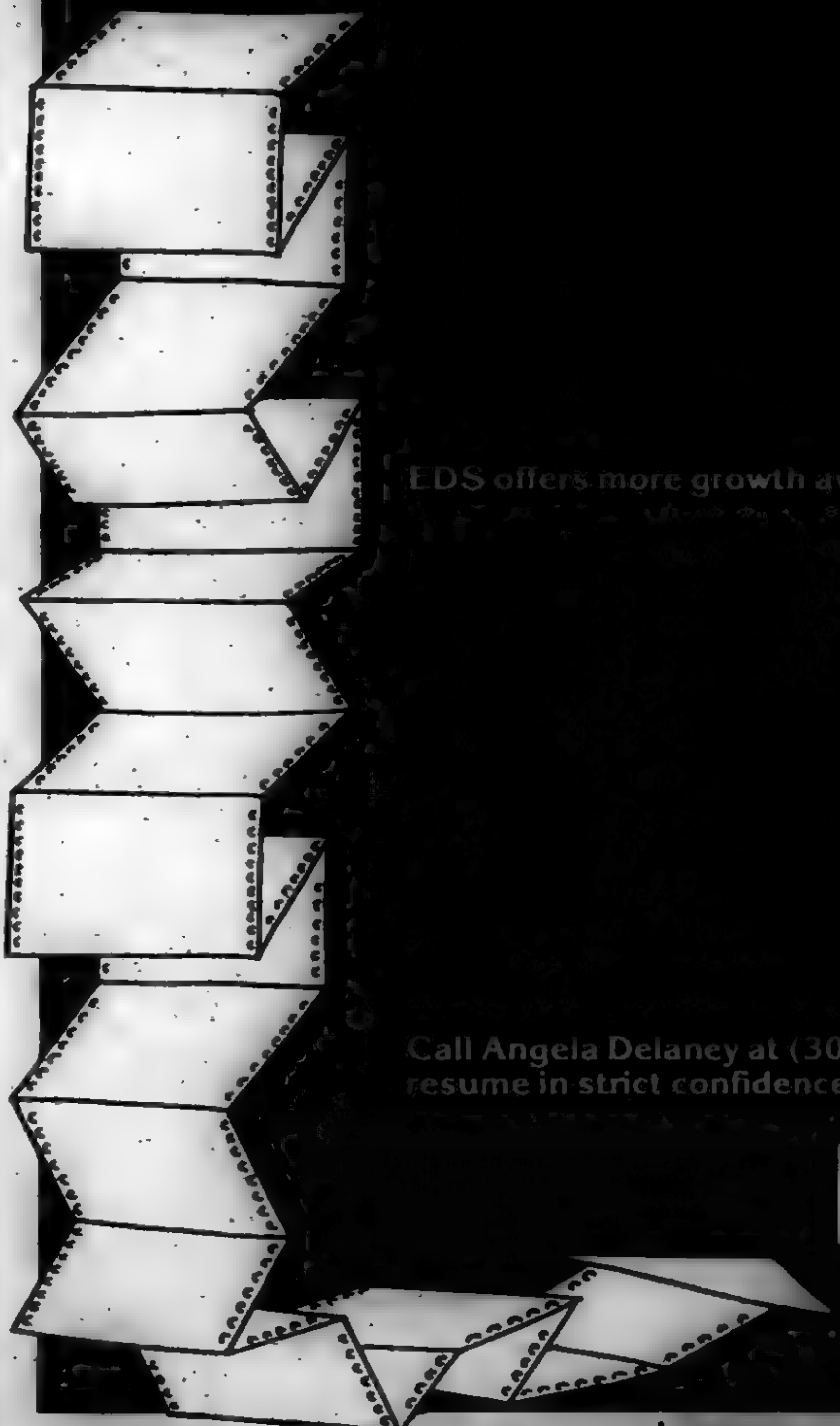

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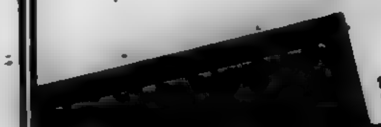

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For a confidential discussion of these and other positions call collect or mail your resume to:

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C-[illegible], Suite A
Bellevue, WA 98004
(206) 453-2700
(24 Hour Phone Service)

Houser, Martin, Morris & Associates

We are a member of National Computer Associates with [illegible] offices Nationwide to assist you in finding a position.

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APPLICATIONS PROGRAMMER

Our rapidly growing Uranium Operations Division requires a person to create scientific, financial and graphics applications for the minerals industry. Areas of systems development include mine design and scheduling, environmental applications, cost studies, and financial analyses. All programs are in Fortran 77 on a Univac 1100-80.

Nuclear Assurance Corporation is a service company to the nuclear industry. The UOps Division provides international consulting and project operations services. We are currently expanding our computer area with the intention of offering our clients both time sharing facilities and software packages. Our location provides easy access to skiing, mountain climbing and hiking. We offer excellent benefits and a salary commensurate with your experience and ability.

If you have four to six years of experience, a degree in Geology, Computer Science, or Mathematics, and superior communications skills, please send your resume, including salary history, to: Nuclear Assurance Corporation, 715 Horizon Drive, Grand Junction, Colorado 81501, Attn: C.L. Hoffman, or call (303) 245-4320. No Agencies Please.

We are an equal opportunity employer M/F.

PROGRAMMER ANALYST To $25,000 KENTUCKY

Due to recent promotion, Division of Fortune 500 giant seeks EDP professional with manufacturing applications exp. for immediate career opportunity. Client reqs. college dg. combined with min. 2 yrs. PDP11/ RSX 11M exp. Exposure to IBM mainframes helpful. Heavy user interface. Excellent advancement potential, full career benefits. All fees paid by client co. to include relocation. For details on the above or numerous additional EDP opportunities contact:
Steve [illegible] at 704/[illegible] or rush resume to FOX-MORRIS PERSONNEL CONSULTANTS, 1742 Southern National Center, Charlotte, NC [illegible].

PROJECT LEADER

Recognized peripheral mfr. seeks lead prog/analyst for devel. & conversion of mfg., fin'l. & order entry appls. Prior proj. mgmt. exp. & strong RPG-II with COBOL familiarity desired. Large SYS-3 environ. upgrading to IBM 4300 w/CICS. Salary $25,000 range. (Fee paid.) Contact Hank Phillips.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

STAFF EDP INTERNAL AUDITOR

CORPORATE STAFF San Antonio, Texas

Tesoro Petroleum Corporation is a growth oriented multi-billion dollar corporation represented in 34 states and five foreign countries. Our operations include oil and gas exploration and production, refining, marketing, transportation, supplying oil field equipment, and coal production. We are currently seeking highly motivated EDP Internal Auditor who will interact with the Management Systems Department.

STAFF EDP INTERNAL AUDITOR: Responsibilities include performing audit procedures on assigned EDP Internal Audit projects and functions as lead auditor on selected EDP Internal Audit projects. A Bachelors Degree in Accounting, Computer Science or related fields, and a minimum of two years EDP Audit experience required. Knowledge of COBOL would be helpful.

If you seek a company that recognizes personal achievement and offers excellent salary and benefits, send your resume in the strictest confidence to:

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Corporate Personnel
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ATLANTA

Major national applications software firm employing some of the finest EDP professionals is preparing to embark on totally new "state of the art" applications development. This company has multiple needs for ANALYSTS who have two or more years of experience on medium to large scale IBM 370/303X OS or DOS hardware using ANSI-COBOL and/or ASSEMBLER (BAL/ALC). Experience in On-Line applications development using CICS, IMS or a related teleprocessing monitor is desired, but not required. Salary to $30,000.

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Current needs throughout the SUNBELT states include:
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IBM COBOL or BAL Programmer Analysts to $28,000.
IBM 370/303X OS Systems Software Specialists to $32,000.
Communications Engineers & Network Analysts to $36,000.
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BIG EIGHT CPA Consultants and Supervisors to $40,000.
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Through our 27 affiliate offices in major metropolitan cities nationwide, we can assist PROGRAMMERS, ANALYSTS, SYSTEMS PROGRAMMERS, and PROJECT MANAGERS in career positions to $38,000.

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DATA PROCESSING RECRUITERS
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Member of: NATIONAL COMPUTER ASSOCIATES
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800MM dollar Mid-Southern corporation needs S/M to implement front office hotel/motel operations system. Must have in-level experience with minicomputer background desired. Staff position reports to Director.

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Tennessee based NYSE listed corporation needs P/M to head up point of sale terminal development. Prefer good management ability in POS or minicomputer environment. Reports to D.P. Director.

SR. SYSTEMS ANALYST to $29,400.
Billion dollar manufacturing concern located in attractive Southern locale needs lead analyst for rapidly expanding operation. Must be user oriented with good design and problem solving background. Prefer on-line systems experience.

SR. PROGRAMMER ANALYST, $25,800 range.
Major Southeastern Fortune 500 corporation needs Sr. P/A for new D.P. division. Prefer IBM/OS mainframe experience in COBOL, IMS software environment. Reports to Systems Manager. Excellent benefits and relocation package.

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The APPLIED TECHNOLOGY DIVISION, our fastest growing division, is constantly seeking career-oriented professionals to join our dynamic company. Our Greenbelt, Maryland facility, Computer Sciences-Technicolor Associates, is working in support of NASA's Goddard Space Flight Center and we would like to hear from dedicated individuals who are interested in expanding their skills in activities such as satellite tracking, telemetry data processing and digital image processing.

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To perform software development and evaluation and telemetry simulation on SEL 32/55 and UNIVAC 1100 series equipment. Must be familiar with SEL RTM system internals, FORTRAN, and ASC II FORTRAN under EXEC 8. Task leadership experience is desirable.

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To perform systems programming and maintenance on IBM 370/145. Must have minimum of 2 years programming experience on IBM 360/370 computers with strong ALC and OS/VS1 and VM.

CSC offers competitive salaries and an excellent benefit program including paid relocation. For immediate consideration, please call COLLECT or send your resume to: M.O. Hill, (301) 794-6360.

The only limitations are the ones you bring with you.

CSC

Applied Technology Division
CSTA Facility
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Town of Barnstable, Hyannis, Mass., seeks a hands-on computer hardware/software professional. Applicant should be a proven Programmer/Analyst with a COBOL and FORTRAN background and some RPG experience. Three years experience in operations and systems support of Burroughs 1700/1800 preferred. Experience in DP training, documentation and standards involved. Starting salary $16,875 per annum plus benefits. Send resume and references information to Personnel, 367 Main St., Hyannis, MA 02601.
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Experienced computer systems analyst needed to design, develop, and install applications for the nation's largest long term health care corporation.

NEAT-3 Level 2, NCR [illegible] VRX operating systems. Salary and benefits are excellent. Forward resume to Personnel, Beverly Enterprises, Eastern Division, [illegible] North Lynnhaven Road, Virginia Beach, VA [illegible] or call 1-800-[illegible] toll free.

Beverly Enterprises is an equal opportunity employer.

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A full-time position to teach all phases of Computer Programs. Also will work with curriculum development. Must have knowledge of BASIC, COBAL, RPG, FORTRAN, Job Control, System Analysis, and Data Base Concepts. Qualifications: Bachelor's degree in Computer Science or Education plus two years related experience. Closing date for applications is November 16, [illegible]. Excellent salary and fringe benefits. Send letter of application and resume to:

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Engineering

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PARADYNE CORPORATION designs, manufactures, markets and services data communication products and systems, and is one of the few companies able to design, manufacture and bring to market an entire family of products that can satisfy both the data processing and data communications needs of today's markets.

As the Company's technical and Corporate growth continues at a record pace, so does our need for people who are looking for a challenge in the 80's. We currently have positions available for the following key professionals:

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Experience with Microprocessor Hardware and Software and a college degree. Any experience with Z80 Microprocessor is a plus.

SOFTWARE ENGINEER (PIX)

Experience with Z80, Z8001 Microprocessors using Assembly Language and a College degree. Any experience with IBM 3270, Communications, UNIX Operating System or C Language would be a plus.

SOFTWARE DESIGNERS (PROGRAM PRODUCTS)

Experience with Operating Systems Internals on large scale IBM Systems using Assembly Language. Any experience with I/O Drivers would be a plus.

SOFTWARE DESIGNERS (RESPONSE)

Experience with the design and development of Operating Systems Software, Data Management Systems or Real Time Communication Systems or Compilers using Assembly Language.

SOFTWARE DESIGNER (PIX)

Experience with 16 BIT Mini Computers, I/O Drivers and Real Time Communication using Assembly Language. Any experience on large scale IBM Systems would be a plus.

SYSTEMS ENGINEER/ MARKETING SUPPORT (Dallas, Texas District)

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Experience with large scale IBM Systems under the DOS/VS Operating System using Assembly Language. Any experience with DOS/VSE, VM/CMS, OS/VS1, or OS/MVS would be a plus.

As a respected member of our dynamic growth picture, you will receive a salary commensurate with experience, a full benefits package and unlimited growth potential. Please forward your resume, outlining work and salary history, in confidence to:

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Director of Professional Recruitment

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EXCELLENT EMPLOYMENT OPPORTUNITIES

[illegible]

PROGRAMMER ANALYST. [illegible]

PROGRAMMER ANALYST. [illegible]

[illegible]

APPLICATIONS PROGRAMMER. [illegible]

SYSTEMS PROGRAMMER. [illegible]

SYSTEMS ANALYST. [illegible]

[illegible] ENGINEER. [illegible]

TECHNICAL SPECIALIST. [illegible]

FIELD ENGINEER. [illegible] COMPANY CAR and expenses.

Call [illegible] or send resume in confidence.

MANAGEMENT SEARCH, INC.
[illegible] HARRIS TOWER, [illegible] PEACHTREE ST.
ATLANTA, GA [illegible]
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Personnel Service
NO CONTRACT — ALL FEES PAID

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Join the Network Research and Development team for Tymshare's worldwide public packet data communications network . . . TYMNET. Openings are available to design and implement network architecture, real-time data switching systems, and state-of-the-art interfaces (X.25, X.75, X.28 and others.)

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If interested, send your resume in confidence to Joe Rinde, Tymshare, Inc., 20705 Valley Green Drive, Cupertino, CA 95014.

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ADP

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Automatic Data Processing, the world's leading computer services company, is looking for a talented Technical Writer to join a start-up group aimed at providing time sharing products and services. This individual will have responsibility for all phases of documentation development from initial design and writing through final production. Major emphasis will be on the development of applications-oriented materials directed at non-data processing personnel.

Involvement will also include the creation of education and training materials as well as participation in the development of sales and marketing literature. In essence, this individual will play an important role in the successful delivery of this new time sharing service to the marketplace.

This position requires a college degree and 3-5 years experience in developing technical/user documentation in a data processing environment. Strong written communication skills, DBMS and time sharing experience required. Knowledge of the securities industry desirable.

Please call Gary Zander at
212-344-8010

or forward resume with salary history in confidence to: G. Zander

Automatic Data Processing, Inc.
Financial Services Group
42 Broadway, 12th floor, NY, NY 10004
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Potential packed opportunity with the major oil conglomerate. Co converting from large Sys 3/15 to 4341. 3+ years systems analyst with heavy communications experience and COBOL programming in background. Automate G/L, INVENTORY and [illegible] applications. Very secure $32,000

SYSTEMS

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Excellent upper level position for technically oriented manager. 4+ years FORTRAN programming with responsibility for evaluation of hardware and software in background. HP 3000 experience is a plus. Overall management responsibility for design through implementation with heavy user interface. Newly installed HP 3000 [illegible] $35,000

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B.S. in Computer Sc. + 1 yr. exp. in job or in computer programming. Computer graphics software and data base development & maintenance; real time programming using PDP 11/70 & RSX-11M operating system in Fortran & Assembly. Map plotting program using CALCOMP software & plotters. Technical procedure analysis and trouble shooting, debugging & documentation. $1,[illegible]/mo., 40-hr wk. Contact Autographic Mapping, Inc., [illegible], Ste. [illegible], Houston; Tel (713) [illegible], Mr. J. Allen. Equal Opportunity Employer.

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(413) 781-0882

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The work involves: the development of Software using modern techniques for Radar Systems Mission Planning, Data Reduction and Analysis.

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The BOSTON TECHNICAL CENTER is a division of the Advanced Technology Center of Calspan Corporation which has, for over 35 years, been a world-recognized leader in Research, Development and Engineering.

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Principal Lecturer in Computer Sciences
Faculty of Mathematical and Computing Sciences

The New South Wales Institute of Technology is established to provide a wide range of courses for those entering or already employed in industry, government and technological fields.

The School offers a bachelor's degree in Computing Science, a post-graduate diploma in Data Processing, and a Master's Degree by Research and Thesis. It is planned to introduce a Master's Degree in Information Science by course work in 1981

The School has a number of laboratories and a PRIME [illegible] Computer. The Computer Centre is currently proceeding with the installation of a large Honeywell network which will include a Level 66, two Level 6 computers and some [illegible] terminals. The School is active in research and consulting to industry. The current academic establishment is 27 staff, divided into four specialist Units: Computing Systems, Information Systems, Computing Methods and Business Computing. The Principal Lecturer would also be appointed as Head of the Department of Computer Science for a period of three years in the first place. This Department would comprise the two Units of Computing Methods and Computing Systems.

Computing Systems includes systems architecture, operating systems, languages and processors, performance evaluation, and microprocessors.

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The successful applicant will have a doctoral degree and will have demonstrated leadership in one of the above fields. The Principal Lecturer will have a major role in the planning of this rapidly developing School and will be given specific responsibility for certain aspects of its administration.

Salary will be within the range of [illegible] p.a.

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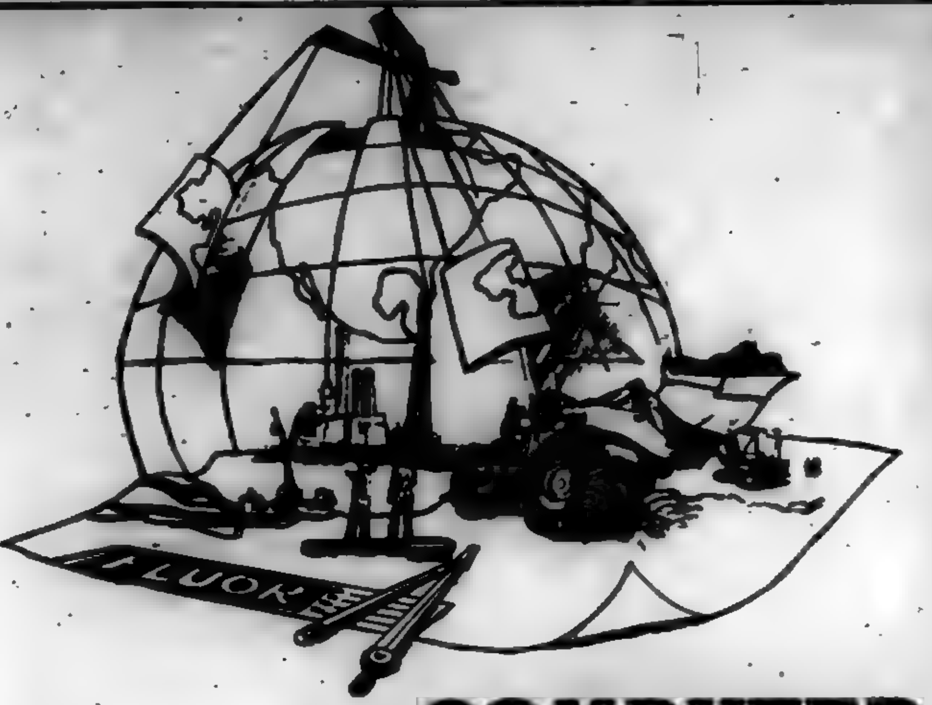
Applications close on November [illegible], 1980. Applicants should arrange for three confidential referees' reports to arrive by the same date. Written applications should include: address, phone number, personal particulars; evidence of qualifications, publications; research work undertaken and the names and addresses of the referees contacted. Applications and referees' reports are to be sent to:

The Commissioner
N.S.W. Government Office
[illegible] Floor
7 West 51st Street
NEW YORK, NY 10019



COMPUTER PROFESSIONALS
Overseas Opportunities With Fluor in Saudi Arabia

Fluor Engineers & Constructors, Inc., a world leader in the design, engineering and construction of process facilities for the energy and natural resources industries, is currently seeking several key individuals to join our Jobsite Computer Services Department.

The hardware configuration at the jobsite in Saudi Arabia consists of two IBM 4341 processors and related peripheral equipment. This configuration is to be utilized for data communications to and from the Irvine home office computer and jobsite processing of construction systems. The construction systems would include payroll, labor distribution, financial, cost and scheduling control, and material control and warehousing systems.

Positions are available in programming and operations from intermediate to management levels. Current openings include:

DIRECTOR, COMPUTER SERVICES

This position reports directly to the project construction directorate. The candidate should have at least 10 years of diversified experience in a large data processing installation, 5 years of which should be in a supervisory capacity. A degree in Computer Science or Engineering is preferred.

APPLICATIONS ANALYST/PROGRAMMERS (4)

3-5 years' experience in development, installation and maintenance of COBOL application systems (payroll, financial, cost and scheduling, material control systems).

SYSTEMS PROGRAMMERS (2)

3 to 5 years' experience in installation and maintenance of operating systems (MVS/SP) and communications software (ACF/VTAM).

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Responsible for directing the computer, data entry and data control operations at the jobsite. Minimum 3 years of supervisory experience in large computer installation is required.

Those accepting overseas assignments with Fluor in Saudi Arabia will receive outstanding compensation and benefits including:

Highly Competitive Salary Offers •
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For immediate consideration forward your resume, including current salary, to: Bob Woodruff (Department CW).

FLUOR

FLUOR ENGINEERS & CONSTRUCTORS, INC.
3333 Michelson Drive
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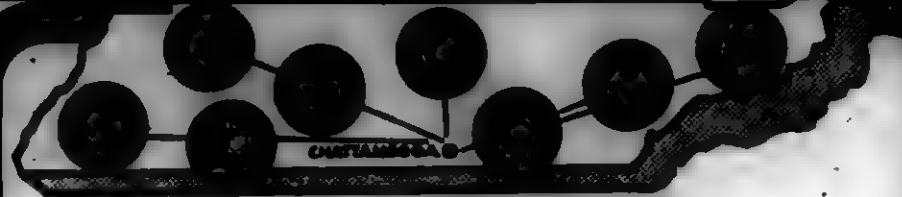

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- reap the rewards of top salaries where the cost of living is low (plus no state income tax).

The Hospital Computer Center is an organization operated by Blue Cross Blue Shield to provide a full range of data processing services for a growing user community of Tennessee hospitals.

We have substantially increased our technical staff in the last year and additional growth is planned.

Our plans for the 80's include:

- evolving from an RJE—BATCH operation to an On-line interactive data base environment.
- implementation of a distributed processing network of IBM 4300 systems.
- upgrading of all applications to use state-of-the-art hardware and software technology.

Our tools include: Twin large IBM main frames running VM/370, CMS, DOS/VS, DOS/VSE, CICS/VS, VSAM, DL/1, COBOL, PL/1, VTAM, and NCP. Our application software includes: SHAS, PCS, MSA financial software.

We are looking for individuals at several different levels. Positions to be filled:

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- PROGRAMMER/ANALYSTS
- SYSTEMS PROGRAMMERS
- ACCOUNT REPRESENTATIVES

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Recruiting and Employment
Dept. GC2-Hospital Computer Center
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FLORIDA

COMPUTER ENGINEERS

PROGRAMMERS ANALYSTS

We represent leading Florida firms. Challenging career opportunities for professional persons. Don't wait for the snow and dreary cold weather, find your place in the sun now.

A/P BAL - APPLICATIONS - LARGE SCALE BURROUGHS, PEOPLE ORIENTED, DEGREE PLUS A GOOD TRACK RECORD WITH BANKING OR BAL EXPERIENCE. [illegible]

ANALYSTS-PROGRAMMERS - SYSTEM PROG. STRONG BAL IBM OS INTERNALS, CICS, VSAM, FOR SOFTWARE DESIGN & DEVELOPMENT TO [illegible]
PROGRAMMERS BAL DOS VS TO $27K
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SYSTEM ENGINEERS COMPUTER/COMMUNICATIONS TELEPHONY EXPERIENCE, CREATIVE ADVANCED STATE OF THE ART DESIGN & DEVELOPMENT. SEVERAL POSITIONS RE SOFTWARE, HARDWARE DATA-VOICE COMMUNICATIONS. MSEE MSCS PREFERRED BSEE BSCS REQUIRED. TO $40K

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Salary for this key position is in the $40,000 range and compensation includes a progressive benefits program and full relocation to Florida's beautiful Gulf Coast. For immediate and confidential consideration, please call or submit your resume including salary history to:

frank leonard
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Primary responsibilities will be to identify and develop new applications for the OCR scanner. Major emphasis will be on forms design and software requirements for both the scanner and internal processing.

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Minimum 3 years ALC programming in a business environment.

COBOL PROGRAMMERS

Minimum 3 years analysis, design and applications experience.

SYSTEMS PROGRAMMERS

Large IBM systems, ALC required.

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Voice and data communications. Working knowledge of front end processors, statistical multiplexers, network protocols and architectures.

For immediate consideration, call or send resume in confidence to:

MARIE KIMBROUGH
TECHNICAL RECRUITING SPECIALIST
505 City Parkway West, Suite 100, Dept. CW-100
Orange, CA 92668
(714) 937-[illegible]

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TRW
INFORMATION SERVICES

EXECUTIVE DIRECTOR
Data Processing Cooperative

The Minnesota School Districts Data Processing Joint Board (TIES), an educational data processing cooperative located in St. Paul, Minnesota, is seeking applicants for the position of Executive Director. The Joint Board provides administrative, instructional and research services to over 60 elementary-secondary-vocational educational agencies in Minnesota. Masters degree in educational or business administration required. Doctorate preferred. Eight (8) years of general data processing administrative experience required. General educational administrative experience preferred. Submit resume and letter of application to:

Mr. Howard H. [illegible], Chairman
Minnesota School Districts
Data Processing Joint Board
1925 West County Road B2
St. Paul, MN 55113

Application deadline:
November 10, 1980.

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Major computer lessor has position available in NYC metro area for a qualified Salesperson with at least 3 years experience in marketing IBM 360 and 370 systems.

Excellent salary and company paid benefits.

Call or send resume to:

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212-[illegible]
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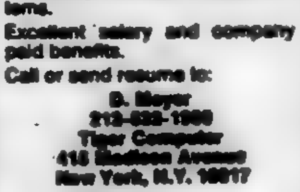
New York, N.Y. 10017



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33 IMMEDIATE OPPORTUNITIES
$16,000 - $35,000

Three of our major international companies are now expanding their EDP centers which are located in Reston, VA, Seattle, WA, and Boston, MA. They are now actively staffing for approximately 33 immediate openings in Analysis, Design and Programming of sophisticated new business and statistical systems. Systems utilize COBOL, FORTRAN and Assembly Languages and include IMS Data Base Management Systems and other software. Some applications include on-line, real-time teleprocessing work. If you have 1-3 years of programming and analysis experience, excellent advancement potential and salaries await you.

For immediate consideration call 800-[illegible] or send your resume to:

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OPPORTUNITIES

For Computer/Software Marketing Professionals

INCREASE YOUR ANNUAL COMPENSATION 10 TO 30%

If you are currently a successful computer marketing professional, possessing a proven track record and looking for a more rewarding future, the opportunity behind this ad will be of interest to you.

We are a well-established, computer software organization. Our company enjoys a highly regarded reputation for EXCELLENCE and PROFESSIONALISM in the computer industry. You will represent AMCOR's comprehensive line of application and DBMS software products & services applied within many different industries.

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Lucrative Compensation Package, Insurance Program & Expense Account.

A college degree or equivalent with a minimum of two years marketing experience is desired. Familiarization with DEC or other minicomputer vendor's hardware systems plus business and DBMS software will be helpful. Successful sales record with a package software vendor a definite PLUS!

Submit resume, with salary history, ATTN: DEPT TA 100, or call:

Robert O. Reardon
V. P. Marketing
404/934-2200

amcor computer corp.
[illegible]

---

computer professionals

L.D. Schreiber Cheese Company Inc., a fast-growing national, private-label food manufacturing company with sales in excess of [illegible] million per year, is rapidly expanding the corporate data processing staff to meet the needs of the 80's.

We offer challenging opportunities in an expanding on-line database environment for experienced:

- PROGRAMMER/ANALYSTS
- DATABASE ADMINISTRATORS
- SYSTEMS PROGRAMMERS
- MANUFACTURING DATABASE [illegible]

These positions require a BS degree or the equivalent, plus several years experience.

Currently we are operating a 370/145 under VS with [illegible], [illegible], [illegible], and [illegible] with a 4341 on order. The on-line database portion consists of OS/VS1, IMS, CICS and [illegible]. We are establishing a [illegible] network of the latest [illegible] hardware.

We can assure a future filled with growth, opportunity and challenge by sending your resume and current earnings to:

Corporate Staffing Director
L.D. SCHREIBER CHEESE CO. INC.
P.O. BOX 610
Green Bay, WI 54305

With Our Resources You Need Not Be Left Out In The Cold!

Tired of those long, cold winters?

Consider a move to the San Francisco Bay Area and a beautiful, sunny, year-round mild climate. If you are a Data Processing Professional and have considered changing jobs, consider California. Logical Options can be a valuable resource for you!

If you are an experienced Programmer or Analyst, with a knowledge of COBOL/ALC, OS/JCL, CICS/IMS, DATA BASE/ON-LINE SYSTEMS, don't waste your best resource!

Call COLLECT or send your resume.
Naturally, the fees are paid by the employer.

LOGICAL OPTIONS

One Market Plaza, Spear Tower
Suite #2014 C
San Francisco, CA 94105
(415) 777-3000

PROCESS COMPUTER ENGINEERING

When it comes to process computer systems we at Northeast Utilities have it all together. We've "been there". More importantly, we know where we're going! Our central Process Computer Engineering [PCE] group is in its second decade with a Corporate commitment, visibility, purpose, and capability that is the envy of the electric utility industry.

The key to our accomplishments is our in-house approach. PCE functions as an internal systems house—in the full sense of the term—with total system supply and system life cycle support responsibilities. Our areas of involvement include:

GENERATION

- Nuclear Plant Computer Systems
- Fossil Plant Computer Systems
- Hydroelectric Plant Computer Systems
- Environmental Monitoring Systems
- Equipment Vibration Monitoring
- Plant Site Security Systems

TRANSMISSION/DISTRIBUTION

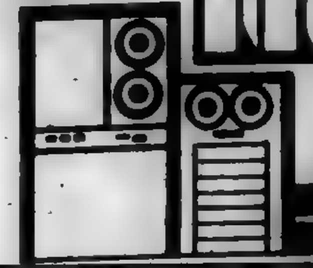
- Bulk Power Transmission Scada
- Automatic Generation Control
- Power Control Center Operations
- Load Management

Process computer engineering is a rigourous pursuit. This is no place for the uninitiated. It demands the utmost in engineering and people skills from its practitioners.

Our PCE staff of engineers faces an unprecedented work-load, both near and long term. We invite your investigation of numerous PCE career openings. If you have three [3] or more years of related experience, and seek a challenging state-of-the-art professional opportunity, please call collect:

ANN JOHNSON AT [203] 666-6911 Ext. 5103
[She will put you in touch with the appropriate engineering manager.]

Or send your resume in confidence to:
Ann Johnson, Employment Coordinator



NU NORTHEAST UTILITIES
P.O. BOX 270,
HARTFORD, CONNECTICUT 06101
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Affirmative Action Employer M/F

Our 1000+ Clients in 41 states are paying fees for Computer Personnel with the following background/experience. Most listings represent duplicate positions in different geographical locations. Est. 1957.

Data Base Analyst	[illegible]
EDP Director/Mgr.	To [illegible]
Sales (Hardware/Software)	Open
EDP Auditor	[illegible]
Tech Services Mgr.	[illegible]
Project Leader	[illegible]
MBA's (EDP Background)	[illegible]
Management Sci/O.R.	[illegible]
MS, Ph.D. Computer Sci	[illegible]
Systems Prog./Tech Spec.	[illegible]
On-Line Financial Sys	[illegible]
[illegible]	[illegible]
Mini Micro	[illegible]
Scientific Programmer	[illegible]
Cobol Prog. OS or DOS	[illegible]
Sys 3/34/38 Specialist	[illegible]
[illegible] Programmer	[illegible]
Real Time Programmer	[illegible]
CICS Programmer	[illegible]
Jr. Prog. Cobol/ALC/PL-1	[illegible]
[illegible] Entry Level	[illegible]
Vendor [illegible]	[illegible]
RPG II Programmer	[illegible]
Manufacturing Specialist	[illegible]
B.S./M.S. Mathematics	[illegible]
Military Computers	[illegible]
Consultants	[illegible]
Tech Wtr/Documentation	[illegible]
Process Control Experience	[illegible]
Graphics	[illegible]
Network Design	[illegible]
Computer Design	[illegible]

[illegible], C.P.C.
Computer Specialist
[illegible] Personnel Agency
Suite [illegible] Rand Bldg.
Buffalo, NY 14203
(716) [illegible]

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Princeton, New Jersey 08540

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ADR

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Call today if your background includes any of the following:

MICROPROCESSOR SOFTWARE DEVELOPMENT
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Join our team and participate immediately in a technically challenging project. Furthermore, you will be able to experience the casual, family oriented lifestyle on the Atlantic coast within easy driving distance of Florida's most inviting recreational attractions. Melbourne, Florida—the cost of living is low, but the quality of life is high.

Call or send resume to **Daphne Cumberland, Harris Composition Systems Division, P.O. Box 2080, Dept. CW 10/27, Melbourne, Florida 32901. 1-800-327-0482.**

HARRIS
COMMUNICATION AND INFORMATION PROCESSING

An Equal Opportunity Employer M/F/VH.

DATA PROCESSING PROFESSIONALS

Consulting opportunities for problem solvers who prefer a large-scale environment

We're working toward an advanced Distributed DP network at Colonial Penn, pioneer in marketing specialized group insurance by mail. The environment is on-line and offers pivotal involvement to professionals who can provide consulting type support to analysts, programmers and clients. Those qualified will work at the systems level, integrating applications with operating systems, and will participate in special task force assignments.

TECHNICAL ANALYST

To identify and solve problems with applications program logic, compiler and operating system interfaces; and to participate in technical projects. Must have 3 years programming experience on L66 systems, and demonstrated ability to develop and document technical procedures and routines. Solid understanding of JCL, TSS, FMS, IDS, utilities and slave dump analyses essential.

ON-LINE SYSTEMS CONSULTANT

To provide liaison between clients and data management. Must have 2-3 years experience in applications programming involving on-line systems design. Data base knowledge and TDS or DM IV-TP experience preferred.

Competitive salaries are enhanced by an outstanding benefits package. Please send resume including salary requirements to Mr. Michael McDonald.

Colonial Penn Group
5 Penn Center Plaza
Philadelphia, PA 19103
An Equal Opportunity Employer

CALIFORNIA

CO PAID RELOCATION-Major Financial Institution seeks several P/As & S/As to develop on-line state of the art applications. Large scale IBM req with COBOL or BAL programming experience. Extensive relocation package and excellent benefits. Salary to $35,000.

CO PAID RELOCATION-Large Sales Co seeks OS/COBOL progs. with some time-sharing experience and a desire to learn IMS. They are enlarging existing dist. apps & converting all systems to IMS. Extraordinary benefits, education reimbursement, 4 yr fully vested pension, elaborate bonuses, full relocation. Salary to $30,000.

INTERNATIONAL MANUFACTURING FIRM is looking for a Systems Programmer to support MVS. Experience with VTAM, NCP or IDMS a plus. Excellent company benefits. Salary to $35,000.

the jarvis walker group
3255 Wilshire Blvd., Suite 1503
Los Angeles, Ca. 90010 (213) 384-4800

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If your career is developing just one step at a time, look into BRAEGEN CORPORATION, a quality manufacturer of computer-based terminal systems ideally located in Cupertino. In one year we have grown from 100 to 600 employees, and have expanded our sales and service division from 6 to 52 cities.

A move into new product development has created challenging opportunities for innovative Logic Design Engineers at BRAEGEN.

Candidates must have knowledge of LSI circuits, microprocessor control design and state-of-the-art microprocessors. Familiarity with communications protocols desired. Requires 4 years' logic design experience, plus a BSEE or equivalent.

BRAEGEN offers excellent starting salaries and benefits including a paid holiday from Christmas to New Years. Please send your resume or contact **Jim Rook at BRAEGEN CORPORATION, 20740 Valley Green Drive, Cupertino, California 95014, (408) 255-4200.**

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The BRAEGEN Corporation

SYSTEMS & PROG MGR
To $3[illegible],000

SE based industry leader has immediate opportunity for EDP professional to head up Business/Financial Systems & Applications Dept. (15 programmer/analysts in addition to several in Tech. Support in dept.) Co. operates IBM DOS/VS, CICS on-line environment. Client reqs. college dg. combined with good management skills and related technical knowledge. Excellent opportunity for Sr. Analyst or Project Mgr. to assume additional responsibilities. Complete career benefits.

OPERATIONS MGR
TO $3[illegible],000
NORTH CAROLINA

Multi-billion dollar client, due to upcoming promotion has opportunity available for EDP operations professional to assume total responsibilities for the 60+ person dept. within IBM OS/MVS shop. Client reqs. college dg. combined with good management skills, technical expertise and exposure to financial planning & forecasting as relates to dept. needs. Any exposure to IBM hardware/software will be appreciated. Complete career benefits.

All positions are employer fee paid to include interview & relocation expenses. For details on the above or numerous additional EDP opportunities at all levels contact [illegible] at 704/375-[illegible] or rush resume in strictest confidence to:

fox-morris
personnel consultants
[illegible] Southern National Center
Charlotte, N.C. [illegible]
MEMBER NATIONAL PERSONNEL CONSULTANTS

ROBERT HALF

[illegible]

SR P/A-Cobol-CICS	[illegible]
P/A-Basic-Bus Appls	[illegible]
P/A-Fortran-Bus Appl	[illegible]
P/A-Cobol-Bus Appl	[illegible]
P/A-RPG or Cobol	[illegible]
Prog-RPGII	[illegible]
P/A-Data Base	[illegible]
Prog-Neat 3	[illegible]
Sys Analyst-Cobol-Mfg	[illegible]
Prog Mgr-Cobol-[illegible]	[illegible]

[illegible]

ROBERT HALF
of LOUISIANA, INC.
[illegible] St. Charles Avenue
Suite [illegible]
New Orleans, Louisiana [illegible]
([illegible]) [illegible]

PROGRAMMER

NCR Programmer Analyst

Work in the growing Computer Service Division of a 441-bed medical center located in central New Jersey. Processing done for other health oriented associations also. Currently running an NCR 8450, 512K Memory, 658 and 656 Disk Drives with the B3 Operating System. Languages include NEAT/3 and BOSS/3 On-Line. Plans include on-line processing, shared services expansion and COBOL usage. Salary $16,000-$22,000 based on experience. Send resume and salary requirements to: Irvin L. House, Data Processing Manager.

John F. Kennedy Medical Center
James Street, Edison, NJ 08817
OR CALL (201) 321-7762 or 7637
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PROGRAMMER ANALYST OPPORTUNITIES

Datapoint Corporation, the pioneer leader in dispersed data processing has career openings for programmer analysts in our SAN ANTONIO office.

JOIN THE "OUT-THINK" TEAM WHERE NO ONE IS A CODER!

While we prefer a degree, your demonstrated skills are what will make the difference. Those professionals with financial and marketing applications experience will have the inside track.

IMAGINATIVE PROFESSIONALS MOVE FAST WITH DATAPOINT!

We can offer you an excellent salary, great company paid benefits, and the advancement potential that makes Datapoint the place where you can move fast. For prompt consideration, please send your resume including salary history to:

Jim Ramsey
Datapoint Corporation
9725 Datapoint Dr., MS M-64
San Antonio, Texas 78284

We are an equal opportunity employer M/F.

DATAPOINT

Data Base Project Leader

Annual sales approaching $1 billion reflect much more than just growth at National Semiconductor. It also reflects our commitment to provide quality people with the resources they need to reach their goals, as well as ours.

This position offers an opportunity to lead a team responsible for the development of a data base system for a major new product. This product will be a fully redundant (both hardware and software) high-integrity, mini-computer system. The data base will be required to support high-volume transaction throughput in an on-line, shared data environment.

We're looking for an experienced software designer with at least a BS and a sound working knowledge of the following areas: data base models, file and record-level locking, access mechanisms, transaction back-out and recovery techniques. Some supervisory experience is also required although we'll consider someone currently employed as a senior programmer or equivalent.

Please send your resume, in complete confidence, to Nancy McAuliffe, Professional Employment, National Semiconductor, P.O. Box 60678, Department 3-51-218, Sunnyvale, CA 94088; or call COLLECT (408) 737-5848. An affirmative action employer.

National Semiconductor

If you didn't know that, you don't know National.

COMPUTER ENGINEERS/SYSTEMS ENGINEERS/SOFTWARE ENGINEERS

NORDEN SYSTEMS invites you to meet our Engineering Managers during...

AFTER 5 INTERVIEWS
Monday–Wednesday
Oct. 27-29

Come to our Melville, Long Island facility between 5 & 8 PM on any of the dates indicated.

With the day's work pressures behind you, come relax and discuss your interests, background and the opportunities now available at Norden Systems.

Highly successful supplier of complete military electronic systems, we're committed to designing advanced new computers from the ground up—as well as to militarizing existing systems. To this end, Norden is forming an elite group of computer professionals at our well-established facility in Melville. Continuing our tradition of creativity and innovation, our activity will employ new approaches extending the state of the art.

In support, we have the nearly $2 million a day R&D budget of United Technologies to draw upon—one of the largest in force in America—and major government contracts carrying deep into the decade. The challenge is without precedent. The opportunities long-term. And the future is what you make it. Immediate openings available for the following:

COMPUTER ARCHITECTS

High level assignments calling for 8 years or more experience in designing computer systems including: implementation of logic design, microcontrolled architecture, cache memory, I/O-memory interface, and CPU structuring. BSEE, preferably MS.

COMPUTER HARDWARE ENGINEERS

Capable of designing circuitry to implement architecture requirements. Complete familiarity with microprocessor-based CPU and peripheral interfaces. Openings at Senior level require 6-10 years experience. Other openings call for 3 or more years experience. BSEE, preferably MS.

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Will be responsible for designing systems to military requirements with state-of-the-art capabilities. Involves interfaces between multiple computers and peripherals, data transfer, telecommunications, error detection and correction techniques, and functioning in hostile, real-time environments. Familiarity with PDP-11 family desirable. Must be able to define system requirements to meet customer specifications. BSEE/MSEE with 8+ years experience for Senior level openings. Minimum 3 years experience for other positions.

MICROPROCESSOR ENGINEERS

Thorough knowledge of standard microprocessor functions, capabilities, limitations. Able to satisfy specifications with available units and determine optional configurations of MPU's. BSEE/MSEE with 5 or more years experience.

SOFTWARE ENGINEERS

Design basic software to perform real-time functions under demanding conditions. Develop operating systems with diagnostic programs and utilities. Capable of developing complete operating systems for unusual processing functions. BSCS or BE (preferably MS) with 2-3 years experience.

If you require further details about these special evening interviews or are unable to attend, call COLLECT any weekday.

Eugene Wolsin
(516) 694-0866

Or send resume or brief letter describing your work background to: Personnel Dept., Norden Systems, 75 Maxess Rd., Melville, N.Y. 11747.

For information on opportunities at our Norwalk, Connecticut facilities, contact Kevin Keegan at (203) 852-5408/
303 Norden Place, Norwalk, CT 06856.

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NORDEN SYSTEMS

An Equal Opportunity Employer

N.Y. City
CONTRACTS, To
$200/DAY
FULL TIME, To
$35,000

- [illegible]
- [illegible]
- [illegible]
- [illegible]

Call or forward resume to:
PARAMOUNT CONSULTANTS
[illegible] Madison Avenue
New York, New York [illegible]
(212)[illegible]

FLORIDA DIRECTOR MIS

Corporate [illegible]

ROBERT HALF
of STAMFORD, INC.
111 Prospect St.
Stamford, Ct. [illegible]

N.C. Opportunities

Programmer/Analysts
COBOL - IMS - CICS . . 22K
Systems Programmers
-IMS 33K
Sr. EDP Auditor 30K
Business Systems
Designer 27K
Systems Analysts
Insurance Bkgd. 31K

[illegible]
P.O. Box 11121 Charlotte NC 28209 [illegible]

MELLONICS

IMS PROGRAMMER/ ANALYSTS

(Southern California)

Mellonics Information Center is located just 29 miles Northwest of downtown Los Angeles in the beautiful San Fernando Valley.

We are currently seeking IMS Professionals that can take charge in creating a new multi-company IMS pension system, as well as other related business systems.

MIC has built a nation-wide reputation on delivering cost effective data processing services to customers who span the many functions of modern business. We offer a rare blend of a relaxed, friendly atmosphere and exciting, innovative career assignments.

To arrange an interview appointment:
Call COLLECT:
(213) 887-5036
Jona Hester
Or send resume to:

Professional Employment

MELLONICS INFORMATION CENTER
Litton
6701 Variel Ave., Canoga Park, CA 91303
Equal opportunity employer M/F

Oklahoma City is OK!

- Senior Programmer/Analyst
- Programmer/Analysts
- Systems Programmer

An immediate 10% bonus is just one of the outstanding benefits you'll receive as part of this fast-growing oil company. Tremendous company growth and increased user requirements have led to an expanding EDP department.

If you are a self-starter who enjoys a challenge and has experience in one or more of these areas:

- 3-5 years systems programming
- 3-5 years oil & gas applications
- 3-5 years financial accounting applications
- 1-2 years data base design/programming

we can offer you an opportunity to be part of a state-of-the-art development team utilizing an IBM 4300 DOS/VSE/DB-DC.

If you seek a company that recognizes personal achievement and offers excellent salaries and benefits, call or send your resume in confidence to:

Jim [illegible]
Texas International Petroleum Corporation
[illegible] NW 63 • Oklahoma City, Oklahoma 73116
(405) 847-[illegible] Ext. [illegible]
An equal opportunity employer M/F

THE GOOD NEWS

At Diners Club Operations Center in Denver, we mean business. Other companies are slowing down or laying off but at Diners Club it's business as usual. Our Data Center, is a progressive technically sophisticated environment where continued expansion enables your talents and skills to be called on to make valuable contributions to our progress during the 80's. Extensive automation, data base development and distributive processing, all utilizing the latest IBM technology (IBM 370/3031 OS/MVS) will project us into international communications during the 80's.

These projects have created new opportunity for the best data processing professionals to fill the following positions:

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Our development of an IMS data base is well underway. To continue this development we require an individual with 2 years IMS/VS/DB and DB utilities.

IMS/DB backup and recovery experience is strongly preferred or if you are in the IMS/DB-OS/VS1 rut and are ready for a progressive, technically sophisticated IMS/DB-MVS shop we would be interested in speaking to you.

COMMUNICATIONS SYSTEMS PROGRAMMER

Excellent opportunity in a MVS/DL1 environment embarking on a large scale growth plan, encompassing distributed systems in a worldwide network. Strong ASSEMBLER and CICS experience required. Series/1 (RPS, VTAM, NCP) and/or 8100 (DPPX) experience a plus.

Outstanding compensation and benefits package make these positions the key to your advancement and growth during the 80's. Find out more about these exciting opportunities by sending your resume with salary information to Linda Petersen.

Diners Club
10 Denver Tech Center
I-25 and Belleview, Exit [illegible]
Englewood, CO 80111
Equal Opportunity Employer

Director of Information Systems

A well-known consumer products division of a Fortune 200 company is seeking a strong and aggressive systems professional to provide leadership for our domestic and international systems operation.

The Director of Information Systems is a highly visible position within our organization. The Director reports directly to the Vice President and Controller and is responsible for:

- Systems planning, development and implementation world-wide.
- Management and development of a staff of over 100 employees.
- A 7 million dollar budget.
- Administration of a large centralized computer operation as well as distributed data processing facilities in a variety of locations world-wide.

To be a candidate for this position, you should have experience managing a large systems organization and be able to demonstrate your ability to successfully make the type of business decisions this position requires. Successful applicants must have the following qualifications:

- Minimum of 12-15 years of progressively responsible systems management experience in a large, multi-location manufacturing environment.
- Bachelor's degree required, MBA degree preferred.
- Excellent communication skills. Must be able to interface with all levels of corporate management.
- Exposure to systems planning is essential.
- Experience in charge back systems considered helpful.

We offer an excellent compensation plan that includes a salary commensurate with experience, plus comprehensive benefits.

For prompt, confidential consideration, forward your resume and salary history to:

CW Box [illegible]
375 Cochituate Rd., Rte. 30
Framingham, MA 01701
An Equal Opportunity Employer M/F

IMS PROGRAMMER/ ANALYSTS

$18 to $28K

San Francisco

Several of our Bay Area clients have immediate openings for IMS Programmer Analysts. Positions require a minimum of 2 years in Data Processing with 1 year in IMS COBOL applications. Prefer Manufacturing, Finance or Distribution Applications. Positions include relocation and excellent benefit packages. Salary commensurate with abilities.

We are consultants to management. For immediate and confidential consideration send detailed resume to CW Box 2418, 375 Cochituate Rd., Rte. 30, Framingham, MA 01701.

Employer assumes fee

COLORADO JOBS

Come join one of the fastest growing high technology centers in the U.S. New book, THE COLORADO CONNECTION, TELLS YOU EVERYTHING YOU NEED TO KNOW. Covers Denver, Boulder, Colorado Springs, and Ft. Collins. Employment Guide contains history, topography, indepth look at contemporary Colorado; aerial photos of cities; details on employment outlook, cost of living, education, housing, the arts and entertainment, and much more. Directory of High Technology Companies contains nearly 400 entries: name, address, phone #, date company was founded, # of employees, description of major products and services, computer systems used. The real growth is just beginning. We believe that no other area in the nation offers more opportunity for the 80's. Author has worked in Colorado as a programmer for over 10 years. Format 8½ x 11, 84 pg. bound book. Send $9.95 plus $1.50 for shipping and handling to: [illegible] Publishing Co., Box [illegible], Boulder, CO [illegible]. Visa and MC send # and exp. date or call 1-[illegible]. Satisfaction guaranteed! 30 day money back return privilege.

Broward County, Florida

Employment Opportunity

Data Processing Director

(Administrative Officer VI, $31,[illegible] - $44,[illegible])

Large on line data processing system consisting of IBM 3031 and 370-158 equipment operating on OS/VS 1 and on a 7 day, 24/hr./day basis, needs an experienced, professional director to assume complete responsibility. This is a central information system serving all county divisions and governmental agencies. Must be able to deal with elected and judicial officials and numerous other appointed division directors.

Requires a degree in an appropriate field, specialized training in electronic data processing, and extensive progressively responsible data processing experience, which shall have included administrative and supervisory duties.

Submit detailed resume, no later than 5 p.m. Nov. [illegible], 1980 to

County Administrator
c/o Division of Personnel, Governmental Center [illegible]
[illegible] S.E. [illegible] Avenue, Ft. Lauderdale, FL [illegible]
Phone [illegible]

Equal Employment Opportunity M/F

PROGRAMMER/ANALYST

In yesterday's environment? Want a solid opportunity? An expanding company in a growth industry has a need for a P/A with 2 or more years COBOL OS on IBM large scale. Excellent benefit package. To $[illegible]. ALL FEES PAID BY EMPLOYER.

PROGRAMMER (2)

Under-challenged and want more money? Large Memphis distributor has an opening for 2 programmers with 2 yrs. COBOL. Company has DOS CICS shop. High growth and good benefits. To $[illegible]. ALL FEES PAID BY EMPLOYER.

HALF
Robert Half of Memphis, Inc.
[illegible] Ridge Lake Blvd.
Memphis, TN 38119
(901) [illegible]

DATA PROCESSING PROFESSIONALS

FOUST, DIER AND ASSOCIATES OFFER EXECUTIVE PLACEMENT IN THE PROFESSIONAL MANNER.

Phoenix, Dallas, Houston, Los Angeles, San Francisco, Denver, Sacramento, Boise, Las Vegas, Reno.

Programmers, programmer analysts, systems programmers, systems analysts/engineers, project leaders/managers, data base administrations, tech. support.

Manufacturing, banking, forest products, insurance, energy, medical.

Our clients are located throughout the western U.S.and utilize state-of-the-art operations.

If you have experience with the following, you owe it to yourself to contact us.

IBM -
4331-3033-32-31, 370/168-158,
IMS-DB-DC, CICS-TOTAL,
OS, DOS, MVS, VS1, VS2.

We are able to combine career path with lifestyle. Our clients pay all fees and relocation. Some clients include attractive relocation packages, which include real estate. Due to the slowdown in movement caused by the housing situation many excellent positions are now open. Take advantage of these opportunities we offer: confidentiality, professionalism, career growth and life style.

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EXECUTIVE PLACEMENT IN THE PROFESSIONAL MANNER
7801 E. McCormick Pkwy., Suite 220 N.
Scottsdale, Arizona 85258
(602) 998-4100

Systems Analysts
Bring Your Creative Energy
to the Pacific Northwest

The City of Seattle is seeking experienced, creative computer professionals to work in our new and expanding Large-scale DP environment. Vacancies currently exist at all levels for Business Applications, Data Communications and Operating System/Technical Services. These vacancies offer on-line software development, structured analysis and design with a varied portfolio of computer application with significant new development in the immediate future.

The City offers competitive salaries and an excellent benefits package including medical and dental coverage. The greater Seattle area is well known as an environment appealing to all age groups and offering unlimited recreational opportunities. Cultural activities such as theatre and opera are readily available, as are outdoor activities such as skiing, boating, fishing, backpacking, camping and numerous opportunities for participation in sports.

For an application, call Mary Chapman at (206) [illegible], or write to:

City of Seattle
[illegible]
800 United Pacific Building
1000 Second Avenue
Seattle, WA 98104
Attn: Mary Chapman

AN EQUAL OPPORTUNITY EMPLOYER

SUPERVISORS

Badische Corporation is a multi-plant manufacturer of chemicals, fibers and yarns. These are immediate openings in our central computer facilities at

ANDERSON, SOUTH CAROLINA

Application Software Development

Technical and administrative supervision of 20-25 software professionals involved in the development of manufacturing and financial applications. Ideal candidate will have degree, 8-10 years applications development experience, data base exposure, plus proven supervisory experience. Familiarity and experience with Burroughs Medium Systems desired.

Technical Support

Challenging position for an innovative technical specialist to provide support of a medium scale Burroughs Medium System. Knowledge of B-4000 architecture, the MCP operating system, RJE, CANDE, DMSII, NDL, and Utility software is essential. Candidate should have 4-6 years experience, degree preferred.

If interested, please send resume, including salary history, and indicating position desired, to:
Manager, Professional Placement

Badische Corporation
P.O. Drawer D
Williamsburg, Va. 23185

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SYSTEMS PROGRAMMER - UNIVAC 1100/60

SUNBELT
EXCELLENT SALARY

Outstanding Southeastern company, Division of major corporation, will soon install a Univac 1100/60 for existing batch operations and new on-line applications.

If you are a systems programmer with experience on OS 1100 and related software, you can become an important part of this exciting installation.

You will enjoy the benefits of an outstanding community: excellent schools and colleges, year round outside activities, numerous civic and cultural opportunities.

No agency referrals accepted.

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EDP OPPORTUNITIES

PROJ Ldr-[illegible] OS COBOL on-line D/B	[illegible]
CHECK [illegible] DOS	[illegible]
S/A-[illegible]	[illegible]
ANALYST Prog-[illegible] + PDP 11/70, RSTS BASIC + DBA [illegible]	[illegible]
PROJ Ldr-Foreign [illegible]	[illegible]
SYST Eng [illegible] SDLC SNA PL/I ALGOL	[illegible]
PROJ Ldr [illegible] PDP 11/70 RSTS BASIC. Co. car	[illegible]
SOFTWARE-OS MVS CICS, [illegible] TSO 370/165	[illegible]
ADABASE Anal-[illegible] 370/168/[illegible]/TSO	[illegible]
[illegible] state of the art [illegible]	[illegible]
SYSTEMS/ANA data collection, [illegible] on-line concepts	[illegible]
4 DAY w/e [illegible] COBOL OS [illegible] CICS	[illegible]
PDP 11/60-11/70 RSX 11 [illegible] 11	[illegible]
P/A CICS 2 yrs on line [illegible]	[illegible]
PROJ Ldr-[illegible] OS-COBOL on-line ADABASE-CICS	[illegible]
DOS-OS conversion [illegible]	[illegible]
CMS COBOL [illegible]	[illegible]
RPG 2 Systems [illegible] Westchester	[illegible]
MGR T/A-Audit & review [illegible]	[illegible]
4 Day w/e P/A OS COBOL learn CICS/IMS	[illegible]
[illegible]	[illegible]

WM HARRIS ASSOC
[illegible]

PROGRAMMER

Requirements: Bachelor's Degree from an accredited college plus 2 years experience in computer programming using BASIC. It is desirable that applicants have PDP experience. An equivalent combination of training and experience is acceptable. Starting salary: $16,000. Resumes should be sent to Helen Thomas, Personnel Officer, Guilford College, 5800 W. Friendly Avenue, Greensboro, NC 27410.

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FLORIDA POSITIONS

Urgently need Programmers, Analysts and Systems Programmers for Florida and other Sunbelt locations. Experienced individuals needed in financial, manufacturing, and for Software Development. IBM 370, COBOL, CICS, OS/VS, DOS, BAL or Assembler. Others needed with Univac, Burroughs, Honeywell, PDP-11 or NCR experience. All fees, interview and relocation expenses paid. Salaries 15 to 35K. Rush confidential resume and earnings history to:

J.C. [illegible], President
[illegible], INC.
[illegible] Blvd., Suite [illegible]
Tampa, Florida [illegible]

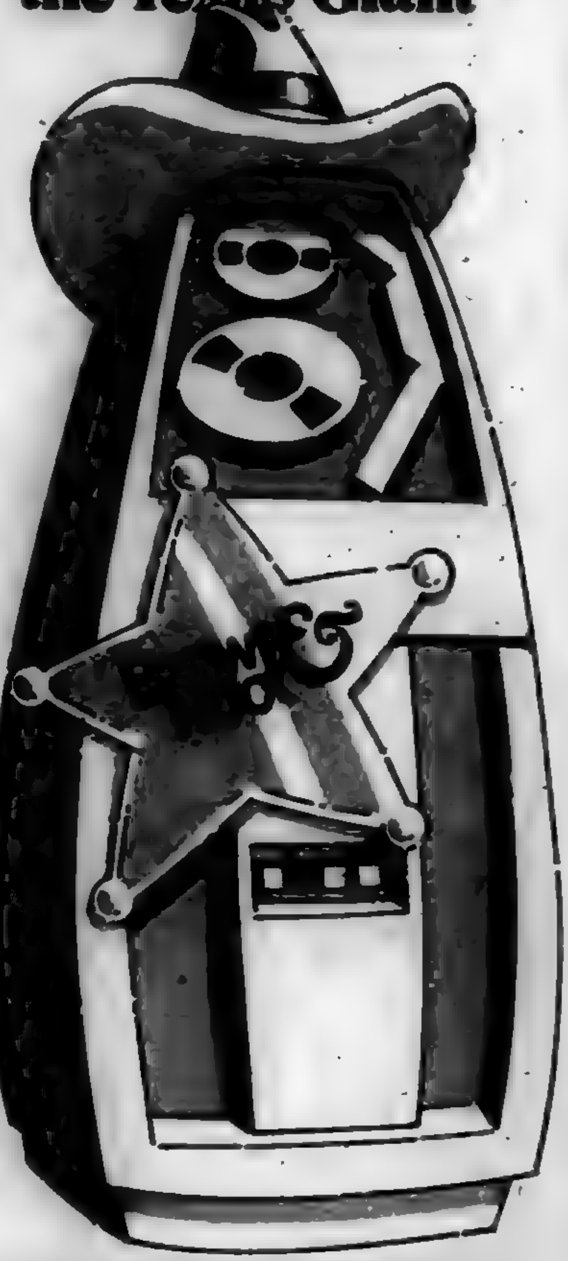
FACULTY POSITION

A Full-time Tenure Track Faculty position in Computer Data Processing is available at Charles County Community College, January 1981. Duties and responsibilities involve teaching Computer Data Processing courses and assist in the Management and Development of Computer Data Processing Curriculum. Qualifications: Masters preferred, Bachelor's required. Closing date Nov. 14, 1980.

If interested, send resume, transcripts and three letters of reference to Charles County Community College, Personnel Dept. P.O. Box [illegible], La Plata, Md. [illegible]. EOE/M.F.

Programmers & Analysts

A Computer System with the Brand of the Texas Giant



Continued success and expansion of our worldwide operations has created many new career opportunities. Because our operations are worldwide, we are developing a new, integrated computerized system to support our reputation as the international leader in Engineering and Construction. Its use will be of a scope unequalled by any other organization and we need top professionals to meet the challenge.

Our Computer Services Division supports a diversity of business applications such as Materials Management, Accounting, Project Control and Personnel/Payroll. If you have 2+ years COBOL programming experience in an IBM S370/MVS environment, and a Bachelor's degree, or equivalent, there could be a place for you on the Brown & Root team.

We are also seeking Systems Analysts with a minimum of 5 years experience in a business environment. Large-scale, data base oriented systems development experience, preferably under IMS, using structured design/programming techniques are all pluses and will give your application a considerable advantage.

Brown & Root offers excellent salaries to qualified candidates, along with top benefits and relocation compensation. If your background and education qualify you for these positions, call Sam Gaines at (713) 676-5723, out of state call toll-free at 1-800-231-1357, or send your resume to: P.O. Box 3, Houston, TX 77001 (03-125).

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GRUMMAN DATA SYSTEMS, a subsidiary of Grumman Corporation, is expanding its Washington-based operations. We have immediate openings for Senior Marketing Representatives who can sell ADP systems.

Qualifications? At least, 5 years experience in marketing computers and/or computer software, a B.S. degree in marketing, business or a related field and a proven track record in the Federal marketplace.

At GRUMMAN, you will be working for a company that developed systems for the space program and the lunar module. Today, we are using this type of sophisticated engineering technology to develop systems for the ADP field. GRUMMAN DATA SYSTEMS is a total systems company offering design, development, integration, implementation, operation and maintenance capabilities.

With GRUMMAN, you will be a systems specialist and not just the seller of hardware or software. You will perform objectively, counseling our customers on how to design and implement the most effective system for their needs. You will help them solve problems.

Take the first step today by sending us your resume. The more you know about GRUMMAN, the more you will want to work for us. Write in care of Glenn Nichols, Dept. "C" at the address below.

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Contact Rhonda [illegible]

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Offers challenging opportunities for experienced professionals to develop new applications in our on-line environment.

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Supervises a staff of Analysts and Programmers in the design and implementation of MIS. Requires two years of experience as an EDP Systems Project Manager with administrative and supervisory experience desirable. Starting salary $[illegible] - $[illegible] annually depending on experience.

PROGRAMMER ANALYST

Requires two years of programming experience, primarily COBOL, CICS. Database and IBM operating system experience desired, but not necessary. Starting salary $[illegible] - $[illegible],111 annually depending upon experience.

Due to the nature of the application systems, a background investigation will be required of the successful applicant.

Arizona Department of Public Safety
[illegible] Ave., P.O Box [illegible]
Phoenix, AZ [illegible]

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Nationwide opportunities for programmers/systems analysts. Salary ranges $18,000 to $45,000. Immediate response! ALL Fees paid by our client companies. Submit resume in confidence along with preferred geography and salary information to:

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Famous Eastern Penna Mfgr. BS Public or Private EDP Audit Exp. CIA or CDP/CPS helpful, not reqd. Outstanding spot.

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Solid Sys Program exp w/360 or 370. Knlg applications w/key ASSEMBLER. DOS ESSENTIAL.

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(215) [illegible]

Computer & Information Sciences: One tenure track position as Assistant or Associate Professor in a program offering a bachelor's degree in software systems, information systems and systems analysis. Required: Ph.D. in computer science or related field; or equivalent research and development experience in computer science. Strong interest in teaching and specialization in one of the following areas preferred: Databases, Operating Systems, Systems Programming, Computer Architecture, Computer Communications and Networks. Opportunity to participate in the development of an innovative CIS Program and to work in a professionally and culturally dynamic environment. Rank and salary dependent on qualifications. Starting date: 1 February 1981 or 1 September 1981. Deadline for applications: 15 November 1980. Send resume to:

Affirmative Action Officer
Search Committee (CIS)
State University of New York
College at Old Westbury
Old Westbury, New York 11[illegible]

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JOB OPENING

Electrical Engineer needed to design, develop, and implement software tools for the automated design of digital systems. B.S. in Electrical Engineering required. 40 hours per week, $21,000 per year. Contact Ms. Valerie K. Smith, President, V-R Information Systems, Inc., [illegible] Balcones, Suite 2[illegible], Austin, Texas. (512) [illegible].

Equal Opportunity Employer.

SENIOR PROGRAMMER/ ANALYSTS

COBOL experience required in the analysis and programming of application systems in higher education.

Exciting things are happening at the University and in the Florida sunshine (no State or local income tax). Join an organization of growth and commitment which is dedicated to state of the art systems. Full range of benefits including tuition waiver through Master's level courses and corresponding 75% discount for dependents.

To be considered, send resume and salary history to:

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Data Processing

PROJECT LEADER

American Television & Communications Corporation is a rapidly expanding multiple system cable television operator, serving over 1 million subscribers nationwide. To meet the challenges of our current and future growth, we are developing on-line computer systems for financial, business accounting and administrative applications.

We currently have a career opportunity available for an individual with 4 years programming and 1-3 years project management experience in a real-time environment to coordinate the development of our subscriber billing system. IBM and CICS experience will be helpful. The selected individual will be responsible for hiring and supervising a staff of 4 to 6 programmer analysts and will be required to travel heavily until January 1981.

ATC offers a competitive salary and benefits package as well as an excellent environment for rapid career advancement. For confidential consideration, please forward salary history and resume to Mr. Chip Crawford, Employment Manager. (No phone calls please.)

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160 INVERNESS DRIVE WEST
ENGLEWOOD, COLORADO 80112

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ALC + APL

Are you tired of those same old decrepit batch systems?

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Are you tired of wordy and verbose business languages that waste your time and efforts?

Do you want an opportunity to be a pioneer in state-of-the-art computer systems?

We're looking for the kind of person who is.

OUR ENVIRONMENT: IBM VM/370 running only VS/APL.

If you're one, you'll enjoy excellent advancement opportunities, competitive salary and excellent benefits, because you'll be with Ivy Financial Corporation, the umbrella company for several of the largest and fastest growing rare coin and collectible firms in the nation.

Call Chuck Chadwick toll-free at (800) 527-9250. (In Texas call (214) 742-1079.) Or send resume in complete confidence to: 2121 N. Akard, Dallas, Texas 75201. Relocation and interview expenses paid.

IVY FINANCIAL CORPORATION
2121 North Akard, Dallas, Texas 75201. (214) 742-1079
WATS: 1 (800) 527-9250. Telex: 732507 IVY FIN CP

REAL TIME O/S DESIGN

Our client has an excellent career opportunity available to an experienced Professional to work as a Project Leader in the design of high speed Real Time Operating Systems for Telemetry applications. Duties will include structured programming using HOL (PASCAL, PLI, ADA) desired with UNIX or VAX VMS experience ideal. The selected candidate must understand CPU Architecture and HW/SW Trade Off options and possess BS/MS EE/CS.

Salary and benefit programs are structured to enhance your lifestyle in beautiful Florida. Please submit your resume, including salary history, in confidence or call:

(813) 872-1[illegible]

frank leonard personnel
[illegible]

Our Client Is An Equal Opportunity Employer with Client Company Paying All Fees

Programmers

San Francisco Bay Area

Airco Temescal, a division of Airco Inc., is a leading supplier of vacuum deposition equipment and custom design electron beam evaporation and sputtering systems to the electronics, optical, metal and glass industries. Because of continued growth in operations, the following opportunities are now available in our Data Processing Department:

Sr. Programmer Analyst

Unusual challenge for a Sr. Analyst with 5-7 yrs. designing and programming experience. Manufacturing systems exposure, applications software package analysis and project leadership required. Major duties will include enhancements to the existing system and the implementation of a new on-line manufacturing system.

Programmer Analyst

Opportunity for Programmer with 6 mos.-3 years of systems and programming experience in COBOL environment. Familiarity with GCOS operating system, GCOS JCL and the Honeywell 64/20 preferred. Background in manufacturing systems desired. Position will involve maintenance and enhancement of existing systems.

Salary commensurate with experience plus excellent fringe benefits including FULLY PAID RELOCATION. Please submit resume including salary history, in confidence to Donna MacDonald, Airco Temescal, 2850 7th Street, Berkely, CA 94710. (415) 841-5720. Equal opportunity employer.

AIRCO® Temescal

Computer Software Applications

This is a headquarters position with a major telecommunications company involving Hardware and Software Systems focusing on the terminal and customer applications.

Major role in planning and training in conjunction with operating companies across the country.

Requires a BS Engineering or equivalent; plus 5 years commercial SW applications preferably related to teleprocessing.

Attractive salary and benefits package.

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BROWARD COUNTY, FLORIDA
Civil Service Opportunities

Broward County, Florida, one of the largest major employers in south Florida has immediate challenging opportunities in its Information Systems Division utilizing OS/VS1, NCP, VTAM, CICS and IMS/DB methods. Applications are currently being accepted for the following job classes:

Systems Programmer II $22,120-$29,000
Requires college degree in computer science or related field and four (4) years experience in Systems Analysis, SYSGEN and Maintenance.

Systems Programmer I $19,516-$24,486
Requires college degree in computer science or related field and two (2) years experience in Systems Analysis, SYSGEN and Maintenance.

Programmer Analyst II $21,083-$27,034
Requires completion of two (2) years of college level course work in computer science and four (4) years computer programming and systems analysis experience.

Programmer Analyst I $17,719-$22,340
Requires high school diploma supplemented by college level course work in computer science and two (2) years computer programming and systems analysis experience.

Applications and additional information may be obtained from the

PERSONNEL DIVISION, BROWARD COUNTY
GOVERNOR'S CLUB BUILDING, 2ND FLOOR
236 S.E. FIRST AVE.
FT. LAUDERDALE, FL 33301
Hours: 8:30-5, Phone: 1 (305) 765-[illegible]
Equal Opportunity Employer

APPLICATIONS
PROGRAMMER ANALYST
$1867 to $2311/month
SENIOR PROGRAMMER ANALYST
$2084 to $2581/month

An Applications Programmer Analyst works with users of data processing services to design and maintain information processing systems. A Senior Programmer Analyst supervises a team of Applications Programmers and Analysts in all activities related to systems design, development and maintenance.

Must be experienced, journey-level Applications Programmer to apply. Applicants for Senior Programmer Analyst must have supervisory or project-leader experience and performed the duties of an Applications Programmer Analyst.

Must submit SMUD application forms by Thursday, November 6, 1980. Obtain applications:

SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT
6201 S Street
P.O. Box 15830
Sacramento, CA 95813
(916) 452-3211, ext. 305

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NEW MEXICO HIGHLANDS UNIVERSITY
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Are you tired of that long drive to work everyday? Would you like to live at the edge of the beautiful Sangre de Cristo mountains of northern New Mexico?

If this appeals to you, consider this position. The major responsibilities are to direct the activities of a staff of systems and application programmers in the design and implementation of administrative on-line data base systems and system software; to help maintain the existing administrative batch processing systems and participate in the policy making and allocation of computer resources of the center. Installed system is a Magnuson M80. Qualifications include a Bachelor's degree, work experience in COBOL and BAL programming management and expertise with interactive hardware and software, preferably WEST! and DATACOM/DB.

For full consideration send resume and salary history, prior to November 15, 1980 to Personnel Office, New Mexico Highlands University, Las Vegas, New Mexico 87701. NMHU is an EOE/AFFIRMATIVE Action Employer.

Systems Development Professional

Private 2 year college in Baltimore County, Maryland is seeking an individual with a systems analysis background to perform the initial development of a proposed college-wide Management Information System. The applicant should possess a Bachelor's Degree in a related discipline and demonstrate 4 years of experience in systems design including development of hardware and software specifications, procurement and related duties. This position will be a "ground floor" opportunity for a person to progress to Manager of Data Processing as the system is implemented. Salary is commensurate with experience and may be arranged on a 12 or 10 month basis. Applicants should send their resumes to President's Office, Villa Julie College, Stevenson, MD 21153.

DATA PROCESSING MANAGER

Clayton County Civil Service System, Jonesboro, Georgia, located just south of Atlanta, is currently seeking a qualified, experienced person to manage a well established governmental Data Processing Center. Candidate must have extensive experience with S/3 15D Computer, with CCP, and ability to plan, organize, supervise and instruct subordinates in the methods of Computer Programming and Operations, to establish, develop and maintain effective working relationship with officials, subordinates, business representatives and the general public. Excellent salary and fringe benefits. Interested candidates should submit complete resume and salary history to: A.C. Collier, Personnel Director, Clayton County Civil Service System, County Administration Building, Jonesboro, Georgia 30236. (404) 478-9911 Ext. 335.

CLOSING DATE: NOVEMBER 28, 1980
EQUAL OPPORTUNITY EMPLOYER

SVS/MVS SYSTEMS PROGRAMMING MANAGER

Sooner or later a degree will really pay off! Combine work and education if you like. SVS with CICS and WYLBUR on large scale system. Planning for MVS. Competitive salary. Send resume to Personnel Office, Texas Tech University, Lubbock, TX 79409.

Equal Opportunity Employer through Affirmative Action

Data Processing Manager

(San Francisco Peninsula)

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Bank of the West is an aggressive and rapidly expanding California bank. Our recent affiliation with Banque Nationale de Paris, the second largest bank in the world, provides many new opportunities for growth within our organization. We currently have an attractive opportunity for a Data Processing Manager to manage our data processing function located in the heart of the Santa Clara Valley.

The ideal individual should have a minimum of 5 years of progressive data processing management experience within commercial banking. You should also have proven managerial, communication, planning and project administration skills. A Bachelors degree in Business or Computer Science would be preferred as would experience with Burroughs equipment.

We offer an attractive salary and benefits package and excellent career growth opportunities. To apply, please send your resume including salary history in confidence to:

Rebecca Adams Nestor
Employment Manager
Bank of the West
P.O. Box 1000
San Jose, CA 95108

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Miami, Florida

Racal-Milgo, world leader in data communications, has an outstanding marketing opportunity available. Our tremendous growth and expansion has created an opening for a Multiplexer Marketing Manager to be responsible for all marketing and future product planning activities relating to Racal-Milgo's new Advanced Statistical Multiplexer product line.

This position involves planning future product requirements, analyzing market conditions and competitive activity, establishing marketing plans, coordinating activities with various departments and providing overall product line leadership.

The candidate should have a B.S. in Engineering/Computer Sciences or Marketing (or equivalent) and at least twelve years experience in data communications, with a strong background in multiplexer products.

Racal-Milgo offers an excellent salary, bonus, and benefits plus the opportunity to expand your professional career development with a major international company. If you meet the above qualifications and would like to take an active role in our worldwide marketing operations, call **Linda Huett** in our Corporate Headquarters collect at 305/591-5907.

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RACAL

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You're a results-oriented problem-solver with ambitious career objectives. Your background includes a degree with at least 5 years successful data processing experience in systems software/hardware or planning. And your ability to communicate both orally and in writing is excellent. If so, you're qualified for these management positions in our Dallas office.

We're HDR Systems, a nationally recognized consulting firm and widely respected leader in computer services. The dynamic, articulate professionals we select will prepare and present original proposals, interact closely with clients as well as organize and conduct the marketing program for our systems consulting services.

In addition to high visibility and further growth potential, we offer an attractive starting salary commensurate with expertise, and comprehensive benefits. For immediate consideration, please call TOLL FREE 800-228-2780, or send your detailed resume in confidence to: JACQUIE EVANS

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Immediate openings for experienced Programmer/Analysts who have any combination of training and experience equivalent to a degree in Business Administration, Mathematics, Accounting, Computer Sciences or related fields plus two or more years of experience with DEC, RT-11 and RSX11 M Operating Systems & Fortran. Also, similar experience in COBOL & FORTRAN on large timesharing systems.

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Replies held confidential
Must be a U.S. citizen

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Send Resumes to:
Trudie L. Rainey, M/S 567
Reynolds Electrical & Engineering Co., Inc.
Post Office Box 14400
Las Vegas, NV 89114

REECo

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MOTOR CARRIER SYSTEM

Successful conglomerate seeks skilled systems professional with user management experience.

Candidate filling this key position will interface with the corporation's largest subsidiary — a growing profitable transcontinental motor carrier.

Requisites are:
- Recent substantial systems development experience with a major motor carrier.
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- Superior ability to communicate with all levels of management.

Location: Atlanta, Georgia

Full range of benefits.

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CENTRAL FLORIDA
DIRECTOR OF DATA PROCESSING

Headquarters for a multi-state corporation is seeking a professional manager to direct expanding scope of data processing functions. The person in this position will direct all data processing activities for the company.

Responsibility includes supervision of computer, operations, data communications, systems analysis, programming and support functions, feasibility studies, planning for short and long-range systems design and development.

Successful candidate will have a strong commercial management and technical background. Other key attributes for this position include a degree in business and recent experience in distributed on-line processing, formalized departmental reporting and control, and knowledgeable about data security.

Information submitted for consideration must be complete and contain salary history. Write: CW Box 3416, 375 Cochituate Rd., Rte. 30, Framingham, Mass. 01701.

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- 1 - Manufacturing Engineer M.E.
- 1 - Industrial Engineer - I.E.
- 1 - Design Engineer - E.E.
- 1 - Quality Assurance Engineer - E.E.
- 1 - Computer Analyst Design Engineer - E.E. or Computer Science
- 1 - Computer Senior Programmer Analyst

REQUIREMENTS:
Experience - Three or more years experience.
Salary - Based on ability and experience.
Benefits - Excellent Company fringe benefit programs.

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Laurel, Mississippi 39440
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OPPORTUNITY IN MONTANA

Enjoy the benefits of Big Sky Country. Live within a few hours drive of Glacier and Yellowstone National Parks. Ski areas, excellent hunting and blue ribbon trout fishing available within minutes.

SYSTEMS ANALYST

International multi-company transportation group headquartered in Great Falls, Montana, has a need for an innovative, responsible EDP professional with a preferred background in trucking industry systems. He must be heavily qualified in Burroughs equipment, data communications, NDL, MCS, data base (DMSII) design and implementation, COBOL, RPGII, and state of the art hardware. He must be capable of giving direction to Programmer Analyst and communicate effectively with data processing and users. Salary open. Send resume, including salary history to: George Conquest, Transystems, Inc., P.O. Box 369, Black Eagle, Montana 59414.

Assistant Director of Administrative Computing

Qualifications include: Bachelor's Degree or equivalent experience plus 2 years experience with a medium scale computing system and at least one year of supervisory experience. Duties will include supervision of programming staff of seven, coordination of computing systems and planning. Salary is open and will be based on education, training and experience. Application deadline Dec. 1. A completed application includes a resume, transcripts and recommendations. Mail to: [illegible], Computer Center, University of Wisconsin-Whitewater, Whitewater, WI 53190.

UW-Whitewater is an equal opportunity employer with an affirmative action plan. Females, minorities and handicapped are encouraged to apply.

CPA SERVICE BUREAU MANAGER - S/34
RELOCATE REDDING, CA

Outstanding career opportunity. Minimum 3 years experience in batch and interactive RPGII programming. Background in management, Sys 34 telecom, and accounting is a plus. Aid in establishment and implementation of effective business systems. $25,000 to $30,000. Must show a winning track record. Send resume to NV DATA CORP., P.O. Box [illegible], Redding, CA 96049.

SENIOR SYSTEMS ANALYST - BANKING

Opportunity for an analyst with a minimum of 4 years experience in analysis and design of banking TP systems. Use your knowledge of COBOL and IBM systems utilizing CICS and 3270's to advance in this career path position.

SENIOR COMPUTER OPERATOR

A true growth opportunity for the experienced operator with IBM DOS/VS or VSE skills. The ability to create efficient job control is a plus. You will have the opportunity to plan, schedule and supervise the activities of the computer room. Experience using CICS would be helpful.

Submit resume (including salary history) in confidence to Thomas E. [illegible], Vice President-Data Processing, Owensboro National Bank, 230 Frederica Street, Owensboro, Kentucky 42301.

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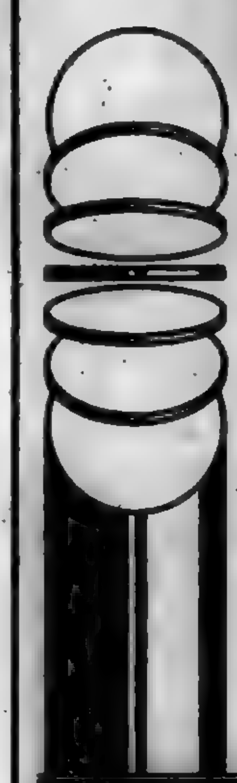

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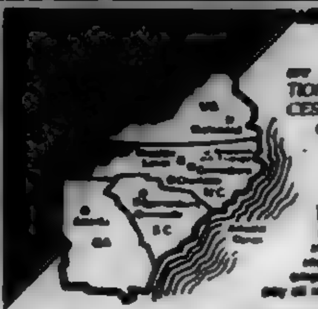

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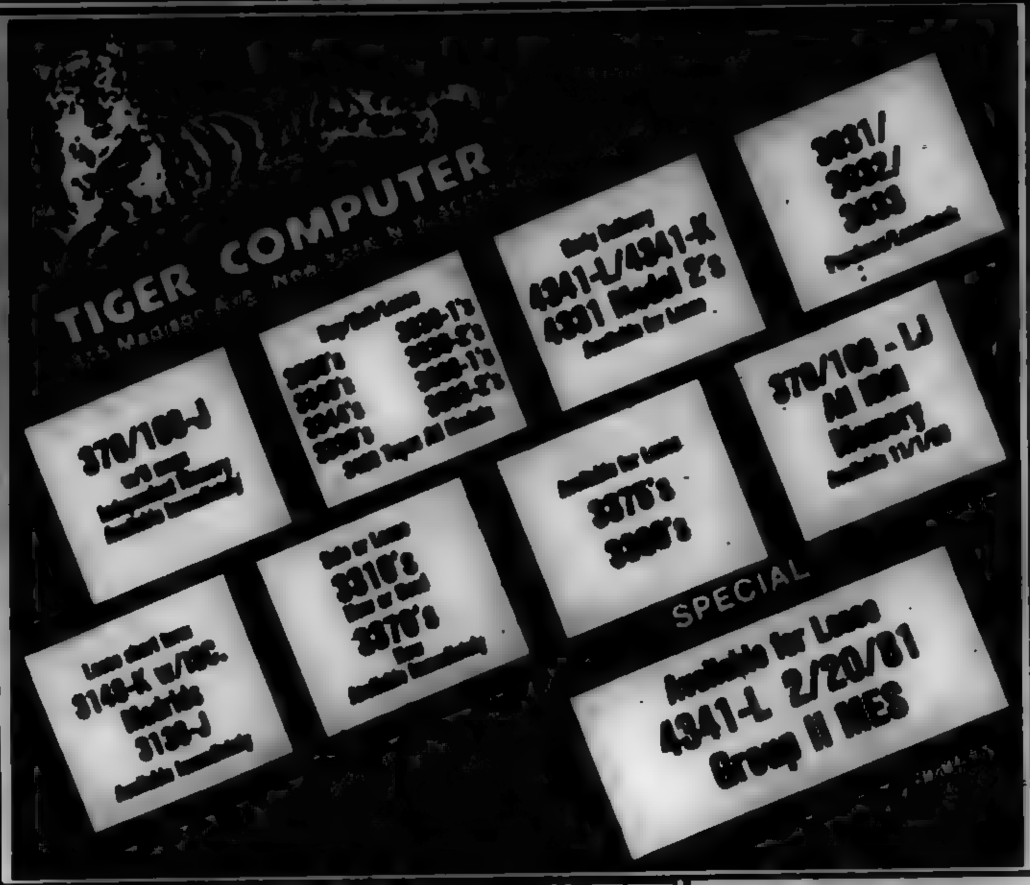
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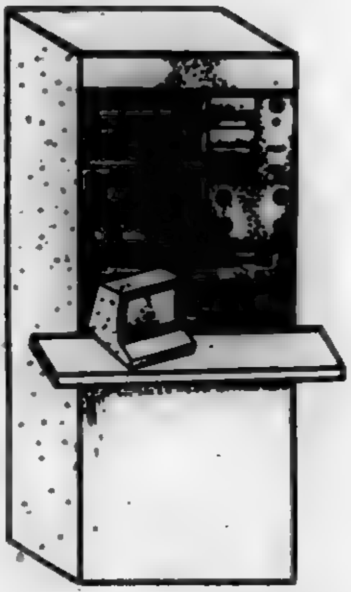

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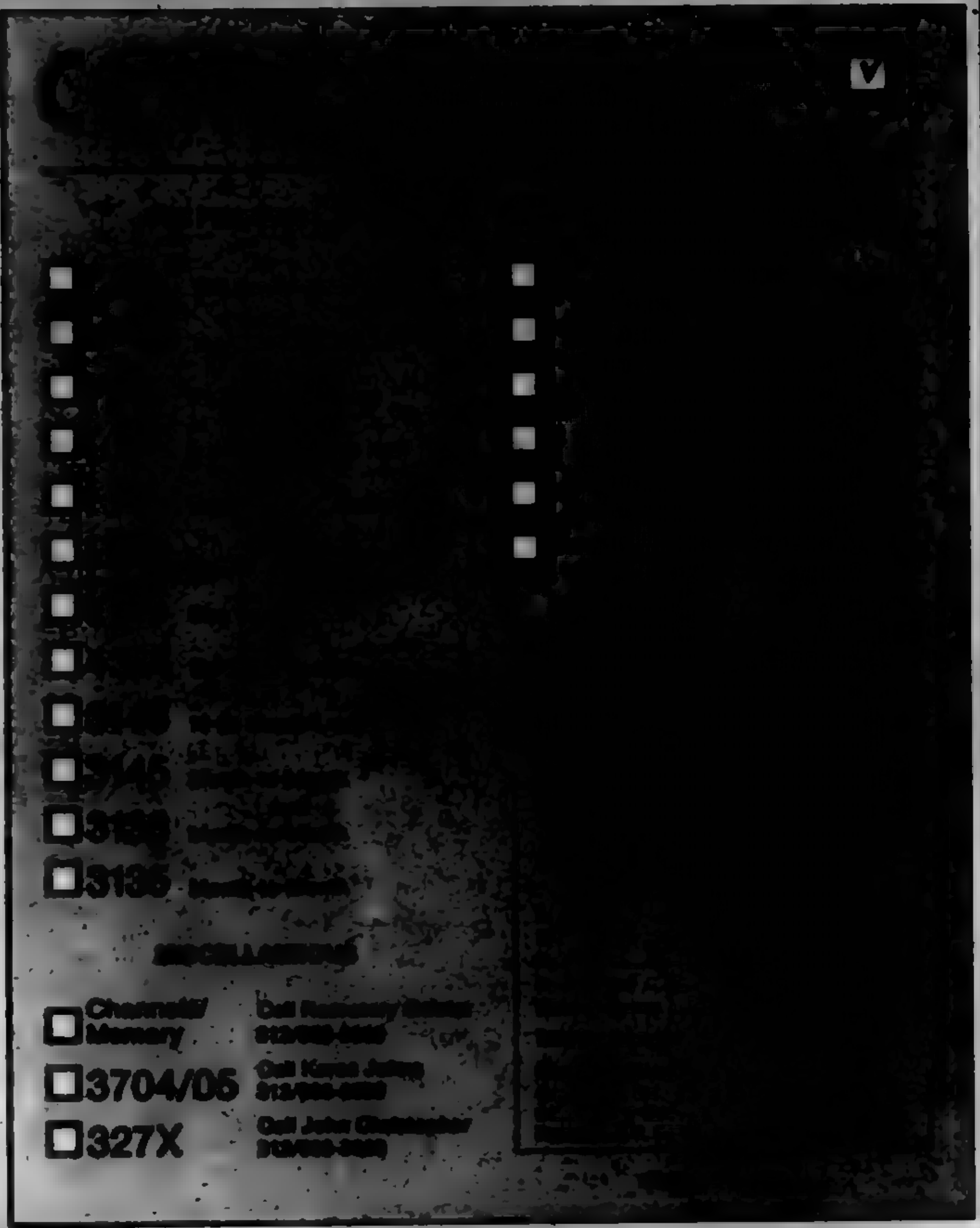

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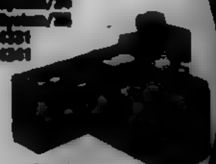

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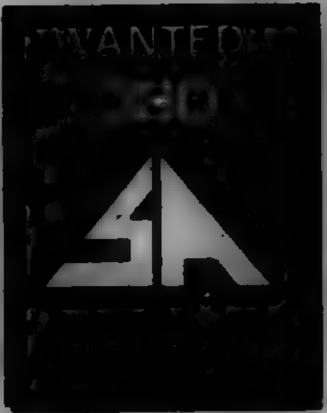

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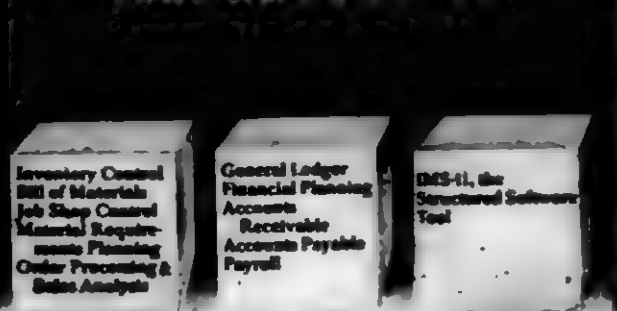

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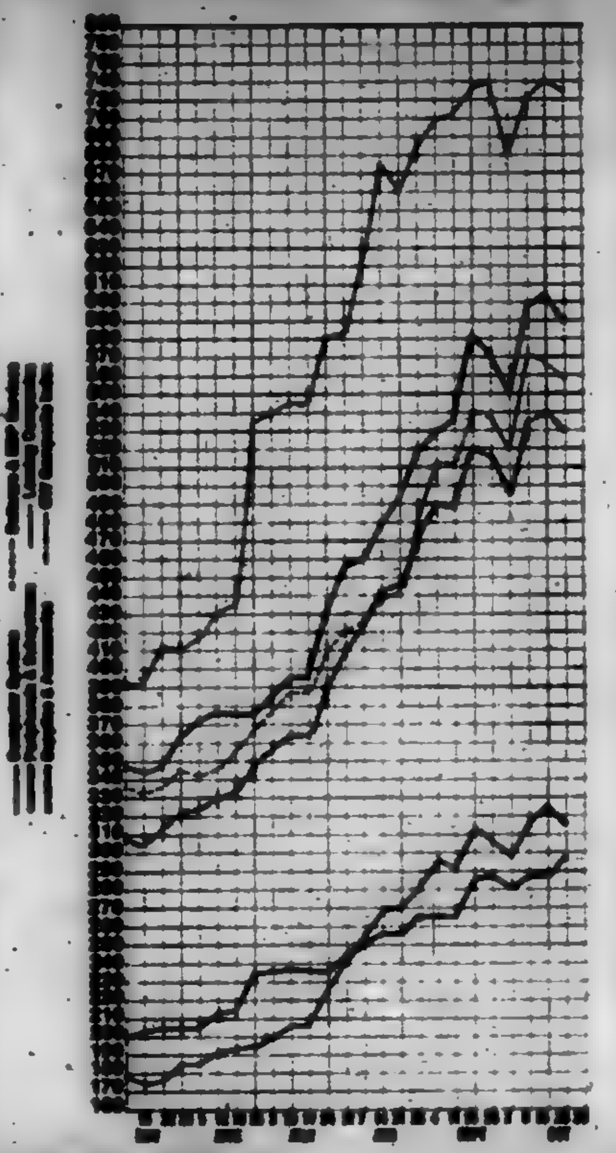

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 22, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	AMDAHL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	BURROUGHS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER AUTOMATION	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONTROL DATA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CRAY RESEARCH INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATA GENERAL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATAPOINT CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DIGITAL EQUIPMENT	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DECU INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ELECTRONIC ASSOC.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FOUR-PHASE SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FOXBORO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GENERAL AUTOMATION	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GRI COMPUTER CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HEWLETT-PACKARD CO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HONEYWELL INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	IBM	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] COMP SYSTS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MANAGEMENT ASSIST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MANUFACTURING DATA S	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MINI-COMPUTER SYST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MODULAR COMPUTER SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NCR	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PRIME COMPUTER INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PERKIN-ELMER	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SPERRY CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SYSTEMS ENG. LABS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TANDEM COMPUTERS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEXAS INSTRUMENTS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WANG LABS.	[illegible]	[illegible]	[illegible]	[illegible]

LEASING COMPANIES

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	[illegible] FINANCIAL CP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMDISCO INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER [illegible] CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER INVSTRS GRP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONTINENTAL INFO SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATRONIC RENTAL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DCL INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ITEL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LEASPAC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PHOENIX LSG CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	RELIANCE GROUP INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	U.S. LEASING	[illegible]	[illegible]	[illegible]	[illegible]

EXCH: [illegible]
[illegible]
[illegible] PRICES ARE NEW PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	ADVANCED COMP TECH	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANACOMP INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANALYSTS INTL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	APPLIED DATA RES.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AUTOMATIC DATA PROC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER HORIZONS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER NETWORK	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER SCIENCES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER TASK GROUP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER USAGE	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUT AUTO REP SVC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMSHARE	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CULLINANE CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATA DIMENSIONS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATATAB	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ELECTRONIC DATA SYST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INFORMATICS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] COMPUTER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	KEANE ASSOCIATES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	KEYDATA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LOGICON	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MATHEMATICA INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MATHEMATICAL APP GRP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NATIONAL DATA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PLANNING RESEARCH	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PROGRAMMING & SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	RAPIDATA INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	REYNOLDS & REYNOLDS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	STSC INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SCIENTIFIC COMPUTERS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TYMSHARE INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	URS SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WYLY CORP	[illegible]	[illegible]	[illegible]	[illegible]

PERIPHERALS & SUBSYSTEMS

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	AM INTERNATIONAL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AMPEX CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANDERSON JACOBSON	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	APPLIED DIG DATA SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AUTO-TROL TECHNOLOGY	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	BEEHIVE INTL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CAMBRIDGE MEMORIES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CENTRONICS DATA COMP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CETEC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER DEVICES INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER COMMUN.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER CONSOLES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER TRANSCEIVER	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTERVISION CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONRAC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATA ACCESS SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATA PRODUCTS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATUM INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DECISION DATA COMPUT	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DELTA DATA SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DOCUMATION INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATARAM CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ELECTRONIC M & M	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	EVANS & SUTHERLAND	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FABRI-TEK	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GENERAL COMPUTER SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GENERAL DATACOMM IND	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GENERAL TERMINAL CP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HAZELTINE CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HARRIS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INFORMATION INTL INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INTEL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INTERSIL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LUNDY ELECTRONICS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MSI DATA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MEMOREX	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MOHAWK DATA SCI	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PARADYNE CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PERTEC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	RAMTEK CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	RECOGNITION EQUIP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SCAN DATA	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	STORAGE TECHNOLOGY	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SYKES DATATRONICS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	T BAR INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEC INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEKTRONIX INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TELEX	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] SYSTEMS CP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] INC	[illegible]	[illegible]	[illegible]	[illegible]

SUPPLIES & ACCESSORIES

EXCH		1979-80 RANGE (1)	CLOSE OCT 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	AMERICAN BUS FORMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	BALTIMORE BUS FORMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	BARRY WRIGHT	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CYBERMATICS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DUPLEX PRODUCTS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ENNIS BUS. FORMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	3M COMPANY	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MOORE CORP LTD	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NASHUA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	STANDARD REGISTER	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] PRODUCTS CO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] GRAPHICS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WALLACE BUS FORMS	[illegible]	[illegible]	[illegible]	[illegible]

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NEWSPAPER

Political Deception by Computer?

By Marguerite Zientara
CW Staff

NASHVILLE, Tenn. — Is it deceptive and unethical for a political candidate to use computerized methods to disclose only certain portions of his or her beliefs to certain portions of the electorate? That question was addressed here last week at a session of ACM '80, the conference of the Association for Computing Machinery (ACM), in a forum entitled "The Management of Information in Political Campaigns."

Chaired by Douglas Rochester, assistant manager of corporate systems at Manufacturer's Hanover Bank and president of the New York City chapter of ACM, the session opened with a presentation of the argument against selective disclosure by Dr. Walter Maner, professor of philosophy and computer science at Old Dominion University in Norfolk, Va.

More election coverage on Pages 11, 12 and 13.

Noting that computers have been used in political campaigns since 1960, Maner presented a hypothetical case in which an incumbent senator, "Polly Facets," used various computer-based techniques in her bid for the presidency.

By hiring several computer consultant firms, the senator was able to tailor and deliver her messages to particular audiences,

(Continued on Page 8)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices
©1980 by CW Communications, Inc.
Vol. XIV, No. 45 November 3, 1980 $1.00 a copy; $30/year

More Interconnection for SNA

By Brad Schultz
CW Staff

ATLANTA — IBM's Systems Network Architecture (SNA) will allow users to make communicating processors equally accessible and to procure network resources from many vendors, IBM Chief Scientist Lewis M. Branscomb said here last week.

The world's largest DP supplier can ill afford to impose a rigidly hierarchical networking structure on many large customers or attempt to exclusively supply their networks, Branscomb indicated at the International Conference on Computer Communication.

SNA began as a "disciplined, single-host controlled structure for transaction applications and has grown to a multihost structure supporting hundreds of terminal types," Branscomb noted in a speech at the conference's keynote session. But as users integrate data and text streams in coming years, the architecture will "include more and more peer capability and more and more openness."

This means making information resources increasingly available to end users in a network without

(Continued on Page 6)

Two Access Methods Confuse SNA Users

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Many IBM users have expressed confusion about why their vendor maintains two access methods for its Systems Network Architecture (SNA), nor do they fully understand how the methods differ from one another, two representatives of IBM's Communications Support Center said here last week at the fourth annual Interface West conference.

Because of their confusion, users who migrate to SNA often find themselves hard pressed to choose intelligently between the two access methods — Vtam and Tcam, according to IBM support consultants Al Hedeen and Gary Craig.

"A lot of users who have already gone to Vtam wonder why IBM continues to support Tcam, and a lot of other users who already have Tcam wonder why IBM still offers Vtam," Hedeen said.

IBM Rationale

The rationale behind IBM's decision to simultaneously support two SNA access methods is fairly straightforward: Vtam and Tcam are fundamentally different in conception and serve radically different purposes, Craig explained during an all-day Interface West seminar examining "User Strategies for SNA Implementations."

Vtam is geared primarily to specialized communications monitoring and to supporting IBM's application subsystems like IMS, CICS and TSO.

Tcam, by contrast, is a queued access method and thus is optimized primarily for message-switching systems and

(Continued on Page 6)

Supply Can't Meet Demand

Computer Graduate Seen a Hot Item

By Marguerite Zientara
CW Staff

NASHVILLE, Tenn. — College graduates with computer skills are "about the hottest thing going" and will be for some time, according to Patrick Wash of the Bureau of Labor Statistics.

Speaking at the Association for Computing Machinery's ACM '80 conference here last week, the head of the bureau's research team in the Division of Occupational Outlook told an audience of mostly students the bureau's findings based on its 1974 and 1979 computer manpower studies.

Additional coverage on talent shortages on Page 9.

First explaining why the computer field is expanding so much, Wash cited the fact that in 1970, 100,000 computers were in use, while years later, in 1978, that number had increased to 600,000. Wash also cited International Data Corp. projections that by 1983, there will be 1.6 million computers in use.

Noting that educational institutions cannot keep up with the demand in the "exploding" field of computers, Wash acknowledged there has been a "phenomenal increase in educational programs," which he said will more than double in the next eight years, although "demand will grow even faster."

"The trained supply lags so far behind the demand, that [employers] have to scramble to get you folks," Wash told the students in the audience. "The litany goes on unchanged," he said, describing a common scenario in which an employer hires someone right out of college, trains him, and then, according to the employer, "some headhunter calls, on my time, and offers him $5,000 to move to Cleveland, and off he goes."

Bureau Projections

Wash shared the bureau's statistics on the projected growth of employment requirements for computer occupations from 1978 to 1990. For systems analysts, 1978 employment was 182,000, with 1990's needs expected to be 400,000, for a 119.8% change. Programmers' 1978 employment was 247,000 with 500,000 expected in demand by 1990, for a 102.4% change.

Computer and peripherals operators comprised 393,000 workers in 1978, a number expected to increase to 850,000 by 1990 for a 116.3% change. Computer service technicians, numbering 63,000 in 1978, are expected to total 160,000 by 1990, for a 154% change.

(Continued on Page 8)

Could Computers Be Blamed For Decline in Life Quality?

By Marguerite Zientara
CW Staff

NASHVILLE, Tenn. — Is the general decline in the quality of life worldwide traceable to the rapid proliferation of computers or simply a result of overpopulation in a consumer-oriented society?

More stories on the social impact of computing on Page 4 and on In Depth 1.

Those points of view were enthusiastically debated here last week at the Association for Computing Machinery's ACM '80 conference session entitled, "The Computerized Destruction of Western Civilization."

Theorizing that computer technology is at the root of the rising unemployment rate as well as at the root of increasing violence among the young was Dr. Robert Parslow, deputy head of the Computer Science Department at Brunel University, Uxbridge, Middlesex, England.

Suggesting that the session might

(Continued on Page 4)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.00 a copy: U.S. – $30 a year; Canada, Central & So. America – $50 a year; Europe and Near East – $90 a year; other foreign – $130 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Speeds up to 50M Bit/Sec

Tandem Offers Local Net Links

By Brad Schultz
CW Staff

CUPERTINO, Calif. – Tandem Computers, Inc. has announced communications products that allow its Nonstop processors to trade data at speeds up to 50M bit/sec with other vendors' mainframes and minicomputers configured in a local network.

The Hyper Link permits a Nonstop – described by Tandem as a "fault-tolerant" multiprocessor system – to tap Network Systems Corp.'s Hyperchannel, a wideband networking product, for communications with systems made by IBM, Univac, Control Data Corp., Digital Equipment Corp., Data General Corp., Perkin-Elmer Corp., Cray Research, Inc. and Systems Engineering Laboratories, Inc., among other vendors.

Besides that local net product, Tandem unveiled its Tandem to IBM Link (TIL), which opens a data path between one Nonstop or a network of Nonstops and an IBM 370 or compatible system equipped with IBM's 3803-1 or 3803-2. Under OS/VS, or a similar operating system, TIL emulates an IBM 3420-7 tape drive, handling a burst rate as high as 300K byte/sec.

Tandem also introduced an enhanced version of its Exchange remote job entry software. This version permits use of the Hasp multileaving workstation capability, a spokesman said, for communicating batch jobs to IBM hosts in conjunction with existing 2780 or 3780 support.

"The new communications offerings make it possible for an organization to utilize Tandem's fault-tolerant multiple processor computer system to meet on-line transaction processing requirements while protecting its investment in host mainframe computers," a spokesman remarked.

Hyper Channel Interface

Hyper Link was described as hardware and software Tandem developed to interface Hyperchannel, which transfers data as fast as 50M bit/sec among different makes of systems separated by no more than 5,000 feet. An IBM interest, Satellite Business Systems, recently announced plans to supply satellite interconnections between local networks featuring this Network Systems product [CW, Oct. 27].

Hyper Link connects a Nonstop to a Hyperchannel network through Network Systems' A400 adapter series, which communicate over one of four high-speed coaxial cables, the spokesman explained. A Hyperchannel network can accommodate up to 64 adapter connections, allowing multiple simultaneous data transfers with network multidropping.

TIL is a hardware and software subsystem, the spokesman continued, that facilitates a migration of application functions from IBM hosts to Tandem Nonstops while retaining rapid access to the hosts. New applications, the spokesman said, may be developed on TIL using Tandem's Encompass relational data base management software.

Other Products

Tandem made two other product announcements: A Hasp enhancement of its Exchange remote job entry software and a multiple line enhancement to Tandem's Expand data network software.

The Exchange enhancement reportedly gives Exchange full use of the Hasp multileaving workstation capability for communicating batch jobs to IBM systems, while augmenting existing IBM 2780 and 3780 protocol support. This makes line utilization more efficient, the spokesman explained.

Specifically, the revamped Exchange allows bidirectional and simultaneous file transfers between a Nonstop and an IBM host running Hasp, ASP, RES, JES2 and other multi-leaving remote job entry software from IBM.

Finally, the Expand enhancement gives the network user multiple links between nodes in a Tandem network, boosting throughput and adding further line redundancy as a hedge against line failures. This software extension breaks messages into packets and sends them through multiple leased lines under an end-to-end protocol that Tandem claims will ensure integrity from sender to receiver regardless of the number of lines or intervening nodes in the transfer.

Hyper Link costs $15,250 and is available in first quarter 1981. With a battery of diagnostics capabilities, TIL costs $24,500 and can be ordered now.

Tandem will make the Exchange enhancement at no charge starting this February. Exchange costs $2,000. Tandem will also enhance existing Expand packages with the multiline capability beginning June 1981. Expand costs $15,000 plus a microcode charge of $2,000 per processor.

Tandem is located at 19333 Vallco Parkway, Cupertino, Calif. 95014.

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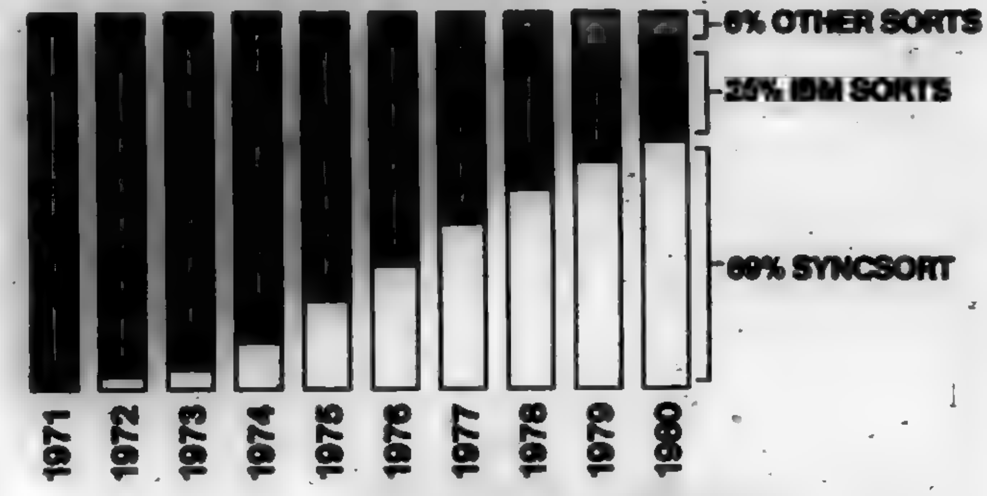

From IDC's OS Sort Studies

USERS OF	1977	1978	1979	1980
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While Raising Access Costs

Home Services Seen Fostering Elite User Class

By Phil Hirsch
CW Washington Bureau

ATLANTA — The negative implications of newly emerging information services for the home were discussed in detail here last week at the fifth International Conference on Computer Communication (ICCC).

Consultant Konrad Kalba warned that the new technology, if it utilizes overly complex searching and indexing schemes, may result in the creation of an elite class of users. He also suggested that on-line systems may raise, rather than lower, the cost of information access.

If traditional information sources "lose market share, they may be forced to curtail their services, lower their standards and/or increase their price," Kalba explained. Aside from disadvantaging those who could not afford the price increase, this could "raise the need for government or other sources to intervene."

A closely-related problem is that the complexity of new searching and indexing systems may condition many users to "abandon the effort to find the unit of information most relevant to their needs," and impel them to settle instead "for the most accessible."

Kalba, whose comments were contained in a paper read by his associate, Peter Lemieux, pointed out that today, consumers are generally made aware, when they read a newspaper or watch a TV program, of "whether a given message is an advertisement, a news item, an editorial, or a consumer report."

It isn't clear that on-line information services will retain such distinctions, he said, pointing out that "the British Post Office's Viewdata service does not require information providers to differentiate advertising from nonadvertising information.

Privacy is another potential problem, since "some of the new telephone and cable-based media services will [be able to monitor] household viewing, and, if transactional services are made available, purchasing behavior." This monitoring capacity "places potentially enormous marketing power in the hands of vendors with access to personal or disaggregated information on viewing and purchasing patterns. As a result, will marketers be able to manipulate consumers more effectively, knowing what their previous purchases have been?" Kalba asked.

While some consumers "may be willing to sacrifice privacy for the convenience of direct 'electronic' ordering," Kalba said, "the idea of a central data bank compiling viewing habits, purchasing behavior and answers to opinion polls for every participating household raises the specter of 'Big Brother.' "

EFT 'Warfare' Viewed Top Security Threat

By Brad Schultz
CW Staff

ATLANTA — Nations may discover within 10 years that "computer warfare" directed at electronic funds transfer (EFT) is more practical than thermonuclear warfare in destroying other nations.

A leading researcher in computer crime, Donn B. Parker of SRI International, made that conjecture at an International Conference on Computer Communication (ICCC) session here on the day after presidential candidate Jimmy Carter and Ronald Reagan debated thermonuclear war issues on nationwide television.

Although Carter indicated those issues to be the most important facing him as president, Parker said foreign attempts to disrupt a nation's EFT links may prove a more significant threat to national security several years from now.

Unlike the situation with thermonuclear or other military actions, politically motivated EFT assaults often cannot be reciprocated. Through history, nations have avoided initiating a war where their opponents seemed able to retaliate successfully.

"The concentration of assets and records of assets in electronic form in such fragile systems makes new kinds of catastrophes and wars more likely than [thermonuclear attack] in the future," Parker told the session.

Economic Depression

For the U.S., "A material fraud of catastrophic proportions that could cause deep economic depression might be 10% of total negotiable assets, $160 billion." This would be equivalent to stealing total deposits of the nation's two largest banks, or the total assets the Federal Reserve Banks, Parker pointed out.

But $160 billion represents just 0.4% of the funds U.S. banks turned over in 1978, he said. The largest computer-assisted bank heist known to date drove the Herstagg Bank out of business in 1974 with a $330 million loss.

A single theft of $160 billion over EFT links is highly unlikely, Parker suggested, since such an amount could hardly be hidden or used without detection. But it might be possible to steal a hundredth of that sum — $160 million — from a large EFT system handling $16 billion daily without much impact on the system's regular participants.

It would be easier to gradually drain a nation's economy by executing an EFT fraud incrementally over a long period of time than to steal hundreds of millions of dollars in a single act, Parker surmised, but the extended time frame for the former strategy entails higher probability of detection.

"Nevertheless, a well-regulated drain could appear to be an unexplainable weakness in the economy, which would not be solved until too late and economic disaster had set in."

CW at
ICCC

Another way to disrupt the economy via EFT is suggested by the error in reporting the U.S. money supply to the Federal Reserve System about a year ago, Parker continued. In that case, a large bank's clerk was off by $37 billion in reporting the money supply during a three-week period, resulting in $65 billion of "paper and real" losses in the stock and bond markets.

A foreign power might try to cause an economic collapse by gradually modifying indexes such as the money supply through EFT links, the SRI consultant warned.

But a more likely scenario involves holding computer-stored assets for ransom or extortion. The assailants might encrypt those assets, which take the form of bits in a computer, and all backup copies right where they are and demand payment in exchange for the encryption key needed to make those assets usable.

The people or groups most likely to attempt massive assaults on EFT links in coming years were said to be "unethical business enterprises," "extreme political advocates," and "foreign powers."

Italy's Red Brigades have physically attacked 28 computer centers in Europe during the past three years, Parker noted.

Computers May Be Eroding Life's Quality

(Continued from Page 1)

better have been titled "The Technical Attack on Democracy," Parslow projected that the Informatics Revolution will ultimately result in governments assuming totalitarian powers.

Total Misery

Parslow called to mind what he called the "total misery" experienced by "enormous numbers of people" during the Industrial Revolution and paralleled that distress with identical problems we face today, including the existence of slums, high unemployment and a migration to the cities.

"I *don't* want to stop the technological advance, but I feel technical people are duty-bound to warn the public of the potential dangers of the technology," Parslow said.

One area of danger is in personal privacy: "They can get any information about you," according to Parslow, who added that attempts at privacy legislation in Europe have been "ineffective."

In England, he noted, phone tapping is done not only on criminals, but on "all politicians, trade union members and members of way-out political parties."

While it is generally believed that a democracy wouldn't do such things, "it will [do them] if it's pushed hard enough," he asserted.

Unemployment is another major area of concern, according to Parslow. The Informatics Revolution has resulted in many jobs becoming deskilled, as well as in many unskilled workers losing their jobs. The technology will allow all the qualified people to move up the scale, leaving those unqualified or without skills — who can least afford to lose their jobs — unemployed.

Furthermore, the range of unemployment is expected to be uneven — concentrated in the inner-city areas and manufacturing areas — affecting mostly people 25 and younger, and women, who make up the majority of office workers.

When "less gifted" young people, who have been trained to get a job, suddenly realize at the age of 11 or 13 that they'll never get a job, Parslow observed, the result is an "enormous increase in violence against teachers."

CW at
ACM '80

Unemployed, unskilled youths who have never been "trained" to use leisure time will also turn in frustration to vandalism and crime, he said.

Such situations in a consumer-oriented society breed a climate of revolution, against which we can only "fortify our living areas with bulletproof windows and steel doors," Parslow suggested.

Even worse, he asserted, is the pressure that exists in such times to force the government to take action against the situation.

The expected calls for a "return to real law and order" in the face of widespread unrest "is the backlash that we've got to watch," he said. That backlash leads to totalitarian governments that control the people completely, in the style of George Orwell's 1984, Parslow warned.

Rebuttal Presented

Rebutting Parslow's viewpoint, commentator Gerard Salton, Cornell University professor of computer science, claimed that computers "have almost nothing to do with unemployment; these predictions have never been proven here or in Europe."

Acknowledging that unemployment among those least about to afford it could undermine society, leading to violence and the destruction of "civilization as well know it," Salton offered a different cause.

"The basic root of what we're facing is overpopulation in a consumer-oriented society," Salton said.

For one thing, "there is a greater aggressiveness among people than before," he noted. The "downtrodden" immigrants who entered the U.S. at the beginning of the century "worked like mad and are no longer downtrodden," he observed.

"There is a greater willingness to fight against the establishment, and not only on the part of the unskilled," he noted, citing recent riots in Zurich staged by affluent, university-educated young people.

As for resistance to automation, there have been "a few" strikes related to computerization, as in the recent one at Minneapolis Star and Tribune Co. [CW, Sept. 29, Oct. 20], but these have been "minor skirmishes," according to Salton.

Burroughs Users Found Most Apt to Update

By Tim Scannell
CW Staff

WALTHAM, Mass. — In the next two years, Burroughs Corp. computer users will make the most hardware changes and Univac and Honeywell, Inc. users, the least; but migrating Burroughs users will stick with Burroughs equipement while most Univac and Honeywell users will be searching for a new supplier.

These findings are contained in a survey released recently by the International Data Corp. (IDC) here.

Conducted in the second half of last year, the IDC survey focused on users of Burroughs, Univac, Honeywell and NCR Corp. systems and covered current equipment and future acquisition plans. In all, 782 users with an average of 1.2 computer systems per site took part in the mail survey, conducted as part of IDC's continuous Information Industry and Technology Service (IITS).

Of the 238 Burroughs users participating in the survey, 38% said they will exchange their current systems for a new system in the next two years; most will be moving from a 700 series processor to a 900 series machine. Seventy percent of the firm's 500 series users will upgrade from that model to a later model in the next few years. The 500 series processor will nearly disappear by 1982, the IDC study showed.

Approximately 21% of current Univac systems and 25% of all Honeywell systems represented in the survey will be replaced in the next two years, mostly by equipment from other vendors. Nearly 63% of the Honeywell users considering a hardware change will flock to a new vendor, while more than 58% of Univac users will make the vendor switch, the survey continued.

During the next two years, 35% of the NCR systems included in the survey will be replaced, but by other NCR computers. Most of the firm's Century series users, as well as users of the 8350, 8430 and 8450 systems, will be migrating to the 8455 and the 8555, the most popular systems for NCR users making equipment changes, the report noted.

As part of the survey, participants were also asked to detail the best and worst characteristics of their equipment. Although Burroughs users ranked system software as a best feature, they gave low marks to the firm's support and maintenance.

NCR and Honeywell users rated hardware reliability and system upgrade capabilities as a best feature, but gave low grades to NCR's application software and Honeywell's system software. NCR's marketing, technical support and maintenance were also placed on the low end of the best/worst scale.

Although most gave negative appraisals of their mainframe equipment, the majority of the users surveyed by IDC have been with the same vendor for a number of years. The average number of years for a Burroughs user, for instance, is seven while Honeywell users have stuck with that vendor for an average of eight years. NCR and Univac users have been with the same vendor for an average of nine and eight years, respectively.

Effect of Communications

Users were also asked to comment on the effect data communications has had on their computer site. The findings indicated that while most users are aware of the communications products offered by their mainframe vendors, less than 2% have implemented any kind of a network. And a full 7% have decided not to delve into data communications at all.

However, for nearly every user that is unaware of any network offerings from its particular vendor, there is a user that is considering implementing a data communications system, the report found. More than 25% of the Burroughs users, 27.2% of the Honeywell users, 32% of NCR users and 25.6% of the Univac computer users are considering some sort of a network in the near future.

Finally, the survey pointed out that nearly every user considered IBM before making an equipment selection. Burroughs was the next most frequently considered vendor, followed by Honeywell and Univac.

Burroughs users considered Honeywell equipment more often than IBM, IDC noted.

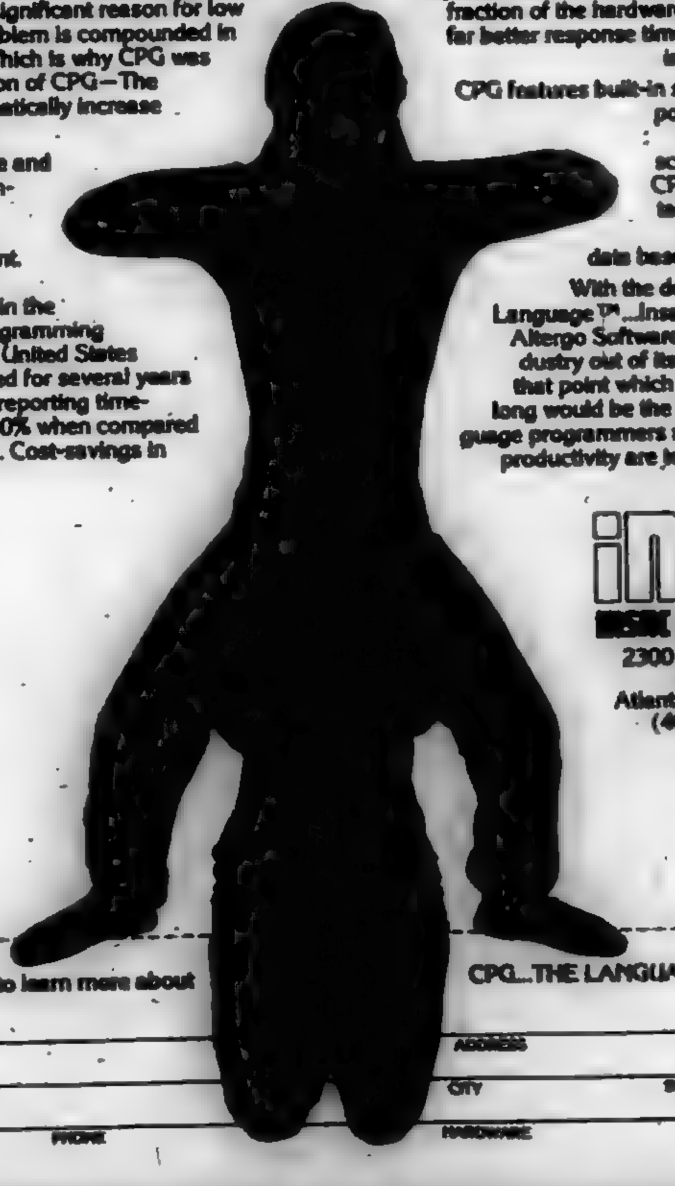
Details on the survey and IDC's IITS information service are available from the research firm at 214 Third Ave., Waltham, Mass. 02154.

Seminar Stars Carlton Amdahl

DALLAS — Carlton G. Amdahl, executive vice-president of technology for Magnuson Computer Systems, will be the featured speaker at a Magnuson-sponsored seminar here Thursday, Nov. 6.

Amdahl will discuss "Computer Architecture for the User." One of the founders of Magnuson Computers Systems, he led the team that designed and built the company's M80 line of computers.

The seminar will take place at the Hyatt Regency Hotel beginning at 8:30 a.m. Reservations can be made by contacting Harry Carr, marketing representative for Magnuson Computer Systems, at Suite 301, 8700 Stemmons Freeway, Dallas, Texas 75247.



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Eleven Vendors' Products OK'd

Tymnet-Certified X.25 Software List Disclosed

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Tymnet, Inc. last week publicly disclosed for the first time a comprehensive list of the X.25 software products that have been certified to run on the company's packet-switched data communications network.

Tymnet had previously identified the certified products only to selected users inquiring about the extent of the network's X.25 support, according to Don Hall, the firm's communications consultant.

Last week's disclosure at the fourth annual Interface West conference reportedly marks the first time that the names of all the X.25 software products compatible with Tymnet's communications facility have been made publicly available in a single written statement.

Speaking at a session entitled "X.25 vs. All Challengers," Hall explained that disclosure of the certified products is aimed at broadening user knowledge of the Tymnet network's X.25 interfacing requirements.

CW at Interface West

OK Given

Through mid-October, Tymriet had OK'd 11 vendors' X.25 software products for operation on the company's network. Some of the certified products reportedly include Honeywell, Inc.'s Multics operating system, Tandem's Guardian operating system, Prime Computer, Inc.'s Primos operating system running with the firm's 50 series processor and Data General Corp.'s Advanced Operating System coupled to the company's Eclipse minicomputers and Xodiac networking software.

Tymnet has also certified:

- Customized versions of the Dartmouth time-sharing system's X.25 telecommunications interface for Honeywell processors:
- Associated Computer Consultants' IF-11/X.25 interfaces for Digital Equipment Corp.'s RSX-11M communications controller
- Compro's network-access software for IBM's Model 3705 communications controller.
- Cambridge Telecommunications' Data Network Modified Emulation Program for the IBM 3705.
- I.P. Sharpe's in-house X.25 software for the 3705.
- The operating system for Memotec Service Corp.'s Mpac series of processors.
- Systar Corp.'s CMX Network-Communications Executive for the IBM Series/1.

Tymnet is also said to be evaluating at least six other vendors' X.25 software products and is expected to certify each of the offerings soon.

Under the certification plan, users of any of the 11 currently acceptable X.25 software products can communicate through Tymnet's network with any other user of the same system model. Tymnet still lacks the expertise, however, to support X.25 communications between systems from different vendors, Hall said.

The reason for the restriction is that every supplier's X.25 software offering uses a different transport-level protocol and thus is incompatible with competing products from other vendors, he explained.

More Interconnections Envisioned for SNA

(Continued from Page 1)

tight controls by headquarters facilities. Although systems might vary in capabilities and functions, endusers would have more license to tap whatever resources linked systems feature.

X.21 and X.25 Attachments

IBM will give users certain products they can attach to networks that employ the X.21 and X.25 interface recommendations of the Consultative Committee on International Telephone and Telegraph (CCITT), Branscomb noted.

CW at ICCC

And the company is "wholeheartedly participating" in the International Standards Organization's (ISO) development of an open systems interconnection reference model, he said.

But, as the former National Bureau of Standards director noted earlier this year [CW, May 26], IBM does not wish to give domestic customers support for X.21 and X.25 across its communications product lines before the nation's common carriers, especially AT&T, do so.

According to informed sources at the conference, IBM's refusal to support X.21/X.25, which are entailed by the first three layers of the ISO open systems model, makes it difficult for data communications users largely supplied by IBM to access the world's major public packet networks. A number of mainframe vendors have announced such support for their respective network architectures, including Honeywell, Inc. and Univac in recent weeks.

The latter two vendors pledged support for the open systems model still being developed, but SNA remains more hierarchical — with implied master/slave relationships between linked systems — than the model defined so far, critics have said [CW, Oct. 27].

Layered Architecture

Network users need a layered architecture, Branscomb asserted. The bottom layers, such as the three containing X.21 and X.25 and the high-level data link control in the ISO model, set the rules for moving messages from one point to another, he said.

The upper layers apply these rules in routing messages along links between sender and receiver and in specifying how to format, print, display and interpret the messages.

Despite allegations that SNA locks users into IBM dependence [CW, Oct. 6], Branscomb maintained that developers of network architectures are trying to define upper layers that can tell a system what to do with the bits it receives without restricting users to a particular brand of equipment.

Regarding local-area networks, the IBM vice-president said the Ethernet specification announced by Digital Equipment Corp., Intel Corp. and Xerox Corp. addresses only the lowest two layers of communication — physical interconnection and data link control — and leaves issues such as session management unresolved.

In the 1980s, some users may elect to integrate DP resources with those of voice communications on the assumption that voice dominates their electronic traffic, Branscomb observed. For them, "the logical way of switching voice and data is to handle both with an intelligent digital PABX."

Other users may view electronic distribution of documents as their dominant requirement, he continued, and transmit multiplexed streams of data and text over broadband lines without attempting to handle voice traffic.

Users may also differ on ways to integrate data and text. Those with multidrop communications loops featuring a wide variety of bandwidths may consider it better to manage control and contention with a processor, since a processor can provide optimum resource utilization.

An alternative view, Branscomb remarked, would be that distributing facilities management among all the network's intelligent devices is preferable. This would allow addition and deletion of nodes having different speeds and characteristics without initiating the changes at the network control room.

'A Custom Kind of Business'

By Brad Schultz
CW Staff

ATLANTA — The computer industry has been "a custom kind of business" until recently, IBM Chief Scientist Lewis M. Branscomb told the International Conference on Computer Communication here last week.

Industry has grown "precisely because it stayed dedicated to the solution of individual problems," he said, unlike the telephone industry, which has offered "universal connectivity for very standard applications."

But the situation is reversing. Computer equipment makers suddenly face the prospect of filling large numbers of orders for particular configurations — mass production, in other words, which calls for more standardization in product design.

And telecommunications vendors now have much more to sell than telephones and other easily standardized commodities. As computing and telecommunications technologies merge, vendors rooted in the latter technology "will respond to an ever-widening variety of applications environments," Branscomb predicted.

To be mass producers, computer equipment vendors will need to make their products easier to install and service, more reliable and easier to use, he told the conference.

"After all, with a terminal for every 10 employees, most [user personnel] will not be DP professionals, nor will they be motivated to accept a less-than-friendly system."

Interactive data terminals and teleconferencing may allow managers and professional people to spend less time in meeting organizational obligations — administrative chores could be done rapidly from electronic desks — and more time in traveling to where their most valued skills, such as in handling individuals or especially complex situations, can be applied.

SNA Methods Confuse Users

(Continued from Page 1)

for transaction-switching networks.

In theory, therefore, SNA users should select Vtam as their access method if their systems' environments are characterized by lots of application-subsystem activity. On the other hand, if their computing jobs involve loads of queued activity and message switching, users would probably be well advised to opt for Tcam.

In practice, of course, efforts to evaluate the appropriateness of the two competing SNA access methods seldom yield such simple, clear-cut results. Most users will probably have to consult at length with their local IBM support representatives and analyze their applications in detail before they can reach an informed decision.

The task of choosing wisely between Vtam and Tcam has been further complicated recently with the announcement of a new IBM software release that enhances Tcam through the addition of improved productivity aids, Craig said.

In other SNA-related comments, Hedeen disputed the widespread user notion that IBM's latest network architecture is little more than another line protocol, a successor to old communications standbys like synchronous data link control, bisynchronous and start-stop. Nothing could be further from the truth, he said.

SNA, as its name implies, is an architecture that "glues" all the pieces of IBM's communication networks together, and, as such, it far and away surpasses a simple line protocol in both technological sophistication and user impact, Hedeen asserted.

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IBM Denies Bridge From IMS Impossible

By Rita Shoor
CW Staff

ARMONK, N.Y. – IBM denied that a bridge to provide migration from an IMS data base management system (DBMS) to a relational DBMS cannot be built [CW, Oct. 27].

The report was based on statements supposedly made by Dr. Frank King, currently director of General Purpose Systems, after he presented a paper on relational DBMS concepts at the International Federation for Information Processing's (Ifip) Congress 80 in Australia.

IBM's official statement maintained that the article "did not correctly report the technical information [that] Dr. King presented in either tone or content."

"What he said was that the problem of supporting both hierarchic applications and relational applicational applications on shared data is hard and is still being worked on. In no way did he suggest this task is not possible as the author [of the article] states."

An IBM spokesman went on to maintain that the vendor had "never promised a bridge" although "we have stated that we recognize a need for evolutionary data systems direction."

He also maintained that "we know of no such marketing announcements" in response to a statement that such announcements have been used to prevent potential DBMS users from migrating to other data base systems.

The vendor representative also claimed that King did not indicate that multiprocessing was necessary in order to achieve "reasonable performance" with a relational DBMS. "Acceptable performance is being achieved today on uniprocessor systems," according to King. However, he stated that "multiprocessing may be a direction for even higher performance" in the paper released at the Ifip conference.

Qualifying all statements specifying achievable transaction speeds with the disclaimer that "any transaction rate measurement has to be dependent on the application complexity," IBM maintained that the airline control program (ACP) could achieve transaction times up to 180 per second on a 5M-byte processor.

In comparison, 20 to 50 transaction/-sec rate is achievable with hierarchical models, and implementations of System R – IBM's experimental relational DBMS – handle between three and 20 transaction/sec on 5M-byte hardware.

King maintained that relational systems "can approach the performance of current network and hierarchic data base systems." But, there is always a trade-off between performance and functionality – a term that encompasses such factors as data independence, higher level application programs and easing the data base administrator's function.

"In a wide variety of applications, we have seen that it makes sense to trade these user productivity achievements for performance where this trade-off is economical," he noted.

Computers Fostering Political Deception?

(Continued from Page 1)

based on census tract data, city directory data and established sociopolitical categories. Word processing technology allowed Polly Facets to send seemingly "personalized" letters to those portions of the electorate most likely to be receptive to certain portions of her campaign platform.

"The question is, should a candidate try to be different things to different people, according to their differences, or should she try to be all things to all people, despite their differences?" Maner asked.

Pros and Cons

In an attempt to answer that question, Maner presented arguments both for and against the concept of selective disclosure. Arguments for selective disclosure included the following:

- The voter is responsible for acquiring the information he needs to make an informed decision.
- The voter should realize that campaign rhetoric is motivational, rather than educational, by nature.
- The voter has a limited and selective attention span, and so the candidate must enter the voter's "operating mode."
- Since the means of mass communication are neither cheap nor plentiful, with only four major television networks and normally one newspaper per city, a candidate is limited to coverage she can afford.
- The purpose of political campaigns is to promote rapport with the voting public. Therefore, the candidate must try to find common ground with the electorate.
- The candidate is not a source of ideas, but rather a mirror capable of reflecting the interests of main political groups.

As for arguments against selective disclosure, which Maner noted were in line with his opinions, he suggested:

- Filtered truth, though still "the truth," reduces the quality of information available; in turn reducing one's options.
- If the intent of selective disclosure is to misrepresent or conceal the truth, it is the moral equivalent of lying. It illustrates "one of the great ironies of truth-telling – you can disclose the truth and deceive simultaneously," Maner said.
- A candidate forfeits her right of privacy in terms of political beliefs as soon as she declares herself a candidate – her ideas and information about her are then in the public domain.

In conclusion, Maner suggested, "while one may imagine cases were 'information overkill' occurs with consequent stultification of choice, the normal cases would be those where poor information leads to poor choices."

As for a solution to the problem, Maner suggested that "equal time" laws be strengthened to produce an equal distribution of information that candidates be required to file comprehensive, standardized dossiers that would be available to the voters; that campaign data bases operated with public funds should be in the public domain; and that there is a dial-up citizen inquiry system that tells all candidates' positions on all issues.

CW at ACM '80

In direct opposition to Maner's viewpoint was that presented by Dr. Paul Lutzker, president of Targeting Systems, Inc., (TSI) in Washington, D.C., a firm that makes use of the Claritas Corp. Cluster system [CW, Sept. 24, 1979] to locate a candidate's potential backer.

In presenting his rebuttal to Maner's argument, Lutzker outlined a second hypothetical case, in which a candidate had scarce resources in terms of time and money; there was low interest in the election on the part of the electorate; and the candidate felt, from past experience, that some information would be of more interest to some voters than others.

"The question facing the candidate is, can she segment the electorate and influence those most likely to be receptive, or should she assume the sole burden of informing the entire electorate about all issues?" Lutzker said.

Voter behavior studies have shown that a candidate should solidify his or her base, that different issues are important to different voters and that candidates' personality traits have proven instrumental in getting elected, Lutzker noted.

In describing TSI's Claritas Cluster system – developed in 1973 and first applied in 1978 – Lutzker explained it makes use of aggregate census data at the block-group level, identifying geographic areas in terms of urban, suburban or rural areas, income levels, mobility of the dwellers, ethnic diversity and where most of the inhabitants are in "the family life cycle." From those attributes, the system describes every block in the entire country, coded into 40 classifications.

Code 37, for example, is the "bohemian" type of neighborhood – predominantly peopled by single, slightly above median income, highly educated groups of diverse ethnic backgrounds.

Noting that techniques such as the Claritas Cluster system are most beneficial to the candidates in terms of efficient use of campaign resources, Lutzker said the press and political opponents are "time-honored" sources of information.

Computer-aided techniques that target specific types of voters who are most likely to want particular information are "useful tools that aid rational voters in making rational and wise decisions," Lutzker claimed.

Although such methods can be used to deceive, the penalties for deception are too great, he asserted, adding that, undoubtedly, "most attempts to deceive will fail."

Computer-Skilled Graduate Called 'Hottest Thing Going'

(Continued from Page 1)

The only area of reduction in demand is for keypunch operators, who numbered 273,000 in 1978, a number expected to drop to 230,000 in 1990, a 15.8% change.

Low Unemployment

In addition, the 1978 unemployment rate for all workers was 8%, while for systems analysts, programmers and technicians, it was 1.9%, a figure Wash called "incredibly low." As for computer operators, who have less attachment to their careers because of less training invested in them, the unemployment rate was 3.1%. Keypunch operators – the only area in decline – had a 6.6% unemployment rate, "still below the national average," Wash pointed out.

The unemployment figures for DP-related jobs represent mainly people who left their jobs voluntarily to move to a different area, he noted, adding that the field features such enhanced job mobility because of the high demand. "There are more options to change jobs, and more likelihood that one will be enticed to change jobs than in other fields," Wash said.

Such demand has resulted often in the hiring of people without computer degrees, but who are qualified by virture of having engineering, business or other degrees, he said. "There is no defined and strictly enforced route of entry to the occupation."

As for salaries, college placement council data indicates that as of March 1980, people with bachelor's degrees in computer science were being offered starting salaries of more than $18,000. People without a computer-related degree who were hired in DP jobs were offered "a couple hundred dollars less" than that figure, he said.

Masters' degrees in computer science resulted in offers of $21,500 on the average, to start, according to that data. Wash cited a Fox-Morris survey for mid-1980 [CW, June 2, 1980] showing that software programmers with an average of 4.1 years of experience earned $24,900. Systems analysts with 5.6 years of experience earned $23,800 and applications programmers with 3.5 years' experience earned $21,700.

All of those figures are an average of 16% higher than the year-earlier figures, Wash noted.

Employer's View

Giving the employer's perspective on recruitment was Roy Cottrell, manager of administration, budget and technical services for Missouri Pacific Railroad (Mopac).

Cottrell described his firm's method of recruitment, which relies mainly on college recruitment, training and in-house training.

"We feel someone who has had the academic exposure of getting a college degree is probably trainable," Cottrell said.

While the railroad's own system of technical interviews resulting in the recruitment of college graduates "offers the best candidates and is the most cost-effective," according to Cottrell, the organization at times depends on other sources of employees.

Declining Science Education Blamed

DPer Shortage Expected to Persist Beyond 1990

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The current shortage of computer professionals in the U.S., at all educational levels, is expected to persist beyond 1990, the National Science Foundation (NSF) said recently.

In a report prepared jointly with the U.S. Department of Education, NSF blamed the shortage on the declining emphasis on science education in the U.S., lack of proper training equipment and facilities and the exodus of qualified university DP instructors to better paying positions in private industry.

Measuring the problem, NSF projected approximately 550,000 openings in the U.S. between 1978 and 1990 for programmers, systems analysts and other computer professionals. During the same period, the study foresaw no more than 157,000 persons receiving baccalaureate or master's degrees in computer sciences.

Although many practicing DP professionals have been recruited from other disciplines, the shortages will definitely persist through the decade, the report said.

Trends for computer professionals have been similar to those for engineering: namely, rapidly rising undergraduate enrollments and decreasing Ph.D. production, according to the report. The result will be eventual cutbacks in undergraduate programs as the shortage of qualified instructors accelerates.

In fact, the decline may occur during this decade, the report suggested, as faculty erosion continues, with qualified faculty members being lured into private industry for more challenging and better paying positions.

Declining Ph.D. production and the availability of more attractive employment opportunities in industry for persons with doctorates in engineering and the computer professions have already led to a shortage of both junior and senior faculty in these fields, the study found.

College Vacancies

The report refers to a recent survey that found approximately 200 vacancies in college departments specializing in the computer profession and as many as 2,000 unfilled positions on engineering faculties.

"These vacancies are straining the capacity of these schools and departments," the report said. The size of many undergraduate classes has already increased to the point that students are not receiving enough personalized instruction. In addition, overworked teaching assistants are burdening senior faculty members, who are then left with less time for research, the report added.

Compounding these problems, much of the laboratory equipment and facilities for research and teaching in university computer departments was acquired during the 1960s, the study noted. This lack of access to state-of-the-art facilities for faculty and graduate students "decreases the attractiveness of academic careers and contributes to the engineering and computer profession faculty shortage problems."

Obsolescence of instructional equipment also implies undergraduate education in computer sciences is itself obsolete vis-a-vis current industrial practices, the report said.

These problems suggest the capacity of engineering and computer schools to accept and provide an adequate education to all qualified applicants may be reached during the present decade, the report said. Also, the "rigidity implied by the strained capacity of these schools and departments limits their ability to respond to changing demands of the engineering labor market."

The report concluded that while federal programs can help alleviate faculty shortages and equipment obsolescence problems, long-term solutions "must derive from the establishment of close working relationships between universities and industry."

For example, "industry could make its unique research facilities available to university faculty, offer sabbatical year arrangements whereby university faculty would engage in industry research while industrial engineers and computer specialists taught and conducted research in university departments."

Universities could allow faculty more liberty to supplement their incomes and gain access to specialized research facilities in industry. Corporations could offer assistance to schools in return for university research.

However, the report noted "there is some evidence that current tax, patent, antitrust and copyright laws and regulations are creating barriers to more effective university/industry cooperation."

Finally, because of "the dramatic changes" in computer technology and its applications, the report argued for "engineering curricula that provide a broad conceptual foundation in addition to training in specific techniques and thus provide new graduates with the capability to retrain themselves in fields that may be somewhat different from those of their original major."

NEW!

A *practical* course in OS JCL for $20

The amount of job-control language that can be used on an OS system is overwhelming. There are more parameters than you would ever want to know about; and those parameters let you do more things than you would ever want to do.

Of course, the IBM manuals are designed to tell you all there is to know about OS JCL. But that's what makes it so frustrating when you have to code the JCL for a new application. When you look up a function in the manuals, there are often pages of detail that don't apply to your situation...or do they? It's hard to be sure from the few examples shown. So you end up figuring things out on your own, through trial and error or by consulting the JCL "guru" in your shop. Either way, you avoid coding new applictions in JCL whenever possible...they're just too much trouble.

Unfortunately, most "training" courses and texts on OS JCL are no better than the manuals they're supposed to explain. They get so wound up in complex details, without ever showing real-life examples, that you don't learn much. Then, when you want to know how to code a specific function, it's back to the manuals and the trial-and-error process.

Now, though, I'm happy to announce a new textbook that concentrates on the practical use of OS JCL. It doesn't try to teach you everything there is to know about the subject. But it *does* teach you how to code the JCL for applications that occur every day in an OS shop. For example, you'll learn to execute utility, sort/merge, language translator, and link-edit programs. You'll learn to create, maintain, and execute JCL procedures. You'll learn to code JCL for handling sequential, direct, ISAM, and VSAM files. You'll learn what JCL to use on virtual storage systems. What's more, you'll learn to use time-saving techniques that can reduce coding errors. And you'll be introduced to a standard method of "structuring" your JCL code so it's easier to read and modify.

2 reasons why this book is effective

1) Probably the most important feature of this book is that it contains hundreds of illustrations. You won't just read about the JCL to use for a certain application; you'll see an actual JCL listing that you can use as a model for your own code.

For example, there are listings that show how to: use the IEBUPDTE utility to create and modify OS libraries; execute compiler procedures for COBOL, PL/I, FORTRAN, and assembler language programs; create the required data areas for VSAM files; link various combinations of source and object modules; and much, much more. In our experience, examples like these, more than any other factor, determine whether or not a course is effective. And they are the missing ingredient in most JCL courses—and in the IBM manuals.

2) The educational approach used in this book is one we've found to be effective again and again. Quite simply, a complete subset of JCL is presented in the first three chapters. That means you can start coding the JCL for many applications right away. After this, all material is organized by function (using procedures, executing utilities, and so on). So after you've finished the first three chapters, you can go on to any topic you want to know about.

Who this book is for

Simply stated, this book is for people who need to write OS JCL. This includes beginning programmers who have had a programming course (or are taking a concurrent course in a programming language); the experienced programmer who is new to the OS environment; and the experienced programmer, systems analyst, data control specialist, or computer operator who may be familiar with some parts of OS JCL through experience, but who has never mastered it. So if you use a System/360-370 running under some version of OS (MFT, MVT, VS1, VS2, or MVS), this book is for you.

How to use this book

If your're reading this book on your own, you can decide for yourself what to study and when you want to study it. For example, suppose you need to know how to compile a COBOL program. After you've mastered the basic subset (chapters 1-3), you can skip over the chapter on advanced file handling and go straight to the chapter on compiling programs. In other words, the book's modular organization lets you study the parts you want to study in your own time.

If you're in charge of training for your company, I think you'll find that the modular approach will allow you to design the course around your own requirements and resources. Because of the amount of material covered, you may want to split the course into two classes—one for beginners and one for more advanced students.

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Four 3800 Rivals Carry Suspected Carcinogens

By Tom Henkel
CW Staff

Four out of five alternatives to the IBM 3800 — a laser printer that uses a chemical that Environmental Protection Agency (EPA) tests have confirmed is a carcinogen — also contain chemicals suspected of causing cancer.

Burroughs Corp.'s B9270-35, Xerox Corp.'s 9700, Univac's 0777 and Uppster Corp.'s 6510 use either selenium or nickel in their photoreceptors. Both chemicals exhibit strong carcinogenic tendencies, but have not been tested sufficiently for the government to make a statement on whether they are, in fact, carcinogens.

However, the EPA, the Food and Drug Administration (FDA) and the Occupational Safety and Health Administration (Osha) all list selenium and nickel as possible carcinogens that deserve further testing.

The photoreceptor of the IBM 3800 contains trinitrofluorenone (TNF), a chemical listed by the EPA as a known mutagen [CW, Aug. 25]. Mutagens are highly suspected as a cause of cancer, but not all mutagens prove to be carcinogenic.

The difference between TNF and the other two chemicals, selenium and nickel, is the mutagen factor. The Ames test, used to identify mutagenic tendencies in chemicals [CW, Sept. 15], showed TNF to be a mutagen, but not the others. However, the Ames test is not perfect, and its results are often found to be faulty, an FDA spokesman said. The 3800 seems to be the fastest of the laser printers at 5.5 page/sec. It costs roughly $325,000, or $6,560/mo on a two-year lease; paper costs roughly $12,900/mo, according to a December 1979 survey by International Data Corp. (IDC). IBM charges a paper usage fee of 3.5 mills per foot.

Another difference between TNF and the other chemicals is that TNF is a man-made product while nickel and selenium are natural elements. In small quantities, both nickel and selenium are considered essential to life; in larger doses, however, all three chemicals exhibit strong carcinogenic tendencies, according to at least two toxicologists, MIT's Dr. Dale Hattis and the FDA's Dr. Kurt Biddle.

Printer Technology

All the laser printers that contain suspected carcinogens use the same basic technology. A charge apparatus places a negative electrostatic charge on a photoconductor — a belt or a drum coated with the chemicals in question. A toner is used to develop the image, and it is then transferred to the paper by placing a strong negative charge on the back of the paper and bringing it in contact with the photoconductor.

Honeywell, Inc. uses a somewhat different approach to the same problem. In its Page Printing System (PPS) II 800 series laser printers, Honeywell uses paper treated with a special plastic, a petroleum derivative. The paper is charged electrically, as opposed to electromagnetically, with a light source and a petroleum-based toner is used to develop the image, the firm explained.

This method eliminates the photoconductor, or receptor, from the printing process. Instead, the paper is the photoconductor.

The chemicals used in the Honeywell printer do not appear, at least yet, to be carcinogenic. While they are petroleum-based and therefore toxic, Honeywell maintained there is almost no chance of the user experiencing ill effects from its printer.

But how great a danger the other printers pose is difficult to ascertain. Although many government and academic scientists attest that TNF, selenium and nickel demonstrate carcinogenic tendencies, none can say whether prolonged use of laser printers constitutes a hazardous exposure to the chemicals.

"I'm guessing, but I can't see where there would be a real exposure risk from [laser printer] use," Biddle said, adding that animal tests have revealed a higher incidence of cancer when the subjects were given about 10 times the normal selenium intake of humans. Speaking specifically of selenium, Biddle said the amounts humans would receive from contact with laser printers would probably be far less than a dangerous dose.

Nickel is probably the same story, Biddle said, and Hattis agreed. He noted there are some cases of workers in nickel-smelting environments who show a higher than normal incidence of cancer, but said the higher rate cannot yet be pinned on nickel. The cause of the cancer may be fumes given off by the smelting process or a combination of other environmental factors, he explained.

Nickel also tends to promote allergic skin reactions in some people. That reaction — usually not serious or cancerous — suggests nickel is easily absorbed through the skin, the type of contact most likely with laser printers.

Both Hattis and Biddle — although neither said they knew enough about laser printers to be considered expert — pointed out that it could take 20 years before the carcinogenic effects of TNF, selenium or nickel are realized. Hattis added that the computer industry changes so rapidly that laser printers may not be around long enough to provide any quantifiable long-term effects.

Characteristics[1] / Printer	[illegible]	Xerox Corp. 9700	Honeywell, Inc. PPS II Series 800	Uppster Corp. 6510	Univac[2] 0777	Burroughs Corp.[7] B9270-35
Print Speed (Page/Sec)	[illegible]	2	5	1.5	2.65	2
Purchase Price	[illegible]	$129,000	$200,000[5]	$90,000	$364,000	$332,500
Monthly Lease (Lease Term)	[illegible]	$7,300[3]	$6,836 (3-year)	$2,800 (2-year)	$7,000 (5-year)	$8,506[4] (3-year)
Paper Cost/Mo[6]	[illegible]	$12,300	$20,400	Not Available	$12,900	$12,300
Paper Type	[illegible]	Single-sheet	3,900-Ft Roll	Fanfold	Fanfold	Single-sheet
Chemical	[illegible]	Nickel-plated belt	Petroleum-based toner and paper	Selenium tellurium over metal	Selenium coating over metal	Nickel-plated belt
Printing Process	[illegible]	Laser	Laser	Fiber Optics	Laser	Laser
Special Paper Required?	No	No	Electro-graphic	No	No	No

1. Based on a monthly work load of 3 million pages.
2. Manufactured by Siemens AG.
3. Xerox charges a flat monthly fee of $7,300 plus a surcharge of 3.5 mils per impression. A monthly plan that offers 1 million impressions is available for $10,500 a month.
4. Burroughs charges an additional $2 for each 1,000 pages.
5. Honeywell's PPS II Series 800 is available in six different printing speeds. A spokesman said the model that most closely matches the IBM 3800 costs $200,000. However, prices range from $170,000 to $250,000. Likewise, lease prices range between $4,500 and $7,000 on a three-year basis. The lease price listed is for the model closest to the 3800.
6. Paper cost figures are approximations based on an International Data Corp. survey in December 1979.
7. Burroughs' printer is manufactured by Xerox.
8. IBM says its printing speed varies with the forms size. A typical 8.5-in. by 11-in. sheet can be processed at a rate of 215 pages per minute or 3.5 page/sec. There are 50 different forms sizes, IBM reports.
9. IBM charges a paper usage fee of 3.5 mills per foot.

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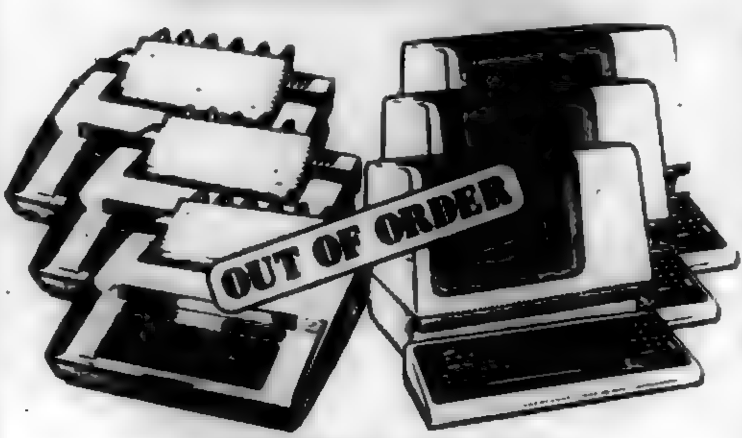

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ELECTION '80

By Marguerite Zientara
CW Staff

When Ronald Reagan, Jimmy Carter and John Anderson face off in the Presidential election tomorrow, millions of voters will be casting their ballots electronically. Although 50% of the American electorate still uses the mechanical lever-type voting machines, increasing numbers of voting citizens have moved into the electronic age, and reportedly most are pleased with the method. As for voting jurisdictions that have switched from mechanical to electronic voting systems, the reasons most often cited are the need for speed and accuracy in the face of growing electorates.

Cost-effectiveness, too, is a factor: while lever-type voting machines cost several thousand dollars apiece, electronic voting machines sell for several hundred. Furthermore, the electronic voting units are easier to move around and store, and many of them generate their own audit trails. Here and on the next two pages is a random sampling of how electronic voting equipment will be used in locations around the country, ranging in size from Fort Bend County, Texas — with 54,000 registered voters — to Orange County, Calif., with more than a million.

Election 1980

• Orange County

SANTA ANA, Calif. — When Orange County's first electronic voting system reached its 15th year of service and became very slow and very costly to operate, it was time to look around for something new.

Since the manufacturer of the county's original system was since defunct, Orange County turned to Martel Systems, Inc., based in Costa Mesa, Calif., for its mark-sense voting system, according to Barbara Fox, assistant director of the general services agency.

First used in California's June primary vote, the Martel equipment posed "some transitional problems, but we're working them out for the November general election," Fox said.

Working out those problems entails "small debugging jobs, and developing some appropriate administrative procedures to use with" the system, she added.

Faster Tabulation

With "one million, one hundred" registered voters in the county, faster tabulation time was essential for vote administrators. Added speed has been realized, but as for overall reliability — "We plan to reevaluate and compare the system after the November election. We do expect that it will better meet Orange County's needs because we're a large county," Fox observed.

The county chose mark-sense voting in the first place, instead of punch-card electronic voting, because the method offers an audit trail, has pen and ballot together and shows a high degree of voter acceptance. "Martel is the only state-certified mark-sense system," Fox said.

In the county's more than 2,000 precincts, officials "box up the ballots at the end of election day and transmit them via security procedures to our central facility here," Fox explained.

"Then we run the precinct ballots through 90 vote tabulators, the output of which is magnetic tape." The tapes are then processed through the central computer facility, comprising two Univac Corp. 1110 computers — "programmed to run simultaneously in case one goes down" — with an 1160 backup machine "in case both go down," Fox added.

• Palm Beach County

PALM BEACH, Fla. — In contrast to the mostly glowing reports from electronic voting equipment users around the country, Palm Beach County is still considering filing suit against Computer Election Systems, Inc. (CES) for its alleged failure to provide proper technical support and quality control [CW, April 28].

The possibility of a suit arose after CES' Alpha Ballot Tab system broke down the night of the March 11 Florida primaries, delaying election results 24 hours.

The breakdown — the second in two years for the system — followed a similar failure on election night 1978. On both occasions, the system crashed when its three Data General Corp. Nova II minicomputers went down, according to Election Supervisor Jackie Winchester.

Palm Beach County will use the CES system tomorrow and hope for the best. Although the county has not yet filed suit, "we're still dissatisfied," Winchester said.

Slight Problem

In a recent September election, there was "a slight problem" because a card reader did not work, she said. "It was giving incorrect counts; CES replaced the unit but never really explained to us what was wrong with it."

In October, however, the system worked "fine," she added. "It's all working now, and we hope it will continue for November."

In an effort to improve the system's reliability, CES has made some modifications, Winchester reported. "They put some shielding on the cables that connect [the equipment] together; they put some extra ventilating fans in the area where the CPUs are because they thought overheating might be causing problems like the boards going out; and some of the line filtering equipment has been modified."

Palm Beach County, with 310,000 registered voters, will use 2,400 voting machines for tomorrow's election. "We don't feel we can really assess the whole situation and decide what we're going to do until after the November election," Winchester said recently.

"Right now we're working night and day getting ready for that," she concluded.

• Lynn, Mass.

LYNN, Mass. — With 43,000 registered voters, Lynn, Mass., has used punch-card-based electronic voting equipment from EVM Corp. of Newton, Mass. "for five or six years," according to Leo D'Entremont, chairman of the election commission.

While EVM is now a dealer for Computer Election Systems, Inc. (CES) of Berkeley, Calif., it has been so "only for a couple of years," according to D'Entremont. "When we started using electronic systems, there were only two suppliers — EVM and CES."

"We wanted to get out of paper balloting because it entailed too long a process, and that left two options: Electronics or lever machines.

"I knew the council would not vote for lever-type machines because they were $4,000 apiece vs. a couple hundred dollars apiece for electronic voting systems, at the time," he recalled.

"Electronic systems at the time were 90% cheaper than lever machines, and we elected to go with the nearby EVM Corp. instead of the California-based firm," he noted.

With one voting machine for every 100 voters, the system also includes one IBM 2501 card reader, the output of which is then processed on the IBM System/3 computer "downstairs in City Hall," D'Entremont said.

• Lake County, Ill.

WAUKEGAN, Ill. — While Lake County, Ill., — with 235,000 registered voters — has utilized electronic punch-card voting machines since 1966, this election year has brought a switch from one vendor to another.

"Although we used the Votomatic machines from Computer Election Systems, Inc. (headquartered in Berkeley, Calif.) until this year, now we've converted to equipment based on the same principle from Election Data Corp.," based in St. Charles, Ill., explained Fred Boyd, Lake County elections administrator.

Besides the fact that the original equipment, put into use in 1966, "was approaching the point where it needed repair," according to Boyd, "we also needed additional units beyond what we had in inventory."

After examining the available machinery, "this particular equipment looked to be the most cost-effective," he recalled. "The price was right and the timing was right.

"We were actually able to replace our inventory and procure additional units for considerably less than our original investment," he noted.

Although tomorrow's presidential vote will be the first election in which the new equipment will be used, vote administrators do not anticipate problems. "I think the engineering of these units is really better than the original equipment we had and I really look forward to considerably less problems," Boyd said.

Election 1980

Engineering improvements over Lake County's previous equipment include an improved frame that holds the punch bed, better tolerances, better engineered stops for the template, stronger templates that are less likely to pop out of position, and a better shape to the guide holes in the template, according to Boyd.

In addition, "this unit is much smaller than the original equipment we had," Boyd indicated. "Because of the size, I'm able to package units together in the same container with other supplies going to the precincts.

"That offers real advantages in that it reduces the cardage people have to handle, reduces the number of cartons, plus it gives us a little better control."

Using 3,000 punch devices furnished by Election Data Corp., the electorate will cast its votes on cards that will then be processed by the election judges at the end of the day, Boyd explained.

"After preparing documentation to determine that they've accounted for all the ballots delivered to them, the judges of election will bring the cards to collection stations," he continued.

"The cards will be grouped at the collection stations and then brought to the central processing area where we'll verify the number of ballots being returned for each precinct, and then run them through two IBM 2501 card readers here," Boyd said.

"A processor program then translates the punches in the cards into election returns using our IBM Corp. 3031, running under DOS/VSE," he concluded.

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• Fort Bend County, Texas

RICHMOND, Texas — In contrast to the 1,000,100 registered voters in California's populous Orange County (see related story), Martel Systems, Inc. also supplies its mark-sense electronic voting system to tiny Fort Bend County here, with 54,000 registered voters.

While the county had paper ballots until last year, "the county was getting so big it was hard to count the ballots by hand," explained County Clerk Pearl Ellett.

With one optical scanning system for each of the county's 38 precincts, "which counts the ballots as they go through," according to Ellett, the county relies on telephoned precinct results, which are then manually tallied in the county clerk's office here, Ellett said.

• Hawaii

HONOLULU, Hawaii — If your image of Hawaii is one of a lazy island paradise that is slightly behind the times, think again.

In the vanguard, at least in the area of electronic voting, Hawaii happens to be the only state that is computerized statewide for those big election days.

With 4,000 punch card voting machines purchased from the Datavote Division of Diamond International Corp. in San Francisco, Hawaii serves its 400,000 registered voters, as it has since 1971.

"Back in 1968, we were faced with a problem because of increasing numbers of people in the state," explained Morris Takushi, Director of Elections for the state. "Three-fourths of the state was using paper ballots and one-quarter was using mechanical voting machines.

"We knew the paper ballot was on the way out, and we were fairly well pleased with the voting machines," Takushi recalled. "However, the voting machines were very expensive.

"When Datavote came on the market, we found that with a very small amount — around $50,000 — we could get a pilot program started," he said.

Growing Electorate

By 1970, the island was pleased with the experimental system and found itself, again, needing more equipment because of a growing electorate, Takushi recalled. "An Election System Advisory Committee was formed — including organized partisan and nonpartisan groups — which called in all the major vendors and made an analysis of their systems," he said.

With Datavote the winner, Hawaii went statewide with electronics for the 1972 elections. "We finished the entire count by midnight, our time," Takushi noted.

Besides the "tremendous accuracy" of the system, proven time and again against manual recounts, according to Takushi, voter acceptance is very high for the system. "In a poll taken after the 1972 election, 97% of the voters said they were pleased with the system."

As for the computer equipment used to tabulate the punched cards, Hawaii uses "whatever is available" on the seven inhabited islands. "The equipment has varied because the neighboring islands [to Hawaii Island] are behind in technology," he noted.

"We once used a Data General Corp. minicomputer on the Island of Kauai, but now all the equipment is IBM," he noted. Tomorrow's election will be the first time the islands are standardized with IBM equipment.

"By 1982, we will be even more standardized," Takushi predicted, "because the state will have its own computer facilities on all the major islands, and they will be linked by teleprocessing for the transferring of results to the Election Center in Honolulu.

"Now, we have to phone in results from the neighbor islands to Honolulu, and then manually insert the counts into our IBM 3033 for the statewide totals," he explained.

"The next day, computer tapes arrive from the neighbor islands, they are fed into the computer system and we compare the manual and automatic counts," Takushi said. "They always match."

CBS Coverage Inaugurates Graphics System

NEW YORK — If you watch CBS News' coverage of the presidential election returns tomorrow, you will witness the network's inaugural use of its newly acquired Ampex Corp. Ampex Video Art (AVA) graphics system.

Developed by Ampex with the assistance of CBS, AVA reportedly permits the graphic artist to create original art or modify existing pictures, charts or diagrams with the broad selection of colors, hues, saturation, line weights, shapes and intensities.

While the AVA system gives the artist fewer tools to work with — gone are the X-Acto knives, paste pots, straight edges, paints, pens, pencils and brushes — it offers "more creative possibilities than were ever available before in the video medium," according to Donald Kleffman, general manager of the firm's audio-video systems division.

In place of such traditional artist's materials will be an electronic stylus and palette that directs the system's Digital Equipment Corp. PDP-11/34 minicomputer to paint or draw the art, Kleffman explained.

On election night, the system will be used to create pictures, charts and drawings that depict the night's activities.

Electronic Tablet

To use the AVA system, the graphics artist sits at an adjustable flat surface called an Electronic Tablet that is divided into two working areas. Two CRT monitors face the artist.

On the left, the color monitor displays the artist's work. The right-hand "menu" monitor lists a large number of different verbal commands that allow the artist to select a variety of painting and sketching styles, colors and special effects, Kleffman explained.

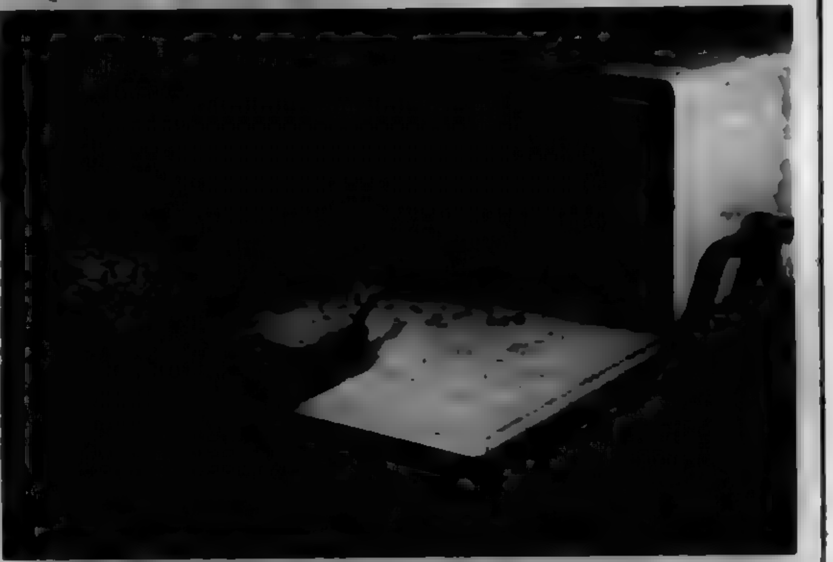
Using the electronic stylus, the artist draws and communicates with the AVA system on the two halves of the palette before him. The stylus is used to select various operating modes — using plain English commands — from the menu monitor. Touching the stylus to the palette causes a video cursor to be shown in the corresponding area on either the picture display or the menu monitor.

Slight additional pressure activates whatever command has been given to AVA, and artistic work on the palette's drawing area can proceed.

Multimodal Pseudomedia

AVA is said to permit the artist to paint in "any number of modes that resemble such media as watercolor, pencil, acrylics and pen and ink." The artist can select "brushes" varying from very thick to delicately thin, and create new brushes and store them permanently in the computer's memory for future use.

The artist can choose from 256 colors and six basic painting modes — opaque paint, tint paint, value paint, picture paint and two softening modes. Additional color palettes can be stored in memory for use as desired, as well, Kleffman explained.



Graphics artist sits at Ampex Corp.'s AVA graphics system. The color monitor on the left displays the artist's work, while the right-hand "menu" monitor lists a number of verbal commands for selecting numerous painting styles, colors and special effects.

If captions or headlines are needed, nine type fonts are available to provide the desired lettering style, color and size. In addition, the system offers predrawn shapes such as squares, circles, rectangles and ellipses. Entire sections of a picture — such as the sky — can be colored automatically with a touch of the stylus.

Once the art is completed, it can be broadcast immediately, recorded on video tape, stored in memory, or run through a photocopy printer to produce a hard-copy sample of the work.

AVA is said, in short, to eliminate the time-consuming process of creating board art, photographing and processing a 35mm slide, then creating a video image through a film chain.

"This system offers unparalleled opportunity for creativity," commented George Shannon, vice-president of production facilities and engineering for CBS.

"Traditional television graphics systems limit the artist's images to fairly simple geometric shapes, while AVA actually expands the artist's horizons," Shannon added.

Besides the PDP-11/34 minicomputer, the system comprises an Ampex DM-980 or DM-9160 computer disk drive.

• Alaska

JUNEAU, Alaska — Still considered by many to be the last frontier on earth, Alaska has nevertheless blazed its own trails into the most up-to-date methods of voting available.

Starting back in 1970, Alaska contracted with the Datavote Division of Diamond International Corp. of San Francisco to use its punch card-based voting system.

In 1974, the system was expanded to serve the three most populous areas of Alaska — Fairbanks, Anchorage and Juneau — which it has done ever since, according to Director of Elections Patty Ann Polley.

With 170,000 registered voters in those areas — "well over half the number of voters registered in Alaska" — the state uses "about 1,600" punch card voting machines on election day.

"After the polls close, the ballots are removed from the ballot boxes [in each precinct], put into containers and transported to computers in the three main cities for actual tallying," Polley said.

All the computers are from IBM, but are different models. "The ones in Anchorage and Juneau are very similar to each other, and the one in Fairbanks is the smallest," Polley said.

'Overall, Delightful'

Datavote has been "overall, delightful to work with, and has given a great deal of assistance to us when we've needed it," she noted. While there have been "no problems" over the years, she said, "One year we had a printing problem with the ballots, but it was something we did to ourselves — we can't simply blame them for it."

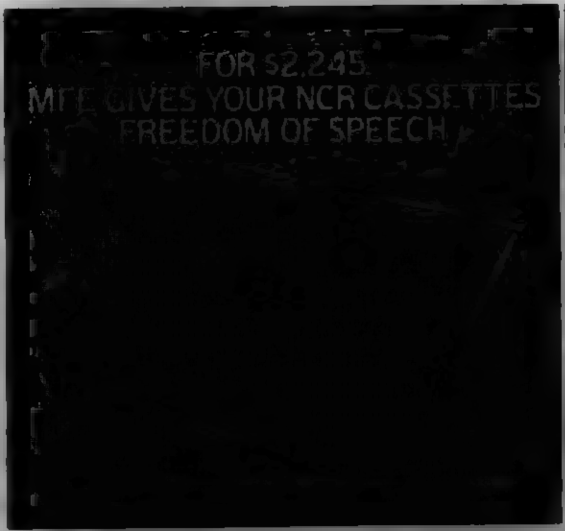
Election 1980

Why did Alaska go electronic in the first place? "Simply not being able to handle the hand-marked paper ballots and the hours of counting they were requiring" were the reasons, Polley recalled.

And, since the municipality of Anchorage at the time owned "30 to 40" lever-type machines that "nobody in the state liked," Alaska started looking at punch card systems.

"In the lever-type machines, [we objected to] the way they handled the voting, the way the counters apparently didn't work — and we were totally unhappy with that and knew we didn't want to go in that direction," she said.

The main reason the state chose Datavote over other suppliers was that "the ballots can be read by the eye without additional requirements or anything in conversion," Polley said.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SBS Plans Nov. 12 Blast-Off for First Satellite

By Brad Schultz
CW Staff

ATLANTA — Barring an 11th-hour hitch in plans, Satellite Business Systems (SBS) will launch its first satellite for specialized common carrier services on November 12 at Cape Canaveral.

The podium masked whether SBS President Robert C. Hall crossed his fingers when he made that announcement at an international conference on computer communication session here last week. The man who once ran all DP and telecommunications for the New York and American stock exchanges seemed especially bullish.

SBS had to scrap plans for having the National Aeronautics and Space Administration's Space Shuttle place its satellites in orbit when technical problems such as tiles falling off the Shuttle's hull made that method impractical (CW, July 21).

Instead, a McDonnell-Douglas Co. Delta rocket, considered the most reliable vehicle in the U.S. Space Program, will allow SBS to start providing all-digital services early next year, Hall told the session. The Delta is estimated to have better than a 92% chance of successfully putting the first SBS satellite in geostationary orbit, he said.

Just in case, SBS bought launch insurance to cover the 8% risk. This was "an approach found to be prudent by our predecessors," Hall explained, several months after another carrier saw a satellite it wanted to place in orbit unexpectedly veer towards other sectors of the cosmos.

By April and perhaps as early as January, SBS will orbit a second satellite, a replica of the first, that will serve as a spare facility. A third satellite will be held as an "on-the-ground spare," Hall said, until launching in 1983 when customer traffic volumes fill the first spacecraft's capacity and expand into that of the second.

By 1983, SBS also intends to complete designs for the next generation of its satellites and start preparing to launch them in 1985 or 1986.

"The satellite may be the heart of the SBS system," Hall observed, "but the brains are on the ground." SBS will sell complete communications services, he said, including the earth stations necessary for satellite links. The company will not handle customers that acquire earth stations from another source and want those antennae to access the SBS services.

Private, Switched Nets

The initial SBS service offering, called the Communications Network Service (CNS), provides private, switched networks for large organizations, Hall stated. For DP users, CNS will allow remote copying of large files for the first time, he claimed.

At 56K bit/sec — the top speed of conventional data networks right now — a user would need almost two days to transmit a one-billion-byte file, which might be the daily sales transactions for a large retailer, Hall maintained.

SBS services will let the user transmit a one billion byte file in an hour and a half at 1.5M bit/sec or in 23 minutes at 6.3M bit/sec, he asserted.

"As a result, we expect many of our users to routinely update and replicate files overnight when the transmissions capacity of their networks is not needed for the voice and other daytime priority uses."

The first customers of SBS, which has yet to provide any services in its five year history, include IBM and Aetna life and casualty — which share ownership of SBS with Communications Satellite Corp. — as well as Boeing Computer Services Co., the Travelers Insurance Companies and Isacomm, a subsidiary of Insurance Systems of America.

Isacomm will be a value-added reseller of SBS services to the insurance industry, Hall pointed out. Travelers' initial SBS data network will run at 1.544M bit/sec.

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To West Coast, Overseas

Substantial Intelpost Expansion Predicted

By Phil Hirsch
CW Washington Bureau

ATLANTA — Intelpost, the international facsimile service recently launched by the U.S. Postal Service (USPS), may be substantially expanded within the next year, one of the system's developers said here last week.

Gov. Jerry Brown of California has written Postmaster General William F. Bolger, asking for establishment of an Intelpost pickup and delivery center on the West Coast, explained Helmo Raag, director of electronic mail systems at Communication Satellite Corp. laboratories.

His organization developed the system under contract to the Postal Service and is providing technical support on a continuing basis. The West Coast center would supplement the Intelpost centers already established in New York City and Washington, D.C.

"Some oil companies are interested in connecting their private communication networks directly to Intelpost facilities," Raag reported. In addition, the Netherlands has indicated that expansion of Intelpost to additional serving post offices within the U.S. would make it much more useful, since only about 20% of the mail which the Dutch send to this country is addressed to cities on the East Coast.

Because of these developments, USPS is "very conscious of the need for establishing additional Intelpost centers," Raag said.

Overseas Expansion?

The big question at the moment is whether or not U.S. Intelpost service will be expanded overseas. Currently, messages are being exchanged only with Canada, mainly because the Federal Communications Commission (FCC) has refused to let U.S. international record carriers (IRC) lease overseas circuits to the Postal Service.

The commission says such a lease would violate a long-established rule barring resale of international communication facilities. The commission recently proposed doing away with this rule, and may finally decide to do so shortly.

In the meantime, USPS has said that if the restriction is not lifted, it will offer Intelpost service overseas via Canada.

Raag, who was interviewed here at the Fifth International Conference on Computer Communication, said shortly after speaking at one of the sessions that the negotiations are now underway, although he does not know how soon service overseas will begin.

He also indicated the real problem may be U.S. IRCs, rather than the FCC. One international carrier — RCA Global Communications, Inc. — offers a facsimile service called "Q-Fax" that competes directly with Intelpost, and the others probably consider Intelpost customers prospects for their international telex offerings.

Conflict Abroad

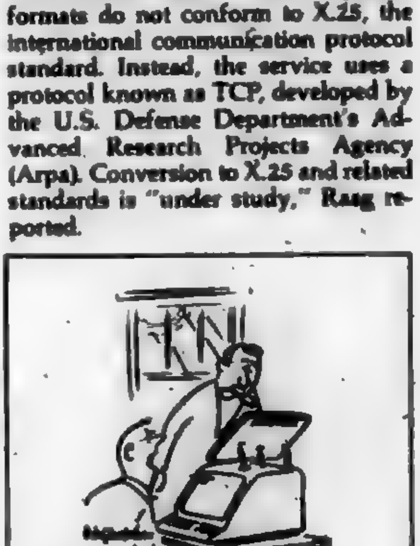
There is also some conflict over Intelpost abroad, Raag said. Mainly it involves rivalry between the postal and telecommunications arms of foreign postal, telegraph and telephone administrations (PTT).

Each organization resists the other's efforts to control technical and operational details of the service. However, Raag said that efforts are now underway within international postal and telecommunications organizations to resolve this conflict.

While implementation of Intelpost by the U.S., which developed the basic concept, has been hobbled by regulatory delays, several other countries have begun commercial field-trials of the service or will do so shortly. They include Canada, Argentina, Belgium, West Germany, France, the Netherlands, Switzerland and the U.K. Both the French and the West Germans, Raag reported, are planning to connect analog, low-speed facsimile machines directly to Intelpost centers via dial-up telephone lines.

The Communication Satellite Corp. laboratory is working on a number of other enhancements — laser-driven printers, for example, and smaller-scale versions of the terminal equipment now installed in Washington, D.C. and New York, which might be used in smaller cities, or at multiple post offices within a large city, to make Intelpost more accessible to the user. The Comsat Laboratory is also developing encryption, priority-assignment and network traffic control enhancements.

Although Intelpost employs a packetized transmission scheme, the packet formats do not conform to X.25, the international communication protocol standard. Instead, the service uses a protocol known as TCP, developed by the U.S. Defense Department's Advanced Research Projects Agency (Arpa). Conversion to X.25 and related standards is "under study," Raag reported.



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From Technologist to Generalist

Changing DPer Role Seen Leading to Big Bucks

By Ann Dooley
CW Staff

PHILADELPHIA — The role of the DP manager will evolve in the 1980s from the technologist to the generalist and computer professionals should concentrate on cashing in on the accompanying "big bucks," according to Dr. Stephen Ruth.

Speaking at the annual International Data Processing Management Association (DPMA) conference held here last week, Ruth, an associate professor of decision sciences at George Mason University, Fairfax, Va., outlined some of the issues that will be confronting the computer professional over the next decade.

Ruth noted that managers will find themselves dealing with more staff grievances as computer professionals become more confident about making demands. Personnel will continue to become more mobile and the best people will be the ones moving most, he said. In the '80s more continuing training and discipline will be necessary for computer professionals and expertise will become more fragmented and specialized than ever, he predicted.

As DP people earn larger salaries for lower-level jobs, fewer people will be willing to take the responsibilities of leadership, Ruth claimed. At the same time, professionals will face an increasing demand for higher productivity, he said, and managers will find themselves forcing their staff to constantly increase their productivity.

Vendors, too, will undergo changes over the next decade, Ruth predicted, noting that more disputes will arise between user and vendor.

Users will be forced to buy packages that will result in packaged managers, he said. Managers will find that because of the continued dominance of packaged software, systems will have to be changed to fit the package rather than the other way to customizing a package.

CW at
DPMA

Administrative changes will also occur such that as the information processing function becomes more important, the manager will either have responsibilities dispersed or the job upgraded, he said. DPers will no longer be treated differently from the rest of the corporation, but will face the same kind of return on investment demands, Ruth warned.

On the same note, the DP department will be regarded as an overhead function and corporate executives will no longer view it as saving bottom-line costs, but rather as a way of increasing profits, he stated.

The '80s will see hardware improving in cost ratio while software will continue to be more expensive, Ruth predicted. Neither home computers nor the Office of the Future will make much of an impact over the next decade, although word processing and data base administrators will become increasingly important.

Manager Salary

Ruth also outlined how managers can write their own salaries.

Managers first must become conspicuously more dollar-oriented and show an obvious concern for a return on investment — something that most DP departments have never been involved with, he stated.

Ruth also told the managers to constantly study the technology that is available. Additionally, managers should always remember to act like managers, he stated. This means dressing properly and displaying the proper attitude, he noted.

Managers should educate themselves about new issues and become experts so that others will have to rely on their knowledge, he advised.

They should not lock themselves into one position, but be open to a number of different career paths — and let people know about it, he said.

Maintaining one's own work and the department's work at a certain level, and spending a lot of time of the planning stage of any project should also be part of the manager's program, he advised. And a manager who wants to increase his salary worth should work incrementally each day toward a specific goal, Ruth stated.

Micro-Based System Tracks Pikes Peak Juvenile Cases

COLORADO SPRINGS, Colo. — To coordinate and prevent duplication of 7,500 juvenile infractors' records that are processed annually from reports of 23 agencies and services at the Pikes Peak Area Council of Governments here, the council bought a microcomputer.

"Before we did this, we didn't know whether it was one very busy kid or 7,500 kids being processed," said Jan Wellman, the council's criminal justice coordinator.

The term "infractors" is used rather than "criminal" because records of noncriminal cases, like runaways and subjects of child abuse, are also processed.

With a grant from the Law Enforcement Assistance Administration (LEAA) Wellman bought an Apple Computer, Inc. Apple II Plus with an internal memory capacity of 48K bytes and two floppy disk drives. In addition, he purchased a Corvus Systems, Inc. hard disk with 10M bytes of memory, a Sony Corp. videoscope and a Datasystems Corp. Paper Tiger printer.

The Corvus hard disk allows for five to eight years of storage capacity at 255 characters per record.

Initially the council had planned to rent time on the University of Colorado's computer, but the cost of one year's rental was equivalent to the system it eventually bought.

The LEAA grant of $72,250 runs until 1982, so the project would have been short-lived. As it is, Wellman predicted that local services that will benefit from using the organized records will be able to contribute to the cost of running the system, which he estimates at $5,000 per year.

A local software house provided a file management program and the council's systems analyst, Peter Sencenbaugh, wrote more programs.

Anyone outside the office who wishes to review the records must receive the judge's approval beforehand by establishing that it is for "meaningful statistical research."

After Fire Destroys Systems, Business as Normal in Days

ARLINGTON, Texas — After a fire destroyed the offices and computerized reservation and ticketing equipment at Dan Dipert's Travel Services, Inc. here, business was back to normal within days.

Dipert had moved into new buildings specifically designed to house the computer equipment installed six weeks ago. This consisted of five programmable terminals from Raytheon Data Systems Co.'s PTS 100 range and two Raytheon printers which were part of American Airlines, Inc.'s Sabre system.

"Immediately after the fire they began working to try to get our system in operation," Dipert said. "They got us back in working order within days and we were very pleased with the service," he added.

American Airlines' Sabre is installed in about 2,800 travel agencies nationwide according to Max Hopper, vice-president of DP and computer services for American Airlines, Inc.

"We have an emergency reporting system for any kind of failure and we automatically dispatch servicing staff," Hopper said.

Dipert had to replace all his printers and terminals and said he was pleased with the quality and speed of the service provided.

American Airlines was among the first of the large carriers to offer automated reservations and ticketing services to travel agencies in 1976. The Semiautomated Business Research Environment system pioneered by American Airlines in the early '60s was the first system to link passenger names to seat numbers, Hopper said.

In most cases it uses Raytheon terminals that link up with IBM 3033 and Amdahl Corp. 470V/8 mainframes.

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Sitting on Sidelines Held Ill-Advised for DPers

By Ann Dooley
CW Staff

CW at DPMA

PHILADELPHIA — The DP department cannot sit on the sidelines any longer and wait for a call from top management if it wants to be taken seriously.

In order to be integrated into the corporate structure, a DP manager must carve a place for himself and his department in the planning and implementation processes from the beginning, a panel of top executives at the annual International Data Processing Management Association (DPMA) conference concluded here last week.

Examining how top management perceives information processing professionals, the panel of non-DPers maintained that computer professionals have a lot of work to do.

Most executives even now indicate they don't believe that DP managers are able to be promoted to top-level positions within the corporation, they indicated.

Leery Executives

Although information processing is spreading into every aspect of a corporation, top executives continue to be leery of DP professionals and pigeonhole them as "those technical people," James McKenna, a panel moderator and vice-president of American Management Associations, noted.

Corporate executives maintain certain beliefs that DPers have frequently helped perpetuate, he noted. Computer personnel are generally considered more loyal to their profession than to any one company and are therefore unlikely prospects for promotion outside of their technical expertise he asserted.

Corporate executives often consider computer managers technically oriented and many still have difficulty understanding them or what it is they do, according to McKenna.

The executives also feel that computer professionals tend to isolate themselves from the rest of the corporation, but at the same time feel it might be for the best.

These attitudes have historically been perpetuated by DPers and "it's time to stop," McKenna stated.

Help CEO

Every information processing manager should examine his department and ask to what extent it is helping the company's chief executive officer (CEO) with corporate planning, according to Robert McLean, executive vice-president of Insurance Co. of North America. DP has increased communication, but hasn't increased corporate overall productivity, he asserted.

In order to integrate DP with corporate authority, the information processing manager must learn the business side of the corporation, he said. The DP manager also has to institute human interest plans by going out into the field and talking to users and communicating short- and long-range plans, McLean said.

Managers have to develop people-efficient rather than system-efficient systems, as well as involve and gain the commitment of top management, McLean said.

Dependent on DP

Users often feel themselves at the mercy of their DP department, dependent on it for data and efficient communications in order to do their own work, and this breeds tensions, according to Thomas Plaskett, senior vice-president of marketing for American Airlines.

As a corporate user of information processing Plaskett noted that he expects the DP department to provide faster response time in implementing system changes, develop more flexible designs, provide a better understanding of strategic planning for the company and find ways to expend the skills of DP personnel.

Plaskett also noted that the DP department has to work harder to include the user in the design and implementation or else it will be spending all its time redesigning over and over again.

John Ryan, president of Sun Information Services Co. said that as a user of information processing, he expects computer professionals to provide knowledgeable support to business.

Ryan, unlike the other panelists, advocated more decentralization among the information processing department and the rest of the company and told the audience that the most important thing to remember is that productivity should be their overriding theme.

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The van, equipped with four Apple Computer, Inc. Apple II microcomputers and Anadex, Inc. printers, parks in a city for six days. On average, 1,200 people pass through the vehicle each day, according to Cathy Leiber, the project director.

Three people can be polled at one time as they stand in front of three CRT terminals. Ten questions flash on the screen including such topics as the Olympic boycott, oil prices and the death penalty.

The people make their choices and the fourth Apple II micro then tabulates these to show how an individual compares with all the other opinions cast that day. The printers provide hard-copy analyses for the polled people to take home.

"The promotion was an internal idea and we did a great deal of research," Leiber said. "We wanted to use computers that would travel well."

Leiber said the project has received good response to date and, if this continues, nine more vans will be fitted to poll the rest of the country next year.

Each customized van costs around $150,000.

Dangers of New Technology

On-Line Technology Seen Promoting Deception

By Phil Hirsch
CW Washington Bureau

ATLANTA — Although on-line information systems are growing and may be more cost-effective than face-to-face meetings in some cases, it is also possible that the new technology promotes "deception and concealment."

This is one of several hazards posed by the sytems now beginning to proliferate within the world's developed nations, according to Prof. A.S. Douglas of the London School of Economics. He delivered the keynote address here last week at the Fifth International Conference on Computer Communication (ICCC).

Another danger is posed by the software being developed to support on-line information systems, he added. The quality of the information supplied depends "materially" on this software, but "the technology needs considerable development."

There is considerable uncertainty about ownership of the information stored within on-line data bases, and "such legislation as exists has not yet been fully tested in the courts. International traffic in information is so voluminous that an attempt to monitor it to detect violations of international conventions is probably impracticable, even if it were regarded as politically desirable," Douglas said.

The impact of on-line information systems on employment is another problem that has not been addressed adequately, he added. It is not only that on-line systems are likely to reduce jobs in the 1980s, particularly for office workers, but also that many of those who remain employed will gain increased bargaining power.

CW at
ICCC

"Even if we understood exactly what aims we should serve by the changes impending, there still exist some very real problems of implementation," Douglas pointed out. "We are no longer dominated by hardware considerations, by our ability to analyze and specify the systems we wish to set up and by our ability to construct the programs for the computers embodied in the networks specified.

"Both software engineering and systems analysis are relatively new subjects. Moreover, the techniques developed are continually lagging behind the requirements placed on them by enthusiastic salesmen.

"No sooner do we develop compilers for simple languages than we are required to design and implement more elaborate languages and add a programming environment module. Relative to the march of external events, software research workers have had to run at breakneck speed to stay still."

A related problem is the lack of an acceptable query language and the need for further network standardization. X.25 "only deals with a part of one level of the protocols needed to provide trouble-free interconnection between data bases or their partitions over public switched networks," Douglas pointed out, "Moreover, not all existing implementations of X.25 are completely consistent. I have no doubt that much more will be heard of standards and data base problems in the 1980s."

Implementation Problem

Perhaps the most difficult implementation problem involves the question of government regulation. Douglas argued that unrestricted competition "is impractical, if only because of the need for a higher authority to regulate use of the radio spectrum and prevent one or a few suppliers from monopolizing the market."

However, he quickly added that government regulation has serious drawbacks: Because of it, the communications industry has become "cooperative if not monopolistic and reluctant to move to new methods."

On-line information systems may alleviate this problem by helping the voter "both inform himself better and inform his representatives better. Even this, though, has its snags. No ship can steer a straight course with many hands on the tiller, and the ship of state with some 200 million hands all trying to steer at the same time would be likely to behave somewhat erratically."

Legislation Held Right Way To Run Communications

By Brad Schultz
CW Staff

ATLANTA — Even though the proposed law to rewrite the Federal Communications Act has died, legislation, not a court decision, is the right way for government to address the data communications industry in the public interest.

This opinion was expressed by Henry Geller at the International Conference on Computer Communication here last week.

Appearing at the conference keynote session, Geller, head of the Commerce Department's National Telecommunications and Information Administration (NTIA), described as "sound" the Federal Communications Commission's (FCC) decision in Computer Inquiry II — the regulatory agency's second attempt at deciding how to handle AT&T's DP ventures. However, the ruling "does not represent as good a policy as does the more far-reaching legislation" contemplated this year.

Similar Action

Similar to the actions proposed in Congress, the commission called on AT&T to cast off its computer equipment manufacturing operations as a fully separated subsidiary, the Commerce official said, but in contrast to the legislation the commission mandated less protection against Bell subsidizing these operations with revenues from its telephone side.

The FCC found such cross-subsidization to be anticompetitive, preventing much smaller suppliers from exercising what the commission considered their more legal right to participate in the marketplace.

The NTIA will ask the FCC to levy more constraint on AT&T against cross-subsidization, bringing the commission's position closer to that of the bills Congress failed to pass.

But the FCC probably will not cooperate, he speculated. On appeal filed by Bell, "the matter will then shift to the courts" and attempts to revise the 1934 Communications Act will stall pending the litigation's outcome.

If, as NTIA prefers, the FCC wins in court, the DP industry will have lost ground, Geller remarked, relative to the situation if Congress actually approved this year's rewrite bills. But the industry will also lose if the court decides against the commission in reviewing Computer Inquiry II because AT&T will push for passage of milder bills, he maintained.

Bell Argument

The company will argue that fewer restrictions should be legislated because it has already undergone substantial reorganization in compliance with FCC orders, Geller explained. Meanwhile, Bell will continue offering products and services with an unfair advantage over independent carriers and communications vendors, he asserted.

Under either scenario, the only sure winner is the Washington, D.C., bar, Geller said. Lawyers also benefit from antitrust litigation that cites the 1956 consent decree that AT&T signed with the Justice Department, promising not to stray into the DP market place, he added.

Geller warned that legislation forcing AT&T to split into several independent companies, similar to the breakup of the Standard Oil trust early in the century, would engender the marketing of essentially equivalent products and services with little subsequent benefit to users or the industry.

Leased TRS-80s Balance Checks

KNOXVILLE, Tenn. — For a fee of $15 per month, checking account customers here can lease a TRS-80 personal computer to check the balance on their checking account, and which checks have cleared the bank.

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No One Cares About Past Victories

DPer-Turned-Manager Told to Change Focus

By Ann Dooley
CW Staff

PHILADELPHIA — Nobody cares about a manager's past victories in the technical field and the sooner a new manager realizes that, the better chance for success there will be.

While a technician-turned-manager does not have to forget about technical expertise, he has to realize his job is now primarily concerned with people, according to James Towsen, president of Towsen Associates, Inc., a consulting firm based in Harrisburg, Pa.

Speaking at the annual International Data Processing Management Association (DPMA) conference last week, Towsen stated that management is not for everybody. Completely new challenges and obstacles face the manager who has moved from technician to supervisor because the emphasis is placed more on people and less on data, Towsen told the management group.

CW at DPMA

To be effective, managers must find out what is important to employees. Most managers believe that money is the deciding factor in motivation, but that is not true, Towsen maintained. Job satisfaction and gratification rate higher than money among staff members, but every manager must determine for himself what sparks his staff, Towsen said.

Larger Issues

Towsen outlined to the audience some of the larger issues that new managers must deal with when working with people instead of data. Managers have to motivate their people, both for the morale of the staff and for the good of the company, he said. Time costs money and estimates show that 20% to 40% of the work force is working below capacity, he noted. Increasing motivation is obviously essential, he stated.

Employees also have pretty definite expectations of what they want in a manager, and it is up to the new manager to conform to them, Towsen noted. Highest on their list is honesty, he stated. Employees also expect their manager to be knowledgable, be able to establish working relationships, be loyal to the organization, show gratitude for work well done, back up an employee, be consistant, prepare staff members for larger responsibilities, ask for ideas and suggestions and give credit for a job.

Employees also have definite ideas about what they do not want to see in a manager, according to Towsen. Employees do not want managers to nitpick, delve into their personal lives, not listen or be unwilling to make a decision. Other negative points against managers are for those who can't be bothered, who are indifferent, bossy, sarcastic, complain constantly or take employees for granted, Towsen said.

Towsen stated that a successful manager is one who is willing to do what the unsuccessful manager would not even think of doing.

Handling Mistakes

A new manager is faced with a number of challenges and problems from the opposite perspective of a technician, Towsen noted. Managers can not afford to worry about who is to blame when mistakes occur, according to Towsen. Placing the finger of blame on an employee only sets up a negative reaction and when the next mistake is made, the employee will be more likely to try to conceal it than to solve it, Towsen said.

When a mistake occurs, the prime importance is to find out what happened, why, how it can be prevented in the future and how the present mistake can be corrected. "Get in touch with the problem but don't get out of touch with the people," Towsen noted.

Towsen stated that evaluation is always better than criticism. One is constructive and the other is judgmental he noted. If criticism is necessary, focus on the problem and not on the person and always try to suggest a remedy, he stated.

A new manager must also learn to explain changes to his staff and be ready to justify them, Towsen said. What the change consists of, why it is being made, who will be affected and when it will begin and end must all be explained to employees, he stated.

A good manager should also remember to follow up with reviews and reminders and then follow up again, he said.

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Europe Seen Quadrupling Packet Net Demand

By Phil Hirsch
CW Washington Bureau

ATLANTA – Although many European countries are building or planning packet-switched data communication networks, there may not be enough facilities available to meet the demand likely to develop during the second half of this decade, warned a telecommunications consultant here last week.

Overall, demand for data communication facilities will more than quadruple during the '80s in Western Europe, according to David Lewin, of Logica, Ltd., a British telecommunications consulting organization, which last year completed a $3.5 million study of data transmission requirements in 17 Western European countries. Lewin and an associate, Timothy Johnson, designed the study. They coauthored a paper, discussing some of the results, which was presented here by Lewin at the Fifth International Conference on Computer Communication (ICCC).

A major conclusion of Logica's "Eurodata '79" study is that use of the telephone network for data transmission will fall drastically, percentagewise, while use of public data networks – particularly those employing packet switching – will mushroom.

"Currently, nearly 40% of the network termination points in Western Europe are attached to telephone lines," Lewin said.

"By the end of the decade, that proportion will have fallen to less than 20%." The demand for lease circuits will grow "very much in line with the overall growth in demand for data communication," he added, while public data networks, which now serve about 3% of all data communications users in the 17 countries, will serve 30% by the end of the decade.

CW at ICCC

Lewin predicted that by 1987, "the demand for lines on public data networks alone will exceed the total demand for data communications now" in these countries.

Reasons for Switch

Partly, the growing popularity of data networks will be due to their availability. Today, such networks are found mainly in France, Germany and Spain. By 1982, only four Western European countries – Ireland, Portugal, Italy and Greece – will be without Public Switched Data Networks (PSDN), and by 1984, these countries also plan to have such facilities in operation.

But the main reason for the switch from telephone to data nets is that the latter provide a low-cost means of satisfying the user's basic transmission requirements. Lewin defined these as the ability to transmit specified volumes of traffic specified distances at specified speeds.

PTT Plans

Because of the tariffs which Western European postal, telegraph and telephone administrations (PTT) plan to adopt, circuit-switched networks will be cost effective for only a small percentage of the users, Lewin said.

Typically, these will be customers transmitting low volumes of data at 1,200 byte/sec or less from city to city. Those who need local transmission at these speeds will use the telephone network, he said, while those requiring high-speed local-or long-distance transmission will employ packet-switched networks or leased circuits.

However, because the tariff structures in the 17 countries covered by the Logica study vary widely, the popularity of individual transmission alternatives will not be the same from one country to another, he added.

Rising Percentages

The study indicates that by 1987, the proportion of all data communications users connected to packet-switched networks in individual countries will range from 21% to 30%. For circuit-switched nets, the percentage will be 3% to 32%.

Meanwhile, use of leased circuits and telephone networks will decline. In 1979, 54% to 94% of the data communications users within each of the 17 countries employed leased circuits. Logica estimates that by 1987, it will be 34% to 48%.

During this same period, telephone usage will drop from a range of 6% to 48% to 1% to 18%.

These projections assume that the PTTs will provide the facilities needed to meet the anticipated demand. But "in some countries, the demand for packet-switched networks far exceeds what the PTTs plan to supply," Logica said.

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Scientists Join Moratorium Against Soviets

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Almost 8,000 scientists from 44 countries have joined a moratorium on scientific exchanges with the Soviet Union to protest the treatment of their dissident Russian colleagues, such as imprisoned computer scientist Anatole Sharansky.

The moratorium, which began in May, will extend through the end of a conference in Madrid, Spain, early next year. The conference has been called to review compliance with the 1975 Helsinki Accords treaty, according to the moratorium sponsor, Scientists for Sakharov, Orlov and Sharansky (SOS).

The loosely knit, ad hoc SOS was formed two years ago after Sharansky was jailed for allegedly spying for the U.S., and physicist Yuri Orlov was arrested after he became chairman of the Moscow Helsinki Watch group, which monitors Soviet compliance with the human rights treaty.

By early 1979, SOS had gained the support of more than 2,400 U.S. scientists who pledged to curtail or end their participation in scientific exchanges between the U.S. and the Soviet Union [CW, March 12, 1979].

International Movement

The Oct. 16 press conference here announcing the status of the moratorium was called to note the growth of SOS support, especially the fact it is now an international movement. The sustained, international response to the situation of Soviet scientists at odds with their government is "truly unprecedented," SOS Chairman Morris Pripstein said.

Similar press conferences were held the same day in London, Paris, Rome, Geneva, Switzerland and Hamburg, West Germany. Scientists participating in the moratorium include 32 Nobel laureates, 187 members of the U.S. National Academy of Sciences, 82 Fellows of the Royal Society of London and a number of members of the French and Italian academies of science, according to the SOS list.

The duration of the moratorium will depend on what action is taken at the Madrid meeting, according to Pripstein, a Lawrence Berkeley Laboratory physicist.

The conference is slated to bring together representatives of signers of the Helsinki treaty, including the Soviet Union.

The SOS action serves as "a signal warning" to the Soviet Union, he said, that "future scientific exchange will be severely curtailed" unless there is "some significant restoration of elemental human rights for so-called dissident Soviet scientists."

Unknown Effect

Also appearing at the press conference here, Anthony Ralston, former president of the Association for Computing Machinery (ACM), said it is hard to tell what effect SOS has had on the treatment of the dissidents.

According to SOS, however, the number of scientists visiting between the U.S. and the U.S.S.R. during the first six months of this year was less than one-quarter of that for the corresponding period in 1979.

Ralston also suggested that recent hospital treatment for the seriously ill Sharansky, reported in the press last week, might have resulted from the publicity SOS has given the computer scientist's plight.

Addressing the computer science community's response to SOS, Ralston said the fact that Sharansky is a computer scientist has made his U.S. colleagues "more sympathetic" to the aims of SOS. A number of scientists and engineers from IBM, Burroughs Corp., Univac and other computer firms are participating in the moratorium.

'Conservative Group'

Ralston added there has been no SOS effort to target computer scientists, a "relatively conservative group," for participation.

He noted, however, that ACM members have expressed considerable interest in this issue.

The aim of SOS, according to Ralston and his colleagues who spoke here, is not to "choke off" all contact between the U.S. and the Soviet Union, but to urge scientists to act individually, in any way they see fit, to moderate their relationships with Soviet scientists.

Those sympathetic to SOS would lose any influence they might have with the Soviet Union were all interaction cut off, Ralston said. But the exchanges must "not be in a vacuum," according to Ralston, who said the Soviets must be made aware of the consequences of their oppression of dissidents.

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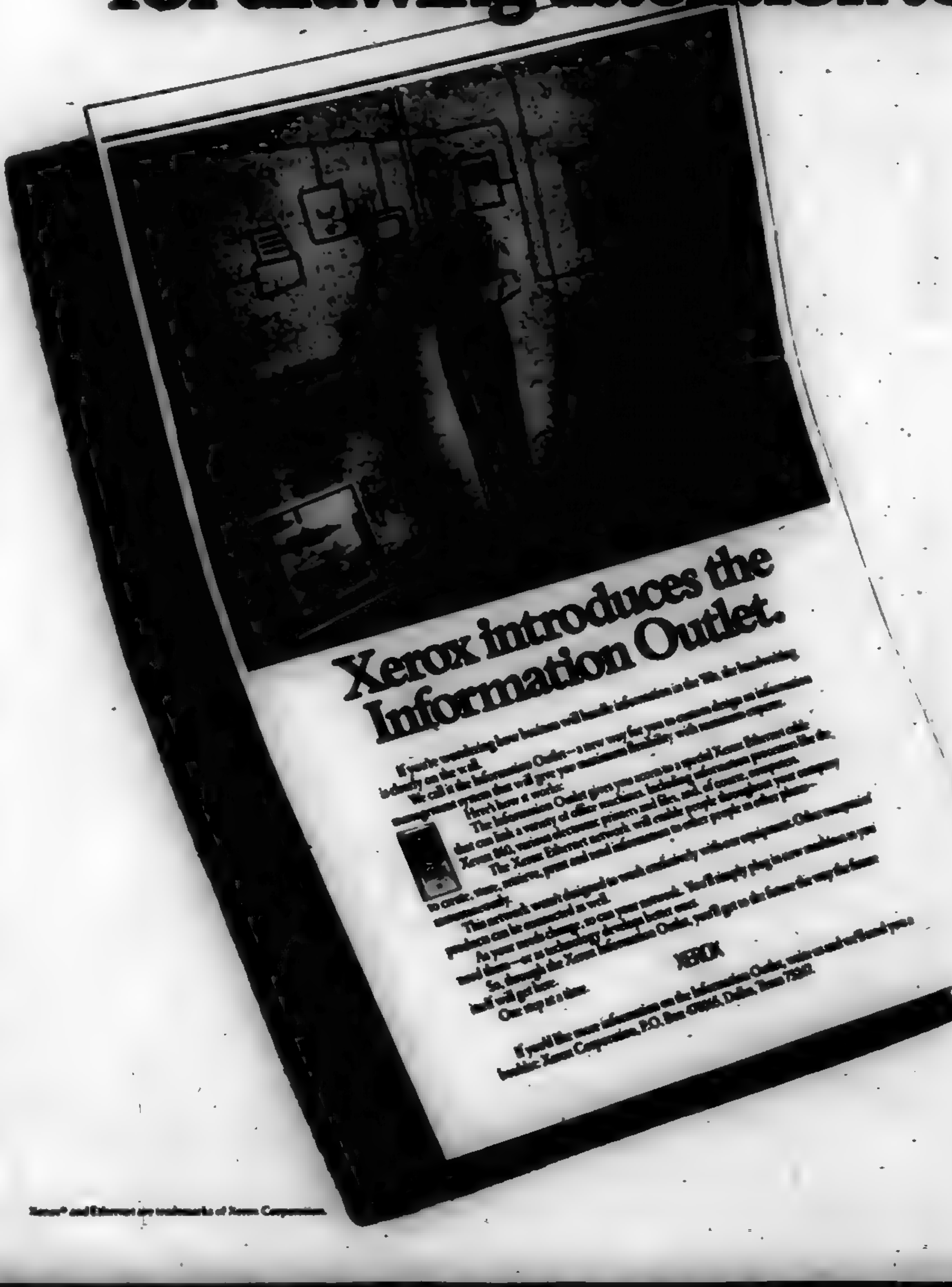

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Typical 'Criminal' Profiled

Smart, Trusted Worker Viewed Likely Defrauder

By Rita Shoor
CW Staff

NEWPORT, R.I. – Who is the person most likely to defraud a company using one of its automated systems? Chances are it will be a trusted employee who is intelligent, gives the appearance of being a hard worker and is not directly involved in computer operations management, programming or systems analysis.

That is a general profile of many "computer criminals" who have been unmasked, according to Dan Horsey, an information systems consultant who conducted a session on "Fraud and Auditing Control" during the New England Computer Users Group (Necug) conference here recently.

Horsey addressed four questions on this topic, indicating that all of them should be considered by the installation manager who is concerned with computer system fraud control.

Major Concern?

First on the list was a question concerning the dimensions of the problem. There are several opinions as to just how much money companies lose because of computer-related crime. Loss estimates range from $140 million to some $1.8 billion each year.

If the larger number is reasonably accurate, "It's worth doing a lot to solve a problem of this magnitude," Horsey said. If, however, the total losses in this country are closer to the $140 million figure, it may not be worth "spending a dollar to save a dime."

The end user should also be aware that other factors, such as wrong input, reruns because of programming errors, "unneeded and unheeded systems" and simple waste, may actually be more significant in terms of cost to the installation, the consultant maintained.

So why continue talking about fraud? Because it does happen and "it's embarrassing if it happens to you."

The second question as to what can be stolen from a computer system elicited the answer that money, goods, competitive and/or saleable information and time were all possible commodities for the computer system thief.

Thirdly, the question of defining a likely culprit's characteristics resulted in the portrait of a trusted, intelligent worker. While he may not be directly involved with the computer system, he will take advantage of an existing system weakness and often operate in collusion with another employee, Horsey said.

The last question involved methods for preventing computer fraud and catching malefactors if the fraud is taking place.

Prevention is largely a matter of hiring honest people, according to the consultant. The employer should always check employee references and educational background.

It is necessary to know your employees, and show a genuine interest in what they are doing outside the office, how they live and who their friends are, Horsey warned the management information systems supervisors.

Horsey recommended that managers "show up when not expected" – on second shift, for instance, to discourage potential internal thieves.

SMIS Slates Awards Event

CHICAGO – The Society for Management Information Systems (SMIS) has announced its 1981 Awards Competition, complete with $5,000 bounties, for the best papers describing significant contributions to the development and/or implementation of management information systems (MIS).

Papers should pertain to inplace, evaluated MIS activities, judged to have had a significant impact on the organization involved – a contribution to improved profit, service, communication and so forth. Relative telecommunications and word processing topics are also acceptable.

Abstracts of up to 1,000 words should be submitted by Jan. 15, 1981, to Robert Rouse, Center for the Study of Data Processing, Washington University, St. Louis, Mo. 63130. Papers should include a brief statement of the MIS work, its impact, the extent of its implementation and a list of senior managers who can be contacted to validate its impact.

Finalists in the competition will have their original papers presented at the 1981 SMIS conference and reviewed for possible publication in the *MIS Quarterly*.

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NSF Grants $4 Million for Local-Area Net

By Bruce Hoard
CW Staff

SEATTLE — The University of Washington Computer Science Department has been awarded a five-year, $4,122,983 grant from the National Science Foundation (NSF) to construct a state-of-the-art local-area network.

As envisioned by Prof. Jerre D. Noe, project director, and the four professors working with him, the network will be composed of approximately 30 high-speed node computers within the computer science building interconnected by an Ethernet-type protocol, or the real thing, depending on when it becomes commercially available.

The department's Digital Equipment Corp. VAX-11/780 and Decsystem 20 will be used as "file" or storage nodes while the system is still in its infancy. Noe was unsure about what larger mass storage devices will be used in the future.

The professor was equally uncertain about what specific machines will be picked to serve as nodes. He did say the researchers are looking for something with about 1M byte of memory and a CPU with a throughput capability of one-half to one million instructions per second (Mips).

One or more of the nodes will also serve as a link with other outside networks, he added.

> *'Although the system will not be that different from the Ethernet system "in terms of structure," it will be different in its quest to obtain a "logical unification" greater than that offered by Ethernet.'*

Although the system will not be that different from the Ethernet system "in terms of structure," it will be different in its quest to obtain a "logical unification" greater than that offered by Ethernet.

By logical unification, Noe means a network node will have the ability to pick up extra computing power from other node machines that are not busy and are thus free to work on concurrent processes.

The hope is to have the process happen so smoothly that the user will be unaware CPUs are swapping jobs. "That gives us the benefit of a building-sized computer," Noe said.

Software as well as hardware will be mobile within the integrated network. In taking what Noe termed an "object-oriented approach" to the system, various software programs will also be swapped around, freeing up memory for other tasks.

Such methodology contrasts favorably with the autonomous systems currently in use, he noted.

The development schedule calls for the construction of a "throwaway net" to be used as an experimental prototype during the first year.

After a limited observation period, it will be dismantled in favor of the final product, which will begin to emerge during the second and third years.

The plan is to begin using the system for computer science research while it is still being developed, Noe said. He mentioned image processing and office automation as two of many areas that may be targeted for research.

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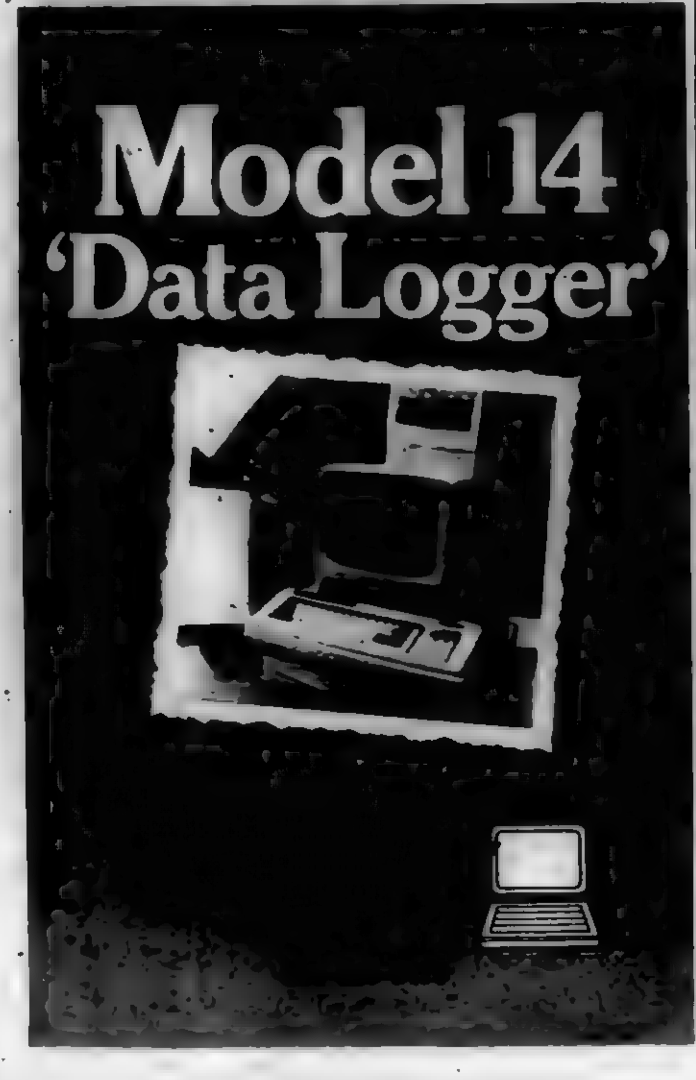

IP Manager Runs Night Shift From His Home

NEW YORK — By having the master console installed at his house, one information processing (IP) professional is able to run his DP department's third shift from home.

While this may seem far-fetched, changing work habits for IP professionals are on the horizon, according to Richard Dooley, vice-president of RHS & Associates, Inc.

Dooley gave his predictions of the trends intensifying within the IP environment at an American Management Associations conference for management information services (MIS) managers held here recently.

Other trends in the not too distant future?

- IP professionals will be on good track for management positions. In the past, managerial ranks have been filled with managers from finance or international management ranks.
- Users will gain greater control of the IP function. "The 1980s will be the decade of user responsibility," Dooley said.
- DP development staffs will spend 30% of their time developing interfaces — a phenomenon not experienced a few years ago.
- Graphics are here. "War room thinking" is a reality today in some corporations.
- Training budgets for IP professionals will increase markedly, Dooley maintained, noting that a firm he once worked for had an MIS training budget of $12,000.
- Factory management, including robotics, will merge with IP.
- Buildings and offices will be designed as vehicles for delivering data. Interfaces to DP equipment will be part of the architectural design.

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Court Suits Expected

Texas Medicaid Contract Handed to Bradford

By Bruce Heard
CW Staff

AUSTIN, Texas — In a controversial and confusing advisory opinion, Texas Attorney General Mark White has decided the Bradford National Corp. has a binding contract with Texas to process its $2.2 billion Medicaid program over the next four years.

White based his opinion on information supplied to him in the form of an inquiry from the board of the state's Department of Human Resources, which "awarded" the contract through a disputed oral agreement.

Electronic Data Systems (EDS) is taking the state to court this week over the decision. EDS is the parent company of the National Heritage Insurance Corp. (NHIC), which has held the contract since 1976. The company based its argument on the grounds that White formulated his opinion on insufficient information and has misinterpreted the law.

State statutes make it illegal for the attorney general to render an opinion based on any information other than that he is directly queried about.

What the attorney general did not consider was which company submitted the lowest bid and whether or not awarding of the contract complies with applicable state and federal statutes.

Contract Proposed

The controversy originated at a July 15 meeting of the three-person board, consisting of Chairman Hilmar G. Moore, William Terry Bray and Raul Jimenez. After hearing arguments from both Bradford and NHIC, Bray proposed a motion:

"Thus, I wish to make a motion that this contract be awarded to Bradford subject to successful consummation of a contract that would include maximum use of a Texas banking system with respect to the funding and which would include consideration not necessarily in the contract, but consideration during the contract deliberations of trying to specify some methodology for premium setting in future years."

Jimenez seconded the motion and Moore agreed, saying, "The chair concurs, unanimous choice."

EDS maintained that an oral agreement is subject to the intention of its formulators and the board's intentions have been misinterpreted. The board meant only to negotiate with Bradford toward a contract, not actually commit itself to a contract, an EDS spokesman said.

Moore agreed. The chairman, who along with his two colleagues received a hasty visit from EDS President Peter Del Col after the decision was reached, is now unsure about who deserves the contract, how it was awarded and what can be done to reverse it.

"I have some reservations as to whether they [Bradford] are the best company," he told *Computerworld*. "I can honestly say I did not know we were awarding a contract. I thought we were to begin negotiations."

Asked if the entire situation had been born of confusion, he replied, "I think that's rather accurate."

NHIC did a good job, he said, and several health providers, including the Texas Hospital Association, the Nursing Home Association and the Texas Medical Association, all wrote letters to the board expressing their support for the company.

The Human Resources Department can terminate the contract if it can show it is not in the best interest of the state, according to the attorney general. Moore professed he had no knowledge of how to do that, however.

What he did not say was that he received a letter from White informing him that if he attempted to hold public meetings over the issue, he and the other board members would be subject to suits from Bradford. That information was supplied by the EDS spokesman and confirmed by a spokeswoman for White. Thus the only door opened to redress was slammed shut.

Amidst the furor, Bradford is quietly preparing to take over the contract on Sept. 1 next year. "We see no reason for the court reaching a conclusion that would reverse the contract," Bradford Financial Vice-President Paul Biegal said.

Computer Degree Viewed No Career Guarantee

NEW YORK — A degree in computer science does not necessarily mean a later move into information systems management, if the experience at IBM is representative.

"Persons with computer science degrees are significantly behind those with other degrees in moving into management," said William R. Bradshaw, who chronicled this for IBM.

Bradshaw suggested the reasons for this are not all in yet, but that the computer scientists went into this field because they were not interested in management. Another factor is the computer science curriculum.

However, the number of employees with computer science degrees in the information systems at all IBM divisions has gone from 16% in 1970 to 44% in 1979.

Bradshaw, IBM director of information systems, described how IBM manages information systems personnel at an information systems strategies for the 1980s session sponsored by the American Management Association here recently.

In the mid-1970s IBM began formally surveying its information systems employees.

From that and subsequent surveys IBM learned that the employees' perception of the career movement in information systems was less than it actually was. Therefore IBM gave the career changes more publicity and emphasized they are, for example, moving to information systems within the controller's office, rather than simply to the controller's office.

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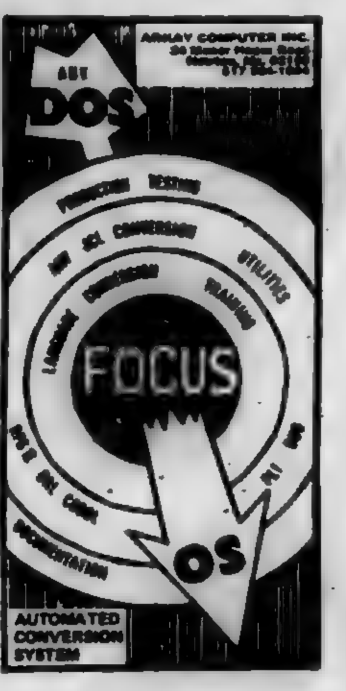

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At One-Third Cost of Humans

Robotics Advances Aimed at Assembly Lines

By Connie Winkler
CW Staff

NEW YORK — Robots are being outfitted with vision, tactile devices and sophisticated hierarchical programming to make them even more successful contenders for assembly lines.

Today's robot costs about $4.80 an hour to run and participants at a recent conference session here on advances in manufacturing automation pointed to many coming improvements.

"Any manufacturer who ignores robots does so at his own peril," observed Joseph F. Engelberger, the father of American robot manufacturing. He is the president of Unimation, Inc. of Danbury, Conn., which was formed in 1958, produced its first manufacturing robot in 1961 and only became profitable in 1975.

Today's sophisticated robot, programmable to do a variety of tasks, costs about $40,000, but can work two and sometimes three shifts, Engelberger pointed out. That $4.80 an hour is about one-third the human cost.

All the speakers emphasized the human worker is still impossible to duplicate; there is no way to mechanically duplicate a hand, for instance.

Foreign Impact

Engelberger said he is regularly asked why Japanese manufacturers use more robots. Unimatic's Japanese licensee currently has an order for 720 robots, while the largest U.S. order has been 120. "Just give me an order for 720," Engelberger challenged.

The Japanese are committed to productivity. While the Danbury Unimatics plant produces about 55 machines a month, Fujitsu in Japan is currently building a plant that will produce 100 robots a month.

The Japanese have also recognized that they have an aging work force and will need robots to maintain expected levels of production. Further, they have acknowledged that robots have affected the entire production process and they operate them three shifts.

"Nobody needs to buy a robot," Engelberger said. "The only thing that drives you to have a robot is that someone else has one."

All manufacturers without robots competed well, as was the case of American auto makers, until the Japanese import invasion. In fact, Engelberger called the current growth of robotics in American manufacturing, "innovation by invasion."

Unimatic's Efforts

Unimatic is currently working with General Motors Corp. to develop Puma robots (Programmable Universal Machine for Assembly) that use Unimatic's proprietary language VAL. What is interesting about the GM work, Engelberger noted, is that 90% of the parts in an automobile weigh less than five pounds, parts that can easily be lifted by a man-weight robot.

Robots are now being moved into assembly-line operations — even such as screwing light bulbs into dashboard panels — but up until now have been primarily used for spot welding — 1,800 of Unimatic's 3,500 stand-alone machine population. The others do dirty factory work such as die casting, permanent mold casting and potpourri applications. They are accurate shots at pouring hot aluminum, Engelberger noted.

Engelberger pointed to a list of basic improvements needed by American industry:

- Design for manufacturability rather than form and structure. Car odometers are manufactured by machine because they are the same in each car. Speedometers are manufactured by people because they are designed differently in each car,
- Group technologies so that milling and lathe departments are next to each other for quick flow of operations.
- Integrate robotics, computer-aided design (CAD), computer-aided manufacture (CAM) and other advanced technologies.
- Automate warehousing and prevent the accumulation of scrambled tubs of parts that are indecipherable to robots.

"The richness of all these things together will give us a chance to do in the factory what we have done on the farm," Engelberger observed.

James S. Albus of the Industrial System Division of the National Bureau of Standards (NBS) showed films of the robot arm with vision that the bureau is programming to pick up variously shaped objects on detection.

"Up until this time there has been little sensory perception," the robot enthusiast explained. "Until now programs have been played and replayed."

He foresees large gains in productivity as robots are integrated into large systems. This requires the availability of economical computers that are fast enough so the robot can react to the sensory data.

The programming problem is that the control programs grow exponentially with the increased number of sensors and become complex to write and impossible to debug, Albus said about the bureau experience.

To address this, the bureau uses hierarchical command and control structures. To run such programs NBS is in the process of implementing a network of microcomputers that are the simplest and least expensive way to build this system, Albus said.

All the speakers were highly enthusiastic about the use of robots, including William E. Jarett, who is heading a robotics effort at General Electric Co.: "There's only one limit to robots — the collective imagination of you and me as practitioners of a technology whose time has come."

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I/O Standards Anticompetitive, Court Told

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — How can the federal government promote competition for DP procurements if it excludes competitors?

That is the question three U.S. Appeals Court judges asked a federal attorney here Tuesday as he argued against four mainframe manufacturers challenging a set of federal information processing standards.

The I/O standards, in effect since June, have effectively removed the companies from bidding for large government system acquisitions, according to attorneys for Honeywell, Inc., Burroughs Corp., Control Data Corp. and Univac.

The companies brought suit in federal court here a year ago asking the standards be overturned. But the government successfully argued the standards were a federal administrative matter and could not be challenged in court by vendors who, the government said, were essentially trying to tell the government what kinds of computer equipment to buy [CW, Feb. 11].

The firms are now asking the U.S. Appeals Court to overturn the lower court ruling and find the companies do have legal standing to challenge the standards.

In the year-long court battle, the government has conceded the four standards, based on IBM architecture, do indeed harm non-IBM-compatible manufacturers but maintained the interests of government economy and efficiency supercede the economic interests of the four firms.

Leaning on the lower court decision, U.S. Attorney Mark Mutterperl told the appeals court last week the standards were promulgated under the 1965 Brooks Act, which mandated economy and efficiency in federal DP.

Congress did not intend to make equipment providers "beneficiaries" of the law, Mutterperl argued. Because the Brooks Act does not address vendors, he said, the companies cannot legally protest they have been injured by regulatory actions taken pursuant to the law — in this case, adoption of the standards.

The three-judge panel, however, appeared skeptical of Mutterperl's reasoning. Judge Lloyd F. MacMahon suggested that removing several major vendors from competition for federal contracts was not in the best interest of competition — an argument essentially identical to that of the four companies.

Mutterperl maintained the companies have not been excluded from competition for federal contracts. By their decision to not comply with the standards, the firms have taken themselves out of competition, he said, claiming there are 70 vendors who do comply with the standards.

Eldon Crowell, attorney for the four firms, argued, however, that the time and expense needed to comply with the standards means non-IBM-compatible manufacturers, such as his clients, "will be removed from the federal market for a substantial period of time."

Those companies will therefore suffer injury from the standards and the government, contrary to the intent of the Brooks Act, will suffer from a lack of competition, according to Crowell, partner in the Washington law firm, Crowell & Moring.

Interest Zone

This government/vendor relationship creates a "zone of interest" legitimizing the firms' complaint and entitling them to a court hearing on the standards, Crowell argued.

If the appeals court rules in the companies' favor and decides they do have standing to challenge the standards, the case will be sent back to the U.S. District Court here to be heard on its merits.

Although the appeals court usually takes as much as six months to render decisions, the court in this case has promised to act as quickly as possible. Because the standards are already mandatory for federal procurements the four companies would like the case resolved soon.

Research Project Aimed at Upkeep

WALTHAM, Mass. — The International Data Corp. (IDC) has under way a major research project on the subject of the development and maintenance of a secure data center.

Analysts from the firm's Information Systems Planning Service are currently soliciting background information on products, programs, services and strategies, from vendors and users alike, on potential and actual disaster situations, preventative policies and remedial actions.

Contributors are invited to send related information to Mark Weisman at IDC, 214 Third Ave., Waltham, Mass. 02154.

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Meet Gives Sneak Preview

DPMA Model Curriculum to Push Business

By Ron Jones
Special to CW

ST. LOUIS — The new model curriculum for two- and four-year college students being recommended by a committee of the Data Processing Management Association (DPMA) got a sneak preview here recently.

To no one's surprise, the Computer Information Systems (CIS) curriculum emphasizes the business side of computing and omits courses dear to the hearts of computer scientists.

The model, which was developed by DPMA members and others with a business bias rather than a committee of academic experts, was the topic of discussion at a regional conference and workshop here. The meeting was one of five such regional conferences planned prior to formally unveiling the model at the National Computer Conference (NCC) next May.

Course Curriculum

Seven core courses on the DPMA list deal with computer-based systems, applications program development, systems analysis and design and data bases. Twelve elective courses span a variety of topics, ranging from RPG and Assembler languages through EDP auditing and DP law to decision support systems and the office of the future.

The DPMA-CIS curriculum omits topics characteristic of the 1978 Association for Computing Machinery (ACM) computer science curriculum, such as numerical mathematics, automata, computability, formal languages, theory of programming, algorithms, organization of programming languages and artificial intelligence.

Furthermore, the DPMA-CIS curriculum is set in the context of business courses rather than the mathematics courses suggested by ACM for computer science. The difference is deliberate.

Colleges and universities are not teaching what industry needs in traditional computer science programs, according to Don Price, president of the Education Foundation of DPMA, which cosponsored the conference. He feels industry wants individuals with a broad business background.

When asked for the most unique aspect of the CIS curriculum, Dr. Tom Athey, who chaired the DPMA Model Curricula Committee, said it was its development by many people, including DPMA members, rather than a blue-ribbon committee of academics who have prepared past computer-science curricula. DPMA's Educational Foundation has assisted in the development effort and, together with the St. Louis DPMA chapter and the Center for the Study of Data Processing of Washington University, sponsored the October conference.

A questionnaire is being used to gain input from a variety of persons. One sent out in March drew responses from 97 representatives of industry and government compared with 78 responses from educators. Questionnaires are to be used at several points prior to release at the 1981 NCC. The five regional conference workshops provide opportunities for DP professionals to be heard. DP professionals wanting further information are invited to contact Dr. Thomas H. Athey, Chairman Information Systems Department, Cal Poly University, Pomona, Calif. 91768.

Despite efforts to involve DPMA members, attendance at the St. Louis conference was almost entirely from academia. Bill Tryon, DPMA member and workshop leader, apologized to the educators for lack of a DPMA turnout. The preponderance of educators was natural, however, since a stated goal of the conference was "the identification of a nucleus of faculty interested in business data processing education as contrasted with computer science education."

Textbook publishers were the second largest group in attendance. The impact of the CIS program will first effect colleges, universities and textbook publishers and later effect industry as better qualified business application programmers and analysts are produced during the '80s.

Successful development of the CIS program will result in three academic disciplines in computing: Computer engineering, computer science and

(Continued on Page 30)

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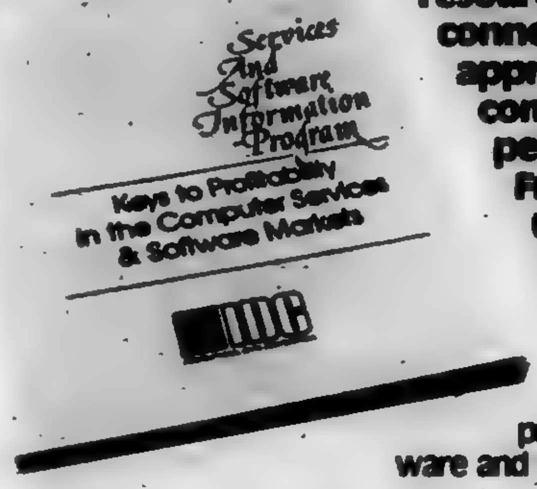
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Curriculum Emphasizes Business Computing

(Continued from Page 29)

computer information systems. Graduates of computer engineering and computer science would be recruited by vendors for the production of hardware and vendor-supplied software such as compilers and operating systems.

User Orientation

Computer information systems graduates would be associated with end users rather than with hardware manufacturers and would produce user-oriented computer programs. In contrast to computer engineering and computer science — which have been most associated with engineering and mathematics — the computer information systems program is intended for an academic home in the business school.

Featured speaker Dr. John Hamblen, chairman of the Education Committee for the American Federation of Information Processing Societies, agreed that curriculum development is settling down in three clusters: Computer science, computer eingineering and information systems — the latter being associated with schools of business. Hamblen noted, however, that a curriculum committee for computer education for management was launched by ACM in 1965 and resulted in the publication by ACM in 1972 and 1973 of model curricula for graduate and undergraduate programs in information systems. Several academic programs for information systems exist today, although not as numerous as computer-science programs. Minnesota and UCLA provide noteworthy examples. Hamblen's major topic was the current shortage of DP manpower and his projections for the future.

Implementation Problems?

Dr. Athey and Dr. Gerald E. Wagner, another member of the executive committee developing the CIS curriculum, have written of the need to educate about the "real world" of the DP work place. However, DPMA's next task may be to face up to the real world of academia. Shortages of qualified faculty and accreditation problems stemming from excessive use of industry personnel as lecturers may block implementation of their educational program.

The major accrediting body of four-year and graduate schools of business is the American Assembly of Colleges and Schools of Business (AACSB). The AACSB rule is that 40% of undergraduate course-work must be taught by faculty who are full-time employees and possess doctoral degrees. The requirement is 75% at the graduate level. The AACSB rule is enforced as an average for an entire school, and thus a smaller percentage might be possible in the CIS area if offset by higher percentages in other areas.

This rule might pose a barrier to implementation of the CIS program for the 230 AACSB members. Professors with doctorates in CIS are extremely rare. The production of doctorates in the allied computer science area has declined in recent years because of the pressure of industry for employees.

DPMA Accreditation?

Members of the CIS Executive Committee raised the possibility that DPMA might provide accreditation for the CIS program. The American Chemical Society, itself an accrediting body in chemistry, has been contacted by them for information about the accrediting process.

Another indication of possible DPMA accreditation lies in discussions held with the Certificate in Data Processing (CDP)-granting Institute for the Certification of Computer Programmers (ICCP). Could completion of the CIS program waive all or some of the experience requirement for the CDP? If so, which academic programs would be accredited for the waiver? And by whom?

The creation of a new accrediting body is a very expensive and timestaking process, according to Dr. Jack D. Heysinger, recent member of the AACSB Board of Directors and former business school dean. He recommended that DPMA work through existing accrediting agencies.

Stronger Role

Accreditation and implementation problems for the major universities might strengthen the role of the two-year community colleges: For example, St. Louis Community College at Florissant Valley has a 36-hour, 12-course data processing program — an amount equal in quantity to that which might be encountered in a four-year program.

The geographically-central St. Louis location drew conference attendees from across the nation — from Texas to Minnesota and from Washington state to Massachusetts. Washington University's Center for the Study of Data Processing provided an examplary instance of university and industry cooperation.

More than 20 corporate associates joined with the Center in offering a variety of traininig, development and continuing education services to DP professionals. Center Director Robert J. Benson and Associate Director Bob Raush acted as hosts to the flawlessly conducted conference. DPMA may also wish to return to St. Louis in the future; the AACSB has its headquarters there.

Jones is a professor of computing at the University of Missouri-Kansas City's School of Administration.

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In One-Month Period

County Finds 50% Downtime for IBM System

By Bruce Hoard
CW Staff

POUGHKEEPSIE, N.Y. – A "combination of complex malfunctions of various IBM hardware and software components" kept Dutchess County DP users here off their system 50% of the time between June 6 and July 10.

"During this period, the computer system failed almost every day for over four weeks," according to a letter from James J. Falanga Jr., commissioner of the county's Department of Computer Information Systems, to Lucille P. Pattison, county executive.

The letter listed several examples of the problems incurred. Falanga now maintains the problems have been solved.

"I don't know what prompted the situation," he said. "It was a whole myriad of problems."

The blame for the situation must lie with both the county and IBM, the commissioner added. IBM didn't realize the seriousness of the crisis as it unfolded and, with the system's normal customer engineer on vacation, things unraveled quickly, Falanga noted.

IBM refused to comment on the situation, calling it "confidential" through a spokeswoman.

However, in a July 31 letter addressed to Falanga, company field manager Robert L. Brown admitted "a breakdown in communications during this time frame severely impacted the problem."

Trouble Begins

Things first went wrong on June 9 when a county 3274 disk drive went down. Following the installation of a new logic card, it was restarted. However, the machine went down the next day and each of the remaining three days of the week, according to Brown's letter.

With each failure, the substitute customer engineer (CE) relied on on-site diagnostic information, phone assistance and remote assistance from IBM's nearby plant for help.

During this period, the CE was aware that the system's 20 in-house users were unable to access the system but unaware the additional 55 outside users were also locked out. He was finally told on Friday the 13th.

On the same day, the remote support center decided that new microcode would alleviate the problem and made arrangments to have it sent out the following Monday.

Turn for Worse

Instead of getting better, things then took a turn for the worse when the CE and a specialist discovered an "intermittent CICS problem." Checks were made to determine if the two problems were related.

On Tuesday and Wednesday, "3420 equipment checks" were reported and repaired.

Hopes Dashed

The 3270 microcode arrived and was installed on Thursday the 19th. Hopes that the problem was ended were soon dashed, however, when "the external network was brought down by what was believed to be CICS failures for which a fix was being obtained."

The next day, an I/O controller check on the 370/148 mainframe occurred, followed by a 3274 stopping again. Down came the system.

After more problems on June 23, a 3274 dump was obtained and delivered to the plant engineers at Kingston. They recommended replacement of the logic card installed June 9 and that was accomplished June 26.

More Problems

There were more problems reported on July 1 and July 9 when "highly intermittent" I/O checks occurred on the 148. Similar problems were experienced on July 10 and July 14. These are the final references to the situation mentioned in the letter.

Brown went on to say the situation was unusual, complex and difficult to solve based on the paticity of available information.

He suggested more frequent visits to the location by field engineering management, review meetings between IBM and the county and the development of a system management plan for the center, a user of exclusively IBM equipment.

Although distressed by the incident, Falanga indicated no interest in switching vendors.

Since things have straightened out, IBM has worked on its internal communications and "made us more aware of what kind of communications channels are available to us," he said.

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Finally, for those who reason that despite the problems which CICS has become notorious for, it is still a risk to buy a TP Monitor from a company other than IBM, we would like to summarize by saying this:

SHADOW II has long continued to outperform CICS on virtually every important criteria. And while IBM has made attempts at correcting problems, CICS performance stills falls dramatically short of SHADOW II in memory usage, CPU utilization, response time, application development time and programmer training time. In short, no matter how IBM has added to, taken away, or otherwise repackaged their system...it's still CICS. And therein lies the problem.

So if we haven't already given you reason enough to consider SHADOW II for your TP Monitor, we welcome the opportunity to give you more. And it just doesn't seem reasonable not to let us.

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System Development To Head Meets

CHICAGO – "Structured Analysis and Structured Design" is a five-day seminar conducted by Eduteach, Inc., to be held here Dec. 8-12.

Designed for exprienced programmers, designers, analysts and managers, the program reportedly spans state-of-the-art techniques for system development.

Emphasis is placed on new methods of improved system and programming technologies and tools that maximize productivity and minimize production and maintenance costs.

Advanced registration in this seminar is required and classes are limited to 14 participants. Cost of the program is $500, which includes all course materials.

Further details may be obtained from Dushun Mosley, Suite 907, Eduteach, Inc., 162 N. State, Chicago, Ill. 60601. Registration closes Nov. 17.

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[illegible]

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On-Line Data Base Access Aids Reporters at Presidential Debate

CLEVELAND – Reporters covering the presidential debate here last week were aided by a special information system provided by the Cleveland Public Library.

The library supplied on-line access to its own newspaper data banks and those of several commercial time-sharing data banks, including the New York Times Information Bank, the Associated Press Political Data Base and the Dow Jones News Retrieval Service.

The library's Digital Equipment Corp. PDP-11/70 was at the heart of the system.

It was linked to the press room at the Cleveland Convention Center by four specially installed voice-grade telephone lines, according to Charles Waller, DP manager at the library.

In the press room, reporters were able to access needed information via a DEC VT100 CRT terminal, two DEC LA34 hard-copy printers and two Texas Instrument, Inc. Silent 700 printers linked to the library by a Multi-Tech Systems, Inc. FM30 accoustic coupler.

"I think we'll be able to handle the national press corps," Waller said, when asked if his system would hold up under information requests from the anticipated horde of 1,500 reporters.

Such a system is not unprecedented, he noted, adding a similar set-up was supplied to the press at last month's John Anderson-Ronald Reagan debate in Baltimore.

That system was put together by the Enoch Pratt Library and, in seven hours, provided reporters with answers to 85 diverse political questions, he said. Information supplied included candidates' quotes and positions on issues.

Security in Banking Set As Topic of Jan. 28 Meet

PARIS – "The Fifth International Security in Banking" is slated to take place here on Jan. 28-30, according to conference sponsors at the Institut de Recherche Interbancaire.

Thirty different nationalities are expected to represent 10 countries in presentations and debates dealing with security problems unique to information handling in banking. White-collar crime, risks due to the rise in automechanization, abuses in the various money-transfer systems and attempts to crack banking secrets will be discussed and solutions sought.

Further information on the upcoming event is available from Insig, 40, Rue de Monceau, 75008 Paris, France.

Framingham State Sets Department For Computer Ed

FRAMINGHAM, Mass. – D. Justin McCarthy, president of Framingham State College, formally announced the school's recent establishment of a separate Computer Science Department.

On hand to present a $2,000 grant to the new department was John Nevison, chairman of the Greater Boston Chapter of the Association for Computing Machinery (ACM).

Computing facilities at the college presently include the Mass. State College Network dual mainframe Control Data Corp. Cyber 170, a Digital Equipment Corp. PDP-11/34 and a microcomputer laboratory.

Also a part of the computer science major at Framingham State is an internship program that places qualified upper classmen in neighboring high-technology companies such as Data General Corp., DEC, Prime Computer, Inc. and Raytheon Co.

The computer bachelor of science major became a degree program in 1974, and the college is presently developing a master of science and a bachelor of science degree program to be offered through their evening division.

Further details are available from Framingham State College, Framingham, Mass. 01701.

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FSO CICS
TONE

Disgruntled Former Students Sue Michigan Computer School

By Bruce Hoard
CW Staff

GRAND RAPIDS, Mich. — Two disgruntled former DP students are suing Key 5 Institute, Inc. here for $10,000 each on the grounds it offered an inadequate program and misrepresented career opportunities.

Valerie Stankus and Ronald Miklosovic, who graduated from the school last December, claim their list of complaints add up to a violation of the Michigan Consumers Protection Act.

They paid $2,400 each to participate in the five-month program, and neither has been able to find a computer programming job since graduation.

Amos Steraick, a co-owner of the school, refused to comment beyond saying, "I assure you, this is the first complaint I've had in 12 years." No date has been set for the trial.

"We didn't finish a single book we started," said Stankus, who claimed her instructor was more interested in going through a lot of books rapidly than studying a few thoroughly.

She also claims to have received only 380 of a promised 650 hours of instruction.

Her instructor was not the one originally scheduled to teach, but a recent graduate who, "lacked sufficient ability, educational background and field experience to teach," she claimed.

The computer used by the school was "obsolete" and incapable of programming three of the four languages offered through the course, she claimed. The computer was a "Cascade Data" with an RPG compiler and frequently broke down, she added.

At one job interview, she was laughed at after describing the computer she had been trained on, Stankus said.

Steraick was indifferent to her questions about inadequate training and either walked away or told her to "shut up" when she pursued him, she claimed.

Asked what assurances she had been given about employment opportunities after graduating from Key 5, the former student said, "They promised everything in the world. They told us we would have no problem getting a job."

The Michigan Department of Education recently gave the school a clean bill of health saying, "The curriculum was reviewed and found adequate to employ students at the beginning level of training."

[illegible]

Auditing OS/VS	Phoenix Dec. 1-3	Auditing Data Base	Chicago Nov. 17-19
Auditing DOS/VS	Chicago Dec. 1-3	EDP Auditing for Non EDP Auditors	Boston Nov. 10-12
Auditing MVS	Chicago Nov. 12-14	Auditing Computer Based Systems	Houston Dec. 3-5

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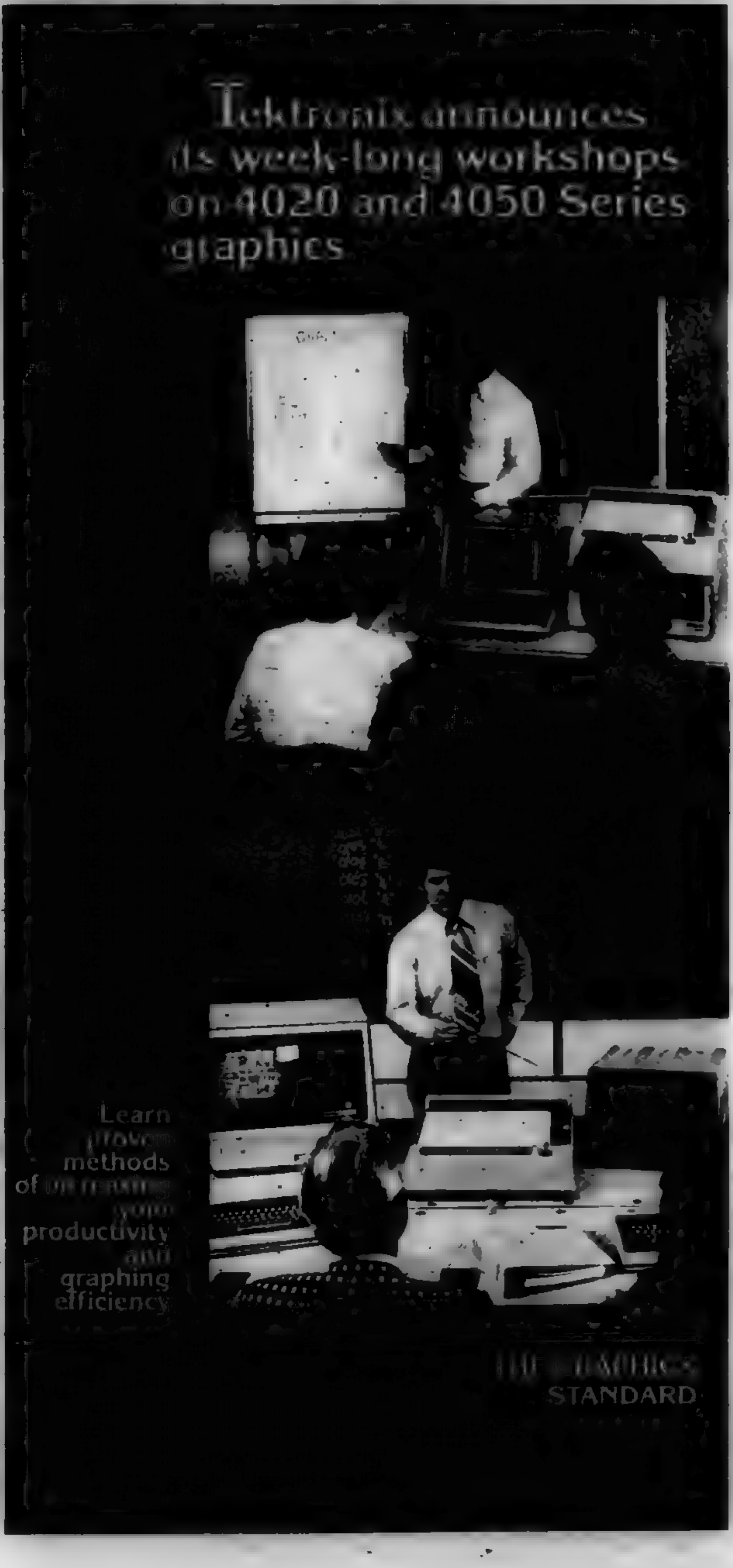
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252	Santa Clara, CA	Apr. 13-17, 1981

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150	Santa Clara, CA	Jan. 12-16, 1981
151	Rockville, MD	Jan. 12-16, 1981
152	Rockville, MD	Feb. 9-13, 1981
153	Santa Clara, CA	Feb. 9-13, 1981
154	Santa Clara, CA	Mar. 9-13, 1981
155	Rockville, MD	Mar. 30-Apr. 3, 1981
156	Rockville, MD	April 20-24, 1981
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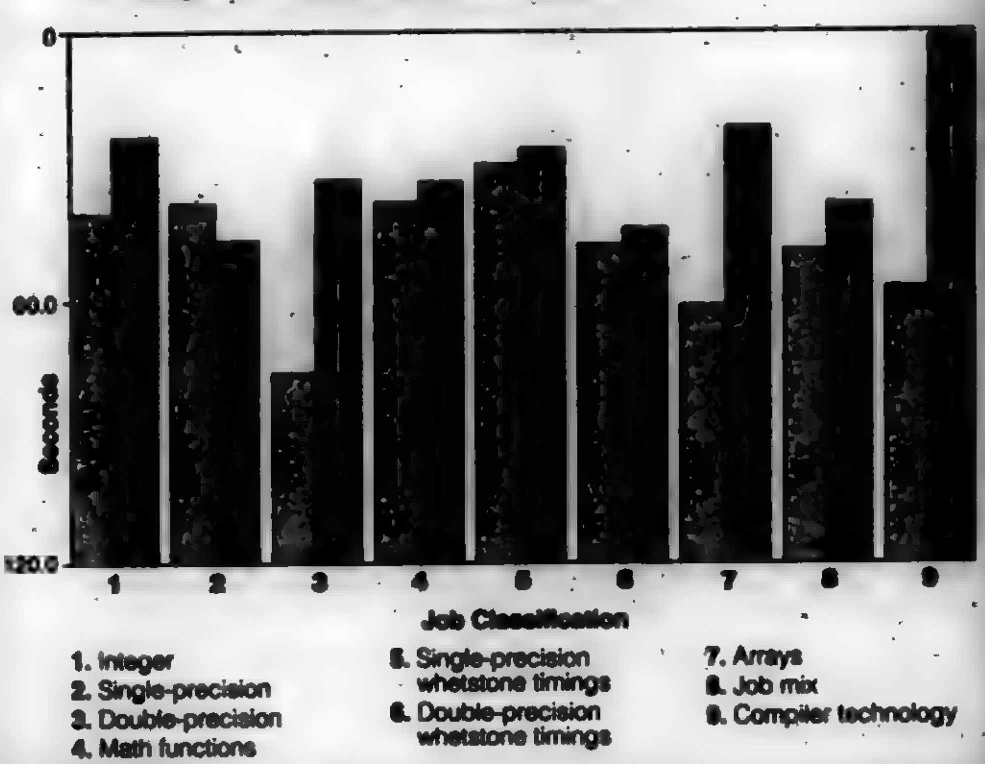
MEGA

1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.485	1.05
PMS0354	9.160	8.980	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0664	1.610	1.350	1.19
PMS0764	7.040	6.679	1.05
PMS0864	13.730	13.370	1.03
PMS0964	66.830	66.068	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.308	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.005	0.98
PMS1724	52.550	53.133	0.99
PMS1807	50.180	34.768	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.264	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.610	137.997	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2708	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.190	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	156.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.050	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.764	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4584	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5008	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5208	0.900	0.917	0.98
PMS5306	0.330	0.029	11.38
PMS5408	2.080	1.697	1.23
PMS5502	1.130	2.180	0.52
PMS5602	207.140	198.085	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

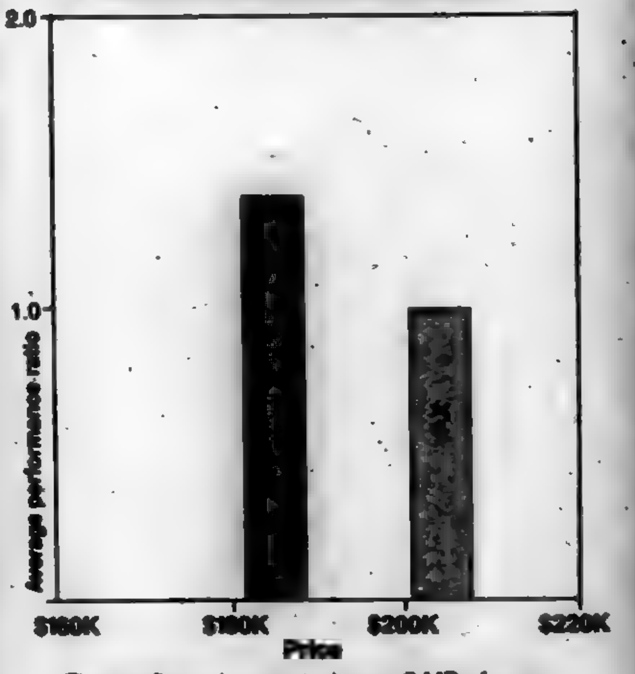
$$\text{*Performance Ratio} = \frac{\text{VAX 11/780 CPU time}}{\text{Perkin-Elmer 3240 CPU time}}$$

2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



*VAX is a trademark of Digital Equipment Corporation.

3. Proven Price/Performance



The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

POWER

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In Table 2, we organized the benchmark results into nine common types of job classification, so you can see at a glance how the 3240 stacks up vs. VAX 11/780. (The ninth classification demonstrates the superiority of Perkin-Elmer's system software, in this case globally optimizing FORTRAN VII.)

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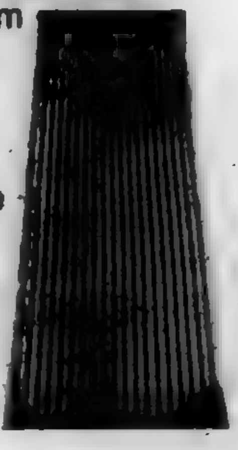

The Perkin-Elmer Corporation, Marketing Communications,
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☐ documentation ☐ a sub-set of benchmarks.
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Western Union, IRCs Dispute Gateway Ruling

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Federal Communications Commission (FCC) efforts to promote greater competition in international communications have produced a major battle between Western Union Telegraph Co. and the U.S. international record carriers (IRC).

The nub of the dispute involves commission decisions last December which, among other things, allowed the IRCs to interconnect with international telex users at 21 additional "points of operation" within the interior — "hinterland" — U.S. Previously, IRC networks were allowed to terminate domestically only at five "gateways" — New York, Washington, D.C., Miami, New Orleans and San Francisco.

In exchange for allowing the IRCs to serve the 21 additional cities directly, the FCC said the carriers would have to interconnect their domestic access facilities with each other and with the Western Union domestic telex and TWX network. Also, the IRCs would have to unbundle their tariffs — charge separately for transmission, access lines and terminals.

The basic aim in both cases was to reduce costs for the user. Interconnection would give the user access, through a single terminal, to points served by one IRC but not by others, thus eliminating the need to subscribe to more than one service and lease more than one terminal as previously required.

Unbundling would enable the user to exploit discounted rates introduced last year by all of the IRCs. These tariffs allowed a discount of 56 cent/min if the customer provides his own terminal and access circuit to the nearest IRC termination point.

Court Action

Western Union has taken the gateway expansion order to court, alleging — among other things — that allowing the IRCs to extend their operations into the U.S. hinterland without permitting the telegraph company to offer international services directly is unfair.

Last December, the commission recognized the need for this quid pro quo by allowing Western Union to offer international services. However, a federal court subsequently overruled the commission in response to a complaint from the IRCs.

The major battle at the moment concerns the third change wrought by the FCC last December requiring Western Union and the IRCs to interconnect their transmission facilities.

Traditionally, Western Union has interconnected only at the IRC switching centers, most of which are located in New York and San Francisco. If the telegraph company is forced to interconnect at all five of the traditional gateways — as well as the 21 additional points of operation established in December — it will carry most outbound and inbound international telex traffic a much shorter distance and earn far less revenue as a result. The company claims that "better than 50% of its telex business consists of traffic transmitted to and from foreign points.

Recently, under protest, Western Union complied with the FCC order to file a tariff permitting interconnection at the five original gateways. Stating that it does "not intend to commit economic suicide," the telegraph company proposed charging each IRC a nonrecurring fee of $3,058,700 for establishing each connection, plus $13,200 per month for service.

Meanwhile, two U.S. international carriers have filed multimillion-dollar damage claims against Western Union.

In 1976, RCA Global Communications, Inc. (RCA Globcom) received FCC permission to extend dedicated circuits to Miami and New Orleans from its New York switching center. But Western Union, "to maximize its revenues," has continued to "circuitously" route telex and TWX messages to New York, RCA Globcom charged, adding that it has been forced, as a result, to pay the telegraph company an extra $5.8 million in communications charges since 1976.

ITT has filed a $10 million treble-damage antitrust suit against Western Union, alleging that the telegraph company has refused to interconnect with ITT's domestic as well as international affiliates.

Seminar Series Set for IP Pros

NEW YORK — The New York City Chapter of the Association for Computing Machinery (ACM) has launched a nonprofit seminar series for information processing (IP) professionals.

The NYC/ACM schedule encompasses "Data Base Design" on Nov. 3; "Robots Today," Nov. 6; "Attacking Application Development Inhibitors," Nov. 11; "Going into Business for Yourself," Nov. 19; "Creativity," Nov. 24; "Overview of Voice Response Technology," Dec. 1; "Innovations in Computer Architecture," Dec. 4; "Communications Choices for the 1980s," Dec. 8 and Dec. 15; "Microcomputers' Adaptability," Dec. 18," and "Computer Typography," Dec. [illegible]

Fees for the various programs vary. Details on the Professional Development Seminars are available from ACM at P.O. Box 245, New York, N.Y. 10163.

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H.G. Wells' time machine was a fantasy. IBM's is a fact.

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Firms Urged to Adopt OECD Privacy Policy

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The State and Commerce departments are urging U.S. businesses to publicly embrace personal data privacy guidelines recently adopted by the Organization for Economic Cooperation and Development (OECD).

The voluntary guidelines, which urge personal data be secured against unauthorized access or disclosure, also call on OECD member countries — Western European nations and their major trading partners, including the U.S., Japan and Canada — to foster unimpeded international data flows.

By publicly adopting the principles contained in the guidelines document, corporations can possibly avoid problems of data protectionism in international business transactions involving overseas information transfer, according to government officials.

Adopted by the OECD after two years of negotiations, the guidelines say countries should "endeavor to remove or avoid creating, in the name of privacy protection, unjustified obstacles to transborder flows of personal data."

However, U.S. officials pointed out at a recent State Department meeting here that the guidelines would also allow national governments to restrict data flows to countries that do "not substantially observe these guidelines." Exceptions could also be made for various categories of personal data if the information would not receive "equivalent protection" in the destination country.

Because U.S. privacy laws do not correspond to those of other OECD members, a private-sector show of compliance with the guidelines could forestall many data flow restrictions implemented under the exceptions provisions, according to Commerce officials.

The guidelines "should be fully acceptable" to U.S. firms, according to William Fishman of Commerce's National Telecommunications and Information Administration, a U.S. negotiator to the OECD privacy effort. But, he added, the document is only a "statement of principles" and not legally binding on the organization's membership.

It can assist U.S. businesses in maintaining open information flows, but companies should make it known nationally and internationally they embrace the guidelines principles, Fishman said.

It was suggested at the Oct. 23 meeting here that a number of OECD members, including the U.S., might move to harmonize privacy protection legislation with the guidelines, but, until then, private organizations can help themselves by publicly honoring the guidelines.

U.S. negotiators were pleased the final OECD document reflected the "free-flow" position long espoused by the U.S. and reported to the State Department advisory group on transborder data flow that follow-on OECD talks on economic issues of data flow seem to also be leaning toward a free trade posture.

Under-Secretary of State Matthew Nimitz said a U.S. "plug for free trade" was well received at last month's OECD meeting on information, computer and communications policies.

U.S. delegates to the Paris meeting agreed with Nimitz and told the advisory group that other nations' representatives at the meeting showed a willingness to study in depth various data flow issues and did not seem bent on rushing into data protectionist actions.

Fears of Hegemony

Fears of possible U.S. hegemony in international data processing and communications and of resulting threats to OECD members' economic and cultural sovereignty seem to have subsided with the successful completion of the privacy guidelines, according to Nimitz.

As the developed nations begin considering the economic aspects of data flow, the privacy issue is no longer central to the debate because of the guidelines, he explained.

According to the State Department, the U.S. will continue to push its free trade policy in meetings of the OECD, European Economic Community and other forums as well as in bilateral talks with U.S. allies. Such talks include upcoming discussions with the Japanese, who are showing more interest in data flow issues now that they have taken on more economic and trade dimensions, department officials said.

While data flow discussions will continue as a lengthy and involved process, the State and Commerce representatives said they are optimistic because of the success of the guidelines effort and because U.S. trading partners are showing a genuine interest in the American free market approach to international communications.

Also, Nimitz pointed out that the Third World countries, to date some of the strongest advocates of data protectionism policies designed to usher in a "new world information order," have been singularly unsuccessful in defining what the "new order" should be.

He noted the inconclusive results of the recent Unesco meeting on international communications in Belgrade and said "there is never going to be, in my opinion, a new world information order" because of this failure to reach a consensus on its structure.

If you can write a witty-one-liner as good as these, you could be a winner in the 1981 Computerworld button contest.

As all you button freaks know, *Computerworld* buttons have become a tradition in the industry. And every year we distribute tens of thousands of them at NCC, Info, and other trade shows across the country.

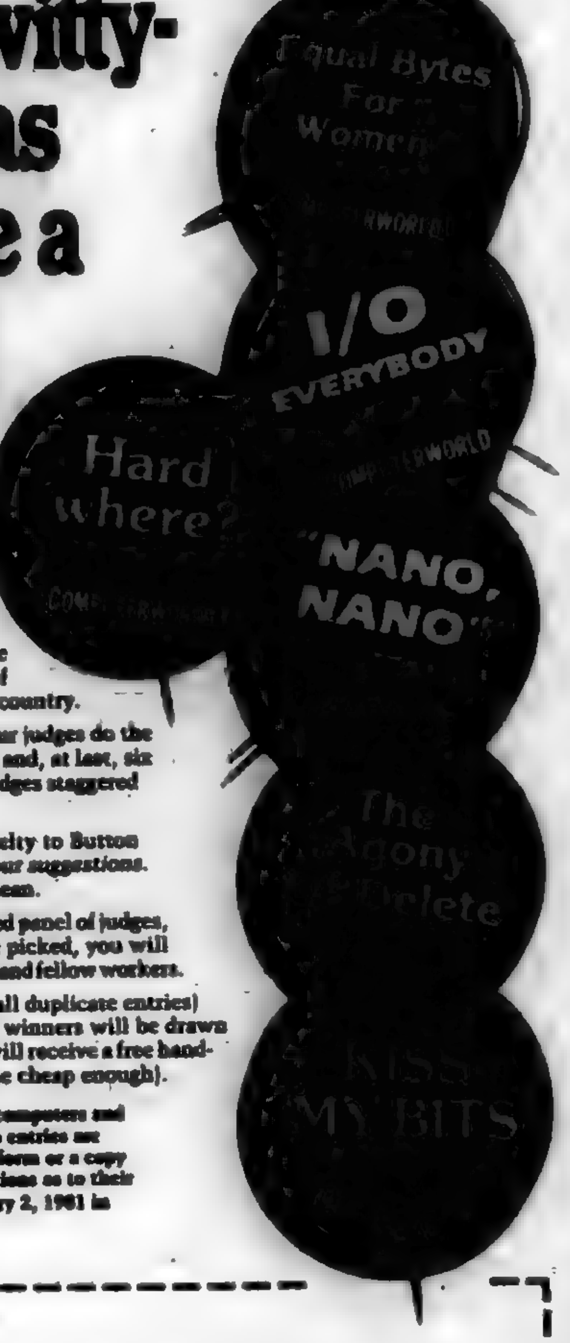
Last year, for the first time, we let our readers do the writing, and our judges do the laughing. We spent many hours sifting through hundreds of entries, and, at last, six winners (shown above) emerged from the smoke-filled room. The judges staggered out later.

This year, despite protests from the SPCBJ (Society to Prevent Cruelty to Button Judges), we've decided to do it again. And we're hereby *soliciting your suggestions.* They should be short, funny, relevant — and at least moderately clean.

As many as six suggestions will be chosen by our (by now) experienced panel of judges, based on criteria known only to them. If your entry is among those picked, you will receive a certificate of appreciation suitable for impressing your friends and fellow workers.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (at least their entries will) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky souls will receive a free hand-held computer game valued at well under $100 (if we can find some cheap enough).

You may not enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representations as to their competence, skill or fairness are being made. Deadline for entries is January 2, 1981 in our offices in Framingham.



yes,

I'd like to enter Computerworld's ridiculous button contest. I hope your judges can read. Here is my entry (if you have more than one, please put them on separate forms). (All entries become property of CW Communications/Inc.)

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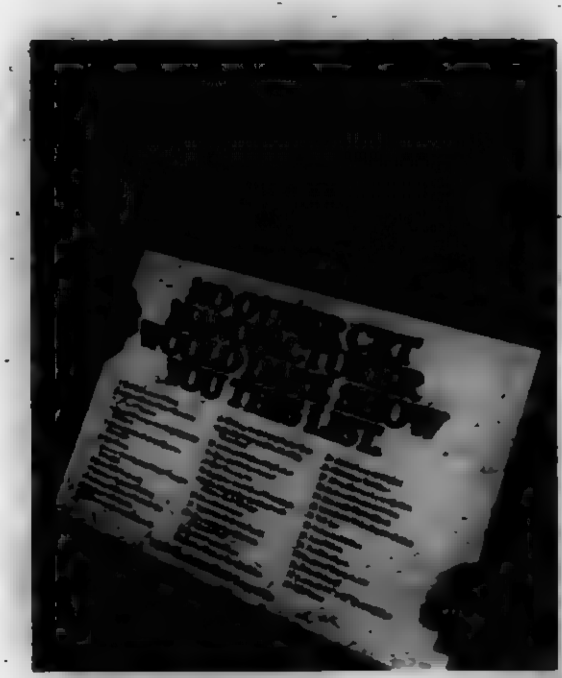

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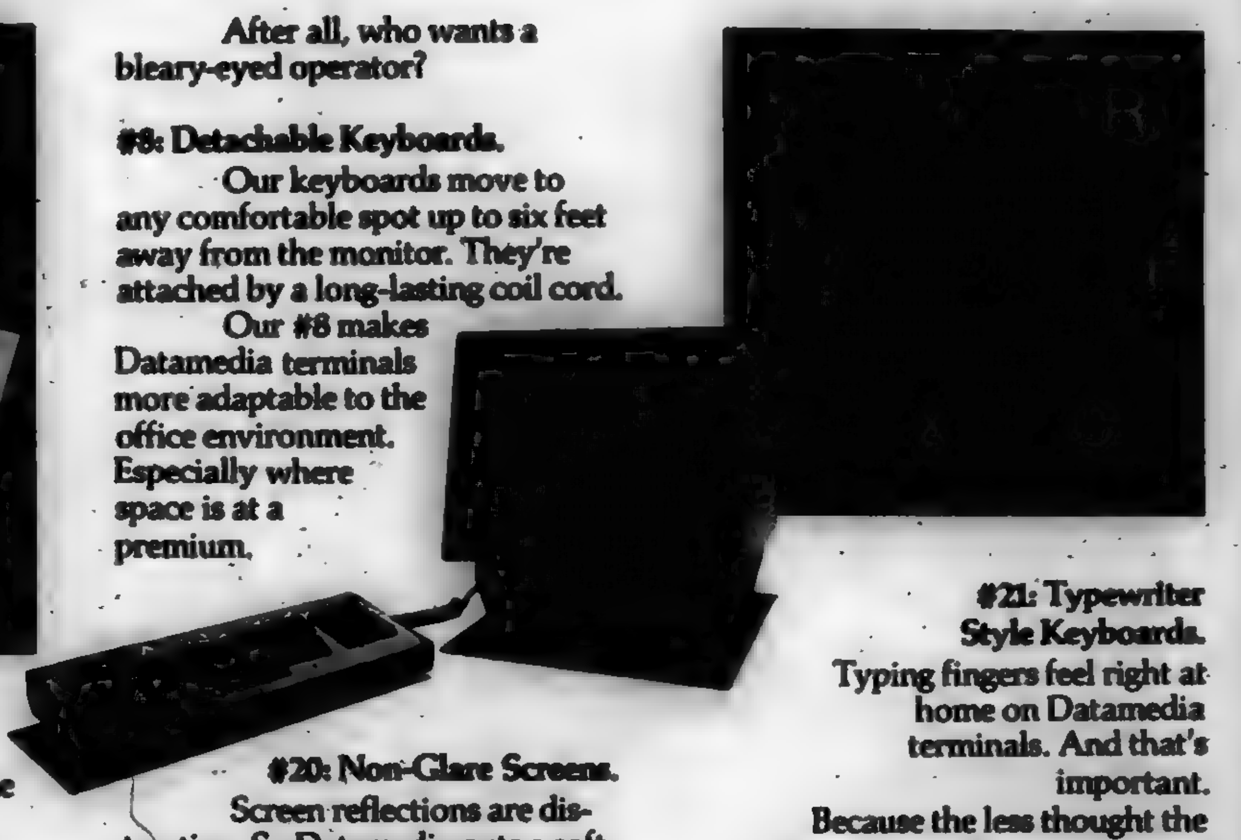

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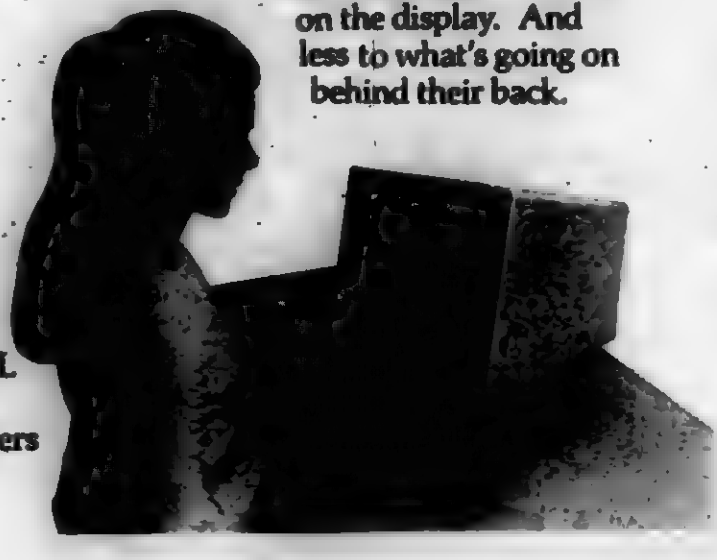

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Contracts Seen Placing DPers in Legal Jeopardy

By Connie Winkler
CW Staff

NEW YORK — Data processing managers might one day be found criminally liable for entering into computer contracts that involve stolen software — legally being a fence — or are totally nonprotective of their company. Dick H. Brandon, who heads Brandon Consulting Group, Inc. here, presented that possibility to show the sorry state of many users' contractual obligations.

One-page contracts from vendors often offer absolutely no protection for the customer, and companies could chose to take the DP manager to court, Brandon said at the New York chapter of the Association for Computing Machinery (ACM) recently.

Poor contracts and numerous other problems have led to a marked increase in computer litigation so that there are 500 cases before the courts today. By 1985 Brandon predicted there will be 5,000. For the 500 filed, there are probably 5,000 dissatisfied users who chose not to make their mistake public.

Brandon said his small consulting company alone is handling 46 such cases and he averages two calls per week from both users and vendors who have just been sued or are about to sue.

"I am startled by this," Brandon said. "We are spending inordinate amounts of money suing each other."

He presented a picture of the increasing failure of users to obtain adequate contracts and of vendors not delivering what was promised and then resorting to finger pointing.

Horror stories included a system with 71% availability, experiencing 1,200 incidents of failure over a two-year period, and data entry terminals with seven-minute response times.

Brandon said he discourages users from suing because of the tremendous expense involved — not just lawyers' fees, but travel and court expenses.

He cited the recent Triangle Underwriters, Inc. vs. Honeywell Inc. case where Triangle was awarded $1.1 million when the installation of a computer was followed by the company going out of business. After appeals are heard and the other cuts taken, Triangle may get $500,000 in 1982 — eight years after losing the business. And that's one of the best rewards in the history of the industry, Brandon added.

Stand-Off Point

How has the situation gotten to such a stand-off? Brandon listed these problems:

- Financial pressure. Vendors, mostly undercapitalized, are under tremendous financial pressure. One vendor said he would rather sell the customer the wrong machine than lose the sale.
- Proliferation of vendors. Of the 6,000 vendors in the industry today, 3,000 were not around five years ago.
- Vendor financial viability. Only seven of those 6,000 vendors have sales over $1 billion, only 20 with over $250 million, only 200 with sales over $50 million and on down until the 4,400 vendors with sales under $1 million.
- Perception problems. The difference between what the vendor says he will deliver and what the customer thinks he is going to get has been heightened by the increase in computing power and the decreased cost, which has been heavily advertised.
- Reliability. Lemon systems exist, but clients continue to place their entire business on the system without any backup. A dead-on-arrival (DOA) machine doesn't work when it arrives at the customer, and although DOAs are decreasing, they still exist. Brandon said Data General Corp. has cut its DOA rate from 15% five years ago to 5% today.
- Performance problems. One vendor simply failed to properly size a data base and the memory delivered was too small, Brandon said.
- Industry traditions, particularly IBM's one-page contract. IBM allowed only that the customer could have the machine removed on 30 days' notice.

To deal with all this Brandon recommended more sophisticated contracts and an arbitration clause, whereby instead of going to court, a DP-knowledgeable arbitrator from the American Arbitration Association would decide the debate.

These contracts have to clearly define responsibilities, spell out ownership in the case of software, set performance and provide for business termination. Brandon's firm provides a free contract checklist; the address is 1775 Broadway, New York, N.Y. 10019.

CDC Courses On CAD/CAM

ROCKVILLE, Md. — Courses in computer-aided design and computer-aided manufacturing (CAD/CAM) are now being offered by Control Data Corp. on both a public and a private in-house basis.

The curriculum includes a "Management Overview of CAD/CAM," "Introduction to CAD/CAM Fundamentals," "Computer-Aided Design and Analysis" and "Control of Machine Tools."

Lengths and prices of these programs vary. Additional information can be obtained from Control Data Corp.'s Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FRANCE INTRODUCES A NEW TELEPHONE SYSTEM THAT ISN'T ALL TALK.

As one of the first countries to recognize the future significance of an information based society, France invested some 30 billion dollars in the modernization of its telephone system and the development of a range of products based on the convergence of telecommunications and computers. This is known today as the 'Telematique Programme'.

Using the advanced technology of TDM and packet switching (Transpac), the French telephone line is being transformed into a multifunctional tool, permitting information to be transmitted in all forms: Oral, visual, and by means of the 'Telewriter', even handwritten or drawn.

Once equipped with a video screen, the telephone user will have access to Teletel (the French videotex service), offering services such as armchair shopping, reservations and electronic mail, as well as a wide range of information including entertainment, travel and even electronic directories, which will be given a 250,000 terminal trial in France during 1981. (This system is technically compatible with Antiope broadcast teletext service.)

Recently, the USA's largest computer information service for the home signed a distribution agreement for a quarter of a million of these low cost Teletel terminals over the next three years.

Another Telematique product, the digital fax terminal, will produce hard copies of the information provided by Teletel and will also serve as a low cost copier.

A further major development is the 'smart card', employing a microcomputer. The added security and intelligence this provides will be invaluable for both point of sale and Teletel home based transactions.

For the first time in the USA, the full range of these products will be demonstrated live in the 'French Pavilion' at the Intelcom '80 exhibition, opening on November 10th.

Come and take a look. You'll see that the French 'Telematique Programme' isn't all talk. It's a reality.

For further information, write to Intelmatique, C/O France Telecom, 1270 Ave. of the Americas, N.Y., 10020.

THE FRENCH PAVILION, INTELCOM 80.
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With Fewer Lost Sales

Truck Dealership Teams Up Horsepower, CPU

LOS ANGELES — Computing power has joined horsepower to help a heavy duty truck dealership keep its profits up and costs down.

Steve Jacobs, parts manager at the J.T. Jenkins Co. branch in Los Angeles, shows off the team — a terminal and the heavy duty tractor it supports via an automated parts inventory system.

The J.T. Jenkins Co., which grossed $52 million in sales last year, exclusively services Kenworth trucks in southern California and is a major dealer for diesel-powered construction equipment. The firm has major sales and services branches here and elsewhere in California in Bakersfield, Irwindale and San Diego.

"We experienced such a rapid growth in diesel parts sales (50% in three years) that we developed an on-line computer system to keep pace," Robert Emett, DP manager, said.

"We now have an efficient system for managing inventories, determining stock status and prices and handling all the math and paperwork vital to parts of sales and invoicing," he said.

Before installing an IBM 370/115 computer and CRT terminals, Jenkins had grown so rapidly that its manual system was unable to keep pace. For example, at each of the sales and service branches, parts specialists frequently had to trudge between the counter and warehouse just to see if a part actually was in stock, Emett recalled.

If not, the specialists had to check other branches to fill the order. Sales were occasionally lost to a competitor because the customer could not spare the time to complete the transaction.

If the part was available, an employee had to pore through a thick price book that referenced some 43,000 line items in Jenkins' parts inventory. Pricing out the items invited errors, either in arithmetic or illegible handwriting, he noted.

Sometimes, errors resulting from this process involved significant amounts of cash that Jenkins would later try to recover via an amended statement to the customers concerned.

As the business volume increased, the errors increased; Jenkins was forced to expand its staff just to monitor the error-prone system.

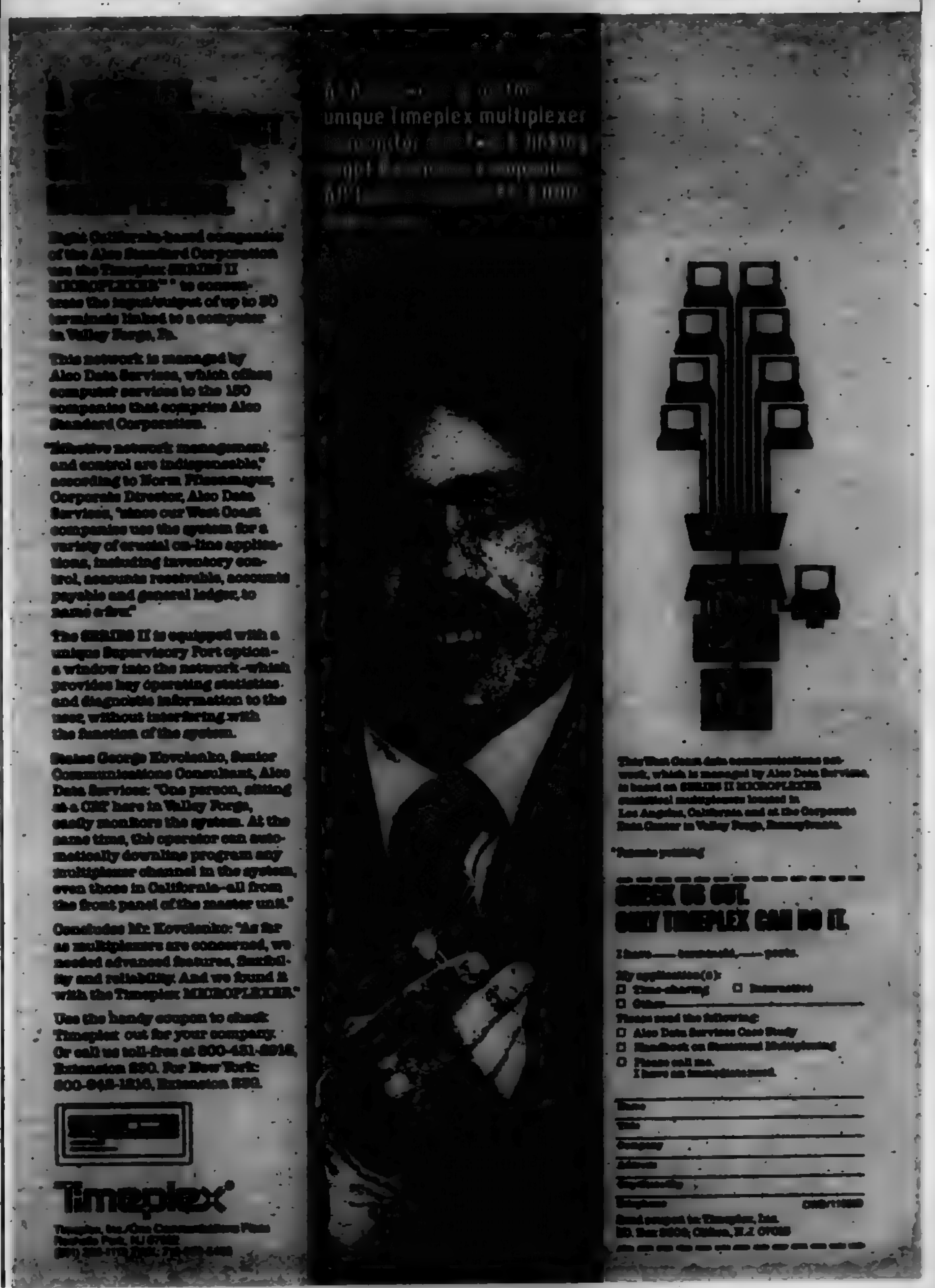
"That's when management decided to go to an on-line network," recalled Steven H. Jacobs, parts manager at the Jenkins branch here. "The computer was installed at the nearby Jenkins headquarters, along with IBM 3270 CRT terminals and printers.

"In selling parts today, a specialist no longer wears out shoe leather trekking from the counter to the warehouse to check the parts bin," Jacobs said. "All data is stored in the computer where any branch can get to it."

At the display terminal, a parts specialist keys in an account number to bring up an appropriate invoice on the CRT screen.

Then as data on a part is entered, the computer instantly checks the availability of the part, where it is located and how much it costs.

The computer checks creditworthiness of a charge customer, generates paperwork for billing and delivering the part and automatically updates the parts inventory file.



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Eight California-based companies of the Alco Standard Corporation use the Timeplex SERIES II MICROPLEXER™* to concentrate the input/output of up to 80 terminals linked to a computer in Valley Forge, Pa.

This network is managed by Alco Data Services, which offers computer services to the 150 companies that comprise Alco Standard Corporation.

"Effective network management and control are indispensable," according to Norm [illegible], Corporate Director, Alco Data Services, "since our West Coast companies use the system for a variety of crucial on-line applications, including inventory control, accounts receivable, accounts payable and general ledger, to name a few."

The SERIES II is equipped with a unique Supervisory Port option–a window into the network–which provides key operating statistics and diagnostic information to the user, without interfering with the function of the system.

States George Kovalenko, Senior Communications Consultant, Alco Data Services: "One person, sitting at a CRT here in Valley Forge, easily monitors the system. At the same time, the operator can automatically downline program any multiplexer channel in the system, even those in California–all from the front panel of the master unit."

Concludes Mr. Kovalenko: "As far as multiplexers are concerned, we needed advanced features, flexibility and reliability. And we found it with the Timeplex MICROPLEXER."

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This West Coast data communications network, which is managed by Alco Data Services, is based on SERIES II MICROPLEXER statistical multiplexers located in Los Angeles, California and at the Corporate Data Center in Valley Forge, Pennsylvania.

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A Bird? A Plane? A Mini?

HP Minis Flight-Test, Certify Rockwell Jets

BETHANY, Okla. — Rockwell International Corp. is using minicomputers to test and certify its high-powered propjet executive airplanes, including its Jetprop Commander 980. The testing for that plane required 140 flights, 253 hours in the air and 284 million different in-flight readings regarding equipment and flight performance.

To accomplish those tests Rockwell's General Aviation Division (GAD) here developed a minicomputer flight testing program, using both on-board and ground-based minicomputers to cut data acquisition and reduction times.

"The savings in time, money and man-hours have been incredible since we installed our first computers in 1976," said Bob Kerr, special projects engineer for Rockwell's General Aviation Division. "We estimated that the first three computers — Hewlett-Packard Co. HP 2100s — cost in total about $200,000, but they eliminated post-flight data assembly, a test procedure that cost approximately $366,000 for a single aircraft.

"The computers have since paid for themselves during aircraft development and certification," Kerr reported. "Now, with our newer HP 1000, GAD has cut man-hours by as much as 30% in the areas of software development and data reduction."

Speed and Flexibility

Before acquiring the computers, Rockwell used a photographic/oscillographic recording method that required several days for the data to be reviewed and analyzed. In 1974, Rockwell began considering other methods of testing and precertifying its business aircraft — small, twin-engine propjet planes that seat eight people. Minicomputers seemed to offer the speed and flexibility that were required, a spokesman noted.

Three HP 2100s were installed, the first one mounted behind the copilot's space. A CRT terminal was installed on top of the processor, while a magnetic tape unit was housed in the left side of the aircraft. Various types of front-end equipment — torque meters, air speed transducers, thermocouples and strain gauges — are located in strategic places on the plane to feed information into the processor. This configuration allows engineers to monitor 128 different parameters at up to 8,000 samples per second, Rockwell said.

The second system detects and analyzes vibration and sound levels, while the third is a data acquisition system for static ground testing. Rockwell had to move this last system and its associated Fourier analyzer to Norman, Okla., to aid in static ground testing there. But in doing that it created the need for yet another computer system, a spokesman noted.

HP 1000

The latest addition to Rockwell's computer testing equipment is an HP 1000, which replaces the system now in Norman, used to support flight testing.

The process is simple. The on-board computer collects information fed to it by the front-end equipment. The data is converted into engineering units, the output being simultaneously recorded on magnetic tape and displayed on the on-board CRT terminal for the flight engineer's use. When the plane lands, the magnetic tape is loaded into the HP 1000, where the data is analyzed, according to Rockwell.

On the ground, structural testing is conducted to simulate the performance of the aircraft in rough air and to determine load limits of the various parts of the plane, a spokesman added.

According to Kerr, Rockwell's program development capabilities have improved greatly with the HP 1000. "The iteration process, normally associated with source program development, is faster because we've replaced the photo reader/punch units with a real-time disk operating system. With the new graphics terminal, we simply load instrument calibrations with the cartridge tape reader, which takes about half the time of the old procedure."

The graphics terminal also lets Rockwell engineers plot data on the terminal itself, bypassing the time-consuming process of producing hard copy on the digital plotter, the firm said.

Kerr is also pleased with the data storage ability. "People who work in any sort of testing have all been faced with the problem of storing and preserving large amounts of test data. With the new system, we have stored 225 flights' worth of information on 15 magnetic tapes."

The possibility of human error is also reduced with the HP 1000, Kerr said.

In the near future, Kerr said Rockwell will install a graphics terminal and real-time executive memory (Rtem) software in the on-board configuration, which currently consists of the computer, CRT terminal and magnetic tape unit. Performance data will be plotted in flight on the graphics terminal to determine the acceptability of data that is affected by the environmental conditions.

On the ground, the HP 1000 will probably move the RTE IV software, which will allow Rockwell's engineers a wider range of user programs and eliminate segmenting.

The current HP 1000 consists of 128K bytes of memory, and includes an HP 2607 line printer, HP 2644 CRT terminal, HP 7970 magnetic tape unit, HP 7905 disk drive with 14.7M bytes of memoy, HP 7210 digital plotter and an HP 2648A graphics terminal.

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Dedicated to Food Stamps

Output Feeds North Carolinians

REIDSVILLE, N.C. — Output from the Rockingham County Department of Social Services' processor feeds residents in this North Carolina county.

Rockingham is one of the few counties in North Carolina to have a computer dedicated to the administration of its $2.85 million food stamp program, said Glenn D. Fuqua, director of the social services department. Most other food stamp programs are part of the county DP operation.

Prior to installing the Burroughs Corp. B800 system, the county used a Burroughs B80 computer. "We wanted to go on-line with remote terminals and keep our data on-line so that we could have full inquiry capabilities at our three locations. The B800 with its front-end processor, is ideal for data communications," said Ronald N. Winn, analyst/programmer.

The department has two satellite offices in the county, one in Eden, and another one in Mayodan, with a Burroughs TD 830 input and display terminal at each site. Two TD 830s are at the department's headquarters in Reidsville.

How It Works

A prospective food stamp recipient is interviewed by a department employee at any of the three locations and, based upon income and family size, may be eligible to receive food stamps. If the person is eligible for the program, the certifying employee sends an input document to the department headquarters for entry into the data base.

The eligible recipient, who receives $10 to $846 per month in food stamps, depending on income and family size, is then mailed an "Authorization To Participate" (ATP) form, which is like a check. The recipient takes the ATP to a U.S. Post Office where the U.S. Department of Agriculture food stamps are given in the amount specified on the form.

Depending on the season, 2,700 to 3,200 ATP forms per month are mailed to food stamp recipients, one form to a family, covering periods ranging from one month to one year.

"Dealing with this volume of food stamps and recipients is no easy accounting task," Winn said. "Add to that all the federal and state welfare reporting forms that are required, it is easy to devote half of the computer's time to these tasks."

Microfilm System Clears Vicks' Congested Paperwork

FORT WASHINGTON, Pa. — Lack of control of large amounts of paperwork and little space in which to store the documents were nothing to sneeze at for the Vicks divisions of Richardson-Merrel, Inc.

The ability to answer customers' questions promptly and accurately often means the difference between made and lost sales in the fast-moving, highly competitive health care and toiletry products industry, according to Walter J. Pietrak Jr., manager of systems engineering for the company, which manufactures such products as Vicks NyQuil, Vicks Formula 44, Clearasil and Oil of Olay.

The solution Pietrak chose was to put the order files on microfilm coded for automated retrieval using Eastman Kodak Co. Oracle equipment.

"Ours is a very customer service-oriented business," Pietrak said. "If we don't have products where they're supposed to be and when they're needed, we could lose that sale. After the products are delivered, we still need to respond promptly to customer inquiries."

Customer Service

The response is the domain of the Customer Service Department, which answers some 7,000 inquiries a month, about 5,000 of which require information from the order files. These files consist of the original customer orders, invoices and bills of lading for 196,000 orders received annually.

"Each year we accumulate over a million documents in our order files," Pietrack said, "and that was the source of a lot of our problems."

The primary problem was control of the documents. Eight different departments referred to the files and anybody could remove documents and take them back to their desks. Often those documents stayed out of file or in in-boxes for long periods of time, with the result that about 10% to 20% were considered lost at any particular time. Customer service correspondents spent many frustrating hours searching for documents that were not in the file.

Space was another part of the problem. The document paper files filled 49 filing cabinets that were crowding people out of the office space.

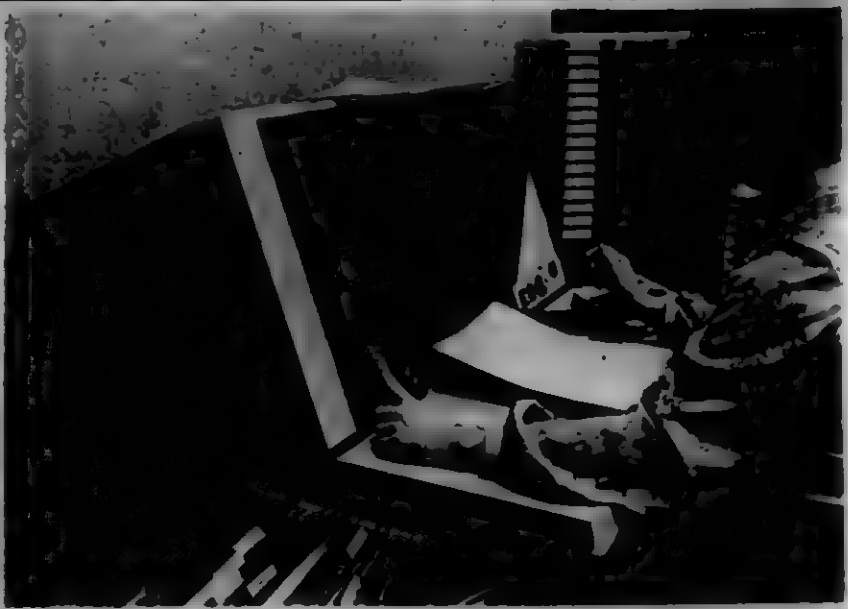
Oracle System

The Kodak Oracle equipment selected by Pietrak reduced the physical size of the file. Each 4-in. by 4-in. by 1-in. microfilm magazine contains the images of up to 6,000 paper documents. In addition, because every document image is refiled immediately after reference on the microimage terminal, out-of-file conditions are no longer a problem.

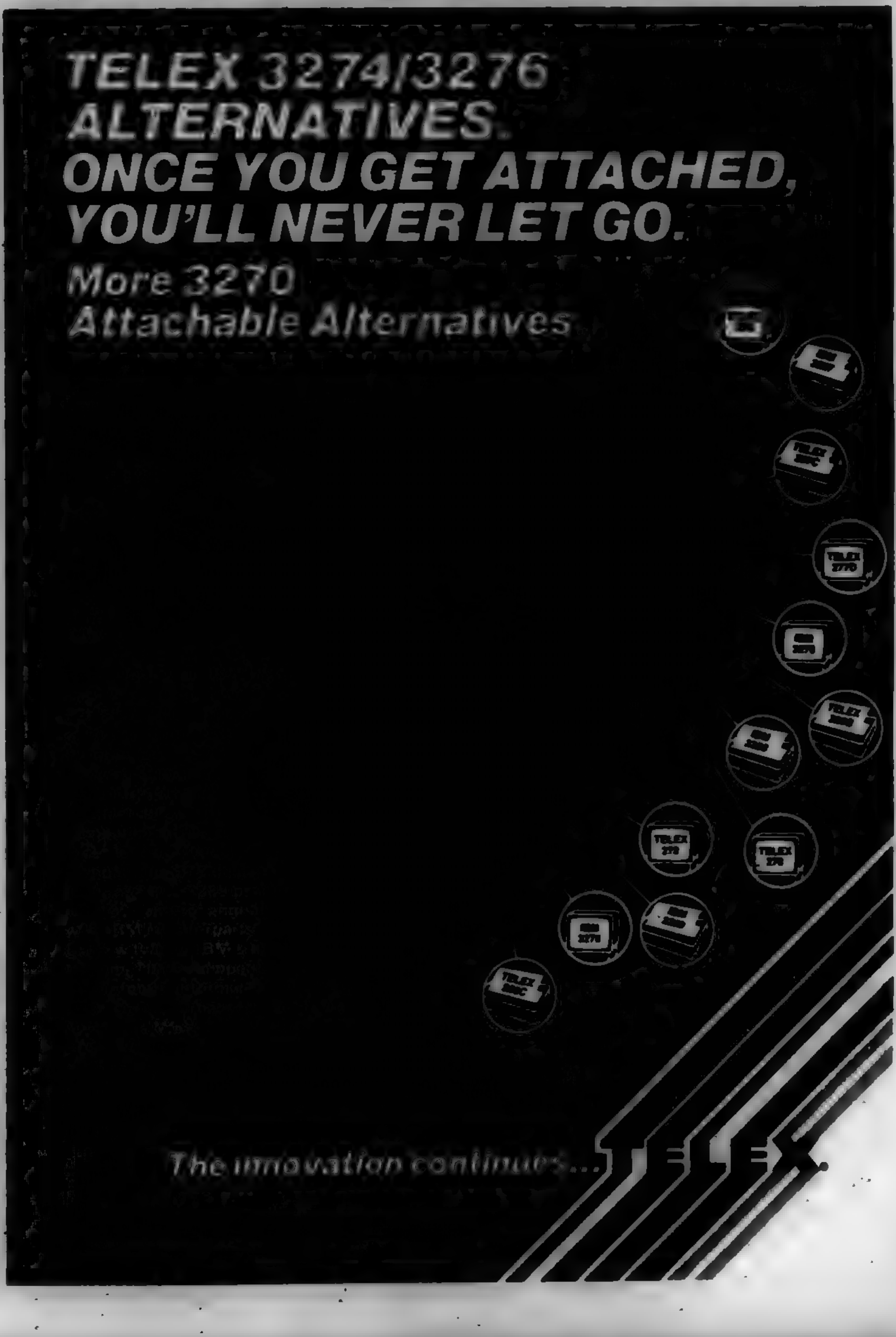
Three people are assigned to retrieving information from the microfilm file and they almost always have information back to the customer service correspondents within three or four working hours of the time they receive the request, Pietrak said. In certain situations where a customer is waiting for an immediate answer over the telephone, the microfilm operator will retrieve the information while the correspondent waits.

The microfilm operator also has the capability of making a paper copy of the document image by pressing a button on the Oracle microimage terminal.

The microfilm file has saved the space occupied by the 49 file cabinets in the Customer Service Department and another 50 in the archives in the basement of the building. On top of this, it has saved countless wasted hours of searching for proper documents for the customer service correspondents. Pietrak estimated that the total saving of time and space is almost $80,000 a year, and customers are getting their answers faster than with the paper files.



The use of microfilm coded for automated retrieval is saving about $80,000 a year in the Vicks Customer Service Department of Richardson-Merrell, Inc.



A DBMS on a System/34?

Plastic Maker Fits Maxi Data Base on Mini

By Bernard Werner
Special to CW

KINGSVILLE, Ohio — The Total data base management system (DBMS) on an IBM System/34? Not even IBM had a DBMS to offer our one-man DP shop at a plastics manufacturer, Premix, Inc. In fact, in the spring of 1979, no software vendor could fill that need in programming a billing/receivables/sales analysis system save one — Cincom Systems, Inc.

Since the original plan involved a rewrite of a currently operating order entry system, speed in retrieval for customer service and ease in programming and maintainability were major considerations.

The complexity of the proposed system demanded some means to force the consistent use of data names, provide a centralized definition of all files in the system, and make all files accessible through a common set of routines. Four approaches were considered:

- Standard indexed files were used initially to plan the system and define the data fields in the system. This traditional approach would have led to a plethora of temporary work files and wasted space in files due to their rectangular structure. It also would have resulted in awkward programming to deal with invoices containing a variable number of line items and with shop work orders with a disparate number of due dates. In fact, the current order entry system used IBM's System/3 Bomp as a primitive data base to get around this problem.
- A "hme-grown" DBMS was briefly considered. It was discarded when time estimates put writing the DBMS beyond the constraints of the entire system. There was also little incentive to write any major software in assembler, even for the sake of performance, because of the possibility of changing processors in the next few years.
- IBM's "multiple index support for disk files" was also briefly considered. The technique is to use a suite of RPG and Assembler programs and up to 10 index/address files for a single master file. To retrieve an added record, the user would have to wait until all index/addresses were updated by the sort utility and an RPG program — up to 40 job steps for a single master file. It was considered unusable for the intent of the system — that of being on-line and interactive.
- Cincom's Total was the final consideration. It met our needs in providing consistent data names, centralized file definitions and a common set of routines for accessing the data in all files. Also of concern was the reliability of the software since the System/34 was still a new machine. But since System/3 Total had been available for a number of years, any fears were alleviated. However, the user interface had been rewritten because of machine architecture differences and did cause problems in the multitask version, problems since resolved.

Because Total is a network-oriented DBMS, any hierarchy of data records is not implied. Through its Data Management Language (DML), Total defines a relationship between a master file and a variable entry file. A master file may, in actuality, have no or multiple variable files related to it. However, a hierarchy may be *logically* imposed in the data base module which defines the contents and relationships of the files.

This master-variable file relationship is used to partially invert the data. The degree of inversion away from the traditional upright card-image file is at the user's discretion.

Because of these different means of access — up to 60 files — a System/34 limit can be accessed by any RPG, Cobol or Fortran program. Cobol and Fortran use Total through subprogram CALLs. RPG, the language of the billing/receivables/sales analysis system, uses a special device handler for a dummy file, DBIO. A subsequent personnel system was written entirely in Cobol when IBM supported it fully with Release 5 of SSP.

On-Line Use

It should be noted that Total is oriented towards random processing and superb for on-line use or where data is selectively accessed. The package's partial file inversion makes possible high-speed access.

The use of a sort utility often produced an intolerably long response times even though upright data with a sort is very flexible. While a DBMS requires more planning to identify relationships, it gives response several magnitudes faster.

However, reports involving whole files may take longer than a sort of a sequential file and a printing program. This is because the DBMS must be accessed in one RPG program, creating a sequential file, sorting it and finally formatting it into a report. In Cobol, this can all be done in one job step with increased efficiency, almost obviating this drawback.

Although different languages were used, techniques common to both greatly reduced coding time. "Dummy programs" were defined containing, in RPG, the header; DBIO file "F" specification; compile-time element lists in "E" specifications; "I" specifications with data structures to redefine the DBIO record 18 times — one for each file; basic access and error handling subroutines in the "C" specifications; and "O" specifications for exception output to the dummy DBIO file and the error handler output.

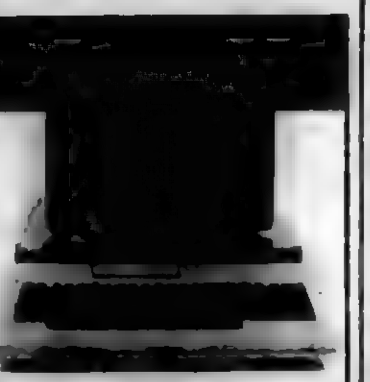
The use of the data structures in RPG and redefinitions in Cobol of the data area promoted the use of the "dummy program" as reusable code. Writing a program became a process of removing unneeded "I" and "E" specifications and fleshing out the "C" specifications. The process was done in Cobol by removing redefinitions. However, in Cobol, a user subprogram accessed Total and handled errors.

Often a 500-line RPG program had 300 lines predefined from the dummy program. Since accessing the data base in the remaining 200 lines was easy, a program could often be debugged in less than a day.

Total was installed in the middle of June 1979. By September, billing and aging was in production. A month later, standard costs were being captured from the System/3 Bomp, and historical diskettes were produced for comparative sales analyses by product, customer and salesman.

In this time, one person produced the entire system consisting of over 20,000 lines of programs, procedures and screen definitions.

Werner is data processing manager at Premix, Inc., N. Kingsville, Ohio.



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This Week: Who Writes Documentation? Where's

Q My company has recently formed a Standards and Documentation Group. I am the manager of this small group, which has two others besides myself. The duties of the group are still not well defined, but a more immediate problem has surfaced.

The group was formed because documentation was so lax. Since the very first day, programmers have been giving us source code listings without accompanying documentation, and asking us to complete the documentation. This has become an impossible task and a point of contention, in that I believe such documentation is the programmer's responsibility. Am I correct?

A Your most immediate task should be to work with DP management to define the duties and responsibilities of your newly formed group. The following list of possible duties and responsibilities may be helpful in your initial analysis:

- Develop and maintain the system development methodology.
- Control a library of existing applications documentation.
- Insure compliance with the methodology.
- Perform quality assurance for documentation.
- Serve as procedures and standards advisers to users and DP personnel.
- Conduct training in use of methodology and documentation preparation.
- Develop and maintain programming standards.
- Develop and maintain design standards and approaches.
- Maintain historical statistics on dollar, manpower and time utilization.
- Generate management reports.
- Gather feedback on methodology and update as appropriate.

Note that the actual documentation process was not included in the above list. The programmer is responsible for compilation of the complete program documentation package according to the instructions set forth in the design methodology. Documentation is not something you do after system implementation. Documentation, if done correctly, is an aid to program development and is therefore part of the program development process. The same is true of system documentation.

Asking anyone, other than the program author, to document a program from the source listing is an unnecessary waste of manpower.

Q I have been promoted and am faced with the task of evaluating subordinates. Would you recommend guidelines for employee performance evaluation, since my company has none?

A Performance evaluation is a system that encompasses a range of activities from manager-subordinate contracts and periodic performance reviews to termination of an employee.

The first step is to produce a written contract that is agreeable to both the manager and the subordinate — possibly using the MBO (management by objectives) technique. Upon completion, the subordinate should confirm an understanding of the contract and the criteria upon which performance will be evaluated and promotion will be based.

Subsequent performance evaluations become a farce if the subordinate is not held accountable for his actions. Depending on the employee's level within the organization, accountability might be based on a project plan, MBO objectives, management information system long-range plan, deadlines, milestones and so on.

Frequency of the periodic performance reviews would range from three months for new hires, to no longer than one year. For whatever reason, many DP managers simply go through the motions of performance evaluation. The resultant evaluations do not delineate the top performer from the mediocre performer. This is a disservice to the employee and the company.

Rate personnel in a minimum of categories and provide a support statement with each rating. Possible categories that should be weighted are: technical capabilities, quality of work, verbal communication skills, written communication skills, ability to interact with others, level of contribution to goals and appropriate personal qualities — initiative, imagination, flexibility and integrity.

A written report of the evaluation is critical. A manager has an obligation to let employees know where they stand. Documentation is equally important for both promotion and termination.

Q I know very little about computers and programming, but I read and enjoy *Computerworld* every week. My husband is a programming manager and he has *Computerworld* sent home rather than to his office. My husband and I seldom talk about his work, and when we do, I don't understand.

Here's the problem. It is not at all uncommon for Ralph (a fictitious name) to work two or three nights a week and often on weekends. He will work all night long at least once a month. Needless to say, his offbeat working hours not only disrupt our social, eating and sleeping schedules, but cause a dutiful wife to wonder.

Ralph has a standard comment to any

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Her Programmer Spouse at Night?

inquiry I might make: "It comes with the territory." Does it?

A Yes. In the programming environment weird hours are common. There are essentially three valid reasons why a programmer would be required to work other than regular hours.

First, the company computer system is usually saturated with production work during the day; therefore, off-hours are used to test certain programs and systems.

Second, when something goes wrong in the machine room, the applications and/or systems programmer responsible is called, day or night.

Third, the "crisis" is unfortunately very popular in the DP environment and to meet deadlines — which are sometimes unrealistic — the programmer must work long and often frustrating nights and weekends.

Q I am 57 and puzzled. Two years ago I took early retirement after 24 years in computers and started working on a desk-top computer in my bedroom. I enjoy the work and have produced two complete application packages. From time to time, to test the water, I write to advertising companies for jobs. I invariably tell them I am 57.

No one ever bothers even to ask me for an interview, even though I occasionally offer my services on any basis whatsoever — not needing any company benefits any more. The wording of the replies I receive, if I receive them, manifests a clumsy and pathetic attempt to appear not to discriminate on the basis of age. However, we all know, in this country, age is considered a curse.

By contrast, two foreign employers, in different continents, have shown interest in me, even though I have not mastered the languages of their respective countries. As it happens, I do not need the jobs, but merely want to know whether I am still lovable.

I have concluded that the U.S. is too hung up in its concern with cosmetics or social security taxes or what not to qualify as a smart buyer of experienced technical labor. One more mark for the Japanese.

A Not many people can boast 24 years of DP experience. Under the right circumstances, managers of short-handed information services departments would actively solicit your services. Unfortunately, the paradox of government intervention surfaces its ugly head — again.

Upon receipt of your resume, the information systems managers' rationale for their response might go something like this: "This man's resume is very impressive and he would certainly be an asset to our organization. His financial security is already taken care of and he is willing to take a lesser position for the sheer love of the information processing business. He is even willing to take a drastic cut in salary, status and work for no benefits.

"Employing him would be a mutually beneficial arrangement, but can we risk the possibility of age discrimination accusations? The next thing you know the Federal government would be all over us. I suppose we have no option but to send him letter X2-1" (a letter similar to those you have received).

I don't see the situation reversing in the near future. Although I am reluctant to say it, your best bet would be to approach potential employers as a private contractor desiring short-term work. I would like to invite employers to take advantage of this opportunity.

Q I am taking a special early retirement from a company for which I worked with Cobol and PL/I using both Univac and IBM equipment.

I would like to take on occasional jobs on a contract basis after my retirement. How would I go about making such contacts?

A First you need to identify the potential market. Small companies often contract with individuals for both software development and implementation of packaged software. Medium and large companies contract for part-time and temporary help for augmentation and work load leveling.

Prepare a resume that emphasizes your most salable assets — flexibility, experience, desire for temporary work only, etc. Send a few exploratory letters with brief background description to DP managers of a few local corporations — large and small. Indicate that a resume is available upon request.

Join and attend meetings of local DP professional associations. I have seen handshakes on several short-term, one-person contracts before dessert was served.

rnaro d Time
By Larry E.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.*

Long is a professor at Lehigh University, a DP consultant and author.

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EDITORIAL

Facing Facts

People who still argue that computer automation is creating more jobs than it is eliminating should face facts: Although computers create new positions for the people needed to program and manage them, the positions created can rarely be filled by the people whose positions they eliminated.

According to statistics collected during the past 10 years by a number of political scientists — some in the U.S. but most of them abroad — computer automation is creating a class of displaced workers too old to learn a new trade yet too young to retire.

Until their organizations automated, most of these individuals had been employed in what had been considered perfectly respectable, highly paid crafts, such as typesetting.

The problem is compounded by our youth-oriented culture. How recently did you hire a 50-year old applicant as an entry-level programmer? Have you ever hired such a person? Then what makes you think any other manager is likely to hire a 50-year-old ex-typsetter for any type of work at all?

The solution, however, is not to use fewer computers but to find meaningful work for those whose skills become outdated.

If it's difficult for a highly educated person such as an engineer, systems analyst, programmer or DP manager to keep from falling behind the times technologically, how much more difficult must it be for a typesetter or telegraph operator?

People should be prepared from childhood in school and the community for a working lifetime that might involve several career changes.

Further, it's time people in our industry — and especially in this country — did some meaningful work on this matter.

Apparently, little new is happening. Even at a major international conference like the one put on by the International Federation for Information Processing in Tokyo and Melbourne recently, little attention was paid to this very important social issue. The few individuals who did present papers on the subject did not have any new data or solutions to present. In fact, some of the references they were citing were 10 or more years old!

It's time we had a national effort to learn how society can gain the most from computers without causing massive job displacement. How about it?

DATA PAST

Five Years Ago
Nov. 12, 1975

WASHINGTON, D.C. — The Federal Communications Commission (FCC) sounded the death knell for the Data Access Arrangement (DAA). In a far-reaching decision that affected virtually every dial-up user with non-Bell System modems, the FCC ruled DAA-equivalent circuitry could be built into equipment beginning in April 1976.

———

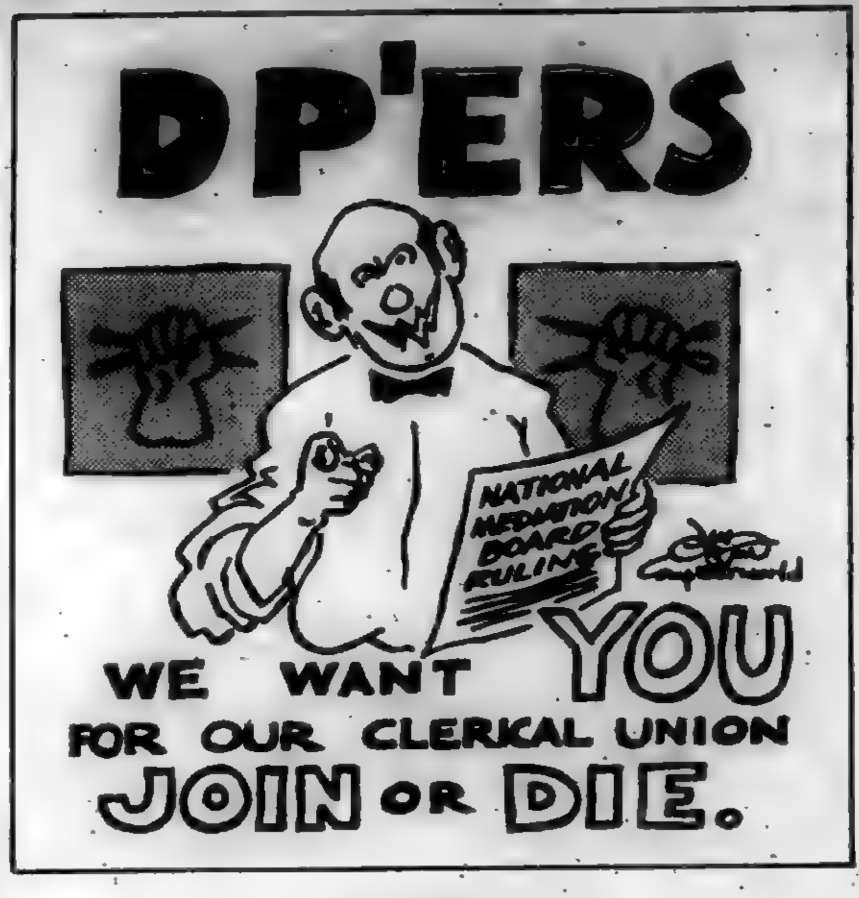
NEW YORK — Agreeing with IBM that the judge hearing the government's antitrust suit against it had overstepped his procedural bounds, the Second Circuit Court of Appeals here delivered a gloved — but public — slap to Judge David N. Edelstein and the Department of Justice. The decision ordering the trial judge to vacate three of his rulings and orders was intended to limit the "irreparable damage" IBM counsel claimed its client's defense suffered as a result of Edelstein's actions.

Eight Years Ago
Nov. 8, 1972

NEW YORK — Only 10 years old, computer-based prognostication of election results got its biggest test this week as all three national television networks struggled to be the first to tell voters whom they had elected. This year's computer operations were the largest in their history, with the networks spending a combined total of more than $11 million on this election to correlate the election returns.

———

WASHINGTON, D.C. — The National Bureau of Standards launched a six-month study to determine the significance and impact of American Standard Code for Information Interchange (Ascii) as a federal DP standard. Under the federal standard, all new computers and related equipment brought into the federal inventory after mid-1969 were supposed to be Ascii-compatible, with the obvious hope that such compatibility would facilitate the swapping of information and programs between DP centers.



LETTERS

Misplaced Emphasis

It was with mixed emotions that I read the article by Bruce Hoard covering the Second National Meeting of Black Data Processing Associates (BDPA) in Washington, D.C. [CW, Oct. 6].

As an organization we were pleased to receive the national exposure. This is emphasized by the number of inquiries we have received from various cities requesting information and chapter requirements. We are, however, extremely upset and dissatisfied with the emphasis on racism with which the associated article was written.

The intent of Black Data Processing Associates is not to castigate the data processing industry nor individual companies for their past, present, real or imagined actions of discrimination. We resent any reference to us as an organization obsessed with complaining about the lack of social conscience or insensitivity of our industry.

We are a professional organization with an ongoing goal of self-improvement. Our purpose is to inform our members and assist them in improving their skills so that they might move upward in their chosen careers. That is our emphasis!

The opinions expressed by the individuals interviewed, who were not all BDPA members, are theirs and not those of their companies nor of Black Data Processing Associates. We have been contacted by many companies in the industry voicing concern about this article.

We are sending a copy of this letter to several of the companies that we feel were erroneously represented in the article. It is our hope that this letter stating the official position of BDPA will be given as prominent a location and position as the original article that generated this controversy.

As an organization we were extremely hospitable and open to the representative of *Computerworld* covering our meeting. It is my hope that the future relationship enjoyed by BDPA and CW will allow us to continue this policy.

Earl A. Pace Jr.
National President

BDPA
Philadelphia, Pa.

Don't Blame Programmers

I find it very difficult to believe Dr. Hamming's conclusion [CW, Oct. 20] that programmers are to be blamed for not keeping up with technology.

Why is there such a huge turnover of programmers in the industry? Of course, some programmers change jobs because of money, but associated with the money are also new challenges (at least as promised by the prospective employer).

I think much of the blame should be attributed to employers. I have been in the industry for 10 years and have changed jobs every two years. Each move I have made has been to avoid becoming obsolete.

There are some employers who will hire with promises, but once the programmer reports for work, the job description turns out to be mainly routine with "don't rock the boat" signs painted all over.

The programmer, after six months, is inevitably tamed to a point of frustration and starts chasing the rainbow again.

Some readers might say "but the company has priorities." I say that's fine, but don't look at the approaches through a needle hole.

In my opinion, the programming profession forces the programmers to be imaginative and technology frontier seekers.

People management is the key!

Howard Smith
Systems Analyst

San Diego, Calif.

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THE TAYLOR REPORT/Alan Taylor

RM-Cobol Shows a Real User Breakthrough

Twice during the past year this column has celebrated Cobol developments from independent software suppliers. Now a new Cobol has been released that is probably the most important one since 1960, when IBM joined Univac and others and allowed users to write transportable software. Truly it can be said that Cobol is gaining liberation in the 1980s.

The original transportability gain for users in 1960 was effectively canceled almost immediately when operating systems came into use. This made the compilers themselves become fixed and dependent upon operating systems.

Now a trade house that has for the past six years been successfully supplying Cobols to computer vendors ranging from NCR Corp. to Radio Shack is offering multi-operating system Cobol which again promises to provide users with real application transportability — the basic aim of Cobol since the beginning.

RM-Cobols

The Cobol manufacturer is Ryan-McFarland Corp., and the compiler sells, retail, at around $600 from the dozen or so retailers who so far have taken OEM licenses. The source language and intermediate codes are the same as any of the current RM-Cobols (including NCR 8200, Radio Shack Model II) and have also been fitted to the CP/M operating system issued by Digital Research, Inc., which is just about universal for micros, as well as a version of Unix.

Moreover, 6-bit supersets, as well as 8-bit versions, are coming by the end of the year, which will open up the popular mini area.

What is new, brand new, is that this Cobol marketing is based upon facing up to competitive products, rather than on monopolizing some more or less captive market niche, which every Cobol up to now has attempted to do.

This means that RM-Cobol is not tied to that of some particular operating system, or some particular group of hardware. Instead, the better and more widely it can run, the more different operating system and hardware environments that it can handle, the better its commercial success will be.

With an independent Cobol availability, users are in a stronger position, both in the selection of hardware and the availability of software. In hardware, they can make their choices based on direct merit, rather than having to take into account the lack, or lateness of Cobols promised ahead. In software, they will be able to use software suppliers whose products previously have not been accessible, without having to consider hardware and operating systems.

Millenium Not Here

Few developments, however, bring only ease and profit, and the RM-Cobol is not one of them. To start with, it is unlikely that this will be the only independent Cobol available to users. There is nothing technically unique about the new Cobol. It uses a set of primitive pseudocodes as an interface to specially written drivers connecting the codes to the appropriate functions in the operating system.

That's standard advanced technology and has been illustrated previously in this column. So there will be other independent Cobols. Users will have to rethink their decision-making processes.

Then again there is the question as to exactly what source compatibility there is between your current Cobol programs and any independent language. If your hardware supplier continues to provide the best bargain here, it is likely that most users will stay with that — unless there is a demonstrable mix-and-match capability of running both types of Cobol under the same job stream. And so on.

Currently, Ryan-McFarland have only six people on the project, headed by Michael Saccomano. This is going to be increased. The ability of this small staff to achieve their current status is an indication of the economic viability of the new approach, but it is not enough for the achievement of the technical possibilities. Not yet.

The "retailers" also are just getting organized. In some cases application packages written for other systems are being brought into RM-Cobol, and the conversion checked out. Marketing techniques and brochures will have to be defined and developed. All of this will take time.

Even the relationship of the RM-Cobol with the Ansi standard has not been checked with the U.S. government as yet. The definition is quite persuasive, including much Level 2 material. The history is also quite persuasive, as a number of the firm's customers have supplied copies for testing, quite successfully. Even the reason for not having done so — not having got around to it as yet — is understandable.

Despite understanding and reasonability, the fact remains that Ryan-McFarland Corp. has not provided publicity, and permitted periodic testing of, the certificates of equivalency of operation over different operating systems and different hardware configurations, which are a major requirement of such testing — *and* which happen also to be the major marketing points for the new venture.

These are all transient points, however. The offering of RM-Cobol marks a giant step towards users having the transportability that they have been promised for 20 years, without having to reconvert to the nature and whims of operating systems and hardware. The ability of the few currently involved, and the skill and record of the rest of the firm are shown by their successes thus far, and users can approach the product with confidence. Welcome, RM-Cobol!

(Users or potential OEMers can contact Michael Saccomano at (408) 662-2522, or write RM-Cobol, Ryan-McFarland, 609 Deep Valley Drive, Palos Verdes, Calif. 90274.)

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SOCIOLOGY OF COMPUTING/Robert L. Glass

The Pressure-Cooker World of Proposals

Most of us who love the technology of software don't often have occasion to tinker with political tactics along the way.

And those who do blend technology and tactics have varying degrees of success at it. This is the story about someone who tried — and failed.

Have you ever worked on a proposal? If you have, you know it's a tension-filled, technology-concentrated, write-your-arm-off-to-the-wrist kind of hardly-any-fun adventure. If you haven't, congratulations! Your life, whatever else characterizes it, has been protected from a destabilizing kind of experience. In the pressuer-cooker world of proposal preparation, strange things have been known to happen.

When Philip Tenderfoot first joined the Microsoftware House staff, he had never heard of proposals. In fact, it wasn't until Phil finished his 14-month stay on Microsoftware's contract to build a Pascal compiler for the first computer-on-a-thimble, that he realized there was anything to working for a software company besides writing software.

But at that point, he found out quickly enough. No one sits around idle between assignments at Microsoftware. There are proposals to be written!

After all, a small company like Phil's spends all of its time doing jobs for other companies. Most of those jobs result from competitive procurements. If you want to build a Cobol compiler for Z-Hawk Computers, you write a proposal telling Z-Hawk how good your Cobol folks are at cramming a massive compiler into a miniscule memory, send the proposal like an arrow into the air, and wait to see where it (and the Z-Hawk Cobol job) fall to earth.

Now Phil was a fairly fast study. He wasn't too far into his first proposal before he realized that appropriate technology is only a part of the content of a winning proposal. There is also price. You not only tell the other company how great you are, but how cheap as well. And that's a tough technological highwire to tread. In cost-trade studies, rare indeed is the result which has both quality and cost on the same side.

So by the time Phil was assigned to his third proposal, he felt like he knew proposal writing well enough to have earned his merit badge at it. That surge of pride may have proved to be his downfall.

This particular proposal was trickier than most. The request for proposal (RFP) had been issued by the National Energy and Transportation Department (most people called it, somewhat derisively, Neat) and it called for three related software products. Neat had made a quantity buy on some Quadranova Superstar computers, and they needed a generalized report generator, a payroll application and a high-level simulation language compiler for their Superstars. Fast!

Phil felt pretty good about Microsoftware's proposal. For one thing, they'd built a lot of compilers, including one or two for simulation languages. For another, they'd written so many payrolls that the Microsoftware folk used to joke that there was Fica running out of their ears.

But most importantly, Microsoftware had a big leg up on the report generator problem. They had written a proprietary, generalized one over the last year, and it was just now ready for use. Better yet, its specs matched Neat's RFP's requirements to a well-crossed "T."

Move to Tactitian

It was at this point that Phil Tenderfoot crossed the line from technologist to tactitian. Why not gamble Microsoftware's proposal, he thought cleverly to himself, on their off-the-shelf RPG?

The tactic Phil evolved was clever. The RPG would be a price leader. Their figures there would be tighter than a Cheryl Tiegs swimsuit. If it lost money? No biggee. They'd make it up on the payroll and the compiler. By drawing the RPG price highwire tight, and mildly overpricing the other two, Phil felt he'd end up in the low total bid position and still offer a top-quality product.

The next word from Neat seemed to bear out Phil's tactics. Microsoftware was in the finals. There were a few questions to be answered, concentrated mostly on the technical quality of the RPG, but they were a breeze.

It wasn't until the award was actually made that the roof fell in on Phil. And it fell in a most peculiar way.

The good news was, Microsoftware had won! Phil's hand fairly trembled with excitement as he read the award letter. But why, he wondered idly, were two other winners named?

His idle concern moved swiftly into deep concern, and then despair. Neat, he quickly saw, had split the award in three. Each winner had won only one of the software products to produce. Guess which one!

Now the guy who writes the proposal at Microsoftware often ends up doing the job. And nobody — but nobody — wants to spend six months explaining to a manager at weekly activity reports why he's overrunning his budget.

READER COMMENTARY/Jerry Cashin

'Plugged-In' Solution the Latest Industry Fad

The ascendancy of so-called local networks, along with their imminent standardization, has given impetus to the latest fad in contemporary information processing — the call to link together into some form of communicating entity even the smallest of our computing systems.

Now, there are circumstances under which such interaction within appropriate environments may be desirable and productive. But there are certainly counter-situations where marriage of a lone, personal microcomputer to a local or public data network is a distortion of common sense and functional utility.

Yet there is a growing clamor for the wired approach, the plugged-in solution to each and every processing situation, no matter how ludicrous such a convoluted policy may appear.

Who are the purveyors of this monolithic plan for universal networking, for invasion of computer user domains at all levels of activity?

Primarily it is the marketers of local networks and their associated brethren. They proclaim the apostate nature of any who would dissent at their demands for universality and conformance to the orthodoxy of network integration. They bluster phrases such as "efficiency," "capability expansion," "wider access," "information dissemination," "increased user resources" and so forth.

Operational Scenarios

There are operational scenarios where qualities like these are useful, perhaps even necessary. But there also remain many contrasting circumstances where independent, solitary system implementation is both logical and necessary. Examples abound in academia, field sites, laboratories, homes, industry and small business. The technical entrepreneur may function quite satisfactorily with his micro system in an environment totally devoid of external interface.

The frenzied automata, however, vociferously demand linkage, plugged-in interaction, a homogenization of individuality in order to further communication efficiency. Yet their entreaties should be rejected! Rejected by all but those multidisciplinists who require external access. Progress in this era of communication may actually depend on tuning out the network proselytizers.

Communications in our times may literally impoverish those who embrace its ethereal charms. Its incessant cacophany of sound, data and images is future shock revealed. Where is there analysis, meditative review, reflective awareness when explosive volumes of new data are persistently and pervasively entering our consciousness?

How does one think, not react?

How does one review, not absorb?

How does one actively incorporate, not passively accept?

How does one implement, not progress in a sea of inertia?

How does one retain creativity and a genuinely humanistic resolution?

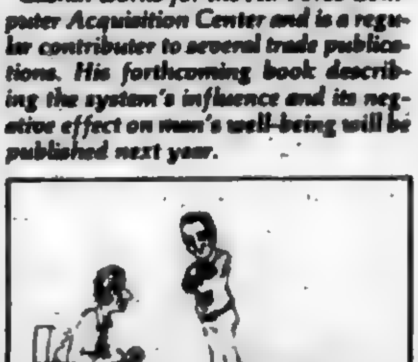
In many, many cases, one does these things just by pulling the plug, unwiring the network interface, restoring the individuality associated with an independent system. The exhortations of network salesmen that all smaller users out there should connect to their facilities is abhorrent. Within the virtues — and there are several — of the services they thrust at us are the harbingers of lost individuality.

We may fall prey to the allure of instant retrieval and far-flung access, the convenience of network resources, but it may not be all that it appears. What is initially perceived as expanding one's capabilities may actually result in a diminishment of independent development and progress.

If we have access to a larger system, it also has a measure of admittance to our own environment. It becomes, in a sense, an uninterruptable imposition. The network's demand for conformance and standardization could even alter matters of substance in the work being done, as well as mandatorily changing procedural conventions.

Let's slow the hype for universal networking and admit that there are some users who will be better off without it. In this context, a communication gap might be the best approach.

Cashin works for the Air Force Computer Acquisition Center and is a regular contributer to several trade publications. His forthcoming book describing the system's influence and its negative effect on man's well-being will be published next year.



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For example, if you compare the STC 4800 with today's streaming tape devices, there's no comparison at all. In data mode, a streaming tape will typically transfer data at a rate of about 20 kb per second, while the STC 4800 offers a data rate of 400 or 780 kb per second. When you use the STC 4800 to backup a high-

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[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

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For one thing, the 4800 is a tri-density subsystem. Thus, it eliminates the need for a separate, additional 800 bpi drive. This helps reduce your initial investment, as well as your total cost-of-ownership.

[illegible] 4800 tape subsystem can be diagnosed either on-site or remotely. In either event, if one 4800 drive goes down, it can be diagnosed in-line, and switched off-line without affecting the operability of the subsystem's operations. Further, built-in diagnostics also help ensure enhanced data availability. In fact, the STC 4800 has microprocessor-based diagnostics designed to make fault isolation faster and more effective by permitting the subsystem to be exercised off-line. And special "wake-up" diagnostics will exercise the memory, microprocessor, and interface at power-up to ensure proper operation.

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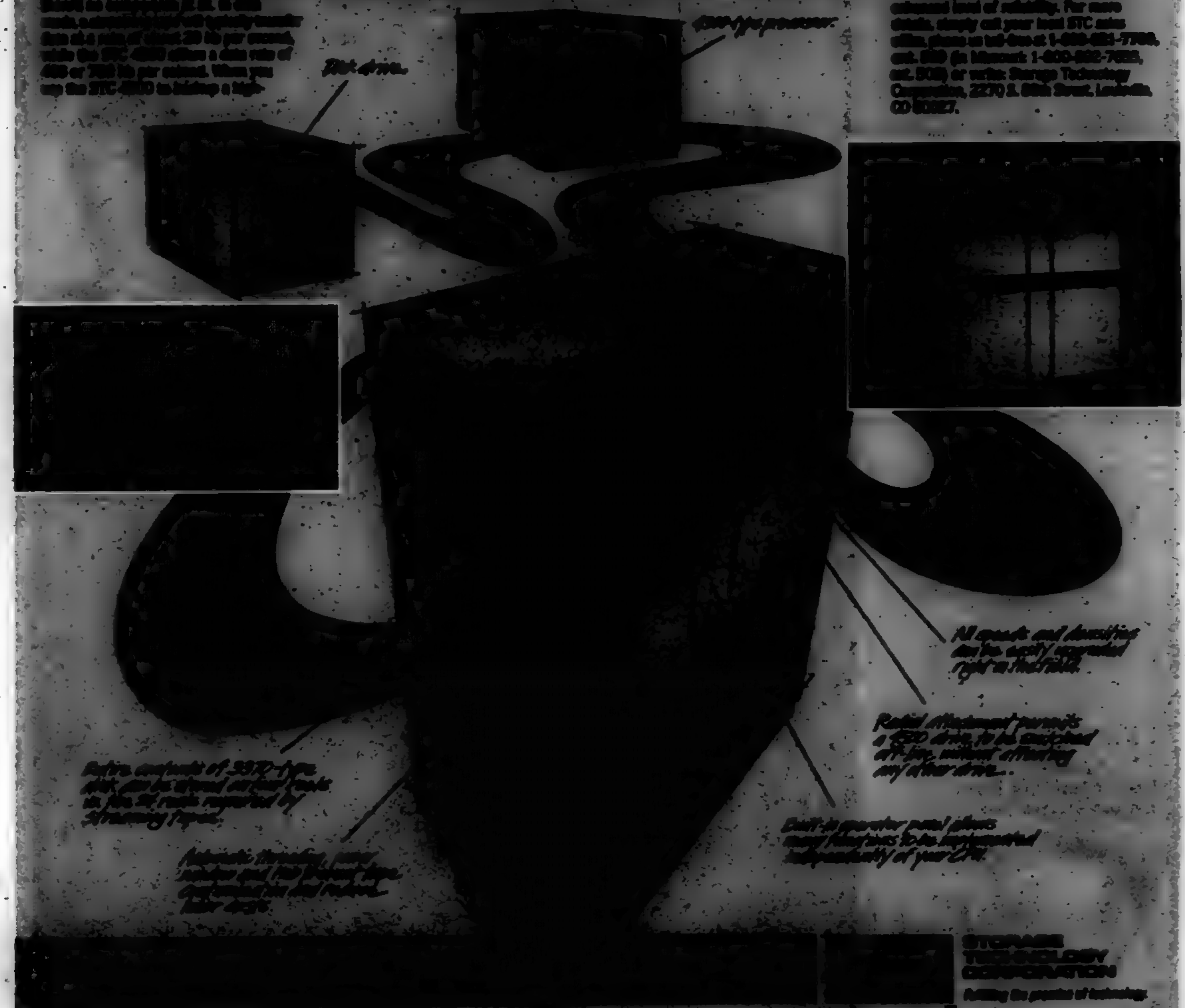

4300-type processor.

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LETTERS

A Cobol Parable

The recent controversy over the efficacy and proper use of various Cobol control structures brings to mind an old story regarding the wisdom of taking a bottle of vermouth along on an expedition. With certain details altered, the same story might be considered apropos the current dispute.

Smith was preparing for a long and dangerous safari. As he reviewed the list of provisions he would be taking, his friend Jones looked on with disapproval.

"You've forgotten the most important thing," he said.

"What's that?" demanded Smith.

"A microcomputer with a Cobol compiler. It's essential in case you get lost."

"A Cobol compiler? What good would that be?"

Jones explained, "All right, suppose you're hundreds of miles from civilization. Your guides have all deserted you and you're alone in the jungle.

"So you sit down and bootstrap your microcomputer — and that's where the Cobol compiler comes in. It saves you. You just write a short transaction processing program, and from all over the jungle people will jump out at you crying, "That's no way to code a PERFORM structure!"

"And you're rescued."

Matthew Lena

Emeryville, Calif.

All for Gnat

"Gnat Desktop Unit Based on Z80 MPU" [CW, June 23] caught my eye. Being new to the data processing field, I'd like to ask some "stinging" questions about Gnat Computers, Inc.

Is it a fly-by-night operation?

Will the System 10 take a large bite out of my DP budget?

Will I be stung by hidden costs?

Will IBM take a swat at Gnat Computers?

Shouldn't the random-access memory of 65K bytes have read "65K bites?"

Will I have any problems with disk drives flying off at the handle?

Is the software easy to debug?

In addition to Dsect and Csect instructions, will the Insect instruction be available?

If I suggest the Gnat computer, will my manager tell me to bug off?

Nevertheless, now if someone asks me "What's the buzz?" my unscreened response will be Gnat Computers, Inc.

John Kokotiuk

Woodstock, Conn.

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What's In a Name?

I've been reading your paper for some time, and the reference in articles and advertisements to the terms "programmer," "senior programmer," "analyst," "software analyst," "programmer/analyst," "systems programmer," and "systems analyst" has finally got to me. What are commonly accepted definitions of those terms? What kinds of jobs do they refer to?

I began programming before "computer science" was invented, and at the place I work we do not have such titles as listed above. (The DP programmers, systems programmers, scientific programmers and doodlers — entry-level to senior — are all called "programmers" here.)

In the course of writing and debugging a program I have to analyze what's going on, both in my program and in various aspects of the computer system; I should think that programming and analyzing are inseparable. So an "analyst" isn't just someone who analyzes. What is it?

Carolyn R. Hunt

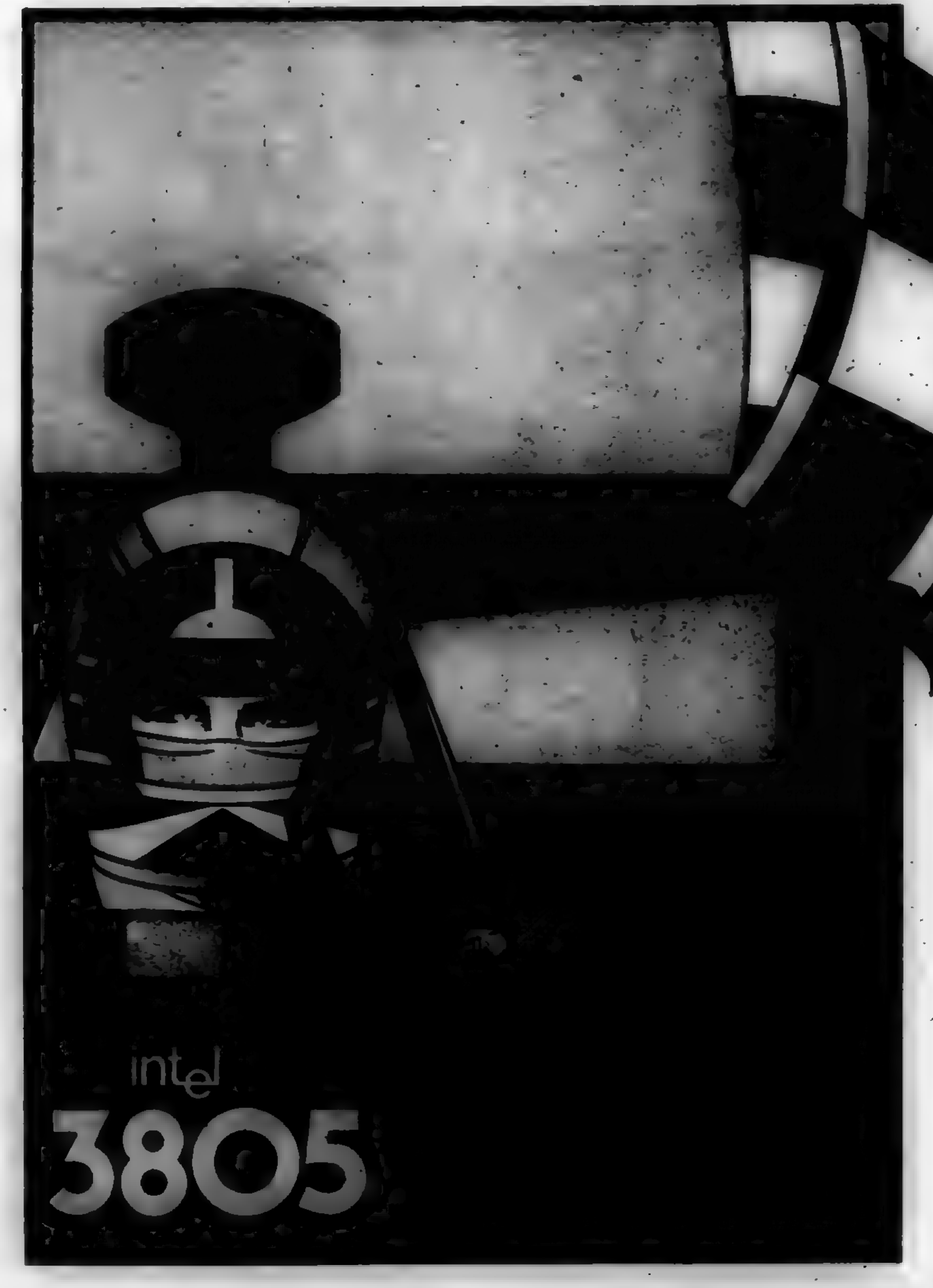
Livermore, Calif.

Job-Killer 'Myth'

Calvin Gotlieb's claim that "computers are job-killers" [CW, Oct. 13] proves that old myths die very slowly. The myth in this case is that the quantity of work to be done is static and that as machines cause the work to be done more efficiently, people are deprived of their share of that work.

Gotlieb cited "dozens of studies" showing people being thrown out of work by computers because companies were able to do the same tasks with fewer people. What he failed to point out was that this gain in efficiency enables companies to offer more goods and services at a cheaper price than before, increasing the value of the worker's effort and thus the value a worker — whether he remains at such a company or is forced to go elsewhere — gains from his salary. If fewer people are needed to do a task under new technology than under old, the greater productivity and availability of the workers under the new technology will give businesses an incentive to hire more people.

If it were true, as Gotlieb seems to believe, that a machine threatens workers when it lets one do the work two used



LETTERS

to do, then the ideal for workers ought to be a primitive economy in which their jobs are not "threatened" by any automation at all. Would Gotlieb claim that because it now takes only one man-day to drive a truck over a distance that would once have required several days of driving a horse and wagon, trucks have "thrown people out of work"? Does he object to the use of printing presses because they have caused unemployment among scribes?

It is obvious that these technological developments have not caused a static quantity of work to be done by fewer people, but rather have increased the amount that people can do with a given amount of effort. Computer engineers should not feel guilty, as Gotlieb suggests, that they have denied others the opportunity to do tedious jobs, but rather should be proud that they have made it possible to free people for more productive activity.

Gary D. McGath

Milford, N.H.

Double Identity

Yesterday I spent time on my lunch hour reading your Oct. 20 issue. The article by Phil Hirsch entitled "FCC, Congress Powerless to Hold Bell Accountable" was vividly brought to light late yesterday when I met with a Central Telephone representative.

I recognize Centel is an independent telephone company and, therefore, practices of Centel are not necessarily those that Bell would adopt, but here is the brief scenario of my meeting.

The central regional office of my employer, Tran Telecommunications Corp., is moving from Hinsdale, Ill., to Rosemont, Ill., to join our new parent firm, Amdahl Corp. Obviously, new telephones are required, and Russ Jordan, communications consultant of Centel, met with us to discuss telephones. I asked Russ if he represented the tariffed or unregulated side of Centel as we were buying the telephones. He said he represented both companies!

Upon my question of how does one do that, he replied, "I put my hours down depending on which side I'm representing." I couldn't believe what I heard and I just had to blurt out, "You are the epitome of the article in *Computerworld*." I apologized for using him as an example, but I couldn't help it.

The situation seems very clear to me for a representative's reporting of time to inflate the costs on the tariffed side and deflate the costs on the unregulated side. He responded, of course, that he wouldn't do that, but how can he even approach accuracy on how much time he spent on the "purchased" phones (unregulated) and how much time he spent on "lines and usage charges" (regulated). Well, Walter Hinchman appears to have identified the problem!

As a postscript, you would probably like to know that a new Centel tariff in service today makes purchase the only alternative for businesses. There is no more rental or lease of equipment from Centel. A businessman can third-party lease or buy and that's it!

Please don't ask me if one "buys" from Russ Jordan of Centel (regulated) or "buys" from Russ Jordan of Centel (unregulated)! There is only one Russ Jordan.

Clinton D. Warkow

Hinsdale, Ill.

If U Cn Rd Ths

It is getting to the point that unless one has a computer dictionary, one can't read *Computerworld*, with all the new abbreviations.

I have been in the computer business for more than 30 years and am familiar with many of the abbreviations, but the situation is getting worse and worse.

It would be nice if sometime CW would print a full glossary of these terms, including exact definitions.

Richard T. Austin

Fort Lauderdale, Fla.

Packed Zip Fields

A *Computerworld* article related to the nine-digit Zip Codes quotes Gary Whiting as saying "Mailing lists do not have adequate space for an expanded Zip Code on current files." I am certain many organizations have not "packed" the Zip Code field of five characters.

I am assuming that the new code will be nine numeric digits. By "packing" the field, one should be able to get the nine digits in the same physical space now occupied by the five digits.

If this technique is possible for a given user, it should save a significant amount of programming time in converting to the new Zip Codes.

G.H. Fochtmann

St. Louis, Mo.

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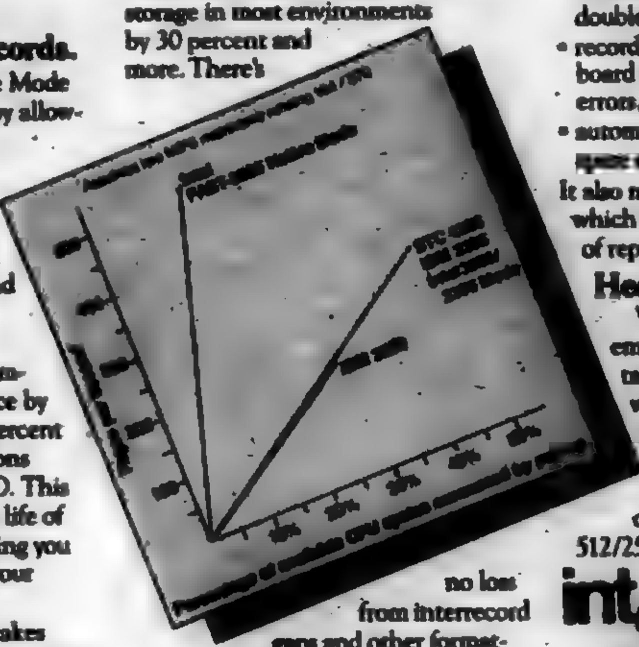

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READER COMMENTARY/James Hammerton

Structured Programming: A Little Deja Vu

Back in the beginning there was Flomatic; then there was Fact; later came Cobol. Back in the rosy but uncertain dawn of business DP, the proponents of those languages latched on to the idea that a programming language must be easy to read so that the user could attest directly to a program's functional correctness; easy to comprehend by successive replacement programmers so that the program could be maintained; and easy to change so that the program could be as dynamic as the business environment it purported to serve.

"Write it in English," Grace Hopper used to say, and she meant it. Some of us — a minority — believed. We embraced the idea of a standard higher level language as a major contributor to cost-effectiveness. We swarmed from the protection of our trenches into the no-man's-land of standardization. "Charge," said our leader — or, in honor of Captain Hopper perhaps it should be, "damn the torpedoes, full steam ahead."

The opposition was intense. In the name of preserving efficiency, not throttling creativity, the inhumanity of strait jacketing standardization, and programming professionalism, the opposition rallied its supporters. Many defected from our ranks; fleeing to the joys of assembly-level programming for minis, to the stimulating ramifications of APL, to the happiness of compiler and operating systems programming.

On the chosen battleground of business DP, disciplined progress by the Cobol troops was slow and measured in inches. Crossfire from established alternatives like Fortran and from IBM-only standards like PL/I threatened continually. From time to time, no-man's-land was illuminated by scintillating distractions such as APL and nouveau chick like Pascal.

Now, 20 years later, comes structured programming — the new revolution. It is said to be a potpourri of techniques: structured analysis, structured walk-throughs, chief programmer teams, continuous integration — presumably also structured — stepwise refinement (I wonder what that one looks like!) and whatever.

According to one definition, a structured program consists of blocks. The blocks can be combined using only three structural concepts — five, some say; six if you toss in a near version of one of the five.

Advocates assert that the Fortran language can be given a couple of simple extensions so that Fortran programs can be labelless and GOTO-less. Even Cobol programs can be structured. Now that's really counterattacking where it hurts.

The declared objectives of structured programming are various. The underlying one, however, appears to be the old three-pronged thrust — easy to read, easy to maintain, easy to change.

Discipline and Diversity

So, perhaps we should rejoice that discipline is triumphing over — or in spite of — diversity. Perhaps we should welcome abroad the disciples of Pascal, Watfor and APL. With a little encouragement perhaps they are ready to defect from the enemy and join us under our flag — our standard, so to speak.

But while some of us are smiling through our deja vu, we hear grumbling among the descendants of the users of Flomatic. A silk purse, they grumble, cannot be made out of a sow's ear.

Maybe they are right. Structured or not, for example, why would anyone choose APL to implement a basic business application? Why indeed? It is fun to write and even to test. But APL's file-handling capability is rudimentary — strictly a graft job. It has a certain power in its matrix manipulation which is not entirely irrelevant to business DP.

But its terminology is impenetrably mathematical — 'empty vector,' indeed! It is neither easy to read, maintain, nor change.

If you do not care for APL for business DP purposes, how about, say, Pascal? Too early to tell, you think? True, the question of a standard is only now being addressed. Also the question of standardizing is inevitably going to become entwined with some needed extensions to the language.

On the other hand, consider some of the advantages being claimed. One source asserts an advantage provided by enforcement of clear definitions of all variables and constants at the front of the program!

Now doesn't that sound like Cobol's Data Division? — Pedestrian, time-consuming, a bear to write, but a real contributor too, easy to read, easy to maintain, easy to change. Now you've really got me smiling through my deja vu.

My advice to the Cobol troops out there in no-man's-land is to stand your ground, wait for the flares to fade, consolidate the gains won over the last 20 years, then inch patiently forward incorporating any tested alternatives in the path of your advance.

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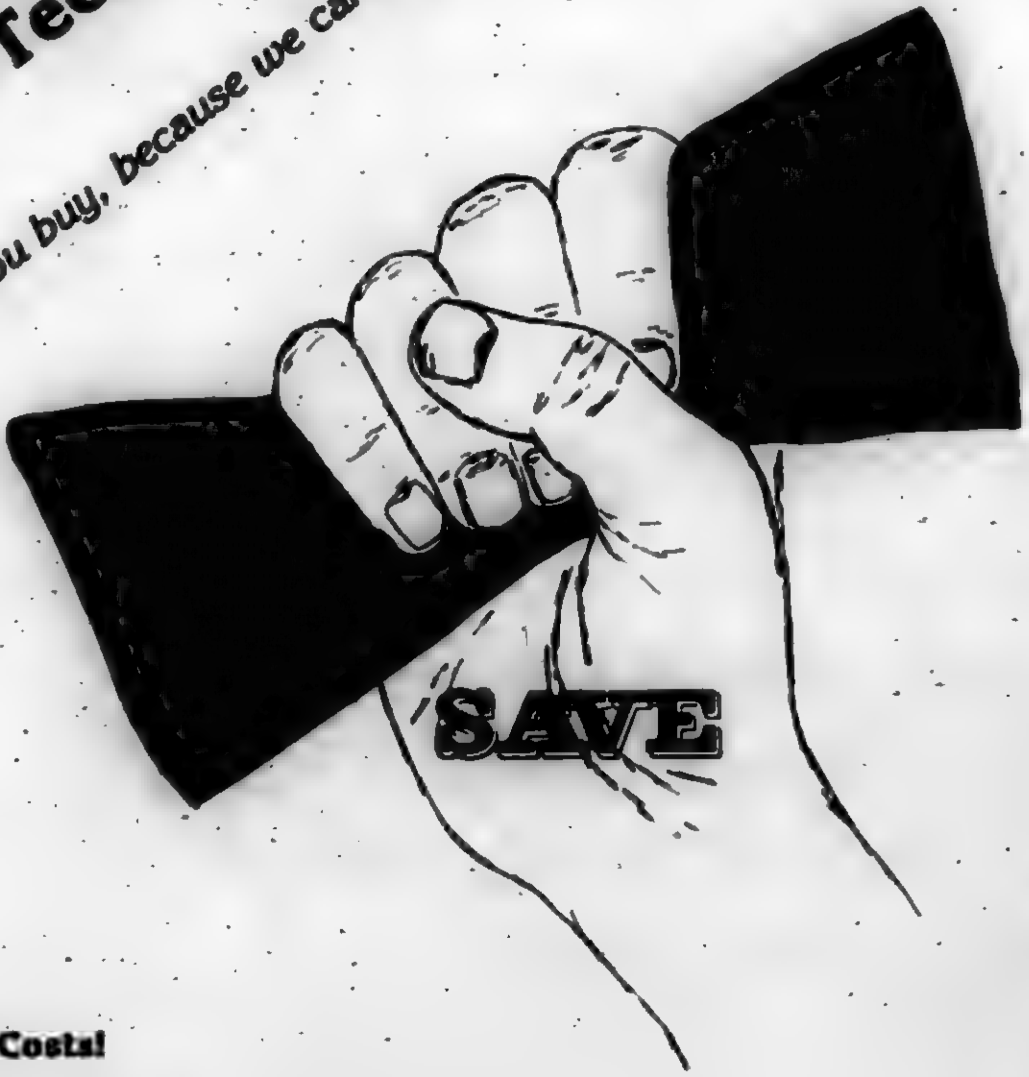

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READER COMMENTARY/Joseph Rigo

Technical Manuals: Where Do You Begin?

Pity the poor introduction.

Every technical manual has to have one, but it is one of the most abused elements in the system development process. People try to make it serve too many purposes.

An introduction has a few simple jobs to do.

First, it provides a gentle entry point for someone who knows nothing about the system. We can be certain that this person knows nothing about the system for the simple reason that no one else reads an introduction.

The introduction's next job is simply to explain what the system does. Usually the system performs one big function and half a dozen lesser tasks or subfunctions. The introduction briefly describes each of these functions within the context of the reader's larger job.

Next, it introduces the cast of characters. These are the system elements the reader must know about. The items in the list depend on whether the manual is for an end user or a maintenance programmer.

For example, an end-user introduction may state that the system prepares the payroll, supports remote terminals in 17 states and bakes rhubarb pies for Aunt Beth in marketing. It identifies the elements as a set of function menus, a master file and a large brick oven. For more information about baking pies, see Chapter 8.

A maintenance programmer's manual would look at these elements, especially the "master file," quite differently. The end user is more concerned with menus, displays and reports.

Last Job

Each of the functions and elements has to be described — briefly. For this reason, the introduction is usually written last. It is very hard to summarize a topic in a few words until after you have written about it in full detail.

Commonly, however, the introduction could be written at any point. The timing doesn't matter because the writer doesn't say much of anything about the system.

"This manual is divided into three parts," the introduction starts. It goes on to describe the manual in glorious detail.

The sad truth is that no one cares about the manual except the writer. The reader needs information about the system and its use. Until that information has been presented, the reader isn't capable of appreciating the wisdom of the manual's organization.

An introduction should also be simple-minded. It covers everything superficially. It is no place for detail.

This is where Aunt Beth and her fellow reviewers cause trouble. They get copies of the draft for comment and correction, and the first thing they see is the introduction.

For years Aunt Beth has been complaining about too much salt in her rhubarb pies. Now she has a chance to do something about it.

She digs into the manual. At the first mention of the pie-baking function, near the middle of page one, she inserts a strong warning against using more than 1/4 teaspoon of salt. Underlined and in capital letters.

Other reviewers do the same. When the draft gets back to the writer, the introduction is cluttered with debris from years of anger, frustration and visions of a brighter world.

All for Nothing

Almost all of these inserts are in the wrong place. They make the introduction disorganized, confusing and unreadable. Even worse, they accomplish nothing. No one will ever see them.

The newcomer cannot handle detail in the introduction. He either skims over the warnings or he just gives up trying to make sense out of it.

Experienced users never look at the introduction. They open the manual in the middle and flip to one of the detailed reference sections.

If Aunt Beth and the writer really care about the salt level, they will keep the introduction simple. They will put the warning in Chapter 8 with the detailed baking instructions. This is where it will be seen — with no need for underlining or capitals.

The same problem occurs again when the maintenance staff takes over the manual. All changes are inserted at the front.

After a while, every topic is discussed in two places. The reference section at the back has the detailed, step-by-step instructions. The disorganized mess at the front has all of the latest additions and changes. Usually the two discussions contradict each other enough that people give up on the manual.

Computers can tolerate disorganized programs. People won't put up with them. They will avoid using a system rather than cope with a bad manual.

Meanwhile, Aunt Beth's problem is real. A warning in the right place may fix it. In the wrong place, the warning just causes trouble.

And no one likes salty rhubarb pie.

Rigo is president of Sysdoc, Inc. in New York.

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Users Pick STSC, Avco Tops in RCS Poll

USERS' RATINGS OF REMOTE COMPUTING SERVICES

Company	[illegible]	Weighted Averages and Response Counts																																		
		Overall Satisfaction					Response Time					Up Time					[illegible]					Languages and Compilers					Application Programs					Technical Support				
		WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
ADP Network Services	5	3.4	3	1	1	0	3.2	2	2	1	0	3.6	3	2	0	0	2.8	1	3	0	1	3.0	1	2	1	0	3.0	1	3	1	0	2.8	1	2	2	0
Avco Computer Services	3	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0	**	0	1	1	0	3.3	1	2	0	0	2.7	1	1	0	1	3.0	1	1	1	0
Boeing Computer Services Co	5	3.6	3	2	0	0	3.8	4	1	0	0	3.8	4	1	0	0	3.6	3	2	0	0	3.6	3	2	0	0	3.6	3	2	0	0	3.6	3	2	0	0
Computer Sciences Corp	3	3.0	0	3	0	0	3.0	0	3	0	0	3.3	1	2	0	0	2.7	0	2	1	0	**	0	2	0	0	**	0	1	0	0	3.3	1	2	0	0
Comshare, Inc	6	3.5	3	3	0	0	3.5	3	3	0	0	3.3	2	4	0	0	2.8	0	5	1	0	2.7	0	4	2	0	3.4	2	3	0	0	3.0	2	2	2	0
Control Data Corp (Cybernet)	3	3.0	1	1	1	0	2.7	1	1	0	1	3.3	1	2	0	0	3.0	1	1	1	0	**	1	0	1	0	3.3	1	2	0	0	2.7	1	1	0	1
General Electric Co	12	3.1	3	7	2	0	3.2	4	7	0	1	3.6	7	5	0	0	2.8	2	6	4	0	3.2	3	7	1	0	3.0	2	6	2	0	2.8	1	7	4	0
Interactive Data Corp	3	3.0	1	1	1	0	2.7	0	2	1	0	3.3	2	0	1	0	2.7	0	2	1	0	**	0	1	1	0	3.0	1	1	1	0	2.7	0	2	1	0
McDonnell Douglas Automation Co	3	2.7	0	2	1	0	3.0	1	1	1	0	3.0	1	1	1	0	3.0	1	1	1	0	**	0	1	1	0	3.3	1	2	0	0	3.0	2	0	0	1
National CSS, Inc	7	3.3	3	2	1	0	3.3	3	3	1	0	3.6	4	3	0	0	3.3	2	4	0	0	3.4	3	4	0	0	3.4	3	4	0	0	3.3	3	3	1	0
Optimum Systems, Inc	3	3.0	1	1	1	0	2.7	0	2	1	0	3.3	2	0	1	0	2.3	0	1	2	0	3.3	1	2	0	0	**	0	1	0	0	2.7	1	0	2	0
STSC, Inc	3	3.7	2	1	0	0	3.7	2	1	0	0	4.0	3	0	0	0	3.0	1	1	1	0	3.3	1	2	0	0	3.0	1	1	1	0	3.0	1	1	1	0
The Service Bureau Company	15	3.2	5	9	0	1	3.1	2	12	1	0	3.5	7	8	0	0	3.1	2	12	1	0	2.8	1	10	3	0	2.9	1	10	3	0	2.6	1	8	3	3
Tymshare, Inc	3	3.3	1	2	0	0	3.0	1	1	1	0	3.3	1	2	0	0	2.7	0	2	1	0	3.3	1	2	0	0	3.3	2	0	1	0	2.7	1	0	2	0
United Computing Systems, Inc	9	3.0	0	9	0	0	3.1	1	8	0	0	3.0	1	7	1	0	2.9	1	6	2	0	3.0	2	4	2	0	3.2	3	5	1	0	2.9	1	7	0	1
All Others	20	2.9	4	15	0	0	3.3	7	12	0	1	3.0	7	15	0	1	2.7	4	13	10	2	3.3	8	12	2	0	3.1	5	12	6	1	3.0	11	7	10	1
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Datapro Chart

By Rita Shoor

CW Staff

DELRAN, N.J. – STSC, Inc. and Avco Computer Services, Inc. tied for first place in terms of users' overall satisfaction with remote computing services (RCS) in a recent survey made by Datapro Research Corp. here.

In the same category of overall satisfaction, McDonnell Douglas Automation Co. came in last with a rating of 2.7.

Both STSC and Avco received scores of 3.7 on a scale where four points were given for an "excellent" rating, three for "good," two for "fair" and one for "poor." The weighted average calculated from these results is listed on the chart above. In the places where two stars appear, the rating was considered invalid because fewer than three responses were received.

STSC was also rated No. 1 by its three user respondents in the "uptime" classification with a top score of 4.0. However, the same users gave the company a comparatively low score for its application programs.

Similarly, Avco maintained consistently good ratings except for the application programs category, where its score of 2.7 was the lowest of the firms receiving scores. (Note that averages were not calculated for Optimum Systems, Inc. and Computer Sciences Corp).

The high score for applications programs provided by the RCS

(Continued on Page 50)

'Dpro' Disk Pack Reorganizer Out

RESTON, Va. – Software Corp. of America is offering a disk pack reorganizer that reportedly makes disk pack reorganization easier.

Called Dpro, the package supports OS/MVT, OS/MFT, OS/-VS1, OS/SVS and OS/MVS environments. It also supports IBM's 2301 drum, 2302 disk, 2303 drum, 2305 drum (models 1 and 2), 2311 disk, 2314 disk and 3330 disk models.

The Dpro data collector and analyzer provides comprehensive performance and analysis data with minimum overhead, its vendor claimed. The analysis can be directed to a single file, to all files on a single volume or to all files on all volumes being accessed by a single computer system.

Reports are generated that show how volumes and files are being accessed and how these files should be rearranged so they can be accessed more quickly.

The unit costs $2,500 for a licensing fee, from P.O. Box 2695, Reston, Va. 22090.

Utility Aids JCL Operations

SPRINGFIELD, Mo. – A utility that provides operators with a means of reading Job Control Language (JCL) directly into the Power reader queue from IBM's Source Program Maintenance On-Line (SPMOL) program data set is being offered by Philinda Software.

PS-Submit can be used whether or not CICS is up or using that data set, the vendor said.

The utility provides up to 25 nested includes. It has no production card decks to drop or lose to a fire or other disaster and, since JCL is kept on the PROMGDS, SPM's facilities are used for backup and updating, the firm said.

The utility costs $425 and is available from Philinda Software, 527 W. Kett, Springfield, Mo. 65803.

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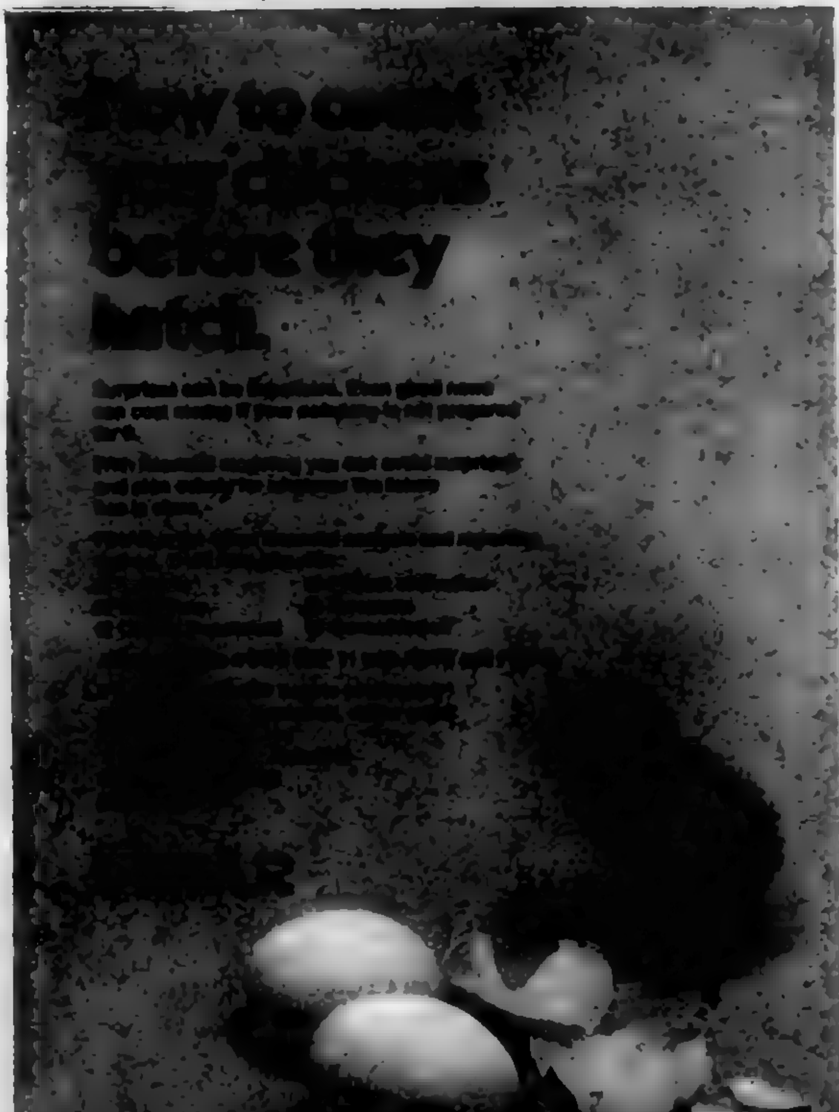

Univac 1100 Programs Made For Chemical Applications

BLUE BELL, Pa. — Univac has reached an agreement with Bonner and Moore Management Science, a Houston, Texas-based software house, to provide three software packages aimed at the oil refinery, petrochemical and chemical applications. The three programs, Gamma 4, the Refinery and Petrochemical Modeling System (RPMS) and Events, run on Univac's 1100 series mainframes.

Gamma 4 is a general-purpose data base manager for linear programming data as well as a generator for linear programming matrices and reports. It interfaces with Univac's FMPS for linear programming solutions.

RPMS is an application generator used for the formulation of linear programming problems in the refining, petrochemical and chemical industries. The package is written in the Gamma 4 language and converts problem statements written in engineering and economic terms to linear programming models, according to Univac.

Gamma 4 costs $642/mo.; RPMS costs between $60,000 and $130,000, depending on modules selected; and Events costs $15,000. Both RPMS and Events are available for a one-time licensing fee.

Univac can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

For Small Business

IBM Retail System Debuts

HELENA, Mont. — A small retail business software system that interfaces the IBM 5120 processor to the IBM 5260 retail system is being offered by Advanced Business Computing Corp.

The Retail Sales and Inventory Management Systems (Raims) was designed to process sales transactions logged on the IBM 5265 point-of-sale terminal's diskette.

A variety of reports are available, including several different inventory, sales and profit reports. The system will also automatically upgrade inventory stock levels with any sales or returns logged into the 5265, the firm said.

Raims was designed so the operator can use either the inventory or retail subsystem independently. Both may also be used on a stand-alone basis, according to the vendor. As many as 10,000 different inventory items may be stored on one diskette and up to four different pricing levels are possible.

A single license fee for the system is $2,950. The firm can be reached at P.O. Box 654, Helena, Mont. 59601.

'Zort' Facility Works As RT-11 Utility

NEPEAN, Ont. — Logicaid, Ltd. is offering a sort facility for the Digital Equipment Corp. PDP-11 that can be used as a standard RT-11 utility or be invoked in an RT-11 background job by subroutine or macro call.

The sort, called Zort, can be invoked from Macro-II, Fortran, Dibol and DBL programs, the vendor said.

The package costs $250. Logicaid is at 97 Craig Henry Drive, Nepean, Ont., Canada K2G 3S8.

STSC, Avco Top Survey

(Continued from Page 57)

firms was received by Boeing Computer Services Co., which scored only a tenth of a point behind the two first-place companies in overall satisfaction.

Noteworthy Ratings

Ratings for application stories are noteworthy, Datapro said, because while cost and accessibility were considered almost equally important criteria during the users' evaluation process, the applications available from the vendor were also described as being of high, although secondary, importance.

Datapro speculated that the high priority given to applications availability might be interpreted as indicating that most of the respondents rely on the programming expertise of the remote computing service rather than assume the expense of developing their own tailored applications.

Based upon a question about the type of applications that were being processed by the RCS, it appears that these off-site services are being used extensively for mainstream DPO applications involving accounting, financial planning, marketing and manufacturing as well as the traditional engineering and scientific calculations.

Besides its applications programs, Boeing received high scores for its response time, operating instructions and training, languages and compilers and technical support from its users.

Most Responses

The Service Bureau Co. (SBC) and General Electric Co. were the firms with the largest number of users responding to the survey — 15 and 12, respectively.

Six of the 15 RSC firms represented by three or more users scored higher than SBC's 3.2 rating, which in turn was immediately above GE's 3.1 score in overall satisfaction. SBC represented the low end of the scale in the technical support category with a rating of 2.6.

Survey results were based upon some 72 respondents to a Datapro questionnaire that solicited user experience and ratings with remote computing and time-sharing services.

Because 40 of the users were customers of more than one service, separate ratings were provided for a total of 112 responses.

The report, which includes various comparison charts and a look at what to expect from the remote computing industry in the next few years, costs $14.

Datapro is located at 1805 Underwood Blvd., Delran, N.J. 08075.

'Ctop' Version 2 Targets Terminals Under CICS 1.4

DALLAS – Version 2 of the CICS Transmission Optimizer (Ctop), a data stream compression package for remote terminals running under CICS 1.4 or above, has been released by H&W Computer Systems, Inc.

With Ctop installed, all applications approach the transmission efficiency of ALC programs using native mode 3270 conventions, H&W said.

As Ctop automatically removes blanks and redundant sequences, it simultaneously inserts 3270 control characters to present a compatible screen or print line to data stream and SCS terminals, according to the firm.

Intercept Code

Ctop's CICS intercept code is completely dynamic and Ctop is installed, activated and deactivated at any time without reloading or affecting the normal operation of CICS, the firm claimed.

Various statistics modes present displays of the overall network and individual terminal transmission savings. Several user-defined variables to control the compression algorithms and the overhead are provided.

Ctop reduces the transmission overhead associated with such productivity aids as command-level Cobol, Tape, UFO, BMS and DMS. The compression ratios vary from 12% to more than 60%, H&W said.

Ctop provides a 5% to 20% reduction for most native mode 3270 applications, a 20% to 50% reduction for BMS- and DMS-based applications and up to 60% reductions for print lines, the firm said.

The site license for Ctop is $1,900, and source libraries can be obtained from H&W at 1750 One Dallas Centre, Dallas, Texas 75201.

Package Aids Manufacturers

ANDOVER, Mass. — Software International's on-line, "closed-loop" Manufacturing Resource Planning (MRP) System is now available for the Hewlett-Packard Co. 3000 and Prime Computer, Inc. and Microdata Corp. processors.

The Net Change MRP System was designed to give greater management control over inventory costs, production schedules and materials by reflecting the actual states of the operation at all times. Engineering changes, unanticipated scrappage and inventory adjustments are all observed, a spokesman said.

The functional capabilities for Master Production Scheduling (MPS) permit master scheduling at any, or at multiple levels of the bill of material, the vendor claimed.

The Shop Floor Control with Capacity Planning Subsystem was designed to extend system capabilities to more thoroughly support control of shop floor activities.

The system is priced from $20,000 to $200,000, depending on computer configuration, the vendor said from Elm Square, Andover, Mass. 01810.

Transaction Journal Joins Banktran Line

TRUMBULL, Conn. – Bunker Ramo Corp. has added a transaction journaling package to its Banktran software line for the Bank Control System 90.

The Electronic Journaling Package/-Standard Transaction Package (EJP/-STP) can operate within mainframe protocols of IBM 3270 in bisync or SDLC modes or on Burroughs Corp.'s TD700 or TD800 units.

The package allows users to record each transaction on a disk file and project it, when called, on a user's CRT terminal screen, the vendor said.

The program is a no-charge addition to the Banktran package from 35 Nutmeg Drive, Trumbull, Conn. 06609.

Prime 50 Gets Interpreters Giving IBM-Type Functionality

PONTIAC, Mich. – Mips Software Development, Inc. has unveiled two APL interpreters with IBM-compatible functionality for Prime Computer, Inc. Prime 50 series computers.

APL/Large Workspace (APL/LW) and APL/Large Workspace Shared Files (APL/LWSF), provide functionality corresponding to IBM's VSAPL and APLSV and are the industry's first commercial APL offerings on a 32-bit mini, the vendor claimed.

Both products support the features of APL found on other implementations, including all APL operators, system variables, system commands, I-Beam functions and system functions. Interpreter efficiency is promoted by the internal use of atomic progression vectors and count logic for multiple references to similar blocks of data, a spokesman said.

Compatible Systems

The shared-file system on APL/-LWSF is compatible with file systems of the major APL time-sharing companies for ease of conversion to Prime. In addition to the component files used widely by time-sharing companies, the product also supports binary sequential and Ascii sequential files.

APL/LW licenses for $8,900 and APL/LWSF for $11,500, the vendor said from Suite 202, 1899 Orchard Lake Road, Pontiac, Mich. 48053.

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McCormack & Dodge Enters Mini Field

System/34 Users Get 'GL Plus' Release

NEEDHAM, Mass. – McCormack & Dodge Corp. has entered the minicomputer field with the release of its latest financial software package.

The System/34 version of the G/L Plus general ledger/financial analysis system is said to allow IBM minicomputer users to utilize the vendor's software previously available only to large mainframe users.

The package reportedly features such components as unlimited network hierarchy, error recycle capabilities, on-line data entry and edit, on-line data collection and report writers.

G/L Plus System/34 serves both stand-alone or network applications, according to the vendor. In developing G/L Plus for the System/34, the same programs that were run in 128K bytes for mainframe packages have been designed to run in 64K, the vendor said.

HP 3000s

The package – written in Ansi Cobol – is also available for Hewlett-Packard Co. Model 3000 computers. G/L Plus System/34 costs $29,500; an introductory price of $25,000 applies through Dec. 25.

McCormack & Dodge is at 560 Hillside Ave., Needham Heights, Mass. 02194.

Package for PDP-11s Updated

FARMINGTON, Conn. – Computer Covenant Corp. has announced Version 2 of its manufacturing package for small to medium-size Digital Equipment Corp. PDP-11 processors.

The package includes controls for materials inventory, bill of materials maintenance, job costing, labor distribution, factory scheduling and capacity planning, according to the vendor.

The next version of the package, already under development, is slated to include computer-aided design and computer-aided manufacturing.

The package costs $20,000, the vendor said from 790 Farmington Ave., Farmington, Conn. 06032.

'PMS' Tracks Team Progress

ATLANTA – A software package that provides the basic information requirements for control of large or small project teams is being introduced by Escape, Ltd.

The Project Monitoring System (PMS) provides weekly reports that are based on an original schedule and a revised estimate-to-complete. Schedules are developed for each project team member consistent with the overall time frame and estimated effort.

In addition, each week, team members enter their actual hours and reestimate the effort required to complete the activity. Reports for each team member are produced showing estimating and scheduling variances.

The users manual explains the concepts in more detail and shows how to install and use the system. The package can be purchased for $125 and the source code (Ansi-66 Fortran) is included.

Escape, Ltd. can be reached at P.O. Box 18797, Atlanta, Ga. 30326.

'Solos' Targets IBM, DEC Minis

CLAYTON, Mo. – An order entry and processing system for medium size manufacturers and distributors is available from STS, Inc. It is suitable for Digital Equipment Corp. and IBM System/34 computers.

Solos, is task-related and automates and coordinates each function from entry through picking, shipping to invoicing, and collection of receivables, the vendor claimed.

The system is especially suited to handle situations where the supplier sells to large national retail organizations, typically against blanket orders.

The one-time license fee is $35,000, the vendor said from Suite 604, 7751 Carondelet, Clayton, Mo. 63105.

'Docs II' Features Financial Analysis

MANCHESTER, N.H. – An enhancement to general ledger software that allows analyses of financial trends and also generates all Aicpa financial reports is being introduced by Infotecs, Inc.

The Infotecs Docs II enhancement features income statement and balance sheet programs that allow reporting of up to 30 profit centers in any combination. It can generate profit center comparison, comparative income statement trends, balance sheet trend, cash flow trend and statement of change trend reports.

The enhancement provides a work sheet with subtotals and expanded trial balance net change capability, permits any report in a new fiscal year to be run before closing the past year and allows comparisons with preceding years. The system was designed for the vendor's Control Center 2 expandable microcomputer or its IMP system.

Part of the General Ledger System for Accountants, the Docs II enhancement costs approximately $400/mo including hardware from One Perimeter Road, Manchester, N.H. 03103.

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The Menace of Micros

By David F. Stevens

One of human beings' more popular pastimes has always been the prediction of the end of the world. Some predictions, such as the Armageddon of the Revelation of St. John, are the result of inspiration, divine or otherwise. Others, such as the original Malthusian prediction or, more recently, those of the Club of Rome, have arisen from the development of input/output models of greater or lesser accuracy. A third category, one of the favorites of the disaster school of science fiction writers, springs from the uses and abuses of technology. We are concerned here with one of these.

There are several standard avenues down which we can follow technology to our destruction. The first proceeds from the laboratory of the mad, misunderstood or frustrated scientist. This road, exemplified by Dr. Frankenstein's creation, has often not been followed to the end (that is, the good guys often win), although the potential is always there.

The second major avenue is that of technology out of control. It has three major branches: the accidental catastrophe, the unforeseen consequence and the deliberate seizure of control by the technological creation. The computer that raped Julie Christie in order to produce progeny in the movie "Demon Seed" is a modern example of the last of these.

A well-traveled byway, which is often related to one of the above, is the mutual annihilation drama: for it is often started by a mad scientist or soldier (Dr. Strangelove) or an accident or act of God (the string of coincidental failures that started it all off in *Fail Safe*).

The last major theme of technological destruction is that of overdependence of technology, to the extent that man loses some essential skill, mental toughness or the physical strength to survive unaided (the big-headed intelligentsia encountered in *The Time Machine*, for instance).

In What Sense 'Demise'?

Before I examine the particular track down which the microcomputer will carry us, however, I would like to explain what I mean by the phrase "the demise of Western civilization." And I will begin *that* by explaining what I *don't* mean.

In a trivial sense, every major technological advance has destroyed the civilization that existed at the time of its introduction into everyday life: the steam engine pushed us out of the fields and into cities, the automobile out of the cities and into the suburbs. The movies gathered us in huge crowds in darkened halls, television returned us to our own — darkened — living rooms. The compass and chronometer made intercontinental travel possible, the airplane makes it trivial and the present advances in communication technology can be expected to make it unnecessary.

This is NOT the demise I mean.

The tapestry which is Western civilization is the result of a continuous — but perhaps not always monotonic — developmental process that has been going on for thousands of years through all the vicissitudes such a span of time implies. Not all of its threads have been continuous or constant. The relative roles of "science" and "religion," for instance, have been at times united, at times in conflict; when in conflict, each has had its times of supremacy.

Some threads *have* been continuous, however. It is my belief that some of those persistent threads have been essential, that without them Western civilization — the civilization that developed the microcomputer — could not have come into being.

It is also my belief that one of the consequences of the development of the microcomputer will be the severance of one of the most crucial of these threads. Furthermore, I believe that the ensuing disruption will cause the whole fabric to tear in an irreparable fashion. That the result will be the end of the human race or even the end of civilization I much doubt, although the possibility should not be dismissed out of hand; that it will be the end of Western civilization I have no doubt whatsoever.

How It Won't Happen

There is common speculation about at least four possible dismal futures the microcomputer can help to bring about: total unemployment, the revolt of the robots, the misapplication of genetic engineering and the ultimate Terminal Man. I will begin by dismissing them.

Total Unemployment. This particular specter has been raised with the introduction of each new labor-saving device since time began (the log-rollers probably protested the invention of the wheel), and each time, in fact, quite the reverse has prevailed. The spinning jenny may have done the work of 1,000 women, but hundreds of thousands were eventually needed in the mills. The automobile may have put the horse out of business, but Henry Ford saw to it that many more mechanics are needed than blacksmiths, many more oil industry personnel than haymakers. The computer itself was hailed (or cursed) as the end of any of a number of occupations; the computing industries now support many more people than the computer has displaced.

In the actual event, it is the nature of

(Continued on In Depth/6)

Every revolutionary technology has been accompanied by Cassandras who prophesy the end of the world. But unlike Cassandra, they have all been wrong.

With the microcomputer, a new generation of Cassandras is appearing. They too, for the most part, are wrong. Their error is not in their conclusion — for the microcomputer *will* bring about the end of Western civilization — but in their concentration on technological consequences.

It is rather a *social* consequence — the willful disintegration of society — which will be the motivating force.

But Cassandra's tragedy was that no one listened to her.

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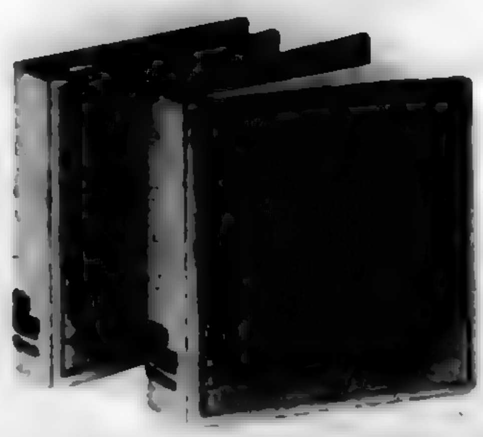

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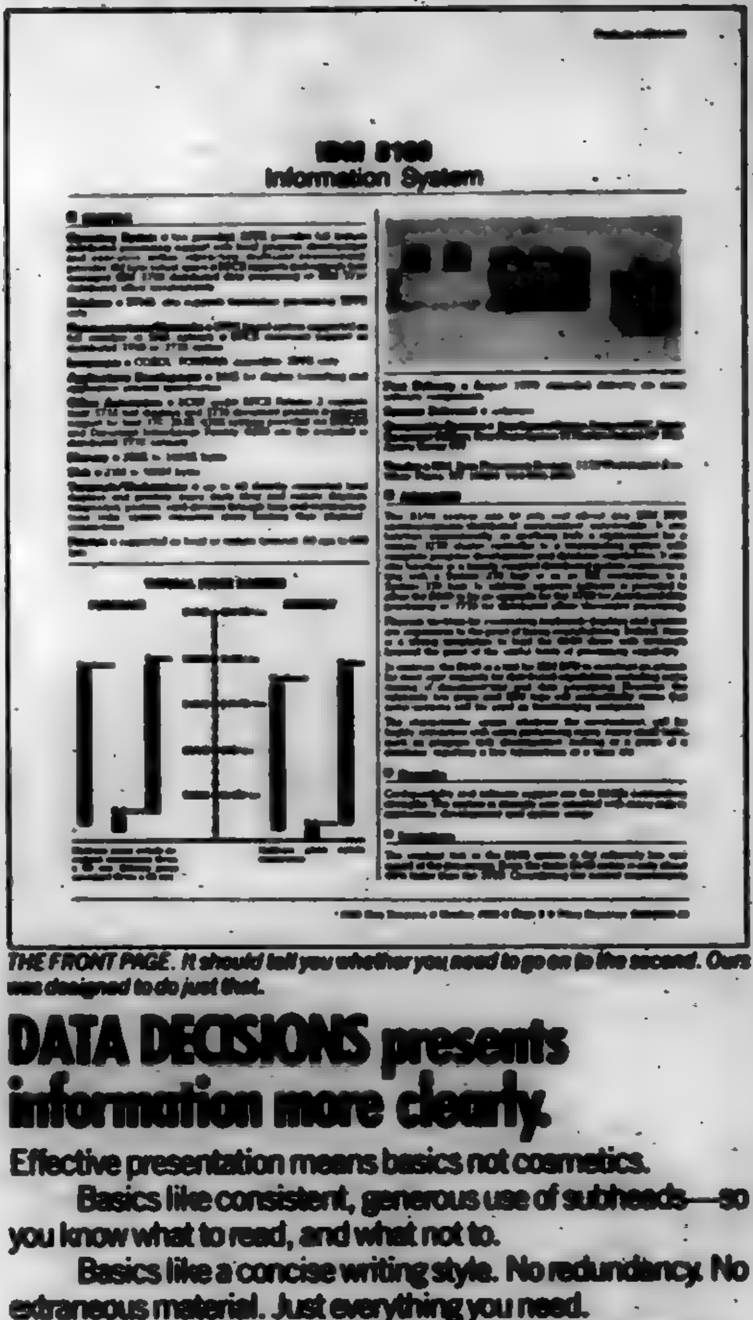

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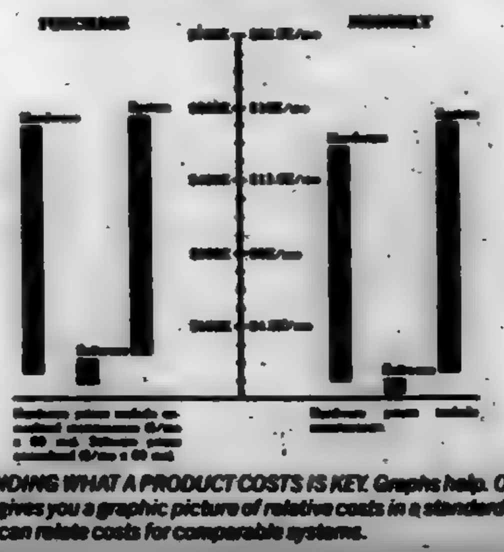

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(Continued from In Depth/1)

the work that changes, not the size of the work force. While it is true that each new tool has displaced some workers from traditional tasks, it is also true that each new tool has encouraged humans to attempt ever more difficult challenges and these new challenges have led to totally new occupations.

There still remains an ample supply of problems that are beyond our capacity: real-time weather prediction, positive weather control, the domestication of the earthquake and the volcano, colonization of the moon, regeneration of lost or broken limbs or organs — the list is endless. One assumes that the microcomputer will contribute in some measure to the solution of some of these problems or their preliminaries and in so doing will generate whole industries even the science fiction folk have not yet dreamed of.

Furthermore, the microcomputer will help combat unemployment in another, more important, way by providing opportunities for the previously unemployable. A few of the contributions in this area are:

- Artificial voices for those who cannot speak.
- Workstations for the sightless.
- Simpler and finer controls for prosthetic limbs.
- Communication for those paralyzed by stroke.
- Augmentation of brain power for the mentally handicapped (thus reversing the traditional division of labor between human and machine).

Again, I am sure this list is incomplete and the next decade will see advances beyond my wildest speculations.

As an aside, I might note that there are two opposing schools of thought on the unemployment issue. One is implicit in the term "universal unemployment"; the other might prefer to use "opportunity for expanded leisure." Whether you find the absence of labor to be a Utopian situation and devoutly to be wished, or whether you believe that it is only the Devil who makes work for idle hands, I believe you are worrying about the wrong problem. The microcomputer will not put the human race out of work.

The Revolt of the Robots. There are those who think such a thing could not happen because of the Asimovian Laws of Robotics. There are also those who think the robots may never hear of Dr. Asimov. This section is addressed to the latter group.

It seems to me that the principal prerequisite for a true Revolt of the Robots is the simulation of the human brain in very nearly equivalent volume and without cryogenics. (I can think of no creation more dependent upon the maintenance of a high technology than a cryogenic brain. The miniaturization necessary to get both the brain and its cooling factory into some sort of reasonable volume is awesome to contemplate.)

However, let us for the sake of argument assume the occurrence of a Revolt of the Robots. I claim that in the absence of the annihilation of the human race, such a revolt will *not* end Western civilization, *regardless of which side is victorious*. Obviously, if humans win, they will repress — and possibly lobotomize — the robots. (This will lead to the creation of the Society for the Prevention of Cruelty to Robots [SPCR], which will work diligently to improve the conditions of robot life.)

It is not in people's nature to turn their backs on a convenience simply because it is recalcitrant. Humans will therefore NOT extirpate the robots, but may overspecialize them and try to deny them any interrobot communication in an attempt to keep them under control. Either we will succeed or we shall have had a successful Revolt of the Robots.

In this case we shall have a situation in which robot is master, human is slave. This event will undoubtedly slow the progress of Western civilization, but it is unlikely to result in its end. There are two major reasons for this. First, because the robots are unlikely to do other than simply reverse the original roles of robot and human and maintain the existing civilization. But more important, because slavery has been an important concomitant of much of Western civilization from its very beginnings in ancient Greece.

The human race knows how to deal with slavery and how to survive serf-

(Continued on In Depth/8)

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(Continued from In Depth/6)

dom. Humans have been subjected to many forms of mental and physical enslavement including domination by conquest, by fear (of this world or the next), by economic chicanery (indenturing and the company store), by patronization, by mass hysteria and by drugs. The species has always survived.

And while history shows that we don't study it carefully enough to avoid the pitfalls of the past, it also shows that we continually climb out of the pits and are occasionally somewhat the better for the experience.

A successful Revolt of the Robots would simply be yet another pit, which would not contain us for long. It would also not materially change the outward attributes of Western civilization, but merely provide, temporarily, a new set of beneficiaries.

A final opinion: Unless and until the robots develop a sense of humor and the ability to act irrationally, they will never understand humans well enough to dominate them. In any case, whether or not the microcomputer brings about the Revolt of the Robots, the Revolt of the Robots will *not* bring about the demise of Western civilization.

The Improper Application of Genetic Engineering. This whole area is such an emotional one that it is probably best if I begin by stating a prejudice and a presumption.

1. I am opposed to genetic engineering on a number of moral and philosophical grounds, none of which is germane to this discussion. The opposition itself may be germane, however, for it may distort my view of this portion of the future.
2. I believe it is going to happen, soon, and that the microcomputer will play a major role.

Experiments in genetic engineering will go forth, with or without the blessing of the legal, social, religious or professional establishment. The essence of human history is the posing of ever more difficult tasks and questions which, when once posed, nag at humanity until they are accomplished or resolved.

Genetic engineering is but the logical extension of earlier work in the biological sciences. Whether or not we approve of genetic engineering, we are standing on its threshold, and humankind is not known for pausing at such thresholds for reflection. The threshold, then, will be crossed and the microcomputer will play a part. What then?

Almost certainly there will be some great disasters and perhaps a giant stride forward or two. (I find it impossible at this juncture to imagine which direction might be construed as "forward.") But neither the triumphs nor the disasters will rend the very fabric of Western civilization. Pretty much by its very nature the changes wrought by genetic engineering must be slow ones, and Western civilization has shown itself to be quite adept at accommodating itself to slow change.

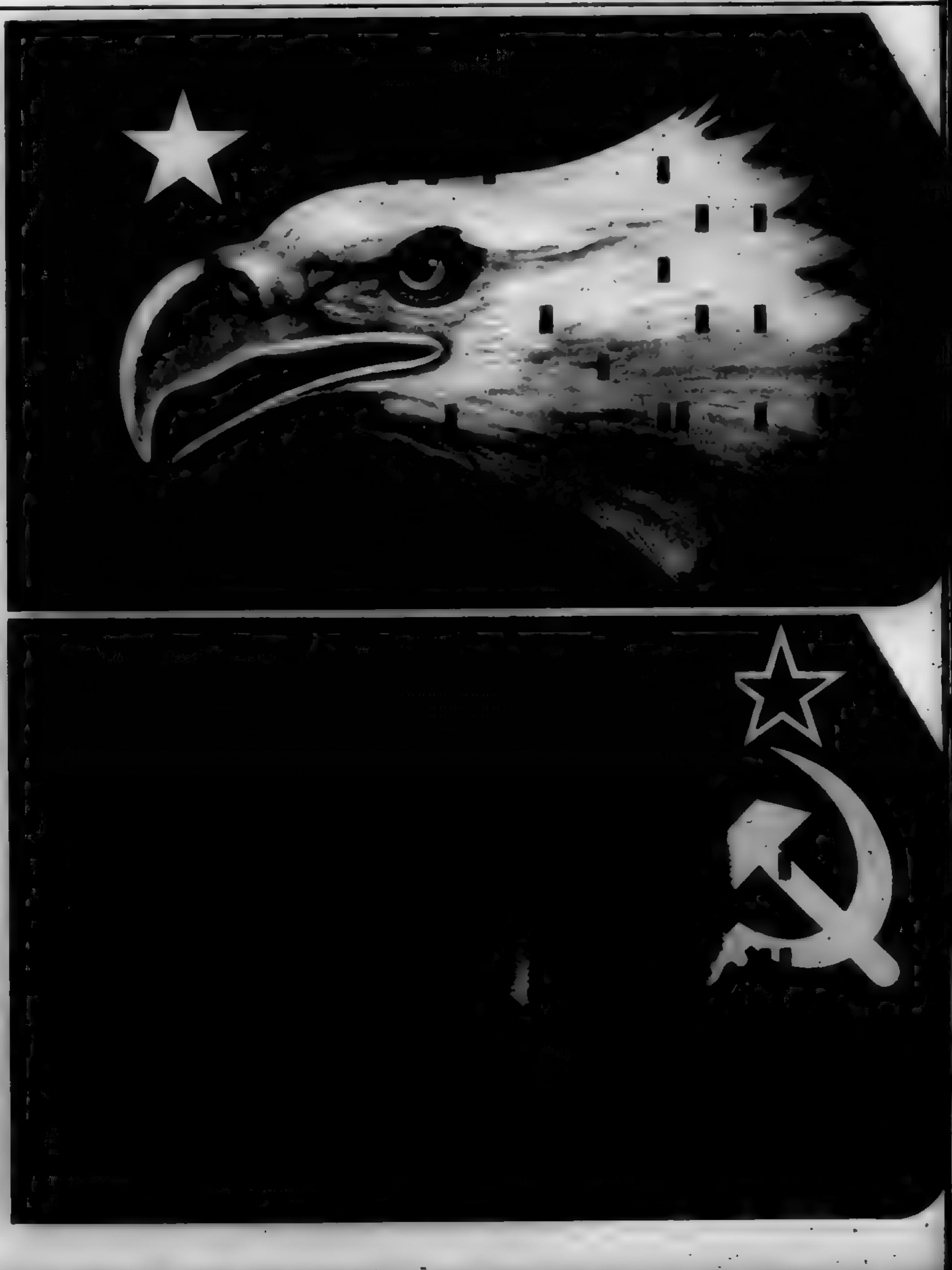
The effect of genetic engineering on Western civilization will be less profound and more gradual than the effect of television.

The Ultimate Terminal Man. The Ultimate Terminal Man, as a result of the implantation of microcomputer-controlled sensors, receivers, servos and other mechanisms, will be capable of more than human operation but possess less than human volition. This will not be a new phenomenon, but merely a substitution of microelectronics for the psychological, hypnotic and chemical means that have been used for such ends for centuries. The Ultimate Terminal Man is thus seen to be a form of robot constructed from rather perishable material and with rather high maintenance costs; the discussion of the Revolt of the Robots, therefore, pertains to this case also, leading to the same conclusion.

In summary, while it is indisputable that the microcomputer can accentuate these four threats, they are not really new ones, and Western civilization can be expected to survive them. One should always remember that the Good Guys will have micros, too!

The Real Reason

The real reason none of the situations described above will come to pass is that Western civilization will be dead; a victim of the microcomputer, long before any of these other influences will have a chance at it. Some of these events, indeed, may happen, but if so



they will happen as consequences of the demise of Western civilization, rather than as causes.

What, then, is it about the microcomputer that will bring about the end of Western civilization? Which essential thread will it break? How can we best characterize this phenomenon?

These questions are most conveniently answered in the reverse order. The phenomenon can be characterized in a single word: isolation. The essential thread is face-to-face communication. Western civilization cannot survive without it.

A person, in order to retain his humanity, must remain in face to face communication with other people. All masks and intermediaries distort the message and dehumanize the person.

The automobile provides an admirable example of this effect. People who are polite and courteous in person, and who remain so to their passengers, frequently become aggressive and impatient as drivers. The walls of the automobile serve to divide the universe into two portions: the smaller one — within — where friends may be found, and the great outside which is peopled by enemies, antagonists, fools and incompetents.

Recent technology as a whole, in fact, appears to possess a definite bias toward increasing the isolation of individuals.

Television is more isolating than either radio or the movies. Radio drama, by forcing the listener to apply his own resources to flesh out, in his mind's eye, the bare sounds, somehow managed to create an identity and feeling of kinship which has escaped television. Television, by contrast, feeds the viewer so much information that use of his own imagination is strongly impeded, if not entirely prevented. And while the movies flood the viewer with as much information as television, at least they involve him in the pseudo-social exercise of leaving his den and mingling with other people, with some of whom he may have actual face-to-face conversation.

'Walking' Earphone

A more recent phenomenon is the "walking" earphone. Conrad Aiken wrote a very poignant short story of a child falling into the isolation of schizophrenia as his "Silent Snow, Secret Snow" cut him off from the rest of the world. Walking earphones are little less than a voluntary dive into a far from silent, but quite secret, snowbank.

Before looking specifically at the microcomputer, let us consider the role of computers and computerniks in general in the increasing isolation of humans. The first point to note is that people who work with computers generally prefer computers to people. Their failures at communicating with real people in the design and construction of their systems are legion and legendary. It is therefore not surprising to see them push Hermes as a substitute for person-to-person or even telephone-to-telephone conversation, or to push Planet or Delphi as a substitute for face-to-face conferences.

Delphi in particular has an impressive weight of authority behind it, but to work it must be tightly controlled: so tightly controlled in fact as to be extremely manipulable.

On the other hand, the absence of such control can lead to the following sort of teleconference experience: A teleconference was established to coordinate a number of people whose offices were in the same or adjoining buildings. A simple misunderstanding arose concerning the vocal distribution of information which was not then entered into the conference. The result was an edict that no information could be considered valid if it did not appear in the teleconference. This did not quite require an insertion of Peano's axioms so that we could discuss arithmetic, but nearly so. What *did* develop was the Interactive Pie-Throwing Conference, a juvenile exercise in vituperation and graffitic one-upmanship.

The second point, of course, is the astonishing number and variety of ways in which machines in general, and computer-controlled machines in particular, already come between two people engaged in transactions which in simpler times would have been person-to-person. Vending and change machines are obvious examples. Another is the telephone, which was bad enough when it merely stood between two people, but which now may hide

(Continued on In Depth/10)

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(Continued from In Depth/9)

another machine — a tape recorder or a speech synthesizer — at the other end. One can turn to the computer for "companionship" in the form of participation in such human games as chess, bridge and poker. Even procreation is not immune to the intervention of the machine.

And so we finally come to the question of the specific role of the microcomputer: How is this little device going to exploit the present tendency towards isolation to bring about the demise of Western civilization? In brief, by bringing total isolation within the reach of anyone who wants it.

We are surrounded by ample evidence of how this will come about. Essentially any profession — except the world's oldest — could be followed in complete isolation. It is already common to do all of one's shopping by telephone and mail; the microcomputer will make it possible to extend that to the remote ordering — and even fitting — of *tailor-made* clothes.

Computers are already assisting in medical diagnoses. It will not be long before microcomputers will be able to monitor all one's vital signs 100% of the time with 99% accuracy, not to mention the automatic specimen analyzer that will be built into the toilet of the future.

And speaking of analysis, it will no longer be necessary to leave one's womb, even for psychoanalysis.

It is not necessary to elaborate. The microcomputer will enable one to live his entire life without face-to-face contact with another human being.

But just because complete isolation is possible, why would anyone — or more particularly, everyone — want it? Because it is there, for starters. Because someone else has it. Because the machine is efficient as a way of delivering individualized services.

But most important, because it is safe. To meet people face to face is to risk involvement, and involvement is certain to result in pain. Most people will willingly eschew the possible joys of direct contact in order to escape the certain pain. And as face-to-face meetings become more rare, people will forget how to conduct them, the pain will become sharper and more certain and the withdrawals more prolonged.

As might be expected, the computer folk will lead the way. The home terminal is the first step of the great shift away from the office and into the home. As computer-powered toys become ever more seductive there will be ever less reason for unfiltered interpersonal communication.

Writing in the *San Francisco Chronicle*, Charles McCabe has characterized the influence of television as a "new loneliness [which] is an inhuman condition, a deliberate removal of self from the concerns which have always moved human beings. Worse, it is an abdication of self."

This abdication of self is a technologically induced change that Western civilization cannot withstand. The result may be chaos or another civilization (I think the latter). It may be better or worse than Western civilization (right now, I'd put my money on worse), but it will not be Western civilization.

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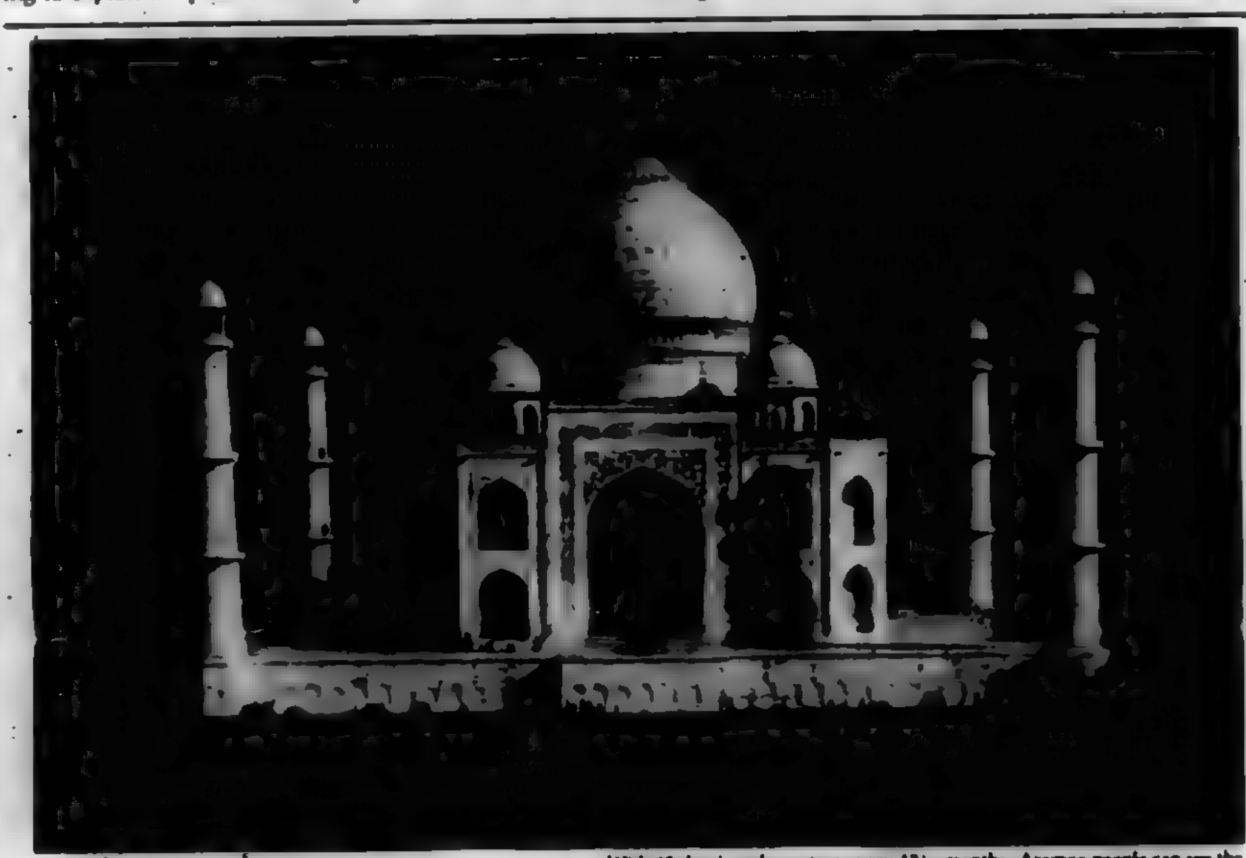
He has published widely in the trade press; this is his second article in Computerworld, *an effort supported by a contract with the U.S. Department of Energy.*

Stevens holds a B.A. degree from the California Institute of Technology and an M.A. from the University of California, both in mathematics.



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The Codec Connection

BY THEODORE VAECHES

Telecommunications systems of the future will use millions of integrated circuits in PBXs, channel banks and transmission systems. The most important linear IC telecommunications developments have involved coder/-decoders, better known as codecs. Codecs perform the complicated task of translating the analog voice signal into an appropriate pulse-code modulation (PCM)-formatted digital code for transmission across data highways and, at the receiving end, restoring the voice signal from the transmitted digital data.

To better appreciate the codec function, it is helpful to examine the structure and organization of the telecommunications network and the concepts involved in converting analog data into PCM-formatted digital code.

In the Beginning

In 1876, Alexander Graham Bell patented the first workable telephone and demonstrated it at the Centennial Exposition in Philadelphia. Two years later in New Haven, Conn., the first telephone network was installed, interconnecting 21 subscribers through a central switchboard or switching center. In the years that followed, many other networks were installed, with an ever-increasing number of subscribers requiring service.

Early telephone systems had manual switchboards to interconnect subscribers, and transmission was limited to one conversation per transmission path. As the number of subscribers increased, switching centers became more complicated and more transmission paths were required for efficient operation.

It soon became apparent that more sophisticated switching and transmission techniques were needed to provide telecommunications services economically. A switching hierarchy was developed to effectively utilize switching offices and transmission paths; multiplexing techniques were devised to enable simultaneous data transfer over a single transmission path.

Switching Hierarchy

The basic function of the telecommunications switching network is to provide an interconnection between any two subscribers on the network via transmission paths and switching centers. In switching network design, there is a trade-off between the number of transmission paths and the number of switching centers; if fewer switching centers are used, more transmission paths are required.

The network should be structured to minimize overall cost and to provide a service with a low probability of failing to establish a connection. Also, alternative routing must be available for routing calls to their destinations when some part of the primary transmission path is busy or damaged. This capacity extends the versatility of the network but introduces switching complexities.

The switching scheme selected to avoid unnecessary complications consists of a hierarchy of switching offices in a successive star-type configuration.

There are three types of switching offices in the hierarchy — local central offices (also referred to as end offices), tandem offices and toll offices (see Figure 1).

Local central offices provide the first level of switching and connect subscribers to the telecommunications network. All subscribers within a given area are connected via local loops — individual transmission paths — to a single local central office. Subscribers within the same area may be interconnected directly through the local central office.

Subscribers within the same city but in different areas may be interconnected by a second level of switching that establishes transmission links between local central offices. These transmission links, called trunks, are made up of many multiplexed transmission paths for simultaneously handling multiple conversations.

A large city may have so many local central offices that it is not economical to have trunks connecting all of them. In that case, the local central offices are interconnected via a tandem office.

To connect subscribers from different cities, calls are routed through toll offices. There are four levels of toll offices in the switching-center hierarchy — toll centers, primary centers, sectional centers and regional centers (see Figure 2). Toll offices are connected by intertoll trunks that provide high-capacity transmission links.

In general, switching priorities are established so that the subscriber will experience minimal delay in completing a connection. The path chosen at each switching level minimizes subsequent switching, using additional switching levels only when a primary transmission path is blocked.

Multiplexing for Economy

One way to reduce the possibility of a blocked transmission path is to extend its signal-handling capability by multiplexing the transmitted data.

There are two methods for multiplexing signals (see Figure 3) — frequency-division multiplexing (FDM) and time-division multiplexing (TDM). Data to be transferred can be thought of as occupying a two-dimensional continuum of frequency and time. The quantity of information that can be carried is proportional to the time period and to the frequency range (bandwidth). If the quantity of information to or from a single subscriber is less than the physical facilities can carry, the available space can be divided into either frequency slots (for FDM) or time slots (for TDM), so that information from several subscribers may be transmitted over the same physical path.

The first multiplexing technique used in telecommunications networks was FDM, an analog transmission technique. Data from several subscribers is used to modulate carrier frequencies separated from each other by a given bandwidth (guard band). These modulated carriers are all amplified and

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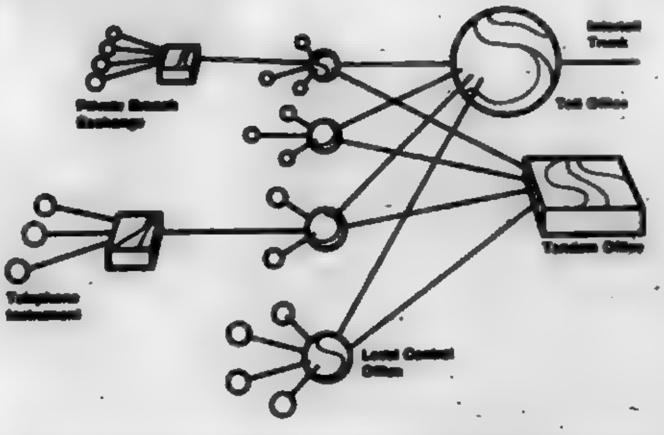

Figure 1. Types of Telephone Exchanges (Switching Centers)

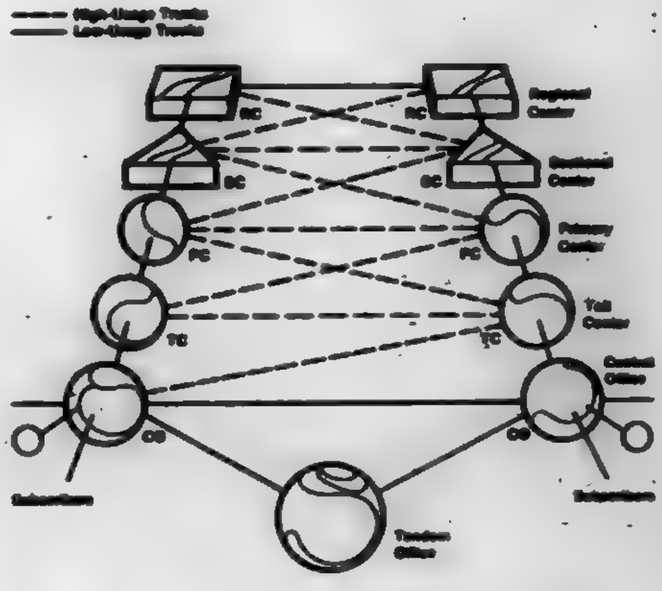

Figure 2. Hierarchy of Switching Centers in Bell System

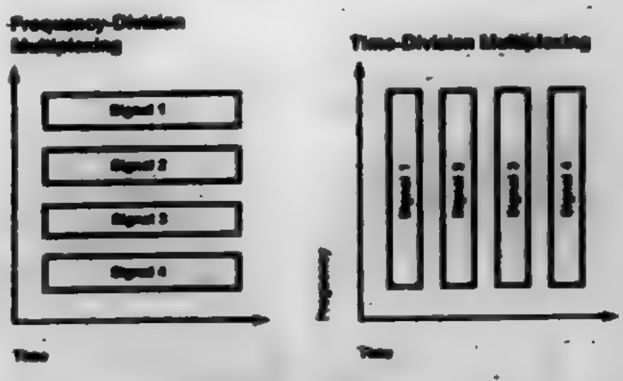

Figure 3. Methods of Multiplexing

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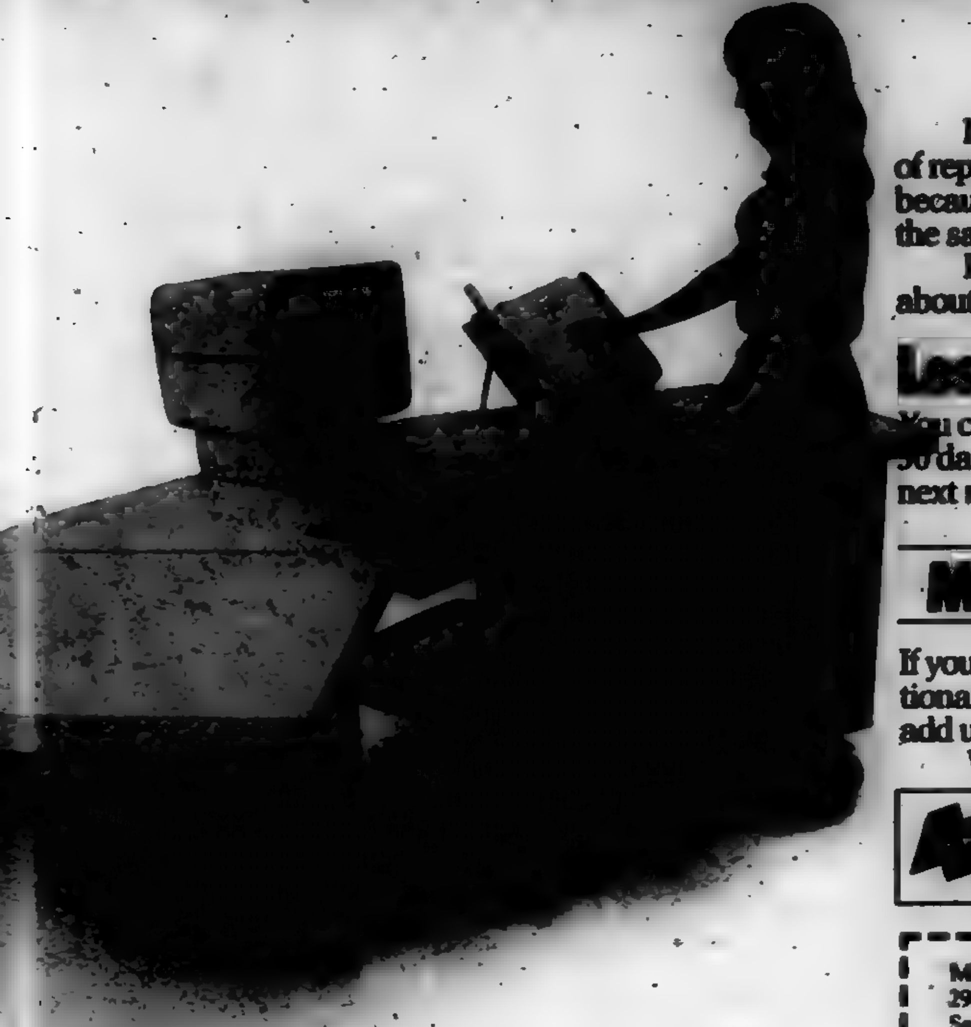

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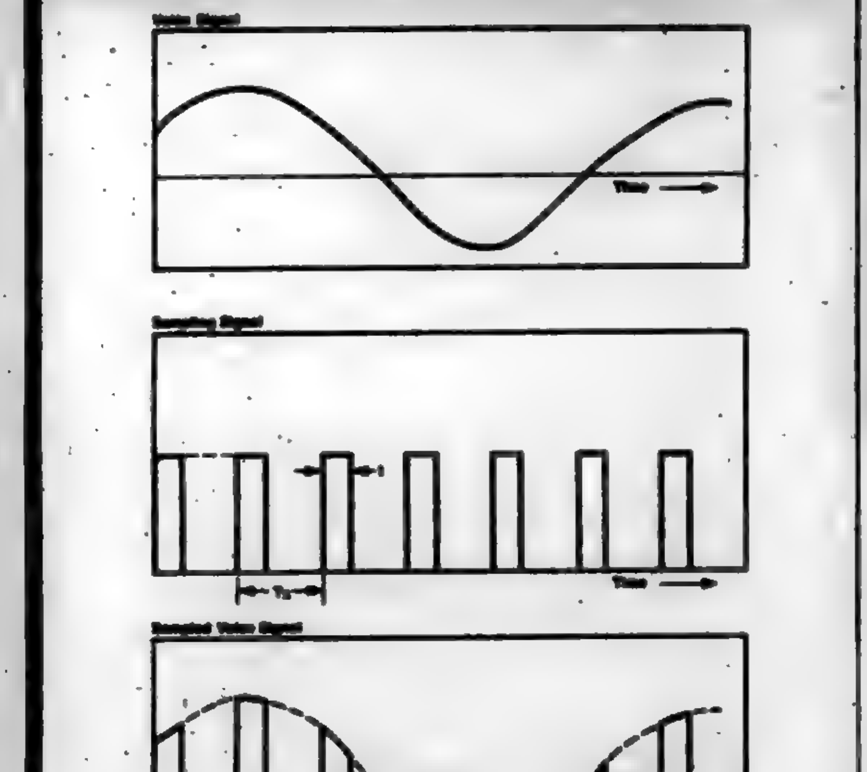
DIFFERENCE

IN DEPTH


Time
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t = Width of Sampling Pulse
T_s = Period of Sampling Frequency

Figure 4. Sampling Process

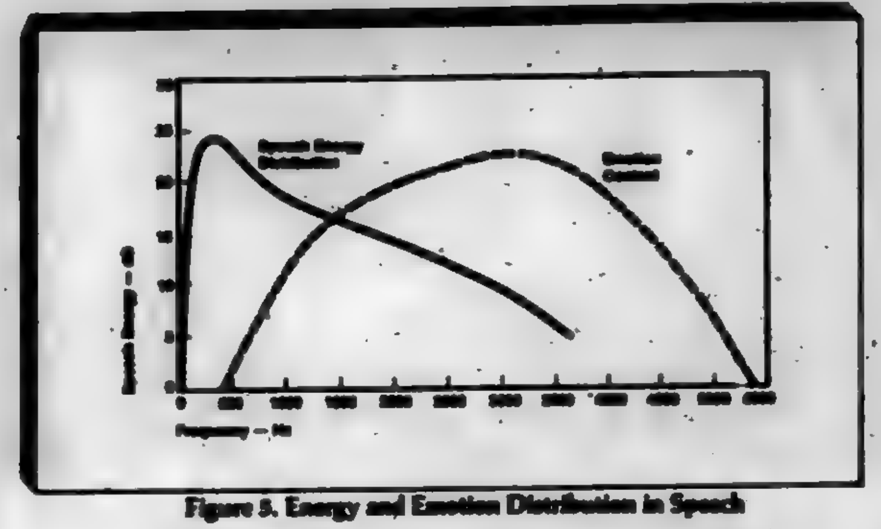

Figure 5. Energy and Emotion Distribution in Speech

(Continued from In Depth/11)

transmitted together over a single data path, then demultiplexed at the receiving end.

Today about 60% of the trunk lines in the U.S. employ FDM. Implementing FDM requires filters of exact prescribed characteristics and highly linear amplifiers. In addition, transmission over long distances is difficult because of noise, crosstalk and other distortion that accumulates over the transmission path.

In the alternative method – TDM – digital signals are interleaved over a basic time period called a frame. Each signal is assigned a time slot within the frame in which to transfer information. The process is repeated in each frame so that the physical transmission path is shared among a number of signals.

TDM has many performance advantages over FDM. Digital switching networks are easier to maintain than analog, have fewer components for higher reliability, require less space and are easier to install. In addition, digital information is easily regenerated, eliminating the effects of noise, crosstalk and other distortion. Another advantage is versatility since information from a variety of sources can be more easily multiplexed and switched in digital form.

PCM Processing

To interleave voice signals with TDM, the voice (analog) signal is first converted into digital form using the PCM technique.

The basic principle underlying this technique is the sampling theorem: If a band-limited signal is sampled at regular intervals of time and at a rate equal to or higher than twice the highest significant signal frequency, then the sample contains all the information of the original signal, which may then be reconstructed by the use of a low-pass filter.

Once the band-limited analog signal has been sampled (Figure 4), the samples are quantized into a finite number of discrete levels and each level is assigned a digital code that represents the quantized sample. The digital code can then be transmitted in place of the analog signal and decoded at the receiving end to reconstruct the original signal. Thus, the basic processes of the PCM system are sampling, quantization and coding.

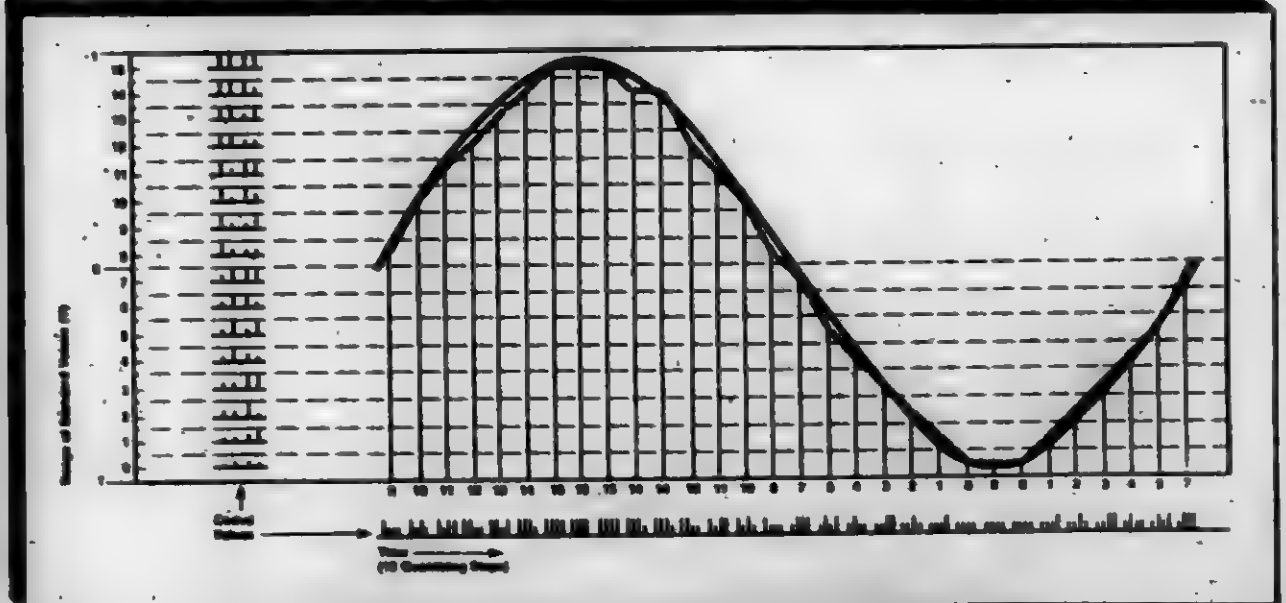

Figure 6. Example of Linear Quantization Process and Binary Coding

Understanding the sampling process requires a basic knowledge of the speech signal. Although the voice frequency range extends from about 100 to 8,000 Hz, the major speech intelligence and energy contents fall within a bandwidth of from 200 to 3,400 Hz (Figure 5). Therefore, if a voice signal is band-limited, using filtering techniques, to a frequency of 3,400 Hz, little information content is lost and satisfactory signal fidelity can be maintained.

Better Use of Paths

Application of the sampling theorem shows how band-limiting can result in more effective use of the transmission paths. Without band-limiting, the voice signal must be sampled at a rate of at least 16 kHz to avoid distortion (aliasing). That is, 16,000 samples must be transmitted each second for each voice signal multiplexed. Band-limiting to 3.4 kHz with a guard band that extends to 4 kHz lowers the required sampling rate to 8 kHz. Since only half as many samples must be transmitted for the band-limited signal, twice as many signals can be multiplexed.

The amplitude level of a sampled voice signal may be any one of an infinite number of levels. If every one of these levels were represented by a code, the code would be infinite in length, and transmitting information economically would be impossible. For this reason, the sample is quantized before coding. In quantization, the sample amplitudes are limited to a finite number of discrete levels.

When a signal is sampled, the nearest discrete level is used in place of the true signal level. Each of the finite number of discrete levels is then assigned a code, the length of which is proportional to the number of discrete levels in the quantization process (Figure 6).

In determining the number of discrete levels, there are two conflicting requirements – signal fidelity and transmission bandwidth. Signal fidelity reflects the ability of the system to reconstruct the original signal from the quantized signal.

Decreasing the distance between discrete levels in the quantization process improves accuracy in reproducing the

THE CODEC CONNECTION

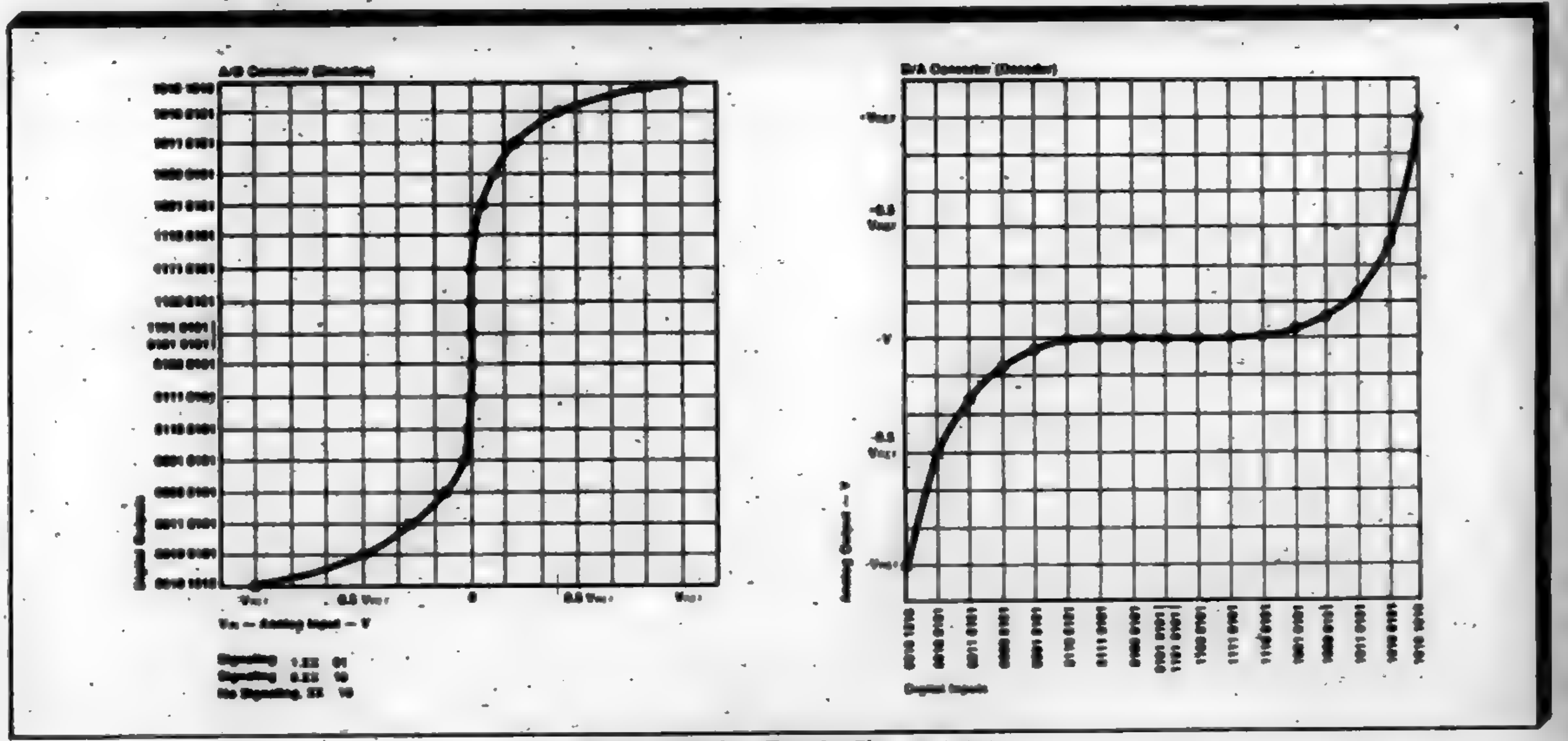

Figure 7 μ-255 Law Transfer Characteristics

original signal by reducing the maximum difference between the true signal and the selected level. However, this increases the number of discrete levels and thus increases the code length. As the length of the code increases, the bandwidth required to transmit the signal also increases, reducing multiplexing capacity.

When linear quantization techniques are applied with constant steps between discrete levels, samples with 13-bit representations (12 bits plus a sign bit) are required for adequate fidelity. This is actually the low-signal-level requirement, since at larger signal levels, adequate fidelity can be maintained with less resolution. Based on this consideration, nonlinear *companding* quantization techniques were developed to reduce the number of bits in the code representing the samples.

Companding

Companding techniques maintain a relatively constant signal-to-distortion ratio (fidelity) over the wide range of levels required by the speech signal by using small step sizes at low signal levels (high resolution) and progressively larger steps at larger signal levels (lower resolution). With companding techniques, acceptable fidelity levels can be obtained with only eight coding bits.

At the present time, two companding algorithms are in wide use — the Bell system μ-255 Law in North America and the CCITT A-87.6 Law in much of the rest of the world. The μ-Law and A-Law differ in transfer characteristics associated with the analog/digital (a/d) and digital/analog (d/a) conversions (Figures 7 and 8). These transfer characteristics are approximated by codecs through a piecewise linear technique.

In each case, the 8-bit code is divided into a sign bit, three chord or segment bits, and four bits for step selection with a given segment. Within each segment, quantization is linear and step sizes are uniform. However, moving away from the origin, the step sizes double for each successive noncolinear segment (Figure 9).

In the μ-255 Law, the first segments on each side of the origin are colinear and have the same step size (Figure 10). Also, the μ-Law has a midstep condition or dead zone around the origin so that for an idle channel the digital code will reflect a zero level, as long as the noise level is less than the step

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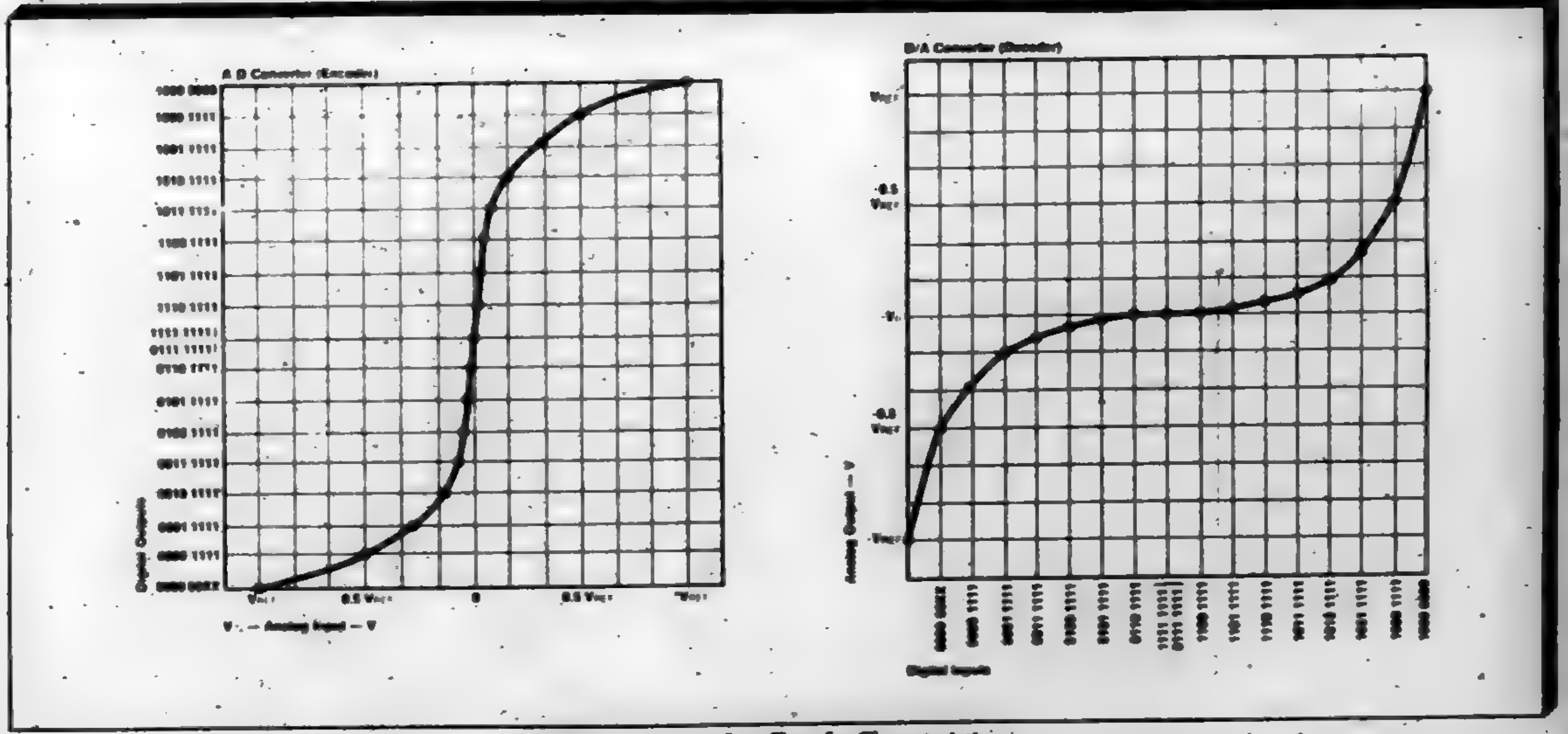

Figure 8. A-87.6 Law Transfer Characteristics

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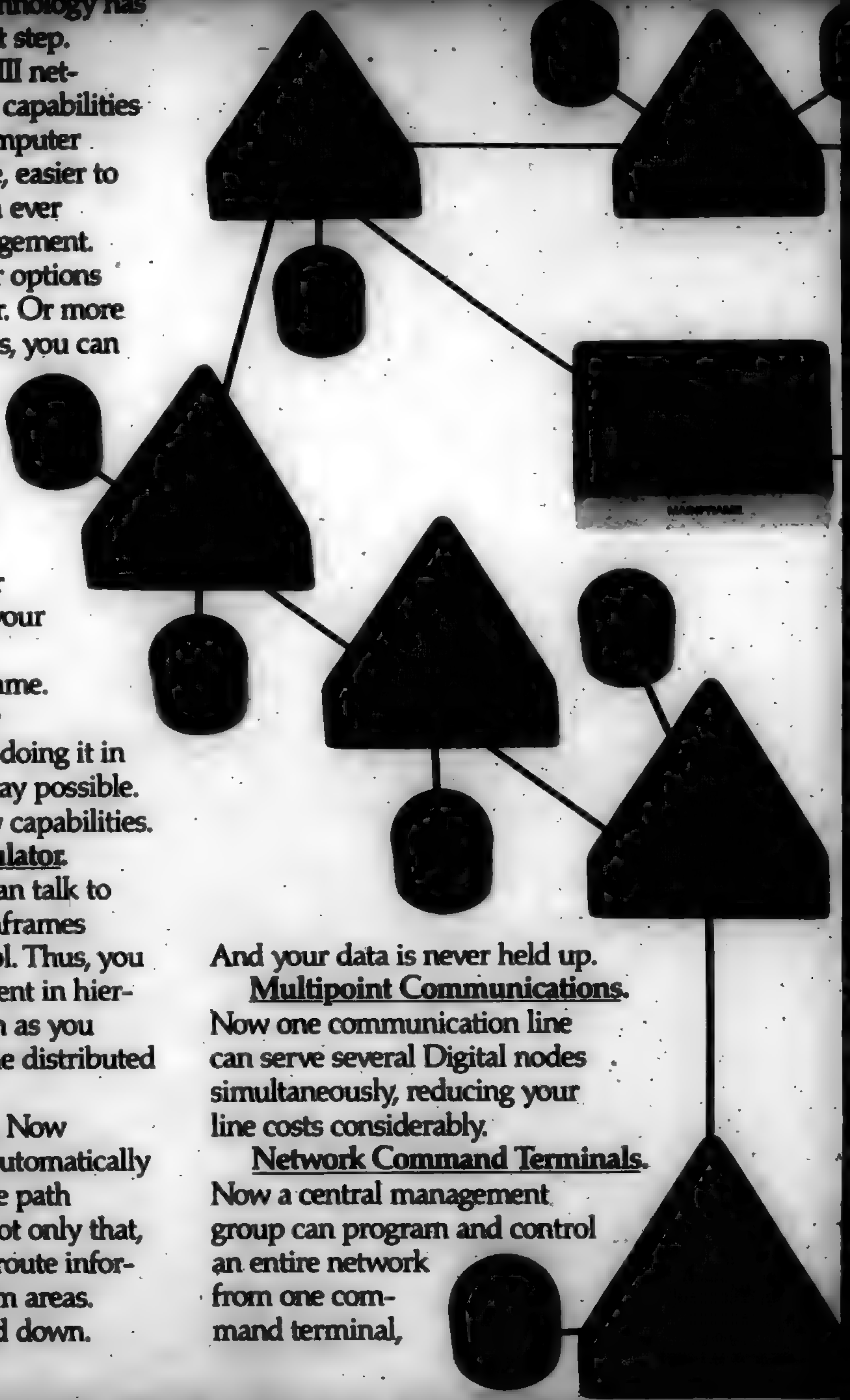

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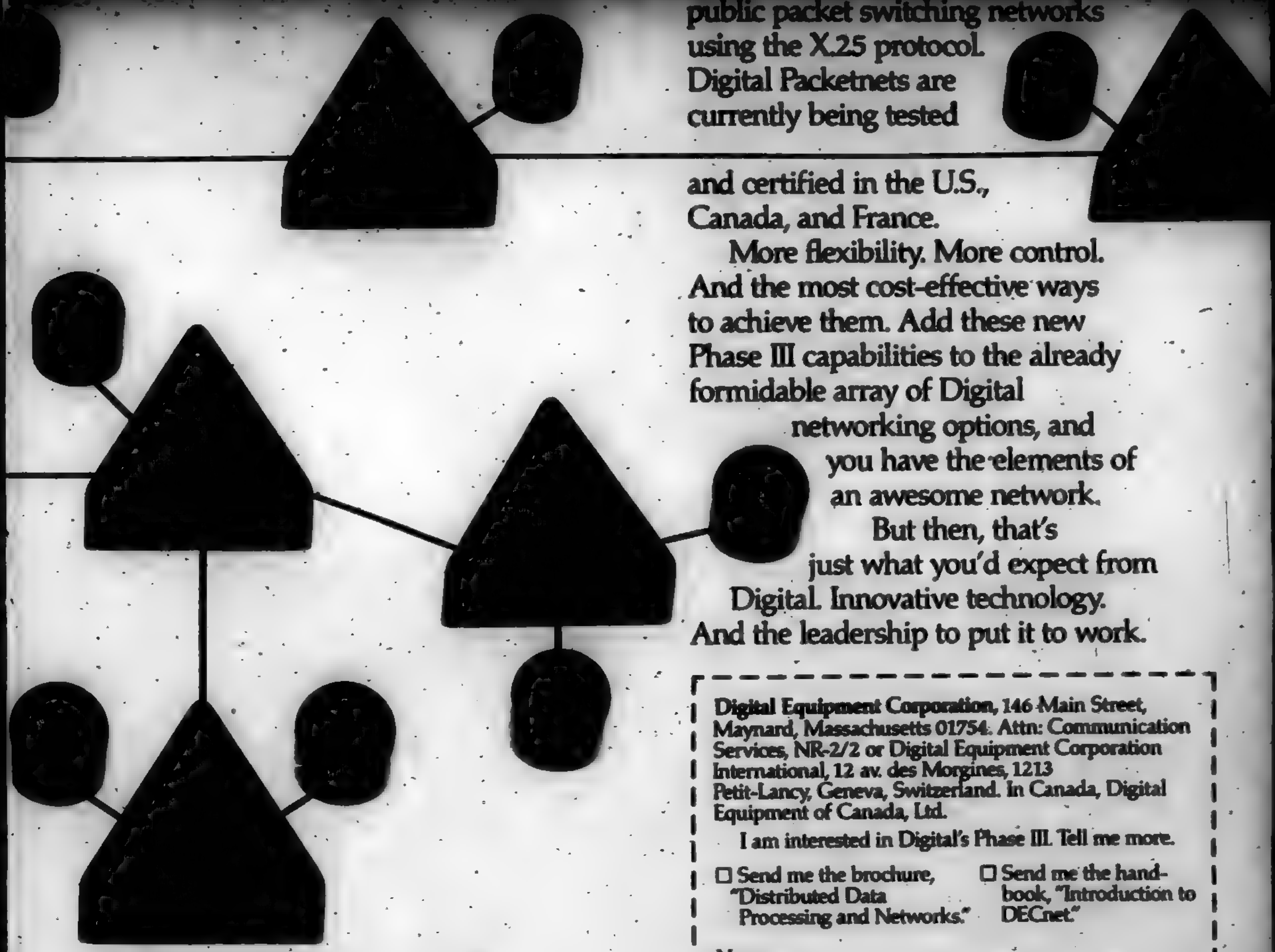

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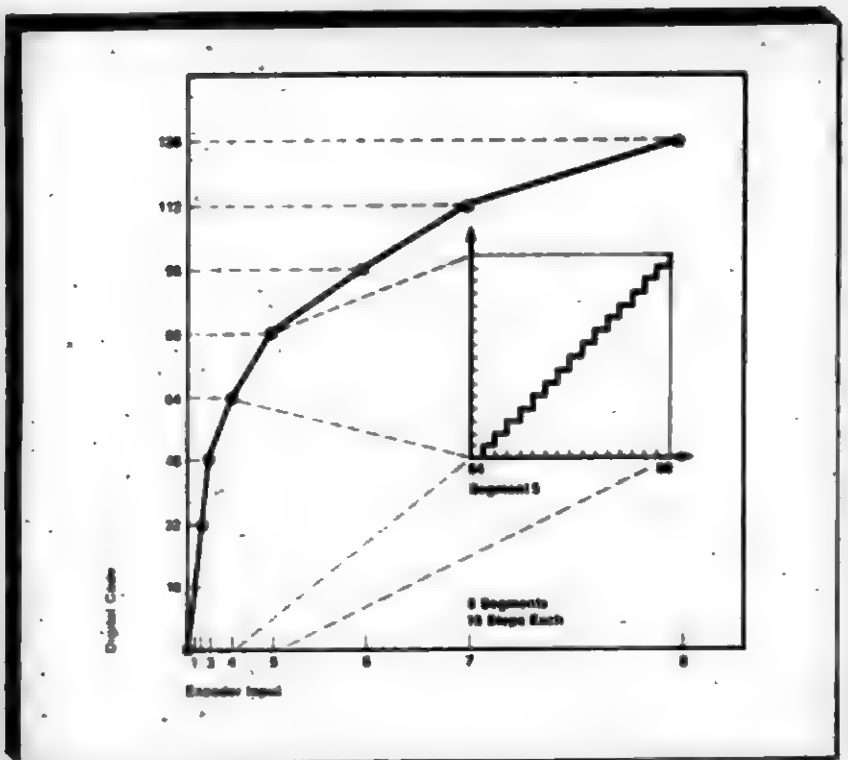

Figure 9. Positive Portion of the Segmented Approximation of the μ-255 Law Quantizing Curve.

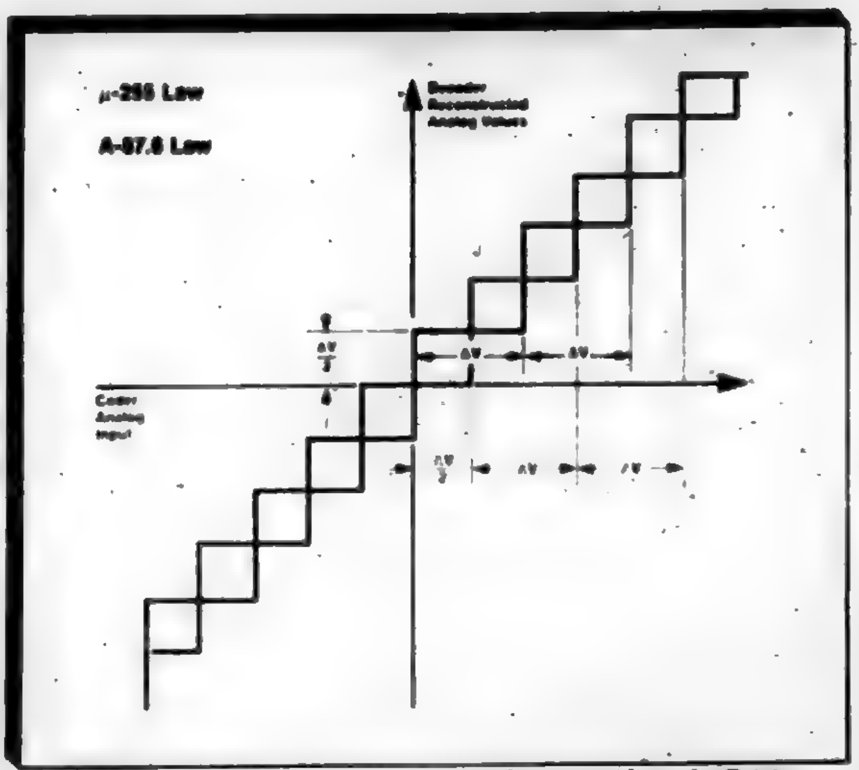

Figure 10, μ-255 Law and A-87.6 Law Performance About the Origin

(Continued from In Depth/15)

size of the first segment (613 μ V).

In the A-Law, the two segments on each side of the origin are colinear and have the same step size. The A-Law has a mid-riser condition at the origin; for an idle channel, the digital code will reflect a zero level, as long as the noise level is less than half the step size of the first segment. Since the initial step size for the A-Law is twice that of the μ -Law, noise performance about the origin is equivalent.

Comparing both laws shows that low-level resolution of the μ -Law corresponds to 13 bits of linear coding, while low-level resolution of the A-Law is equivalent to only 11 bits. Dynamic range is 78 db for the μ -Law and 60 db for the A-Law, and the range over which the signal-to-distortion ratio stays nearly constant is 40 db for the μ -Law and 35 db for the A-Law.

To summarize PCM processing, the voice signal is first limited to 4 kHz, then sampled at an 8 kHz rate. Each sample is then quantized using a companding technique to form an 8-bit code representation for each sample. Therefore, for each multiplexed signal, there are 8,000 8-bit codes sent each second.

Formatting Techniques

Multiplexing a number of signals into a serial data stream requires a method of synchronizing the encoding and decoding operations so that each signal reaches the proper destination and is properly decoded. In North America, the Bell D3/T1 carrier system, which incorporates the μ -255 Law, uses a frame format where each frame consists of 24 channels (time slots) (see Figure 11). During each time slot, the 8-bit digital code corresponding to the signal assigned to that slot is transmitted. Thus, 24 signals per frame can be multiplexed.

In addition, a single framing bit is inserted at the end of the 24 channels, making a total of 193 bit/frame. Eight thousand frames are transmitted each second for a total data rate of 1.544M bit/sec.

The Bell carrier system also permits the insertion of signaling data into the bit stream so that information such as alarm, off-hook and on-hook conditions and so forth can be communicated between the transmit and receive points. Under the μ -255 Law, every sixth frame is a signaling frame, in which the eighth bit (LSB) of each channel is discarded and signaling data inserted in its place.

Systems outside North America use the CCITT recommended format (Figure 12), in conjunction with the A-Law. In this format, each frame consists of 32 channels — 30 to multiplex voice signals, one entire time slot for framing and the final channel for signaling data.

The 5151 Codec

The 5151 monolithic CMOS codec conforms to the North American standard μ -255 companding law and can encode and decode data in the format required by the Bell D3/T1 carrier system. It is intended for use in the telecommunications industry as a per-channel voice-frequency codec in D3 channel banks and PBX systems.

The 5151 codec can be partitioned into three sections: encode, decode and control (Figure 13). The encode section

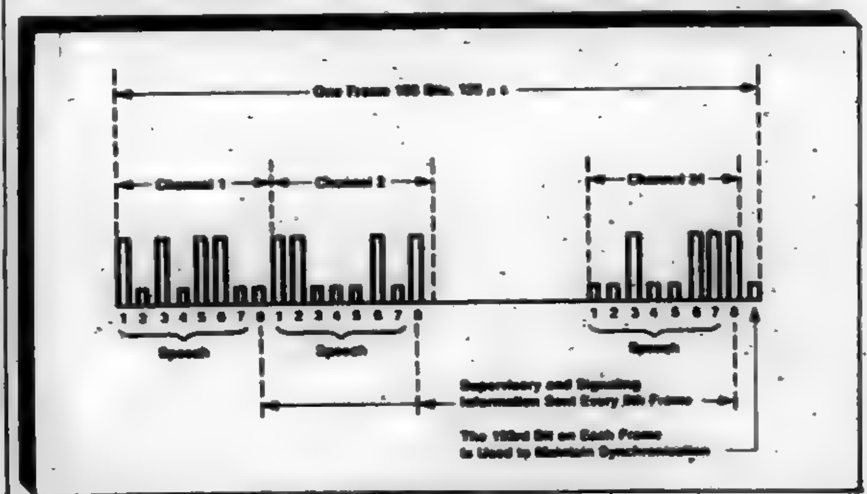
One Frame 193 Bits, 125 μs
Channel 1
Channel 2
Channel 24
1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
Speech
Speech
Speech
Supervisory and Signaling Information Sent Every 6th Frame
The 193rd Bit on Each Frame Is Used to Maintain Synchronization

Figure 11. T1 PCM Carrier Format

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THE CODEC CONNECTION

performs a/d conversion by the successive-approximation technique. It includes a linear 13-bit d/a converter, successive-approximation register (SAR) and comparator. An auto-zero mechanism, used to eliminate the effects of the comparator input offset voltage, and a sample-and-hold circuit are integrated within the comparator.

A 13-bit latch and an 8-bit shift register provide temporary storage for digital information during the conversion process and subsequent output operation. Logic is also provided for inserting A/B signaling information into the word formed during conversion.

The decode section performs the complementary d/a conversion and contains a 13-bit d/a converter, 13-bit latch, 8-bit shift register, unity-gain amplifier that serves as an output buffer and the logic required to remove the A/B signaling from the incoming 8-bit PCM-formatted code.

Control Section

The control section provides the timing for encoding and decoding and determines whether the encode or decode section will be connected to the 8-bit to 13-bit translator used in both operations. This control section includes the master sequence controller, encode and decode control logic and the 8-bit (companded) to 13-bit (linear) translator.

For increased system flexibility and greater isolation between encoding and decoding functions, the 5151 codec contains two independent 13-bit linear d/a converters. The function of each converter is to generate an analog voltage corresponding to the digital input code.

This voltage is generated by a capacitive voltage-divider network using the principle of charge redistribution to select a fraction of a positive or negative reference. With this technique, fractional voltage levels are determined solely by the relative sizes of the capacitors selected in the divider network. Since the auto-zero-filtering and sample-and-hold capacitors are incorporated into the network, no external capacitors are needed.

Operation

During the encode operation, the analog signal is first sampled by the comparator. The sample period begins at the first positive transition of the master clock following the rising edge of the XMIT SYNC pulse and lasts for approximately 32 master clock periods. During the sampling period, the SAR is cleared and the auto-zero sequence initiated. The sample-and-hold circuit then switches to the hold mode and the SAR is enabled, starting the successive-approximation routine which lasts approximately 80µs.

The 8-bit word formed in the SAR serves as the input to the 8-bit to 13-bit translator. The translator output programs the 13-bit d/a converter input, and the converter output is fed into the comparator. The comparator

(Continued on In Depth/20)

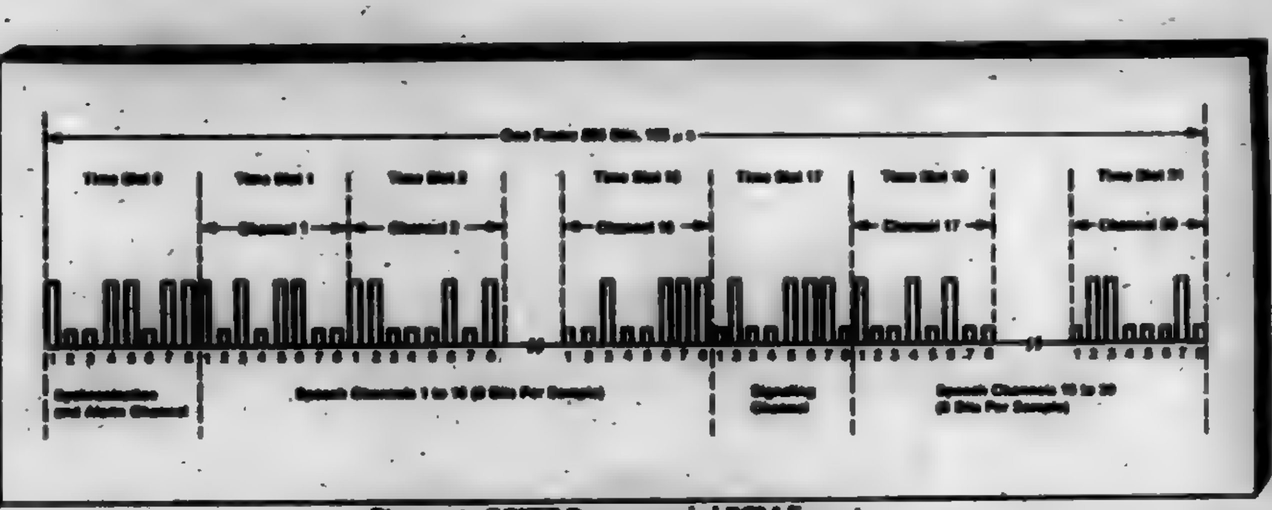

Figure 12. CCITT Recommended PCM Format

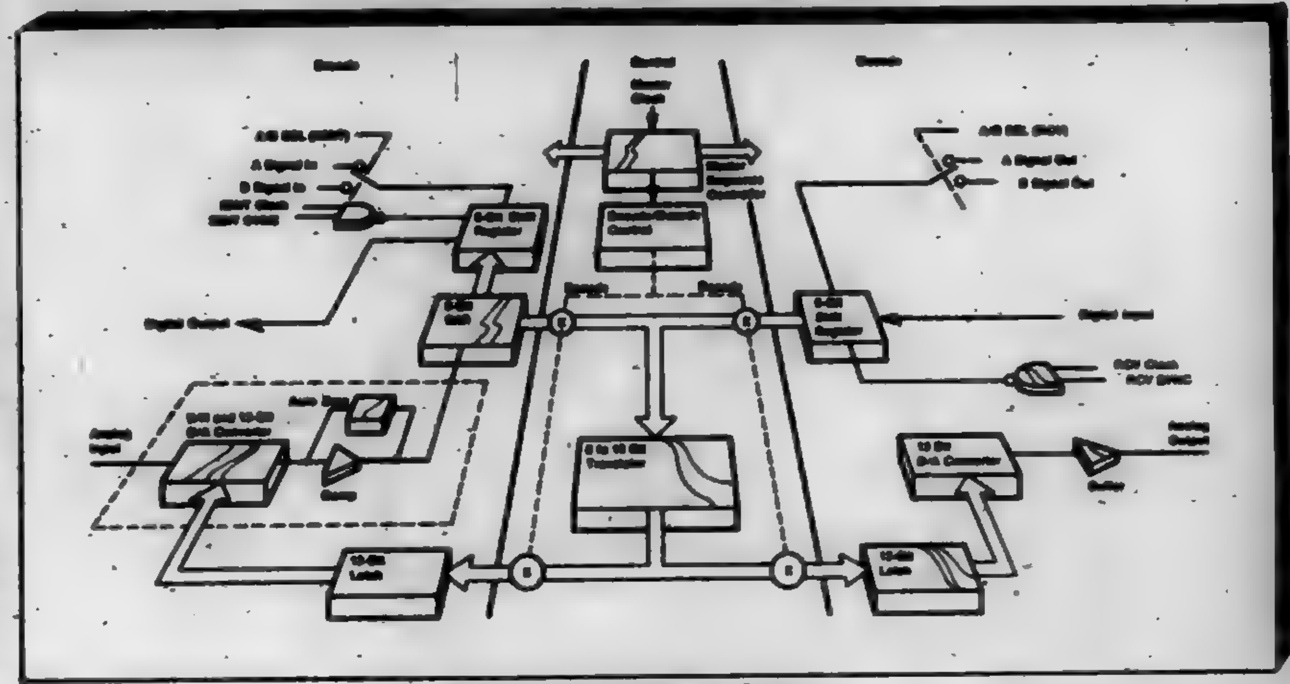

Figure 13. Block Diagram of 5151.

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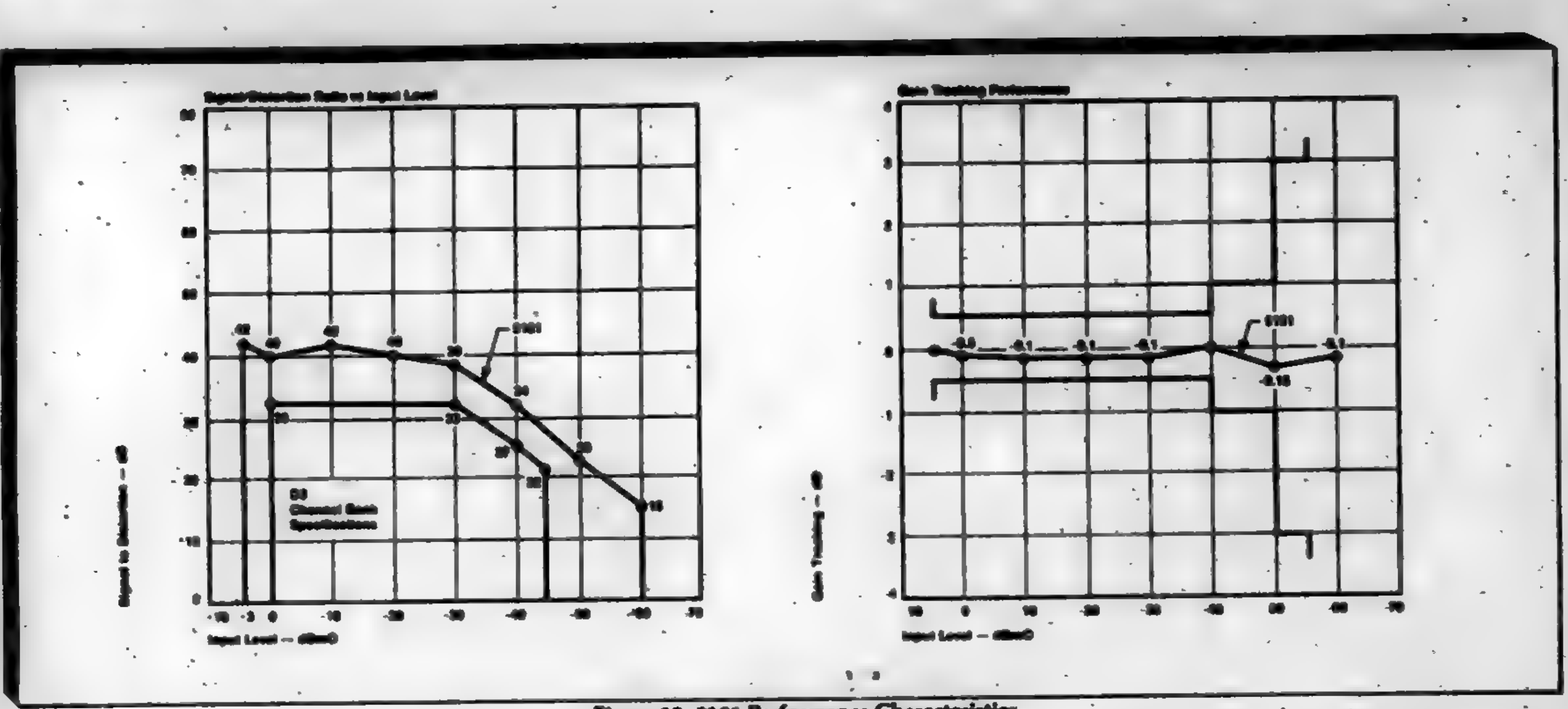

Figure 15. 5151 Performance Characteristics

(Continued from In Depth/19)

output level then determines the value of the bit currently being generated in the SAR. The successive-approximation routine continues until all eight bits have been generated.

At the end of the a/d conversion, the 8-bit companded word generated in the SAR is transferred to the 8-bit shift register, which operates as an output register. When XMIT SYNC is LOW, this register has a three-state high-impedance output allowing the outputs of several codecs to be wired-OR for time-division multiplexing. When the XMIT SYNC is HIGH, the 8-bit word is shifted out on positive transitions of the XMIT clock.

In addition to the basic encoding process in the 5151, A/B signaling information can be inserted into every sixth 8-bit encoded word. A positive transition on the A/B SEL XMIT signal routes the A-Signal input, or a negative transition routes the B-Signal input, into the LSB of the 8-bit word.

During the decode operation, data is shifted serially into an 8-bit shift register, sign bit (MSB) first. Shifting occurs when RCV SYNC is HIGH, on positive transitions of the RCV clock. On the falling edge of RCV SYNC, the encode/decode control logic switches the output of the shift register into the 8-bit to 13-bit translator. At the same time, a signal is sent to the master sequence controller to inhibit the SAR clock used in the control of encode operation.

After six master clock periods, the time required to propagate through the translator, the 13-bit linear code is strobed into the 13-bit latch and encode operation can continue. The output of the 13-bit latch programs the d/a converter. The d/a converter output is buffered by a unity-gain amplifier and externally filtered to reconstruct the original analog input signal.

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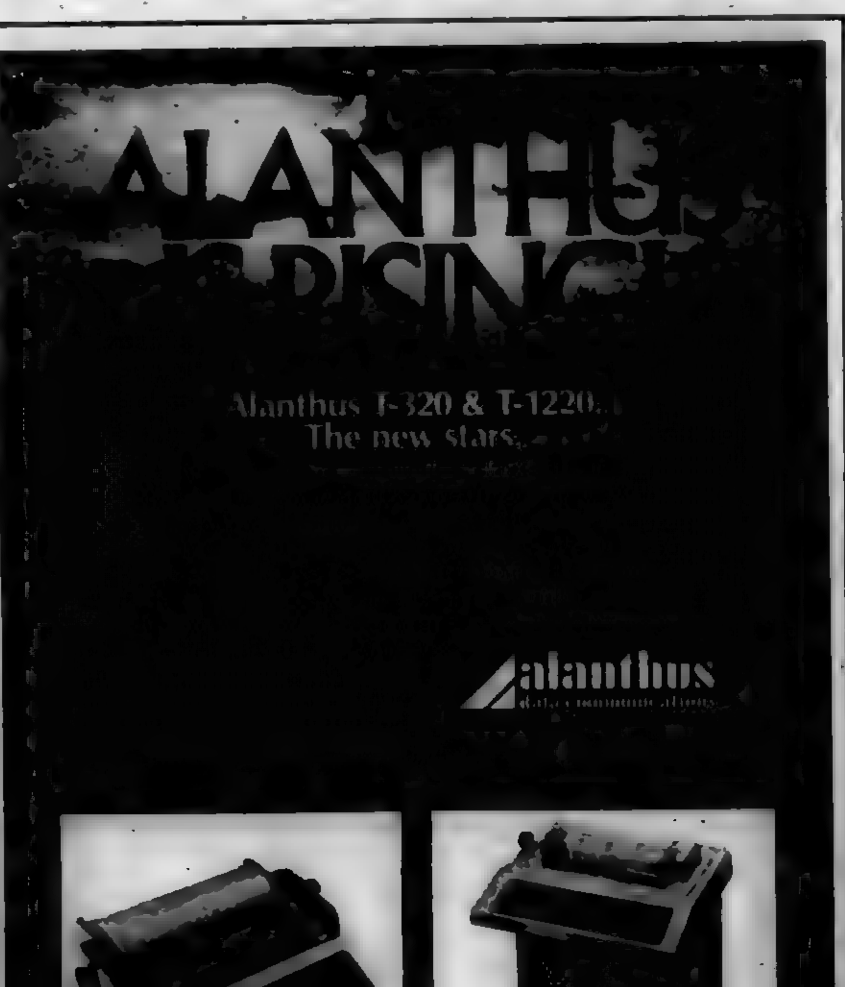

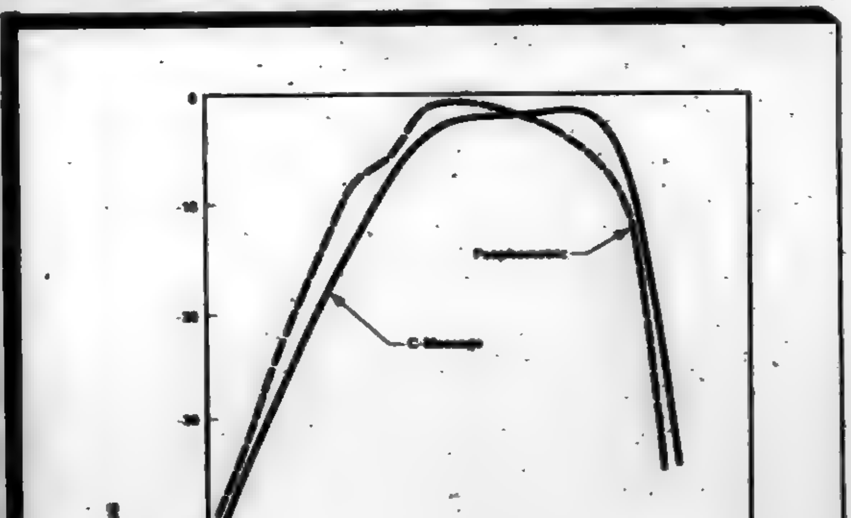

Figure 14. Frequency Response of Weighting Networks

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IN DEPTH

(Continued from In Depth/20)

Every sixth frame, A/B signaling data may be removed from the incoming 8-bit word. During a positive transition of the A/B SEL RCV, the LSB of the 8-bit code is transferred to the A-Signal output; during a negative transition, the LSB is transferred to the B-Signal output.

Codec Performance

The three main specifications for evaluating codec performance are idle channel noise, gain tracking and signal-to-distortion ratio. Idle channel noise is the noise seen at the analog output when no signal is being transmitted. The unit of measurement in North America is dbrnCo, the relative noise level in decibels when measured through a C-message weighted filter. This filter simulates the nonlinear response of the human ear and telephone subset to specific frequencies to allow for the relative effects of noise interference.

Outside North America, the (CCITT) psophometric weighted filter is used and idle channel noise is measured in units of dbmOp — relative noise level in decibels when measured through a psophometric weighted filter (Figure 14).

Gain tracking, specified in db, measures how well the output of the codec linearly tracks the input level. Because of the nonlinear quantization, this specification is given over input power ranges. Signal-to-distortion ratio, also measured in db, is the ratio of the signal power to the distortion power created by quantization errors and internal noise. Signal-to-distortion ratio is also given over input power ranges because of the nonlinear quantization technique (Figure 15).

The 5151 codec exceeds the D3 channel-bank transmission specifications for the above characteristics. In addition, CMOS technology results in extremely low power dissipation, typically 30 mW, an important consideration in telecommunications.

For reasons of economy and efficiency, it has become necessary to organize the telecommunications network as a switching hierarchy and use multiplexing techniques to permit simultaneous transmission of signals over each transmission path. Multiplexing techniques were traditionally analog, but since the mid-1960s, digital techniques have become an alternative. In digital multiplexing, the voice signal is converted into digital form through pulse-code modulation, utilizing a companding quantization algorithm. After transmission, the digital data stream is then demultiplexed and a complementary process converts the digital code back into the original analog voice form.

The process of converting the analog data into PCM-formatted digital words and the complementary process of converting these words back into analog data is the function of the codec. The 5151 codec performs this function in conformance with the μ-255 Law and, in addition, provides the logic necessary to encode and decode A/B signaling data required by the D3/T1 carrier system.

Theodore Vaeches is manager of linear applications at Fairchild Camera and Instrument Corp. in Mountain View, Calif.

Vaeches joined Fairchild in 1977 from Signetics Corp., where he was an applications engineer for three years. Prior to that, he was a field engineer at Univac and Four-Phase Systems, Inc.

Vaeches received a B.S.E.E. degree from City College of New York in 1972 and an M.S.E.E. degree from San Jose State University in 1975.

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GTE Head Sees Private Lines Outpriced by '83

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Leased private-line service will become uneconomical within the U.S. by 1983. A year or so later, the same thing will happen internationally, Dr. Lawrence J. Roberts, president of GTE Telenet Communications Corp., predicted here recently.

According to Roberts, a pioneer developer of packet-switched communications technology, in both cases, the growth of broadband digital transmission facilities — coaxial cable, optical fiber, microwave and satellites — plus widespread availability of public data networks utilizing X.25 and other standard interfaces, will underprice leased services.

He explained that as broadband facilities proliferate, more users will be able to integrate their data, voice and record traffic into a single-bit stream, reducing the cost per transmitted bit below what they are now paying for separate facilities. Use of microwave and cable local distribution facilities, integrated voice and data controllers at the user's site and Ethernet-type cable busses within offices to tie multiple terminals together will extend the benefits of broadband end-to end, Roberts added.

He expects that by 1982, circuits operating at 1.544 M-bytes/sec will interconnect most U.S. cities. At that time, he said, the prices of broadband transmission facilities and fully loaded leased private lines will be competitive.

Meanwhile, increased use of bradband for international communication will drop those rates "by a factor of four during the next three years."

Telecommunications Conference

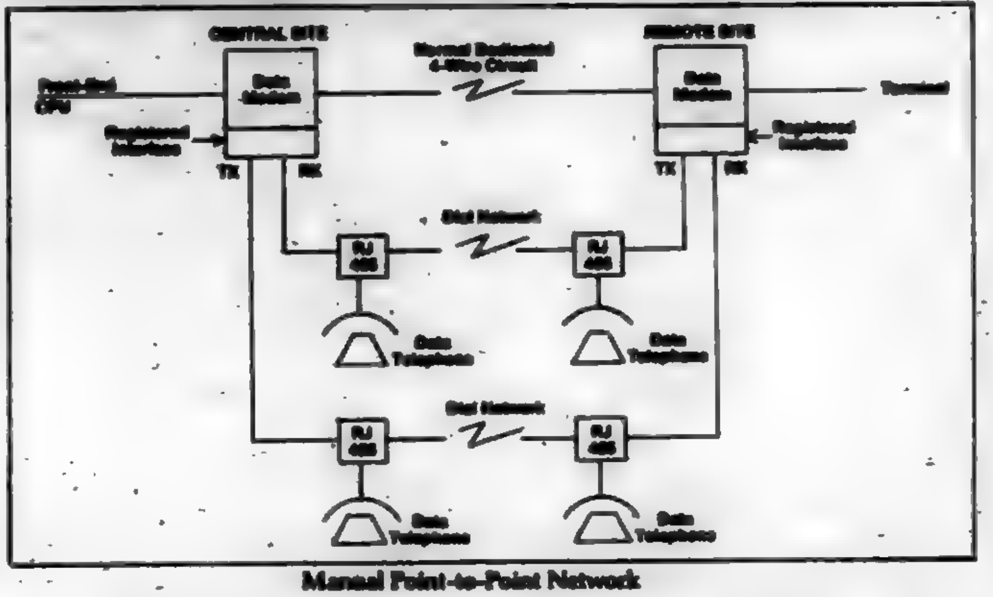
Roberts was one of several speakers who appeared at a conference on international telecommunications convened by Telecom Systems Group, Inc. of Cedar Grove, N.J. His comments about the coming demise of leased private-line service were made during a discussion of the restrictions foreign telecommunications administrations (PTTs) impose on users. He contended that since private-line service is fading away, the restrictions are only a temporary problem.

Roberts also insisted the restrictions are not intended to protect foreign suppliers of computer-based services and systems

(Continued on Page 64)

Dial Backup — Part 1

Network Circuit Failure Asks Resources, Control



Manual Point-to-Point Network

By Barney L. Dewey
Special to CW

To accomplish data transfer when network circuits fail, the user must provide enough resources — lease circuits, in-house private lines and so on — and control, such as switches and routing, to ensure reliability at all times.

A circuit failure may cause substantial inconvenience and lost income to an organization. This article focuses on methods to restore service when a leased circuit fails.

The purpose of most commercial telecommunications systems is to continuously transfer data from one point to another in the most economical and speedy fashion available. Most conventional applications of high-speed data transfer between two geographically separated locations involve the use of modems connected to four-wire leased telephone circuits.

If we focus on a network as a group of resources and controls, there are several possible alternatives for a system design. One combination of resources and controls would be to add a second circuit and an audio patch or A/B switch.

This "hot standby" circuit approach is easy to implement and operate, but it is usually prohibitively expensive.

Another solution is to use the Direct Distance Dial (DDD) network — the telephone system. This solution may take a little longer to establish than the above approach during a failure. However, this is not significant when compared to the advantages.

Dial backup for both point-to-point and multipoint systems is inexpensive, practical and effective in substantially reducing leased circuit downtime, a senior applications engineer for Codex Corp. contends in this two-part series.

Often circuit quality of the DDD network is a concern. Actual experience shows that speeds up to 4,800 bit/sec are usually established on the first call attempted; 9,600 bit/sec backup can often be established on the first call.

Some distant locations may require additional attempts. An alternative to recalling is to "fallback" the speed of high speed modems to 7,200- or 4,800 bit/sec.

Cost Advantage

The major advantages of this DDD approach are the low cost and the automatic circuit rerouting built into the DDD network. If a major circuit failure occurs, the DDD network will route (control) around

(Continued on Page 64)

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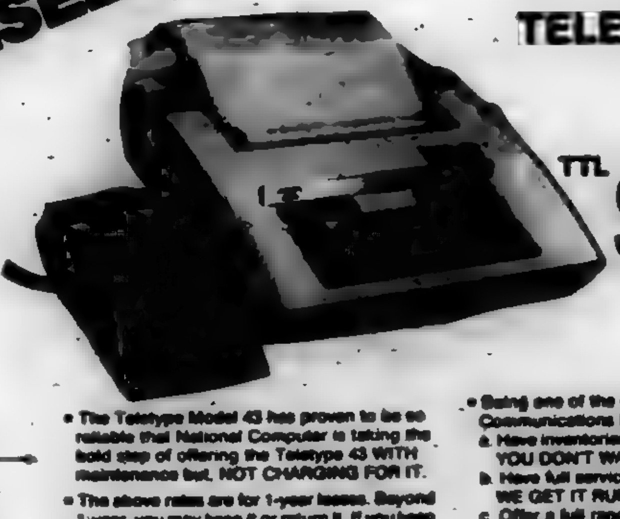

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Private Line Leasing Seen Uneconomical by '83

(Continued from Page 63)

against competition form the U.S. Rather, the PTTs need to earn extra revenue to finance new networks.

Also, he said, they are trying to make their international private-line customers migrate to those networks. The Japanese, for example, refuse to lease private lines to U.S.-based service bureaus unless the lines are terminated in this country at a single, specified computer, but they do not impose such restrictions on access to their new Venus public data network.

The way to cope with these restrictions, Roberts said, is to convince the PTTs that the demand for international data communications services is elastic — in other words, that there is more to gain than to lose by reducing rates, interconnecting with additional U.S. carriers and removing present service restrictions. He suggested that U.S. data communications users will have better luck if they employ this persuasive approach than if they continue to fight the restrictions.

Most of the other speakers, however, disagreed with Roberts.

Philip Onstad, manager of telecommunication services for Control Data Corp., pointed out that NTT, the Japanese domestic communications carrier, is a major supplier of time-shared online data processing services within that country. CDC offers competing services, but because of the restrictions it can not offer most of them to Japanese customers.

Underlying this problem — and most of the others confronting U.S. firms that must lease circuits abroad — is the lack of a coordinated, consistent government policy, Onstad said. Responsibility is fragmented among the State Department, Federal Communications Commission and various other agencies.

There is little consultation with users and even less willingness to act when users come to the government with specific documented complaints showing they have been unfairly treated by foreign carriers.

Onstad, who has been lobbying hard for changes, indicated that next year Congress will consider legislation proposing a major revision of this country's international telecommunications policy apparatus. Establishment of a central office for coordinating government and industry viewpoints and receiving and acting upon user complaints is one change that will be considered, he said. Unless such an office is created, "the U.S. will suffer because this is what other countries are doing," Onstad said.

Resources, Control Needed

(Continued from Page 63)

the failure area.

Even when a portion of a cable that directly feeds a location goes bad, the use of recalling can sometimes establish data transfer over good circuit pairs in the bad cable. The balance of this article will discuss in detail the implementation of dial backup systems.

There are four major types of dial backup systems. For point-to-point circuits there are manual or automatic-answer systems. Likewise, multipoint circuits can use manual or automatic-answer methods of dial circuit acquisition.

Point-to-point circuits are the easiest to back up. They require a simple interface to each modem to provide switching between the dedicated leased circuit and the dial (DDD) network.

Manual dial backup operation of a point-to-point circuit is shown in Figure 1. The following equipment is necessary at each location:

- A pair of data telephones with exclusion keys — set for telephone controlling the lines — with an RJ-455 modular telephone jack.
- A modem with a registered telephone interface and a leased/dial line switch;

To see how manual dial backup actually works, let's look at the following example.

The sample network in Figure 1 consists of a point-to-point 9,600 bit/sec circuit between a computer center on the West Coast and a city on the East Coast.

The leased circuit has failed. A person at the computer center calls another person at the remote site. The call is made from the appropriate data telephone at the computer site to the appropriate data telephone at the remote site.

After the first call is completed, a second call is made using the appropriate data telephones. When both calls are established with a person at the remote site, that person first pulls up the data telephone exclusion keys on both telephones and then pushes the "leased line/dial line" switch on the modem to "dial line."

In systems where there are many modems at the central site, it is desirable to configure the dial backup equipment at the central site so that it can be used by any of the modems. When common dial backup equipment is used, the system design at the remote locations remains unchanged.

At the central site, the analog side of the modems is routed through an audio patch bay. Then any modem can be patched into a Data Access Arrangement (DAA) and data telephone combination when dial backup is desired.

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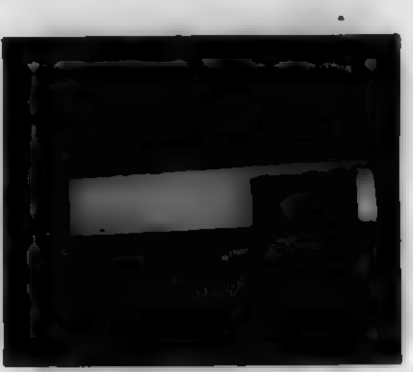

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The 2675 is also remarkably easy to operate. It uses friendly, English-like commands, and has a familiar, typewriter-style keyboard with eight soft keys you can define yourself. Once you've tailored the terminal to your application, those configurations come up automatically at every power-on, including automatic dialing and program calling. So even an inexperienced user can just pick up the terminal and go.

For fast, high-quality printing, the 2675's quiet thermal printer operates at up to 120 characters per second. And multiple print modes allow the printing of full-width computer reports on 8½" paper.

It makes communications a snap.

With both an RS-232-C and modem port, you can configure the terminal for two transmission speeds, each ranging from 300 to 9600 baud. And, to increase transmission accuracy, the built-in modem comes with a convenient modular jack for direct connection to your phone line.

What's more, the 2675's auto-answer and auto-dial features leave you free while the terminal's talking to the computer, and let you save by taking advantage of off-peak phone rates.

Like all our terminals, the HP 2675 is backed by our extensive range of customer services. To arrange a hands-on demonstration, just return the coupon. You'll get carried away with all this power.

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Telex Introduces Printer For 275, 277 and 278 Units

TULSA, Okla. – A desktop message printer designed for Telex 275, 277 and 278 display stations has been introduced by Telex Computer Products.

Using the Telex 281, a terminal operator can obtain a hard-copy printout of information on the display screen with a single keystroke. The 281's partial print capability saves operator time by allowing users the choice of printing only designated information, a spokesman noted.

An optional feature, initiated by the host computer, allows the 281 to act as an electronic mailbox. By means of the printer, terminals throughout the country connected to the same host computer can send and receive information from one another.

The 281 prints up to three sheets of pressure-sensitive, carbon-lined or interleave paper.

Attached directly to Telex 275, 277 and 278, the portable bidirectional 281 matrix printer prints at 80 char./sec. An 80-column version prints at 10 char./in, while the 132-column version prints at 16.5 char./in. with 6- or 8 line/in. spacing.

The 281 printer costs $1,500 from Telex Computer Products at 6422 E. 41st St., Tulsa, Okla. 74135.

The Telex 281

Modem Runs In Two Environs

ANDOVER, Mass. – A limited-distance synchronous modem that operates in point-to-point and multipoint environments is available from Intertel, Inc.

The SLD 1920 reportedly provides data communications at speeds ranging form 2,400- to 19,200 bit/sec at distances up to 18 miles.

The stand-alone price is $895, while the rack-mounted version costs $725. Units can also be leased from the firm at 6 Shattuck Road, Andover, Mass. 01810.

'No-Frills' Version Of Micro8000 Out

CHATSWORTH, Calif. – Micom Systems, Inc. is offering a "no-frills" version of its Micro8000 modem that runs at 2,400 bit/sec.

The unit is suited to the minicomputer user and offers a four-channel data concentrator and automatic retransmission-on-error. It can be used by two to 16 asynchronous terminals, the vendor said.

The No-Frills Micro8000 modem will operate on minis from Data General Corp., Digital Equipment Corp, Hewlett-Packard Co. and other vendors. It costs $1,950.

Micom Systems also announced a high-performance option for its Micro800 data concentrator that is said to more than double throughput and to allow all channels of the concentrator to operate at 9,600 bit/sec.

The maximum composite high-speed output of the Micro800 is now increased from 9,600- to 19,200 bit/sec. The option can be used on dumb terminals that must be operated at 9,600 bit/set, the vendor said.

The concentrator costs between $2,850 and $4,900, Micom said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

Reports Cover SNA, 3270

SAN JOSE, Calif. – Two publications – "Introduction to SNA" and "The 3270 Product Line Report" – are available from Communications Solutions, Inc.

"Introduction to SNA" is said to take the reader step-by-step through all important aspects of SNA, including a description of SNA, its design objectives and scope and its history and evolution.

"The 3270 Product Line Report" traces the evolution of the 3270 product line and offers configurations capabilities, compatibility and features analyses.

The reports cost $45 each from the firm at Suite 200, 4040 Moorpark Ave., San Jose, Calif. 95117.

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System Technology Forum Schedules Three-Day Seminars

BURKE, Va. — Six communications seminars that can be taken separately or in recommended combinations are presently being offered by the Systems Technology Forum, Inc., a company formed by Richard Deal and Ralph Berglund.

The three-day courses to be conducted this fall in various locations include "Introduction to Data Communications," "Advanced Design-Traditional Networks," "Network Architecture," "Voice Planning," and "Communications Technology Trends." Program prices range from $625 to $725.

Systems Technology Forum also offers a training audit that can be conducted over the phone to help interested parties determine training requirements and the best curriculum plans to fulfill them.

Both Deal and Berglund formerly developed and taught courses for Datapro Research Corp. before becoming independent consultants and speakers on the communications lecture circuit. They founded Systems Technology Forum to provide "structural training," a concept that applies instruction in what they consider a logical and progressive sequence.

Further details can be obtained from the firm at 8991 Cotwold Drive, Burke, Va. 22015.

Innovator 202 Printer Centered on Teletype 40

MIAMI LAKES, Fla. — Innovative Electronics, Inc. has extended the communications interface capability for a 300 line/min printer system based on a Teletype Corp. Model 40 printer.

The Innovator 202 offers interfaces compatible with Centronics Data Computer Corp. and Dataproducts Corp. parallel interfaces.

It also has Ascii serial asynchronous communications protocol support, the vendor said.

IBM Protocols

The Innovator 202 can be attached to IBM networks using the 2770, 2780 and 3780 protocols.

It is also compatible with Burroughs Corp. hardware via a poll/select protocol available with an RS-232, concatenation or Burroughs two-wire direct interface, the vendor said.

The printer costs $4,995 from the vendor at 15200 N.W. 60th Ave., Miami Lakes, Fla. 33014.

HP 300 RJE Tool Allows Linkage

PALO ALTO, Calif. — A remote job entry (RJE) software package for Hewlett-Packard Co.'s HP 300 reportedly enables the HP 300 to be linked to other computers for job submission and remote file transfer.

With the addition of RJE/300, the first communication enhancement to HP's RG Advanced Function System, the HP 300 now can emulate an IBM 2780/3780 transmission terminal while simultaneously processing local jobs, according to the vendor.

The RJE package consists of a microprocessor-based Bisync Communications Processor board and a software addition to the HP 300 operating system.

The board plugs into the HP 300 card cage and is connected to the general I/O channel. The board performs all handshaking protocols and processes the data stream during transmission.

Communications may be hard-wired or via modems over switched or leased lines. The Bisync Communications Processor costs $2,250 and the software package has a one-time charge of $500. HP is at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Performance Monitor Gets Count Module

SALT LAKE CITY, Utah — Questronics, Inc. has released an additional module for its Model 500 performance monitoring system.

The Model 523 module collects the number of characters contained in each message and accumulates that figure. The module can track up to 32 different devices at transfer rates of up to 9,600 bit/sec, the vendor said.

The module costs $1,000 from Questronics at 3565 S.W. Temple, Salt Lake City, Utah, 84115.

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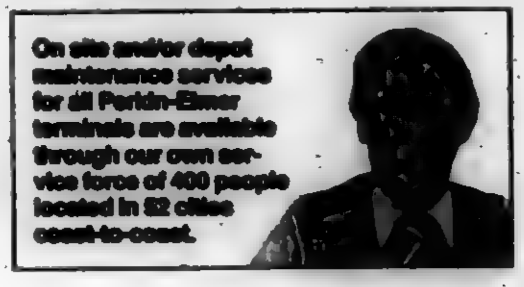
For more information on the 550B write: Perkin-Elmer, Terminals Division, Flanders, NJ 07836. **Or call toll free: (800) 631-2154. In NJ, call (201) 584-1400.**



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How Big Is Big?

Shop Treats 370, 3033 as Batch Terminals

By Rita Shoor
CW Staff

CHICAGO — Just how big is an installation where mainframe cabinet size is a primary concern when shopping for new equipment?

Big enough to consider processors ranging in size from an IBM 370/158 to a 3033 as "batch terminals."

Big enough to keep two complete data centers with a total of eight IBM 3033s, two 370/168s and a lone Amdahl Corp. 470V/6 running on a full-time basis.

And that's just the beginning of the hardware list at Standard Oil Co. of Indiana here.

Two complete data centers are required to execute the production work, handle corporate time-sharing and support VM for the Standard Oil Organization, according to John Chapman, technical supervisor for major systems performance analysis. In addition to the three 3033s and two 168s operating in the Chicago center, another 3033 is expected to be installed during the first quarter of 1981.

Then there are the five 3033s and the Amdahl 470V/6 that form the core of the hardware configuration in Tulsa, Okla. Not to mention the IBM 3838 array processors for seismological data reduction of information about potential oil field locations that can be found in both sites.

The mainframes to which Chapman referred as batch terminals function in 12 remote locations and provide input over a wide-band 50K-bit network to Chicago and Tulsa. These do not include the approximately 60 remote locations that are tied into Chicago via their own communications wire or the unspecified number of additional links via dial-up lines.

Insight into the installation's size was provided by William Graese, supervisor in evaluation and standards of major centers for the firm. When asked about his expectations from IBM's long-predicted H series, he specified "more processing power in a physically smaller area" before mentioning that he would also expect to see a price/performance ratio comparable to IBM's 4300 series.

Disaster recovery planning is another item of concern at this data center, according to Michael Foster, manager of the user support and central control area for computer center operations here.

A disaster recovery committee with a formalized policy and set of plans is part of the firm's organization, he said. The last hardware disaster was caused by flooding that resulted in a power surge at Standard's former Chicago site in 1972.

"Our 360/85 was literally cooked," he recalled. The system was down for 10 days after that happened, but "we've never lost a data center," Foster observed.

However, backup and recovery plans to ensure data integrity are always based on the fact that such a disaster could occur at any time, Chapman pointed out.

Alternate site availability — a service being offered by several U.S. vendors as a solution for disaster recovery — would present some problems for Standard Oil.

For example, the number of software modifications made by the technical staff to its MVS operating system meant that any alternate site would essentially have to be a "first-level Standard Oil site," he said. Therefore, the Chicago and Tulsa data centers serve as primary backup sites for each other.

Commitment to IBM

Standard's current commitment is to stay within the IBM hardware and software mainstream, Chapman said. Even the Amdahl V/6 in Tulsa is slated to be replaced by a 3033. However, this doesn't mean that Standard won't be looking at IBM plug-compatible mainframes in the future, he said.

In the area of plug-compatible peripherals, technicians are currently evaluating Storage Technology Corp.'s (STC) 4305 semi-

(Continued on Page 70)

Increased User Satisfaction Becomes Major Emphasis

CHICAGO — What is a high-priority item in an organization where IBM 370/168 mainframes are described as terminals and about 175 people are required just to staff the computer room?

Increased user satisfaction is becoming the major emphasis at Standard Oil Co. of Indiana's data center, Technical Supervisor John Chapman explained during an on-site interview here (see related article).

Standard Oil is beginning to deal with the fact that hardware costs are going down and people costs are going up, he observed, and one step in this direction is the development of what he described as a "user service contract" (USC) for the company's performance analysis area.

Any contract is a mutual agreement between the supplier of a service and the user of that service, Chapman noted. An example of a USC might be an agreement to deliver support so that a certain number of transactions can be processed at a specified response time during certain hours of the day for a particular CICS application.

"The USC forces the user to articulate exactly what he needs and we, in turn, are required to tell the user what will be provided," he continued.

Standard has put one USC in place as an experiment and will probably develop more USCs before the end of 1980, according to Chapman. "Internally, we have to view our users as customers. They handle the oil and [consequently] they handle the money."

User Reaction

User department reaction to the USC concept is generally positive, Chapman said. "We have the user report on its perception of the service received including the man-hours lost and transaction backlogs due to system problems."

The USC also provides the technical staff with quantification tools, he explained. "If we're meeting our goals, we're doing a good job. If not — and the reason we're not is that the user is processing more than the specified number of transactions — we have a vehicle for tracking the problem."

The firm's upper management sees quantified results of the contract, which naturally increases the motivation to meet the USC's specifications, he pointed out.

Another potential use for the USC is as an aid in capacity planning. Capacity planning was often done on an ad hoc basis in the past, Chapman noted. Equipment might be acquired to use up the hardware budget or to allow for the possibility of a worst-case situation.

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Graphics Systems Handle Engineering Applications

BROOMALL, Pa. — A family of turnkey graphics systems for engineering applications that feature automatic high-speed data capture from existing documents with drum scanners or large-area laser scanners has been introduced by Broomall Industries, Inc.

The Scan-Graphics Acquirer models utilize the firm's Super-Vec software for real-time raster-to-vector data conversion, offering one-step scanning and vectoring and achieving minimal file sizes for electronic storage, the firm said.

The Acquirer 1000 model includes a Univac V77-400 CPU with 64K words of memory, 800 bit/in. magnetic tape unit, 10M-byte disk unit, Broomall's D-400 drum scanner and Super-Vec software. The family of systems ranges in cost from $188,000 to $560,000 from the vendor at 700 Abbott Drive, Broomall, Pa. 19008.

Trident T-600/602 Drives Available Early Next Year

ANAHEIM, Calif. — Century Data Systems, Inc. has announced its Trident T-600/602 disk drives, which will be available early next year.

The 516M-byte drive is compatible with the T-200 and T-300 models, but has more capacity because it uses narrower heads of manganese zinc ferrite core, which reportedly has increased output by as much as 25% and resolution up to 5%, the vendor said.

The price for both the T-600 and the T-602 is $13,400, the vendor said from 1270 N. Kraemer Blvd., Anaheim, Calif. 92805.

3M Introduces Disk Pack For Century Data, Ampex

ST. PAUL, Minn. — The 3M Corp. is offering a 300M-byte disk pack for Century Data Systems, Inc.'s Trident T-300, Ampex Corp.'s DM9300 and compatible disk drives.

The Scotch 947/300 consists of 10 disks with 15,352 primary and 133 alternate recording tracks.

The unit costs approximately $1,075 from 3M through P.O. Box 336000, St. Paul, Minn. 55133.

Mainframes Act As Batch Units

(Continued from Page 69)

conductor disk in comparison to IBM's 2305 Model 2, he continued.

There were initially several component failures on the 4305. These were traceable to substandard parts that have since been replaced, he noted.

Although formal benchmark statistics are not yet complete, the Resource Measurement Facility indicated that service time for pages is better from the 4305 than from the 2305 by a small fraction, according to Chapman. If this type of reliability continues, future plans may include upgrading from a 22M-byte 4305 emulating two drums to a device that emulates four 2305s.

Long-Range Plans

Long-range plans at the currently IBM-based installation include development of an integrated voice/data network over the next five to eight years, according to John Sandberg, a manager in network design, implementation and performance.

"We're trying to determine corporate needs in terms of teleconferencing," he continued. An across-the-board test bed is being set up to help in selecting the set of communications tools that will best meet the needs of the largest number of users.

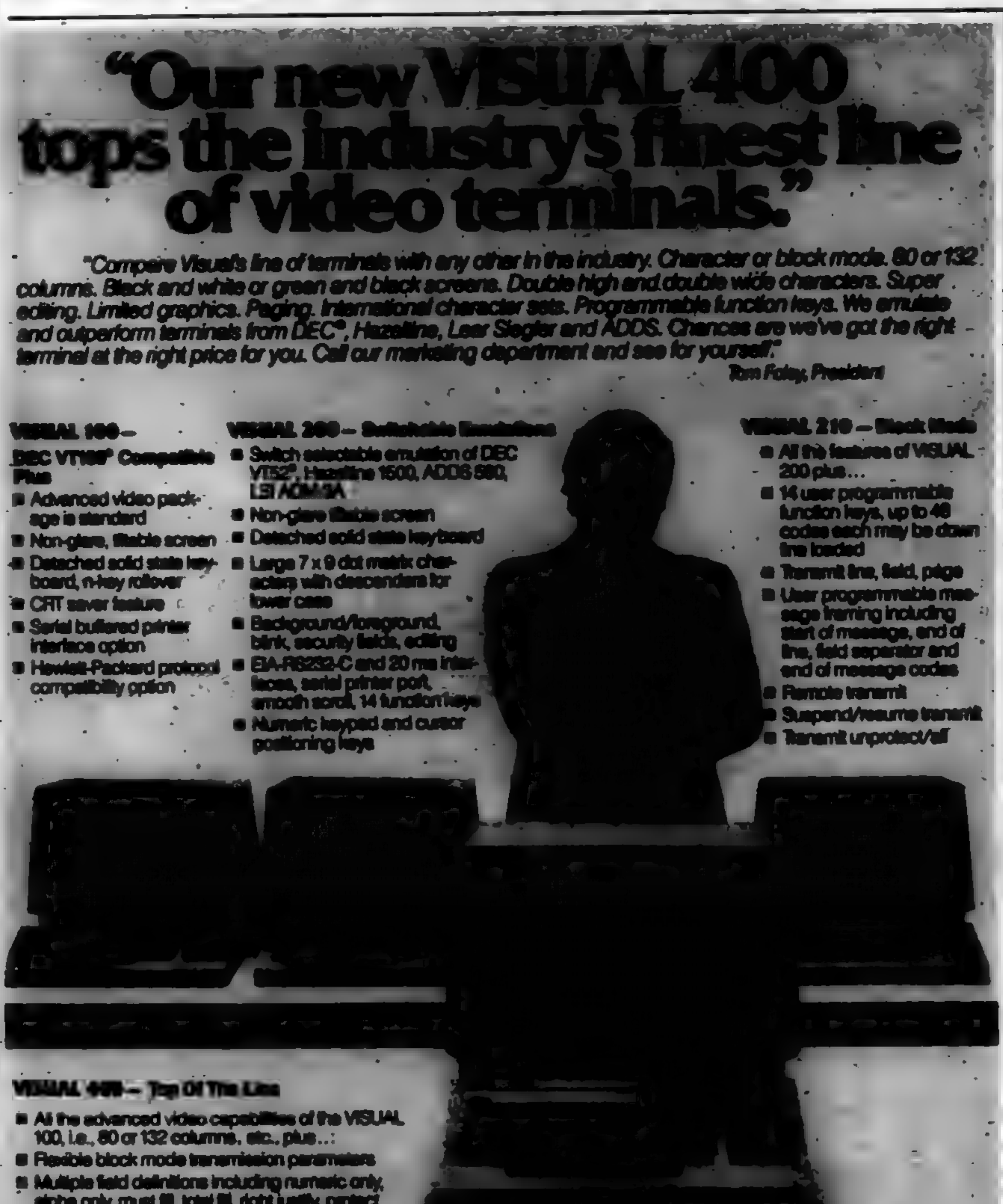
"If you leave this selection completely up to engineering and technical specialists," Sandberg noted, "you might incorporate some elements that would be difficult to justify on a cost/benefit basis. It's the users who pay the bills," he remarked.

A "long-range fantasy" is to enable a person at one terminal to go from one IBM software system to another — from the Time-Sharing Option (TSO) to IMS to CICS, for example — through the simple expedient of entering a terminal command, Chapman said. "Right now, a person sitting at a TSO terminal can only get to TSO," he explained.

The only current means of getting around this is to run two wires into the terminals and provide a hardware switch to go between two systems, he said.

However, he said that Virtual Telecommunications Access Method (Vtam) software was "improving and becoming more operable" and described it as allegedly capable of handling this type of system switching capability.

Finally, although both of Standard's corporate data-centers are considered physically secure, Chapman predicted an increased stress on data security during the next 12 months. "It's difficult right now for outsiders to get to the tools that would let them obtain unauthorized access to data," he claimed.



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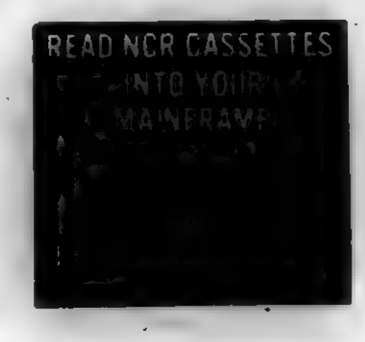

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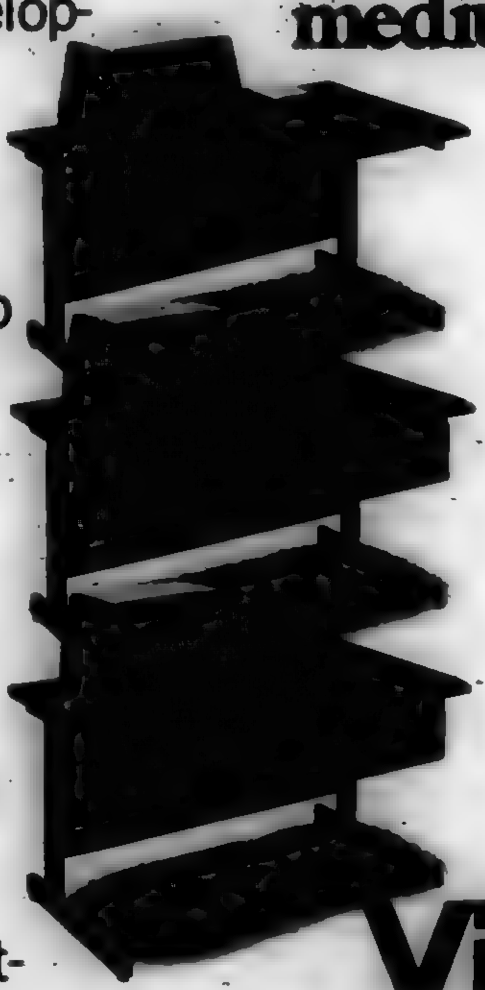

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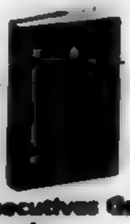

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Gerald M. Weinberg and Daniela Weinberg.
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Mini Bits

Cardamation Unit Reads 600 Card/Min

FRAZER, Pa. — Cardamation Co. has announced the first in a series of 600 card/min 80-col card readers.

The CR600, added to the previously announced 300 card/-min, 400 card/min and hand-fed versions, is said to operate at 600 card/min on a demand basis.

As a desktop reader, the unit weighs less than 70 pounds and includes a 1,000-card input and stacker, fiber optics, card transport, casework, electronics and parallel output.

A vacuum feeder reportedly allows the feeding of worn cards, minimal card jams and ease in removing cards from the transport mechanism, according to the vendor.

In addition to the standard parallel interface, the CR600 is available with RS-232C communications output, as well as Digital Equipment Corp. PDP-11, LSI-11 and IBM Series/1 interfaces.

List price for the CR600 is $4,375, or $3,260 for a quantity of 25 from the firm at 9A Frazer Mall, Frazer, Pa. 19355.

Printer Controller Works on DG Minis

MELVILLE, N.Y. — Ventra Systems Corp. has announced a multiple printer controller for Data General Corp. minicomputers.

The microprocessor-based unit, Model VIP-201, plugs into a single slot on any DG minicomputer. It controls independent line printers with Dataproducts Corp. or Centronics Data Computer Corp. interfaces as well as the 300 line/min Teletype Corp. Model 40 printer, the firm said.

The unit costs $2,400, from the firm at P.O. Box 714, Melville, N.Y. 11746.

DLP-3300 Controller Gets Enhancements

SAN DIEGO — Datasystems Corp. is offering enhancements to its DLP-3300 line-printer controller for IBM Series/1.

The DLP-3300 now features increased diagnostic capabilities, in addition to providing direct memory access (DMA) interfacing between Series/1 minicomputers and printers offering either Centronics Data Computer Corp. and/or Dataproducts Corp. compatibilities, the vendor claimed.

The DLP-3300 provides an external self-test that verifies operation of printer and cable. The internal self-test performs diagnostics functions that test more than 90% of the controller circuitry and display diagnostic as well as operational status via seven LEDs.

The price for the product is $1,825, the vendor said from 8716 Production Ave., San Diego, Calif. 92121.

TI Single-Board MPU Supports Basic

DALLAS — Support for the Basic language is part of the packaged University Board introduced by Texas Instruments, Inc.

The TM990/189-1 is a single-board microcomputer that can be used in learning high-level languages, 16-bit microprocessor fundamentals and interfacing techniques, as well as demonstrating TMS9900 family memory-to-memory architecture.

It comes with TI's University Basic Read-Only Memory kit and has additional features not found on the original University Board. These features include 1K bytes extra random-access memory.

The packaged University Board costs $399 from TI distributors. TI can be reached at P.O. Box 225012, M/S 308, (Attn: TM990/189-1), Dallas, Texas 75265.

Micro-Sci Diskettes Give Apples Storage

ORANGE, Calif. — Micro-Sci has announced two diskettes for Apple Computers, Inc. microcomputers.

The A-40 provides 40 tracks of storage and an additional track to monitor speeds up to 5M/sec. The A-70 offers 70 tracks.

The A-40 costs $495 for the first unit and $395 for each additional unit. The A-70 costs $675 for the first unit and $575 for each additional unit, the vendor said from Suite E, 1405 E. Chapman, Orange, Calif. 92666.

Mini Lets Police Force Seek, Analyze Clues In Predicting Crime

Special to CW

SIMI VALLEY, Calif. — Police here in this small southwestern California town are using a minicomputer system not only to track criminal activities, but also to find out where and when the next crime will occur.

The Data General Corp. 4/X computer, programmed with Crime Analysis System Support (Cass) software, allows police investigators to quickly search for patterns in crime incidents or criminal behavior, in effect developing their own leads. The system tracks and analyzes a territory covering 27 square miles and filters through crime reports from throughout this city of 78,000 residents, Deputy Police Chief Ralph Ioimo said.

"Investigators don't usually have the time to search every report from the field for patterns or clues for their own cases," he explained. And, "it's important to develop this type of lead quickly."

Data for the Cass files, whose software was developed by Simcon, Inc. of McLean, Va. under funding from the Law Enforcement Assistance Administration (Leaa), comes from five sources: stolen property reports, crime reports, arrest reports, field interview reports and pawn shop slips, Ioimo continued.

From these, entry operators at Dasher CRT terminals input dates, places, times, physical descriptions, reported methods of operation, stolen property identification, vehicle descriptions and descriptions of items sold to local pawn shops (the latter information is required from pawn shops by law).

Sifting and Choosing

With all this data in computer memory, Simi Valley's police can retrieve, list, sort, sift and link it along any characteristics they choose, Ioimo said.

For example, if a crime analyst or investigator notices several similar crimes in a neighborhood, he can enter the dates, locations and method of operation (MO) and run these against the MO file for known suspects. The computer will list any possible known suspects, and it will generate leads.

"This happens all the time," Ioimo noted. For instance, "from a recent rape report we extracted the rapist's description and requested a matching search across all files. As it turned out, one of our officers on patrol had earlier interviewed a suspicious person. The man's description in the officer's field interview report matched the rapist's, and we had a prime suspect.

"Of course, the system is not intended to eliminate the need for people in the investigative or judicial processes. It just helps us out by generating leads very quickly," he added.

In searching for these leads, Cass users can retrieve across complete files or parts of files. Up to six files can be searched on up to 25 criteria, testing for relationships of equality; nonequality; greater than; less than; greater than or equal; within a range of input; or for individual characters in a record.

Also, searches can be made when only partial data is available, such as when only the last three of seven digits of a license plate are known.

After a search, the computer reports the number of qualifying records. The user can elect either to cut this list down with additional selection criteria, or to save the qualifying records in a new file for output or analysis.

Analyses Available

Statistical analysis routines can provide maximum and minimum data values, median and mean values, variance, standard deviation, coefficient of variation, standard deviation of the mean, weighted mean, weighted variance, weighted deviation, frequency distribution and multivariate curve fitting.

Output graphics include histograms based on frequency distribution; scatter diagrams showing

(Continued on Page 74)

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Once a claim has been approved, a check is written that night. Since the Level 6 arrived, many claims have been paid in a single day.

The Level 6 has also been helping Wisconsin Life develop new applications for their transaction processing capability. For instance, there's a program in the works now that will enable them to process all new business on-line.

One advantage is that the computer can be used to calculate premiums, thus eliminating a great deal of work currently done by hand.

Finally, the Level 6 runs a very efficient data entry facility. Once CRTs are installed, clerks will be able to correct errors immediately, substantially reducing overall system maintenance costs.

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Rxpedite System Offered For Single, Chain Pharmacies

MILWAUKEE, Wis. — A pharmacy system for retail and nursing home pharmacies called Rxpedite is being offered by Health Information Systems, Inc.

The system reduces the pharmacist's time in filling and refilling prescriptions, automatically prices prescriptions, offers allergy, drug and interaction information and handles third-party insurance billings, Health Informations Systems said.

Rxpedite is the only pharmacy system available utilizing IBM's Series/1 computer that can be used by multiple stores, according to the vendor.

The system also offers continuing hardware maintenance through IBM's nationwide service network and software support via direct phone communication to Rxpedite's Technical Support Center. The system is written in EDX and utilizes IBM's 3101 CRT terminals. The system runs on a 4952 or 4955 processor, depending on the store size.

Rxpedite costs between $16,000 and $24,000, depending on whether it is to be used in a single store or for a chain of stores. The vendor is located at Lincoln Professional Center, Suite 202, 10401 W. Lincoln Ave., Milwaukee, Wis. 53227.

Replace 2230s, 2260s

DS 990s Get TI Printers

HOUSTON — Two dot-matrix line printers that provide optional hard-copy output for Texas Instruments, Inc. DS990 computer family models 4, 6, 8, 20, and 30 have been introduced by TI.

Both printers use raster and dot-matrix technology on a 9 by 7 matrix. They print at speeds of 300- and 600 line min, respectively, using a 96-char. Ascii, 132-col format. In addition to operating in the character print mode, the LP 300 and LP 600 may be used in plotting applications with user-developed software.

The LP 300 and LP 600 are designed to replace the current 2230 and 2260 printers offered with the DS990 family.

Priced at $9,750 and $13,750 respectively, the models LP 300 and LP 600 include the printer, pedestal, paper basket, paper, parallel interface, 30-ft cable, quietized cabinet and an operation and installation manual.

TI can be reached at P.O. Box 1444, M/S 7784 Houston, Tex. 77001.

Tape System Fits Multibus

SAN DIEGO — An IBM/Ansi-compatible magnetic tape system that is plug-compatible with the Intel Corp. Multibus is available from Innovative Data Technology, Inc. (IDT).

The Model INTL-1050 consists of a single-card tape controller that connects to the IDT Model 1050 formatted tape transport.

The complete subsystem uses a dual-density 9-track, 45 in./sec tape transport for either 800 char./in. (NRZI) or 1,600 char./in. (phase-encoded) providing more than 40M bytes of data storage on a 2,400 ft. reel of tape 10.5 in. in diameter.

Error recovery, interrupts, status and diagnostic primitives are resident in 4K bytes of on-board erasable programmable read-only memory (Eprom).

The price for the 1050 master system is $7,750 with additional daisy-chain drives available at $4,250 each, the vendor said from 4060 Morena Blvd., San Diego, Calif. 92117.

Mini Helps Predict Crime

(Continued from Page 73)

both data and fitted curves; and time series line graphs.

The Cass system allowed Ioimo to define those files he wanted maintained and to set authorized users for each file. But, for changing file structures after initialization, Cass offers purge, reorganization and expansion routines and programs that format disk storage, copy and sort files.

Simi Valley's Cass installation includes a DG Nova 4/X CPU with 128K bytes of memory, 10M bytes of disk storage, one Dasher LP2 printer and five Dasher D2 CRTs. The software is written in Basic for the Rdos operating system.

Not surprisingly, other state and local agencies have shown an interest in the computer-based tracking system, especially those constrained by California's controversial Proposition 13, which cut back on local governmental operating budgets, Ioimo said.

"Computers can cut labor costs in law enforcement because the field depends so heavily on storing and retrieving information. We need fewer data entry and retrieval personnel with the computer and can perform more complicated analyses faster," he observed.

Free Brochures

- A condensed catalog has been composed by Connecticut Microcomputer, Inc. to describe its expanded offerings. It can be obtained by writing "1980 Brochure," Connecticut Microcomputer, Inc., 34 Del Mar Drive, Brookfield, Conn. 06804.
- Diva, Inc. announces "DD 70 Series Disk Storage Systems from PDP-11/70 Processors," and "DD 40/50 Series Disk Storage Systems for PDP-11 Unibus Processors" from 607 Industrial Way W., Eatontown, N.J. 07724.

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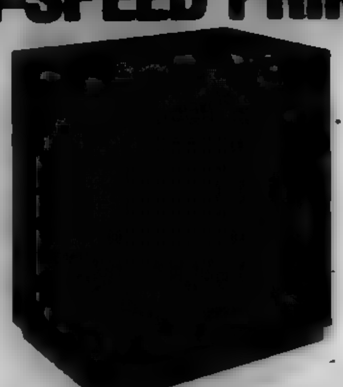

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Cromemco Unveils S-100 System

MOUNTAIN VIEW, Calif. — Cromemco, Inc. has announced System Zero, an S-100 bus system for dedicated applications in engineering, science and medicine as well as for other professional applications.

Based on Cromemco's Z80A-based single-card computer, the unit comes with 1K byte of random-access memory (RAM) and 3K bytes of Control Basic in read-only memory (ROM), the vendor said.

System Zero was designed for ROM-based programs, but it can be expanded to use Cromemco hard or floppy disk subsystems, according to the vendor.

A special version of the microcomputer, System Zero/D, is ready for use with floppy disks. System Zero/D includes 64K bytes of RAM, the vendor said.

The System Zero line supports RPG II, Fortran, Cobol, 32K structured Basic, 16K Basic and Lisp, as well as word processing, data base management and business application software, according to the vendor.

The basic System Zero — Model CSO — costs $995; System Zero/D costs $2,995; and a dual disk drive system — Model DDF — costs $1,295 from the vendor at 280 Bernardo Ave., Mountain View, Calif. 94043.

S-100 Gets I/O Processor

MOUNTAIN VIEW, Calif. — Cromemco, Inc. has introduced an I/O processor that reportedly provides multiprocessing capabilities for Cromemco S-100 bus microcomputers.

The Model IOP is a single card, Z80-based microprocessor with 16K bytes of random-access memory and up to 32K bytes of programmable read-only memory, the vendor said.

Model IOP costs $695 and is available from the vendor at 280 Bernardo Ave., Mountain View, Calif. 94043.

Micro Backs Multiple Users

OAKLAND, Calif. — A system for multiuser applications has been introduced by Digital Microsystems, Inc. The DSC-4 consists of a Multibus-based Z80A processor board and one or more 128K random-access memory (RAM) boards.

Each board contains four RS-232 serial ports and two 8-bit parallel ports. Extra card slots allow for the addition of user-specified Intel Corp. Multibus-compatible boards.

DSC-4 users can utilize software written under CP/M, MP/M and single- or multiuser Phase One System, Inc. Oasis.

The DSC-4 system with 128K RAM costs $6,950 from the vendor at 4448 Piedmont Ave., Oakland, Calif. 94611.

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Hot on Trail for Top Execs, High-Tech Firms Raise Ante

LOS ANGELES — Hot on the trail of top executives, 79% of California's high-technology firms said they have substantially liberalized their relocation benefits and 56% reported they anticipated increased benefits in the next year, according to a recent survey.

Driving the need for more generous relocation benefits are housing prices, which in California hover around an average of $100,000 compared to $74,000 for the rest of the country, reported William C. House of House, Shourds and Montgomery, Inc., the firm that performed the survey.

Addressing the recruitment of executives in the $50,000 and above salary range, the survey found reimbursement for real estate commissions was "frequently or always" offered by 76% of the high-technology firms reporting. This was the most common benefit cited by this class of company, the report said.

The report was conducted among 250 of the largest publicly held companies in California.

Significantly, the survey also found that a growing number of high-technology firms are willing to provide financing as an incentive for executive relocation. Some 39% of the high-technology firms

(Continued on Page 82)

IBM to Make Radical Change In Product Line, IDCer Predicts

By Jeffry Beeler

CW West Coast Bureau

SAN DIEGO — IBM is likely during the 1980s to introduce a new generation of software systems and a new hardware architecture that will mark the most "radical" change in the company's product direction in the last 20 years, a research director with International Data Corp. (IDC) predicted here recently.

The future architecture, which will probably be accompanied by new operating systems and major application subsystems, is expected to be as fundamentally different from its Series 360 counterpart as the Series 360 scheme was from the architecture that immediately preceded it, according to IDC's William Zachmann.

Hints of what the new architecture will probably look like can already be found in the hardware design of recent IBM offerings like the 8100 Information System and — to a lesser extent — in the System/38 and Series/1, according to Zachmann, who directs research for IDC's Information Systems Planning Service.

(Continued on Page 82)

Memorex Tightening Its Belt By Streamlining Manufacturing

By Jeffry Beeler

CW West Coast Bureau

SANTA CLARA, Calif. — Memorex Corp. has embarked on a major cost-cutting effort that will focus special attention on streamlining the company's manufacturing operations, according to the firm's chairman and chief executive officer, Clarence Spangle.

As part of the streamlining effort, Memorex has already consolidated all its manufacturing activities — both end-user and OEM — into a single organization headed by the firm's Peripheral Equipment Group (PEG) president, William Beyer, Spangle said.

The consolidation will enable Memorex to boost production volumes and cut unit costs for many of its products, especially the Model 3652 disk subsystem, a 1.27G-byte equivalent of IBM's Model 3350.

The reorganization will also allow Memorex to eliminate duplication in its end-user and OEM production operations and increase the "bang" the firm gets for its manufacturing "buck," Spangle said.

Loss Rate Slackens

Memorex's efforts to streamline its activities and thus trim its administrative and operational costs appear to be having the desired effect, at least to a certain extent. The company continues to lose money, but the rate of loss appears to be slackening.

During the second quarter of the current fiscal year, for example, Memorex lost $21.7 million on revenues of $185.7 million, while during the following quarter, ended in September, the firm's pretax losses dipped to $6.2 million on sales of $189.9 million.

Spangle's remarks about Memorex's cost-cutting efforts kicked off the company's

(Continued on Page 78)

HP Planning 32-Bit Mini

By Brad Schultz

CW Staff

PALO ALTO, Calif. — Plans for the imminent announcement of a 32-bit minicomputer prompted Hewlett-Packard Co.'s reorganization of its computer manufacturing operations last summer.

Internally known as Vision, the mini is backward-compatible with HP's existing 3000 family of systems and will eventually replace them, *Computerworld* has learned.

Vision's hardware and software will come from two divisions — Computer Systems and Information Systems respectively — which joined the General Systems Division as HP's Business Computer Group [CW, Aug. 25].

According to a spokesman, General Systems will address the burgeoning market for systems costing less than $25,000, while outperforming the most sophisticated programmable terminals.

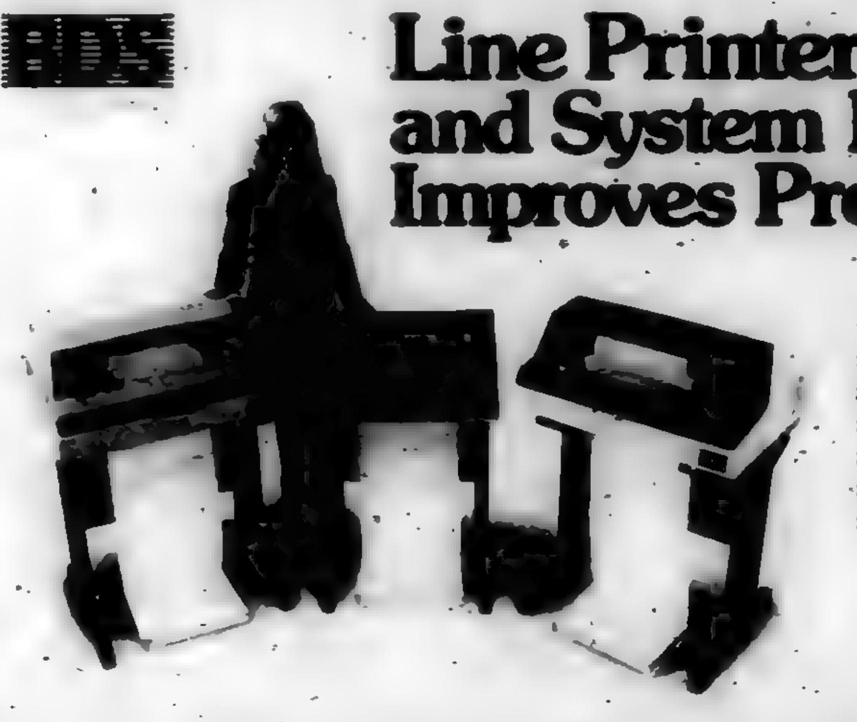
But the advent of Vision, which is expected to make HP more competitive against Digital Equipment Corp., Prime Computer, Inc. and other suppliers of so-called "superminicomputers," is clearly the reason for most of this reorganization.

Commercial Systems

In Pinewood, England, HP is starting a commercial systems operation to develop and market Vision software. And certain products for the low-end Visions will come from HP's revamped Desktop Computer Division.

However, a data communications program is also starting, the spokesman said, and will relieve HP's General Systems and Technical Computer Group of much responsibility for guiding the vendor's entry into the remote

(Continued on Page 78)



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Memorex Tightening Its Belt in Manufacturing

(Continued from Page 77)

first OEM "press day," which was highlighted by the firm's "first comprehensive press tour" of its Recording Technology Center (RTC). The tour covered the RTC's dozen or so applied research laboratories, where Memorex is developing the heads and media for thin-film disk systems that will eventually compete with IBM's Models 3370 and 3380.

Memorex has already developed a working prototype of its 3370-type disk system and is well on its way toward completing an experimental version of its 3380-type unit, which might be introduced as early as the spring of 1982, a company spokesman said privately.

In conducting the tour through its RTC laboratories, Memorex was clearly trying to show that, despite recent financial setbacks, it still feels it has the techological wherewithal to compete with IBM in the end-user disk system market.

OEM Commitment

Memorex also used the press-day proceeding to reemphasize its renewed commitment to the OEM market. Reiterating views expressed several weeks earlier by PEG's President Beyer, Spangle told members of the trade press that the shift in his company's business strategy represents an attempt to capitalize on the rapid growth in the low-cost, high-volume OEM market.

The microcomputer sector of that market is expanding at about 75% per yr, even faster than the minicomputer sector's 30% annual growth, Spangle said. The end-user side of the computer business, by contrast, is growing only at an estimated 15% per yr.

"It doesn't take too much arithmetic to figure that the OEM business, while relatively small now, can be as big as the end-user business within a few years," Spangle said. "We intend to be running with it and, in fact, to be in the front of the pack."

No Exit

Memorex's increased emphasis on the OEM sphere, however, in no way signals its exodus from the end-user business. "That's the biggest piece of the Memorex pie right now, and it's not shrinking," Spangle said. "The pie is just getting bigger, and we certainly intend to maintain and even enhance our share."

Memorex regards the OEM market as another channel of distribution for its products rather than as a substitute for its end-user business, Spangle added.

In other comments, the Memorex chairman credited his company with bringing several competitive advantages to the OEM disk systems market. The first purported advantage is experience.

Memorex's participation in the OEM sector dates back to 1967. As late as 1974, OEM sales accounted for only about 2% of the firm's total revenues. Today, that share stands at 15%, and company officials reportedly expect the figure to continue growing during the years to come.

Another of Memorex's competitive strengths in the disk systems field, Spangle said, is that it manufactures all its own media. As if to emphasize that point, the company used its press-day conference as an occasion to introduce its so-called "M Formula" coating for 8-in. and 14-in. ferric oxide-coated rigid disks.

Common Technology

A third important advantage is that the firm's end-user and OEM products use a common technology, Spangle explained. The same read/write heads, magnetic media and electronics that Memorex originally developed for its end-user and customers are now being applied to the OEM side of its business.

This strategy of sharing technology between two markets purportedly enables Memorex to maximize the return from its research-and-development dollar.

Yet another of the company's reported competitive advantages is its position in the international OEM market. Memorex entered the international arena during the mid-1960s and now derives half of its total revenues from its sales activities in Western Europe, Japan, Canada and Australia, Spangle said.

The firm is currently hiring a manager for its international OEM marketing organization headquartered in London, Spangle added.

Info Sci Names Three VPs

MONTVALE, N.J. — In order to update its products to reflect the technology of the 1980s, Information Science, Inc. (Info Sci) has named three new executives, according to Jack Hight, the firm's president.

Leo Kornfeld was named senior vice-president and president of the Informaiton Services Division. He was formerly a senior officer of Cresep, McCormick and Paget, Inc., a consulting firm acquired by Citicorp.

Also named a senior vice-president and president of field operations was Brian Aspland, formerly with Interactive Data Corp., which was acquired by the Chase Manhattan Bank. Aspland will concentrate on building InSci's sales force.

Kornfeld and Aspland have joined the firm within the past month.

In addition, within the past few months Daniel Federman was named senior vice-president and chief financial officer. His most recent position was vice-president of planning for the National Broadcasting Co.

HP Planning 32-Bit Mini

(Continued from Page 77)

processing marketplace.

The Computer Systems Division was given control of the 3000 supermini family, including associated operating systems, precisely because Vision products will replac those offerings.

As HP's first software division, Information Systems will produce commercial languages, data base management packages and utility programs for Vision as well as for the HP 3000 minicomputers, which will migrate into the Vision stream eventually.

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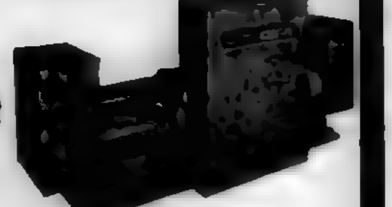

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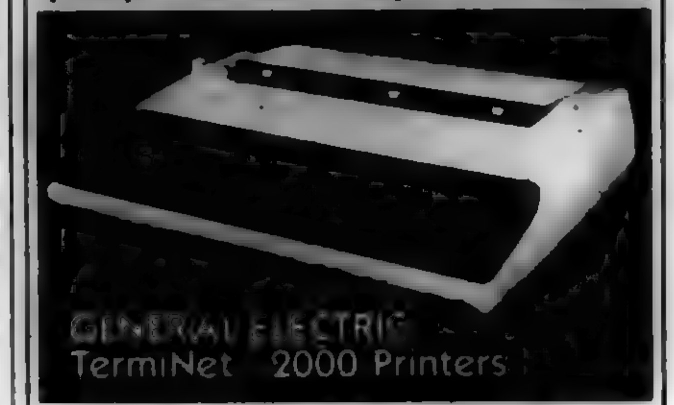

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'Violent Monetary Trauma' Ended; Economist Predicts Good Year for DP Industry

By Marcia Blumenthal
CW Staff

NEWTON, Mass. – The recession has ended, but it was such an unusual one that Albert Summers, chief economist for the Conference Board, labeled it a "violent monetary trauma."

Whatever term is preferred, it looks as though the computer industry is in good shape for the coming year.

The historic two-quarter lag for a downturn in the industry as happened in previous recessions won't happen in 1981, maintained Arthur Carr, president of Codex Corp. and vice-president of Motorola, Inc.

"There's too much growth momentum in the industry and not a serious enough problem in the economy," added Ray Stata, chairman and president of Analog Devices, Inc.

Stata and Carr were two of the executives sharing the podium at the 1981 Forecast Forum sponsored here recently by the New England Council of the American Electronics Association.

Industry Dichotomy

Although the tone of the forecasts was optimistic, executives were cautious, agreeing 1981 would be a good year, but not a great one.

Part of this posture is a result of what Digital Equipment Corp.'s Andrew C. Knowles called a "dichotomy in the industry." Money is expensive, which puts pressure on commercially oriented businesses, noted Knowles, vice-president of DEC's Technical Group. This group oversees products for engineering, education and laboratory sectors, among others.

However, manufacturing plants in the U.S. are antiquated and need to be automated in order to compete with Japan. Real-time and distributed processing systems for engineering, manufacturing and control will flourish in the next few years, Knowles predicted.

DEC's 34% increase in revenues for its latest quarter was largely attributable to noncommercial systems, he said.

While revenues at DEC were up 34%, mainframers such as Burroughs Corp. and NCR Corp. have experienced declines in orders in recent quarters, which have showed up in both revenues and earnings at these firms.

Emphasizing the current weakness of the commercial sector, Knowles claimed these companies cannot change gears because they do not have the real-time software needed for the industrial market.

Although the economy has been tight, DEC recently announced it will spend $400 million on plant and equipment, double the amount spent last year.

Another phenomenon that affected earnings of industry vendors during the past year was users' preference for leasing over purchasing equipment. However, Codex' Carr expects the lease-to-purchase ratio for various segments of the industry to return to normal after the second quarter of 1981. In addition, income from leases will begin to have a positive effect on balance sheets during 1981, he maintained.

Despite the recovery, Carr thinks the prime rate won't go below 10% and inflation will remain at an 8% minimum throughout the next few years. There will not be a sharp snap-back as there was in 1977 after the last recession.

On a cautionary note, most of the panel expressed concern about the recession in Europe, which is expected to intensify through the next year. This, they believed, will undoubtedly cause some difficulty for companies with heavy European sales.

In the semiconductor arena, things are considerably brighter compared to previous recessions, Stata pointed out. Although there may be hiring freezes at some semiconductor firms, there were no major layoffs like those of the last recession, which saw layoffs of up to 25% of the workers at some firms.

Although there has traditionally been a high correlation between the downturn in the economy and the state of the semiconductor industry, its intensity is not as severe as in previous dips. This time the multiplier for the ratio of the peak-to-trough downturn in industrial production compared to semiconductor production is about one to one, Stata observed. In previous downturns, the multiplier was as high as six.

Overall, the semiconductor industry should grow 18.5% annually until 1985 compared to an average annual growth rate of 20.5% for 1975 to 1979, according to the Semiconductor Industry Association.

Good Sign

A particularly good sign for semiconductor vendors is the continued preference of some major component consumers such as Western Electric and IBM to purchase mammoth quantities of devices from outside sources, rather than beefing up captive sources, Stata said.

And, the "U.S. is a lot more chauvinistic than it is given credit for," he stressed. "It's one thing to buy Japanese components when there is a shortage, but another thing when there is an adequate supply."

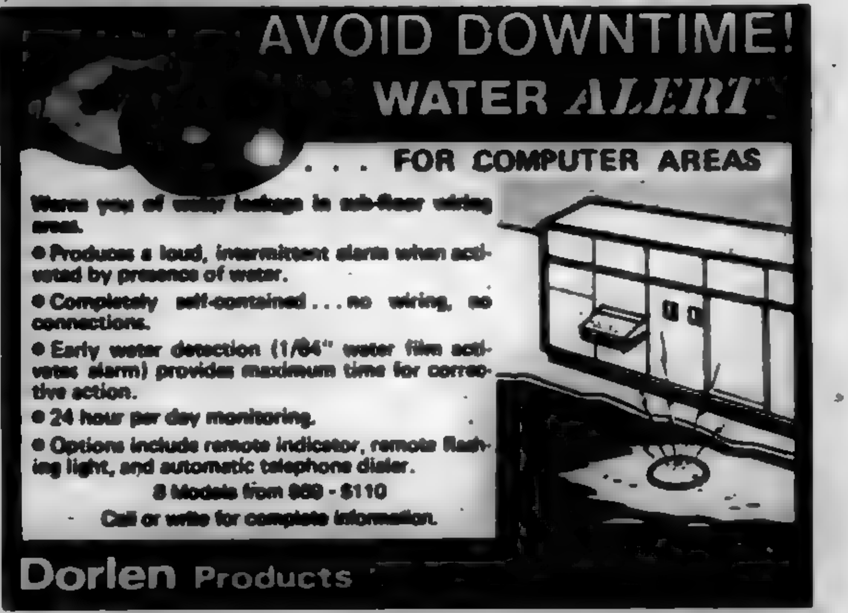
Despite periodic downturns in the economy, the computer industry should focus on the noncyclical demand factors driving the industry, Stata advised. Elasticity is still prevalent in the industry. And inflation is always good for the electronics industry, especially as the low end of the wage scale climbs.

Contracts

Leasametric, Inc. has received an exclusive General Services Administration contract for general-purpose automatic information processing equipment.

Data Pathing, Inc. has signed a $750,000 contract with the Kennedy Co. for Kennedy's Series 9000 tape transports, and the Lohm Corp. has awarded Data Pathing a $150,000 contract for the Kennedy 9700 tape drive transports for use in computer-controlled automatic branch telephone exchange systems.

Robert Seaman of Raytheon Co. (left) and Andrew Knowles of Digital Equipment Corp. take a breather from discussing the state of the economy at the recent 1981 Forecast Forum.



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Mini Earnings Rise 22% to 91% in Quarter

Major mini makers showed increases in earnings ranging from 22% to 91% for their latest quarters.

Prime Computer, Inc. led the earnings dash, posting net income of $8.1 million or 41 cents per share compared to income for the prior year's third quarter of $5.4 million or 31 cents per share.

Revenues for the third quarter were $69.7 million, a 73% jump from the $40 million in sales reported in the corresponding quarter a year ago.

For the first three quarters, Prime's earnings were $21.2 million or $1.10 per share compared to earnings of $11.8 million or 67 cents per share.

Revenues for the year to date advanced 74% to $182.2 million from $104.8 million in the prior year's nine-month period.

At Wang Laboratories, Inc., first-quarter earnings for fiscal 1981 rose 84%, reaching $11.9 million or 42 cents per share compared with earnings of $6.5 million or 26 cents per share for the prior fiscal year's first quarter.

Revenues rose 65% to reach $156.8 million, up from $95 million reported in the prior year.

Orders during the first quarter added $61 million to the company's backlog.

DEC Earnings Up

Digital Equipment Corp. reported a 24% increase in its first-quarter fiscal 1981 earnings and topped $56.2 million or $1.17 per share, up from $45.2 million or $1.02 per share in the corresponding period of 1979.

Revenues grew to $479.2 million, a 34% increase from revenues of $362 million for the prior fiscal year's first quarter.

Of particular note were customer service revenues of $175 million, which rose 40% during the first quarter, DEC said.

DEC also reported strong sales for its Vax-11/780 32-bit system. DEC expects to spend $400 million on plant and equipment during its current fiscal year, about double the expenditures for last year.

DG's Profile

On a more somber note, Data General Corp. reported a 22.3% increase in earnings for the final quarter of its latest fiscal year, but overall earnings for the year advanced a scant 9.8%.

For its last quarter, DG reported earnings of $16.4 million or $1.54 per share, compared with the $13.4 million or $1.27 earned for the same period last year.

Revenues for the fourth quarter grew 25%, reaching $214 million from $171 million last year.

For the full year, DG's revenues were $654 million, up 29% from $507 million for the prior fiscal year.

Earnings for the year were $54.7 million or $5.20 per share, compared with earnings of $49.8 million or $4.82 per share last year.

"Fourth quarter 1980 results reflected growth at a slower rate than the preceding quarter due to reduced order rates," said Edson D. De Castro, DG's president. De Castro said economic uncertainties may continue to adversely affect delivery of the firm's product through the first half of fiscal 1981.

Magnuson Earns $917,000

SAN JOSE, Calif. — Magnuson Computer Systems, Inc. reported third-quarter earnings of $917,000, or 18 cents per share, and revenues of $8.2 million.

This compares to a loss of $172,000, or 19 cents per share, and revenues of $3.9 million for the comparable 1979 period.

For the year-to-date, earnings reached $2.4 million or 58 cents per share, compared to a loss of $2.6 million or $1.61 per share a year ago.

Earnings per share are based on an increased number of shares outstanding as a result of the company's initial public offering on June 25 of 1.1 million shares. Earnings also reflect a tax loss carry-forward of $1.1 million.

Revenues totaled $20.7 million, up nearly four times the revenues of $5.5 million for the first nine months of 1979.

Commenting on the results, Joseph L. Hitt, president and chief executive officer, said, "an important achievement during the quarter was our ability to nearly double production in the month of September to meet orders.

"We anticipate maintaining our production levels in the fourth quarter at this new higher rate," Hitt added.

STC Quarterly Revenues Up 12.5%

LOUISVILLE, Colo. — Storage Technology Corp. reported a modest 7% gain in earnings and a 12.5% increase in revenues for its third quarter.

For the latest quarter, STC's earnings totaled $12.1 million or 46 cents per share, up from $11.3 million or 45 cents per share in the comparable 1979 quarter.

Revenues grew to $117 million, up from $104.3 million for 1979's third quarter.

For the year to date, STC's earnings were $31.4 million or $1.22 per share, up 11.3% from the $28.2 million or $1.12 per share during the comparable nine months of 1979.

Revenues to date grew 22%, reaching $327 million, up from $267.6 million for the same period last year.

Although the company made no comments on its earnings for the latest quarter, both earnings and revenues have moderated this year. For its last fiscal year, the firm's revenues grew 60% and earnings grew 48% from the prior year.

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Cbema Elects James Mellor Chairman

WASHINGTON, D.C. — James Mellor, president of AM International, Inc., has been elected 1981 chairman of the board of directors of the Computer and Business Equipment Manufacturers Association (Cbema) and H. Glen Haney, vice-president of marketing at Univac, was named vice-chairman.

Albert Mullin Jr., director of corporate affairs at Digital Equipment Corp. and Don Riley, director of corporate business intelligence of Xerox Corp., will co-chair the Plans and Policies Committee.

Maury Longsworth, director of government and industrial relations of Honeywell, Inc. will be chairman of the Foreign Trade Committee. He will be assisted by vice-chairman George Bardos, vice-president of marketing development of Control Data Corp.

Robert Beltz, physical distribution manager of 3M Co., will be chairman of the Physical Distribution Council; Jim Hall, director of staff services of Univac, will be the chairman of the Service Management Council; and Ed Nanas, director of information programs at IBM, will chair the Communications Advisory Committee.

Cbema's 36 member companies reportedly account for 85% of the business in the computer and business equipment field, with annual domestic revenues of $35 billion.

Comsat Vamps Operating Units

WASHINGTON, D.C. — Comsat General Corp., has announced the restructuring of its operating functions into three major units.

The three units, each headed by a senior officer with general management responsibility, are Satellite Systems, Communications and Information Products and Systems Technology Services.

William L. Mayo, vice-president, will head up Satellite Systems; Michael S. Alpert, vice-president, will be in charge of Communications and Information Products; and Burton I. Edelson, senior vice-president, will continue to head Systems Technology Services.

STC, Documation Sign Definitive Pact

LOUISVILLE, Colo. — Storage Technology Corp. (STC) and Documation, Inc. have signed a definitive agreement and plan of reorganization providing for the merger of Documation into STC.

Documation stockholders will receive .85 share of STC common stock for each outstanding share of Documation common stock.

The agreement and plan of reorganization is subject to the approval of the stockholders of Documation. Documation intends to call a special meeting of its stockholders this month for the purpose of obtaining such approval.

Carter's Embargo Cited

U.S.-Soviet DP Trade at Record Low

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Data processing equipment trade between the U.S and the Soviet Union dropped to a record low the first six months of 1980, according to the U.S. International Trade Commission (ITC).

U.S. computer exports to the Soviet Union were valued at only $200,000 during the first half of this year, the ITC said in a recent report to Congress. This compares with $17.6 million in such trade for the corresponding period of 1979.

Because computer trade with the Soviet Union has been steadily increasing over the previous five years and because the Soviets had come to rely on Western techology to boost several of its industry sectors, the cutback in American computer exports "may pose problems" for the Soviet Union as it plans for the next five years, the ITC said.

The commission attributed the sharp trade decline to the embargo of high-technology goods to the Soviet Union imposed by President Carter Jan. 4 in response to the Russian military intervention in Afghanistan.

The complete embargo was subsequently lifted in the spring, but technology trade with the U.S.S.R. is still significantly restricted. High-technology exports to that country, which totaled $46.4 million in the first half of 1979, reached only $17.4 million during the same period of this year.

Bilateral trade of all categories was down over 52% during that time, with almost all the decline attributed by the ITC to the U.S. trade restrictions.

Impact Assessment

Assessing the impact on the Soviet Union of the high-technology export restrictions, the commission said although the level of trade was never very high, the effect of trade sanctions "will be much more significant than the volume of this trade would suggest.

"Soviet hard-currency purchases of high technology from the U.S. have always been highly selective," the ITC report noted, "concentrating on computers and process controls crucial to their modernization efforts and incorporating unique technology."

The U.S. ban on these items "may pose problems for certain Soviet industries," the commission said. "It is believed that before the deterioration of U.S.-Soviet relations, the Soviets were interested in increasing their purchases of process-control instruments as one way of improving lagging Soviet productivity."

Since the sanctions were imposed, the Soviet Union has been seeking alternative sources for high-technology equipement and know-how, the report noted.

But because this search for substitutes comes while the Soviet Union is drafting its 1981-1985 economic plan, "not knowing whether key items will ultimately become available from the U.S. or from alternative sources can create uncertainty," the ITC said, and thus "unsettle Soviet planning in important areas."

Executive Corner

- John H. Clark has been appointed president and chief executive officer of Micom Data Systems, Inc. The former president of the Data Products Group at Itel Corp. will head up Micom operations at company headquarters in Dallas.
- Joe Schneider has been elected vice-president of finance at Data Electronics, Inc., where he will be responsible for all financial activities within the company.
- Robert Theriault has joined Century Data Systems, a Xerox subsidiary, as vice-president of market operations.
- Bruce Hamilton has retuned to TEC, Inc. as vice-president and general manager of the company's Component Products Group.
- Peter Hertan has been appointed to the newly created position of vice-president of marketing at the Nestar Systems, Inc., where he will be responsible for all microcomputer product marketing and support.
- Prentice Robinson has been named senior vice-president at Dataroyal, Inc., where he will be responsible for manufacturing operations.
- Marc Ayes has been made controller/treasurer of the Q1 Corp.
- B. Tom Carter Jr. has been named executive vice-president and treasurer of Wyly Corp. and its wholly-owned subsidiary, University Computing Co.
- William Slaughter has been elected vice-president of sales for the Bryan-College Station division of Agency Records Control, Inc.
- Lee Gendron has been appointed to the newly created position of vice-president of technical operations at IPL Systems, Inc.
- Ken Isaac has joined Century Data Systems as vice-president of engineering. He replaces James Conway, who has been appointed to the new position of vice-president of advanced planning and technology.
- Gresford Priestly and Steven Silberstang have been elected vice-presidents at DDP Systems, Inc.

Supershorts

Four-Phase Systems, Inc. recently announced that it is increasing its domestic sales force by 50%.

– – –

Bram International Ltd., a Scotland-based manufacturer, has established a U.S. division to market its productivity improvement product line.

– – –

D.C. Hayes Associates, Inc. manufacturer of the Micromodem II and 100 information communications systems, has changed its name to Hayes Microcomputer Products, Inc.

– – –

Evans & Sutherland, Inc. has signed an agreement with Shape Data Ltd. of Cambridge, England, to market Shape's geometric modeling package, Romulus, in the U.S. and Canada.

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Weill Urges Collaboration

The place was Paris, the show was the Salon International de l'Informatique de la Communications et de l'Organisation du Bureau -- better known simply as Sicob -- and the guest of honor was Simone Weill, president of the European Parliament, who was shown some of Europe's latest technology on the exhibit floor.

In opening comments at the September show, Weill urged European computer corporations to collaborate under the best possible conditions to research new technology and called for the elimination of tariff duties, the establishment of a sound network of communications and the sharing of present data bases.

Weill expressed a special concern that attention be given to humanity and that isolation, lack of initiative and rigidity not become the result of a computerized society.

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The service can be ordered by writing International Data Corp., 214 Third Ave., Waltham, Mass. 02254.

Radical Change Predicted

(Continued from Page 77)

Zachmann described the 8100 as the first "radical departure" in IBM's large systems architecture since the 1960s, when the firm introduced its 360 series, which formed the architectural model for the industry giant's follow-on 370 series. Whether IBM's next hardware architecture will be a direct outgrowth of the 8100 or whether it will develop along entirely independent lines remains to be seen, Zachmann said at IDC's executive conference on "Improving Information Processing Profitability and Productivity During the 1980s."

The expected emergence of a new IBM hardware architecture, which could come as early as 1985, will result in significant user benefits, including dramatic increases in memory addressing space. But the shift in product direction will also create the need for a new IBM operating system and will prompt successors to its application subsystems like IMS.

If IBM had its own way, the company's new architecture and software systems would probably have already been introduced. But realizing its users could ill afford to abandon their $200 billion investment in existing programs, IBM has been forced to implement its future product plans cautiously, Zachmann said.

Painful Lesson

IBM still remembers the painful lesson it learned back in the 1960s, when many of its users bolted to competing vendors rather than brave the perilous passage to the then-new 360 architecture and operating system. The company is determined not to allow the next major shift in its product direction to provoke a similar mass exodus of its customers.

To that end, the firm is consciously using recent products like the 8100, System/38 and Series/1 to slowly acquaint users with the new systems concept that will underlie the vendor's next generation of software systems and hardware architecture, Zachmann said.

IBM's strategy appears to be based on the belief that the most painless way of converting users to a new architecture is to implement the scheme in gradual steps rather than all at once, Zachmann said.

High-Tech Firms Up Ante

(Continued from Page 77)

said they "frequently or always" offered a swing loan. "In the past, we rarely saw companies willing to become involved in financing arrangements," Houze noted.

In addition, 18% of those firms said they were willing to assume the relocating executive's mortgage obligation if the former home was unsold. That same percentage of firms also indicated they were willing to assist in job placement for the spouse in a two-career family.

Break With Past

Another surprising finding of the survey was that 72% of all firms surveyed, including high-technology companies, said they were generally willing to provide the same relocation benefits for new executives as for those transferring within the company. "The willingness to treat a new executive like one of the family marks a sharp break with the past," Houze maintained.

At the same time as liberalizing relocation benefits, more than 50% of the high-technology firms said they would use the services of a third-party relocation firm.

Despite the cost of increased relocation benefits, more than 40% of the high-technology firms said they would continue to seek the best executive talent, the survey noted.

Similarly, only 10% of those firms said they would lower standards in order to avoid such costs.

Conducted among 350 firms last summer, the survey found energy companies to offer the most liberal relocation packages.

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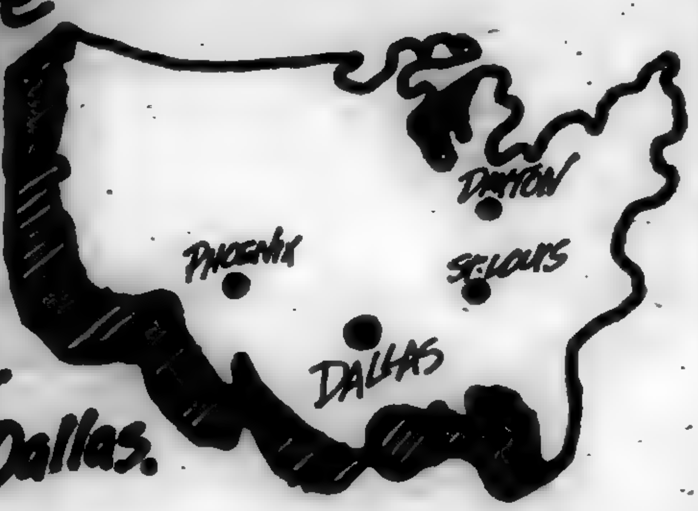

If your future's not looking very bright where you are right now—but the economy is keeping you from making a move—E-Systems Garland Division can solve your problems.

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Major Northwest co requires 3-5 yrs life insurance background. Must have DOS/VS, CICS, and project leader/supv expr. Will supervise 10. ASSEMBLER knowledge helpful. Salary $28-$32,000

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Major hi-tech mfg firm seeks aggressive analyst with exp in designing fin'l & mfg sys. Will interface between users & DP and have full life cycle respon. Exp with IMS DB/DC & COPICS pref. Hi-visibility in a growth co. Salary $28,000 range

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Karl [illegible]
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of Columbus, Inc.
88 E. Broad St., [illegible]
Columbus, OH 43215
(614) [illegible]

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Downtown firm needs CMF analyst for IBM 3031 OS/VS1 CICS installation. Prefer 5 years total experience, including COBOL prog/analyst, technical writing skills. Do internal consulting to applications development teams. To $24,000

SEATTLE DP shops are eager to interview experienced IBM COBOL & RPG II programmer/analysts. Salary ranges are $16-24,000. If you have 1+ years business/financial experience and plan to visit here, call me collect or send a resume ASAP.

Ray [illegible]
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite [illegible]
Seattle, WA 98101
(206) [illegible]

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OS BAL or COBOL for large OS/MVS environment. Financial or banking applications. IMS a +. To $28,700

Mini Computer Systems Programmer with Assembler and Data Base Design & Implementation. To $[illegible]

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ROBERT HALF
of Los Angeles, Inc.
3600 Wilshire, Suite [illegible]
Los Angeles, CA [illegible]
(213) [illegible]

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PROGRAMMER ANALYST

Financial applications. You would get involved with major International Orange Cty. based mfr. Heavy development and design background best. No manufacturing. To $30,000

Dave [illegible]
ROBERT HALF
of Orange County, Inc.
2323 N. Broadway [illegible]
Santa Ana, CA [illegible]
(714) [illegible]

COMMERCE

PROGRAMMER/ANALYST

Strong COBOL. All financial applications. CICS, DL/1 a plus. Client utilizes IBM 4341 with distributed processing. $25-30,000

Bob Beck
ROBERT HALF
of Los Angeles, Inc.
[illegible] E. Telegraph Road
Commerce, CA [illegible]
(213) 721-2107

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You can pick and choose the environment and location of your choice as there is a demand far exceeding the supply of qualified professionals. Look below for a sampling of openings.

HP1000, Heavy Pascal, Assembly. Must have developed OS and TP systems in the past. $31,000

3+ years in compiler design to support "SBC 370 Call" development. Assembler, PL/1, TSO, JCL. $OPEN

IBM Assembler, DOS/VS. Prefer CICS or IMS or IDMS. $30,000

1-3 yrs MVS-installation and maintenance, good user contact skills needed also. $38,000

CICS systems software/programmer needed immediately. $30,000

COBOL/BAL, 370 OS, gens and systems programming in background, install 4341 OS CICS VS1. $28,000

This is just a sampling of systems opportunities — if you are looking for other positions, from applications through senior management, call collect or send your resume now and see what we can do for you.

Jerry Anderson
or
Bob Cronk
ROBERT HALF
of Northern California, Inc.
111 Pine Street
Suite 1000
San Francisco, CA 94111
(415) 434-[illegible]

KANSAS CITY

VICE PRESIDENT

Rapidly expanding Midwestern retail group requires 5 years top level management experience. Newly reorganized department requires effective administrator to develop departmental policy and procedures in areas of retail systems with emphasis in project control, reporting systems, and management by objectives. Salary to $70,000

PROGRAMMER

Suburban Johnson County State-of-the Art MVS shop seeks a solid COBOL technician who enjoys programming. Will be responsible for billing and customer service application in both a batch and on-line environment. Command level CICS a plus. Excellent opportunity to get rewarded for good coding skills. Good career path in programming.
Salary to $30,000

SOFTWARE

Leading edge opportunity for the experienced DOS/VS professional. Person must be capable of doing DOS/VS GEN as well as CICS and DL/1 support. Exposure to VSE would be a plus. Must be capable of taking complete charge of all DOS/VSE software in new 4331 installation. Salary to $28,000

MANUFACTURING

Expanding suburban manufacturing firm seeks aggressive prog/anal to become involved in on-line manufacturing systems. 2 years COBOL with exposure to BOMP, MRP, or other manufacturing systems qualifies. Merit raises and promotions. Salary to $25,000

DATA BASE

Be a part of the new management team installing a 4341. Must be capable of making decisions and taking charge of complete data base design of new manufacturing systems. Proven track record of taking a project from start to finish is required. Will be involved in complete architecture of new corp data base. Experience with IDMS, IMS, DL/1, and TOTAL or other manufacturing data base qualifies.
Salary to $36,000

PROG/ANAL

Fortune 500 firm has excellent opportunity for a prog/anal knowledgeable in RPG II. IBM systems 32 and 34 experience a plus. Firm is rapidly expanding, allowing for unlimited career potential and opportunity to learn COBOL in an OS environment. Progressive benefit package, attractive working-environment. Salary to $25,000

George [illegible]
ROBERT HALF
of Kansas City, Inc.
127 W. 10th
Kansas City, MO [illegible]
(816) 474-[illegible]

NEW ORLEANS

PROGRAMMER/ANALYST

Billion $ Energy related firm has need for a person exp in COBOL/DIBOL/FORTRAN is a plus. They are developing a new acc't system.
To $25,000

SR PROG/ANALYST

Sub of Fortune 500 firm is seeking an exp P/A with 3 yrs COBOL Bkdg. Fin'l systems CICS helpful. To $25,000

ROBERT HALF
of New Orleans
[illegible] St. Charles, Suite [illegible]
New Orleans, LA [illegible]
(504) [illegible]

NEW YORK

SENIOR ANALYST

Potential packed opportunity with this major oil conglomerate. Co converting from large Sys 3/15 to 4341. 3+ years systems analysis with heavy communications experience and COBOL programming in background. Automate G/L, INVENTORY and payables applications. Very secure. $32,000

DP MANAGER

Excellent upper level position for technically oriented manager. 4+ years FORTRAN programming with responsibility for evaluation of hardware & software in background. HP 3000 experience is a plus. Overall management responsibility for design through implementation with heavy user interface. Newly installed HP 3000 3. $36,000

RPG II-SYS 34

Extraordinary opportunity to aid in conversion of SYSTEM 3/10 to SYSTEM 34. 2+ years RPG II programming, financial applications and System 3/15, 32 or 34 experience. Ground floor opportunity in rapidly expanding environment.
$25,000

FORTRAN STATISTICS

Opportunity to work in sophisticated time-sharing environment with this "BIG 8" CPA firm. 2+ years FORTRAN programming with TIME-SHARING and STATISTICAL applications experience. Research and development of statistical sampling system. Highly visible with room for growth. $25,000

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Marty [illegible]
ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY [illegible]
(212) 221-[illegible]

SAN ANTONIO

SYSTEMS PROGRAMMER

Degree preferred, IBM 370/OS/CICS/3800, BTAM, NCP, SSS (Network) a MUST. Financial or banking background a plus in this environment. This firm offers growth/earnings unlimited. $35,000

SYSTEMS PROGRAMMER/MANAGER

Degree a MUST, IBM 370/DOS/CICS/COBOL, RPG II a MUST. Any type business background is acceptable with financial a plus. Company offers good benefits. $35,000

PROGRAMMER/ANALYST

Degree preferred. 3 plus years as Assembler programmer with good basic skills. Financial exposure a big plus. Will promote rapidly if well qualified. Good benefits. No job hoppers please. $24,000

PROGRAMMER

Degree preferred, RPG II language with accounting/insurance background a MUST. System 3, 32, 34 exposure a plus. 10 plus holidays and X-mas bonus with fast growth company. $15,000

Bob [illegible]
ROBERT HALF
of San Antonio, Inc.
Frost Nat'l Bank Bldg #[illegible]
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Do you really know if you're in the one best position? Are others getting better exposure? Are you being paid what you're worth? Where will you fit in your present company's plans a year from now? What about in three years? Will you continue to grow or have you peaked out?

In today's dynamic computer field it's almost impossible to stay abreast of what others are doing and whether you are keeping pace. The Source Edp Computer Career Conference has been conceived to help computer professionals analyze and evaluate the current job market and find out where they stand. Key information systems executives from leading organizations in your area and across the nation will be available at the Conference to explain their long-range plans—and where you might fit in. These firms represent a broad cross section of computer user, consulting and service organizations. They are diverse in industry, location, size and types of positions currently available. Each has something special to offer that might better utilize and broaden your skills and potential. Compensation levels are outstanding.

The Computer Career Conference is an easy way for you to investigate a wide variety of career paths rapidly while maintaining complete confidence. Over 15,000 specific positions currently exist with the Conference participants. A brief summary of these openings is presented below.

Applications Programming

The widest choice of alternatives represented in the Conference is provided to those professionals who have one to two years or more of applications programming background. Conference participants will provide direct exposure and training in a variety of languages (COBOL, PL/1, BAL, RPG, BASIC, etc.), operating systems (OS/VS, DOS/VS, VM, etc.), and data base and data communications (IMS, CICS, TOTAL, IDMS, ENVIRON 1, etc.). In almost all cases, assignments will be projects or teams developing new and leading edge computer techniques. Significant opportunities exist for those with solid programming background to move into systems development, software, EDP auditing, or systems evaluation. In addition, professionals with exposure or interest in minicomputers will find a broad variety available at the Conference. All positions offer challenging job assignments providing the opportunity to accelerate career growth. Starting salaries range from $18-$37,000.

Systems Development, Consulting and Project Management

A broad variety of openings exist within Conference organizations for persons with systems development background ranging from Junior Analyst to Senior Project Manager. While any industry exposure is acceptable, a background in manufacturing, finance, and/or distribution information systems will provide the broadest choice. College degrees are preferred, but not required. Ability to interface at all user levels and good oral and written communications skills are mandatory. A number of the Conference organizations offer current applications programmer analysts the opportunity of moving directly into systems design projects. Those more senior are sought for project manager openings. Due to their ambitious MIS expansion plans, several organizations provide formal management training and development programs. State-of-the-art communications and data base oriented information systems are being planned by many of the participants. In addition, exceptional opportunities are available for those desiring to move into line management. Several small to intermediate firms are now making their first thrust into computerized systems implementation. In addition, nationally respected management consulting firms will be represented for those interested in a variety of assignments and high visibility. Starting salaries range from $25-$54,000.

A special invitation to computer professionals with one to five years of experience.

If you are a computer professional with one to five years of experience, the Computer Career Conference offers you a most unique opportunity. Now is the most crucial period in your career. At this point in time, you have an almost unlimited number of career options from which to choose. Unfortunately, this also means you have more opportunities to make an error in selecting your one best career path. A wrong move now could close forever the option that would have yielded you the greatest long term potential. By attending the Conference, you'll gain invaluable career planning knowledge in a matter of days that might otherwise take you years to learn.

Systems Programming and Software Development

The challenges provided by Conference participants in software are both broad and unique. Those with at least one to two years of OS, DOS, DOS/VS, VS, or VM systems programming experience will be able to gain direct exposure to some or all of the following: OS, VS, MVS, JES3, CICS, IMS, TSO, DL/1, BTAM, TCAM, VTAM, OCR, duplex lines, modems, programmable line concentrators, switches, CRT s, IBM up to 370/168 s and 3033 s, and a variety of non-IBM systems including minicomputers. Assignments range from development and modification to maintenance and support of advanced data base and data communications software. Many larger firms offer the combination of formal training and day-to-day association with some of the top technical professionals in the country, providing an ideal environment for professional development and exposure. Some smaller organizations provide an opportunity to join newly formed software support groups. Opportunities also exist for senior software men and women capable of supervising other professionals. A variety of positions are available in the design and/or development of a wide array of new systems software with both established computer manufacturers as well as ground floor opportunities with the new venture hardware companies. Several Conference participants offer software entry level positions for Applications Programmers strong in OS/BAL. Starting salaries range from $24-$52,000.

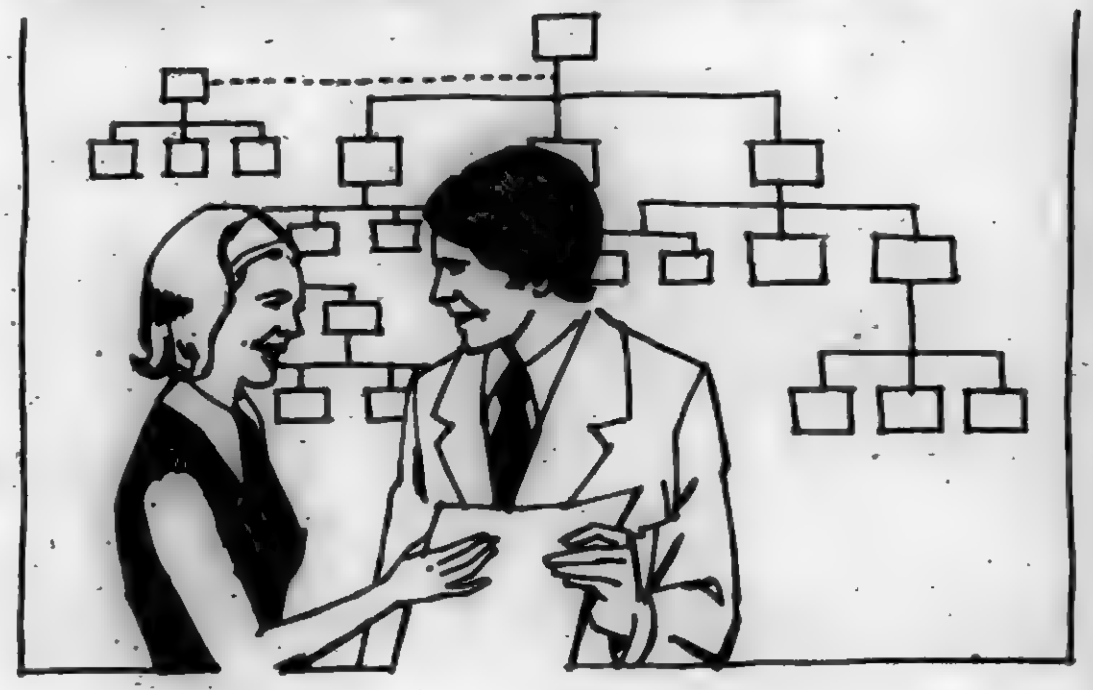
Marketing and Marketing Support

Those professionals with a background or interest in computer marketing or marketing support will find significant opportunity at the Conference at both the individual contributor and management levels. Unique alternatives exist across a broad front including mainframes, minicomputers, terminal systems, time-sharing, facilities management, proprietary software packages, OEM's, consulting, etc. Those firms selected for the Conference have demonstrated a prior record of success and strong financial stability. Several are just now entering new markets providing exceptional growth potential. Compensation for those in direct marketing at quota ranges from $30,000 to $75,000. In support, salaries range from $22-$38,000.

Mini and Micro Computers

The mini and micro computer market is exploding. There exist substantial demands for professionals having experience in applications programming, software development, systems programming, and management. A background in Assembly language, COBOL, Basic Plus, RPG II or FORTRAN in business applications, systems programming, or software development (real-time operating systems, compilers, communications, or data base) is preferred. Starting salaries range from $23-$45,000.

The Computer Career Conference will be in a city near you soon. There is no charge for your enrollment or participation. Call today for complete details.



Call Mike Parr today, tonight or this weekend at 1-800-821-7700 X117 (Missouri residents please call 1-800-892-7655 X117). Our special Career Conference toll-free lines are open twenty-four hours a day, seven days a week, including Saturdays and Sundays. As soon as we receive your inquiry, one of our professional staff will get back to you about Conference dates for your area, specific opportunities available, and how you may enroll in the Conference. There is no charge to you whatsoever to participate in the Conference—and your confidence will be rigidly protected. Don't miss this unique opportunity. Be sure to call today or this week. If unable to call, write:

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IMMEDIATE OPENINGS IN CHICAGO'S WESTERN SUBURBS

SENIOR SOFTWARE RESEARCH ANALYST

This position requires a highly motivated research analyst to plan, develop and implement major software systems and program products, provide technical research, evaluation and advisory service to technical personnel and all levels of management. Prospective candidates must have completed all IBM MVS and JES3 internal schools and acquired a minimum of two years experience in the maintenance and support of both MVS control program and JES3 subsystem. Position involves diagnosing and resolution of software problems through utilization of service aids, IPCS debugging, SMP4, Slip Traps, GTF Traces, RJP Line Analysis, etc. Also development of modifications via coding, testing and implementation of both "inline" code as well as defined user exits. Operating knowledge of MVS under VM is helpful. Networking, VTAM and performance experience a plus. Degree preferred.

SENIOR PERFORMANCE ANALYST

Position involves providing technical guidance and support in the planning, development, and implementation of hardware and software systems as they pertain to defined user service levels from the performance and capacity planning perspective. The successful candidate will be thoroughly familiar with the use of performance/capacity tools such as TESDATA hardware monitors, PLAN IV, MVS, RMF II, CUE, TSA, DSO, PPE and RESOLVE in a large multiple CPU/multi-datacenter environment using MVS 3.8/JES3 and VM/370 6.0 software. The ability to define, conduct, and present performance studies to technical and management personnel and to interface effectively with user representatives is required.

COMPUTER HARDWARE ANALYST

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If you consider yourself to be in the top 10% of the TCAM specialists, this position may be just what you are seeking. The incumbent should have 3-5 years experience in TCAM with control block level experience. Strong knowledge of start/stop and bisync protocols are required. 3705/computer experience required. VTAM experience is a plus.

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The continuous operations of our large North American computer centers near Chicago and Milwaukee require technical expertise at all times. If you are challenged by using your technical knowledge of JES-3 and MVS to circumvent problems and minimize the impacts to a large computer complex, then maybe the position is for you.

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Opportunity for an analyst with a minimum of 4 years experience in analysis and design of banking TP systems. Use your knowledge of COBOL and IBM systems utilizing CICS and 3270's to advance in this career path position.

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A true growth opportunity for the experienced operator with IBM DOS/VS or VSE skills. The ability to create efficient job control is a plus. You will have the opportunity to plan, schedule and supervise the activities of the computer room. Experience using CICS would be helpful.

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EOE

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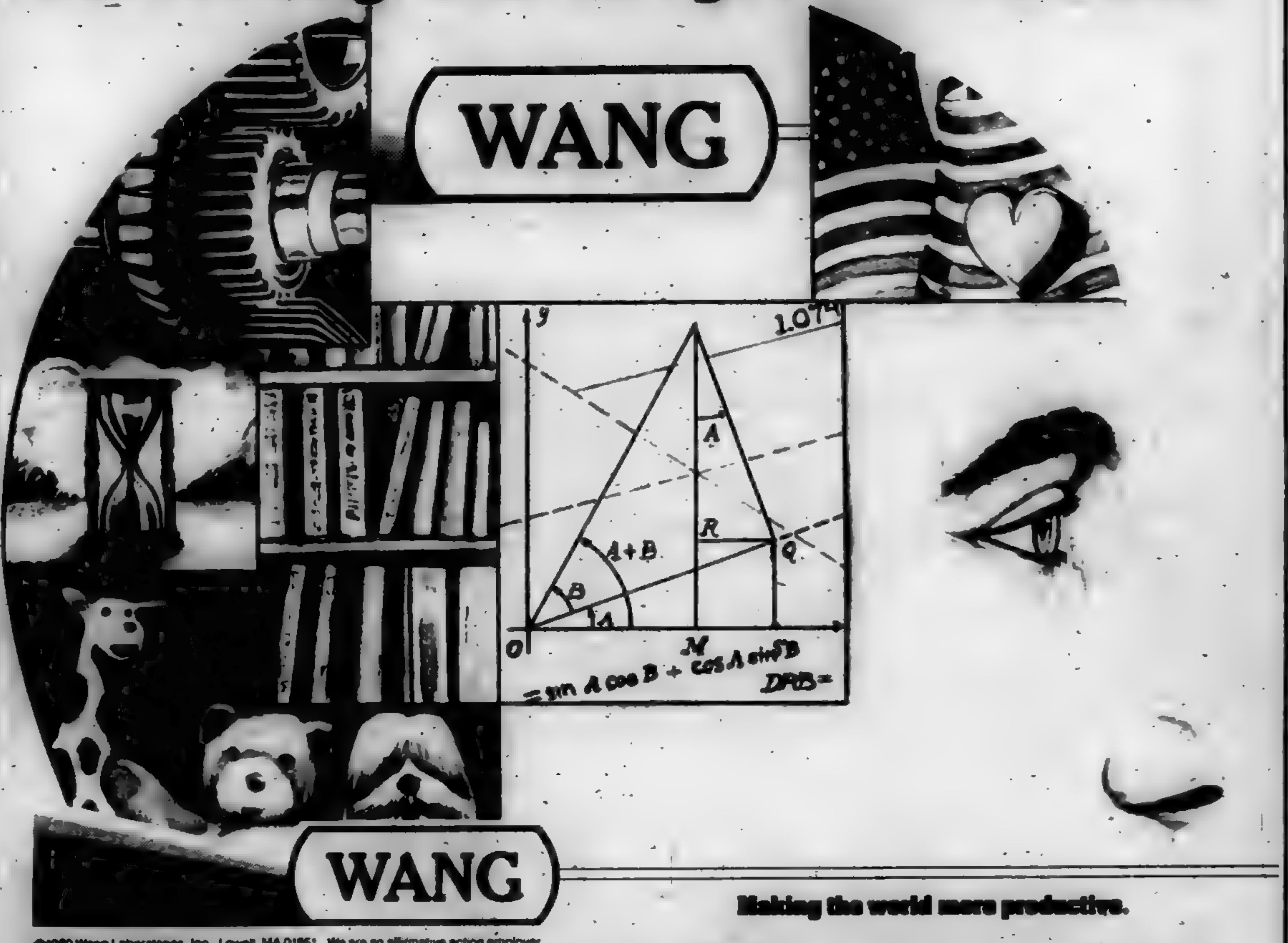

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Systems Software Development.

SYSTEMS SOFTWARE DEVELOPMENT
VS DATA BASE DEVELOPMENT

At Wang, we see data base concepts as keys to solving a much broader set of problems than mere data retrieval and presentation. Some problem areas where data base technology are applicable include distributed processing, data base machines, transaction-based systems, networking, display and Forms management, as well as integration of data processing and "office-of-the-future" product directions. Concomitant with these directions, we are committed to helping solve the software engineering problems that currently attend the use of large shared data bases through the development of very high level language interfaces for the application programmer, non-programmer, and data base designer.

At Wang, we are building state-of-the-art dictionaries, hybrid file systems, query and data definition languages, not as an end in themselves, but as tools to help the end user solve his problems. Some of our products like ADMS, and advanced data management system with centralized data descriptions and a sophisticated recovery/restart system, have already been announced and are well on their way toward becoming products. Others like VS-DBMS, a model independent Data Base which supports both relational and navigational interfaces, are currently under design. Still others such as Query Languages, Data Base Design tools, and a Forms Management System are in the planning stages.

CULLINANE

CULLINANE CORPORATION, the most respected company in the computer software industry, is the leader in introducing state-of-the-art software products.

Our continued rapid growth, as reflected by a greater than 44% increase in revenue and profits this past year, provides the challenge and environment required by skilled software professionals.

If you are among the many professionals who are looking for the visibility and recognition that a growing company can provide, you may be interested in some of the new positions that our growth has created.

SOFTWARE DEVELOPMENT — Development and enhancement of our database management and audit packages.

Requires minimum 3 years experience in database, data communications, data dictionary or query systems.

QUALITY ASSURANCE TECHNICIANS — Audit installation of all new procedures for software and documentation evaluation.

Requires IBM systems background with strong database and teleprocessing skills. Experience with COBOL or Assembler essential.

TECHNICAL WRITERS — Develop and maintain end-user documentation for our database, data communications and data dictionary systems.

Requires excellent communications skills and at least one year's experience as software technical writer. Familiarity with COBOL, PL/1 or Assembler and IBM systems desirable.

SALES REPRESENTATIVES — Requires proven success in software sales to users of medium/large scale IBM compatible equipment; technical background, data communications and/or database management systems exposure desirable. Positions available in several regional territories.

TECHNICAL SUPPORT/Headquarters — Provide phone support to customers for technical/non-technical problems.

Requires minimum 3 years experience as systems programmer in operating or control systems. Familiarity with DB, DC, or Data Dictionary systems desirable.

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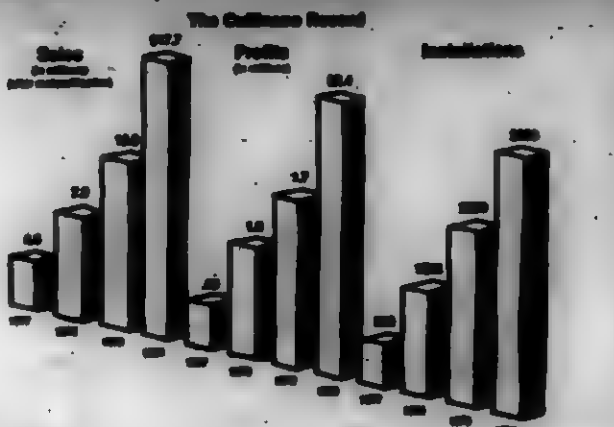

Technical Field Support/Audit & Retrieval — Install products, conduct training classes, and provide on-site support to current and prospective customers.

Requires experience with COBOL, Assembler or other high level report generator; familiarity with OS/DOS and JCL required; auditing or accounting background preferred. Positions available in West Coast locations.

Technical Field Support/IDMS — Install products, conduct training classes, provide phone and on-site support to current and prospective customers.

Requires medium/large IBM mainframe and various O/S background. 3 years minimum experience in programming, DC or DB administration. Positions available in several field locations.

International Field Support/IDMS — Install products, interact with marketing reps to conduct training classes, provide on-site support to current and prospective customers.

Requires medium/large IBM mainframe and various O/S background. 3 years minimum experience in programming, DC or DB administration. Multi-lingual individual preferred. Minimum 25% international travel required.

CULLINANE CORPORATION offers a fully paid employee benefit program including a Revenue Sharing Plan. If you qualify for any of the above positions, please send your resume, including salary history to:

Margaret E. Collins
Personnel Manager
Cullinane Corporation
20 William Street
Wellesley, MA 02181
(617) 237-6600

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You will head a group which designs and implements communications software for current and future Nixdorf products, including SNA, X.25, Teletex and Ethernet. Principal responsibilities include directing design and development of communications software, advising on present and future telecommunications trends; advising on architecture and protocols the company should pursue.

In addition to several years experience in communications software, you should also have solid managerial and communications skills. This position is based at Nixdorf's corporate offices in Burlington, MA, just 20 miles from Boston.

If you're a seasoned professional looking to join a high technology leader in a leadership position, here's your opportunity. Please forward your resume, including salary history, to C.J. Nolan, Nixdorf Computer Corporation, 23 Fourth Avenue, Burlington, MA 01803. We are an equal opportunity employer m/f/h.

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Mr. Howard H. [illegible], Chairman
Minnesota School Districts
Data Processing Joint Board
1925 West County Road B2
St. Paul, MN 55113

Application deadline:
November 10, 1980.

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SYSTEMS PROGRAMMER

Clarkson College of Technology, in upstate New York, has an opening for a Systems Programmer to participate in the support of the College's educational, research, and administrative activities. The Systems Programming staff is responsible for the maintenance of the software environment on an IBM 4341 with 160 ports. SCP's are VM/370, OS/VS1, and MUSIC, with a 3705 communications front-end. Primary languages are FORTRAN, Pascal, BASIC, COBOL, and Assembler. The salary range is open and will be commensurate with qualifications and experience. We offer an excellent benefit package, and our employees are encouraged to enter Bachelors, Masters, and Doctoral degree programs. Send resume, salary history and requirements in confidence to: [illegible], Computing Center, Clarkson College, Potsdam, New York [illegible].

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M-K Power Group's continuing expansion has created challenging new demands for our DP Department. It's engaged in everything from mini-computer installation to on-line systems support. So we're seeking a flexible individual who relishes daily variety and professional challenge. Applicants should have commercial programming experience, including 1-2 years in mini-computers—preferably the Wang 2200. Experience in payroll and accounting, familiarity with OS/VS1 and VM/CMS, and knowledge of BASIC, FORTRAN, and/or PL/1 are desirable qualifications.

This is a growth opportunity in a dynamic engineering environment. Morrison-Knudsen engages worldwide in construction, resource development, and manufacturing. The M-K Power Group is a leader domestically in the design, engineering, and construction of thermal power-plants and power-related facilities. Our large, complex projects require unusually challenging and interesting DP support, including frequent travel to our job sites.

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Gary S. Hunt
Morrison-Knudsen Company, Inc.
Power Group Personnel Manager
Two Morrison-Knudsen Plaza, TAD [illegible]
Boise, Idaho 83729
(208) 386-5000

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Needed at Odessa College, a comprehensive community college in West Texas. Applicant must have bachelor's degree in computer science or related field and minimum of 3 years non-teaching experience in data processing. Preference given for teaching experience and second teaching field. Instructor may be asked to teach COBOL, FORTRAN, etc. Nine months salary ranges from $17,000 up, depending on qualifications and experience. Many fringe benefits also provided. Applications should be sent to the Assistant to the President, Odessa College, 201 West University, Odessa, Texas 79762, before November 21; or call 915/337-[illegible], Ext. 302. An equal opportunity employer.

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Software Systems Programmer

Requires a BS, MS preferred, and at least 1-2 years' experience in VTAM/BTAM along with experience in IBM mainframes, COBOL, ASSEMBLER and communications-related programming.

Software Systems Programmers

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Requires a BSEE, MSEE preferred, and 4-6 years' experience in actual logic and systems design including the design of peripheral interfaces.

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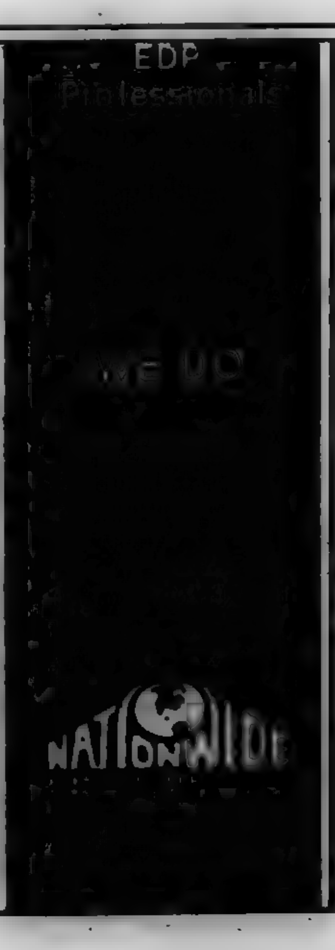

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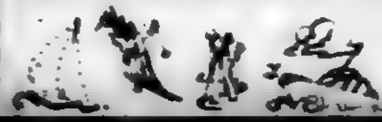

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SOFTWARE DESIGNERS (RESPONSE)

Experience with the design and development of Operating Systems Software, Data Management Systems or Real Time Communication Systems or Compilers using Assembly Language.

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DATA COMMUNICATIONS

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Currently, three positions are available for Software Specialists. Successful applicants must have experience in at least one of the following areas: ACF/VTAM, ACF/NCP, CICS Series/1-RPS. Knowledge in more than one area is desirable. The ability to maintain, test and install these products is required. A good working background with SMP would be helpful.

Salary is commensurate with experience. We offer an outstanding compensation package which includes generous fringe benefits. Please submit resume to: Manager-Personnel.

[illegible]

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Harrah's

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Please send resumes, including salary requirements.

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Software Manager - defense PDP-11
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Project Manager - insurance 370/OS
Sr Project Manager - banking 3000
Project Manager - network systems
Project Leaders - mfr 370 or HON or BUR
Project Leader - finance/sales B-4700
Software Engineers - satellite PDP
Software Test Supervisor - HON
Audit Supervisor
Systems Design/Analyst - UNIV or BUR
Project Leaders - bank/ins 370 or BUR
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S/C Programmers - Compset 11
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DATA PROCESSING CAREERS

SENIOR PROGRAMMER

Must have experience in JCL, program testing, documentation writing, and be a skilled user coordinator and trainer. IBM 3031 computer knowledge required. Graduate degree in computer science may offset experience requirement of 2 years. Favorable working conditions; 40 hour week, may be required to work overtime and odd hours. [illegible] annual salary.
Send resume to Personnel Department, First National Bank of Louisville, P.O. Box [illegible], Louisville, Kentucky [illegible]. Equal Opportunity Employer.

Explosive Computing Growth

New and continuing programs at Lockheed-California Company offer an outstanding opportunity to join an expanding team of computing performance management specialists.

You will assist in establishing a computing performance management function of a facility with three IBM 3033's, one 370-168 and two remote 3031's. Establish/track computing user's service levels and system performance levels. Conduct performance evaluation studies to identify system bottlenecks, determine computing capacity, develop optimum workload balancing and proper system configurations. Use advanced software and hardware monitoring tools to assist in the performance measurement activities.

Five years general data processing experience; two to five years evaluating computer hardware/software performance, background in operating systems, statistics, and modeling are required.

Positions are also available at various levels of experience in performing evaluations of computing hardware and software, matching user requirements with available equipment, selecting and acquiring the equipment. Experience with IBM equipment, minicomputers, peripheral hardware, distributed systems and data communications is desirable. Small to large systems are driving a growing population of on-line terminals and applications. Excellent opportunity to work with hardware manufacturing representatives and the computing-user community to evaluate and select other systems.

BA/BS or equivalent is required. MS in Computer Science or related field is desirable.

All positions offer an excellent starting salary and benefits package that includes free medical, dental, life insurance, retirement plan and much more. An equal opportunity F/M/H/V employer. U.S. citizenship required.

For further information, call Duane Bickel collect at (213) 847-4043. Or send resume to Louise Nagato (DB), Lockheed-California Company, P.O. Box 551, Burbank, CA 91520.

Lockheed
Lockheed-California Company
Burbank, California

PSL

Programmer/Analyst I-II, Two Positions: Bachelor's in computer science or business administration with computer oriented courses; one year of experience in design and programming of business applications computer systems; or any equivalent combination of education and experience providing working knowledge of PL/1 and/or COBOL program languages, data base systems and data communications monitors, CICS/US, business practices and procedures in order to automate systems; work under minimal supervision (demonstrated); knowledge of structured programming techniques. Salary is negotiable DOE, application deadline November 17. Refer to 231.

Personnel Department (231-29)
Physical Science Laboratory/NMSU
Box 3–PSL
Las Cruces, New Mexico 88003

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Physical Science Laboratory

FLORIDA

[illegible]

Head of Computer Dept.

Research Scientist to head Computer-Data Analysis Dept. at the Research Institute on Alcoholism. Permanent position with potential for joint academic appointment with State University of N.Y. at Buffalo. Duties include scientific programming, supervision of programmers, statistical analysis of data and design of experiments and surveys. This position also will provide the opportunity for one to pursue research interests related to alcohol or drug-related problems. PhD or equivalent is required. Applicant should have experience with computer analysis of data. Starting salary [illegible]. Send resume to Personnel Office, Research Institute on Alcoholism, [illegible] Main St., Buffalo, N.Y. [illegible]. Attn: Dr. [illegible]. Affirmative Action/Equal Opportunity Employer

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EDP AUDITOR

National Liberty Corporation, the most progressive and fastest growing life insurance company in the nation, is seeking an EDP Auditor to join its Internal Audit staff. This individual will work closely with our EDP Audit Manager and have an immediate influence on our audit and control processes. The ideal candidate will have a minimum of 2 years EDP Audit experience, with demonstrated ability to develop audit programs and to evaluate both systems and EDP operations controls and effectiveness. Familiarity with IBM OS, JCL COBOL and CULPRIT, as well as basic accounting principles is desired.

We offer a salary commensurate with experience, comprehensive benefits, and a generous relocation package to beautiful Chester County, Penna, 35 miles west of Philadelphia. Qualified candidates should submit resume with salary history for immediate confidential consideration to:

National Liberty Corp.
Valley Forge, PA 19493
ATTN: R.H. KANDLE

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SOFTWARE ENGINEERS

We are about to begin the development of a new generation of software terminals and are looking to add to our highly respected

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of Software Professionals

Our Division is a leading manufacturer and supplier of sophisticated telecommunications components for the commercial banking, thrift banking, and insurance and financial services industries. We are presently undertaking the design of a new generation of software terminal products and require dedicated, career motivated professionals to help us achieve this goal.

Candidates should possess a BS degree in Computer Science or Electrical Engineering (or equivalent), and a Masters degree is highly preferred. One-three years applications and systems programming experience in Assembly language coding for mini and micro computers will be essential.

MANAGER, SYSTEM TEST & SUPPORT

Ideal position for an innovative state-of-art professional with the ability to motivate and direct the efforts of a talented systems test and support group. We require a minimum of 7 years of relevant experience in advanced software engineering in both Assembly and high level languages. Hands-on familiarity with hierarchial cycle path testing, cyclomatic capacity and other recent testing and engineering techniques is a decided plus.

SR TELECOMMUNICATIONS ENGINEER

This opening requires a minimum of 5 years experience in the design and implementation of communications software with heavy recent experience in SNA and/or X.25. Hands-on experience with emulation products in an IMS/AFC and ACF/VTAM environment is an asset. Technical creativity and innovation are essential. Reporting to the Manager of Software Design, you will be responsible for articulating and formulating a network products development strategy for large commercial banks.

LOGIC DESIGN ENGINEERS

Should possess 3-5 years of experience in detailed logic design using standard logic modules, and be interested in working with TTL, MOS-LSI and state-of-the-art microprocessor logic design. You should possess a BSEE (or equivalent), and enjoy working on a wide range of engineering assignments. The ability to communicate and interface with all levels of divisional personnel is essential.

SOFTWARE DEVELOPMENT ENGINEERS

Prior software development exposure at the systems level is preferred for these openings which offer a wide range of state-of-the-art development opportunities in applications, software development, and software support and integration. Ability to assume project leadership responsibilities and communicate effectively with all levels of personnel essential.

SYSTEMS DESIGN ENGINEERS

Software design experience at the systems level plus exposure to operating systems and communications design at the systems level is highly preferred for individuals seeking opportunities in systems design and systems software design. Should be capable of assuming project leadership responsibilities and interfacing successfully with all levels of personnel and management.

Based at our modern TRUMBULL, CONN facility, we offer attractive salaries based on background and qualifications, a generous program of employee benefits and the assurance of an exciting career future.

Qualified candidates should forward resume with salary history and requirements, in confidence, to: Mr. Dan Romanello, Bunker Ramo Information Systems, Trumbull Industrial Park, Trumbull, Conn. 06609. An equal opportunity employer m/f.

BUNKER RAMO INFORMATION SYSTEMS

DENVER

Jeppesen Sanderson, the leading publisher of flight information charts and training systems is expanding our data processing needs. We need an aggressive growth-oriented professional to contribute to . . . and share in this dramatic growth!

Systems Software Programmer Analyst

Responsibilities of this position include maintaining systems and application on DEC System-20. To qualify, you should have 1 year experience with systems software using an assembler level language (prefer MACRO 10/20) and an additional 3-4 years of data processing programming experience; formal education or training may be substituted for hands-on experience. DBMS preferred. Will provide DEC training.

We offer • Paid Relocation • Security • State-of-the-art technology • On-Line systems • Tuition Assistance • Opportunity for professional growth and advancement.

For immediate consideration, send resume and salary requirements to Shannon Smith or call (303) 779-5757.

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Equal Opportunity Employer

COLORADO!

SYSTEMS PROGRAMMERS

To do systems software [illegible] of the Input/Output Subsystem (IOS). Will assist in the design and implementation of a network driver and associated programs [illegible] IOS to the local NCS hyperchannel computer network. MAJOR REQUIREMENTS: MS or equivalent in computer science, engineering, math or physical science, [illegible] years systems programming experience on medium to large scale system, [illegible] operating systems languages, FORTRAN or high level programming skills. [illegible] peripheral equipment drivers. Positions available 1 January 1981

COMPUTER SERVICE ENGINEER

Will assist in maintaining computer systems, subsystems and devices. Will diagnose, troubleshoot and repair a wide range of machine failures (DEC PDP 11 processors are primary area of responsibility). MAJOR REQUIREMENTS: [illegible] skill in troubleshooting computer hardware malfunctions, [illegible] skill in repairing computer peripherals and basic knowledge of computer architecture, peripheral devices, disk and tape drive structures, CRT technology and DC power supply theory. Also desired is 1-2 years experience in the above areas.

Send resume OR to arrange a contact from NCAR, in California call anytime TOLL FREE 1-800-[illegible], Ext. 370, or outside California, call anytime TOLL FREE 1-800-[illegible], Ext. 370.

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
1850 Table Mesa Drive
Boulder, Colorado 80307

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NCAR

Programmer Analyst

American Dade, a major division of American Hospital Supply Corporation, is in its early transition stages of major development efforts - from a small shop atmosphere to a modern state-of-the-arts installation. We recently installed a 500 KB Burroughs B3800.

Our new computer provides on-line programming capabilities, quadruples our previous memory, and adds 8 times our past disc capacity...we expect to outgrow it within 3 years.

The opportunities are outstanding for a Programmer/Analyst with 2 or more years experience (COBOL) to take a significant role in this challenging environment.

We provide an excellent salary and outstanding benefits package. For confidential consideration, please send resume to Ray Angels.

American Dade

Division of
American Hospital Supply Corporation
P.O. Box 520672
Miami, Florida 33152

An Equal Opportunity Employer M/F.

SYSTEMS ANALYST CONSULTANT

Hours: 40 per week. Salary: [illegible] per year. Requirements: Bachelor of Science in Computer Science; 4 years experience in the position, detailed knowledge of large computer operating systems and their business applications; knowledge and competence in the use of COBOL program language. Equipment to be operated: IBM [illegible], hand calculator and 3270 CRT terminal. Duties: Analyze various business and accounting procedures used by clients in the life insurance and pension plan industry in order to modify, refine and convert data into programmable form, considering the specific output requirements for management reports required by specific clients; preparation of instructional manuals to be used by client's own personnel for function of computer operations systems.

[illegible]

COMPUTER SCIENCE-FACULTY

Needed for Spring Semester beginning in mid January. Requires Master's Degree in a Computer Science discipline or Bachelor's plus multiple years of DP experience. Candidates should be capable of teaching all levels of DP, including COBOL and Assembly Language and have either DOS/VSE or OS/JCL experience. 1 year teaching and/or business experience required. Salary commensurate with credentials and experience. Respond in writing by [illegible] to [illegible] County Community College, Personnel Services, [illegible]

Equal Opportunity/ Affirmative Action Employer

PROGRAMMER ANALYST

An opening has developed in a growing and challenging environment for an individual with minimum of 3 years experience. The successful candidate must have at least 2 years of advanced education, good communication skills, proven analytical exposure in developing business systems, preferably in a manufacturing facility and some background in a timesharing EDP shop. Experience with PDP11's, RSTS/E and DDP are a plus. Excellent pay benefit package.

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Send resumes including salary requirements to Personnel Manager.

Colt Industries
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SOFTWARE SPECIALISTS / RADAR ANALYSTS

[illegible]

CALSPAN CORPORATION has several excellent positions available at facilities in Lexington, Massachusetts.

The work involves: the development of Software using modern techniques for Radar Systems Mission Planning, Data Reduction and Analysis.

We seek: individuals with BS / MS in Computer Science, Physics, Math or Electrical Engineering and experience in either of the disciplines outlined below:

SOFTWARE SPECIALISTS

• structured software development • FORTRAN / IFTRAN / PL-1 • large systems —IBM 370 / CDC 6600 • familiarity with Radar Systems Simulation, and Data Reduction Systems desirable.

RADAR ANALYSTS

• generation of automated test plans for the control of radar operations and data collection • understanding of phased array radar systems, missile systems, radar data on reentry vehicles, radar observables and coherent waveforms is desirable.

The BOSTON TECHNICAL CENTER is a division of the Advanced Technology Center of Calspan Corporation which has, for over 35 years, been a world-recognized leader in Research, Development and Engineering.

We can offer you a professional environment, good work to do, career development, and excellent salary and benefits.

For prompt and confidential consideration of your qualifications for one of these fine opportunities, please send your resume to:

DR. ROBERT B. SOLOSKO — PROGRAM MANAGER

Calspan Corporation | **BOSTON TECHNICAL CENTER**

P.O. Box 9X, Lexington, Mass. 02173

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Female/Minority/Veteran/and Handicapped individuals are encouraged to apply

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PL/1 • IMS • CICS DMS • MARK IV

Princeton University is looking for a creative individual with strong management and analysis skills to direct the work on an IMS database system implemented using CICS data communications.

If you know one or more of the above languages, have supervisory experience and would like to work in this challenging environment (expanding your skills and experience), then this is the right opportunity for you.

Requirements:

IBM 360/370, JCL, PL/1 unless you have CICS experience and IMS or DMS/CICS.

PLUS FACTORS:

VSAM, CMS, query language, On-Line Systems development, Structural Programming

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Or Call for Application
(609) 452-3273**

Princeton University

PRINCETON, NEW JERSEY 08544

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SENIOR SOFTWARE MANAGEMENT

For decisive roles at NCR's Corporate Headquarters

If you are a seasoned computer scientist/software engineer with demonstrated people skills, you can have a visible and influential role in shaping the future of this major computer company. You will be in Dayton, Ohio, in the department that exercises central control for all software throughout NCR. You will work with senior software, engineering and management people at corporate, marketing and development levels. And you will be expected to innovate on a broad scale—technically, managerially and financially.

The scope of your responsibilities will include: establishing software design . . . preparing software strategies for the next 3-5 years . . . allocating R&D funding . . . preparing short and long term technical system directions . . . approving development plans. In short, we are seeking:

Senior Consultant—Data Base Management Systems Architecture

To act as a data base management systems consultant; advise on architecture; produce technical papers in data base management systems; develop data base management systems technological strategy and direction for NCR.

Senior Consultant—Operating System Architecture

To act as consultant for design of interactive and transaction oriented environments; determine OS requirements; plan overall integration and coordination of OS software.

Senior Consultant—Software Engineering

You will manage development programs to implement component products of the "NCR Software Development Environment" and develop policies and procedures which are supportive of this major software engineering program in NCR.

Senior Consultant—Language Development

You will be directly involved with the development of NCR language strategies and product implementation, with the design and implementation of our language and language development system.

These positions require at least 6-10 years of increasing software development responsibilities, and sufficient experience to establish confidence in your judgment and grasp of where major developments are headed.

In addition to salaries fully commensurate with qualifications and responsibilities, we offer a comprehensive benefits package that includes relocation assistance. Dayton is a well balanced, friendly mid-western area that offers choice of urban-suburban/semi-rural lifestyles and strong cost-of-living advantages.

Please send resume, salary history and requirements in strict confidence or call collect (513) 445-2261 to: Mr. Dale Harmon, Corporate Executive and Professional Recruitment, NCR Corporation, Dept. [illegible], World Headquarters, Dayton, Ohio 45479.

NCR
Complete Computer Systems

An equal opportunity employer

FACULTY POSITION

A Full-time Tenure Track Faculty position in Computer Data Processing is available at Charles County Community College, January 1981. Duties and responsibilities involve teaching Computer Data Processing courses and assist in the Management and Development of Computer Data Processing Curriculum. Qualifications: Masters preferred, Bachelor's required. Closing date Nov. 14, 1980.
If interested, send resume, transcripts and three letters of reference to Charles County Community College, Personnel Dept. P.O. Box 910, La Plata, Md. 20646. EOE/M/F.

APL-COBOL-PL/1

Urgent need for Programmers, Analysts, Systems Programmers, Microprocessor specialists, etc.

Rochester, NY
Guarantee 25-50% Salary Increase

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IMS Systems Programmer

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A dynamic pattern of planned expansion has created an exceptional opportunity for personal growth and professional development with this international banking institution. We are currently seeking an individual with a successful track record capable of making a significant contribution to maintaining our position as a leader in the banking industry.

The successful candidate will participate in the development of an IMS Release 1.1.5 environment and the evaluation and installation of IMS related program products. This individual should have experience in IMS System generation & maintenance using SMP4 as well as problem determination and resolution. Prior involvement in training and operations staff, documentation and interfacing with all levels of personnel is also a requisite.

Our environment includes four IBM System 370/3033 processors in a multiple system network facility utilizing MVS 3.8, JES2/NJE, VTAM and IMS Release 1.1.5. This system supports a large branch network of terminals and automated teller machines.

Send resume and salary history in strictest confidence to: **IRINA HENDERSON, Employment Department C113, Crocker National Bank, 155 Fifth Street, San Francisco, California 94103.**

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The need for D.P. professionals in Houston is still great, but my Houston clients demand talent. If you are good at your profession and want an opportunity to prove it, contact me now!

PROGRAMMERS	$15-18,000
PROG ANALYSTS	$16-22,000
SR PROG ANALYSTS	$20-26,000
SYSTEM ANALYST	$24-30,000
SR SYSTEM ANALYST	$25-35,000

IBM 370 hardware experience with either assembler language or COBOL skills. IMS and CICS are pluses.

Call Jim Fleming today (collect) at 713-688-1800 to discuss available positions in Houston.

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720 N. Post Oak Rd. — Suite 228
Houston, TX 77024

Applications Systems Support Manager

Put your creative talents to work for you at Hartz Mountain Corporate Headquarters.

Applicant will provide programming and other technical support to the Managers of Systems Development. Responsibilities will include managing the Programming Staff, directing data base development, conducting quality reviews of proposed systems, creating programming, documentation and control standards, and providing technical assistance to the Department.

The ideal candidate will have a degree, be a Programming Manager, a master COBOL/CICS Programmer, and be a creative, resourceful self-starter.

This position, reporting to the Vice President of Corporate Systems, offers excellent compensation and a comprehensive, company-paid benefit package.

For prompt consideration submit resume to:

Director, Personnel
Reference SSAM
The Hartz Mountain Corporation
700 South Fourth Street
Harrison, N.J. 07029

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CDC CYBER SOFTWARE SUPPORT POSITION

The Educational Computing Network serving the instructional and research computing needs of state universities in Illinois is seeking applicants for a software support position in its Network Software Services group. Minimum qualifications include experience in the installation of package software, experience and ability in the preparation and editing of user and technical documentation, good verbal communication skills and a working knowledge of the CDC NOS Operating System command set and related CDC software products. An in-depth working knowledge of FORTRAN and BASIC is essential; knowledge of other high level languages and the CDC Compass assembler is desired.

Salary will be commensurate with qualifications plus excellent fringe benefits. Resumes include salary history should be sent to Executive Director, Educational Computing Network, [illegible] Office Center, [illegible] Road, [illegible], IL [illegible].

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Sr. Distribution Analyst	30K
Sr. Systems Designer	26K
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Send resume
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Forum VI
Greensboro, NC 27408

IMS PROJECT LEADER

Rollins, Inc., an Atlanta-based NYSE corporation known for years as a leader in the service industry, is seeking a Project Leader to work with our systems and programming staff on IMS data base design and implementation.

REQUIREMENTS:

- Strong project leadership abilities including implementation
- IBM 370 hardware and OS/VS or MVS software
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- Minimum 3 years solid experience in IMS DB/DC internals preferred

We offer qualified programmers and analysts an excellent opportunity also.

Your opportunity is NOW.

For immediate consideration, send your resume to:

Jim Morgan
Human Resources

ROLLINS, INC.
2170 Piedmont Road, N.E.
Atlanta, Georgia 30324

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FACULTY POSITION

PURDUE UNIVERSITY SCHOOL OF ENGINEERING AND TECHNOLOGY AT INDIANAPOLIS

An opening in the Computer Technology Department at Indiana University-Purdue University at Indianapolis (IUPUI) is available August, 1981. Applicants must have a strong background in assembler language and IBM operating systems, and a working knowledge of IBM hardware. Business or industrial experience, teaching experience, and a minimum of a master's degree are required. Rank and salary dependent on qualifications. Closing date for receiving applications, including resume and three letters of reference, is November 30, 1980. Contact DR. ROBERT CROZIER, CHAIRMAN, SEARCH AND SCREEN COMMITTEE, IUPUI, 1201 E. 38th STREET, INDIANAPOLIS, INDIANA 46205.

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Tomorrow-minded

UNIVAC APPLICATION ANALYSTS

Martin Marietta Aerospace, NASA's Contractor on the Space Shuttle External Tank, has immediate openings for Univac Application Analysts.

Position requires designing and programming a variety of engineering and specific programs utilizing ANS/COBOL for application on Univac 11XX equipment.

Qualified individuals should possess a BS in Mathematics, Computer Science, or related discipline, and have a minimum of 3 years scientific and/or business programming utilizing data base methodology.

We offer competitive starting salaries and fully paid company benefits. These opportunities exist at the Michoud Assembly Facility located in Suburban East New Orleans. Qualified candidates interested in learning more about these opportunities at Martin Marietta, the tomorrow-minded aerospace people, should forward resumes including salary history to: Ms. Dollie McCann, Martin Marietta Aerospace, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

SYSTEMS MANAGEMENT/ REORGANIZATION

Orange County-

Our client, a highly respected Southern California corporation with worldwide operations, has engaged us to recruit 3 top-notch managers for its DP organization. The department is currently embarking on a dynamic reorganization program. We are searching for a Director of Systems Planning, a Manager of Technical Support, and a Data Base Administrator.

This is an MVS, IMS, Distributed Data Processing environment. The individuals will have previous experience in a large IBM system environment. Respondents should be technically competent and possess a general management perspective. They will have excellent planning, communications, and management skills.

This is an excellent opportunity to join a winning team in a dynamic growth industry. Qualified candidates will be high achievers with potential for continued growth. Excellent compensation packages, benefit program and relocation are offered.

We are consultants to management. For confidential consideration, please send resume and salary history to:

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Chief Information Officer

A major New England Academic Health Center is actively seeking a Chief Information Officer.

This exceptional career opportunity offers significant challenge, to the selected candidate, to develop and implement a center-wide Management Information System.

A Baccalaureate Degree in Business Administration or Computer Science is required (Masters Degree preferred) with 5 years progressively responsible experience in a large academic health center in a middle or departmental management position and/or head of systems and programming.

Competitive salary and excellent fringe benefit package.

Please send resume to:

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National Computer Associates' corporate symbol is more than just another attractive graphic. Not only does it identify us, but it is your assurance, in going to one of our member firms, that your career development will be handled with unsurpassed expertise.

Each of our firms was selected for membership in NCA only after we were satisfied that they could provide you with the most professionally competent services in your community.

Rather than trying to do it yourself you should enlist the services of professionals who can help you to achieve your goals more quickly and more effectively. And you simply could not make a better choice than an NCA firm.

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Chicago: Theo. Hertz & Associates.
150 N. Wacker Dr. Suite 1700 Chicago, Ill. 60606 (312) 977-2555
Cleveland: Professional Staffing Systems, Inc.
4807 Rockside Rd., Suite 200, Cleveland, Ohio 44131
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Columbus: Michael Thomas, Inc.
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Dallas: DataPro Personnel Consultants.
5580 LBJ Freeway, Suite 650, Dallas, Texas 75240 (214) 661-8600
Denver: EDP Infinity, Inc.
6800 E. Evans Ave. Bldg. 2-111, Denver, Col. 80222 (303) 753-1700
Detroit: Electronic Systems Personnel.
3000 Town Center, Suite 2580, Southfield, Mich. 48075 (313) 353-5500
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2800 South Post Oak, Houston, Texas 77079 (713) 626-4100
Indianapolis: Computer Personnel Services, Inc.
307 N. Pennsylvania, Indianapolis, Ind. 46204 (317) 634-4712
Kansas City: Electronic Data Personnel, Inc.
1605 Grand, Suite 1202C Kansas City, Mo. 64106 (816) 421-6031
Los Angeles: Constellation Enterprises.
3250 Wilshire Blvd. Suite 1604, Los Angeles, Cal. 90010 (213) 487-0645
Milwaukee: EDP Consultants, Inc.
11430 W. Bluemound Rd., Milwaukee, Wis. 53226 (414) 475-6077
Minneapolis: Electronic Systems Personnel.
850 Twin City Federal Tower, 121 S. 8th St., Minneapolis, Minn. 55402
(612) 338-6714
New Jersey: System Search.
2040 Millburn Ave., Maplewood, N.J. 07040 (201) 761-4400
New York: Beter Associates, Inc.
485 Lexington Avenue, New York, N.Y. 10017 (212) 687-8686
New York, Upstate: CFA Associates Personnel, Inc.
2530 James St. Syracuse, N.Y. 13206 (315) 463-5223
North Carolina: DataMasters, Div. of TeleForce, Inc.
P.O. Box 6888 Greensboro, N.C. 27405 (919) 373-1461
Philadelphia: Systems Personnel, Inc.
207 Fox Lane, Wallingford, Pa. 19086 (215) 565-2800
Pittsburgh: Electronic Systems Personnel.
400 Lawyers Bldg. 428 Forbes, Pittsburgh, Pa. 15219 (414) 391-6420
San Francisco: The Computer Resources Group, Inc. Agency.
303 Sacramento St., San Francisco, Cal. 94111 (415) 398-3535
Seattle: Houser, Martin, Morris & Associates.
1940 116th Ave. N.E., Bellevue, Wash. 98004 (206) 453-2700
Washington, D.C.: CPS Systems Corporation.
1211 Connecticut Ave. N.W., Suite 210, Washington, D.C. 20036
(202) 833-8840

National Computer Associates

System Analysts and Programmers for IBM 3031, DOS/VS-E, CICS/VS

We just doubled our business volume and intend to do so again in the near future. This planned growth is creating opportunities for DP professionals in the distribution field. We are the leading edge in DP and intend to stay there. Our current systems are IBM 3031, CICS/VS, DL/1, 4331 and VM dedicated to application development area. Programmer positions to be filled offer a combination of challenge and rewarding work as well as a location near many outdoor recreational activities. Interested? Send resume to:

John E. Berry, Personnel Manager
[illegible] Distributors Inc.
Benton, AR 72015

SYSTEMS SUPPORT SPECIALIST

The Institute of Paper Chemistry is seeking an experienced person with background in the areas of systems programming and support, data communications and data base management. Minimum qualifications include a BS degree and 3 years experience. Familiarity with Burroughs large systems is desirable. Major responsibilities will be in the areas of data communications (NDL), data base management (DMS II) and systems support (MCP). We would like to fill this position by January 1, 1981.

We are an accredited independent graduate school offering MS and PhD degrees, a research center and an information center for the pulp and paper industry.

Send complete resume to Director of Personnel, The Institute of Paper Chemistry, P.O. Box 1039, Appleton, Wisconsin 54912.

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Systems Programmers MVS-JES3-IMS

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Join Texas Instruments in the heart of the Sunbelt. You could work in Dallas, TI's hometown, or just north of Dallas in Lewisville, a growing community of 30,000. Live better in Texas, where cost of living is below the average of major U.S. cities and where there is no state income tax.

TI is building one of the largest worldwide networks of Data Processing Centers. This network is supported from the Dallas headquarters and will include installation and support of major domestic and international computer centers in: Lewisville, Texas; Freising, Germany; Nice, France; Bedford, England; and Tokyo, Japan.

To support this network, we are building a staff of Systems Programmers with MVS, JES3, IMS or TSO background. If you have at least 2 years of systems programming experience and are interested in establishing a long-term relationship with a progressive organization, call: John Heft at 1-800-527-3574 (toll-free) or if calling within Texas call (214) 995-3275. Or send your resume to P.O. Box 2103/Richardson, TX 75080. U.S. citizenship or permanent U.S. residency required.

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AT NATIONAL ADVANCED SYSTEMS.

At NAS, we're looking for talented computer professionals with the energy and initiative to fully utilize their technical expertise in advancing their careers. And, as a dynamic young company, we can provide just the right kind of environment for career advancement — one that encourages and rewards individual achievements.

So take the first step in proving your initiative. Apply yourself by calling Ursula Shepherd toll free at 800-227-1930, to discuss these immediate openings:

Systems Support Representatives

Consulting and providing technical support to field sales and marketing, you must be knowledgeable in the internals of IBM virtual operating systems (MVS, SVS, VS1, VM or DOS/VS). College degree or equivalent experience is required. The ability to write and present technical materials a plus. Openings nationwide.

Field Engineers

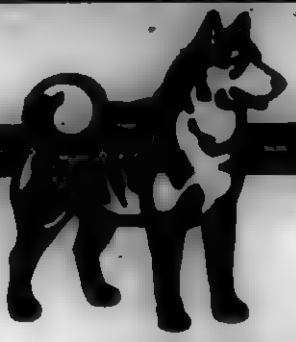
If you have the skills and ability to excel in field engineering, you'll be recognized for it at National Advanced Systems. We have openings nationwide requiring an AA in electronics or equivalent military experience. Our more advanced positions require experience on IBM 370/168 or larger CPUs or associated peripherals experience.

Field Support Representatives

Individuals experienced in problem solving with systems control programming are needed to resolve problems in customer systems software, assist field engineering with problem determination, and assist systems support representatives in running benchmarks.

If you can't call, send a letter of inquiry or a resume to Ursula at National Advanced Systems, 800 East Middlefield Road, Mountain View, CA 94043. We are an affirmative action/equal opportunity employer m/f/h.

National Advanced Systems
A Subsidiary of National Semiconductor



APPLICATION PROGRAMMER
Cody, Wyoming

Husky Oil, a fully integrated oil company, has an immediate opening in its Cody, Wyoming offices for an Application Programmer with 2-5 years OS/VS or related IBM experience.

If you are a COBOL Programmer and your lifestyle could include a small city in the Rocky Mountain West, please send your resume and salary history to:

Dona Copeland
Husky Oil Company
P.O. Box 380
Cody, Wyoming 82414

Husky

An Equal Opportunity Employer M/F

DBMS PRODUCT DEVELOPMENT AND SUPPORT

APPLIED DATA RESEARCH, the world's oldest and largest independent systems software products company, currently has available employment opportunities for programming personnel in state-of-the-art product development and support for the Company's Dallas-based **DATACOM DB/DC** product group.

Candidates for all positions must be skilled in IBM Assembly language and have a minimum of 3 years programming experience. Some data base, data communications, and/or systems programming experience very desirable.

ADR OFFERS:

- Competitive base salary **PLUS** semi-annual bonuses
- Superior work environment
- Excellent benefits including hospitalization, major medical, dental, prescription drug plan, tuition assistance, life insurance, long-term disability, paid sick leave and retirement.

Persons desiring to be considered for career opportunities with ADR should forward a resume, in strictest confidence, including salary history to:

Personnel Director
APPLIED DATA RESEARCH, INC.
8515 Greenville Avenue
Dallas, Texas 75243

An Equal Opportunity Employer m/f/h/v

ADR

GET AN EDP JOB ANYWHERE

CALL FREE
0-612/338-6714
CALL COLLECT

Analysts, project leaders, programmers with more than a year's experience let us help you find a better job. For a decade we have been placing EDP professionals like you all over the country through our network of 26 national offices. Send your resume or call

Electronic Systems Personnel
858 TCF Tower, 121 So. 8th Street
Minneapolis, MN 55402

client companies assume our fee.

esp

EDP Placement Specialists
A Member of National Computer Associates

Assistant Director of Administrative Computing

Qualifications include: Bachelor's Degree or equivalent experience plus 2 years experience with a medium scale computing system and at least one year of supervisory experience. Duties will include supervision of programming staff of seven, coordination of computing systems and planning. Salary is open and will be based on education, training and experience. Application deadline Dec. 1. A completed application includes a resume, transcripts and recommendations. Mail to:

Lyle Hunter, Computer Center, University of Wisconsin-Whitewater, Whitewater, WI 53190.

UW-Whitewater is an equal opportunity employer with an affirmative action plan. Females, minorities and handicapped are encouraged to apply.

SYSTEMS PROGRAMMER CICS
For our East Brunswick, N.J. Corporate Data Center

- State-of-the-art IBM MVS installation
- At least 2 years experience on CICS internals, VTAM and NCP with MVS experience a plus.

Sterling Drug is a Fortune 300 leader in pharmaceuticals, personal care products, household products, diagnostics, and chemicals. We offer an attractive salary and comprehensive benefits package. Send resume including salary requirements in confidence to:

Robert Hutchinson
STERLING DRUG INC.
90 Park Ave.,
New York, N.Y. 10016
An Equal Opportunity Employer M/F/H

PHILLIPS
BAYER
ASPIRIN

BROWARD COUNTY, FLORIDA
Civil Service Opportunities

Broward County, Florida, one of the largest major employers in south Florida has immediate challenging opportunities in its Information Systems Division utilizing OS/VS, NCP, VTAM, CICS and IMS/DB methods. Applications are currently being accepted for the following job classes:

Systems Programmer II $22,126-$28,896
Requires college degree in computer sciences or related field and four (4) years experience in Systems Analysis, SYSGEN and Maintenance.

Systems Programmer I $18,816-$24,484
Requires college degree in computer science or related field and two (2) years experience in Systems Analysis, SYSGEN and Maintenance.

Programmer Analyst II $21,063-$27,034
Requires completion of two (2) years of college level course work in computer science and four (4) years computer programming and systems analysis experience.

Programmer Analyst I $17,719-$23,240
Requires high school diploma supplemented by college level course work in computer science and two (2) years computer programming and systems analysis experience.

Applications and additional information may be obtained from the

PERSONNEL DIVISION, BROWARD COUNTY
GOVERNOR'S CLUB BUILDING, 2ND FLOOR
236 S.E. FIRST AVE.
FT. LAUDERDALE, FL 33301
Hours: 8:30-5. Phone: 1 (305) 765-5065
Equal Opportunity Employer

FPL

FLORIDA POWER & LIGHT COMPANY

EXCITING EDP CAREER OPPORTUNITIES IN BEAUTIFUL SOUTH FLORIDA

Florida Power & Light Company, Florida's largest electric utility, has immediate openings in our data processing organization in Miami. We are a large multi-CPU shop utilizing IMS DB/DC and CICS in a multi-language environment.

IMS APPLICATION DESIGNERS
SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS

Minimum of two years experience in system analysis and design with five years total data processing experience. Bachelors Degree in Business, Finance, Engineering or Computer Science preferred, or appropriate experience in financial, purchasing, inventory and construction application areas.

SYSTEMS PROGRAMMERS

Experience in OS/MVS, operating system internals in an environment including JES 2, VSAM, CICS and IMS. Data communications software experience with VTAM and Network Control is also desired.

DATA MANAGEMENT ANALYST

Experience with IMS/DC and DL1, IBM's Data Dictionary; project leadership desirable. Successful candidate will assist in Information System planning, establish and manage a data dictionary, and develop a data management function.

We offer competitive salaries, an excellent benefit package, challenging work environment, relocation assistance and year round outdoor living.

Qualified candidates who wish to be considered for these positions should mail their resumé and salary requirements to:

Mr. A.M. Strickland
Florida Power & Light Company
P.O. Box 529100
Miami, Florida 33152

AN EQUAL OPPORTUNITY EMPLOYER M/F

ANALYST I

Provide computer analysis as required for engineering, manufacturing and financial systems on IBM 4331 using DL/I and CICS. B.S. in Information Sciences with one year experience in FORTRAN and COBOL.

With over 20 years of operating history, this pioneering manufacturing facility offers all of the amenities of a rural setting, yet it is only about 35 miles from the Tri-City area which is home to over a million people.

Competitive salary and a generous benefit package are provided as a challenge of continuing to meet the changing needs of a complex and developing industry. U.S. Citizenship is required. Send resume and salary history to:

Mr. R.D. Bailey
Nuclear Fuel Services, Inc.
Erwin, Tennessee 37650
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HARDWARE/SOFTWARE ENGINEERS.

LOOKING FOR A NEW STATE-OF-THE-ART DEVELOPMENT PROJECT?

Harris Composition Systems has long been a leader in the development of automated newspaper systems. Expertise in this field, combined with the wealth of technology available within Harris, gives us a solid base to draw from in the development of office word processing systems.

Call today if your background includes any of the following:

MICROPROCESSOR SOFTWARE DEVELOPMENT
MINICOMPUTER SOFTWARE DEVELOPMENT
APPLICATIONS PROGRAMMING
DIAGNOSTIC DESIGN
MANUFACTURE TEST ENGINEER

Join our team and participate immediately in a technically challenging project. Furthermore, you will be able to experience the casual, family oriented lifestyle on the Atlantic coast within easy driving distance of Florida's most inviting recreational attractions. Melbourne, Florida—the cost of living is low, but the quality of life is high.

Call or send resume to **Daphne Cumberland, Harris Composition Systems Division, P.O. Box 2080, Dept. CW11/03, Melbourne, Florida 32901. 1-800-327-0482.**

HARRIS
COMMUNICATION AND INFORMATION PROCESSING

An Equal Opportunity Employer M/F VH.

HOUSTON
PROGRAMMER/ ANALYST

Major Computer Service Bureau seeks 360/370 DOS COBOL Programmer with minimum two years accounting applications experience. We pay top dollar in Texas for aggressive, self-motivated individual.

Call collect:
Mr. Vincent Krauth
Vice President
713/978-6373
or write:
Computer Statistics, Inc.
7100 Regency Square Blvd.
Houston, Texas 77036

Programmer Analyst III
Montana State University

Knowledge of information systems, systems analysis, design, construction, testing and maintenance techniques and practices required. $1,821.67 per month. Rural setting - hunting, fishing, skiing. Send resume to: **Personnel Services, Room 8, Montana Hall, Bozeman, MT 59717 before 5:00 p.m. November 14, 1980.** An affirmative Action-Equal Opportunity Employer.

Software Development Manager

Amdahl is the progressive computer company that offers compatibility and performance in large-scale systems. Our growing software R&D efforts focus on a unique team approach that stresses service to users across departmental areas. And our commitment to our employees is reflected in liberal educational assistance programs, outstanding benefits, and generous salaries.

As technical manager of a Software Development Department, you will be responsible for generating software tools to support diagnostics and console systems R&D efforts. The entire group participates in the TOTAL - DEVELOPMENT PROCESS, from initial concept through design implementation and support. You will plan, schedule, and track these projects and perform personnel administration, including recruiting. You will also provide technical and administrative interface with other departments. If you have a BSEE, BSCS, or the equivalent, plus a knowledge of software development and maintenance and one or more years of managment or senior technical leadership, this could be the career opportunity you've been waiting for. A sincere interest in user satisfaction is essential.

Please send your resume directly to our **Employment Department/#67-4248, Amdahl Corporation, P.O. Box 470, Sunnyvale, California 94086.** We are an equal opportunity employer through affirmative action.

amdahl

NRL

COMPUTER SPECIALIST POSITIONS

(Two Vacancies)
GS-12 ($26,951-$35,033 per annum)
or
GS-11 ($22,486-$29,236 per annum)

The Naval Research Laboratory, Management Information Systems and Special Projects is seeking applicants interested in the development of logical/physical data base(s) to support a large-scale, on-line management information system. Functional areas included are: financial management, personnel, supply, security, maintenance and repair, real property inventory, etc. Responsibilities include conceptual definition and design of the data base(s); establishment of data base related standards, procedures and methodologies; data base backup, recovery, security and monitoring. This position will require considerable involvement with application developers, users, and management officials. Expertise required in data base design and administration. Also desired is experience in applications system development, data communications, and source data automation. Hardware to be used includes a DEC 10, PDP-10, and Honeywell 2220 and CDC 6600.

This is a career Civil Service position with all the normal fringe benefits. Travel and transportation expenses will be paid to those selected. Interested applicants should submit a Standard Form 171, Personal Qualifications Statement, or detailed resume, by 25 November 1980 to:

Naval Research Laboratory
Civilian Personnel Office
ATTN: Code 14-0378-15 CW
4555 Overlook Avenue, S.W.
Washington, D.C. 20375
Telephone: (202) 767-3030

An Equal Opportunity Employer

U.S. Citizenship Required

DATA PROCESSING INSTRUCTORS

San Francisco Bay Area

An innovative training institute for foreign technicians has immediate opportunities for Data Processing instructional professionals.

Programming Instructors

Be involved in preparing and teaching portions of an extensive program of Data Processing lasting up to 2 years and involving an associate degree. The curriculum offers extensive practical programs, hands-on experience and basic theory leading to proficiency in teleprocessing programming.

Applicants must have formal classroom training experience and proven professional ability in the Data Processing field including background and strong interest in developing State-of-the-Art curriculum in structured COBOL with computer assisted instruction as a major component. Recent experience should include large scale IBM teleprocessing systems. Degree in Computer Science or related discipline preferred.

Systems Programmer/ Instructor

You will maintain a Magnuson M80/3 computer system operating CICS and CMS and will instruct students in IBM assembler programming. Applicants must be experienced in IBM OS/VS systems and be a fluent assembler programmer. Some instructional experience required.

Salaries for these positions are commensurate with experience and competitive within the Data Processing industry. Excellent benefits program including attractive relocation assistance. Send resume (salary history required) to Harry T. Dalk, Director of Personnel & Administration.

SYSOREX INSTITUTE

An educational service of
SYSOREX INTERNATIONAL, INC.
10050 N. Tantau Avenue
Cupertino, CA 95014
(408) 996-6363

An equal opportunity employer

NORTHWEST OPPORTUNITIES

Technical

MVS/VTAM An established N.W. based [illegible] company is upgrading their system and converting to IBM. Join the [illegible] team of professionals already on board and be the key person responsible for planning, installation and support communications software in [illegible] environment. [illegible]

Data Security Our client located in the Seattle area is seeking a key individual to develop data security policies, standards and procedures and the software to implement them. Environment is IBM [illegible] MVS. Will also be involved in capacity planning and performance analysis for this industry leader. [illegible]

ADABAS Specialist We have an immediate need for an experienced Data Base Consultant to participate in the design and integration of large scale systems for this worldwide manufacturer. Several years experience with other DBMS ([illegible] DB/DC, IDMS, [illegible]) will be considered. Individual will receive extensive training program to make the transition. [illegible]

Applications Analysts

Senior Systems Analyst Seattle corporation requires individual with financial or manufacturing experience to join team in the development of a large sophisticated system. Experience with COBOL/HP 3000 on-line systems is desired. This is a highly visible project which will allow you to work with the latest technology and get involved with business users. [illegible]

Other technical applications and management opportunities available throughout the west, call collect or send resume.

Al Friedman
Jim [illegible] Judy [illegible]
206/[illegible]
Foote-Waldron
[illegible] Avenue NE, Bellevue, WA [illegible]

SOFTWARE

PROGRAMMER ANALYST
$1887-$2311/month

SR PROGRAMMER ANALYST
$2094-$2551/month

A Software Programmer Analyst designs, programs, installs, tests, and maintains computer software. A Software Senior Programmer Analyst supervises a team of Software Programmers and Analysts in all activities related to systems design, development and maintenance.

Must be experienced, journey-level Systems Programmer to apply. Applicants for Senior Programmer Analyst must have supervision or project-leader experience and have performed the duties of a Software Programmer Analyst.

Must submit SMUD application forms by Thursday, November 13, 1980. Obtain applications.

SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT
6201 S. Street
P.O. Box 15830
Sacramento, CA 95813
(916) 452-3211, ext. 305

AN EQUAL OPPORTUNITY EMPLOYER WOMEN, MINORITIES AND HANDICAPPED ARE ENCOURAGED TO APPLY

Data Processing Professionals

Crocker Commercial Services' Los Angeles Headquarters has data processing career opportunities available now.

Project Coordinator

We are seeking an individual to participate in all phases of project coordination from design to implementation, as well as to direct the efforts of a staff of 3-5 Analysts. Selected candidate will have a minimum of 4 years' experience in DP and the ability to utilize current techniques of computer systems, analysis, design and implementation methodologies.

Senior Analyst/Programmer

Crocker has a need for an individual to design, code, test and implement on-line systems. Preferred candidate must have 3 years of design and programming experience and have knowledge of the following: COBOL, CICS, DLI and IBM 3031.

Supervisor, Computer Services

Supervisor, Computer Services will manage the daily operations of 3 shifts and directly supervise the 3 Shift Supervisors and support personnel. We are seeking applicants with a minimum of 2 years' Operation Shift Supervisor experience and knowledge of the following: IBM 3031, DOS/VS POWER, VM/GRASP and CICS.

Operations Shift Supervisor

We seek an individual to manage the daily operations of the day shift (initially). Position has full scope of supervision for approximately 5 Lead Operators. Preferred candidate must be willing and able to work any shift (rotating assignments). We require 1-2 years' experience as Lead Operator; prior experience training operators preferred. Knowledge of: IBM 3031, DOS/VS POWER, VM/GRASP and CICS also required.

As part of Crocker National Bank, Crocker Commercial Services offers outstanding promotional opportunities as well as a highly competitive compensation package. Benefits include health/dental/life insurance, subsidized parking and 100% tuition reimbursement. Please send resume and salary history in strict confidence to: **Senior Staffing Specialist, Personnel Department, Crocker Commercial Services, 742 South Hill St., Los Angeles, CA 90014.**

An Equal Opportunity Employer

Crocker
Commercial
Services
A DIVISION OF CROCKER BANK

MIS PROFESSIONALS

SUNBELT LOCATION

This Fortune 100 Corporation has immediate career opportunities for the MIS professionals seeking visibility, technical development and rapid advancement. These positions have been created as a result of internal promotions and continued expansion of the information systems organization. You will have the opportunity to enjoy working in a dynamic environment utilizing IBM's most current state-of-the-art technology.

BUSINESS SYSTEMS

- Data Base Manager - Salary to $35,000
- Project Leader Business Systems - Salary to $33,000
- Data Base Analyst - Salary to $30,000
- Sr. Systems Analyst - Salary to $30,000
- Programmer Analyst - Salary to $28,000

TECHNICAL SUPPORT

- Systems Software Programmer - Salary to $35,000
- Telecommunications Specialist - Salary to $30,000
- Data Base Specialist - IMS Internals - Salary to $33,000

We offer an outstanding benefits package to include all relocation and real estate costs with the opportunity to enjoy year-round outdoor recreation. Send your resume in confidence to:

CW Box 2436
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

Our Client is an Equal Opportunity Employer M/F/H

BUSINESS/SYSTEMS ANALYST.

Tenure track position available January 4, 1981 or September 1, 1981. Master's degree required; teaching experience preferred. Primary responsibility to teach Information Systems courses. Anticipated 2 to 3 year goal to direct an undergraduate, newly designed program in a liberal arts institution. Salary and rank commensurate with background and experience. Opportunities for increased income also exist. **Submit vita, transcripts, three letters of recommendation, salary expectations by December 1, 1980 to Dr. Marie V. Tarpey, Academic Dean/Chairperson, Search Committee, Elmira College, Elmira, New York 14901. EOE.**

EDP SPECIALISTS

career search opportunities
$16,000-$65,000+

DIRECTOR R&D SOFTWARE/HARDWARE to $60,000 PLUS. Attractively located Mid-Atl corp, most advanced & largest in growing field, seeks exec for KEY Tech group of 35+ pros dvlp'ng on-line mini-based systems w/multiple custom I/O's. Req's achievements managing software/hardware systems product dvlpmt. Refer HG.

TELECOMMUNICATIONS EXPERT to $50,000. Prominent Mid-Atl corp seeks applications & technical expert to design & maintain large communications network. Excellent pay & benefits for talented & managerial person. Refer GR.

SR. SOFTWARE PROGRAMMERS to $40,000. Responsible for tech suppo t of application programming & computer operations by creating, maintaining, modifying & implementing software systems. Also req'd to provide systems software assistance at remote computer sites, as well as central computer facility. Degree in Computer Sci or Math, or equiv exp pref; and programming exp w/latest IBM software including, COBOL, RPGII, Power/VS, JCL, DOS/VS, CICS/VS, Assembler Languages & VSAM req'd. Refer NS.

IMS or MVS SYSTEMS PROGRAMMER to $35,000. Leading state-of-the-art shop seeks exp in either IMS/VS, DB/DC or OS/MVS/JES 2 w/knowledge of CICS. Refer GR.

MGR. SCIENTIFIC SYSTEMS to $35,000. Major corp/market research group. Direct new dept staff (12) in scientific solutions to business problems/budgets/systems design. Advanced deg statistics/O.R./math. Ohio metro. Refer AT.

SYSTEMS SUPPORT MGR. to $35,000. Central NJ "Fortune 500" corp seeks strong manager w/multi-hardware & 370 tech systems design exp for attractive long term oppty. Refer GR.

DATA BASE ADMIN. to $33,000. Major industrial concern. Develop large IBM data structures. Prefer IMS/mfg exp. Supervisory exposure. West coast location. Excellent relocation plan. Refer AT.

TECH. CONSULTING to $30,000 ++. Atlanta position. Consult w/DP tech clients evaluating operating systems, recommending performance measurement tools. Highly tech position requiring 5+ yrs. Strong IBM bkgd in tech support environment. Refer RS.

SR. SYSTEMS ANALYST to $30,000. Several immediate opptys throughout the Carolinas for analyst w/solid OS/VS or MVS systems design/implementation exp. Strong pref for financial or mfg systems knowledge. Full career benefits. Complete relocation paid by client co's. Refer JS.

SYSTEMS ANALYST to $30,000. Large mfg corp in southern university town seeks analyst w/H.P. 3000 bkgd, COBOL & mfg related packages. Refer DM.

SYSTEMS/APPLICATIONS PROGRAMMERS
$18,000-$30,000. Our Midwest client, directly involved in dvlpmt of transaction oriented computer communications systems, seeks exp'd systems/applications programmers. These highly visible positions w/excellent career paths req 1+ yrs programming exp in Fortran, Basic & Assembler language. Refer SS.

MINI SUPPORT to $30,000+. Atlanta position. Support T/I inhouse + turnkey systems. Responsible for all tuning & modifications in a custom support environment. Req's strong T/I exp + DX-10. Refer RS.

CONTACT OUR NEAREST OFFICE ABOUT THESE AND OTHER
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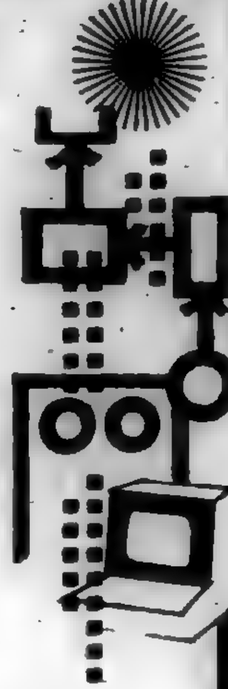
PHILADELPHIA, PA 19103 — S. Burns 1500 Chestnut St. 215/561-6300
ATLANTA, GA 30346 — R. Spang 47 Perimeter Center 404/393-0933
BALTIMORE, MD 21204 — R. Nelson 409 Washington Ave 301/296-4600
CHARLOTTE, NC 28202 — J. Schwab 1742 Southern Nat'l Ctr 704/375-0600
CLEVELAND, OH 44131 — A. Thomas 4401 Rockside Road 216/524-6565
McLEAN, VA 22102 — D. Miller 1710 Goodridge Drive 703/790-1335
NEW YORK, NY 10036 — R. Shanahan 1211 Ave. of the Americas 212/840-6930
PITTSBURGH, PA 15222 — B. Rogers 4 Gateway Center 412/232-0410
PRINCETON, NJ 08540 — G. Fortunato Route 1 CN 5100 609/452-8135
WILMINGTON, DE 19810 — H. Green 3616 Silverside Rd 302/478-5150
HOUSTON, TX 77056 — G. Smith 3800 Richmond Ave. 713/523-5060
LOS ANGELES, CA 90017 — W. McNeese 707 Wilshire Boulevard 213/623-2601
SAN FRANCISCO, CA 94111 — W. McNeese 601 Montgomery Street 415/392-4303

fox-morris
personnel consultants

SYSTEMS PROGRAMMERS

Outstanding career opportunities for experienced specialists and generalists



Colgate-Palmolive, a Fortune 100 consumer products company has outstanding career opportunities for qualified systems programmers in our suburban Piscataway, New Jersey, data center. This centralized facility communicates with numerous remote sites utilizing IBM 3033, 158 (both running under MVS) and 8100 equipment.

These positions offer qualified applicants excellent career opportunities to work with the following inhouse systems: SNA, VTAM, IMS, CICS, MVS, TSO. Both specialists and generalists with solid skills and experience will be considered.

We offer excellent starting salaries fully commensurate with experience or technical qualification, comprehensive company benefits and a convenient, comfortable working environment.

For prompt consideration, please forward resumes with salary history and current requirements to:

R. Mullen
Personnel Department
COLGATE-PALMOLIVE COMPANY
300 Park Avenue, New York, N.Y. 10022
An equal opportunity employer M/F

SOME OF THE BEST SYSTEMS WORK IN THE UNITED STATES

Utilizing UNIX, VAX, PDP11s, M68000s

SOFTWARE MANAGER
$45K Plus Stock

Will be responsible for software development in the Product Engineering organization. Software development using UNIX and microcode M68000. Will have four section managers with approximately 50 to 60 people reporting to you. Sections are: Operating Systems, Data-Base, Communications and Microsoftware.

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$30 - $40K

Multiple positions exist for Software Engineers to work in the following areas:

- UNIX Software Enhancements
- Operating Systems
- Data Management Systems
- Networking Technology

Call collect or submit a resume to:
MICHAEL W. O'KEEFE (617) 273-1740

Management Advisory Services Inc.
"The Recruiting Firm for the Computer Professional"
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Suite #3800
Clients assume all fees and relocation expenses.
Executive search and placement specialists, representing an equal opportunity employer

The more you listen, the more you like.

The more you listen to what we say about career opportunities, the more you like what you hear . . . More specifically, about Data Processing career positions. Growth positions. Rewarding positions. We're D.P. recruitment specialists exclusively. If you'd like to tell us about your career needs, and then listen to what we've got to say, simply call or write in confidence:

N.Y.—535 5th Ave., New York 10017 (212) 867-2650
N.J.—[illegible]
Calif.—3255 Wilshire Blvd., Los Angeles 90010 (213) 384-4900
Texas—3050 So. Post Oak Rd., Houston 77056 (713) 961-3800

the jarvis walker group

SYSTEMS ANALYST

Senior Systems Analyst for Data Base Systems. 48-week position, salary range $17,664-$26,139. BS (MS preferred) degree in computer science, mathematics, business or other closely related field; working/educational experience with CODASYL type data bases and relational data bases. Five years experience with COBOL and experience with an on-line interactive computing system and "super-mini" operating systems. Application deadline is Nov 12, 1980 at 4 p.m. Address applications to:

C.S. MOTT COMMUNITY COLLEGE
PERSONNEL OFFICE C142
1401 E. COURT ST.
FLINT, MI 48503
(313) 762-0385

An Equal Opportunity/Affirmative Action Employer M/F/H

SYSTEM PROGRAMMER
DOS/VS/VSE, CICS/VS S370/S43XX

Minimum 3 years experience as sys. pgrm. Excellent fringe benefits. Salary negotiable. Join a young and aggressive organization with full commitment to EDP. Location Walnut Creek, California. Only applicants need apply. Send resume to CW Box 2423, 375 Cochituate Rd., Rte. 30, Framingham, MA. 01701, or call 415/932-1373, Louise.

HP/3000
Analyst Programmers

Join fortune 200 manufacturer in the implementation of on-line manufacturing and financial systems. We require personnel who are well versed with the HP 3000, IMAGE Data Base, and MPE. A manufacturing background is preferred. Based initially on the west coast, this position requires extensive international travel. A highly competitive salary and outstanding benefits are offered. Please send detailed resume include salary history to;

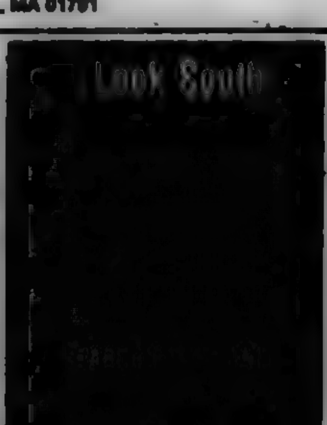
CW Box 2429
375 Cochituate Rd., Rte 30
Framingham, MA 01701

HP SOFTWARE
SALES MANAGERS

DALLAS SAN FRANCISCO
LOS ANGELES CHICAGO

We are seeking qualified persons based in major US cities to demonstrate and sell software for HP computers. Requires knowledge of HP computers and ability to travel. Comprehensive benefits and excellent salary. Contact Tim Chase.

CCS
CORPORATE COMPUTER SYSTEMS, INC
[illegible]
(201) 583-4422



Look South

ATLANTA OPPORTUNITIES

Situated in a beautiful wooded suburban location on the north side of Atlanta, a major corporation has expanded the scope of its Data Processing function and is increasing the areas of responsibility.

SYSTEMS MANAGER
PROGRAMMING MANAGER
SYSTEM ANALYST
PROGRAMMERS

Positions are available at all levels within the development group. Project teams are assigned to each of nine functional areas of application requirements. Personnel are offered an opportunity to learn multiple disciplines or become an expert in one.

LARGE SCALE SYSTEMS
COBOL/DATA MANAGEMENT
INTERPERSONAL SKILLS
FINANCIAL/INSURANCE

The requirements are broad because they are more interested in the individual and his capabilities. We have a challenging assignment with this company, and all screening is performed by Lonny Koff, an EDP professional. If you are interested, please send your resume or call collect:

404-325-3292

CORPORATE PERSONNEL
1800 Century Blvd., Suite 820
ATLANTA, GA 30345

Manager
Office Automation

Weyerhaeuser Company, a world leader in the forest products industry, has an immediate opening at its Corporate Headquarters in Tacoma, Washington for a Manager, Office Automation.

In this newly created Senior position, you'll be responsible for directing the implementation of Office Automation Technology in a $4 billion corporation.

The position requires a BS degree in Computer Science or equivalent. Applicants must have working knowledge of database management and communications including previous experience in planning office automation systems for a large company.

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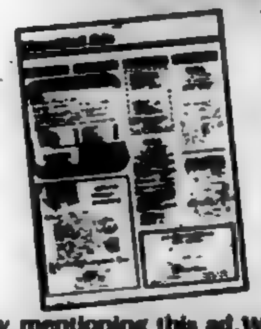

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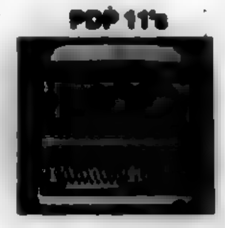

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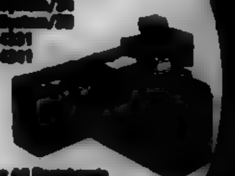

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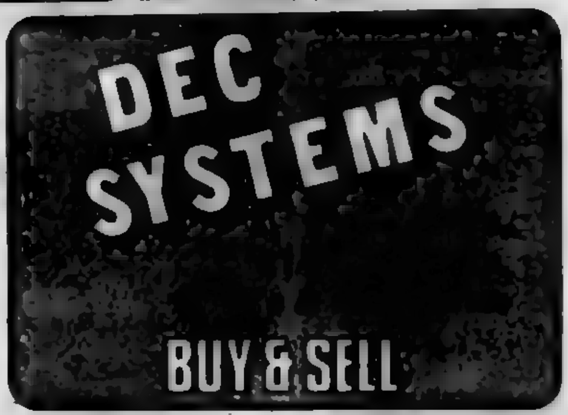

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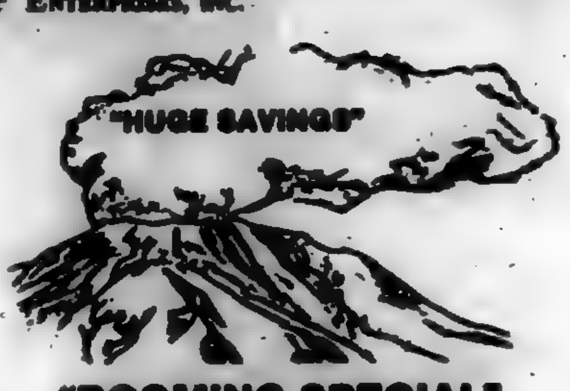

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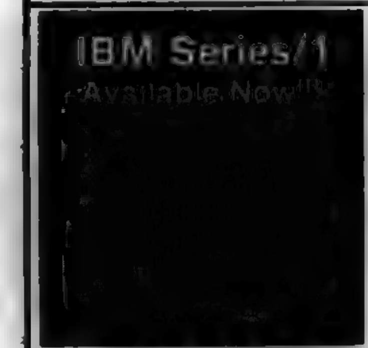

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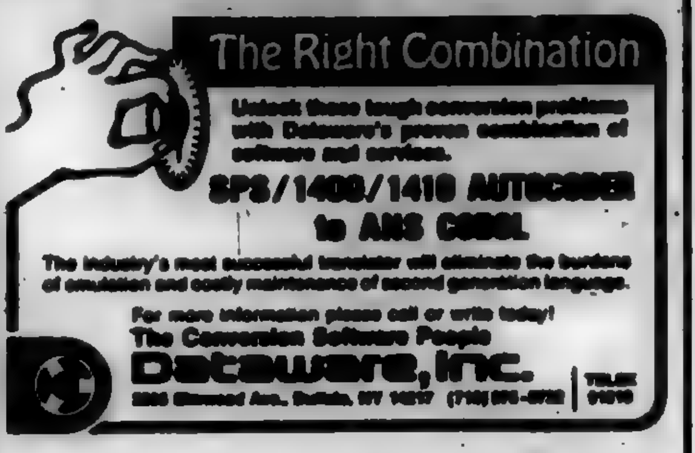

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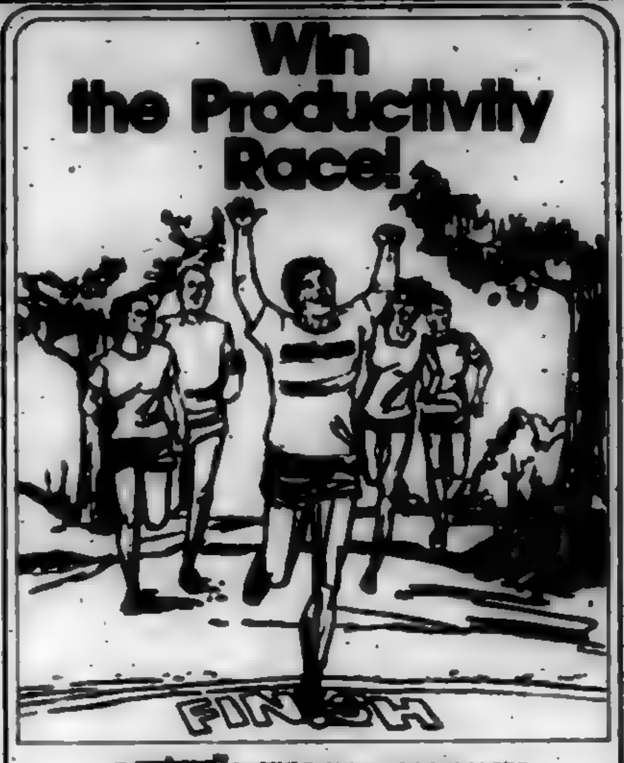

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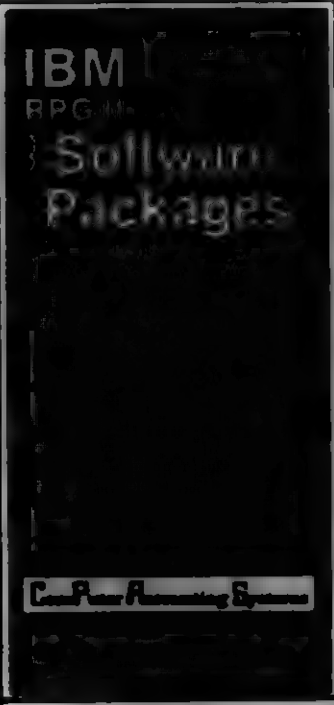

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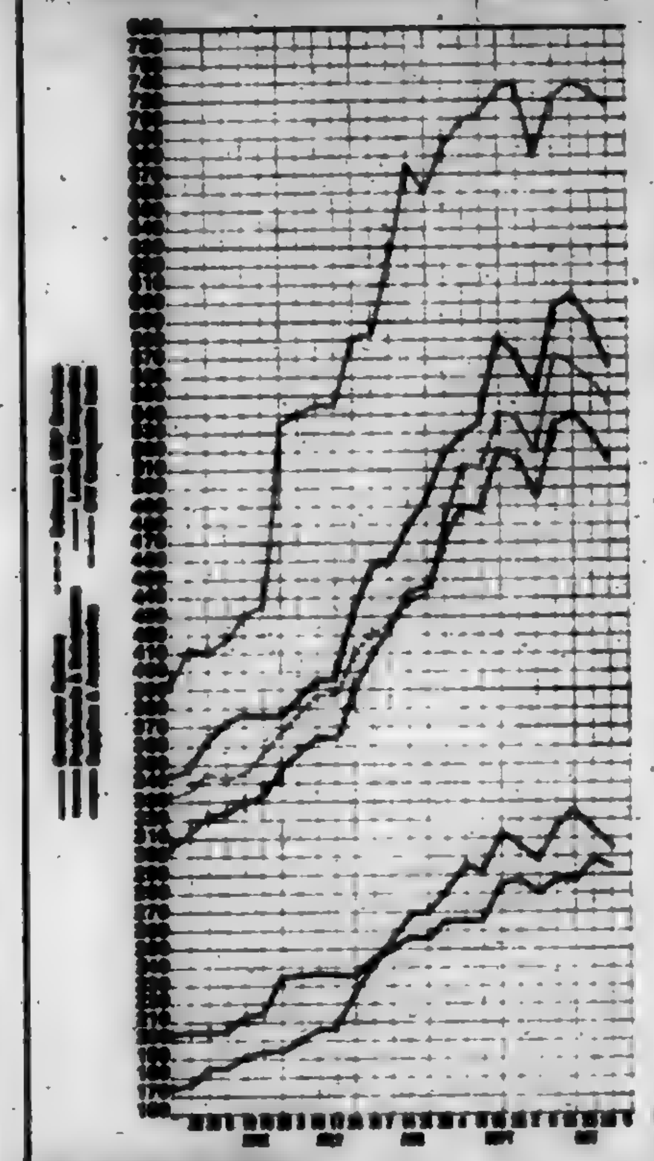

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CLOSING PRICES WEDNESDAY, OCTOBER 29, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1979-80 RANGE (1)	CLOSE OCT 29 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
[illegible]	AMDAHL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	BURROUGHS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER AUTOMATION	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONTROL DATA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CRAY RESEARCH INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATA GENERAL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATAPOINT CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DIGITAL EQUIPMENT	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ELECTRONIC ASSOC.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FOUR-PHASE SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FOXBORO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GENERAL AUTOMATION	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GRI COMPUTER CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HEWLETT-PACKARD CO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HONEYWELL INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	IBM	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MAGNUSON COMP SYSTS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MANAGEMENT ASSIST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MANUFACTURING DATA S	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MINI-COMPUTER SYST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MODULAR COMPUTER SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NCR	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PRIME COMPUTER INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PERKIN-ELMER	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SPERRY CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SYSTEMS ENG. LABS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TANDEM COMPUTERS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEXAS INSTRUMENTS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WANG LABS.	[illegible]	[illegible]	[illegible]	[illegible]
	LEASING COMPANIES				
[illegible]	[illegible] FINANCIAL CP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMDISCO INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER [illegible] CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER INVESTORS GRP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONTINENTAL INFO SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATRONIC RENTAL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DCL INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ITEL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LEASPAC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PIONEER TEX CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] GROUP INC	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	ADVANCED COMP TECH	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANACOMP INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANALYSTS INTL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	APPLIED DATA RES.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AUTOMATIC DATA PROC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER HORIZONS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER NETWORK	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER SCIENCES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER TASK GROUP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER USAGE	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUT AUTO REP SVC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMSHARE	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CULLINANE CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATA DIMENSIONS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATATAB	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DSI CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ELECTRONIC DATA SYST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INFORMATICS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] COMPUTER [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	KEANE ASSOCIATES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	KEYDATA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LOGICON	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MATHEMATICA INC	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	TYMSHARE INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	URS SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	AM INTERNATIONAL	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	DATUM INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DECISION DATA COMPUT	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	DOCUMATION INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATARAM CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ELECTRONIC M & M	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	EVANS & SUTHERLAND	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FABRI-TEK	[illegible]	[illegible]	[illegible]	[illegible]
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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

y Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

November 10, 1980 $1.00 a copy; $30/year

gan May Appoint IBMers

Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — While Jimmy Carter and his host of advisers with IBM connections were resoundly thrown out of office last week, others with IBM ties are expected to come into office with the new Ronald Reagan administration next January.

Four members of the IBM board of directors are active in Republican party circles and all may end up with some jobs in the incoming administration. In addition, the Bechtel Group of companies — an apparent hotbed of Reagan supporters — is also represented on the IBM board.

During the Carter administration, personnel with IBM ties have held at one time or another the posts of Secretary of State, Secretary of Defense, Secretary of Commerce, Secretary of Housing and Urban Development and Secretary of Health, Education and Welfare [CW, Jan. 31, 1977].

The IBM influence on both sides of the political fence follows a long corporate tradition — a tradition that also called for activism in political affairs by the highest corporate officials.

Among present IBM board members who may be enticed to Washington for the new administration are William W. Scranton, former ambassador to the United Nations under Nixon and former governor of Pennsylvania. Pennsylvania went early and dramatically into the Reagan column last week.

(Continued on Page 8)

System Puts NBC First In Calling Reagan Win

NEW YORK — John Chancellor predicted Ronald Reagan would be the next president of the United States at 8:15 p.m. EST last Tuesday — hours before the polls had even closed in some parts of the country and with only 1% of the vote actually counted.

How?

Part of it was guts, but the rest was confidence — confidence in the results of exit polls and the system used to process them, refined over the last four years by NBC's Elections Unit according to an NBC source.

Although the network was criticized by its two rivals, NBC spokesman Ron Najman defended NBC's decision to call the election early. "Exit polling is a very realistic way of assessing the mood of the electorate," he said. "However, the only real way is based on the actual hard data fed from the key precincts, and our protection was based on hard data."

Two Data Streams

NBC uses a system that processes two basic streams of data — actual election returns from the News Election System (NES) here and voter comments from a team of precinct pollsters nationwide. The NES system was set up to serve all the wire services as well as the three national television networks.

The NBC pollsters simply ask voters for whom they voted as they leave the polls. At appointed times throughout the day pollsters call in their totals to data entry personnel at a bank of computer terminals here. The data is input and processed on the system.

When the information from the exit polls started matching actual vote counts coming in from the NES, NBC decided to call it, another spokesman said.

Meanwhile, news anchormen at the other two networks decided to play it more cautiously and wait for actual vote counts. President Carter actually conceded his defeat before CBS had called Reagan the winner.

NBC was the object of severe criticism last week from those news outlets it "beat" in calling the election on two counts: first, the polls had not even closed in some parts of the country; second, they questioned the accuracy of exit interviews.

Court Action Likely

Key Inquiry II Provisions Uncertain

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Although the Federal Communications Commission (FCC) has reconsidered its "final" decision on the Second Computer Inquiry and reaffirmed many of the original provisions, a good deal of uncertainty remains.

The ultimate decision on several key provisions is likely to be made by a court rather than the commission.

Some three dozen petitions for review of the final decision, as initially issued last spring [CW, May 12], are now pending before the U.S. Court of Appeals for the District of Columbia, and more are likely to be filed in the wake of last month's actions.

The FCC, in its latest pronouncement on computer and communications:

- Reaffirmed the separation of all communication services into two basic categories — basic and enhanced. The former, including dial-up and most private-line transmission services, would continue to be offered by AT&T operating companies under tariff. The latter, encompassing services that employ computer processing to act on the format, content, code or protocol of the subscriber's transmitted information, would be offered on a deregulated basis through a separate AT&T subsidiary.
- Excluded General Telephone and Electronics Corp. from the above requirement.
- Asserted the commission's authority to regulate enhanced services, but said regulation would not be imposed unless it was needed.
- Deregulated some terminal equipment beginning March 1, 1982, and announced that the question of deregulating the rest would be the subject of a further inquiry. The equipment to be deregulated includes all devices installed after March 1, 1982, plus all devices — regardless of installation data — subject to interstate tariffs. The inquiry will involve only terminal equipment tariffed by the states.

Several provisions of last month's

(Continued on Page 8)

Univac AVP Runs Both OS 1100, VS/9

By Tom Henkel
CW Staff

BLUE BELL, Pa. — In an attempt to lure its Series 90 users to the larger 1100 line of mainframes, Univac has announced the 1100/60 Attached Virtual Processor (AVP), which will run OS 1100 and VS/9 software concurrently. The AVP will give 90/60, 90/70 and 90/80 users a boost in processing power along with 524K to 1M words of main memory and 32K-byte cache buffer storage without having to go through a software conversion. Additionally, Univac users can continue to run VS/9 programs on the 1100/60 AVP, even if they migrate out of the Series 90 line into the 1100 series, a spokesman said.

The key to the AVP is a software package called the Attached Processor Control Software (APCS), which allows the 1100/60 attached processor to run VS/9 software and Series 90 disk subsystems. In addition, disks like Univac's 8470 also can be used, allowing the VS/9 user to take advantage of more technologically advanced drives, the vendor said.

In a direct attachment, Series 90 disk subsystems are connected to the 1100/60 via the mainframe's block multiplexer channel. In a logical attachment, disks are connected via standard Series 1100 software. And in a local environment, the disks are attached through an optional block multiplexer channel.

(Continued on Page 5)

Product Spotlight

Range of Minis Profiled for DDP Use

By Tim Scannell
CW Staff

If there existed a Hall of Fame for Favorite Phrases and Catchy Buzzwords, distributed data processing (DDP) would probably occupy a key position. However, even though the term probably has been bounced off more conference room walls and eaten up more paper and ink than any other industry topic, few people actually put the concept to practice.

Today, "anybody who has a remote terminal is calling their system a distributed processing system," Dr. Jerry Held, director of software research and development at Tandem Computers, Inc., said. "Some processing may be going on remotely, but really the vast majority of it is centralized."

Held, who describes DDP as "a commonly misused word," explained that true distributed processing not only involves decentralizing the main processor, but distributing the data base and data management work throughout the field. There is no central cache of information, but a scattered body of knowledge that can be accessed equally by any one of several remote stations.

The major stumbling block to "true DDP" is that most major computer systems, including those offering distributed terminals, were designed before the era of distributed processing, Held continued. As a result, people using these systems "are backing into DDP, and it's going to take years to retrofit and get into a really true distributed environment."

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

CDC Offers 3830-Type Controller

MINNEAPOLIS — Control Data Corp. has announced a plug-compatible version of IBM's 3830 disk controller that reportedly offers twice the performance while requiring one-third the space and one-fifth the power as the IBM model.

The CDC 38304 controller offers two independent path, or storage, directors that transfer data file positioning commands between the processor channels and the disk storage units.

The CDC controller can be attached to IBM's 4300, 30 series and 370 mainframes, as well as plug-compatible mainframes, CDC said.

The 38304 can be attached to the block multiplexer channel, and each storage director can access up to four processor channels with the addition of optional two-channel or four-channel switches. In a four-channel configuration, an individual storage director can control up to four strings of disk drives, with a maximum of 32 actuators. That offers a total capacity per storage director of between 5G and 20G bytes of data, CDC explained.

The CDC controller can accept IBM-type 3350, 3333 and 3330 disk drives, the vendor added. The controllers can also be used in a multiple host environment.

The standard string switch on the CDC unit and CDC's dual access features reportedly allow up to eight processors to have two separate paths to each disk volume of data.

The controller costs $58,421, or $1,205 a month on a three-year lease. CDC also charges a $176 monthly maintenance fee. First shipments are scheduled for the fourth quarter of 1980, according to CDC.

In addition to announcing the disk controller, T.G. Kamp, CDC's president of peripheral products, announced the firm will bring out a plug-compatible version of IBM's 3880 controller and a competitor to IBM's newly announced 3380 disk drives.

The firm will probably announce the 3880-compatible controllers the first quarter of 1981, Kamp said.

Firms Suing Iran Awaiting U.S. Plan for Frozen Assets

By Marcia Blumenthal
CW Staff

DP firms with lawsuits pending against the nation of Iran were awaiting word from the State Department last week about what action the government will take to unfreeze the estimated $8 billion in Iranian assets — a condition demanded by Iran for the release of the 52 American hostages held in that country since last November.

Although most firms contacted last week declined to comment on the matter, Charles P. Lecht, president of Advanced Computer Techniques Corp. (ACT) said the assets should not be released.

His firm filed a $2 million lawsuit against Iran six months ago for nonpayment of services performed for the Persian Air Force. ACT had 50 DP personnel working in Iran at any given time since 1976, he said. Ironically, the government was just on the verge of paying its bill when the revolution began.

A State Department spokeswoman said the government was attempting to respond to Iran's demands as quickly as possible.

Releasing the assets is one thing, but complying with Iran's demand that the U.S. government cancel all private claims against the Iranian government is a dilemma, she said.

Court cases have been filed against those assets. Electronic Data Systems Corp. (EDS) already received a $19 million judgment against Iran from a federal court in Dallas last May [CW, May 12].

At last report, EDS was attempting to seek the release of the money award. However, a lawyer involved in that case declined to comment on the present status of the matter.

Government officials have suggested that if Iran agrees to set aside a portion of those frozen assets for payment of U.S. claims, the remainder of the monies could be released within a few weeks.

A Treasury Department spokesman noted there is a precedent for this action. One recent example is with China. U.S. parties had claims against China dating back to the 1949 revolution in that country. When China finally agreed to settle a certain portion of those claims, the U.S. unblocked the assets.

Besides EDS and ACT, Harris Corp. filed a lawsuit for $9.3 million against the Iranian government, charging it breached a contract to manage the installation of sophisticated electronic intelligence gathering and DP systems [CW, Jan. 28].

Computer Science Corp. filed a breach of contract suit in the U.S. District Court in Los Angeles for $8.9 million in February. That firm has already written off $1.9 million in losses for its Iranian operations.

Although Control Data Corp. said it was still receiving payment from Iran for installed hardware, a company spokesman was unable to determine at press time whether CDC had made any legal claims against Iran.

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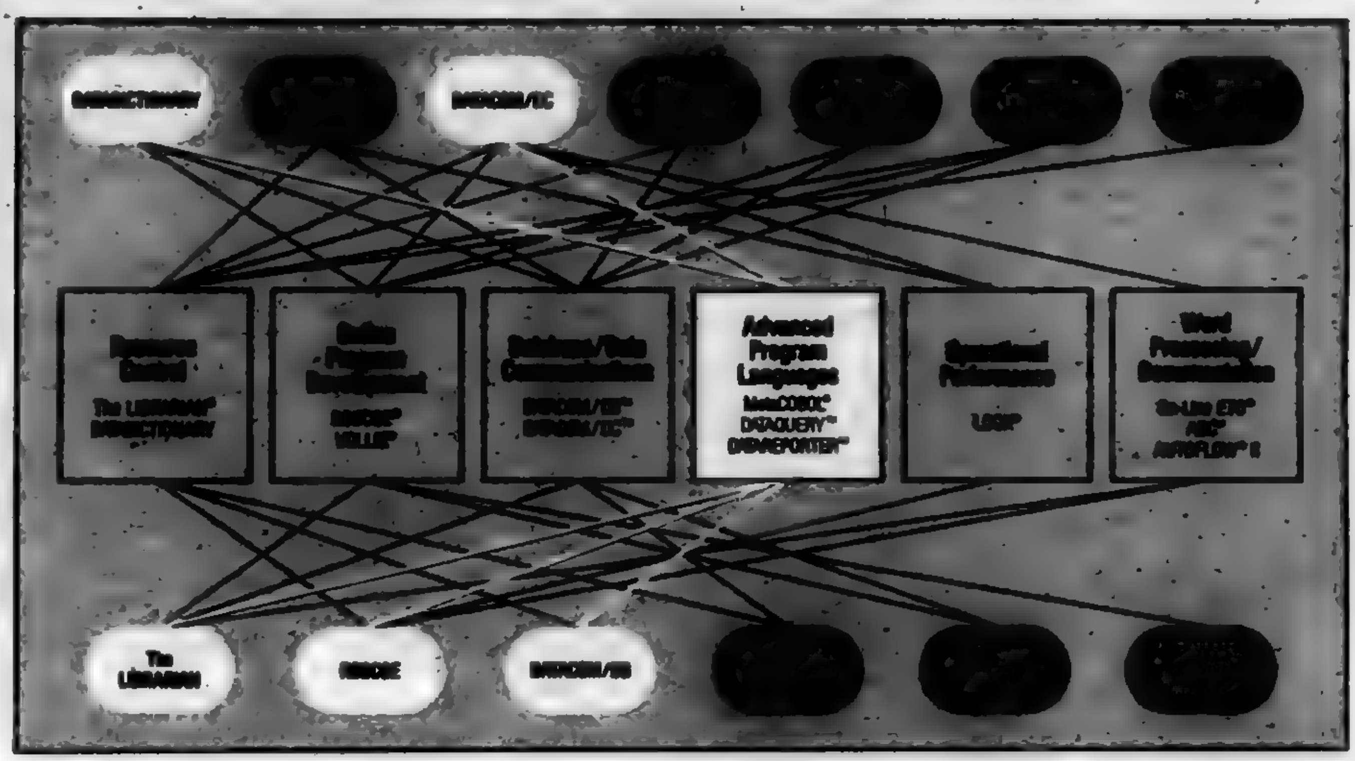

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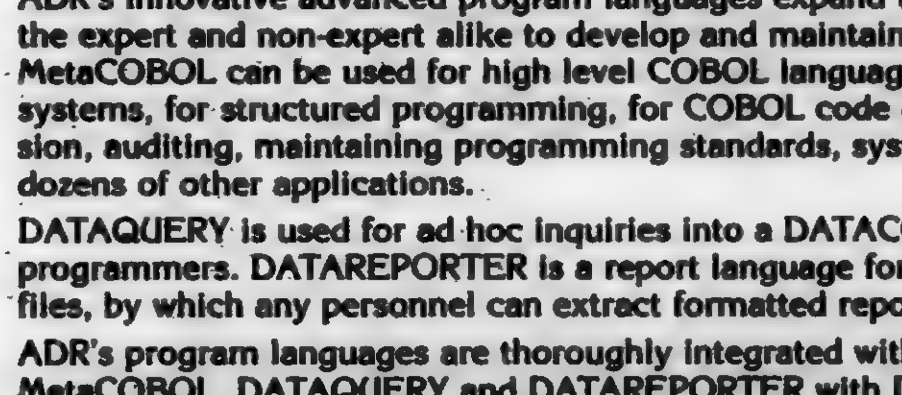

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London Hosts European Computer Exhibition

CW at Compec '80

By Tim Scannell
CW Staff

LONDON — Despite freezing temperatures, overcast skies and an occasional snowflake, thousands of people showed up here last week at the Compec '80 computer show to see Europe's latest in computers, peripherals and systems.

The Compec '80 show is basically an exhibition aimed at the European business community and therefore showcased a lot of minicomputer-based business systems. A number of 32-bit machines were on display — from such companies as Digital Equipment Co. Ltd., Perkin-Elmer Data Systems Ltd. and Systems Engineering Laboratories. The vendors molded their pitch to meet the needs of the small-to-medium business user rather than the large end-user or scientific shop.

Expected Attendees

More than 34,000 people were expected to register before the show's end. The show took place at the sprawling grand hall convention complex, a city-block-long affair that is located in Olympia, a West-End section of London. An annual event, the exhibition is sponsored by *Computer Weekly* and *Data Processing*, two British publications.

While the exhibition was similar to the National Computer Conference (NCC) with its tightly spaced booths and circus-like atmosphere, Compec did not spotlight any equipment that had not been announced in the U.S. In fact, most of the computers and peripherals on display here last week were introduced earlier at last summer's NCC or last month's Info '80 show in New York. However, most of the equipment on the show floor was new to European eyes.

Those American-based companies that did use the show to feature previously U.S.-introduced equipment to the UK included:

Making its first appearance at Compec, IBM demonstrated its 3101 display terminal and associated 3102 serial matrix thermal printer and its 3279 color display station. Systems Engineering Laboratories' British cousin showed its model 32/27 minicomputer, introduced at NCC. Computer Automation ran its Syfa line of computers through their paces for interested show attendees.

Prime Computer Ltd., occupying a large booth on the show floor, demonstrated both its integrated business system and office automation system, which generated a lot of attention, particularly with this continent's interest in viewdata, Prestel and other electronic information systems.

A number of companies at last week's show unveiled new products that are tentatively scheduled to be introduced in the U.S. at a later date. For instance, Sharp Corp., based in Osaka, Japan, showcased its PC-3200 personal computer system which has a 12-in. CRT, 64K bytes of memory, two floppy disk drives and a dot matrix printer. While the system is formally labeled a "personal computer" it is geared more towards the personal needs of the small business person rather than the games and bank-account-balancing functions normally associated with personal computing in the U.S. The Sharp computer is scheduled to be mass-shipped this February and will be marketed in the U.S., although a company spokesman refused to specify exactly when the machine would land on U.S. shores.

Modular Technology, a division of General Robots Ltd., introduced a laser-based data and voice communications system, called Interlaser, which can reportedly be used as a telephone or a data terminal using standard data and telephone interfaces. Housed in a small aluminum box, the laser device operates on a line-of-sight basis and transmits up to 50K bit/sec asynchronous or up to 19.2K bit/sec synchronous.

The unit's high-speed synchronous transmission rate is up to 5M bit/sec. The laser transmitter, demonstrated at the booth by setting up a communications link from one end to the other, can be linked to any computer using an RS-232C interface, a spokesman claimed.

Modular Technology is currently working out distributorship plans with an American company and will soon start marketing the device directly to U.S. end users. Presently, Interlaser can be ordered from the first based here in London.

Other American-based companies joining the more than 350 exhibitors here included Control Data Ltd., Floating-Point Systems, Pertec International and Plessey Peripheral Systems Ltd.

Also, for the first time at Compec, Canada was represented by a cross section of Canadian computer and peripherals manufacturers.

Qume Opens UK Subsidiary

By Tim Scannell
CW Staff

LONDON — As the Compec '80 exhibition got under way, Qume Corp. announced the establishment of a subsidiary here that will include a 6,000 sq ft factory to be based in Reading, Berkshire.

The Qume subsidiary will reportedly provide a single source for customers and users here of the company's products as well as technical support and service facilities. Also, an official distribution channel for end-user and dealer sales has been established under the Qume name, comprised of the following companies: Access Data Communications Ltd., Daisy Terminals Ltd., Facit, ISG Data Sales Ltd., and Rohan Computers Ltd.

Change the Name, The Game's the Same

By Tim Scannell
CW Staff

LONDON — The location's very different, but the selling strategies are the same. Whether it's at the U.S. National Computer Conference or here at Compec '80, vendors seem to use more than enough robots, balloons and plastic bag giveaways to attract a potential buyer's attention.

For instance, BASF's Computer Division recruited a brightly painted high-powered British sports car to attract any attendees that might have an automotive as well as a computer interest. If that wasn't sufficient, the company also supplied pictures of the sports car to the press, featuring a blonde model in various stages of undress.

Not to be outdone, Modular Technology had an assortment of roller-skating models that sported bright red hard hats and red clipboards. As Compec attendees examined the firm's data communication wares, the models skated around on a wooden floor accompanied by the beat of piped-in disco music.

Personal Computers Ltd. enhanced its display by providing a ribbon-clad model that hinted of the Miss World competition, due to take place in London the week following the Compec exhibition. Dressed in bright purple satin, the model passed out the firm's literature to the flowing crowds.

For the weary conventioneer, there was even a pub-like bar that featured pints of ale and a place to rehash any discoveries on the show floor.

Computer Crime Meet to Feature DP Industry Security Experts

WASHINGTON, D.C. — Top DP security specialists from private industry and government will be featured at the upcoming "Computer Crime Info — Computer Security and Fraud Control" conference scheduled here for Dec. 1-3.

The conference, aimed primarily at top executives, will examine in depth the primary management issues and available solutions for government and business in addressing computer security issues and combating computer crime, according to The Information Exchange, the event's sponsor.

The Information Exchange, a nonprofit educational organization for the business and management communities, has enlisted as conference chairman Robert P. Campbell, president of Advanced Information Management, Inc., Woodbridge, Va.

Speakers at the three-day conference will include James H. Burrows, director of the National Bureau of Standards Institute for Computer Sciences and Technology; Dr. Carl Hammer, Univac computer sciences director; Joseph Henahan, chief of the Federal Bureau of Investigation's white-collar crime section; Donald E. Doll, IBM asset protection manager; Robert A. Graytock, chief of ADP and telecommunications security policy of the Justice Department; and computer security specialist Robert V. Jacobson of International Security Technology, Inc., New York.

Conference organizers are expecting approximately 100 people to attend the conference, set for the Crystal City Marriott Hotel here. Registration information is available from Gil Merritt, The Information Exchange, Suite 400, 1730 N. Lynn St., Arlington, Va. 22209.

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First On-Line Maneuver

AT&T's Claim to 'Basic' Service Disputed

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – AT&T's attempt to make its Custom Calling II service "basic" rather than "enhanced" has generated spirited opposition from competitors. They dispute the phone company's claim that Custom Calling II is like basic services already being offered directly by telephone-operating companies.

The argument is significant because it appears to represent the first step in a major Bell effort to win a commanding position in the on-line information services business.

Last April, in its "final" Second Computer Inquiry Decision, the Federal Communications Commission (FCC) explicitly listed Custom Calling II as an enhanced service that would have to be offered through a separate Bell subsidiary, rather than a basic offering that could be provided by an AT&T operating company. The distinction is considered important by the phone company's competitors.

Early last month, however, AT&T Vice-President James Billingsley asked the commission to reclassify Custom Calling II as a basic service. He pointed out that its value is derived largely from interconnection with the dial-up telephone network and that it closely resembles services already being provided directly by telephone operating companies.

The opposition surfaced a short time later – from IBM, the Association of Data Processing Service Organizations, Inc. (Adapso), the computer and Business Equipment Manufacturers Association (Cbema) and the Associated Telephone Answering Exchanges (ATAE).

Custom Calling II consists essentially of two options, which AT&T refers to as "Call Answering" and "Advance Calling." The former allows a subscriber who is away from his phone, or who does not with to receive calls, to have them stored in digitized form within the network on high-density disks. Later, by dialing specified codes, the subscriber can retrieve these messages.

Advance Calling allows the subscriber to store an outbound message within the network and have it delivered at a specified time.

According to Billingsley, Custom Calling II services are part of a family of offerings. The first generation of this family consists of Custom Calling I and Extended Call Answering, both already offered by AT&T operating companies. Custom Calling II services "complement" the earlier services, he added.

IBM argued that Custom Calling II stores voice messages within the network, while Custom Calling I does not. ATAE added that "Custom Calling II services are not products of the switched network, but are made feasible only by . . . attachment . . . of the [digital] voice storage system."

Univac AVP Targets 90V User

(Continued from Page 1)

Tape volumes written on Series 90 CPUs can be processed by the 1100/60 AVP without modification. In addition, all VS/9 spooling to printer, card reader and card punch devices are simulated through the APCS package using standard OS 1100 spooling facilities, Univac said.

The console interface to both VS/9 and APCS is through Univac's UTS 20 terminal. The unit also simulates operator panel controls via functjons keys, the vendor said.

In addition to the attached processor, Univac announced additions to its OS 1100 software line that were designed to interface with VS/9 software. The software products are IMS 1100, a transaction processing system; Edit 1100; the Interactive Processing System 1100, a full-screen display text editor; Pads 1100, the Programmers Advanced Debugging System; and an industry-compatible RPG-II compiling system, according to Univac.

The attached processor package consists of a central processor with a logic bus structure and microcode control similar to the 90/80 family. Specially designed hardware and microcode allow execution of all VS/9 instructions except I/O. Those instructions are performed independently by the APCS package, Univac said.

The 1100/60 AVP costs from $440,684 for a 524K-word version to $701,598 for a 1,048K-word model. The 524K-word AVP leases for $8,427 a month and the 1,048K-word model leases for $13,352 a month. Maintenance on the low-end version costs $1,601 and maintenance on the 1,048K version costs $2,022 a month.

Optional support service on the AVP line costs between $550 and $750 a month, the vendor added.

Monthly charges for the Series 1100 software are: $185 for IMS 1100, $300 for Edit 1100, $900 for Interactive Processing System 1100, $200 for Pads 1100 and $125 for RPG-II. VS/9 software is offered with Series 90V hardware at no additional charge and the APCS package is bundled with the AVP hardware.

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User Spins Net out of Honeywell, Bunker Ramo

Special to CW

AMSTERDAM, Netherlands – Few users are willing to take the time and trouble to modify or create operating software to integrate hardware and software from two systems vendors whose systems were not designed to work together.

One company that did so, and successfully, is Nederlandsche Crediet-verzekering Maatschappij N.V. (NCM) here.

Established in 1925 by a group of banks, insurance companies and private investors, NCM provides credit insurance covering the normal risks associated with domestic and foreign trade, as well as insurance against political risks associated with foreign trade. This is provided under the terms of a reinsurance agreement it has with the Dutch government.

NCM's hybrid system combines CII Honeywell Bull Level 66 mainframes with Bunker Ramo Corp. minicomputers and CRT terminals, according to Rienk de Vries, the Dutch company's systems manager.

Uptime for the Bunker Ramo portion of the system is 99.5% and for the Honeywell Level 66 system, 99.8%, according to de Vries.

The hybrid system was made necessary because in the 1970s, when the firm's latest computer system was designed, not many mainframes with distributed processing capabilities were available in Europe.

Honeywell Bull was chosen on the basis of the performance of the Level 66 mainframe system in a combined environment of batch and on-line applications even though Honeywell did not have an on-line terminal system that would meet NCM's requirements.

Honeywell did help find a terminal system that could be integrated with the Level 66/10 mainframe, and Bunker Ramo's Bank Control System 90, with its Programmable Control Unit (PCU) minicomputer, was the system selected.

The Bunker Ramo System 90 was actually designed for use in on-line branch teller terminal networks for commercial banks, and included the minicomputer-controlled clustered terminal architecture that NCM was looking for. In addition, it came with a terminal controller operating system that both Honeywell and NCM believed had the potential to be adapted both to Honeywell's operating system and the more general, multifunction use required by NCM, according to de Vries.

When Bunker Ramo and its Dutch distributor, Vernon Kantoormachines B.V., offered to assist in making the required software modifications, the decision was made to go ahead with the detailed design and installation of the hybrid system.

Installation of both the Honeywell and Bunker Ramo hardware was completed by November 1976. The initial configuration was rather small: 192K words of memory – 1,152K 6-bit bytes – and 600M bytes of disk storage. The mainframe, a Honeywell Level 66/10P CPU, was connected to the Bunker Ramo System 90 PCUs through 9,600 bit/sec communication lines.

Host Added

In 1978, a second Honeywell/Bull 66/10P computer was added, bringing the configuration to 512K words of memory – 3,072K 6-bit bytes – and 1,400M bytes of on-line disk storage.

The two mainframes were connected in tandem to provide backup in the event of system failure. In addition, the number of Bunker Ramo terminal network systems linked to the central computers was increased to 15 with a total of 120 1,920-char. CRT units. All 15 systems are located at NCM's office in Amsterdam.

Each of the Bunker Ramo systems consists of one PCU with 48K bytes of memory, a floppy disk drive, eight 1,920-char. CRT terminals and two line printers.

Communications between the Honeywell system and the Bunker Ramo systems are managed by NCM's Racal-Milgo, Inc. network control center, which has the capability to monitor, switch and patch data communications lines between the host computers and the Bunker Ramo systems with their associated terminals.

The software driving the host systems is Honeywell's GCOS operating system with IDS as the data base manager, Transaction Driven System (TDS) as the data communications manager, and GRTS/DSE as the operating system for the front-end network processors.

The basic software conversion requirement of the hybrid system was a modification of the Bunker Ramo banking-oriented operating software into general-purpose software. This resulted in the development by NCM and Bunker Ramo's Dutch distributor of software called Mask Generation System (MGS), which was substituted for the Banktran bank terminal applications screen controller software that came with the system.

Because the MGS software is both modular in design and transparent to the host computer, the result has been a network independent of the host computer and the system's application software, according to de Vries.

MGS is based upon the facility provided in the basic Bunker Ramo System 90 software to keep all the application "masks," or screens, on the floppy disk. These masks consist of all the fixed text that, together with the variable data from the company's data base, must be displayed at the terminal in order to complete any transaction.

MGS Capabilities

MGS offers the following capabilities:

- The ability to build, change and delete masks at each terminal independently of the host computer.
- Checks on the data to be sent to the host can be controlled at the local site by defining data fields that are protected or unprotected, restricting data to be displayed by use of multilevel passwords, and by relational checks between data fields and each mask or screen. All of these error-checking functions can be performed independent of the host computer.
- Simple mask call-up either by name or mask number.
- Data entered at the remote terminals can, if desired, be stored off-line on the floppy disks,
- The system has an up-line dump capability for sending information directly from the remote floppy disks to the host computer in batches.
- Down-line system loading can be performed from the host systems either to the floppy disks or directly into the memory of the local PCUs. This capability is used to send the host-generated terminal operating system to the local PCUs at the beginning of each working day.
- The local PCU's floppy disk is also provided with a program that will permit the punching of data on paper tape for telex transmission to clients or other external locations.
- The MGS load generator has been designed to provide highly accurate measurements of on-line system performance. It measures actual network performance and records actual terminal response time.

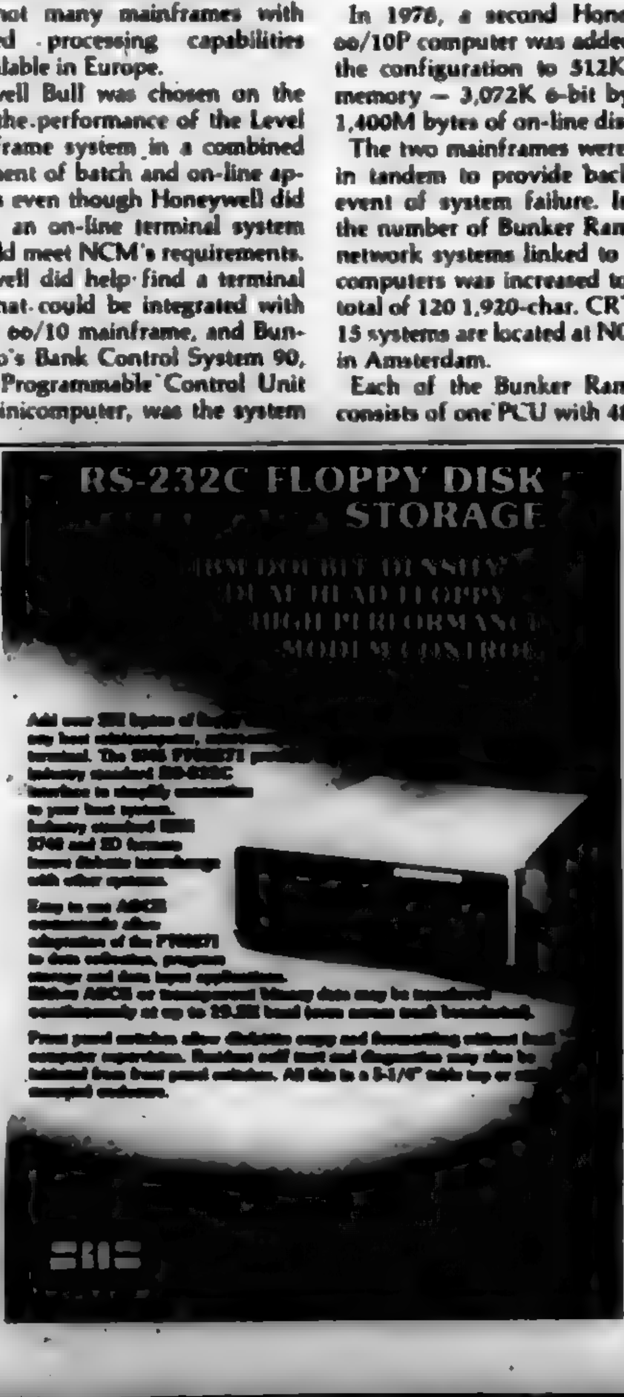
According to de Vries, both his company's credit limitation and credit information gathering and retrieval functions have been in full operation on the system for some time, and the policy and collection and claims housekeeping functions are expected to be fully integrated into the system by January 1982.

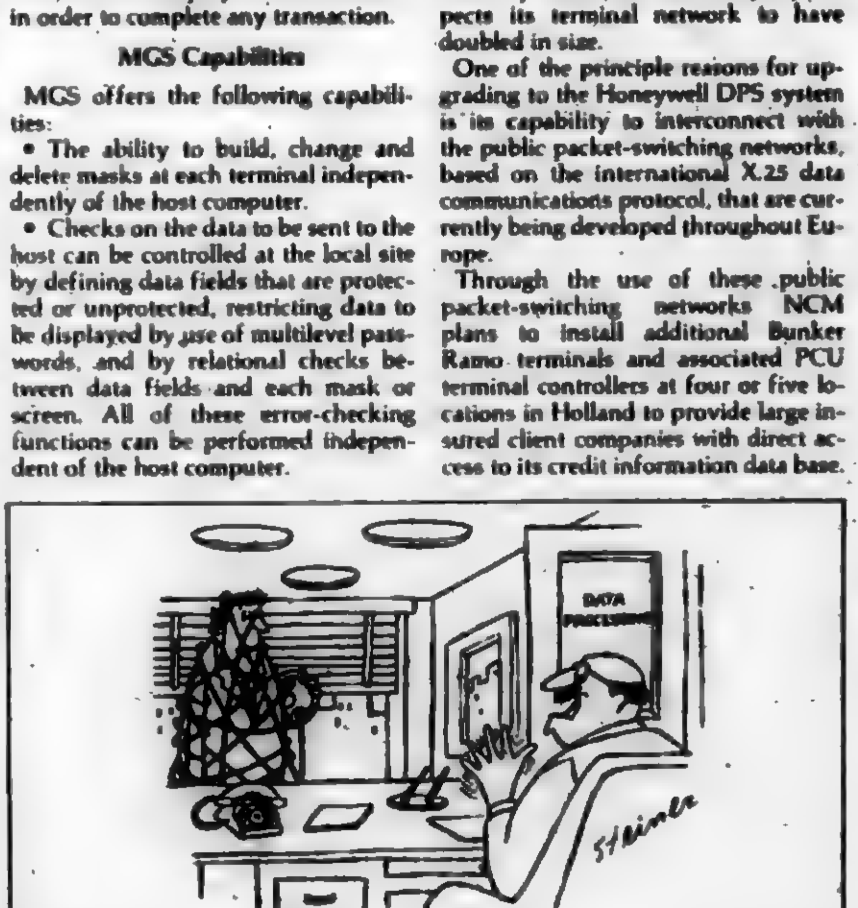
Host Upgrade

In the fourth quarter of 1980 a Honeywell Level 66 Distributed Processing System DPS 05 system is scheduled to replace one of the original Level 66/10s, with a second 66 DPS system scheduled for installation by the end of 1981, by which time the company expects its terminal network to have doubled in size.

One of the principle reasons for upgrading to the Honeywell DPS system is its capability to interconnect with the public packet-switching networks, based on the international X.25 data communications protocol, that are currently being developed throughout Europe.

Through the use of these public packet-switching networks NCM plans to install additional Bunker Ramo terminals and associated PCU terminal controllers at four or five locations in Holland to provide large insured client companies with direct access to its credit information data base.


RS-232C FLOPPY DISK STORAGE



'Harry, You Must Get Over This Notion That the Computers Are Out to Get You.'

Assembly Language Programs Blamed

IRS Gear Underuse Costs $100 Million/Year

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — While the Internal Revenue Service (IRS) plans a long-term, $280 million DP upgrade, its failure to take advantage of current processing capacity is costing the government as much as $100 million a year in uncollected revenues, according to a recent Congressional audit.

IRS officials were called before a House subcommittee last month to explain why they have not instituted the 100% document matching program mandated by Congress in 1976. Document matching is the process of comparing tax return information against wage data reported directly to IRS by employers and matching return information against various reports, such as interest data submitted by banks and dividends reported by corporations.

At the hearing, the General Accounting Office (GAO) said 79% of the returns for tax year 1978 entered the matching cycle. That consisted mainly of data supplied on computer-readable media. Only 22% of paper returns were processed through the IRS National Computer Center in West Virginia for the tax year.

The GAO estimated that if all returns, paper and computer-readable, were processed, the Treasury would take in more than $1 billion more in the 1980 tax year than it did through the 1978 document-matching effort.

After refunds to taxpayers, the net yield to the government would be approximately $590 million, compared to the current matching program yield of some $483 million, the GAO said. The agency estimated the full matching effort would cost only $125 million, compared to the present $85 million.

Funding Blocked

Rep. Benjamin Rosenthal (D-N.Y.) called the October hearing to ask the Treasury Department, the IRS parent agency, why it had blocked funding for IRS efforts to move to a full document matching program, which Rosenthal called "the IRS' first line of defense against tax evasion."

Rosenthal also charged the IRS is pursuing its eight-year, $280 million DP equipment upgrade while "much of its existing sytem lies idle."

The GAO, while agreeing the IRS can improve its computer operations through the upgrade, suggested in a report released after the hearing that the IRS "has the opportunity to greatly increase the productivity of some of its present computers and thereby reduce costs and facilitate conversion to new systems."

While it has made "considerable progress" toward the goal of 100% document matching, IRS has "sufficient computer capacity to process and match all the information returns not currently being used," the report said.

IRS efforts to reach that goal have been impeded by budgetary restraints imposed by the Treasury Department, according to GAO. The study further blamed "inefficient design of the information returns processing system and mismatches between job requirements and computer resources" for limiting IRS computer productivity.

Because planning is not complete for the upgrade, the GAO suggested the new system can be designed to facilitate a more streamlined returns processing arrangement.

By 1985, IRS plans to replace the Honeywell, Inc. 2050A and Control Data Corp. 3500 computers used at its 10 regional processing centers. Because 93% of application programs are in assembly language, the centers cannot easily shift work from the "heavily burdened" 3500s to the "underutilized" Honeywell systems, GAO noted in examining the current configuration.

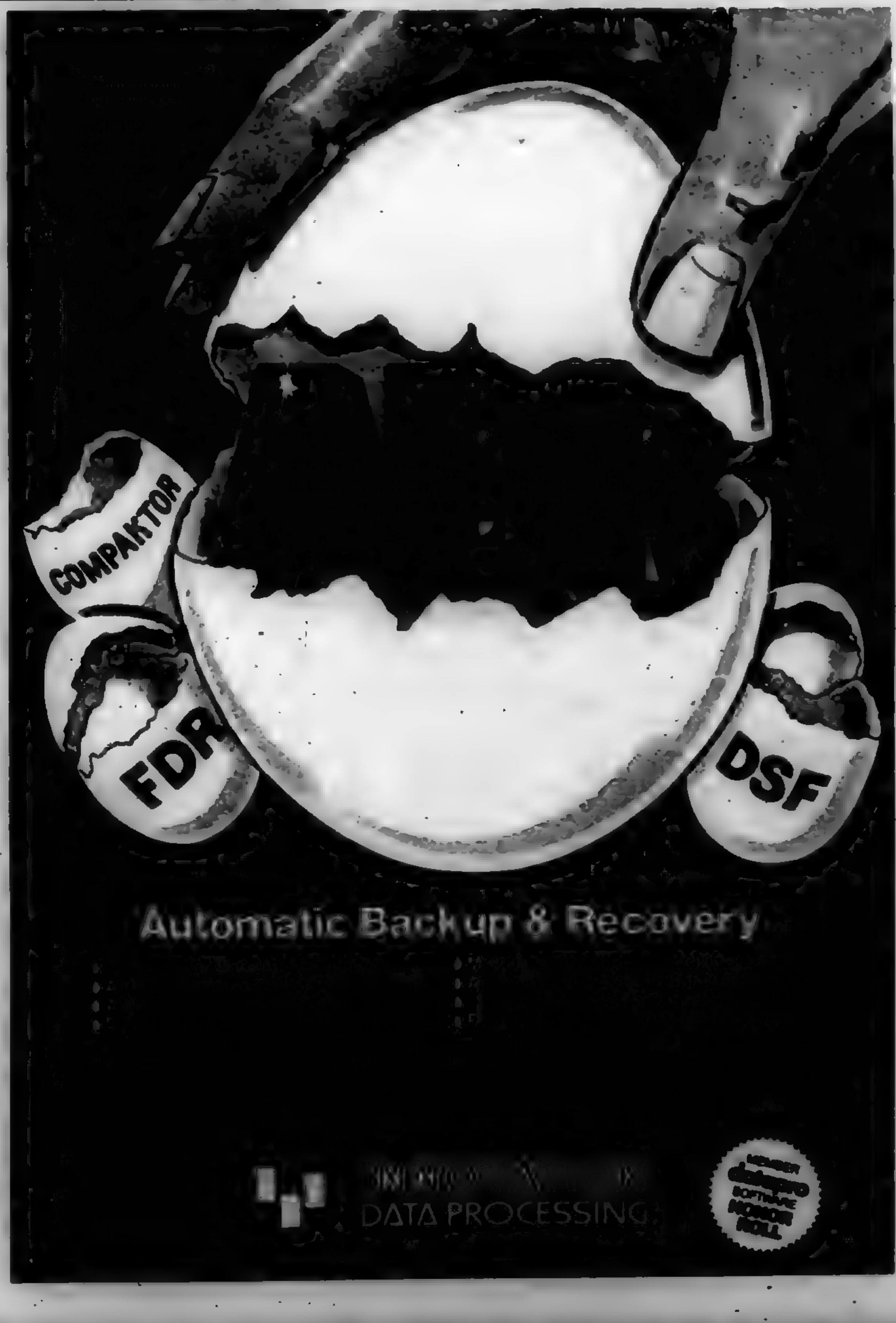
Between 1984 and 1986, IRS plans call for replacing the nine IBM and plug-compatible systems at its national computer center, which will involve, the GAO noted, conversion of over 2,000 applications programs, which for the most part are now written in ACL.

Currently, the GAO said, the center's computers are configured in such a way that "system capabilities are grossly underutilized." Through "modern automated scheduling techniques and resource requirements statements" the center could increase the productivity of its two IBM 370s and its Itel AS/6, possibly allowing the elimination of some or all of its six IBM 360/65s.

According to IRS Commissioner Jerome Kurtz, the agency is already moving to implement many of the GAO recommendations. With the Social Security Administration, IRS is seeking ways to increase the filing of information returns on computer-readable media and is considering the use of OCR equipment to transcribe paper returns.

The IRS has begun redesigning its returns information processing system, including rewriting the service centers' programs, Kurtz said.

At the national computer center, the staff has installed an MVS operating system on its 370/168 system to increase efficiency, and acquisition of an automated scheduling system is under consideration, he told GAO.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IBMers Expected to Fill Reagan Appointments

(Continued from Page 1)

Others include T. Vincent Learson, retired chairman of IBM and an ambassador to the Law of the Sea Conference during the Nixon years, and William T. Coleman Jr., now a partner with O'Melveny & Myers and former Secretary of Transportation under Nixon.

With Reagan seeking out women for high posts, another IBM director has a shot for a high administration office. Carla Anderson Hills, presently a partner with Latham, Watkins & Hills, was formerly Secretary of Housing and Urban Development during the Nixon years.

Bechtel Connections

Perhaps the most interesting connection comes through the Bechtel Group, whose chairman, Stephen D. Bechtel Jr., tops the IBM list of directors. This San Francisco-based construction firm has several of Reagan's top advisers on its payroll.

For example, George Schultz, who has served both Republicans and Democrats since the Eisenhower years, is one of Reagan's top policymakers in the economic arena today.

While Schultz has been mentioned as a possible Secretary of State, this may be unlikely because supporters of Israel in the Senate may object to connections with Arab countries through Bechtel business. However, he may end up with the far more powerful post of White House chief of staff.

Another Bechtel power is Caspar Weinberger, who served in the Nixon years as Secretary of Health, Education and Welfare. Weinberger was Reagan's first finance director when Reagan was governor of California and now serves as head of Reagan's task force on spending controls — an area Reagan has earmarked for early action in the new administration. He may end up as Secretary of the Treasury.

In addition to all the IBMers who may be moving to Washington to take up posts vacated by others with IBM ties, another computer industry executive has a good chance to get the top Defense Department post. David Packard, chairman of the board at Hewlett-Packard Co. Packard served as an Undersecretary of Defense during the Nixon years and is possibly slated for higher things in the Reagan administration.

Government in Waiting

The IBM board in fact has almost served as a "mini government in waiting" between elections. When the Republicans were in power, as during the Nixon years, the board was made up of many prominent Democrats, such as Cyrus Vance, Harold Brown and Patricia Harris, during the early 1970s. And when they went to Washington with the Carter election in 1976, IBM began appointing Republicans, such as Hills, Scranton, Coleman and Learson, mentioned above.

The tradition goes back to the early days of the company. Thomas J. Watson Sr., the founder of IBM as it is today, was active in politics, his greatest success coming when he backed Eisenhower for president of the Republican ticket in 1952.

His sons continued the tradition of activism in politics and began splitting their efforts between the two parties. For example, Arthur Watson, now deceased, always backed Republican causes and was rewarded with the ambassadorship to France by Nixon. On the other side, Thomas J. Watson Jr. was closely allied with Democratic causes and now serves as Ambassador to the Soviet Union — presumably until he will be replaced by the incoming Reagan administration.

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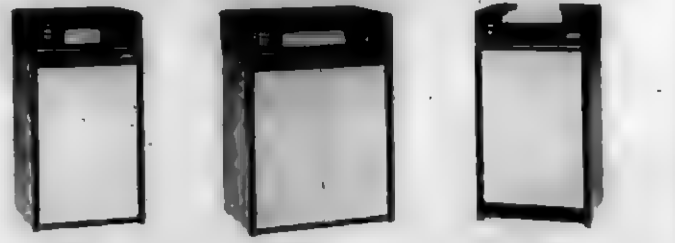

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Inquiry II Issues Uncertain

(Continued from Page 1)

ruling allow AT&T, under certain circumstances, to add computer control to its basic communication offerings. For example, the phone company would be able to apply for waivers permitting a basic service to include code and/or protocol conversion.

Also, voice or data services utilizing network-resident storage facilities — such as videotex and electronic mail and message offerings — could be provided directly by telephone companies as part of their "basic" product line. In addition, the separate subsidiary, via waiver, could be allowed to own the transmission facilities supporting deregulated offerings, even though such facilities are the essential element of a basic service.

A related provision allows the subsidiary, as part of its initial charter, to own the wiring needed to "provide enhanced services within a customer's business location." It is not clear whether this authority extends to transmission circuits interconnecting a single customer's terminals installed at multiple, geographically separate locations.

All of these provisions are opposed by a number of computer industry organizations, notably excluding IBM. These organizations fear that enhancing basic services will give the phone company an unfair competitive advantage in the information services marketplace.

Another reason was stated by Tymnet, Inc, shortly after the initial version of the final computer inquiry decision was issued several months ago. "Given the expansive definition of basic services set forth in the final decision, and in view of the prospect that some level of protocol and code conversion may be permitted in conjunction with basic service, more and more services . . . will be absorbed into the basic service category and be subjected to regulation by the commission," Tymnet said.

The debate preceding last month's FCC vote featured sharp disagreement regarding key provisions. For example, Commissioner Abbott Washburn said he could not think of a circumstance in which the public would be harmed if the subsidiary had its own transmission facility.

Washburn was joined by Commissioner Joseph Fogarty, who argued that "the issue is whether the subsidiary will be able to get into the arena with other competitors . . . who have their own transmission capacity. We can't chain AT&T and then push it into the arena with IBM, Xerox, and Comsat."

However, FCC Chairman Charles Ferris accused Fogarty and Washburn of attempting to "rape" the FCC's emerging computer and communications policy. No court would go along with the idea, he said.

In view of this and other disagreements, it is likely the final text of the order approved last month will differ in at least some respects from what the commission appeared to decide last month. The text will not be released for several days.

Further Complication

Another complication is the commission's decision to resolve some issues through further proceedings. Besides terminal equipment deregulation, there will also be an inquiry into the question of what protocol and code conversion features should be included in basic services.

Meanwhile, an AT&T spokesman said the phone company is "considering" whether to ask for clarification of the company's 1956 Consent Decree. A key question will be the commission's conclusion last May, reaffirmed last month, that the phone company can offer enhanced services, like on-line DP, on a deregulated basis subject to FCC authority if and when the commission decides such intrusion is necessary.

The decree, basically, bars the phone company from offering nonregulated and/or noncommunication services. The commission argues that enhanced services, as defined in the computer inquiry decision, are "incidental" to communications.

The Justice Department, along with much of the computer industry, insists this reasoning is fallacious. In any event, the final word on what the Consent Decree means has to come from a court, not the FCC, the critics say, and the FCC, by assuming the role of interpreter, is exceeding its authority.

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Where Are the Trainers To Teach Engineers?

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Joint industry-academe programs to boost U.S. engineering education can help relieve shortages of engineers in computer science and other professions, but the programs face many logistical problems.

Panelists at a recent National Academy of Engineering (NAE) symposium here noted that career demands on both private industry engineers and university instructors leave little time for engaging in industry-university cooperative programs.

A DP industry engineer's job "cannot just simply be put on ice" while he goes off to a temporary teaching assignment, said Jerrier A. Haddad, IBM vice-president for Technical Personnel Development.

"He's trying to pursue a career in the company," Haddad said of the industry engineer. If he takes a year off to teach, "when he gets back he doesn't even have a desk." Because his company work is so interrelated with the work of his colleagues, the industry professional often cannot be spared, according to the IBM executive.

Similarly, it was suggested by several symposium participants that the best professors are the busiest, not just with teaching but with their own research projects as well. It is very difficult for them to "free up their time" to work in industry for any length of time.

Personnel Exchanges

Echoing Haddad's call for "accommodation" between universities and industry that will allow more short-term cooperative programs, MIT President Paul E. Gray said there is a need for "some short-term, rather intensive" industry-university personnel exchanges.

The Oct. 30 symposium was particularly timely, coming as it did on the heals of a government study showing a downturn in U.S. engineering education, particularly in the field of computer science [CW, Nov. 3].

A similar report by a NAE task force in April arrived at many of the same conclusions as the government study. Declining general science education in the U.S. coupled with problems of obsolete university facilities and "major problems in filling university faculty positions" are worrisome trends despite the generally good state of engineering education in this country, NAE said.

While there are particular problems of inadequate numbers of computer science students, the information industry itself is exacerbating the overall problems of engineering education, according to MIT's Gray.

Gray said the rapid growth of information processing capabilities plus the need to apply computer science to growing national problems, such as declining energy supplies, are creating "a vast new demand" for computer science engineers:

Because this demand is not being met by colleges and graduate schools, the computer industry, already offering high salaries to attract trained engineers, will drain the market of engineering professionals, creating additional burdens on other engineering occupations, he said.

Considerable Difficulties

Many of the NAE panelists agreed on the benefits of programs giving university faculty access to industry experience and facilities while industry supplies teachers on a temporary basis. But they also agreed, there are considerable difficulties in making the programs work.

C. Gordon Bell, Digital Equipment Corp. vice-president of engineering, remarked that "to get anything out of these programs, one has to put an awful lot into them" They can require a large investment not only of money but of the time of "the best people at both ends." The eventual commitment can be "surprisingly steep," Bell said.

In the same vein, IBM's Haddad said although his company has many programs for providing university education and teaching experience for employees, as well as for providing company facilities to university professors, IBM must also expend great effort on in-house engineering education.

"A very, very large in-house training effort" is necessary because company engineers must be kept abreast of the computer industry's rapidly changing technology, Haddad pointed out.

Also, most employees with bachelor's degrees come to the company with an education background that is for the most part fundamental and not specifically suited to their employement responsibilities. For them, continuing company provided education is critical.

Nevertheless, he added, IBM has found that its best employees, those that develop the fastest and advance the fastest, are by and large those who arrive with bachelor's degrees and later receive graduate degrees while employed by the company.

In the final analysis, Haddad and several of the panelists suggested, a strong commitment to making industry-university programs more flexible will allow more people from both sectors to benefit.

"We should do with our industrial people what they do best," Haddad said, suggesting industry engineers could be very useful teaching short case study courses. This would give students the benefit of practical industry experience while not detracting from the engineer's company work load, he said.

What an industry engineer has most to offer, according to Haddad, is what he has learned on the job. Conversely, good industry engineers do not necessarly make good instructors, according to the IBM vice-president, who said academic curricula are probably better taught by academics.

Correction

The maintenance included with the basic two-year lease plan for Telex Computer Products, Inc.'s 8020 tape drives [CW, Oct. 20] covers 24 hour/-day, 7 day/week, according to a company spokesman.

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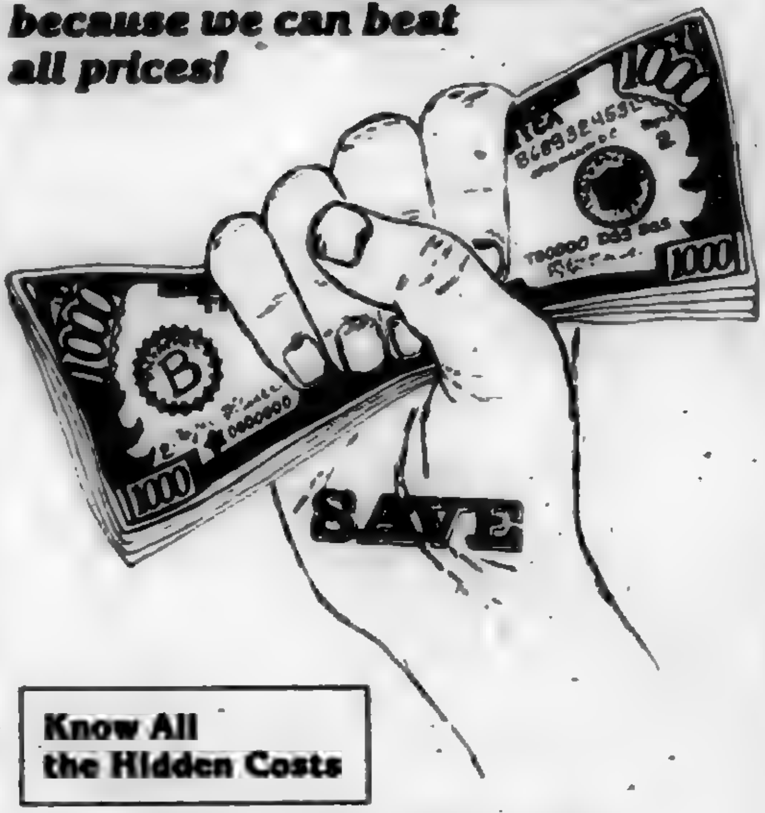

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[illegible]	512K bytes	2M bytes	256 bytes	512K bytes core; 2M bytes semiconductor	2M bytes	256K per application processor
[illegible]	32	Up to 16 under firm's Cande on-line file handling program	64	64	128	5,400 with 256 linked processors
Maximum Line Speed (Remote)	9.6K bit/sec	9.6K-50K bit/sec	19.2K bit/sec	19.2K bit/sec		9.6K bit/sec
Communications Protocols/Networks Supported	Bisync, IBM 278 or 3780, Basic Four Business Information Network (BFBin)	Burroughs Data Link Control (BDLC) Bisync, System Communication Module (SCM), Remote Hasp, Supervisory Message Control System (SMCS), Burroughs Network Architecture (BNA)	Bisync (IBM BSC), X.25, Hasp II, IBM 2780 or 3780	Bisync; X.25; IBM 2780 or 3780; AOS, RDOS, Hasp II; Xodiac network management system	Bisync, X.25, 2780 or 3780 via RJE 80 emulation, Hasp II, Multiple line support via AOS/VS	ARC-ARC communications via Lightlink; Infoswitch Long Distance Control System (LDCS); communications to IBM 360 or 370 via channel adapter
IBM 3270	No	No	No	Yes, via RCX 70 emulator	Yes, via RCX 70 emulator	No
Processor-to-Processor Networking Capability	Yes, BFBin	Yes, BNA	No	Yes	Yes	Yes
Operating System(s)	Boss II	Master control program II, III IV; Network Definition Language (NDL); Text Editor; Computer Management System (CMS); Odesy on-line data entry program	Interactive Cobol Operating System (ICOS), Single or Multiuser, RDOS	Advanced Operating System (AOS), RDOS	AOS/VS, AOS	Disk operating System
Languages	Business Basic III	Basic Interactive Basic, Cobol, Fortran, RPG, User Programming Language	Interactive Cobol, Commercial Basic, Mapped Basic, Fortran IV	Cobol, RDOS Cobol, RPG-II, Pascal, DG/L, Fortran IV, RDOS Fortran IV, Fortran V, Extended Basic, Business Basic, PL/I	32-bit: Fortran 77, PL/I, Basic; 16 bit: Cobol, Fortran 5, Extended Basic, PL/I, RPG-II, DG/L	Cobol, RPG Plus, Snap 3 assembler, Basic Plus, Scribe text O/P language, Databus, Dataform
Data Base Management System	No	Yes: Disk Forte/2, DMS II, Advanced Reporter II	No	Yes: DG/-DBMS, Dbam	Yes: DG/DBMS, Infos II with Isam, DBAM	No, but file processors provide file management and structures
Word Processing/Electronic Mail	Yes: Both	No	No	Yes: WP, AZ-Text	Yes: WP AZ-Text	Yes, electronic message system (EMS), WP, Infoswitch
Maximum Disk Storage	300M bytes	804M bytes	Not Available	Up to 8.9M bytes per burst multiplexer channel (BMC)	6.6G bytes (24 disk drives)	186M byte/-system
Number of Installed Systems	Not Available	Not Available		Not Available	Not Available	About 600
Typical System Cost	610: $51,400; 730: $95,000	About $72,000	CS/50: $34,485; CS/70: $77,050	AP/130: $50,400; M/600: $84,000	$151,200 (5M-byte memory)	$59,950 (5- to 60K-byte application processors + one file processor)

For Users Considering the DDP Route

(Continued from Page 1)

However, despite present misconceptions, DDP has been forecast as a fast track in the computer processing arena. The DDP market, with its minicomputers, terminals and communications controllers, is expected to increase nearly three times to $6 billion by 1988, according to a recent Frost & Sullivan, Inc. study.

Moreover, 51% of the management information systems (MIS) executives surveyed in a just-released Booz, Allen & Hamilton report admit that distributed processing — or distributed information processing, as the research firm is fond of calling it — is a definite part of their business strategy.

However, there are some tough barriers to overcome before distributed processing takes root and becomes "a way of life," Held remarked.

Executive Problems

While the technology, for the most part still in its infancy, is a problem, DP managers and executives — the same ones that swear allegiance at each and every DDP sermon — are the biggest obstacles to the concept, Tandem's researcher stated.

People at executive DP levels "have empires to protect and have built their careers around having large, centralized data management shops. And, in lots of cases, they're the ones deciding the directions of the company," he noted.

In addition, executives who give their imprimatur to DDP want to be assured that they have centralized control over the information and "their networks are going to be reliable enough so that when they need information, they can go out and get it," Held pointed out.

Other Roadblocks

There are other roadblocks facing the successful implementation of true DDP systems. For instance, fragmenting a DP system might not only result in a loss of centralized control, but might cause a duplication of effort and data.

In addition, accessing that data may be harder from one point than another, Dr. Dixon R. Doll, president of DMW Telecommunications Corp., warned.

Speaking last September at the Data Processing Management Association (DPMA) Education Foundation's first national symposium on office automation, Doll echoed many of Held's cautious views on the state of DDP and offered a few observations of his own.

While the DDP momentum will be fueled by the user's desire to reduce costs and the plummeting price of hardware, end users are currently expecting too much from the technology, Doll said.

Personnel Costs

"People have a natural tendency to believe everything the vendors tell them," he observed, especially about how DDP will save money and change the face of computing.

The fact is that although DDP will save users a great deal in communications costs by avoiding rocketing communications tariffs, it will create multiple data centers and escalate rising people costs, Doll contended.

Currently, personnel costs are increasing from 8% to 12% per year, according to another source, and will jump considerably when centralized DP shops are broken up into localized fragments.

Another problem that is presently the focus of much debate is compatibility among different vendor systems, Doll continued. Vendors, today, don't offer any turnkey off-the-shelf solution to support a multimedia mix of equipment.

However, organizations such as the International Standards Organization (ISO) are working on an open system architecture that would be designed to recognize different protocols at various network ends, Doll explained.

In addition, a lot of companies are banding together and commiting themselves to one communications standard, especially in developing future products or systems.

Most notably, Digital Equipment Corp. and Intel Corp. have agreed with Xerox Corp. to adopt Ethernet as a standard, with Intel supplying the

(Continued on Page 13)

Product Spotlight

	Datapoint Corp. [illegible] Processing System	Digital Equipment Corp. PDP-11	Digital Equipment Corp. VAX-11/780	Digital Equipment Corp. VAX-11/780	Four Phase Systems, Inc. IV/90	Harris Corp. 1600 Series
Maximum Main Memory	120K bytes	2M bytes	8M bytes (local)	2M bytes	480K bytes	192K bytes
Maximum Number of Interactive Terminals	Up to 8 local or remote	128	Up to 96 interactive users	32	32	80/system
Maximum Line Speed (Remote)	9.6K bit/sec	56K bit/sec	56K bit/sec	56K bit/sec	9.6K bit/sec	4.8K bit/sec
Communications Protocols/Networks Supported	Bisync, TTY, Datapoll, Multilink emulator for Honeywell, Burroughs, IBM, CDC and Teletype batch terminals	DDCMP (physical line control), Digital Network Architecture (DNA), Decnet, Ethernet-type under development, 2780 or 3780, Hasp	Decnet, CDC, MUX200, SNA emulator, 2780 or 3780, Hasp	Decnet, SNA emulator, MUX200, 2780 or 3780, Hasp	Bisync, SDLC, 2780 or 3780, Hasp	IBM SNA-compatible, 2780 or 3780, Hasp; Univac, Burroughs, Honeywell, CDC network emulator
IBM 3270	No	Yes	Yes	Yes	Yes: via software emulation	Yes
Processor-to-Processor Networking Capability	Yes: Via Datapoll	Yes	Yes	Yes	No	Yes
Operating System(s)	Diskette Operating System (DOS.G) remote disk operating system (Remdos)	RT-11; RSX-11, 11D, 11M, 11M Plus, DMS 11, RSTS/E	VAX/VMS	VAX/VMS	Interrupt Disk Operating System (Idos); Disk Operating System, for custom program development	Ecos disk-based operating system
Languages	Basic Plus, Fortran, Ansi Cobol, RPG Plus, assembler, Scribe, Databus, Dataform	APL-II, Basic-11, Plus, Plus II, Cobol, Coral 66, Dibol, Focal, Fortran IV, IV, Plus	32-bit Fortran, Cobol, Bliss, Pascal, Basic, RPG-II, Coral 66, assembler	Same	Cobol, RPG, Network Transaction Processing (NTP) package, Data IV (allows CPU to be used as shared processor data entry system)	APL, Algol, Basic, Multi-Basic, Cobol, Fortran PL/I, RPG
Data Base Management System	No, but file handlers provided through DOS.G	Yes: DBMS II	No, but Datatrieve provides report generation and data maintenance	Same	No	Yes
Word Processing/Electronic Mail	EMS, integrated electronic office system	Yes: WP	Yes: DX/UMS WP utility	Same	WP	WP, EM under development
Maximum Disk Storage	4M byte/diskette, 40M byte/disk cartridge	Not Available	2,400M bytes	Not Available	About 273M bytes of cartridge, diskette and hard disk storage.	About 176.5M byte/system
Number of Installed Systems	About 2,600	More than 100,000 (May 1980)	More than 2,000	Introduced last month, initial shipments this month	Not Available	Not Available
Typical System Cost	$10,975 (60K bytes of user memory)	$44,900 (PDP-11/44, 256K-byte memory)	$141,300 (512K-byte memory)	$89,900 (512K-byte memory)	Not Available	$114,150 (192K-byte memory and 12 stations)

Representative Minis for Users Considering DDP

	Hewlett-Packard Co. HP 3000	IBM Series/1	IBM 8100	Modular Computer Systems, Inc. Classic 7800 Series	Perkin-Elmer Corp. 3200 (32-bit)	Prime Computer, Inc. Series 50
Maximum Main Memory	1M byte	256K bytes	1M byte	8.1M bytes	16M bytes on 3240	8M bytes
Maximum Number of Interactive Terminals	32 (Series 30/33) or 64 (Series III)	Up to 100, but maximum device address range is 256	48	More than 100	More than 100	64
Maximum Line Speed (Remote)	56K-bit/sec	9.6K bit/sec (SDLC); 56K bit/sec (BSC)	9.6K bit/sec	256K bit/sec (on high-end machines)	56K bit/sec	19.2K bit/sec
Communications Protocols/Networks Supported	2780 or 3780, Hasp, HP's Distributed System (DS) 3000 network software plus distributed facilities in operating system	SNA or SDLC under Real-time Programming System (RPS) only, BSC; IBM 2740, 2741, 3101 and most other IBM facilities	SNA; 2780 or 3780	Maxnet (distributed network system), SDLS, HDLC, Bisync, 2780 or 3780, Hasp	Level II 2780 2780 or 3780, TTY	Primenet X.25 network, DPTX 3271 or 3277, 2780 or 3780 emulation; also CDC 200, Univac 1004, Honeywell Gerts and ICL 7020
IBM 3270	Yes, but only on Series III	Yes	Yes	Yes	Yes	Yes
Processor-to-Processor Networking Capability	Yes	Yes	Yes	Yes, but limited	No	Yes: Via Primenet.
Operating System(s)	MPE-III virtual memory executive	RPS, Event-Driven Executive (EDX), Control Programming Support (CPS)	Distributed Processing Programming Executive with local program development and execution; DPCX for use with IBM 3790 distributed data or 3730 systems	MAX III, IV; Maxcom	OS/32 Multitask, multiprogramming system	Primos
Languages	RPG-II, Cobol II, Basic, Fortran, SPL (assembly language)	RPS: Cobol, Virtual Cobol, Fortran IV, PL/I, Waterloo Basic; EDX: Cobol, Fortran IV, PL/I; CPS: Virtual Cobol	Cobol, Fortran, assembler	Fortran, Cobol, Coral 66	Basic; Cobol; RPG-II; Fortran IV, VII	Cobol; Fortran 66, 77; RPG-II; PL/I; Basic/VM; Pascal; macro assembler
Data Base Management System	Yes: Image and Query bundled into MPE-III	No	DTMS data base and transaction management system	Yes: Infinity package, Cincom's Total	Not Available	Yes
Word Processing/-Electronic Mail	No	WP, EM (text-routing system)	WP and FM and Distributed Office Support Facility (DOSF)	WP	WP, PE text editing package	WP, EM via Prime's office automation system
Maximum Disk Storage	900M bytes	No specified limit, logical maximum of 512M-540M bytes	580M bytes	Not Available	Not Available	4.3G bytes with two disk subsystems
Number of Installed Systems	More than 2,000 (exact figures not available)	Not Available	Not Available	Not Available	Not Available	Not Available
Typical System Cost	$49,750 (256K-byte memory with 4 terminal ports)	About $31,000 for basic system	$36,440 (8140 with 256K-byte memory and 3 ports)	About $68,200 (256K-byte memory)	$33,500 (3220 with 256K-byte memory)	$114,000 for Prime 650 (512K-byte memory and one terminal).

Profiled

(Continued from Page 11)

semiconductor manufacturing and design and DEC supplying the knowledge of how to use such a system.

Recently Hewlett-Packard Co. joined the communications triumvirate in their quest for a single transmission avenue, and more companies are expected to follow.

Product Spotlight

One-Man Band

There are those, however, who believe that although DDP has a definite place in the end-user picture, there is no way it will entirely push centralized minicomputers or mainframes out of the frame.

Henry L. Apfelbaum, a research scientist at Univac whose job it is to identify technology trends, admits that DDP will offer substantial computer power, but the information will not be as easy to access with a centralized system.

The difference between a DDP system and a centralized mainframe is like "the difference between a one-man band and an orchestra," Apfelbaum recently said at a meeting of Univac Series 1100 computer users in Florida. Quite simply, data bases are more useful if they are centralized, he added.

On the other hand, Apfelbaum did promote the concept of a "mission processor" that would perform functions definitely separate from the main processor and be entirely offset from the user's system.

For skeptics who believe that DDP and true decentralization are just around the corner, Univac's researcher warned his audience not to hold their technological breath.

"Anything that we expect to be working five years from now has to be in the research labs today," he said, noting that he doesn't see "the magic" anywhere.

In the final analysis, no matter how you describe it — whether it involves a few scattered terminals or is an octopus-like arrangement of individual, yet connected computers — DDP will stir up a great deal of trouble, Tandem's Held stated.

"There is nothing extremely difficult about solving the [technical] problems." But, emotionally, DDP will cause "almost as much trouble as did going from all keypunch- and card-oriented systems to terminal-oriented systems," he observed.

"There is a resistance because that's the way things have always been."

	Systems Engineering Laboratories 32/[illegible] (32-bit)	Tandem Computers, Inc. T/16	Univac System 80 (32-bit)	Univac V77	Wang Laboratories, Inc. VS Series 16- & 32-bit	Xerox Corp. Diablo [illegible], System-[illegible]
Maximum Main Memory	2M bytes	2M bytes	2M bytes	2M bytes	2M bytes	64K bytes
Maximum Number of Interactive Terminals	64	32	128 remote, but can support 255	About 20 (variable)	128	9
Maximum Line Speed (Remote)	19.2K bit/sec	56K bit/sec	9.6K bit/sec	56K bit/sec	9.6K bit/sec	9.6K bit/sec
Communications Protocols/Networks Supported	TTY, Hasp, Univac protocols and Univac's Distributed Communications Architecture (DCA)	End-to-end packet protocol; Level II X.25 pending; 2780 or 3780, Hasp	Integrated Communications Access Method (Icam), 2780 or 3780	TTY, Univac DCA and SNA emulation; Level III X.25 under development; Hasp	TTY, IBM 2741, 2780 or 3780, Hasp, Burroughs TC 500	Ethernet, TTY, 2780 or 3780
IBM 3270	No	Yes	Yes	Yes	Yes	No
Processor-to-Processor Networking Capability	Yes	Yes: between Tandems	Yes: Univac DCA	Yes	No	Yes
Operating System(s)	Real-Time Monitor (RTM), Mapped Programming Executive (MPE)	Guardian/-Expand network operating system	OS/3 Enhanced, Extended System Software (ESS)	Vortex I, II; Summit	Virtual Storage Operating System	Not Available
Languages	Fortran 66, 77; Pascal; Basic	Fortran, Cobol, Mumps, Tandem Application Language	Basic; BAL, Cobol, UTS 400 Cobol, Fortran IV, RPG-II, Escort	Fortran IV, Cobol, Basic, RPG-II, RPG IV	Cobol, RPG-II, Basic; Cobol Assembly, PL/I, VS Fortran	Not Available
Data Base Management System	No	Yes: Encompass	Yes: Data Management System and Information Management System	Yes: Cincom's Total	Yes: VS advanced data management system & DBMS	No
Word Processing/Electronic Mail	No	EM	No	No	WP, EM: Mailway	WP
Maximum Disk Storage	Not Available	2G byte/-controller, 32 controllers per processor	552M bytes	Not Available	4.6G bytes	5M bytes cartridge, 20M bytes disk
Number of Installed Systems	Not Available	1,065 (June 1980)	Test sites only	Not Available	Not Available	Not Available
Typical System Cost	$39,500 (32/57 with 256K-byte memory)	$85,375 (2 384K-byte processors with room for 2 additional CPUs)	$53,874 (Model 3 with 262K-byte memory and one workstation)	$135,000 (V77-800 with 256K-byte memory and 3 terminals)	$19,000 (120K-byte memory and basic software)	About $18,950

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EFT Seen Restructuring National Economies

By Brad Schultz
CW Staff

ATLANTA — Transborder data flows and electronic funds transfer (EFT) links may be restructuring national economies with far-reaching consequences for international relations.

Recent speakers at the International Conference on Computer Communication (ICCC) gave attendees those conclusions in several different sessions.

A worldwide economic depression could result if national governments clamped down on transborder data flows, according to Harry L. Freeman, an American Express Co. senior vice-president.

In many nations, the data flows and sophisticated network services are available but cannot be digested, indicated Prof. Herbert S. Dordick of the University of Southern California's Annenberg School of Communications. "Free flow and equality of access does not guarantee equality of results," he said. "Access and power do not necessarily equate; information is power only if it is used powerfully."

Disturbing Parallels

Freeman found "disturbing parallels between the situation today and that in 1930," when President Herbert Hoover signed the Smoot-Hawley Tariff Act. "At both points, economic activity was falling," Freeman noted, "and major domestic industries petitioned for relief against imports."

Smoot-Hawley forced foreign companies to sell their wares in the U.S. at higher costs than those of competing domestic companies. In reaction, the nation's trading partners levied similar controls against U.S. exporters, contracting trade throughout the world. This deepened the depression, Freeman noted, and accelerated economic nationalism — a principal cause of World War II.

Privacy concerns are the pretext, if not always the real impetus, behind restrictions on transborder data flows in many countires, some panelists indicated, and these restrictions hamper trade.

From a privacy standpoint, national governments worry about exporting sensitive computer-stored data; but they also worry about protecting domestic vendors from losing business and, often, employees to vendors based beyond their borders.

The latter problem frequently confronts countries visited by U.S. vendors, Dordick noted. Among the remedies available to these nations is communications tariffs.

In this way, "Japan has effectively locked out U.S. firms by means of unusually high local network costs and government restrictions on obtaining domestic circuits," Dordick stated. "Control Data [Corp.] had to wait 27 months for a circuit, only to find that government restrictions on the circuit made it almost impossible to operate," he added.

Sovereignty Element

"There is a strong element of sovereignty," Dordick continued, in the "game" of developing international data communications standards. No nation wants to be locked out of participation in transparent networking, whereby devices of many different brands communicate over common links, but no nation wants adoption of standards incompatible with its present investment in computing and networking resources.

And the origin of international providers of network services means jobs. It means, for example, that between 30,000 and 100,000 jobs will be created outside Canada by 1985 to give the country such services, according to estimates made a few years ago.

Freeman noted that developing telecommunications has long been "a driving force of change in world economies." Even in war, nations are reluctant to destroy the communications links of their enemies, a Satellite Business Systems (SBS) executive maintained in another conference session. "They would rather feed on those links," he asserted when asked about security for the first SBS satellite, scheduled for launching this week.

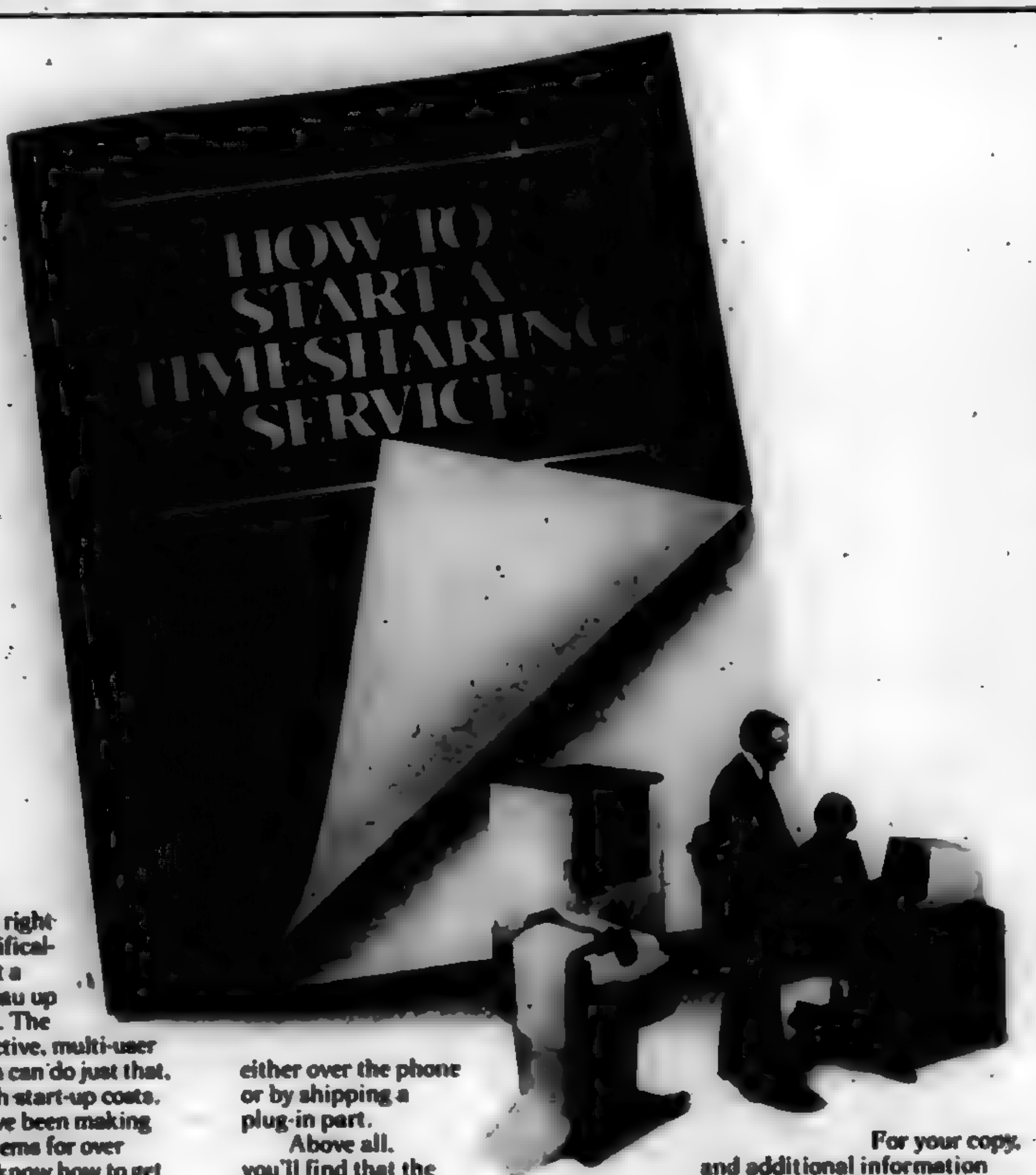
Nevertheless, sources close to the Pentagon have told *Computerworld* that U.S. defense strategists are alarmed by the vulnerability of communications satellites to radiation following thermonuclear explosions.

At the recent Interface West conference, one speaker said he learned from someone in the U.S. intelligence community that a 40 megaton blast on the moon's surface could completely wipe out the world's satellite links, on which much commerce depends.

EFT Raids

However, SRI International, Inc.'s Donn B. Parker told an ICCC session that raids of EFT links will be a more practical approach to destroying an enemy nation than thermonuclear warfare [CW, Nov. 3]. Tampering with the assets that network systems store electronically can plunge a country into a depression, Parker remarked, although other countries that depend economically on the victim would also suffer.

That is why the U.S. is more likely to exprience such assaults — which, to have great impact, would entail theft of at least hundreds of millions of dollars — from impoverished nations or terrorist groups with little to lose if the U.S. economy shattered, Parker maintained.



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In Search for Productivity Gains

Managers Advised to Copy Japanese Practices

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — U.S. business managers, including management information systems (MIS) chiefs, would probably do well to emulate Japanese management practices as they search for ways to improve their companies' productivity and worldwide competitive position, a Southern California computing executive advised here recently.

Japanese managers could teach their American counterparts plenty about how to show genuine concern for their personnel, how to decentralize management decision-making and how to make their employees professionally well-rounded through effective career pathing, according to Southern California Edison Co.'s Administrative Vice-President Robert Umbaugh.

The effectiveness of Japan's management practices accounts for much of the country's high productivity rate and for its consistent ability to expand its market share in key U.S. industries like autos, steel and, increasingly, high technology.

For U.S. managers to duplicate Japan's business success, they will first have to overcome their natural resistance to professional change and revise some of their most basic assumptions about how people and other corporate resources should be managed, Umbaugh said during a seminar sponsored by the Society for Management Information Systems (SMIS).

Japanese firms and personnel present a striking contrast to their American counterparts in their turnover rates, decision-making processes, attitudes toward responsibility, methods of controlling product quality and several other important factors.

Unlike American workers, Japanese employees typically spend their entire careers with just one company. This emphasis on long-term employment gives Japanese companies and personnel at least one important advantage over their U.S. competitors.

Because Japanese managers can count on an almost perfectly stable work force, they can afford from time to time to transfer their employees to different jobs within the same company, Umbaugh said during the seminar, which was sponsored by the SMIS' newly formed Southern California chapter. Every few years, most subordinates in large Japanese firms are rotated to new job slots that bear little if any resemblance to any positions they have ever held previously.

This system of periodic job rotation allows Japanese employees to become acquainted with many if not all facets of their companies' operations and gives them an opportunity to follow varied career paths.

In the U.S., of course, the employment picture looks vastly different. Only rarely do American workers stick with one firm for their entire careers. Instead, job hopping is an accepted way of life, especially among programmers and systems analysts, whose services are constantly in high demand.

The frequency with which most U.S. workers switch employers prevents American firms from imitating the Japanese practice of schooling employees in multiple management disciplines. As a result, U.S. employees tend to be highly specialized in their work skills and to hew closely to well-defined, predetermined career paths, Umbaugh said.

A good example of employees who work all their lives within a narrow technical specialty is computing professionals, he added.

Umbaugh urged his fellow information systems managers to minimize their field's specialization and observed that the most skilled systems analysts are often occupational hybrids who have worked long-term both in computing departments and in nontechnical user environments.

Many other differences in management practices also separate Japanese firms and personnel from their American counterparts. Japanese employees pledge their first allegiance to their companies, whereas U.S. workers reserve their main loyalty for their professions.

In Japan, management decisions usually involve group consensus, unlike U.S. decision-making, which is typically nonparticipative. The Japanese attach more importance to collective achievement than personal glory, while Americans do just the opposite.

Japanese workers know exactly what level of product reliability is expected of them and meet that standard without being told, whereas U.S. employees work under highly formalized, quality-control mechanisms, Umbaugh said.

Americans and Japanese also differ substantially from each other in the degree of respect they show for people. U.S. managers, including those in the information systems field, often treat their employees like "Social Security numbers" and do a "lousy" job of integrating new personnel with existing staff members, Umbaugh said.

Japanese executives, by contrast, show a sincere and abiding interest in their employees' well-being and are even expected to help their subordinates overcome their personal problems.

Not all U.S. companies, however, conform to the classic American management style. Through means that have yet to be fully explained, some U.S. firms have developed hybrid management practices that combine the best elements of the Japanese and American models, Umbaugh said.

IBM provides an outstanding example of an organization where the synthesis of the two management types has yielded impressive results, he added.

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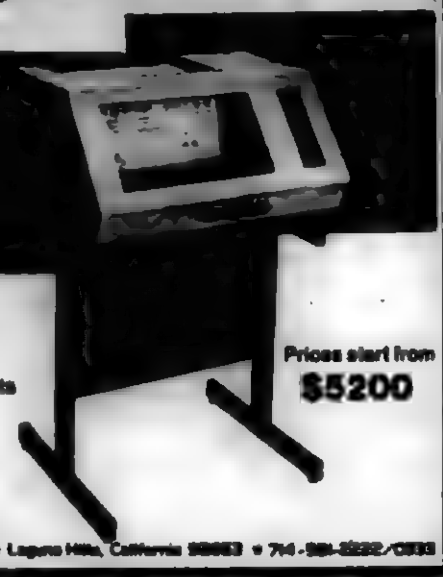

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Rookie Users Warned Of Micro Shortcomings

By Ann Dooley
CW Staff

NEW YORK — Small computers may live up to their name in size and price, but they can still turn out to be large mistakes for first-time users, according to several experts in the microcomputer industry.

Speaking at the recent National Small Computer Show here, microcomputer users and vendors advised large numbers of first-time users that the road to automation may not be smooth for all of them. The advice given to this year's group of eager computer-user attendees did not vary significantly from advice given to other groups in other years, proving that while technology may be advancing, the problems users face remain the same.

"If you're thinking of buying a microcomputer, the most important thing to do is sit down and decide exactly what you need," David Benevy of the Computer Mart of New Jersey told the audience.

A user must determine what tasks are needed and determine the benefits that can be derived from them, he stated. Will installing a computer system save manpower? Will it improve performance and speed of access to the data? Once the tasks are known, a user should look for a machine that is best suited to those needs.

Users should also determine whether the procedures can be specified and interchanged from human control to machine operations, Benevy stated. Sometimes users discover it is more expensive for a computer to do the work than it is to use the clerk who was handling the job for the last 10 years.

No one should assume that a computer will invariably increase profit or company performance. Many business people who buy a computer, install it and then expect instant results are usually disappointed, he noted.

Speaking before another group of attendees, Stan Veit, president of Associated Computer Industries, outlined the growth of the small computer industry from the development of the S-100 bus manufacturers to the entrance of the new vendors such as Radio Shack and Apple Computer, Inc. Veit noted that many of the original companies are no longer in business because, as technicians, they could not compete with the new business-oriented companies that started up.

Software is the biggest problem small computer industry faces today, Veit noted, adding that software from minicomputer systems is frequently stripped down to run on the smaller systems. The safety "error tripping" devices are most frequently left out of these converted software programs which do nothing to improve quality, he noted. The whole industry suffers from it, he said, not just the user.

Now, with larger computer companies like IBM and Digital Equipment Corp. about to enter the arena, Veit predicted that the rate of change in the field would accelerate rapidly.

Veit noted that many businesses will continue to look toward automation as labor costs continue to climb, but a computer system is still a large investment and, once purchased, a user is pretty well locked into it, he warned.

Users should hire a consultant to assist them in selection and should also talk with other users of any system they are considering, he noted. One important thing to remember is to always buy from a company that looks as though it will be around for awhile. When buying a system, Veit cautioned the audience, every inexperienced user is taking a big chance.

Inouye Would Decline Chair Of Communications Subcommittee

By Marcia Blumenthal
CW Staff

Sen. Daniel K. Inouye

KAUAI, Hawaii — Sen. Daniel K. Inouye of Hawaii, the ranking member on the Senate Communications Subcommittee, recently said he would not accept the chairmanship of that committee if it were offered to him.

Sen. Ernest F. Hollings, now chairman of the Communications Subcommittee, is expected to resign his chairmanship in the near future to concentrate on his duties as chairman of the Senate Budget Committee. That would clear the way for the appointment of Sen. Wendell H. Ford as chairman of the Communications Subcommittee, an event Inouye said bodes well for the computer industry.

Speaking at the 20th annual meeting of the Association of Data Processing Service Organizations, Inc. here recently, Inouye said a new set of hearings is in store for the industry. However, the Hawaiian Democrat predicted the extra effort would have a favorable result.

Inouye called on the government to provide legislative assistance — not subsidies — for the industry. "We must apply some semblance of reciprocity with our allies," he chided, noting that "we open our doors for any and all who want to establish businesses here.

"For every car the U.S. sends to Japan, it returns 165 cars," he added.

The government knows of the trade barriers put up by other countries, he continued, but to date has done little to alleviate the problem.

Inouye said he would continue as the ranking member of the Communications Subcommittee, but would also focus considerable energy on maritime problems.

Study Shows Trend To Technical Illiteracy

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Analysis of American education systems reveals a dangerous "trend toward virtual scientific and technological illiteracy" on the part of high school and college graduates, according to a new government study.

"The number of young people who graduate from high school and college with only the most rudimentary notions of science, mathematics and technology portends trouble in the decades ahead," said the study, prepared for President Carter by the National Science Foundation (NSF) and the U.S. Department of Education.

In a society dependent on all sorts of computer and engineering technology, the current downgrading of scientific education implies that "important national decisions involving science and technology will be made increasingly on the basis of ignorance and misunderstanding," according to the government assessment.

While general in nature, the study draws particular attention to the problems of computer education. U.S. school systems virtually ignore the electronic revolution, the report said, which may lead to a long-term shortage of computer professionals in this country.

This declining emphasis on science and mathematics in the U.S. is in marked contrast to other industrialized countries, such as Japan, West Germany and the Soviet Union, all of which, the report noted, "provide rigorous training in science and mathematics for all their citizens."

The report blamed the situation in part on a nationwide trend toward reduced graduation requirements and a "back-to-basics" education approach that does not view science as one of the basics. Science is diminished in such programs, the report said.

"Problems arise when the acquisition of 'basic skills' becomes the curriculum rather than simply a foundation upon which students can build their ability to deal with more complex situations and problems."

The study recommended a number of programs the Education Department and NSF can undertake to increase public awareness of the need for science and technology education. It also called for more government and industry assistance to help schools beef up their science curricula and provide better, more current equipment for teaching facilities.

A particular problem in this area is the rapid development of computer technology, which results in widespread obsolescence of school facilities, the report said.

Moreover, lack of adequate computer education at all school levels is symptomatic of the problems of science and technology education in general, the report said. "Since computers have come to exemplify the pervasiveness of technology, they provide a useful point of departure to grasp the significance, for society, of the full range of modern technology."

However, the report continued, "the school curriculum rarely considers the role of the computer in our society." Examination of existing curricula "would by and large offer little evidence of the existence of this electronic revolution."

The report said the NSF should build on existing programs to foster development of educational strategies and the software necessary to exploit modern electronics in schools and to introduce science and mathematics teachers at all levels to the uses of computer and communications technology.

Action Needed

It was noted corrective action is needed to match the scientific emphasis of U.S. competitors. Although a comparison of the U.S. and its competitors abroad suggests "our eminence in basic research is secure," the study noted "some anxiety" about engineering and computer professions.

"While the U.S. has current shortages and future shortfalls in these areas, the Soviet Union, [West] Germany and Japan are producing much larger proportions of engineers and applied scientists than we are.

"At the same time," the study said, "these countries are educating a substantial majority of their secondary school population to a point of considerable scientific and mathematical literacy, in part because they apparently believe that such literacy is important to their relative international positions."

In these countries people are educated in science in "far greater numbers" than are needed in purely scientific and engineering pursuits, the report noted. "In the Soviet Union and Japan, especially, managerial positions in both government and industry are heavily populated by people with engineering degrees."

This strong national commitment to quality science and mathematical instruction results in a "work force, which, at all levels, has a relatively high degree of science and mathematics skill, and this has been a factor in the very rapid expansion of technical industries" in those nations, the report said.

The report claims there is a direct correlation between the increase in technological literacy of Japanese and West German citizens and their countries' increasing productivity and share of world trade.

Sigi Meet to Offer Development Dialog

NEWPORT BEACH, Calif. — A System of Interactive Guidance and Information (Sigi) national conference will be held here Jan. 18-20 for computer specialists and career planning counselors.

Sigi is a computer-based aid to career decision making and planning. Representatives from some 70 colleges now using Sigi, along with prospective users, are expected to meet with members of the Sigi development team from Educational Testing Service, Inc., which sponsors the event, where they will exchange ideas on practices, problems and prospects with Sigi.

Further details on the conference are available from Educational Testing Service at Princeton, N.J. 08541.

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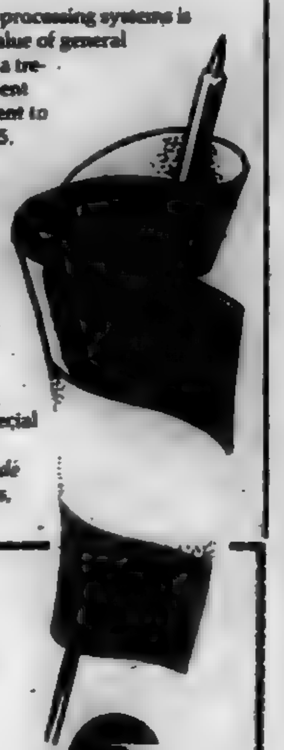

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False Alert Pinned to Faulty Chip

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Intensive hardware and software analyses have confirmed an initial report that a faulty integrated circuit caused last June's false missile attack alert generated by the North American Aerospace Defense Command (Norad).

A report released by the Senate Armed Services Committee late last month said tests by Honeywell, Inc., Texas Instruments, Inc., Ford Aerospace and Communications Corp., Bolt, Beranek and Newman, Inc., and others, placed the blame on a faulty chip in a communications multiplexer.

A series of corrections has been initiated to prevent a recurrence of the June 3 false alert, according to the report, prepared for the committee by Senators Gary Hart (D-Colo.) and Barry Goldwater (R-Ariz.)

The faulty chip caused a Strategic Air Command (SAC) display system to show a submarine-launched missile attack on the U.S. SAC ordered bomber crews to start their engines to prepare to take off should the attack information be confirmed.

When other sensors and other Norad equipment failed to corroborate the SAC data, the alert was recognized as false and the bomber crews were ordered to shut down their engines but remain in their aircraft while Norad tried to pinpoint the system failure [CW, June 16].

'Prudent' Alert

Alerting the crews was "prudent," the report said. "It is quite appropriate and necessary that this step be taken very early to prevent any possible threat because there are very few minutes available for the aircraft to escape a threat.

"The fact that steps were taken to enhance survivability of the aircraft does not lead automatically to their dispatch on the nuclear attack missions," the report noted. "There are many more steps, all controlled and executed by senior civilian and military leadership, that must be taken in order to dispatch on nuclear attack missions."

Although Hart and Goldwater concluded that "in no way can it be said that the U.S. was close to unleashing nuclear war as a result" of the incident, the senators found "there seemed to be an air of confusion, [at Norad] following the determination that the data was erroneous." The report contained a number of recommendations for improving the system.

Failure Explanation

In explaining the failure in the "427M" computer and communications system, the Senate report said the chip was part of a multiplexer that forms a message Norad transmits continuously to all command posts to ensure that communications lines are open and operating correctly.

The message, in the form of numbers indicating how many missiles have been launched, normally indicated zero, but the faulty chip caused some of the zeros to be replaced on a random and continuing basis with the number 2. When the alert was declared false, the system was shifted to backup equipment and the search for the failing equipment began.

Honeywell — which provided most of the 427M equipment — performed an equipment audit, and the Air Force performed a wire audit of more than 400 circuits in the system, according to the report. Several laboratory analyses concluded silver tarnish found on the chip's pins was not a factor in the mishap and blamed the chip itself for the communications failure.

Some of the "significant" corrective actions being taken include an MIT and Lincoln Labs analysis of the 427M "man-machine interface vulnerabilities and procedures," according to the Senate report. Also, a detailed software audit was undertaken by Teledyne Brown Engineering.

In addition, the report said:

- Norad has added computer programs that trace a message through the entire message preparation phase to ensure the transmission accurately reflects what is input into the message system.
- Norad has added a display in its command post to show what is being transmitted to other command posts. At the time of the June incident, Norad "had no way of knowing what was being transmitted to other command posts," the report said.
- The message format has been changed so that it indicates the status of the communications system rather than numbers of missiles. Now if Norad sends a message indicating numbers of missiles, an alert in the Norad command post will be triggered indicating transmission of a "real message."
- Whereas the SAC duty officer had previously been instructed to alert bomber and tanker ground forces upon any indication of missile attack, now, under most conditions, he will first compare warning data from the sensors to that data being transmitted over the communications system.

A team of computer and telecommunications specialists from both government and private industry has been working with Norad to identify weaknesses in the 427M system and recommend improvements.

As part of its findings, the Senate report said the system should be exempted from federal DP telecommunications procurement procedures in order to facilitate equipment upgrades.

The two senators concluded "the Department of Defense has taken what appear to be appropriate steps to examine the technical aspects of the system to try to reduce the room for error" in the system's "vast array of computers and communications equipment."

"There is no guarantee that false alerts will not happen in the future. They will occur, and we must rely on the collective judgment of the people manning the system to recognize and deal with 'false alarms,'" the report added.

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People, DP Relationships Topic of Training Seminar

CAMBRIDGE, Mass. — The subject of people and their relationships to DP will be the topic of Data Training Expo 80, to be held here Dec. 8-10.

The conference will attempt to show how an enhanced human relationship with computers can increase productivity and lead to less turnover. It was also designed to help nontechnical users familiarize themselves with computers and guide them in developing elemental systems.

The full, three-day registration fee is $300 before Nov. 14 and $340 after.

The one-day fee is $120 before Nov. 14 and $135 after, the sponsor, Northeast Training News, said from 176 Federal St., Boston, Mass. 02110.

Compeda Show to Feature CAD, Engineering Systems

ANAHEIM, Calif. — Compeda, Inc. will be showcasing its latest in computer-aided design (CAD) and engineering systems at the Design Engineering Show, to be held here on Dec. 9-11.

The company is featuring systems for mechanical and industrial engineering, the process industries and the electronics industry at its booth, including the Dragon, Sammie, Mosaic, Remus, Gaelic and Splice programs, a spokesman noted.

Further information about the Compeda display is available from Ray Kush at Compeda, Suite 260, 2180 Sandhill Road, Menlo Park, Calif. 94025.

Caused by False Radar Data

Senate Discloses Two More False Norad Alerts

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The Senate Armed Services Committee has released information on two previously unpublicized false alerts generated during the last year by the U.S. missile attack warning system.

The two incidents, one in October 1979, the other in March were caused by false radar data rather than by computer foul-ups, such as those that caused two other false alerts during 1979 and 1980.

Mention of the two incidents turned up in an unclassified version of a report prepared by Senators Gray Hart (D.-Colo.) and Barry Goldwater (R.-Ariz.) at the request of the committee's chairman, Sen. John Stennis (D.-Miss.).

Investigation Triggered

The investigation was requested after a computer failure in June at the North American Aerospace Defense Command (Norad) in Colorado generated a false alert and caused U.S. bombers to move to an advanced stage of readiness [CW, June 16, June 23].

The June 3 alert, quickly recognized as false, was blamed on the failure of an integrated circuit in a communications multiplexer that is part of the worldwide radar, computer and communications system that links sensing stations and various U.S. defense command posts.

The June occurance followed November 1979 false alert of a "mass raid" on the U.S. caused, in the words of the Senate report, by "the inadvertant introduction of simulated data into the Norad computer system" [CW, Nov. 19, 1979].

Besides the two computer-related alerts, Hart and Goldwater reported a "false launch and impact report" was generated Oct. 3, 1979 when a radar system designed to detect submarine-launched missiles detected and incorrectly interpreted a piece of space debris, a rocket body, burning up as it reentered the earth's atmosphere.

Additionally, in March of this year, "an unusual threat fan" was detected by U.S. radar when the Soviet Union launched four submarine missiles as part of a troop training exercise in the Kuril Islands.

Three-Part Response

These four incidents were the only times during the last two years that high-ranking defense officials convened what is known as a "threat assessment conference," the second stage of a three-part response procedure for threats perceived by the warning sensors.

The first step in evaluating sensor data that indicates a possible threat, the "missile display conference," is at the duty officer level and is terminated when the Norad commander decides whether there is a real threat of attack. In 1979 there were 78 of these conferences, in 1980 there were 69. In all but the four instances mentioned above, the data was recognized as false during initial human evaluation.

The third and final possible action, other than counterattack, in response to a perceived attack threat is to convene a "missile attack conference," which brings in all senior defense personnel including the President. No such conference has ever been convened, the Senate report noted.

The report said "It is not surprising" that periodic erroneous data is generated by the combination of satellite and ground-based radars, computers and communications systems.

Complex Task

"The missile tactical warning and threat assessment task is a very complex and difficult technical task [that] will produce some ambiguities and uncertainties," the report said, adding that the system's ultimate reliance on "trained personnel" to evaluate data adequately prevents any unwarranted responses.

Sending bomber crew into advanced readiness to ensure survivability while attack threat data is being reviewed is "a prudent step" and is "quite appropriate and necessary", the report said, given the short time – less than 30 minutes – it would take for a Soviet missile to reach the U.S.

Because the warning system must be sensitive enough to not miss any missile launches it is hard to screen out all "other physical phenomenon both in the atmosphere and on the earth's surface" that can be perceived as possible missile launches by sensing equipment.

Routine Cases

In the last two years there have been 3,703 "routine" cases of the sensors picking up some physical phenomenon or instances of sensors being reconfigured that necessitated special evaluation of incoming data, according to the report.

The report also noted "the possibility that a computer or a piece of communications equipment will transmit a false piece of information. This happens with some frequency," the committee investigation found – perhaps two or three times a year, although prior to the June 3 incidents records were not kept of such incidents.

Given the complexity of the system, the number of false threat data is not surprising or disturbing, the report said. And because in only four cases in the last two years was the information not immediately recognized as false, the two senators concluded the system is working reasonably well.

Improvement Recommendations

Their report did contain recommendations for improving the system, however. Noting management responsibility for the missile warning system is divided among four Air Force commands, the report suggested the Secretary of Defense consider consolidating "essential resource management" under one commander.

A "second major concern" voiced in the report was about the process for acquiring DP equipment for the system. Because of the complicated federal regulations on DP and communications procurements, a "typical system upgrade" for "strategic and tactical warning" can take from five to seven years.

Upgrades under current planning are expected to take even longer, the report added.

As a result, "in most cases, the [ADP] equipment is functionally obsolete prior to its operational use," the report said. Because of the critical importance of the warning system, it was recommended the procurements should be exempted from normal federal acquisition procedures.

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Chance to Transcend Specialties

Technicians Seen Moving to Top Management

By Jeffry Beeler

CW West Coast Bureau

SAN DIEGO — Information systems managers will find growing opportunities during the 1980s to transcend their narrow technical specialties and advance to positions of top general management, a Rockwell International Corp. executive predicted here recently.

The potential for career advancement will prove particularly great in large companies, where a serious communications gap typically separates management information systems (MIS) professionals from senior corporate management, according to Kent Black, president of Rockwell's Electronic Systems Group.

Mutual misunderstanding still characterizes the relationship between most corporate officers and their computing-room subordinates, Black said at an International Data Corp. executive conference on "Improving Information Processing Profitability and Productivity During the 1980s."

During the next few years, however, the gulf between technical and nontechnical management is expected to slowly narrow as information systems managers increase their mastery of general business and senior executives expand their knowledge of computing. The acquisition of increased business expertise will open the way for MIS managers to advance up the corporate ladder and possibly even work their way into their companies' highest management echelons, Black said.

Information Explosion

Speaking on the subject of what top management expects from computing during the 1980s, Black voiced concern that the current information explosion is complicating the task of distinguishing pertinent facts from irrelevancies.

"Hardly anyone doubts that computing has the potential for revolutionizing the way we conduct business," he said. "But it also has the potential for drowning important information in a sea of useless data."

Main Goal

An information processing department's main professional goal in life should be to try to design and implement integrated systems that supply data in exactly the quantity and form that its users need.

Today's hardware and software systems can easily generate an "iceberg of information," but of what possible value is such a huge mass of data when all a user typically wants is a "bucket of ice"? Black asked.

"Whenever I think about the volume of meaningless data that users are sometimes inundated with," he added, "I always recall John Jacob Astor's words when he first learned the Titanic had struck an iceberg: "I know I ordered ice, but this is ridiculous.'"

Like Rabbits

Within his own company, Black expressed concern about the uncontrolled proliferation of small computers and about the Rockwell computing department's regular failure to meet its reporting deadlines.

"It's not at all uncommon for us to get our monthly management reports two weeks after the end of the latest accounting period," he said.

In the future, Black expects to see his company's information processing expenditures grow in absolute dollars but steadily decline as a percentage of total sales.

He also looks forward to the day when his own office, as well as those of many other Rockwell executives, will be equipped with an on-line, desktop terminal that will allow him to query his firm's data base, perform a wide range of sales forecasts, do financial modeling and generate assorted management reports — all in four-color graphics.

Black expects to implement the system gradually and have a final version up and running by 1985.

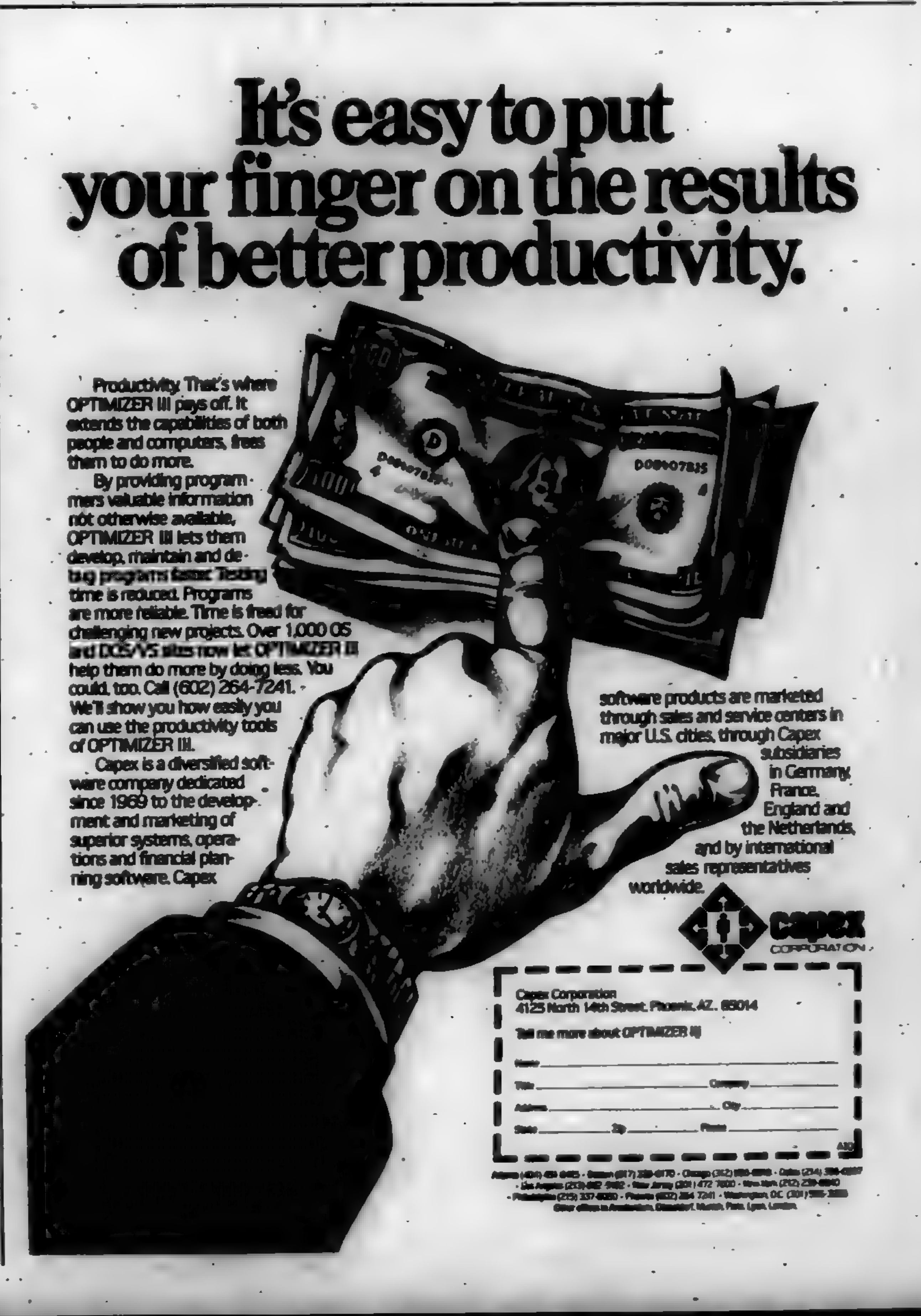
Comnet to Focus On Bell Rebuild

HOUSTON, Texas — The questions relating to AT&T's major restructuring will be a main focal point of the Comnet '81 conference, to be held here Jan. 13-15.

On hand to chair the three-day event will be former Federal Communications Commission (FCC) Chairman Richard E. Wiley, now a Washington regulatory attorney. Wiley feels that Bell should not be permitted to dictate government policy, but rather should adjust its structure to meet legislative regulations devised with the best public interest.

A key session at the upcoming conference will include top industry spokesman in a debate on how the new Bell subsidiary will affect the telecommunications, and the FCC's role therein.

More information on the Comnet '81 agenda is available from organizers at Communications Networks, Management Office, 375 Cochituate Road, Framingham, Mass. 01701.



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Diebold Sees DP Making or Breaking Businesses

By Ann Dooley
CW Staff

PHILADELPHIA — Information management will either make or break businesses in the 1980s, John Diebold told a group of Data Processing Management Association (DPMA) members here recently.

The advent of information technology will affect an organization at every level, as individuals who never had to deal with high technology before suddenly find it an integral part of their jobs, Diebold stated as he accepted the Distinguished Information Sciences award presented to him by DPMA.

While businesses are demanding greater amounts of information, they must also realize that they need less, Diebold said, noting that business must become more selective in its drive for information. More important than mechanisms to gather information will be the ability to create mechanisms to use it effectively, he noted.

Proper Management

Calling this ability the single most important contribution of the new information technology, Diebold said that executives will be able to increase productivity and keep on top of fast-changing events only if they can manage information properly.

Over the past decade, the speed of handling transactions had increased tenfold every four years, while costs of handling has declined by a factor of 10 every four years, he told the audience.

Few realize the extent of these lower costs, he said. Between 1960 and 1970, costs decreased by 99.9% — equivalent to a $10,000 car being reduced to just $10, Diebold stated.

This cost reduction has helped bring technology to users and with spiraling labor costs and a continuing decline in white-collar productivity, users cannot afford not to use the technology, he asserted.

Information will become a key factor in an organization's ability to respond to its various constituencies — most of whom have never been recognized by management before, Diebold said. Being sensitive to groups such as consumers, stockholders, the government and employees can lead to changes in corporate goals and objectives, Diebold charged. Organizations will have to be responsive to many factors and maintaining a profit is no longer as straightforward as it once was.

Diebold told the DPMA audience that less than 15% of the information in a typical organization currently is automated. And the small portion that is automated consists of general business-type applications. Those decision makers who rely most on information often have little technical support and are reluctant about accepting it, Diebold continued.

Who Will Benefit?

Priorities as to who will benefit from automation have also occurred. In the 1970s, expenditures averaged $25,000 per blue-collar worker, compared with $2,000 for each white-collar worker, he stated.

The productivity growth rates of the two groups illustrated the emphasis, he noted, adding that white-collar productivity will continue to lag unless cost-effective tools are begun to be used by management.

Information is just as much a corporate resource as its work force, its capital or its plants and equipment, and corporations must recognize this, Diebold said. Efficient management of information will be accomplished by a new way of thinking about information that Diebold called information resource management (IBM) — meaning that it will have to be managed the same way that other corporate resources are.

To create a successful information policy, corporations need to place a value on information, maintain an accurate inventory of the information available and establish guidelines for use of the information, Diebold said.

This understanding of the role of information will require a massive educational effort, both to sell management on the advantages of the new technology and to train the millions of white-collar workers to use the technology effectively, according to Diebold.

People must be educated that information technology will not replace people or stifle their creativity but will simply make more quality information more readily available to them, he said.

Diebold challenged the management association that if may want to institute the new information technology, they must rethink their own attitudes and realize that the new environment is a departure from the old tried-and-true methods.

Diebold closed by warning the attendees that information management can not be a "one-shot" process but will need constant upgrading on the technical level.

Diebold Receives DPMA Award

PHILADELPHIA — John Diebold, internationally acclaimed expert on information management, was presented the 1980 distinguished Information Sciences award by the Data Processing Management Association (DPMA) at its annual international conference here recently.

Nearly 4,000 DPMA members attended the conference, which was designed to entertain and inform its international constituency.

Diebold, chairman and founder of the Diebold Groups, Inc., a management consulting firm with offices in New York, Frankfurt, West Germany and other cities, was honored for his achievements in the field of automation.

The author of several books and publications relating to the growth of computer and communications technology all resulting in the burgeoning information field, Diebold also serves as management consultant to some of the largest U.S. and foreign corporations regarding their information policies.

Given in recognition of outstanding contribution to the DP field, the award was previously known as the "DPMA Man-of-the-Year" award, and was presented last year to Ruth Davis for her work in computers in the national defense.

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COMPUTERWORLD
Page 24
EDITORIAL
DISASTER PLANNING
The recent flooding of the U.S. Census Bureau computer center where two mainframes were irreparably damaged (CW, Oct. 15) should serve as a warning to all DP managers.
The flooding was caused by an accidental discharge of the center's water sprinkler system, and in [illegible] two units permanently [illegible] action.

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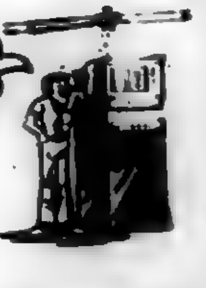


To Hike DP Productivity

Employee Relations Touted as No. 1 Priority

By Ann Dooley
CW Staff

PHILADELPHIA — Employee relations should be the No. 1 priority of a DP manager, according to two personnel experts who told managers at the recent Data Processing Management Association (DPMA) annual meeting here about two very different methods of increasing motivation and productivity.

The need to motivate people increases as people costs rise, Leon Rizio, manager of management consulting services for Coopers & Lybrand, Inc., Los Angeles, maintained.

Although most managers came up through the ranks themselves, the new concepts and technology that are taking place in the industry mean that a manager is directing people in functions with which he never had experience, he noted. And this means more stresses in communications and working relations.

Although employees become more productive over time, their job satisfaction usually decreases over a corresponding time frame and that's where good management techniques are essential, he said.

Rizio told the managers that they must recognize the differences between users and the computer staff. They have different social needs, he stated, adding that while computer personnel tend to be the highest motivated of any group, they do not interact well with people.

Performance Objectives

Managers should recognize this and develop performance objectives that are based on individual performance tasks. These should be mutually agreed to and should undergo periodic review, Rizio noted.

Managers should treat their subordinates as professionals and be aware of their strengths and weaknesses and be ready to educate and develop them, Rizio said.

People are key resources in any department, but most managers do not know "what makes them tick," Dr. John Demidovich, professor of management at the Air Force Institute of Technology at Wright Patterson Air Force Base, Ohio, said.

Productivity is taking a dive and managers must begin to turn that around, he counseled. There can be a systematic approach to problem solving that must be recognized and implemented.

Objectives should be identified, data gathered, solutions listed and tested and then the best solution implemented in every project, Demidovich said.

Group Interaction

But unlike Rizio, Demidovich believed that better quality can be achieved through more group interaction.

Demidovich suggested a program of quality control circles that are composed of small groups of employees who perform similar work and gather on a regular basis to identify, plan and implement work-related proposals.

This kind of people-building program needs to be voluntary and receive management support in order to be effective, Demidovich cautioned. But the whole concept is to push problem solving down to the bottom where the people are doing the work and involve them in the decision making.

In companies that have used these techniques properly, they have found improvement in communications, the quality of work, a decrease in absenteeism and production delays and a boost in morale, cooperation and flexibility, Demidovich claimed.

While this method requires work by both management and employees, Demidovich claimed that motivation increases, which results in higher productivity.

Bell, Dartmouth Honor Computer Pioneer Stibitz

HANOVER, N.H. — George R. Stibitz, professor of physiology emeritus of Dartmouth Medical School and contributing inventor of the computer revolution, has been honored jointly by Dartmouth College and Bell Laboratories.

A bronze plaque from Bell acknowledging Dr. Stibitz's contribution to computing in the late 1930s was presented to Dartmouth Provost Leonard Rieser.

The plaque will be placed in McNutt Hall at Dartmouth, where Dr. Stibitz surprised and confounded some 300 members of the nation's leading mathematicians with his electrical digital computing demonstration on Sept. 9, 1940.

Stibitz has worked as a mathematician for Bell Labs, researcher and private consultant, professor of physiology, inventor and computing pioneer. He has been the recipient of both the American Federation of Information Processing Societies' Harry Goode Memorial Award and the Institute of Electrical and Electronic Engineers' Emanuel R. Piore Award.

Bell vice-president Seth Washburn, Dartmouth Class of '43, presented the Bell plaque to his alma mater and noted Dr. Stibitz's 40-year old demonstration as siring a revolution and paving the way for today's computing age.

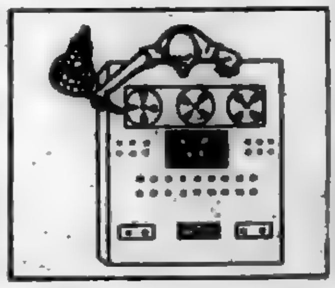
HISSG Seminar to Address Hospital Systems Factors

SAN DIEGO — A three-day seminar on "Cost Containment, Planning and Implementing Computer Systems" will be presented by the Hospital Information Systems Sharing Group (HISSG) at Vacation Village here Jan. 20-23.

The keynote speaker at the event will be Sam Tibbitts, president of the Lutheran Hospitals Society, chairman of the board at Pacific Health Resources, Inc. and past-president of the American Hospital Association.

Other speakers will include Addison Bennett of Pacific Health Resources, Inc., O. George Kennedy of The Kennedy Group, Inc. and John Kravolec of Ernst & Whinney, Inc.'s Management Services Division.

Additional information on the association and the seminar is available from W.V. Rosqvist at HISSG, 2415 South 2300 West, Salt Lake City, Utah 84119.



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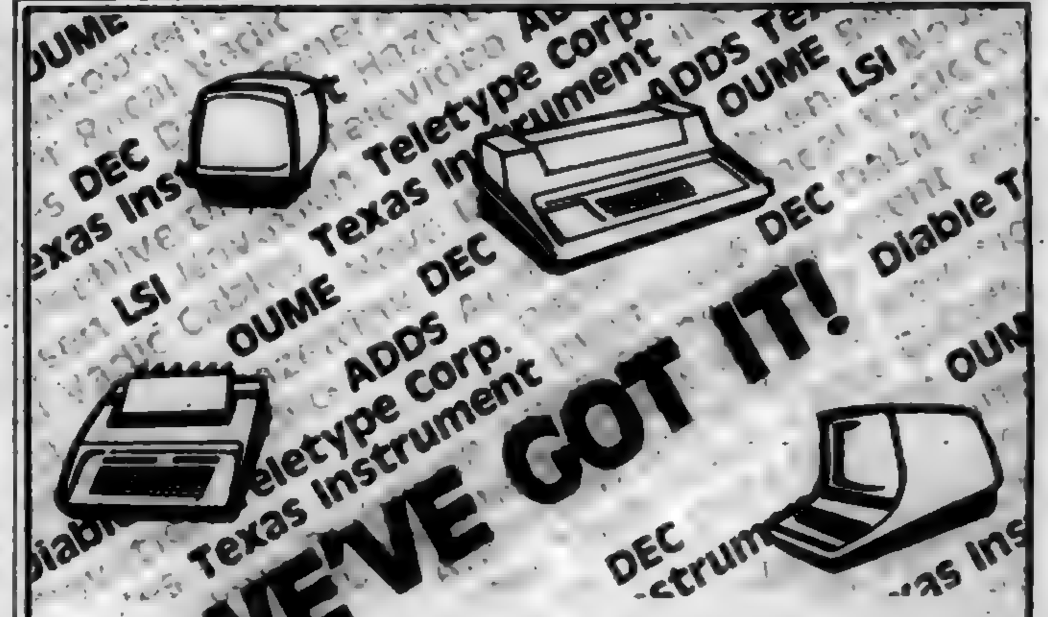

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Among White-Collar Workers

Automation Held Solution to Productivity

By Marguerite Zientara
CW Staff

NASHVILLE, Tenn. — Reorganization and automation are the solutions to the problem of declining productivity in the U.S., where the productivity rating has dived from fourth to 10th internationally in the past seven years.

That was the theory espoused here recently by Richard Wiersba, associate professor of computer information sciences at Bentley College in Waltham, Mass., in a presentation entitled "Improving White-Collar Productivity."

Speaking at ACM '80, the conference of the Association for Computing Machinery (ACM), Wiersba first cited the oft-repeated "simple definition" of productivity as "basic output divided by basic input."

Noting that the term "white-collar" includes secretarial and clerical workers as well as managerial and professional, Wiersba cited survey results showing that one-fourth to one-third of all office labor costs go toward secretarial and clerical work.

"In the clerical area the introduction of word processing (WP) technology is not the whole solution to low productivity," Wiersba said. While the technology is solving some problems, it carries problems of its own.

Among those problems are that "production/WP centers" often break jobs down to their lowest level of repetitive, boring tasks and consequently convert white-collar workers to a blue-collar concept, Wiersba said.

Education Solution

While technology may provide some temporary solutions to productivity problems, it is education, in the long run, that actually offers solutions, he claimed.

Since the communication and math skills of all white-collar workers have deteriorated, according to Wiersba, the most effective workers will need better communication skills, a better idea of their tasks, objectives and resources and higher levels of computer literacy.

"The technology should magnify human capabilities, not replace them," Wiersba noted.

In the managerial and professional area, Wiersba noted that 60% to 75% of office labor and support money goes toward management where there exists a great potential for increased productivity benefits.

The fundamental problem in the managerial area, in terms of productivity, is the amount of time spent on communication and information retrieval, Wiersba said.

He added that the communication problem is a "people, language, sociological, emotional, psychological and business problem."

Not necessarily quantitative, the problem must be examined qualitatively as well, Wiersba said. The specific productivity problem should be defined, and then a search begun for the appropriate system to solve the problem.

An increased acceptance of the technology by managers will be necessary, including expertise in its direct use instead of delegating it to someone else. Keyboard skills and computer literacy will be needed in order to participate in the choice of equipment instead of relying on recommendations.

Reorganized Attitudes

Besides technology and increased computer literacy, management attitudes need reorganizing, according to Charles Wortz, a graduate student and teaching assistant in the computer science department at Vanderbilt University here.

"Managers often assume things are working right, when things aren't working right," Wortz noted, advising that reciprocal communication is needed between management and labor. "Communication is often downward, but not back-and-forth," he observed.

Furthermore, Wortz suggested, "When you try to automate, instead of going for a grand design, put in a little prototype system first — something cheap to try the system out so you can modify it and get feedback from the users."

Identify Personnel

On the personnel side, he noted, "there are always clerical workers who really don't want to make decisions; identify them and let them do the drudge work.

"Higher level workers usually want open-ended jobs, so find them and try to match the people to the jobs," Wortz said. "Again, you need communication to identify different types of workers." As for system designers, they should know what the user needs to do a job right. "Try to talk to the users, get a feeling for the real problems and give the client a prototype system to try out."

Wrapping up the presentations was Ron Oliver, a systems engineer for the Mitre Corp. in Colorado Springs, Colo. "While [the U.S. is] very successful in automating industrial applications in business applications such as payroll, we're way behind, and we've been doing it the longest," Oliver said.

Think Small

Why are we so unsuccessful in this area? "We make the fundamental mistake of patterning our technological solutions after the solutions of 15 or 20 years ago [that ran on] large mainframes," he said.

Many solutions can be implemented — and more easily — on small computers, he added.

Oliver cited a DP vendor who advertised having taken 500 man-years to develop a system. "During those seven years, the technology changed twice," he noted, adding, "We can't afford the time it takes to develop intricate do-everything systems."

Oliver advised managers to stop "increasing their empires by hiring technical experts, and instead restrain themselves." In addition, managers should encourage employees who want to expand their knowledge and experience to learn about computers. However, he counseled, "don't require anyone to be a computer scientist," but rather offer him an opportunity for career growth. In addition, Oliver recommended the use of high expertise for short periods of time, "similar to what lawyers and accountants offer businesses."

Such occasional consulting services — used perhaps one day a month for a year — are "desperately needed," he said.

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Ifip Conducting Study On Design Methodologies

GRONINGEN, Netherlands — The International Federation for Information Processing (Ifip) is conducting a comparative review study on advanced methodologies now being proposed for information processing system design.

Methodologies will be used for presentation at an Ifip-sponsored Working Conference in May 1982.

Groups or individuals who have developed a methodology for information system design are invited to submit design specification for a standard test case by Feb. 26.

Participation is encouraged from both practitioners and researchers alike. Details regarding the standard test case and the requirements for submission can be obtained from H.G. Sol, Cris Conference Secretariat, Information Systems Research Group, University of Groningen, P.O. Box 800, 9700 AV Groningen, Netherlands.

NBS Adopts Ansi Fortran, Basic as Standards

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The National Bureau of Standards (NBS) has adopted the American National Standards Institute (Ansi) versions of Fortran and Minimal Basic as mandatory federal standards.

Under the new standards, all Fortran and Basic applications developed or acquired by federal agencies after the Sept. 4, 1980 effective date must comply with the specifications contained in Ansi X3.9-1978 Fortran and Ansi X3.60-1978 Minimal Basic, respectively.

Adoption of the standards follows consideration of comments on the standards solicited by NBS in July.

Washington Update

Detroit Tech Center Gets Commerce Grant

WASHINGTON, D.C. – The Department of Commerce has awarded $1 million to the Detroit Cooperative Generic Technology Center (Cogent) to create a research facility for computer integrated manufacturing.

Established under the recently passed Technology Innovation Act of 1980, the Cogent facility is also eligible for a $5 million grant from Commerce's Economic Development Administration, the department said.

The funds, to be made available during fiscal 1981, will be matched by an estimated $6 million in private support. The generic technology centers were called for in the innovation act to enhance industry-government cooperation in bolstering U.S. competitive and technological strength.

DOE Seeks Proposals On Energy-Wise Uses

WASHINGTON, D.C. – The Department of Energy (DOE) recently requested project proposals to demonstrate energy-efficient applications of industrial computers.

DOE said it will accept proposals from "all technically qualified organizations for research, development and demonstration work." The department said it might provide financial assistance for projects offering "unique energy-saving potential."

The proposals should be for industrial, in-plant demonstrations of computer technology that will save energy and be cost-effective, DOE said.

Proposals will be accepted through Jan. 22. Information on submitting proposals and on technical questions is available from the Office of Industrial Programs, Mail Station 2H-085, Department of Energy, Washington, D.C. 20585.

Retailers' Meet On Profitability Set for Jan. 11

NEW YORK CITY – "Strategies for Growth and Profitability" is the theme of the National Retail Merchants Association (NRMA) 70th annual convention, which is scheduled to take place here on Jan. 11-14. Also featured at the NRMA-sponsored event will be a retailers' business and equipment exposition.

Products and services to enhance productivity, increase efficiency and control expenses will be showcased at the event.

In addition to some 70 general sessions of interest to retailers, private consultations with field experts can be arranged to help retailers solve specific problems.

Awards will be presented for retail excellence, and outstanding independent and international retailers will be honored as well.

Further information on the NRMA event can be obtained from their headquarters at 100 W. 31st St., New York, N.Y. 10001.

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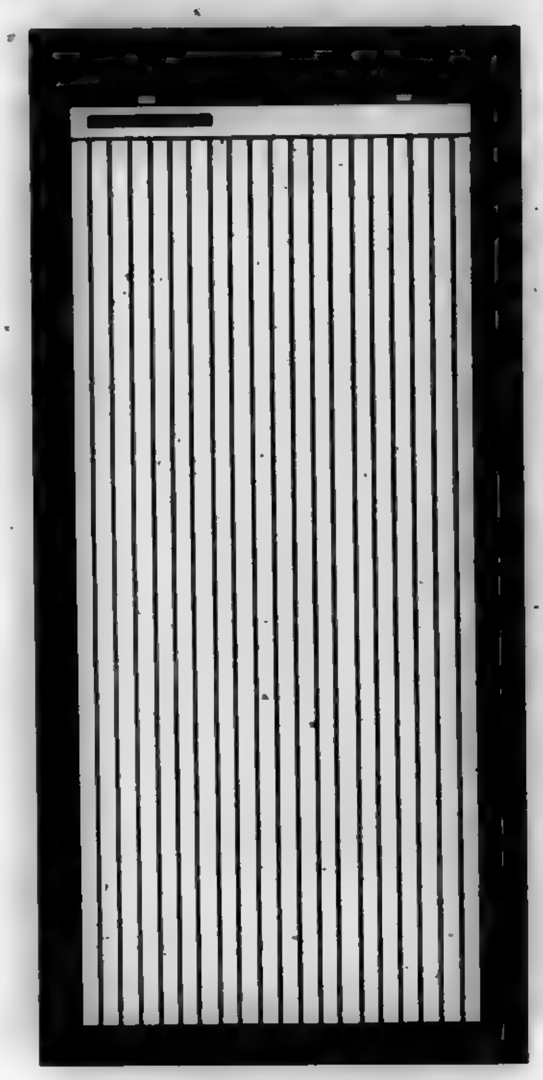

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'Woeful Litany of Problems'

House Unit Calls INS System 'Ironic Disgrace'

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – It is an "ironic disgrace," a congressional committee said recently, that the U.S., a land of computers and efficiency, greets foreign visitors and immigrants through the mismanaged, underautomated and inefficient Immigration and Naturalization Service (INS).

Detailing a "woeful litany of problems" of INS recordkeeping, the House Subcommittee on Government Information and Individual Rights released the results of its year and a half investigation into failed INS attempts to automate its overburdened recordkeeping practices.

Government reliance on "teeming" INS record systems has grown dramatically in recent years with no corresponding increase in INS staffing. The agency's recordkeeping, the subcommittee said, " has strained under this increasingly heavy load, buckled and finally fallen down.

"As a result, aliens are forced to wait years for the service to process their papers, if indeed the papers are not lost. The inconvenience and hardship are an ironic disgrace to a country whose reputation for being able to get the job done undoubtedly attracted many of the aliens here in the first place.

Discord Threatens

"More critically," the report continued, "the clerical collapse threatens discord in a country that relies heavily on knowing who is within its borders in order to maintain economic and social well-being."

Commenting on the report, Subcommittee Chairman Rep. Richardson Preyer (D-N.C.) said he was particularly disturbed about the lack of security controls over immigration files. He noted a number of INS employees have recently come under investigation for allegedly selling or altering immigration documents.

"We found that security personnel at INS had never run test raids on its paper and computer records," Preyer said. "They had also failed to test means of spotting forged or altered entries on the files." These failures are distressing because of the "large black market in forged documents," Preyer said.

Justice Blamed

The subcommittee blamed inadequate oversight by the INS parent agency, the Justice Department, for letting the Service drift into its present situation and criticized INS top management for failing to properly introduce computerization into agency record-keeping operations.

"INS waited until its problems were critical before moving to automate and then proceeded precipitously and improperly," the report said. INS is consequently threatened with "an expensive quagmire of unwarranted and unnecessary computer equipment."

Efforts by then INS Commissioner, Leonel Castillo to automate several INS district offices in 1977 ignored federal procurement regulations and legislation as well as Office of Management and Budget guidelines, the subcommittee found, terming INS contracting procedures "deplorable."

At the request of the subcommittee, the General Services Administration (GSA), which oversees federal DP procurements, halted the INS automation efforts last year while the House panel continued its investigation [CW, Aug. 6, 1979].

In its report, the subcommittee said the hold on computer procurements will continue while INS draws up a "suitable" DP plan, assisted by the subcommittee, GSA and the General Accounting Office.

"In the meantime," the subcommittee said, it has "insisted that INS improve its manual handling of records so that the future DP system will not be built on a foundation of missing documents and misplaced files."

Recommending a series of changes for INS planning, contracting, procurement and record-keeping practices, the subcommittee also said Congress and the Administration should consider the impact of proposed legislation on INS' record-keeping burden.

> *'The clerical collapse threatens discord in a country that relies heavily on knowing who is within its borders in order to maintain economic and social well-being.'*

Solving its record-keeping problems is particularly important to INS because, the subcommittee noted, it is one of the few agencies, along with the Internal Revenue Service and the Social Security Administration, "that is totally dependent on the adequacy and accuracy of its records to accomplish its statutory mission and to survive in the bureaucratic swamps."

After surveying the "woeful" findings of its investigation, the subcommittee expressed some optimism about INS record-keeping practices, saying the study "discloses hopeful signs that automation will provide some solutions."

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Managers on the Move

Eugene A. Paulsen

EUGENE A. PAULSEN has been appointed senior vice-president of DP at Bowery Savings Bank in New York. He will be responsible for direct supervision of electronic DP functions, including operations, control systems and programming.

Paulsen began his career at Burroughs Corp. where he held various positions, including U.S. product manager for DP and general manager of marketing for such clients as General Motors Corp., Ford Corp., Chrysler Corp. and AT&T. While at the bank division of Burroughs, he became involved in the development and implementation of the first bank automative system.

Paulsen graduated from Siena College, Loutonville, N.Y., with a B.A. in business administration.

• • •

PAUL JOTWANI has been appointed DP director for Ancilla Domini Health Services, Inc., Des Plaines, Ill. He formerly served as associate director for the corporate headquarters, which serves hospitals in Illinois and Indiana.

During his eight years with Ancilla Domini, Jotwani has helped develop a patient information system, directed development of a distributed online support for materials management and accounts payable systems and of distributed data entry support for all financial systems.

Jotwani holds a B.S. in mechanical engineering from Sardor Patel University, India; an M.S. in industrial engineering and operations research from the University of California, Berkeley; and an M.B.A. in financial management from Loyola University, Chicago.

• • •

JOHN H. TALLEY has been appointed assistant director of production and technical services in the corporate DP department at Connecticut General Life Insurance Co., Hartford, Conn.

He joined the company in 1978 as manager of technical support in the DP section. In his new position, he will be responsible for the development, performance measurement and quality assurance of the data center, which is an IBM-Univac environment.

Talley previously was data base manager with CBS in New York and a systems analyst with Consolidated Edison, also in New York.

Talley is a graduate of New York City Community College and holds an A.A. in mechanical technology.

• • •

Pneumo Corp. has appointed JOHN F. MATUSCAK president of Pneumo Services, a wholly owned subsidiary which provides electronic DP services to its parent company.

Matuscak was previously employed by McDonnell Automation Co. as manager of financial systems planning and was a consultant with Ebasco Services. He also served as chief of operations at the National City Bank of Cleveland.

• • •

JOEL N. SOBO has been promoted to vice-president of computer systems in the Services Department of Prudential Reinsurance Co., Newark, N.J. He will be responsible for organization, operations and

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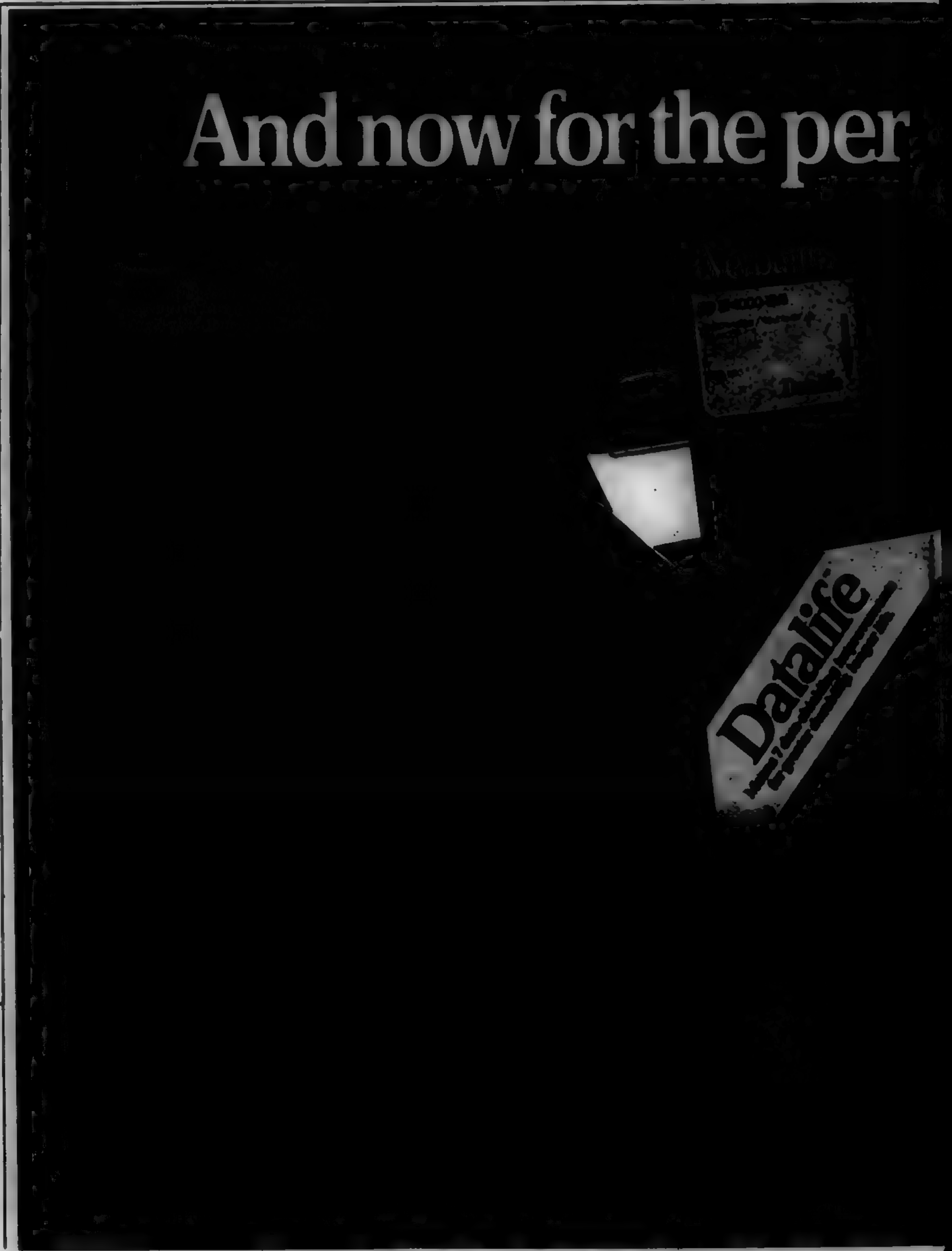


Managers on the Move

quality assurance.

Sobo joined the parent company, Prudential Insurance, in 1963 and served in the accounting, personnel and computer areas of Newark, N.J. and Boston prior to transferring to Prudential Reinsurance in 1978. He was director of computer systems prior to his recent promotion.

Sobo graduated from Cornell University with a B.S. degree in business administration.

WILLIAM L. HARRISON has been elected vice-president and deputy director of the DP department at the Hartford Insurance Group in Hartford, Conn. He will continue to be responsible for Hartford's DP systems unit.

Since joining the company in 1969, Harrison has held several positions in DP management and was elected assistant vice-president in 1971. He was previously employed by RCA Corp. and Prudential Insurance Co.

Harrison graduated from the University of Rhode Island with a B.S. degree in economics and earned an M.B.A. in buiness administration from Rutgers University.

• • •

C. LEE MYERS III has been named director of systems development in the information services department of the American Automobile Association, Washington, D.C.

Myers was formerly with Univac, where he was branch manager, finance and control, for federal systems operations. Prior to that, he was group manager of Univac's worldwide benchmark and demonstration activity for large-scale systems, systems manager for all 1100 systems in the federal government and project manager for one of Univac's large government computer installations.

• • •

JOHN F. COULEUR has joined A.B. Dick Co. as director of computer development at the Phoenix site.

Couleur was recently a consultant to the director of engineering for Honeywell Information Systems. Earlier, he served as vice-president for computer development at University Computing Co., Dallas, and manager of computer engineering at General Electric in Phoenix.

Couleur received a B.S. in electrical engineering from Southern Methodist University in Dallas.

Couleur holds more than 40 patents in the computer industry.

• • •

RICHARD E. BIRKENBEUEL has been named director of corporate management information services MIS for AM International, Inc. He will be responsible for all corporate data center activities, including software support, corporate-wide hardware and software planning and voice and data telecommunications.

Birkenbeuel joins AM from Kraft, Inc., where he held various MIS management positions. He held management and technical posts with Jones and Laughlin Steel Co. and the Sunstrand Corp.

He received B.S. and M.S. degrees in mathematics from Illinois State University.

• • •

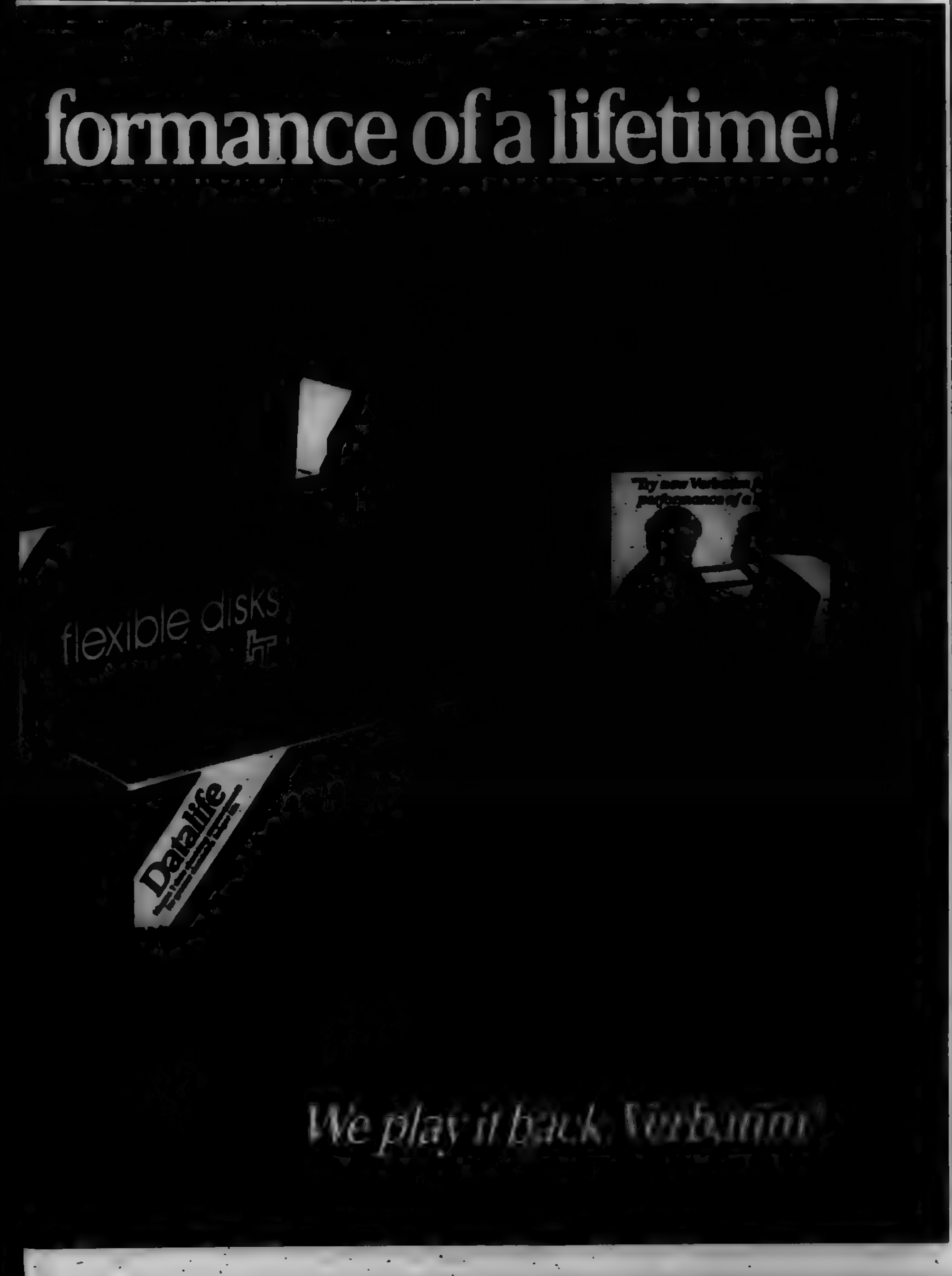
RICHARD V. JASINSKI has been named vice-president of data services and DAVID RIGBY has been promoted to manager of DP at the computer marketing services division of Rumrill-Hoyt, Inc., Rochester, N.Y.

Jasinski joined computer marketing last year as supervisor of DP. Prior to that he was employed by the city of Rochester, N.Y. as a computer system analyst and programmer supervisor. Before that he was analyst/project leader with Griffin Computer Services, Inc. of Rochester.

He received his associates degree in applied science from Alfred State College, Alfred, N.Y.

Rigby was previously assistant of DP at Computer Marketing. Prior to joining the company he also was employed by the city of Rochester as a computer programmer/analyst, and senior programmer, administration at Monroe Community College, Rochester.

He holds a B.S. in applied science from Monroe Community College.



Oklahoma City Controversy

Automated Gas-Up Works — Three Years Later

By Bruce Hoard
CW Staff

OKLAHOMA CITY, Okla. — A computer system designed to regulate the flow of gasoline to city vehicles here is finally getting off the ground after three-and-a-half years of controversy.

Although it functioned smoothly for about a year after its 1975 installation, the field monitoring system experienced a continuous rash of software and hardware difficulties that lasted until the middle of last month, according to Steve Eubanks, Oklahoma City industrial engineer.

Nine remote fuel stations throughout the city are tied to a Data General Corp. Nova II minicomputer downtown by a dedicated data line. Software for the system was provided by Engineered Systems, Inc. (ESI).

As originally envisioned, employees were to stop at a fuel site and insert their personal and vehicle identity cards in a terminal. The terminal was to then unlock the gas pump, measure the amount of fuel pumped and charge the appropriate city agency for the transaction.

The employee pumping the gas was also supposed to enter the first five digits on the vehicle's odometer, starting from the right and moving left.

Going Wrong

After the one-year grace period, things started going wrong. "Our major problems throughout have been with the software," according to Eubanks, who added that the Nova II also experienced memory board problems when it was first purchased.

ESI did not agree that software was at the heart of the system's hang-ups and blamed the Nova II and the dedicated line leading to it, Eubanks said. After considerable disagreement, "the whole thing turned into a finger-pointing match," he claimed.

As he described it, the system would go down about twice weekly after "seeing information it didn't understand."

By January 1977, things were so bad the system was taken out of service and employees put on an honor system with the gasoline.

At the rate it was abused, the city figured its losses at about $100,000 a year.

After periodic feuding, the city signed another contract with ESI last fall and the firm attempted to straighten things out. Little was accomplished, according to Eubanks, who joined the city early this year.

Machine Language

One of the biggest problems revolved around the fact the software was written in machine language, rendering it unintelligible to experts on the city's DP staff, he said.

When it appeared another impasse had been reached with ESI, Eubanks called in a consultant from American Rail Testing, Inc., who made rapid headway with the system, he said.

Within two months it was operating better than any time in the past three years.

Infotech Event To Treat Banking, Automation Plans

LONDON — "Automated Banking — The Next Five Years" is the name of Infotech Ltd.'s state-of-the-art conference slated to take place here Dec. 1-3. The event is aimed at senior management in banking and finance who are responsible for strategic planning of automation.

Pactel International S.A. President Ken Hughes will chair the conference, which will analyze the impact of technological development on banking and related services. Topics will include automation implementation, network technology, electronic funds transfer, relative legal issues and interbank relationships.

Further information on the event can be obtained from Bob Muller, Infotech Ltd., Nicholson House, Maidenhead, Berkshire, UK.

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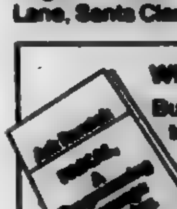

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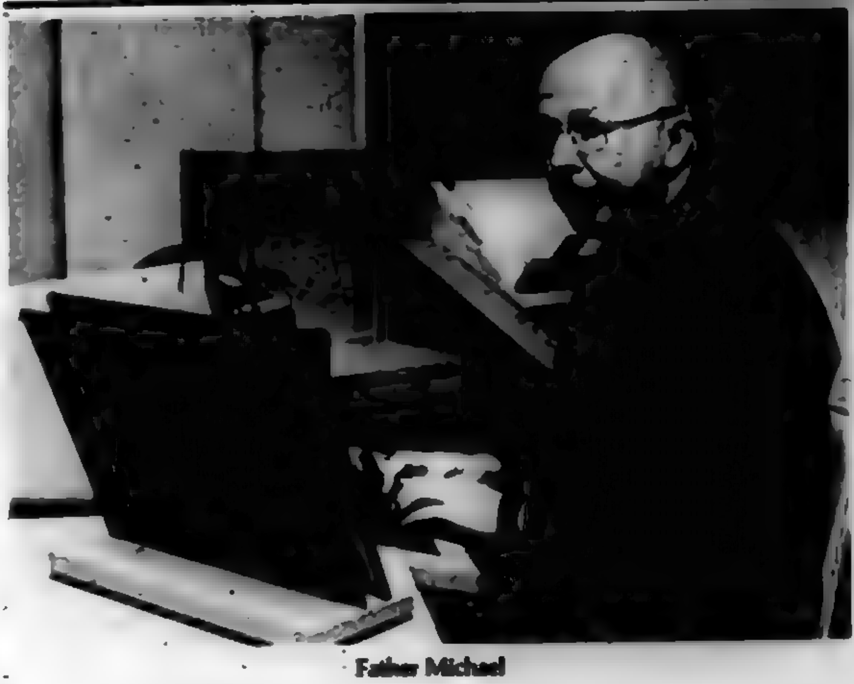


Father Michael

Monks Leave Farm to Open Computer Services Outfit

By Deborah Wise
CW Staff

RESACA, Ga. — The monks of the Monastery of the Glorious Ascension used to run a reform school for boys on a Mississippi farm. They now manage a computer services operation here.

After a dramatic, almost fly-by-night departure from the farm, the monks set up MGA Computer Services, Inc. in June. MGA — an acronym of the order's name — offers mailing list, fundraising letter drives and reproduction services to mainly nonprofit organizations in the Southeastern states.

The order started in California, but moved to Picayune, Miss., in 1970 to take over the management of a reform school called St. Michael's Farm for Boys. Initially part of the Monastic Congregation of St. Augustine, an Episcopal denomination, the five monks switched orders to the Russian Orthodox Church in America in 1976 because of what they called "doctrinal disagreements."

St. Michael's farm, which aimed to be as self-sufficient as possible, received donations from an Episcopal board of trustees. The board was concerned at the monks' conversion to Orthodoxy, but because they thought the farm was well looked after, they let the matter rest.

However, the monks became disenchanted with teaching and farm management, according to Rev. David Yancey, the farm's present director. The animals were sold and the farm ran into disrepair; when the boys attending the school had completed their programs, the monks sent them home and moved out themselves.

Better Location

After friends and associates suggested there was a need for computer services in the Southeast, the monks came here "to be more centrally located for our diocese," according to Father Michael, who directly manages the computer services business.

The monks lease an IBM Office System 6 and the IBM System/34. "We want to take just enough business to do high quality work to provide support for the monastery and no more," Father Michael said.

However, there seems to be some confusion over the monk's departure from the farm. They maintain they informed the trustees of their decision to change jobs, but the farm's new director, Rev. Yancey, was puzzled by the abruptness of that decision.

Yancey described the monks as having "gone crazy." He commented that he found it strange that the same people who had left the farm's bookkeeping in a mess had gone on to set up a records service.

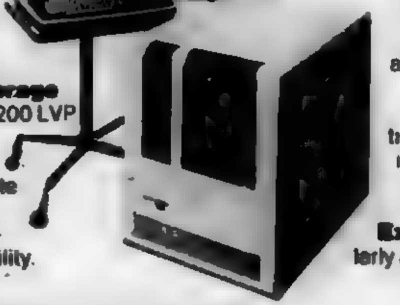
"The files for the last three years are in kind of a state, and we are in the process of trying to find out what the story is," Yancey said.

Workshops Ease Computer Fears

PHILADELPHIA, Pa. — In an effort to acquaint management personnel with computer technology and its effect on jobs, the City of Philadelphia recently sponsored a series of two-day computer literacy workshops for its employees.

"The program was designed to help nontechnical people communicate with technical people," explained Dr. Louis Malfara, director of training for the city.

Sixty middle to upper level management employees from all city departments attended the workshops conducted by Executive Technology Associates (ETA), management advisers and trainers from Allentown, Pa. Using microcomputers for hands-on experience, the "students" were introduced to the concepts of office automation and computer capability.



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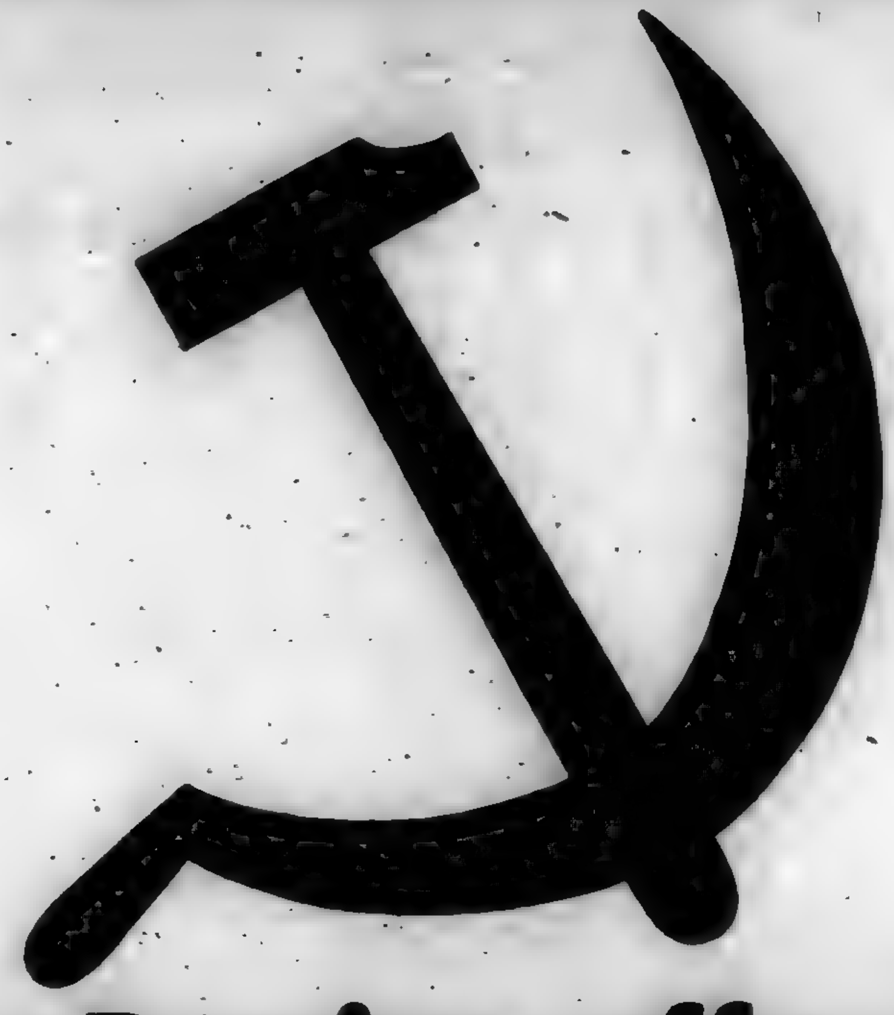

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1110

Staged by California National Guard

War Games Simulate European Confrontations

By Bruce Hoard
CW Staff

BARSTOW, Calif. — The scene was right out of *The Third World War: 1985.* Warsaw Pact troops poured across the Czechoslovakian border into the Federal Republic of Germany. Beleaguered Nato forces gave way reluctantly while inflicting heavy damage on the aggressors.

But this battle took place in Central California, not Germany, and its outcome was determined not by bullets and bombs, but by computers in Kansas City.

It was all part of the California National Guard's Computer Assisted Map Maneuver Simulation (Camms) war games, held at Fort Irwin near here and at Camp Roberts in Southern California.

Only 1,250 people were involved in the games, but the scaled-down force represented a full-blown division of 20,000 to the Kansas computers. The Camms system also cut down on the time normally associated with war games. Several weeks of warfare were condensed into 24 hours.

Tactical Decisions

Tactical and strategic decisions were made by company, battalion and division commanders in the field, where most of the personnel were deployed. Decisions were relayed to Fort Irwin and Camp Roberts via radio communications.

The "war room" at Fort Irwin was equipped with two large table boards, manned by up to 40 people each, on which players and pieces representing men and machines were manipulated in accordance with field orders. Camp Roberts had one such board.

Once orders were relayed from the field to the board, they were entered into the Kansas City Control Data Corp. 6500 computers of United Computing Systems, Inc. The connection was made via dial-up lines attached to Texas Instruments, Inc. TI 745 CRT terminals at Fort Irwin and Camp Roberts.

The probability-based Camms software then took over, rendering life-and-death decisions over troops and equipment.

Critical knowledge programmed into the system includes weapons capabilities and their potential in given geographical areas.

Glaring Weaknesses

The Camms system has been around since 1975, and it has some glaring weaknesses, according to the 40th Infantry Division's Colonel James Jones.

"As it works now, there's not enough resolution," he said. "For instance, if a vehicle is damaged, we don't know the exact damage, so we can't decide on whether to repair it or not."

The "Broadsword" system, as it is called, will soon be replaced by Broadsword II, a more sophisticated model with higher resolution that will increase the realism of the national guard's mock battles, he added.

As for the outcome of this battle, it was a draw. After the guard's top brass decided enough key decisions had been made and imaginary blood spilled, they simply called off the first battle of World War III.

USAF Center Now Permanent

SAN ANTONIO, Texas — The prototype centralized information processing center established here in 1973 by the Air Force has been redesignated as the San Antonio Data Services Center (SADSC), a direct reporting unit of the Air Force Communications Command, thus affirming the success of the project.

The SADSC is called a regional center at present, though it is the only one of its kind and services Air Force organizations nationwide. Plans are being discussed, however, to establish other centers in Oklahoma and on the East Coast.

The center's Burroughs Corp. B4700 and IBM 4341 — recently upgraded from an IBM 360/65 — handle data processing work for a variety of Air Force organizations including the San Antonio Air Logistics Command, Air Training Command, Air Force Medical Systems Command and the General Accounting Office, among others.

The center is run on a time-sharing, fee-for-service basis and was set up, according to an Air Force spokesman, "to realize the cost advantages accrued through consolidation of computing equipment combined with the greater economic returns due to large-scale operations."

Besides providing information processing services, the center also acquires and installs remote job entry terminals and communications equipment anywhere in the U.S. for Air Force organizations.

It gives backup services such as conversion advice, user training and many other customer/service support functions, according to a spokesman.

Colonel Roy E. Salziger, who headed the SADSC from the beginning, will retire this month to be replaced by Colonel Anthony L. Baggiano.

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When Wisconsin Life added a Level 6 computer their customers were the real beneficiaries.

Not all insurance companies are slow-moving behemoths. Wisconsin Life just installed one of our Level 6 computers and is now processing most claims within 72 hours. Response time has been cut by a full 80%.

Businessware.

Wisconsin Life is benefitting from something we call Businessware. A well-balanced combination of the right hardware, the right software, and Honeywell's vast business experience.

Everything our salespeople have learned in 25 years of working with businesses has been put into Businessware.

TPS-6 is part of Businessware. Thanks to this built-in transaction processing system, Wisconsin Life's new computer is helping in three key areas. First, linked to a network of 60 terminals, it's making clerical functions easier to perform. Clerks now use terminals to check the nuts and bolts of individual claims: Is this policy valid? Has this claim been paid before?

In all, there are more than 30 screen formats.

Once a claim has been approved, a check is written that night. Since the Level 6 arrived, many claims have been paid in a single day.

The Level 6 has also been helping Wisconsin Life develop new applications for their transaction processing capability. For instance, there's a program in the works now that will enable them to process all new business on-line.

One advantage is that the computer can be used to calculate premiums, thus eliminating a great deal of work currently done by hand.

Finally, the Level 6 runs a very efficient data entry facility. Once CRTs are installed, clerks will be able to correct errors immediately, substantially reducing overall system maintenance costs.

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Wisconsin Life's new Honeywell is doing precisely what we knew it would. It's giving them greater control of their operations. And in so doing, it's increasing the quality of service Wisconsin Life offers their customers.

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For a more detailed look at the Level 6, write Honeywell, 200 Smith Street (MS 487), Waltham, MA 02154.

Honeywell

Agnet Harvests Computer Services for Farmers

By Deborah Wise
CW Staff

LINCOLN, Neb. – Until recently, only large agribusinesses could cost-effectively utilize information processing services, but an agriculture computer network known as Agnet is now providing computer services to farmers and those in the agricultural business for $10 per hour.

Agnet offers all types of information to help farmers and businesses make day-to-day decisions on such things as crop organization, irrigation costs, livestock accommodation and feeding mixes, for examples.

The network, which runs on an IBM 3031 mainframe, was developed in 1975 by Prof. James Kendrick, an agricultural economist at the University of Nebraska, and Prof. Thomas Thompson. It has a base of 200 programs that can be accessed by any Teletype-compatible terminal with an acoustic coupler.

At present 30 states in the U.S. and two Canadian provinces use the network. "We wholesale time and services to the states," Kendrick said.

Inputting information is free of charge, but "think time" costs $10 per hour, and the charges on the Wats line linkup run at 20 cent/min during prime time (8 a.m. to 5 p.m.) and 13.5 cent/min off-peak.

Decentralized Control

The original six Agnet partners – the states of Montana, Nebraska, North Dakota, South Dakota, Wyoming and Washington – have decentralized control and can add or omit programs to their own data bases without consulting the national Agnet office here. This allows for the accommodation of local conditions and a flexibility to write new material when required.

At present negotiations for other states to enter into this kind of relationship with the national Agnet office are under way, Kendrick said.

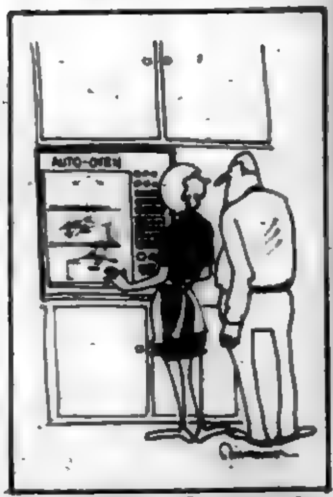
"Many states are interested in providing modern management services to agricultural businesses, so there is a lot of pressure to develop some sort of system," Kendrick said. "Rather than developing their own system from scratch, we offer a ready-made network."

Reaction among farmers and agribusinessmen has been favorable, according to George Hartman, a farmer and rancher who helps promote Agnet in Nebraska.

He introduces the system by talking to farm organizations and young farmers' educational groups as well as individual farmers. In Nebraska the service is offered through local county extension offices of the University of Nebraska.

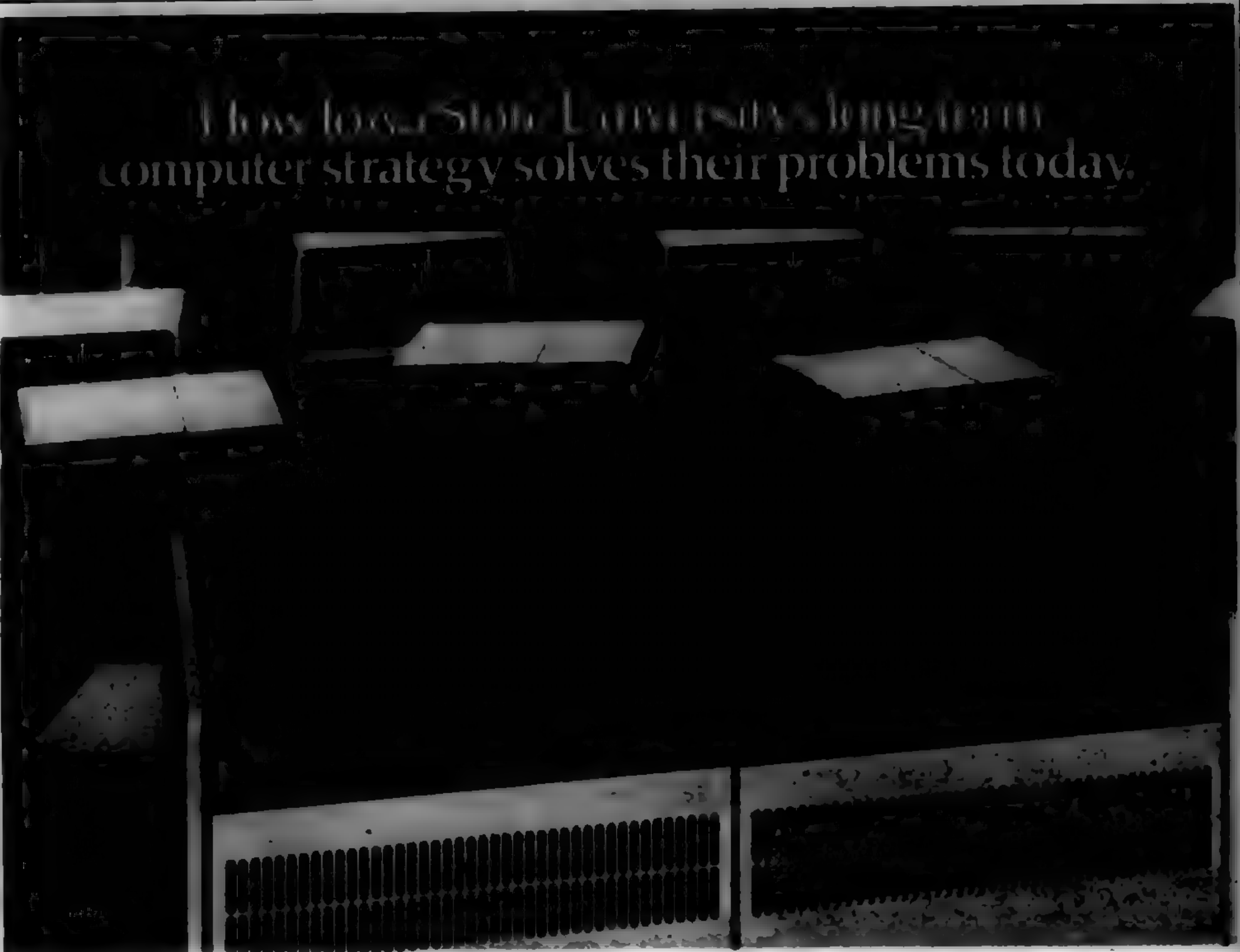
"Initially I got a mixed reaction, but when the farmers see what kind of information is on the Agnet system and what it can do for them, the reaction becomes most favorable," Hartman said.

Kendrick estimates that the service is used about 6,000 hours per month.



'The Meat and Potatoes Are Go, the Gravy Is Holding, and the Stewed Tomatoes Are in an Error Condition.'

DATA TRAINING '80



How Iowa State University's long-term computer strategy solves their problems today.

One of the most difficult problems faced by computer centers is planning for future needs, while at the same time meeting today's skyrocketing demands.

But some universities, like Iowa State, have found a simple, practical solution. Distributed processing with Digital. Thanks to Digital's broad line of compatible minis, superminis, and mainframes, they can add and reassign computers as needed.

Distributed processing with Digital means more students get more time on more terminals.

To solve one of their biggest problems—availability—Iowa State bought one of Digital's VAX systems in 1978. The VAX-11/780 gave them the ability to connect 64 interactive terminals to one computer, which they spread out among various math, engineering and science departments. Then when funds became available, they added another VAX-11/780 and 64 more terminals, including several in special dormitory rooms.

"Until we acquired the VAX systems," says Dr. Clair G. Maple, Computer Center Director, "Iowa State was not providing enough accessibility to our students. We wanted to get into an interactive, distributed environment, and the VAX-11/780, with its 32-bit architecture, gave us a lot more power than a standard mini.

"We also look at the VAX system as more than just an object of study, we see it as an educational tool," says Dr. Maple.

The VAX-11/780 is a natural for teaching computer science. But it's so simple and so widely available, just about every department is using it—no matter what level of understanding the students have.

Dr. George Brant from the College of Agriculture explains, "We have a program that teaches students to estimate the amount of meat they'll be able to sell from a steer carcass. The program is already written, so the students simply follow the program sequence, prompted by the system each step of the way. If the student enters an incorrect answer, the computer instantly tells him he's wrong. That way the students get a better understanding of the problem, and can keep on working until they get it right."

Of course the VAX-11/780 is also used for extremely complex computations in departments like mathematics, engineering and aerospace. And it's been a tremendous tool in those departments as well.

Distributed processing with Digital means an introduction to the real world.

According to Dale Anderson, Prof. of Aerospace Engineering, the university's combination of a mainframe supplemented with VAX systems

For Competitive Environment of '80s

S&Ls Told to Align Computer, Business Strategy

SAN DIEGO — Alignment of computer strategy with business strategy will be vital to the success of thrift institutions in the radically changed competitive environment of the 1980s, a meeting of computer professionals from the savings and loan (S&L) industry was told here recently.

"More sophisticated computer systems will be crucial not only to handle the growing array of new services permitted by deregulation, but also to support decision making by managers who will have to become increasingly informed and decisive," John M. Thompson, vice-president of Index Systems, Inc., told the U.S. League of Savings Associations' Systems Automation Division.

Most software currently used by thrift institutions is inadequate to meet these increasing demands: "Business strategies and information system strategies are going in different directions, pulled by rapidly changing market and technological conditions," Thompson maintained.

In the environment of the 1980s, development of new systems can pose far higher risks than in the past, he warned.

"There is nothing wrong with risk as long as you know you are taking it and plan improved capabilities by assessing the risk/return relationship of each project, scheduling to balance the risks as in an investment portfolio. Too many high-risk projects at the same time should be avoided, no matter how high the potential return each may offer," he advised.

Index Systems, a management consulting and systems development firm based in Cambridge, Mass., recently completed a study of the S&L industry for the U.S. League of Savings Associations. Results of this study have been utilized to produce a kit to help league members evaluate their own DP resources with guidelines for planning future requirements under various potential business and service scenarios.

"The first thing to do is to assess where you are by evaluating your current risks in relation to your own business and technological situation," Thompson said.

Major Factors

Major factors that affect the risks associated with systems development include the size of the project, whether the technology involved is new to the organization and whether the project deals with routine accounting functions or more complex needs such as financial planning.

In addition to project risks, assessment must be made of the institution's current DP resources relative to business strategy, according to Thompson. This calls for particular attention to the growing need for systems that give management interactive access to timely information to aid business decisions in a more competitive environment, he emphasized.

"Achieving these decision support systems requires a different approach to software development as well as the direct involvement of management in defining the information needs," he added.

"We have accepted the need for strategic planning in our businesses," Thompson observed.

and more than 40 other minis from Digital gives students a better feel for computers used in the real world.

"We had little distributed processing here until Digital. With the VAX-11/780, students are using terminals interactively to study aerodynamics, structural dynamics and propulsion. Not only do they learn faster that way, they're better prepared for jobs in the real world when they leave college."

"No matter how the system is used," says Dr. Maple, "the students are finding that the VAX-11/780 is very easy to operate. It's had tremendous acceptance to the point that, now, in a peak month, 36,000 log-ins have been recorded, averaging more than 40 minutes each."

The Iowa State story is just one example of how Digital is committed to making the computer a practical, economical and accessible tool for education. We offer the world's broadest and most widely used family of educational computers—from entry-level minis to 36-bit mainframes. Plus the networking tools to tie them together.

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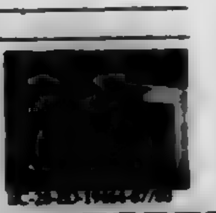

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DATA
TRAINING
'80

Minis Pressed Into Service at Marines' Race

Special to CW

WASHINGTON, D.C. — Nearly 10,000 runners and two minicomputers participated here last week in the 1980 Marine Corps Marathon, the fifth annual race sponsored by the U.S. Marines.

As runners crossed the finish line, an official timer pressed a push-button control linked by wire to a Hewlett-Packard Co. HP 1000 minicomputer housed in a nearby van. Each time the button was pushed, an interrupt occurred, resulting in a computer-recorded time-of-day log, explained Major R.M. Rudolph (USMC), data processing coordinator for the race.

When a large group of runners converged on the finish line, the timer simply pressed the button as many times as necessary for the finishing runners. Runners who crossed concurrently had finishing times within hundredths of a second, Rudolph said.

Winner in the men's division was Mike Hurd of Suffolk, England, who finished in two hours, 16 minutes and 55 seconds. Placing first among the women was Jan Yerkes of Buckingham, Pa., with a time of two hours, 39 minutes and 53 seconds.

The mobile HP 1000, which included an HP 7906 disk drive and an HP 2608 400 line/min printer, had access to an HP 1000 F-Series processor at marathon headquarters in Rockville, Md. The F-Series computer with 1M byte of memory and 20M bytes of disk storage contained registration information collected by Marine Corps personnel months in advance.

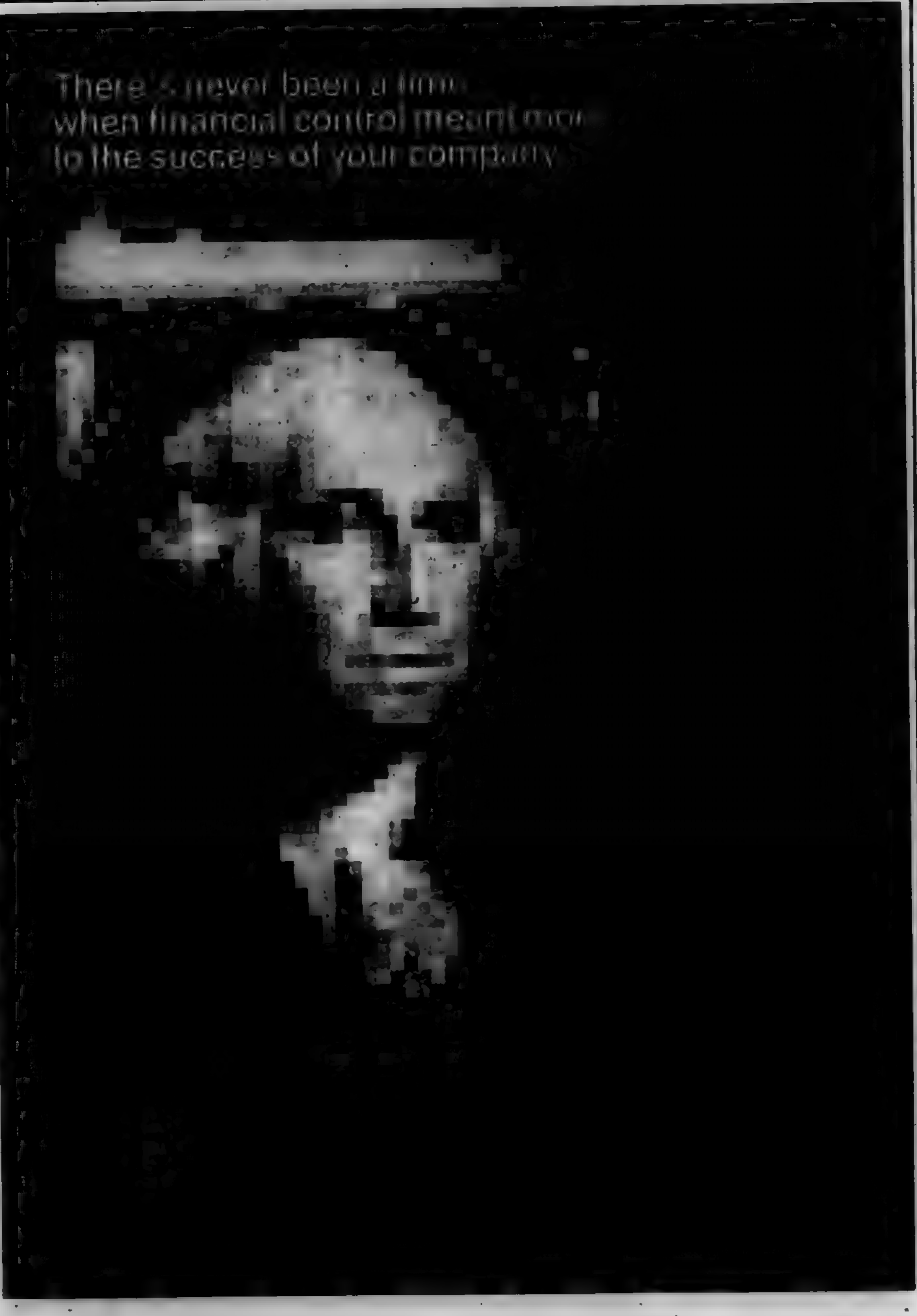
During race week, registration continued at a Washington, D.C., hotel where the Marines had set up an HP 2648 CRT terminal that was linked by telephone to the F-Series machine.

Bar Coded Labels

In addition, registration procedures were also aided by a Dataroyal, Inc. bar code printer that provided an adhesive-backed label for each runner with his name, number and a bar code of the number printed on it.

By using the bar code technique, accurate time and place results were available to runners and the press several minutes after the completion of the race.

In order to keep the runners' finishing times matched with their numbers, the runners were herded into chutes as they crossed the finish line. There the Marines scanned each person's bar code with the reader and transmitted the information via terminal to the HP 1000 in the sideline van.


There's never been a time
when financial control meant more
to the success of your company

Guide Lists Consultants

SAN JOSE, Calif. — A free directory of 150 Southern California-based consultants has recently been published by the Professional and Technical Consultants Association (Patca).

People who specialize in cutting phone bills, getting patents, evaluating software and microcomputer systems and marketing practices can be pinpointed with the reference tool.

Also available through Patca is a free referral service. Further details and directories can be obtained from Patca, Suite 3, Department RC75, 1190 Lincoln Ave., San Jose, Calif. 95125.

Communications Topic of Seminar

NEW YORK — "The New Office Communications Capabilities" is the name of a seminar being offered by Probe Research, Inc. here on Nov. 18-19.

The user panel at the seminar will include George Grove, regional director of telecommunications for the U.S. General Services Administration; Charles Schweis, manager of telecommunications of Ciba-Geigy Corp.; Brian Paxson, assistant vice-president of voice services at Equitable Life Insurance Co.; William Osborne, communications analyst at Bankers Trust Co.; and Donald Smith, former director of communications at *The New York Times.*

Interested parties can obtain further details from Probe Research, Inc., P.O. Box 251, Millburn, N.J. 07041.

Tracks Driving Strategy

Mini Gives Al Unser Racer's Edge in Mexico

By Bruce Cross
Special to CW

MEXICO CITY — "We didn't win the race," said Al Unser, steely-eyed driver of the Longhorn car in the Copa Mexico Indy 150 race held here late last month, "but that computer gave us the driving strategy that let us come in third place.

"You know, racing is not just driving like hell to get here first. There's a strategy to it. Every time you have to stop to take on fuel, it costs time. That's the whole point of our using a computer — to help us manage our time, to help us manage our fuel consumption."

Why does a Formula 1 race driver use a computer during a race? "It tells us when to burn up the track and when to back off and go easy on the fuel so that we'll have to fuel up one less time — and save just that much time," the two-time Indy champion explained.

"Bobby Hillin, owner of the Longhorn racing team, started racing with a computer in March 1980. We got the idea, the inspiration if you will, that a computer could help us plan strategy for our race," Unser said.

"We looked at several machines — Wang, Radio Shack, I think a Digital and Basic Four. We chose Basic Four Corp. because, aside from being a mini that could do the job for us, Basic Four was willing to agree to a deal that we couldn't refuse: We got the computer system in exchange for giving them the marketing rights to use the Longhorn racing team name in their own promotion.

"Basic Four supplies us with a Model 410 mini. With it comes three video terminals, a disk memory, a magnetic tape unit and cartridge, the software, plus four persons to run the system — a software field engineer, a maintenance expert and two data entry experts," he said.

Paramount Jobs

Jon Simms, the Basic Four development engineer who is responsible for software, described two paramount jobs that the computer does for Longhorn racing.

"First it tells us how everyone is doing at any given time in the race. Second — and this is the most important thing — the computer keeps track of fuel consumption on every lap of the 17 leading cars in the race.

"Every car carries 40 gallons of fuel," explained Simms, who looks more like a cowboy than a software expert in his tall Western hat and red bandana. "Our computer keeps track of each time a car stops and takes fuel. Every time a car stops for any reason it is fueled, so we know that every time a car pulls back onto the track it's going with a full tank."

"With all those facts," Simms said, "We can predict pretty accurately when each car will have to pull into the pits again — and we can predict what its position will be in the race."

"The reason for this is simple," he added. "We want to know when things are going to happen. We want to know when we're going to have to make pit stops for gas and tires. If we know that, then we can plan how we will run the rest of the race."

P.J. Schmidt uses a Basic Four model 7250 CRT terminal to enter data for each competing car into the Longhorn computer. Data fed into the computer includes how many laps each car completes, the times of those laps, fuel used, tire replacements, time of each pit stop and time under the caution light.

The computer tracks all the cars, but displays only the 17 fastest cars. It also computes the apparent fuel consumption of each car. With that information the computer is able to predict when each car will again have to stop in the pits for fuel and for new tires.

"So we can see what our position is against our top competitors," Hillin said. "The computer helps us with our racing strategy because it can keep track of many more variables than can one of us poor humans — and do it accurately.

"Let's say that we're running close to another car and there are only maybe 20 laps left in the race. We know what the other car's apparent fuel consumption is — we know that it's going to have to make a pit stop for fuel before the end of the race, and we know what our car's got.

"We know that if we slow down slightly, we will improve our own gas mileage and we can complete the race on the fuel we've got left if we ease off a bit.

"So that's what we do. We call our driver over the radio — he's got headphones built into his racing helmet — and we tell him to slow down a little.

"We let the other car pull ahead — because we know that he's going to have to stop for fuel while we'll just keep on going nice as pie to the finish.

"We started running with a computer in March of 1980," Hillin said. "We ran with it in 12 races prior to the Copa Mexico, and we led in four of them.

"But I believe that when it comes down to the crunch, then the computer can make all the difference and give us the strategy to win."

Crose is an associate editor of Computerworld/Mexico.

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IPL's 4446 is faster than IBM's newly-announced 4341-2 for most applications, costs less, and is field-upgradeable from the IPL 4443. First customer shipments of the IPL 4446 will be made in the third quarter of 1981.

To find out more about the new IPL 4400 family, call your local IPL representative. Or call or write: Vice President, Sales, IPL Systems, Inc. 360 Second Avenue, Waltham, Massachusetts 02154. (617) 890-6620.

ipl SYSTEMS INC.

St. Jude Hospital Enlists Dual ARC Systems for

SAN ANTONIO, Texas — St. Jude Children's Research Hospital here, celebrating its 18th anniversary, has made great strides over the years in medical data management and earned world acclaim for its research into catastrophic childhood diseases.

The development of a comprehensive information system has allowed important improvements in patient care in both the pharmaceutical and business administration functions of the hospital's complex treatment and research center.

The pharmaceutical department, headed by Larry Barker, is using a Datapoint Corp. Attached Resource Computer (ARC) system for all of its data entry and the major portion of its processing tasks.

The system is based upon 10 Datapoint processors and associated peripheral equipment.

Completely interconnected with a high-speed interprocessor bus, the system currently supports 25 Datapoint Model 3600 video display workstations dispersed throughout the facility on a functional requirement basis, four mass storage file units with a total storage capacity of 240M char. of information, 10 printers and one magnetic tape unit (see figure).

Included in the pharmaceutical application of the ARC system are patient data center, kinetics laboratory, contagious isolation, dietary pharmacy outpatient, accounting reports and bio statistics.

Also included are programming, order entry, labeling, general pediatrics and several more functions.

These categories and others interact to receive, share and disperse data wherever required within the total system.

In the order entry program, for example, a physician's prescription is entered into the system. The system then checks the interacting of this order in comparison with previous treatments and the possible accumulation tendencies of such treatments for current dose acceptability.

Patient's Protocol

The system also checks and determines if this order meets the patient's protocol which is necessary in keeping pure research data. If all is acceptable, the order is approved and entered as a valid prescription, the label automatically typed on a system printer and the dosage issued.

The Bio Statistics Department produces heavy numeric processing requirements and uses a Datapoint 3800 workstation to preprocess data and prepare a data tape on an associated tape drive. The taped data is then transferred to a Data General Corp. mainframe for final processing.

The processed data and statistical information is transferred back to the 3800 via tape and entered into the ARC system for dissemination to the proper files and for the preparation of required reports.

Six Inventories

Within the total pharmacy system there is a $500,000 inventory in medicines and $250,000 in supplies at any one time. Drugs are so closely controlled that up to six separate inventories are kept in balance on the overall inventory on a real-time basis.

These inventories include drugs in warehouse not issued to pharmacy, drugs locked in pharmacy storage not issued, drugs assigned to pharmacy front counter, drugs on dose carts being administered to inpatients and out-

(Continued on Page 41)

Fenwick Elected DPMA President

PHILADELPHIA — P. Roger Fenwick was elected international president of the Data Processing Management Association (DPMA) at its annual meeting here recently.

Fenwick, district staff manager at New York Telephone, New York, is responsible for developing, implementing and maintaining that company's billing methods and procedures. He will assume office on Jan. 1.

During his one-year term, Fenwick will head the 28,000-member organization in its goals of educating members and the general public about the information management field.

Chairman Named For DPMA '81

SAN FRANCISCO — Gene C. Giannotti, director of the San Francisco Bay Data Center for GTE Data Services, has been appointed honorary conference chairman for the 30th annual international conference and exposition of the Data Processing Management Association (DPMA) to be held here on Nov. 1-4, 1981.

Giannotti earned his certificate in data processing in 1967 and has served as president of the San Francisco chapter of DPMA from 1971-72. He has published articles on information processing and has contributed to one college text on the subject.

The DPMA '81 conference will feature over 50 siminars, workshops and special sessions related to information processing management functions, trends and industrial applications. Further information is available from the DPMA's International Headquarters at 505 Busse Highway, Park Ridge, Ill. 60068.

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Research in Catastrophic Childhood Diseases

(Continued from Page 40)

patients and drugs in shipment to local treating doctors.

When there is a need for additional data or program changes, the requesting doctors or committees use a request form developed by the Patient Data Center to specify the information need that is not being currently provided.

This can result in new program development, existing program enhancement and even the acquisition of new equipment within DP or in the laboratories which would be needed to provide data for the ARC system.

St. Jude's Pharmacy System, which was developed by Gamma Systems Services of St. Petersburg, Fla., uses predefined formats to guide most data entry functions.

This reduces errors and allows data to be entered at more than one workstation by various operators and still be valid.

Doctors and clinical personnel quickly learn to use the system simply by using a patient's name or number for bringing up a complete data review, either on the video display or by hard copy from a system printer.

Second System

In addition to the medical information systems, St. Jude Hospital has a second Datapoint ARC system which is used in the business office for numerous applications.

The business office ARC system consists of five Datapoint processors, three printers, 13 workstations and four mass storage units with 100M bytes of capacity.

"We are pleased with the versatility of the ARC system. Its ease of programming and operations makes it very useful both as a learning device and as an operational system of business machines," Administrative Computer Services Director Charles Sanders observed.

"Our dual ARC systems have upgraded our operation substantially and enabled the entire staff and facility to provide our patients and vendors with much improved service."

Within the Blood Bank program, for example, a donor file is maintained on all donors, providing a complete history on all donations by name, blood types and other culture breakouts.

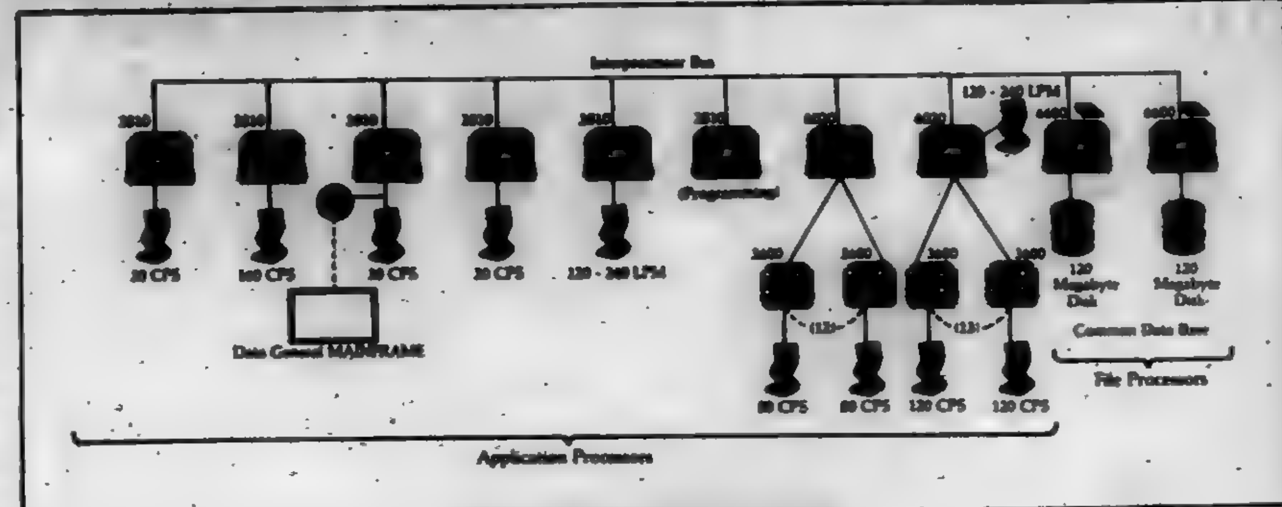
Exacting Inventory

An exacting inventory is kept on the location of all blood and the system "rotates" the inventory to ensure first-in and first-out usage. The file also contains all blood assignments to patients, records the actual infusion amount and any amount returned unused.

A complete transfusion record is maintained in the system on each patient and the data shared with other programs and files requiring the information.

"The volume of our work load, the inventory turnover, the legal requirements for reports, and just the sheer amount of paper work associated with our function could never be accomplished on a manual basis," according to Keith Kunkel, Blood Bank supervisor.

"The ARC, and its ability to share data and files, provides us with the services we need."



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With Hand-Held Terminals

Merchandiser Finds Time Savings in Its Hands

JACKSONVILLE, Fla. — With a single stroke, Sav-A-Stop, Inc., the nation's largest service merchandiser, has enabled its sales force to handle an additional 20,000 customer calls a year.

The time savings was accomplished through the purchase of 875 hand-held data entry terminals. Initial deliveries of the terminals to Sav-A-Stop began last summer, and the company is now putting them in the hands of its more than 800 salesmen, or "route merchandisers."

"We'll more than pay for the MIS/88s from MSI Data Corp. with the increased productivity of our route salespeople," Gregory Kaelin, corporate director of operations, stated. "But there will be substantial savings in other areas, too."

The company's method of ordering was virtually unchanged during the first 25 years of operation.

Each Sav-A-Stop route merchandiser maintained a separate order book for each customer and on each sales call would enter the quantity of each item ordered for that customer.

At the end of the day the route merchandiser would return to the territorial subwarehouses, drop off the order books and pick up the latest shipment of merchandise delivered by truck from the main warehouse to the region.

At the end of the delivery run, the tractor/trailer driver would retrace the route and pick up the order books left at the subwarehouses by the route merchandisers. The complete cycle took seven days.

Electronic Experiment

In 1975, Sav-A-Stop began experimenting with electronic ordering. That year it bought 10 Source 2100 portable data entry terminals from MSI and the following year puchased 130 Source 2200s equipped with scanners to read the MSI (modified Plessey) bar code.

Around these terminals, the company developed its Star system for Sav-A-Stop transmission and recording.

The terminals were placed in the company's 210 subwarehouses and, at least twice a week, each route merchandiser returns to the subwarehouse to turn over the order books to a data entry clerk, who scans the bar code beside each item ordered for each customer.

At the end of the day, the clerk dials the Sav-A-Stop divisional main warehouse and transmits all of the orders recorded.

The system's benefits include:

- More economical use of Sav-A-Stop's truck fleet by giving a 24- to 48-hour cushion. As soon as an order is received from a subwarehouse via a data entry terminal, Sav-A-Stop simulates the order on its IBM 370/145 computer, checking to ascertain whether all items are in stock or will be by shopping time.

This enables the firm to determine whether it has enough of each item to fill the order and facilitates scheduling of delivery runs. Additionally, trucks have more time to pick up merchandise from suppliers.

- Ability to receive orders up to midnight any night of the week via random dial-up.
- Reduction in the number of out-of-stock items on the picking lines.

Comparison Shopping

Sav-A-Stop eventually decided to upgrade and selected the MSI/88, but not until it had completed an extensive analysis of the products of two other competitors.

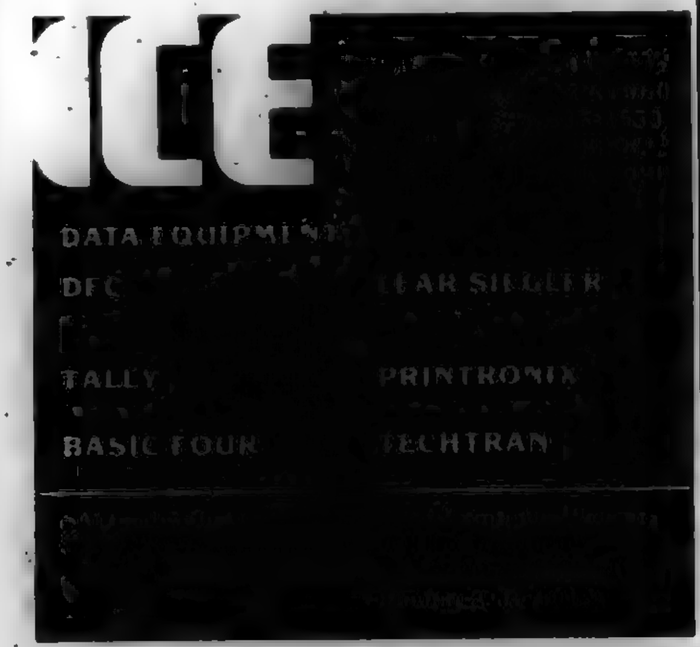
"The MSI was chosen because the terminal seemed to be sturdier and better constructed. We particularly like the sealed circuitry of the MSI/88, in view of the fact that we wanted a terminal our route merchandisers could take with them on their rounds," Kaelin said.

One of the savings identified by Kaelin was elimination of the individual order books maintained for each customer. Now the company has developed not only standard order books but also customized order books for each of its four types of customers — supermarkets, convenience stores, department stores and drug stores.

Today, the Sav-A-Stop route merchandiser no longer has to write anything to record an order.

The merchandiser simply takes the appropriate order book and scans the bar code for each of the different items of merchandise to be ordered for each customer.

Using the MSI/88 with bar-coded order books, Sav-A-Stop expects to save at least $75,000 a year on order books alone, Kaelin asserted.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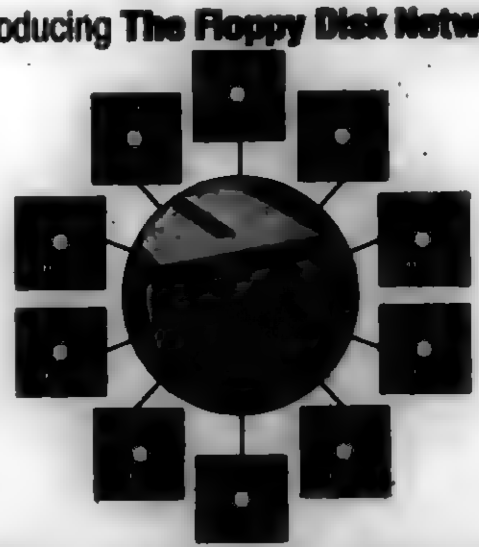

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Sparks Corporate Rethink

Power Plant Switches to Paperless Transactions

GUELPH, Ont. – When Canadian General Electric (CGE) wanted to revamp its inventory system, collect supplier debts and reduce clerical staff at its power transformer plant here, it installed an on-line manufacturing control system.

Since then, the plant, which employs 800 workers, has discovered the advantages of rapid and efficient information management and paperless transactions. The system has led CGE to rethink many aspects of the way it does business.

CGE's material group's modernization objective was to integrate all master scheduling, purchasing, inventory control, production control, traffic, customs, stores, receiving and operational planning within one system.

But according to Jim C. Gray, material manager, one of its first lessons was that software should dictate the selection of hardware. After investigating many packages, CGE selected the MS-11 manufacturing system from NCA Corp. Its software was specifically designed for Digital Equipment Corp. PDP-11 mini computers.

CGE chose MS-11 after being impressed with its proven customer base. "Proven, to us, meant that it had to be in use for at least a year," Gray said. "We were able to obtain a list of MS-11 installations and compare their results with our expectations."

Predicting the modernization effort would pay for itself within a year and a half, GCE expects benefits in three categories. First, a reduction in inventory by reducing queues of material ahead of final assembly. Secondly, improvement in purchasing due to use of commitment reports, better supplier tracking and negotiation. And finally, a reduction of clerical staff.

Inventory Control

Fully integrated with the MS-11 system, CGE uses the (material requirements planning) (MRP) capabilities as an inventory rescheduling mechanism. When schedules change for any reason, these changes can be reflected at all levels down to individual purchased parts and raw materials. "Real-time operations are the key point in having better confidence regarding the location of material orders and their due dates," Gray commented.

Also contributing to inventory control are commitment reports, another by-product of the MS-11 system. A detailed and aggregate tally of all items promised to be bought from vendors in this and all future periods, the commitment report is analyzed by Gray and his supervisors on a regular basis.

"When the aggregate for a current month is running higher than our estimate of what the aggregate should be, we can look at all the items and determine which jobs they are scheduled for," Gray explained. "From there, we decided which purchases should be delayed."

Pressuring Suppliers

CGE uses up-to-the-minute MRP reports from MS-11 to put pressure on suppliers to improve their material shipments. For example, whenever supplier sales and marketing people call on CGE buyers, the buyer first takes them to a terminal and prints out the open-order status for that supplier. Discussion then becomes, "Before we talk about new orders, let's talk about what you still owe us."

MRP and open-order reports are also used to negotiate with suppliers for better prices.

To train suppliers in using its MRP System, CGE is developing a series of seminars. "If we can give them the whole picture of what is on order, say six months out, they can plan their production accordingly," Gray pointed out.

CGE's third objective, the reduction of clerical staff, was accomplished through attrition. Now inventory control, purchasing, receiving, stores and a large part of operational planning is handled realtime on one of 17 materials-dedicated terminals.

Minor Adjustments

CGE has made several minor adjustments to the software system. Most have concerned doing business in Canada as opposed to the U.S. and operating in a multinational environment.

"We needed conversion factors built in to compensate for different currencies and metric/standard measurement," Gray said.

"Also, our addresses had to be developed for intracountry exchange. NCA provided these when asked; and, in fact, incorporated some of them into their packages."

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Nov. 19-21, Phoenix — **Simulation Modeling & Analysis.** Institute for Professional Education, Inc., Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 19-21, Atlanta — **Effective Computer Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 19-21, Washington, D.C. — **Fiber-Optic Communications Systems.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 20, London — **FPS Introductory Overview.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 20, Chicago — **Software Maintenance Seminar.** Contact: Shetal Enterprises, Inc., 1787 B W. Touhy, Chicago, Ill. 60626.

Nov. 20, New York — **Financial Decisions: Choosing a Financial Decision Support System.** Contact: Real Decisions Corp., 123 High Ridge Road, Stamford, Conn. 09605.

Nov. 20, London — **APL*Plus Ltd. Introductory Overview.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Nov. 20-21, Middlebury, Conn. — **Software Reliability Seminar.** Contact: Computing Trends, Inc., 6925 56 Ave. S., Seattle, Wash. 98118.

Nov. 20-21, San Diego — **Educational Computing in the '80s.** Contact: Ron Langley, Computer Center, California State University, Long Beach, Calif. 90840.

Nov. 20-21, Washington, D.C. — **Computer-Aided Graphics.** Contact: Data Processing Management Association Education Foundation, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Nov. 20-21, Minneapolis — **Informatics National Shareholder Managers Symposium.** Contact: CSS/Informatics, Inc., Suite 387, 340 Interstate N. Parkway, Atlanta, Ga. 30339.

Nov. 20-23, Boston — **Personal & Business Computer Shows.** Contact: National Computer Shows, Inc., P.O. Box 678, Brookline Village, Mass. 02147.

Nov. 24-26, New York — **Developing Computer-Based Accounts Payable Systems.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 30-Dec. 2, Andover, Mass. — **Imaging Industries Over the Next Decade.** Contact: Institute for Graphic Communication, Inc., Floor 4, 375 Commonwealth Ave., Boston, Mass. 02115.

Nov. 30-Dec. 3, Colorado Springs, Colo. — **Micro Thirteen,** sponsored by the Institute of Electrical and Electronic Engineers and the Association for Computing Machinery, Inc. Contact: G.R. Johnson, Engineering Science, Colorado State University, Fort Collins, Colo. 80523.

Nov. 30-Dec. 3, New York — **Money Transfer Conference.** Contact: Bank Administration Institute, Inc., P.O. Box 500, Park Ridge, Ill. 60068.

Nov. 30-Dec. 4, Houston — **National Telecommunications Conference.** Contact: Walter E. Ulrich Consulting, Suite 12, 11030 Kingspoint Road, Houston, Texas 77075.

Dec. 1, Chicago — **Utility Programs.** Contact: EDP Audit Associates, Inc., P.O. Box 366, Summit, Ill. 60501.

Dec. 1-2, Orlando, Florida — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20654.

Dec. 1-2, Utrect, The Netherlands — **Data Courier On-Line Training.** Contact: Data Courier, Inc., 620 S. Fifth St., Louisville, Ky. 40202. Also being held Dec. 4-5 in London.

Dec. 1-2, Atlanta — **Integrating Word Processing & DP.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 1-2, Boston — **Computer Graphics.** Contact: Data Processing Management Association Education Foundation, Suite 1016, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

Dec. 1-2, Cambridge, Mass. — **Data Base Management.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 1-2, Dusseldorf, W. Germany — **Viewdata Congress.** Contact: Dr. H. J. Grobe, Diebold Deutschland GmbH, Feuerbachstr. 8, D-6000 Frankfort/-Main 1, W. Germany..

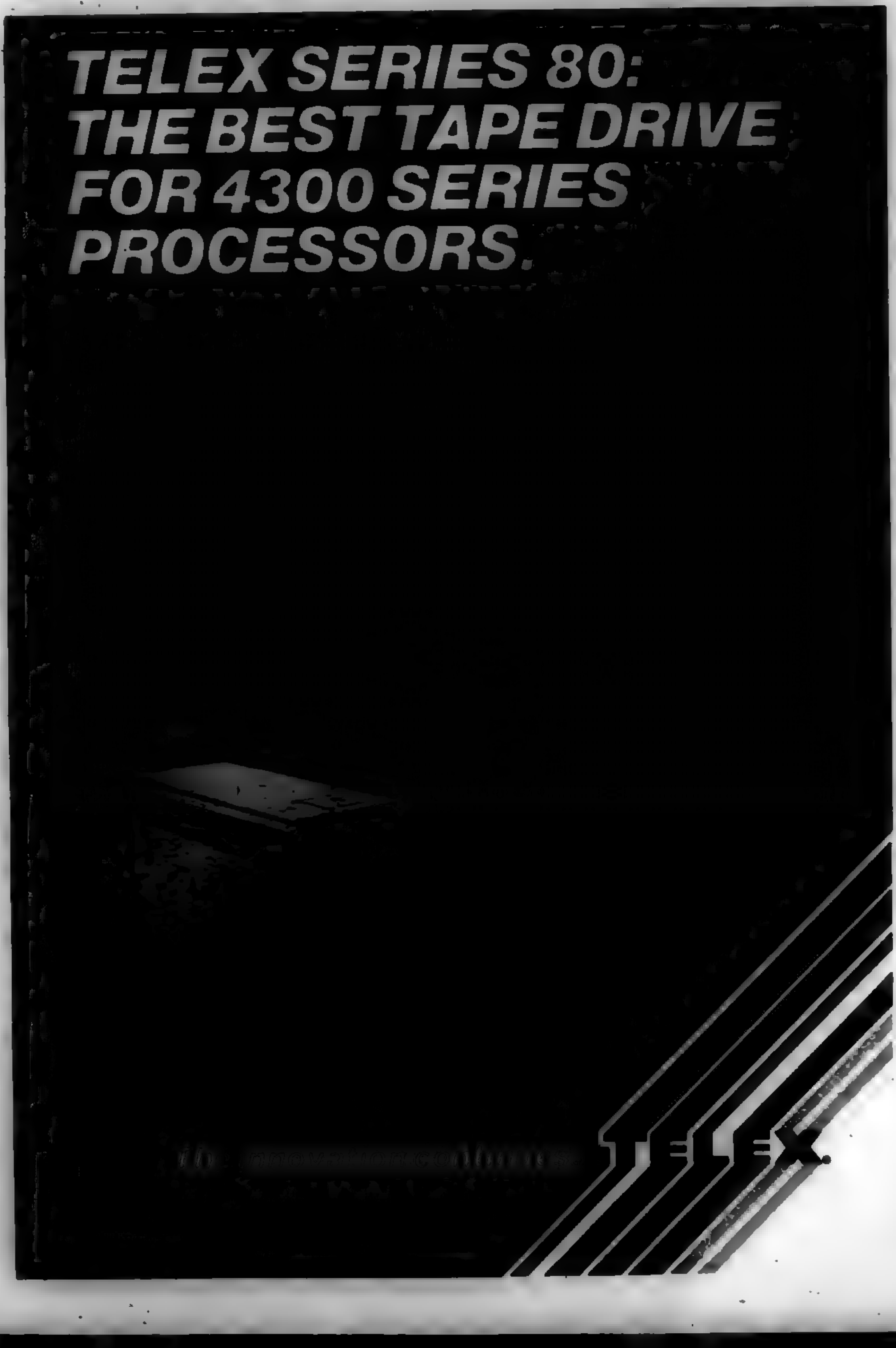
Dec. 1-2, Chicago — **Computer Graphics: In-Depth Seminar on Application & Technology.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 1-2, Chicago — **DP Fundamentals for Management and Users.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 1-3, New York — **Data Communications: An Introduction to Concepts & Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Dec. 8-10 in Denver.

Dec. 1-3, Phoenix — **Developing DP Systems for General Ledger and Financial Statement Preparation.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Dec. 15-17 in New York.

Dec. 1-3, Mexico City, Mexico — **Designing, Installing and Managing an International Telecommunications Private User Network.** Contact: Kathleen Kerns, Telecom Systems Group, Inc.,



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Dec. 1-3, San Francisco — **Decisions by Design.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 1-3, San Diego — **Data Processing Security.** Contact: Data Processing Security, Inc., 200 E. Loop 820, Fort Worth, Texas 76112.

Dec. 1-3, San Francisco — **Local Network Architecture.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

Dec. 1-3, Arlington, Va. — **Computer Crime Info — Computer Security and Fraud Control.** Contact: Gil Merritt, The Information Exchange, Suite 400, 1730 N. Lynn St., Arlington, Va. 22209.

Dec. 1-3, Atlanta — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637. Also being held Dec. 15-17 in New York.

Dec. 1-3, Toronto — **APL Systems Design.** Contact: Numetrix Seminar Administrator, Numetrix Ltd., Suite 600, 3 Church St., Toronto, Canada M5E 1M2.

Dec. 1-3, San Francisco — **Audit and Control of On-Line Systems.** Contact: the Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 1-4, Phoenix — **Computer Elements Workshop,** sponsored by the Institute of Electrical and Electronics Engineers Computer Society. Contact: W. Rosenbluth, IBM, 9500 Godwin Drive, Manassas, Va. 22110.

Dec. 1-4, Phoenix — **Senior Project Management.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Dec. 8-11 in New Orleans and Dec. 15-18 in San Francisco.

Dec. 1-4, Portland, Ore. — **Structured Systems Analysis and Design.** Contact: Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

Dec. 1-5, San Francisco — **CICS/VS Intervals.** Contact: Online Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Dec. 1-5, Atlanta — **Structured Systems Analysis and Design.** Contact: Improved Systems Technologies, Inc., Suite 4500, 888 Seventh Ave., New York, N.Y. 10106. Also being held Dec. 1-5 in San Francisco.

Dec. 1-5, Miami Beach, Fla. — **Symposium on Distributed Data Acquisition and Control,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: Dr. Earl Swartzlander Jr., TRW R3/2004, 1 Space Park, Redondo Beach, Calif. 90278.

Dec. 2-3, New York — **The Print Publisher in an Electronic World.** Contact: Sheila Frank, Knowledge Industry Publications, 2 Corporate Park Drive, White Plains, N.Y. 10604.

Dec. 2-3, New York — **Advanced Strategies in DP and Communications.** Contact: The Yankee Group, Harvard Sq., P.O. Box 43, Cambridge, Mass. 02138. Also being held Dec. 9-10 in Palo Alto, Calif.

Dec. 2-4, Cleveland — **Managing the DP Training Function Workshop.** Contact: Advanced Systems, Inc., 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005. Also being held Dec. 9-11 in Atlanta.

Dec. 2-4, Gaithersburg, Md. — **Precision Time and Time Interval Applications and Planning Meeting,** sponsored by the National Bureau of Standards, the National Air and Space Administration and agencies of the Department of Defense. Contact: Arthur McCoubrey, A-363 Physics Bldg., National Bureau of Standards, Washington, D.C. 20234.

Dec. 2-4, Roseland, N.J. — **Manufacturing Planning and Control.** Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174. Also being held Dec. 9-11 in St. Charles, Ill.

Dec. 2-4, Andover, Mass. — **Home Video/Information Market.** Contact: the Institute for Graphic Communication, Inc., Floor 4, 375 Commonwealth Ave., Boston, Mass. 02115.

Dec. 2-5, Boston — **Computer Performance Evaluation in the '80s,** sponsored by Computer Measurement Group, Inc. Contact: Judith G. Abilock, Price Waterhouse & Co., Office of Government Services, 1801 K St. N.W., Washington, D.C. 20006.

Dec. 2-5, Atlanta — **Basic Project Management: Planning, Scheduling and Control.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Dec. 8-11 in Boston and Dec. 15-18 in Phoenix.

Dec. 2-5, Sunnyvale, Calif. — **Programming in Ada.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to Calendar, CW Editorial Department, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701, at least six weeks prior to the month in which the event is slated to occur.

Dec. 2-5, San Francisco — **Voice Planning.** Contact: Systems Technology Forum, 8991 Cotswold Drive, Burke, Va. 22015.

Dec. 3-5, San Diego — **Planning Data Networks.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

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EDITORIAL

Too Much Interference?

With computers now being used in every facet of elections — from polling and targeting, through direct mail fund-raising and political persuasion, to electronic voting and Election Day results projections — one may well ask, "Who really elects the President?"

In the area of polling, computers allow pollsters to process huge amounts of demographic and survey data in an effort to pinpoint the issues certain voters want to hear about, how voters feel about a candidate's stand on those issues and how a candidate should present his views in a certain geographic area.

Such information can then be used as the basis for direct mail campaigns, in which campaigners send millions of computer-generated "personalized" letters to those people most likely to be receptive to the ideas presented in them.

Direct mail efforts can help raise hundreads of thousands of dollars, sway undecided voters toward a particular candidate, round up volunteer workers and get out the vote.

Then, on Election Day itself, millions of voters cast their ballots using either mark-sense or punch-card electronic voting machines that reportedly cost less; offer greater portability, storage and ease of use than mechanical lever-type machines; and feature audit trails as well, for greater accuracy. Those votes are commonly converted to impulses on magnetic tape and tallied by computer.

And while voters on the West Coast are still casting their ballots, armies of television poll-watchers, field interviewers, technicians and commentators are busy analyzing East Coast results in a network race to predict the winner.

Besides the argument that such projections take the fun out of the American tradition of waiting for the final election returns, there are those who fear such projections can actually sway Westerners to "go with the winner" or to become discouraged and not bother to vote at all.

While the computer-based methods certainly allow the candidate to use his campaign funds in the most efficient manner, it is obvious that the capability exists for manipulation of the electorate — especially through aiming specific messages at portions of the electorate and through Election Day projections.

It is time to ask whether it is the good of the candidate or the good of the state that is paramount. Are computers in politics simply the tools of man, or is the ordinary man at the mercy of those computers?

DATA PAST

Five Years Ago
Nov. 19, 1975

WASHINGTON, D.C. — The Federal Bureau of Investigation was denied permission to proceed with its computerized message-switching system until legislation could be passed to regulate the exchange of computerized criminal history information. U.S. Attorney General Edward H. Levi tabled the communications plan, bringing to an end a six-month dispute between the FBI and members of Congress.

— — —

MAYNARD, Mass. — Digital Equipment Corp. had completed specifications for its Decsystem-20. Internal company documentation claimed the hardware provided a multitasking, multiprogramming environment to support concurrent time-sharing, batch and transaction processing.

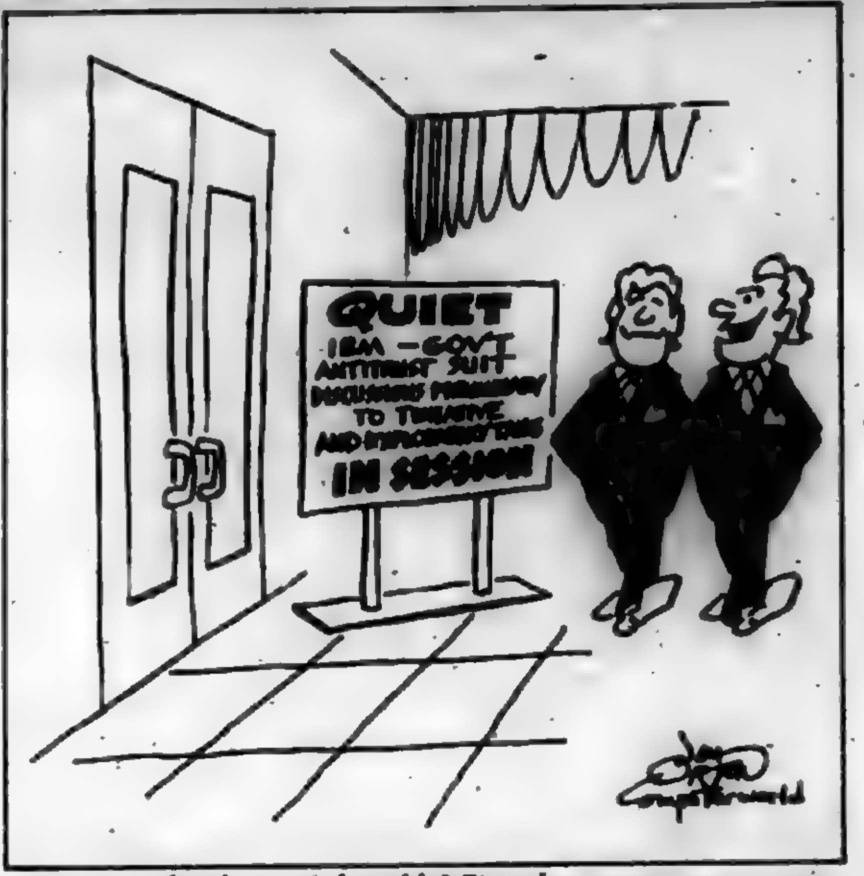
Eight Years Ago
Nov. 15, 1972

NEWTON, Mass. — Independent suppliers were exepected to have good news soon for IBM 360 users who wanted to add a virtual storage capability to their systems. Most independents and leasing companies admitted more than a passing interest in Dynamic Address Translation (DAT) "boxes," but it was believed that few already existed.

— — —

HOUSTON — While computer-based voting systems worked smoothly in most places around the country, a major problem occurred in Harris County (Houston), Texas.

Some names were reversed on the ballots and the entire vote was challenged on the basis of irregularities in the vote-counting system.



'Agree on the shape of the table? First they gotta agree to use a table . . .'

LETTERS

Scare Tactics

Computerworld erred in two areas in the Oct. 27 editorial "The FAA Must Act Now." First, by liberally quoting from other news media, the presumption is created that those writers are knowledgeable of the topics of which they write. Second, by reprinting rhetoric from the Professional Air Traffic Controllers Organization (Patco), CW articulates one side of a labor/management dispute.

As usual in a labor/management dispute, there is truth on both sides. The Federal Aviation Administration (FAA) is quite correct in pointing to the significant safety record that is a combination of computerized automation and professional air traffic controllers (people). The controllers are also correct in pointing to system deficiencies and inadequacies of equipment.

However, scare tactics and rhetoric that indicate potential mid-air collisions do a disservice to the public that travels by air. That public is relatively unsophisticated about flying and insecure in an unnatural element while completely in the hands of someone they neither know nor particularly trust.

I am a 1,000-hour pilot of some 11 years' standing with single-engine, multi-engine and instrument ratings. I am also a 22-year professional in the information systems industry with 15 of those years in management.

I strongly suggest that *Computerworld* stick to areas of known expertise — specifically, computers, data processing and information services — and not muddle in what is essentially a labor/management dispute.

Barry R. Hemphill
Elmhurst, Ill.

Project Deserves Contempt

Twelve years and only 25 cases of welfare fraud ["Matching Uncovers Two-State Welfare Fraud," CW, Oct. 13]! The auditors of Pennsylvania and Ohio used computers to match state welfare rolls and are presumably proud of this dubious technique which came up with $83,742 in illegal payments since 1968.

Has there been any statement of what the project cost? Especially in terms of lost opportunity to invesigate corporate tax fraud, for example? I should think the state governments would be boasting of the integrity of their welfare-eligible populations rather than trumpeting this trivial success.

I should think computer professionals involved would be trying to pass on to their superiors the contempt that such a project deserves.

Peter S. Graham
Bloomington, Ind.

It Was a Basic Four

We'd hate to think that all word processing systems look alike.

For the record, the system displayed at top, center, on Page 11 of the Oct. 13 issue is the brand new Basic Four Spectrum 80 Information System, introduced at Info 80 by the Basic Four Information Systems Division of Management Assistance, Inc., not a Vydec word processor.

As the excellent story on Page 13 of the same issue indicated, Spectrum 80 Information Systems are in a class by themselves.

William F. Rigby
Group Vice-President
Marketing
Basic Four Corp.
Tustin, Calif.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

READER COMMENTARY Durward P. Jackson

Deskilling Programming: Management Issues

The structured methodology debate is alive and well and living in the pages of the professional press. Structured programming, especially, is taking its lumps and receiving its share of praises.

Even James Martin [*Computerworld Extra!*, Sept. 17] has entered the debate arena by asserting that structured methodology can contribute at best 10% to programming productivity. Martin believes that order-of-magnitude improvements are needed in the decade ahead and that they can be achieved only through nonprocedural, very high-level languages.

He is right, of course. We do need the benefits of better software tools, and slowly we are getting them. Natural languages for data base update and retrieval are available, although they are better suited to prototype developement and on-line query than to batch production systems. Application development aids and a vast array of utilities are reducing coding redundancy.

But strucutured programming does have its place. It is available today, easy to learn and, contrary to many opinions, adaptable to Cobol, the most widely used procedural language. Furthermore, it has the potential of greatly increasing programming productivity, certainly not by tenfold, but probably more than the 10% quoted by Martin.

Definition Hang-Up

One of the problems with structured programming is in the definition. Depending on the programmer's perspective, it is (a) the absence of GOTO statements, (b) extensive user of multiply-nested IFs, (c) table-driven code, (d) modular design, (e) "what I have been doing for the last 20 years" or (f) all of the above.

In view of all these definitions, one more could not possibly add to the confusion: structured programming is a *standard* methodology for creating programs that are elegant because of their *simplicity*, *reliable* because of the reduction of the number of "moving parts," *maintainable* because of their modular structure and *minimally documented* because they are so explicit. Each of these characteristics deserves more discussion.

Standardization is as important in DP as in other corporate endeavors. Without standardization, training of new employees is difficult and effective quality control and supervision impossible.

Simplicity is an important feature of good engineering and good programming.

The engineering definition of reliability is based on how long something operates before it fails. Increased reliability in engineering systems is obtained from reducing the number of component parts, improving the reliability of each part and using redundant parts.

There is no direct parallel here between engineering and software reliability, but some of the same principles apply. For example, transfers of control (GOTOs) can be thought of as moving parts. Any reduction in the number of GOTOs should improve reliability because of the decreased structural complexity.

Maintainability is concerned with reducing the time required to correct malfunctions or make design modifi-

(Continued on Page 54)

SOFTLINE/Werner L. Frank

What Are We Integrating With WP and DP?

During the '70s it was very popular to speak about the integration of computers and communications. In fact, the relationship of these industries was often described as a marriage of two technologies.

We are now witness to another integration which, in keeping with the times, may be more of a cohabitation than a true betrothal. I am, of course, referring to the coming together of word processing (WP) and data processing.

The advertising hype, however, is confusing. It is not clear which of the following propositions are being put forth:

(1) The same computer can provide either WP or DP.

(2) In a given computer and given software operating environment, it is possible to switch back and forth between WP and DP.

(3) With a given computer, it is possible to simultaneously share the CPU resource for either WP or DP from any two or more terminals.

(4) A WP system is capable of being hooked to a second system which may be a DP system.

(5) WP documents, thought of as files, can be operated upon by the DP software, and vice versa.

(6) Data from files derived from DP can be accessed, coordinated and integrated into WP-generated documents.

(7) WP capabilities are enhanced beyond the mere handling of text to include additional functions, more often identified with DP, such as sorting and arithmetic operations.

(8) DP capabilities are enhanced beyond the mere handling of numbers and character strings that are associated with formatted files to also have the facility to manipulate text and manage documents.

(9) WP equipment and functions are part of a more total system inclusive of communications, DP and reprographics so that capture of information in any one medium or system becomes channeled and available in another.

(10) WP can be used to manipulate and reformat any file, whether originated under WP or DP.

(11) A common data base management system (DBMS) underlies both WP and DP.

(12) The terminal device and associated keyboard is designed to operate so that it can be used interchangeably between WP and DP.

(13) Both the WP and DP responsibilities throughout an organization are centralized within the same unit.

Synergy or Compatibility?

Perhaps integration is meant to suggest one or all of the above. It certainly is not clear from the promotional campaigns of the vendors whether the intent is to achieve synergy or compatibility.

Perhaps one way to approach the question of what "integration" is would be to review the changing aspect of DP and WP.

DP first took on an aspect of WP when the edit function was introduced through the popularization of timesharing. This quickly led to early text-handling technology through mainframe-oriented systems such as IBM's

(Continued on Page 50)

HUMAN CONNECTION/Jack Stone

Execs Cynical About DPers, Not Machines

It may be hard to believe, but there are still many user executives and managers in major organizations who continue to shun all manner and form of computerization.

In explaining why this is so, we DPers usually sally forth with technology-driven reasons, such as:

- "User managers are technology ignorant, and they fear what they don't know."
- "User managers are concerned that machines will displace them and they are bothered by job insecurities."
- "User managers are worried that their employees will become more knowledgeable about the technology than they are and the employees will make the managers look foolish in the eyes of the top execs."

However, I recently became involved in a fascinating project from which I obtained an entirely different perspective on why certain user managers have played the arch-conservative role in the automation process.

Here is the situation. A large multinational organization is in the process of building a global distributed DP system. Unfortunately, the technolgical experience of nearly all the overseas offices is little more than the use of the hand-driven pencil sharpener.

Wisely, the DP department limited the initial phase of the program to the introduction of stand-alone minis that support several proven DP applications and word processing. Their implementation idea is to gain office acceptance of the local system and then, after the staff begins to rave about all the thrilling things they can do with it and cry out for more capabilities, hook it onto the net.

However, because the DP staff was so heavily involved in systems development activities and couldn't get too excited about training user managers and execs, the company went outside to get this job done and I wound up with the assignment.

Reasons for Foot-Dragging

The systems people warned me that I would see a great deal of resistance to the machines and cited all the reasons noted above, which, at least prior to the first class, I believed to be valid. But the user managers gave this explanation for their foot-dragging.

- "Just because we're not living in the States, it doesn't follow that we are unknowing about computer developments in multinational organizations. And even though we are inexperienced, we are fully aware of the significance of computer-based information systems and how they can help us improve the organization and maintenance of our data and provide us information services that are impossible to achieve otherwise. We are realists in what we can expect from computer systems and are sensitive to the problems of the development of worldwide networks."
- "In spite of our positive attitude toward business automation, our DP colleagues have chosen to give us the label of 'technology reactionaries.' We feel this is certainly unwarranted because we really are enthusiastic proponents of business automation. They don't seem to understand that we have a great deal more confidence in the way machines perform their jobs than we do in the DPers. Frankly, they have done such a lousy job, we don't want to waste our time supporting another dumb system."
- "And there's lots of past history to justify this assessment, such as this story. Some years ago, the DP department decided that all the overseas offices needed a certain complex business machine and a short time later, each office found one sitting on its loading dock. Although the machine had installation and operating instructions, almost no one in the field had the technical expertise necessary to interpret the instructions and use the equipment, and there were no plans for training.

"Furthermore, the equipment was hardly designed for the power supply conditions we have in many overseas areas, and after some offices finally figured out how to get the machine going, the fluctuating line voltage destroyed reliable operation.

"Finally, only a handful of offices were near the vendor's maintenance support facilities; so when the machines failed, most of the office managers moved them into dark corners to collect dust. This tale serves as an example of why it is the DPer, not the machine, that we don't want to do business with."

What Are We Integrating With WP, DP?

(Continued from Page 49)

ATS. Following this, two related capabilities emerged, the processing of text into a form suitable for photocomposition and the handling of text-oriented data bases for library-type browsing and reporting. These capacities were all big-computer-, DP-oriented.

In the meantime, the electric typewriter was extended in capability by introducing electronics and magnetic recording. Such systems were freestanding and independent of the DP center management, as well as separate from the computing tasks themselves.

As the CPU decreased in price and increased in capability and the CRT terminal became a lower cost device, the freestanding, enhanced typewriter became a freestanding electronic word processor.

The stage had been set: DP operated on files, WP produced documents and communications handled mail. These three functions seem to belong together and yet they were emerging in use and control in different parts of the organization.

Is not WP an example of where software could be eliminated and a hardwired solution would be most applicable?

However, a number of observations were made:

(1) Information collected under WP or DP could be of mutual use to the other system. For example, a personnel file contains names and addresses useful for generating letters. On the other hand, filling out a form, under WP, involves the collection of certain information that should find its way to a formatted data file.

(2) Documents generated under WP are at once also transmittable over communications wires and subsequently displayable on distant terminals. Text capture by WP is the single most important step toward realizing electronic mail and/or the paperless office.

(3) WP is a convenient way to restructure or reformat an output print file generated by a DP application program. In this way, the WP function could be used to generate more richly endowed text-oriented reports incorporating selected output information from formatted data files.

(4) The WP function is really a form of source data entry that has become a major focus for DP systems. The concept of one-time capture, no duplication of keystrokes, can be exploited via WP and the benefits passed on to DP.

Control, Consistency

This brings us back to the basic question of what is meant by integration. At a minimum, integration connotes the effort at control and consistency in use of hardware and communications to achieve information exchange between WP and DP. Such integration would be manifest if the following were possible:

(1) The WP device can interface through a standard communications protocol to a DP system and send text files (documents) for storing and/or forwarding.

(2) Information entered via WP can be selectively identified and peeled off into separate files that can subsequently serve as input files into well-defined DP applications.

(3) Text captured by WP can be further processed into specialized and structured files suitable for formatted handling within the capabilities of the modern DBMS.

(4) Data files derived from DP operations can be operated upon by WP functions such as format redesign, cut and paste, column movement, column arithmetic operations, repagination, search and replace of phrases, introduction of annotations, updating or revising and automatic checking for spelling.

No Standards

But standing in the way of this integration is the present absence of standards and structure in WP in relation to those that have developed on the DP scene.

For example, there is the issue of the special characters embedded in a text file generated by WP, present to facilitate that document's handling for output. How will DP dispose of such symbols? Then there are simple procedural issues such as the emphasis on the personal files aspect in WP vs. more public file attitudes within DP.

The disciplines of DP must be inserted into the world of WP before a successful marriage can be completed.

In reviewing and analyzing this question of WP and DP integration, an interesting phenomenon comes to the surface.

WP, at the outset and as a goal in itself, was a perfectly good and excellent candidate for a specialized and dedicated computerized function. In fact, if anything, is not WP an example of where software could be eliminated and a hardwired solution would be most applicable?

Nevertheless, having isolated and perfected this application, the next step of the vendors and users was to seek integration with other ongoing activities.

We are now on the threshold of this bringing together. But will the wave of specialization soon overtake us again, break asunder these very same functions and seek their independence once again?

"Not since the early 60's have MIS departments faced such significant changes as those that are about to occur."

E. Drake Lundell, Jr.
Editor of Computerworld

Computerworld will 'Forecast 81' Inside and Out in its combined Year-end Wrap-up Issue, December 29 and January 5, 1981. Ad close is December 12.

From the **Inside**, **Computerworld**'s editorial staff will be taking a close look at:

- **How to protect your software.**
- **Relational data bases: Fact and Fiction.**
- **DP unionization in 81: What to expect.**
- **What's ahead in local networks.**
- **Network architecture: SNA vs Others.**
- **U.S. information policy after the election.**
- **Delivery delays: How long must users wait.**
- **Venture Capital: How much for computer firms?**
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And from the **Outside**, industry experts will report on:

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- **Integrating word and data processing.**
- **Graphics: What can it do for you?**

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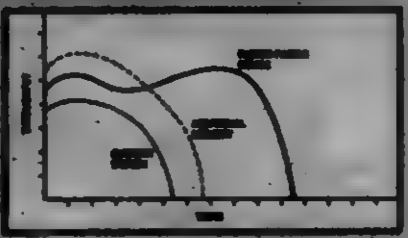

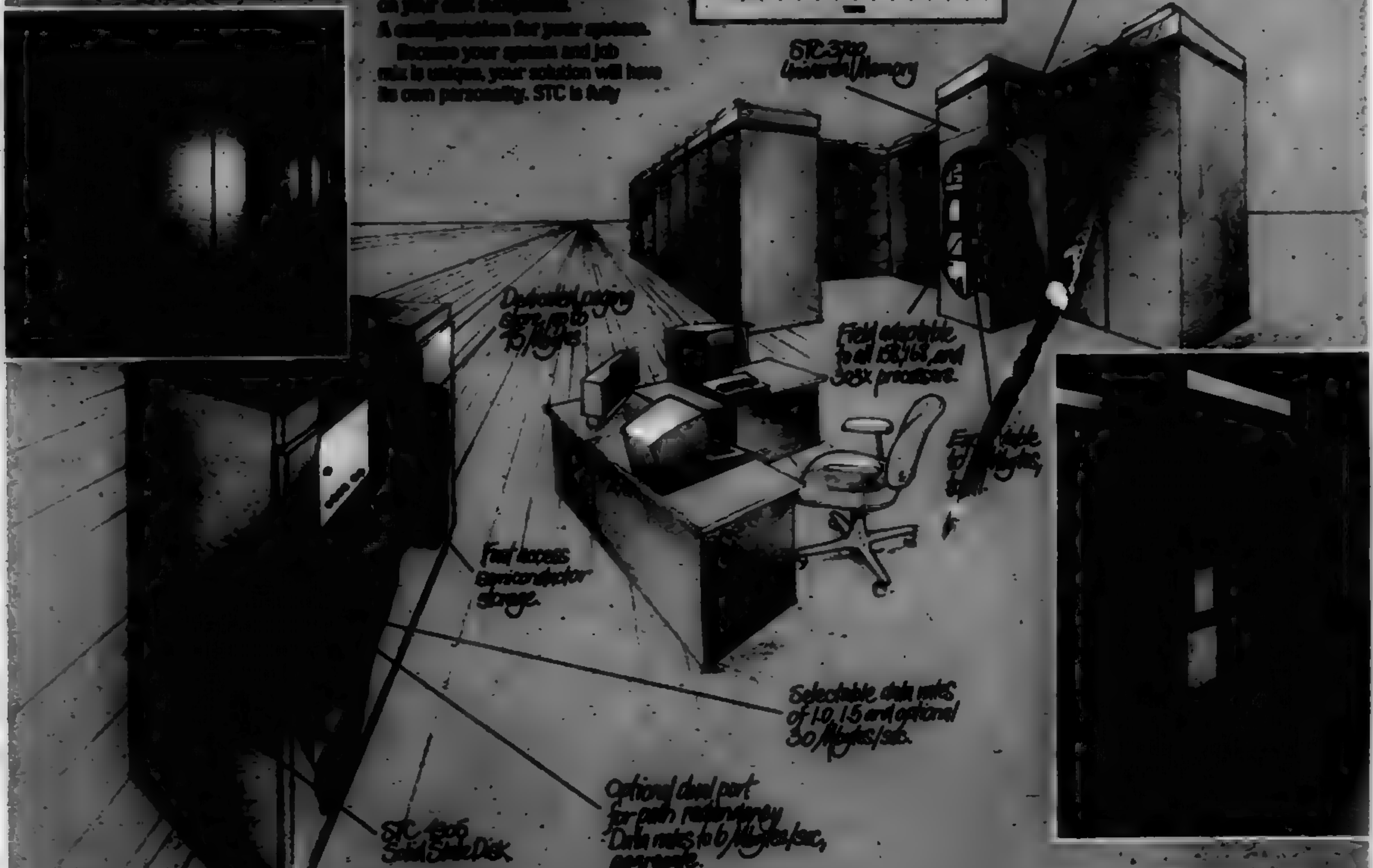
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LETTERS

Out for a Swim

Concerning "Programmers Slammed for not Keeping Up" [CW, Oct. 20], Dr. Richard Hamming, in my opinion, is very narrow minded.

A programmer is like a fish; he will only develop as the environment will allow. That is, if management would provide the software, hardware, vendor education, freedom of mind, adequate development and test time and all other necessary tools, a programmer will only be nonproductive if he was inadequately interviewed before he got the job.

In other words, a nonproductive programmer is just a human being out for a swim, while a productive programmer is like anything else which is suited to its environment.

Peter M. Codispoti
Williamsport, Pa.

Implausible Position

I cannot believe that *Computerworld* would print such an implausible article as "Programmers Slammed For Not Keeping Up."

Dr. Hamming is under a great misunderstanding if he thinks programmers themselves are to blame for not keeping up technologically with their industry.

Most programmers have limited personal time because of the amount of time they must devote to a home or extra hours at work. Also, not until programmers are paid in the professional salary range of $35,000 to $45,000 can anyone expect them to take the time and additional money to keep up with technological advancement.

It would be more realistic for Dr. Hamming to expect employers to reinvest their profits in education of their programmers to make the employee more valuable to his company. This is usually not done because DP departments are more concerned with meeting their deadlines and budgets.

The only realistic way in which a programmer can "keep up," if his employer is not contributing, is for him to change jobs every few years to move with a company that has higher technological opportunities. This very reason is why the average stay of a DP professional is two years.

I thing it would help stabilize the computer profession if "honored software experts" like Hamming would rethink their philosophies of professionalism.

Lawrence E. McCarthy
Joliet, Ill.

Color, Sex and DP?

Black Data Processing Associates? Association of Women in Computing? I never realized color or sex had anything to do with computing.

I am reminded of a costume worn by someone attending the Science Fiction convention in the early '60s. The fellow had blue greasepaint on every exposed square inch of skin and carried a placard proclaiming "Martian Civil Rights."

Maybe he was really from IBM.

E.G. Johnston
Westminster, Md.

Case Dismissed

A recent *Computerworld* article reported a lawsuit brought against my client, Joseph Hershman, by the Leeds & Northrup Co. This lawsuit alleged that my client "maliciously and willfully" deleted a large number of programs from the active files of Leeds & Northrup [CW, Sept. 8].

The institution of this suit was widely publicized in the metropolitan Philadelphia area and in trade journals. The unfortunate aspect of this lawsuit and the attendant publicity is that Hershman was acting to protect Leeds & Northrup as well as himself by attempting to prevent tampering with the computers.

Unfortunately, Leeds & Northrup did not contact Hershman prior to instituting this suit in an attempt to uncover his motivations.

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LETTERS

Finally, I would like to note that the lawsuit filed by Leeds & Northrup against Hershman was dismissed on Oct. 17 by the Honorable Vicent A. Cirillo of the Montgomery County, Pa., Court of Common Pleas. The dismissal included an agreement by Leeds & Northrup and Hershman that his actions were undertaken with no malicious intent and that Leeds & Northrup suffered no compensable damages as a result of Joe's actions.

I hope this letter serves to clear up any misunderstanding or bad impressions that may have been created by the lawsuit and its attendant publicity.

Mark C. Schultz
Norristown, Pa.

Response to Strong

Recently, *Computerworld* has published a series of letters relating to the use of independent consultants. As a national organization representing independent firms, we feel it is necessary to respond to specific points in the letter from Al Strong printed Sept. 29.

To begin with, we agree 100% that whether "freelancer" or any other outside service, the buyer must beware. Throughout our industry there are many truly professional organizations and many others that no one would like to admit exist.

Next, Strong states that independent contractors help cause a high turnover rate at their client companies. The reason given was that employees become "envious of their freelance counterparts who do not put in as many hours, do not have the same career concerns with a job and do not concern themselves with the successful completion of each task. Yet, the employees make half as much money as freelancers."

To begin with, most freelancers put in many more hours than salaried employees. It is true they have different career concerns, but that is a function of deciding to run one's own business.

Finally, to even suggest that they are not concerned with the succesful completion of each task is a slur on the professionalism of our members. Data processing is a very small, tight community. Poor performance cannot be kept a secret for long.

As to income, when you consider the benefits and noncash items that employees receive, there may not be a large difference between their pay and that of a consultant. Remember, the hourly rate that one charges does not go directly to the bank. There are expenses for phone, office, secretarial, legal, accounting and other business functions that an employee never worries about.

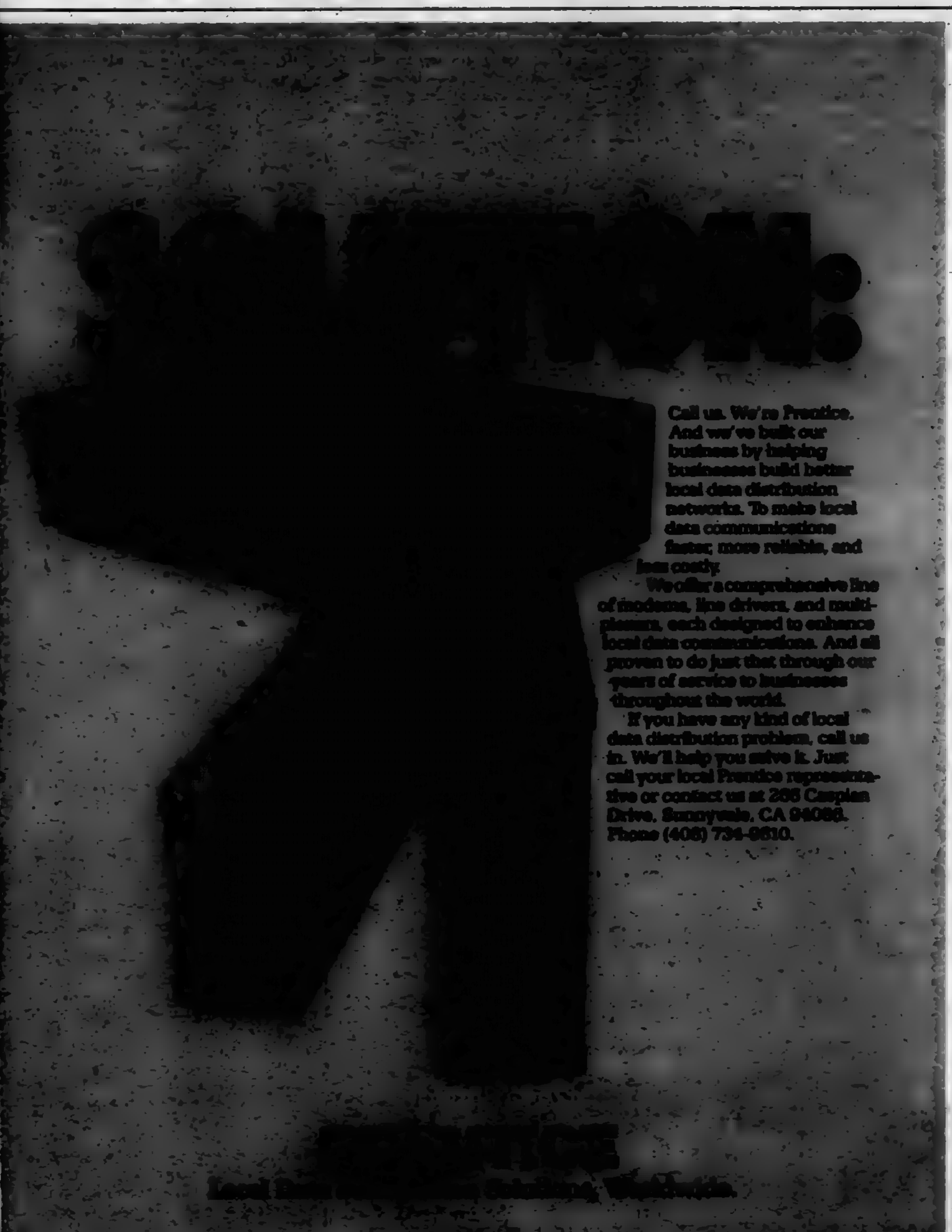
Concerning the comment on the inability to get an independent back "during prime shift hours," this can be a concern with independents or contractors.

Obviously, both groups must produce additional business to be successful. Therefore, as much billable time as possible is scheduled.

Knowing many hundreds of consultants across the country, I feel confident in saying that most will do everything in their power to assist a past client who needs help at any given time. More important, this help will be provided without major interruptions in current project work.

Strong stated that the Independent Computer Consultants Association (ICCA) cannot ensure the reliability of a freelancer's product, nor the technical competence of our membership. This is true. It is also true that there is no way to assure the same reliability or competence for any contract service organization. ICCA is taking a step in the direction of providing the community with a means of evaluating reliability and competence based on actual experience.

Steven A. Epner
President
ICCA
St. Louis, Mo.



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Deskilling Programming: Management's View

(Continued from Page 49)

cations. Modern fighter aircraft can be maintained by semiskilled mechanics largely because of the "black box" concept. The aircraft is composed of modularized equipments that can be easily removed and replaced. In like manner, the modularized program can be maintained by entry-level programmers because it is well-structured, easily readable and decomposable into "remove and replace" routines.

Documentation is critical to the success of a system over its life cycle. It almost never gets done, especially at the program level. Cobol was once touted as a self-documenting language, but "tricky code" requires elaborate flowcharts, decision tables and so forth to supplement the source code. Structured Cobol does eliminate the need for external documentation except for a simple structure chart and some minimal level of descriptive narrative.

If all these benefits accrue from structured methods, why then is there so much controversy? The answer is related to the people who must implement structured methodology and goes far deeper than just resistance to change.

Programmers are, in many respects, a breed apart. They are above average in intelligence, analytical and independent. Being mostly technical types, they are probably less knowledgeable and less concerned about the rest of the organization. Thus, they see their job as an end in itself and often as a source of amusement.

None of this is said in a derogatory sense. Dedication to the craft is an essential element of any technical job. The engineer also engages in "hobby shop" activities. Making work fun is necessary in order to improve the quality of work life and the quantity and quality of production. But the manager who lets these activities go on in an uncontrolled way is serving neither his subordinates nor the organization.

The dichotomy, then, is how to use structured programming to improve productivity while maintaining employee interest and motivation. Structured programming does involve deskilling the programming job. It does involve a lot of mundane work. It will turn off some programmers, even some very good ones.

On the other hand, it will allow a DP department to hire people with just average programming skills. There is a limited supply of super programmers in the world, and they are increasingly expensive and will leave at the drop of a better offer. Less skilled individuals can handle structured programming at far less cost and risk of turnover and still do a creditable job.

There are also benefits for the super programmer. Well-structured programs can substantially reduce the number of late-evening telephone calls so familiar to DP people. The resulting reduction in stress levels can only improve the quality of work life as well as home life.

Motivational Problems

This is not to say that the motivational problems in a structured programming environment will not be serious. The manager must recognize the impact of deskilling on programmers' morale and motivation. How he handles this touchy issue will largely determine the success of any structured methodology program.

One thing the manager must do is understand the real purpose of structured programming — that is, to make people's weaknesses irrelevant. Few people in our society have the IQ to understand a spaghetti-like structure of GOTOs and mutliply-nested IFs. On the other hand, there is a vast pool of talented people who can be very effective in a structured programming shop. Structured programming makes their weaknesses irrelevant to the job to be done.

But what of those high-powered programmers who resent being reduced to the lowest common denominator? One solution is to put them to work in areas where their talents are more useful. Programmers are logical candidates for jobs such as systems design, equipment or software evaluation, data base design, programming supervision, quality assurance and telecommunications. The manager must be alert to these and other career alternatives.

The manager who is convinced of the importance of structured programming must do four things to make it a reality. First, he must announce the decision forcefully so that there is no question as to the corporate direction. Second, he must develop and publish a set of guidelines or standards. Third, he must provide for the necessary training. Finally, he must ensure compliance with the standards while listening to the reasoned arguments of his staff.

Compliance with the standards must be aggressively pursued. During the initial implementation stages, programmers must be closely supervised. This means management must actually read the program.

Structured programming is not the panacea some would like to make it, but the basic principles make good engineering sense. The improvements in productivity will be substantial if the method is properly implemented. Problems in implementation involve primarily human issues, which must be overcome with firm but understanding management.

Durward Jackson is a management and information systems consultant based in Lancaster, Calif.

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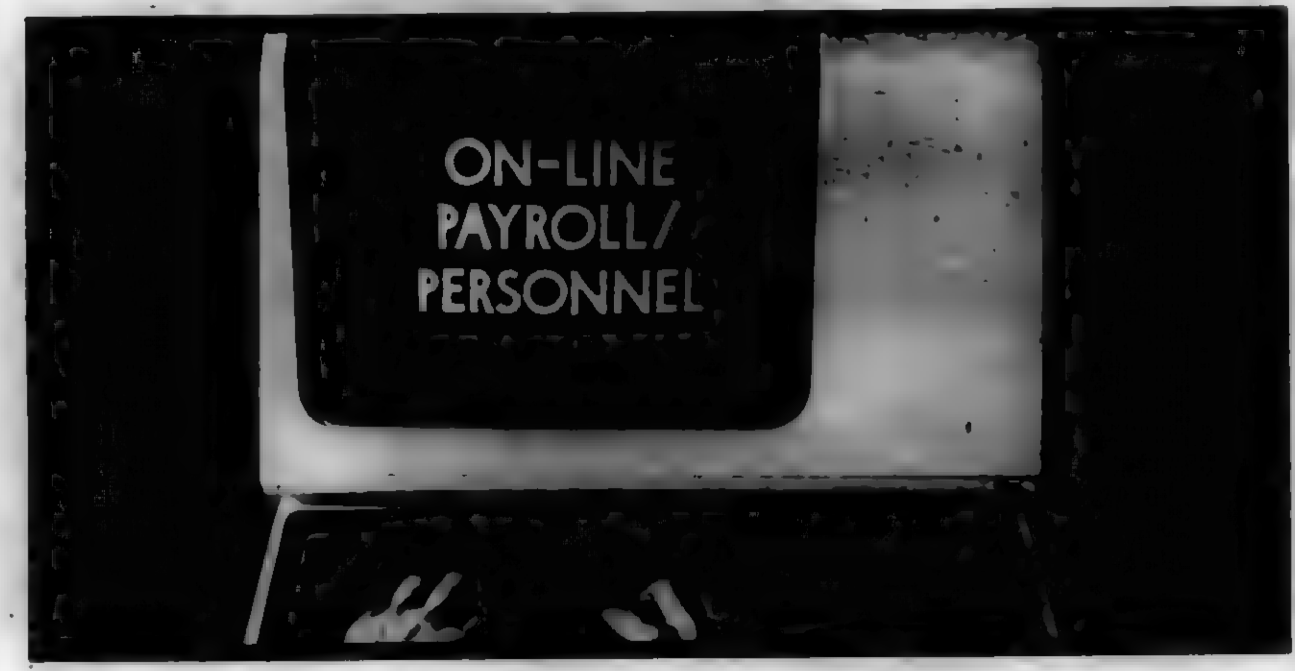

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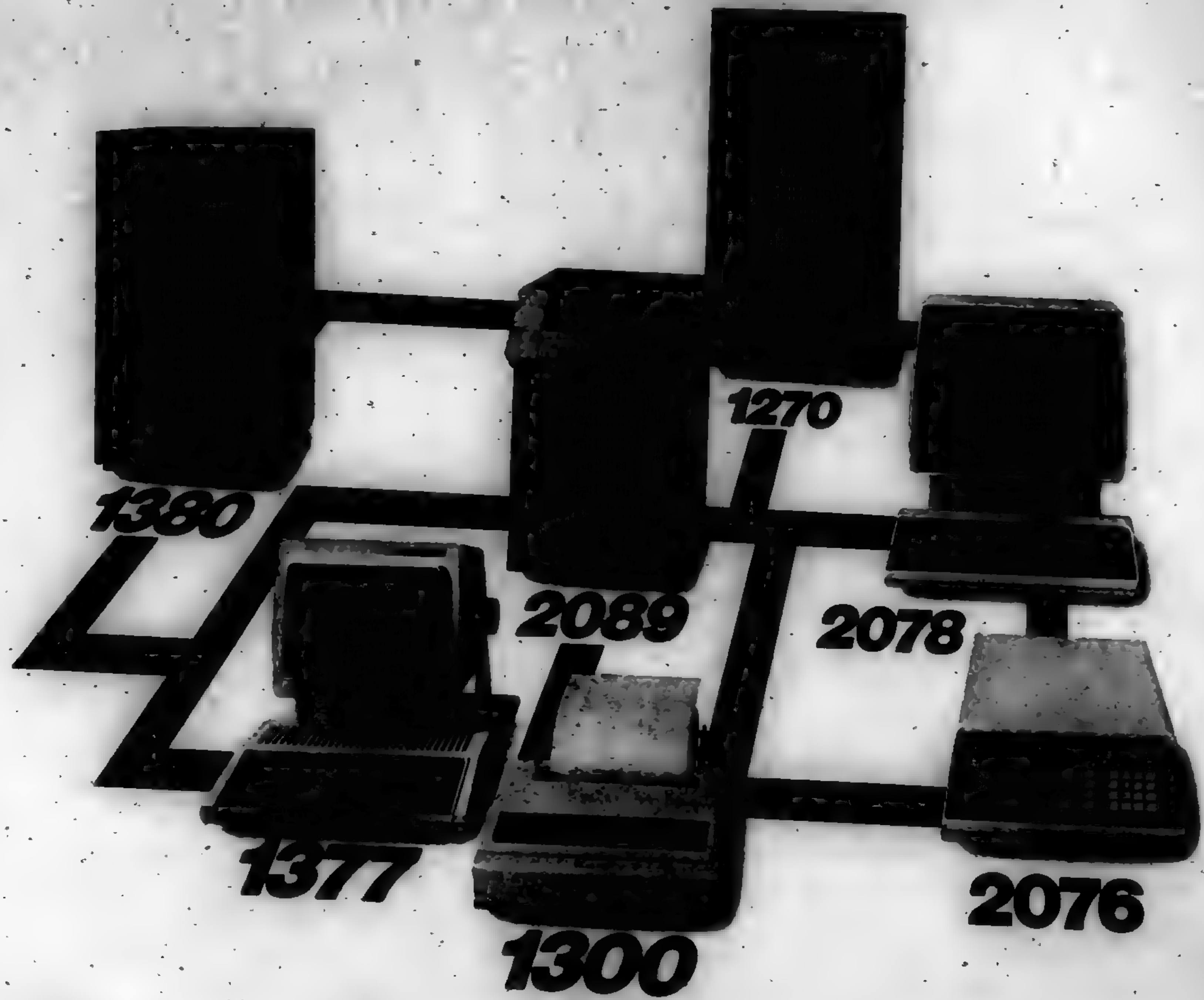

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A DBMS As Witness For Prosecution?

By Rita Shoor
CW Staff

NEW YORK — Company XYZ is being sued for an unspecified amount of money by a former employee who has allegedly been hospitalized because of toxic fumes he inhaled while on the job. Chief witness for the plaintiff is company XYZ's hard-working, uncomplaining data base management system (DBMS).

A DBMS as witness for the prosecution?

That's a legal risk that some firms will have to consider when designing data bases in the next decade, according to Dr. Alan Westin, a professor at Columbia University.

The specialist in public law and government used the concept of a DBMS in court in a session entitled "Privacy and Access Issues — On Personnel Data Systems" during the National Conference on Human Resource Management Systems here.

Given the regulations required by such government agencies as the Environmental Protection Administration and Occupational Safety and Health Administration, many firms may be forced to collect increasing amounts of sensitive medical data about employees. Some companies are already combining this information with data about the employees' exposure to possible occupational hazards such as toxic chemicals, Westin said.

(Continued on Page 58)

Built Around Relational Model

'Oracle' a Possible New Breed of DBMS

By Stephen Wright
Special to CW

Webster's dictionary defines an oracle as "any person of great knowledge or wisdom." Oracle also happens to be the name chosen by Relational Software, Inc. for its data base management system (DBMS), and my initial impression after working with it through a CRT terminal was a wish that it had been available in the "old days" — that is, the 1970s.

Developed around a relational model, Oracle offers several features that could be used to identify it as one of a possible new breed of DBMS.

These include:

- Utilization of a common language for most data base interaction instead of the more typical separate languages for end-user queries, data base design and report-generation functions.
- Lack of complicated data structures that the data base user often must deal with and the programmer has to "code around."

Three Components

Written in C, the language developed for Bell Laboratories' Unix operating system, Oracle consists of three major components: the nucleus or Kernel, the Sequel 2 (SQL) language and the data dictionary.

The Kernel is the heart of the Oracle DBMS. It manages SQL and the data dictionary and dynamically maximizes re-use of memory-resident data by controlling all Oracle system buffers. One copy of the Kernel can support multiple data bases in one CPU.

Oracle is not based on the chain pointers used in a hierarchical DBMS. The elimination of pointers provides the potential for improved performance and increased flexibility in defining new data relationships. Compressed indices help cut down the processing needed to add or delete a record because there is less data to process. This processing tends to be a problem in some other inverted list systems, but it is the price that often must be paid for added flexibility.

Touted as a relational data base management system, Oracle was introduced to the end-user market several months ago [CW, June 30]. Wright, a consultant with Arthur D. Little, Inc. in San Francisco, recently put Oracle through its paces on a Digital Equipment Corp. VAX-11/780 supermini; this is his description and evaluation of the software.

Data security and integrity are ensured via two software commands. GRANT allows a table owner to extend access to his data to other users. TRIGGER allows an update in one table to initiate a corresponding update in another table, if desired by the table owner.

Oracle also includes a multithread access feature that provides support for multiple simultaneous updates and queries against the data base. I/O operations can be overlapped up to the hardware limit.

SQL, the data base interaction language, was originally developed by IBM as the high-level interface for that vendor's yet-to-be-released System R. It allows the user to describe his request to the Oracle system with little difficulty and is especially easy to learn for those people having prior experience with National CSS, Inc.'s Nomad system.

SQL is a nonprocedural language, which means that you tell the system what you

(Continued on Page 62)

'Relational' a Relative Concept

By Rita Shoor
CW Staff

"Relational" — like beauty — is a concept that is defined in the mind of the beholder.

If the beholder is a satisfied end user, it probably doesn't matter if the relational data base management system (DBMS) utilizes a physically relational data structure or the more common hierarchical, networking and inverted list structures.

That point was made by Stephen Wright, a consultant with Arthur D. Little, Inc., when he was specifically asked whether he would describe Relational Software, Inc.'s Oracle as a relational DBMS (see related article).

"One school of thought holds that a relational system is one which physically relates everything [each piece of data] to everything else," he explained. "There is nothing like that now."

However, there is another school of thought which states that if the data appears to the perceptions of the user in a relational manner, then from a practical standpoint, it is a relational DBMS, Wright maintained.

And, does Oracle fulfill this definition?

At least one user, who wished to retain his anonymity, felt that it did. Oracle allows the data to be normalized and presented in two-dimensional tabular form — an easier concept for the programmer to grasp than other data structures, according to the shy source. "This allows us to cut down on the requirement for the analysts to interact with the programmers," he said.

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Legal Hazards of Data Base Design Previewed

(Continued from Page 57)

One factor that management must keep in mind when coordinating this information in a data base is controlling access to extremely sensitive medical information about things like sexual performance, he continued.

Tort Law Concepts

Another possibility is that present tort law concepts provide a plaintiff with the capacity for charging the company with "minute-by-minute knowledge" of when things began to happen in a tort claim action against a firm with this type of data base, according to Westin. "The data base can be subpoenaed."

Westin felt that this connection between issues of privacy and broader business trends such as "management recognition of positive employee dissent" marked another change in the pattern between individual privacy and computer systems that began to evolve nearly 30 years ago.

"During the late '50s and early '60s," he recalled, "there was a complete fascination with computer systems. Everyone's attention was on getting the systems up and reducing processing costs." The focus at this time was on the positive aspects of computer productivity. The potential effect of computer systems on individual privacy was getting very little attention, he said.

Sometime between 1964 and 1969 came the period of what Westin described as "early alarms." Books like Vance Packard's *Naked Society* contained chapters on computer data banks and referred to "the electronic goldfish age." The idea that machines would dominate decision making was prevalent and people assumed that anything that a computer could "possibly do" it would "inevitably do."

In the business world, Westin said, the first payroll systems were functioning and statistical reporting efforts had been successful. The integration of all information known about an employee to aid in manpower planning and government regulatory reporting was the next area of concentration — in essence, the concept of a data base.

The era from 1968 through 1974 was one of "empirical investigation," he continued. Both government commissions and private groups were studying the effect of the computer on business systems.

Results of these studies led to the conclusion that, contrary to earlier opinions, computerization didn't inevitably lead to "knowing everything about people" — mostly because the cost was too high. Instead, automation was leading to the creation of data files that included only the most frequently used information about an employee.

Westin maintained that these commissions found that it was the company's policy about letting people have access to their own files was the real area of importance — rather than the fact that the system had been computerized.

New concepts that emerged during this period of empirical investigation included the application of fair information practices to the area of credit reporting. The Fair Credit Reporting Act which went into effect in 1970 was "an excellent first shot," Westin said, in providing the individual with some control over information that had been gathered about him.

Privacy Consideration

The fourth phase extended from 1974 to the present and may be considered the period of the first major legal intervention and interpretation regarding an individual's right to privacy, he said.

The Privacy Act of 1974 applied fair information practices to the government sector. A Privacy Protection Study Commission was formed in 1977 to determine which areas of information access should be subject to government legislation and which should be left to voluntary regulation within the private sector, Westin explained.

During this same time period, companies like IBM and Bank of America appointed task forces to determine the rules of confidentiality and access that should be included in voluntary privacy regulation, he said.

More than 50 large firms have joined in this voluntary effort. Combined with a "dramatic change in [company] attitude" from the 1930s, 1940s and 1950s, when it was an accepted practice to perform an extensive screening on a prospective employee's political loyalty, sexual role and life-style, these task forces have made top management in these firms feel "pretty clean" about their information-handling practices, Westin said.

Ironically, he pointed out, because these firms have become more responsive to employee needs and safety requirements, they've moved from collecting information about morals, politics and life-style to collecting extensive medical and economic data — areas of equal sensitivity.

Therefore, as the decade closed, approximately 50% of the Fortune 500 firms have to take a "very close look at their files," Westin maintained.

He speculated that the focus on privacy in the next decade would shift to methods for handling legitimately collected but sensitive information.

He also predicted a debate over federal vs. state privacy legislation that would continue growing over the next 10 years, but felt that federal legislation would not be enacted for at least five more years.

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Keyvest Provides Portfolio Management

DENVER — A portfolio management system designed to provide investment decision-making reports has been released here by Keyvest, Inc.

Income statements, cash flows, realized capital gains and transactions histories are included in reports provided by the system, according to a company representative.

Keyvest's system reportedly features institution reports that embrace the investment philosophy defined by the particular institution. "Categorization of risks and returns or diversification schemes are solely a matter of top management's objectives, policies and controls [with this system]," a spokesman claimed.

In order to achieve transportability, he continued, hardware-independent random-access methods as well as standard Ansi Cobol statements and symbolic JCL are used throughout the system.

The system provides more than 90 investor and management reports that are designed to fit one standard 120-char. form. This allows for a reduction in the costs tied to the initial forms purchase as well as their storage and movement, he claimed.

In addition to offering a Keyvest system license, the firm provides the following alternatives for potential customers:

- A service bureau. Keyvest handles input, processing and output and provides clerical assistance as required.
- A software service. Keyvest runs the system on an IBM 3033 via a General Electric Information Service Co. Terminet hook-up. The customer controls data entry, verification and report distribution.

Available immediately, the software license costs approximately $30,000. Prices for operating the system as a service are variable with the primary determinants being: number of accounts, number of assets, number of assets per account, number of transactions per day, number of pages printed and frequency of processing, a spokesman explained.

Keyvest is located at Sakura Square, Plaza Level, 1215 19th St., Denver, Colo. 80202.

Package Aids Headhunters

MARINA DEL REY, Calif. — Mini-Systems Associates, a technical placement firm, has announced a software package that reportedly enables firms to find the right DP or engineering professional for their needs.

Search, written in Basic for the IBM 5110 or 5120, can be used to find contractors and permanent employees, according to the vendor.

Potential candidates are classified by background and areas of expertise. Requirements for a specific job are keypunched and a printout appears listing those people most qualified.

The package carries a license fee of $2,500. The firm is located at 634 Venice Blvd., Marina Del Rey, Calif. 90291.

Order Modules Run on PDP-11

NORWALK, Conn. — A series of modular software programs that automate all aspects of order processing, inventory control and accounting for any type of manufacturer has been announced by Remote Business Services, Inc.

Written in Dibol, the programs are designed for use on any Digital Equipment Corp. PDP-11 minicomputer system operating under the CTS300 or CTS500 (RSTS) operating systems.

Each package is written so that it may be used stand-alone or interactive with other modules.

System prices are: bill of material, $5,000; material requirements planning, $7,500; order entry/billing/inventory/purchasing, $7,500; and accounts receivable/sales analysis, $2,500. Source code is provided.

The programs are supported on a direct dialup basis through remote diagnostics. A trial or demo plan is offered via remote terminals.

The firm is located at 9 Bettswood Road, Norwalk, Conn. 06851.

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Application Software Three-Pack Joins Science Management's 'BAS'

RIVERDALE, Md. — Science Management Corp. has unveiled three application software packages that run as part of its Business Application Software (BAS) under the Idol data base management system.

The Wholesale Distribution System, the Construction System and Insurance Agency Production System are operational on the Basic Four Corp., Rexon Business Machines, Inc., IBM Series/1, Texas Instruments, Inc. TI 990, Pertec Computer Corp. PCC200 and Onyx Systems, Inc. computers.

The Wholesale Distribution System is designed to process order entry, inventory control, sales analysis, accounts receivable and payable, general ledger, payroll and purchase orders. It costs between $12,000 and $20,000, depending on the number of modules desired.

The Construction System was created to process accounts payable, payroll, job cost (work in process) and general ledger functions. It costs between $14,000 and $22,000, depending on the number of modules desired.

The Insurance Agency Production System combines accounting, rating and word processing cost reduction programs. It costs between $14,000 and $17,000 depending on the number of modules desired, the vendor said from 3711 Sarvis Ave., Riverdale, Md., 20840.

Applying Yourself?

Have you been applying yourself to purchased software this year? *Computerworld* is interested in hearing about your experiences with applications packages for a forthcoming Special Report.

CW's readers want to know the special considerations involved when interfacing these packages with various data base management systems; what to do when an applications package almost — but not quite — fits your needs; and any other factors that affect buying and implementing applications software.

Typed, double-spaced manuscripts no longer than five or six pages should be sent by Dec. 12 to Rita Shoor, Senior Editor/Software and Services, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

'TDP/3000' Lets HP 3000s Process Text, Documents

PALO ALTO, Calif. — Hewlett-Packard Co. has announced that its HP 3000s can now do text editing and document processing, as well as DP.

Using HP terminals and HP 3000 Series 30, 33 or III computers, according to the vendor, the firm's TDP/3000 text and document processing software adds a command-driven word processing system to the computer's DP capabilities.

TDP/3000 is said to offer such editing capabilities as adding, deleting, modifying or rearranging all or part of a document. The package reportedly provides extensive formatting capabilities for the creation of letters, multicolumn reports, tables, form letters and other special document needs.

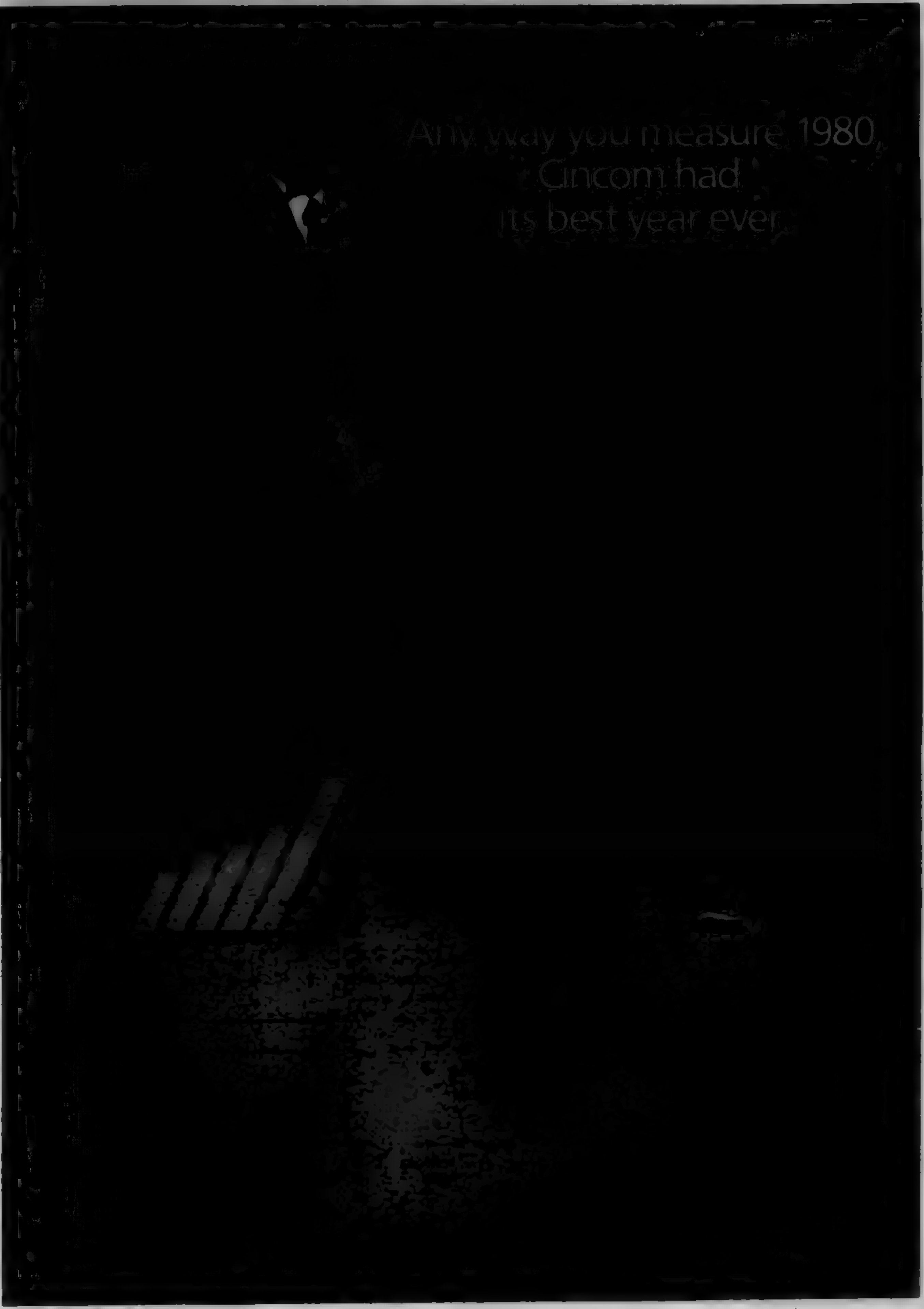
The first copy of the TDP/3000 is $6,000, with each additional copy costing $3,600. Customer service support costs $60/mo from 1501 Page Mill Road, Palo Alto, Calif. 94304.

WP Aid Made For Blis/Cobol

ORLANDO, Fla. — The Center for Cobol Software, Inc. is offering a word processing (WP) package in Cobol that is compatible with Blis/Cobol operating systems executing on Data General Corp., Ampex Corp., Point 4 Data Corp. and other DG-compatible minicomputers.

The system is available in either object or source programs and is reportedly easy to learn for nonprogramming personnel.

It costs $2,500, the vendor said from Suite 207, 5104 N. Orange Blossom Trail, Orlando, Fla. 32804.



Offices Get Mail System

CAMBRIDGE, Mass. — Information Data Search, Inc., a business research service, has introduced IDS/Mailbox, an electronic mail system that allows users to receive research material through an office terminal.

Designed for the user who needs information quickly or who does not have access to major libraries or information centers, IDS/Mailbox is said to send and receive messages of any size and shape.

With no monthly charges, clients pay a one-time application fee of $25, plus computer time. There is no minimum required usage.

The firm is located at Suite 2A, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

Datapoint 1500 Gets Ansi Fortran

SAN ANTONIO, Texas — Datapoint Corp. is offering Ansi Fortran for the firm's 1500 dispersed processors.

Datapoint's version of the language is said to meet all Ansi X3.9-1966 standards less complex data type and includes several extensions that improve programmer productivity.

Datapoint Fortran can run on any 1500 processor with 60K bytes of main memory using the DOS.H operating system.

Datapoint Fortran costs $500 for the initial licensing fee plus a $10 monthly maintenance fee, the vendor explained.

Datapoint is headquartered at 9725 Data Point Drive, San Antonio, Texas 78284.

CICS, Copics Security Aided

SAN JOSE, Calif. — A software package that provides security for IBM's CICS transactions and Copics functions is available from Scott-Kennard & Associates, Inc.

The User Profile-Security Utility (Upsu) was designed to work as a front end with the IBM Copics software programs and serves as a security monitor for all CICS transactions.

Features include verification of passwork and log-on, verification of secured transactions and verification authorization at the transaction level.

Upsu costs $5,000.

The vendor can be reached through P.O. Box 23839, San Jose, Calif. 95123.

Axxess 'Aims' Academic System At Prime 500, 1000, 5000 User

MOUNTAINSIDE, N.J. — An administrative and academic system for higher educational institutions is available from Axxess Information Systems, Inc.

The Academic Institution Management System (Aims) serves up to 63 on-line display terminals simultaneously. The software runs on Prime Computer, Inc. 500, 1000 and 5000 minicomputer systems.

Academic processing needs covered by the system include registration, fund raising and financial tracking and reporting, among others, the vendor claimed.

The price for the system ranges between $65,000 and $82,500, depending on the number of modules desired, the vendor said from Suite 102, 200 Sheffield St., Mountainside, N.J. 07092.

'Oracle' DBMS A New Breed

(Continued from Page 57)

want done rather than how to do it. The following example illustrates the commands required to raise the salary of employee No. 1552 to $22,000.

```
UPDATE EMPLOYEE
SET SALARY = 22000
WHERE EMPNO = 1552
/
```

(EMPLOYEE is the assigned table name. The "/" ends the set of commands.)

All of these commands would be entered after the user received an SQL prompt, which positions the cursor on the CRT screen. Note that the data base structure is hidden from the user. He has no idea of how the Oracle data is internally stored.

Because SQL functions as the data definition language, the report writer and the programming sublanguage, staff members are, in effect, able to produce reports, program Oracle commands in Cobol application programs and describe various data bases once they have mastered writing queries.

Oracle's data dictionary is, perhaps, most comparable to Cullinane Corp.'s integrated data dictionary. Tight control is provided by the fact that all data managed by Oracle must be defined in the data dictionary. In fact, the system won't run without it.

Data dictionary maintenance is simplified by access time binding, which means that the data description is attached to the application program at execution time. This also allows unauthorized programs to be locked out.

As is the case with all new products, the Oracle system cannot be regarded as complete. For example, there isn't a high-speed loader to allow for the rapid creation of large data bases — a feature which is a requirement for users with a large volume of data.

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Nixdorf Computer Software Company

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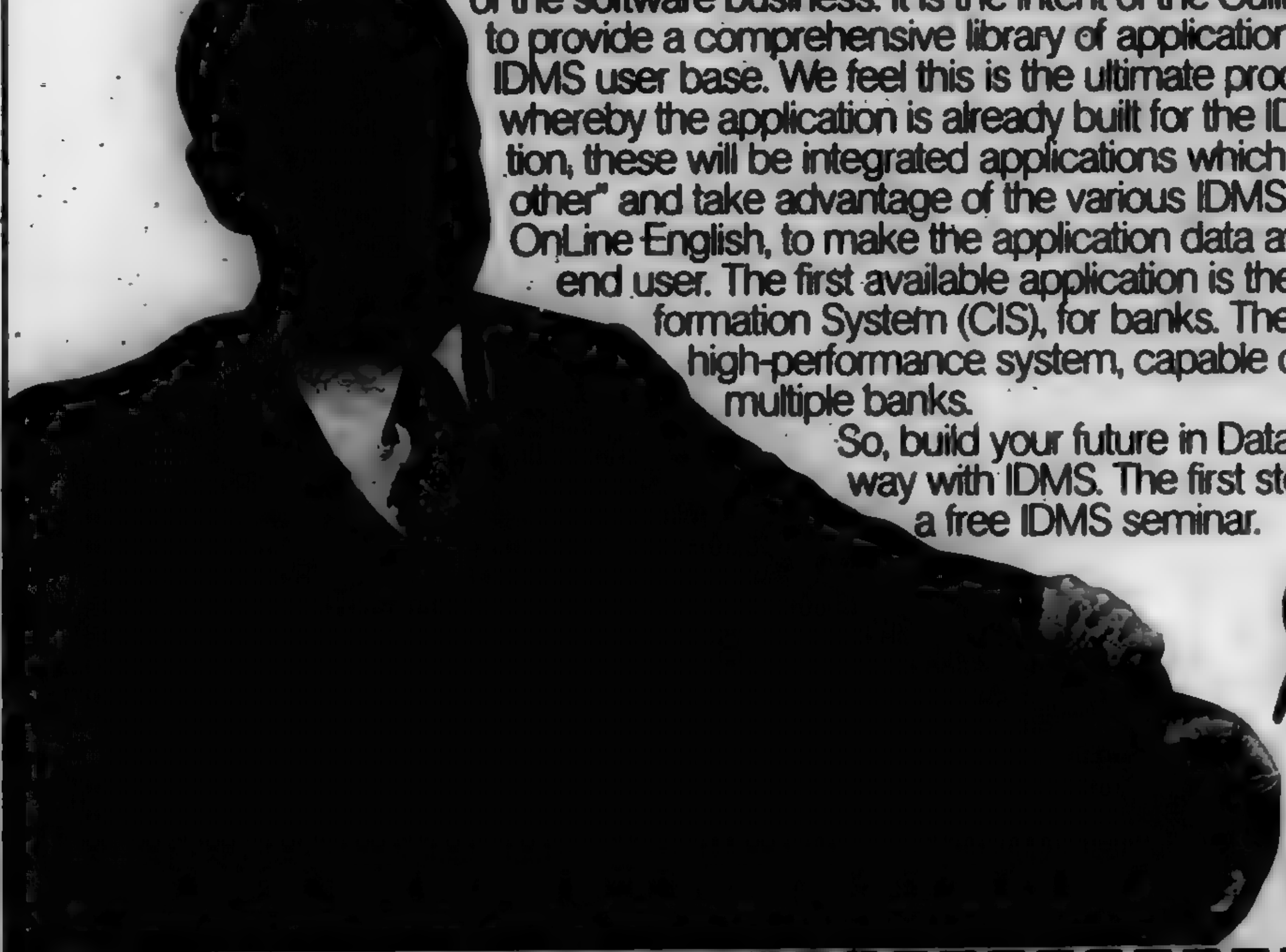

Cullinane Corporation recently raised $15,000,000 to invest in application packages for IDMS users; the first such effort in the history of the software business. It is the intent of the Cullinane Corporation to provide a comprehensive library of application packages to its IDMS user base. We feel this is the ultimate productivity tool whereby the application is already built for the IDMS user. In addition, these will be integrated applications which "speak to each other" and take advantage of the various IDMS tools, such as OnLine English, to make the application data available to the end user. The first available application is the Customer Information System (CIS), for banks. The CIS is a proven, high-performance system, capable of supporting multiple banks.

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John Cullinane, President

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TSO User's Terminal Acts as Braegen Console

CUPERTINO, Calif. — A software package that reportedly substitutes the IBM Time Sharing Option (TSO) user's CRT terminal for a console in Braegen Corp. multitask terminal systems has been announced by the company. Opcon package thus reportedly allows users to enter console commands from their terminals. The operator console buffer is displayed at the CRT terminal, where TSO and system commands can then be entered.

A table allowing only authorized users to enter commands is included in the package. Furthermore, only commands specifically assigned to the user can be entered into a particular console.

In addition, local card readers and printers attached up to 7,500 ft from the host can be controlled with a CRT terminal running Opcon. Opcon is free to users of the firm's multitask terminal system. Braegen is at 20740 Valley Green Drive, Cupertino, Calif. 95014.

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'Demon' Exercises Harris Minis

FT. LAUDERDALE, Fla. — A multiprogramming operating system that reportedly exercises CPU, memory and peripheral equipment in a manner similar to the conditions created by actual user programs is available from Harris Corp. for its 80, 100, 500 and 800 computer systems.

The Diagnostic Environment Monitor (Demon) creates a realistic testing environment and increases the probability that potential hardware problems will be identified before they affect user operations, the vendor claimed.

The product also tests the operating system for reliability during program execution.

Each Demon module contains verification sequences that reduce the probability of executing lengthy code sequences after illogical operations or other failures, a spokesman said.

Demon is a no-charge addition to the above-mentioned Harris systems, the vendor said from 2101 W. Cyprus Creek Road, Fort Lauderdale, Fla. 33309.

Micro Notes

Data Master redefines file layouts, merges and subdivides files, subdivides records and modifies fields on Apple Computer, Inc.'s Apple II. Price: $100. Vendor: High Technology, Inc., 8001 N. Classen Blvd., P.O. Box 14665, Oklahoma City, Okla. 73113.

Record Manager allows users of Apple Computer, Inc.'s Apple II to commit complete files into memory to access records. It requires Applesoft in read-only memory, 48K bytes of random-access memory. Price: $35. Vendor: Connecticut Information System Co., 218 Huntington Road, Bridgeport, Conn. 06608.

Menumanager monitors food costs, predicts sales trends and calculates a restaurant's estimated profits on the North Star Computer, Inc. Horizon system. Price: $595. Vendor: Microsource, Inc., 1425 W. 12th Place, Tempe, Ariz. 85281.

Newdos/80 is an upward enhancement for the Radio Shack TRS-80 which reportedly expands that system's capabilities to mix or match disk drives and improve security. Price: $149. Vendor: Apparat, Inc., 4401 S. Tamarac Pkwy., Denver, Colo. 80237.

Microbench 6809 is a family of software packages that operate in conjunction with Digital Equipment Corp.'s LSI-11 to provide program development capability for the Motorola 6809. Microbench Z8000 is another series of programs to support applications development for the Zilog, Inc. Z8000. Price of perpetual license fees: $1,695. Vendor: Virtual System, Inc., No. 406, 1500 Newell Ave., Walnut Creek, Calif. 94596.

SPSS Release 9 Features Statistics, Graphics Tools

CHICAGO — SPSS, Inc. is offering Release 9 of its SPSS Batch System. The release features three statistical procedures: Manova, Box-Jenkins and enhanced regression, and a graphics option.

Manova is a general linear models procedure for univariate and multivariate analysis of variance and covariance and multiple and multivariate regression, as well as related multivariate techniques.

Box-Jenkins is a procedure designed to aid in the analysis of univariate time series data.

The regression procedure features five equation-building methods including forward entry, backward elimination, stepwise selection, forced entry and forced removal.

The system licenses for $6,000 the first year and $3,000 each successive year. Discounts are available for nonprofit and academic sites, the vendor said from 444 N. Michigan Ave., Chicago, Ill. 60611.

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The Gravy Train Derails

By Charlene Franci
And W. Thomas Lin

Programmers continue to be overly concerned with salary as a work motivator and are completely unaware of the coming modification to their function. The end of the line is in sight.

The dramatic emergence of the computer in the past 25 years has been hailed as the beginning of the second Industrial Revolution — an era in which the computer will revolutionize the office much as power machinery drastically altered the operation of the factory. Today, the computer is both an important tool for management and a significant factor in the nation's economy.

The importance of programming in the current state of computer refinement cannot be underestimated. In the early days of computing, the major problems facing the industry were concomitants of the equipment; that is, design, fabrication and maintenance. Today these problems have been reduced largely by manufacturing and engineering improvements. Errors that can be traced to machine malfunction are rare.

On the other hand, the problems of programming and programming design are the major stumbling blocks to the real payoff in the use of computers. Too often, user departments request services from the DP department and are delivered products that bear little resemblance to those actually requested or needed.

The proper role of the programmer is unclear in the rapidly changing technological environment. The once-agreed-upon traditional role — that of a coder of computer programs — is being eroded.

Responsibility for correctly installing a user's request is shifting gradually into the area of the user environment. More and more application products provide sophisticated processing capabilities requiring little or no technical knowledge of DP to install, maintain and enhance. These turnkey systems have diminished greatly the importance of the programmer as the person who talks to the electronic brain and replaced it with a genuine concern as to the continued viability of this occupation in the emerging era of power for the user by the user.

The major purpose of this article is to examine and evaluate the present and future roles of programmers and their motivational factors. Specifically, a recent study by the authors assessed the major motivational factors of programmers and examined their views about their future roles. Programmers were defined as those individuals who possess technical DP knowledge and perform the function of coding programs. Technological developments were defined as all hardware and software products relating to the processing of requests for computer-generated information.

Programmer's Present Role

One of the difficulties immediately encountered in discussing the programmer is the lack of a uniform description of the programming function. Robert Ledley has described the programmer's role as the utilization of techniques and methods to translate

(Continued on In Depth/2)

IN DEPTH

(Continued from In Depth/1)

the verbal, mathematical or other description of a computational problem into a list of instructions that will direct the computer to perform successfully the required computation[1].

Peter Drucker feels that computer programming is merely semiskilled work, requiring only a knowledge of junior high school arithmetic, three months of training and six months of practice[2]. He qualifies his assessment by saying that while the skill may not be an elevated one, it is based on knowledge rather than manual training or experience.

In practice, the current role of the programmer is simply that of a program coder who translates specifications into notation that can be interpreted and executed by the computer. The programmer receives these specifications from a systems analyst.

The work actually performed by the programmer involves interpretation of the programming specifications generally attended by discussion with the systems analyst for clarification of the documentation. The programmer has few options to take or choices to make since the analyst usually will determine the action to be taken for such considerations as input and output file storage media, file organization, logarithmic calculations and report layouts.

The primary area in which the programmer exercises a degree of originality and creativity is in the optimization of program code; within the program itself, the programmer is free to manipulate the data being processed as he sees fit. In addition, the programmer usually writes the job control language, which is the mechanism enabling the computer to read and process the actual program.

Motivational Reference

The DP profession, now more than 25 years old, is gradually assuming some of the behavioral problems characteristic of older disciplines such as accounting and engineering.

Abraham Maslow explained in 1954 how employee needs exist in a hierarchy. "Lower level" needs, explained as physiological and safety needs, must be satisfied before the higher ones, social and esteem needs, begin to work as motivators[3].

During the 1960s, Frederick Herzberg directed a motivational research project which led to his now popular two-factor theory of motivation[4]. This theory suggests that the basic motivational elements can be split into two categories labeled "hygienes" or "dissatisfiers" and "motivators" or "satisfiers."

Herzberg identified 10 hygienes: achievement, recognition, work itself, responsibility, advancement, company policy and administration, technical supervision, salary, interpersonal relationships with superiors and peers and working conditions. These, he said, are aspects of the job which must be maintained at an essentially positive level before motivation can flourish.

In DP literature, discussion of motivational factors affecting systems analysts and programmers has concentrated on salary, state-of-the-art equipment and user contact.

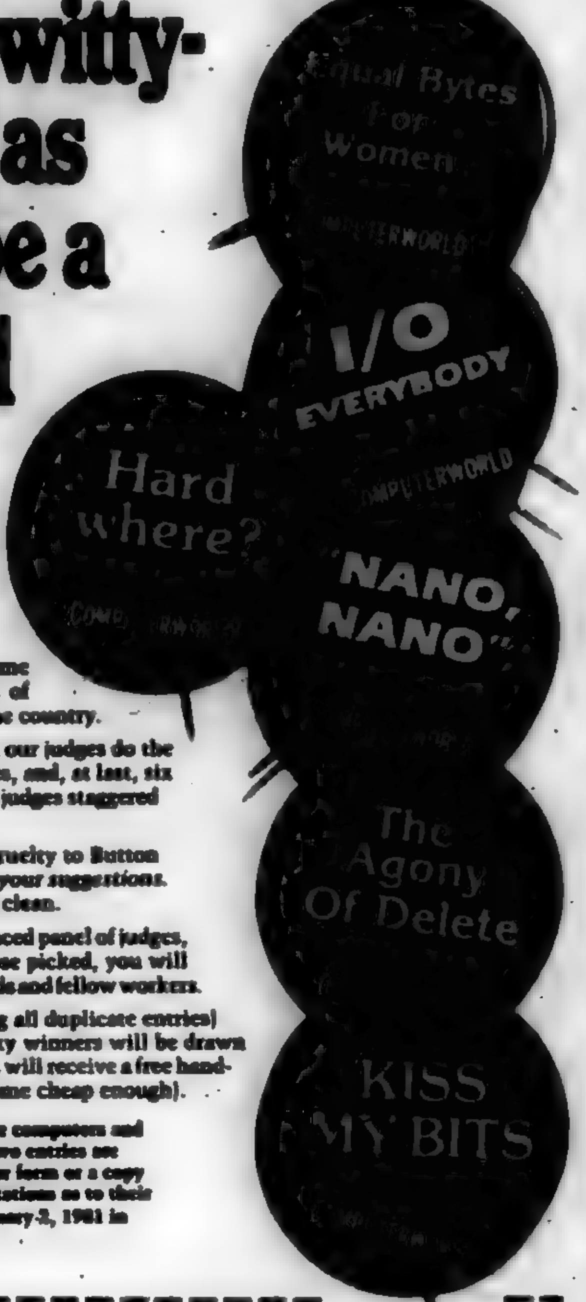
Effect on Salaries

Among programmers, a certain mystique is attached to the very human activity of computer programming. One of the corollaries of this mystique is that high salaries must be paid.

In a survey by Jac Fitz-enz, salary ranked 10th in importance among factors that really motivate DP employees[5]. Fitz-enz compared his results with those for employees in other fields as reported by Herzberg. Herzberg found salary ranking ninth. Both researchers found other rewards, including achievement and personal growth, to be more important.

It is commonly thought that younger DP professionals place more emphasis on salary, while older ones value fringe benefits more highly. However, the Fitz-enz survey revealed a surprising lack of correlation between compensation categories and employee characteristics. It was expected that base pay amount would be negatively correlated with age — that is, the younger a person, the more he desires salary-wise and the less he values fringe benefits. The survey response was just the opposite; the amount desired in base pay had insignificant correlation with level of education, and it was not correlated with sex, job title

If you can write a witty-one-liner as good as these, you could be a winner in the 1981 Computerworld button contest.



As all you button freaks know, *Computerworld* buttons have become a tradition in the industry. And every year we distribute tens of thousands of them at NCC, Info, and other trade shows across the country.

Last year, for the first time, we let our readers do the writing, and our judges do the laughing. We spent many hours sifting through hundreds of entries, and, at last, six winners (shown above) emerged from the smoke-filled room. The judges staggered out later.

This year, despite protests from the SPCBJ (Society to Prevent Cruelty to Button Judges), we've decided to do it again. And we're hereby *soliciting your suggestions.* They should be short, funny, relevant — and at least moderately clean.

As many as six suggestions will be chosen by our (by now) experienced panel of judges, based on criteria known only to them. If your entry is among those picked, you will receive a certificate of appreciation suitable for impressing your friends and fellow workers.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (at least their entries will) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky souls will receive a free hand-held computer game valued at well under $100 (if we can find some cheap enough).

You may not enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representations as to their competence, skill or fairness are being made. Deadline for entries is January 2, 1981 in our offices in Framingham.

yes,

I'd like to enter Computerworld's ridiculous button contest. I hope your judges can read. Here is my entry (if you have more than one, please put them on separate forms). (All entries become property of CW Communications/Inc.)

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(programmer, programmer/analyst) or industry.

This finding makes sense in light of what Maslow has said about human nature. Since DP employees tend to be on a rather high pay scale compared with the general populace, it might be expected that money would be less motivating for them.

State-of-the-Art Equipment

DP professionals are different from other professionals in that they have a higher need for personal growth and development. They respond more positively to jobs high in motivating potential than do people with low needs; state-of-the-art equipment and products are key motivators.

Computer product manufacturers are introducing faster hardware and more powerful software, and users of these products eagerly line up to purchase them. It is a fact of life that DP managers whose installations have the newest tools for the programmer to work with can more easily attract and retain talented personnel.

Programmers regard these new products as toys, and they relish the challenge of embracing and mastering these tools. They eagerly seek projects involving terminals with more processing functions, higher readability targets, new software extensions and, of course, the newest technology. They cannot afford to let their skills atrophy or stagnate lest they become unmarketable.

J. Daniel Couger indicated that the experience with the latest terminal, data base or operating system is necessary to the programmer's professional career requirements and also satisfies personal motivation needs. Programmers, he found, have a strong need for personal accomplishment, for learning and developing beyond their present status and for being stimulated and challenged*.

User Contact

A widely discussed topic concerns who has responsibility for making decisions on a computer system project — the user or the DP department or a combination of the two.

Most authors indicate that the user is responsible for controlling and defining a project. Users need to participate in decisions so that DP personnel do not dictate what is best for a system.

Users feel that programmers do not understand their problems, are not sensitive to their requirements and cannot give them the responses and services they would like.

Peter Schoderbek and James Babcock conducted a poll of 200 of the Fortune 500 companies. The 1969 study examined the organizational location of the DP department within a company, the reporting authority of the department and the degree of line management involvement.

The researchers dealt with the potential repercussions when a programmer makes too many decisions. Decisions made by computer personnel that affect operating personnel, but which reduce their role to that of mere spectators, will not win general acceptance, they noted. The criticism frequently leveled at DP staff — that they lack an awareness of operating realities — may carry considerable weight, thus further reducing their effectiveness for implementing changes, they said*.

The majority of writers concluded that it is the users' responsibility to ensure that a project is designed and implemented to suit their needs. The programmer is responsible for providing what is requested in terms of a computer system that is understandable to the user.

Future Role

The evolution of the computer industry has proceeded fairly rapidly. The '60s were dominated by large centralized systems and satellite stations that were, for the most part, independent. In the '70s, rising costs and increasing systems overhead brought about the use of small, intelligent computer systems — many of which were linked in a distributed processing fashion.

The 1980s, however, will unveil a different type of computing from that of the previous two decades. During the next 10 years, computers will evolve into utilities consisting of a number of specialized modes and terminals.

The programming of computer applications is about to turn a corner. The function of application programming

(Continued on In Depth/4)

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THE GRAVY TRAIN DERAILS

(Continued from In Depth/3)

will be obsoleted by technology. Even today, more and more "user" or nonprogrammer-oriented languages are appearing on the market.

The user is gaining closer proximity with the computer and the trend is toward removing the middlemen — the programmers.

DP tools are being put in the hands of the users who will control the resources for getting their data processing work done.

Hardware manufacturers have realized the days of just pushing hardware are coming to an end and are beginning to rush toward the end user. Canned programs and improvements in hardware are combining to contribute to the "clericalization" of programming.

Programmers are adept at what they do, but they do not attempt — or know how — to really communicate with users and understand their problems. Too often, the wrong problems get solved. Programmers are not seeking the kind of interaction that user-oriented applications packages are imposing and will not readily take to the possible assimilation of their job function into the user environment.

While DPers are formally educated in technical subjects, they do not take courses in interpersonal relationships and communication. Many computer science courses still are more machine- than business applications-oriented. Programmers with a marginal appreciation of business are hurting themselves.

The potential impact of change is worth noting and has been explored by many writers. Individuals' inability to grow and direct change in their lives is a major problem. One of the truly ironic consequences of automation is the attitude of those programmers who believe that technological developments will lead to their own employment. Programmers who feel that clerical personnel should not object to being replaced by computers are quite vocal when they think their own jobs are in jeopardy.

Users will continue to gain sophistication as the embers of the DP mystique fade. Removal of this mystique will, of necessity, open up the communications channels between DP and users. The user who understands the application together with the computer will program cost-effective software because technology will have eliminated the need for the programmer. The user will no longer need to rely on DP personnel to program routine information requests.

An article by Ann Dooley predicted that within the next five years, the computer industry will begin to see the demise of the programmer — that high priest who understands the machine but not the application. In the next quarter of a century, the programmer function will no longer exist except in research and in analog-to-digital conversion*.

Concerned professionals must use the change to their advantage. Programmers who do not move into user types of functions will become significantly less secure. Those with aptitude, a solid business background and good interpersonal skills will slowly

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slip out of the profession. For those who remain strictly technical and continue to concentrate only on mastering improved coding techniques, only highly routinized jobs will remain.

There will always be a programmer in the marketplace; but in the future, most programmers will be involved in writing the software tools, not in actual applications programs.

The authors conducted a questionnaire study in the fall of 1979 to obtain information regarding the motivational preferences of programmers, their perceptions of future modifications in programmers' functions and their attitudes toward technological developments as they relate to their work.

Population Surveyed

The population was drawn from companies in a variety of manufacturing and financial businesses in the Los Angeles area. This geographic region was selected as being representative because of the large number of installations in the area and its similarity to other metropolitan markets for DP services. The study expressly excluded computer service bureaus and software vendors who provide computer support to outside companies, because programmer positions in such firms are very different from in-house DP groups in larger, non-DP businesses.

Out of 80 questionnaires distributed, 50 were returned. The respondents were asked to distribute 100 points over eight factors, indicating the relative importance of these factors as related to their jobs. They also answered questions concerning their perceptions of the technological developments in DP and their awareness of the changing job scene for programmers. In addition, background information was requested concerning the respondents' age and education.

A summary of the mean values of the eight motivational preference factors is presented in the table on the following page. It shows that salary and oportunity for advancement are the most important motivational factors for the sample programmers. The results of t-tests show the mean value for salary preference is significantly greater than that of state-of-the-art preference and heavy user contact preference.

This is in contradiction to the literature which indicated that programmers do not regard salary as a primary motivator when compared with other rewards such as personal growth and achievement.

One possible interpretation relates to the current high inflation rate. The only way to keep ahead of inflation has been to change employers frequently in order to get a higher salary. In the DP industry, job-hopping is an acceptable practice since employers are desperate to find even marginally talented individuals.

Isolationist Attitude

The isolationist attitude of the programmer is reflected in the resoundingly low assessment of user contact. A Pearson's correlation coefficient of the sample data shows that preference for user contact bears no relationship to the length of a programmer's education, and the importance of the user contact factor is minimal. In other words, the programmer views his profession as involving one-to-one communication with the computer, while users represent an alien element not capable of such privileged communication.

This elitist attitude was supported by the literature and indicates a lack of perception regarding skills mandatory in light of the present role modification. The aversion to working with other individuals represents a significant obstacle to the programmer who desires to remain a viable professional entity.

The survey respondents did indicate their awareness of the significance of experience with the most technologically current products. The state-of-the-art equipment assumed greater importance as the length of the individuals' education increased, which was supportive of that position put forth in the literature — technical aspects of the profession are emphasized in the educational process.

The attitude expressed by the survey respondents was that the technical aspects of their functions could never be replaced by technological developments in hardware or software. Contrary to the literature, the respondents

(Continued on In Depth/6)

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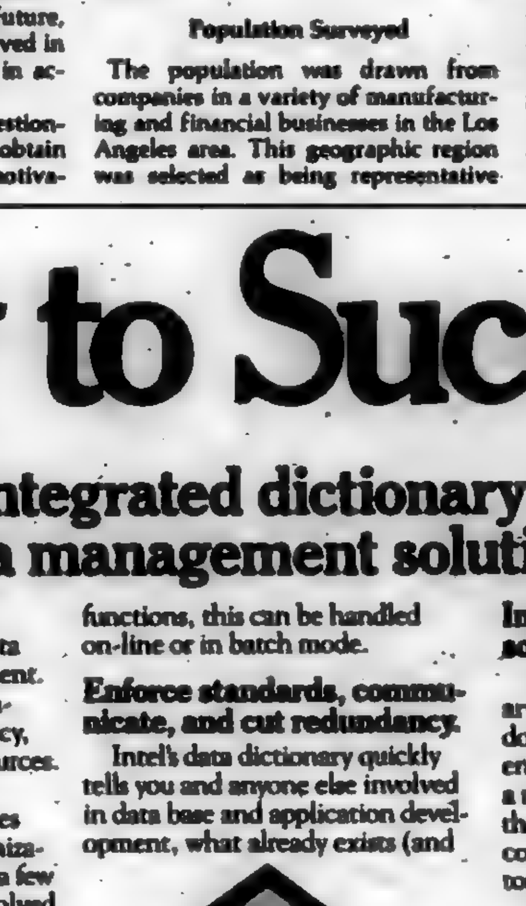

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IN DEPTH

(Continued from In Depth/5)

felt that the programming function would always exist and that the user population would never achieve the level of communication required for direct interaction with the computer.

A chi-square analysis by age group revealed that the younger programmers were significantly more positive in their attitudes toward technological developments relating to the profession than those over the age of 39. This finding is supported by the literature which highlights the automator's fear of being automated.

Finally, in spite of the ever-increasing amount of published material heralding the drastic modification or obsolescence of the programming function, none of the survey respondents expressed any comprehension of this situation.

Preference Factor	Mean Value	Rank
Salary	23.84	1
Opportunity for Advancement	20.44	2
Job Security	11.88	3
Systems Development Work	10.68	4
State-of-the-Art Equipment	9.16	5
Company Reputation	8.64	6
Office Location	8.18	7
Heavy User Contact	7.28	8

Programmer's Motivational Preference Factors
(Sample Mean Values)

Summary

Historically, computers and automation conjure images of job elimination or job modification. This article has examined the relationship between technological development in DP pertinent to modification of the traditional programming function and programmer attitude toward these developments. Specifically, programmer opinions were solicited regarding motivational preferences and perceptions concerning the current and future roles of the programmer as they relate to the trend towards placement of computing power directly into the hands of the user.

The survey results clearly indicated that the programmers were heavily preoccupied with salary as a motivational preference. They placed minimal emphasis on other attributes which would enhance their promotability. Although the opportunity for advancement was also of significant concern to them, they placed little importance on being technologically current and on having user communication skills, both of which are factors that enhance programmers' professional viability, promotability and, as a result, salary.

In addition, the programmers did not express any awareness regarding the coming modification of their role and felt that technological developments in DP would never enable user department personnel to communicate intelligently and directly with the computer.

Because of the relative newness of computer programming when compared with other occupations in business organizations, the role of the programmer has not always been clearly defined.

The survey results indicated that the literature to date concerning motivators for the non-DP work force cannot consistently be applied to programmers.

Furthermore, the traditional programming role as it is known today will no longer exist in the future and this segment of the working population must be prepared for the imminent redefinition of its role.

A thorough understanding of the roles as well as the needs and goals of programmers is important and will require more investigation and research.

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A Look at CICS/VS 1.5

By Mark W. Greenberger

The newest release of IBM's CICS/-VS, 1.5, looks very exciting because of its new functions and enhancements made to existing functions. The highlights of the release are:

1. Multiregion operation.
2. Enhanced intersystem communication.
3. New device support.
4. Enhanced high-level language interface.
5. New security features.
6. Additional monitoring capabilities.
7. New user exit interface.
8. New master terminal functions.

This article describes the highlights in detail and the impact they will have on the CICS/VS systems programmer and his installation. The information is based upon currently available IBM documentation. No guarantee can be given that the features will be implemented as described.

Multiregion Operation

Multiregion operation (MRO) provides a CICS/VS installation with a number of options in configuring its CICS/VS systems. It is no longer necessary to allocate terminals based on application use. Instead, an installation can now allocate all the terminals to one CICS/VS system and dedicate other CICS/VS jobs to distinct applications. Each application system can have its own CICS/VS system with the terminal CICS/VS system doing all the routing necessary to ship the transaction to the proper CICS/VS region.

This capability wasn't previously available on Btam CICS/VS systems. Even in a Vtam CICS/VS system, where this capability is currently available through Vtam, MRO provides an advantage in that the terminal operator doesn't have to log off and log on to the various CICS/VS application systems. The terminal operator perceives the multiple CICS/VS region's address spaces as a single system image and does not realize that his request was processed by more than one CICS/VS system.

The method used to implement MRO is operating system dependent. In MVS environments, the operating system's common service area (CSA) is used to move the data from one address space to another. An SRB is created to move the data from the CSA to the target address space.

In DOS/VSE and OS/VS1 environments, an SVC is used to move the data from one partition to another and a cross-partition post is utilized to signal the receiving partition that it has data to process.

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The resources that can be shared by multiple CICS/VS systems include terminals, files, transactions, DCT and TST entries, DL1 data bases and CICS/VS management modules. All the CICS/VS systems have to reside in the same CPU. The three functions available with MRO are:

1. Transaction routing.
2. Function shipping.
3. Management module sharing.

Transaction Routing

Transaction routing allows a terminal operator connected to one CICS/VS region to run transactions in any other connected CICS/VS region. Transaction routing is accomplished through a CICS/VS-provided "relay" program that routes the transaction to the proper CICS/VS system. CICS/VS will determine, through the PCT, if the transaction is to be attached locally or routed to another CICS/VS system. If the transaction is defined as a "remote" transaction, CICS/VS will use the "relay" program to route the transaction to the proper system and wait for a reply from that system. When the transaction is received by the connected system, it will be attached by CICS to the corresponding TCTTE defined as a remote TCTTE.

When the transaction finishes processing and writes a message to the terminal, CICS/VS ZCP will recognize that the TCTTE is a remote TCTTE and route the message to the originating CICS/VS system, which is waiting for this reply, and will write the message to the real terminal.

Transaction routing is available for macro and command-level programs since CICS/VS provides all logic necessary for routing in its management modules. A comparison between a single CICS/VS system and multiple CICS/VS systems utilizing transaction routing is shown in Figure 1 here.

Function Shipping

The function shipping facility just introduced with MRO is analogous to the function shipping facility available with Intersystem Communication (ISC) in CICS/VS 1.4. Function shipping allows a CICS/VS command-level program executing in one CICS/-VS region to access resources residing in another CICS/VS region. ISC function shipping permits the second CICS/VS region to reside in a remote CPU, while MRO function shipping requires that both CICS/VS regions reside in the same CPU.

When function shipping is utilized by a command-level program, it is transparent to the application program. This is true for ISC and MRO function shipping.

The Exec Interface Program (EIP) re-

(Continued on In Depth/8)

TRANSACTION ROUTING

	SINGLE CICS	TERM CICS	APPL CICS
RECEIVE TRANSACTION	X	X	
ATTACH RELAY		X	
TRANSFORM REQUEST		X	
TRANSMIT REQUEST		X	
RECEIVE REQUEST			X
TRANSFORM REQUEST			X
ATTACH TRANSACTION	X		X
EXECUTE TRANSACTION	X		X
TERMINATE TRANSACTION	X		X
TRANSFORM REPLY			X
TRANSMIT REPLY			X
RECEIVE REPLY		X	
TRANSFORM REPLY		X	
EXEC REPLY (TERMINAL WRITE)	X	X	
TERMINATE RELAY		X	

Figure 1

GLOSSARY OF TERMS

SRB: Service Request Block. A control block used by the MVS operating system to initiate a unit of work in another address space.

SVC: Supervisor Call. The mechanism used by programs to request a service from the operating system.

DCT: Destination Control Table. Used by CICS to route information to logical destinations.

TST: Temporary Storage Table. Used by CICS to determine which temporary storage identifiers to recover after a system Abend.

PCT: Program Control Table. Used by CICS' Task Control program to validate transaction identifiers.

TCTTE: Terminal Control Table Terminal Entry. Used by CICS to describe the physical terminal which is connected to CICS. It also contains various control pointers which are used by CICS' Terminal Control Program.

ZCP: Vtam Terminal Control Program. This program is used by CICS to communicate with Vtam.

ELR: Exec Local/Remote Routine. This routine is used by the CICS Exec-level interface program to determine if the required resource is local or remote.

FCT: File Control Table. This table is used to describe the data sets accessed by the CICS application programs through the File Control Program.

EIB: Exec Interface Block. Used as an interface between an Exec-level CICS application program and the CICS Exec interface program.

FDP: Field-Developed Program. Any program which was developed by an IBM user and which is being marketed by IBM.

WTOR: Write to Operator with Reply. The method used by an application program to communicate with the console operator.

CSMT: The Transaction Identifier for the CICS-provided Master Terminal Operator functions.

BMS: Basic Mapping Support. The mechanism used by CICS to insulate the application program from the characteristics of the terminal hardware.

PTF: Program Temporary Fix. The method used by IBM to supply corrections to its software before the modification is incorporated in a new version.

RACF: Resource Access Control Facility. A security package for the MVS environment being marketed by IBM.

PPT: Processing Program Table. Its purpose is to identify application programs to CICS' Program Control Program.

SIT: System Initialization Table. This table is used by CICS initialization programs to identify the various options and program versions to be used for this execution of CICS.

PLT: Program List Table. Used by CICS System Initialization Program to determine which application programs are to receive control before polling of the network begins.

PAII: Performance Analyzer II. A CICS performance monitor package marketed by IBM.

(Continued from In Depth/7)

ceives control from the application program after a CICS/VS command has been executed. EIP uses DFHELR, in conjunction with the applicable CICS/VS table, to determine if the resource resides in the same CICS/VS system or in a different (remote) CICS/VS system.

The method used to send the request to the other CICS/VS system, if the resource doesn't reside in the local system, will be different for ISC and MRO. Both will utilize ZCP to ship the request to the other CICS/VS system. The Intersystem Program (ISP) will determine if intersystem communication or interregion communication should be utilized to ship the request.

An ISC or MRO function shipping request has to go through the same transformations before the request can be processed. The only difference between an ISC and an MRO function shipping request is the method used by CICS/VS to get the request to the other CICS/VS system: ISC uses Vtam and MRO uses an SRB or SVC.

MRO function shipping ensures less overhead than ISC function shipping if both CICS/VS systems are executing on the same CPU.

Module Sharing

The process of running multiple copies of CICS/VS systems in the same CPU has been made more efficient in CICS/VS 1.5 by allowing most CICS/VS management modules to reside in the OS Link Pack Area (LPA) or DOS Shared Virtual Area (SVA). This allows multiple CICS/VS regions to use the same version of CICS/VS management modules instead of each region having its own private copy of them. This ability will decrease the working set requirements of the multiple CICS/VS regions (which can significantly reduce paging) and also ensure storage protection for the CICS/VS nucleus.

Each CICS/VS region will be able to control which of its management modules should be placed in the LPA/SVA and whether it wants to use a management module already in the LPA/SVA.

As usual, the CICS/VS management modules will be suffixable to allow multiple versions of the same management module to reside in the LPA/SVA at the same time. This feature will affect any user mods that overlay management module code or CSA entry point addresses.

Intersystem Communication

ISC was first introduced in CICS/VS 1.4. It allows transactions to access resources residing in the CICS/VS systems. The application program requesting the resource is not cognizant of where the resource actually resides. CICS/VS logic, in conjunction with its tables, determines if the resource is on the local system or on a remote system. The request or function is shipped to the proper system, hence the term "function shipping."

The CICS/VS 1.5 enhancement to ISC allows a CICS transaction to communicate to another CICS task executing in another CICS/VS system. Any part of a transaction's logic can be removed from the local system and moved to a remote system where it is executed. When the remote transaction has completed processing, it can send the reply to the portion of the transaction's logic executing in the local system.

This facility is called distributed transaction processing, since a transaction's processing logic is distributed across multiple systems. Before discussing the advantages and disadvantages of function shipping and distributed transaction processing, let's take a look at an example that highlights the difference between them.

A transaction, Tran, is executing on the local system and requires that the master file be accessed multiple times. The program issues a file control re-

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A LOOK AT CICS/VS 1.5

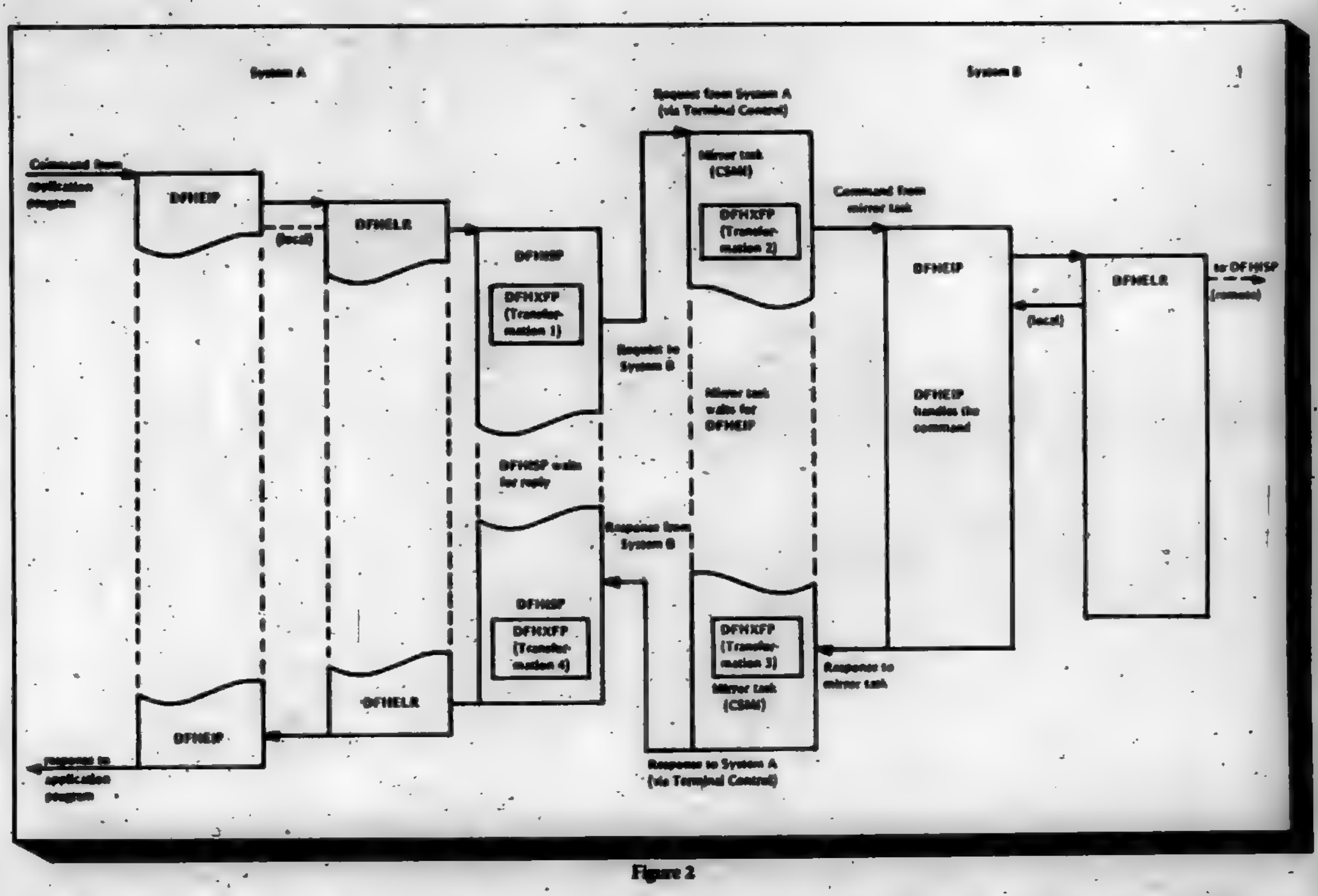
System A
System B
Command from application program
DFHEIP
DFHELR
(local)
DFHISP
DFHXFP (Transformation 1)
Request to System B
DFHISP waits for reply
Response from System B
DFHISP
DFHXFP (Transformation 4)
DFHELR
DFHEIP
response to application program
Request from System A (via Terminal Control)
Mirror task (CSMI)
DFHXFP (Transformation 2)
Mirror task waits for DFHEIP
DFHXFP (Transformation 3)
Mirror task (CSMI)
Response to System A (via Terminal Control)
Command from mirror task
DFHEIP
DFHEIP handles the command
Response to mirror task
DFHELR
(local)
to DFHISP
(remote)

Figure 2

quest to read the file. EIP receives control when the request is issued, since the application program is written using the CICS/VS command-level interface.

EIP passes control over to ELR to determine if the master file is on the local system. If the FCT indicates that it is a local file, control is returned to EIP to issue the file control request to the file control program.

If the master file isn't on the local system, control is passed to the intersystem program (ISP). ISP transforms the request into a format suitable for transmission to the remote system.

ISP requests ZCP to send the request to the remote system and puts the transaction into a wait, until a reply is received from the remote system, The master file definition in the FCT on the local system tells ISP the name of the remote system where this file resides. When the request is received on the remote system, a "mirror" transaction is initiated through ZCP which transforms the request back to a format that can be used to issue the file control request.

Again, EIP receives control when the request is issued and uses ELR to determine where the master file resides. In this case, the file resides on the same system and there is no need to route the request to another system. After EIP issues the file control request and it is satisfied, control is returned to the mirror transaction. The mirror transaction transforms the reply into a format suitable for transmission back to the requesting system. After sending the reply back to the requesting system, the mirror transaction terminates.

When the reply is received in the originating system, ZCP gives control back to the Tran transaction which is waiting in ISP. Before returning control to the application program, ISP transforms the reply into the format expected by the application program (that is, error codes go into the EIB and the record is moved into the area specified by the application program). The application program isn't aware that the request was executed on a remote system. This process is repeated for every file control request on the master file (see Figure 2).

Programmer's Alternative

Distributed transaction processing provides the application programmer with an alternative to the above scenario. Instead of shipping each file control request to the remote system, the application programmer can divide the transaction's logic into two separate transactions — one executing on the local system and one on the remote system.

The transaction executing on the local system would ship a request over to the remote system when it reaches the point in its processing where it is necessary to access the master file. The request shipped over to the remote system would tell CICS/VS to initiate a transaction to execute on that system. The transaction to be initiated would

(Continued on In Depth/10)

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ISC vs. MRO	ISC VTAM	IRC MRO
CICS FUNCTION SHIPPING	1.4	1.5
USER FUNCTION SHIPPING – TRANS. TO TRANS. – DIST. TRANS. PROC.	1.5	X
TERMINAL SHARING – TRANS. ROUTING	X	1.5

Figure 3

(Continued from In Depth/9)

be the second half of the original Tran transaction.

This part of the transaction would issue all the file control requests necessary to complete its processing. When the second half of the transaction finishes on the remote system, it sends a reply to the first half of the transaction, which is waiting for the reply.

The shipping of the request to and from the remote system utilizes ISP and ZCP just as function shipping does. But instead of shipping multiple requests back and forth, only one request is shipped, to initiate a transaction, and one reply is received from the remote system.

No Program Changes

The advantage of function shipping over distributed transaction processing is that it requires no application program changes. The application program doesn't know on which system the resource resides, and it can be changed without its knowledge.

The big problem with function shipping is that there can be very heavy usage of the link between the CICS/VS systems, which can create performance problems. This bottleneck is alleviated with distributed transaction processing, because the number of requests going between the CICS/VS systems is reduced. The designer of an application system has more flexibility in designing a system utilizing distributed transaction processing, but more interaction between the systems programmer and the application designer is required.

Another drawback to distributed transaction processing is that it can't be utilized on current applications since the application programs have to be cognizant of where the resources reside.

A new control block, the Status Information Block (SIB), was introduced in conjunction with distributed transaction processing. This control block can be accessed by an application program to determine the status of the link between the CICS/VS systems and the current conversation. Figure 3 highlights the functions available with ISC and MRO.

The other enhancement to ISC incorporates the features available with the new version of ACF/Vtam Release 2. The new release provides the capability for multiple sessions to be active concurrently between two applications (LU TYPE 6). The CICS/VS systems programmer can define the maximum number of parallel sessions that can be active. This feature should alleviate some of the performance problems that can be encountered using ISC function shipping.

New Device Support

CICS/VS 1.5 also provides:

1. OS/VS console support.
2. Network terminal option.
3. Additional 3270 support.

The OS/VS console can now be supported as a CICS/VS terminal. The system console was supported as a CICS/VS terminal in previous releases of CICS/VS, but only in a DOS/VS environment. An FDP was available for OS/VS environments which provided this support. The console will be supported as a card reader-line printer (CRLP) terminal. This support will be generated automatically in Terminal Control.

An installation will have the choice of supporting the console, as a terminal, through an outstanding WTOR or

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through a MODIFY command. With a MODIFY command, there is no need to have an outstanding WTOR to gain access to the system.

An installation will also have the option of generating a specific TCTTE for each console to be supported or use one generic console TCTTE to support many consoles. If the installation wants automatic transaction initiation (ATI) to be available for the consoles, it will have to generate a specific TCTTE for every console that is to be ATI eligible. ATI will not be available for consoles supported through the generic console TCTTE.

Most installations will welcome the OS/VS console support because it makes it easier to manage multiple CICS/VS systems. It will no longer be necessary for an installation to have a dedicated 3270 terminal as a master terminal for every CICS/VS system. Instead, an installation will be able to manage the multiple CICS/VS sytttems through the system console.

The system console will not replace a dedicated 3270 terminal because it can not accept a formatted 3270 screen. Through the use of the CSMT transaction, which is terminal independent, the console operator will be able to manage the CICS/VS systems. A CICS/Vtam installation will be able to use the same console (terminal) to enter both CICS and Vtam commands.

Network Terminal Option

Although Vtam always supported TWX devices in "basic" mode, the CICS/VS Vtam interface did not support this mode. The lack of CICS/VS Vtam support for TWX devices has always been an obstacle for an installation trying to convert its Btam network to Vtam.

With the inclusion of CICS/VS Vtam support of the Network Terminal Option (NTO) facility, this obstacle has been removed.

NTO supports a start-stop TWX device and converts the data stream to 3767 LU Type 1 protocol. This allows the CICS/VS Vtam interface to communicate with a TWX as though it were a Systems Network Architecture (SNA) device. This support will also be available to the IBM TWX-compatible terminal, the 3101.

NTO is a program product that resides in the 3705 and performs the conversion of the TWX data stream to a 3767 data stream. One problem with the NTO interface is that it does not support auto-call. This lack of support for auto-call might be an obstacle to an installation converting from a CICS/VS Btam to a CICS/VS Vtam system.

Additional 3270 Support

The additional 3270 support announced for CICS/VS 1.5 includes the 10/63 magnetic stripe which can be used to initiate a transaction or to provide data as input to a transaction. BMS support has been extended to allow the use of multiple 3270 screen sizes, while remaining independent of screen width.

CICS/VS 1.5 will also support the 3279 color CRT terminal. The four base colors — red, green, blue and white — as well as the three extended colors — yellow, turquoise and pink — are supported. All forms of 3279 highlighting, blinking, underlining and reverse video are supported. These features are available on a character or field basis.

In its continuing effort to make life easier for the high-level language application programmer, CICS/VS 1.5 will have an interpreter to facilitate the interactive development of CICS/VS commands. The interpreter will check the syntax of a command as it is entered and notify the programmer if there are any errors. In addition to checking the syntax, it will also tell the programmer if there are any missing parameters and the default options that were taken.

After the interpreter has checked the command, the programmer can request that his command be executed. The results are displayed on the screen in the same format that is available with the Execution Diagnostic Facility (EDF). The command interpreter will be supported only on a 1,920-character, or larger, 3270 screen.

New Security Features

Security enhancements that were previously announced for CICS/VS 1.4.1, and were available for CICS/VS 1.4.0 via a PTF, are included in CICS/VS 1.5. These enhancements include

(Continued on In Depth/14)

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IN DEPTH

CLASS 2 ACCOUNTING DATA

- task identification
- terminal identification
- operator identification
- transaction type
- # of transactions
- # of failing transactions
- # of input messages
- user count

is collected for each transaction

CLASS 3 PERFORMANCE DATA

- Data includes for each task
  - transaction elapsed time
  - transaction dispatched time
  - transaction real CPU time
  - wait times for I/O completion
- Data includes for the system
  - user dispatched time
  - KC dispatched time
  - TC dispatched time
  - JC dispatched time
  - user, KC, JC CPU time
  - wait time
  - page ins/page outs

CLASS 4 DETAILED EXCEPTION DATA

Data collection will include

- wait for string
- wait for shared buffer
- wait for temporary storage
- wait for SOS
- ISAM overflow

Figure 4

(Continued from In Depth/11)

nondisplay of the password during sign-on and the ability to log all sign-ons and sign-offs.

A new interface to an external security manager has been introduced for CICS/VS 1.5. The interface has a macro, DFHSEC, which gives the user the ability to verify an operator's authority to access a resource. For MVS installations, the interface was designed to use RACF as the external security manager. CICS/VS-provided transactions for ISC, EDF and the new command interpreter have the ability to interface with RACF.

A new monitoring and data-gathering mechanism was introduced for CICS/VS 1.5. The new mechanism will be utilized to capture data for performance tuning as well as the regular accounting data. The accounting data was available in previous releases, but will now be integrated with the other data being captured.

One big drawback is the lack of off-line data analysis and reporting programs. It is the installation's responsibility to provide them. Since Performance Analyzer II (PAII) is the base for this new facility, look for PAII analysis programs for a comprehensive set of analysis and report programs. This support could become available in a PTF or future release.

The data to be captured by this new facility can be classified as follows:

- Class 0 — Basic system management data.
- Class 1 — System managment data.
- Class 2 — Accounting data.
- Class 3 — Performance data.
- Class 4 — Detailed exception data.
- Class 5 — Trace data (AUX TRACE).

Classes 0, 1 and 5 were available in prior releases of CICS/VS. Classes 2, 3 and 4 are new and are summarized in Figure 4 above.

The method to be used for recording the new data differs from OS to DOS installations. OS installations will have the option of using the SMF data sets to record the data as type 110 records. DOS installations will have to utilize CICS/VS Journal Control.

A special journal entry will have to be dedicated for this purpose. These new records will not be compatible with regular journal records, because they will not have a journal label record or a journal header record. This was done, perhaps, to make the source of this data transparent to analysis programs. The accounting data will be written at user-specified intervals, but the performance and exception data will be written when the buffer is full.

The user will be able to control the capturing of the data with the DFHTR macro. Each class of data will be controllable by the macro. This also implies that the user will be able to record his own performance and statistical data.

Those installations that use the trace program's CSA entry point, CSATRNAC, and expect it to point to the trace programs are in for a surprise. The entry point for the trace program will be in the CSA Optional Features List and CSATRNAC will now point to the new monitoring facility program. A new table, the Monitoring Control Table (MCT), will control the various aspects of the new monitoring facility.

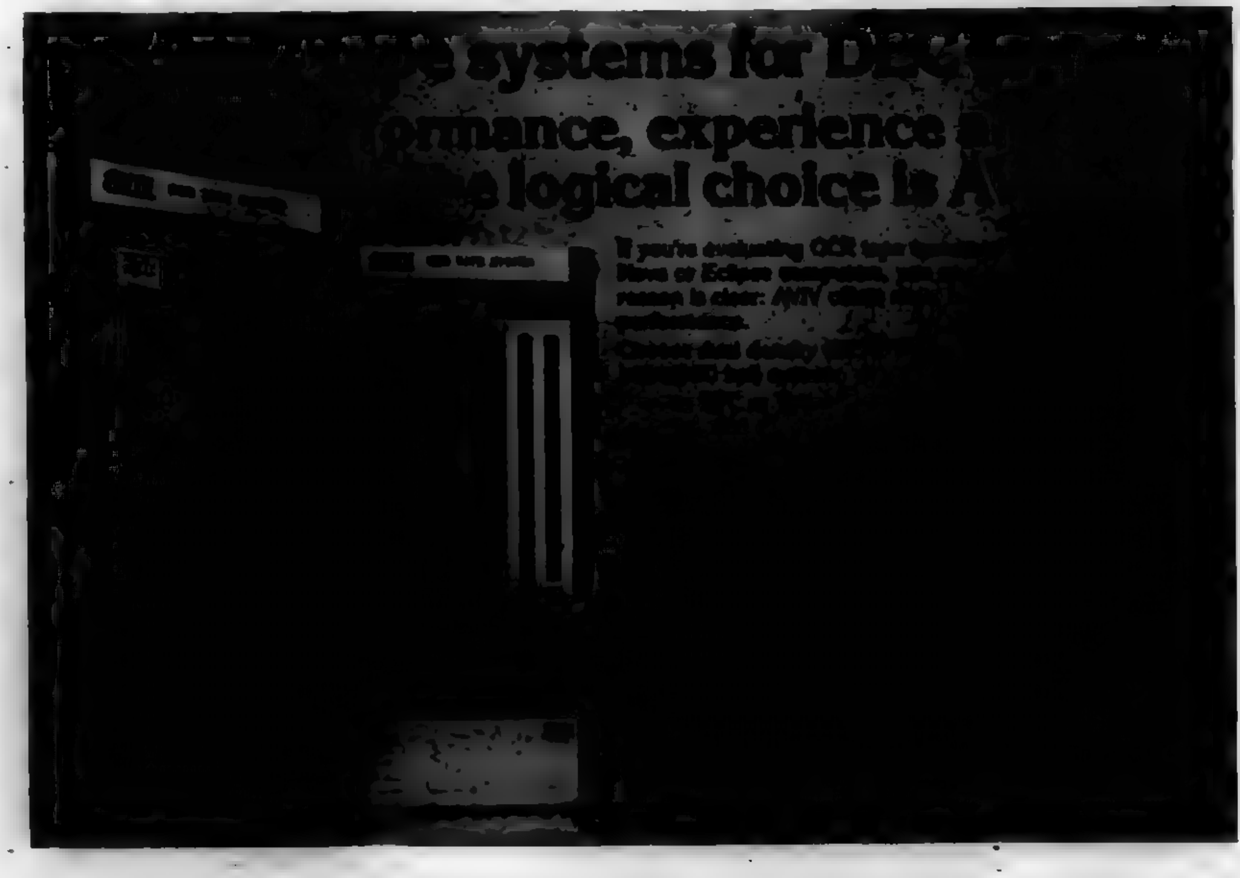
User Exit Interface

The new user exit interface announced for CICS/VS 1.5 allows an installation to incorporate user exits into CICS/VS management modules without reassembling the modules. This means that an installation can use most of the pregenerated modules when installing a new version of CICS/VS or applying a PTF. The new user exit interface can coexist with previous exit routines incorporated into management modules.

Instead of assembling the exit routine with the CICS/VS management module, the new interface requires them to be in a separate program. Each of these user exit programs requires a PPT entry, but one program can contain multiple exit routines. In addition, each exit point can have multiple exit routines and one exit routine can be used by multiple exit points.

When an exit routine receives control from a CICS/VS management module, it will pass a parameter list which will contain an exit number, among other parameters. This exit number identifies the particular exit point that invoked the routine.

A new user exit interface became necessary with the introduction of MRO, which allows CICS/VS management modules to reside in the LPA/SVA. An installation could have a potential integrity exposure if user code were assembled with the CICS/VS management module and were allowed to re-



side in LPA. The new interface, in conjunction with MRO, allows the management module to reside in LPA and the exit routine to remain in the CICS/VS region. The management module's registers are saved and restored by the exit interface.

An exit manager and table have been added to CICS/VS to support the new exit interface. This manager is automatically generated with CICS/VS, and a new SIT keyword, EXIT=YES/NO, specifies whether the exit manager and table should be loaded. The individual exit routines can be activated only after PLT processing has completed.

A new command is available to command level programs to control the processing of these exits. The five functions of the new command are:

1) Enable.
2) Activate.
3) Disable.
4) Deactivate.
5) Extract.

The ENABLE command makes an exit program available for the one or more exits contained within. The ACTIVATE command makes an exit active for a specific exit point. The DISABLE and DEACTIVATE commands are the reverse of the ENABLE and ACTIVATE commands.

The EXTRACT command makes available to the requesting task the address and length of the work area that was obtained when an exit program was ENABLED. Multiple exit routines in multiple exit programs can be active for any exit point. Each of the exit routines will be called in the order of their activation.

This capability will benefit installations that have program products that utilize exits and conflict with the installation's own exit routines. The new interface will enhance the module sharing capability of MRO by allowing multiple CICS/VS systems with different exit routines to share the same module.

Master Terminal Functions

A new master terminal transaction, CEMT, is introduced in CICS/VS 1.5. The new transaction is keyword-oriented and the keyword abbreviations actually make sense. The CEMT transaction will be supported for the system console and the 3270-2 or larger terminal.

All new master terminal functions that will be necessary to support new facilities in CICS/VS will be incorporated in the CEMT transaction only. The CSMT transaction will not be enhanced and will only support its current functions.

The two basic CEMT commands are SET and INQ. SET is used to modify the status of a resource or set of resources, and INQ limits the user to inquiries. The big advantage with CEMT over CSMT is its ability to inquire or modify the status of a generic group of resources.

An asterisk (*) is used to denote the end of the generic name and a plus (+) is used as a substitution character. Thus, PROG (AB*) identifies the group of programs that begin with the characters AB, regardless of their actual length. TRANSID (X++A) identifies all those transactions that begin with the character X and end with A, no matter what the two middle characters are.

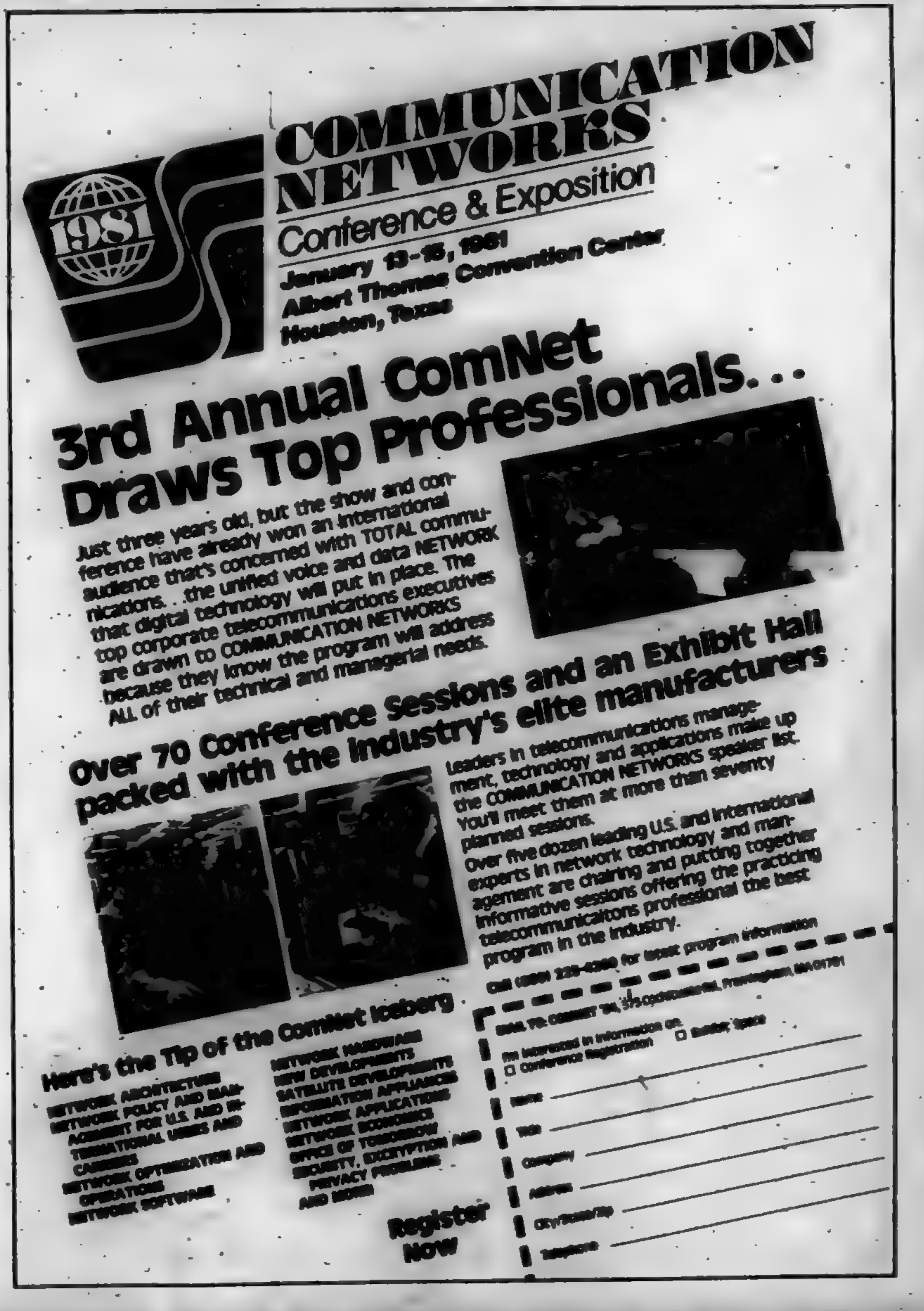
More Usable

With the release of this version of CICS/VS, IBM is serving notice on the CICS/VS community that it will keep on enhancing CICS/VS and making it more usable. The introduction of MRO is the most exciting function announced with this release. This capability should benefit most installations which run a minimum of two copies of CICS/VS, a test and production version.

It also seems that IBM is trying to encourage installations to split their CICS/VS applications into multiple jobs for better performance and integrity. It is too early to judge whether performance will benefit from this approach since little is known about MRO overhead.

The usability of CICS/VS has also been enhanced with this release. The new user exit interface, master terminal transaction and support for the OS/VS system console will be greatly appreciated by system programmers and the operations staff. These functions will also make MRO easier to implement and use.

(Continued on In Depth/16)



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IN DEPTH

(Continued from In Depth/15)

The new monitoring facility is everything you always wanted to know about CICS/VS in the way of statistics and performance. Let's hope that off-line analysis and report programs are not long in coming.

IBM also seems to be going after the CICS/VS software market by incorporating many of its functions and facilities into CICS/VS. CICS/VS 1.5 will obsolete program products and FDPs such as Peer Address Space, OS console support and PAIL.

The only area not successfully addressed by CICS/VS 1.5 is security. The user is still left to his own devices. RACF is not viewed as a realistic CICS security solution by most MVS installations, as discussed at the last Guide meeting. Furthermore, it was not designed with the intent of protecting on-line systems, whose special security needs cannot be satisfied by interfacing with a batch security system.

The enhancements to ISC will make CICS/VS a viable program product for distributed processing. With the recent announcement of ISC support in IMS, CICS-to-IMS communication is finally a reality. Maybe now the IMS development team will stop working on IMS/DC and use CICS/VS as its data communications vehicle.

The new command interpreter is not really very useful since the command still has to be entered into a program, which leaves room for error. Look for a further enhancement to the command interpreter which will contain a user-oriented language.

Finally, this author waits anxiously for the day when multiple operating system CICS/VS tasks will be able to run in the same address space/region. This capability will provide for enhanced multitasking without most of the overhead incurred in the current implementations (ISC and MRO). This capability will also allow CICS/-VS to handle its own page faults.

This approach was made possible when the CICS/VS management modules were rewritten for placement in the LPA/SVA. A module has to be reentrant before it can be placed in the LPA/SVA.

Mark W. Greenberger is a systems consultant for On-Line Software International, where he is primarily involved in CICS systems support and performance tuning.

Formerly he was the senior systems analyst for Con Edison in charge of CICS technical support.

Greenberger holds an M.S. degree in computer science from City College in New York.

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Dial Backup — Part 2

Net Failures Remedied Automatically

By Barney L. Dewey
Special to CW

Circuit failures in a data network can bollix an organization's operations at great economic cost.

To avoid this situation, an automatic dial-backup configuration,

---

Dial backup for both point-to-point and multipoint systems is inexpensive, practical and effective in substantially reducing leased circuit downtime, a senior applications engineer for Codex Corp. contends in the final part of this two-part series.

---

as shown in Figure 1, requires the computer center to have a pair of data telephones with an RJ-455 modular telephone jack as well as a modem with a registered telephone interface and dial/leased line switch.

This is the same equipment for the computer center as used in the manual system previously described [CW, Nov. 3]. The following equipment is required at the remote site. Either:

- A point-to-point modem.
- A pair of dial telephone lines with an RJ-455 modular telephone jack — telephone instruments are not required; if they are provided, they must be set for data set controlling the line.
- A registered interface for the above dial lines.
- A dial backup automatic answer unit (DBAAU).

Or:

- A modem with a built-in automatic dial backup interface.
- A pair of dial telephone lines with an RJ-455 modular telephone jack. Telephone instruments are not required.

With automatic answer systems all functions at the remote location are automatic, requiring no operator action. Operator action is necessary at the central site.

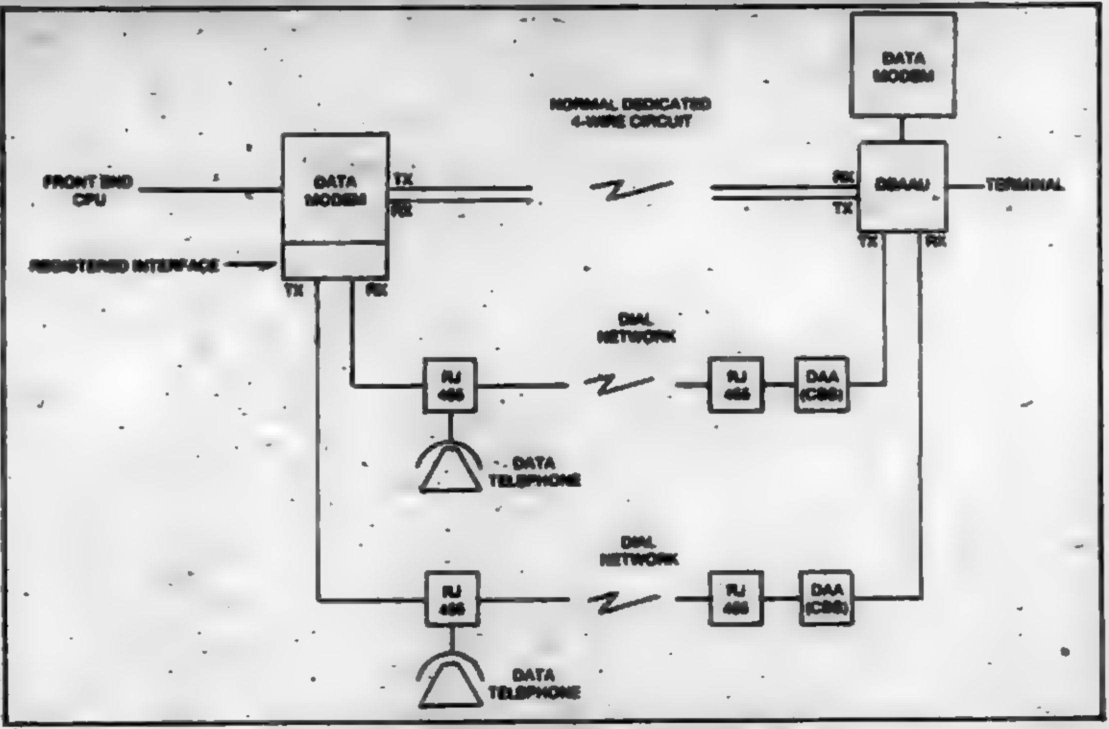

Figure 1: Automatic Answer Point-to-Point Network

Because we are backing up a 4-wire full-duplex circuit, we must use two dial connections. One dial connection will carry data from the central location (Transmit Data). The other will pass data from the remote site to the central site (Receive Data).

The two connections become

(Continued on Page 71)

Net Flexibility Improved

Node Bypass Hikes Throughput

MARINA DEL RAY, Calif. — Node bypassing, an alternative form of network configuration that is said to increase network throughput and flexibility without adding to cost, is being offered to Tran Telecommunications Corp. digital network users.

Geared to work with Tran M3200 integrated networks, the bypass architecture allows each multiplexer or network access concentrator in a switched network to have one or two trunks tied directly to other multiplexers.

The feature also permits having one or two trunks tied to network processor nodes, a spokesman said. The result is that dedicated traffic — synchronous or asynchronous — passes over the mux-to-mux links, while switched traffic goes through the network processors.

In effect, node bypassing lets the user overlay a point-to-point network on top of a switched network to share the same hardware, without losing the advantages of integrated networking, the spokesman added.

Large Network Use

The architecture technique has been used before in large networks such as Canada's Dataroute — which stretches coast-to-coast more than 3,000 miles. But in Tran's application, the bypassing technique is applied to high-volume local networks.

The bypassing feature is designed to be used for dedicated links in a switched digital network or in any local environment.

The node bypassing option is offered as a no-charge software conversion for Tran M3200 users.

Additional information on the architecture can be obtained from the communications company at 2500 Walnut Ave., Marina Del Ray, Calif.

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Option Added To Diablo 3000

SUNNYVALE, Calif. — Xerox Corp. has announced an option to the Diablo 3000 small business system that allows use of data communications and up to four additional terminals or printers.

Both daisywheel and matrix Diablo printers can be used and each terminal/printer port is individually selectable as either an RS-232C or current loop under program control.

Software to support the new release is also available.

Prices will be determined by Xerox distributors, a spokesman said, from 701 S. Aviation Blvd., El Segundo, Calif. 90245.

CRT Emulates NCR Terminals

LOS ANGELES — A CRT terminal that is a plug-compatible replacement for the NCR Corp. 796-301 and 796-101 terminals is available from Informer, Inc.

The D304-N is a desktop model with a standard data entry keyboard configuration. An executive-style walnut version, the I304-N, is also available. It has the keyboard located in a pullout drawer.

The D304-N weighs 40 lb less and costs $1,000 less than the NCR 796-301 series, the vendor claimed.

The D304-N costs $2,600 and the I304-N, $2,295, the vendor said from 8332 Osage Ave., Los Angeles, Calif. 90045.

Store-and-Forward Receiver Out

COSTA MESA, Calif. — A data communications receiver with store-and-forward capability has been introduced by MSI Data Corp.

Designed as an interface between MSI's portable data entry terminals and a host computer, the 2732-S reportedly will allow organizations that previously had to use a separate IBM disk reader to now link their computers directly to the receiver's bisynchronous port when reading stored data.

Based on the MSI/2732 transmission converter/receiver, the 2732-S costs $1,000 more than the older model. A one-disk system is priced at $9,000; a two-disk system at $10,000; one with three disks at $13,000; and one with four at $14,000.

The firm is located at 340 Fischer Ave., Costa Mesa, Calif. 92626.

Concentrator for Terminal Clusters Allows Mix of Univac Devices

LOS ALTOS HILLS, Calif. — A port concentrator for terminal clusters designed expressly for use with Univac computers is available from Kaufman Research Manufacturing, Inc.

The Model 871 True Port Concentrator is said to allow free interfacing with a mix of terminals of various speeds, including hard copy and CRT terminal devices.

Data rates of the terminals can range from 110- to 19,200 bit/sec, and communication with the Univac system is via Univac UTS 400 protocol.

For non-Univac terminals, the Model 871 provides the necessary display and formatting control functions to make the terminal behave and display information as if it were a Univac.

The unit comes with one line interface module and costs $4,765 from the firm at 14100 Donelson Place, Los Altos Hills, Calif. 94022.

Data Set Suited For 28-Mile Run

SAN JOSE, Calif. — Anderson Jacobson, Inc. has unveiled a short-range asynchronous point-to-point data set.

The AJ 1050 short-haul data set transmits digital data up to 28 miles over dedicated, paired wire unloaded lines without telephones, the vendor claimed. Transmission speed ranges up to 9,600 bit/sec.

The product is suited for data transmission within self-contained facilities or building complexes such as colleges or military installations.

Modular add-on options include TTY interface, EIA port expansion, ac power control, multiple transmitters in a polled environment and a housing that will accommodate a second card.

The unit is priced at $330, the vendor said from 521 Charcot Ave., San Jose, Calif. 95131.

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Teleray Replaces VT100

MINNEAPOLIS – Teleray Division of Research, Inc. has unveiled a terminal that is reportedly code- and performance-compatible with Digital Equipment Corp.'s VT100.

The Teleray Model 100 features a nonvolatile, programmable function memory (880 characters/20 functions), RS-232 peripheral port with programmable data rates and six "hidden" character attributes, the vendor claimed.

Other features include two programmable smooth scroll rates, four different character widths – which may be programmed on a line-by-line basis – screen saver and a programmable 30-character answerback.

The Model 100 costs $1,790. Teleray can be reached at Box 24064, Minneapolis, Minn. 55424.

Local Net Fiber-Optic Link Bows

WASHINGTON, D.C. – A fiber-optic system for local data distribution that provides a direct link to the CPU for 16 different terminals from several different locations – all from a single fiber-optic cable pair – has been introduced by Versitron, Inc.

The multiplex link consists of a 16-channel central unit multiplexer and several remote units located throughout the local distribution network.

The central unit, located at the CPU, operates as a conventional time-division multiplexer and provides the 16-channel interface to the local distribution network over a fiber-optic cable pair and 16 parallel data EIA interfaces to the CPU.

Each of the remote units is assigned a certain number of channels and will automatically insert and withdraw the assigned channels from the aggregate signal.

The system was designed to operate with any combination of synchronous or asynchronous terminals with data rates up to a maximum of 19.2K bit/sec for synchronous and 9,600 bit/sec asynchronous.

A typical system with one unit costs $13,000 from Versitron at 6310 Chillum Place, N.W., Washington, D.C. 20011.

Interface Card Lets Teletype Printers Mimic 3286/7

DETROIT – Electronic Distribution Processing, Inc. has announced an interface card that reportedly allows the Teletype Corp. Model 43 printer to be attached to the Teletype 40/4 or 4540 series control units as a 3270-compatible 3286/7 printer.

The complete printer costs under $2,000. When combined with a Teletype 40/4 from Electronic Distribution, a remote user has a 3270 bisynchronous software-compatible control unit, display and printer and the dual port capability for $226/mo including maintenance on a three-year lease.

The firm is located at 1400 Howard St., Detroit, Mich. 48216.

CCI Announces Faster Service

NEW YORK – Consortium Communications International, Inc. has announced it now offers 1,200 bit/sec asynchronous and 2,400 bit/sec bisynchronous service to firms with higher speed requirements for their international message communications.

The company presently has several clients sending messages via Wang Laboratories, Inc. Model 30s, IBM 370s and Bell Dataspeed 40s.

The firm, an international record carrier that offers reduced-rate international Telex, is at 80 Broad St., New York, N.Y. 10004.

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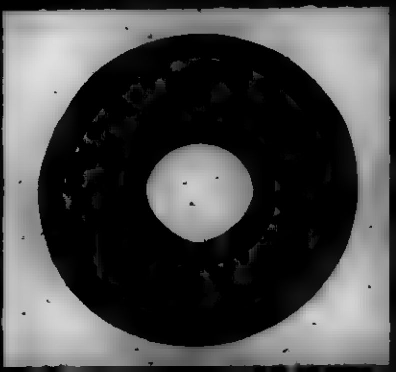

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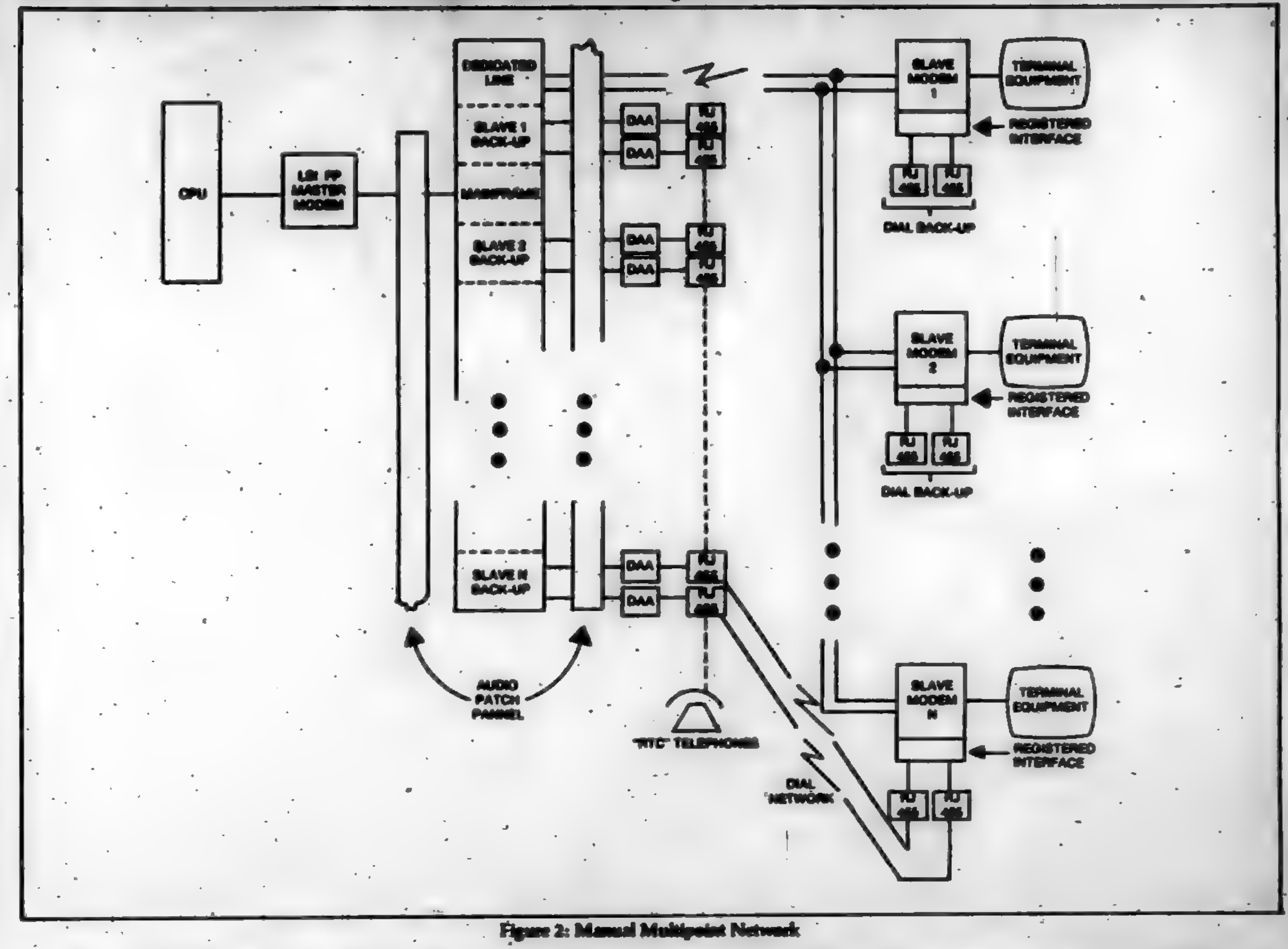
Net Failures Remedied by Automatic Backup


CPU
LSI FP MASTER MODEM
DEDICATED LINE
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MAINFRAME
SLAVE 2 BACK-UP
SLAVE N BACK-UP
DAA
RJ 45S
SLAVE MODEM 1
SLAVE MODEM 2
SLAVE MODEM N
TERMINAL EQUIPMENT
REGISTERED INTERFACE
DIAL BACK-UP
AUDIO PATCH PANNEL
"RTC" TELEPHONE
DIAL NETWORK

Figure 2: Manual Multipoint Network

(Continued from Page 65)

two simplex (one-way) circuits. Each connection replaces two wires of the 4-wire circuit. Because two calls must be made, this type of dial backup is usually called "dual dial backup."

The use of automatic dial backup is best illustrated by the following example. Let's assume the same network looked at before — a single 9,600 bit/sec circuit between the East Coast and the West Coast.

No Answer

In this case, a person at the computer center calls one of the remote site telephone numbers. The DBAAU does not answer this first call.

The person at the computer center now places a second call on the other data telephone to the second remote site telephone number. The DBAAU now answers both lines simultaneously and responds by sending the U.S. standard 2,025 Hz answer-back tone back to the computer site for eight seconds on the modem's transmit line.

This tone signals the computer center operator to operate the exclusion keys on the telephones and then push the "dial line" switch on his modem. Data can now be transferred over the dial network.

After data transmission has begun, the DBAAU continues to monitor for data carrier loss. If the carrier is not present for eight continuous seconds, the DBAAU assumes that the central site has terminated the connection. The modem is then reconnected to the leased line.

As discussed before regarding point-to-point manual operation, common dial-backup central site equipment for many co-located central site modems can be configured with audio patch bays and registered interfaces.

Multipoint circuits can also be backed up easily with dual dial calls. Because a multipoint circuit "talks" to many remote locations with one circuit, and each dial-backup link requires two calls to each remote location, a new item of equipment must be used to "split" the multipoint circuit.

This equipment takes the analog signal from the master modem and provides multiple analog interfaces for connection to the dial network through registered telephone interfaces — DAAs.

The line-sharing unit (LSU) is a 4-wire device receiving on all inputs. The receive side provides a path based on data carrier contention to the master modem.

A device such as the Codex Corp. line-sharing unit is modular, allowing up to eight 4-wire line interfaces. It also has an automatic level set (ALS) that sets the interface receive level when the DBAAU auto-answer tone is sent. This assures the proper level for operation on any randomly dialed telephone circuit automatically.

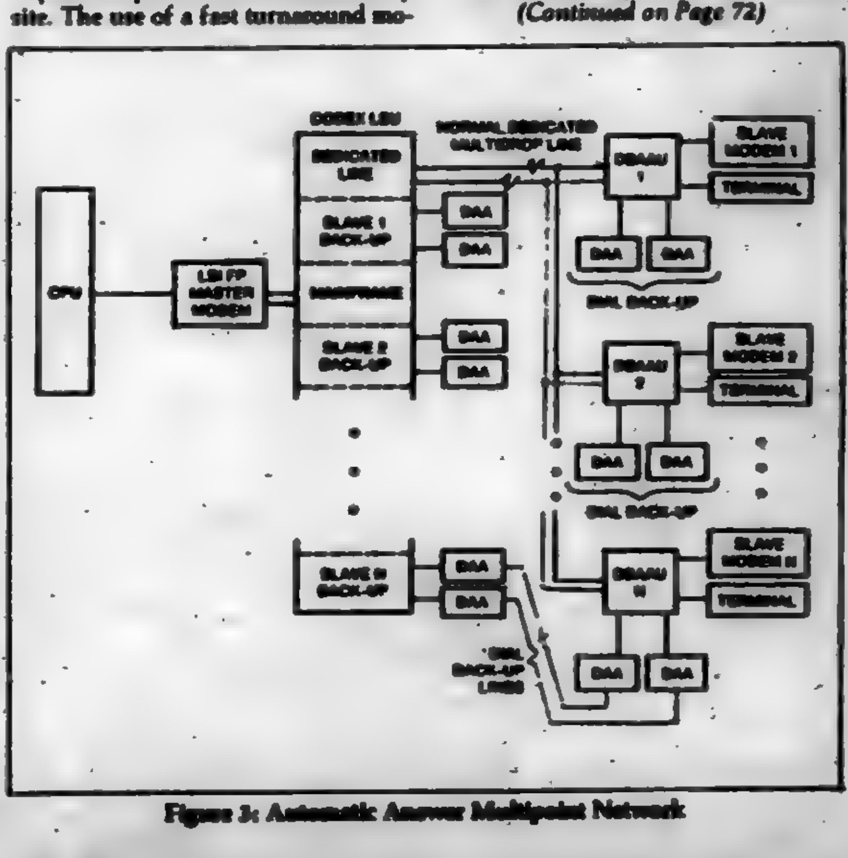
Each line interface can be used to "dial" a multipoint drop. The master modem and computer front end still see one circuit; therefore, the use of an LSU in dial backup applications does not require any computer system reconfiguration.

The equipment required at a remote multipoint site is similar to that used at a point-to-point remote dial-backup site. The use of a fast turnaround modem is the only significant difference.

Operation at the central site requires the operator to patch the master on the failed circuit into the main line interface on the LSU. The leased line is usually patched to the manual set line interface on the LSU.

This allows drops on the circuit be-

(Continued on Page 72)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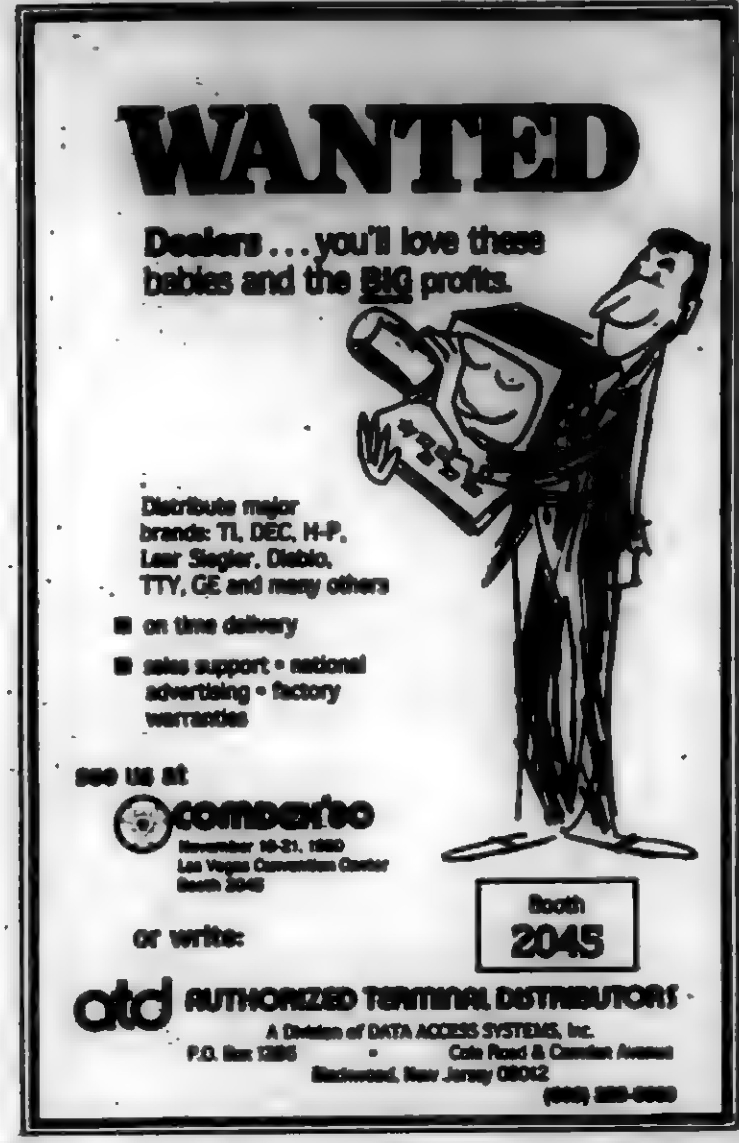
NORMAL DEDICATED MULTIDROP LINE
DEDICATED LINE
SLAVE 1 BACK-UP
MAINFRAME
SLAVE 2 BACK-UP
SLAVE N BACK-UP
CPU
LSI FP MASTER MODEM
DAA
DBAAU 1
DBAAU 2
DBAAU N
SLAVE MODEM 1
SLAVE MODEM 2
SLAVE MODEM N
TERMINAL
DIAL BACK-UP
DIAL BACK-UP LINES

Figure 3: Automatic Answer Multipoint Network



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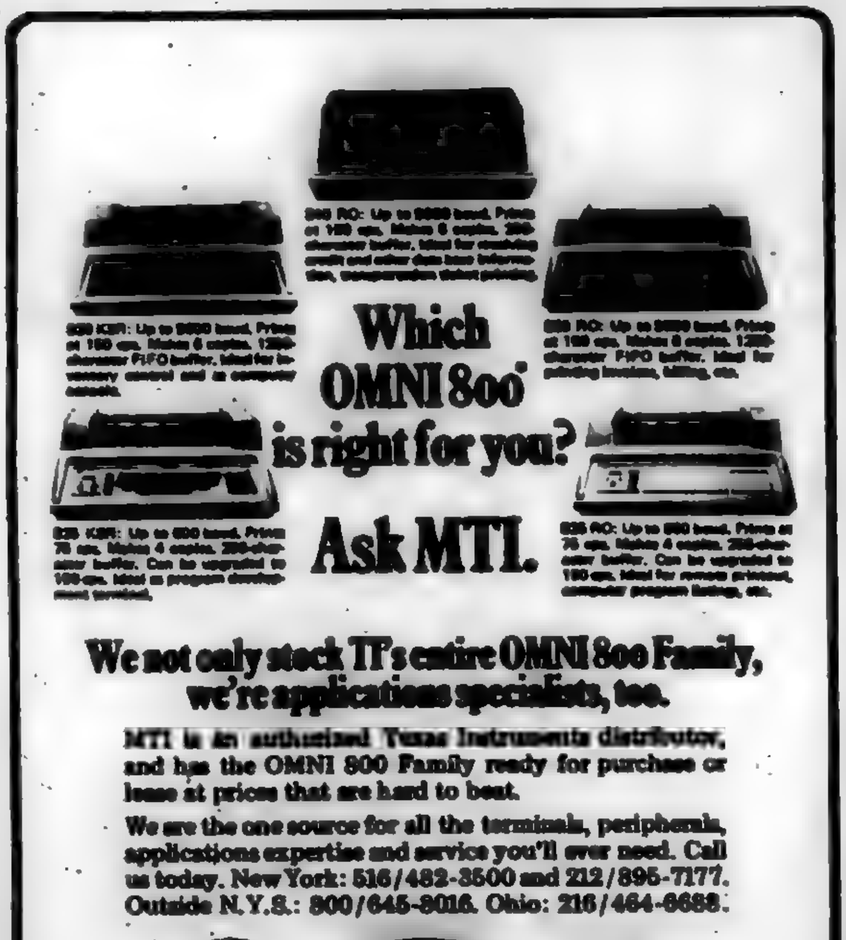

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GE Offers Enhancements For Terminet 200 Printers

WAYNESBORO, Va. — Three enhancements for the General Electric Co. Terminet 200 printer line have been announced. They are an APL/Ascii keyboard layout, 9-wire print head and an alternate font.

The APL/Ascii option allows users to print and transmit APL and Ascii characters. Two distinct character sets are incorporated in the printer and the keyboard features specially marked key tops indicating APL and Ascii characters.

With the 9-wire print head option, the user can print lowercase characters with descenders and provide true underlining as well, the vendor claimed. The option is available with teleprinter and line printer models.

The alternate font allows users to define their own character sets. Special single or dual character sets, including special symbols, can be created, the vendor said.

The APL/Ascii option costs $350 and the 9-wire print head, $125. A single or dual font may be obtained. The single font costs $4,590 for a one-time programming fee and an additional $75 unit price. The dual font has a one-time $900 programming fee and a $150 unit charge, the vendor said from Data Communications Products Business Department, Waynesboro, Va. 22980.

RS-232C Modems Debut

BEAVERTON, Ore. — Cablebus Systems Corp. is offering three synchronous and asynchronous RS-232C data modems.

The UAM-1 is an asynchronous, full-duplex data modem for use on CATV or industrial cable systems. In addition to being used for linking remote terminals to CPUs, it can be employed in establishing networks for home computer users. It costs $250.

The UVM-1 is a voice-grade CATV modem intended for point-to-point delivery of voice or voice bandwidth signals. A transmitter enable function permits the product to be controlled manually or by a device such as a facsimile transceiver.

The UVM-1 is priced at $300.

The USM-1 is a synchronous full-duplex data modem for use on CATV or industrial cable systems. It is capable of data rates of up to 19.2 K byte/-sec. It costs $450, the vendor said from 7869 S.W. Nimbus, Beaverton, Ore. 97005.

Net Failure Remedy Offered

(Continued from Page 71)

fore an interruption to continue operation on the leased circuit. Only the drops that have failed the circuit interruption need to be dialed and backuped.

Figure 2 depicts this system example. A typical 5-drop multipoint circuit is shown. Many computer centers have many similar circuits originating from them.

In the sample system, for each drop beyond an interruption the computer site operator places a pair of calls. The remote operator answers the calls from the computer site operator (as in point-to-point operation), operates the telephone exclusion keys and then presses the transfer switch on the modem.

The computer site operator sets the incoming signal level on the LSU manual level set line interface module. Data transfer to the backed-up drop may now start.

Automatic dial backup is shown in Figure 3 for multipoint circuits. The equipment required at the computer center for automatic multipoint dial back-up is the same equipment described above for a master modem site.

Automatic dial backup of multipoint circuits is a combination of the manual backup procedure for multipoint circuits at the computer site and the procedure for automatic answer at a point-to-point site.

To illustrate the operation of automatic multipoint dial backup, refer to Figure 3. For each drop in the sample multipoint system beyond the interruption, the computer site operator needs to make a pair of calls.

First the computer center operator connects the LSU manual-set line interface to the leased line. Then, as each set of calls is made to each drop beyond the line interruption (dial calls are not necessary to drops before the line interruption), the following occurs.

When the DBAAU senses both dial backup lines ringing and the loss of Data Carrier Detect, both lines are answered simultaneously. The DBAAU respotds after answering the calls by sending the U.S. standard 2025 Hz answer-back tone to the computer site for eight seconds. The DBAAU then switches the modem to the dial lines.

The answer-back tone signals the computer center operator to operate the telephone exclusion keys that connect an LSU ALS line interface to the telephone interface. The answer-back tone is then used to set the receive level in the ALS interface. Data can now be transferred to this drop over the dial network. If the remote modem does not receive data carrier detect within 16 seconds, the DBAAU terminates both calls.

After data transmission has begun over the dial network, the DBAAU monitors for data carrier loss. If the carrier is not present for eight continuous seconds, the DBAAU assumes that the central site has terminated the connection. The modem is then reconnected to the leased line.

Free Brochures

• "X.25 and Data Link Control Diagnostics" details a new software package from the Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314.

Bits & Pieces

Two Honeywell Printers Boast Speeds of 300-, 600 Line/Min

WALTHAM, Mass. – Two line printers which operate at speeds of 300- and 600 line/min and feature operator-replaceable print bands are available from Honeywell, Inc.

The printers include a 64-char. Ascii print band, a paper tape driven vertical format unit and a 132-column-width carriage.

To set up either printer for 96-char. upper- and lowercase print, an operator removes the 64-char. band and replaces it with an optional 96-char. band.

The 300 line/min model is immediately available and costs $10,500 with a $115 monthly maintenance fee. The 600 line/min model will be available in February for $15,700 with a $170 monthly maintenance fee, the vendor said from 200 Smith St., Waltham, Mass. 02154.

Xylogics Processors Handle DG's Lark Disk, Multibuses

BURLINGTON, Mass. – Xylogics, Inc. has announced peripheral processors for Data General Corp.'s Nova and Eclipse minicomputers and Intel Corp.'s Multibus systems that can be used to control Control Data Corp.'s Lark disk.

Use of Xylogics 850 peripheral processor for control of Nova and Eclipse and the 440 for the Multibus systems permits connection of up to four Lark disks, each with 16M-byte capacity, the vendor claimed.

As Lark disks become readily available, Xylogics will provide a packaged disk subsystem, but at present, the individual peripheral processors cost $3,575 for the 850 model and $3,960 for the 440, Xylogics said from 42 Third Ave., Burlington, Mass. 01803.

Optical Wand Scanner Offered For MSI/66 Data Entry Unit

COSTA MESA, Calif. – MSI Data Corp. has introduced an optical wand scanner for its MSI/66 basic portable data entry terminal.

The scanner is said to use a simplified visible-light optical system and sells for 37% less than the firm's high-end data entry product.

A typical 4K-char. wand costs $600, or $700 with an 8K-char. memory, a spokesman said from the company at 340 Fischer Ave., Costa Mesa, Calif. 92626.

State's DDP Route Leads To 40% Productivity Climb

Special to CW

HARTFORD, Conn. – By going to the distributed rather than the centralized data processing route, the state's Bureau of Research, Planning and Evaluation here has cut computing costs 60% and improved productivity 40%.

The bureau, part of Connecticut's Department of Education, uses a Nixdorf Computer Corp. 600 series system as a remote job entry and application development tool to support five divisions, five district offices and 17 regional vocational technical schools. The statewide system was installed about a year ago and is used to produce, maintain, store and transmit more than 100,000 records monthly.

The computer system functions as an intelligent terminal, remote batch terminal, on-line inquiry and response system and as a stand-alone multistation data base management system, Dr. Evan Confrey, consultant for DP for the State of Connecticut's Department of Education, said.

With the most recent addition, Connecticut

(Continued on Page 76)

Dr. Evan Confrey (right), DP consultant for the Connecticut Department of Education, consults with department specialists Philip Mollison and Dave Kellogg. "We wanted a system that would not only solve today's problems, but would also allow us to grow and meet future needs without penalty. The compatibility issue was the key," Confrey said.

IBM Unveils Chip With 370/138 Capability

EAST FISHKILL, N.Y. – IBM has unveiled an experimental 5,000-circuit bipolar logic chip it said has the data flow capability of a 370/138 processor. The densest logic component previously developed by IBM was the 1,500-circuit Shottky chip, used in the System/38 and 4300 processors.

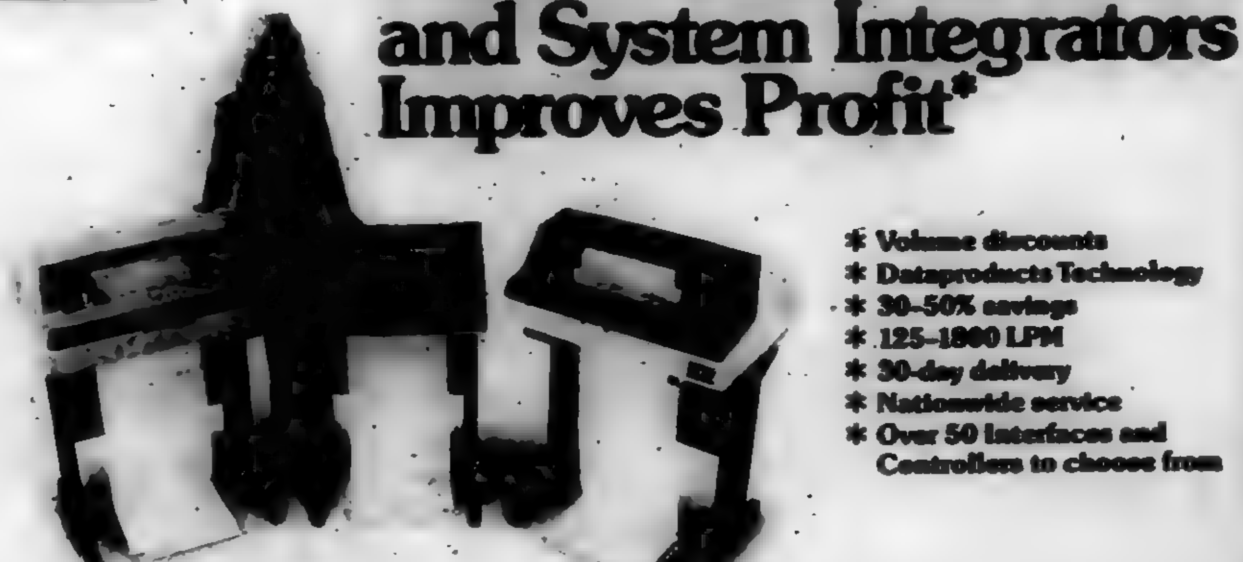
Developed at the firm's Data Systems Division laboratory here, the 5,000-circuit bipolar logic chip was developed as a test of IBM's existing design and manufacturing processes. The chip – containing 11,000 connections – was designed using an IBM 370/168 machine.

Most of the chip's manufacturing processes are identical to those used for the 704-circuit transistor-transistor logic (TTL) and the 1,500-circuit Shottky current-switch chips. In fact, Shottky claimed TTL-circuit technology was chosen for the experiment because of its compactness, speed and power requirements.

The new circuit's actual measured speed is 2.2 nsec, but is more conservatively clocked at 4 nsec, the spokesman said. This speed reportedly enables a machine cycle time of approximately 100 nsec, about the performance rating of an IBM 370/138.

A key finding of the 5,000-circuit logic chip experiment was that despite the four-fold increase in the number of circuits and connections, only a modest increase in computer design increase in computer design time was required, the spokesman observed.

News of the chip breakthrough was unveiled to scientists at last month's International Conference on Circuits and Computers in Port Chester, N.Y. There was no indication whether IBM will incorporate the experimental chip into future systems design.



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Calcomp Adds Two Models To Graphics Line

ANAHEIM, Calif. — California Computer Products, Inc. has expanded its IGS 500 turnkey graphics system series by adding two models that provide dynamic interactive graphics.

The models 400 and 300 support data bases that accommodate both graphics and nongraphics information and an English-like command language. The systems also support all IGS applications programs, including design and drafting, piping and mapping.

Stand-Alone System

The IGS 400 is a stand-alone system with 64K words of memory, a 50M-byte disk drive, a floppy disk subsystem with 128K words of storage space and a user workstation. The workstation includes its own picture processor, allowing dynamic graphics to be performed locally at the station, two CRT screens, a keyboard, graphics tablet and joystick.

In addition, the 400 can be expanded to 256K words of memory; other options include additional disk storage, plotter, a digitizer and impact matrix printer/plotter.

The IGS 300 is similar to the 400, but is supported with a synchronous communications line instead of floppy disks.

IBM 2780 protocol up to 9,600 bit/-sec is used, the spokesman noted.

Both the IGS 400 and 300 can be upgraded to a 500 with multiple workstations operating simultaneously.

The basic IGS 400, including systems software, sells for $89,000. The satellite IGS 300 price begins at $85,000.

Calcomp can be reached at 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Desktop System Gives Security

CHATSWORTH, Calif. — A computerized desktop security system priced under $15,000 for small to medium-size businesses has been announced by Cardkey Systems, Inc.

The Dimension 2000 is said to perform television surveillance, alarm monitoring, access control and control of security-related building operations.

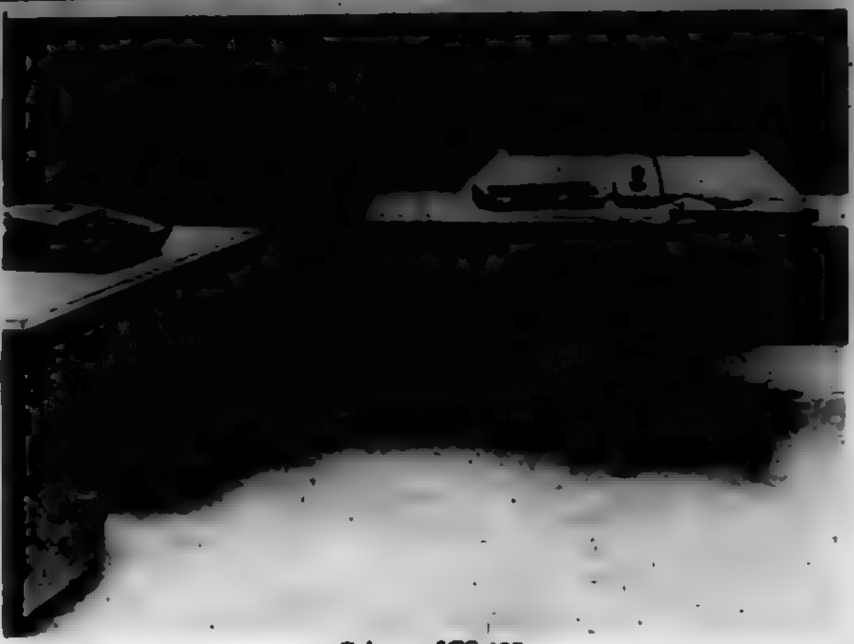
The system features simultaneous English-language data display and television surveillance through a 9-in. CRT screen. Any number of closed circuit TV cameras can be connected to the system.

Also featured is event time control to preprogram security-related building or business operations up to 12 months in advance, including automatic operation of any electrical device, voiding and validating access card keys.

The system permits control for up to 4,100 card holders at up to 32 card-reader locations with built-in entry/-exit and antipassback controls and an executive bypass status to override the controls.

While the system costs "just under $15,000," according to a company spokeswoman, card readers cost $1,000 each beyond that price.

Cardkey Systems is at 20660 Bahama St., Chatsworth, Calif. 91311.



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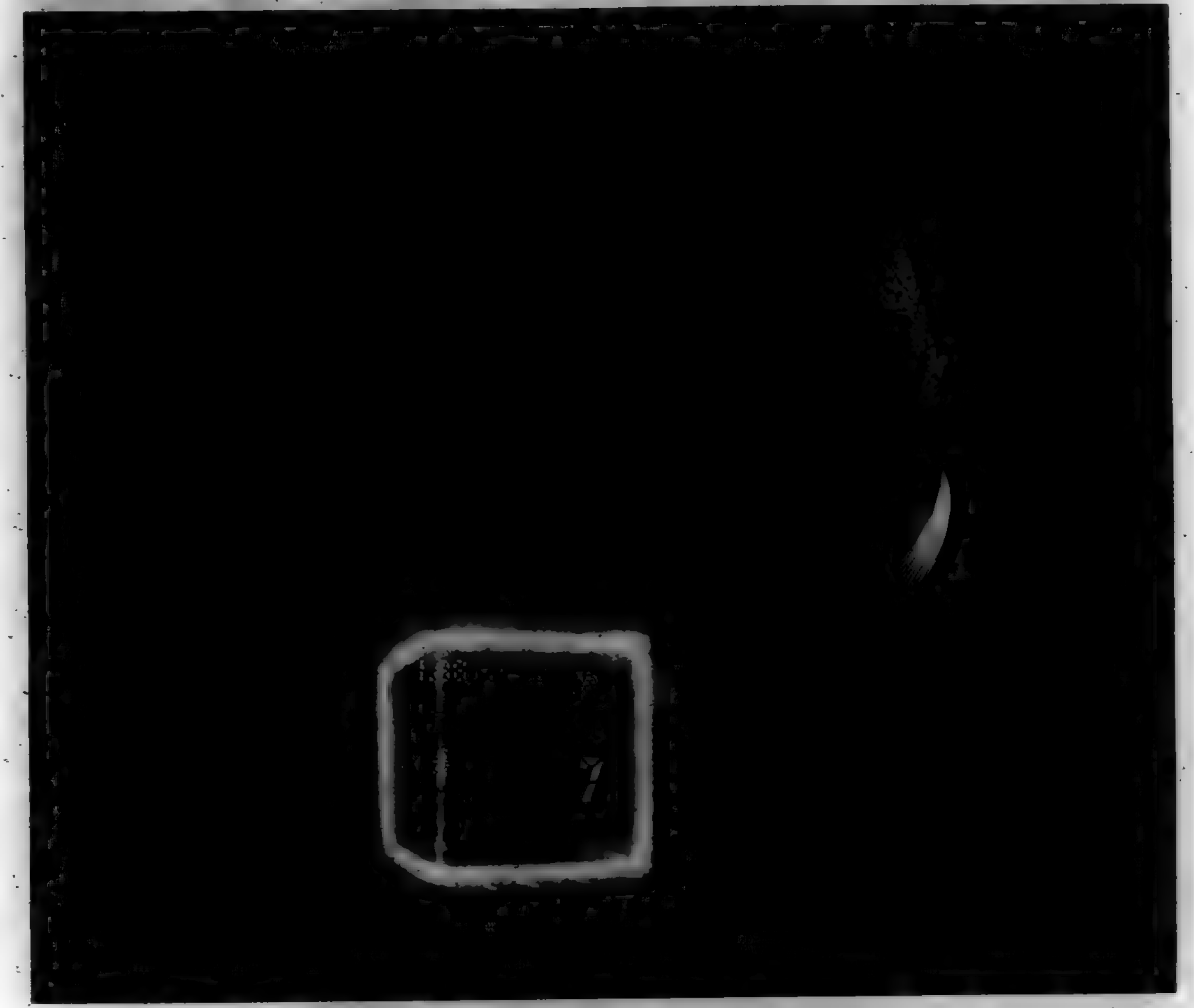

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AM International Offers Intelligent OCR Systems

LOS ANGELES – AM ECRM, a division of AM International, has announced three intelligent optical character recognition (OCR) page-reader systems.

The Concept 2, 3 and 4 page readers are similar in design to AM's Concept 1 system announced last year.

Concept 2 features font recognition programmed on minidiskettes. Operators can switch a diskette to read a variety of common typewriter fonts. The system includes a single two-port communications board, with a second available as an option. The unit costs $23,500, the vendor said.

Concept 3 features a keyboard display terminal that can modify optically scanned text without rereading it. The display screen can be tilted for user comfort, and the unit features multifont recognition. It costs $25,900 according to the vendor.

Concept 4 offers editing and storage capabilities and can be used for computer data entry as well as word processing applications.

The unit features a keyboard display terminal and programmable multifont recognition. Text stored on diskette can be recalled for editing while the page reader is scanning other documents.

The unit costs $31,900, the vendor said from 1900 Avenue of the Stars, Los Angeles, Calif. 90067.

State Follows DDP Route To Increased Productivity

(Continued from Page 73)

now has eleven Nixdorf computer systems installed and operating in eleven state agencies.

The Bureau's Nixdorf 600/50 DDP system has 33M bytes of fixed disk storage, a 1,600 bit/sec tape drive, seven terminals, a 300 line/min printer and three 45 char./sec terminal printers. The system enters, checks, double-checks, corrects and alternately stores and transmits information for each of the educational divisions it serves, Confrey related.

Since the system was installed, it has virtually eliminated the keypunch work that formerly dominated the Bureau's computing efforts. Previously, the Bureau used IBM 029 and 129 keypunch units to enter data for processing at the State Data Center located a mile away.

Now, instead of waiting the 24 hours previously needed to find out if data entry errors had been made, the Bureau knows immediately with the Nixdorf system, the DP consultant stated. Also, instead of only two data transmissions daily to the State Data Center, the Bureau can perform 10 to 20 times more work by working in an on-line fashion.

Three-Step Technique

The Nixdorf system is currently used to enter and maintain information on more than 55,000 people served by the Department of Education's Vocational Rehabilitation division. This particular effort involves a three-step data collection and processing technique, David Kellogg, a data communications analyst with the department, explained.

"With the old card system, every time we entered new client data we had to rekey information that had already been entered." With the present system's data base management feature "we now can expand files to include new information," he said. And, "we have control where we need it most — at the source."

Prior to the Nixdorf system, all hard-copy data received for the division was sent to an outside service bureau that entered the data and then sent it back to the Bureau for verification, he noted. "If data was entered wrong, it took two days to find out, and up to two weeks to correct it."

The Nixdorf system is also used to support the Division of Internal Management's general ledger system that encompasses a $470 million operating budget for the four other divisions; to prepare and evaluate surveys conducted with Connecticut's 149 local and 16 regional school districts; and to track vocational funds allocated to 169 towns, 12 community colleges and 17 vocational technical schools.

The computer is also used to edit a 250,000 record data file on special education students that is maintained by an outside service firm. Eventually, the Special Education Monitoring Information System will be entirely handled by the 600/50 processor, and allow data to be entered from the point of transaction.

Six-Step UPS Claims High Efficiency Rate

ELK GROVE VILLAGE, Ill. – A line of uninterruptible power systems (UPS) inaugurating a six-step, pulse-width-controlled inverter design has been introduced by Sola Electric.

Intended for use with large mainframes, industrial process controls and other large-scale electronic equipment, the unit achieves a top operating efficiency of 84%, the vendor claimed. The six-step UPS is available in 25, 37.5 and 50KVA ratings.

Standard models are 120/208Vac, 60 Hz, 3-phase, 3 or 4 wire and range in price from $30,000 to $50,000, with a normal-size battery included. Sola is at 1717 Busse Road, Elk Grove Village, Ill. 60007.

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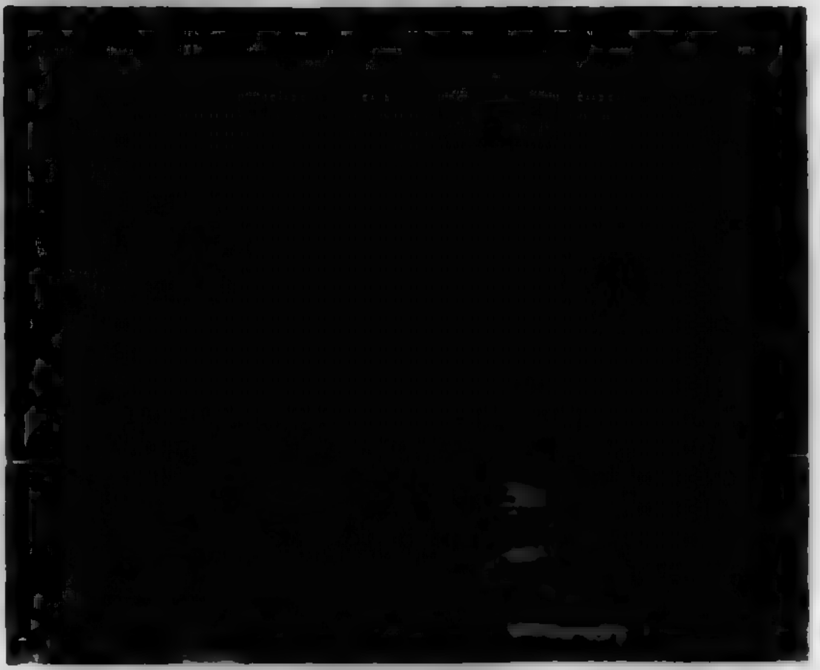
"We switched to NCR," says Joseph A. Dee of Brooks Camera, Inc.



Joseph A. Dee (left) is president and chairman of Brooks Cameras, Inc. in San Francisco. Jim Sweeney is his NCR Account Manager.

DEE:
Brooks Cameras is the largest photographic dealer in Northern California. And we're growing fast. We just outgrew the processing center that had been doing our computer work. We needed faster turn-around. And we wanted to establish our own priorities.

NCR's SWEENEY:
So you went to your own NCR system.

DEE:
Yes, but not directly. First, we selected a competing vendor's newly announced system. But as we started to plan, we began to see problems ahead. No tape drive. Perhaps no COBOL. Perhaps no match-up with our sales terminals. And all we could get from the supplier were vague assurances that the problems would somehow disappear. So we switched to NCR. Very fortunately, as it turned out, because our NCR system is up and running. While the other vendor is still not delivering the other system.

NCR's SWEENEY:
We are not only delivering, our operating software is fully tested.

DEE:
We had a shirtsleeve session with the NCR software people that was refreshing. They told us exactly where they stood. What we could expect and when. And that's the way it's turning out. They gave us the hard answers.

NCR's SWEENEY:
You liked Migration Path Engineering, too.

DEE:
Our requirements are too unique for us to expect off-the-shelf application software from any supplier, We have every kind of sales transaction. We accept all the regular charge cards as well as our own. We have rentals, repairs and layaways. And our own special promotions. So once we made the investment in our own specialized programs, we wanted to protect it. Even when our growth forces us to move to a larger system. With Migration Path Engineering, NCR can give us that protection.

NCR's SWEENEY:
And finally, you wanted one supplier who would assume responsibility for the entire system from A to Z — including the terminals.

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In the NCR office nearest you, there is an account manager like Jim Sweeney who knows both NCR systems and your industry. To learn more about what an NCR system can do for you, phone him at your local office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

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ANAHEIM, Calif. — Minicomputers, bar code readers and CRT terminals are helping librarians keep track of the comings and goings of hundreds of thousands of books here at the Anaheim Public Library.

With approximately 400,000 items to watch and 40,000 library-card holders, the management of the library turned to a Digital Equipment Corp. PDP-11/34 minicomputer for control because many patrons don't always return materials on time, Pat Sullivan, head of technical services, said. The system was designed to provide up-to-the-minute information on library patrons and circulated materials.

The system's files consist of information on any type of material circulated to the public, information such as title, author, copyright and cost. The computer also keeps tabs on the patrons' names and addresses and also a record of any overdue fines.

Information is input to the computer via a number of Monarch Marking Systems, Inc. bar code readers and Lear Siegler, Inc. terminals. The bar codes are affixed to all of the library books and patron cards, Sullivan stated.

Book Checkout

When an individual attempts to check out a book, the clerk passes the bar code reader first over the person's card and the patron's record automatically appears on the terminal's screen. The clerk then checks to see if there are any overdue books or payable fines.

If the record is clear, the bar code reader is next passed over the book's bar code. The book and due date are added by the system to the patron's record and the transaction is completed.

For check-in, the process is similar, except the items are then removed from the person's record, Sullivan pointed out. "Of course, the clerk can also use the terminal's keyboard to access the computer and enter data, as well."

The library circulation system was developed by Systems Control, Inc. (SCI), Palo Alto, Calif.

"It is now nearly impossible for our patrons to be abusive with library materials because the computer won't let them, which is quite an improvement over our previous manual method," Sullivan stressed.

The library's old circulation procedures had no built-in way to review patron records as they checked out books. "Formerly, a person could almost start his own library at home and there would be a delay before we would be able to spot the large number of overdue books," Sullivan observed.

> *'It is now nearly impossible for our patrons to be abusive with library materials because the computer won't let them, which is quite an improvement over our previous manual method. . . Formerly a person could almost start his own library at home and there would be a delay before we would be able to spot the large number of overdue books.'*

Anaheim Library's previous manual system is still common to many libraries, Sullivan indicated.

It was a photographic system. Each time an individual checked out a book, the clerk would take a photograph of the person's library card, the book identification card and a punched card with the due date. The photo was produced as microfilm, and when the book was returned, the punched card was sent to the Anaheim DP center on a batch basis.

"We would get printouts from the DP center regularly telling us which books were overdue," Sullivan said. "It then took six full-time employees to check the overdue book numbers against the microfilm to find the patron's name and address and send out overdue notices."

The library also kept paper files on each patron, which obviously could not be reviewed for fines every time that person checked out a book, she continued. "We would have had lines out the front door. In fact, the only way we could really collect all fines from negligent people was to make the library cards expire every year. Then we could check records before issuing a new card."

Lifetime Cards

With the current system, patrons can get lifetime cards, Sullivan explained.

Sullivan pointed out that the computer also takes care of issuing overdue notices. "On a daily basis, the computer scans for overdue notices," she said. "This is done at night in a batch processing mode. Additionally, on a monthly basis, we can get a printout of people with fines in excess of $50 [that] are then handled by the individual libraries with phone calls and letters."

According to Sullivan, the system has been so well-received in Anaheim that the library has installed one for the Placentia library and will implement systems for Buena Park and Yorba Linda library districts in the near future. All of these libraries will interface with phone lines to the Anaheim-based computer.

Sharp Unveils Business System

PARAMUS, N.J. — An expandable small business computer featuring a step-by-step programming aid will be available from Sharp Electronics Corp. early next year.

The YX-3200 includes a CPU, high-resolution CRT, dual floppy disk drives and an impact printer.

The desktop system has an expandable 32K-byte read-only memory and 64K-byte random-access memory, and an automatic program generator that poses questions and when answered "yes" or "no," actually designs the desired program, the vendor claimed.

Sharp YX-3200

The price for the system is approximately $6,000.

Sharp Electronics is located at 50 Ans Drive, Paramus, N.J. 07652.

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LSI-11 Gets Add-In Memory

WALTHAM, Mass. — Cambex Corp. has unveiled an add-in memory for Digital Equipment Corp.'s LSI-11 microcomputers that features on-board refresh, parity and a provision for battery backup.

The Cambex board is reportedly double the density of standard DEC memory with up to 128K bytes on a single card.

It is also said to be the first to offer this dense configuration using 16K-byte random-access memory technology. Other configurations of the memory include 32K, 64K and 96K bytes, a spokesman noted.

Read and write access times are 140 nsec and 100 nsec, respectively, and the board's cycle time is 450 nsec, he added.

The memory is priced at $1,300 for the 128K-byte version and $750 for the 64K-byte model. Cambex is located at 360 Second Ave., Waltham, Mass. 02154.

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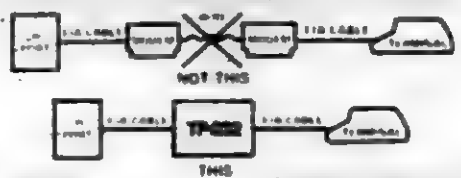
The TP-232 Modem Simulator replaces a pair of modems in local, in-house applications, as shown below. With its wide variety of strap selectable options, this unit is a versatile tool for system check-out as well as an economical replacement for a modem pair.



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Color Unit, WP System, Floppy Fit Commodore 8032

NORRISTOWN, Pa. — Commodore Business Machines, Inc. (CBM) has announced an expandable color computer system selling for less than $300, a floppy disk drive and a word processing (WP) system for use with the Commodore 8032 business system.

The Video Interface Computer (VIC) 20, said to rival systems priced at four or five times its cost, connects to any television set or monitor and provides 5K bytes of memory.

The unit features programmable function keys, memory expansion to 32K bytes, standard Petbasic, typewriter keyboard, external expansion ports, 22-char. by 23-line screen display, graphics character set and plug-in program cartridges.

The VIC-20, priced at "under $300," according to the firm, will be available during the first quarter of 1981.

The CBM 2031 single floppy disk unit stores up to 170K bytes on a single 5.25-in. floppy diskette and incorporates an IEEE-488 interface for use with the firm's PET and CBM computer series.

A serial-bus version, tentatively designated the 2031S, will provide compatibility with Commodore's VIC 20 computer, a spokesman said.

The CBM 2031 will sell for "under $600" in both the IEEE and serial bus configurations and will also be available in the first quarter.

The Wordcraft 80 WP system, when combined with the Commodore 8032 business system, is said to provide a complete WP system for $5,000, compared with "most dedicated WP systems," that reportedly cost up to $13,000.

Commodore is located at 950 Rittenhouse Road, Norristown, Pa. 19403.

Disposable Print Head

Dot Matrix Printer Debuts

TORRANCE, Calif. — An 80-column dot matrix printer for microcomputer-based systems is available from Epson America, Inc.

The MX-80 features a disposable print head that wears out after 50 million to 100 million characters; a new one costs $30 and can be installed by the user, the vendor claimed.

The product prints a full character set, in up to 12 print modes, of which more than half utilize multistrike and/or multipass techniques to generate letter-quality printing, a spokesman said.

The price for the printer is $650, the vendor said from 23844 Hawthorne Blvd., Torrance, Calif. 90505.

SMD Controller for PDP-11

TUSTIN, Calif. — A single-board disk controller for Digital Equipment Corp. PDP-11 computers that handles up to four storage module disk (SMD) drives has been announced by the Wespercorp division of Western Peripherals.

The DC-231, when used with a Control Data Corp. 80M-byte drive or equivalent, is completely compatible with all DEC operating systems having RM02 support, a spokesman said. A 300M-byte drive will yield RM05 compatibility. In addition, the controller is software compatible without patches or drive modifications.

The unit was designed with self diagnosis, displayed by five LED indicators on the board, the spokesman added.

Serviced and maintained by Wespercorp's service organization, the controller costs $3,150 from the company at 14321 Myford Road, Tustin, Calif. 92680.

Cash Register Replaces Computer

ST. LOUIS — Sauer Computer Systems, Inc. is offering a software-controlled cash register capable of functioning as a stand-alone computer, data collection center for a "back room" computer or a terminal to a central computer.

The Retail Data System stores the day's transactions on one or more minifloppy disks. A switch is available which allows either on- or off-line operation of the register. If the back room machine is down, transactions can be stored in the register to be processed later, the vendor claimed.

The systems are supplied with 28K-byte random-access memory. The RDS-100 system, with one minifloppy disk drive and a 30 char./sec printer costs $4,000, the vendor said from Suite 601, 1750 South Brentwood Blvd., St. Louis, Mo. 63144.

Apple II, Centronics Printer Tied

SUNNYVALE, Calif. — The California Computer Systems Model 7728 interface gives users of the Apple Computer, Inc. Apple II compatibility with Centronics Data Computer Corp.-type parallel interfaces.

Such printers include the Integral Data Systems, Inc. Paper Tiger, Okidata Corp. Microline 80, Microtek, Inc. MT-80P and MPI 88T.

An on-board 256K-byte read-only memory (ROM) provides driver firmware and controls Ascii character output to the printer.

The driver responds to standard Apple II printer commands for selection of command characters, characters per line, auto feed and video echo, the vendor claimed.

Users who choose to develop their own drivers may replace the standard ROMs with random-access memories (RAM). A ROM/RAM jumper makes the necessary logic changes.

The 7728 costs $119.95, the vendor said from 250 Caribbean Drive, Sunnyvale, Calif. 94086.

Adapso Revamps Stands on Top Issues

By Marcia Blumenthal
CW Staff

KAUAI, Hawaii – The Association of Data Processing Service Organizations, Inc. (Adapso) agreed to formulate a new position on its long-range approach to IBM and formed a new committee to study the issue of overtime pay for programmers at its 20th annual meeting here recently.

While these are not new issues, Adapso has decided to take a more active position on these common industry concerns.

By agreeing to develop a new position paper on IBM, Adapso reversed its former position, formulated in 1972, advocating the breakup of IBM into two separate companies, one for hardware products and one for software and services.

Adapso's general mandate is to protect the software and services industry from competition from regulated industries such as AT&T and banks. To that end, Adapso last year spent 40% of its $1.1 million budget on legal fees.

CW At Adapso

However, IBM does not fit into the regulated industry category. Adapso prefers to concentrate its effort on persuading IBM to release its interface standards for hardware and software products on a timely basis, one Adapso member said. When IBM makes early announcements on products without issuing specifications, the market for independent vendors dries up, damaging revenues.

Moreover, Adapso wants IBM to further unbundle its software, not only from its hardware, but also from other software products. The association plans on calling for full costing and fair market pricing for all IBM software products.

(Continued on Page 82)

STC Planning IBM-Type CPU

LOUISVILLE, Colo. – Storage Technology Corp. (STC) intends to develop a high-performance mainframe for the IBM-compatible market.

This development effort will mark STC's initial entry into the CPU market.

The new computer venture will be financed by a seperate independently owned entity which will be organized to design and develop, in conjunction with STC, a family of high-performance IBM compatible CPUs.

"Use of an independently financed development entity should allow Storage Technology to use its financial resources for expention of its existing product offerings and at the same time avoid the adversie impact on Storage Technology's near-term earnings which would otherwise result if the development program were to be financed solely by Storage Technology," Jesse I. Aweida, STC president, said.

Upon completion of the development effort, STC will have the right to purchase the technology developed by the venture on a deferred payment basis and obtain the exclusive manufacturing and marketing rights to the new computer.

According to Aweida, "Financing of the development entity is expected to commence in late 1980 or early 1981.

"First customer shipment of the new central processor by Storage Technology is expected to take place in early 1984," he added.

World Teleprinter Mart Viewed Topping $1 Billion by 1985

By Marguerite Zientara
CW Staff

The worldwide market for teleprinters will exceed $1 billion by 1985, according to two market research firms – Creative Strategies International (CSI) of San Jose, Calif., and Venture Development Corp. (VDC) of Wellesley, Mass.

While the two agreed the market is growing for teleprinters, VDC was more optimistic, predicting that it will top $2 billion by 1985, according to its recent study, "The Teleprinter Terminal Industry: A Strategic Analysis."

In spite of its optimism about future sales, VDC noted that shipments of teleprinter terminals in 1980 will be lower than they were in 1979. "Although the recession has not hit most areas of the computer industry," VDC found, "the teleprinter terminal market is one area that has been affected."

Apparent Disparity

Addressing the question of how the teleprinter market can decline $200 million "when Digital Equipment Corp. and Teletype Corp. cannot manufacture them fast enough," VDC blamed the apparent disparity on the fact that "the vast majority of the ... industry is seeing flat or negative growth in 1980."

Of the 32 U.S.-based teleprinter manufacturers, three industry leaders control over 60% of 1980 shipments, VDC noted. "Growth potential for these and approximately 15 other manufacturers looks good, but the rest ... will continue to lose market share."

While CSI predicted that the present suppliers will be joined by "at least a dozen more by the end of 1985," VDC believes there will be a "shake-out" in the teleprinter industry "in the near future."

Competition in the teleprinter marketplace of the 1980s "will be based on price and performance, customization and innovative marketing to new groups of potential teleprinter users," CSI forecast.

Expected to be installed over the next five

(Continued on Page 91)

DEC Meet Unfolds Good and Bad News

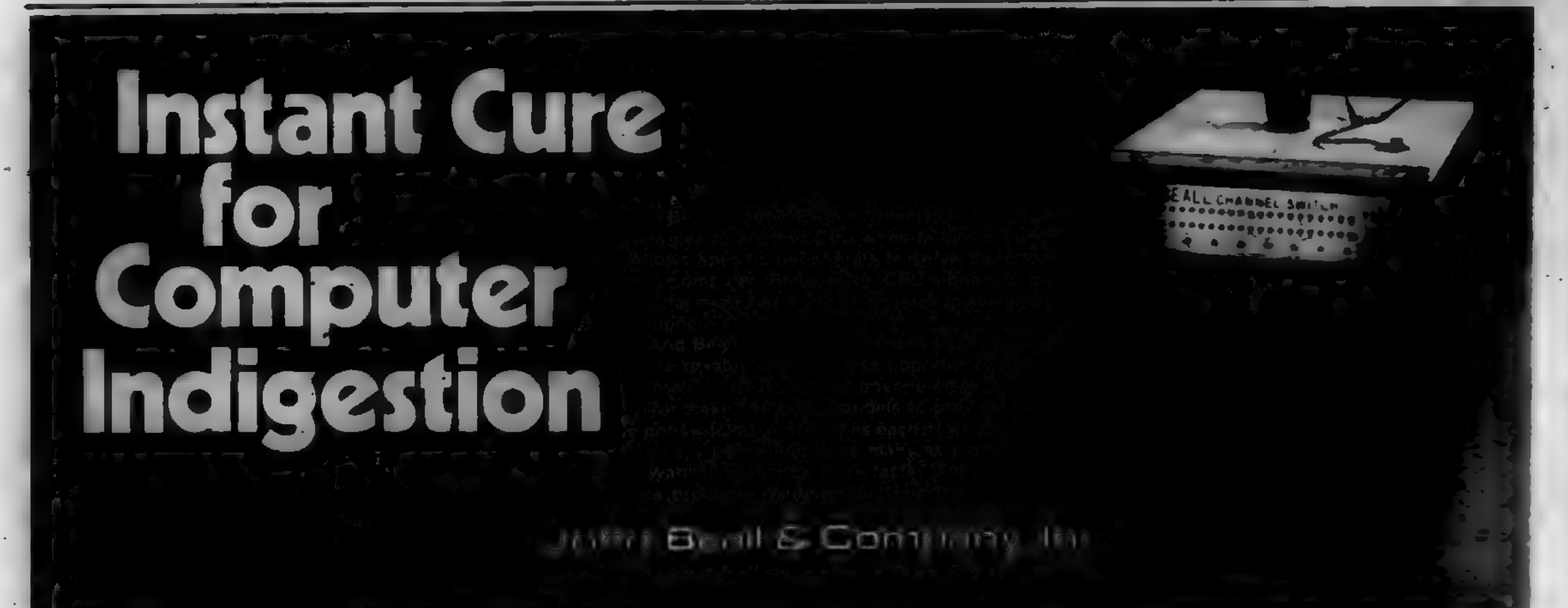
By Tim Scannell
CW Staff

BOSTON – There was some good news and a little bad news here recently at Digital Equipment Corp.'s annual meeting.

The good news, for stockholders, is that company profits in the first quarter of fiscal 1981 are up 24% to $56.2 million and total operating revenues rose 34% to nearly $654.4 million. On the whole, company revenues for the past fiscal year increased 31% to nearly $2.4 billion and earnings jumped 40% to just under $250 million.

However, the bad news for customers is that demand for the firm's computer products is growing and will increase delays for equipment deliveries. DEC's business is

(Continued on Page 90)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Firms Hurt by Datapro Surveys To Get Legal Aid From Adapso

KAUAI, Hawaii — The Association of Data Processing Service Organizations, Inc. (Adapso) said it will provide legal assistance to any of its members determined to be competitively injured by Datapro Research Corp.'s surveys of software products.

Datapro recently revamped its survey techniques, but Adapso statisticians do not yet know whether the new survey method will yield results more statistically valid or reliable than past surveys.

Part of the flap over the surveys revolves around the sample size Datapro uses for its rating, which are on a scale of one to four. To define a statistically valid population for each specific software product included in the survey would be expensive, Adapso said.

Adapso contends the sample is far too small to be statistically accurate. As a result, some software firms have suffered a loss of business due to the survey, the association maintained.

Datapro's position has been that it does not intend to spend significantly more money on performing surveys, Adapso staffers charged.

Adapso officials said Datapro wanted the association to help formulate the survey method, but counsel advised against this.

Adapso Strengthens Stands On Top Industry Concerns

(Continued from Page 81)

While the vendor Relations Committee will hammer out the IBM position paper, the Software Industry Association (SIA), a special entity within Adapso, is developing the specific types of information needed on interface standards from major hardware vendors.

An SIA committee is drafting these interface specifications and expects to complete the task in two to three months.

In general, Adapso members report satisfactory relations with IBM. Some 80 members are participating in exchanging "publicly available" information with IBM.

As for the programmer overtime issue, Adapso members claim it has more serious implications for DP groups in end-user sites than those at software and service companies.

Nonexempt Employees

Currently, the U.S. Department of Labor (DOL) does not consider programmers professionals and they are classified as "nonexempt" employees.

Under the Fair Labor Standards Act, programmers could be considered exempt if they "regularly exercise individual diagression and judgment on matters of material importance to their employers' business or customers of their employers. Many software and service firms view their programmers as consultants."

Although the new Adapso Professional Staff Committee claims it is neutral on the subject and its task is to formulate a position for Adapso, most firms in the industry consider programmers professionals. Nonetheless, part of its activity will be to gather data on whether firms pay programmers overtime.

However, the risk of disgruntled employees complaining to the DOL or DOL-initiated investigations could cause significant financial problems to both vendors and end-user installations.

Weissman Gets Top Adapso Post

KAUAI, Hawaii — Robert E. Weissman was named the 1981 chairman of the Association of Data Processing Service Organizations, Inc. (Adapso) at the association's 20th annual meeting here recently.

Besides Weissman, Jerome L. Dreyer was named president of Adapso. His previous title was executive vice-president.

Laurence J. Schoenberg, president of AGS Computers, Inc., will serve as vice-chairman of the board.

Named vice-president of administrative and self-development was Richard W. Thatcher Jr., president of Atlantic Software, Inc.

Vice-president of communications next year will be David Sherman, general counsel of General Electric Information Services.

Serving as vice-president of competitive practices will be Fred Lafer, vice-president and general counsel of Automatic Data Processing, Inc.

Named vice-president of education and small business interests was Arthur M. Kramer, president of Praxa Corp.

John P. Imlay, Jr. was named vice-president of image. He is chairman and chief executive officer of Management Science America, Inc.

Selected as vice-president of software issues was Bruce T. Coleman, vice-president of Informatics, Inc.

Named vice-president of government relations was Stephen H. Beach, general counsel at Control Data Corp.

During the past year, 72 companies joined Adapso, bringing total membership to 438 members. In all some 200 representatives of 172 companies attended this year's annual meeting.

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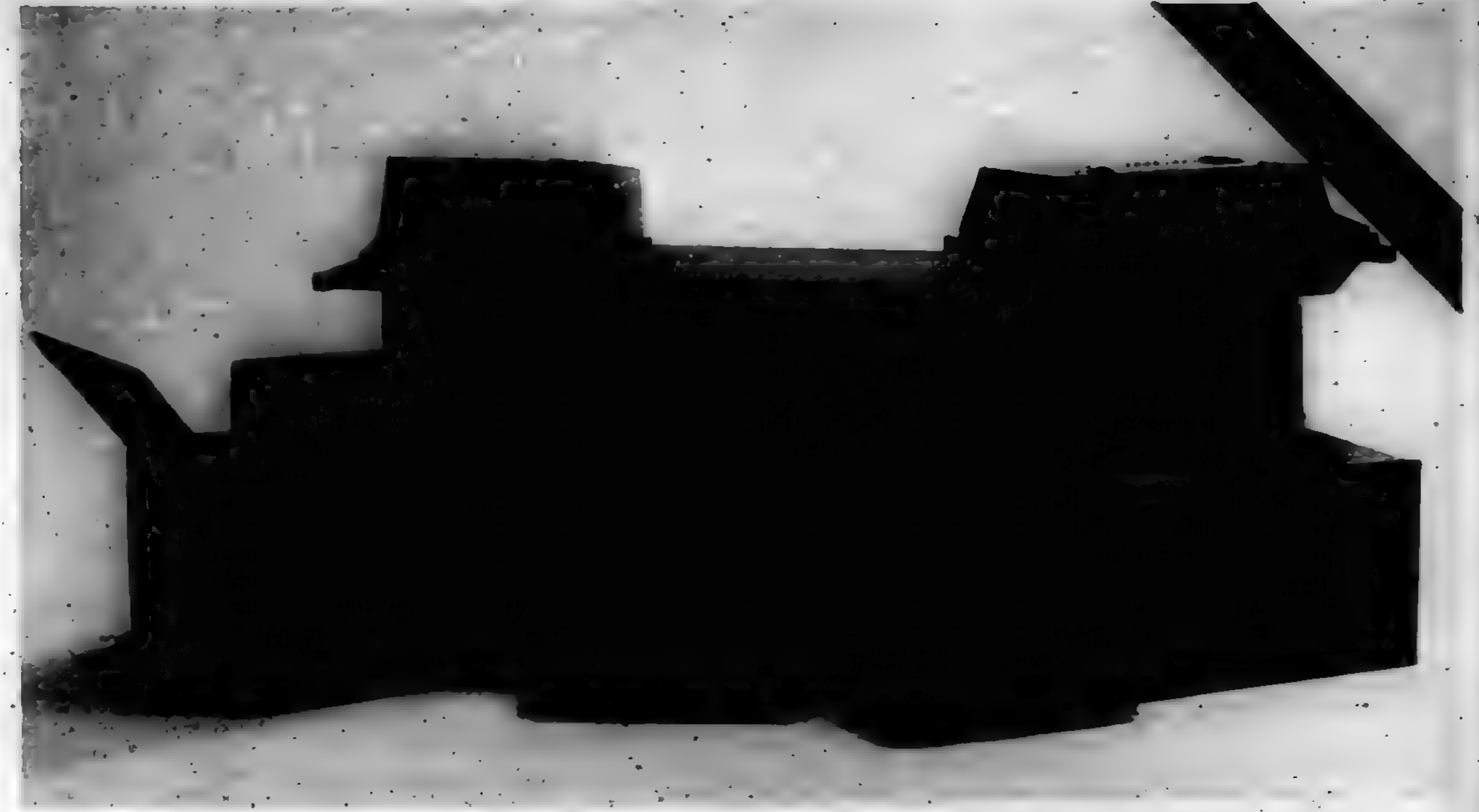

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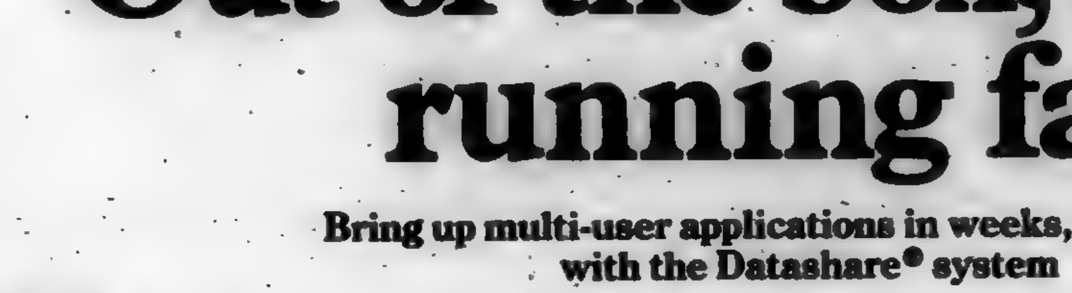

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Job Category	Average 1980 Salary	Average 1979 Salary	Increase
Lead Systems Software Programmer/Analyst	$28,000	$27,500	2%
Senior Systems Software Programmer/Analyst	$26,000	$23,500	10.4%
Intermediate Systems Software Programmer/Analyst	$21,000	$19,800	5%
Lead Applications Programmer/Analyst	$26,500	$24,800	6.6%
Senior Applications Programmer/Analyst	$23,500	$21,500	7.5%
Intermediate Applications Programmer/Analyst	$19,500	$18,000	10.8%

1980 Adapso Compensation Survey Results

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370/148—J	1 Meg IBM & 1 Meg EM & M	2/81
370/155—II	IBM Dat Box & 3 Meg CDC	11/80
370/158—U31	524K IBM & 2.6 Meg EM&M	3/81
370/168—L	4 Meg IBM & 2 Meg EM&M	12/81
4331—J1	1 Meg IBM	2/81

All systems qualify for IBM maintenance.

The auction will be held in New York City at our York Avenue Galleries, 1334 York Avenue at 72nd Street. If you have any questions, or if you would like a copy of an auction catalogue which describes in detail all of the equipment to be offered, please contact John J. Carr, Director of Sotheby's Business Systems Department, at (212) 472-4780.

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Computer Services Pay On Par With DP Salaries, Adapso Survey Reveals

By Marcia Blumenthal
CW Staff

KAUAI, Hawaii — Salaries for technical and professional staff in the computer services industry are about equal to compatible staff at DP installations, according to the second annual Association of Data Processing Service Organizations, Inc.'s (Adapso) Compensation Survey.

Overall, the growth rate in total compensation for technical and professional positions was 8.5% over the year. Generally, lower level positions in the industry pay about 4% to 6% less than at end-user sites in all industries, but are about that much greater for higher level technical staff, noted Joseph H. Blumberg, vice-president of human relations at Comshare, Inc.

Moreover, the career paths at vendor companies are broader, he maintained.

While the average compensation increases appear modest, some personnel had increases in the 15% to 20% range, but because of attrition at the high end of one category and the filling of the slots at the entry-level salary for the same category, actual percentage increases seem lower, he explained.

Average increases for systems software programmer/-analysts are shown in the accompanying box.

The time it takes an employee to progress from a trainee to a lead position is constricting, Blumberg noted.

Because promotional increases are greater than merit raises, this may explain the relatively low pay increase averages within specific categories.

On the other hand, the average jump in salary from a trainee position to associate is 27.3%, from an intermediate rating to a senior rating is 20%, and from a lead slot to a managerial position is 30%.

CW at
Adapso

Like other DP installations, Adapso member companies are experiencing a shortage of technical staff.

However, computer science programs at universities are concentrating on teaching students to write programs for an end use such as inventory control, Blumberg observed. But the computer services industry needs talent that has a broader systems view and can make the distinction between what tasks should be done by the hardware and what tasks should be performed by software programs.

The survey was conducted by Adapso and A.S. Hansen, Inc., with 100 firms participating. The survey collected data on compensation not only for technical personnel but also for executive, sales and selected middle management positions. The survey is available for $500 to non-Adapso members and $200 for Adapso members from A.S. Hansen at 1080 Green Bay Road, Lake Bluff, Ill. 60044.

Ampex, Signal Ink Accord

REDWOOD CITY, Calif. — Ampex Corp. and the Signal Cos. Inc. have signed a formal definitive agreement providing for the acquisition of Ampex by Signal through an exchange of common stock.

The agreement calls for the exchange of .85 share of Signal common — prior to an announced stock split — for each common share of Ampex.

The merger is still subject to approval by the shareholders of each company, a favorable tax ruling and approval by various regulatory agencies, the companies noted.

Contracts

Comsat General Corp. has been awarded a consulting and technical assistance contract by AT&T's Long Line Division to help implement AT&T's Telstar-3 domestic communications satellites, which will succeed the present Comstar series.

Informatics, Inc. has been awarded a two-year $1.6 million U.S. Air Force contract that involves intelligence information handling at Strategic Air Command headquarters in Nebraska.

Nixdorf Computer Corp. has signed a $2.1 million contract with CISI Group, Inc. for the installation of 35 Nixdorf 8840 word processing systems to be used for a variety of applications, including compilation of mass mailing lists and typing of catalogs and legal contracts for customers.

The Redwood Bank of San Francisco has signed an agreement with Boeing Computer Services Co. for information processing services, for an undisclosed amount.

Services Firms Say Recession Taking Toll

By Marcia Blumenthal
CW Staff

KAUAI, Hawaii — Has the recession taken its toll on processing services companies?

Yes, said Richard L. Crandall, president of Comshare, Inc.

CW at Adapso

In 1977, Crandall forecast processing service companies would feel recessionary pressures one year after the start of a recessionary period in the general economy.

That prediction took shape after the second quarter this year when the revenue growth rate of 17 publicly traded processing service firms dipped 28%. Earnings were not hurt as severely.

While the jury is still out on how long revenue growth will continue to lag, Crandall noted "everyone in that sector of the industry said August was terrible." His model predicted the third quarter will see a lag in revenue growth with recovery trailing the recovery of the general economy.

Oddly enough, "new name" contract signing is going along at a healthy clip, Crandall reported during a recent interview here at the Association of Data Processing Service Organization Inc.'s (Adapso) 20th annual meeting.

However, older, more experienced customers, which supply the bulk of the business, have figured out how to use outside services more efficiently. "A company may request a monthly report instead of a weekly one," he observed.

One solution to the revenue doldrums is to write long-term contracts — two to four years — with existing users at discounts ranging from 10% to 25%. Comshare recently wrote $6 million worth of long-term business on this basis, Crandall maintained, adding that other companies are also using this approach.

Inflation has compounded the drag of the recession, he noted. Raising prices could help, but a lot of service companies are afraid to raise prices even though software is underpriced, he maintained. Price increases have generally been in the 7% to 10% range.

Although margins haven't been as severly hit as revenues, service companies can't achieve as much "tweaking" as before from economies in hardware.

The cost of hardware as a percent of total revenue during the early 1970s was 50%, but today is only 18%, Crandall noted.

CW Photo by M. Blumenthal

Robert E. Weissman

Industry 'Identity Crisis'

KAUAI, Hawaii — "There is an identity crisis in our industry." The perception that society is goods-oriented and technology is the key to success is partly fallacious, Robert E. Weissman, chairman of National CSS, Inc. and chairman-elect of the Association of Data Processing Service Organizations, Inc. (Adapso), declared here at the group's 20th annual meeting recently.

Data has become the new control point in our information society, and "we cannot neatly separate data from software."

The infrastructure of today's society is based upon information and the software and services industry must work toward recognition of this phenomenon, he said.

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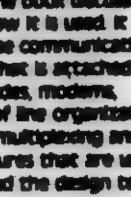

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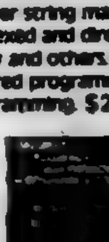

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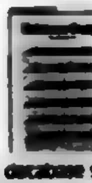

HM145

Database Design

Gio Wiederhold

From hardware to files to database systems, this is a methodical approach to the principles of database design for commerce and industry, and the scientific disciplines. Throughout, theory is integrated with practical applications. Consistent terminology and theoretical models of immediate practical adaptability make the book particularly helpful for those just beginning their study of database design. $25.95

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James Martin

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Application Design Handbook for Distributed Systems

Robert Patrick

An excellent handbook for the practicing systems analyst, this book is a state-of-the-art approach to the mechanics of computer application design and an organized compendium of application design hints. It's a non-mathematical treatment based on firm data processing principles, and provides basic coverage of human factors, performance, distributed data and systems availability concepts that must be considered during the evolution of a successful design. Addresses economics of distributed computing and includes a checklist of 95 activities to be considered by the designer of a distributed system. $22.50

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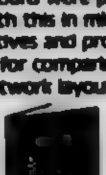

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Programming with ADA

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This is the first step-by-step introduction to ADA, the completely new programming language developed for use by the Department of Defense and all its suppliers. Featuring over 350 graduated examples, this book is a readable and comprehensive primer on the programming language that many experts feel is destined to become the FORTRAN of the 1980's. $13.95

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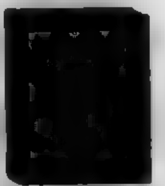

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Dr. David A. Lien, author of the TRS-80 Learner's Manual

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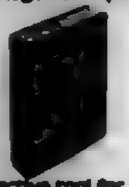

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Kenniston W. Lord, Jr., CDP and James B. Steiner, CDP

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SC084
Pascal: An Introduction to Methodical Programming
William Findlay and David Watt

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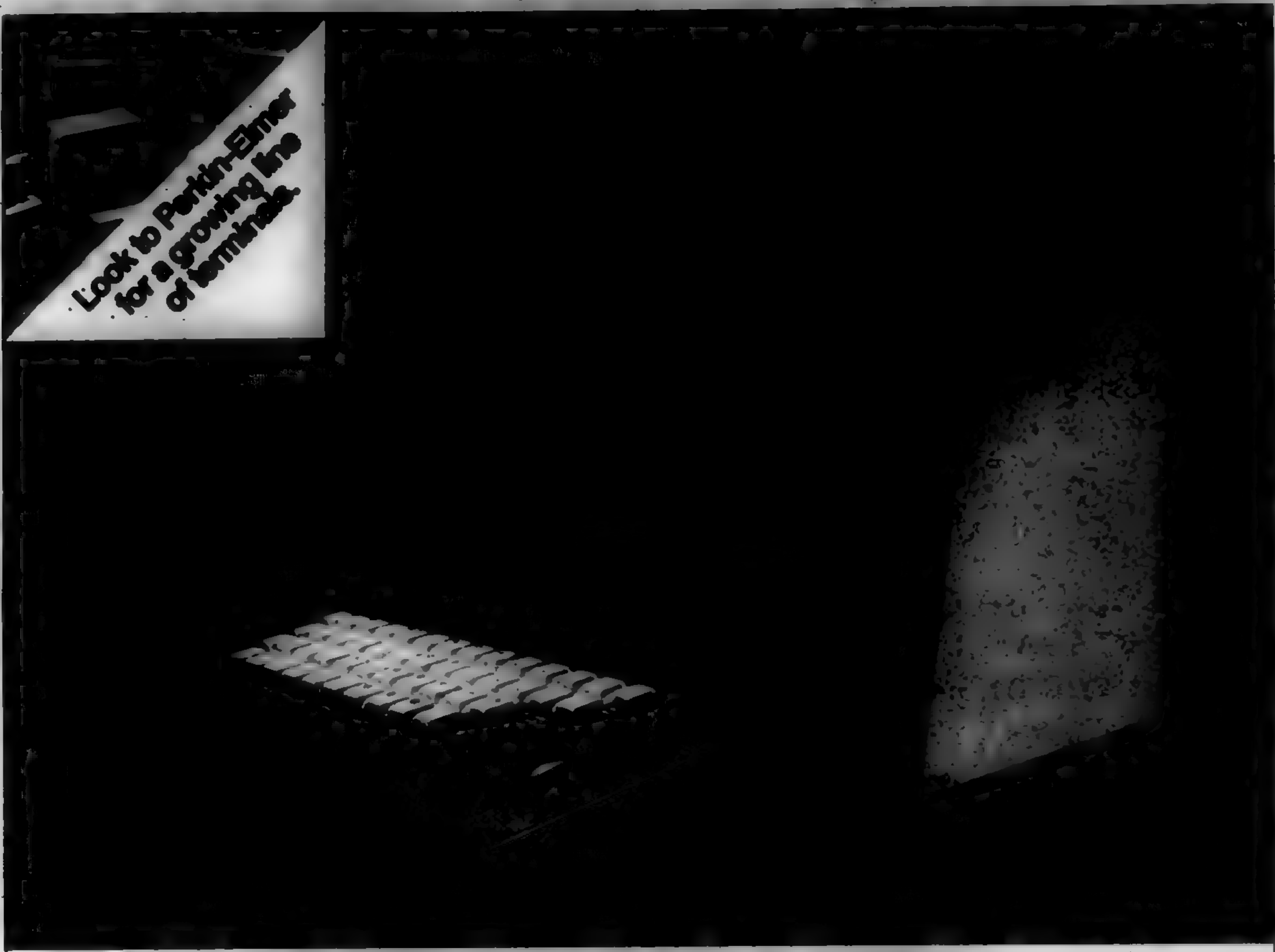

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CDC Opens First Business Center

MINNEAPOLIS – Control Data Corp. has opened the first of a nationwide series of Business Centers designed to give small business owners access to a wide range of products and services.

Technology, computer services, microcomputer software, education and training services, hardware and financial and insurance services will all be available at the centers, according to W.H. Bruning, CDC vice-president of retail marketing.

The first center will be in the Minneapolis suburb of Edina. Initially, Ohio Scientific, Inc. (OSI) microcomputing systems and accompanying OSI software will be available.

Computing services and software available will include everything from generic business packages, such as general ledger and billing, to the scientific and engineering applications of Cybernet. Services will be available directly or through referral.

Consulting and education services to be offered range from technical and information processing consulting to sound business decision-making advice. Included will be consulting services on a complete range of marketing, personnel and financial matters.

Financial services will involve leasing, equipment financing, insurance and working capital and other business loans, including the Small Business Administration loan program.

A variety of other services also will be available to the small business owner, including an import-export trading company, temporary help, hiring assistance, hardware and software maintenance and support a host of related business products media and supplies.

The Edina store will be the first of eight to be opened in 1980 – there will also be two each in Minneapolis-St. Paul, Milwaukee, St. Louis and Kansas City, Mo.

Pertec Shuts Down Plant, Halts Building Plans

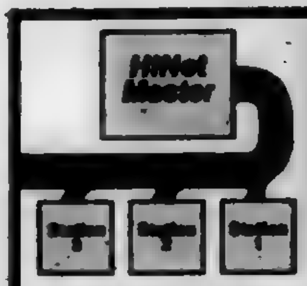
ALBUQUERQUE, N.M. – Pertec Computer Corp. has closed its computer manufacturing facility here and suspended previously announced plans to construct a new manufacturing facility in the Academy Industrial Park northwest of the city.

"Although the company is continuing to grow its computer systems production generally, improved labor efficiencies and the company's concentration on smaller systems has pushed demand for facility expansion several years later than previously anticipated," Thomas Elrod, Pertec's senior vice-president and general manager of the Systems Group, explained.

Corrections

First Federal Savings & Loan Association, which has placed a $1 million computer order with Univac [CW, Oct. 13], is located in Columbus, Ga., not Columbus, Ohio.

James J. Bryne was appointed president, not vice-president, of the North America Marketing Group at Mohawk Data Sciences Corp. [CW, Oct. 20].



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DEC Has Good News, Bad News

(Continued from Page 81)

booming and "we have paid a price," Kenneth H. Olsen, the company's president and chief executive officer, said. "Everybody's unhappy when there's not enough equipment."

Speaking to more than 200 stockholders, analysts and other people at the annual meeting, Olsen noted that while the backlog of equipment orders is increasing the company is doing everything it can "to take care of its customers."

The minicomputer manufacturer spent nearly $109 million in this first quarter on property and plant expansion aimed at providing sufficient capacity to meet customer demands. In fact, full-year spending should be close to $400 million, as opposed to the $210 million spent in fiscal year 1980.

DEC has also stepped up production on its more established products such as the VAX-11/780 32-bit minicomputer and the relatively new VT100 terminal. In 1979 DEC increased production on the VAX by 40% to satisfy customer demands and tripled the production schedule for its CRT terminal, Olsen stated.

At a press conference following the meeting, Olsen stated that DEC was presently manufacturing about one VT100 terminal per minute. But, "we'll never make enough of them" or computers, he said.

Looking toward the future, Olsen pointed out that microprocessor electronics — although not of major importance in terms of dollars earned — will play a big part in systems development. Chip manufacturing facilities, like the one recently opened in Hudson, Mass., will serve to speed up computer design and production.

Home Computers

He also restated the company's decision not to dive into the home computer field. "One thing that's sure going to kill us is if we try to do everything," he said. Historically, "many people got burned trying to satisfy both markets."

Olsen observed that there are actually two definitions of personal computing: one refers to the home-based system that helps a consumer balance a checkbook, and the other concerns a computer or intelligent terminal that is used in the office.

In the future, everyone will have computers of the second type that employ time-sharing for difficult problems, can access large files and might even be interfaced to typesetting machines for instant document preparation, he explained.

STC Forms OEM Subsidiary

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has formed an OEM subsidiary to design, manufacture and market peripheral products for original equipment manufacturers of computers and other control equipment.

The new subsidiary is called STC Peripherals, Inc. Its president is William R. Mansfield, who is also a corporate vice-president of STC.

Commenting about the establishment of STC Peripherals, Jesse Aweida, chairman and president of STC, said, "Storage Technology's OEM business is a very important part of both our current and future operations. By setting it up as an independent subsidiary, we will be able to better serve this important market."

PRC Restructures Into Four Units

WASHINGTON, D.C. — Planning Research Corp. (PRC) has been restructured into four strategic business units. The units and the executives heading them are:

- Commercial Information Systems — Bert I. Helfinstein, currently the president of PRC Realty Systems, Inc. This new unit will seek a greater PRC role in the computer services business.
- Government Information Systems — Wayne V. Shelton, currently the president of PRC Information Sciences Co. Shelton's unit will have overall responsibility for PRC's computer software and systems services to the federal government.
- Architectural and Engineering Services — Jerome M. Fischer, an executive vice-president of PRC. Fischer's unit will direct the company's planning, design and management activities for construction projects.
- Systems Engineering and Facilities Support — George E. Monroe, a vice-president of PRC and currently the president of PRC Systems Services Co.

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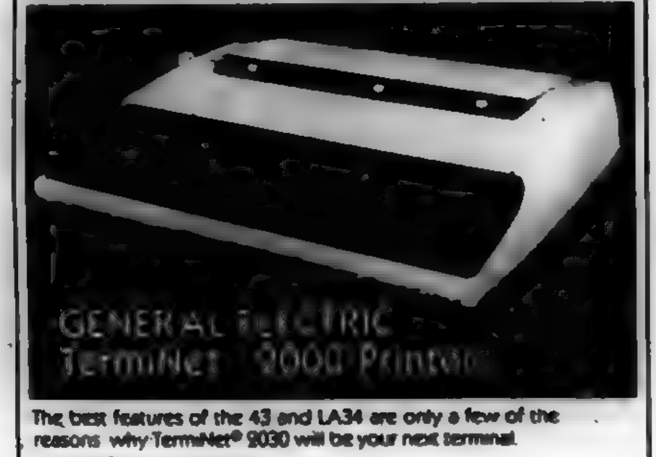

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Teleprinter Mart Expected to Top $1 Billion

(Continued from Page 81)

years is "a cumulative 18% of all teleprinters . . . related to electronic mail, office automation and interoffice message systems," according to CSI.

In addition, public data networks (PDN) are expected to provide the entry vehicle for teleprinting terminals into the home market, CSI continued. Other potential home applications include newspaper and magazine delivery, electronic U.S. mail, text editing, word processing, electronic yellow pages, travel planning and reservations, library research, family bookkeeping and keyboard entertainment.

Fastest Growing Sector

The fastest growing market sector, according to VDC, is nonimpact teleprinters, despite the drawbacks of their expensive heat-sensitive paper and their ability to print only one copy at a time.

The daisywheel segment of the impact teleprinter market is also doing "quite well," according to VDC, but U.S. suppliers in that area are somewhat concerned about Japan's entry into the marketplace, VDC noted.

"Japanese daisywheel manufacturers are coming out with improved technologies at lower prices," VDC noted, adding that U.S. makers will have to improve their price and performance ratios in oder to successfully compete.

"While CRT devices are viewed by many observers to be a serious contender for the attention of teleprinter users," CSI observed, "It is most likely that teleprinters and video display devices will evolve toward separate markets."

"Rather than full-size CRT displays used in conjunction with teleprinter activities, it is anticipated that a 1- to 3-line LED/LCD display will be incorporated into the teleprinter to facilitate input, reading and editing of material prior to transmission," CSI suggested.

At the high end, the teleprinter market is driven by "sophistication of functional capability," CSI noted. "With new technologies often becoming obsolete within three years of introduction, product flexibility and extensibility will be critical."

Challenges to the established vendors will exist in the form of "a wide variety of entrepreneurial small firms [that] will . . . offer high-quality, lower-priced products," CSI predicted.

These new and small firms entering the market "will have to overcome several barriers to entry," according to CSI. "Lacking the economies of scale that large-quantity production allows, small firms find it difficult to offer competitive pricing."

All in all, "the teleprinter as a communications device is expected to rise as dramatically as the telephone did," CSI predicted. CSI is located at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129. VDC is located at One Washington St., Wellesley, Mass. 02181.

Tymshare to Buy Capital Credit

CUPERTINO, Calif. — Tymshare, Inc. has signed a letter of intent to purchase Capital Credit Corp., a subsidiary of Union Corp. based in Verona, Pa. The purchase price of the acquisition was not disclosed.

Capital Credit, a retail credit collection service, is headquartered in Washington, D.C. It has 17 branch offices throughout the U.S.

Capital Credit's services will join those provided by Tymshare Transaction Services, a subsidiary of Tymshare, which provides credit and debit card transaction processing and authorization services for financial institutions and merchants.

Capital Credit reported annual revenues of approximately $8 million for its fiscal year ending June 30.

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Supershorts

Burroughs Corp. has formed an Air Force Systems Division within its Federal and Special Systems Group, to manage the Air Force's Phase IV program, which will reportedly provide the Air Force with multiple computer systems at air bases throughout the world.

Direct, Inc. and Boles & Co. have signed an agreement awarding Boles & Co. exclusive marketing rights of the Direct VP 800 line of video processors.

Bull Corp. of America, the U.S. subsidiary of CII Honeywell Bull, has opened an office in California that will house both Western regional sales offices and the North America repair and spare parts center.

Richard C. Smith Jr., president of ISA Communications Services, Inc., has announced FCC authorization for his firm to operate as a common carrier. It will become an initial subscriber of service from Satellite Business Systems of McLean, Va.

Digital Equipment Corp. has awarded a $500 grant to the Data Processing Management Assoc. Education Foundation in a motion to endorse the foundation's efforts in improving educational opportunities for computer professionals.

Collier-Jackson & Assoc., Inc. of Tampa, Fla., recently changed its name to Collier-Jackson, Inc., and opened a western regional branch in Englewood, Colo. The firm develops newspaper industry software.

New Companies

Infoscribe, Inc., a company engaged in designing, manufacturing and marketing advanced printers for the computer industry, has been established recently. It is headquartered in Suite 524, California Federal Bldg., Anaheim, Calif. 92801.

Sigma Microsystems, Inc. has been established to provide technical services to Hayden Publishing Co.'s recently acquired Programma International. It is located at 415 W. Palmer Ave., Glendale, Calif. 91204.

M.W.L., Inc. has been formed to provide training and consulting to companies that sell information processing products or services and to aid information processing departments in larger firms in achieving tighter management controls. M.W.L. is located at Suite 254, 3655 Thousand Oaks Blvd., Westlake Village, Calif. 91361.

Mergers/Acquisitions

Tymshare, Inc., parent company of the western-based bankcard processor called Tymshare Transaction Services, has acquired the Bankcard Association of Rhode Island in a move to establish a national bankcard service capacity. Terms of the acquisition were not disclosed.

A.C. Nielsen Co., international market research firm, recently acquired Compucom, Inc., a Dallas company specializing in engineering services for the telecommunications industry.

Computer Task Group (CTG), a computer services firm, recently merged with Neoterics, Inc., a professional services company. Neoterics principals will become part of CTG's management and CTG shareholders.

Cummins-Allison Corp. has agreed to sell the operating assets of its Data Systems Division to Recognition Equipment, Inc., for approximately $6 million.

Security Pacific National Bank has recently acquired a substantial amount of the assets of Phoenix Data Corp., a system software development firm with headquarters in San Diego.

Computer & Communications Technology Corp. and Yang Electromagnetic Systems, Inc. have completed their previously announced merger.

Scientific Atlanta, Inc., has completed acquisition of Systems Communications Cable, Inc.

Executive Corner

- Ross Belson and Paul Derby have been named vice-presidents within Honeywell, Inc.'s Small Systems and Terminals Division, and Philip Stoughton and Ed Vance have been appointed vice-presidents in that company's Large Information Systems Division.
- Jess Barber has been appointed vice-president of corporate systems and services at Modular Computer Systems, Inc.
- John Waterman has joined Franklin Electric, Inc.'s programmed power division as vice-president of marketing.
- John N. Zimmerman has been named vice-president and assistant general counsel at Control Data Corp.
- Dr. Jared A. Anderson, president and chief executive officer of the Two Pi Corp., will leave his post at the end of this year.
- William Tollenger Jr. has joined Hastech, Inc. as director of systems engineering, and Jerome J. Strokus has joined that company as sales representative.

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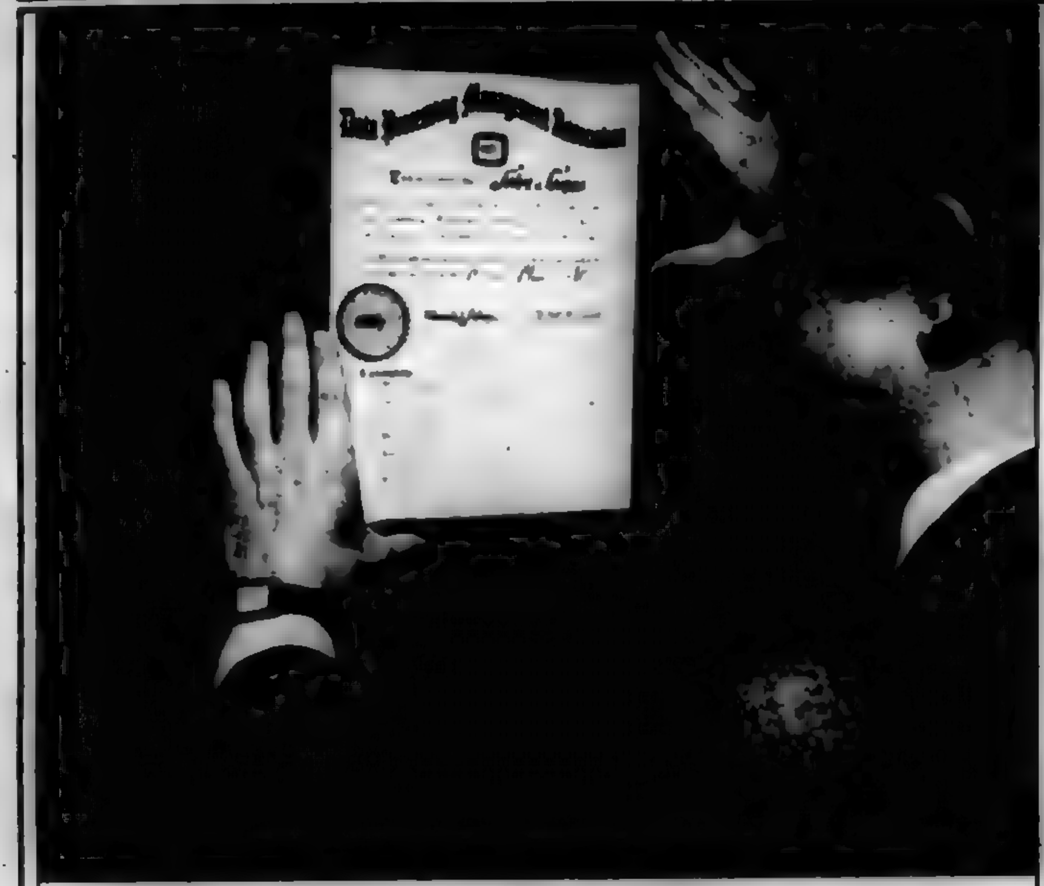

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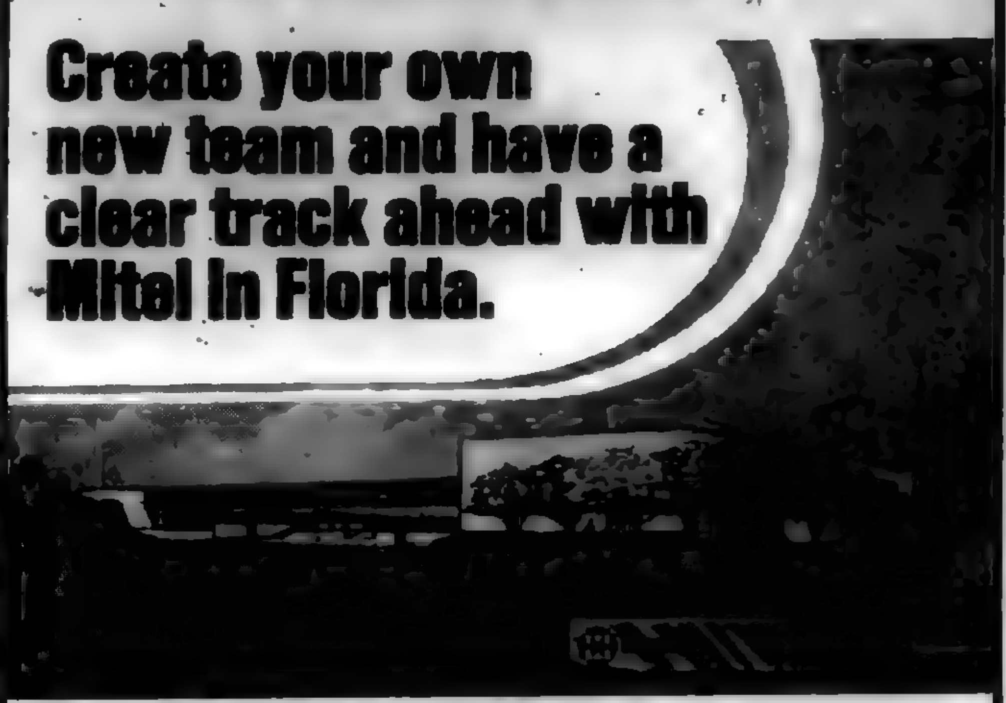

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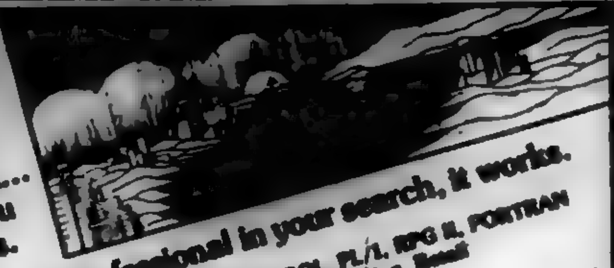

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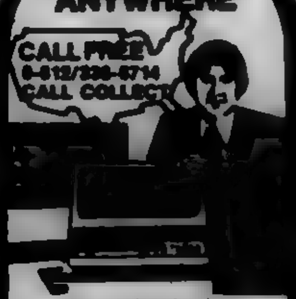

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     88   YOU-HAVE-IMS VALUE 'YES'.
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     88   YOU-HAVE-DOS VALUE 'YES'.
77   DP-MANAGEMENT PICTURE XXX.
     88   IM-MANAGER VALUE 'YES'.
77   PROGRAMMERS PICTURE XXX.
     88   IM-PROGRAMMER VALUE 'YES'.
77   OPERATORS PICTURE XXX.
     88   IM-OPERATOR VALUE 'YES'.
77   COUNTER PICTURE 9 VALUE ZERO.
PROCEDURE DIVISION.
     IF IM-MANAGER OR IM-PROGRAMMER OR
         IM-OPERATOR
         NEXT SENTENCE ELSE GO TO EOJ.
     IF YOU-HAVE-IMS ADD 1 TO COUNTER.
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PROGRAMMER/ANALYSTS

If you are a dynamic, creative people-oriented DP professional and feel that you are not using these talents in your present job, become a consultant with one of the nation's leading environmental consulting companies.

Our MIS team is an established supplier of data management systems to Federal and State governments. We utilize data base and other commercial techniques to organize vital information concerning air and water quality, solid waste, health, and hazardous materials disposal.

We are looking for candidates with a minimum of 2 years experience using COBOL to fill our Programmer/Analyst and Sr. Programmer/Analyst openings. IDMS experience a plus, but not required.

Our positions are highly visible, provide for involvement in the critical environmental issues of our time and allow for high growth potential. Some travel is required. No agencies please.

Send resume in confidence to:

Margaret J. O'Connell, Personnel Administrator,

TRC

TRC-Environmental Consultants, Inc.
125 Silas Deane Highway
Wethersfield, CT 06109
Equal Opportunity Employer M/F/H/V

800-543-7583

in Ohio call collect 513-898-1200

IMMEDIATE OPENINGS

NORTHEAST
PL 1
IDMS—COBOL

EAST
IMS DB/DC
HP 3000
SYSTEMS ANALYSTS
MVS INTERNALS

SOUTHEAST
IMS
ASSEMBLY/CICS
APT/AC

NORTHCENTRAL
IMS DB/DC
PRIME
HEAVY CICS

MIDWEST
CICS
CA/CIS IDS

SOUTHCENTRAL
DOS/COBOL
VM

ASC SALARY + BENEFITS

- Time and ½ OT Pay · Paid Vacations and Holidays · Company Paid Health, Life and Dental · Per Diem · Prescription Drug Plan · Profit Sharing Retirement Program
- As an ASC employee you can be a valued, integral part of a champion in the data processing industry. For more information on your career opportunities, call toll free

ALLEN SERVICES CORP.
212 West National Rd
Vandalia, OH 45377

DESIGN SUCCESS INTO YOUR CAREER ENGINEERING . . .

The growth of our $1.5 billion company with over 1,000 retail outlets serving the Southern United States has created career opportunities at our corporate computer center located on Florida's West Coast. To maintain our leadership role in our industry, we are seeking skilled Professionals for the following positions:

DATA BASE ANALYST

The successful candidate will have 2 to 5 years experience supporting application development in an MVS/IMS, DB/DC environment. The knowledge of data dictionary, IMS utilities, MFS, and BTS is required, with exposure to ADF and/or DMS under DPPX on the 8100 greatly desired.

TELECOMMUNICATIONS SOFTWARE MANAGER

Requires 3 or more years experience supporting VTAM and NCP in an MVS environment, plus the knowledge of NPDA and NCCF as well as IMS, DB/DC software. Responsibilities will include all network software, distributed processing software, and performance monitoring.

IMS SYSTEMS PROGRAMMER

Candidates should have 1 to 3 years experience in generating and maintaining IMS, DB/DC software. Knowledge of SMP is necessary, as well as a desire to expand into other areas of telecommunications and distributed processing software support.

We offer both Professional rewards and personal satisfaction as you meet the challenging demands of advanced technology, with pleasant working conditions and competitive compensation and benefits. Send complete resume including salary history to:

Headquarters Personnel Manager
JACK ECKERD CORPORATION
P.O. Box 4689
Clearwater, Florida 33518

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DALLAS HOUSTON

An exciting place to live and work. Positions offer unlimited growth in our rapidly expanding Dallas based computer software service company. A minimum of 2 years COBOL is required. Further experience in IBM JCL and software development in IMS, CICS, ALC or Mark IV will assure you state-of-the-art projects and continued growth technically. Top salaries with paid overtime, bonus, stock plan, profit sharing, paid relocation, medical, dental & life insurances. Positions available immediately for salaried or independent P/A's. Call collect or send your resume to:

Evert Polak
Leardata
8735 Pineland, Ste. 238
Dallas, TX 75231
214-363-6399

SYSTEMS ANALYST

Internat. co. needs analyst for corp. level pos. Bkgrd. must be mfg. co. oriented. Client needs hvy. design & implementation exp. to head up project for total design function. Hvy. user interface. Salary $29,000. (Fee Paid.) Contact Pam Siegel.

Robert Half of Buffalo, Inc.
Agency
1310 Liberty Bank Building
Buffalo, NY 14202
(716) 842-0801

Systems Programmer

NEW YORK METRO AREA

Major financial institution has an excellent growth opportunity for an individual with the following experience:

- BAL
- CICS
- DOS/VS
- BTAM

Excellent benefits including tuition assistance and incentive savings plan.

For consideration, call

212-584-6063

or send resume with salary history and requirements, in complete confidence, to: Personnel Manager.

P.O. Box 111, Fordham Station, Bronx, NY 10458

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SOUTHERN CALIFORNIA

SYSTEMS PROGRAMMERS - 2 yrs. +

Maintain/Support online monitors and DBMS software. Experienced in Assembler, PL/1, CICS

SENIOR SYSTEMS PROGRAMMERS - 5 yrs. +

MVS/SE performance analysis/ tuning - system capacity workload analysis - Plan, evaluate, install ACF/VTAM, VM, CMS and RJE. Familiar with one or more of the following: BEST-1, PLAN 4, CMF, OMEGAMON 4 TUNE. Current with MVS/IPO and proficient in Assembler and PL/1 Statistical math background desirable.

Outstanding location and working environment, plus full benefit package, flex hours, excellent compensation, relocation expenses and much more.

Please submit resume or background:

Mr. R.W. Hubbard
TBA
366 San Miguel Dr., #100
Newport Beach, CA 92660
714/760-1313
100% Employer Retained

ON LINE SOFTWARE INTERNATIONAL

CICS MVS IMS

software specialists

On-Line Software International, a name synonymous with state-of-the-art software development, seeks senior Software Specialists to join their staff and participate in a variety of stimulating assignments for sophisticated clientele.

The Jarvis Walker Group is coordinating an interviewing session and presentation which will be held on November 19 at the headquarters of OSI

If your background and training demonstrate a level of expertise that can uphold this company's reputation for excellence, we welcome you to join us and discover why your future with OSI would be one of continual challenge, diversification and growth.

* Your actual assignment time would be approximately 40 weeks per year with the remainder devoted to enhancing your expertise through education and training

The upper bracket salaries offered reflect the status of these positions. OSI provides for relocation, and encourages inquiries from qualified candidates nationwide

For further details, please call (201) 966-0600 or write The Jarvis Walker Group at 26 Vreeland Road, Florham Park, NJ 07932

the jarvis walker group

PROGRAMMER/ ANALYST

UNIVAC 1100

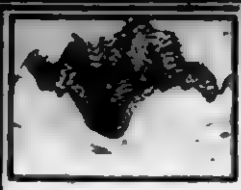
SYSTEMS AND APPLICATION PROGRAMMERS
TECHNICAL WRITERS
SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS
LOGISTICS SYSTEMS ANALYSTS

Knowledge of DMS 1100 with experience in COBOL, TIP and ECL Languages desirable.

Interested applicants should call Mr. Hill collect at (301) 468-2500 or forward resume to same c/o.

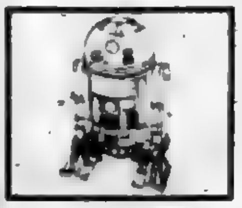
Dynamac Corporation
11300 Rockville Pike
Rockville, MD 20852

EOE M/F

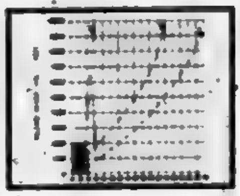


Systems Analysts

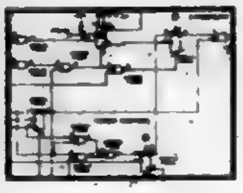
...Your Experience in Computer Graphics, Systems Analysis, and FORTRAN Just Paid Off!



That's exactly the background you'll need to start an exciting career with Tektronix. Demand for Tektronix's computer graphics products means great opportunities for the Systems Analyst who wants to see the entire picture before settling for a fragment. At Tektronix you'll be involved with many customers in many industries. You'll be the person customers will call upon during start-up. You'll provide technical assistance. You'll consult on graphing and interactive graphics. You'll train customers in the use of hardware and software. You'll do all this while you earn valuable experience in a variety of applications.



Your background should include experience in using timesharing systems and data communications. In addition to technical knowledge, you should possess excellent written and verbal communication skills. We can offer you an excellent salary, complete benefits, and outstanding advancement potential with a strong, growing company.



We have opportunities in various major cities including Long Island, Woodbridge, N.J., Philadelphia, Rockville, Md., Chicago, Houston, Portland, OR., Irvine, CA.

For confidential consideration please contact Jane DeRolph at TEKTRONIX, INC., 2 Research Court, Rockville, MD 20850

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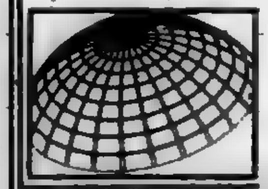

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AT VEDA THERE ARE MANY OPPORTUNITIES TO GROW IN SOFTWARE SALES

At Veda you'll use your creativity and imagination ... your technical skills and ingenuity in selling or installing specialized software packages. We're a progressive growing company that serves various industries and we're the kind of company where individual contributions are appreciated and rewarded. We have a number of opportunities at our Springfield, VA facility for dynamic people who are looking to the future.

SOFTWARE SYSTEMS SALES $18,000-$26,000+COMMISSION

Customer oriented software specialists will enjoy this opportunity to provide software packages direct to users. At least 1-2 years computer/software sales experience essential. Knowledge of accounting desirable. Base salary + commission. Extensive travel. Veda offers excellent salaries and one of the best benefits programs in the business. including incentive bonuses; life and health insurance and retirement plans; liberal vacation, and incentive to obtain advanced degrees. Relocation expenses are fully paid. For immediate consideration, please send resume in confidence, to the attention of our Personnel Director, Dept. CW1110, at: VEDA, INCORPORATED, 1755 Jefferson Davis Highway, Arlington, VA 22202.

An Equal Opportunity/Affirmative Action Employer

SYSTEMS PROGRAMMER

MIT'S LABORATORY FOR COMPUTER SCIENCE is seeking an individual to work on the design and implementation of advanced integrated office workstation in Office Automation Research Group. Must have experience in development of text editing and formatting systems, and familiarity with state-of-the-art in word processing and photocomposition equipment. Experience necessary in development of large-scale software systems in high-level languages. Candidate will supervise the activities of students and represent the group in meetings with sponsors. M.S. in computer science is required.

MIT is an affirmative action employer and welcomes applications from women and minority group members. Please send resume to:

[illegible]
Laboratory for Computer Science
545 Technology Square
Cambridge, Ma. 02139

VIRGINIA OPPTYS

PROJECT LEADERS/ ANALYSTS To $[illegible]

Progressive manufacturing corp. in Southern VA. seeks analysts with IMS, COBOL from large 370 shop. Industry leader. State of the art shop, top benefits. Low cost of living area.

SYSTEMS ADMINISTRATOR To $32,000

Hdqtrs. of national diversified corp seeks administrator to install and develop new IBM 4300 distributed system. High visibility, authority. Prior 4300 experience desired.

PROGRAMMER ANALYST To $27,000

Nationally known prestige company on Chesapeake Bay seeks analyst with financial systems and MSA accounting packages experience. Super travel benefits, solid career equity.

EDP AUDIT To $[illegible]

Central VA. corp. lead position. EDP Audit planning and reviews. Audit software programs and risk/security assessment. BS & 4+ yrs. corp. or public exp.

Our clients assume all fees and employment expenses. For more information, contact David Miller 703/790-1336, FOR-MORRIS PERSONNEL CONSULTANTS, 1710 Goodridge Dr., McLean, VA 22102

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Prime is an Affirmative Action Employer, seeking outstanding individuals.

WANT A REAL FUTURE TO TALK ABOUT? CONSIDER IOMEGA

IOMEGA is a new corporation founded primarily by former IBM employees. The company will soon be manufacturing flexible and low end rigid disc storage devices using advanced technologies.

Ground floor opportunities are available now. We're interested in professionals with Computer Science and/or Engineering degrees and a minimum of 3 years experience for the following positions:

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MANUFACTURING ENGINEERS
QUALITY ASSURANCE ENGINEERS
TEST ENGINEERS
BUYERS

The company is located in Ogden, Utah, one of the most attractive and affordable living areas in the United States. You'll enjoy clean Rocky Mountain air, abundant summer recreational activities and the most outstanding winter sports in the nation.

IOMEGA offers a competitive salary/benefits package; and a high degree of visibility. Interested candidates should send their resumes, in confidence to:

Ken Borchert
IOMEGA CORPORATION
4646 South 1500 West Suite 190
Ogden, Utah 84403

An Equal Opportunity Employer

PROGRAMMER/ANALYSTS

$18-30,000/EXP'D

Central N.J. Openings

Aggressive Fortune 50 mfg/mktg co will move into its own MIS facility that houses new 4341's in early 1981. Be involved in new methods, major transition, telecommunications, on-line applications, network — that address corporate projects, mgmt science while LEARNING CICS. Exp'd in design, revamping & maintaining COBOL mfg, mktg, & business programs.

CICS training, 2 per terminal, planned expansion, internal promotions, rapid career advancement, top benefits & creative atmosphere makes this worth your IMMEDIATE response.

Call Collect/Resumes to:

Bette Kantor (609) 921-[illegible]
Research Park Bldg J
1101 State Rd., Princeton, NJ 08540
"Specialist in EDP Placements"

WE NEED DP PROFESSIONALS

Who Can Take On A Challenge!

At Southeast Data Processing Inc., we are backing Florida's leading bank, Southeast Banking Corporation. Our DP center features the latest in hardware, IBM 3033 and 370/158. You can work with other top professionals to develop new applications. We have immediate openings for:

TIMESHARING PROGRAMMER

Entails meeting clients, developing specifications, programming, systems documentation, & customer training in timesharing environment. 1-2 years programming experience in timesharing environment. Requires knowledge of Fortran, Basic, COBOL and/or advanced languages.

NETWORK INSTALLATION ANALYST

Individual with minimum 2 years Data Processing experience in Operations with emphasis in network control. Position involves planning and installation of On-Line network components. Intrastate travel required.

COMPUTER PERFORMANCE ANALYST

Bachelor's degree in Math, Statistics, Operations Research or strong related experience. Individual will utilize operations research techniques to measure computer performance and interpret results. Knowledge of data processing concepts are required.

PROGRAMMER ANALYSTS

COBOL and/or ASSEMBLER language is necessary. 2-4 years previous experience in batch and/or On-Line applications. Banking applications background is preferred.

SYSTEMS PROGRAMMERS

Background required in OS/VS 2, (MVS), JES 2/NJE internals, working knowledge of SMP 4, TSO and ROSCOE beneficial. Heavy exposure to troubleshooting and operations systems. Degree in computer science, math or statistics is desirable.

We offer an excellent salary, extensive benefits program including medical/dental insurance, continued training on state-of-the-art equipment, and an opportunity to share in our success and advance with us as we continue to grow.

For confidential consideration, send your resume including salary requirements or complete the instant application below and mail it today.

Southeast Data Processing, Inc., Pat Perez/Personnel, P.O. Box 012111, Miami, Florida 33136.

NAME ____________________
STREET ____________________
CITY ____________ STATE ____________ ZIP ________
CURRENT POSITION ____________________
CURRENT SALARY ____________________
TELEPHONE (HOME) ____________________
(OFFICE) ____________________
WHEN MAY WE CALL? ____________________

Southeast Data Processing, Inc.

An Equal Opportunity Employer M/F

COMPUTER LEASING SPECIALISTS

Successful growth oriented company expanding in major U.S. cities is currently looking for proven computer leasing specialists.

Buy/Sell experience and customer base desirable.

Excellent commission plan, draw, and expenses available.

Send details to: CW BOX [illegible], 375 Cochituate Rd., Rte. 30, Framingham, Ma. 01701.

COMPUTER SCIENCE FACULTY

One or two people to teach BASIC, COBOL, FORTRAN, assembler, and advanced programming, design courses for emerging major. Familiarity with PDP 11/70 and ability to teach math helpful. Master's in computer science or related area required. 11-month position with summer programming duties. Salary [illegible]. Position begins February, summer, or September 1981. Send resume and credentials to Academic Dean, Bellevue College, Bellevue, [illegible] by Dec. 15.

Equal opportunity employer.

PROGRAMMERS MOVE UP TO ...

COLORADO

... and CF&I Steel Corporation. We offer sunshine and clean air, spectacular year around climate, and the breathtaking beauty and unequaled recreational opportunities of the Colorado Rockies. You seek a challenging career opportunity. You'll find one with us. We're the nation's 12th largest steel producer and have immediate need for programmers possessing a degree in computer science, related field, or with equivalent years experience. The successful applicants will have a minimum of two years programming experience.

BUSINESS PROGRAMMER

To be responsible for computer programming in application areas of inventories, payrolls, financial, order entry, communications, etc. Working knowledge of Cobol a must. Some Fortran, CICS, DMS, VM-CMS, DOS/VSE preferred. IBM 3031 hardware system. Experience on IBM 370/135 (or above) highly desirable.

DEC PROGRAMMER

Major responsibility will be in our management information data collection center in high production areas, and in the monitoring and controlling of utilities, energy, etc., utilizing minicomputers. Working knowledge of DEC PDP 11/34 or 11/44 using RSX-11M a must. A good understanding of fundamentals and familiarity with MACRO-11, Basic +2 and RMS-11K is desirable.

If you meet any of the above requirements and seek a challenging opportunity with growth potential, excellent salary and steel industry benefit package, please submit your detailed resume, including salary history and requirements in confidence to Paul Arriaga, CF&I STEEL CORPORATION, Dept. CW 11/10 P.O. Box 316, Pueblo, Colorado 81002. We are an equal opportunity employer m/f.

CF&I STEEL CORPORATION

Computer

EDP AUDIT PROFESSIONAL

(10207-A)

UCSD

University of California, San Diego, is seeking an experienced, self-reliant EDP Auditor to perform audits of large, complex computer systems with supervision. Assignments are diverse within the University environment, which includes the Scripps Institution of Oceanography and University Hospital. Responsibilities include developing audit programs, preparing reports, and discussing findings and recommendations with Management regarding EDP systems integrity, data control and effectiveness. Requires thorough knowledge of principles of business administration to include accounting and statistics, in addition to proven experience in an auditing capacity with demonstrated ability to design, program and document EDP systems. CDPA or CISA certification is highly desirable.

Starting salary [illegible] with range maximum of [illegible]. If you are seeking a challenging opportunity to practice your profession in a stimulating environment with one of the world's leading universities, please send your resume with salary history to UCSD Staff Personnel Mngmt. Office, Q-016, (10207-A), 301 Warren Campus, La Jolla, CA 92093. Applications/resumes must be received by 11/19/80. This position is subject to the Financial disclosure requirements of the California Reform Act of 1974. UCSD is an Equal Opportunity Affirmative Action Employer. Full details available in the employment office.

Move up with Magnuson!

Match our Momentum!

At Magnuson we move. We do things before anyone else and we do them better. We're building a reputation on fast machines, a fast moving organization and talented, fast moving people.

Software Support Representative

Philadelphia Area —

You'll be responsible for providing systems support to our installations in the PHILADELPHIA AREA, identifying software problems, developing emergency correction and providing a general consulting service to our customers.

Your background should include min. 3 years experience in systems programming, systems engineering or a related field, and a thorough knowledge of DOS/VS internals.

Systems Support Regional Specialist

Los Angeles Area —

Your principle responsibility will be the technical performance of the Magnuson M80's in the Western Region. You will conduct seminars on Account Management and Diagnostic Techniques in many Western cities and will be called upon to solve technical problems that can't be fixed at the local level.

To qualify, you should have at least 5 years extensive IBM systems support and experience and an ability to work well with our customers and technical staff. Some software experience would also be desirable.

We offer career opportunities that will take you to the top of your field and a high degree of visibility within a company that is rapidly making its presence felt. You'll have the opportunity to work with top professionals who have worked for the larger corporations but like the feel of the Magnuson momentum and the best salaries and benefits in the industry.

Become part of Magnuson's future — send your resume or contact Dave Lovell at MAGNUSON COMPUTER SYSTEMS, INC., 2902 Orchard Park Way, San Jose, CA 95134. Call TOLL FREE (800) 538-7909, or in California, call (408) 946-8100. An equal opportunity employer M/F/H/V.

MAGNUSON COMPUTER SYSTEMS

EDP OPPORTUNITIES

NEW YORK CITY

PROJ MGR-PDP 11/70, basic & RSTS [illegible] .... [illegible]
PROJ LEADER-Dsg, CICS, ADABAS, OS COBOL .... [illegible]
P/A CONTROLLERS-[illegible], VM/CMS, DOS/VS .... [illegible]+
P/A-BAL/COBOL, DOS/OS .... [illegible]
VOICE&DATA COMM-[illegible] .... [illegible]
S/A-Data Collect, COBOL, OS .... [illegible]

WESTCHESTER & CONN.

PROJ LDR-CICS,OS,DOS,[illegible] .... [illegible]
S/A-PL-1,OS,DOS,COBOL,[illegible] .... [illegible]
P/A-MVS/TSO,COBOL/BAL .... [illegible]
PROJ MGR-DOS/VS,CICS,DL/I,[illegible] .... [illegible]
PDP-11/[illegible]-RSX 11M,macro-11 .... [illegible]

NEW JERSEY

PROJ LDR-S/A-[illegible] dsgn,COBOL, IDMS,MVS,[illegible] .... [illegible]
P/A-COBOL,IDMS,MVS 370/158 .... [illegible]
PROJ LDR-DOS/VS,CICS,AT,COBOL, [illegible] .... [illegible]
PROJ LDR-DOS/VS/VSE,JCL,VSAM,DOL, CICS .... [illegible]
SOFTWARE-CICS,BAL,[illegible] .... [illegible]
SOFTWARE/TECH MGR-DOS,VSE,CICS[illegible]

SALES/MARKETING

FINANCIAL-[illegible], TCAM/[illegible] .... [illegible]K+Comm+Car

Call [illegible] (212) [illegible]

[illegible] ASSOC

[illegible] Broadway NY [illegible] (agency)

Systems Programmer II

$15,060-$18,990 DOE

Systems Programmer III

$16,375-$20,741 DOE

Closing Date

Nov. 21, 1980

Small town state government site (excellent hunting & fishing) is seeking Systems Programmers with 2 and 3 years of DP experience for IBM 370/158 OS/VS1 System. Variety and challenge. CICS, ADABAS, ACF/VTSM, NCP, ALTER, On-Line Microfiche. Assembler Language, system and/or telecommunications network software desirable. For further information call toll free 1-[illegible] or send applications to:

Bureau of Personnel
Capitol Bldg.
Pierre, S.D. 57501

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SENIOR EDUCATIONAL SPECIALIST

Develop advanced and support-level software courses . . . at the world's largest producer of minicomputers

Digital Equipment Corporation is seeking a professional who can make important contributions to the continuing education of employees and customers.

Working within an assigned discipline or systems product line, you will use independent judgement in determining software training objectives, course content/organization, and best media for presentations. You will also develop handouts and laboratory exercises, conduct seminars, and teach pilot courses on software products — utilizing the latest instructional methods and techniques.

To qualify, you must have a Master's degree in Education or equivalent and 3-5 years of course development/teaching experience, or experience with real-time data processing on large computer systems. Knowledge of system programming languages and operating systems and the ability to communicate complex software solutions is necessary. Background in educational training techniques a must.

This position is based in Marlboro, Massachusetts, a suburban community close to all the recreational, cultural, and educational centers of the greater Boston area. We'll provide a competitive salary, generous benefits, relocation assistance, and ample opportunity for further career growth. For more details, send your resume and salary history to: Trudy Cordeau, Digital Equipment Corporation, Dept. 1110 38071, 12 Crosby Drive, Bedford, MA 01730.

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digital

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FLORIDA

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Our client companies offer excellent career opportunities for Engineering Professionals.

SOFTWARE DESIGN - BSCS/EE experience in top down structured programming, real time operating systems, assembly and high level languages, variety of hardware. Advanced degree desirable. $20-25,000

ELECTRONIC DESIGN-BSEE/MSEE - Positions available in a variety of specialties including data communications/network analysis, medical electronics, instrumentation and controls, mini-computer design. $22-28,000.

PROGRAM MANAGEMENT - BSEE/ME experience in Program/Project management in defense electronic systems. Some digital/analog design experience a plus. $25-30,000.

PRODUCT SPECIALIST - Pre & Post sales support for communications products. Interface with R & D to determine product requirements and with customers to solve problems. Strong technical knowledge of telecommunications. $20-25,000.

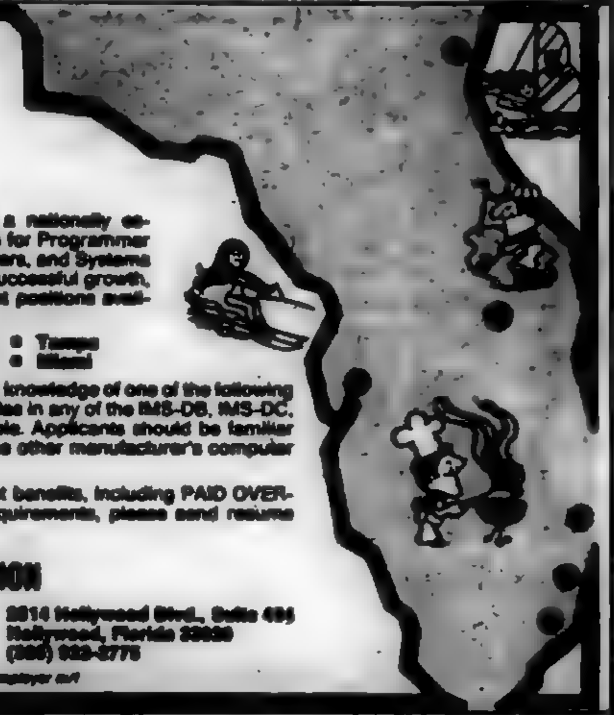
For immediate consideration call or send resume, with salary requirements to.

(813) 872-1853

frank leonard personnel

Member

1211 N. West Shore Blvd., Suite 100
Tampa, Florida 33607
An Equal Opportunity employer M/F Client Company Pays All Fees.



SUNBELT OPPORTUNITIES

PROGRAMMER ANALYSTS SYSTEMS ANALYSTS PROJECT LEADERS SYSTEMS PROGRAMMERS

An outstanding opportunity exists with a nationally established data processing consulting firm for Programmer Analysts, Systems Analysts, Project Leaders, and Systems Programmers (DOS or OS). Due to our successful growth, we presently have 14 full time permanent positions available immediately in:

- The Palm Beaches
- Ft. Lauderdale
- Tampa
- Orlando
- Jacksonville
- Miami

The successful applicants should possess knowledge of one of the following languages: COBOL, PL/1, or BAL. Expertise in any of the IMS-DB, IMS-DC, CICS (COMMAND or MACRO) is desirable. Applicants should be familiar with IBM (OS or DOS) and preferably one other manufacturer's computer system.

To qualified candidates we offer excellent benefits, including PAID OVERTIME. If your background meets our requirements, please send resume with SALARY HISTORY, or call:

DASD CORPORATION

4511 N. Himes Ave., Suite 120
Tampa, Florida 33614
(813) 876-3130

2614 Hollywood Blvd., Suite 405
Hollywood, Florida 33020
(305) 922-2775

an equal opportunity employer m/f

PHILADELPHIA

PROGRAMMERS

The demand for Programmers in Philadelphia has exploded. The opportunities for PROGRAMMER professionals has never been greater. If you seek FINANCIAL and PROFESSIONAL GROWTH and A GREAT PLACE TO LIVE AND RAISE A FAMILY send us your resume immediately and let us go to work for you.

Below a sampling of the varied opportunities that currently exist:

IBM 370 COBOL Telecom bkgd	25K
IBM ON-LINE CICS COBOL	20K
IBM 370 COBOL	27K
H-P 3000 FORTRAN SCI APPS	20K
B 1800 COBOL	20K
IBM 370 COBOL + BAL Sem.	20K
Sys 3 COBOL RPG	18K
MICRODATA BASIC	22K
B 1800 COBOL	23K
IBM 370 COBOL or RPG	22K
Sys 34 RPG 2	22K
Entry Level MBA Comp Sci.	18K

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Philadelphia, PA 19103
(215) 568-4580

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Major computer vendor seeks indiv. with 5+ yrs. of MS/OR exp. Will apply advanced methods & problem solving techniques to analyze actual & possible situations + provide quantitative basis for decision making. Hi-visibility with opty. for proj. leadership. Salary $25,000 range. (Fee Paid.) Contact Frank Goldschmidt.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
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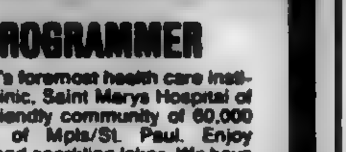

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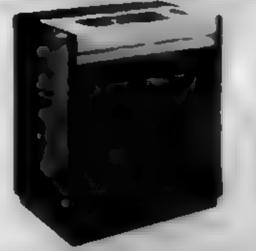

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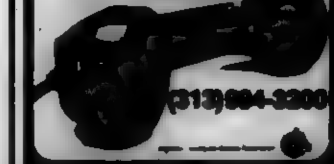

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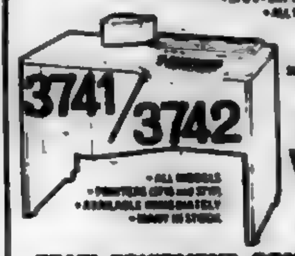

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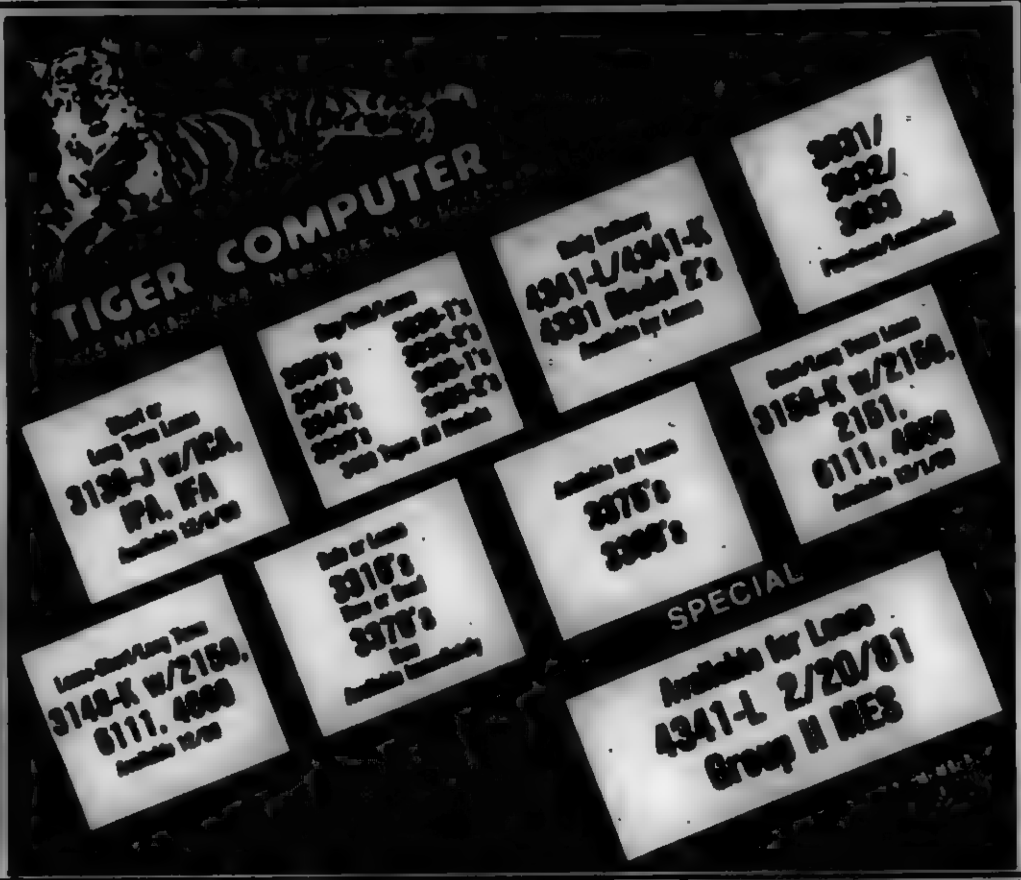

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Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, Mississippi 39201, for the following data processing equipment and services:

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of ASCII compatible CRT's. This is a general RFP to be used to select terminals for the state of Mississippi during 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of ASR and KSR hardcopy terminals. This is a general RFP to be used to select terminals for the state of Mississippi during 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of receive only printers to attach to ASCII compatible CRT's. This is a general RFP to be used to select printers for the state of Mississippi through 1981.

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of IBM 3270 compatible CRT's printers and controllers. This is a general RFP to be used to select terminals for the state of Mississippi through 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of acoustic couplers. This is a general RFP to be used to select couplers for the state of Mississippi during 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of low to medium speed synchronous and asynchronous modems ranging in speed up to 3600 baud. This is a general RFP to be used to select modems for the state of Mississippi through 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of medium, high and wideband modems ranging in speed from 4800 through 56K baud. This is a general RFP to be used to select modems for the state of Mississippi during 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of short haul modems, line drivers and modem eliminators. This is a general RFP to be used to select special purpose modems for the state of Mississippi during 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of printing, interpreting, keypunch-verifiers. This is a general RFP to be used to select keypunches for the state of Mississippi during 1981

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Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of graphics terminals, plotters and related peripherals. This is a general RFP to be used to select graphics equipment for the state of Mississippi through 1981

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of insurance coverage on state-owned computer equipment.

Request for Proposal No. [illegible] due 3:30 P.M., Wednesday, December 17, 1980 for the acquisition of a small-scale multiprogramming computer system for instructional and administrative applications at a junior college

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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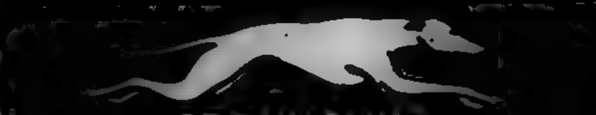

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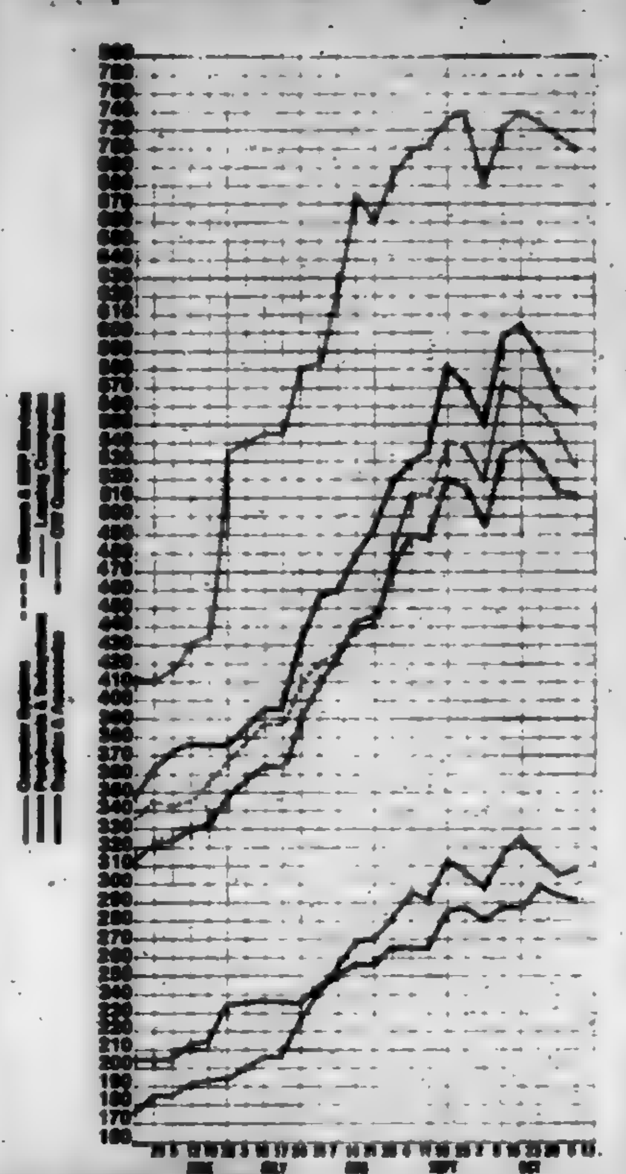

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CLOSING PRICES MONDAY, NOVEMBER 3, 1980

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EXCH		1979-80 RANGE (1)	CLOSE NOV 3 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	AMDAHL CORP	13- 42	20 3/4	+ 3/8	+1.8
N	BURROUGHS CORP	52- 88	52 3/8	+ 1/2	+0.9
O	COMPUTER AUTOMATION	9- 27	22 3/4	- 1/4	-1.1
N	CONTROL DATA CORP	35- 77	70 1/2	+2 3/4	+4.0
O	CRAY RESEARCH INC	30- 99	88 1/4	+2 1/2	+2.9
N	DATA GENERAL CORP	46- 87	72 7/8	- 5/8	-0.8
N	DATAPOINT CORP	44- 97	88 1/8	+3	+3.5
N	DIGITAL EQUIPMENT	52- 98	88 3/4	+3	+3.4
A	DECC INC	9- 21	21 3/8	+ 3/8	+1.7
N	ELECTRONIC ASSOC.	6- 12	9	- 3/4	-7.6
N	FOUR-PHASE SYSTEMS	26- 49	27 3/8	- 1/8	-0.4
N	FOXBORO	31- 57	54 1/2	- 1/8	-0.2
A	GENERAL AUTOMATION	7- 19	9	- 1/2	-5.2
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	40- 94	90 1/4	+ 7/8	+1.0
N	HONEYWELL INC	65-101	96 7/8	+2 1/8	+2.2
N	IBM	50- 70	67 1/2	+2	+3.0
O	MAGNUSON COMP SYSTS	20- 37	30 1/2	- 3/4	-2.4
A	MANAGEMENT ASSIST	9- 25	23	+ 1/8	+0.5
O	MANUFACTURING DATA S	22- 49	44	+1	+2.3
O	MINI-COMPUTER SYST	2- 6	2 3/4	- 1/8	-4.3
O	MODULAR COMPUTER SYS	9- 33	27	+ 7/8	+3.3
N	NCR	52- 82	67 5/8	+ 1/8	+0.1
N	PRIME COMPUTER INC	15- 49	45	+2 1/2	+5.8
N	PERKIN-ELMER	20- 48	43 5/8	+1 1/8	+2.7
N	SPERRY RAND	42- 60	45 3/8	- 5/8	-1.3
N	SYSTEMS ENG. LABS	11- 45	41 5/8	+1 1/4	+3.1
O	TANDEM COMPUTERS INC	13- 60	60 1/4	+1 1/2	+2.5
N	TEXAS INSTRUMENTS	79-144	120 3/8	+ 5/8	+0.5
A	WANG LABS.	17- 64	27 3/8	-10	-26.7
	LEASING COMPANIES				
N	BOOTHE FINANCIAL CP	13- 47	32	-1 3/4	-5.2
N	COMDISCO INC	6- 10	10 1/2	+ 1/2	+5.1
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	2	+ 1/8	+6.6
O	CONTINENTAL INFO SYS	2- 15	5	0	0.0
P	DATRONIC RENTAL	2- 5	4 1/8	+ 1/8	+3.0
A	DCL INC	3- 4	3 1/8	- 1/8	-3.8
A	DPF INC	5- 12	7 1/8	+ 1/8	+1.7
N	ITEL	1- 15	1 3/8	- 1/8	-8.3
O	LEASPAC CORP	1- 2	3/4	- 1/4	-25.0
A	PIONEER TEX CORP	2- 4	3 3/8	0	0.0
N	RELIANCE GROUP INC	20- 70	67 7/8	+ 3/4	+1.1
N	U.S. LEASING	12- 26	22 3/4	- 1/4	-1.1
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	4 5/8	+ 1/8	+2.7
O	ANACOMP INC	7- 21	19 7/8	- 5/8	-3.0
O	ANALYSTS INTL CORP	3- 10	9 1/4	0	0.0
A	APPLIED DATA RES.	6- 24	22 1/8	+1 1/8	+5.3
N	AUTOMATIC DATA PROC	31- 52	47 3/4	+ 3/8	+0.7
O	COMPUTER HORIZONS	1- 9	6 1/2	- 1/4	-4.3
O	COMPUTER NETWORK	4- 9	7 3/8	+ 1/4	+3.5
N	COMPUTER SCIENCES	11- 30	19 3/4	0	0.0
O	COMPUTER TASK GROUP	3- 22	10 1/2	+1	+5.1
O	COMPUTER USAGE	4- 10	7	+ 1/8	+1.7
O	COMPUT AUTO REP SVC	4- 10	8 1/8	0	0.0
O	COMSHARE	11- 21	17 1/4	- 1/4	-1.4
O	CULLINANE CORP	10- 63	58 1/4	+2 3/4	+4.9
O	DATA DIMENSIONS INC	1- 4	1 1/2	- 1/4	-14.2
O	DATATAB	1- 4	1 1/8	- 1/8	-10.0
O	DSI CORP	4- 9	7 5/8	+ 1/8	+1.6
N	ELECTRONIC DATA SYST	19- 37	31 1/4	- 3/8	-1.1
O	INFORMATICS INC	9- 25	24 1/2	- 3/8	-1.5
O	INSYTE CORP	1- 3	1 7/8	0	0.0
O	SPS COMPUTER MARKET.	3- 4	2 1/2	0	0.0
O	KEANE ASSOCIATES	3- 9	6	- 1/8	-2.0
O	KEYDATA CORP	1- 5	3/4	-1 1/8	-60.0
A	LOGICON	12- 28	27 1/8	+1 1/4	+4.8
O	MATHEMATICA INC	9- 16	12 1/2	-1 3/4	-12.2
O	MATHEMATICAL APP GRP	7- 33	29 1/2	-2	-6.2
O	NATIONAL DATA CORP	10- 29	28 3/4	+1 1/8	+4.3
N	PLANNING RESEARCH	5- 13	11	- 5/8	-5.3
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 9	7 1/2	- 3/8	-4.7
O	REYNOLDS & REYNOLDS	21- 34	25 3/4	+ 1/4	+1.0
O	SYSC INC	6- 19	18 3/4	+ 1/2	+2.7
O	SCIENTIFIC COMPUTERS	6- 27	24 1/4	- 3/4	-3.0
N	TYMSHARE INC	14- 79	73 3/4	+ 3/4	+1.0
A	URS SYSTEMS	5- 15	10 1/2	- 1/8	-1.2
N	WYLY CORP	4- 20	10 1/2	+ 3/8	+2.6
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 24	20 3/8	+ 1/4	+1.5
N	AMPEX CORP	14- 34	29 3/4	+ 1/8	+0.4
A	ANDERSON JACOBSON	4- 20	17 3/8	+1 3/8	+8.5
N	APPLIED DIG DATA SYS	5- 14	11 7/8	- 1/8	-1.0
O	AUTO-TROL TECHNOLOGY	10- 62	60 1/2	+1 1/2	+3.8
O	BEEHIVE INT'L	3- 10	10 1/8	- 3/8	-3.7
A	[illegible]	12- 35	28	-2 3/8	-7.8
N	BUNKER-RAMO	17- 41	36 1/8	+2 5/8	+7.8
O	CAMBRIDGE MEMORIES	1- 4	3 7/8	+ 1/8	+3.3
N	CENTRONICS DATA COMP	20- 95	30	+ 1/8	+0.4
A	CETEC CORP	3- 7	6 5/8	- 1/8	-1.8
O	COMPUTER DEVICES INC	3- 10	7 3/4	- 1/8	-1.5
O	[illegible]	3- 8	7 1/2	- 1/8	-1.6
O	COMPUTER COMMUN.	4- 10	5 5/8	-1	-15.0
O	COMPUTER CONSOLES	6- 29	23	+ 1/4	+1.2
O	COMPUTER TRANSCEIVER	1- 5	3 7/8	0	0.0
N	COMPUTERVISION CORP	26- 62	73	+6 3/4	+10.3
A	CONRAC CORP	13- 25	17 3/8	+ 1/2	+2.9
A	DATA ACCESS SYSTEMS	6- 17	19 1/2	+ 1/8	+0.6
A	DATA PRODUCTS CORP	11- 35	30 1/4	+1 3/4	+6.2
O	DATUM INC	2- 5	4 3/4	+ 1/8	+2.7
O	DECISION DATA COMPUT	2- 8	4 3/4	+ 1/4	+5.5
O	DELTA DATA SYSTEMS	1- 3	2	- 1/8	-5.8
N	DOCUMATION INC	7- 27	16 5/8	+ 3/8	+2.3
O	DATARAM CORP	6- 37	16 1/8	+ 1/4	+2.9
A	ELECTRONIC M & M	3- 8	7 5/8	+ 3/8	+5.1
O	EVANS & SUTHERLAND	21- 72	69 1/2	- 1/2	-0.7
O	FABRI-TEK	1- 4	3 1/8	+ 1/8	+4.1
O	GENERAL COMPUTER SYS	1- 6	5 3/4	+1	+21.0
O	GENERAL DATACOMM IND	12- 30	28 1/4	0	0.0
O	GENERAL TERMINAL CP	1- 4	2 3/8	+ 1/2	+30.0
N	HAZELTINE CORP	12- 33	36 1/4	+3	+11.0
N	HARRIS CORP	25- 52	51 3/4	+ 1/4	+0.4
O	INFORMATION INTL INC	6- 15	12 1/2	- 1/4	-1.9
O	INTEL CORP	21- 90	62	-3 3/8	-5.1
N	INTERSIL	11- 33	33 1/8	0	0.0
A	LUNDY ELECTRONICS	6- 17	13 5/8	-1	-6.8
O	MSI DATA CORP	9- 10	13	0	0.0
N	MEMOREX	10- 34	18 3/8	- 3/8	-4.6
N	MOHAWK DATA SCI	10- 31	23 3/4	-3 3/8	-12.6
O	OMEX	2- 12	12	- 1/2	-4.0
N	PARADYNE CORP	10- 55	54 3/4	+3 1/2	+6.8
N	PERTEC CORP	9- 15	12 1/8	- 3/4	-5.8
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O	RECOGNITION EQUIP	9- 21	17 5/8	+ 3/8	+2.1
O	SCAN DATA	1- 5	4	- 1/8	-3.7
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O	SYKES DATATRONICS	10- 47	40 1/2	+ 1/2	+1.2
O	T BAR INC	10- 22	26 1/2	+ 1/4	+1.0
A	TEC INC	3- 9	5 3/8	+ 1/4	+4.8
N	TEKTRONIX INC	42- 70	63 1/8	- 3/8	-0.5
A	TELEX	3- 6	5 3/4	- 1/4	-4.1
O	TESDATA SYSTEMS CP	8- 26	24 1/8	+ 5/8	+2.6
N	TIMEPLEX INC	7- 40	26 5/8	+1 1/8	+5.2
O	WILTEK INC	1- 3	1 7/8	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODUS	8- 15	12 1/2	- 3/4	-5.0
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	8- 22	18 1/4	+ 1/8	+0.6
O	CYBERMATICS INC	1- 2	1 3/8	- 1/4	-15.3
A	DUPLEX PRODUCTS INC	11- 16	13 3/4	+ 1/4	+1.8
N	ENNIS BUS. FORMS	12- 21	14 1/4	- 1/2	-2.9
N	3M COMPANY	48- 63	57 3/4	+ 7/8	+1.5
O	MOORE CORP LTD	29- 38	32 3/4	- 1/4	-0.7
N	NASHUA CORP	25- 35	30	+ 1/8	+0.4
O	STANDARD REGISTER	22- 35	31 3/4	0	0.0
A	TAB PRODUCTS CO	9- 24	23 7/8	0	0.0
N	WABASH MAGNETICS	11- 20	19 3/8	+1 1/8	+6.6
N	WALLACE BUS FORMS	23- 38	40 7/8	+1 3/8	+2.8

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

Vol. XIV, No. 47 November 17, 1980 $1.00 a copy; $30/year

NEWSPAPER

IBM SYSTEM / CHARACTERISTICS	370/158-3	3031	4341 Model Group 2	3032	[illegible]	3033N	3033U	3033 Multi-Processor	3081
Relative Performance[1]	45	54	66	124	120	210	237	405	465
Memory Size in Bytes (Minimum to Maximum)	512K-8M	2M-8M	2M-8M	2M-8M	4M-8M	4M or 16M	4M-24M	4M-32M	16M-32M
Purchase Price (Memory Size)	$1,609,500 (1M)	$518,000 (2M)	$385,000 (2M)	$990,000 (2M)	$990,000 (4M)	$1,595,000 (8M)	$2,225,000 (4M)	$4,751,000 (4M)	$3,720,000 (16M)
Monthly Lease (Lease Term)	$46,350 (4 years)	$26,130 (4 years)	$10,100 (2 years)	$43,630 (4 years)	$51,066 (4 years)	$66,420 (4 years)	$75,070 (4 years)	$175,720 (4 years)	$93,000 (4 years)
Memory Cycle Time (nsec)	690-1,035	345	Not Available	320	Not Available	265	265	265	Not Available
Machine Cycle Time (nsec)	115	115	120-240	80	57	57	57	57	26
Channels (Minimum to Maximum)	0-6	6	6	6-12	6	6-16	12-16	24-32	16-24
Cache (Buffer) Size in Bytes	16K	32K	16K	32K	Not Available	16K	64K	64K	2 CPUs, 32K buffer each
Bus Architecture?	No	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory[2]	$50,000	$50,000	$15,000	$50,000	$35,000	$35,000	$35,000	$35,000	$25,000

1. Relative throughput based on the IBM 370/158-3's equaling 45. Performance based on manufacturer's claims.
2. Prices are for the processor only. The console is not included, according to IBM.

IBM Double-Header Gives First Glimpse of 'H'

• Series 30 Not Obsolete

IBM's introduction of its 3081 and 3033S processors gave users a preview of the long-rumored H series and at the same time put to rest speculation that the Series 30 would become obsolete.

That was the reaction of industry observers interviewed just hours after IBM's double-header announcement last week.

Coverage of the major IBM announcement last week was provided by Marcia Blumenthal, Tom Henkel, Bruce Hoard and E. Drake Lundell Jr.

Although at press time analysts generally had not had time to digest the technical details of the 3081 — purportedly the first of the heralded H series — they were comfortable commenting on IBM's pricing.

"Revolutionary" was the word used to describe the ratio of purchase price to rental for the 3033S, which hit rock bottom at between 18 and 20.

IBM is pricing these machines for purchase, remarked Thomas Crotty, vice-president of research at the Gartner Group. He predicted the 3033S would have a replacement within two years. At the same time, he said, the announcement showed IBM's "fine marketing hand" at work, giving longevity to the 30 series and thus spurring user confidence.

Moreover, with the repricing of the 30 series and the introduction of the S — a slowed-down 3033 — Crotty speculated that IBM has repositioned the family to compete with Amdahl

(Continued on Page 7)

Key Features

Major points in IBM's announcements last week:

- The top-of-the-line 3081 offers twice the performance of a 3033 uniprocessor. But is it the full H system?
- An entry-level machine to the 3033 family — the 3033S — gives users a field-upgradable line within that family.
- Purchase price reductions on the 3033 line make purchasing attractive. The rental-to-purchase ratio on the 3033S is 18 months, IBM's lowest ever. Other reductions bring the 3033 to a ratio of under 30 months.
- New operating systems announcements indicate that MVS is the operating system of the 1980s. Increased functionality frees processor time by off-loading work to the channels.
- New packaging techniques provide for increased reliability on the 3081 and decrease the need for floor space, air conditioning and power.
- Engineering changes — free! — boost the 3033N performance.
- Main memory expanded on the 3033 uniprocessor and attached processor permits direct addressing of 24M bytes.
- Support Center Concept was expanded for operating system. Direct access to IBM customer service data base for modifications and corrections is permitted — a first.

Product Spotlight:

Intelligent Terminals

By Brad Schultz
CW Staff

Intelligent terminals make decentralized DP possible — and practical — for a great many users these days. In the process, the language stretched to describe these creatures tingles with ambiguity.

Many intelligent terminals are, for example, called systems, whereas a system has commonly meant a terminal's host computer — sometimes with the added connotation of the milieu in which the host is approached by humans.

Intelligent terminals might well be called systems. The etymology is understandable, since they really are just as powerful as many minicomputers (not that anyone is too sure about how to define "minicomputer" nowadays), and even some of the larger computers designated mainframes.

Datapro Research Corp. wisely stepped away from the above problem in drafting "User-Programmable Terminals — Management Perspective and Equipment Specifications," a $15 report now available.

Most people mean "user-programmable" when they call a terminal intelligent. And, by drawing on information contained in the Datapro report, this article with its charts will hopefully give the reader a good idea of what models he can buy, even if he does not consider programming a terminal to be an "intelligent" activity.

(Continued on Page 10)

• But Is It The H Series?

The new IBM 3081 processor is certainly big and cost-effective, but is it H?

Clearly the system is the basis for whatever the full-blown H series of processors will look like, but it hints more to direction rather than spelling it out in concrete terms. In many ways, the 3081 may be to the full-blown H series what the 370/155 and 370/165 were to the full 370 implementation — a first step that may be superseded with increased functionality in the relatively near future.

Analysis

For example, one of the keys to the large-scale systems of the future will be increased memory addressing. Somehow with the 3081 IBM has managed to be able to squeeze an extra bit of addressing into the system to permit a rather kludgy scheme for addressing up to 32M bytes. However, most observers feel that this will be inadequate in the future, particularly since IBM still limits virtual addressing to 16M bytes with the system.

Another example is in the area of functionality. Apparently the firm has been able to off-load a great deal of the paging overhead on virtual systems to the channels with the 3081, implying that the channels have a Dynamic Address Translation (DAT) box capability. Perhaps they are reworked 370/168s.

At the same time, however, IBM did not go all the way and offer such func-

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.00 a copy: U.S. – $30 a year; Canada, Central & So. America – $80 a year; Europe and Near East – $90 a year; other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Among Other Reductions

IBM Cuts Prices on 30 Series CPUs

ARMONK, N.Y. – Along with releasing what some are calling the H series last week, IBM dropped the purchase price of its 30 series hardware by as much as 22% and slashed charges for additional main memory resulting in a per-megabyte price as low as $35,000. Memory upgrades for the new 3081 were even lower – $25,000 per 1M byte.

Moreover, IBM also reduced prices for some 370 features by up to 39%, dropped maintenance charges for selected Series 30 processors by 5% to 15% and reduced some software maintenance prices by up to 30%.

Representative of 30 series hardware decreases, the price of a 3031 with 2M bytes of main memory went from $664,000 to $518,000, a 22% decrease. In addition, the accompanying 3036 console was reduced from $120,000 to $96,000. The 2017 power unit remained unchanged at $16,000.

3033 Uniprocessor

The 3033 uniprocessor with 4M bytes of main memory was reduced about 15%, dropping from $2.62 million to $2.225 million. This reduced the purchase-to-monthly-rental ratio to about 27, from about 32. On the other hand, the 3033N, a model with high user demand, was reduced a scant 3.5% from $1.755 million to $1.695 million.

In a multiprocessor configuration, the 3033 with 8M bytes of main memory was reduced 15% from $2.8 million to $2.375 million per processor.

In addition to hardware, memory prices for conversions for 3033 models took only a 30% dive, dropping to a low of $35,000 from $50,000 for current models. The new 3081 processor features a price of $25,000 per 1M byte of main memory on conversions.

In converting a 3033N from 4M bytes to 8M bytes of main memory, users will now pay $145,000, or $36,250 per 1M byte instead of the previous price of $205,000. Going from an 8M-byte model to a 12M-byte model, the price drops from $228,000 to $168,000, or $42,000 per 1M.

For the 3033 multiprocessor (MP), converting from 6M bytes of main memory to 8M bytes will now cost users $70,000 instead of $100,000. And upgrading from a 12M-byte 3033MP to one with 16M bytes will cost $140,000, or $35,000 per 1M byte, instead of the old price of $200,000.

Other hardware changes included the 2305 Model 1 fixed head storage unit which went from $131,600 to $92,120. The Model 2 was dropped from $104,500 to $73,150.

IBM also reduced prices on a variety of other hardware.

On the features side, one example was the decrease in the integrated file adapter for the 370/135 with 3330 and 3340 disks. This feature was reduced from $19,820 to $14,870.

IBM also lowered maintenance charges for certain Series 30 processors. For example, maintenance for the 3031 Model A2 was reduced from $2,505/mo to $2,255/mo.

Price reductions also encompassed software maintenance for both 370 and Series 30 systems. The monthly program support charge (MPSC) for a 370/125 dropped from $192 to $135, while the monthly additional program support charge (MAPSC) for the same model dropped from $115 to $81.

The MPSC for a 3033 attached processor was reduced to $931/mo from $1,330/mo, while the MAPSC dropped to $559/mo from $798/mo.

Monthly license program support charges for CICS, DOS and VS were reduced from $168 to $116, and the monthly additional program support charge dropped to $70 from $99.

Amdahl Says 'Oslo' Coming

SUNNYVALE, Calif. – Not one to be caught sleeping on the job, Amdahl Corp. responded quickly to IBM's announcement of what has been called the H series by announcing it would unveil a competitive product, code-named Oslo, on Nov. 18.

Amdahl's statement was made last Wednesday, the day IBM introduced its 3081 processor.

While not revealing any details of the proposed offering, Amdahl said the new unit would be a 370-compatible large-scale system.

Last week Amdahl circulated documentation and other materials to its field organization in preparation for the Tuesday launching.

This Week

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Who got 69% of the vote?

(a) Carter ____
(b) Reagan ____
(c) Anderson ____
(d) SyncSort ____

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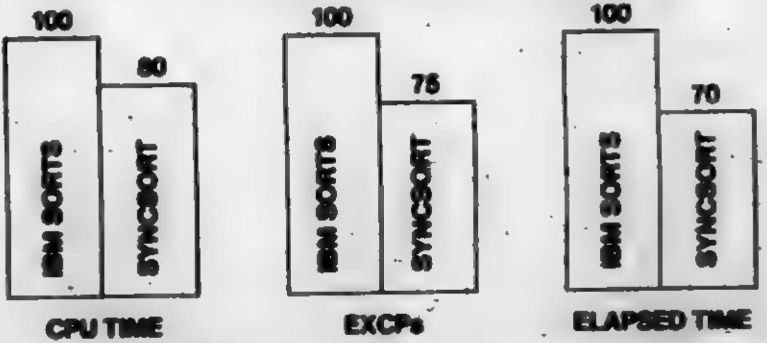
Today, if you compare SyncSort's performance against that of the candidates of the "Hardware Party," you'll see savings like this:



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Melbourne: Shell Co. of Australia Ltd., (03) 8400311
Milan: SYNTAX, (39-2) 87. 74. 44
Paris: CAP/SOGETI Produits, 33-1-539-22-25
Reading (UK): SyncSort Technology Ltd.,
44-0734-481919
Stockholm: BRA, 46 8 88 03 00
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Hidden Features?

IBM 3081 Tops 30 Series, Affirms MVS Reign

WHITE PLAINS, N.Y. – The IBM 3081 announced last week is clearly IBM's highest performance system to date with about 10% greater performance than the largest 3033 complex available.

At the same time, it signals that "tightly coupled processors continue to be a prime vehicle for implementing large advanced IBM systems," in the firm's words, and it affirms the supremacy of the MVS operating system for large processors.

Furthermore, the unit and its new control programming show IBM's intention to offload more function from the processor into such areas as the channels and to make greater use of microcode for performance improvements.

However, the 3081 does not break much new ground in terms of technology and does not go as far as many expected in terms of memory addressing and functionality, leading many to believe there is more under the cover than immediately meets the eye.

While test units of the system will be available early next year, the full-blown 3081 with 32M bytes and its new operating systems will not be available until the first quarter of 1982.

Technical Specs

The 3081, which the firm calls the "highest performance System/370 processor," features an instruction execution rate of up to 2.1 times the uniprocessor 3033 and is rated on the *Computerworld*/International Data Corp. throughput rating scale at 465.

Within the processor complex are two identical, "dyadic" processors, each of which has access to common central storage and its own set of channels. However, that access to storage is through one path for both processors, the firm admitted.

At press time, IBM was not very forthcoming about exactly how the paired or dyadic processors actually work, except to say – in answers to questions at the Guide users group meeting in Miami – that the system looks more like an attached processor than a multiprocessor.

Only one of the processors, in the configuration can be varied dynamically on-line, IBMers told the users group. At the same time, the firm indicated that the paired processors cannot be broken into two simultaneously executing subsystems. This means that both systems work on parts of the same problem rather than on separate problems or jobs.

A third processor in the configuration – a 3082 Processor Controller – contains the path to main memory and routes jobs to the two other processors. This extends the service processor concept found on other large IBM systems.

The 3082 unit, which provides the controlling mechanism for monitoring and supervising the 3081 processor complex, also houses the interface logic for each channel.

The 3082 also provides automatic central storage validation testing and address assignment and can have one of the paired processors in the 3081 complex take over the entire work load if the other processor fails.

The Processor controller also saves error symptoms, correlates multiple symptoms, performs error data analysis and isolates failures within the dyadic complex to the field-replaceable unit or units – all automatically and concurrently with continuing operation of the 3081, where possible.

More Specs

Memory for the 3081 complex comes in three sizes – 16M, 24M or 32M bytes, and the unit has either 16 or 24 channels, with data streaming standard on all block multiplexer channels.

In addition, the unit, which is supported only by MVS/System Product (SP) or VM/SP, has functions of the 3033 Extension and Extended Addressing features as standard, and the Virtual Machine Assist is also standard.

Channel affinity and channel sets may be assigned to either central processor, and each central processor in the paired design has a 32K-byte buffer.

Cycle time for the unit is 26 nsec and central storage access time is 312 nsec with an 8-byte data path between each processor and storage. In addition, IBM said the 3081 "contains multiple, distributed control stores which interact asynchronously, permitting functional changes with minimal hardware impact."

The unit has a minimum of three consoles – the service support console, the system console and an operator console, IBM noted.

The channels are organized into two sets, with up to 16 channels serving any one of the two processors. Channel set switching allows one processor to continue all the channel activity in the event of failure.

Four of the channels may be byte multiplexer channels with conversing from block multiplexer channels to byte channels accomplished in the field, the firm said.

While both data streaming and non-data streaming devices can be attached to any block multiplexer on an intermixed basis, the block multiplexers are capable of a data rate of up to 3M byte/sec in the data streaming mode.

IBM noted that an aggregate data rate of up to 72M byte/sec across 24 block multiplexer channels was measured at a channel utilization of 70% on all channels.

With four byte multiplexer channels, a 3081 has an aggregate byte capability in the range of 45K- to 500K byte/sec for control units having fast I/O interface turnaround times at 50% channel utilization, the firm said.

With the exception of some relatively old gear, the 3081 will support the same I/O devices as does the 3033 family.

In addition, IBM said it will be accepting RPQs for a 3838 high-speed attachment immediately to give users data rates of up to 3M byte/sec; the existing attachment uses a single byte interface.

The major operating system for the 3081 will be MVS/SP, although VM/SP will also be supported.

Enhancements to MVS/SP Release 1 to run on the 3081 will be available in March for use on test units, and Release 3 of the product will be available in the first quarter of 1982, when the new operator frame will be available, IBM said.

Further protection against main storage alteration for segments fully occupied by Pageable Link Pack (PLPA) pages will not be available until Release 3, the firm added.

Extended Addressing support – which allows addressing of more than 16M bytes – up to 32M bytes – will likewise not be available on the unit until Release 3.

VM/SP support will be available in the first quarter of 1981.

And while IBM said the 3081 would not support DOS/VSE natively, it did say the firm will provide programming

(Continued on Page 9)

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	TI785 Portable KSR, 120 CPS	2,395	230	128	86
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	704 RS232-C Printer	1,795	172	96	65
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IBM's 3033S Lowers Entry Level to 3033 Series

WHITE PLAINS, N.Y. – With the introduction of the 3033 Model Group S processor last week, IBM has lowered the entry level to the 3033 series of processors and given 4300 users running under DOS/VSE a migration path to the large mainframes.

The unit, with either 4M or 8M bytes of storage, comes out with a throughput rating of 121, approximately equal to that of the 3032 and 2.1 to 2.4 times the power of the 3031 processor. It will be available in January.

The 3033S can be upgraded in the field to a 3033 Model Group N processor, which is rated 210, and then onto a 3033U or uniprocessor, rated at 237, or to a 3033 attached processor or multiprocessor, each of which have a rating of 405 on the throughput scale.

This modularity of design and field upgradability now gives users of the 3033 line a very wide range of processor power to choose from and easy migration paths from the lowest to the highest units in the line. Each field upgrade takes about a day, IBM said.

With the 3033S, IBM also radically reduced the time it takes for the rental price to equal the purchase price for the system. For the 3033s, this is now between 18 months and 20 months, the lowest in IBM history, indicating either that the life for the machine will be very short or that IBM is really trying to boost purchases.

In addition, the price cuts on the rest of the 3033 family brought, for the first time, their rent-to-purchase ratio to less than 30 months.

At the same time, the 3033S is the first of the 3033 family to run under DOS/VSE, which is the native operating system for the 4300 family of computers, thereby giving those users a migration path to the larger mainframes in IBM's arsenal.

With the announcement of the 3033 Model Group S, however, IBM also announced that DOS/VSE could run on the 3033N and the 3033 uniprocessor, but said "it is not recommended for those processors."

IBM also used the occasion to announce an engineering change on the 3033N processor. This change, which was unexplained at press time, will be offered free to 3033N users and will boost performance of those systems from 5% to 14%.

Furthermore, the firm upgraded the 3033 line by announcing that the main storage for 3033 uniprocessors and 3033 attached processor models had been boosted from 16M bytes to 24M bytes. Earlier the firm announced a software feature that allowed the machines to directly address more than the 16M bytes, but had not provided processors with more capacity.

Tech Specs

The new entry model for the 3033 family features 4M or 8M bytes of four-way interleaved processor storage and six channels – one byte multiplexer and five block multiplexer channels.

It has a 57-nsec processor cycle time, like the other members of the 3033 family. Optional features include Data Streaming, 3033 Extension and a channel-to-channel adapter.

While IBM warns that "throughput measurements are highly dependent upon configuration, application and operating characteristics," it said that the S is capable of an instruction execution rate of 2.1 to 2.4 times that of the 3031 with "similar configurations" and identical programs running under MVS/System Extenstion Release 2 program product.

On the channels, IBM said that the byte multiplexer channel is generally capable of 40K- to 75K byte/sec operation. The byte multiplexers consists of control units with fast I/O interface turnaround time, and the firm said that multibyte data transfer may be even higher.

A block multiplexer channel is capable of a 1.5M byte/sec data rate, and the first two block multiplexers are capable of operating with data streaming devices up to 3M byte/sec with the optional Data Streaming Feature, the firm said. The system can run all the I/O devices previously announced with the 3033 family.

On the 3033S, the following Systems Control Programs (SCP) can be installed with Systems Maintenance Program (SMP) through the Program Temporary Fix (PTF) process.

- MVS Release 3.8.
- MVS/System Extensions Release 2.
- MVS/System Product.

The following SCPs and program products can be added without changes to the normal 3033 support:

- OS/VS1 Release 7, with or without Basic Programming Extensions program product.
- VM/370 Release 6.
- VM/System Extensions Release 2 program product.
- VM/Basic System Extensions Release 2 program product.
- VM/System Product.
- Airlines Control Program/Transaction Processing Facility (ACP/TPF) program product.

To add DOS/VSE to the system, three PTFs for the VSE/Advanced Function program product are needed. IBM said these PTFs would be available at the first customer shipment of the 3033S.

The IBM 3033 Model Group S with 8M bytes of main storage has a purchase price of $1,135,000. It can be leased for $63,645/mo on a four-year agreement or rented for $70,010/mo.

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And while there seems to be a great deal of wisdom in reasoning that technical support and maintenance will be better for CICS by virtue of its being an IBM product, consider the reality of the matter.

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Datapoint Unwraps Bus-Type 16-Bit System

By Nancy French
CW Staff

NEW YORK — Datapoint Corp. has used its Attached Resource Computer (ARC) as the blueprint for a new 16-bit processor that uses architecture consisting of a CPU and main memory supported by peripheral processors linked by a high-speed internal bus and direct memory access (DMA) channel.

The Model 8800 processor comes with several new disk drives and a new operating system — the Resource Management System (RMS), which is said to run on any Datapoint system with at least 64K bytes of main memory.

The architecture allows the peripheral processors, with their separate processing power and up to 64K bytes of independent memory, to relieve the central processor of the time-consuming tasks of controlling peripheral devices such as disks, tapes and communications devices, Datapoint said.

The 8800 uses an expanded and enhanced version of Datapoint's 6600 instruction set and will be able to function as part of a Datapoint ARC system, the company said.

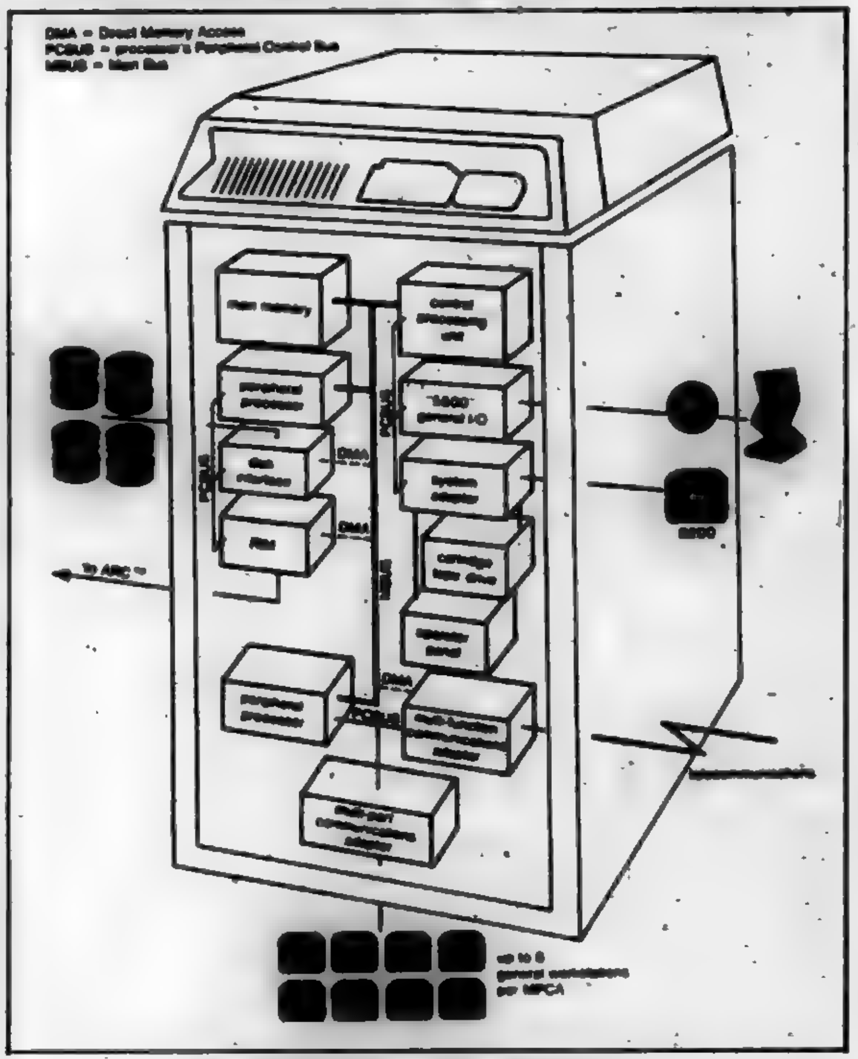
Announced in November 1977, the ARC system is the forerunner of a concept that today is known as local networking. It links all system components with coaxial cable and allows users to share the same disk files, printers and other peripheral devices without having to be concerned about where the devices are physically located, whether anyone else is using them and which functions correspond to which files, according to Datapoint.

The system design reflects Datapoint's philosophy of modular systems that offer users easy expandability, the firm said.

System Software

RMS allows any workstation — whether intelligent or nonintelligent — to perform every function supported by the software. It will manage the allocation of resources from whatever is available within the user's particular equipment configuration, making a business' entire computing power available to every workstation, Datapoint said.

The operating system is said to allow greater processing speed, larger file sizes (equal to the storage capacity of whatever disk drive is being used), virtually unlimited file names, hierarchical user-defined levels of security, multitasking and multiprogramming. RMS software will initially support Cobol, Assembler language and Datapoint's Databus high-level business-oriented language. Support for additional languages and functions is planned for future releases, the company said.


DMA = Direct Memory Access
PCBUS = processor's Peripheral Control Bus
MBUS = Main Bus
DMA
PCBUS
MBUS
To ARC
8800
up to 8
per MPCA

Example Block Diagram for 8800 System

The new computer has three standard configurations. The 8860, a stand-alone processor, can support a local network of "nonintelligent" terminals, a disk storage unit and other peripheral devices.

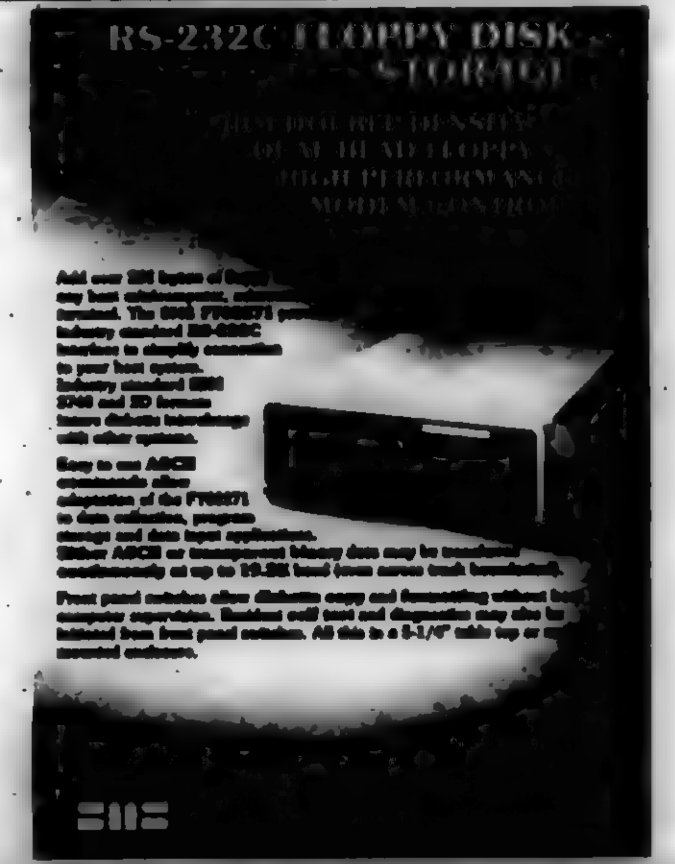
Purchase price is $68,000 and a three-year lease is $2,680/mo for a 256K-byte model. The price includes the system console, the peripheral processor, a multiport communications adapter, a disk interface and one 202M-byte disk drive.

The 8840, a data resource processor in an ARC system, can support a minimum of 202M bytes of on-line disk storage, 67M bytes of which would be on a removable disk, facilitating the production of file "backups." The disk capacity can be expanded with an additional six disk drives of 135M bytes each, bringing the total to more than one billion bytes of on-line storage.

Purchase price is $87,900, and lease is $2,665/mo for three years for a 256K-byte 8840 with a system console, peripheral processor, disk interface, resource interface module (RIM) and one 202M-byte disk drive.

The third version, the 8830 applications processor, comes without a disk controller, but includes a multiport communications adapter for operating multiple workstations.

(Continued on Page 9)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IBM Putting Old Techniques in New Packages

WHITE PLAINS, N.Y. – There is little new in the way of technology in the IBM 3081 computer systems announced last week, with major changes coming in packaging of old technology rather than changes in the underlying techniques.

For example, the system uses 16K-byte Mosfet chips in its memory, pretty much the same technology it has been using on other members of the 30 series mainframes, even though it has been able to gain extra speed by packaging modifications.

The major new packaging comes in the packing of logic chips. IBM uses the bipolar logic chip first announced with the 4300 series last year.

These chips, which have up to 704 circuits each, operate at speeds of 1- to 2 microsec, the firm said.

New IBM Module

What is new, however, is that up to 118 of these chips are sealed in a new module designed by IBM that is approximately 5 in. square by 2 in. Metal pistons, actuated by helium gas, press against each chip in these modules and convey heat to a metal plate, which is in contact with the circulating chilled water system for heat dissipation.

Inside the module, the chips are fixed on a ceramic carrier, with each carrier having up to 33 layers and about 400 feet of internal "wiring" for signal interconnection and power distribution, the firm said.

IBM noted that the new logic modules each contain 45,000 circuits, about equal to all of the logic circuitry in a 370/148.

IBM calls the new module a "Thermal Conduction Module (TCM), which is said to result in an increase in computing capability while reducing space requirements approximately 21%, cooling requirements approximately 70% and power requirements around 66%, when compared with a 3033 uniprocessor. The TCM is a field replaceable unit and the central processor of the 3081 is made up of eight TCMs mounted on a new multilayered board.

Series 30 Not Yet Obsolete

(Continued from Page 1)

Corp.'s V/7B.

As for the 3081, Crotty maintained "whenever you can reduce the price of a million instructions per second from $450,000 to $375,000, you've got a significant offering." Crotty expects IBM to introduce lower end models of the 3081 within the next year.

Although the $3.7 million price tag on the 16-channel, 16M-byte 3081 was not as aggressive as expected, it was still good, Crotty noted. The purchase-to-rental ratio for that machine is about 32, also slightly lower than IBM's usual pricing.

Realistic Price

While also surprised at the $4 million price tag for the 3081, Edward Cherney, president of CMI Corp., said it was realistically priced so that IBM would not have to hike the price as it had to do twice with the 4300s.

Cherney, also president of the Computer Lessors Association, interpreted the pricing of the 3081 as IBM's commitment to continue to charge for hardware, despite industry speculation that the industry giant would downplay hardware pricing in favor of reaping revenues on software.

If IBM had come in somewhat lower in pricing the 3081, it would have wreaked havoc on its installed base, Cherney observed. Instead, by realistically pricing the H processor, IBM is attempting to bring stability to the marketplace, avoiding the fallout that occurred in the aftermath of the 4300 announcement.

IBM is telling users "we are not going to hurt you, if you purchase," he said. At the same time, IBM has recognized that the economic life of the machine is less than the five years that has been standard until recently.

H Competitors

Although high-end IBM plug-compatible manufacturers were hesitant to comment on the new H processor, both Amdahl and National Advanced Systems (NAS) said they could match IBM's product offering.

Amdahl will introduce a competitive processor tomorrow (see box on Page 2). In general, the technology of the 3081 was no surprise, Amdahl said, adding, it was close to recent rumors on both the nature of the machine and how it fits IBM's product line.

At NAS, David Martin, executive vice-president, maintained that his firm's newest offering, the AS9000, was competitive with the 8081 in terms of density, performance and level of integration.

However, over the next few months, NAS will bring out "a number of enhancements" that will show the 9000 to be on a level above the 3081, Martin claimed.

"The real secret of the 3081 is the packaging of the logic," Crotty observed. While the 3081 packs 45,000 circuits on a logic module, it could load more than 80,000 on a module, according to the company's announcement. However, one industry source saw this density as a drawback, questioning how much of the system would go down when a module failed.

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MVS/SP in Spotlight, But Transitions Blurry

WHITE PLAINS, N.Y. — IBM's announcement of new MVS/System Product (SP) releases last week indicates that MVS will be the major operating system for IBM's large-scale computer users in the 1980s.

But the transitions may be confusing.

IBM first released enhancements to MVS/SP Release 1 to support the 3081 processor complex, the 3375 disk and the 3880 speed matching buffer for the 3380 feature.

The enhancements will be available in March 1981, but will only be supported until the end of 1982.

At the same time, the firm announced MVS/SP Release 3, which will be available in October 1981, and released a great deal of information about how users should plan to convert through the new MVS/SP ladder.

Tech Specs

MVS/SP Release 1 allows system operators to both logically and physically reconfigure channels, processors and storage in a single operation on the 3081 processor complex.

The system generation process is simplified, so users in most cases can create a single set of statements that can be used as input to both the MVS Sysgen process and to the I/O Configuration Program, which allows an installation to determine current configuration and revise channel configurations as required.

A new test block instruction tests memory and clears all that is found to be usable during Initial Program Load, the firm said.

The new support for the 3375 and 3380 disk subsystems allows the devices to be used for user and system data sets, system residence and system paging, IBM said, but JES spool and checkpoint support for these devices will not be available except with Release 2 and 3.

The Data Facility/Device Support program product is required to support the disks. The monthly charge for this release will be $1,375.

While IBM did announce Release 3 at the same time, much of the information available now is only for planning purposes. The 15-page document describing the new system is sprinkled with "shoulds" and statements like "more information will be available later."

Release 3 will provide support for the 3081, IBM asserted, and will have all of the functional benefits of Release 2 plus support for up to 32M bytes of main memory on both the 3033 (for which IBM has announced only 24M bytes of main storage) and the 3081.

In addition, the system offers improvements to system reliability, an extension to the global resource serialization facility and "potential savings in the common service area virtual storage requirements," IBM said.

One of the main features of Release 3 for the 3081, IBM said, is protection against any alteration to main storage segments entirely occupied by Pageable Link Pack Area (PLPA) pages.

In addition, the internal structure of Job Entry Subsystem (JES) 3 has been enhanced for the 3081, IBM said, to permit JES3 global to utilize the processing capacity of the tightly coupled processor more effectively. This item is not going to be available until the first half of 1982, IBM said, adding that performance data on the system will not be available until late 1981.

IBM had more data about how MVS/SP Release 3 will work on the 3033, however. The new release "should," IBM said, provide throughput improvements of approximately 10% on uniprocessors and more on attached processors and multiprocessors in the TSO/Batch environment.

For users of IMS, IBM promised throughput improvements of 6% on uniprocessors and more again for attached processor and multiprocessor configurations.

These expectations "are based upon measurements and projections of test environments," IBM said.

IBM's Advice to Users

WHITE PLAINS, N.Y. — With the sudden proliferation of releases to MVS/SP, IBM last week announced planning guides that a firm user should follow. In the firm's words, here's what you should do:

- *MVS/SP Release 1:* Current MVS users, including those with MVS/System Extensions planned or installed, should consider migrating to MVS/SP Release 1 to position themselves for the 3375/3380 DASD, 4341 or 3081 processors and program products that require MVS/SP. MVS/SP Release 1 includes all the performance and functional enhancements of MVS/SE Release 2. MVS/SP Release 1 utilizes current JES subsystems, thus reducing the migration effort.

Note: IBM intends to provide an MVS/SP Release 1 based System IPO. Details will be provided by Nov. 30, 1980.

- *MVS/SP Release 2:* MVS users who immediately need virtual storage constraint relief, the global resource serialization function or new JES function, should consider installing MVS/SP Release 2 available June 1981. Other users should consider installing MVS/SP Release 3 available in October 1981. Release 3 replaces Release 2 so the user will save an installation cycle by going directly to Release 3. The performance information in this announcement should be taken into consideration when making the decision to migrate to Release 2 or 3. If a user wants early experience with cross memory, global resource serialization or the JES components, Release 2 could be ordered for initial testing and then Release 3 installed for production.

The JES2 and JES 3 components of MVS/SP Release 2 and MVS/SP Release 3 are the same. A user who installs MVS/SP Release 2 with its level of JES will have to reinstall the base control program (BCP) component when migrating to Release 3, but will not have to reinstall the JES component.

The MVS/SP Release 2 documentation including JES source code will be available March 1981 under the terms and conditions of the Agreement for IBM Licensed Programs. The JES source code can be used to initiate rework of user mods to expedite migration when MVS/SP Release 2 or 3 is available.

MVS/SP Release 2 introduces significant new functions to MVS users. MVS/SP Release 3 extends the use of this function. The MVS/SP Release 2 early support program (ESP), starting first quarter 1981, is key in gaining experience that will be beneficial when installing either Release 2 or 3.

- *MVS/SP Release 3:* Consideration should be given to a staged installation of MVS/SP Release 3. Install the BCP component without exploiting its new function, then either exploit the new function or install the new JES depending upon their relative importance to the installation.

MVS/SP Release 1 is current through December 1982 and MVS/SP Release 2 is current through April 1983. MVS/SP Release 3 migration of at least the BCP component should be scheduled for completion prior to these dates. The availability of MVS/SP Release 3 does not affect the currency of JES2 Release 4.1, the NJE for JES2 program product, JES3 Release 3 or the JES3 Networking PRPQ.

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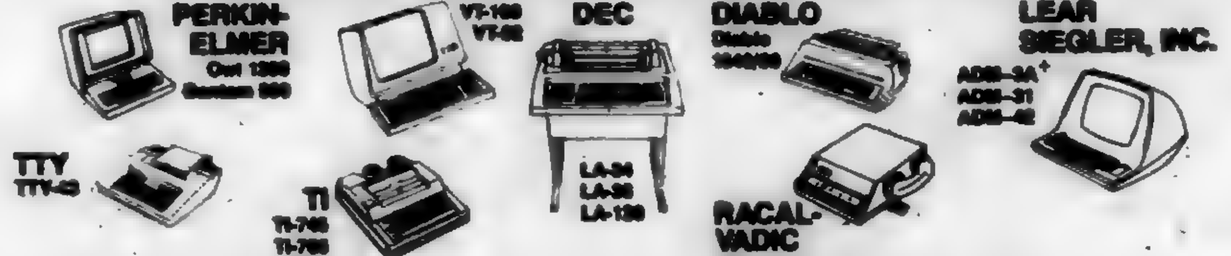

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. . . But Is It the H?

(Continued from Page 1)

tions as a full-blown back-end processor as many had expected — and probably feared. Increased functionality is obviously a key to the 1980s, but IBM seems to be moving slowly with this announcement.

This cautious approach should be good for users in the long run because it seems to signal IBM's intention of making upgrades slow and easy.

But what is countered with the announcement is the operating systems area. For example, here IBM has announced that MVS/SP Release 1 with enhancements for the 3081 will be a relatively short-lived product — available in the spring and outmoded by the end of the year. Similarly, Release 2 of the operating system will be available late in the year and will be outmoded within months by Release 3.

Furthermore, even though the firm announced Release 3 last week, the details are still sketchy and won't be filled in until users actually have some experience with the system in IBM's early support program.

The news for 3033 users is better — perhaps. IBM filled the gap at the low end of that line with the 3033s and provides users with a path of field-upgradable units that permit them to more than triple their capacity without ever replacing an entire system. This functionality — the ability to go from the 3033S to the 3033MP through one-day field upgrades — must be welcome.

However, there's a sticker here, too. It takes only 18 to 20 months of rental price to equal the purchase price on the 3033S — the lowest such ratio ever from IBM. Does this mean that the firm plans to replace the system in such a short period of time or does it just mean that IBM wants purchases to bolster its revenues in the short term? Users will have to ponder that for a while.

No Shock Waves

Of course the rest of the industry — particularly the software-compatible CPU manufacturers — are happy. The 3081 machine will not be available with all of its bells and whistles — and with MVS/SP Release 3 — for 15 months, which gives them plenty of time to get their acts together.

Furthermore, the announcement did not send shock waves through the industry because, while aggressive, it was not that aggressive. When IBM announced the 4300 series, the price per million instructions per second was set at $300,000. With the 3081 that price is between $375,000 and $400,000, which gives the rest of the industry a chance to compete effectively on the basis of hardware.

But while that raw hardware price looks like a tempting target, they are going to have to know more about how IBM is going to use the "multiple control stores" or microcoded instructions spread throughout the 3081 before they can really be happy.

So the announcement was big. It was H or at least is the beginning of the new series of computers IBM will offer in the 1980s.

But the announcement itself raises almost as many questions as it answers.

IBM 3081 Tops Product Line

(Continued from Page 4)

services and local program support for DOS/VSE users under certain conditions.

First customer shipments of the unit will be in the fourth quarter of 1981, but a limited number of machines will be delivered earlier under an early support program. The unit is already operating within IBM.

However, the early units will have only 16M bytes of memory. Users wanting either 24M-byte or 32M-byte models will have to wait until the first quarter of 1982.

An IBM 3081 Processor Complex, which includes a processor, processor controller, power unit, coolant distribution unit, systems and operator's consoles, with 16 channels and 16M bytes of main storage can be purchased for $4,046,240, leased for $101,170/mo under a four-year agreement or rented for $126,446/mo.

A 24-channel, 32-million-character IBM 3081 Processor Complex can be purchased for $4,596,240, leased for $116,320 or rented for $145,384/mo.

Datapoint Adds 16-Bit Mini

(Continued from Page 6)

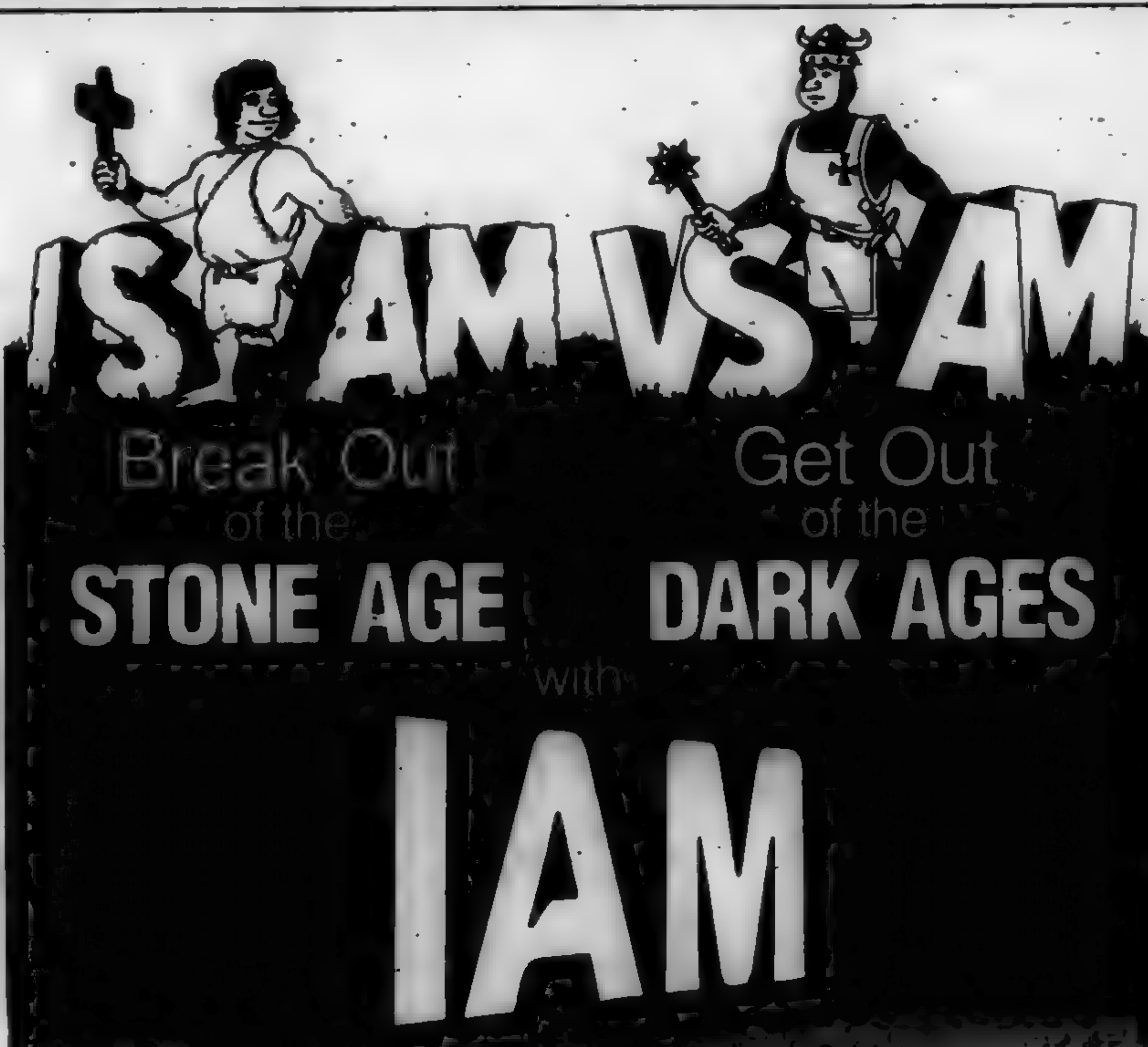
Its purchase price is $42,500 and lease is $1,295/mo for three years, for the 256K-byte model, system console, peripheral processor, multiport adapter and RIM.

Four disk drives were announced along with the 8800 processor. The Model 9395 disk drive provides 135M bytes of nonremovable and 67M bytes of removable disk storage and costs $37,000.

The Model 9331 drive, at $19,500, provides a nonremovable 135M-byte expansion unit, and the 9333 provides a nonremovable 135M-byte unit to be added to the 9331's cabinet for $18,500.

The 9332 provides two nonremovable 135M-byte drives in one cabinet and sells for $37,000.

Datapoint Corp. is at 9725 Datapoint Drive, San Antonio, Texas 78284.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AM Jacquard J600	No	Yes	Yes	No	HF	AB	110-9,600	Ascii, BSC	128K	$11,900
Beehive B550	No	Yes	Yes	No	HF	A	110-19.2K	Ascii	4K-48K	$3,745
Bunker Ramo System 90	No	Yes	No	Yes	HF	AS	1,200-9,600	BSC SDLC	16K-256K	$8,120
Burroughs MT600	No	Std	Std	No	H	AS	150-9,600	Burroughs DSI, TDI	16K-96K	$2,740
Burroughs MT700	No	Yes	Yes	No	H	AS	0-19.2K	Burroughs DSI, TDF, BDAA	32K-96K	$3,000
Burroughs TC3900	Yes	No	Yes	Yes	HF	AS	1,200-9,600	Burroughs BSC	4K-50K	$19,400
Cado 20/20	Yes	Yes	Yes	Yes	HF	AS	0-9,600	Ascii, BSC	32K-96K	$15,000
Codex CDX-68 Series	No	Yes	Yes	Yes	HF	AS	0-19.2K	Ascii, BSC	Up to 64K	$7,996
Comark QB 11/23	No	Yes	No	Yes	HF	AS	150-19.2K	Ascii	64K-256K	$12,000
Comark MB86	No	Yes	No	No	HF	AS	150-19.2K	Ascii	4K-64K	$9,135
Compal 8200	No	Yes	Yes	No	HF	AS	110-19.2K	Ascii, BSC	56K	$12,500
Compression Labs CLI-441	No	Yes	Yes	Yes	HF	AS	50-9,600	Ascii, BSC	64K-304K	$11,900
Computek 218/30	No	Yes	No	Yes	HF	AS	110-19.2K	Ascii, BSC, SDLC	2K-128K	?
CA Syfa System 300	Yes	Yes	Yes	Yes	HF	A	110-9,600	Ascii, BSC	64K-304K	$36,000.
Computer Devices Miniterm 1204P/1206P	Yes	No	Yes	No	HF	A	50-19.2K	Ascii	32K	$4,335
Computer Devices Miniterm 1206	Yes	No	Yes	No	HF	A	50-19.2K	Ascii	64K	$5,485
Consolidated Computer Falcon Series	Yes	Yes	Yes	Yes	H	AS	300-4,800	BSC, SDLC	64K-128K	$10,853
CDC Cyber 18-5M	No	Yes	Yes	No	H	S	1,200-9,600	CDC Mode 4A, BSC	32K-64K	$16,705
DG CS/10	Yes	Yes	Yes	Yes	H	AS	50-9,600	BSC	64K-128K	$10,950
DG CS/20	Yes	Yes	Yes	Yes	H	AS	50-9,600	BSC	64K	$13,820
DG CS/30	Yes	Yes	Yes	Yes	H	AS	50-9,600	BSC	112K	$20,290
Datapoint 1500	No	Yes	Yes	No	HF	AS	110-4,800	BSC	32K-64K	$7,075
Datapoint 1800	No	Yes	Yes	Yes	HF	AS	110-4,800	BSC	64K-128K	$10,975
Delta Data 7183/7383	No	Yes	Yes	No	F	A	9,600	Ascii	32K	$9,810
Delta Data 7186/7386/7586	No	Yes	Yes	No	F	AS	9,600	Ascii, BSC	16K-96K	$11,055
Digi-Log Microterm II	No	Yes	Yes	No	HF	AS	110-19.2K	Ascii, BSC	72K-88K	$8,400

Intelligent

(Continued from Page 1)

As a number of articles explained in *Computerworld's* Special Report on Data Terminals, "When is It Smart to Buy Dumb?" [CW, March 31] earlier this year, terminals can be grouped under three different headings: Dumb, smart and intelligent.

A dumb terminal has the basic features of a teletypewriter, but is often faster and quieter.

A smart terminal generally has a microprocessor inside that executes programs such as text editing routines written by the supplier or the user. If written by the user, the terminal is intelligent as well as smart.

Intelligent terminals can support local software development without involving the host mainframe, although they are often end-user-oriented and not intended for esoteric applications.

Terminal or Computer?

Another expression, "data terminal equipment," has come to mean both terminals (in the usual sense) and computers that lie at the end of a data link. Dumb terminals can be data terminal equipment, but it is interesting that the language used to describe networks has been forced to obscure the distinction between what are often powerful processing systems and the so-called terminals through which humans access those systems.

Within an organization, the proliferation of intelligent terminals tends to mean less remote communications is necessary because end users have less dependence on host mainframes at a centralized facility.

A trade-off between the cost of processing and the cost of communications is sometimes the user's basis for deciding whether to buy intelligent terminals, but the organizational impacts of adding "intelligence" to the field are also important.

Models Listed

Among the models listed in the charts are products that may otherwise be called small business systems endowed with communications capabilities. Some of the models have printing capabilities; most display data on CRTs; and some serve remote job entry applications in a batch fashion.

The charts indicate which of these functions are offered by each model and also express such parameters as mode (duplex, half-duplex) and technique (asynchronous, bisynchronous and synchronous). As suggested by the wide differences in pricing, these models differ from each other substantially in what they are meant to accomplish.

Terminals Make Decentralized DP Practical

The charts can only represent what products are available: They should not be construed as indicating the products' relative merits.

The Datapro report, which includes a survey of user experiences with some of the user-programmable terminals identified in the charts, is available from the company at 1805 Underwood Blvd., Delran, N.J. 08075.

Product Spotlight

Names, Addresses Of Vendors

- AM Jacquard Systems, Department 777, 3340 Ocean Park Blvd., Santa Monica, Calif. 90405.
- Beehive International, 4910 Amelia Earhart Drive, Salt Lake City, Utah 84125.
- Bunker Ramo Corp., Trumbull Industrial Park, Trumbull, Conn. 06609.
- Burroughs Corp., Room 4D20, Burroughs Place, Detroit, Mich. 48232.
- Cado Systems Corp., 2771 Toledo St., Torrance, Calif. 90503.
- Codex Corp., Phoenix Operation, 2002 W. 10th Place, Tempe, Ariz. 85281.
- Comark Corp., 257 Crescent St., Waltham, Mass. 02154.
- Compal Computer Systems, 6300 Variel Ave., Suite E, Woodland Hills, Calif. 91367.
- Compression Labs, Inc., 10440 North Tanau Ave., Cupertino, Calif. 95014.
- Computek, Inc., 63 Second Ave., Burlington, Mass. 01803.
- Computer Automation, Inc., 2180 Dupont Drive, Irvine, Calif. 92713.
- Computer Devices, Inc., 25 North Ave., Burlington, Mass. 01803.
- Consolidated Computer, Inc., 410 Consumers Road, Willowdale, Ontario, Canada M2J 4H1.
- Control Data Corp., 8100 34th Avenue S., Minneapolis, Minn. 55440.
- Data General Corp., 4400 Computer Drive, Westboro, Mass. 01581.
- Datapoint Corp., 9725 Datapoint Drive, San Antonio, Texas 78284.
- Delta Data Systems Corp., Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.
- Digi-Log Systems, Inc., Babylon Road, Horsham, Pa.

(Continued on Page 12)

DEC Decstation 78	No	Yes	Yes	No	F	A, S (opt.)	50-19.2K	Ascii	32K	$8,995
DEC PDT-11/110, PDT-11/130	No	Yes	Yes	Yes	F	AS	50-9,600	Ascii	32K or 60K	$4,800
DEC PDT-11/150	Yes	Yes	Yes	Yes	F	AS	50-9,600	Ascii	32K or 60K	$8,600
Digilog 4400, 4401, 4402	Yes	Yes	Yes	Yes	F	AS	50-800K	Ascii, BSC	64K-128K	$9,950
ECD Smart Ascii	Yes	Yes	Yes	No	HF	AS	150-9,600	Ascii (std.), BSC (opt.)	32K-1MB	Contact vendor
ECS Microsystems 4536/4537/4532	No	Yes	Yes	No	HF	AS	1200-19.2K	BSC, SDLC	16K-256K	$8,320
Four Phase Systems IV/10	No	Yes	Yes	Yes	HF	S	2,400-9,600	SDLC	24K	Contact vendor
Four Phase Systems IV/40 through IV/90	No	Yes	Yes	Yes	HF	AS	300-9,600	Ascii, BSC, EB, SDLC	24K-480K	Contact vendor
Harris 1660	Yes	Yes	Yes	Yes	HF	AS	110-56,000	BSC, SDLC	96K-192K	$73,570
Harris 1670	Yes	Yes	Yes	Yes	HF	AS	110-56,000	BSC, SDLC	96K-192K	$84,800
HP 2647A	No	Yes	No	No	HF	AS	110-9,600	Ascii, BSC	100K	$8,950
Honeywell (Incoterm) SPS 10/25	No	Yes	Yes	Yes	HF	AS	50-9,600	BSC, HDLC, SDLC	16K-64K	Contact vendor
Honeywell (Incoterm) SPD 20/20	No	Yes	Yes	Yes	HF	AS	50-9,600	BSC, HDLC, SDLC	16K-32K	Contact vendor
Honeywell (Incoterm) SPD 20/40	No	Yes	Yes	Yes	HF	AS	50-9,600	BSC, HDLC, SDLC	32K-64K	Contact vendor
ICL, Inc. 1500 Series	No	Yes	Yes	Yes	H	AS	50-9,600	BSC, SDLC, ASL	8K-32K	$5,020
Inforex 7000 Clustered Terminals	No	Yes	Yes	Yes	HF	AS	0-4,800	BSC	128K	$30,900
IBM 3735	Yes	No	Yes	No	H	S	1,200-4,800	BSC	?	$12,540
IBM 3774/3775	No	No	Yes	No	H	S	0-4,800	BSC, SDLC	6K-22K	$9,696
IBM 3790	Yes	Yes	Yes	Yes	H	S	1,200-9,600	SDLC	8K or 16K	$26,402
IBM 5285	No	Yes	Yes	Yes	H	S	0-4,800	BSC, SDLC	16K	$5,650
IBM 5288	No	Yes	Yes	Yes	H	S	0-4,800	BSC, SDLC	32K	$9,515
Intertec Compustar 10/20/30/40	No	Yes	Yes	Yes	HF	AS	0-9,600	Ascii	64K	$2,496
Logabax	Yes	No	Yes	No	HF	AS	75-9,600	BCD, SDLC, 2741	1.5K-16K	$6,400
Megadata UPS-7	No	Yes	No	No	HF	AS	50-9,600	BSC	32K-64K	$13,200
MDS Series 21	No	Yes	Yes	Yes	H	AS	110-9,600	Ascii, BSC	48K-256K	$7,035
MDS 2300	Yes	Yes	Yes	No	H	S	2,000-9,600	BSC	4K-16K	$7,999
MDS 1200/2400	No	Yes	Yes	Yes	HF	AS	110-230, 400	Optional	48K-128K	$26,800
NCR 2950	Yes	Yes	Yes	Yes	H	A	300-9,600	Ascii	48K-64K	$3,630
NCR 7520	No	No	Yes	No	H	S	2,400-9,600	BSC	48K	$8,450
NCR 7530	No	No	Yes	No	H	S	2,400-9,600	BSC	48K	$8,640
Nixdorf Computer 600/20	No	Yes	Yes	No	HF	S	150-19.2K	BSC	32K	$17,380

Names, Addresses of Terminal Vendors

(Continued from Page 11)

19044.

- Digital Equipment Corp., Main St., Maynard, Mass. 01754.
- Digitex Systems, Inc., P.O. Box 210366, Dallas, Texas 75211.
- ECD Corp., 196 Broadway, Cambridge, Mass. 02139.
- ECS Microsystems, Inc., 215 Devcon Drive, San Jose, Calif. 95112.
- Four-Phase Systems, Inc., 10700 De Anza Blvd., Cupertino, Calif. 95014.
- Harris Corp., Data Communications Division, 16001 Dallas Parkway, P.O. Box 400010, Dallas, Texas 75240.
- Hewlett-Packard Co., Data Terminals Division, 19400 Homestead Road, Cupertino, Calif. 95014.
- Honeywell, Inc., (formerly Incoterm), 65 Walnut St., Wellesley, Mass. 02181.
- ICL, Inc., 415 E. Airport Freeway, Irving, Texas 75062.
- IBM (Data Processing Division), 1133 Westchester Ave., White Plains, N.Y. 10604.
- IBM (General Systems Division), 875 Johnson Ferry Road, N.E., Atlanta, Ga. 30342.
- Intertec Data Systems Corp., 2300 Broad River Road, Columbia, S.C. 29210.
- Logabax (U.S. Division), 10889 Wilshire Blvd., Los Angeles, Calif. 90024.
- Megadata Corp., 35 Orville Drive, Bohemia, N.Y. 11716.
- Mohawk Data Sciences Corp., 7 Century Drive, Parsippany, N.J. 07054.
- NCR Corp., Small General-Purpose Systems, Building 26, Main & K St., Dayton, Ohio 45479.
- Nixdorf Computer Corp., 168 Middlesex Tnpk., Burlington, Mass. 01803.
- Northern Telecom Systems Corp., Data Park, Minnetonka, Minn. 55343.
- Ontel Corp., 250 Crossway Park Drive, Woodbury, N.Y. 11797.
- Onyx Systems, Inc., 73 E. Trimble Road, San Jose, Calif. 95131.
- Perkin-Elmer Data Systems, Terminals Division, 360 Rt. 206, S., Flanders, N.J. 07836.
- Pertec Computer Corp., 12910 Culver Blvd., Los Angeles, Calif. 90009.
- Ramtek Corp., 2211 Lawson Lane, Santa Clara, Calif. 95050.
- Raytheon Data Systems Co., 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.
- Scan-Data Corp., 800 E. Main St., Norristown, Pa. 19401.
- Univac, P.O. Box 500, Blue Bell, Pa. 19424.
- Texas Instruments, Inc., Digital Systems Group, P.O. Box 1444, Houston, Texas 77001.
- Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.
- Xerox Corp., 440 Oakmead Parkway, Sunnyvale, Calif. 94086.
- Zentec Corp., 2400 Walsh Ave., Santa Clara, Calif. 95050.

Product Spotlight

Model	Print?	Display?	RJE/Batch?	Shared?	Mode	Technique	Speed	Protocol	Main Memory	Basic Price
Nixdorf Computer 600/50	No	Yes	Yes	Yes	HF	S	150-19.2K	BSC	64K-96K	$70,080
NTSC 340	No	Yes	Yes	No	HF	AS	37.5-4,800	Ascii, BSC	8K-16K	$6,600
NTSC 340D/350	No	Yes	Yes	No	H	AS	37.5-9,600	Ascii, BSC	16K	$5,750
NTSC 435	No	Yes	Yes	Yes	HF	AS	37.5-9,600	Ascii, BSC, SDLC	64K-256K	$19,300
NTSC 445	No	Yes	Yes	Yes	HF	AS	37.5-9,600	Ascii, BSC, SDLC	64K-256K	$26,380
Ontel OP-1/50	No	Yes	Yes	Yes	F	AS	0-50K	Ascii, BSC, SDLC	32K-64K	$3,145 (qty. 100)
Onyx C8002	Yes	Yes	Yes	Yes	HF	AS	300-19.2K	Ascii, BSC	256K-1M	$20,600
Perkin-Elmer 3500	No	Yes	Yes	No	HF	AS	110-9,600	Ascii, BSC	16K-48K	$8,763
Pertec XL20	No	Yes	Yes	Yes	HF	S	0-9,600	BSC, Batch SDLC	80K-128K	$17,380
Pertec XL40	No	Yes	Yes	Yes	HF	S	0-9,600	BSC, Batch SDLC	128K-512K	$31,080
Ramtek 8410	No	Yes	Yes	No	HF	AS	0-9,600	Ascii, BSC, Univac	32K-64K	$8,200
Raytheon Data PTS/1200 Mark I	No	Yes	Yes	Yes	H	S	2,400-14.4K	BSC	64K-128K	$39,220
Raytheon Data PTS/1200 Mark II	No	Yes	Yes	Yes	H	S	2,400-19.2K	BSC	64K-128K	$121,190
Raytheon Data PTS-100	No	Yes	No	Yes	HF	AS	0-9,600	Ascii, BSC, SDLC	16K-128K	$10,860
Scan-Data Corp 2250/2	Yes	Yes	Yes	Yes	H	B	1,200-9,600	BSC	128K-512K	$37,500
Univac UTS 400	No	Yes	No	Yes	H	AS	0-9,600	Uniscope	32K	$6,030
Univac UTS 40	No	Yes	No	No	H	S	2,400-9,600	Uniscope	64K	$4,160
Univac UTS 4020	No	Yes	No	Yes	H	S	2,400-19.2K	Uniscope	64K-256K	$9,000
TI 783 DEV	Yes	No	Yes	No	HF	A	110-9,600	Ascii	20K-80K	$3,390
TI 770	No	Yes	Yes	No	HF	AS	75-9,600	Ascii, BSC	64K	$5,995
TI OS 990 Model 1	No	Yes	Yes	No	HF	AS	75-9,600	Ascii BSC	64K	$9,995
Wang 2200 VP	Yes	Yes	Yes	No	HF	AS	0-7,200	Flexible	32K-64K	?
Wang 2200 MVP	Yes	Yes	Yes	Yes	HF	AS	0-7,200	Flexible	32K-256K	?
Wang 2200 SVP	Yes	Yes	Yes	No	HF	AS	0-7,200	Flexible	32K-64K	?
Wang 2200 LVP	Yes	Yes	Yes	Yes	HF	AS	0-7,200	Flexible	32K-128K	?
Xerox Diablo 3000	Yes	Yes	Yes	Yes	HF	AS	9,600	Ascii, BSC	32K-64K	$13,000
Xerox Diablo 3200	Yes	Yes	Yes	Yes	HF	AS	9,600	Ascii, BSC	32K-64K	$17,000-60,000
Xerox 510	Yes	Yes	Yes	Yes	HF	AS	9,600	Ascii, BSC	64K	$13,300-13,800
Zentec ZMS-70	No	Yes	Yes	No	HF	AS	110-19.2K	Ascii	16K-64K	$4,449 (qty. 100)

Dema Conference Features Pertec, Microdata Debuts

By Tim Scannell
CW Staff

ORLANDO, Fla. – Although the "hows" and "whys" of management were the main focus of the Data Entry Management Association's (Dema) meeting here last week, hardware and a few introductions were also part of the conference scene.

One of the key products introduced at the show was a multitasking clustered processing system that features multiport communications, a Winchester-disk drive and 512K bytes of memory. Unveiled by Pertec Computer Corp., the 3600 system is an outgrowth of the firm's Model 1800 distributed data system and reportedly has double the processing and speed capacity. The 3600 also features IBM 3270 emulation, a spokesman said.

Although the system was not on display – except for a short movie describing its characteristics – Pertec representatives explained that the computer was designed to support large-volume simultaneous operations with as many as four mainframes. The system handles up to eight terminals per mainframe and can be used for remote on-line work, data entry, 3270 host processing and file management functions.

The 3600 is scheduled for delivery in June 1981, and the company already has 80 customers lined up. The system costs about $230,000 for a basic model or can be leased for about $5,500 a month.

Situated in the middle of the small exhibit hall, Microdata Corp. demonstrated its Sovereign Distributed Data Processing System. The system was introduced in the UK about a year ago by the firm's British cousin, CMC Ltd., but the Dema conference was its first American debut.

The Sovereign system consists of a file processor, which contains a minimum of 32K bytes of memory, and up to 30M bytes of disk storage in 5M- and 10M-byte units. The system also has a tape drive and CRT console.

Basically, Sovereign can be used for data entry, local DP, local data base inquiry and communications to mainframe computers – most often IBM. The system incorporates Dataway as a means of communication between processors, which allows messages to travel serially in both directions, a spokesman explained. The Microdata computer also uses an English-type command language and can communicate with different CPUs under different protocols.

Sovereign costs just under $70,000 in its basic configuration, the spokesman from the California-based firm said.

Other Companies

Other companies exhibiting at the show included Consolidated Computer, Inc., which showed its Falcon Business Information System; Computer Devices, Inc.; Harris Corp.; Nixdorf Computer Corp.; and IBM.

In all, about 20 companies displayed hardware, software and services packages at the week-long Dema show.

OCR Techniques Viewed Fitting Into Paperless Office

By Tim Scannell
CW Staff

ORLANDO, Fla. — Will optical character recognition (OCR) – a technique dependent on paper and the printed word — fit into the reduced-paper office-of-the-future?

Yes, according to Raymond Kurzweil, president of the Cambridge, Mass.-based Kurzweil Computer Products, Inc. However, unless certain changes and adaptations are made, OCR could be one of the first casualties of office automation movement.

Speaking to a gathering of data entry professionals here last week at the Data Entry Management Association's (Dema) fourth annual conference, Kurzweil gave a brief overview of "the long and troubled history" of OCR and detailed the possibilities of its "vibrant but controversial" future.

He began his talk with the less-than-optimistic comment that, although current OCR is more than a quarter-century old and the concept dates back to 1914 when RCA Corp. used photosensors and rotating mirrors to read images, the technology still "hasn't fully established itself."

Major Trouble

The trouble with the majority of today's machines is that they operate on a limited-font basis and require that written material be specially prepared before the machine can handle it, the company president and inventor said.

In fact, most OCR machines are only useful in the very early stages of word processing.

A number of studies point out that by mid-1980, CRT workstations will outnumber typewriters in the office. With CRTs to take care of data entry, OCR equipment will be relegated to the backburner, Kurzweil stated. The equipment will still be used to handle the ever-present tide of paper and will serve in its original role – as a reading tool for the blind.

The only way for OCR to survive as an available data entry alternative is for companies to adapt their equipment to handle a variety of different type styles. Currently, only two OCR manufacturers — one of which is Kurzweil — offer an omni-font capability.

Looking toward the future, Kurzweil observed that omni-font OCR equipment could be used to handle graphics, supplement data base systems, facilitate electronic mail, facsimile and other office automation concepts. OCR could also be used to juggle a large portion of paper that will not disappear under the office automation blanket, such as technical manuals and documentation.

The company president noted that a recent study showed that the amount of paper in an office actually increases instead of decreases as a firm becomes more versed in the use of an office automation system.

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Republican Replacement Likely

Ferris to Leave FCC, Warns of Privacy Threats

By Brad Schultz
CW Staff

LOS ANGELES — Charles D. Ferris said last week he will soon be replaced as Federal Communications Commission (FCC) Chairman at a time when the U.S. government has largely decided its relation to data communications, but not how to handle technology's threat to privacy rights.

Soon after Ronald Reagan takes office as president in January, he will name a new FCC chairman, Ferris told the press just before keynoting the Intelcom Conference here.

Ferris did not indicate whether he would stay with the commission through expiration of his seven-year term in 1984.

After 14 years as one of the top legal counsels to Democrats in Congress, Ferris succeeded Republican Richard E. Wiley as the nation's chief regulator of the telecommunications and shared with Wiley the distinction of holding that post as the FCC decided how to handle the merging of telecommunications and computing technologies. A Republican is expected to succeed Ferris.

Right of Privacy

In his keynote address, the former chief engineer of the *U.S.S. Brinkley Bass* said. "I fear that as the information age frees us from the weighty effect of ignorance, it will rob each of us of one of our most important rights: The right to privacy."

In coming to terms with the emerging information age, the Reagan administration will have to focus on "transitional issues" rather than the "fundamental policy questions" of the past several years, Ferris predicted. Rather than concentrating on how to limit AT&T's involvement in information technology, policymakers will tackle the social impacts of the technology, especially with regard to privacy, the FCC chairman indicated.

Many of these matters will transcend the FCC's jurisdiction. Although the 1934 Communications Act restricts the commission's charter to domestic telecommunications, commission members have met recently with representatives from Mexico, the People's Republic of China, the UK, Chile and other nations to discuss what happens as domestic vendors export products and services, Ferris noted.

"I know the special trade representative has completed his most recent set of talks with the Japanese government concerning telecommunications," the FCC chairman continued.

"Moreover, we have been informed that the Japanese government does not intend to eliminate the transparent private line as a medium for our growing data processing service needs," Ferris added.

Japan's tight restrictions on DP services from U.S. companies has been seen as a de facto tariff, intended to protect Japan's domestic data communications industry [CW, Nov. 10].

Simple Problem

Beyond the complexities of worldwide data communications and clashes between major U.S. vendors and carriers, policymakers under Reagan and subsequent presidents will face a "simple" but "very profound" problem with the information age that "goes to the very heart of the free society in which we live," Ferris remarked.

"When my children's homes are wired," he said, "a computer will have a record of what they buy and how much they spend.

"It will know whether they pay bills quickly, slowly or not at all, and it will know where all their money comes from.

"It will know whether they watched the debates, or the football game or a controversial movie," Ferris continued.

"It will know when they came home the previous night . . . [and] how many people are in their homes and in what rooms.

"In other words, it will know more about them than anyone should."

Ferris called on the professions in information technology to avoid unnecessary collecting of data in computer systems and to ensure adequate security for data that is collected.

Privacy Consequences

"As you develop goods and services for the information society," Ferris told conference attendees, "I would ask each of you to think of the privacy consequences, and to try to address them at an early stage.

"Design them away, program them away," he said. "Do your human engineering with this human interest goal in mind."

At a press conference, Ferris stated that the most significant result of the Nov. 4 elections, with respect to government's role in telecommunications, was the defeat of San Diego's Congressman Lionel Van Deerlin, who led efforts in the House of Representatives to rewrite the 1934 Communications Act.

Nevertheless, Ferris went on to maintain that telecommunications policy under President Reagan will probably resemble the policy under President Carter.

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Report Blasts FAA Air System 'Mismanagement'

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Aviation Administration (FAA) has mismanaged the country's computerized en route air traffic control (ATC) system and maintains an "inaccurate and distorted" computer outage reporting methodology, according to a report by the Carter Administration's Senate Appropriations Committee.

The 94-page report was issued recently by then-chairman of the Transportation Subcommittee Sen. Birch Bayh (D-Ind.), who subsequently lost his seat to Republican Dan Quayle in the Nov. 4 election.

"Because of weaknesses in reporting equipment outages, lack of planning and the absence of a well-defined approach to managing system operations and software changes, FAA cannot be certain that the current system will operate at a level that will assure the air safety of the traveling public until the proposed replacement system is operational," the report stated at the outset.

In addition, the FAA's "proposed replacement system," — slated to supplant the existing IBM 360 technology-based 9020 computers at the 23 Air Route Traffic Control Centers — will cost an estimated $2.8 billion, not including software and added capability costs, the report noted.

The report — based on a nine-month inquiry — suggested that an interim upgrade calling for replacement of old hardware and software, and incorporating technical "enhancements" could be done at a cost of about $700 million.

In addition, the Committee's Investigations Staff found the FAA made its replacement proposal "without identifying the problems in the current system which need correction or complying with prescribed and valid policy and procedures of the Office of Management and Budget."

Inadequate Training

In addressing the problem of air traffic controllers' transition from automated to manual ATC systems when computer outages occur, the report concluded, today's air traffic controllers, who are inadequately trained in transition to and use of broadband, are ill-prepared to do their job and in turn jeoparidze the safety of those who travel by air.

Only those controllers hired before the 1970s — when all air traffic control was done on broadband systems — have used the system enough to be fully comfortable, the report added.

Regarding the FAA's planned $22 million replacement of its backup system — the Direct Access Radar Channel (Darc) — the committee found it is 18 months behind schedule and will be delayed "about another year due to technical and operational problems."

Based on those findings and conclusions, the Investigations Staff suggested and the Subcommittee on Transportation and the Appropriations Committee recommended that:

- The FAA give "top priority" to developing an adequate backup capability for the current en route system. Alternatives should include off-loading the radar processing from the current system to peripheral computers to serve as primary and backup "thereby extending the life of the current system or an interim replacement system."
- The FAA revise its reporting system to eliminate the practice of reporting unscheduled maintenance outages as scheduled outages. Current practices have resulted in "inaccurate and distorted equipment outage reporting, questionable work-load standards and unreliable agency budgeting forecasts," according to the report.
- The reporting criteria of one minute or more for reporting an outage be dropped and all outages of any duration be recorded "to determine their impact on safety, service to user and computer performance reliability."
- The FAA establish a computer performance management function to systematically evaluate the capacity and performance of its computer systems.
- The FAA develop a statement of goals for measuring overall efficiency of the current computer system including processing requirements for general overhead and recording functions with accompanying plan and implementation schedule.
- FAA evaluate and determine — as a short-range alternative to en masse replacement of the current system — the possibility of buying or leasing computers for centers expected to exceed capacity in the 1980s, and of functionally splitting and upgrading the software.
- FAA develop a comprehensive, formal, long-range plan to reflect agency strategies, goals and objectives and be reviewed and approved by top management.
- No research, engineering and development funding for 1981 be spent for the proposed replacement system pending an FAA study and analysis to determine deficiencies of the present system and costs estimates to correct those deficiencies nonessential tasks that could be shed from the current and replacement systems and interim actions and funding necessary to enhance the current system during the replacement system acquisition cycle.

While the FAA has not yet formulated a formal response to the report, according to an agency spokesman, the group is in the process of preparing a response — slated for January, the spokesman said.

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'Improved' Dataspeed 40/4

Proposed Bell Terminal Priced 10% Below 3270

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A tariff covering an improved version of the Dataspeed 40/4 keyboard/CRT terminal, priced up to 10% below IBM's 3270 charges, was filed here early this month by AT&T. The tariff is scheduled to become effective next Feb. 1.

The Dataspeed 4540 terminal system consists of a cluster controller connected to as many as 32 terminal devices, each of which can be as much as a mile away.

On the line side, the controller interfaces with either analog or digital (DDS) transmission facilities.

AT&T said its offering is designed for "highly interactive" applications, typically consisting of inquiry-response and text-editing communication with a data base resident in a remote central computer. The system allows messages to be formatted in either Ascii or Ebcdic character codes.

Payment Plans

The proposed charge for the controller ranges from $128/mo to $360/mo, depending on the number of ports and the payment plan selected. There is also an installation charge of $450 to $650 for each controller.

To qualify for the $128/mo rate, the user would have to sign a 48-month lease. The controller available at this price interconnects with up to eight terminal devices: one must be a CRT, the others could be line printers.

The $360 price applies to a controller which has 32 ports and is rented by the month.

Aside from these two payment plans, AT&T is also offering Dataspeed 4540 components on a 24-month lease contract.

Each display unit holds 24 lines of 80 characters each. It is available for $53 to $65/mo plus a $75 installation charge. Along with this unit, the user must lease a keyboard and table or keyboard base; interconnecting cable is also needed.

Each keyboard costs $25- to $47/mo plus $75 for installation; tables cost $6- to $13/mo each, plus $75 for installation, while a free-standing keyboard base costs $3- to $3.75/mo. Installation of the latter is free.

The Dataspeed 4540 printer outputs a line at a time containing up to 132 characters. Each printer station can be as much as 2,000 ft from the controller. Prices range from $190- to $230/mo plus $250 for installation.

Material submitted with the Dataspeed 4540 tariff filing indicates that the 48-month lease rates quoted above are 10% below those charged by IBM for similar 3270 system components.

The rates for a two-year lease are reportedly about 5% less, while monthly rentals are about the same.

The controller costs $142- to $327/mo if leased for two years; The display station, $59; the keyboard, $28- to $43/mo; and the line printer, $210.

System Crash Election Night May Spawn Suit

By Marguerite Zientara
CW Staff

PALM BEACH, Fla. — Palm Beach County may well file suit against Computer Election Systems, Inc. (CES) — as it has been considering doing [CW, April 28, Nov. 3] — after Election Day Nov. 4.

While last week's problems were "nothing as severe as those in the past," according to Election Supervisor Jackie Winchester, the failure of a Documation, Inc. 1,000 card/-min card reader caused voting results to be delayed by "about a half hour."

The possibility of a suit originally arose after CES' Alpha Ballot Tab system broke down the night of the March 11 Florida primary vote, delaying results 24 hours. The breakdown resulted from the "crashing" of all three of the system's Data General Corp. Nova II minicomputers.

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China Found Eager to Catch Up in Computing

By Deborah Wise
CW Staff

NEW YORK – The People's Republic of China may have a shortage of trained computer professionals, but it makes up for that with the drive and enthusiasm it has for learning more about the computer industry.

This was the impression Min Hsin Li brought back with him after completing a teaching trip to China, where he gave two seven-day seminars – one in Peking and the other in Shanghai – on data base management systems (DBMS).

"My general impression is that the Chinese people face a significant challenge in the area of computer technology, and they seem eager to make every effort to catch up. Those people I talked to indicated to me that they want to get more contact and to develop closer relations with technically more advanced countries," Li said in a recent interview.

China's Management Modernization Research Association, the trip's organizers, asked Li, a systems engineer in the information services group of Chemical Bank here and an assistant professor of management at New York University, to conduct the seminars because of his practical experience in the DP industry.

The Chinese national policy is to pursue a modernization program, but Li compared the level of DBMS used in industry in general at this time to the situation in the U.S. in the late 1950s to early 1960s when filing cabinets were still predominant.

"There are no data base systems used in China today, but they want to learn and catch up. They especially want to learn how to convert manual systems to computer systems," he said.

But in spite of all the outside help China needs and wants, Li said he understands the feelings of the Chinese that they want to develop their own software for data base systems. "Their current focus is on software. They realize, I think, that this is one of the areas where we can help, and it is my personal impression that there will be a new horizon of DP in China through the cooperation of America and China," Li said.

Overwhelming Response

The response to Li's seminars was overwhelming. At one session, 1,100 college professors, DP professionals and management personnel from industry and government agencies attended.

"Because the audience knew I had practical experience in the field, the most popular questions concerned the actual experiences I had. They asked me how to implement, how to design and how long it takes to set up a DBMS; also, how many people are required. But there were other questions in the area of systems analysis," Li said.

Li was impressed with the enthusiasm and energy of the people he met and predicted a tremendous future for the Chinese computer industry once it overcame the problem of its lack of qualified personnel needed to implement the technology it is fast learning.

Min Hsin Li answers questions at DBMS seminar.

"I do believe that they have a great deal of determination and enthusiasm to better this situation, but there are a limited number of computer professionals in China at this time. However, they appear to be moving forward in developing their university curricula and practical computer research," Li said.

While in China, Li had the chance to review university programs. "Their level is not low, but they are short of teachers. It is very hard to find a qualified person in some subject areas, but in others they have made outstanding achievements," he said.

At Fudan University, Li was shown a computer built by the computer science, mathematics and physics departments. It had an operating system developed by faculty members which Li said was very well designed.

"You have to bear in mind that during the 10 years of the Cultural Revolution from 1967-77, Chinese education was almost at a standstill. For example, Fudan University established its computer science education very late, not until 1975, so there is good reason for them to have a low level of computer technology," he pointed out.

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Guide on Pricing Antiques Prepared by Modern Means

By Deborah Wise
CW Staff

NEW YORK — To make the value of the past more appreciable in the present, a computer system helped organize, edit and typeset information for a soon-to-be published guide on pricing antiques.

The Official Sotheby Parke Bernet Price Guide to Antiques and Decorative Art was compiled from Sotheby's prospectus catalogs that list prices of about 160 items sold by auction each month.

"The total production of the job was quite rapid in comparison to conventional methods," said Larry Tranalone of Infoconversion, the computer-based publication service that undertook the job for Simon and Schuster, Inc., the New York publisher.

Time, Labor Costs Cut

Using a time-sharing facility provided by Infoconversion's parent company, Grumman Data Systems Corp., raw information was fed into an IBM 370/168 mainframe using telephone terminals. Time was saved and labor costs minimized since drafting preparations were required, according to Tranalone.

Charles C. Colt Jr., the guide's editor, did not have to organize his material before inputting it into the computer. He numbered the 21 chapter headings and subheadings according to a prearranged plan.

The computer batch-processed the information then manually transferred it to Infoconversion's in-house Digital Equipment Corp. PDP-11/70 microcomputer for text processing and photocomposition. The software for the system was developed by Datalogic of Chicago.

"The key advantage was the ability to file the material from separate publications, and let the computer do the sorting. If we had to do it by hand, it would have been extremely difficult," Jonathan Segal, a senior editor at Simon and Schuster, noted. The typesetting was done by an Information International, Inc. Comp 80/2.

Infoconversion estimated the production costs at $25,000, and Tranalone maintained that a similar book published by conventional methods would cost between $40,000 to $60,000.

Segal commended the flexibility of the method which allows for information for new editions to be retrieved easily from computer files, correction and updating.

The book, to be published this month, will cost $19.95 in hardcover and $9.95 for the paperback.

Managers on the Move

LANDIS MACINTOSH has been elected staff vice-president in charge of computer management and information services at the Scott Paper Co.

MacIntosh has been director of the organization since 1972. He joined Scott in 1966 as a systems analyst and has held several positions in information services during his tenure with the company.

He graduated from Montclair State College, N.J. and currently resides in Lansdowne, Pa.

• • •

GEOFFREY S. HICKS has been promoted vice-president, information systems for Hospital Affiliates International (HAI), Nashville, Tenn. In his new position, he will be responsible for implementation and coordinating of information systems at the corporate level.

Hicks joined HAI as director of information systems in 1979. Before that he was director of computer services for Republic Airlines, Atlanta for 10 years.

Hicks received a B.A. degree in mathematics from the University of Southern Mississippi, Hattiesburg and an M.B.A. in mathematics from the University of Alabama, Tuscaloosa.

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IBM 3033 Helps Stalk Alligator Poachers

BATON ROUGE, La. — Game wardens are using computer power to protect alligators from poachers who hunt and try to sell the beasts' hides illegally.

The IBM 3033 processor at Louisiana State University (LSU) keeps detailed records of every alligator hide taken legally in the state — up to 20,000 a year. This makes it hard to sell any that are poached, said Allan Ensminger, chief of the Fur and Refuge Division of the State Department of Wildlife and Fisheries.

A legally taken hide must be identifiable from the time an alligator is skinned until after the hide is tanned, anywhere in the world, according to the Endangered Species Act.

Hunting is permitted in Louisiana to keep the swelling alligator population from encroaching on people and endangering them, their children and their pets, Ensminger says.

"The state wanted an automated record-keeping system that would make it easy to enter and retrieve information, so it would be possible to check on a particular alligator hide very quickly," Vernon L. Wright, assistant professor of experimental statistics at LSU, said.

"The basic purpose of the system is to enable enforcement officers anywhere to determine whether a particular alligator hide was legally taken in Louisiana.

"But an additional goal is more to protect the crocodile and other nonharvestable species of alligator, both American and non-American, because after tanning, it's impossible to tell an alligator from a crocodile hide," Wright said.

Here is how the system works. A landowner submits a notarized application to the Department of Wildlife and Fisheries to allow alligator hunting on his property.

Hunters load an alligator into their boat in a Louisiana bayou. They will attach a numbered tag to its hide. An IBM computer at Louisiana State University keeps track of tag numbers, hunters and legally taken hides.

The department studies habitat maps showing the approximate number of gators on the property and issues the landowner a limited quantity of serially numbered tags.

The landowner gives the tags to hunters. As soon as a hunter kills an alligator, he skins it according to specific state instructions and affixes a tag. When the gator is sold, the buyer fills in a computer form with information about the gator and the tag.

The hunter sells the hides — which bring an average of $100 each — to a licensed Louisiana dealer who reports the tag numbers to the state, further identifying those that are being shipped out of state and their destinations.

The state then sends this information to LSU and the university enters it into the IBM computer.

With all the tags accounted for, "we then can say about any alligator that was shipped out of state who it was shipped to, who harvested it in the first place and who bought it from him," Wright said.

"After that, it's the federal government's responsibility to track it."

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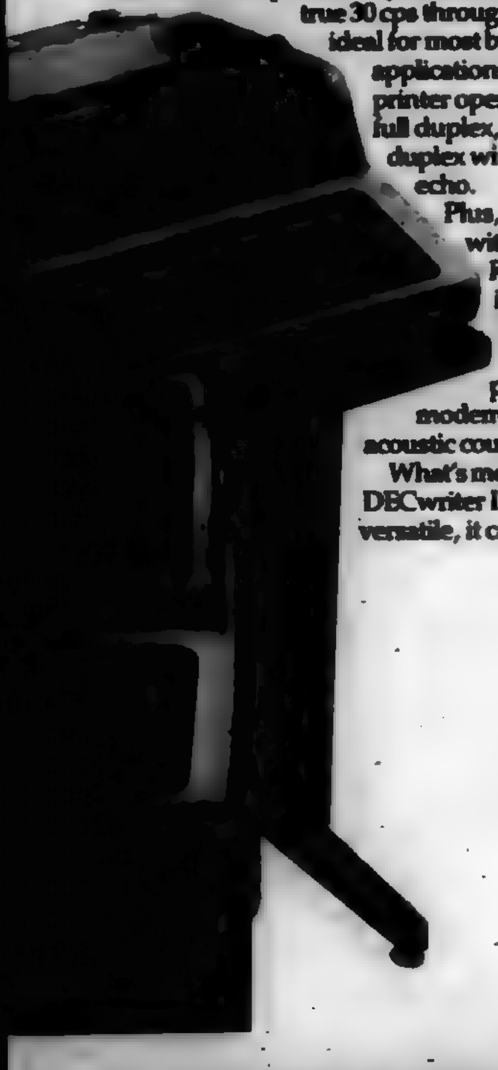

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At Federal Automation Conference

Hopper Urges Common Sense in DP Planning

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Computer industry pioneer Grace M. Hopper opened the recent Federal Office Automation Conference here with an enthusiastic address urging her audience to change the direction of their thinking and use common sense in DP planning.

Machines that deliver the computer power needed in the coming years will have to be radically different from computers produced over the last 35 years, according to Hopper, a retired Navy captain now on active duty at the Pentagon's Naval Data Automation Command.

Hopper, who began her DP career in 1944 working on development of the Mark I computer at Harvard, said too often "we base our plans on the things we're doing now and the equipment we have in-house."

Planning must be done in terms of what technology will be like down the road. It must be "reviewed in the light of the future," according to Hopper, who counts among her accomplishments instrumental work in the development of the first compiler program and the development of Cobol.

In an hour-long, far-ranging talk on the computer industry — past, present and future, hardware, software and people — Hopper displayed the considerable intelligence, experience and wit for which she is famous and had her audience laughing and applauding.

'Future' Nut

A self-confessed "nut on the future," Hopper gave the conference attendees her vision of future computing in the U.S. She predicted it will require large "systems of computers" to provide the considerable computing capacity needed to solve pressing economic problems of the country.

Increasing population and resulting demands on the world's food supply will mean a "desparate" need for long-term weather forecasting that can be done adequately only with more computer power than is now available in a single unit.

"Can you imagine what computer power it's going to take to fairly manage water throughout the U.S.?" she added, noting the current water shortages in several areas of the country. In many areas, she said, "we desperately need computer power."

Because circuit speeds are already limited by the distance between computer components, common sense dictates that for the near future, at least, the way to more computer power is through systems of computers, and indeed they are already being built, Hopper said.

"It's perfectly all right to use common sense," she remarked. "It's a perfectly legitimate scientific technique." And common sense indicates, she said, that present computer systems are "the Model Ts" of the industry, an industry she predicted will eventually be the largest in the U.S.

To prepare for the systems of the future, the whole scheme of DP planning will have to change, she said. Planning should be done not on the basis of the equipment that now processes and transmits an organization's information, but on its "total flow of information." One cannot just "buy machines and start hanging software on them," she said.

By examining the total information flow, an organization can evaluate the relative importance of different parts of the flow. This leads, she said, to intelligent decision making about DP expenditures.

Cost of 'Not Doing'

Besides examining the consequences of all possible future scenarios, Hopper said it is also vital to determine "what is the cost of not doing something." She illustrated this by noting that supposed cost considerations have delayed widespread government use of federal DP standards even though a recent study found the delay costing the government as much as $450 million a year.

Having spent the last 14 years promoting DP standards in the Navy, Hopper said she has found "there are some people in business, in government, in universities who always say 'no' the first time" but can be won over through persistance.

Hopper concluded here optimistic assessment of the computer industry's future by saying "we have a bad habit of totally underestimating our young people. They know much more than we did at their age.

"They learn faster and they're bright as they can be," she said. All they need is "positive leadership," said Hopper who ended her talk to a long, standing ovation from the conference goers.

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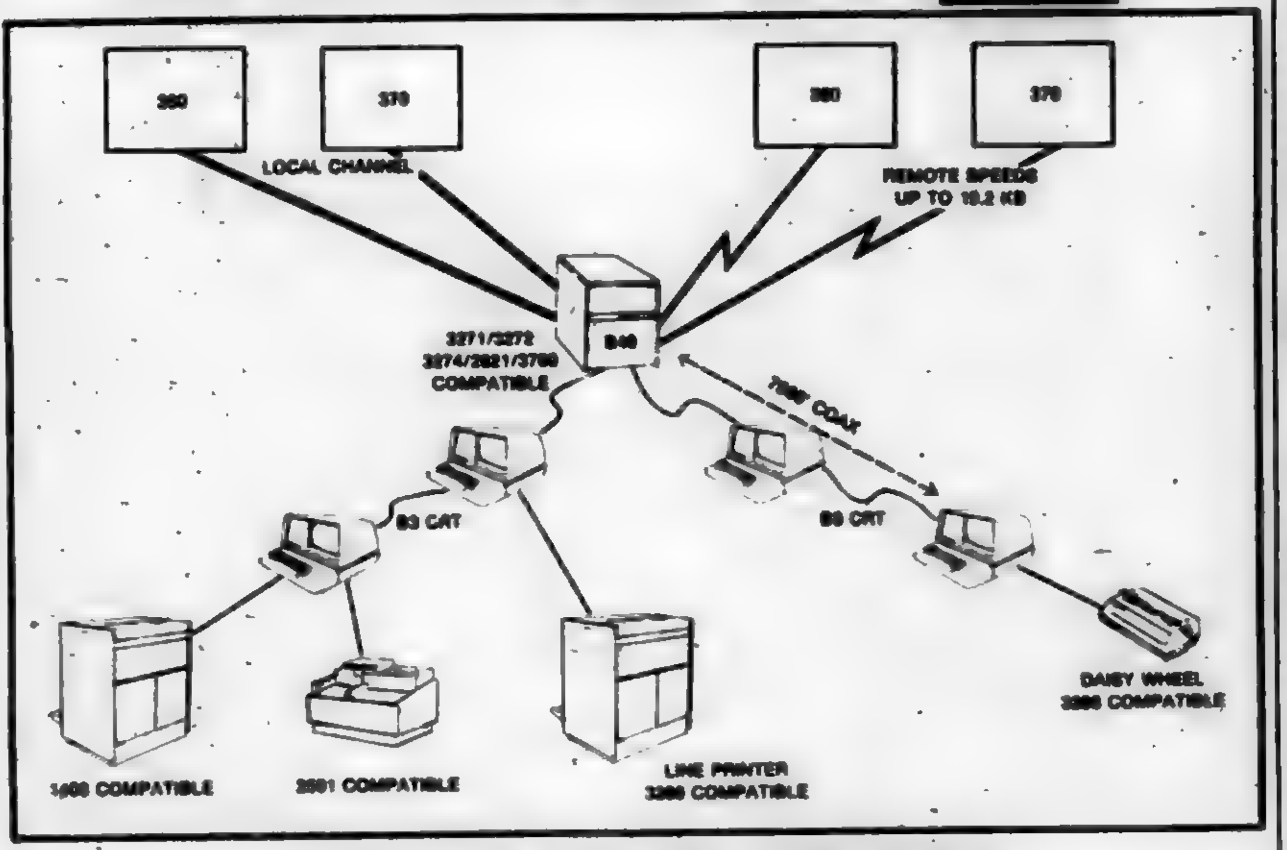
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Mini Slashes RJE Time in Half For Nuclear Safety Engineers

IDAHO FALLS, Idaho – Although remote job entry (RJE) through dumb terminals is often an economical way for small engineering firms to gain access to computer power, an engineering/consulting firm here has found that a minicomputer can handle the same job twice as fast – and many other jobs as well.

"When we had only four engineers needing access to computers, the RJE terminal approach worked well," recalled Glen A. Mortensen, senior engineer at Intermountain Technologies, Inc.

"But today we have 18 technical people submitting jobs, and the dumb terminal approach using card decks would be just too cumbersome and slow for us.

"Using a minicomputer, we have cut our remote job entry time by 50%, can now develop programs in-house and have even begun running business programs and large engineering applications on the computer," Mortensen said.

Firm's Speciality

Intermountain Technologies is primarily engaged in the technology of nuclear reactor safety. The firm specializes in the application of advanced computational methods and experimental research in hydrodynamics, thermodynamics and heat transfer as they apply to current reactor licensing requirements.

The firm's simulation and data base programs are extremely large and generally have to be run on mainframes such as a Control Data Corp. 7600 Lawrence Berkeley Laboratory or a CDC Cyber 175 at the University Computing Center in Dallas.

According to Mortensen, Intermountain Technologies installed its Hewlett-Packard Co. 1000 computer in August 1978, "based on the computer's reliability, Fortran compiler, and flexible software."

The system, with 128K bytes of memory, is configured with a 15M-byte HP 7905 disk, an HP 2645 CRT terminal used for transmitting jobs back and forth between the minicomputer and mainframe and an HP 2640 CRT terminal used primarily for editing and for running an HP 7210 plotter.

Other equipment includes a card reader, 300 line/min. printer, tape drive and digitizer.

For remote job entry, the HP 1000 emulates a UT 200 terminal for input into CDC mainframes or an IBM 2780 terminal for input into IBM mainframes. RJE transmission is over dial-up lines at 4,800 bit/sec.

The minicomputer uses HP's RTE IV operating system, which allows multiprogramming. "This has greatly increased our throughput," Mortensen said.

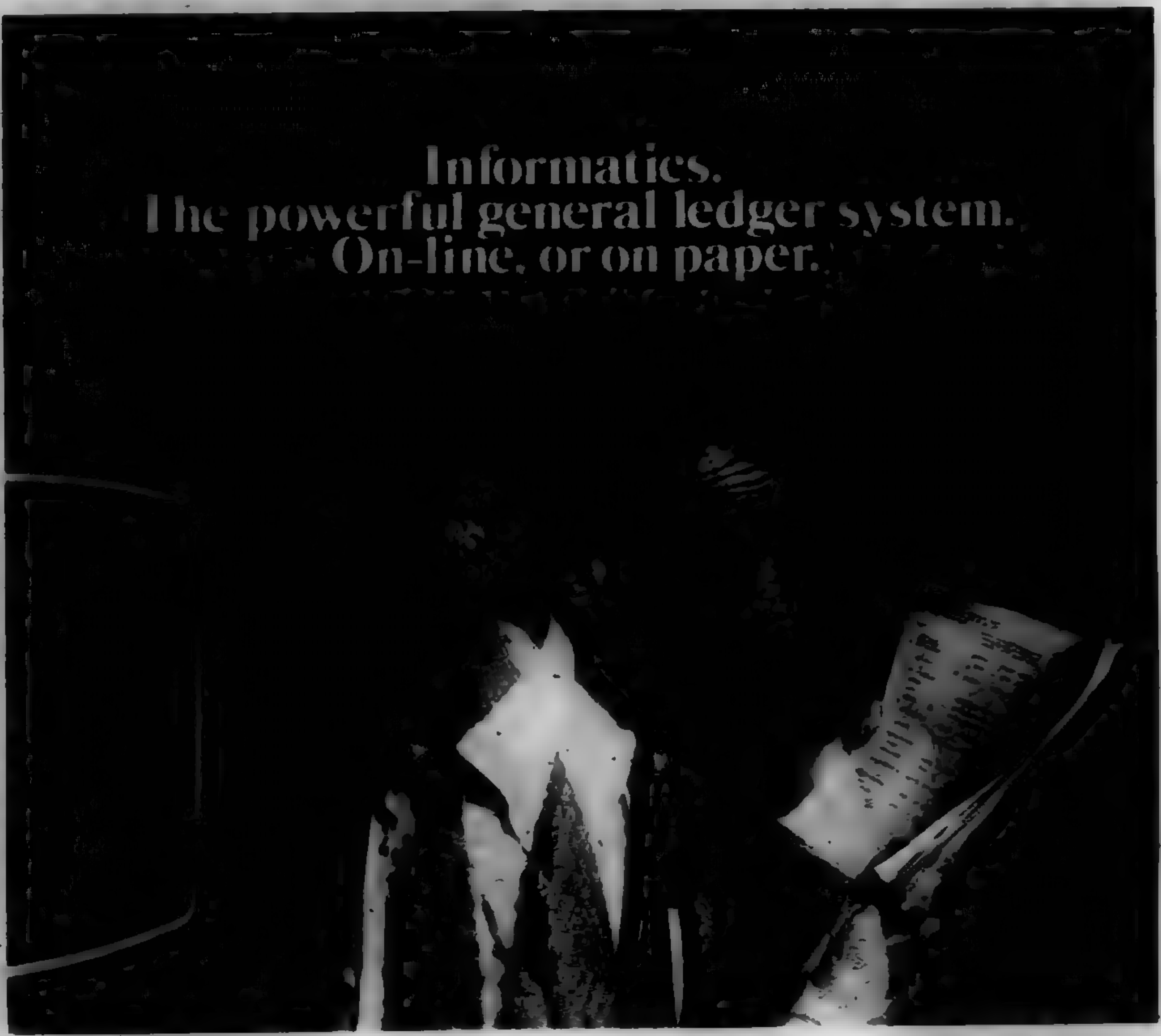
"We can be sending an RJE job to a large mainframe, developing new programs and running large engineering programs on the minicomputer all at the same time."

One program that Intermountain Technologies formerly ran on a remote basis but is now running on the minicomputer calculates water properties from given parameters.

Another such program involves water hammer analysis and is used to study pressure transients in piping systems. Both programs use 28K bytes,

(Continued on Page 22)

Computer Room at Intermountain Technologies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Office Seminars Set

MADISON, N.J. – "Automated Office Documentation and Word Processing Support" is now being covered in seminars conducted this winter by the Carnegie Press, publishers of *EDP Training News*. These two-day sessions were designed to give office managers a clearer sense of the integrated automated office and complete system documentation, its sponsors said.

The courses are slated to take place in San Francisco on Jan. 6-7; Los Angeles, Jan. 8-9; Chicago, Jan. 13-14; Washington, D.C., Jan. 15-16; New York, Feb. 10-11; and Boston, Feb. 12-13.

Registration costs $495. Further details are available from the Carnegie Press, Center for Documentation Resources, 100 Kings Road, Madison, N.J. 07940.

Mini Lets Engineers Cut RJE Time

(Continued from Page 21)

Mortensen noted.

According to Mortensen, Intermountain Technologies frequently gets requests for jobs that require extremely fast turnaround. "The mini makes it possible for use to respond quickly," Mortensen said.

"Because the terminals are so friendly, our engineers can run their own jobs as needed; no specialized data entry people are required.

"The 'soft keys' on the 2645 terminal speed up and simplify communication with the computer, since we can program these keys to type in 80-character strings. For instance, we can hit one key which automatically types in 'Transmit,' and the transmission will then take place.

"But even more important is the HP 1000's editor," Mortensen noted. "This allows us easily to update our library of card deck format jobs on disk to reflect the particular needs of the new job and then transmit the job to the mainframe. We can quickly add, delete or alter instructions or data.

"In fact, this editing software is really what enables us to cut our remote job entry time in half."

Plotter Capability

Another capability which speeds turnaround time, according to Mortensen, is the minicomputer's ability to use the plotter to generate plots of the results of mainframe processing.

The firm has written a special program on the HP 1000 that converts plot output from the CDC computers – output which is written in code appropriate for California Computer Products, Inc. plotters – to commands used by the HP plotter.

"This means that we do not have to spend time altering the original programs to generate HP plotter code," Mortensen explained.

"As a result, we both save time and have much greater flexibility since, if our in-house plotter is tied up, we can divert the file to Dallas or Berkeley, where it can be run on a Calcomp plotter.

"Though this means that the plots would then have to be sent to us through the mail, it does provide backup for extremely busy periods," Mortensen said.

Simulation Programs

One of the many ways in which plots are used is for comparing the firm's simulation programs against measured operational results. An engineer can take a plot – such as pressure vs. time – from a data report or a strip chart and use the digitizer to store it in memory in digital form.

Later, when the simulation program results are available, they can be used to produce an overlay graph showing both the simulation and the measured results. This graph can then be used to check the model for accuracy, and appropriate corrections can be made.

In addition to engineering applications, which account for about 90% of computer usage, Intermountain Technologies also uses its HP 1000 for business applications.

For example, both payroll processing and monthly, quarterly, and annual employer reports required by government agencies are now handled by the computer.

According to Mortensen, these applications alone are saving the company a couple man-days a month of clerical work. The firm has also written a program to keep track of all remote job entry time for proper client billing.

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Micro Helps Hunters Bag Amorous Deer

By Bruce Hoard
CW Staff

INDIANAPOLIS — Frustrated deer hunters no longer need be subjected to the imprecise vagaries of ruts, rubs and scrapes. They can now rely on computer intelligence to put them in the hunt.

Deer hunter and computer buff Lynn Crawford has taken several variables, including subspecies of deer, location, latitude, solar radiation and amount of snow cover in the spring, mixed them well and fed the results into his Radio Shack TRS-80 microcomputer. The result is a one-page printout available to U.S., Canadian and Mexican subscribers that details the dates when hunters can expect to find an unsuspecting deer with his pants down, so to speak.

More specifically, once the computer is told what area and species of deer on which to concentrate, it provides the most likely rutting, rubbing and scraping times for the animals. It is during this period that they are most in evidence — and thus the best targets.

Rutting refers to the period when females are the most active in pursuing males. Rubs are marks carved on saplings' by bucks with their antlers. Scrapes are paw marks on the forest floor.

Like the humans that hunt them, deer have a tendency to lose their objectivity during the mating process. Crawford recognizes their vulnerability during this period, referring to it as "the kink in their armor." Just how kinky they get is a matter better left to wild life observers and other voyeurs.

Rubs and scrapes indicate the presence of a buck in the area and provide the size of a given deer.

Crawford's research is rivaled in volume only by that of Masters and Johnson. Over 50 years worth of written information has been perused in an effort to digest the most intimate details of the deer.

With no stump left unturned, the unsuspecting deer and all his well-documented "variations" have now been exposed to an enlightened corps of hunters, whose own faulty instincts have in the past frequently led them to shoot each other instead of deer.

While "hundreds" of hunters have shelled out $5 each to obtain Crawford's predictions (which can be obtained from Hunters' Service, P.O. Box 36067, Indianapolis, Ind. 46236), it's still too early in the season to reach any final conclusions, Crawford said.

One thing can be concluded. If all is fair in love and war, we shouldn't be surprised if a herd of rifle-wielding White Tails re-create the St. Valentine's Day Massacre at Plato's Retreat.

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Technical School Solves Traditional DP Problem

By Dennis F. Merrell
Special to CW

ROCK HILL, S.C. — York Technical College's problem was the traditional academic computing problem. Its solution was not so traditional, but the benefits have been beyond expectations.

York is not unlike many other small, technically oriented schools. It was faced with an increasing demand for computer time and a severely limited budget. Beyond the demands of the school's administrative DP needs, it was attempting to provide computer access for instructional purposes in electronics, secretarial training, drafting, engineering, business, accounting and computer science.

The traditional solution calls for a large mainframe computer supporting a network of interactive and card-oriented remote job entry terminals. For most small schools, including York Technical, the cost of RJE terminals alone can consume an entire DP budget.

If a school follows the traditional route, it finds itself limited to batch operations during a time when the more advanced applications are conducted in a real-time interactive mode. With only batch operations, students are denied the opportunity of learning in a host interactive environment.

No Single Solution

There was no single solution to York's many faceted problem, but several approaches have had promising results.

For the digital electronics classes, York was able to obtain a grant from the National Science Foundation and with it install 10 digital logic training stations, a 16-bit microcomputer system with disk storage and a printer. Secretarial science students are being trained in word processing techniques on an IBM magnetic card system.

For the engineering graphics and technical drafting classes, York is presently studying a stand-alone graphics system, such as the Tectronix, Inc. system, or a graphics system supported by a communications link to a large mainframe computer.

For business and accounting classes and the major part of York's programming and administrative needs, a mainframe computer seemed the only solution. The University of South Carolina provided mainframe time, and York acquired a Harris Corp. 1670 distributed data processing (DDP) system as the backbone of its local operations.

The 1670, manufactured by Harris' Data Communications Division in Dallas, provides more than 200 students with training in data entry, editing and an interactive environment. The 1670 also performs administrative data entry.

For custom screen formatting and data editing, York is using Harris' Remote General Application Language (Regal). The 1670's teleprocessing editor software allows students to enter and modify batch-oriented jobs, then transmit those jobs with a single keystroke.

The student workstations are Harris' 880 CRT terminals, which can be independently switched from the local 1670 processor to the mainframe at the University of South Carolina. In the local mode, students learn data entry techniques using Harris' standard Format/10 and Format/41 data entry software packages.

The Harris 1670 is configured with 192K bytes of main memory, 32 bytes of disk storage, 13 CRT terminals, one 250- and one 600 line/min printer, Harris' Extended Communications Operating System (Ecos), Hasp/-multileaving and 3270 communications software, a Regal compiler, Format data entry packages and the teleprocessing editor software.

Merrell is manager of York Technical College's DP department.

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System Fills Library's Overdue Data Base Needs

RICHMOND, Va. — Pulling together all the frequently incompatible functions of a public library into a single integrated data base is a tall order for any computer system. But the Henrico County library system has done it in an installation that is already being duplicated around the country.

Traditionally, libraries with any DP equipment at all need separate systems to handle their cataloging and circulation functions. Patrons need the catalog to find books and the library staff needs a system of its own to keep track of library materials.

Not only do the two systems not talk to each other, but they usually operate in the batch mode, with resulting delays and inconvenience for all concerned.

When Henrico County, which serves the suburban Richmond area, decided to upgrade to an integrated system, it set ground rules that the system chosen would have to be able to perform all library functions from a single bibliographic data base. This was basically an inventory control application, but it also involved sophisticated software to permit the library to manage the acquisition of future library materials.

'Classic' Answer

After seeking proposals from seven potential vendors for a complete turnkey system during the fall of 1978, the Henrico County library system chose a system from Cincinnati Electronics Corp. called the Circulation Library Automated System for Information Control (Classic). Graham H. Sadler, director of the library, said Classic was the only system offered that met all 11 of the library's stringent criteria.

"We'd had batched systems that weren't compatible with the county's DP operations," Sadler added, "and we also knew the problems of trying to operate separate data bases."

The old manual system couldn't handle the county's growing volume, which has now reached more than 1.2 million items in circulation a year (based on 321,000 volumes and 126,000 titles) and is growing at a rate of more than 10% a year.

Since Henrico county uses Univac mainframes at its central DP facility, a key factor in favor of the Classic system is that it is based on Univac's V77 line of minicomputers. This assures the library system of readily available maintenance since Classic is designed to require no DP personnel, Sadler noted.

The library system consists of three main facilities, two satellite branches, a bookmobile and specialized libraries in the county building and the jail. The total installation, which was put on-line in July, consists of a Univac V77-600 minicomputer with 256K bytes of main storage, two 300M-byte disks, a Printronix 300 line/min printer and three data loggers, 10 circulation terminals and four portable terminals — the latter three items all provided by Cincinnati Electronics as part of the turnkey system.

The Classic system is an outgrowth of a joint development project with the University of Chicago on advanced technology circulation library terminals. Although Henrico County is Cincinnati Electronics' first major system, it tested the Classic concept with a pilot installation at the Institute of Mining and Mineral Research in Lexington, Ky., using that organization's own dual Univac V77-600s and a special software package developed by Cincinnati Electronics.

Classic is an on-line, real-time system that accepts data in the form of bar-coded markings on the library items (using the standard American Library Association format) that are instantly entered from wands. Once entered into the system, the data is available for all the basic library management functions.

Reserving books for library patrons, for example, used to be an entirely manual operation — and there was always a question of which branch had the book the patron wanted. This information is now available instantly, and the desired book can be put on reserve as soon as it comes back.

Sending out overdue notices also used to be a laborious hand process, but now these are produced daily as a normal function of the Classic system. Patrons whose library cards have expired or who already have too many items out on loan can be flagged immediately at the time they take new books to the circulation desk.

'Control of Assets'

But even more important than these immediate benefits is what Cincinnati Electronics calls the "control of assets" feature that permits a library to operate more efficiently. By knowing what books are most in demand — and at what locations — a library can order exactly what it needs, thus saving taxpayer dollars.

Moreover, Classic did not require that the library system change its operations. All dialogues with the system are conducted in librarians' language, not the language of computer personnel. The system is also almost impossible to outgrow. It can accommodate 64 — and ultimately 256 — terminals, and Cincinnati Electronics is developing word processing and payroll software packages to make it even more cost-effective for libraries.

The operating system is Univac Vortex II, which can support Fortran, RPG-II, assembler, Basic and Cobol. Univac provides this part of the system along with most of the hardware.

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Calendar

Dec. 1-3, Montreal — **Future Systems Forum Canada**, sponsored by Advanced Computer Techniques, Inc. and Whitsed Publishing Ltd. Contact: Whitsed Publishing Ltd., Suite 1201, 55 Bloor St. W., Toronto, Ont. M4W 3K2, Canada.

Dec. 2-5, Chicago — **Data General Users Group Conference**. Contact: Users Group, Data General Corp., 4400 Computer Drive, Westboro, Mass. 01580.

Dec. 3-4, New York — **How to Buy PBXs**. Contact: Linda Starek, MCI Education Center, 1301 Avenue of the Americas, New York, N.Y. 10019. Also being held Dec. 17-18 in Los Angeles.

Dec. 3-5, New York — **Implementing Computer-Based Human Resource Systems**. Contact: the University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Dec. 3-5, Orlando, Fla. — **How to Build and Use a Data and Information Resource Directory**. Contact: Bernett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Dec. 3-5, Atlanta — **Network Architecture**. Contact: Systems Technology Forum, 8991 Cotswold Drive, Burke, Va. 22015. Also being held Dec. 3-5 in Chicago and Dec. 8-10 in San Francisco.

Dec. 3-8, Orlando — **Simulation Conference**, sponsored by the Association for Computing Machinery, Inc.; the American Institute of Industrial Engineers; the Institute of Electrical and Electronic Engineers; Operations Research Society of America; the Society of Computer Simulation, Inc.; the Institute of Management Sciences and the U.S. Department of Energy. Contact: Paul F. Roth, Operations Research Analyst, U.S. Department of Energy, Mail Stop 4530, 12 and Pennsylvania Ave., Washington, D.C. 20461.

Dec. 4, New York — **Innovations in Computer Architecture**. Contact: the New York City Chapter of the Association for Computing Machinery, P.O. Box 245, New York, N.Y. 10017.

Dec. 4, Hartford, Conn. — **Data Communications for Minicomputer Users**, sponsored by Micom Systems, Inc. and T.H. Maguire & Associates, Inc. Contact: Micom Systems, Inc., 9551 Irondale Ave., Chatsworth, Calif. 91311.

Dec. 4-5, Anaheim, Calif. — **Polyforth Workshop**. Contact: Forth, Inc., 2309 Pacific Coast Hwy., Hermosa Beach, Calif. 90254.

Dec. 4-5, New York — **Data Communications: Advanced Concepts and Systems**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Dec. 11-12 in Chicago and Los Angeles.

Dec. 4-5, Raleigh, N.C. — **Basics Course**. Contact: SAS Institute Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Dec. 11-12 in Raleigh.

Dec. 4-5, Chicago — **Data Management Seminars**. Contact: Midge Woolley, Computer Task Group, Inc., 800 Delware Ave., Buffalo, N.Y. 14209.

Dec. 4-5, Minneapolis — **Computer in Elementary Education**. Contact: Association for Educational Data Systems, 1201 16 St. N.W., Washington, D.C. 20036.

Dec. 4-5, Boston — **Digital Communication Principles and Systems**. Contact: Battelle, Seminars and Studies Program, 4000 41 St. N.W., P.O. Box C-5395, Seattle, Wa. 98105.

Dec. 5, Chicago — **Advanced Concepts for Designing Security Audits**. Contact: EDP Audit Associates, Inc., P.O. Box 366, Summit, Ill. 60501.

Dec. 5, St. Louis — **Stradis Overview**. Contact: Improved System Technologies Inc., Suite 4500, 888 Seventh Ave., New York, N.Y. 10106.

Dec. 7-9, Carmel, Calif. — **Electronic Mail in Tomorrow's Office**. Contact: the Institute for Graphic Communications, Inc., Floor 4, 375 Commonwealth Ave., Boston, Mass. 02115.

Dec. 7-10, Cambridge, Mass. — **DataTraining '80**. Contact: Nancy Weingarten, Northeast Training News, 176 Federal St., Boston, Mass. 02110.

Dec. 7-11, Ft. Lauderdale, Fla. — **Modcomp Users Exchange (Muse) Meeting**. Contact: Kathy Black, Suite 6C, Muse, 4620 W. Commercial Blvd., Tamarac, Fla. 33319.

Dec. 8, Cambridge, Mass. — **Digital Image Processing**. Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 8-9, New York — **Successful Selection of Minicomputers**. Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Dec. 8-9, Washington, D.C. — **Basic Data Communications**. Contact: Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314.

Dec. 8-9, San Francisco — **CICS/VS Performance and Tuning**. Contact: On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Dec. 8-9, Chicago — **Improving EDP Center Performance and Productivity**. Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 8-9, Chicago — **How to Achieve the Cost Savings and Sales Benefits of Manufacturing Resource Planning**. Contact: McGraw-Hill Seminar Center, Room 3112, 305 Madison Ave., New York, N.Y. 10017.

Dec. 8-9, Hartford, Conn. — **Data Base Concepts**. Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

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Dec. 8-10, Washington, D.C. — National Conference on Government Information Systems. Contact: Government Information Systems, 12611 Davan Drive, Silver Spring, Md. 20904.

Dec. 8-10, Washington, D.C. — Data Communications Systems. Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 8-10, Chicago — DP Project Management: A Practical Approach. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Dec. 15-17 in Dallas.

Dec. 8-10, Denver — Effective Analysis and Design of Information Systems. Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 8-10, Orlando, Fla. — Effective Data Systems Development. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Dec. 8-10, Washington, D.C. — DP: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Dec. 15-17 in Houston.

Dec. 8-10, Washington, D.C. — International Electron Devices Meeting, sponsored by the Institute of Electrical and Electronics Engineers and the Devices Society. Contact: Melissa M. Widerkehr, Conference Manager, Courtesy Associates, Inc., Suite 700, 1629 K St. N.W., Washington, D.C. 20006.

Dec. 8-10, Washington, D.C. — Word Processing: Effective Operations Management. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Dec. 15-17 in Houston.

Dec. 8-10, New York — Computer Controls. Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Dec. 8-10, San Francisco — Information Systems Project Management. Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 8-10, Washington, D.C. — Automating Your Office Today: Planning and Implementation Methods. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 8-10, Boston — Minicomputer Systems: Selection and Implementation. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Dec. 8-10, New York — Basic: A Computer Language for Managers. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Dec. 8-10, Dallas — Effective Computer Operations Management. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Dec. 15-17 in New York.

Dec. 8-10, Los Angeles — Developing Computer-Based Accounts Payable Systems. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Dec. 8-10, Denver — Systems Analysis and Design: Concepts and Effective Practice. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 8-10, Los Angeles — Introduction to Teleprocessing Software. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delcan, N.J. 08075.

Dec. 8-11, New York — Computer Contracts Negotiation. Contact: Brandon Consulting Group, Inc., 1775 Broadway, New York, N.Y. 10019.

Dec. 8-11, Boston — Sigplan Symposium on the ADA Programming Language, sponsored by the Association of Computing Machinery, Inc. Contact: Robert M. Graham, Graduate Research Center, University of Massachusetts, Amherst, Mass. 01003.

Dec. 8-11, New York — CICS/VS Application Design. Contact: On-Line Software International, 65 Rt. 4E., River Edge, N.J. 07661.

Dec. 8-12, Washington, D.C. — Data Base Analysis and Design — Tools and Methodologies. Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 8-12, Hartford, Conn. — ANS Cobol Programming Workshop. Contact: The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Dec. 8-12, New York — Structured Data Base Design. Contact: Improved Systems Technologies, Inc., Suite 4500, 888 7 Ave., New York, N.Y. 10106. Also being held Dec. 15-19 in San Diego.

Dec. 8-12, Minneapolis — Computer Auditing. Contact: RHY Consultants, Inc., P.O. Box St. Paul, Minn. 55121.

Dec. 8-12, Philadelphia — Systems Design Workshop. Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., Wellesley, Mass. 02181.

Dec. 8-12, Hartford, Conn. — Advanced ANS Cobol Efficiency Techniques. Contact: The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Dec. 8-12, Houston — Structured Programming. Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

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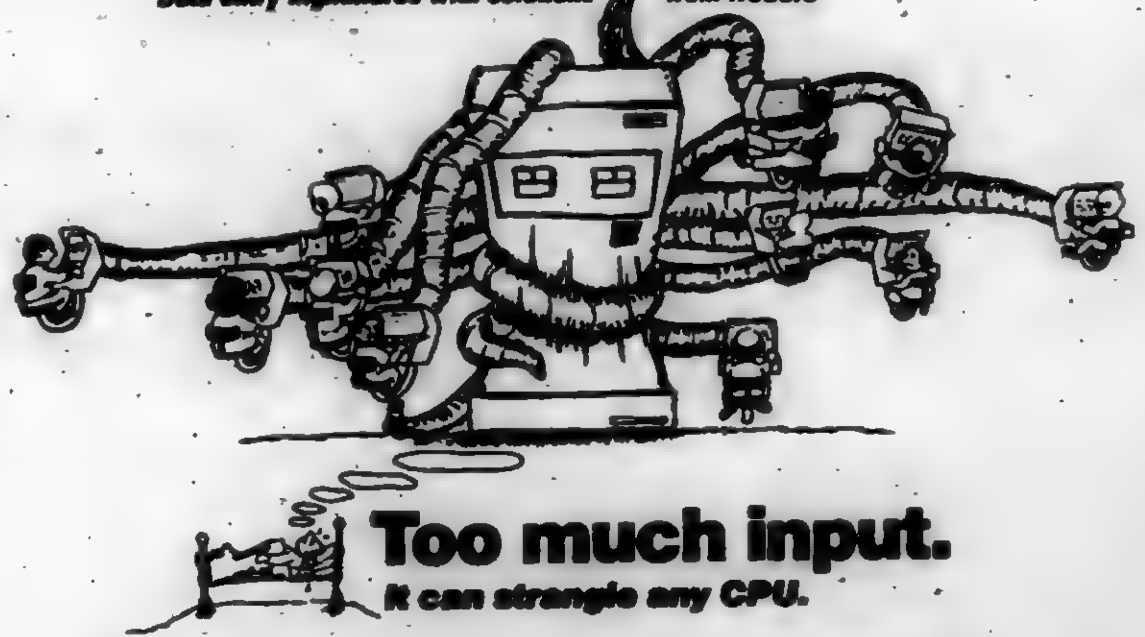

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Is Job-Hopper Hurting His Marketability? What

Q **Last January I resigned a senior-level programming position of six years to make my fortune peddling computers. The job was definitely not for me and I left after two months. I would have left sooner, but I couldn't find a position of commensurate pay. I was lucky. Three months ago I found an exciting, challenging, well-paying job.**

A serious problem has arisen. A friend of mine has just offered me a job that sounds more exciting, more challenging and offers a higher salary. I enjoy my present job and foresee a bright future with this company. On the other hand, I see the same opportunities in the other company. If I were to accept this job, would my work history record affect my future marketability?

A Someone once told me that the grass is always greener on the other side of the hill, but I still don't believe it. Granted, the turnover in the DP business is very high — but four jobs in one year? This is inordinate and is bound to have a detrimental effect on your mobility should you decide to switch jobs again within the next three years.

At this critical stage in your career, a change in jobs is a calculated risk. If the next position falls short of your expectations and you begin to search for another position, a seller's market for everyone else could become a buyer's market for you.

Should you accept the position and remain with the company three or more years, you will have established some job permanence which would serve to negate the fact that you had held four jobs in one year.

Personally, I enjoy taking a calculated risk now and then, but then it's not my decision.

Q **You once said that the key to having good interaction with users is having an ongoing DP education program for user management and analyst. As a training coordinator, I'm responsible for all DP training. Presently, programs are geared to programmers, analysts and DP management, but I would also like to implement a user program.**

Could you be more specific about the scope and content of such a program?

A The implementation of a user education program is the first step in creating an atmosphere of cooperation and understanding between DP and users. An ongoing program of in-house user seminars will help build lines of communication through a common understanding between DP and users, and between user departments. Not only is it necessary for users and DP to cooperate, but users must cooperate with each other.

A user seminar is much more than DP fundamentals. It also provides a forum for the resolution of problems and misunderstandings.

I've presented both public and in-house seminars for user personnel and, in my opinion, the in-house user seminar is the most beneficial approach to user education. This mode of presentation allows participants to interact with instructors and other users, all sharing the same environment and problems. A training coordinator, like yourself, DP managers and other DP professionals can serve as instructors.

Depending on the company size, you might consider presenting seminars geared to the following levels: top management, middle management, operational management, user analyst and clerical. Obviously, the content and approach to each of these seminars would vary.

Depending on the audience, the content might include MIS concepts, fundamentals of information processing, an overview of existing corporate application systems, corporate MIS policy and procedures, DP organization, user and DP roles and responsibilities, the DP plan for the future and other areas depending on the type of organization.

I might add that very few programs exist, but as other data centers recognize the impact that having knowledgeable users has on improving user interaction, I would expect these seminars to be more popular than seminars on structured methods.

Q **I'm in the Computing Services group of a defense consulting firm. Most of the operations research analysts here have little background in computers, yet they are expected to do most all of their own programming. Most of them have found APL easy to use and enjoy the interactive nature of the language. Unfortunately, few of them use APL effectively and often their applications are unsuitable for APL in the first place. The result is extremely poor response/turnaround time for both APL and non-APL users.**

At in-house computer courses we stress the fact that APL should not be used for heavy-looping, number-crunching production work, but the abuse continues.

Short of removing APL from the system, have any other shops met and/or solved this problem? Specifically, has anyone found effective hard and fast rules concerning, for instance, total number of lines of code or total execution time, to determine when APL may or may not be used?

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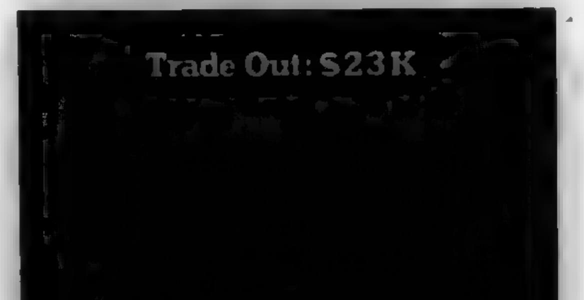

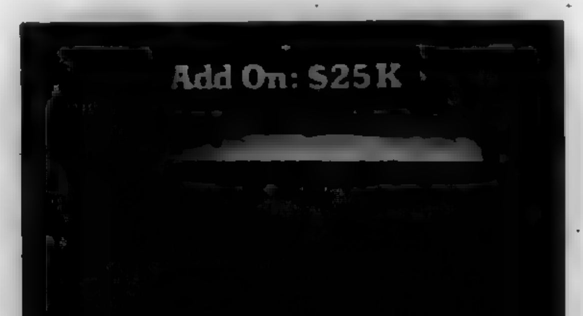

Goes Into a User Training Program?

A Any APL usage guidelines based on lines of code and/or total execution time would be arbitrary by installation. You have provided sufficient guidelines by describing the proper environment for APL usage.

The nature of OR methods and techniques personifies what we usually refer to as "number crunching." APL or any language that uses an interpreter is not appropriate for most OR-type applications.

Your question implies that APL is the only interactive language available. These analysts have been spoiled by the wonders of interactive programming and will be reluctant to return to batch programming. If used properly, APL will continue to be a valuable aid; but they need an interactive alternative better suited to OR-type applications. Interactive Fortran, PL/I and Pascal are widely used by OR groups.

Q In five years with a Fortune 500 company, I have been promoted three times and am now a project leader. Of course I'm not privy to all information, but from what I've seen in the past year or so, promotions from project leader seem to be random.

How does a person in my position break out of the pack?

A As I've noted before, hard work and a quality end product seldom go unnoticed. However, you should become keenly aware of the company's personnel performance criteria, evaluation methodology and what is expected for promotion. Set objectives which, if accomplished, will meet these criteria. The realities of promotion dictate that you also be politically astute and avoid unnecessary confrontations.

Punch one more ticket than your colleagues (e.g., CDP, master's degree, speaker at a major conference). Maintain a state-of-the-art knowledge of computers and information systems by reading related journals, periodicals and books. This knowledge and understanding will surface in meetings with your managers.

Perhaps the best way to be noticed is to be imaginative and innovative. In the process of accomplishing your job function, make note of any procedures, methods, systems and so forth that could be improved. On your own time, identify the problem and develop a generalized solution. Present the idea to your immediate manager. If he doesn't like it, drop it immediately and keep looking; if he does, offer assistance in expanding or implementing the idea. In either case, you win.

In any highly competitive situation, the promotions are afforded those who are not only good at what they do, but are willing to go beyond the call of duty.

Q I recently took a job as an installation manager for a facilities management company that caters almost exclusively to medium and large hospitals. I've spent much of my spare time reading and studying about medical information systems. Also, I've had a great deal of personal interaction, both at my installation and other installations.

In my reading and our conversations, two points ring through loud and clear. First, there are numerous management information systems opportunities to make significant improvements in the area of health care. Second, no matter how good or helpful the information system, it is either impossible to implement because of resistance, almost exclusively by physicians, or because physicians refuse to learn to use the system after implementation.

I would be interested in your candid comments on health care information systems.

A In my opinion, the level of health care service, information systems notwithstanding, is well below its potential. Granted, this statement can be made about other industrial environments, but it is far more acute in the health care profession. Most professionals strive to enhance the level of their profession by utilizing any idea, technique or tool that would help, but not so in medicine. I find this particularly alarming since the health and even lives of individuals are concerned.

DP people, with the assistance of medical people, have attempted to automate such areas as medical records, diagnostic procedures, drug interaction checks and a host of other systems that, in my opinion, would be significant aids to the practice of medicine. I hear and read about many more failures than successes. Invariably the failures can be traced to a lack of cooperation.

I would be interested in responses from CW readers, DP personnel, physicians, hospital administrators and nurses.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.

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By Larry E.

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EDITORIAL

Beware!

Computerworld readers, beware!

Instances of people using *Computerworld's* name to obtain employee information from readers are on the upswing. Typically, the telephone caller will state he is from *Computerworld* and request lists of DP employees in your company, sometimes promising free subscriptions to CW in return for the help. Such a call will not be from *Computerworld*.

More often than not, the impersonator will be from a recruitment agency, and those on the list will later hear from a headhunter asking if he or she wants to switch jobs.

If this happens to you, ask for a telephone number to call back. Usually, the number given will be out of service. If the caller is a legitimate CW employee, the number will connect you to the right person.

Let others in your company know that this kind of scam is on the upswing and that anyone who receives one of these counterfeit calls should contact *Computerworld* and tell us about it.

While it may be flattering that recruitment agencies believe the CW name will give instant entree to people in the industry, let impersonators be fully warned: "*Computerworld* will prosecute to the fullest extent of the law" anyone who uses its name without authorization.

This kind of activity is an annoyance to you, our readers, and even more of an annoyance to us since it is our name and reputation that is being abused. Help us put an end to it.

FYI

Computerworld has received numerous queries from readers asking where they can contact the newly formed Black Data Processing Association [CW, Oct. 6].

Here are the addresses of the group's three current chapters:

- P.O. Box 22198, Cleveland, Ohio 44121.
- P.O. Box 50128, Washington, D.C. 20004.
- P.O. Box 2254, Philadelphia, Pa. 19103.

DATA PAST

Five Years Ago
Nov. 26, 1975

WASHINGTON, D.C. — Law enforcement officials expressed concern that shared rather than dedicated computer systems might pose security and service problems. Testifying at hearings conducted by the Law Enforcement Assistance Administration, Adam D'Allesandro, deputy director of New York State's division of criminal justice services, said that shared systems must be looked at "with a jaundiced eye."

– – –

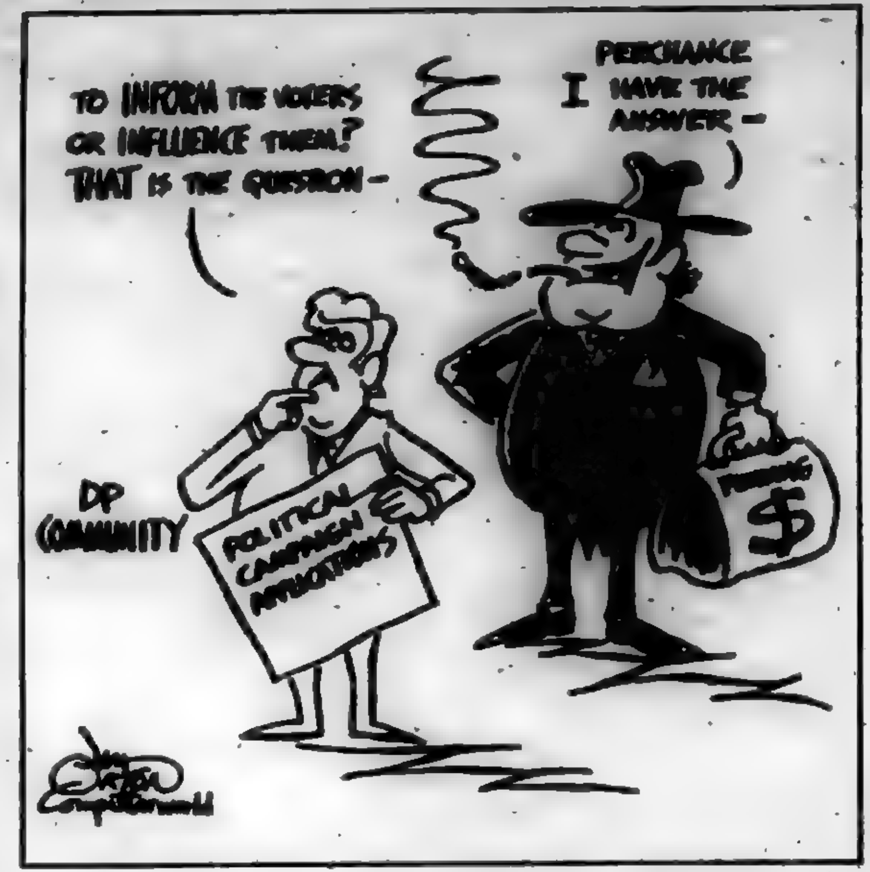
CONCORD, N.H. — A behind-the-scenes political fight for control of the New Hampshire Department of Centralized Data Processing led to the resignation of its director, Arthur T. Hill. In his letter of resignation, Hill referred to a two-year "personal conflict" with Edward Berg, chairman of the state's Central Data Processing Commission.

Eight Years Ago
Nov. 22, 1972

YORK, Pa. — The validity of thousands of "standard" contracts was feared to be in jeopardy as a result of a court decision that admitted "oral representations" where terminology in the basic contract was vague or ambiguous. A jury ruled that a salesman's promises, even if made only orally, could be binding, at least where they were made in order to clarify vagueness in the contract. In the breach of contract case against Burroughs Corp., Carl Beasley Ford, Inc. was awared $56,000. Burroughs was expected to appeal.

– – –

WHITE PLAINS, N.Y. — IBM added a package called Vancouver Data Language-One to provide data base capabilities for conventional DOS 360 or 370 installations. Several independent software houses had catered to this area.


TO INFORM THE VOTERS OR INFLUENCE THEM? THAT IS THE QUESTION -
PERCHANCE I HAVE THE ANSWER -
DP COMMUNITY
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Computerworld

LETTERS

Headline Spoiled It

The Oct. 20 issue contained quite a nice review of the paper I presented at the International Federation for Information Processings's (Ifip) Eighth World Computer Congress. However, the article was completely spoiled by a very misleading headline.

Nowhere in my paper was the overall conclusion reached that computers are "displacing jobs faster than creating them." Quite to the contrary, I stated that "the evidence is very strong that computers are good for the overall economy and employment."

The paper and, indeed, the text of *Computerworld's* summary make it clear that the employment losses in four industries/occupations studied are more than offset by the number of jobs created within the computer industry. Apparently, the headline writer only read the section about the first four industries.

The misleading headline is particularly disturbing to me because a principal intent of the paper was to set forth in as unbiased a way as possible the available facts on the effects of computers on employment in the U.S.

I hoped this would contrast with the frequent off-the-cuff unsubstantiated statements by both the proponents and opponents of the position that computers unfavorably affect employment. The headline makes my work appear to be of the same ilk.

Moreover, it deflects the reader from my main point, which was that although the overall employment impact is probably positive, there are some individuals in some industries who are paying a heavy price in disruption of their own and their families' lives.

Bruce Gilchrist

New York, N.Y.

An Advertisement?

I must assume that the salary survey printed on pages 10 and 11 of the Oct. 27 issue was a paid advertisement. There could be no other reason for giving such a play to a recruiting firm's presentation of supposed industry salary norms.

Articles such as that do little to help programmers, analysts or managers. What the article will do is encourage turnover, cause unwarranted dissatisfaction and generally add to the decline in stability for computer personnel.

Robert D. Savola

Wellesley, Mass.

Understandable, Useful

John B. McKeehan overstated the case against OS JCL when he said that "it is too big and too inhuman to be of much good" [CW, Oct. 13]. Admittedly the OS utilities are a disaster which should not be repeated, but I have always found JCL itself to be understandable and useful.

Detractors point to the "complexity" of language; I prefer to view its many parameters as providing flexibility and capability.

A case in point is the COND parameter, which provides for conditional execution of job steps, a feature not present in most (if not all) other control languages.

Moreover, there is no need for an individual to learn all of JCL in order to use it effectively.

The major problem, if there is one, is its mystique — yes, the multipage collection of //s, XXs, system messages and so forth is foreboding to the uninitiated.

Given half a chance, however, it becomes thoroughly understandable. I submit the problem exists in education (or lack thereof).

I can (and have) taught a useful subset of the control language in two days including procedure overrides and an introduction to utilities.

Robert T. Grauer

Coral Gables, Fla.

THE TAYLOR REPORT/Alan Taylor

Independent Cobols Fit New Software Pattern

The recent development of independent Cobol fits into a whole pattern of software development that can change the way users will look at software. The pattern, which is technically characterized by the internal use of pseudocodes at an interface within each particular piece of software, now has spread widely. The same basic structure can be found in procedural and expandable languages, in operating systems and in hardware interface modules.

Taking such a structure successfully into a Cobol compiler really is no technical feat, but rather a demonstration that the current software investment, amounting to billions of dollars, can be preserved at the application level.

Internal interfaces are the key technical developments. In the past, interfaces have normally been on the outside of a hardware module, connecting it to other modules. Disk drives, for example, were made plug-to-plug compatible with specific disk controllers. And Cobol compilers were made compatible with government standards on the outside and with the idiosyncrasies of some operating system on the other side.

This technique of going straight from the specifically desired input to the specifically desired output means that the major, well-used pathways — normally the hardware vendors' captive marketplaces — are the only ones that can be economically catered to by independent competitive suppliers.

Widens Market

Using a system with an internal interface, however, changes the situation drastically. Depending upon how well the internal interface is designed, one set of designs can be economically adapted and numerous products produced. All can be handled and marketed with one maintenance method and one marketing force, irrespective of how many operating systems or types of hardware are involved.

In addition, the use of internally interfaced software frees the applications programmer from having to select, and professionally depend upon, specific hardware markets. Instead, it leaves him able to be of general value to users of many types of hardware.

RM-Cobol, for instance, recently described here [CW, Nov. 3] has a compiler that breaks into two segments, connected at an internal interface which is as smooth as possible, using and implementing on its upper and lower levels respectively only references to a primitive language. On the upper side of the interface are the working processes of a good, marketable and more-or-less standard Cobol. There is currently only one version of this side of the interface, although other versions are possible in the future.

Underneath the internal interface, the second part of the RM-Cobol software system takes the interface definitions down to one of a number of operating systems. For each one of these, a different set of users can be served — and all with the same, beyond-the-

(Continued on Page 32)

READER COMMENTARY/William A. Hansen

The Silencing Of a Computer Room

I suspect that the war between programmers and operators dates back to when one of the junior employees at the Census Bureau dropped a deck of Dr. Hollerith's cards. In any case, left unchecked, programmer/operator rivalry can cause serious problems that affect the productivity of an installation.

This story is about such a battle. In this case, senior DP management took sides rather than mediating a dispute. The result hurt the installation for years.

Every shop has some dinosaur programs still kicking around, relics that were written shortly after the invention of the vacuum-tube computer. Poppapill Pharmaceuticals' payroll system was like that. It was written for the first-generation Bigbytes 210 and later converted to a Greedy Electronics 425.

Both systems used a tape operating system and the conversion went smoothly, albeit slowly. Then Greedy Electronics announced disk drives and a disk operating system for the 425. Having spent two years on the last conversion, the management information services (MIS) department faced a growing backlog of new applications. Management decided to move the program libraries from tape to disk, but otherwise ignore the use of disks for existing application.

Hero Enters

Enter Tom Superop. Tom joined Poppapill when the operations manager recognized the advantage of hiring someone with previous experience on the 425.

Tom was one of those rare operators who read every reference manual they can get their hands on. After training the other operators on the disk operating system, Tom spent his free time looking for ways to improve productivity. (Programmers may argue that Tom was just looking for a way to make his job easier. These are often the same thing.)

(Continued on Page 38)

READER COMMENTARY/Karen I. Flatt

On-Line Environment Boosts Design Risks

Systems design is a risky business, despite the ever-increasing number of design aids on the market. Certain areas of risk are given more significance by the on-line environment and must be of special concern to the on-line system designer.

First, the presentation and evaluation of benefits in on-line systems are often too vague. The designer speaks of "faster response time" as if that were itself a benefit. Rarely does anyone ask if faster response time is necessary, or even desirable. A system that overruns the user with data is as useless as one that fails to provide the data. We concern ourselves with the quantity of data rather than the quality. We speak of "user acceptance," yet fail to define either "user" or "acceptance."

Benefits ascribed to on-line systems are frequently so futuristic it is impossible to envision their impact. Whenever a designer speaks of benefits to be accrued three or five years in the future, no one can dispute his claims — but no one can support them either. The user and management are left with the uneasy feeling that they are buying a pig in a poke.

Cost Concern

A second, although not secondary, concern is costs. The complexity of on-line systems leads to high costs, often too high for the user's budget. Complexity also contributes to our inability to accurately predict the costs of a project. Not only is the technology changing rapidly, and often incompatibly, but business priorities are being regularly rearranged by vacillating economic conditions. The designer is shooting at an erratically moving target.

Performance is the third major area of risk. I am not referring to response time, but to the system's ability to provide the functions required. Can the system actually do what the user needs to have done? Can the system expand to meet those future user needs which are logical extensions of the current needs? If expansion is possible, what is the cost? On-line systems design must address both today and tomorrow, at a reasonable cost and in a reasonable time frame.

> *'Shared data and centralized sites provide many opportunities for espionage, vandalism, theft or just plain mistakes. Any of these could reduce or eliminate the cost-effectiveness and the efficiency of the computerized system.'*

All of these risks contribute to the fourth area, the vulnerability of the business because of the amount of data managed exclusively by the computer. The spread of computers, the wide acceptance of the management information services (MIS) concept and data base technology have created a world in which many businesses have consolidated 75% to 80% of their data under the management of computerized systems. Should one or more of these systems fail, there is rarely a manual backup procedure that can handle any significant volume or duration.

Shared data and centralized sites provide many opportunities for espionage, vandalism, theft or just plain mistakes. Any of these could reduce or eliminate the cost-effectiveness and the efficiency of the computerized systems.

Designer's Challenge

How does a designer avoid or at least reduce the probability of these risks?

The first tool is specialized knowledge — of the data base management system (DBMS) and of the application. Knowledge of the DBMS is the first step. Any hardware/software product is relatively rigid, offering some options, but not the ability to respond uniquely to each system's requirements. At best, a DBMS can be tailored to provide adequate service for the most important applications while not completely neglecting the other applications. The team that designs an on-line system must include someone who really knows what the DBMS can and *cannot* be reasonably expected to provide.

More important to the design is a thorough knowledge of the application: what functions must be directly provided, what functions must be supported, what expansions are planned and in what time frame?

Coming at the questions from a different angle, what decisions will be made by this system and based on this system? The systems analyst must have a sound business orientation to the application. The analyst must know not only what reports are needed but why.

Knowledge of the application must include who is going to use the system and how. Screens must be designed for the skill levels that can be reasonably expected. Information flow must be structured to make sense in the overall business context in which the system will be used.

Appropriate Tools

All too often we forget that the system is not intended to obviate rational activity by human beings. Our application knowledge must be adequate to allow us to design systems that are appropriate tools for the specific functions. We need to know not just what but why. The better our understand-

(Continued on Page 36)

Independent Cobols Demonstrate New Pattern

(Continued from Page 31)

interface compiler. This makes the marketing of Cobol compilers to quite small market segments economically practical.

The Real Multiplier

What makes everything particularly attractive economically, however, is the next step when two of these internally interfaced systems are matched together. A good example of how powerful the interplay of multiple internally interfaced software packages can be is seen by considering an internally interfaced Cobol compiler mounted upon an internally interfaced operating system.

This is a valid example, too, because operating systems, just like compilers, can be and are being written with their own internal interfaces. Normally, the upper side of the operating system builds upon a set of pseudo machine codes, the type that might be in almost any computer — input, output, test and computation instructions. On the lower side, these assumed pseudocodes are matched to one of many types of real computers.

Now the same operating system facilities are transferable from machine to machine, simply by providing a new set of machine code that will implement the primitive or the pseudocode. The result can be spread from machine to machine, as the market demands.

And each time the operating system is spread to a new machine — by changing the lower part of the internally interfaced operating system and doing nothing else — the whole of the internally interfaced compiler goes right along with it and into immediate availability and use.

So, of course, do all the other software systems that have been matched to the internally interfaced operating system, in a positive explosion of available software that can dwarf the capabilities of software types which only have external interfaces.

This ability of internally interfaced systems to mutually multiply each other's power and spread is the key to the new software — just the way that the importance of this new software to users of current software is magnified by the creation of transportable Cobol compilers like the RM-Cobol.

Programming Aids

But matters do not end here. Programming aids, which are also application programs, equally will be able to move around. In particular, converters that can convert Cobols designed for the old type of operating systems can be built to match on top of the always spreading operating systems. They will then ensure that the process of having the new scheme of software is practical and acceptable as being the norm.

Then the traditionalists who cling to single-vendor software programming will have to explain their actions, because the arguments for the multivendor software, through internal interfacing, will be so powerful.

Now the time is ripe to question the whole traditional software approach from the ground up and to see if we are better served by speedily adopting the new style of software.

■

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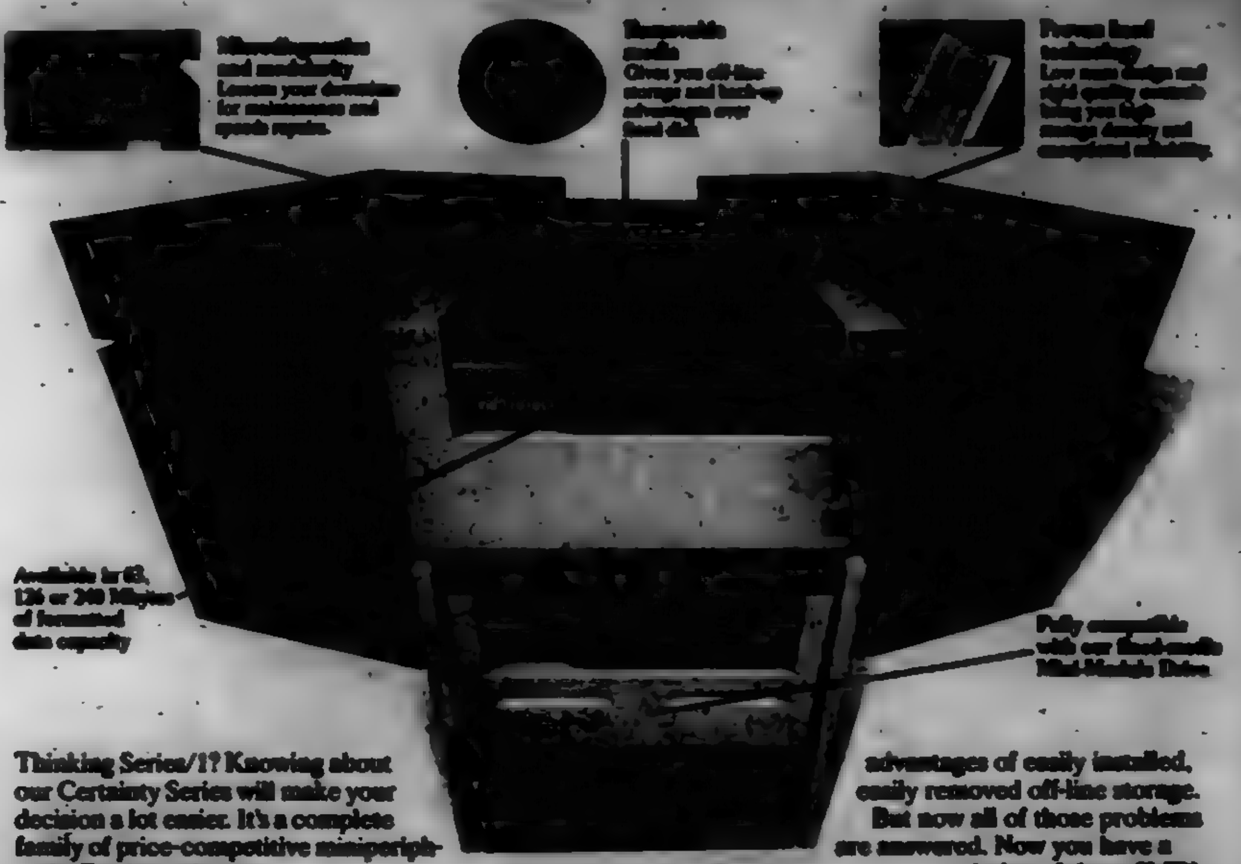

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LETTERS

Facts on Cascade Data

In "Disgruntled Former Students Sue Michigan Computer School" [CW, Nov. 3], the Cascade Data system at the school was referred to as "obsolete," "incapable of programming three of the four languages offered" and "frequently broken down."

We would like to present some facts which more accurately portray the role of our company and its equipment in the Key 5 Institute situation.

The Cascade Data computer referred to in the article is a Model 80, the first of which was installed by Cascade Data in April 1970. Since the Model 80 is no longer marketed by Cascade Data, obviously we have not released compilers for additional languages for the Model 80 as we have for other of our newer systems. We don't believe we differ from other manufacturers in this respect.

With regard to the system in question frequently breaking down, we would like to point out that the system at Key 5 Institute was not purchased from Cascade Data, but rather from another end user, and was installed at Key 5 in May 1978. From April 1979 to September 1979, the system was not covered by a valid maintenance agreement, and at the election of Key 5 Institute, no maintenance services were provided.

These relevant facts should remove any unnecessary and unfair stigma placed upon us by the story.

Tom J. Mox
Vice-President of Marketing
Cascade Data Marketing, Inc.
Grand Rapids, Mich.

What Is Professionalism?

I was very interested in Jack Stone's "Human Connection" column on DP professionalism [CW, Oct. 27]. Unfortunately, I found the column did nothing concrete to dispel the confusion that surrounds this topic. I offer the following comments.

The *Oxford English Dictionary* defines profession as : "A vocation in which a professed knowledge of some department of learning or science is used in its application to the affairs of others or in the practice of an art founded upon it. Applied specifically to the three learned professions of divinity, law and medicine . . . Now usually applied to an occupation considered socially superior to a trade or handicraft."

The important components of professionalism, therefore, are knowledge, application of that knowledge and social standing.

The factor common to the three traditional professions is the existence of ethical standards of practice. In the case of religion, this is obvious; lawyers are pledged to preserve truth and the law; doctors are bound by the Hippocratic oath. The high social standing attached to these professions derives from practitioners' adherence to their respective ethical principles.

All three have methods for defining the knowledge required for that profession and for regulating its application — the ecclesiastical hierarchy, bar and medical associations. Education and training requirements are set forth. Ethical standards are policed.

The lesser professions, such as engineering, also have professional associations to set and maintain standards; registration is required in some instances. The beginnings of an ethical consciousness are emerging — the social and environmental impacts of technology are normative considerations.

Jack Stone asked: "Are you sure you know what a DP 'professional' is?" The answer has to be: "No." DP has no ethical underpinning, hence it can have no social standing. There are no requirements for training and education and there are no professional associations charged with creating and enforcing such requirements. If such standards were to appear, there is no commitment on the part of the DP community to be bound by them.

To say that some data processor is or is not "professional" is a meaningless statement. DP is a trade.

David P. Riedel
Bolton, Conn.

A Proven Tool

We at Genasys International, Inc. have spent more than 10 years building and using application generators. Our experience may be helpful to Werner Frank in his search for a definition of the term [CW, Oct. 27].

An application generator is a tool designed to help systems analysts and programmers work more effectively. This has very little to do with the number of programs or lines of code produced. It has everything to do with making systems more responsive to the real needs of users.

The best way to develop systems that are truly responsive to users' needs is to get users thoroughly involved, and keep them involved, throughout the entire design process.

This degree of user involvement requires some method of bridging the DP/user communications gap. That's where the application generator comes in. The most effective application generator products available today employ "user-friendly," interactive techniques to create what are, in effect, blueprints of the financial system.

In that way, the application generator works to ensure that the fundamental system design decisions are made correctly. Once that agreement has been reached, most of the required code can be generated automatically.

What Werner Frank describes as an unsettled buzzword is, in fact, a proven productivity tool.

Gary Guttman
New York, N.Y.

Spell Them Out

I have read *Computerworld* for only a short time now. I greatly enjoy the publication, but I agree with Richard T. Austin, who sent you the letter about over-abbreviation [CW, Nov.3].

If a full glossary of terms cannot be printed in each issue, could you please write them out by the abbreviation? Anything would be helpful, as things are changing and improving so fast it is hard to keep up.

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HUMAN CONNECTION/Jack Stone

An Open Letter to President-Elect Reagan

Dear Mr. Reagan:

Congratulations on your smashing victory! I'm sure that millions of people associated with computing systems join me in wishing you the very best success in the challenging years ahead.

In many speeches you referred to the critical need to get our economy moving again by such actions as controlling inflation, increasing exports, cutting the dependency on foreign oil and reducing unemployment. We are proud to be associated with an industry which has been able to contribute to this important effort through the information systems services we provide to business, science and government organizations.

You also emphasized the need to cut waste and improve operating efficiency in the federal government. Perhaps you remember that President Carter also expressed the same good intentions while he was on the campaign trail. One of his major complaints was the terrible management conditions in the federal data processing establishment and, as one of his priority action programs to improve the situation, he initiated a 50-some-odd person-year task force during his early months in office whose mission was to assess the status of large-scale government computer centers and develop recommendations for governmentwide improvements in their management and operations.

Well, to this very day, as far as I can tell, the task force report is *still* in draft form and not generally available to the public. Further, although I heard through the Washington grapevine that some recommendations have been adopted, they are not detectable to the naked eye.

How do I assess the current situation in federal data centers? Easy. I believe it is about the same today as it was four years ago when I wrote an open letter to president-elect Carter on this subject [CW, Nov. 29, 1976]. Here are some excerpts:

"On the positive side, much progress has been made over the years. The departments have institutionalized DP operations, allocated substantial resources to DP tasks, developed strong in-house technical personnel and sought to exploit new technologies.

"Much credit is due to the federal government for building the industry both through its extensive funding of technology R&D and by virtue of its position as the world's largest DP customer.

"On the negative side, managerial effectiveness causes grave concern. Troublesome stories of serious management failures run rampant through the trade and public press.

"Continuing reports tell of massive welfare overpayments; hardware procurement irregularities; proliferation of underutilized mainframes, including some on lease which are still warehoused; questionable validity of certain global computer/communications systems; inadequate or nonexistent control and evaluation mechanisms . . ."

One of the most distressing aspects about government computer operations is that the management-by-crisis philosophy that was so widespread in 1976 is even more rampant today. As an example, I was with a government agency computer center manager just two days ago who was complaining about the new personnel policies that are being implemented as the result of the Civil Service Reform Act (one very good result from the efforts of the current administration). That manager said, "The new program calls for the setting of performance standards and an annual appraisal to assess performance against the standard. But how can I set standards — and keep the employees committed to them — if all they do is 'fight fires' every day?"

What I suggested in 1976 continues to apply today:

"Current management must mend its ways: It must stop taking on new commitments without adequate planning and without finishing up the old ones; end the practice of bringing in new hardware without appropriate staffing and support resources; start looking at more efficient ways of handling software development; and begin providing the time, the environment and the feedback for the technical people to do a job of which they can be proud.

"Government executives must: commit to short- and long-range center plans and stop resetting priorities in the middle of projects; establish annual budgets for centers and stop adjusting them so arbitrarily; and focus on goals and performance, not operating details.

"In conclusion, I sincerely hope the new leadership you bring to the government possesses the experience and knowledge necessary to apply this magnificent technology to government problems in an intelligent and practical manner.

"Toward this goal and on behalf of the industry, we pledge to you our wholehearted and enthusiastic support."

Sincerely,
Jack Stone

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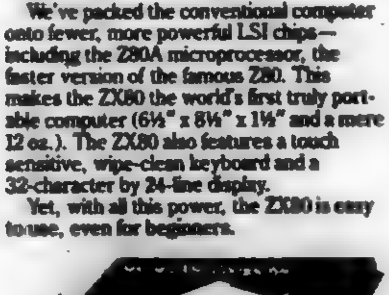

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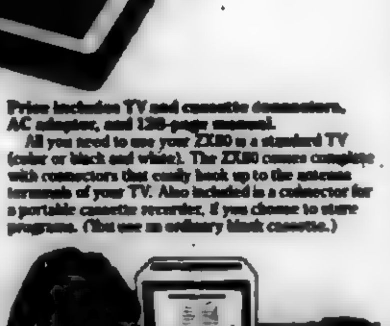

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On-Line Environment Increases Design Risks

(Continued from Page 31)

ing of the purpose and approach of the business function, the more useful our design. To be truly successful, we must concern ourselves with the spirit as well as the letter of the functions that govern the application.

When the design team is thoroughly familiar with the DBMS and the application and the knowledgeable specialists are in place, the team can establish priorities for the design. Certain criteria of the applications may be met poorly, or not at all, by the particular DBMS.

Some features of the DBMS may be inapplicable or even detrimental to a given application. The design team must work out the compromises necessary.

Always remember that the DBMS is relatively inflexible; the human interface is not. The application needs can usually be met if the design team approaches them as functions rather than as detailed and rigid specifications.

Discouraging Aspects

From our vantage point as systems designers and application developers, the picture is not so rosy. The costs of systems development have increased dramatically over the past decade.

While hardware and software are cheaper per unit, our companies require ever-increasing amounts of equipment and products to run the system.

Perhaps more important, systems development is no longer exclusively a DP cost. The more complex systems require extensive user involvement, often months of full-time activity.

Distributed data processing (DDP) brings the hardware and software costs up, as well as adding an expensive level of human interface to ensure that continuity and integrity of data is maintained. It would appear that costs will continue to climb during the '80s, despite vendor price reductions or technological efficiencies.

Yet company after company is outgrowing the systems designed in the past decade. New data requirements, new business priorities and business diversification have all contributed to the demise of systems. Remember, we promised these systems were flexible, growth-oriented and could adapt to change.

Remember? User management does!!

Start Performing

Our responsibility in this brave new world of data processing is realism. For too long we have "puffed" our products, overselling every concept.

We are no longer struggling for acceptance; the user is convinced of the practical wisdom of computerizing systems. It is time to stop selling and to start performing.

Our answer to the user community's demand for consistent, higher quality data processing must come in the form of people-oriented, machine-based solutions. People needs are paramount in all systems, but the realities of the equipment with which we work can no longer be ignored.

Automatic upgrades at every product announcement are becoming a thing of the past, even in very large companies. Our systems must run on the currently available or envisioned configuration, not serve as a basis for a complete revamping of the computer center.

Today's Shop

Today's environment must bring us back to the basics of our profession. We are in the business of solving problems. The hardware and software are merely tools that we must throroughly master if we are to do our jobs well.

As for the human side, know what is to be done, by whom, why, when and under what conditions.

With regard to machinery, know what can be done, at what cost, under what conditions, when, for how long and with what potential impact on the total environment.

If you make the effort to design your systems based on a thorough knowledge and understanding of these points, you will indeed be designing solutions.

Flatt is a senior consultant with the Detroit District of Cutler-Williams, Inc.

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MPI 91	960K	Evaluation only	steel band and capstan	96/100	240
TEAC 50C	960K	<10,000 Mainly in Japan	steel lead screw	100	[illegible]
Micropolis 1016/1015	1,100K	60,000	steel lead screw	96/100	385

Our drive was designed from the ground up for its double density capacity, not merely redesigned from a single density unit. That's one reason we've shipped more high capacity 5¼" floppies by far than anyone else. Another is that no matter how many imitators there are, there's no substitute for the original.

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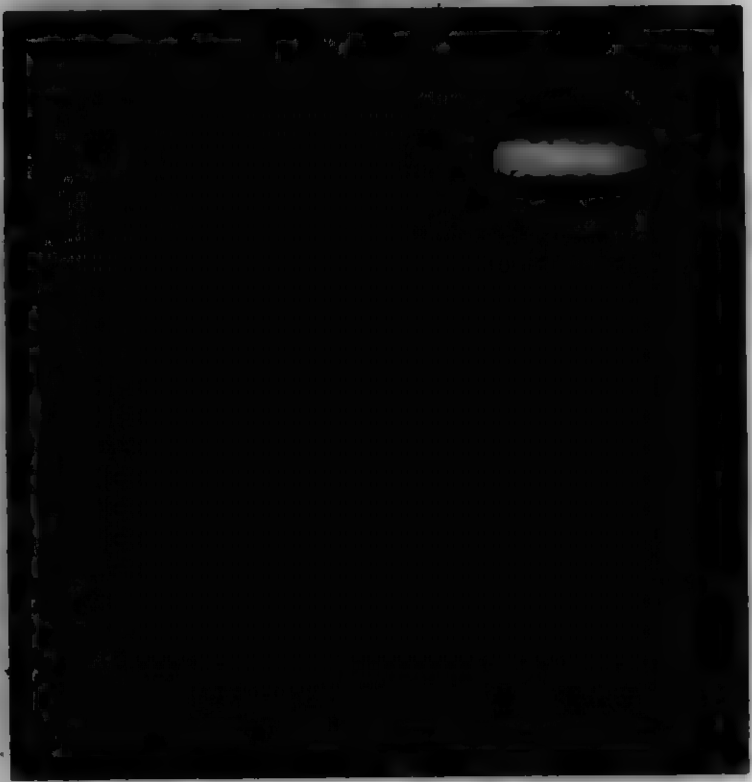

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Graphics. Added Value From National Computer

National Computer — truly the greatest name in terminals, does it again. Adding graphics to the VT100 puts it up front with other National Computer products such as the Lear Siegler ADM3A, Teletype 43, Televideo 920, Techtran 951 and many others.

Of course, a great idea like Graphics always starts with a good one. And the VT100—featuring 96 upper/lower case ASCII characters, up to 132 characters per line, numeric and function keypad, detachable keyboard and a wide variety of screen customizing features—is a very good idea, indeed.

Together, they become one exceptional idea called the Graphics VT100. The perfect graphics addition for business, scientific and engineering design applications, regardless of whether you want to maintain DEC product continuity or are just looking for the highest quality graphics terminal at a cost hundreds less than the competition.

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Department Conflict Silences Computer Room

(Continued from Page 31)

Tom didn't have to look far. The weekly payroll run was one of those monstrosities that operators hope is run during their lunch hour. The job required 52 tape mounts, all but four for temporary files. Many of these were never opened, depending on the input for that run. All tapes containing temporary files, whether they were opened or not, were assigned a one-day retention period because of the frequent need to restart the job in the middle, usually after an unrecoverable tape error.

Tom saw the folly of this, having come from a disk-oriented shop. He rewrote the payroll JCL, moving all temporary files to disk and deleting them after a successful completion of the job.

Proud of his work, he got the operations manager to bring in the MIS director, the payroll manager and the manager of systems and programming for a demonstration. Without 48 unnecessary tape mounts, the job ran in five minutes instead of the usual 55.

Instant Hero

Tom was the instantaneous hero of operations. But Floyd Axtogrind, the manager of systems and programming, was the first to realize that the actual result of Tom's demonstration was to show the incompetence of the conversion programmers under his command. Without a rational argument to fall back on, Floyd decided to use the class prejudice of his fellow managers. He congratulated Tom on his technical competence, a trait seldom found in "mere operators."

Floyd then reminded everyone of Poppapill's rigorous system development methodology. The analyst who designed the payroll system (whoever he was) had a college education and years of experience in the pill business. There must have been some, albeit obscure, business reason for the selection of tapes and a one-day retention. The payroll system was to remain as is.

New Kid

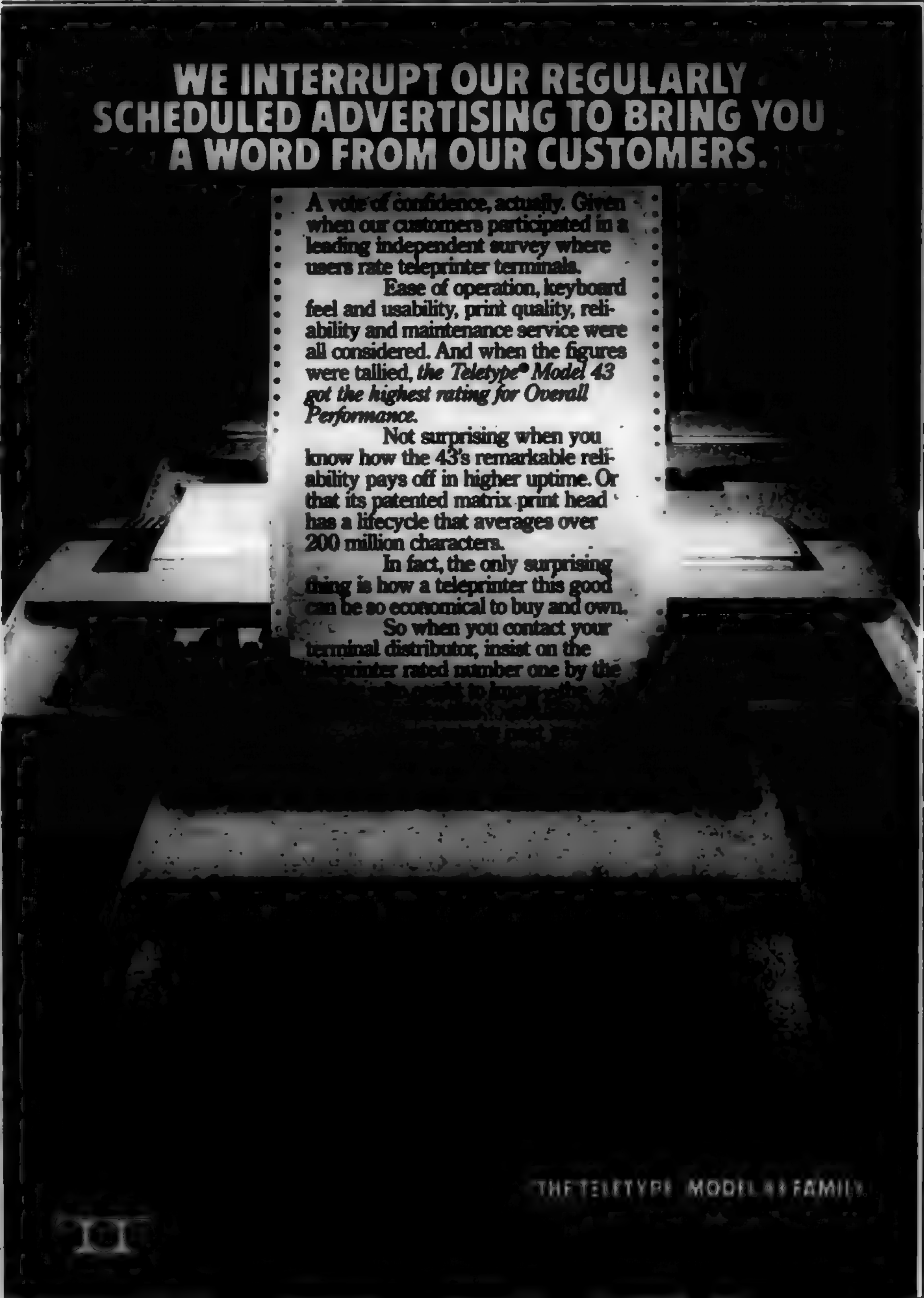
As the new kid on the block, Tom didn't anticipate the political implications of his act. He was too flabbergasted to point out that the payroll system was designed years before disks were invented. The demonstration was over.

Tom compunded his mistake by continuing to use his own JCL whenever it was his misfortune to run payroll. He was soon fired for "exceeding his job description."

This story could have ended right there, with the loss of a potentially valuable employee. The greatest effect of this event, however, was its impact on the operators who remained at Poppapill. Management had demonstrated — in no uncertain terms — what would happen to operators who made suggestions. To the operators, Tom had become a martyr in the war against programmers. His tale was told to all new operators for years to come.

Ironically, the payroll system was eventually moved to disk. The deed was done quietly by a contract programmer hired to assist in the conversion to a brand new Big Blue Model 58.

Hansen is a DP training consultant based in Elk Grove Village, Ill. An admirer of Robert Glass' columns in Computerworld, *Hansen has written this piece after Glass' style.*



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LETTERS

The Real Reason

We have read the synopsis of remarks by Dr. Richard Hamming concerning an aspect of the source of low programmer productivity [CW, Oct. 20]. Although we agree that programmers do tend to allow their skills to deteriorate as their careers develop, we do not believe that this is an adequate explanation.

The productivity of the data processing department is directly relatable to the utilization of capital. The software constituents of programs are tools. The DP department can best view these tools as capital. This demands the systematic development of software tools to enhance productivity.

The programming capital currently consists of compilers, operating systems, generalized utilities and subroutine libraries. Do management policies currently exploit the available capital?

The failure to formulate policies for phasing in new capital forms and phasing out the old forms has led to the ad hoc development of new capital forms which are inconsistent with old forms and the fashionability of structured techniques which attempt to wring the last possible drop of value from obsolete capital. The decline of programmer productivity is a symptom of the exhaustion of software capital.

William H. Lemay
Orchard Lake, Mich.
David B. Lightstone
Southfield, Mich.

Six Project Stages

Robert L. Glass' article "Hiding One Failure Behind Another" [CW, Oct. 20] clearly illustrated stages 3, 4 and 5 of the six stages of a project:

1. Enthusiasm.
2. Disappointment.
3. Panic.
4. Search for the guilty.
5. Punishment of the innocent.
6. Promotion of the nonparticipants and awards to the nonparticipants.

Heather A. Pierce
Kent, Wash.

One-Sided View

Prof. Calvin C. Gotlieb's contention that computers are "job killers" is incredibly simplistic and one-sided, especially for a "noted Canadian computer scientist" [CW, Oct. 13]. The logical conclusion of his argument would be that any effort to improve productivity borders on the criminal. Any purchase of carbon paper should be preceded by an "employment impact statement" for it might reduce the amount of repetitive typing!

A reasonable discussion of any productivity-improving techniques or technology should include mention of both long-term and short-term effects on workers, owners, consumers, the industry as a whole and the economy as a whole.

For instance, when installing a computer, the owner may choose to increase production or reduce costs. If the owner chooses to reduce costs, this results in a higher profit margin, thus attracting new entrepreneurs into the industry and thereby somewhat offsetting the original loss of jobs. The total output of the industry is increased either way, and the (real) price of the product will fall. As a side effect, the computer industry expands, and the economy as a whole grows.

In these times when sluggish productivity growth is seen as a major problem in North America, Professor Gotlieb's lecture serves only to impede the constructive and essential process of computerization.

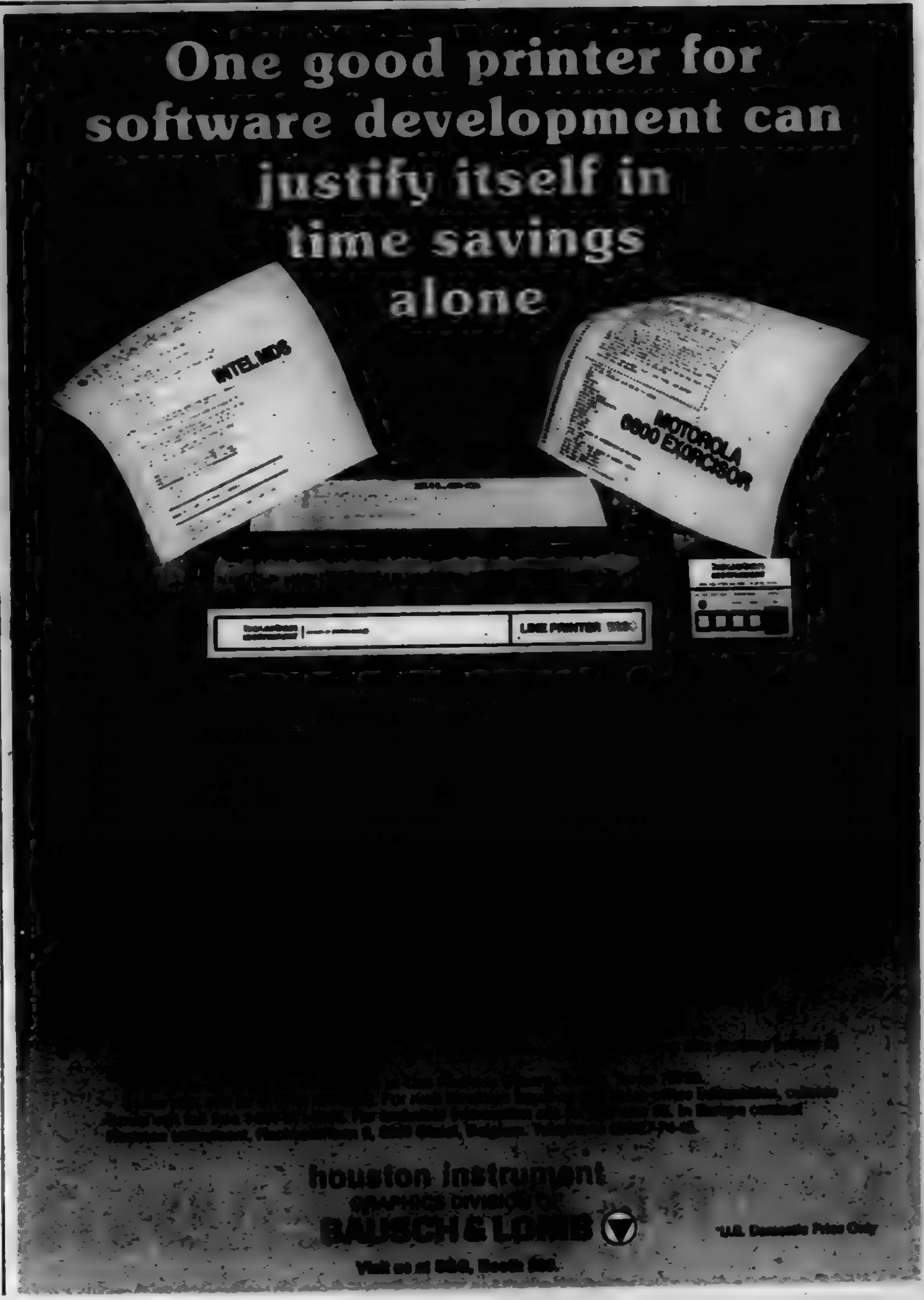
S. Tucker Taft
Somerville, Mass.

Problems With Zip

A recent letter from Rudolph E. Hirsch [CW, Oct. 13] illustrates some misunderstanding of the problems created by the nine-digit Zip Code. If we are to peacefully coexist with those who allocate the resources to change all that will need to be changed, we in the trenches must be sure they understand the magnitude of the problem.

Statements such as "changing to five alphanumerics would only require minimal program changes" do not improve our plight. If Hirsch can devise a method of storing five alphanumeric characters in three bytes of a record, he could make a fortune!

John Meurer
Winchester, Ky.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'Core-Plus-Modules' Approach

Ansi X3J3 Putting Fortran on a Diet

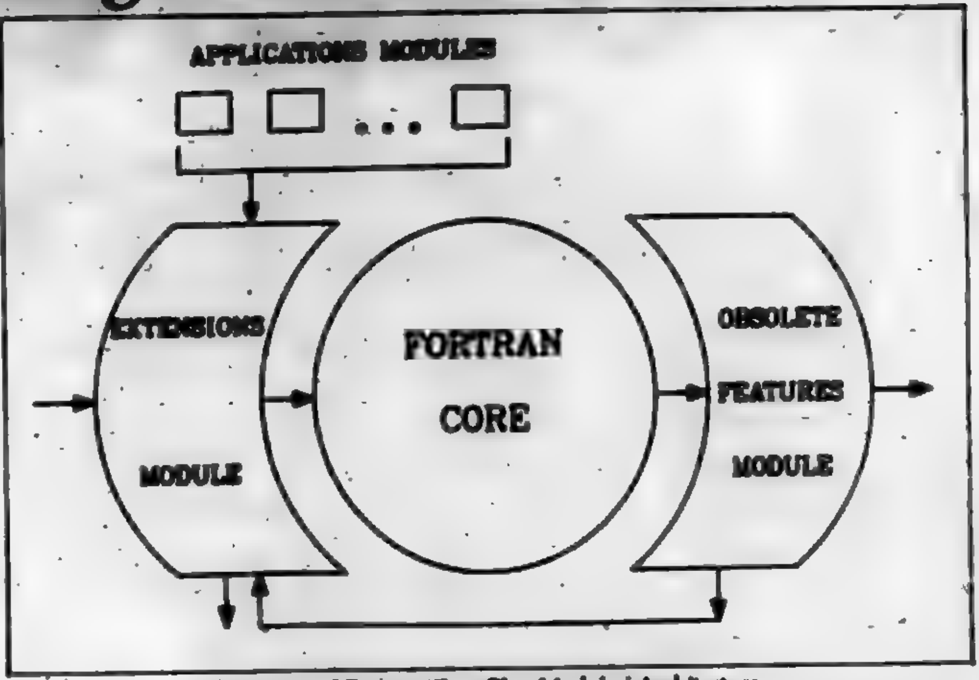
By Rita Shoor
CW Staff

MELBOURNE, Australia — Fortran is being put on a diet, and if you want to have a voice in how the pounds will be pared away, it's a good time to get in touch with the American National Standards Institute (Ansi) Committee X3J3.

The effort to stimulate interaction between the committee responsible for Fortran standardization was one of the driving forces behind a paper entitled "Fortran for the 1980s," presented at the recent International Federation for Information Processing (Ifip) Congress 80 here.

The paper was co-authored by Walt Brainerd of the Los Alamos Scientific Laboratory and Jeanne Adams of the National Center for Atmospheric Research in Boulder, Colo. Adams chairs X3J3 and Brainerd is in charge of coordinating the technical work on the standards committee.

Core Fortran



The Proposed Fortran 'Core-Plus-Modules' Architecture

The paper laid out one of the approaches being considered by X3J3 for the next Fortran standard. This is a "core-plus-modules" structure that will hopefully address the two major problems of collateral software systems and "an overweight language," the authors explained.

The core, serving as the Fortran nucleus would consist of a complete set of language features with the intention being that "most general-purpose applications" could be written in "Core Fortran."

Separate modules would contain features that are not in the core but are used to provide an enhanced facility. Three kinds of modules were identified in the paper: an extensions module, an obsolete features module and applications modules.

The extensions module would give some means of introducing features that may or may not survive in the language and, in addition, provide a place to put language features that may be of special importance to a particular class of problems. A collection of sophisticated array processing facilities was specified in the report as a "good example" of a feature that would be of interest only to a specific type of user with access to array processing hardware.

An obsolete features module could be a sort of retirement home for features that "no longer serve the Fortran users well." Placing candidates for retirement in a separate module would serve notice that there features "will probably not appear" in future versions of the standard. However, the proposal to make certain functions obsolete would have no immediate impact on current users of these functions, Brainerd noted.

A main purpose of the obsolete features module would be to retire certain facilities in a way that does not require that all programs using these features be immediately converted. "I suspect that all major [Fortran] implementations would contain the obsolete features module," he said.

The proposed system architecture also allows for the possibility of "many kinds of applications modules interfacing with the rest of the language." Possible applications

(Continued on Page 44)

Corporate Structuring Backed

CINCINNATI — M. Bryce & Associates, Inc. has announced Release 5.1 of its Pride-Logic Information Resource Manager (IRM), which features a component for structuring corporate organizational components.

The Entity component reportedly allows the structuring of such things as functions, departments and people for cataloging and maintenance by the IRM.

Entity will show and maintain relationships among entities; enumerate names, locations and telephone numbers of employees; depict an entity's use of systems, subsystems and procedures; show what files are used by the entity; and show what inputs and outputs are used to implement an entity's information requirements.

Other enhancements include an improved data flow analysis feature for project-status checking, a faster reorganization procedure and a new auditing feature, a company spokesman said.

The Pride version of the package costs $20,000, while the free-standing version costs $27,000. An optional DL/1 interface to Pride-Logic is available for $5,000 from the firm at 1248 Springfield Pike, Cincinnati, Ohio 45215.

Strategic Planning Optimized

AUSTIN, Texas — A software package said to allow executives to analyze strategic planning options has been announced by Execucom Systems Corp. for users of its Interactive Financial Planning System (IFPS).

The Interactive Financial Planning Optimization System (Ifpos) is said to be suited for such applications as portfolio analysis, profit planning, production and inventory planning, cash management and transportation logistics.

Also suited for manpower assignments, advertising and media selection, and project scheduling and budgeting, the package is available for an introductory one-year trial period for $15,000, or a perpetual license at $90,000 from Execucom, P.O. Box 9758, Austin, Texas 78766.

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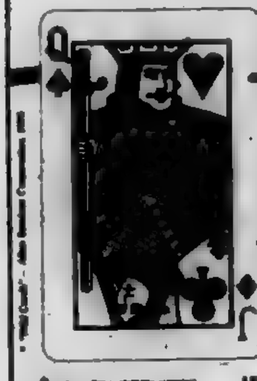

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Software AG announces a major breakthrough in data processing technology:

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"Until now, the data base machine has been the illusive 'holy grail' of computers – because nobody has succeeded in producing one that would deliver any acceptable degree of efficiency and cost-effectiveness. Recently, in fact, many of the experts have been predicting that such a machine just couldn't be built."

A data processing breakthrough

"Now, at last, The Data Base Machine is a reality. Software AG has built the first practical backend data base system – a machine which not only off-loads all DBMS activity – but at the same time actually *increases* the performance of the DBMS in the process."

"We call our unique new system The Data Base Machine."

ADABAS architecture provides the answer

"There have been many attempts in the past to produce a high-performance backend data base system – both by hardware and software companies. Software AG has been able to succeed where others have failed because of ADABAS, our highly respected Data Base Management System."

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"If you'd like to know more about this revolutionary software system, write us today. We'll be happy to show you how The Data Base Machine can bring new cost-effective performance to your DP environment, starting right now!"

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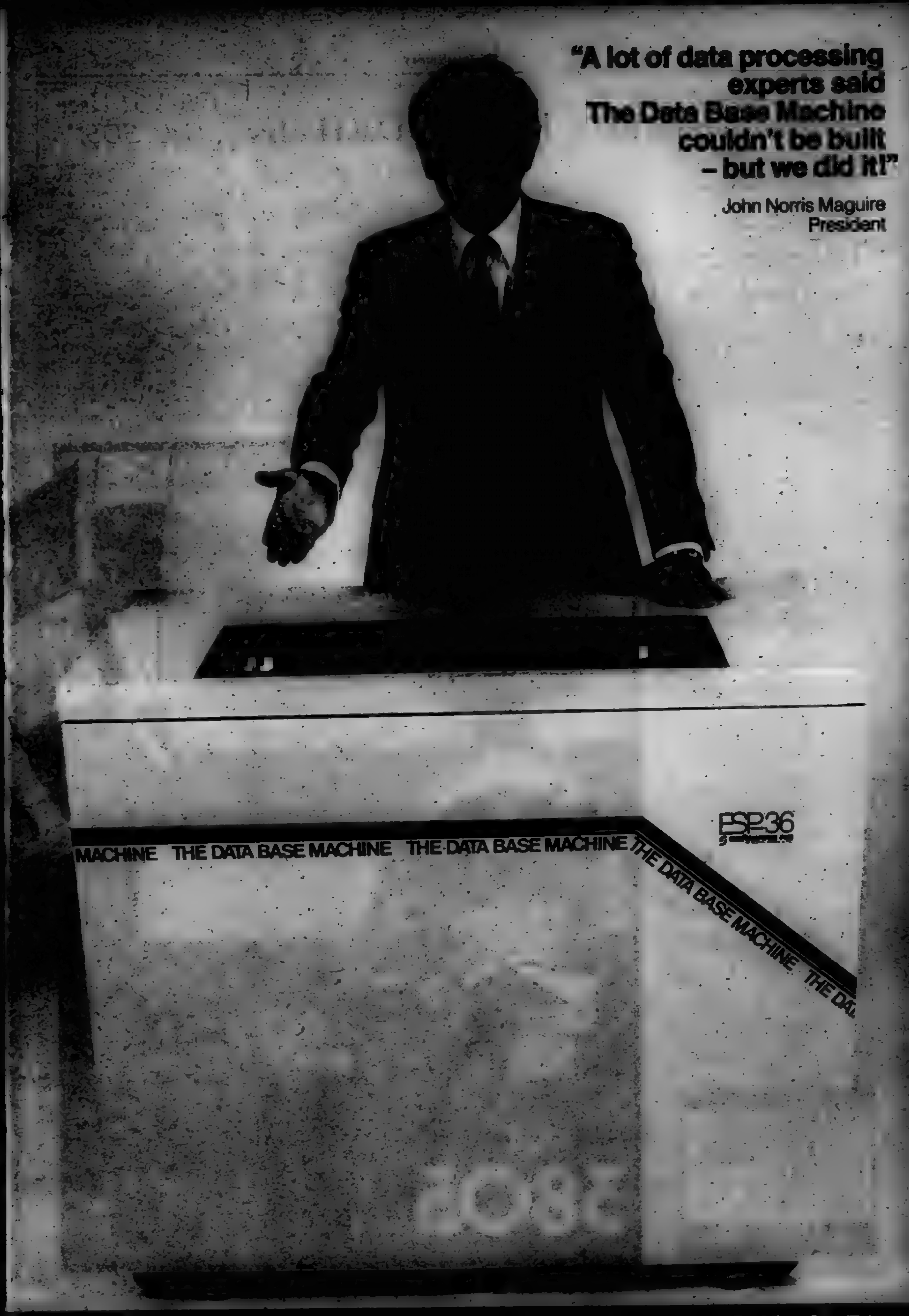
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"A lot of data processing
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John Norris Maguire
President

Parameter-Driven Program

Series/1 Under EDX, RPS Gets Data Entry

DALLAS — A high-volume data entry software program designed for the IBM Series/1 minicomputers operating under the EDX or RPS operating systems has been developed by System Consulting Services, Inc. (SCS) of San Antonio, Texas.

The software, called S1DES, is completely parameter-driven with self-prompting menus and has no editing languages. Table searches are standard without using exists, and automatic logical entries and defaults simplify data collection and increase performance, the firm said.

S1DES will support 4978 and 3101 display stations and operates in an interrupt-per-keystroke mode. It builds an intermediate output file which is converted and blocked to user specifications with labels and proper JCL, the firm said. These output files are standard EDX- and RPS-compatible.

A CPU license for S1DES is available for $3,500. It is also available as a turnkey package and in OEM quantities. More information may be obtained from Information Concepts, Inc. at 1750 One Dallas Centre, Dallas, Texas 75201.

Teletype Emulator, Utilities Provided for HP Series 80

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a line of software for its Series 80 personal computers that includes utilities for data communications and teletypewriter emulation, along with enhanced functions and commands including an emphasis on statistics, math and string manipulation.

The teletypewriter emulation and the other utilities are available for HP's HP-85 processor, and the software will run on future Series 80 machines. The software is packaged individually on tape cartridge or disk. Tapes cost $29 for the first tape and $12 for additional tapes. Disks cost $21 for the first one and $12 for additional disks, the vendor said.

HP is also selling solution books of about 10 related programs on subjects like stocks and bonds or numerical analysis. The books cost $10 each, the vendor said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

OS/VS1 User Gets 'SDSI'

SANTA CLARA, Calif. — Memorex Corp. has announced its Shared Data Set Integrity (SDSI) software package, developed by Duquesne Systems, for OS/VS1 users with multiple CPUs.

SDSI, available to MVS users since 1979, provides integrity for data sets that are shared among multiple CPUs without the overhead of hardware reserves. The program does this by changing both reserves and normal intrasystem enqueues and converting them to global enqueues.

SDSI costs $12,000 for two CPUs and $15,000 for more than two CPUs.

Memorex's Software and Services Division can be reached through M/S 12-16, San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Ansi Designing Fortran Diet

(Continued from Page 41)

modules would include those for data base management, graphics and real-time process control, the paper noted.

Criteria for determining whether a proposed facility goes into the core or in a separate language module include the following:

- The core must be a complete language suitable for most general-purpose applications.
- The core must be internally consistent and regular.
- The core must consist of features characterized as reflecting modern software technology.
- Programs written in Core Fortran should compile and execute efficiently.
- Features in the core must be machine-independent.
- Features should not provide duplicate functionality.
- All features (except program source form) must be compatible with the obsolete-features module.

Now is the time for concerned people and organizations to make X3J3 aware of their opinions and suggestions, Brainerd said. These should be sent to Loren Meissner, Secretary of the X3J3 Committee, CSAM — 50B, Lawrence Berkeley Laboratory, Berkeley, Calif. 94720.

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Graphics Support Enhanced For LSI-11s, PDP-11s

CANOGA PARK, Calif. — Andromeda Systems, Inc. has expanded its offerings of graphics support software for Digital Equipment Corp. LSI-11 and PDP-11 computers.

Graphics hard-copy output is now supported for Anadex, Inc. DP9500 and 9501 series printers. The DAS/F (Data Acquisition System/-Fortran version) now supports graphics hard-copy output to Printronix, Inc., Okidata Corp. and Anadex printers.

Software input routines are now available for the Houston Instrument Co. HI-PAD graphic digitizer pad.

Labex6 is a set of subroutines written in Fortran and Macro-11 that will drive the Anadex DP9500 and 9501 printers. The routines will create hard-copy graphics images from a bitmap in the computer's memory, the vendor explained.

Labex 7 has been introduced as a separate development. It allows the user to get graphics positional data from a graphics pad through a serial interface.

DAS/F-GH costs $700 and includes Labex6, which sells for $200. Labex7 costs $100, the vendor said from 9000 Eton Ave., Canoga Park, Calif. 91304.

On-Line Report Writer, Query Language Fit PDP-11

NEW YORK — An on-line report writer and query language designed for use with a variety of data base systems and file access methods is available from Enterprise Technology Corp.

The Generalized Reporting System (GRS) for Digital Equipment Corp. PDP-11 minicomputers running under RSTS/E will be released in January; a version for IBM and compatible mainframes is scheduled for release later in 1981.

GRS consists of an English-like query language which Enterprise said is suited for non-DP users. Structured to facilitate its use by management for ad hoc information retrieval, the language is also intended for systems personnel to reduce the time spent on user requests for reports.

In many cases, one statement is all that is necessary to produce a formatted report, the vendor claimed. Summarization statements and an advanced set of built-in calculations are said to allow the user to aggregate data and perform complex analyses, again using a single statement in many cases.

The user can supply his own titles, headings and footers, and several different files, record formats and/or print line formats can be incorporated into a single report.

GRS also includes an extensive on-line user HELP facility and optional password protection at the individual field level.

GRS reportedly operates on most types of interactive terminals, both hard-copy and CRT. A special Scope mode allows GRS to pause at the bottom of each page, facilitating its use on CRT terminals.

The GRS software will be supplied under both perpetual licenses and leasing agreements. The license fee for PDP-11 users is $12,000, including documentation and one year of basic support.

Enterprise is located at 305 Madison Ave., New York, N.Y. 10165.

'DP-1' Offers Drafting System

YPSILANTI, Mich. — Software that provides a two-dimensional drafting system for draftsmen, designers and engineers using symbols and names with which they are familiar has been introduced by Com-Code Corp.

Drafting Package-1 (DP-1) contains five generally accepted line types, line functions, circles, arcs and dimensioning capabilities that the draftsman routinely faces, the firm said.

Also included is a set of drawing modifications and a software support program.

DP-1 costs $9,500 for a five-year, single-user license, Com-Code said from 1977 Chevrolet St., Ypsilanti, Mich. 48197.

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Native Mode FAST-3805 takes advantage of the inherent characteristics of semiconductor random access memory to achieve a paging rate of up to 530 4k-pages per second per controller. That's almost double the maximum paging rate of a 2305—and triple that of the 3350—while using less than half the CPU cycles.

Native Mode utilizes Fixed Block Architecture—a simple and highly efficient addressing scheme—which further increases the semiconductor disk's already exceptional performance. Data transfer is started with a sequence of only two commands (in contrast to six commands for a rotating disk).

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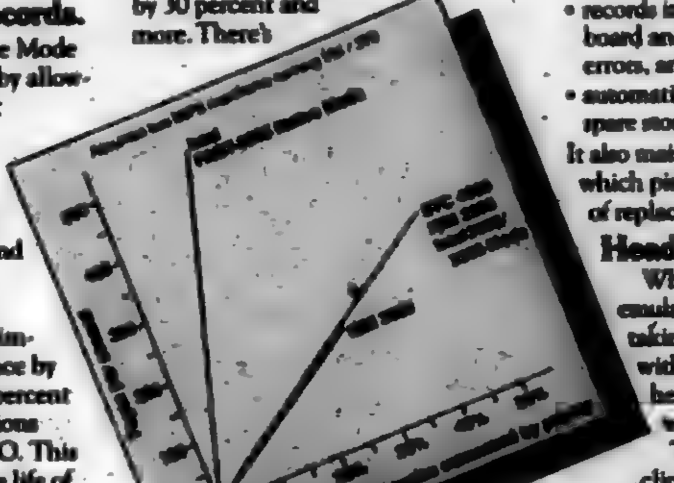

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Harris Users Get 'DS1'

FULLERTON, Calif. – The Drafting System 1 (DS1), which reportedly allows up to six users to digitize directly from a free-hand sketch of an electronic schematic directly to a computer, is now available for Harris Corp. computers.

Created by Design Aids, Inc., the software straightens slanted lines, inputs the correct size symbols and enters alignments among symbols imposed during the input process, the vendor claimed.

The price for the software ranges between $42,000 and $79,000, depending on user needs.

Harris is located at Suite 1F, 1661 E. Chapman Ave., Fullerton, Calif. 92631.

For Legal Firms

'Wanglaw' Gives WP, DP on OIS

LOWELL, Mass. – Wanglaw, a software package that helps automate critical business and professional functions of legal firms, has been introduced by Wang Laboratories, Inc.

Designed for small to medium-sized firms, Wanglaw is the firm's first business package to combine DP and word processing (WP) capabilities on the Wang Office Information Systems (OIS).

The system handles timekeeping and disbursement accounting, billing, accounts receivable, management reporting and WP.

Wanglaw's analysis functions break down into three separate categories: work-in-process, realization-and-profitability and accounts receivable analyses. The work-in-process report tracks every hour spent by an attorney and calculates its dollar value.

The realization-and-profitability analysis compares bill amounts to the standard value of an attorney's time, expressed as a percentage. Realization equals 100% when actual billings equal standard value. Wanglaw also computes cash receipts.

The accounts receivable function tracks all billings, amounts owed and balances. Comprehensive repocting is also available, Wang said.

The software package was designed to operate on the Wang OIS Systems 130, 130A, 140 or 145 with adequate disk storage for both WP and DP. A permanent license costs $10,000.

Wanglaw will be available in early 1981. Wang is headquartered at One Industrial Ave., Lowell, Mass. 01851.

Dow Jones Extends Base

NEW YORK – Subscribers to the Dow Jones & Co. News/Retrieval Service will have electronic access to Media General Financial Services, Inc.'s full data base of detailed corporate financial information.

Users of the Dow Jones service will be able to obtain such information as revenues, earnings, dividends, price-earnings ratios and stock-price performance relative to market indicators on 3,200 companies.

The data base also includes composite information on 180 industries. Included in the data base for each company and industry are five-year growth rates of earnings and dividends plus five-year highs and lows for stock prices and price-earnings ratios. The data base will be updated on a weekly basis.

Dow Jones News/Retrieval users will have an initial free-trial period and then be charged $1/min for usage. Tymnet or Telenet telecommunications charges are included in this price. Dow Jones is at 22 Cortlandt St., New York, N.Y. 10007.

'Best' Packages Provide Training

RIVERDALE, Md. – SMC-Proprietary Systems is offering a training program that reportedly simplifies the teaching of computer operations by using video training tapes.

The Business Environment Software Training System (Best) training packages range in price from $500 to $1,000, the vendor said from Suite 100, 5711 Sarvis Road, Riverdale, Md. 20840.

Disaster Recovery Insurance

You can consider the DMS/OS DASD management system as your major Disaster Recovery Insurance. Many of its users rely on it as the cornerstone of their disaster recovery plans, because it ensures them a swift and efficient recovery of their DASD data.

The duplication of critical data is one of the most time consuming activities at any data center. Yet, the cost in jobs, earnings and company stability is so high that this task must be performed regularly.

Most data centers perform weekly back-ups for the complete data center, with critical data backed-up more frequently. There are full pack dumps, application, selected data set and selected data base back-ups performed on some scheduled basis.

Yet, should a disaster strike, most plans cannot easily establish a firm time oriented baseline for even one storage device. With DMS/OS, a baseline can be established as frequently as desired *without redundant back-up.* Most DMS/OS users create this firm time-stamped baseline on a daily basis, for their entire data center. Critical data bases and data sets can still be backed-up more frequently.

Back-Up

What is the magic in DMS/OS? How can the users of this package create this daily baseline? INTELLIGENT BACK-UP backs up only those data sets that have been created or modified since the previous back-up run. By using the VTOC back-up feature of the package, and the intelligent back-up tapes, users can restore/recover all, or any part, of their data at will.

Most DMS/OS users find that INTELLIGENT BACK-UP saves a considerable amount of time since, on average, only 10% to 15% of all their data sets are created or modified between weekly back-ups. Just a portion of the time saved with INTELLIGENT BACK-UP is often used to provide more frequent back-up of critical data sets.

Recovery

DMS/OS maintains an on-line index of all the data sets that have been backed-up. Using this index, and the VTOC back-up features, it is very easy to recover to the time of the last intelligent back-up. All the user needs to do is identify the lost device and indicate the device (or pool of devices) on which recovery is to be accomplished. DMS/OS automatically recovers the VTOC, interrogates the on-line index, orders the necessary tape mounts, allocates the data sets and recovers the lost information.

Even More

Device Independence- Since all data sets are backed-up as logical data sets, as opposed to track image copy, they can be recovered with true device independence.

Critical Data Recovery - Sometimes it is not possible to recover all of the data that was lost. In these cases, the RESTORE command lets the user recover one or more data sets using their names or high level qualifiers. Critical and time dependent applications can be recovered without significant impact on other processing requirements, and it is not even necessary to use a spare or expendable on-line device.

Spreading the Baseline - Many data centers can no longer do a complete baseline on any given day of the week. Fortunately, DMS/OS eliminates the need and benefit of this procedure. Using a vendor written exit, the user can automatically spread his back-up across his optimum cycle. With the exit in place, it is never necessary to create a full pack baseline. All of the data sets that have not been backed-up in N-days are backed-up automatically when the intelligent back-up is run.

Flexibility - Intelligent back-up can be run in many different ways. It can truly be tuned to support the many variations in your environment. Applications, devices, groups of devices or your data center can be backed-up or recovered as needed.

Tape Handling - In both the incremental and the full pack back-up modes, each output tape is used to its maximum capacity (without end of tape processing or modifying a tape). User experience has shown that this practice uses less tape and provides greater reliability than other processes.

Tape Duplexing - If desired, DMS/OS will write two tapes at the same time during output processing. This extra security feature illustrates the design integrity of the entire package and further, reduces the probability of data loss through mechanical failure at the tape drive.

Portability - DMS/OS can be run on any IBM full operating system, from MFT through MVS. It can rebuild its own on-line index. You do not need your computer, storage devices or operating system to recover or use any of your applications.

DMS/OS is your Disaster Recovery Insurance. It gives you the speed, flexibility and capabilities to perform a swift and efficient recovery. It also frees you from the heavy overhead of unnecessary redundant back-up.

DMS/OS is available for a free on-site 30-day evaluation. Get your disaster recovery planning on the right track. Call or write SMM today.

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Six Packages Among Zilog Debuts

CUPERTINO, Calif. — Zilog, Inc. has introduced six applications software packages to run on the firm's MCZ-1 and MCZ-2 small business systems; an IBM 2780 or 3780 workstation emulator; and a new version of the RIO operating system.

The six applications software packages handle the functions of accounts payable, accounts receivable, payroll, order entry and inventory control, general ledger and financial modeling.

Zilog has previously offered only systems software to its customers, a company spokesman pointed out. The firm is offering five of the six applications software packages in floppy-disk, source-code versions for a combination price of $2,500; object-code versions are $225 per package.

The combination offer excludes the Financial Modeling System, which costs $1,050 or $125 for the object-code version. Cartridge-disk versions of all packages are also available.

The 2780/3780 Workstation Facility runs on the RIO (MCZ-1) and RIO/-CP MCZ-2) operating systems. The emulator is said to let the user of a Zilog system read a data file and transmit it to another processor, as well as receive data from a remote processor and record it on a disk or send it directly to an on-line printer, Zilog said.

Data transmission is handled via switched or dedicated lines at speeds ranging from 1,200- to 9,600 bit/sec. The emulator supports multiple data links, such as multipoint private lines or the emulation of up to four workstations on a single MCZ system.

The Workstation Facility costs $850 and the PSI board is priced at $895.

The new version of the RIO operating system, aimed at transaction-oriented business applications, runs on the MCZ-1 series of microcomputer systems.

RIO Version 3 includes software support features and a new Sort/Merge package, said to economize on execution time and programming effort. The package features an advanced file system that supports up to four floppy disk drives (1.2M bytes) and/or four hard-disk drives (40M bytes), the firm said.

RIO Version 3 costs $500 from Zilog at 10340 Bubb Road, Cupertino, Calif. 95014.

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Service Offers Typesetting

SCHENECTADY, N.Y. — A telecommunications interface service that allows word processor users to translate written material via phone lines and modem terminals into typeset documents, books and brochures has been announced by Komp Korner, an affiliate of Acme Press Printing.

Besides an estimated 25% to 50% savings in production costs, the service is said to offer typesetting services in "a fraction of the typical . . . turnaround time," according to the vendor.

In addition, photocomposition can condense the client's stored, previously keyboarded material into 40% to 50% less space per printed page, the spokesman said.

Offering any combination of typefaces, the service reportedly eliminates the error factor resident in conventional printing processes, since the client inputs all keystrokes himself without the printer's having to retype material, a vendor spokesman noted.

A typical 8.5-in. by 11-in. paper sheet accepted, typeset and run off would cost $15, the spokesman said. Acme Press/Komp Korner is located at 306-314 Union St., Schenectady, N.Y. 12305.

Six Modules Update 'IMCS'

CINCINNATI — Interactive Information Systems, Inc. is offering a product release, Version 7A1 of IMCS, that includes such enhancements as Variable Time Buckets, multiple stocking locations, a fully integrated purchasing module and a capacity requirements system.

The vendor now offers six integrated modules: Inventory Management, Materials Standard Data Base, Materials Requirements Planning, Shop Floor Control, Capacity Requirements Planning and Purchasing, a spokesman explained.

The new release extends the costing, especially in the area of Bill of Material, Inventory, Material Requirements Planning and Capacity Requirements Planning.

Version 7A1 is available for a one-time license of $74,500 from the vendor at 10 Knollcrest Drive, Cincinnati, Ohio 45237.

DTSS Includes 'Smug' Analyses

HANOVER, N.H. — Smug, a group of interactive computer programs for the analysis of structural members and mechanical elements, is now available as part of the DTSS, Inc. remote computing network.

Smug may be accessed through DTSS Interactive Computing Services by retail customers or members of the DTSS Associates Plan, or it may be licensed for use with the DTSS operating system.

DTSS is located at 10 Allen st., Hanover, N.H. 03755.

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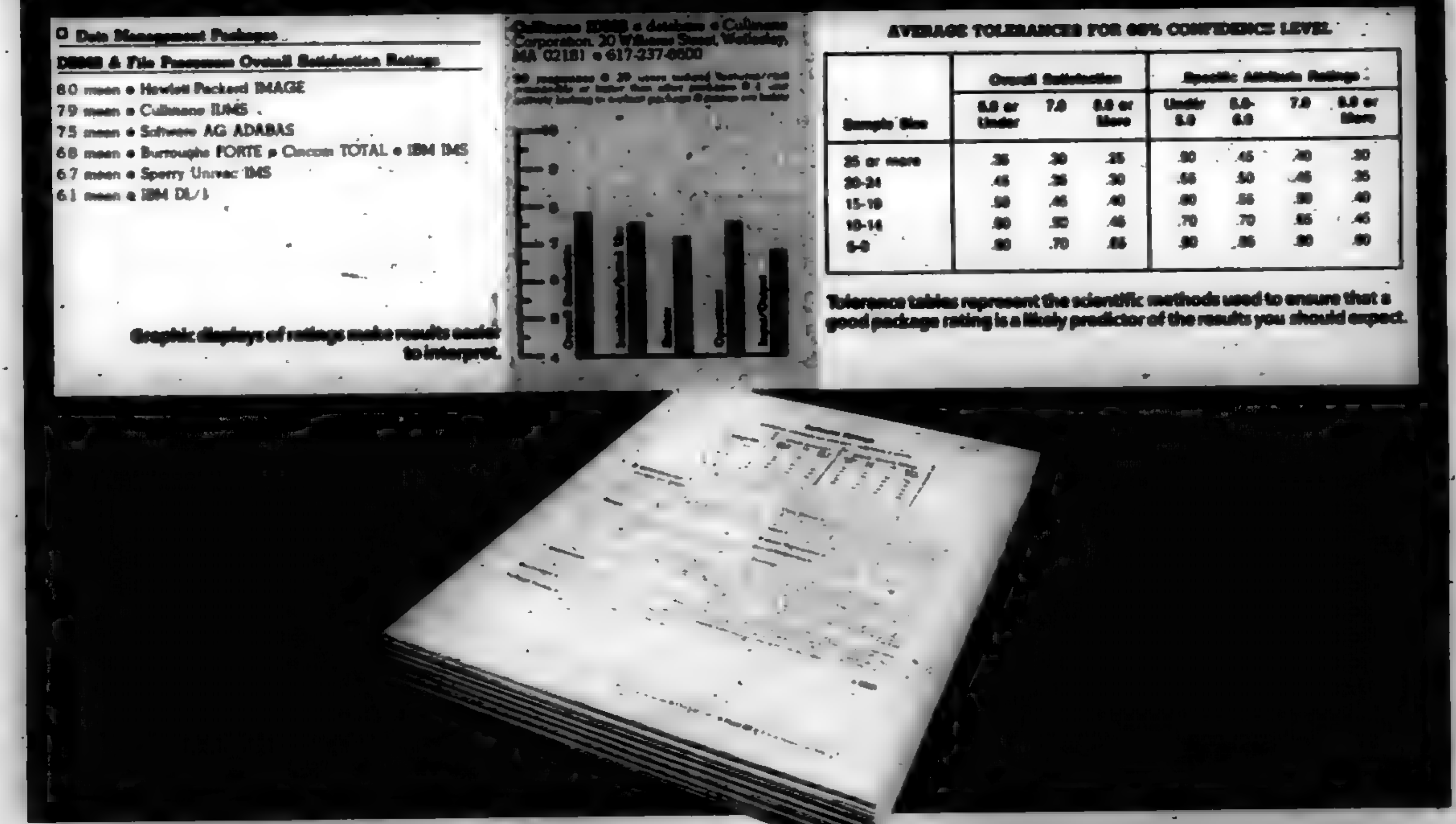

□ Data Management Packages

DBMS & File Processor Overall Satisfaction Ratings

8.0 mean • Hewlett Packard IMAGE
7.9 mean • Cullinane IDMS
7.5 mean • Software AG ADABAS
6.8 mean • Burroughs FORTE • Cincom TOTAL • IBM IMS
6.7 mean • Sperry Univac IMS
6.1 mean • IBM DL/1

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25 or more	.35	.30	.25	.50	.45	.40	.30
20-24	.45	.35	.30	.55	.50	.45	.35
15-19	.50	.45	.40	.60	.55	.50	.40
10-14	.60	.50	.45	.70	.70	.55	.45
5-9	.80	.70	.55	.90	.85	.80	.60

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Software Gives Vector Files

BROOMALL, Pa. — Software for raster-to-vector data conversion has been released by Broomall Industries, Inc.

Rave Super-Vec operates in real time for the Scan-Graphics family of host computers. Data capture via scanning and vectorization now occurs as a single-step process.

Vector data files created by Super-Vec are 90% smaller than equivalent raster files, the firm stated. The vector data base may be stored on magnetic tape or disk and accessed by a retrieval system and interactive graphics system.

The software costs $85,000 from Broomall at 700 Abbott Drive, Broomall, Pa. 19008.

'RTfile' Gains Internal Sort

BELTSVILLE, Md. — RDA, Inc. has enhanced the report generator capabilities of RTfile, its relational data base manager. The product now features an internal sort and logical operator selection.

The sort provides ascending or descending multiple field sorting of up to 10 fields, the vendor claimed.

The logical operator selection allows Boolean testing for the following conditions: Equals, not equals, greater than, greater than or equal to, less than, less than or equal to and "contains" (string B within string A).

The report generator is included with RTfile, which costs $2,500, the vendor said from 5012 Herzel Place, Beltsville, Md. 20705.

'Cope' Reduces Procedure Code

ALLENTOWN, Pa. — Software Consulting Services has announced the release of Cobol Plus Extensions (Cope), a package said to combine a logic table processor and a macro generator.

Cope is said to eliminate up to 50% of Procedure Division code. The software also reportedly improves documentation, speeds debugging and eases maintenance.

Cope is written in and generates ANS Cobol and costs $1,500 from the firm, which is headquartered at 901 Whittier Drive, Allentown, Pa. [illegible]

On-Line 'Freight' for Shippers Computes Charges, Picks Routes

ST. LOUIS — Freight, software that allows large shippers to use a centralized data base of transportation rates and routes for computing freight charges and selecting carriers and routes, is being offered by McDonnell Douglas Automation Co. (McAuto).

The minimum requirements for licensing the package are an IBM 360/-158 or 370/148 with the MVS or OS/-VS operating systems and the IMS DB/DC software.

A license for Freight costs $125,000 for the program source code, documentation and training from the vendor in St. Louis, Mo. 63166.

Corrections

Information Concepts, not H&W Computer Systems, Inc., is handling the marketing of the CICS Transmission Optimizer (Ctop) [CW, Nov. 3]. The firm is located at 1750 One Dallas Centre, Dallas, Texas 75201.

In the Oct. 20 issue, the article, " 'IDA' Provides Statistical Analysis" omitted the fact that discounts on the SPSS, Inc. package are available to academic and nonprofit institutions. SPSS is at 444 N. Michigan Ave., Chicago, Ill. 60611.

Stratmar Unbundles Its 'Supervisor II'

NEW YORK — Stratmar Business Solutions Corp. has unbundled its Supervisor II software from its turnkey computer systems.

The Supervisor II software, operational on Data General Corp. equipment, includes order entry, inventory control, accounts payable, accounts receivable and general ledger.

Individual systems are priced from $3,000 to $5,000 for end-user purchases, Stratmar said from 385 Madison Ave., New York, N.Y. 10017.

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Coordinates 400,000 Components

Space Shuttle System Links Nasa Sites

HOUSTON — Before the Space Shuttle orbiter is launched, more than 400,000 parts, supplies and ground support components will be needed to ensure the spacecraft's reliability. To account for these parts, the National Aeronautics and Space Administration (Nasa) and its prime shuttle contractor, Rockwell International Corp., have developed several software systems, and receive-only printers have been installed at inventory tracking stations to supply hard-copy printouts of parts information.

There is a great demand for a cross-referencing inventory system since many of Nasa's sites are involved in the Space Shuttle program. The project links the Nasa sites at Cape Kennedy, Fla.; White Sands, N.M.; Huntsville, Ala.; Downey, Calif.; and Houston.

One of Nasa's software programs, the Logistics Inventory Management System (Lims), tracks components by part number and provides shipping data, stock locations and information on back orders. For example, with the computerized accounting systems, Nasa logistics clerks in Huntsville can find out if the needed part is stocked at the Nasa site in White Sands.

Need for Quick Access

"The Lims system was designed to meet the widely dispersed need for quick access to parts information," Ernie Trevino, coordinator for material supply and support at Rockwell's Field Operation in Houston, explained. "Besides providing constant and immediate on-line file maintenance, the system expedites emergency orders for spare parts. As the by-product of file maintenance, a complete audit trail of the movement of parts all the way down to serial number level is provided."

Texas Instruments, Inc. Omni 800 Model 810 printers generate permanent records of the Lims data and interface with CRT terminals. To obtain a permanent record of parts data, the clerk can print information displayed on the CRT screen onto paper at 150 char./sec and can call up reports on priority requisitions every morning to facilitate management decisions.

In addition to the Lims network, Nasa has another program which utilizes hard copy provided by the 810. The Base Line Accounting and Reporting System (Bars) provides transaction reports and stock movements for all the shuttle modules.

Because the Space Shuttle is an extremely complex mechanism, Nasa has divided it into various modules, with a different contractor responsible for each one. For instance, the orbitor is one module and the external, fall-away fuel tank is another.

When a parts change in one module affects a second module, Bars monitors the change throughout its implementation.

"We have the TI 810 printer in Huntsville, Cape Kennedy, Houston, White Sands, Vandenberg Air Force Base in California and Bay St. Louis, Miss., in conjunction with the Bars program," Dick Sciortino, configuration management specialist for Rockwell at Houston, said. "We can keep the inventory numbers and the paperwork together and we get printouts when changes are to be implemented. This system is valuable in preparing meeting reports. The printer is used to format and print reports on an as-needed basis."

Logistics System

Nasa also uses the printers within the Automated Logistics Management System (Alms) in Houston. Like Lims, Alms is a parts control system that monitors inventory at Houston's Johnson Space Center. It tracks various maintenance and warehouse equipment needed to support the mission control center and works in conjunction with CRT terminals.

R.E. Coblentz, aerospace technologist for Nasa in Houston, described how the system works: "Typically, we would type in an item's catalog number and the computer would respond by filling the CRT screen with the item's stock balance and stock location. If a maintenance technician needed written information, he would have the 810 print what is on the screen. That way, he can keep the printout as a record of the information. It's a 24-hour operation."

"We've had good luck with the 810," Sciortino added, "but I especially like the TI printer because it has bidirectional printing. Other printers that we've had only print in one direction and would take a third more time to print what we need."

Moreover, he noted, "we can compress the number of characters printed per inch on the 810. We have some reports that require the full 132-column width of the paper, and it is hard to get oversized paper for the reproduction machine if we want more copies. We can use the 810's compressed printing capability and get it all on letter-size paper."

Trevino added, "The 810 is very reliable and has performed flawlessly. It has been a time and cost saver."

Access to 3270 Applications Offered From Ascii Terminals

MOUNTAIN VIEW, Calif. — An entry-level communications system that reportedly provides IBM 3270 applications access via Ascii CRT terminals has been introduced by Datastream Communications, Inc.

The T7 is said to be suitable for locations where casual data entry and inquiry is important, but economically impractical because of the high cost of terminal equipment. Depending on user requirements and usage characteristics, the T7 may co-reside with up to 15 directly attached terminals or may be located remotely and provide 15 ports of access for a community of dial-in terminals.

The user may also specify a mix of directly attached terminals and dial-in ports. The terminals, operating in conversational (character) mode, appear to an IBM 370 or compatible host computer as 3271-attached 3277 display stations, according to the vendor.

Links to one or two host computers, menu-selectable from any terminal, are possible over leased-line connections using IBM BSC protocol at modem-clocked rates of up to 9,600 bit/sec, the vendor said.

The 8-port version of T7 costs $9,350, while the 16-port version costs $15,400 from the firm at 555 Ellis St., Mountain View, Calif. 94043.

Data Briefs

Telex Impact Printer Replaces IBM 3287

TULSA, Okla. — Telex Computer Products, Inc. has introduced an impact printer called the Telex 286C that provides a printout of data sent from a Telex 274/276 control unit, an IBM 3274/3276 control unit or and IBM 4300 mainframe.

Plug-compatible with the IBM 3287, the microprocessor-based printer is offered in two models: the 286C Model 1, equipped with a 1345A Hytype II printer mechanism, and the 286C Model 2 with a 1355 WP Hytype II mechanism that uses a metallized printwheel.

The 286C averages 45 char./sec; both models have a choice of Ascii-B or Ebcdic character sets, the vendor said.

The Telex 286C Model 1 costs $4,600 and the Model 2 costs $4,900. Telex Computer Products is at 6422 E. 41 St., Tulsa, Okla. 74135.

Price of HP 2640B Reduced to $2,300

PALO ALTO, Calif. — Hewlett-Packard Co. has cut the price of its HP 2640B interactive CRT terminal by 30%, from $3,250 to $2,300.

In addition, a display enhancement package and a data communications cable, formerly available as options for $300, have been made standard on the 2640B.

HP is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Cross-Over Switch Links Four Devices

PALO ALTO, Calif. — A cross-over switch designed for interfacing four devices has been unveiled by Giltronix, Inc.

The GRS 232-S12 is said to be useful in communications applications in which two CPUs need to be connected to two modems. Each one of the CPUs may be connected to any of the two modems.

Monitoring and CPU interconnect options are available. The unit costs $199 from the firm at Suite 44, 450 San Antonio Road, Palo Alto, Calif. 94306.

Printer Interface Suits TI 810-Type Units

PHOENIX — A printer interface that provides X-ON/X-OFF handshaking for printers like the Texas Instruments, Inc. Model 810 has been introduced by Southwest Peripheral Service, Inc.

The BUSY signal is monitored by the DA-5, and appropriate control signals are produced to prevent buffer overflow, the vendor said.

The DA-5 costs $225 from the firm at Suite 104, 2875 Sky Harbor Blvd., Phoenix, Ariz. 85034.

Peripheral Line Adapter Announced by Tandem

CUPERTINO, Calif. — A peripheral line adapter said to offer flexibility in placement of Tandem Computers, Inc. 6520/6524 multipage display terminals has been unveiled by the firm.

The Model 6810 is also said to allow remote printers to be connected to the same synchronous communications lines as the terminals, thus reducing modem costs.

The adapter costs $1,975 from 19333 Vallco Pkwy., Cupertino, Calif. 95014.

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Adapter, Modem, Cross-Over Switch

IDS Expands Series 6000, Series 8500, Modems

LINCOLN, R.I. – International Data Sciences, Inc. (IDS) has added three devices to its 6000 series of on-line data communications products; the Series 8500 patch, monitor and switching modules; and its modem product lines.

The Model 6330 rack-mount adapter was designed to allow up to three model 6200, 6210 or 6110 desktop units to be rack-mounted in a standard EIA cabinet. It consists of a window-frame-type front panel with the modems positioned on a shelf attached to the front panel by means of side brackets.

Filler panels are available for unused modem locations. The Model 6330 costs $125 and filler panels are available for $12 each.

The firm's Model 6200 limited distance modem was designed for asynchronous operation over private two- and four-wire nonloaded metallic conductors at speeds up to 19.2K bit/sec. It can be used in both point-to-point and multidrop network configurations and is suited for local data distribution up to nine miles.

Diagnostic Capability

The Model 6200 provides diagnostic capability by means of an analog loopback mode that allows for verification of system performance and helps isolate equipment failures in the communications link, the firm said. The Model 6200 costs $225.

The Model 8549-D telephone line cross-over switch allows the operator to reverse manually the two- or four-wire connection between two modems and two telephone lines. All connections are made at the rear of the panel of the module and all switching is done at the front panel.

The Model 8549-D allows a "chaining" function that enables a single modem or telephone line to act as a backup for several other modems or telephone lines. The Model 8540-D is priced at $180.

IDS is located at 7 Wellington Road, Lincoln, R.I. 02865.

Canoga Data Multiplexer Expandable to 32 Channels

CANOGA PARK, Calif. – Canoga Data Systems has unveiled an eight-channel time-division multiplexer that is expandable to 32 channels as an extension unit.

The Model CMX-832E can be configured to the master CMX-832 through ribbon cables, thus achieving the 32-channel capability, the vendor claimed.

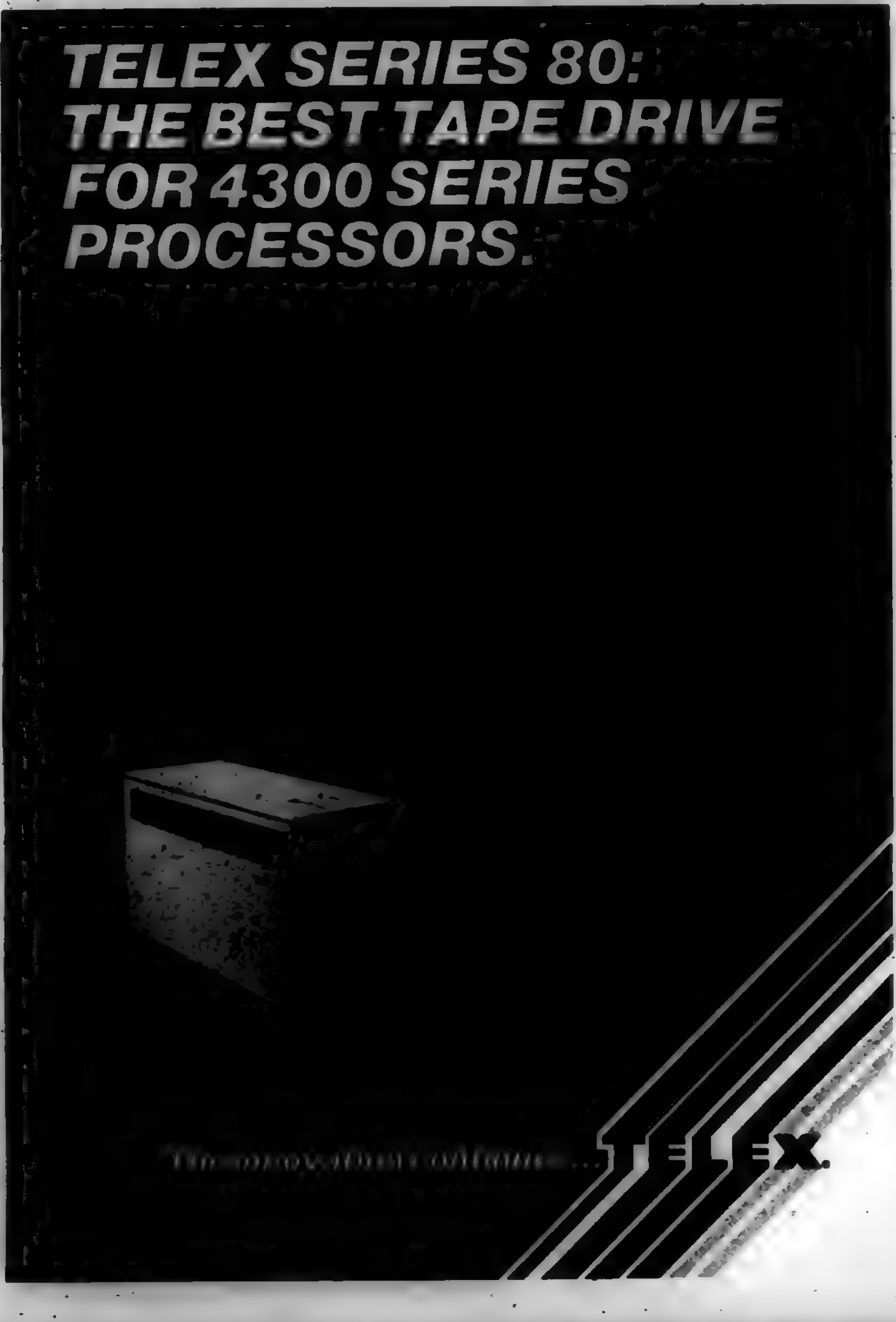
The channels within the master CMX-832 and the CMX-832E can be selected in groups of four, as either asynchronous or synchronous channels. The feature is selected by internal selection switches, accessible through the rear of the unit.

Data Rate

Maximum channel data rate is 19.2K bit/sec in either asynchronous or synchronous mode. In a synchronous mode, switches are provided to select the internal clock rate of 1,200-, 2,400-, 4,800-, 9,600- or 19.2K bit/sec. All synchronous channels within the system will then be slaved to the selected clock rate, a spokesman said.

The multiplexer transmits data at real time without storing it in storage buffers and is transparent to the character structure of the data patterns. That transparency alleviates the requirements for the user to determine how many bits wide the data is or what protocol the user is inputting to the multiplexer.

Each channel operates as if it had its own separate communications line with no interaction or waiting because of other channels and the product was designed to stand alone with its own self-contained power supply.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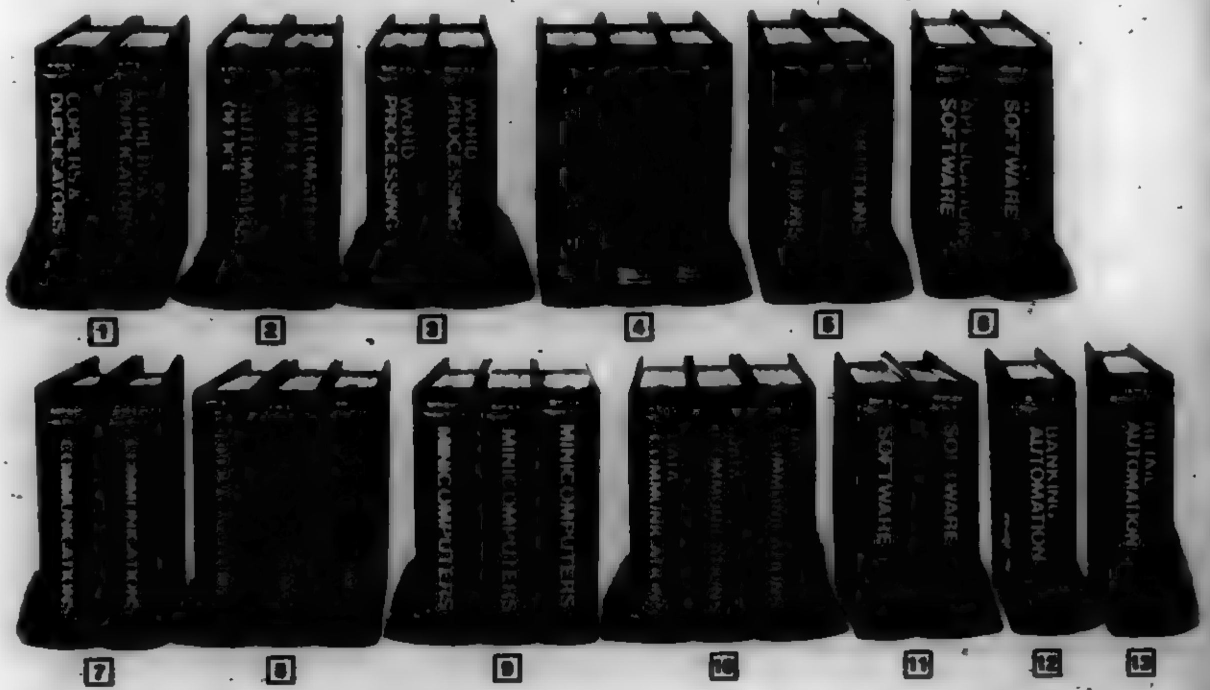

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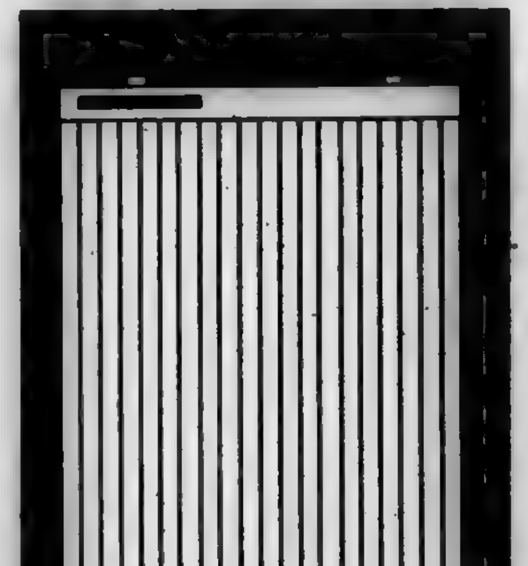

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Portable Set Eases VF Line, Modem Testing

YORKTOWN HEIGHTS, N.Y. — A device for VF line and modem testing in communications systems using Bell 100 series or equivalent modems and which reportedly combines the functions of seven instruments is being offered by AQ Systems, Inc.

Unit features include a band-switchable transmitter, test tone and variable frequency generator, band splitting receive filters and demodulators, autoranging level and frequency metering as well as an audible monitor.

The test set can terminate the line, replace the modem or bridge the line permitting measurements on working circuits.

Operational modes are selected by pushbuttons, functionally grouped. An LCD display provides readout of frequency and level either individually or alternatively, and a monitor with adjustable volume control provides an audible indication of circuit conditions, the firm said.

The Model VS103 test set costs $1,250 from AQ Systems at 1736 Front St., Yorktown Heights, N.Y. 10598.

The Model VF103 Test Set

Acoustic Coupler Answers Back

NEW BRIGHTON, Minn. — A Bell 103/113-compatible, 0- to 300 bit/sec originate-only acoustic data coupler with programmable answer-back capability is available from Multi-Tech Systems, Inc.

An individual time-sharing system log-in code, password or user authorization number is programmed into the FM30AB programmable read-only memory (Prom), and this code is "answered back" to the host computer when an ENQ signal is received by the coupler, the vendor claimed.

A major application involves the prevention of unauthorized access to time-sharing systems; service and credit bureaus; and educational services by incorporating authorization codes into the user's terminal equipment.

The product sells for $350.

Multi-Tech Systems is headquartered at 82 Second Ave. S.E., New Brighton, Minn. 55112.

Coupler Allows Direct Interface

HAVERTOWN, Pa. — Chrono-Log Corp. has released a data coupler designed to interface directly to the communications port of a computer, CRT terminal, cassette or other recording device.

The bit-serial output can be provided at TTL voltage levels or as an EIA-RS-232C voltage interface or 20 mA current.

Up to 16 of these can come from variable sources (digital time and front panel thumbswitches); the remainder are fixed and stored in the programmable read-only memory.

The data coupler for TTL output costs $272; the RS-232C voltage interface costs $312 and the 20 mA current loop output costs $344, the vendor said from 2 W. Park Road, Havertown, Pa. 19083.

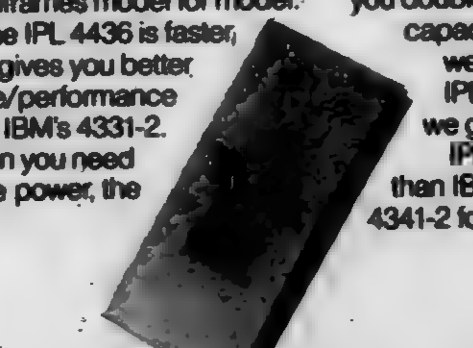
CRT Terminal For the Road

SCHAUMBURG, Ill. — Motorola, Inc. is offering the KDT-240, a keyboard/CRT terminal that can be mounted in a vehicle using FM two-way radio communications.

The unit can send messages to or access remote computers. In addition, jobs submitted by two-way radio channels are more readily available for complex voice communications, Motorola explained.

The units can be used by police and other agencies to check data in the field and gain access to criminal histories, vehicle ownership data and so on, the vendor said.

The units start at $4,293, Motorola said from 1301 Algonquin Road, Schaumburg, Ill. 60196.



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IPL's 4446 is faster than IBM's newly-announced 4341-2 for most applications, costs less, and is field-upgradeable from the IPL 4443. First customer shipments of the IPL 4446 will be made in the third quarter of 1981.

To find out more about the new IPL 4400 family, call your local IPL representative. Or call or write: Vice President, Sales, IPL Systems, Inc. 360 Second Avenue, Waltham, Massachusetts 02154. (617) 890-6620.

ipl SYSTEMS INC.

ITT to Offer Japanese Link

NEW YORK — ITT World Communications, Inc. will interconnect its Universal Data Transfer Access Service (UDTS) with the International Computer Access Service (Icas) offered by the Kokusai Denshin Denwa (KDD) administration of Japan, giving subscribers in Japan access to U.S. computer data bases.

A subscriber in Japan would access U.S. data bases, via Icas and UDTS, by utilizing a telephone and data terminal equipped with an appropriate modem or acoustic coupler.

The service, available since 1977, is available in a number of other countries. ITT World Communications is located at 2 Broadway, New York, N.Y. 10004.

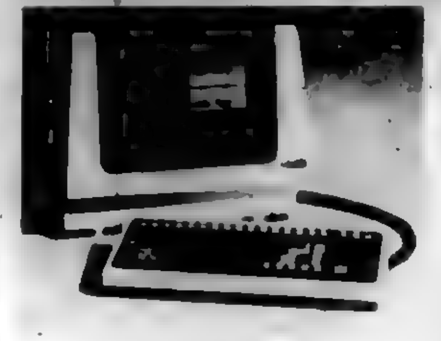
With 11 Special Function Keys

Televideo Terminal Targets OEMs

SAN JOSE, Calif. — A CRT terminal targeted to OEMs and featuring 11 special function keys — 22 functions with the shift key — is being offered by Televideo, Inc.

The function keys can be programmed to the user's needs via 256 bytes of on-board random-access memory (RAM) which can be distributed among the special function keys or concentrated within one or several, the firm said.

The terminal features a 25th status and message line, operation at rates between 50 and a true 19.2K bit/sec, a detached keyboard, a line-drawing character set with 15 special graphics characters and 128 displayable Ascii characters, the firm noted. A split screen with "line lock" permits lines of copy to be held on the screen while other lines are scrolled up or down.



The Model 950

Normal and slow scroll modes, as well as advanced editing with wraparound are provided, as is reverse screen video, dual intensity, underline, blink, blank and protected field.

The Model 950 costs $1,195 with discounts available for quantity purchases from the vendor at 249 Paragon Drive, San Jose, Calif. 95131.

Cybernex Adds CRT Terminals

MISSISSAUGA, Ont. — Cybernex, Ltd. has unveiled its XL series of CRT terminals, featuring a detachable keyboard with numeric pad and green phosphor CRT.

The output of each XL series keyboard switch is interpreted by a microprocessor. A socket is provided on the logic board for an alternate character generator programmable read-only memory (Prom), which can generate an additional 128 special display characters.

Future XL series models will emulate Hazeltine Corp., Digital Equipment Corp., Control Data Corp., Perkin Elmer Corp. and other vendors' terminals, Cybernex claimed.

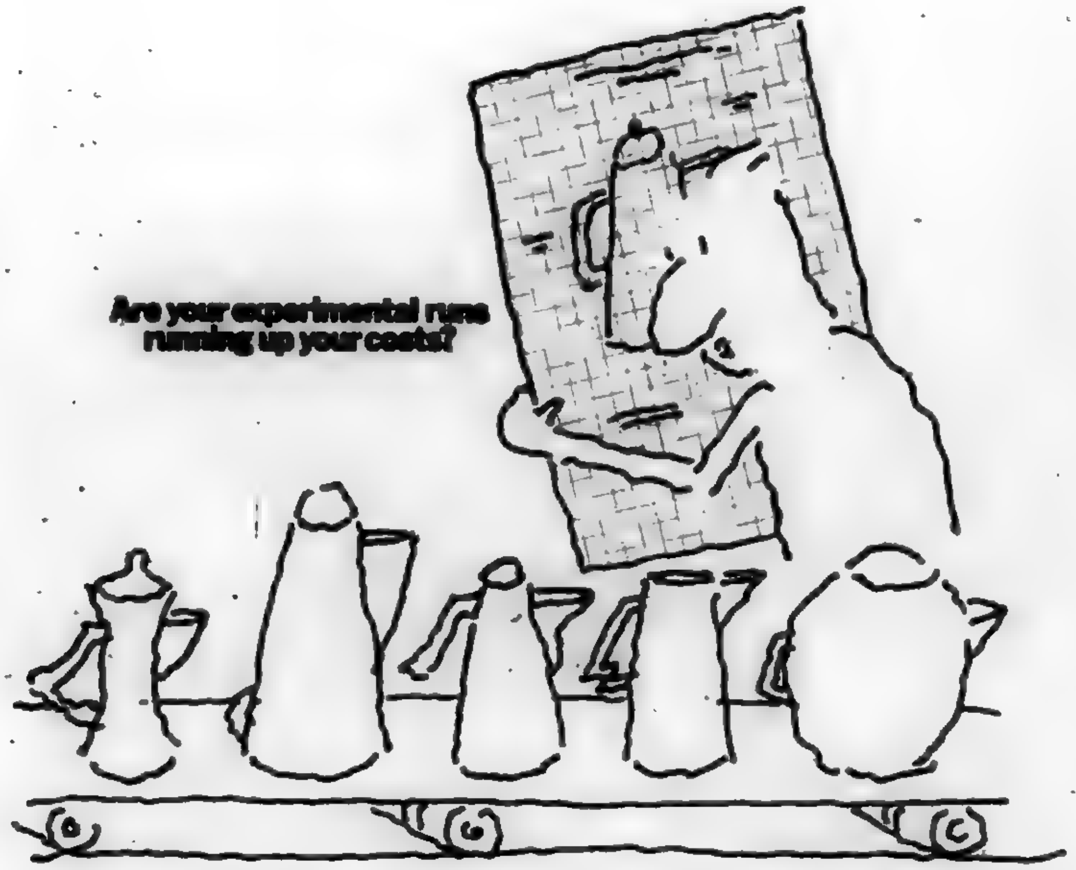
The first of the series, the XL-83, will be available in the U.S. about the end of October for approximately $1,100, the vendor said from 2457 Dunwin Drive, Mississauga, Ont. L5L 1T1 Canada.

Intelligent Terminal Takes CP/M, Basic

BURLINGTON, Mass. — Display 8, a user-programmable intelligent terminal, is available from Computek, Inc.

The Display 8 terminal allows support for CP/M and Basic software, the vendor claimed. It is based on a single-board architecture using large-scale integration (LSI) technology and includes the Z80A microprocessor. The alphanumeric display is on a 12-in. CRT with capacity for 25 80-char. lines.

The single-unit price ranges from $2,700 to $3,900, depending on configuration desired, the vendor said from 63 Second Ave., Burlington, Mass. 01803.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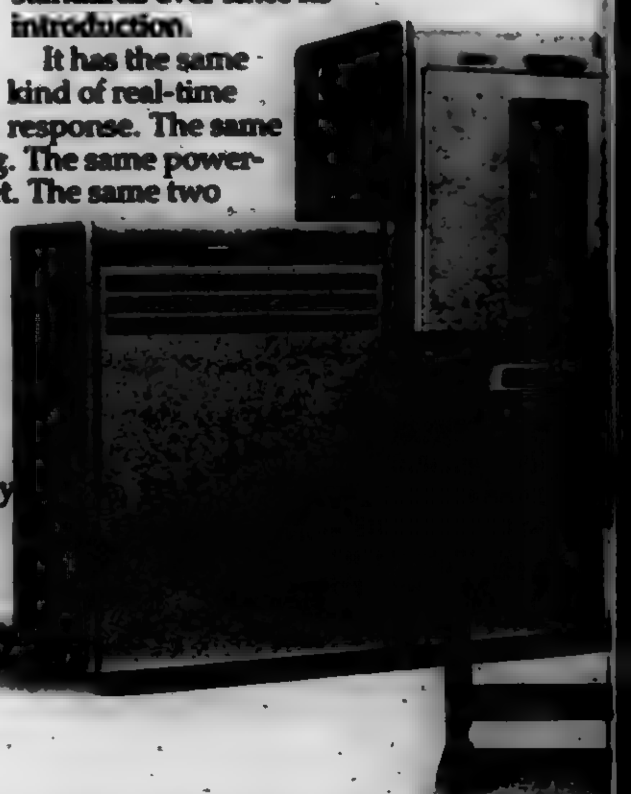

VAX-11/750.

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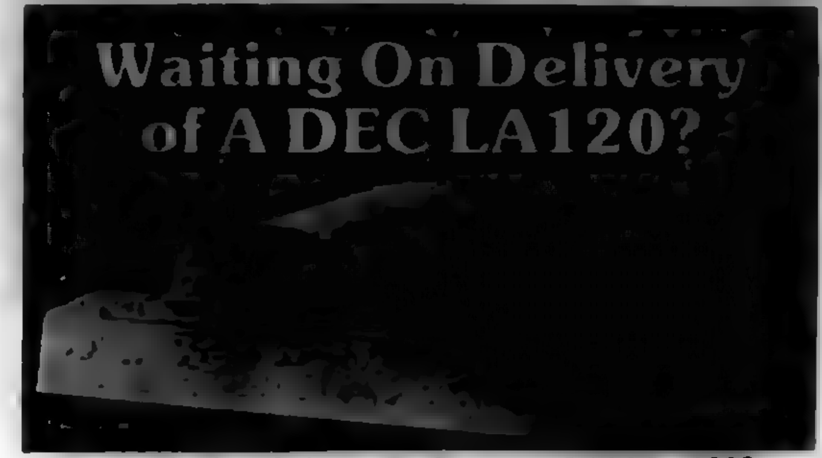

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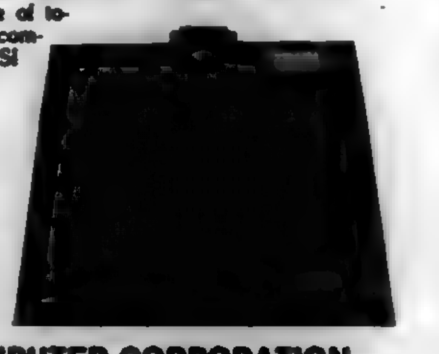


CRT Terminal Replaces DEC VT132, VT100, VT52

FULLERTON, Calif. — A CRT terminal compatible with the Digital Equipment Corp. VT132, VT100 and VT52 terminals has been introduced by Cobar, Inc.

Cobar's Model 3132 provides full functional emulation of all three DEC terminals together with matching size, similar case design and a detachable DEC-oriented keyboard, the vendor claimed.

Standard features include a nonglare screen; numeric and special function keypad; video attributes, such as reverse video; blinking and bold enhancement, as well as VT132 word processing-oriented features like text editing by line or character, protected data fields and block or interactive data transfers. EIA standard interfacing and universal power configuration are also included.

In addition to emulating the three DEC devices, the microprocessor-based unit is also adaptable to other system environments, Cobar said. The Model 3132 costs $1,995 from Cobar at 699 S. State College Blvd., Fullerton, Calif. 92631.

Cobar's Model 3132

S-100 Interface Card Satisfies High-Speed Communications Tasks

MOUNTAIN VIEW, Calif. — Cromemco, Inc. has introduced a serial communications S-100 interface card said to satisfy high-speed data communications applications.

Each Quadart interface card has four serial channels, any of which can support asynchronous or synchronous byte mode (Bisync) or bit mode (SDLC) communications protocols under software control.

Complete handshaking is reportedly provided for modems. The Quadart is said to be particularly suited to provide connection between an S-100 microcomputer and an IBM-type machine using Bisync or SDLC protocol.

Transmission rates for each channel are software-selectable up to 300K bit/sec, or asynchronous to 19.2K bit/-sec. Control for the Quadart is from the C-Bus provided by the firm's I/O processor computer (Model IOP).

The Quadart Serial Communications Interface (Model QDRT) costs $595. The I/O Processor (Model IOP) costs $695 from the firm at 280 Bernardo Ave., Mountain View, Calif. 94043.

Modem Added to Tri-Data Buffers

MOUNTAIN VIEW, Calif. — Tri-Data Corp. has announced the integration of an internal modem with its Telecommunications Systems Units (TSU), offering users of Teletype 43 terminals a combination of data storage, text editing, batch transmission and an automatic telephone in one package.

TSUs are microprocessor-based buffers packaged in single circuit boards that convert Teletype printers into intelligent data entry workstations and two-way communications terminals.

The modem is implemented on a piggyback circuit board attached to a Model 43 TSU that fits inside the terminal enclosure. It is currently available for 4K- and 16K-byte TSUs produced to the Teletype 43 form factor.

A similar modem is being developed for Digital Equipment Corp. terminals, the vendor said.

A 4K-byte TSU with modem is priced at $1,100 and the 16K TSU with modem costs $1,300. The modem option costs $400. Tri-Data Corp. is at 505 E. Middlefield Road, Mountain View, Calif. 94043.

Voice, Data Echo Suppressor Out

FALLS CHURCH, Va. — An echo suppressor for use on voice or alternate voice and data communications circuits for communication paths, including continental and satellite circuits, is being offered by Pulsecom Division of Harvey Hubbell, Inc.

The Model 1696-1 Series Pulsecom Echo Suppressor prevents reflected speech energy from being returned to the far-end talker by inserting a 60 db loss into the transmit path. Break-in operation permits the near-end talker to override the transmit suppression, when desired, to interrupt the far-end talker. The unit costs $214 from the vendor at 5714 Columbia Pike, Falls Church, Va. 22041.

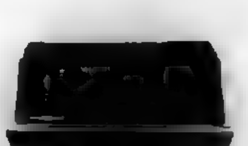
Qume Sprint 3 Gets Two Interfaces

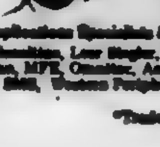
LOS ANGELES — Two interfaces for Qume Corp. Sprint 3 printers are available from Data Wholesale Corp.

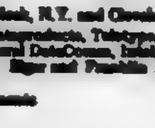
The Model CS-1 is an intelligent RS-232 serial interface that provides text processing at selectable transmission rates from 150- to 9,600 bit/sec with full hardware and software handshaking, the vendor claimed.

The Model CS-2 Centronics Data Computer Corp. parallel interface provides complete handshaking and communications capabilities to all standard 8-bit Centronics parallel ports.

The CS-1 costs $695 and the CS-2 $395, the vendor said from Suite 1504, 10960 Wilshire, Los Angeles, Calif. 90024.







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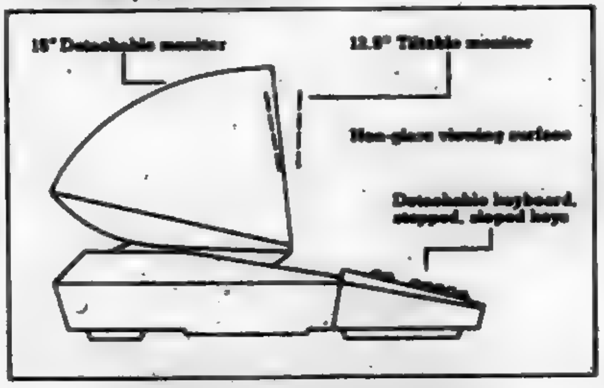
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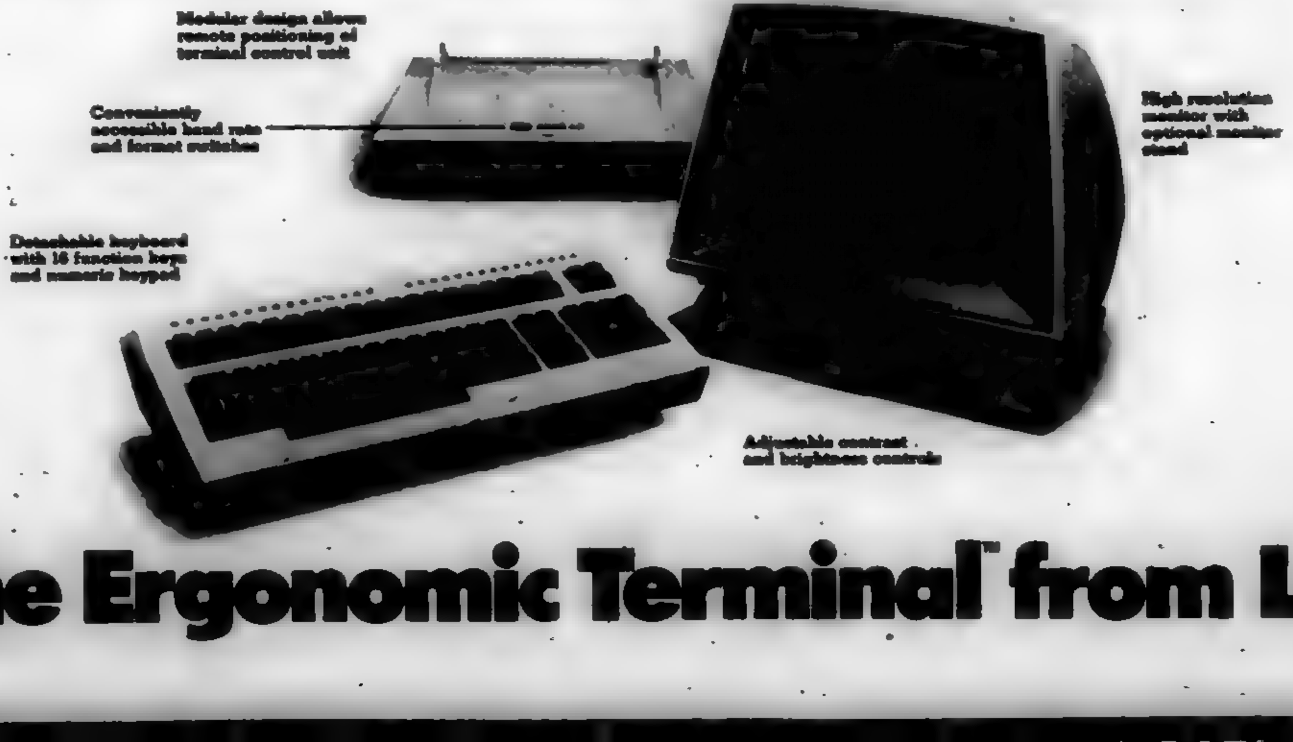
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Role. Attitude. Communications. Image.

Where Have We Gone Wrong in DP?

BY ROBERT DAVIS

Data processing has not been very successful in most organizations.

Where are the management information services (MIS) systems promised to top management in the late 1960s? Where are the distributed on-line processing systems promised to top management in the late 1970s? Where are CRTs in every office? Where are computers being used on a daily and hourly basis as management planning or decision-making tools? What is holding up widespread use of computer technology by top executives in making business decisions?

We all can identify exceptions, but generally something is keeping DP from reaching its technical potential even though present technology can deliver these capabilities. Let's look at some of the obstacles to using technology to its fullest extent.

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1. Proper role of DP in organizations.
2. Business attitudes of DP personnel.
3. Communications.
4. Image.

Proper Role

DP affects the success of a business in several ways. It can help or hinder the service a company provides its customers. It can affect how well the managers of a company are able to do their jobs.

The management information provided by a DP system should give enough detail to call attention to operations that are not performing as planned, and it should be up-to-date enough for something to be done about them.

John Diebold, chairman of The Diebold Group, a New York City management consulting organization, sees "an increasing need for information in the business environment and a need for speed in accumulating and retrieving it." The technology to fulfill these needs is already available. Until recently, however, information was an unmanaged, intangible entity that traveled haphazardly throughout the various levels of an organization.

This attitude toward information handling must now change. Executives must approach information as a resource and manage it in much the same way they manage other resources such as capital, personnel and property.

This means management should keep track of the overall cost of information and maintain better controls on its distribution and storage. Information should be made more accessible, and greater technical support should be supplied to those executives who use the information.

Manual Systems

In the "manual systems era" (during the 1940s) hardware consisted of most of the equipment found in an office today — calculators, typewriters and file cabinets). "Software" at that time consisted only of an intimate knowledge of the operation at hand. The manager relationship in this era was intimate or firsthand. Each manager knew the system and how to control it. The manager had responsibility for the complete system (see Figure 1.)

Hardware of the "unit record era" was represented by punched-card equipment, much of which is still used today. This equipment can handle one or two questions rather than the complete processing spectrum. Software was limited to specialized assistance by technicians who could do the necessary panel wiring. We should remember that the position of systems analyst did not exist during this era.

The manager relationship had changed, and managers had become once-removed from their system. Intervention was represented by a technician familiar with the operation of the hardware. The manager now had to be able to specify his request for some other person to interpret.

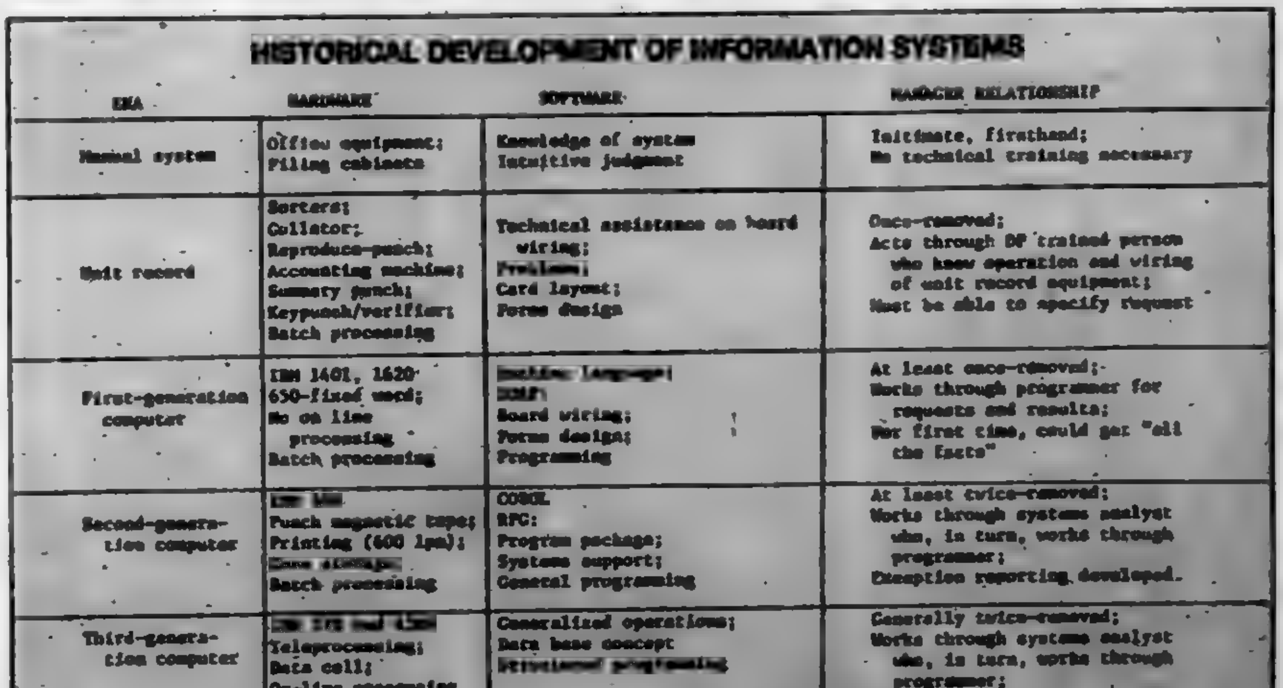
First-generation computers had no on-line processing capability. Batch processing was the order of the day. Software included such components as machine language and only the beginnings of symbolic languages. Managers were twice-removed from their system. That is, they worked through a programmer for requests and results. The programmer, in turn, worked through the person who performed the board wiring and other technical functions. Now, for the first time, a manager could get "all the facts," and this was the characteristic method of management reporting — stacks of printouts that no one had the time to digest.

The Second Generation

Hardware in second-generation computers consisted of both commercial and scientific systems. In the second-generation equipment, an on-line capability was introduced for certain functions. Other hardware improvements included magnetic tape, core storage and high-speed printers. Software included the Report Program Generator (RPG), whose purpose was to duplicate the unit record functions on the computer until new programs could be written.

The manager was still at least twice-removed from his system. He had to work through a systems analyst who, in turn, worked through a program-

(Continued on In Depth/2)



HISTORICAL DEVELOPMENT OF INFORMATION SYSTEMS

ERA	HARDWARE	SOFTWARE	MANAGER RELATIONSHIP
Manual system	Office equipment; Filing cabinets	Knowledge of system Intuitive judgment	Intimate, firsthand; No technical training necessary
Unit record	Sorters; Collator; Reproduce-punch; Accounting machine; Summary punch; Keypunch/verifier; Batch processing	Technical assistance on board wiring; Problems; Card layout; Forms design	Once-removed; Acts through DP trained person who knew operation and wiring of unit record equipment; Must be able to specify request
First-generation computer	IBM 1401, 1620 650-fixed word; No on line processing Batch processing	Machine language; SOAP; Board wiring; Forms design; Programming	At least once-removed; Works through programmer for requests and results; For first time, could get "all the facts"
Second-generation computer	IBM 360 Punch magnetic tape; Printing (600 lpm); Core storage; Batch processing	COBOL RPG: Program package; Systems support; General programming	At least twice-removed; Works through systems analyst who, in turn, works through programmer; Exception reporting developed.
Third-generation computer	IBM 370 and 4300 Teleprocessing; Data cell; On-line processing	Generalized operations; Data base concept Structured programming	Generally twice-removed; Works through systems analyst who, in turn, works through programmer; Conceptual idea of on-demand reporting "Real time" systems
Future	IBM "H" series and beyond	English like languages	Intimate, firsthand through remote terminal operation; No training necessary; Will be conversational mode

Figure 1

(Continued from In Depth/1)

mer. Sometimes computer operations further interpreted the programmer's processing requirements.

The concept of exception reporting was developed during the second generation. This means that certain limits are established for job performance, and no report of the transaction is made unless the job violates these predetermined limits. However, reports to management might not be in the form necessary for making decisions.

Current third-generation computers include such technological improvements as on-line processing and teleprocessing. Software emphasis is on generalized systems that can be adapted to many organizational operations. The main software contribution of the third generation is the data base concept: The manager is still twice-removed, working through the systems analyst and the programmer. The reporting concept has changed from exception reporting in the second generation to on-demand reporting. On-demand reporting means the manager can retrieve facts from the system as he wants them and have them available for decision making as needs arise.

Future Relationship

In the future, the manager relationship will, in effect, come full cycle from what it was with the manual system, although there will be many improvements. The manager will be on an intimate, firsthand relationship with his system, and no training will be necessary because he will be able to interact with the computer in some conversational mode.

But where are we today? DP management is two or three steps removed from the computer system. Company top management is still another step removed. A manager's needs still must be interpreted by DP personnel.

What kinds of problems does this cause?

When asked if computers have changed the way managers manage, Peter Drucker responded, "Not at all so far. They have changed the way a warehouseman runs his warehouse, but for top management? No. Partly because what the computer considers information is marginal for top management decisions and partly because very little top management is basically structured [CW, May 19]."

When asked how managers are failing to make the best use of computers, Drucker replied, "They don't think through this question: 'What information do I need?' They expect the computer specialist to know that."

Classic Disaster

The entry of companies into DP has been a classic disaster. Excuses sent to top management include the following: (1) installation costs were higher than expected; (2) maintenance costs continue to exceed budget limits; (3) equipment complexity causes frequent and expensive breakdowns; (4) the computer just isn't doing the job for which it was purchased; (5) transition using duplicate systems in parallel was too long; (6) good programmers are too hard to find; (7) vendor's aids and training programs were too technical for available personnel; (8) the changeover was not adequately planned.

"But no," you say, "this did not happen at my company. We bought a computer only after careful analysis because we convinced top management of many advantages." These included:

1. Clerical economy. Fewer people are involved in paper flow, in routine decision-making and record-keeping.

2. Greater speed, accuracy and clarity of reports. New valuable reports are available which were not feasible without DP.

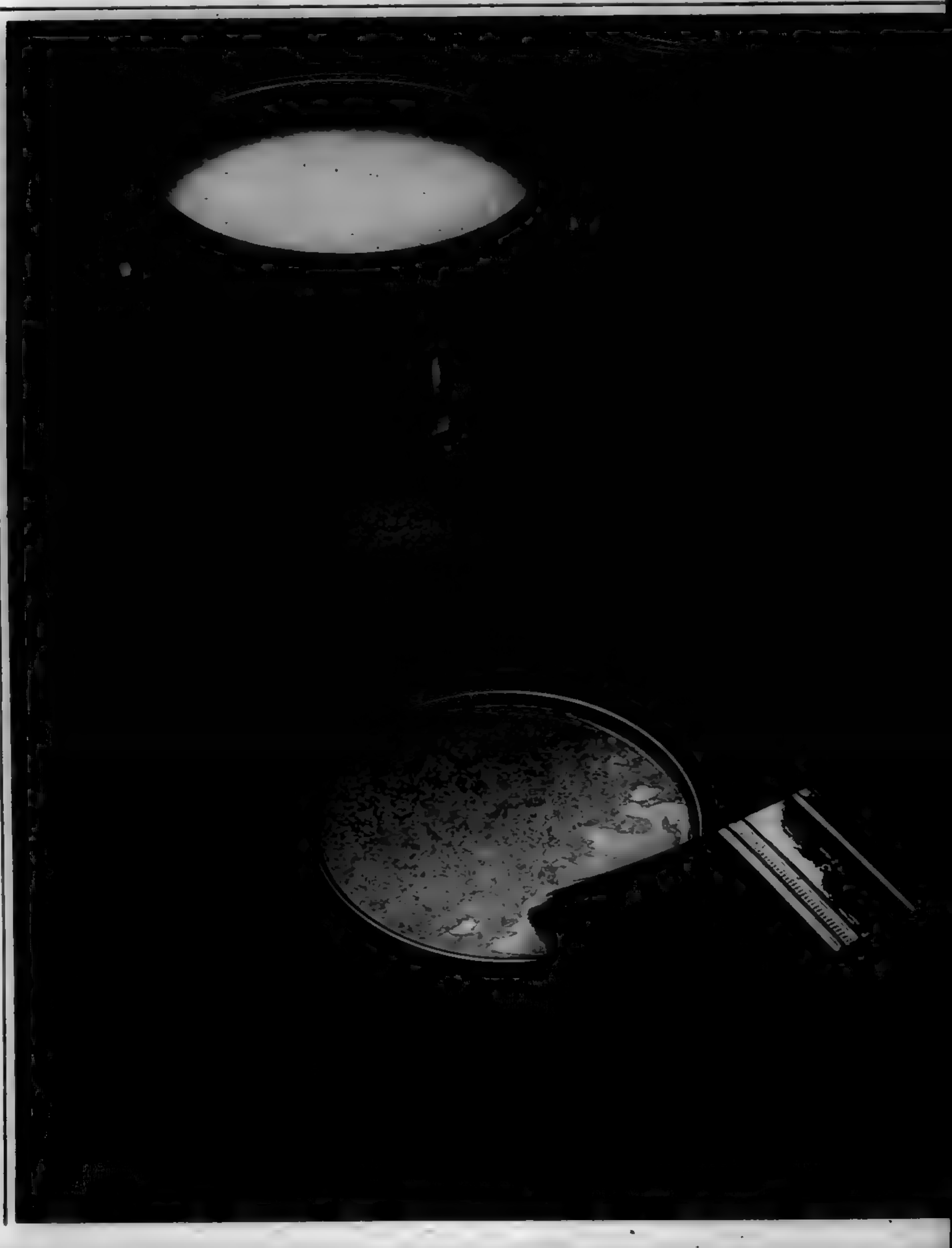
3. Instantaneous reporting on inventories, work in progress and labor.

4. Effective predictions of sales; evaluation of salesman performance and sales promotion effectiveness; long-range planning.

5. Better engineering quality control, planning, scheduling; reduced warehousing and production costs.

6. Immediacy of executive-control feedback for decisions and rapid and clear execution of procedures and policies.

7. Better customer service; more efficient handling of payables, payroll and personnel information; invoicing same day as order; greatly improved cash flow; lower bank interest cost.



8. More efficient capital budgeting, product mix, location studies, product planning, testing, market sampling and research.

Did you notice that these are all broad generalizations? Quick analysis will offer most of these advantages on every planned computer acquisition.

Business Attitudes

How are we going to get out of the same old mold and get decision-making information to top management? Let's talk about the classic panacea for all ills — the systems analyst. Here is a list of required skills for today's systems analyst from the April 1980 issue of *Datamation*:

1. Strong client orientation, delivering systems clients like and use.
2. Ability to work with ill-defined objectives and resolve conflict productively.
3. Skills in organizational design and assessing system impacts on client departments.
4. Behavioral sensitivity to impacts of systems on individuals.
5. Project management skills (planning and control).
6. Broad view of company goals and operations, senior management orientation.
7. In-depth knowledge of client's operations.
8. Dedication, hard work and hustle.
9. Implementation planning; education, motivation and training of clients.
10. Cost consciousness, hardware and operational efficiency.
11. Expertise in system design of monitor and exception systems.
12. Leadership ability, administrative experience, political sensitivity.
13. Ability to work intimately with senior client managers.
14. Rigid adherence to project costs and schedules.
15. Expertise in design of inquiry and analysis systems.
16. Technical skills (programming, data base design, telecommunications and so forth).

Two Critical Functions

When a systems analyst undertakes a study of a company's total information flow, he must be able to perform two critical functions. First, he must identify the existing information flows. Second, he must gain sufficient insight into the operations of the company to be able to specify the purpose for each information flow. The full attainment of the latter would include the ability to (1) see how various information flows are integrated into the total company information system and (2) comprehend the organizational objective served by each of these information subsystems.

Specifying the information requirements requires a familiarization with the unique characteristics and practices as well as an appreciation of the general environment in which the business organization is located. This appreciation must include a general insight into how the business organization reacts to its environment.

What are the characteristics of the environment in which this decision-making activity is located? Top management's decisions are influenced by customers; vendors; government regulations; employees; stockholders; local, national and international events and competitors. Shouldn't the systems analyst be aware of these influences, too?

After the systems analyst knows the environment, he can more intelligently observe the operations at the physical place of business and can ask more enlightened and relevant questions.

The systems analyst is responsible for specifying the exact requirements for information that are needed to achieve the organization's mission. The systems analyst should not begin by asking the decision maker what information he is using. Likewise, the systems analyst should not begin by asking the decision maker what information he needs.

The systems analyst approaches this from another perspective. He should ask the decision maker to describe what occurs in the decision-making process. The systems analyst is concerned with identifying the various questions that must be resolved in the particular decision-making activity under scrutiny. The systems analyst can expedite this step by asking the decision maker to cite the issues or questions that must be resolved in this

(Continued on In Depth/4)

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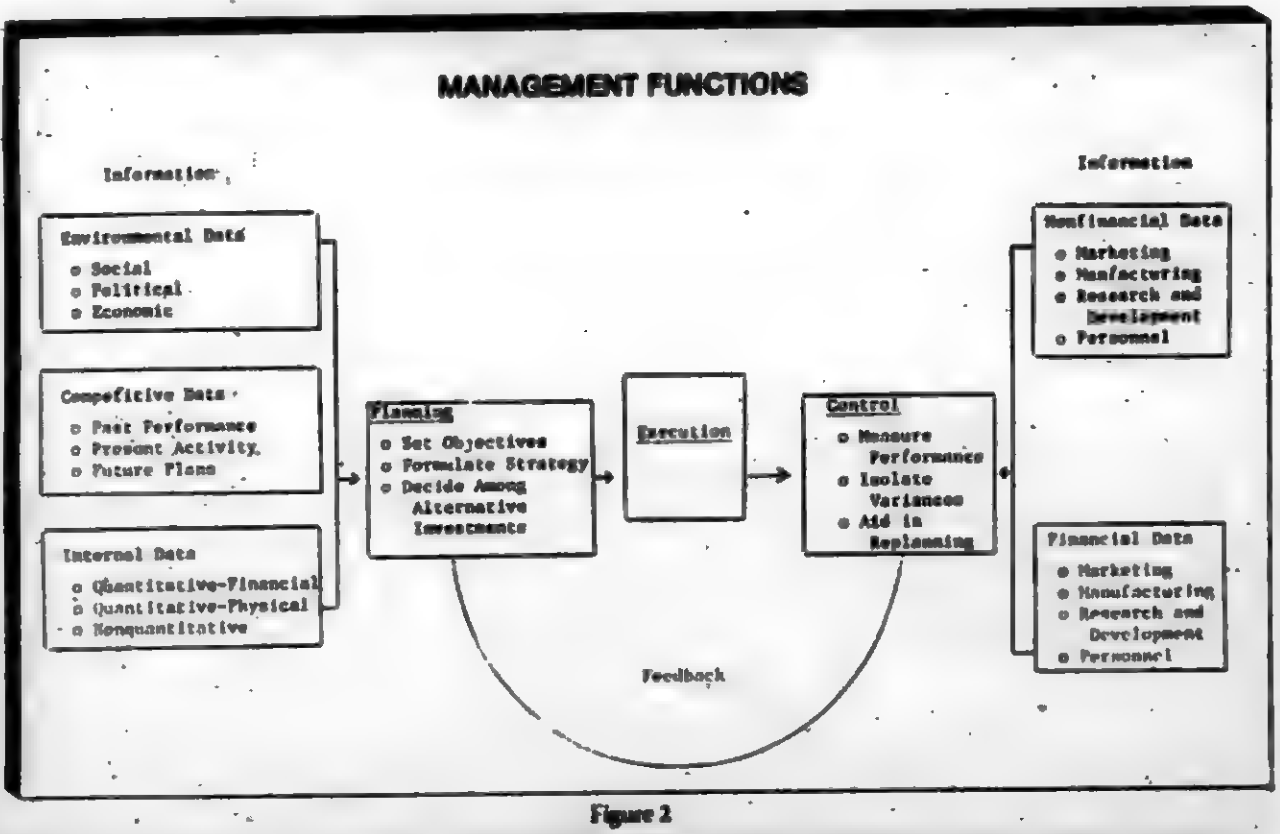
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o Quantitative-Financial
o Quantitative-Physical
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Planning
o Set Objectives
o Formulate Strategy
o Decide Among Alternative Investments
Execution
Control
o Measure Performance
o Isolate Variances
o Aid in Replanning
Feedback
Information
Nonfinancial Data
o Marketing
o Manufacturing
o Research and Development
o Personnel
Financial Data
o Marketing
o Manufacturing
o Research and Development
o Personnel

Figure 2

EVOLUTION OF DATA PROCESSING

STAGE	TIMEFRAME	HARDWARE	SOFTWARE	ORGANIZATIONAL POSITION
I	1950's	EAM Machines	Punched Cards	Payroll Dept.
II	Early 1960's	360/30	batch	Accounting Dept.
III	Late 1960's Early 1970's	370/135	disc based	Data Processing Dept.
IV	Late 1970's	370/168	on-line data base	Division of Data Processing
V	Late 1980's	"H" Series	real time, true MIS	All company functions under EDP

Figure 3

(Continued from In Depth/3)

business process.

However, the analyst must beware of overreliance on this technique. For example, the decision maker may fail to cite some variables because he feels the answers to these questions are taken as "givens," when in fact they may be the most significant issues in the decision process under scrutiny.

Remember, the decision maker must be capable of understanding and using the relevant data that is being transmitted to him before this data can properly be classified as information. Frequently, the systems analyst spends more time in "educating" the decision maker and in informing subordinates than he does in designing a new information system. Some executives consider using a CRT terminal to be a clerical activity and view interactive computer sessions as inappropriate. The analyst must know the preferences and biases of his management.

The systems analyst must also remember some organizational considerations. There are some types of information requirements over which executive management cannot relinquish control. For example, there are certain legal requirements and institutional considerations that preclude the treasurer and controller from permitting the manager of the common data base to handle all external reporting requirements. The corporate annual reports, statements for the Securities and Exchange Commission and manpower reports are some of the reports that must be reviewed by the treasurer and controlled prior to their distribution.

Occasionally new government regulations will create a short-term requirement for new information for top management decisions. The systems analyst must anticipate or even "second guess" the future information requirements of management. His knowledge and perceptions must go beyond data processing.

For example, are you familiar with the Foreign Corrupt Practices Act of 1977? A 454-page study by the Financial Executives Research Foundation states that failure to establish adequate safeguards and controls over your firm's DP system can be a costly mistake that might land your top executives in jail.

The act, which outlaws direct or indirect payments to government officials and business people in foreign countries, also requires American companies doing business overseas to maintain strict internal controls over all their transactions. The controls are intended to make corporate managers responsible for any corrupt payments, even if the managers themselves are not directly involved in them.

Under the act, executives found guilty of violations are subject to maximum penalties of five years in prison and $10,000 in fines; companies can be fined up to $1 million.

Many corporations have already responded to the law by upgrading their internal auditing and accounting systems. According to the study, however, when it comes to problems of internal control, the real Achilles' heel of the modern corporation is the DP department.

Is your company complying with this law?

Organizational Chart

We are all familiar with the typical organizational chart. Each level of management on the chart has a different view and, hence, different needs in relation to a DP system. And the higher the management is on the chart, the less structured its decision-making strategies become.

The management function of planning requires inputs of environmental data, competitive data and internal data (see Figure 2).

The management control function measures performance and isolates variances after selected plans are executed. Control information tends to follow organizational lines, cover finite periods of time, be very detailed and be post-event-oriented.

DP is very good at giving top management control information. But top management needs and wants planning information. Planning information transcends organizational lines, covers long periods of time, includes nonfinancial data, lacks details and is future-oriented. Again, there is much less structure in the planning function top management performs.

Figure 3 shows DP's evolution in organizations. Where is your company in its evolution? Companies at Stage V tend to have innovative top management that seeks a decentralization of authority. Companies at Stage III tend to have conservative top management that seeks a traditional centralized management authority structure. This "positioning" in an organization structure will affect your DP department's ability to be successful.

DP-Based Frustrations

Clients often express frustration in dealing with DP personnel. Results take too long and committed schedules often slip. Are clients expressing their DP-based frustrations to your top management?

Frustration is a serious issue because it affects morale and productivity. A study conducted by the Public Policy Research Organization at the University of California involving 1,200 municipal employees who use computer-generated reports in their jobs but did not work directly with a computer sys-

(Continued on In Depth/6)

(Continued from In Depth/4)

tem found the following:

- Computers do increase job pressure by creating new time constraints.
- Computers do not increase supervisory control over an employee's work.

Most survey respondents had little to say either positively or negatively about computing in general, but most expressed strong feelings — mostly negative — about specific incidents related to computer use.

A majority of clients reported difficulties in their interactions with computer specialists, difficulties in getting access to data, difficulties in finding reliable service, a slow response to information requests and difficulty in gaining priority to use the computer.

Paul Strassman, vice-president of Xerox Corp., recently called the centrally funded and administered DP "establishment" a perfect example of a bureaucracy. It is indirectly accountable to the people using it. Clients can exercise no spontaneous or informal choices because their relationships to the DP organization are fixed and governed by detailed procedural conventions. (Remember to use the term "client" because talking about "the users" reminds top management of people addicted to controlled substances.)

Communications

Communications between top executives and DPers are, generally speaking, dismal, and this leads to gross misunderstandings about the mission and the responsibilities of DP departments.

It is important to the health and welfare of the company that DP personnel truly understand the information goals and needs of business and develop solutions to these needs. It is just as important that they be able to explain these solutions to top executives so that they will understand the reasons for, and endorse financial commitments to, DP.

Most chief executives are very concerned with the DP budget and DP productivity (which is often difficult to measure). DP managers need to build a strategy whereby DP funding is treated by the executives as a capital item, not too different from the plan construction budget, and is subjected to the same kind of scrutiny. DP plans and programs must be tied to the fundamental operating parameters of the business, and that involves the profit plan, business thrust and corporate goals. Managers must justify financial needs on a corporate basis, not a divisional, departmental or client basis.

DP staff should spend many hours with top management in an effort to make the technology comprehensible, an investment in time which usually results in faster approvals for new hardware acquisitions.

Getting top management involved tends to remove the mystique from the DP business. There are several ways to do this:

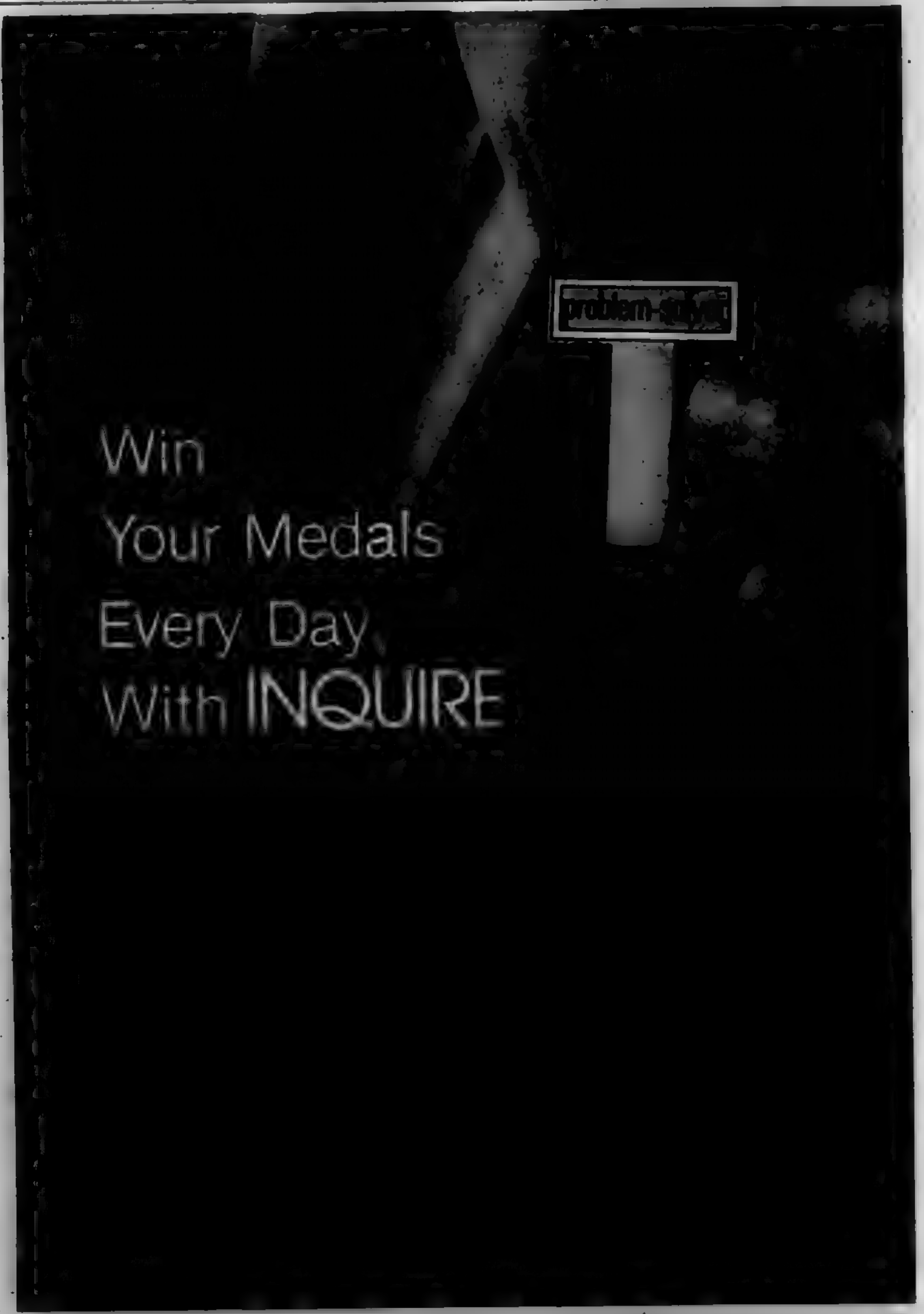
- Demonstrate existing systems, stressing operational benefits to key clients.
- Offer executive training programs developed in-house and presented by consultants.
- Set up an executive-level DP steering committee.
- Establish systems review board, with representation from every functional area, which is tasked to advance the applications of DP technology within the corporation.

Clarity Essential

Then comes the matter of communications techniques. Every session with top management should begin with a clearly stated objective and, from that point on, the language must be completely understood by the executives. Here are some other pointers:

- The higher the level of management, the more general and simplified the presentation perspective should be.
- Be convincing, firm and sincere, and come across with an image of leadership.
- Make certain your talk is timely, to the point and significant to the business at hand.
- Where practical, include comments that address two key management concerns: system availability in terms of reliability and system security.
- Demonstrate your loyalty to the company and not to the DP industry.
- Present business solutions and not a vendor's solution.

A common pitfall is that the DP manager, in concert with staff members, may talk not only to his clients, but



also to senior management, about systems that "crash" and programs that "bomb." They will say, "As soon as we get a dump of the program and find and correct the bugs, we can resume processing."

That type of discussion does nothing to instill confidence in the minds of either clients or senior management. Stop using DP jargon! The mystique created by this practice prejudices top management's perceptions of your contribution to the overall organization.

Other Image Problems

The DP manager compounds his image difficulties when talking about his "DP shop." The use of the term is widespread. From his exposure to this term, a senior manager may indeed find it difficult to determine if the DP manager is a professional manager or an assembly line foreman.

The normal impression of many DP departments is one of confusion. This involves the apparent propensity of many DP departments to operate in a continuing state of semi-chaos. While significant advances have been made in areas such as hardware, software and even, albeit to a lesser degree, system design and programming methods, MIS difficulties continue to abound. Systems still fail at 3 a.m.; incorrect programs or files are used; results promised are not produced. A department that operates in such a disorderly fashion only helps reinforce an already poor image for its manager.

This is not to imply that management of the DP function is not demanding or difficult. Of course it is. The problem is in the tendency to accentuate the negative, to fail to develop and to maintain a professional image. Internal DP problems must be kept internal!

Unless the DP manager is viewed as a professional, as someone capable of fitting into the ranks of senior management (no matter how well the job is being done), progress beyond a certain point becomes very difficult.

Poor Sales Job

The practitioners of the data processing profession do not, in the main, do an adequate job of selling either themselves or the value of their services. This selling must improve; the image must be strengthened. The DP manager will not advance to the top if he continues to use terms that cast his effort in a nonprofessional light or if the DP department projects an image of confusion and disarray.

The relationship between DP executives and chief executives is very important. But more so is the positioning of the information system activity within the structure of the overall organization. For example, the decentralization vs. centralization issue is of paramount concern because it deals with the subject of ultimate control of the information processing resource. But this and other organizational issues also relate to the careers of capable professional people in both the client and management information service establishments. Therefore, the discussion of this issue is usually subjective, if not emotional.

For this reason, the DP executive must be willing to enter the political and business battles that are part of the challenge of being high up in the corporate structure. Otherwise, he will wind up as just another statistic in the extravagantly high turnover rate (20% to 25%!) that is currently associated with the position.

There are several key areas in which a DP manager must be alert to ensure the growth and acceptance of DP in his organization. He must:

1. Communicate clearly with top management.
2. Understand the chief executive's attitude toward the DP function.
3. Present DP's yields in positive financial terms.
4. Be receptive to change to meet the company's future needs.
5. Always present a professional managerial image.
6. Understand and present the DP activity as an information processing resource available to the entire organization and not just another business function, such as accounting, finance or manufacturing.

Robert Davis is a senior account manager with Systems Engineering Laboratories, Inc. in Riverdale, Md.

Davis holds a B.S. degree in management from Virginia Commonwealth University, Richmond, Va.

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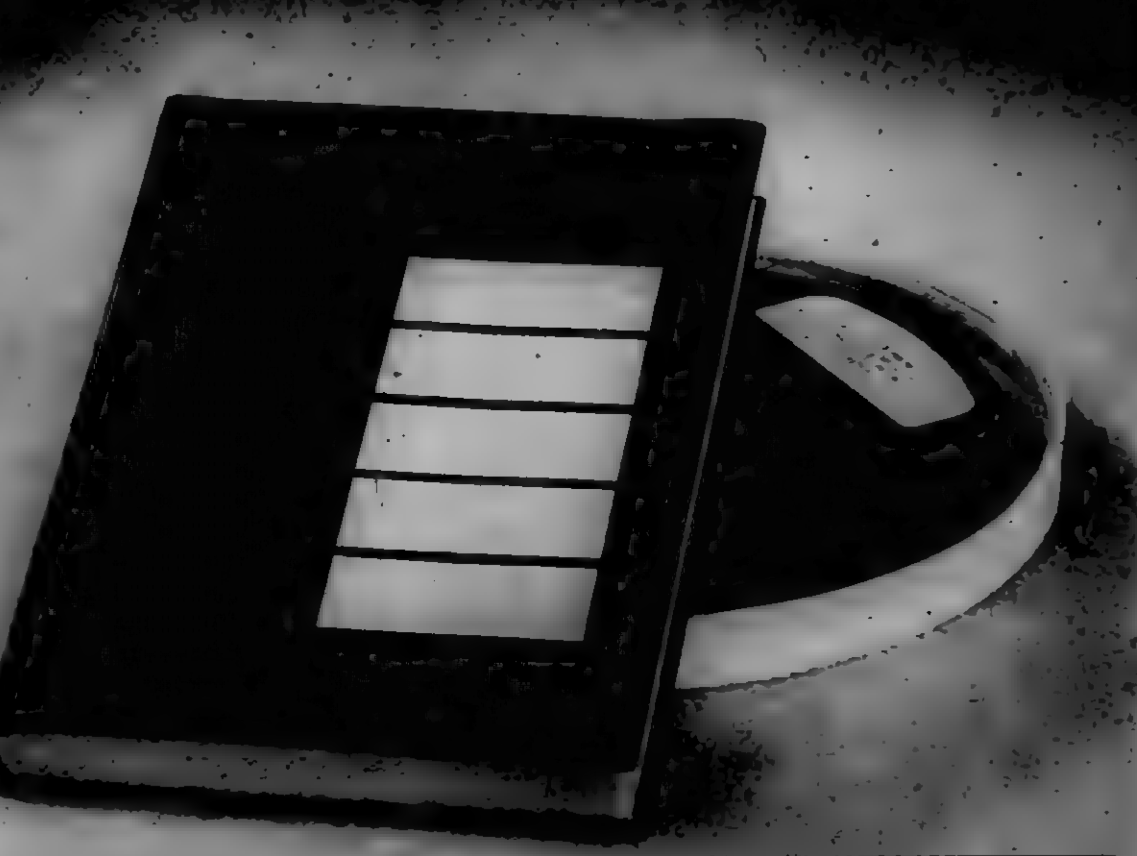

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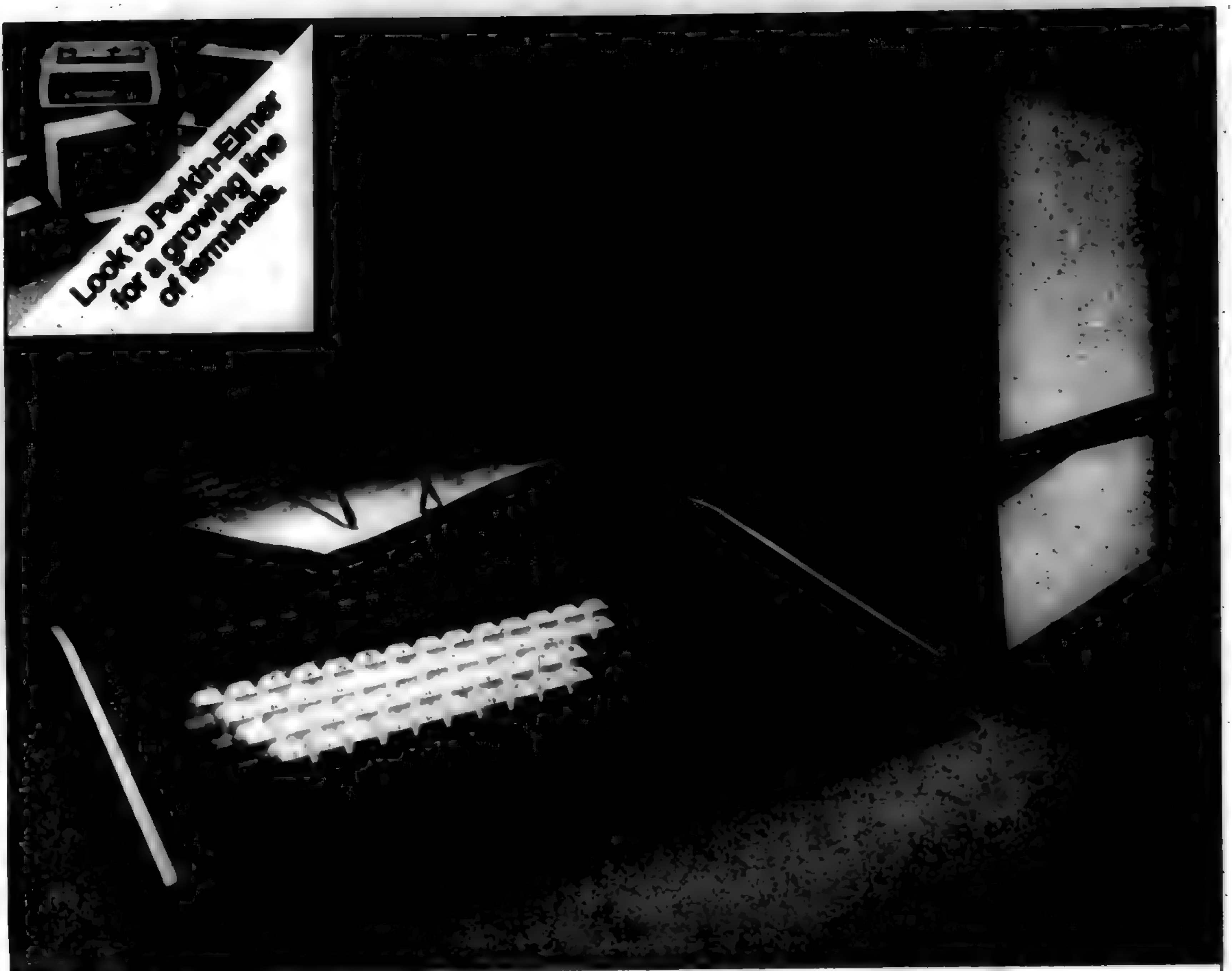

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What Management Should Know About DBMS

By Ernest H. Forman

Data base management systems (DBMS) may be the key that unlocks the door to that promised but elusive management information system.

Today DBMS provide capabilities to support business and management applications ranging from routine processing for day-to-day business operations to the less structured, higher level information requirements of management, such as strategic planning.

A DBMS is a powerful and costly tool. Before we turn our attention to the benefits and costs of using a DBMS, we should examine the relationships between a DBMS, an organization's data base(s) and its management information system(s).

James Martin[1] has commented that although "some writers and consultants have described data base systems as though they were synonymous with management information systems . . . the terms are unrelated. A data base can have value for narrow groups of applications which do not necessarily provide any information to management." There appears also to be much confusion between data base(s) and data base management systems.

Indeed, what is a data base? R. Clay Sprowls[2] defines a data base as simply a "collection of interrelated data elements that are processible by one *or more* application programs . . . The data base is companywide rather than applicationwide, and it cuts across functions as well as levels in the organization."

Martin views a data base in a similar way and points out that it must be subject-oriented rather than application-oriented. He adds that the intention of a data base is to allow the same collection of data to serve as many applications as is useful.

Both Martin and David Kroenke[3] agree that it is possible and probable that an organization could have several data bases, each separate in structure but available in whatever combination is required to support a given application.

Rather than think of a corporate data base, it might be more appropriate to think of a data base environment as a collection of data bases (each a collection of subject-oriented data) as opposed to the typical collection of files (each oriented to a specific application). The problem facing most organizations is how to *evolve* from the latter to the former.

A DBMS — the software that greatly facilitates the logical organization, physical organization, access to and maintenance of data bases — might be considered to be a necessary but not sufficient tool for achieving a data base environment. A data base environment increases the probability of the success of sophisticated management information systems.

The evolution to the data base environment and subsequently to more sophisticated management information systems will not be rapid — or painless. First, most large organizations (and many small ones) will find themselves having to simultaneously support both new and converted application programs tailored to the data base environment as well as older application programs which are dependent on application specific files. Procedures and programs can be devised so that it is possible to support present operations while evolving to the data base environment.

Second, the additional costs in using a DBMS *are* significant in spite of the continually decreasing costs of computing power.

Faced with these difficulties, some organizations will defer making a commitment to a data base environment, but will selectively utilize a DBMS as a tool to implement applications in their present data environment. Regardless of whether a DBMS is to be used to create a data base environment or to support existing or new programs in the typical applications-centered environment, its efficient usage is — or will shortly become — a major concern to most organizations. The operating costs (in terms of time-sharing expenses or additional resources required for an in-house system) will often make the lease or purchase price of the DBMS miniscule in comparison.

Benefits of DBMS

I will not attempt to give a detailed listing of the benefits of using a DBMS. A lengthy list can be assembled simply by inviting one or more DBMS sales representatives to your office. Instead, I will discuss a few important advantages from which management is likely to benefit.

The main advantages of DBMS to management are the need for fewer personnel, improved response to information requirements and the ability to adapt more rapidly to new and changing requirements.

DBMS are sufficiently user-oriented that fewer personnel are required to design, build and manage the data base and application programs. Immediate salary savings are apparent.

A more important result is that a smaller staff has far less difficulty with intrastaff communications. This facilitates a "surgical team" approach to applications systems development analogous to the "surgical team" approach to operating systems development advocated by Frederick Brooks in his book, *The Mythical Man-Month*[4].

The flexibility and relative ease of use of most DBMS usually means that much faster response to requests for information is possible. Thus, the loss in value of information resulting from the aging of the information and the loss in relevance to the management decision-making process is minimized.

The importance of proceeding rapidly during data base (or application) design and implementation is often underestimated. Conventional software requires long lead time to implement a data base (or application program) or to respond to an ad hoc query, often resulting in partial or total lack of acceptance of the final product.

Long lead times reduce the ability of management and the DP staff to communicate effectively. This is particularly true when those managers who are still naive about what can be done easily (and what is difficult to do) with today's hardware and software request something markedly different from anything the DP staff has had experience with in the past.

In such situations, several iterations of the kind shown in Figure 1 are required so that management can alter its specifications based on preliminary implementations and the DP staff can realize what management's real requirements are. If the delay in this "closed-loop" system is sufficiently small so that minimal time elapses between iterations, both management and the DP staff will quickly appreciate each other's needs. The shorter the delay, the greater the probability of a successful application.

Few information systems, particularly those used in executive decision making, are immune from new and changing requirements. A DBMS pro-

(Continued on In Depth/12)

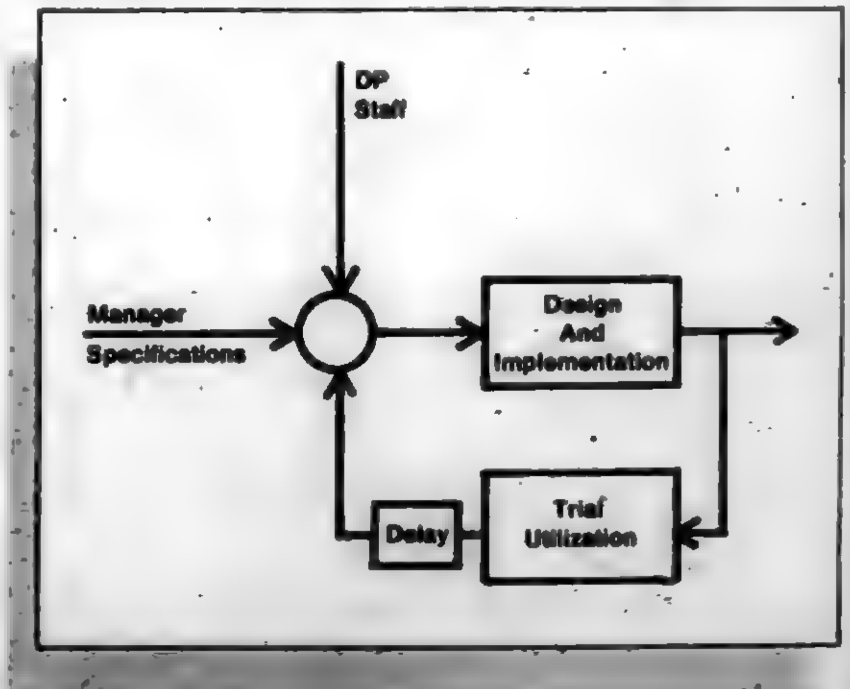

Figure 1

(Continued from In Depth/11)

vides the flexibility to respond to these in a timely fashion. Response to ad hoc queries is often offered as the raison d'etre for some DBMS.

Perhaps more important is the ability to change or integrate applications programs that were previously unrelated. One example of this is the Committee Assignment System for the U.S. Senate, which was designed to quickly accommodate changes in the data base (senators and their previous assignments) at the start of a congressional session. At the start of the next session, a change was made to the complex rules for committee assignments. Use of a DBMS enabled a timely response to this unanticipated change.

Usage and Efficiency

The many advantages of DBMS can be very expensive. The operating costs of most DBMS are quite large and can make the lease/purchase cost of the DBMS look miniscule in comparison. The manifestation of the operating costs will vary depending on where the DBMS is installed and how the DBMS is used to model an organization's data.

The costs are most apparent (and perhaps most accurately reflected) when a DBMS is installed on a commercial time-sharing system. (An organization can usually lease/purchase a DBMS and install it on a commercial time-sharing system for its exclusive use, just as if it were installing it on its own computer. Alternatively, the time-sharing bureau or a franchiser may lease/purchase a DBMS and offer its use for a surcharge, typically 33% to 150% of the data processing costs.)

It is difficult, however, to compare operating costs on competing time-sharing bureaus because each has a different accounting algorithm and cost structure. For example, one time-sharing bureau might charge rather heavily for the number of I/O operations, but will lease and store a large disk for only $50 per month. A second might charge less per I/O operation, but more for the leasing and storage of a disk.

Each might charge a nominal fee to mount the disk. A third bureau might have a nominal fee to lease and store a disk, charge nothing for I/O operations, but might have a large charge for the time a disk is on-line.

Furthermore, a benchmark may not accurately reflect what the costs of using a DBMS with a particular time-sharing bureau will be, since the costs are very dependent on the sizes of the data bases, their logical and physical organization and the application programs that will be written — variables which are difficult to specify and which will not stabilize for quite some time after a DBMS is first utilized.

Costs attributable to the use of a DBMS at an organization's own computer installation are even more difficult to identify. A corporation's internal computer accounting algorithm is often less objective than that of a time-sharing bureau. And how should we account for the cost of hardware (e.g., a faster CPU, more core or additional disk controllers) that is required only partly because of the installation and use of the DBMS?

It is likely that a large percentage of the hardware resources will be devoted to DBMS in the not-too-distant future. Advances in computer hardware and architectures will continue to reduce processing costs and hence lessen (but never eliminate) the concern paid to efficient usage of these resources.

Most DBMS require the user to make numerous decisions (some very detailed and mysterious) in using the software that have a significant impact on efficiency. (This is understandable in that the software is very general in design and flexible.) Furthermore, it is often the case with today's DBMS that in order to utilize a capability (such as an ad hoc terminal query) in the manner so succinctly and innocently illustrated in the user's manual and perhaps at a staged demonstration, very careful attention must be paid to efficient usage of the DBMS or the user will find that response time is minutes or even tens of minutes instead of seconds.

Many of the decisions the user must make in structuring and processing the data base cannot be made intelligently without an understanding of some of the internal operations of the DBMS software (for example, how key field inversions are accomplished). But a user may find it difficult or impossible

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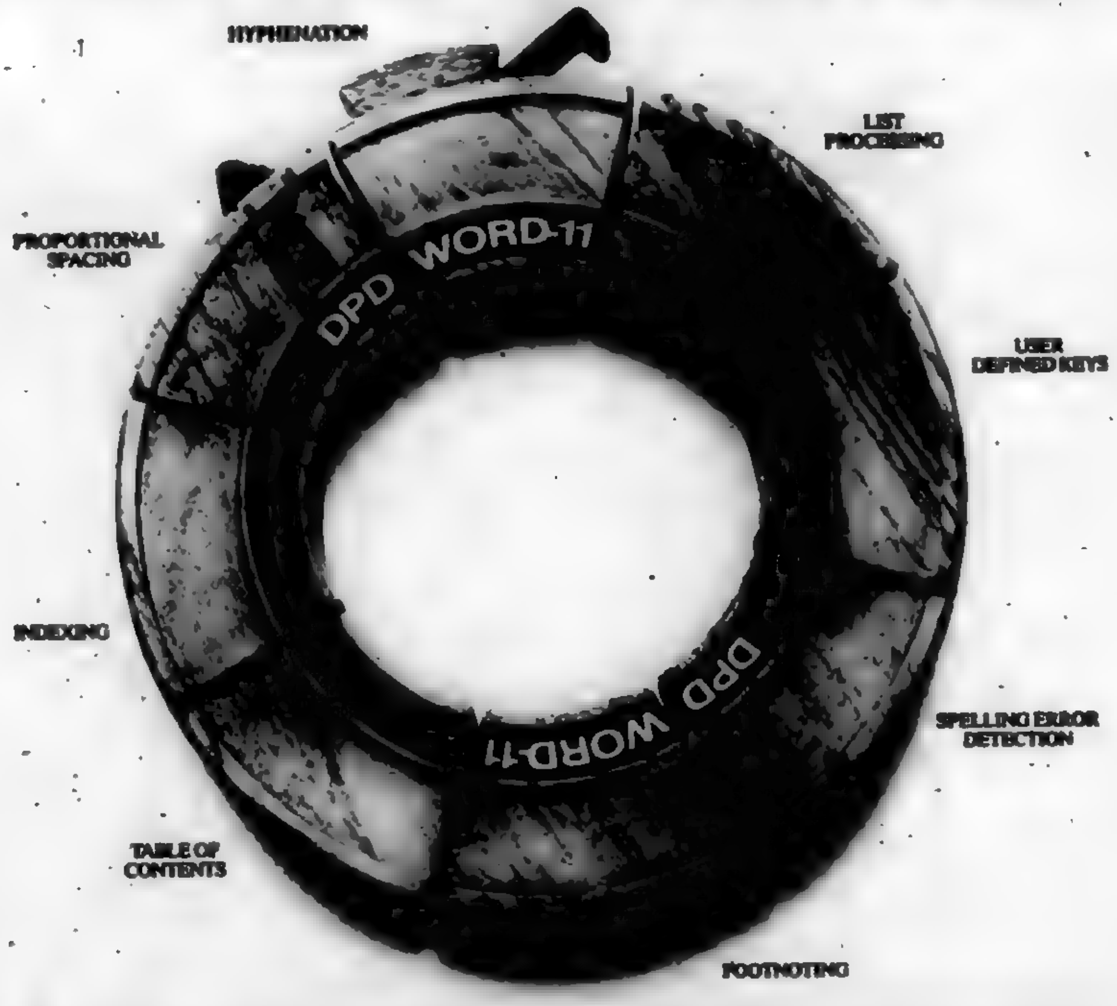

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to learn about the internal operations of a particular DBMS — difficult because it may be quite involved and impossible because the DBMS vendor may consider some, most or all of this information as proprietary.

A real dilemma facing DBMS vendors is how much to tell the user about *how* the product actually works. If it doesn't tell enough, then the user may not be able to operate efficiently enough to achieve even moderate satisfaction, and the DBMS will acquire a bad reputation.

If the vendor tells too much, then (1) users may feel that it takes too much time and expertise to learn to use the DBMS and (2) the detailed revelation of how the DBMS functions may eliminate a competitive edge for the product and lead to financial disaster for the vendor.

Data Model and File Structure

The grouping of related fields into logical records, the grouping of logical records into logical files and the relationships between logical and physical files will have profound effects on usage efficiencies. Such design considerations are very much dependent on both the data model and the DBMS and must usually be addressed in an iterative fashion (what logical relationships seem reasonable in view of the data relationships; how might this be implemented with the DBMS under consideration; what difficulties are present with such a design; how the logical model of the data might be modified to eliminate or alleviate these difficulties).

As the file structure design process progresses, we must specify such things as what fields will be key (i.e., records can be retrieved by specifying a specific value for the given key field), what abbreviations (if any) should be used, what fields should have their values coded (to conserve space) and how much space to allocate to the files.

The impact of some of these design decisions will be significant on usage efficiency. Some of the impact will not be apparent until the data base is in full use. Some of the impact may never become apparent, but nonetheless will result in much inefficiency.

Some of the decisions made during the data base design will be easily rectifiable later on (e.g., with some DBMS it is a relatively easy matter to make a key field nonkey and vice versa; some files can have their size increased dynamically). Other decisions will be rectifiable only through a costly and time-consuming process such as a reload of the entire data base (e.g., the reserved space for hashed files — used in almost all DBMS to facilitate fast record retrieval — cannot as a rule be increased).

Although the details of some of the tradeoffs that should be addressed while designing the file structure may not be apparent until application programs are written and exercised with the data base, the nature of the tradeoffs should be apparent from the start. For example, it is much more expensive in CPU and I/O costs if a full field value is *not* stored in a record but in a "table" (separate file or part of the same file) and retrieved based on a code for the value.

The nature of this trade-off, space vs. CPU-I/O costs, is apparent, but the most efficient implementation may not be evident until application programs are written and/or benchmarks are performed.

Given the data model and file structure of the data base and the repertoire of instructions to the DBMS, the user must devise strategies for data retrieval and processing. Again, the nature of the tradeoffs between different strategies may be apparent from the start, but the proper choices not at all obvious.

As an example, consider the problem of calculating the average age of a class of items in a data base. This appears to

(Continued on In Depth/14)

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(Continued from In Depth/13)

be a sequential processing application, so that an inverted file DBMS may be very inefficient. Indeed, there are users of DBMS who occasionally produce a sequential dump of their data base so that some applications can be processed more efficiently with a Cobol program or a sequential data retrieval system.

An approach that differs from either the sequential processing of records with the DBMS or the sequential processing of records with a Cobol program is to calculate the average age using the DBMS without accessing the records themselves. This can be done by using the inverted files to count the number of occurrences for each value of the age field in the data base.

A test of these three strategies for a file of 150,000 records revealed that sequential processing with a particular DBMS cost hundreds of dollars on a particular time-sharing system, sequential processing with a Cobol program cost about $20 and processing of the inverted files with the DBMS cost about $5.

As the above example illustrates, the ability of many DBMS to easily present every value of a "key" field and the count of the number of records having each value can be very useful. The loading and maintenance costs associated with this capability may, however, be quite large.

One of the more popular inverted file DBMS gives the user the *option* of automatically maintaining lists of every value for designated key fields. For those users which find the cost of exercising this option too large, there is a program included in the vendor's user manual which can be written to simulate this capability.

The implication, although somewhat obscure, is that the option is very "expensive." One consultant in the use of the DBMS has advised that the option for this capability never be exercised and that the capability be simulated when necessary.

Because of the generality and cost of using DBMS, it is advisable to consider one or more alternative approaches when formulating retrieval and processing strategies. This is particularly important for producing complex reports or for processing that is different from that with which the staff is experienced.

I experienced an example of the savings that can result with alternative approaches. This was a technique alternative to the one that seemed to be the most straightforward for a complex report, which resulted in an 86% reduction in CPU time with only a .01% increase in the number of I/Os.

For some organizations, such savings are of primary concern. For others, however, the ability for nonprogrammers to generate a complex report in a straightforward manner in a reasonable amount of time is paramount.

Operating Procedures and Options

There are numerous options that can have significant effects on the efficiency of DBMS usage. If a commercial time-sharing system is being used, the choice between interactive and batch usage will have a significant effect on cost.

A good rule of thumb is to develop applications interactively, but to process reports in the less expensive batch mode. If processing cost is of *any* concern, then off-hour or overnight batch runs are almost mandatory for large reports with many DBMS.

This is not a severe limitation; there will be a high probability that the report will be produced correctly in one attempt, after being tested using the DBMS in the interactive mode. Updates to the data base in the interactive mode can be deferred so that the inverted files can be updated for a batch of changes rather than after each individual change.

While this does impact the timeliness of the changes, great cost reductions can result. One test showed a cost reduction of 95% (from $110 to $5.50) when updates of the inverted files were deferred and batch processed.

Many options will be left to the data base administrator or DP professional rather than the end user. Among these are the number of buffers or amount of core to allocate cluster size for disk storage, contiguity or separation of data on disks and tapes (See Figure 2). Choices among these options will directly affect operating characteristics

(Continued on In Depth/16)

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254	3	17.4	1666	13.60
260	4	15.6	344	6.30
266	5	13.6	318	5.80
270	6	13.1	296	5.60
282	8	15.1	266	6.20

Figure 2. An example of the possible impact of option or parameter selection is given by these results from test runs. The amount of core was varied to change the number of buffers, resulting in changes in CPU, I/O and cost figures.

(Continued from In Depth/14)

such as number of I/Os, disk arm movement and contention for systems resources.

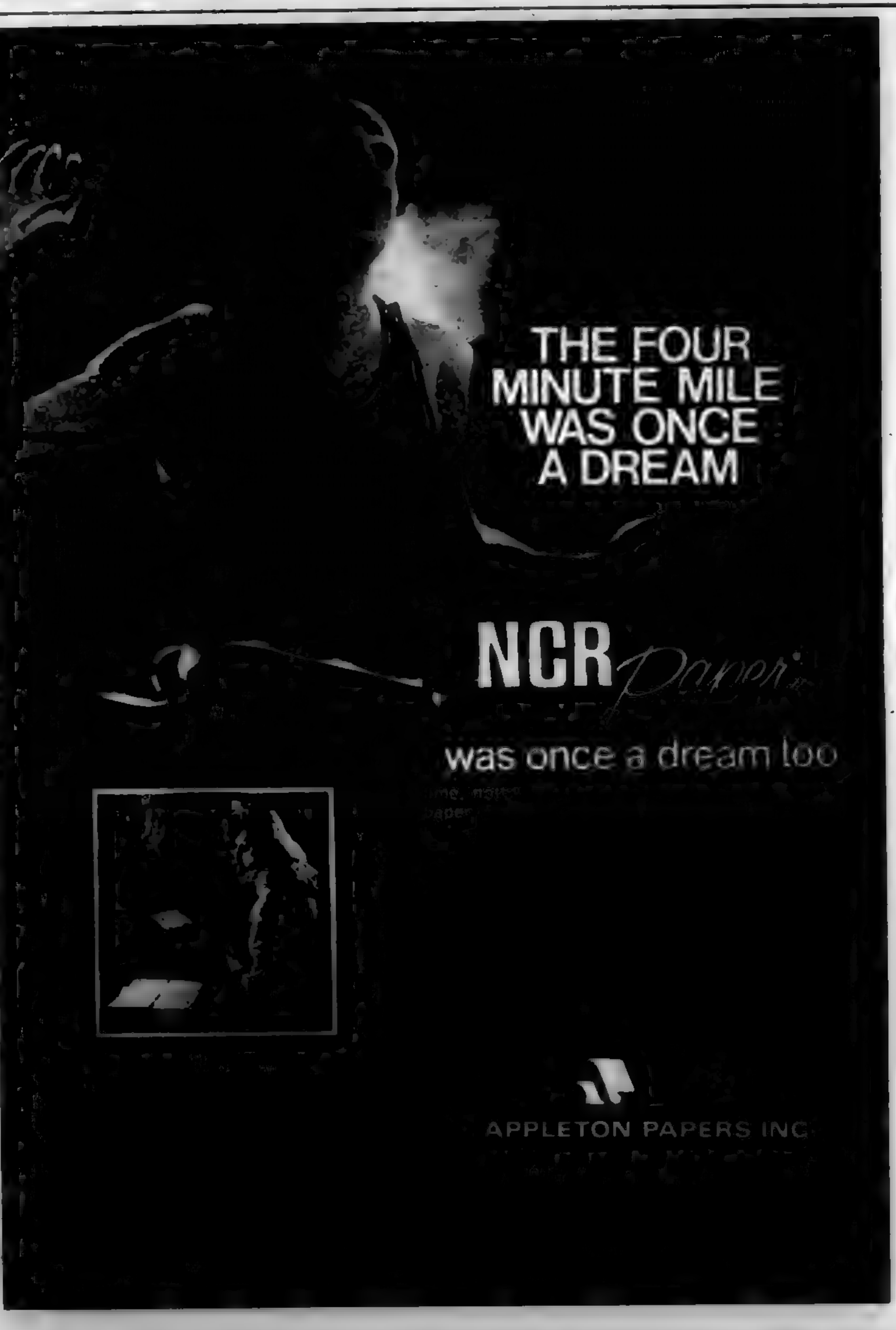
Other options that are more specific to DBMS, rather than data processing in general, include the means of dumping and restoring files (i.e. using a DBMS-supplied utility or a dump/restore utility supplied with the operating system); how and when to reclaim previously used space; if, when and how to "reorganize" the file to improve efficiency (file reorganization is sometimes a euphemism for reloading the data base because the internal tables become too full or a mess of "tangled spaghetti").

Other options will be in the provinces of both the DP staff and the end users. For example, there may be alternative means of adding new entries to the data base, for example, by using the DBMS data load utility or via the DBMS user language or host language interface. The choice of options will be greatly influenced by the experience and inclination of the person(s) making the choice.

The DP professional will, by and large, choose those options that will maximize reliability and efficiency. The applications user (the person requesting information from the data base for his or her own usage in decision making) will be as concerned with reliability as the DP professional, but will tend to minimize effort rather than be concerned with efficiency. This is as it should be — or must be — if we are ever to have truly successful management information systems.

If, at the present time, it is too costly for an organization to choose those options that result in ease of use and sacrifice some or a great deal of efficiency, the DBMS may not be an appropriate tool. Viable compromises can usually be reached that provide a reasonably efficient system with relatively easy access to information in the data base. The ease of access may not be such that a naive end user can access the data base directly, but a third party can serve as intermediary.

Such an arrangement might sound like nothing new; programmers have been acting as third (and fourth and fifth...) party intermediaries for a long time. The difference with the DBMS third-party intermediary is that he will be able to respond to the end user's request in a matter of minutes, hours, or at worst, overnight and can devote more time to understanding the end user's application rather than trying to figure out how to get the cantankerous machine to present the desired information.



FOOTNOTES

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Dr. Ernest H. Forman is associate professor of management science, School of Government and Business Administration, The George Washington University, Washington, D.C.

Brings in Magnuson CPUs Instead

Service Opts Against Upgrade to 3031

Special to CW

CHARLOTTE, N.C. — When Allied Financial Services, a company here that provides on-line data processing services to banks in North and South Carolina, decided to replace its two IBM 370/138s, it initially saw only one alternative. The firm planned to scrap the overworked 138s and bring in an IBM 3031.

However, the company finally selected two IBM-compatible M80 computers from Magnuson Computer Systems because they offered "greater performance than the 3031 and will save more than $250,000 in hardware costs," Larry Cullingford, Allied's vice-president, said. In addition, the firm didn't have to dump the 138s since the M80s were designed to boost overall system performance.

The first M80, installed in April, operates in a fully shared environment with one of the 138s and handles 114,000 transactions daily. The second IBM mainframe backs up the M80 and other 370 in case either shared mainframe fails. So far, the system has been up about 99% of the time, Cullingford reported.

In benchmarks run by the company against the 138s, the M80 delivered roughly twice the throughput for average on-line jobs and three times the throughput on number-crunching applications, Cullingford said. In addition, he said the M80 puts out less than 25% of the heat and uses about 25% as much power as the 138.

The single M80 cost Allied about $259,000; the 3031 would have cost about $827,000, according to Cullingford.

Development Plans

Allied decided to increase its computer capabilities more than a year ago. The company evaluated future customer requirements and laid out a schedule to meet them. The development effort will take more than two years and requires upgrading hardware and developing new software.

"We're in the business to give (smaller banks) data processing services that let them compete with the large banks," Cullingford noted. "That way, independent banks with just three or four branches can offer many of the same services as a 200-branch bank."

All of the bank service company's software programs were designed to run under IBM 370/138 DOS/CICS and were created in the early 1970s, he explained. Although they were working well, it was decided that they couldn't meet future capacities. "And in bank data processing, with changing economic and regulatory pressures, the future comes along very fast."

The Magnuson systems were also selected because they could reportedly handle the program conversions and hardware demands of switching from a DOS to an OS operating environment, which are part of the company's plans.

Recently, Allied established a shared automatic teller machine (ATM) network for its client's customers that is expected to expand to 35 units by the end of the year, the vice-president said. Currently, the teller terminals have a maximum response time of five seconds.

The M80 has an 8M-byte memory capacity and like the 3031 offers six I/O channels. However, the I/O rate of the Magnuson machine is 2.5M byte/sec as opposed to the 3031's 1.5M byte/[illegible]

Beyond keeping response time low, Allied was also concerned with differences in computer architecture and operational requirements between the M80 and the 3031, Cullingford said. For instance, the M80 had to be able to interface to the company's IBM 1419 check sorter.

Upgrading was another concern. According to Allied's estimates, it would take 12 to 18 months to convert from dual IBM 370/148s and then to a 3031. But because the M80 uses a bus-oriented architecture, the company can eventually upgrade to an M80/43 by just swapping printed circuit boards.

Users Share Master's Peripherals

DDP System Built Around Z80

OAKLAND, Calif. — A distributed data processing (DDP) system with expansion capability has been announced by Digital Microsystems, Inc.

The Hinet System is said to provide each user with his own low-cost computer while allowing him to share the more expensive peripherals — such as disk drives or printers — of the Hinet Master.

Hinet reportedly allows the addressing of up to 250 User Stations; the actual number of users that can be supported depends on the application.

User Stations can be located up to 1,000 feet from the Master Station and can communicate over the network line at a rate of 500K bit/sec. The Hinet Master, as well as each User Station, can support up to 28M bytes of disk storage.

The core of the system is the DSC-3 computer consisting of a Z80A microprocessor, 64K random-access memory, three RS-232 serial ports, an RS-422 high-speed network port, two parallel ports, real-time clock, I/O and clock interrupts, 1K of Shadow read-only memory with built-in diagnostics and floppy disk controller.

The basic Hinet Master Station comprises the DSC-3 computer mounted in a cabinet with two Shugart Associates, Inc. double-density, single-sided floppy disk drives and costs $5,495.

The standard Hinet User Station consists of the DSC-3 computer mounted in a CRT terminal and costs $3,290 from the firm at 4448 Piedmont Ave., Oakland, Calif. 94611.

Drive System for VAX-11/780 Offers 300M-Byte Capacity

SEATTLE — A 300M-byte drive system for operation with Digital Equipment Corp. VAX-11/780 computers is available from Nordata. The Nordata drive system, named NVM05, features a controller interface that utilizes the Synchronous Bus Interface (SBI).

The 300M-byte system is the first offered by an independent supplier that uses the faster SBI rather than the Unibus and offers full DEC diagnostics, Nordata claimed. The system can support up to eight additional drives. Transfer rate is 9.7M bit/sec and the system is spindle-compatible with the RM05.

The basic drive with controller costs $28,900; each additional drive is $16,900, Nordata said from 4433 27th Ave. West, Seattle, Wash. 98119.

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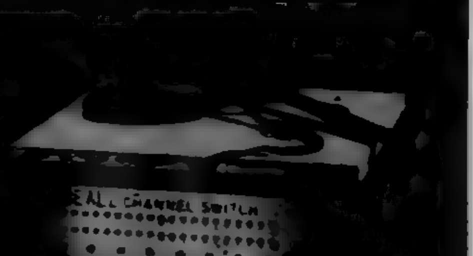

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Two High-Speed Printers Join Dataproducts B-Series

WOODLAND HILLS, Calif. — Dataproducts Corp. has introduced two high-speed band printers, the 1,500 line/min BP-1500 and the B-900.

The BP-1500 is the first in a family of printers designed to complement the B-Series. It prints an average page in 1.5 sec, according to the vendor.

Built to provide print quality and high reliability at the heavy duty cycles, the firm said, the BP-1500 uses an interchangeable steel band to print 1,500 line/min using a 48-char. set and 1,200 line/min with a 64-char. set.

The printer uses diagnostic and status indicators that minimize downtime by providing detailed status on the condition of the microprocessor and system interlocks that control the total printer operations.

The BP-1500 also features a touch-sensitive control panel that includes a built-in self-test unit; built-in sensors indicating paper out and adjustable forms thickness control; and universal power supply.

The printer costs $16,700 with quantity discounts available, the firm said.

Datapoint's B-900 is the highest speed device in the firm's line of B-Series band printers, which include the B-300 and B-600 models.

Its print speed is 1,100 line/min using a 48-char. set, 900 line/min at 64 char. and 700 line/min at 96 char. The printer also offers specially designed steel bands, available in 48-, 64-, 96- and foreign character sets. The microprocessor-based B-900 uses a diagnostic and display feature that constantly monitors machine status, enabling the operator to quickly identify and correct off-line conditions, the vendor said.

The B-900 costs $9,800 from the firm located at 6200 Canogo Ave., Woodland Hills, Calif. 91365.

Ramtek Offers Color Graphics

SANTA CLARA, Calif. — Ramtek Corp. has introduced the RM-6212, a color graphics terminal that reportedly gives the user full-color, high-resolution raster-scan graphics output from a host computer.

The unit can interface via serial asynchronous communications with any host CPU using a standard RS-232C interface and is suitable for business graphics, management information systems, CAD/CAM and educational applications, the vendor said.

The RM-6212 offers resolution of 640-by-480 picture elements with an option for 640 by 512 and is based on the eight-bit Z80 CPU operating at 4 MHz. It features 32K bytes of read-only memory and programmable read-only memory and 16K bytes of random-access memory (RAM) with an option for 16K bytes of additional RAM.

The RM-6212 costs $16,000 from Ramtek Corp., 2211 Lawson Lane, Santa Clara, Calif. 95050.

Compuscan Interfaces Alphaword, Tab 700

TETERBORO, N.J. — Compuscan, Inc. is offering an interface to allow integration of the Alphaword OCR page reader with the Tab System 700 terminal.

Text typed on standard office typewriters is scanned by the Alphaword, then transmitted to the Tab System 700. It is then automatically recorded on an IBM-compatible diskette.

With the combination, the user also gains the ability to make high-speed data searches, read constants out of memory and perform full-character word and line editing, the vendor claimed.

The interface is available for $2,000, from Compuscan at 225 Franklin Ave., Midland Park, N.J. 07432.

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For more information on the Level 68/DPS and the Multics operating system, write Honeywell, 200 Smith Street (MS 487) Waltham, Massachusetts 02154.

Honeywell

COM Unit Fits on Desk

MENOMONEE FALLS, Wis. — A microform reader said to combine the most widely accepted image blowback ratios for computer-output microfilm (COM) and source document in a desktop unit has been introduced by Realist, Inc.

The Valiant 11, one of five in a series, was designed for viewing full-size source document and .75 size COM.

The unit costs $235 from the firm's Micrographics Division, N93 W16288 Megal Drive, Menomonee Falls, Wis. 53051.

CPU Gives Graphics And Color

TUCKER, Ga. — Chromatics, Inc. has unveiled a color graphics computer in the middle price range.

The CGC 7900, driven by the 16-bit Motorola, Inc., MC68000 CPU, has a 19-in. color CRT, 1,024 by 768 screen resolution (with 1,024 by 1,024 graphics memory), high-speed image generation and a unique eight-color overlay mode.

The 7900 provides the capability to display up to 256 colors simultaneously and to alternate between two display images, using a dual-screen buffer technique.

The CGC 7900

Price starts at $19,995, and deliveries are scheduled for February.

Chromatics is located at 75 E. 55th St., New York, N.Y. 10022.

Printer Gives 240 Line/Min

GAITHERSBURG, Md. — Printer Systems Corp. has announced the TH240, an 80-column thermal printer that operates at speeds up to 240 line/min.

Manufactured by Olivetti Corp. and distributed by Printer Systems, Corp. the unit can print at up to 1,200 bit/sec on-line or copy a full 24-line CRT terminal display in less than 6 sec, the vendor said.

The unit is available in an alphanumeric configuration, or a plotting configuration is available for dual printing and plotting applications.

The basic unit comes with RS-232 or current loop interface and costs $1,395 for the alphanumeric version and $1,595 for the combination printing and plotting version, Printer Systems said from Suite 104, One W. Deer Park Road, Gaithersburg, Md. 20760.

Manual Outlines Internal Controls

PORT JEFFERSON STATION, N.Y. — A manual offering a methodology for including internal controls in systems design as mandated by the Foreign Corrupt Practices Act and management's control needs is now available from FTP.

The manual provides a step-by-step procedure for building systems of internal controls during the design phase.

Information covered includes how to isolate risks in a computerized business system.

The manual costs $495, FTP said from Suite 202, Colwick Towers, 4401 Colwick Road, Charlotte, N.C. 28211.

OMR System Ends Need for Key Entry

IOWA CITY, Iowa — An optical mark reading (OMR) system that eliminates key entry and reduces error potential by optically scanning documents that are completed at the data source has been introduced by Westinghouse Electric Co.

The W201 system features an optical sheet scanner which reads pencil-marked ovals on both sides of an 8½- by 11-in. input document. The data may be alphabetic and/or numeric.

The scanner can feed data to the computer at the rate of 10,000 page/hour, Westinghouse said.

Imminent Capability

Both single-sheet documents and multiple-sheet booklets can be processed. Imminent capability changes will allow for reading of variable document sizes, including conventional punched cards with marks and holes, the firm said.

Operations which benefit from OMR technology usually process large volumes of data, use many different sources of data which can be entered in the field and need fast turnaround time.

Other OMR applications include order entry, inventory control, time and work distribution records, job skill talent banks and attitudinal surveys for educational, commercial and governmental services, Westinghouse noted.

The W201 ranges in price from $90,000 to $165,000, depending on configuration. A complete system includes the scanner, tape drive, printer, CRT terminal and mini. The vendor is at Westinghouse Building, Gateway Center, Pittsburgh, Pa. 15222.

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'Better Data Base System'

User Chooses HP Mini Over System/34

HUNTINGTON PARK, Calif. — A "better data base system" combined with quicker delivery and lower cost made Latchford Glass Co. go with the Hewlett-Packard Co. 3000 Series 3 instead of IBM's System/34, according to DP Manager Joseph Toth.

The privately held firm, with some 1,600 employees, manufactures glass containers for the food and liquor industry.

Before installing the HP minicomputer, Latchford handled inventory on NCR Corp. 399s and scheduled production runs manually. Inventory records were frequently out of date, and there were logistic difficulties in coordinating production in the three plants, Toth said.

Latchford Glass Company manufactures custom and generic containers for the food and beverage industry. Here, Pearl Blankenship examines bottles on a light table to eliminate imperfections.

Container Orders

Latchford customers place container orders with specific delivery dates, and the firm manufactures the containers, packs them in cartons and stores them in inventory. The cartons are printed with the customer's label, warehoused in flat bundles and must be opened, the bottoms sealed and separaters installed before they are filled with glassware.

"Manual methods were adequate when we had only one plant," Toth said. "When the company acquired two additional manufacturing facilities in Northern and Southern California, management saw the need for tighter control and better management information.

"After examining various systems, the company narrowed the contenders down to an IBM System/34 and the HP 3000 Series 33. The HP equipment was selected because it seemed to have a better data base system and was interactive," Toth said. "The delivery date also was better and the system was less expensive than IBM's."

Installed in late 1979, the Series 33 has 1M byte of main memory and four disk drives with a total of 340M bytes of disk storage. Peripherals include 15 CRT terminals in the Huntington Park plant and a terminal and printer in one remote facility.

Production printing is handled by a BDS Computer Corp. HPI-33 printer controller and Model 2470, 1,800 line/min printer, Toth said. The mini limits operation to about 1,600 line/min and that is about four times faster, and 2.5 times more expensive, than the 2608 printer, a company spokesman said.

Terminals are installed in the production control, manufacturing and the sales departments, the spokesman explained. As bottles are manufactured and cartons received, the quantity and production location are entered via terminals distributed throughout the factory.

Inventory Data Base

The inventory data base is entered by the personnel close to the appropriate activity, and some 26 data sets are included in it, he said.

"Previously, all inventory transactions were performed by the accounting department and there were posting delays and inaccuracies," Toth said.

Each department now posts its own inventory and adjusts its own inventory. As a result, they are much more current and accurate."

(Continued on Page 74)

Memorex Printer Fits System/34, 38

SANTA ANA, Calif. — Memorex Corp's. Business Systems Division expanded its line of small system printers with the 200 char./sec Model 3056 matrix printer, designed for the IBM System/34 and System/38.

The printer incorporates an advanced metal tractor design that can reduce paper costs in applications requiring use of either single or multiform parts and also offers "superior" print quality and speed, Memorex claimed.

A tear-off bar positioned above the printing head saves paper and also enables the operator to remove a completed form from the printer while the print head is positioned at the very top of the next form.

The 3056 is equipped with a pedestal which allows forms or paper to be loaded from the front. The printer feeds forms in a straight path from the forms stack directly out to the top of the printer, eliminating the need to load forms around a narrow, typewriter-like platten as in some other matrix printers, Memorex said.

The printer can accommodate forms ranging in width from 4.75- to 15.75 in.

The Model 3056 Matrix Printer costs $6,675 with 36-month lease prices of $207/mo. Memorex Business Systems Division is at 3015 Daimler St., Santa Ana, Calif. 92705.

DEC Cuts Prices on WP, DP Systems

MAYNARD, Mass. — Digital Equipment Corp. has cut prices on its WS78 series of word processing (WP) and DP systems, effective immediately.

The WS78 series, which includes the Datasystems 208 and 408, will be available for the first time in hardware-only configurations, allowing users to select their own configuration with prices 10 to 35% lower than standard packaged systems, DEC claimed.

Under the new pricing policy, a complete system, including CRT terminal with keyboard, dual diskette drive and 32-char/sec matrix printer, will cost $4,995, exclusive of software.

The price for a complete WS78 WP system, including software and a 45 char./sec. letter-quality printer, has been reduced from $11,995 to $7,795. The same system can be purchased with a COS-310 operating system license for $8,595, to provide both WP and DP capabilities, according to DEC.

With the firm's Dental Management System, a full WP and DP configuration is available for $10,505, down from $14,505.

In addition to the operating system software, separate application packages for general business use are also available.

The special multiple system packages will be offered at reduced prices.

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IBM Series/1 Users Offered 80-Column Card Reader

FRAZER, Pa. — An 80-column card reader subsystem that operates at 400 card/min on a demand basis and intended for IBM Series/1 users has been introduced by Cardamation Co.

The CR400/01 sits on a desk and includes mechanism, read electronics, casework, interface cable and controller which plugs into the Series/1 backplane.

The controller automatically translates "on the fly" 80-column punched-card data into Ebcdic format, overlapped with Series/1 cycle stealing operations, the firm said.

The CR400/01 is a faster version of the vendor's 300 cards/min reader for the Series/1. It costs $6,950 with monthly lease rates for three years of $273 and for five years of $185. The vendor is at 9A, Frazer Mall, Frazer, Pa. 19355.

CAT Handles WP, DP Tasks

TORRANCE, Calif. — Cado Systems Corp. is offering the Cado Executary Computer-Aided-Tutor (CAT), a word processing (WP) system designed to increase a manager's productivity by performing WP and DP and also by keeping track of people, appointments and assignments.

The system features document-oriented WP, bookkeeping, electronic filing, Rol-A-Disc name and address filing, a tickler file, a daily planner, a list-management system and an arithmetic calculator.

The CAT system offers self-teaching programs for noncomputer personnel. CAT includes a keyboard and display unit, CPU and diskette drives, a letter-quality printer, complete WP software (including all the manager support functions), five bookkeeping packages, an English language management inquiry and reporting system, the tutorial programs and the diskettes, a spokesman explained.

The bundled system costs $15,990 from Cado at 2771 Toledo St., Torrance, Calif. 90503.

Glass Firm Goes With HP Mini

(Continued from Page 73)

Using appropriate data, the HP 3000 calculates a suggested optimal production schedule designed to reduce warehouse levels on slower moving items while maintaining adequate inventory of faster moving glassware, he continued.

However, the monthly production plan can be modified by sales and marketing people based on their own knowledge of customer requirements.

The BDS printer line adds hard-copy capability to Latchford's inventory and production systems and is vital to the management reporting systems, a spokesman said.

The BDS HPI-33 controller emulates the HP controller and is daisy-chained with other peripherals in the standard HP convention, he explained.

More than 25,000 pages of inventory are printed each month with another 20,000 pages estimated for production scheduling, management reports and general ledger systems. "We anticipate an even higher print volume as we install other applications programs," Toth said.

Despite the print volume, the HP 3000 accommodates up to nine simultaneous sessions.

"It is difficult to directly attribute cost savings to the HP 3000," Toth acknowledged.

"However, we feel that significant benefits accrue through better inventory control and production scheduling, while timely reports let management make more effective operating decisions."

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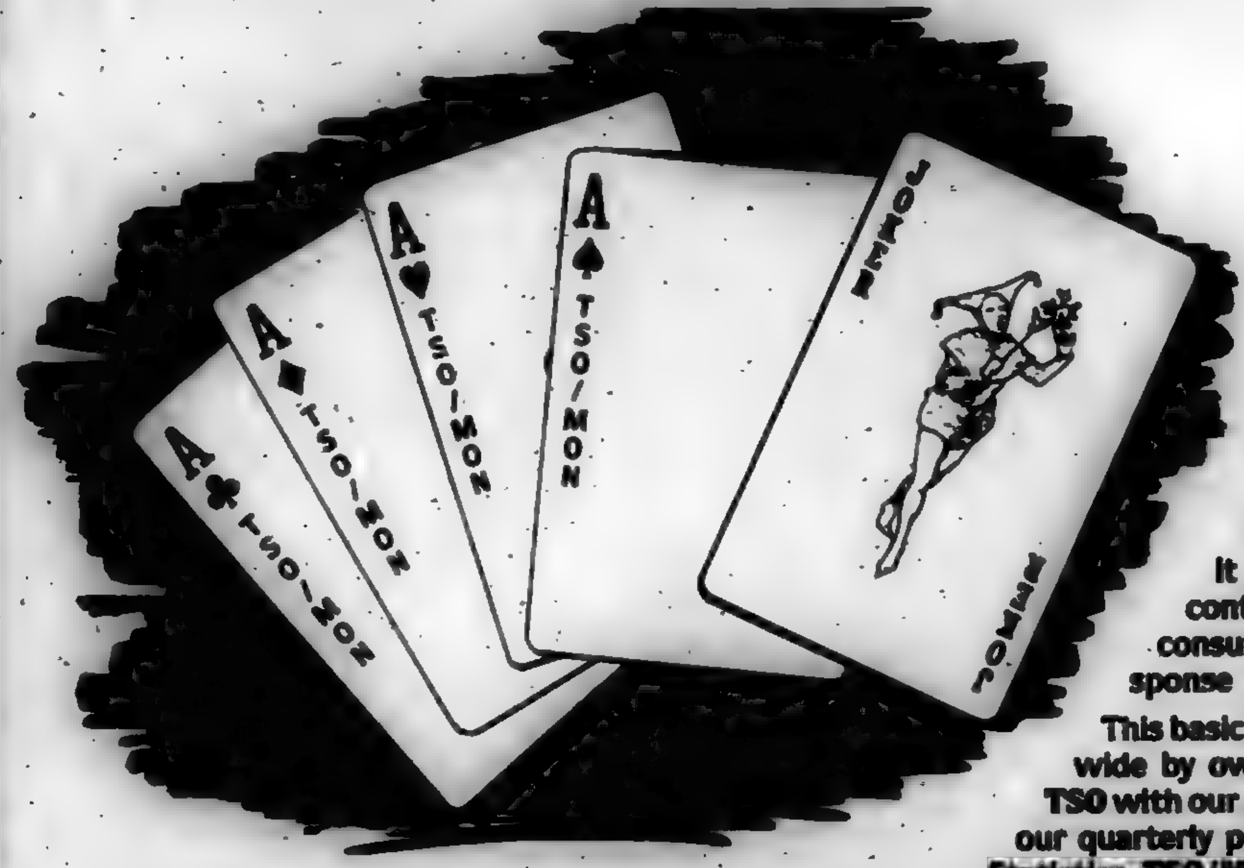

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CWC

Mini Bits

DTC Micro Smaller Than Typewriter

CAMPBELL, Calif. — Data Terminals and Communications, Inc. (DTC) has announced a microcomputer said to be smaller and weigh less than an office typewriter.

The DTC Micro 210 contains 64K bytes random-access memory, 2K bytes Phantom read-only memory, an 8085A-2 microprocessor and four RS-232C asynchronous interface ports. The unit employs two BASF minifloppy disk drives having 300K bytes of on-line storage.

The operating systems available with the unit are fully compatible with DTC's current line of microcomputers. Applications software can be written under Digital Equipment Corp.'s CP/M, DTC's Multi-User Business Basic or DTC's version of Microsoft Extended Basic.

Priced at $3,295, the Micro 210 is available from the firm at 590 Division St., Campbell, Calif. 95008.

Micro-Disk 981 Boasts RAW Error Control

ROCHESTER, N.Y. — Techtran Industries, Inc. is offering the Micro-Disc 981 with read -after — write RAW error control.

The 981 raw offers error control during read and write operations. The Raw option further enables the user to rename a file currently listed in the directory, as well as merge the files of one disk with a second disk using the existing copy routine, the vendor claimed.

The price for the standard Micro-Disc 981 with RAW error control is $2,630, the vendor said from 200 Commerce Drive, Rochester, N.Y. 14623.

CAD/CAM System For Hybrid Design

BURLINGTON, Mass. — A computer-aided design and manufacturing (CAD/CAM) system for hybrid design has been introduced by Applicon, Inc. to enable electronics companies to automate and integrate the design, checking, documentation and manufacturing functions.

The Video Hybrid System is configured with a dual-processor architecture that combines a Digital Equipment Corp. PDP-11 minicomputer working in tandem with Applicon's 32-bit minicomputer, the Graphics 32.

A four-terminal system ranges in price from $250,000 to $300,000, depending on configuration, an Applicon spokeswoman said from 32 Second Ave., Burlington, Mass. 01803.

Corvus Disk Drive Designed for Micros

SAN JOSE, Calif. — Corvus Systems Inc. has announced a 20M-byte Winchester-type disk drive for most popular microcomputers.

Similar to the firm's 10M-byte drive, the drive consists of three elements: An 8-in. IMI-7720 Winchester disk drive; a Z80-based intelligent disk controller capable of supporting up to four disk drives; and an intelligent personality module for each processor, the vendor said.

The 20M-byte drive costs $6,450 from Corvus at 2029 O'Toole Ave., San Jose, Calif. 95131.

Minifloppy Provides 1M-Byte Storage

DENVER — Apparat, Inc. is offering a dual-sided minifloppy disk drive that reportedly offers more than 1M byte of storage for Radio Shack's TRS-80 Model I microcomputers.

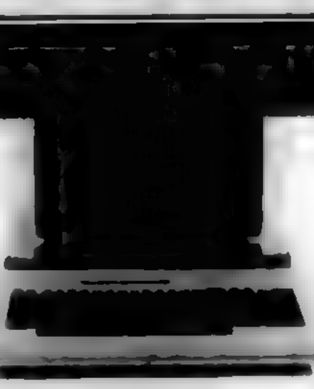
The disk drives offer dual-sided, 80-track spindles with modification patches to the Newdos/80 operating system that make each disk appear as a single volume, but with 405K bytes of storage, the vendor said.

The drives cost $839, and additional drives cost $779, the vendor said from 4401 S. Tamarac Parkway, Denver, Colo. 80237.

Eventide Cuts Price Of WMAP-1 by $650

NEW YORK — Eventide Clockworks, Inc. has reduced the price of its WMAP-1 memory board from $2,900 to $2,250. The WMAP-1 adds 128K bytes of memory to the Hewlett-Packard 9845 desk-top computer.

The WMAP-1 has identical characteristics to those of the HP board at half the cost, Eventide claimed. The WMAP-1 carries a one-year parts and labor warranty, its vendor said from 265 W. 54 St., New York, N.Y. 10019.



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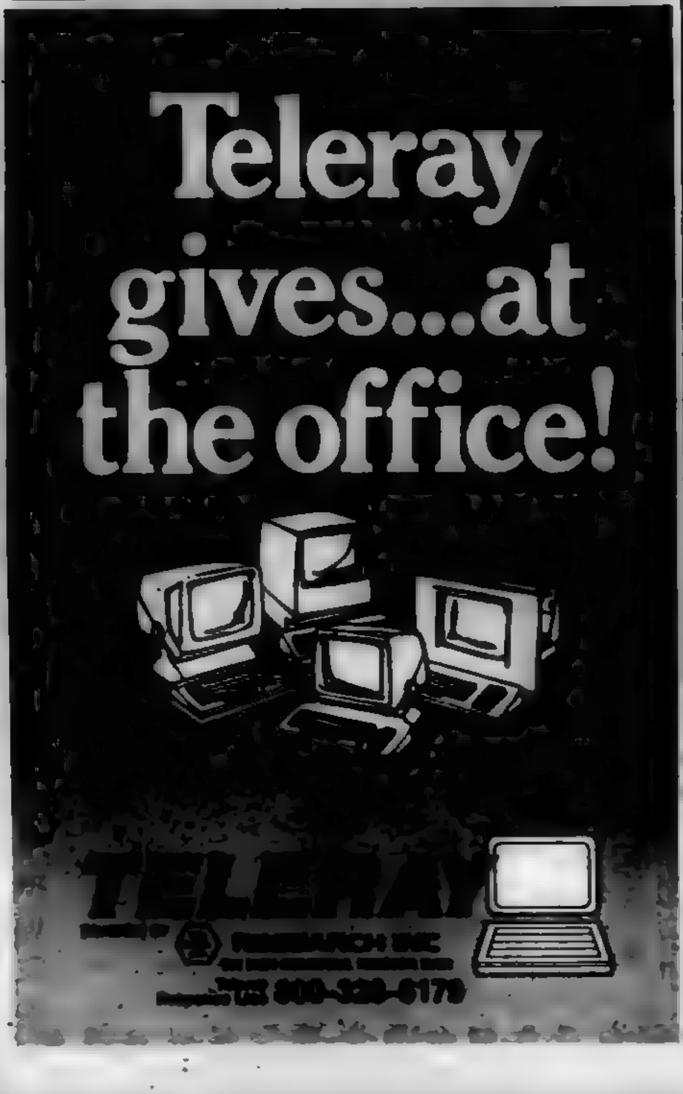

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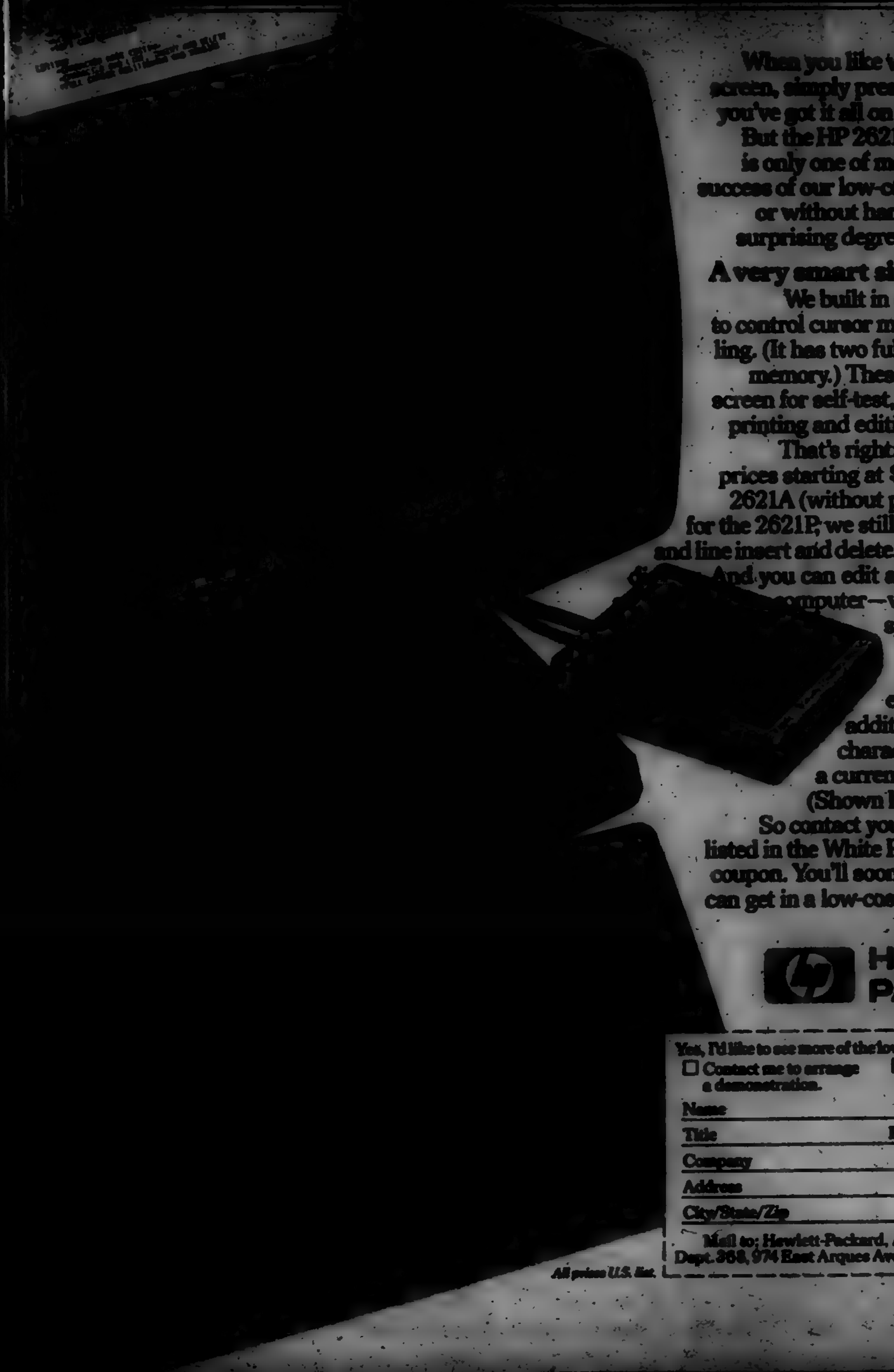

When you like what you see on the screen, simply press a key and presto! you've got it all on paper.

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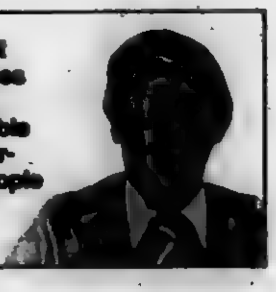

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PERKIN-ELMER

BDS Printers, DEC Gear Tied

MENLO PARK, Calif. – BDS Computer Corp. has announced a single-board printer controller that links its line printers with Digital Equipment Corp. LSI-11, LSI-11/2 and LSI-11/23 microcomputers and PDP-11/03 minicomputers.

The LPC-03 is fully plug-compatible with the Unibus and software-transparent to the operating system, the vendor said. It can be used with the BDS 180 char./sec dot matrix printer with a 64- or 96-char. set, the 340 char./sec printer and the 300 line/min printer.

The LPC-03 costs $795. Prices for both the controller and printers are $2,700 with the 180 char./sec printer, $3,400 with the 340 char./sec printer and $5,400 with the 300 line/min printer, BDS Computer Corp. said from 1120 Crane St., Menlo Park, Calif. 94025.

LSI/11s Gain Tape Controller

ANAHEIM, Calif. – The Datum 1521, a dual-density tape controller/-formatter, has been introduced by Datum, Inc. as a tape storage system for Digital Equipment Corp. LSI-11, LSI-11/2 and LSI-11/23 micros.

The 1521 can be used with any industry-standard reel to reel magnetic tape transport operating at speeds up to 75 in./sec, the vendor said. Users may switch select recording in either NRZ format at 200- to 800 bit/in. or in PE format at 1,600 bit/in.

The controllers cost $2,025 for quantities of 25, Datum said from 1363 S. State College Blvd., Anaheim, Calif. 92806.

Memory Boards Fit DEC, DG Machines

PLANTATION, Fla. – A line of Digital Equipment Corp. and Data General Corp. Nova-compatible memory boards is available from Digital Data Systems, Inc.

Boards carrying a one-year warranty are available for the DEC PDP-11, LSI-11, PDP-8 and all DG systems. Boards are also available for Interdata Corp., Varian Corp. and Harris Corp. computers.

A 128K-word board for the PDP-11/34 costs $3,000, Digital Data said from 1396 N.W. 65th Terrace, Plantation, Fla. 33313.

Dot Matrix Printer Fits TRS-80 WP Use

FORT WORTH, Texas – Radio Shack has announced the Line Printer IV, a dot matrix printer for TRS-80 word processing (WP) applications.

The printer is capable of producing either 80 or 132 fixed-space char./line for line justification or tabular information. Both upper- and lowercase letters are available in all three printing modes.

Special characters available include the grave, braces, back slash and a carat.

The printer costs $999. Radio Shack is at 1800 One Tandy Center, Fort Worth, Texas 76102.

POS Mini Fits Smaller User

LINCOLN, Neb. – Retail Data Corp. is offering a "stripped-down mini" for small to medium-sized point-of-sale (POS) users.

The Retail Data Collection Network supports up to four lines and approximately 300 POS terminals, the vendor claimed.

The system's basic configuration features a 16-bit, 64K-byte processor, one tape drive and controller, one disk drive and controller, two CRT terminals, one printer and identical polling and communications software.

The price for the system ranges between $75,000 and $500,000, depending on configuration and the size of the user system, the vendor said from 620 N. 48 St., Lincoln, Neb. 68504.

For Retail Firms

MPU/Cash Register Out

CHICAGO – Retail Data Services has introduced a small business computer and electronic cash register system called RDS Mod II and Mod III. Designed for firms doing more than $500,000 in sales, the units feature menu-driven transactions, modular on-line subsystems and either 48K or 64K of random-access memory (RAM), the vendor said.

The RDS system consists of a control processor unit, document printer, cash drawer and the necessary software to run the system.

The Mod II uses a three-port Radio Shack TRS-80 microcomputer with 64K RAM and an 8-in. floppy disk drive and costs $6,500.

The RDS Small Business System

The Mod III uses a two-port TRS-80, 48K RAM and dual 5.25-in. floppy disk drives for $5,200, the vendor said from 160 W. Burton Place, Chicago, Ill. 60610.

Allied Bancshares' Accounts for the Future with IFPS

Allied Bancshares, Inc. is a two billion dollar plus bank holding company headquartered in Houston, Texas with 24 member banks. In 1979, Allied ranked first in the nation in return on assets and return on equity among banks with assets over two billion dollars. This represents a continuation of the company's consistent leadership in these two key performance ratios used to measure banks and bank holding companies.

Since 1978, Allied Bancshares has used the Interactive Financial Planning System (IFPS) from EXECUCOM Systems Corporation for historical analysis, planning, and financial procedures.

Tom Clausen, Treasurer for Allied, recently said, "*The pace and nature of our acquisition program combined with the profitability posture established by Allied in the industry does impose some specialized requirements on parent company accounting. Often we deal with relatively small banks which have no automated financial systems of any kind. With IFPS, we find that we can bring new banks into our corporate financial system without an expensive and time-consuming conversion process. IFPS allows us to create a compatible financial data file regardless of the internal system of each member bank. The end result is an automated, comprehensive financial system maintained with minimal staff and no specialized data processing personnel.*"

Buddy Pollard, Allied's Assistant Treasurer, added, "*We selected IFPS because it offered the most direct, rational approach to planning and problem-solving situations. IFPS has allowed us to minimize the staff and resources allocated to the problem translation and setup steps.*

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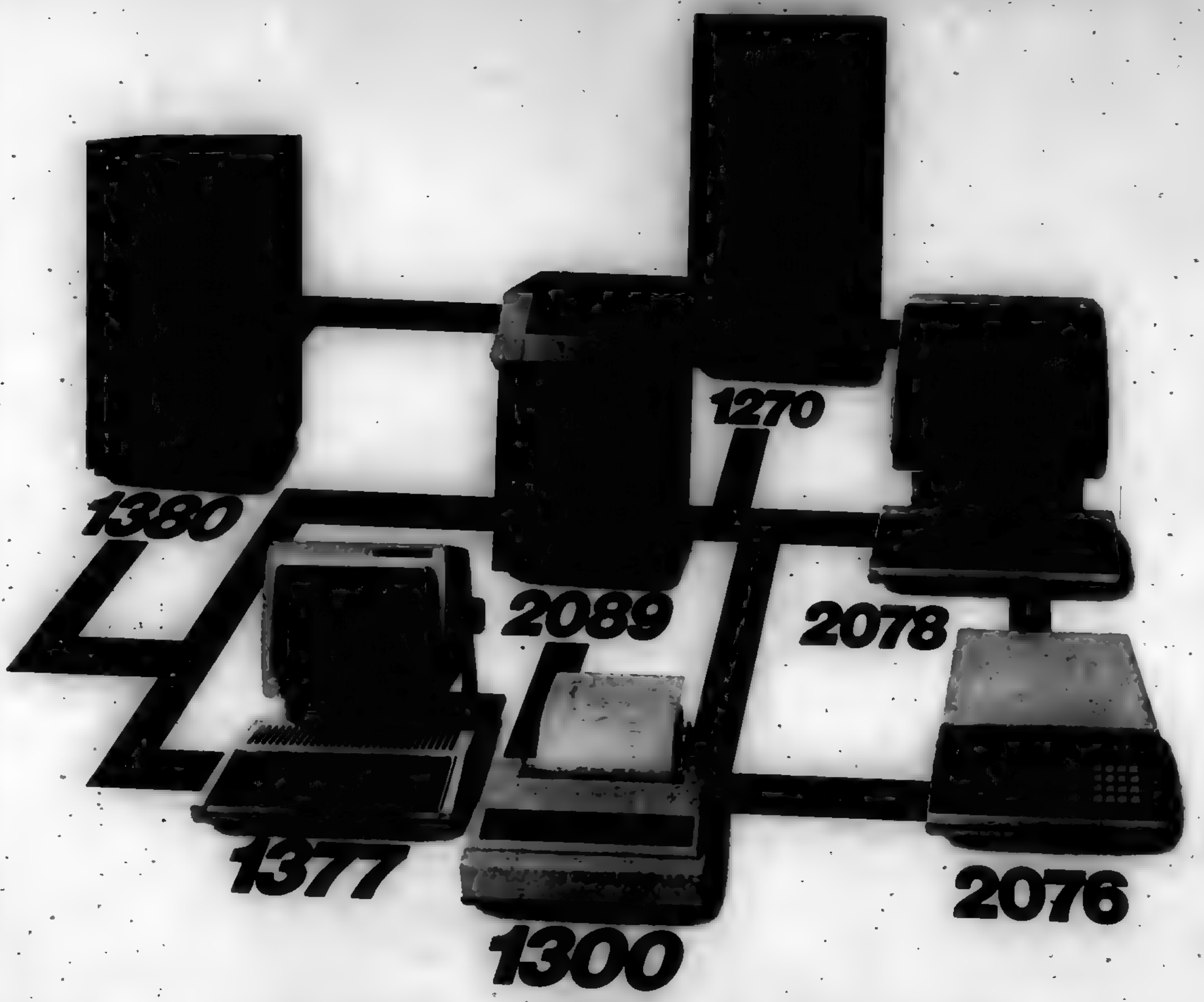

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Suspension Shuts Out CSC From New GSA Business

WASHINGTON, D.C. — The General Services Administration (GSA) has temporarily suspended Computer Sciences Corp. (CSC) from acquiring new GSA business in light of the recent federal indictment of CSC and six individuals associated with the company.

The suspension will remain in effect until the completion of legal proceedings, according to the GSA notice. A trial has been scheduled for Feb. 2, 1981.

The GSA decision affects some 200 federal users of CSC's Infonet service not yet covered by a multiple award schedule contract for the government's fiscal year that began Oct. 1.

The GSA has also agreed to extend CSC's multiple award schedule contract for one year to provide continuity of service, provided the user agencies certify CSC is the only vendor available to fulfill essential requirements. These agencies will be required to submit a recompetition plan to GSA.

Under the agreement CSC is required to provide federal users with a means of auditing billing and contract performance immediately after user programs are executed on Infonet. CSC said it could fulfill this condition.

The GSA order does not impact other agencies. The decision to suspend an indicted firm from receiving new business is made by individual agencies.

Lloyd's Losses Increase

BOSTON — Lloyd's of London is likely to sustain even heavier losses than expected in connection with the policies it wrote on computer leases during the early 1970s.

Unofficial estimates made last year by the First National Bank of Boston set the loss at $340 million, 45% greater than the original loss estimate of $234 million prepared by British loss adjusters Toplis and Harding. Now that loss is likely to creep up to $420 million, officials noted.

The Lloyd's policies in question insured lessors of a guaranteed revenue stream from leased equipment. With the tremendous drop in hardware prices coming on the heels of IBM's 4300 and Series 30 announcements, users have not renewed the original lease contracts, as expected by Lloyd's, preferring instead to renegotiate lease terms.

Datawest Exec Accused

SCOTTSDALE, Ariz. — The president of Datawest Corp. here has been accused by a former business associate of bilking stockholders.

In a suit filed last month by Ralph H. Olson in the Maricopa County Superior Court, Nathaniel T. Holzer, Datawest and other associates were charged with defrauding stockholders by, among other means:

- Siphoning money from the corporation and investing it in the Holzer-owned M Bar T Land and Cattle Co., which is also named in the suit.
- Making major investments in shopping centers and other ventures without the approval of Datawest's board of directors or stockholders.
- Tricking stockholders into selling their stock for prices below its true value.

Olson is reportedly seeking $1.3 million in damages for himself and wants the defendants to pay civil penalties of $10,000 per violation and triple damages to parties defrauded by the defendants.

Although neither party would comment on the case, Holzer reportedly has acknowledged he has been served with the suit.

Selling Turnkeys Hard Way to Turn Profit

By Marcia Blumenthal
CW Staff

KAUAI, Hawaii — Companies in the software and services industry thought a couple of years ago that adding minicomputers to their product offerings was the way to fend off mini vendors touting the benefits of an in-house system. So a good number of companies took to hardware systems.

However, many firms are not yet convinced that it's the way to beat the mini vendors. Why? It's hard to make a profit selling turnkey systems.

Profits have been elusive, noted Jack Courtney, executive vice-president of the Computer Task Group, Inc. His company's sales are $25 million, primarily for professional services, but also include $4 million in revenues from sales of Basic Four Corp. systems.

The companies that have had the most success have developed turnkey systems for specific industries, such as credit unions or insurance agencies, continued Courtney, also head of the Association of Data Processing Service Organizations, Inc.'s (Adapso) Mini/Micro Committee.

The dilemmas and opportunities for selling bundled systems was the topic of a workshop at Adapso's annual meeting and management conference held here recently.

"We felt we had to do it," explained Clifford Asplund, president of Manus Services

(Continued on Page 82)

Managers Seen Turning To Value-Added Carriers

CAMBRIDGE, Mass. — Data communications managers are willing to pay value-added carriers to provide network control and management functions rather than performing them in-house, according to a study recently published by The Yankee Group here.

Based on this finding, the study predicted that equipment vendors and common carriers will compete for business based on not only how well their products perform, but also on how much support and advice their sales forces can provide customers.

Although common carriers besides AT&T are growing at 50% annually, they have barely tapped the needs of users for innovative voice services, such as store-and-forward, and more sophisticated data communications offerings, the report entitled "Value-Added and Specialized Common Carriers" noted.

Moreover, data communications managers are often frustrated about the proliferation of alternative services and the announced but mythical availability of Satellite Business Systems and Xerox Corp.'s Xten offerings. Even managers who have put together solid multivendor networks are worried about the durability of their configurations.

The report, compiled from interviews with 842 large data communications users, discusses the financial, technological and regulatory status of existing and future common carriers.

Three Threats

Three major threats to telephone company revenues have emerged: interconnect equipment (PBS and modem) makers,

(Continued on Page 82)

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Plus—Both HP terminals have two full pages of memory for quick reference. Memory contents are viewable either page-by-page or by scrolling. On the 2621P, upper/lower case letters, control codes and underline are printed on thermal paper at 120 characters per second. And, even in character mode both models allow editing before transmission.

Selection. DASI also has the full line of CRT's from Lear Siegler*, Hazeltine*, Digital Equipment Corp. and Datamedia, and all the complementary hard copy printers from TI*, Diablo* and DEC. High speed modems such as the 212A or Vadic compatible acoustic couplers provide you with the communications speed you need.

Service. DASI maintains the equipment it sells nationwide. Your HP terminal and modem combination will be serviced by one source who stocks the parts and has technicians available for fast response.

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It's Hard to Turn a Profit on Turnkey Systems

(Continued from Page 81)

Corp., a Seattle-based batch processing bureau that sells Digital Equipment Corp.-based systems for wholesale distributor applications.

Although Asplund acknowledged the learning curve accounts for some of the lack of profitability, he noted Manus' 1979 hardware system sales totaled $2.6 million, including maintenance and installation, but netted only $102,000. The profitability of selling hardware is far lower than other areas of the business, which yield 10% or more, he noted.

In the past three years the systems portion of the business has grown from sales of $180,000 to over $2 million, employing 39 people, compared with the original three assigned to the new business venture.

Although the company "got into the business fast," some of its early decisions turned out to be sound. Asplund assigned one of his strongest managers to head the hardware effort. The firm also decided to purchase rather than build its own software. Choosing DEC minis gave the company a range of products with a variety of power.

Although the learning curve accounts for some of the lack of profitability, the profitability of selling hardware is far lower than other areas of the business.

On the other hand, Asplund found customer training "ate into profits." And the competition from other mini vendors was stiff: "Anyone who has a mini is out there pitching," he said.

In addition, Asplund noted the company forgot everything it knew about project management including formalized plans, budgets, scheduling of reports and cash flow considerations. Moreover, Asplund advised "never let technicians complicate products. They are not project managers."

'Lower Expectation'

Although at times it may be difficult, maintaining good vendor relations is essential, he noted. "Lower client expectation," he advised, adding that his firm has moved its client training to the company site and charges for training services.

Agreeing with Asplund's advice to lower customer expectations was Myron E. Congdon, president of Quodata Corp. His firm started in the systems arena selling DEC PDP-8s for the education market, competing head on with its supplier.

The cost of sales for a system in the $15,000 to $20,000 range, including software, made profits nil, he recalled. Since then, Quodata has revamped its strategy, selling word processing and data management systems for education administration and other vertical markets, Congdon noted.

Instead of selling low-priced systems, Congdon noted a $40,000 system is the minimum sale advisable to provide for a 50% margin. Congdon, like Asplund, recommended buying rather than developing applications software.

Congdon also advised would-be systems vendors to charge for software and charge an additional 20% of that price for support. He noted the average industry charge of 10% of the cost of software is far too low.

Although relatively few companies have ventured into the hardware arena, Adapso has some 50 members whose main line of business is systems integration. As a result of representation by this group, the association has renamed the Mini/Micro Committee the Integrated Systems Committee. James R. Anderson, manager of on-site systems for Xerox Computer Services, will chair the committee next year.

Managers Found Looking Outside

(Continued from Page 81)

"alternate" or specialized common carriers and value-added network providers.

The report examines the latter two threats, noting that the specialized common carrier business is an easy one to enter for companies that already have networks of some sort in place.

New specialized carriers will emerge from two sources: existing carriers and by acquisitions, The Yankee Group predicted. New carriers backed by cash-rich companies will have the greatest chance of success. The Yankee Group predicted the acquisition of both Tymnet, Inc. and Southern Pacific Communications by large firms.

A firm without a network in place, on the other hand, would find it difficult to enter the market because the price of a nationwide network could easily cost $500 million.

Aside from specialized carriers, the value-added network arena is undeveloped at this time, with only two major carriers — GTE Telenet Communications Corp. (Telenet) and Tymshare, Inc. (Tymnet) — in operation.

The value-added carriers allow even small users to share the benefits of sophisticated data communications technology. Generally these services are not available to the public from other sources, the report noted.

The report is part of The Yankee Group's Communications/Information Systems Planning Service, which costs $9,500 per year. The company may be reached through P.O. Box 43, Harvard Square, Cambridge, Mass. 02138.

"Not since the early 60's have MIS departments faced such significant changes as those that are about to occur."

E. Drake Lundell, Jr.
Editor of Computerworld

Computerworld will 'Forecast 81' Inside and Out in its combined Year-end Wrap-up Issue, December 29 and January 5, 1981. Ad close is December 12.

From the Inside, **Computerworld's** editorial staff will be taking a close look at:

- **IBM after H.**
- **What will users spend in 81?**
- **How to protect your software.**
- **Relational data bases: Fact and Fiction.**
- **DP unionization in 81: What to expect.**
- **What's ahead in local networks.**
- **Network architecture: SNA vs. Others.**
- **U.S. information policy after the election.**
- **Delivery delays: How long must users wait.**
- **Venture Capital: How much for computer firms?**
- **The economic outlook for today's system suppliers.**

And from the Outside, industry experts will report on:

- **Strategies for MIS software management.**
- **Hardware and software technology: Six areas to watch.**
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Sees Shipments at $2 Billion in '85

Report Sizes Up Intelligent Terminal Outlook

SAN JOSE, Calif. — Emerging from the distributed data processing (DDP) boom, intelligent terminals are expected to reach nearly $2 billion worth of shipments by 1985, according to a report by Creative Strategies International (CSI).

As defined by CSI, intelligent terminals are stand-alone or clustered systems that are used primarily to communicate with other, usually larger, computers. They are user-programmable and must have some type of storage medium.

In this market, IBM has never been a leader, according to the research firm, which noted that IBM's 3770 and 3790 systems did not receive the kind of attention in the market that other IBM products did. The CSI report reviews the probable IBM Data Processing Division (DPD) and General Systems Division (GSD) strategies in both market and product contexts.

AT&T's Role

The report also assesses AT&T's role in the market, takes a look at existing efforts, explores high-value-added strategies as a way for intelligent terminal vendors to market effectively and evaluates proposed solutions in terms of distribution and other factors.

The "smart" classification of terminals will diminish or disappear, according to CSI. Existing smart terminal vendors will move into intelligent units as advances in microcomputer technology decrease costs.

Forecasts in terms of units and if-sold user dollars are provided for stand-alone and clustered systems through 1985. The stand-alone market is projected to grow significantly, although it will trail the clustered intelligent terminal market segment, whose growth rate is projected at more than 30%.

The Creative Strategies report analyzes the price trends for both types of intelligent terminals, offers a breakdown of the devices by storage medium, shows why local storage is a key to the marketplace and depicts trends numerically and graphically.

The report also explores the alternative strategy paths open to intelligent terminal vendors with emphasis on changing distribution channels. Other significant trends are reviewed, including sales vs. leasing, non-U.S. market factors, line quality issues and the personnel factors inherent in multinational marketing.

The report describes the technology today and as it is projected to look in the mid-1980s by analyzing each component of the terminals. The importance of system software is assessed and the role of electronic mail and its impact on intelligent terminal products is examined.

DPD Product

The expected role of IBM's DPD — including the characteristics of a projected intelligent terminal product that CSI expects to be announced — detailed in the report. The new product will provide a buffer to the low end of the DPD 8100 market, yet be somewhat apart from the GSD 5280 product line, according to Creative Strategies.

Foreign competition is expected in the market, especially from Japan, and the report focuses on which companies are expected to enter the area and which ones will or should avoid doing so.

The report presents arguments in favor of new U.S. vendors entering the market and discusses the reasons some may disappear.

CSI gives market penetration estimates on a unit basis for both the stand-alone and clustered markets and profiles a number of major companies. The "Intelligent Terminals" report costs $1,195 from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

M/A-COM Net Up 89% From '79

BURLINGTON, Mass. — M/A-COM, Inc. earned $24.9 million, or 77 cents per share, for the fiscal year ended Sept. 27, up 89% over the almost $13.2 million, or 46 cents a share, reported for fiscal 1979.

Consolidated revenues of $322.5 million were 42% higher than the $227.1 million reported last year.

Orders for the year totaled about $354.4 million, compared with almost $314.1 million for fiscal 1979. Backlog at the close of the fiscal year was $222.1 million, compared with $188 million for fiscal 1979.

The 1979 and 1980 results give retroactive effect to the acquisition of Linkabit Corp., Omni Spectra, Inc. and Valtec Corp., which are being accounted for on a pooling-of-interests basis. The results also give retroactive effect to M/A-COM's recent two-for-one stock split and a 50% stock dividend paid on April 7.

Earnings results for fiscal 1980 reflect printing, legal and similar direct costs of approximately $1.4 million that were incurred primarily in the fourth quarter in connection with these acquisitions, according to Dr. Lawrence Gould, chairman and chief executive officer.

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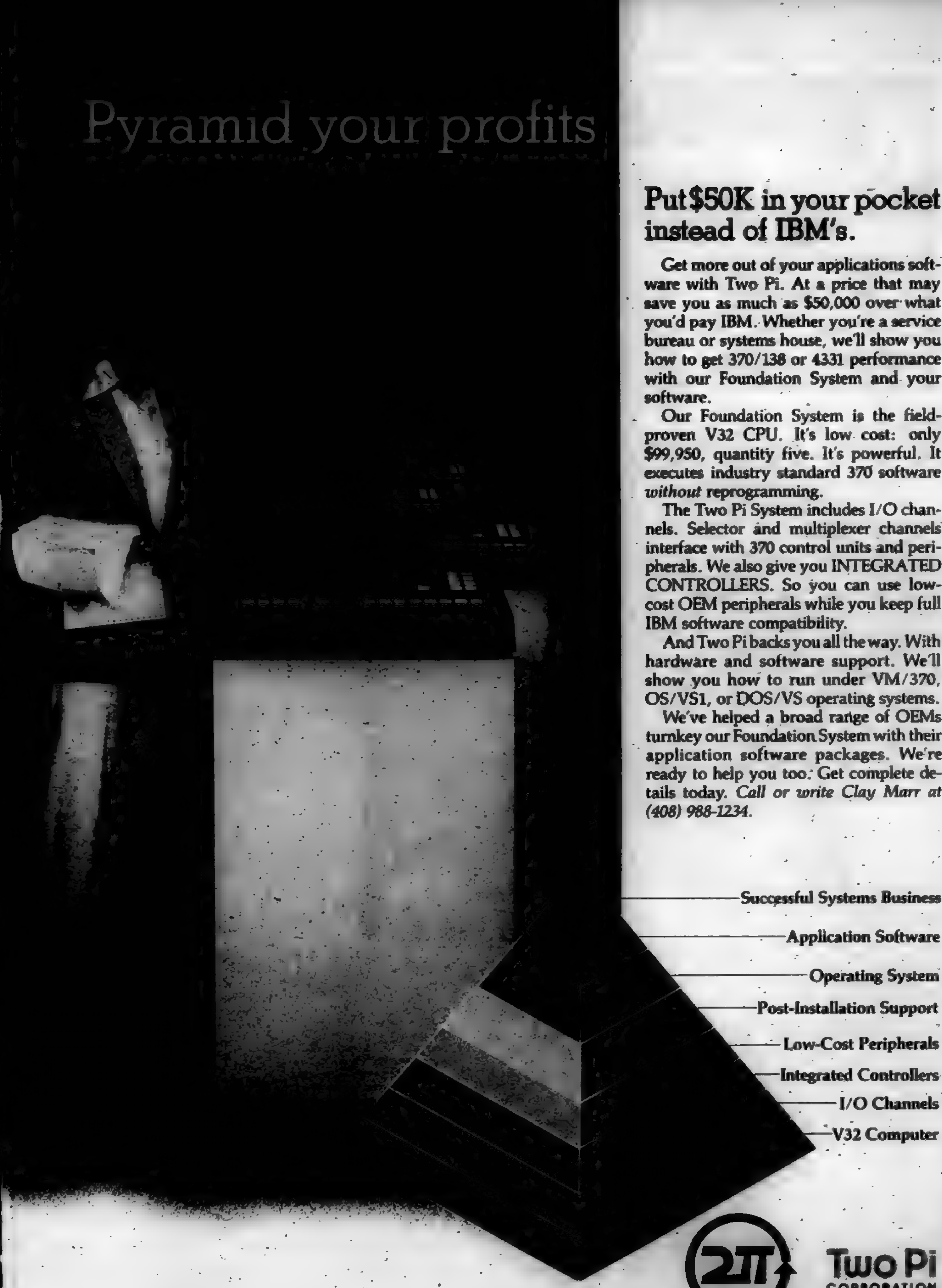
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World Technology Lag Seen Gold Mine for U.S. Growth

ANAHEIM, Calif. — "Europe and other advanced areas of the world are, on the average, about two years behind the U.S. in their use of computer technology." And the less developed countries are even further behind, maintained William A. Terry, president of Lear Siegler, Inc.'s Data Products Division.

U.S. firms should view this 20-year technology lag in less developed nations as an opportunity for long-term business growth as those nations advance, Terry recently told a meeting of the International Marketing Association of Orange County.

In India, for example, 75% of the 1,600 computers now operating are old IBM models that were first introduced 20 years ago.

An example of computer industry growth in Europe alone was shown in a recently published report on European banking, which indicated that by the late 1980s, European banks will have installed more than 17,000 host computers — up from about 6,000 today — and will install 90,000 front-office workstations per year, Terry reported.

Big Spenders

"In total, the European banking industry will spend more than $2.5 billion per year on automation. The foreign market for alphanumeric CRT terminals alone is three billion to four billion dollars and, for midrange matrix printers, it is $100 million to $150 million," Terry said.

"In order to penetrate this and similar increasing markets, however, companies must be prepared to make a strong commitment that begins with the product design and definition phase because foreign product requirements differ from domestic needs in several respects.

"For printers and CRT terminals, scripts and keyboards must be adapted to meet various language requirements and there are also power considerations," he noted. Human engineering factors to enhance operator comfort and productivity, such as detachable keyboards and large tiltable screens for CRT terminals, have always been a key issue in Europe whereas they have just now emerged as a significant factor domestically.

Terry urged companies that have not yet made foreign marketing a key element of their business to pursue international markets vigorously.

Lear Siegler has increased its international sales from 10% of total sales in 1978 to 26% in 1980. The division projects that foreign sales will be 35% of its total sales in 1981, he noted.

Supershorts

Okidata Corp. has made plans to establish five depot repair centers for its Microline series printers in Dallas, Chicago, Denver, Boston and Atlanta. The target date for the opening of the facilities is December.

Led by Prof. Song Jian, a leading population control scientist of the People's Republic of China, a team of seven Chinese engineers and scientists recently visited Honeywell, Inc.'s Large Information Systems Division in Phoenix. The Chinese scientists have been authorized to establish a major computer science facility in the Hua Feng Computation Center to analyze and 'control' China's population growth.

Rockwell International Corp. has initiated a year-long examination of teleconferencing's role in the office-of-the-future. Four projects are being conducted in cooperation with AT&T's Long Lines Department to encourage the use of teleconferencing.

If Churchill had used SPSS®, he might have saved his statistical department a lot of blood, sweat and tears

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Thanks to the honest and tireless efforts of his Department, most of the war's critical decisions were based on facts, not hunches. Had they been able to use the SPSS Data Analysis Package, the Department's analysts could have explored the legions of data more quickly, efficiently, creatively . . . with easy-to-generate tables, graphs and reports, as well as sophisticated statistical analysis.

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When you decide which data analysis software package is right for your life and death decisions, consider the facts, as Churchill would have done. SPSS is sophisticated in output, yet simple to input. It's extremely portable—works in almost all computer environments. And you needn't hire any extra data processing people—your data researchers work on their own . . . with considerably less "blood, tears, toil and sweat."

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Now Controller-Only Vendor

Datum Aspiring to Make Disk Subsystems

By Jeffry Beeler

CW West Coast Bureau

ANAHEIM, Calif. — Datum, Inc., whose activities in the minicomputer disk systems market have been limited thus far to controllers, now aspires to become a manufacturer of complete disk subsystems.

Datum's planned evolution from a controller-only vendor to an integrated storage subsystem supplier took a major step forward in late September when the firm introduced a full line of controllers compatible with the Digital Equipment Corp. disk systems family.

Last September's announcement marked the first time that Datum has leaped with both feet into the DEC-emulating disk systems market, according to the firm's marketing manager Dan Sullivan.

Before the introduction, Datum's line of DEC-emulating disk controllers consisted of just one product — a controller compatible with the minicomputer vendor's RKO-5 disk system. Today, Datum's controller family spans the full range of DEC's LSI-11-, PDP-11- and VAX-compatible disk offerings, Sullivan said.

At the moment, Datum's penetration of the DEC-compatible disk subsystems business is still restricted to the controller sector, but the company expects to remedy that shortcoming within the next few months.

Vendor Evaluation

The firm's eventual plan is to buy disk systems from outside vendors and then combine the independent products with its own existing controller line to form complete storage subsystems.

Datum is already evaluating several well-known disk systems vendors — including Ampex Corp., Control Data Corp. and Memorex Corp. — as potential outside suppliers, and the final vendor selection is expected to be complete by year's end, when first shipments of Datum's disk subsystem are scheduled to begin, Sullivan said.

Whatever vendor Datum chooses as its independent disk systems supplier, the partnership is likely to be short-lived. By 1985 at the latest, the company expects to start manufacturing its own disk systems and to discontinue the practice of buying such products on the outside, Sullivan said.

Datum then plans to couple its in-house-supplied disk systems with its controller expertise to produce integrated mass storage subsystems that outperform as well as emulate their DEC counterparts.

Many of the enhancements that Datum's future disk subsystems are expected to offer will likely result from innovations in software — a product area to which the firm will probably devote steadily increasing attention during the next few years. "In support of our integrated storage subsystem approach, we may find ourselves very heavily into the software business sometime between 1983 and 1985," Sullivan speculated.

Today, Datum already offers a broad range of both controllers and transports for the minicomputer tape market, and the company is aiming eventually to achieve a similar product breadth on the disk side of its operations, Sullivan added.

Datum's designs on the integrated disk subsystems business are part of a long-range diversification aimed at insulating the firm from the uncertainties of the minicomputer disk and tape controller market, where rapidly changing technology often makes products obsolete in as little as six months.

The roots of Datum's ongoing diversification can be traced back to 1978 when a fundamental shift took place in the company's long-term market goal. The shift coincided with the firm's decision to depart from its traditional role as a controller-only supplier and enter the business of

(Continued on Page 88)

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BIS Riding Overseas Banking Tide

NEW YORK — The growth in international banking since 1976 has also led to the growth of software houses which deliver software for international banking systems.

Currently U.S. banks are drawing 60% to 70% of their profits from overseas, said Peter C. Beckett, vice-president of Business Intelligent Services (BIS). BIS, with its Modular International Dealing and Accounting System (Midas) package, is one of the largest suppliers of software for this international banking.

Midas handles foreign exchange, interbank deposits, syndicated loans, bills and credits, retail accounting and Eurobond trading. It runs primarily on IBM's System/34 at either small banks or local branches of larger banks, Beckett said.

Top Customers

BIS has installations at about 85 banks. Its most prestigious customers include Chase Manhattan Bank.

What eventually became Midas was first developed in England for Merchant Banks in London, and the company was then Kingsly-Smith and Associates. Development is still done in London where BIS is working on a telex-like system and more clearinghouse interfaces.

The company, with offices from here to Tokyo to Brussels, can answer customer questions around-the-clock and employs about 120 persons.

Datum Plans Disk Making

(Continued from Page 87)

manufacturing its own peripherals.

"We reviewed and reaffirmed our original business premise as laid down by Datum's founder and decided to augment that plan by evaluating markets we hand't yet attempted to penetrate," Sullivan recalled.

For the moment at least, Datum continues to receive most of its DEC-emulating disk controllers from an independent supplier, Emulex Corp. Use of an outside source has enabled Datum to start selling the controllers almost immediately rather than waiting an estimated 18 months for its in-house staff to develop the products from scratch.

The arrangement with Emulex also allows Datum to focus its resources on other research-and-development projects and gives the company access to the desired controllers without forcing it to expand its engineering effort unduly, Sullivan explained.

Venture to Offer Insurance Service

NEW YORK — Quotron Systems, Inc., American Information Development, Inc. and the Continental Corp. have signed a definitive agreement for a venture to provide information services to independent insurance agents.

The agreement is subject to the approval of American Information Development's stockholders and the closing of the transaction is subject to certain other conditions.

Under the proposed arrangement a new corporation, Insurnet, Inc., has been formed to acquire the business of American Information Development and develop a service to include data processing, word processing and communications. It is anticipated that Insurnet will begin offering its services in late November.

Quotron and Continental will make equity investments in Insurnet, but the bulk of the financing for the new venture will be in the form of debt that will be made available subject to achieving certain volume and profitability goals, the firm said.

Executive Corner

- George McNeil has been named vice-president of manufacturing for Honeywell, Inc.'s Phoenix-based Large Information Systems Division.
- Stauton T. Oppenheimer has been appointed vice-president of marketing at the Northern Telecom Systems Corp.
- Denis Hickey has been made vice-president of finance at Dynabyte, Inc., and John Reutter has been named director of software development of that firm.
- William N. Levin has been named vice-president of finance and administration at the Peripherals Division of Pertec Computer Corp.
- Gerald E. Rodts has joined Computerized Automotive Reporting Service, Inc. as executive vice-president of marketing.
- H.E. James Finke has been appointed to the newly created position of vice-president of international marketing development at Data General.
- John D. Gorman has been promoted to senior vice-president of marketing at Florida Computer Services, Inc.
- Steven J. Puchkoff has been appointed vice-president of marketing at Interaction Systems, Inc.

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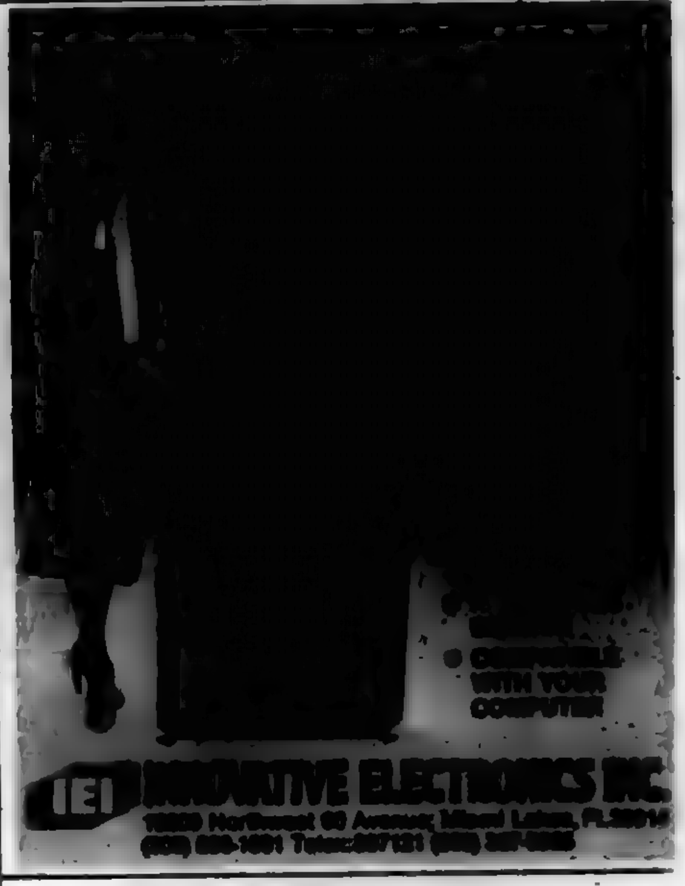

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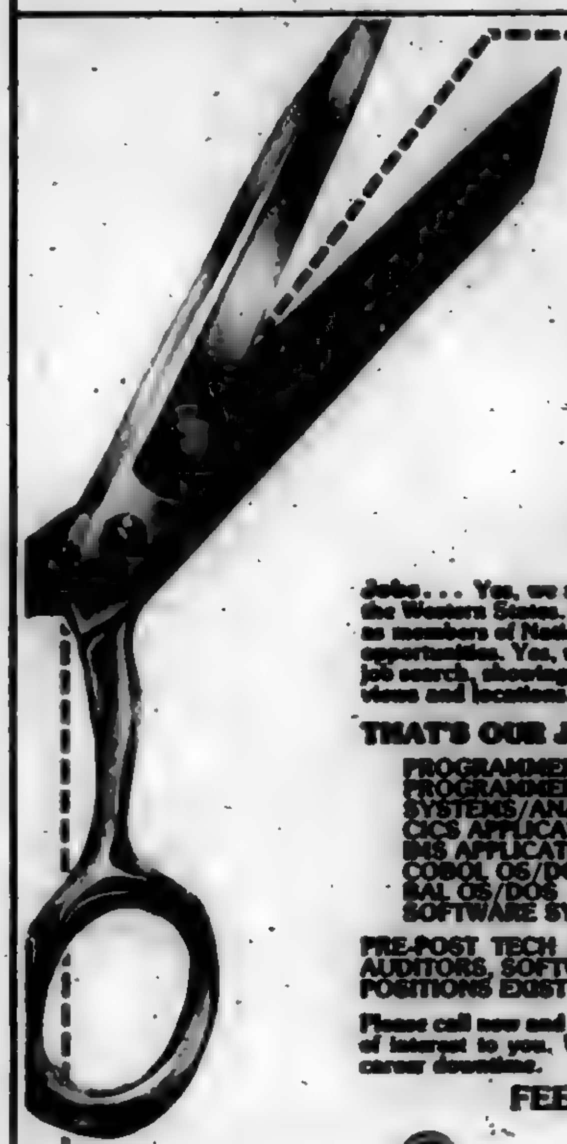

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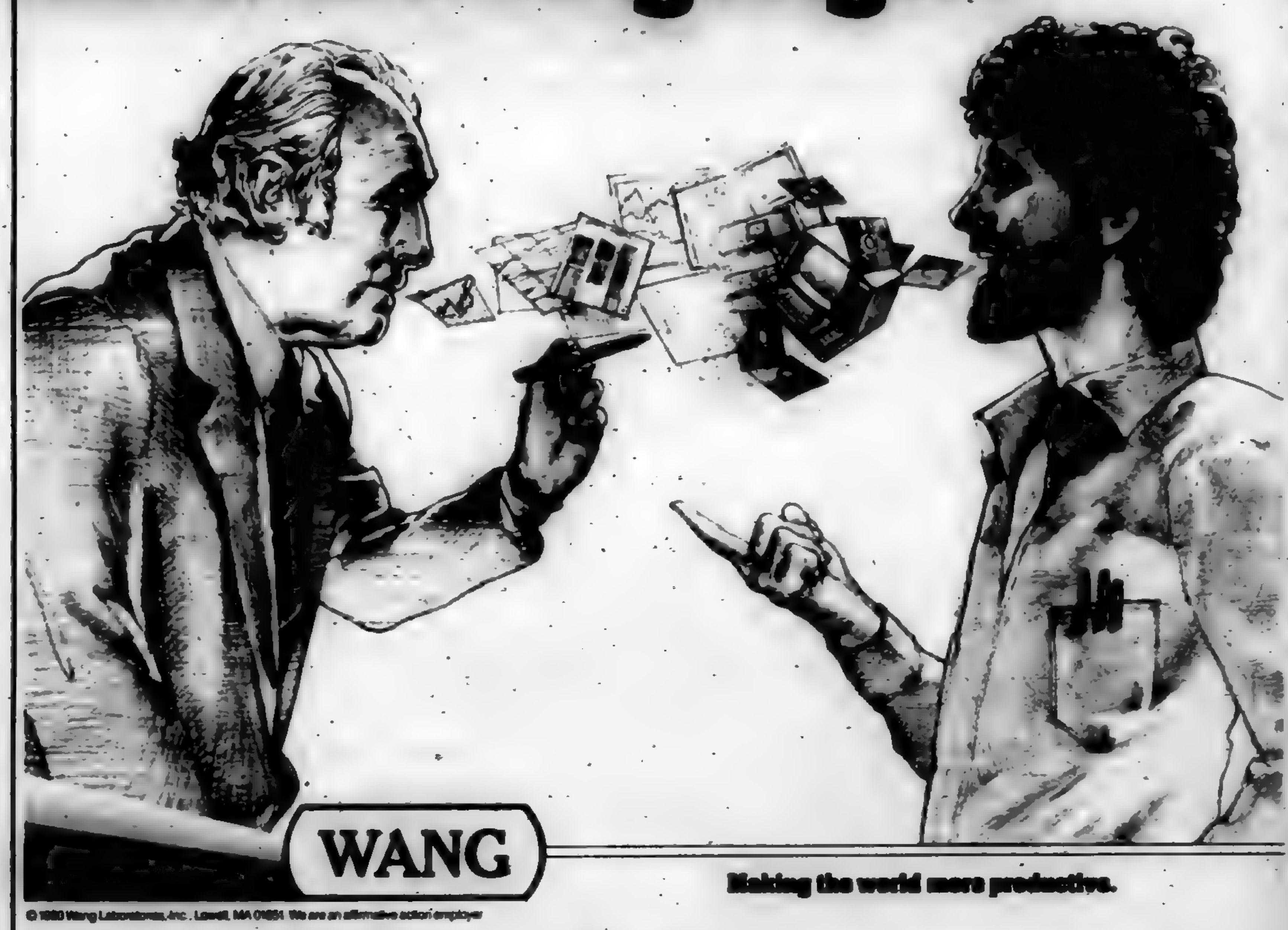

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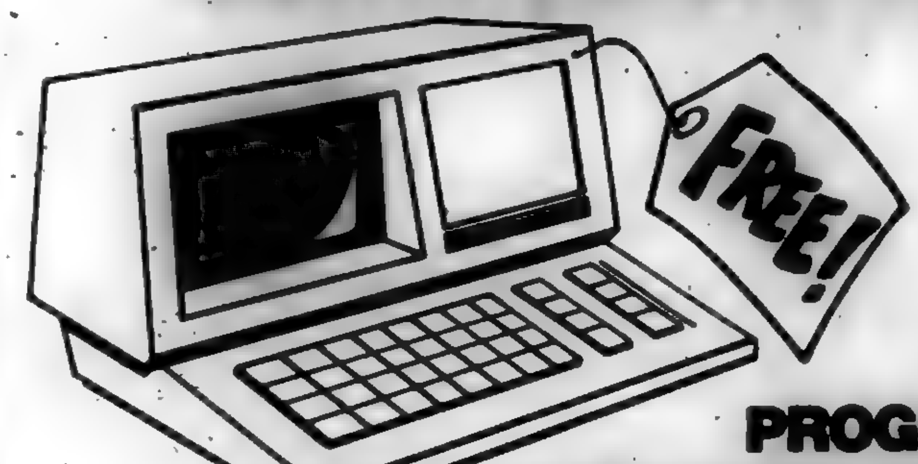

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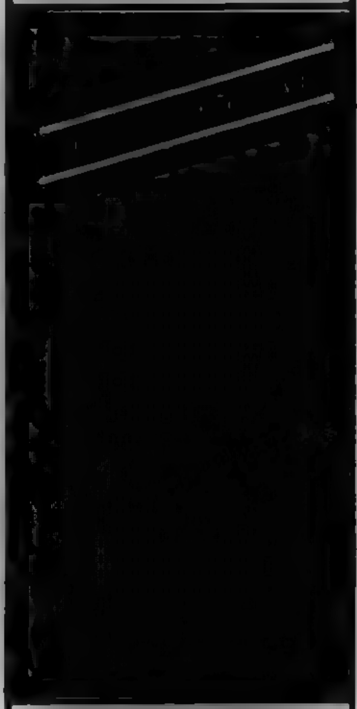

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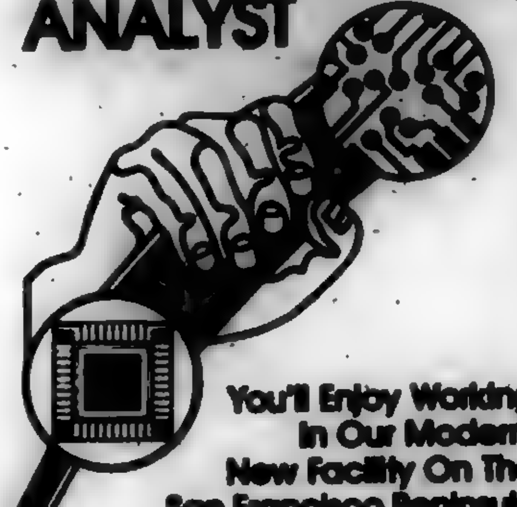

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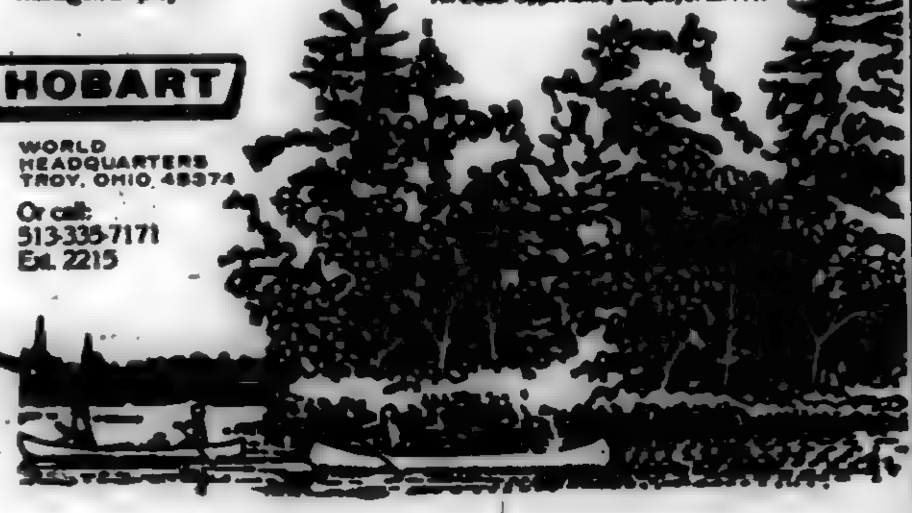

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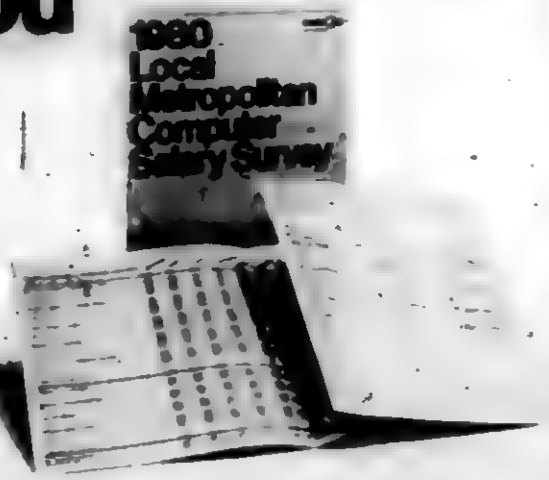

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The 1980 Survey has been expanded to provide specific data for 23 new categories. These include positions in data communications, mini/micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

Do you know how your salary compares with other EDP professionals in your specialty—with the same level of experience—working in your city, or in other cities across North America? Are you being well paid for what you do? Are salaries better elsewhere?

Now you can find out simply by calling today and asking for a copy of our current 1980 Local Metropolitan Computer Salary Survey. It's FREE!

Source Edp, North America's largest recruiting firm specializing in the computer field, publishes this valuable Survey annually as a service to computer professionals from coast to coast. The 1980 Survey shows current salaries in your area, 37 other areas in the U.S. and Canada, plus overall national averages. Salaries are shown by career specialty broken down by length of experience or size of computer system.

As you will discover, this Survey can be extremely valuable in helping you make important career decisions. Call for your free copy today.

For your free report, simply phone the Source Edp office nearest you.

source edp

If unable to call, write:
Source Edp, Dept. CL 11
100 South Wacker Drive
Chicago, Illinois 60606

(When writing, please be sure to indicate home address and position title). Client companies assume our charges.

United States	
Arizona	
Phoenix	602/[illegible]
California	
San Francisco	415/434-2410
Palo Alto	415/856-0800
Los Angeles	213/386-5500
Van Nuys	213/781-4800
Torrance	213/540-7500
Irvine	714/833-1730
San Diego	714/231-1900
Colorado	
Denver	303/773-3700
Englewood	303/571-4490
Connecticut	
Hartford	203/522-6590
Stratford	203/375-7240
District of Columbia	202/466-5890
Florida	
Miami	305/624-3536
Georgia	
Atlanta Central	404/588-9350
Atlanta Suburban	404/325-8370
Illinois	
Chicago	312/782-0857
Northfield	312/446-8395
Oak Brook	312/986-0422
Rolling Meadows	312/392-0244
Indiana	
Indianapolis	317/631-2900
Louisiana	
Baton Rouge	504/924-7183
New Orleans	504/561-6000
Maryland	
Baltimore	301/727-4050
Towson	301/321-7044
Massachusetts	
Boston	617/482-7613
Wellesley	617/237-3120
Michigan	
Detroit	313/259-7607
Southfield	313/352-6520
Minnesota	
Minneapolis	612/544-3600
St. Paul	612/291-2467
Missouri	
St. Louis County	314/862-3800
St. Louis Downtown	314/231-4880
Kansas City	816/474-3393
New Hampshire	
Nashua	603/880-4047
New Jersey	
Cherry Hill	609/482-2600
Edison	201 494-2800
Paramus	201/845-3900
New York	
Midtown	212/736-7445
Wall Street Area	212/962-8000
Long Island	516/364-0900
White Plains	914/683-9300
North Carolina	
Greensboro	919/378-1842
Ohio	
Cincinnati	513/769-5080
Cleveland	216/771-2070
Columbus	614/221-3070
Oregon	
Portland	503/223-6160
Pennsylvania	
Philadelphia	215/665-1717
King of Prussia	215/265-7250
Pittsburgh	412/261-6540
Texas	
Dallas	214/387-1600
Fort Worth	817/338-9300
Houston Central	713/751-0100
Houston Suburban	713/626-8705
San Antonio	512/344-0217
Virginia	
McLean	703/790-5610
Washington	
Seattle	206/454-6400
Wisconsin	
Milwaukee	414/277-0345
Canada	
Toronto	416/865-1125
Don Mills	416/425-5730

SENIOR PROGRAMMER ANALYST

OUR COMPANY IS GROWING!

We have just installed an IBM 4331 and we are looking for a senior level programmer to help us in the development of our department. Responsibilities will include coordination of the user and other programmers in the planning and scheduling of projects.

Individual should have experience with MRP, 3-5 years COBOL programming, familiarity with CICS desired, and have a good application background.

This is an excellent opportunity to join a growing EDP staff of professionals. Many good benefits and growth potential. Please send resume with salary history to:

Recruitment Supervisor

TRW

[illegible]

COMPUTER SCIENCE/ INFORMATION PROCESSING INSTRUCTOR

So. California Community College is accepting applications for a full time position of CSIP instructor for the academic year 81-82. Must have or be eligible for a valid California Community College Instructor's Credential. Application deadline 12/8/80. For further information contact **PALOMAR COLLEGE, Personnel Office, 1140 W. Mission Rd., San Marcos, CA [illegible]. (714) 744-1150, Ext. [illegible].**

An Equal Opportunity Employer

Programmer/Analyst

A growing southern California CPA firm is seeking a career oriented professional for design and implementation of client and in-house systems. The successful candidate will have a minimum of 3 years experience in business and financial applications in RPG on IBM System 3 or 34. The firm will provide excellent career growth and upward mobility potential for the aggressive self-starter who accepts this opportunity. Send resume and salary history in confidence to

**Personnel Director
P.O. Box 1699
Covina, CA 91722**

HOUSTON

Systems Prog/Perf. Evaluation . . . . to $30K

A major oil company is seeking an individual with 2-5 years of systems programming experience (MVS) and skilled in the use of hardware and software tools to monitor the performance of IBM systems. This represents an outstanding opportunity for the qualified candidate.

Lead Programmer Analyst . . . . to $30K

A leading user of large scale IBM systems, is seeking an individual with 5+ years of COBOL experience to lead a major application development. Experience in a data base environment using CICS would be a definite plus. Excellent benefits.

Data Base Analyst . . . . to $36K

This major oil company is seeking two data base analysts with 5+ years of experience in IMS DB/DC to join their staff. Excellent location and benefits.

the jarvis walker group

3050 South Post Oak Rd.
Houston, Texas 77056 (713) 961-3600

ENGINEERING PROGRAMMERS

RCA Global Communications, the world's leading international record carrier, has immediate openings available at its

PISCATAWAY, NEW JERSEY COMMUNICATIONS CENTER

We seek individuals to provide software design, development and maintenance for several types of minicomputer based systems. The RCA computer switching systems at Piscataway include: packet, international telex, public message and specialized store and forward message switching. Programming will be done on: Perkin-Elmer, General Automation, Data General and Hewlett-Packard CPUs in Assembly and higher level languages. Understanding of communications hardware and software interfaces (modems, multiplexers, interrupt handling, etc.) is desirable.

We particularly need software problem solvers who are interested in, and enjoy taking, a task through to completion. A college degree is preferred, but not essential.

If you feel you meet these qualifications and are looking for a career with a progressive, innovative communications company, please send your resume in confidence, specifying both salary history and requirements, to:

RCA Global Communications, Inc.
Box 11C, 60 Broad Street, New York, N.Y. 10004
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RCA

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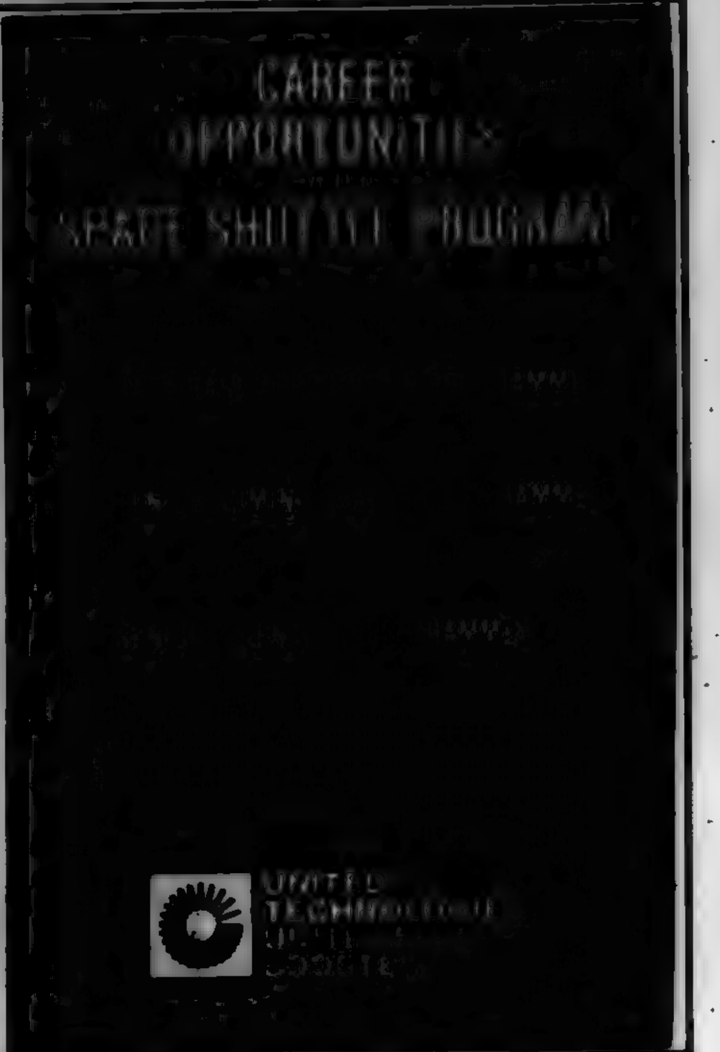

CAREER OPPORTUNITIES

SPACE SHUTTLE PROGRAM

UNITED TECHNOLOGIES

DATA PROCESSING DIRECTOR

General Management Potential

Our client, a Southeastern based Fortune 500 diversified manufacturer seeks an individual to guide its operating divisions in the development of manufacturing systems. The atmosphere is professional and informal.

Ideally, the candidate will have industrial experience, including the introduction and use of EDP manufacturing systems. Interpersonal skills will allow easy interface with very senior corporate and divisional management.

Initially, the Director will be heavily involved in MRP development, equipment selection and software evaluation within the framework of $25-35 Million operating divisions.

This opportunity will appeal to a person who seeks a stepping stone to general management. Salary to $35,000 plus bonus of up to 25%.

Telephone inquiries welcome. Reply in confidence to: Walter Meyer

ROMAC Personnel Consultants
Accounting/Finance Data Processing and Banking
P.O. Box 67, Orchard Park, New York 14127 • Tele: (716) [illegible]

FIELD ENGINEERING SPECIALIST

Circle Computer Services, Inc. is a rapidly expanding multi-national company. Because of our expansion we require top level Field Engineering Specialists Experience with either IBM 370-158-168, 303X, 43XX mainframes or add-on memory. We offer challenging career opportunities with excellent benefits and salary commensurate with your experience. Send your resume or call me collect for an interview.

Ken Gerstenkorn
Vice President
CIRCLE COMPUTER SERVICES
820 Remmington Rd.
Schaumburg, IL 60195
312/884-2424

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DATA PROCESSING

PROGRAMMER/ ANALYST

We are a multi-national Chicago based publishing corporation seeking a Programmer/Analyst with three or more years experience with CICS, DL1, and Assembler Programming under DOS/VS.

TECHNICAL ENVIRONMENT

Software:

DOS/VS (soon to be VSE), CICS, DL/1, VOLLIE, Librarian

Hardware:

370/158 3M, going to 4341's

POSITION: Part of a 3 member team responsible for the total processing environment.

We give a $2000 referral bonus for this position. If you refer yourself through this ad we'll give you the $2000 bonus after three months satisfactory employment. Qualified candidates should send a resume and salary history in confidence to:

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SR P/A-COBOL-CICS	[illegible]
P/A-BASIC-BUS APPLS	[illegible]
P/A-FORTRAN-BUS APPL	[illegible]
P/A-DIBOL-BUS APPL	[illegible]
P/A-RPG OR COBOL	[illegible]
PROG-RPG II	[illegible]
P/A-DATA BASE	[illegible]
PROG-NEAT 3	[illegible]
SYS ANALYST-COBOL-RPG	[illegible]
PROG MGR-COBOL-BURR	[illegible]

[illegible] CONTRACT

ROBERT HALF
OF LOUISIANA, INC.
[illegible] St. Charles Avenue
Suite [illegible], New Orleans
Louisiana 70130
([illegible]) [illegible]

COORDINATOR HOSPITAL DATA PROCESSING SERVICES

We are a large county hospital. Located in the central United States seeking a person to monitor and coordinate hospital planning, implementation, and utilization of data processing systems. College degree, extensive hospital experience and current knowledge of data processing developments in the health care field a must. Travel required. Salary commensurate with experience. Excellent benefits. Send resume and salary requirements in confidence to:

CW Box [illegible]
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

PERFORMANCE

- MVS and IMS "Nuts and Bolts" Capacity Planning Analysts to help Honcho New Products
- Marketing Managers

Harold Schwenk, Jr., Pres.
BGS Systems, Inc.
470 Totten Pond Road
Waltham, MA 02254
617-[illegible]

- BEST/1™
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BGS Systems has a rapidly expanding international base of over 200 customers using our capacity planning products CAPTURE/MVS™ and BEST/1™. Additional products are scheduled for near-term announcement.

MANAGER COMPUTER OPERATIONS

We are a major financial institution located in the Harrisburg, PA area with an immediate opportunity for a Manager of Computer Operations.

The individual we seek will have a minimum of 3 years experience as Manager of Computer Operations in a large shop and will have had direct responsibility for: staffing, work flow, production scheduling, accuracy requirements and budgeting. This position reports directly to the VP of Data Processing.

Excellent salary, unique benefits, profit sharing and more make this an outstanding opportunity. For immediate consideration call collect or send resume including salary history to:

Mike Snow, Personnel Dept.
(717) 780-3410
P.O. Box 1010
Harrisburg, PA 17108
An Equal Opportunity Employer M/F

PRINCIPAL PROGRAMMER ANALYST

Make the most of your leadership and technical skills with Digital/Colorado Springs

Digital Equipment Corporation is the world's largest producer of minicomputers. At Digital/Colorado Springs, we're supporting this leadership by producing an advanced line of mass storage products.

To further enhance our productivity, we're now seeking a proven performer who can work independently as a Principal Programmer Analyst within our Information Systems Department located in Colorado Springs, at the base of Pikes Peak.

Will assume a leadership role in designing and implementing on-line, interactive and integrated systems in Materials and Manufacturing.

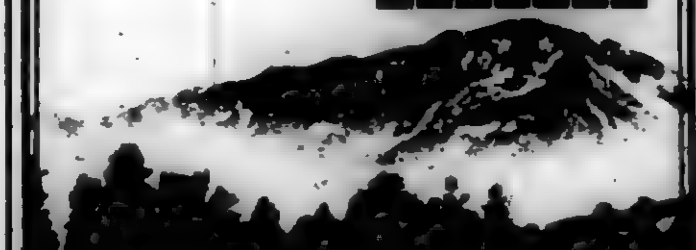
Candidate must have at least 5 years experience in working with MRP, Inventory Control, and Shop Floor Control and must have managed medium to large size systems projects. Should have strong communications and people skills.

A Masters degree in Computer Science, Industrial Engineering or Business preferred. Knowledge of PDP-11, RSTS/E and BASIC PLUS desired.

Digital offers a competitive salary and attractive benefits package that includes medical, dental, 100% tuition reimbursement and stock purchase plan.

Qualified candidates may send resume and salary history to N. Butler, Digital Equipment Corporation, Dept. 1110 3807, 301 Rockrimmon Blvd. South, Colorado Springs, CO 80919. We are an affirmative action employer.

digital



PROGRAMMERS or PROGRAMMER ANALYSTS

CNL, a rapidly growing computer service bureau with heavy emphasis on software development and sales, is looking for key, experienced programmers with capability to become Senior Programmer Analyst. Minimum of one year experience with RPG II in an IBM environment. Salary commensurate with experience. If you're interested in a ground floor opportunity to join a rapidly growing company send your resume to Curtis L. Brown, President, Computer Network, Ltd., P.O. Box 443, Farmington, MO 63640. 314/756-4555.

Is your job sending you a subtle message?

Translated, "Dead End" can mean 1.Your input in effort has gone way "up" while your paycheck hasn't 2.Recognition for a job well done is almost nil 3.The chemistry has changed and you're uncomfortable. If you face any of the above, it's time to turn to Dunhill EDP specialists. We'll find you a happier workplace (with the fee paid by our client company). Because when a company asks us for a programmer, systems analyst, engineer, marketing person... we ask them for much more. We want facts. All the facts that tell us what a company really expects; what a company is really like. That's what makes the Dunhill System work for you. The system that cuts down mis-match between candidate and company. And cuts down "Dead Ends".

Dunhill. The National Personnel System

[illegible]

MOVING WEST?

NCP/VTAM

[illegible]

JES3/MVS

[illegible]

Network Control Analyst

[illegible] XEROX, ETHERNET, [illegible]

[illegible]

Foote Waldron

[illegible]

ATLANTA

PROGRAMMER/ANALYST

Atlanta based management consulting firm, presently has openings for analyst with recent design and programming experience in the implementation of large scale management information systems. Human services applications experience is preferred. A minimum of 4 years experience including programming/design is required.

Computer language background should be heavy in IBM COBOL, CICS, OS/VS and JCL. A knowledge of TSO would be helpful. Occasional travel is necessary. A college degree is required. Applicants should call or submit resumes including salary history to:

Consultec, Inc.

[illegible] Roswell Rd N.E.
Suite [illegible]
Atlanta, GA [illegible]
404/[illegible]
A profit sharing company.
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Preview ADC at the Northeast Trade Center Career Job Fair Nov. 24-25

Aquidneck Data Corporation:
A Not-So-Modest Success Story

You know the success stories of the software industry leaders, and you know the career opportunities that developed right along with them. Aquidneck Data Corporation is experiencing that kind of rapid expansion now, and through our stock and profit sharing plans, our employees are the beneficiaries of our continuing growth. In just three years our sales have more than tripled . . . and in 1980, earnings are expected to double again. Doesn't it make sense to go where the growth is?

CURRENT OPENINGS

Lead Analysts—to be team leaders and analysts for development of program performance specifications for shipboard operational systems. Knowledge of navigation or operating systems is desirable. 3-5 years of programming or analysis experience is required. A Project Manager position is also available.

Senior Systems Analyst—to provide technical consulting to a military computer system acquisition V & V program. Technical areas of emphasis will include analysis of mini-micro computer system simulation and stimulation requirements, logical network analysis, and software/hardware interfaces. Experience in the testing of military systems with embedded computers is desired.

Combat Control Systems Analyst—to perform systems analysis for an attack submarine combat control system. Will utilize structured analysis techniques to determine the functional and performance requirements for a shipboard tactical system.

Systems Analysts—for positions that range from entry level through senior systems analysts and programmer team leaders. Required skills include computer program design, coding, checkout, documentation and system integration. Experience is desired in AN/UYK-7 programming, particularly in shipboard systems applications.

For more information, please call our Personnel Director, Ellen [illegible] (Rhode Island 847-7260, out-of-state 1-800-556-7570) or send your resume to P.O. Box 639, Newport, Rhode Island 02840

P.O. Box 639, Newport, Rhode Island 02840 1-800-556-7570

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COMPUTER SERVICE MANAGER
For A Major University Hospital

— Professional Challenge
— Career Advancement Opportunity

The University of Missouri Hospital and Clinics is seeking a highly motivated individual to assume the management responsibilities involved in providing data processing services to the University Hospital and Clinics.

We want a "self-starter" who will provide coordination and leadership for the [illegible] of departmental computing requirements, establishment of computing facility objectives and delivery of computing services. Responsibilities will also include directing the formulation and implementation of Hospital policy and procedures governing computer operations, computer facility maintenance, and computer personnel and user training programs.

The successful candidate will have a Master's Degree in Computer Science Administration or related area and at least [illegible] years experience in computer [illegible]. Hospital experience is preferred.

Columbia, Missouri, which is conveniently located between Kansas City and St. Louis offers a community atmosphere with easy access to the Ozarks recreational area. Located on the main campus of the University of Missouri, we can offer you a broad spectrum of cultural and recreational activities plus the opportunity to pursue your educational goals with individual assistance. Salary will be commensurate with education and experience. Please contact:

Personnel Office
UNIVERSITY OF MISSOURI
HOSPITAL & CLINICS
[illegible] Columbia, Missouri [illegible]

Key Technical Proposals Opportunity

In this position you would be associated with a dynamic communications systems manufacturer located in the southeastern United States. You will manage and direct the efforts of a talented proposal group in responding to customers requests for quotes for major communications systems.

Our emphasis on quality proposals will enable you to fully utilize your organizational technical and human resource skills as you interpret your customers needs in conjunction with what our Company can provide. In order to effectively interface with our wide range of specialists your background should include a knowledge of the data processing or electronics industry. Your current work history has provided you with a broad business overview which encompasses the technical and financial aspects of making a proposal become an order.

Join a leader in the industry whose quality products have earned them a place as the industry leader in communications systems. Start now by sending your resume to:

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375 Cochituate Rd., Route 30
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EDP Specialists

Call Bill Carroll
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Wm. Harris Assoc.
150 Bway N.Y. 10038

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We have an immediate opening for an experienced Programmer/Analyst. Experience with Transcomm on-line accounting system (TOLAS) is required. Excellent working conditions, benefits and salary. Send resume or call in confidence to

R.L. Murray
Valley Computer Systems, Inc.
2672 No. 27th Ave.
Phoenix, AZ 85017
[illegible]

Marketing Manager
Software Marketing Representative
Support Analyst

We are a successful software product company with a range of products operating on IBM System 34 and 38. Our unique financial software system is one of Europe's top selling products and we intend to repeat this achievement in the U.S.

These are unique opportunities for professional software marketing and support people to join a young dynamic company based in New York City and offering top salary and bonus.

If you have a track record in software marketing preferably with experience of financial management information systems and are looking for a more rewarding career this opportunity will be of extreme interest to you.

Please reply in confidence to:

Vincent Dillon or Matt Crotty
IRISH EXPORT BOARD
10 East 53rd Street
New York, New York 10022

Tel: (212) 371-3600

Data Processing Programmer/Analyst

One to three years programming and analysis experience. Knowledge of [illegible] Data General Eclipse experience desirable. Good problem definition and problem solving skills. Experience with clinical lab programs preferred. Salary commensurate with experience. [illegible] location. Send resume to [illegible] Clinical Labs.

[illegible]
[illegible]
Santa Clara, CA [illegible]

EOE

DATA PROCESSING SENIOR SYSTEMS ANALYSTS

Now is the chance to join our rapidly expanding organization. If you have strong experience in the execution and control of . . .

MSA PAYROLL/PERSONNEL — IBM OS/VS1

. . . and are looking for an opportunity to get ahead, we have outstanding opportunities for you. Our salary and fringe benefits are excellent. If you qualify, we invite you to send your resume and salary history to the address below. Please, only qualified applicants need apply.

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Financial/Administrative Systems
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Dean of Learning Resources
Division of Academic Affairs
Baylor University

This is a most unusual position in that it requires sufficient knowledge to direct the University Computer Center and also to coordinate all systems pertaining to learning resources in the libraries, museum and Oral History program where computer terminal or word processing equipment may be widely employed. The applicant for the position should hold the Ph.D in Computer Sciences or learning technology appropriate to a major university; consideration may be given to an applicant with the Ph.D. in another field provided that demonstrated competency exists. The incumbent will advise the Vice President for Academic Affairs and the central administration on all matters pertaining to automation and systems as these relate to academic and administrative computing, three major libraries, three special collections, a natural history museum and one of the leading Oral History programs in the nation. Furthermore, there is a highly diverse external affairs and development program which requires a detailed data base and extensive coordination.

This will be a high level leadership post in the life of the University and several candidates will be brought to the campus for interview. Baylor University is an equal opportunity employer and welcomes inquiries about the position. Applications and inquiries should be directed to: Dr. John S. Belew, Vice President for Academic Affairs, Baylor University, Waco, Texas 76798, 1-817-755-3601.

PROGRAMMER

The City of West Allis, Wisconsin, is seeking a COBOL Programmer to work in its progressive EDP department utilizing a Honeywell Level 64 Tape-Disc System. Interested applicants should have at least one year of programming experience. Salary to $18,600.00 plus excellent employee benefits. Write to Personnel Department, City Hall, 7525 West Greenfield Avenue, West Allis, WI 53214.

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CAREER OPPORTUNITIES AT:

AVCO COMPUTER SERVICES

Avco Computer Services, a business unit of Avco Systems Division, is one of the largest and fastest-growing computer centers in New England. Located in a pleasant suburban area north of Boston, we supply data center services to clients throughout the United States. Our operation is based on a very large IBM 370 computer system. Growth of our data center is creating new opportunities for data processing support professionals to engage in challenging and rewarding work.

SECTION CHIEF OF TELECOMMUNICATIONS SUPPORT—a key position that involves the management of a technical section responsible for the planning, implementation, maintenance and performance evaluation of a large telecommunications network and related software such as CICS/VS, IDMS/DC and TCAM. In addition, this unique position will have consulting and project responsibilities that will help form corporate telecommunications direction thru the 1980's. To qualify, candidates should have at least 8 years experience in telecommunications hardware and software support.

TELECOMMUNICATIONS SUPPORT PROGRAMMER—responsible for installing and maintaining communications software and on-line systems including CICS/VS, IDMS/DC, 3705 EP, TPNS and network diagnostic packages. Applicants should have at least two years experience in communications software support.

MVS SYSTEMS PROGRAMMER—challenging and rewarding position supporting MVS on a 3033 AP and two 158 processors. Primary responsibilities include system generation, system maintenance, problem determination and system testing. To qualify, candidates should have at least 2 years direct experience supporting MVS.

TECHNICAL SUPPORT REPRESENTATIVE—Technical support of our diversified and growing user community requires individuals who enjoy communicating with other people and staying technically current. Activities include consulting, education, conversions, benchmarks, troubleshooting, demonstrations and product support. The preferred candidates should have at least 2 years background in COBOL and a knowledge of IMS/VS DB systems. Experience with TSO and CICS would be advantageous.

TECHNICAL WRITER—As a professional software writer with excellent research, organization, editing, graphics, and production skills, you will inform Avco users of new program products and how to use our timesharing system. You should be able to take charge of a document from initial research through production, and handle several writing assignments at a time.

English major and experience with an IBM system preferred.

Avco offers a liberal benefits program that includes full Company paid Dental and Retirement Plans, an education policy of full tuition reimbursement, a liberal incentive Savings Plan and excellent salary commensurate with your educational and professional background.

If you would like to investigate these opportunities further, please send your resume including salary requirements in confidence to:

Peter C. Dowd, Employment Manager

AVCO COMPUTER SERVICES
201 Lowell Street
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AVCO CORPORATION

TOMORROW'S INFORMATION TECHNOLOGY... TODAY

Prime Computer's newly formed Information Resources Organization is recruiting experienced professionals to ensure that Prime continues to be a world leader in using computers to support their rapid growth and profitability. Prime is committed to integrating computing and communications technologies and we need excellent people to help. We currently have an opening for:

DATA ADMINISTRATION/INFORMATION SERVICES

Prime's Application Systems are based on a worldwide network of computers with distributed data bases. The Information Services group is responsible for insuring that dispersed data/information are managed and controlled, that application systems are of the highest quality, and an appropriate level of systems (information) integration is achieved. The Senior Manager of Information Services will be responsible for establishing the administrative and technical processes for controlling data during the rapid expansion of the network caused by the continued growth of the company and the extensive adoption of office automation. In addition, the opportunity exists to advance the state of the art in the management and control of data and text in a distributed environment.

Interested candidates, please submit your resume to:

Hugh B. McGettigan
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Prime Park
Natick, MA 01760

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MANAGER MANAGEMENT INFORMATION SERVICES

EAF International is a corporate business jet management company based in northern New Jersey. We are a leader in our market segment and employ over 120 skilled and professional personnel. Long range expansion of EAF has created an exciting and unique opportunity for a talented individual to assume the duties of Manager, Management Information Services. This position is a ground floor opportunity and offers high visibility within the corporation. The individual will report to the Office of the President and will have an opportunity for general management responsibility within 3-5 years. Initial responsibilities will include the establishment of an MIS Department and the implementation of Wang's 2200VS computer and Software International's software packages. Starting salary will be in the $30-40,000 range, depending on qualifications. Technical background should be minimum of 3-5 years of systems design and project management experience. MBA degree or equivalent, hardware and application knowledge, business and industry experience.

If you possess leadership qualities, strong interpersonal skills, and are looking for a career opportunity in smaller but dynamic company environment, please contact us.

Please submit resume including salary history in confidence to:

Office of President
EAF International, Inc.
110 [illegible] Rd.
Teterboro, N.J. 07608

INFORMATION SYSTEMS MANAGER

Ft. Lauderdale

Expanding department seeks a results oriented problem solver with technical expertise, professional know-how and management skills.

Requisites
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Interactive hardware/software background
solid manufacturing/financial applications

We are a leading electronics firm, manufacturing computer directed measurement and control interface subsystems.

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Director of Personnel
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Join our rapidly growing computer service company. We offer unlimited opportunity to those with initiative and ability. Systec provides a full benefit package, top salaries, and participation in Systec's future.

Immediate opening for field engineer with IBM 360/370/303X plus plug compatible CPU and peripheral experience. We also need top notch DEC people now!

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Phone: [illegible]; In Fla.-[illegible]

SysTec

2715 Navigator Ave.
P.O. Box 2016
Sanford, Florida 32771

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Major mini-vendor seeks take charge indiv. to manage staff of business analysts. Respon. include: booking forecasting; product mix reporting; reporting on ROI; & installed base pricing admin. MBA pref. for this hi-visibility position. Salary $30,000. (Fee Paid.) Contact Frank Goldschmidt.

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(617) 423-1200
Personnel Consultants

Systems Programmer

CDC CYBER Operating Systems

Broadly diversified energy systems company, Combustion Engineering runs one of the most advanced computer and international data communications networks currently in operation. Our equipment includes a CDC 7600 and CYBER 730, both used to support engineering and scientific workloads.

In an environment matched to the broadest professional scope, opportunity exists for a Systems Programmer skilled in operating systems software. Qualifications include 2-5 years experience with CDC SCOPE or NOS internals, including modifications and extensions to improve system capability and stability. Degree in Computer Science, Math or exact science desirable.

Our Data Center is located in Windsor, Connecticut, a pleasant suburban area offering excellent housing, educational and recreational facilities. For immediate consideration, please send your resume and current salary in complete confidence to: J.W. Doyle, COMBUSTION ENGINEERING, 200 Pigeon Hill Road, Windsor, Connecticut 06095.

COMBUSTION ENGINEERING

The Energy Systems Company

An equal opportunity employer M/F/H

National Steel Corporation

America's third-largest steel maker has rewarding opportunities in Applications Programming:

SENIOR APPLICATIONS PROGRAMMER

Midwest Steel - Portage, IN

- 3-5 years experience in programming for large-scale IBM computer systems
- 3 years experience in COBOL
- 1-2 years experience in IMS DB/DC and MFS programming
- Strong background in OS/VS JCL

Position will lead directly to Supervisor, Applications Programming

APPLICATIONS PROGRAMMER

Great Lakes Steel-Detroit, MI &
Corporate Staff-St. Louis, MO

- 2 years experience in programming for large-scale IBM computer systems
- 1-2 years experience in COBOL
- Working Knowledge of OS/VS JCL

Interested applicants should send their resumes to:

James E. Ash
NATIONAL STEEL CORPORATION
425 N. New Ballas Road
St. Louis, MO 63141

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[illegible]

SENIOR ANALYST

[illegible] with the major oil [illegible] Co. converting from [illegible] to 4341. 3+ yrs systems analysis with [illegible] and COBOL programming in background. [illegible]

SR. COMM ANALYST

[illegible] Environment is dual 370/168 OS/VS. [illegible]

ALL FEES PAID
Call MARTY AMATO

[illegible]

[illegible] Fifth Avenue
New York, N.Y. [illegible]
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DATA SYSTEMS MANAGER

OREGON STATE TREASURY DEPARTMENT

Salary range $[illegible] — $[illegible]

Position plans and directs a small staff performing all system development and computer operation functions. Principle applications include banking, fund accounting, investment and [illegible] systems. Responsible for supervision of a medium scale Honeywell [illegible] system operating under GCOS and supporting batch and integrated on-line processing modes.

Desired qualifications include a Bachelor's degree or equivalent in Business Administration or Computer Science plus [illegible] years of increasingly responsible experience in systems development and computer operations, including a minimum of two years experience as a manager responsible for both development and operations. Preference will be given to applicants possessing relevant experience in banking and investment systems.

Applicants should submit complete resumes, including salary history, post marked no later than December [illegible], 1980 to:

Oregon State Treasury Department
[illegible] State Capitol
Salem, OR [illegible]

Equal Opportunity Employer

PROGRAMMER

We are seeking an experienced programmer to join our Information Services Group. It is essential that the individual have a working knowledge of COBOL and DOS/JCL. Manufacturing programming experience and knowledge of assembler would be helpful.

Competitive starting salary, excellent company paid benefits. For consideration send resume and salary history to:

L. A. [illegible]
[illegible]
P.O. Box [illegible]
[illegible], VA [illegible]

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Annenberg School of Communications at USC

The Annenberg School of Communications at USC announces three full-time faculty positions available for Fall 1981 rank and salary negotiable. Computer and telecommunication technologies in organizations and society-design, implementation, management or evaluation. Telecommunication policy-politics and economics. Mass communications — media effects, the sociology and economics of media institutions, information campaigns, communication networks, or public or political communications. These positions require a Ph.D., strong scholarly credentials, empirical research, interest in applications of research to practices and policies, and excellence in teaching. Apply by sending vita and statement of interest by February 15 to William H. Dutton, Chair, Faculty Search Committee, Annenberg School of Communications, University of Southern California, Los Angeles, CA 90007. An equal opportunity/affirmative action employer

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COMMUNICATIONS.

Harris Corporation is a billion dollar (Fortune 500) leader in communications and information processing. We are seeking the following telecommunications professionals for senior positions in our three-node $1 million-plus satellite based corporate communications network:

MANAGER, TELECOMMUNICATIONS

Dallas, Texas

SENIOR COMMUNICATIONS ANALYST

Melbourne, Florida

Experience with communications terminals, modems, multiplexers, controllers, and software required. Desire background emphasis on data communications, but must also be knowledgeable on voice regulatory environment and capabilities in Europe/Asia, and VAN capabilities domestically and internationally.

Prefer electrical engineering degree and minimum 5-10 years experience. This is a senior level position with a rapidly growing company at the forefront of communications technology.

We offer excellent salary benefits, liberal relocation assistance, high visibility and growth. For immediate consideration, please call (305) 727-5241 or send resume to Paul Giuliani, Corporate Staffing, Harris Corporation, Melbourne, Florida 32919.

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COMMUNICATION AND INFORMATION PROCESSING

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SAN FRANCISCO

Tymshare Transaction Services, Inc. (a subsidiary of Tymshare, Inc.) is a leader in credit card processing, banking, and retailing systems.

- IMS Systems Programmer with at least 3 years' CICS/VS and IMS DB experience.
- Systems Programmer with 5+ years MVS/JES2, with 3 years' VM experience desirable to support our multi-CPU environment.
- T/P Systems Programmers with 3+ years of VTAM + BTAM macro coding, for enhancements and support of our in house T/P monitor.
- TCAM, NCP and SMP experience in an MVS, multi-CPU environment is a plus.

Tymshare Transaction Services, Inc. offers a high energy working environment with a professional team, competitive salaries and outstanding benefits. Interested persons are invited to send resume and salary history in confidence to: Anita Ho, Divisional Personnel Manager.

Tymshare
Transaction
Services, Inc.

156 Berry Street
San Francisco, CA 94107
Equal Opportunity Employer

SOFTWARE PROFESSIONALS

Some of New England's finest companies rely heavily on E.P.Reardon Associates to assist them in finding software professionals. Two of our clients have expressed an urgent need for talented software engineers with the qualifications listed below:

SR.SOFTWARE ENGINEER-PDP11 To 30K

Lead technical role responsible for systems design, RSX-11M operating systems knowledge is essential. Experience with networking, I/O drives, diagnostics or other areas helpful.

DATA COMMUNICATIONS SYSTEM DESIGNER To 32K

Key spot for individual contributor in the Future Products group of this leading mini computer vendor. Requires experience with protocols, packet switching and SNA. BSEE or Comp. Sci. necessary. Advanced degree preferred. Excellent combination of tech. challenge and visibility.

CAD/CAM To 28K

Systems level software design or CAD/CAM applications experience necessary. Assembly and high level programming language knowledge required.Co. is a rapidly growing leader in the design and installation of CAD/CAM systems for electronic and manufacturing industries.

OPERATING SYSTEMS To 28K

Work with a small team in the design and development of new operating systems. Experience in large, multi-user operating systems, virtual memory and sophisticated paging techniques is required.

PRODUCT SUPPORT To 28K

Provide technical support to Field Service, Sales, and Manufacturing in the solution of software problems. Strong hardware background is essential as is real-time assembly language experience.

To explore these, or many other challenging positions, please contact Dan Meagher by calling (617)329-2660 or mail your resume to him (in complete confidence) at:

E.P. Reardon Associates

[illegible] Washington Street, Dedham, Mass. 02026

PROGRAMMER AND PROGRAMMER ANALYST

LINKABIT CORPORATION, a M/A-COM Company, is engaged in the development, design and manufacture of communication systems and components primarily for satellite and space application. We have a need for outstanding individuals with educational background and experience in Applications Programming.

Responsibilities will include analysis, design, coding, testing, documentation, implementation and maintenance of programs for Manufacturing and Financial Information Systems in an on-line, Data Base environment. Programming will be in COBOL using DEC20 mainframe computers. Requirements for a Programmer are 1 to 2 years of COBOL programming work experience. Requirements for a Programmer Analyst are 2 to 3 years of COBOL programming work experience. A B.A. degree is preferred. LINKABIT's computer resources include two networked CPU's, 9M bytes of main memory, 1800M bytes of disk and 160 on-line users. This computing power supports LINKABIT's commitment to the office and factory of the future with applications such as electronic mail, word processing and CAD/CAM.

LINKABIT offers competitive salaries and an outstanding benefits package. Please send your resume and salary history in confidence to Pat McLean.

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Systems & Computer Technology Corporation (SCT), in suburban Malvern, Pennsylvania, is the recognized leader in providing computing management services and software development to state and local government, as well as higher education.

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We are prepared to offer a high base salary plus a financial premium for results. Stock participation and a comprehensive benefits program. What's unique is the rewards can also include equity participation and the excitement generated by running with the best.

If you can meet the challenge we've described, please send your resume in complete confidence to: **Mr. Bill Dransfield, Director of Corporate Recruiting, SCT Corporation, Great Valley Corporate Center, 4 Country View Rd., Malvern, PA. 19355. (215) 647-5930.**

Systems & Computer Technology Corporation

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PROJECT LEADER

IBM 4331 Environment

Major responsibilities for this position will be the developing, designing and modifying of data processing projects. To qualify, the successful candidate should possess experience in application development and implementation at Project Leader level in a DOS/VSE, CICS, DL/1 environment.

For this individual the BENJAMIN F. SHAW COMPANY will offer an excellent salary/benefits package, a challenging position, responsibility and growth.

Qualified applicants should send resume, including salary requirements, in confidence to: HUMAN RESOURCES DEPT.

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New and expanding Univac needs talented people to take a role in development of new systems. Requires at least 2 yrs 1100/ECL, COBOL in a business environment. To $24,000.

CONTACT: JOHN STABER
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Dallas, TX 75231
(214) [illegible]

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We are seeking candidates for Programmer/Analyst positions with experience in check processing using the IBM 3890 document processor. The individual should have 3 to 5 years of experience in both COBOL and ALC. MVS (CPCS) and DOS (FEDCHEX) environments available.

- *Permanent Dallas Location
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Send resume with salary history in confidence to:

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Personnel Department
Station K
Dallas, Texas 75222

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UNIVERSITY OF VERMONT ANALYST PROGRAMMER I

The Administrative Computing Center is seeking an Analyst Programmer I with a Bachelor's Degree, preferably in a scientific or business related discipline. Applicants must have two to four years of experience in systems analysis and programming, two of which must be in COBOL under IBM/[illegible]. Applicants with experience in higher education applications, on-line systems or DBMS preferred. We offer an excellent benefits package. Salary commensurate with experience. Send resume and 3 professional references by Dec. 12, 1980 to University of Vermont, [illegible], Waterman Building, Burlington, Vermont 05405.

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HONGKONG POLYTECHNIC

The Hong Kong Polytechnic is a large institution of advanced education which offers courses in a wide range of subjects. In addition to three major academic Divisions comprising 16 teaching departments, it also has a number of interdisciplinary institutes and centres. For the academic triennium 1981-84, emphasis will be placed on developing high level programmes and applied research activities relevant to the needs of Hong Kong. It is also envisaged that a number of vocationally-oriented degree programmes will be introduced in this triennium.

The Polytechnic invites applications for the following posts which are tenable from September 1981:

DEPARTMENT OF COMPUTING STUDIES
PRINCIPAL LECTURERS/ SENIOR LECTURERS/ LECTURERS

To teach Design of Real-time Systems, Computer Aided Design & Graphics, Systems Programming, Installation Management, Management Information Systems, Systems Analysis and Design, Applications Programming, Computer Systems, Data-Base Management, Computer Applications in areas relevant to the Polytechnic including Engineering, Mathematics, Accountancy, Business Studies, Textiles, Applied Science and Design.

Qualifications for Appointment and Salaries

Principal Lecturer: HK$120,600 - HK$162,780 p.a.

Candidates should have (a) a degree or professional qualifications and an advanced specialist qualification or extensive experience in a specialized field; (b) substantial professional experience; and (c) proven administrative ability.

Senior Lecturer: HK$107,580 - HK$153,960 p.a.

Candidates should have (a) a degree or professional qualification and preferably an advanced specialist qualification; (b) substantial professional experience; and (c) proven administrative ability.

Lecturer: HK$61,380 - HK$102,180 p.a.
Candidates should have a degree or professional qualifications or in some areas, at least a Higher Technician qualification; and (b) at least three years professional experience.

Note: US$1 = HK$5.06 on 27th October 1980

Conditions of Service

Appointment will be on two-year gratuity-bearing contract terms initially. Thereafter suitable appointees may be offered further contracts or superannuable terms of service at the discretion of the Polytechnic. Benefits include long leave; subsidized accommodation for overseas appointees, and local appointees on a salary of HK$8,515 p.m. or above; medical and dental benefits; children's education allowance and a terminal gratuity of 25% of basic salary received over entire contract period.

Further information and application forms are obtainable from the General Secretary's Office, Room L402, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong. Completed application forms should be returned by 8th December 1980.

DATA PROCESSING PROFESSIONALS IN ARIZONA

Motorola's Government Electronics Division, located in Phoenix, Arizona, has immediate opportunities for MIS professionals in our IBM multi 3033 environment.

- **SENIOR PROGRAMMER/ANALYSTS** — Candidates with 2 years experience utilizing COBOL, IMS DB/DC and OS JCL. Mark IV experience a plus!
- **PROGRAMMER/ANALYSTS** — Candidates with experience in evaluation/implementation of a distributive data processing environment. COBOL programming knowledge required.
- **WORD PROCESSING ANALYST** — Candidate with current knowledge of word processing and other office technology. Position requires "hands-on" experience in evaluation/implementation of word processing application and knowledge of office requirements and procedures within a large engineering or manufacturing organization. Degree preferred.

Motorola GED offers excellent professional growth opportunities, complete benefit package and relocation assistance. Qualified candidates should forward resume and salary history to:

Dotti Morris
Department 1613

MOTOROLA INC.
Government Electronics Division

8201 E. McDowell Road
Scottsdale, Arizona 85252

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Ad closing is every Friday, 10 days prior to issue date.

Rates: Open rate is $73.50 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $147 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

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Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available. $10 per insertion.
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To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

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Chicago - (312) 827-4433
San Francisco - (415) 421-7330
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Directing analysts and programmers in the development, implementation and maintenance of financial or retail data processing systems.

SYSTEMS PROGRAMMERS

OS/VS1, CICS, VTAM or IBM 3790/8140 DPCX.

PROGRAMMERS

Programming, implementation and maintenance of large and complex systems. 1-5 years COBOL.

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Plan, develop and administer division standards and procedures; experience in EDP technical training.

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Our Software Engineering Support Group requires accomplished software engineers to develop Computer Aided Design software for sophisticated electronic countermeasures, communications and navigation systems. You will be required to install and maintain engineering/scientific packages in an IBM 370/CMS environment and will educate and assist users in this environment.

Your qualifications should include FORTRAN and the utilization of simulation packages such as SuperSceptre, Logic V, and TEGAS. Since you will be aiding systems users, you should be familiar with PDP-11 and VAX 11/780 Assembly language.

We are located in an attractive suburban campus-like setting only 11 miles from Manhattan. Our salaries and benefits are what you would expect from ITT.

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Software Technical Writers

Texas Instruments in Austin, Texas needs experienced Software Technical Writers.

Software Technical Writers coordinate, research, and write computer system and user documentation from development data and personal interviews.

Positions are available for persons familiar with programming languages, telecommunications, transaction processing, or operating systems structures.

All positions require a college degree although equivalent experience will be considered. At least 2 years of software technical writing experience is desired.

TI offers competitive salaries and a full line of benefits including company-paid relocation.

Call us now to schedule an interview. Call collect (512) 250-7442 during normal business hours, or send your resume in confidence to: **P.O. Box 2909, M/S 2206, Austin, Texas 78769 Attn: Bethany McAdams.**

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Candidates should have an undergraduate degree and 3-8 years experience designing and implementing financial and other business oriented systems.

Specialty skills in health care, manufacturing (MRP package implementation acceptable) or banking and minicomputer evaluation and systems security experience are especially desirable.

For prompt, confidential consideration for these and other positions, send your resume to:

ACCOUNTING RESOURCES INTERNATIONAL
CW Box 24[illegible], 375 Cochituate Road
Route 30, Framingham, MA 01701

Or, for immediate information, call:

Atlanta	[illegible]	Los Angeles	[illegible]	Salt Lake City	[illegible]
Boston	(617) 237-[illegible]	Memphis	[illegible]	San Antonio	[illegible]
Chicago	[illegible]	Miami	[illegible]	San Diego/Orange County	[illegible]
Cleveland	[illegible]	Minneapolis	[illegible]	San Francisco	[illegible]
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Walnut Creek, California [illegible]
San Francisco Bay Area
(415) [illegible]

ETHAN ALLEN PERSONNEL AGENCY
Contact: Barry [illegible]
59 Academy Street
Poughkeepsie, New York 12601
(914) 471-[illegible]

U.S. INTERNATIONAL RECRUITERS
[illegible] Union Blvd., Suite 127
Lakewood, Colorado [illegible]
(303) [illegible]

DATA SYSTEMS MANAGER

OREGON STATE TREASURY DEPARTMENT

Salary range $25,[illegible] — $32,772

Position plans and directs a small staff performing all system development and computer operation functions. Principle applications include banking, fund accounting, investment and bonded debt systems. Responsible for supervision of a medium scale Honeywell L64 DPS-330 system operating under GCOS and supporting batch and integrated on-line processing modes.

Desired qualifications include a Bachelor's degree or equivalent in Business Administration or Computer Science plus 6 years of increasingly responsible experience in system development and computer operations, including a minimum of two years experience as a manager responsible for both development and operations. Preference will be given to applicants possessing relevant experience in banking and investment systems.

Applicants should submit complete resumes, including salary history, postmarked no later than November 24, 1980 to

Oregon State Treasury Department
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Salem, OR 97310

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An excellent opportunity for a qualified "big picture" individual to direct the implementation of office systems. Immediate objective includes establishing priorities, policies and long range planning for the office automation function. Ideal candidate will, at a minimum, possess a bachelor's degree in Business, Computer Science or a related field; be knowledgeable in the areas of word processing, document management, electronic filing/mail and possess excellent written/oral communication skills. Exp. in DBMS and telecommunications a definite plus.

SENIOR PLANNING SPECIALIST

A dynamic position for the seasoned motivated professional to assist in forecasting corporate business information needs and planning resource utilization to meet future requirements. Requires advanced planning exp. in large scale data processing environment, good management/interpersonal skills, in-depth knowledge of computer systems. Ideal candidate will have appropriate degree, consulting background (internal/external), financial/capital forecasting knowledge and excellent business systems background.

SENIOR TECHNICAL SUPPORT SPECIALIST

The ideal position for the computer specialist interested in exploring "leadings edge" technological advances and able to interpret impact on corporate resources, systems, hardware and software requirement. Candidate must have a bachelor's degree or equivalent, and be hardware/software oriented with DBMS and/or communications experience. A solid IBM/HP product knowledge a definite plus.

SENIOR DECISION SUPPORT SPECIALIST

A quantitative oriented individual who can apply Operations Research tools to solve short and long range business problems in user environment will find this position all the challenge needed. Candidate should possess appropriate Math/OR degree have significant modeling/simulation exp. an be user oriented with good interpersonal skills.

SENIOR RESEARCH SPECIALIST

A challenging opportunity for the creative, "think tank" individual interested in exploring data processing equipment, software, concepts and organizational issues as far as 10 yrs. away. Education training and motivation must be oriented in direction of intersecting two or more technologies and products which result in shorter development cycles, higher quality products, reduced maintenance costs, better response to user needs. Ideal candidate must have apropriate degree and work exp. in either the university environment or private/public sectors.

For a confidential discussion of these and other positions contact:

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DIRECTOR

MANAGEMENT INFORMATION SYSTEMS

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The successful candidate will have a BS in accounting or a related discipline with an MBA a plus. 3-4 years of proven management experience and a minimum of 5 years of Data Processing exposure, preferably in systems development, is required.

Current environment includes 370/138 DOS/VS, CICS; DL1 and ETSS II. Overall responsibilities include a wide range of systems development activities and the continuing support for corporate information needs.

We offer an excellent salary commensurate with experience, a favorable fringe benefit package and liberal relocation assistance. Qualified applicants are requested to send their resume, salary history and requirements to:

DIRECTOR OF INDUSTRIAL RELATIONS
CW Box 2437
375 Cochituate Rd., Rte. 30; Framingham, MA 01701
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DATA PROCESSING OPPORTUNITIES

San Antonio, Texas

The Customer Service Division is meeting the challenge of our Growth and creating new career opportunities along the way.

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SYSTEMS ANALYST

This individual must have a BS in Computer Science or equivalent with at least 4 years programming experience. Responsibilities will include analyzing systems requirements with users, development of detailed specifications for systems including cost analysis and preparation of status reports. Financial application experience an asset.

PROGRAMMER

This individual must have a BSCS or equivalent with at least one year programming experience. Knowledge of COBOL or BASIC is a plus. In this position you will write, test and implement new programs and modify programs for logistics and management systems applications.

Datapoint offers excellent starting salaries with complete corporate benefits. For prompt confidential consideration, please send your resume, including salary history to Marianne Palacios, Datapoint Corporation, 8415 Datapoint Dr., MS T-61, San Antonio, Texas 78284.

We are an equal opportunity employer M/F.

DATAPOINT

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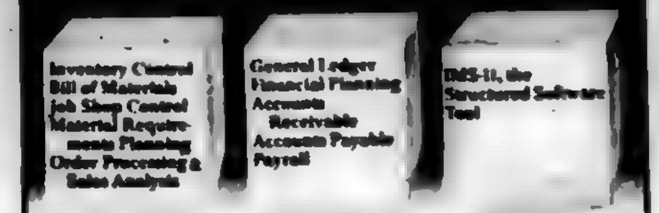

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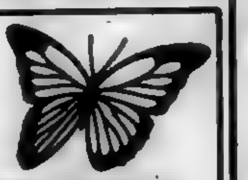

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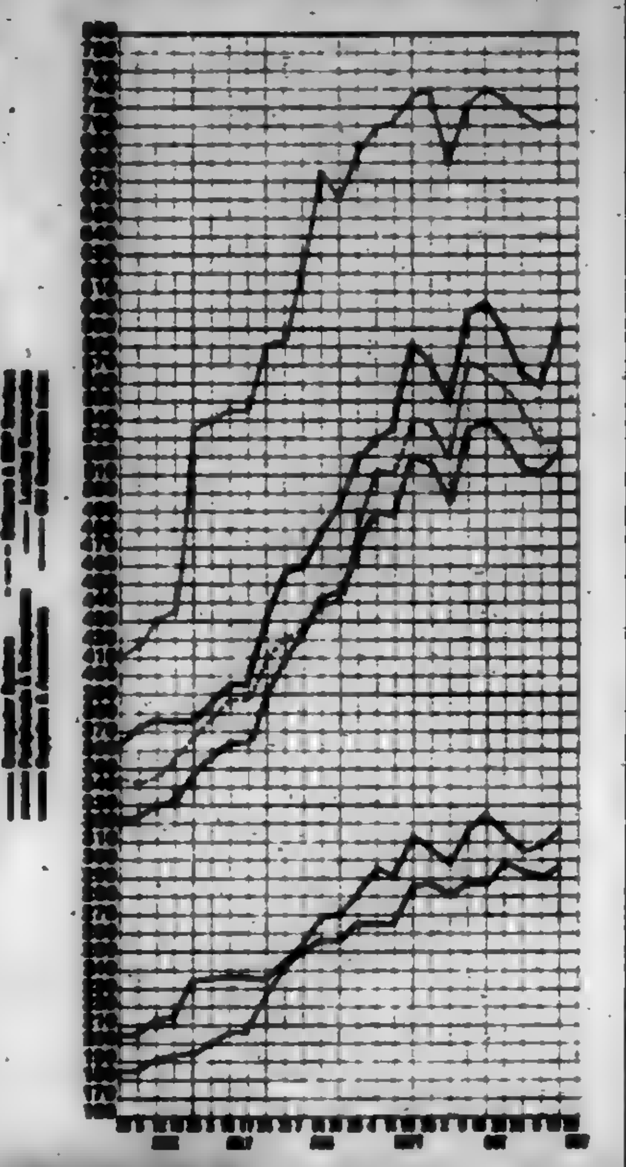
Computerworld Stock Trading Index



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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 12, 1980

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

EXCH		1979-80 RANGE (1)	CLOSE NOV 12 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	13- 42	32	+3 1/4	+11.3
N	BURROUGHS CORP	50- 86	80 1/2	-1 7/8	-2.3
O	COMPUTER AUTOMATION	9- 27	23	+ 1/4	+1.0
N	CONTROL DATA CORP	38- 77	70	- 1/2	-0.7
O	CRAY RESEARCH INC	30- 99	91 1/4	+5	+5.3
N	DATA GENERAL CORP	44- 87	73	+ 1/8	+0.1
N	DATAPOINT CORP	44- 97	94	+5 7/8	+6.6
N	DIGITAL EQUIPMENT	52- 96	89 5/8	+ 7/8	+0.9
A	GECO INC	9- 25	22 1/2	+1 1/8	+5.2
O	ELECTRONIC ASSOC.	4- 12	8 3/4	- 1/4	-2.7
N	FOUR-PHASE SYSTEMS	20- 40	37 3/4	+ 1/8	+0.4
N	FOXBORO	31- 57	53 7/8	- 5/8	-1.1
O	GENERAL AUTOMATION	7- 19	9	0	0.0
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	46- 84	84	+7 3/8	+10.1
N	HONEYWELL INC	68-101	94 1/2	+2 3/8	+2.9
N	IBM	50- 79	70 7/8	+3 3/8	+5.0
O	MAGNUSON COMP SYSTS	20- 38	29 3/4	+2 1/4	+6.1
O	MANAGEMENT ASSIST	9- 25	23 3/4	+ 3/4	+3.2
O	MANUFACTURING DATA S	22- 74	73 1/2	+7 1/2	+11.3
O	MINI-COMPUTER SYST	2- 6	3 1/8	+ 3/8	+13.6
O	MODULAR COMPUTER SYS	9- 21	20 1/4	+1 1/4	+6.6
N	NCR	53- 82	67 3/4	+2 1/8	+3.1
N	PRIME COMPUTER INC	15- 49	46 1/4	+3 1/4	+7.2
N	PERKIN-ELMER	20- 49	44	+2 3/8	+5.4
N	SPERRY RAND	42- 66	53 7/8	+4 1/2	+9.1
A	SYSTEMS ENG. LABS	31- 45	42 1/8	+ 1/2	+1.2
O	TANDEM COMPUTERS INC	12- 66	64 1/2	+4 1/4	+7.0
N	TEXAS INSTRUMENTS	79-144	134 1/4	+5 7/8	+4.5
A	WANG LABS.	17- 48	44 1/2	+17 1/8	+62.5
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 27	22	0	0.0
N	COMDISCO INC	6- 19	18 3/4	+2 1/4	+13.6
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	3 1/8	+ 1/8	+4.2
O	CONTINENTAL INFO SYS	3- 15	4 7/8	- 1/8	-2.5
N	DATRONIC RENTAL	3- 5	4 1/4	0	0.0
A	DCL INC	3- 6	3 1/8	0	0.0
N	DPF INC	8- 12	6 7/8	- 1/4	-3.5
N	ITEL	1- 15	1 1/4	- 1/8	-9.0
O	LEASPAC CORP	1- 2	3/4	0	0.0
A	PIONEER TEX CORP	2- 4	3 5/8	+ 1/4	+7.4
N	RELIANCE GROUP INC	24- 79	69 1/2	+1 5/8	+2.3
N	U.S. LEASING	12- 24	21 1/8	-1 1/8	-5.0
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	4 7/8	+ 1/4	+5.4
N	ANACOMP INC	7- 21	19 3/8	- 1/2	-2.5
O	ANALYSTS INTL CORP	3- 11	11 1/4	+2	+21.6
A	APPLIED DATA RES.	6- 24	22 1/4	+ 1/8	+0.5
N	AUTOMATIC DATA PROC	31- 52	49 1/4	+1 1/2	+3.1
O	COMPUTER HORIZONS	1- 5	2 3/4	0	0.0
O	COMPUTER NETWORK	4- 9	7 1/2	+ 1/8	+1.6
N	COMPUTER SCIENCES	11- 29	19 1/4	- 1/2	-2.5
O	COMPUTER TASK GROUP	2- 22	17 1/2	-1	-5.4
O	COMPUTER USAGE	2- 10	7	0	0.0
O	COMPUT AUTO REP SVC	4- 10	9	+ 1/8	+1.4
O	COMSHARE	11- 21	17	- 1/4	-1.4
O	CULLINANE CORP	10- 60	31 1/4	-27	-46.3
O	DATA DIMENSIONS INC	0- 6	1 3/8	+ 1/8	+0.2
O	DATATAB	1- 4	1 1/8	0	0.0
O	DSI CORP	4- 9	7 1/2	- 1/8	-1.6
N	ELECTRONIC DATA SYST	19- 37	32	+ 3/4	+2.3
O	INFORMATICS INC	9- 25	20	+ 1/2	+2.5
O	INSYTE CORP	1- 3	1 3/4	- 1/8	-6.6
O	[illegible] COMPUTER MARKET.	2- 4	3	+ 1/2	+20.0
O	KEANE ASSOCIATES	3- 9	5 3/4	- 1/4	-4.1
O	KEYDATA CORP	1- 3	3/8	- 1/8	-16.6
A	LOGICON	12- 29	29	+1 7/8	+6.9
O	MATHEMATICA INC	5- 18	13 1/4	+ 3/4	+6.0
O	MATHEMATICAL APP GRP	7- 33	27	+1 1/2	+5.8
O	NATIONAL DATA CORP	10- 29	28 3/8	+1 5/8	+6.0
N	PLANNING RESEARCH	5- 13	10 7/8	- 1/8	-1.1
O	PROGRAMMING & SYS	1- 1	3/8	- 1/8	-14.6
O	RAPIDATA INC	4- 9	7 5/8	+ 1/8	+1.6
O	REYNOLDS & REYNOLDS	21- 34	22 1/4	+ 1/2	+2.2
O	STSC INC	4- 20	19 3/4	+1	+5.3
O	SCIENTIFIC COMPUTERS	4- 28	27 1/2	+3 1/4	+13.4
O	TYMSHARE INC	24- 79	74 1/4	+ 1/2	+0.6
A	URS SYSTEMS	9- 16	16 1/4	+1 3/4	+12.0
O	WYLY CORP	4- 20	16 3/4	-1 3/4	-9.4
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 20	15 1/4	- 7/8	-5.4
N	AMPEX CORP	14- 30	31 3/8	+1 3/8	+5.4
A	ANDERSON JACOBSON	9- 19	19 1/4	+1 7/8	+10.7
N	APPLIED DIG DATA SYS	9- 13	11 7/8	0	0.0
O	AUTO-TROL TECHNOLOGY	10- 42	49	+8 1/2	+20.9
O	BEEHIVE INT'L	3- 18	17 3/8	+1 1/2	+9.5
A	BOLT,BERANEK & NEW	12- 33	30 3/8	+2 3/8	+9.3
N	BUNKER-RAMO	17- 41	40 1/4	+1 1/8	+2.8
O	CAMBRIDGE MEMORIES	1- 7	3 1/2	- 3/8	-9.6
N	CENTRONICS DATA COMP	20- 35	32 3/8	+2 3/8	+7.9
A	CETEC CORP	3- 7	6 3/8	0	0.0
O	COMPUTER DEVICES INC	5- 10	7 1/4	- 1/2	-6.4
O	COGNITRONICS	1- 8	7 7/8	+ 3/8	+5.0
O	COMPUTER COMMUN.	1- 8	2 3/4	-2 7/8	-51.1
O	COMPUTER CONSOLES	4- 29	23 3/4	+2 3/4	+13.0
O	COMPUTER TRANSCEIVER	1- 5	4	+ 1/8	+3.2
N	COMPUTERVISION CORP	24- 92	79 1/8	+6 1/8	+8.3
N	CONRAC CORP	13- 25	18 1/4	+ 7/8	+5.0
A	DATA ACCESS SYSTEMS	6- 18	17 3/8	+2 1/4	+14.8
A	DATA PRODUCTS CORP	11- 35	34	+3 3/4	+12.2
O	DATUM INC	2- 5	4 3/8	- 3/8	-7.8
O	DECISION DATA COMPUT	2- 6	4 3/8	- 3/8	-7.8
O	DELTA DATA SYSTEMS	1- 3	1 7/8	- 1/8	-6.2
O	DOCUMATION INC	7- 27	17 1/4	+ 5/8	+3.7
O	DATARAM CORP	6- 37	12 3/8	+2 1/4	+22.2
N	ELECTRONIC M & M	3- 8	7 1/2	- 1/8	-1.6
O	EVANS & SUTHERLAND	21- 81	82	+11 1/2	+16.3
O	FABRI-TEK	1- 4	2 7/8	- 1/4	-8.0
O	GENERAL COMPUTER SYS	1- 6	4 3/8	+ 3/8	+10.0
O	GENERAL DATACOMM IND	12- 30	30 1/4	+2	+7.0
O	GENERAL TERMINAL CP	1- 4	2 3/8	-	-2.5
N	HAZELTINE CORP	12- 33	29 7/8	- 3/8	-1.2
N	HARRIS CORP	25- 53	51 1/2	- 1/4	-0.4
O	INFORMATION INTL INC	8- 15	12 1/2	0	0.0
O	INTEL CORP	22- 50	45	+3	+7.1
O	INTERSIL	13- 33	32 1/4	+ 1/8	+0.3
A	LUNDY ELECTRONICS	6- 17	10 7/8	-2 3/4	-20.1
O	MSI DATA CORP	8- 16	11	0	0.0
N	MEMOREX	10- 34	25	+ 1/8	+0.5
N	MOHAWK DATA SCI	10- 31	26 1/4	+2 1/2	+10.5
O	[illegible]	2- 12	12	0	0.0
A	PARADYNE CORP	10- 64	63 3/4	+9	+16.4
A	PENRIL CORP	9- 15	13 7/8	+1 3/4	+14.4
O	QANTEX CORP	10- 18	17	0	0.0
O	RECOGNITION EQUIP	9- 21	20 1/8	+ 1/2	+2.5
O	SCAN DATA	1- 5	2	-	-3.0
N	STORAGE TECHNOLOGY	12- 26	22 3/8	+ 7/8	+3.8
O	SYKES DATATRONICS	14- 30	30 1/4	+3 3/4	+10.0
O	T BAR INC	10- 27	20	- 1/2	-2.4
A	TEC INC	3- 9	5 3/8	0	0.0
N	TEKTRONIX INC	42- 70	65	+2 7/8	+4.6
N	TELEX	3- 6	5 7/8	+ 1/8	+2.1
O	TESDATA SYSTEMS CP	8- 26	13 3/4	- 3/8	-2.6
A	TIMEPLEX INC	7- 29	27 1/4	+4 5/8	+20.4
O	WILTEK INC	1- 3	2	+ 1/8	+6.6
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	8- 15	15 3/4	+1 1/4	+10.0
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	8- 22	21 1/4	+3	+16.4
O	CYBERMATICS INC	1- 2	1 3/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	13 1/2	- 1/4	-1.8
N	ENNIS BUS. FORMS	13- 21	16 1/4	0	0.0
N	3M COMPANY	46- 63	57 3/8	0	0.0
O	MOORE CORP LTD	27- 37	31 3/4	-1	-3.0
N	NASHUA CORP	20- 35	27 1/8	- 7/8	-3.1
O	STANDARD REGISTER	22- 35	31	- 3/4	-2.3
O	TAB PRODUCTS CO	9- 24	22 7/8	-1	-4.1
N	WABASH MAGNETICS	11- 22	22 3/8	+2 5/8	+13.2
N	WALLACE BUS FORMS	20- 32	29 3/8	- 1/2	-1.6

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agan Impact? Soon to Tell, ndustry Says

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Information industry representatives, while enthusiastic about the prospect of four years of a pro-business, Republican administration backed by a Republican Senate and a fairly conservative House, are taking a wait-and-see approach to Ronald Reagan's actions on individual information issues.

Because Reagan campaigned on issues of the economy and national defense, he is expected to hit the ground running with proposals for tax cuts and enhanced military spending, both of which bode well for the electronics industry in general. But specific proposals for overhauling federal procurement practices and dealing with information policy have not yet been formulated.

The Reagan team is said to believe one fatal mistake President Carter made in the early days of his own administration was to get bogged down immediately in bureaucratic reorganization. Reagan, by way of contrast, hopes to go for some early big victories in pushing tax reform and beefing up defense capabilities.

The Carter administration has been very active in addressing such information issues as the Communications Act rewrite, privacy of personal records, electronic mail, paperwork reduction, industrial innovation and library

(Continued on Page 8)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
Vol. XIV, No. 48 November 24, 1980 $1.00 a copy; $30/year

NEWSPAPER

SYSTEM / CHARACTERISTICS	Amdahl Corp. 470V/8	Amdahl Corp. 580-5860	Amdahl Corp. 580-5880	IBM 3081
Relative Performance¹	310	620	[illegible]	465
Memory Size in Bytes (Minimum To Maximum)	4M-16M	16M-32M	16M-32M	16M-32M
Purchase Price (Memory Size)	$2,775,000 (16M)	$3,800,000 (16M)	$7,800,000 [illegible]	$3,720,000 (16M)
Monthly Lease (Lease Term)	$101,050 (4 years)	[illegible] (4 years)	$106,100 [illegible]	$93,000 (4 years)
Memory Cycle Time (Nsec)	260	Not Available	Not Available	Not Available
Machine Cycle Time (Nsec)	26	[illegible]	[illegible]	26
Channels (Minimum To Maximum)	12-16	16-24	16-32	16-24
Cache (Buffer) Size in Bytes	64K	64K	64K	2 CPUs, 32K buffer each
Bus Architecture?	No	Yes	Yes	No
Price per 1M Byte Of Main Memory	$37,500	$25,000²	$25,000²	$25,000

1. Relative throughput based on the IBM 370/158-3's equaling 45. Performance based on vendor claims.
2. Memory sold only in 8M-byte additions.

CW Chart

Amdahl Unveils Rivals To IBM 3081 Processor

By Tim Scannell
CW Staff

SUNNYVALE, Calif. – Amdahl Corp. last week introduced two computer systems billed as IBM 3081 competitors that offer users twice to more than three times the processing power of the firm's 470V/8.

At the same time, the company brought out the 470V/7C, an entry-level machine for the 470V/7 processor line that enables users to enter Amdahl's high-performance migration path for as little as $1 million, compared with the previous $2.3 million base price for a 4M-byte system.

Amdahl also announced larger main storage capabilities for the 470s and across-the-board purchase price reductions of 17%.

The Amdahl 580 Model 5860 uniprocessor and the dual-processor 5880 – code-named "Oslo" – are large-scale 370-compatible systems that both support the MVS/SP and VM/SP operating systems. The 5860 also supports the ACP operating system, Amdahl said.

The 5860 processor offers twice the processing power of the 470V/8 in typical commercial environments. Based on the *Computerworld*/-International Data Corp. (IDC) throughput rating scale, the 470V/8's relative performance clocks in at 310, while the 5860 is rated at 620. By comparison, IBM's 3081, the 580's chief target, is rated at 465..

All of the relative performance ratings are based on the IBM 370/158-3 processor, which is rated at 45.

The 5860 processor is about 40% smaller than similarly configured Amdahl 470 packages, but has up to 32M bytes of main memory and up to 34 I/O channels made up of 32 block multiplexers and two byte multiplexers. The machine supports the data-streaming feature for all I/O channels

(Continued on Page 4)

System Generator Speeds Changes

By Rita Shoor
CW Staff

CHICAGO – The assignment was to convert approximately 300 programs from Easycoder to Cobol when IIT Research Institute (IIT) went from a Honeywell, Inc. Model 200 to a Prime Computer, Inc. 550 minicomputer.

In-house personnel included the DP director and three programmers without much more than a "smattering of Cobol" experience. An extra fillip was added by a decision to go from batch to interactive processing. And management wanted all this accomplished within 12 months.

In many shops, this combination would add up to a recipe for disaster, but that is not what is happening at IIT, according to Irwin Kusel, a consultant hired to manage the conversion project. Rather than following the popular approach of throwing lots of programmers at a project in a tight time frame, Kusel recommended that IIT obtain a Cobol program generator software package from David R. Black & Associates, Inc. Almost 11 months later, the recommendation is justified by the fact that Kusel still intends to make the Jan. 1 deadline.

The parameter-driven generator is a "badly named product," the vice-

(Continued on Page 6)

Large IBM Users Planning on X.25 Now

By Brad Schultz
CW Staff

LOS ANGELES – Whether or not IBM delivers X.25 compatibility to U.S. customers soon, some of the vendor's largest customers are writing X.25 into plans for network expansion right now.

Chase Manhattan Bank, which will replace a battery of aging Control Data Corp. M1000 mainframes as the basis of an expanded electronic funds transfer (EFT) network, will make the net compatible with the X.25 packet-switching interface as well as IBM's Systems Network Architecture (SNA), which does not accept the interface in the U.S.

See more on X.25 and other articles about network planning in this week's special report, "Networks: Planning and Implementation," which follows Page 58.

Chase Manhattan must replace the M1000s because CDC will withdraw service support after 1983, according to the man directing the expansion, Vice-President Peter M. Lacovara. Speaking at an Intelcom conference session here recently, Lacovara said Chase Manhattan needs X.25 to continue its extensive business in countries where the Consultative Committee on International Telephone and Telegraph (CCITT) recommendation is becoming necessary for high-volume data communications.

Although IBM continues to withhold X.25 compatibility domestically, other major systems vendors such as Honey-

(Continued on Page 5)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-127-420) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.00 a copy: U.S. – $30 a year; Canada, Central & So. America – $80 a year; Europe and Near East – $90 a year; other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Gloves Now Required

TNF Forces IBM Service Changes

By Bruce Hoard
CW Staff

Despite its long-standing claim that the suspected carcinogen trinitrofluorenone (TNF) poses no threat to service personnel or users of the IBM 3800 laser printer, IBM has changed its service policy for the controversial machine.

A spokeswoman last week confirmed service technicians have been instructed to wear gloves when changing photoconductors, which contain and emit TNF. IBM is also adding labels describing proper use of the printer to photoconductors, developer containers and toner disposal bags.

In addition, the company is searching for a central disposal site for used photoconductors.

These changes come less than two months after IBM announced through a spokeswoman, "We consider these machines safe for users, machine operators and service personnel. No special precautions have been taken because we are convinced that TNF poses no health risk as used in these machines."

IBM has implemented the new service procedures in the interest of being "extra cautious," the spokeswoman said last week.

"Although we believe the photoconductors are not harmful, we want to eliminate any possibility that if they are left for normal disposal, they might be used in ways for which they are not intended," she said.

Some people have used the TNF-laden photoconductors for decorative purposes, and one person used one as a cover for a swimming pool slide, she added.

Never Told

In a related story, Jack Fleischer, an engineer who designed the optics for the 3800 between 1969 and 1973, claims he was never told about the existence of TNF or its possible dangers. He found out about TNF by reading *Computerworld*, he said.

Asked what his reaction was after reading about the chemical, the former IBM employee said, "I'm not unhappy enough to file a class action suit."

Another person more intimately involved with the 3800 photoconductor during its development claimed he was warned of the possible dangers of TNF. Bill Hausle, a laboratory specialist who frequently handled photoconductors, said "I don't recall any particular points of elaboration," about what he was told about TNF.

Hausle, who still works for IBM, was told the chemical was a possible carcinogen, he claimed. He did not know if, and what, other people were told about TNF.

The laboratory specialist, who wore gloves "sometimes" when handling photoconductors, would not say how many years he worked on the 3800 development project after he started in 1968.

Elsewhere there is evidence that more and more 3800 users are becoming increasingly uncomfortable with the printer.

Girard Bank of Philadelphia is replacing two 3800s with Xerox Corp. 9700 laser printers — ostensibly for economic reasons. The bank reportedly feels it can save up to 50% in total printing costs by moving to the 9700.

Equitable Life Insurance has ordered a Datagraphix, Inc. 9825 laser printer for a 90-day trial because the company wants to be covered in case the 3800 is definitely shown to be dangerous. "We're kind of up in the air about the situation," a spokesperson said. "We are looking into it and we are concerned about it."

Meanwhile, the Environmental Protection Agency (EPA) is still studying the latest round of TNF test-related documents submitted by IBM late this summer.

This latest submission — requested after two earlier submissions were found to be "inadequate" by the agency — will be reviewed and evaluated in a status report to be prepared by the agency.

The report is expected to be available sometime within the next two months.

Finding for IBM Upheld

SAN FRANCISCO — The Ninth U.S. Circuit Court of Appeals has upheld a district court decision that IBM did not employ illegal monopoly practices against Memorex Corp.

In a suit filed in 1973, Memorex sought $306 million in actual damages, claiming that IBM had violated antitrust laws by creating a monopoly.

During the five-month trial in 1978, Memorex charged that IBM was forcing it out of the computer peripheral business by releasing competitive equipment, changing existing equipment so that Memorex products would no longer be compatible and lowering prices below Memorex's.

A deadlocked jury at the trial had failed to reach a verdict and U.S. District Court Judge Samuel Conti, who said the jury was not competent to decide such a complex case, ruled for IBM.

A spokesman for Memorex said the firm would ask the appellate court for a full court rehearing. A full court would have the power to overturn the decision.

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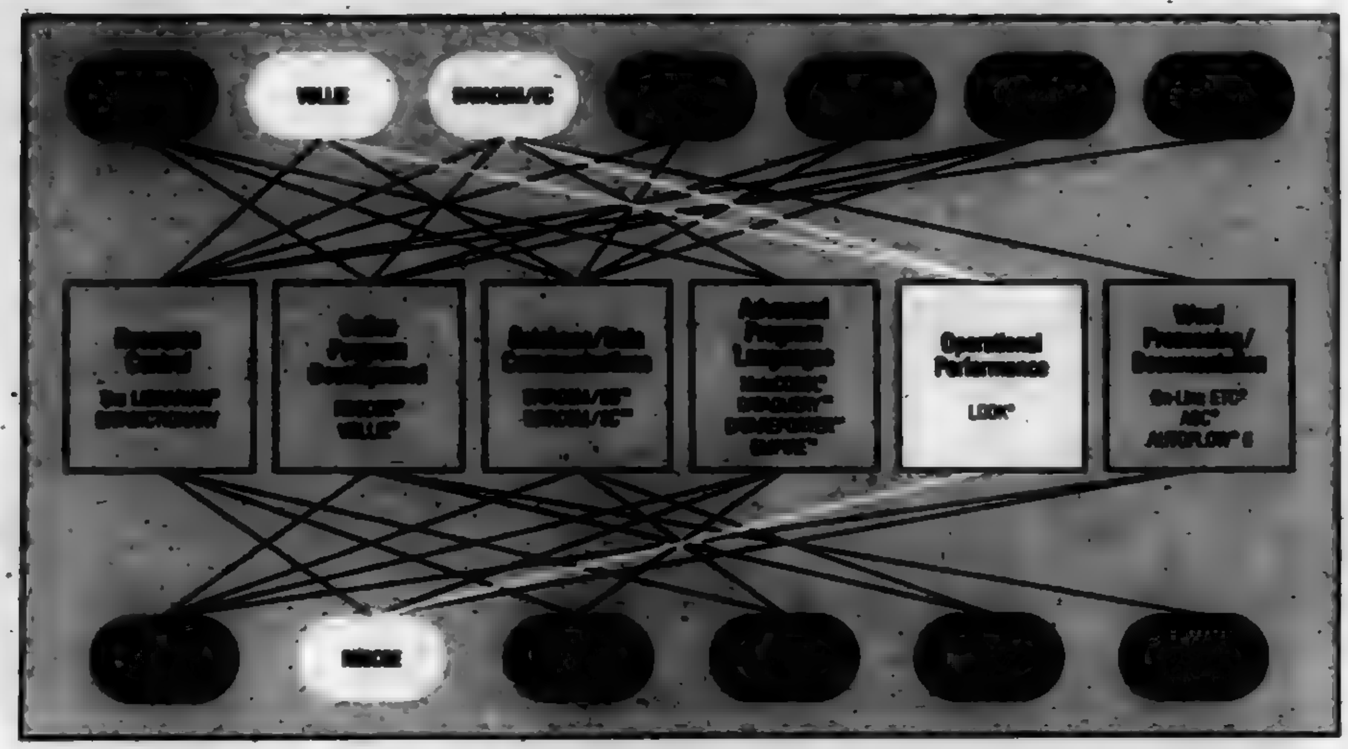
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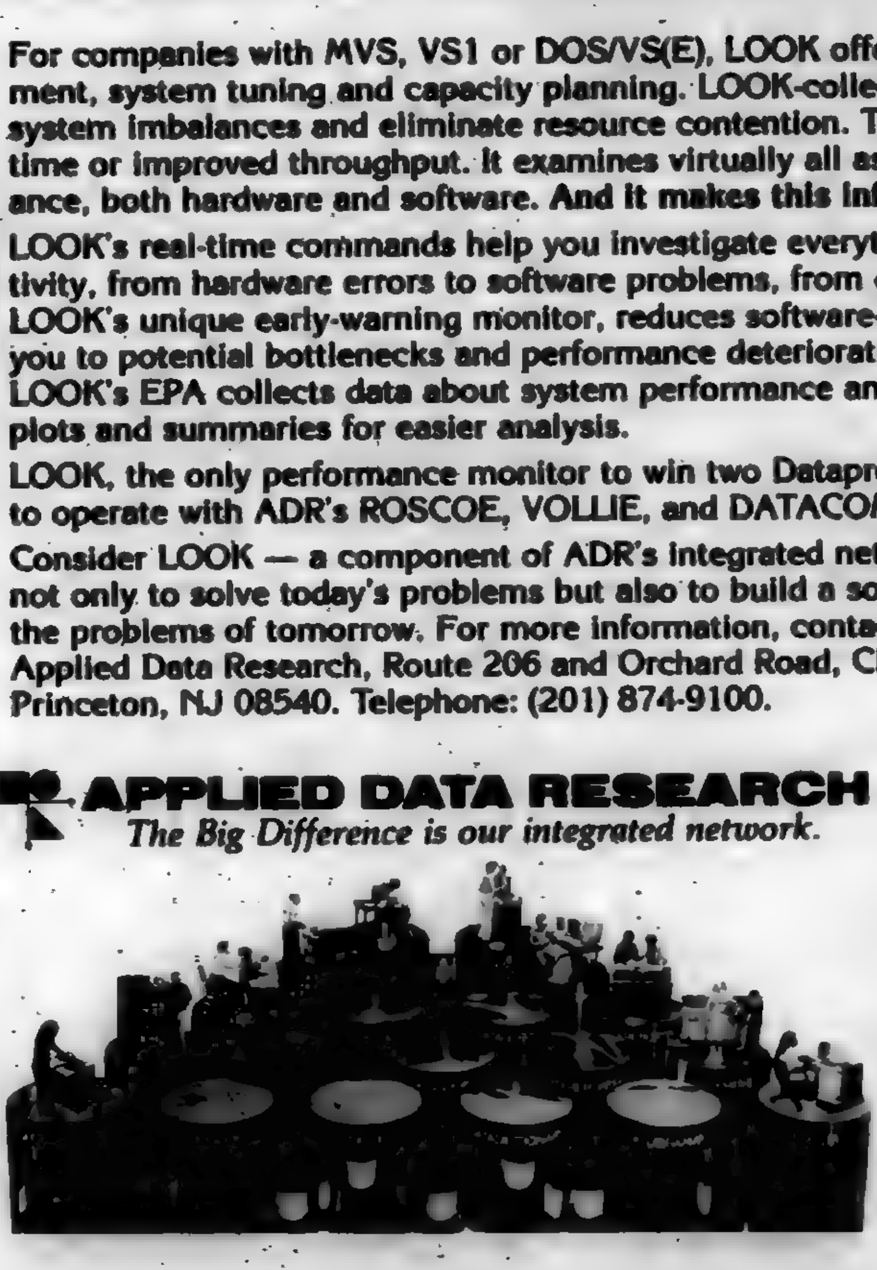

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Magnuson Competitor to IBM 4341-2 Bows

By Tim Scannell
CW Staff

SAN JOSE, Calif. — Magnuson Computer Systems, Inc. has unveiled a fully compatible competitor to IBM's 4341 Group 2 processor described as offering equal performance for three-quarters the price.

The M80/44 computer supports the same operating systems as the 4341-2, but in its basic configuration sells for $297,000, as compared with the $388,000 price tag for the IBM system. In addition, the Magnuson system has up to 16 I/O channels, while the 4341-2 has a maximum of six, and the M80/44 has a maximum main memory of 16 bytes — twice that of the IBM machine, a spokesman said.

The M80/44 is also said to offer from 1.5. to 1.7 times the performance of the 4341 Group 1 for 12% more cost.

Like the firm's previously announced M80/42 and M80/43, which were designed to compete against the 4341-1, the M80/44 has a 3M byte/sec data streaming capability that IBM features in its 4300 processor family. This capability reportedly lets the M80 series computers take advantage of IBM's 3370 and 3375 disk drives and 3880 controller.

Strategic Architecture

The price/performance and operating features of the M80/44 are made possible by the firm's "strategic architecture," a modular technology that links the processors' separate functions by a high-speed bus, the spokesman explained. In contrast, most competitive systems use a hard-wired technology that is said to be inherently less flexible.

In addition to supporting the DOS/-VSE, VS1, MVS/SP and VM operating systems of the 4341-2, the M80/44 supports DOS, DOS/VS and all releases of VSI and VM 370, which IBM does not, the spokesman continued. And because the Magnuson computer uses firmware to emulate IBM's instruction set, added functions are duplicated in microcode, allowing the firm to respond to IBM announcements within two months, in most cases, he said.

Current users of the firm's M80/31 and -32 systems can upgrade to the M80/44 as well as to the M80/42 and -43 systems.

All upgrades are performed by exchanging or adding circuit boards. No personnel retraining or software or hardware changes are required, the spokesman noted.

Finally, the M80/44 takes up about 25% of the floor space required by the 4341-2.

Like the M80/42 and -43, the M80/44 will not be available until the third quarter of 1981. Extra channels for the basic six-channel M80/44 cost $5,600 each and the standard configuration's 2M-byte main memory can be boosted in 1M-byte increments at $15,700 per megabyte, the spokesman said.

Additional information on Magnuson's 4300 series can be obtained from the firm at 2902 Orchard Park Way, San Jose, Calif. 95134

Amdahl Adds 3081 Rivals, Entry-Level 470V/7 CPU

(Continued from Page 1)

and is fully compatible with the 470 series processors.

The system reportedly incorporates a "pipeline" design that reduces the average number of cycles per instruction and permits a maximum execution rate of one instruction per cycle. The instruction pipeline also allows overlapping execution of about five instructions at a time.

Using random-access memory (RAM) technology, the firm has implemented distributed microcode in the system's instruction unit, execution unit, I/O processors, memory bus controller and console, the spokesman said.

The 5860 computer boasts dual 32K-byte high-speed buffers that are said to reduce the interference between the instruction fetching and execution processes. The computer's primary data paths are eight bytes wide.

I/O Processor

The computer's I/O processor (IOP) contains 16 block multiplexer channels. However, a second I/O processor can be added to increase the number of multiplexer channels to 32. While the first IOP has a maximum aggregate data rate of 50M byte/sec, a higher data rate can be reached with the addition of the second IOP, the spokesman claimed. Each block multiplexer can transmit data at up to 6M byte/sec. In addition, the system's byte multiplexer channel data rate is .2M byte/sec.

The machine's large-scale integration (LSI) RAM chips are intermixed with logic chips on the firm's multiple chip carriers (MCC), specifically designed for use in the 580 series. The MCCs are made up of 14 layers and can hold up to 121 LSI logic and RAM chips. One MCC can reportedly implement an entire system function.

Finally, the 5860 incorporates a hardware/firmware facility, Macrocode, that supports the system's machine and channel check capabilities. Macrocode can also accommodate more significant changes in the software interface than microcode and can be used to implement Amdahl-designated op codes, the firm said.

The 5860 with 16M bytes of memory and first-year maintenance charges costs $3.8 million, about $280,000 more than a similarly configured IBM 3081. Initial system shipments are slated for April 1982.

The 580 Model 5880 is similar to the 5860, but is a dual rather than a single-processor configuration. The 5880 reportedly has 3.4 to 3.6 times the power of the 470V/8 and can handle up to 36 I/O channels. The dual-configuration 580 machine has the same amount of maximum main storage — 32M bytes.

The 5880's relative performance rating, according to *Computerworld*/IDC calculations, is 1,085.

The Model 5880 sells for $7.5 million and is scheduled to be shipped in the second quarter of 1983.

Both 580 machines make use of microcode-controlled maintenance and checking functions such as enhanced maintenance analysis language, dynamic error analysis and an error logging routine.

Expansion Planned

The systems can run all currently available Amdahl software and future plans call for eventually expanding the systems' maximum main memory to more than 32M bytes.

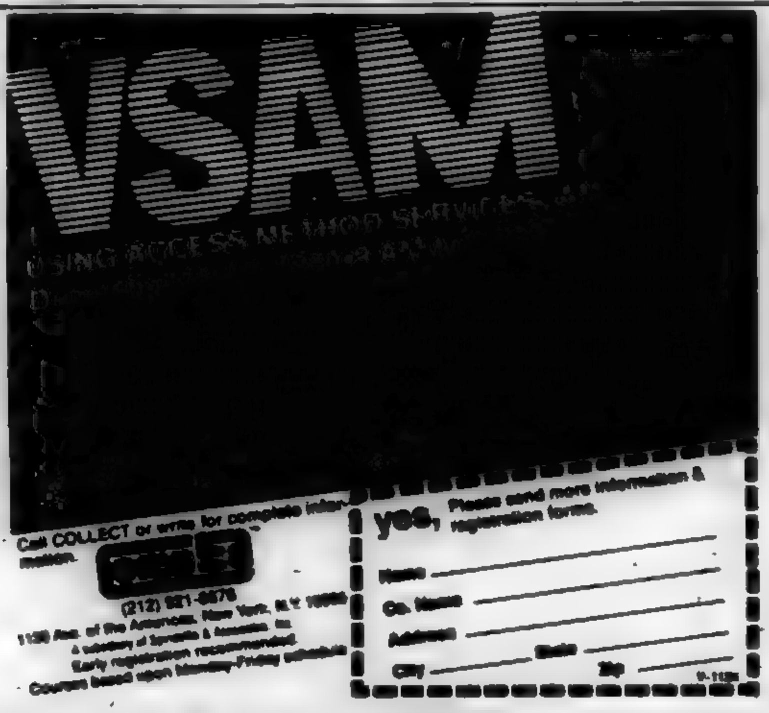
The 470V/7C is an entry-level computer that has about 45% of the power of the 470V/7 processor. The system features 4M bytes of main storage, eight I/O channels, a 32K-byte buffer and a console display. The computer also has a 29-nsec machine cycle time, the same as that offered by the 470V/7 processor, Amdahl said.

The 470V/7 differs from the V/7C in that the earlier machine has a maximum main memory of 16M bytes and has up to 16 I/O channels.

The $1.05 million 470V/7C comes with 4M bytes of memory and eight I/O channels. Shipments are scheduled to begin in the third quarter of 1981.

In the area of memory, Amdahl announced that all 470V/5 and 470V/6 models in the 470 series can now be configured with up to 16M bytes of main storage. For all 470V/7 and 470V/8 processors except the newest model, the company will offer MVS/-SP support for main storage up to 32M bytes. Delivery dates for this support will be released in the first quarter of 1982, the spokesman said.

Amdahl is headquartered at 1250 E. Arques Ave., P.O. Box 470, Sunnyvale, Calif. 94086.



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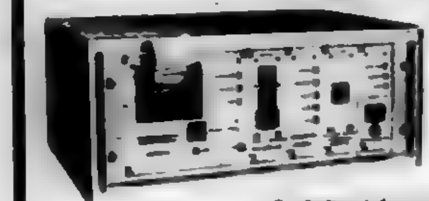

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Cincom Offers Interactive Version of ENV-Data

By Marguerite Zientara
CW Staff

CINCINNATI – Cincom Systems, Inc. has unveiled an interactive version of its end-user data entry facility that reportedly provides immediate on-line operation, eliminates the need for specialized applications and allows for application prototyping on-line.

Competitive with IBM's Video, Turnkey Systems, Inc.'s Keymaster and Applied Data Research, Inc.'s Datacom/DE, the Series 80 ENV-Data is said to eliminate the traditional multistep process of designing input formats, coding the application, compiling and testing.

Replacing that process is an interactive function in which the operator specifies the data format and editing rules directly on the CRT terminal, and ENV-Data assumes the tasks of designing, testing and making applications operational "within minutes," according to a company spokesman.

All logic required to enter the data, edit it, return error messages to the operator and transfer the data to ENV-Data's on-line data base work files is built into the system.

Among the enhancements to the system is an advanced mapping system that defines screen formats and data-field edit criteria on-line "to improve turnaround time for new screen designs and provide better quality screen designs the first time," according to the vendor.

Another feature is ENV-Data's full integration with Series 80 Environ/1's Task-Level Recovery. In the event of a system failure, all data entry operations are automatically recovered and screens reset to the last valid screen entered.

A editing function – automatic file update of Total, Cincom's data base management system (DBMS) – is said to perform either a WRITE or ADD function and is supplied in Cobol-XT source code.

The release operates under Series 80 Total Release 8.1, Series 80 Environ/1 Release 8.1 or 8.2 and Total Information Systems (TSI) Release 1.2. For installations with DOS or OS with advanced mapping, the facility costs $11,055, with a $20,000 installation fee and $1,105 annual usage fee or $285/mo.

For installations with DOS or OS and non-Environ/1 customers with Total, the purchase price is $20,625, with a $4,500 installation fee, $2,062 annual usage fee or $530/mo rental fee.

For DOS or OS, non-Environ/1 and non-Total customers, the prices are the same as for DOS or OS non-Environ/1 customers, except that the installation fee is $5,500.

Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

IBM Users Set Sights on X.25

(Continued from Page 1)

well, Inc. and Univac have recently said their network architectures will support X.25 and the International Standards Organization open networking model that contains it.

The nation's largest bank, San Francisco-based Bank of America, is also expanding its EFT network and also plans to have both X.25 and SNA, according to Lacovara's counterpart, Vice-President Randall C. Fong.

On a busy day, Bank of America passes $20 billion in assets through its worldwide network, Fong told the Intelcom session, and, like Chase Manhattan, the bank cannot stall its expansion planning until IBM gives its blessing to a de facto international standard.

The U.S. will bank on X.25, predicted Leonard W. Fernelius, senior vice-president of the Federal Reserve Bank in Minneapolis and director of planning and development for the Federal Reserve Communications System (FRCS) 80, which will drive the Fedwire EFT network through this decade.

As he described FRCS 80, for which procurement contracts will be signed this month, Fernelius said the facility will probably need X.25 to switch packets and interconnect with the many different bands of data terminal equipment (DTE) run by the nation's financial institutions.

The Federal Reserve System would be reluctant to order financial institutions to have X.25 between their DTE and packet networks, Fernelius said, but they will clearly need the interfacing to stay in business.

See a Need

Lacovara indicated that people like himself who must persuade bankers to buy systems are coming to realize that they need X.25 and open networking without understanding what such terms really mean.

"We would like to think of telecommunications as electricity that flows through a wall," Lacovara observed. "We want a utility we can switch on as needed."

The conference panelists said the Federal Reserve System has done a poor job of keeping financial institutions informed about the FRCS 80 project.

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Xerox Unwraps System for Use With Ethernet

By Tim Scannell
CW Staff

DALLAS — Xerox Corp. last week announced an information system that allows users to create, process, file, print and distribute data within an Ethernet communications network.

The Xerox 8000 information system is actually a series of hardware and software products that work together to provide a number of services, from document storage to communicating with remote computer systems. The communications end of the system can even be used to link competitive office equipment into the same integrated Ethernet network, a spokesman claimed.

The 8000 system was designed to be used with the firm's previously announced 860 information processing system which can act as an office workstation in the network.

Four 'Servers' Featured

The system itself consists of four "servers" that provide a variety of office automation services. Those servers are the network communication file server, the network system file server, the network system print server and the 872 and 873 communications servers. Up to 1,024 servers and workstations can be linked to the same Ethernet network, the spokesman said.

The 8000 NS file server provides storage for documents and is a central point on the Ethernet network for receiving, holding and forwarding electronic mail. Rigid disks can be added to the unit with capacities of 10M, 29M or 58M bytes of storage, which amounts to 1,000, 4,500 or 10,000 pages of text, respectively.

The material stored by the file server can be various types of programs as well as conventional documents, the spokesman stated.

Print Server

The print server provides electronic printing capabilities and can churn out pages at the rate of 12 per minute. The printer server also has a processor to control operations, floppy and rigid disk storage, a CRT and a scanning laser printer. The printer has a variety of fonts and printing can be done in portrait or landscape modes using standard-size plain paper.

The communication file server provides three services and enables remote Xerox 850 and 860 systems to exchange electronic mail with 860 systems attached to the Ethernet network. It also permits several geographically separated networks to be interconnected by way of leased or manually dialed telephone lines. Third, the communications units allow users to refer to file and print servers by textual names, rather than by their internal network addresses.

The communication file server supports both half- and full-duplex modems and data rates up to 9,600 bit/sec.

Finally, The 872 and 873 communications servers provide an external interface to remote workstations and host computer systems, allowing them to communicate with the Ethernet network. The 872 has four outside connections, while the 873 can handle eight. Data transmission rates are up to 9,600 bit/sec and the units can reportedly accommodate Teletype, IBM 2770, IBM 2780 or IBM 3270 communication protocols.

Deliveries of the information system components will begin in the first quarter of 1981. Purchase prices of system units range from $13,995 for the smallest communications server with software to $29,995 for a print server package. Lease prices for the same units are $605/mo and $1,135/mo. on a one-year agreement.

Except for the print server, hardware and software are priced separately. The firm also charges a monthly maintenance fee for the software, the spokesman said.

Additional information on the 800 system can be obtained from Xerox Office Products Division, 1341 Mockingbird Lane, Dallas, Texas 75247.

Generator Eases Cobol Conversion Process

(Continued from Page 1)

president of Superior Management Consulting Systems, Inc. maintained. "It not only generates Cobol code, it actually generates systems," he claimed. All IIT screens were completely generated with the package and the software was used to produce 70% to 90% of each report.

Programmer Productivity

While conceding that it obviously took some time for the programmers to become familiar with the various parameters required to utilize the data dictionary and the report writer elements of the program generator, Kusel was able to provide some rather impressive examples of how the package affected programmer productivity.

One programmer began working on the project on a contract basis in July 1980. His prior experience was on Burroughs Corp. systems and he "had never seen a [program] generator before." Between September and November, he succeeded in converting 50 programs involving 30 files from Easycoder to Cobol.

Another programmer was hired last February to replace one of the in-house staff members. His assignment was to convert the entire payroll system and "he made it on time," according to Kusel.

The system began running in parallel test mode on Sept. 1, in conformance with a schedule that had been set up more than six months earlier.

Kusel estimated that the entire consulting fee for the conversion of IIT's budget system was between $18,000 and $20,000. The institute may have saved as much as $80,000 because the consultant indicated that if he had taken on the same assignment when working for his previous employer — another contract programming firm — and had not used the program generator, fees for the necessary programmers would have run between $100,000 and $125,000.

One more example was given by George Vesely, the part-time consultant who joined the project in July. Vesely had just completed formatting a screen with more than 100 date entry positions. "It took about a day," he said. When asked to estimate how much time it would take to complete the same assignment without the program generator, he guessed at least 10 working days for someone who was already familiar with both Cobol and screen formatting.

Despite three positive results, IIT's programmers were not enamored with the software package when it was brought into the installation. Initially, "there was a very negative reaction," Kusel recalled. He countered this by requiring the staff to explain how they would handle each assignment if they opted not to use the generator.

Acceptance came most easily from the staff member with the least Cobol experience. "She went to it [the program generator] because she was essentially forced to. She learned the package with no problem" in about four weeks, Kusel noted.

Productivity Measurement

Rather than using the more conventional, but increasingly out-of-favor, method of measuring programmer productivity — number of lines of code written — the consultant defined productivity simply as "results. You give a programmer an assignment and a due date and he gets [the job] done." The time allotments for each project in the IIT conversion would have been much longer without the program generator, he said.

Structured programming played no part in contributing to the productivity statistics. "I still don't understand what's meant by structured coding," he said.

One of the relatively few problems encountered because of the generator is that management is losing all concept of how long it would take to complete a comparable project in a "regular shop." Since the package allows the staff to respond to most requests fairly rapidly, management can become "very insensitive" to system problems that have a negative effect on turnaround and cannot be solved within a short time span, he said.

Although he would recommend the package to any shop "as long as they'd really use it," he cautioned that the tool might be less than successful without strong internal management support. Given this support, his recipe for fast, successful program development was to purchase a mini and devote it to development work.

Any shop that followed this formula rather than tying up its mainframe with development and conversion projects would "get their return on [the mini] investment quickly," he said.

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Program Product, Dial-Up Service

IBM Adds Double-Barreled Support for MVS

By Tom Henkel
CW Staff

WHITE PLAINS, N.Y. — IBM has taken two major steps to help users of its biggest operating system, MVS, solve their own software problems.

One is a program product available for a monthly fee and the other is a free dial-up support center — with an 800 number — that allows users to check their problems against a data base of known complaints.

The dial-up support center has been available to users of DOS/VSE, OS/VS1 Release 7 and VM/370 Release 6 for some time. It operates on two levels. Level one calls go to IBM support centers in Tampa, Fla., or Chicago where operators check the user's problem against a data base of common problems. Claiming most users' problems have already been identified, IBM said about 85% of MVS problems can be solved through the centers.

If the user's problem is not found on their list, the case is transferred to one of three IBM software development sites in Endicott or Poughkeepsie, N.Y., or Raleigh, N.C., where the problem will be studied in greater detail, IBM said.

Response from the second-level support force takes anywhere from two to 24 hours, one test user of the program said.

Information/System

A more primary line of MVS support comes in IBM's Information/System, an application package that runs on the TSO or NCCF interactive subsystems.

Information/System is divided into three parts: Information/MVS, Information/Management and Information/Access.

Information/MVS provides systems programmers with technical information about MVS for installing, supporting and tuning IBM systems, subsystems and components.

Information/Management is an integrated problem management tool to aid users in configuration management applications.

The meat of the Information/System is the Information/Access feature, which gives users direct access to IBM's Customer Software Support Facility (CSSF). CSSF is a data base that will contain IBM Approved Program Analysis Report (Apar) fixes and Program Temporary Fixes (PTF) along with preventative service planning information. In addition, users can use the CSSF to submit requests for corrective program fixes, bypassing the Level 1 part of the dial-up support facility, the company said.

Information/Access can be used by systems programmers through a variety of data input methods, help and tutorial facilities, the vendor said.

The facility also comes with a conversational dialog that allows less experienced users to work with the CSSF data base, IBM said.

The Information/Access Apar search facility allows users to submit requests for information on problems similar to users' current problems.

Information/Management can also be used to create a search augment to determine whether a given problem has already occurred at that installation. If such a search turns up negative, and the user still suspects the problem is in IBM software, the user can poll the Information/MVS Early Warning System to see if the problem is a newly discovered one, IBM said.

The Information/Access data base consists of one data set containing entries and a corresponding data set containing quick-search index for these entries. Consistency is checked each time an entry is retrieved to help preserve the data base's integrity in a troubled system.

In addition, if the entry data set is damaged, the user can recover by using journaled tries to a recovery log. If the data base is damaged by some external force, for example, it can be updated to the point last saved via the recovery log, IBM said.

Both the Information/System and dial-up support facilities are available on any IBM system running MVS Release 3.8. The MVS/Systems Products option need not be installed to use the support tools, IBM noted.

Both support facilities will be available starting in the first quarter of 1981.

The Information/System package will cost $243/mo through Dec. 31, 1982. On Jan. 1, 1982 the price will go down to $225/mo, along with reductions of about 40% in multiple product usage prices under IBM's Distributed Systems License Option.

The IBM support center is a no-charge addition to the service provided under IBM's monthly service support charge.

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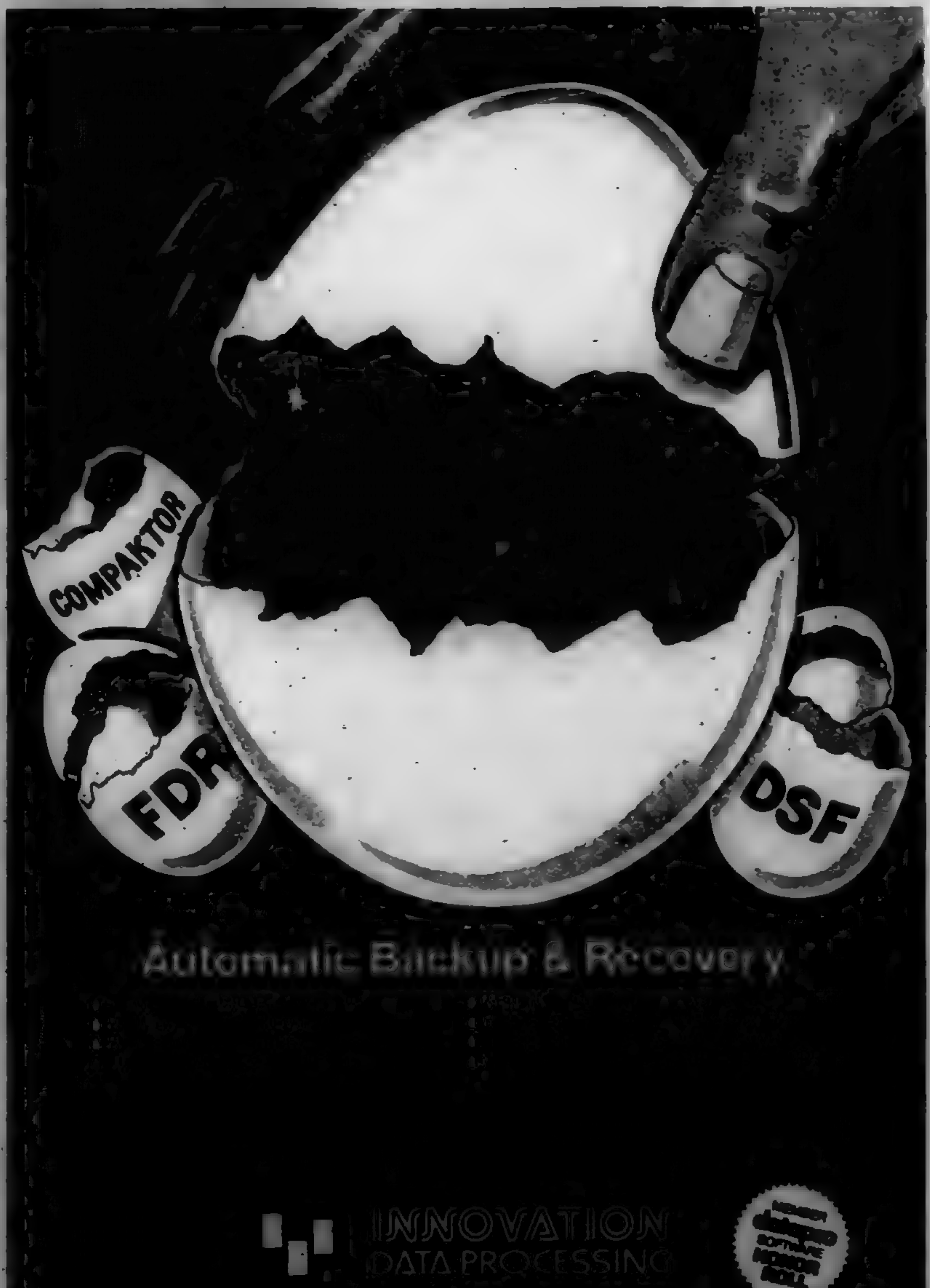
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AT&T Rivals Considered Better Off in New Senate

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. – AT&T's competitors are "measurably better off in the House and significantly worse off in the Senate," as a result of Ronald Reagan's election victory, according to a knowledgeable source.

Rep. Tim Wirth (D-Colo.), who is likely to be the next chairman of the House Communications Subcommittee, "has a far better understanding of the industry's problems" than this year's chairman, Lionel H. Van Deerlin (D-Calif.), who lost his bid for reelection, the source explained.

Wirth in "likely" to introduce legislation next year which eliminates at least some of the shortcomings found by Bell's competitors in H.R.6121, he added. H.R.6121 is the Communications Act rewrite bill which Van Deerlin's group drafted earlier this year. It died later, mainly because of objections from the House Judiciary Committee.

Although Wirth cosponsored H.R.6121, our source insists he did so despite reservations about a number of provisions. In his new post as chairman of the subcommittee the congressman will be "in a much better position to implement his own views."

New Appointments

In the Senate, the Republican victory will almost certainly make Bob Packwood (R-Ore.) chairman of the Commerce Committee and is likely to put Barry Goldwater Sr. (R-Ariz.) in charge of its communications subcommittee. Both favor legislation which would prohibit divestiture of AT&T and limit the Federal Communications Commission's (FCC) discretionary authority to restructure the Bell System.

The new administration's views on telecommunications competition and regulation will almost certainly affect what Congress does in this area, but those views have not yet emerged.

While Sen. Goldwater is an influential member of the new president's inner circle, the group also includes two former FCC chairmen, Richard Wiley and Dean Burch, who are likely to favor a bigger regulatory role for the commission.

There is widespread feeling here that the Reagan victory will encourage a negotiated settlement of the Justice Department's antitrust suit against AT&T.

One communications attorney said he had heard rumors that lawyers for the two sider were already discussing details. Partly, the idea of a compromise settlement was inspired by the recently released report of a Reagan task force, established to recommend new regulatory policies. One of its recommendations is that major pending antimonopoly suits – such as the IBM and AT&T cases – should be "closely scrutinized."

Another straw in the wind is the FCC's Second Computer Inquiry decision. Recently, the commission reconsidered that decision, orginally deliberated last April, and decided for the second time that AT&T should be allowed to offer "enhanced" services through unregulated, separate subsidiaries.

Reaffirmation of this scheme could give the phone company some leverage in negotiating with the Justice Department.

Also, the commission's separation scheme is considerably less onerous to Bell than the terms imposed by Congress in this year's legislation.

Meanwhile, according to a former FCC attorney who maintains close contacts with his former associates, the government's trial staff has become progressively more ineffective, because of frequent changes in personnel.

The key point to keep in mind, says a veteran Washington, D.C., communications attorney, is that the Reagan administration reflects the viewpoints of the U.S. big business community. As a result, current FCC efforts to restructure Wats and do away with Telpak "will not be pursued." The attorney predicted the FCC's proposal to require resale and sharing of international private-line circuits will be quietly abandoned.

He expects this process to begin "about Jan. 20, when the President asks for the resignation of FCC Chairman Charles Ferris."

Within the next year or so, at least two other members of the commission – James Quello and Robert E. Lee – are scheduled to depart.

Reagan Planning Upgrade Of Air Traffic Control System

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. – President-elect Ronald Reagan has indicated he plans to upgrade both the computers and personnal of the nation's air traffic control (ATC) system.

In an effort to both promote the growth of the aviation industry and increase airway and airport capacity to "the maximum safe level," Regan has called for "state-of-the-art [ATC] computers and radar systems," more air traffic controllers and modernized flight service stations.

Reagan said his plan "would include good maintenance during and after the installation, as well as a good backup system" and added the new computers and radar should be "adequately tested."

Reagan unveiled his plans in his response to a 10-item questionnaire sent out three months ago to presidential candidates Jimmy Carter, John Anderson and Reagan by the Aircraft Owners and Pilots Association (AOPA), headquartered here.

As for selection of an FAA administrator, Reagan said, "We should attempt to pick as administrator of the FAA and chairman of the NTSB people who have real aviation experience. We should choose someone from the aviation community who is familiar with the problems of the system."

Industry observers have noted that current FAA Administrator Langhorne Bond does not meet those qualifications. Therefore, it is "almost a given" that Regan will appoint a successor, according to Professional Air Traffic Controllers Organization (Patco) spokesman David Trick, although he had "no idea whatsoever" who that might be.

Patco Backed Reagan

Patco – the outspoken union that in recent years has brought national attention to the safety problems surrounding the antiquated and reportedly unsafe ATC computer system – was one of the few unions to formally endorse Regan in his bid for the presidency.

Now that Reagan has been elected, that support might pay off. In several press conferences held since the election Nov. 4, Reagan has indicated that controllers will not be subjected to "a total hiring freeze on Civil Service employees," according to Trick.

Stressing that Reagan's ATC hiring plans may not be "a direct result of the endorsement," Trick observed, "We'd like to think we were able to convince him that we were short-staffed and it's a matter of safety, not a matter of economics."

Industry Taking Wait-and-See Attitude

(Continued from Page 1)

and information sciences.

The Reagan administration approach to these and similar subjects will not be clear until the Republican team is firmly entrenched in the executive agencies and the congressional committee assignments are sorted out.

The biggest question is how the new Republican majority in the Senate will take shape, according to veteran Congress watcher Robert Willard, vice-president for government relations, Information Industry Association (IIA). "One of the big unknowns is the new people coming in," he remarked.

The Senate has so many committees and subcommittees that even freshmen legislators take over chairmanships, he noted. And in the House, there will be 74 new faces, making it just about impossible at this point to figure out how subcommittee assignments will be made, according to Willard, who said he is "following it as carefully as possible."

It is possible at this point to note the magnitude of some of the changes. Rep. Lionel Van Deelin (D-Calif.), for example, backer of the communications bill in the House was defeated, leaving the legislation's fate in the House uncertain. The Republican takeover of the Senate makes the outlook for the legislation there even more confused (see story on Page X).

Also, Rep. Richardson Preyer (D-N.C.), chairman of the House Government Information and Individual Rights Subcommittee, lost his bid for reelection. Preyer "had a broad understanding of information policy issues and was one of the few in Congress doing anything about them," according to Willard.

Preyer, "who in a quiet way accomplished a great deal," was instrumental in pushing privacy legislation and addressing transborder data flow and other information policy issues.

On the executive side of town it is really too early to tell, Willard said, but he suggested there will probably not be "any strong policy changes" from the Carter stance on most of these issues.

Little Change

Echoing Willard, Jerome Dreyer, president of the Association of Data Processing Services Organizations, Inc. (Adapso), said he foresees little change in the federal agencies' approach to information issues. He said he is "optimistic" about the new administration even though the Reagan regulatory task force has called for a one-year moratorium on federal regulations, possibly jeopardizing Adapso efforts to have the Federal Reserve Board restrain banks' entry into the DP services business.

Adapso, which has fought to protect smaller DP industry firms from what the association sees as unfair competition, from such giant corporations as AT&T and Citibank, does not expect any great threat from the Republicans, supposedly friends of big business.

"Regulatory agencies, except for the top [personnel], don't change that very much" from one administration to another, Dreyer said. "The people who really run the show," the staffers, generally remain, he said.

But how much agency staffs are shaken up remains to be seen. Reagan, as California governor, took a strong interest in not only cabinet appointments but subcabinet staffing as well. With the possibility of deep changes in the Office of Management and Budget and the General Services Administration, as well as in the larger cabinet-level departments, important changes could occur.

Reagan chief of staff Edwin Meese has been quoted saying he expects the cabinet posts and top 100 administration positions to be set by early December, with the next 300 or so top jobs filled by the inauguration, by which time the situation could be clearer.

But with congressional committee assignments uncertain until mid-December and subcommittees unassigned until February, it could be as much as three months from now before a good picture of information policy for the next several years is evident.

Consequently, it is also too early to tell who will be the new administration members influential in information issues, according to Alexander Roth, Washington office director of the American Federation of Information Processing Societies.

Roth, another who is busily trying to sort out all the changes and identify key personnel of the new administration, noted, however, that the transition team is moving fast to set up shop and the Reagan influence in information policy could be felt even before the inauguration.

Roth, like others contacted by *Computerworld*, noted the number of unresolved information issues – Postal Service electronic mail, the communications bill and others – that will have to be addressed by the new administration and the new Congress.

If there was any consensus at all among these industry representatives, it seemed to be that many of the issues are nonpartisan in nature and are moving toward resolutions on paths unlikely to be drastically changed by the election.

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Start-Up Firm Debuts With Mini-Based Net

By Tim Scannell
CW Staff

BILLERICA, Mass. — A small start-up company here brought out its first computer product last week — an interactive processing system consisting of a series of dedicated 32-bit minis strung along a local network.

Domain — Distributed Operating Multiaccess Interactive Network — was announced by Apollo Computer, Inc.

The company was incorporated on St. Valentine's Day by top executives from Prime Computer, Inc. Digital Equipment Corp. and Data General Corp. Apollo's chief executive officer and president, John W. Poduska, was a founder, officer and director of Prime where he sported badge No. 006 in an employee cast of thousands.

The Domain system incorporates a number of complete minicomputers, or computational nodes, that can be used to swap data back and forth, send messages and interact over a 10M bit/sec coaxial communications network. Each minicomputer in the network is said to be comparable in performance to DEC's VAX-11/750 or Prime's 550 computers and can be located throughout a building or campus, a spokesman said.

The basic idea of the Domain system is that users in a several-node system can access data from a particular system without suffering any performance degradation, a problem in multiterminal time-sharing networks.

The processor nodes, whose hearts are Motorola Semiconductor Products, Inc.'s M68000 chip, have from 256K- to 1M bytes of main memory and include a high-resolution, bit-mapped CRT display, detachable keyboard, three serial I/O ports, a network interface and operating system. In addition, each node can accommodate a 33M-byte Winchester disk drive and 1M byte of floppy diskette storage.

Information Access

The basic idea of the Domain system is that users in a several-node system can access data from a particular system without suffering any performance degradation, common to a multiterminal time-sharing network. Instead of having a series of terminals linked to a central CPU and scattered throughout a building, Domain offers each user a dedicated minicomputer that can be accessed or access information from other systems.

A typical system would consist of from 10 to 20 computational nodes, but users can link up to 200 nodes on a single network with very little performance degradation. Users can theoretically link more than 65,000 nodes on a single network, the spokesman explained.

Although the concept of dedicated yet distributed computers is not new and, in fact, common in some academic areas, Domain represents the first time the concept is offered commercially, the Apollo spokesman stated.

Domain's computational node has a fully associative virtual mapping system that translates a 32-bit virtual address into a 24-bit physical address, which is said to allow users to perform large problems. In fact, this ability to handle large computational problems is part of the reason Apollo chose to target the initial offering of the system toward the scientific and engineering arenas, as well as computer-aided design and computer-aided manufacturing applications.

'Multiple Window' Feature

A key feature of Domain is the system's high-resolution CRT terminal which can offer a "multiple window" view into the different software processes. For instance, the vertically designed screen can be broken up into a number of areas displaying such things as mailbox messages, a system menu or even graphics on the same screen image. The screen's image writing occurs at memory writing speeds of about one-sixtieth of a second to complete a new image. This reportedly compares to the 25 seconds required by a dumb terminal connnected to a time-sharing system to redraw a 3,000-char. picture at a 1,200 bit/sec communications rate.

In addition, the CRT terminal's "windowing" allows Domain's operating system to support multiple command environments simultaneously, such as a Basic environment in one screen area and a query-language environment in another, the spokesman noted.

Finally, the Domain system presently supports Fortran-77, an engineering language, and Pascal, a systems programming language. Both are optionally available from Apollo. Other languages will eventually be added as Apollo penetrates other markets — such as the educational, financial and commercial business sectors — with the Domain system, the spokesman continued.

However, it is not clear at this time which market will be targeted first, he added.

March Shipments Set

Initial shipments of Domain are scheduled for March and the company's first customers are Harvard University's Department of Computer Science, which will use the network for research purposes, and Rutherford Labs in Cambridge, England.

The system's computational node costs $24,000, while the Winchester and floppy disk expansion is priced at $10,000. Optional equipment includes a peripheral node adapter, which allows users to link a series of printers or tape drives to the network, and a tape drive and line printer.

Apollo Computer is located at 5 Executive Drive, N. Billerica, Mass. 01862.

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User Attitudes: They're Unaffected by Recession,

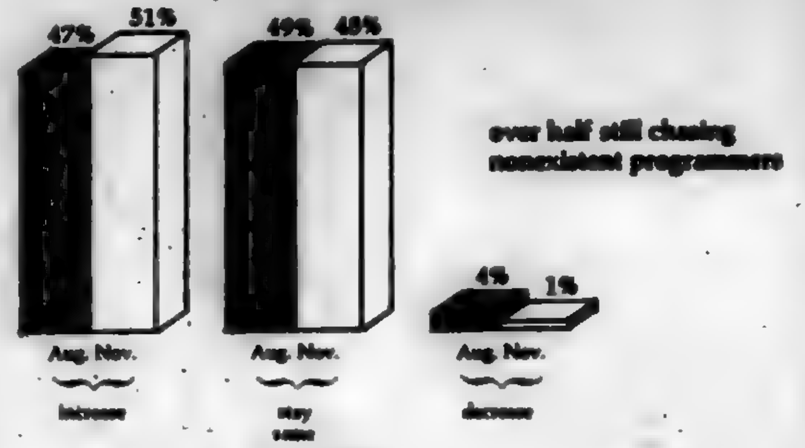
There's still no sign of recession in U.S. information processing: a substantial number of users are planning to increase their expenditures for both hardware and software, and the biggest issue facing MIS chiefs, they say, is meeting project deadlines — there's just too much to do in too little time with too few people.

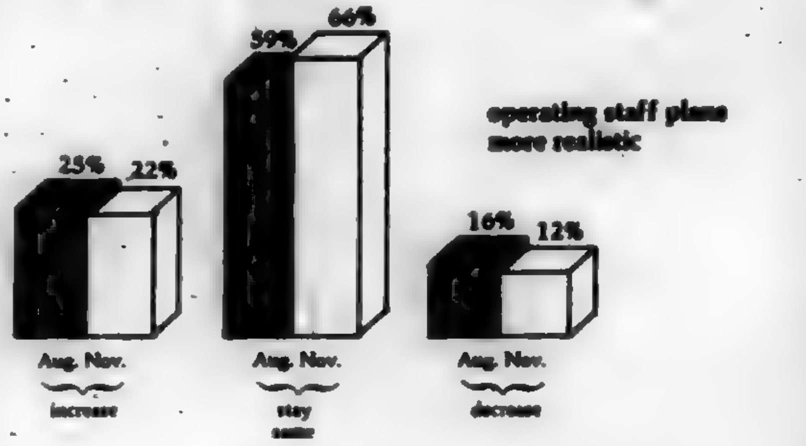
That's what *Computerworld* and Urwick International Ltd., an international consulting firm, found in their second quarterly survey of computer opinion.

Who was surveyed? Before the first poll [CW, Aug. 18], Urwick sent out short questionnaires to MIS managers. More than 300 agreed to become part of a permanent panel.

Urwick went back to those 300 this quarter and asked them the same questions; here and on Pages 11 and 12 are the results.

RECRUITMENT PLANS ARTIFICIALLY HIGH





- *Do you expect the number of systems and programming staff employed by your company over the next 12 months to increase? stay about the same? decrease?*
- *Do you expect the number of operating, data entry and control staff employed by your company over the next 12 months to increase? stay about the same? decrease?*

The demand for operating data capture staff fell 3% this quarter, reflecting users' continued takeover of this role. "The user pushes the buttons these days and does it as part of an existing job. It makes for a net decrease in staff," one DP manager explained.

The demand for analysts and programmers is far greater than the supply, however — and with staff expansion expectations up 4%, the chase for the few available ones looks like it will become even tougher.

Interviews showed many installations are being constrained to hold the line on staff size. "We're consciously trying to stay the same. Where would we get highly trained staff, anyway?" one DP manager asked. "Low-grade application programmers are reasonably plentiful — but we didn't build up in the boom just so we wouldn't have to lay off now that it's tight."

This attitude, although realistic, is not typical. Despite the low success rate with recruitment, many sites still expect to solve their problems by increasing analyst and programmer staffs.

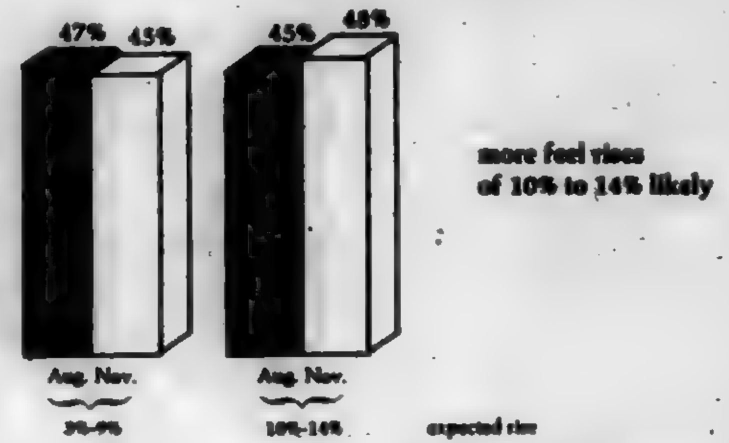
"I've got to recruit," one of those surveyed maintained. "We have scheduled work past a year for each of my staff. How can we cope with any new demands?"

As shown below, the Northeast has the heaviest demand for new staff.

Number expecting to increase development staff

Northeast	Mid-Atlantic	Southwest	Midwest	West Coast
55%	53%	51%	48%	47%

SALARY EXPECTATIONS RISE SLIGHTLY



- *Do you expect the average salary of computer staff in your company over the next 12 months to rise? stay the same? fall?*

A slight shift in expectations of 10% to 14% salary increases is evident this quarter. As the table below shows, however, 48% of the DP managers surveyed expect their staffs' salaries to rise less than 10%, which is well below the consumer price index.

"We've got to keep within the 8.5% federal limit," one manager explained. "It's hard to live with, so we've given some promotions to get around it. It hurts, but we depend on government contracts."

The pressure to pay varies with location. "Many Long Islanders like to work near their homes. There's no trouble finding staff here — and keeping within the Presidential guidelines is no problem," the manager of a Long Island site noted.

Retail and distribution organizations expect to give the greatest salary increases; educational and research organizations expect to give the smallest.

Expected salary increases

	stay same	1% to 4%	5% to 9%	10% to 14%	15% to 20%	more
Retail and distribution	0%	0%	31%	61%	6%	2%
Education and research	0%	2%	61%	35%	2%	0%
Total	1%	2%	45%	48%	3%	0%

But Harried by Deadlines

A Joint Survey Conducted by Computerworld And Urwick International

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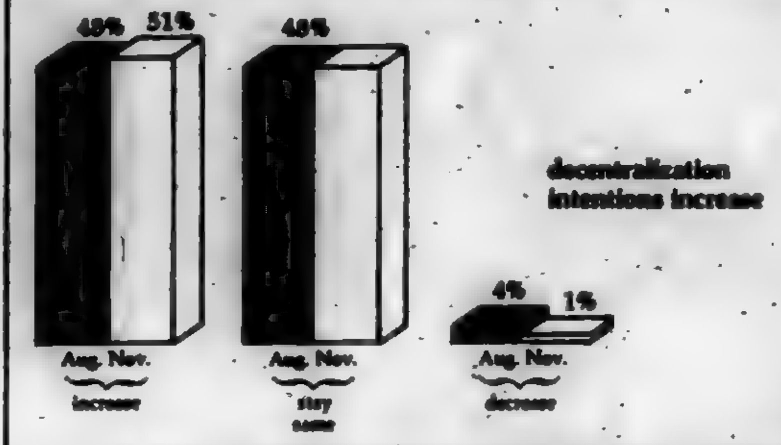


● *Do you expect the amount spent by your company on user-controlled hardware, software and DP staff over the next 12 months to increase? stay about the same? decrease?*

Although 3% more of the users interviewed this quarter intend to decentralize, they made a point of noting that decentralization is not necessarily synonymous with distributed processing. User-controlled terminals are all that many DP managers plan to provide — and all that many users want.

"The accounting department doesn't want to expand or get involved in a level of work it doesn't understand," one DP manager explained. "It's pleased to give the work to us. Give the accounting people CRT terminals instead of batch and they're happy."

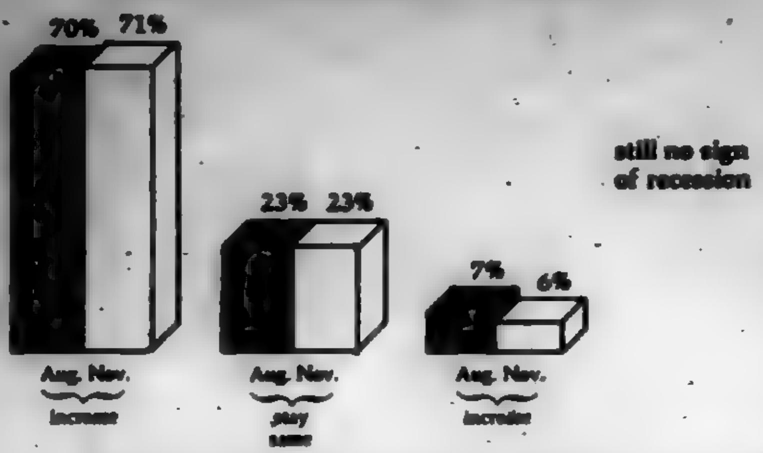
Why? User resistance was mentioned frequently as a reason. "Instead of looking at reams of reports, they're pleased to look up screens. The difficulty is to convince them they ought to input. Fifty is the average age, and computers aren't obvious to these guys as a benefit."

The intention to decentralize varied considerably according to industry.

Number intending to increase decentralization

Service bureaus	Engineering	Finance	Other industry	Retail/ distribution	Process industry	Public administration	Education/ research	Public utilities
75%	62%	57%	56%	54%	49%	48%	41%	39%

HARDWARE BOOM HOLDS UP



● *Do you expect the amount spent by your company on hardware over the next 12 months to increase? stay the same? decrease?*

A massive 70% of the users surveyed in the last quarter expected their hardware expenditures to increase despite the recession; this increase will be maintained, according to reports this quarter.

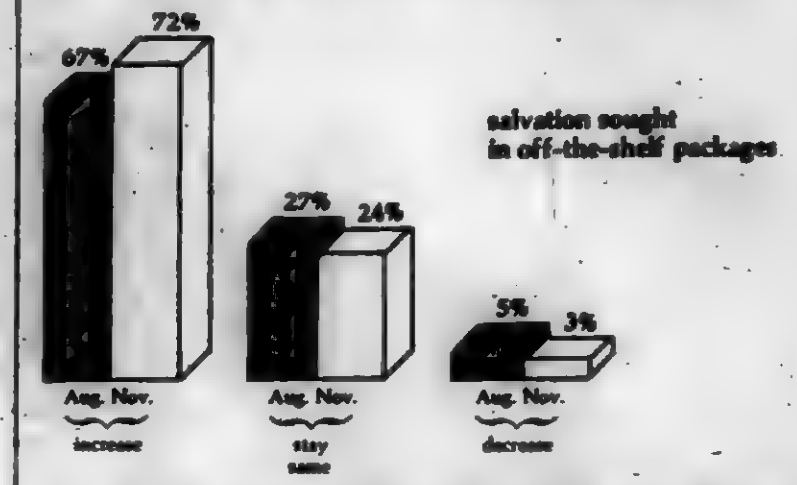
Some companies see expenditures for computers immune to general cutbacks and even believe they help achieve those cutbacks. "Computers aren't a luxury, they're a necessity these days," one user said. "Demand for new systems continues unabated, mainly because computers can save people."

Others — even though they also expect to spend more for hardware — are not so optimistic. "We're spending more on hardware, but not as much as the business plan called for," one of those users said. "I guess you'd call it a slowdown."

Another was even more pessimistic: "We're in a cutback situation and we're not making the expansion we'd like. I'm spending more because it makes financial sense; we can get more for the dollar today. I'd like to think we save people with each system, but the company doesn't see it that way."

Another installation feels the increased demand is entirely self-induced. "The business is stable; this demand for more hardware is pure Parkinson — programs grow to fill the memory available," the installation's DP manager said.

BIG MONEY IN SOFTWARE



● *Do you expect the amount spent by your company on proprietary and vendor software over the next 12 months to increase? stay the same? decrease?*

The number of installations planning to increase software expenditures rose 5% this quarter, demonstrating the hope DP managers are placing in ready-made solutions.

Even those not planning to increase their software budgets said that is only a temporary situation. "Our budget's staying the same, reluctantly — things are tough just now," a DP manager said.

Many users said vendor unbundling policies are forcing them to spend more. "IBM's bill just goes up and up," one remarked.

The great majority talked positively of saving programmers, either by improving productivity using program development software or by buying packages.

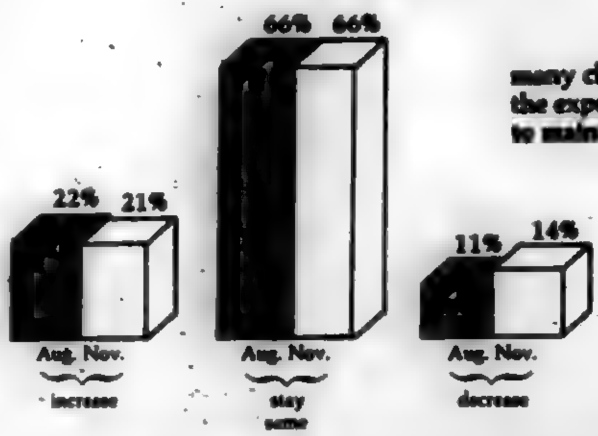
Source program on-line maintenance came in for praise: "We're going to get more from the guys we've got. On-line programming gives us a 2 to 1 increase in output."

Writing and testing programs is becoming more and more unpopular as the pressure on headcount and on target dates increases. "Our policy is to continue to purchase software. It's better than in-house software," one DP manager said. "Good people are always busy people. This way we buy time."

User Attitudes

(Continued from Page 11)

DEMAND FOR CONTRACTORS STEADY



many choose the expensive way to maintain staff size

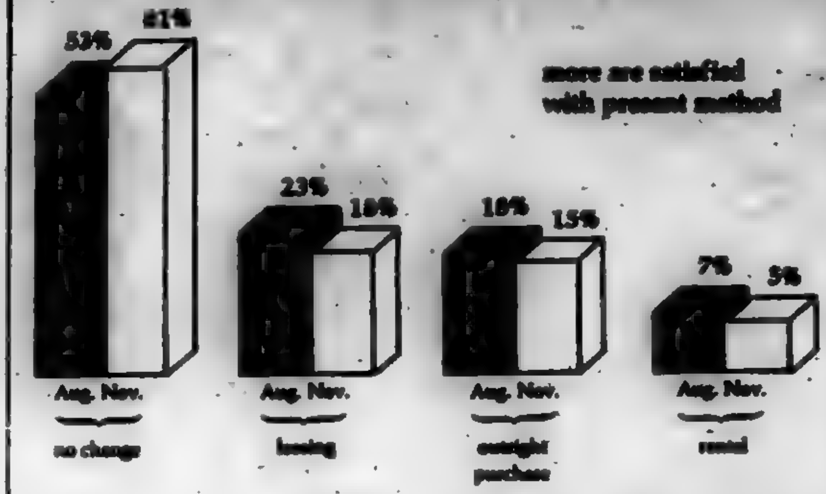
● *Do you expect the amount spent by your company on outside DP staff over the next 12 months to increase? stay about the same? decrease?*

The use of subcontractors, despite their unpopularity with DP managers, is expected to remain steady. Many managers complained about cost. "Recruit one person and get rid of one contractor — you've halved your bill," one said.

A correlation between the purchase of software and the use of outside staff was pointed out. "When you're no longer building it yourself, when you're directed toward buying software and fitting it yourself, then you're into contractors. It's temporary work," the DP director of one installation noted.

DP managers attributed the reason for using contractors this quarter to company policy on maintaining staff size. But, one manager complained, "We're going to pay a dear price for this. I don't prefer contractors; I've told my company this. You pay $100 to $150 and when they go, you lose all that learning curve."

SHIFT TO LEASING SLOWS DOWN



more are satisfied with present method

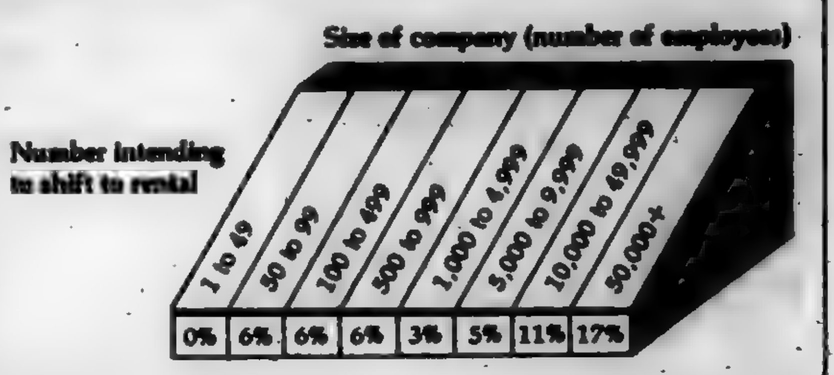
● *Do you expect the method of financing your hardware over the next 12 months to shift toward rental? outright purchase? leasing? stay the same?*

The number of installations intending to stay with their present methods of financing equipment rose 8% this quarter. This is partly explained by the fact that some have made the changes they said last quarter they would make.

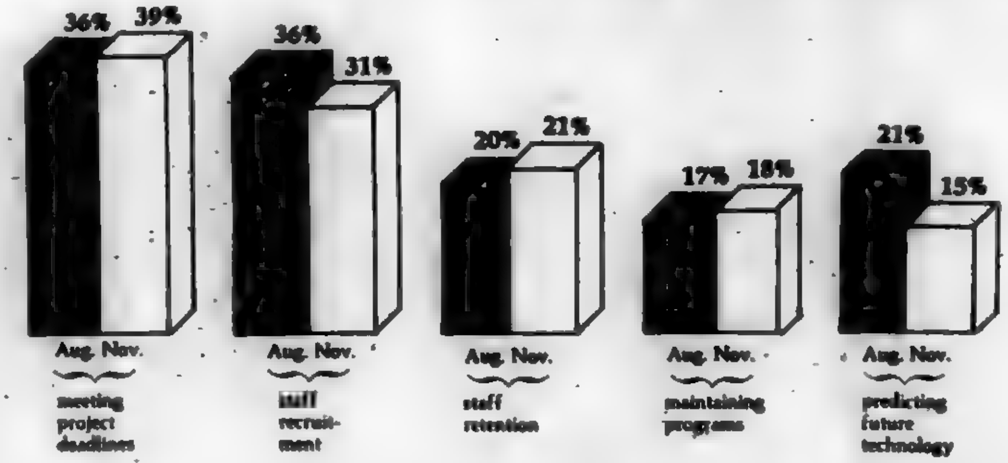
Leasing has dropped in popularity. "The technology is moving too fast to get wrapped up in a lease," one user commented.

Of those users which do intend to lease, the greatest number is composed of service bureaus (42%), followed by engineering users (30%), retail and distribution (24%) and public administration (23%).

The shift to rental correlates strongly with the size of the using company, as shown below.



MAIN WORRY: PROJECT DEADLINES



predicting future technology not such a problem

● *What is the major issue facing you at present — staff recruitment? staff retention? "go-it-alone" users? meeting project deadlines? meeting project cost targets? maintaining existing programs? evaluating present technology? predicting future technology?*

Meeting project deadlines is clearly the main issue confronting managers this quarter, with staff recruitment mentioned by 9% fewer installations than last quarter.

Artificial initial estimates was frequently given as the reason. "We have to face up to not knowing how long these things are going to take when we sign on. After three months — when we really understand what's wanted — we reestimate. And some programs we kill," one manager noted.

Staff retention replaced predicting future technology as the No. 3 worry. Staff turnover generally appears to be abating, but many feel this is a temporary phenomenon.

"It was 20% last year," another manager recalled. "I've lost none this year so far, but I have bad feelings about it."

Of those worried about future technology, office automation is one of the main concerns.

"We have a conceptual feel for how it should go, but we don't see anything offered yet. We can't live with three terminals on the same desk. I guess we have to get into it," one manager acknowledged, "but I know I'm going to be wrong!"

Other issues mentioned were "go-it-alone" users (14%); evaluating present technology (11%); and meeting project cost targets (6%).

'Why Pay Analyst or Programmer?'

Clerical Staffers Take On Data Dictionary Job

By Rita Shoor
CW Staff

PHOENIX — Why pay analysts and senior programmers to perform a task that high-level clerical workers can be trained to do? When Ann Christy from the Department of Economic Security (DES) for the State of Arizona asked herself that question, she answered it with the simple statement: "You don't need to."

In order to prove her point, the data base project manager is presently implementing a plan that will use nontechnical personnel to do the actual physical loading of the Data Catalogue 2 (DC2) data dictionary recently acquired from Synergetics Corp.

"I just couldn't see paying an analyst or top programmer to do this kind of thing [describing data elements at the terminal]," she explained. After DC2 was initially installed, Christy "borrowed" a statistical clerk for three months. In addition to actually keying in data at a terminal, the clerk worked at filling in forms that defined the entities to be included in the data dictionary. The forms themselves had been previously defined by Christy.

Successful Experiment

Describing herself as "very happy" with the temporary loan of the clerical staffer, Christy said the experiment "proved the thoughts I had all along. There is no need for a highly trained technical person to accomplish this type of task."

The person loading the data dictionary would not necessarily have to be a clerk. It could be someone at a lower staff level in one of the DES user sections, Christy noted. DES users include employees in programs involving the administration of unemployment insurance, foster care, welfare, vocational rehabilitation and social service, among others, she said.

While some of the systems associated with these programs are running on an in-house IBM 370/158, others are being executed on a Honeywell, Inc. H6000 computer at the state data center.

Since the two systems are incompatible, "I pushed for a plan that would allow us to first find out what data elements we have before we acquire a data base management system (DBMS). We must learn where the data elements are, how frequently they are accessed and how many systems use each element throughout the day," the project manager explained.

Dictionary First

Therefore, DES opted to install and load a data dictionary before deciding on a particular DBMS.

Christy is "very happy" with the temporary loan of the clerical staffer. The experiment "proved the thoughts I had all along. There is no need for a highly trained technical person to accomplish this type of task."

While training non-DP users was not a "weighty factor" in the decision to select DC2 over several other products, ease of use was a primary consideration, Christy noted. She estimated that training time for the clerical staffer involved in the three-month experiment was about 24 hours — or approximately three working days.

In addition to the savings she expected from the difference between programmer/analysts' salaries and those of clerical personnel, her approach will release the technicians for work on other projects, such as an upcoming operating system conversion from DOS to OS, she said.

Key analysts will be assigned the task of loading files, records, programs, modules and jobs from the 370/158s, she explained. Not only will this information serve as the first data entered on the data dictionary, but it will also be a training tool for the clerical workers who will do the majority of work involved in loading the data elements.

Explaining that DES is currently in the process of "acquiring the necessary positions from the state" for the new tasks, Christy said she hoped to bring some people in within the next few weeks. However, she was unable to project a completion date for the project because of such variables as staff availability.

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Shift From Finance Department

Top Management Taking MIS Reins: Survey

By Bruce Hoard
CW Staff

BURLINGTON, Mass. — Top management is slowly but surely assuming more control over management information services (MIS), according to a survey conducted by Rath and Strong, Inc., a management consulting firm here.

General managers, presidents and executive vice-presidents now pull the MIS strings 20% of the time, with adiministrative vice-presidents and MIS vice-presidents in an even stronger position, at 28%, the survey found.

Operations, manufacturing and materials vice-presidents hold control 4% of the time.

The findings, which represent the opinions of about 50 general managers and presidents, also showed MIS control migrating rapidly away from finance departments, long the bastion of MIS control.

For example, in the 1960s, finance controlled MIS 80% of the time; in the 1970s, 60%; and the latest figures show a 48% control figure.

However, the respondents admitted having less control over software than hardware.

On a scale of one to five, the respondents' mean score for hardware control was 3.0, while operations and applications software control was rated at 2.6 and 2.0 respectively.

Two Categories

The survey questionnaire addressed two categories: divisions in the case of very large companies and whole companies in smaller organizations. Within each category, consumer and industrial products were broken out for one- to two-year and three- to five-year periods.

Under hardware, 43% of consumer produce manufacturers in the divisions category predicted they would have increased control over the one- to two-year period, while 71% agreed their control would increase within three to five years.

Fifty-seven percent saw no change in control in one to two years and 14% expected no change over the longer, three- to five-year period. No one predicted a decrease in one to two years, while 14% foresaw a control decrease within three to five years.

Cautious Industrials

Industrial producers reflected a more cautious attitude. Only 25% predicted increased hardware control over the one- to two-year period. Thirty-eight percent anticipated an increase over the three- to five-year period.

The industrial respondents' caution also showed up in the form of a 63% answer to no change in control for one to two years. That was 6% higher than the consumer side. Over three to five years, 56% expected no change, a whopping 42% increase over the consumer side.

Twelve percent of industrial producers predicted a decrease in hardware control over one to three years; none of their consumer counterparts did. Only 6% of industrials foresaw decreased control in three to five years.

When the company category was examined, the results flip-flopped, with industrial producers predicting more control sooner.

The move toward central control does not bode ill for distributed processing, according to the study. What it means is distributed processing will be tied into central systems.

Operations and applications software closely followed the pattern set by hardware. There were no predicitons of decreased control for the immediate one- to two-year period and far fewer than for hardware over three to five years.

Another Look

Looking at the figures another way, hardware is most easily distinguished from the two software categories by the low instance of respondents who rated their degree of control as zero or one on a scale of five.

Where most of the hardware respondents were lumped in the two through five categories, operations and application software respondents were evenly distributed across all five levels.

Rath and Strong cited an instance where, in the case of a $10 billion corporation with about 40 divisions, a corporate MIS manager inherited four different hardware suppliers, five different data base systems, three different communication systems and five different application software packages for similar operations.

Although such a diverse configuration might be successful, the consulting firm allowed, "one of each would have cost less, been easier to improve and better facilitated training."

Delta 153 Rocket Lifts Off With First SBS Satellite

Nasa Photo

The 116-foot Delta 153 rocket lifted off from Cape Canaveral Air Force Station at 5:49 p.m. Nov. 15. Aboard is the first Satellite Business Systems space vehicle, which is expected to allow point-to-point data communications as fast as 6.3M bit/sec.

By Brad Schultz
CW Staff

CAPE CANAVERAL, Fla. — A satellite that is reportedly capable of moving a 1G-byte data file across the nation in the time it takes to brew a pot of coffee slid into geosynchronous orbit 22,250 miles above the equator last week.

A McDonnell-Douglas Co. Delta 153 rocket carried the first Satellite Business Systems (SBS) vehicle, SBS-1, from Cape Canaveral Air Force Station to outer space just after sunset Nov. 15. The launch ended months of delay in getting SBS to first base with plans to offer specialized common carrier services for data, voice, video and facsimile communications.

The company — a joint venture of IBM, Aetna Life & Casualty Co. and Comsat General Corp. — had to scrap plans for stowing SBS-1 aboard the National Aeronautics and Space Administration's Space Shuttle, still grounded by technical problems.

Hughes Aircraft Co., which produced SBS-1, is already delivering the rooftop earth stations necessary to receive the all-digital services scheduled to begin sometime next year. While SBS-1 floats over the equator at roughly the longitude of Santa Fe, N.M., Hughes Aircraft is readying two other HS 376 satellites slated for launching in April 1981 and November 1982, respectively.

SBS-2 will serve as a spare, so some of America's largest corporations will not be devastated should something happen to their SBS-1 link in its first several months. But SBS-2 will eventually be an active link in its own right when the first satellite's capacity is filled; SBS-3 will then be a spare vehicle, according to SBS president Robert C. Hall [CW, Nov. 3].

The solar-powered HS 376 satellites expand in space to a height of nearly 22 ft and carry antennae that continuously point to earth. Their lifetime is said to be 10 years.

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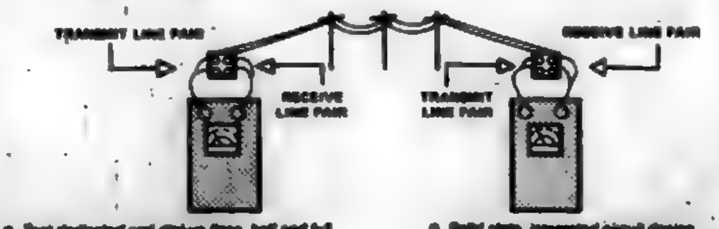

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Users Cautioned on Extent of Trade Secret Law

By Rita Shoor
CW Staff

CHICAGO — If you are not personally involved in the development of computer software, you may be under the impression that the ambiguities plaguing trade secret protection for software programs do not affect you.

Not true, according to Miles Gilburne, a speaker at last week's National Software Protection Conference here.

Trade secret law has a potential impact on "virtually every party to a DP transaction," said the attorney with Los Angeles-based Blanc, Gilburne, Peters & Williams.

Software developers are obviously very concerned about trade secret protection for their products. They are also concerned about potential competitors hiring employees so that they can develop products to compete with the software the original firm developed and marketed, he said.

However, programmers and systems analysts are also becoming increasingly aware of the impact of a trade secret nondisclosure clause or a noncompetitive covenant on their mobility, he continued. It is extremely difficult to get high-powered technicians to sign these nondisclosure agreements because they are concerned with the effect of such an agreement on their subsequent employment, he said.

Software distributors who are licensees of the software developer and distribute the product to end users must be "wary of incurring liability to their suppliers by failing to maintain or to ensure that their employees maintain the confidentiality of their suppliers' software," Gilburne noted in the paper that accompanied his presentation.

End users are also subject to license restrictions in the same way as software distributors once they license the package, he said. The trade secret protection clause in vendor form contracts essentially tells the licensee that be must prohibit any access to the software and that he must prevent any unauthorized disclosure.

Practical Difficulty

"As a practical matter, it is extremely difficult to prevent an employee from taking a copy of that software and marketing it elsewhere," Gilburne said. Thus, if the buyer signs a contract with an "overly restrictive" trade secrets clause and one of the firm's employees "walks off" with a copy of the package to develop and market a competing product that causes the original supplier to suffer substantial business damages, the end users or distributor may be held liable for those damages.

Employers should be aware of the potential problems involved in hiring programmers and systems analysts who may use trade secrets belonging to their former employers, he continued. Corporations can be affected when acquiring businesses that are operationally dependent on software that could turn out to be misappropriated or nonprotectable.

Finally, a software vendor might become subject to a trade secret action that results in the issuance of injunctions that substantially impair the end user's ability to continue using the software or to obtain maintenance and future enhancements from the vendor, according to Gilburne.

Because "the applicability of patent and copyright protection in the software industry is very unclear," business will continue to look toward trade secret protection as a way to insure its investments, Gilburne maintained.

"It is also a fundamental tenet of our economic and social environment that competition be encouraged and that individuals be free to practice their chosen professions wherever and for whomever they choose," he said. Therefore, "every jurisdiction in the country has a very strong public policy against restrictions that cut down on postemployment mobility of individuals," he said.

Generic Knowledge

"If general knowledge that is generic to the profession is granted trade secret protection, competition in the industry that relies on the profession is going to be severely hindered," he said. This problem is particularly severe in the software industry where a clear understanding of the various interests of competitors, employers and employees demands a "high level of technical sophistication beyond that of most attorneys and judges," according to Gilburne's paper.

The majority of trade secret cases deal with the employer/employee relationship and this also happens to be the area that is most difficult to "get a firm handle on." Essentially, much of the law boils down to determining which areas of knowledge are specific and should be protected under trade secret law and which areas are generic to the industry and, therefore, should not be preempted from use.

The focus in trade secret software litigation should not be on whether the software was misappropriated, but rather on whether the trade secret elements of the software were misappropriated, he said. These elements include:

- Unique logic engineering and coherence of the software. Although packages may be functionally similar, there is an infinite variety of ways the inputs get translated into the outputs.
- "Headstart" elements. An investment in time and money may give a vendor a competitive advantage for the relatively short time the product is on the market without competition.
- Substantive uniqueness in application. Software is sometimes developed to automate an application that has never been computerized before. One example was the development of update parameters to detect abnormal conditions in catalytic conversion.

The employer who wants to avoid being the defendant in trade secret litigation would probably do well to maintain an awareness of current judicial trends, Gilburne advised.

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Through In-House Efforts

Managers Clued on Cutting Recruitment Costs

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Many computing departments could significantly trim their recruitment costs by improving their internal hiring practices and thus cutting their reliance on outside employment agencies, two personnel recruiters for Southern California Edison Co. advised here recently.

One of the keys to upgrading a computing shop's in-house recruiting effort is to respond as rapidly as possible to solicited and unsolicited job applications and to minimize reliance on resumes as a personnel-screening tool, according to recruiters Susan Ellery and Bob Westmoreland.

In many large businesses, the routine for hiring programmers, analysts and other skilled computing personnel typically works as follows: a job applicant's resume arrives first at an employer's personnel office and then is forwarded in turn to each of the company's information-systems hiring supervisors. By the time the resume has run its course and is ready to be acted upon, as much as several weeks have passed, by which time the job applicant usually already has found work with another company.

Telephone Screening

Unlike most other recruiters, who evaluate an applicant's job qualifications primarily through his or her resume, Ellery and Westmoreland prefer to do most of their personnel screening over the telephone.

When they advertise for computing professionals in newspaper "Help Wanted" sections, the pair ask job candidates to reply by phone rather than by sending in their resumes. Each phone inquiry leads to a 30- to 45-min. "technical screening," during which Ellery and Westmoreland review a candidate's professional history and try to assess the suitability for the job opening in question.

The two personnel recruiters have managed to cut Southern California Edison's recruitment expenditures from a total of $345,000 last year to about $147,000 through the first 10 months of this year.

If the candidate seems to have the right qualifications for the advertised position, the name and phone number are forwarded immediately to the appropriate hiring supervisor.

Using the telephone to screen job applications offers several advantages, according to these recruiters:

- It greatly increases the speed with which Southern California Edison can respond to applications from qualified job candidates. Previously, Edison often took as long as three weeks to reply to a typical computing professional's job application. Today, the turnaround time has been trimmed to just a few days, Ellery and Westmoreland said.
- It allows Ellery and Westmoreland to analyze a candidate's professional background, qualifications and career interests in much greater detail than would be possible with a simple one- or two-page resume.

The increased detail in turn has sharpened Ellery's and Westmoreland's personnel-screening skills and thus has improved their ability to fill Southern California Edison's job openings with highly qualified employees, the pair said.

Expenditures Cut

Partly as a result of their decreased reliance on agencies, the two personnel recruiters have managed to cut Southern California Edison's recruitment expenditures from a total of $354,000 last year to about $147,000 through the first 10 months of this year. At the same time, the average per-person cost of hiring the company's computing professionals has dropped from $2,950 in 1979 to $1,120 in 1980 — a more than $1,800 per head savings, Ellery and Westmoreland said.

Payments to recruitment firms went from $220,000 for 30 computing professionals, to $106,000 for 16 this year.

"Most of our techniques for recruiting DP professionals are really quite simple and are based on common sense more than anything else," Ellery said. "As a result, the methods we've developed at Edison can readily be applied at almost any other company."

One of the key principles of Ellery's and Westmoreland's recruiting methodology is that they try to avoid hiring people to do jobs they have already performed elsewhere.

The two personnel recruiters soon expect to open their own consulting firm to teach their methods to other recruiters.

"Good programmers seldom change jobs just to get more money," Westmoreland explained. "They usually do so because they want a chance to improve themselves professionally, gain new skills, do new kinds of applications and increase their marketability."

For additional information about Westell Consultants, Inc. and its recruiting methods, write to Ellery and Westmoreland at Suite 201, 524 Esplanade, Redondo Beach, Calif. 90277.

IBM, HP Decide to Test Computer Store Market

By Tom Henkel
CW Staff

PHILADELPHIA — IBM has broken its traditional sales strategy by opening its first retail computer outlet here. While the firm formerly sold its products through a sales force that called on customers, the retail outlet will offer low-end small business computers and other office automation hardware.

Hewlett-Packard Co. also announced it is entering the computer store market.

IBM's retail outlet will focus mainly on the firm's line of typewriters and copiers, but its merchandise will also include more advanced items, such as IBM's Displaywriter word processing hardware and the 5100 line of intelligent business computers, a spokesman said.

The outlet will also handle other computer paraphernalia, such as printer ribbons and paper for yet-unspecified hardware.

IBM plans to open a similar store in the Baltimore area, along with several other stores, during 1981. However, a spokesman would not say where additional stores would be located.

IBM's marketing strategy seems to follow closely Digital Equipment Corp.'s experiment into the retail scene with its Computer Stores. While DEC says it is generally pleased with the results of its retail outlets, the firm has closed two stores in the past year.

Two stores in New York were consolidated into one and a store in Detroit was shut down because of a faltering economy there, a spokesman said.

Hewlett-Packard Co. entered the retail store market through the back door with an agreement with ABC Computers, Inc. ABC will offer HP's 1000L series of small business computers.

Available through some 350 ABC outlets, the HP 1000L offers 128K to 512K bytes of main memory, a 15M-byte Winchester-type disk drive, tape backup and a CRT terminal; it supports the RTE-XL operating system. ABC will also offer business accounting software including accounts payable, accounts receivable, order entry, inventory, invoicing, general ledger and payroll.

The HP system costs in the neighborhood of $20,000, ABC said.

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Programmer Fined $50,000 for Software Theft

By Ann Dooley
CW Staff

MOBILE, Ala. — A former service bureau employee here has been found guilty and fined $50,000 for copying his former employer's software programs and using them in a competing business he started.

The Circuit Court of Mobile County has found that Max Coffee, a programmer previously employed by Applied Systems, Inc., a service bureau with clients in Florida and Alabama, used programs taken illegally from Applied Systems after he left the company to open his own service bureau.

Although no conclusive evidence was presented proving Coffee had in fact duplicated the programs, a jury found enough circumstantial evidence to convict him. Coffee's lawyer, Herndon Inge Jr., plans to appeal the decision in the Alabama Court of Civic Appeals.

The jury reportedly made its decision largely on the basis of expert testimony that stated it would be impossible to recreate the programs so precisely in the short amount of time that elapsed between the time Coffee left his former job and the time he started his own firm.

The programs in question are customized business packages. As many as eight of Applied Systems' customers switched to Coffee's firm, Data Plus, Inc., which offered them lower rates.

Coffee formed his own company in January 1978. Although an injunction was immediately imposed to stop Coffee from using the programs, the case did not come before a jury until last month.

Unusual Jury

A jury trial is somewhat unusual in these cases, Gordon Tanner, the lawyer representing Applied Systems, said. However, the jurors were able to grasp the complex issues and deliver a fair verdict, he maintained.

The intangibility of software was an important aspect of the case, according to Tanner. The jury was called upon to decide whether a theft had occurred even though nothing was physically taken and the company still had the original tapes.

After hearing all the evidence, the jury decided that Coffee could not have recreated the identical programs in a short space of time.

Coffee and his lawyers maintained throughout the trial that he had originally developed the programs and that he had recreated rather than copied them once he left Applied Systems. Coffee's lawyers would not comment further because his appeal is still pending.

In the meantime, Coffee and his assistant, Robert Sawyer, who was also named in the case, can operate the business as long as they do not use the programs belonging to Applied Systems.

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Program Helps Doctors Diagnose Rare Variety of Eye Malignancy

By Deborah Wise
CW Staff

CHICAGO — University of Chicago ophthalmologists have developed a computer program to aid in diagnosing a rare form of eye cancer that affects one out of every 14,000 births.

The disease, retinoblastoma, shares the common symptom of leukocoria, or white pupil, with many other eye diseases, but manifests itself as a malignant tumor that has to be removed. The other diseases are not treated in this fashion, so accurate diagnosis is very important.

Dr. Karl J. Fritz and his associates spent more than a year and a half updating and developing a data base originally prepared by Dr. Albert S. Leveille and others from a review of articles written about patient populations and leukocoria. The program "correctly predicted 14 out of 15 cases that we had here," Fritz said. "It is more accurate than doctors have been when they just look into the eye."

The program is running on the university's Amdahl Corp. 470 system, but is being adapted for an Apple microcomputer.

It is available on a time-sharing basis to any hospital capable of communications with the university computer. Fritz noted it is also available in a PL/I version.

"It is a general system, not just useful for one diagnosis. The data base is independent of the computational algorithm [Bayes' Rule]. It is a learning program and is such that the data base is modified when new information is entered," Fritz said.

Fritz said it is not limited to ophthalmology, but at the present time has only been used in the eye clinic.

The system could be extended to all areas of medicine, but accurate data bases would be needed, he noted, adding that his department does not have the time to construct these at present.

"It is essential that the data base be extremely accurate or it could lead to wrong diagnoses," Fritz said.

OCR Group Seeking Candidates for Award

HACKENSACK, N.J. — The Optical Character Recognition (OCR) Users Association is currently soliciting candidates for consideration for its third annual $1,000 Education Fund Award.

Potential recipients must be continuing their education in the electronic data processing field, with emphasis on applied data entry systems. Personal criteria should include any history of academic achievement, professional accomplishment, organizational involvement and social contributions.

Applications will be provided upon request by the OCR Users Association, 10 Banta Place, Hackensack, N.J. 07601.

'It Wants a Second Opinion.'

Key Technical Challenge

SBS Giving Priority to Local Net Development

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Local networking remains one of Satellite Business Systems' (SBS) key technical challenges and has received a high priority in the company's product development plans, according to SBS President Robert Hall.

SBS is jointly developing a high-speed, local-loop facility with Tymnet, Inc. and Local Data Distribution, Inc. (LDD) and expects the service to make its formal debut next spring, Hall said at the recent Intelcom 80 conference here.

Implementation of a local-loop capability will coincide roughly with the start of SBS' first customer services, which are slated to become available sometime "during the next few months," Hall said.

A local networking facility will provide a much needed terrestrial complement to SBS' planned family of data communications satellites, the first of which was scheduled to be blasted into orbit recently.

The satellite family, which will likely be rounded out by two additional launchings in April and November of 1981, is expected to be well suited to addressing the long-haul side of a user's data communications needs. But what about the short-haul side? After traveling thousands of miles through space from a sending earth station, how is a returning data stream going to be relayed the last two or three miles between a receiving station and the users at the end of the line?

The answer, of course, lies in the development and implementation of high-speed local loops. Satellites by themselves are simply ill equipped to provide the crucial links between earth stations and communications endpoints only short distances away.

In SBS' case, such short-haul data communications links will be made possible though cable TV facilities, fiber optics or perhaps other transmission "vehicles," Hall predicted.

Under the firm's current plan, one end of a cable TV line or similar data communications vehicle will connect to an SBS earth station through a special LDD interface, while the other end of the link will attach to one or more remote user facilities.

The interface will effectively enable earth stations and users at network extremities to communicate directly with one another through any one of several types of links at SBS's disposal, Hall said.

Hall's comments came during an Intelcom 80 panel discussion dealing with the subject of "business user networks." In other remarks during the session, the SBS president ranked flexibility as a network's single most important user requirement.

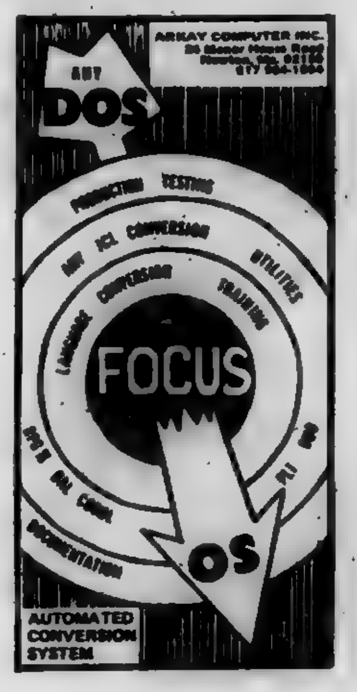
Flexibility, he explained, implies the ability to modify communications resources quickly and easily to meet changing business needs; add new capabilities without having to scrap existing facilities; and expand network capacity as circumstances dictate.

Pratt Studying Energy Factors In System Use

BROOKLYN, N.Y. — A study of the energy utilization characteristics of information processing equipment has been initated by the Graduate School of Library and Information Science at Pratt Institute.

The purpose of the study is to assess the current state of the art with respect to energy consumption to compare operating costs of various types of equipment, to develop guidelines to assist information systems analysts and to provide architects and other planners with guidelines for energy efficient design.

Project findings will be made available through a series of reports to be published next year. Further details about the research project can be obtained from H.J. Coopersmith or William Saffedy at the Graduate School of Library and Information Sciences, Pratt Institute, Brooklyn, N.Y. 11226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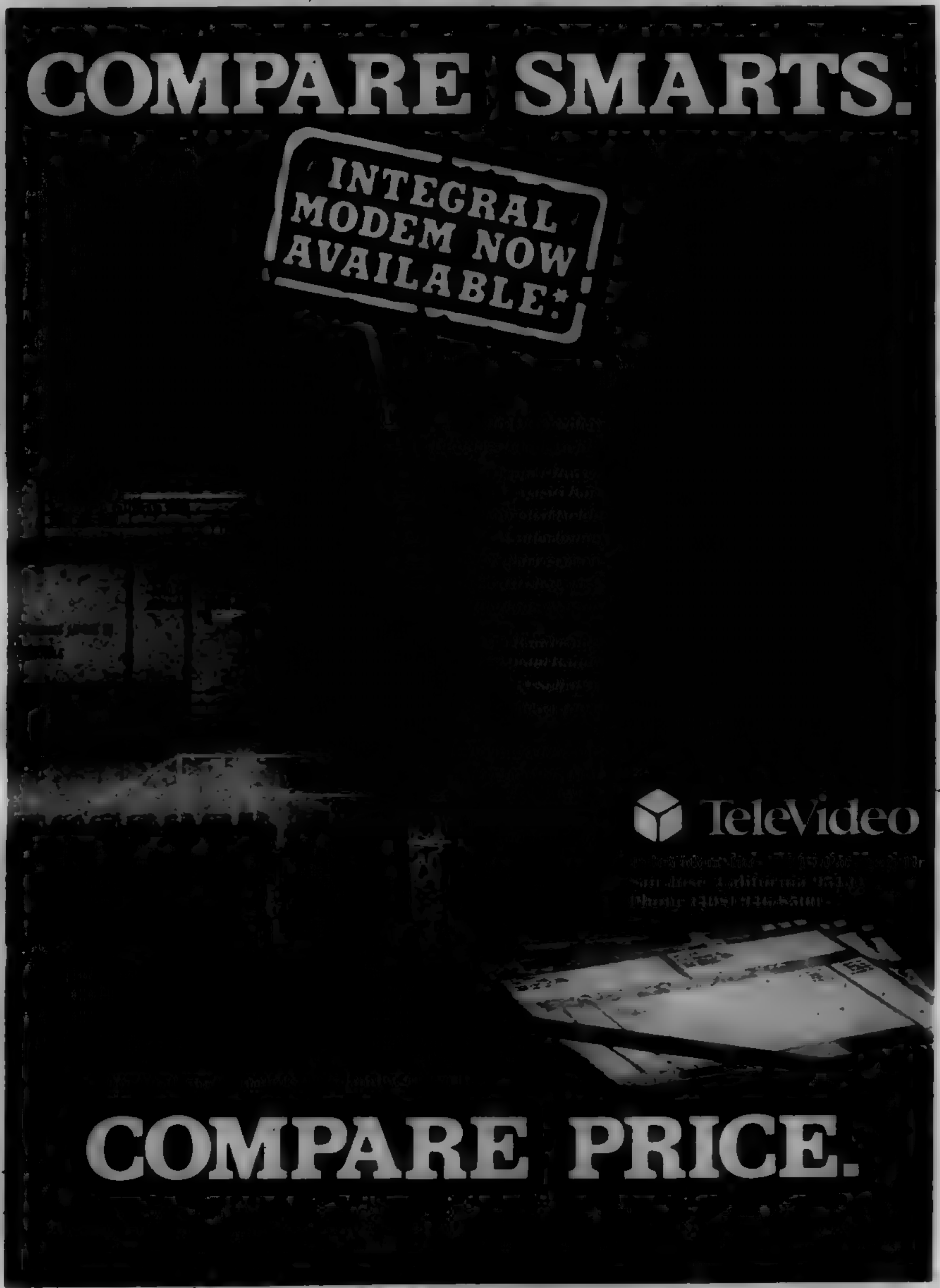
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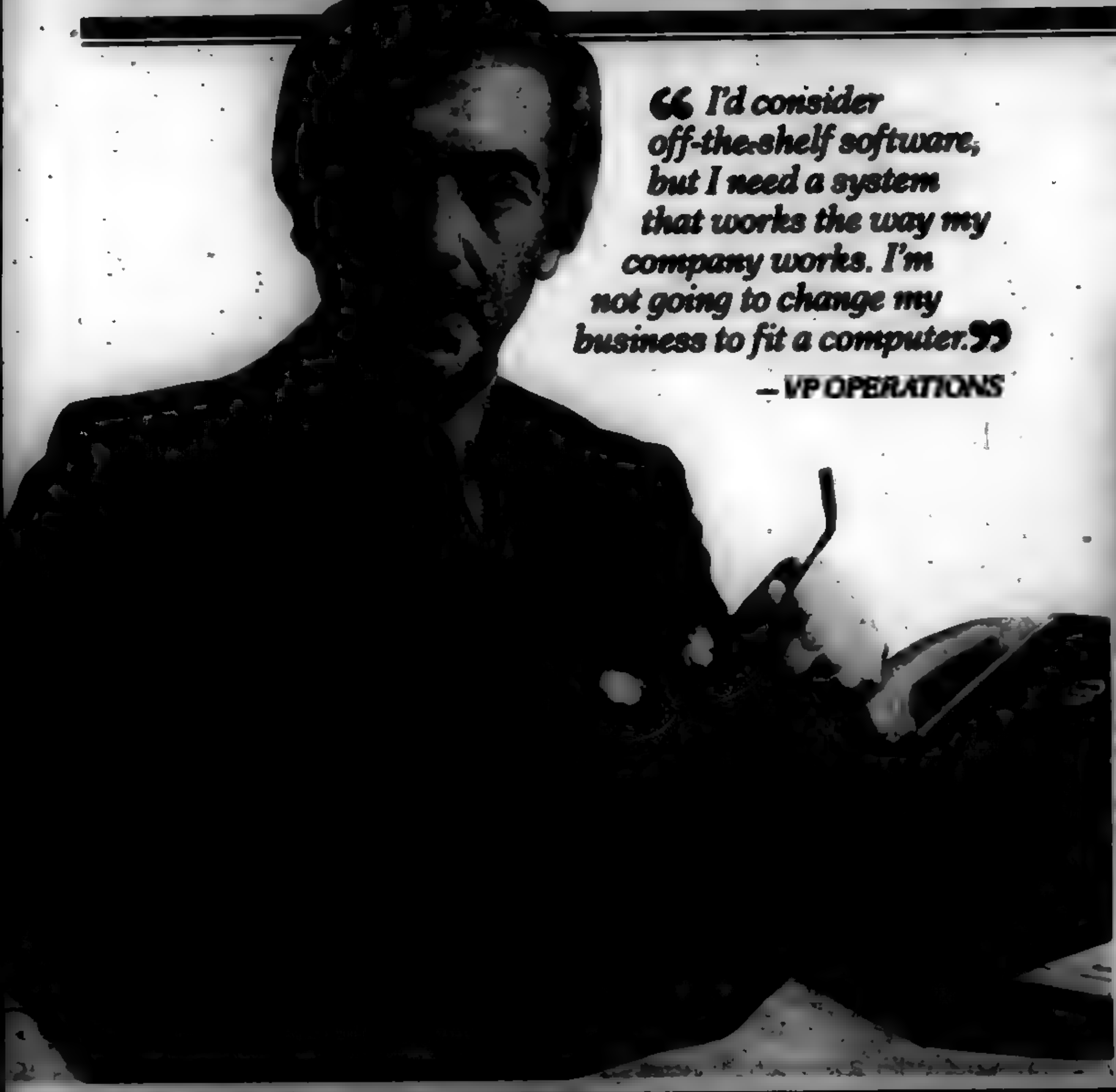

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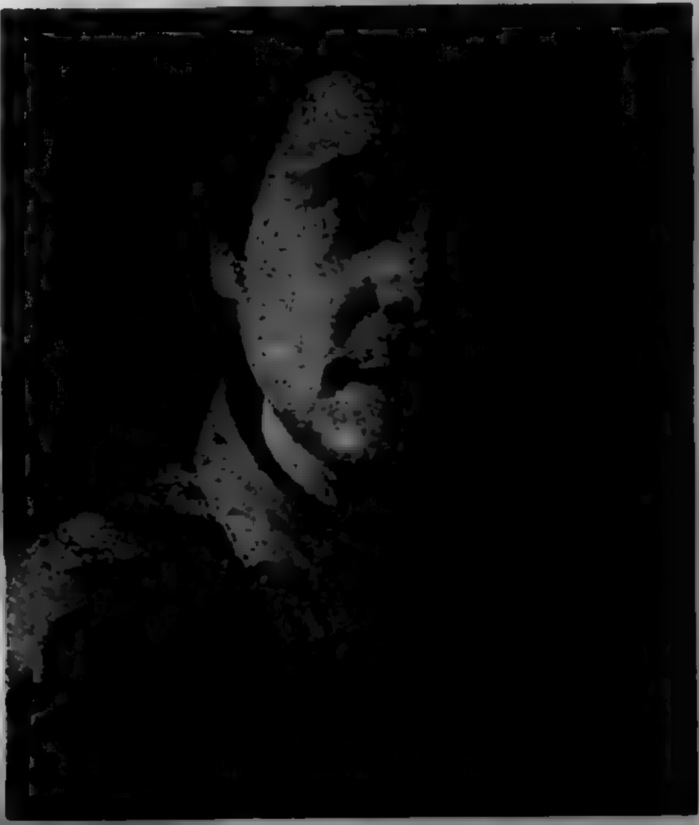

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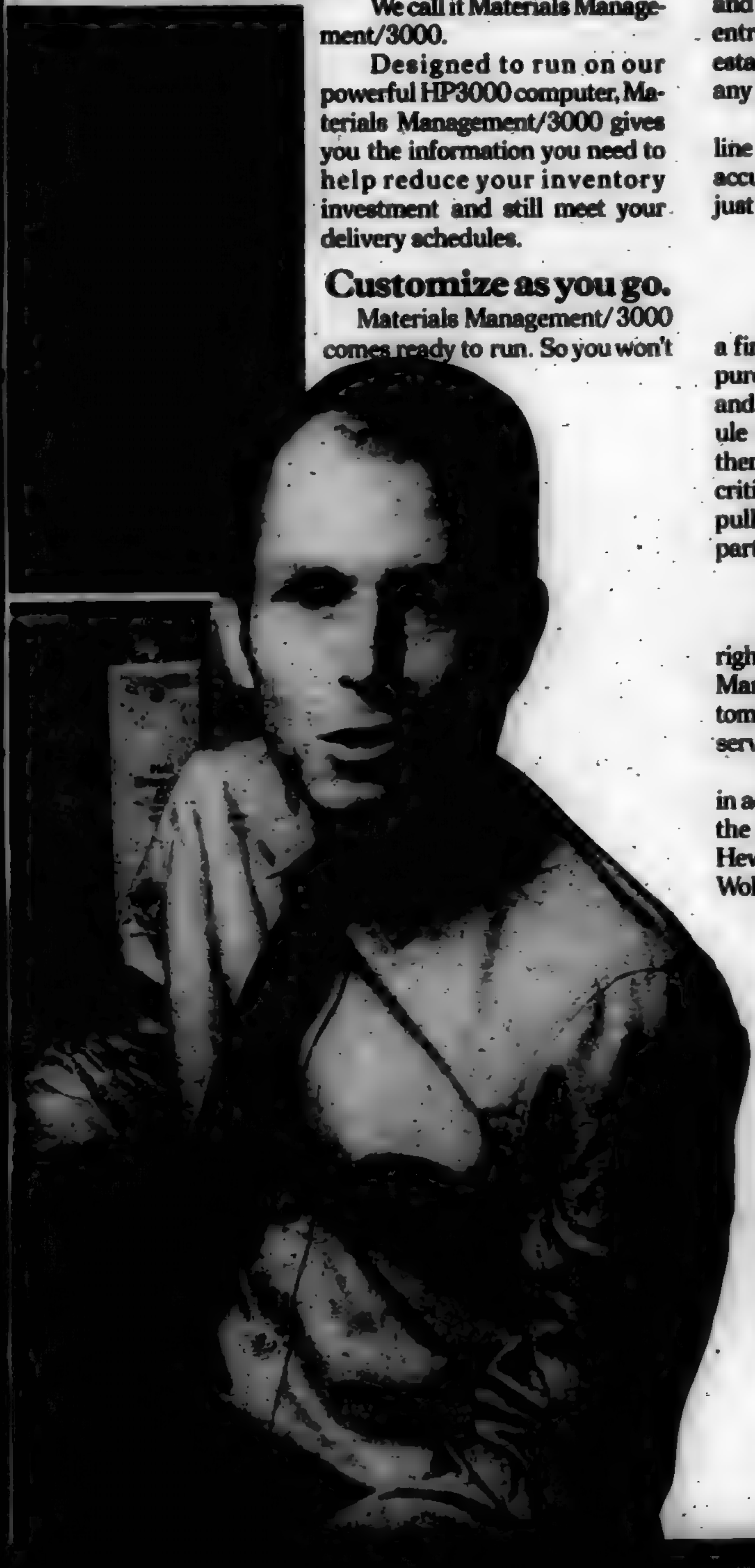

“Developing your own in-house materials system is one alternative, but it's an extremely lengthy, and costly, proposition. I need a system now, and one that won't tie up my programming staff.”

—EDP MANAGER

47001HPG66

Under Aggressive National Policy

Brazilian Computer Market Now Sixth Largest

Letter from Brazil

By Ney Soara Kruel
Staff Writer
Datanews

RIO DE JANEIRO, Brazil — In the wave of booming economic growth, Brazil has become the sixth largest computer market in the world and the second fastest growing after Japan. The dynamics of this expansion — an 860-computer population in 1972 grew to 8,000-plus by 1979 — can only be understood within the framework of a deliberate national policy to develop a domestic computer industry.

In 1977, almost all computers and associated equipment marketed in Brazil were imported and U.S. corporations accounted for approximately 90% of sales, though a good part of it was supplied from U.S. subsidiaries in European countries.

Today, less than three years later, there are some 50 industries manufacturing, at different levels of domestic technological development, more than 100 models of DP equipment corresponding to $500 million in sales in 1980 alone. The services and software industry includes 80 companies developing software products of various levels of sophistication and expertise.

How did this turning point come to take place? In April 1973, the Brazilian government created Digibras, the holding company and executive arm for the policies being drawn out by Capre, the Ministry of Planning's agency in charge of developing a domestic computer industry. In 1974, the first Brazilian computer company, Cobra Computers, became operational, and in 1977 Capre invited all interested computer companies doing business in Brazil to present projects for the domestic production of minicomputers.

It was recommended that the projects submitted to Capre meet the following prerequisites:

- Complete transfer of technology within five years (by the end of 1982) with license payments never to exceed 3% of net sales.
- Plans for participation in local markets as well as for export.
- Joint ventures with share control in Brazilian hands.
- Net reserve savings accruing from project implementation.

From the sixteen proponents, three were chosen and joined two other minicomputer manufacturers to operate in a captive market guaranteed by government regulations. As of 1977, sector-related imports were limited to amounts well below demand expectations and all requests have to be reviewed on a case-by-case basis by the government.

Mini Cornerstone

Minicomputers were the cornerstone of the initial development of the Brazilian computer industry. Basically they represent the fastest growing chunk of the market.

This boom in demand for minis is being churned up on two fronts. First, the natural expansion of companies has brought about the need for more capability and variety of applications.

As we have seen, the import of new equipment is tightly controlled, so there are users resorting to computer service companies for extra punch. But the squeeze on the CPUs can be alleviated also by shunting routine and time-consuming chores such as payroll, billing, and inventory control to minis linked to CPUs in a distributed processing environment.

Second, new computer users who have never before felt the need for DP embrace it in order to become competitive in a changing economic environment. The bulk of Brazilian computer customers are first-time users who naturally start with a mini.

Conflicts Develop

Most market trends in Brazil develop along these vectors. However, the complexity of this pattern has created some conflicts. In 1979, Capre was substituted by SEI, the Special Secretariat for Informatics, an agency reporting to the National Security Council and with wider attributions in terms of regulatory powers. This change in computer regulatory agencies occurred in the wake of severe economic hardships for Brazil as a whole and of growing pains for the computer sector in particular.

Pressures from all sides — private and government financial agencies, domestic manufacturers, multinational vendors, user groups and research centers — to adequately evaluate the flows of demand and supply in a regulated environment has brought SEI to the center of a heated debate on the near-term policies for the DP sector.

Less than three years ago, the discussion was on the pros and cons of creating Brazilian companies for the production of high technology equipment. Today, the issue is the consolidation of the domestic manufacturing structure already existent and whose importance can be measured by the figures mentioned above.

Domestic Components

Because computers are an assembly industry, however, true nationalization of the Brazilian computer industry will have to rely heavily on the future availability of domestically produced components.

Considering the size of the market and the complexity of the technology, the limited response of the present domestic production of components is understandable and, once again, forces other than the market's alone will intervene to stimulate domestic production.

Another sector that demands greater attention is software, basically applications software and monitors. Overcoming Brazil's shortage of computer capability using minicomputers will depend as much on the availability of software as on computers themselves, perhaps more.

Specialized software can be much more difficult to produce than the hardware that uses it. Innovation for many Brazilian users takes the form of new programming rather than breakthroughs in the computers themselves.

So, despite all the inherent problems of any young growth industry in a developing country, the Brazilian computer sector is alive, well and is coming through the '80s as a solid showing that Brazil means business.

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Auerbach Service Gains Section on Analysis

PENNSAUKEN, N.J. — In response to the need for improved requirements analysis and specification techniques, Auerbach Publishers, Inc. has created a section, "Analysis Methods and Tools," within its *Systems Development Management* information service.

Implicit-design approaches, specification, explicit design and structured analysis are some of the topics examined.

Systems Development Management is a one-volume, $195-per-year information series, which is updated bimonthly. More information on the service is available from Auerbach at 6560 N. Park Drive, Pennsauken, N.J. 08109.

For Precollege Level

'The Computing Teacher' Debuts

EUGENE, Ore. — To help expand the use of computers in education, the International Council for Computers in Education (ICCE), a nonprofit corporation, has published a journal for people interested in computer instruction at the precollege level.

The Computing Teacher illustrates ways to use computers in teaching and gives methods for learning about computers themselves. It also covers the impact of computers upon the general curriculum.

The goal of the publication is to acquaint educational policymakers with some of the potential uses of computers in education and to encourage these policymakers to initiate actions that will lead to increased use of computers in their school systems, the publishers said.

Although computer use in schools is increasing dramatically, very little is being implemented in the area of curriculum improvements, according to *The Computing Teacher's* editor, David Moursund.

Each person who subscribes to *The Computing Teacher* becomes a member of ICCE. In addition to individual members, ICCE includes professional organizations working to enhance the instructional use of computers at the precollege level.

Early Growth

The publication began in May 1974 and was called the *Oregon Computing Teacher*. In the spring of 1979, it carried paid advertisements and evolved into an internationally circulated journal called *The Computing Teacher*.

Circulation averaged in excess of 3,200 during the 1979-1980 academic year and is expected to increase to an excess of 6,000 copies per issue during the 1980-1981 academic year, according to ICCE.

The publication currently offers seven issues yearly, but will increase to nine next year — and all contain a variety of articles and other material helpful to teachers using, or interested in using, computers. Subscription rates are $10 for seven issues, $20 for 16 issues and $27 for 25 issues.

More information is available from David Moursund, editor, *The Computing Teacher*, Computer and Information Sciences Department, University of Oregon, Eugene, Ore. 97403.

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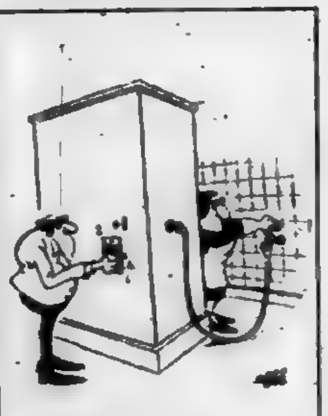

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Pacific Tel Moving to Hike Private-Line Rates

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Pacific Telephone and Telegraph Co. has completed the first step in what appears to be a campaign to raise its private-line rates significantly. Several other Bell operating companies are likely to do the same if Pacific Tel is successful.

Essentially, the company wants to impose a local access charge on customers who lease foreign exchange (FX), CCSA, EPSCS and tandem tie-line services. An FX circuit connects a user in one exchange area with all the telephones in another exchange area. CCSA and EPSCS are telephone company provided switching arrangements leased on a dedicated basis to companies with multiple locations. Tandem tielines are leased circuits connecting user-owned switching facilities in different locations.

The new charge would apply to all interstate subscribers leasing FX, CCSA, EPSCS and tandem tie line circuits which terminate within Pacific Tel territory. Circuits obtained from specialized carrier, as well as from a telephone carrier, are included. Most intrastate users of similar facilities would also be impacted.

Earlier this month, the California Public Utilities Commission (CPUC) went along with Pacific Tel's access charge plan. The next step is for the company to file specific rates. They are due around the end of this year. If accepted, the access charges would be imposed in stages, beginning 12 months after the tariff becomes effective.

Tariff Opposition

Some 18 specialized carriers, users and trade associations are fighting the tariff — notably MCI Telecommunications Corp., American Satellite Corp., the airlines, the federal government and the Tele-Communications Association, which includes several major U.S. companies.

The opponents contend that the access charge will actually cost far more than Pacific Tel has estimated.

The phone company is proposing a charge of $32.50- to $33.90/mo for each termination, but it says this rate is based on estimated circuit usage and may be adjusted later if further analysis shows a need to do so.

MCI contends that the estimated usage on which the proposed rates are based — 650 min/mo/local access line — is way too low.

"The simple fact of the matter, as Pacific must know, is that the average usage level is actually between 3,000 and 5,000 minutes per month," an MCI spokesman told the California commission. If the latter figures are used, "FX termination charges will increase as much as $500 per month, the spokesman added — or, $6,000/year for "the use of one telephone number."

Premeditated Effort?

It is "inconceivable that any experienced telecommunications company could in good faith" estimate 650 minutes as the average usage of a business-type access line, the company spokesman contended. Pacific Tel's "egregiously low estimate . . . seems part of a . . . premeditated effort to deceive . . . users and the (California) commission . . ."

MCI and other opponents also contend that Pacific Tel cannot impose local access charges without getting them approved beforehand by the Federal Communications Commission (FCC). They point out that many of the affected circuits are interstate.

Several months ago, the New York Public Service Commission authorized a similar tariff increase and subsequently was slapped down by the FCC [CW, Aug. 1]. The case then went to court, which upheld the FCC ruling. However, since the New York levy was applied only to out-of-state subscribers, California regulators argue that the decision may not apply to Pacific Tel's proposal.

They cite the FCC's conclusion in the New York case that, although it has jurisdiction over the local access circuits connecting interstate transmission facilities, the commission has deferred to the states so long as the rates charged local and interstate subscribers are the same — which they would be in the case of Pacific Tel's proposal.

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Data Entry Said Alive and Well Despite Upheavals on Horizon

By Tim Scannell
CW Staff

ORLANDO, Fla. — Although there are changes, adaptations, and equipment upheavals on the horizon, data entry is "alive and well" and will probably play an important role in the much-heralded office of the future.

The data entry operator of today will probably be the data specialist of tomorrow, supporting and supplying information to several managers in a corporation instead of just one or two, Ryal Poppa, president and chief executive officer of Pertec Computer Corp., said. The office will become an entity in itself and the traditional data entry manager will be responsible for the entire office function.

Delivering the industry keynote at the recent Data Entry Management Association's (Dema) annual conference here, Poppa outlined where data entry has been and where it will go in the coming years. During his presentation — which consisted of a multimedia slide show complete with a professional soundtrack and theme song — Pertec's president spoke of a resurgence in the acknowledgement of the data entry function and a renewed importance bestowed on these unsung heros of information processing. As sights and sounds washed over the audience, the effect was as good as any created by Oral Roberts or Billy Graham.

The idea of the show was that like coal, trains, sailboats and cowboys, data entry would experience a 180-degree turn in importance and notoriety. Currently, two-thirds of the U.S. work force is engaged in some kind of office function, but at best the productivity rate rises only a few percent a year, Poppa explained. Therefore, "nowhere is the need for productivity more apparent," he said.

'Axis' of Evolution

Labeling data entry the "axis" of the office automation evolution, Poppa pointed out two trends that will come about in the near future. One, data entry personnel will adapt to new modes of processing by fitting into distributed processing environments and become information handlers. And two, hardware will achieve a commonality and emerge as multipurpose systems that are as flexible as the software.

The data entry person will have to become "a complete business person and not a remote specialist," he observed. "We will all have to have a much broader view of business and not only be concerned with how many batches you have to get out tonight."

The idea that the concept of a data entry operator is disappearing is true "only to those who imply limitations through definitions," he added.

The key to the future spotlight on data entry lies in software, "the limiting item and No. 1 requisite." Presently, Pertec is investing 68% of its research and development budget in software. In fact, this year marks the third year in a row that the company has reserved more than 50% of its budget for software, Poppa told the Dema group.

Ending his presentation with a Star Wars-like representation of a futuristic data entry station, complete with banks of terminals and hundreds of switches, Pertec's CEO explained that since most DP managers are too busy looking at the forest, it is up to the data entry person to provide a pertinent education of the all-important limb.

CW Photo by Tim Scannell

Ryal Poppa

Poppa Takes Crowd Down Memory Lane

ORLANDO, Fla. — In an effort to convince his audience here that he is "one of their own," Ryal Poppa, president and chief executive officer of Pertec Computer Corp., took them for a trip down memory lane.

In a scene reminiscent of the old "This Is Your Life" television show, Poppa recounted that he started out in DP 28 years ago operating an early card reader, earning $1.17 an hour. His job involved feeding cards into a machine that read them at a rate of 100 card/min. To break the monotony, he and a few of his fellow workers would stage a contest and see who could grab a punched card as it whipped through the reader without jamming the machine.

He then moved on to become a data entry operator, running an IBM 031 punched-card puncher, and in the early '60s began selling punched-card machines for IBM. He stayed about 10 years with IBM, spent a short time leasing data entry equipment and working for Mohawk Data Sciences Corp. and in 1973 joined Pertec as its president.

Throughout his career, Poppa was always involved with data entry equipment and he proudly describes himself as an industry "gray hair."

Program Result Off by $40,000

Error Overvaluates Property

MIAMI — Property values were wrongly assessed here recently when the Dade County Property Appraiser's office tried to apply more factors in a computer program than the program was capable of handling.

The errors were made for 127 lots of land that border or fall in the path of the new Metrorail public transportation project currently under construction. Each year the office appraises 550,000 lots.

"The error was in one of the programs that applies various depreciation factors for properties," said Tom McGovern, director of computer services for Dade County. He said the appraiser's office tried to apply multiple depreciation factors that the program did not have the capability of handling.

The tax assessments had not been sent out and the errors were spotted by auditors at Dade County Transportation office, which was making offers for the land in the path of the projected Metrorail service.

In most cases the assessments were only $2,000 to $3,000 over the correct value, but an auditor said one calculation was off by $40,000.

"We have increased the number of factors that can be applied in the program and will clearly instruct the Property Appraiser's office as to just how many factors can be applied at one time," McGovern said.

The computer services center developed the program itself and runs it on an IBM 3032 with 6M bytes of memory.

The areas that were affected were mainly in Washington Heights, a section of Dade County that saw the worst rioting during the disturbances earlier this year.

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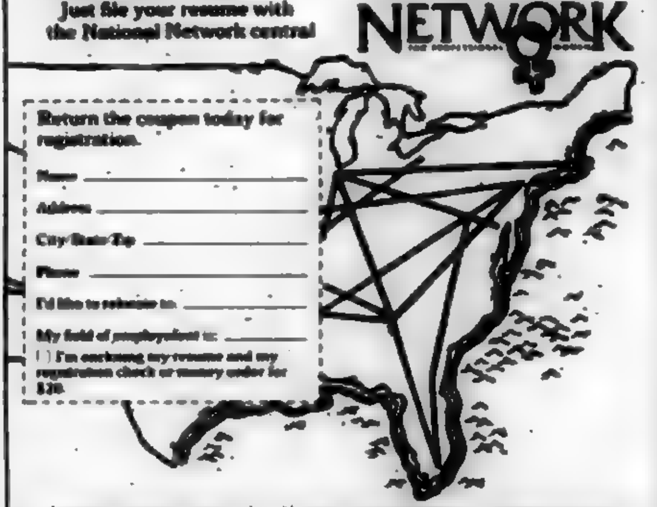

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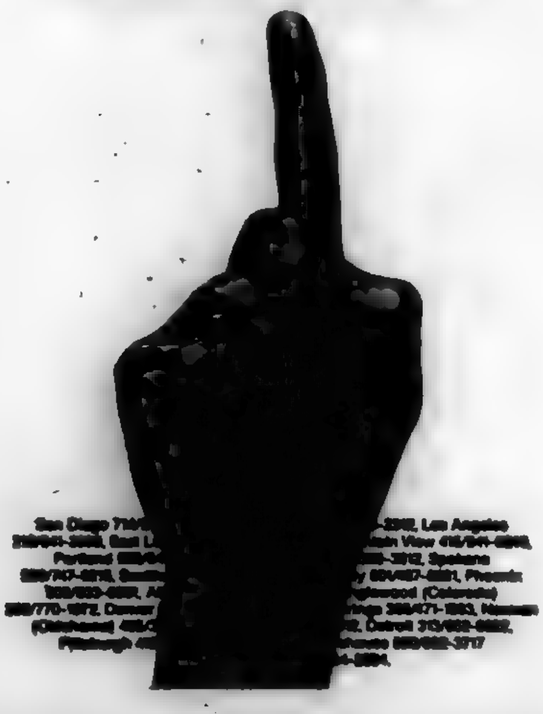

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Or Face Loss of Transborder Access

Observe OECD Guidelines, U.S. Firms Warned

By Brad Schultz
CW Staff

LOS ANGELES — The U.S may lose access to transborder data networks in Canada and Europe if U.S. companies act contrary to certain privacy guidelines, a Commerce Department strategist has warned here.

Not legally binding, the guidelines recently set by the Organization for Economic Cooperation and Development (OECD) nevertheless show that America's trading partners see their sovereignty and economic health jeopardized by U.S. domination of information technology.

William Fishman, senior policy advisor with the National Telecommunication Information Agency, told a recent Intelcom conference session that privacy concerns among OECD member nations on both sides of the Atlantic have led some members of the trade reviewing body to limit transborder data flows, slowing international commerce.

The OECD nations, including the U.S., worry that data pumped to computers beyond their border may be secretly used to monitor activities of citizens and organizations. The networks may also carry misinformation — for example, designating the wrong people as credit risks, Fishman pointed out.

America's trading partners are especially concerned about transborder data flows to the U.S. because the U.S. has more computer power than any other nation, Fishman indicated.

While several trading partners have enacted comprehensive privacy laws bearing on data communications generally, the U.S. has mandated privacy protection on an industry-by-industry basis, he continued.

Strictly economic concerns add to the impetus for statutory controls on transborder flows. Some nations find they are losing jobs when they transmit data to the U.S. for processing, Fishman noted.

Despite the intensity of these problems, six of the 23 OECD nations did not adopt the privacy guidelines. Only Canada objected to a "free flow" provision calling on nations to share access privileges equitably, Fishman said. Canada is trying to reduce its dependence on the processing resources of its southern neighbor.

OECD Guidelines

The OECD guidelines specify that data not be stored without reason and that the reason for storing data cannot be changed after the data is acquired. The guidelines also specify that data on individuals cannot be manipulated without their permission, that it must be of "good quality" and that individuals have a right to see what data relevant to them is subject to transmission.

Under the guidelines, responsibility for proper handling of data transmitted across borders rests with the companies that profit from the transmission, Fishman stated.

Legislation is not necessary to implement the guidelines, he observed, but violations may provoke some nations to press for privacy-oriented treaties as a condition for retaining links with the violating nation. A sudden rush to regulate and restrict transborder flows could seriously hurt international commerce, Fishman warned.

Prestel International Discussed As Among Videotex Innovations

By Phil Hirsch
CW Staff

ATLANTA — Prestel International was one of several recent innovations in videotex technology described at a recent communications conference here.

Launched last March, the service has about 145 users in seven countries, including the U.S.

One application involves distribution of information among a multinational company's dispersed locations. A major British software company, for example, uses Prestel International to transmit information to its field technicians. Soon after a bug is reported in one of the company's software releases, Prestel International provides each technician with a description of the problem, a brief instruction on how to fix it and reference to further information.

Prestel International also distributes general and specialized information provided by commericial data base vendors.

Among these are Lloyds of London, which publishes a daily report of international container ship movements, and various business news organizations providing frequently updated listings of securities and commodities prices.

Invitation Only

Until next spring, Prestel International will be in test mode, and available on an invitation-only basis, Marketing Director Tim Cooke explained.

The service is a joint venture of Logica Ltd., a British consulting firm, and the British Post Office (BPO), which developed viewdata, the world's first commerical videotex system. Within the UK, Viewdata is known as Prestel. The Logica/BPO joint venture, although using separate computer facilities, employs the same searching/indexing scheme as the domestic service.

Cooke stressed that there are advantages as well as limitations to using the viewdata system for on-line business applications. Lack of real-time update capability is one drawback, another is that the search scheme can be "cumbersome" with a large database. The Prestel International database, he added, consists of approximately 7,000 information frames.

A major benefit of Viewdata, he added, is its cost in comparison to other on-line storage/retrieval schemes.

One of Prestel International's information providers is a worldwide hotel chain that accepts reservations through the system. Cooke presented figures showing that the total cost of putting this application on-line was far less than a service bureau would have charged — specifically, $15,000 vs. nearly $60,000.

He also reported that his own company, Logica Ltd., uses an on-line service bureau to maintain its payroll records. The overall cost of this service is $3/min. "The cost of a similar viewdata service, at 6 cent/min for connect time, $10/year frame rental and a $10,000 annual subscription fee would work out to $1.40/min," Cooke said.

Viewdata's big advantage for business applications, he indicated, is its ability to make frequently changing information instantly available to widely dispersed users at a low unit cost. It fills a gap between telex systems, which are simple to operate but have limited data base searching capability, and large, time-shared, research-oriented information retrieval systems that employ sophisticated but expensive indexing schemes.

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Underground Mini Could Avert Mine Disaster

WALLACE, Idaho — A northern Idaho silver mine is using a minicomputer at its 4,000-foot level to develop for the first time a method of predicting rock burts, the small seismic events which plague deep and hard rock mines.

The study's results will not only increase mining safety, but could ultimately lead to prediction of large-scale earthquakes as well.

Galena Mine, managed by Asarco, Inc., is one of five major silver operations in Idaho's Coeur d'Alene district. By using a minicomputer to capture and analyze sufficient seismic data, Galena hopes to outline areas where ground stress is on the verge of violent release.

Knowing where and when these bursts are likely to occur could reduce the potential for injury and even death that is present in mining operations. Where rockbursts can be prevented, Galena will save time lost to repairing small and large bursts — a rockburst several years ago damaged a working area, and mining crews spent two years repairing it.

"When we see one spot in an area that looks critical, we notify the mine manager," the rock mechanics engineer for the mine said. "We're not always correct, but there've been times when miners were pulled from a work area. Other times, they've done destressing. That is a method to relieve pressure by drilling holes to either fracture the rock or cause it to burst in a controlled situation."

The rock mechanics engineer, who is a graduate mining engineer, was cautious in his evaluation of the project. "It's hard to gauge our success because there isn't much to compare it with," he said. "In the past, we had to take it for granted that rock bursts were going to happen. Now, at least, we're doing something about it."

Expanding Field

Although this field of rock mechanics — known as microseismics — has been around since the 1920s, the technology to take advantage of it has not been available until the last five to 10 years. "Now with computers that can collect and process data rapidly and the special sensing devices, this research is expanding," the engineer commented, adding that similar projects have started up in Pennsylvania, Australia and South Africa.

Asarco's mini, a Data General Corp. scientific Eclipse S/230, works with signals received from 30 geophone sensors cemented to walls through the mine. To avoid problems with running sensor cables up the main shaft, Galena built a computer room at its 4,000-foot level complete with air conditioning and fluorescent lighting.

The mine installed the Eclipse S/230 with a memory storage device, 30 char./sec printer and Dasher CRT screen with keyboard.

The Eclipse basically monitors the changing equilibrium of ground stresses by processing signals from the geophones. As these sensors detect rock noises or vibrations from shifting ground, the computer determines the source location for each noise.

The information is both printed out and stored in the computer's memory for future reference. With a growing history of seismic activity for various mine areas, the engineer can determine noise patterns and study them for anomalies, a potential danger sign.

The Galena Mine covers about two miles east to west, is 4,900 feet deep and has a total production of 725 tons of ore/day. Each ton, processed through crushers and flotation cells, yields approximately 20 oz. of silver and seven-tenths of 1% copper.

"The miner's safety is our primary concern in attempting to predict rockbursts," the engineer commented, "but of course productivity is important to us, too. By studying our event history, we hope to come up with a well-defined methodology to guide us."

Galena's computer room, located within the mine itself, is equipped with air conditioners and filters to keep down damaging heat, humidity and dust.

To this end, the computer monitors the mine 24 hours a day, seven days a week. A timing device within the computer accepts the geophone signals for a predetermined interval, creating an "event window."

The engineer programs the computer himself, using Fortran, to produce histograms, maps and accumulation curves to better interpret patterns and abnormalities.

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Model to Aid in Spotting Businesses Near Failure

COLLEGE STATION, Texas — Two professors at Texas A&M University here, building on a research concept of the early '60s, are developing a computer model they hope will produce a set of indicators able to forecast potential business failures.

"What we're trying to test for is firms that have the economic characteristics of failing firms," Dr. Gary A. Giroux, professor of accounting, explained.

Giroux and his associate, Dr. Peter Rose, professor of finance, use information on thousands of companies provided by Compusat Services, a subsidiary of Standard and Poor's Corp., and Security and Exchange Commission reports.

By using a technique known as multiple discriminatory analysis, this information is compared with about 200 financial indicators, such as a company's profit margin, size of debt and other balance-sheet particulars. The professors hope to come up with a set of equations that classify fail and nonfail firms.

The model is being tested in the DP department of Texas A&M on an Amdahl Corp. 470V/6 mainframe.

Back in 1960, Edward I. Altman, a professor at New York University, developed a similar model called Z-Analysis.

"Our approach is basically similar," Giroux said. "Our data analysis is a little more complete. We're using more years and we're using a considerably larger data base."

When perfected, Giroux said, the model will not be commercially marketed, but used to help companies recognize early signals of disaster.

Instead of Public Seminars

Consultants Offer Alternative Training Plan

By Jeffry Beeler

CW West Coast Bureau

DANVILLE, Calif. — A northern California consulting firm is offering computing professionals an alternative to public training seminars, which are often criticized for their irrelevance, overcrowdedness and lack of specific information.

The proposed alternative will provide information systems personnel with an opportunity to attend a wide selection of educational seminars, workshops and conferences that will differ from more traditional programs of computing instruction in at least three important respects.

First, the training program will strictly limit seminar and workshop attendance in an attempt to cultivate group rapport and thus stimulate interaction and information exchange. Second, the plan will reportedly give seminar and workshop attendees an opportunity to customize their course of study to meet their unique professional needs. Third, course materials will reportedly cost $90 per student-day, roughly half the price of many typical public seminars.

Education Consortium

Developed at the consulting firm of Kapur & Associates, Inc. based here, the alternative training program will be implemented through a so-called Education Consortium, a newly formed society of computing professionals and senior executives united by a common interest in increasing their knowledge of software engineering, structured methodology, programmer productivity aids and related topics.

Members of the consortium will represent a broad spectrum of large and medium-sized companies ranging from banks to insurance firms to manufacturing outfits. At present, the group boasts 10 member organizations, and consortium founder Gopal Kapur reportedly intends to limit membership to about 30 companies.

Among its chief benefits, the consortium offers members an opportunity to:

- Attend up to 16 one-week seminars and workshops covering topics like structured analysis and design, effective management of computing projects, structured programming, methods for conducting walk-throughs, structured testing, the development and implementation of structured programming standards and procedures and techniques for cutting maintenance requirements.
- Join the consortium's Education Committee, which controls the form, content and scheduling for each of the instructional seminars and workshops.
- Take part in an annual one-day Executive Seminar aimed at updating technical and nontechnical management about the latest developments in software engineering, structured methodology and programmer productivity.
- Attend a Structured Methodology Users Group conference, an annual one-day event that will give participants an opportunity to hear formal presentations and exchange ideas and information with fellow members.
- Take advantage of an information clearinghouse and newsletter.

The consortium's Education Committee will consist of one representative from each of the participating organizations and will meet at least twice yearly to give members an opportunity to reassess the group's instructional needs, Kapur said.

The Education Committee and information clearinghouse will be reserved for consortium members only, while the remaining services will be open to a limited number of nonmembers.

To join the consortium as a full member, organizations will have to pay a $500 one-time-only joining fee plus $325 per year in membership dues. Seminar seats cost $90 per day for a minimum purchase of 60 student-days of instruction.

For charter members who join the consortium before Dec. 31, special discount membership rates will be available from Kapur & Associates at 776 El Cerro Blvd., Danville, Calif. 94526.

FAA Inks Arts IIIA Pact Despite Patco Criticism

WASHINGTON, D.C. — The Federal Aviation Administration (FAA) is moving ahead with its plan to install Arts IIIA computerized air traffic control (ATC) systems in 63 major U.S. airports despite criticism that the system still has not been perfected.

The agency has awarded a $43.3 million contract to Univac to upgrade the automated ATC systems at 34 airports, with equipment deliveries scheduled to begin in 1982.

Univac's previous contract to upgrade 29 airport installations called for equipment to be installed in those locations by January 1981 [CW, Feb. 18].

The first contract announcement came on the heels of a charge by Tampa, Fla., Professional Air Traffic Controllers Organization (Patco) members that their hybrid version of Arts-IIIA was "unsafe and unreliable" [CW, Feb. 11].

Basic on a modified Univac I/O Processor (IOP), Arts IIIA is designed to track both "primary" and "secondary" radar targets, as opposed to the commonly used Arts III system, which tracks only secondary targets.

Secondary targets are those equipped with electronic transponders carrying identification codes that indicate airline name, flight number, altitude and ground speed. Primary targets are smaller aircraft that are not equipped with transponders.

While FAA spokesmen have contended the Arts IIIAs going in around the country are "completely different" from the troublesome Tampa system, controllers already using Arts IIIA claim the system fails too often, displays overlapping targets on their radarscopes, sometimes fails to track airplanes and occasionally tracks airplanes that are not there.

The FAA has made improvements in the system since the initial phase-in, but some problems remain, according to Mike Coe, Patco facility representative at Atlanta International Airport.

"The computer people say the problem is with the radar, and the radar people say the problem is with the computer," Coe said last week.

Still plagued with mistracking and target overlapping, according to Coe, the system has improved in the area of recovery time from power fluctuations. "The 3-second recovery is a great improvement over the 27-second recovery, but sometimes it doesn't recover at all, and you don't know whether it will," Coe noted.

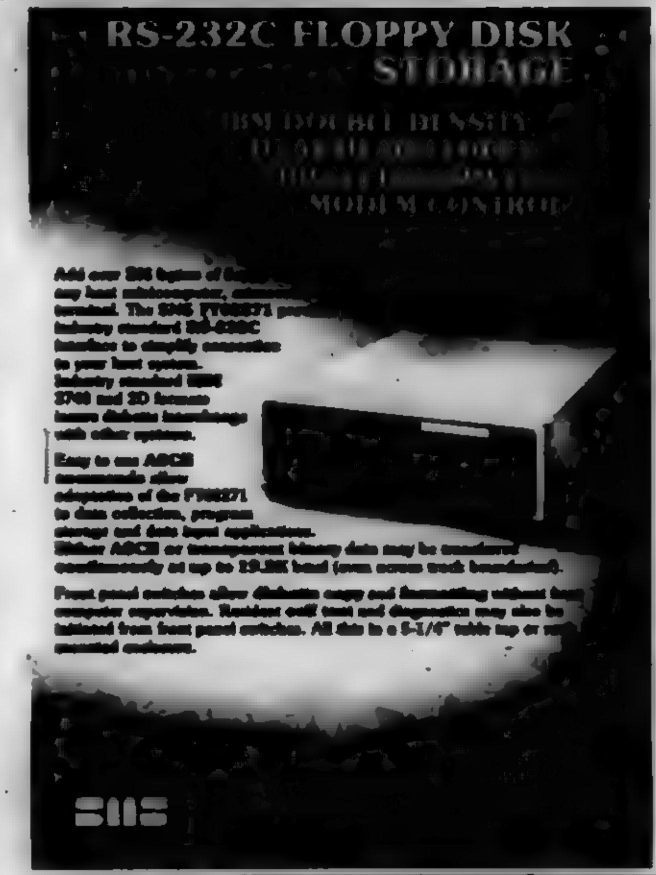
The shorter recovery time was made possible through installation of a battery power-conditioning system put in "three to five months ago" that guarantees the power will "come right back up" in the event of a failure, he explained.

IWPA Changes Name to Reflect Scope, Abilities

WASHINGTON, D.C. — At the fall meeting of the executive board of the International Word Processing Association, held here Oct. 19, the directors voted to expand the association's name to "International Information/Word Processing Association." The nonprofit professional group will use the new name starting June 1.

According to the directors, the expanded version of the name reflects a broadening of the agency's professional role. The board felt that the new name would better describe the abilities and scope of the association.

More information on the International (Information/) Word Processing Association can be obtained from the group at 1015 N. York Rd., Willow Grove, Pa. 19090.



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Comnet to Probe Reagan's Impact on Industry

HOUSTON – The impact of the Reagan administration on the communications industry and Washington regulatory agencies will be a main topic of discussion at the Communications Networks '81 (Comnet) national conference and exposition when it is held here Jan. 13-15.

General Conference Chairman Richard E. Wiley, former chief of the Federal Communications Commission, has arranged a series of panels that will examine the new administration's ideas, changes in congressional makeup and struggle for power in relation to telecommunications policy.

Featured speakers examining how communications professionals will be affected will be Allen J. Krowe, president of IBM's Systems, Communication Division, who will discuss telecommunications profitability and resource employment; Robert LeBlanc, vice-chairman of Continental Telephone Co., who will talk about winners and losers in the communications marketplace and future trends; and Dr. C. Jackson Grayson Jr., chairman of the American Productivity Center, who will provide a perspective on telecommunications' influence on U.S. productivity.

The panels will include: "Legislative and Policy Framework for Telecommunications in the 1980s"; the "Second Computer and Communications Inquiry," examining the doctrine of competition; "What Is the Franchise for USPS and Public EM/MS Networks?," studying electronic mail; and "Policy, Regulatory and Privacy Problems," dealing with transaction communication issues.

Conference registration for the full three days costs $395; one day is $145. More information is available from The Conference Co., 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Town Meeting Session To Cover Bell's Future

HOUSTON – The future of the Bell System, its users and competitors will be probed at the Communications Network '81 (Comnet) annual town meeting here on Jan. 13.

"The Future of AT&T: For Whom the Bell Tolls," will center on unregulated subsidiaries of the Bell System and their move into the marketplace, a central concern of the '80s, the organizers said.

Representing various positions will be William M. Ellinghaus, president and chief operating officer of AT&T; William McGowan, chairman of MCI Communications Corp.; Winston Himsworth, vice-president of Soloman Brothers, investment bankers; Ray Sanders, president of Tran Communications, a division of Amdahl Corp.; Ken Anderson, formerly a chief counsel on the Justice Department case against AT&T; Joseph Fogerty, commissioner of all Federal Communications Commission (FCC); George M. Shea, of National Data Corp., and the Association of Data Processing Service Organizations; Paul Henson, president of United Telecommunications, Inc.; and Walter Hinchman, consultant and former chief of the FCC Common Carrier Bureau.

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Constant Corporate-Level Change Blamed for MIS Planning Chaos

TORONTO — "Constant changes taking place within corporate structures are often the reasons why information processing master plans become so chaotic," R.G. Taylor, president of Datacrown, Inc., told the recent Canadian Computer Conference here.

"Mergers, acquisitions and divestments often force DP departments to alter MIS systems, which tie up the staff and prohibit the development of new applications," Taylor explained.

Commenting on the topic of whether the DP profession will be able to meet the demands of the future, Taylor stated that the backlog of underdeveloped systems that has arisen because of computer cost-effectiveness must be rectified if users' needs are to be met.

"The DP industry must make a supreme effort within the next few years to alleviate the problems that now assail it if it is to realistically meet future demands," he stated. "Enormous strides have been made in the last few years in operating systems to give greater performance, reliability and security. Hardware now features things that were not always priority demands of users in the past."

Taylor pointed out that the "user-friendly" terminals of today will let managers handle their day-to-day operations through the desktop terminal.

"With the advent of distributed data processing and telecommunications culminating in a trend toward decentralization, DP departments will have more control over the purchasing of hardware in their organizations," he said.

He also noted that computer service companies have the ability to make major contributions to meeting the demand for more and better services because of their ability to stay abreast of the industry's state of the art.

The audience at the conference was generally in agreement with Taylor's opinion that the end user must become more involved and that a heightened level of cooperation is needed between senior management and DP professionals.

Usita Schedules Seminar On Deregulation Issues

WASHINGTON, D.C. – Three more Roundtable Seminars on "Deregulation and Competition in a Changing Telecommunications World" have been scheduled by the U.S. Independent Telephone Association (Usita), in cooperation with the Organization for the Protection and Advancement of Small Telephone Companies.

Sites include Atlanta on Jan. 7-8; Salt Lake City, Feb. 9-10; and Boston, Feb. 25-26.

Access charges, settlements and separations, deregulation and competition will be among the topics covered at the seminars.

The $150 registration fee is being charged to help defray costs for the nonprofit organizing sponsors. Additional information is available from Usita offices at Suite 1201, 1801 K Street, N.W., Washington, D.C. 20006.

Efta Elects Top Officers

WASHINGTON, D.C. – Howard Mandelbaum, vice-president at Manufacturers Hanover Trust Co. in New York, and Robert Barone, vice-president and general manager of financial marketing at Diebold, Inc., were recently elected chairman and vice-chairman, respectively, of the Electronic Funds Transfer Association (Efta).

Mandelbaum, a charter member of the group, most recently served as its vice-chairman. He is responsible for retail EFT research and planning at his bank.

Barone, also a charter member, heads up the Automatic Banking Group in his organization.

The next public meeting of Efta members will be held in Chicago, Dec. 7-9. Further details can be obtained from Efta headquarters at Suite 502, 1029 Vermont Ave., N.W., Washington, D.C. 20005.

Calendar

Dec. 8-12, Boston — **Structured Programming: Design, Coding and Implementation Techniques.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Dec. 8-12, Los Angeles — **Strategies for Software Development,** Contact: Yourdon, Inc., Suite 3830, 1133 Avenue of the Americas, New York, N.Y. 10036.

Dec. 8-12, Ft. Lauderdale, Fla. — **How to Develop Long-Range Data Processing Plan.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

Dec. 8-12, San Francisco — **Structured Systems Analysis and Design,** Contact: Oberland Associates, 4036 N.E. Sandy, Portland, Ore. 97212.

Dec. 8-12, Washington, D.C. — **IMS/VS Data Base Design.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Dec. 9, Cambridge, Mass. — **Remotely Sensed Data: Management and Integration.** Contact: Harvard University, Laboratory Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 9, San Francisco — **Computer-Aided Thinking for Financial Executives.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Dec. 3 in Madrid and Dec. 11 in Los Angeles.

Dec. 9, Boston — **Automatic Control of Execution (ACE).** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

Dec. 9-10, Washington, D.C. — **National Data Systems Forum and Exhibit.** Contact: Transportation Data Coordinating Committee, 1101 17 St. N.W., Washington, D.C. 20036.

Dec. 9-11, Hartford, Conn. — **DL/1 Application Programming Workshop.** Contact: The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Dec. 9-12, Anaheim, Calif. — **Voice Input/Output for Computer.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

Dec. 9-12, Boston — **Interactive Computer Graphics.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

Dec. 10-11, San Francisco — **Recovery/Restart.** Contact: On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Dec. 10-11, Gaithersburg, Md. — **Computer Networking Symposium,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: Computer Networking, P.O. Box 639, Silver Spring, Md. 20901.

Dec. 10-12, New York — **DP Operations Today: Effective Scheduling and Console Operation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 10-12, Singapore — **Telecom Conference and Exhibits.** Contact: John Sodolski, 2001 Eye St. N.W., Washington, D.C. 20006.

Dec. 10-12, Houston — **Leadership Skills for Office Supervisors.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held Dec. 17-19 in New York.

Dec. 10-12, Wellesley, Mass. — **Structured Programming Workshop.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., Wellesley, Mass. 02181.

Dec. 10-12, Washington, D.C. — **Linear and Nonlinear Model Fitting.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, VA 22201.

Dec. 10-12, Hartford, Conn. — **Audit and Control in the Data Base Environment.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Dec. 10-12, Dallas — **Distributed Systems: Effective Approaches and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 10-12, Washington, D.C. — **Intershake Concepts.** Contact: Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314.

Dec. 10-12, San Francisco — **Office Automation Systems.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 10-12, Washington, D.C. — **Microfilm Information Systems.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Dec. 10-12, New York — **Introduction to Data Communications.** Contact: Systems Technology Forum, 8901 Cotswold Drive, Burke, Va. 22015.

Dec. 10-12, San Diego — **DP Disaster Recovery Workshop.** Contact: EDP Security, Inc. 400-402 Totten Pond Road, Waltham, Mass. 02154.

Dec. 11-12, Washington, D.C. — **Technical and Policy Issues in Electrical Mail and Message Systems.** Contact: American Federation of Information Processing Societies, Inc., P.O. Box 9657, Arlington, Va. 22209.

Dec. 12, New York — **Word Processing.** Contact: The University of Albany, Draper 306, Albany, N.Y. 12222.

Dec. 12, Cambridge, Mass. — **Computer Mapping: Getting Started, Applications.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Dec. 12-15, Acapulco, Mexico — **International Congress on Applied Systems Research and Cybernetics,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: George E. Lasker, School of Computer Science, University of Windsor, Windsor, Ont. M9B 3P4, Canada.

Dec. 15, New York — **Communications Choices for the 1980s — Hardware, Software and Services.** Contact: The New York City Chapter of the Association for Computing Machinery, P.O. Box 245, New York, N.Y. 10017.

Dec. 15-16, Washington, D.C. — **Increasing Manufacturing Productivity Conference.** Contact: American Institute of Aeronautics and Astronautics, P.O. Box 91295, Los Angeles, Calif. 90009.

Dec. 15-16, San Francisco — **Communications Technology Trends.** Contact: Systems Technology Forum, 8901 Cotswold Drive, Burke, Va. 22015.

Dec. 15-16, Boston — **Data Base Management, Administration, Control.** Contact: Battelle Seminars and Studies Program, P.O. Box C-5395, Seattle, Wash. 98105.

Dec. 15-17, New York — **Systems Analysis and Design: Concepts and Practice.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 15-17, Washington, D.C. — **Computers: Hardware and Software.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Dec. 15-17, Washington, D.C. — **Data Base Systems: A Comparative Analysis of General-Purpose Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 15-17, New York — **Advanced Design-Traditional Networks.** Contact: Systems Technology Forum, 8901 Cotswold Drive, Burke, Va. 22015.

Dec. 16-18, Phoenix — **Auditing, Security and Controls.** Contact: Advanced Computer Techniques Corp., 222 N. Central Ave., Phoenix, Ariz. 85004.

Call for Papers

TWENTIETH ANNUAL TECHNICAL SYMPOSIUM OF THE ASSOCIATION FOR COMPUTING MACHINERY, College Park, Md., June 18, 1981.

Innovation is the main theme of this meeting, and relevant papers are being solicited with empirical, practical and theoretical slants.

Authors should submit five double-spaced (unpublished) manuscripts to the program vice-chairman, W.M. Osborne, by Jan. 13, to Room B265, Technology Building, National Bureau of Standards, Washington, D.C. 20234.

WORKSHOP ON SOFTWARE ENGINEERING STANDARDS APPLICATIONS, San Francisco, Aug. 18-20, 1981.

Papers that summarize the impact of or experience with the application of software engineering standards are being sought for presentation by the IEEE Computer Society. Suggested topics include the selling of standards; the drive to standards; process standardization vs. recommended practices and tradeoffs; unreliable standards; realistic standards; cost effectiveness; standards development and compilation; factors in standard selection and tailoring; the case against standards; and other relevant themes.

Five copies of each submission are requested and should include a 750-word summary along with the 3000-word paper. Proposals should be mailed by Jan. 26; and writers will be notified of acceptance by March 30. Authors are reminded to include address and phone numbers. Camera-ready copy is due back May 25.

Participation in this workshop is limited to the authors of accepted papers and guest speakers and panelists. All accepted papers will be published in the proceedings.

Proposals should be sent to E. Bersoff, CTEC, Inc., 7777 Leesburg Pike, Falls Church, Va. 22043.

AUTOFACT III CONFERENCE AND EXPOSITION, Detroit, Mich., Nov. 9-12, 1981.

The Society of Manufacturing Engineers (SME) has issued a call for papers for its Autofact III conference and exposition on the automated, integrated factory. The technology areas to be discussed include computer-aided design and graphics, computer-aided manufacturing, automated assembly, materials flow and inventory control, inspection and quality control, predictive maintenance, automatic controls and processes and robotics.

Persons wishing to submit papers should contact Kevin Miller at the Technical Activities Dept., SME, One SME Drive, P.O. Box 930, Dearborn, Mich. 48128.

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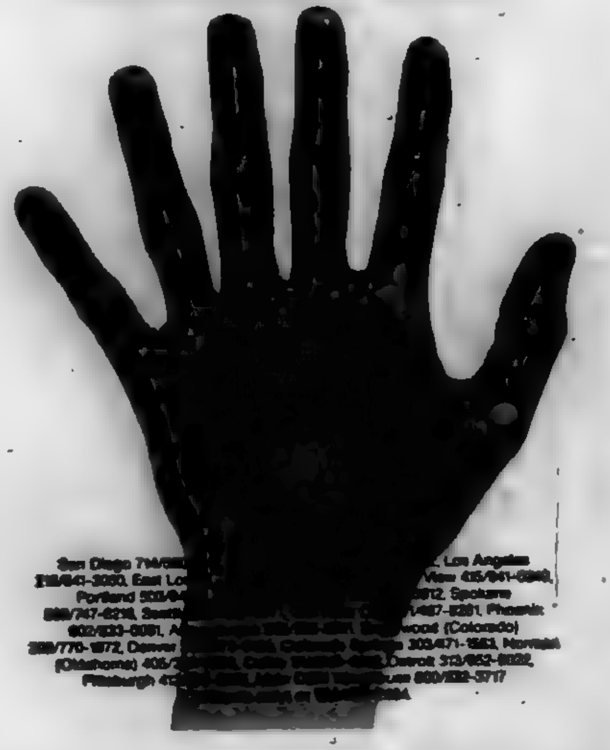

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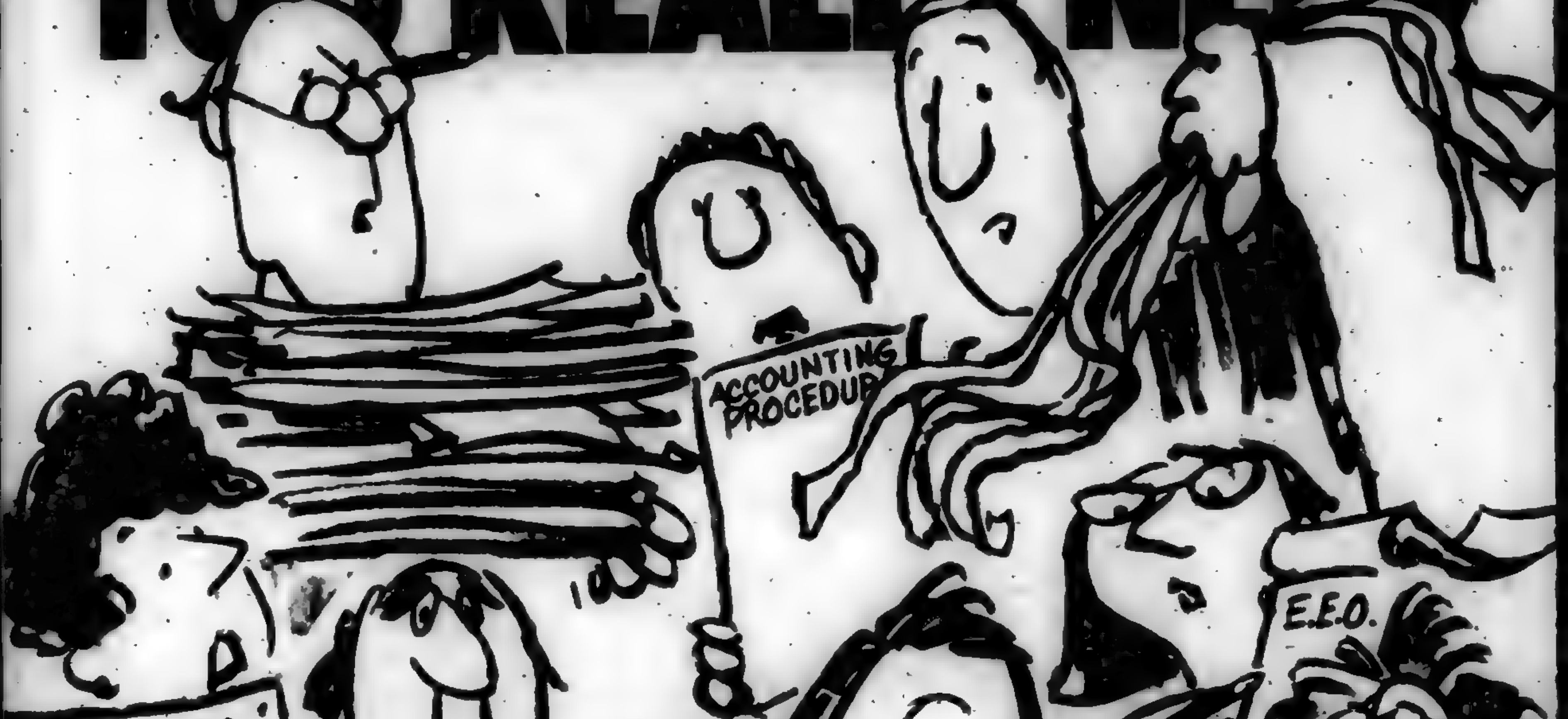
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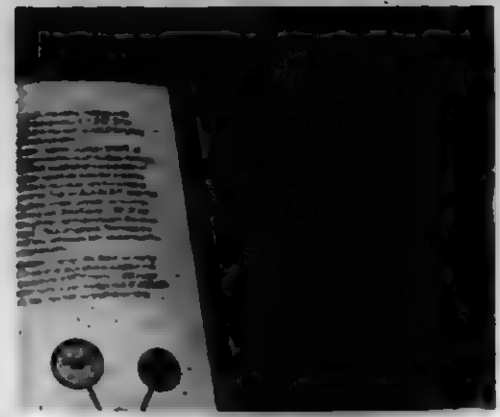

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EDITORIAL

What Course for the 3081?

IBM's recent announcement of the 3081 processor will leave users in a state of confusion until many details about the system are clarified.

For the past two years, a series of leaks from within IBM has given industry watchers a glimpse of the "H" series of mainframes which the IBMers claim will be IBM's main system in the 1980s.

However, the 3081 does not live up to many of the observers' expectations. But whether that means the expectations were off the mark or that IBM has more up its sleeve in the form of "mid-life kickers" for the system remains to be seen.

In any case, some directions are hinted at in IBM's release material.

For one thing, while the 3081 may be to H what the 370/155 was to the real 370 line, IBM will probably not have to outmode the 3081 system in order to add additional functions.

Users with long memories will remember that IBM announced the 370/155 and 370/165 with much fanfare in 1970. However, neither offered virtual storage capability, which was to be a hallmark of the 370 line. Within two years — and the announcement of the 370/148 and 370/158 — the systems were completely outmoded and a rather expensive piece of hardware — a Dynamic Address Translation (DAT) box — had to be added to make the 155 and 165 act like real 370s.

In many ways, the 3081 is like those early 370s — many more functions will be added over the life of the system, but probably without the disruption associated with the early 370s. Apparently IBM will be able to do this through a combination of microcode and changes to software, particularly operating system software.

"The 3081 contains multiple, distributed control stores which interact asynchronously, permitting functional changes with minimal hardware impact," IBM said in a description of the system issued to the press and users.

The use of control storage [illegible] for microcode — will permit the firm to add functions to the 3081 without completely outmoding the processors themselves.

In addition, IBM has put a lot of capability into the channels of the 3081, which can handle many paging functions that formerly had to be handled by the central processors.

By putting a large amount of computing power in the channels, the firm should be able to add functions such as back-end data base processing or other specialized processors without having to change the central processor configuration.

So while users should be somewhat leary of purchasing a 3081 — and should ask for some assurances from IBM that the firm does not plan to obsolete the system within a year or two — the system may not turn out to be the turkey the 370/155 and 165 became.

DATA PAST

Five Years Ago
Dec. 3, 1975

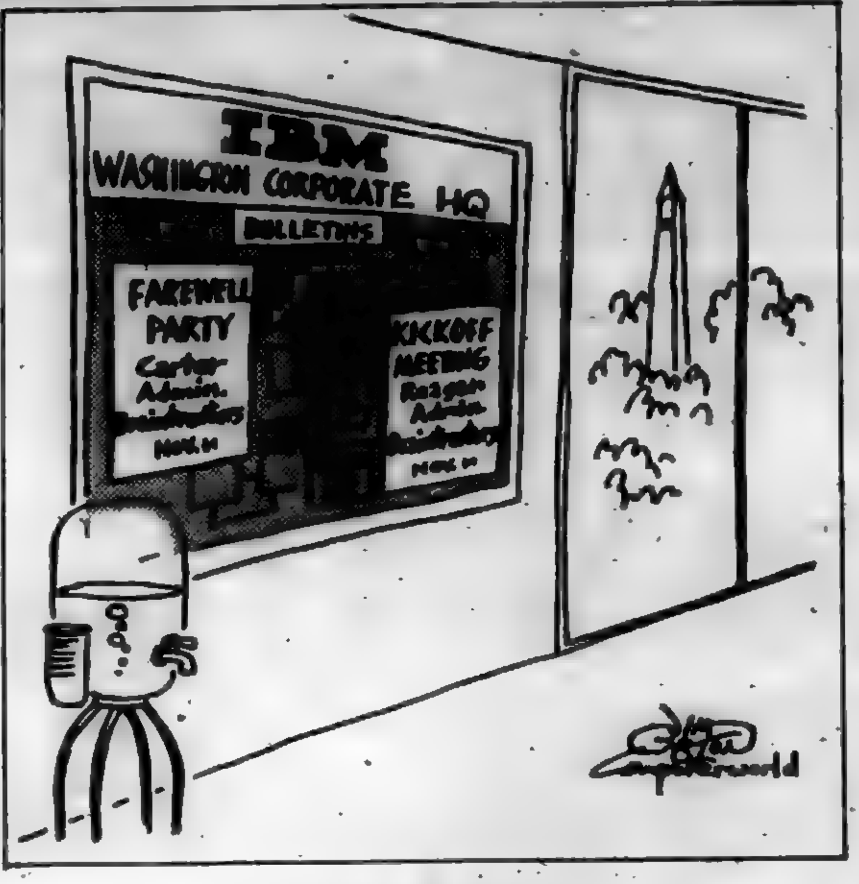
NEW YORK — Loopholes that facilitate DP-aided fraud existed "in all business systems," either by design or oversight, according to Leonard I. Krauss, manager of Ernst and Ernst's Management Consulting Services. Krauss told attendees at the Second Annual Computer Security Conference Workshop here that managers should "have a formalized approach" to fraud analysis.

– – –

LOS ANGELES — A 42-year-old DP executive, accused of stealing computer time and using someone else's password to gain access to the system, was arraigned in municipal court here. Marvin H. Maki, who worked for Manufacturing Data Systems, Inc. (MDSI), allegedly used information learned as an MDSI employee to gain access to that firm's computer.

Eight Years Ago
Nov. 29, 1972

DENVER — The Colorado Supreme Court barred the compilation of arrest records on persons who had not been convicted of crimes. The move made it illegal for police agencies to store or transmit criminal history information or rap sheets on persons arrested for criminal acts, but never convicted.



LETTERS

Enough Said

"Robotics Advances Aimed at Assembly Lines" [CW, Nov. 3] was very interesting. But I am forced to make one comment: In response to William E. Jarett's statement that there is only *one* limit to robots, namely us, I am wondering if he has ever encountered that American phenomenon — the union. Enough said about only one limit.

James Hoffner

Minneapolis, Minn.

Hung Up About Age

I was appalled by Larry Long's answer to the 57-year-old programmer with 24 years' experience who could not get a job [CW, Nov. 3]. I felt the answer was misleading and, most significantly, demonstrated a lack of sensitivity toward a serious problem in business.

The defense offered for the discriminating personnel managers was that by hiring an older person, they were exposing themselves to future age discrimination suits!

By the same logic, it would be unwise to hire any blacks, females or other minorities.

Long's reference to the "paradox of government intervention surfacing its ugly head" was a cop-out and a cheap shot.

Agism, racism, sexism or any other form of bigotry, when introduced into the personnel management process, repudiates the classical free enterprise theory that each individual would be reimbursed for what he is worth, without regard to irrelevant considerations.

Discriminating personnel practices are economically unsound for the above reason, socially irresponsible because in the aggregate they create an alienated and underutilized caste in our society and morally evil because of the psychic damage done to the individual.

It is conventional wisdom to characterize government bureaucracy as stupid and incompetent and business managers as all-wise and super-efficient.

Long's analysis of this particular situation reinforces the thesis that business gets the regulation it deserves.

If the firms involved in the cases cited have pension plans so poorly constructed that they could not afford to carry an older new hire, then they have an inherent agist bias and should be revised to permit the waiver of pension benefits or to base the pension on length of service, which could be done without running afoul of discrimination laws.

[Name Withheld by Request]

Action for Afghans

I read with interest the Oct. 20 article "DPers Contribute Big to Afghan Aid Fund." I believe Don Weidenweber's view that DPers have a strong sense of world affairs is true. We are conscious that we are shaping the future as no other industry is and wish these profound changes to work for the benefit of all mankind.

The idea of computers assisting the outrageous invasion and destruction of Afghanistan is sobering. As I become more aware of the immediate humanistic issues challenging the maturity of our profession, the larger issues take clearer shape. Is it possible to sell our achievements to the Soviets without facilitating acts of this kind? Some things just should not be automated.

These thoughts are part of my deep feeling of compassion for the courageous Afghans defending their country against awesome odds. I encourage all my fellow DPers to commit to some form of action in confronting this issue. Supporting American Aid for Afghans seems an ideal way.

Robin H. Shaylor

Portland Ore.

SOCIOLOGY OF COMPUTING/Robert L. Glass

Management Enters the Garden of Eden

Once upon a time, when coding was done in binary and the console "halt" button was considered a useful device, there arose in the land a small band of iconoclasts who spoke only to computers.

These people, clad in shirtsleeves, faded dungarees and loafers, slaved happily hour after hour over a hot console, making automated magic emerge from the giant vacuum tubes and playing the toggle switches like master musicians. Nothing gave them more pleasure than to elicit good responses from the flashing-lighted, tape-twirling seductress that inhaled all of their punched cards and switch settings and responded coyly with dubious logic and faulty checksums before finally sanctifying their numbers with the holiness of her awkwardly stylized printer.

A name was given to these iconoclasts; they were called "Programmers," and their creations were called "Programs," and the object of their love/hate relationship was called a "Computer." And as word of the Programmers' magic achievements spread throughout the land, a romanticism grew about their activities, and an awe grew about their results, and their numbers increased.

Before the first payroll program ever existed, these dedicated weavers spun tiny bits into big bucks. Before the first computer science course was taught, these earnest learners had mastered the intricacies of multilingual communication with inanimate devices. And before the first programmer manager existed, these technologists were sincere, dedicated and responsible workers whose only concern was doing a job well.

But into this Eden slithered a snake bearing beguiling apples labeled "Success." The responsible, multilingual Programmers found more and more of their time spent manipulating the big bucks, and less and less the tiny bits. And this did not please them. The big bucks, they felt, were a pleasant and necessary nuisance, a digression from Eden. The technology, the infinite twiddlings, were the goal. Pleasure derived from the computer, not from the bucks.

Tempting Fruits

The fruits of Success tempted the Programmers, and soon they bit into the shiniest and brightest of the lot, one with the extra label "Management." With Management on their team, they reasoned, they could spend less time on the bucks and more on the bits. They would delegate the uninteresting, largely trivial task of money management and free themselves to return to their technology. After all, wasn't that what Programming was all about?

And so they did. The Programmers hired a meek, eyeshade-wearing, stool-sitting accountant to track their big buck problems with his quill pen and inkstand. "Bother us not," they said to him, "unless disaster is imminent.

"Manage our money," they said to him. Then they added, parenthetically, "But don't manage us." And they went back, happily, to their collective consoles.

But as the accountant sat on the tall stool day after day, making the pennies balance under each horizontal line he drew, he perceived that not only was there more to life than horizontal lines and numbers, but he had it all within his grasp. The bucks the Programmers had attracted for their wares were indeed Big Bucks, and the accountant began to realize that he had sole control over all that money.

Accountant's About-Face

There are many possible interpretations of "The meek shall inherit the earth." The last one the Programmers would have expected was that their mild-mannered accountant would turn

(Continued on Page 36)

SOFTLINE/Werner L. Frank

Software Maintenance Here to Stay

Software maintenance is surely the most talked about problem after the issues of implementation are set aside. And maintenance and implementation are key topics today since these two efforts comprise the lagging software productivity dilemma.

Industry observers report that the maintenance portion of the software life cycle can consume more than three to five times the effort initially expended for the basic implementation itself. Others report that up to 70% of the ongoing efforts in programming departments are occupied with modifying earlier written software.

The intensity of this effort can also be noted by the following observations:

(1) Programs grow over time, doubling or even tripling in lines of code over the life cycle, from the initial development size.

(2) Individual instructions are replaced rapidly so that the half life of a written piece of code is only a few years.

(3) Program maintenance is expensive since the practitioners have limited tools and incentives for doing a cost-effective job.

All this leads to the seeming conclusion that maintenance is a costly nuisance. It is also the iceberg that is bound to scuttle budgeteers who fail to incorporate sufficient resources into their tables of organization as new applications make their appearances. That is to say, for every programmer who develops new software, the organization must anticipate adding two-thirds of a maintenance person to the staff annually just to stay in place, if the software has an optimistic life cycle of eight years.

Containing the Monster

Thus we have the basis for motivating the containment of this maintenance monstrosity. Suggestions come from four directions:

(1) Do a better initial design job to eliminate or at least minimize the ultimate defect-removal process during systems operation.

(2) Do a better programming and documentation job through structured methods and careful checks in order to minimize operational bugs or to facilitate their fix.

(3) Use programming development tools and aids that simplify the statement of problems and to the extent possible employ previously generated, checked-out code.

(4) Use packaged software that is centrally maintained for many users.

But we do ourselves a disservice in thinking that software maintenance is necessarily bad and avoidable. Unfortunately, we are too prone to associate the word with "repair" and connect this function with the use of the term in a hardware context.

After all, hardware maintenance is what we really understand and can gracefully expect and accept, since all machines wear out over time. On the other hand, weakness in software seems to be hard to acknowledge, since it speaks to the inadequacy of the individual creator — who should be in control of the situation.

Important Differences

But hardware and software maintenance are different! As so ably pointed out by my colleague, Fred Braddock, the objective in coping with hardware maintenance is to achieve consistency from the point of view of its operability. But in the case of software, what we call maintenance is, for the most part, a concern with chasing change.

In other words, in hardware maintenance we wish to maintain efficient machine performance by avoiding breakdowns and causes of errors. Hence, we are willing to even cease operations from time to time and pay for preventive maintenance.

In the case of software maintenance, much is concerned with correcting de-

(Continued on Page 38)

READER COMMENTARY/Domenick Flotta

A Zip Code Solution

As team leader and supervisor of maintenance programming in our division, I have been concerned with the possibility of converting to a nine-digit Zip Code. This has prompted me to decide what could be done about it using minimal factors supplied by the U.S. Postal Service (USPS) in the form of a conversion tape. Cobol is the language used in our division.

First let me point out that our existing files containing Zip Code data will not pose a problem insofar as space is concerned. The nine-digit code can simply be packed into the present five-position field. The exceptions are those fields that may have the current five digits packed into three positions.

The old formula:

$$\frac{\text{field size}}{2} + 1 = \text{packed size}$$

indicates that nine unpacked digits fit nicely into five packed bytes of storage. Thus size is not much of a factor in our conversion on storage media. However, display media and printed documents or labels will need complete revisions to allow the edited nine-digit code to be inserted.

Putting aside the size conversions and getting into the actual Zip Code conversion, let us assume a tape is furnished by the USPS. This means we will have two input files, the USPS file and our own, to have Zip Code data converted. I am assuming that the USPS tape would consist of records that would be used as table entries in the following format: The record minimum size would possibly be 39 positions.

- Positions 1 to 5 — current Zip Code.
- Positions 6 to 35 — first line of address.
- Positions 36 to 39 — four-digit extension.

Taking the above into consideration, we can see that the furnished tape records would have to be stored in a table or tables depending on the size of the file. After this, the file would then be processed by extracting the current Zip and first line of address to build a search key for matching against the table.

On a match, the four-digit extension would be moved to a work field preceded by the current Zip Code. This field is redefined as picture 9 (9). The redefined field is then moved to the output Zip Code definition: picture 9 (9) Comp-3 (packed decimal).

In order for a conversion of this type to work, the following must be true:

- The supplied first lines of address must furnish a match.
- To match they must come in various formats including all possible abbreviations and various characters used in addresses.
- If other factors are used, they would have to follow suit unless the USPS has new unknowns.

Flotta is with the Pennsylvania Bureau of Health Data Systems located in Harrisburg, Pa.

LETTERS

Perhaps a White Robe?

I teach a graduate-level MIS course at night at a local military base. At the conclusion of the last term, I was given copies of the student evaluations of the course. One student replied, "I expected more variety in MIS and was disappointed to find it only the process of logic."

Obviously I was not living up to the reputation of the computer "type." Next term, I am contemplating renaming the course "Management Information Magic." I will be sure to include whistles, bells and flashing lights. Perhaps I should wear a white robe.

William J. Maisey

Lackey, Va.

Likely Pitfall

"Rookie Users Warned of Micro Shortcomings" [CW, Nov. 10] I believe gave the wrong warning to the right people. The most likely pitfall for the first-time user is speaking to unqualified people who sell micros.

Micros can and do serve a very useful purpose to small businessmen. They can provide management information that is valuable.

The real problem is that many sellers of microcomputers have not the slightest idea of the *results* the businessman needs to run his business. That is evident in the mortality rate of such sellers as computer stores.

The best interests of the computer industry, users and sellers of micros will not be served until salespeople are taught accounting and management information requirements. Prospective users are waiting eagerly to talk to someone who understands their needs.

Computers are no longer wonders, they are tools. The buyer should not be expected to "reinvent the wheel" by diagnosing his own requirements and exposing himself to salesmen whose only claim is a high degree of technical knowledge, not results.

B.R. Mills

Fort Myers, Fla.

Not Energy-Related

David F. Stevens' article, "The Menace of Micros" [CW, Nov. 3], presented some interesting speculation on the future, however it did not appear to be related in any way to energy or the problems of energy in the future. I point this out because the Department of Energy paid for this research and probably expected a finished product that at least mentioned the word "energy" once.

The closest Stevens ever got to the subject of energy was mention of brain power and brain cooling factories (unless we assume Dr. Frankenstein was mentioned as an example of the first solar-powered toy).

While the few talented inventors in America scramble for R&D funding from the Department of Energy, we find that the money is being wasted on factless, hypothetical wanderings which present no immediate or long-term solutions. The public, and the readership, would be better served if *Computerworld* reported solutions instead of suppositions.

Wayne J. Socha

Phoenix, Ariz.

Simplistic Analysis

Dr. Robert Parslow's contention that the quality of life is declining because of computers [CW, Nov. 3] is like saying that air pollution is a result of the discovery of electricity. Parslow reminds me of a local police chief that recently recommended that our park benches be removed because drunks sleep them. Such simplistic analyses of what are symptoms and what are problems lead to erroneous "solutions."

There is no doubt that society needs to be made aware of possible applications and abuses of computer technology. We must actively manage the use of these tools. But don't let us blame Ben Franklin the next time we handle a frayed wire and get an electric shock.

James O. Baldwin

Philadelphia, Pa.

Right On!

When I read the report of Dr. Richard Hamming's talk ["Programmers Slammed for Not Keeping Up," CW, Oct. 20], I thought, "Right on!" I certainly never expected to see letters of disagreement.

My degree is in aeronautical engineering; I got into programming almost by accident and stayed in because I liked it. Both as an engineer and as a programmer, I have taken the position that it is my responsibility, not my employer's, to study my chosen field after work as well as during work.

Of course, my employer has helped me do so, to some extent, and I would prefer it do more. But Mr. McCarthy, ["Implausible Position," CW, Nov. 10] had it backwards. To put it correctly, "Not until programmers take the time and money to keep up with technolog-

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Management Enters the Garden of Eden

(Continued from Page 35)

into a Supermanager before their very eyes. But turn he did.

Gradually, as in slowly but surely, the accountant used his knowledge of the financial aspects of the Programmers' tasks to gain control of those tasks. And all too soon, instead of the accountant doing the Programmers' bidding, the situation was reversed. Supermanager was behind the man behind the console, with his hands in his pockets.

It is time to digress from our tale. What is happening here is not just a story about computing. What is happening is a more historically significant saga, clad in computing clothing. What is happening here is a fable that might be called "The Technologist and the Administrator."

Try reading the story on another level. For "Programmer," read "inventor of the wheel." What we see emerging from the caves of early technology is the origin of management, not as the knight in shining armor saving the world from the mad scientist (mixed metaphorically speaking), but as the Fagan of technology, grasping the reins and veins of financial control from the innocent and unsuspecting intelligentsia. If technology's earliest watchword was "Think," management's, this fable is saying, may have been "Scheme."

But back to our story. The nature of the Programmers' task began to change. With the advent of Management, Management Control also came to pass. And, far from freeing himself from the nontechnical nuisances of his life, the Programmer now had to satisfy a seeming infinity of peripheral tasks — progress reporting, design reviewing, schedule building, visual aids drawing, flowcharting and other offenses to the intellect.

Worse yet, an apathy settled on the land. The once-responsible Programmers, proud of the quality of their product, no longer cared very much. They were scored more for the quality of their flipcharts than for the quality of their programs.

Personality was rewarded more than productivity. Coding was a neglected art, as Management, firmly in the saddle, rewarded management-mimicking activities.

And with the decline in responsibility, Management, aware of the problem but not aware of the solution, instituted still tighter controls, still more apathy-producing peripheral tasks, because, they kept insisting, "Management can solve this problem" which Management had, in fact, created!

The Programmers' world, in short, had turned topsy-turvy. What had begun as the delegation of trivia had instead become the victory of trivia.

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LETTERS

ical advancement can they expect to be paid in the professional salary range of $35,000 to 45,000."

Doug Pearson

Mountain View, Calif.

Flip Flop

Have you ever run into a situation where you want to set and reset a flag alternately when you pass through a routine?

An example of this would be if you have a special button on a keyboard, which you push once to change the mode and push again to reset the mode.

The standard approach to this task could be to reserve a mode flag and, upon detecting this special key, test to see if the mode flag is set. Then if it is not set, set it — or, if it is set, reset it.

```
Special Key:
    LD     A, (FLAG)
    CP     01
    JP     Z, SET IT
Reset It:
    LD     A, 0
    LD     (FLAG), A
    Ret
Set It:
    LD     A, 01
    LD     (FLAG), A
    Ret
```

Instead, why not use the flip flop: "exclusive OR" it.

```
Special Key:
    LD     A, (FLAG)
    XOR    01
    LD     (FLAG), A
    Ret
```

This subroutine does exactly what the first did, but it takes nine bytes instead of 20 bytes. Notice that the "XOR 01" says if this bit (0) is set, it will be reset by the XOR. Or if it is already reset, it will be set by the same XOR.

Therefore, every time you pass through this subroutine, the flag changes state: a flip flop.

Flip flopping will work on every bit specified in the XOR statement and only those bits. So if other bits were used for other modes, each can be handled separately.

Further, if you had the need to alternate between the numeric values, this would work in the same way. For example, to alternate between "D6" and "20" calculate what number when exclusive ORed with "D6" would result in "20" and you have it.

```
ALTERNATE:
    LD     A, (VALUE)        ; If value = D6 it
                             will change to 20
    XOR    F6                ; If value = 20 it
                             will change to D6
    LD     (VALUE), A
    Ret
```

Ted Di Salvo

Elmwood, Park, N.J.

Shallow Software View

"Programmers Slammed for Not Keeping Up," based on Richard Hamming's remarks at the 10th annual conference of the Association of Computer Programmers and Analysts, was an accurate description of the situation in the programming world.

Unfortunately, in his analysis, Hamming, a professed expert on the subject, displayed an amazingly shallow and naive view of the programming environment. As he stated, programmers do not keep up with the state of the art of their profession. This situation also exists to a very great degree in hardware engineering as well.

The point Hamming totally missed is that the incentive for keeping up does not really exist in most software and hardware development organizations. The pressures and schedules to deliver today's products rarely leave time for what management considers software symposiums and training "boondoggles." Though there is generally managerial support for technical training or improvement, it is almost always lip service or "that's fine if we can get it free." Any real pressure to acquire state-of-the-art expertise must be self-generated.

Hamming was quick to beat his breast and stated, "I put myself on the firing line regularly and let people take shots at me." This is garbage. It is his business to pursue such positions or his consultant fees would dry up very rapidly. In fact, the programmer on the firing line very rarely has the leisure, opportunity or incentive for such pursuits. Even if he acquired the capability, his management would make it very difficult for him to express or implement state-of-the-art technology in the ongoing business environment.

Hamming totally missed the fact that the employer and software management are equally responsible for the technological gap which has developed in the programming world. Rather than promote and actively support the concept of constant training and upgrading of their organization, they have taken the myopic view that it is easier to pay headhunters their exorbitant fees and cause salary compression by ignoring the best solution.

Yes indeed, programmers should be admonished for not keeping up, but so should the introverted management that neither promotes nor provides any incentive to those who would pursue the leading edge of the technology.

S.L. Showah

Billerica, Mass.

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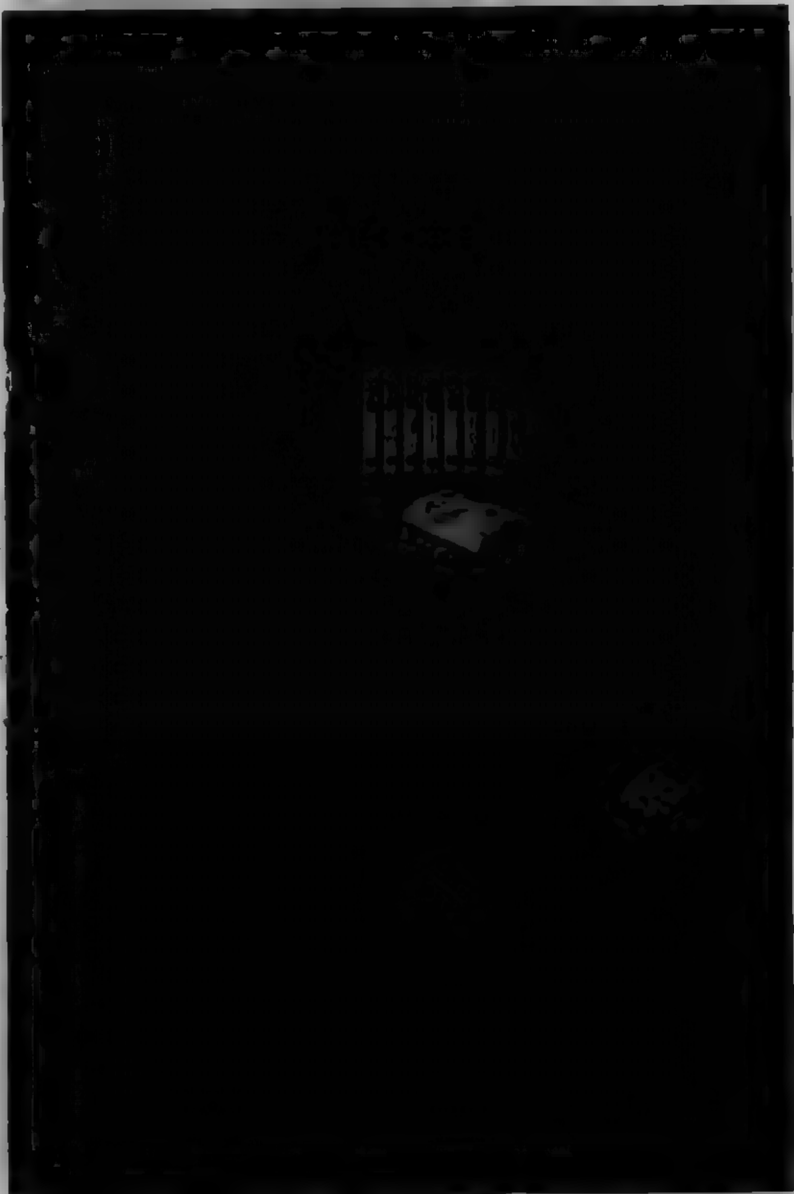

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HEWLETT PACKARD

Software Maintenance: It's With Us for Good

(Continued from Page 35)

fects in design or error in logic of the code, but for the most part the effort is usually expended in adding capacity or capability to existing functions. Over time, software must reflect changes in user needs and the operating environment. That is why it is *software* and not *hardware* to begin with. And therefore, there is a certain inevitableness about the software maintenance aspect that will continue to be with us because we live with change.

Better Records

How then do we cope with software maintenance? First of all, we should recognize it for what it is, organize and handle it. There is a subtle and important difference between the correcting or repair process and the production of enhancements and reconciling older features to new environments. Understanding of the maintenance process begins with better accounting records reflecting these differences.

Initial budgeting and subsequent actual cost feedback of expenditure in maintenance to the user by these breakdowns will soon get the message across as to where the real problems lie. If too much is expended in the repair column, remedial action can be taken with the analysts and programming staff as it relates to the implementation process. If a large effort is ultimately identified with respect to basic redesign of the application, the user himself must accept responsibility for having understood his problem in the first place.

On the other hand, if the bulk of the effort is in response to change, the user will better appreciate the nature of software as distinct from hardware. Such changes, functional or environmental, should be at the discretion of the source of the application's financial support. The change should be entertained only if there is a cost benefit to be achieved.

Aggressive Aspect

But maintenance is not only a reactionary process. There are also aggressive steps that can be taken to further the performance of a system:

(a) Streamlining ongoing procedures.

(b) Adding more safeguards in areas of security as well as data validation.

(c) Enhancing machine performance via software tuning.

(d) Checking for system and processing integrity of the data as well as the application logic.

In this broader context, maintenance really becomes a specific and continuing software life cycle function that must be anticipated and funded. This ultimate requirement must be imposed during the initial system design so that the following will be accommodated:

(1) The application will be described for varying performance parameters relating to numbers of users, size of buffers and tables, number of transactions and size of files.

(2) The application logic will be modular and data independent, parameterized as much as possible.

(3) The application will have standard interfaces to systems software and will have defined entry and exit points.

In placing these limits and restrictions, we have generalized the software so that it can operate with broader scope and in varying circumstances.

It stands to reason that giving up very specific and custom-built requirements in software also helps the maintenance problem.

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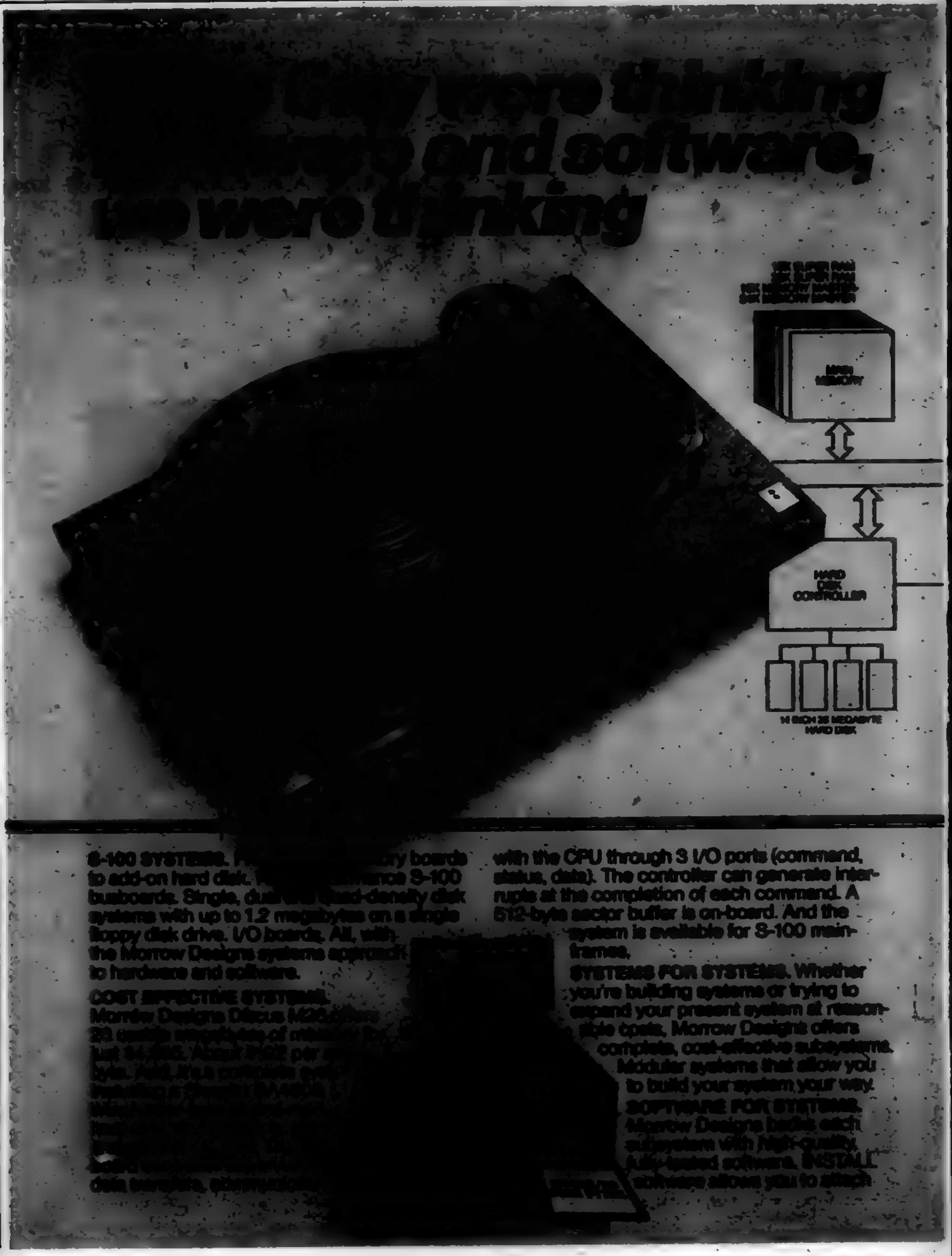

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LETTERS

One Happy Note

"Computers are job killers," said Calvin Gotlieb [CW, Oct. 13]. That is probably true. And it is probably true of every technology there ever was. Look at what the car did for the harness maker.

Nevertheless, I stand by the wisdom learned on my father's knee: jobs don't disappear — they change. That is why I constantly test the winds for change in my own field. I am not deaf to the prophets who predict a decreasing need for software people like myself.

However, in fairness to you whose jobs are threatened by computers, I did have one panicky moment when Gotlieb suggested limiting the growth of computer applications. I was looking up the number for Dial-a-Union when I caught myself and decided to stick to my original game plan.

There is a happy note for all of us who stand to lose our jobs to new computer technology. Gotlieb suggested we have employment impact statements (like environmental impact studies) before a new computer system is approved. The jobs created by the bureaucracy to administer that piece of legislation should take up any slack.

Jacques C. Kaufman
Binghamton, N.H.

Pays Off in the End

Calvin Gotlieb's comments are true when you speak of the jobs lost at the production-worker level, but he does not take into consideration the jobs added in other production facilities for manufacturing the computers or the jobs added in the area of sales and support to the new technology.

The problem is not lost jobs, but the upgrading and retraining of the production worker to function in a more sophisticated environment. Actually, we have been experiencing this "lost jobs" phenomenon since the 1950s. Then we were replacing office workers doing pencil jobs and upgrading them to data entry people. The DP equipment then gave management more information with fewer people.

It very often turned out that despite the vendor's sales pitch, more people were required than before, but with expanding business, more information could be processed than before.

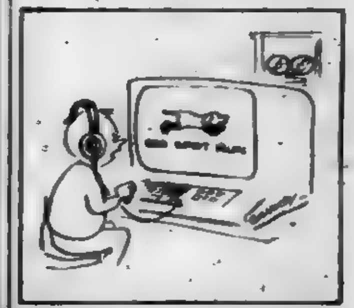
I remember making a study for a former employer in 1963 regarding order entry, shipping papers, billing, accounts receivable and inventory control, and we determined that it would require 200 more clerks to handle the same information and give the customer the same service.

Essentially, the computer reduces the direct labor of the company by indirect labor and depreciation, but new industries have been born to supply the equipment and supplies for this new environment.

The loss of jobs during the industrial revolution occurred at an unskilled level by replacing these jobs with others at a more skilled level. In addition, these changes allowed the industrialized nations to produce more at a lower cost while increasing the standard of living for all.

There is always a period of adjustment, but improved technology pays off for all mankind in the long run.

H. Lawrence Abbott
Wyomissing, Pa.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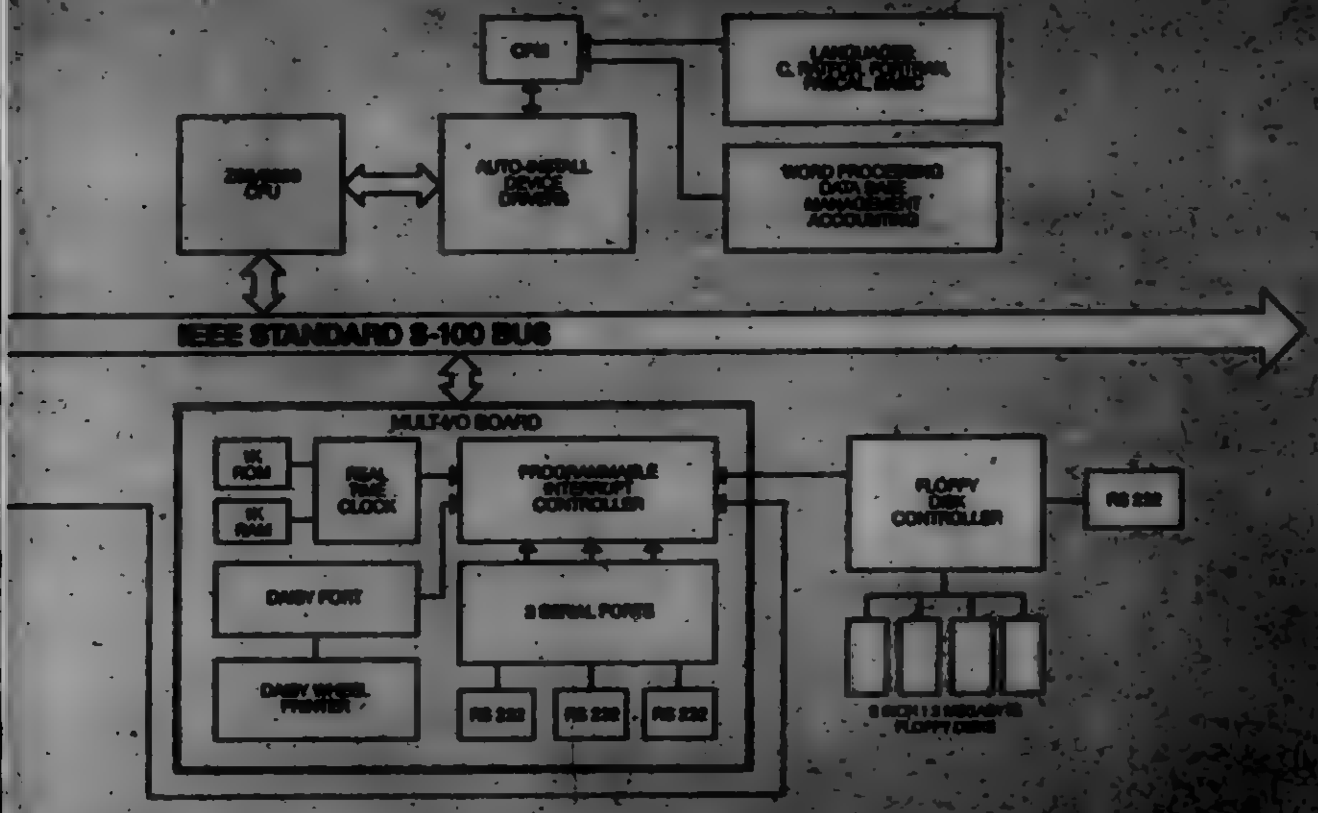

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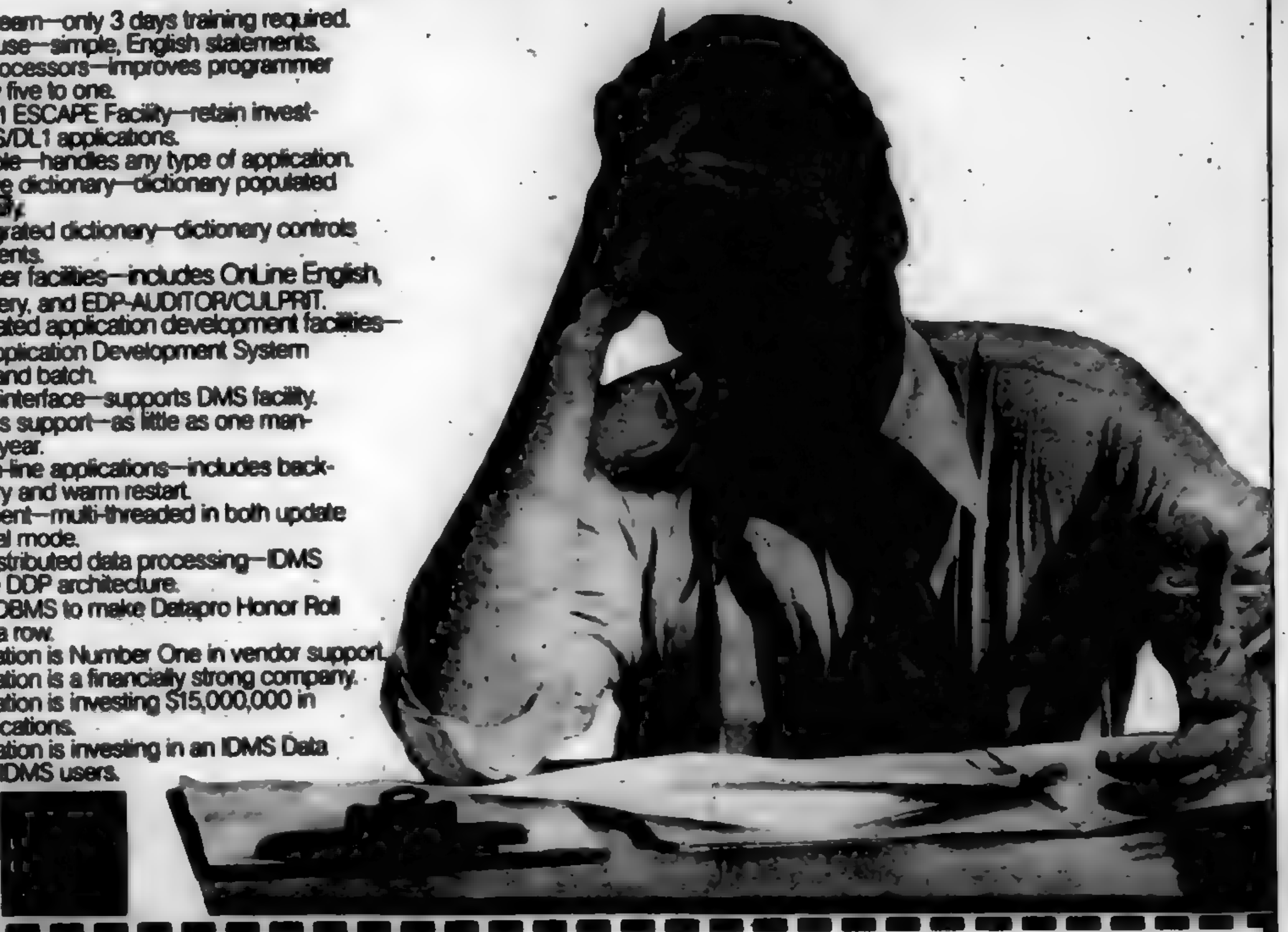

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How Does a DBA Cope?

By David A. Herb

Special to CW

How does a data base administrator (DBA) cope with constantly changing informational needs? Can the newly appointed DBA accomplish long-term objectives while providing some immediate benefits to the corporation? These are questions that a DBA is almost certain to face when establishing his function.

This description of a DBA's responsibilities is provided by a person who copes with them on a day-to-day basis – the DBA for the State Accident Insurance Fund in Salem, Ore.

In 1978, State Accident Insurance Fund (Saif) recognized the need for a data base management system (DBMS) in order to effectively respond to changing system requirements. At that point, Saif was a state agency providing workmen's compensation insurance. Since the organization was competing with private insurance companies, the ability to react quickly to changes in the marketplace was essential.

In addition, frequent requests for information were being received from the Oregon state legislature. These requests were generally unstructured and nonrepetitive. Conventional file structures made it difficult, if not impossible, to write the programs necessary to generate the reports for the legislature within an acceptable time frame. These same delays made Saif management reluctant to propose changes to the Workmen's Compensation law which could be backed up by firm statistics.

DBA Position Defined

Based upon these needs and an operating environment that included IBM 370 hardware and CICS, Saif installed Intel Corp.'s System 2000 DBMS. It was also necessary to create a data dictionary directory (DDD) in order to store the vali-

(Continued on Page 44)

Between Subsystems

IMS/VS Update Allows Data Sharing

By Rita Shoor

CW Staff

WHITE PLAINS, N.Y. – IBM recently introduced Version 1 Release 2 of its IMS/VS software with strong emphasis on a data-sharing facility.

This facility will allow multiple IMS/VS subsystems to share data with each other while batch systems are retrieving data, the vendor explained. Data may also be shared between one updating batch subsystem and other retrieve subsystems, and large installations will be able to use multiple processors with shared direct-access storage to access the same data base with integrity.

Data-sharing capability is being offered at the data base level and the block level. Block-level sharing was defined by the vendor as "locking at physical block for Isam/Osam data bases and at a control interval for Vsam data bases," while data base sharing is "locking at the IMS/VS DL/1 data base level whether Isam/Osam or Vsam."

In less technical terminology, block-level sharing offers one user exclusive use of a particular block of data while leaving other users access to the rest of the data base. At the data base level, one user would have exclusive use of the entire data base.

A maximum of two processors can be configured to participate in block-level sharing, and the maximum number of processors which can participate at the data base level is limited by the number of paths to the direct access devices that store the data to be shared, IBM said.

Support for IBM's 3375 disk and the speed matching buffer for the large-capacity 3380 device is also available with Release 2.

DBRC Prerequisite

IBM's Data Base Recovery Control (DBRC) feature, which is enhanced in Release 2, is a prerequisite for the data sharing capability.

This may cause potential data-sharing users to view the capability with some hesitation. At least one data base specialist indicated that he received a generally unfavorable impression of the earlier DBRC release through the DP grapevine. While admitting that he did not have direct hands-on experience with DBRC at his installation, he indicated that "we'd look at the data sharing very carefully because of [possible] previous problems with DBRC."

The enhanced DBRC also interfaces to six additional IMS/VS utilities and provides the ability to invoke DBRC control statements as IMS/VS commands. IBM said the DBRC installation macro has been improved, and the number of interface points used by the IMS/VS control program for storing information required during recovery has been expanded.

Extended printer support for both system network architecture (SNA) and non-SNA environments is included with the data communication (DC) feature in Release 2. Printer sharing is also provided for users with multiple systems sharing a common network of 3270 display and printers between IMS/VS and other systems.

The DC feature extends the use of the local storage option

(Continued on Page 44)

We Want to Know

Information systems managers are faced several times in their careers with deciding whether purchasing an applications software package is more beneficial to the company than developing the same application in-house.

Computerworld will be publishing a "Special Report on Applications Packages" in January. If you are one of those who have opted to buy software, we want to hear about your experience with the package: How much tailoring had to be done by your programmers? Did you encounter problems interfacing the applications package with your operating system or data base management system? Would you make the same decision again?

We also want to know the costs and benefits tied to the package you chose. Send your experiences by Dec. 12 in a typed, double-spaced manuscript no longer than five or six pages to Rita Shoor, Senior Editor/Software and Services, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

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DBL Substitutes for Dibol On PDP-11-Based Systems

CARMICHAEL, Calif. — Digital Information Systems Corp. (Disc) has announced Release 2.0 of Data/-Business Language (DBL), reportedly usable on any Digital Equipment Corp. PDP-11-based computer system.

DBL 2.0 is said to compile and execute programs written in either DBL 1.3 or DEC's Dibol-11, as well as offer additional capabilities to those languages.

For the programmer, the release is said to offer extensions that reduce the effort in originally creating programs. For the software manager, the release reportedly enables programs to be more easily maintained.

Besides some structured concepts in the release, also featured are an INCLUDE facility, "global" storage definition, fixed-length binary I/O and enhanced error-handling facilities, according to the vendor.

Prices vary according to the operating system used: RT-11 costs $1,100; TSX, $1,500; RSTS, $4,200; and RSX-11M, $4,200. Disc is located at 6247 Fair Oaks Blvd., Carmichael, Calif. 95608.

Fortran Debug Aid Released by Pilkerton

ANAHEIM, Calif. — Pilkerton International has developed a Fortran debugging aid that it said eliminates the need to look at Abend dumps.

The package gives programmers information in a form that relates directly to the Fortran program, such as the current value of variables in the correct decimal format, the vendor said.

The package costs $190 and is available for a 21-day free trial.

Pilkerton International can be reached through P.O. Box 6372, Anaheim, Calif.

'Cosap' Runs Stat Functions For Discrete, Continuous Data

APPLETON, Wis. — Lawrence University has announced Version 2B of its Conversationally Oriented Statistical Analysis Package (Cosap) for Digital Equipment Corp. PDP-11s operating under RSTS/E, said to perform manipulations and statistical analyses of discrete and continuous data.

Version 2B, written in Basic-Plus, was designed for use on PDP-11s in an 8W user area operating under Version 7.0 of RSTS/E.

Documentation includes a system manager's guide and a user's guide.

One-time license charges are as follows: Time-sharing service bureau, negotiated rates; commercial organization, $5,000 plus $2,500 per additional system; nonprofit organization, $2,000 plus $1,000 per additional system; and educational institution, $1,000 plus $500 per additional system. One-time fees include one set of documentation and any updates or revisions issued within the first 12 months.

More information is available from Computer Center Publications, Lawrence University, Box 599, Appleton, Wis. 54912, Attn: Cosap V2B Order Processing.

DBA Functions Defined

(Continued from Page 43)

dation rules applied to each element within the data base. Given these basic tools, Saif defined the DBA position.

The DBA has eight major functions. The object of each is to organize and control information so access to information will be improved.

- *Definition and Organization:* Defining the contents and structure of a data base is an iterative process. At Saif, this involved examining multiple files and combining, eliminating and renaming elements. These elements were organized into a structure modeled after insurance claim processing. The hierarchical framework not only eliminated element redundancy, but also made a structure which could be expanded whenever necessary.
- *Data Integrity:* Since claims processing requires an on-line update to the data base, a backup copy is taken each night. If the data base is damaged during on-line processing, it is restored by reloading the backup copy and applying an update log.

It is also necessary to validate data as it is entered and changed on the data base in order to ensure data integrity.

- *Performance:* A critical part of the DBA's role is tied to making the DBMS perform effectively. At Saif, that means an on-line update environment with rapid response to on-line transactions and some ad hoc query ability. The first task was to define an acceptable performance level and a measurement methodology. Tuning consisted of selecting DBMS execution parameters, determing which elements should become segment keys and reviewing program commands.
- *Documentation:* Principal items to document are data base definitions and data structures. The structures can be represented by a hierarchical chart, and data base definitions are stored in the DDD.
- *Standards:* Providing standards is necessary for an effective data base environment. Standards should define the design, program development and operational aspects of using a data base.
- *Education:* The DBA is responsible for all data base-related education. Students include systems analysts, programmers, operations personnel, corporate management and DBMS users.
- *Security:* Three levels of security have been provided by passwords. The highest level protects functions such as changing data base definitions, structures and passwords. The second level controls the authority to update a data base. The lowest level controls the retrieval of information.
- *Technical Knowledge:* A DBA must keep up with the technical features of his particular DBMS and with effective methods for applying data base technology in general.

Update Offers Data Sharing

(Continued from Page 43)

(LSO) available in IMS/VS Version 1 Release 1,6 by allowing LSO to run on MVS/System Products Release 2, utilizing MVS cross-memory services.

Planned availability date for IMS/VS Version 1 Release 2 is June 26, 1981, with the exception of the data-sharing facility. An early support program for this will begin in June, but general availability is set for December 1981.

Monthly charge for the data base system including the data sharing feature is $1,045, with the DC facility costing $1,265 per month and DBRC priced at $258 per month.

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When you chose your 4300-type processor, it was to upgrade system performance and reduce ownership costs. Yet, if you select the wrong tape subsystem — a subsystem whose performance is not "balanced" with that of your processor — you can actually [illegible] throughput and [illegible] system efficiency. On the other hand, if you choose STC's new 4300 tape subsystem, you can achieve a balanced system, and get all the throughput and CPU utilization for which you've paid.

A subsystem matched to your processor.

The new STC 4300 is fully compatible with today's intermediate-sized processors, including IBM [illegible], 370 and 4300 series devices, as well as other compatible units. But more importantly, the STC 4300 incorporates speeds of 75 and 125 ips, and densities of 800 bpi (NRZI), 1600 bpi (PE) and 6250 bpi (GCR). This combination of high-speed and high-density permits the 4300 subsystem to deliver performance equal to that of your CPU, to help achieve a balanced system.

For example, if you compare an STC 4300 with today's streaming tape devices, there's no comparison at all. In data rate, a streaming tape will typically transfer data at a rate of about 20 kb per second, while the STC 4300 offers a data rate of 469 or 780 kb per second. When you use the STC 4300 to backup a high-performance disk, it outperforms [illegible]-type devices (see chart below) by a factor of six to one. If you consider total time, this expands to a differential of eight to one. And with 3410 subsystems, the difference is almost nine to one. In sum, the STC 4300 makes frequent disk backup a realistic and cost-efficient alternative — no matter your workload — and at your convenience.

Equally important, the 4300 subsystem also offers enhanced read/write reliability. Users who move from non-STC 1600 bpi (PE) to STC 6250 bpi drives and who take advantage of GCR blocking can reasonably expect an increase in megabytes processed per unit failure of 20 to 25 times that of PE, and an increase in megabytes processed per hard failure of 10 to 20 times.

Reduced ownership costs.

Other 3400-type tape subsystems deliver good performance in certain applications. But their price/performance falls far short of that which you'd expect with a 4300-based system. In comparison, the STC 4300 — like a 4300 processor — was designed for use in any office environment. As you can see from the accompanying chart, this means a reduction of 40% or more in space, power, and air conditioning costs, and eliminates the need for raised flooring entirely. And in this age of spiraling inflation, this can be an important long-term consideration indeed.

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	[illegible]	[illegible]	SAVINGS
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Features you get only from STC.

The new STC 4300 also gives you several important features you'll find on no other comparable subsystem.

For one thing, the 4300 is a tri-density subsystem. Thus, it eliminates the need for a separate, additional 800 bpi drive. This helps reduce your initial investment, as well as your total cost-of-ownership.

STC's new 4300 tape subsystem can be diagnosed either on-site or remotely. In either event, if one 4300 drive goes down, it can be diagnosed in-line, and serviced off-line without affecting the remainder of the subsystem's operations. Powerful, built-in diagnostics also help ensure enhanced data availability. In fact, the STC 4300 has microprocessor-based diagnostics designed to make fault isolation faster and more effective by permitting the subsystem to be exercised in-line. And special "wake-up" diagnostics will exercise the memory, microprocessor, and interface at power-up to ensure proper operation.

Proven STC technology.

The STC 4300 was designed around technology that has been tested and proved in some of America's largest, and most demanding, data processing shops. In fact, STC is far and away the world's largest supplier of high-performance tape subsystems for the big processor market. And in the 4300 tape subsystem, we've made all this experience and expertise available to the intermediate system user.

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Find out for yourself how an STC 4300 tape subsystem can help you achieve a balanced system, reduced cost-of-ownership, new configuration flexibilities and an enhanced level of reliability. For more details, simply call your local STC sales office, phone us toll-free at 1-800-[illegible]-7[illegible], ext. 300 (in Missouri: 1-800-[illegible]-7[illegible], ext. 300) or write: Storage Technology Corporation, 2270 S. 88th Street, Louisville, CO 80027.

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Disk drive.
All speeds and densities can be easily upgraded right in the field.
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Word/Text Processing Aid Operates on IBM's Series/1

TUSTIN, Calif. – A word/text processing software system for the IBM Series/1 is now available from Royal International Software Systems (RIIS). Written in Series/1 assembly language, it runs in approximately 13K bytes under the RPS operating system and 16K bytes under the EDX operating system.

RIIS says that up to four source files may be merged to produce a document along with multiple copies and complete page and text definition. Standard features include "text fill" mode headings, subheadings, footing, table of contents, right margin justification, tab stops and numbered paragraphs.

The price of the RIIS Text Processor is $1,850 which includes six-month maintenance and system manual. RIIS is at Suite 206, 202 Fashion Lane, Tustin, Calif. 92680.

'Prompt' Backs EDX on Series/1

SHELBYVILLE, Ky. – Version 7 of Mid-American Control Corp's (MAC) Prompt software package is said to support IBM's new release of its EDX operating system (Version 3) for the Series/1 minicomputer.

Built around the firm's Prompt Data Base Facilities, MAC offers a full line of financial application software products: Guide, for the private sector of business, and the Public Budgetary Accounting (PBA) product.

Guide typically costs $18,000 to $20,000, including Prompt, as does PBA, according to a company spokesman. Prompt alone sells for $6,000 from the firm at U.S. 60 West, P.O. Box 97, Shelbyville, Ky. 40065.

System/3 Gains Tape Manager

DARIEN, Ill. – Financial Systems and Services has added the Tape Management System to its Retail Store Systems package for IBM System/3 users.

The Tape Management System organizes and manages a tape library that controls and structures tape operations.

It can be installed in large System/3 shops with four tape drives and 2,500 reels of 2,400-ft tape, the vendor said.

The Tape Management System costs $180 on a 12-mo license fee. Financial Systems and Services is at 805 Plainfield Road, Darien, Ill. 60559.

Harris Minis Get CAD Support

HOUSTON, Pa. – A computer-aided design (CAD) software package called Ansys is being offered to Harris Corp. 500 and 800 minisystems users by Swanson Analysis Systems, Inc.

Ansys, a finite-element CAD package, was designed for engineers dealing with structured analysis, heat transfer, thermal fluid flow, thermoelectricity and wave motion analysis. Data can be graphically reviewed as input and can also be modified at that time.

Interactive graphics is also available with the system which costs $2,000/mo. Swanson Analysis Systems can be reached at P.O. Box 65, Houston, Pa. 15342.

Auto-Trol Enhances Graphics Turnkey

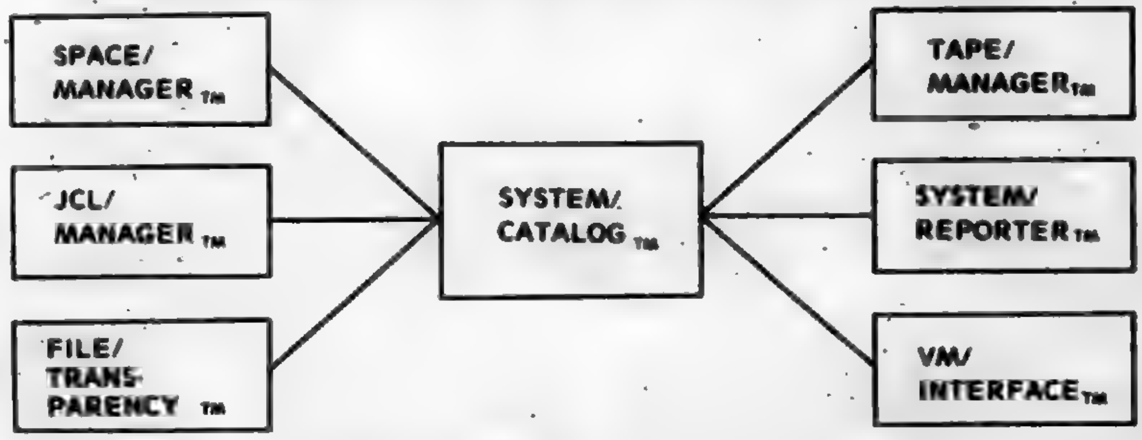
DENVER – Auto-trol Technology Corp. has announced software enhancements to two components of its turnkey graphics system.

AD/380, an automated design and drafting package, has been enhanced to include mapping features for forestry management, agricultural management and land use applications.

The firm's GS-2000 has been enhanced to include system security capabilities, pattern system storage and the ability to concurrently create plotter files and continue with design operations, the vendor said.

Auto-trol turnkeys start at $150,000, the vendor said from 12500 N. Washington St., Denver, Colo. 80233.

FRUSTRATED WITH DOS/VS(E)?



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Library for HP 3000 Shops Aids Programming Staffs

LEXINGTON, Mass. — Release 3 of the Programming Aids Library (PAL) for programmers and DP managers of Hewlett-Packard Co. HP 3000 installations has been introduced by Wallach & Shepherd Associates.

The library includes Palsta, a store tape analyzer that analyzes backup and store tapes; Pack and Unpack programs that reportedly reduce space required for on-line data and source code files that are accessed infrequently; and Include, which provides for the inclusion of data, text and program source code in a job stream.

Setterm is said to change the characteristics of a log-on terminal without requiring a log-on; and Termio is a terminal I/O system that allows rapid development of interactive programs.

Release 3 of PAL is available for a free 30-day trial and rents for $100/mo including maintenance, periodic updates and new routines and features, a spokesman said from 3 Wallis Court, Lexington, Mass. 02173.

On PDP-11s

Unix Code Control Backed

BATVIA, Ill. — The Unix Source Code Control System (SCCS), a package for controlling changes in text files, has been released by Uniq Computer Corp.

SCCS runs under Version 7 of the Unix operating system, distributed and supported by Uniq for the Digital Equipment Corp. PDP-11/23, 11/34, 11/40, 11/44, 11/45 and 11/70 minicomputer.

Providing facilities for storing, updating and retrieving multiple versions of a text file, SCCS administers changes, controls updating and retrieving multiple versions and controls updating privileges.

The package also records the maker of each change, when and where it was made and why.

SCCS costs $7,500 from Uniq Computer, 143 First St., Batvia, Ill. 60510.

Cobol Generator for TI Mini

HARRISBURG, Pa. — An interactive Cobol program generator initially designed for Texas Instruments, Inc., DS990 minicomputers reportedly produces the Ansi 74 Cobol source code required for master file creation and maintenance programs.

Working from program design notes, file descriptions and screen layouts, Generato can produce programs within a half hour, according to the generator's vendor, Accudata, Inc. Because no further linking of output is required, programs can be immediately compiled and executed, a spokesman noted.

Priced at $5,000, the Generator is marketed for either the one-programmer installation or large software houses.

Accudata is at 4601 Locust Lane, Harrisburg, Pa. 17109.

Package Ties TI 990, PM550

MILFORD, Ohio — A network software package designed to interface the Texas Instruments, Inc. Model 990 computer with one or more TI PM550 programmable controllers has been unveiled by Computer Technology Corp.

The PM550 Network Software Package (NSP) — a control and monitoring package — allows two-way access to each PM550 controller, either through a computer terminal or from a user's program, according to the vendor.

In systems using multiple PM550 controllers, the NSP is said to give the 990 computer both monitoring and control functions. The computer can automatically make programmed changes in any or all controllers, as required, the vendor said.

The package costs $2,500 from the firm at Park 50 Techcenter, 2002 Ford Circle, Milford, Ohio 45150.

System Assesses Bank Profits

OAK BROOK, Ill. — Software that allows a bank to assess the profitability of each of its commercial accounts has been released by the Weiland Computer Group.

The Analysis/Profitability Extension (APX) system can be used in conjunction with Weiland's Demand/Deposit Credit Reserve System (which provides all basic input or as a stand-alone system. It can focus on a single account or a family of related accounts into groups for analysis purposes.

Service charging options include monthly, quarterly, semiannual or annual cycles along with historical reporting for current month, year-to-date, last year and second-to-last year cycles.

APX provides a set of reports including monthly and periodic analysis worksheets, a charge control summary and a monthly analysis book as well as a customer's analysis statement and charge notices generated for mailing.

As of Jan. 1, 1981, the price of the APX system will be $20,000. Weiland is at 1515 W. 22 St., Oak Brook, Ill. 60521.

'Visicalc Plus' Update Operates on HP-85

PALO ALTO, Calif. — Visicalc Plus software is now available on Hewlett-Packard Co. HP-85 personal computers.

The product features line charts, bar charts and curve-fitting graphs.

The product sells for $200 in computer stores and in office equipment dealers who sell the HP-85, the vendor said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Interactive Storage Analysis

Tool Backs PDP-11 File Design

SCHAUMBURG, Ill. — A storage analysis program said to allow a designer of files on PDP-11 minicomputers to interactively determine record characteristics and reduce the amount of needed file space has been introduced by Reicor Systems, Inc.

In addition, the total amount of disk space required to store records on the file can be calculated for any number of records.

STOR-11 can be used by any organization using DEC's Record Management System (RMS-11).

STOR-11 produces three reports at the user's terminal indicating the effects of a given record size and bucket size on the disk space required to store the data.

The designer can minimize the amount of unused space by selecting certain file characteristics. The user can then enter estimates of the number of records on the file and STOR-11 will compute the number of M bytes needed. Generated reports can be saved for printing at a later time.

The STOR-11 program is available immediately for $895.00 and can be obtained from Reicor Systems, Inc., Suite L, 1305 Remington Rd., Schaumburg, Ill. 60195.

Directory Covers Data Base Groups

SANTA MONICA, Calif. — A directory that describes more than 600 data bases or distinctly named files in a data base family available through one or more of 93 on-line service organizations, is available from Cuadra Associates, Inc.

The Directory of On-Line Data Bases includes data base services that are available in only one country or a limited set of countries, the vendor claimed.

The directory is published quarterly and a subscription includes two complete editions per year and two update supplements. The price is $60, the vendor said from Suite 12, 1523 Sixth St., Santa Monica, Calif. 90401.

Asset System Fits PDP-11

PLYMOUTH, Ind. — A fixed assets system for Digital Equipment Corp. PDP-11 minicomputers using the RSTS/E or CTS operating systems is available from Plycom Services, Inc.

The system gives management an asset reporting capability over such areas as auditing, property taxes, asset movement, acquisitions and disposals, as well as typical book and tax depreciation reporting, the vendor claimed.

The price for the system is $4,000 from the vendor through P.O. Box 160, Plymouth, Ind. 46563.

Planning System Runs on TI Gear

ROSWELL, Ga. — The Computerized Operation Planning and Engineering (Cope) software package from Antech, Inc. reportedly will allow budgeting, planning, financial modeling, engineering calculations and property acquisition evaluation.

Cope is said to provide for the small computer user the type of planning software previously available on large computer systems through time-sharing service bureaus.

Designed to operate on the Texas Instruments, Inc. DS990 Model 1 computer, Cope can be purchased for $13,500, including the computer, double-sided, double-density floppy disks, a TI 810B printer and a word processor.

The software alone costs $400 from 225 Corinth Court, Roswell, Ga. 30075.

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CDC Program Aids Architects Via Cybernet

MINNEAPOLIS — A program designed to help architects pinpoint the energy demands of a building is available through the Cybernet Data Services of Control Data Corp.

ESP-1 — previouslsy available only to members of Automated Procedures for Engineering Consultant, Inc. (Apec), which developed it — is now available with no initial fee to non-Apec members.

ESP-I is said to offer the means for modeling the performance of heating, cooling and other energy-consuming systems or equipment. It stimulates the building's mechanical systems on an hourly basis, taking into acocunt the building's heat gain and loss, weather data, operating schedules and building thermal storage and its analysis.

Program users pay only for computer time, a spokeswoman said form the firm at Box O, Minneapolis, Minn. 55440.

Program Aimed At Oil Refiners

SANTA CLARA, Calif. — A process simulation program said to solve the design and operating problems associated with refining crude oil has been added as a service on the Optimum Systems, Inc. (OSI) remote computing network.

The program was developed by Oleson & Associates of Fullerton, Calif., to treat a multiunit separation system as an integrated entity.

The cost of PS-01 varies according to the specific usage by each customer, OSI said from 2801 Northwestern Pkwy., Santa Clara, Calif. 95051.

Surcharge Off On OAG Data

NEW YORK — As a result of a new agreement between I.P. Sharp Associates, Inc. and Official Airlines Guide, Inc. (OAG), the surcharge associated with the OAG Time-Sharing data base has been dropped.

The two companies are hoping that this change will encourage users to examine new applications for this data.

Users of OAG data must still sign a copy of the OAG contract in order to access the data on the I.P. Sharp system. Existing customers of the data base do not need to reprocess their current agreement, since the new arrangement automatically applies to all users.

'MSC/Nastran Runs On UCS' Cray 1

OVERLAND PARK, Mo. — MSC/Nastran, a structural analysis system, was available on United Computing Systems, Inc.'s Cray-1 supercomputer as of Nov. 1.

Nastran was originally developed in the late 1960s for the National Aeronautics and Space Administration.

United Computing is headquartered at 5454 W. 110 St., Overland Park, Kan. 66211.

Package Tests Solar Design

BERKELEY, Calif. — The Berkeley Solar group (BSG) is offering architects and engineers the use of a Data General Corp. MV/8000 and a software package to analyze passive solar home designs.

The program, called Calpas3, is available through GTE's Telenet Communications Corp.'s Telenet network.

Users need a computer terminal and a modem to access the BSG system. Access to the system and Calpas3 costs $100 for a start-up fee and $10 per Calpas3 run, the vendor said from 3026 Shattuck Ave., Berkeley, Calif. 94705.

'SAS' Available In Two Modes

CHICAGO — Computer Research Co., a subsidiary of Comshare, Inc., has announced that Statistical Analysis System (SAS) capabilities are available in time-sharing or batch mode through Computer Research's remote computing services.

SAS will allow users to plot data and values, perform regressions and print data reports, all on one computer job, according to a spokesman.

Comshare is headquartered at 3001 S. State St., Ann Arbor, Mich. 48106.

'Code V' Cuts Cybernet Costs

PASADENA, Calif. — The NOS 176 release of Optical Research Associates Code V software program offers lens designers use of Code V programs at cost savings one-half to one-third the previous version's charges, the vendor claimed.

The software runs on Control Data Corp.'s Cybernet Services network and is an integrated package of optical design and engineering programs.

The price for the software is based on computer time used, the vendor said from 550 N. Rosemead Blvd., Pasadena, Calif. 91107.

Local-Area Net Alternative Discussed

Big Users Need Big Nets, Right? Wrong

By Brad Schultz
CW Staff

LOS ANGELES — Large data communications users do not need large all-encompassing networks, a recent Interface West session was told here by consultant Jon S. Gould of O'Donnell & Associates.

A very complex problem, such as solving the data communications needs of a geographically dispersed user, should be broken into a set of smaller problems, the former vice-president of Citibank, Interdata Corp. and DDP Systems, Inc. indicated. The user should therefore concentrate on communications among adjacent buildings at each dispersed location, rather than the total communications process among all locations.

Local-area networks handle at least 60% of a typical large user's electronic traffic, Gould said, and deserve the bulk of development dollars when a user decides to upgrade communications resources. By focusing on the local net predicament of each location and, when that is resolved, "latching" local nets together to form the total network, a user is better positioned to manage the network as the organization it serves changes, Gould advised.

Vested Interest

Vendors have a vested interest in convincing users to take the all-encompassing approach, Gould observed. By attempting to sell systems, peripherals, link equipment and associated software as supplies for the total network, the manufacturer is maneuvering to lock the user into sole source dependence, he warned.

Yet no large network can be supplied by only one vendor and successfully meet a dispersed user's contemporary data communications needs, Gould continued. Because companies typically undergo major reorganizations over the lifetime of a network — especially when they participate in acquisitions or mergers — data communications among their nodes entails considerable traffic between dissimilar equipment from different manufacturers.

Unfortunately, some of the emerging network architectures fail to accommodate dissimilar devices, Gould remarked. And the integration of word processing (WP) with DP tends to make matters worse since those forms of information are transmitted in much different ways.

Although data communications managers must come to terms with this integration, they should recognize that WP is not transaction-oriented like DP, Gould continued. Words typically pass in one direction and in large volumes, whereas data typically passes in both directions along a link and in small volumes on a query/response basis.

Thus, attempts to sell the user equipment that can handle both kinds of information may have limited relevance to the user's true needs, Gould suggested. In fact, manufacturers' solutions are typically opposed to user needs, he asserted, because manufacturers themselves do not have the resources for marketing products that can fully meet the needs of most users.

Self-Imposed Dilemma

By trying to be sole source suppliers of large networks, vendors place themselves in the dilemma of attempting to develop general-purpose products for applications that can vary significantly from user to user, Gould told the Interface West session.

Hence, vendors have had great difficulty in bringing cure-all architectures to market, he said, naming IBM's Systems Network Architecture (SNA) and AT&T's Advanced Communications Service (ACS), as examples.

Gould said much of SNA's reported capabilities are a "myth," since they cannot be applied with the generality advertised by IBM and remarked that "nobody knows where ACS is."

When large networks fail to perform as expected, their prob-

(Continued on Page 54)

Net Management Seen Key To Communications Planning

By Michael Beltz
Special to CW

The complexity of most data communications systems today makes network planning synonymous with network management.

Drawing up a schematic and installing equipment might produce workable results — but probably not manageable ones. While good physical design and suitable equipment remain essential to efficient and economical network operation, their benefits rapidly diminish without proper diagnostic and management controls.

Prior to the advent of those considerations, excessive mean times to repair, error rates and downtimes inevitably defeated the best intentioned plans.

Three Basic Systems

Thus when users plan systems of any magnitude today, they plan the management of those systems more than anything else. Three very basic types of diagnostic systems exist: Qualitative, quantitative and microprocessor-driven combinations of both.

The latter, for the purpose of discussion, can be called a communications management system. All use a low-speed, frequency shift keying secondary telemetry channel to access line and modem testing features.

In many systems, each modem also has a built-in secondary channel. Signals from a central-site controller can put specific modems into test modes to determine if faults exist in lines, interfaces or modems. These signals can also be used to activate various remote-control devices incorporated into the system.

A qualitative system monitors network performance between preset points. When these parameters are exceeded, an alarm notifies the operator that a fault exists. Tests must then be conducted to determine the fault and its location.

A quantitative system provides central-site operators with specific information concerning faults, including their nature and location. With this information, the central-site operator can determine if an abnormal condition will affect the integrity of network transmission and if reconfiguration is required.

To facilitate network reconfiguration, for example, central site operators may use remote-control devices for automatic dial backup for the correction of leased-line problems, or remote modem transfer switches in the case of modem malfunctions.

(Continued on Page 54)

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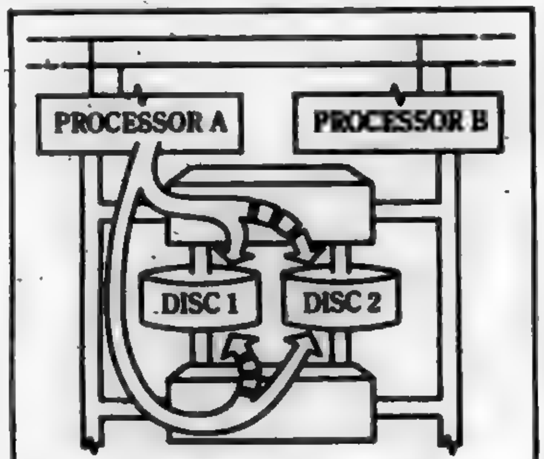

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Terminal management has been the classic nightmare of on-line data base systems. No more. ENCOMPASS automatically handles support for the Tandem 6520 Multi Page Display, Tandem 6510, and IBM 3270.

The Tandem system also supports a variety of communication methods and protocols, including Asynchronous, Bisynchronous, Multipoint, Point to Point, X25 and SDLC.

Screen formatting, data validation, screen sequencing and data mapping, plus sequencing and control of multiple terminals; these are all handled for the application programmer automatically and at a fraction of the cost in development time and dollars.

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Consistency of the data base is essential. Multiple files must be capable of being updated simultaneously, even if located across distributed nodes. If for any reason a transaction cannot be 100% completed, this is the one system in the world which can un-do it completely. Automatically.

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Tandem NonStop™ architecture provides not only this redundancy in hardware, but the software to take advantage of it, utilizing all available resources.

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You don't need to learn a whole new language with the ENCOMPASS system: OPEN, READ, WRITE are the verbs you've been using all along. Industry standard COBOL, FORTRAN, MUMPS and our own transaction-oriented language TAL provide simple interaction between programs and data base.

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And there's still more. In addition to all this, there's a whole host of other features that the ENCOMPASS data base management system will provide. To name just a few:
- on-line data base backup
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Loop Test System Out For IBM 3600 Users

RICHMOND, Calif. — Support Systems International (SSI) is offering the Model DT-1 loop test system for users of IBM 3600 financial communication systems.

The DT-1 consists of a loop cable, a battery-operated control box, a diagnostic test block and 15 shorting plugs.

The test system was designed to detect shorts, opens, miswires or reversed wires in local loops. It may also be used for initial testing of new installations and for troubleshooting existing systems.

Interruptions in the integrity of new or existing loops are signaled by indicator lights and an audible alarm, defeatable by a front-panel switch, according to SSI.

Priced at $385, the unit is supplied in a carrying case with inserts for protection.

Support Systems International is at 150 South St., Richmond, Calif. 94804.

Success Rides on Management

(Continued from Page 51)

The third type of system, or the microprocessor-driven combination, enables the central site operator to know when and where a failure has occurred and the element that has failed (a circuit, terminal, modem, multiplexer and so forth). Through restoral hardware, the operator can dial up remote locations and place remote equipment back on-line immediately.

The system then permits the operator to correctly dispatch either internal or vendor organizations to correct the malfunctioning unit. These functions give the user a tool for managing not only their networks, but also their service organizations, regardless of site location and geographics.

The latter system is preferable for obvious reasons, but it is also the costliest. However, because a data communications system, once installed, normally represents a fixed cost, overall network economics cannot exist in medium- or large-scale networks without some form of it.

Such a system consists of central-site diagnostic controllers that are computer systems in themselves. They have their own CPUs, disks, I/O, terminals and associated equipment.

However, the controller is used only for diagnostics and control management. The controller communicates with all remote devices — modems, switches, terminals and more.

Small networks use controllers that handle eight- to 16 communications circuits. Medium-sized networks use controllers that handle up to 32 circuits, and still larger scale networks use more powerful controllers that handle over 200 circuits.

A popular medium- and large-size controller, for example, has a 10M-byte hard disk that retains significant information about modems, switches and other devices, their physical location in a network and their relationship to each other. It has the ability of four functions on a single terminal or operator.

The largest of the controllers offer 16 functions among four operators. In such networks, both backbone and remote modems are microprocessor-driven. They have certain programming capabilities to perform specific tasks, such as transmitting serial numbers, functional temperatures, faults that have occurred within or around them and the nature of the problem itself.

Communications management systems of these kinds apply computer disciplines to traditional network management techniques and offer software packages to provide users with programs for information management, problem management, inventory management and installation management.

New Concept

The concept itself is not a new one, but rather an adaptation of a management information system — a data base where the user can store and manipulate information, secure meaningful reports, enter information and build applications.

In effect, it permits the user to define proprietary problem formats. Each user has problems unique to specific system goals, and this function represents the utility to define the fields to be recorded.

The user can also obtain daily reports, files and interactive references from the system. For example, a user can obtain a daily report of outages of any specified duration by location and sorted order.

From this capability, the user can also obtain reports utilizing any appropriate files from the system. The user can locate inventory, for example, which is decidedly advantageous in systems containing thousands of remotely located terminals, controllers, modems, cables, multiplexers and other devices.

The user can also control installation management from the basic management application package.

Most users use standard procedures for installing equipment. Site survey, network design, equipment specification and purchasing procedure — as well as curcuit installations and the like — are benchmarked into a program that coordinates timely network installation and training for staff.

Michael Belitz is assistant to Racal-Milgo, Inc.'s vice-president for sales and marketing.

Exec Cautions Net Users

(Continued from Page 51)

lems tend to increase the revenues of suppliers, Gould pointed out. In fact, typical large networks are developed in two to three years through three stages: They fail the first time, are late the second time and are simply disappointing the third time they are tried out. "That's when you rewrite the specifications," he said.

Gould identified two types of networks: Those directly offered by systems manufacturers and those sold as a service. While SNA exemplifies the first type, the Defense Department's Arpanet was said to fall into the second type. Linking a number of universities, government agencies and research organizations, Arpanet is supported by $20 million of software written with public funds, Gould noted.

As further examples of the service type of network, the Telenet and Tymnet packet-switched offerings from GTE Telenet Communications Corp. and Tyment, Inc., respectively, can go a long way towards solving some users' problems, Gould indicated.

However, he said users must learn to position themselves carefully in acquiring those services and other products because their needs will change in time.

This announcement appears as a matter of record only.
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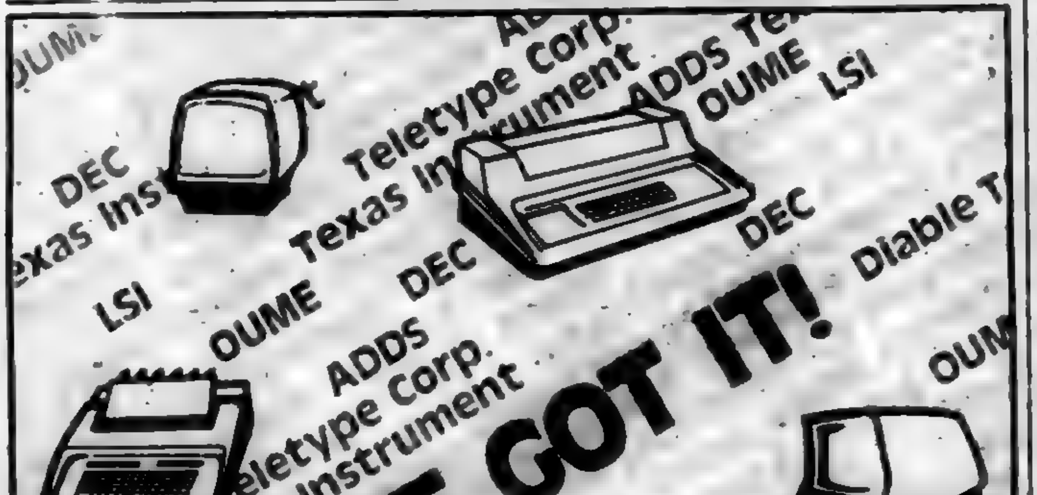

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Memorex Expands 3278-Type CRT Terminals

CUPERTINO, Calif. — Memorex Corp. has released three CRT terminals and a remote cluster controller designed to operate with IBM 360, 370 and 30 series mainframes.

The 2078 models 3, 4 and 5 are functionally equivalent to the IBM 3278 and increase character screen capacity from 1,920 char. (Model 2) to 2,560 char. (Model 3), 3,440 char. (Model 4) and to 3,564 char. (Model 5), using a 132-char. line.

The 2078 also uses 50% less power and generates 47% less heat than the IBM 3278, the vendor claimed.

The 2078 is available with five keyboard options: 75-key data entry, 75-key Ebcdic typewriter, 75-key Ascii typewriter, 87-key Ebcdic typewriter and 87-key Ascii typewriter.

The nonglare screen reduces operator eye fatigue, while the tilt-screen option allows the operator to position the monitor for optimum readability, the vendor claimed.

To reduce screen burn and extend monitor life, a feature automatically dims the display if there has been no activity from the keyboard for approximately 20 minutes.

A line and column indicator displays the line and column location of the cursor and the status of the system, cluster and terminal.

The purchase price of the 2078 ranges from $2,431 for the Model 1 with the 75-key data entry, to $3,365 for the Model 5 with the 87-key Ebcdic typewriter keyboard.

The 2076 remote cluster controller supports all four models of the 2078 or IBM 3278 and features three types of diagnostic capabilities for fault detection and isolation.

The 2076 costs $4,494, the vendor said from San Tomas at Central Expressway, Santa Clara, Calif. 95052.

IBM-Type CRT Needs No Modifications

RALEIGH, N.C. — Custom Terminals, Inc. has provided IBM 2740 and 3767 users with what it said is an economical way to add a display to existing or planned networks with no hardware or software modifications.

The CTI 1000 CRT terminal will provide hard copy by supporting up to two printers either as slave units or directly addressable by the host processor, the firm said.

The microprocessor-based unit features a 12-in. diagonal screen with 23 80-char. lines. A 24th line features operator status and diagnostics.

CTI 1000 increases data throughput by means of a print-through feature, the firm said. CTI 1000 operators can initiate a transaction, send that transaction to the host for processing and begin work immediately on the next transaction without waiting for a response from the host.

With the two-printer capability, messages from the host can be routed selectively to either printer or, if operator interaction is required, to the display.

Screen formats, operator prompts and other productivity aids can be created at a central location and loaded down-line to CTI 1000 terminals.

In a standard configuration, the CTI 1000 costs $2,350. Custom Terminals can be reached through P.O. Box 19906, Raleigh, N.C. 27619.

CUE XVI Set For Atlanta

ATLANTA — The Comten Users Exchange (CUE XVI) will be held April 27-May 1 at Dunfey's Hotel here.

Most sessions are geared to users or potential users of NCR Corp.'s Comten product lines. The Thursday sessions will be devoted to "Communications Challenges of the '80s."

Scheduled sessions include "The Common Carrier: User Options," "Disaster Backup Systems," "Network Management Systems" and "Communications Economics of the '80s."

The fee is $150 for the week or $75 for Thursday only. More information is available from Marilyn Cianciolo, General Motors Research Labs, GM Technical Center, Warren, Mich. 48090.

Modem Nest Houses Up to Eight Cards

MANSFIELD, Mass. — Codex Corp. is offering the MX 2400 Series Multiple Unit Nest, designed to house card versions of its MX 2400 modems. The nest allows up to eight individual card modems in a single nest.

In addition, all options for the MX models may be added to the card modems without decreasing the number of cards that can be housed in the nest, the vendor claimed.

Any combination of the three MX 2400 models can be used in the nest — the basic 2400 modem for 4-wire leased line operation, the dual dial-restoral version, equipped for 2-wire dial backup and the 2400 dial modem for 2-wire operation.

The price for the nest is $2,125, the vendor said from 20 Cabot Blvd., Mansfield, Mass. 02048.

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Basic Four Users Offered Editing CRT Terminal

BURBANK, Calif. — Basic Four Corp. users are now being offered a CRT terminal by Southwest Data Systems, Inc. that features editing capabilities, screen formatting, modular construction and a customer warranty.

Several features formerly not available to Basic Four users, have been incorporated into the R725, according to the vendor. All function control switches are accessible from the rear panel, including bit/sec rate, parity, mode and reverse video. Each unit comes equipped with upper- and lowercase with descenders and an auxiliary interface for serial peripherals that includes "print transparent" capability.

The R725 costs $1,875 from Southwest Data Systems, Inc., 2509 Empire Ave., Burbank, Calif. 91504.

Cable Tester Debuts

PHOENIX — A low-cost cable tester that displays continuity and cross-wiring end to end and jumpers within an end of 25-wire EIA cables has been introduced by McKeon Microsystems.

Pressing any one of 25 separate push-button switches will display the configuration for the selected line using two sets of LEDs, the firm said.

The cost for the cable tester is $350 from McKeon Microsystems, 19810 N. 17 Drive, Phoenix, Ariz. 85027.

CSI Issues SNA Guide

SAN JOSE, Calif. — Communications Solutions, Inc. (CSI) has published the *SNA 3270 Design Guide*, designed to aid manufacturers in developing IBM 3270 products compatible with IBM's Systems Network Architecture (SNA).

Also meant to help users evaluate SNA-compatible products, the 300-page report is part of CSI's Data Communications Technology Series, which covers the latest developments in the data communications field.

The publication costs $950 and includes a one-year quarterly update service.

CSI is located at Suite 200, 4040 Moorpark Ave., San Jose, Calif. 95117.

Multiplexer Supports X.25

GERMANTOWN, Md. — Digital Communications Corp. (DCC) has released a switching multiplexer which reportedly combines the features of a digital matrix switch, a port connection unit and a statistical time division multiplexer into a single product.

The Model SM9200 offers the user port selection, port contention, user-defined contention groups, speed conversion, X.25 Level 2 support and expandability.

The price for a four-line unit with support capabilities is $2,350, DCC said from 11717 Exploration Lane, Germantown, Md. 20767.

Telcon Makes Terminals to Go

FT. LAUDERDALE, Fla. — The Ambassador III and IV portable terminals by Telcon Industries, Inc. weigh less than 20 lb and were designed to be taken anywhere.

The Ambassador III features a built-in 300 bit/sec acoustical coupler and the Ambassador IV provides a built-in 80-column printer with electric discharge at two line/sec. Both terminals feature a Selectric-style keyboard.

The two terminals incorporate full 7-in. diagonal CRT terminal screens that provide 24- by 80-char. display using 128 Ascii char. set.

The terminals work in both page or char. mode and feature transmission in seven- or eight-level code at a data rate keyboard selectable anywhere from 110- to 9,600 bit/sec, the vendor said.

The Ambassador III costs $2,895, and the Ambassador IV costs $3,495 from the vendor at 1401 N.W. 69 St., Ft. Lauderdale, Fla. 33309.

Rixon Modem 'Two in One'

SILVER SPRING, Md. — Rixon, Inc. is offering a modem it claims is two modems in one.

The ACM300/1200 can operate as either a 0- to 300 bit/sec, asynchronous, full-duplex modem or a 0- to 1,200 bit/sec asynchronous, half-duplex modem, a spokesman said.

The feature is switch-selectable and allows the modem to transfer low- or medium-speed data over normal voice grade lines using commonly available telephone sets.

The product costs $695, the vendor said from 2120 Industrial Parkway, Silver Spring, Md. 20904.

ABR Introduces Readout Units

NEW YORK — ABR Corp. has introduced a line of computer readout terminals that interface with any RS-232 unit and produce a transcription of data punched on tape.

The units are "video editors" that can be used with ABR's Maxi-Memory units, ABR said.

The readout units start at $1,200. ABR is at 262 Mott St., New York, N.Y. 10012.

If you can write a witty-one-liner as good as these, you could be a winner in the 1981 Computerworld button contest.

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COMPUTERWORLD
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COMPUTERWORLD
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KISS MY BITS
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As all you button freaks know, *Computerworld* buttons have become a tradition in the industry. And every year we distribute tens of thousands of them at NCC, Info, and other trade shows across the country.

Last year, for the first time, we let our readers do the writing, and our judges do the laughing. We spent many hours sifting through hundreds of entries, and, at last, six winners (shown above) emerged from the smoke-filled room. The judges staggered out later.

This year, despite protests from the SPCBJ (Society to Prevent Cruelty to Button Judges), we've decided to do it again. And we're hereby *soliciting your suggestions*. They should be short, funny, relevant — and at least moderately clean.

As many as six suggestions will be chosen by our (by now) experienced panel of judges, based on criteria known only to them. If your entry is among those picked, you will receive a certificate of appreciation suitable for impressing your friends and fellow workers.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (at least their entries will) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky souls will receive a free hand-held computer game valued at well under $100 (if we can find some cheap enough).

You may not enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representations as to their competence, skill or fairness are being made. Deadline for entries is January 2, 1981 in our offices in Framingham.

yes,

I'd like to enter Computerworld's ridiculous button contest. I hope your judges can read. Here is my entry (if you have more than one, please put them on separate forms). (All entries become property of CW Communications/Inc.)

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Graphics Terminal System Targets Education Market

MAYNARD, Mass. — Digital Equipment Corp. has unveiled a graphics terminal package aimed at the educational marketplace.

The General Imaging Generator and Interpreter (Gigi) is a microprocessor-based, portable "intelligent keyboard" that can be used with user-supplied color or monochrome video monitors, according to the vendor.

Gigi and its associated software are supported under the RSTS/E, VAX/-VMS and Tops-20 operating systems. Gigi is said to extend the capabilities of DEC's interactive educational computer systems based on the PDP-11, VAX-11 and Decsystem-20 computers.

The Decwriter IV Graphics Printer — a microprocessor-driven dot matrix printer — provides hard copy of images from the system's monitor screens.

Gigi is available to educational institutions in "5-packs." Each 5-pack includes five Gigis with associated cables and connectors, one Gigi graphic printer, discount certificates toward additional Gigi units, and a choice of one or two software options.

Educational customers can buy 5-packs at $25,000. Single-unit pricing is available without the educational discount from the firm in Maynard, Mass. 01754.

Terminal-Master System Uses TWX, Telex, Dataphone Nets

N. HOLLYWOOD, Calif. — A communications system that reportedly permits users to utilize TWX, telex and Dataphone networks has been introduced by Terminal Systems, Inc.

Terminal-Master consists of a Teletype Corp. Model 43 KSR printer with a microprocessor that enables it to be used with the three communications systems.

In addition to allowing a single printer to be used for multiple purposes, Terminal-Master is said to handle a number of other protocols.

Designed to contain 4K bytes of buffered storage, the system is expandable to 16K bytes. Terminal-Master, including 4K bytes of memory, leases for $125/mo, including maintenance on a 2-year rental, or sells for $3,100 from 11300 Hartland St., N. Hollywood, Calif. 91605.

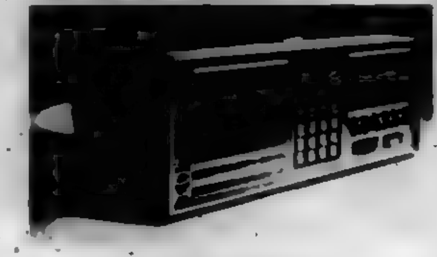
Line Diagnostics Tool Offered

RIDGEFIELD, Conn. — A portable data communications diagnostics tool for field technicians is available from Digitech Data Industries, Inc.

The Data Monitor 200 can be used by anyone, regardless of experience level, to diagnose a majority of line problems, the vendor claimed.

The product was designed to interface with the vendor's Encore 100, and all data captured on the 200 can be analyzed by the 100.

The Data Monitor 200 includes monitor, tape recorder and scope and costs $5,000. Digitech is headquartered at 66 Grove St., Ridgefield, Conn. 06877.



Data Monitor 200

Avanti Direct-Connect Unit Debuts

NEWPORT, R.I. — Avanti Communications Corp. has unveiled its 300 Modem Eliminator/Driver, designed to allow direct connection between terminals and computers at distances up to 400 ft.

An internal crystal-controlled oscillator provides operating speeds of 2,400-, 4,800-, 9,600- and 19.2K bit/-sec, all switch-selectable.

The Modem Eliminator/Driver is priced at $360, the vendor said from Aquidneck Industrial Park, Newport, R.I. 02840.

Lee Data Upgrades Terminal Line

MINNEAPOLIS — Lee Data Corp. has expanded the capability of its All-in-One Softprint CRT terminal by adding screen format compatibility with the IBM 3278 Model 3. The All-in-One CRT terminal is used as a component with the Series 300 system, which is compatible with IBM 3274 models, the vendor said.

Lee also announced a 1,920-char. CRT terminal for use on its systems.

A Series 300 system with controller, seven All-in-One CRT terminals and a 120 char./sec printer leases for $738/mo plus maintenance on a three-year lease. The equivalent system with 1,920 char. CRT terminal leases for $661/mo, the vendor said from 10206 Crosstown Circle, Minneapolis, Minn. 55344.

Data Control Adds Short-Haul Sets

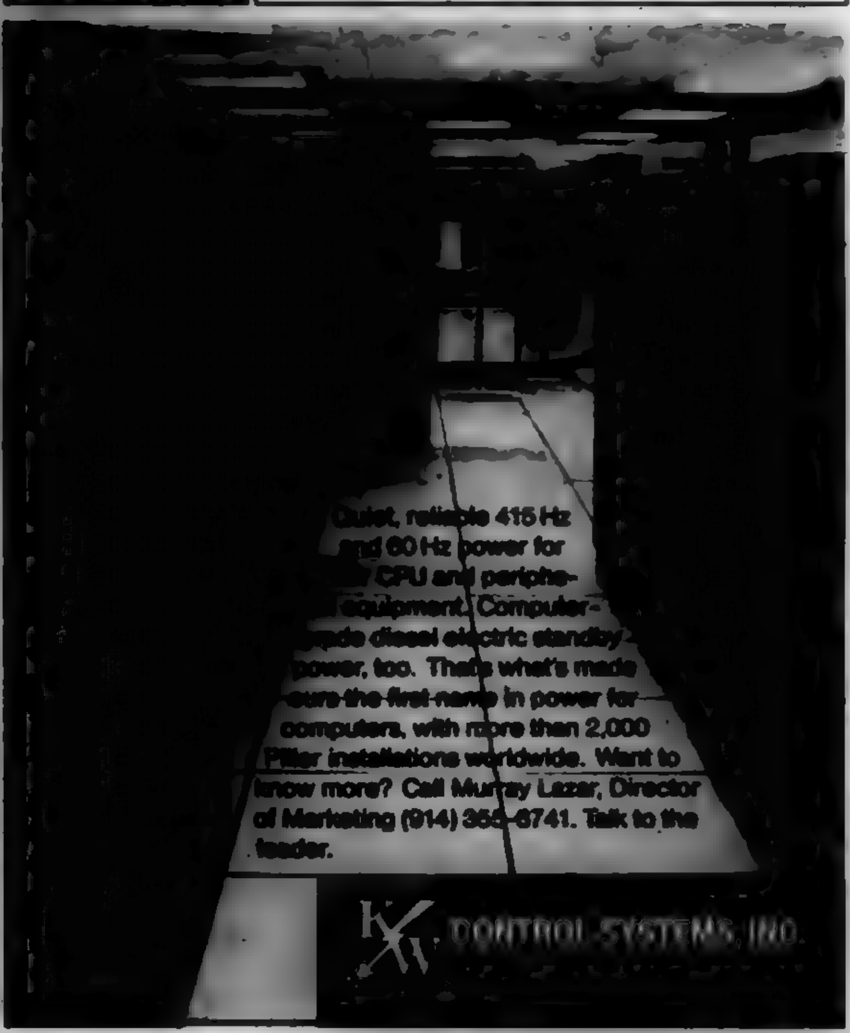
DANBURY, Conn. — Data-Control Systems, Inc. has added two short-range data sets to its Access Network product line.

The SR-102 is an asynchronous device that operates at up to 1M-byte data rates over twisted pairs.

The Model SR-202 is synchronous, operating at strap-selectable speeds of 2,400-, 4,800-, 9,600- or 19.2K bit/sec.

The free-standing unit price is $260 for the asynchronous model and $360 for the synchronous model.

Data-Control Systems is located at Commerce Drive, Danbury, Conn. 06810.



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Unit Routes Optic Signals

HARRISBURG, Pa. – A fiber-optic splitter/combiner that is said to provide a means of routing one optical signal to or from seven locations is available from AMP, Inc.

Working transmission distances are up to one kilometer for each of the seven legs.

The product costs $130. AMP can be reached through P.O. Box 3608, Harrisburg, Pa. 17105.

Timeplex Offers Options

ROCHELLE PARK, N.J. – Timeplex, Inc. has introduced two firmware options for its Series II Microplexer that add data communications network control and diagnostic capabilities.

The Configurator option allows the user, via a standard CRT terminal, to reconfigure any or all channels in a noninterfering mode, the vendor claimed.

The Extended Diagnostics option allows the user, via the supervisory port of the multiplexer, to initiate diagnostic statements to generate test patterns and loop-backs. It also analyzes data on a per-channel basis, the vendor said.

The Configurator option costs $150 and the Extended Diagnostics option is priced at $100. Timeplex is at 1 Communications Plaza, Rochelle Park, N.J. 07662.

Interactive Systems Adds RF Modem for Coax Nets

ST. PAUL, Minn. – An RF data modem for point-to-point broadband coaxial cable networks has been introduced by the Interactive Systems unit of 3M Co.'s Telcomm Products Division.

The Model 920 modem, designed for half- or full-duplex operation, can be used with other modems, audio modems and video devices on a fully loaded coaxial cable network. When interfaced with intelligent terminals, the 920 can be used for multidrop as well as for point-to-point system applications.

Data rates are 600- to 9,600 bit/sec synchronous and up to 10K bit/sec asynchronous. RS-232C and 20mA current-loop operating modes and communications protocol also are switch selectable.

The price for the Model 920 is $840. More information can be obtained from 3M, Telcomm Products Division, Departemnt TL80-17, P.O. Box 33600, St. Paul, Minn. 55133.

Motorola System Lets Agencies Share Computer

SCHAUMBURG, Ill. – Motorola, Inc. has unveiled its MDS-500 Multiagency Dispatcher Software/Data Communications product, which is designed to allow diverse public agencies to share computer resources.

With the MDS-500, police complaints, fire alarms and other incidents can be handled on an interagency basis between dispatch centers without sacrificing self-government, the vendor claimed.

The minicomputer-based system handles up to six public safety agencies. It is part of a communications system that combines mobile radios, printers and data terminals with software and hardware.

The system costs approximately $170,000 for one agency, the vendor said from 1301 E. Algonquin Rd., Schaumburg, Ill. 60196.

'Good News, Baker. The System Thinks You Should Be Transferred to a Different Climate.'

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Nov. 24, 1980

SPECIAL
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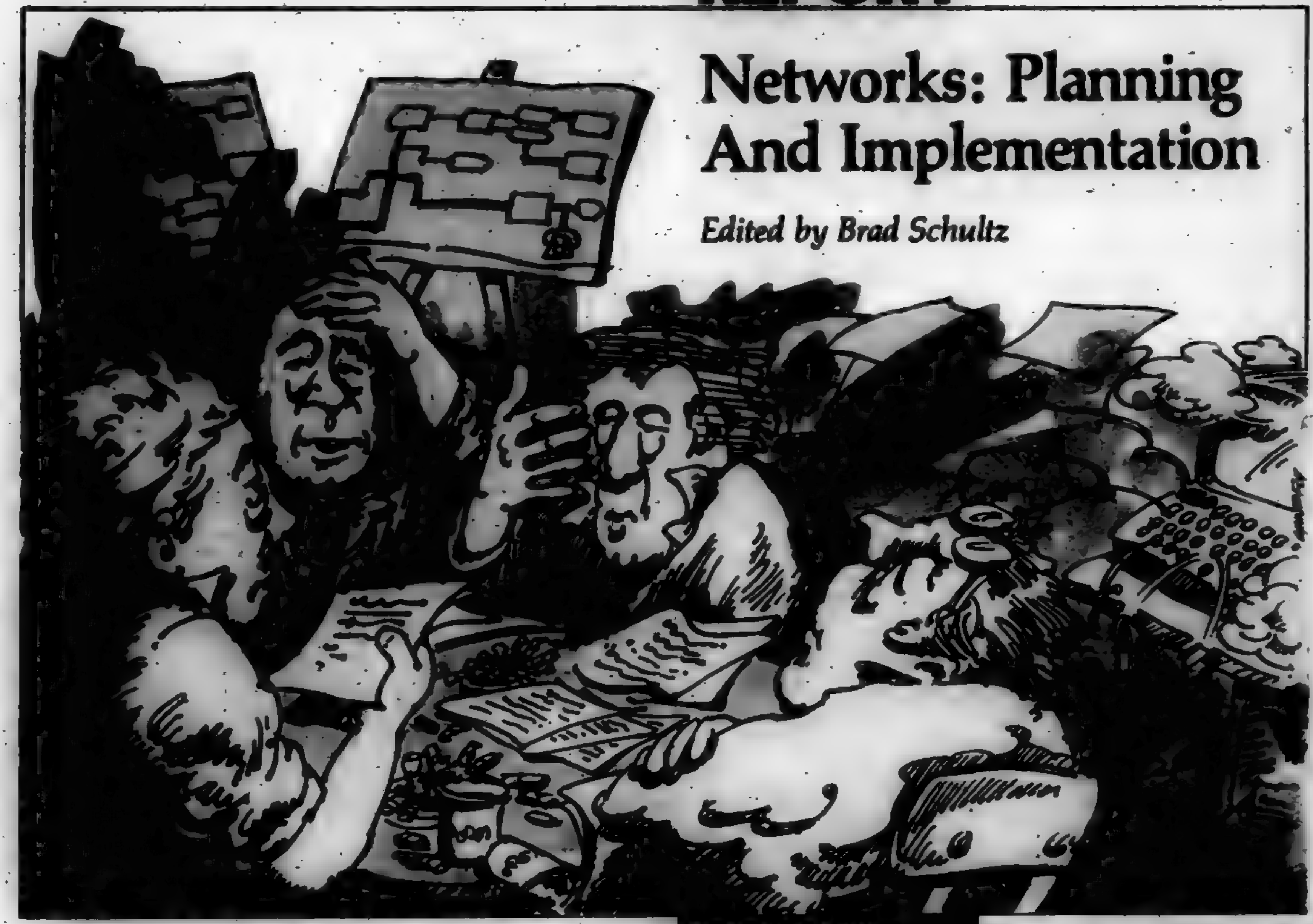
REPORT

Networks: Planning And Implementation

Edited by Brad Schultz



COMPUTERWORLD

Soup-to-Nuts Approach

Planning Tack Starts With Design Concept . . .

By Philip A. Tenkhoff
Special to CW

All too often in the anxiety to get a communications network "up," the implementor decides to omit several aspects of a methodical approach to planning, design and implementation. The result is generally a network capability that falls short of expectations.

This failure to meet expectations can also arise from the lack of clearly defined network objectives and requirements. This omission usually results in a network that may meet some short-term objectives, but may lack the flexibility to achieve long-term goals.

In either event, much wasted time and expenditure can be eliminated by following a well-disciplined approach to the planning and implementation process.

This article briefly summarizes an approach used in a variety of network situations with highly favorable results. It is based upon a logical process that commences with the definition of network objectives and concludes with installation and integration.

The approach recognizes clearly that a successful network is based upon more than the requisite collection of hardware, software and common carrier services. It must possess such other attributes as:

- Responsiveness to requirements.
- Flexibility to accommodate changing requirements.
- Optimized cost/performance.
- Reliability consistent with objectives.
- Adaptability to changing technology.

The approach was divided into 10 phases, and phases 1 through 4 are summarized below. *[A second article presenting phases 5 through 10 begins on this page — Ed.]*

Although the extent to which each phase is followed will depend upon the magnitude and scope of the network, each must be considered and evaluated.

Definition of Objectives

The purpose of Phase 1 is to define clearly the goals and objectives of the network. As a minimum, the following should be addressed specifically and documented:

- Statement of the overall purpose and objectives of the network.
- Statement of the relationship of the network to the total data processing system.
- Assessment of the feasibility of the network.
- Statement of the justification for the network.
- Definition of the scope of the network.
- Identification of organizations to be affected by the network.

Upon completion of definition of objectives, the next step is to define clearly the requirements of the network. The primary purposes of Phase 2, Requirements Analysis, are threefold:

- To validate the objectives and make modifications where appropriate.
- To outline the performance requirements necessary to meet network objectives.
- To establish specific functional and operational requirements for the network.

At the conclusion of this phase, a report should be issued specifically to address:

- Feasibility of achieving stated objectives.
- Scope of the total network.
- Documentation of network requirements (reliability, performance, security, cost, schedules, estimated network traffic, geographic coverage and operational controls).

Current Systems Analysis

Phase 3 — Current Systems Analysis — addresses the systems currently in use. Because the selected network approach must interface with existing systems such as host computers, terminals, communications devices or other networks, it is important early in the study to understand clearly and to document the characteristics and constraints imposed by these existing systems.

Specific objectives of this phase are:

- Documentation of existing systems (hardware components, available software, performance, reliability and functional characteristics).
- Analysis of characteristics and constraints of currently utilized systems.
- Review of any previous network studies that have been made.

Evaluation and Planning

The documented results of the requirements analysis and current systems analysis phases provide the basis for Phase 4, Evaluation and Planning. The initial task effort is to formulate conceptual network designs that appear to be responsive to network requirements.

Such conceptual designs could include, for example:

- Design and implementation of a private network.
- Use of available "value-added" network services.
- Use of common and specialized carrier services.
- Purchase/lease of a private network.
- Network sharing.
- Combinations of the above.

These conceptual designs provide a clearer perspective of the magnitude of the network project — including gross cost and time estimates.

Three distinct tasks are required as part of this phase. The first such task is to produce gross estimates of the costs and potential benefits of alternative network designs. Categories of costs to be estimated include those associated with software development, facilities, communications services, communications hardware devices, personnel, maintenance and common carrier services.

The second task involves the development of implementation plans for primary and alternate network design approaches. These plans include tentative schedules and labor requirements.

The third task involves describing each proposed design. This description includes rationale for design concept, constraints and responsiveness to requirements.

. . . And Reduces It to Functional Model

By Philip A. Tenkhoff
Special to CW

The network General Design phase results in a high-level functional and performance design of the total network.

The primary purpose of Phase 5 is to reduce the overall conceptual design produced in Phase 4 to a definitive description of the system. Upon completion of the general design, the following are documented:

- General description and diagram of the network.
- General description of the network architecture.
- Definition of all hardware and communications service components.
- Narrative of network functions.
- Network performance capabilities.
- Network reliability capabilities.
- Flexibility for future growth.
- Interface requirements.
- Traffic volume capabilities.
- Results of trade-off studies.
- Maintenance approach.
- Performance monitoring capabilities.
- Human engineering.
- Operational control.
- Hours of operation.
- Recommendations.

Upon completion of the general design, specifications for the procurement of hardware and software components are produced in Phase 6. The scope and amount of detail for these specifications depend to a degree upon the complexity of the network.

Simple networks, using standard "off-the-shelf" components, do not require the same level of detail as the more complex networks.

Typical components requiring specifications are modems, terminals, multiplexers, concentrators and communications software.

(Continued on SR/8)

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Planning Local-Area Nets Harder Than It Looks

By Ivan T. Frisch
Special to CW

Beware! Planning local-area communications networks (LACN) may look too easy. Indeed, because the networks usually use coaxial cable or optical fiber, it appears that there is bandwidth to burn.

Because the systems are confined to a few local buildings and, hence, propagation times are about 10 microseconds, response time would seem to be almost instantaneous. Because of a protected communications environment, error rates of less than one error per 100 million bits are easily attained.

Therefore, you may be tempted to throw together some cable with a few microprocessors and build a network, or hastily buy the best looking off-the-shelf system that meets deadlines. However, it may be that, inspite of all its mind-boggling capacity, the network you wind up with is missing precisely the capability that is vital to you or is lacking the flexibility to be expanded to your needs.

Essential Steps

Indeed, disaster may lurk in skipping any of these classical planning steps:

Step 1. Determine applications to be supported, for example, office automation.

Step 2. Formulate functional requirements such as electronic mail, file transfer and interactive computing.

Step 3. Specify operating requirements, such as response time, reliability and so on.

Step 4. Categorize LACN architectures.

Step 5. Formulate tradeoffs among LACN features based upon your needs and priorities.

Step 6. Design and select system.

To illustrate my point, let me give you an example in terms of three important LACNs, each of which has many excellent features. They are Ethernet of Xerox Corp., Hyperbus of Network Systems Corp. and Mitrenet of Mitre Corp.

My purpose is not to grade these systems, but just to demonstrate the steps you must take to compare their ability to meet your requirements. Many variations of the three systems exist or are being developed. Therefore, to provide a framework for this discussion, let me very briefly describe the high-level features of one version of each of the systems.

Ethernet is a coaxial cable-based, bus-oriented communication system, providing a raw bandwidth of 3M bit/sec, interconnecting word processors, minicomputers or intelligent terminals, and spanning a linear distance of about 1 kilometer. The overall structure of this system is shown in Figure 1a.

The Ethernet controller resides in the host minicomputer or intelligent terminal, and is connected to the transceiver by a twisted-pair cable. The controller is implemented partially in hardware, microcode, and in software. Together, they perform all the intranet data transfer functions. The basic unit of data to be exchanged between two Ethernet controllers is called a "packet." The transceiver transmits and receives signals on the cable, and detects collisions among "contending" packets.

Network Systems Corp. is currently developing a new coaxial, cable-based, commercial LACN called Hyperbus designed for the interconnection of terminals or computers of different vendors through devices generally known as Bus Interface Units (BIU).

The bus operates at 1M bit/sec and provides for multidrops over distances of several thousand feet. Figure 1b illustrates the configuration of a Hyperbus. The BIUs contain microprocessors and data buffers and various BIU models implement interfaces to different families of logical or physical units.

The Mitre Corp. has also implemented a coaxial cable-based, local area network, using an Ethernet-like contention discipline. This system employs microprocessor-based nodes as the interfaces for subscriber devices. The Mitre cable bus system uses two parallel channels — one outbound and one inbound — as shown in Figure 1c. The Bus Interface Unit (BIU) contains modems and digital logic which support the network protocol and interface the subscriber's equipment. Standard cable television (CATV) components, such as cables, taps, splitters and amplifiers are used for signal distribution. The Mitrenet operates at 1.2M bit/sec.

Of course, at this level of description there is certainly no way to say which system is better — so let's look at some

(Continued on SR/4)

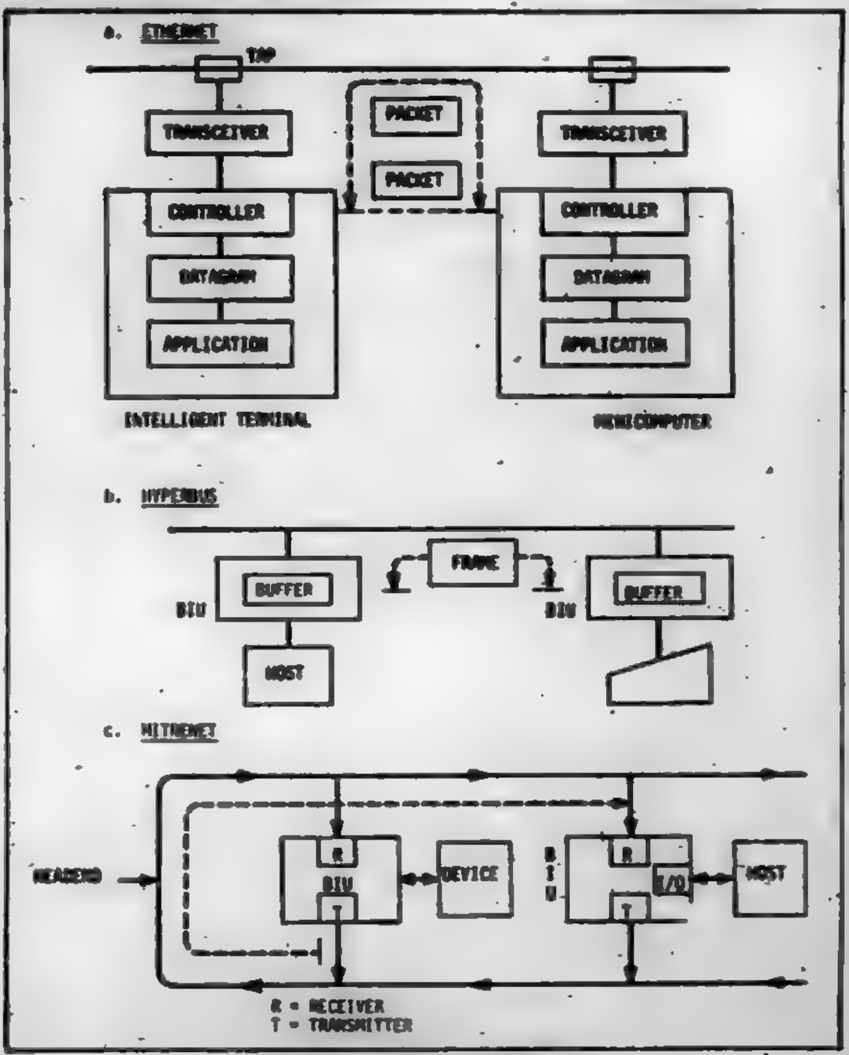


Figure 1: Network Architecture

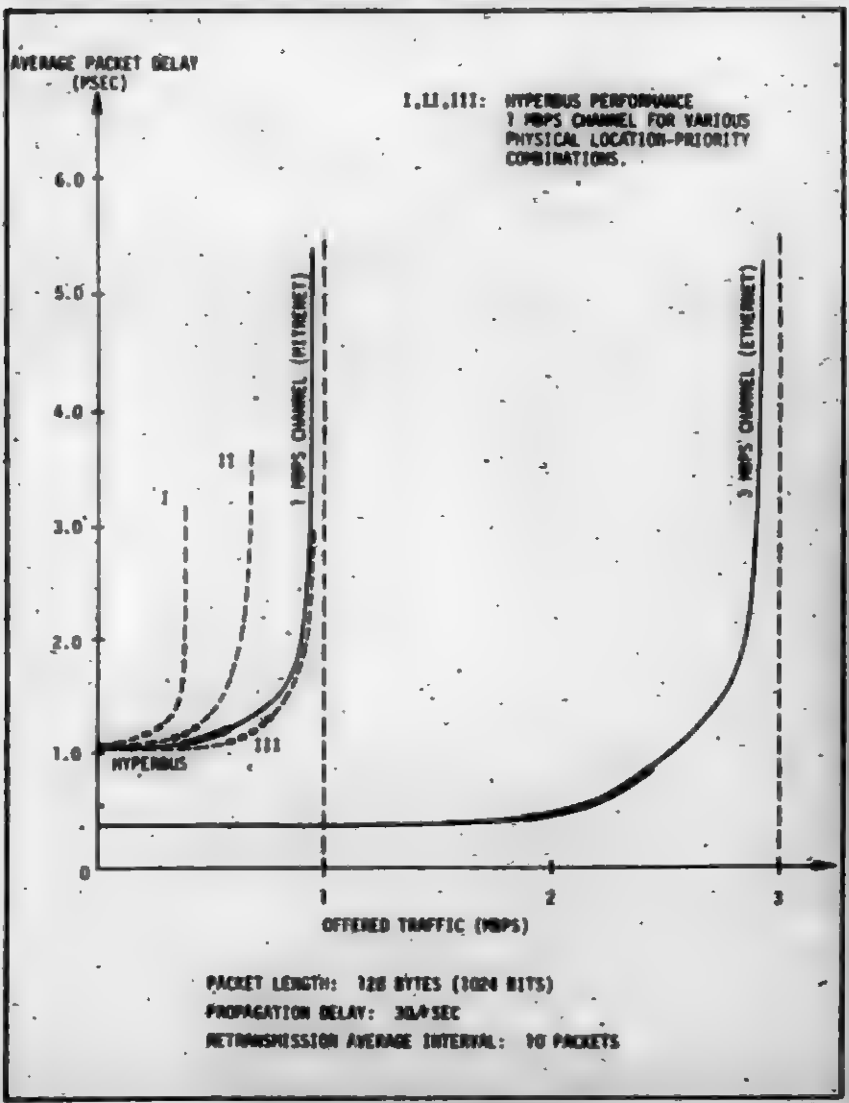
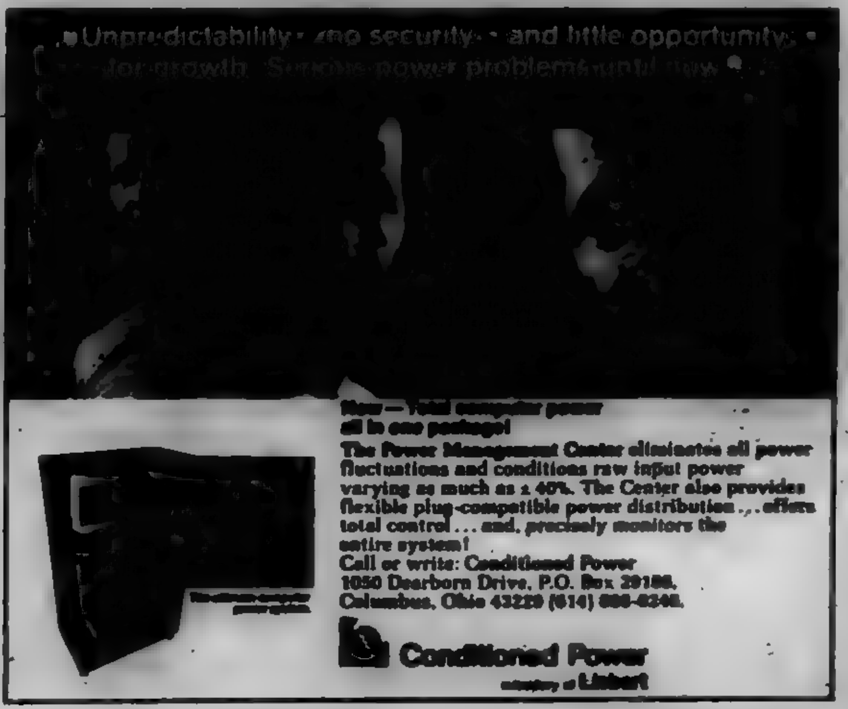


Figure 2: Response Time Curve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Disaster Lurks in Shortcuts to Local-Area Nets

(Continued from SR/3)

applications. It is possible that you have, or soon will have, a terminal in your office to do some interactive computing or editing. In these cases you would like to be able to send a few thousand bits in no more than 10 seconds.

In addition, you or another user in your operation may want to use the same LACN to transfer the contents of tapes between different tape drives or from archive in one location, to a mainframe in the same or another building. This is a common requirement in billing and accounting operations, computer-aided design and many other applications. It is not uncommon at all for files of 100 million bits to be transferred.

The key here is not a response time of only 10 seconds; a couple of minutes might be acceptable. Rather, the important point is that these transfers must not tie up the system. Of course, it would be ideal if such bulk transfers could be accomplished in a few seconds without significant cost penalty.

How do our three systems fare under these requirements? Examining the curves in Figure 2, we can get some answers. The curves show average response time per packet in milliseconds as a function of total traffic offered by all users.

Each system is well utilized if it is operated in the knee of each curve because then we have many users with reasonably low delays. If traffic is increased beyond the knee, then delays become unbounded, i.e., you will go to sleep before you get your response.

We see that Ethernet can handle the most interactive traffic. Thus, at 2M bit/second of offered traffic, if each input is about 1,000 bits, we can handle 2,000 simultaneous users.

Hyperbus exhibits strange behavior in that its performance depends upon the actual configuration of users on the system. In any case, for interactive requirements, all three systems give impressive response times, in the order of milliseconds, for large numbers of users.

The Hyperbus seems to be poorest, and would fare even worse if on Curve I we were to look at peak delays instead of average delays.

Now let's look at a second requirement for file transfer. If you need to transfer 100 million bits in, say, 10 seconds, the data rate (even ignoring headers, protocols and so on) would be 10M bit/sec. That takes you into the unbounded part of the curves; even worse, it floods the system so no one else can use it.

Thus, none of the three systems is adequate in the configurations I have described. However, it turns out that Mitrenet can be easily modified in architecture so that we can dedicate enough bandwidth, say 6 MHz, to be able to give you 10M bit/sec of data transferred.

At that speed you can get 10-second response time for your file *without affecting the interactive traffic.*

Three Questions

Knowing all this beforehand, you would then have selected and tailored your system to your requirements. But you see now why it is not so easy. I still haven't explained enough about the systems for you to understand the answers to these questions:

Question 1: Why does Hyperbus performance depend upon terminal arrangement?

Question 2: Why are the systems ordered as they are in Figure 2?

Question 3: Why is it easy in this case to modify Mitrenet for bulk transfers and not the other two?

Let me explain just a little bit more about the systems to enable you to understand the answers. First of all, to avoid comparing lists of random features, it is useful to classify LACN architectures by several broad categories, as in Table 1.

These categories encompass current architectures and can easily accommodate new developments. The categories are generally highly correlated. For example, twisted-pair cable will often dictate low- to medium-speed networks, and a mesh system often uses distributed control.

Of course, the lines between each choice are fuzzy, and the categories are certainly not unique. All of the categories and items in Table 1 are important for different applications.

However, for the purpose of answering the questions I have posed, it is sufficient to briefly address just two items: transmission mode and access protocol. Let's look at transmission mode first.

In Ethernet and Hyperbus, data is transmitted at baseband (i.e., not modulated into a carrier). On the other hand, the Mitrenet employs Radio Frequency (RF) transmission, whereby data is modulated onto a carrier frequency in a standard CATV 6-MHz band between 3- and 300 MHz before being transmitted.

This is why, in answer to Question 3, it is easy on Mitrenet to add another 6-MHz channel for file transfer. Indeed, it is also easy to piggyback video and separate voice channels.

However, recognize that there are no unmixed blessings. RF components are quite expensive compared to baseband transmission (a factor of approximately 3:1).

Therefore, for low data rates (up to 3M bit/sec) and short cable length ap-

(Continued on SR/6)

[illegible]

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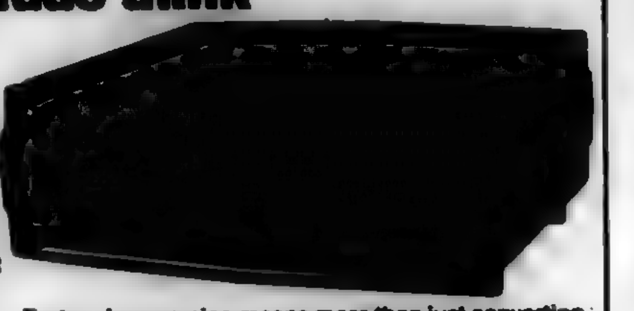

Protocol conversion means more than just converting codes. It means "total bi-directional communications" using the proper code, at the proper data rates, in a proper specified format. The BLACK BOX ® Catalog's Model A/S-1 Protocol Converter "IS AN" IBM 2770, 2780, 3780, 2741, or 3741. Alone, it can communicate with a bi-synchronous computer port or terminal and maintain system continuity. With an asychronous terminal attached to the A/S-1, it will transmit and receive data, maintaining the prescribed bi-sync format/protocol.

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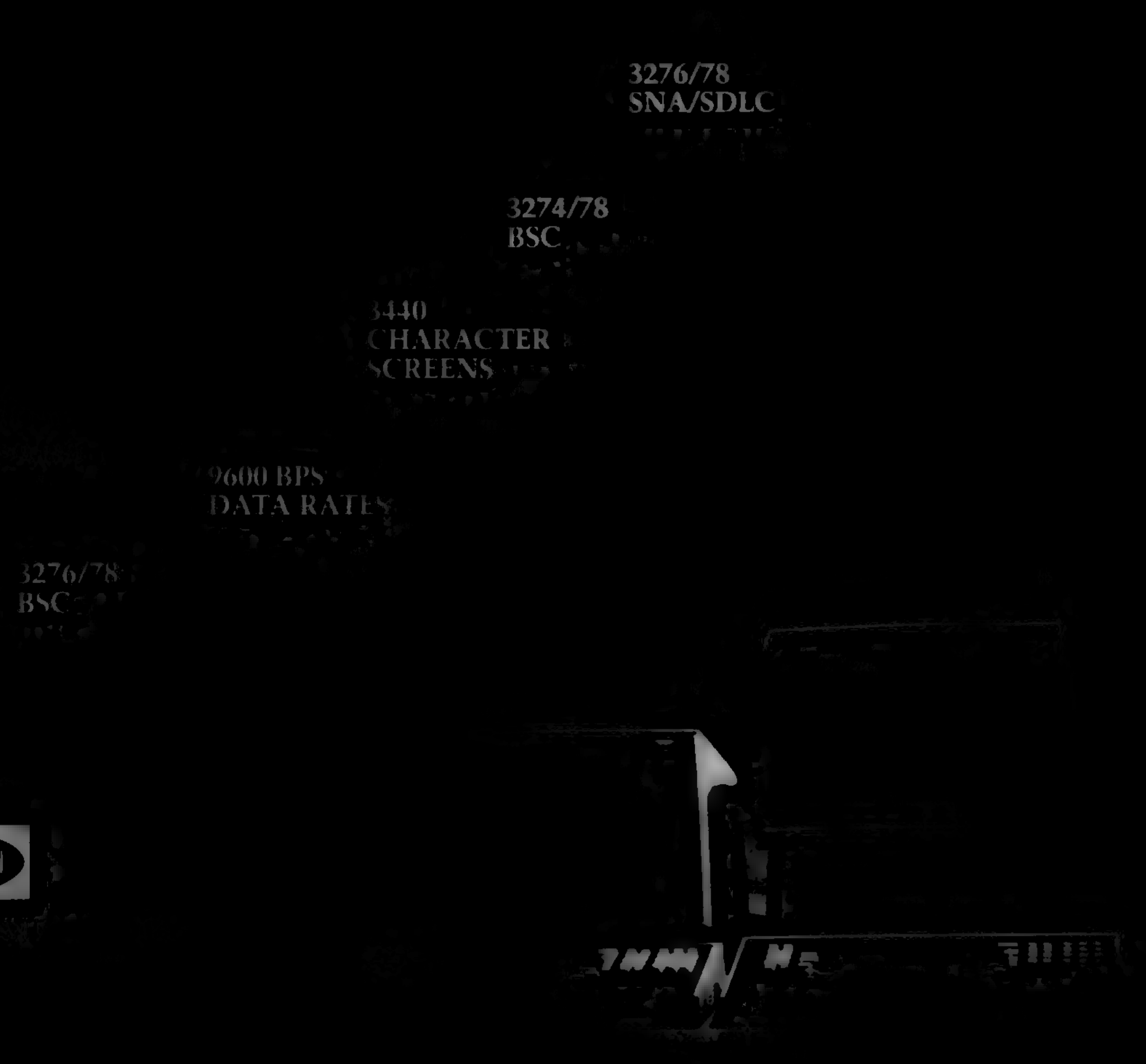
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No Easy Shortcuts to Planning Local-Area Nets

(Continued from SR/4)

plications (less than 1 kilometer), baseband designs are quite appropriate. For applications which require high bandwidth or simultaneous use of the cable for purposes other than data exchange (such as voice and video), the RF broadband approach is clearly a better choice.

Access Protocols

To answer the two other questions, I will briefly examine access protocols. Ethernet and Mitrenet employ similar access methods known as carrier-sense-multiple-access-collision detection (CSMA/CD), allowing each BIU to access the cable on a contention basis.

This scheme involves three different operations: The *carrier-sense* (also known as "listen before talk") operation means that each BIU will monitor the channel prior to transmission. If carrier is sensed on the bus, the BIU will be restrained from transmitting until the channel is free again.

The second operation is *collision detection*. Each transmitting station aborts the transmission immediately if destructive interference due to collision is detected.

The final operation is *back-off*. When collision is detected, the colliding BIUs wait or "back-off" for random periods of time before retransmitting the frame. The resulting CSMA/-CD access scheme yields very high channel utilization (in excess of 90% of channel capacity) and low access delay during light traffic.

The access protocol of Hyperbus is quite different from the other two. The Hyperbus employs two modes of operation: free flow mode and priority mode. During the free flow mode, the BIU is free to transmit when the channel is idle. Collisions in the free flow mode are detected by the absence of an acknowledgment.

Once any BIU has transmitted during the free flow mode, the system will enter the priority mode, whereby the cable is reserved for a period of time after each transmission to allow acknowledgment. The scheme allows a certain number of priority classes and, for equal priority traffic, gives preferential treatment to BIUs depending upon their relative position on the cable.

If there is a collision in the free flow mode, the acknowledgment will not be present. All BIUs will enter the operational priority mode to resolve the contention. This access scheme is somewhat complex for the interactive applications in this example. It prioritizes access to the cable and allows marginal improvement of channel utilization during heavy traffic.

However, such capabilities are attainable only through strict control of each BIUs location on the bus; otherwise, the performance can deteriorate substantially. Therefore, the biggest disadvantage of this scheme is its inflexibility of system configuration.

This answers the first question and explains why, with different terminal configurations, we get different performances for Hyperbus in Figure 2.

Finally, in answer to the second question, we see that Ethernet and Mitrenet both are CSMA and that for our example of interactive traffic, their performance is at least as good as for Hyperbus and that the performance of Ethernet is roughly three times as good as Mitrenet simply because the data rate based upon bandwidth allocation is roughly three times as high.

I started out trying to make a very simple point: there are very significant tradeoffs in planning an LACN. To do this I have had to drag you through some technical details that should ordinarily be transparent to you as a user and, of course, once your system is implemented you will not have to worry about the details of access methods, etc.

However, in the planning stage, it is important to proceed through all six steps indicated at the beginning and make sure that your system is specified to meet your requirements.

Obviously, there are many other features of LACNs I have not addressed in this discussion. For example, the item on standards and compatibility in Table 1 is critical to all potential LACN users. Regardless of how well you address the issues of access methods, the system is useless if it will not handle your protocols and equipment interfaces.

Furthermore, standards have certainly not been agreed upon so that you must assess your capability of adding new protocols and equipment and the costs you will incur.

The small example I have given you should help to illustrate the type of considerations and methodology that you should use to evaluate all your requirements in planning a Local Area Communication Network.

Frisch is senior vice president of Network Analysis Corp., located at 130 Steamboat Road, Great Neck, N.Y. 11024.

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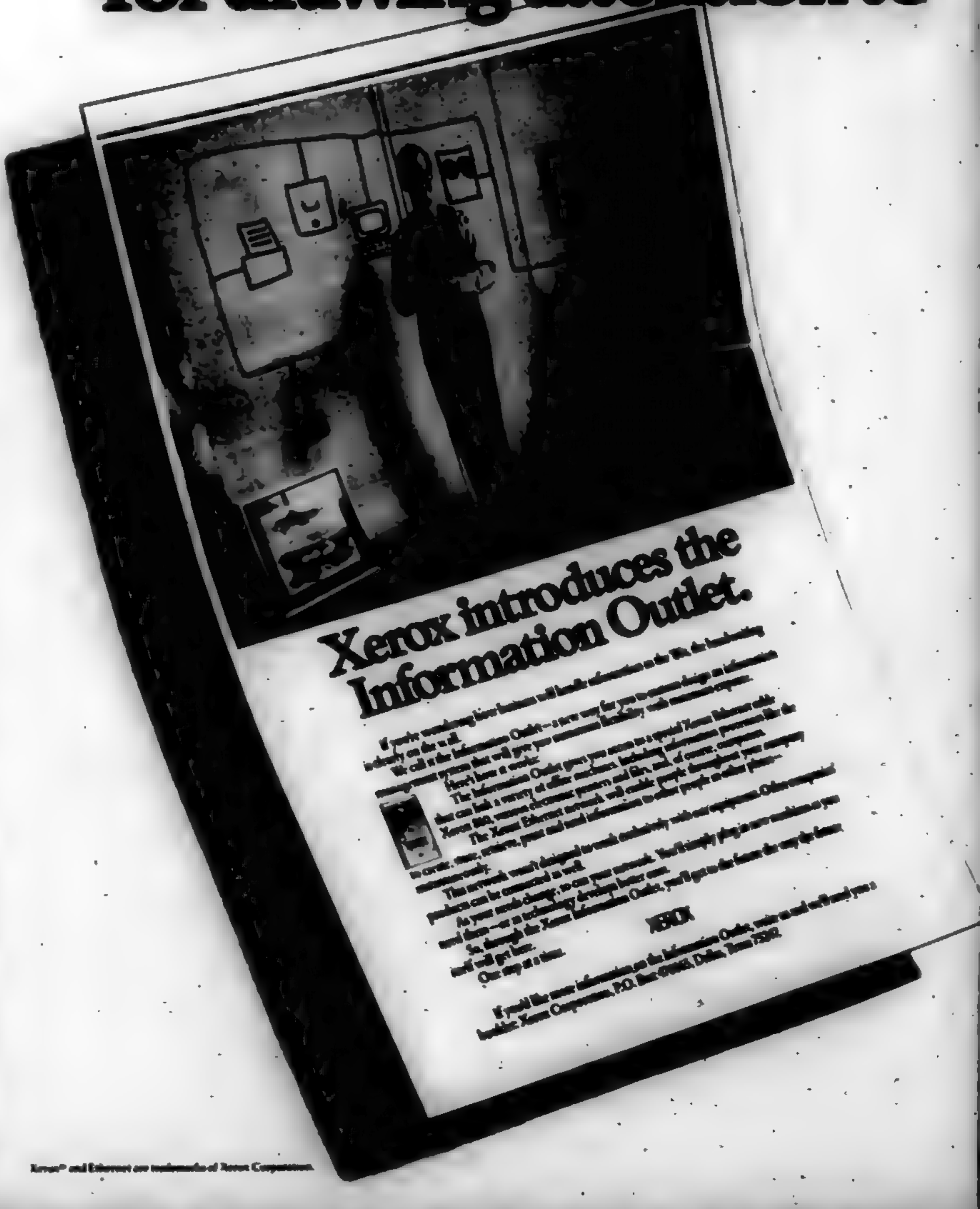

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To Ensure Economic Security

Decentralization Vital to Library Networking

By Cynthia Durance
And Mazharul Islam
Special to CW

Library networking will be economically insecure and uncertain unless the user ensures sufficient decentralization and openness of systems and services to allow widespread resource sharing and maximum resource utilization.

For library networks and systems to be open to one another as well as to related systems in the information sector, it is essential that existing library networks migrate systematically to a layered or modular structure and that new networks conform to an architecture requiring clear differentiation and a strict hierarchy of all network functions.

Only a network conforming to such a modular architecture and a standardized protocol system can be hospitable to openness and decentralization. Only in this way can library application-oriented networks derive the maximum technical and economic benefits from the rapidly growing data networks in industrialized countries.

Fortunately for library networking, international standards now exist and are being progressively implemented by concerned parties at the first three levels of the "open systems architecture." It also appears likely that standardization up to the (end-to-end) transport level will be achieved before long.

Basic Objective

The basic objective of all library networks is to provide a mechanism for shared use of dispersed, costly and scarce library resources, such as collections, data, services and systems, by the widest possible circle of users.

Such a network is crucially important in a country like Canada, where library resources are not only relatively scarce and scattered, but must be shared by a relatively small population of 24 million dispersed over the second largest country on earth.

These resources are not only dispersed geographically, but are also controlled by many jurisdictions both public and private. Furthermore, automated library systems that now exist in Canada differ considerably from one another in type, scope and the extent of technical resources they command.

At one end of this spectrum are stand-alone minicomputer-based systems serving individual libraries; at the other end are large systems equipped with dedicated mainframe computers serving tens or hundreds of libraries and handling data bases of a million or more bibliographic records. The Utlas system of the University of Toronto and the Dobis system of the National Library/Canada Institute for Scientific and Technical Information are two prime examples of this latter kind.

In such an environment resource sharing, though clearly indispensable, can only be effected through voluntary cooperation.

Data Interchange

The cornerstone of all cooperative or library network-based operations and services is the ability of libraries to interchange and share bibliographic data promptly and economically — data that identifies, locates and describes documents and contents of documents held in various libraries and information centers in the country.

In the past and to a large extent at present, interchange of bibliographic data has been slow and labor-intensive. With the increasing automation of library operations and the growth of modern data communications facilities, library networking has been moving steadily towards ever-increasing reliance on computer and communications technologies.

Today, an immense quantity of bibliographic data exists in machine-readable form, but interchange and shared use in a nationwide network environment raises formidable problems.

Communications Roadblocks

The roots of these problems are complex, but can be traced largely to the isolated efforts towards library automation and networking. As a result, we now have a variety of closed networks incapable of communicating with one another without considerable effort and commensurate expense.

In this environment, the end user invariably loses because there is no effective mechanism to support his access to the library and information resources held independently by many systems or networks in the country.

The user is only slightly better off if locked, as is often the case, in one of the closed networks while lacking the freedom and the necessary technical means to access resources that belong to other networks or to no network at all. The owners of library resources and closed networks also lose because their scarce and expensive resources are largely underutilized.

The underfinancing and the underutilization of library resources, particularly of the costly automated variety, is too well known to need elaboration here. Suffice it to mention that the deeper roots of this problem have so

(Continued on SR/8)

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Decentralization Key to Library Net

(Continued from SR/7)

far been generally ignored; remedies proposed called mostly for bigger or more closed networks, more ad hoc interconnections and more public subsidies.

Fresh Approach

Now the National Library of Canada has come forward with what is undoubtedly a fresh approach to networking in Canada and may well prove to be the most fruitful framework for all network development and implementation.

The key elements in the National Library's approach to library networking in Canada are decentralization and openness. These concepts are by no means revolutionary in themselves, but in the context of the present environment and future prospects they have powerful implications.

Decentralization duly recognizes the geographic, sectoral, jurisdictional and organizational boundaries of library and information resources of the country. Openness encourages and makes possible multisystem, multinetwork interactions, without which universal accessibility of all systems and resources to all users can never be assured.

Only a decentralized open network can provide the required mechanism for widespread resource sharing and maximum resource utilization, without which the economic future of library-based systems and services must remain insecure and uncertain.

The National Library of Canada did not adopt this strategy overnight; it has been studying the problem of library network building in Canada and elsewhere quite intensively since 1972.

End to Isolation

In a forthcoming document entitled "The Context of Interconnection for a Nationwide Bibliographic Network," the National Library reviews the broader context of bibliographic networking and concludes that *it is no longer desirable or indeed possible to view library-based systems in isolation and in disregard of profound technological and structural changes now taking place in other components of the information sector.*

Historically, the impetus for bibliographic networking arose from the internal needs of libraries for economy and efficient use of scarce resources. As a result, libraries tended to regard bibliographic data interchange as internal to the library world involving little or no direct interaction with the outside.

Such a view is no longer tenable. Other segments of the information sector, such as information dissemination industry, publishers and the book trade, have also acquired an interest and expertise in utilizing automated bibliographic data systems.

Library systems are increasingly undertaking machine-based business transactions with these and other segments of the information sector. Characteristically, the machine-readable data used by nonlibrary segments differs structurally and quantitatively from that generated by library systems.

There is, nonetheless, no insurmountable reason why library-created data cannot be communicated over one or more of the message delivery systems being utilized or developed by other segments of the information sector, provided some additional efforts are undertaken to make the structural differences transparent to the users and to the communication system.

Maximized Access

By integrating with other segments of the information sector, a library-oriented data interchange network not only ensures its economic viability but, more importantly, maximizes access to bibliographic data by the widest possible circle of information seekers.

In the past, library networks were designed as closed systems built upon centralized processing power and dedicated communication lines leased from common carriers. The architecture of such networks, being application- and hardware-dependent, often lacked the necessary separation between purely communications-oriented functions and those concerned with the processing of application level tasks.

Technical incompatibilities would generally inhibit development of interconnection with other networks and outside systems.

As a result, closed library networks tend to be characterized by inflexibility, high cost of services, underutilization of resources, a captive clientele and highly centralized administration and control. The goal of universal access to the library and information resources of the country will be unattainable so long as these resources remain locked in numerous closed networks unable to communicate and cooperate with one another.

The National Library's position is thus essentially that library systems not only have to be "open" to one another, but also to related systems in the rest of the information sector. When there were only a few systems to interconnect, interconnection via ad hoc, bilateral and usually nonstandard procedures posed no insurmountable problems.

As the number and variety of systems that need to be interconnected increase, such an approach is clearly unworkable. It is at this point that the issue of networking through open systems interconnection assumes a magnitude of central importance.

Durance is director of the National Library of Canada's National Library Network Project, where Islam serves as network liaison officer, at 395 Wellington, Ottawa, Ont., Canada K1A 0N4.

Conceptual Network Design Reduced to Functional Model

(Continued from SR/2)

For each component, the specifications should be of sufficient detail to ensure the desired functional, reliability and performance parameters of the network. Such specifications should be sufficiently clear that any qualified vendor could readily respond.

Design

The detailed design provides the next level of detail to the general design discussed in Phase 5. However, system components will now have been selected and can be integrated into the overall design. Some aspects of the detailed design developed in Phase 7 include:

- Specification of all circuits.
- Detailed network configuration.
- Test equipment requirements.
- Maintenance plan.
- Personnel plan.
- Documentation plan.

Implementation Plan

An implementation plan — Phase 8 — needs to be prepared including:

- Facilities requirements and orders.
- Circuit requirements and orders.
- Hardware requirements and orders.
- Software requirements and implementation.
- Personnel acquisition and training.
- Operating procedures.

This plan is then used as the basis for installation of the network.

Following the adoption of the implementation plan, a test plan should be prepared in Phase 9. Components of the test plan include:

- Vendor quality assurance requirements.
- Hardware and software component acceptance tests.
- System level testing.
- Pilot operation.
- On-line maintenance testing.

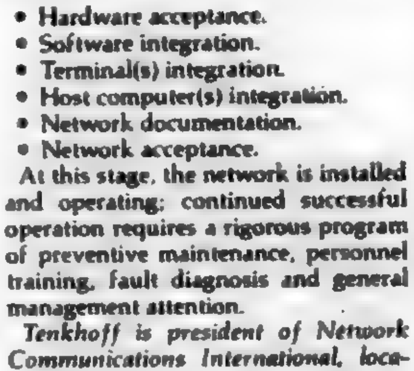
Integration and Installation is the tenth and final phase of the development and implementation of a network. The end result is a network integrated with other systems, such as existing host computers and terminals, and one that satisfies the design objectives and functional requirements.

Major phases of integration and installation include:

- Facility preparation and acceptance.
- Hardware installation and integration.
- Hardware acceptance.
- Software integration.
- Terminal(s) integration.
- Host computer(s) integration.
- Network documentation.
- Network acceptance.

At this stage, the network is installed and operating; continued successful operation requires a rigorous program of preventive maintenance, personnel training, fault diagnosis and general management attention.

Tenkhoff is president of Network Communications International, located at 2639 Parkmont Court, Olympia, Wash. 98502.



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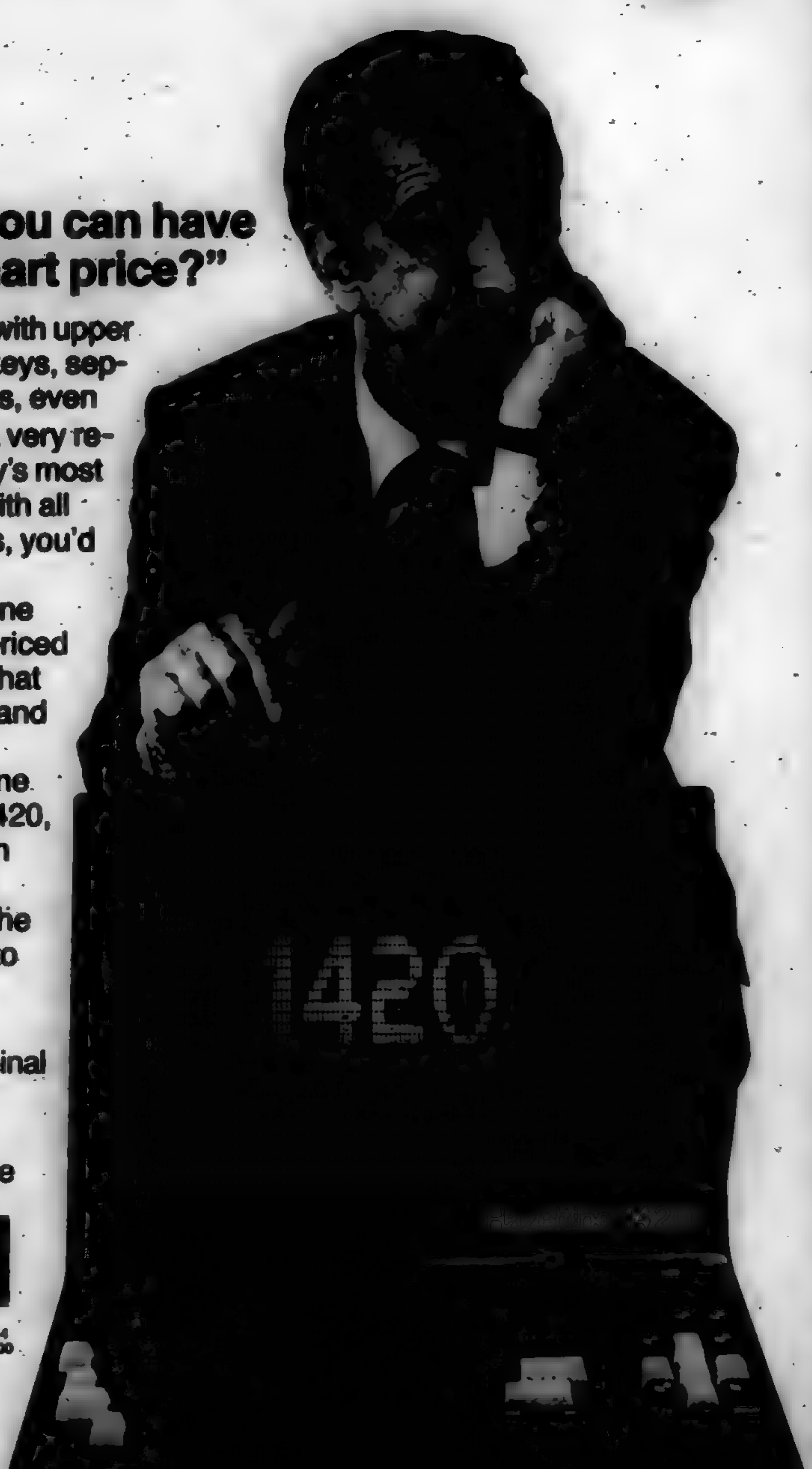

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X.25 Nets No Cure-All for Intervendor System

By Tony Russo
Special to CW

Be careful not to view X.25 networks as a cure-all for intervendor communication. X.25 does not guarantee that X.25-compatible devices (even from the same vendors) are compatible with each other.

X.25 is a recommendation of the Consultative Committee on International Telegraph and Telephone (CCITT). Based in Geneva, Switzerland, CCITT is a standards-making body composed primarily of European, government-owned postal, telegraph and telephone companies (PTT), but also including other interested government-sponsored parties from around the world.

While CCITT creates communication standards, it has no authority to impose them on anyone. Hence, the "standards" coming out of CCITT are called recommendations rather than standards.

There are well over a hundred of the recommendations from CCITT that describe interfaces between all types of data communications equipment including things like voltage and signal levels, connection configurations and protocol definitions.

In particular, Recommendation X.25 only defines the *interface* to a public packet-switching network. It does not attempt to describe the internal workings of the network. This is left up to the network designers so long as the network has a well-defined user interface.

In other words, X.25 only specifies the interface between a user's data terminal equipment, which can be a terminal computer or other electronic device, and an X.25 network data circuit-terminal equipment, which is simply the physical port into the X.25 network (see Figure 1).

The X.25 standard is actually only a part of a layered communications architecture — network definition. One model of a communications architecture is the International Standards Organization (ISO) Open Systems Interconnect.

This architecture is an international attempt to define the functions of each layer and the interface between layers for both users and carriers [CW, Oct. 27].

In any layered architecture, the total communications capability is broken into distinct "layers" where each layer performs a specific function required to support the high-level features "seen" by the user.

Each functional layer is tightly defined, as is the interface between layers, or levels. In the Open Systems Interconnect model, only three have so far been defined for public packet-switching networks, commonly referred to as X.25 networks.

Level by Level

As seen in the CCITT packet-switching architecture in Figure 2, Level I is the electrical interface level that describes the voltage levels and the pin configurations and signal definitions that are needed to physically connect two devices together successfully.

Level II outlines the link-level protocol that enables a user's data buffer of ones and zeros to be transferred between two devices.

Error checking, bit sequencing and retransmission of buffers in error are all functions described by this level. Note that this function is only concerned with correctly moving a set of ones and zeros or what they mean.

These link-level protocols are often simply called "proto-

(Continued on SR/16)

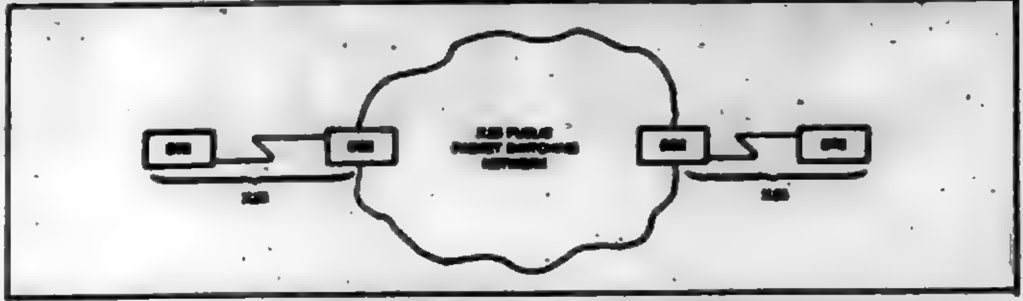

Figure 1. X.25 is the interface between the user Data Terminal Equipment and the network ports. The protocol does not attempt to describe the inner workings of the network.

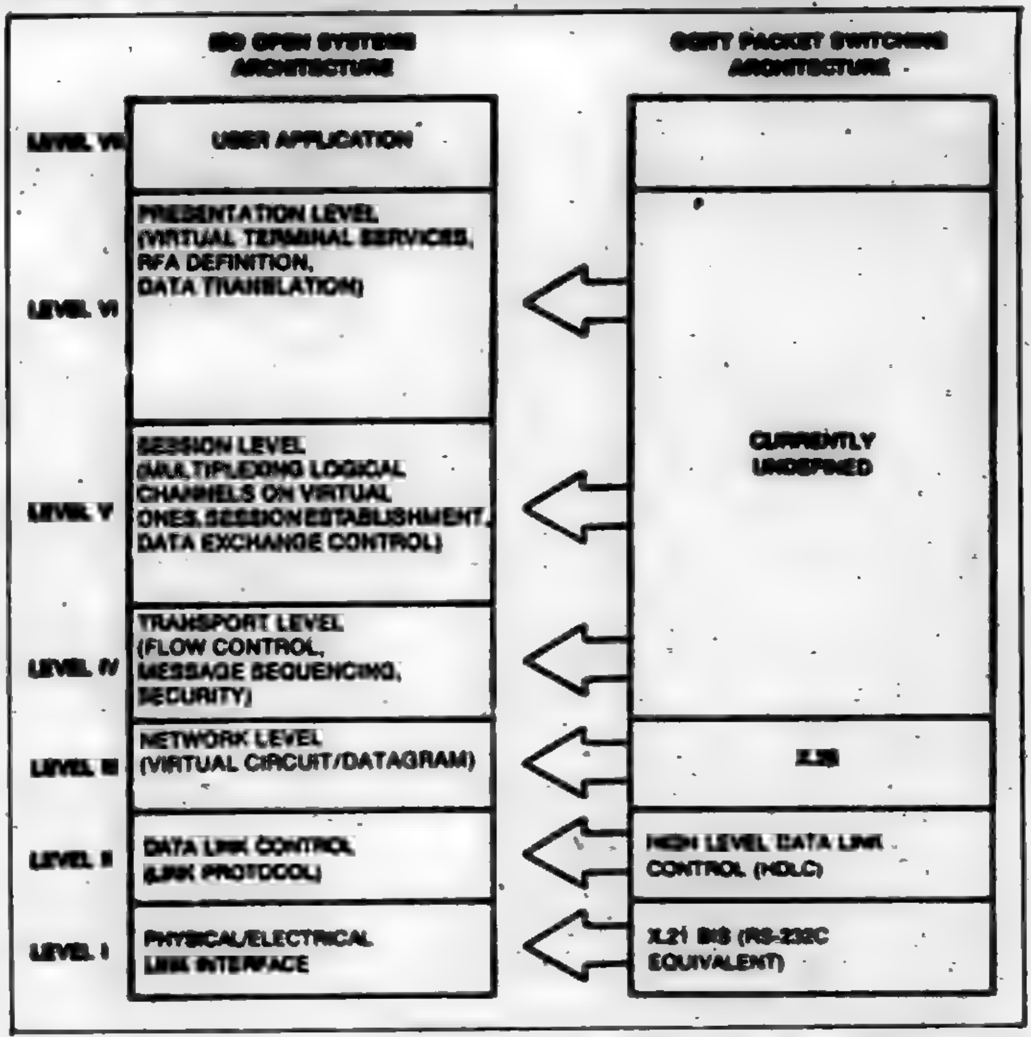
ISO OPEN SYSTEMS ARCHITECTURE
CCITT PACKET SWITCHING ARCHITECTURE
LEVEL VII
USER APPLICATION
LEVEL VI
PRESENTATION LEVEL (VIRTUAL TERMINAL SERVICES, RFA DEFINITION, DATA TRANSLATION)
LEVEL V
SESSION LEVEL (MULTIPLEXING LOGICAL CHANNELS ON VIRTUAL ONES, SESSION ESTABLISHMENT, DATA EXCHANGE CONTROL)
LEVEL IV
TRANSPORT LEVEL (FLOW CONTROL, MESSAGE SEQUENCING, SECURITY)
CURRENTLY UNDEFINED
LEVEL III
NETWORK LEVEL (VIRTUAL CIRCUIT/DATAGRAM)
X.25
LEVEL II
DATA LINK CONTROL (LINK PROTOCOL)
HIGH LEVEL DATA LINK CONTROL (HDLC)
LEVEL I
PHYSICAL/ELECTRICAL LINK INTERFACE
X.21 BIS (RS-232C EQUIVALENT)

Figure 2. The relation of CCITT-recommended standards to ISO open systems architecture is shown above.

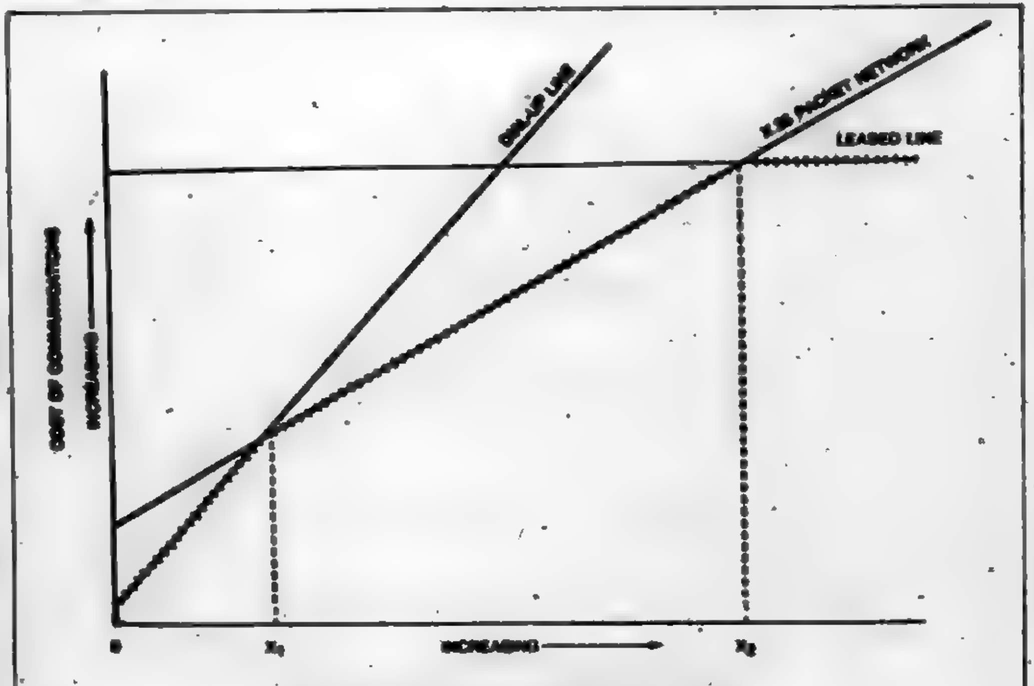

Figure 3. The corss-hatched line is least-cost alternative among dial-up communications lines, packet networks and leased lines.

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Entry-Level Explanation

Mystery of X.25 Packet Network Cracked

By Tony Russo

Special to CW

One of the hottest topics in the computer business nowadays is the sometimes mystical X.25 network. This article attempts to clear up a number of commonly held misunderstandings about X.25 networks, while also providing an entry-level explanation for those people with little or no prior knowledge in this area.

Since the X.25 standard defines the interface between a user and public packet-switching network, it is appropriate to discuss packet-switching networks in general before attempting to explain the standard.

Packet-switching networks offer lower cost data communications because their toll charges accrue based on how much data a user sends across the network (plus a flat, monthly connect fee).

Charges are not related to connect time or the distance between points as is true for dial-up or private networks.

Flat Rate

The telephone system, for example, charges customers a flat rate for a leased telephone line, or a time and distance rate for dial-up circuits, regardless of the amount of information the user actually transmits across the line.

This means that if you use telephone links to connect two computers, you pay the same rate whether or not you send any data. With packet-switching networks, you only pay for what you send.

The three most important benefits are:

- Lower cost of data transfer.
- Increased network reliability.
- A well-defined standard user interface, (i.e., X.25).

To understand how packet-switching networks can charge less money to provide the same data transport service as existing public networks — i.e., the telephone companies and their spinoffs — requires a little insight into how the packet-switching networks operate.

The first important thing to understand is that all information passing over a packet-switching network must be broken up into fixed-length "packets."

Since this packetizing function is not a user-level task, the length of these packets is unimportant to this discussion, and may in fact vary from network to network.

Even though a user may wish to send large, contiguous blocks of data, these large blocks must be broken down into smaller chunks (packets) to be efficiently transported. This packetizing requirement is due to the fundamental difference in packet-switching network operation.

In today's public networks, a user "monopolizes" a physical connection between source and destination. This is the cause for toll charges being keyed to circuit usage rather than data quantity. For example, in a leased circuit, only the users at each end of the link have access to the circuit.

Similarly, in a dial-up connection, once the connection is made, only the two connected parties can use the physical wires connecting them together.

In these cases, the parties involved must pay for the entire cost of their physical circuit for the duration of their exclusive use.

No Restricted Access

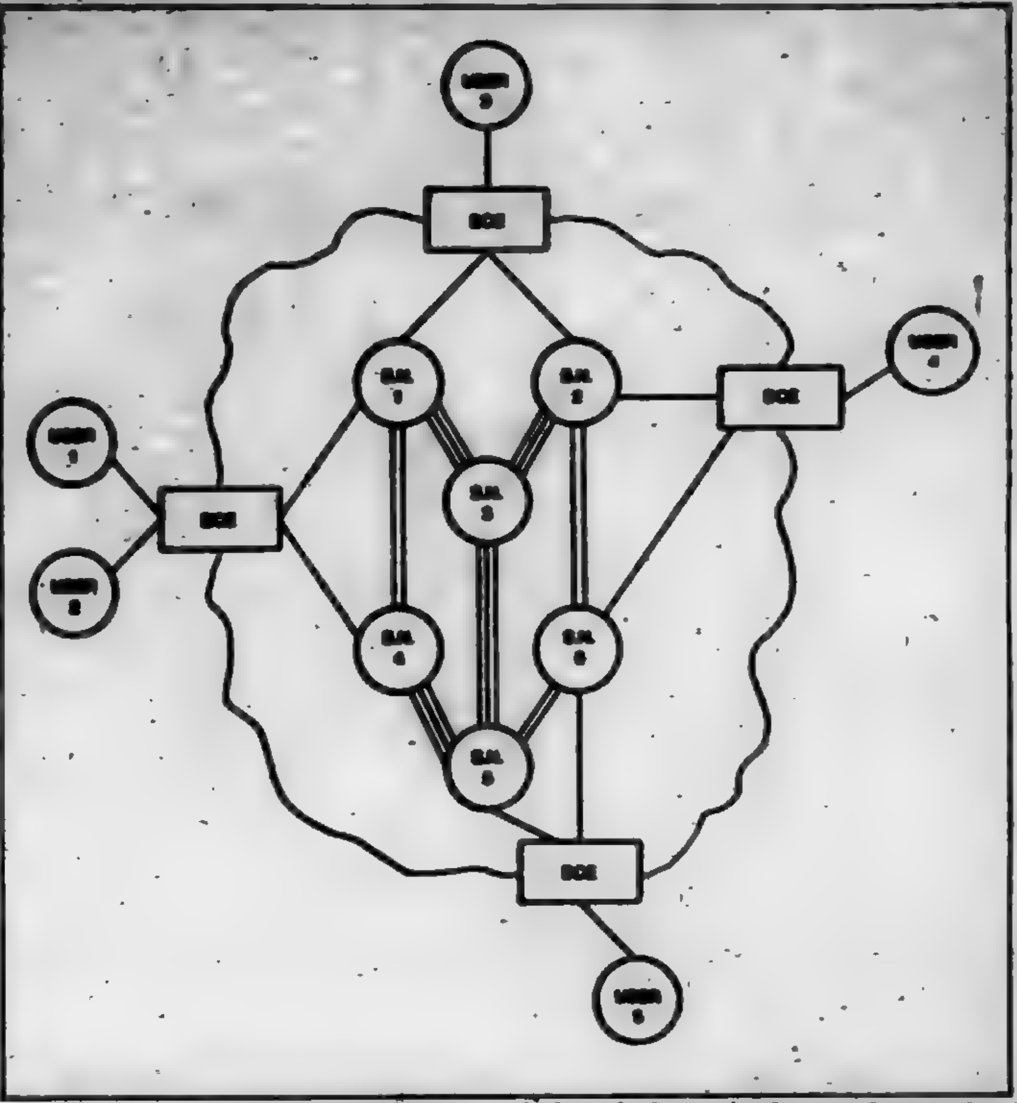
In packet-switching networks, nobody has restricted access to any physical assets. By not assigning physical assets to users, the network can multiplex many users' packets over the same wires.

And since the active path is composed of multiple short segments, a single packet never occupies the entire length of circuit from source to destination.

The network can even go so far as to send your packets over multiple physical circuits as it attempts to maximize the use of its transmission facilities. This shared use of facilities is the basis for the cost reductions and the reason for the name "packet-switching network."

Note that how this packet switching is done by the network is also unimportant to the user, just as the telephone

(Continued on SR/14)



This diagram of typical packet-switching network shows built-in redundancy paths. Switching Nodes (SN) are multiply interconnected to each other and to the Data Circuit-Terminating Equipment (DCE) ports into the network. Many routes are thus open to any given packet of data.

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X.25 Packet Net Mystery Solved

(Continued from SR/11)

company switching algorithms are unimportant to users as long as their calls go through. Different packet-switching networks will undoubtedly perform this function in different ways.

Network Reliability

The second benefit of packet-switching networks — increased network reliability — is a result of the built-in redundancy provided by the basic network structure (see Figure 1 on SR/11).

Typical packet-switching networks are made up of Data Circuit Terminating Equipment (DCE), which are the ports into the network and provide the user interface, plus multiple switching nodes that forward packets around the network.

The high-speed interconnections between DCEs and switching nodes and between pairs of switching nodes can be of any type including telephone system facilities, microwave channels and satellite links.

As shown in the figure on Special Report/11, switching nodes are usually connected to many other switching nodes by sets of redundant links. Since DCEs are also connected to multiple switching nodes, multiple physical paths exist between all DCEs in the network.

When a link or switching node fails, the network reroutes the data from that path to another circuit, thereby maintaining continuity of service. Some very sophisticated networks can even distribute data flow from heavily used links to underutilized ones to permit maximum use of the network facilities.

This capability is called "load balancing." In any event, users benefit from this network redundancy by having higher availability of the communications service.

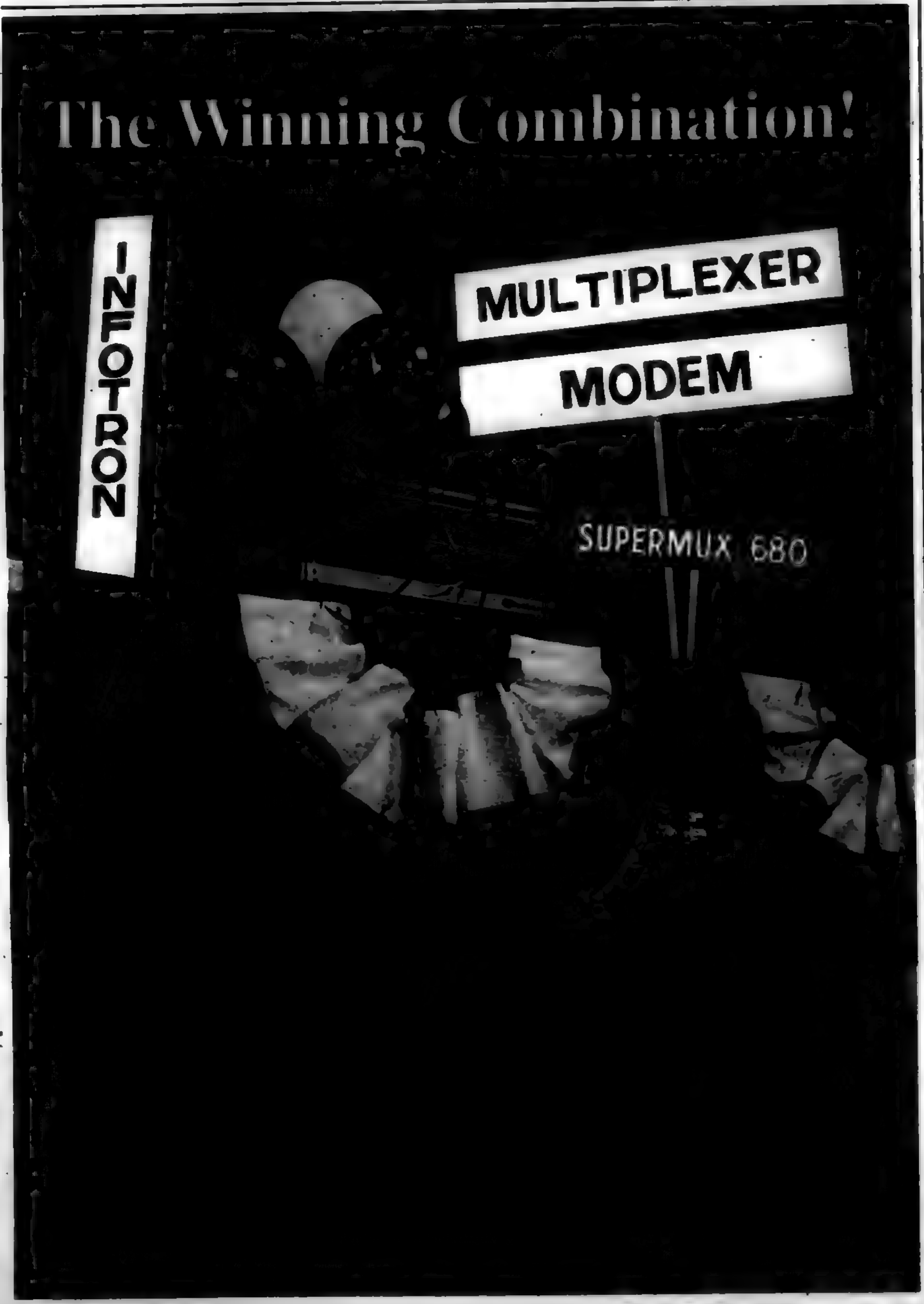
The third major benefit to packet-switching networks is that there is a standard user interface (X.25) that has been developed by the common carriers that will provide the transmission services rather than by computer vendors who provide the user equipment.

This means that vendors will no longer be able to impose their own protocols and network architectures, as is the case today. (Hewlett-Packard Co.'s DS/1000-IV, IBM's Systems Network Architecture and Digital Equipment Corp.'s Decnet are examples of vendor-specific architectures.)

Users of packet-switched networks will find it easier to employ equipment from multiple vendors. But compatibility with X.25 networks does not in itself guarantee that two pieces of equipment can communicate with each other.

Although X.25 networks will eliminate many of the problems with interconnectability, it will by no means eliminate them all.

Russo is product manager of network products for Hewlett-Packard Co., located at 1501 Page Mill Road, Palo Alto, Calif. 94304.



"Go Ahead and Sue! It's Your Computer's Word Against Ours!"

Analysis by Analogy

Net Planning Like Engineer's Product Flow Plan

By Christine Leja
Special to CW

Planning a network closely resembles an engineer's product-flow plan. Where a manufacturing engineer would design a shop floor-plan with the idea of assembling a given product line, the network designer would plan on the basis of how particular data flows in the network system.

The analogy between a shop floor-plan and a network closely fits from the conception of an idea to the finished product rolling off the assembly line or bouncing off the data communications line.

A product engineer takes his product design and builds a prototype. As a manufacturing engineer is constructing the die that will produce the samples, the engineer more than likely is gathering information about how the product is being built, how the die is modified from the original design, and noting the constraints about the construction of the die.

As the samples are tested, modifications may be required for durability and applicability. Once the samples meet specifications, design work begins on the shop floor-plan and product-flow through the assembly area.

The shop floor-plan not only includes the physical layout of equipment, but also the flow of the product being built from one area to another, from materials gathering to the shipping dock.

Network Design

A network is designed in a similar fashion. For example, suppose production control is to be facilitated by means of a DP network. The product assembly is controlled via DP, spans several buildings, has a large fluctuation in volume and contains certain options that can be omitted to shorten assembly depending on a customer's requirements.

Prior to designing the network, the systems analyst must first design the nuts and bolts of a computerized production control system incorporating all these constraints and assuming some given network.

Just as an engineer produces samples, so too the systems analyst must show that his production control system, the system design and programs, can fit the requirements of applicability, durability in growth and timely response from one assembly stage to the next. Given a viable design and the equipment to be used, a network can be planned.

Referring back to the engineer's shop floor-plan, the physical placement of equipment, materials and personnel, and the factory layout itself limit and sometimes predetermine the flow of assembly from one stage to the next. In the same way, network design has constraints placed upon it.

The type of data to be analyzed, the physical staging of assemblies, feedback requirements, option requirements at given assembly stages, the time factor involved, equipment currently owned and/or selected for this function, monetary constraints and so on — *all* limit the network design that is developed.

Here too, testing occurs. Does the network design fulfill the requirements given it? Can the network handle a given volume efficiently and accurately? Can the network handle growth and expansion? What happens if one aspect of the network fails? What if one phase of the network is eliminated to affect changes in the production control system? How will the network design respond to these and other "what if" conditions?

Once these questions have been posed and the network adapted to fit these necessary requirements, implementation can proceed. However, the likelihood that some modification can and probably will take place during this phase must be kept in mind.

Testing of the network design will again produce modification — hopefully only minor. It is here that everything comes together. The production control system is again tested, this time under the network design.

How do the two interconnect? Are modifications required either for the production control system or for the network design or for both? Has the resulting system produced an applicable, viable and durable system?

The engineering approach to implementation has proved itself with time, but as with any engineering assembly system, maintenance is necessary for the product to continue out the door on time and with a satisfactory profitability margin. The network system too must have its maintenance and show a satisfactory profitability picture.

The approach, then, to a network design should be structured from bottom to top, from the system design of programs for a given function to a network design that will handle the system and perhaps other systems within the same network.

Implementation of one system function at a time within a network design will ensure an orderly implementation and testing of a network.

Leja is vice-president of Le Com Enterprises, Inc., whose address is Box 346, Winfield, Ill. 60190.

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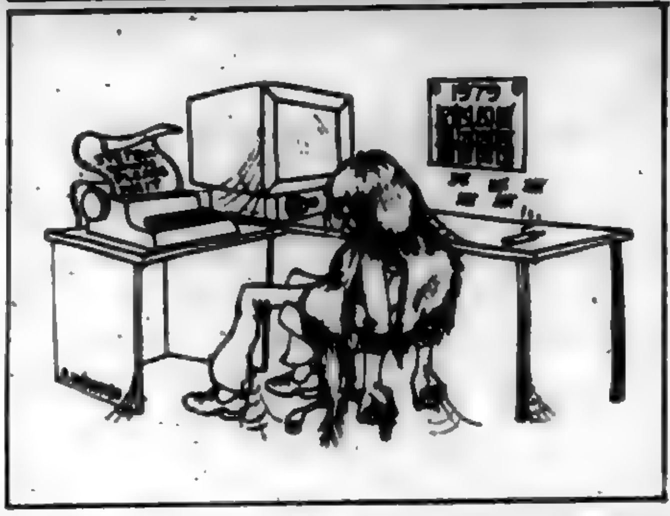

Nets Based on X.25 No Cure-All

(Continued from SR/10)

cols" and include binary synchronous, high-level data link control and synchronous data link control.

Level III is primarily concerned with the tasks required to establish the communication path. It describes the types and sequence of user messages to the network to create a link to another user and to destroy the link when through. Level III does not attempt to define any type of user request nor perform any routing or control functions internal to the network operation.

Taken Together

Together, Levels I through III only enable users to connect to X.25 networks, to establish communications paths through the network and to transfer buffers of data from one location to another.

The standards for user-level services, such as remote file access and virtual terminals, are located in the higher and as-yet-undefined levels.

For this reason, it is impossible to assume that simply because two devices are X.25-compatible they can communicate with each other in any useful way. Buffers of ones and zeros can be transferred between two X.25-compatible devices over an X.25 network, but X.25 in no way tells the devices how to interpret those ones and zeros.

Telephone Analogy

To return to the telephone system analogy, imagine a telephone customer in France direct dialing someone in West Germany. A link can be established and data transferred. That is, the French person can dial the West German's telephone number, the West German can accept the call by answering the phone and talking can begin.

However, unless both people speak the same language, no meaningful communication occurs. Similarly, if one X.25 user makes RJE-type requests to a 3270-type device, nothing valid happens.

Two final caveats are in order here. First, don't automatically assume that X.25 networks will always provide the lowest cost transmission facilities.

Recall that X.25 costs are based on the volume of data transmitted and a flat connect fee to the network whether you use it or not. If data volumes are low, a dial-up line could be the cheapest way to go.

If data volumes are very high, a leased line may be the cheapest alternative. X.25 networks are only cost-effective for the middle range of data volumes.

Resulting Curve

This results in a curve similar to Figure 3 where data volumes from 0 to X^1 should be on a dial-up line, from X^1 to X^2 on X.25 networks and greater than X^2 on a leased line.

This evaluation should be done for each communication path. Only then can the customer be sure he has the least cost communications method. Most customer networks will have a mix of all three types.

Lastly, X.25 networks are not yet available everywhere or between every pair of locations where a user might have facilities. This would require a long-distance telephone charge from the user's site to the nearest available X.25 facility.

So in addition to data volumes, X.25 availability is another important consideration.

Russo is product manager of network products for Hewlett-Packard Co., located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

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By Stephen Kane
Special to CW

If you are planning a data communications network, stop, immediately! If you are installing a data communication network, pause. The modems and multiplexers you are planning for and acquiring today are philosophically and technically obsolete. There is an approach that will improve price/-performance and provide many operational enhancements. This approach makes data communications networks obsolete.

With the decreasing cost of computer hardware, there is an increasing number of processors and applications. These applications are increasingly on-line for improved accessibility. To support these on-line systems, data communication networks are utilized. These networks can be the classical polled environment (master-slave), the newer packet-switching environment (master-master), or some hybrid configuration.

Obviously, the quantities of computer terminals are also increasing. IBM vice-president and chief scientist Dr. Lewis Branscomb has stated that "today in the U.S. work force, there is a computer terminal for every 48 employees. By 1986, it is estimated there will be a terminal for every 10 employees."

This 800% computer terminal growth, in addition to the distributed data processing (DDP) node additions, will fuel dramatic increases in data communications networks. The networks designed for today's application and volumes will be under a constantly increasing burden, resulting in network reconfigurations and higher line speeds.

Electronic Office

Another major factor in the growth of data communications is the office-of-the-future, or the electronic office. Components of the electronic office include word processing, facsimile and electronic mail. In the past, IBM was the acknowledged leader in word processing, a term originated by IBM.

The current leaders in word processing and in office automation were not well-known just a few short years ago. The goal of the electronic office is not to increase a secretary's typing speed (current industry estimates are $11 per page, delivered to the recipient), but to improve white-collar productivity.

The potential benefits are enormous. Citicorp has estimated it can save more than 30 to 40% of its management costs by eliminating paper funneling channels of management.

The electronic office provides a significant opportunity to reduce operational costs and to improve corporate responsiveness to changes in the marketplace. Although the growth and potential benefits are substantial, the electronic office of the future is in an evolutionary stage of development.

Both computer communications and the electronic office currently use modems on analog telephone lines. Within a single organization, multiple computer communications networks with multiple application data bases are common.

The reasons for this situation are usually terminal to computer incompatibilities and the lack of terminal accessibility to multiple applications. The same problems will exist when installing electronic office networks.

The installation of these networks will clearly produce many redundant communication paths. The duplicity will manifest itself in multiple network software, equipment, maintenance and management.

The elimination of this redundancy is a significant problem, but many "solutions" exist. France and Canada have a national data communication network based on X.25. IBM's solution is Systems Network Architecture (SNA), Xerox Corp. has Xten, and AT&T has the Advanced Communications Service (ACS).

Then there is the other side of the house, voice communications. Current voice budgets are significantly higher than data communication budgets. At the National Bank of Detroit, our data communication expenses for lines and modems is approximately $31,000/mo, while our voice expense is in excess of $200,000/mo.

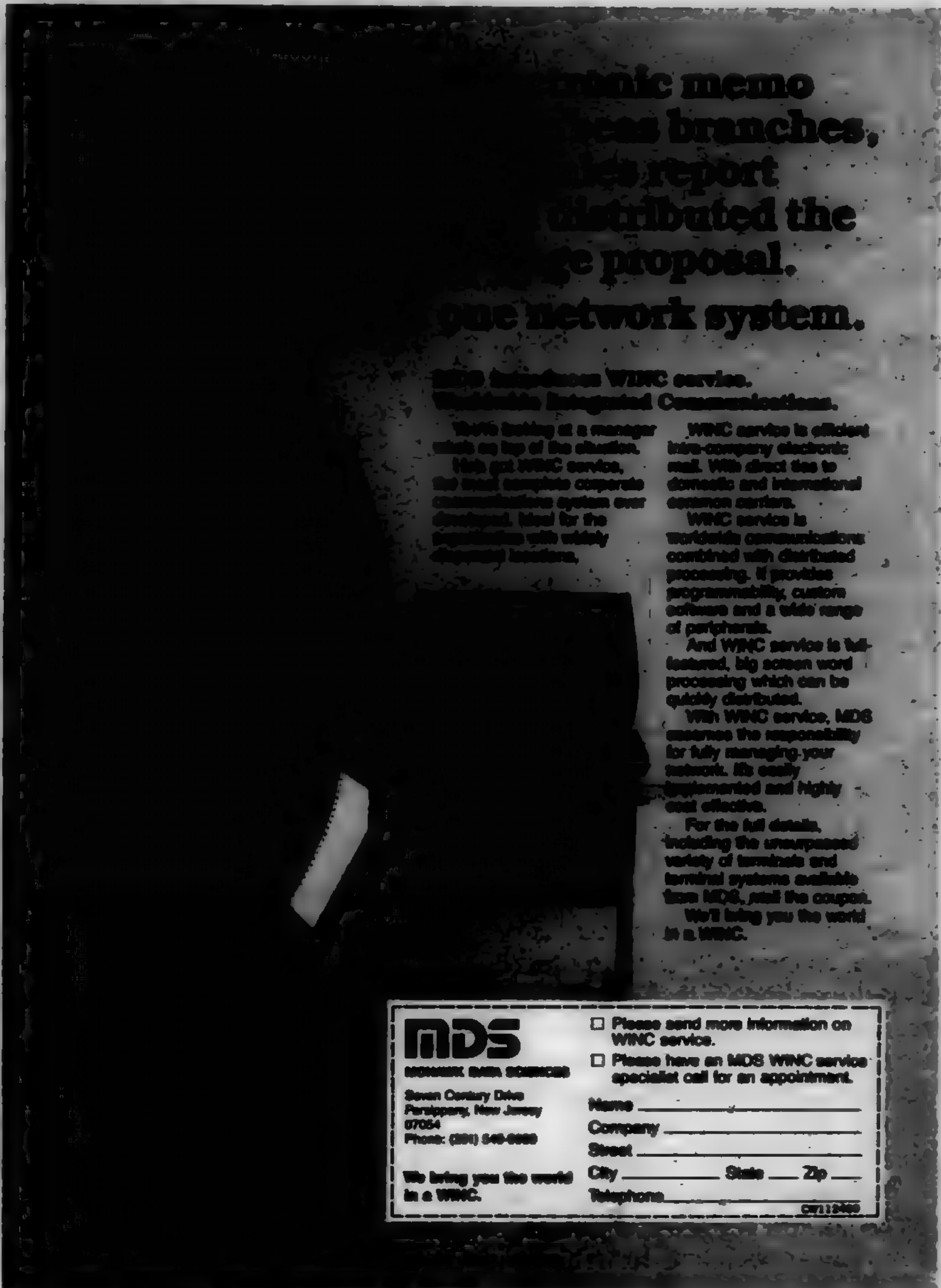
For a long time, the Bell Companies have had few voice-related features to offer their customers. The non-Bell or interconnect companies, however, have been innovative, providing additional features with significant cost advantages.

MCI Communications Corp. has been offering reduced-rate long-distance telephone service for a few years, using original concepts now adopted by other companies. Rolm Corp. has had great success in marketing intelligent private branch exchanges (PBX).

The availability and the cost performance of digital telephone is constantly improving. Reliability and system sophistication is increasing, with the relative cost decreasing.

This will make digital telephone systems a continuously more attractive investment and will also provide a hedge against ever increasing telephone costs.

(Continued on SR/20)



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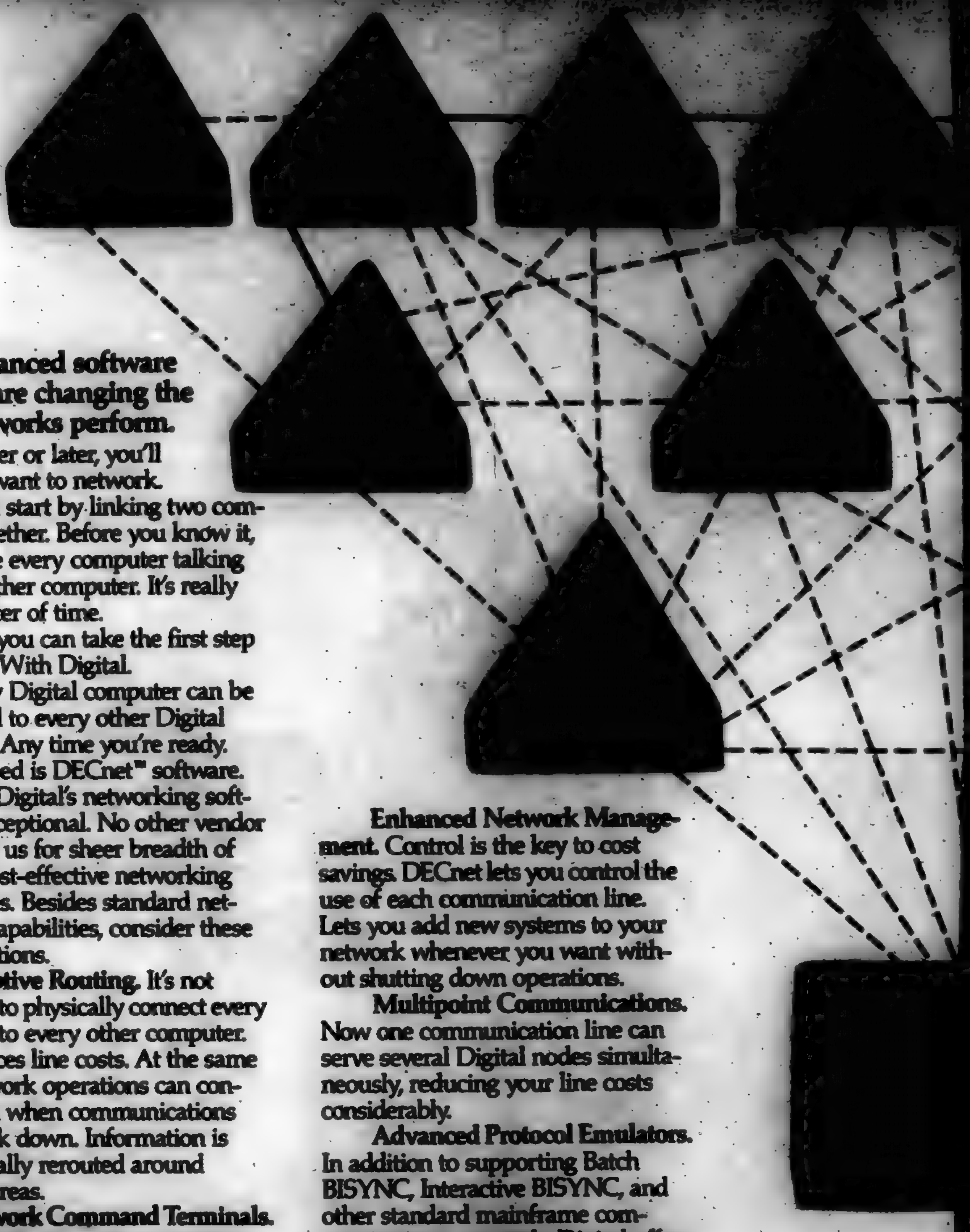

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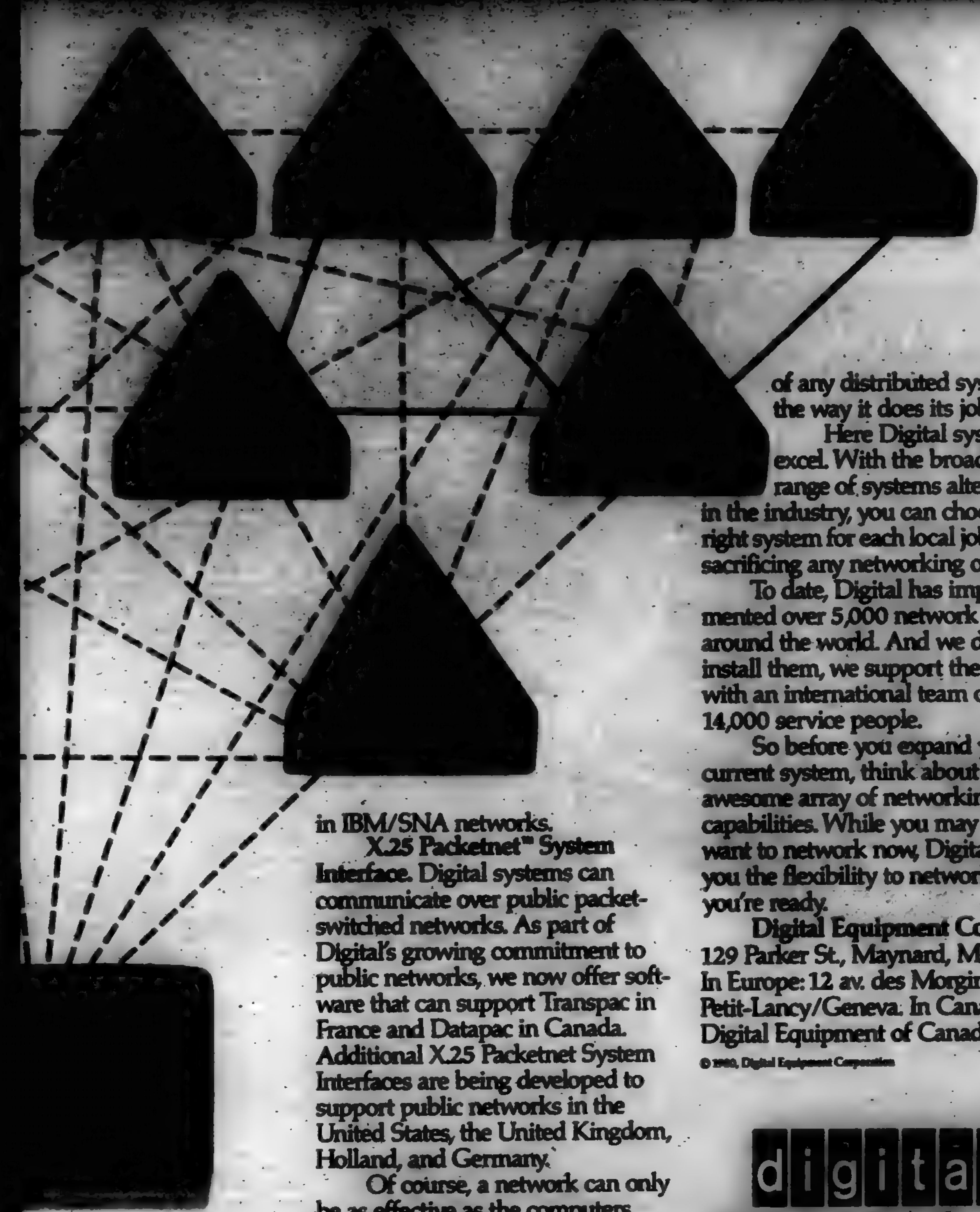

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Of course, a network can only be as effective as the computers within it. After all, most systems only use their networking capability 20 percent of the time. The real test of any distributed system is the way it does its job.

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We change the way the world thinks.

Information Synergy Envisioned for Networks

(Continued from SR/17)

It is clear that voice communications is moving rapidly to a digital environment at an ever increasing speed. The relative merits of digital over analog communications is reminiscent of the discussions years ago of digital computers vs. analog computers, the results of which are now clear.

Therefore, a "digital highway" that will accommodate all forms of digital data — voice, data, facsimile, word processing, etc. — is key. This digital highway must accommodate intra-, and interoffice information transfer on switched-, as well as leased-line facilities.

Current digital PBX vendors offer such facilities. Some of the features include:

- Switched and leased facilities provided via the concept of virtual circuits.
- Multiplexing included by the nature of virtual circuits.
- The ability to directly access telephone company's T1 carrier (1.544M bit/sec).
- The ability to interface to Bell's Digital Dataphone Service (DDS) facilities.
- The ability to provide analog voice interfaces to Bell circuits.
- Intrabuilding communications via fiber optics.
- Redundant processors.
- RS-232C interfaces on all telephone sets that provide simultaneous, nondegraded, voice and data transmissions over two twisted pairs.
- RS-449 interfaces.
- Data speeds to 56K bit/sec, synchronous or asynchronous.
- Remote diagnostics.

Some features that have been discussed, but are not yet announced, are:

- X.21 circuit-switched interface.
- IBM 3277/3278 coaxial cable interfaces.
- Speed, code and protocol translation — such as ACS.
- Satellite interfaces.
- Performance statistics.

These features are obviously not all inclusive. They sound like features offered by the modem vendors, such as Intertel, Codex, Paradyne and Racal-Milgo.

The most significant difference between the modem and the PBX vendors regarding these features is that the digital PBX's are 99% soft. That is, these features are implemented through software, although some — RS-449, for instance — may require hardware modifications.

The key benefit is that the systems are easily upgradable. They can easily accommodate the addition or deletion of any features, configuration modifications, or any other changes.

Moreover, the PBX installed today, will be functionally identical to the PBX that will be shipped in say five years, thus minimizing technical obsolescence.

If a digital PBX were installed today, it would provide immediate operational cost savings for voice communications of 10% to 20%. Computer terminals could be then added at a minimal cost, then DDP nodes, then alarm circuits, and then electronic office components.

All of these devices would be able to interact with each other, providing significant improvements in application accessibility and interoffice communications. There would be a single, digital, information transfer network to manage and maintain, thus simplifying operations. This "digital highway" would grow and expand. It would become a digital framework into which any communicating device could be added.

In addition to operational benefits and cost savings, there is another, but much subtler benefit. Each terminal will have greater access to all data bases — not only on different mainframe processors, but on minicomputers, distributed processors, and even word processors — and a sharing and integrating of information is possible. That is, multiple pieces of related information from various sources can be collected at a terminal, and this information can be analyzed and processed at the operators discretion.

A new perspective on a problem or on a business opportunity will be generated. A synergism is created, and new information is generated. The total information available will be greater than the sum of its parts.

This is where the greatest return on investment will be generated. This is where business will find the most interesting and rewarding results.

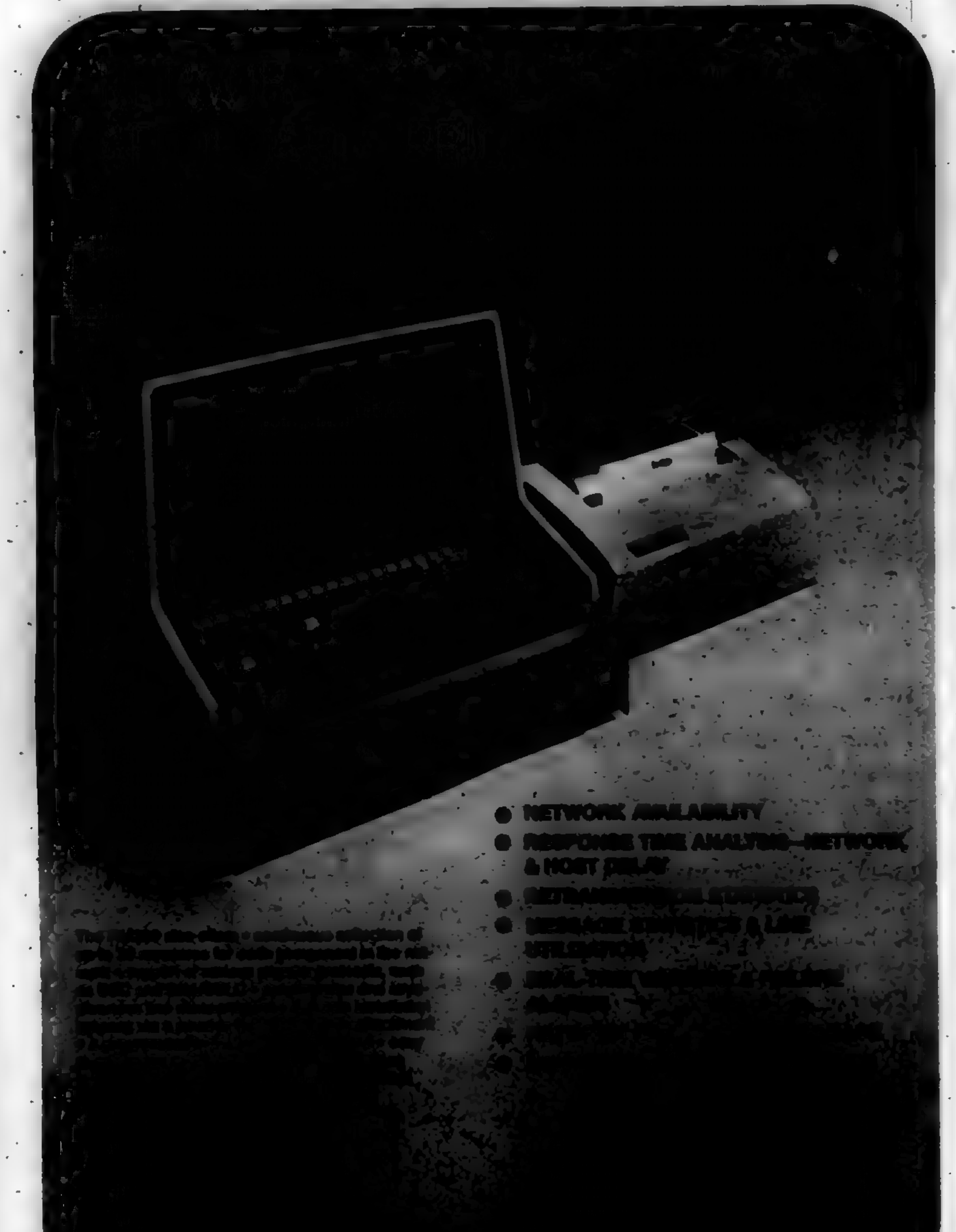
This new information is of greater significance than the cost savings and operational improvements. The synergism of new information will improve white-collar productivity, improve business sophistication, improve communication and identify new business opportunities.

In short, it will change the way business operates and provide tangible cost and operational savings at each step along the way.

We can lay the foundation for this synergy today, not by planning a data communications network with multiplexers, modems and lines, but by planning an information network. A network that will accommodate many device types, and one that will grow.

If this information network brings this synergism one year, or one month, or one week closer, we will have truly made a significant contribution.

Kane is an internal consultant for the National Bank of Detroit, located at 611 Woodward Ave., Detroit, Mich. 48232.



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• *'Establish Organizational Confidence'*

Successful Nets Require Careful Planning . . .

By Garry G. Raser
Special to CW

Successful data network implementation requires careful planning with plenty of input from the user's network department.

In today's highly technological and constantly changing communications environment, it is a challenge to design a network. Large books have been devoted to the subject. However, in the following passages we will briefly cover some of the major areas involved in most network configurations.

Many times user departments purchase a packaged deal without initially involving the technical staff. These people should be used to help spot possible incompatibility of hardware and software.

If at all possible, establish a level of organizational confidence in the network department so input is solicited at the beginning of a project. Otherwise it may be a process of making the pieces work and possibly finding missing parts. Unfortunately the user is not always to blame. Many times it is not aware of the technical staff's job function.

One cure for this problem is to get involved with the user. The technicians should be careful not to complicate matters by using DP jargon. Learning "business language" and practicing public relations with non-DP departments will have a positive effect on the network planning process.

Three Considerations

Other than natural variables such as maintenance and cost, there are at least three other important considerations that deserve notice. These are intelligence, security and future compatibility.

In a point-to-point link where batch transmissions are to occur with little or no error checking, a dumb teletypewriter-type terminal could be used for communications. On the other hand, if a multidrop scheme is used, then there has to be a certain level of intelligence at each drop.

The drop — terminal, concentrator and so on — needs the ability of knowing its address and answering an inquiry from the device doing the polling. Beyond the basic level, protocol — SDLC, HDLC and BDLC — and code — Asci II, BCD and Ebcdic — will need to be considered while choosing network hardware.

As an example, the IBM trend seems to be leaving the character-oriented protocol of BSC and going to the more sophisticated SDLC, which is bit-oriented. Regardless of which computer center is under consideration, if operation is to exist under the new bit protocols, then more sophisticated equipment will be needed. Thus the planning process should take this into account.

Security Measures

Another point of interest is data and operations security. Increasingly this subject is becoming more important in data communications.

Each industry has to decide on the level of protection it needs. Some, such as banking, are finding they need, or will need, the type of hardware required to provide a barrier to information theft.

One of the protective devices available is encryptive generators. These machines use a mathematical formula to scramble information at the transmitting end.

> *'Each industry has to decide on the level of protection it needs. Some, such as banking, are finding they need, or will need, the type of hardware required to provide a barrier to information theft.'*

Naturally this data is made coherent at the receiving end by a decryptor. Use of this technique in a polling environment could cause throughput problems because of the time required for data conversion.

However, with the lengthy turnaround propagation — approximately 160 msec — of the public switched network, it is possible to use these machines in certain cases.

Other Measures

Other security measures that can be considered are terminal locks — on/off key activated — that are controlled by one individual, no automatic answering on computer dial-in lines, fiber-optics cabling where possible — cannot be tapped — and so on. A good technical library would have references for other possible measures.

The final variable under consideration is very important. That is the ability of the network to handle future information needs of the organization.

With technology growing in an exponential fashion, it is very possible that future information flow will depend on interfacing of word processors and facsimile devices with the central computer system. Thus there is the need to know these technologies and how they can be incorporated into the network.

Books have been devoted to the subject of teleprocessing software. Many industry experts claim this will be the primary communications medium in

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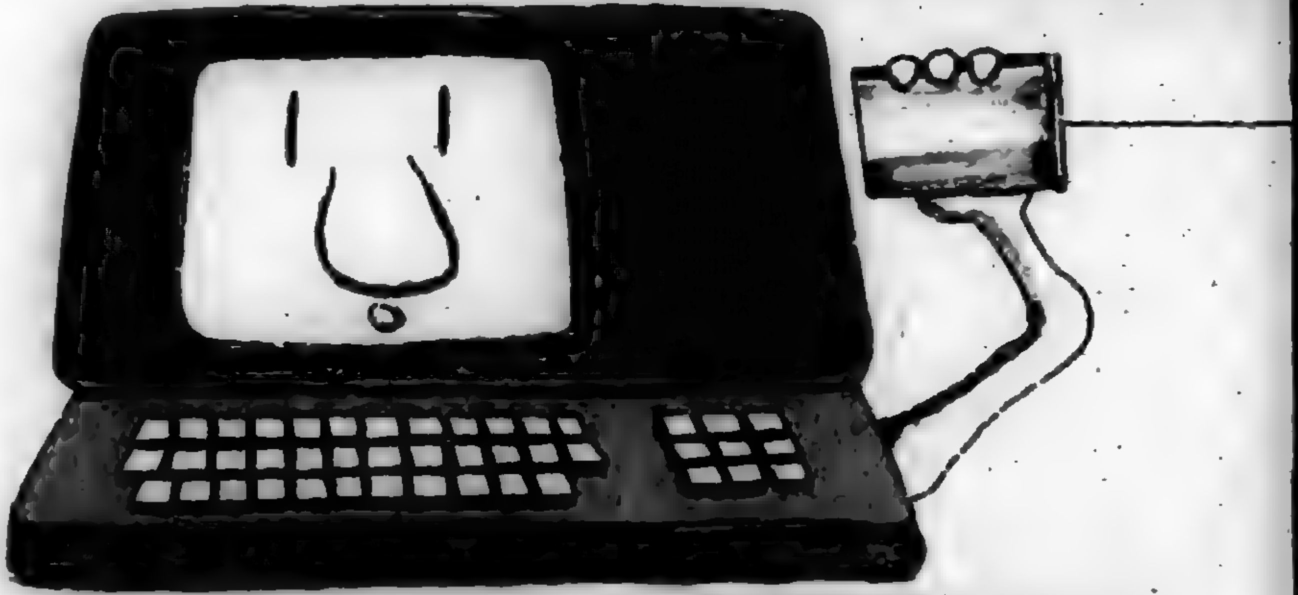

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Common Software. With BBN, software is the same at each node. Already in place throughout the network is the Interface Message Processor (IMP) program to handle packets from both hosts and other nodes. A program variation, Terminal Interface Processor (TIP), supports terminals as well as hosts.

Maintenance costs are now dramatically reduced. More important to the designer, system configuring couldn't be easier.

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. . . And Plenty of Input From Technical Staff

the future.

For sure, this is a high-priority subject, not only for futurist, but for present planners also. Indeed, with the complicated networks present today, employing control centers and high-level access methods such as IBM's VTAM, software deserves serious consideration.

Software Compatibility

One important area is compatibility of software. Lengthy conversions can result from trying to interface packaged and remote programming.

It is important to make sure the foreign packages will work with the present access method being used.

Considerable delay could result from converting the operating system to accept a different access method. Good planning could prevent this from happening.

The data set now has as many as 15 different options that have to be put in one state or the other, and it is the user who decides on the proper state.

We are no longer restricted to banging away at 300 bit/sec with a Model 33 on each end of the line.

Modems and Multiplexers

Once communications links are chosen for the network, data communications equipment (DCE) has to be considered. Under this category modems and multiplexing will be discussed.

A certain amount of research is required before any modem is selected. Other than line speed — which is determined by the modems and data terminal equipment — and type, demands of the EIA interface equipment — computer and controller — have to be understood.

> *'With technology growing in an exponential fashion, it is possible that future information flow will depend on interfacing of word processors and facsimile devices with the central computer system.'*

This will require understanding internal modem operation. For example, there are phase and gain — amplification — settings on many modems. After the network is in operation, one or both of these settings may need readjustment — "fine tuning."

The important thing to remember is modems are simply one part of a whole — the network. For this reason good planning is needed to match all of the aforementioned units.

Pipe Analogy

Consider the following analogy. Assume there is a 2-in. water pipe — representing 9,600 bit/sec carrier bandwidth — that has a .5-in pipe (2,400 bit/sec line) connected to it. For this example there is a carrying capacity waste (cost) of 1.5-in. (7,200 bit/sec).

Now with the addition of three more .5-in. pipes (2,400 bit/sec lines) or a 1-in. (4,800 bit/sec) and one .5-in. pipe we can input an equal amount to fill the main pipe.

To do this we need an interface unit with multiple small inputs and one large output.

For data communications, this would be a multiport modem or a multiplexer. Multiplexers are of two general types: frequency-division multiplexing (FDM) and time-division multiplexing (TDM).

The latest, most complicated multiplexing means is statistical multiplexing. This type of frequency synthesis produces the most cost savings in line utilization. However, it is the most difficult to incorporate into a multidrop network.

The above analogy is very simplistic, but may prove helpful to those who lack training in this area.

Measuring Devices

Last, and of equal importance in the planning process, is vendor selection. Respectable savings can result from shopping around and not locking yourself into one supplier. To do this, minimal measuring devices are employed. These are: service, price and equipment failure rate.

Usually the closer the vendor service center the better off you are. However one good tool to use here is the mean time to respond (MTTR) when a service call is placed.

Naturally the shortest MTTR is the goal. But be cautious.

An aid in deciding on the proper MTTR and price is the mean time before failure (MTBF). The equipment with the longest operating life should be the most reliable.

When the above guides are satisfied, then requests for proposals (RFP) can be sent to a select group of vendors. Their financial response to the RFP is yet another tool to use in the decision process.

Lastly, a contract has to be drawn up and its contents agreed upon by vendor and user alike. This document should cover every aspect of network implementation; including the quality of installation.

Rasor is a telecommunications analyst with the First National Bank of Louisville in Louisville, Ky.

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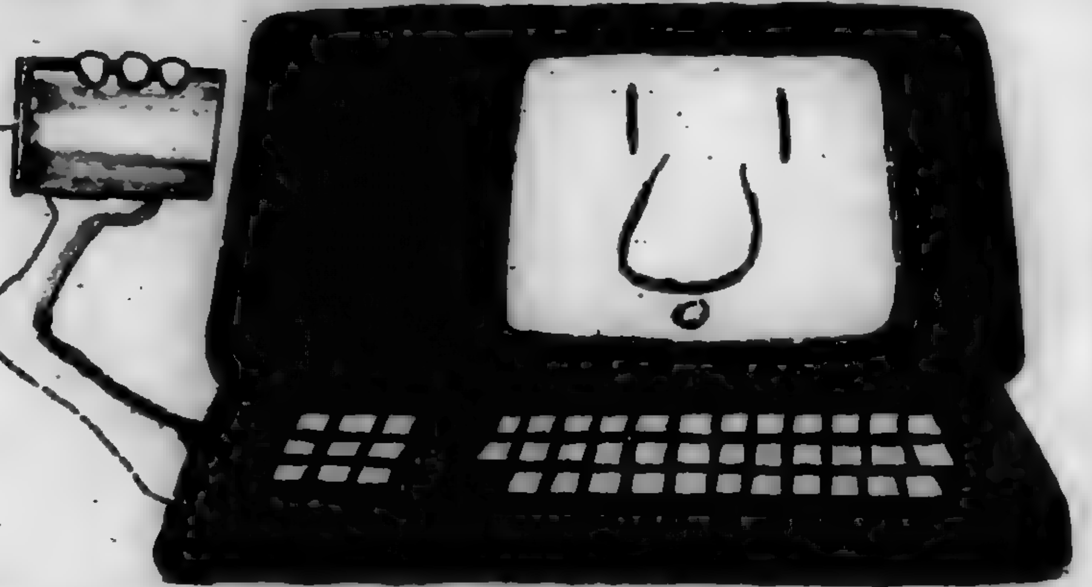

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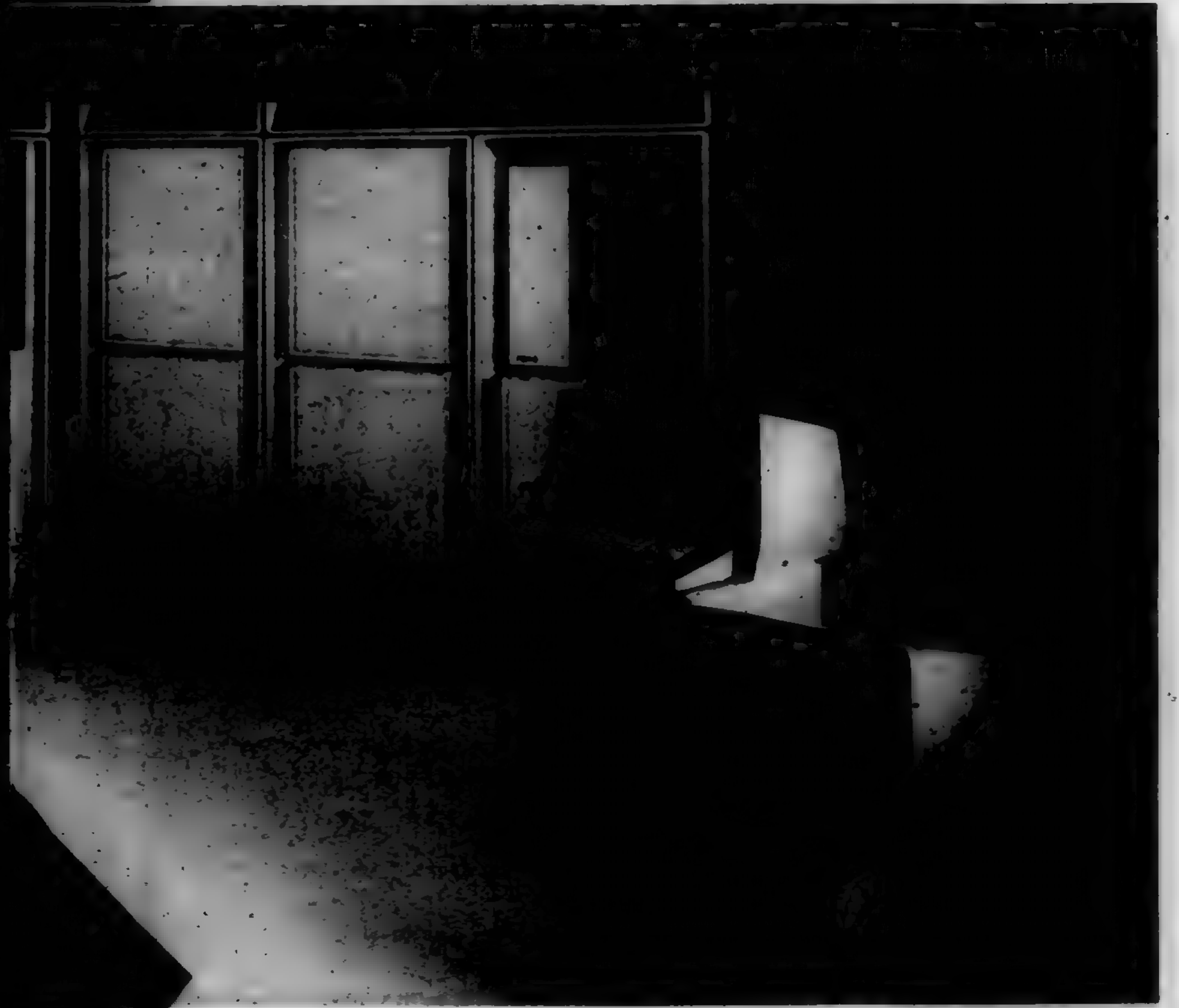

puters use the same operating system, the same file structure, and the same communication system, which, incidentally, supports our IBM 3270-compatible Distributed Processing Terminal Executive and the X.25 packet switching protocol.

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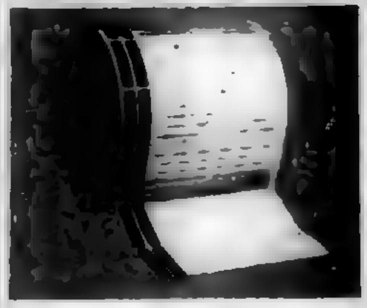

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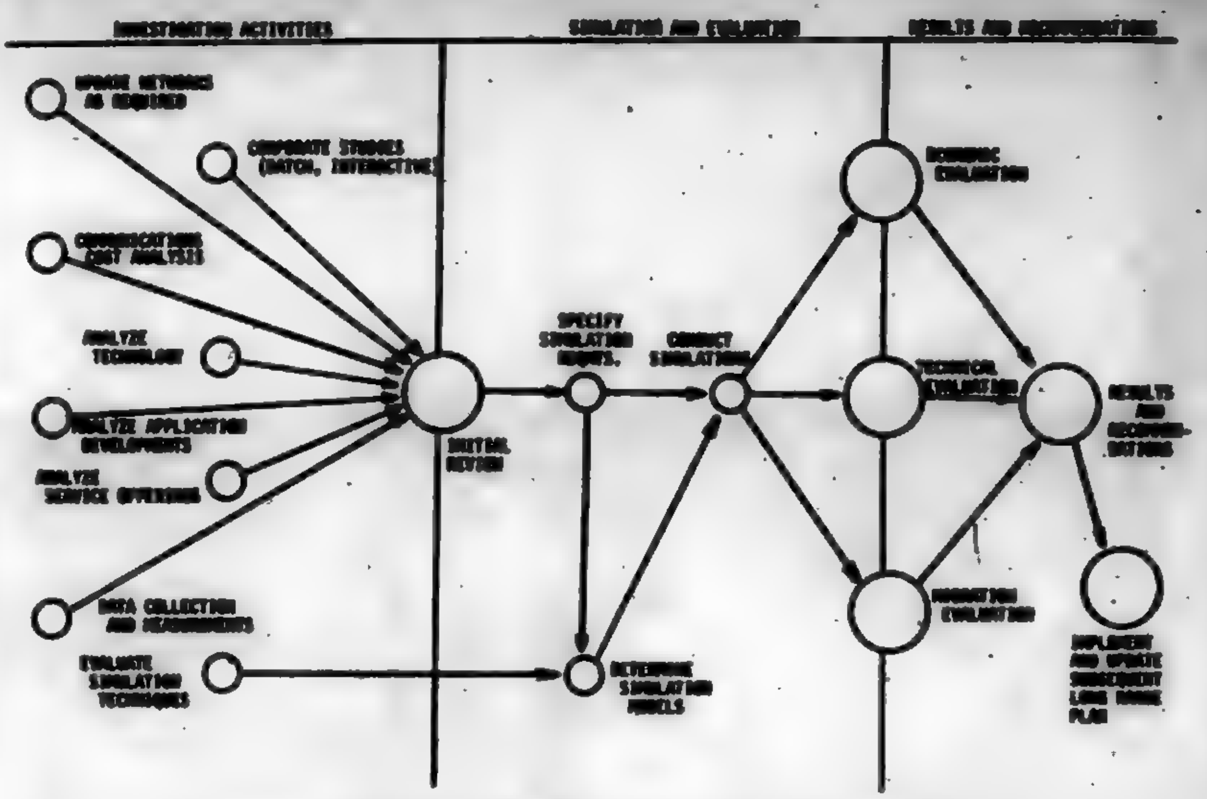
INVESTIGATION ACTIVITIES
SIMULATION AND EVALUATION
RESULTS AND RECOMMENDATIONS
UPGRADE NETWORKS AS REQUIRED
CORPORATE STUDIES (BATCH, INTERACTIVE)
COMMUNICATIONS COST ANALYSIS
ANALYZE TECHNOLOGY
ANALYZE APPLICATION DEVELOPMENTS
ANALYZE SERVICE OFFERINGS
DATA COLLECTION AND MEASUREMENTS
EVALUATE SIMULATION TECHNIQUES
INITIAL REVIEW
SPECIFY SIMULATION REQMTS.
CONDUCT SIMULATIONS
DETERMINE SIMULATION MODELS
ECONOMIC EVALUATION
TECHNICAL EVALUATION
MIGRATION EVALUATION
RESULTS AND RECOMMENDATIONS
IMPLEMENT AND UPDATE SUBSEQUENT LONG RANGE PLAN

Telecommunications Planning Methodology – Studies and Activities

Initial Pragmatic Approach Required For Definitive Long-Range Planning

By Harold C. Walder

Special to CW

In order to devise a definitive long-range plan, it is required, in the initial phase, to fashion a pragmatic approach to the planning process. A series of logical sequential functions consisting of investigative activities, simulation and analytical evaluations, and results analysis and recommendations should be followed (see figure).

The investigation activities pursued are intended to study the current network environment and to examine future technology and requirements. Specifically, the investigative phase should include the following:

- Examine current networks to determine the short-range facilities updates required.
- Conduct corporate task force studies to evaluate batch, interactive and time-sharing requirements.
- Perform an analysis of current network costs and billing criteria.
- Assess future technology and service offerings.
- Analyze application developments and forecast user requirements.
- Perform data collection and analysis of traffic statistics and network system performance.
- Evaluate network simulation and modeling techniques.

The simulation and analytical activity is intended to combine the diverse activities from the investigative phase in order to produce meaningful results that would aid in the decision-making process for updated or new network implementations.

It is expected that this function will be an iterative process to allow the interaction of the many input variables.

The results and recommendations phase will examine the output of the simulation activity and evaluate economical, technical and migrational alternatives for implementing technological advances based upon corporate growth and user demand for improved services. The results will culminate in the updating of current networks and will be used to modify subsequent five year plans. And it is expected that the planning function will be an evolutionary process that will respond to changing business requirements and

(Continued on SR/28)

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Spreading to Smaller Organizations

Systematic Net Planning Gaining Acceptance

By Harold C. Walder
Special to CW

Systematic planning of telecommunications is essentially practiced by many large corporations and the approach is rapidly gaining acceptance by smaller organizations as their operations become more complex.

The major factor influencing the introduction of a formalized planning activity is the anticipation of a changing environment that would offer many alternatives — both opportunities and potential threats.

Planning permits organizations to exercise favorable influence over future events. The overwhelming diversity of new telecommunication offerings, sophisticated techniques and services to be offered in the immediate future necessitates that an organized approach be pursued in order to consider these changes.

Strategic planning is interwoven into the entire management process and fundamentally applies to decisions that must be made at the top of the organizational structure. It provides to upper management a scenario that simulates the future on paper, but does not attempt to make future decisions, since firm decisions can be made only in the present.

However, strategic planning assists in bridging the gap between the present and the future. This type of planning is broadest in scope, has the largest degree of uncertainty, and the probable outcome is less known.

It provides a framework for formulating and implementing plans that are intuitive and anticipatory in nature and is based upon projected business needs.

In an optimal planning environment, there exists a flow of strategic guidance downward from top management in the form of qualitative goals, objectives and supporting policies. Within the same environment there must exist a flow of planning information upward in the form of draft tactical system plans and proposals for achieving the stated goals and objectives.

Tactical Planning

Tactical planning is directed toward implementing the strategic plans by coordinating the requirements of involved organizations. It is concerned with the utilization of the corporate resources in order to achieve its strategic goals.

This type of planning involves middle coordinating and operational management. While tactical planning is tentative and flexible, it does take advantage of the knowledge about a changing environment. A systems approach can be pursued to maneuver telecommunications facilities over time in a changing environment.

Tactical planning allows the quantitative examination of the chain of cause-and-effect consequences in time, permits alternative decisions to be made and is concerned with the development of short- and long-range plans that would directly affect operational management.

The implementation of these plans is intended to satisfy immediate telecommunication requirements through upgrading existing networks or acquiring new facilities. Long-range plans attempt to satisfy projected business needs and

(Continued on SR/32)

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Analysis. In building on-line systems, many users have adopted piecemeal approaches which have focused on one problem or need at a time. They have attempted to fulfill their needs by first buying a teleprocessing monitor and then interfacing it with other packages for such vital needs as data entry, program development, inquiry, etc. The result however has often been a non-integrated system that requires enormous maintenance and is generally cumbersome and incomplete.

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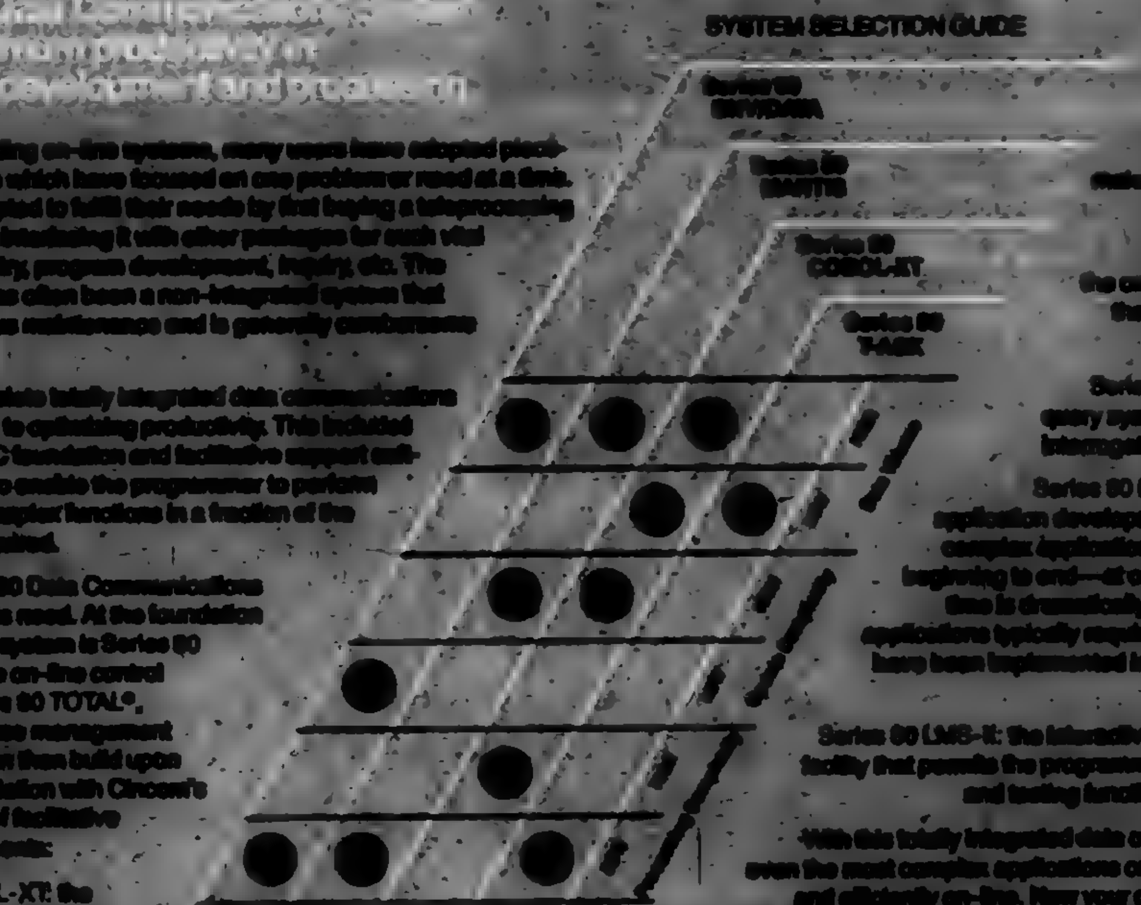

Pragmatic Approach Key to Long-Range Plans

(Continued from SR/26)

newly developing technology.

The planning methodology outlined should be applied to the creation of a tactical long-range plan. To accomplish this it is necessary to acquire an in-depth knowledge of currently installed networks.

Successful planning depends on an understanding of network performance, the level of service provided to the users, and the traffic volume that the networks can sustain.

Forecasts of users' demands must be made, technology assessments must be determined and special studies relating to the desired degree of voice and data integration must be undertaken. Also, simulation studies pertaining to cost, technology and migration must be completed.

The requirements in each of these major areas are expanded below.

To establish a base from which user demands can be projected and future technology applied, an intimate knowledge of the current telecommunications environment must be acquired. This is best achieved by developing a corporate data base containing a complete inventory of the current status of all telecommunications equipment installed or on order.

The data base should be a complete inventory of locations, connecting circuits, front-end processor terminations and host subchannel definitions. Network configurations should include terminals, multiplexors and port selectors.

Performance measurements of line utilizations, response times varying with different traffic loads and reliability characteristics should be noted. The inclusion of these parameters will build a foundation from which network growth can be forecast, costs projected and meaningful management reports generated.

The collection of network performance data will aid in providing an understanding of user requirements and characteristics of network traffic. The implementation of network control centers to monitor network performance and measure network reliability should be instituted. With recent advances in microprocessor technology the development of monitoring devices to measure user service levels — system availability, accessibility, capacity and utilization should be investigated.

User Forecast

User forecasts for development of new systems and growth of existing systems for telecommunications facilities are difficult to obtain for purposes of long-term projections. Even with long-range development planning in effect, it is difficult to translate development efforts into requirements for telecommunication facilities.

The request for a five-year users' forecast of their requirements for facilities will invariably result in linear-like growth for the first two years and a flat, no-growth trend projected for the remaining three years. This is understandable since long-term development planning is dependent upon business requirements yet to be conceived.

In order to obtain realistic projections of users' requirements forecasting techniques must be engaged for the purposes of obtaining meaningful growth curves. Valid results for a long-term forecast period can be secured by inputting historical data into a mathematical model. A Box-Jenkins time series analysis or a similar approach can be used to relate past observations of historical data and project future observations.

Technology Assessments

Long-range network planning is significantly affected by technological advances, new and developing communications concepts and corporate telecommunications postures. Therefore, studies and assessments of each of these areas become integral input into the definition of a methodology to meet future goals and objectives for telecommunications.

Long-range planning for the next five-year period will encounter broad and rapid changes complicated by the influence of technical, regulatory and marketing issues. An understanding of these issues is a key element to effective planning.

In a teleprocessing environment it is necessary that a technology evaluation be made of all components affecting the computer-communications-terminal link.

The future of central processors, storage and peripheral devices, communication processors, terminal equipment and the various telecommunication services must be projected and evaluated to determine the affect upon this environment.

A technical assessment of distributed processing, office-of-the-future offerings, electronic mail, teleconferencing, digital voice and the promise of integrated networks must be determined and the impact upon the future of a corporation should be determined.

It will require, in many instances, that in-depth corporate studies be undertaken to fully analyze the diversity of networks and the effects that technology might have upon an environment.

Task force studies in these areas are important for the purpose of providing direction for future offerings.

Walder is a senior member of Western Electric Co.'s Information System Staff, located at the Guilford Center, Greensboro, N.C. 27420.

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Private Nets Risky

Leased Nets Best Chance to Fill Future Needs

By Bill Kernan
Special to CW

Private networks at this stage of technological development are likely to be risky propositions in terms of price/-performance and capacity over the next five years.

Leased dedicated networks and the use of shared networks offer the best opportunity for meeting the future data communications needs of organizations. Computer service companies are often in the best position to offer network services since they have already acquired expertise in the field.

Planning a private data communications network that can meet an organization's future needs can be a futile proposition.

The problems are many, but generally involve data traffic growth projections and the capital investment necessary to accomodate future capacity. While short- and medium-range planning for data traffic is possible, the unpredictable element of technological change requires planning trade-offs that may be costly.

The interaction of these two planning elements should be kept in mind when evaluating the proposed network's future cost/performance. In time, the cost/performance issue may reach a critical point when traffic needs outstrip capacity.

At that point the data communication manager is faced with a decision to expand or improve a network that is based on technologically aging equipment or to scrap the system for a new one. Currently, the useful life of equipment is just under five years. Add start-up costs, personnel costs and maintenance, and an argument against private data networks begins to emerge.

Major Alternative

The major alternate choice is to lease needed data transmission facilities from companies that can provide instant networks. Computer service companies are often in a position to offer network services because they have already acquired experience and expertise in running networks. These technical strengths are supplemented by knowledge of user needs and strong support capabilities.

The most conspicuous advantage to leasing a network is fast delivery. There are minimum design problems, shortened implementation schedules, minimum capital investment and minimum personnel and equipment acquisition costs.

With the communication links up and running, and maintenance staff already in place, the bulk of the network planning effort has already been accomplished. Once performance criteria are determined, the design effort becomes transparent to the user.

Leased networks offer protection from technological obsolescence. With the changing concepts of network technology, the lack of universal protocol standards and competing technologies, there is a continuing widespread use of incompatible data communications equipment.

This in itself is spawning a new industry of conversion equipment to link the diverse systems. However, it is axiomatic that the greater the number of processing elements within a data channel, the greater the opportunity for Murphy's Law to prevail and create reliability problems.

A leased network can reduce compatibility problems with a range of capabilities that free the user from traditional suppliers of terminal equipment and enable terminals with different characteristics to look alike.

A key element in the rationale behind leasing a network is growth flexibility. The importance of this is demonstrated by studies that have measured a 400% increase in data communications traffic in the past five years.

By 1983, data traffic is projected to increase by at least another factor of two. Clearly if an organization's requirements parallel the industry growth curve, the cost implications of a 100% annual growth rate in the face of changing and nonstandard technology are terribly convincing that a leased network is the most cost-effective avenue to data communications.

Case in Point

A case in point is the experience of the DP organization of a large telephone operating company that came to National CSS, Inc. (NCSS), for assistance in setting up a data communications network to seven cities.

Prior to using the NCSS network, data transmission for the operating company was accomplished through the standard dial-up long-distance voice network. The problems with this method were obvious: it was the lowest grade of service; data integrity was difficult to maintain; and data communications had to compete with voice communications over the same lines, resulting in constantly busy circuits.

Initial internal feasibility studies on establishing a private network suggested a two-year development and implementation cycle. This brought the company to NCSS for an interim solution. After initial consultations with NCSS's data communications ex-

(Continued on SR/32)

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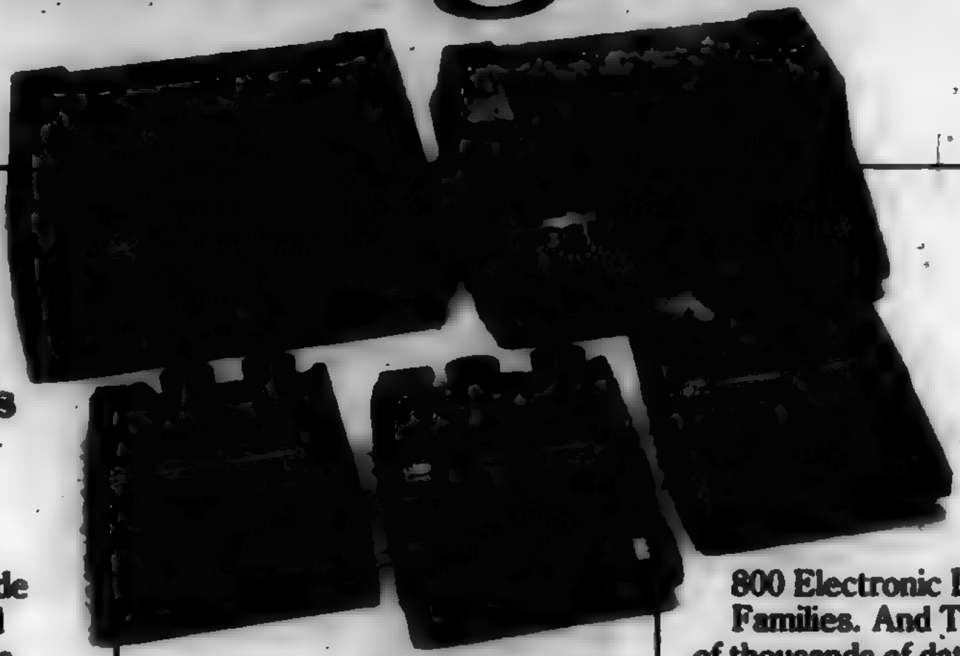

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Systematic Net Planning Gaining Acceptance

(Continued from SR/27)

they should be in concert with strategic goals and policies.

It is at this level that the alternatives of packet switching, public network services, private dedicated systems or migration to promised ones such as Xerox Telecommunications Network, Advanced Communications Service or Satellite Business Systems offerings should be evaluated. The requirements for distributed processing, office-of-the-future offerings, electronic mail and administrative message transfer media should be analyzed.

Most large organizations have experienced significant growth in telecommunication requirements over the past several years. Considerable effort to support separate network facilities to maintain voice, data, facsimile and administrative message transfer over a large geographical area has highlighted some major concerns:

- Increased growth demand has led to a proliferation of diversified and incompatible networks.
- Although unit communication costs are decreasing, total corporate communication costs are increasing at a rapid rate.
- Difficulty is evident in attempting centrally to manage geographically dispersed networks.
- A high level of network reliability is difficult to attain.
- The effects of new corporate processing philosophies and applications are unknown.
- Uncertainty exists as to the availability and capability of new vendor telecommunication service offerings.

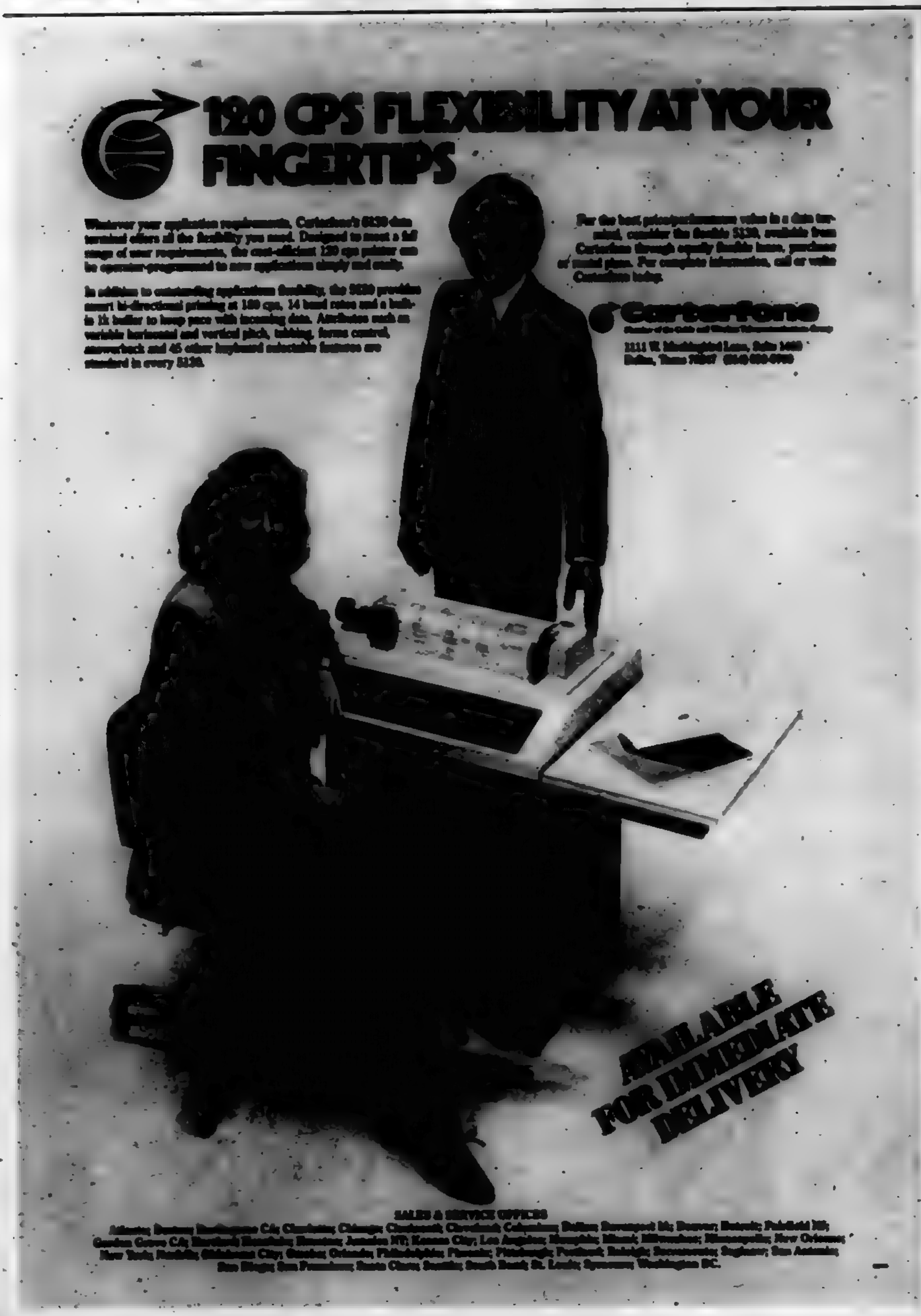
The overwhelming diversity of new offerings and sophisticated services now offered or promised for the future, coupled with the general increase in user demand and experienced major problem areas, necessitates that an organized approach be developed.

Effective long-range planning has long been a strong desire of management and it has seldom been achieved in practice due to a lack of a workable methodology for technological assessment, cost estimating and user problem definition and integration.

In order to overcome these deficiencies, it is necessary to develop adequate techniques for planning that will keep pace with the growth, complexity and sophistication of modern telecommunications facilities and service.

In order to devise a long-range plan, such as that recommended on SR/27, it is necessary that an initial examination be made of user requirements, technological offerings and communications growth. The promise of tomorrow's high system reliability, widespread equipment compatibility, ease of host connectability, sophisticated network control and adaptability to varying traffic loads must be assessed.

Walder is a senior member of Western Electric Co.'s Information System Staff, located at the Guilford Center, Greensboro, N.C. 27420.



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Leased Nets Best Offer

(Continued from SR/29)

perts, the company found that a permanent network maintained by NCSS would be more cost-effective.

Network architecture is structured around a dedicated Amdahl Corp. 470 mainframe with 160 parts. All hardware and software is developed and maintained at central data facilities of NCSS. Additionally, the facilities of the commercial NCSS network are available for overflow or short-term growth needs.

Even though the company had the wherewithal to implement a private network, by choosing to have a leased network planned, implemented and maintained by a computer services company, the operating company avoided high startup costs and all peripheral costs associated with a general private network.

They also avoided the liabilities associated with high data traffic growth and technological flux.

A senior network specialist with National CSS, Inc., Kernan helped install that company's data network, which reportedly now spans 100,000 miles.

Information as Resource

Net Goals Must Match Corporate Direction

By Dan Remy
Special to CW

The corporate information system function must ensure that the goals and directions set within management information systems are consistent with those of the company.

A key charter is to provide corporate managers with the information reference they need to make and support decision-making processes. Because of the accelerated nature of the business environment, the speed required to obtain information has become crucial to making timely decisions in a rapidly changing marketplace.

The recognition of the need for timely and meaningful information has led to the recognition that information is a resource, like cash and inventories, that must be managed to ensure accurate and speedy information flows.

'Because of the accelerated nature of the business environment, the speed required to obtain information has become crucial to making timely decisions in a rapidly changing marketplace.'

The management of information, carefully monitored and controlled as both a corporate current and long-term asset, has come to be known as information resource management (IRM) to reflect its true importance.

The managers and practitioners of IRM can no longer be data processing people, per se. Since information flows pervade each of the business functions – marketing, finance, production and engineering and service – the IRM professional must be totally aware of the business environment as a businessman.

The computer is then only a tool used to direct and control information flows to the business functions to provide a needed resource.

However, one must recognize the uniqueness of IRM in its duality as both a business and technical effort. The informationist must evaluate alternatives with respect to both technical capabilities and return-on-investment measured in dollars and not lose his perspective to the bottom line. Telecommunications, a technical field with many facets, represents one type of challenge to the managers of the information resource.

Complex Environment

Over the past 20 years, and most notably the last five, telecommunications has evolved and matured into a complex environment with many opportunities and pitfalls. A crossroad has been revealed where the opportunities for enhanced information management and cost savings are too large to incur as opportunity costs due to lack of planning.

The main impetus for increased data communications planning is that it allows for a systematic and the cost-effective development of a single multipurpose network.

The alternative to planning is the development and operation of many single-solution networks that overlap and are often redundant. Unnecessary redundancy is merely a lack of efficiency that downgrades the cost-effectiveness of the overall system.

The merging technology of DP, word processing and telecommunications has led to the concept of the "office-of-the-future." Further, the use of the same carrier service for voice, image and data has provided the opportunity for large cost savings from the multipurpose use of the carrier service.

In 1975, voice, data and message services were all distinct, separate disciplines that were administered by different individuals within the corporation. But within the last five years, we have had a merging of voice and data followed by the integration of electronic message and word processing functions.

'The office is the most undercapitalized portion of the labor market and represents a viable market segment for terminals and word processing equipment manufacturers within the next decade.'

The economies and efficiencies that result from this integration dictate that further progress in this area will be ag-

From a business planning point of view, the office is the most undercapitalized portion of the labor market and represents a viable market segment for terminals and word processing equipment manufacturers over the next decade.

A three-tier market has evolved: first-time users tend toward low-cost producers such as electronic typewriters and blind systems; more experienced users generally tend toward display-based systems with text editing and some arithmetical or other functions; and finally, the most sophisticated user tends towards multifunction display-based stand-alones

(Continued on SR/34)

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'Fred Received the Analog Computer In Kit Form This Morning. They Took Him Away in a Net This Afternoon.'

Effective Net Goals Must Match Corporate Direction

(Continued from SR/33)

and shared systems including data communications capability.

Perhaps the best way to depict the office-of-the-future is by its components. Multifunctional video receivers with intelligence and processing capability would prevail. These videos would be capable of receiving corporate correspondence (electronic mail) with the recipient having the option of hard copy — thermal or printed.

Network Integration

The most significant change in the office will be the integration of voice, data, message and imaging systems into one network. Communicating word processors, desktop computers, Telex/TWX/facsimile and telephones will all share the same communications link.

Another way the office-of-the-future will differ from today is in the numbers and types of business systems used and the organizational changes that must be made to take full advantage of the new capabilities.

The now-separated functions of data communications, network design and voice/TWX/facsimile telecommunications will gradually merge into a functional communications entity comprising all the skills required to implement and manage the corporation-of-the-future's integrated needs.

These needs will span DP, word processing and communications in total and be responsive to the business needs of the corporation for all of its business functions — marketing, production and finance — as an integrated whole.

The cement of the office-of-the-future is basically communications. The catalysts are the large-scale integration and very large-scale integration revolution and large memory chips that have made intelligence available to most common office devices — (calculators, typewriters, phone switches and so on.)

Industry Metamorphosis

The next major trend will be the refinement and expansion into common usage of a number of existing technologies — a trend known as "industry metamorphosis."

This is already evident in the facsimile area. Xerographic printing technology and advances in digital communications are now spawning intelligent printers used for communications and office systems peripherals with CRT terminals and/or word processing stand-alone devices. Also, laser and ink jet printing is evolving rapidly to allow for plain-paper facsimiles.

It should be noted that, although soft data in the form of video displays will prevail, the hard-copy capability will continue to prevail either by custom or necessity in certain situations.

Social Solutions

In the next five years, we will see communications technology called upon not only to promote office efficiency, but also to help resolve larger social problems under the hat of corporate social responsibility. The use of teleconferencing and electronic mail are examples of how communications technology will be used as energy-efficient alternatives to business travel and traditional mail deliveries.

With the increased cost of commuting, progressive companies will be encouraged to have professional employees work out of their homes or in minioffices close to residential districts completely linked to the corporation via video, visual and conversational hookups.

Realistically, the sales and service office works in this manner today geographically, if not with the current technology available.

Remy is a member of Pertec Computer Corp.'s Corporate MIS Planning staff, located at 17112 Armstrong Ave., Irvine, Calif. 92714.

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Especially in Business Use

Understanding Protocol Key to Mini-Based Net

By Roger L. Evans
Special to CW

BLOCK CHECK CHARACTER	END OF MESSAGE	MESSAGE	ADDRESS	SEQUENCE NUMBER	HEADER

Direction of Data Flow →

Figure 1. Typical Message Envelope

The implementation of a data communications system with a minicomputer as the host is different in several respects from a data communications system with a large mainframe host computer.

Communication typically is over shorter distances — 50 or 100 miles rather than 1,000 or 2,000 miles — and minicomputer users usually have only one or two discrete data communication links to remote offices rather than a complex multinode data communications network.

The fundamental difference in implementation is that the minicomputer only supports, with very few exceptions, asynchronous "dumb" terminals, whereas the mainframe user typically expects his terminals to benefit from some kind of built-in communication protocol.

It is vital for all those planning to implement minicomputer-based data communications systems, especially in business applications, to understand the importance of communication protocol.

> *'If a terminal conforms to one of the defined communications protocols, such as IBM's Bisync, it operates error-free because it has the benefit of automatic retransmission-on-error.'*

Communication Protocol

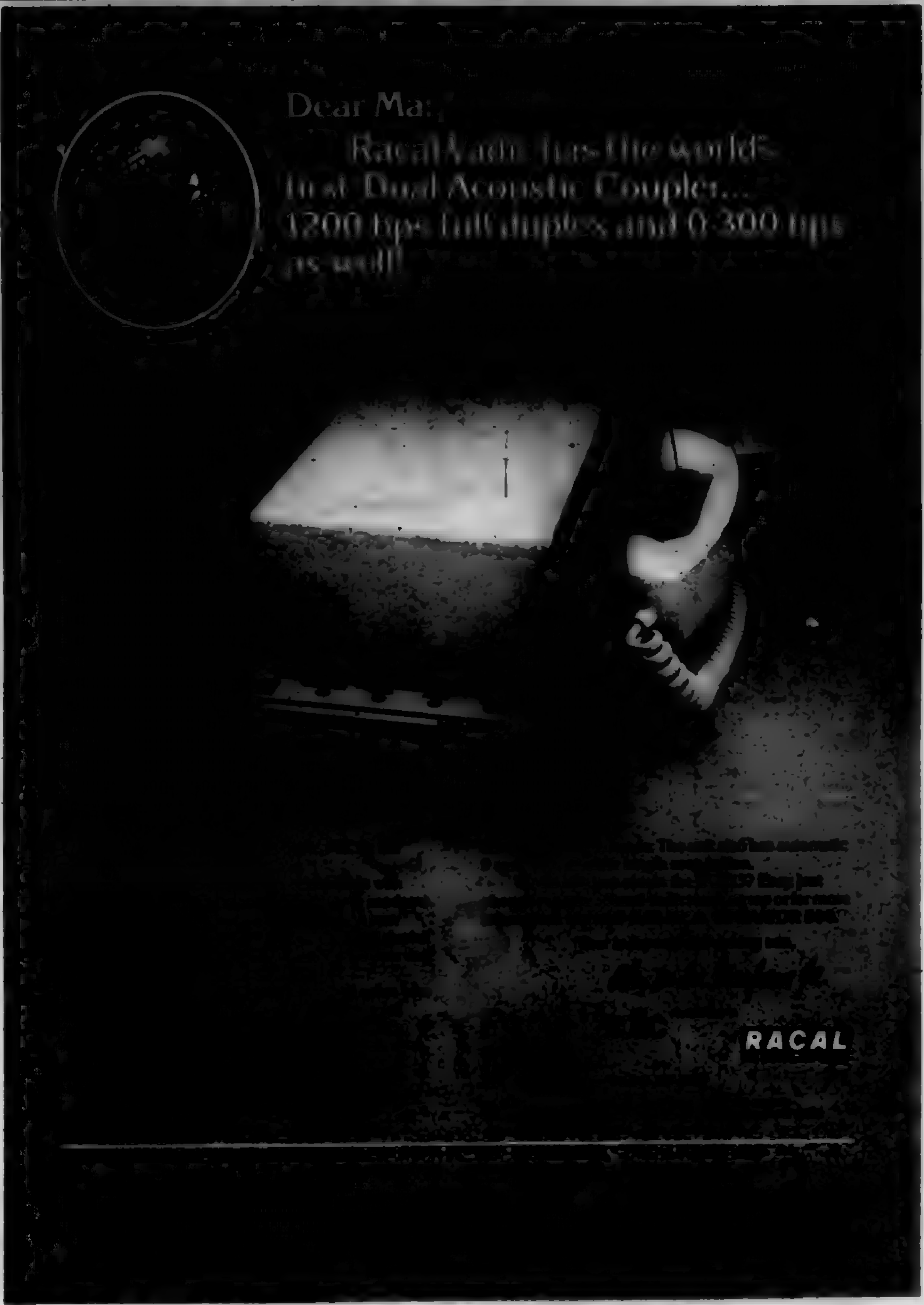
Communication protocol is a set of rules governing information flow in a communication system. The rules include a definition of the block format or message envelope which is used to "packetize" each message transmitted.

The message envelope, as shown in Figure 1, usually contains special control characters to mark its beginning and end, along with an address, so that messages can be directed to selected terminals.

It may also include a sequence number and/or block check character so that the receiving terminal may check the incoming message for errors. The protocol rules also define how a terminal acknowledges a message or, in the event it detects an error, how a terminal requests a retransmission.

If a terminal conforms to one of the defined communication protocols, such as IBM's Bisync, it operates error-free because it has the benefit of automatic retransmission-on-error; it can also be multidropped, either individually

(Continued on SR/36)



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RACAL

Understanding Net Protocol Vital

(Continued from SR/35)

or in clusters, with other terminals on a single line because it can be selectively addressed or polled by the host computer (see Figure 2).

Polling involves the addressing by the host computer of each terminal on the line, one after the other. The computer polls the first terminal which responds "NAK" if it has nothing to transmit or "ACK," followed by its message if it has a message to transmit.

The computer then polls the next terminal in sequence. If any terminal does not respond, the computer will "time out" and proceed to poll the next terminal.

Polling takes place constantly, in round-robin fashion. Outbound messages from the computer are also transmitted to each terminal when it is due to be polled. Typically, the ACK-NAK protocol is also used to verify correct receipt of messages or request retransmission.

Terminal polling is only possible if three criteria are satisfied:

- The terminal must be "smart" enough to have an address and be able to respond when it reads its address in a message received on the line.
- The terminal must be buffered, since it only has access to the line at the discretion of the computer. Such a system is only efficient if the message has been entered at the terminal and is ready for transmission in the terminal's buffer when the terminal is polled.
- The host computer must have software available to perform the polling procedure and support the particular communication protocol which the terminals are designed to use.

'The minicomputer user is typically forced to use so-called "dumb terminals" and configure his terminals one per computer port, thus losing the cost advantages of being able to put multiple terminals on one line and also losing the benefits of retransmission-on-error.'

Typically, these criteria are only satisfied in terminals and data communication systems supplied by the large mainframe manufacturers or designed to be compatible with the product offerings of the mainframe manufacturers.

The minicomputer user is typically forced to use so-called "dumb terminals" and configure his terminals one per computer port as shown in Figure 3, thus losing the cost advantages of being able to put multiple terminals on one line and also losing the benefits of retransmission-on-error.

An increasing number of data communications systems using minicomputers as the host cannot tolerate the risk of undetected data transmission errors and the telephone line costs associated with using multiple dumb terminals at a single office remote from the computer.

The solution to these problems is a range of currently available intelligent black boxes which provide add-on communication protocol — what Micom Systems, Inc. calls Add-On Data Link Control (ADLC) — to minicomputer-based dumb terminal configurations without requiring any changes to existing hardware and software.

'Error Controller'

The most basic element of the ADLC family is the "Error Controller."

The error controller is a low-

(Continued on SR/37)

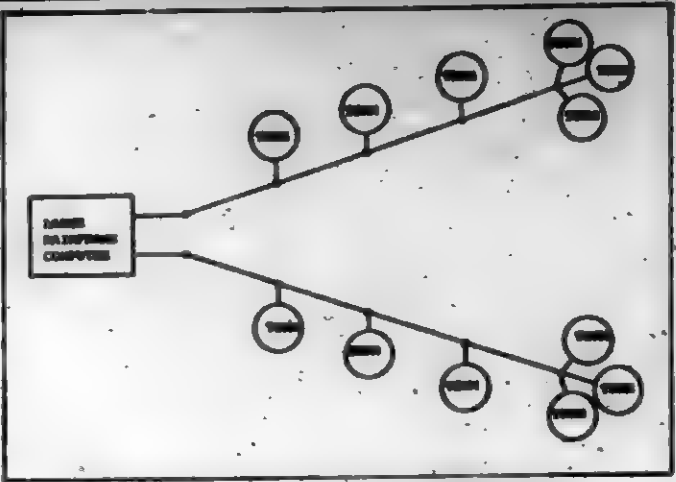
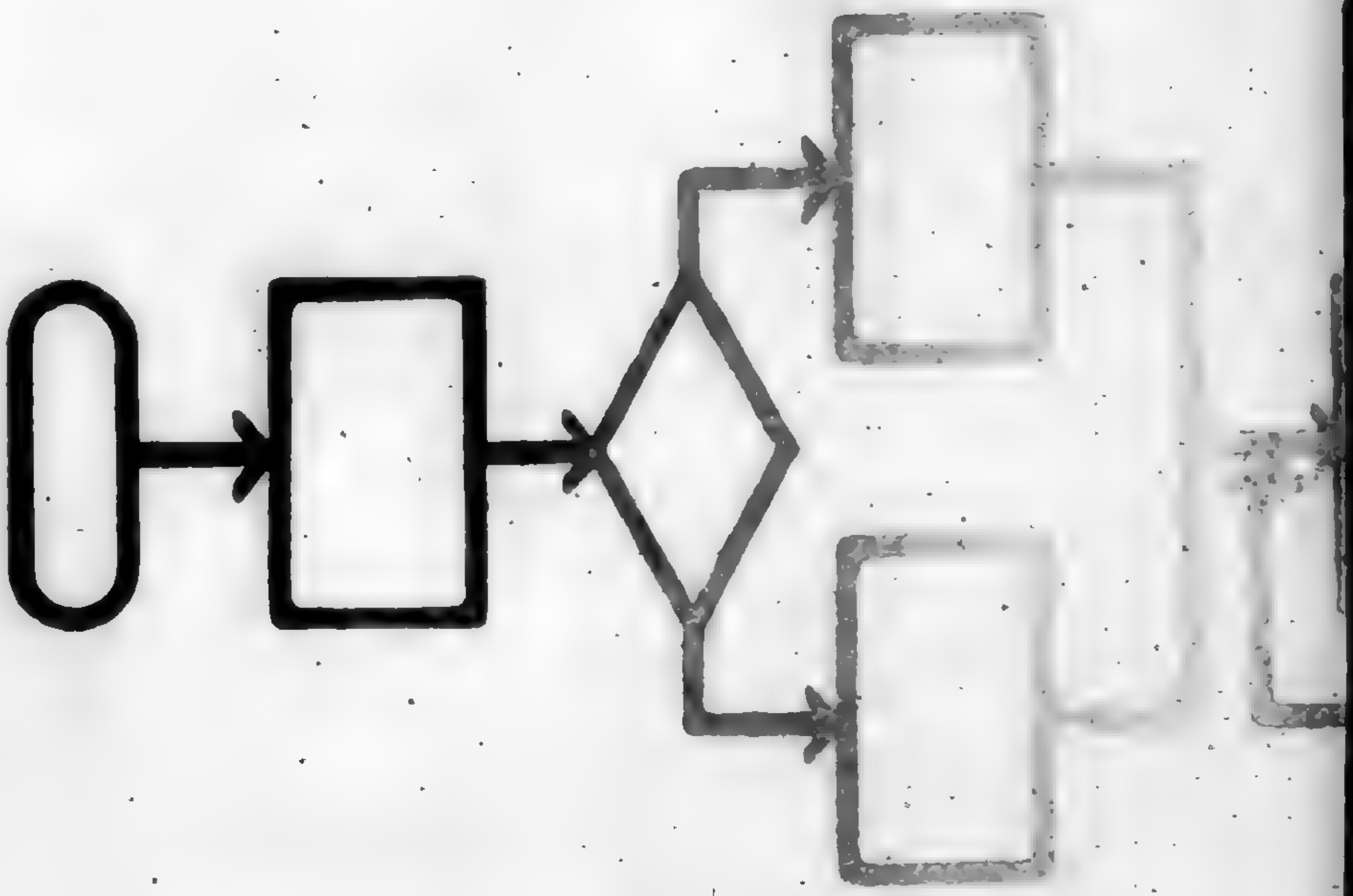


Figure 2. Typical Polled Terminal Configuration



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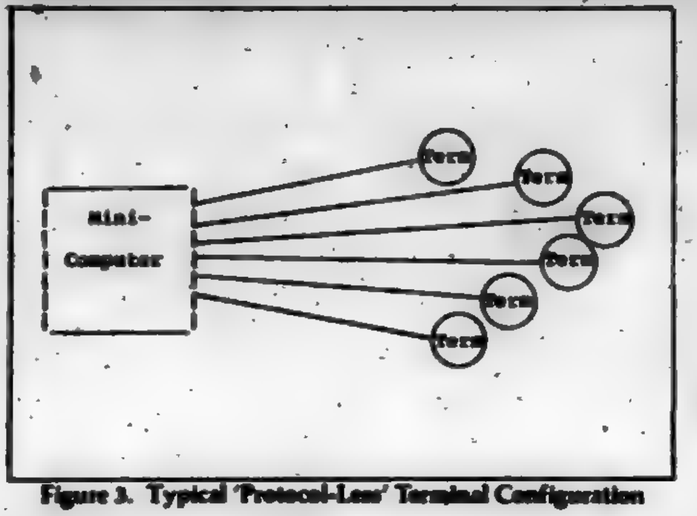

Mini-
Computer
Term
Term
Term
Term
Term
Term

Figure 3. Typical 'Protocol-Less' Terminal Configuration

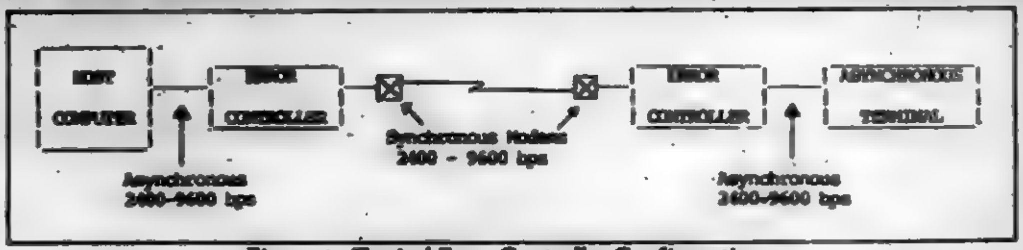

HOST
COMPUTER
ERROR
CONTROLLER
Synchronous Modems
2400 - 9600 bps
ERROR
CONTROLLER
ASYNCHRONOUS
TERMINAL
Asynchronous
2400-9600 bps
Asynchronous
2400-9600 bps

Figure 4. Typical Error Controller Configuration

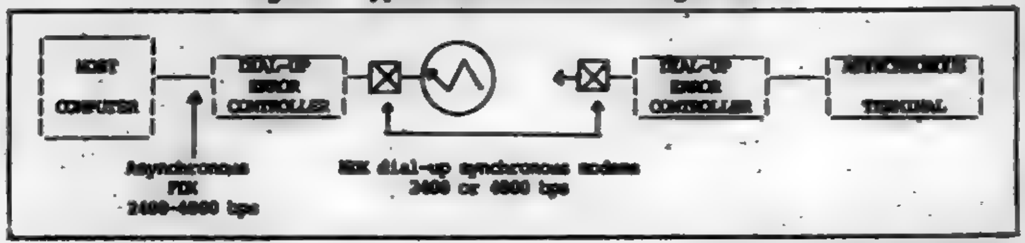

HOST
COMPUTER
DIAL-UP
ERROR
CONTROLLER
DIAL-UP
ERROR
CONTROLLER
ASYNCHRONOUS
TERMINAL
Asynchronous
FDX
2400-4800 bps
FDX dial-up synchronous modems
2400 or 4800 bps

Figure 5. Typical Dial-Up Error Controller Configuration.

Net Protocol Vital Factor In Planning

(Continued from SR/36)

The error controller is a low-cost black box designed to provide automatic retransmission-on-error as well as the mode conversion necessary to allow an asynchronous terminal to operate with synchronous modems at 2,400 bit/sec and above. It is installed in pairs, one at each end of the leased telephone line, as shown in Figure 4.

In operation (see Figure 5), the error controller receives data character-by-character from the terminal or computer port and transmits it in a block format, with block length determined by the number of characters received since the last block was transmitted.

Each block starts with a "Header" containing control information. This consists of the sequence number of the block and also the sequence number of the last block received correctly in the other direction.

A Cyclic Redundancy Check (CRC) character terminates the block. The CRC is recalculated at the receiving end to ensure that the data block was received correctly.

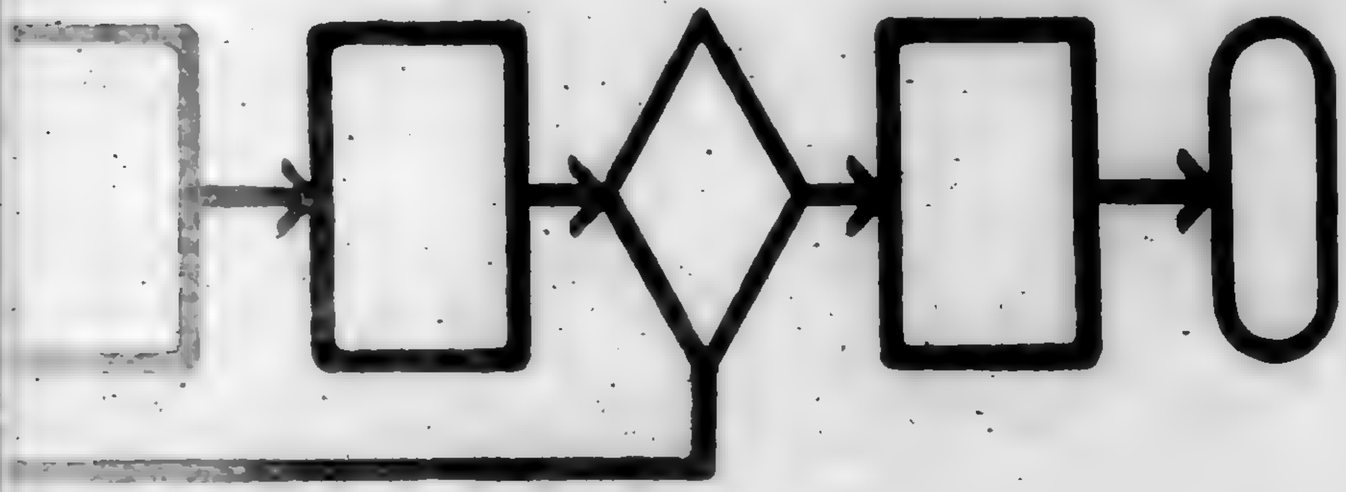
The CRC is the 16-bit result of a polynomial calculation performed on the bits in the block and provides only a 1 in 10^{14} probability that a CRC will check out correctly with a block in error.

It thus reduces to almost zero the possibility that multiple bit errors will be self-canceling and thus avoid detection.

Another ADLC product, the "Data Concentrator," uses statistical multiplexing techniques to allow several "dumb terminals" to share a single telephone line, with one concentrator unit installed at each end of the line (see Figure 6). The device operates extremely efficiently with interactive CRT terminals, since it allocates the shared telephone line to each terminal dynamically, as needed, rather than on a predefined fixed basis.

The data concentrator acts as

(Continued on SR/38)



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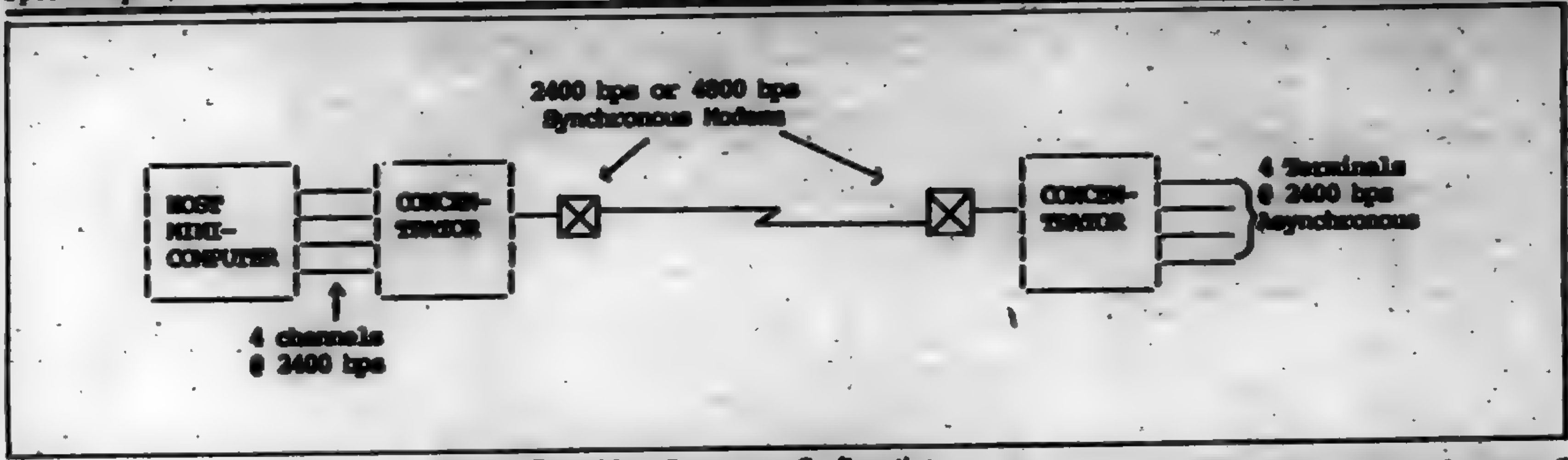

Figure 6. Typical Data Concentrator Configuration

Protocol Vital To Net Plans

(Continued from SR/37)

both an error controller and cluster controller for as few as two terminals, without requiring any changes to the existing dumb terminal hardware and minicomputer software. And it also allows the asynchronous terminals to be used with high-speed synchronous modems.

The third product in the ADLC family is the "Multidrop Concentrator," which uses the same statistical multiplexing techniques as the data concentrator, but, since the device can be configured in a multipoint configuration, it allows individual dumb terminals and dumb terminal clusters to be multidropped at different locations to share a single multipoint telephone line.

In operation, the master concentrator polls the remote node units at high-speed, accepting multiplexed inbound data from terminals at each site and delivering multiplexed outbound data addressed to individual terminals at each site. The multipoint data link operates synchronously at speeds to 9,600 bit/sec, but speeds of 2,400- or 4,800 bit/sec are most typical.

The availability of devices like the ADLC products has greatly extended the power of low-cost minicomputers and dumb terminals in implementing data communication systems for business applications where cost-effective reliable systems were not hitherto achievable.

Evans is marketing vice-president of Micom Systems, Inc., located at 9551 Irondale Ave., Chatsworth, Calif. 91311.

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Several Paths Open

Queuing Major Deterrent to Small Net Design

By Charles Pross
Special to CW

The major deterrent to small data communications network design by DP analysts is the complex queuing equations that are associated with network design.

Such equations are complex for someone who has not had formal training in queuing theory. However, a number of software programs are currently available on the market — either for outright sale or on a "pay-as-you-use" basis — that attempt to automate that part of the network design process involved with queuing theory.

There are software programs intended to fully automate the network design process. When applicable to a company's needs, these programs are generally very expensive and require detailed information about traffic characteristics anticipated for the network to be implemented. In presenting an alternative approach to network design, this article will not discuss such packages.

Present Status

Before dealing with that approach, let's review what network design encompasses nowadays.

Among the factors that have increased interest in private data communications networks for small to medium-size companies, the technologies of DP, word processing and telecommunications have begun to merge, resulting in the advent of a wide range of equipment enabling small businesses to integrate information resources efficiently and at a lower cost than previously possible.

In most companies, the senior systems analyst is the individual responsible for moving the organization in the direction of distributed processing. This person is usually well versed in the DP methodologies and often has access to the word processing manager, who is proficient in word processing methodologies.

However, in most small to medium-size companies, no individual in the company is well versed in data communications methodologies. Therefore, in most cases, a consulting organization is generally called in to aid in the design of the company's data communications facilities.

For large-scale data communications networks, these consultants can offer invaluable advice to a company. But when the number of switching or concentrator nodes is small, the services of a consultant may in fact not be necessary, and by using tools currently available in the marketplace, a network can be designed by the senior systems analyst that would be as optimal as one designed by a communications specialist.

For most small data networks, the protocol will have to be selected from among those supported by the computer vendor. In general, the choice of network protocol will be uniquely determined by the typed (interactive vs. batch) of traffic and the terminal vendor.

However, even in the case of multifunctional backbone protocols, small data communication networks can be constructed using the computational tools to be described. What is left at this point is the problem of designing a "glue" by which the diverse parts of the network can be tied together into a unified facility.

At the outset of any design effort three distinct sets of reference materials must be obtained. Information is generally best obtained by reading periodicals concerned with network design.

The second set of reference material deals with the methodology of network design. Such reference materials exist in the form of textbooks.

The third set of reference material deals with the current marketplace of products that are available to serve as the components of a data communications network.

One such product, Amnet, offered by Advanced Management Systems Corp., prompts the user for such information as:

- Average message block length.
- Average number of blocks per second.
- Line bit error rate and so on.

Menu Displayed

When all requested data have been entered, the system displays a menu in which the user may elect to change any given parameter or compute any of the list of unknowns such as minimum bandwidth required or average queue size.

Thus, the analysis proceeds one node at a time through all nodes. The partitioning of a network into separate nodes and solving for the parameters for each node fails for nodes within complex network configurations, but is accurate for small networks utilizing a straightforward backbone configuration.

It is therefore possible for small to medium-size companies that have private data communication network requirements to design and plan their own network.

Pross is vice-president for application services of Advanced Management Systems Corp., located at 304 Sorel Court, Millersville, Md. 21108.

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Data Communications Uptime, Reliability

By Charles R. Robbins
Special to CW

Data communications networks have come a long way since the first users began to attach modems to their business machines. Today, as DP applications are tailored to meet the specific needs of the user, the data communications networks in typical organizations have become important corporate assets.

As company networks grow in complexity, the continued uptime and reliability of these data communications links has taken on a new measure of importance. Much of this increased concern about network uptime can be traced to an escalating awareness by management about the vital role of communications. Corporate leaders recognize that effective networks are a key element in meeting company performance and revenue goals.

As part of the increased emphasis on corporate data networks, the functions of telecommunications management have also taken on new importance. It is no longer possible to consider communications as a self-contained function. A company's network has become closely related to other vital corporate operations, and this in turn has led to the development of new methods to monitor the communications system.

Only a few years ago, the first equipment aimed at network control was introduced. Although the idea of this equipment was to provide users with an important network control tool, the first systems offered only basic capabilities.

More recently, these systems have been enhanced to provide users with expanded features that often are tailored to the customer's application requirements. These more sophisticated control systems have given users capabilities that can be utilized to optimize data transmission operations.

But increasingly detailed network control functions have also made it more complex for customers to select and implement the systems and features best suited to their requirements. Thus the corporate telecommunications manager must be skilled in network control in order to effectively select such systems.

Guidelines Needed

When a telecommunications manager, in cooperation with other department managers, makes a decision to add network control functions some fundamental goals and guidelines must be established. While vendors of these systems stand ready to provide detailed support, the user must know the current and future data transmission needs of the company so these can be integrated into the overall plan to phase in a network control capability.

The user should approach potential suppliers of these systems with a clear understanding of the high-priority applications where downtime must be minimized. In addition, the geographic sites at which control functions will be implemented should be specifically defined.

The user should also have a basic concept of how network control will be added to the system. At the same time, corporate growth should be taken into account so that the enhanced data communications network will have built-in allowances for expanded operations.

The user who can establish such parameters prior to contacting network control vendors will be able to evaluate the best system for the company's needs in the most objective and effective manner. Vendor representatives can provide more effective technical and applications planning support if the user has a basic concept of how network control is implemented.

Complement Advances

Many telecommunications managers realize that the introduction of network control functions can often complement general advances in a data communications system. As many company networks are modified to incorporate distributed data processing concepts, the prospect of complete network control capabilities becomes economically attractive.

Distributed DP adds remote and geographically dispersed sites into a network. Typically, these sites are transmitting data for the first time and may be staffed by company personnel not well versed in the technical intricacies of network operations.

The dispersed locations and more complex network operations make it more difficult for telecommunications staff to keep networks operating properly. In these environments, the introduction of network control can add network reliability and monitoring capabilities that are often more cost effective than training on-site technical experts.

Network control systems can be implemented to allow centrally located telecommunications staffs to monitor operating parameters at all network sites. This makes it possible to add remote locations while still assuring network availability and reliability to meet corporate goals. Users that have a detailed understanding of such needs make it easier for vendors to suggest the proper mix of equipment to be in-

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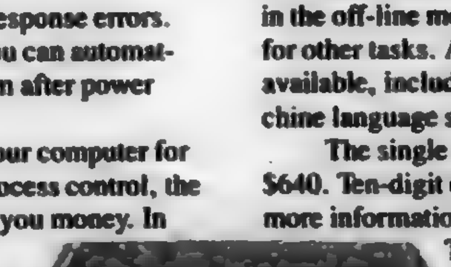

GET INTO THE TIME MACHINE.

DIGITAL PATHWAYS

As Nets Grow in Complexity •

Gaining Recognition as Corporate Assets

stalled.

The first network control systems were implemented by large users such as banks and airlines who had widespread networks with high priority uptime requirements. But increased capabilities and ease of use have now made it feasible for small users to install this same type of equipment.

Moreover, the data collection features of these systems have undergone a gradual transition. Network control equipment had concentrated on monitoring important parameters to give users detailed technical data that made it possible to identify, diagnose and correct network malfunctions.

Needs of the '80s

In response to the needs of the '80s, vendors have begun to add operational data that is of interest to management. As top management has become more familiar with the relationship between communications and corporate success, this new operational data can give company officials a new perspective on day-to-day functions.

An example of this type of advanced system is the Intertel, Inc. EMS-One/-Sigma reporting and management system, which utilizes a minicomputer-based capability to build a customized data base of network statistics. The data collected as part of routine monitoring features can be summarized in the form of management reports that give key company officials important information on network operations. Telecommunications managers are finding that increased understanding of network function performance often plays a vital role when management is asked to approve network expansion proposals.

By adding reporting and management capabilities to network control systems, vendors are providing telecommunications customers with powerful tools. The ability to selectively monitor and summarize key network parameters and statistics gives managers the data to better understand the operational patterns of their network.

This in turn allows them to plan network expansion to support corporate goals and growth.

The concept of a closely monitored dynamic network is bringing increased opportunities for greater network efficiencies. As a result, new remote sites will be added to networks with a minimum of operational changes because they had been included in the long-term communications plan.

Modified to Meet Needs

Despite the most detailed plans, however, most users find that network needs must continually be modified to meet company needs. In such fast-changing environments, control systems that can be customized to monitor specific applications and network facilities assure the telecommunications manager that warning indications will be given before critical operating thresholds or line capacities are reached.

Furthermore, users appreciate the flexibilities of the current network control systems that monitor a wide variety of communications network equipment. By working with vendors to utilize the full flexibilities of these control systems, users can identify and correct network growth problems before they take on the dimensions of intolerable outages.

Future network needs will not be based only on expanding corporate growth. Many telecommunications managers are aware of the new technology trends that will broaden the communications requirements of the user. While today's networks are primarily based on analog private lines with some switched facilities, changes are coming. Public data networks, all-digital links and satellite facilities are among the emerging options expected to provide attractive economies of scale to communications users.

In selecting a network control system that meets today's needs, the telecommunications manager should carefully evaluate whether the vendors are making a commitment for state-of-the-art products. Vendors that have upgraded their network control systems to operate on more complex communications networks and have added features that allow automatic monitoring and management reports can be expected to keep pace with upcoming changes.

Users are becoming more aware that network control system vendors should have a history of incorporating new features with a minimum of effort and upheaval.

As reliance on network control increases, it becomes more difficult for telecommunications staffs to tolerate major disruptions in these systems — especially for the sake of upgrades. Most innovative vendors have a policy of incorporating upgraded features with a minimum of effort. The user should look for such assurances when selecting this type of system.

Network control is an evolutionary process for both user and vendor. As such, a continuing commitment from both parties to keep pace with a dynamic network environment can prove to be mutually beneficial.

Robbins is product marketing manager at Intertel, Inc., Andover, Mass. 01810.

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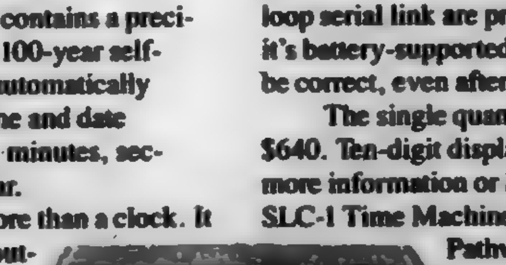


GET INTO THE TIME MACHINE.

DIGITAL PATHWAYS

Present Net Status Critical to Future Planning

By Murrell F. Jessen
Special to CW

As part of the network planning process, the present network's status should be carefully assessed. The following list of questions will aid this assessment.

1. Who is the data communication manager?

2. Should voice/data communication system responsibility be split?

3. Does he report to a corporate officer?

4. How many *independent* data networks in your company?

5. Are they application-dependent?

6. What is system availability for yesterday, last five days and last month?

7. Are reports mentioned in previous section available?

8. Are controls mentioned in previous section available?

9. Is batch processor work load greater than five day/-week, 12 hour/day?

10. What is your company's data communications system annual budget?

11. What is your monthly data communications cost? Total cost last year?

12. How many single function/purpose terminals in use?

13. How many multiple function/purpose terminals in use?

14. Is your network utilized in your company's revenue stream management? Expense stream management?

15. Is network operation erratic, difficult to pinpoint problems?

16. Are response times less than three seconds, 95% of the time for on-line traffic?

17. Management reports: Are they all timely? Do they contain latest up-to-date statistics? How are they delivered to user? Are they generated periodically or on demand?

18. How easy is reconfiguration?

19. How many hours per day, days per week for network operation?

20. What is the inventory of the current network configuration for the following, including location, type, traffic volumes by message type and hours:

- I/O terminals.
- Process terminals.
- Data processors.
- Modems.
- Concentrators.
- Multiplexers.
- Front ends.
- Common carriers: identification, services provided, traffic volumes and monthly costs.

21. Are applications handled by networks?

Data Movement

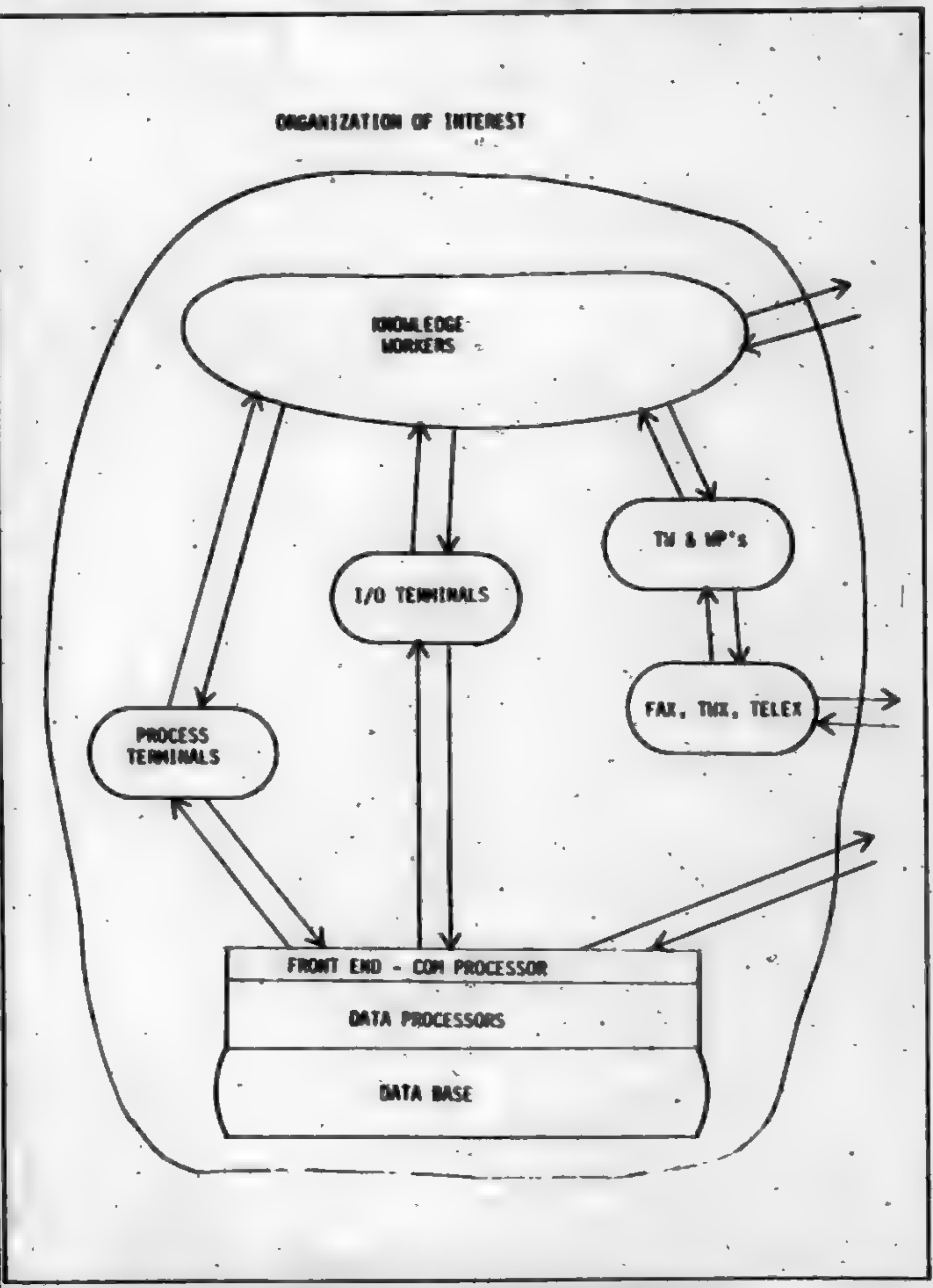
The accompanying figure represents the overall movement of data among knowledge workers, data processes, I/O terminals and data processors directly coupled to data base. The links among these include the network of concern and may in reality be several electronic networks as previously discussed as well as networks for information transfer as basic as walking, auto and air transport, company or common carrier mail system.

An interesting perspective is obtained by determining the number of knowledge workers, secretaries and administrative clerks, telephones, locations or buildings served, I/O terminals, process terminals (CAD, CAM, Scada and so on), data processors, typewriters, word processors and telex/TWX/fax terminals for the organization or company of interest in this planning project.

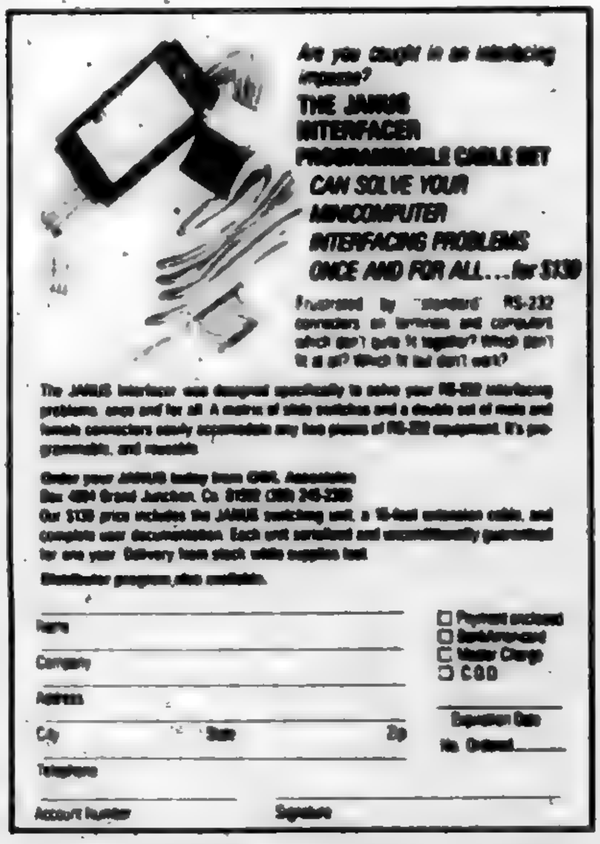
Typically, the number of phones is equal to the number of knowledge workers and is at least 10 times the number of I/O data terminals. The knowledge worker — also called the decision maker — is defined as the individual whose normal task and responsibility is to act as a result of information received and/-or generate information for someone else to act.

In general, this includes everyone in an organization except production workers, secretaries and administrative clerks.

Jessen is president of M.F. Jessen & Associates, Inc., a data communications consulting firm located at Suite 255, 5580 LBJ Freeway, Dallas, Texas 75240.



Data Movement Among Knowledge Workers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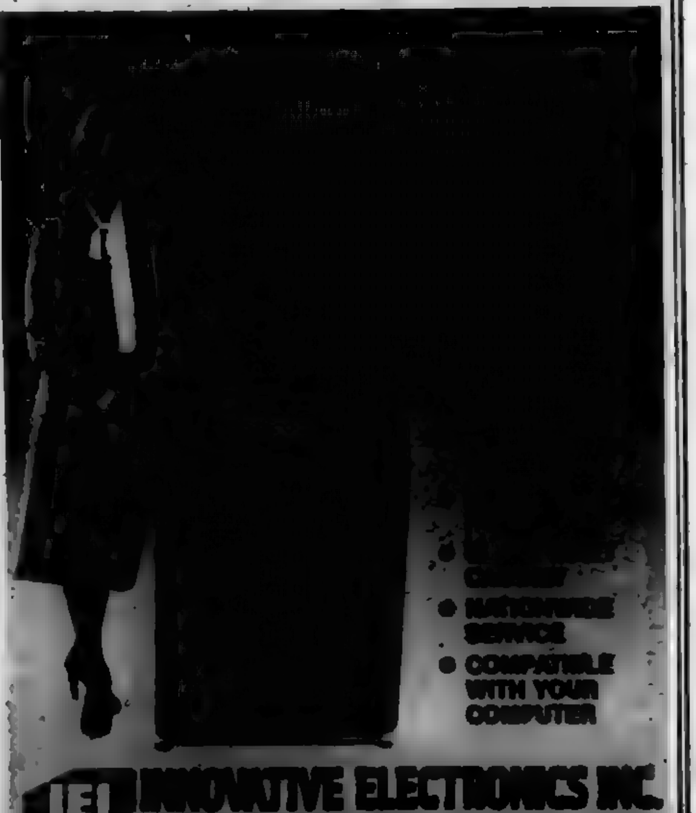
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For Timely Flow of Data

Net Plans Must Run Under Corporate Aegis

By Murrell F. Jensen
Special to CW

A first and most important element of network planning methodology is placement of the network functional responsibility under the aegis of corporate-level management.

With this direction, a planning team is selected and organized. Members should include a responsible representative from each current and potential user organization. Professional project management techniques should be utilized for this planning activity, just as in any other well-managed endeavor.

Before proceeding further, it is imperative that the term "network" be defined. Webster's definition is: "A system of interlacing lines or channels."

The term *system* is significant. A network is a communications system and, specifically for the purposes of this report, a data communications system. A data communications system enables the movement of data between people, processors and processes, in all possible combinations (see figure below).

The planning of a network is an important step for a company to undertake. The major benefit of this plan is that it results in a managed resource.

This means that costs, performance and benefits are determined for the past and present, and anticipated. The values become readily apparent. Timely movement of data — information — throughout a corporation is directly proportional to the productivity of its decision makers.

Most networks have not had the benefit of planning! The great majority of networks today have availabilities of 90% to 95%, a commonly accepted level of performance.

Can you imagine being unable to use your telephone — no dial tone — 24 to 48 minutes out of each working day, not knowing when it will be unavailable, possibly at the most inopportune time? Considering only the previous parameter, this performance is consistent with networks void of planning.

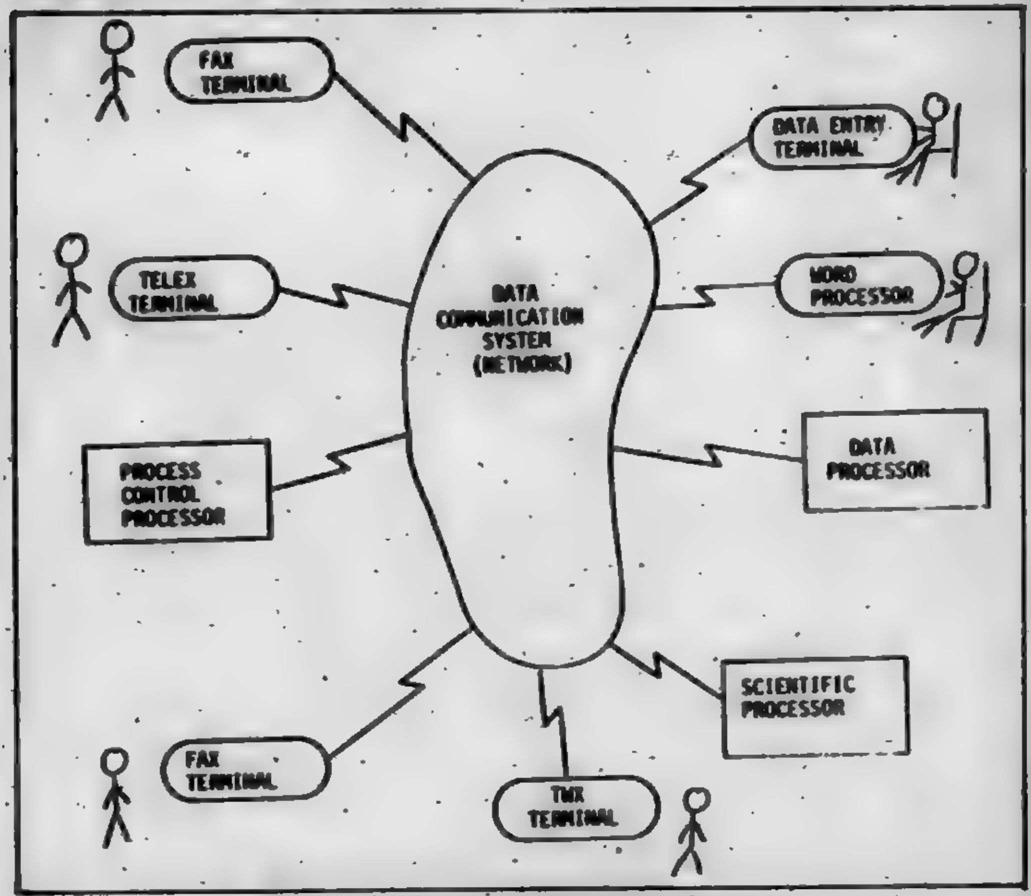
Need I say more about the desirability of a planned network? We can not totally blame users if they are hesitant about relying on the latest DP technology.

Network as Utility

An effective network is a utility, it is there when needed while providing desired data transfer at an acceptable error rate; it is application-independent and enables communication among all users functions.

A network contains all those elements — hardware and software — necessary for the movement of data. The elements include I/O terminals; process terminals such as data acquisition and process control; data processors; interconnect equipment and carrier

(Continued on SR/44)



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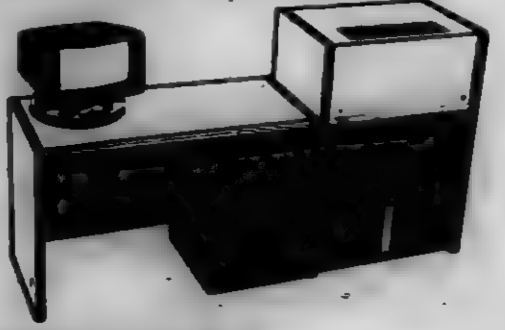

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Placing Net Planning Under Corporate Aegis . . .

(Continued from SR/43)

(special and common) equipment and services.

These elements are connected in numerous configurations to purportedly best suit the needs of the user. Fortunately, today there are a considerable number of choices a user can make from the menu of suppliers in each element category.

Often, these choices are left by default to the mainframe data processor supplier, which in most instances is not a major technological contributor in this field.

The I/O element is the source and destination of the data handled by the network. This element consists of specific hardware and software that is application-independent and communications-related. Functions such as line protocols — bisynchronous, Synchronous Data Link Control, a synchronous — and line termination hardware are included.

The interconnect equipment elements include modems, multiplexers, concentrators, front ends (communications processors), private branch exchanges (PBX), message switches and data switches. These give the user the ability to interconnect the terminals, processors and processes into the most advantageous configuration, as well as the capability to manage the network.

The third and final element, common-carrier equipment, includes microwave, coaxial cable, conventional cable, fiber optics, central switching and satellites.

Common-carrier services include line switching (dial service), private line (dedicated) packet switching such as Telenet and message switching such as TWX or Telex. The contents of the third element are tariffed and available in a variety of competitive offerings for the discerning user.

Performance of a network is measured in the following ways:

- Percentage of availability.
- Load handling capability based on design response (transit) times defined by the number of messages or transactions handled per unit of time and throughput (peak or average) by line, node and total.
- Error rate by line, node, and total.
- Response (transit) times based on percentage of loading.
- Optional capabilities such as code conversion, protocol conversion, message transaction, storage (short- or long-term) and store-and-forward.

A managed system has at least the following alarm-reporting capabilities:

- Terminal, line, communications and data processors and interconnect equipment status on demand or whenever status changes.
- Traffic statistics per unit of time for terminals, lines, nodes, total and histograms.
- Retransmission and delivered and undelivered statistics.
- Percentage of utilization by line, node and total.

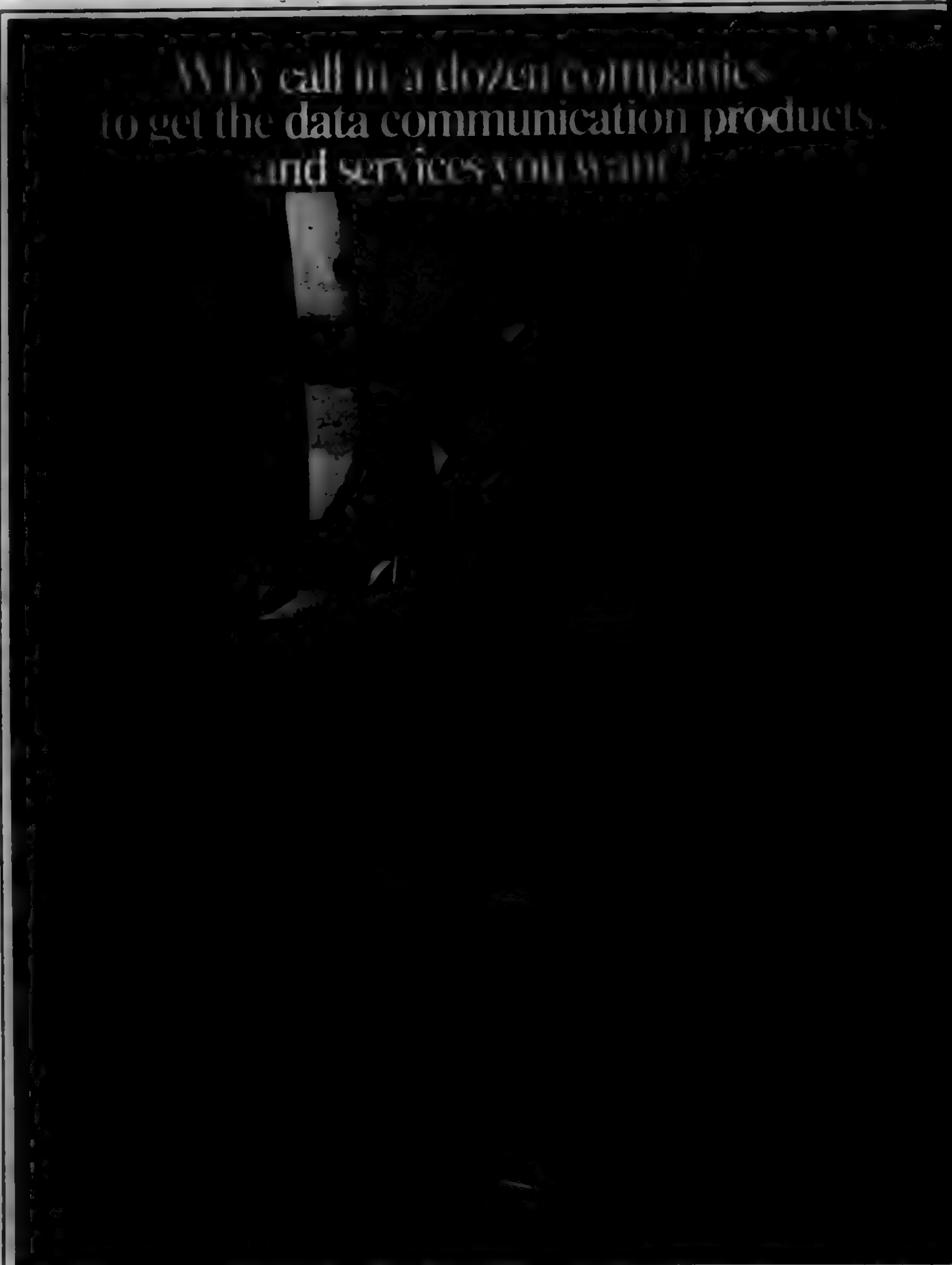
The following control capabilities are applicable:

- Open, close, skip and poll individual, group, all lines or stations.
- Alternate routing and destination.
- Add or delete terminals, lines and nodes.
- Hold or release traffic and all, individual or group lines or stations.

Network planning warrants a careful assessment of the present data communications resources' status (see SR/42).

Is there adequate data communication capability provided among all the nodes indicated; in turn, where are the bottlenecks? Which links

'Every Six Months We have to Add More Numbers to Keep Up With Inflation!'


Why call in a dozen companies
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. . . Important Prerequisite to Timely Data Flow

should be electronic? At what data rate? Should there be a closer coupling between the knowledge worker and the data base? These are network-related questions of concern, to be addressed in the network plan.

When the data necessary for characterization has been gathered, the analysis and assessment of today's network can be initiated. One must be aware that a data communications system is a utility for use by the knowledge worker. Using this system will conserve time, which is a *nonrecoverable* resource and one of the most important contributors to improved productivity of each knowledge worker and the company.

Merits and deficiencies should be noted and an overall assessment made from the viewpoint of the user, i.e., system performance and maintainability, growth capability, cost and manageability. Are the most cost-effective network elements — terminals, interconnect equipment and carrier equipment and services — in place? Could the system be reconfigured for less cost and better performance?

A document describing the detailed findings, merits, deficiencies and overall assessment should be prepared and reviewed.

After identifying the current network's characteristics and assessing their relative importance, the user will typically find it easy to determine the prospective network's near- and long-term needs.

At this stage, the user should establish priorities based on need, complexity and estimated cost and time to implement; and these priorities should then be translated into near- and long-term goals.

A document describing network requirements in detail, near- and long-term and priorities and benefits should be prepared and reviewed, using the previously written report as a reference.

In the process of, first, establishing corporate-level responsibility and organizing the planning team; second, briefly describing networks, elements, management and performance parameters; third, characterizing the current networks, the merits and shortcomings; and fourth, near- and long-term requirements; the framework for a three- to five-year plan has been established.

A review of current technology is the next step. Relative costs, performance and availability of network elements under consideration must be determined. Detailed budgetary costs and schedules need to be established for near-term — one to two years — actions.

Longer term actions, costs and schedules should likewise be determined; however, it will be more difficult to acquire an equivalent level of accuracy. Adjustments in priorities and reconsideration of various options may be necessary at this stage.

This is the basis for a three- to five-year plan to be documented, reviewed and approved. The immediate (upcoming year) near-term actions, plans and estimated costs can be submitted for review, approval and funding as a project.

Annual reviews and updates are mandatory for the network plan. Updating is essential when considering the rapid changing technology and highly competitive markets.

After the plan is approved by top management, professional project management techniques will probably be utilized for implementation team formation, system design, documentation, implementation, verification and performance auditing for each project.

Planning and implementation are of equal importance in the overall process of attaining desired benefits. The point we are making is that all too often the most critical and significant portion of the project is defining the problem.

The key parameters for a planned network have been highlighted along with techniques for increasing awareness of network-related problems, thus the benefits of a planned data communication system are attained.

Jessen is president of M.F. Jessen & Associates, Inc., a data communications consulting firm located at Suite 255, 5580 LBJ Freeway, Dallas, Texas 75240.

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GENERAL ELECTRIC

Industry Watchers Tout

By David L. Hinders
And Patricia A. Becker
Special to CW

Although industry watchers have touted the benefits of distributed data processing (DDP) for a number of years, until now most businesses have been reluctant to put operations in an on-line dispersed data network.

The reason is fear — fear that the user cannot get to the data in a distant location and fear that once critical business information is on-line, it will not be consistent throughout the network.

Establishing a distributed network is an attempt to meet one or more of the following objectives: distribute processing power closer to the end user, reduce communications costs, increase performance and decrease response time by distributing the data and achieve higher system availability.

The manner in which the network is configured, however, can have significant consequences in terms of communications costs, software development time and costs and network expansion capabilities.

There are nine key issues in network configuration that need to be addressed by users and vendors of data communications networks:

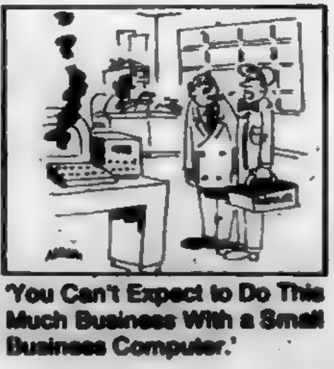
- Availability of on-line data.
- System compatibility.
- Ease of access to geographically distributed system resources.
- Flexibility of communications connections.
- Network expansion.
- Ease of programming applications.
- On-line adaptability.
- Network control facilities.
- Consistency and integrity of information stored in geographically distributed locations.

The true benefits of distributed processing come in bringing the processing power and the most frequently accessed data closer to the end users. Therefore, the two primary areas of concern to all network users are: (1) Will the computers in each node of the network be up and running when the data is needed for processing? And (2) will the communication links connecting each node be available when communications is required?

When data is stored at geographically independent locations, the system node storing the information necessary for business operations must be continuously available to network users. Reliability of the hardware and software in each system of the multiple-node network thus becomes crucial.

In addition to the high availability of system resources, the integrity of the communications network must be maintained. Network operating systems should be designed to reroute messages dynamically in the event of a line failure.

Better still, the network should have the capability of accommodating multiple lines to provide a redundant path. Of course, the added benefit would be the ability to utilize multiple lines for faster



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Benefits, But Businesses Slow to Adopt DDP

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Software Factors

Selecting the equipment for each node of a network requires consideration of factors other than just the hardware costs. If only hardware costs are considered, it may make sense to install different kinds of computers at different sites.

In a network, however, software costs increase as the number of vendors increase. Different programming groups are required for the different processors. Incompatibilities in data types, operating systems and programming languages must be resolved. Making a relatively simple change at the network level may involve extensive reprogramming requiring extensive coordination.

Implementing a data communications network presents users with a complex task of addressing and accessing dispersed data files. Network software should be designed with the user in mind. This really means that users should be able to access the resources of any node — processor, files or physical devices — without regard for the physical location of the resources. A query to the networkwide data base should be able to access files in dispersed geographical nodes, all totally transparent to the user.

Ideal Setup

Ideally, the user of a distributed data network should have the broadest range of options for communications interface. Depending on the distance and data traffic, users should look for network operating sytems that offer multiple connection capabilities.

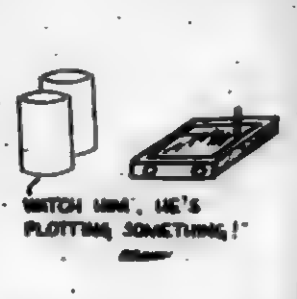
Therefore, networks providing the capability of connection to dedicated private leased lines and public data networks — such as those based on the X.25 standard — would give users the greatest flexiblity in meeting their specific communications requirements.

Of primary concern to most network users is the ability to expand the network once it is up and running. System expansion must be carefully planned because mistakes can be very expensive.

The user should plan for both the expansion of the network and the hardware expansion of individual systems. In regard to the latter, it should be noted the even with a single vendor, different sizes of computers often use different, incompatible operating systems and access methods.

Thus, outgrowing a particular processor may involve extensive reprogramming. Reprogramming without gaining additional system capabilities is the most expensive kind of programming. Users should look for vendors offering the necessary system and network expansion facilities consistent with future needs.

(Continued on SR/48)



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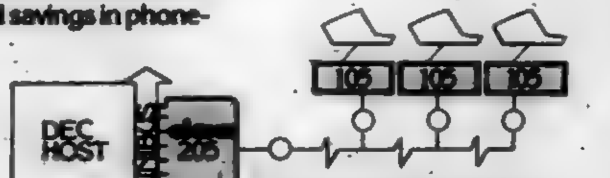

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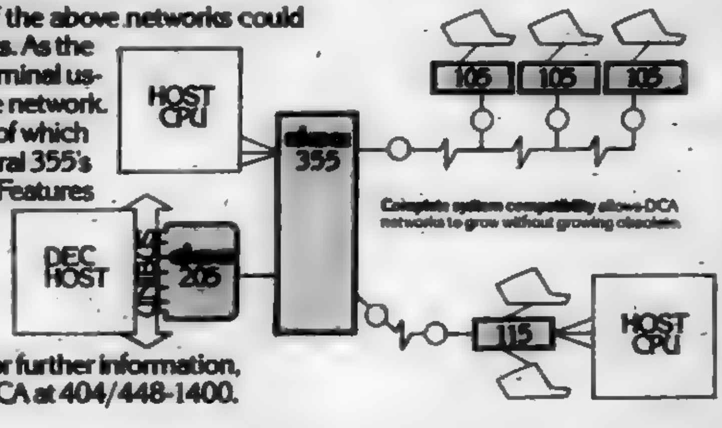

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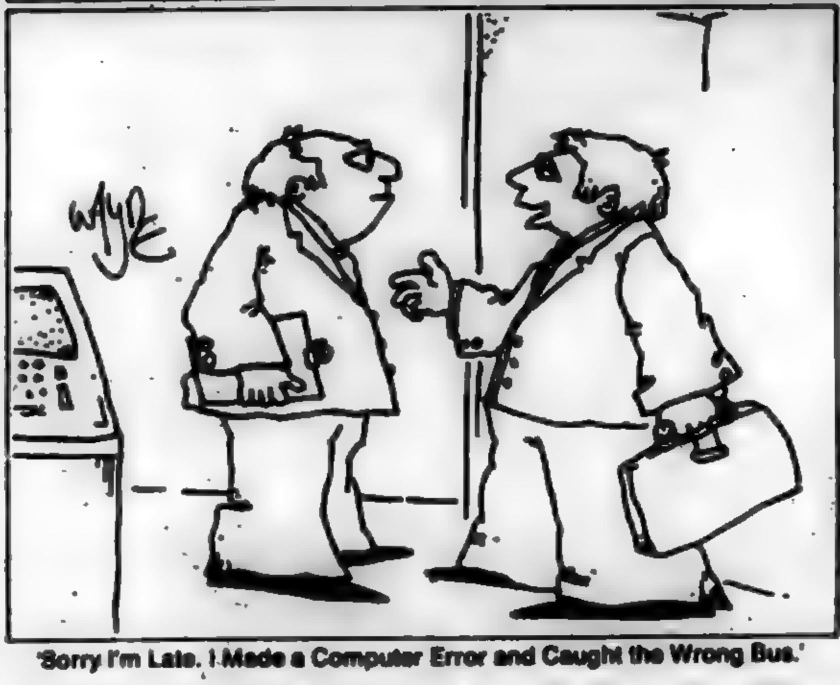

'Sorry I'm Late. I Made a Computer Error and Caught the Wrong Bus.'

Despite Experts' Efforts, Business Slow to Go DDP

(Continued from SR/47)

> *'Probably the most important element of any distributed network is the integrity of the data. Users should look for vendors offering such capabilities as an end-to-end protocol that assures message integrity from sender to receiver, regardless of the number of intervening nodes involved in the transfer.'*

The costs associated with the development of network software can be awesome. Complicating this is the fact that software development personnel capable of implementing an on-line data communications network are scarce.

Vendor-supplied support programs, therefore, are an important consideration in implementing a network.

Users should look for network software that supplies a variety of developmental and diagnostic tools to ease the programming burden. Vendors offering complete network software are perhaps a better choice for users without substantial in-house data communications programming resources.

On-Line Adaptability

From a user's perspective, the method by which messages are routed throughout the network is of prime concern. Two elements are of particular interest here.

First, an automatic routing capability — and rerouting in the event of line failure — assures that messages will be received as sent. When a communications path is broken, the network operating system should be designed to retry until the transmission succeeds or until the system determines that the communications path has been completely broken. When a communications path has been broken, the network systems should be able to reroute the message via a different communications path.

The second consideration is a "best-path routing" capability that automatically selects the best path — the path with the least travel time between nodes. This assures users that the fastest communication path is selected.

Control Facility

Users of data communications networks need a control facility that allows the status of the network to be continuously monitored. These utilities might include logging of changes in network status (such as communication line up or down), logging of changes in remote systems status (such as devices and processors up or down), display of any network changes and the display of network traffic.

Probably the most important element of any distributed network is the integrity of the data. Users should look for vendors offering such capabilities as an end-to-end protocol that assures message integrity from sender to receiver, regardless of the number of intervening nodes involved in the transfer.

In addition, vendor-supplied software capable of backing out incomplete or aborted transactions across a networkwide data base is of critical importance in assuring the consistency of data distributed geographically.

Hinders is manager of systems software at Tandem Computers, Inc. He was responsible for the architecture and design of Tandem's communications networking software.

Becker is marketing communications specialist for Tandem.

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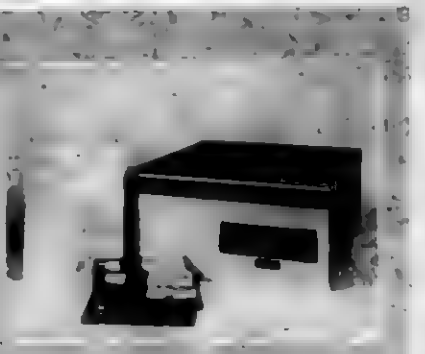

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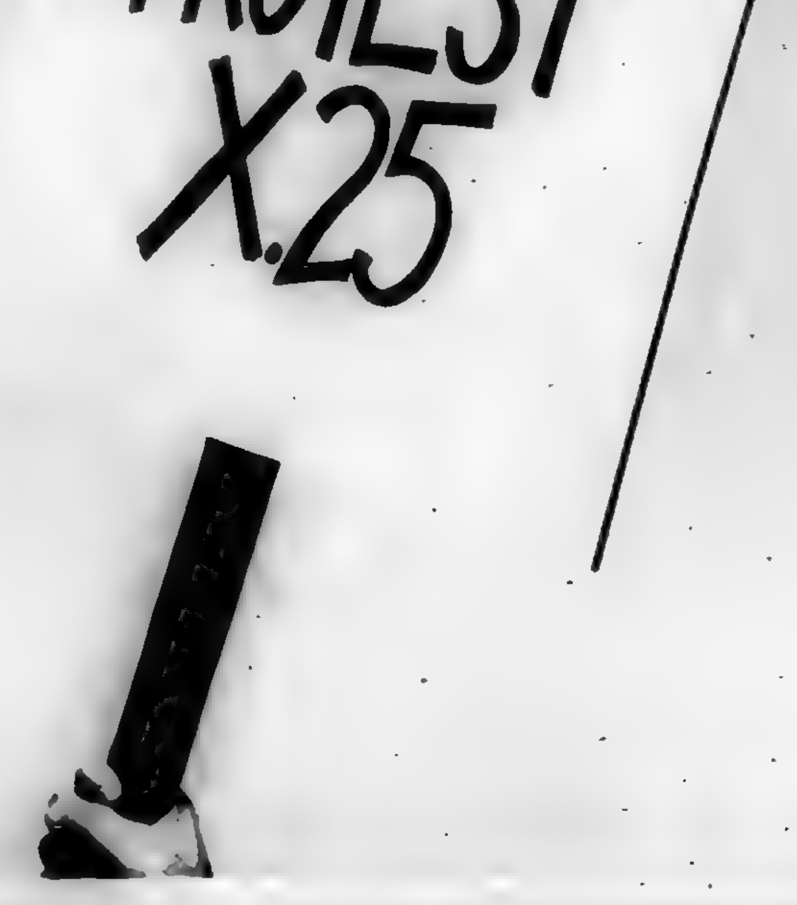

System Minimizes Interruptions

Railroad Gets a Handle on Network Control

Special to CW

ST. PAUL, Minn. – When you're busy managing, scheduling and maintaining the freight operations of one of the largest railroads in the U.S., the last thing you want to worry about is the transportation of data.

For that reason, Burlington Northern, Inc. has always insisted on better than average reliability from its data communications network.

Early in 1970, when the company was formed by the merger of four independent railways, complete responsibility for planning and overseeing its vast network was turned over to a single group of data communications professionals. From then on, a Communications Center located at BN headquarters here has been the hub of network activity – routing and physically monitoring all line traffic 24 hours a day, seven days a week.

According to Don Goodwin, manager of data communications, system availability is critical – and not only in terms of the heavy flow of on-line data traffic involved. At Burlington Northern, it also directly affects the safety and efficiency of actual train movements.

With more than 800 daily freight and passenger trains that must be tracked, cargo that must be scheduled and billed and close to 25,000 miles of railroad that must be maintained, any serious problems with communications cannot be tolerated.

More Than 1,000 Users

To offer maximum service for more than 1,000 terminal users, Burlington Northern owns and manages four separate Rockwell Collins microwave systems that span some 4,582 miles of territory. These are augmented by a network of dial and leased lines, with much of the assoicated equipment also company-owned and company-maintained to give Burlington Northern greater physical – as well as economical – control over its operations.

While a separate Management Services Group is charged with handling all data processing aspects of the 300 to 400 locations served by the Burlington Northern system, the Communications Group has total responsibility for the data transmission facilities.

"In the DP area, day-to-day concerns are more likely to center around software updates, new applications, system crashes and problems of this nature," Goodwin explained. "We, on the other hand, have to be constantly aware of what's happening in a highly vulnerable communications environment that's increasingly complex to control – where telephone line distortion and modem malfunctions are just a few of the factors that can interrupt transmission."

> *'At Burlington Northern, system availability is critical. With more than 800 daily freight and passenger trains that must be tracked, cargo that must be scheduled and billed and close to 25,000 miles of railroad that must be maintained, any serious problems with communications cannot be tolerated.'*

Keeping those interruptions to a minimum and helping to isolate and resolve any problems that arise are a few of Goodwin's most challenging tasks. Ever since modem diagnostics appeared on the scene, Goodwin said these tasks have become more and more manageable.

"With two groups – Management Services and Communications – in charge of a single information system, the lack of built-in diagnostic functions could very easily make 'finger-pointing' a daily occurrence. If there's a problem, how do you know whose problem it is? The questioning could go on interminably," he pointed out.

Only Part of Solution

Today, modems with built-in diagnostic capabilities appear to be only part of the solution. Wanting some way to monitor and control its

(Continued on SR/50)

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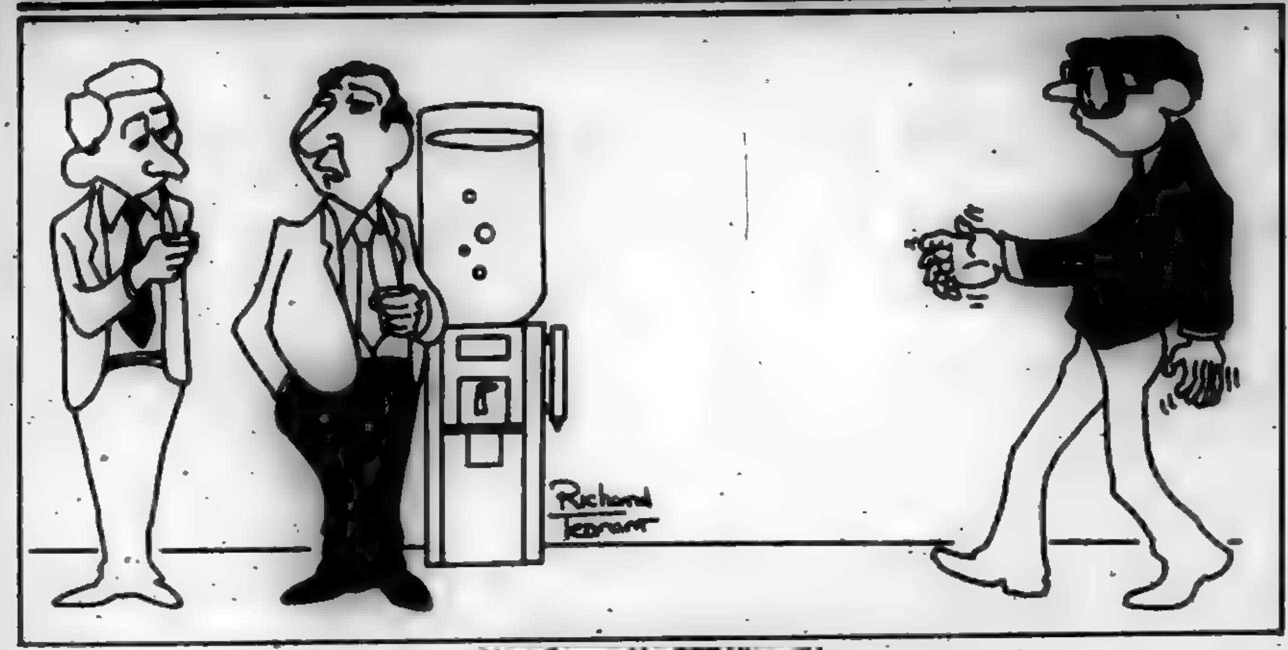
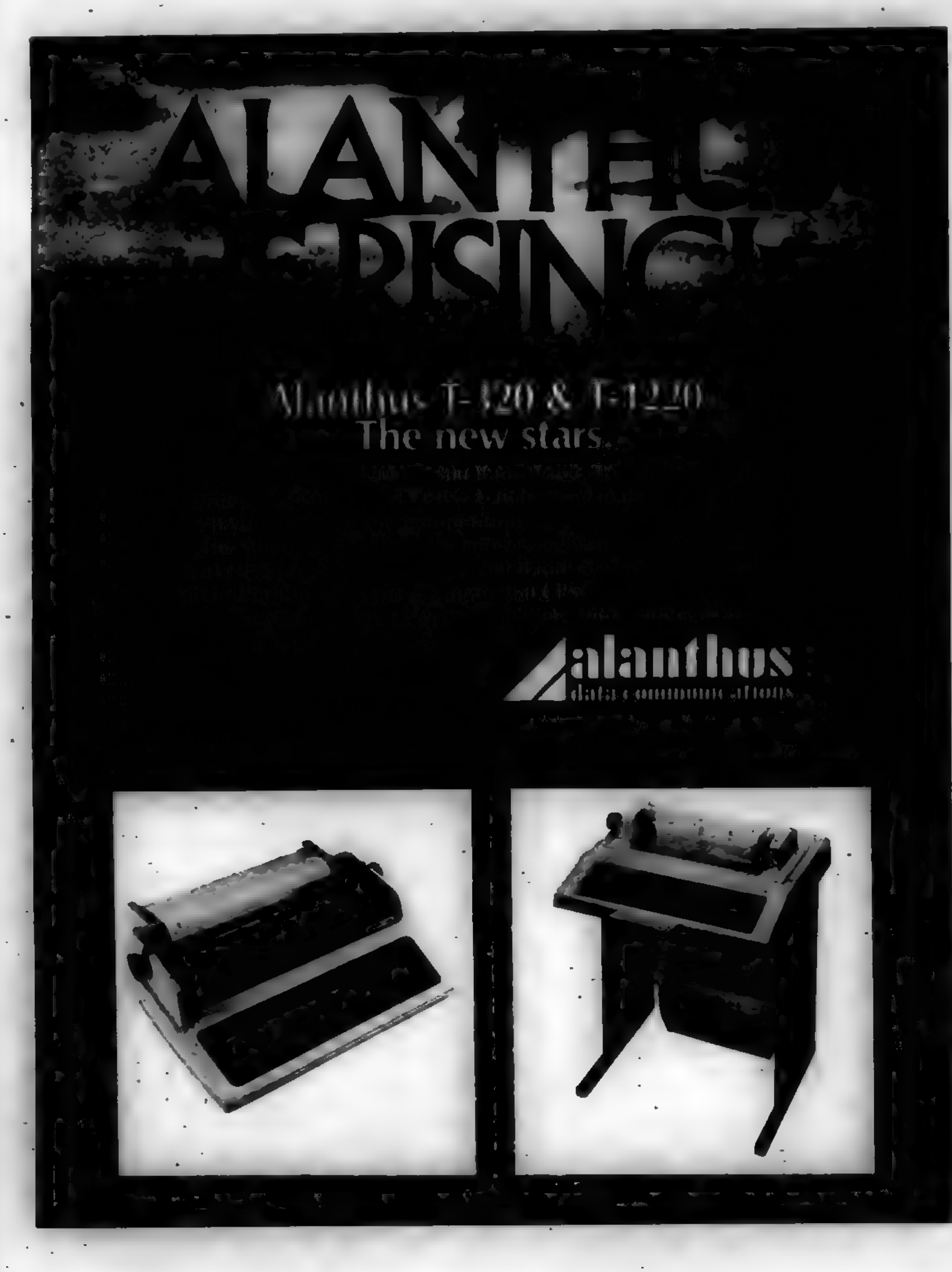


'Here Comes Mr. CRT Himself.'



System

(Continued from SR/49)

network activity from the Communications Center, Burlington Northern now links about 60% of the network to a Codex Corp. Distributed Network Control System (DNCS).

With this system, the diagnostic capabilities of modems work in conjunction with a DNCS intelligent terminal system and network processor at the central site to monitor, locate and reconfigure system elements.

As Goodwin described it, this arrangement provides the group with the ability to perform continuous on-line network monitoring and to run tests and initiate restoral without involving personnel at remote sites. Instead, all activities are controlled from the DNCS terminal located in the Communications Center.

"Now," Goodwin stated, "we can perform most of the functions it used to take a warm body to do at the remote locations — pushing buttons, examining lights and indicators, going to dial backup if a leased line fails, putting a modem into fallback to transmit over a degrading circuit at lower speed or taking a faulty modem off-line and switching in a 'hot spare' unit.

"What we've gained by this — most definitely — is automation," Goodwin said. "We now have constant surveillance of the data circuits, and any problems are flagged immediately. In fact, we're able to get a handle on problems even before users are aware of them. That gives us a real edge."

Early Notification

The group is also notified of network problems at least 10 to 15 minutes before people in the main computer room see them, according to Goodwin. "We've simply mapped out the network — identifying lines, drops and so forth — and assigned threshold values using the preprogrammed menus and prompts on the CRT."

Whenever any one of these is exceeded, an audible alarm is sounded and an alarm report is automatically logged on DNCS' system disks and printer.

Immediately, the Communications Group can select from a menu of tests to pinpoint the location of a failure. A dynamic poll test checks the operation of a multipoint circuit in its true operating mode; bit error rate tests check modem functionality and end-to-end line status, as well as inbound and outbound line segments; and modem tests initiate loopback self-testing and isolate modem failures.

All results are displayed on the terminal screen in an easy-to-follow format. "To us," Goodwin said, "the ability to actually isolate problems this quickly — without remote operator intervention — is probably more important than anything else DNCS provides.

If users in the field are experiencing difficulties, they do not hesitate to call. "The hardest part is finding the problem quickly so you can fix it before service is interrupted, Goodwin said.

"Also simplified for us is the overall task of network management," he noted. "We can obtain a listing of all stations connected to DNCS, along with their status at any particular time. We can look at alarm reports to determine if any circuits are experiencing more failures than they should. And test results can be recorded for failure

Keeps Data on Track

analysis."

The decision to incorporate a system like DNCS was made last year, primarily because of the network's growing size and the variety of lines, speeds and locations involved. Burlington Northern was already operating with Codex Fast-Poll modems at 4,800 bit/sec and had plans to cut over at least 12 additional multipoint lines to 2,400 bit/sec.

Because the DNCS works with the secondary channels of both the Codex Fast-Poll series and Codex MX 2400 microporcessor-based modems, Burlington Northern found that network control capabilities could be added with minimal effort and expense, Goodwin said.

The Codex system also offered special advantages, according to the Communications Group. Especially vulnerable were two segments of the network that many other central site control systems were unable to handle. The challenge, Goodwin recalled, entailed extending control to the multitiered sections — where lines are not directly connected to the central communications facility.

These appear in areas where the railroad operates its distributed "yard networks" — currently in Northeast Minneapolis, with plans under way to install similar systems in Chicago, Kansas City, Seattle, Portland, Denver and Spokane.

In each of these "yard" locations, two point-to-point 4,800 bit/sec lines are routed from St. Paul to a Digital Equipment Corp. PDP-11/70 processor, which in turn supports additional point-to-point lines connecting IBM 3270-type terminals. Although the PDP-11/70s only periodically communicate with the hosts in St. Paul (two IBM 370/168s and two Amdhal Corp. 470V/6s), the Communications Group still needed some way to monitor the second-tier lines from the central site.

This was accomplished very simply by bypassing the processor altogether — extending a crossover cable out of the secondary port of each modem directly connected to DNCS to the secondary ports of modems supporting the yard terminals. In this way, Burlington Northern was able to extend DNCS capabilities to all the remote devices, not merely those directly attached to the monitoring system.

Apparently, DNCS proves useful in another critical area as well: Burlington Northern's Denver-St. Paul connection. Here, Codex 6040 Intelligent Network Processors (INP) are currently used to statistically multiplex two 4,800 bit/sec lines, four 2,400 bit/sec lines, one 1,200 bit/sec line and one 75 bit/sec line, all originating in Denver.

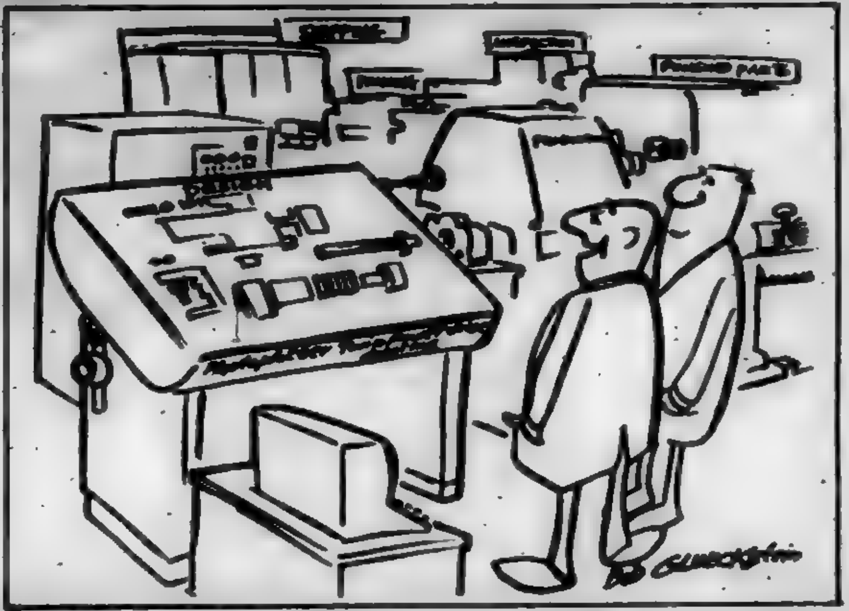
By dynamically allocating bandwidth and compressing data, the INPs enable these lines to be channeled to St. Paul via a single 9,600 bit/sec leased circuit, thereby reducing leased line charges substantially. To ensure reliability, two spare INPs were installed — one in Denver and one in St. Paul — to provide backup capabilities in the event of failure.

Network control capabilities were also added. Now, at the same time traffic and throughput statistics are reported by the INPs, the DNCS in St. Paul continuously monitors all associated lines and modems — simply by passing secondary channel data through ports of the INP.

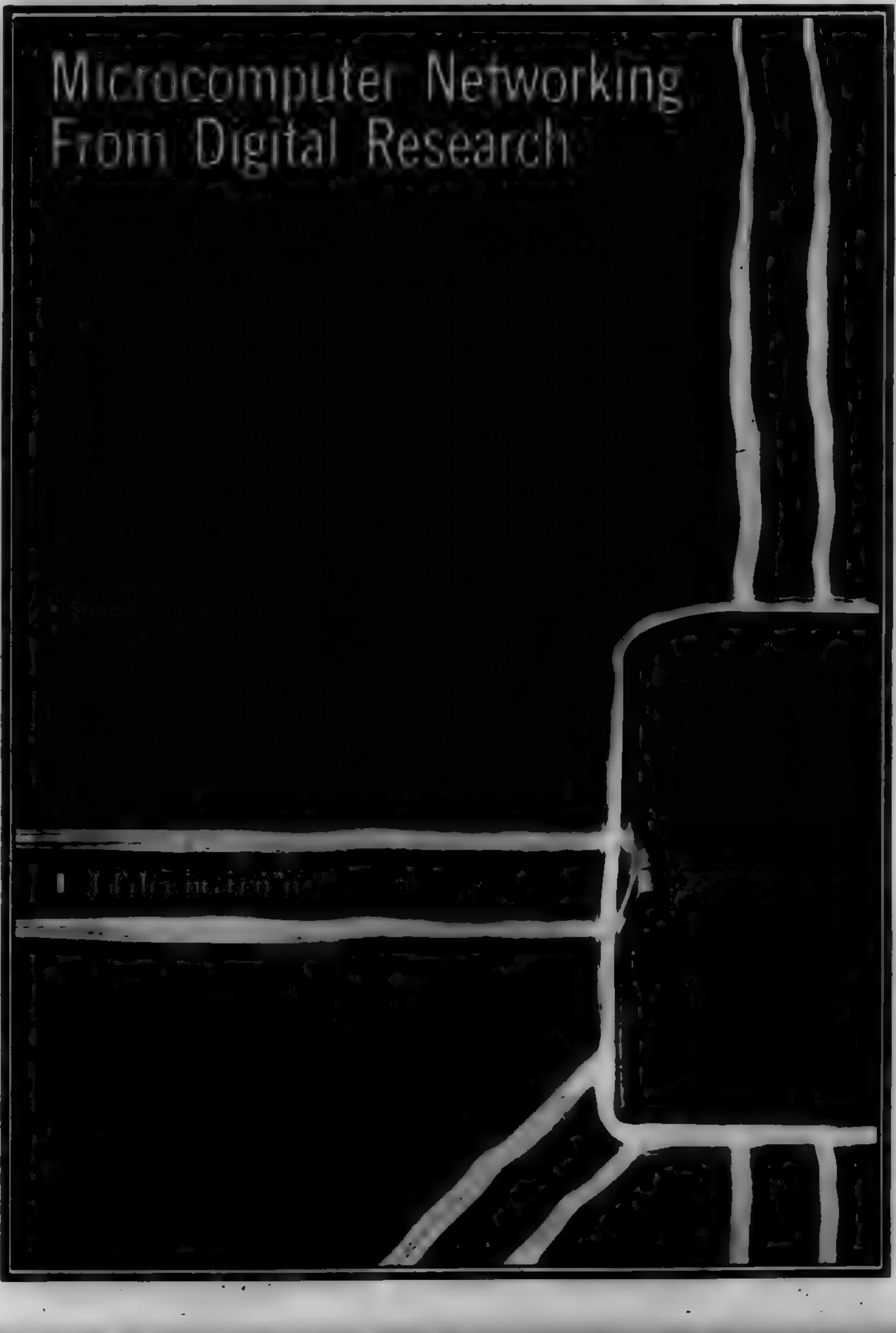
Even with the master modems situated in Denver, Burlington Northern is capable of centrally monitoring and controlling all the remote modems and additional leased tail-circuits that extend outward from Denver.

And more connections are soon to be added. Goodwin expects to use the existing INPs to consolidate at least two additional 4,800- and two 75 bit/sec channels in the near future — and still have room to pick up more circuits.

With the merger of Burlington Northern and the St. Louis-San Francisco Railway, another 6040 INP will be added in Springfield, Mo., to consolidate additional lines running into St. Paul.



'From Idea to Drawing to Finished Part, Packed and Shipped. Now if We Can Just Get It to Do the Billing . . .'



The Zenith Smart Terminal.

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Z80 Microprocessor-control brings easy editing, cursor flexibility and reverse video highlighting to your on-line system.

Professional touch keyboard follows standard typewriter layout with 72 keys, including 12 special function keys, (8 user programmable) plus 12 key numeric pad.

Underline or reverse video blinking cursor is addressable to allow you to edit or correct on the entire screen.

Insert and delete character features allow easy correction or modification of displayed information.

80 character by 24 line format, plus a 25th line for operator messages and prompts.

Cursor and special functions are accessible by keyboard or outside computer.

Displays complete ASCII character set including upper case, lower case with descenders and special graphic symbols.

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CW1104

Backup for Single PDP-11

Chase Manhattan Adds VAX to Data Base

Special to CW

NEW YORK — The Chase Manhattan Bank here recently added a Digital Equipment Corp. VAX-11/780 computer to what was already the largest data base working from a single PDP-11/70 minicomputer.

The VAX machine is currently used for backup and data base development for the bank's summary performance report information delivery system (Sprids), a multiterminal setup that provides on-line analysis. The Sprids system monitors and analyzes the management accounting for the entire corporation, which includes more than 8,500 organizations and about 7,300 accounts, Daniel Maher, Sprids project manager, said.

By the end of this year, Sprids will have more than 100 users nationally as well as terminals in 35 different countries. The Chase Manhattan Bank is the country's third largest banking institution.

Analysis System

The bank's analysis system uses a total of eight 300M-byte disk drives manufactured by Systems Industries of California. Six drives are connected, in common, between the PDP-11/70 and the VAX, while two are dedicated to the VAX alone, Maher explained. This reportedly allows the 32-bit computer to be used for data base development and as an immediate backup should the 11/70 fail.

In addition, three RP06 200M-byte disk drives are used as a shared backup for both CPUs, Maher stated.

> *'We provide real-time access to all departments for any account in the corporation and also provide real-time variance analysis for 24-month periods, so that management can look at a comparative analysis in a department for an account in 1979 against the same month in 1980.'*

"We provide real-time access to all departments for any account in the corporation," he continued, "and also provide real-time variance analysis for 24-month periods, so that management can look at a comparative analysis in a department for an account in 1979 against the same month in 1980."

The Sprids system can also provide the account's trend analysis for any department in the bank, which is listed month by month, actual and budget, current year and prior year. Finally, the computer can project what the account status would be at the end of the year.

Common Data Base

Chase Manhattan's Sprids reportedly incorporates the only operating system that combines an 11/70 and an 11/780 against a common data base. Although half of the system's users work off the 11/70 while the other half use the 11/780, both can access the same data off the disk.

The bank eventually plans to add a second VAX-11/780 to the system, replacing the 11/70, and add more peripherals including six to eight more System Industries disks.

The Sprids system is actually a compilation of four different data bases, Maher pointed out.

One gives the bank's executives a straight cross-section look at the major departments for ease of access. Another, a geographical data base for the international department, takes the system's prime data base and redoes it to reflect a geographical area summary.

Within each area, North Africa or Asia Pacific, for example, the system can summarize the subsidiaries' affiliates and head office operations under one management structure, Maher said.

The fourth data base is an "institutional line-of-business" data base, in which the Sprids staff takes the management accounting structure of the bank and "strips off" all accounts and activities associated with the institutional bank line of business.

Maher explained that it is really more geared toward marketing than toward regu-

(Continued on Page 62)

Amcor Creates DDP System From Combined Software, Mini

PHILADELPHIA — Amcor Computer Corp. combined software with a minicomputer and introduced the entire package as a modular distributed data processing (DDP) machine at the recent Data Processing Management Association conference here.

The software portion of the product — dubbed Ambase/80 — is divided into two primary modules — the Ambase data base management system (DBMS) and applications software.

The DBMS module is particularly targeted to batch-oriented DP shops and offers various utilities, report writers and query facilities, according to Robert Bearden, marketing vice-president.

Applications are divided into accounting systems and business control systems and include the following packages: accounts receivable, accounts payable, general ledger, order processing/billing, inventory management and sales analysis.

Hardware for Ambase/80 includes Digital Equipment Corp. minis ranging in size from 256K bytes to 2M bytes of main storage.

Available immediately, an Ambase/80 system including a 256K-byte mini, 20M bytes of peripheral storage, operating system software, the file management, report writer and query facilities of Amcor's DBMS and applications software costs approximately $45,950.

Amcor is headquartered at 1900 Plantside Drive, Louisville, Ky. 40299.

In OS Environment

Fujitsu WP System Runs on 370

SCARSDALE, N.Y. — Fujitsu America, Inc.'s Word Machine Group has developed a word processing (WP) system for use on any IBM 370-compatible mainframe operating in an OS environment.

The Word Machine is comprised of a Fujitsu terminal, Dataproducts Corp. 45 char./sec printer and host software system operating inside the user's computer, according to a company spokesman.

The terminal, within which all WP functions are performed, reportedly can be expanded to 320K bytes of memory for multifunction use.

The Word Machine software reportedly requires about 400K bytes of resident memory to support a configuration of up to 40 terminals.

Inclusive in the software is an independent telecommunications network monitor, a text data base manager and an auto-indexing system. The Word Machine software is completely turnkey-installed on a user's computer.

The Fujitsu terminal costs $8,500; the Dataproducts printer sells for $3,500; and the software and one-time installation fee total $5,000 from the group at Two Overhill Road, Scarsdale, N.Y. 10583.

Whipper Snapper

(hwĭp'r-snăp'r, MDu wippen, MLG snappen. n. 1) a bright-eyed, bushy-tailed youngster with one foot in the mailroom and the other in his mouth 2) an employee with big ideas and an eye on the executive suite 3) a genius who calls Leasametric to solve immediate electronic equipment needs.)

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BE125
Modern Project Management
Claude W. Burrill and Leon W. Ellsworth

A comprehensive book about data processing application development, presenting a project methodology designed to assist all levels of management in their efforts to achieve productivity, quality and worker satisfaction. $39.00

WJ129
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Jerry FitzGerald and Tom Eason

An introductory book for people with little previous knowledge of data comm. Includes discussion of hardware, design methods, network configuration and control concepts. $20.95

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The Art of Software Testing
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New ideas and techniques for finding and eliminating software bugs. Includes practical advice on the management aspect of testing, test tools, highest order testing, debugging and code inspection. Programmers at all levels will find the comprehensive information indispensable. $18.95

WJ143
Advanced ANS COBOL with Structured Programming
Gary Brown

This book does not deal with the elements of programming, but goes right to its task: teaching the basics of COBOL and simplifying many of COBOL's advanced features, including sort-merge, character string manipulation, report writer, indexed and direct files, communications facility and others. Emphasis is placed on structured programming as a way to simplified programming. $24.95

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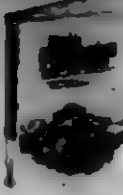

IW018
Data Processing Contracts: Structure, Contents and Negotiation
Dick H. Brandon and Sidney Segelstein

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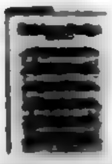
Gordon B. Davis, Margrethe H. Olson and Charles R. Litecky

This is a problem-oriented approach to writing and maintaining well-structured programs in COBOL. Practice exercises in writing programs begin immediately so that the reader can grasp the fundamentals of COBOL through application. There is added emphasis on structured programming and disciplined program writing, as well as a more convenient explanation of the COBOL features pertaining to sample programs. $14.95



HM146
Database Design
Gio Wiederhold

From hardware to files to database systems, this is a methodical approach to the principles of database design for commerce and industry, and the scientific disciplines. Throughout, theory is integrated with practical applications. Consistent terminology and theoretical models of immediate practical adaptability make the book particularly helpful for those just beginning their study of database design. $25.95

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This volume explains real-time systems from the points of view of management, systems analysis, programming, and sales. The book discusses design, programming, testing, and implementation of real-time systems. In defining "real-time," Martin goes beyond a mere discussion of a real-time computer's essential characteristic (i.e., direct and immediate response to rapidly changing situations). Program testing and system build-up, which are particularly difficult on real-time systems, are discussed in detail. $21.95

HP186
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Larry E. Long

Scores of standardized, practice-tested methodologies help you minimize the effort required to develop documentation procedures while maximizing effectiveness and usefulness of the final computer project. This manual brings you in-depth coverage of codocumentation and procedures in the DP environment—system development and implementation, general computer center documentation, and hardware and software evaluation. Plus, there are hints about intermediate, permanent, and project management documentation—space requirements, maintainability, redundancy, structural organization and personnel and much more. $21.00

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Chris Gane and Trish Sarson

Here's a practical approach to the building of logical models for commercial data processing systems. With numerous flow charts, tools and step-by-step procedures, this guide brings you the "how" and the "what" of handling awkward notational problems and making the transition to a top-performance structured design. $22.50

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IC130
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An excellent handbook for the practicing systems analyst, this book is a state-of-the-art approach to the mechanics of computer application design and an organized compendium of application design hints. It's a non-mathematical treatment based on firm data processing principles, and provides basic coverage of human factors, performance, distributed data and systems availability concepts that must be considered during the evolution of a successful design. Addresses economics of distributed computing and includes a checklist of 95 activities to be considered by the designer of a distributed system. $22.50

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Andreas Philippakis and Leonard J. Kazmier

This book uses COBOL as the programming language and as the vehicle for discussion of systems concepts. It includes comprehensive coverage of the COBOL programming language based on principles of structured programming that do not require any previous exposure to programming or computers. This book enables the reader to write COBOL programs almost immediately. This edition includes greater emphasis on the relationship between information systems concepts and techniques of COBOL programming. $19.95

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Peter Wegner

This is the first step-by-step introduction to ADA, the completely new programming language developed for use by the Department of Defense and all its suppliers. Featuring over 350 graduated examples, this book is a readable and comprehensive primer on the programming language that many experts feel is destined to become the FORTRAN of the 1980's. $13.95

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Monte Jay Meldman, Dennis J. McLeod, Robert J. Pellicore, and Morris Squire

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Edited by Efrem Sigel

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Dr. David A. Lien, author of the TRS-80 Learner's Manual

The publishers say that this book is an "encyclopedia of the BASIC language," that will help you "make those programs found in magazines work on your computer—or know the reason why they can't." If there is an alternate way to write a needed function that your machine doesn't have, this book will give you a subroutine to accomplish the same thing. If there is another way to write a program with different BASIC words, the book will show you how. $14.95

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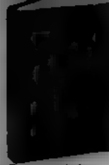

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SC084
Pascal: An Introduction to Methodical Programming
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Bits & Pieces

Matrix Printer/Plotter Gives 240 Line/Min

SAN JOSE, Calif. — Alphacom, Inc. has introduced a matrix printer/plotter that reportedly provides program control for up to 240 line/min of 40-char. lines utilizing a graphic 280 by n dot matrix.

The Sprinter 40's user-selectable interfaces include parallel; 7-bit Ascii, Strobe, Busy and ACK (Centronics standard) and serial; and RS-232 with selectable transmission rates of 110-, 150-, 300-, 600-, 1,200-, 2,400-, 4,800- and 9,600 bit/sec.

Sprinter 40 can be connected with the TRS-80, Apple II, Atari 800, Commodore Pet and all microcomputers using standard interfaces, according to the vendor.

The unit costs $390 from Suite 200, 3031 Tisch Way, San Jose, Calif. 95128.

Impact Matrix Printer Has Graphics Option

SALT LAKE CITY, Utah — Micro Peripherals, Inc., has announced the Model 88G impact matrix printer, which has a dot-addressable graphics option.

The Model 88G features 100 char./sec bidirectional or unidirectional printing with a short-line "quick cancel" feature, giving throughput rates of up to 150 line/min, the vendor said.

The graphics option produces printouts that can be varied through selection of one of four horizontal dot resolutions. Alphanumerics may be overprinted into the printout for labeling, according to the vendor.

The Model 88G with the graphics option costs $799, with pricing for large OEM quantities below $400, the vendor said from 2099 W. 2200 S., Salt Lake City, Utah 84119.

Merlin Introduces Micr Encoding Unit

WINTER PARK, Fla. — Merlin Equipment, Inc. has introduced a stand-alone magnetic ink character recognition (Micr) encoder.

The Merlin Document Encoder employs two daisy-wheel printers operating under computer control. The user can choose from a range of character sets and styles.

The running speed of the Merlin Document Encoder averages 1,250- to 1,500 document/hour, according to Merlin. It costs $69,020.

Merlin is located at 1160-70 Solana Ave., Winter Park, Fla. 32789.

Disk Subsystems, Tape Subsystem Bow

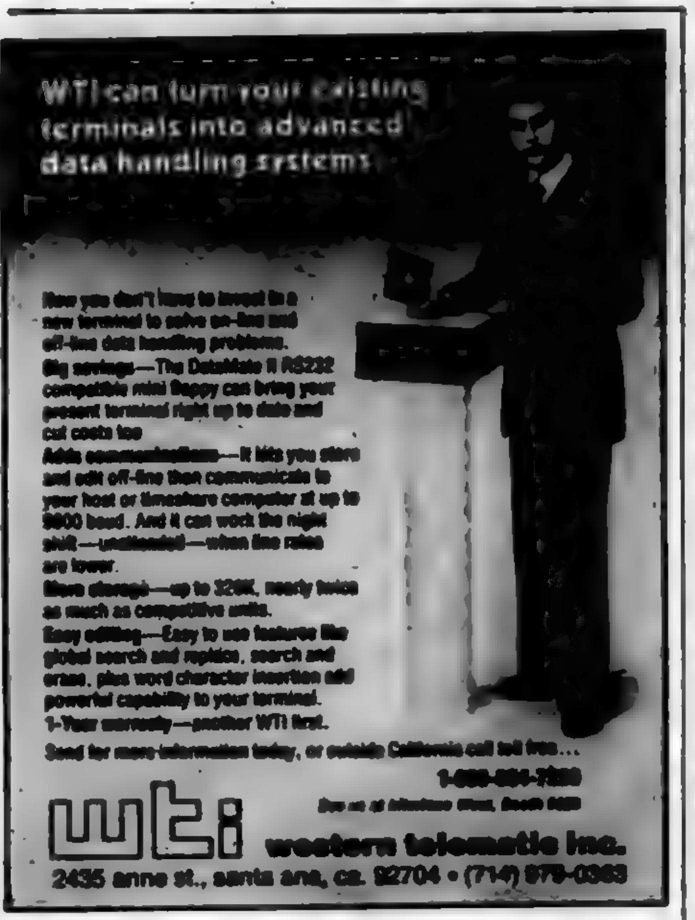
GRAND RAPIDS, Mich. — Three mass disk storage subsystems and a .5-in. magnetic tape subsystem are available from Cascade Data, Int. They were designed to run with the vendor's Concept II and Concept III hard disk computer systems.

The disk subsystems, called the models 920-3, 920-6 and 92-15, range in capacity from 33.9M bytes to 67.9M bytes to 158.5M bytes, respectively.

The tape subsystem, the Model 921, includes power supplies, interfaces, cables and one of six streaming tape drives, the Model 424. The 424 has been designed for streaming data on the fly, at high speed, yet it can be used in nonstreaming applications, too, the vendor claimed.

The disk subsystems cost between $16,700 and $25,900 depending on capacity. Additional disk drives cost from $8,900 to $18,100.

The tape subsystem costs $16,200 with one tape drive, and additional tape drives are available for $10,600, the vendor said from 6300 28 St., S.E., Grand Rapids, Mich. 49506.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Fixed-Disk Drive Out

PHOENIX — The 10M-byte Series 4000 fixed-disk drive introduced by Western Dynex Corp. is a direct replacement and is interface-compatible with Control Data Corp., Perkin-Elmer Corp., Dynex and other cartridge disk drives, its vendor said.

The Series 4000 (at $1,650), in combination with the Dynex 10M-byte Series 6000 cartridge disk drive (at $2,100), allows system designers a means for low-cost system expansion to 40M-bytes in any combination of fixed-disk and removable-cartridge drives, the vendor stated.

Each drive has its own built-in backup and provides an alternative to Winchester drives in mini- and microcomputer applications, according to Western Dynex.

Western Dynex is located at 3536 West Osborn Road, Phoenix, Ariz. 85019.

Chase Manhattan Adds VAX to PDP-11 Data Base

(Continued from Page 59)

latory reporting.

The management information delivery department also creates tailored reports for more than 22 of the bank's departments.

Prior to Sprids, the management accounting data was distributed throughout the corporation's various departments via tape as well as hard copy. Various departments within Chase could then load these tapes on the bank's time-sharing system and generate their own tailored reports.

About three years ago Maher did a resource study for the controller's department with the goal of improving information delivery in the bank.

The bank tried to survey all of the current hardware and software with Chase's future as well as present needs in mind. What came out of that study was the use of Admins-11 software, a "very high-level development language."

Maher felt the Admins package was a potential key to efficient information delivery because the programmer can be more effective and productive with it.

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Olivetti's 2030 FV Small Business Computer

Olivetti Brings Out Pair Of Small Business Systems

TARRYTOWN, N.Y. — Olivetti Corp. has introduced two small business computers, the BCS 2030 FV and the BCS 2025, each of which feature a CRT screen and storage capacity starting at 2M bytes of information.

Both systems are programmable in Basic and are intended primarily for use in general accounting applications. Unique to these systems is their ability to produce a hard-copy ledger record of account transactions when required by the user, Olivetti said.

The computers are available with from two to four high-density diskette drives providing a maximum of 4M bytes of storage. The BCS 2030 FV can be expanded to 20M bytes of storage with the installation of two 10M-byte hard disk units, according to the vendor.

Both systems incorporate a 1,920-char. CRT workstation with a screen that guides the operator through every step of the program and facilitates inquiry, Olivetti noted.

The difference between the two systems is that the 2030 FV includes an integrated, 100 char./-sec matrix printer, an 18-in. print line and can be expanded to hard disk storage while the 2025 cannot. Auxiliary printers, other peripheral devices and data communications capability are also available on both units.

The 2030 FV costs $14,950 and the 2025 costs $12,950. Turnkey application packages are also available from the vendor at 155 White Plains Road, Tarrytown, N.Y. 10591.

DEC Datasystem Paces Pump Maker's Growth

Special to CW

MONROEVILLE, Pa. — Growing companies sometimes find their rapid pace outstrips the ability of their small business computer to keep up to date. But that's not the case at Leybold-Heraeus Vacuum Products, Inc. (LHVP) here.

This small firm has more than doubled its business volume during the past three years, but its three-year-old, general-purpose minicomputer has been expanded as needed to keep up with the firm's explosive growth.

LHVP, a manufacturer and distributor of vacuum pumps, is a subsidiary of Leybold-Heraeus, located in the Federal Republic of Germany. During the past several years the U.S. firm's business has changed. Formerly only a distributor of the parent company's pumps, it now manufactures and distributes its product from the Monroeville plant.

In 1977, LHVP found its business expanding so rapidly that it quickly outgrew the manual methods in use. According to Gaetano Reano, manager of information services, "The manual system would have stalled out, or we would have had to hire too many additional clerical people to keep up with the work load." So the company computerized.

The decision to computerize was not taken lightly. A feasibility study was undertaken and directed by Ronald C. Southeimer, vice-president of finance. Management considered both mainframes and minicomputers for the job.

Among the mainframes, IBM and Burroughs Corp. systems were examined, then dismissed from consideration because they were too expensive. Minicomputers from Digital Equipment Corp., Wang Laboratories, Inc., Data General Corp. and Datapoint Corp. were also discussed in management meetings. The firm finally decided on a DEC Datasystem.

Why DEC

"We chose the DEC minicomputer because we felt it gave us the best price/performance of any of the minicomputers we looked at. We liked the design of the DEC gear. You could start out with a basic machine and expand both the hardware and software without conversion problems," Southeimer said.

"We also needed an interactive processor that would allow both interactive and simultaneous file update by multiple users. The DEC system gave us that. And we wanted to deal with a manufacturer with a good reputation, which had enough equipment installed and which could support us and provide adequate service," Southeimer stated.

In addition, he said, DEC's method of selling its small busi-

(Continued on Page 64)

MDB, Spur Link IBM 1403, Series/1

ORANGE, Calif. — MDB Systems, Inc. and Spur Products Corp. are offering the hardware necessary to wed an IBM Series/1 computer with an IBM 1403 line printer.

To effect the system, the two companies employed a Spur controller, which performs all the control, logic and power functions of the 1403, with one of MDB's line of printer controllers.

The MDB controller is designed to operate the 1403. Because the Spur controller provides the universal character set capability for the 1403 model N1, the firmware in the MDB controller was modified to implement this feature with the Series/1.

MDB is selling the line printer controller for $1,995. Spur is selling the device in combination with its controller for $20,000, and Spur sells the completely refurbished 1403 N1 printer for $12,000.

MDB Systems, Inc. is located at 1995 N. Batavia, Orange, Calif., and Spur Products Corp is located at 1904 Centinella Ave., Los Angeles, Calif.

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CA Additions Include Naked Mini Languages

IRVINE, Calif. — Three high-level programming languages for Computer Automation, Inc. Naked Mini 4 series computers, a mass storage capability for the Scout microcomputer and an "intelligent cable" interface have been introduced by the firm.

The compilers are for Pascal, BCPL and Coral 66, according to the firm. The Pascal compiler, based on the ISO standard, has extensions for real-time and multitasking operations, and can communicate with modules written in other languages.

All three compilers execute under both the OS4 and RTX4 (real-time executive) operating systems. BCPL is a system implementation language said to be suited for real-time applications; it can replace assembly language or be used in combination with assembly language subroutines.

BCPL also reportedly can call or be called by other program modules and pass data between modules, according to a spokesman.

Coral 66, a procedural language designed initially for UK defense applications, is the simplest of the three compilers. Like the Pascal and BCPL compilers, Coral 66 is block-structured and recursive.

Its data types include constants, signed and unsigned integers and floating point real numbers. It can be linked to programs written in the Naked Mini Pascal, BCPL or assembler.

The mass storage capability for the Scout Naked Mini 4/04 computers consists of a dual-sided, double-density floppy disk subsystem. The dual-drive Scout Quad Floppy subsystem has a formatted-data capacity of 1M byte per drive.

The "intelligent cable" interface is said to facilitate computer-to-computer communications under DDCMP protocol, which was selected last year for the firm's Intracomm real-time communications subsystem.

The microprocessor within the cable reportedly transfers data, manipulates device control signals, monitors device status and handles computer interrupts.

Prices for the products are as follows: Pascal compiler, $2,500; BCPL compiler, $2,000; Coral 66 compiler, $2,000; Scout floppy disk subsystem, $3,950; and "intelligent cable," $160.

CA is located at 2181 Dupont Drive, Irvine, Calif. 92713.

DEC Datasystem Keeps Pace

(Continued from Page 63)

ness computers through independent resellers assured LHVP of a supplier that could develop and implement appropriate application software.

The Datasystem at LHVP includes a PDP-11/34 CPU with 256K bytes of main core memory, two 28M-byte RK07 disk drives, one fixed and one removable RK05 disk drive, three CRT terminals (with three more on order), one 300 line/min printer and one 180 char./sec printer.

The system operates under the CTS-300 operating system, but the company expects to upgrade to CTS-500 within the next few months.

LHVP is upgrading operating systems because CTS-500 will support more peripheral equipment and more languages, allowing the company a wider range of applications packages from which to choose.

The applications running at LHVP include order entry, inventory control, payroll, general ledger, accounts payable, job costing and bill of materials processing. All applications were purchased as packages through Pittsburgh, Pa.-based Mesta Computer Services, Inc., an authorized DEC distributor.

"Everything but the bill of materials processor was part of our original installation and was written by Mini-Computer Business Applications, Inc. in Los Angeles," Reano recalled. "The bill of materials processor was written by a DEC OEM in Connecticut called Computer Covenant Corp."

In all cases, LHVP selected the application package that would best fit its business, "then we had Mesta modify it to suit our requirements," Reano explained. All of the packages were written in Dibol DEC's business programming language.

Reano considered the most important module installed to date to be the inventory file control system. "Prior to installing this system, we had a classical card-oriented system. You had a card in a tub for each of your parts numbers, and you recorded the various types of inventory activity manually on the card."

Now when an order comes in, the Customer Service Department reviews the stock status and compares customer requirements with actual material availability. Once the order passes that check point, it is written up and entered into the system.

The computer reserves the materials, updating the inventory master file and also updating the backlog file. When the order is finally shipped, a billing notice is received by the billing department from the shipping department. The billing department calls up the order for billing, either on a full or partial basis, and orders the system to print an invoice.

The printing of the invoice updates the backlog file and also updates the inventory file by reducing the quantity on hand.

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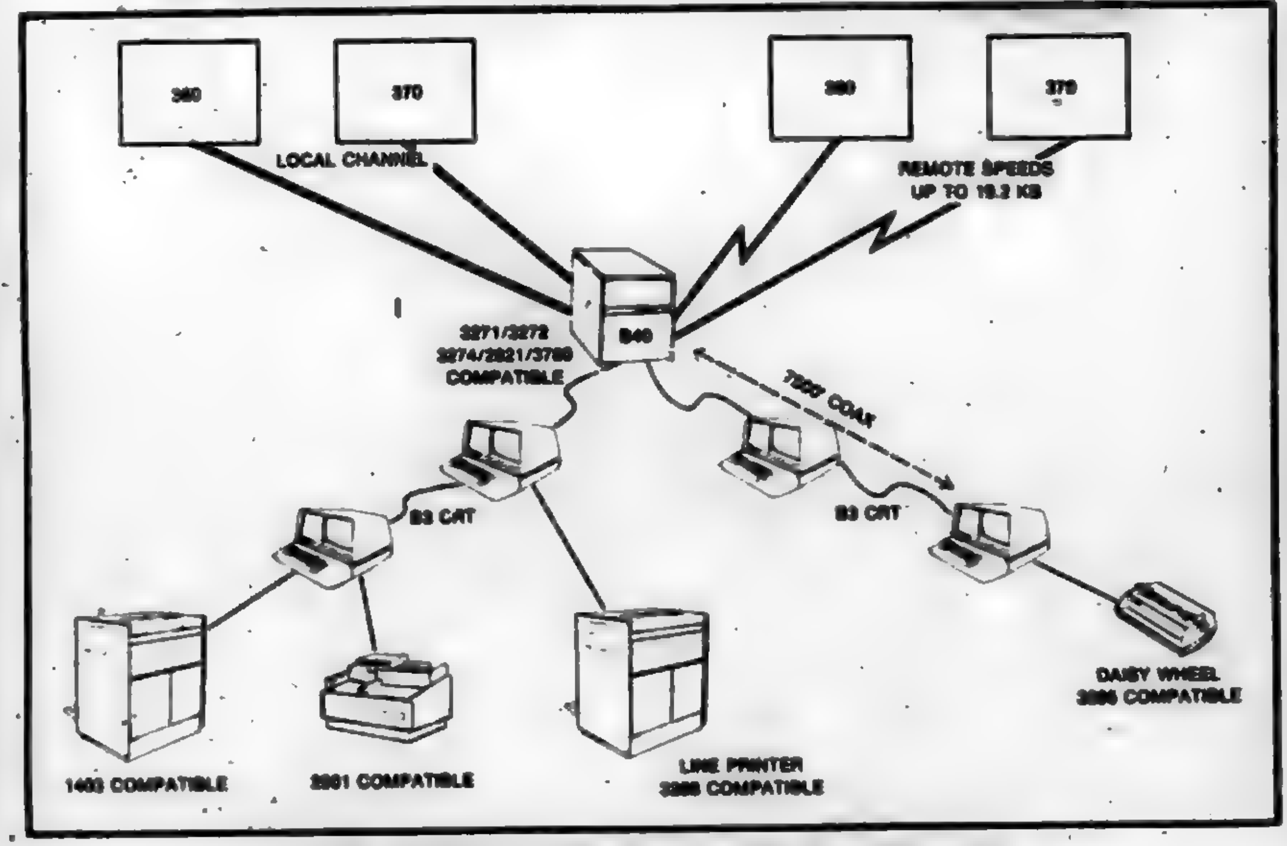
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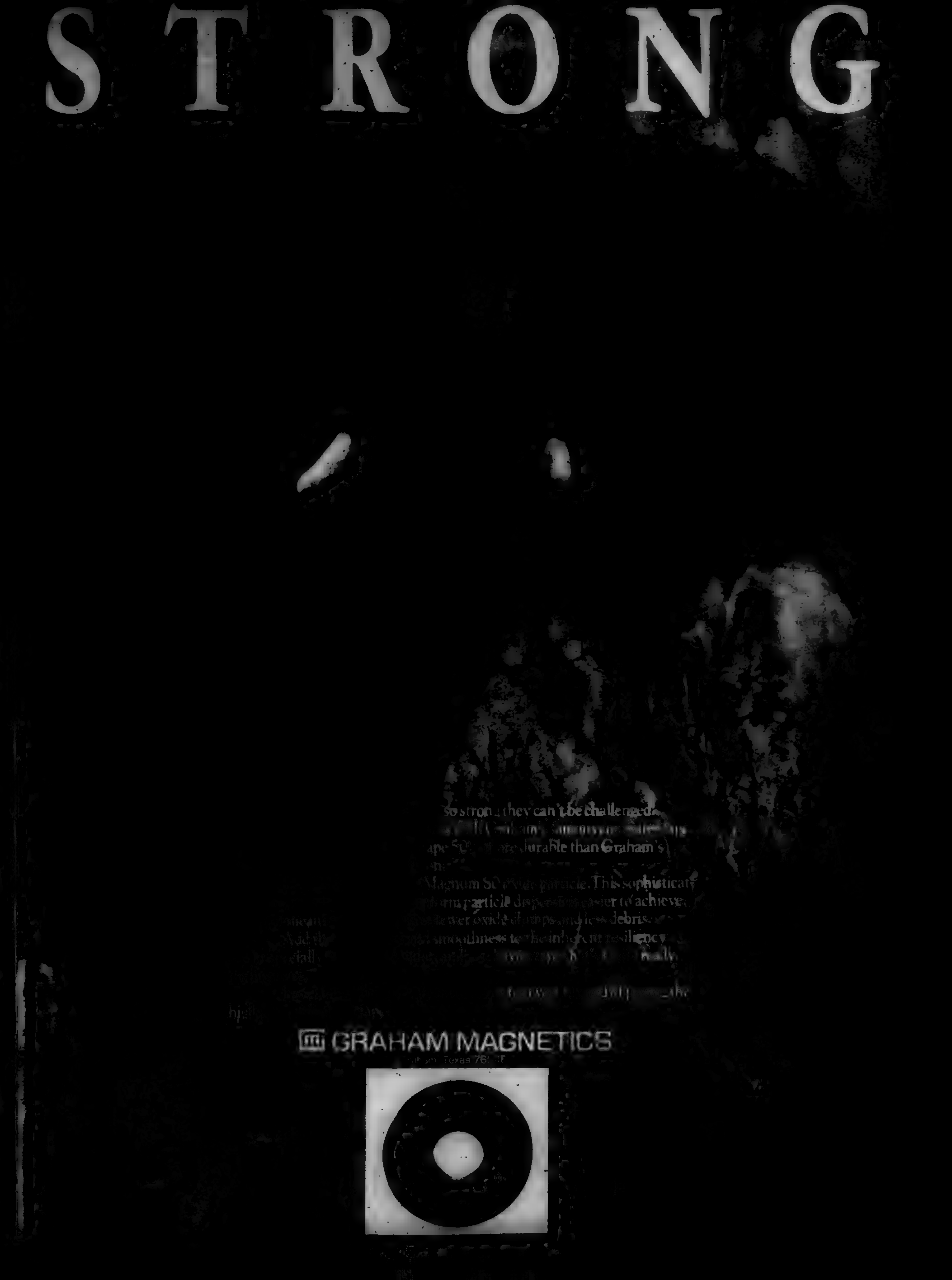

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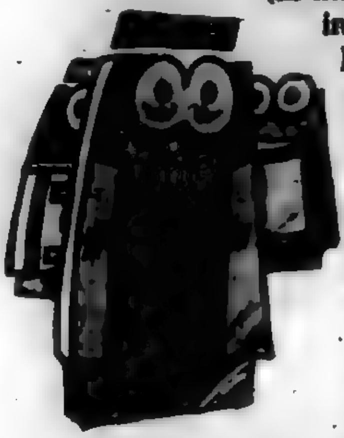

In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "super-conductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.

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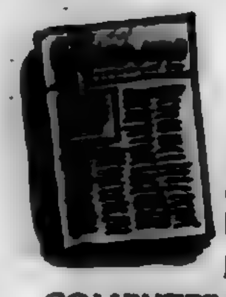

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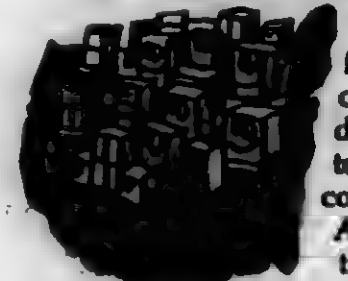

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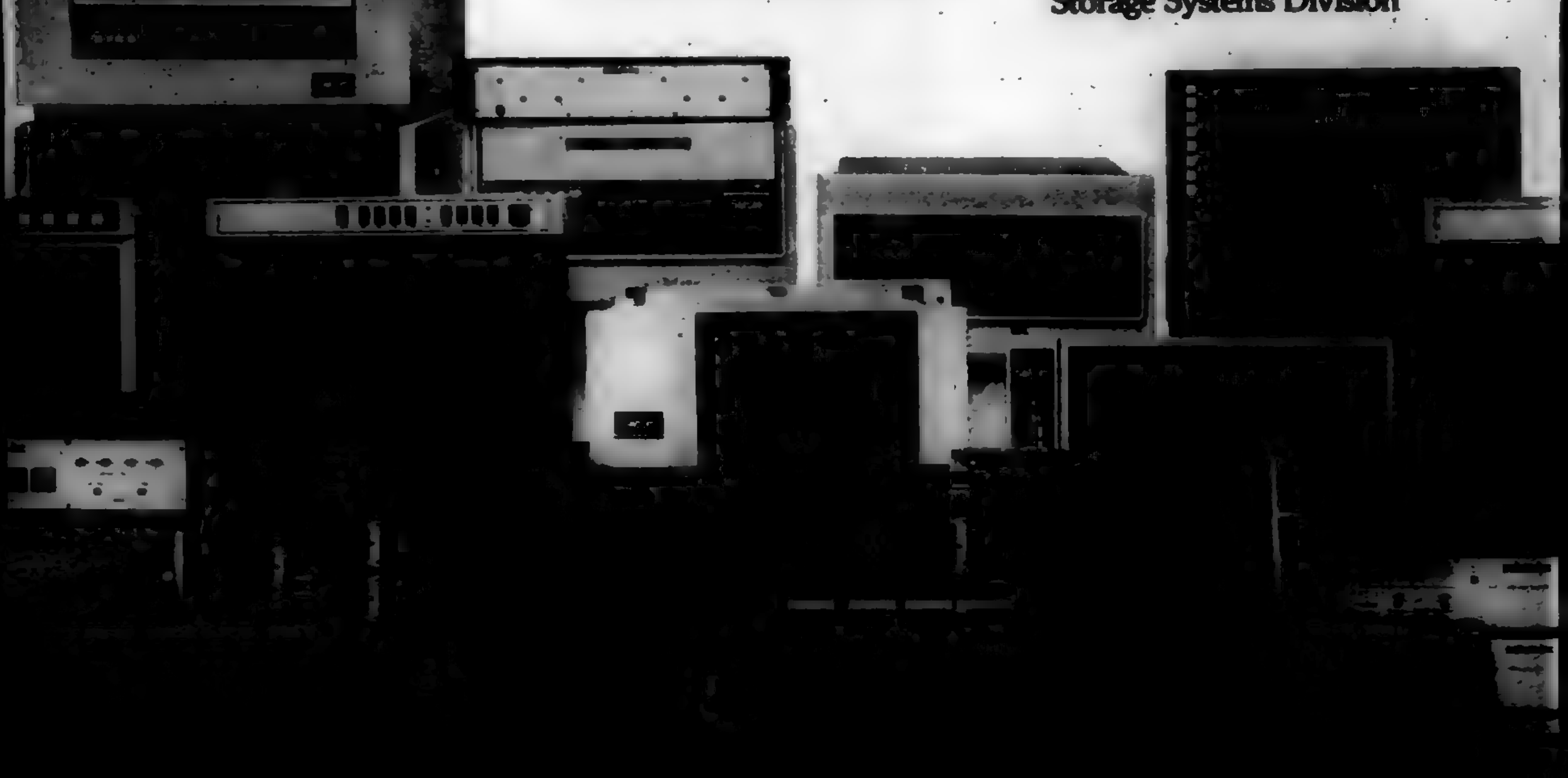


But Not Other Mainframers

Analyst Predicts 3081 Will Hurt PCMs

By Marcia Blumenthal
CW Staff

The recent announcement of the 3081 will have a positive effect on IBM and be neutral for other mainframers, but will probably hurt the plug-compatible manufacturers (PCM), according to one Wall Street analyst.

The launching of what had been known as the H series set the tone for products IBM will introduce during the decade, although it will not kill off outright sales or conversions, according to William D. Easterbrook, a vice-president with Kidder, Peabody & Co. Easterbrook predicted IBM will deliver about two dozen 3081s to customers during the first half of 1981; the delivery date was pegged by IBM for the fourth quarter of next year.

The delivery time will be shorter for the 3081 than for other products, he observed, adding this signals an alleviation of production buildup problems IBM has been experiencing.

On the other hand, Easterbrook sees some problems in the wings for the PCMs because of new ways of executing microcode in the 3081.

While IBM has not been too explicit about its engineering changes, it has put more of the microcode out in the channels, Easterbrook explained.

IBM is making it increasingly easier to change the interface between the operating system and the hardware, which could spell trouble for the hard-coded PCM offerings, most notably those of Amdahl Corp. and National Advanced Systems, he contended.

Moreover, some observers have interpreted the 3081 as a signal that IBM will compete vigorously with Japanese computer makers. At Hitachi Ltd., Katumi Fujiki, group executive of the Computer Group, said his firm would be able to compete with IBM's new H family by increasing the performance of the M200H.

Others OK

While the 3081 may portend trouble for the PCMs, other mainframers should be in pretty good shape. "They've had powerful systems waiting in the wings," Easterbrook noted.

Univac is nearly into the fourth year of development of an upgrade for its high-end 1100/80 system, noted H. Glen Haney, its vice-president of world marketing.

"Nothing in this announcement changes the plans of what's already in our laboratories," he said. Univac's 1100/84 system is in the range of 7.5 million to 8 million instructions per second (Mips), which is not too far off from Univac's initial estimate of 9 Mips for the 3081.

However, any announcement of a new high-end system will be paced against the company's as-

(Continued on Page 70)

While Foreign Firms Profit

Productivity Seen Haunting Vendors

By Tim Scannell
CW Staff

ORLANDO, Fla. — The computer industry has grown by technological leaps and bounds, but has yet to face its greatest enemy — decreasing productivity.

Battered by a sluggish economy, high interest rates and other by-products of "stagflation," U.S. computer makers — especially smaller companies — are sacrificing research and development efforts in order to stay financially afloat — and the wolf is at the door. The Japanese electronics industry, with its higher rate of productivity, is already threatening to give U.S. manufacturers a run for their computer money.

So far in the U.S., "there has been more talk than there has been action," Rep. Stanley Lundine (D-N.Y.) said at the fourth annual meeting of the Data Entry Management Association (Dema) here recently. Lundine is from New York's 39th congressional district and is a member of the House Banking and Finance Subcommittee. He is also a member of the recently formed House Science and Technology Committee.

Calling computers a "sunrise industry" that "may not have come to grips with human and productivity problems," Lundine cautioned both labor and management to work together to eliminate productivity roadblocks.

In particular, he asked managers to focus on people as well as technological and financial resources. "When you're in a time of transition, by concentrating on the human resources part of productivity, you can make great improvements," he stated.

Speaking to a packed audience of data entry managers at the conference, whose theme was "Improving Productivity and the Quality of Working Life," Lundine hinted that the industrial revolution may have run its course. America's industrial "backbone" has "atrophied almost like a muscle put in a cast," he said, noting that since 1974, productivity has all but abated and actually declined last year.

Politically and industrially, the U.S. is in the midst of an enormous transition, and the productivity issue is at the center

(Continued on Page 72)

Deltak Sues Former Employee, ASI

OAK BROOK, Ill. — Deltak, Inc. has filed suit in the Circuit Court of Cook County, Ill., against a former employee and a competitor to prohibit the use of confidential Deltak information that the suit charges was obtained by the former employee during a Deltak management meeting last month.

The defendants in the suit, which is seeking $1 million in punitive damages, are Advanced Systems, Inc. (ASI) of Arlington Heights, Ill., and Paul Pinney, formerly a Deltak national account manager.

ASI has agreed not to use any alleged confidential information and to return original documents obtained by Pinney pending the outcome of the suit, reported R.E. King, Deltak's president.

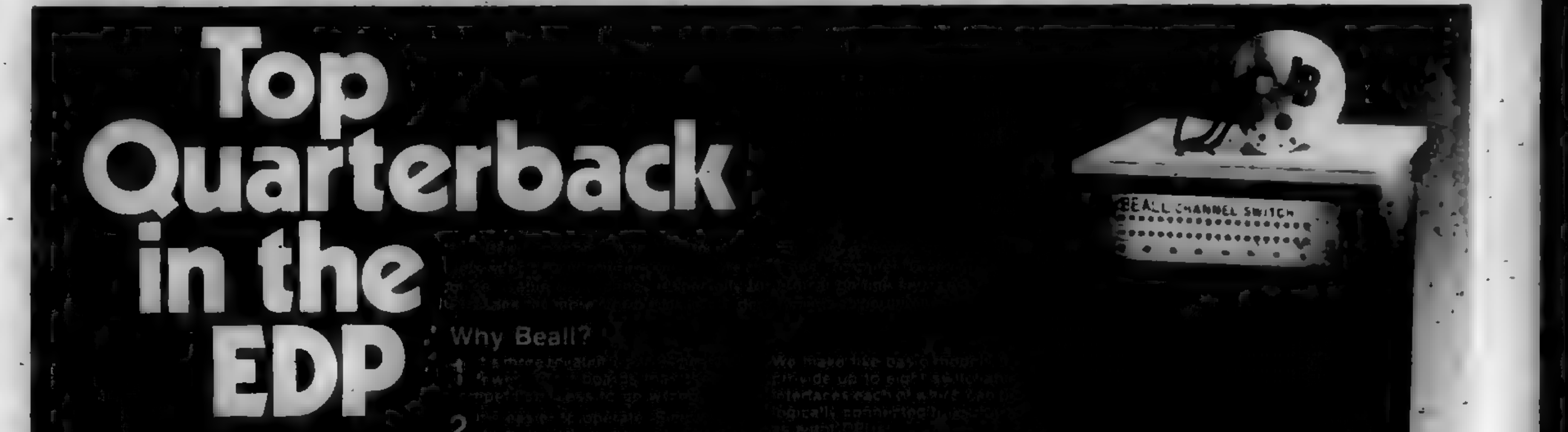
October Meeting

In its suit, Deltak alleged Pinney attended an Oct. 24 meeting of the company's management-level employees at which confidential marketing and product development strategies for 1981 were presented. Both Deltak and ASI specialize in multimedia training programs primarily for the DP industry.

On the following Monday, Pinney resigned from Deltak, becoming an employee of ASI.

This sequence of events convinced Deltak it was necessary to file suit to protect the confiden-

(Continued on Page 70)



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John Beall & Company, Inc.

Former Computervision Exec Hit With Trade Secret Suit

BEDFORD, Mass. — A former vice-president and assistant secretary of Computervision Corp., Philipe Villers, is being sued by that firm for allegedly using trade secrets after he left the company last December.

The suit charges Villers and Automatix, Inc., a robotics company which he had formed, with "wrongful appropriation of corporate opportunities." According to the filing, Villers was given responsibility for starting a robotics division while employed by Computervision, but intentionally frustrated that company's attempts to expand into the robotics business.

Villers was also charged with coercing five Computervision employees including Michael Cronin, another vice-president, into leaving the firm and joining Automatix.

In response to a Computervision claim that it had made appropriations of $400,000 to him for the robotics venture, Villers stated that Computervision never gave him the money and in fact rejected the idea of entering the business when he had proposed it to the company in April of last year.

Computervision insisted that it was developing robotics technology as an integral part of its industry automation business.

IBM 3081 Introduction Expected to Hurt PCMs

(Continued from Page 69)

sessment of user demand for large systems. Right now the market does not really require the power of the 3081, Haney maintained.

Much to Univac's surprise and delight, the 3081 did not create a new price/performance curve, Haney said, adding that while there is a new curve for the 30 series, it is not anywhere as radical as the one established by the 4300 announcement.

Honeywell, Inc. also responded to IBM's 3081 with a "no surprise" comment. The system contains no reason to modify the company's product plans or pricing, noted Stephen G. Jerritts, president of Honeywell Information Systems.

Jerritts said Honeywell is committed to large systems, but he declined to comment on any forthcoming offerings, pointing out that some members of the DPS 8 line already approach the power range of the 3081.

While noting the reduction in maintenance charges for hardware and software, Honeywell said the decreases were really minimal because the old prices were too high.

Firm Files Suit To Protect Data

(Continued from Page 69)

tiality of the information. "Our business is of such a nature that our competitors would have a significant advantage in the marketplace by knowing our plans and strategies," King noted.

'Good Evidence'

"This is the first suit we are involved in and we would not have filed suit if we didn't have good evidence," King asserted.

King claimed that over the past several months ASI had made contact with "the greater percentage of our marketing and educational services staff," eventually hiring away four people. Likewise Deltak has hired about five former ASI employees, but King maintained Deltak management told those employees the company did not want any confidential information about ASI.

John DeAno, president and chief executive officer of ASI, could not be reached for comment on the suit, but in an earlier public statement claimed the suit was "completely without merit" and said his firm's counsel would vigorously defend the company.

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WP Shipments Top $1 Billion in '79

Study Sees Healthy Growth in OEM Mini Sales

WALTHAM, Mass. – Word processing (WP), process control and photocomposition were the most lucrative market areas for OEM minicomputers in 1979 and promise to grow 30% to 50% in each of the next three years, according to a research report compiled by International Data Corp. (IDC).

Overall, the OEM minicomputer market generated revenues of approximately $4 billion last year. The WP market shipped some 60,000 units valued at $1.1 billion, while process control generated $700 million in revenues and photocomposition checked in at $400 million, the report, "OEM Minicomputer Market," noted.

Together these three markets accounted for approximately half of all 1979 OEM revenues in the application areas reviewed by IDC. For each of the other application areas – automatic testing, computer-aided design (CAD), data acquisition, factory data collection, materials handling, message switching, energy management, numerical control and security – 1979 sales were between $100 million and $300 million.

Combined growth for these OEM markets will be approximately 25% over the next three years, IDC predicted, adding that prospects for WP, CAD and energy management are particularly bright – averaging some 30% to 50% growth per year.

For other application areas, relatively moderate growth of 15% to 20% was forecast.

Common Factors

While the OEM markets mentioned above are varied, there are some similarities that cut across all application areas, IDC said.

System reliability is important to all OEMs and was a strong if not the primary criterion for selection of a CPU, according to the market research firm. This concern is easily understood, since in most OEM applications the CPU is controlling a system that is essential to the entire industrial operation, the report pointed out.

Another common feature across OEM markets is the tendency for OEMs – particularly the large ones – to take responsibility for hardware maintenance. While manufacturer-supplied maintenance may be useful as a backup, the necessity for rapid response pretty much dictates that the OEM provide most of the support. Those large OEMs that buy peripherals from independent suppliers and can support a substantial field maintenance force, in particular, are taking on more of this maintenance responsibility, the report noted.

Digital Equipment Corp. is the leading supplier to each of the OEM markets examined in the course of IDC's research. Data General Corp. is in second position, although it is vulnerable (given its emphasis on large OEM sales) to vertical integration by the OEM into manufacture of its own CPUs, IDC said.

Computervision Corp., the market leader in CAD, is an example of an important OEM that switched to self-manufacture of its CPUs. Other important hardware suppliers include Hewlett-Packard Co., Modular Computer Systems, Inc. and IBM.

Several others are big in certain markets, including Computer Automation, Inc., Honeywell, Harris Corp., General Automation, Inc. and Perkin Elmer Corp.

What IDC found, however, is that being the dominant supplier in a particular market does not necessarily mean an advantage in approaching new OEMs in that market. Reliability, maintenance, and other company-specific factors are more important than a supplier's share of any given market, the researcher maintained.

There are two major technological trends that may have a significant effect on the various OEM markets. The first is the trend toward the increased use of microprocessors, either in place of a mini CPU or in conjunction with it to provide "distributed intelligence" to the system – thereby reducing the demands on the central processor.

Microprocessors play a particularly significant role in process control and security systems, where they are displacing the use of minicomputers to a significant extent.

The second major trend is toward increased system functionality and complexity. In these cases, increased central processing power is required as systems functions expand. This trend is noticed in the area of computer-aided design and in data acquisition.

"OEM Minicomputer Market" costs $2,500 from IDC's Corporate Planning Service, 214 Third Ave., Waltham, Mass. 02254.

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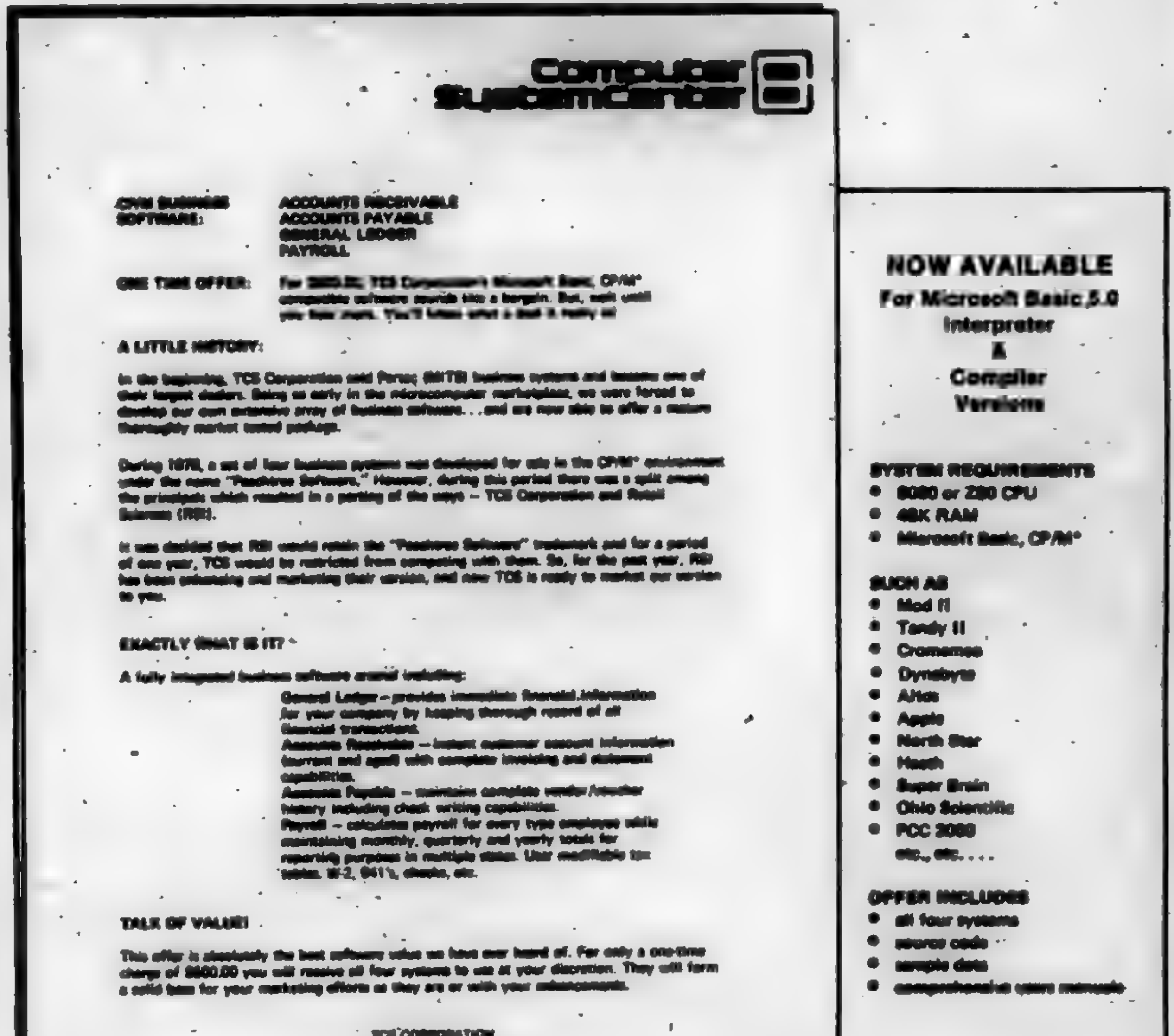

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Mostek 64K RAM Set for December Sampling

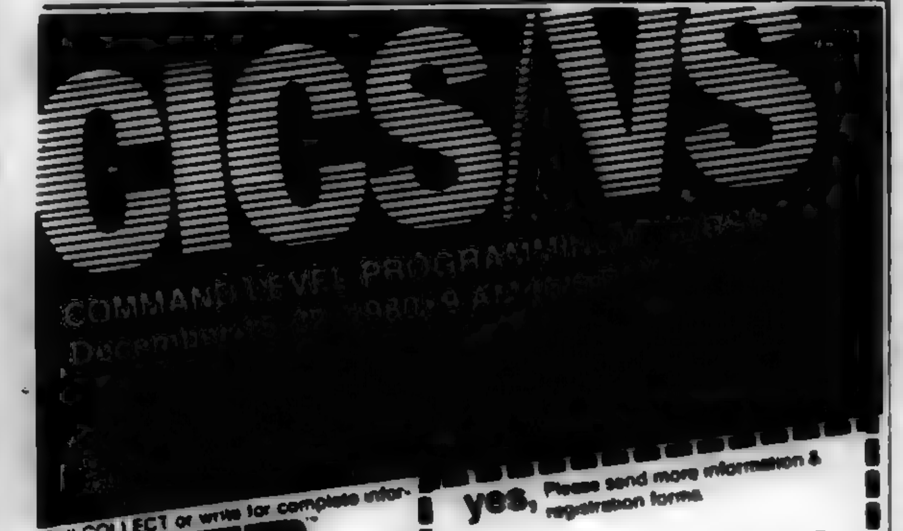
DALLAS — Mostek Corp. has entered the 64K dynamic random-access memory (RAM) market with the introduction of the Model MK4164.

Because of such features as the Direct Step-on Wafer Projection printing technique, which never touches the surface of the wafer, and the use of polysilicon diffused bit lines, Mostek claimed the MK4164 is more manufacturable and able to be produced in greater quantity.

The combination of these new designs and fabrication technologies gives the corporation a feeling of security over its major U.S. competitors — Texas Instruments, Inc. and Motorola — as well as competition from Hitachi in Japan, Mostek said.

The MK4164 is slated for limited sampling on Dec. 1.

The units will be generally available in quantity sometime in the first quarter of 1981, the vendor said.



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Ergonomics Seen Taking Terminal Market Limelight

ANAHEIM, Calif. — The proliferation and higher usage rate of CRT terminals coupled with the growing sophistication of terminal users is forcing manufacturers to pay strict attention not only to applications, but also to human engineering factors, according to an industry executive.

Ergonomics has come into the limelight largely as a result of recent studies conducted by the National Institute for Occupational Safety and Health, John Ludutsky, director of marketing at Lear Siegler, Inc.'s Data Products Division, said at a recent conference here.

"These much-publicized studies discovered that employees using CRT terminals regularly appear to have more health complaints than those not using terminals frequently," Ludutsky continued. "The alleged problems are mostly visual in nature, but these are also reported to lead to other physical ailments, such as backaches, neckaches and similar muscular discomforts.

"The problem, however, does not lie entirely with the terminals; they are only a part of the whole workstation design. Anytime a person sits in one position all day, comfort inevitably becomes a major concern for productivity as well as health," Ludutsky stated.

"Lighting, the angle of the equipment, desk and chair height are all important components that must be analyzed. The science of ergonomics, therefore, has been and should continue to be stressed by manufacturers of all office equipment. Because terminals are the operator's direct link with the computer, however, they have received far more attention that other components," he observed.

With that in mind, terminal manufacturers have begun to move aggressively beyond price/performance features to focus on meeting this new demand, the executive pointed out. As a result, more and more terminal models now offer ergonomic characteristics as key features of their products.

"And, although terminal users have created the demand for ergonomic features to enable them to perform their tasks more effectively and comfortably, there is evident confusion among them as to when they should implement ergonomic terminals and which ergonomic features are most important for their particular requirements," Ludutsky emphasized. "This is largely due to the inevitable bottom line — cost — because human engineering features are in many respects luxury features. The need for physical comforts they provide must therefore be weighed against the expense factor."

In order to help solve this user dilemma, Ludutsky divided the broad base of CRT terminal users into two categories based on usage rate: casual vs. extensive. "An ergonomic terminal should not be too great a priority when operators are only performing a couple of entries a day," he explained. "Yet in those applications where terminals are the main tool of an individual's job, operator comfort becomes a key concern.

"Once it has been determined that ergonomic features are required, the next step is to select which of those features are most critical. Just as terminal manufacturers offer a wide range of models with a myriad of performance features, terminals are also on the market with a variety of ergonomic characteristics. The user does not necessarily need an ergonomic terminal that is 'loaded.'"

Productivity Woes Cited

(Continued from Page 69)

of the storm. By improving worker productivity, Americans not only battle inflation, bolster the weakening dollar and expand employment, but also establish a common goal which "provides a crucial glimmer of light at the end of the tunnel."

Turning to the political scene, Lundine said although President-Elect Ronald Reagan will probably not bail out single major failing businesses — a la the Chrysler Corp. — he will push to revitalize important industrial areas. In fact, a new "buzzword" — reindustrialization — that arrived in Washington, D.C., on the coattails of the new President promises that the new administration will look at the economy on a sector-by-sector basis with an eye toward improved productivity, the congressman explained.

However, the productivity reversal thrust will not be easy, Lundine added, quoting an MIT economist as saying that the economy is "not like one big wound, but like many small cuts."

Pointing to his previous experience as mayor in Jamestown, N.Y., where he faced and reportedly solved a smaller scale productivity problem, Lundine noted that the private sector's battle against nonproductivity cannot be won without the government's help.

In the coming months, Congress will work on passing accelerated depreciations laws that make it easier to acquire the latest in computer equipment. At the same time, both houses will move toward reducing unnecessary social regulations.

In the same vein, Congress will establish a rule that if a regulation is imposed on the private sector by a federal agency, that agency will have to figure out the bottom-line costs to corporations and whether the regulation acts as a barrier to improved productivity, Lundine observed.

Finally, the congressman told his audience that more effort will be made to work with colleges and universities as well as with smaller firms that may be short on equity capital, but long on research and development ideas.

To underscore his last point, he noted two technology-aimed bills are currently in committee and under consideration by both the Senate and House of Representatives. The first one, the Small Business Innovations Act, will grant financial assistance to smaller high-technology firms that have great ideas, but do not know how to finance them. The second bill, the Technology Foundation Act, will promote better coordination among different firms and move toward major new developments under a single umbrella. Both bills are being sponsored by Lundine.

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Frank J. Sanzone, Jr., Carroll County General Hospital

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Mergers/Acquisitions

M/A-COM, Inc. has acquired Prodelin, Inc. of Hightstown, N.J. Prodelin shareholders will receive 180,000 shares of M/A-COM common stock at an exchange ratio of one share of M/A-COM for 1.83 shares of Prodelin.

On-Line Business Systems, Inc. has acquired the Computer Utility Division of Optimum Systems, Inc.

Comserv Corp. has bought the computer processing customer base of Accounting Associates Data Center, Inc.

Tymshare, Inc. has signed a letter of intent to purchase the Capital Credit Corp., a subsidiary of Union Corp. in Verona, Pa., for an undisclosed amount.

Datacore Systems, a division of the Westinghouse Learning Corp., has acquired the assets and business of Information Associates, Inc.

Aragon Group, Inc. has acquired Swift Computer Services of Chicago.

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Executive Corner

Zilog Chief Goes to Exxon; Fernandez Named President

CUPERTINO, Calif. — Manual A. Fernandez was elected president and chief executive officer of Zilog, Inc. and named a director of the company at a special board meeting earlier this month.

Fernandez's, appointment was taken in conjunction with an announcement by Exxon Enterprises, Inc. (EEI) naming Federico Faggin, Zilog's former president and chief executive officer, to the post of vice-president of EEI in charge of the Computer Systems Group.

Zilog is majority-owned by EEI, with the remaining shares held by a small number of individuals, primarily employees and former employees of the company.

Last year Zilog's sales reached $34 million, and this year sales will be "comfortably ahead of that figure," Fernandez noted.

Other Moves

- In an internal reorganization at Point 4 Data Corp., Paul Davies has been named president of that organization; Geza Gorgenyi, executive vice-president of operations; Dan Paymar, vice-president of staff; Catherine Davies, secretary/treasurer; John Mather, vice-president of marketing; Robin Ollivier, vice-president of sales; Renny Bosch, vice-president of engineering; Max Heller, vice-president of software support; and Lou Smith, controller.
- Dale F. Pilz has been named to the newly created position of executive vice-president and general manager of Southern Pacific Communications Co.
- Robert S. Bernstein has been elected director, president and chief executive officer at Compuscan, Inc.
- Five new vice-presidents of marketing were announced by an Amdahl Corp. spokesman: Clifford Rudolph, headquarters; Thomas McKenna, western region; Joseph Francesconi, north central; Ollie Nutt, south central; and Milton Nelson, eastern region.
- Richard Fisher has been appointed vice-president of finance and treasurer at Network Systems Corp.
- W. Clay Matthews has joined Pertec Computer Corp. as senior vice-president and general manager of the Peripherals Division, and Richard A. Hahn has been named corporate vice-president and general manager for the Systems Marketing Division.
- James W. Ashbrook has been promoted to the position of vice-president of systems marketing at National Advanced Systems.
- Informatics, Inc. has promoted Douglas Salmon to vice-president of business development and institutional marketing, Dominick Ciminello to vice-president of production services for data services operations and Richard Kaylor to vice-president of the data services group. Victor Martinelli has been named vice-president of finance and administration and chief financial officer.
- Donald L. Sink has been appointed vice-president of marketing at California Computer Systems, Inc.
- Ken Henninger has been named vice-president of timesharing services at National Information Systems, Inc.
- John D. Seiley has been elected vice-president of engineering in the Applied Technology Division of Computer Sciences Corp.
- Gregory Liemandt, president of General Electric Information Services Co., has been elected a vice-president of General Electric Co.
- Peter J. Fenchel has been appointed vice-president of finance at Omnidata, Inc.
- Richard Ottaviano has been elected to the newly created post of vice-president of personnel at Century Data Systems, a Xerox Corp. company.
- James Fletcher has been named vice-president of sales for the Minicomputer Division of Data Communications Corp.
- John Bartolo and James Hanly, both former product sales managers for Continental Information Systems, Inc. have been named vice-presidents.
- Gary Hughes has been appointed president and chief operating officer of Benson-Varian, Inc.
- Donald G. Burgar, president of Elgar Corp., upon his retirement this month, will be succeeded by Joseph P. Gibbs.
- Rich Brechtlein has joined Cobar, Inc. as vice-president of marketing, where he will oversee sales and marketing for the firm's Model 3132 Digital Equipment Corp.-emulating CRT terminals.
- Thomas K. Shaffert has been made a vice-president at Shared Medical Systems Corp., where he will be responsible for its Physicians Services Division.
- M.E. Stever has been elected vice-president of customer service, a newly created position at General Automation, Inc.
- Kim Ehler and Kevin Frey have been elected vice-presidents at Cubic Data Systems, Inc.

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Because the Level 68/DPS is an interactive system, administrators and secretaries can also benefit by it.

Naturally, with so many people using the computer, security is essential.

But thanks to extensive safeguards built into the Multics operating system, security can be maintained without lessening the computer's availability.

All in all, Oakland's Level 68/DPS is working out very well.

Most Oakland students will graduate with the ability to use a computer. A necessary skill in our increasingly technological society.

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What could be more appropriate for *any* university than distributed computer power that's easily accessible and easy to use?

For more information on the Level 68/DPS and the Multics operating system, write Honeywell, 200 Smith Street (MS 487) Waltham, Massachusetts 02154.

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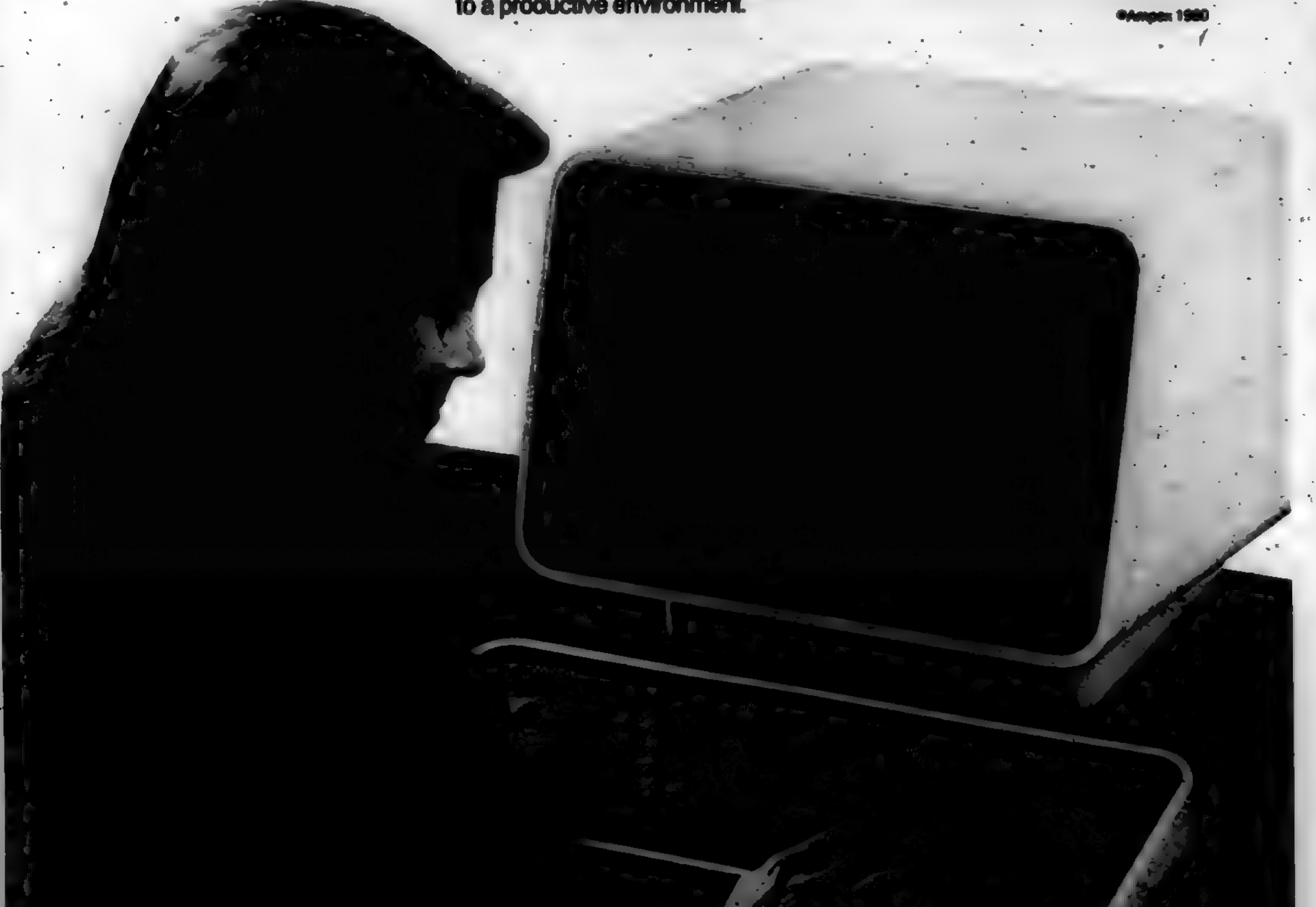

Nickels & Dimes

Computer Automation, Inc. has obtained a $12 million unsecured four-year credit line from United California Bank at an interest rate of 109% of the bank's prime rate.

$$$

Tymshare, Inc. has announced a two-for-one stock split effective Dec. 1.

$$$

Micro Peripheral, Inc. has secured a $3 million loan from United California Bank to retire higher interest loans from smaller lenders and to expand production output and new product development.

$$$

Apple Computer, Inc. has filed a registration statement with the Securities and Exchange Commission to make 4.5 million shares of common stock available.

$$$

Micropolis Corp. has obtained $2 million in additional financing through private placement of common stock.

$$$

The board of directors at Automatic Data Processing, Inc. has declared the regular quarterly dividend of 19 cents per share, payable Jan. 1 to stockholders of record Dec. 16.

$$$

Computer Sciences Corp.'s directors have authorized the repurchase of up to $2.5 million principal amount of the company's convertible debentures to meet a sinking fund requirement due Sept. 15, 1982.

The board of directors of CGA Computer Associates, Inc. has declared a 50% stock dividend, which has the effect of a 3-for-2 stock split, to be payable Nov. 24 to shareholders of record Nov. 10.

$$$

Data Terminal Systems, Inc. has sold $8 million in subordinated debentures, $4 million each to Connecticut General Life Insurance Co. and Massachusetts Capital Resource Co.

$$$

Texas Capital Corp. has arranged and participated in a $1.7 million financing for Telxon Corp. of Bath, Ohio, producers of portable data entry terminals and accompanying software and support systems.

Contracts

Applied Communications Networks, Inc. has been awarded a contract by the Corporation for Public Broadcasting to identify and evaluate available interactive technologies that would enable TV viewers to respond to programs from their homes.

The Librascop Division of the Singer Co. has received a $4.3 million contract from the U.S. Army's Communications Research and Development Command to develop the triservice Single Subscriber Terminal that would reduce communications time in tactical warfare environments.

Diva, Inc. won a $500,000 subcontract from the Link Division of the Singer Co. for the Diva Computroller V Series DD-4300.

Univac Defense Systems Division has been awarded a $10 million contract for the development of the AN/-UYK-44 (V) computer system for the Naval Sea Systems Command, Washington, D.C. This three-year contract is the first awarded for the Navy embedded computer system development effort.

Nixdorf Computer Corp. has signed a $2.1 million contract with CISI Group, Inc. for the installation of 35 Nixdorf 8840 word processing systems to be used for a variety of applications, including compilation of mass mailing lists and typing of catalogs and legal contracts.

Supershorts

Battelle, Inc.'s Columbus Division has established a center for developing I/O models used in economic analysis and forecasting. Prof. Wassily W. Loentief, a Nobel laureate in economics, will advise the new center.

The Association of Data Processing Service Organizations has moved its headquarters to Suite 300, 1300 N. 17 St., Arlington, Va. 22209.

The recently reactivated Applied Technology Center at the University of Massachusetts in Amherst is seeking solutions to industrial problems under the direction of Dr. David Nayon.

Data General Corp. has established an Asian marketing operations office in Hong Kong to provide direct sales and support to that market.

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Programmer productivity. It's the cry of the decade. Even programmers themselves are crying for it. Because while present efficiency levels are counter-productive and costly for a company, they're also frustrating, tedious and boring for programmers. And the culprit is language. Repeatedly, knowledgeable programmers are citing antiquated language as the single most significant reason for low performing levels. The problem is compounded in an on-line environment. Which is why CPG was created, and why installation of CPG—The Language ™ can so dramatically increase programmer productivity.

CPG is in short, a complete and thorough language for generating efficient, on-line application programs in a teleprocessing environment. And it is clearly the most significant advance made in the area of teleprocessing programming in years. While new to the United States market, CPG has been used for several years internationally with users reporting time-savings as significant as 80% when compared to the cumbersome Cobol. Cost-savings in the areas of data-processing budgets, CPU and memory upgrades, education and support are equally impressive.

CPG is easy to use, requiring no specialized training, yet CPG generates the most efficient on-line code available. It allows you to develop, test and implement on-line systems in far less than the normal time. It uses a fraction of the hardware resources and provides far better response times than programs written in conventional languages.

CPG features built-in screen data mapping support, interactive testing and debugging, and on-line screen editing. Additionally, CPG programs are also portable across teleprocessing monitors, file structures, data bases and operating systems.

With the development of CPG—The Language™...Insac Software Inc. (formerly Altergo Software, Inc.) has brought the industry out of its former fledgling stage to that point which so many have said for so long would be the turning point. It is the language programmers need, if calls for increased productivity are to be heard. And answered.

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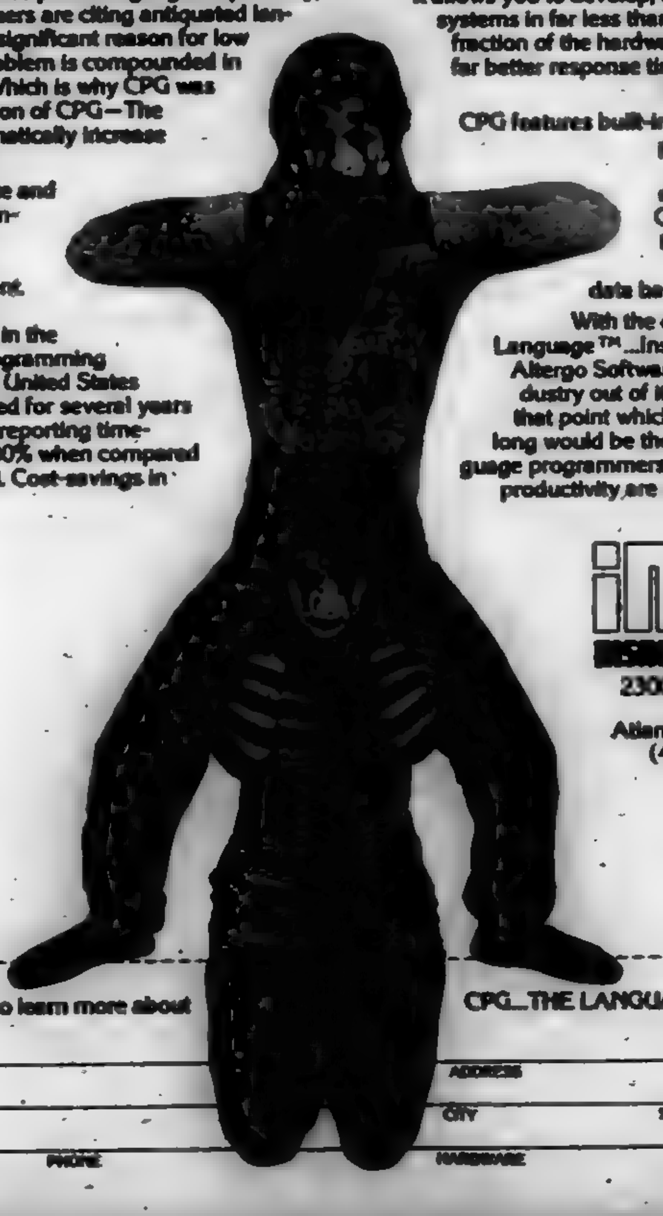

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Senior Project Manager—[illegible].
Fortune 200 organization in the process of building a new corporate business systems development team seeks two Senior Analysts having a broadly based applications background and heavy exposure to data base. Multiple career paths available including systems and line operating management. To $32,000

Sales Representative—New Florida Branch.
Well known, highly profitable computer services firm seeks three marketeers for its first office in Florida. Prior experience with either a hardware or services vendor and knowledge of commercial applications required. Estimated first year earnings $40,000

DOS Systems Programmer.
Division of a national organization offers a unique opportunity for a DOS Software Programmer with Assembler skills to assume responsibility for all technical support. Position will grow to Project Manager within one year. To $22,000

Systems Analyst—Data Base.
State-of-the-art IBM facility has need for an Analyst having at least two years experience in designing large-scale business applications. Strong emphasis on user interface skills. IMS preferred but not required. To $28,000

Minicomputer Programmers.
Rapidly growing organization in the process of implementing a massive distributed processing network has openings for professionals with at least one year of Assembler, COBOL or BASIC experience. Prior sales support experience preferred but not required. To $24,000

Consultant—Manager/MIS.
Southeast regional consulting firm seeks a Manager for its MIS group. Highly diverse applications background required. Prior Big 8 exposure preferred. Minimum travel. To $35,000

Programmers—Gain IBM Experience.
Sophisticated large-scale facility seeks a number of Programmers having at least one year of COBOL experience involving commercial applications on any hardware. Will train in the latest IBM techniques. To $21,000

Scientific Programmer—[illegible] or [illegible].
Unique opportunity for a degreed professional having PDP 11 experience to work in simulation and network analysis areas. To $30,000

Systems (Software) Programmer.
Leading Southeast organization seeks a professional having heavy JCL and utilities experience along with COBOL and HASP exposure to maintain OS/MVT operating systems. To $25,000

Data Base Programmer Analysts.
Growing IBM facility seeks several COBOL Programmer Analysts with some exposure in data base design to assist in its first data base conversion. IMS training provided. To $26,000

Mini Software Development—Distributed Processing.
Major Southeast apparel manufacturer is staffing its new marketing systems data center and seeks minicomputer professionals to assist in developing a distributed processing system with 40 remote sites. BASIC or COBOL programming experience required. To $25,000

Georgia
Atlanta, Savannah, Macon, Columbus

Programmers—IMS Training.
Rapidly expanding firm seeks Programmers with IBM OS COBOL and Dump solving skills. Will be trained in multiple data bases (IMS, TOTAL, DMS) and participate on new systems development teams. Exposure to structured programming with top-down design provided. To $23,400

Mini Marketing Support—Patient Care.
Major health services vendor has just moved its corporate headquarters to the Southeast and provides opportunity for real-time interactive mini software development with customer contact. Multiple languages (any machine) required. To $25,300 + incentive bonus.

Marketing Representative—Management Opportunity.
Leading computer services firm seeks an experienced marketing professional to establish and build a new branch office in the Southeast. A successful record in selling hardware, timesharing, applications packages or service bureau required. No prior management experience necessary. Base to $25,000 Package to $60,000+

Minicomputer Programmer Analysts.
Well-known national organization is starting a new minicomputer business applications development group using Data General RDOS Business Basic. It seeks minicomputer professionals at various levels to play key roles in this "leading-edge" effort. To $25,200

MVS Systems Programmer—Management Training.
Major Fortune 500 company seeks a Software Specialist capable of leading an MVS conversion effort and then assuming the position of Technical Support Manager. To $33,000

Programming Services Manager—Equity Potential.
New software company seeks professional to lead an on-line data base product package development team. Potential to assume partnership role in this multi-million dollar company based on performance. To $30,000

Data Base Administrator.
Expanding organization with IBM 3033 OS/MVS environment is establishing its first data base and offers the opportunity to evaluate and select the DBMS. Will interface with top management. To $32,000

IMS Software/Data Analyst.
Southeast university seeks an IMS Systems Programmer/DBA to establish and manage its first formal data base administration function. Free tuition, four weeks vacation and state-of-the-art large scale IBM environment provided. To $29,000

COBOL Programmers—CICS Training.
International Fortune 500 organization seeks experienced COBOL Programmers to develop new applications software using structured techniques. Formal training in CICS provided. To $24,900

Insurance Systems Analysts—Growth Environment.
Rapidly expanding Southeast based insurance organization seeks Analysts to lead a variety of new systems development projects. Planned growth will provide management opportunities within one year. 3080 IMS DB/DC environment. To $35,300

MVS Systems Programmer—Mountains.
Major corporation located near a highly attractive ski area seeks an MVS specialist. VTAM and NCP expertise desired. To $29,750

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Major New MIS Expansion.
Recently approved three-year project for advanced MIS development and implementation has created the need to double the existing staff of this highly progressive organization. Current openings exist for Programmers, Analysts, Software Programmers, Computer Performance Specialist and Long-Range Planning Analyst. Computer environment includes on-line CICS, IMS, ADABASE, 303X, MVS. Salaries range from $18-$35,000

Compiler Software Design.
Computer vendor seeks professionals to participate in the design of COBOL or FORTRAN compilers for advanced processors. Research environment. To $30,000

Programmer Analyst—Gain CICS Experience.
Newly installed IBM 370/138 CICS facility seeks a Programmer Analyst having at least one year of COBOL or BAL exposure. Coast location. To $22,000

Senior Business Analyst—Management Training.
Corporate staff of a well-known organization seeks a senior professional for internal consulting. This is a highly visible position and leads directly to management. MBA preferred. To $30,000

Programmer—Rural College Town Location.
Growing medium sized manufacturer seeks a Programmer with two years of COBOL exposure. Will work in the on-line systems area. To $22,000

Process Control—Minicomputers.
Unique opportunity exists for professionals interested in the design and implementation of real-time data collection, process control (closed loop) and energy management systems. Skill in FORTRAN and minicomputers required. To $27,000

Systems Support Manager.
Progressive organization seeks a person capable of managing a growing technical staff in a multiple CPU installation. Software includes DOS/VS, VM, CMS, ROSCOE, CICS, etc. Requires strong systems background, excellent written and oral skills, management exposure and ability to set guidelines for future hardware and software. To $32,000

Junior Systems Programmers.
Outstanding opportunity for several professionals having at least one year of IBM BAL, OS/JCL and utilities exposure to become full-fledged Systems Programmers. University town environment. To $21,000

Software Marketing Representative.
Well-known national organization seeks a professional to market sophisticated computer software to senior executives. Experience in selling timesharing, remote batch or general computer services preferred.
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HP 3000 Programmer Analyst. Manufacturing division of a Fortune 500 organization seeks a COBOL Programmer Analyst to participate in the implementation of an advanced production control system involving data collection. To $20,000

On-Line Programmers—Resort Location.
Major manufacturer located in a highly desirable resort area seeks CICS Programmers for its on-line development group in an IBM 370 CICS/VS environment. Rapidly expanding company provides opportunity for some international travel. To $24,000

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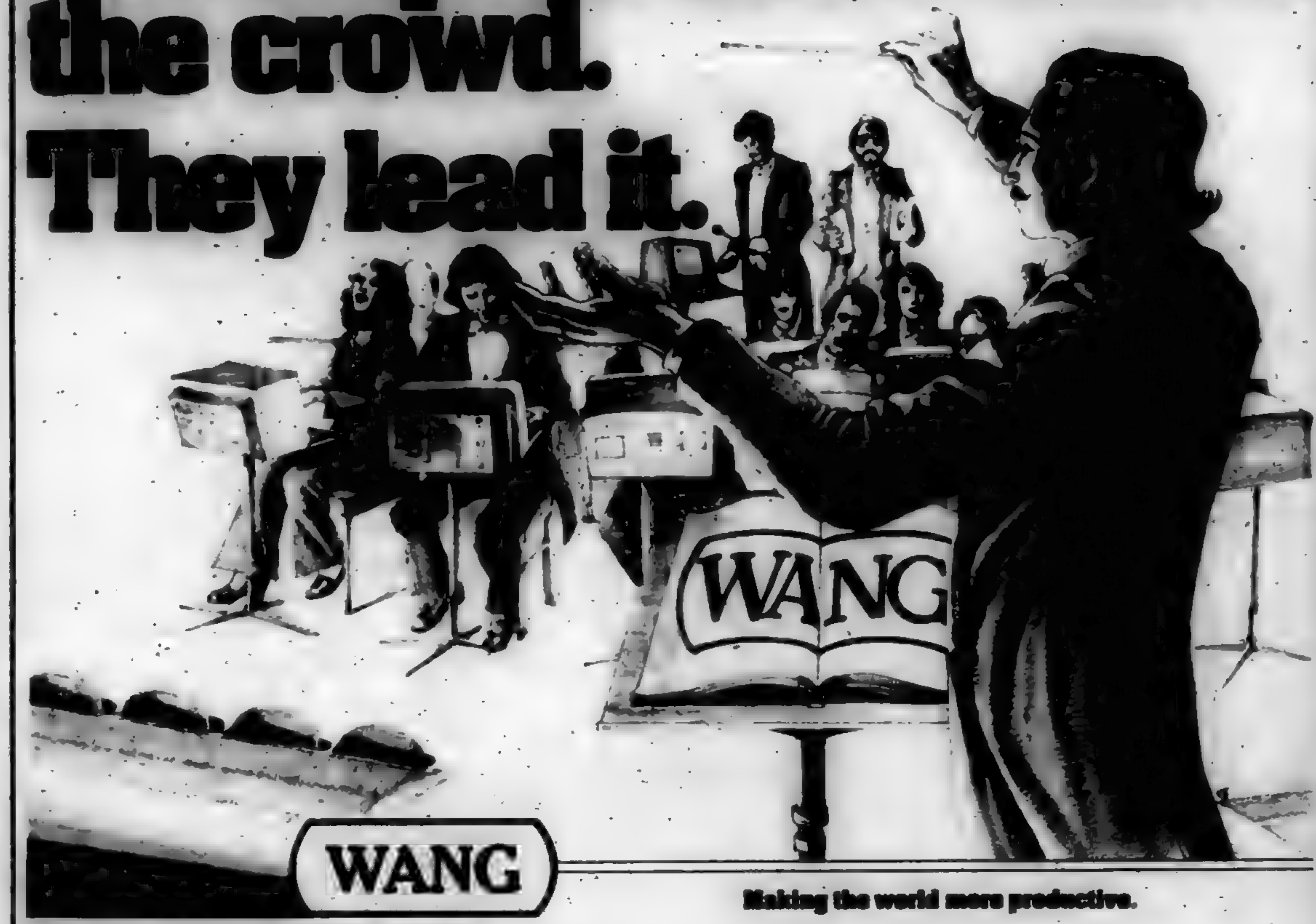

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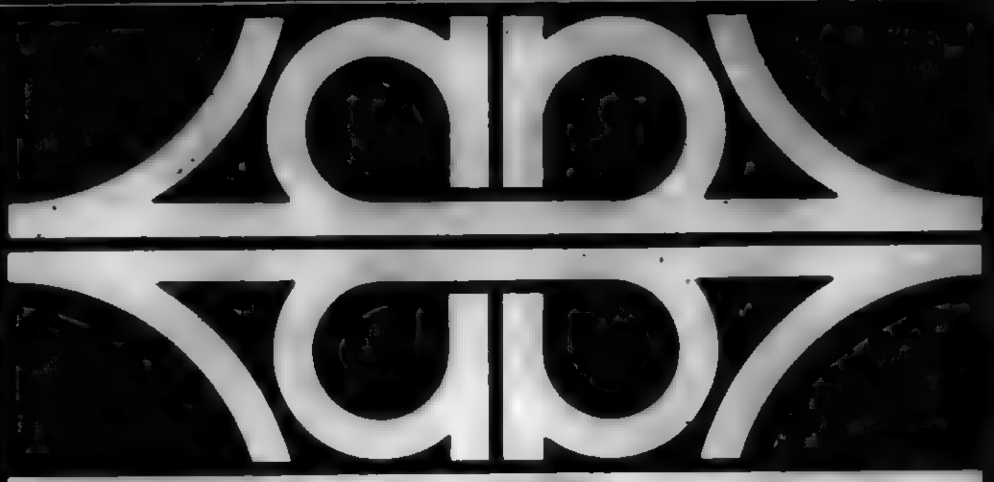

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SYSTEM ANALYSTS with a BS degree or equivalent experience. Six years experience in analyses of system requirements, proficiency in developing computer programs and skills in using programming principles and techniques. Must know the principles of DOD telecommunications (AUTODIN) and a thorough knowledge of assembly language.

SYSTEM ANALYSTS with a BS in Mathematics or Computer Sciences. Six years experience in scientific programming preferably in the area of structural engineering. Programming experience should include assembly language level as well as high level language such as PASCAL.

SCIENTIFIC PROGRAMMERS with a BS degree in Math, Engineering, or Physics. Two years experience preferably in numerical analysis and numerical reduction of data.

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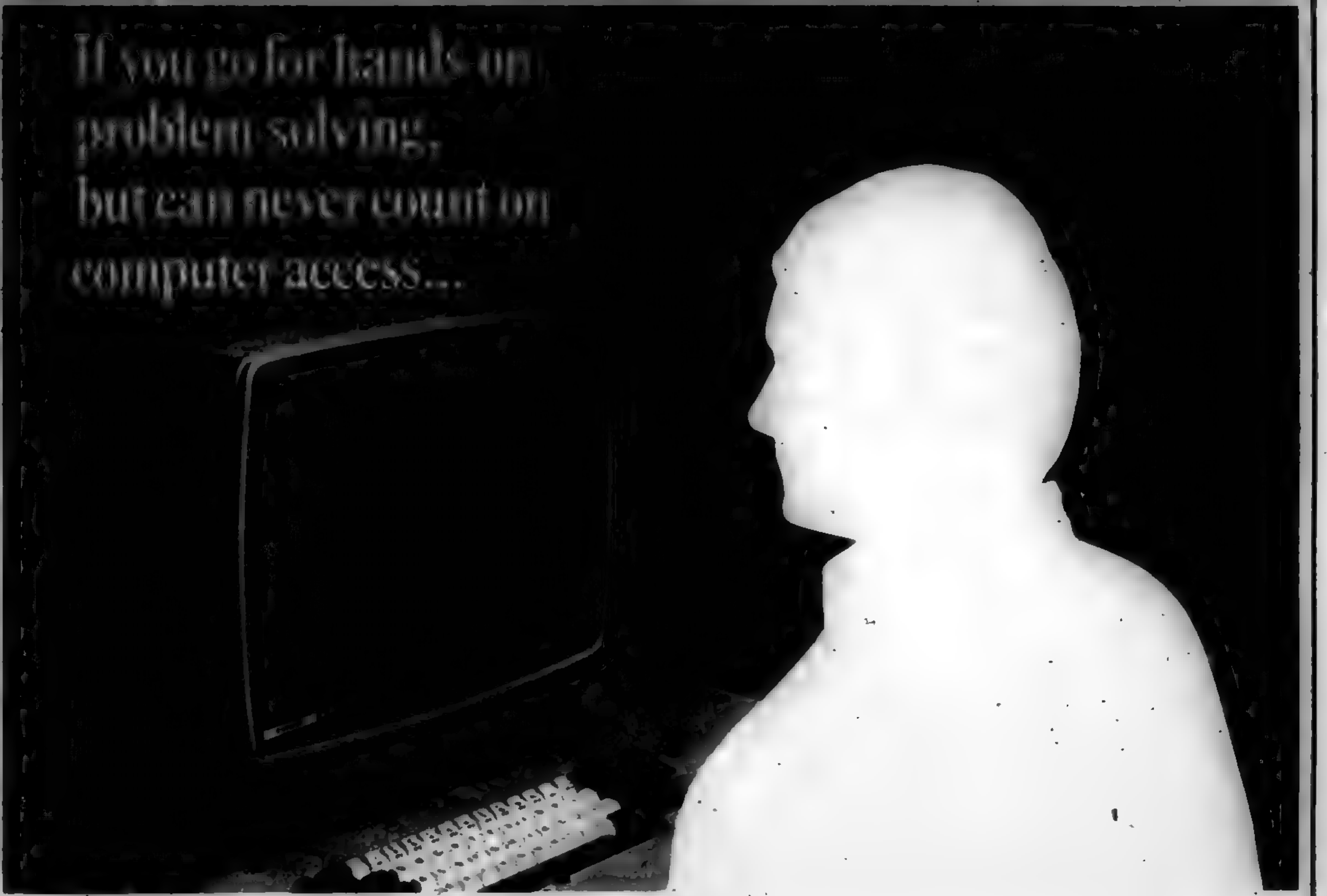
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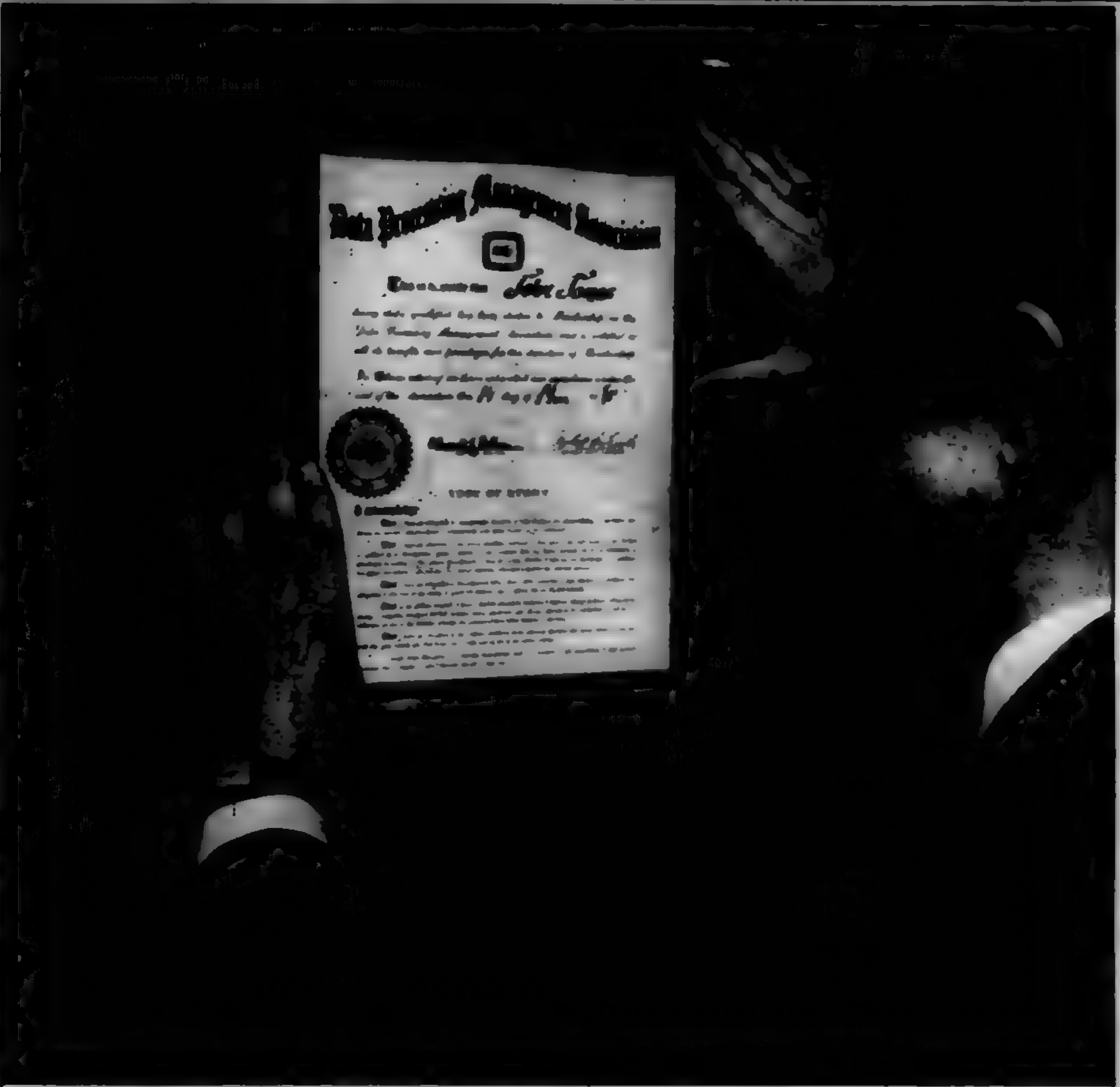

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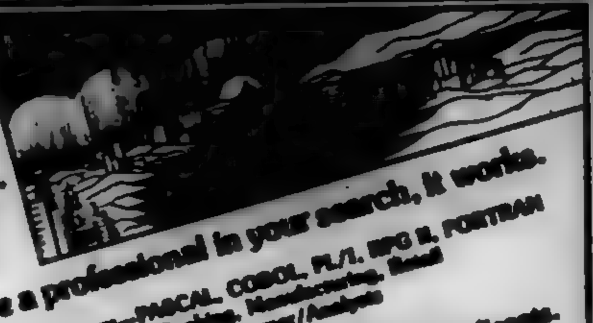

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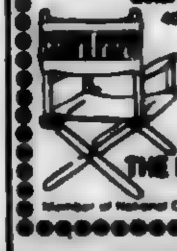

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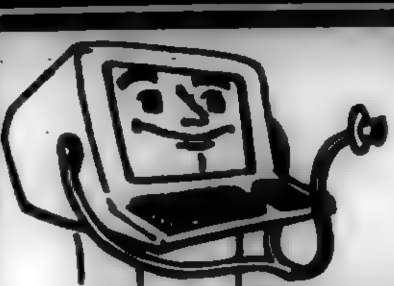

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- **SENIOR CICS APPLICATIONS PROGRAMMER/ANALYST**

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HBO & COMPANY, the leader in mini-computer based hospital systems, has opportunities for experienced Programming Professionals in our Corporate Research and Development offices in Atlanta.

COMMUNICATIONS SPECIALIST - Responsible for designing and programming software required to interface our information system with other systems. Qualifications include:

- **Minimum 4 years programming experience**
- **Experience designing and programming communications software**
- **Solid background in communications interfaces**
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OPERATING SYSTEMS SPECIALIST - Responsible for developing and writing operating systems software. Requirements include:

- **Minimum 4 years programming experience**
- **Prior responsibility for developing and writing operating systems components and utilities**
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APPLICATIONS DEVELOPMENT/PROGRAMMING - Responsible for developing and writing applications software. Requirements include:

- **Minimum 3 years experience in applications programming**
- **Assembler and/or COBOL background**
- **Prior experience with financial applications a plus**

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HBO & COMPANY

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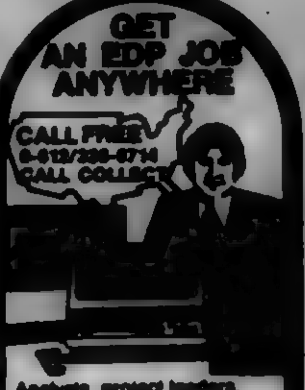

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CURRENT, INC. is seeking a Manufacturing Analyst to be involved in the development of both manual and automated manufacturing management systems. This position will interface with MIS personnel on a user level in the development of systems such as MPS, SPC, MRP and CRP.

The ideal candidate will have a minimum of three years in manufacturing with direct involvement in the design and development of automated manufacturing planning and control systems. Good communication skills are essential. We offer a competitive salary, excellent benefits and an attractive working environment.

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DATA PROCESSING

PROBLEM SOLVERS

Our corporate data center has immediate openings outlined below. We are a heavy equipment manufacturer located in the far northern suburbs of Chicago and with an excellent IBM environment.

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Opportunities exist in both MVS and DOS/VS COBOL environment. We require a BS degree or equivalent with 4 or more years related experience. We prefer knowledge of data base design, programming and on-line experience. Technical knowledge should include most phases of systems analysis and design techniques to the extent of providing direction to others.

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B.S. degree or equivalent with 3 years related experience in design techniques and specifications in an MVS or DOS/VS environment preferred. JCL proficiency in a COBOL shop a must. IMS-DC or CICS/VS experience preferred.

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You'll be responsible for coding, debugging and documenting programs as well as standard systems procedures. A minimum of 2 years experience in a COBOL environment preferred.

We offer an excellent starting salary (including Cost of Living Allowance) plus an outstanding benefit package with Company Paid medical, dental & life insurance, prescription drug and pension plans plus MUCH MORE. For immediate consideration send resume including salary history to:

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375 Cochituate Rd., Rte. 30
Framingham, MA 01701

Programmer Analyst

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To qualify you should have a degree in Computer Science or related field, along with a working knowledge of FORTRAN and COBOL. A minimum of 3 years experience preferably in a manufacturing environment is also required.

We offer a competitive salary and comprehensive benefit program including life, major medical and dental insurance, pension and car purchase plan. We're conveniently located near beautiful recreational areas and pleasant residential communities. For immediate confidential consideration, write or send resume including salary history to:

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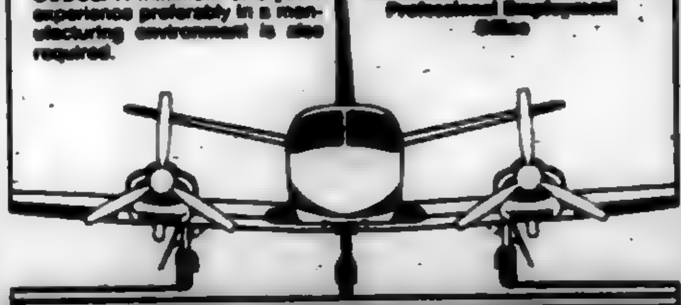

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SYSTEMS PROGRAMMERS

Come Join ISS/Sperry-Univac On the Beautiful San Francisco Peninsula!

We're ISS/Sperry Univac, a leading company involved in the design and production of mass storage computer memory systems and controllers, and attractively located on the scenic San Francisco Peninsula. An operating unit of Sperry-Univac, we combine the personality and independence of our people-oriented division with the advantages involved with being a member of the vast Sperry-Univac network. Of vital importance to us is the promotion of fresh, innovative ideas. To this end we have provided our people with modern facilities that rank as some of the finest in the industry as well as access to the latest state-of-the-art equipment. Further, we strongly encourage our people to upgrade their skills and capabilities through a variety of company-sponsored training and development programs. In addition to promoting high quality in our product line, these methods have also resulted in us having one of the lowest attrition rates in the industry. So, if you're a Systems Programmer, consider the following position.

We are seeking Systems Programmers with 2+ years' experience in Univac EXEC VIII operating systems internal organization and operation. An interest in physical I/O, facility management, teleprocessing or hardware performance evaluation highly desirable. We have a relaxed, hands-on environment and you'll be working with a small group of people on a variety of hardware and software projects.

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In addition to flexible working hours, you can expect a good salary and a comprehensive benefits package that includes: insurance; retirement plan; holidays; vacations; sick leave; educational assistance; credit union; stock purchase plan . . . AND MORE.

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ISS
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PROGRAMMER

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An entry level writing position. You will write news and product stories, participate in team projects and surveys all under supervision.

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SENIOR SYSTEMS PROGRAMMER

The Advanced Technology Center of CALSPAN CORPORATION, a major Scientific and Engineering Research Company, has a challengine position for a systems programmer at their Computer Center in Buffalo, New York.

The position requires an individual with a BS in Computer Science or related discipline, at least 5 years' experience in Computer System technical support, a thorough knowledge of JCL, Utilities and Assembler language. MVS/TSO operating system generation and maintenance experience is highly desirable. The major responsibilities include project management in network planning, configuration management, and system software planning. Technical leadership in real-time system support, system performance and scientific and business user consultation is required. The operating system consists of a 4 meg 3031 running VM, OS/MVT and MVS with a wide variety of program products.

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PROGRAMMER ANALYST

Innovative Programmer Analysts with 2-5 years recent systems development experience on large scale business computers are needed to take an active role in the design of batch and online business systems using COBOL as primary language.

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We're in the process of expanding . . .

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Technical Writer — A thorough familiarity with data processing and technical writing, plus experience in software products and data communications.

Software Engineers — Experience in Systems, Communications, or high level applications programming, as well as TAL or a PL1-type language helpful. Current requirements in our Omaha, Chicago and Tampa offices.

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Our state-of-the-art data systems environment currently offers an opportunity for an individual with a telecommunications background to join our technical staff. This person will assist in planning and coordinating telecommunications activities for a large coast-to-coast network.

The ideal candidate will have a systems programming background with experience in MVS, NCP and VTAM along with a knowledge of data terminal equipment and data communications equipment.

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The preferred candidate should have 2-4 years' experience and be able to install and maintain systems software on Data General C330/M600 series computers. A thorough knowledge of AOS and COBOL is required. IDEA experience is a definite plus.

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The ideal position for the computer specialist interested in exploring "leading edge" technological advances and able to interpret impact on corporate resources, systems, hardware and software requirement. Candidate must have a bachelor's degree or equivalent, and be hardware/software oriented with DBMS and/or communications experience. A solid IBM/HP product knowledge a definite plus.

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[illegible]

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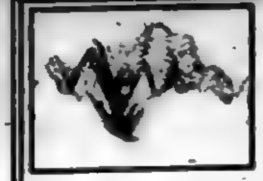

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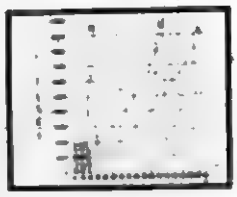
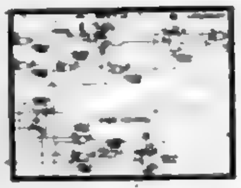
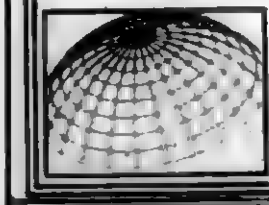




We have opportunities in various major cities including Long Island, Woodbridge, NJ, Philadelphia, Rockville, MD, Houston, Portland, OR and Irvine, CA. For confidential consideration please contact Jane DeRolph at TEKTRONIX, INC., 2 Research Court, Rockville, MD 20850. An Equal Opportunity Employer M/F/H.



Tektronix

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SENIOR SOFTWARE ANALYST

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& Associates Inc.
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San Rafael, CA 94913
(415) 479-8101

SYSTEMS ANALYSTS AND PROGRAMMERS

[illegible]

Dunhill

of CHARLOTTE, INC.

[illegible]

SAN DIEGO STATE UNIV. FACULTY POSITION INFORMATION SYSTEMS

Tenure-track position available fall 1981. Candidates should be experienced in business data processing. Preferred specialties: program languages, systems design, data base management, data communications, and operating systems. Doctorate or ABD in information systems or related field required. The department offers MBA, MS and BS in information systems. Please send resume to Dr. [illegible], Information Systems Dept., San Diego State University, San Diego, CA 92182. Equal Opportunity/Affirmative Action/Title IX Employer. SDSU does not discriminate against handicapped persons. Deadline: 12/31/80

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APPLICATION PROGRAMMER

Responsibilities: Write computer programs. Analyze existing programs and improve coding techniques.

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EOE-M/F

PROJECT LEADER

GEOMET Technology, Inc. a rapidly expanding environmental and health consulting firm, is seeking a uniquely qualified individual to be Project Leader for the detail design and implementation of an interactive user-orientated retrieval system in the cancer research environment. This system concept incorporates aspects of statistical package manipulation and data base management system as well as features not common to either.

A successful candidate should have a computer science degree or equivalent experience, including knowledge of interpreters, user language development, and data and file structures; structured design; system implementation experience using PL/1 and S/370; some health area experience. Desirable skills include data base concepts, assembler, and biostatistics. At least 7 years experience.

This position is in our Bethesda office. GTI offers competitive salaries, good growth opportunity, and a complete employees benefits package. Interested candidates, please send resume to:

Kathy S. McPherson, Personnel Director
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EOE M/F/H

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Qualified candidates must have 3+ years extensive exposure to ALC with OS internals and OS MACROS, plus a background in DOS. Responsibilities will include user interface and support, and some new development opportunities for OS systems products. Emphasis on Tape Management Systems, Production Control Systems, DOS to OS conversions, and Automated Recovery Systems.

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EOE

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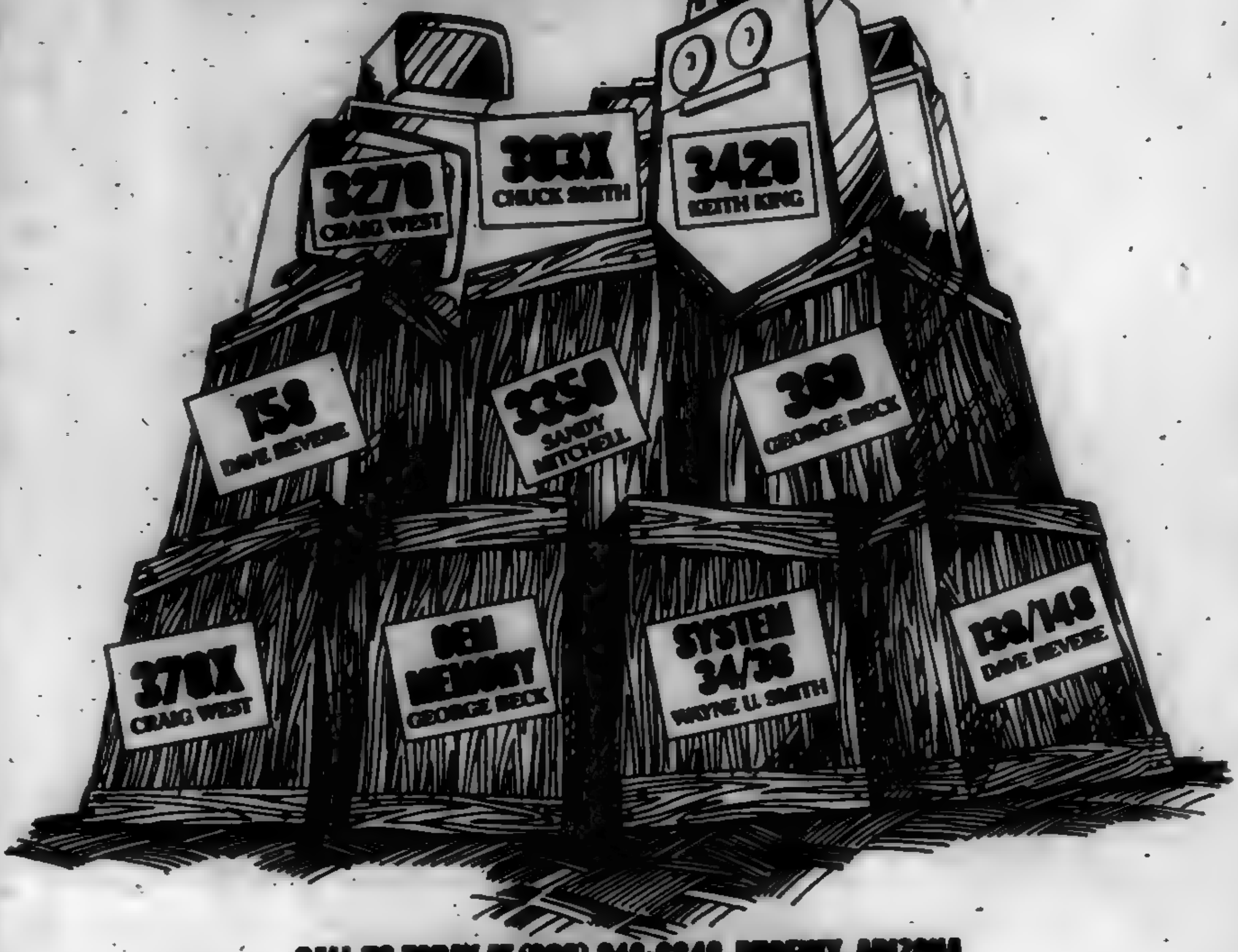

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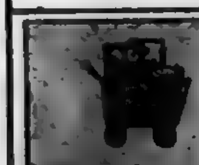

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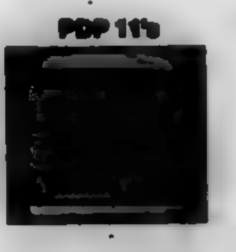

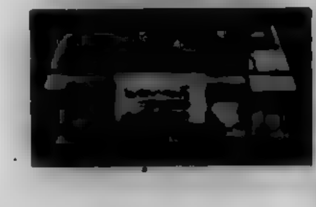

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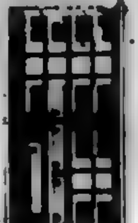

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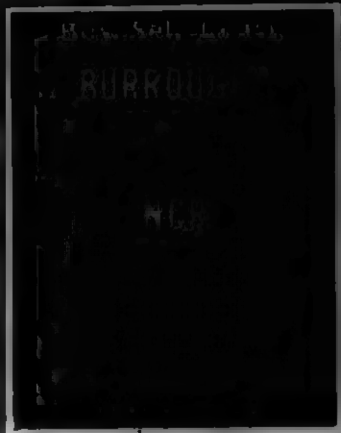
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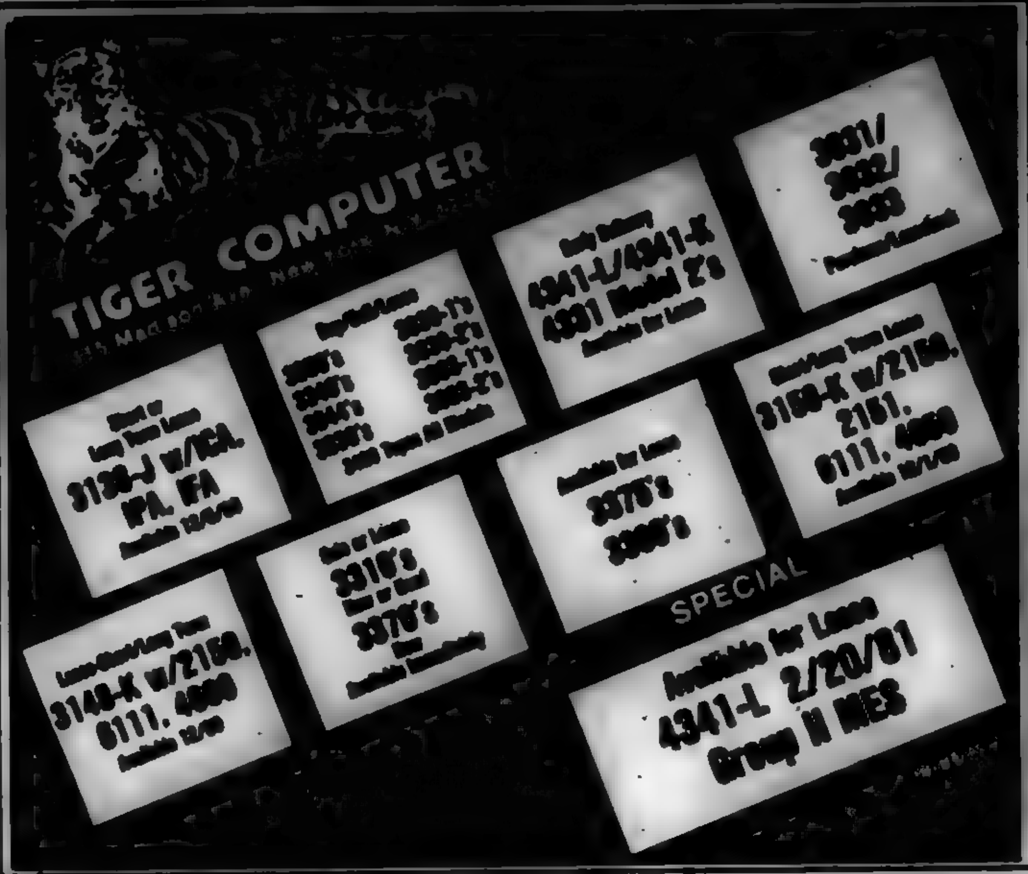
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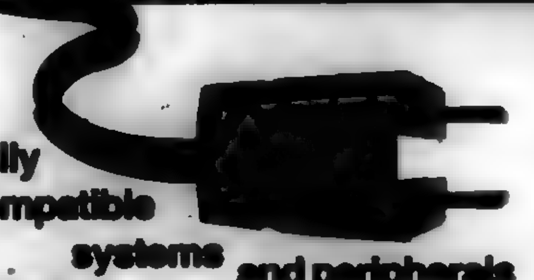

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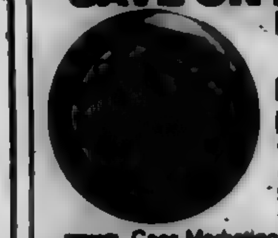

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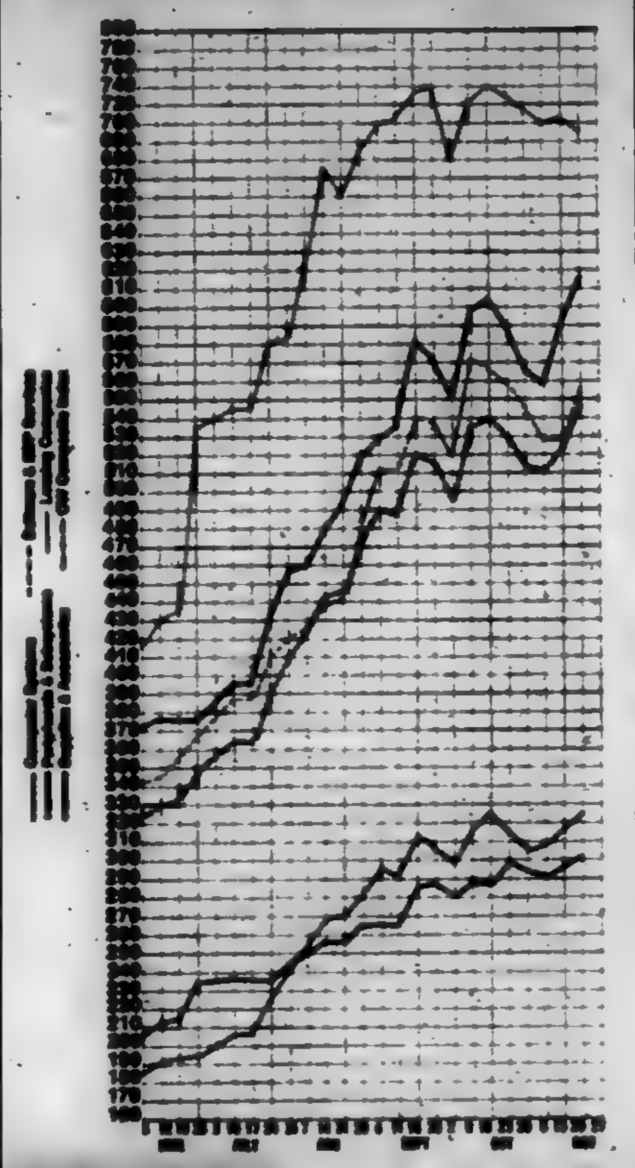

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 19, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 19 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	13- 42	34 3/8	+3 3/8	+10.2
N	BURROUGHS CORP	47- 88	47 1/4	-3 1/4	-6.4
O	COMPUTER AUTOMATION	9- 27	24	+1	+4.3
N	CONTROL DATA CORP	38- 77	72 1/2	+2 1/2	+3.5
O	CRAY RESEARCH INC	30-100	98	+6 3/4	+7.3
N	DATA GENERAL CORP	44- 87	75 5/8	+2 3/8	+3.3
N	DATAPOINT CORP	44-113	111	+17	+18.0
N	DIGITAL EQUIPMENT	52- 97	93 1/4	+5 5/8	+6.2
A	EECO INC	9- 24	20 1/8	+1 3/8	+7.3
N	ELECTRONIC ASSOC.	4- 12	8 1/4	- 1/2	-5.7
N	FOUR-PHASE SYSTEMS	20- 49	27 7/8	+ 1/8	+0.4
N	FOXBORO	31- 57	56 1/4	+2 3/8	+4.4
O	GENERAL AUTOMATION	7- 19	9 1/8	+ 1/8	+1.3
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	46- 95	94 3/4	+10 3/4	+12.7
N	HONEYWELL INC	68-104	99 5/8	+5 1/8	+5.4
N	IBM	50- 79	71 3/8	- 4 1/2	-5.7
O	MAGNUSON COMP SYSTS	20- 46	46	+6 1/4	+14.1
N	MANAGEMENT ASSIST	9- 25	20 3/4	-3	-12.6
O	MANUFACTURING DATA S	22- 75	75 1/4	+1 3/4	+2.3
O	MINI-COMPUTER SYST	2- 4	3 1/8	0	0.0
O	MODULAR COMPUTER SYS	9- 31	27 3/4	- 1/2	-1.7
N	NCR	50- 82	73	+3 1/4	+4.6
N	PRIME COMPUTER INC	13- 56	55 5/8	+7 3/8	+15.2
N	PERKIN-ELMER	24- 67	64 5/8	-2 3/8	-3.4
N	SPERRY RAND	43- 60	57	+5 1/8	+9.8
A	SYSTEMS ENG. LABS	11- 46	46 1/8	+4 1/8	+9.7
O	TANDEM COMPUTERS INC	13- 68	64 1/2	0	0.0
N	TEXAS INSTRUMENTS	79-144	142	+7 3/4	+5.7
A	WANG LABS.	17- 40	45 1/2	-1	-2.2

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 19 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	[illegible] FINANCIAL CP	13- 37	32	0	0.0
N	COMDISCO INC	6- 33	32 7/8	+6 1/8	+22.9
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVESTRS GRP	2- 4	1 5/8	- 1/2	-23.5
O	CONTINENTAL INFO SYS	2- 13	5	+ 1/8	+2.5
O	DATRONIC RENTAL	2- 5	4 1/8	0	0.0
A	DCL INC	2- 6	2 7/8	- 1/4	-8.0
O	DPF INC	5- 12	6 3/4	- 1/8	-1.8
N	ITEL	1- 13	1 1/4	0	0.0
O	LEASPAC CORP	1- 2	5/8	- 1/8	-16.6
A	PIONEER TEX CORP	2- 6	3 5/8	0	0.0
N	RELIANCE GROUP INC	24- 79	49 1/2	0	0.0
N	U.S. LEASING	12- 24	23	+1 7/8	+8.8

SOFTWARE & EDP SERVICES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 19 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 4	5 3/8	+ 1/2	+10.2
A	AMACOMP INC	7- 24	22 7/8	+3 1/2	+18.0
O	ANALYSTS INTL CORP	3- 12	11 1/2	+ 1/4	+2.2
O	APPLIED DATA RES.	6- 24	20 3/4	-1 1/2	-6.7
N	AUTOMATIC DATA PROC	31- 52	51	+1 3/4	+3.5
O	CGA COMPUTER ASSOC	13- 25	22 1/4	-1	-4.3
O	COMPUTER HORIZONS	1- 5	2 3/4	0	0.0
O	COMPUTER NETWORK	4- 9	7 1/2	0	0.0
N	COMPUTER SCIENCES	11- 20	18 7/8	- 3/8	-1.9
O	COMPUTER TASK GROUP	1- 22	23 1/4	+4 3/4	+22.0
O	COMPUTER USAGE	2- 10	8 1/4	+1 1/4	+17.8
O	COMPUT AUTO REP SVC	4- 11	11	+2	+22.2
O	COMSHARE	11- 31	16 3/4	- 1/4	-1.4
O	CULLINANE CORP	9- 39	28 1/2	+7 1/4	+34.1
O	DATA DIMENSIONS INC	1- 6	1 3/8	0	0.0
O	DATATAB	1- 4	1 1/8	0	0.0
O	DSI CORP	4- 9	8 1/2	+1	+13.3
N	ELECTRONIC DATA SYST	15- 27	23 5/8	+1 3/8	+6.0
N	INFORMATICS INC	9- 25	23 1/4	+3 1/4	+16.2
O	INSYTE CORP	1- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/2	- 1/4	-4.3
O	KEYDATA CORP	1- 5	3/4	+ 1/8	+20.0
A	LOGICON	12- 29	28 3/8	- 3/8	-1.2
O	MATHEMATICA INC	5- 18	12 1/2	- 3/4	-5.6
O	MATHEMATICAL APP GRP	7- 23	20 1/2	+2 1/2	+13.8
O	NATIONAL DATA CORP	10- 31	29 3/4	+1 3/8	+4.8
O	PLANNING RESEARCH	5- 13	11 3/8	+ 3/4	+6.8
O	PROGRAMMING & SYS	1- 1	3/4	+ 1/8	+20.0
O	RAPIDATA INC	4- 9	8 1/2	+ 7/8	+11.4
O	REYNOLDS & REYNOLD	21- 34	33 1/2	+1 1/4	+3.8
O	STSC INC	6- 20	19 1/2	- 1/4	-1.2
O	SCIENTIFIC COMPUTING	6- 29	28	+ 1/2	+1.8
N	TYMSHARE INC	24- 87	86 3/8	+10 3/8	+13.9
A	URS SYSTEMS	5- 16	16 3/8	+ 1/8	+0.7
N	WYLY CORP	6- 20	16 3/8	- 1/8	-0.7

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 19 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	14 7/8	- 3/8	-2.4
N	AMPEX CORP	14- 34	32	+ 5/8	+1.9
A	ANDERSON JACOBSON	5- 25	23 3/8	+3 3/8	+17.5
N	APPLIED DIG DATA SYS	5- 12	11 7/8	0	0.0
O	AUTO-TROL TECHNOLOGY	10- 42	40 1/2	- 1/2	-1.0
O	BEEHIVE INT'L	3- 22	21 5/8	+4	+22.6
A	BOLT, BERANEK & NEW	12- 35	33 1/2	+2 7/8	+9.3
N	BUNKER-RAMO	17- 46	39 3/8	- 5/8	-1.5
O	CAMBRIDGE MEMORIES	1- 7	3 1/8	- 3/8	-10.7
N	CENTRONICS DATA COMP	28- 58	30 3/8	-2	-6.1
A	CETEC CORP	3- 7	6 1/4	- 3/8	-5.6
O	COMPUTER DEVICES INC	5- 10	6 3/4	- 1/2	-6.8
O	COGNITRONICS	1- 10	9 5/8	+1 3/4	+22.2
O	COMPUTER COMMUN.	4- 10	3 1/8	+ 3/8	+13.6
O	COMPUTER CONSOLES	4- 29	22 3/4	0	0.0
O	COMPUTER TRANSCEIVER	1- 5	3 1/8	+1 1/8	+30.1
N	COMPUTERVISION CORP	34- 92	90	+ 7/8	+1.1
N	CONRAC CORP	13- 25	18 3/8	+ 3/8	+2.0
A	DATA ACCESS SYSTEMS	6- 20	18 1/4	+ 1/2	+2.8
A	DATA PRODUCTS CORP	11- 28	23 3/8	- 3/8	-1.1
O	DATUM INC	2- 5	4 3/8	0	0.0
O	DECISION DATA COMPUT	2- 6	4 1/8	- 1/8	-2.7
O	DELTA DATA SYSTEMS	1- 3	1 7/8	0	0.0
N	DOCUMATION INC	7- 17	18	+ 3/4	+4.3
O	DATARAM CORP	6- 37	11 7/8	- 1/2	-4.0
N	ELECTRONIC M & R	3- 9	8 5/8	+1 1/8	+15.0
O	EVANS & SUTHERLAND	21- 63	62 1/2	+1 1/2	+2.4
O	FABRI-TEK	1- 4	2 3/8	- 1/4	-9.6
O	GENERAL COMPUTER SYS	1- 7	4	- 3/8	-8.8
O	GENERAL DATACOMM IND	13- 30	30 3/4	+ 1/2	+1.7
O	GENERAL TERMINAL CP	1- 4	2 1/2	+ 1/8	+5.2
N	HAZELTINE CORP	12- 33	28 3/8	-1 1/2	-5.0
N	HARRIS CORP	25- 55	53 3/8	+3 7/8	+7.5
O	INFORMATION INTL INC	8- 13	12 1/4	- 1/4	-2.0
O	INTEL CORP	23- 50	48 3/4	+3 3/4	+8.3
O	INTERSIL	13- 34	33 1/2	+ 1/4	+0.7
A	LUNDY ELECTRONICS	4- 17	11 1/4	+ 3/8	+3.4
O	MSI DATA CORP	5- 16	14 1/8	+1 1/8	+8.6
N	MEMOREX	10- 34	14 1/8	- 7/8	-5.8
N	MOHAWK DATA SCI	10- 31	27 1/8	+ 7/8	+3.3
O	ONEX	2- 12	12	0	0.0
A	PARADYNE CORP	18- 48	48	+1 1/8	+1.9
A	PENRIL CORP	9- 15	12 5/8	- 1/4	-2.0
O	RAMTEK CORP	10- 18	18 1/4	+1 1/4	+7.3
N	RECOGNITION EQUIP	5- 21	19 7/8	+1 3/4	+9.6
O	SCAN DATA	1- 5	1 7/8	-	-3.1
N	STORAGE TECHNOLOGY	13- 35	24 3/8	+1	+4.2
O	SYKES DATATRONICS	10- 38	35 1/4	+1 3/8	+4.2
O	T BAR INC	14- 26	22 3/4	+2 3/4	+13.7
A	TEC INC	5- 9	5 1/4	- 1/8	-2.3
N	TEKTRONIX INC	42- 70	67 3/4	+2 3/4	+4.2
N	TELEX	3- 6	5 3/8	- 1/8	-2.1
O	TESDATA SYSTEMS CP	8- 26	14 3/4	+1	+7.2
A	TIMEPLEX INC	7- 30	30	+2 3/4	+10.0
O	WILTEK INC	1- 3	2 1/8	+ 1/8	+6.2

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 19 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMERICAN BUS PRODS	6- 15	14 3/8	+ 5/8	+4.5
O	BALTIMORE BUS FORMS.	1- 2	1	0	0.0
N	BARRY WRIGHT	8- 23	20 3/4	- 1/2	-2.3
O	CYBERMATICS INC	1- 2	1 1/8	- 1/8	-9.0
A	DUPLEX PRODUCTS INC	11- 16	13 7/8	+ 3/8	+2.7
N	ENNIS BUS. FORMS	13- 21	16 1/4	0	0.0
N	3M COMPANY	46- 63	60	+2 5/8	+4.5
O	MOORE CORP LTD	27- 37	32 7/8	+1 1/8	+3.5
N	NASHUA CORP	30- 38	38 3/8	+1 1/4	+3.4
O	STANDARD REGISTER	22- 35	31	0	0.0
A	TAB PRODUCTS CO	9- 27	25 3/8	+2 1/2	+10.9
O	WABASH MAGNETICS	11- 25	24 1/2	+2 1/8	+9.4
N	WALLACE BUS FORMS	33- 52	40 3/8	- 3/4	-1.8

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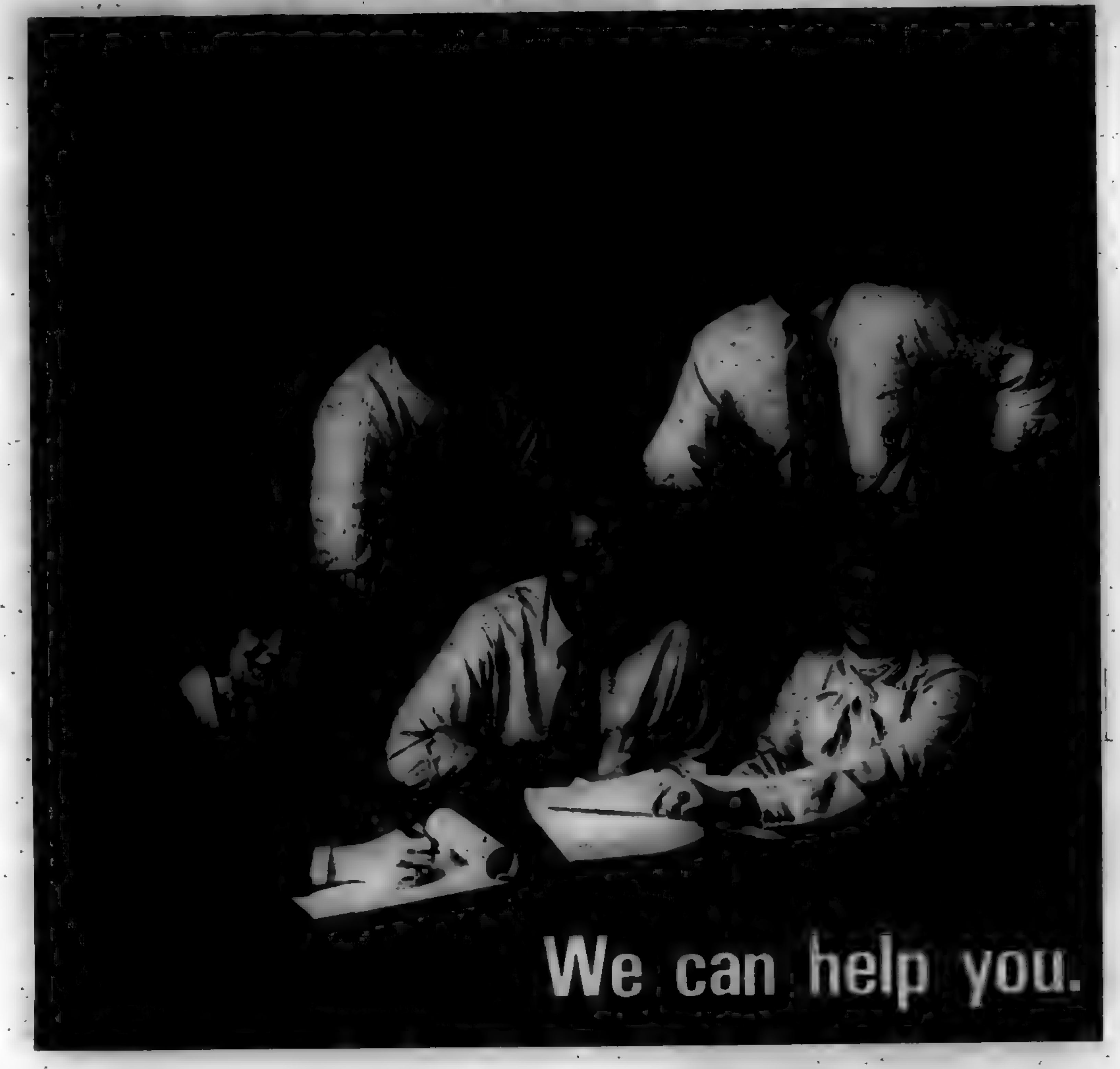
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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Framingham, Mass.; and additional mailing offices
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o. 49 December 1, 1980 $1.00 a copy; $30/year

NEWSPAPER

Industry Spotlight

Processing Services Now A Whole New Ball Game

By Marcia Blumenthal
CW Staff

The processing services industry is evolving into a whole new ball game. Companies that want to avoid striking out with users are intensifying their development of value-added products and services and expanding into specialized markets.

"I don't see a big future for companies offering a lot of diverse services unless they are large enough to do them well like the Service Bureau Co.," suggested Alfred R. Berkeley of Alex. Brown & Sons, an investment banking firm.

Processing service companies increasingly have been selling off or dropping their less profitable service lines, concentrating on specialized services, noted Robert E. Cook, senior vice-president of market development for STSC, Inc. STSC recently dropped its communications services, which were outside of the firm's mainstream business of financial applications.

One of the few total exits from the market recently was Calldata Systems, Inc., the commercial arm of Grumman Data Systems Corp. The firm reportedly failed because "it tried to be all things to all people" and because it never made the transition from raw time-sharing sales to industry-oriented applications sales, one industry observer noted [CW, May 19].

(Continued on Page 10)

Manager Ignorance Blamed For Staff Blues, Turnover

By Bruce Hoard
CW Staff

WALTHAM, Mass. — DP management is contributing to high industry turnover through ignorance of workers' wants and needs, according to a recent study conducted by International Data Corp.'s Information Systems Planning Service (ISPS).

Employees and management generally agree salary is the most important factor in attracting potential employees. What management fails to discern, however, is the decreased importance of salary after a DPer is hired, the study found.

"Acquiring and Retaining EDP Personnel" was based on interviews with 38 employees — programmers, systems analysts, managers and "other." "Other" consisted of DPers in areas such as customer training, data acquisition and security.

In addition, 28 employers as well as eight students were interviewed.

The report showed that DPers are strongly influenced by motivators, satisfiers and dissatisfiers when considering accepting or remaining with a job. It also showed that employers interpret those factors differently, leading to unnecessarily high turnover rates.

Some suggestions for keeping workers happy include rewarding their technical and personal relations skills and convincing top management

(Continued on Page 8)

MVS Users Unsure How Best to Keep Up

By Tom Henkel
CW Staff

IBM's rapid-fire announcement of three releases of its MVS/SP operating system in the past six months has left users of that software wondering how to best keep up with the changes.

Users and industry analysts last week agreed that the amount of time and money a DP shop can devote to MVS updates would govern that decision.

IBM made its first attempt at giving the MVS operating system a boost in power last June. At that time it changed MVS' name from MVS/-System Extensions (MVS/SE) to MVS/System Products (MVS/SP) and announced two releases, 1 and 2. Volume shipments of Release 1 are just starting to make their way to end users, and Release 2 is slated for volume deliveries in the fourth quarter of 1981. On Nov. 12, IBM announced that Release 3 of its MVS software will be available during the fourth quarter of 1981.

How to Migrate?

The big question for current MVS users is how to migrate to Release 3. Taking each MVS/SP release in turn will probably cut down on long-range problems, because software bugs will be ironed out in a staggered fashion, IBM analysts and users agreed.

Additionally, if the enhanced MVS is installed in three pieces, the management information systems (MIS) staff will be more familiar with it. That will be a big help when a shop tries to install new applications and new IBM hardware and software. If some-

(Continued on Page 6)

Stores Get 3-D Scanner

By Bruce Hoard
CW Staff

WHITE PLAINS, N.Y. — IBM has introduced a holographic supermarket scanner that improves on previous scanners by reading the Universal Product Code (UPC) from a variety of angles.

Designated the 3687, the laser-based scanner represents one of the first commercial uses of holography.

It owes its versatility to the three-dimensional properties of the holographic process. The three-dimensional effect is created by a ring of mirrors that reflect light and act as lenses and prisms, IBM said.

As the scanner senses the UPC being drawn toward it, it emits a variety of illuminating rays that reach out in different directions and heights, creat-

(Continued on Page 2)

Eight Comdex Visitors Die

By Deborah de Peyster
And Rory J. O'Connor
Special to CW

LAS VEGAS — More than 450 people here for the recent Comdex '80 representing about 150 companies were among those trapped for as long as six hours in the MGM Grand Hotel while poisonous gases and smoke swirled throughout the building from the inferno below.

At press time, eight persons attending or exhibiting at the Comdex show were known dead. Countless others with smoke-tinged faces milled around the conference floor with only the clothes on their backs. They were glad to be alive.

Among the 84 victims of what has become one of the worst hotel fires in the nation's history were Edward W. Herring, a product manager at Printronix, Inc. in Irvine, Calif., and his wife of only three weeks, Genese H. Bartlett Herring; a Printronix distributor, Richard Sipfle, senior vice-president of Lowry

(Continued on Page 4)

CW Photo by V. Farmer

Countless Comdex '80 visitors were rescued from the blaze at the MGM Grand Hotel in Las Vegas.

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-0010-4841) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.00 a copy: U.S. – $30 a year, Canada, Central & So. America – $50 a year; Europe and Near East – $90 a year; other foreign – $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Cullinane Interfaces IDMS, DMS

By Rita Shoor
CW Staff

WELLESLEY, Mass. — Cullinane Corp. last week announced an interface between its Integrated Data Management System (IDMS) and IBM's Development Management System (DMS) along with a data dictionary called the Information Directory (ID). ID is the latest component of its Audit Information Management System (Aims).

The IDMS/DMS interface provides IDMS data base support for users of IBM's DMS and CICS/VS software, according to a Cullinane spokesman.

It reportedly enables users to retrieve and update IDMS data base information through DMS in an on-line CICS/VS environment. Included among the facilities offered by the product are:

- Inquiry and update capabilities.
- Keyed access to specific record occurrences in a path.
- Browse capability that allows users to proceed forward or backward through record occurrences at the desired path level.
- Data from multiple IDMS record types displayed on the same screen.
- A repeat capability that allows multiple record occurrences to be retrieved and displayed on the same screen.
- Built-in interface functions such as get-first, get-next, and get-prior, which operate according to user-specified navigation paths.

Batch components of the IDMS/-DMS interface are used to prepare data base descriptions and on-line components communicate with IDMS Central Version to access data base records, the spokesman explained. On-line transactions that utilize this product are pseudo-conversational in nature, he said.

Comprising the second part of the firm's announcement, the ID was designed to enhance program productivity in an audit environment, according to Cullinane. It combines a report generator with a library of audit routines to allow for management, programming, reporting, protection and control of corporate assets by auditors.

Additional ID features include:

- A facility that enables auditors to verify the completeness and accuracy of controls.
- Automatic provision of key audit information.
- Enhanced audit independence.
- Reduction in errors caused by redundant, inconsistent or erroneous data element names.
- Elimination of manual input coding.
- Facility for limiting access to corporate financial information.

Available immediately, the IDMS/-DMS interface feature costs $10,000 and the ID is currently priced at $9,500. As of March 1, 1981, ID will cost $12,000, Cullinane said from its headquarters at Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.

Corrections

In the recent story "Amdahl Unveils Rivals to IBM 3081 Processor" [CW, Nov. 24], Amdahl's 470V/7 processor should have been listed as being able to handle a maximum of 32, and not 16, I/O channels. Also, in the chart accompanying the article, IBM's price for its 3081 is the cost of the processor only, with no console. And Amdahl's monthly lease price for four years for the full-scale 580-5860 is $105,100. The monthly lease price for the 5880 has not yet been released.

Stores Get Holographic Scanner

(Continued from Page 1)

ing a dense depth of field, an IBM spokesman said.

This increased focal depth enhances the scanner's ability to make contact with the UPC marking. Nonholographic laser scanners are limited by their shallower depth of field and thus required closer alignment with the UPC, he said.

The 3687 reportedly requires no special skills to operate and works in conjunction with five recently announced models of the 3683 point-of-sale supermarket terminal, featuring high-density memory technology.

The five models of the 3683 can be equipped with modular print stations, alphanumeric or numeric display panels, cash drawers and keyboards.

Other programs available for the 3683 generate customized store reports on its printer, build and maintain store files and provide store-to-store communication in chain store operations, the spokesman said.

First customer shipments of 3683 terminals are scheduled to begin in the first quarter of next year. Shipments of the 3687 scanner and 3683 models to which the scanner can be attached are scheduled for the third quarter of next year.

Equipment for a checkstand that includes the scanner, terminal with three print stations, a keyboard and cash drawer can be purchased for $10,033, IBM said.

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ELECTION

Who got 69% of the vote?

(a) Carter ____
(b) Reagan ____
(c) Anderson ____
(d) SyncSort ____

Call (201) 568-9700.

It's sorting's Oval Office.

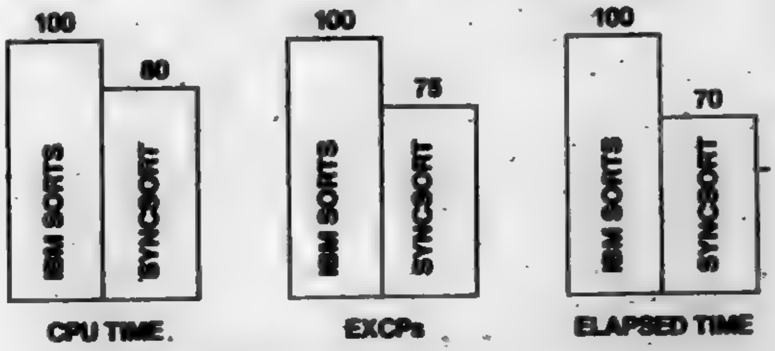
The correct answer is (d)...SyncSort. If you guessed it, congratulations! You are a very shrewd data processor indeed. So shrewd you're probably already a SyncSort user. A lot of people are.

SyncSort is now the sorting choice of 69% of America's major data processors, according to the 1980 annual sort-program survey conducted by the International Data Corporation. Here are a few of the reasons for our stunning electoral victory:

1. LEADERSHIP IN SORT REFORM: In less than a decade, we've succeeded in taking the sort program out of Tammany Hall and turning it into a productive, hard-working public servant.

Virtually every sorting innovation since 1971 has been introduced in a long line of SyncSort releases. In terms of resource savings, we have made sorting one of the most advanced areas of data processing.

Today, if you compare SyncSort's performance against that of the candidates of the "Hardware Party," you'll see savings like this:



2. A FAIR DEAL FOR PROGRAMMERS: Those long lines you saw outside the polling booths were programmers waiting to vote for SyncSort. They've never forgotten that we were one of the first proponents of "A Reduced Work Week for Applications Programmers." (ARWWAP)

SyncSort has been designed to take the blood, sweat, toil and tears out of sorting. It includes a host of labor-saving features like INCLUDE/OMIT, INREC/OUTREC, SUM, and others.

In typical selection-report applications or modifications, a job that would take five days using a programming language can be handled by SyncSort in just one day.

3. RESPONSIVENESS TO THE VOTERS: We've never forgotten who's boss. We work for the users, they don't work for us.

When our Technical Service specialists get a call, they follow it up fast and accurately. Our new TSR system (Technical Service Requests) is so good that 85% of all requests for assistance or advice are resolved within 24 hours!

Are we going to rest on our laurels? Nope, we're now hard at work on our Inaugural Address.

It's got one line that goes: "Ask not what you can do for your sort program. Ask what your sort program can do for you."

OVERSEAS REPRESENTATIVES—
Düsseldorf: SyncSort Technology GmbH,
Tel.: 0211-480351
Johannesburg: Computing Benefits Ltd., (011) 46-521
Melbourne: Shell Co. of Australia Ltd., (03) 8400311
Milan: SYNTAX, (39-2) 87. 74. 44
Paris: CAP/SOGETI Produits, 33-1-539-22-25
Reading (UK): SyncSort Technology Ltd.,
44-0734-481919
Stockholm: BRA, 46 8 88 03 00
Tel Aviv: ADVANCED TECHNOLOGY Ltd., 442697
Tokyo: Software Engineering Co., Ltd., (03) 446 1811
Utrecht: SyncSort Technology BV, 030-31-26-11

WHITLOW
COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Hotel guests gathered on balconies to await rescue. Some who were not so patient fell or jumped from makeshift lifelines.

Unused exhibit space in the East Hall of the Las Vegas Convention Center, site of Comdex '80, was hastily turned into an evacuation center for survivors.

Smoke billowing from the burning hotel made balconies a dubious choice for many who waited there.

Vendor Reps 'Just Tried To Help'

Special to CW

LAS VEGAS — It wasn't until about 9:30 a.m. Nov. 21 that Marge Gilette recognized the scope of the disaster that was unfolding at the MGM Grand Hotel.

She was not alone. Most people had seen the hotel fire, as she did, on their way to the Las Vegas Convention Center, site of Comdex '80, but few realized the numbers of homeless and injured that would need help.

It was not until an associate of Gilette's received a panic-stricken phone call concerning the safety of relatives and friends that she recognized something should be done to answer the hundreds of similar questions that were flooding into the area.

Fortunately, she was in a position to help. Gilette is a market representative for Commodore Business Machines, Inc. and had at her disposal several Commodore systems brought to Comdex to demonstrate a list management system.

Within one hour, two complete systems had been hand-carried or wheeled on dollies to the east wing of the convention center and set up to process names.

Within another few hours, as the number of names increased beyond anyone's imagination, Honeywell, Inc. representatives appeared on the scene with a Level 6 computer system to further help in the listing process.

Together, microcomputer company and minicomputer company representatives worked out programming and data entry coordination to produce hourly, up-to-date alphabetized listings of survivors' names and whereabouts.

"We just tried to help," Gilette said. "That's what we were there for. It was a joint effort."

The MGM Grand, engulfed in smoke, is shown viewed from the Hilton, about two miles away, where other Comdex attendees were housed.

Eight Comdex Visitors Die in MGM Hotel Fire

(Continued from Page 1)

& Associates of Brighton, Mich.; Joseph Bell, head of engineering for Tiffany Stand and Furniture Co., of Conway, Ark.; two office machine dealers from Indianapolis, David F. Sanders, 39, and Barbara J. Sanders, 37; and two Alpha Micro dealers from Midwestern Digital Electric, David Blair Jr., 26, of Columbus, Ohio, and his partner James E. Thebeault of Mansfield, Ohio.

The Comdex exhibition was being held at the Las Vegas Convention Center, about two miles from the MGM Grand.

Convention Survivors

Survivors from the fire began straggling back to their booths on the convention floor shortly after 10 a.m. Friday, about three hours after the fire erupted in the faulty electrical system in the hotel's first-floor kitchen area.

The mood was subdued and one of disbelief as the executives who had done business in three-piece suits the day before returned to their booths that morning disheveled and dirty. Some had blankets wrapped around their shoulders.

They told of being awakened by screams or the sound of fire engines to find their rooms filling with smoke and the hallways mobbed. They spoke of the lack of warning from any fire alarm and the search for fresh air in the midst of dense acrid smoke that quickly filled the hotel.

Many who attempted to find their way down the stairway, only to be confronted with a column of smoke gases, returned to their rooms to await rescue.

The photos above and on Page 1 were taken by Victor J. Farmer, editor of Computer Business News *(CBN). Farmer, along with Deborah de Peyster, a CBN West Coast editor, and Rory J. O'Connor, CBN senior editor/software, were in Las Vegas covering Comdex '80.*

Stories Emerge

Other stories also began to emerge during the day — stories about the generosity and concern of fellow Comdex exhibitors and attendees.

A Data General Corp. exhibits manager, Bob Kneeland, never went to his booth that morning. Instead he headed to the MGM in hopes that his fire training could be of help.

A man from Onyx Systems, Inc. gave his room to four people from Corvus Systems, Inc., and many other exhibitors offered their rooms as well, in an effort to help the survivors shower and find clothes.

And Commodore Business Machines, Inc. and Honeywell, Inc. brought equipment from their booths to the evacuation center in the east wing of the convention hall. They worked through Sunday making lists of names from the hundreds of people being bused there from the hotel and from lists provided by the five hospitals aiding in the emergency.

Michael Segroves and Gordon Hoffstein of Micro-America Distributing Co. of Needham, Mass., were two Comdex exhibitors who were trapped until 9:30 on the 17th floor of the MGM. They had tried to escape, but found all the exits impassable because of the smoke. They returned to their room to wait with about 20 other residents of the floor for help.

Segroves, coughing from the smoke, described the scene as "pretty grim up there. It was hard to breathe and all the exits were smoky."

"The worst thing was the uncertainty," he said of the long wait on the room balcony.

Two hours after they were rescued, both men were manning their booth, Hoffstein still coughing and Segroves nervously smoking a cigarette.

Steve Koch of Pertec Computer Corp. said he awakened to the sounds of people screaming. By then, the smoke was so thick in the hallway he couldn't see anything and retreated to his room balcony. His room had no running water or phone and he was getting "just a little bit panicky" when the firemen rescued him.

Tom Dunn, the national sales manager for Perkin-Elmer Corp., stood with five regional managers at the Perkin-Elmer booth recounting their narrow escape. The six men were coughing, covered with smoke soot and looking for aspirin for their headaches. One of their group had inhaled quite a bit of smoke and had to be carried from the hotel.

Dunn said that they threw chairs through the window in their room to get more air and "were on the floor with our noses in the corners saying Hail Mary's."

Claims Reputation, Sales Hurt

Burroughs Hits Quality Books With Countersuit

By Tim Scannell
CW Staff

NORTHBROOK, Ill. — Burroughs Corp. has filed a $1.5 million countersuit against Quality Books, Inc. here, charging the book distributor with "false or misleading" statements about the firm's computers that have resulted in lost sales.

The Detroit-based computer vendor is seeking actual damages in excess of $500,000 and $1,000,000 in punitive damages. In addition, Burroughs is asking the court for an injunction prohibiting Quality Books from making any more statements about the company or its products.

Quality Books filed a $1.9 million suit against Burroughs about six weeks ago, charging that the vendor knowingly sold it a defective B800 computer system.

Before filing the suit, the book distributor placed ads in both the regional and national editions of *The Wall Street Journal* asking to hear from other Burroughs users who may have had similar problems (CW, Sept. 8). To date, nearly 600 replies have been received from around the world, the company claimed.

In an answer and counterclaim to the suit, Burroughs said that Quality Books committed and continues to commit acts "with the sole, malicious intent to injure Burroughs' business, to destroy Burroughs' existing and prospective business relationships, and to coerce Burroughs to meet Quality Books' monetary demands."

Burroughs "has suffered, and is continuing to suffer, identifiable losses of sales of computer products" as well as a "loss of reputation and business good will," the counterclaim stated.

The counterclaim also categorically denied nearly every accusation made by Quality Books against Burroughs in the book distributor's original suit. Also, while the six-count claim, filed in federal court in Chicago, specified that Burroughs' sales were "identifiably" hurt, the company did not say just how severely sales figures were affected.

"I think it's an act of intimidation," Tony Leisner, Quality Books' general manager, said of Burroughs' countersuit. In effect, Burroughs is saying "Hey, all you little companies out there, just take your licks and shut up, or otherwise we'll sue your pants off!"

At least 50 lawsuits have been filed against Burroughs by other unhappy B80, B800 and B700 small computer users, Quality Books' attorney Marvin N. Benn has claimed. And "it may get larger," he said, adding that he is presently representing eight disgruntled users in suits against Burroughs.

A Burroughs spokesman last week refused to acknowledge Benn's figures or state exactly how many legal actions are pending against the company for the B800 computer.

Quality Books' Leisner contended that it is the deluge of letters generated by the unconventional ad and the resultant flurry of law suits by other dissatisfied Burroughs users that have caused the vendor to seek an injunction against the book distributor.

Burroughs "is really looking to sweep this thing under the rug," he claimed. "One little company having a bad computer is not news. What is news is that 600 companies responded to the ad or articles about it."

Meanwhile, both Quality Books and Burroughs are gearing for an all-out legal war that could take some time to decide and whose outcome would reflect on the vendor's reputation in the small business computer community.

Burroughs is reportedly gathering written praises of its small business systems from present users and digging up past bouquets from the firm's files. The firm is also preparing filmed testimonials from satisfied users and drilling its sales force on how to respond to any aspersions cast by the Quality Books affair.

The flack created by the small publisher comes at a bad time for Burroughs, particularly since earnings have been plummeting since the end of last year. In the third quarter this year the company's earnings fell 32% and total earnings in 1980 probably won't exceed $6 a share, compared with $7.45 a share in 1979, according to W. Michael Blumenthal, Burroughs chief executive officer.

In addition, any shadows that mar the reputation of the firm's B800 computer line could affect the sales of Burroughs' B900 series of computers, which were brought out as replacements for the B800 line. At the moment, the company is shipping one B800 series computer to every B900 model, according to published reports. Burroughs has about 20,000 small business systems installed in the field.

On the other front, late last week Quality Books was expected to file an answer to Burroughs' counterclaim denying allegations of interference of business opportunities and contractual obligations and any intent on its part to harm the firm, the publisher's attorney said.

When asked about the wisdom of placing the experience-soliciting ad in a national newspaper — a move that did not especially please Burroughs execs — Benn called it a "beautiful move, in view of the facts of the case."

For every reason you have to choose CICS, there's an even better reason not to.

SHADOW II

Not long ago, everyone had a very good reason for electing to use IBM's CICS TP Monitor. There simply wasn't a good alternative. But since the advent of SHADOW in 1973 and ultimately SHADOW II in 1975, there's every reason to reconsider. Look for example at the reason many people cite for choosing CICS... compatibility with IBM hardware. A good reason, indeed, but in truth...

SHADOW II is even more compatible. And well it should be. INSAC Software's business is, after all, exclusively software. So all our energies are put toward developing, improving and enhancing systems software to make the best use of IBM hardware. In short, in this area, we can out IBM IBM.

For those who reason that it's simply easier to buy and install a TP Monitor from the same people you buy the hardware, we'd like to point out this.

SHADOW II's technical consultants know IBM hardware as well as IBM technical consultants. And because SHADOW II is such an advanced TP Monitor, it can typically be installed in less than one hour. Compare that to the time it takes to install CICS.

And while there seems to be a great deal of wisdom in reasoning that technical support and maintenance will be better for CICS by virtue of its being an IBM product, consider the reality of the matter.

SHADOW II has, in the first place, far lower technical support requirements than CICS. But when such support or maintenance is required, an ample and highly capable support team stands ready on a moment's notice to provide necessary service. In fact, present users and objective evaluators alike cite this area as one of SHADOW's greatest strengths. In addition, our technicians provide four days of intensive, on-site, classroom education in using the SHADOW package.

Finally, for those who reason that despite the problems which CICS has become notorious for, it is still a risk to buy a TP Monitor from a company other than IBM, we would like to summarize by saying this:

SHADOW II has long continued to outperform CICS on virtually every important criteria. And while IBM has made attempts at correcting problems, CICS performance still falls dramatically short of SHADOW II in memory usage, CPU utilization, response time, application development time and programmer training time. In short, no matter how IBM has added to, taken away, or otherwise repackaged their system...it's still CICS. And therein lies the problem.

So if we haven't already given you reason enough to consider SHADOW II for your TP Monitor, we welcome the opportunity to give you more. And it just doesn't seem reasonable not to let us.

INSAC
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I want to learn more about SHADOW II

NAME ADDRESS
TITLE CITY STATE ZIP
COMPANY PHONE HARDWARE OPERATING SYSTEM

Suit Cites Program Theft, Asks $1.7 Million Damages

By Marguerite Zientara
CW Staff

ATLANTA — Programmed Closing Systems, Inc. (PCS), a small real estate- and mortgage-related software firm here, has filed a $1,750,000 lawsuit against Minnesota Title Financial Corp. (MTF) of Minneapolis, charging theft of a program that PCS had licensed to MTF.

Filed in U.S. District Court here, the suit alleged that MTF appropriated the program with the intent to disseminate it to "unauthorized persons" for its own profit.

MTF allegedly entered into a contract on Jan. 31, 1978 for "multiple-sale" rights to PCS' Mortgage Information and Servicing System (MISS), according to PCS President Krishna Srinivasa.

Under the contract, MTF agreed to pay PCS royalties on the program as MTF gradually disseminated duplicates of it to MTF's "several" regional offices, Srinivasa claimed. In addition, MTF allegedly agreed not to modify the software in any way.

However, MTF subsequently modified the software and then claimed it was not responsible for paying royalties on the package that it made accessible to personnel in various locations via terminals, the suit alleged.

MTF is "supposed to tell us and ask our permission in writing where they're going to use the software and they didn't inform us," Srinivasa said. "Every time they use the terminal, they should let us know so that we can keep track of where all the software is being utilized.

"Because it's on-line software, they may be in Alaska and be using the same software there," he added.

The program in question is a fully automated loan processing, secondary marketing, document preparation, title policy and binder preparation and loan servicing system, he explained.

Further Charges

The suit also charged that last August, PCS was "confronted by" MTF representatives who said that unless PCS would waive the "Restriction on Disposition or Use of Program" and "Covenant Against Disclosure," contained in the software license agreement, MTF "would harass [PCS] by instituting spurious legal claims against [PCS] and, further, would disparage [PCS'] product and discourage other companies from doing business with [PCS]."

In addition to charges of larceny of trade secrets and breach of contract, the suit alleged that MTF is guilty of product disparagement, defamation and fraud.

"This lawsuit will have a major impact on the software industry since this will decide the issues on proprietary rights and trade secrets in software," Srinivasa said.

The suit focuses on "people who take software and make little modifications and then say it is theirs," he added. "Small software companies cannot fight with the bigger companies . . . and I feel strongly that it should be prevented.

Besides the general damages of $1,750,000, the suit seeks an injunction to prevent further use of the program by MTF, as well as an accounting of any profits attributable to allegedly unauthorized use, and punitive damages in the amount of $2,500,000.

Reached by telephone the day after Minneapolis Title was served with the suit, an MTF spokesman explained the company's president was conferring with outside counsel and was expected to issue a statement late last week, after *Computerworld's* press time.

MCBA Wins Software Case

GLENDALE, Calif. — After a three-year battle, Mini-Computer Business Applications, Inc. (MCBA) has received a final judgment and permanent injunction against Business Information Systems, Inc. (BIS) of Hillsborough, Fla., in a proprietary rights software case.

In the spring of 1978, MCBA filed suit against BIS for misappropriation of MCBA's software for use on Digital Equipment Corp.'s 310, 340 and PDP/11 hardware systems, according to an MCBA spokesman.

The use of the "improperly acquired" copies of MCBA packages by BIS was judged by the Court of Tampa, Fla., to have been a misappropriation of MCBA proprietary software, the spokesman said.

In addition, the marketing of the software by BIS was argued to be unfair competition, which was supported by the court Oct. 17. The court decree enjoined BIS from using, selling or leasing any software developed by MCBA or derived from MCBA software for a period of not less than 10 years.

BIS was further enjoined from advertising or disclosing any information about MCBA's software. Furthermore, BIS was ordered to provide a list of all names and addresses of people to whom BIS had furnished any of MCBA's software, advertising material, price lists and other materials.

BIS was ordered to return all MCBA software and materials of MCBA, the spokesman added. A damages hearing against BIS is set for Jan. 12.

MCBA is currently pursuing four other alleged offenders, the spokesman noted, and is offering a license for one software package to any person reporting knowledge of illegal use of its software, upon successful prosecution of the illegal user.

Industry Analysts Assess IBM Strategy for MVS/SP

By Tom Henkel
CW Staff

GREENWICH, Conn. — Why all the releases of MVS/SP?

Rumors have been flying since IBM's Nov. 12 announcement of MVS/SP Release 3 and the 3081 processor, but at least two industry analysts here said last week that IBM has a few more tricks up its sleeve.

IBM announced three releases of MVS because the firm is developing its hardwafe at a faster pace than its software, Dave Stein, an analyst with The Gartner Group, theorized. Since IBM did not want to postpone announcing major products like the 3380 and 3375 disk drives and the 3081 processor, the computer vendor was forced to announce software support for those products in a staggered fashion.

Further, IBM's announcement of the 3081 without a native operating mode suggests another operating system may be on the horizon. Users can expect that new operating system to have more of the characteristics of DOS/VSE such as increased modularity. The new operating system will offer better performance with less overhead than MVS, he claimed.

To stay ahead of the plug-compatible mainframe (PCM) vendors in the marketplace, IBM has to make drastic changes in its operating software, Stein commented.

When the changes will come, however, is the big question. Bob Fertig, president of Advanced Computer Techniques, said IBM has some big performance changes lined up for MVS/SP Release 3 that will send PCMs like Amdahl reeling. Release 3 is still 370-era technology and if, as Stein contends, the successor to MVS transcends the 370 era, the changes will probably come soon before IBM announces more models of its H series — of which the 3081 is said to be a mid-range model.

With that in mind, MVS/SP Release 3 may be the last of the 370-era software. The next release will probably be the 3081 native mode, Stein said.

MVS/SP Users Unsure How to Keep Up

(Continued from Page 1)

thing goes wrong, one user explained, it will be easier to pinpoint the problem if the staff knows the operating system.

Installing each of the three releases, however, is expensive — for many users an unaffordable luxury. One MVS user estimated it would take his organization two to three months to install and test Release 1 (assuming the installation and testing is being done during nonpeak hours). He estimated it would take another two to three months to install Release 2 and three to four months to install Release 3.

Full Disk Speed

MVS/SP Release 1 is the entry path to the new levels of MVS. The biggest advantage of installing Release 1 is it allows use of IBM's bigger and faster 3380 and 3375 disk drives at full speed. Current MVS users would have to install a speed-matching buffer, or software that slows the new disk drives to a level that can be managed by the operating system. But since neither the 3380 or 3375 is available to end users yet, analysts like The Gartner Group, Inc.'s, Dave Stein and Advanced Computer Techniques Corp.'s Bob Fertig said most MVS users planning to use those devices will probably migrate to Release 1 before delivery.

Another advantage offered by a quick migration to MVS/SP would be readiness to install new program products that might be announced to run only on newer releases of MVS.

As one MVS user put it, if management decides it wants a new IBM program product, installation will be much easier if the MIS department doesn't have to bring up a new program product and a revised operating system at the same time.

The most likely candidate for elimination from a user's upgrade plans is MVS/SP Release 2. Analysts agree the only difference between MVS/SP Release 2 and Release 3 is Release 3 will work better. IBM has promised a throughput improvement in Release 3, but it won't say how much the improvement will be until the first customers receive copies of the release.

Furthermore, Release 2 will be available for volume shipments in the third quarter of 1981 — probably around June. Release 3 will be available for volume shipments in the fourth quarter — probably in November or December.

So why bother with Release 2? From a user's standpoint, it's clear: Practice may not make perfect, but it helps. One large MVS shop plans to bring up MVS/SP Release 2, but never put it into production. The plan is the shop will have hands-on experience on what changes have to be made to accommodate MVS/SP Release 3, the user said.

Another big advantage of Release 2 is cross memory — an architectural extension that allows communication among address spaces in an MVS/SP-JES2 environment. A key ingredient to cross memory is global resource serialization (GRS), an extension to the MVS ENQ/DEQ serialization function that allows ENQ/DEQ control blocks to be removed from system virtual storage and placed in a private address area. That means in a multisystem environment, systems can be connected by channel-to-channel adaptors and share resource serialization.

In addition, GRS will run in its own address space and is protected against accidental modification. In short, GRS provides information about an object without requiring an application to look at the internal ENQ control block, according to IBM.

The advantage of cross memory and GRS is it uses up less virtual storage.

The bad news about GRS is it may require reprogramming, or at least regenerating, some applications to use it at peak performance — Release 2 is an excellent vehicle to make those kind of programming changes, according to some users.

For users who need more virtual storage, Release 2 may not help much, since Release 3 may well be on the market before users have a chance to install and test Release 2, both users and analysts contend. But a switch to Release 2 may give those users a jump on implementing Release 3.

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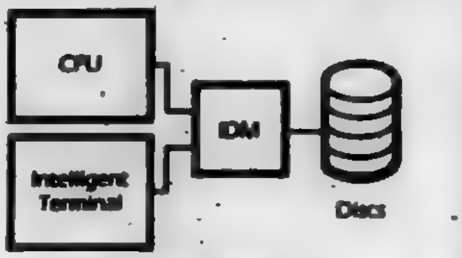

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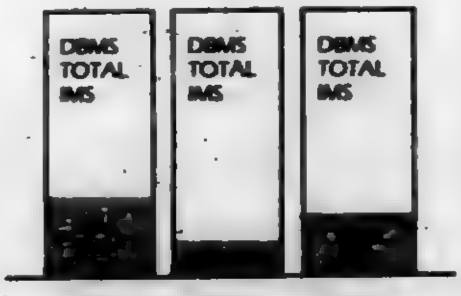

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Among DP Personnel

Management Found Top Source of Discontent

By Bruce Hoard
CW Staff

WALTHAM, Mass. — Although many employers blame high salary demands for their inability to retain DP personnel, a sampling of those employees shows poor management as the primary source of discontent.

That was one of many findings published by the Information Systems Planning Service (ISPS) of International Data Corp. in a recent study entitled, "Acquiring and Retaining EDP Personnel."

Three Factors

ISPS reached its conclusions by studying three basic tools: motivators, satisfiers and dissatisfiers.

The report defines motivators as "those specific impulses a person feels that influence the person to initiate a course of action." For instance, when passing a restaurant, a person may be motivated to stop and eat.

"Satisfiers are those forces which make a current situation pleasant or rewarding, while dissatisfiers do just the opposite. Such forces can work only after a situation has been entered into, and thus differ from motivators, which function primarily before the fact," the report noted.

Undesirable Aspects

Programmer/analysts, systems analysts, managers and "other" were asked about the least desirable aspects of the company or management at their present job. They were also asked what factors were most often ignored or fouled up by any DP employer.

In response to the first question about dissatisfiers, three of the four groups cited "poor management," with programmer/analysts picking "little chance to advance." On the second question, "poor management planning" was cited twice, along with "management insensitivity to workers' needs."

Overall responses included poor management, poor company planning, little chance to advance, poor facilities or equipment, poor benefits, poor pay, politics, personnel management system and little company commitment to DP.

Positive Side

On the positive or satisfier side, the same people were asked about the most desirable aspects of their current job's management, factors contributing to job satisfaction and the most important considerations in staying with a job.

Three of the four groups listed "work atmosphere" as the most desirable aspect of their present job, while managers listed it second behind "variety of work."

"Feeling of accomplishment" topped the factors contributing to the job satisfaction response list with all but systems analysts, who had it second behind "company management."

There was only slightly less unanimity on the question of most important considerations with staying with a job. Systems analysts and "other" agreed that "opportunity to advance" was most important, while that response was second in the minds of programmer/analysts and managers. Those two groups cited "increased expertise/training" and "salary," respectively.

Overall Response

Overall response to the three questions relating to satisfiers and including most desirable aspects of a current job, factors contributing to job satisfaction and the most important considerations in staying with a job were feeling of accomplishment, good management, good work atmosphere, good salary, recognition, responsibility, chance to advance, challenge, chance to increase expertise, user contact and quality coworkers.

The fact that salary had little bearing on any of the questions concerning job dissatisfaction reflects the study's assertion that incentives for accepting a job are not always the same as those for staying with a job.

That argument is further supported by examining the answers to these two questions: What are the factors making an employer most attractive and what are the most important considerations in choosing a job? It is in these areas that salary became much more important.

Salary Top Motivator

When it came to most important considerations in choosing a job, "salary" was the most important motivator with each group except "other," which had it second to "chance to advance."

As far as factors making an employer attractive were concerned, salary was number one with programmer/analysts and managers, but tied for third with systems analysts and fourth with "other."

Systems analysts cited "benefits" and "location" first and second, while others ranked "opportunity to advance," "work environment," and "location" and "company management" (tie) ahead.

The overall response for these two questions were salary, chance to advance, work environment, benefits, location, facilities, management, company reputation, job responsibility, recognition, commuting distance, quality of coworkers, quality of work and minimum business travel.

Of course, all the opinions mentioned are those of employees. As we shall find out next week, employers frequently have different perspectives on the same questions, according to the study, which costs $3,500 from IDC at 214 Third Ave., Waltham, Mass. 02154.

Management Ignorance Hit For High Staff Turnover

(Continued from Page 1)

of DP's importance to organizational success.

Another area where employer perceptions run askew of employee expectations is the need to pay more attention to employees' advancement opportunities, work environment, job facilities and performance recognition.

Antidotes to employee dissatisfaction in these areas include emphasis on company benefits and career potential, the creation of a long-term managerial development and acquisition program and an effort to show that promotion and salary increases are based on performance.

Retaining Workers

The report also advises employers on how to acquire and retain workers in areas where their perceptions are the same as would-be employees.

Specific problems addressed are the raiding of DP personnel by other companies, ensuring worker motivation and dealing with workers' demands for increasingly costly and comprehensive benefits.

Beating raiders requires a "sell job," according to the study. The idea is to emphasize company benefits and career potential, grant more worker responsibility and stress the need for workers to stay and fully learn the business before moving on.

Look at Records

The best way to ensure worker motivation is by scrutinizing previous employment records as carefully as possible.

". . .a person's work history can often tell volumes about their work habits, strengths, weaknesses and potential problem areas," the study claims. "Thus a person who has left previous jobs for reasons that the interviewer questions or cannot understand may not be a good risk as an employee."

It goes on to suggest that successful employee retention and correct matching of company and worker goals go hand in hand.

Dealing with workers' demands for increasingly expensive and comprehensive benefits can best be done through three channels: Employer emphasis on the benefits of a company's location; emphasis on career potential; and concentration on drawing employees from local schools.

Less Costly Benefit

A good location "can be used as a force to de-emphasize those more controllable costly benefits with which workers may be dissatisfied," the study asserts.

Selling the employee on career potential means convincing him that down-the-road benefits are more significant than short-term deficiencies.

Lastly, recruiting from local schools "offers the chance for an employer to form a worker's perceptions and expectations about the industry." The idea is to minimize dissatisfaction by hiring an employee with little or no comparable experience.

Selective Service Suffers Computer-Match Setback

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Selective Service System has suffered what draft registration opponents hope is a setback in its plans to use computer-matching techniques to track down draft resisters.

A federal judge here last Monday ordered the service to stop requiring registrants to supply their Social Security numbers. Registration opponents fear the numbers would make it easier for the government to match registration files against driver license files and other such lists of nonregistrants [CW, Sept. 29].

The ruling came in a suit brought by the American Civil Liberties Union (ACLU) challenging the Selective Service requirements that draft-age males disclose their Social Security numbers. According to the ACLU, requesting the numbers violates the Privacy Act. U.S. District Court Judge Gerhard Gesell agreed with the ACLU, ruling the Selective Service has no legal authority to request the numbers as a condition of valid registration. He ordered the service to stop requiring disclosure of the numbers and to not use the numbers already collected.

No Immediate Reaction

The Selective Service had no immediate reaction to the ruling, saying its legal counsel was still studying the decision.

As of last Tuesday, the service had not decided whether to appeal Gesell's ruling.

In any case, Joan Lamb, Selective Service spokesperson, told *Computerworld* the agency has not finalized its draft registration enforcement program. "We had been in contact with the [the Department of] Justice and been discussing it," she said, "but we have to wait until the new administration has its people in and they can have their input into it."

The service has not begun to collect lists to match against registration files at this point, she added, although as early as two months ago, the agency had indicated computer-matching techniques would be used to find nonregistrants.

Terminals Free On Trial Basis

WHITE PLAINS, N.Y. — Free hardware from IBM? It's true. IBM is offering its 3279 color CRT terminals and 3101 and 3102 printers on a free trial basis so users can see the difference color makes.

In what appears to be a new marketing strategy, IBM is willing to let its users try out the I/O devices for a 15-day test period in the case of the 3101 and 3102, and for an unspecified period for the 3279, according to IBM.

The 3279 is available through the firm's branch offices and the 3101 and 3102 are available through IBM's National Marketing Center in New York, the firm said.

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Warner Bros. Programmers Secede From Clerical Union, Form Independent Unit

By Jeffry Beeler
CW West Coast Bureau

BURBANK, Calif. — A programming department that had belonged to a clerical labor union for roughly 30 years recently won federal government approval to withdraw from the union and form its own separate bargaining unit.

The case involving Warner Bros., Inc.'s programming staff is believed to mark the first time that the National Labor Relations Board (NLRB) has permitted dissatisfied computing professionals to secede from an established union and provide their own representation.

Most of Warner Bros.'s rebellious programmers see the formation of their independent union as just the first phase in a long-term drive toward total deunionization.

By this time next year, the employees hope to have abolished their newly formed organization, known as the Warner Bros. Programmers Guild (WBPG), and to have severed their last tie with the organized-labor movement, according to Chris Brooks, one of the firm's system programmers.

The exodus from the programmers' original union, known as the Warner Bros. Office Employees Guild (WBOEG), was climaxed last summer when the workers persuaded the NLRB to endorse a petition calling on the WBOEG to release its hold on the company's computing professionals.

In accepting the programmers' petition of decertification, the NLRB paved the way for the employees to hold an election to decide whether they would continue to let the WBOEG represent them.

The election has since taken place, and the programmers voted overwhelmingly to leave the WBOEG and organize their own independent bargaining unit.

Years of Discontent

The revolt of Warner Bros.' programming staff ends several years of growing disaffection with the previous union, which consists primarily of clerical workers ranging from secretaries to script readers.

The programmers' discontent with the WBOEG stemmed from several sources. For one thing, the employees resented being assigned to the same labor union as clerical personnel, with whom they feel they have little commonality of interest.

"There's a stigma associated with belonging to a craft organization, particularly one that's considered a nonprofessional craft," Brooks explained. "Our programmers have found that, when they're out gathering data or designing major systems, top management treats them differently if it perceives them as craft workers rather than as professionals."

Another reason the programmers objected to their WBOEG membership was that it denied them access to several of the company's lucrative fringe benefits and seriously hindered their efforts to negotiate salary increases, Brooks added.

Motivated by these and other perceived grievances, the programmers began during the mid-1970s to seek their independence from union control, but their efforts consistently ended in failure, Brooks recalled.

Decertification Process

Last Feb. 13, the employees for the first time presented the NLRB with a petition of decertification. In essence, the petition argued that programmers are members of a profession and thus deserve to be classified differently from most clerical workers.

On Feb. 28, the NLRB opened a two-day hearing to consider the programmers' position, and last July — after several unexpected delays and complications — the federal agency released its final conclusions.

On most of the petition's key points, the NLRB came down squarely on the side of the programmers. The agency agreed with the employees' assertion that programmers require a high degree of technical training and that they therefore perform a fundamentally different job from most office personnel.

The NLRB also agreed that, because of the highly technical and specialized nature of their work, programmers cannot justifiably be forced to belong to the same labor union as nontechnical clerical workers.

Half a Loaf

On the other hand, the agency stopped short of giving the decertification petition its unconditional approval. The organization rejected the petitioners' contention that programmers are members of a profession and denied the employees' request to be reclassified as nonunion personnel, Brooks said.

The latter rejection dealt the petitioners' cause something of a setback. Most of the 26 members of Warner Bros.' programming staff had originally hoped their union election would give them an opportunity to choose among three ballot options: continued membership in the existing WBOEG, recertification as members of the newly formed WBPG or exemption from any form of union control.

But the NLRB limited the ballot options to just the first two items and thus ensured that, regardless of how the programmers voted, they would continue to have some form of union representation, Brooks said.

Despite the NLRB's unfavorable ruling on the ballot question, the programmers still stand an excellent chance of achieving their ultimate goal of deunionizing themselves entirely. Next summer, the employees plan to call for another union election by filing a second decertification petition with the NLRB.

The follow-on election most likely will decide whether the programmers should remain in the WBPG or whether they should dissolve the union and proclaim their independence, Brooks explained.

If the balloting were held today, most of the employees would probably vote in favor of independence, Brooks said.

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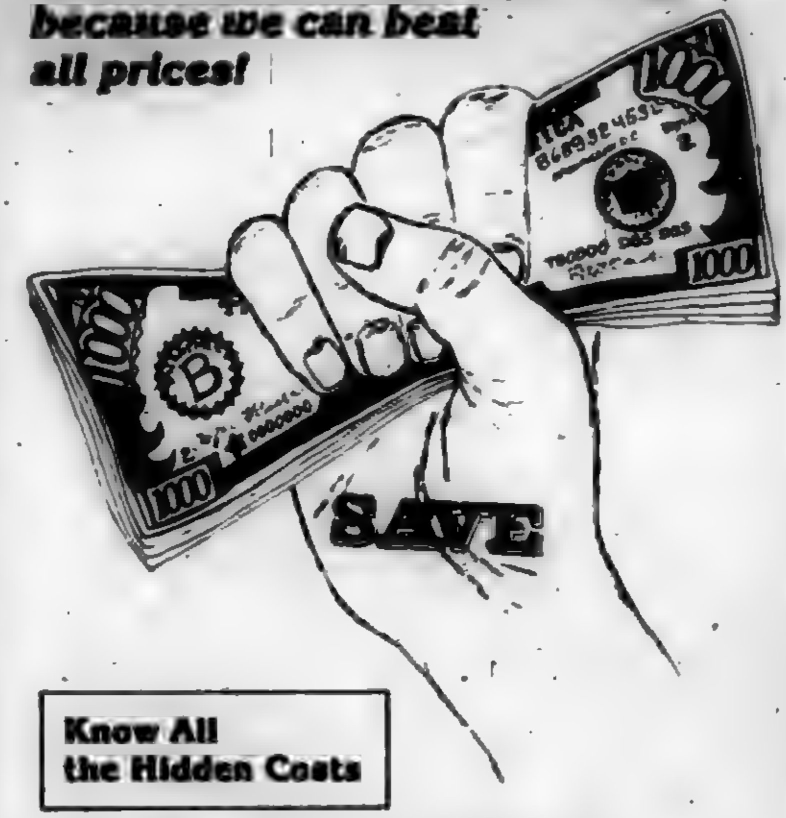

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Processing Services a Whole New Ball Game

(Continued from Page 1)

At the opposite end of the spectrum are companies that concentrate wholly on one market niche. The highly successful Shared Medical Systems provides hardware systems and a myriad number of applications to more than 500 hospitals. Another highly specialized firm is Quotron Systems, Inc. that offers stock quotations via a private network.

Rather than going to either one of these extremes, savvy service firms are beginning to concentrate in four or five niches, offering a wide range of applications for the markets they serve, Berkeley noted.

The processing services market is expected to grow a healthy 17% annually. Story on Page 12.

"Users of computer services have the right to expect more sophisticated solutions to their problems," remarked Bernard Goldstein, a partner in Broadview Associates, Inc., a firm specializing in mergers and acquisitions in the computer services industry.

Besides specializing, processing services firms are broadening the environment for their products. One method is to push processing into a software environment, observed STSC's Cook. This way vendors can offer their products in a remote environment and, at the appropriate time, can move the application to the user's in-house system. This allows the user to try out the product on a time-sharing basis, reducing the risk of acquiring new products.

Although this new marketing tactic may nibble away part of the firm's processing services revenues, it creates new opportunities for the company, Cook reasoned.

End of Era

Apparently the days of offering only processing services is coming to an end. Cook is bullish on processing service vendors acquiring licenses to market software packages independently of processing offerings.

National CSS, Inc. is representative of the growing number of companies that make their products available both in a remote mode and bundled with hardware provided by the company.

Industry Spotlight

U.S. COMPUTER SERVICES COMPANIES WITH 1979 PROCESSING REVENUE EXCEEDING $50 MILLION[1]

	Estimated 1979 Revenue (in millions)	Estimated Market Share
Control Data Corp.	$420	7%
Automatic Data Processing, Inc.	400	7%
General Electric Information Systems	290	6%
Tymshare, Inc.	160	5%
United Information Systems, Inc.	138	3%
McDonnell Douglas Automation Co.	135	2%
Computer Sciences Corp.	129	2%
NCR Corp.	93	2%
Bradford National Corp.	89	2%
National CSS, Inc.	77	1% or less
Bank of America[2]	70	1% or less
Comshare, Inc.	67	1% or less
Mead Data Corp.	66	1% or less
Boeing Computer Services Co.	62	1% or less
TRW Information Systems	56	1% or less
University Computing Co.	60	1% or less
Xerox Computer Services	60	1% or less
National Data Corp.	54	1% or less
Trans Union Systems Corp.	50	1% or less
First Data Resources	50	1% or less
Bunker Ramo Corp.	50	1% or less

1. Revenue estimates supplied by Input and International Data Corp. In many cases these estimates vary with the vendors' actual revenues.

Not included in this chart are Electronic Data Systems Corp. (EDS), Reynolds and Reynolds, Co. and Shared Medical Systems, whose respective revenues are estimated to be $313 million, $113 million and $83 million. EDS and Shared Medical Systems operate more on a facilities management basis than on a strictly processing services basis. Reynolds and Reynolds processing services revenues were about $47 million of its total revenue last year, with the remainder derived from turnkey systems and terminals manufactured by the company.

2. Revenue from services sold outside of the bank through various subsidiaries.

Processing service firms have been selling hardware since 1977, when Xerox Computer Services made available an intelligent terminal system for use as an in-house system and as an adjunct to remote computing services. Since then many processing firms have added minis to their product lines.

Although still considered a hot topic in the industry, selling turnkey minicomputers has not met with overwhelming acceptance among processing firms because they are generally not very profitable.

"Turnkeys have been unsuccessful because they usually offer plain vanilla general ledger packages," maintained Warren N. Sargent Jr., director of information processing services programs for Input, a Palo Alto, Calif.-based research firm.

International Data Corp. (IDC) estimated that by 1984 only 4% of processing service revenues will come from hardware sales, up from the 3% in 1979, which represented less than $200 million in sales.

Faring much better are those vendors selling highly specialized turnkey mini systems such as McDonnell Douglas Automation Co.'s computer-aided design system.

Data Base Services

In addition to increasing emphasis on hardware and software sales, processing service vendors see a great opportunity selling data base services. Several of the top 10 vendors in the industry, such as Automatic Data Processing, Inc., have already entered the data base services arena (see accompanying chart).

IDC estimated the market for remote data base services will reach annual sales of $1.6 billion by 1984, up from $572 million in revenues last year.

Interestingly, the ability to obtain the technology to deliver data base services has been the driving force behind some of the more spectacular acquisitions in the industry. Good examples of these are Dun & Bradstreet, Inc.'s $167 million purchase of National CSS and McGraw Hill, Inc.'s $103 million acquisition of Data Resources, Inc., Broadview's Goldstein pointed out.

And mergers and acquisitions in the processing services segment will continue strong. IDC calculated processing firms acquired 33 software or processing services firms last year. This trend is in keeping with these firm's desire to provide a wider range of services to selected markets.

In addition to expanding application packages, some vendors are creating application development tools, like Nomad or Ramis, offered to end users on a time-sharing basis, according to Burt Grad, president of Burton Grad Associates, Inc., a consulting firm for computer services companies.

At the same time as processing service firms are trying to find ways to expand their offerings, Input's Sargent noted nonprocessing firms are edging into the business. Airlines are offering services to other airlines, General Motors Corp. is providing services to dealers, and banks are marketing services to other banks.

While Sargent is not alarmed at this trend, he certainly views it as a red flag for established processing service companies.

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TOP 10 AT A GLANCE

COMPANY	MAJOR SERVICES	NEW DIRECTIONS
CONTROL DATA CORP.	The Data Services Co. within CDC includes the Service Bureau Co. as well as CDC's specialized Arbitron, Ticketron and Cybernet services. The Service Bureau Co. contributes some 90% of Data Services revenue and has two major offerings. One is time-sharing services with more than 2,000 applications, primarily commercial. The other is DP services, mainly for banking, credit unions, brokerage, electronic funds transfer and delinquent accounts collection. CDC's Cybernet services are used for scientific applications.	CDC is placing more emphasis on data base services, such as the Evans Economic Data Base. New data base services will concentrate on current industries served, including manufacturing, insurance and banking. Moreover, the firm is selling a turnkey mini for the wholesale/distribution industry and is also expanding its electronic trading service which allows securities brokers to execute sales directly from their offices via a terminal. Currently 75 issues listed on the Cincinnati Stock Exchange are traded this way.
AUTOMATIC DATA PROCESSING, INC.	ADP consists of two major groups: the Commercial Services Group, which handles accounts payable, accounts receivable, general ledger and unemployment cost control processing services across major industries; and the Financial Services Group, which performs bank DP services such as deposit accounting and brokerage processing. In addition, the company has three divisions: The Network Services Division encompasses its Onsite program, which places mini systems at the customer's site to operate in a dedicated function or interact with central ADP systems; the Dealer Services Division provides inventory control and other applications for automobile, equipment and other dealers; a third division offers pension services applications.	ADP reports it will concentrate on "more of the same" for the next five years, since all current business areas look healthy. It recently added a Collision Estimating Division, which will offer insurance companies a computerized look at the cost of repairing automobiles involved in accidents. The firm also intends to move more heavily into the area of proprietary data bases, providing specialized applications based on data gathered from publicly available sources. A step in this direction was the recent formation of Econolyst, an equally owned joint venture with the consulting firm of Townsend/-Greenspan.
GE INFORMATION SERVICES	Through its Mark III time-sharing service, GEIS offers financial management, forecasting and general business processing services across a broad spectrum of industries.	GEIS over the past year has developed applications for the energy and retail store sectors. Enercom is a residential energy audit service and Epos is an electronic purchase order service.
TYMSHARE, INC.	Tymshare offers internal accounting services for banks, is a major processor of income taxes through the acquisition of Dynatax and is heavily involved in credit card processing. The company also offers a service called Manufacts for smaller manufacturing companies in the $5 million to $25 million revenue range consisting of on-line accounting and manufacturing control applications. Through Tymcare, the firm provides financial and patient tracking services for hospitals on the East Coast. Tymshare provides a variety of services for accounting firms of all sizes. In addition, the company operates its data communications network, Tymnet, which last year provided $16 million in revenue.	Tymshare intends to continue adding services in the area of check guarantee, credit card processing and health care. To this end the firm, within the past year, has acquired Telecheck Services, Inc., Mediatat, Inc. and Bankcard Association of Rhode Island. Currently the company is testing in California a check guarantee service using a T-3 digital authorization telephone and plans to expand this service to other parts of the country. Through the acquisition of the Rhode Island company, Tymshare intends to obtain a foothold for credit card processing services on the East Coast. Tymnet is the fastest growing unit of Tymshare, revenues expanding at 50% annually compared with 30% for Tymshare as a whole. The company recently acquired Microband Corp. of America, a maker of microwave transmission products, to further the expansion of the Tymnet service.
UNITED INFORMATION SYSTEMS, INC.	The company currently has four primary areas of specialization. Its project management services, called Oscar, are provided by its On-Line Systems unit and account for about one-third of the company's processing services revenue. Applications for the telephone and engineering sectors contribute about 20% each to processing services revenues. Fourth, United Information Systems provides services for government, under both General Services Administration contracts and sole source contracts to individual government agencies.	The firm's future plans call for expanding applications to its current market sectors. In particular, it is beginning to offer specialized on-site hardware with graphics capability for design analysis and documentation and specifications drawing for structural, electronics and petrochemical engineers. For the telephone industry, the firm is offering management information services such as business planning and financial modeling using interactive graphics.
McDONNELL DOUGLAS AUTOMATION CO.	McAuto's Health Care Services Division provides financial and patient care applications to doctors' offices and 532 hospitals, representing 46% of McAuto's 1980 processing service revenues. Another major service area is for structural, civil and mechanical engineers, including structural design and analysis for bridges, high-rise buildings, dome stadiums and so on. The communications industry, primarily telephone companies, is a third prominent application area. For these companies McAuto offers on-line IMS services, Force, an operator scheduling application; and Dens, a directory equipment numbering system.	McAuto is expanding sales of its computer automated design and manufacturing (CAD/CAM) turnkey systems. This year services and hardware sales in the CAD/CAM area represented 7% of revenues and is slated to double next year. McAuto is also stressing graphics interfaces for its engineering applications, but intends to expand these to business services offerings. While remote processing will continue to be a major thrust of McAuto, the company also plans to sell software packages built around IMS, professional services and equipment leasing of minis as front ends for the company's processing services.
COMPUTER SCIENCES CORP.	Through its Infonet time-sharing network, CSC offers general business applications for the federal government and Fortune 1000 companies. These services represented about 80% of CSC's processing services revenues last year. Besides services through Infonet, CSC provides payroll, accounts receivable and payable and general ledger applications for small businesses; on-line financial management and inventory management for distributors and manufacturers; and third-party claims processing services for health insurers and labor unions.	Through the acquisition of three Itel Corp. processing services units last year, CSC intends to emphasize general business services to small and medium-sized businesses in the $5 million to $25 million range. "Small businesses need services, not hardware," a spokesman noted. The firm also plans to step up its third-party health care processing services. Recently it added processing of vision and hearing aid claims for labor unions, Blue Cross and Blue Shield and other health plans.
NCR CORP.	Through its NCR Data Centers Division, NCR provides various services to the financial and retail sectors, markets that match the company's important mainframe targets. For the financial sector, NCR provides accounting processing, NOW account processing and automated teller machine network switching for commercial banks and thrift institutions. For its retail customers, NCR provides accounting services, management control reports, unit control modules and cash planning for apparel stores, leisure time stores and specialty stores.	NCR will continue to concentrate on the financial and retail sectors. In particular, it is interested in providing more services for commercial banks, whereas in the past it concentrated heavily on thrift institutions. NOW account processing and automated teller machine network switching offer the company growing opportunities. In the retail sector, NCR is increasingly offering on-line inquiry services for timely reporting. With tight cash requirements today, retail vendors are no longer satisfied obtaining reports through the mail that are two weeks old, a spokesman noted. NCR does not plan on providing its clients turnkey minis.
BRADFORD NATIONAL CORP.	Bradford specializes in services-related stock transfers and bank trust accounting. Bradford also provides securities custody services, portfolio and employee benefit recordkeeping, personal trust accounting and annuitant services. The company offers on-line real-time bank trust accounting services to 75 of the largest banks in the country. Moreover, the company does processing for the New York state Medicaid program.	Bradford will continue to offer a wider range of services related to its current niches. For example it is now offering on-line trust accounting services for small to medium-sized banks and recently established Bradford Broker Settlement, Inc., a clearing service in 30 cities for the equities market. Bradford also intends to expand its services in the health care and insurance industries. To this end, the firm recently purchased Eagles National Corp. and its wholly owned subsidiary, Eagles National Life Insurance Co.
NATIONAL CSS, INC.	National CSS specializes in DP development tools and offers an end-user data base management system, Nomad, which is currently the most prominent sector of the firm's business. Other applications include engineering design, business research, demographics and econometrics. Moreover, the company offers a hardware system, the 3200, that can incorporate all of the firm's application programs, tools and data base management system. Last June the company merged its computer division and remote computer services division into one entity named Integrated Systems and Services.	National CSS is emphasizing its Nomad product. It recently introduced Nomad II, which offers four new functions: full CRT screen support, multiple concurrent users, arithmetic and statistical functions and arrays, including time series. This data base product is sold to middle management end users across most industries. The company plans to introduce a human resources package next February and will introduce a Nomad-like product targeted at middle managers. In the near future, National CSS will introduce specialized tools for the banking, insurance and electronic manufacturing industries.

CW Chart (Information Supplied by Vendors)

To Hit $8.6 Billion

Processing Services Expected to Grow 17%/Year

By Marcia Blumenthal
CW Staff

Industry Spotlight

Processing services will account for $8.6 billion or 62% of total 1980 service industry revenue of $14 billion, according to projections made by Input, a Palo Alto, Calif-based research firm.

Although Input noted processing services in the future will hold a smaller portion of the total industry revenues than it has in the past, this segment of the services industry is expected to grow at a healthy 17% per year within the next five years, with certain segments growing even faster. Remote computing services, for example, will post a 22% annual growth rate this year, Input said.

While the phenomenal 30% annual growth of the software segment of the industry has eclipsed the processing services sector, observers agree processing services are not in danger of fading into oblivion. Professional services is the third sector of the services industry and will grow about 16% yearly, Input said.

Health Assured

The health of processing services is assured by users' continued inability either to provide all applications in-house or provide the computing power necessary to perform all applications.

Not surprisingly then, even corporations with extensive in-house computing capability comprise a large portion of the remote computing service customer base, Datapro Research Corp. noted.

Some 58% of users of service firms polled in a recent Datapro survey said they had an extensive in-house computing facility, while another 22% of the total responded that they had "some in-house capability."

The revenue size of companies represented in that survey was at least $100 million for 59% of the users responding.

Monthly Bills

The Datapro survey detected no trend in users' total monthly bill for remote computing services, which ranged from $500 to $10,000.

However, the research firm did find 57% of the users were spending less than $500 per month for terminal costs. This appeared to be consistent with the Datapro finding that 58% of the users had three or less terminals in-house.

Regardless of the extent to which computing services are utilized, market research firm International Data Corp. (IDC) noted that the segmentation of the market is changing.

In 1979, 40% of the processing services revenue was derived from traditional batch services, but by 1984, batch services will contribute only 25% of that revenue.

This shows an increasing commitment of these companies to data communications, IDC noted.

By 1984, 75% of processing services revenue will be contributed by some sort of data communications instrument, IDC predicted.

As for applications functions, IDC forecast data base inquiry would be the fastest growing applications, increasing from a 1979 revenue base of $75 million to $1.4 to $1.6 billion yearly by 1984.

Although the processing services market continues to be highly fragmented, the trend toward consolidation is increasingly visible. In 1978, the companies with more than $50 million in annual revenue held a 42% share of the market, but in 1979 that share had jumped to 50%, IDC said.

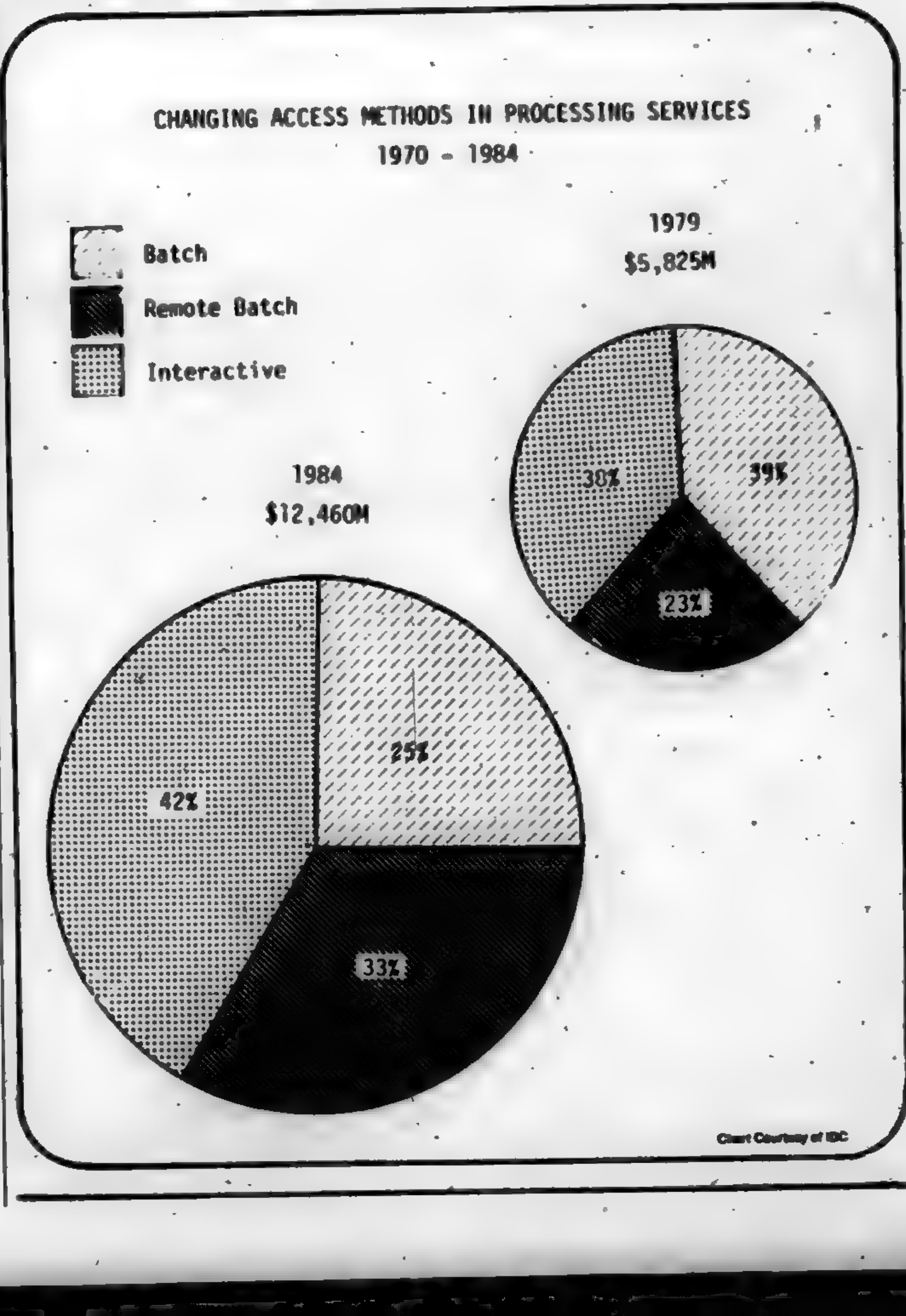

Chart Courtesy of IDC

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Supervisor Job Called Toughest in World

By Rita Shoor
CW Staff

CHICAGO — First-level information management supervisors have the "toughest job in the world," according to Nate Newkirk, a speaker at the recent Spectrum /80 conference sponsored here by Advanced Systems, Inc. (ASI).

One way for these hard-pressed project leaders to improve their lot is to decrease the amount of time spent in fire-fighting activities while increasing the focus on leadership qualities. During a session entitled "Delegating for Improved Productivity," the consultant from Newkirk Associates, Inc. maintained that the ideal time model for a first-level supervisor is to spend 30% of available time on a combination of planning, organization and control functions. The remaining 70% of the time should be allocated to leadership, he said.

Leadership was defined as "getting things done through others," he said. "People don't write wrong programs, they're just being told to do the wrong things" by their bosses, according to Newkirk.

Nine-Step Procedure

He then outlined a nine-step procedure for assigning someone a task, which he maintained would improve a worker's on-the-job performance. This improvement should, in turn, imply a corresponding increase in that worker's productivity, Newkirk claimed.

First, the project leader must actually assign the task to be accomplished. This is usually done by describing the desired end result. "Design a human resources system," for example, would qualify as a complex task assignment.

The next step is to discuss the constraints tied to the assigned task. These might include such items as the due date and the number of people available for the job, he said.

The project manager must then inform his subordinate of the criteria that will be used to judge the final result. Evaluation criteria could include the cost or effort to complete the project, timeliness of the project's completion and the quality of the end product.

The quality might be judged by how well the system or program meets the requirements originally specified by the end user. Ease of maintenance and program enhancement — both of which are heavily dependent on documentation — could also be used to evaluate the product, he said.

Fourth, the supervisor must get some feedback on the assignment from his subordinate. It is essential to treat people differently according to their professed and/or documented performance, he said.

Newkirk suggested that one of the best ways to obtain this feedback is to ask the assignee to come up with a plan that outlines the sequential steps to be taken to solve the problem. This process allows the manager to find out "up-front" whether the programmer or analyst understands the job's requirements. He emphasized that this plan would list *what* had to be done without going into detail as to *how* the job would be accomplished.

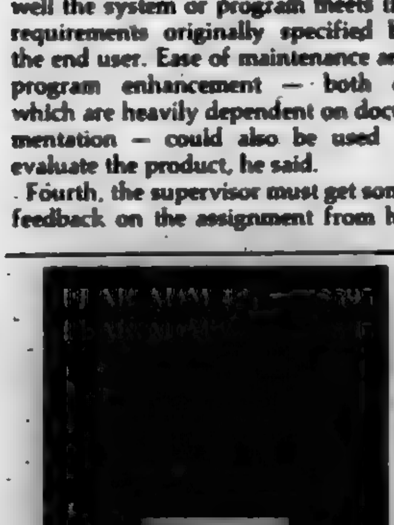
Next, the supervisor and subordinate work together to set up a schedule of interim deadlines. "Each one of [the deadlines] should have the same characteristic as the end goal — in that a deliverable is received," he said.

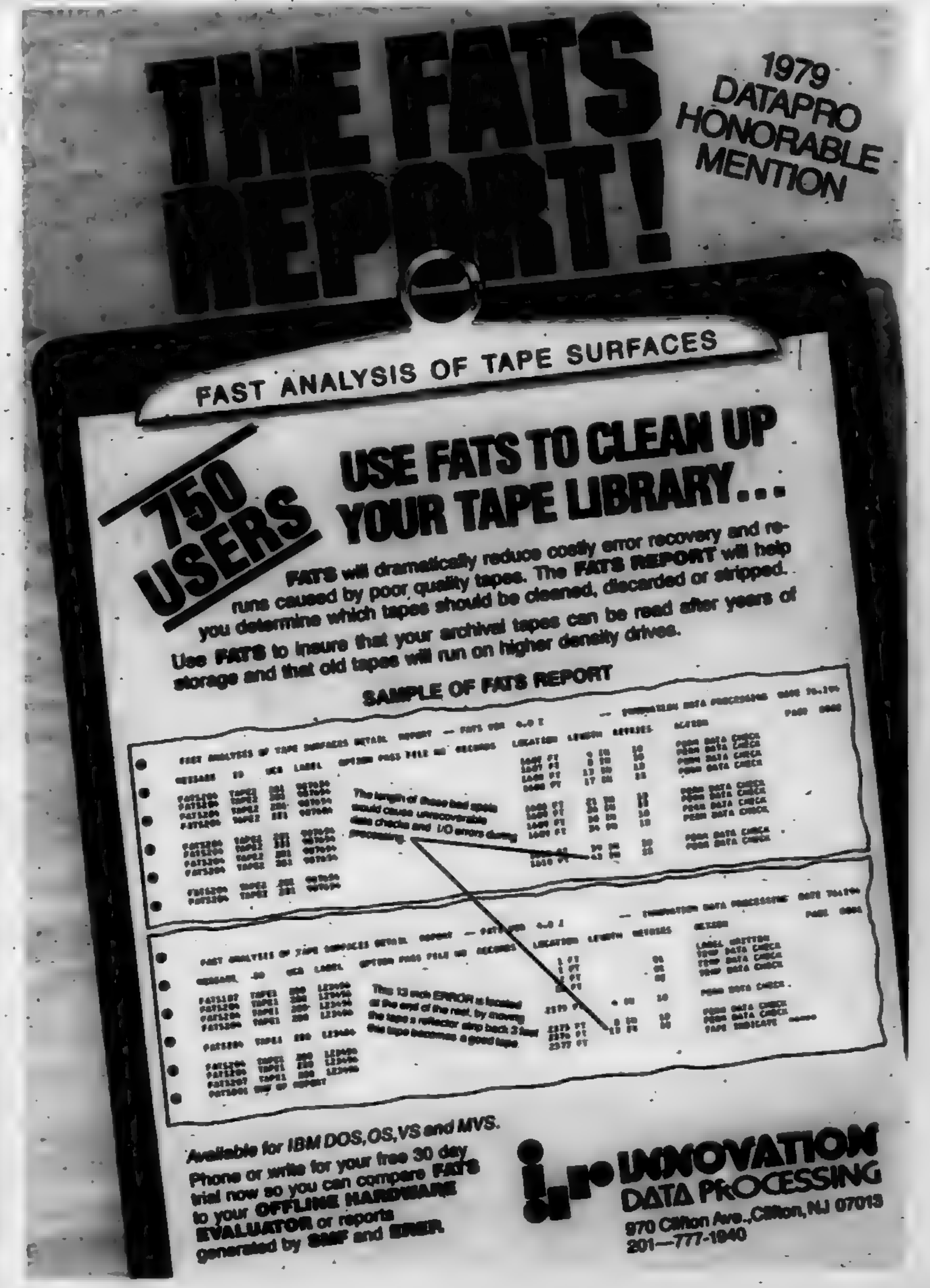
Newkirk noted that the control schedule can be negotiated and used as a reward/punishment tool by the manager. The person who consistently meets the interim deadlines can be rewarded by the fact that the manager is not constantly checking on him. The opposite naturally applies to the technician who is missing the deadlines, he said.

The sixth step is to "strip away all excuses for failure" by asking the question: "What help do you need?" By actually providing this help, which is seventh on Newkirk's list, the manager puts the technician in a position where he cannot point to outside factors if the project is not successfully completed.

Documentation of all items under discussion as the project goes along is the manager's responsibility. If, for example, deadline pressures force the manager to tell the programmer to "forget about documentation for now," he must put this in writing and inform the technician that the quality of documentation is no longer among the final criteria by which he will be judged.

The ninth and last item required for successful delegation is formal and informal evaluation, according to Newkirk. Informal evaluations should be performed at each of the interim deadlines, while a formal evaluation is necessary once the project has been completed.

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Communications Tops Europeans' Lists

DELRAN, N.J. — Expanding data communications capabilities and additional software top users' lists of purchases in West Germany, France and the UK.

That is what users polled in the Datapro Research Corp. "European User Rating of Computer Systems" report indicated when asked about upcoming planned acquisitions.

Two other high-growth areas will be in distributed processing and integrated word processing, according to the users surveyed.

WP Applications

Although word processing (WP) has not been implemented in most European sites yet, users in all three countries listed it as one of the top 10 applications for the year.

In both West Germany and the UK, users told Datapro their major problem was with systems proposed by the vendors being too small for their needs. The major problem among the French was late delivery and/or installation of equipment. Too small systems ranked as the No. 2 problem in France.

Other major problems cited by the European users were the difficulties in keeping up-to-date on vendor enhancements and changes in hardware and software, excessive power and cooling requirements and system costs exceeding the expected total.

Major Benefits

Major benefits from their systems, according to the users surveyed, included efficient response time, compatible programs and data, as promised by the vendor, and easy expansion and reconfiguration of the system.

Accounting, payroll and personnel and manufacturing were the major applications used by the respondents, with transaction processing rising rapidly in use. Cobol was the most popular language used, with assembler running a strong second.

Users were found to be looking increasingly toward outside sources for software as a means of containing costs.

"Ready-made" packages from the manufacturers and proprietary packages are the two most popular outside sources for mainframe users, with French and British users favoring proprietary packages and German users preferring "ready-made" packages from the vendor, the survey showed.

The methods of purchasing a computer varied, depending on a vendor's pricing policies in each country. In Germany and the UK, users preferred purchasing, systems, but in France, users showed a distinct preference for renting, the survey found.

Survey Covers 3,485 Users

DELRAN, N.J. — Datapro's "European User Ratings of Computer Systems" represents information obtained from 3,485 users of mainframes, minicomputers and microcomputers.

The survey was conducted with the help of France's *Zero-un Informatique*, West Germany's *Computerwoche* and the UK's *Computer Weekly* and is considered one of the most comprehensive examinations of the European computer industry ever undertaken.

Users were asked 67 questions in 14 categories with the intention of determining how they rate their computer systems.

Survey results and analysis are available for $25 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Casa/SME Offers Award For CIM Work

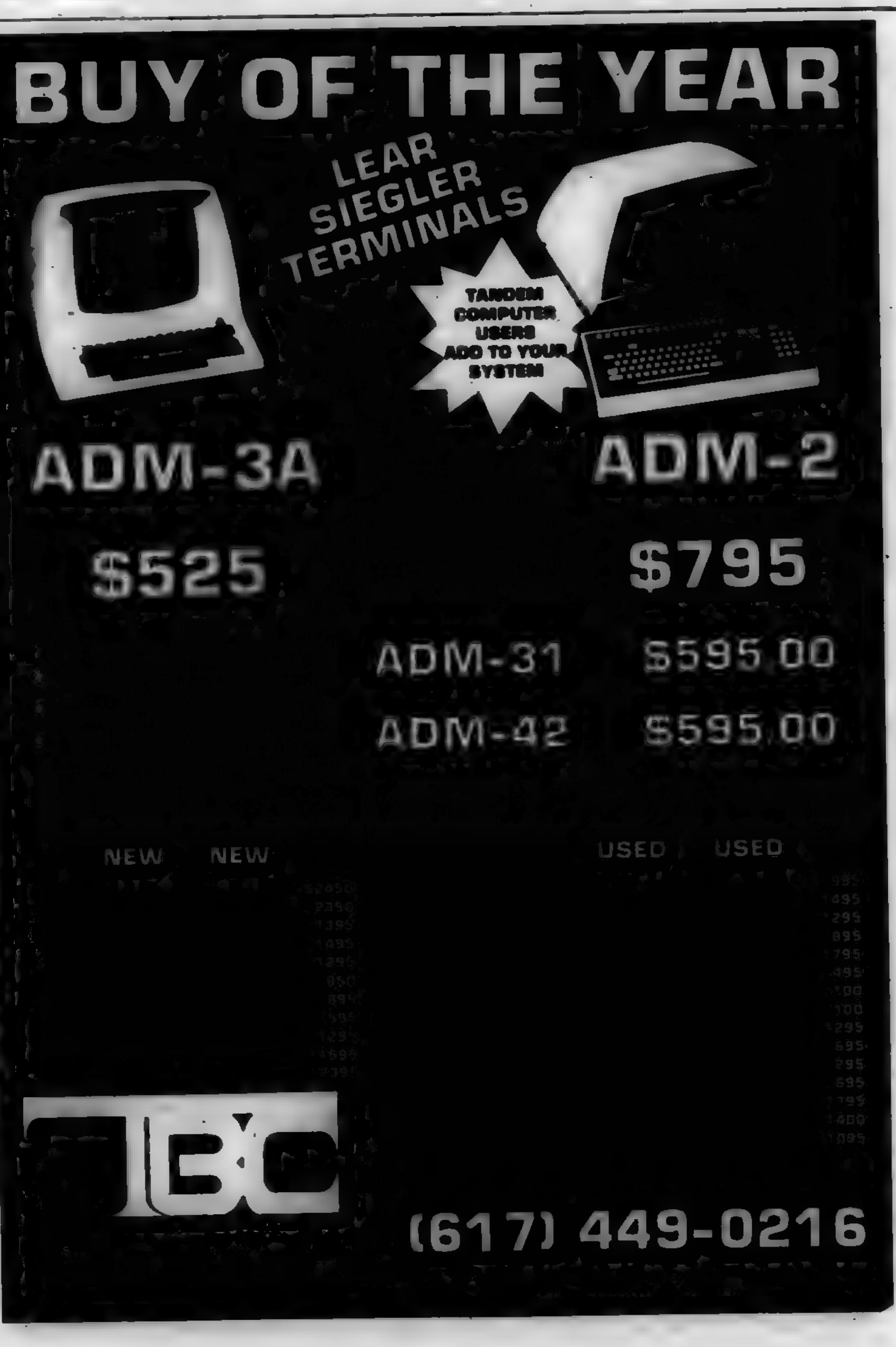
DEARBORN, Mich. — "Lead" is the acronym for "Leadership and Excellence in the Application and Development" of computer-integrated manufacturing (CIM) — and the name of an industrywide annual award recently established by the Computer and Automated Systems Association (Casa) of the Society of Manufacturing Engineers (SME).

The first Lead Award will be presented in 1981 to the company technical management team that has incorporated an innovative CIM program into its operations.

Specifically, Casa/SME said, the team will have demonstrated leadership by achieving a CIM team approach composed of professionals from several disciplines, installed applications that link and integrate multiple manufacturing functions, management vision and commitment to improved productivity by CIM on a near- and long-range basis and dissemination of their valuable "how to" experience to advance CIM methodology in the industry.

In this way, the Lead Award hopes to emphasize the need for implementing CIM programs and sharing information, Casa/SME said.

The procedure for nominating a company team for the 1981 award is available from Casa/SME Headquarters, 1 SME Drive, P.O. Box 930, Dearborn, Mich. 48128.



Few Plan System Replacements

User Satisfaction Found Common In Europe

By Ann Dooley
CW Staff

DELRAN, N.J. — What do computer users in France, West Germany and the UK have in common?

They are all so satisfied with their systems — regardless of manufacturer — that they have few system replacement plans and, in general, would recommend their own system to other users.

A comprehensive examination of the computer field in France, the UK and West Germany by Datapro Research Corp., "European User Rating of Computer Systems," futher revealed that no one mainframe vendor is distinguishing itself by performing either a particularly good or bad job of pleasing users.

Except the Amdahl Corp., whose equipment received a 100% recommendation for use by its users and a perfect overall equipment rating by French users — the only group to rate Amdahl equipment — the statistical difference between user satisfaction was no more than a .6 spread.

Digital Equipment Corp., which rated second highest in user satisfaction by users in all three countries, was also given a 100% recommendation by French and German users, but would be recommended, interestingly enough, by only half the British DEC user population.

French users rated Amdahl, DEC and National Advanced Systems (Itel) among the top three vendors. German users gave CII Honeywell Bull, NCR Corp. and IBM the top three positions, and Honeywell, Inc., DEC and IBM made the top spots in the UK.

OVERALL USER SATISFACTION				WOULD RECOMMEND TO OTHERS (%)					
	UK	France	Germany	UK		France		Germany	
				Yes	No	Yes	No	Yes	No
Amdahl	*	4.0	*	*	*	100	0	*	*
Burroughs	2.8	2.9	2.4	73	24	75	17	56	44
CII Honeywell Bull	*	2.7	3.0	*	*	66	29	80	11
CDC	*	*	2.7	*	*	*	*	67	33
DEC	3.0	3.3	2.8	50	50	100	0	100	0
Honeywell	3.2	*	*	97	3	*	*	*	*
IBM	3.0	2.9	2.8	88	9	77	18	78	18
ICL	2.9	2.7	*	65	29	56	38	*	*
NAS (Itel)	*	3.2	2.6	*	*	100	0	83	17
NCR	2.8	2.6	2.9	74	26	64	36	87	9
Siemens	*	2.9	2.8	*	*	77	15	84	15
Univac	2.9	2.9	2.8	75	25	78	17	83	14

Figures above are weighted averages based on a scale of 1 (poor) to 4 (excellent).

* — Not Applicable

Results of Datapro's 'European User Rating of Computer Systems'

Overall Satisfaction

Users in the three countries generally rated their systems as "good" in terms of overall satisfaction. On a scale of one (poor) to four (excellent), vendors as a whole were given a 2.8 rating in France, a 2.8 rating in Germany and a 2.9 in the UK, compared with 3.1 in the U.S., according to previously compiled Datapro figures.

Their level of satisfaction was also apparent in the fact that more than three-quarters of those polled would recommend their present systems to other users.

German users were most pleased, with 80% responding they would recommend their systems; 78% of British users would offer recommendations; and 74% of the French users would recommend their present systems, the survey found.

The entire survey covered 5,000 systems at 3,485 user sites and showed that more than two-thirds of the users have no system replacement plans. Of those planning new systems, the Germans indicated the most loyalty to their current mainframe/plug-compatible vendor, where only 2% expect to switch vendors. British users were shown most willing to change allegiances, with 10% reporting plans to change vendors.

European users are generally less satisfied with their systems than U.S. users, with Germans the least satisfied, according to Datapro statistics. The greatest area of dissatisfaction in all three countries is in technical support, where users almost unanimously gave vendors low ratings, usually pinpointing "troubleshooting" as a source of special dissatisfaction.

User Findings

Here are some significant user findings for each country on a vendor-by-vendor basis:

- **Amdahl Corp.** received a 100% recommendation for its 470 system by French users. This system received the highest rating in the survey, scoring a perfect 4.0 overall satisfaction rating and generally receiving high ratings for each of its individual system components. Only its education and documentation received anything but good to excellent marks, but systems across the board scored low in this category.
- **Burroughs Corp.** achieved a 100% recommendation for two of its systems in the three countries, among them the B2800 in France and the B3700 in the UK.

While all of Burroughs' systems scored generally well by European users, French DPers gave disapproving marks to the B4700 and B4800 systems, granting those two only a 25% recommendation rate. Burroughs scored lowest in Germany in terms of overall satisfaction, but German users gave the B1700 and B1800 operating systems perfect 4.0 overall ratings. The British gave the B1800 high marks for its ease of operation and its operating system and the B2700 and B3700 high ratings for their compilers and assemblers and mainframes reliability, respectively. The French commended the B3700 for its operating ease and the B3800 for its operating system and compilers and assemblers.

- **CII Honeywell Bull** drew a mixed reaction from users in Germany and France. Its Level 64 achieved a 91% user recommendation while models (excluding the Level 66) achieved only a 33% recommendation from users. In France, the Level 66 obtained a 100% recommendation, but the French gave the Iris 80 only a 14% recommendation and the Series 77 received absolutely no recommendations by users — the only case where this happened in the survey.
- **Control Data Corp.** received tempered approval from the Germans. Two-thirds of the users said they would recommend CDC systems to others, but no outstanding rates were given to any of the specific system components.
- **Digital Equipment Corp.'s** Decsystem 20 obtained a 100% recommendation for both French and German users, while only half the British said they would recommend the Decsystem 10 even though they gave it a "good" overall satisfaction rating.
- **Honeywell Inc.'s** Level 64 and Level 66 received 100% recommendations from its user group and received a 3.2 overall satisfaction rating. The British appear to be more satisfied with the equipment than U.S. users, who

(Continued on Page 16)

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DATA SYSTEMS for INDUSTRY

Implementation Two Months Away

Congress Still Opposed to Nine-Digit Zip Code

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — There continues to be active congressional opposition to the U.S. Postal Service's (USPS) nine-digit Zip Code scheme even though scheduled implementation of the expanded codes is only two months away.

Although Postmaster General William Bolger recently rejected a heavily backed House resolution calling for delay of the new Zip Code until the plan can be further studied, a similar resolution has been put forward in the Senate.

In addition, a Senate Government Affairs subcommittee held hearings on the USPS plan with one committee member, David Durenberger (R-Minn.) threatening to seek a funding cutoff unless cost questions about the Zip Code plan were satisfactorily answered.

Lame Duck Session

With the lame duck session of Congress quickly nearing its end, it may be too late to stop the Zip Code expansion through the appropriations process, but the Postal Service has already demonstrated it will not be deterred merely by Congressional expressions of concern.

Bolger quickly turned aside the request of over 100 Congressmen for a delay raised in October correspondence between the Postal Service and Rep. Richardson Preyer (D-N.C.). The Postmaster General was also not moved by a House resolution that month that received strong bipartisan support and called for further cost-benefit studies of the Zip Code plan [CW, Oct. 20].

Fears Cited

Nevertheless, Sen. Roger Jepsen (R-Iowa), introduced the same resolution in the Senate Nov. 19.

Citing fears of massive computer reprogramming that might be necessitated by the new codes and the possible $1 billion cost for public conversion to them, Jepsen said he wanted to make sure the new Zip Code "will not place excessive costs and burdens on individuals and businesses."

Although Bolger said in October the USPS has "carefully studied the impact of our plan," and said the expansion would proceed on schedule, the USPS Board of Governors last month delayed appropriations for the equipment the Postal Service will need once the plan goes through.

Also further jeopardizing the scheduled February implementation schedule are problems USPS is reportedly having finding U.S. manufacturers to bid on the equipment procurement. Bolger has promised the necessary equipment, whose price tag may reach $1 billion, will be purchased from American vendors.

IBM's 3081 Said to Show Tendency To Control Pace of Evolutionary Process

By Rita Shoor
CW Staff

CHICAGO — IBM's recent announcement of the 3081 processor illustrated IBM's tendency to maintain a firm grip on the pace of evolutionary process and its commitment to change control, according to Michael Haupt, a senior product manager for Advance Systems, Inc. (ASI).

Speaking at ASI's Spectrum '80 conference here recently, Haupt predicted "rapid releases" of MVS system product (SP) versions, but added each phase in that evolutionary process will come one step at a time.

The former systems programmer also speculated that there might be a convergence of VM and MVS facilities in the future. Although this would not necessarily mean a merging of the two products, he indicated that the VM and MVS product development groups are "very aware" of what their opposite numbers are doing. IBM is very careful about its naming schemes, according to Haupt, and the vendor didn't call both VM and MVS "system products" by accident.

Haupt also predicted that a real technological upgrade will only come after the 3081's identical or "dyadic" processors are "out and tested." Then, IBM might increase the number of processors from two to four and possibly go to multiprocessing with the 3081, he said.

He does not foresee new hardware announcements coming out every two or three months, though. "IBM doesn't make a lot of the same mistakes twice," he noted, referring to the unhappiness generated among 370/155 users who were unable to run a VS operating system on their mainframes.

As far as the distribution function of ISM is concerned, Haupt indicated that announcements were supposedly imminent but warned the audience not to hold their breath while they waited for IBM to make things official.

Among the items that Haupt would like to see in these future announcements were:

- A faster link between the 3705 front-end processor and the CPU.
- Expansion of both the 3705 and the Network Control Program (NCP) to take advantage of outer intelligence devices that form a part of the network.
- Possible addition of power to the processor so that the teleprocessing access method can be run to the same box that runs NCP.

It might also be possible to run the network communication control facility (NCCF) base to the same piece of equipment. IBM currently advocates splitting the network control center from the system control center, he said.

Haupt predicted that there would be more network control operators than system console operators in computer rooms within five years.

Haupt also warned attendees about the vendor's MVS/SP Release 2, saying the software probably had some problems that were not "quite fixed" before the cutoff date for the development team. "Unless you're really into pain," he said, avoid bringing up Release 2.

Europeans Plan Few System Replacements

(Continued from Page 15)

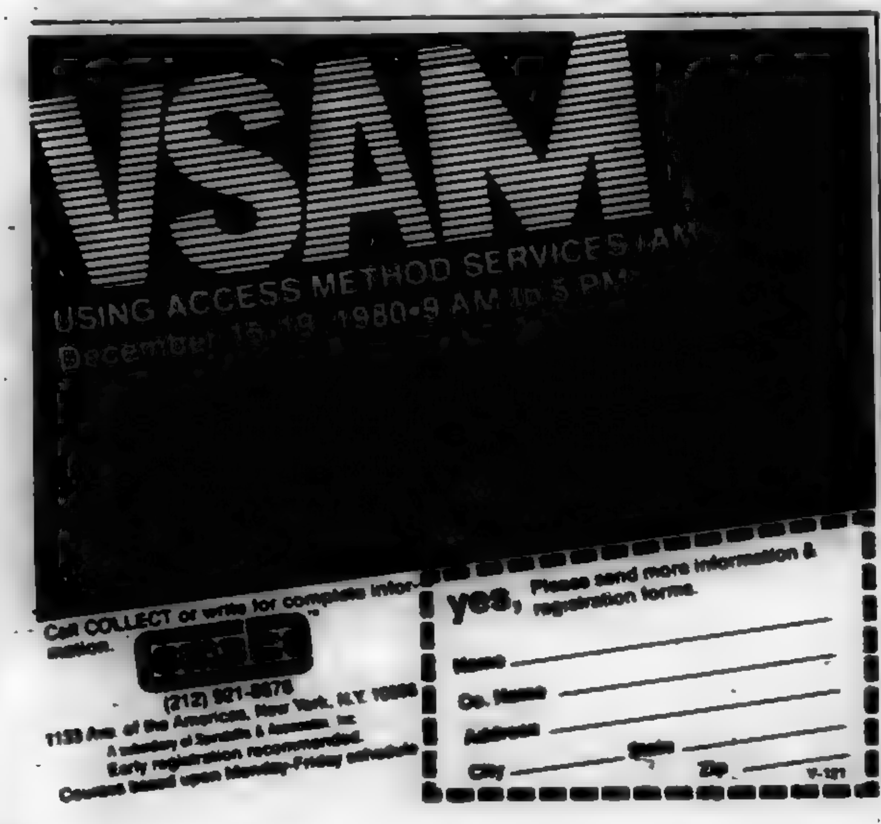
rated Honeywell a low 2.9 overall satisfaction rating in an earlier Datapro survey [CW, May 19].

- IBM, although topping European manufacturers, did not stand out in user satisfaction, according to survey figures. IBM's 3032 and 3033 in the UK and its 370/168 and 3033 in Germany received 100% recommendations, and its other systems also did well in those countries. But IBM received only average ratings, for the most part, by French users with the exceptions of high marks to the 3032 for its maintenance response and to the 370/135, 370/138, 3033, 4331 and 4341 for mainframe reliability.

IBM scored well by British users on almost all of its models for its mainframe reliability and was given a perfect score for its mainframe reliability for the 370/148. In Germany, users gave the 370/115, 370/125, 370/138, 370/158 and 4331 high marks for mainframe reliability and 370/158 for responsive maintenance. IBM did score some low points on its older systems, a fact which may not be relevant since many of them are no longer even being manufactured.

- International Computers Ltd. (ICL) received only moderate recommendations for its systems other than its 2900 series in France and its 2960 system in the UK, which received 80% and 93% recommendations, respectively. Neither country gave ICL particularly outstanding ratings for any of its system components.
- National Advanced Systems received a 100% recommendation for its systems from the French, who gave it a 3.2 overall satisfaction rate, and 83% recommendation from the Germans, who gave it only a 2.5 overall satisfaction rating. The Germans thought well of its mainframe reliability and the French liked its ease of operation.
- NCR Corp.'s 8400 scored a 100% recommendation by the British and its 8400 and 8500 series received unanimous recommendations from the Germans. All three countries gave high marks to the 8400 series for its mainframe reliability and its ease of conversion. Its effective maintenance was cited by the British, who also commended the 8500 for its operating ease, its operating system and its ease of conversion.
- Siemens AG, Germany's own vendor, was given a 100% recommendation by German users for its 7531, 7740 and 7748. The Germans highly rated the 7531 for its responsive maintenance and the 7740 for its operating system. Both the Germans and French rated the 7700 high for its mainframe reliability.
- Univac varied among the countries in user recommendations. German users unanimously recommended the 90 series (other than the 90/30, which received more than three-quarters support).

French users gave 100% recommendations to the Univac 90/60 and 1106, while only one-third of the British would recommend the 90/60 or 90/70, while giving 100% recommendations to the 1100 series.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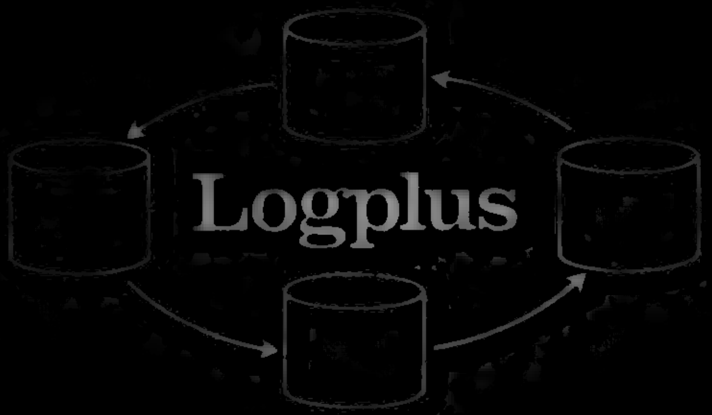

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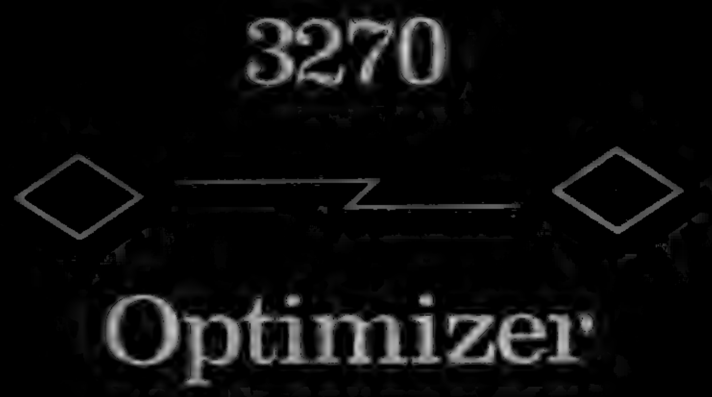

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At Training Conference

Drucker Stresses Personal Management

By Rita Shoor
CW Staff

CHICAGO — "One can't manage other people unless one first manages oneself." This pithy statement was the focal point of Dr. Peter Drucker's keynote speech at the recent Spectrum '80 here, the 12th annual training conference sponsored by Advanced Systems, Inc. (ASI).

Drucker made the presentation through the courtesy of high technology — "live via satellite" was periodically displayed at the bottom of the picture originating in California. In his remarks, the man sometimes described as the founding father of the discipline of management concerned himself with the personal aspects of organizational management rather than with the teleconferencing tools that enabled him to answer questions posed by Spectrum '80 participants.

Programmers, designers and systems analysts fall into that category of people defined by Drucker as "knowledge workers." In order to increase their productivity, the successful manager will play on their strengths rather than weaknesses. It is essential to place subordinates where they can perform to their highest achievement level, he said. "Of all the drugs we know, the most addictive one is achievement."

Worker Specialization Key

Another way to view this focus on workers' strengths is to take the example of someone who is technically competent — perhaps even brilliant — but does not communicate well with nontechnicians. He is probably not going to change this basic attitude. It is unlikely that this type of person is going to accept the need for increased communication skills, Drucker noted. Therefore, concentrate on using him in his area of specialization and do not force him to develop a skill that he will only work on under duress.

The speaker indicated that managers should realize they are being paid for enabling people to do their jobs. Managers and trainers must learn from the feedback they receive from technical staff members and be open to new concepts.

Since "one cannot manage subordinates as one cannot manage children," Drucker said the road to successful management is through personal example rather than "by the book." For that reason, the manager should constantly question his own strengths and weaknesses.

Major Shift

There has been a major shift in this country to an increased reliance on people rather than technology, Drucker said. This has been accompanied by "prodigious advances" in education. However, the first step in the educational process — making competent people out of beginners — is relatively easy. The process of converting incompetence into excellence is more difficult and is a problem faced by many managers today, he pointed out.

When Drucker completed the initial presentation and began answering questions from conference attendees, it became apparent that the education specialists and information systems managers were especially concerned with the shortage of competent technical specialists.

A major concern in the not-so-distant past was how to turn good programmers into effective managers. Now, things have changed to the point that one group wanted suggestions on how to dissuade technicians from going after management slots.

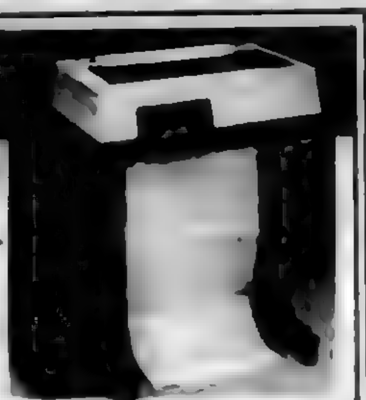
Assuming comparable economic incentives for both career paths, Drucker had two recommendations — neither of which he felt would draw cheers from the audience.

First, he recommended allowing programmers and analysts to try functioning as managers early in their careers. "Throw them in early and let them sink," he said. Many technicians will discover they do not like management and will return to the other side of the fence.

The second option is to decrease the status allotted to managers in many organizations. The manager could be treated as less of a boss and more of a resource. However, Drucker warned that an inherent risk tied to this choice is that managers may become less satisfied while the knowledge workers are increasing their satisfaction.

In response to a query as to what factors will motivate the knowledge worker and increase personal pride in his work, Drucker listed five items:

- Rewards should be issued for performance.
- People must be challenged by their work. "Nothing breeds cynicism like management that preaches one thing and rewards workers for something else."
- The job's critical factors should be determined from worker feedback and learning should be built into the job.
- Permissiveness is a negative factor. Managers should be pleasant and polite, but still demanding of subordinates.
- If managers cannot build challenge into the job, they should hire people who will be challenged by the job. In other words, "Don't hire Phi Beta Kappas for the stockroom."



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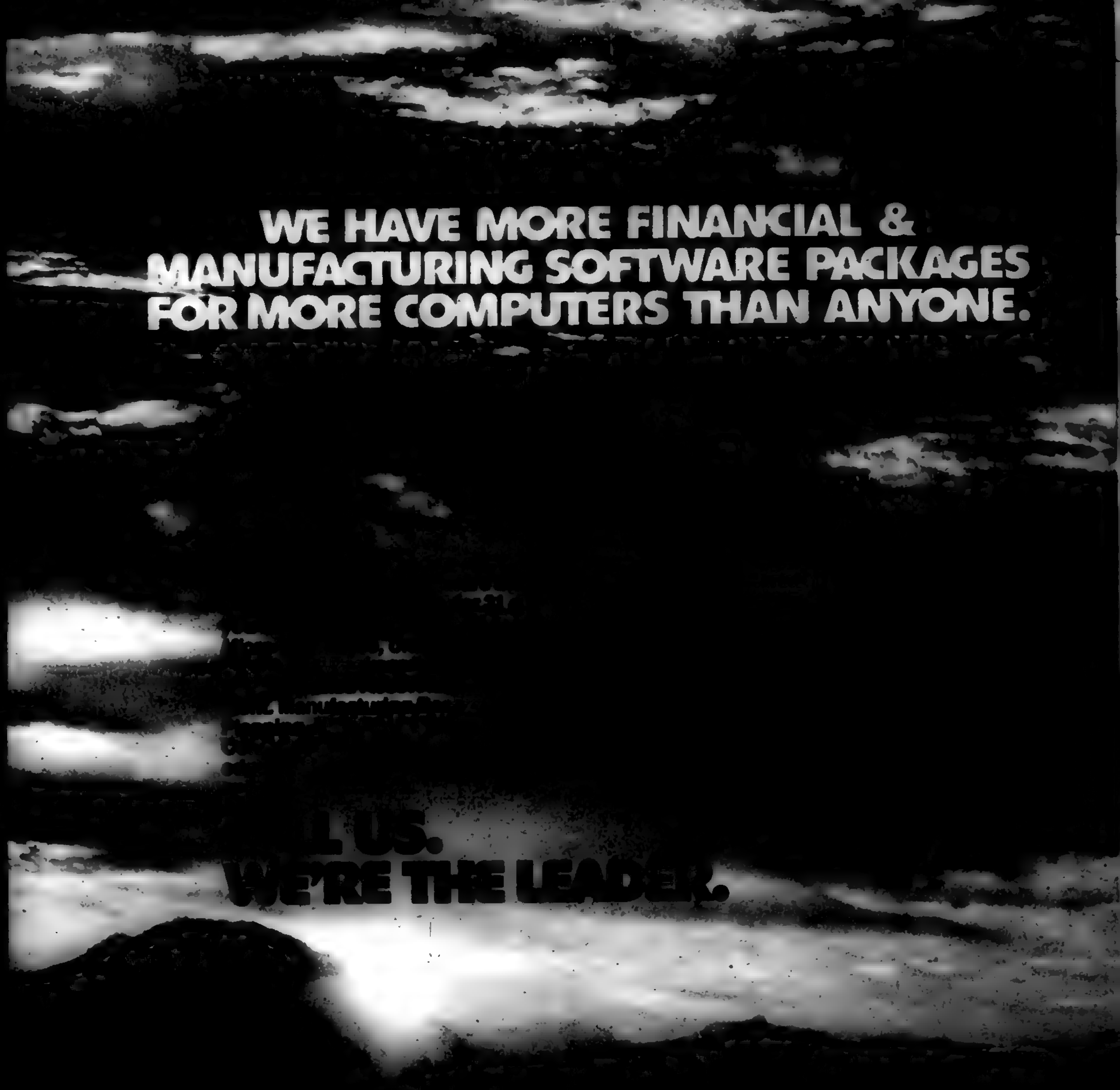
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OFFICES AROUND THE WORLD

Policy Agenda Suggested

Carter Technology Report Points to Social Issues

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The social implications of rapidly expanding information technology were identified as major "emerging policy issues" in a recent Presidential report to Congress.

The "abundant technological capacity" of computer and communications networks "poses numerous and far-ranging information-related policy issues," according to President Carter's second annual science and technology report.

The report serves to suggest a federal science and technology policy agenda for the coming years.

The document, prepared by the National Science Foundation this summer, was presented to Congress Nov. 12. In submitting the report, Carter said "careful and systematic assessment of scientific and technological development remains crucial to the formation of effective public policy."

The report highlighted Carter administration activities in support of science and technology and recent advances in various related areas, such as nuclear waste management, health, energy R&D, space exploration, transportation and agriculture.

Turning to science and technology on a general level, the report said "a central theme of the administration's science and technology policy has been to provide real and immediate growth in support of basic research to build a solid foundation for the solution and avoidance of future problems."

Emerging Issues

After a discussion of the federal government's role in improving state and local use of science and technology and its role in developing and commercializing new technology, the report briefly discussed emerging issues, including information and communications "in the computer age" and privacy and computer data bases.

Noting the rapid expansion of computer technology through large-scale integrated circuits, the report looked ahead to coming use of such sophisticated technologies as bubble memories and Josephson junctions.

These technologies, coupled with a great increase in the number of communications satellites, will facilitate numerous new uses of computer networks.

Also, advances such as fiber optics are leading to greater business communications capabilities through both land-based and satellite-based transmission systems.

Three Categories

The associated policy issues are "far ranging," the report noted, breaking them into three categories.

- Issues regarding the technology and its social control through regulation. Here the report mentioned the blurring distinctions between computer and communications technologies, resulting in increased regulatory activity by both Congress and the Federal Communications Commission.,

"There are personal as well as business implications here," the report said. "If home computer terminals become a major channel for mail, consumer information, education, political campaigning and perhaps even for voting, they may end up being as important in the 21st Century as the printing press has been for the past 500 years."

- Issues related to industrial applications of technology, such as electronic mail and funds-transfer systems. The latter example "shows both how a new technology can affect a primary information sector group" and in turn "raise numerous policy issues for the federal government."

- Issues concerning access to information and its general effects on society – "ideological and policy issues involved with access to and use of information. As a higher value is placed on possessing and using information effectively," the report said, "those who are informative – rich may have an advantage over those who are information-poor.

Uneven Distribution

"As newer and more sophisticated information technologies are developed, economic, education, social and motivational factors may create an uneven distribution in the ability of people to make use of them. Simply improving equality of access to such technology . . . does not necessarily convey ability to use the technology, since this depends on information already in the possession of the potential user.

"Whether attempts should be made to promote equal ability to use the technology remains an open question," the report concluded.

Social Issues

While these new technologies "present opportunities for increased efficiency and productivity, they also exacerbate many important social issues involving the maintenance of personal privacy in a computerized society."

Therefore, a major issue arising from this growth in technological capability is whether a policy based upon indi-

(Continued on Page 24)

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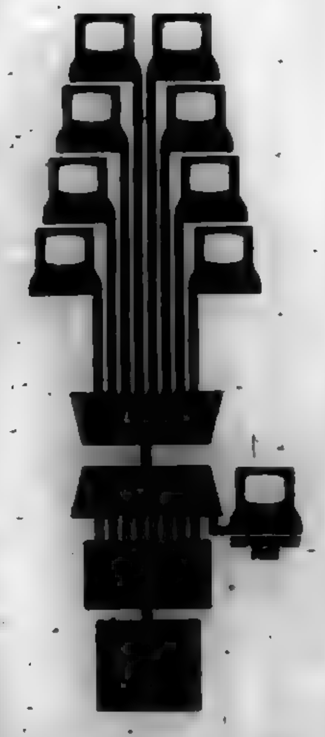

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IEEE Local Net Standard Expected Next Year

By Brad Schultz
CW Staff

BEAVERTON, Ore. — The Institute of Electrical and Electronics Engineers (IEEE) will probably issue a standard for a local data network architecture in the last few months of next year, according to Maris Graube, chairman of the IEEE's Local Area Networking Committee.

The committee will meet next week to resolve one last snag in emerging IEEE Standard 802: how to distribute access rights in a local loop.

Two approaches are under scrutiny, Graube told *Computerworld*. A method known as carrier sense multiple access collision (CSMA/CD), which is featured with the Ethernet architecture announced by three vendors recently, involves statistical sampling of line traffic.

Roughly speaking, the user must wait if line monitors detect collisions between his traffic and other traffic on a line.

The other method is called token passing and avoids such collisions by allowing only one user to transmit on a line at one time, Graube indicated.

Access Rights

Members of the IEEE committee are also debating whether or not to give the standard provisions for assigning priorities of access, allowing some users of a local loop more access rights than others. A few committee members have argued that the high speeds eventually possible in local network architectures make priorities of access meaningless in practice because wait times for low-priority users would be virtually the same as for high-priority users, Graube noted.

Standard 802 will specify a "media access unit," which Graube said was a kind of modem allowing various interfaces to data terminal equipment in a local network. Besides a purely coaxial interface, this unit would feature an interface for media such as fiber optics that are likely to be popular with local net users in the future, he explained.

The IEEE local net committee wants a "universal" interface that will accept a range of media so that architectures will not be rendered obsolete by fast-breaking innovations in link technology, Graube added.

In drafting standard 802, the committee has concentrated on an architecture appropriate for distances of up to 1 km between nodes of a local net, he continued.

The committee has tentatively settled on four speeds for transmission between nodes: 1M-, 5M-, 10M- and 20M bit/sec. Ethernet, in contrast, is pegged for 10M bit/sec transmissions.

Bottom Layers

The committee has also confined its attention to the lowest two layers of the International Standards Organization's open systems interconnection reference model.

These layers concern physical interconnection between data terminal equipment and links (layer one) and the High-Level Data Link Control protocol (layer two).

According to Graube, these layers are likely to be addressed by the makers of semiconductor chips: The committee wanted to standardize the design of chips used at these layers to lower their cost and facilitate network modifications.

Following next week's meeting, a draft of standard 802 should be ready in first quarter 1981, Graube remarked.

After review by the data communications-community, the draft will probably go to the IEEE Standards Board for approval next summer, Graube predicted.

Report Outlines Social Issues

(Continued from Page 23)

vidual access and responsibility as the principle mechanism for protecting information privacy is adequate."

"It seems clear," the report said, "that individuals are in a poor position to police the record-keeping or record-sharing activities of organizations with which they have little or no direct contact."

The growing size of record-keeping organizations and the ease of combining, analyzing and interpreting stored data afforded by computer technology means "individuals have little leverage or bargaining power in their dealings with such institutions," the report noted.

"It is unrealistic to expect individuals to guard their information rights aggressively in these situations," according to the Carter report, which noted the privacy legislation put forward during this administration.

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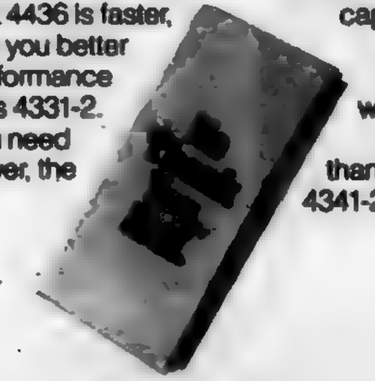

Such as Long-Term Investment

Strategics of Productivity Urged for Industry

By Bruce Hoard
CW Staff

CHICAGO — American industries are unwilling to pay the dues needed to increase productivity, Daniel T. Carroll, president and chief executive officer of Hoover Universal, Inc. told conferees at Info/MFG here recently.

Instead, they emphasize bottom-line profits to the exclusion of less exciting and less lucrative issues such as long-term investment and asset accumulation, he maintained.

"I think the lack of productivity is the root of inflation, the root of high taxes and perhaps the root of the demise of Jimmy Carter," the CEO said. "And it will be the root of Ronald Wilson Reagan's downfall, too, if he doesn't watch out for it."

Carroll also cited the decline in U.S. investment in industrial equipment and the lack of interest in operations management careers as antecedents to our current economic malaise. Operations management is the function most likely to get "down and dirty" with productivity, he claimed.

Technology is being touted as the best way to increase productivity, he said, adding technology in the U.S. is not producing as much in the way of productivity gains as in countries such as Japan and West Germany.

Productivity Strategies

In order to face the productivity problem square up, and beat it, U.S. industry should adapt what Carroll dubbed "strategics of productivity." Those individual elements of strategy are designed to deal with our most basic productivity woes, he stated.

Ticking off a series of ideas, the president decried the inadequate demand for business segments that offer unusual productivity leverage. Instead, he argued, businesses have maintained a "vainglorious" effort to sustain segments with only marginal productivity.

Maintaining these marginal areas is seen as a challenge or test to management, while needed technological, volume and growth segments are left to wither, Carroll said.

What we should do is give up on segments that are losers, as the Japanese did with shoe manufacturing and shipbuilding, and concentrate on such areas as semiconductors and pharmaceuticals, he claimed.

Fatal Fixation

Somewhat contradictorily, he declared U.S. research and development efforts should not be heavily focused on products responding to a technology push or market pull. "We have a fatal fascination with Alexander Graham Bell and the wonderment of market research," he said.

The result of such a fixation is a "great void." Rather than look for the next xerographic process or the next telephone discovery, productivity should be the immediate goal. But "productivity is not glamorous, productivity is not exciting and, therefore, productivity is ignored," he said.

Marketing is another obstacle to increased productivity, according to Carroll. It compromises productivity by agreeing to unreasonable delivery dates and pricing arrangements that do not deliver the cash flow necessary to increase productivity, he said.

When making capital investment decisions, estimates of the degree and longevity of productivity improvement should take precedence over the high cost of money and the risks of capital intensity, he commented.

Elaborating, he explained, "There is a need for management to develop programs that provide good training and experience in the identification, realization and measurement of productivity opportunities." Only now are graduate business schools stressing such an approach, he added.

Industry Decentralization

The decentralization of American industry was the CEO's next target. It is decen-

(Continued on Page 28)

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MRP Viewed Slashing U.S. Air Freight Bill

By Bruce Hoard
CW Staff

CHICAGO — If used judiciously, computer-based materials requirements planning (MRP) would alleviate much of the nation's $100 million annual air freight bill by reducing superfluous inventory transactions, the acknowledged "father of MRP" said here recently.

Speaking at Info/MFG, sponsored by Clapp & Poliak, Inc., Joe Orlicky of Orlicky Consulting and Educational Services repeatedly lashed out at the top managers who allegedly refuse to embrace MRP.

He also downplayed the importance of the computer hardware and software that power it.

MRP, which, as it becomes better known, is increasingly referred to as "manufacturing resource planning," is based on a series of minicomputers tied into a central mainframe.

The minis are distributed at key sites throughout the manufacturing workplace and monitor processes such as inventory, scheduling, work and purchase orders. The goal of MRP is to achieve maximum production efficiency through the fewest necessary inventory transactions and the maximum concentration of workers on high priority projects at all times, Orlicky explained.

Untapped Potential

So far, the ideal has been more attractive in theory than in fact, Orlicky noted. Despite what he referred to as a "track record that is mixed at best," the MRP pioneer was adamant about the largely untapped potential of his brain child.

Referring to the conference's keynote speech on productivity given by Daniel T. Carroll, the combative Orlicky described it as "an intellectual exercise that was not helpful" (see related story on Page 25). Carroll's ideas were "long-range solutions" that would require an organic restructuring of the economy and "billions of dollars," he said.

MRP, on the other hand, requires little investment and offers fast payback at a time when Labor Department figures reflect productivity decreases in six consecutive quarters, he said.

Currently, there are about 2,000 MRP systems in place, and the majority of them are not realizing the expectations of their owners, he said. On the positive side, some have "succeeded brilliantly" and others have been "out-and-out failures.

"With MRP, if you don't do it well, you'll end up worse than you were when you started out," Orlicky declared.

A good system reflects the amount of demand for a material, tells when a given amount will be needed and describes how to meet the demand, he said, adding MRP can save a great deal of time by detecting purchase and shop orders whose due dates have passed, rendering them invalid.

Scheduling Top Priority

Scheduling, not inventory management, is the top priority of MRP, Orlicky stressed. "Manufacturing inventories cannot be managed in their own right. The purpose of inventories is to support production schedules. The secret to better scheduling is MRP."

MRP is frequently "installed," but much less frequently fully "implemented," and the blame for that "belongs with top management and no one else," he said. "They have not established the procedural and human environment necessary to operate the system."

Furthermore, there is far too

(Continued on Page 26)

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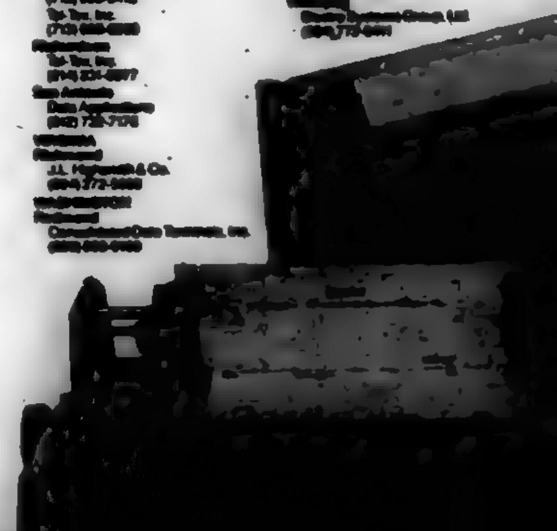

Reactions Mostly Favorable

Lure of Productivity Draws 4,500 to Info/MFG

By Bruce Hoard
CW Staff

CHICAGO — Drawn by the lure of increased productivity and more stringent control over manufacturing processes, some 4,500 people came through the turnstiles at the first Info/MFG conference and exhibit, held here recently.

Reactions to the show, which featured 42 conference sessions and 79 exhibitors, was mixed, but generally favorable. On the positive side, the overall organization won praise. On the negative side, many attendees were talking about IBM and Digital Equipment Corp. — neither of them were represented.

The vendors who were displayed an array of manufacturing-oriented hardware and software, ranging from bar code readers to materials requirements planning (MRP) systems — highly desired, but not yet proven under fire.

'The way it's going, software packages with basic data bases, which users can use to massage data without going through the data processing department, will become very popular.'

Conference attendees heard a host of manufacturing company executives hold forth on 12 basic subject areas including materials management, closed loop manufacturing systems, human resources and computer-aided design.

Satisfied Vendor

Michael Ehrensberger of Cincom Systems, Inc. was one of many vendor representatives who expressed satisfaction with the show. He said it represented the ever-growing number of manufacturers in the $30 million range who are getting the itch to buy minicomputers and take a direct stab at manufacturing control.

Gerald B. Mendelbaum, management systems analyst for Burroughs Corp., echoed similar thoughts on manufacturing trends. "I think the way it's going, software packages with basic data bases, which users can use to massage data without going through the data processing department, will become very popular," he said.

Nancy Campbell, marketing services coordinator for Ask Computer Services, Inc., said the show was filling "a definite void."

In her opinion, smaller manufacturers stand to gain from the minicomputer boom. "Judging from our sales, the small manufacturers can now find something that will fit their businesses that's user-oriented," she said. "The marketplace is huge."

Donald T. Wang, manager of project and data base administration for Mid-America Computer Corp., attributed the size of the crowd to an increased interest in automating manufacturing.

More and more people are moving the computer out of the computer room onto the shop floor and "into the hands of the guys who have the problems," according to Dick Lingeman, manager of manufacturing industry marketing for Honeywell, Inc.

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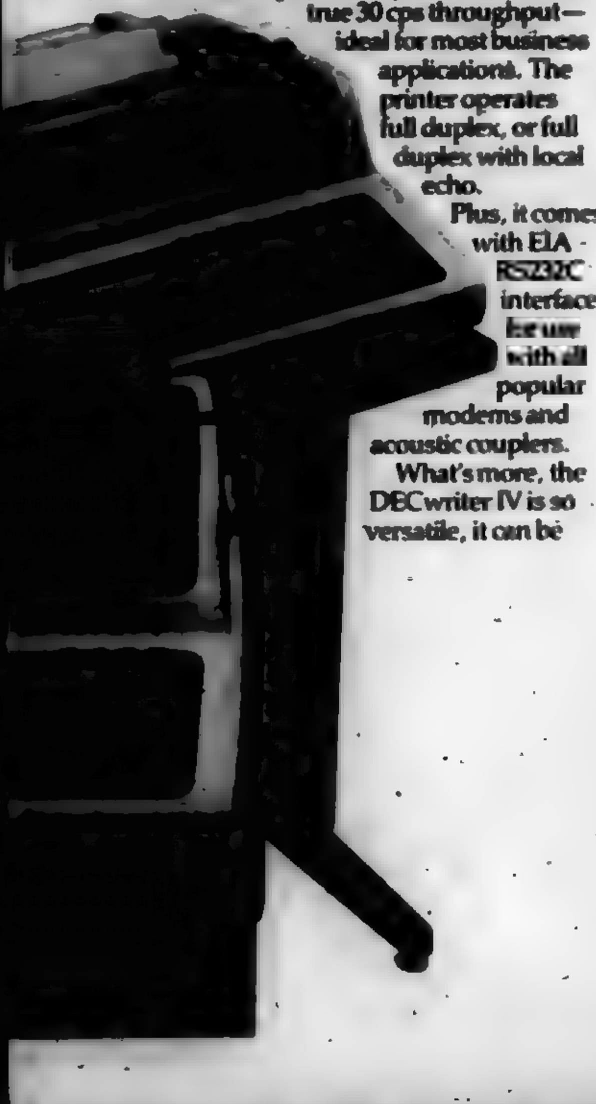

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Human Interaction Seen Vital to Manufacturing

By Bruce Hoard
CW Staff

CHICAGO — Good communication between top management, middle management and end users is a must if manufacturing systems are to be successful, Odell Richardson, manufacturing consultant for Univac told attendees at the Info/MFG conference held here recently.

And it is top management who must initiate not only communication, but all other phases of a new system. In order to do that, they must actively monitor and use the system while it is being designed and implemented, the consultant said.

Richardson depicted system implementation as an interlocking process by which there is always interaction between all concerned parties.

Top managers are responsible for planning, approving and funding. In addtion to those exclusive responsibilities, they must also guide middle management in its role as the day-to-day leaders in a new system.

In its leadership role, middle management is held accountable to end users who are familiarizing themselves with the system.

Like top management, they must tend to their exclusive duties as well as oversee the next echelon of employees, Richardson said.

"There needs to be a people to people communication of attitudes involved in the project, no matter what sphere of influence they are in," he noted.

Human Integrity

The consultant stressed the importance of human integrity in system building, saying people are the most important building block. They should at least have an aptitude for what they will be doing, if not previous experience, he stated.

Even though such requirements seem obvious, they are frequently not met, he said.

A "climate of coordination" should be created around systems development to encourage maximum productivity. Such a climate makes it possible for employees to evaluate themselves, saving the time of managers who might be otherwise responsible for doing so, the consultant commented.

Motivating top management to actively participate in a project throughout its development is a difficult task. Because they are torn by other duties, they frequently delegate their responsibilities to underlings who often lack the desire or power to get things done, Richardson claimed.

However, top management is not amenable to comments and especially criticisms from middle management and end users who are mostly intimately involved with the development process, he added.

"They become very irritated if someone lower down tells them what's wrong because it doesn't fit the social order of the company."

So, rather than listen to free advice from within, top managers solicit the help of consultants, who charge up to $600 a day to tell them what could have been had for nothing. Added to that, the system frequently collapses when the consultant leaves, Richardson noted.

The key to avoiding such pitfalls is a management commitment and systematic review in the form of a weekly progress meeting, he said. The meeting should never be more than an hour long and should confine itself to a specific, preset agenda.

Items to be discussed include delayed tasks, completed tasks, work in progress, future jobs and major milestones. "You discuss these things, and when you're finished, that's the end of the meeting," he said. "If you want to talk about something else, call another meeting."

MRP System

Richard Burns, MIS director for Hollister, Inc., described the efforts his company is making toward implementing its second materials requirements planning (MRP) system. The human element of that system is being handled very carefully, he claimed.

An MRP system is a computer-based manufacturing control system designed to achieve more efficient production processes through tight inventory and scheduling control.

After the go-ahead was given for a second system, (the first one failed) top management realized the need for user education for all potential users, Burns said. That need is currently being met through a series of classes on site and in Chicago.

Some of the problems the company has faced include relocation to a new corporate headquarters, requiring the purchase of new DP equipment, and the incompatibility of the system with Hollister's manufacturing processes.

"In all cases, you don't get a perfect match," he said. "You either have to modify the package or plant procedures every time."

Even though the firm will not have terminals for the system installed until late in the year, end users have been deeply involved with the development of the system in order to ensure comfort with it, he said.

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Strategies of Productivity Urged

(Continued from Page 25)

tralized to accommodate size and diversity. Perhaps more important, it is decentralized to foster career ambitions, he asserted. Such a structure leads to more "pseudo-top management" positions, according to Carroll.

He also noted the emergence of the "chief production officer." "Is this a sop or solution?" he asked rhetorically. "I worry about the hero approach to productivity. It smells of a nonsolution, and a nonstrategic one at that."

Taking a shot at such failed U.S. "dinosaurs" as Chrysler Corp., Lockheed Corp. and the Penn Central Railroad, he espoused a shift to international logistics. By bailing out the likes of those three, America is "pouring public and private money into the ditch," he claimed.

What is worse, such welfare may be harmful to other, stronger enterprises such as the semiconductor industry, he warned. "We have not been Japanese enough to realize some businesses aren't worth saving," he argued.

Legal Broadside

While on the subject of the fallen businesses, he also fired a broadside at the legal profession.

When Chrysler and Penn Central were at the "moment of crisis," he said, "they were led by lawyers."

Carroll cited IBM, Texas Instruments, Inc. and Caterpillar Tractor Co. as examples of companies with a dedication to productivity. Their success is attributable to people who think in productive terms and reward others who do likewise, he said.

The Hoover executive called for more public affairs programs as part of an effort to reunite industry and government, who have been adversaries in the past. Such an adversarial relationship can only be degenerative, he stated.

Carroll concluded with two comments. First, productivity affects nations with and without free market economies equally, he said.

Second, he noted that lasting solutions to productivity problems are only available to those who have the freedom to choose among strategic options.

MRP Viewed Economizing

(Continued from Page 26)

much emphasis on the computer angle of MRP. It merits a one on a scale of 10 in overall importance, he said. "Just because you run some software through a computer doesn't mean you're going to have success."

The other nine points on the 10-point scale are attributable to what Orlicky termed "the three pillars of MRP." They are educated users, master schedule and data integrity.

The educated user is everybody from the top manager to the stockroom clerk, he said. They must all be trained, compensated and qualified.

Most important, the master schedule must be "doable," he maintained. It must be intelligently managed and realistically reflect such factors as lead time and capacity planning.

If the master schedule is skewed, the MRP system becomes subject to an awful litany of disruptions, including excessive inventory, no capacity planning, an ineffective priority system and unpredictable surges in shipments.

Data Integrity

Data integrity includes the all-important bill of materials, inventory data and other file data. "MRP is totally dependent on the bill of materials," Orlicky said.

Orlicky repeatedly blamed management for the high rate of MRP failures. "If we are to have law and order in the manufacturing process, people must give up their ways and practices, and management must be at the head of the charge.

"I guess managers don't understand that, and that's why most of them who have put in MRP systems have failed."

Japanese Example Cited

U.S. Warned of 'Technology Trap' in Robotics

By Bruce Hoard
CW Staff

CHICAGO — Japan's burgeoning robot population could lead that country into a "technology trap," according to Bruce Haupt, director of Advanced Manufacturing Systems for IBM. Haupt made his remarks at the Info/MFG conference and exhibition held here recently.

"People tend to use new technologies the same ways they used the old ones," he said. In the case of humans and robots, that could lead to high-speed feeders and low-speed robots, he claimed.

Japanese robots also lack flexibility, he added. This inability to adapt to new modes of operation could be costly when it comes time to retool. U.S. robot manufacturers can avoid that pitfall by using "passive" tooling on robot-aided assembly lines.

Passive Tooling

Passive tooling eschews the use of motors and springs in favor of gravity, a far less expensive feeding device, he explained.

Haupt also urged U.S. manufacturers to disregard traditional return on investment wisdom when considering the economics of robotics.

"The problem today is people justify equipment on a two-year payback," he said. "But the rules are changing. The short-term payback is intimidating, and it's going to change because the Japanese did it."

A change in U.S. government policy toward robotics will fuel that change, he claimed. "Finally, the political pressure in the country is turning in support of the industry. But up to now, the U.S. government has been terrible compared to the Japanese," he charged.

Japan spent $100 million on robotics development between 1973 and 1978, 63 Japanese universities are working on robot research and 130 Japanese companies manufacture robots currently, Haupt said. All that adds up to twice as many robots in Japan than in the U.S.

There are some bright spots on the home front, however. The 35% yearly industry growth rate has pushed two previously divergent institutions into bed together — academia and government. "I think that's great," the director said.

Dr. Angel Jordan, dean of Carnegie Mellon University's robot institute spoke of the role of robots in the "factory of the future." Like Haupt, he cited the big lead Japan enjoys in robotics development.

"Japan is rapidly developing self-contained factories to be sold to developing nations," he declared. Such a factory is at least 10 years away, he added.

And before completely automated factories become reality, today's robots are going to have to undergo some major improvements. Most robots are not "intelligent," lack perceptual capabilities and are too slow and heavy, the dean noted.

3-D Vision

Perhaps the most difficult perceptual trait to achieve is three-dimensional vision, Jordan said. When breakthroughs are made in that area, robots will be able to perform such tasks as picking small objects from bins, a major breakthrough on the shop floor.

Such technological advances will be good for both employer and employee, he claimed. "Automation will free the workers for something more interesting and challenging."

On a broader scale, the entire manufacturing process will fall into the hands of what the dean described as "intelligent manufacturing systems (IMS)." IMS will provide instantaneous assessment of all manufacturing processes to all relevant and concerned parties, he predicted.

In the case of a breakdown, the shop foreman, maintenance personnel and even salespeople will be notified of the problem and its likely ramifications. However, failures will be uncommon because "no resource will be critical" and thus capable of bringing down the entire system, he said.

IMS will also use artificial intelligence to perform organizational modeling. Models will represent processes, machine tools, materials, people, departments and data bases, Jordan stated.

Organizational management and analysis are two other areas that will fall within IMS's bailiwick. Scheduling, a complex bane to many manufacturers, will be taken over by the system.

"Current approaches to scheduling are either manual or subject to an inflexible computer-based system," the dean noted.

Organizational analysis is now performed with simulation models that take three weeks to six months to build. IMS will have a complete profile of the organization available at all times, he said.

Every user, from managers to shop floor workers, will have terminals and be in communication with machines throughout the system, he added.

Tool Maker's Mini Guides Firm To $25 Million Revenue Hike

PHOENIX — A small machine tool manufacturing plant here has improved productivity while increasing its work force since it added a microprocessor to its manufacturing apparatus.

Six years ago, Bayer Industries, Inc. — which makes machine tools for the aircraft industry — had fewer than 12 employees and 12,500 sq ft of plant space. By 1980, the firm's employees had grown in number to 140, and the space had increased to more than 60,000 sq ft, according to Carl Riordan, the company's marketing manager.

As for revenues, Bayer went from being "practically broke, with the boss mortgaging his house to make the payroll" to $25 million in gross revenues, he noted.

In addition, the firm grew from manufacturing four machines a year to more than 30 each month, Riordan added. Contributing to such growth and success was the addition of a microprocessor to its manufacturing apparatus, a change that eliminated the need for machine toolers at every step of the process, Riordan explained.

"With the microprocessor taking over some tooling functions, all we needed were people who could pull a lever," he noted. "We hired 35 or 40 guys off the street and trained them."

The resulting shift in skilled and unskilled workers left some gaps in the machinists' expertise, however, since it was then necessary for them to communicate with machines instead of run them. The solution? "We teach the toolers to program instead of teaching programmers to become machinists," Riordan explained.

Bayer's "high-speed programmable machining center," called Acroloc, which it sells to users around the country, and on which it fashions parts for the machine itself, is now essentially run by computerized numerical controllers.

The unit's microprocessors are supplied by McDonnell-Douglas Automation Co. of Monrovia, Calif., which makes the Actrion III, and General Numerics Corp. of Oak Grove, Ill., which sells a 6M-byte microprocessor with a bubble memory.

"We have two suppliers so we won't get in a bind in terms of availability, and we'll sell machines with either one," Riordan said. "The customer knows which one he's getting, but they're really interchangeable."

Fips 70 to Aid Data Exchange

WASHINGTON, D.C. — A new standard to help improve the interchanges of geographic point location data in federal automated systems has been approved by Secretary of Commerce Philip Klutznick. The standard is of particular interest to mapmakers, geologists and other users of precise geographic information.

The new Federal Information Processing Standard (Fips 70) becomes effective April 24. It is based on American National Standard X3.61-1978, a voluntary industry standard of the same name — "Representation of Geographic Point Locations for Information Interchange" — developed by the American National Standards Institute.

In short, it provides a uniform means for information representation in digital form, facilitating exchange among information systems.

Print and microfiche copies of the standard will be available from the National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Road, Springfield, Va. 22162.

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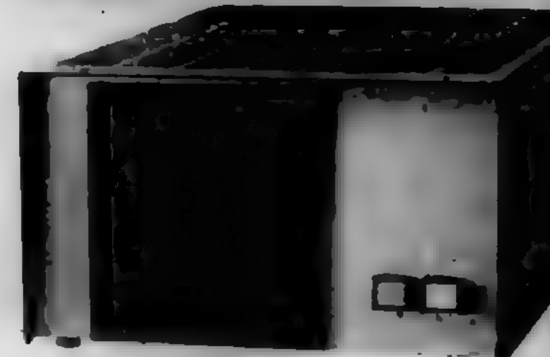

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FAA Drafts Plan in Case of Controller Strike

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Aviation Administration (FAA) has issued a draft contingency plan that would drastically limit airline service if a rumored strike of the nation's air traffic controllers (ATC) takes place next spring [CW, Oct. 13].

ATCs are civil service employees that guide air traffic using computer-based tracking equipment.

Seeking comments on the proposed plan by Dec. 15, FAA Administrator Langhorne Bond was quoted recently in the *Washington Post* as saying, "I believe a strike will happen."

Bond also reportedly charged that the Professional Air Traffic Controllers Organization (Patco) "is planning a nationwide strike that closes everything." While Patco's present contract expires next March 15, Patco members around the country consistently deny that a strike is planned.

Such denials belie the "frustration, anger and resentment ... across the country" privately expressed by controllers toward FAA management. One of the sources of such frustration is what controllers have long regarded as the outmoded and unreliable ATC computer equipment.

Other traditional sources of discontent include alleged undercompensation, understaffing and training programs that strain the limitations of journeymen controllers.

Lending credence to the FAA's intuition is the fact that, last April, Patco issued to its members an "educational" document — numbering more than 100 pages — describing actions to be taken in the event of a strike. According to Patco Executive Vice-President Robert Meyer, the document will be used only in the event that Congress should change the existing law barring civil servants from striking.

The FAA, however, calls the sheaf "a detailed strike plan." In addition, the FAA regards Patco's $2 million "subsistence fund" — allegedly for use if Patco gets the right to strike — as an outright "strike fund."

Cutback to 15%

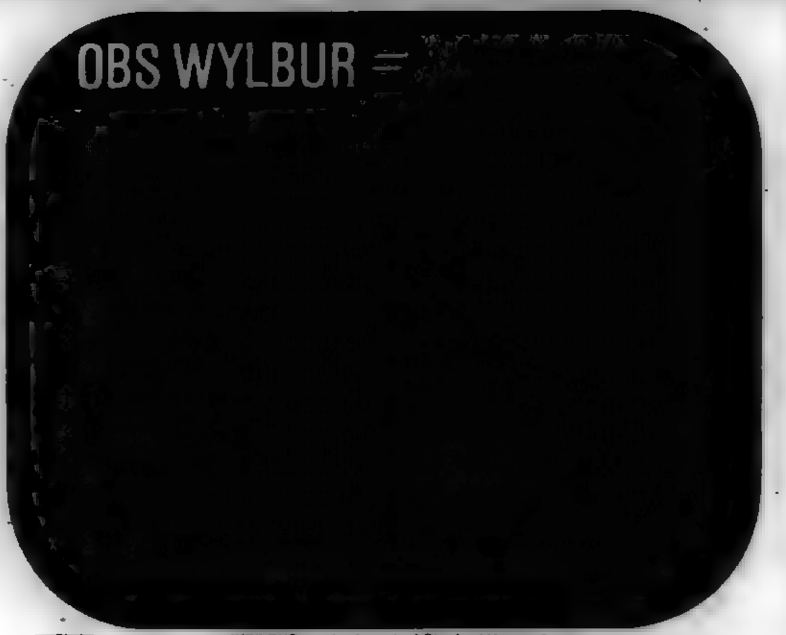
If the FAA's guess is correct, and Patco's 15,000 members — 85% of the U.S. controller workforce — go out on strike next March, the agency estimates air service would operate at only 15% of normal strength and that only between 35% and 40% of the more than 12,000 scheduled daily flights could be handled by the remaining controllers.

In the event of such a strike, the agency plans to "maximize the number of aircraft that can be accommodated with the reduced work force," which would comprise supervisors, nonbargaining unit employees and nonparticipating controllers.

Such maximization would entail "the use of limited aircraft operations, rigid schedules, routes and altitudes and the reduction or elimination of some service not affecting the safety of the ATC system users," according to the FAA's "National Controller Strike Contingency Plan."

Specifically, in the event of a strike, most people who want to travel less than 500 miles will have to find alternative means of transportation, according to the plan.

The FAA will give top priority to essential military and medical emergency flights and secondary priority to scheduled airline flights of more than 500 miles. Only then would other flights be considered.



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Auction Net Lets Ranchers Sell Cattle Via Terminals

By Deborah Wise
CW Staff

COLLEGE STATION, Texas — Cattle auctions could go on without the animals, the corrals or the auction barns if ranchers used a computerized auction system recently developed.

Instead of traveling many miles to an auction and risking the physical well-being of his cattle, a rancher can put his herd up for sale using a communications network devised by two systems analysts at Texas A&M University here. The network allows buyers and sellers to complete transactions without leaving their CRT terminals.

"If you have cattle to sell, you contact an auction market that then sends out a grader to classify the cattle by age, size, breed and weight," Thomas S. Clifton Jr., one of the system's developers, explained.

This information is then stored in the Amdahl Corp. 470V/6 mainframe at Texas A&M's data processing center. The software for the system is based on IBM's IMS data base management system; Clifton and his colleague, Jeffrey C. McCabe, wrote the auction programs in Cobol.

Problem of Acceptance

At present, there are 16 IBM 3275 terminals in the field that communicate using leased telephone lines. Though the response from ranchers has been slow, "the system has only been in operation a couple of months," Clifton said. "I think the biggest problem is getting the people to accept it."

Cattle auctions are traditional and sometimes social events, and it is difficult to get farmers to suddenly change over to a system where they have to put absolute faith in an outside grader and may even be selling to someone they do not know, he said.

The system is only in operation for feeder cattle — that is, cattle to be sold to be fattened for slaughter — but may be expanded to include "fat" cattle, cattle sold directly for slaughter.

"We were interested in trying to come up with something for the breeder who deals in large volumes and something that increases the size of the market and the number of buyers," Clifton explained.

Both buyer and seller can be in contact from a distance of 100 miles or more without moving the cattle an inch before finalizing a transaction.

Bidding Process

The auctions follow the English rules whereby a predetermined time and date must be advertised. As many as eight lots at a time appear on the terminal screens along with detailed information as to breed, average weight and age.

Buyers then have a chance to bid during a 16-minute period. Both the highest bid and their bid are recorded on the screen simultaneously.

The terminals themselves are situated at auction barns and in central locations where more than one buyer or breeder can use the facilities. "On one day we had a lot that went for $100,000," Clifton said. And on another occasion, if the bids had passed the seller's reserved price, more than $350,000 worth of beef would have been sold.

At present no commercial concern has advanced plans to take over the project, which is being financed through a federal grant and by Texas A&M.

Proceedings of ICCP To Be Published Soon

CHICAGO — The edited papers and proceedings from the recent Institute for Certification of Computer Professionals (ICCP) conference will be made available by early next year.

At the conference, 30 international experts discussed the definition of systems analysis and design and the needs and criteria of certification.

More information is available from the ICCP at 35 E. Wacker Drive, Chicago, Ill. 60601.

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Amid Growing Decentralization

Optimism Voiced for 'Trusted' Future Systems

By Jake Kirchner
CW Washington Bureau

GAITHERSBURG, Md. — With the growing trend toward decentralization — allowing more and more people access to computing power — the need for secure systems architecture becomes more urgent. Fortunately, the prospect for commerical availability of such systems is auspicious, according to participants at a recent seminar here.

I'm really encouraged by the efforts coming out of the manufacturers," said leadoff speaker Stephen Walker, chairman of the Defense Department Computer Security Technical Consor[illegible].

The seminar, the third in a series sponsored by the DOD Computer Security Initiative Program, brought together a mix of users and vendor representatives who presented an optimistic outlook for development of "trusted" computer systems.

'Trusted' Definition

A trusted system is defined as one that employs sufficient hardware and software integrity measures to allow simultaneous processing at multiple levels of security.

The Defense Department, which has carried on its own struggle to develop trusted systems, has been trying to get the word to manufacturers that there is a growing need for multilevel computer security in both government and private sectors. The vendor community has reponded well, according to Walker.

The task "is being pursued very aggressively," he said. "Soon we may not have to be able to build the ultimate [secure] system ourselves: we may well be able to buy it from the manufacturers."

Walker said he recognizes the constraints on manufacturers — the need to develop "a ready and easy way to transition the existing customer base" to secure operating systems — but said he sees "evolutionary" progress toward that goal.

To keep abreast of this progress, he said, the government will establish within a year, perhaps in DOD or with the cooperation of the Commerce Department, a computer security technical evaluation center. A prime function of the center will be to set hardware and software security criteria and to evaluate industry and government developed systems against those criteria.

From the seminar presentations of several vendors, it seems the center will soon have a number of products to evaluate.

Honeywell, Inc., whose work in this area goes back to the '60s and its primary role in developing the multiple access time sharing system, Multics, is "committed to aggressive action" in providing economical trusted systems, Irma Wyman, Honeywell director of corporate information services, said.

Using the security kernel approach, Honeywell is developing a "spectrum" of computer systems to reduce the security risk to a level acceptable to individual product markers, military and civilian, she said.

Also represented were Mitre Corp. and Systems Development Corp. (SDC), which have done considerable work in developing trusted operating systems using security kernels — hardware and software mechanisms that, when incorporated in systems, control access of individual user to specified information and processing functions.

Tymshare, Inc., which, like SDC, is developing a trusted operating system for IBM 370 architecture, was represented by Jay Jonekait, manager of advanced systems development, who reported on Tymshare's Gnosis 370 operating system.

Rounding out discussions by Univac and Digital Equipment Corp. executives of their firms' security research efforts, Viktors Bertis of the IBM systems architecture group, described the security features of the IBM System/38, whose design, DOD's Walker predicted, will be "widespread" in upcoming IBM systems.

The System/38, with its log-on procedures for each user, incorporates a matrix of user profiles and resident data objects thaf determines user access to information and operations.

The noncomputer center, nonprogrammer environment — for which the small business computer System/38 was designed — typifies, Walker said, the kind of future computing environments that will necessitate more widespread use of trusted systems.

Technology to 'Populate 'The World With Terminals'

By Rita Shoor
CW Staff

OAK BROOK, Ill. — The number of people in an organization that interact with computer systems will increase from today's 2% to between 50% and 70% by the end of the decade, according to Serge Beauregard, Deltak, Inc.'s group vice-president for literary services and products.

"That includes word processing systems that communicate with DP systems, " he said. Technology is moving to "eventually populate the world with terminals," he said in a recent interview here.

Within 10 to 15 years, "no one will be working at keyboards any more," he continued, because of technological advances in voice recognition gear.

What does all this mean to the people whose jobs will become obsolete?

On a macroeconomic level, the trend means "a large population in the work force will have to be redeployed," according to Beauregard. In microeconomic terms, it is probable that companies that traditionally allowed attrition to take care of those employees with jobs that are being phased out will be faced with extensive retraining and reemployment problems.

The movement to distribute technology to its users has been going on since the beginning of this century, according to Beauregard. Most jobs in today's business world did not exist in 1900, he said.

The DP industry is following the same pattern by its increasing effort to put information technology into the hands of the system users, he noted.

Future plans for Deltak — a firm that specializes in training and education tied to DP technologies — include the development of programs that will enlarge the technical vocabularies of the leaders within an organization and make them aware of the rate of change within the DP industry.

Johns Hopkins Announces Contest To Aid Handicapped Programmers

LAUREL, Md. — Johns Hopkins University announced a nationwide search and contest aimed at uncovering new applications of personal computing for the handicapped.

Funded by the National Science Foundation and Radio Shack, the contest began last week and will run until June 1981. The university is offering a $10,000 grand prize for the device, system or computer program that best fits the needs of the handicapped. In addition, 100 other awards, including 15 personal computer systems, will be presented for winning submissions, a spokeswoman said.

The contest is open to computer professionals, amateurs and students throughout the U.S., with awards in each category. Submissions can include Computer-based aids for the blind, deaf or mentally retarded; ideas for applications that help individuals with learning disabilities; and devices for the orthopedically handicapped.

As part of the contest, special meetings on computing for the handicapped will be held at rehabilitation centers and technical conferences across the country early in 1981 .

Additional details on the contest can be obtained from Johns Hopkins University, Personal Computing for the Handicapped, P.O. Box 670, Laurel, Md. 20810.

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GE Technique Finds Faults, Helps Restore Power Fast

SCHENECTADY, N.Y. — A computer-based power distribution monitoring and control system developed at General Electric Co.'s (GE) research and development center here could help restore electricity immediately to all but the locations directly affected by a fault.

The new technique, called Probe, will be able to locate a power fault in a miles-long power distribution network and reconfigure the network to restore electricity to all but the households in the immediate vicinity of the fault, according to a GE spokesman.

The concept was tested at a Commonwealth Edison substation near Chicago and was very successful, according to Dr. Arthur C.M. Chen, manager of GE's Electrical Systems and Technology Laboratory.

Based on the test results, the Electric Power Research Institute (Epri), a nonprofit organization involved in research programs for the utilities industry, has awarded GE a $3.5 million contract to "commercialize" Probe. Epri has rights to the patents of any discoveries.

The tested prototype system consisted of two Univac V77 minicomputers, Intel Corp. 8080 microcomputer-based monitoring and control units and a communications network that used either radio transmitters or specially allocated frequency or power lines.

Ideally, the system should work as follows: The micro-based monitoring units are installed on utility poles. In the event of a fault, sensing devices at the substation send warning signals to a substation computer which determines the location of the fault using specially designed software.

The minicomputer "interrogates" the units on the utility poles to establish whether the fault is transient. If it is permanent, the computer will reconfigure the network to reestablish power to unaffected sections and then alert a service team.

When the system is in operation, Chen predicted, about five to 50 pole units would serve a single substation, depending on the area.

Further research is being done at GE's Digital Systems Operation in King of Prussia, Pa., and Chen said GE may be taking orders by 1984. A full-scale test will be put into operation by 1982 at the Texas Electric Service Co.

Chen anticipated problems in the communications aspect of the system. During the Chicago test no actual power failure occurred, though results from simulated conditions were favorable.

With about 40,000 distribution substations nationwide, it would require more than 25 years before the system could be adopted nationwide, Chen estimated.

Probe could be used nationwide because most utility companies, with the exception of those in a few large cities, work on the same principles for power distribution.

Robert M. Hardy, a member of the Probe development team from the GE Research and Development Center, examines a microcomputer circuit board that serves as the "brains" of an experimental remote unit that is designed to open or close a pole-top switch on command from the Probe system's central computer. This unit is part of an experimental Probe system that was installed for evaluation in the Commonwealth Edison service area outside Chicago.

DBMS Lets Dairy Bottle Up Order Problems

SAN ANTONIO, Texas — "Unlike most businesses, which match production to market supply and demand, milk producers must work with the schedules nature has given them," noted Bob Seymour, data processing manager of Associated Milk Producers, Inc. (Ampi) here.

By installing a data base management system (DBMS), Ampi, the nation's largest nonprofit cooperative dairy in terms of revenues, has improved the coordination of its processing plants that convert surplus milk to other marketable products.

"We were looking for an immediate solution to our cheese packaging bottlenecks," Seymour explained. "Cheese has a relatively short shelf life, so we must key production to fit the day-to-day demand.

"Once the cheese is packaged and ready to ship, the price has to be figured. The price of cheese — and all dairy products — fluctuates constantly, and manual calculation for each order can cause headaches and costly delays. All orders have to be out within seven days of receipt," he noted.

In selecting a specific data base management product, the dairy looked for the ability to get applications up and running quickly, the advantages of multiple entry points, an end-user-oriented language, a competent report facility and marginal use of computer resources.

Tree Index

Intel Corp.'s System 2000/80's inverted tree index and straightforward programming language were endorsed by the dairy's programmers, and the flexible on-line capabilities were exactly what was needed for completely computer-naive end users in a manufacturing environment, Seymour said.

After installing the DBMS on an IBM 370/158 with an MVS operating system, the DP department began to implement what is now called the on-line order entry application, focused at this stage on cheese packaging.

The dairy's main cheese packaging plant is located in Portage, Wisc. Cheese orders come in to one of the regional offices and must be logged on the CPU here before proceeding to Portage.

Prior to acquiring the System 2000/80 DBMS, Ampi employed telex [TWX] facilities to relay orders from the regional office to Portage. In addition to the time delays, there was always the probability of human error and equipment malfunction. "It was clear we were heading into the space age of data processing with dark ages equipment," Seymour recalled.

Now, clerks in the cheese factory — who know nothing about computers or data base management — utilize the DBMS through customized on-line systems and string commands to communicate with regional office personnel.

Calculating Prices

Another area where the DBMS helps tremendously, Seymour said, is price calculation. Dairy products are priced by independent exchanges, similar to the stock exchange. Their pricing fluctuates at least weekly, in response to bidding from the exchange floor.

"The DBMS completely automates the procedure, plugging the weekly market figures and the date into a formula and instantly producing current price. It has really helped to speed the process along," he said.

System 2000/80 handles more than 2,000 orders per month on the cheese application alone, and data processing personnel are looking to the day when similar applications will be up and running for fluid milk, butter and other manufactured dairy products.

Five additional data bases — accounts payable, personnel, general ledger, fixed assets and a billing system for fluid milk — are already loaded and ready to go into production.

These will help to lift the managerial burden that has increased with the complexity of Ampi's operations, Seymour noted.

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Twin Nuns Pool Efforts To Establish Micro Lab

Sisters Marilyn (left) and Carolyn build a micro.

By Deborah Wise
CW Staff

S. ORANGE, N.J. – "Microcomputers are really beginning to come of age – but it is happening so rapidly. Three years ago, we didn't have any microcomputers at all."

Such comments are usually made by the manager of a small business. This time, however, they were made by an Ursuline nun, Sister Carolyn Therese Welter, who, with her identical twin sister, Sister Marilyn Therese, is setting up a microcomputer laboratory at Seton Hall University here.

"We're trailblazers in a way," Sister Marilyn said. "Many colleges do not have a computer laboratory as such, just computers in different departments or off in some closet. What we do is bring the computers together in a central location."

The two sisters have been organizing the laboratory since September. It has Heath Co. H89, Radio Shack Model II, Level II and Radio Shack Model I, Level II microcomputers.

The center is located in the Business School at Seton Hall. "This is an excellent idea because computers and micros in particular are used most in business," Sister Carolyn said.

The center will be used primarily by students who will be given hands-on experience with the micros. However, it will also be available for use by the rest of the faculty and by the university's administration.

"We are not entirely up and running," Sister Carolyn said, adding that the center could do with more equipment. "We really don't have the systems we need, like disk drives and printers."

At one time, the twins did some consulting work for friends. They are considering going back into the consulting business to make the extra money they need to buy more equipment for the laboratory.

Identical Careers

Combining the religious with the secular, the two sisters have followed identical careers. Both joined the Ursuline order 27 years ago, both majored in mathematics at the same college and both received master's degrees in computer science from the University of Maine. They are now doctoral candidates at the University of Toledo; however, they have undertaken different thesis topics.

Sister Carolyn is researching ways to alleviate the anxiety that administrators and faculty members feel when computers are introduced into their working environments. She believes one way of easing this situation is developing easy-to-use software packages for microcomputers specifically designed for the noncomputer science-oriented person.

Program Gives Career Guidance

CLEVELAND – Cleveland State University (CSU) is using a computerized career guidance program to give students an overview of the regional and national job market and their potential to find work within it.

The program, called Discover, allows the students to sit down and work at their own speed and on their own without hesitation. "We have found that some students are reluctant to go to a counselor," Robert Moore, director of computer services at CSU, said.

According to Moore, the response has been favorable. "But let me stress that the computer is not making the decisions. It lets the student find out more information about his values and goals and he can make the choices himself. It augments our counselors and is not used with a view to replacing them," he added.

The program, written in Cobol, runs on IBM mainframes and 3270-type terminals. It was developed by the Discover Foundation, a nonprofit organization headquartered in Maryland, and IBM has an exclusive marketing agreement. There are two versions available, one for secondary school children and one for college students and adults contemplating midlife career changes.

"The biggest advantage of the system is that it was built to be modified easily by non-DP people," according to Larry Blasch, education and industry consultant for IBM. This means that users can add regional information to the national data base to enhance the counseling potential of the system.

Moore said CSU has added a program that reflects the job market of the Cleveland district and Ohio area.

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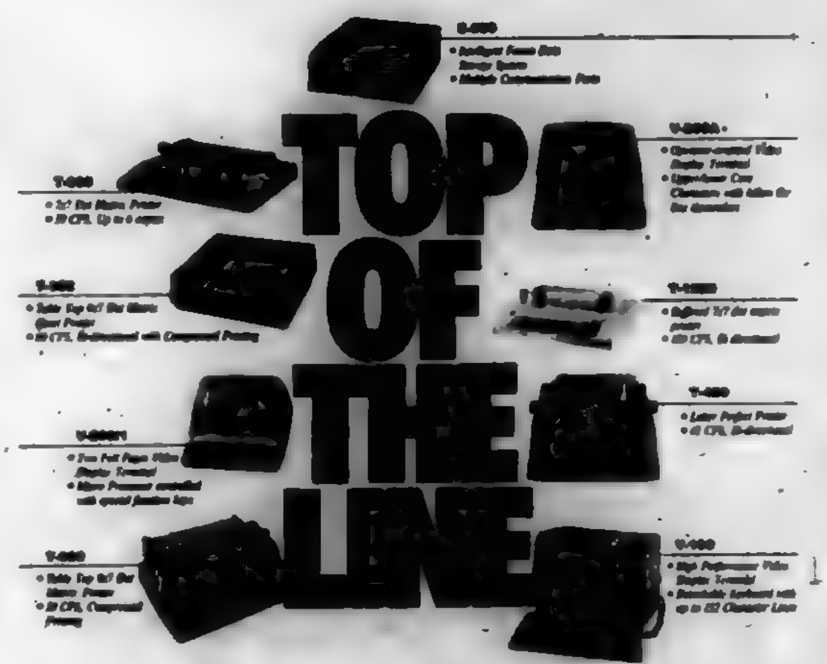

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Development Method Eases Documentation, Estimates During Project Life Cycle

PITTSBURGH, Pa. — System documentation and time and cost estimates are usually top contenders for "least favorite" assignment during a project's life cycle. Transcomm Data Systems, Inc. has made these tasks less formidable by implementing a formal system development methodology.

The software development firm has specialized in developing, installing and supporting distribution control and financial information systems since 1972. Its products are based on an on-line accounting system, Tolas-II. They include order entry, inventory management, purchase order management and sales analysis applications as well as modules for accounts payable and receivable, financial reporting, payroll and fixed assets.

Like many other installations, Transcomm initially opted for creating an in-house methodology for developing and maintaining computer software applications. However, the decision was made to go with Atlantic Software, Inc.'s SDM/70 when "manpower costs became prohibitive on the [in-house] project," a spokesman noted.

Tailored Needs

A full-time senior analyst was assigned the six-month job of coordinating training and implementation of the complete methodology. One of the reasons for the lead-in time was that the series of manuals had to be tailored to meet Transcomm's specific requirements, according to Richard Burns, senior systems analyst. SDM/70 is primarily targeted toward end-user installations rather than at software development houses.

Personnel from Atlantic Software, Inc., the SDM/70 vendor, were available for both training and consultation as necessary, Burns noted.

"We began the process by using it on a small project. The SDM/70 estimating guidelines produced amazingly accurate final-cost figures. That initial demonstration of success prompted an enthusiastic, receptive response from the analysts, programmers and technical writers," he said.

SDM/70 is a phased approach to developing and maintaining computer software applications. Its key feature is the process of segmenting all projects into clearly defined phases. Each phase ends with the development of describing the work of that phase for both the vendor and the client. Succeeding phases are based on the work of previous phases as represented by their end documents.

"SDM/70 has helped us most at the requirements-definition phase of every project by focusing our attention more rigorously at this design level," Burns noted. "The approach encouraged us to do a predetermined step-by-step analysis of a client's business requirements and compare those requirements with our standard software."

The net effect is to isolate design problems in the planning stage rather than in the installation stage of the project, according to Transcomm.

The improved documentation, attributed to SDM/70, is also improving communications between clients and the firm's technical staff, a spokesman said. By providing a detailed base of knowledge common to both parties, full SDM/70 documentation supposedly makes for easier problem solutions.

A systems design objective, systems external specification, user guide, procedural guide and systems guide using SDM/70 guidelines are provided for each system. "This documentation supports our systems in many instances where people would have once fielded the question," noted Richard D. Sikon, manager of product development.

Lastly, the SDM/70 technique has been helpful in predicting software development costs by using the phased approach to estimating instead of blanket quotations, the firm said. Each software development project is broken down into several discrete segments. Estimates, using SDM/70 guidelines, are made segment by segment and acknowledged by both the client and Transcomm in the same way. Both have a clear idea of the cost of work in progress and a more reliable estimate of the total cost of the entire project.

This phased approach substantially reduces the likelihood of unmanageable and unexpected cost overruns on software projects, according to the company.

There are six projects currently underway at Transcomm, and SDM/70 is being used on all of them, Burns said. The methodology played a "vital role" in organizing an assignment for a Cincinnati-based client, Mead Merchants. This paper distributor required the completion of a large order processing and inventory control system by 1981.

Through SDM/70, "we are progressing on schedule, within budget, in developing the appropriate enhancement documents to tailor our standard packages to Mead's needs," Burns claimed.

The full implementation of SDM/70 has resulted in "better designed and better documented" software, Transcomm President Alex Burstein maintained. And — no small consideration — it has allowed the firm to price its wares more accurately.

MVS Course to Focus On Design, Structure

AVON, Conn. — To provide MVS users with practical knowledge of the design and structure of MVS, Computer Systems Research, Inc. will be conducting a five-day in-depth program on MVS internal logic, system design and performance. The two upcoming options are Dec. 8-12 in Tampa, Fla., and Jan. 12-16, 1981, in Hartford, Conn.

Topics that will be covered include supervisor services, IOS, storage management, virtual I/O, catalog management, design of IPS and various MVS performance considerations.

Further details are available from course sponsors at 195 West Main St., P.O. Box 45, Avon, Conn. 06001.

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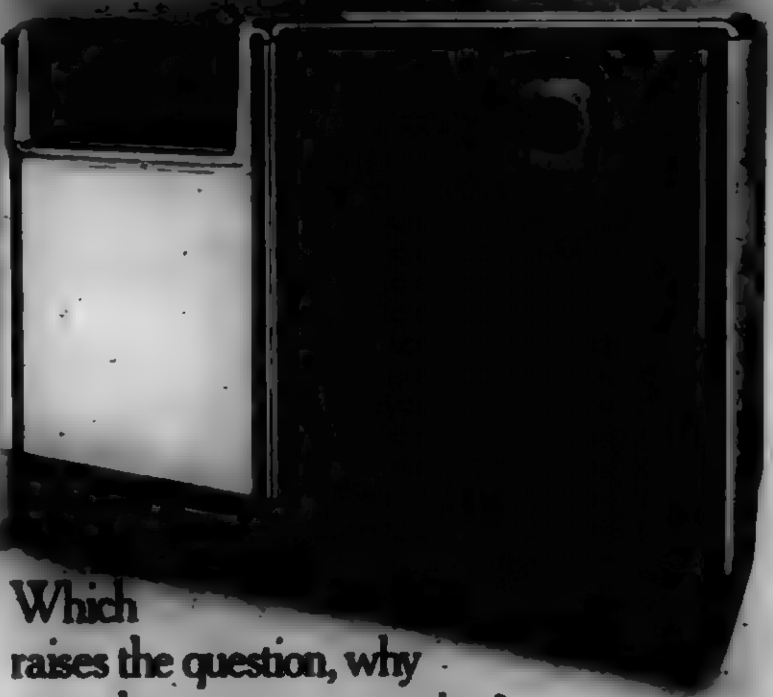

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IBM Builds on Single Chip Fiber-Optical Receiver

YORKTOWN HEIGHTS, N.Y. — A researcher at IBM's Thomas J. Watson Research Center here has designed and built on a single silicon chip an experimental optical receiver that IBM said could lead to more economical use of fiber-optic data communication links between computing system devices.

The receiver is relatively inexpensive to fabricate and can operate at data rates high enough to take advantage of the information-carrying capacity of fiber-optic cables, according to an IBM spokesman. Much more information can be transmitted through such cables than through copper wire.

Besides higher data rates, smaller size and lighter weight, transmission through optical fibers provides immunity to electrical interferences and effects of the environment as well as security from unauthorized "tapping."

Possible Applications

One possible application of the receiver could be in the data channels that presently connect large central computers to peripheral equipment, such as storage and I/O devices; these channels currently use bulky copper cables. Another application could be in distributed data processing networks.

With a technique called current-mode amplification, used in an optical receiver for the first time, IBM researcher Dennis L. Rogers met the needs for both high bandwidth and low cost, the spokesman said. The data rate of the new receiver was reported to be 200M bit/sec, which is an improvement by more than a factor of 13 over commercially available, fully integrated optical receivers that produce logic outputs. The bandwidth is 180 MHz.

According to Rogers, the data rate appears extendable up to 1,000M bit/-sec with anticipated advances in silicon-chip technology.

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Stratton Chair Created at MIT By Hewlett Gift

CAMBRIDGE, Mass. — An academic chair honoring Dr. Julius A. Stratton, 11th president of MIT and a leader in the development of research and education in American science and engineering, has been established at MIT through a gift from William R. Hewlett, chairman of the executive committee of Hewlett-Packard Co.

The Stratton Professorship of Electrical Engineering and Physics, recognizing Stratton's dual interest in these fields, will be occupied alternately by a faculty member from the Department of Electrical Engineering and Computer Science and the Department of Physics.

Dr. Stratton was the first director of MIT's Research Laboratory of Electronics, founded in 1946. Strongly interdisciplinary, it was viewed as the successor of MIT's Radiation Laboratory, where the major U.S. research that led to the development of radar was carried out.

Under Stratton, the laboratory became the prototype interdisciplinary research center.

Stratton remained in this post until his appointment in 1949 as provost, MIT's chief academic officer. He then served as MIT president from 1959 to 1966.

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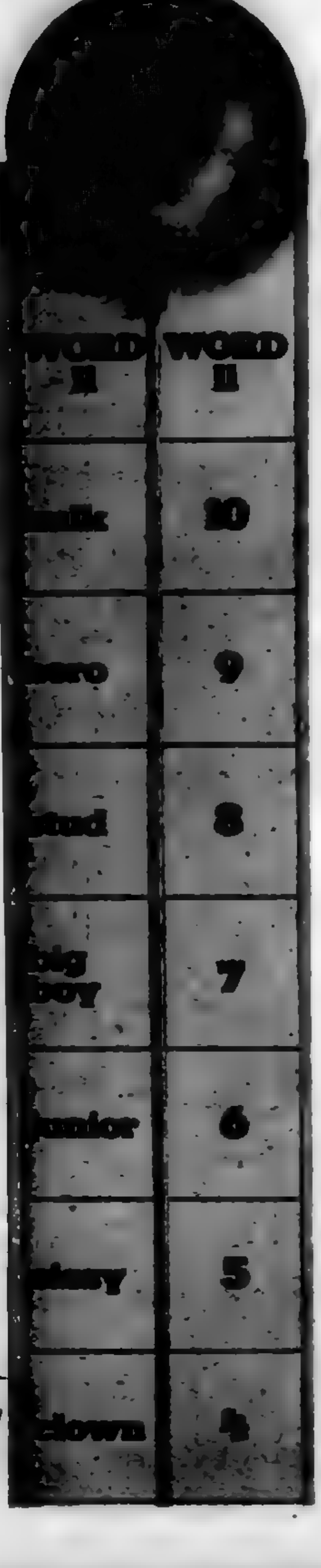
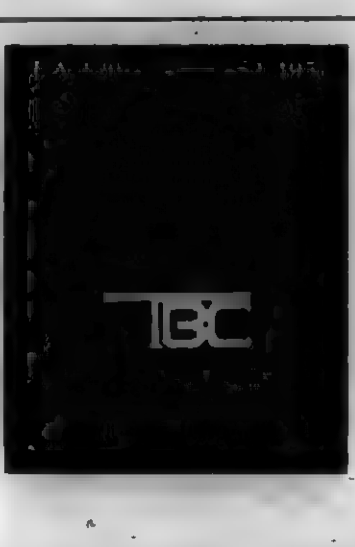




Bell Labs Improves Glass Fiber Fabrication Rate

MURRAY HILL, N.J. – Researchers at Bell Laboratories here have devised a method to increase substantially the rate at which glass fibers used in light-wave communications can be fabricated. The technique is expected to make the technology more economically competitive with alternative transmission media.

Jim Fleming (left) and Paul O'Connor make adjustments on the apparatus they use to fabricate preforms for the glass fibers used in light-wave communications.

The researchers, Jim Fleming, John MacChesney and Paul O'Connor, have done this by using a plasma – a highly energetic mixture containing ionized atomic fragments – to speed up "preform" production, an early step in the fabrication process.

"The plasma technique speeds up the making of preforms for glass fibers while maintaining the fiber's transmission properties," Fleming explained. "Based on preliminary results, the preforms can be fabricated five times faster with this technique."

The technique is a variation on the generally practiced methods of the modified chemical vapor deposition (MCVD) process. MCVD was developed at Bell Labs in 1973, and a patent for the process was awarded Aug. 12.

In the MCVD technique as commercially practiced, the glass "preforms" that are eventually collapsed and drawn to form light-guides are made by passing chemical vapors into a glass tube.

With the plasma-assisted process, the vapors – instead of being heated only by an external torch – are heated within a zone that includes a plasma formed and maintained inside the tube by electromagnetic energy generally produced by an induction coil.

"The plasma fireball supplies the energy that helps propel the glassy particles toward the walls of the tube," Fleming said.

Since preform production is a significant part of fiber fabrication, increasing this rate should substantially reduce the cost of fabrication.

Seminars Set On DP, Personnel

NEW YORK – Management International, Inc. has developed four seminars for DP and personnel managers.

The seminars will be conducted in New York, Boston, Fort Lauderdale, Fla., Washington, D.C., and Toronto between Dec. 16 and March 17.

Topics Covered

The seminars, which are also offered on-site, cover "Developing DP's Strategic & Long-Range Plans in the 1980s"; "Productivity and Performance Planning for Programmers and Analysts"; "DP Recruiting: A Challenge for the 1980s"; and "Organizing and Managing the DP Human Resources Function."

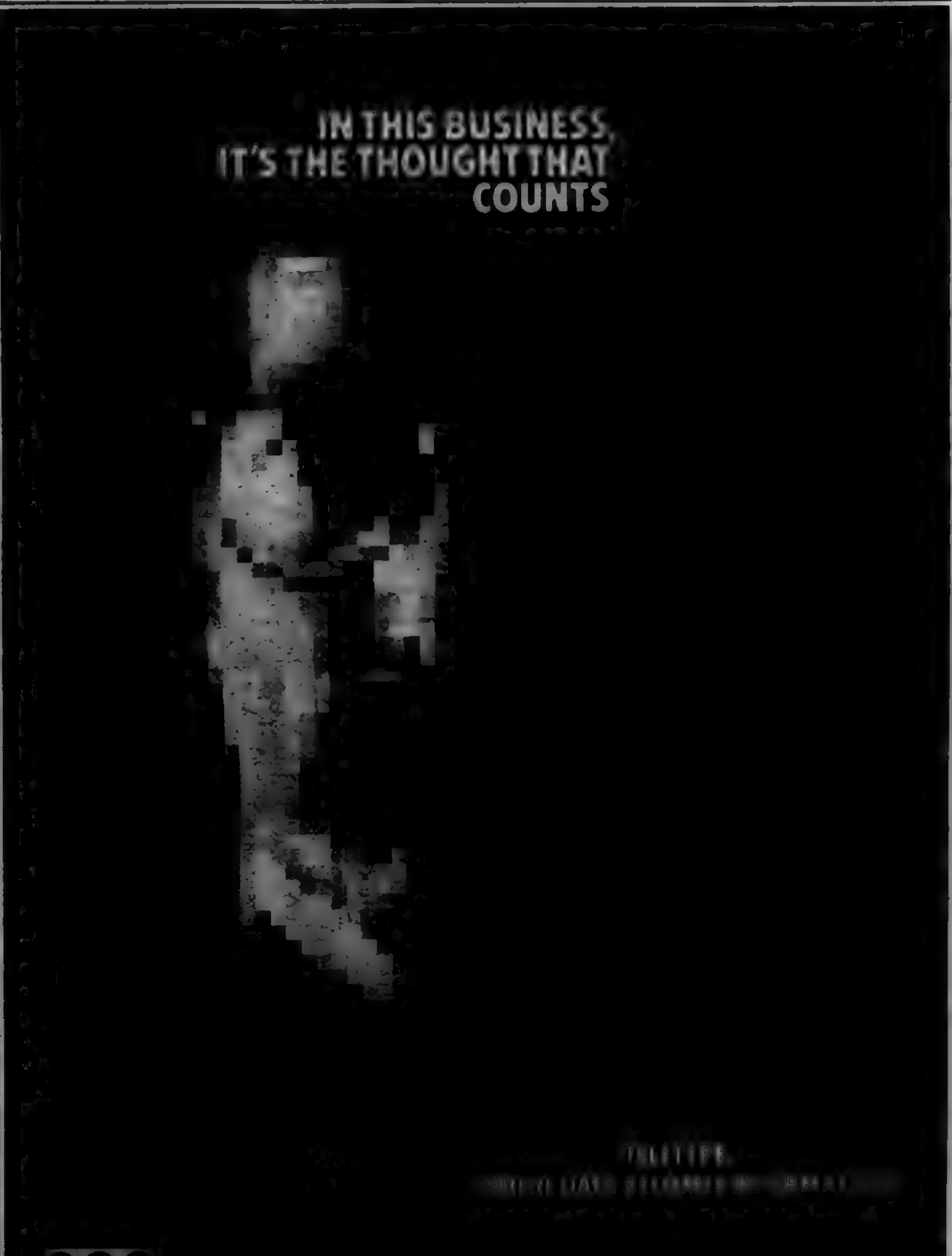
Additional details are available from Management International, Seminar Data Center, Box 5111, FDR Station, New York, N.Y. 10150.

Women to Meet On Networking In New York

NEW YORK – The New York chapter of Women in Data Processing will hold a "Women Managers Network" meeting here Friday, Dec. 5 from 5:30 p.m. to 7:30 p.m.

Featuring a speaker from within the organization, the gathering will cost $10 per attendee.

It will be held at the group's headquarters at 310 Madison Ave., New York, N.Y. 10017.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Calendar

Dec. 8-12, Boston — **Structured Programming: Design, Coding and Implementation Techniques.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Dec. 15-17, Washington, D.C. — **Electronic Mail: An Overview of Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 15-17, Washington, D.C. — **Simulation Modeling and Analysis.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Dec. 15-17, Washington, D.C. — **Computer Performance Measurement: Tools and Techniques for Increased Systems Productivity.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 17-19, Wellesley, Mass. — **Project Management and Control.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., Wellesley, Mass. 02181.

Dec. 18, New York — **Microcomputers — Their Adaptability.** Contact: New York City Chapter of the Association for Computing Machinery, P.O. Box 245, New York, N.Y. 10017.

Dec. 29-30, Orlando, Fla. — **MC11 Effective EDP System.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Jan. 5-9, Wellesley, Mass. — **Fundamentals of Microprocessors and Microcomputers.** Contact: The Commonwealth Center, 900 Washington St., Wellesley, Mass. 02181.

Jan. 6-8, Houston — **Managing the DP Training Function: A Workshop.** Contact: Advanced Systems, Inc., 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

Jan. 7-9, San Diego — **International Symposium on Minicomputers and Microcomputers.** Contact: The International Society for Mini and Microcomputers, P.O. Box 2481, Anaheim, Calif. 92804.

Jan. 8-9, Honolulu — **International Conference on System Sciences,** sponsored by the Association for Computing Machinery, Inc. Contact: Prof. Ralph Sprague Jr., University of Hawaii at Manoa, College of Business Administration, 2404 Maile Way, Honolulu, Hawaii 96822.

Jan. 8-9, Arlington, Texas — **User's Role in Systems Development.** Contact: Q.E.D. Information Sciences, Inc., P.O. Box 181, Wellesley, Mass. 02181.

Jan. 11-14, Atlanta — **Conference of the Optical Character Recognition Users Association.** Contact: OCR Users, 10 Banta Place, Hackensack, N.J. 07601.

Jan. 12-13, New Orleans — **Strategic Planning for Information Systems.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Jan. 12-13, Sioux Falls, S.D. — **Computers in Farm Management.** Contact: Association for Educational Data Systems, 1201 16 St. N.W., Washington, D.C. 20036.

Jan. 12-13, Atlanta — **How to Achieve the Cost Savings and Sales Benefits of Manufacturing Resource Planning.** Contact: McGraw-Hill Publishing Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

Jan. 12-13, New York — **Distributed Systems.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Jan. 12-14, Philadelphia — **Data Base Fundamentals.** Contact: Q.E.D. Information Sciences, Inc., P.O. Box 181, Wellesley, Mass. 02181.

Jan. 12-14, Honolulu — **Pacific Telecommunications Conference.** Contact: Richard J. Barber, Pacific Telecommunications Council, 2424 Maile Way, No. 704, Honolulu, Hawaii 96822.

Jan. 12-16, Dallas — **Structured Systems Design, and Structured Requirements Definition.** Contact: Ken Orr & Associates, Inc., 715 E. 8 St., Topeka, Kan. 66607.

Jan. 13-15, Milwaukee — **Microprocessor Fundamentals and Industrial Applications.** Contact: Instrument Society of America, P.O. Box 3561, Durham, N.C. 27702.

Jan. 13-15, Houston — **Communication Networks.** Contact: Communication Networks '81, Registration Dept., 375 Cochituate Road, Framingham, Mass. 01701.

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Calendar

Jan. 13-16, Los Angeles – **Programming in Ada.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., Santa Monica, Calif. 90405. Also being held Jan. 20-23 in Washington, D.C.

Jan. 14, New York – **The Expanding World of Data Bases: Perspectives and Prospects,** sponsored by the Metropolitan New York Chapter of the American Society for Information Science and the New York Chapter of the Special Libraries Association. Contact; Mary Glascock, Salvation Army Archives, 145 W. 15 St., New York, N.Y. 10011.

Jan. 14-16, Washington, D.C. – **Structured Design and Programming.** Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., Santa Monica, Calif. 90405. Also being held Jan. 28-30 in Atlanta.

Jan. 18-23, Montreal – **DP Training Managers' Workshop.** Contact: Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

Jan. 19, Los Angeles – **Cryptography and Data Security: Executive Summary.** Contact: Hellman Associates, 299 California Ave., Palo Alto, Calif. 94306.

Jan. 19-20, Hartford, Conn. – **Data Communication Systems Concepts.** Contact: The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Jan. 19-20, Houston – **Data Base Management Administration and Control.** Contact: Battelle Seminars and Studies Program, 4000 N.E. 41 St., P.O. Box C-5395, Seattle, Wash. 98105.

Jan. 19-21, Tampa, Fla. – **Jovial: Ada Users Group Meeting.** Contact: Austin Maher Singer-Kearfott, 150 Totowa Ave., Wayne, N.J. 07470.

Jan. 19-21, Palo Alto, Calif. – **Error Correcting and Detecting Codes.** Contact: Hellman Associates, 299 California Ave., Palo Alto, Calif. 94306.

Jan. 19-22, San Francisco – **Structured Systems Analysis and Design Seminar.** Contact: Oberland Associates, 4036 N.E. Sandy, Portland, Ore. 97212.

Jan. 19-23, St. Louis – **Structured Systems Analysis and Design.** Contact: Improved System Technologies, Inc., Suite 4500, 888 7 Ave., New York, N.Y. 10106. Also being held Jan. 26-30 in Washington, D.C. and Los Angeles.

Jan. 20-23, Long Beach, Calif. – **Hospital Information Systems Meeting.** Contact: Hospital Information Systems Sharing Group, 2415 S. 2300 W., Salt Lake City, Utah 84119.

Jan. 22-23, Los Angeles – **Summit Conference on Computers,** sponsored by the American Institute of Aeronautics and Astronautics and the Education Foundation of the DP Management Association. Contact: Summit, 5959 W. Century Blvd., P.O. Box 91295, Los Angeles, Calif. 90045.

Jan. 26-27, Miami – **Records Retention and Microfilming.** Contact: Thomas Wilds Association, Inc., 516 Fifth Ave. New York, N.Y. 10036. Also being held Jan. 28-29 in Miami.

Jan. 26-27, Miami – **Security and Audit of Data Centers.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Jan. 26-28, Dallas – **Fundamentals of DP for the Nondata Processing Executive.** Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Jan. 26-28, Washington, D.C. – **The IBM 4300 Series.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

Jan. 26-28, Monte Carlo – **Honeywell's Computer Security and Privacy Symposium.** Contact: Security Symposium, Honeywell Information Systems, M/S T-99-4, P.O. Box 6000, Phoenix, Ariz. 85005.

Jan. 27, Luxembourg – **European Information Providers Association Symposium.** Contact: Providers Association, P.O. Box 38, Oxford OX1 5LG, England.

Jan. 27-29, Atlanta – **Basic: A Computer Language for Managers.** Contact: The American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

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Call for Papers

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS (AIAA) COMPUTERS IN AEROSPACE III CONFERENCE, San Diego, Calif., Oct. [illegible].

Original papers are being sought for this conference, whose theme is "Computer Technology: Enhancing Performance and Productivity." Subjects dealing with computer systems technology incorporated into embedded systems for aerospace applications are of special interest, and also microprocessors and support circuits, novel architectures, memory devices, radiation hardened components, [illegible] PLAs, custom very large-scale integration and very high-speed integrated circuitry implementation, emerging [illegible] approaches, requirements and design specifications for software, development tools, distributed systems networking, space applications, project planning and organization of resources, contractor interaction and costing and procurement areas.

Digests of less than 1,000 words must be submitted for review by March 2 and should include title, author, address, a concise statement of the problem and the objective of the paper, along with a summary of important conclusions.

Digests should be sent in triplicate to the appropriate [illegible] for AIAA. Further details can be obtained from AIAA headquarters at [illegible] Ave. of the Americas, New York, N.Y. [illegible].

URBAN AND REGIONAL INFORMATION SYSTEMS ASSOCIATION (URISA), New Orleans, La., Aug. [illegible].

The theme of the conference is "The Link Between Users and Providers," and Conference Chairman [illegible] Trotter is looking for papers. Potential topics include planning, physical and economic development, geo-coding, general data processing, human service delivery systems, neighborhood information systems, natural resource management, remote sensing, financial management systems, social indicators, public safety and labor relations.

Two copies of a half-page abstract should be submitted to the Urisa chairman by Feb. 1 at Suite [illegible], [illegible] St. N.W., Washington, D.C. [illegible].

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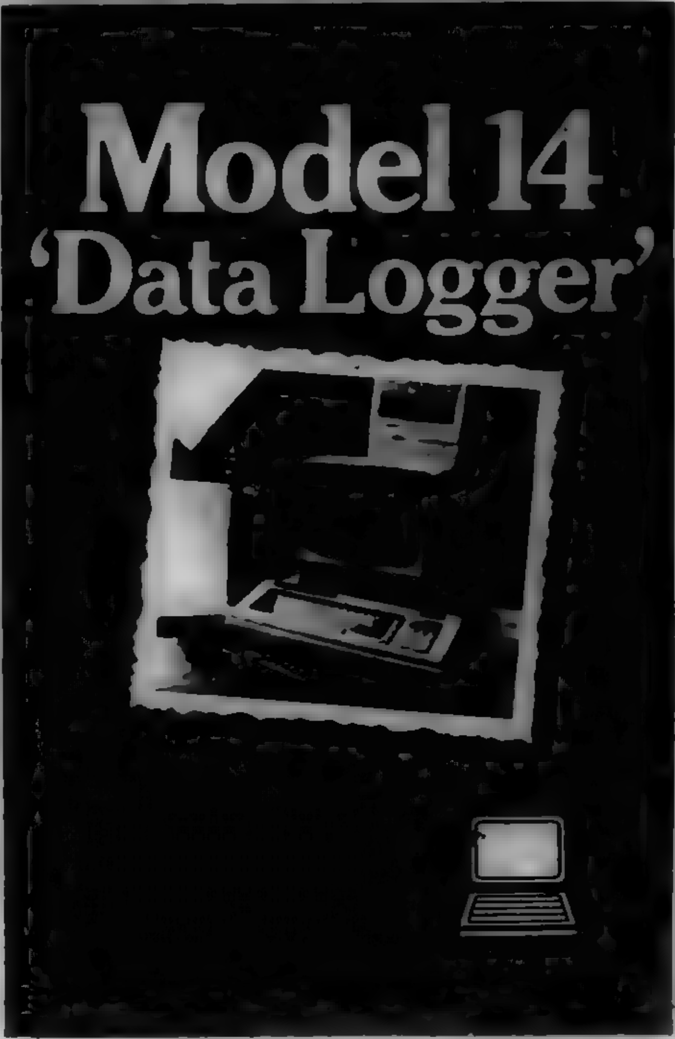


Who Makes Up Ansi Standards? What Formula

Q I will be graduating with a master's degree and have accepted an offer of employment with a computer manufacturer and refused all others but one. I interviewed with a company six weeks ago and was told to expect a decision in two weeks.

Yesterday, out of curiosity, I called for a status report. The personnel department said that the Management Information Systems (MIS) Division was reorganizing and that they were delaying any decisions until after the reorganization. Reorganization or not, they have 20 slots that they need filled.

I would have considered a job offer with this company earlier but certainly not now, although I am interested in seeing how long it takes them to respond.

How should I respond?

A The company has an obligation to render a quick decision on your interview and you have an obligation to immediately terminate negotiations after you have accepted a position.

Address the letter announcing your employment intentions to the director of the MIS Division. Include an informative, not hostile, statement of your less-than-hospitable treatment. This feedback may be the most important piece of recruiting information the director will receive all year. A competent director will ensure that those who follow you will not suffer the same neglect.

Q Many of the DP problems that you address can be attributed to the high rate of personnel turnover, a plague that is sweeping the DP industry. Although my company's turnover rate is not much different from that of the industry, I refuse to accept high turnover as a given.

Our management staff has made a long-term commitment to reduce the rate of turnover. Our initial efforts centered on the compensation package, which was increased to well above local norms. In our case, high salaries were not the solution.

We can't afford another expensive failure. Perhaps you or your readers who have had success in curtailing personnel turnover would share some tried and proven solutions. This would be helpful to the whole industry.

A Congratulations on overcoming the most formidable obstacle to personnel retention — recognition of the problem. Too often data centers accept a high turnover rate as part of doing business. It doesn't have to be that way. I recently visited a medium-sized installation that has not lost a DP professional in over four years.

I, like you, think we can benefit from the insights of managers of DP installations who have been successful in minimizing personnel turnover. I would like to invite readers who have experienced success in retaining personnel to share their methods and approaches.

Q I am a financial business applications programmer (Cobol) with two years of DP experience. I have a B.S. degree in accounting and an M.B.A. in management. I have reached a point in my career where I would like to broaden my DP education and background.

I would like to know if you could recommend any DP-oriented organizations that I could join and what, if any, suggestions you might have as to the type of education I could pursue to broaden my DP background. I would appreciate any suggestions you could offer.

A Your academic background and experience provide an excellent foundation for a career in DP/MIS auditing. You may have several educational voids that you need to fill while pursuing this career path.

You should have a complete grasp of the entire system life cycle including not only programming, but systems analysis, design, conversion, implementation, evaluation and ongoing operation.

Although the principles of general auditing that you studied in your M.B.A. program are complementary, you'll need to study DP/MIS auditing specifically.

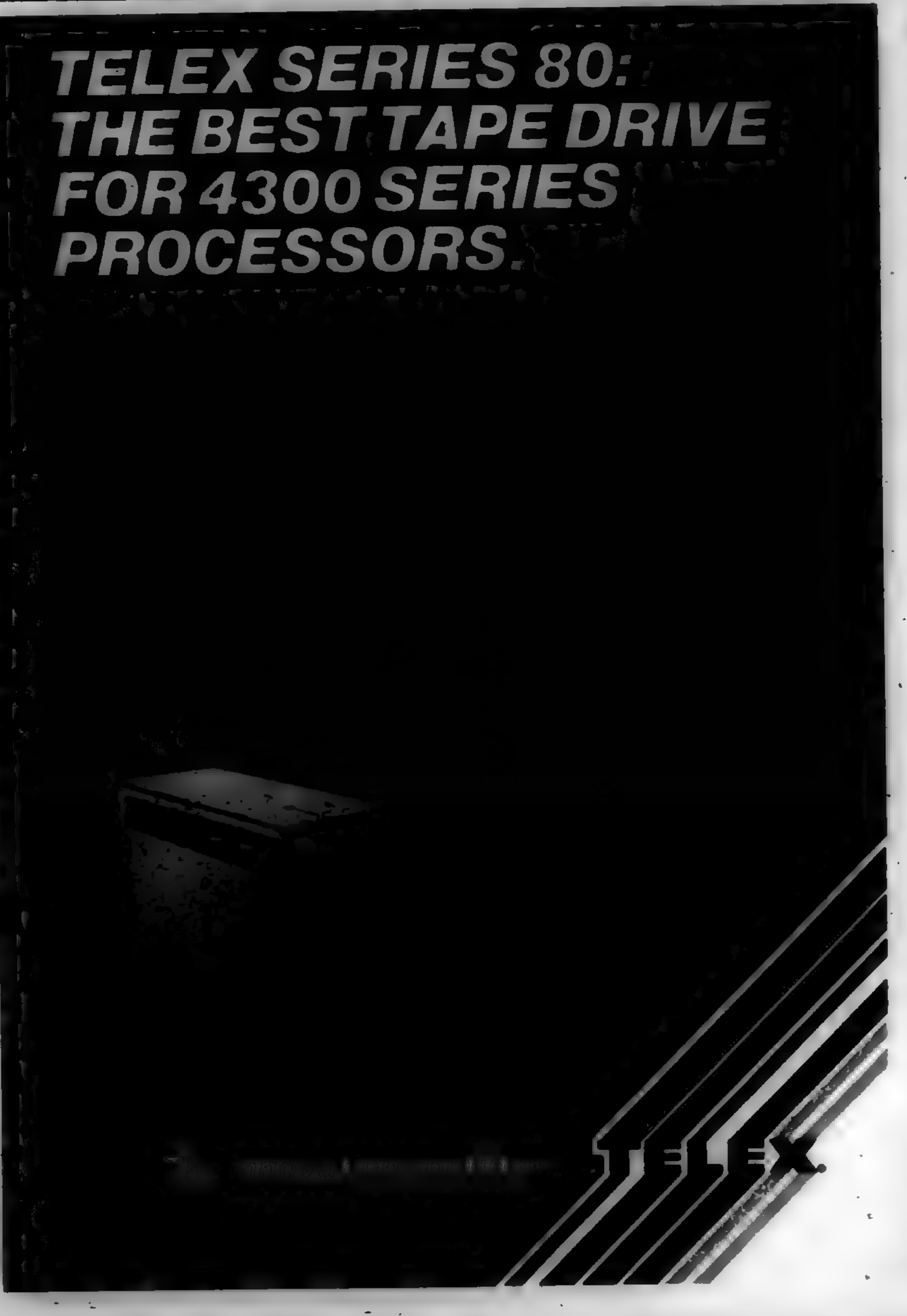
Plan to attend seminars and/or conferences on DP privacy and security to obtain an awareness of the scope and importance of these areas to the auditing function.

Formal education in the area of DP/-MIS auditing is limited to a few professional seminars and isolated university courses. The members of the EDP Auditors Association chapter in your city, or in other cities throughout the country, can help direct your educational efforts.

Q I have been using Fortran for a long time now. The shop I work for markets a large engineering applications program. Because our code runs on several diverse machines (IBM, Univac, Control Data Corp., Digital Equipment Corp. VAX-11/780 and Cray Research, Inc.), we code in Ansi standard as much as possible.

Who are the people that come up with the standards, and how can I, a user, make my needs known to them?

A The American National Standards Institute (Ansi) is a pri-



Gives Number of Tapes Per File?

Turnaround Time

By Larry E.

vate, nonprofit organization that coordinates America's federal national standards system. The Ansi federation consists of over 900 companies and 200 trade, technical, professional, labor and consumer organizations whose members have cooperated to establish approximately 10,000 standards that encompass virtually every field and discipline.

The American National Standards Committee X3, Computers and Information Processing, is the primary support committee for the computer community. The Fortran technical committee, within Committee X3, establishes Fortran standards.

Eighty-nine technical and working group committees support standards maintenance and development in seven categories: recognition, media, programming languages, documentation, data representation, data communication and systems engineering.

Suggestions for improvement and update of standards are welcomed and should be addressed to: Administrative Secretary of X3 - Cbema, 1818 L St. NW, Washington, D.C., 20036. Those persons or groups desiring to initiate a standards development project should request a Form SD3.

The latest American National Standards Committee X3 membership roster listed only 19 manufacturers of computing hardware and 14 special interest groups.

Standards are a serious problem facing the future of computers and information processing and are the responsibility of all those involved. Several major suppliers of computing hardware and software and many influential special interest groups were conspicuously absent from the list. Information concerning membership can be obtained at the same address.

Q I would be appreciative if you can provide, through Turnaround Time, the formula for calculating how many tapes are required for one file. Factors of the formula should be record length in bytes (R), tape BPI (B), blocking factor (F), number of records (N) and so on.

A Gladly, but you'll also need tape length in inches (T) and interblock gap length in inches (I).

Number of tapes required =

$$\frac{N}{\left[\frac{T}{\frac{R(F)}{B}+I}\right]F}$$

Q After 13 years of moving up through the ranks of several DP organizations, I feel that it is time to move into a No. 1 or 2 spot (director or assistant director of DP).

How does one find out about such openings? Most of the ads are for the lower level positions. Are there reputable placement agencies that specialize in these jobs? If so, how do I find out about them?

A It stands to reason that the number of job opportunities for directors or assistant directors of DP would be somewhat less than the number of the lower level positions, and so it is with the listings of professional placement agencies and the positions announcement section of *Computerworld.*

Checking the CW classified section for 4 consecutive weeks, I counted an average of 10 DP director positions per issue. All DP placement agencies that I contacted assured me that they had listings for the top slots.

These positions are available, but my experience has shown that the vast majority of these positions are filled from within or via internally generated recommendations. In your case, I'm assuming an internal promotion is unlikely, for whatever reason; therefore, I would suggest that you make yourself known through informal conversations at local professional society meetings, major regional and national conferences, professional seminars and, perhaps, by publishing articles in DP periodicals.

To my knowledge, no DP placement service specializes in listing positions for director or assistant director. You did not indicate your present position or size of your installation, but, in order to broaden the scope of potential job opportunities, you might consider a move to a larger installation as director of programming and/or systems and use this position as a stepping stone.

Be advised that the scope of the job function of the assistant director varies considerably from one company to the next. The assistant's job function may vary from routine administrative tasks with no line authority to actually managing and controlling the DP department.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.

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KISS MY BITS

If you can write a witty-one-liner as good as these, you could be a winner in the 1981 Computerworld button contest.

As all you button freaks know, *Computerworld* buttons have become a tradition in the industry. And every year we distribute tens of thousands of them at NCC, Info, and other trade shows across the country.

Last year, for the first time, we let our readers do the writing, and our judges do the laughing. We spent many hours sifting through hundreds of entries, and, at last, six winners (shown above) emerged from the smoke-filled room. The judges staggered out later.

This year, despite protests from the SPCBJ (Society to Prevent Cruelty to Button Judges), we've decided to do it again. And we're hereby *soliciting your suggestions.* They should be short, funny, relevant — and at least moderately clean.

As many as six suggestions will be chosen by our (by now) experienced panel of judges, based on criteria known only to them. If your entry is among those picked, you will receive a certificate of appreciation suitable for impressing your friends and fellow workers.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (at least their entries will) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky souls will receive a free hand-held computer game valued at well under $100 (if we can find some cheap enough).

You may not enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representations as to their competence, skill or fairness are being made. Deadline for entries is January 2, 1981 in our offices in Framingham.

yes,

I'd like to enter Computerworld's ridiculous button contest. I hope your judges can read. Here is my entry (if you have more than one, please put them on separate forms). (All entries become property of CW Communications/Inc.)

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EDITORIAL

The OECD Privacy Guidelines

The Organization for Economic Cooperation and Development's (OECD) privacy guidelines are passed about quite a bit at major telecommunications conferences these days. That's because the world's economy is considered at jeopardy if U.S. companies tied to transborder data flows fail to meet the guidelines.

A number of nations, not all of them members of OECD, have enacted laws that restrict export of data into computers beyond their borders. Privacy concerns are usually the pretext for such measures, which affect many U.S. corporations with overseas branches.

America's trading partners feel threatened by the continuing U.S. domination of information technology; they see their national sovereignty at stake so long as the U.S. seems able to tap their data banks using the world's most powerful processors. Moreover, U.S. hegemony in the technology is perceived as a direct economic threat, undermining domestic data processing and telecommunications industries in nations whose users import most systems and services.

According to a National Telecommunication Information Agency (NTIA) senior policy adviser, some nations represented in the OECD are so worried by these problems that their governments may require treaties with the U.S. as preconditions for further commerce [CW, Nov. 24]. The treaties might obligate Americans to refrain from privacy violations, secure their systems to a specified extent and even restrict overseas processing operations.

Historically, treaties are not signed frivolously; they often have been attempts to avoid war and have limited many a nation's political and economic expansion.

However, the privacy guidelines issued by the OECD executive council in September may dissipate pressures for transborder data flow treaties if the U.S., which endorsed the guidelines, abides by them, the NTIA official suggested. The guidelines are seen abroad as filling a certain vacuum in American policy on transborder data flow.

A number of experts on the use of financial systems have recently warned that further tightening of transborder data flow controls could worsen the world's general economic slump and even set off a major economic depression [CW, Nov. 10]. Such legislated or de facto controls are tantamount to tariffs, these experts have pointed out.

When economics is the official reason, those advocating tighter data flow controls often complain that jobs will be lost to the foreign technology suppliers unless the controls are tightened. But their arguments often ignore the fact that systems exporters usually need to create jobs in the countries they serve; and they do serve those countries if their products are marketable.

Users around the world should agree to meet minimal standards of privacy protection before transborder data flows critical to international commerce are severed. Those advocating formal tariffs on transborder flows to protect their nation's economic health have a lot of explaining to do.

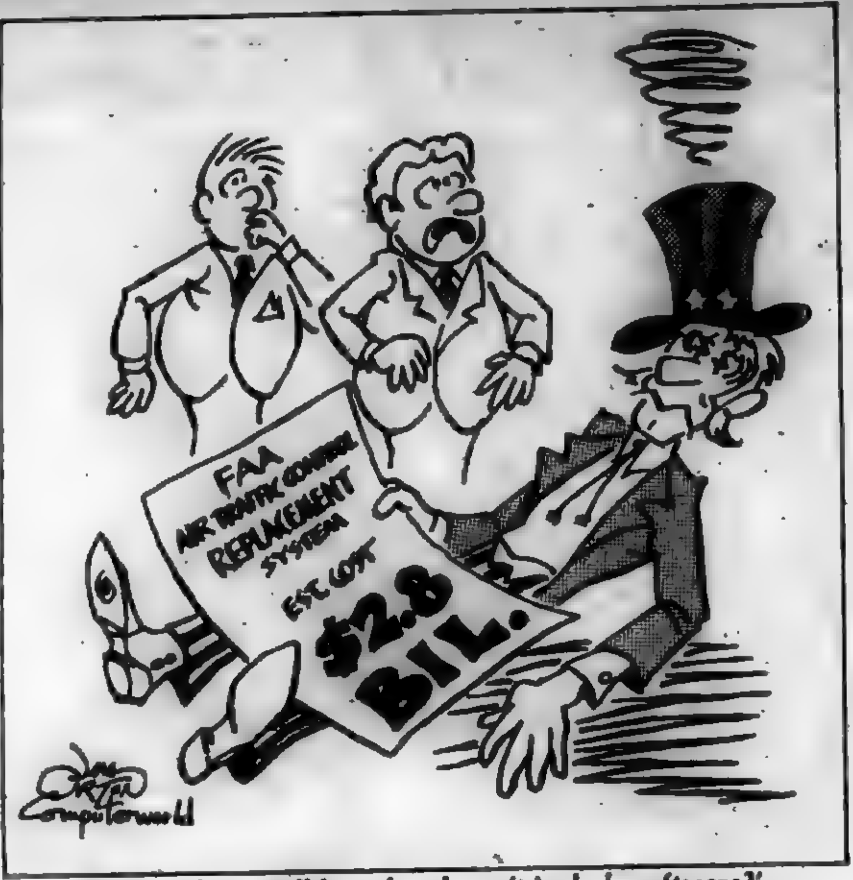
DATA PAST

Five Years Ago
Dec. 10, 1975

TALLAHASSEE, Fla. — A Brevard County official on the way to his father's funeral was shot and killed near here by a Florida state trooper who mistook his car for a stolen vehicle after checking with the state's crime computer. The victim's auto bore a license number identical to another issued in 1971 which was still in the active stolen vehicle data base.

Eight Years Ago
Dec. 6, 1972

DOVER, Del. — The DP director for the State of Delaware charged IBM with trying to ruin his career because he chose another source for computer equipment. "On the morning of Nov. 14, an IBM representative came to my office and, in the presence of witnesses, informed me that I was 'finished' in the state," Arthur Hill, director of central DP, said.



'So how do we tell him that doesn't include software?'

LETTERS

Responsible Reporting

In his letter, "Scare Tactics" [CW, Nov. 10], Barry R. Hemphill pointed out that he has only 1,000 hours of flying time, but he does have more than 22 years' experience in the information system history.

Our seven years of contact with the media with respect to aviation safety problems has fairly well borne out the fact that media writers, in general, do a credible job of reporting. Although there may be technical discrepancies at times, most of these have little impact upon the mass of information presented in papers and on television. Therefore, Hemphill's advice that *Computerworld* should stop quoting the media is not necessarily the best.

Second, we have seen CW print the rhetoric of both the Federal Aviation Administration (FAA) and the Professional Air Traffic Controllers Organization (Patco). To say that CW is biased and one-sided to the labor/management dispute would be incorrect. There is a reality to the issue of aviation safety and computer utilization. In a phrase: "It is all fouled up!"

We believe CW has done a very responsible and ethical job of reporting some of the significant failures of the system. Hemphill can check that by examining the U.S. Senate Appropriations Committee report entitled "Report on FAA's En Route Air Traffic Control Computer System," Report 80-5, October 1980.

It is time for the American public to face the reality of our National Airspace System (NAS). The NAS is sensitive to disturbances and tends to be unstable. Fortunately, there are excellent pilots and controllers to keep the laws of chance from working against us.

John B. Galipault
President

Aviation Safety Institute
Worthington, Ohio

Gravy Train

Charlene Francl and W. Thomas Lin say that programmers now rank salary as the top job motivator ["The Gravy Train Derails," CW, Nov. 10]. The authors may be right, but their conclusions conflict with prior findings and the basis for their conclusions is weak.

The Francl and Lin study consisted of asking 80 in-house programmers from the Los Angeles area to indicate the relative importance of eight job factors. Only 50 of the questionnaires were returned. A 63% response rate is sometimes sufficient for drawing valid conclusions, but only when the initial sample is clearly representative of the whole population or the initial sample size is much larger than 80.

It is quite possible that the 50 programmers who took the time to fill out and return the questionnaire are different in some important way from programmers in general. For instance, the 50 may be those most anxious to complain about their jobs.

Often, those of us who help DP managers make the most of human resources have to proceed on educated guesses. But not when the issue is programmer motivations. Here, a good, solid base of findings exists. Francl and Lin serve us all well by summarizing those findings and discussing the implications. However, to adequately challenge that good, solid base, they need a large, representative sample or a better-constructed logical argument.

Bruce Sanders

Vacaville, Calif.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

COUGER ON EDUCATION/J. Daniel Couger

'Half-Asked' Questions on Productivity

"What is the time comparison for writing vs. processing a programming instruction?" I was asked this question in a recent class. The resulting calculation produced a very interesting statistic — worthy of careful consideration by DP management.

Before answering the question, I asked member of the class to give me their estimates of the ratio of processing vs. coding. Most guessed 10,000 to 1. One student thought that figure far too low and estimated 100,000 to 1. We then computed the correct answer. The ratio of processing to coding is more than 100 million to 1.

In the *Mythical Man Month*, Fred Brooks analyzed a large number of projects to produce the following statistics on programming output. The figures cover the whole program development process: preparation of specifications, design, coding and testing.

Type of Development	Lines of Debugged Code Per Year
Batch	6,000-9,000
Compiler	2,000-3,000
Operating System	600-800

An IBM 370/148 performs at .4 million instructions per second (Mips). Even if we use the highest level of programming output (4.5 instructions per hour for developing batch systems), the computation yields a ratio of 320 million to 1.

One might get enmeshed in the calculations and forget the message — the ratio is increasing precipitously. For an IBM 4341 (.7 Mips), the ratio is 560 million to 1. For a 3033 (4.5 Mips), the ratio is 3.6 billion to 1.

Before we discuss the implications, let's simplify terms. We will refer to the IPS/ICS ratio (instructions processed per second/instructions coded per second) simply as the processing/-coding ratio, or the P/C ratio.

The above figures show that programming improvements have not kept pace with technology. Although programming techniques such as the "programmer's workbench" have produced a 30% to 80% increase in productivity, computer processing capability doubled during the same span of time.

Improving the Ratio

Massive efforts have been undertaken to improve programming techniques. My office shelves contain more than 25 books on techniques to improve programming efficiency. I have more than 50 proceedings, papers and journal articles on the same subject. Despite these efforts, labor costs climbed to more than 50% of the typical DP budget this year for the first time.

Compared with the abundance of research and writing on technical improvements, there is a minuscule amount of material on improving motivation of programmers and analysts. Searching for ways to improve motivation should receive attention equal to that focused on finding new technical approaches. Stated another way, the *same* levels of improvement realized by techniques like the programmer's workbench can be obtained through redesign of the motivational environment for programmers and analysts.

A principal reason for the lack of books and papers on motivation is the absence of hard data on the subject. Most publications provide the writer's speculations on the subject.

Research Results

This month the results of our research — hard data — are being published. *Motivating and Managing Computer Personnel*, co-authored by Robert Zawacki and myself, has now been released by John Wiley and Sons, Inc., 605 Third Ave., New York, N.Y. 10016 ($19.95). Our data base contains information on 4,000 people (more than 1,000 analysts and programmers, 2,000 operations personnel and 1,000 managers of DP). The statistical reliability and validity of the survey methodology have been substantiated. Although preliminary results were published in *Computerworld* and *Datamation*, the book contains a large amount of new material. An example is the task/GNS matrix, described below.

One important survey result was the identification of new approaches for work assignment, based on the growth need strength (GNS) of the individual. GNS is the need for personal accomplishment — for learning and developing, for being stimulated and challenged. The book provides a four-quadrant matrix to increase productivity through better matching of work assignments to individual GNS.

For example, assigning new system development projects to personnel with low GNS rarely produces motivation; low productivity typically results.

A second matrix suggests the optimum leadership style to use with each of the four task assignment/individual GNS match-ups. The leadership styles are: 1) directive, 2) supportive, 3) participative and 4) caretaker.

For example, assume the situation described above, where the supervisor had no alternative but to assign a new development project to a person with low GNS. This situation is characterized by subordinates who, either because of lack of ability or desire, have difficulty coping with this ambiguous situation. As a consequence, they would be expected to have difficulty in structuring their own activities.

The function of the leader would be to provide task structure by planning, organizing, coordinating, directing and controlling the work of subordinates. Such behavior is analogous to directive leadership. This form of behavior by the leader would relieve the ambiguity, thereby improving productivity.

However, such a leadership style would be entirely inappropriate for

(Continued on Page 48)

THE TAYLOR REPORT Alan Taylor

New Environment Requires 'Application' Safeguards

Oscar Rodriguez, president of American Business Systems (ABS) of Westford, Mass., has reason to be happy that he backed Cobol for the application products when he formed a new company two years ago — and to feel lucky in choosing a Zilog, Inc.-based compiler which has become the transportable RM-Cobol compiler.

ABS' financial modeling package, real-estate application and accounting are all able to run in many different operating system environments in the traditional microworld, and in the lab the new 16-bit Cobol compiler is being tested for much greater expansion of usable environments next year.

Indeed, with more working applications now available than any of the other known RM-Cobol wholesalers — most of whom are still gearing up for first announcements next year — the firm has been attracting buy-up offers.

However, ABS has not reached its position without developing an understanding of what really transportable Cobol or other applications need to implement properly. This type of design thinking has aspects that don't show on the surface, but can make all the difference between reliable and unreliable transportable systems. It is worthwhile to look at the ABS implementation design.

When a Cobol compiler can move from operating system to operating system, from hardware to hardware, the application programs produced by the compiler will at least run during tests. The problems then are not in lack of compatibility, but in providing for a guarantee of durable, reliable use. And this is an application problem in any multivendor situation, as it is not possible to call a single service organization and complain any time any output is wrong!

Needed Application Response

In the new situation, it is accepted that the application programs must take account of the possibility that there may be operating system problems or hardware problems. "After all," Rodriguez pointed out, noting his applications run under CP/M, Unix, RIO, TRSDOS and other operating environments, "we cannot test the flock of hardware out there each time an operating system version is distributed."

To solve the problem and to complete the reliability of the systems, some way has to be found to prevent mistakes in operating systems, in the compiler or in the hardware from hurting the file contents. If possible, accurate operation should be provided in the face of intermittent error. And the de-

(Continued on Page 48)

READER COMMENTARY/Paul Sita

Many Sites Ignoring Disaster Recovery Basics

Today there is an almost universal interest in disaster recovery and contingency planning. Without a doubt, the topics are in discussion everywhere. Recent statistics indicate that the majority of corporations even claim to have a disaster recovery plan in place.

However, the field is so new that standards do not yet exist. Like "data base", "disaster recovery" means something different to every organization. Few can agree on the required contents or an acceptable format for a comprehensive plan. Still, our experience has brought out some very general points that are worth mentioning.

1) Most companies have not sufficiently analyzed the possible risks associated with any significant data center downtime.

2) Considering the actual risks involved in a data center disaster, most companies have not committed anywhere near the amount of resources required to negate those risks.

3) Most corporations have never conducted a thorough test of their disaster recovery plan.

4) Most corporations have no regular program for the maintenance of their disaster recovery plan.

The majority of the work already done in the area of disaster recovery planning has concentrated on hardware capability. In some instances, backup facilities have been contracted for, in others reciprocal agreements with corporate data centers have been negotiated. Still other organizations have analyzed their critical applications from a system resource point of view.

Many of the contracts are sketchy, however; they do not guarantee the amount of computer time a reciprocating organization is required to provide, nor do they spell out exactly what I/O devices and communications facilities will be available. In many instances, no clear-cut provisions or rules have been laid out for the joint use of a single data center.

Problem Waiting to Happen

In such a critical matter, anything not perfectly clear is only a problem waiting for a time to surface. The message is clear: Management must know what it wants and needs, and the backup processing arrangements selected must be equal to those needs by means of contract.

Because DP is a technical discipline, most of the disaster recovery plans already written do include a fairly comprehensive rundown of system requirements from a software and hard-

(Continued on Page 48)

Battle Between Assembly, High-Level Language

SOCIOLOGY OF COMPUTING/Robert L. Glass

In this story, the names of many of the people, places and things have been fabricated . . . but the computing essence of the story is true.

The battle between assembly language and high-order language advocates is age-old in computing.

There are those people who wouldn't touch a HOL even if the direction to do so came from God. And there are others who wouldn't touch an assembler even if they got paid for every microsecond they saved in doing it.

This is not a story about who is right or wrong in that battle. This is a story about a project that failed because one stubborn language advocate couldn't change his mind.

Studs Axeswinger, you must understand, is one of your all-time macho programmers. His self-belief is second only to his swagger. When his company issued some bumper stickers saying "General MPG's Way Is My Way," he was the only person in the company who cut it apart and put it back together to say "My Way is General MPG's Way." When the president of MPG passed through his work area shaking hands one day, Studs was the only guy who told him what he thought of company policy and then handed him a written grievance list. "Doubt" simply wasn't in Studs' vocabulary.

Studs is also a died-in-the-wool assembly language programmer. He's been writing an assembler now for more than 20 years, and he doesn't see any reason to change his style. Fortrans may come and Cobols may go, but Studs continues to load registers and shift and "exclusive or" with the best of them.

Not that his style is a bad one. Studs can probably cram more functions per cubic centimeter into a computer than any other programmer at General MPG. Rumor has it that no one has ever been able to take over and maintain a Studs Axeswinger program because they're virtually unfathomable, but then that rumor is irrelevant because Studs has always been around to do it himself.

On His Own

So Studs is tolerated. No, he is more than tolerated. No matter how all-encompassing the rolling-stone trend toward HOL becomes, Studs is allowed to stand well clear of its impact.

Studs, in fact, is singled out for special benefits. He has a private office just off the computer room. He has a 24-hour key to the corporate gate. And he has a parking pass that puts him between the sixth vice-president and the assistant comptroller. (Rumor has it that he won it at an all-night poker game, but that is another story!)

In short, Studs is an institution at General MPG. Nearly, in fact, a legend. And in his own time.

Now let me digress from the world of Studs Axeswinger for a moment. Have you heard of the programming language Ada? It's the Department of Defense's (DOD) attempt to standardize on a computer programming language. The Army, Navy and Air Force have run around inventing enough new languages of their own, DOD feels, and it's time to herd them into line.

Because of the impact of Ada and the apparent inevitability of its use, each of the services is taking some hard looks at what Ada really means to them. "How well can Ada do the jobs I need to do?" is the burning question of the military day.

Government Projects

You may or may not know that General MPG builds more than passenger cars and trucks. Over the years, General MPG has also found it important to build a few products for the government as well. Like a rocket-firing antitank killer for the Army, complete with vinyl bucket seats and whitewall high-traction tires; and electronics systems for the F-222 fighter plane complete with a console plaque that says "This avionics system built especially for" and a blank to scratch in the correct operator's name.

So when the DOD speaks, it isn't just the triservices who listen. It's contractors like General MPG, as well.

It's time make this digression relevant to Studs. Now it is no military secret that General MPG wanted the jeep replacement contract, when it came up for bidding. The old World War II jeep, although universally loved and manytimes modified, was well past its prime by the time the Army asked for proposals for a new one. General MPG, of course, was the favorite bidder. No, I don't mean that it had an inside track on the contract. I just mean that in Las Vegas they were quoting 6 to 5 that MPG would get it.

You may not realize it, but almost all

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Results in Project Collapse for 'General MPG'

new military hardware uses computers by now. Even the new jeep, as most competitors saw it, would have a family of microprocessors tending such functions as operator panel displays, the carburetion system and the ignition. General MPG, rumor had it, went a few micros further.

Studs' Assignment

The question naturally arose, "What language will the micros be coded in?". And Studs, to get the story back on track, was assigned to make that decision.

That may strike you as a peculiar personnel assignment. Of course, you are right. It was sort of like letting the tobacco companies set the ground rules for phasing out cigarette smoking. The final result was predetermined — in spades.

As time passed, Studs almost forgot he had been assigned to work the problem. At the last minute, just before the proposal was due, he broke out a rationale for writing in assembly language he had first written in 1958, crossed out the word computer in a few places and wrote in microprocessor. He turned it in and off went the proposal.

More time passed. The Army was carefully evaluating the Jeep II proposals, and that can be a lengthy process.

Then one day the results were announced. Two finalists had been selected for final negotiations — and General MPG was one of them.

Elation reverberated throughout the MPG halls. Jeep II was a big contract. The name of the game, MPG knew, had to be and could well be "Win."

If you've been paying attention throughout this story, you have already guessed what happened next. Remember the inevitability of Ada? Well, that inevitability encompassed Jeep II. And remember the intransigence of Studs Axeswinger? A monumental clash was brewing between Studs' assembler language part of the proposal and the Army's need to use Ada.

The early part of the MPG-Army negotiations went pretty well. The Army had been a little appalled at the yellow striping down the side and the American Eagle painted on the hood, so MPG removed that part of their proposal and cut the price accordingly. Olive drab mohair upholstery with orange leatherette inserts was an Army preference, and MPG put it in as a no-cost extra.

Even when the computer component of the contract came up, MPG was agreeable. "You want Ada, you get Ada," said the chief negotiator. Studs, who was sitting in on the meeting, almost swallowed his unlit cigar.

"No way," he roared from his preassigned spot near the back of the room, leaping from his chair and striding forward. Before the MPG negotiator could stop him, he was pounding on their table. "We used assembler on the Automated Multiple Grenade Launcher system," he bellowed, "and will use assembler on Jeep II. And you can take your Ada and stuff it up your . . ."

They were ushering him out of the room by then, and hardly anyone heard him say "tail pipe."

A studied silence descended on the room. The MPG negotiators tried to pick up the pieces, but to no avail. MPG had no other language expert in the room. The impression so clearly left by Studs that MPG would never use Ada could not be corrected. The meeting adjourned not too long after.

Time passed interminably while MPG waited to hear about Jeep II. The final word, in fact, came as it often does, by newspaper.

"General MPG Loses Jeep II Contract," said the *Evening News* page one headline. Auto industry watchers the world over were mystified. How could the favorite have failed?

Little did they know that the age-old battle between assembly language and high order language had claimed yet another casualty!

Oh, and Studs Axeswinger? Well, he still has his office and his key and his parking pass.

But he doesn't get invited to negotiating sessions any more!

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READER COMMENTARY/John N. Krueger

Structured Methods Need Individual Evaluation

We are in a day and age in the data processing industry when many of the myths about "structured methods" should be recognized rather than propagated. Many articles in our industry publications unfortunately foster these misconceptions.

The term "structure" itself is at the root of most of the incongruities. It became a buzzword, for which we have a propensity, and begat a bandwagon approach to its use. Twenty years ago the term itself had no special significance to the DP community. The modern romance with structure began in Europe in the early 1960s where people such as Bohm, Jacopini and Dijkstra developed the basic foundations of structured programming from the mathematical principles of set theory and ordered pairs.

For the interested layman, a clear and concise explanation of these principles can be found in the Auerbach Computer Programming Management set, Structured Programming-Part 1 (14-03-01). Simply stated, all procedural logic can be expressed in the simple terms of sequence, selection and iteration. The beauty of that is that it is indisputable fact.

Unfortunately, in the remainder of structured plethora, there are precious few indisputable facts. GOTO-less programming, structured Cobol, structured walk-throughs, structured design and analysis and so on are, at best, attempts to extend or prostitute those basic principles. The key here is not to discredit any of those items but rather to realize that they cannot be arbitrarily related because of the use of the term "structure."

For example, walk-throughs are great! However, there is nothing "structured" about them. More aptly stated, they are one of many programmer productivity techniques. Structured design and analysis methodologies no doubt will have a great impact on the industry over the next few years. On the other hand, their guidelines (in fact, basic principles) may vary from one to another and are indeed a departure from the absolute basics of structured programming.

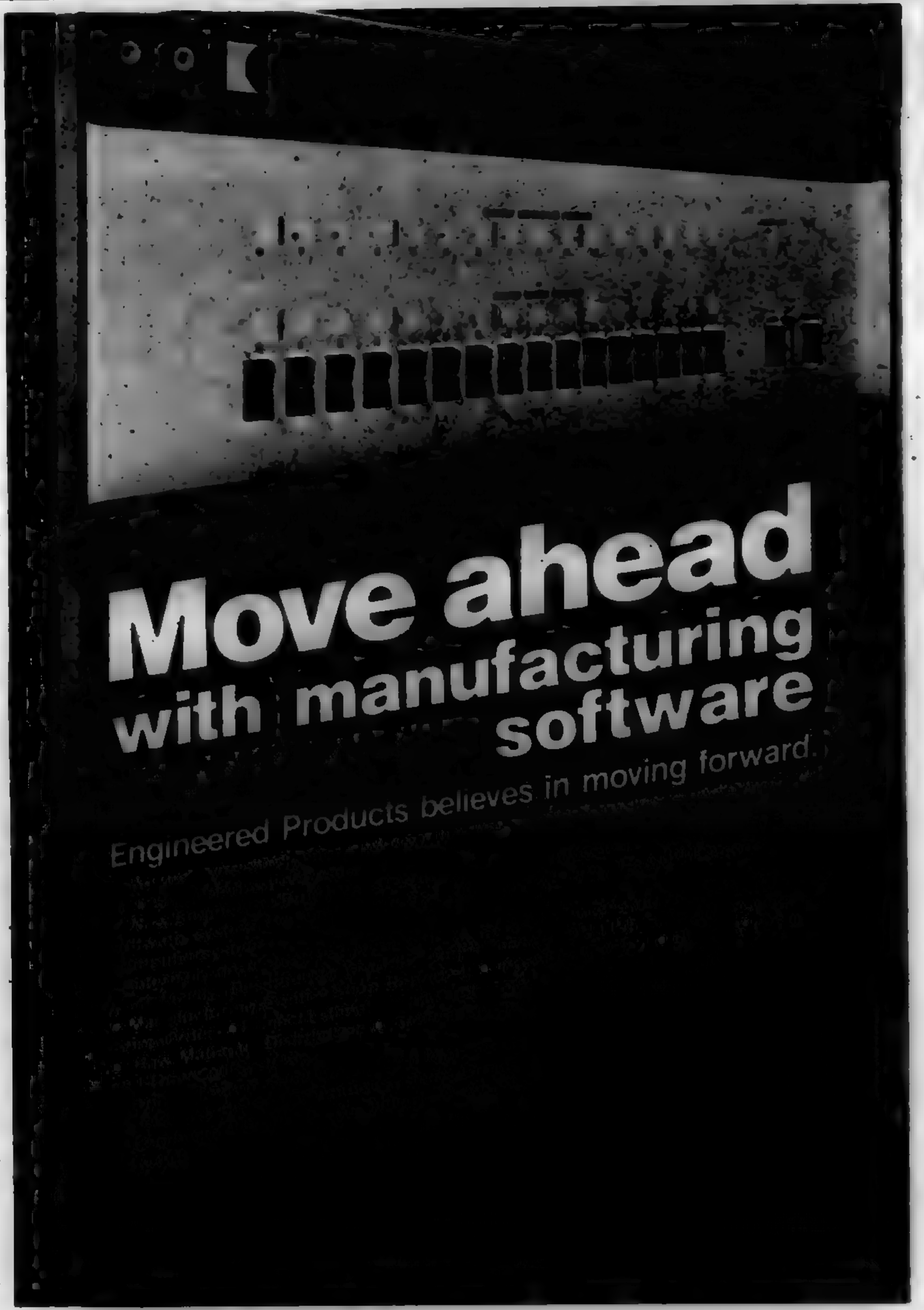
The key to resolving any myths, of course, is knowledge. Each of the so-called structured methods must be evaluated on its own merit and may not relate directly to another. Structured language, or pseudocode, lends itself very well to Pascal or Fortran while not nearly as well to Cobol due to present language constraints. However, the use of a structured charting technique such as Warnier/Orr does a creditable job for Cobol.

One item which should certainly be put to bed is that of languages. *Structured programming basics are language independent.* Some languages have constraints which make the adaptation of code from logic harder than others. However, those techniques can be easily mastered unless the organization falls under the "old dog, new trick" syndrome.

Cobol, particularly with its over publicized GOTO-less code and pseudo-nesting problems, is subject to myths all its own. A Cobol program can be well structured and contain no GOTOs or many GOTOs depending on shop standards. Nesting is simply a matter of module management. GOTO-less code and nesting are mostly problems of perception by the uneducated. It should be no surprise that there are excellent structured programs and there are abominations.

In summary, a comprehensive level of knowledge should be achieved about each structured method on an individual basis before making rash decisions about its application. While attaining that knowledge, most organizations could, I'm sure, benefit selectively from the wealth of new technology embedded in "structure."

Krueger is manager, planning and control, for MGIC Investment Corp. in Milwaukee, Wis.



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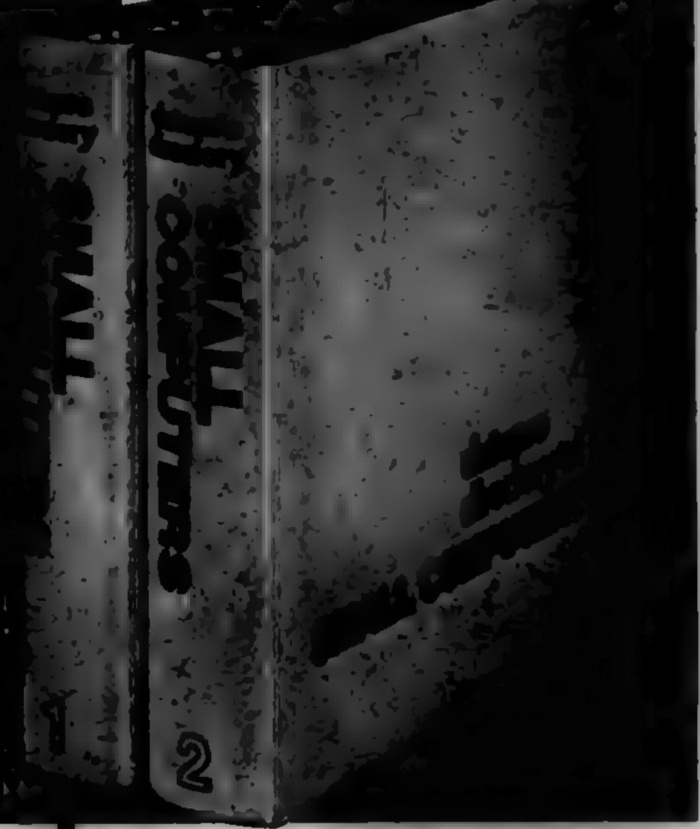

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  - Zip Code Listing
- Computer Services Vendors
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SERIES/1

THE PROBLEMS

multiple indexing, disk space management, recovery after system crash, rebuilding index directories, cumbersome file design, programs don't fit, on-line response time is embarrassing, development effort overran budget, terrified of change after application goes into production, the hardware vendor has no convincing answers, trapped by investment in existing code, additional hardware may conceal problems but only good system software can solve them, complaints from users, programmers, upper management, everyone.

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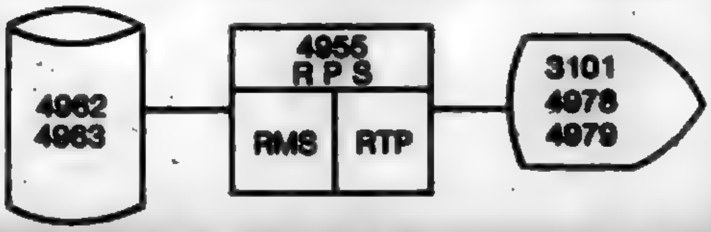

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New Safeguards Required

(Continued from Page 43)

signer has to meet both these criteria while being aware that the user is liable to be working with some totally unknown environment, which the application designer cannot influence. This is quite a job.

With this acceptance of possible operating system error, some form of safeguard is included, but the systems buyer often will not see it in the application data.

The type of safeguards currently in use to fulfill such needs are mainly error-detection with an emphasis on the occasional breaches that can result in records or characters being dropped or mishandled in the communications systems.

In ABS, safeguarding systems are built as "pseudo-application programs" which fall under the operating system proper and provide control functions for the payload programs. The system's diagram shows the place where they logically fall.

In addition, control tables that provide for separately programmed handshaking as the records move to and from the application systems are the key, and this appears to be the direction other developers are taking, too.

These developments are important at this stage because of the need to keep the software investment down and to take maximum advantage from the volatile hardware market. Software investment in the past has been related to specific hardware groups — like the IBM 370 and compatibles or the Data General Corp. AOS groupings. This has made software lock-in a problem for any growing installation.

In current usage, the problem of software/hardware lock-in has been particularly strong when new parts of a distributed processing system are being phased in, as use of the operational software in effect restricts the choice of the hardware and prevents the user from taking full advantage of improved hardware offerings.

Rodriguez noted that his firm's precautions may later be proved to have been totally unnecessary, but I doubt this. At the minimum, there are always shakedown problems; with the safeguards, even application directories that have apparently been lost can be recovered.

There is no substitute for being prepared; and when a software supplier is asked to interface to operating systems that can come out of nowhere on the number of types of hardware that are already available, then precautions — even unnecessary ones — are comfortable indeed.

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Sites Ignoring Basics

(Continued from Page 43)

ware resource point of view. What seems to be missing in almost all cases are important operational considerations, considerations that can spell the difference between a workable, effective disaster recovery plan and an ineffective one. Some of these considerations are:

- Off-site storage of critical forms in adequate quantities.
- Transportation facilities.
- Communication facilities between the backup site and the corporate center.
- Housing facilities.
- Disaster recovery organization structure.
- Forms handling equipment.
- Backup site security.
- Periodic testing of power supplies.
- Periodic testing and validation of off-site data.

The preparation of an adequate disaster recovery plan requires a combination of technical expertise, operations know-how and thorough attention to detail. Existing operations must be approached from an audit perspective.

It is clear that to prepare a truly effective disaster recovery plan is a complex, time-consuming task, which, much like documentation, is never complete. Organizations whose operations depend upon the computer must be prepared to deal with the contingencies which could interrupt those operations.

In today's environment the cost of Disaster Preparedness must be considered part of the cost of doing business. Management has a responsibility to be prepared in order to protect the interests of the corporation as well as the individuals who depend upon the corporation for their livelihood and survival.

Site is a principal with Systems Research Group, Inc., a company in E. Williston, N.Y., that specializes in contingency planning.

Questions on Productivity

(Continued from Page 43)

other match-ups on task assignment/individual GNS. Each match-up requires its own leadership style for enhancing motivation.

The play-on-words heading for this column is more than a jest. Managers have been questioning (investigating) only half of the programming process — the technical side. The other half, the behavioral side, is equally promising.

Improving motivation not only increases productivity, it also reduces turnover. Programmer turnover (34%, according to the most recent *Datamation* survey) is very costly. First, there is replacement cost — recruitment, selection and orientation. Second is the cost associated with the learning curve for bringing personnel up-to-date.

Over the five generations of hardware, Mips rate has increased by a factor of 10 per generation. Programming output has increased less than a factor of 10 during the *entire* five-generation span. Because of the continual increase in labor cost, the cost per instruction has not decreased at all.

Values for the "P" term in the P/C ratio will continue to climb. In order for the "C" side of the ratio to show improvement, managers must place more emphasis on the whole personnel equation — the behavioral as well as the technical.

For Entry-Level Slots

'Grow Your Own Programmers' Advised

By Rita Shoor
CW Staff

CHICAGO – Given the limited resource pool that many organizations have to draw on and the fact that hiring raids on other companies only reshuffle this resource, where does one go to find entry-level programmers? "Grow your own programmers" was the answer from Steven Comstock, a speaker at Advanced Systems, Inc.'s recent Spectrum '80 training conference here.

The technical training specialist listed several additional reasons why a company might opt to train its own programmers:

- Opportunity to tap in-house talent and, in fact, become aware that this talent exists.
- Ability to tailor training to exact organization needs.
- Chance to build company loyalty. The in-house DP staff sees a commitment to their development and employees outside the DP area see a new career path.

Comstock also indicated that entry programmer training could be cost-effective since entry-level salaries range from $10,000 to $16,000, while experienced hires usually draw between $18,000 and $24,000 annually.

He pointed out that many experienced programmers are hired through employment agencies that earn fees for individuals placed. In contrast, "You should be able to train your entry person for less than $2,000 a head," according to Comstock. He qualified this figure by stating that planning time and the salaries for the people who were being trained were not included.

> *'You should be able to train your entry person for less than $2,000 a head.'*

Entry-level training is a four-phase process of planning, selection, training and placement, he said. Planning required agreement at all organizational levels on head count and resources. Then, the curriculum content must be defined. This should include both global and installation-specific DP topics in addition to information about the business and the individual company.

Office space and furniture cannot be forgotten, Comstock pointed out. Finally, a mentor or teacher and appropriate vendors of training materials must be selected.

Selection of the trainees is also a four-step process, he said. There should be an in-house position announcement and advertising when required. Comstock warned the audience to expect the responses to number 10 to 40 times the number of available positions.

Initial Interviews

Initial interviews must then be conducted, in which the interviewer explains what is involved and what will be expected of the trainees. In-depth interviews to discover personal motivation and potential personality conflicts are third on the list. Fourth is the management review step of final applicant selection and followup for everyone who originally applied for the positions.

Training should be mentor-centered, according to Comstock. It should include guest speakers, multimedia instruction, if possible, and on-site class work. He recommended getting trainees into production work as soon as possible in order to familiarize them with working in a real-life environment.

The whole process should take from six to 10 weeks, he claimed. After this, the trainee could work on a programming team for

(Continued on Page 50)

Hierarchical DBMS Geared To Series/1 Users Under EDX

CHICAGO – A hierarchical data base management system for the IBM Series/1 under the EDX operating system is being offered by Unique Information Systems, Inc.

The Data Base Management Executive (DBMX), which utilizes standard EDX files, enables the user to hold, maintain and retrieve all the information needed within one data base, Unique said.

Four data bases can be supported concurrently, each composed of up to 10 record types, each of which is composed on one root segment with a unique key and several trailer segments.

Data is stored in its original size, regardless of EDX physical file blocks. A data base may range over several physical volumes of EDX and a space management mechanism reallocates unused space, the firm said.

A checkpoint-restart mechanism ensures file integrity in case of system failure.

For on-line application development, an interactive data base maintenance and retrieval system, DBMR, is available. Using DBMR, the application programmer may define and create a DBMX data base on a terminal, interactively.

DBMX carries a one-time fee of $10,000. Unique is located in Suite 2900, 30 N. Lasalle, Chicago, Ill. 60602.

Conversion System Links Office System 6, 5110/5120

SAN DIEGO – A conversion system that reportedly provides compatibility between the IBM Office System 6 OSC Information Processor and the IBM 5110/5120 minicomputer has been announced by Chase Enterprises, Inc., along with four business software packages for the 5110/5120.

The 5120/OS6 Conversion System – calling for a 5110/5120 computer with at least 16K bytes of memory – allows data from a 5120 data file to be put into a file job on an OS6 diskette, the vendor said.

In addition, OS6 data can be put on a 5120 diskette. The process runs totally on the computer and reportedly does not require any nonstandard hardware features such as communications interfaces

The four software packages are Medical Accounts Receivable, General Ledger, Payroll and Accounts Receivable.

Medical Accounts Receivable was designed for a 5110/5120 with 32K bytes of memory.

It is a random-access package usable by up to four doctors with a total of 2,800 patients, according to a company spokeswoman. The

(Continued on Page 50)

IBM DOS USERS BUDGET FOR DOSSIER IN '81

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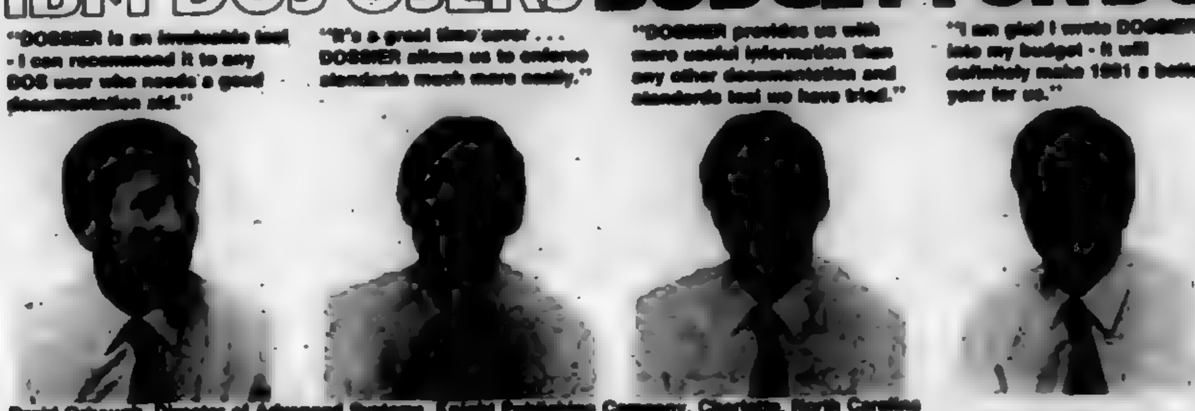
"I am glad I wrote DOSSIER into my budget - it will definitely make 1981 a better year for us."



David Orbaugh, Director of Advanced Systems, Knight Publishing Company, Charlotte, North Carolina

All it took was a free trial to convince David Orbaugh that he needed DOSSIER. "My programmers are most enthusiastic," says Orbaugh. "Once they saw the DOSSIER trial, it was impossible to get it away from them - I had to buy it!"

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DBMS Updates IDMS Tool

LOMBARD, Ill. — DBMS, Inc. has announced Release 2 of its IDMS Journal Analyzer system, said to feature a chronological event report, abort coincidence analysis and documentation update.

The chronological event report details by time all activities within the IDMS central version, according to the firm.

The documentation update reportedly simplifies the problem-analysis procedures that a data base administrator uses to isolate transactions for review.

Release 2 costs $7,300 from the firm at 33 W. Roosevelt Road, Lombard, Ill. 60148.

Genasys Backs DBMS, IBM 3800

NEW YORK — Release 3.07 of Genasys International, Inc.'s application system development software adds support for data base management systems (DBMS) and the IBM 3800 laser printer.

Release 3.07 extends the maximum size of an overall data base definition and expands support for Segment Search Arguments (SSA) under IBM's Information Management Systems (IMS).

The update also includes enhancements to the vendor's support of IDMS from Cullinane Corp., Adabas from Software AG, DMS-II from Burroughs Corp. and Image from Hewlett-Packard Co.

Other changes optionally allow Isam-type, in addition to sequential, files to have records located in the file definition area instead of working storage. The release also allows the user to code a condition that suppresses all verification for a file or a CRT terminal screen display that is being edited, the vendor claimed.

Recognition of common patterns in program logic has been carried further in Release 3.07 with the inclusion of an enhanced prototype of file maintenance logic, the vendor claimed. Common data needs are supported by more patterns of dates for testing and other functions, as well as an additional print format for telephone numbers.

The basic Genasys software can be licensed for $100,000. Depending on configurations, the price can rise to $175,000, the vendor said from 17 E. 45th Street, New York, N.Y. 10017.

Growing Your Own Advised

(Continued from Page 49)

some six to nine months and then might be classified as an experienced programmer.

Placement of the trainee involves student evaluation, which should be completely honest, and team or project assignment. The trainer must be prepared to handle the person who does not successfully complete the course. If that person was an in-house transfer, the organization will usually try to find another position within the company; if it was a new hire, the rejected trainee usually goes "back on the street," Comstock said.

Finally, he recommended placing the trainee on development rather than maintenance teams. After teaching the group new techniques, it is better not to expose them to "bad habits" or inefficient programming logic structures, he said.

Other possibilities that should be considered are cooperative internship programs with neighboring colleges and consortium training, which involves several companies combining their training resources. However he warned that organizational differences often have a negative impact on consortium training.

System Links OS6, 5110/5120

(Continued from Page 49)

base system may also be expanded.

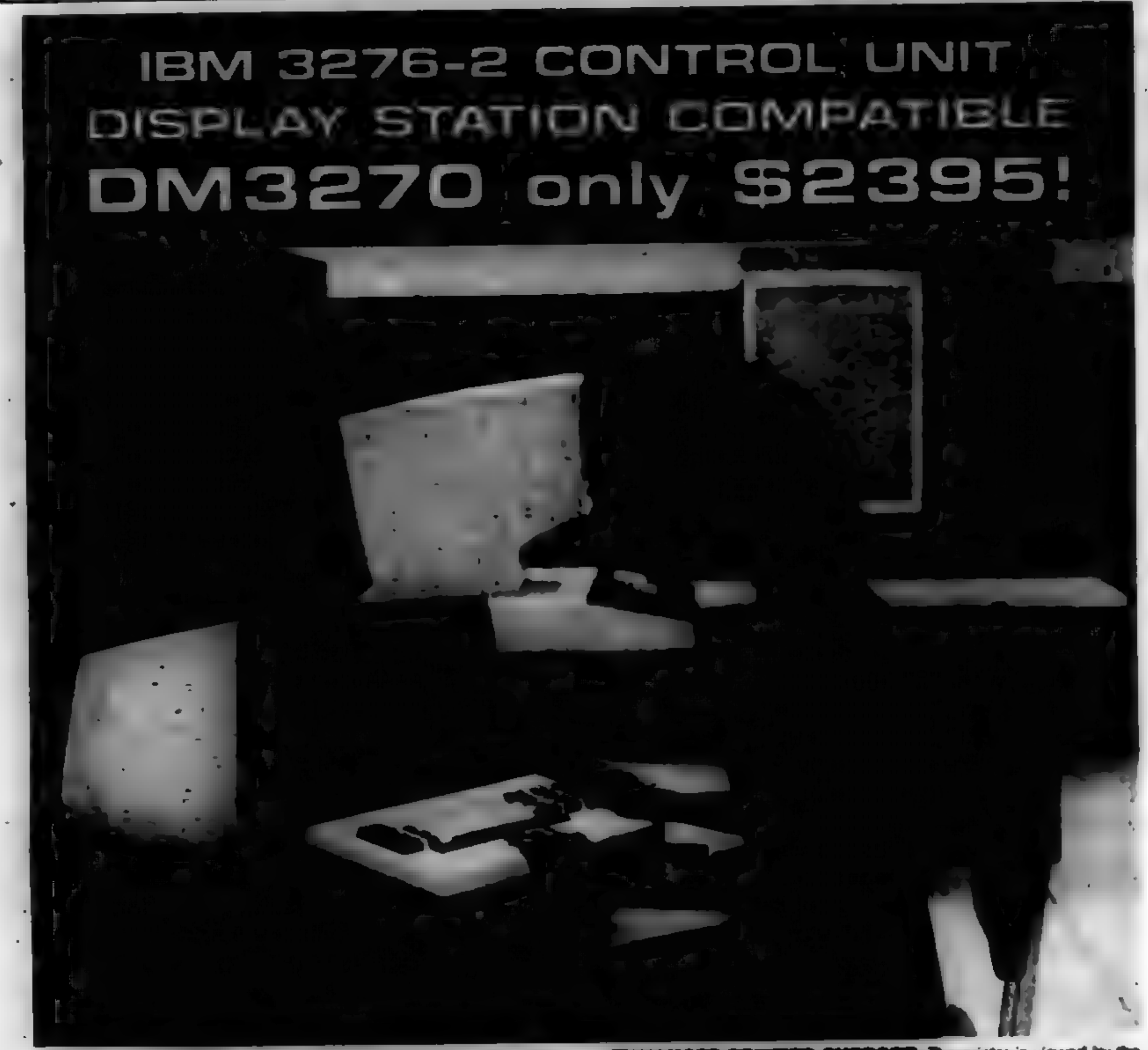
The system is capable of producing monthly statements, standard insurance forms, Medi-Cal and Medi-Care insurance forms. While the monthly balance forward accounting method is utilized, detailed transactions may be saved for more than a month for selected patients.

The General Ledger multiple entity system needs at least 16K bytes of memory and supports up to nine different Charts of Account. Different entities have different fiscal-year starting months, the spokeswoman explained.

The Payroll system provides for multiple entities and integrates with the General Ledger system, according to the spokeswoman. Monthly, quarterly and yearly reporting is done by company and the system consolidates companies for reporting purposes.

The Accounts Receivable system is said to allow processing of accounts receivable, inventory control and order entry. Open item and balance forward systems are available.

The 5120/OS6 Conversion System costs $800; the Medical Accounts Receivable system costs $4,000; General Ledger costs $1,500; Payroll costs $1,500; and Accounts Receivable is available for $5,000; all may be obtained from the company at Suite 202, 8334 Clairemont Mesa Blvd., San Diego, Calif. 92111.



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"Here are four reasons why we switched to NCR," says Dale A. Dooley of the Iowa Transfer System.

Dale A. Dooley (left) is executive director of Iowa Transfer System, Inc., in Des Moines. Jim Schulte is NCR district manager.

DOOLEY:
The Iowa Transfer System is the first electronic funds transfer system to operate statewide. Over 85 percent of the commercial banks in Iowa are supporting members. We recently installed an NCR 8450 as the central element — the switch — in our network.

NCR's SCHULTE:
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DOOLEY:
Our first reason for going to NCR is monetary. With NCR, our costs are substantially lower than under our previous arrangement.

NCR's SCHULTE:
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DOOLEY:
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DOOLEY:
The third reason is software. Only NCR could provide the switch software we needed when we had to have it.

NCR's SCHULTE:
Not only did we meet the deadline, but the transition to our system was very smooth.

DOOLEY:
Finally, our decision was influenced by the dependable performance of the other NCR systems within the network. And we have had the same experience with this system. Our uptime level has been very high — a critical consideration when you're talking about a network switch.

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But thanks to extensive safeguards built into the Multics operating system, security can be maintained without lessening the computer's availability.

All in all, Oakland's Level 68/DPS is working out very well.

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For more information on the Level 68/DPS and the Multics operating system, write Honeywell, 200 Smith Street (MS 487) Waltham, Massachusetts 02154.

Honeywell

Series/1 Gets Ansi Cobol

TUSTIN, Calif. — A 1974 Ansi Level 2 Cobol system is now available from Royal International Software Systems for the IBM Series/1 minicomputer running under EDX.

The Cobol system supports the Level 2 features of Nucleus, Table Handling, Sequential I-O, Relative I-O, Index I-O, Sort-Merge, Segmentation, Library, Inter-Program Communication and Ansi Debugging.

The system also supports a Report Writer; Packed Decimal, which eliminates the conversion effort from existing IBM Cobol programs; and Screen Handling, according to Royal.

The compiler will compile with 32K bytes of main memory at 400- to 600 lines/min depending on the listing options requested, Royal said.

The software costs $6,700 per CPU for compiler and run-time library and $3,480 per CPU for run-time library only. The price includes maintenance and future enhancements, the vendor said from Suite 206, 202 Fashion Lane, Tustin, Calif. 92680.

MTM Utilities Fit Series/1 Use

WAKEFIELD, Mass. — Four Multiple Terminal Manager (MTM) utilities for IBM Series/1 users operating under EDX are available from Wakefield Software Systems, Inc.

The utilities are:

- The Batch Job Invoker, which allows a program under MTM control to load a sort, job utility or program to another partition as a batch job that is not running under MTM control. It costs $160.
- The MTM Menu Processor, which allows the creation of menus using $Image screens. These menus can describe a string of up to 20 programs to be run sequentially from any one menu item, the vendor claimed. The Menu Processor costs $200.
- An Automatic Diskette Varyon, which allows a program running under MTM control to vary on a diskette. It costs $60.
- A Utility Processor which permits a program running under MTM control to invoke any EDX utility in another partition and pass the parameters required by that utility. It also costs $60.

Wakefield Software Systems is located at 28D Vernon St., Wakefield, Mass. 01880.

Accountants, Lawyers Get Staff Scheduling

ATLANTA — Management Control Systems, Inc. (MCS), a producer of software systems for CPA and accounting firms, has released the Staff Scheduling System to be run on IBM System/34 computers.

Designed for scheduling employees in accounting and law firms, the system can save professional time by matching employee availability with client requirements, according to MCS. Firms of this type can use the system to plan, schedule, monitor and evaluate optimal schedules.

Priced at $2,500, the system can be obtained from MCS at 2111 Powers Ferry Road, Atlanta, Ga. 30309.

In Various Cities

Course Series Slated for CICS, Vsam Users

RIVER EDGE, N.J. — A series of courses for users of IBM's CICS and Vsam has been scheduled by On Line Software International:

- **CICS/VS Application Programming, (Command Level)**, five days, $700. It will be given Dec. 1-5 in San Francisco; Jan. 19-23, Dallas; Feb. 23-27, New York; March 30-April 3, Los Angeles; May 4-8, Chicago; and June 8-12, New York.
- **CICS/VS Application Programming, Macro Level**, five days, $700. It will be given Dec. 8-12 in San Francisco; Jan. 26-30, Dallas; March 23-27, Los Angeles; May 11-15, Chicago; and June 15-19, New York.
- **CICS/VS Logic and Debugging**, four days, $600. To be given Nov. 17-20, New York; Feb. 10-13, Houston; April 6-9, San Francisco; March 11-14, New York; and June 22-25, Chicago.
- **CICS/VS Internals**, five days, $700. This workshop examines program structures. It will be given Dec. 1-5, San Francisco; Jan. 19-23, New Orleans; March 2-6, New York; April 6-10, Minneapolis; May 11-15, Los Angeles; and June 22-26, New York.
- **CICS/VS Performance and Tuning**, a two-day, $300 course. This course will be given Dec. 8-9, San Francisco; Jan. 26-27, New Orleans; March 9-10, New York; and May 18-19, Los Angeles.
- **Recovery/Restart**, $300, two days. To be given Dec. 10-11, San Francisco; Jan. 28-29, New Orleans; March 11-2, New York; and May 20-21, Los Angeles.
- **Vsam: Its Structure and How To Use It**, $600 for four days. To be given Dec. 15-18, New York; Feb. 10-13, San Francisco; March 30-April 2, Dallas; May 4-7, New York and June 22-25, Minneapolis.
- **CICS/VS Application Design**, four days, $600. It is scheduled for Dec. 8-11 in New York; Jan. 26-29, San Francisco; March 9-12, Minneapolis; April 13-16, New York; May 18-21, Houston; and June 29-July 2, New York.

Registration forms are available from On Line Software International at 65 Rt. 4 East, River Edge, N.J. 07661.

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Minimal Basic, Fortran Approved as Fips

WASHINGTON, D.C. — Federal Information Processing Standards (Fips) for Minimal Basic and Fortran have been approved by Secretary of Commerce Philip M. Klutznick.

The Minimal Basic and Fortran standards, Fips 68 and 69, are now added to the previously approved standard Cobol as the high-level programming languages adopted for federal government use. The Commerce Department's National Bureau of Standards was actively involved in the development of the standards by voluntary groups under the auspices of the American National Standards Institute and recommended their adoption as federal standards.

Minimal Basic and Fortran language processors developed or acquired by federal agencies on or after Sept. 4, the effective data of Fips 68 and 69, must conform to the standards.

The two Fips, including associated ANS documents, are expected to be available sometime this month, according to a spokesman at the National Bureau of Standards, who estimated Fips 68 will cost $7 and Fips 69, $16.50.

They can be ordered from the National Technical Information Service, Springfield, Va. 22161.

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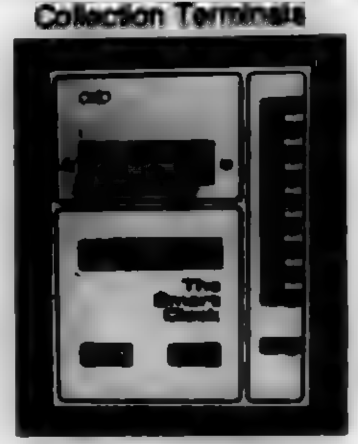

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COMPUTERWORLD
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Runs on System 80

Univac Gets 'Unisdis-Wholesale'

BLUE BELL, Pa. — Unidis-Wholesale, an application package for the distribution industry, will be available on the Univac System 80 this month.

A fully integrated, on-line interactive system that can be used in wholesale warehouse operations, the package provides order entry, stock control and scientific inventory management, the vendor said. The overall system can interpret how the orders will be priced, filled, shipped and how stocks will be affected.

It can also create purchase orders instantly, validate and control the receipt and movement of goods, update inventory records and generate account transactions.

Demand Forecasts

Unidis-Wholesale performs demand forecasting, with model selection and monitoring, purchasing parameter calculation and review, strategy simulation and stock analysis and reporting.

The minimum System 80 configuration required to support the software is a Model 3 or Model 5 CPU with 524K bytes of main memory and two disk drives, one diskette, one workstation and one printer with 64-char. print band. It is also available on the Univac 90/30 and 90/40 computer systems.

The software license fee for Unidis-Wholesale is $420/mo. for Order Entry/Stock Control and $420/mo. for Inventory Management, including support. Univac can be reached through P.O. Box 500, Blue Bell, Pa. 09424.

Unis 1100 Update Interactive

BLUE BELL, Pa. — Univac has announced an enhanced interactive version of Unis 1100, the package for manufacturing management control on Univac's 1100 series mainframes.

The enhanced Unis 1100 allows manufacturing people to load their own data and then call it up via simple English commands, update immediately and have it displayed on a terminal screen or call for hard-copy printouts as needed, a Univac spokesman said.

Interactive Functions

The interactive functions of Unis 1100 share data through a common data base.

Capabilities include production engineering data management, product costing, customer order processing, purchase-order control, inventory status and control, forecasting and analysis, master scheduling, material requirements planning, production planning and work order control, a Univac spokesman explained.

Monthly charges for Interactive Unis 1100 range from $600 to $1,500 depending on the manufacturing functions being used.

First customer deliveries are scheduled this month, a spokesman said.

Industrial Engineer Tools Out

PARAMUS, N.J. — Four industrial engineering software packages in use in the UK and Europe have been introduced into the U.S. market by the American subsidiary of Compeda Ltd. of Britain.

The four packages are Sammie, Sword, Timelink and Nulisp. Sammie is a computer-aided design system that enables the human form to be modeled three-dimensionally, then moved about to evaluate the physical interaction between man and the workplace or work task.

Sword is a workshop scheduling package that aims to provide the optimum allocation of work between man and machines. It is designed for volumes of up to 10,000 operations.

Timelink is a system for the management of all aspects of an organization's work-study activities. It can provide automatic transfer of relevant data to other company systems such as production control.

Nulisp is said to be a suite of programs that complements Timelink and helps the industrial engineer produce a breakdown of a complete assembly process into stations whose work content is balanced among operators.

The packages are available on three-year licenses, including warranty, maintenance and system upgrades during that time. At the expiration of the 3-year period, the user has perpetual use of the package and can buy updates at preferential rates. The one-time cost for Sammie is $120,000; Sword, $25,000; Timelink, $90,000; and Nulisp, $36,000.

Compeda, Inc. is located at Paramus Plaza I, 140 Rt. 17 North, Paramus, N.J. 07652.

McAuto Has 'Caposs-E' Programs

ST. LOUIS — McDonnell Douglas Automation Co. has developed three on-line modularized transaction programs for integration into the IBM Caposs-E release.

Available to installations that operate under OS or VS with the IMS data base management system and also to customers who process through McAuto's data communications network, the programs are contained in three separate modules.

Executive Module

The Executive module was designed to improve standard reports, the Order Status module allows planners to inquire about work process and the Process and Routing module allows planning engineers to maintain instructions on the manufacturing process, according to McAuto.

The prices for McAuto's modules licensed separately are: Executive, $35,000; Order Status, $60,000; and Process and Routing, $40,000. The combined price is $115,000.

More details are available from McAuto, St. Louis, Mo. 63166.

'Profit Control' Systems Support Sentinel Minis

CINCINNATI — An integrated set of financial and distribution application software systems called Profit Control is available from Sentinel Computer Corp.

The product is designed to be compatible with the vendor's Database capability, which is offered on its microprocessor-based minicomputers.

The software includes the "Company Profile" concept, which provides for all master control information to be stored and maintained in a common file to facilitate modification without the need for reprogramming, the vendor claimed.

The hardware and software together cost between $30,000 and $100,000, the vendor said from 9902 Carver Road, Cincinnati, Ohio 45242.

'FCS-EPS' Ready On DEC

CHICAGO — EPS, Inc. has unveiled a financial evaluation and planning system for use on Digital Equipment Corp. Decsystem-10, Decsystem-20 and PDP-11/70 CPUs.

The FCS-EPS package performs statistical, risk and financial analysis in a three-dimensional mode that can work models and scenarios into a complete hierarchical consolidation structure and allow the user to plug in variables for what-if analysis, the vendor claimed.

The system currently runs on IBM, Honeywell, Inc., Burroughs Corp., Univac, Hewlett-Packard Co., Data General Corp. and Amdahl Corp. systems.

The system costs $20,000 to $50,000, depending on CPU configuration, EPS said from 8600 W. Bryn Mawr Ave., Chicago, Ill. 60631.

PDS Offers Library Set

CARSON, Calif. — Pacific Datasystems, Inc. (PDS) is offering a set of library procedures and utilities to provide support software for the implementation of business applications packages.

The Pascal Applications Support Software (Pass) runs under the RT-11 operating system for the Digital Equipment Corp. PDP-11, the vendor explained.

However, the procedures are written in Pascal and are transportable to other Pascal systems, the vendor said.

The package is priced from $3,000 to $6,000 depending on user requirements. PDS can be reached through P.O. Box 5369, Carson, Calif. 90749.

'Wafe' Text Editor Adjunct To DPD Word-11 Package

PLACENTIA, Calif. — A full-screen text file editor called Wafe has been released by Data Processing Design, Inc. (DPD) as an adjunct to its Word-11 multiuser word processing package.

Word-11 enables users of Digital Equipment Corp.'s PDP-11 systems operating under RSTS/E to run extensive word processing tasks concurrently with DP operations, Data Processing Design said.

Originally developed for internal use, Wafe adds to programmer efficiency, resulting in faster training and savings in system resources, the vendor claimed. Benchmarks are currently being developed and will be available at no charge.

The Wafe package costs $1,500 from the vendor at Suite F, 181 W. Orangethorpe Ave., Placentia, Calif. 92670.

Tool Lets Terminal Handle Up to Four Job Streams

BEDFORD, Mass. — A single data terminal in a Digital Equipment Corp. PDP-11 or VAX-11/780 configuration reportedly can do the job of four interactive terminals with a software package released by Clyde Digital Systems.

A terminal supporting either family of DEC hosts can handle alternately up to four job streams, a spokesman explained, without interrupting the interactive mode.

Keystrokes entered by the user and data presented to the terminal are captured in a log file, the spokesman added.

The package costs $195 from Clyde Digital through P.O. Box 348, Bedford, Mass. 01730.

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Tool Lets NCR VRX Machines Run Imos, IRX Applications

PLEASANT HILL, Calif. — Ibos/5, a comprehensive implementation tool that allows NCR Corp. Imos and IRX applications to run on that vendor's VRX machines, has been released by Century Analysis, Inc.

Ibos/5 was designed to enable VRX users to take advantage of the interactive applications developed for the I-Series user, as well as to enable I-Series users to migrate into the VRX environment.

In both instances, Century's teleprocessing monitor, Boss/3, can be used concurrently, a spokesman noted.

Background Jobs

Ibos/5 allows each individual terminal to continue on-line processing after one or multiple background jobs are initiated.

In addition, Ibos/5 supports menu and control string functions and, because of its self-documenting feature, provides an audit trial of Imos program modifications, the vendor noted.

Ibos/5 can be implemented on any NCR Criterion using the VRX operating system. It can run as a stand-alone system or as a feature under the Boss/3 teleprocessing monitor.

It is priced at $8,000 for the stand-alone version and $3,000 for use with Boss/3.

Century Analysis is located at 114 Center Ave., Pacheco, Calif. 94553.

'Structure(s)' Updated For Warnier-Orr Diagrams

TOPEKA, Kan. — Version 3.0 of Structure(s), a software package that automates the production and maintenance of Warnier-Orr diagrams, has been released by Langston Kitch & Associates, Inc.

Structure(s) is used to aid the analyst, designer and programmer with the design, construction, maintenance and documentation of systems.

The latest version offers the addition of conditionals to the diagram, more user-specified options, improved error handling, support for IBM laser printers and for asynchronous terminals and new support material, a company spokesman explained.

Structure(s) is available in IBM FCobol. Source code is provided and can be modified to run on most machines having Cobol compiler, the firm said.

Structure(s) costs $9,900 or $600/mo to lease, but will be increasing in sale price to $11,500 as of Jan. 15.

The vendor is located at 715 E. 8th St., Topeka, Kan. 66607.

Tool Creates Formats

PHOENIX — Database Systems Corp. has announced a software programming tool for users of Prime Computer Corp. minicomputers.

The Dataforms package offers a method of creating and maintaining CRT terminal screen formats for user applications, Database said.

Features include range check, table look-up, modulus, data types and computed values, the vendor said.

Dataforms includes a runtime library of calls that can be invoked from Cobol, Fortran, PL/I or other languages supporting external calls.

The package supports block mode terminals and is priced at $7,500.

Database is at Suite 710, 5251 N. 16 St., Phoenix, Ariz. 85016.

Expandable Job Cost Set Designed for HP 3000

LONG BEACH, Calif. — A Job Cost Processing package that offers a set of Cobol programs designed to be modified and expanded to meet user requirements is now available for the Hewlett-Packard Co. HP 3000 computer.

Data Systems for Industry, Inc.'s JCP is dependent upon the prior installation of HP's Materials Management/3000.

JCP utilizes the HP Image data base and V/3000 terminal control program.

The fill-in-the-form data entry screens collect labor distribution records, which are accumulated against a work order.

A detailed actual cost vs. standard cost variance report is then produced and a cost summary record is generated for historical summary reporting.

Shop Floor Model

In addition, JCP was designed to supplement a previously released Shop Floor Processing Model.

JCP is available with source code and system documentation for $10,000 from Data Systems for Industry, 3450 East Spring St., Long Beach, Calif. 90806.

Data Capture Package Supports HP Terminals

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a data capture package that supports three of its terminal models recently added to the HP 1000 computer system.

Datacap/1000-II's menu-driven format reduces the time and cost required to design, install and maintain a real-time data capture system by minimizing the user's programming effort, the vendor claimed.

Up to 56 HP data-capture terminals with various configurations can be linked to the 1000 computer and managed by Datacap/1000-II, a spokesman said.

Datacap/1000-II is priced at $5,000.

HP is headquartered at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Micro Notes

Plotting Graphs for Line Printer, Active Filter Design, Descriptive Statistics & Regression Analysis, Electronics I and Electronics II are software programs designed for the TRS-80. Price range: $16.95 to $21.95. Vendor: Howard W. Sams & Co., Inc., 4300 W. 62nd St., Indianapolis, Inc. 46268.

Version 4.0 of Cobol-80 is available from Microsoft for 8080, 8085 and Z80 users. Price: $750 ($20 for documentation). Vendor: Microsoft, Suite 819, 10800 N.E. Eighth, Bellevue, Wash. 98004.

CP/M-86 from Digital Research, Inc. is an operating system for the Intel Corp.'s 8086/8088-based micros. Price: $300. Vendor: Digital Research, Inc., P.O. Box 579, 801 Lighthouse Ave., Pacific Grove, Calif. 93950.

The Order Scheduler maintains up-to-date purchase order information on the Apple Computer, Inc. Apple II. Price: $150. Vendor: High Technology, Inc., 8001 N. Classen Blvd., P.O. Box 14665, Oklahoma City, Okla. 73113.

RCS the Micro-Modeler is a financial modeling package, written in Pascal, which runs on Apple Computer, Inc. MPUs. Price: $1,500. Vendor: Ferox Microsystems, Inc., 5881 Leesburg Pike, Falls Church, Va. 22041.

The Assistant Principal is an administration package for high schools and junior high schools that runs on the Apple Computer, Inc. Apple. It requires two disk drives and Applesoft in random-only memory. Price: $500. Vendor: Monument Computer Service, P.O. Box 603, Village Data Center, Joshua Tree, Calif. 92284.

Business Package V handles patient records, appointement scheduling, billing, insurance claims, bookkeeping and analysis for the medical professional, on Apple Computer, Inc.'s Apple computer. Price: $450. Vendor: Compusoco, P.O. Box 2325, 25251 Via Roble, Mission Viejo, Calif. 92690.

RCS-The Micro-Modeler is a full-scale financial modeling package written in Pascal that runs on Apple Computer, Inc.'s Apple II. Price: $1500. Vendor: Ferox Microsystems, Inc., 5881 Leesburg Pike, Falls Church, Va. 22041.

CP/Modem expands the communications capabilities of CP/M-based computer systems, with both high and low protocols, on Digital Equipment Corp. systems. Price: $500. Vendor: Information Engineering, Box 305, 8 Bay Rd., Newmarket, N.H. 03857.

Dental Office Management is an appointment scheduling, billing and insurance form preparation package that operates on, Apple Computer, Inc.'s Apple II system. Price: $359.95. Vendor: Charles Mann & Assoc., Micro Software Division, 7594 San Remo Trail, Yucca Valley, Calif. 92284.

Data Base Focus is the name of Micro Data Base Systems, Inc.'s newsletter on micro product development and applications. Price: $1. Vendor: Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, Ind. 47902.

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Structured Methods: The Impossible Dream?

BY MARK S. LIPPARD

It took three years for the University of Toronto to introduce structured methods into its Student Record Services division. Here's how the staff did it — and what they learned.

Student Record Services (SRS), a division of the University of Toronto, is responsible for maintaining a complex IBM IMS data base system for recording applicant, student and fees information and for developing systems to access the information. To help it do its job more efficiently, SRS has introduced structured methods and is in the process of developing a completely structured life cycle.

In describing SRS' transition to a structured approach, this article will present:

- A general analysis of the situation before and during 1976, before the introduction of structured methods.
- An analysis for each of the three years — 1977, 1978 and 1979 — in which the structured methods were introduced.
- A brief discussion of where SRS is, at present, in the process of developing a structured life cycle.

This description of SRS' experience is not intended to serve as an outline of how to introduce structured methods in other organizations. Instead, it is intended to illustrate the difficulties and costs of introducing a new methodology as well as the benefits of using structured methods.

The experience at SRS does indicate that there may be guidelines that can be followed by other organizations. They include the following:

- Management must be committed to the introduction of structured methodologies and be able to demonstrate its attitude to the staff.
- Structured methods should not be applied directly from a book. They must be modified to meet the requirements of a specific environment.
- The introduction of structured methods requires a well-developed interface between management and staff.
- Management must be willing to invest a large amount of its time as well as the staff's time.

The SRS story also illustrates the costs of introducing structured methods and the benefits of using structured methods. The main cost was that associated with change. The changes at SRS were accompanied by staff frustration and insecurity resulting in low levels of staff morale. In retrospect, it appears as though this cost could have been reduced, but not eliminated.

The organizational cost of the low morale was the cost of almost complete staff turnover. The human cost cannot be measured.

Another cost was the management time devoted to introducing the change. From 1976 through 1979, this cost was approximately $320,000.

The benefits of using structured methods include:

- Increased reliability of systems and elimination of maintenance costs.
- The ability to enhance systems at minimal cost and with complete success.
- High staff morale resulting from an environment that is progressive and stresses personal development.
- Increased staff productivity measured in number of systems produced and enhanced rather than in lines of code, which is no longer a meaningful measure.
- The ability to manage projects and assure that all projects are completed on time with complete documentation.
- A high level of user satisfaction and confidence resulting from all of the above benefits as well as others.

This narrative also illustrates that structured methods cannot be used as rules that always result in well-developed and easily enhanced systems.

The experience at SRS indicates that structured methods are an excellent mechanism for communicating ideas and for restating those ideas in increasingly specific terms. As with any method of communication, there are some rules and many guidelines. When the guidelines are applied in a creative and socially acceptable manner, the communication is more effective than when only the rules are followed.

As structured methods are only a method of communicating, they are not in themselves a panacea for improving system development. Improved systems do result when structured methods are used to communicate ideas among people willing to provide constructive criticism.

NOTE: This article does not include descriptions or definitions of structured methods and assumes that the reader has a basic understanding of these methods. And to maintain the structure of discussing changes on a yearly basis, not all dates are exact.

Before 1976

Before 1976, two organizations shared the responsibility for systems development. One division was responsible for user relations and system specification. The other was responsible for system design and implementation.

There were a number of traditional problems with the systems developed by the two groups:

- They were not completed on time.
- They had many bugs.
- They did not meet the users' expectations.
- They went into production without user documentation.

These problems were not a reflection on the ability or dedication of the system development staff. The group worked many hours and was always available in the evening to deal with the many problems that occurred. Instead, the problems were a reflection on the methods used to develop and enhance systems.

The system development or enhancement cycle usually consisted of the following stages:

1. An analyst would review the user's verbal or written request (most requests were verbal).
2. The analyst would transmit the request to a senior programmer/analyst.
3. The programmer/analyst would discuss the project with a programmer, who might prepare a flowchart if the system was new and complex. Occasionally the programmer/analyst would confirm the discussion by preparing a brief written outline of the requirements.
4. The programmer would code and test the system until the user was satisfied.
5. The documentation was produced (maybe).

Outdated Documentation

More than 80% of all development time was devoted to the coding and testing phase. Projects were often 90% complete long after they had gone into production because the documentation had not been completed. As many systems were enhanced frequently because of user requests or error correction, any original documentation quickly became outdated and worthless. In order for the systems to survive, specific programmers became responsible for individual systems. Each programmer had to rely upon his memory of a system instead of the documentation.

This approach was partially successful in that it guaranteed that someone was capable of modifying a system. But the success of introducing enhancements was dependent upon the presence of a single individual rather than complete and meaningful documentation. The major drawback of this approach was that when a staff member resigned, the unwritten system documentation was lost.

Changes in '76

In early 1976, the two organizations were merged to form SRS. This change was made in response to pressure from a highly vocal user community that was not satisfied with the quality of the systems developed by these divisions. One of the reasons for the merger was to eliminate the separation

(Continued on In Depth/2)

IN DEPTH

(Continued from In Depth/1)

between specification and development in the hope that the quality of systems would increase.

When the divisions were merged, a new director was brought in from outside the two divisions. His appointment was the most important change resulting from the merger because he would lead the new division in the development and use of improved development methodologies. This is an important point because it meant that the direction would come from above.

During 1976, the director and some of the staff he had brought with him analyzed the existing systems. They realized that the problems mentioned in the preceding section were caused by the method (or lack of a method) used to develop systems. There were some attempts to improve the ability of the development staff by sending them to courses (a Hipo course offered by IBM stands out). The staff agreed that using a methodology like Hipo could result in improved systems, but they believed it was impossible to use a formal approach all the time in their environment.

To some extent, they were correct. The environment was one of continuous "fire fighting." Much time was devoted to correcting errors that had been made while attempting to correct previous errors or while making enhancements. We realized that to correct the problem with the quality of the existing systems, we would have to change both our environment and our methods. The following years would be devoted to this effort.

Emphasis on Redevelopment

While developing a coherent structured methodology, we continually attempted to redevelop procedures rather than to enhance them. This approach resulted in an initial increase in cost, but we were able to guarantee that subsequent enhancements would be made properly. By redeveloping procedures, we were also eliminating the source of the "fire fighting" mode of operation.

This approach was successful because the direction came from the top of the organization. The director had the ability to make certain the organization had the time and knowledge to remake its environment.

The main accomplishments in 1976 were an understanding of the problems and a plan to correct them. The main visible result of the problem analysis was increased staff dissatisfaction caused by the intervention of "outsiders who did not understand the difficulties of the environment." There was also an increase in staff frustration caused by the unfulfilled expectation that there would be an immediate improvement in the level of user satisfaction. These two developments in combination with others led to a decrease in staff morale.

Results in '77

The introduction of a coherent development methodology began in 1977. A number of changes in the development cycle were introduced. These changes included:

- The use of structured programming.
- The use of structured English (an internally developed form of pseudocode) to develop the structure and logic of a system before coding began.
- The use of structure charts based upon the Yourdon-Constantine model to graphically develop the structure of a system.
- The use of written specifications for all system development and enhancement.
- The walk-through.

The details, in 1977, of the nature of each of the five changes were as follows.

Structured programming. The use of structured programming techniques was based upon many of the concepts already in use by the development staff and the experience in the Hipo course. Three aspects of structured programming were emphasized:

- Meaningful comments.
- Functional modularization.
- Procedures no longer than one page.

The introduction of structured programming techniques was the easiest change made in this year as it involved coding, a familiar activity, rather than a new technique. In some cases, the programs that had been developed before 1977 were adequately modular-

(Continued on In Depth/6)

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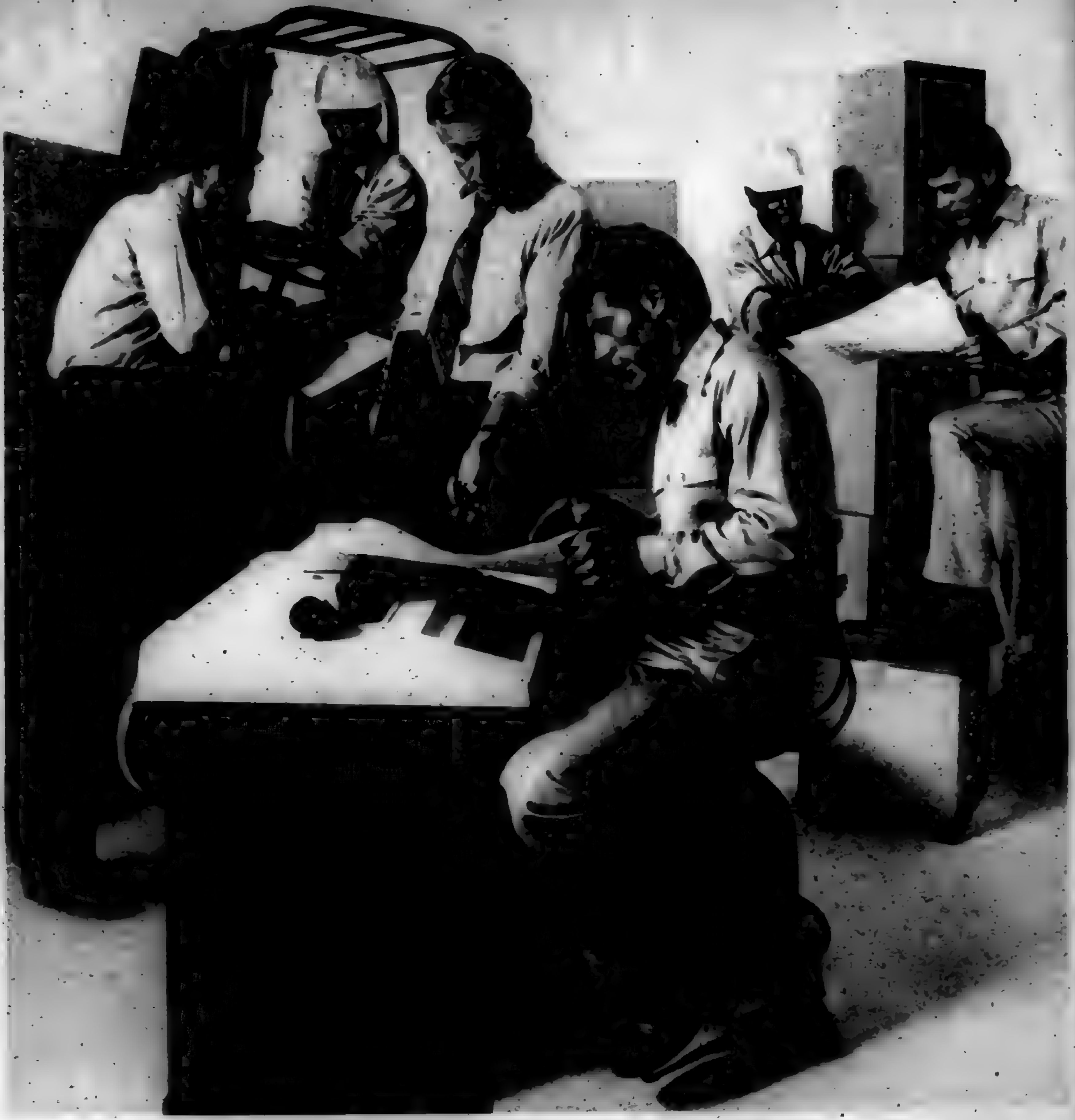

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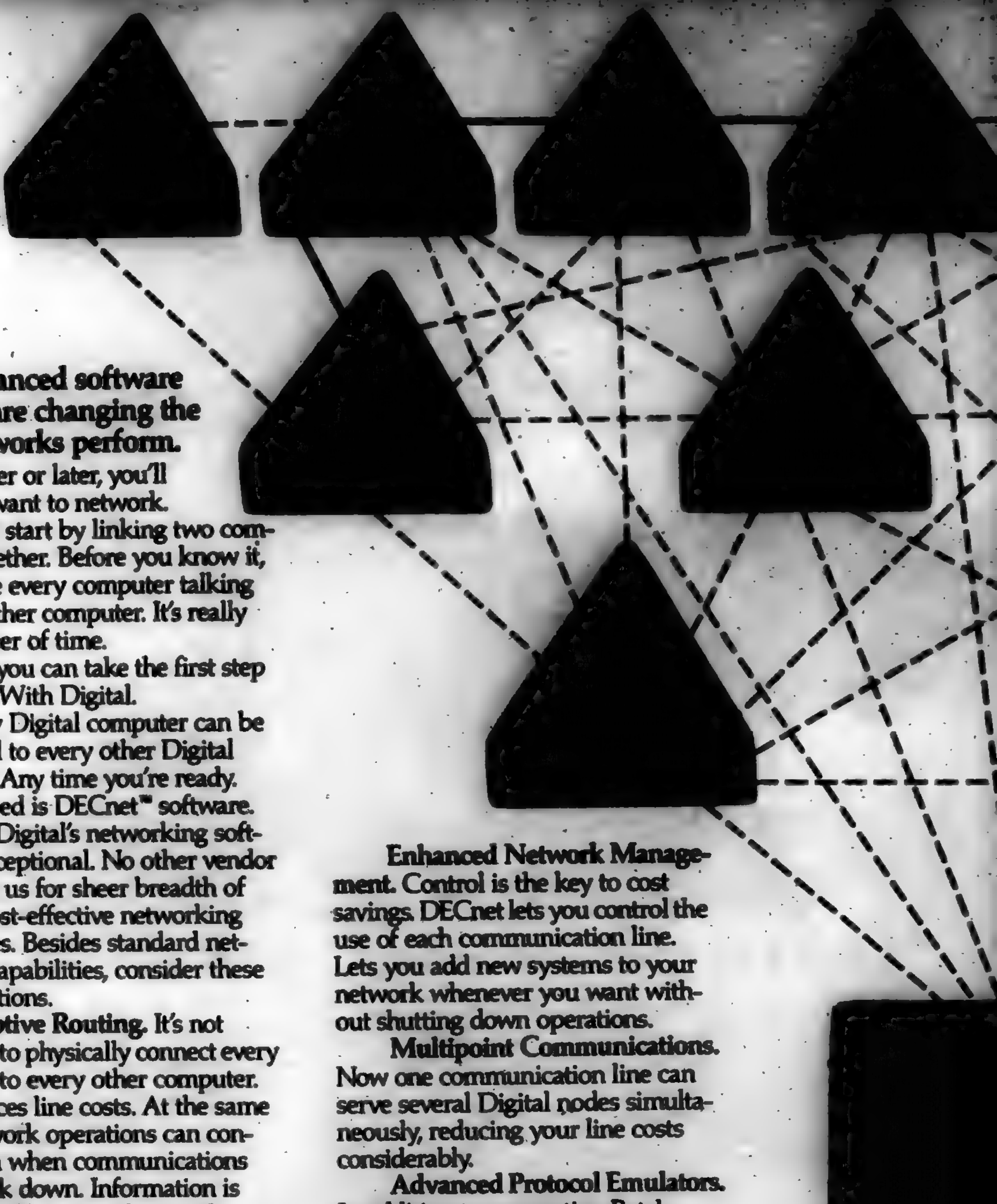

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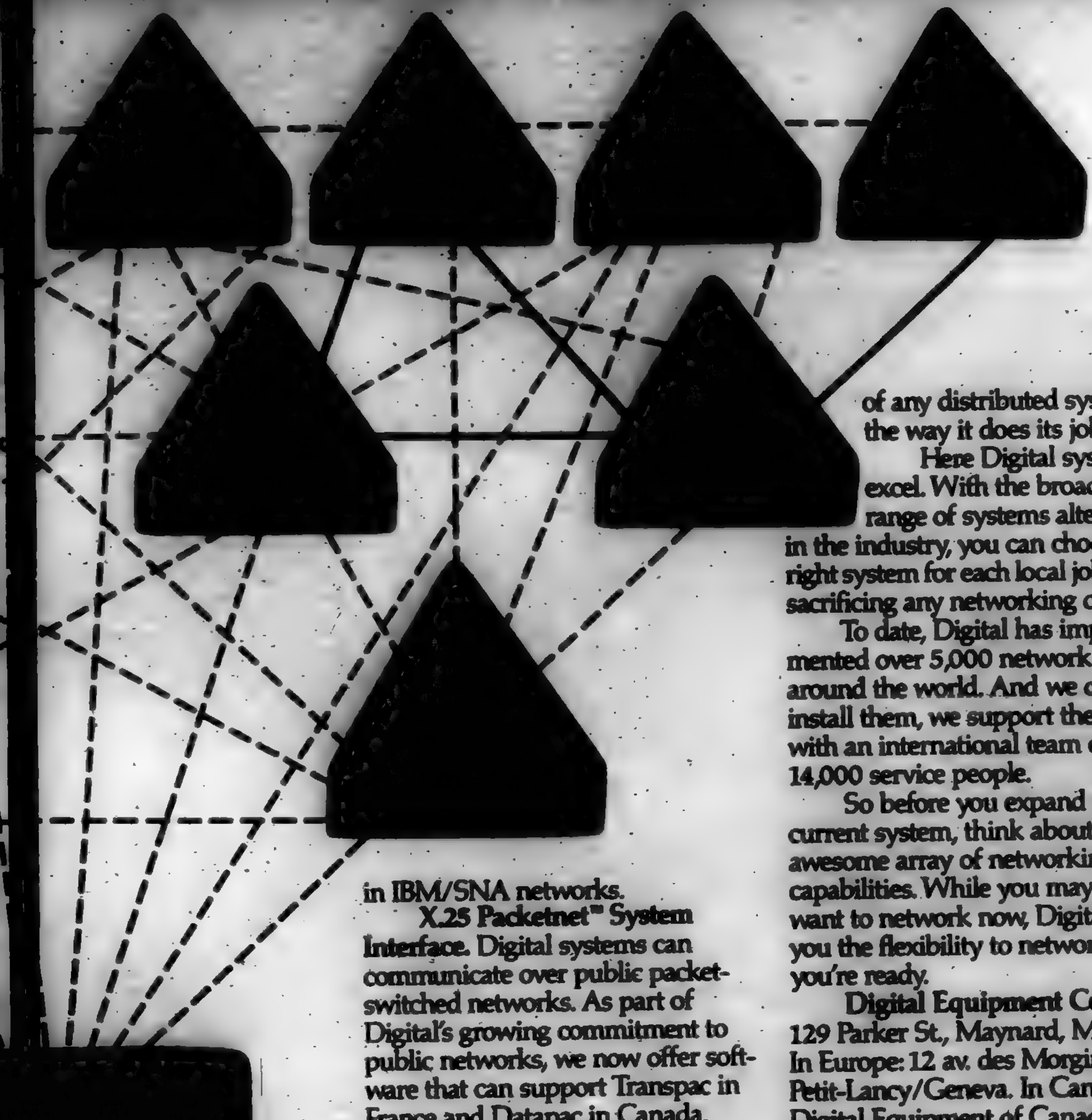

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IN DEPTH

(Continued from In Depth/2)

ized and contained adequate comments. In other cases, programs contained 1,500 line procedures and comments like "special routines and other stuff."

Structured English. The use of structured English was initiated by using pseudocode as introduced by the Hipo course. Initially the narrative was very detailed and much like code. In fact, many of the programmers wrote the code (secretly) and then wrote the pseudocode. Throughout the year, the narrative was gradually made more English-like and many standards for common phrases were developed.

This development was not easy. Many hours were devoted to discussing (arguing over) acceptable forms. One example was the replacement of the "DO UNTIL" construct with "repeat for each" because it was agreed that the latter was more appropriate and a clearer statement of what was to be accomplished.

Each aspect of the narrative was carefully examined and discussed. The rules for underlining and indentation changed many times. The development was not by trial and error, but rather by careful examination of everything that was done and agreement on the clearest method. Throughout the year, we gradually developed a set of rules for the use of structured English that resulted in the use of a narrative that was more general than pseudocode, but just as clear and complete.

Structured design. By the early part of the year, we were using a request calling structure that included an indented list of all modules in a procedure. The request calling structure was introduced as one aspect of structured programming. But while this was a beginning, it was not close to structured design.

The formal introduction of structured design to the development staff began with a Deltak, Inc. video course narrated by Ed Yourdon and Larry Constantine. Attendance at the approximately 15 sessions was mandatory. One module was completed every week. The course leader was one of the staff brought to SRS by the director. Each module was discussed at a weekly tutorial and the staff was required to begin using the various techniques as they were learned.

By the end of the year, the programmers were required to complete a structure chart before beginning the structured English. Some staff were still secretly completing the code before developing the structured English and structure charts, but others were able to begin with the structured English and then develop the structure chart. We were using structure charts which followed the Yourdon-Constantine model almost exactly.

Specifications. In the middle of the year, we began to require written specifications for every project, no matter how small. The first specifications were either extremely detailed and described only what was to be done or were very general, explaining that there was a specific problem that had to be solved.

Throughout the year, the amount of information included in the specifications was increased. By the end of the year, there was agreement that at the very least the specification must include a statement of purpose and a specification of what was to be done.

Walk-Throughs

Walk-throughs. We began to have walk-throughs for all projects by the middle of the year. The walk-through consisted of a presentation and discussion of the specification, the design and the code. Senior management attended all walk-throughs. Although most writers agree that senior management should not participate in walk-throughs, we found that the only method for assuring that the staff followed the new methods was to have management participate at walk-throughs.

The introduction of walk-throughs had many effects, both immediate and deferred. The immediate effects included a high level of dissatisfaction and frustration by most of the programming staff. The main cause of this was that their work was being publicly criticized.

The public nature of the walk-through was a very difficult adjustment for programmers who had always worked alone. Programmers disliked presenting their own work and

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were reluctant to criticize the work of their peers. This resulted in most of the criticism coming from management. Walk-throughs soon became known as "walk-overs."

The first year was difficult. Management was attempting to demonstrate that structured methods were superior to traditional approaches at the same time it was teaching the structured methods. The programmers were naturally defensive and the managers were critical. A positive environment did not result.

The long-term effects were that by using the walk-through as an educational vehicle, the programmers were able to learn how to use structured methods. By participating, management was able to develop ideas and standards on how systems should be developed and tailor the methods to local needs. Most important, management was able to guarantee that all programmers used structured methods.

The walk-through was the catalyst in our development of structured methods. It allowed us to test various ideas in a production environment and see the result. The walk-through was the vehicle for disseminating new ideas and making certain they were used. All aspects of the life cycle came together in the walk-through and could be examined individually or in the context of the entire life cycle.

Walk-throughs led to a number of staff problems, but without the walk-through, we could not have accomplished as much as we did.

General Comments on '77

1977 was a year of great development and increasing staff frustration. In retrospect, it seems that the best method of guaranteeing successful introduction and use of structured methods was to have direction from above. In our case, the presence of the director was critically important because many of the ideas came from him.

The walk-throughs consisted of heated debates on the best method for describing a process. The debates were productive in that they allowed us to develop our understanding of what we were doing, but they were unproductive in that they raised the level of insecurity of the staff.

The environment became very dynamic. What was satisfactory on Monday was often unsatisfactory by Friday. The staff wanted rules so they could do what was expected of them, but it was impossible to provide rules. To say the least, it was a difficult time for both staff and management.

An important result of the changes was that it became possible to manage projects. As all projects were specified and uniquely identified, we were able to identify all development activity, no matter how brief. The use of structured design made it possible to monitor the progress of a project because once the design was complete, all parts of the project were known.

In 1978, we refined the techniques previously introduced and firmly established structured techniques as the only method of developing or enhancing a procedure. It was also the year staff turnover increased. The combination of severe budget reduction, organizational changes and low staff morale all contributed to an almost complete change in staff in the next 18 months.

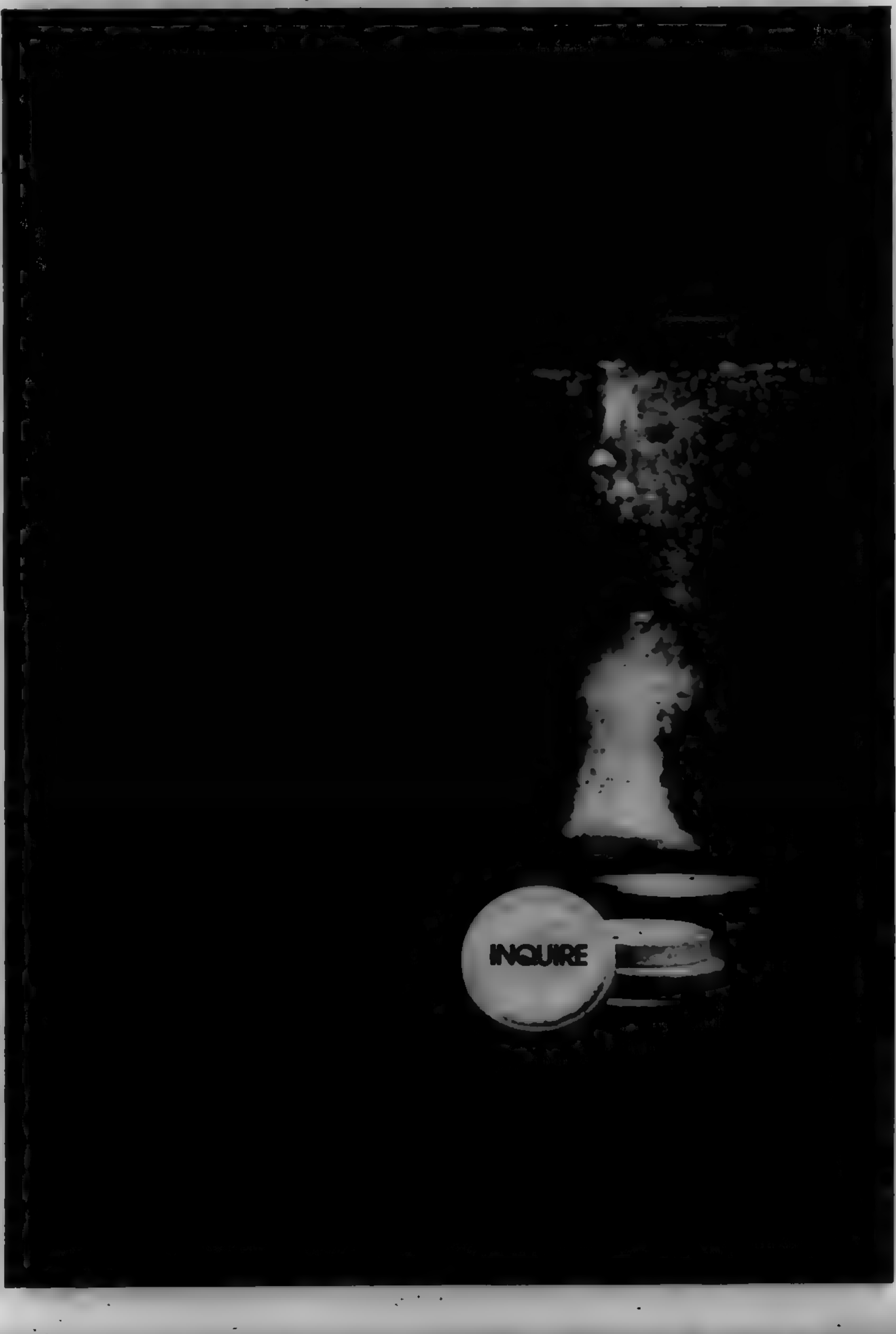
In the early part of the year, the director temporarily assumed control over the development staff so he could have direct input into the development process. More pressure was applied to the staff to learn and use the new techniques and more guidance was provided. The difficulties of getting the staff to continue to use structured methods at the same time they were developing their ability to use the methods surpassed the challenge of the initial introduction.

Our development in each area of structured methods was as follows.

Structured programming. The use of structured programming became firmly entrenched in our life cycle. The combination of structured design and structured English assured that the code was well structured. This was the first major benefit derived from using structured methods. Most of the questions relating to the design of a procedure were resolved before the code was written.

Writing code was becoming a routine task. No longer were we attempting to deal with problems at the code level.

(Continued on In Depth/8)



IN DEPTH

(Continued from In Depth/7)

The use of structured design allowed us to assign the coding of a single procedure to large numbers of staff with the assurance that each section of the procedure would properly fit in place. The structured English description of the function of each module that was approved in the design stage made the inclusion of meaningful comments easy for the staff.

Many of our guidelines for coding were developed through our experience in redeveloping a major financial application. This procedure was redeveloped because it had been the source of many costly problems. The procedure was redeveloped by having the user verify the design and structured English as they were developed. The resulting code was our first excellent example of structured programming.

We began to adopt standards like separating input and output variables in PL/I CALL statements by inserting a comment indicator between the variables; for example, CALL PROC (variables output/**/variables input). We completely eliminated global variables and used many external modules. The procedure functioned without error when it went into production.

We were still developing our ideas on what guidelines should be used to evaluate the quality of code, but for the most part we had fully implemented structured programming.

Structured English. We became more and more aware of the importance of structured English in the development life cycle. It was the vehicle used to transform a specification into code. It served as the verfication that a specification was clear and complete. It informed both the user and the analyst of exactly how the designer had interpreted the specification. In addition, it was the basis of the code and if properly done, the structured English almost eliminated any problems with code.

We discovered that structured English could be used as the basis of operating instructions for interactive applications. Its proper use assured that the operating instructions would be complete and clear. We began to develop the operating instructions as the first step of the design phase because they were the complete statement of how the system should function.

We devoted much of the walkthrough time to discussing various forms of structured English. We began to use decision tables to supplement or refine structured English statements. Structured English had become our main method of communicating the structure and logic of systems. We found that it was by far the clearest and thus the best form of communication we had at our disposal. We began to encourage our users to learn to read structured English so that they could verify that a system fulfilled their expectations.

Structured design. We continued to develop our ability to use the Yourdon-Constantine model of structured design. In the middle of the year, we completed a three-man-year financial procedure that was developed entirely with structured methods. We used the classic top-down approach that we found possible only with structured methods. We were able to begin coding the top levels before the lower levels were completely designed. We began testing at a very early stage of the development using program stubs.

This procedure was developed to replace an existing procedure that had never functioned correctly and included a great number of enhancements. The project was completed on time and the system functioned properly.

It is important to note that during the development, the user added a number of functions we were able to include in the procedure; but when the design was complete, we realized that given the additional functions, we could have used a better design. We documented this and signed the project off.

This procedure is still operating today, although it has been enhanced many times. We have never had any difficulty introducing an enhancement because of its well-defined structure. In addition, we discovered we did not have to read the code to determine what the procedure did or how it did it. The structure charts and structured English provided enough accurate information to answer almost any question the user posed.

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Once we had developed the ability to use the Yourdon-Constantine model, we began to evaluate its attributes to determine if they were appropriate for our environment. We found that the interface descriptions for module connections on the structure chart were not worth the effort. The description of interfaces is important, but we discovered that without the description of the function of each module, the interfaces were not meaningful. We began to include the interface description with the structured English.

'Boxing' Tried

As more projects were completed, we began to realize that the structure chart was only a preliminary guideline for the designer. It was difficult to evaluate the appropriateness of the design without the description of the function of each module. As we realized this, we began to place less emphasis upon the structure chart and more emphasis upon the structured English. We introduced the technique of "boxing."

"Boxing" is a method of illustrating the modules within a single procedure. A box is drawn around one or more structured English statements, and a module name is placed in the upper right-hand corner of the box. If a single statement was boxed, we included a more detailed description on another page of the structured English. If a group of statements were boxed, that was the complete description of the module.

Eventually we stopped boxing because we found that a single statement describing a lower level module was usually sufficient, and the box was replaced by the name of the module. Instead of noting the module name where a more complete description was given, we began using numbered notes.

Specifications. The specifications we had begun writing in the previous year were straightforward, but did not provide much information on the project outside of exactly what was to be done. By the middle of the year, we had developed the ability to write specifications that were complete and clear. As most analysts know, this is not easy to accomplish with the English language.

For the first time, it became possible to ask the user to read the specification and confirm, in writing, that it was complete. This was a major accomplishment because it allowed us to have an adequate concept of what the system included before we began to design the procedures.

We began to structure our specifications by writing general descriptions of functions and detailing the functions in appendixes. We began to write specifications that were more English-like by including data base field names and detailed logic in parentheses or as notes following the English description. We discovered that the more we suppressed the technical details of our system, the more readable the specification became. We had learned to write specifications that could be understood by both technical and nontechnical people.

We found that to be understandable, the specification had to be placed in the context of the entire system in which the procedure to be developed would function. To accomplish this, a section entitled "Discussion" was added to the specification. The purpose of the discussion was to allow the analyst to give background to the project that would put it in context so it could be properly evaluated in a walk-through.

We also began to include rudimentary testing specifications. Previously tests were designed by the person responsible for developing the procedure. We found that the designer often did not fully understand how the system would be used and that the user found many problems after the system went into production. Including testing instructions with the specification was the first step in placing the responsibility for testing with the user rather than with the developer.

Walk-throughs. By the end of the year, most of the staff had accepted the walk-through as an important aspect of the development process. This change in attitude was caused by both the presence of many new staff members who had no vested interest in old methods and the occurence of much less destructive criticism in the walk-through.

The walk-through had become the central aspect of our development process. All stages of the life cycle were

(Continued on In Depth/10)

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IN DEPTH

(Continued from In Depth/9)

reviewed and improved in the walk-through. The quality of specifications, designs and programs were evaluated on the basis of how easy they were to understand as well as their accuracy.

We realized that the quality of a system was dependent upon the group of people who participated in the walk-through. This awareness was enforced by the management attitude that all members of a walk-through shared responsibility for the system. No longer was a single person saddled with the responsibility for the success of a project.

By the end of the year, many walk-throughs were held without all managers being present. We realized that our walk-throughs were really presentations to management and that the staff should hold peer walk-throughs to review the material before it was presented. This was important because for the first time it gave the staff complete authority to determine what occurred in a walk-through while retaining management's ability to control the process.

General Comments on '78

At the end of the year, structured methods for design and code were firmly entrenched as the only method used to develop systems. Many of the staff were unable to develop even the simplest procedure without quickly completing a structure chart and structured English. We had forgotten that there was another approach.

We were experiencing the benefits of the structured approach. Projects were costing less to develop and the resulting systems were easier to enhance. The systems being produced were almost error free and most projects were completed on time. For the first time, the documentation was being completed before a system went into production because documentation was generated in each stage of the development process.

Each project was more effectively managed because each was clearly defined by a separate specification called a "project development request." The distinct phases of project development allowed easy monitoring of progress and allowed us to quickly discover areas that were costing more than we had forecast.

We began to develop a standards manual outlining acceptable techniques in coding and design. We found this to be extremely difficult because of the dynamic nature of our standards. The standards manual contained reasons for, and examples of, each standard to assure that we would remember why a technique was a standard.

As soon as the manual was distributed, we discovered that the staff wanted to follow it exactly. They wanted rules for acceptable behavior, but there were no rules, only guidelines. It was difficult to convince the staff that a specific construct might not be acceptable in all circumstances.

We began to realize that a design was good if a group of people thought it was good. The test of acceptability was public acceptance — not that the rules were followed. We realized that a design was evaluated subjectively rather than objectively and began to evaluate results with expressions like "clarity," "good taste" and "elegance."

We became more aware of the difficulty of enhancing the many procedures we supported that were not developed with structured methods. In some cases, the only way we could reliably enhance a procedure was to completely analyze it using structure charts and structured English. Even when the analysis was completed and its accuracy verified, the code was modified with great caution. In other cases, it was impossible to properly analyze the procedure and we were forced to rely upon our collective ability in the walk-through to verify the accuracy of the change.

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The ease of enhancing structured procedures greatly contrasted with the difficulty of enhancing unstructured ones.

Testing Less Important

As our ability to develop procedures improved, testing became less important. We knew a procedure would function properly when the design was complete, and we knew the code was a correct restatement of the design. Although we did discover a few coding errors during testing, we realized that the main reason for testing was that it gave us "warmth" and sample output for the program binder.

Testing unstructured procedures was another matter. When we changed an unstructured procedure, we tested it exhaustively because we assumed we had introduced an error with the change.

The real benefits from the changes were becoming apparent. We were producing more procedures at a lower cost. We could not measure productivity in terms of lines of code because fewer statements were used; proper design minimized redundancy. Coding was also becoming a lower percentage of the cost of a project as more time was being devoted to design and considerably less to coding and testing.

Staff morale was beginning to rise. People began to realize that structured methods were working and their jobs were becoming more pleasant. Staff members were developing a sense of group awareness through participation in the walk-through and were beginning to publicly assist each other.

By the end of the year, the level of user satisfaction was increasing. Our users began to realize we could develop procedures that functioned properly and were completed on time. Our users had begun to trust and have confidence in us.

'79: Near Completion

In 1979 we began to work on the completion of the structured life cycle by introducing structured analysis to replace the narrative specification. We also continued to evaluate and refine the other phases of the structured life cycle.

Structured programming. We continued to develop our ability to write clear and concise code. We realized that code should be easy to read and understand. We began to use comments to explain the purpose of a module as well as the purpose of groups of statements.

Coding had become a minor aspect of almost all projects. In most cases, less than 15% of project costs were associated with coding. As our ability to design systems improved, the challenge of coding decreased. Structured programming is guaranteed when structured design is used.

Structured English. Structured English became more important as the main vehicle for communicating how a function would be completed. Over the past two years, we had discussed using structured English to write the specification, but decided that our users should not be required to learn a new language. In the middle of the year, we began to revise our decision.

One of the main reasons for the reevaluation was a presentation on structured analysis given by a representative from Yourdon, Inc. at the summer share meeting. The representative emphasized that the clearest method for communicating how functions were completed was through the use of structured English. We were already experimenting with structured analysis, and the Yourdon method of describing specific functions ("primitives") with structured English seemed to be the best solution to the description problem. (The development of structured analysis is outlined in the following section on specifications.)

The form of structured English we were using was too specific for our users to accept, so we developed a more general form that was much

(Continued on In Depth/14)

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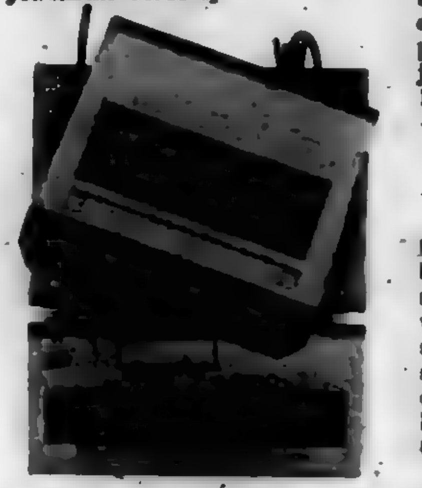

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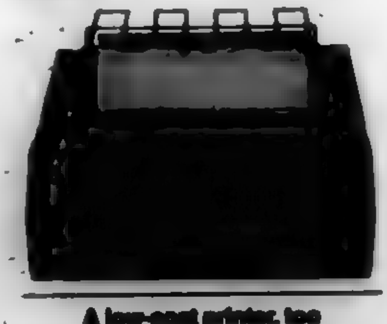

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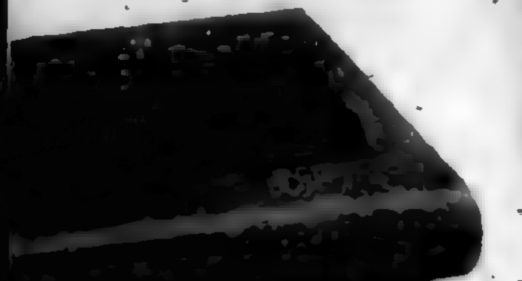

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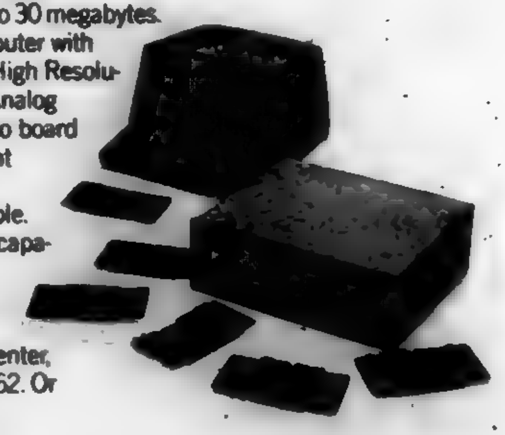

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IN DEPTH

(Continued from In Depth/11)

more English-like: We began to insist that all statements be grammatically complete sentences beginning with a capital letter and ending with a period. We decided that all descriptions should not have more than two levels of indentation to avoid complexity. We adopted new constructs like "Calculate service charge when all of the following are true:" (followed by a list of conditions).

Through the year, we experimented with various forms of structured English and completed one production project as a test of the new method. As with all new methods that had been introduced, there was much revision resulting in frustration among the staff involved in this project.

By the end of the year, we were using one form of structured English for specifications and another form for design. This also led to confusion among our staff.

Structured design. By the beginning of the year, the use of structure charts had become a natural part of the development process. Most staff had no difficulty preparing a structure chart from the narrative specification, and in many cases the programmer/analysts had "forgotten" how to develop a procedure without using a structure chart.

In the spring, the programming manager attended a presentation by Michael Jackson on his technique for designing a procedure based upon the structure of the input and the output. We found this approach interesting and examined it to determine if we should emphasize the Jackson technique instead of the Yourdon functional approach.

After using the Jackson technique, we agreed that while it was sound, following it too closely could result in inappropriate designs. Like Yourdon's method, Jackson's approach was successful only when modified to meet local needs. While descriptions of input and output structures are included with design documentation, our main thrust is still functional modularization.

The examination of a different methodology was important to our development because it led to a reevaluation of our methods. One of the dangers in adopting a specific methodology is that it can become a rote process. By reevaluating the method, we minimized the possibility that we would use structured design because it was a rule rather than because it was the best approach to design.

Specifications. By the middle of the year, we were developing narrative specifications that were well structured, accurate and understood by the user. The narrative specifications we were preparing had the traditional drawbacks: They were difficult to maintain and often difficult to understand because of their length. No matter how well structured the narrative was, its sheer volume made it difficult to comprehend.

As mentioned in the preceding section on structured English, we had begun to experiment with the data flow diagrams used in structured analysis. The data flow diagrams we decided to use consisted of rectangles, as used in Soft Tech's SADT, instead of Yourdon-DeMarco bubbles.

By using rectangles, we could make each side meaningful. The left side was used for inputs and the right for outputs. In our opinion, this made the diagrams easier to read than when bubbles were used. It also encouraged a left-to-right reading of the diagram, which we found preferable to the apparent chaos that could result from the use of bubbles.

We tried using the top of the rectangle for "controls" (data that caused the function to begin) and the bottom of the rectangle for "environment" (data that had to exist for the function to complete). We decided not to use the top and bottom because it complicated the diagram more than it added information. Because simplicity was our watchword, discarding this complication was the obvious thing to do. We did agree that when using data flow diagrams to describe physical systems, for example, JCL procedures, the controls and environment were important enough to be included in the diagram.

At the end of the year, we experimented with data flow diagrams in two projects. The first project was to develop a new system. We found that the most important aspect of the diagram was the description of the functions and that only inputs and outputs were

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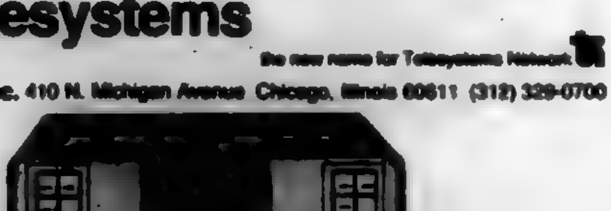


needed. In the second project, we were analyzing an existing procedure and found that the most informative general statement of the system had to include controls and environment. The difference between the two projects was that the first was a logical description of a proposed system and the second was a physical description of an existing system.

We began to realize that a physical description for a well-designed logical system was often unnecessary. The reason was that the physical system was usually similar to the logical system.

Walk-throughs. As walk-throughs were now a fully accepted part of our life cycle, we began to modify our approach. By the end of the year, management — with the exception of the manager of programming — was no longer attending walk-throughs. We discovered that when management was not present, the staff was much more willing to comment on the work being presented and the quality of the finished product did not decline. Because of the positive effect on the staff, we decided that management should not attend walk-throughs unless specifically invited.

General Comments on '79

By the middle of the year, we had finished the introduction of new and revised methods for our life cycle, but had discovered that the narrative specification was not satisfactory. We began the cycle of change again. The effect on the staff was the same as it had been in every change that had been introduced. The rate of change was so rapid that techniques accepted one week became outdated the next.

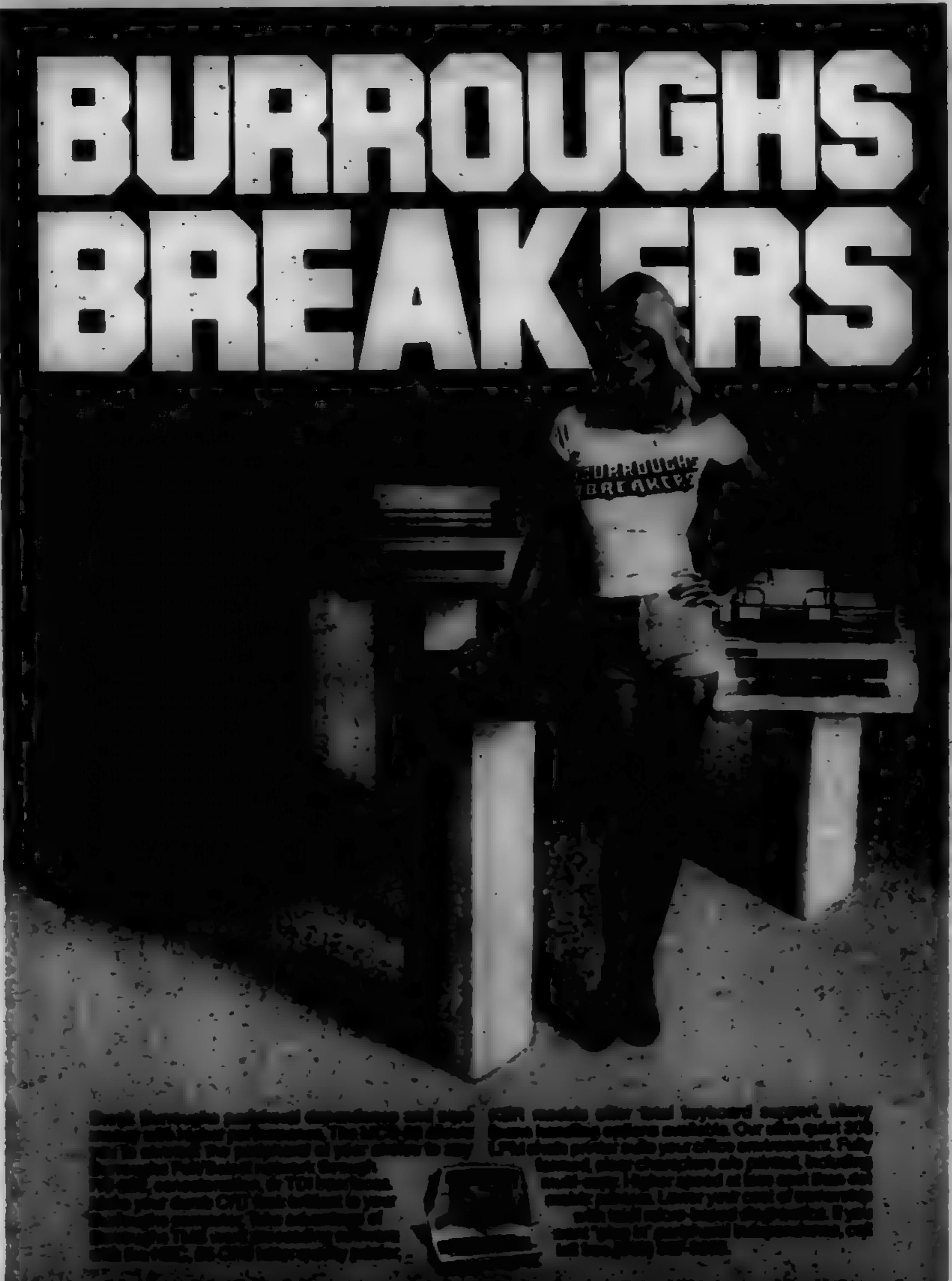
We began to experience a shift in the percentage of time devoted to each aspect of the life cycle. The use of structured design had greatly reduced the percentage of time devoted to coding and testing. The introduction of structured analysis now reduced the percentage of time devoted to design. More and more of the project code was being devoted to analysis and specification.

By the beginning of the year, we had used all aspects of a completely structured life cycle. We began to use structured analysis for all projects and continued to develop guidelines for its use in our environment.

By the middle of the year, we were prepared to begin developing guidelines describing the methodologies we were using. As with all projects, we used a structured approach. At present, we are developing these guidelines, and the project is scheduled for completion by early 1981.

We are now using a completely structured life cycle and have begun to develop our users' ability to use structured analysis to assist us in developing systems for them. At present, more than 70% of a project's cost is associated with the analysis/specification process. Approximately 20% is devoted to design and only 10% devoted to coding and testing.

Mark S. Lippard is the director of Student Record Services at the University of Toronto.



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Open Networking Stymied

X.25 Delay Viewed Hurting Net Users

By Brad Schultz
CW Staff

LOS ANGELES — IBM and the circuit-switched network community hurt data communications users by slowing the spread of X.25, the emerging world standard for linking data terminals to packet-switched networks.

So said executives of companies that offer packet-switched products and services who participated in a recent conference here.

Users suffer on two counts, some participants asserted. X.25 would give users the ability to link data terminal equipment of many different brands, whereas users without X.25 typically are constrained to one or a few brands, they maintained.

And X.25 would give those who must route data through a number of network nodes the advantages of packet-switching, which include help on finding optimum routes and on coping with congested or dead links.

These executives noted that X.25 is a recommendation, not a standard, issued by the Consultative Committee on International Telephone and Telegraph. But X.25 comes with the first three layers of the International Standards Organization's (ISO) model for an "open" network architecture [CW, Nov. 24].

While the ISO develops higher layers of the model, many nations outside the U.S. already rely on X.25 compatibility for their data communications. That is why banks and other organizations based in the U.S. cannot do much business abroad without X.25 interfacing at home, according to Gerard Schreder, marketing vice-president of SESA-Honeywell Communications, Inc.

But IBM's 3270 terminal family is incompatible with X.25, he said, and is presently inappropriate for so-called open networking, which ties together many brands of data terminal equipment to ease communications between different networks. Since X.25 allows open networking, it allows long-standing IBM customers to implement terminals from IBM's competitors.

As IBM chief scientist Lewis M. Branscomb has said more than once this year [CW, Nov. 3], IBM's policy on X.25 is to withhold compatibility in the U.S. until common carriers offer domestic compatibility themselves. IBM does offer X.25 compatibility in some foreign nations.

The common carriers that make more money from voice than data communications are traditionally oriented toward circuit-switching, but AT&T may be developing X.25 compatibility and a host of open networking protocols in its long-awaited Advanced Communications Service (ACS), Schreder speculated.

If so, IBM and other major systems vendors that are also major terminal vendors would treat sudden availability of ACS as an act of war, according to Jacques Arnould, director general of Sesa S.A., which built some of Europe's largest packet nets.

X.25 threatens any major terminal manufacturer, Arnould indicated, that tries to be the only terminal supplier to its customers' networks.

Besides IBM, promoters of two circuit-switched media are lobbying against X.25 by attempting to have the highest layers of the ISO's model for open networking accommodate those media, according to Barry Wessler, a GTE Telenet Communications Corp. vice-president. The model's highest layers concern prioritizing, interpretation and application of data, among other matters.

One of these circuit-switched media is teletex, an electronic message service viewed as a successor to telex and a rival to facsimile.

ISDN Approach

The other cause for pressure against X.25 acceptance is often called the integrated services data network (ISDN) approach, Wessler noted. ISDN involves integration of data, voice, facsimile and other forms of information over circuit-switched networks, he indicated.

Arnould and Schreder told *Computerworld* that the all-digital specialized common-carrier services expected from Satellite Business Systems will not disturb the packet-switched market because the satellite links will serve as point-to-point expressways for large volumes of data and other information. In contrast, packet switching will be the popular way to move data over moderate distances through complicated networks, they maintained.

Telex 276 Gains SDLC Capability

TULSA, Okla. — Telex Computer Products, Inc. has announced a Synchronous Data Link Control (SDLC) capability for its IBM 3276-compatible terminal controller.

The Telex 276/SDLC is said to be fully compatible with IBM's program products for SDLC network problem determination and isolation. The stand-alone display and keyboard controller reportedly provides control and multiplexing capabilities for up to seven terminals and printers in addition to its own internal display.

Terminal devices and printers from either Telex or IBM can be attached to the controller in the same cluster, according to the vendor, including the recently announced Telex 281 message printer.

Operating at line speeds up to 9,600 bit/sec, the 276/SDLC costs $4,650, with lease plans available from the firm at 6422 E. 41st St., Tulsa, Okla. 74135.

Countdown

The Hughes Aircraft Co. HS 376 satellite will deliver specialized common carrier services from Satellite Business Systems at megabit per second rates. The carrier's first satellite, SBS-1, was launched into space recently [CW, Nov. 24]. Two more HS 376s, SBS-2 and SBS-3, are planned for lift-offs in the next two years.

Data Briefs

Statistical Multiplexer For Async Terminals

ATLANTA — An $825 two-channel statistical multiplexer designed for use with asynchronous terminals has been announced by Technical Analysis Corp. (TAC).

The SM/2A is said to allow two independent terminals to communicate simultaneously over a single dial-up or leased telephone line, with such features as error detection and retransmission, compression of embedded blank spaces, independent buffering of each device and independent transmission rate selection.

TAC is located at 120 W. Wieuca Road, N.E., Atlanta, Ga. 30342.

Intelligent Terminals Univac-Compatible

BROOKLYN HEIGHTS, Ohio — The Computer Place has announced a family of intelligent terminals called the Q310 that it said is compatible with all Univac CPUs and was designed as an alternative to Univac's U200, UTS400, UTS20 and UTS40 workstations.

The Q310 is available with 64K bytes of random-access memory and starts at $3,000, the vendor said from 4595 Van Epps Road, Brooklyn Heights, Ohio 44131.

Concentrator Aimed At Burroughs Users

NEWARK, Del. — The DM1600B concentrator from Datagram, Inc. has been developed for Burroughs Corp.-oriented systems to allow up to 10 asynchronous terminals to be connected to one computer port.

Using the Poll/Select protocol, the DM1600B supports most standard terminals, according to the distributor, University Computing Services Corp.

A basic four-channel unit with CPU costs $5,650, and four channel increments are $1,750. University Computing Services Corp. is at 286 Main St., Newark, Del. 19711.

Terminal Runs With DEC Gear

ANAHEIM, Calif. — The first in a family of intelligent terminals compatible with Digital Equipment Corp. computers has been announced by the Minicomputer Peripherals Division of Braegen Corp.

The BT-100 CRT terminal features DEC VT-100 emulation, video package, printer port, double size and reverse video characters, user-selectable 80- or 132 char./line, split-screen and scrolling capabilities, composite video output, line drawing and graphic characters, transmission speeds up to 19.2K bit/sec and full duplex asynchronous communications.

The BT-100 is available for $1,995 from Braegen at 3340 East LaPalma Ave., Anaheim, Calif. 92806.

Intelligent Modems Feature Code-Multiplexed Design

MENLO PARK, Calif. — Bizcomp Corp. has introduced the Model 1030 and Model 1031 intelligent modems, which reportedly offer increased capabilities compared with ordinary "dumb" modems.

The 1030, a low error rate modem, has an automatic calling unit and custom BIZ-080 microcomputer configured into a compact FCC-registered unit with auto-answer, auto-dial and auto-repeat dial features. The unit was designed around Bizcomp's Code-Multiplexed Design, which allows intelligent modem control using the same terminal as that for data communication, the firm said.

Code multiplexing enables communications software to be written in high-level language, such as Basic or Cobol, speeding development time, a spokesman noted.

In addition to the 1030 features, the 1031 offers command-selectable dial pulse or tone dialing and self-test for ensuring full functionality. The tone dialing capability makes it suited as a CPT-TWX network interface. Both models feature automatic bit/sec rate acquisition and communications rates of 110-, 134.5-, 150-, 200- or 300 bit/-sec.

The Model 1030 costs $395 and the Model 1031 costs $495 from Bizcomp, which can be reached through P.O. Box 7498, Menlo Park, Calif. 94025.

Teletype 43 Sends Telex

CHERRY HILL, N.J. — RCA Service Co. has taken Teletype Corp.'s Model 43 and enhanced it so it will send telex messages.

The Model 43 Telex features keyboard dialing and an 8K-byte memory with full text-editing capabilities, according to a spokesman. It combines "the convenience of a typewriter-like keyboard with solid-state high reliability," he said.

The unit is available on various lease and lease/purchase plans; on a one-year lease, for example, it costs $119/mo with preventive and remedial service.

The Model 43 Telex can also be purchased for $2,600, RCA Service Co. said from Cherry Hill, N.J. 08358.

Eliminator Ties Controllers

NORWALK, Conn. — Datacomm Management Sciences, Inc. has introduced the ME-31A/B modem eliminator, designed to provide multichannel interfacing capabilities between two front-end controller units for back-to-back test mode operation.

Connection of either controller via pushbutton selection is permitted (on a channel or group basis) to the on-line modem.

In its IBM Teleprocessing Network Simulation (TPNS) mode, the ME-31A/B regenerates data and clock interface signals so that a full 50-ft interface cable may be used at each RS-232 interface.

The price of the ME-31A/B is in the range of $500 to $750 per circuit, depending upon functions required, from Datacomm Management Sciences, 181 Main St., Norwalk, Conn. 06851.

Line Monitor Shows Tristate Signal Status

WOODBURY, N.Y. — A line-powered data line monitor said to provide tristate indication of data communications signal status is available from Remark International.

Previously, line-powered testers would only indicate whether the signal being monitored in the RS-232 interface was above +3V by illuminating an LED, even though the RS-232 standard requires signals to be in the range of +25V to -25V, according to the vendor.

The one-year warrantied Model 41 costs $99, with quantity discounts available, from 4 Sycamore Drive, Woodbury, N.Y. 11797.

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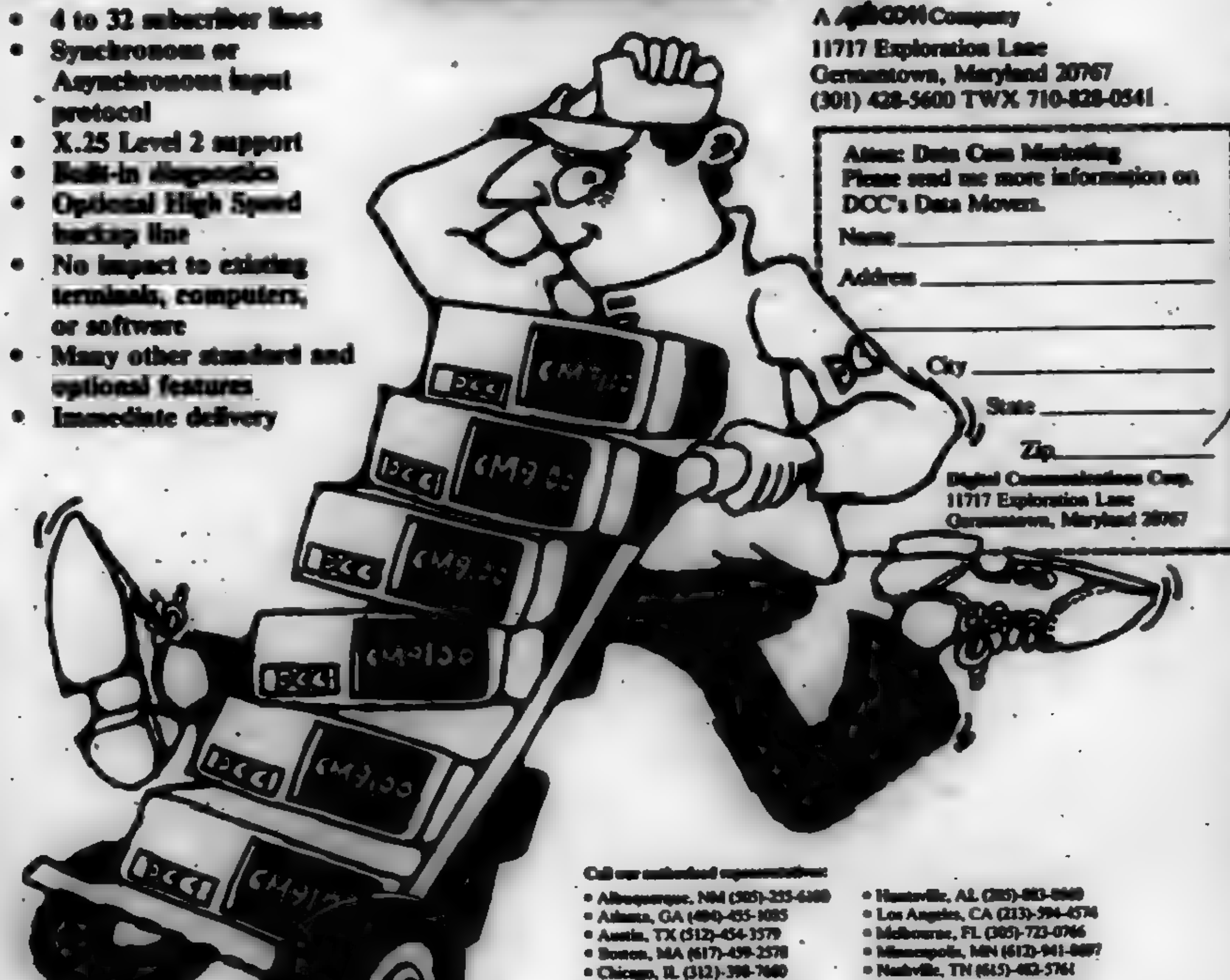

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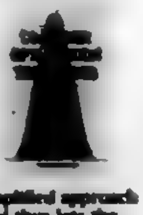

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First Commercial User

Firm Has Smooth 4331-2 Conversion

By Tim Scannell
CW Staff

CUMBERLAND, R.I. – When Roger Williams Foods, Inc., a wholesale food distributor here, replaced its aging IBM 370/125-2 computer with an IBM 4331 Group 2 mainframe, the company was prepared for the worst.

For one thing, the conversion – which occurred in late August and September – could not have happened at a less opportune time. The firm was not only handling more than 10,000 customer orders per day, but was secretly negotiating with another supermarket chain to take over 22 stores scattered throughout New England.

On top of that, Roger Williams Foods – the largest meat distributor in New England – would be the first commercial user of the 4331-2, introduced this year. So the company was rightly concerned with how fast and smooth the machine could be installed, what kind of support IBM would give during installation and how much time the firm's DP staff would need to get used to the new computer.

Of course, the bottom-line worry was if the computer would work at all. And if it did not, how severely would a processing shutdown affect the company.

(Continued on Page 64)

NCR Proof, Encoding Unit Targets Single-Pocket Users

The NCR 760-1000

DAYTON, Ohio – NCR Corp. has announced a proof and encoding machine for the single-pocket, stand-alone proof machine market.

The NCR 7760-1000 can be used by institutions of any size for proof and encoding or for remittance processing, such as credit card billing, lock box accounting, and the generation of small-loan coupons.

The basic unit incorporates over 80 totals, check-digit generation and verification, incrementing serial number and credits-first or debits-first proof, all of which can be programmed by the user to meet individual requirements.

The 7760 also offers full endorsement, which includes consecutive document number, date, bank identification number and customized endorser stamp.

Optional features include a cassette recorder for automatic program loading and OCR-A or OCR-B font in place of the basic E-13B magnetic ink character recognition (Micr) encoding font.

The 7760-1000 costs $8,000, with multiple-unit discounts available. One- and three-year extended term rental contracts, including maintenance, are $293/mo and $266/mo respectively. LNCR is in Dayton, Ohio 45479.

Initializer Runs Floppy Disks With Different Formats

The System 800

SANTA ANA, Calif. – Media Systems Technology, Inc. (MST) has announced an automatic diskette initializer that simultaneously processes floppy disks of different formats, densities and media under multitasking software.

The System 800 was configured around a Digital Equipment Corp. LSI-4/10 computer, a 1,920-char. CRT terminal, a flexible disk drive and MST's automatic media loader, MST said.

Either 5.25- or 8-in. diskettes can be loaded, initialized and sorted at a maximum rate of 80/hour/station for 8-in. single-sided disks, (45/hour for 8-in. double-sided disks) and 144/hour for 5.25-in. disks (80/hour for double-sided versions), the vendor said.

System 800, with console, media loader, controller and software, costs between $30,000 and $86,000, depending on the configuration.

MST is located at 609 Deep Valley Drive, Palos Verdes, Calif. 90274.

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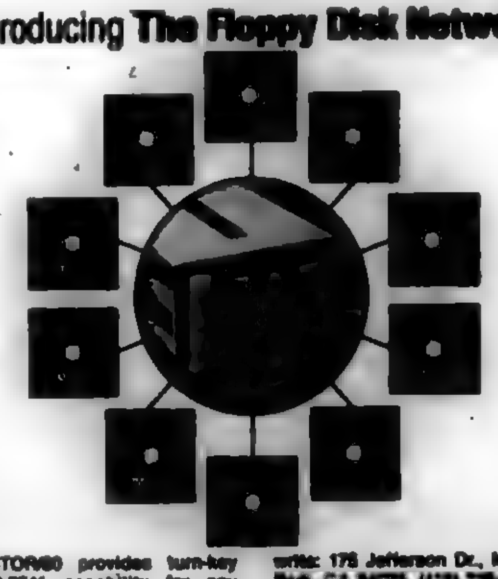
John Beall & Company, Inc.

Add-In Memory Boards Fit VAX-11/780s

WABAN, Mass. — Shell Computer Systems, Inc. has announced add-in memory boards for Digital Equipment Corp. VAX-11/780 mainframes. The SM256 boards are direct replacements for the DEC M8210 memory module, Shell said.

The SM256 has a capacity of 256K bytes, organized as 32,678 quad words. It is fully hardware, software and ECC compatible with the DEC M8210, the vendor claimed.

The boards cost approximately $10,000 per 1M byte, the vendor said from P.O. Box 36, Waban, Mass. 02168.



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For Large-Scale Systems

Preprocessing Data Logger Bows

SANTA ROSA, Calif. — A programmable data logging system, featuring Basic and assembly-language programming, CRT display, full typewriter keyboard and program and data storage capability is being offered by F.I. Electronics, Inc.

Designed for data preprocessing applications for large-scale computers as well as production testing and small-scale process monitoring and control, the Fidac Series 7240 offers a range of plug-in function cards for analog and digital signals, plus minidisk memory and impact printer options. IEEE-488 controller capability allows other compatible instrumentation to be integrated into the system for completely automated electronic test systems, according to the vendor.

Base price for the system, including the analog-to-digital converter, is $4,200 with additional function cards averaging $300 to $400 each. Further information is available from the vendor at 968 Piner Road, Santa Rosa, Calif. 95401.

Calcomp Clear Film Fits Electrostatic Printer/Plotters

ANAHEIM, Calif. — A clear film for its electrostatic printer/plotters has been introduced by California Computer Products, Inc.

Clearplot features a reproduction quality substantially better than other electrostatic plot media, according to Calcomp, and also allows for the overlaying of plots.

The film can be used with all Calcomp electrostatic units and requires no system modifications or sacrifice in plotting speed, the firm said.

Clearplot is available in 200-ft rolls in both 11-in. and 22-in. widths and can be used for seismic mapping, well-logging or check plotting.

A roll of 11-in. film costs $239 and the 22-in. costs $478 from Calcomp at 2411 W. La Palma Ave., Anaheim, Calif. [illegible]

Firm's 4331-2 Conversion Smooth

(Continued from Page 63)

which was then moving about 2.5 million pounds of meat per week from its Rhode Island base. As a bit of insurance, Roger Williams Foods arranged to handle its DP workload with a local bank that had just installed an IBM 4331-1 if a failure occurred.

"I honestly expected problems," Scott B. Laurans, the distributor's executive vice-president and treasurer, said. "I just made a decision that I was willing to live with those problems to get the machine in early."

Smooth Transition

Fortunately, the $220 million company's apocalyptic fears of a crashing system and delivery and inventory chaos never came to light. The installation of the 4331-2 processor was accomplished over a weekend. And the process of unplugging the overworked 370/125 and plugging in the new mainframe "went extremely smoothly," Laurans said.

The 4331-2-based computer system currently consists of the processor with 2M bytes of main memory, three 3370 disk drives that offer a total of more than 1.6G bytes of storage, 15 CRTs and two terminal printers. The DP department has about 12 employees, including data entry.

As for problems, the system was only down for about an hour or so during its first week of operation. In fact, the company had more trouble a few weeks ago when it switched from one type of IBM disk drive to another than it did with the installation of the 4331-2, Jim Teixeira, Roger Williams Foods' DP director observed.

Before installing the 4331-2, the firm replaced its 3340 removable disk drives with 3370 fixed-head disk drives. When the 3370s went on-line, the company had some "very strange problems" with the drives themselves, Teixeira said. IBM investigated and subsequently installed a new level of cards in the drives and there have since been no significant problems.

Minor Changes

The firm's DP staff also had to make some minor software changes and adopt a virtual storage access method (Vsam) to accommodate the fixed-block architecture of the 3370 devices, the DP director said. These software changes were not related to the 4331-2 itself, although they occurred at the same time the system was installed.

Before deciding on the 4331-2, Roger Williams Foods' management seriously considered computer systems offered by such companies as Univac and Digital Equipment Corp. "We're not a company that hasn't had its problems with IBM," Laurans stated, referring to the firm's continuing relationship with the computer giant.

In fact, one of the problems the distributor had with IBM was with the original claims made about the 370/125-2 computer. "One of IBM's people was very adamant in his support that the system would handle what we wanted it to do," Teixeira pointed out. However, although IBM believed that machine would fit the company's needs for at least two years, the fast-growing firm outgrew the system in just a few months.

Limited capacity and a series of rapid-fire processing changes killed the 370/125-2, the DP director said. In a short period of time, Roger Williams Foods not only changed from an on-line minimum telecommunications system to an expanded CICS system, but also started doing Cobol applications in what was an Assembler language environment.

"That was what really buried it," Teixeira observed.

As for the company's future, Laurans noted that the 4331-2 processor and additional equipment have actually reduced the company's overall hardware budget for the current year. And the additional computing power will allow the firm to better handle the financial, accounting and supply duties required by its recent food store acquisitions.

Bits & Pieces

Benson-Varian Unveils Metric Printer/Plotters

MOUNTAIN VIEW, Calif. — Benson-Varian, Inc. has introduced the Quadramet series of metric electrostatic printer/plotters, which utilize the firm's Quadrascan writing head to produce a resolution of 100 dot/cm (254 dot/in.).

The Quadramet 9424 plots at 2.54 cm/sec (1 in.) at a plot width of 59.51 cm/sec (23.43 in.). The vendor's Quadramet 9436 plots at 1.27 cm/sec (.5 in.) across an 89.59 cm (35.27 in.) plot width.

The introduction of the metric electrostatic printer/plotters will eliminate the costly and time-consuming process of metric conversion to English, the firm said.

Deliveries are scheduled for January 1981. The Quadramet 9424 costs $29,500 and the 9436 costs $39,800 from 385 Ravendale Drive, Mountain View, Calif. 94043.

For Easing Growing Pains

Tax Service Indebted to In-House Mini

Special to CW

DALLAS – In more than 20 years of business DP, Joe Melton has seen it all.

In the course of operating his small company, Melton Bookkeeping and Tax Service, and keeping up with clients' demands, Melton has been involved with service bureaus and has used time-sharing and punched tape. Back in 1970, he finally brought it all home by purchasing his own system and found that in-house processing was the only way to keep up with his company's growth.

Currently, Melton is using a 128K-byte Digital Equipment Corp. Datasystem-355 with 10M bytes of disk storage arranged in two 5M-byte removable drives. The system was purchased from Digital Systems of Florida, Inc. (DSI), an integrator that pulled together the DEC package for Melton's business.

The unusual thing about Melton's operation is that since all of his clients have varied needs, he almost has to develop a unique software package to handle a particular client's bookkeeping or tax duties.

Flexible Software

"I have to have a flexible software program that can be user modified to meet every need," Melton explained. "I found that having my own system gave me more growth potential and made it easier to customize my services."

Melton is presently developing an accounting package for a client that will give the firm a complete sales analysis of its entire inventory. The client has five salespeople covering seven states and wants the program broken down by customer and product line.

Joe Melton supervises the inputting of data into his in-house accounting system.

A program that Melton has already developed, with the assistance of DSI, is an oil and gas program that creates royalty reports and writes royalty checks.

Earlier this year, Melton's firm took over the account of a large nonprofit organization that has seven divisions. The organization previously worked with a service bureau that provided only one monthly statement that attempted to cover all of the organization's business activities.

Using the DSI-provided system, Melton reportedly designed a software system that breaks down all of the organization's financial activities division by division. Each division receives a separate financial statement detailing earnings and other parameters.

The 1,500 accounts the organization previously received have been consolidated into 500 accounts. Melton's service also provides a 25-page report that summarizes business activities.

In the area of income taxes, Melton noted that business has never been better, especially since preparer penalties can amount to as much as $500 for simple mistakes, he said.

On-the-Spot Corrections

The DEC computer system allows Melton to control the input and output of each client's tax figures. Errors are caught and corrected on the spot, rather than having to wait for a service bureau to run off the report with mistakes and volley it back and forth through the mails until it is

(Continued on Page 66)

VAX, PDP-11; LSI-11

Interprocessors Link DEC Machines

ORANGE, Calif. – MDB Systems, Inc. has introduced four interprocessor subsystems linking Digital Equipment Corp. PDP-11, VAX-11/780 and LSI-11 computers, as well as a number of interfaces.

For linking two PDP-11 minicomputers, a choice of Interprocessor Subsystem Links is available: the MDB-DA11BJ, providing differential driver/receiver modules for high-speed parallel data transmission up to 3,000 ft; and the MDB-DA11BOI with differential receivers and optically isolated receiver modules for transmission up to 1,000 ft.

For LSI-11 applications, a third subsystem is available: the MDB/MLSI-DA11BOI which links a PDP-11 computer with an LSI-11/2 or 11/23 microcomputer. The fourth system links two LSI-11s.

The MDB-DA11BJ costs $4,875; the MDB-DA11BOI costs $5,275; the MDB/MLSI-DA11BOI costs $4,050; and the MLSI-DA11BOI costs $3,295.

One series of interfaces was designed for use with Intel Corp. 16- and 8-bit single board computers. The line is said to include two General-Purpose Bus Foundation Modules and Universal Wire Wrap Module, all of which require only one card slot in the computer chassis, according to the firm.

The 16-bit General-Purpose Bus Foundation Module costs $295; the 8-bit model sells for $245; and the Universal Wire Wrap Module costs $145.

The second series of interfaces is said to extend the performance of LSI-11/23, LSI-11 and

(Continued on Page 66)

Portable Business System Unveiled

CUPERTINO, Calif. – A fully integrated, portable business computer system for less than $10,000 has been announced by Systel Computers, Inc.

The Report/80 system combines two CPUs, memory, keyboard, video display, two mini-floppy diskette drives, dot matrix printer and two RS-232C ports in a unit weighing less than 50 lb.

Systel supplies the latest version of Digital Research Corp.'s CP/M operating system as a standard part of Report/80, providing automatic compatibility with many prepackaged applications software, according to the vendor.

The unit is available in two models, which differ only in the type of mini-floppy diskette drives used.

Report/80

Model 11, costing $8,950, includes two double-sided, double-density drives for a total of 740K bytes of formatted storage. Model 15, priced at $9,950, includes two double-sided, quad-density drives, for 1.4M bytes of formatted storage.

Both models have an average track-to-track access time of 5 msec and a transfer rate of 250K byte/sec.

Systel is located at 20370 Town Center Lane, Cupertino, Calif. 95014.

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SANTA MONICA, Calif. – An on-line, microcomputer-based data entry and retrieval turnkey developed by Cuadra Associates, Inc. provides users with a stand-alone system for generating, maintaining and searching in-house, private files of library holdings, legal materials, technical reports, memos, customer records, mailing lists and other types of textual records.

The System to Automate Records (Star) can also be used to support the production and management of small to medium-sized data bases that are to be distributed through one or more on-line services.

Star features full Boolean logic, use of nested parentheses for complex queries, truncated term searching, use of controlled vocabulary, as well as free-text searching, index displays and flexible on-line and off-line print formats.

A typical system includes an Alpha Micro, Inc. microcomputer with 128 bytes of memory, four CRT terminals, a printer, 90M bytes of hard disk storage and software. The hardware costs $35,000 and the software will be in the range of $20,000.

The system can support up to 24 terminals and printers, 1M byte of memory and 2,400M bytes of hard-disk storage and can also run with floppy disks.

Cuadra is located at Suite 12, 1523 Sixth St., Santa Monica, Calif. 90401.

Modular Array Processors Provide High Throughput

NEEDHAM, Mass. – A series of modular array processors tailored for use in systems which have high throughput requirements has been developed by the Computer Products Division of CNR, Inc.

The Mars-232 processor modules are typically controlled by a minicomputer. Because of synchronous hardware design principles which provide software support, the Mars family provides programming simplicity and easy interfacing of compatible processing modules, CNR claimed.

The Data Processor (DP) module is available in two versions: the DP-R, which can carry out a single 32-bit multiply and two 32-bit adds in 200 nsec, or the DP-C, which is capable of four multiplies and six adds in 200 nsec.

The data flow of the system is controlled by the Interface Processor (IP) module and was designed to handle prioritized device interrupt request arbitration and I/O transfers at a 20M byte/sec rate.

A typical mid-size system consists of two DPs and a controlling IP with power supplies and an LSI-11/02 microcomputer. With read-only memory boards in the microcomputer, the system can run stand-alone.

Complete development systems are priced at about $40,000 depending on options, CNR said from the Computer Products Division, 220 Reservoir St., Needham, Mass. 02194.

Tax Service Indebted to Mini

(Continued from Page 65)

correct, he stated.

Even though the bookkeeping and tax services company president is gung-ho on in-house computing, he still advises caution in making the jump from a service bureau or time-sharing to a dedicated minicomputer.

"Look carefully and know what you're getting into," Melton observed. "Determine your present needs and try to determine your growth and future needs."

In investigating different vendors, Melton stressed the necessity of finding a company that will work hand-in-hand with a company not familiar with the nuances of in-house DP.

In addition, a vendor "should be able to analyze your requirements and sell you a system that fits your needs," he added.

DEC Units Interfaced

(Continued from Page 65)

PDP-11 computers, with models available in Q-bus and Unibus models.

Both MDB DUP-11 synchronous, single-line communications interfaces are reportedly functionally equivalent and software-compatible with the DEC DUP-11.

With data rates up to 500K bit/sec, the interfaces will accommodate Bi-Sync and DDCMP in byte-control (BCP) and SDLC, ADCCP and HDLC bit-oriented protocol (BOP).

The Q-bus model costs $950 and the Unibus model costs $1,200 from the firm at 1995 N. Batavia St., Orange, Calif. 92665.

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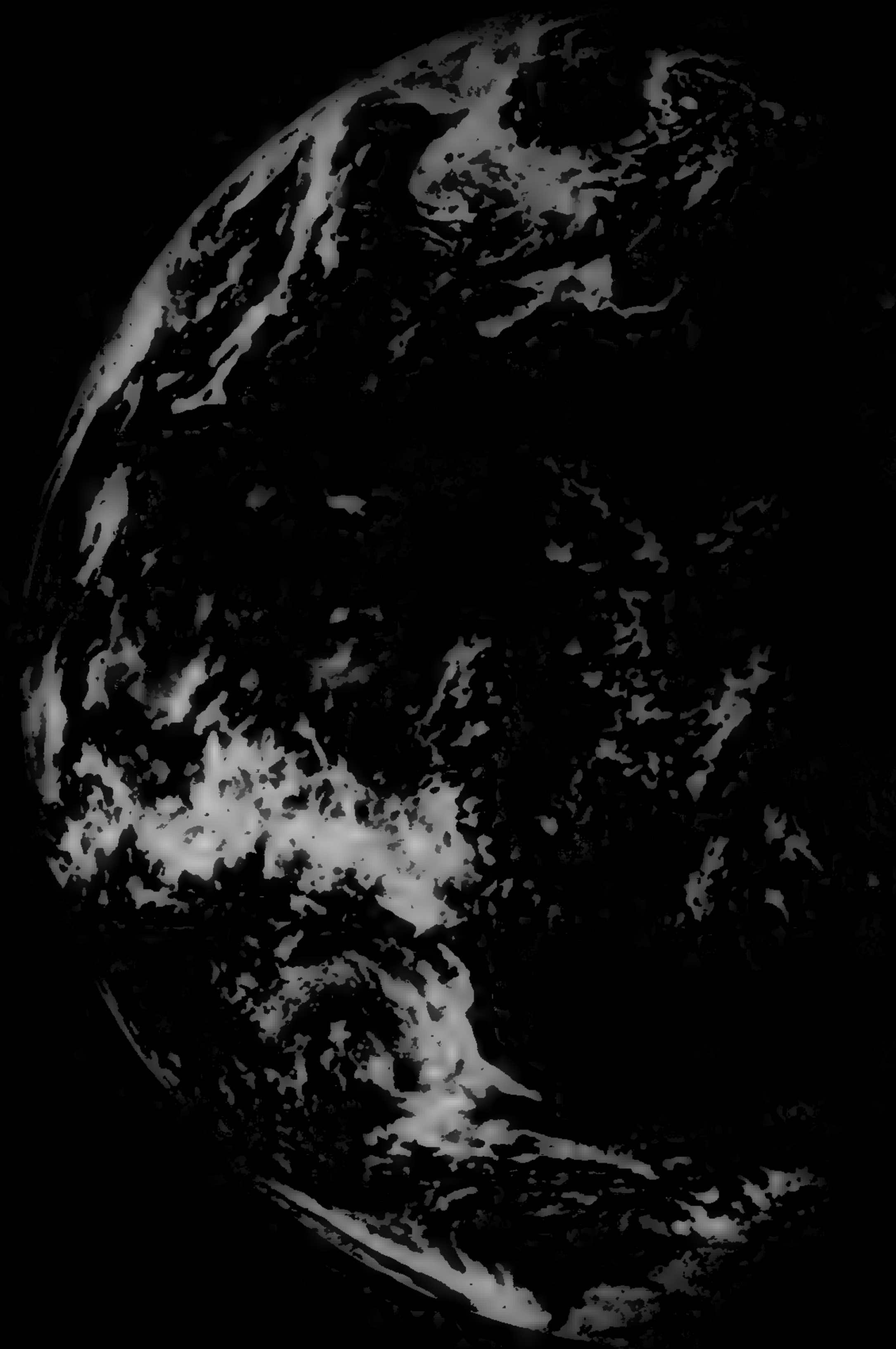


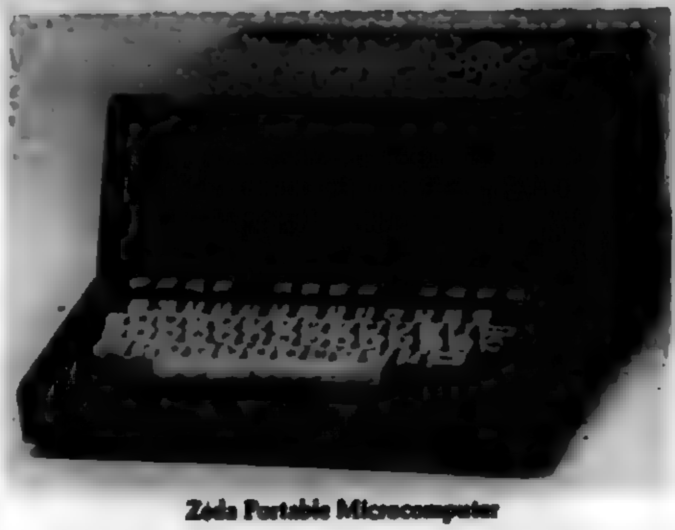
COBOL-Plus

Portable Micro Series Bows

PROVO, Utah — A line of portable microcomputers, each containing an MPU, CRT display, floppy disk drive and detachable keyboard, is being offered by Zeda Computers International Ltd.

Designed to be easily transported, the 520 series can be powered by standard 110/220 Vac outlets, 12 Vdc or optional internal batteries.

Included in the series are the 522, 525 and 529 with 12-in., 5-in. and 9-in. screens respectively. The software-selectable screen format can be either 16 lines by 56 char. or 25 lines by 81 char.



Zeda Portable Microcomputer

All models utilize a 4 Mhz, Z80A microprocessor with a full-vectored interrupt structure.

Each unit contains 48K bytes of dynamic random-access memory (RAM) and 2K bytes of video RAM as well as a double-density minifloppy disk controller and built-in, 200K-byte, double-density drive. A 400K-byte quad-density drive is optional.

Up to three external drives can be added, boosting the storage capacity to 1.6M bytes.

Three ports providing interfacing capabilities include a Centronics Corp. printer port, an RS-232C serial port and a bar-code reader port for a Hewlett-Packard Co. Heds-3000 digital wand. The serial port has a programmable bit/sec rate up to 42K bit/sec.

The CP/M-compatible Zedos operating system includes all CP/M and Cdos system calls as well as additional Zedos system calls.

All models can be used for tasks including downloading and network processing. The prices are $4,495 for the 522, $3,995 for the 525 and $4,195 for the 529. Zeda is at 1662 W. 820 North, Provo, Utah 84601.

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TERMINAL Systems, Inc.

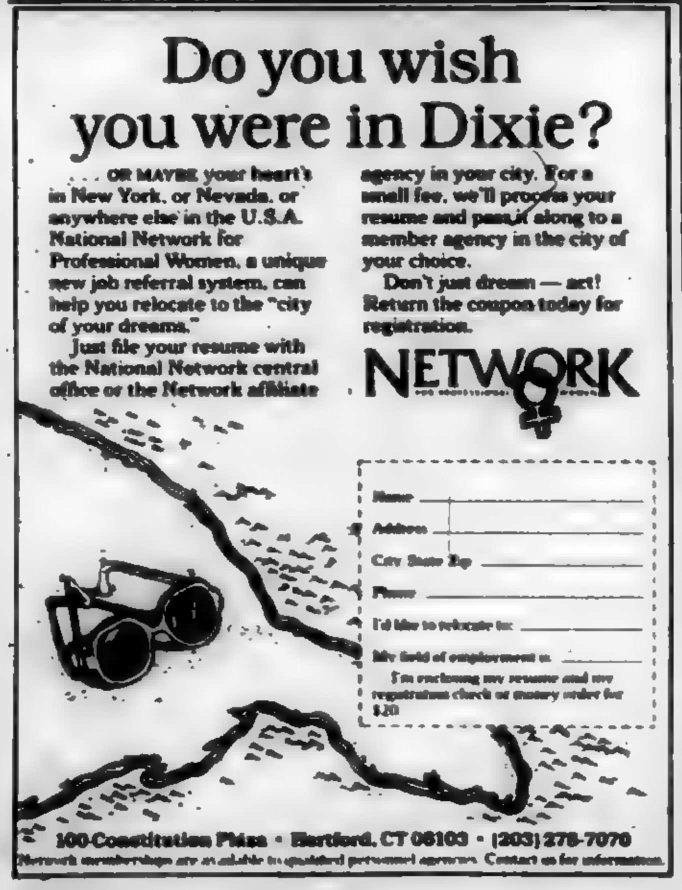
LSI-11 Gets Flinchester

MOUNTAIN VIEW, Calif. — Scientific Micro Systems, Inc. has introduced a Digital Equipment Corp.-compatible storage system, the FWT 01172 LSI-11, also known as the Flinchester.

Including 8.9M bytes of fixed 8-in. Winchester storage and 1M byte of double-sided floppy disk storage, the Flinchester is available for the PDP-11.

Compatible with standard DEC operating systems RT-11 and RSX-11M, the storage systems operate with floppy diskettes and standard DEC RX01, RX02 and IBM 2/2d formats that are automatically recognized for data input and output. Avetage access to 8.9M bytes of storage is 70 msec with greater than 500K byte/sec data transfer rates, according to SMS.

The Flinchester systems include disk drives, controller (to interface between the floppy and Winchester disks), interface, power and cabling. Prices start at $6,700 from 777 E. Middlefield Road, Mountain View, Calif. 94043.



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Computer Faire Needs Applications Speakers

SAN FRANCISCO — A call for speakers and session leaders for the Sixth West Coast Computer Faire, to be held here April 3-5, is being issued by Computer Faire, the conference and exposition sponsor.

This annual small-business and personal computing event anticipates a crowd of 24,000 industry people to be on hand. To address these vendors and users, speakers are being sought who have created interesting microcomputing applications or projects, or have developed other information of interest to the small computer community.

The deadline for proposals is Jan. 1. Further details are available from Computer Faire headquarters at 333 Swett Road, Woodside, Calif. 94062.

Audio-Cassette Course Covers System/34

WOODLAND HILLS, Calif. — A self-paced audio-cassette course for IBM System/34 operators and programmers is now being offered by Info III, Inc.

The course, "System/34 Operations and Implementation," covers hardware components, system console, operating system, configuration, hardware and software trouble-shooting, utilities, OCL/SEU/SDA, principles for efficient operation of a System/34 shop and a number of advanced System/34 tools and techniques. Features such as shop organization, error reporting and patching are also included.

Each lesson begins with a specific set of learning objectives and ends with a complete set of review questions. The course takes approximately 40 hours and a practice diskette is provided with the package for hands-on testing and implementation.

The single-copy price is $695 with discounts available from Info III, 21250 Califa St., Woodland Hills, Calif. 91367.

Controllers Introduced For Perkin-Elmer Minis

SANTA CLARA, Calif. — Spectra Logic Corp. has announced an emulating disk controller for users of Perkin-Elmer Corp. minicomputers.

The single-board Spectra 14 provides emulation of the MSM-80 and MSM-300 Perkin-Elmer disk sybsystems while attaching up to four 80M-byte or 300M-byte compatible drives, Spectra said.

The Spectra 14 will be available Jan. 1 and cost $4,500, the vendor said from 2316 Walsh Ave., Santa Clara, Calif. 95051.

AC Powerline Filters DP Incompatibility

PLAINVIEW, N.Y. — Pilgrim Electric Co. has introduced an ac powerline filter that reportedly was designed to achieve self-compatiblity within a range of DP equipment.

Voltector Multibus Strips are rated 15A, 125Vac and 60 Hz and are available with six, eight, 10 or 12 receptacles.

Prices start at $79.50 for a six-outlet model, $93 for eight outlets, $105 for 10 and $122 for 12, the vendor said from Pilgrim Electric Co., 29 Cain Drive, Plainview, N.Y. 11803.

FSO CICS
TONE

'Very Good Environment'

Industry Spokesmen Welcome Reagan

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Lobbyists, influence peddlers and other hangers-on are still scrambling to assess their prospects in the wake of Ronald Reagan's landslide victory over President Carter Nov. 4.

However, optimism verging in some cases on near-euphoria was expressed here last week by spokesmen for the DP and the electronics industry.

"It looks wonderful," exclaimed Kenneth Hagerty, vice-president of government operations, American Electronics Association (AEA). "We think [the Reagan victory] is very, very important. It's just a tremendous change in the direction of the country."

Historic Republic affinity for big business coupled with Reagan transition team statements on tax and regulatory policy have created "a very good environment" for the industry, the Computer and Business Equipment Manufacturers Association (Cbema) said.

A Cbema statement issued after the election proclaimed the Reagan "decisive victory," the shift in Senate majority and "substantial GOP gains in the House of Representatives" as representing "a mandate by the electorate against inflation, excessive regulation and intervention by the government in the affairs of the individual and business."

Contributing to the generally positive assessment of the industry's outlook for the next four years was the perception that businessmen with high-technology backgrounds may have an important role in the Reagan administration.

Although the top 100 or so positions in the administration, including the cabinet, will not be set for at least several weeks, the electronics industry seems to have already deeply infiltrated the ranks of Reagan advisers.

Jerry Sanders, president of Advanced Micro Devices, Sunnyvale, Calif., and Robert Noyce, chairman of Intel Corp., are among members of the Reagan transition task force on innovation, noted Warren Davis, Semiconductor Industry Association (SIA) director of government relations.

The full tally is even more impressive, according to the AEA's Hagerty: "Of the 40 members of the Reagan advisory panel on business, one-third are from high-technology fields – eight from Silicon Valley and four more from electronics firms elsewhere in the country."

(Continued on Page 72)

Small Business Computer Show Well-Received in Las Vegas

By Vic Farmer
Special to CW

LAS VEGAS – If the enthusiastic reception by both exhibitors and attendees here at last week's second annual Comdex Show was any indication, the small computer system industry has found its first real "trade" show.

Comdex is basically a middle-man show, geared to the independent sales organizations (ISO) – the term coined last year by the Interface Group, the show's sponsor, to define that nebulous range spanning systems houses through dealers, distributors, commerical OEMs, reps, computer retailers, turnkey vendors and office machine dealers.

Growth over the last year for the show proved dramatic, with the number of exhibitors doubling to more than 350. The show now has the status of being the second largest computer show in the country, based on exhibitor space.

Attendance Figures

Total attendance, on the other hand, was low, reaching slightly over 10,000. That was a hefty increase from the 4,000 last year, but substantially less than the 80,000 of the top-rated National Computer Conference.

Exhibitors expressed little disappointment in the attendance, however, because most of the attendees were the kind of third-party computer business people they wanted to reach.

The show was all business, both on the exhibit floor and in the sessions, where panelists discussed such topics as the relationship of ISOs and vendors, recession-resistant markets for applications, start-up financing,

(Continued on Page 74)

Apollo Takes Off At Whirlwind Clip

By Marcia Blumenthal
CW Staff

BILLERICA, Mass. – When John W. Poduska left Prime Computer, Inc., a company he helped found in 1972, he fully intended to spend three months skiing.

How much schussing Poduska managed to do remains a mystery, but barely more than three months after leaving Prime last December, Poduska founded Apollo Computer, Inc. and arranged the company's first round of venture capital funding – $1.76 million.

Still moving at a whirlwind clip – just 10 months after the company's founding – Apollo recently unveiled its first product: Domain, a 32-bit minicomputer designed to be configured as a series of computational nodes in a locally distributed network [CW, Nov. 24].

"When you want to get something done, establish a time frame and fit the pieces in," advised Poduska, chief executive officer and president, during an interview prior to Apollo's first news conference last week.

Poduska was a founder, officer and director of Prime, where he was responsible for the development of all hardware and software products and oversaw the company's research and development and planning activities.

Although those responsibilities were challenging, life in Prime's executive aerie ironically offered little chance for advancement. About a year before resigning, Poduska began hearing the entrepreneurial call of the wild.

(Continued on Page 70)

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CW Photo by T. [illegible]

Bill Poduska

Apollo Takes Off at Blinding Clip

(Continued from Page 69)

Once Poduska's idea for the company and product crystallized, he wasted no time in assembling a cadre of executives, gathered largely from high-level ranks of Prime, Digital Equipment Corp. and Data General Corp. By combining the views of executives from three distinct computer companies, Apollo has avoided taking a one-sided approach to the marketplace, Poduska said.

"Our team is on the average 10 years older than executives at other computer start-up ventures," he added.

Although the concept for Domain is not new, Poduska maintained it is original as "a product for the marketplace." Until now, the concept of having a large amount of processing power immediately available to a single user was utilized in academic and research environments or in cases where the payoff justified the expense of the application, such as aircraft design, he noted.

Driving the commercialization of the concept is what Poduska described as a "technology surge." Even in the past 18 months, the price and development of microprocessor chips, Winchester disk storage and communications costs have dropped by as much as a factor of five, he noted.

He likened this environment to the one that created an impetus for start-ups in 1972.

Despite the glamour of technological advances, Poduska is quick to point out he is not mesmerized by technology. Instead he is more intent in building a solid business. "We are worrying about the long haul."

And his goal is not modest — to be a $100 million company by 1985. Describing 1980 as the company's development year, Poduska said Apollo expects sales of less than $10 million during 1981.

One excellent lesson he learned at Prime and is putting into operation at Apollo is an emphasis on an end-user sales force. "Fully 30% to 35% of our revenue will be dedicated to the company's marketing effort," he said.

Although seemingly much lower in price, Apollo's Domain is competitively positioned against DEC's VAX-11/750 and the Prime 550. However, Poduska said he sees product lines overlapping rather than directly competing.

Initially, the company will target high-end scientific and engineering users who work in a time-sharing environment. Conceptually, Domain meshes the resource and data sharing of time-sharing and the responsiveness of a dedicated mini. Users do not have to share central processor space and the local network set-up can be upgraded by adding a $35,000 node as needed rather than an entire processing system.

General-Purpose System

However, Poduska sees Domain as a general-purpose system and in the future intends to offer it for commercial applications, a tack taken by DEC with its recent VAX-11/750 offering. Moreover, although not yet available, Apollo expects to add communications features whereby a node would become a gate to a large mainframe or a packet network.

As for manufacturing, Poduska has no intention of going the vertical integration route. Instead, the firm will assemble the components of its product much like "a production assembly process."

While many start-up firms flounder for financing, Poduska's proven track record gave him ready access to venture financing, which after second-round financing totaled $4.4 million.

Five venture firms are included in the financing, but Poduska said the seven partners retain "considerably more" than the 31% ownership left to the founders of Prime after venture financing.

Going public is certainly in Apollo's future, Poduska remarked, noting this could occur as early as 1982.

The seven partners in the Apollo venture are Charles P. Spector, executive vice-president and chief operating officer, who was formerly with DEC; Robert M. Antonuccio, vice-president of manufacturing, formerly corporate director of manufacturing engineering at DG; David L. Nelson, vice-president of systems development, whose experience includes managing special systems programming at DEC and directing research at Prime; J. Michael Greata, vice-president of engineering, who formerly headed Prime's Advanced Systems Development Group; David G. Lubrano, vice-president, treasurer and chief financial officer, who was senior vice-president, of National Medical Care Corp.; and Gerald W. Stanley, vice-president of marketing and customer services.

"Not since the early 60's have MIS departments faced such significant changes as those that are about to occur."

E. Drake Lundell, Jr.
Editor of Computerworld

Computerworld will "Forecast 81" Inside and Out in its combined Year-end Wrap-up Issue, December 29 and January 5, 1981. Ad close is December 12.

From the **Inside**, **Computerworld's** editorial staff will be taking a close look at:

- **IBM after H.**
- **What will users spend in 81?**
- **How to protect your software.**
- **Relational data bases: Fact and Fiction.**
- **DP unionization in 81: What to expect.**
- **What's ahead in local networks.**
- **Network architecture: SNA vs. Others.**
- **U.S. information policy after the election.**
- **Delivery delays: How long must users wait.**
- **Venture Capital: How much for computer firms?**
- **The economic outlook for today's system suppliers.**

And from the **Outside**, industry experts will report on:

- **Strategies for MIS software management.**
- **Hardware and software technology: Six areas to watch.**
- **Data base machines: Where are we?**
- **Integrating word and data processing.**
- **Graphics: What can it do for you?**

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IBM Realigns Divisions To Handle Semi Operations

ARMONK, N.Y. – IBM has moved control of semiconductor operations from the firm's General Business Group to the Data Processing Product Group.

In announcing the move, IBM Chairman Frank T. Cary said the change in control was aimed at making semiconductor operations a more unified effort throughout IBM. The group, officially called the General Technology Division (GTD), will be responsible for worldwide development and U.S. manufacturing of IBM semiconductor components.

Chip purchases from third-party vendors will still be handled through IBM's procurement department in Poughkeepsie, N.Y., a spokesman said.

Under the reorganization, GTD has been expanded to include semiconductor research efforts in E. Fishkill, N.Y., in addition to its existing control of semiconductor production facilities in Burlington, Vt., and Manassas, Va. GTD will be headquartered in White Plains, N.Y.

IBM Vice-President Jack D. Kuehler has been named president of GTD. He formerly was IBM vice-president and president of the System Products Division. Kuehler will report to Dr. Arthur G. Anderson, IBM vice-president and group executive of the Data Processing Product Group.

IBM Vice-President Thomas M. Liptak, formerly president of GTD, has been named assistant group executive, management services, a new position in the General Business Group. He will report to C.B. Rogers Jr., IBM vice-president and group executive of the General Business Group.

H. Mitchell Watson Jr. has been named president of the Systems Products Division, and will report to Anderson. Watson was assistant group executive, plans and controls, Data Processing Product Group.

Sotheby Computer Auction 'A Total Flop'

NEW YORK – "A total flop" was how the senior vice-president of a Boston computer appraisal firm appraised the Sotheby Parke Bernet Group's recent computer auction.

Except for the lone sale of an IBM "antique," a 370/125 that went for $13,000, the auction did not live up to Sotheby's expectations of selling 13 IBM processors for as much as $1.5 million each.

Discussing the failure of the auction, Paul Blumenthal, senior vice-president of American Computer Appraisal Service, said end users did not bid on the equipment because of the time element involved. "A user is not going to wait around for an auction to buy a computer when he can go directly to a broker or dealer and get one quickly and configured exactly the way he wants it," Blumenthal explained.

Moreover, the introduction of the new IBM 3801 decreased the value of the systems that were offered for sale at the auction.

"The end users just didn't bid," said a disappointed John J. Carr, Sotheby's computer specialist. "They came and they watched, but they didn't bid."

Nevertheless, Sotheby remains optimistic about the future of computer auctions. It has another scheduled Jan. 28.

Forecast Service Eases Decisions

MENLO PARK, Calif. – Gnostic Concepts, Inc. is offering an Electronic Component Price Forecast service designed as a decision-making tool for material managers, business planners and procurement managers.

The service offers timely data on prices and lead times for more than 50 electronic components, including resistors, connectors, backplanes, integrated circuits, MOS memories and microprocessors. In addition, technology trends, inventory conditions, component supplier capacity and other leading market indicators are analyzed in each report.

The annual service will consist of four quarterly reports and unlimited phone and written consultation with the firm's staff. Each report contains short-term and long-term data bases, a strategic management summary, an industrial analysis and separate market profiles of each component.

The price of the service is $12,000 annually, but initial subscribers will pay a special founders' price of $9,800. Gnostic Concepts is at 2710 Sand Hill Road, Menlo Park, Calif. 94025.

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Work Force Cut 10%

ICL Ax Falls as Recession Hits

Special to CW

LONDON — International Computers Ltd. (ICL) has blamed high interest rates, inflation, uncompetitive exchange rates and the general climate of recession for its decision to cut its work force by 10%.

The company announced that it will close its factory in Winsford, Cheshire, which currently manufactures the ICL 2946, 2950, 2956 and 2960 range of systems. About 1,500 manufacturing people, mostly at Winsford, will lose their jobs; a further 700 will be lost throughout the company.

According to ICL's director of corporate communications, Alan Benjamin, the ax will fall "by and large in marketing, including technical services."

In the midst of these financial woes, the British government reportedly has decided to award ICL a contract, said to be valued at about $73 million, for the computerization of Britain's witholding tax system.

Although British treasury officials were said to be in favor of opening the bidding to U.S. firms, apparently Prime Minister Margaret Thatcher was swayed by the protectionist "Buy British" movement.

The three U.S. firms bidding on the contract were IBM, Honeywell, Inc. and Burroughs Corp.

Mixed Reactions

Reaction from the trade unions has been mixed. ASTMS, the largest union within ICL (but weak on the ground in Winsford) issued a statement accepting the main reasons stated by ICL for closure and described them as "understandable." But ASTMS warned that the unions would resist the closure.

The AUEW and Tass, the white collar section of the engineering group (union), plan to start a campaign to prevent the closure. The unions will meet in the next two weeks to draw up their battle plans, which includes appealing to the local community for support.

ICL is the town's largest employer and alternative jobs will be difficult to find.

The ICL ASTMS Conservative Trade Unionist (CTU) group has passed an emergency resolution deploring the closure. The resolution was sent to the November meeting of the CTU's national committee.

The CTU issued a statement saying, "We are now seeing the consequences of the government's failure to provide an environment in which new technology can flourish."

Foreign Orders & Installations

J.H. Ryder Machinery Ltd., a Canadian firm engaged in distributing and servicing fork lift trucks, has placed an order for a Univac 1100/60 computer system.

Science Research Council of Daresbury, UK, has retained Cray Research, Inc. in a contract extending to 1983 for the Cray-1S 500 system. The contract is valued at $6.3 million.

Golden Rail, the holiday planning branch of British Rail, has installed a Syfa distributed processing system made by Computer Automation, Inc. The system automatically prints vacationers' itineraries.

Wades Department Stores, the Sheffield-based furniture retail chain in the UK, has placed an order for a Honeywell, Inc. DPS 8/20 large-scale computer system.

Britian's Automic Energy Authority will lease a Cray-1B computer system from Cray Research, Inc., according to terms of a recent agreement. The terms of the lease were not disclosed. The system is valued at approximately $5 million, with installation set for April.

Royal Insurance, a large British insurance outfit, has placed an order for approximately $2 million of advanced Racal-Milgo, Inc. information communications equipment. The new equipment will provide links in a major upgrading of the Royal nationwide computer network, involving nearly 70 branch offices throughout the British Isles.

Nisshin Steel Co. Ltd. of Tokyo, Japan's sixth largest steelmaking firm, has placed an order for four large-scale Univac systems valued at over $9 million.

Industry Welcomes Reagan

(Continued from Page 69)

Added Hagerty, "the new team is reaching out [to] high-technology heads and the likelihood is that a number of those people will get into the administration."

That is "just one indication," he said, "of a very tremendous difference in the interest level of the two administrations. We found ourselves at odds with the Carter administration repeatedly. Either we were on the defensive or they disliked things that we proposed. There were very few times we found ourselves working together for the same goals. That was very unfortunate," he said, "but consistently true."

Exciting Prospect

The most exciting prospect for Hagerty, Davis and their colleagues around the capital was the initial hope Congress would pass the Senate Finance Committee's proposed Tax Reduction Act of 1980 during the lame duck session that began last week.

However, any chance for the bill was lost when Democrats in both Houses returned last Wednesday and promptly vowed to block the legislation during this Congress. House Speaker Thomas J. O'Neill Jr. (D-Mass.) said President Carter would veto any tax cut this year.

But support for the bill by Sen. Robert Dole (R-Kan.), upcoming chairman of the Finance Committee, assures the bill will come up again by next summer, predicted Hagerty. "If this bill passes," he said, "it will be a major benefit to high-technology industries."

The tax reduction bill, whose lame duck passage had gotten the nod from Reagan Chief-of-Staff Edwin Meese and from the president-elect himself, encompasses a number of measures supported by the electronics industry.

The bill would cut capital gains taxes to a top rate of about 21% from the present 28%, provide a 25% tax credit for corporate R&D outlays, and set greatly accelerated depreciation schedules for equipment — a major boon to rapidly changing, high-technology industries.

Besides the tax proposal, it is generally considered the election bodes well for the industry's fight against the Service Contract Act, which would set minimum wage scales for companies servicing federal computers.

One of the greatest opponents of the industry's stance on the law, Rep. Frank Thompson (D-N.J.), chairman of the House Labor-Management Relations subcommittee was defeated Nov. 4. His replacement, not yet determined, and a secretary of Labor more sympathetic to business could lead to a lifting of the Act's provisions.

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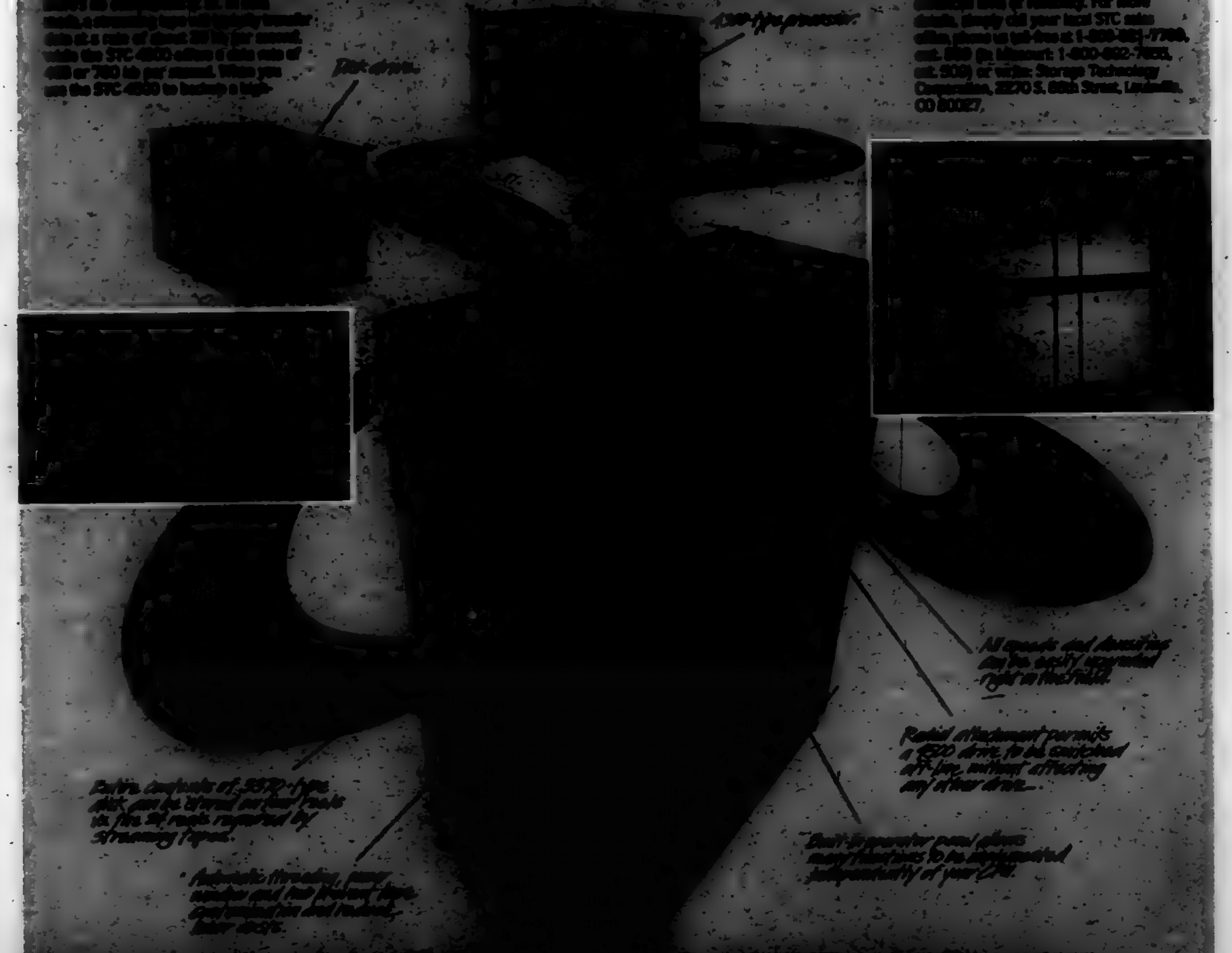

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CLA, CDA Merge

WASHINGTON, D.C. — The Computer Dealers and Lessors Association (CDLA), which hopes to be the single voice of the trade, has been formed by the merger between the Computer Dealers Association (CDA) and the Computer Lessors Association (CLA).

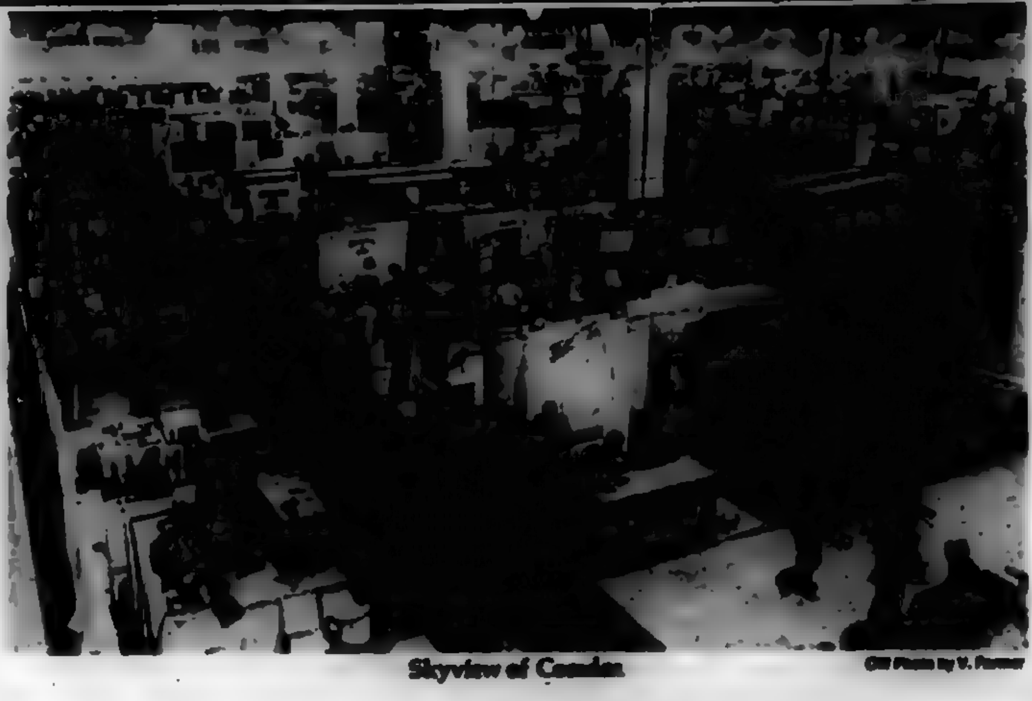
The CDLA will represent companies and institutions that own computer equipment and promises to protect their interests by monitoring vendor policy, pricing, maintenance and special tax considerations. They hope to act as a liaison between the vendor and the end user.

George Heilborn, president of IPS Computer Marketing Corp. of Paramus, N.J., has been elected president of CDLA. The former presidents of CLA and CDA, Edward Cherney and William S. Grinker, respectively, will be co-chairmen beginning with the official operation of the group on Jan. 1, 1981.

James Benton, former CLA executive director, will retain the same position in CDLA and remain with his staff in Washington, D.C. Benton will assume the responsibility for industry relations, a major aspect of CDLA's concern, and he will replace Sidney R. Rose as cochairman with Edward Kane of IBM on the joint IBM/CDLA committee. Rose has been named Executive Secretary and will remain in Milwaukee where his office will administer CDLA, work with the Industry Practices Committee and handle media relations.

The CDLA promises to expand its major industry and public relations activities and also to form special interest groups under the umbrella of the larger and stronger trade association.

According to Grinker, CDLA members will have $5 billion in equipment owned in 1980, and there is at least $30 billion owned by private and other entities.



Skyview of Comdex

[illegible] Photo by V. [illegible]

Comdex Show Well-Received

(Continued from Page 69)

selling to the fortune 1,000 and DP marketing strategies.

Action on the floor was geared to the small business system middle man, with software announcements of applications and programming tools nearly equaling those of hardware. More than 100 different small business systems were exhibited, ranging from simple desktop systems to multitasking, multiuser systems. Companies such as Digital Equipment Corp., Data General Corp., Texas Instruments, Inc. and IBM exhibited a minimal amount of equipment, concentrating instead on developing their distribution channels.

IBM, for example, limited its efforts to its 3101 video display terminal with only a half dozen units at the booth. DEC, IBM, and TI all had more booth space devoted to conferencing areas than equipment display.

At the Las Vegas convention center, where the show was held, an undercurrent of excitement pervaded the floor. Veterans of the record-breaking 1969 Fall Joint Computer Conference, held in the same hall 11 years earlier, predicted that the industry is entering another boom stage of phenomenal growth potential in the small systems area.

New Companies

DSI Computer Services, Inc. has been established at 428 Fourth St., Annapolis, Md., to provide maintenance to the Washington, D.C./Baltimore, Md. area.

Perex, Inc., a U.S. subsidiary of the British Sintron Group, has been established to market and manufacture a series of computer-related products. They are headquartered at 1798 Technology Drive, San Jose, Calif.

Interface Modules, Inc. will specialize in peripherals compatible with Digital Equipment Corp. computer systems. It is located at 2893 E. La Palma Ave., Anaheim, Calif. 92806.

The formation of **Datasoft, Inc.** has been announced by John Demos, president and chief executive officer of that outfit. The firm will develop and market application software packages for personal and small business computers. It is located at 16606 Schoenborn St., Sepulveda, Calif. 91343.

Croton Research Group, Inc. is a new consulting company with a multidisciplinary staff located at 124 Penfield Ave., Croton-on-Hudson, New York 10520.

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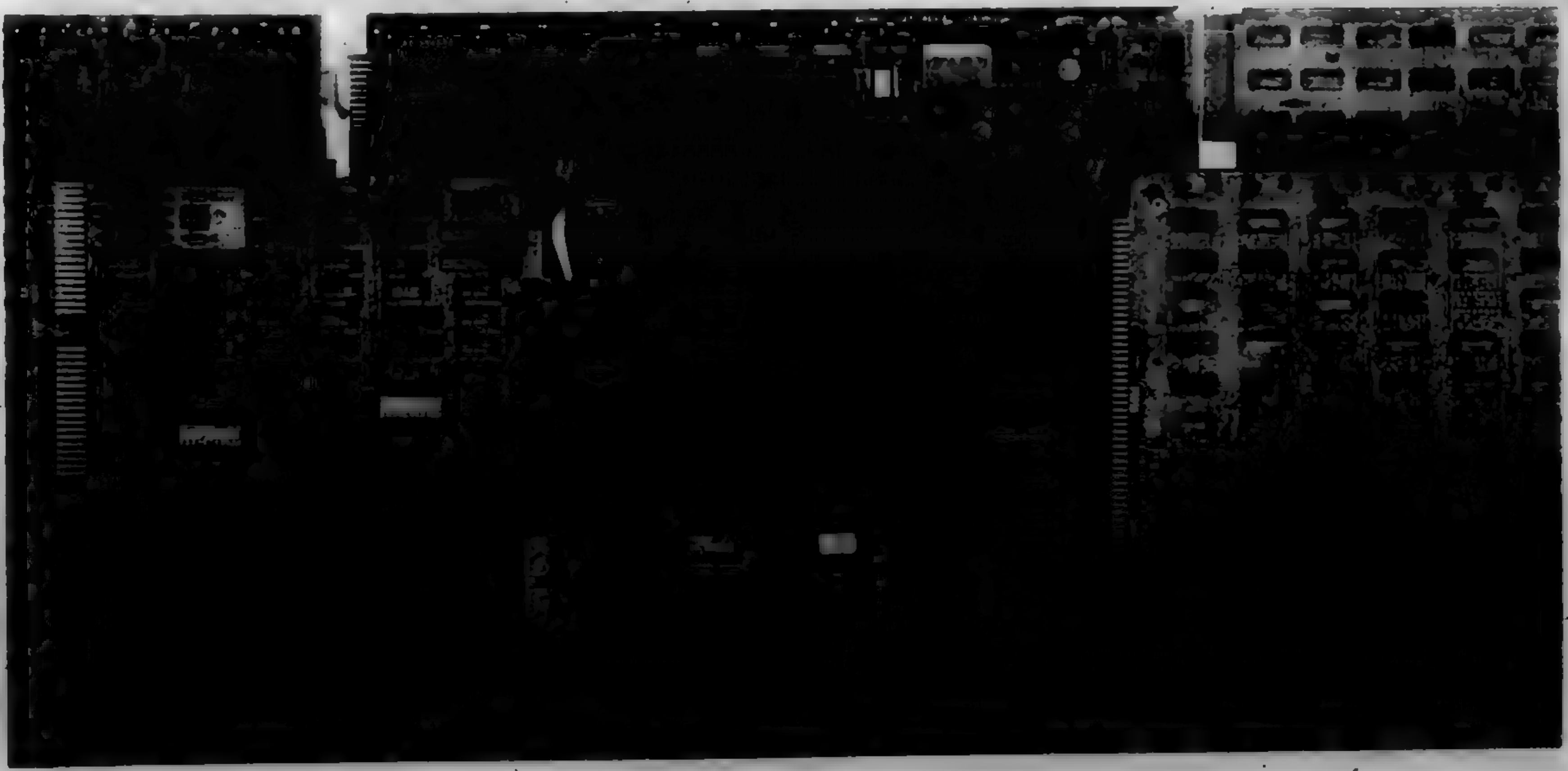
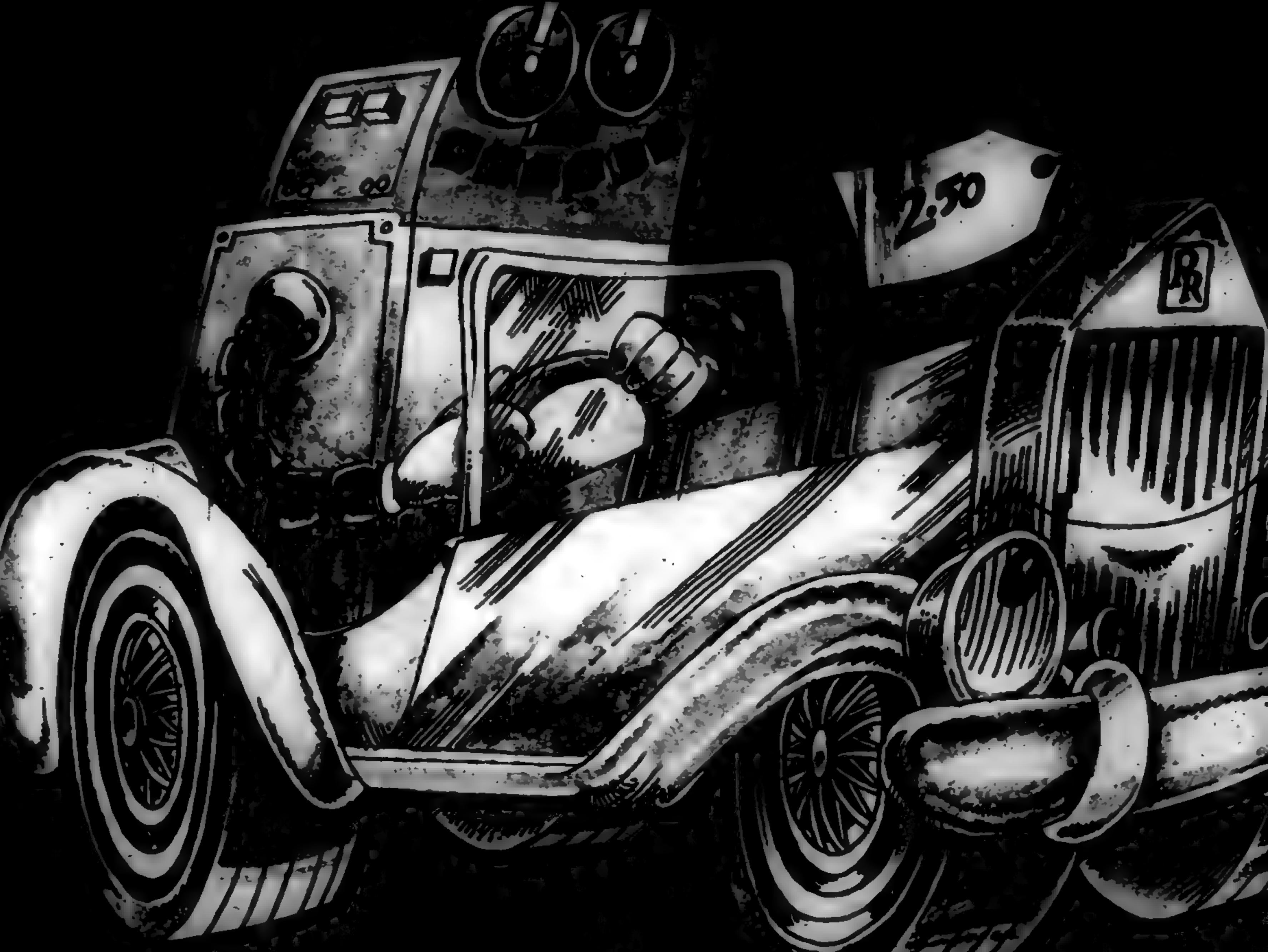
Datum, Inc., Corporate Headquarters: 1363 South State College Blvd., Anaheim, California 92806, Telephone: (714) 533-6333, Ext. 207, TWX: (910) 592-1289, Telex: 68-5579.

Datum
Storage Systems Division



"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."



Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

We are CW Communications/Inc. and despite our youth (we'll be 13 this year) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear). In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.

A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is *COMPUTERWORLD*, a weekly newspaper with a growing all-paid circulation in excess of 105,000 (quite an increase from our modest 7,500 in 1967).

COMPUTERWORLD serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.

COMPUTER BUSINESS NEWS is our weekly newspaper for executives in the U.S. computer industry whose organizations are involved in the manufacture, integration and resale of computer systems. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.

The latest phenomenon of the computer industry is personal and desk-top computers and we're covering it with our newest publication, *INFOWORLD*. We report from the user's point of view – with product ratings, and information on using small computers in business and at home. It's a paid circulation, bi-weekly newspaper, and the only publication of its type – located right in the middle of silicon valley — where it's all happening.

The United States alone accounts for nearly half of the worldwide computer market, but billions of dollars are spent by foreign computer people for American-made computers and computer products. And our publications penetrate those marketplaces, too.

We are publishers of newspapers and magazines in the following markets: Australasia, West Germany, United Kingdom, The People's Republic of China, Japan, Brazil and Mexico.

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Computing is an exciting industry, with a unique need for information. And the publications we produce provide that information to hundreds of thousands of computer people around the world. They are excellent vehicles for reaching these people with your advertising message, and we'd be happy to give you more information on any of them. Just call or write, Roy J. Einreinhofer, *Vice President, Marketing.*

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IDC Expects 'Staggering' Desktop Growth

WALTHAM, Mass. – The expected growth for desktop computer systems is "staggering," according to International Data Corp. (IDC), which forecast an increase in the worldwide installed base from 335,000 units in 1979 to more than 5.2 million units by year-end 1984.

The U.S. installed base will jump from 371,000 units in 1979 to about 3.1 million units by 1984, with shipments rising from 200,000 in 1979 to 849,000 in 1984, the market research firm predicted in a report entitled "The Small Computer Market."

Once geared toward the home computer enthusiast, desktop systems are finding their way into the business community more and more. "Today," IDC noted, "desktops have the capability to become multiuser systems with up to 192M bytes of on-line storage, multiple terminals and other I/O peripherals on a single base system. The cost can range from less than $5,000 to as high as $10,000."

The business/professional market segment is the most important one for desktop computers at present and will remain so in the future, IDC said, pointing out that there are presently more than 13 million small businesses in the U.S. Within the U.S. market, the business/professional segment will show a 52% compound growth rate for the period from 1979 to 1984.

In terms of percentages, the business/professional segment will account for 54.8% of the total U.S. installed base by 1984 – representing some 1.7 million units. Average prices for business/professional systems are approximately $4,700, although basic systems may range anywhere from $1,000 to $17,000.

The home/hobbyist area, once identified as the main market for desktops, has not shown the spectacular growth that was predicted. In fact, IDC revised its forecast downward as last year's shipments fell short by 16,000 units from its original forecast for this market.

IDC forecast the gradual end of the differentiation between desktops and traditional small business computers, such as the IBM System/32. The boundary between these products has become increasingly hazy as vendors like Radio Shack, Apple Computer, Inc. and Commodore Business Systems, Inc. have upgraded their systems to appeal to the business community. Similarly, many of the vendors in the traditional small business computer market are now extending their products downward.

Upward Compatibility

IDC sees the presence of an upwardly compatible line of computers that will run right into the larger, more powerful systems becoming very important to vendors in the coming years. At present, only four vendors have such a line – IBM, Wang Laboratories, Inc., Digital Equipment Corp. and the Hewlett-Packard Co.

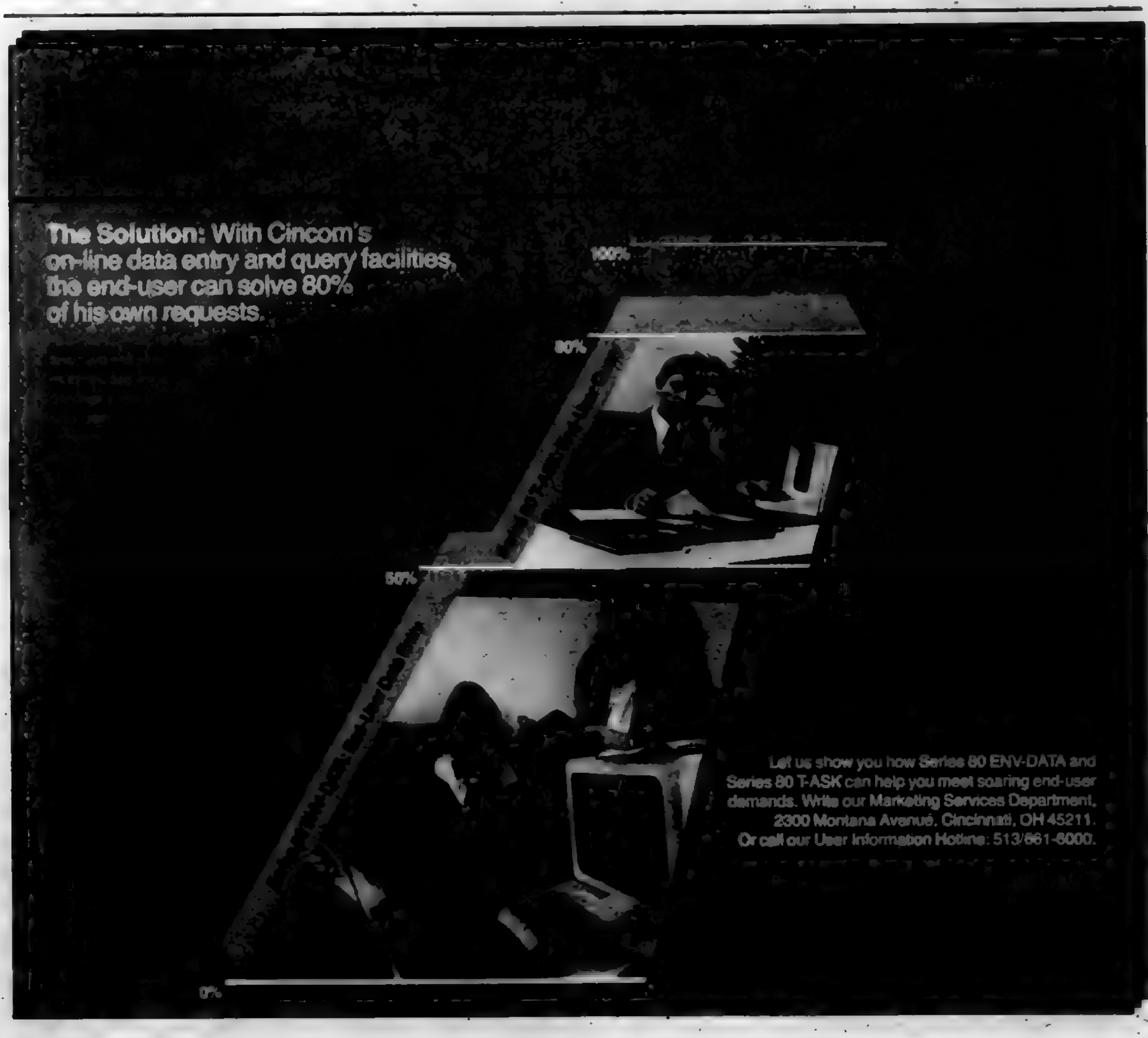
While the desktop computer is "currently riding high," IDC warned there will be some problems to watch out for in this market:

- First, the rising cost of doing business has eaten up much of the cost savings that advanced technology has developed. Consequently, IDC sees no dramatic price declines in the foreseeable future.
- The software for desktops is still not up to par, IDC said. Many users complain of having to rewrite substantial sections of programs in order to get them to run properly.
- Component parts – most notably floppy disk drives – have been in short supply.
- Finally, IDC expects an industry shakeout by 1983, resulting in many companies closing their doors, as well as a rash of acquisitions.

Taking a look at the vendors, IDC said Radio Shack led the pack with 81,000 systems shipped in 1979. Apple was a distant second with 32,000 units shipped, followed by Commodore with 19,000 and HP with 10,800.

At the dollar value of shipments, however, HP was at the No. 1 position with $181.9 million (24% of the market) and IBM was in the No. 2 spot with $110.5 million (14.6% of the market).

The entire "Small Computer Market" is available for $3,500 from IDC's Corporate Planning Service, 214 Third Ave., Waltham, Mass. 02254.



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To Take on IBM 3081

Univac Hints at Joining Mainframe Skirmish

By a CW Staff Writer

BOSTON — Will Univac join the large mainframe skirmish precipitated by the latest announcements from IBM and Amdahl Corp.?

The Univac division should not be counted out of any price/performance contest, according to Gerald Probst, newly elected president and chief operating officer of Sperry Corp.

Probst assured financial analysts here recently that Univac would remain competitive in the mainframe market and that the IBM and Amdahl announcements "will not force us to modify the future development of Univac products." Specifically, he said:

- On IBM's announcement of the 3081: "The IBM 3081 does not constitute a big threat to the Sperry product line in terms of price or performance. We have products on the drawing board that will be highly competitive with the 3081."
- On Amdahl's announcement of the 580 series: "Amdahl is shooting for a much higher market than Sperry cares to participate in. They are approaching the supercomputer market, and there is no magic in what they are doing."

Probst also had tough words for AT&T's movement into data processing: "Just another competitor. Sperry can compete against them as we can compete against anyone else. They don't frighten us."

Sperry's second-quarter earnings growth of 15%, an increase of 19% in company-funded R&D expenditures and a strong order backlog at Univac were evidence of Sperry's commitment to and acceptance in the marketplace, Probst said.

Probst added that the company next spring would build a 47,000-sq-ft addition to its research center in Sudbury, Mass., and that its $50 million addition at the St. Paul semiconductor fabrication plant was "only the tip of the iceberg."

Software Packages Predicted To Outsell Custom Products

MINNEAPOLIS — This is the year when revenues from packaged software will exceed that of custom products, a vice-president of Informatics, Inc. said here recently.

Speaking before a symposium on the use of computers for managing shareholder accounts, James R. Porter noted that industry statistics from Input, a research organization, show standard and readily available software packages will generate revenues of approximately $2.25 billion in 1980, slightly edging revenues from custom products.

Forecasts show the spread between the two types of software reaching almost $3 billion by 1985, with standard software valued at $8 billion and custom products at $5 billion.

"These statistics indicate two trends in the computer software and services industry," Porter said. "users are beginning to see inherent productivity benefits to using readily available and standardized packages because the development costs are spread over a larger base and their personnel costs can be held more constant.

"Second, packages today are much more versatile than they have been in the past, affording users with a combination of more powerful software and 'friendly' access to information and programs," he continued.

These new economics in software hold promise of breaking the programmer bottleneck that currently exists in the industry because of a shortage of people.

"Today more than half a million people are classified as programmers. They are working against a backlog of an estimated 10 million programs," he said.

"Demand for these people is growing at 20% per year; consequently, their sales are growing are more than 16% a year. If the colleges were producing enough new programmers, we could live with this situation, but they're not. Of the 8,300 computer science students expected to graduate in 1981, the 30 to 40 large companies among us in the computer industry will absorb almost all."

He said it takes from three to five years for the best programmers to become totally productive.

CDC Settles for $2 Million In Washington Transit Lawsuit

WASHINGTON, D.C. — Control Data Corp. has settled for $2 million in a suit involving the Washington Metropolitan Area Transit Authority.

CDC said it was hired by the Washington agency in the early 1970s to provide a computerized fare collection system for the city's subway line. CDC contended it also had a contract to build the system, but that contract was given to a San Diego-based firm, Cubic Corp.

In May 1975, CDC filed a $14 million suit against the authority, and in August 1978 it filed suit against Cubic Corp. seeking damages from both. In March 1979, the authority filed a $34 million countersuit against CDC.

Earlier this month, CDC announced that the transit authority agreed to pay the computer firm $2 million for "costs incurred during contract performance," and the two firms agreed to withdraw all claims with each other. CDC also dropped its suit against Cubic Corp.

Supershorts

Control Data Corp. has established a domestic distributor program to handle the marketing of magnetic recording media, produced by the company's Business Products Division, to end users of computer products and systems.

— — —

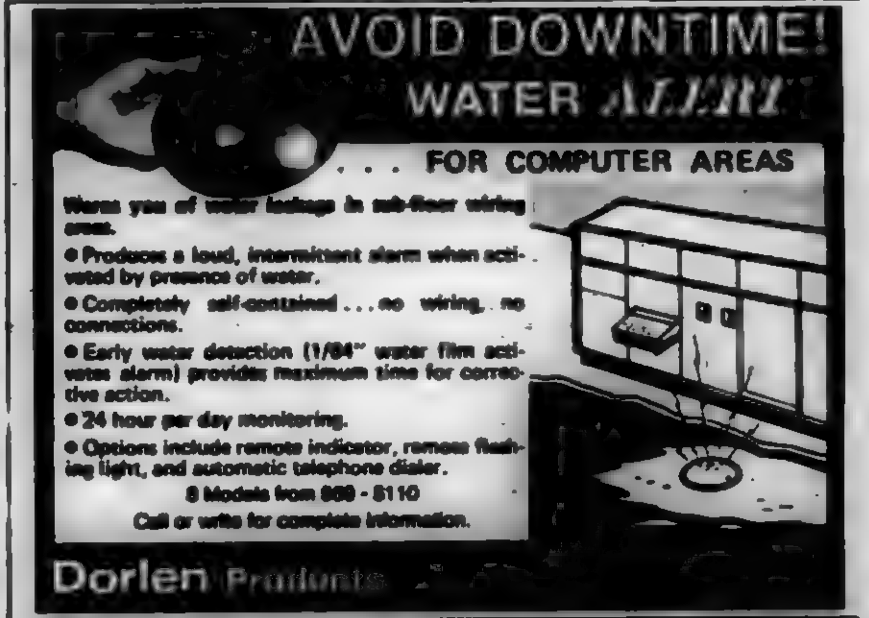
Thomas A. Grogan, director of acquisitions and development at McGraw-Hill, Inc., has been elected chairman of the Information Industry Association.

— — —

Joseph A. Verderber has been named AM International's Inventor of the Year, the first employee to receive that honor. The award was established under the company's Inventor's Incentive Awards Program, which recognizes employees whose work results in patents for the company.

— — —

Data Card Corp. has acquired the worldwide manufacturing, marketing and patent rights to the products and technology of Comparator Systems Corp. for one year, under the terms of a recently signed agreement. Data Card also has the option of permanent acquisition of those rights at any time during the year.



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	5/55 KSR	LETTER QUALITY	3050	130
	WIDE TRACK	LETTER QUALITY	3005	165
NEC	55 CPS RO	LETTER QUALITY	3055	130
	55 CPS KSR	LETTER QUALITY	3375	136
DEC	LA 34 AA	WIDE CAR.	1195	72
	LA 120	1200 BAUD	2495	110
TI	820 RO PKG.	1200 BAUD	2025	82
	820 KSR PKG.	1200 BAUD	2250	102
	765	MEM. PORT	2505	123
	745 STD.	PORTABLE	1525	75
	745 U/L	PORTABLE	1805	84
	745 A/L	PORTABLE	1875	[illegible]
LSI	ADM 3A	U/L DUMB TERM	850	40
	ADM 31	2 PG. MAX.	1325	72
	ADM 42	EXPANDS 8 PG.	2075	100
AJ	1234	ACOUSTIC 1200 BAUD	795	38
GDC	212A	300/1200 BELL COMP.	725	35

*INCLUDES ON SITE SERVICE IN [illegible] SERVICE AREAS
OFFER EXPIRES DECEMBER 31, 1980

Orders & Installations

Qantas, Australia's international airline, has recently placed an order with Univac for the Univac Standard Airline System (USAS*CGO) to automate its cargo operations. New orders at Univac also include one from Penn Machine Co. for the System 80 processor to aid in manufacturing control; Gaines Chemical Co., Inc. purchased the same system for its billing, inventory control and general accounting; and Stones Southern School Supply of Raleigh, S.C., ordered the System 80 to fulfill the same functions.

Hasbro Industries, Inc. has chosen a Univac 90/40 system and a 90/30 processor for its manufacturing control in Pawtucket, R.I., and the U.S. Air Force Academy in Colorado Springs, Colo., has ordered $2.3 million worth of Univac system equipment to keep the medical records of the cadets in order.

Kranzley & Co., Inc., a subsidiary of Anacomp, Inc., will install its EFT 8500 transaction switching and processing system in Metroteller Systems, Inc. headquarters to meet the needs of Metroteller's 26 bank members throughout New York state.

Cray Research, Inc. announced that Westinghouse Electric Corp. has ordered a one-million-word Cray-1 S-series computer system, valued at approximately $8.1 million.

Oklahoma City has ordered the Informap System for interactive mapping and geographic data base management from Synercom Technology, Inc.

Valtec Corp. Communication Fiberoptics, has delivered a VS-100 fiber-optic baseband video system and 1.2 km of duplex fiber-optic cable to Cox Cable Communications, Inc. of Atlanta. Cox will utilize this system in evaluating light wave technology for future applications in CATV trunking, local distribution and short-haul signaling.

Satellite Business Systems will provide satellite-transmitted voice and data communications among earth stations for Wells Fargo & Co.

A $3.5 million order for in-plant-assembly computer systems made by General Automation, Inc. has been placed by an unidentified major Detroit-based automobile manufacturer.

Carl Byoir & Associates, a public relations firm, has placed an order with one of its oldest clients, Honeywell, Inc., for a Level 62 business computer. The two companies have been associated for 30 years.

Management Assistance, Inc.'s international unit has secured a $3 million order from Citibank N.A. for its Basic Four Corp. computers and related software to be installed in Citibank's Latin American operations.

The People's Republic of China will be receiving its recently ordered used IBM 370/138J from Cometals, Inc.

Northern Telecom Ltd. has installed two SL-1 digital business communications systems valued at more than $900,000 at the New York Futures Exchange and The Depository Trust Co., two wholly owned subsidiaries of the New York Stock Exchange.

Gerrity Building Centers, a wholesale/retail lumber distributor with headquarters in Meredith, N.H., has placed an order with Univac for a System 80, and Eighty Four Lumber Co. of Pittsburgh, Pa., has ordered a $1.1 million Univac 1100/60.

Pan American World Airways, which recently acquired National Airlines, is installing new voice switching systems from the Collins Communication Switching Systems Division of Rockwell International Corp. in two of National's locations. The Automatic Call Distribution (ACD) systems are valued at $2.8 million.

The Grand Union Co. has purchased 1,000 MSI/88e portable data-entry terminals from the MSI Data Corp., and Max Factor has ordered 283 MSI/88 portable terminals from the same firm to automate its order entry operations.

Computer Sciences Corp. has recently installed 44 four-color graphics display systems to enable the Navy to monitor operations during war-game exercises. The systems are manufactured by Sanders Associates, under the terms of a $1.8 million contract with Computer Sciences Corp.

Executive Corner

- The appointments of Robert F. Zenisek to vice-president of operations and John W. Crane-Baker to vice-president-treasurer were announced recently by GTE Lenkurt, Inc.
- F.L. Mike Harvey has been elected president and chief executive officer at the Verbex Corp., formerly Dialog Systems, Inc.
- Robert Turmala has been promoted to vice-president of sales in the western region of Data Access Systems, Inc.
- John V. Roach has been elected president and chief operating officer of Tandy Corp.
- Nicholas Scharf has been named vice-president of finance at Personal Software, Inc.
- In an internal reorganization at Software AG North America, Inc., Gary Bowers was named vice-president of education and consulting; Larry Jones was appointed vice-president of development; Steve Greaves was named head of the new Computer Services Division; and John Weil was promoted to vice-president of the western sales region.
- Jules M. Seshens has been appointed vice-president of 4-1-1 Systems, a division of Comshare, Inc.
- J.C. Chu, formerly of Honeywell, Inc. and Wang Laboratories, Inc. has been elected a director and chief executive officer of R.C. Sanders Technology Systems, replacing R.C. Sanders in that office.

Expansions

IBM recently dedicated its new 1.7-million-sq-ft manufacturing and development plant in Tuscon, Ariz., where it estimates it will employ up to 5,000 people within the next two years.

Computer & Communications Technology Corp. has made plans to establish a manufacturing facility in Moca, Puerto Rico, under industrial development incentive programs providing for favorable tax treatment. The firm has leased an initial 46,000 sq ft.

Codex Corp. has opened its newest facility, a 150,000-sq-ft office and assembly center in Mansfield, Mass.

Prime Computer, Inc. has entered into negotiations with the Springfield Area Development Corp. to purchase 90 acres of land west of Springfield, Mass., for future growth.

Machine Intelligence Corp. has moved its headquarters and manufacturing operations to 1120 San Antonio Road, Palo Alto, Calif.

Southern Systems, Inc. has announced the opening of it's new 10,000-sq-ft manufacturing plant for research and development operations at 2131 Sunnydale Blvd. in Clearwater, Fla.

Harris Corp. has broken ground for its largest expansion project ever. The $120 million investment in new buildings and equipment in the Palm Bay area of Florida will double the production capacity of the semiconductor manufacturer.

Congressional Information Service, Inc. has recently relocated to Suite 800, 4520 East-West Highway, Washington, D.C. 20014.

Computervision Corp. plans to acquire plant sites in Sanford and Gorham, Maine, in a move to expand its manufacturing operations in 1981.

Prime Computer, Inc. has opened its new world headquarters on the 35-acre site of the former Carling Brewery. The address is Prime Park, Natick, Mass. 01760.

Nickels & Dimes

Wang Laboratories, Inc. shareholders approved an increase in the number of authorized shares of Class B common stock from 30 million shares to 70 million shares.

$$$

IBM directors announced a regular quarterly cash dividend of 86 cents per share on the common stock payable Dec. 10 to shareholders of record Nov. 12.

$$$

The General Datacomm Industries, Inc. board voted a 3-for-2 stock split, payable Nov. 20 to shareholders of record Nov. 6.

$$$

MSI Data Corp. declared the regular cash dividend of 10 cents per share payable Dec. 17 to shareholders of record Nov. 14.

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Design and implement ROM resident self tests. Assist in H/W bring-up and review H/W schematics and logic flow. Requires a BSEE or equivalent with 3 years experience. Microprogramming and microprocessor experience desirable.

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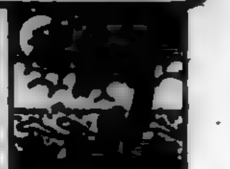

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Your challenge will focus on the management of a product line that includes the design, development and implementation of on-line data base student and/or financial information systems, such as: funds and encumbrance accounting, student admissions, registration and records, and payroll/personnel and position control. This will include significant user contact, planning, directing and evaluations of administrative systems development, design and enhancement.

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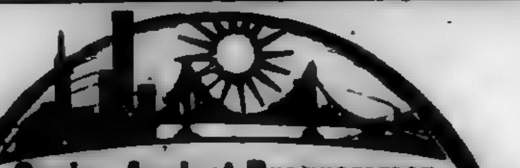

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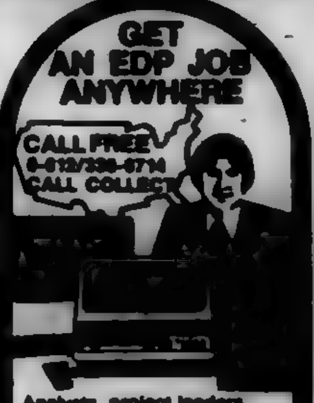

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The qualified candidate's past experience will enable him/her to effectively relate to state-of-the-art computer technology, computer economics, operations and management, as well as to a diverse body of users and to senior management of the University.

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- Measurement and Research Center

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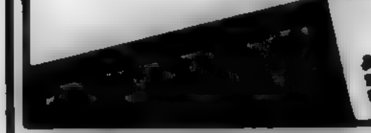

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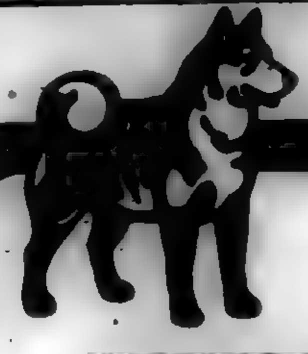

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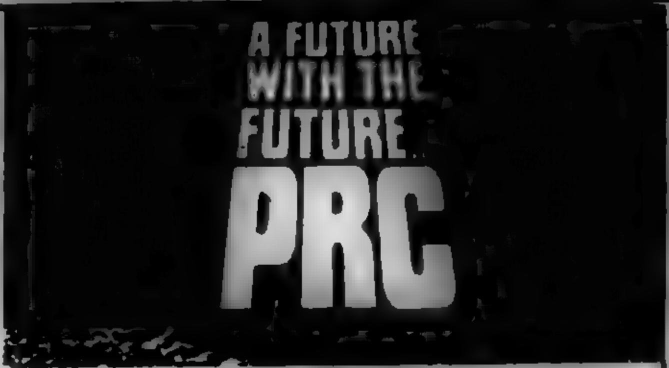

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Multi-located syst. prog. sought by nationally prominent firm to support IBM and in-house developed utilities. Min. 2 yrs. solid tech. exp. Pleasant New England area apply. Salary to $26,000. (Fee Paid) Contact Pam Siegel.

Robert Half of Hartford, Inc.
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170
Personnel Consultants

[illegible]

[illegible]
Clearwater, Fla. [illegible]

PROGRAMMER/ ANALYST

Gather and Analyze information to develop new or modify present application systems. Design, code, and test programs for computer operation. Minimum of Associate Degree. [illegible] Experience with DEC system is an asset.

Apply to [illegible] Technical Community College, [illegible] or Phone [illegible] prior to December [illegible], 1980.

OVERSEAS POSITIONS

For Programmers
with IBM/370
Mark IV Experience
Contact Susan Scott
concerning this and
other possible positions.
1-800-446-[illegible]
P.O. Box [illegible]
Richmond, VA [illegible]

AiDE

Operation Research Analyst

[illegible]

Data Processing

DP DIRECTOR

Directs and administers operational/developmental activities for state CDP facility using data base and on-line systems. Supervises 110 personnel. Large IBM computer. Requires 8 years DP (3 of which are managerial). Salary negotiable. Submit resume to Administration, Capitol Building, Pierre, S.D. 57501.

S.D. Equal Employment Employer

Data Processing

Ohio Savings is just opening a new computer center in a conveniently located suburban community. This new installation offers dynamic career opportunities for an individual with hands-on experience and high ability as well as the desire to grow with an organization in the early stages. The installation will include IBM 370/4300, DOS/VS (future OS/VS or MVS), CICS, telecommunications, batch and interactive programming (BAL and COBOL). The installation is dedicated to state of the art approaches, technology and continuing education of staff.

Technical Support Specialist/ Systems Programmer

Reporting to the computer center manager. This position will be responsible for participating in hardware and internal software review and selection. Operating systems support; telecommunications support; data base generation and support. Telecommunications network and capacity planning; throughput optimization; software application package and new operational systems proposal reviews for compatibility and capacity requirements; functioning as a consultant to systems development, programming and computer operations, education and training and supervision of staff.

We offer good benefits and free parking. For more information or to apply for this position, please send resume or letter about your background to C.H. Cooper, Ohio Savings Association, 1801 E. Ninth Street, Cleveland, Ohio 44114.

OHIO SAVINGS ASSOCIATION
1801 E. Ninth Street
Cleveland, Ohio 44114

An Equal Opportunity Employer M/F

WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY
DEPARTMENT OF COMPUTING AND QUANTITATIVE STUDIES

Senior Lecturer — Management Information Systems (Ref. 394A) (Permanent Appointment or Three Year Contract Available)

Taking a leading role for Management Information Systems teaching and research in undergraduate and postgraduate courses for students qualifying as Computer Professionals or in other business spheres. Applicants must have practical experience in Management Information Systems Analysis, design and application in manufacturing, other industries or commerce. Tertiary teaching experience an advantage.

Salary Range: Senior Lecturer $US27,754 — $US32,348; Lecturer $US20,686 — $US27,175 (Oct 29 Exchange Rate).

Conditions Include: Fares for appointee and family plus some assistance with removal expenses. Superannuation is available for staff with permanent tenure. Return fares are provided for staff appointed for a limited term.

Applications: Details, including names and addresses of three referees should be submitted not later than 12th December to the Appointments Officer, Western Australian Institute of Technology, Hayman Road, South Bentley, Western Australia 6102. A brochure containing further information may be obtained by telex (AA 92983) or cable (waintech) citing "appointments", position number and your return Airmail address.

When applying please quote position reference number and Media Code CW4.

OLD DOMINION UNIVERSITY COMPUTER CENTER

ASSOCIATE DIRECTOR ADMINISTRATIVE SERVICES

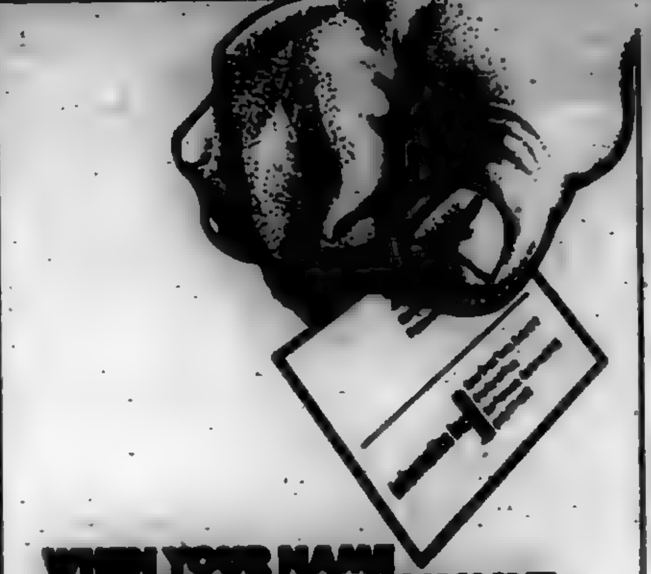
The Computer Center is seeking the right individual to be a key person in the major development of modern techniques in our Administrative Data Processing Systems.

This recently expanded position requires strong leadership abilities and an extensive background in Data Base oriented project management.

Qualifications:	[illegible]
Responsibilities:	[illegible]
Environment:	[illegible]

Salary range $[illegible] to $31,[illegible] per year. To be given full consideration send resume and salary history, prior to December [illegible], 1980 to Employment Office Old Dominion University, Norfolk, VA [illegible]

OLD DOMINION UNIVERSITY IS AN AFFIRMATIVE ACTION
EQUAL OPPORTUNITY EMPLOYER



WHEN YOUR NAME IS ON THIS CARD, YOU HAVE A REPUTATION TO LIVE UP TO.

Are you qualified to become a Member of the Informatics Professional Staff? If you're a top performer in large IBM/OS environments with a background in COBOL, data base or on-line systems, you're definitely going in the right direction.

The Informatics team of consultants, analysts, and programmers has a reputation for high competence and productivity. We earned it by applying our skills and creativity to successfully solve a broad range of data processing problems for our clients.

Consider the satisfaction of high-level challenge at Informatics. Send your resume to Informatics Inc., Professional Services West, Suite 1018, Room 1280A, One Market Plaza, Spear Street Tower, San Francisco, CA 94105. We are an equal opportunity employer.

Informatics Inc

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Working for a Major International Organization in Washington can be challenging, rewarding and fun for the right people. If you:

- have five years of applications programming experience
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- know, or want to know more about data base
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- feel comfortable in a multinational environment

Please send resume to:

Pan American Health Organization
Department of Personnel
525 Twenty-third Street, N.W.
Washington, D.C. 20037

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The Frank Lloyd Wright County Civic Center in Marin County is not equipped with hot tub and peacock feathers, but it is a nice place to work. In addition to competitive salaries and excellent fringe benefits, we offer convenient free parking, flexible hours, a pleasant working environment and a variety of professional challenges in a small shop environment.

The Marin County Data Processing Department is expanding and is looking for a:

SYSTEMS PROGRAMMER - This requires two years of data processing experience involving disc operating systems, assembly language programming, and or data communications in addition to one year of programming experience.

If interested, please immediately call Lew Williams at (415) 499-6104 or send your resume with minimum salary requirements to the Marin County Personnel Office, Civic Center, San Rafael, CA 94903.

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

COMPUTER SYSTEMS SUPERVISOR

. . . for Clinical Anatomical Pathology. MS or PhD preferred plus in-depth experience in computerized laboratory information systems. Responsibilities include participation in selection of system, installation involving interfacing with departmental operations and hospital information systems, development of new functions, and management of on-going system. Reports to Chairman of Pathology and Laboratory Medicine. Please send resume with salary requirements to Employment Manager

HOSPITAL OF THE
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3400 Spruce Street
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At NAS, we're looking for talented computer professionals with the energy and initiative to fully utilize their technical expertise in advancing their careers. And, as a dynamic young company, we can provide just the right kind of environment for career advancement — one that encourages and rewards individual achievements.

So take the first step in proving your initiative. Apply yourself by calling Ursula Shepherd toll free at 800-227-1828, to discuss these immediate openings:

Systems Support Representatives

Consulting and providing technical support to field sales and marketing, you must be knowledgeable in the internals of IBM virtual operating systems (MVS, SVS, VS1, VM or DOS/VS). College degree or equivalent experience is required. The ability to write and present technical materials a plus. Openings nationwide.

Field Engineers

If you have the skills and ability to excel in field engineering, you'll be recognized for it at National Advanced Systems. We have openings nationwide requiring an AA in electronics or equivalent military experience. Our more advanced positions require experience on IBM 370/158 or larger CPUs or associated peripherals experience.

Field Support Representatives

Individuals experienced in problem solving with systems control programming are needed to resolve problems in customer systems software, assist field engineering with problem determination, and assist systems support representatives in running benchmarks.

If you can't call, send a letter of inquiry or a resume to Ursula at National Advanced Systems, 800 East Middlefield Road, Mountain View, CA 94043. We are an affirmative action/equal opportunity employer m/f/h.

National Advanced Systems
A Subsidiary of National Semiconductor

Systems Engineering Manager

In support of O.E.M. Division Operations

A TRULY UNIQUE OPPORTUNITY WITH NCR

Here is an opportunity to assume a highly visible managerial role in our worldwide OEM Systems Engineering organization. You will be joining our OEM Marketing Division, and will have broad responsibilities for helping us provide strong pre and post sale support to both marketing staff and OEM customers. You will have the resources of a $3 billion computer company behind you. Moreover, you will be in a position to significantly influence new product and market development strategy.

In addition to the satisfaction of further strengthening an expanding OEM Division, the position offers excellent prospects for continued professional growth. Your background should include 2-6 years of management experience, a degree in CS, EE or related discipline, and preferably an MBA as well. You must, moreover, have demonstrated ability to motivate others, and provide customers with competitive solutions.

We offer compensation commensurate with experience, and a superior benefits package. Please send resume, salary history and requirements to: Brian Pfizer, Corporate Executive and Professional Recruitment, Dept. [illegible], NCR Corporation, World Headquarters, Dayton, Ohio 45479.

NCR
Complete Computer Systems

An equal opportunity employer

[illegible]

SOFTWARE PROFESSIONALS

Megatek, a San Diego based corporation, is a leader in commercial high performance computer graphic systems. We are enjoying a dramatic growth rate of 50%-100% per year, and offer the following career opportunities:

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We are seeking a dynamic, self-motivating individual with interest in the communications aspect of new product development. This person should be very knowledgeable in high speed synchronous protocols (SDLC, HDLC, BISYNC, SNA, X25) and should have significant experience in the implementation of these protocols at the device driver level. Position involves the strength/weakness evaluation of protocol designs. BS/MS in CS, with 5 years experience required, some experience with IBM Systems preferred.

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Positions are available on several of Megatek's state-of-the-art software development teams. Previous experience with a range of graphics equipment and in graphics software system design necessary, as well as a BS/MS in CS.

Please submit your resume in confidence to C. Stowell

MEGATEK
MEGATEK CORPORATION

[illegible] Sorrento Valley Blvd.
San Diego, CA 92121
(714) [illegible]

Equal Opportunity Employer m/f

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Project Leader Supervise seven, heavy user contact, key position.	[illegible]
Real Time Systems Analyst Develop new industrial software, state of the art environment.	[illegible]
Assembler Programmer Interactive network, all new development, financial application.	[illegible]
Operations Manager Supervise all data center activities, training and personnel.	[illegible]
Systems Programmer Install and maintain database, heavy user contact.	[illegible]
Project Manager (Transportation) Develop own project team, heavy new development.	[illegible]
Engineering Consultant Heavy system concept identification, prestigious firm.	[illegible]

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Cleveland, Ohio 44115
or call Louise [illegible]
216/781-5344

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IBM SYSTEMS PROGRAMMER

You'll Find Professional Success Here. . .at Harris/PRD

Challenge, excitement, potential for growth and meaningful responsibility are part of the Harris/PRD growth environment.

Currently we have a select opening for a talented individual with experience in BAL, COBOL, VM/CMS. Converting to MVS. Exposure to DB/DC systems helpful. Degree required.

We invite you to investigate the many unique benefits of this opportunity by submitting your resume to Mr. Harry Roberts, Employment Manager, Dept. BR, Harris Corporation, PRD Electronics Division, 6801 Jericho Turnpike, Syosset, N.Y. 11791.

HARRIS
COMMUNICATION AND INFORMATION PROCESSING

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COMPUTERWORLD CLASSIFIEDS WORK!

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- SOFTWARE
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- SOFTWARE FOR SALE
- REAL ESTATE
- BUSINESS OPPORTUNITIES

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call Sue Stevens at 1-800-343-6474. She will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available): note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 10 days prior to issue date.

Rates: Open rate is $73.50 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $147 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

1 col x 4"	$294
2 cols x 4"	588
2 cols x 5"	735
2 cols x 8"	1,176

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available. $10 per insertion.
Ad Closing is every Friday, 6 working days prior to issue date (issues are dated Monday).

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700
New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (213) 450-7181
TELECOPIER SERVICE - (617) 879-0703

William J. Millo, Manager Classified Advertising

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

MARKETING MANAGER
COMPUTER FURNITURE & ENCLOSURES

We are seeking a highly motivated, results oriented marketing professional prepared for a rapid growth business environment. We are a national manufacturer of computer furniture and enclosures expanding the state-of-the-art in computer packaging to mini/micro O.E.M.'s systems houses, dealers/distributors and turnkey systems suppliers. The preferred candidate will have a proven record of accomplishment in O.E.M. marketing of C.P.U.'s, disk, tape or related peripheral. Experience in the improvement and expansion of a national rep and distribution network is required. This position is based in No. Hollywood and will report directly to the president working as a team member in a dynamic company environment. Please send resume and salary history in confidence to:

TRIMM INDUSTRIES
P.O. Box [illegible]
Santa Barbara, CA 93111

Faculty Position
Computer Science
Birmingham-Southern College

[illegible] September 1, 1981. [illegible] Deadline for application is March 1, 1981.

Birmingham-Southern College is an equal opportunity/affirmative action employer.

MANAGER OF OPERATIONS - Supervises all data entry, control and computer operations in dual CPU environment with large teleprocessing network. Bachelor Degree in business administration, computing or EDP and four (4) years computer operations experience, two of which should be supervisory. Candidates lacking degree may substitute eight years computer operation experience. Salary Range [illegible] - [illegible] - Salary Commensurate With Qualifications. Contact by resume No Later Than December 15, 1980. Send Resume To:

[illegible]
[illegible]
Personnel Department
Director of Personnel
[illegible] Court Street
Clearwater, Fla. [illegible]

COLORADO SPRINGS

Penrose Hospital, located at the base of Pikes Peak is looking for an Assistant Director of Data Processing. We are a two hospital system with 480 beds, and 1,900 employees.

If you have a BS and five or more years of program or project management experience, why not join Southern Colorado's finest hospital and enjoy our clean air and mild, dry climate. Major responsibility will be program management and daily operation in absence of Director.

Call: Roy Kiser (303)-630-5236
Mrs. Im Sun Stevenson
630-5237
Or Write:
Employment Office
Penrose Hospital
2215 N. Cascade Ave.
Colo. Springs, Colo. 80907

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SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ANALYSTS

AVAILABILITY, INC.
[illegible]
P.O. BOX [illegible], DEPT. CW
TAMPA, FLORIDA [illegible]

SENIOR PROGRAMMER ANALYST
$1620 - 2230

PDP11/34 to PDP11/70, RSX11M, assembly language; local police facility requires dynamic self-starter to assume responsibility for maintaining and enhancing its on-line dispatch system. Communication experience helpful. B.A. degree, 2 years experience in computer programming, including one year in [illegible] and [illegible] EDP systems. Apply by December 15, 1980, to the City of [illegible], Personnel Department, [illegible], [illegible].

SR. PROGRAMMER ANALYST

An immediate opportunity exists for a Sr. Programmer Analyst to join our Information Services Department. Requirements include a B.S. or equivalent experience plus a minimum of 5 years of experience in a manufacturing environment. Candidate must be proficient in COBOL in a 370 environment with exposure to IDMS, on line systems. Panvalet, and Easytrieve being a plus. Responsibilities include the design of program logic to be written, specifications, preparation and thorough testing of programs, conducting data gathering interviews to interpret user requests and the preparation of program specifications to satisfy user requirements. Codman & Shurtleff, Inc. is an operating company of Johnson & Johnson and is dedicated to excellence and innovation in design, manufacture and marketing of surgical instruments and disposable products for the operating room. We offer a competitive salary and outstanding benefit package including major medical and dental plan. Please send your resume with salary history and current requirements to D.M. Gore, Selection & Placement.

Codman & Shurtleff, Inc.
Pacella Park Drive
Randolph, MA 02368
An Equal Opportunity Employer

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$18 to $28K
San Francisco

Several of our Bay Area clients have immediate openings for IMS Programmer Analysts. Positions require a minimum of 2 years in Data Processing with 1 year in IMS COBOL applications. Prefer Manufacturing, Finance or Distribution Applications. Positions include relocation and excellent benefit packages. Salary commensurate with abilities.

We are consultants to management. Please call or send resume in confidence to: Heather J. Handley, One Maritime Plaza - Suite 1350, San Francisco CA 94111, (415) [illegible]. Employer assumes fee.

professionals for computing, inc.
Search & Personnel Services

PROGRAMMERS ANALYSTS
To $30K
All Fee Paid Positions

Our organization has many client companies needing experienced computer programming professionals - for banking applications, financial applications, scientific applications, real time, data base-IMS and systems engineers.

Contact M. D'Terra, 303/[illegible]-9110 or send career profile to

COMPUTER RESEARCH INSTITUTE
1290 S. Monaco Parkway
Denver, CO 80224

DATA CENTER

The New Jersey Department of Human Services has immediate openings for two (2) individuals to manage its Data Base Group and its Teleprocessing Group at its Data Center in Mercerville, N.J. The Data Center operates a Honeywell [illegible] dual processor system with three (3) [illegible] network processors, approximately [illegible] terminals and utilizes GCOS-[illegible], [illegible], TSS and [illegible]. Planning is underway for migration to DM-IV.

DATA BASE MANAGER

Responsible for the design, installation, maintenance, and performance of all data bases. Will be responsible for the DM-IV migration period. Applicants must have strong technical experience in data base systems, with some exposure to supervision and management.

TELEPROCESSING MANAGER

Responsible for the planning, implementation, maintenance, control and performance of the data network, telecommunications, software and all support efforts. Wide exposure to high technology communications to include TSS, NPS, hardware and diagnostic tools is desirable.

These are permanent positions which offer salaries ranging from [illegible] to [illegible] based on experience and an excellent benefit package.

PLEASE REPLY IN COMPLETE
CONFIDENCE TO:
VERONICA MANNING
PERSONNEL COORDINATOR

HUMAN SERVICES DATA CENTER
3625 Quakerbridge Road
Mercerville, N.J. 08619
Equal Opportunity Employer

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Sophisticated, multi-state, very success oriented mid-management and professional recruiting organization, offers personalized, intensive training program plus continuous guidance. Major city locations available.

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485 5th Ave.
New York City, NY 10017

VIP

CITY OF PHOENIX
POLICE COMPUTER APPLICATIONS PROGRAMMER II
$19,115-25,792 Annually

One year experience in programming mini digital computers. A Bachelor's degree in mathematics, computer science or related field is preferred. Any other combination of experience and education with the knowledge, skills and abilities required to perform the work may be substituted. Must meet polygraph and background standards appropriate for nonsworn employees of the Police Department. Applications will be accepted on a continuous basis until a selection has been made. Apply:

CITY OF PHOENIX
Personnel Department
[illegible] N. 3rd Avenue
Phoenix, AZ [illegible]
Equal Opportunity/Affirmative Action Employer

SUPERVISOR, SYSTEMS ANALYSIS AND DESIGN
Greenwich CT
$18,791-24,401

Excellent benefits. Supervises systems development and implementation activities. Designs programs and maintains computer software. Considerable experience in computer programming and systems analysis. Resume to Personnel Office, Town of Greenwich, Town Hall, Greenwich, CT 06830 by Dec. [illegible], 1980.

ATLANTA/S.E.

CONSULTANT (TECH SUPPORT) TO [illegible]+

[illegible]

DATA BASE MGR TO [illegible]+

[illegible]

DP MGR TO [illegible]

[illegible]

SUPPORT TO [illegible]

[illegible]

Client companies pay all costs. For more information on the above positions, contact [illegible] at 404/[illegible], or send resume in confidence including current salary to:

FOX-MORRIS PERSONNEL CONSULTANTS
47 Perimeter Center E, N.E.
Atlanta, GA 30346

EDP OPPORTUNITIES

SYSTEMS Consul Wall St. Prog & Design	[illegible]
PROJ Mgr [illegible] 11/70 [illegible]+	[illegible]
B/A Sys-MBA [illegible] O.E.	[illegible]
P/A on-line [illegible] TANDEM [illegible]	[illegible]
PROJ LDR - dsg OS, COBOL, CICS	[illegible]+
ADABASE D/B Anal VS1/MVS TSO	[illegible]+
MGR Systems - OS, MVS, CICS	[illegible]
ASST MGR Tec Support - JCL ASM/DOS ROSCOE, [illegible]	[illegible]
PLANNING ANAL WALL ST. [illegible]	[illegible]

NEW JERSEY

PROJ LDR - Dsg order entry CICS	[illegible]
PROJ Mgr 3031, OS VS 1, CICS	[illegible]+
SOFTWARE OS, VS1, CICS	[illegible]
SYSTEMS Consul MBA G/L	[illegible]
EDP AUDITOR CARS - 3 or other [illegible]	[illegible]
SYSTEMS ANAL [illegible] IDMS, MVS	[illegible]
P/A dsg COBOL, IDMS	[illegible]
PROJ Ldr order entry CICS, MBA pfer	[illegible]
SR SOFTWARE DOS, CICS	[illegible]
SOFTWARE MVS degree	[illegible]
P/A, CICS, OS, VS 1	[illegible]
PROJ Ldr degree [illegible]	[illegible]
[illegible] Systems communications, [illegible]	[illegible]

WESTCHESTER/CONN

S/A Prog PDP 11/60/70, RSX11M [illegible] 2 Assembler	[illegible]
P/A, MVS, TSO, COBOL	[illegible]
S/A, Communication, MVS 1, TOTAL CMS, COBOL	[illegible]+
PROJ Ldr DOS, VS, DL1	[illegible]
S/A [illegible], IDMS, CICS, COBOL, OS	[illegible]
S/A, CICS, OS, Data dictionary	[illegible]
SR P/A-[illegible], IDMS, OS	[illegible]
P/A, OS, CICS, [illegible]	[illegible]
PROJ Ldr CICS, OS, MBA	[illegible]

Call [illegible]
(212)[illegible]
WILLIAM [illegible] ASSOC.
[illegible] Broadway, NY NY [illegible] (Agency)

ROBERT HALF

DALLAS
SOFTWARE SPECIALISTS

We are currently filling key positions for several NYSE listed clients. All require IBM, OS or DOS systems background. Specifically, positions require one or more of the following: IMS, CICS, MVS, DOS-VS, DL-1 or assembler. To [illegible].

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New and expanding Univac needs talented people to take a role in development of new systems. Requires at least 2 yrs 1100/ECL, COBOL in a business environment. To [illegible].

CONTACT: JOHN STANGER
ROBERT HALF OF DALLAS, INC.
Two North Park East
Suite [illegible]
Dallas, TX [illegible]
(214) [illegible]

SENIOR PROGRAMMER ANALYST

We are looking for strong, clear-thinking independent individuals. We have openings at sites in Detroit, Boston, Atlanta, Houston and Minneapolis areas. Urgent needs are in inventory and materials control, local and remote. For more details contact John B. [illegible], Technical & Executive Division, 400 W. Parklane Towers, Dearborn, MI 48126 or call him at 313/[illegible].

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Nationwide

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or in Florida call 1/305/771-[illegible] collect.

Cosmo Data Services
[illegible] N. Dixie Hwy.
Ft. Lauderdale, FL [illegible]

All fees paid by clients.

ASSEMBLY LANGUAGE PROGRAMMERS
San Francisco Bay Area

Varian Instrument Group is a leading manufacturer of scientific instruments and data handling devices for chemical instrumentation. Our growing Walnut Creek division is conveniently located in the San Francisco East Bay area, just a few minutes from downtown San Francisco.

Our expanding software development department has immediate openings for Programmers to participate in the development of microprocessor-based products. Minimum 2 years assembly language programming experience on Z80 or 8080 CPU's. Prefer degree in computer science or related field with some chemistry. Real Time operating systems experience desirable.

We offer excellent fringe benefits including 100% tuition refund for job related studies, health and dental insurance plans for employees and dependents. For confidential consideration please send your resume, including salary history and requirements to: Professional Employment, 2700 Mitchell Drive, Walnut Creek, CA 94598. An equal opportunity employer f/m/h/v

VARIAN
Instrument Group

DATA BASE ADMINISTRATION

Management position available which is responsible for established Data Base Administration Group, IMS db/dc environment, which provides heavy consulting in on-line application development and data base design, control of data definition through data dictionary, control of integrity of data bases, installation of data bases and associated programs. Minimum qualifications: five years experience in information systems including three years in application development or systems support using data base software and one year supervisory experience. Strong communication skills and Bachelor's Degree.

Liberal benefits include opportunity to continue education. Applications must be received by December 15, 1980. Send resume and salary history to:

UNIVERSITY OF ILLINOIS
Administrative Information
Systems Development
[illegible] E. Chalmers, Room [illegible]
Champaign, Illinois [illegible]

The University of Illinois is an Affirmative Action/Equal Opportunity employer and encourages applications from members of minority groups and women.

DIBOL PROGRAMMER

Development of a sophisticated import/wholesale distribution system in Miami, Florida needs an experienced programmer. To qualify you must have several solid years of Dibol experience and be thoroughly familiar with the RSTS operating system and the RMS11-K.

Business background is very helpful. Development package includes order entry, billing, purchasing, inventory control, accounts receivable and accounts payable. A job for a career minded programmer. Full benefits.

For prompt confidential consideration send your resume and salary requirements to:

P.O. Box [illegible],
Miami, Fla. [illegible]
Attn: DP Manager

UPSTATE NEW YORK

PROJECT MANAGER: Multi-project mgt. duties with consulting firm specializing in state-of-the-art MIS systems. Strong mgt. skills. $32,000 plus.

SYSTEMS ENGINEER: Develop real-time data base systems for telephone industry applications. PDP-11 UNIX operating system, C language. $25,000.

PROGRAMMER ANALYST: Mfg. applications including national service system. Cobol, CICS. $22,000.

[illegible] PERSONNEL agency

[illegible] Security Tower,
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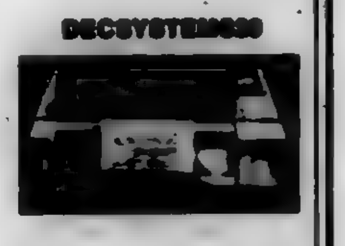

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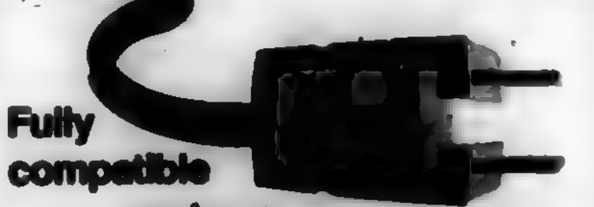

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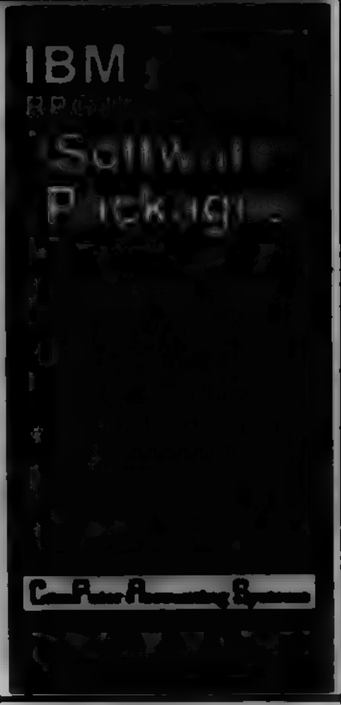

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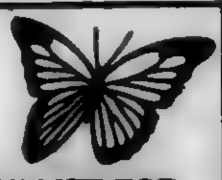

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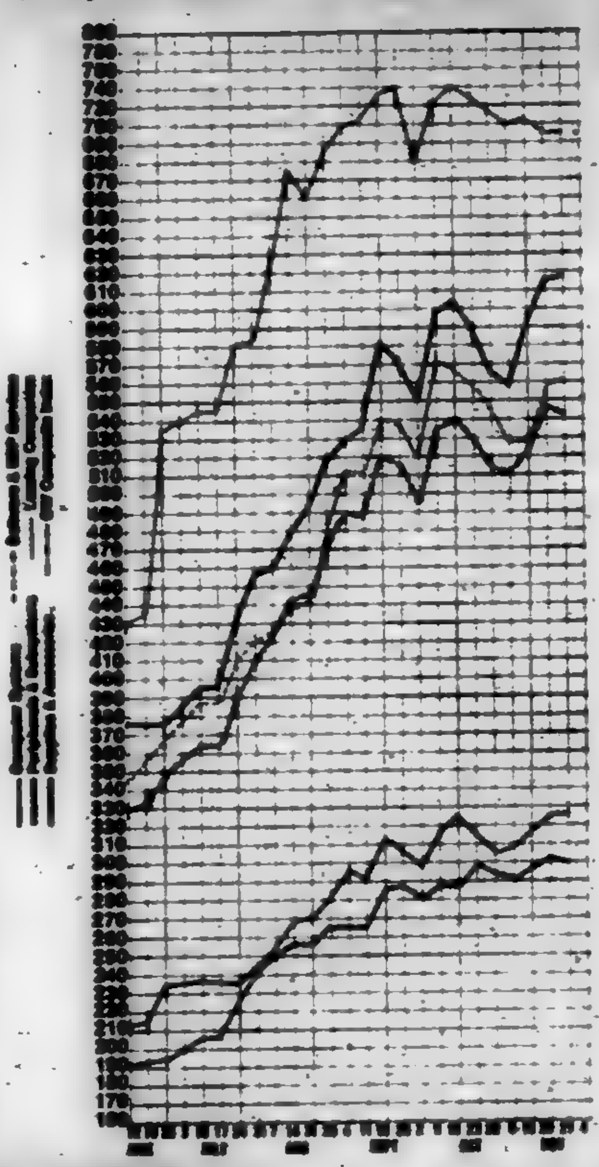

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Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, NOVEMBER 25, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHANGE	WEEK PCT CHANGE
A	AMDAHL CORP	15- 42	34 3/8	- 1/4	-0.7
N	BURROUGHS CORP	47- 80	52 3/8	+5 1/8	+10.8
O	COMPUTER AUTOMATION	9- 27	24 1/4	+ 1/4	+1.0
N	CONTROL DATA CORP	38- 77	73 1/2	+1	+1.2
O	CRAY RESEARCH INC	30-101	97 1/4	+2 1/4	+1.2
N	DATA GENERAL CORP	46- 87	76 5/8	+1	+1.3
N	DATAPOINT CORP	44-115	115	+4	+3.4
N	DIGITAL EQUIPMENT	52- 98	91 1/4	-4	-4.1
A	ECCO INC	9- 20	20	- 1/8	-0.3
N	ELECTRONIC ASSOC.	6- 12	8 1/2	+ 1/4	+3.0
O	FOUR-PHASE SYSTEMS	20- 49	25 3/4	-2 1/8	-7.6
N	FOXBORO	21- 59	58 3/4	+2 1/2	+4.4
O	GENERAL AUTOMATION	7- 19	9 7/8	+ 3/4	+8.2
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	46- 95	92	-2 3/4	-2.9
N	HONEYWELL INC.	65-104	103 3/4	+4 1/8	+4.1
N	IBM	50- 79	69 1/2	-1 7/8	-2.6
O	MAGNUSON COMP SYSTS	20- 45	43 1/2	-1 1/2	-3.3
O	MANAGEMENT ASSIST	9- 25	18 1/4	-2 1/2	-12.0
O	MANUFACTURING DATA S	22- 80	79 1/2	+4 1/4	+5.6
O	MINI-COMPUTER SYST	2- 6	2 7/8	- 1/4	-8.0
O	MODULAR COMPUTER SYS	9- 31	27 1/4	- 1/2	-1.8
N	NCR	52- 82	72 1/4	- 3/4	-1.0
N	PRIME COMPUTER INC	15- 56	55 7/8	+ 1/4	+0.4
N	PERKIN-ELMER	26- 49	48	+1 3/8	+3.0
N	SPERRY RAND	42- 60	59 7/8	+ 7/8	+1.4
A	SYSTEMS ENG. LABS	11- 47	46 1/2	+ 1/4	+0.5
O	TANDEM COMPUTERS INC	13- 48	47 1/4	+2 3/8	+4.3
N	TEXAS INSTRUMENTS	79-146	146 1/8	+4 1/8	+2.9
A	WANG LABS.	17- 60	41 1/2	-2	-4.5

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHANGE	WEEK PCT CHANGE
O	BOOTHE FINANCIAL CP	13- 37	22 1/4	+ 1/4	+1.1
N	COMDISCO INC	6- 23	22 3/8	- 1/4	-1.0
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVSTRS GRP	2- 4	1 3/4	+ 1/8	+7.6
O	CONTINENTAL INFO SYS	2- 15	4 7/8	- 1/8	-2.5
N	DATRONIC RENTAL	2- 5	4 1/2	+ 1/8	+2.8
A	DCL INC	2- 6	2 5/8	- 1/8	-4.6
N	DPF INC	5- 12	6 5/8	- 1/8	-1.8
N	ITEL	1- 13	1 1/8	- 1/8	-10.0
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 5/8	0	0.0
N	RELIANCE GROUP INC	24- 79	73 1/4	+3 3/4	+5.3
N	U.S. LEASING	12- 24	23 3/8	+ 3/8	+1.6

$ CULLINANE CORP PRICE DECLINE IN NOV 12 REPORT RESULT OF STOCK SPLIT. CORRECT PRICE OF 29 1/8 WAS +2 1/8 AND +7.32 FOR THE WEEK.

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHANGE	WEEK PCT CHANGE
O	ADVANCED COMP TECH	1- 6	4 7/8	- 1/2	-9.3
O	ANACOMP INC	7- 24	21 1/2	-1 3/8	-6.0
O	ANALYSTS INTL CORP	3- 12	12	+ 1/2	+4.3
A	APPLIED DATA RES.	6- 24	20 3/8	- 1/8	-0.6
N	AUTOMATIC DATA PROC	31- 52	48 1/4	-2 3/4	-5.3
O	CBA COMPUTER ASSOC	9- 17	14 1/2	+1 3/4	+11.8
O	COMPUTER HORIZONS	1- 5	2 3/8	- 1/8	-4.5
O	COMPUTER NETWORK	4- 9	7 1/2	0	0.0
N	COMPUTER SCIENCES	11- 20	16 3/4	-2 1/8	-11.2
O	COMPUTER TASK GROUP	5- 23	22	-1 1/4	-5.3
O	COMPUTER USAGE	2- 10	7 1/4	-1	-12.1
O	COMPUT AUTO REP SVC	4- 11	11 1/8	+ 1/8	+1.1
O	COMSHARE	11- 21	16 1/4	- 1/2	-2.9
O	CULLINANE CORP $	18- 40	39	- 1/2	-1.2
O	DATA DIMENSIONS INC	1- 4	1 1/4	- 1/8	-9.0
O	DATATAB	1- 4	1 1/8	0	0.0
O	DBI CORP	4- 9	8 3/8	+ 1/8	+1.4
N	ELECTRONIC DATA SYST	19- 37	32	-1 3/8	-4.0
O	INFORMATICS INC	9- 25	24 1/4	+1	+4.3
O	INSYTE CORP	1- 3	2 1/8	+ 3/8	+21.4
O	IPS COMPUTER MARKET.	2- 6	5	0	0.0
O	KEANE ASSOCIATES	2- 9	5 3/4	+ 1/4	+4.5
O	KEYDATA CORP	1- 5	3/4	+	+0.3
A	LOGICON	13- 28	27 7/8	+1 1/4	+4.3
O	MATHEMATICA INC	3- 10	13 1/4	+ 3/4	+6.0
O	MATHEMATICAL APP GRP	7- 23	19 1/2	-1	-4.8
O	NATIONAL DATA CORP	10- 31	29 1/2	- 1/4	-0.8
O	PLANNING RESEARCH	5- 13	11 1/2	- 1/8	-1.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 10	9 3/4	+1 1/4	+14.7
O	REYNOLDS & REYNOLDS	21- 30	30	+ 1/2	+2.1
O	SYSC INC	6- 24	23 3/4	+4 1/4	+21.7
O	SCIENTIFIC COMPUTERS	6- 29	27 1/4	- 3/4	-2.6
N	TYMSHARE INC	24- 67	66	+1 3/8	+1.6
A	URS SYSTEMS	9- 17	16 7/8	+ 1/2	+3.0
O	WYLY CORP	4- 20	16 3/8	0	0.0

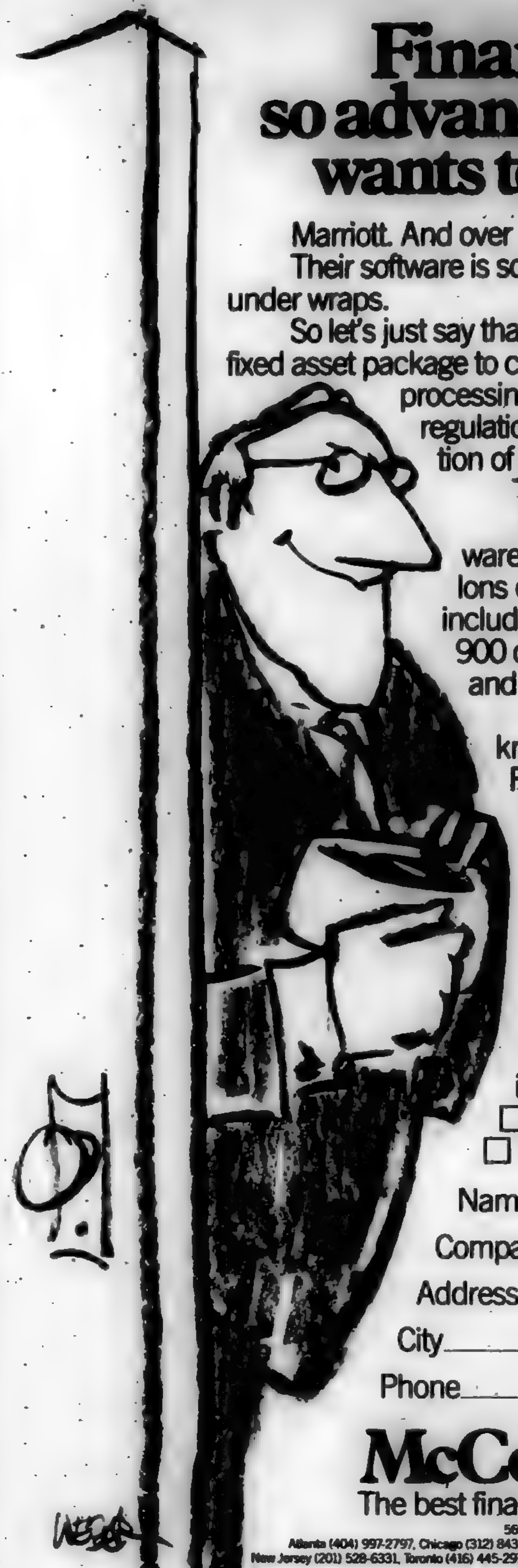
PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHANGE	WEEK PCT CHANGE
N	AM INTERNATIONAL	13- 26	16 3/8	+1 3/4	+11.7
N	AMPEX CORP	14- 35	34 1/2	+2 1/2	+7.8
A	ANDERSON JACOBSON	6- 25	22 3/8	0	0.0
O	APPLIED DIG DATA SYS	5- 12	11 7/8	0	0.0
O	AUTO-TROL TECHNOLOGY	15- 62	49	+ 1/2	+1.0
O	BEEHIVE INT'L	3- 24	24	+2 3/8	+10.9
A	BOLT, BERANEK & NEW	12- 26	25 3/8	+2 1/4	+6.7
N	BUNKER-RAMO	17- 41	39 3/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 9	2 7/8	- 1/4	-8.0
N	CENTRONICS DATA COMP	20- 50	27 3/8	-2 3/4	-9.0
A	CETEC CORP	3- 7	6	- 1/4	-4.0
O	COMPUTER DEVICES INC	5- 10	7	+ 1/8	+1.7
O	COGNITRONICS	1- 10	10	+ 3/8	+3.8
O	COMPUTER COMMUN.	4- 10	5 3/8	+ 1/4	+4.9
O	COMPUTER CONSOLES	4- 29	23 3/4	0	0.0
O	COMPUTER TRANSCEIVER	1- 5	4 7/8	- 1/4	-4.8
N	COMPUTERVISION CORP	24- 92	80 3/4	+ 3/4	+0.9
O	CONRAC CORP	12- 25	19 5/8	+1	+5.3

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHANGE	WEEK PCT CHANGE
A	DATA ACCESS SYSTEMS	6- 20	19 1/8	+ 7/8	+4.7
A	DATA PRODUCTS CORP	11- 26	20 3/4	+2 1/8	+6.3
O	DATUM INC	2- 5	4 1/4	- 1/8	-2.8
O	DECISION DATA COMPUT	2- 6	4 3/8	+ 1/2	+12.1
O	DELTA DATA SYSTEMS	1- 3	1 3/4	- 1/8	-6.6
N	DOCUMATION INC	7- 27	18 3/4	+ 3/4	+4.1
O	DATARAM CORP	6- 37	12	+ 1/8	+1.0
N	ELECTRONIC M & M	3- 9	8 3/4	+ 1/8	+1.4
O	EVANS & SUTHERLAND	21- 83	76 1/2	-6	-7.2
O	FABRI-TEK	1- 4	2 1/4	- 3/8	-14.2
O	GENERAL COMPUTER SYS	1- 7	6	0	0.0
O	GENERAL DATACOMM IND	5- 20	21	+1 7/8	+9.8
O	GENERAL TERMINAL CP	1- 4	2 1/8	- 1/4	-12.4
N	HAZELTINE CORP	12- 33	27 3/4	- 5/8	-2.2
N	HARRIS CORP	25- 58	52 1/4	-3 1/8	-5.6
O	INFORMATION INTL INC	8- 18	12	- 1/4	-2.0
O	INTEL CORP	23- 90	46 3/4	-2	-4.1
O	INTERSIL	13- 36	33 3/4	+ 1/4	+0.7
A	LUNDY ELECTRONICS	4- 17	10 1/2	- 3/4	-6.6
O	MSI DATA CORP	8- 16	14 7/8	+ 3/4	+5.2
N	MEMOREX	10- 34	14 1/8	0	0.0
N	MOHAWK DATA SCI	10- 31	27	- 1/8	-0.4
O	ONEX	2- 12	12	0	0.0
A	PARADYNE CORP	18- 65	63 1/4	-1 3/4	-2.6
A	PENRIL CORP	9- 15	14 3/8	+ 3/4	+5.5
O	RAMTEK CORP	10- 21	20	+1 3/4	+9.5
O	RECOGNITION EQUIP	8- 21	20 1/2	+ 5/8	+3.1
O	SCAN DATA	1- 5	1 3/4	- 1/8	-6.7
N	STORAGE TECHNOLOGY	12- 25	25 1/4	+ 5/8	+2.5
O	SYKES DATATRONICS	14- 50	32 1/4	-8	-9.5
O	T BAR INC	14- 24	22 3/4	0	0.0
A	TEC INC	3- 9	4 3/4	- 1/2	-9.5
N	TEKTRONIX INC	43- 70	64 3/4	-3	-4.4
N	TELEX	3- 6	6	+ 1/4	+4.3
O	TERMIDATA SYSTEMS CP	8- 26	14 3/8	- 1/8	-0.8
A	TIMEPLEX INC	7- 22	21 1/2	+1 1/2	+5.0
O	WILTEK INC	1- 3	2 1/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE NOV 25 1980	WEEK NET CHANGE	WEEK PCT CHANGE
A	AMERICAN BUS PRODS	8- 15	14 3/8	0	0.0
O	BALTIMORE BUS FORMS	1- 3	1	0	0.0
O	BARRY WRIGHT	6- 22	20 3/8	- 1/8	-0.6
O	CYBERMATICS INC	1- 2	1 1/8	- 1/8	-10.0
A	DUPLEX PRODUCTS INC	11- 16	13 3/8	- 1/4	-1.8
O	ENNIS BUS. FORMS	12- 21	14 3/8	+ 1/8	+0.7
N	3M COMPANY	46- 63	59 3/8	- 3/8	-1.0
O	MOORE CORP LTD	27- 37	33 1/4	+ 3/8	+1.1
N	NASHUA CORP	20- 33	27 1/8	-1 1/4	-4.4
O	STANDARD REGISTER	22- 35	30 3/4	- 1/8	-0.8
A	TAB PRODUCTS CO	9- 27	26 3/8	+1	+3.9
N	WABASH MAGNETICS	11- 27	26 1/2	+2	+8.1
N	WALLACE BUS FORMS	23- 33	45 5/8	-3	-6.1



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NEWSPAPER

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.
December 8, 1980 $1.00 a copy; $30/year

The HP 3000 Series 44

Top-End HP 3000 Hikes Price/Performance 90%

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Hewlett-Packard Co. last week extended the high end of its most powerful processor family by announcing a system that reportedly boasts 90% better price/performance than the company's previous top-of-the-line model, the 3000 Series III.

The 3000 Series 44, HP's latest high-end systems addition, provides twice the processing power of the Series III for just a 5% increase in price, a company spokesman said.

Among its key features, the Series 44 is said to provide a significantly enhanced version of the MPE-III operating system long available with the Series III.

Support for HP's recently announced operating system revision, dubbed MPE-IV, is currently limited to just the Series 44.

By the end of the first quarter of next year, MPE-IV support is expected to be extended to the rest of the Model 3000 processor family as well, the spokesman predicted.

In addition to the top-of-the-line Series 44, the 3000 family currently consists of the Series 30 and 33 as well as the Series III.

Key Element

Another key element in last week's Series 44 introduction was the announcement of an optional service agreement that entitles users to financial compensation if their top-of-the-line systems' downtime exceeds 1% a month.

The guaranteed uptime service agreement gives HP a strong incentive to make sure that a Series 44's critical systems modules — processor, main memory and disk storage — consistently operate at a 99% or better reliability level, the spokesman said.

In other product developments, HP last week introduced the Model 2680

(Continued on Page 4)

HP Guarantees 99% Uptime

PALO ALTO, Calif. — Responding to the growing user demand for increased product reliability, Hewlett-Packard Co. is offering its just-announced 3000 Series 44 processor with a money-back guarantee of at least 99% hardware uptime.

The guarantee forms the centerpiece of an optional maintenance agreement that adds 7.1% to the cost of a normal, full-time service contract and covers a Series 44's pro-

(Continued on Page 4)

Honeywell Doubles Bits Unwrapping DPS 6

By Tim Scannell
CW Staff

BILLERICA, Mass. — Honeywell, Inc. last week unveiled a 10-processor family of computers — including two 32-bit systems — that it said has double to triple the power of the firm's Level 6 minicomputer for a cost of about 10% to 20% more.

The two 32-bit computers in the DPS 6 series lineup represent the company's initial push into the highly competitive "supermini" market and are directly targeted against Digital Equipment Corp.'s VAX-11/780 and newer VAX-11/750. In addition, four of the DPS 6 family's eight 16-bit computers can be field-upgraded to fully compatible 32-bit systems, reportedly an industry first.

To accommodate its new systems, Honeywell also unwrapped an updated version of its Gcos Mod 400 operating system. The software features enhancements that increase system availability, improve memory utilization and boost file system capabilities, according to a Honeywell spokesman.

The DPS 6 computers — or "Solution Systems" — consist of the low-end DPS 6/30, 6/32, 6/34 and 6/38; the medium-range 6/48, 6/54, 6/74 and 6/76; and the top-of-the-line 32-bit 6/92 and 6/96.

The architectural roots of all these systems are based on the Level 6 minicomputer, enabling them to run any programs or applications developed on the Level 6 without prior software modifications.

CW Photo by T. Scannell

Stephen G. Jerritts, president of Honeywell Information Systems, last week reassured Level 6 users the firm will not abandon them. The newly announced DPS 6 series was not designed to replace the four-year-old processors, he said. Story on Page 6.

Unlike their closest competitor and other 32-bit rivals, the DPS 6 computers are Cobol-oriented and feature a business-slanted commercial instruction set.

Also, since the machines were designed to fit into the company's Distributed Systems Architecture (DSA)

(Continued on Page 6)

Pouzin Explores 'Seven Plagues of the '80s'

By John Whitmarsh
CW Staff

LONDON — For all the blessings of computer technology, a number of curses — most of the industry's own making — remain.

Louis Pouzin, director of pilot projects at the Institut de Recherche d'Informatique et d'Automatique (Iria) in Paris, called them the "seven plagues of the '80s."

The problems, which he discussed before an audience at the Infotech State of the Art review here recently, include:

- *Human interface mismatches.* "Here is precisely where human beings and computer systems are light-years away from each other," according to Pouzin. "We do not handle the same abstractions."

Humans communicate with computers in their language. "Granted we do not use binary or assembly codes, but the difference is only superficial," Pouzin noted. "We use keywords, syntax, keys, menus, optional or positional control arguments and so on. Anything offered to us is nothing but a mapping of a subroutine call, and we are supposed to be the 'main' program."

- *Communication gaps.* Public data networks are growing up, but are they growing more public? Not in the sense of the public telephone system, which has a phone booth on every corner, a telephone directory in every booth, an operator for assistance and a dial to reach any number in the world. None of this applies to the so-called public data networks, Pouzin said.

"First, there is no public terminal

(Continued on Page 2)

Analyst Finds 3081 Disappointing, But He Expects Dramatic Changes

By Tom Henkel
CW Staff

MONTREAL — IBM's 3081 processor offers no new functions, uses a jury-rigged cooling system and gives less performance for the dollar than Amdahl Corp.'s 5860 processors — but things will change.

That was the opinion of Robert Fertig, president of Advanced Computer Techniques Corp.'s (ACT) Technology Analysis Group, on IBM's Nov. 12 announcement of the machine, long anticipated as the H series.

Speaking at last week's Future Systems Forum Canada, Fertig said IBM has some dramatic changes planned for the 3081 over the next three to six months:

- IBM has left the door wide open to add 31 more bits of addressable storage to the 3081 processor.
- The vendor could make the 3081 considerably faster by announcing a specialized version of MVS/SP as the 3081's native operating mode.
- Throughput could be further

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-0010-4841) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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Pouzin Sees 'Seven Plagues of '80s'

(Continued from Page 1)

anywhere. Second, there are no directories with numbers and call procedures. Third, there is no assistance. And finally, it is very likely that the computer we want to dial is not accessible for some reason. What is accessible – and how – is presently a well-kept secret," Pouzin said.

Even when computers are available through the public networks, using them is "extremely hard and painful" because of antiquated switching plants, noise, wrong or busy numbers, disconnections and expensive long-distance telephone charges. Moreover, in most countries the maximum speed is 30 char./sec, which is totally inadequate for display terminals.

"Data networks work no better than any computer installation that keeps being upgraded," Pouzin said, adding that a transatlantic virtual circuit between France and the U.S. goes down about once an hour and that circuit lifetime on some evenings is as little as 10 minutes.

"This plague of continuous instability appears to have no cure for at least another decade. New networks develop, older ones are rebuilt, new procedures are introduced, new software is phased in with new errors, numbers change and so do expectations. Before it gets better, it is distinctly getting worse. This trend is not likely to change soon."

- *Lack of Support*. Since public data networks are new and expanding fast, customer support has not yet reached a satisfactory level. A more fundamental cause, Pouzin claimed, is that public data networks have been designed without functions for customer support.

"In the telephone and telex systems, we use the same terminal for talking to our correspondents and to the telephone/telex operator. There is no such thing in data networks," Pouzin said.

The problem worsens with international networks. "Without exception, every carrier is proficient in explaining that the trouble is caused by another carrier and that they cannot help. This finger-pointing syndrome is well known, as it has always been the hallmark of international communications.

Additional coverage of Infotech appears on Pages 10, 11 and 12.

"Since the territorial division of the world in national monopolies is not likely to change soon, the built-in irresponsibility in international communications is also likely to remain," Pouzin predicted.

- *Pseudo-standards*. Pouzin believes the most popular standard in data communications is the V24 interface because it provides easy interconnection between equipment of various makes and because it does little except pass bits.

"The X.25 packet interface, however, is going in an opposite direction," Pouzin said. "The written description takes more than 100 pages in natural English, which means that X.25 is a system in itself."

The consequence is that the interpretation of such a bulky document is necessarily ambiguous. In addition, the standard provides for many incompatible national and subscriber options, and interconnection between two X.25 interfaces is only possible if they have been carefully engineered with compatible options, according to Pouzin.

"While standards for real circuit interfaces (V24, V35, X.20, X.21) are now reasonably stable, standards for packet networks (X.25, X.28, X.29) are a moving target," Pouzin charged.

"Between the initial version in 1976 and the present one in 1980, there have been a number of changes, deletions, additions, options and explanations which have doubled the size of the document.

"Since there is no commonly agreed implementation of these standards, market pressures and national interests are going to produce frequent adjustments, whether or not they will be officially standardized."

- *Reliability*. The rise of the data networks has increased the amount of equipment that must function properly and simultaneously, but human and system failures and the lack of any realistic redundancy limits service on a data network to no more than 80% of availability, Pouzin said.

"Despite the higher intrinsic reliability of modern technology, the unstable environment of data networks produces a deterioration at global level. And as long as instability remains, reliability will go up and down," Pouzin believed.

- *Regulations*. While the present policy in the U.S. is to eliminate most forms of communications regulation in favor of the marketplace, that is not the policy in Europe. The tradition here and in the rest of the world is to regulate not the common carriers but their potential competitors.

"Owing to their status of state administrations, postal, telephone and telegraph administrations are setting the rules to their own advantage for both domestic and international communications," Pouzin charged. "As they are also the ones who benefit from the rules, there is no reason to think that the freedom left to other businesses will expand at all. Nevertheless, fluctuations will appear when new services develop."

- *Unemployment*. Computer technology will take its greatest toll in the workplace and especially on production workers, Pouzin said. He believes it would take a wholesale restructuring of society to absorb laid-off workers.

"Thus the future will presumably be made of persisting conflicts between technology and sociology. As people tend to become emotional when their own lifestyle is at stake, there is no reason to believe that technology will be assessed on its own merit. It is more likely to be associated with the social enemy and viewed as a threat."

This Week

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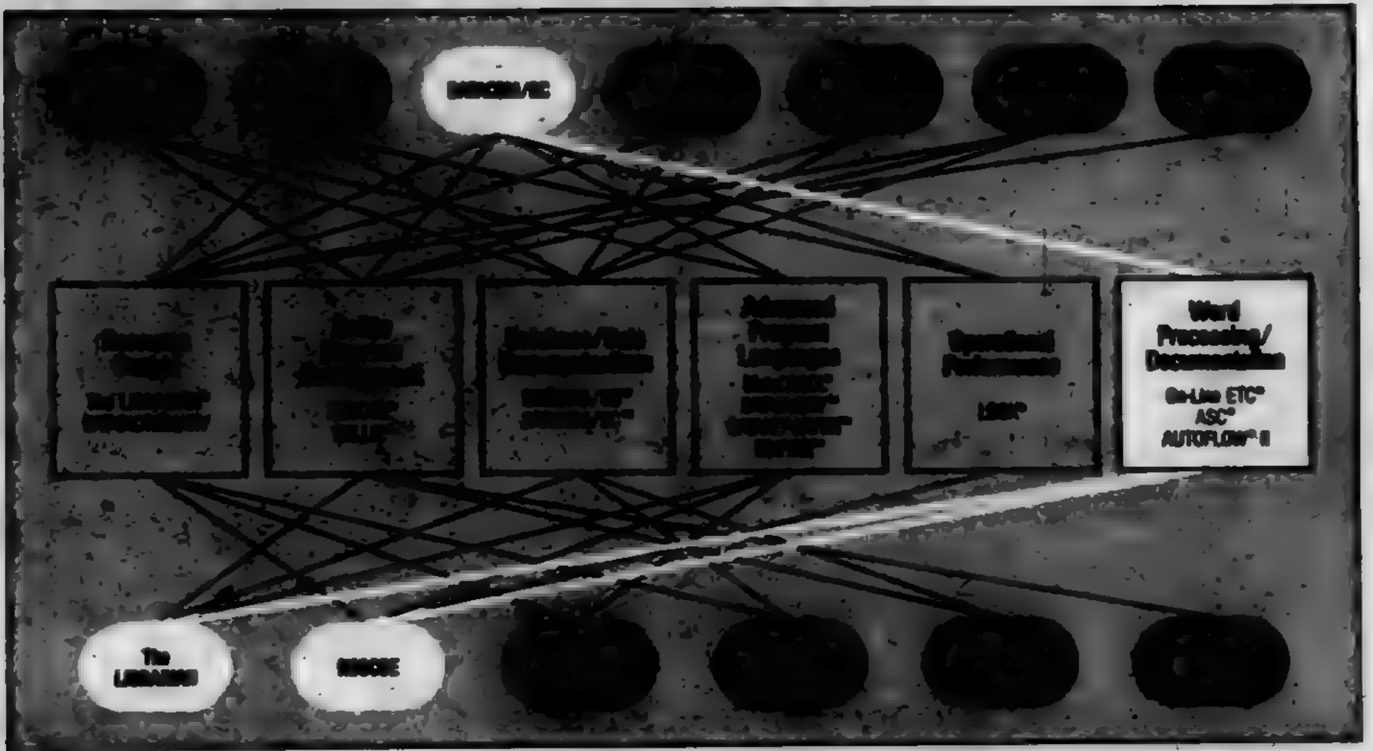

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HP Brings Out 3,000 Line/Min Laser Printer

PALO ALTO, Calif. — Users can reportedly simplify their forms design and thus cut their paper costs with a 3,000 line/min laser printer that operates under control of the Hewlett-Packard Co. 3000 systems family.

Introduced last week along with HP's 3000 Series 44 processor, the printer, designated the Model 2680, comes with an Interactive Design System (IDS). This is a software package that permits business forms to be generated electronically at the graphics terminal of a controlling HP 3000 processor.

Such forms are then transmitted to the printer, where they are automatically merged with their accompanying data during printing. The contents of the forms can come either from the controlling processor itself or from any other HP 3000 CPU linked to it in a network.

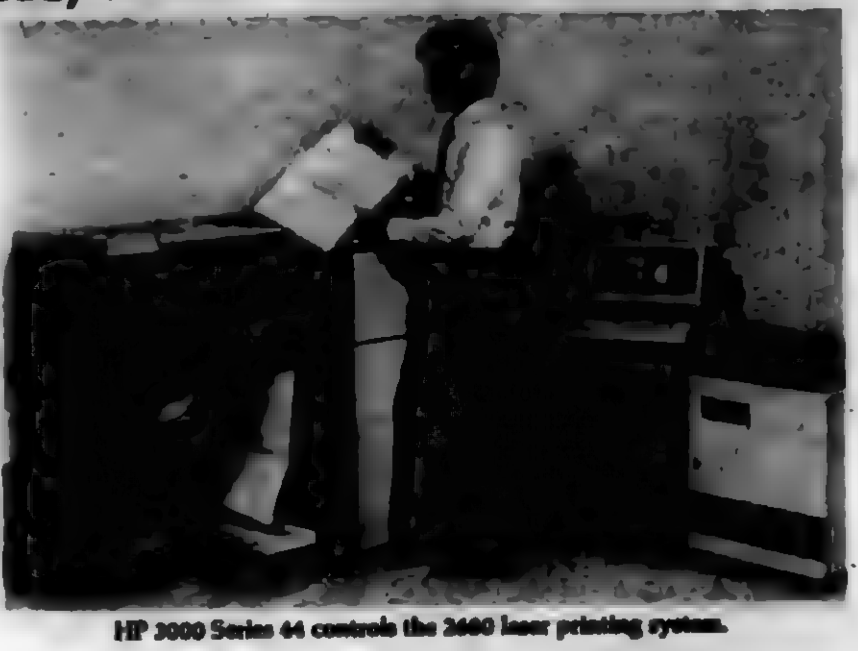
By permitting forms to be designed electronically, the 2680 enables users to dispense with most of their costly preprinted forms, HP said.

The printer's IDS software package also reportedly aids in the design of special character sets, symbols, logos, formats and signatures. In addition, a second software package known as the Interactive Formatting System (IFS) permits the constituent sections of multipart forms to be integrated to form complete documents.

The HP 2680 does not contain trinitrofluorenone (TNF), as the IBM 3800 laser printer does, nor any other carcinogens or mutagens, according to HP officials. Instead, it uses carbon black and various plastic isomers that have been tested by an independent laboratory and certified as safe, they said.

Designed primarily to operate as part of a distributed processing network, the 2680 prints 45 page/min, which translates to about 3,000 line/min.

The 2680 currently operates with HP's Series 30 and 33 processors as well as with the company's recently introduced Series 44.



HP 3000 Series 44 controls the 2680 laser printing system.

In fact, the only 3000 family member not now offering support for the laser printer is the Series III — a shortcoming HP expects to address sometime next year, probably during the spring, the spokesman said.

The 2680's $121,000 price tag covers the printer itself as well as the accompanying IDS and IFS software packages.

Deliveries of the system are slated to begin next February from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

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Series 44 Hikes HP Price/Performance 90%

(Continued from Page 1)

laser printer, a 3,000 line/min unit that enables users to eliminate most preprinted forms and operates with all HP 3000 family processors except the Series III, whose 2680 support will probably begin next spring.

Last week's announcement also resulted in the addition of another member to HP's daisywheel printer line. The Model 2601A printer is said to produce letter-quality output at either 32- or 40 char./sec.

The Series 44, meanwhile, falls into roughly the same performance class as the IBM 4331 Group II and will compete directly with systems like the 4300 series machines and the IBM System/38, the spokesman said.

Performance Edge

Much of the Series 44's apparent performance edge over the existing Series III reportedly stems from the larger machine's expanded main memory and disk-storage capabilities. The Series 44 holds up to 4M bytes of main memory, compared to a 2M-byte maximum for the Series III, and supports as much as 1.9G bytes of disk storage, twice the capacity of the next largest HP 3000 processor.

The Series 44 also owes its increased computing power to the machine's improved MPE-IV operating system, which boasts several advances over the existing MPE-III, including:

- A modified file manager to accommodate the top-of-the-line processor's expanded main memory requirements.
- An enhanced file system that reportedly streamlines the processing of disk-system I/O.
- A revised memory-management algorithm that purportedly simplifies main memory handling.

Yet another source of the Series 44's expanded processing power is its improved logic circuitry, the spokesman explained.

Unlike the Series III, which incorporates transistor-transistor logic and executes a microinstruction in 175 nsec, the Series 44 uses Schottky logic chips with a bit-slice approach that cuts execution times to 105 nsec.

Compatible with the other members of HP's 3000 family, the Series 44 supports all Series 30, 33 and III peripherals, except for a few paper tape and punch card units, the spokesman said. The top-of-the-line system also runs — without recompilation — all Cobol, RPG, Basic and Fortran programs already operating on existing 3000- family processors.

Like its sister systems, the Series 44 supports HP's Image/3000 data base management system, Query/3000 data base inquiry language, V/3000 business forms and data entry software, and Ksam/3000 keyed sequential access method software.

Protocol Support

As a system optimized primarily for distributed processing applications, the Series 44 also supports three mainframe communications protocols, including IBM 2780/3780, Hasp multileaving and 3270. In addition, the system communicates with multipoint terminals through HP's MTS/3000 software subsystem.

To upgrade a smaller 3000 family system to a Series 44, users merely swap their existing processor for the top-of-the-line model. A typical upgrade takes about eight hours and allows users to retain most if not all their original peripherals, the source said.

A basic Series 44 configuration incorporating a 1M-byte processor, four terminal ports, CRT terminal console, 50M-byte disk unit and 1,600 bit/in. tape unit costs $109,445. The minimum system can be expanded in 512K-byte increments for $10,000/increment.

Additional information about the Series 44 can be obtained from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

HP Warrants 99% Uptime

(Continued from Page 1)

cessor, main memory and up to two system-domain disk units.

Under the guaranteed-uptime agreement, HP awards a user a service credit if its Series 44's downtime exceeds 1% for any three-month interval. The amount of the credit equals a user's monthly service charge, HP said.

The guaranteed-uptime agreement means that a Series 44 operating 24 hour/day, seven day/week will qualify for a service credit if its total downtime exceeds 22 hours during a typical quarter.

"For HP, the agreement provides a strong financial incentive to keep a user's Series 44 up and running almost all the time," the spokesman said.

One of the keys to making the guaranteed-uptime agreement work is the Series 44's integrated Control and Maintenance Processor (CMP), a single-board microcomputer with self-test and diagnostic capabilities.

When part of a Series 44 fails, users activate the CMP locally in an attempt to pinpoint the source of the problem. In many cases, the CMP's self-test and diagnostic procedures allow users to specify the exact nature of their system's trouble when they request help from their area HP service center.

If a user-initiated self-test fails to isolate a systems bug, the CMP can be activated remotely from an HP service center, which can rerun the user procedure and perform additional diagnostics.

Slated to start Feb. 1, the guaranteed-uptime agreement will be made available to all Series 44s lying within a 100-mile radius of any HP primary service office.

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FBI Agent Says Crime Pays: DP Theft Averages $500,000

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Who says crime doesn't pay? The take from an "average" computer-related crime is approximately $500,000 and only about one of every 22,000 computer criminals goes to jail, according to one estimate.

"That sort of blows holes in this theory we tell our kids about crime not paying," Federal Bureau of Investigation (FBI) agent Paul Nolan noted at last week's Computer Crime Info.

Nolan, a supervisory special agent in the bureau's white-collar crime section, admitted the statistics on computer crime are not much more than best estimates, but said the magnitude of the problem is inescapable.

Nolan told the conference a "large computer company" — a manufacturer he would not identify — told the FBI recently "that they were aware during fiscal 1979 of 1,083 computer-related crimes." The average loss was $502,000, he said. Only 12% of the crimes were reported to law enforcement authorities and only 18% of those reported crimes resulted in convictions, according to Nolan.

Robbery Report

In an interview following his conference address, Nolan said a recent FBI bank robbery report showed embezzlements without the aid of a computer averaged $23,000 while computer-assisted embezzlements averaged $430,000. Bank robberies, by way of an additional comparison, averaged only about $3,000.

It is obvious, he said, that "computer people" have it all over the everyday "pencil-pusher" embezzler and the lowly, garden-variety bank robber.

Nolan expressed confidence in the bank-loss estimates because they came from various federal regulatory agencies that oversee financial institutions — a business sector that is heavily regulated and closely watched.

And of course no one expects the statistics to get any better any time soon, considering the massive proliferation of computers and the numbers of people exposed to them, he remarked.

The FBI, however, is much better prepared to investigate and assist in the prosecution of computer crime than it was just a few years ago, according to Nolan. He noted the Bureau recently lowered its mandatory retirement age, which necessitated bringing in many new agents.

Computer Backgrounds

Most of the new agents have had some exposure to computer science as part of their college curricula, he said. And because the FBI recruits a lot of accountants, it is getting significantly more people who are already familiar with computers.

In addition, all agents receive at least some training in computer crime investigation, with some agents going on to advanced study in what the Bureau calls "system deceit crime."

One thing the FBI is looking forward to is congressional approval of the proposed Federal Computer Systems Protection Act now languishing on Capitol Hill. Nolan said the FBI will continue to push for the bill when the new Congress comes in next year. The act "would make it a hell of a lot easier" to prosecute, he said.

But, he added, "one thing that we've learned is that it's not enough to try to control computer crimes by playing catchup. It's ridiculous to let this type of crime take root in fertile soil and then try to frustrate it rather than to do something about its breeding ground."

Nolan told the conference attendees that companies should "improve their business ethics. We want them to stop the crime before it occurs," he said.

The FBI wants these crimes reported, Nolan said, "because we want to do what is expected of us to do — that is, lock people up."

Computers Linked to Blaze

HARRISON, N.Y. — An explosion and fire that killed at least 26 people here last Thursday morning was apparently caused by some computers that Arrow Electronics Corp. was demonstrating for some of its executives.

The tragedy occurred at a recently built Stouffers hotel and conference center here. The five-alarm blaze reportedly killed some of the Arrow executives, who were there for a budget meeting. Toxic chemicals within the building were blamed for the fire's spread.

The Arrow demonstration was laid out in three rooms and consisted of "computers and other high-powered electrical equipment," according to reporters on the scene.

Arrow distributes memory modules, matrix printers and disk drives, among other computer-related products. A spokesman for Arrow refused to comment on what equipment was involved.

The fire broke out in a one-story conference center next to the nearly full 365-room, four-story hotel. Most of the victims were business executives.

Smoke inhalation was blamed for most of the deaths, but some victims burned to death.

Hotel officials said the building's smoke detectors and sprinkler systems functioned normally during the flash fire, which broke out at 10:23 a.m.

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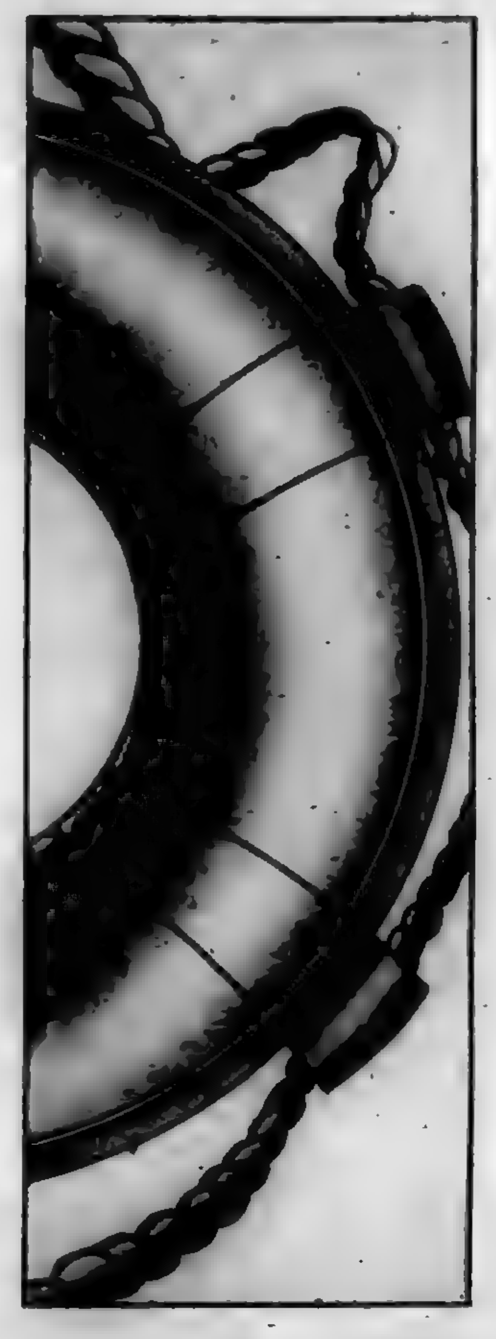

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Honeywell Unwraps 10-Member DPS 6 Family

(Continued from Page 1)

— introduced about two months ago — they are geared for distributed processing environments.

Low-End Models

The first three low-end DPS models feature a fiveslot Megabus and 128K bytes to 256K bytes of memory. Each processor can support up to eight communications lines and a variety of mass storage ranging from a 10M-byte cartridge disk drive for the 6/30 to an 80M-byte cartridge disk with the 6/34.

On the other hand, the DPS 6/38, while still a low-end system, has a 10-slot Megabus and a maximum memory capacity of 768K bytes. This system can support up to 24 communications lines.

Honeywell's first 32-bit computers are available in two models: the DPS 6/92 and the DPS 6/96 (pictured).

In a typical configuration, the DPS 6/30 is priced at $28,800, including a CPU with 128K bytes of memory, 10M bytes of disk storage, a 160 char./sec printer and two CRT terminals. A 6/38 similarly configured but with 256K bytes of memory and a 26M-byte disk costs $44,500.

Mid-Range Systems

All of the medium-range systems in the DPS team except for the 6/48 feature a second Commercial Instruction Processor (CIP) that acts as a slave to the main processor, handling Cobol- or RPG-generated programs. These systems can be supplemented by an optional Scientific Instruction Processor (SIP) for enhanced execution of Fortran or Basic programs, the spokesman pointed out.

The 6/48 can support up to 32 workstations and up to 1G byte of disk storage. It can also carry up to four printers, two card readers, four magnetic tape drives and/or two diskettes, the spokesman said.

The 6/54 and 6/74 can each support up to 40 communications lines and up to 1G byte of disk storage, while the 6/76 handles a maximum of 64 workstations and 2G bytes of disk storage. In addition, both the 6/74 and 6/76 incorporate a cache memory to speed processing.

Each of the four medium-range DPS systems can be upgraded to 32-bit computers basically by plugging extra boards into the processor. The machines feature an expandable Megabus that consists of a 32-bit bus line sandwiched between two 16-bit communications avenues. When the user wants to upgrade, 32-bit devices are inserted into the Megabus and make contact with the 32-bit pipeline, the spokesman explained.

The upgradable DPS computers are priced from $50,000 to $200,000 for typical systems.

'Flagship' Systems

Finally, the company's 32-bit computers — which were described as the flagships of Honeywell's extended momentum into distributed processing — offer a maximum of 64 communications lines with the 20-slot DPS 6/92 up to 112 I/O lines with the 40-slot 9/96.

The computers also respectively feature up to 2G bytes and up to 3G bytes of mass storage.

The 32-bit bus in both computers is a fully compatible superset of the 16-bit Megabus used in the Level 6. However, by doubling the width of the data path, throughput has also been doubled from about 7.5M to 13M byte/sec, the spokesman claimed.

Although the DPS 6/92 and 6/96 are fully software-compatible with the Level 6, in scientific and commercial applications the machines operate at about three times the speed of the Level 6 Model 57 — Honeywell's top-of-the-line Level 6 computer — a rate said to be significantly beyond that of most other 32-bit systems.

The 6/92 has a direct addressing range of 4M bytes while the 6/96 has a 16M-byte range. Using Honeywell advanced Cobol, the systems clock a Cobol execution rate of more than 80,000 statements per second, the spokesman said.

The multiprocessor 6/92 with 1M byte of memory, two disk drives, a console and a 600 line/min printer costs $223,400. The DPS 6/96 with 4M bytes of memory, four disk drives, two tape drives, a card reader and the printer sells for $461,800.

The 16-bit models in the DPS family will be ready for shipment in the first quarter of 1981 and the 32-bit machines will be shipped in the fourth quarter of 1981.

Jerritts Says DPS 6 Won't Replace Level 6

BILLERICA, Mass. — Although Honeywell, Inc's new DPS 6 series computers offer more computing muscle than the firm's Level 6 minicomputers for nearly the same price, they will not replace the four-year-old computer line.

"One does not take away from the other. One reinforces the other," Stephen G. Jerritts, president of the company, said at last week's system introduction.

However, "traditional minis are a thing of the past," he observed later that day.

Speaking at a press conference held at Honeywell's Small Systems and Terminals Divisions here, Jerrits reassured the small audience of mostly press people that the firm would not abandon the approximately 10,000 Level 6 users worldwide. Systems enhancements and improvements would be forthcoming.

However, Jerritts did say that the company's momentum would be toward distributed processing and the application of vertically aimed "Solution Systems."

Honeywell's chief executive officer also stated that the firm at this time would not do anything to alienate users of the company's Series 60 Levels 62 and 64 mainframes. Such is not the case in Europe, where a DPS 4 series of computer was unveiled as a direct replacement for the Level 62. The DPS 4 computers are not available in the U.S.

Meanwhile, Honeywell has high hopes for its DPS 6 solution systems, which incorporate the Level 6 processor as a front end, and sees the computers making up nearly 50% of the company's annual revenue in five years.

IBM Division Opens Second Retail Outlet

BALTIMORE — IBM's Office Products Division opened its second retail sales outlet here.

Like IBM's first outlet, opened in mid-November in Philadelphia, the Baltimore store will focus mainly on IBM's line of typewriters and copiers. IBM's Displaywriter, a word processing unit, and the 5100, a desktop computer, will also be available.

The store will offer other computer paraphernalia such as printer ribbons and paper for certain hardware, a spokesman said.

IBM plans to open several stores in 1981, but a spokesman declined to say how many stores or where they would be located.

However, the spokesman said the sucess of the Philadelphia and Baltimore stores would determine future policy.

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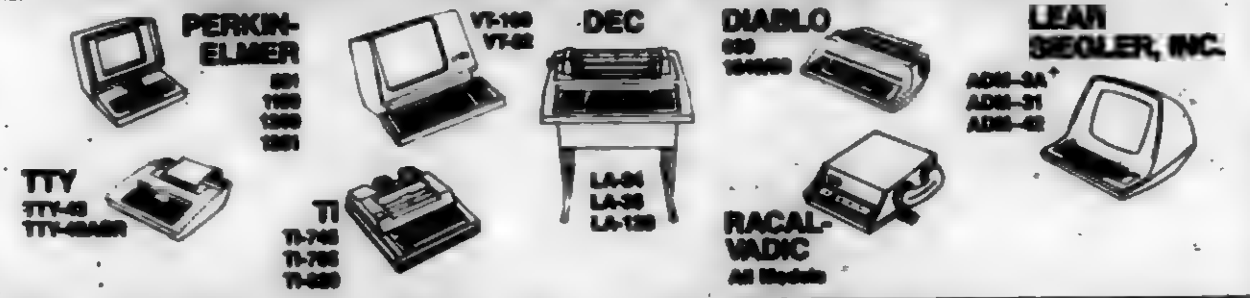

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Honeywell Offers WP Application, Office Software

By Tim Scannell
CW Staff

BILLERICA, Mass. — Honeywell, Inc. waded into the fast-moving office automation waters last week by introducing a word processing (WP) software application and two software systems for large, multiterminal users.

The software-based systems were introduced at the same time as the DPS 6 series processors, whose distributed processing capabilities they were designed to enhance.

The Word Processing 6 application package runs on both DPS 6 or Level 6 computers under the Mod-200 and Mod 400 executives of the Gcos 6 operating system.

In a nutshell, the package allows users to interchange text and data processing files or incorporate information from different systems' files into a single report.

The files can be placed on the same system, on another system, or can be telecommunicated from a remote mainframe, a spokesman explained.

The package is menu-driven and can co-exist with transaction processing, data entry or other user-written programs.

Shared Resource Systems

The shared resource systems — the Administrative System 4 and Administrative System 16 — were designed for users in large organizations that need multiterminal word processing plus document distribution facilities.

Available on the DPS 6/30 and 6/32, Administrative System 4 supports up to four workstations, two printers, 10M or 26M bytes of fixed and removable disk, and diskettes for archiving purposes, the spokesman continued.

On the DPS 6/38 and 6/48, the System 16 handles up to 16 workstations, six printers and all of the storage devices offered by these systems, the spokesman added.

The shared resource software utilizes the firm's transfer facility for telecommunicating documents from one location to the next, and is menu-driven and menu-defined to help users define different locations on a network. Users can send or receive electronic mail via a mailbox system, selecting which correspondence they want to review by scanning a list.

WP Capabilities

Word processing capabilities of both the shared resource and word processing systems include text entry, abbreviation, text formatting, text revision, global search and replace, pagination and column manipulation.

Hardware for both software-based systems includes the firm's VIP 7803 visual display terminal with detachable keyboard and a letter-quality printer, the spokesman noted.

The Word Processing 6 facility is priced at $5,000 with an annual software support charge of $1,350. The Administrative System 4 and 16 cost $3,000 and $5,500, respectively, with annual software support charges tagged at $810 and $1,485, respectively.

Both office automation systems will be available in first-quarter 1981.

. . . And the Glue: Updated Gcos 6

BILLERICA, Mass. — Covering every angle, Honeywell, Inc. last week introduced the glue to hold together its new DPS 6 distributed processing-oriented computer line: an updated release of its Gcos 6 Mod 400 operating system.

Gcos Mod 400 Release 2.1 increases communications support in a distributed environment, improves access to the system and provides a multikey route to get at the computer's files, Honeywell claimed.

Enhancements include a power resumption feature that uses the memory save and battery backup to preserve the memory image through power failures; a file recovery feature that saves recorded images before they are updated and writes these images back to the file later to ensure file integrity in the event of a power or program failure; and a checkpoint restart facility to help with file recovery, a Honeywell spokesman explained.

Alternate Index

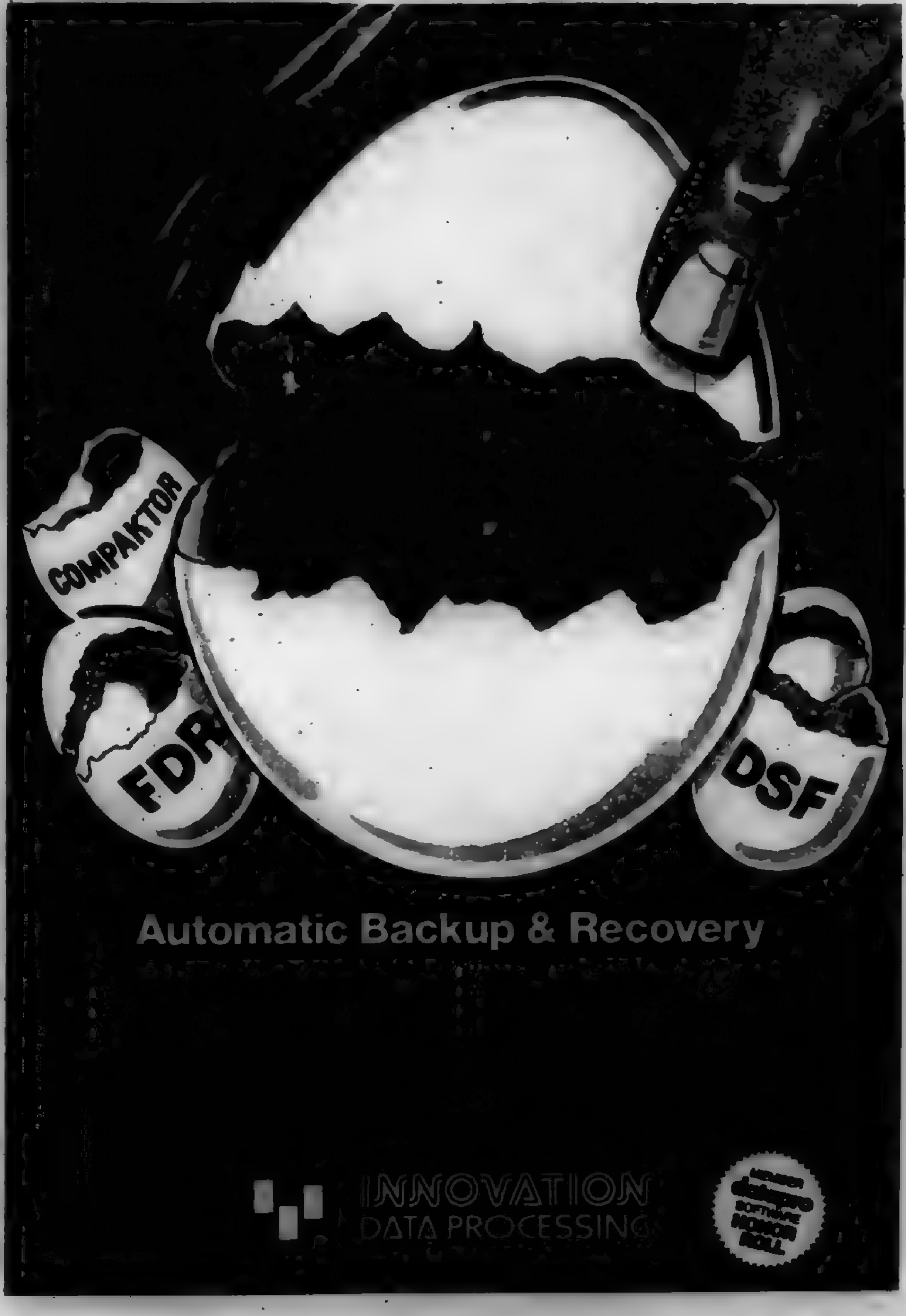
The updated operating system also has an alternate index or multikey feature that helps the programmer locate files and file information from a different perspective, as well as a record locking facility that prevents unauthorized access to shared data in a distributed arrangement, the spokesman added.

Focusing on memory utilization improvements, Honeywell added buffer pooling to the operating system, which provides a method of conserving memory for disk file access.

When users open a file, that file is assigned to a buffer pool, which can be designated public or private.

Private pools exist in user memory and are only usable by the person who created the pool, a spokesman said.

Mod 400 Release 2.1 will be available in January at an initial license fee of $4,500. The annual support charge for the operating system will be $2,500.



Lame Duck Congress Hatches Paperwork Bill

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Legislation to streamline federal information policies and practices, including acquisition and use of computer systems, was approved last week as the 96th Congress cleared its calendar for final adjournment.

The Paperwork Reduction Act of 1980 was sent to President Carter after the House acceded to Senate amendments to exempt from the bill's provisions certain intelligence, defense and investigatory agencies.

The legislation had been approved by the Senate Nov. 19.

The bill, H.R. 6410, was originally approved by the House in March but had been held up in the Senate primarily because of Defense Department concerns that the legislation would further complicate the acquisition process for defense DP and telecommunications systems.

The bill has two main objectives: to reduce the federal paperwork burden on the public and to improve the management of federal information resources.

The legislation incorporates recommendations of Carter's federal ADP reorganization project and of the Commission on Federal Paperwork. Rep. Frank Horton (R-N.Y.), chairman of the paperwork commission, cosponsored H.R. 6410 with House Government Operations Committee Chairman Jack Brooks (D -Texas).

Billion-Dollar Savings

Proponents of the legislation estimate it will save the public as much as $1 billion a year by reducing requirements to provide information to federal agencies. To that end, the bill calls on the Office of Management and Budget (OMB) to implement a governmentwide, on-line "federal information locator system" to promote agency information sharing [CW, March 3].

Among provisions to streamline federal DP practices, the bill calls for establishment of a high-level Office of Information and Regulatory Affairs in OMB to be responsible for all government information practices, including "acquisition and use of automatic data processing, telecommunications and other technology for managing information resources."

Anticipating passage of the legislation, OMB has already reorganized along the lines called for in this provision. In addition, each federal agency is directed to designate a "senior official," reporting directly to the agency head, who will be responsible for the agency's activities under the legislation's mandate.

Those activities include a requirement that every agency "systematically inventory its major information systems and periodically review its information management activities, including planning, budgeting, organizing, directing, training, promoting, controlling and other managerial activities involving the collection, use and dissemination of information."

Five-Year Plan

H.R. 6410 requires agencies to develop a five-year plan for meeting their "information technology resource requirements." OMB, assisted by the General Services Administration, is charged with developing a governmentwide plan that will assure, according to Rep. Brooks, "the most recent technologies are known and are made available to meet the agencies' requirements."

Brooks said the legislation is needed because "the government's traditional information systems are breaking down under the burden" of increased processing demands.

"Instead of providing timely and accurate information to manage government programs and services," he said, "these systems more often than not stifle communications between the government and the people, mislead the government decisionmakers, clog information channels and suffocate government officials under mounds of computer printouts."

The Paperwork Reduction Act will go into effect April 1.

IBM Watcher Sees Changes Ahead for H

(Continued from Page 1)

enhanced by stretching the 3081's 32K-byte buffer storage to 64K bytes — a change that could be accomplished by some board switching in the field.

Claiming that the 3081 is the "tip of the iceberg," Fertig said the Nov. 12 announcement marked a change in IBM's marketing strategy.

The firm now plans to announce degraded, or "crippled," CPUs and gradually enhance them to offer more power, according to the IBM watcher, who said the strategy will give each CPU model a band of performance versions that will make life more difficult for manufacturers of plug-compatible mainframes.

Operating System

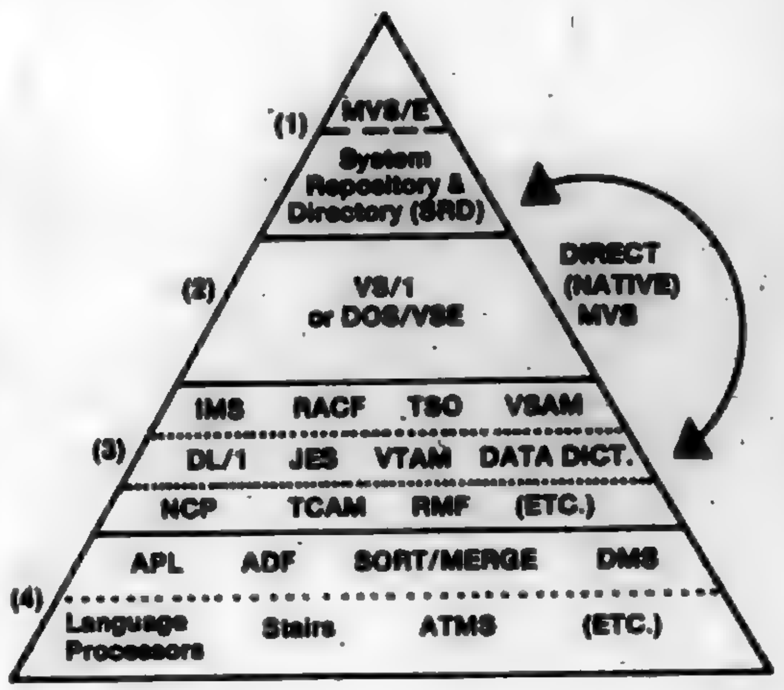
Fertig also believed IBM will make some hefty changes to the MVS/SP operating system. Those changes will allow other operating systems, such as OS/VS1 and DOS/VSE, to run as subsets of MVS without increased overhead.

This would give a clear, easy migration path to IBM's biggest operating system, and IBM would get more money, according to Fertig.

The new version of MVS — which Fertig dubbed MVS/E — will offer virtual machine capabilities, 32-bit addressing and an immediate interface to OS/VS1. An interface to DOS/VS will come along later, he predicted.

The key to MVS/E is a new facility called the System Repository and Directory (see chart). This facility will act as a software controller and watchdog, Fertig said; serving as a go-between for MVS/E and other subsystems such as JES, IMS, TSO and a data dictionary.

However, it will also protect MVS/E, beefing up the operating system's integrity and security, Fertig said.



IBM SOFTWARE LAYERS

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(1) *MVS/Extended* with virtual machine capability and 32-bit addressing:
OS/VS1 interface under MVS/E (now);
DOS/VS interface under MVS/E (later).
(2) *SRD* controls all access to resources and maintains integrity/security.
(3) *Subsystems*: Program products for data communications/data base.
(4) *Productivity Tools*.
(5) *Application Code*: Customer developed code.

Chart Courtesy Advanced Computer Techniques Corp.

MVS/E: ACT's Prediction

Speaking of the 3081 processor itself, Fertig pointed out that IBM announced the 3081 with a 26-nsec cycle time and a performance rating of 10.5 million instructions per second (Mips). The 3033 has twice the cycle time — 57 nsec — and roughly half the performance, around 5 Mips.

However, the 3081 is a dyadic processor, which works similar to an attached processor. If the 3081 were viewed as a uniprocessor (although IBM has said the dyadic processor can not be split in half), it would offer roughly the same performance as the 3033.

TCM a Mistake

Another area in which Fertig claimed IBM has fallen behind is cooling. The recently announced Thermal Conduction Module (TCM), which contains approximately as many logic chips as a 370/145 in a 61-cubic-inch helium-filled container, is a technological advance, but is a mistake on IBM's part, Fertig maintained.

The TCM was originally designed to be a self-contained cooling unit. But IBM discovered — well into the 3081 testing phase — the TCM was not sufficient. It then reinstituted the concept of running chilled water — from outside the CPU — through the TCM.

While Fertig admitted 3033 users — the most likely candidates for the 3081 — already have the necessary plumbing to use water cooling, he said it was a big disappointment for IBM that the self-contained TCM did not work out.

Fertig was quick to point out, however, that the 3081 offers some advantages, too. For IBM users, it gives more Mips for the dollar, while promising that performance will get even better when some hidden features are brought to light.

And despite Fertig's contention that the TCM is at least partly a mistake, he said it is still a technological improvement — another feather in IBM's cap.

The 3081 also has improved I/O capabilities (all 24 channels can be used for high-speed multiplexing) and requires less space, power and cooling than the 3033. It is 370 software-compatible, and the speculation that IBM will soon announce a 3081 native mode is an indication to 3033 users that they will not be left out in the cold, according to Fertig.

Another advantage to the 3081 is improved reliability, accessibility and serviceability (RAS) and lower maintenance costs, the ACT vice-president said. Advanced processor technology along with power and the thermal monitoring, checkout and retry and field-replaceable unit technology in the processor controller make it more advanced than the 3033, he added.

IBM's dial-up service facility for MVS also will cut maintenance costs on the 3081, Fertig said, but he noted that recent increases in service charges on the 3033 line offset the recent price cuts on those systems.

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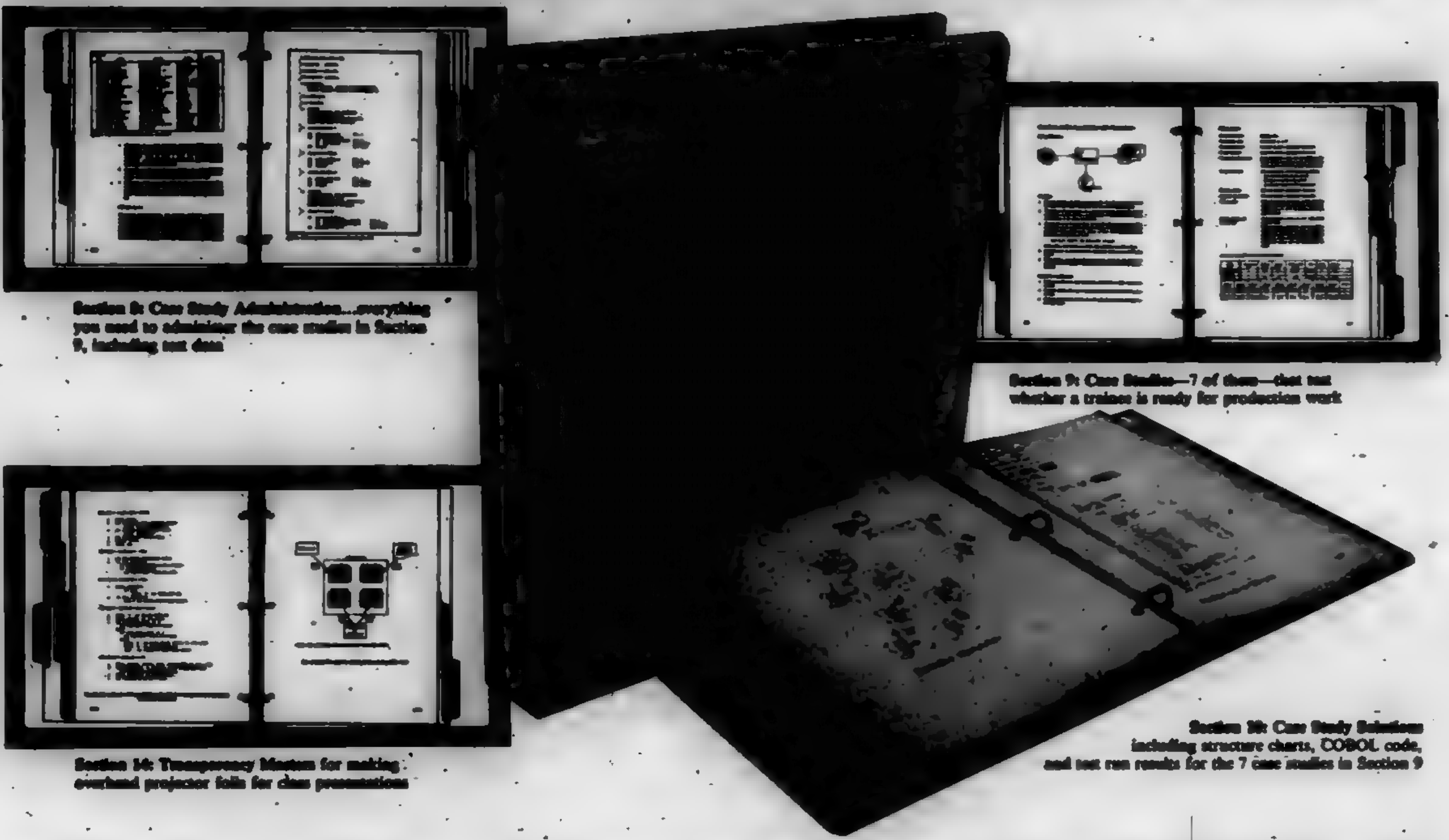

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COB-2

Managers Told Value, Not Cost, Sells Systems

CW at Infotech

By John Whitmarsh
CW Staff

LONDON — How do you justify your computing system to top management — cost or value?

DP managers who point to the multimillion dollar cost of computers as the justification for their existence are only fooling themselves, according to David Butler, chairman of Butler Cox & Partners Ltd., a British DP research and consulting firm.

"The cost of computing systems is not the best way to interest top management in DP," Butler told attendees at the opening session here last week of the Infotech State of the Art Review.

Infotech is Europe's largest gathering of international computing experts, drawing over 400 delegates from 18 countries to hear 74 speakers discuss key developments in computing around the world.

"Despite the fact that computer systems are becoming more expensive, I doubt that the cost of those systems is the reason why they loom so large in the eyes of top management," Butler said.

On a strictly cost basis, DP expenditures across all industries average around 2% of total corporate expenditures — a cost that in some companies compares to the amount spent on office cleaning services, according to Butler.

"The true importance of computing systems is not what they cost, but what they earn," Butler emphasized. "The fact that it is easy to measure cost and difficult to measure benefit does not change matters. It is in the light of what systems can do for companies that DP is evaluated."

How to make computing systems more valuable to the companies they serve and thus more competitive for top management's attention and recognition?

Several key issues need to be addressed, according to Butler:

- Office automation. "Office automation is the most burning issue now," Butler said, adding that implementation of these systems is the big challenge of the next 10 years.

"The need for office automation is paramount and self-evident in an era of spectacularly low office productivity and high labor costs," Butler said.

Implementation can proceed along one of two routes, day-to-day experimentation or long-range planning. Research conducted at 30 British companies by Butler Cox found that experimentation with office automation systems was by far the preferred method.

"We have found very few companies that are putting down long-range detailed plans," Butler reported. "Experimentation seems to be the way ahead because, unlike DP, it does not cost an arm and a leg."

Implementation of office automation systems — whether by experimentation or deliberate planning — is not expected to have serious impact on those 30 companies until 1983 at the earliest, Butler added.

- End-user computing. "Computers get cheaper, packages more widespread and vendors more intent on cultivating the end user directly," Butler said. "And the appearance of more microcomputers and high-level languages makes it easier for the end user to use computing systems."

This specter of user power is generating heated arguments and throwing DP managers into a state of anxiety. An uncontrolled slide from centralized human and processing resources into a totally decentralized system is the danger, according to Butler.

"A concerted campaign of internal education to alert management to the risks of uncontrolled development" is one half of the solution, according to Butler. The other half is end-user education that lays the foundation for sensible end-user computing schemes.

- Systems development pro-

(Continued on Page 12)

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SETTING A BOLD NEW PACE

No Longer a Dream

Frank Predicts Integrated Digital-Based Nets

CW at Infotech

By John Whitmarsh
CW Staff

LONDON — The integrated network of the future — that which supports voice, data, facsimile and video modes in a single exchange — will almost certainly be digital-based.

What's more, digital technology is advancing at such a rapid clip and costs are dropping so fast that such integrated networks are no longer the dream of futurists. They are technically feasible and within the financial grasp of large organizations right now, according to Howard Frank, president of Network Analysis Corp., of Great Neck, N.Y.

"Because of the radical reduction in cost of digital logic, it is now relatively inexpensive to convert voice and facsimile to digital signals and to perform sophisticated digital switching," Frank said here at the Infotech State of the Art Review, Europe's largest confabulation of international computing experts.

"This factor, combined with the properties that digital transmission has more resistance to noise than analog transmission and that switching, compression, encryption and other 'added value' services can be more easily implemented digitally, results in a strong motivation for combining all modes of communication onto digital channels."

Significant advantages can accrue to reorganizations that integrate their voice, message, data and facsimile requirements, according to Frank. Among those advantages:

- Voice circuits not used after business hours will be available for data, message and facsimile traffic during off-hours.
- By combining separate requirements for voice, message and data, the total number of circuits can be reduced without degrading service quality.
- Individual requirements of voice, data and message at a given site might not justify a leased circuit, but the combined requirements very well could, thus introducing economies of scale.

The heart of future digital networks will be sophisticated digital switches now under development that will be able to switch voice, data, message and facsimile traffic in any combination. By 1985, most suppliers of conventional private telephone branch exchanges (PBX) will be offering PBX devices incorporating these switches, Frank said.

Specific characteristics of future networks containing these switches are not yet defined, Frank cautioned.

Digital Backbone

"The future integrated network will have a primary digital backbone connecting a set of either public or private switching nodes," Frank predicted. Initially these switching nodes will be based on circuit-switching technology but will be replaced later by hybrid switches combining the best elements of circuit-switching and packet-switching technologies.

Ultimately the switches may become pure packet switches serving both voice and data. However, such switches will be used only in special cases until the latter half of the decade, Frank added.

The switching nodes themselves will be linked together via common-carrier digital lines, either terrestrial or satellite. If satellite, there may be additional transmission facilities from the site of the switch to the satellite ground station.

Trunk Lines

Local-access trunk lines emanating from computerized PBXs on customer premises will connect with the switching nodes in Frank's scheme. For the forseeable future many trunks will remain analog if routed on terrestrial facilities. Eventually, however, some of the links between the PBX and switch might become radio channels, "but this migration will depend on the cost of radios, ground stations and the tariffs for terrestrial circuits," Frank said.

"It is highly likely that as hardware communications continues its cost decline with respect to the cost of transmission, more and more local access will be accomplished via radio techniques," Frank noted.

Technological innovation in the '70s focused on the "long-haul backbone networks," but

(Continued on Page 12)

Frank's Forecast

LONDON — If integrated networks are in the future for data communications users, so are new value-added services, lower cost satellite services and incompatibility problems with the X.25 standard. Here is a forecast of what is ahead in those three areas by Howard Frank:

- *X.25 Standard.* "While the X.25 standard has been widely adopted for packet-switching systems, this standard addresses only the first three levels of the Ansi/ISO Protocol Reference Model. Furthermore, there are today many incompatible implementations of X.25. Thus, while standards emerged during the last decade, much work is needed before one even remotely resembling a universal standard is possible.

"It is highly likely that over the next few years all major vendors will provide some form of X.25 interface. It is equally likely that in 1990 little compatibility will have been achieved at the upper levels of the protocol families."

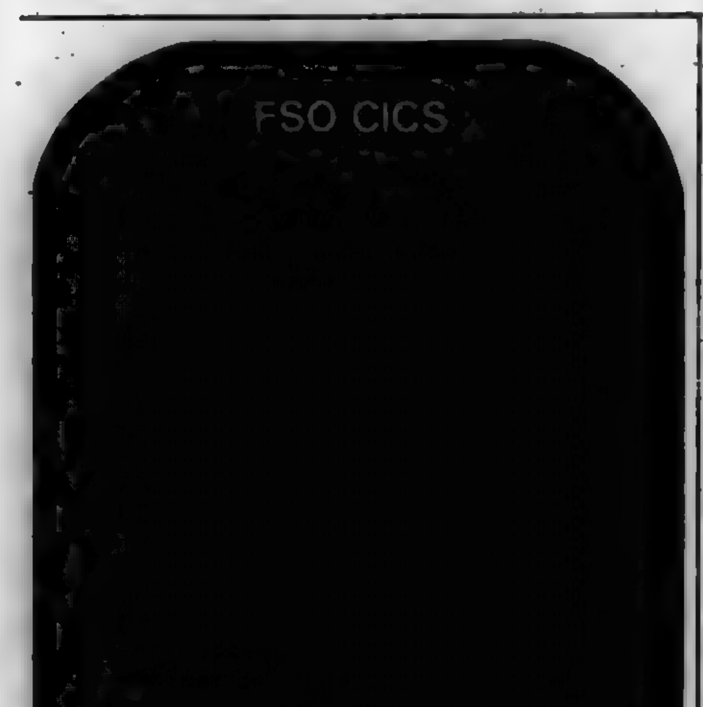
- *Value-Added Networks and New Carrier Services.* "Today's value-added networks (VAN) have increased rapidly in number of access locations and within the next decade should provide convenient access for a majority of the population of Western Europe and North America.

"Currently, most data service is for low-speed (up to 1,200 bit/sec) asynchronous terminals. However, synchronous service on a limited basis is now available and, within the next few years, should be widespread. However, today's VAN represents only a minimum resource compared to the data communications utility required by tomorrow's user.

"The next step in the evolution is the attachment to the VAN of additional value-added services such as message and mail services. By 1990, numerous new electronic services including store-and-forward voice will be available. This latter feature will probably be introduced into the VAN services during the 1983 to 1985 period."

- *Satellites.* "The cost of high data-rate satellite channels is substantially lower than their terrestrial equivalents. As higher frequency satellites develop, smaller and cheaper ground stations will become feasible and, consequently, a greater number of such stations will be economically feasible.

"Thus, within the next decade, it is feasible that satellites will be able to serve most of the medium and large locations of a large organization. However, unless major breakthroughs in transmission technology are forthcoming, there may not be sufficient capacity available within currently feasible frequency bands to serve the array of desirable services."



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Vendor Size, Base Seen Vital To Future Survival in Industry

By Phil Manchester
Special to CW

LONDON — The vendor company most likely to survive in the future information industry will be large, offer a broad spectrum of products and be headquartered in a country that will support its development.

A New York-based industry consultant, Philip Dorn, told the recent Infotech State of the Art Review in London that only IBM comes close to the survival model he envisaged. There are, however, other companies not yet recognized as "computer industry" companies that could meet the criteria. He cited both Exxon and Xerox Corp. as examples.

Dorn divided the well-known names of the industry into four categories ranging from "Sure Bets to Survive" to "Some Changes Needed." As expected, IBM and many of the emerging Japanese companies, including Fujitsu, Ltd. and Hitachi, Ltd., fall into the first category along with CII-Honeywell-Bull and Siemens.

CW at Infotech

Dorn's "Pretty Good Bets" included Amdahl Corp., Control Data Corp. and Philips. Up and coming companies, which Dorn saw as having too small a product range or insufficient research resources, included Tandem Computers, Inc., Prime Computer, Inc., and Wang Laboratories, Inc.

What might be called the danger zone — where Dorn saw a need for change — included most of the non-IBM compatible manufacturers still in the mainframe business: ICL, Honeywell, Inc., Burroughs Corp., NCR Corp. and a couple of surprises in Digital Equipment Corp. and Intel.

Despite IBM's poll position, however, Dorn said "the notion that an IBM can dominate this new information technology industry the way that they once dominated data processing is foolish." Rather, he predicted the industry will be dominated by a small group of competing companies.

"Direct competition will ensue between vertically integrated companies that are hardware manufacturers and software suppliers and information gatherers and providers of network services that connect it all into place. Entry into this business may come from any of several sources; computing, communications or pure outside."

Manchester is a staff writer at Computerworld UK.

Prof's Predictions Called 'Preposterous'

By John Whitmarsh
CW Staff

LONDON — "Preposterous."

"Pie in the sky."

"Superfluous."

Those were hardly the adjectives Anthony I. Wasserman would have chosen, but they summed up the reaction of skeptical attendees at the recent Infotech State of the Art Review here to Wasserman's vision of the next generation of software development tools.

Wasserman, an associate professor of medical information science at the University of California at San Francisco, had just finished a chronology of the working environment of the professional programmer since 1960 when he launched into his answer for the software development crisis.

"By the mid- to late '80s, I expect a new mode to evolve based upon personal computing that will address the problems of current software tools and development environments and the basic needs of the programmer," Wasserman said.

"In particular, I envision personal computers integrated into video terminals that will provide sizable processing and storage capacity. They will look like intelligent terminals with the power of a 32-bit minicomputer. They will have graphics capability and audio input/output. They will communicate with each other in a local or geographically dispersed network and will be supported by significant new software to create a working environment for programmers that can be tailored to individual needs."

This personalized development machine — a "professional programmer-based system" (PPBS) — could be built now for $50,000, Wasserman said. By the end of the '80s it would cost $10,000 to $20,000 or roughly the same amount now spent to train a single programmer for one year on a time-sharing system.

Wasserman admitted his concept was "highly speculative" and said prototypes are currently being designed but "they need further study."

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Managers Told Value Sells Systems

(Continued from Page 10)

ductivity. "The problem is a long way from being solved," according to Butler. The program is aggravated by a "monstrous" backlog of work that will grow over the next five years and by manpower shortages that in England will require at least 500 new programmers per month through 1985 to keep pace with growth in user demand.

In addition, a Butler Cox survey found that more than half the systems development work that is ever done on an average project is done after it goes live.

Thus, cutting the costs and duration of systems development is false economy in Butler's mind because it pushes problems into the future where over 50% of the development work still awaits.

Productivity aids, usually thought to be advantageous, may in fact be detrimental to systems development.

"Report generators, data base management systems, high-level languages and so on, which generally aim at faster or cheaper implementation, are not just irrelevant to the main problem but could actually make it worse by speeding up and cheapening delivery of these products that consume more raw material to run than to make," Butler said.

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Integrated Nets Sighted

(Continued from Page 11)

future efforts will center on the local access area, Frank stated.

"The future PBX will be the interface between growing intrafacility networks and the outside world," Frank said. "In addition to its most advanced current features and elements, it will contain banks of voice digitizers and dynamic multiplexers and will also be able to interface directly to remote PBXs, packet switches and a variety of other network controllers," Frank envisioned.

The integrated network of the future is technically feasible now, Frank said, adding that many of its necessary components exist as off-the-shelf devices. The cost of those devices will drop over the next five years to the point where large corporations can begin cost-effective implementation.

"Since the need to transmit combinations of voice, data, message and facsimile traffic is characteristic of the modern organization, strategic planning for these networks will become a major area of attention within the next few years," Frank said.

This evolution is sure to place demands on the way an organization manages and controls its networks. Voice and data communications are typically maintained by separate departments in today's organization, with the latter being part of the DP shop. That may change, according to Frank.

Antitrust Case Reinstated on Appeal

IBM Loses in Bid to Kill Symbolic Control Suit

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — IBM has been temporarily thwarted in its bid to prevent or at least delay resumption of the Symbolic Control, Inc. vs. IBM antitrust suit, which was at first dismissed and later reinstated on appeal.

The Ninth U.S. Circuit Court of Appeals has denied IBM's request for a review of a lower court decision reversing the original dismissal.

The circuit court's Nov. 19 ruling paves the way for the resumption of the Symbolic Control vs. IBM trial, in which the industry giant stands accused of seeking to monopolize the software business through predatory pricing.

IBM still has the option, however, of [redacted] U.S. Supreme Court. If the company exercises that option, the resumption of the Symbolic Control vs. IBM trial could be postponed indefinitely, or even circumvented entirely.

Few Precedents

The circuit court's refusal to grant IBM a rehearing reportedly marks only the second time that the industry giant has lost two decisions at the appellate-court level during the same antitrust trial. The only precedent for such a setback occurred during the suit filed by Greyhound Computer Corp., according to Symbolic Control's president, Art Pfeiffer.

Never before has a plaintiff enjoyed so much success against IBM in an antitrust suit where the main focus of discussion was software, Pfeiffer [redacted]

Filed in Nov. 1971, Symbolic Control's suit accuses IBM of giving away its software in an effort to promote its hardware sales. IBM's software-giveaway policy allegedly gave the company an unfair advantage over its competitors, none of whom could afford to adopt a similar practice, and prevented Symbolic Control from selling its main product, a software package for numerical-control machine tools, the complaint contended.

As a result of IBM's allegedly illegal pricing practices, Pfeiffer's Palo Alto, Calif.-based firm was eventually driven out of business, the suit claimed. The company nine years ago filed the law suit charging IBM with antitrust-law violations and seeking damage totaling $63 million, which would automatically be trebled to $189 million.

Bifurcated Case

Symbolic Control's case first appeared in Federal District Court here, where the trial was bifurcated to allow its two main issues to be tried separately. The first issue to be examined was impact, which refers to the injuries allegedly inflicted upon Symbolic Control by IBM's pricing practices. The second issue was violation, which refers to the alleged illegality of the practices themselves.

After considering arguments on both sides, a district court judge dismissed Symbolic Control's case against IBM. But the plaintiff appealed the dismissal and finally convinced a federal appellate court here to reverse the original decision.

Symbolic Control's suit was reinstated for two main reasons. First, the appellate court judge ruled that the earlier decision had ignored some of the antitrust case's key issues, including the effect of IBM's pricing actions on the plaintiff's financial condition.

Second, the appellate court ruled that the bifurcation of the original trial was improper and that the decision to try the issue of impact without first defining the accompanying violations was illogical and unjustifiable.

Slots Filling Up For Comnet 1981

HOUSTON — Telecommunications' leading users, technologists and consultants are filling up the program slots for Communication Networks (Comnet 1981), which will be held here Jan. 12-15.

The 70-session program covers new technology, products, carrier services, applications and key economic and policy considerations for voice, data and electronic mail communications.

Heading the list of speakers are Allen Krowe, president of IBM's Systems Communication Division, who will provide some guideposts on what is ahead for the data user, and Dr. C. Jackson Grayson Jr., president of the American Productivity Center, who will address the role that telecommunications will play in improving corporate resource usage.

Participants from Comnet 1980 returning this year include Dr. Dixon Doll of DMW Group; Dr. Howard Frank of Network Analysis Corp. and Richard L. Deal of R.L. Deal Associ[redacted]

Admission fees range from $395 for the full three-day event to $5 for exposition entrance only. Further details are available from show sponsors at Communications Networks '81, The Conference Co., 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

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Datapro Finds Europeans Highly Recommend

By Ann Dooley
CW Staff

DELRAN, N.J. — Mirroring the satisfaction expressed by European mainframe users, small business computer users in Europe told Datapro Research Corp. they like their systems, like their vendors and would recommend both to other users.

In general, more than three-quarters of small business computer users surveyed in France, West Germany and the UK indicated that satisfaction, Datapro reported in its recent "European User Ratings of Computer Systems" survey.

Rating their small business systems on a scale ranging from 1 (poor) to 4 (excellent), users in France awarded their computer systems a high overall score of 3.0 in terms of user satisfaction, while British users followed with an overall 2.9 rating and German users gave vendors' equipment a 2.8 overall satisfaction rating.

In an effort to determine how well small business computer vendors in the three European countries are meeting user needs, Datapro surveyed more than 3,485 users, which rated 5,000 large and small installed systems. The survey found that small business computer users were happy overall with their system performance, regardless of vendor. The positive results found among the small computer business users were similar to those found among mainframe users in the same Datapro study [CW, Dec. 1].

> *'Rating their small business systems on a scale ranging from 1 (poor) to 4 (excellent), users in France awarded their computer systems a high overall score of 3.0 in terms of user satisfaction, while British users followed with an overall 2.9 rating and German users gave vendors' systems a 2.8 overall satisfaction rating.'*

Understandably, those users with older small business systems tended to report less satisfaction, but percentage point differences were very small, with no one vendor outperforming any other, the survey showed.

In France, small business users rated MAI (Basic Four Corp.) highest among vendors with a 3.6, followed by Prime Computer, Inc. (3.3). German users rated Wang Laboratories, Inc. the top vendor (3.4) and awarded Computer Gesellschaft Konstanz the second highest spot (3.3).

Tied Rating

In the UK, Computer Automation, Inc. and Harris Corp. tied for first place with 3.3 each; the next highest rated vendor was Hewlett-Packard Co. with a 3.2.

Users were given the opportunity to rate their systems on 14 specific system functions. The results showed that users were least happy with technical support supplied by the vendor, while mainframe reliability was cited most often for high performance.

The Datapro survey examined a total of 191 minicomputers and small business computers comprising both foreign and U.S. manufacturers. A glance at U.S. vendors on the list shows that European users rely heavily on American small business computer equipment.

In ratings for U.S. systems, users appeared only mildly pleased with Burroughs Corp. Only 33% of the German users would recommend Burroughs equipment to other users. Among British users, 75% would not recommend the B80 model they rated. However, satisfaction levels rose in France, where users indicated that 86% would recommend their Burroughs equipment to other users.

Digital Equipment Corp. received 100% user recommendations on several of its small computers, and its PDP-11/34 and 11/40 received high ratings from users in France and Germany for mainframe reliability.

The Hewlett-Packard Co. 250 computer received a perfect score for its ease of operation and ease of programming by German users. The same user group rated the 250 high in mainframe reliability and applications programming, gave it an overall satisfaction rating of 3.7 and a 100% recommendation rating.

British users gave HP 100, 3000 Series III and 3000 Series 33 all 100% recommendations and also cited them for their operation ease, mainframe reliability and operating system. The HP 3000 Series III and the 3000 Series 33 also scored high marks in France for its mainframe reliability and operating system, and 100% of French users of both systems would recommend it to others, according to the survey results.

IBM Scores

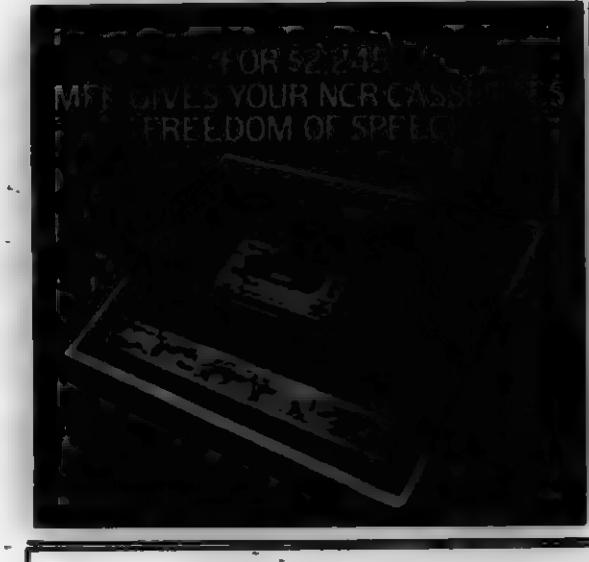
IBM offered users in the three countries one of the largest equipment selections of any of the U.S. vendors. In Germany, its Series/1 and Series/32 received 100% recommendations from its user base and, in the UK, Series/1 received a 100% recommendation. Although French users did not give any

WEST GERMANY

	Overall Satisfaction	Would Recommend To Others Yes (%)	Would Recommend To Others No (%)
Burroughs Corp.	2.3	33	67
CII Honeywell Bull	2.5	77	23
Computer Gesellchaft Konstanz (CGK)	3.3	75	25
CTM	3.2	100	0
Data General Corp.	3.0	67	33
Datapoint Corp.	—	67	33
Dietz	2.4	43	57
Digital Equipment Corp.	2.9	71	24
Hewlett-Packard Co.	2.9	80	10
IBM	3.0	77	22
ICL	2.7	76	19
Kienzle	2.5	55	27
MAI (Basic Four Corp.)	3.2	91	9
NCR	2.4	74	21
Nixdorf Computer Corp.	2.8	78	20
Philips Business Systems, Inc.	2.6	77	23
Prime Computer, Inc.	3.2	100	0
Siemens AG	2.1	44	56
Tandem Computers, Inc.	—	100	0
Univac	1.8	25	75
Wang Laboratories, Inc.	3.4	100	0
Other Vendors	2.9	60	30

Figures are weighted averages based on a scale of 1 (poor) to 4 (excellent).

Figures Courtesy of Datapro



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Their Small Business Computers and Vendors

IBM systems a 100% recommendation, users rated the Series/3 Model 8, Model 10, Model 15, Series/32, Series/34 and 1130 highly in mainframe reliability and ease of programming.

The IBM 1130, in particular, received a perfect score from French users for its mainframe reliability and high marks for its maintenance effectiveness and documentation — one of the few systems to score well in those categories. The mainframe reliability of IBM's Model 15 was rated highly by users in all three countries.

Prime also scored well in all three countries. In Germany, "all models" were given a 100% recommendation and maintenance responsiveness was given high marks. In France, Prime's 400, 500, 550, 650 and 750 systems were all given 100% recommendations and high marks for programming ease, operation ease, operating system and mainframe reliability; and the 550, 650 and 750 systems garnered a high rating for overall satisfaction.

In the UK, the vendor's 300 and 400 systems were given 100% recommendations. The 300 was cited for operation ease and its operating system and the 550 was cited for mainframe reliability.

Wang received a 100% recommendation from users in Germany for its 2200VP and its 2200MVP and high grades for its mainframe reliability by users in all three countries.

MAI (Basic Four Corp.) equipment, which was rated only by German and French users, did well in both countries. German users ranked MAI's Model 400, 600 and 700 high on several system functions and gave each of the systems a 100% recommendation to other users.

> *'The Datapro survey examined a total of 191 minicomputers and small business computers comprising both foreign and U.S. manufacturers. A glance at the list of U.S. vendors shows that European users rely heavily on American small business computer equipment.'*

Data General Corp.'s Nova 3 mainframe reliability was highly regarded in France, where its CS Series received high marks for mainframe reliability and ease of programming. German users also rated DG's ease of operation high.

The only country to rank the U.S. vendor Univac was Germany, where users appeared unhappy with the equipment; 75% of the user population indicated they would not recommend Univac equipment to other users.

Among the major U.S. vendors marketing in the UK, users gave Computer Automation, Inc.'s Syfa system a perfect score in ease of operation and also gave high marks for its programming ease. Datapoint Corp. earned good grades for its operation ease and Harris Corp. received high marks for its operating system and compilers and assemblers.

All of the above systems, plus Perkin-Elmer Corp. equipment, Diablo Systems, Inc.'s Ranger 3200 system and Honeywell, Inc's. Level 6, were recommended to other users by their entire user population, according to those surveyed.

Tandem Computers, Inc.'s T16 did well in Germany in terms of ease of operation, compilers and assemblers and programming ease and also earned 100% recommendations from its German user base.

The survey, "European User Ratings of Computer Systems," covers microcomputers and personal computers, in addition to mainframes and minicomputers.

It is available for $25 from Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

FRANCE

	Overall Satisfaction	Would Recommend To Others Yes(%)	No(%)
Burroughs Corp.	2.4	55	45
CII-Honeywell Bull	2.8	62	25
CMC	2.9	86	13
Data General Corp.	3.0	90	10
Datapoint Corp.	2.6	60	40
Digital Equipment Corp.	3.1	89	7
Hewlett-Packard Co.	3.1	84	11
IBM	3.1	81	15
ICL	2.7	74	24
Intertechnique (Microdata)	2.9	69	25
Logabax	2.8	100	0
MAI (Basic Four Corp.)	3.6	86	0
Mohawk Data Sciences Corp.	2.5	70	20
NCR Corp.	2.8	78	15
Nixdorf Computer Corp.	2.6	67	33
Norsk Data	3.0	100	0
Olivetti Corp.	2.9	63	38
Philips Business Systems, Inc.	3.1	82	9
Prime Computer, Inc.	3.3	96	4
R2E	2.3	80	20
SEMS	2.5	43	55
Texas Instruments, Inc.	3.1	83	8
Univac	2.7	83	17
Wang Laboratories, Inc.	2.8	70	20

Figures are weighted averages based on a scale of 1 (poor) to 4 (excellent).

Figures Courtesy of Datapro

UNITED KINGDOM

	Overall Satisfaction	Would Recommend To Others Yes (%)	No (%)
Allied Business Systems	2.8	71	29
Burroughs Corp.	2.1	37	59
BCL	2.9	86	14
Computer Automation, Inc.	3.3	100	0
CMC (Microdata)	2.9	87	13
CTL	2.9	69	25
Data General Corp.	2.8	73	27
Datapoint Corp. (Ventek)	2.9	82	18
Datasaab	2.7	75	25
Diablo Systems, Inc. (Xerox)	3.0	100	0
Digico	2.4	43	57
Digital Equipment Corp.	3.1	88	11
General Automation, Inc.	2.4	56	44
GEC	2.9	67	25
Harris Corp.	3.3	100	0
Hewlett-Packard Co.	3.2	95	0
Honeywell, Inc.	2.8	78	22
IBM	3.1	85	15
ICL	2.9	89	11
Mael Computers	2.0	0	100
Mohawk Data Sciences Corp.	2.3	67	33
NCR Corp.	2.7	62	27
Nixdorf Computer Corp.	2.8	60	40
Olivetti Corp.	2.6	57	43
Perkin-Elmer Corp.	3.0	100	0
Philips Business Systems, Inc.	2.9	71	29
Prime Computer, Inc.	2.9	89	11
Rediffon Computers, Ltd.	3.1	80	13
Research Machines	3.0	86	13
Systime	2.9	75	25
Texas Instruments, Inc.	3.0	82	18
Univac	2.7	71	14
Wang Laboratories, Inc.	3.0	75	25
Other Vendors	2.5	75	25

Figures are weighted averages based on a scale of 1 (poor) to 4 (excellent).

Figures Courtesy of Datapro

Nasa Monitor Helps Cut Energy Consumption

HAMPTON, Va. — When President Carter mandated a 5% reduction in energy usage, agencies everywhere scrambled to find ways to cut back. However, the general atmosphere of confusion did not extend to the National Aeronautics and Space Administration's (Nasa) Langley Research Center here — the center had been reducing energy consumption on a continuous basis since 1977.

In fact, Nasa had set itself an overall goal to reduce energy usage 50% from fiscal 1973 to fiscal 1985.

The Langley Research Center deals primarily with aeronautical research. In fact, center personnel boast that there is not a major airplane manufactured and flown in the U.S. today without some parts designed or tested at Langley.

The center consists of 90 major facilities, including laboratories, administration buildings and 10 major wind tunnels. Another tunnel, the National Transonic Facility, is scheduled for completion next year.

The center is divided into seven directorates (administration, electronics, engineering, space, structures, projects and aeronautics) and employs more than 3,000 people and 1,000 contractors.

One of Langley's most active programs concerns its energy usage, according to E. Eugene Mason, the center's energy resource manager. Langley's power bill for the fiscal year ending in September 1979 was almost $5.5 million, or the equivalent of between 6,000 and 8,000 totally electric homes.

"Nasa knew it had to try to get a handle on how much electrical power was used and where. The only meters we had were in the major wind tunnels themselves, so we really didn't know what the rest of the facilities were using," Mason admitted.

Top Challenge

The challenge, according to Mason, was to determine where power was being used and where it could be reduced without adversely affecting the center's research role.

The problem was compounded by Langley's growth pattern, which had resulted in buildings being serviced by more than one power substation. One building alone had 13 meters that had to be read, added to and/or subtracted from in order to arrive at power usage.

After a detailed feasibility study, Nasa installed a computer-based monitoring system in 1977. The system, built around two Wang Laboratories, Inc. 2200VP units, is a "management" tool, Mason emphasized.

"The return on investment is hard to estimate since you don't really get a payback from a meter. Much like a speedometer," he pointed out, "it simply allows you to make intelligent decisions. The Wang system gives management the tools it needs to make decisions on people and facilities, to see where the energy is going and how to conserve it."

As an example of the types of reduction the system has made possible, Mason noted that weekend consumption alone has been reduced by about 3.5 million kilowatt-hours (kWH) in the last year, a savings of some $150,000. Overall, Langley reduced its usage by 8M kWH during fiscal 1979.

Langley considers its system a prototype for energy conservation. There was no packaged software available to handle the data the center wanted, no hardware designed specifically for the application. This meant the center had to begin the search for a vendor from ground zero.

Wylie Laboratories, Inc., a contractor for the center's Electronics Directorate, was given a task order to find the most feasible equipment. After evaluating several manufacturers' equipment with respect to price and capability, Nasa chose two Wang 2200T central processing units, two CRT terminals, a printer and a drum plotter.

Mason has since replaced the 2200Ts with two 2200VPs with 48K and 64K bytes of memory respectively, to take advantage of their additional processing speed. Two 10M-byte disks have also been added, along with a graphics CRT terminal and printer.

To enhance the system's performance, Mason has ordered an additional graphics CRT terminal and a graphics plotter. The CRT terminal will allow a preview of the plot before actually printing it, while the plotter will cut present plotting time by as much as 75% for the same work load, Mason said. Mason anticipated he may need the added time as more requests come in all the time.

The system's software consists of Basic programs written by Wylie Laboratories.

The entire system is dedicated exclusively to resource monitoring and is physically located in the base station, a small building designed especially for this purpose.

System Operation

During its feasibility study, Langley estimated that it would need 400 channels to handle all facilities at the center. Currently, 250 electric power meters, 13 steam meters and 20 environmental parameters are monitored. The system has a total capability of 400 channels, allowing for future additional growth.

The Wang 2200VPs scan all 400 channels every five minutes. Each complete scan requires 32 seconds. In addition, 55 channels are scanned every minute.

After the data is collected, the system converts the digital signals into engineering units. While working out the timing for collection and conversion, Langley found that when it got up to 200 channels, it ran out of time to do the calculations. This prompted the installation of the VP systems.

After conversion, the data is stored on disk. Two full years' worth of information is kept at all times so that hourly averaged data can be picked up that far back.

A data averaging routine converts five-minute scan summaries to hourly averages, and hourly to daily averages. This information can then be tabulated and printed out or plotted on a graph.

The base station routinely prints 11 plots daily, in addition to special requests from the building managers and directorates. Special requests may be for a printout or plot of 24 hours of five-minute data or for a monthly update on energy allocation and usage year to date. Reports may be broken down by building or by directorate or may cover the entire center.

In retrospect, Mason said, he is pleased that he chose the drum plotter rather than a flat bed, since this allows him to do unattended plotting.

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For Data Base, Operations Managers

AMA Finds Top Salary Dollar on West Coast

By Bruce Hoard
CW Staff

NEW YORK — Data base administrators and DP operations managers are earning more money on the West Coast than anywhere else nationwide, according to a survey by the American Management Associations (AMA).

The study, *Professional and Scientific Positions Report*, also detailed college graduate hiring rates and reflected special budgetary increases for DP departments. Approximately 1,150 companies responded to the survey, which covered 1979 and the first five months of 1980.

While the national median salary for data base administrators is hovering at $28,700, the West Coast boasted the top level, $30,100.

Following in order were the Northeast, South Central, North Central and Southeast sections of the country. Those respective figures were $29,500, $29,400, $25,400 and $26,900.

DP operations managers also did best out West, taking in a median salary of $30,400. The West was followed by the South Central ($28,100), Northeast ($27,400), North Central ($26,900) and Southeast ($26,100). The national median was $28,000.

These figures are fairly consistent with those in another AMA survey issued earlier [CW, Sept. 1]. Not included in that survey, but covered in the new one, was salary information on methods and procedures analysts.

Analysts' Salaries

A methods and procedures analyst was defined as someone who coordinates proposed policies, procedures, systems, forms and methods to promote effective operations. He may also review the functions and structure of organization units to avoid overlapping or duplication.

In this category, the West Coast was not only defeated, but trounced by every other region. Leading the way was South Central at $30,000. The Northeast was next at $27,700, and the Southeast ($27,000), North Central ($25,400) and West Coast ($25,000) filled out the bill.

The study found computer science graduates to be competitive with, but not always superior to other young professionals when it came to salaries for first jobs. Comparisons were made with engineering, science and business positions, with business generally coming out lowest.

The salary range for computer science graduates started at a median figure of $13,500 for two years of college and moved to $16,800 for bachelor's degrees, increased to $18,600 for bachelor's degrees with some predegree experience, went up to $22,300 for master's degrees and slipped to $20,700 for doctorates.

In the science area, the match-up between computer science and physics was a close one, with computer science showing significantly higher figures at the master's degree level, $22,300 to $19,200. Chemistry was also closely comparable to computer science, faltering only at the master's degree level where there was a $3,400 gap.

Moving on to engineering, computer science took a decided back seat to chemical, civil, electrical and industrial engineers. Of those, electrical engineers posted the highest salary, $28,800 for graduates with doctorates.

Although most of the business statistics did not reflect doctorate-level salaries, computer science held a clearcut advantage up to the master's degree level. For example, accountants with a master's degree were starting out at a median of $19,000, compared to $22,300 for computer scientists.

Economists did a little better at $20,100, but there still remained a $2,100 gap between them and computer science grads.

Lawyers were more competitive at $22,000 on the master's degree level, while MBAs with additional technical undergraduate degrees made the strongest showing in the master's degree category with $22,800.

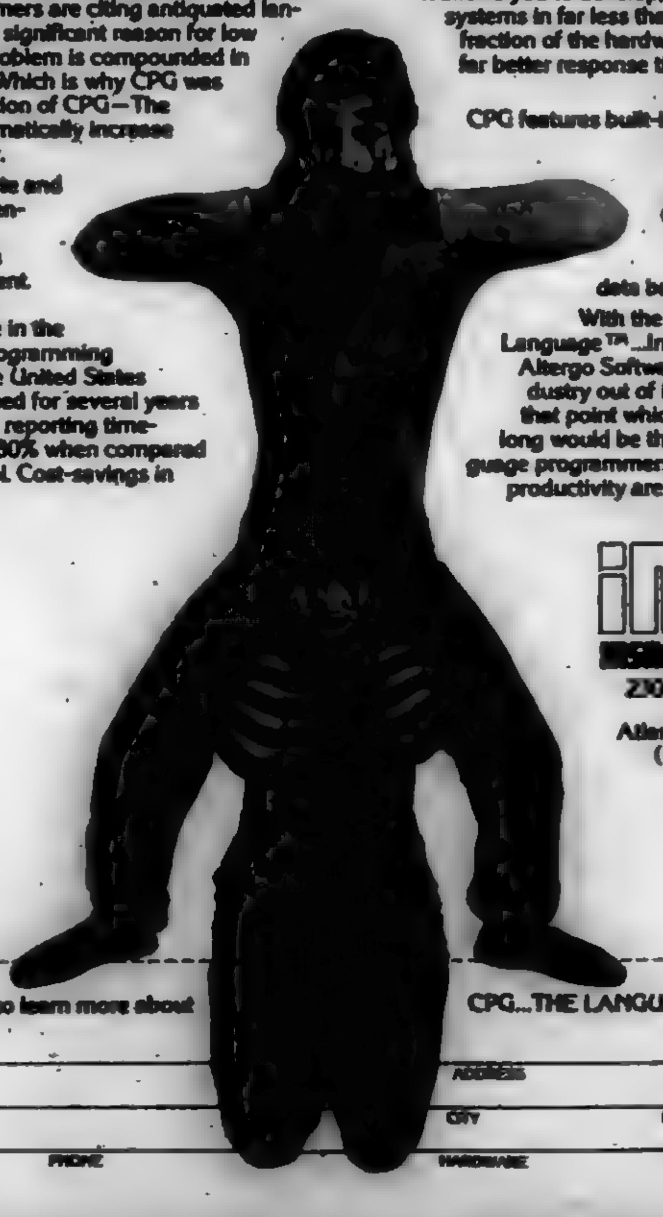
Hiring rates for both computer science and engineering graduates consistently increased at a more rapid rate than salary increases for employees hired the previous year.

This was true with 53.2% of engineering respondents and 47.2% of DP respondents. The differential by which DP hiring rates exceeded salary increases ranged from a low of 2% to a high of 22.9% and an average 8.7%.

Companies surveyed attempted to compensate for the effects of this salary compression in DP and engineering by trying one of four strategies: more frequent salary reviews (29.4%), larger increases at salary review (26.9%), individual compression adjustment (33.7%) and general increase (7.8%). "Other" was chosen by 2.2%.

Of the companies contacted, 8.2% said they had alloted extra budgetary funds for DP salaries. Engineering responses reflected a slightly lower 7.7%.

In engineering, the differential of the engineering increases above the established salary schedule varied from a low of 6% to a high of 12% and a 9.5% average. In the case of DP increases, the separate schedule ran from 8.2% to 15%, with an average figure of 9.9%.



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No More 'Star Trek' on CPU

Computer Security Tightened at Sandia Labs

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Federal auditors have all but closed the books on an investigation into unauthorized computer use by employees of a government nuclear weapons research center in Albuquerque, N.M.

Although it has not done a follow-up study, the Department of Energy (DOE) said recently the Sandia Laboratory has taken "commendable" steps to beef up computer security following revelations of widespread problems at the facility.

The DOE Inspector General's office here revealed last month it had found more than 200 Sandia employees had stored a total of 456 unauthorized files on one of the facility's Control Data Corp. systems.

The laboratory, operated for the government by Western Electric Co., performs nuclear weapons research and development and conducts research projects in such areas as solar and wind energy.

Although the lab does classified work, the time-shared CDC 6600 system involved was used for unclassified projects.

DOE Investigation

The DOE investigation began a year ago when the Federal Bureau of Investigation informed the department it had found one of Sandia's employees using the CDC system to help local gamblers run a bookmaking operation.

The employee was fired and a subsequent audit found hundreds of rather routine, although unauthorized, files that included several hundred games, such as Star Trek and Adventure, as well as poetry, jokes, personal letters, a beer collection catalog and bowling team rosters.

About half the offending employees disregarded an initial warning to purge the files of unauthorized data and were later reprimanded, according to DOE.

One of the "most disturbing findings," the DOE said, was that a so-called "bomb book" was on the system and accessible to all users. This file contained numerous forms used as a checklist for setting up and monitoring nuclear test shots.

While not classified, the bomb book was considered sensitive and was later removed from the system.

This problem and other findings of the investigation raised questions about Sandia's overall computer security procedures.

The DOE investigators found, for example, that "a common practice at Sandia was to share passwords among staff people." Also, passwords were changed only once a year so that a person leaving Sandia employ could still access the computer system using another person's password.

Another problem was with physical security. DOE said its auditors observed no security checks on briefcases or packages carried by Sandia, DOE or contractor employees.

Policy Directive

Following the DOE investigation, Sandia issued a policy directive stating any use of a facility computer must be for official work.

DOE also advised Sandia employees that personal or improper use of the computers would result in disciplinary action.

Employees were further reminded that misuse of government property is punishable by fine, imprisonment or both.

DOE called for better recordkeeping of computer access at the facility and greater dissemination of computer security guidelines to employees, as well as periodic random sampling of computer files to make sure no authorized data is being stored.

The Albuquerque facility and its companion facility at Livermore, Calif., operate more than $100 million worth of computer systems., includ-

Three CA Ex-Employees Charged With Theft of Documents, Gear

IRVINE, Calif. — Three former employees of Computer Automation, Inc. have been charged with grand theft of documents and hardware from that minicomputer manufacturer.

All three of the suspects were employed in CA's factory service department before leaving to work at National Minicomputer Service, Inc., a competing firm. Materials allegedly stolen include service manuals and other documentation; test cables and in-house circuit boards valued at $3 million, according to an Irvine Police Department spokesman.

A three-month police investigation leading to the arrests was originally triggered when some CA customers contacted the company, saying nearly identical CA services were being offered by National Minicomputer.

Incriminating Evidence

The investigation culminated when police obtained a search warrant for National Minicomputer where they discovered proprietary documents bearing the CA logo.

However, National Minicomputer has not been implicated in the conspiracy and grand theft charges against these accused employees.

They are Tommy Charles Sammons, 51, of Huntington Beach, Calif., Steven Allen Hain, 29, of Orange, Calif., and 28-year-old Eileen Jackson of Santa Ana, Calif.

Sammons was service manager at CA and executive vice-president and a major shareholder at National Minicomputer. He was released on his own recognizance after surrendering to authorities.

Hain also surrendered, and Jackson was arrested shortly thereafter.

The next court action in the case in scheduled for Dec. 12, when attorneys for both sides will gather to discuss possible pleas, according to an Orange County district attorney spokeswoman.

If convicted, each individual could face up to $10,000 in fines and three years in jail.

Auditor Training Course Available for Non-DPers

CHICAGO — A computer auditor training program designed to help those without computer experience operate as DP auditors has been introduced by Shared Resources, Inc.

The course, which consists of 92 hours of classroom sessions and 84 hours of self-study assignments, is spread over a two-and-a-half month period.

The first sessions concentrate on introducing DP concepts and terminology with a view to preparing the student to audit a Cobol program, said Thomas Noll, president of Shared Resources.

Further sessions highlight different auditing techniques and provide hands-on experience of hard-copy programs and on-line computer terminals.

Students are given faulty and fraudulent accounts to audit and correct in class, though a major factor Noll stresses is the importance of the self-study assignments.

The program is offered in three formats: Public seminars are run on an interest and geographic location basis for $895 per person; in-house sessions can be arranged by companies for a 20% to 30% discount and consortium seminars where firms club together to make up the numbers are also available for a similar discount.

Shared Resources, Inc., is at Suite 500, 625 N. Michigan Ave., Chicago, Ill., 60611.

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Catalog Card Maker's System Processes Votes

MINNEAPOLIS — On Nov. 4, the State of Minnesota processed the election votes of its 1.5 million residents here on the computer normally used by a manufacturer of catalog cards for libraries.

Catalog Card Corp. produces about 100,000 library cards per day from large data bases holding bibliographical information on 1.5 million book titles.

The firm has a customer base of approximately 25,000 public, school, corporate and technical libraries, and receives and processes several thousand new titles each week from the Library of Congress.

Catalog Card was chosen as the vote-processing site because of its computer capabilities and the availability of facilities to accommodate hundreds of election workers, local and national media and volunteer phone-bank operators who received election results from local precincts.

System Change

One aspect of the project's success was Catalog Card's switch in August from an IBM 360/50 — which it had used for two years — to a Magnuson Computer Systems, Inc. M80/31 using Nixdorf Corp.'s EDOS operating system and its DEX on-line entry, according to Catalog Card's John Zacrep, director of DP.

Prior to selecting the Magnuson system, Zacrep considered a Control Data Corp. Omega and IBM's 4331 Model 2 and 4341, and went so far as to order an IBM system, he recalled.

That order was canceled when Zacrep learned of the price/performance ratio and delivery schedule available with the M80. The Magnuson system was on site and operating three weeks after it was ordered, Zacrep noted.

On Election Night, after local results were received by the phone operators, they were fed into Nixdorf's DEX on-line entry system. The M80 continually processed the results and provided totals on demand, which averaged every 10 minutes, according to Zacrep.

Preparation for Election Night — including cataloging five assembler programs and running a brief systems test — took one hour, Zacrep recalled. It took less than two hours, he said, for six data entry volunteers to learn DEX system.

"Everyone at election headquarters was amazed at the performance of the system," Zacrep said. "Everyone but me — I knew it was fast and reliable."

Since the August installation, production processing has been running three times faster than the 360/50, Zacrep said. "With the 360/50, we had programs that stretched the machine's capabilities.

In addition to Magnuson's price/performance and delivery advantages, Zacrep was interested in Magnuson's compatibility with advanced disk technology and the M80's upgradability features.

"The 360/50 wouldn't support the type of equipment we need to grow," he explained. "Our data base is so large, we have to go with large disks to get everything on-line."

Lancaster Given Award by Asis

ANAHEIM, Calif. — F. Wilfred Lancaster, professor of library and information science at the University of Illinois' Graduate School of Library Science, has received the first Outstanding Information Science Teacher Award from the American Society for Information Science (Asis) here recently.

Lancaster was cited for his "contributions as an instructor, adviser, researcher and author for more than a decade."

The $500 prize was donated by the Institute for Scientific Information and administered by the Asis Education Committee.

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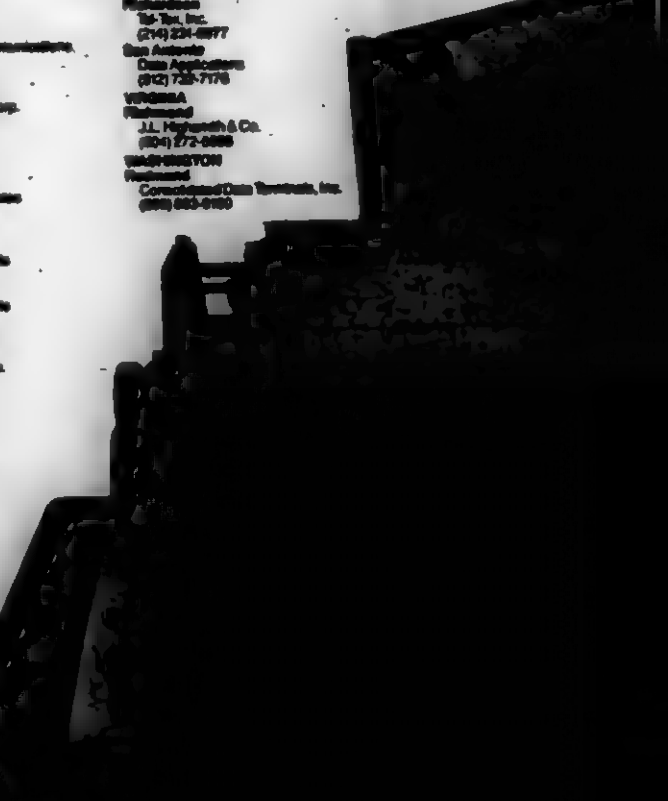


With Current Programming Methods

Applications Increase Unattainable, Martin Says

By Rex Malik

Special to CW

LONDON – The 100% increase in the number of applications that has been predicted for the '80s will not be achievable using conventional programming methods and organizations, according to James Martin, author and lecturer.

Speaking at the first Deltak International DP Training Conference here recently, Martin observed that the number of programmers needed for this will not be available to user organizations.

Although the pool of programmers is being steadily increased, more of these individuals are being snapped up by software houses, he explained.

The author, whose next book will be called *Applications Programming Without Programmers,* warned that structured programming will make little difference.

Not Good Enough

Surveys have shown that structured Cobol, for instance, would give an improvement in programmer productivity of up to 25% – not good enough.

Yet an IBM Share/Guide study has shown that there was no technique based on using programmers in a centralized DP organization and conventional methods and languages such as Cobol or PL/I that would give even a 50% improvement, he said.

The reason, an IBM study has shown, is that programmers spend only 24% of their time on new applications, 12% on conversion, and 19% on system maintenance and the bulk of their time – 46% – on application maintenance.

And where did the bugs that programmers have to deal with come from? That, James Martin said, has been surveyed to death. The figures looked like this: requirements, 56%; design, 27%; coding, 7% and other, 10%.

Martin defined requirements as problems that arise as the result of errors, however caused, in systems analysis – expensive ones to fix. When you look at programmer effort in fixing bugs, 82% of it goes into fixing the requirement bugs, he pointed out.

User-Written Applications

Great strides have been made in increasing the number of applications up and running where user departments are writing their own applications using terminals in the user department, he said.

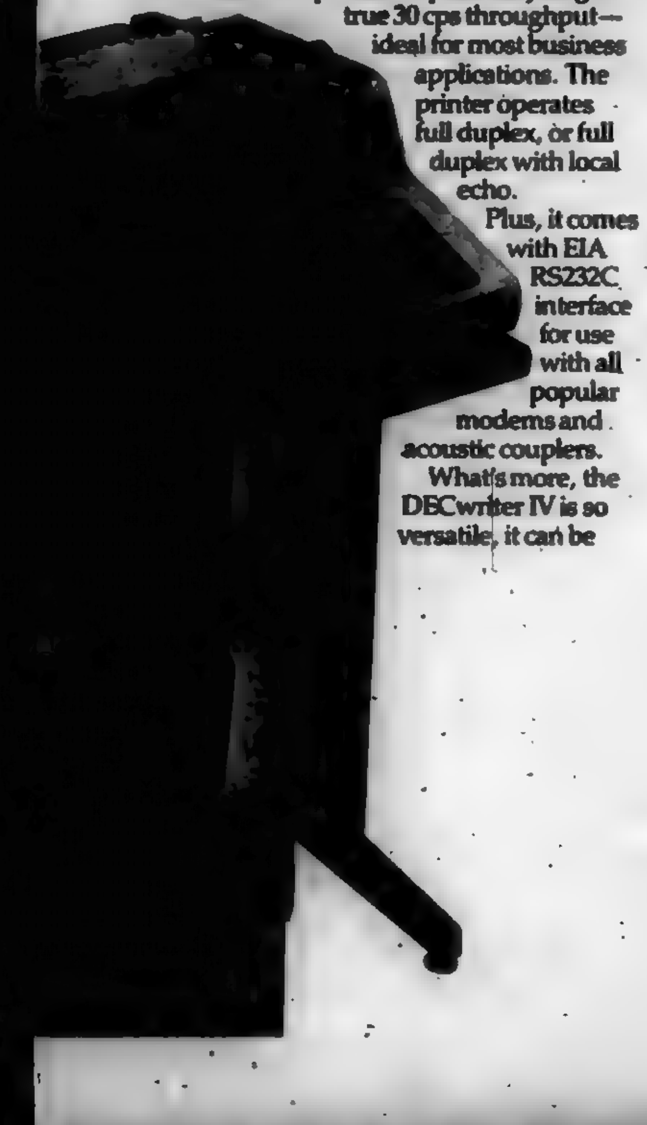
In such cases, users tend to be using such languages and tools as National CSS' Nomad, STSC, Inc.'s APL Plus, IBM's Application Development Facility and Sperry Univac's Mapper.

These drive a bulldozer through existing conventional methodologies because they were user-driven. True, the DP department might regard this with suspicion, but some of the figures now show the increases possible in programming productivity to be quite startling, he noted.

It is not just the lines of code per man-day equivalent, though figures of from seven lines of code-equivalent to 1,000 lines of code-equivalent have been recorded – without relying on genius. There is also the question of support.

The Bank of America, which has many of its users using Nomad without the good wishes of the DP department, now has over 500 applications written by users up and operating. They are supported by a software staff of six.

Nevertheless, training organizations continue to spend 80% of their time teaching the wrong things using the wrong methods, he said.



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CDC Wants Payment for Canceled Art Tour

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Control Data Corp. has asked the U.S. government to reimburse the firm for expenses it incurred setting up an American tour of Soviet-owned art that was canceled following the Russian invasion of Afghanistan.

CDC filed a $1.8 million claim with the U.S. Comptroller General's office here Nov. 17, arguing the money was spent "in good faith at a time when increased cultural interchange with the Soviet Union was being promoted as part of national policy," according to Lawrence Perlman, CDC vice-president and general counsel.

The company had arranged for the two-year tour of works from Leningrad's famed Hermitage art museum not only for international good will and for the sake of art lovers, but in the expectation Soviet profits from the sale of art books and reproductions of the paintings would be used to purchase a CDC computer system.

However, Perlman pointed out, the claim "doesn't have anything to do with the profits we might have made in connection with the sale of any equipment." The company is interested only in being reimbursed for expenses for setting up the tour, he said.

U.S. Retaliation

The firm had printed some 250,000 catalogues for the show and had arranged to cover travel cost and other expenses of the tour. The show was canceled earlier this year after the U.S., retaliating for the Afghanistan invasion, refused to protect the art works against attachments that might have been sought by American parties seeking payment on outstanding claims against the Soviet government.

If the Comptroller General approves the claim, Congress would have to appropriate the money to reimburse Control Data. Perlman said the firm expects the government to respond "promptly" to the claim.

While the success of the claim is not at all assured, Perlman noted a recent precedent for the CDC action. Congress this year, at the request of the Commerce Department, appropriated $10 million for the U.S. Olympic Committee to defray expenses incurred by the committee in helping U.S. athletes prepare for the 1980 summer games in Moscow, which were boycotted by the U.S. at the request of President Carter.

CDC Files Suit Against Iran

CW Washington Bureau

WASHINGTON, D.C. — Control Data Corp. has filed a $28 million law suit against Iran, joining a long list of American firms seeking a share of that country's assets held in the U.S.

The suit, filed Nov. 19 simultaneously in federal court here and in Minneapolis, named as defendants the government of Iran and more than a dozen Iranian government agencies and government-controlled organizations.

Lawrence Perlman, CDC vice-president and general counsel, said in a telephone interview from Minneapolis the company is owed approximately $5 million on contracts with those Iranian organizations.

The balance of the $28 million claim, he said, "is related to the value of equipment which we have not been able to regain possession of, breach of contract claims and some other monies we've advanced in connection with various business transactions in Iran."

Compensation Sought

The company is also seeking compensation for spare parts it cannot recover from Iran and payment for a CDC-owned building in that country that has been damaged, he added.

CDC, which has a "whole range of equipment" installed in Iran, from small Cyber 18s to systems in the Cyber 170 series, has continued to receive payments from some of its customers in Iran, Perlman said.

He noted the courts cannot act on the suit until the U.S. government unfreezes the Iranian assets in this country. He also said he expects Washington will request a stay of the CDC legal action as has been the case in other suits pending against Iran.

If a stay is granted by the courts, action on the suits would be delayed even after the Iranian assets are released.

"I've instructed our lawyers not to oppose [a government stay request] on the grounds that the government wants the stay in order to keep things in status quo while it carries out the negotiations for the hostages," Perlman said. "We do not want to do anything that would interfere with those negotiations."

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This issue of *Computerworld Extra!* will focus its entire editorial content on a single subject: "Communications Systems in the 80's." Top experts from all areas of the communications field will write magazine-length articles on a variety of topics including: Integrating Voice and Data Networks; The State of Videotex in the US, Uk, France, and Canada; Network Management; Satellite Technology in the 80's; The Past and Future of the Communications Act and Federal regulations; Network Standards and Protocols; and Future Directions in Telecommunications Technology. Plus, there'll be Wrap-up and Analysis articles for Data Communications Software, Data Terminal Equipment, and Data Communications Equipment.

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Data Comm Terminals-Smart	34	22,000	33	83,000
Multiplexers	30	19,200	29	73,000
Distributed Processing Equipment	28	17,900	18	45,000
Computer Services and Timesharing	26	16,600	20	50,000
Teleprinters	26	16,600	15	38,000
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Source: "A Profile of Computerworld Subscribers and their Companies" — Becker Research.

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Managers on the Move

JAMES W. BISHOP has been elected vice-president of management information systems at Lanier Business Products, Inc. in Atlanta.

Bishop will be responsible for all DP activities, directing and managing the company's computer center at the Tucker, Ga., distribution site. Additionally, he will be in charge of design, development and implementation of computer systems and procedures, long-range DP plans and selection of computer equipment and applications software programs.

Previously Bishop was vice-president at Hartz Mountain Corp. in New Jersey. He has also held management posts with United States Lines, Inc., Kidde Computer Services, Franklin Mint and Western Electric Co.

JOHN K. BUCKNER has been named vice-president and chief financial officer for Prime Computer, Inc., of Natick, Mass. Buckner will be responsible for the functions of the controller, treasury, information resources and corporate services.

Before joining Prime, Buckner was vice-president of administration at Millipore Corp. in Bedford, Mass., which he joined when Waters Associates was acquired by Millipore. Prior to this, Buckner was vice-president and chief financial officer at Waters.

He was also employed by Eastern Gas & Fuel Associates as vice-president of financial operations with responsibility for corporate finance and DP.

James W. Bishop

John K. Buckner

Buckner received a B.A. degree from Williams College, an M.S. degree in nuclear engineering from MIT and a Ph.D. in mechanical engineering from Stanford University.

• • •

Air Products and Chemicals, Inc. of Allentown, Pa., has appointed **JOSEPH C. SCHULTER, MATTEW G. ZELLNER, TIMOTHY J. CENNA** and **PETER J. TEMPLIN** as managers of management information.

Schulter was named group systems manager of the firm's Gas Group and will coordinate the design of a distributed computing network to support the group's operations. Prior to his appointment he was manager of long-range planning in the management information department. Schulter holds an M.S. degree in business and economics from Lehigh University, Bethlehem, Pa.

Zellner was appointed group systems manager of the Process Systems Group (PSG) and will develop systems for the management of engineering projects. Zellner joined Air Products in 1960, most recently as manager of research planning and coordination for the Gas Group and PSG. He received a B.S., M.S. and Ph.D. in chemical engineering from Lehigh University.

Cenna was promoted to manager of applied statistics, responsible for providing formal statistical analysis capability in experimental design, quality control, market survey design and statistical modeling. An employee since 1977, Cenna holds a B.S. in general engineering from the U.S. Coast Guard Academy, an M.S. degree in applied mathematics from Rensselaer Polytechnic Institute, Troy, N.Y., and an M.B.A. from the University of New Haven, Conn.

Templin recently joined Air Products as manager of information retrieval systems with responsibility for administering and providing in-house and commercial information systems.

Formerly with the Pennsylvania legislature, he was responsible for bill and statute processing and retrieval. Templin has a B.S. degree in industrial engineering from Lehigh University.

• • •

NORMAN STAFFORD has been appointed manager of DP at Tariff, Inc. of Metuchen, N.J., where he is responsible for computer systems programming operations and their control functions.

Prior to joining Tariff, Stafford was project leader for the Boy Scouts of America, Inc. and a senior analyst/programmer for John Wiley & Sons, New York.

Stafford received a B.S. degree in business management from Rutgers University.

Tariff provides prEaudited, computerized freight payment plans to the transportation industry.

• • •

JOSEPH McKISSICK has joined Twin County Grocers, Inc. of Edison, N.J., as director of management information services. He will be responsible for DP, systems and programming and technical support.

Previously, he was vice-president of information services with Hudson-Thompson, Inc., an Alabama-based retail and wholesale company.

Prior to that he served in the DP division of Fabrics of America, a subsidiary of Allied Products, Corp. of Chicago.

Book Blames Methodologies For Role in Software Crisis

SEATTLE — The "software crisis" is worsened by current software engineering methodologies, according to Robert L. Glass in his book, *Software Soliloquies*.

Glass charged that the software industry suffers from such maladies as a stuck technology in software checkout, a general lack of understanding of the individual contributor, a refusal on management's part to examine the software product and a communication chasm between academic and industrial specialists.

Glass also maintained that many of today's commonly accepted practices and teachings are actually counterproductive, and writes of this dilemma in a humorous, anecdotal style.

The book, which costs $9.95 including shipping, is published by Computing Trends, located at 6925 56th Ave. S., Seattle, Wash. 98118.

Advanced Office Systems Key Topic of ASM Meet

LAS VEGAS — The advanced office, systems concepts and the rapidly changing world of information resource management will be the key topics at the May 10-13 conference of the Association for Systems Management (ASM) here at Caesars Palace.

Focusing on the many changes expected in the next few years because of technological advances, the program features a series of seminars on advanced office systems.

Registrants in the Management Development Program will be able to complete the final level of the program. Instituted in 1973, the program is being phased out this year to permit greater flexibility in educational programming, an ASM spokesman said.

More information is available from ASM at 24587 Bagley Road, Cleveland, Ohio 44138.

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Training Device Simulates Nuclear Plant Control Room

By Bruce Hoard
CW Staff

SEABROOK, N.H. — The Public Service Company of New Hampshire has taken the wraps off a new $5 million, computer-based control room training simulator.

The simulator — a duplicate of the actual control room at the Seabrook nuclear power plan here — is designed to provide trainees experience in handling day-to-day conditions as well as emergencies that may crop up at the plant.

Computerwise, the training device, which was built by the Link Division of the Singer Corp., features a Modcomp Systems Classic and a Systems Engineering Laboratories, Inc. (SEL) 3255, according to Peter M. Richardson, senior instructor at the training center.

The real control room at Seabrook also uses a Modcomp Classic. "We call it a logic by computer," he explained. It carries all the operator-assist programs. In the training center "we have an exact duplicate of the Modcomp — not for direct simulation — but for interface for those logic-by-computer programs."

For example, if an operator wants to change power, he plugs in the amount of power he wants to change and the logic-by-computer program on the Modcomp will tell him how much of an adjustment is required.

The two computers interact as part of the plant's video alarm system. Because there are no field transmitters, the 3255 assumes that role and supplies data to the Classic, which interprets it for emergency conditions. In

(Continued on Page 26)

Computerwise is a computerized simulation of the control room at the Public Service Co. of New Hampshire's Seabrook nuclear power plant.

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Hospital Cuts ECG Analysis Time in Half

By Bob Johnson
CW New York Bureau

DAYTON, Ohio — An advanced medical system that hospital spokesman said consistently saves electrocardiogram technicians and physicians up to 50% in graph-reading time daily has been installed in Grandview Hospital, Ohio.

The Hewlett-Packard Co. Regional ECG Analysis and Management system (Realm), currently at Grandview, is connected to its Ambulatory Care Center in Washington Township by telephone lines allowing ECG technicians to edit and analyze graphs from two clinical sites instead of just one as in the past.

Information is transferred from the ECG cart via telephone lines by FM carrier in a maximized mix of digital and analog methods.

'Real-Time' Data

It is now possible to send critical ECG data "real-time" from any bedside at Grandview or from as far away as another city or state and receive an analysis from the main CPU (an HP 1000, 2113 E), located in Dayton.

Grandview claimed that Realm can process and analyze an EDG graph within 45 to 50 seconds, a great deal faster than humanly possible.

Leslie R. White, D.O., Director of noninvasive cardiology at the hosptial, said, "not only is the system beneficial in time savings, but also it has increased the accuracy of the data being processed."

The storage and retrieval of information about patients who have had ECGs taken is a plus for the ECG staff as well as the patients who benefit because of the better service they receive, he added.

According to White, a 25% savings in technician time proves the system's worth. It also enable a shorthanded ECG unit to function more quickly and diligently.

The technicians stated that the system has alleviated routine tasks such as graph measurement, evaluation and report printing.

Productivity Graphs

In addition, Realm identifies every technician using the system, how many graphs were run and it documents the number of errors made on hard copy. This record offers administrators the ability to chart productivity. To their surprise, many technicians who were thought to be slow workers were in reality producing a substantial amount of work.

One reason why Grandview chose the HP system over others was the over-reading capability that can read three ECG's simultaneously. The decisive factor, however, was that Realm software could be modified to meet their particular needs.

Certain criteria must be considered when installing this type of system such as the number of technicians, number of patients and amount of clinical facilities. Grandview felt that Realm could fill the bill.

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Nuclear Control Room Simulated

(Continued from Page 25)

case of an emergency, information is transmitted to CRTs throughout the facility.

Building time for the system was about a year, according to Richardson. After the contract was signed, Public Service spent three months supplying pertinent data on the power station to Singer. After that, Singer employees wrote the necessary programs.

Other Simulators

The company has produced similar simulators for other clients, such as the National Air and Space Administration (Nasa), so a great deal of the necessary software was already in place, the instructor commented.

Both Singer and control board operators will be supplying new programs for the simulator as part of the ongoing training program.

Tasks to be performed by trainees include heating up and shutting down the base-loaded nuclear plant. However, those particular jobs are not likely to be performed often because a base-loaded plant rarely varies its power supply, running at 100% until it needs to be refueled, Richardson said. "Only a few plants do that," he added.

Surveillance Tests

Most of the trainees' time will be spent on what he called "surveillance testing," which ensures the operability of plant equipment. Fifty-two major systems are monitored on a weekly, monthly or quarterly basis.

Typical malfunctions programmed into the simulator include loss of feed water, loss of both normal and vital power, pipe leaks and blown fuses in the instrumentation, Richardson said.

Most of the 38 potential operators at the facility have been involved in the Navy atomic submarine program. Before going on-line, they will spend 300 hours in the simulator and over 1,000 classroom hours studying college-level courses.

Instructors will be able to create unusual conditions in the simulator to see how trainees react. They will also be able to stop the action on the simulator at any time, back it up and discuss operators' options.

William C. Tallman, chairman and chief executive officer at Public Service, pointed out the value of having trainees work in a training atmosphere identical to that found in the actual work place.

Three Classrooms

In addition to the simulator, the training center also includes three classrooms equipped with rear-screen projection rooms designed for audio-visual presentations.

Trainees face a vigorous regimen. They must meet educational standards set by the Nuclear Regulatory Commission, (NRC) complete the Seabrook course and then pass yet another test to obtain an NRC operating license.

Once the controversial nuclear plant begins operation — projected to be in 1983 by company officials — retraining on the simulator will be required once every six weeks, Tallman said.

About 40% of the first unit at Seabrook is complete, a spokesman said. Construction of the second unit has been delayed until the financially strapped utility can reduce its share in the plant from 50% to 35%.

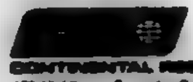
Calendar

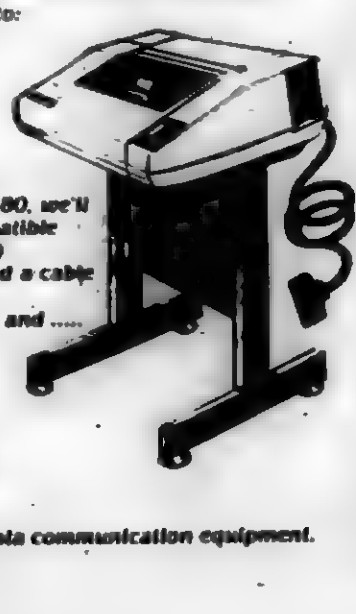
Jan. 28-29, New York — **Leadership in the New Information Era.** Contact: McGraw-Hill Publishing Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

Jan. 28-29, Miami — **Advanced On-Line Systems.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Jan. 28-30, Orlando, Fla. — **Third-Party Lease Negotiations.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Jan. 28-31, Orlando, Fla. — **Effective DP System Quality Assurance Standards.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.





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Delta Replaces Fuel Trucks With Computerized Piping

By Deborah Wise
CW Staff

ATLANTA – Delta Airlines, Inc. has grounded its fleet of refueling trucks and replaced them with an automated fuel piping system.

The computer-directed automatic control and information system at Atlanta International Airport Midfield Terminals "has been working without problems from the day it went into operation on Sept. 21," said Bill Berry, a Delta Airlines spokesman. On average, Delta pumps 788,000 gallons of fuel per day, he said.

The system, which cost approximately $10 million, was designed by the Turbitrol Co., a division of the Taukman Co.

The minicomputer-based control system performs all monitoring and control functions and generates operating reports and information regarding the status of all major operating equipment in the system. According to Berry, Delta has not experienced any problems to date.

Turbitrol designed the software and provided the Digital Equipment Corp.-based system that includes a DEC PDP-11/03 with DEC RL/01 disks, a dual-floppy disk system, DEC VT100 CRT terminals, DEC LA120 report and event writer and a Turbitrol Series 1600 I/O system.

Before the system was installed Delta used a combination of underground pumping lines and fuel trucks that ferried fuel from Delta's fuel farm to the planes at Atlanta's old airport. Now the five-minute truck journey has been dispensed with and Delta's 340 daily flight departures are serviced by underground fuel lines monitored through the computer system.

"Now you don't have to wait for the truck to get into position and there's no loading up time," Berry said.

Honeywell Users Form Nahu

WALTHAM, Mass., Nov. 10 – Approximately 2,500 users of Honeywell, Inc. computers have united to form an international organization known as the North American Honeywell Users Association (Nahu), the company said.

The primary purpose of the group, which will function as a control group concerned with the interests of small and medium system users (Level 6, Level 62 and Level 64), is to promote the free exchange of information between member units and Honeywell.

Nahu's objectives include expanding its members' knowledge of automatic data processing, providing adequate communication among members to ensure a sustained effort in problem-solving techniques and maximizing state-of-the-art procedures, Honeywell said.

The Nahu board of directors has planned the first national conference for 1981, which will be held at the Galt House Hotel in Louisville, Ky., May 11-14. The agenda will include various sessions on numerous topics of interest to Nahu members as well as several demonstrations and speakers.

Further details on Nahu are available from Tom Eifler, Honeywell, Inc., 200 Smith St., Waltham, Mass. 02154.

Facilities Set Up For Emergency

BOSTON – Emergency DP facilities have been set up in Rosendale, N.Y., and Glocester, R.I., by Data-Site, a joint venture established by Wright Line, Inc. and the Iron Mountain Group.

The shell sites offer 8,091 and 5,252 sq ft of space, respectively. Each contains raised flooring, library capabilities, phone lines, normal and emergency power and water supply and 75 tons of air conditioning capacity, the firm said.

No computer equipment is being offered at either site.

A spokesman for Data-Site said, "In the event of a disaster, fewer than 10% of existing company emergency contingency plans will work."

The annual charge for the shared shell site is $12,000. More information can be had by contacting Bill Dryer, Data-Site, 160 Gold Star Blvd., Worcester, Mass. 01606.

Management Seminars To Cover Innovations

PARK RIDGE, Ill. – Three seminars on "Innovations in Management" will be offered by the Data Processing Management Association (DPMA) Education Foundation, in association with Fundamentals in Responsibility Management, Inc., in Chicago, Jan. 20-22 and Feb. 10-12 and Toronto Feb. 10-12.

The registration fee in the U.S. is $345 for DPMA members and $380 for nonmembers. In Canadian dollars the fee is $400 for members and $440 for nonmembers.

More information is available from Fundamentals in Responsibility Management, 1032 N. Lombard, Oak Park, Ill. 60302 or, in Canada, Jackson-Smith Ltd., 56 Shepard Ave. W., Toronto, Ont., Canada M2 N1 M2.

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EDITORIAL

Work Is Work

People have to be made to feel important and be treated with respect and openly expressed concern, whether they work in data processing, teaching, publishing or street cleaning. And this has nothing to do with how much money they are paid.

That much was clear in the findings of a recent International Data Corp. survey of data processing employees and management published in *Computerworld* last week.

The managers surveyed said the only way to keep employees is to pay higher and higher salaries.

The employees, on the other hand, said salary is an important motivator in accepting a job but, once employed, its importance pales in the face of other considerations. For example, they want to be noticed and rewarded for their accomplishments, trained so they can advance more quickly and considered in decision making that affects them.

Why don't managers and employees talk to each other?

Even though many studies have shown the typical DPer relates better to his CRT terminal than to the human beings around him, data processing professionals are basically no different from any other people — only their circumstances are different. Because there has been a shortage of skilled personnel in computing, DPers have the freedom to quit a job with greater ease than people in publishing or teaching, for example. After all, there's always another job around the corner — probably a better one, in fact — and if not, one can always freelance until one turns up.

This is a luxury enjoyed by few other professionals. It seems that DPers haven't been forced to get along with others. When the going gets rough, they simply leave. Continuous availability of jobs encourages a certain laziness on the part of both employee and management.

One can't help but be reminded — by the daily newspapers and television reports — that many of our country's citizens aren't so lucky. Most people collecting unemployment checks as a result of the current malaise in the auto industry, for example, have probably long forgotten their beefs against their supervisors and the frustrations they may have felt working at the same job day after day with little hope of advancement.

Further, many teachers, clerks, fire fighters and police officers face uncertain futures as funds that pay their salaries are shaved as the current conservative mood takes over the country. Most DPers don't have these concerns. It's time DPers started doing what everybody else has been doing for years — talking things over and making them work.

After all, when all is said and done, work *is* work.

DATA PAST

Five Years Ago
Dec. 17, 1975

NEW YORK — The then-chairman and chief executive officer of General Electric Corp. told the court hearing the government's antitrust suit against IBM he knew of no IBM practice or act that forced GE out of business in 1970. Instead, Reginald H. Jones described the exit as a missed opportunity on GE's part.

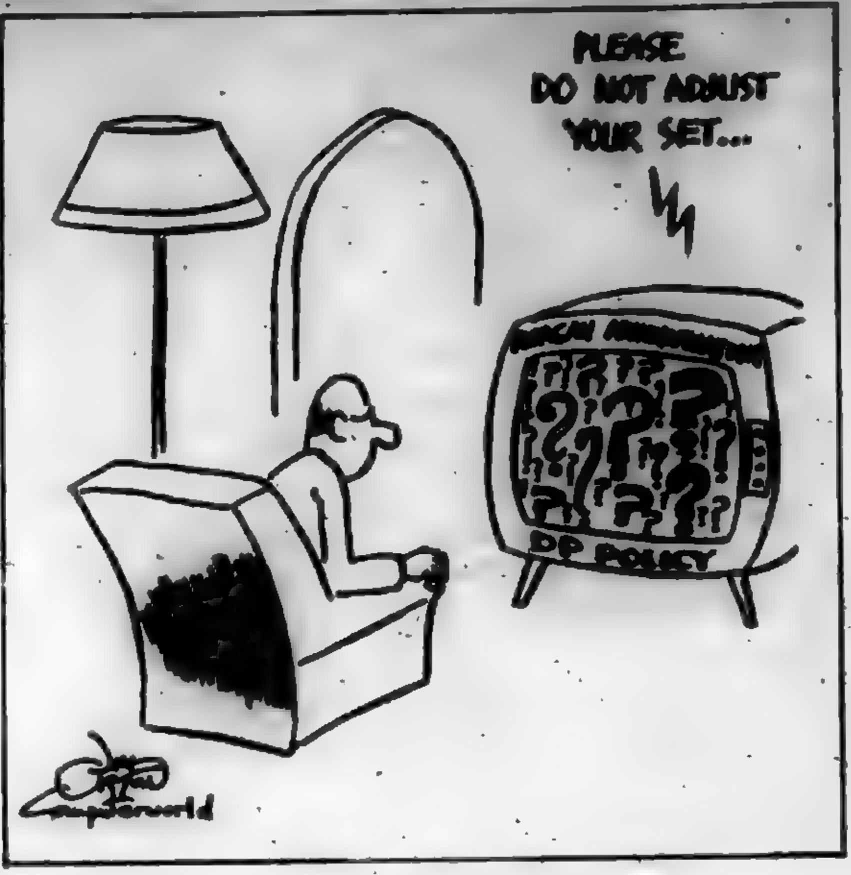
– – –

WASHINGTON, D.C. — Arguments for and against patenting of software filled the historic chamber of the U.S. Supreme Court as attorneys completed the process of submitting the Thomas R. Johnston case to the high court for review. There were no requirements or precedents governing how soon any decision might be rendered. However, Morton C. Jacobs, Johnston's attorney, said he wouldn't be surprised if a ruling came down in "about a month."

– – –

Eight Years Ago
Dec. 12, 1972

ANAHEIM, Calif. — Most of the planners and attendees of the Fall Joint Computer Conference here pointed to the increased emphasis on user topics, the move into vertical sessions aimed at specific markets and the switch of the site to Anaheim. In May 1972 the show's sponsor, the American Federation of Information Processing Societies, said it was "at the crossroads" of some very big decisions, including the possibility of changing the format to only one conference a year. That decision was made only a few weeks later, and this fall conference was seen by many as a transition.



LETTERS

Doomsday Predictions

There are several counterpoints that arise from reading the article on social problems allegedly caused by computer technology [CW, Nov. 3].

The first of these is how anyone may assume that one singular influence, no matter how powerful, can result in the complex sociological consequences which Dr. Robert Parslow predicts. Parslow's doomsday predictions may or may not be accurate, but his explanation of their causes seem to be as inane as are some of the oversimplifications of earlier soothsayers.

Does anyone remember Dr. Nobel's prediction that his invention, dynamite, would be the ultimate weapon to end all wars? How about the common belief, prior to the invention of steam propulsion, that anyone moving faster than the speed of a galloping horse would necessarily disintegrate into the universal ether? Or that the industrial revolution would result in a world of human slaves entrapped by their own technology?

Quotes from Parslow's speech bear all of the earmarks of such technological paranoia. He refers to the ubiquitous, Orwellian (and, in the article, undefined) "They" when wringing his hands about lack of information privacy in a computerized society. "*They*" will get any information about you in this society.

I recall when such corruptive and degrading influence was blamed on Communism, or on some other imaginary or real enemy such as Hollywood, television, the automobile (and its back seat) and drugs. Now it's the computer.

If one accepts that man is capable of either building or destroying himself and his creations, then one must accept the strong likelihood that the race of man is also totally responsible for the results of its actions. The tools used in either creation or destruction do not move of their own accord.

It's interesting to note that in the name of some obscure cause, interest or motivation, such obsolete and simplistic opinions as Parslow's still gain enough credibility to reach the ears and eyes of the general public. Worse, this scholar is assuredly no ordinary street radical or back-to-nature proponent, but by his credentials purports to be a member of academia, who should know better.

Reinhard Mirkovich

Lowell, Mass.

Professional Attitude

I must take issue with Larry Long's assertion that resistance to computerized medical information systems is a failure on the part of the physicians to "enhance the level of their profession" [CW, Nov. 17]. In evaluating a tool or technique, the physician must ask two questions: Will this help my patients? Is my time well-spent doing this? For those cases where the answer to either question is yes, physicians are likely to accept and support the system quite readily.

A dramatic example is computerized axial tomography, CAT scanning. This process gives physicians images much superior to standard x-rays and frequently allows them to avoid expensive and dangerous procedures.

On the other hand, if you ask a physician to type into a terminal drug orders he has just finished writing on the patient's chart, he is likely to perceive that the benefits of this activity accrue not to the patient or physician, but to the hospital's billing office, and to decide that his time might be better spent in treating patients. Insistence by physicians that they be allowed to concentrate on the practice of medicine to the exclusion of clerical tasks is not a failure to enhance their profession. It is the very essence of professionalism.

Bob Brown

Medical Association of Georgia
Atlanta, Ga.

HUMAN CONNECTION/Jack Stone

What Do DPers Respect in a Manager?

"Job performance measurements? Performance standards? In a computer center? Listen to me. My systems and programming staff are in a continuing merry-go-round as they try to respond to what our users need — or think they need.

"Performance standards imply an environment where planning stability prevails — which we don't have. Documenting job descriptions, task assignments, performance goals and measurement factors in the systems development business is an exercise in utter futility."

All this from a fast-track computer center manager.

For a moment, I couldn't imagine why he wasn't taking action to correct his situation, and then I realized he didn't understand: (1) the true nature of his job, which, in large measure, relates to personnel management; (2) how his employees are impacted by working in a chaotic work place; or (3) why he probably wasn't held in very high esteem.

Survey Results

To provide further insight into the subject, I want to relate the preliminary results of a recent survey taken in a large organization, which was given to managers and employees in the computer center, as well as user departments. Those surveyed were asked to identify the distinguishing features of a good manager. Their answers are shown in the figure.

The reader should note the contrasting results in the areas of "job competency" (2) and "fairness" (8).

Survey respondents were also asked to identify managers they considered to be exemplary. The survey team interviewed some of these managers with the objective of finding commonalities of good management. The team first learned that there wasn't much in common with the styles of these managers, which were strongly dependent on a range of factors, including:

- Personality of the manager.
- Types of people with whom the manager works.
- Type and organization of work performed.
- Systems and processes in the department.

The team did, however, uncover some functional similarities. These "good managers" were people who:

- Shared business information with the staff, in one way or another, including "sensitive" information (as opposed to confidential).
- Clearly communicated job priorities.
- Evaluated the staff well so that all employees knew where they stood.
- Were knowledgeable and experienced in their fields.
- Build a cooperative spirit with the staff.

The survey team also found similarities among the personalities of "good managers":

- Genuine interest in people.
- Sincere trust in the staff.
- Strong desire to grow professionally themselves.
- Knowledge of own strengths and weaknesses.
- Deep commitment to department's program.

I'm not suggesting that the survey results represent the final authority on the matter, but I am noting that the professional and personal attributes of the typical information systems manager that I've met are so different from those described above, that I can't help wondering just how many of them are treated with respect by their employees.

	MANAGERS		EMPLOYEES	
Order Responding	Rank Order	Percent Responding	Rank Order	Percent Responding
1. Friendly, good rapport, listens	1	75%	1	58%
2. Competent in the job, knowledgeable	2	50	7	12
3. Delegates well	3	30	5	38
4. Develops the staff	4	30	4	44
5. Plans ahead, well organized	5	28	3	47
6. Encourages cooperation	6	28	8	27
7. Gets the job done	7	25	—	—
8. Fair to employees	8	23	2	51
9. Keeps staff informed	9	18	—	—
10. Supports the staff	10	15	6	36

Manager and Employee Views of a Good Manager

SOFTLINE/Werner L. Frank

The Software Environment: A 30-Year Evolution

In the early 1950s there was no software environment. Machines stood bare after switch-on or, more than likely, contained a random pattern of bits in the memory.

But presto, in response to a button push or switch setting, the automatic bootstrap was loaded into the first few positions of memory and the system was go.

Next came the external response. This involved input processing of a sequence of characters by the "booter," which added this data to the very primitive, hardware-based (our first version of hardwired software?) bootstrap itself. This process was repeated several times and, as soon as the memory-based code was suitably extended, the system was prepared to read in the well-structured object code of a specific run. That was environment!

Input to the computer was more often than not via punched paper tape, although punched cards came very quickly thereafter. The specific run program had to be preceded by a specially spliced header, if the medium was tape, and preloaded with a fixed set of binary punched cards when employing cards. This header, which extended the boot strap, was the first instance of the more complex world of the JCL of today.

The run program also had to be manually combined with support software such as the cord dump routine, the trace program, the elementary function subroutines or the input/output utilities. Each user, therefore, generally defined and produced his own software operating environment for each run, on an ad hoc basis. Machines in the early 1950s were word-oriented (36 to 40 bits) and had at most 1,024 words. Hence, users were very conservative in their development of such an environment.

Early Assemblers

In the beginning, the coding itself was machine language, often expressed in hexadecimal notation. But then came the assembler, which gave the first assistance to the programming implementation process. These early assemblers, being one-pass, had very strict constraints — requiring code assignment to specific memory locations and the requirement for specifying certain parameters and values in a regimented order. That was how it was in 1954.

Assemblers got to be more complex. They became multipass vehicles absorbing more of the bookkeeping tasks and therefore freeing the implementor of certain notational chores. They also could include, on call, certain standard subroutines.

By 1957, the assembler was extended and became known as a compiler, mainly because it now had sufficient capability to do more than convert one

(Continued on Page 30)

READER COMMENTARY/Joseph T. Rigo

Poor Organization Kills a Technical Manual

A technical writer's most important task is to organize the material. A topic must be discussed in one place, and the discussion must include all information that the reader needs to get some work done.

Poor organization kills a manual more effectively than any other problem. The reader simply gives up trying to find anything. When the manual is well organized, the reader at least knows where to scratch in his own notes to make up for deficiencies in the text.

Now, no one is going to argue against good organization. But they may disagree on what it is. The disagreement may center on whether the writer is a manager, a programmer or a systems analyst.

Take, for example, a programming standards manual organized by a manager. Managers like an organization that reflects the corporate structure.

Their manuals tend to have separate sections for data center operations, security, auditing, data base management and data communications. Each department or staff specialist has a section in the manual. A single topic, such as file design, may turn up in two, four or every one of these sections. A programmer is expected to keep up with all of them.

In practice, the programmer will read the data center's section and ignore everyone else. The data center has the clout necessary to enforce its standards. All of the others will give way in the face of project deadlines.

When writing for programmers, it makes sense to organize the manual by technical subject. There may be sections on file and data base, program design, source code libraries, program testing and other job-related topics.

Each section is complete. It may even include instructions for locally developed utility programs that support the programming task.

More Sense

A by-product of this organization is that everything makes more sense. The data center's rules for files are on the same page with the security staff's requirements. The conflicts between them are obvious and can be cleaned up before the manual is published.

Manuals designed by programmers also have distinguishing features. Characteristically, each program is lovingly described, and there is a complete set of file layout charts.

On the other hand, the manual will say next to nothing about how the programs and files relate to each other. There is virtually no description of the system as a whole or of any function that involves more than one program. A JCL listing may be the only clue of how the programs are organized into job streams.

(Continued on Page 30)

The Software Environment's 30-Year Evolution

(Continued from Page 29)

source statement to one object code line. The system could fully manage its operation via a number of reporting documents, mapping out the code and providing glossaries, as well as automatically generating a good amount of object code from much less source code. These capabilities led to the adoption of the term "automatic programming," although very little was really automatic.

The compiler was extended by the input/output control system (IOCS), which was the first significant step in softening up the difficulty in using the fixed hardware. Through the IOCS the programmer received assistance in communicating between his program and the peripheral world surrounding the CPU. The interface between the input and output calls from the program to the IOCS became the most important function of the embryonic operating system.

Thus, in the late '50s, the application programmer had at his disposal a general compiler (or sometimes a special higher order language), the I/O control function and the beginning of the operating system.

CPU memory had now grown to more substantial proportions. The typical Univac 1103 had 1,024 words of 36 bits each and what amounted to the first virtual memory, being able to extend its 1K byte of internal memory by automatically addressing 16K words on a magnetic drum.

The IBM 1400 series was subsequently introduced and provided up to 16K bytes character positions of memory.

The resident software environment supporting the application program in the early 1960s occupied a few thousand bytes of the typical sized memory.

Next Wave

The next wave of innovation took three paths. First, the operating system took on more responsibility and became more complex. Secondly, the I/O system was expanded to incorporate an ever increasing number of access methods to the stored data, as well as more I/O handlers to a variety of peripheral devices and makes.

The third contribution represented a new direction. This was the teleprocessing (TP) monitor which absorbed a number of I/O functions and operating system responsibilities. The TP monitor entered the scene in the mid-1960s in answer to the beginning incorporation of computers in communication environments.

At that point in time the application software implementor was obligated to provide the processing logic and the data file structure and organization. The rest of his needs could be derived from the three environmental components of the day: the operating system, the I/O control and the TP monitor. This software complex had now grown to require tens of thousands of bytes while the CPU memory also increased to sizes as small as 4K bytes, but also reaching as high as 512K bytes or even 1M byte. The more sophisticated software environments actually began using more than 100K bytes of memory.

The time was ripe for laying the groundwork for the next stage, which ultimately provided a quantum jump in enhancing the software development process and enriching the implementor's environment. The end of this process was the emergence of the data base management system (DBMS) in the early 1970s. But these systems were preceded by the file management system of the late 1960s.

The file management system never became a part of the operating environment. They typically became application program instances themselves and, as in the case of the RPG, represented nonprocedural language approaches to implementing applications, standing in parallel and as an alternative to the evolving spectrum of procedural languages which were also proliferating in the '60s.

The DBMS era began in the early '70s and pervaded the decade. The application program was now surrounded on four sides — by the operating system, the I/O handlers, the TP control and the heralded DBMS. It would appear that the application implementor had his day in being given the ultimate of support at, of course, the cost of an extended software environment, typically requiring hundreds of thousands of bytes of committed CPU memory and some additional hardware resources to make all the pieces work together.

That's where we are as we begin the decade of the '80s. A software environment of one million bytes is not unusual. But like the proverbial amoeba, another split of functions is now in process taking further capability away from the operating system utilities and the DBMS and emerging with another major module for the software environment of tomorrow. This is the data dictionary, which is rapidly achieving status in its own right as the central focal point for both definition and control of all data elements.

There is yet another major element to emerge and be given equal recognition with the five basic environmental modules already enumerated. This component is the transaction processor, which will be the important contribution of the mid-1980s in completing the overall software environment. Of this we will speak in another column.

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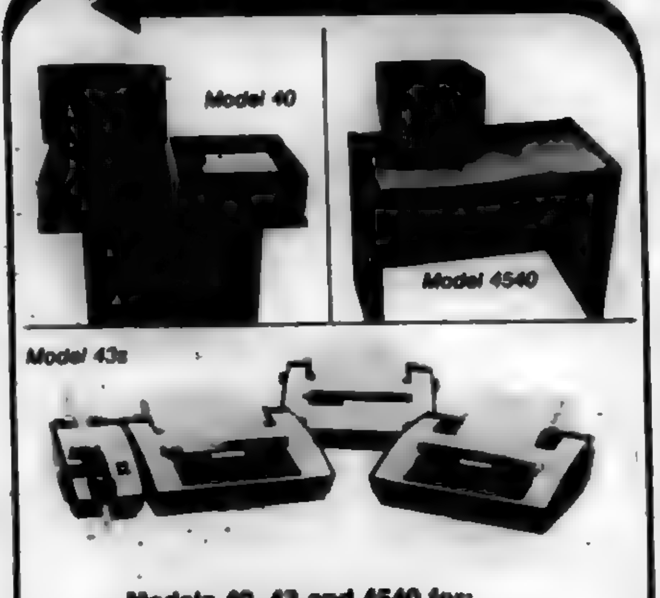

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Poor Organization Kills a Manual

(Continued from Page 29)

This is an exaggeration, of course. The best manuals I have ever seen were written by programmers who were describing their own work. Still, it is not far off base. Programmers get uncomfortable when they have to talk about the forest instead of describing each tree.

End-User Reaction

End users are easily overwhelmed by such manuals. They want to know what goes in and what comes out. They don't care how many programs are executed in between.

A good end user's manual may well be three or more manuals. Volume 1 is for the data processing liaison group. It contains technical information and run schedules.

Volume II has data entry instructions. It contains full information for a key punch operator.

The remaining volumes are output-oriented. There will be one volume for each distinct group of users.

The table of contents may be little more than a list of screen displays and reports. Each section shows the reader what a report looks like. It tells the user how to get the report, what data is included, and where the data came from.

The user should have no need to refer to any other section for information about that report or display.

All of which proves that end users are no different from systems people. They want manuals oriented to their work.

In the end, it shouldn't matter who does the writing. The organization must reflect the job needs of the reader. And if there is more than one reader, it may be necessary to have more than one manual.

Rigo is president of Sysdoc, Inc. in New York.

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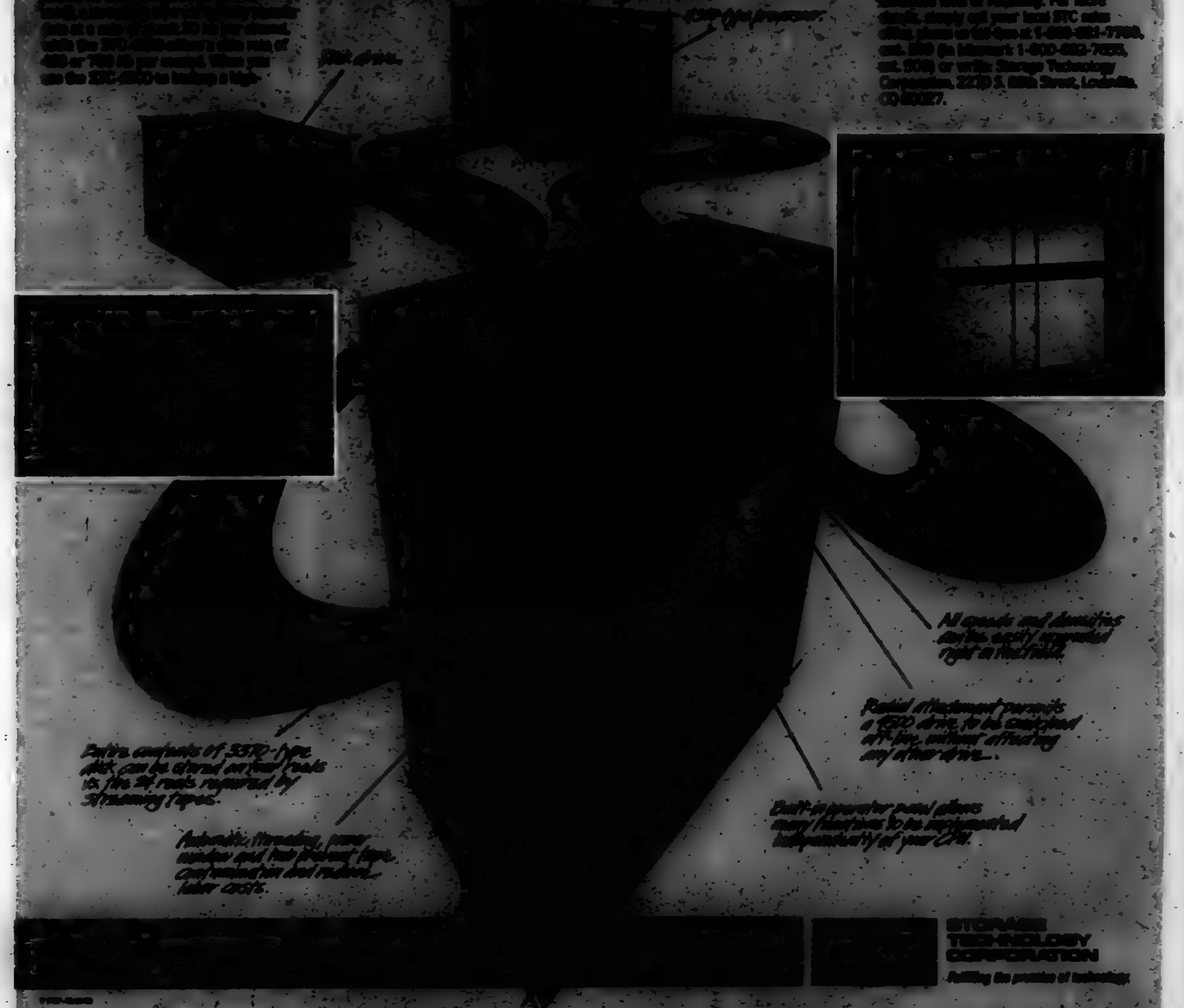
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LETTERS

Union Climate

It is the very situation in "The Gravy Train Derails" [CW, Nov. 10] which will foster a climate attractive to union organizers. The cases of unionization as typified by the situations at Western Airlines and the Union Pacific Railroad are isolated instances of unionization and very situational.

The issues expressed in "The Gravy Train Derails" have timeliness. Although the software industry may be currently in a time of uncontrolled growth, this growth, like inflation, cannot go on forever. With the development of turnkey packages, promulgation of ideas such as the "IBM Information Center" concept, and the demystification of the function of programmers, the programmers still left in the industry five to 10 years from now may look to means of protecting their function through legal mandating of an employer-employee relationship — a union contract.

Now is the time, before the train actually derails, for programmers to give thought to what they actually do and how it will fit into the industry five to 10 years from now. Perhaps Peter Drucker's conception of computer programming as semiskilled work has validity.

As some clerical jobs are being replaced by computers, so may generalized software packages and data bases accessed with user-oriented languages replace many programmers.

Elizabeth A. Davidson

Los Angeles, Calif.

'They' Are Us

David F. Stevens' article "The Menace of Micros" [CW, Nov. 3] was excellent — a thought-provoking treatment of a subject that is usually ignored in our zeal to introduce computer technology into business operations. We have gone ahead blithely with the development of computer-based systems that use terminals for access. Seldom is consideration given to how the systems affect those using the terminals.

We are now on the threshold of the office-of-the-future, in which other terminal-based technologies will be introduced into our lives — electronic mail, computer conferencing, data base retrieval and the like. While terminal users on computer-based systems tend to be lower ranking personnel, the newer technologies are aimed at the managerial and professional work force. How this group will react to these new technologies, how their behavior and modus operandi will change and, ultimately, what kinds of human beings they will become are questions of extraordinary importance, because "they" are us.

I commend Stevens for his foresight and *Computerworld* for publishing his article.

John J. Connell

Pasadena, Calif.

Missed the Point

Regarding William Hansen's commentary "The Silencing of a Computer Room" [CW, Nov, 17], he has missed the point completely. There is a right way and a wrong way to do things, and the computer operator definitely chose the wrong way.

As a data processing manager, I would have agreed with the systems and programming manager, but for different reasons. Computer operators should not be allowed to modify a program or JCL indiscriminately. These modifications go against all auditing and control principles. If Poppapills' internal auditors had discovered that a computer operator was modifying JCL, they would have the right to crucify the DP manager.

The systems and programming manager was wrong in not evaluating the new procedure just as Hansen is wrong in making his snide comments about a college education. However, the computer operator could have put his suggestions in writing and let his manager handle the proposed modification.

As for the operator being fired for running his system after he was told not to, that is insubordination and if left unchallenged would lead to anarchy. Right or wrong, when senior management in or out of DP, makes a decision, it is to be followed. If you don't want to abide by the decision, leave before you have an involuntary termination on your record.

Harold Steintrager

Los Angeles, Calif.

Classic Lament

Robert Glass's article, "Management Enters the Garden of Eden" [CW, Nov. 24] is an entertaining fable. But it is just another version of the classic lament of detail workers everywhere: "Do you want me to do the work, or do you want me to make out reports?"

The answer from management, of course, has to be, "We want you to do both. We're running a business — not a hobby center. And part of your job is to help us keep score."

Whether you're a programmer or a plumber, if you're on somebody's payroll, that somebody must find ways of keeping track of the detail work flow and detail costs in all areas of the business. If a plumber is expected to complete the work order and write down the materials used, it's because that's the most cost-effective way to collect that data.

Is it illogical to expect a programmer to be at least as articulate in estimating, recording and reporting his progress in applying his particular skills?

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'Luci' Measures CICS Performance

NEW YORK – A Line Utilization Control Inquiry (Luci) system designed to measure live performance in a CICS environment has been introduced by Analysts International Corp.

By calculating the dates and traffic – the number of bytes transmitted for a selected line – for a specific time interval, a ratio is calculated that represents line utilization, according to the firm.

Such data is said to be helpful in establishing the causes of performance degradation, such as traffic overloads at specific time intervals, inefficient programming techniques that transmit more data than is required and application systems that have especially high fluctuations in message rates.

The results may be displayed at a terminal for immediate review, at a printer for later review or for comparative analysis with other time intervals.

Luci runs under the IBM 370 OS environment with CICS/VS and Basic Mapping support. Luci transactions are designed for 3270-type terminals.

Basic Luci costs $9,500 per site with a $1,000/site annual maintenance fee. Basic Luci with Data Compression costs $14,500 per site, with a $1,500/site annual maintenance fee. The firm is located at Suite 930, 295 Madison Ave., New York, N.Y. 10017.

Utility Supports CICS Mapping

TULSA, Okla. – DBC Information Systems, Inc. has developed a utility program said to produce Basic Mapping Support (BMS) map set definitions and copy groups for CICS programmers.

The CICS map and copy group generator is said to eliminate the following steps in generating BMS mapset definitions: determining field locations, calculating field lengths and specifying field attributes and edit requirements.

To use the utility, the programmer designs the screen layout and provides names for the fields to be accessed by Assembler, Cobol and PL/I programs.

In one step, the generator produces the BMS statements for input to the assembler and creates copy groups for all the languages specified. Multiple maps can be generated for each mapset by supplying additional screen layouts and field names.

The utility runs under DOS and OS in less than 64K bytes of memory and costs $500 for source code documentation from Box 33020, Tulsa, Okla. 74135.

VAX Machines Get 'Ingres': C-Based Relational DBMS

BERKELEY, Calif. – Relational Technology, Inc. (RTI) has introduced a relational data base management system (DBMS) for Digital Equipment Corp. VAX-11/780 and VAX-11/750 computers running under VMS.

Ingres includes the following facilities:

- Commands to define logical and physical data bases.
- Quel – a query language designed for interactive data manipulation.
- Equel – a precompiler for query language statements embedded in the C programming language.
- Tools required to define views of the data base, specify protection predicates and assert integrity controls.
- Utilities designed to load and unload the data base and to assist in crash recovery.
- An internal editor to support interactive use.

An Ingres data base consists of a set of tables, or "relations," each of which can hold a maximum of 50 fields, according to an RTI spokesman. The tables can have a record width up to 2K bytes.

Valid field data types are 1-, 2- or 4-byte integer, 4- or 8-byte floating-point or a fixed-length character string of up to 255 bytes, he explained.

The data base is essentially created through four commands. CREATDB names the data base and sets up a skeletal directory, CREATE defines each relation within the data base, COPY fills each relation with values sorted on a disk file and MODIFY organizes the storage structures of the relations.

Once a relation is defined, its values can be loaded through either the COPY command or the Quel language insertion facility, the RTI representative noted. He justified the description of Quel as a nonprocedural language by noting that the user specifies which set of records is to be accessed, but is not required to provide the algorithm required to obtain them.

Quel is available interactively via terminal monitor software or from a host language. The only host language currently being supported is C.

Requiring a minimum of 256K bytes of main memory, Ingres will be available Jan. 1 for approximately $30,000. Additional information can be obtained form RTI at 2212 Eunice St., Berkeley, Calif. 94709.

Three ASI Courseware Modules Provide CAI for DP Training

CHICAGO – Computer-assisted instruction (CAI), which is usually associated with end users, has come home to roost with Advanced Systems, Inc.'s (ASI) introduction of CAI "courseware" for DP-related education and training. The announcement was made here at ASI's recent training conference.

The initial CAI release will include three educational series.

One, which covers approximately 20 course units, offers simulation capability to computer system oeprators in such areas as JCL, Time-Sharing Option (TSO) and JES2.

Another series was designed to allow students to reinforce skills developed in video-assisted instruction courses through a series of tests. It covers some 130 DP-related course units, ASI noted.

The third group is essentially a placement tool for the DP training manager. It provides for quantification of the skills level of any given student. This capability supposedly makes it easier to place the student at the appropriate level of a course or curriculum.

Requiring an IBM operating environment that includes IBM's Interactive Instructional System (IIS), CAI courseware is perceived as a natural addition to existing textual, audio and videotape instruction.

Included in the offering is a monitor program that produces a series of reports.

The minimum tape-month contract allows for 360 tape-months in one year at $65/tape-month, the vendor said.

ASI is headquartered at 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

'Total' Users Get Documentation

AUSTIN, Texas – Gunter & Associates, Inc. has announced a Structured Documentation System for IBM installations using Cincom Systems, Inc.'s Total data base management system.

The system is said to track the relationships of programs to systems, systems to programs, programs to files, reports to users, users to reports, source documents to users, users to source documents and source documents to data entry formats.

A perpetual license for the Corporate Information Documentation Control System costs $21,800 from Gunter & Associates, Suite 111, 3636 Executive Center Drive, Austin, Texas 78731.

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'Jars' Gets Upgrades

McLEAN, Va. — Johnson Systems, Inc. has announced upgrades to its Job Accounting Report System (Jars), including four additional reports to its working set.

Jars is comprised of a report generator, data management utility, data set spool utility and the $JOBACCT interface routine. Included in the enhancement are Johnson-supplied paging modifications for DOS/VSE Release 2, support for Power/VS Account Files from a shared pool environment and longer RJE (type T) records created by DOS/VSE.

Jars Version 4.1 costs $4,000, and a Power/VS interface costs $2,000 from the firm at 7923 Jones Branch Drive, McLean, Va. 22102.

Formerly Time-Shared Service

'Pbar' Gives Patient Billing on ARC System

LOS ANGELES — The on-line, interactive patient billing and insurance form preparation system currently offered as a time-shared service under the Datapoint Corp. Attached Resource Computer (ARC) system is now available as a software package from Data Care Systems, Inc.

The Patient Billing and Accounts Receivable (Pbar) system reportedly utilizes formatted video displays to enter and edit data and to inquire to the patient master and transaction history files.

Pbar utilizes the "Profile" technique that allows each user to tailor the system options to its particular needs concerning automatic pricing, delinquency control, and statement and insurance forms preparation.

The Pbar software in conjunction with the ARC system allows more than 48 on-line users on Data Care's five-processor ARC system. ARC allows expansion of on-line terminals by 16-terminal increments.

The software costs $15,600 for the source modules and the Datapoint computers start at $24,000 for a 10M-byte system with a printer. Software and hardware are available from Data Care at 2044 Armacost Ave., Los Angeles, Calif. 90025.

Digi-Log System 2000 Gains Four Financial Packages

HORSHAM, Pa. — Digi-Log Systems, Inc. is offering four financial software packages for its System 2000 desktop business computer.

The Accounts Payable system was designed for cash management. Key benefits include increased discounts from payments targeted for due dates and a reduction of cash tied up in operating accounts.

The Accounts Receivable system converts excess receivables to cash, while retaining good customer relations, the vendor claimed. It reportedly aids businesses in speeding collections, spots potential losses early and takes corrective action.

The General Ledger system produces compartmental and summary income statements that contain all current and year-to-date amounts and percentages categorized.

The Payroll system controls personnel costs through departmental totals each pay period and produces monthly summary reports.

Each system costs $1,250, the vendor said from Babylon Road, Horsham, Pa. 19044.

HP Users Get RTE Hot Line

STAFFORD, Texas — Users of Hewlett-Packard Co. RTE-based computer systems can now utilize a hot line service number offered by Letts Systems Corp.

For $150/mo, subscribers can receive advice ranging from recovery assistance to programming tips, for up to five hours per month. Users will receive a 5% discount from field service rates when involvement beyond the five hours per month is required.

Letts is located at 13102 Naples Lane, Stafford, Texas 77477.

ADP Boosts Features Of DEC's Fortran 10

ANN ARBOR, Mich. — ADP Network Services, Inc. has developed a modified version of Digital Equipment Corp.'s Fortran 10 that is said to make the language more powerful, more efficient and easier to use.

Some of the features of the new Fortran are dynamic arrays with an arbitrary number of dimensions for all data types, a string data type with complete string-handling capabilities, extended character set and expanded free-format source input statements.

Also featured are array bounds that may be negative or zero, any number of subscripts on arrays, symbolic names for constants, compiler macro definitions, global optimization and enhanced sequential and random-access I/O capabilities.

The language is offered as part of the firm's time-sharing services. ADP is located at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

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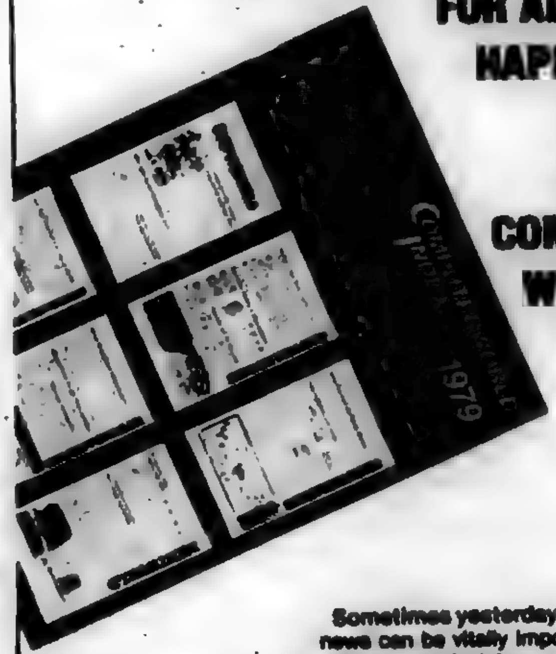

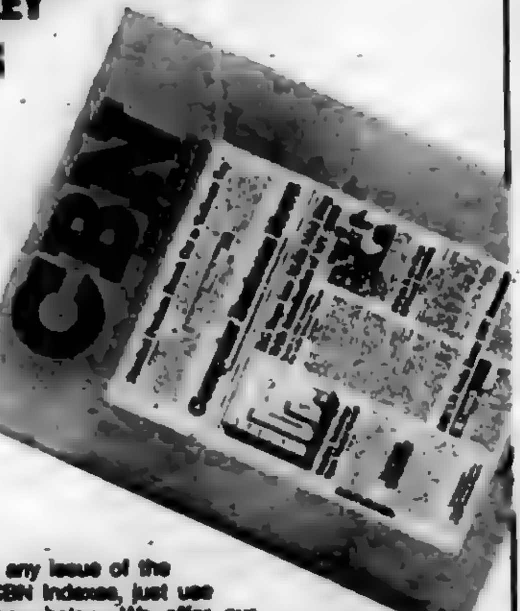

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GRAHAM MAGNETICS

Proprietary Software

Panda Systems Packages Fit Medical, Dental Use

LOS ANGELES – Panda Systems, Inc. has designed two proprietary software packages for the medical, dental and medical accounting markets: the Medical Practice Management System and the Dental Practice Management System.

The medical system performs normal recordkeeping and billing functions and maintains information on physician referrals and patient activity. A special coding feature is keyed to the individual fee structures, which reportedly releases users from changing their procedures to suit the system.

The dental system allows the input of data from a 10-key pad for master account and credit information and handles patient statements, income allocation, cycle billing and multiple fee schedules.

Both systems require a minimum configuration of 64K bytes of main memory and a 10M-byte hard disk and operate under Iris Basic or Digital Equipment Corp. Basic Plus.

The packages, priced at $6,500 each, have vendor maintenance and software customizing available. Panda Systems is at Suite 518, 7080 Hollywood Blvd., Los Angeles, Calif. 90028.

Prodigy Adds General Ledger

ISELIN, N.J. – Prodigy Systems, Inc. has added a general ledger package to its accounting software for its small business computer line.

Features of the package include user-defined chart accounts, detail general ledger and summary, instant access to current balance, complete audit trail and the ability to produce comparative statements, the vendor said.

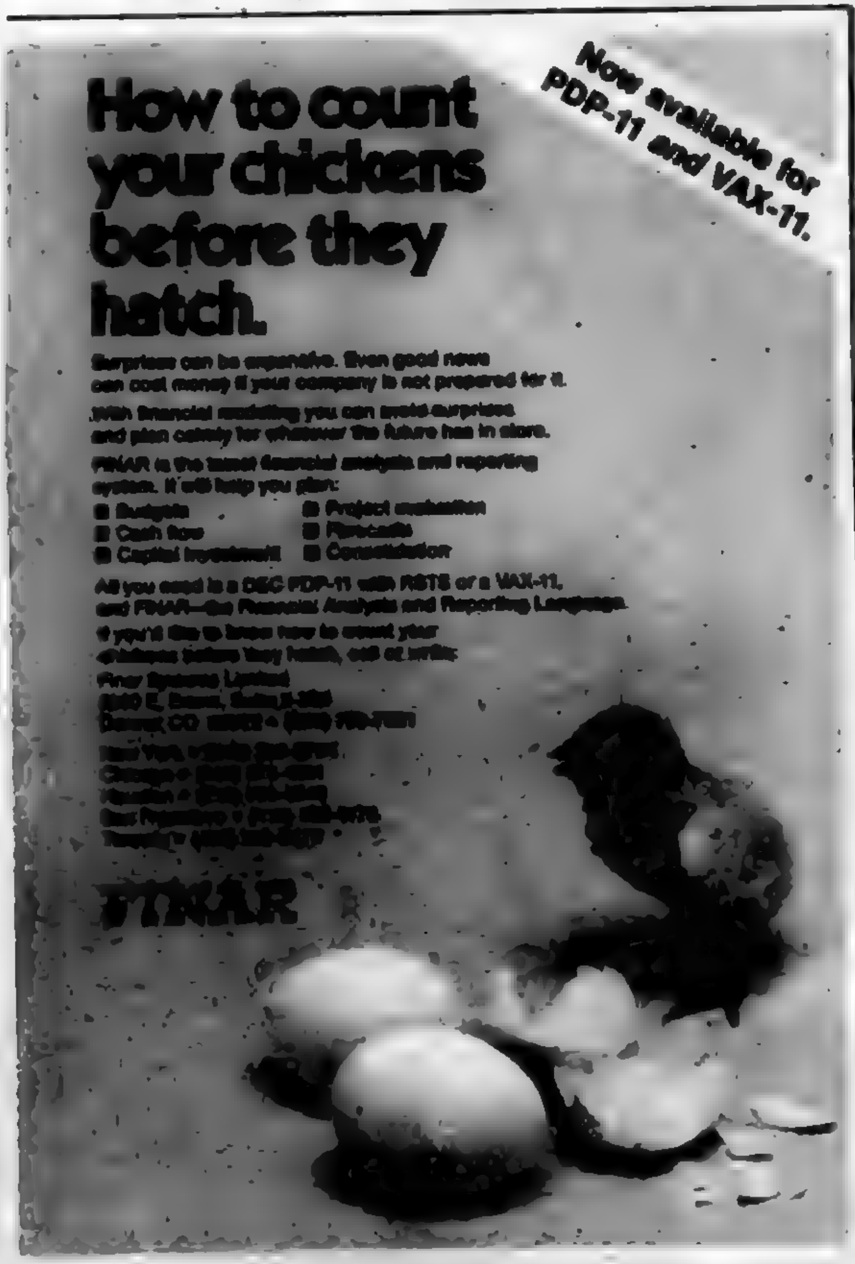
The general ledger package is part of an integrated accounting package that includes accounts receivable, accounts payable and payroll. Prices for the accounting package start at $12,500, the vendor said from 497 Lincoln Highway, Iselin, N.J. 08830.

DG Minis Get WP Package

OREM, Utah – Satellite Software International is offering a word processing (WP) package for Data General Corp. systems.

SSI*WP will run on DG minis under the AOS, RDOS and Icos operating systems. It costs $5,500 on DG's Eclipse line, $4,000 on the Nova and $3,000 on the Micronova.

Satellite Software International is at 116 N. State St., Orem, Utah 84057.



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Prime Series 50, VAX-11/780 Gain Schematic Drawings

FISHERS, N.Y. – Scientific Calculations, Inc. has introduced a software package that automatically generates schematic drawings for Prime Computer, Inc. 50 series and Digital Equipment Corp. VAX-11/780 CPUs.

The Schemactive program is said to automate the design process, or it can work with the designer by offering computer-assisted designer-controlled operations, the vendor said.

The program comes with "Coach" routines to aid the designer through direct prompting via the dynamic switching of command lists to determine design options or define needed data, the company said.

The package costs $10,000 for an initialization fee and $1,100 a month thereafter, Scientific Calculations noted from 7635 Main St., Fishers, N.Y. 14453.

Vector Graphic Micros Get WP, Financial Planning

WESTLAKE VILLAGE, Calif. – Word processing (WP) software called Memorite III and a financial planning system called Execuplan have been introduced by Vector Graphic, Inc. for its family of microcomputers.

Both operate on the Vector Intelligent Partner (VIP) microcomputer, as well as the System B, the 2800 and the 3030; all under control of CP/M 2 operating system.

Memorite III offers a built-in quick reference manual that displays answers on command; fastest available editing due to memory capacity of 17 pages without disk access; and field-accessible software so that user-defined features can be added as needed, the firm said.

Execuplan is a coordinate-based system for calculating, displaying and printing planning, budgeting and forecasting schedules and for projecting profits; sales, shipments, cash flow, costs, taxes or other financial data. Functions for scientific applications are also provided, according to the vendor.

In operation, Execuplan presents a video screen look at any selected section of a large electronic "sheet" representing financial entries. The user can title columns and rows as desired and enter formulas and numbers while the program stores data, formulas and results in disk memory.

The two software systems can be integrated. The Memorite III WP software costs $450 and the Execuplan program costs $150 from Vector Graphic, 31364 Via Colinas, Westlake Village, Calif. 91362.

Data Access Updates Bookkeeping Package

CHARLESTON, S.C. – Data Access Management Service has released the second version of its Basic Bookkeeping System for Ohio Scientific, Inc. computers.

The package consists of general ledger with double-entry bookkeeping, single- or multiple-division companies, data entry and reports. Also included is a check writer with automatic look-up of accounts, multiitem and multiaccount checks, deposits and bank balance.

The version costs $2,250 including a 90-day warranty period and 90-day maintenance period; maintenance costs extra after that time, a spokesman said from 3320 Rivers Ave., Charleston, S.C. 29405.

Seven Features Added to 'Personnel/Payroll'

ROCHESTER, N.Y. – Information Associates, Inc. has added seven more features to its Payroll/Personnel package.

The additions are complete on-line capabilities for customers using IBM's CICS or a similar telecommunications monitor, a job attribute table, a system calendar, automatic vacation and sick pay accruals, user-controlled tax tables, integrated position control and automatic gross amount calculations, the vendor said.

Payroll/Personnel costs between $50,000 and $100,000, the vendor said from 97 Humboldt St., Rochester, N.Y. 14906.

Modcomp Adds Pascal

FORT LAUDERDALE, Fla. – Modular Computer Systems, Inc. (Modcomp) has added a Pascal compiler to its line of software products.

Modcomp/Pascal meets proposed International Standards Organization (ISO) standards, the vendor said. The compiler is compatible with Modcomp's MAX IV software family and reportedly takes advantage of the firm's Classic architecture.

The compiler costs $3,500 including documentation. Modcomp can be reached at 1650 W. McNab Road, Fort Lauderdale, Fla. 33310.

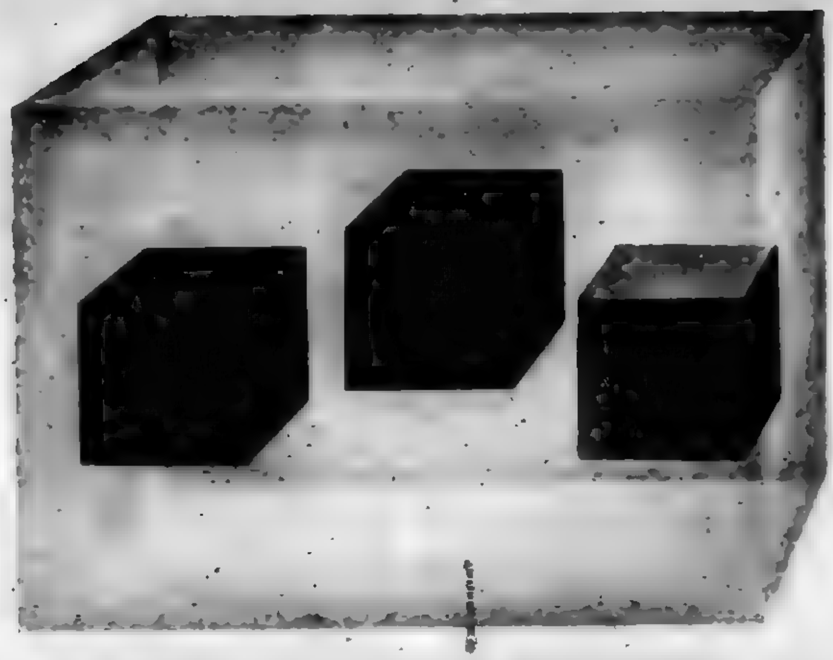
Corrections

"Cincom Offers Interactive Version of ENV-Data" [CW, Nov. 24] contained an error in price and an error in nomenclature. The firm's Total Information Systems software package should have carried the acronym TIS, by which it is commonly known. In addition, the ENV-Data facility was said to carry a $20,000 installation fee for installations with DOS or OS with advanced mapping. The installation fee is actually $2,000.

The correct address of Philinda Software ["Utility Aids JCL Operations," CW, Nov. 3] is 527 W. Kerr, Springfield, Mo. 65803.

The correct address of the Wollongong Group ["Unix, SCCS Supported by PE 32-Bit Supermini," CW, Oct. 20] is 960 San Antonio Road, Palo Alto, Calif. 94303.

The Transparent Single System Image Has Arrived!



With the recent addition of the Global Console Director (GCD) to Allen Services' line of software packages for Multiple System environments, an entire complex of systems can now be treated almost as though it were **one single unified** system.

The complete "unified system" effect is achieved through combined use of three independent (but related) program products. Each of these, Super-MSI, MSM and GCD addresses distinct concerns present in multi-system environments.

Of course, since the products are independent, if you aren't yet ready for the full-blown unified system effect, you only need to select the products which interest you.

UNIFIED DATA INTEGRITY (including VSAM)

SUPER-MSI™
The Multiple Systems Integrity Facility

The Multiple Systems Integrity Facility provides the same thorough dataset integrity protection for jobs in different systems that would exist if the jobs were in the same system. In addition to propagating "standard" dataset integrity across systems, Super-MSI also insures that the VSAM "internal" SHR options are honored throughout your entire complex. Effective cross-system VSAM integrity can be obtained in no other way than through the use of Super-MSI.

Another feature: Super-MSI also eliminates the hardware RESERVE lockouts which are normally inherent with SHARED DASD in multiple system environments.

Much more besides: Super-MSI has many other exciting features including special aids for operators and TSO Users. All in all, Super-MSI will be a very powerful addition to your installation.

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MULTIPLE SYSTEMS MANAGER

The Multiple Systems Managér manages the allocation of TAPE and MOUNTABLE DISK devices across all systems in your complex. It allows you to operate normally with all devices ONLINE to all systems. MSM insures that device allocation by jobs in different systems occurs just as if all jobs were operating in one single unified system.

MSM eliminates the operational burden of juggling TAPE and DISK units among systems. It protects against the danger of a system accidently rewinding or overwriting a TAPE in use on another system; this removes the single greatest cause of shared tape mishaps.

MSM will use your TAPEs and DISKs more efficiently — which can result in immediate device cutbacks or (more likely) postponement of future acquisitions.

MSM is so transparent that it can be operated without the use of any new operational commands. Of course, there are powerful new commands available — however these are extras, not necessities.

Only MSM allows such truly NATURAL and transparent shared device management.

Other features (for MVS environments only):

- The MSM Device Preferencing capability allows devices to be dynamically structured into a hierarchy of sets: MSM insures that units in preferred sets are used, wherever possible, before less preferred sets.
- The MSM SOFTSWAP™ feature insures that DDR device SWAPs for TAPE units will NOT impact JOBs or TSO users which are not using tape allocation. Without SOFTSWAP™, TAPE DDR SWAPS are likely to impede all allocations in a system — including even those which do not use tape.

UNIFIED OPERATOR CONSOLES

GCD

The Global Console Director is an extremely flexible tool. It allows (selected) message streams from different systems to be logically "blended" to create a **unified system image** (to whatever degree desired). In a slightly differenf vein, GCD allows any console on any system to be logically attached concurrently (and perhaps in different ways) to any set of systems in your complex!

GCD allows commands entered from any console to be directed and processed anywhere in the complex: in this respect, all consoles are effectively linked to all systems.

In almost every aspect, GCD is philosophically and operationally compatible with the standard system console support.

GCD can improve overall throughput by simplifying operations. By allowing several physical consoles to be logically merged, excess devices can be eliminated for immediate savings, or deployed elsewhere to strategic advantage.

GCD is absolutely transparent to your users, and aside from major simplifications, nearly transparent to operations.

If you wish to use more than one of the above products, they can be integrated together into a single control task (thus further reducing overhead and complexity).

In nearly every instance where our products have been competitively evaluated against all possible hardware or software alternatives — our software has been chosen. Aside from IBM, Allen Services has been providing commercial software specifically designed for multiple system environments longer than any other company. Over 400 major installations throughout the world have already selected our products as the preferable means of handling problems associated with multiple system environments. The number grows daily. Reliability has always been an integral part of our design.

When considering software, most people consider support to be a very important factor — Allen Services has over 200 support personnel.

The only other comprehensive approach to unifying multiple systems is JES3 (or ASP). Aside from the fact that MSI/MSM/GCD can be installed and implemented in only a few minutes, there are several other significant differences from JES3: For example, MSI/MSM/GCD (combined) are only 1% to 2% overhead; MSI/MSM/GCD are invisible to your users; MSI/MSM/GCD were designed to be strictly compatible with OS/VS/MVS philosophies — in this regard none of your personnel will require re-training.

The majority of all eligible multiple system installations are now using our products to help manage their systems.

Because installations can have widely different characteristics, you may still have a nagging suspicion that our claims may not actually apply to your shop. To alleviate this doubt, we invite you to try our products (whichever ones interest you) at your own installation under your own conditions. This trial carries no charge and is without obligation. One word of caution: You're going to like them so much, you'll never take them out.

ALLEN SERVICES
CORPORATION

For more information, call Susan: 800-543-7583 (in Ohio: 513-890-1200)
Or write: Software Department • Allen Services Corp.
212 W. National Rd. • Vandalia, Ohio, 45377

Time Series Accessed

ANN ARBOR, Mich. — ADP Network Services, Inc. will offer on-line interactive access to approximately 800 Conference Board time series reports on a variety of business statistics in the U.S.

The time series data base can be accessed via ADP's international teleprocessing network through desktop computers. Features include summary projections of GNP inflation and unemployment, as well as indicators collected by the Conference Board. The Conference Board is a nonprofit research organization.

The access feature is billed on an as-used basis, ADP said from its headquarters at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Product Evaluation Aid Offered

ANN ARBOR, Mich. — Comshare has added a product evaluation tool to its time-sharing network.

The New Product Introduction is a cluster of computerized information analysis aids that reportedly support the financial marketing management decisions of clients in the consumer goods and industrial manufacturing business.

The package can be used to test the effects of pricing strategies on a product's contribution margin, the vendor said.

Comshare is offering demonstration seminars on the new product tool in Chicago, Nov. 12, Minneapolis, Dec. 4, St. Louis, Dec. 10, Los Angeles, Dec. 16 and San Francisco, Dec. 17.

The New Product Introduction tool is billed on an as-used basis, the firm said from 3001 S. State St., Ann Arbor, Mich. 48106.

Windfall Tax Tool Bows

ANN ARBOR, Mich. — Computer Research Co. (CRC), a subsidiary of Comshare, Inc., has added a windfall profits tax calculation package to its time-sharing services.

Developed by Coopers and Lybrand, Inc., the package provides accounting, reporting and recordkeeping procedures for handling windfall profits taxes, the vendor said.

The package is available on CRC's time-sharing system and is billed on an as-used basis.

Comshare is located at 3001 S. State St., Ann Arbor, Mich. 48106.

With 400 Weekly Time Series

Citibase-Weekly on Rapidata Net

FAIRFIELD, N.J. — The Citibase-Weekly data base of money supply statistics from Citibank is available on Rapidata, Inc.'s nationwide computer system.

The data base will contain approximately 400 weekly time series. Among items included are currency exchange rates for 16 major countries; the Bureau of Labor Statistics' spot market price indices for 22 commodities; weekly prices for hard and soft commodities, and key production data for coal, electrical power, paper, paperboard, steel, passenger cars and petroleum.

The subscription cost for the data base is $130/mo if used alone, or $100/mo if used in conjunction with the Citibase data base. The charge is in addition to Rapidata's standard computer service costs.

There is a $100 start-up fee for new customers, the vendor said from 20 New Dutch Lane, Fairfield, N.J. 07006.

'Tsam' Gains 30 Additions

ANN ARBOR, Mich. — A version of the Time Series Analysis and Modeling System (Tsam) featuring over 30 new commands and options has been announced by ADP Network Services, Inc.

Expanded graphics capabilities that include automatic curve labeling, footings, stacked bar charts and vertical line plots, automatic positioning of multiple plots and horizontal and vertical axes lettering options can be utilized without need for programming graph set-up files, data files or product linkage, as was true of past Tsam releases.

In addition to the graphics enhancements, the new Tsam offer features as "Auto Repeat," which repeats time series values; "Roll Command," which shifts the current date range forward and backward; and a "Dictionary" subsystem that helps users identify time series of interest, an ADP spokesman explained.

Prices for the updated version of Tsam are based on connect hours and computer resource units with typical applications ranging from $500 to $2,500 monthly.

More information can be obtained from Lawrence Rafsky, ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Dow Jones Adds Text Search To News/Retrieval Service

NEW YORK — Dow Jones & Co. is adding free text search and information retention over a longer period to its computerized News/Retrieval Service, which provides business and financial news on command through time-sharing terminals or personal computers.

Free text search will enable News/Retrieval Service subscribers to search for and retrieve news and information using words that are contained in the text of stories stored in the data base, a spokesman explained.

Users will continue to be able to retrieve stories by company stock symbols and various industry and government agency categories, a Dow Jones spokesman said.

Free Text Search

The standard free text search software from Bibliographic Retrieval Services, Inc. of Scotia, N.Y., will be used.

Stories will be able to be retrieved as far back as 15 months initially, the firm said.

Dow Jones can be contacted at 22 Cortlandt St., New York, N.Y. 10007.

Air Crash Data Base Debuts

TORONTO — I.P. Sharp Associates is now offering details on aircraft crashes and accidents on-line in over 300 cities through its time-sharing network.

Using its statistics, Sharp can provide an analysis of a major crash in one minute, the vendor claimed, adding that in the past, a full day was required.

The data base contains factual information on all jet and turboprop airliner losses for aircraft of 2,000 pounds or over.

The data base is priced according to amount of computer time used.

I.P. Sharp Associates is located at 145 King St. W., Toronto, Ont. M5H1J8.

McAuto Markets Fluid Flow Tool

ST. LOUIS, Mo. — A program that analyses fluids under pressure is now available from the remote computing network of McDonnell Douglas Automation Co. (McAuto).

The Fluid Analysis and Simulation Technique (Fasst), program is owned by GCN/-Hydronet Services and solves fluid flow problems in such systems as fire sprinklers and domestic water distribution.

Fasst can be processed in either batch or interactive time-sharing modes on McAuto's Control Data Corp. Cyber computers. Costs vary depending on the computer time used.

McAuto is located in St. Louis, Mo. 63166.

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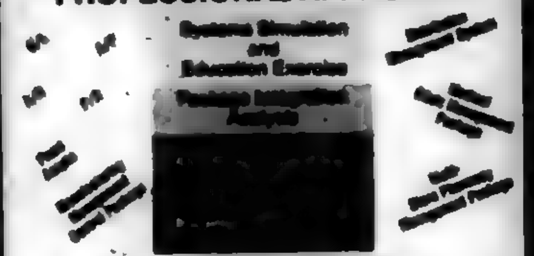
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With Nine Subsystems

On-Line Business System Runs on HP 3000

MINNEAPOLIS — Corporate Support Systems (CSS), a comprehensive on-line real-time business software system that combines standardized packaging with customized applications, is being introduced by Technalysis Corp.

Developed on the Hewlett-Packard Co. HP 3000 and written in Cobol, CSS consists of the following nine subsystems: order entry, inventory, purchasing and receiving, sales analysis, payroll, general ledger, accounts payable, accounts receivable and fixed-asset accounting. The user may install any or all of these subsystems.

A user can add, delete and change daily business information and call up a full range of reports using ordinary English terminology, the vendor said.

CSS Subsystems

All subsystems under CSS — no matter what the combination or sequence — are logically linked so that a data item that affects other information is automatically carried through to the relevant functions. Thus, a data item need be entered only once, saving time and reducing errors, according to the firm.

The complete CSS package costs $40,000 from Technalysis Corp., 6700 France Ave., S. Minneapolis, Minn. 55435.

Structured Analysis Workshop Focuses on Logical Modeling

NEW YORK — Yourdon, Inc. has introduced a five-day advanced structured analysis workshop concentrating mainly on logical modeling.

The workshops are given three times a month, Monday through Friday, at Yourdon's offices throughout the U.S. and cost $850 per person.

Registration details are available from Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Datasystem 500 Gets 'Indent'

MERRIMACK, N.H. — Digital Equipment Corp. has introduced a forms management software package called Indent for its Datasystem 500 series of processors.

The package runs under PDP-11 Cobol, Basic-Plus-2 and/or Dibol-11 programming languages and provides an independent data entry front end to business application programs, the vendor said.

Indent can be used in both single and multiterminal applications and supports RSTS/E operating system, version 7 or the CTS-500 operating system.

Licenses for Indent with full support start from $2,700, the vendor said from DEC, Maynard, Mass. 01754.

Astra 205 Gets Four Packages

LEXINGTON, Mass. — NEC Information Systems, Inc. has announced four turnkey business-application packages for the firm's Astra 205 small business system.

The packages — accounts payable, accounts receivable, inventory control and text processing — are aimed at small businesses with annual sales in the $500,000 to $10 million range.

Astra Turnkey systems start at $8,500, the firm said from 5 Militia Drive, Lexington, Mass. 02173.

Ontel Enhances 'Dear' Packages

WOODBURY, N.Y. — Ontel Corp. has enhanced its Data Entry and Retrieval (Dear) software packages with three features: Dearform, Dearfile and Deardata.

Dearform is used to create a form which can be used in an Ontel OP/L application program directly on the display screen. Dearfile performs data entry and retrieval functions using the forms created by Dearform, and Deardata provides added entry and retrieval functions, the vendor said.

The three packages are free to licensees of OP/L, a spokesman said from 250 Crossways Park Drive, Woodbury, N.Y. 11797.

Analysis Aided For CAD/CAM

BURLINGTON, Mass. — Applicon, Inc. and Structural Dynamics Research Corp. (SDRC) have jointly announced a software package called Applicon/SDRC Mechanical Design Library Interface, which reportedly enhances finite element analysis techniques by speeding and simplifying model generation.

The package enables analysis results to be translated into graphical data for display on the Applicon computer-aided design/computer-aided manufacturing (CAD/CAM) system, the vendor said.

The software costs $25,000 from Applicon, 32 Second Ave., Burlington, Mass. 01803.

DOS/VS(E) and CICS/VS
SYSTEMS PROGRAMMING CONSULTING

CONSULTANTS: Bennett I. Moyle, 4355 Lyndale Ave. So., Minneapolis, MN 55409 612-822-2661.
Steven W. Huggins, 10317 Cherryview Ct., Oakton, VA 22124 (Wash.D.C.) 703-281-0222.

EXPERIENCE: Each consultant has 10+ years experience in DOS/VS and VSE systems programming in multiple-CPU environments. Specific experience includes DOS/VS and VSE and CICS/VS system generation, performance measurement, control program modifications, equipment evaluation and implementation, various conversions, audio-response, SDLC (VTAM), VM/370, most commonly used software products, 3270 terminal printers, including graphics systems, software development for vendors.

RATES: $300 per day (fixed fee available) plus transportation expenses. Telephone consulting contracts also available.

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BIMSPOOL—DOS/VS(E) Terminal Printer Spooling
Retrieves print output from POWER/VS queue and prints it on 3270-type terminal printer via CICS/VS or SHADOW II, effectively providing support for terminal printers to POWER/VS. May be used to eliminate RJE printers.

A CRT transaction is included to perform control functions:
- Display terminal printer queues and printer status
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- Respond to forms change message
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- Deleting job output from queue
- Restarting, repositioning, or flushing current output

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PRICE: $4,000 or $200/mo.

BIMDSLOG—DOS/VS(E) Console Hard Copy File Display
BIMDSLOG displays console messages from the DOS/VS(E) console hard copy file on a 3270-type CRT via CICS/VS or SHADOW II. It may be used:
- By computer operators, to redisplay console messages without tying up the console CRT and therefore the entire DOS/VS system.
- By systems and programming personnel, to review console messages without interfering with computer operations or requiring printing of console output for every job.

Console messages for all partitions, or for specific partitions only, may be displayed. A character string may be specified which will be used to search the file for a starting position. Displaying may be performed in either forward or backward directions.
BIMDSLOG reads multiple blocks per I/O on both CKD and FBA drives for optimum performance and response.

PRICE: $720 or $36/mo.

BIMSERV—DOS/VS(E) Library Display NEW
BIMSERV provides on-line display under CICS/VS or DOS/VS and DOS/VSE:
- Core Image, Relocatable, Source Statement and Procedure Library directories
- Entries in all libraries, except E-type Source macros
- Label area—permanent and executing partition disk and tape label JCL
- Disk VTOC's. Unused areas are also shown

Both system and private libraries may be accessed. Libraries and VTOC's to be accessed are dynamically assigned if necessary. Library directories may be partially displayed using a generic name capability to search for entries beginning with the same characters.
PRICE: $1,480 or $74/mo.

BIMMONTR—DOS/VSE System Status and POWER/VSE Queue Display
BIMMONTR includes several functions oriented toward systems programmers, operations, and programmers:
- Displays internal system performance variables such as paging rate, CPU utilization, channel queue utilization, etc.
- Displays current partition status, including real memory in use.
- Displays current POWER/VSE queue entries
- Displays contents of job entries in the reader, print, or punch queue. Entries may be scanned forward or backward, or by searching for a character string
- Alters queue entries by passing a user-entered command to POWER/VSE

The program may be automatically initiated at a user-specified frequency, which is often used by operations to dedicate a CRT to providing a POWER/VSE queue display.
BIMMONTR is based on the "world famous" DOSMONTR system, with over 300 users worldwide. It uses a 3270-type CRT under CICS/VS and supports POWER/VSE on both CKD and FBA disk using high-speed I/O techniques.
PRICE: $920 or $46/mo.

BIM Program Products are marketed in France, Belgium, and Switzerland by ORDILOG, 10 Rue Auber, Paris 75009 • Ph. [illegible]

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Larry E. Long

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HP225

Data Communication for Distributed Information Systems

Dimitris Chorafas

The increasingly intimate relationship between data processing and data communications is fully elaborated in this book. Aimed at the computer professional, but assuming no extensive knowledge of communications, the book fully covers transaction-based systems. Practical examples include the use of space-, frequency-, and time-division, time slots, intelligent TDM, modems, terminals, multiplexers, concentrators, and front-end tasks. $24.00

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Robert Glass

From requirements definition to maintenance, you'll get a complete, conveniently-referenced overview of the most up-to-the-minute technologies for maximizing software reliability. Here are nearly 50 methods for building superior software through each phase of the software life cycle. $21.95

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Practical Data Processing Management

Louis Fried

Here's the ideal handbook for the senior executive of data processing—or just about anyone striving for that position. You'll find a practical orientation toward real-world problems and solutions, improving your skills for contributing to the profitability of your firm. It's packed with up-to-the-minute tips, techniques, and proven strategies detailing all the ins and outs of organizational matters, project management, personnel and personnel management and much more. $17.95

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Structured Analysis and System Specification

Tom De Marco

Here is the on-the-job guide for today's systems analysts helping you pinpoint problems in present systems and specify and implement new systems. You'll see how to select an optimal target, produce detailed documentation and accurate predictions as well! And you'll also see how to implement the Data Flow Diagram as a tool for structured analysis. Too, you'll see how to develop a structured specification with system models. And what's more, there is information on the continuing analysis function and the ongoing application of structured analysis tools and principles. $26.95

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Programming with ADA

Peter Wegner

This is the first step-by-step introduction to ADA, the completely new programming language developed for use by the Department of Defense and all its suppliers. Featuring over 350 graduated examples, this book is a readable and comprehensive primer on the programming language that many experts feel is destined to become the FORTRAN of the 1980's. $18.95

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Techniques of Program and System Maintenance

Edited by Girish Parikh, this comprehensive volume includes sections on maintenance problems and perspective, practical tips for maintainers, management considerations and techniques, structured technologies and maintenance, and the future of maintenance. Edward Yourdon, Gerald M. Weinberg, Daniel P. Freedman, as well as Girish Parikh are among the outstanding authors in the computer industry who have contributed to this book. $25.00

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Design of Real-Time Computer Systems

James Martin

This is an essential handbook in the expanding field of data processing with conveniently organized contents that reach into most applications in today's business, industrial, and governmental activities. The uses of terminals, communication lines and random access files are analyzed; and advances in time sharing, man-machine conversations, reliability engineering, and degradation procedures are discussed. This book is a companion volume to Programming Real Time Computer Systems. $25.95

HP201

RPG & RPGII Programming: Applied Fundamentals: A Job Approach to Learning

William E. Burr and Edward C. Cunningham

Based on realistic business applications, this guide offers you a step-by-step development of 20 programming projects. You'll find ready-to-apply coding techniques relating to actual business concepts and easy-to-follow illustrated examples. You'll soon gain early programming success with the guide's wealth of source data and dozens of sample projects designed to give the programmer on-the-job practical experience. $16.95

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Roland Backhouse

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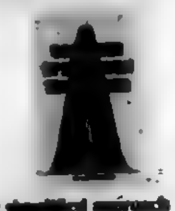

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William Conley

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Program Style, Design, Efficiency, Debugging and Testing, 2nd Ed.

Dennie L. Van Tassel

Here's a newly updated guide to the "lore of programming" geared toward helping the seasoned professional develop superior software for every situation. You'll find a complete rundown of suggestions you can use to set up an installation guideline of program style—detailed coverage of what coding techniques hinder a program and how to improve efficiency—on-the-spot methods for getting logic errors out of the program early in the design stage—and much more! $18.95

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PITTSBURGH, Pa. — An intelligent message-switching system is credited with helping a $1.4 billion savings bank here complete migration from a dual Honeywell, Inc. 3200 central host system to a dual IBM 3031/3705 host system.

Dollar Savings Bank's switching system permits input messages to be routed to one or both central host systems on the basis of message content. Since application areas are defined by transaction code/account prefix combinations, a given application area is routed to both host systems while all other transactions are routed to one host only.

The routing function permits a controlled approach to program verification on the new central host and also allows Dollar Savings to gain the new system's benefits as soon as possible.

The bank's message-switching system was implemented on a Tandem Computers, Inc. T/16 Nonstop computer system by Pittsburgh-based Midec, Inc. The T/16 consisted of four processors, each with 384K bytes of solid-state memory, and two 64M-byte formatted disk drives configured as mirrored volumes with removable packs.

The system also included one 9-track magnetic tape drive capable of 800- and 1,600 bit/in. transfers, a programmer's CRT terminal, a 300 char./sec console printer and 68 asynchronous communications ports.

Redundant Hardware

According to Midec engineering vice-president Joseph C. Lombardi, the Tandem T/16 Nonstop features redundant hardware to the modem level and switches messages to backup circuitry in the event primary components fail. To minimize the route-through delay, Lombardi said, the processing load was equally distributed among the four processors.

A failure of one CPU resulted in the distribution of its processing load among the remaining three processors, Lombardi noted.

For the final systems test phase of the conversion to a dual 3031/3705 configuration, jobs were run in parallel on both IBM hosts to see if one host's performance trailed the other's. The quadruple-processor Tandem system, acting as a message switch, provided a selective logging capability that eased isolation of problem areas, Lombardi stated.

Also, this system compared responses from the hosts and reported mismatches.

Switching parameters were defined in a Route Translation File indexed by transaction code and account prefix. The programmer/operator reportedly had no trouble changing parameters in the route file with a formatted CRT program dedicated to file maintenance.

The message switching system assigned new account numbers for new account transactions, Lombardi continued, to maintain data synchronization between

(Continued on Page 42)

In Packet-Switch Architecture

Net Tool Ties Perkin-Elmer 3200s

ORLANDO, Fla. — A networking tool for Perkin-Elmer Corp. 3200 series minicomputers is available from Transaction Data Systems, Inc.

Called NNF32, the product is a networking control task that interfaces with Perkin-Elmer's OS32 and ZDLC protocols to provide a complete packet-switching architecture between multiple Perkin-Elmer systems, the vendor said.

Features reportedly include multiple precedence levels, data encryption and Datagram and logical connection modes of operation.

An adaptive routing mechanism allows ring network architectures without user or network manager concern for building or maintenance of routing tables, according to a spokesman.

Adaptive routing may be disabled for star network architectures.

NNF32 is a subset of Transaction Data Systems' Netrol system. The complete Netrol supports terminal emulation and offers a variety of terminal support, including foreign terminal access to Perkin-Elmer's Reliance transaction processing system, the spokesman said.

The total NNF32 package, including source code, has a single-CPU one-time license charge of $3,000. Discounts on multiple-CPU licenses start with the third license.

Installation support is available, the Transaction Data Systems spokesman noted from Suite 210, 5750 Major Blvd., Orlando, Fla. 32805.

Unit Expands KSRs' Roles

ARVADA, Colo. — Henriksen Data Systems has released Comm Center 1, a communications device that allows any keyboard send/receive (KSR) terminal to communicate via TWX, telex or telephone lines.

Features include a nonvolatile keyboard, keyboard dialing and 4K bytes of expandable memory.

The basic Comm Center 1 can be custom-programmed to the needs of large- or small-volume users, Henriksen noted. An optional Bell 212A direct distance dialing feature allows messages to be transmitted or received four times faster than at the standard 300 bit/sec rate.

The unit costs $1,995. Henriksen is located at 6084 W. 55 Ave., Arvada, Colo. 80002.

After Telpak?

GREAT NECK, N.Y. — Anticipating the elimination of interstate Telpak slated for later this year, Network Analysis Corp. (NAC) is offering users of the service a repricing study that examines the costs of employing alternative private-line tariff offerings of AT&T and six specialized common carriers.

The user need only provide NAC with a listing of its circuits, preferably in machine-readable format, the vendor said. NAC will then create a computerized network data base and apply its Net-Trak software program to the task of repricing the network.

The repricing will be based on any one or any combination of the following tariffs: MPL, AT&T wideband, RCA American, MCI Communications Corp., Southern Pacific Communications Co., American Satellite Corp., U.S. Transmission Systems, Inc. and Western Union.

With results available in "a few weeks," a network of 700 Telpak circuits could be repriced under the MPL tariff for about $5,000.

NAC is located at 130 Steamboat Road, Great Neck, N.Y. 11024.

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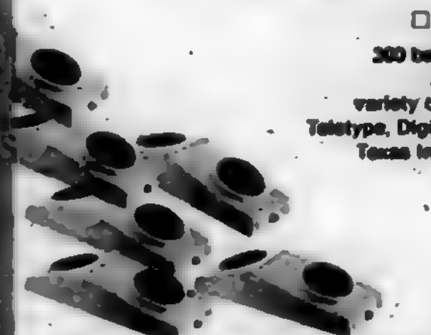

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IBM 3276-Compatible Station Out

SALT LAKE CITY, Utah — Beehive International, Inc. has announced a control unit display station that emulates a stand-alone IBM 3276-2 control unit display station.

The DM 3270 features IBM 3270 protocol compatibility and an IBM 3276 look-alike keyboard with a 12-key numeric pad, 24 program function keys and a double-buffered print capability to enhance printer throughput.

The unit is also said to allow use of a low-cost Ascii serial printer as a replacement for the IBM 3287 buffered printer. The printer is supported via the asynchronous RS-232C port and offers switch-selectable speeds up to 9,600 bit/sec.

The DM 3270 costs $2,395 from Beehive at 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, Utah 84125.

Lanier Gets 3270 Option

ATLANTA — Lanier Business Products, Inc. has announced an IBM 3270 data communications option for its No Problem typing system that allows those typing systems to be used in almost any communications network to retrieve stored data from central CPUs.

The option consists of a printed circuit board and applications software that can be inserted into a No Problem typewriter to give communications capabilities.

The option costs $3,270 and is available in a bisynchronous version. An IBM Systems Network Architecture/-Synchronous Data Link Control-compatible version will be available in March.

Lanier is at 1700 Chantilly Drive N.E., Atlanta, Ga. 30302.

Datamedia Adds Printer

PENNSAUKEN, N.J. — Datamedia Corp. has unveiled an 80- and 132-column terminal featuring regional smooth scrolling, split screen and double-high/double-wide characters.

The DT80/3 has features found in the Digital Equipment Corp. VT 100. It emulates several popular terminals, including the Hazeltine Corp. 1420, the Applied Digital Data Systems, Inc. Regent 25, the Lear Siegler, Inc. ADM 3A and the Datamedia Corp. 1521A, a Datamedia spokesman said.

From the keyboard, the user can select compatibility modes that emulate the four terminals. He chooses the desired mode from a menu displayed on the screen, and the mode is then stored in random-access memory.

The price for the unit is $1,395, the vendor said from 7401 Central Highway, Pennsauken, N.J. 08110.

System Aids CPU Switch

(Continued from Page 41)

the two IBM hosts.

Dollar Savings' on-line banking network consists of 150 data terminals connected to 30 remote concentrators multidropped over 10 leased private lines. An asynchronous IBM 2260 poll/select protocol was used to communicate with all remote concentrators, Lombardi pointed out.

This on-line network is now undergoing a major expansion expected to include state-of-the-art teller and automated teller machine equipment, Lombardi added.

Midec is engaged in developing a generalized message switching system that will include the ability to switch or store and forward entire files of information or individual messages (financial transactions when the application is banking).

The Midec system, based on at least two Tandem T/16s with 384K-byte main memory each, is now said to support the following communications protocols: IBM binary synchronous, Synchronous Data Link Control, High-level Data Link Control, IBM 2780/3780 Remote Job Entry, Hasp Workstation, Tinet, IBM 3747 emulation and asynchronous IBM 2260.

Other supported protocols include IBM 3270, Burroughs Corp.'s multipoint asynchronous and ADM-2 multipoint asynchronous.

Midec's address is 267 Kappa Drive, Pittsburgh, Pa. [illegible].

The Teletype 4420

Detached Keyboards Available

Teletype Adds CRT Terminals

SKOKIE, Ill. — Teletype Corp. has unveiled two more members of its communications product line in the form of keyboard CRT terminals. The Teletype 4420 and 4543 use LSI technology and are available with detached keyboards and optional character and line printers.

The 4420 is a multipurpose buffered keyboard display. The asynchronous point-to-point terminal features character or block transmission, speeds up to 9,600 bit/sec, three-screen memory and buffered printer port.

Function Keys

With full editing and formatting capabilities, keyboard-selectable options, cursor XY addressing and readout, the unit also offers programmable program function keys, destructive scrolling and built-in diagnostics. Depending on type, printers can be located 50 ft or 2,000 ft from the display.

The Model 4543 Single Display Terminal complements the firm's 4540 clustered terminal system and features stand-alone operation for access from remote locations where the traffic load would not justify a clustered system.

The 4543 operates at up to 9,600 bit/sec over nonswitched point-to-point or multipoint private-line systems using a bit-oriented synchronous link protocol.

The 4420 with standard keyboard costs $3,824, and the 4543 costs $4,731 from Teletype Corp. at 5555 Touhy Ave., Skokie, Ill. 60077.

Two Bantams Join PE Line

FLANDERS, N.J. — The Terminals Division of Perkin-Elmer Corp. (PE) has introduced two more members of its Bantam CRT family, the Models 550S and 550E.

The microprocessor-based Model 550S is a block mode/-editing CRT unit. Its three different modes are optimized for conversational timesharing, transaction processing and text manipulation of software development.

The 550S offers an optional second page of fully scrolling memory. The 24-line screen acts as a movable window into 48 lines of 80 columns of memory.

In transaction processing mode, the optional second page can store a second page of the form, which is called up automatically when the operator tabs off the first page, PE said.

Standard Model

The standard model has 83 keys, including a multifunction numeric pad and four (shiftable to eight) program function keys.

The Ascii serial printer port is standard, as is "XON/-XOFF" host control over terminal block transmissions and field attributes for half intensity, blink, nondisplay and protected, according to a spokesman.

The Model 550E offers a standard dedicated keypad for numeric entry and cursor movement. It is driven by a custom LSI chip and 19 integrated circuits.

The 550S costs $1,189 and will be available in February. The 550E costs $1,016 with availability in January.

PE's Terminals and Customer Service Division, is located at 360 Rt. 206 S., Flanders, N.J. 07836.

CRT Terminal Has Smart Features

ANAHEIM, Calif. – A low-cost conversational CRT terminal said to offer features traditionally available only on smart terminals has been introduced by Lear Siegler, Inc.,'s Data Products Division.

The ADM-5 Dumb Terminal provides reverse video, reduced intensity and reverse video/reduced intensity; limited editing capabilities; and a gated extension port for selective transmission of data from the terminal to any serial RS-232C peripheral.

Priced at $995, the terminal operates asynchronously in half- or full-duplex modes at any of 11 data rates from 75- to 19.2K bit/sec, a company spokesman said.

Up to 32 control char. may be transmitted to the computer and/or entered on the display screen. The Data Products Division is located at 714 N. Brookhurst St., Anaheim, Calif. 92803.

The ADM-5 Dumb Terminal

IDS Dot Matrix Printer Gives Letter Quality

BOSTON – Integral Data Systems, Inc. (IDS) has unveiled a 132-column printer that can reportedly produce correspondence-quality overlapping dot matrix char. at high print speed.

The Model 560 is intended for data and text processing applications, prints bidirectionally at speeds up to 150 char./sec and is lighter than its competitors, the vendor claimed.

IDS's Dotplot raster graphics option enables the Model 560 to print a range of high-resolution graphics such as block letters and complex illustrations and charts under software control.

The Model 560 has a standard RS-232C serial interface as well as a Centronics-compatible parallel interface. Serial transmission rates from 110- to 9,600 bit/sec are switch-selectable.

The product costs $1,695 and the Dotplot option costs $99, IDS said from 14 Tech Circle, Natick, Mass. 01760.

Zenith Offers Updated Z19

GLENVIEW, Ill. – Zenith Data Systems Corp. has introduced an enhanced version of the firm's CRT terminal for the small computer market.

The Z19 "smart" data terminal features a deflection system that creates a smaller spot size for sharp resolution, a company spokesman said. The terminal's 12-in. diagonal screen has a 24-line by 80-char. format and a 25th user-status line.

The keyboard has enlarged high-use keys, a separate numeric keypad and direct cursor control. Interfacing of the Z19 is by standard EIA RS-232 at speeds of 110- to 9,600 bit/sec.

Compatibility with Digital Equipment Corp.'s DEC-VT52 CRT terminal can be configured from the keyboard, an outside computer or a special interior switch.

With 90-day parts and labor warranty, the Z19 costs $995 from the firm at 1000 Milwaukee Ave., Glenview, Ill. 60025.

Gandalf Modem, Data Set Out

WHEELING, Ill. – Gandalf Data, Inc. has announced a dual-active modem emulator, the ME 922, and a synchronous data set, the LDS 250/3.

The ME 922 permits direct interconnection of two business machines at EIA levels. The module includes two independent channels which may be used in either synchronous or asynchronous applications, the vendor said. The ME 922 operates within the limits of EIA RS-232C and CCITT V.24 interfaces, the vendor said.

The LDS 250/3 offers an alternative to high-speed modems and channel facilities for short-distance communication, according to a Gandalf spokesman.

The ME 922 costs $450 and the LDS 250/3 costs $786 for RS-232C or V.24 interfaces, the vendor said from 1019 S. Noel, Wheeling, Ill. 60090.

Ask Ramtek.

Now, Ramtek offers the first integrated system for MIS graphics users.

Ramtek's new 6214 color graphic computer frees you from buying each of your display elements from a different supplier. Ramtek has put it all together in a true stand-alone color graphics system complete with processor, monitor, console, mass memory storage and UCSD Pascal.™ And full Ramtek support with field service, training and documentation.

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For MIS, computer-aided design or any application that requires high resolution, high-performance color graphics, look into Ramtek's 6214 colorgraphic computer. To get more information, write: Ramtek, 2211 Lawson Lane, Santa Clara, CA 95050.

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Bits & Pieces

Trial Subscription Offered For Graphics Newsletter

SUDBURY, Mass. — A free three-month (six-issue) trial subscription to "The Harvard Newsletter on Computer Graphics" is currently available.

Requests for the subscription, which otherwise costs $125 on an annual basis, must be on letterhead, and a check for $3.50 ($5.50 overseas) must be included to cover postage and handling.

Checks should be made payable to Harvard University and sent to Sample Subscription, "The Harvard Newsletter on Computer Graphics," P.O. Box 89, Sudbury, Mass. 01776.

Graphics Subsystem Features MPU-Based CRT Terminal

FOUNTAIN VALLEY, Calif. — A computer graphics subsystem featuring a microprocessor-based CRT terminal, graphics option board and printer is available from MQI Computer Products, Inc.

The G100 microprocessor-controlled graphics option board is a Tektronix, Inc.-compatible graphics option for Televideo TVI-912, 920 and 950 and converts off-the-shelf video display terminals to Tektronix compatibility, the vendor claimed.

The system cost $4,500, the vendor said from 18381 Bandilier Circle, Fountain Valley, Calif. 92708.

Direct Updates VP800 Family With Text Editing, Block Mode

SUNNYVALE, Calif. — Direct, Inc. has introduced a local text editing and block mode capable version of its VP800 family of Video Processors.

The Video Processors — video terminals with some intelligence — now include the VP800/B, which adds an Ansi-compatible editing and block mode transmission capability to the features of the VP800/A processor video.

The VP800/B costs $2,350 from the firm at 1279 Lawrence Station Road, Sunnyvale, Calif. 94086.

Indoor Pollution Controller Clears 2,000 Sq Ft Rooms

GIBBSTOWN, N.J. — An indoor pollution control system which reportedly operates without electrostatic devices is available from Airomax Corp.

The Model H700A system filters tobacco smoke, dust and odors from computer rooms up to 2,000 square feet in size. The filter costs $695.

Airomax may be reached through P.O. Box 96, Gibbstown, N.J. 08027.

Power General Offers Dual-Output Power Supplies

CANTON, Mass. — Power General has introduced a new generation of dual output dc power supplies ranging in cost from $49 to $109.

The firm is also offering a free 32-page booklet detailing the electrical and mechanical parameters on ac-dc and dc-dc power supplies. Power General is located at 152 Will Drive, Canton, Mass. 02021.

Honeywell Graphics Copier Warms Up in Five Minutes

DENVER — Honeywell, Inc. has unveiled a video graphics hard copier that reportedly warms up in less than 5 min and produces 8.5-in. by 11-in. pictures in up to 16 grades of gray from raster scan video screens.

The VGR 4000 consumes 100w on standby and is desktop or rack-mountable.

The price range is $5,000 to $7,000, the vendor said from Honeywell Test Instruments Division, P.O. Box 5227, Denver, Colo. 80217.

'Macrocode' Firmware

Amdahl Explains Why 580 Outperforms 470V/8, 3081

By Jeffry Beeler

CW West Coast Bureau

SAN FRANCISCO — Amdahl Corp.'s recently announced 580 series systems have a faster instruction rate and are twice as fast as the firm's previous top-of-the-line computer, the 470V/8. What's more, the computers are said to be 20% to 25% more powerful than IBM's newest machine, the 3081.

Why? The answer lies in the computers' use of advanced logic circuitry, "macrocode" firmware and a modified instruction pipeline that enables the systems family to execute twice as many instructions in a given unit of time as the 470 V/8, according to the company's product marketing director, Wayne McIntyre.

In a recent press briefing held here by Amdahl, McIntyre said that the 580 series' technological advances are the key to why the 5860 and 5880 outperform the 470V/8 and their IBM counterparts by such a wide margin. The briefing was held just two weeks after the systems' debut to clarify the differences between the 580 and 470 families and to illustrate the firm's latest hardware and design advances that boost the computers' performance.

Instruction Pipeline

In designing the 5860 and 5880, Amdahl shortened its instruction pipeline length from six to five stations and increased the number of instructions that can be overlapped, or executed at the same time. The 580 series permits overlapping execution of all five pipeline instructions, whereas the 470V/8 provides only about half as much overlap, McIntyre said.

The result is that, in ideal circumstances, the 580 uses only one machine cycle to execute each instruction, whereas the 470V/8 typically requires at least two such cycles.

This reduction in the cycles-to-instruction ratio accounts for much of the 580 series' huge performance increase over the existing 470V/8. The fewer the machine cycles a system needs to execute a typical instruction, the more instructions — and thus the more work — it can process in a given amount of time.

For example, the 5860 reportedly executes 12- to 14 million instructions per second (Mips) while the 5880 operates in the 22- to 24 Mips range. By comparison, the IBM 3081 clocks in at a conservative rating of 10 Mips, according to non-IBM sources.

One of the most important sources of the 580's increased computing power is its denser emitter-coupled logic circuitry, which holds 400 gate/chip, compared with 100 gate/chip for the 470V/8, McIntyre said.

The 580's logic circuits also boast a 33% shorter gate delay than their 470 series counterparts. In the 5860 and 5880, gate delays average 400 picosec; in the 470V/8, 600 picosec, McIntyre said.

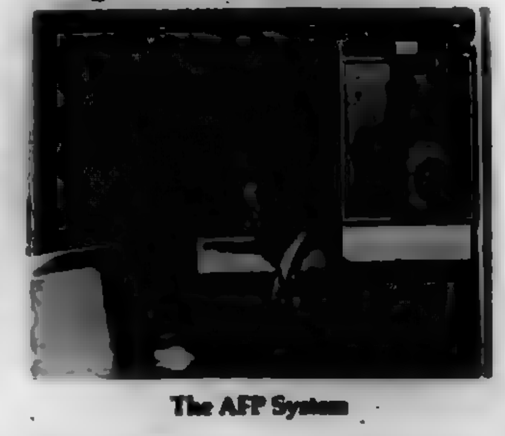
MCC Design

The 580 series also owes part of its added processing power to improvements in the design of Amdahl's Multi-Chip Carriers (MCC), which are composed of both large-scale integrated logic circuitry and random-access memory (RAM) chips.

In the 580, each MCC holds 121 logic and RAM chips on a 14-layer printed circuit board. In the 470V/8, by contrast, an MCC contains 42 such circuits resting on a 10-layer board, McIntyre said. The extra

(Continued on Page 46)

Retrieval System Based on Mini Replaces DBMS



The AFP System

CALABASAS, Calif. — A minicomputer-based text- and document-retrieval hardware system that is said to replace data base management system (DBMS) software has been developed by Datafusion Corp.

The Associative File Processor (AFP) reportedly does the job previously done by "elaborate software systems running on large mainframes," according to a company spokesman.

Text retrieval is done by the system's Associative Crosspoint Processor (AXP-100) along with disk units, a Digital Equipment Corp. PDP-11 minicomputer, control software and a user front-end subsystem.

The AFP is said to utilize data streaming, scanning disks at rates up to 1.2M byte/sec, with 8,192 bytes of parallel query term memory. The effective character matching, at the maximum input rate, is over 9G byte/sec, according to the spokesman.

Typical applications would be research functions for newspapers, legal entities and medical facilities, the spokesman said. Documents may be stored as free text or partially or fully formatted.

The system's basic configuration — the AXP-100 — consists of AFP and disk controller, firmware and user software with software license and documentation. It is attachable to an exisiting PDP-11 and can operate under RSX-11M, RSX-11D or IAS operating systems. Cost for the basic configuration is $39,000 from the firm at 5115 Douglas Fir Road, Calabasas, Calif. 91302.

HP 3000 Users Gain Tape System

WESTLAKE VILLAGE, Calif. — A high-density, 6,250 bit/in. tape system for Hewlett-Packard Co. HP 3000 users has been introduced by Qualex Technology, Inc.'s Qualex Group.

The system features group-coded recording (GCR) and a 125-in./sec transport speed. The system is said to be Ansi/IBM-compatible and plug- and program-compatible with HP 3000 Series II and III.

It features a radial interface for up to eight drives per controller, auto thread/load for open reel and cartridge and switch-selectable dual- or triple-density (800-, 1,600- and 6,250 bit/in.).

The Qualex Group 3000 System ranges from $34,000 to $52,000, depending on performance and features selected. Delivery is 60-to-90 days from Suite 111, 31220 LaBaya Drive, Westlake Village, Calif. 91361.

NCR, NCR Japan Offering Japanese Language System

DAYTON, Ohio – NCR Corp. and its subsidiary, NCR Japan, Ltd., are offering a Japanese language information processing system that was developed jointly by the two organizations to add full Japanese language processing capabilities to an existing alphanumeric-Katakana-based system.

Japanese Advanced Processing Architecture by NCR (Japan) will eventually be used for Japanese language applications on all products the company markets. As a first step, NCR Japan has introduced a new I-8290 family of computer systems that support both conventional alphanumeric-Katakana processing and the new Japan software.

A minimum system, capable of handling approximately 3,600 different ideographs, can be expanded as required up to a maximum system accommodating approximately 9,000 different characters. I-8200 users can upgrade to Japanese language processing by adding Japan software, a Japanese-language CRT terminal and a Japanese-character printer to their present configurations.

Hardware for the system ranges between $58,000 and $120,000 and software is $240 monthly. Prices are reduced for users upgrading or those with Katakana systems already. NCR is at Dayton, Ohio 45479.

Crip Rivals IBM 3890

DALLAS – Banctec, Inc. has announced a high-speed check reader/-sorter similar to IBM's 3890 at about half the cost.

The Compatible Remote Item Processing (Crip) system is said to perform all the reader/sorter functions required in remote, regional or central processing centers. Crip operates at up to 1,400 document/min with a typical throughput rate of 60,000 document/-hour.

Crip throughput may be significantly faster than IBM's 3890 on subsequent document passes when both systems are operating remotely and when data image matching is used, Banctec claimed.

A typical Crip installation includes one or more reader/sorters, line printers, key entry terminals, data transmission devices, an operator console and – for reject repair and re-entry – Banctec's Core and Checkmender systems, the vendor said.

The Crip system costs approximately $400,000, the vendor said from 14500 Midway Road, Dallas, Texas 75234.

Amdahl Explains 580 Series

(Continued from Page 45)

four layers available in the 580's MCCs are said to contain additional internal data paths and thus reportedly contribute to the performance gap separating Amdahl's latest offering from the 470V/8.

The differences between the 580's and the 470's MCCs also extend to packaging. In the 470V/8, the MCCs are planar-mounted in a 79-cubic ft cabinet that holds up to 60 of the modules.

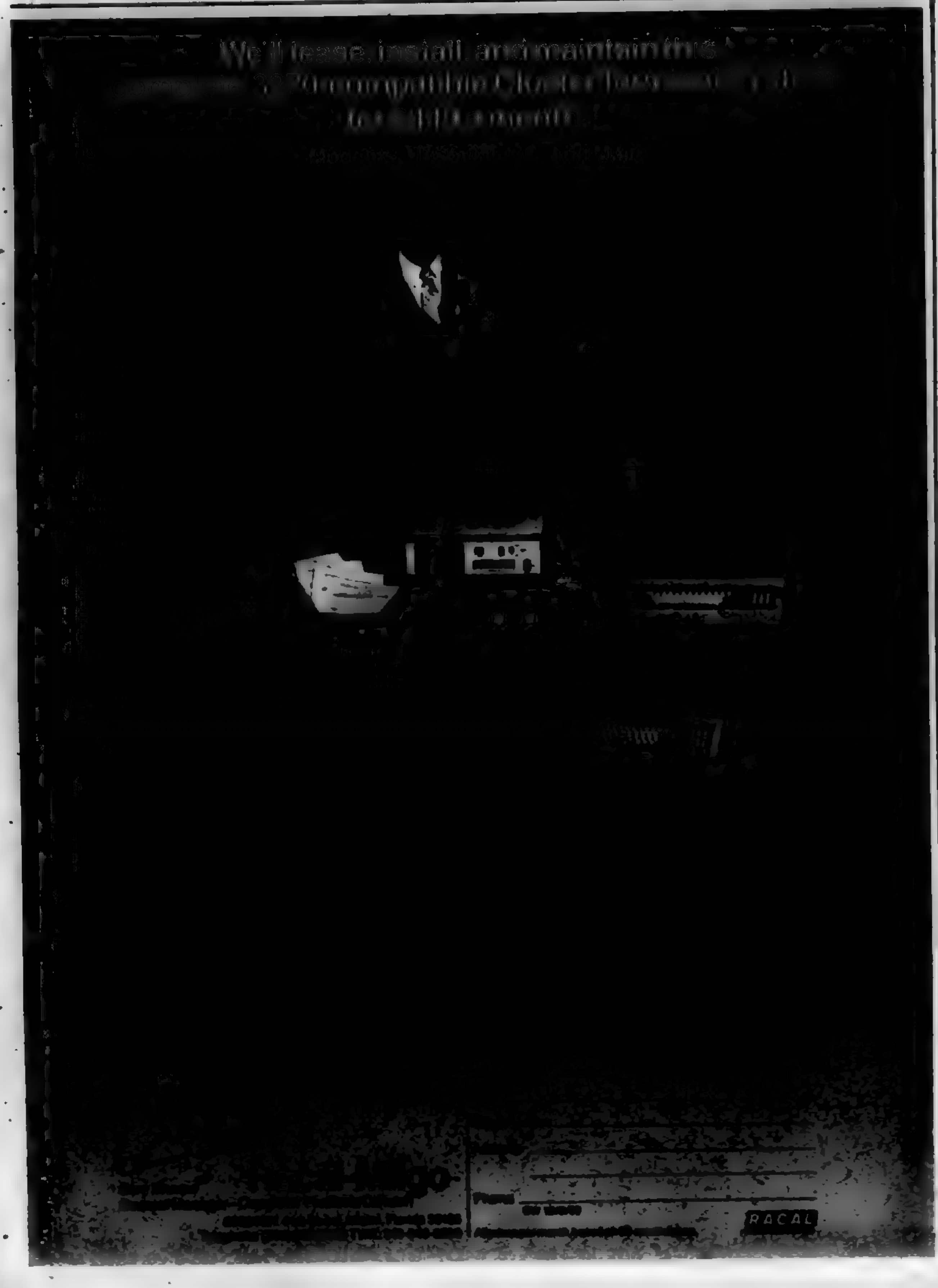
> *Because the 580's control storage is less centralized than the 470's, the data paths between its functional units and their associated microcode are much shorter than in Amdahl's older systems. As a result, the 580 series' processing speeds receive yet another shot in the arm.*

In the 5860 and 5880, by contrast, the MCCs are stacked horizontally in a 5.6-cubic ft console that provides room for 13 boards. Eight MCCs constitute a basic 5860 system, except for main storage, McIntyre said.

A 580's MCCs are interconnected by twin 12-layer circuit boards that form two of the MCC console's opposing sides. Such an interconnection scheme virtually eliminates discrete wiring between the MCCs and thus cuts the distance that signals have to travel between boards. Reduced signal-path lengths in turn translate into increased processing speeds, McIntyre explained.

Yet another reason for the 580's improved computing power is its extensive use of distributed microcode. In the 470 series, only the console functions and channel-to-channel adapter are implemented in microcode. In the 580 family, microcode is distributed as well to the processors' instruction units and execution units, McIntyre said.

Because the 580's control storage is less centralized than the 470's, the data paths between its functional units and their associated microcode are much shorter than in Amdahl's older systems. As a result, the 580 series' processing speeds receive yet another shot in the arm, the product marketing director added.



Correction

"Magnuson Competitor to IBM 4341-2 Bows" [CW, Nov. 24], the delivery schedule for the M80/42 and M/80 43 was incorrect. They will be available during the first quarter of 1981, not the third.

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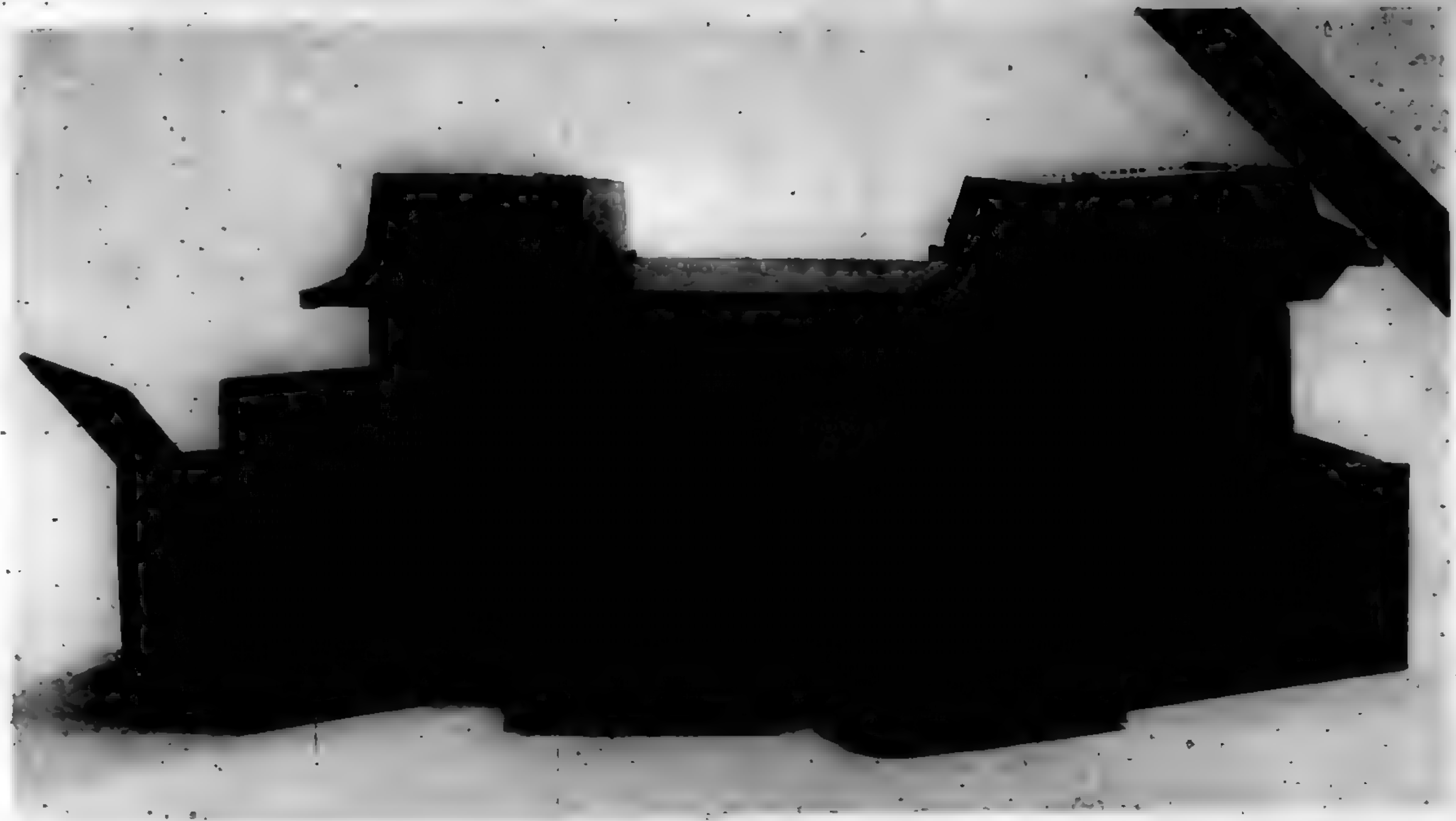

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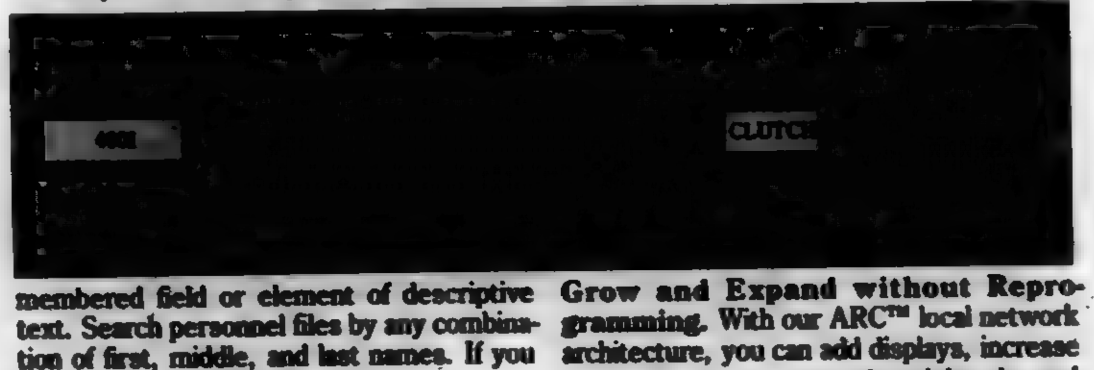

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Micos Adds Low End, Restructures Line

ELMSFORD, N.Y. — Mini-Computer Systems, Inc. (Micos) recently announced a low-end addition to its business systems product line as well as a restructuring of its entire systems family.

At the same time, the company also unveiled a software package aimed at the wholesale distribution market.

The entry-level system, announced a few weeks ago at the Comdex '80 computer show in Las Vegas, consists of a microcomputer with 64K bytes of memory, two RS-232C I/O ports, a CRT terminal and a Centronics-compatible parallel or serial printer interface. The system also has 10M char. of hard disk storage, 5M char. fixed and 5M removable and the Micos operating system, a spokeswoman explained.

The system is geared as an entry-level machine for the first-time computer user and is said to be fully software compatible with other Micos systems. As users' needs grow, the system can be upgraded to a Micos 100, 200 or 300 without the need for application software changes, the spokeswoman continued.

The recently announced computer will be available prior to mid-1981 and will sell for under $20,000.

Mini-Line Restructured

Effective immediately, Micos has restructured its minicomputer product line, consolidating its six presently-available systems into three models.

Previously, the vendor offered the Micos 45, 75, 85, 100, 200 and 300 which ranged in configurations from a one-CRT terminal and 10M-byte disk system to a 32-CRT terminal and more than a billion-byte storage computer system. Now, the company is offering the Micos 100, 200 and 300. When the entry-level computer is made available next year, the Micos line will have a total of four models, the spokeswoman observed.

Micos will also change the architecture of its present minicomputer systems. Starting early next year, the firm will begin using Data General Corp. Nova 4 processors in the Micos 100 and 200 systems. The Micos 100 will use a Nova 4C with 64K bytes of memory and the Micos 200 will have either a Nova 4X with 128K bytes of memory or a 4X with 256K bytes of memory.

Previously, the Micos 100 and 200 used a Nova 3/4 and Nova 3/12, respectively. The Micos 300, however, will continue to use a dual Nova 3/12 processor configuration.

The processor changes were made to accommodate field service, the spokeswoman stated.

The new configuration rules are accompanied by a revised price list effective immediately. A sample Micos 100 system with 64K bytes of memory, an eight-port multiplexer, real-time clock, master I/O port and printer controller, three CRT terminals, 10M bytes of disk storage, a 150 char./sec printer, the Micos operating system and cabinetry costs $31,100. Previously, the cost for the same system was about $40,000.

Also, a typical Micos 200 system with 128K bytes of memory, nine CRT terminals and 160M bytes of disk storage and a 300 line/min printer sells for about $99,100. Before, the same system with a different processor would sell for more than 115,000.

Finally, the East Coast-based company announced a software package for wholesale distributors, geared to run on any of the Micos computers. The Micos distributor system (MDS) is comprised of eight software modules that perform such routines as inventory, sales analysis and general ledger. Other features of the system include a multicompany multiwarehouse

(Continued on Page 51)

Desktop Systems Aid Small Firms

NEW YORK — Canon U.S.A. has introduced two small desktop business systems, the BX-3 and CX-1, designed to allow the small business to automate operations.

Both models are programmable in assembly language and Extended Basic. They use Canon's disk operating system.

BX-3 features include a built-in, 80-column impact printer that operates at up to 80 char./sec. The BX-3 uses a full typewriter keyboard and 10-key numeric pad.

The unit has a processing capacity of 64K bytes and is expandable to 128K bytes, the vendor said.

The CX-1 was designed for small businesses that want larger and faster operations than the BX-1 offers. It features a 12-in. P-31 green monochrome CRT terminal with a screen capacity of 1,920 char. It has the same internal capacity as the BX-3, but it can be expanded by adding high-speed printers and an 8-in. floppy disk drive, the vendor said.

The cost of the BX-3 starts at $5,600 and the CX-1 at $4,000, the vendor said from 211 E. 43 St., New York, N.Y. 10017.

David Mini Doubles as Terminal

SUNNYVALE, Calif. — Logical Machine Corp. has released David, a user-programmed minicomputer that can be used as a stand-alone processor or as an intelligent terminal in a system of up to 20 users.

The unit features 1.25M bytes of floppy disk storage and a choice of printers. Other features include built-in logic and the ability to create programs in a user-defined language as opposed to traditional programming languages, the vendor said.

The unit is the latest in a series of processors which the firm calls Goliath and Tina. David operates in practically any spoken language including French, German, Italian, Portuguese and Spanish, the company noted.

A 1.25M-byte system with 64K bytes of main memory and a Model 730 printer costs $8,500, the vendor said from 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.

Small Business Line Grows

ISELIN, N.J. — Prodigy Systems, Inc. has introduced the Prodigy Two, a two-user version of the Prodigy One computer, and Prodigy Junior, which it called a "high-performance economy system."

Prodigy Two includes two CRT terminals, three 8-in. floppy disk drives and a high-speed printer; all built into a desk unit. Prodigy Junior consists of one CRT terminal, a compact processing unit with two 5-in. disk drives and a line printer.

Both computers utilize the firm's software, which is comprised of the Prodigy operating system, the Protege data base language and a variety of applications.

Prodigy Two costs $16,700 and Prodigy Junior costs $8,995. Inquiries can be made to the firm at 497 Lincoln Highway, Iselin, N.J. 08830.

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WP Package Has Printer

MINNEAPOLIS — A word processing (WP) package that includes a letter-quality printer has been announced by Northern Telecom Systems Corp. for its Model 405, 435 and 445 distributed data processing systems.

The WP/ DDP Omniword package requires present users to add only the software package and a new keyboard for use, Northern Telecom said.

Working in plain English, the operator can request that simple function explanations be displayed on the datastation screen by pressing a help key.

A central document catalog and built-in document-handling utilities stores documents, keeps track of document parameters, such as margins and page length, and also maintains historical and statistical information, including a document's author, subject, size and creation date.

The package offers a document merge function which combines documents or portions of them up to 160 columns wide and 10,000 lines or 1,000 pages long, the firm said.

Clustered Keys

Omniword offers clustered keys with four levels of functionality and an intelligent printer with a 2,000-char. buffer. The Striker printer can be equipped with an optional bidirectional tractor feed and single-sheet feeder.

The 445 system will support up to three workstations out of eight in the WP mode, due to memory limitations. The 435 will support two workstations in WP and the 405 will support one workstation, Northern Telecom said. About 20K bytes of memory is used per workstation.

The minimum system configuration on which Omniword can function is a Northern Telecom Model 405 with 64,000 char. of memory, one million char. of flexible diskette storage, one printer and one data station with a WP keyboard. The cost for this system, excluding the printer, is $10,450.

Omniword software can be obtained for a $750 one-time licensing fee or for a $30 monthly licensing fee; the monthly software support charge is $6. The Striker printer is available for $4,290 or $145 monthly (based upon a three-year lease and including maintenance). First customer deliveries are planned for April 1981 from Northern Telecom at Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

Micos Adds To System Line

(Continued from Page 49)

capability, customer credit checks, tax computations and open inventory costing methods, the spokeswoman said.

The system is priced from between $2,000 to $4,000 per software module. Complete user support is available for MDS including installation, customization, training and reference manuals.

Additional information on the Micos entry-level computer, systems reconfigurations and the MDS software can be obtained from the company at 399 Fairview Park Drive, Elmsford, N.Y. 10523.

PE Announces Two Disk Drives

OCEANPORT, N.J. — Perkin-Elmer Corp. has announced two disk drives, the MSM80F and the MSM80F/HPT, that incorporate Winchester-type technology.

The MSM80F is a rack-mountable unit that costs $13,000 ($15,200 with controller); the MSM80F/HPT costs $20,300 ($22,500 with controller). Both drives have 67M bytes of formatted storage accessed by moving heads.

Fixed-head storage is accessed by 96 data heads in the head disk assembly that provides 1.6M bytes of storage, the firm said.

The fixed media drives are both hardware- and software-compatible with existing Perkin-Elmer Corp. systems, including the Model 3220 and Model 3240, according to the vendor.

Drives can be configured as mixed sets on the same controller, and performance of the recently announced Perkin-Elmer drives equals current MSM drives, the vendor said.

The disk drives are controlled by an internal microprocessor that provides such functions as seek, read/write, data separation, addressing and internal diagnostics. Internal diagnostics test and monitor all operations within the unit's circuitry.

Both drives are available for immediate delivery, Perkin-Elmer said from 2 Crescent Place, Oceanport, N.J. 07757.

Datapoint Offers Dual-Sided Disk

SAN ANTONIO, Texas — A double-sided, double-density diskette drive for use with Datapoint Corp.'s 1800 series of dispersed processors has been announced by the firm.

The Model 1413 is said to store more than 2M bytes of data, and up to four dual-drive units reportedly can be configured with an 1800 system, for a total of more than 8M bytes.

The diskette drive module is available for $5,795. Quantity discounts and one-, two- and three-year leases are available from the firm at 9725 Datapoint Drive, San Antonio, Texas 78284.

Controller Bows For LSI-11 MPU

ANAHEIM HILLS, Calif. — Sigma Sales, Inc. has introduced a floppy controller for the LSI-11, 11/2 and 11/23 that supports one or two dual-density, single- or double-sided floppy disk drives.

The single dual-wide board replaces Digital Equipment Corp.'s RXV21 control logic and is completely software compatible with DEC operating systems and diagnostics designed for RX02, Sigma said.

The SCD-RXV21 is compatible with RX01/RX02 media, IBM 3740 format and Shugart interface. It is pin-to-pin-, signal-, and power-compatible with Q bus backplanes that support LSI-11 series MPUs and associated devices, the firm said.

The unit costs $666.66 with a six-month warranty and a 24-hour replacement plan from Sigma at 6505 Serrano, Anaheim Hills, Calif.

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PDP-11s Get Status Monitor

SUNNYVALE, Calif. — A Digital Equipment Corp. Unibus-compatible status monitor for PDP-11 computers has been announced by Pacific Digital Systems, Inc.

Capable of being inserted directly into a Unibus slot, the PDM-U1 is said to exert a negligible load on the PDP-11 system while acting like a 50-channel logic probe.

In PDM-U1's latched mode, the PDP-11 SSYN signal is used to initiate storage of the Unibus state in an on-board register. In its transparent mode, the operator can view the static nature of the PDP-11 bus, the vendor said.

The unit costs $350 from the firm at 878 Hollenbeck Ave., Sunnyvale, Calif. 94082.

DG Dot Matrix Printer Fits Small Business Systems

WESTBORO, Mass. — A high-speed matrix printer for small business systems and distributed data processing has been unveiled by Data General Corp.

Three subsystems are offered: the Model 4355, with a programmed I/O controller; Model 4356, with a data channel controller; and the Model 4354, with a serial I/O interface.

The 4355 and 4356 run on Nova and Eclipse computer systems. The 4354 can be used with Micronova, Nova and Eclipse computers, a DG spokesman explained.

The 4355 costs $6,650; the 4356, $7,000; and the 4354, $6,450, DG said from Rt. 9, Westboro, Mass. 01581.

DG's High-Speed Printer

Interfaces, Controllers Out

ANAHEIM, Calif. — Datum, Inc. has unveiled a family of microprogrammed controllers and two tape interfaces.

The 6520 family of microprogrammed controllers was designed for large disk storage requirements of Digital Equipment Corp. PDP-11 computers.

The 6520/A emulates the RP11/-RP02/RP03 subsystems, the 6520/B emulates the RH11/RH02/RP04/-RP05/RP06 subsystems and the 6520/C emulates the RK611/-RK06/RK07 subsystems.

The tape interfaces are to be used in conjunction with formatted tape drives. The models 3812 and 3820 are .5-in. magnetic tape interfaces for Data General Corp. and DEC computers. Designed to operate with any formatted industry-standard tape transport, they emulate standard tape subsystems from an operations software and diagnostics standpoint, the vendor claimed.

The price for the 6520 family is $5,900 and the models 3812 and 3820 cost $1,700 each, the vendor said from 1363 S. State College Blvd., Anaheim, Calif.

DEC, DG Minis Get Controllers

SANTA CLARA, Calif. — Spectra Logic Corp. has announced two single-board, multifunction disk and tape controllers: the Spectra 20 for users of Data General Corp.'s Nova and Eclipse minicomputers and the Spectra 21 for users of Digital Equipment Corp.'s PDP-11 minicomputers.

The Spectra 20 offers emulation of DG 6067 disk and 6021 tape subsystems under RODS, AOS, Iris and Blis/Cobol. The Spectra 21 offers software transparency to standard DEC operating system and diagnostic software, the vendor claimed.

Both controllers are able to attach removable-pack or fixed-Winchester SMD disk drives and start/stop or streaming .5-in. formatted tape drives.

The Spectra 20 is available for $5,100 and the Spectra 21 costs $5,800. Spectra Logic Corp. is located at 2316 Walsh Ave., Santa Clara, Calif. 95051.

HP Training Prices Cut During December

PALO ALTO, Calif. — Hewlett-Packard Co.'s customer training courses on its computer systems will be available at a discounted rate through Dec. 29. During this period, three persons may enroll for the price of two.

HP training courses are taught in local sales offices in 16 major cities throughout the U.S. and Canada. They are offered on all HP systems, ranging from desktop computers to multiterminal computer systems.

Topics range from general introductions to operator training and applications design, with an emphasis on hands-on use of HP equipment.

Fees vary from $125 to $200 per day, and programs last from two days to two weeks. Further details and course descriptions are available from any local HP sales offices.

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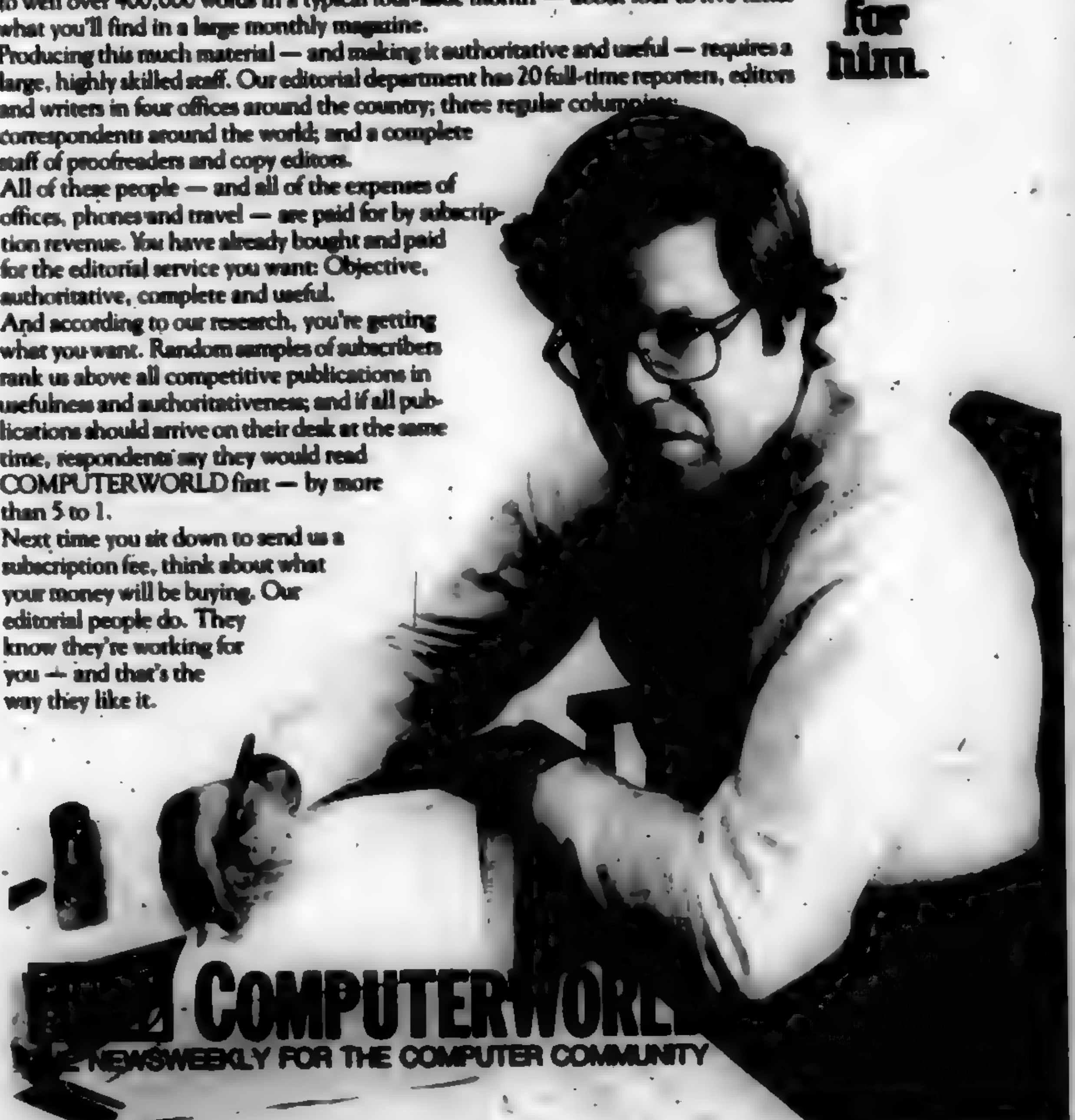

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What's a Bubble?

Magnetic "bubbles" are actually cylindrical magnetized volumes, less than one-sixteenth the diameter of a human hair, in a thin film of crystalline magnetic material about a quarter-inch square. The polarity, or magnetic direction, of the bubble is opposite that of the film, or "chip."

Bubbles are created when a uniform magnetic field is applied perpendicularly to the chip — that is, as a series of "ones" and "zeros," which are the binary units of digital communication.

Bubbles can be moved about under magnetic force to transfer and store data. At the heart of a magnetic bubble memory system is the chip — a small, thin piece of crystalline material, usually a synthetic garnet.

Development of the Technology

Currently, a bubble chip approximately one inch square developed by Bell Labs can store more than eight million bits of information. Future bubble chips will store several times more data as bubble and circuit element sizes are reduced.

Magnetic bubble technology is the result of research in both materials science and electronic systems design. Materials scientists had studied magnetic domains before the birth of bubble technology, but the discovery that bubbles could be ordered and manipulated to transfer and store data was made by Bell Labs researchers in 1966. The basic bubble patent is shared by Andrew H. Bobeck, Umberto F. Gianola, William F. Shockley and Richard C. Sherwood.

Prior to the discovery, Bobeck and others had examined ways to store data as magnetic units. Silicon integrated-circuit memories were in their infancy at the time, and ferrite core devices were the primary memory medium for computing applications. Although core memories were swift and reliable, they required extensive peripheral circuitry, consumed much electrical power and were bulky. The Bell Labs engineers and researchers therefore viewed bubbles as a potentially simpler, smaller, less costly memory alternative.

The advent and rapid implementation of stored program-controlled systems — such as electronic switching systems — in the telecommunications network emphasized the need for greater data storage capability. Bell Labs people investigated several memory technologies, including integrated circuits, charge-coupled devices and magnetic bubbles, so the memories best suited for particular applications

(Continued on In Depth/2)

This article is drawn from a background paper on magnetic bubble technology produced by Bell Laboratories, Murray Hill, N.J.

An advanced memory technology born at Bell Laboratories in 1966 promises a way to electronically store large quantities of information in telecommunications and data processing systems. The technology is based on magnetic bubbles — tiny magnetic spots created in thin garnet wafers and manipulated electronically to store and move data digitally.

Within the past few years, magnetic bubble devices designed at Bell Labs and manufactured by Western Electric Co., have gone to work in many Bell telephone companies, specifically in systems providing recorded voice announcements. More recently, bubble memories have been put into systems that measure the performance of digital microwave radio equipment.

Magnetic bubbles are expected to compete with some established memory technologies by offering advantages in speed, size, power consumption, reliability and cost. They can store more information per unit area than can be stored in silicon integrated-circuit memories, and they retrieve data much faster than some electromechanical magnetic ones (disks, drums and tapes). Further, they are nonvolatile (information is not lost if electrical power fails) and have no moving parts. These advantages should make bubble technology attractive for a variety of applications.

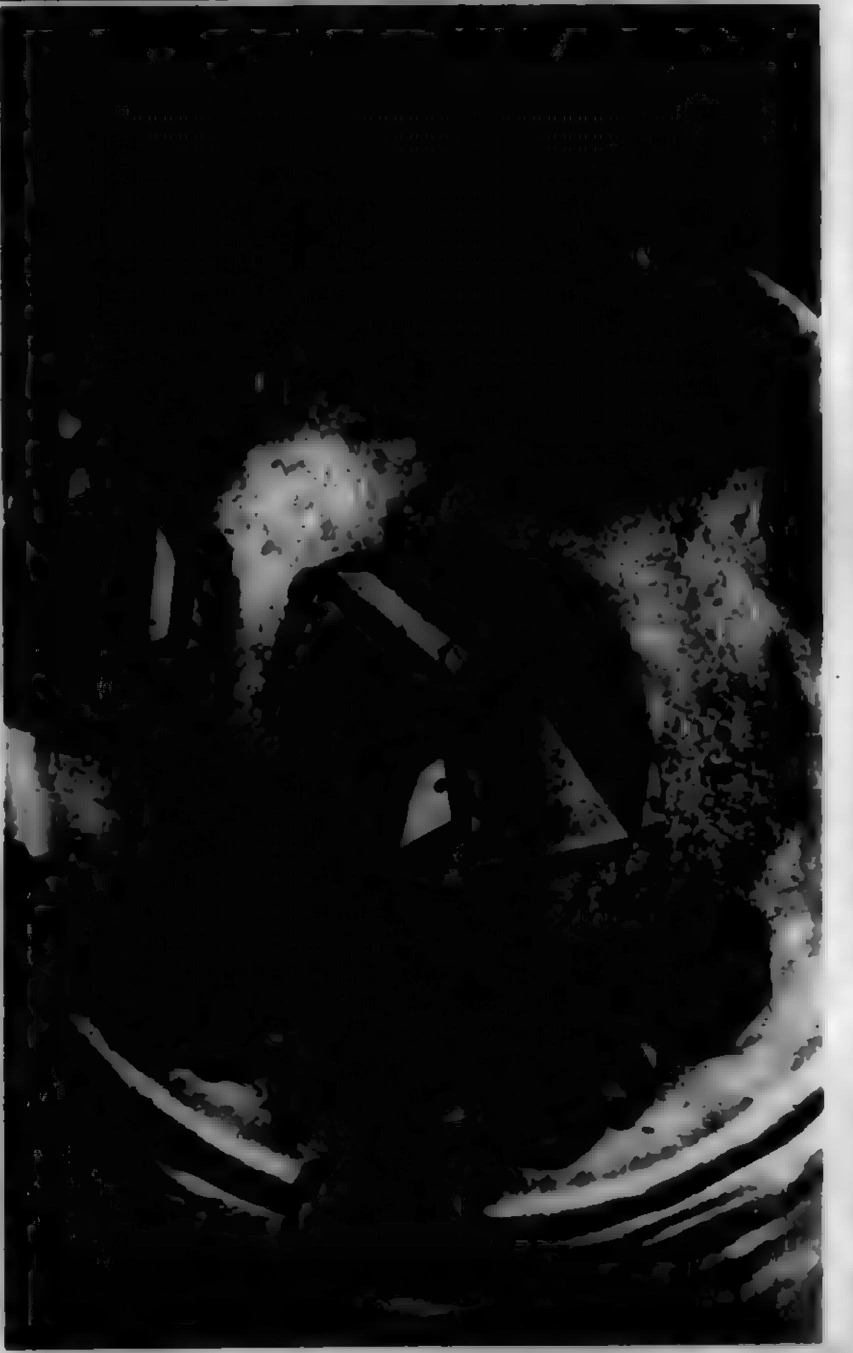

Photo at left shows rare-earth iron garnet crystals in a large platinum crucible as they appear after being grown in the laboratory.

Below, magnetic bubbles (the light circles) are shown moving through a circuit pattern formed on a thin film of uniaxial garnet.

IN DEPTH

(Continued from In Depth/1)

would be available when needed.

More work remained before magnetic bubbles could be transformed from an idea to a practical memory technology. Paramount was the development of a suitable crystalline host material. Because the economic viability of bubble memories would improve with their ability to store more data in a smaller area than competing memory devices, the bubbles had to be extremely small and easily and swiftly moved. The ideal material would deliver the desired bubble performance and also be economical to manufacture.

Although crystals of the orthoferrite class had been considered as bubble materials, subsequent investigations showed they had technical and economic limitations. Continuing research into materials and crystal-growing processes by LeGrand Van Uitert, and other Bell Labs materials scientists led to the utilization of synthetic garnet crystals.

At first, garnets were thought to lack a property essential for bubble materials — a uniform magnetization direction. However, Bell Labs researchers found that this property could be realized by introducing mixtures of elements such as yttrium, samarium, calcium and germanium during crystal growth and growing the crystals at relative low temperatures (800 to 1,200 degrees C), which permits the ordering of these elements at particular sites in the crystal.

Inexpensive Method

Another major need was to develop a potentially inexpensive way to manufacture the material. The most promising method was to deposit a thin magnetic garnet film atop a nonmagnetic substrate, or base, using a rapid-growth process and a supersaturated solution. Materials scientists at Bell Labs and Western Electric perfected this growth method, obtaining magnetic films of uniform thickness with few defects.

Methods for manipulating bubbles and packaging the chips were also required. The current method for moving bubbles is to immerse the entire chip in a rapidly rotating magnetic field (created by electromagnetic coils) to propel bubbles along precisely defined metal tracks on the chip's surface. The tracks — made of a magnetically conductive metal called Permalloy — were originally shaped as a series of adjacent "T-bars," but later, asymmetric "chevrons" and "semicircles" were selected because those configurations would yield higher-density circuits. As the rotating field was applied, the bubbles would travel along the track by jumping from one Permalloy element to the next.

Bell Labs and Western Electric engineers together developed a package for the magnetic bubble chips that closely resembles packages for silicon memories. In addition to housing the bubble chips, the package contains a permanent magnet to provide the perpendicular field over the entire chip and electromagnetic coils to provide the bubble driving force. (A recent Bell Labs development, promising greater speed and storage by replacing field coils with thin conducting layers to provide the bubble driving force, is described later.)

The package is enclosed in a Permalloy outer casing to shield against external magnetic fields, and is fitted with pins to connect with printed circuit boards.

The close ties between Bell Labs and Western Electric enable new developments in bubble technology to be rapidly translated into designs for a manufacturable product. Some magnetic bubble manufacturing processes are newly developed. But, significantly, certain processes previously established for silicon integrated circuits are applicable to bubble circuit fabrication — an important synergism that helps reliability and reduces costs.

In the first step of bubble manufacture, a film of magnetic material (yttrium samarium calcium germanium iron garnet) is grown atop a thin wafer of gadolinium garnet — a nonmagnetic material. Each circular wafer — 3 in. in diameter — can yield up to 44 chips. The magnetic bubbles are formed in the film, which is only 120 millionths of an inch thick.

Bubble tracks are laid down using techniques common to silicon integrated circuit manufacture. A thin layer of Permalloy and a light-sensitive material are deposited atop the wafer,

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and a mask (or template) containing the track patterns is placed over the Permalloy.

After exposure to light, the metal not covered by the track pattern is etched away. (This lithography technique, as well as an electron-beam exposure technique used to create the high-resolution masks, are also Bell Labs developments.)

Production of the tracks requires only three masking steps, vs. more than twice that number to manufacture most silicon integrated-circuit memories. This helps hold down costs and reduces the chance of defective circuits.

Following inspection, the individual chips are cut from the wafer and readied for packaging. In the bubble memories now manufactured by Western Electric, four quarter-inch chips, each with a capacity of 68,000 bits, are mounted side-by-side in the package. First, the chips are surrounded by two wire coils that will produce the spinning magnetic field to drive the bubbles. Then they are sandwiched between a pair of thin, rectangular permanent magnets that will provide a field perpendicular to the chip — creating and sustaining the bubbles.

The entire assembly is enclosed in a Permalloy casing and 32 pins provide the means for external connections. The 272,000-bit package is about 1 in. wide, 2 in. long and a .5 in. thick — about half the size of a cigarette pack.

Like a track of data on a magnetic tape, bubbles lined up in single file on a Permalloy track can be "read out" as they move past a fixed point in a magnetic bubble memory system. At equally spaced intervals, the presence of a bubble can represent a "one" and the absence a "zero."

Input and retrieval of data in bubble memory systems are accomplished by means of bubble "generators" and "readers." The generator is a small electrical loop placed adjacent to the Permalloy track. When a pulse of current is put into this loop, a bubble is formed and rapidly whisked away along the track by the rotating magnetic field.

The bubble reader retrieves data by detecting the presence or absence of bubbles as they stream along the track. In the bubble memory now manufactured by Western Electric, the track gradually widens like an inverted funnel to stretch bubbles into long magnetic bars. These elongated bubbles pass over a current-carrying Permalloy strip and briefly alter its electrical resistance. This lets through a short burst of current, indicating a "one" in the data stream.

To store long streams of bubbles, the Permalloy track can be made in various patterns. The simplest approach is to compactly fold a continuous track back and forth across the chip's surface. With this arrangement, the entire bubble stream is kept in constant motion, and desired units of data can be read each time the bubbles make a complete revolution. The current Western Electric bubble package incorporates this pattern.

In a more complex pattern, several loop-storage tracks are constructed adjacent to a "major" loop that handles data entry and retrieval functions. Data can be transferred between the major loop and storage loops as needed.

Useful Technology

Several technologies for storing and retrieving data are competing for data communications and processing applications.

The choice of a specific memory system involves trade-offs among data storage capacity, speed of data retrieval, reliability and cost. Silicon integrated circuits, for example, provide access to data in billionths of a second, but their cost per bit of storage is relatively high because of manufacturing complexities. (Semiconductor memo-

(Continued on In Depth/6)

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IN DEPTH

(Continued from In Depth/3)

ries, however, are still lower in cost than older high-speed random-access memory technologies, such as ferrite core units.)

By contrast, electromechanical magnetic memories, such as disks and magnetic tapes, can store vast quantities of information at an extremely low cost per bit, but access to specific groups of data is relatively slow because of the mechanics of addressing them.

Originally conceived as an alternative to ferrite core memories, magnetic bubbles are emerging as a technology that will bridge the gap between relatively fast but expensive silicon integrated-circuit memories and relatively slow but low-cost mass memories.

And, though access to data in bubble memories — which is measured in thousandths of a second — is slower than in integrated circuits — measured in billionths of a second — data retrieval times with bubbles are comparable to those of the speediest magnetic disk or drum memories.

Appropriate Applications

Certain characteristics could make bubble memories the most attractive choice for certain applications. For example, the bubble memories' ability to retain stored data despite electrical power failure would be a major advantage. And the lack of moving parts would also be desirable in applications where size and maintenance are important factors.

The Bell System's first application of magnetic bubble memories was in a voice announcement system, delivering prerecorded, repetitive messages such as, "We're sorry, you have reached a number that has been disconnected . . ." This system — the 13A — underwent a field trial in 1977 at Michigan Bell in Detroit and is available to all Bell-operating companies today.

The heart of the 13A Announcement System is the four-chip, 272,000-bit magnetic bubble package. Two of these packages are mounted on a single circuit board along with associated circuitry to convert digitally encoded recorded announcements into conventional analog signals for transmission over telephone lines. Each circuit board can store up to 24 seconds of digitized speech. Eight boards — each storing a standard message — can be loaded into one 13A system.

The 13A system is replacing magnetic-drum units that store one message each. Since each of those units is the same size as a 13A system holding eight message boards, the latter saves considerable space. And, because it has no moving parts, the 13A eliminates the need for periodic maintenance and rerecording of announcements deteriorated through voice track wear.

In 1978, the 13A system was given a new use by New York Telephone — simulating some of the routine messages normally delivered by toll operators in handling coin telephone calls. Fifty-nine 13A systems throughout the company now provide a variety of messages such as "please deposit 30 cents for the first three minutes."

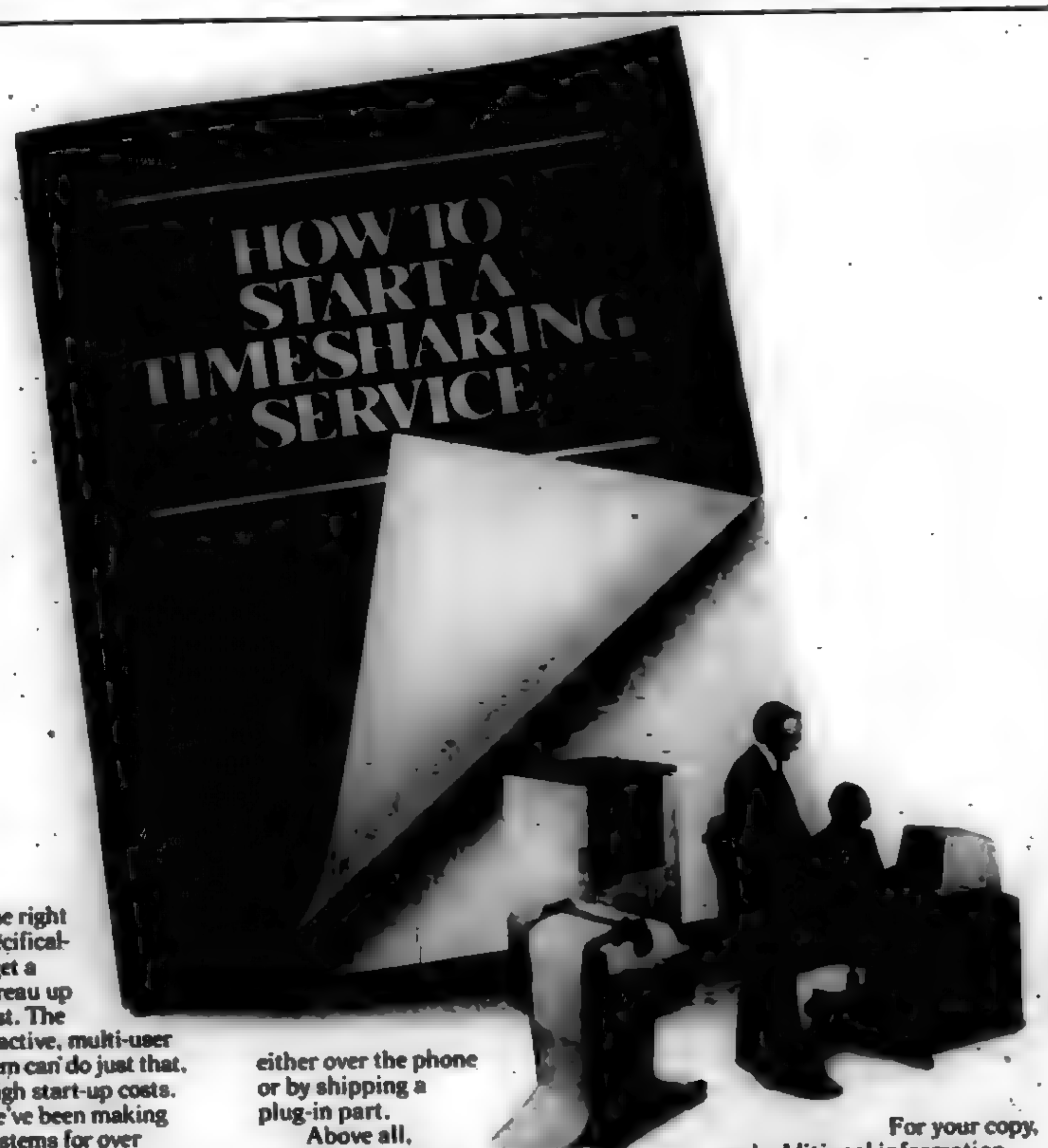
Looking Ahead

There is growing interest in putting magnetic bubble memories to use as data storage devices in telecommunications equipment and other applications. At Bell Labs and elsewhere, engineers are developing bubble memory subsystems capable of storing one million bits of information. These are described as memory "building blocks."

Prototypes of one memory subsystem, using the same bubble package as the 13A, are now in limited manufacture at Western Electric. Called the Serial Bubble Store (SBS), the unit can deliver information at a rate of 200,000 bit/sec and access stored information in less than .4 sec.

Currently under investigation is the Parallel Bubble Store (PBS), which will incorporate several small loops for data storage linked to a major loop for data entry and retrieval. PBS will deliver data at a rate of 400,000 bit/sec and retrieve a specific unit of data in less than .01 sec. Cost will be higher because of its complexity and extra circuitry for memory management; PBS would be chosen over SBS where data access speed is the prime consideration.

(Continued on In Depth/8)



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IN DEPTH

(Continued from In Depth/6)

Bubble memory subsystems are expected to have a variety of new applications in Bell System equipment. For instance, a newly designed measurement system that remotely evaluates the performance of digital microwave radio equipment incorporates bubble memories to store data. In addition, Digital Equipment Corp., Texas Instruments, Inc. and others have incorporated magnetic bubble memories into "smart" data terminals, which perform certain editing and storage functions.

Commercially available 1M-bit bubble chips have been introduced by TI, Rockwell International, Intel Corp. and National Semiconductor Corp. In Japan, Hitachi, Ltd. also make a 1M-bit bubble unit that is available in the U.S. And Nippon Telephone and Telegraph has tested a 4M-bit bubble unit for use in electronic switching networks.

Bell Labs and several other companies, including TI, Intel, Rockwell, IBM and some Japanese and European firms, are exploring ways to make magnetic bubble memories denser, more compact, faster and less costly.

Faster Pace

"Bubble technology is now at a point where major increases in data storage capacity and reductions in access time will be achieved more frequently," said Andrew Bobeck, co-inventor of bubble technology at Bell Labs. Today, 250,000-bit and million-bit bubble chips are already state of the art, and multimillion-bit chips are available in experimental form.

These improvements will be achieved by reducing the size of magnetic bubbles and distances between adjacent bubbles and by improving lithography resolution so that finer bubble-movement patterns can be created. These advances, along with new methods for moving bubbles, should also contribute to substantial reduction in access time and cost.

The companies involved in bubble research and development have taken different approaches.

TI, for example, is the first company to develop for the commerical market a single-chip bubble package and to exploit the concept of redundancy — building in spare data storage space on the chip to substitute for areas affected by minor manufacturing defects. TI was the first company with a bubble-using device on the general trade market — a "smart" computer terminal.

IBM's Work

IBM has made advances in bubble theory. The computer manufacturer has a major research effort under way to understand bubble physics and phenomena. One of its prime efforts in bubble memory design is to encode data in bubble "wall states" rather than in streams of individual bubbles.

One development that has been announced by Bell Laboratories involves an improved method for manipulating bubbles on a chip. Instead of moving them with a rotating magnetic field created by drive coils, the new method uses magnetic forces created by two wafer-thin conducting layers.

Because the coils are eliminated, the bubble package can be reduced to one-third its present size. The new propulsion method also promises a tenfold improvement in the rate of data movement. And, the compact, oval-shaped bubble track patterns etched in the driving wafers should permit a four-fold increase in storage capacity.

Toward Improved Economy

In addition, more steps in the bubble memory manufacturing process will then be compatible with integrated-circuit production techniques. This should further improve the economy of bubble devices.

In the Bell System, bubbles could eventually be used in electronic switching systems to replace disk files that now hold the switchers' main operating programs.

Bubble memories may also find applications in home and business telephone equipment, enabling new features to be developed.

Outside the Bell System, bubbles are expected to appear in various computing and data processing applications, such as in office equipment, electronic "cash registers," computer input and display terminals, microcomputer program and storage memories and, eventually, pocket calculators.

"Not since the early 60's have MIS departments faced such significant changes as those that are about to occur."

E. Drake Lundell, Jr.
Editor of Computerworld

Computerworld will "Forecast 81" Inside and Out in its combined Year-end Wrap-up Issue, December 29 and January 5, 1981. Ad close is December 12.

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- **Strategies for MIS software management.**
- **Hardware and software technology: Six areas to watch.**
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IDMS
The Dictionary-Driven DBMS That Meets the 6 Key Factors for Success in Database Systems

IDMS

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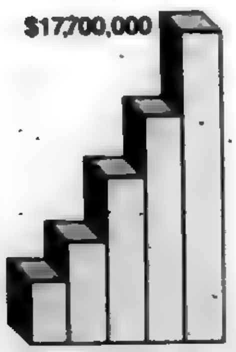
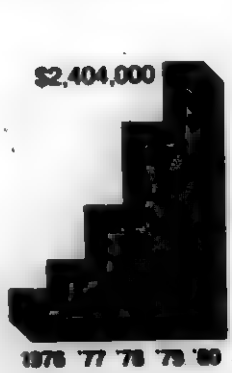
☐ FIRST EDP audit version of retrieval system and EDP auditors user group.	1970
☐ FIRST CODASYL DBMS for IBM Computers.	1973
☐ FIRST to build back-end database machine software.	1975
☐ FIRST active dictionary-driven DBMS.	1975
☐ FIRST computer software company to have public offering in 10 years.	1978
☐ FIRST distributed data processing DBMS.	1979
☐ FIRST IMS-DL/I ESCAPE Facility.	1980
☐ FIRST Audit Information Management System.	1980
☐ FIRST DBMS to meet the 6 key factors for success in database systems.	1980
☐ FIRST DBMS to be on Datapro Honor Roll 4 years in a row.	
☐ FIRST in profits, growth, and financial reserves of all independent database software companies.	

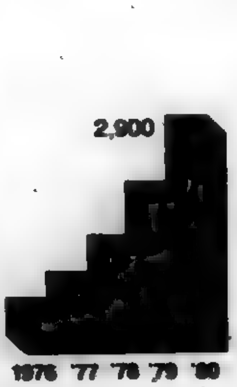
Revenues



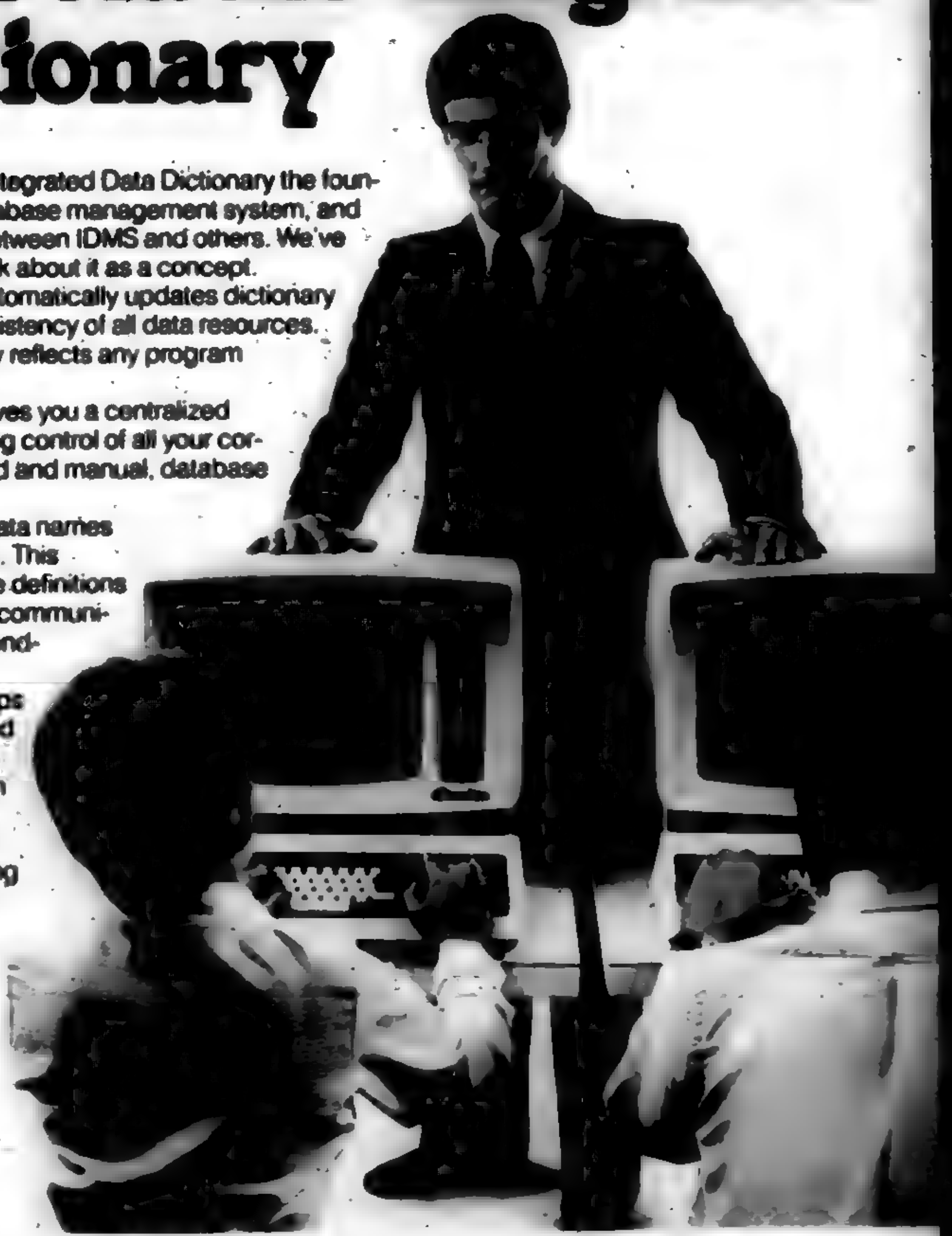
Profits



Installations



2. Control via the Integrated Data Dictionary



Cullinane Corporation has made the Integrated Data Dictionary the foundation of its completely integrated database management system, and this is the most important difference between IDMS and others. We've had it for four years while others still talk about it as a concept.

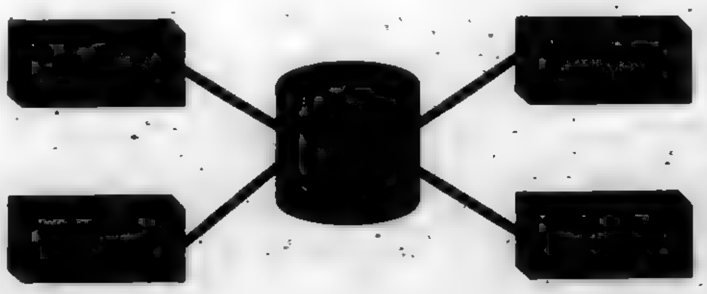
IDD, the active data dictionary, automatically updates dictionary contents, assuring accuracy and consistency of all data resources. The unique facility of IDD automatically reflects any program changes.

The Integrated Data Dictionary gives you a centralized resource of "data about data," providing control of all your corporate data resources, both automated and manual, database and conventional files.

The IDD also sets standards for data names across all systems, programs and files. This ensures that all users employ the same definitions to describe the same data, facilitating communication between data processing and end-user departments.

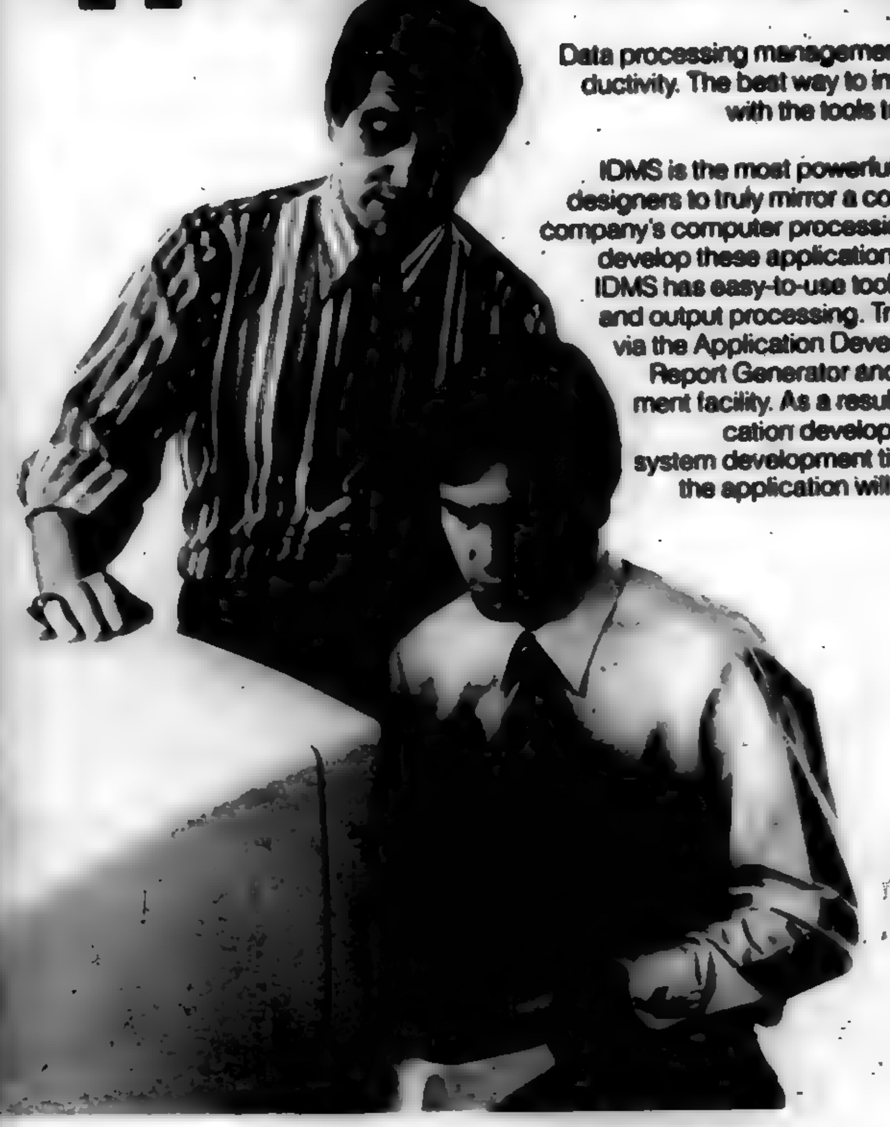
And the IDD maintains relationships between systems, users, programs and data elements. Because of this it can monitor the impact of proposed design changes on the system, in advance.

IDD is the integration point for the award-winning DBMS, IDMS, facilitating easy application development, end-user access to data and efficient processing in an on-line environment. The IDD is an absolute must in the growing complexity of today's typical computer operation.



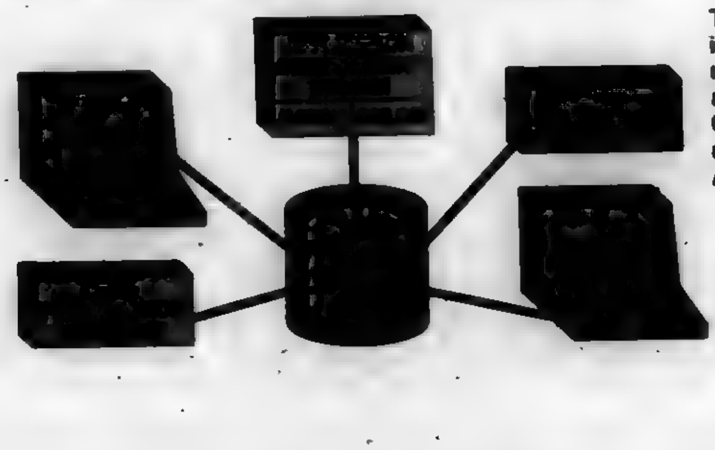
Integrated Data Dictionary is the control point for IDMS, integrating all components. As a result, IDMS is a true dictionary-driven DBMS. In addition, the IDD is an active dictionary whereby the dictionary is populated automatically, greatly reducing manual input and ensuring integrity of the dictionary.

3. Facilities for fast application development



Data processing management is looking for ways to increase staff productivity. The best way to improve productivity is to provide your staff with the tools to develop applications quickly and easily. IDMS is just such a tool.

IDMS is the most powerful DBMS in the world. It allows applications designers to truly mirror a company's operations within the limits of the company's computer processing capabilities. However, you also want to develop these applications faster, with fewer people. Simply stated, IDMS has easy-to-use tools for input processing, data management and output processing. Traditional programming is greatly reduced via the Application Development System, OnLine Query, CULPRIT Report Generator and the INTERACT on-line program development facility. As a result, IDMS will dramatically reduce the application development cycle. Other DBMS systems reduce system development time too, but IDMS gives you a big bonus – the application will run fast, faster than with any other DBMS.



The IDMS DB/DC facilities include the Application Development System, batch and on-line, as well as INTERACT, OnLine Query, CULPRIT and Data Manipulation Languages for COBOL, Assembly, PL/I, and FORTRAN.

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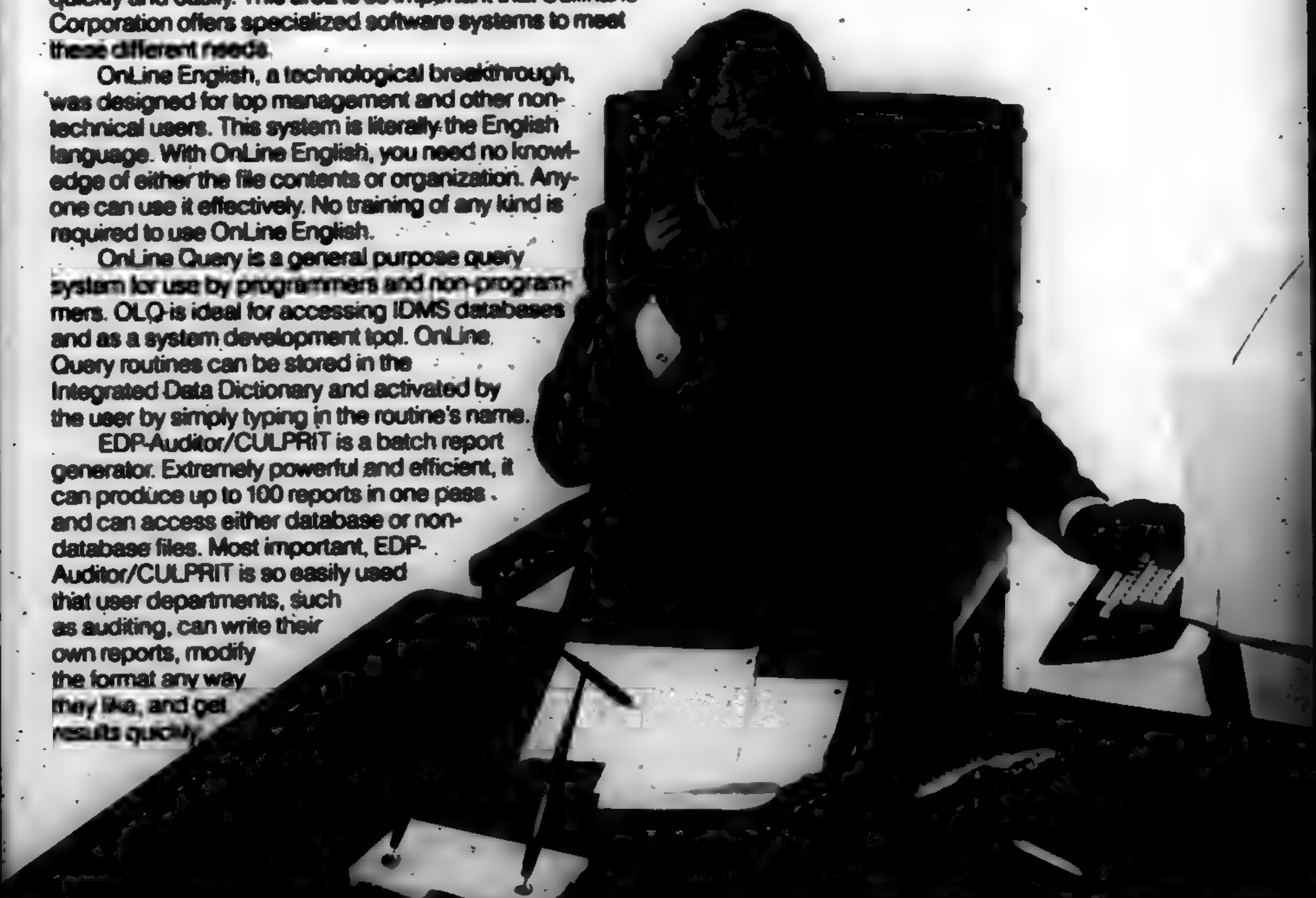

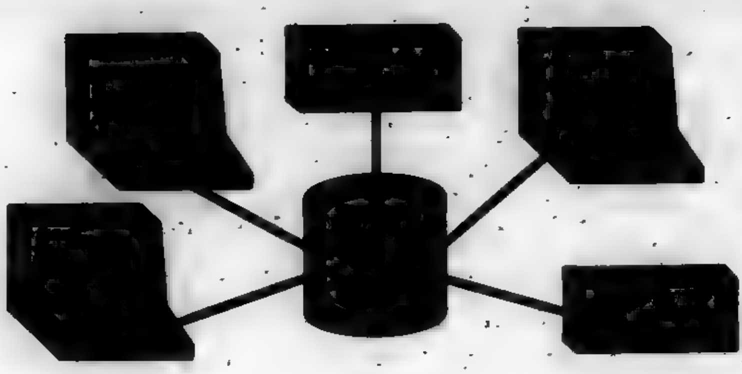

User facilities include OnLine English, INTERACT, CULPRIT and OnLine Query, all integrated and controlled by the IDD. Also available is EDP-Auditor, which provides complete DP auditability, especially designed with an extensive library of routines for use by non-programmers.

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Processing facilities, in addition to supporting distributed database networks, also include UCF, ESCAPE and the Shared Database System, which supports multiple CPU's sharing databases.

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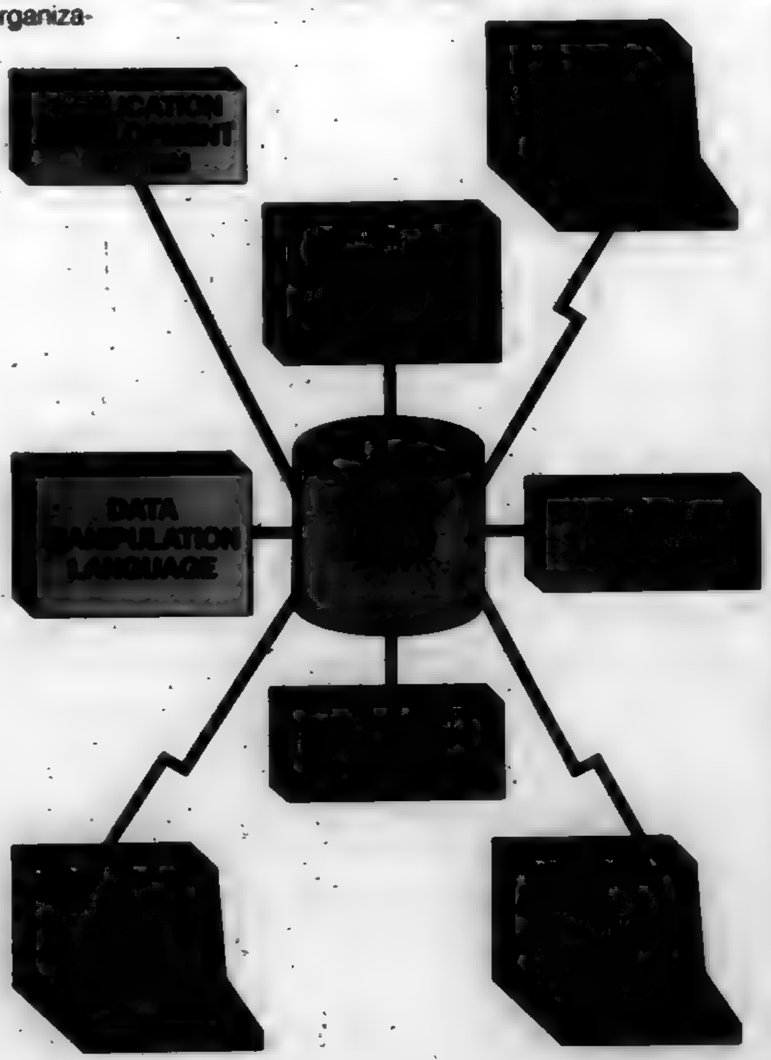

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Back to Data Bas(e)ics

BY MARK L. GILLENSON

One of the exciting advantages of being in the data processing field is the chance to watch new disciplines emerge, develop and mature, all in a relatively short time span.

So it has been with data base. Topics, tools and techniques – such as data base design, data administration, data dictionaries, backup and recovery – have all come into their own as viable concerns. As data becomes more of a recognized, manageable resource and as we try to do more and more with ever-expanding collections of data, we know that those topics, tools and techniques will be with us for a long time.

An ever-increasing number of data processing personnel and others are coming into close or occasional contact with the central physical embodiment of data base, the data base management system (DBMS). *But it has become quite clear that a large number of those people don't understand how DBMS are supposed to improve data processing – which is to say, they don't understand what the justification is for using them.*

Furthermore, uses of the term "data base" remind me of the queen in Alice's Wonderland: it often seems to mean whatever someone wants it to mean. Also, since so many papers and books on the subject are too theoretical, too detailed or too obtuse, the fundamental points get lost.

A *data base* is simply a stored collection of data. A *DBMS* is a software tool that provides access to the data in an "integrated" (to be defined later) way.

What follows is a *net* description of the whys of data base, suitable for passing on to your boss, your subordinates and your colleagues (and even yourself – just don't tell anyone that you read it).

I've divided the discussion into five areas:

1. Data base environment characteristics.
2. Redundant data.
3. Multiple relationships.
4. General data management issues.
5. Data independence.

Data Base Environment Characteristics. In the earlier days of data processing, most of the emphasis was placed on the programs themselves. Hardware was expensive and limited in addressing scope. Programming was a new discipline and there was much to be learned about it in order to achieve the goal of efficient processing. Partial mechanization of the process and even standardization of style were unknown. In this environment, the treatment of the data itself was not the highest priority concern.

As data processing continues to grow, a number of the ground rules are changing. Hardware is becoming cheaper, software development has taken on a more standardized, "structured" form and large backlogs of new applications to be implemented have built up, making the huge amount of time now spent on maintaining existing programs more and more unacceptable. It is becoming increasingly clear that the way in which we have handled (or mishandled) data in the past is one of the major factors in the program maintenance mess in which we now find ourselves. Today data:

- Is stored in different formats.
- Is often not shareable, necessitating redundant files.
- Is often not easily recoverable or secure.
- Usually has its structure tied directly into the program logic.

As a result, data is all too often inaccurate, inconsistent or outdated. Changes in everything from access methods to tax tables require programming changes.

Enterprise Resource

At the same time, as an increasing amount of the enterprise's operational and strategic work becomes dependent on automated data processing, an increasing awareness that the data itself is an important *enterprise resource* is evolving.

Money, capital equipment, inventories and so forth are all important property to an enterprise. We have applied numerous management techniques to them (many of which, of course, have involved computers). Many people are now coming to the conclusion that data is also a manageable resource. A firm's data about its products, manufacturing processes, customers, suppliers, employees and competitors can, with proper storage and use, provide a significant competitive advantage.

At the intersection of all these happenings is the question, "How?" We want to manage data as an enterprise resource, while at the same time improving its treatment in terms of the technicalities of data processing. It becomes clear, even before we reach the discussion of the specifics to come later in this article, that some sort of a uniform system to manage data is needed. That class of uniform systems have come to be known as data base management systems.

As the DBMS chosen by an enterprise comes into increasing use, it sets de facto standards for file structures, access mechanisms and programming techniques.

The sharing of data files among different applications in this environment forces a more careful and standardized look at the entire application development process. Now, whatever you do may affect others too in terms of data accuracy, update schedules and performance.

All of these points of standardization and increased control of the data processing environment can only serve to make for a less error-prone shop.

The data base environment leads to new levels of job specialization, which is really another form of standardization. Typically, a data administration function is formed to be responsible for the data base. Within that function are people who specialize in structural design, security, backup and recovery, performance and so on.

As the commitment to data base increases, the applications programming and operations groups develop a dependency on the data administration function to assume an increasing amount of the data-oriented legwork of the application development and execution processes. This will include data collection and verification, data base design (replacing the old file design step), integrity monitoring, security, backup and recovery – in effect a thorough custodianship of the enterprise's data. That doesn't happen overnight, but rather takes place as a gradual transition. But again, that kind of standardization – people and functional standardization in this case – can only lead to a more efficient, error-free environment.

2. Redundant Data. Let's take a look at the problem of redundant data and its companion, the problem of integrity. First we will consider in the context of one file, then in the context of many files.

Redundancy Within One File

Suppose we are a sales organization and, of course, have to have a way of keeping track of our customers and our sales representatives. Figure 1 shows two simple, "flat" files (many occurrences of one record type), one for the sales reps and one for the customers.

(Continued on In Depth/22)

SALES REP#	•••	SALES REP NAME	•••
5		Smith	
10		Jones	
21		Doe	
•		•	
•		•	
•		•	
•		•	

Figure 1A. Sales Rep File

CUSTOMER #	•••	SALES REP#	•••
112		5	
215		10	
223		5	
324		5	
527		21	
[illegible]		21	
•		•	
•		•	
•		•	

Figure 1B. Customer File

Figure 1. Separate Files

(Continued from In Depth/21)

The Sales Rep File is keyed on sales rep number (a unique number which can take us directly to the one record which deals with a particular sales rep) and has, as one of its other fields, the sales rep's name. The Customer File is keyed on (the also unique) customer number and has, as one of its other fields, the number of the sales rep who is assigned to that account. There is one record per sales rep, representing each piece of information pertaining to him just once, and there is a like situation for each customer.

That kind of data storage is said to be *nonredundant*. That is as it should be.

If someone comes along and wants to know the name of the sales rep who is identified by a particular sales rep number, he merely looks up that sales rep's record in the Sales Rep File (Figure 1A), using the sales rep number as the key, and reads off the name. Similarly, if someone wants to know the number of the sales rep who is responsible for a particular account, he goes to the Customer File (Figure 1B) and looks up that customer's record, using the customer number as the key. So far, so good.

Now, what if someone comes along and wants to know the *name* of the sales rep who services a particular account, identified by account number? Can that information be obtained from only one of the files in Figure 1? Clearly it cannot, since the customer number information exists only in the Customer File, and the sales rep *name* information exists only in the Sales Rep File.

The only way to answer that question is to first look up that customer's record in the Customer File, find the number of the sales rep on that account, then use that number to find that rep's record in the Sales Rep File and finally find his name in that record. That kind of custom-made, multicommand, multifile access is error-prone in terms of programming, expensive in terms of execution performance and, depending on the software involved, may have to be coded separately for each such access combination.

As One File

Ah, but if we knew that we were going to make such queries, why did we bother breaking the data up into two files in the first place? If it is all contained in one file, in a meaningful way, then there are no costly multicommand, multifile accesses.

Figure 2 shows the same data represented in one file. Notice that we show the sales rep (by number) assigned to a particular customer and the name that goes with a particular sales rep number, just as we did in the two files in Figure 1.

We can still answer the two original, simple questions we put to the files in Figure 1. But now, in addition, we can answer the tougher, previously multifile question, "What is the name of the sales rep on a particular account?" with just the one file in Figure 2 and one command.

Fine! Or is it? In the file in Figure 1A, there is one record per sales rep, each containing the particulars for a given rep once. Indicating which sales rep services a particular account is simply a matter of attaching the sales rep's number to the single record that describes that customer in the file in Figure 1B.

But in the combined file of Figure 2, where all of the fundamentally different kinds of information are intermingled, the particulars of a particular sales rep must be repeated for every account he services. A given sales rep may appear in several records in that file, and it makes no sense from a logical or a retrieval standpoint to specify, for example, the sales rep name for one customer the sales rep services and not for another. To be complete, the data must be repeated in every appropriate slot.

Thus, whereas in the two files of Figure 1, the name "Smith" is attached to the sales rep number "5" just once, in the combined file of Figure 2, the name "Smith" appears with sales rep number "5" in as many records as customers that Smith services.

Numerous Problems

That situation causes a number of problems. For one thing it takes up a lot more storage space. (Try adding a home address field of 40 bytes and see how you feel about storing it once as opposed to, say, 50 times.) For another

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thing, it is rather unpleasant when it comes to updating. If Smith changes his (or her) name, the change must be recorded many times. The time consumed in doing that can be very costly, particularly if the records involved are scattered all over a disk. Also, there is the nagging doubt that all of the occurrences may not have been updated, because of anything from programming bugs to execution time system failures. When that happens, it is called an *integrity* problem.

There appears to be a trade-off, but then trade-offs are hardly rare in the computer field. In the two files of Figure 1, we have no redundancy (at least among the nonkey fields, strictly speaking), but a query of the type we have been looking at requires a multicommand, multifile access. In the combined file of Figure 2, we have eliminated the need for a multicommand, multifile access for that type of query, but we have introduced redundancy among the nonkey fields. Neither of these situations is tolerable, for the reasons indicated above.

The question is, can we have our cake and eat it too? And that brings us to one of the key features of the data base environment. An *integrated* data management system — that is, a true data base system — is one in which data can be held nonredundantly (in the sense of the files in Figure 1) while at the same time, a query that requires a mixture of different kinds of data (such as the query we have been looking at) can be specified in a single command from the highest level programming interface. Any system that does not have this property really should not call itself a "data base" system; "data management" system would be a more accurate term.

SALES REP#	CUSTOMER #	SALES REP NAME	••••
5	112	Smith	
5	223	Smith	
5	324	Smith	
19	215	Jones	
21	527	Doe	
21	632	Doe	
•	•	•	
•	•	•	
•	•	•	

Figure 2. Combined File

True Data Base

There are several approaches to designing a true data base system, which revolve around different storage structures and different times and ways of "mixing" different pieces of data together. (See Section 3 for an example of how this can be accomplished.)

Another benefit of the integrated approach is the encouragement it gives to finding new uses for the data in the data base by being able to derive new information from combinations of different classes of data relatively easily.

There is another kind of redundancy which, while perhaps a bit more obvious than the one discussed above, is not necessarily easier to combat — but

(Continued on In Depth/24)

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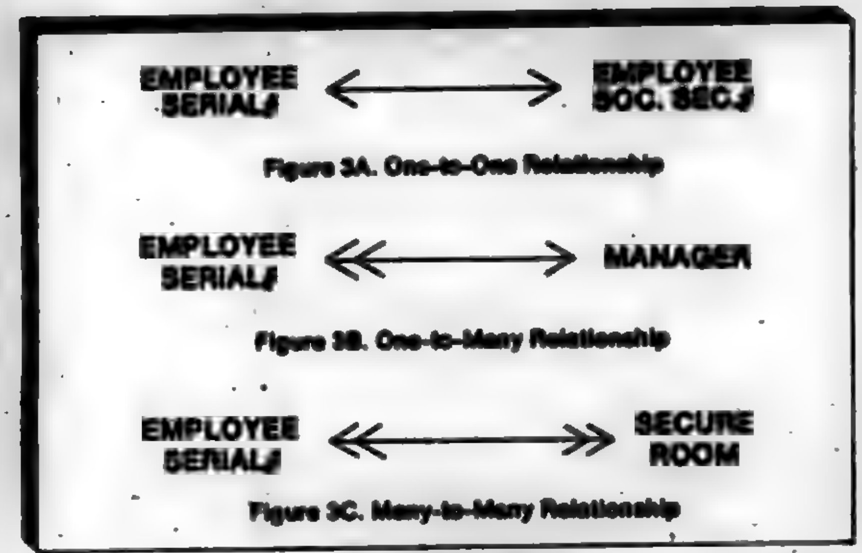
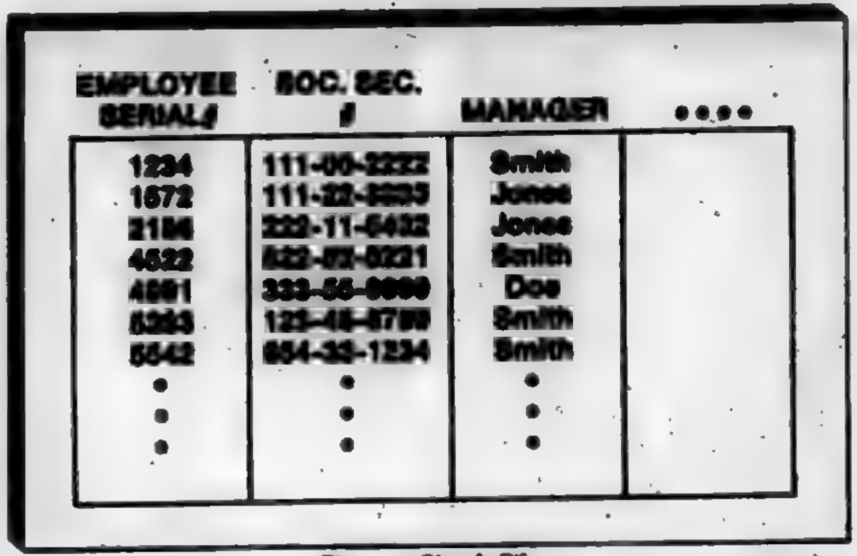


Figure 3A. One-to-One Relationship

Figure 3B. One-to-Many Relationship

Figure 3C. Many-to-Many Relationship

Figure 3. Relationships



EMPLOYEE SERIAL#	SOC. SEC. #	MANAGER	• • • •
1234	111-00-2222	Smith	
1672	111-22-3335	Jones	
2186	222-11-6432	Jones	
4522	422-[illegible]-0221	Smith	
4891	333-55-9999	Doe	
5283	123-45-6789	Smith	
5542	654-33-1234	Smith	
•	•	•	
•	•	•	
•	•	•	

Figure 4. Simple File

(Continued from In Depth/23)

for different reasons.

Frequently, certain data is needed by different departments in an enterprise in the course of their normal, everyday work. For example, customer name and address may be needed by the sales department, the accounts receivable department and the credit department. There will also generally be other pieces of information involving customers which are only needed by one or two departments. Typically, the solution to this multiple need is redundancy. The sales department has its own stored file which, among other things, contains the customer name and address, likewise for the accounts receivable and credit departments.

While it is true that this keeps the departments from competing for the data, it opens up a can of worms, which is reminiscent of the problems we encountered in single file redundancy. First of all, storing a piece of data three times takes three times the amount of storage as storing it once. In addition, every time the data must be updated, it must be changed in each file where it resides. That wastes processing time, causes control nightmares and has the potential of leading to integrity problems if all of the data is not updated correctly and at the same time. Furthermore, the question arises as to whose responsibility it is to update the data in all of those different files, which are probably owned by widely separated departments.

Wouldn't it make more sense for such data to be stored just once, in a way that makes it accessible to all of the different groups that need it? That way there would be one group in charge of updating it, little wasted space, few integrity problems and so on.

The data base approach includes the concept of a common, shared data base, with controlled management and update responsibility.

3. Multiple Relationships. Let's turn now to a discussion of the ways different pieces of data in a particular organization can relate to each other and the ways we might represent those relationships.

Suppose we are interested in storing data about our nonmanagement employees. We identify each employee by a unique employee serial number and want to keep track of the employee's Social Security number, manager and rooms to which the employee can be granted access. There is exactly one Social Security number and one manager associated with each employee, so we'll call them *unary associations.*

We further note that in addition to there being one Social Security number associated with a given employee, for a given Social Security number there is exactly one employee associated with it. In this case there is a unary association in each direction, and we'll call that a *one-to-one relationship* (Figure 3A).

Returning once again to employees and managers, we note that while a given employee has only one manager, a given manager may have many employees working for him. Thus there is

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a unary association in one direction and a multiple association in the other direction, and we can call the combination a *one-to-many relationship* (Figure 3B).

Finally, consider the situation of employees and secure rooms. An employee may be authorized to be in several rooms, while a room will have several employees authorized to be in it. That's a *many-to-many relationship* (Figure 3C).

Easiest Storage

The question we must now ask is, "How easily can we store data involving the two kinds of associations and three kinds of relationships in simple files?"

Roughly speaking, unary associations and one-to-one relationships are handled well by simple files. After all, a key field and a simple nonkey field in a record represent one item being attached to another item (Figure 4). But when it comes to multiple associations and their resulting relationships, simple files leave something to be desired.

A multiple association can be represented "horizontally" with variable-length records (Figure 5A) — but that can cause space management and program logic headaches. It can be represented "vertically" with one participant being repeated once for each of the other related participants (Figure 5B) — but that introduces redundancy. It can be represented with interspersed record types (Figure 5C) — but trying to find all occurrences of one of the record types is a problem. So none of these solutions is very good (although, when processed with certain other devices, such as indexes, relational constructs and so on, they may well qualify as legitimate data base solutions).

One of the capabilities of DBMS is that they provide the means of naturally and easily representing all of the above described data associations and relationships.

Although this is a discussion of the "why" of data base and not the "how," there would be a significant void if it did not include an inkling of how a data structure can be used to implement the provisions discussed in these last two sections on redundancy and multiple relationships.

Hierarchical Model

Figure 6 shows an example of a structure based on the hierarchical data base model. Actually, there are two interconnected hierarchies: one headed by MANAGER and one headed by SECURE ROOM. There are three other approaches used in the industry: network, relational and one that is sometimes called pseudorelational or flat-file integrated.

In Figure 6, each box represents a record type. Thus, for example, the box labeled "MANAGER" really consists of several fields (as any record would) such as manager name, manager address, manager age and so forth. Note the EMPLOYEE record. A manager normally has several employees, but an employee works for only one manager. A connecting line, called a branch, represents a one-to-many relationship.

The physical implementation of this is typically done with a variety of pointers. So for a given manager (which we assume can be reached randomly with an appropriate access method), I can store unarily associated data in the same record and multiply associated data in the next level of the hierarchy, all connected together by pointers (for example, a pointer from a given manager to a pointer-connected chain connecting together all of the employees who work for that manager).

Notice that there is another (trivial) hierarchy dealing with secure rooms. We might be interested in knowing which employees are authorized to be in a given room, and in which rooms a particular employee is authorized to be. That is a many-to-many relationship and can be implemented with a set of connective pointers, represented by the box connecting the EMPLOYEE and SECURE ROOM records.

Notice, in terms of redundancy, that the employee information is stored only once per employee, regardless of how many rooms the employee is authorized to be in, while at the same time the room information is stored only once per room, regardless of how many employees are authorized to be in it. That's the way it *should* be!

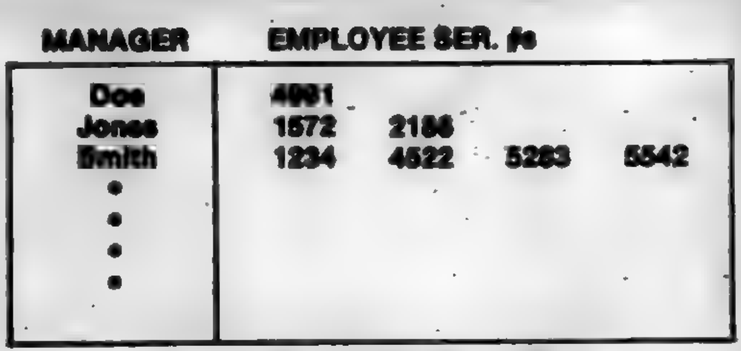
4. General Data Management Issues. There are several concerns about the way we manage data which must be considered whether or not we are dealing with a data base environment. These concerns are inherent in storing, managing and accessing data. As we shall see, it is reasonable to assume that when we *are* dealing with a data base environment, the DBMS should provide the means for handling them. The four areas are:

- Security.
- Backup and recovery.
- Concurrency.
- Auditability.

In all four cases, the key concept is that it makes sense to have a common way to deal with these areas built into the DBMS. That means that when a new application program is written, the programmer does not have to write security, recovery and other routines from scratch, or try to use specialized, but unconnected, software packages for those functions. It means we can be confident the routines work, since they are standard, tested components of the DBMS. It means the functions are standard for all application programs in the environment, which leads to easier management of them and economies of scale in assigning and training personnel to be responsible for those aspects.

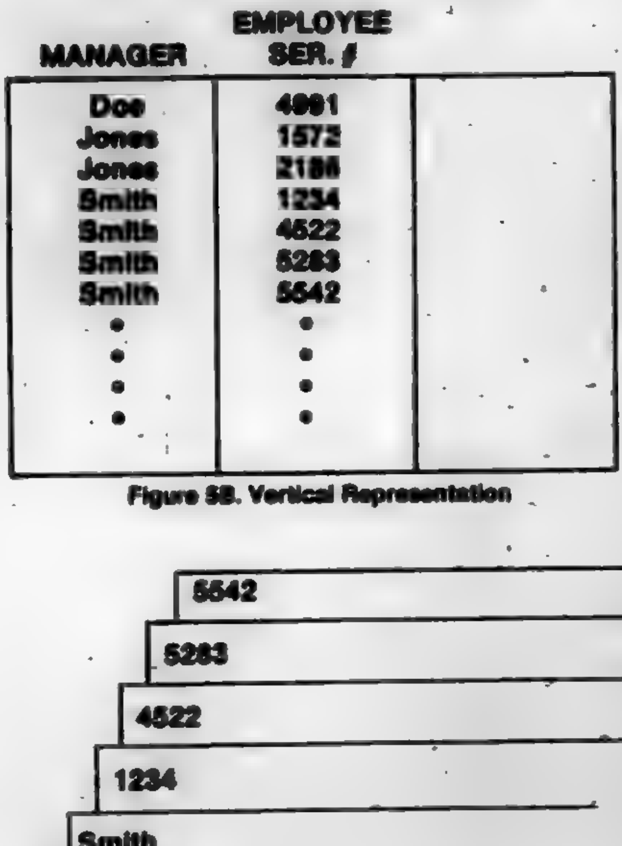
There are many aspects to security in

(Continued on In Depth/28)



MANAGER	EMPLOYEE SER. #			
Doe	4991			
Jones	1572	2186		
Smith	1234	4522	5283	5542
•				
•				
•				
•				

Figure 5A. Horizontal Representation



MANAGER	EMPLOYEE SER. #	
Doe	4991	
Jones	1572	
Jones	2186	
Smith	1234	
Smith	4522	
Smith	5283	
Smith	5542	
•	•	
•	•	
•	•	
•	•	

Figure 5B. Vertical Representation

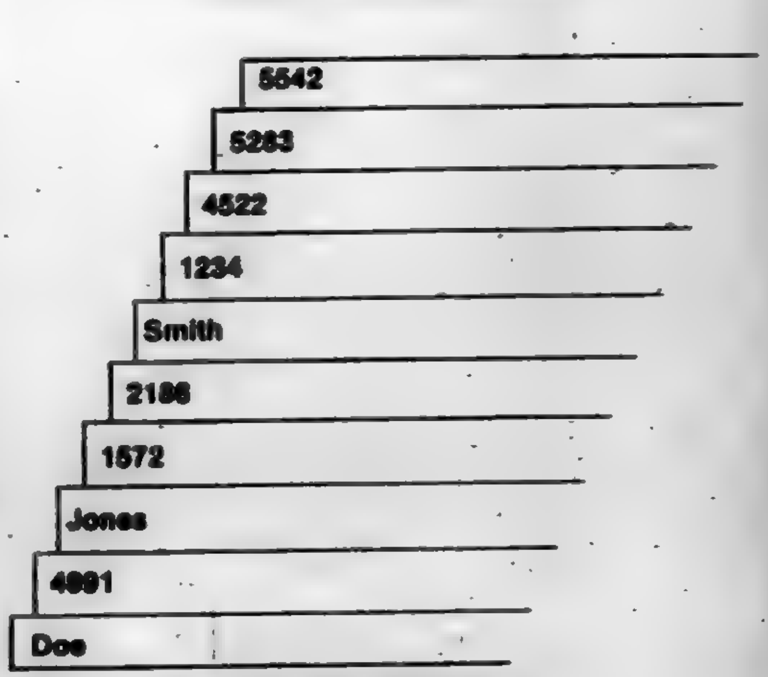


Figure 5C. Interspersed Records

Figure 5. Multiple Relationship Representation

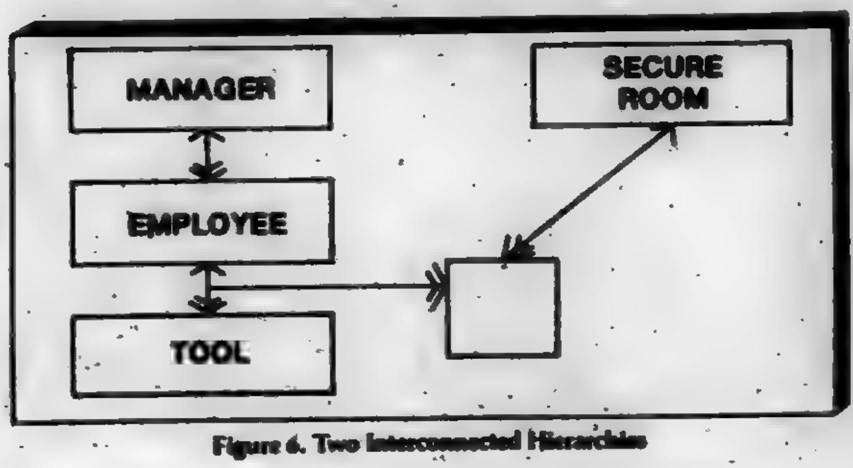


Figure 6. Two Interconnected Hierarchies

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IN DEPTH

(Continued from In Depth/25)

a data processing environment, ranging from sign-on passwords for using a system to armed guards to stop someone from blowing up the computer. There are several aspects of security that are specifically data related and thus of interest in discussing DBMS. The two key points involved are preventing persons from seeing data they are not entitled to see and preventing them from changing data they have no business changing.

A problem that is a direct consequence of the shared, integrated data nature of the data base environment is preventing someone from accessing data to which he is not entitled access, but which happens to be attached or linked to data he is entitled to access. A manager who is giving up control of his data to the common data base will rightfully demand that that data be handled as carefully as when he had direct control over it. Furthermore, we may want to allow someone the right to simply look at some data, while at the same time forbidding him to update it.

A facility that exists in many DBMS solves these problems. Essentially, a two-level system of describing data is established: one level to describe the physical, intertwined storage of the data and another level to describe the specific program/programmer views that are required by specific applications. These are sometimes called physical views (or schemas) vs. logical views (or subschemas), the latter being subsets of the former. At some time during the running of the program, a mapping must take place between the two. Not only is this organization an effective way of preventing unauthorized access, but also more sophisticated controls can be built in to solve the other problem, forbidding such operations as update, even when legitimate read-only access exists.

While methods vary from system to system, there are some general techniques that can be mentioned. One is the ubiquitous password (a "key" for a software "lock" controlling some aspect of the system). While we usually think of passwords as needed to get onto a system, they can also be required to gain access to specific data or to execute specific routines which can gain access to particular data.

Finally, a DBMS can monitor the programs that use it. This is another important step at a slightly higher level.

Backup and Recovery

Suppose a computer operator causes some unspeakable tragedy which mangles one of your disk packs. Or, suppose an error in input is discovered which took place 10 minutes ago and, in the data base environment, affected other data as well. These concerns are emphasized in the data base environment because of the shared and integrated nature of the data, the process of on-line update and the fact that old-style sequential processing had an inherent backup (the transaction and old master files) that no longer exists.

The common solution mechanism for those problems, albeit fairly Neanderthal in nature, deals with data base dumps and logs. Periodically a dump is taken (a copy made) of the data base. During the operation of a data base environment, every change that is made to the data base is recorded on a log. By using the last dump and "rolling forward" through the log, starting with the first change that was made after that dump was taken, an obliterated data base can be recreated. By starting with the current state of the data base and "rolling backwards" through the log from the last entry, the data base can be unravelled to the point where an error occurred.

Besides the obvious needs for a backup and recovery mechanism, an additional benefit can be considered to be increased availability of data, since it will take a shorter length of time to

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repair the damage if it does occur.

When two users try to update the same record simultaneously (or as simultaneously as a multiprogrammed system allows), they have a rather nasty way of interfering with each other unlike when they are merely doing simple retrievals.

Say there are two users, A and B, who both want to update the same field in a specific record. Suppose the current value of that field is 100 and user A wants to add 20 to it, while user B wants to add 30 to it. To begin, user A retrieves the record and, with the magic of multiprogramming, gets interrupted and goes off somewhere else in the computer system to make the desired change to the field.

In the meantime, user B retrieves the same record (that is, another copy of it). User A then modifies the field and replaces the record in the data base. Finally user B makes his change and replaces the record in the data base. What's the final result? 130. The two operations were unaware of each other. Figure 7A shows this sequence.

You might question the probability of two users going after the same record simultaneously in a one-million-record file. Have you ever tried to get a reservation on a flight from New York to Miami for Chirstmas week the week before Christmas week?

"Lockout," or some variation of the same concept, is the usual method used by DBMS to prevent this problem. Once one update operation has begun on a piece of data, any attempt to begin another update operation on that same piece of data will be locked out and, depending on the implementation, may be rescheduled.

Actually, the level of lockout varies among different systems. Lockout at a high level — the file level, for instance — prevents much more than that one particular piece of data from being modified while the update operation is going on, but is a low overhead solution. Lockout at a low level, such as the field level, doesn't hold up the rest of the data base, but is a comparatively high overhead solution.

Creates Problems

Unfortunately, as so often happens, the introduction of this beneficial device itself causes other problems which did not previously exist. Follow the next scenario.

User A retrieves record 1 from the data base (with the intention of doing an update) and locks it. At about the same time, user B retrieves record 2 and locks it. User A's program notes that in order to complete its update, it also needs record 2, but by the time it goes to get it, finds it locked by user B. Meanwhile, user B's program notes that in order to complete its update, it also needs record 1, but by the time it goes to get it, finds it locked by user A. And the two programs sit there forever, waiting for each other to give up what each other needs to complete its processing.

That is called "deadlock" or "the deadly embrace." Figure 7B shows this sequence. It actually bears a close relationship to the "gridlock" traffic problem major cities worry about during rush hour.

There are several ways for DBMS to totally avoid, or at least detect, this condition. For avoidance, a high level of lockout can be used to lock a major area of data, within which all further accesses by the same program would be made (at a price in performance). Or, it can be demanded that all multiple requests be made in the same key sequence. For detection (which must be a consideration since total avoidance procedures are often unacceptable for performance reasons) timeouts, or the periodic checking of a matrix that keeps track of the lockable objects vs. the processes with authority to lock, are used.

Auditability

As more and more of an enterprise's data is stored in a data base, that data base becomes an increasingly important focus on the auditing function. Unfortunately, some of the same features that make the data base environment so attractive from a data processing point of view make it a more difficult environment from an auditing point of view. The increased structural complexities, the separation of the storage and programmers' views of the data — and especially the shared nature of the data — are all problems for the auditor.

Besides careful documentation, thorough program testing and the like, all of which should exist anyway, the primary tool of the auditor is the audit trail, and that brings us back to logs. While logs used just for backup and recovery often record only changes to the data base, logs or journals used for auditing purposes may also have to record simple retrievals from the data base and identify the users who made them. We should expect to hear a lot more about auditing in the data base environment as time goes on.

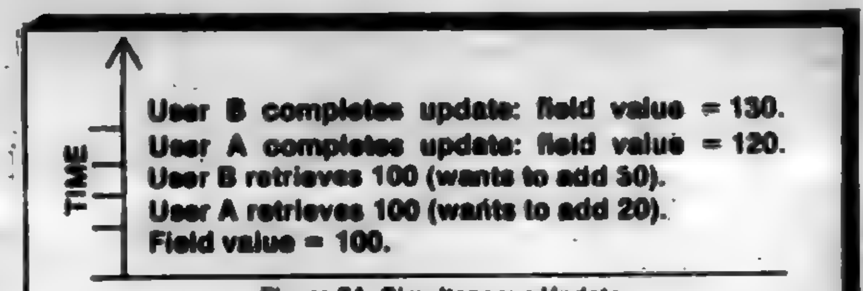
5. **Data Independence.** Whether we are working in a simple file environment, or in a data base environment with interconnected records, we are, by the nature of computers, faced with going beyond just thinking about records to the task of actually physically storing them. In fact, there are two points to consider that are closely related, although fundamentally different: the file organization and the access method. The former is the way the file is physically stored, while the latter is the way the data can be reached by programs, assuming a particular storage structure.

In the nondata base environment, decisions involving the way the application program is written are usually made in concert with the choice of file organization and access method. In fact, the *dependence* is so strong that if for any reason the storage characteristics of the data should be changed in the future, the program itself must be modified as well. That is a very undesirable characteristic. In practice, storage structures do and/or should change to reflect improved storage techniques, new hardware, attempts at sharing data and performance tuning, to name a few reasons. One of the reasons for the massive amounts of time spent on program maintenance is the typical level of dependence between programs and data.

We would like to be able to separate out storage and access considerations from programming to as great an extent as possible. Today's DBMS have been successful in this respect in certain aspects of the problem and unsuccessful or only partially successful in others.

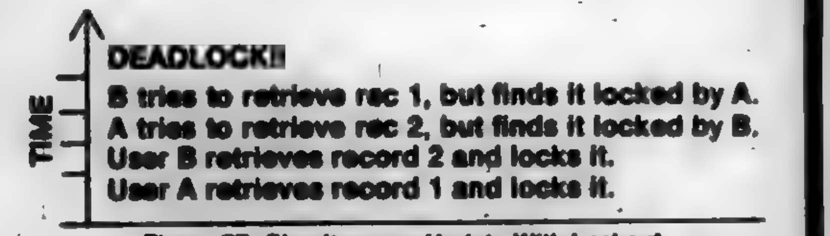
An area in which today's DBMS are

(Continued on In Depth/30)



User B completes update: field value = 130.
User A completes update: field value = 120.
User B retrieves 100 (wants to add 30).
User A retrieves 100 (wants to add 20).
Field value = 100.

Figure 7A. Simultaneous Update



DEADLOCK!!
B tries to retrieve rec 1, but finds it locked by A.
A tries to retrieve rec 2, but finds it locked by B.
User B retrieves record 2 and locks it.
User A retrieves record 1 and locks it.

Figure 7B. Simultaneous Update With Lockout

Figure 7. Concurrency Problems

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(Continued from In Depth/29)

successful in terms of data independence is in changing the file organization and access method of the data used by an existing program. For example, changing from a direct storage method to an indexed method can be accomplished without substantial program changes in some commercial systems.

Another area of interest concerning data independence in DBMS involves adding new data categories to existing structures, or the related action of changing the design of existing structures. In spite of the complexities of the hierarchies and networks that programmers must contend with, such changes may not require any code modification, given that some reasonable programming standards have been observed and depending on the type of change.

Of the kinds of DBMS currently on the market or being proposed, relational systems show the greatest promise in terms of data independence, many people feel.

In a true relational system, data integration is accomplished independently of physical interconnection of files. All programs deal with a relatively simple file structure concept and are unconcerned with the later addition of new files. In terms of hierarchical and network-oriented systems, a proposal has been made to expand the concept of multiple levels of data from the current internal and external (or physical and logical) levels to a three-level system consisting of internal, conceptual and external levels.

Without getting bogged down in detail, the basic idea is to have a stable, mid-level platform of data representation (the conceptual level) with mappings between it and the other levels. It is argued that this arrangement would make data independence more feasible in these DBMS.

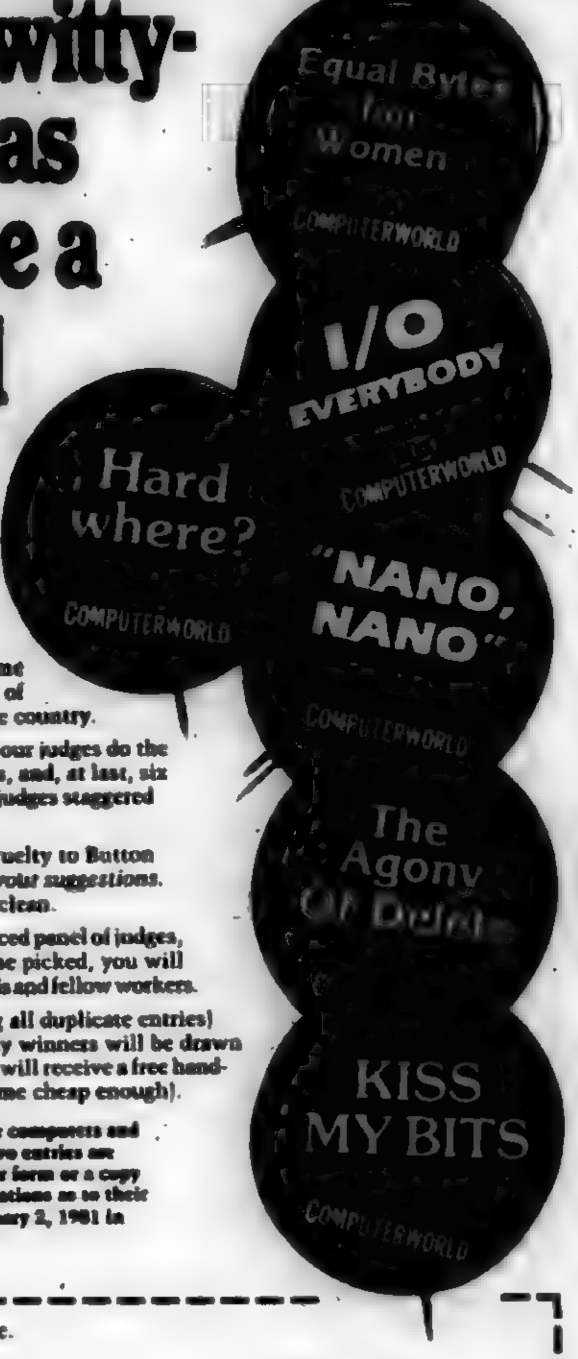
While this approach does have some interesting features, including the close relationship between the conceptual model and certain systems analysis techniques, its full implementation would not be an easy task and has not as yet been done.

Data base is a welcome addition to the world of data processing and is here to stay. With data base, we can deal with the problems of data redundancy, integrity, independence, security, recovery, concurrency and auditability, all in manageable ways.

Better management decision making will result from the wider availability of data and the ability to generate more meaningful kinds of information through data integration. As data reflects the real world environment, the newly managable data resource will result in better control of the enterprise.

Mark L. Gillenson is a faculty member of the IBM Systems Research Institute (SRI) in New York. SRI is IBM's internal, graduate-level teaching facility.

Gillenson holds a B.S. degree in mathematics from Rensselaer Polytechnic Institute plus M.S. and Ph.D. degrees in computer and information science from Ohio State University. He also holds the Certificate in Data Processing and is an associate editor of the journal Pattern Recognition.



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Structuring the Software Development Contract

By Richard Raysman

As a result of the nature of the software industry, a disappointingly large percentage of software development efforts fail. The failures can be attributed to any number of reasons including lack of proper planning, unrealistic projects, lack of qualified personnel and large staff turnover.

Regardless of the reasons for failure, a failure can have expensive repercussions. Usually, the outside software vendor has either been paid substantial sums or is expecting to be paid a substantial sum. In addition, and equally as important, the user's data processing development effort can be set back several years, which can have a seriously detrimental effect on the user's business operations, including making the user less competitive in certain business areas. Since licensed application software is presumably already in use and has at least a nominal proven track record, the failures are more likely to occur in development of custom software.

The key to a successful software development effort is to structure a contract that acts as a blueprint and sets a firm foundation for a positive result. A properly drafted and realistic agreement benefits both user and vendor. The agreement should be structured to catch problems at an early stage, giving both parties an opportunity to remedy them before they become too large to adequately handle. Of course, both parties want a contract that will protect them legally; but the main thrust of the contract should be the design of a practical approach to developing and installing a system.

During the last several years, the computer industry has evolved to the point where hardware costs have become a lower and lower percentage of the overall costs of a company's DP operations. Personnel costs for software development have, on the other hand, skyrocketed. As a result of the increased costs of software development and the severe scarcity of qualified programming personnel, the software industry has developed into what is now a multibillion-dollar industry.

Most users of data processing equipment, both large and small, will, at some point in time, look to an outside software vendor for some type of programming assistance. Generally, the software services fall into the category of either "application" software or "custom" software. Application software is an already existing program or programming system that usually has a proven track record and that the vendor licenses to the user, with the vendor retaining ownership and the right to license to other users. Custom software is developed specifically for a user's particular and individual requirement, and ownership of this software usually passes to the user.

Middle Area

A middle area of custom software development includes custom modifications to already existing licensed application software. Many licensed packages are now written modularly, so the user or a consultant can more easily modify and tailor the package for the user's needs. A project to make substantial modifications to an already existing program should be approached as carefully as that of developing a system from scratch.

Prior to entry into serious negotiations with a vendor, every reasonable effort should be made by the user to consult in depth with its lawyer or with a consultant with particular expertise in the software application, for purposes of developing a negotiating strategy. As in any contract negotiation, the side that is better prepared and has a better concept of what is needed more frequently gains better results in the bargaining process. The user should define as well as possible the important items to require from the vendor.

In general, a user who has taken the time to be well prepared not only obtains a more favorable contract, but also has a greater chance for a successful system installation. In his preparations, he has probably identified the strengths and weaknesses of his installation and has a greater understanding of possible problems.

Watch Out for Turnkeys

A contract for a "turnkey" system should be approached with particular care. With a turnkey system, the software vendor performs all the development for the user and installs the system in an operational mode. Turnkey systems have a high incidence of failure, as is evidenced by the many lawsuits resulting from failed installations.

The reason for the many failures is related to the nature of the DP industry. Once a software system is installed, it must be maintained on a regular basis.

It is also helpful, in the daily operations of the system, if the user has a full understanding of the intricacies of the system. Accordingly, in any software development project, user personnel should take an active role.

The user's involvement should be ensured as a clause in the agreement. A user's active involvement is beneficial in several ways. Once the vendor completes the project and proceeds to other customers, the user can maintain the system himself. An equally important benefit is that user personnel will be able to monitor the vendor's progress and alert user management if time schedules begin to deteriorate or if the project appears to be drifting off course as a result of any variety of causes. For this reason, vendors may discourage user involvement, so it is important to include a user participation clause to ensure the user's ability to monitor the project.

Progress Reports

Another important clause that does not go to actual performance, but is a significant protection to the user, relates to periodic progress reports. Timetables for software development projects tend to deteriorate quickly. Consequently, the agreement should include a clause requiring the vendor to provide a progress report to the user twice a month. There should be a further requirement that a senior management executive of the vendor provide a summary of the project's progress to a senior executive of the user on a monthly basis.

Although this reporting system will not ensure the success of the project, it will allow the user to be alerted at an early stage to potential problems. It will also encourage the vendor to give immediate attention to problems as they occur instead of waiting until the situation deteriorates. It is not uncommon in a software development project for a user not to find out about a serious problem until six months, a year or more has passed.

Along the lines of an early warning system, a tentative timetable should be included as an exhibit to the agreement. Although the timetable can be

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nonbinding, any slippage can be a warning that the project is in trouble. It has the effect of giving the user client an earlier view of potential problems.

Although this article is oriented toward the needs of user clients, it should be noted that a properly structured software agreement is more beneficial to a vendor than a sloppy agreement is. A good agreement helps to assure the ultimate and timely successful completion of the project, which is, of course, to the vendor's benefit. A good agreement also clearly defines the obligations of the user. Thus, after a project is initiated, if the user makes unreasonable demands or refuses to perform its part of the bargain, the vendor can look to the contract for protection.

Defining Deliverables

One of the most important functions of a good agreement is defining the actual deliverables under the contract. What has the vendor promised that the system can do? This is where the user, especially an inexperienced user who is unfamiliar with contract procedures, must be particularly careful. The natural inclination may be to view the deliverables as they would be viewed in a contract for a tangible product such as an automobile or machinery.

The real danger is that the vendor will deliver a series of programs that the vendor claims meet the letter of the contract, but which are clearly inadequate for the user's business needs. The user should insist on three clearly defined commitments from the vendor to properly protect himself.

The first requirement should be a clear, detailed design specification describing the specific deliverable items. The detailed design can include file layouts, flowcharts, program documentation, output descriptions, user manuals, operation manuals and screen layouts, if a teleprocessing system is involved.

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The detailed design can be performed as a separate proposal prior to entry into the performance agreement, or it can be a part of the performance agreement, with the understanding that it will become an exhibit to the performance agreement once the design is completed. If the design phase is included in the performance agreement, the user should have an option to terminate at the completion of the design phase if the user determines that the design is inadequate.

The user should recognize that the system may meet the design specifications, but still be inadequate for the organization's needs. Accordingly, as a second vendor commitment, a general description of the user's business functions intended to be performed by the system should be included. This description will form the basis of a warranty of fitness for a particular purpose.

It should be noted that when a software system is sold, the user is often unfamiliar with and unsophisticated in the intricacies of the particular industry application. The salesman for the vendor, in pressing for the sale, makes all sorts of oral representations, some of which may not be completely accurate. Often an unsophisticated user, in making its decision, relies upon these vendor representations. The user should be sure to reduce the vendor promises to a specific warranty of fitness for a particular purpose.

Third Commitment

The third commitment the user should have from the vendor is that once the user begins to use the system for the processing of live daily transactions, the system will run without significant errors for a period of 90 days. It sometimes happens that a programming system will run for a period of weeks or even months without difficulty and appear to be error free. Then, because of a continuation of unusual circumstances, the system may have a serious failure. For this reason, the user should have a commitment of a reasonable period of time from the vendor (such as 90 days) during which the system will be continually operational.

Often, a vendor will present a detailed proposal to a user prior to entering into a formal contract. The proposal should be attached as an exhibit to the contract and be incorporated by reference into the contract. With this procedure, any representations contained in the proposal will be enforceable under the contract.

There is a procedure referred to in the DP industry, in both hardware and software agreements, as the acceptance test. The acceptance test is performed at the time the vendor states it is prepared to turn the system over to the user. An acceptance test is usually a series of transactions that are input into the system and are expected to produce certain results.

The acceptance test can be defined as a part of the detailed design specification. The user should be fully cognizant of the significance and importance of a comprehensive acceptance test. The vendor's interest will be to design an acceptance test that is as simple and limited as possible, while the user's concern is that the acceptance test include all the combinations it can visualize occurring in the system.

Payment Schedule

A key element in any contract, whether it be a software agreement or otherwise, is a payment schedule. The user should be careful to tie periodic payments to particular completed and proven tasks that have been performed by the vendor. This is a technique to maintain the vendor's interest during the development of the programming system.

One of the most serious user errors is to make large front-end payments to the vendors. By making front-end payments, the user gives up his most powerful leverage.

Regarding payments, a recommended user approach is to retain a portion of the overall payments until after the system has been fully operational for a period of time. In this way, the vendor will be completely committed to the implementation phase of the system.

Technical Support

Another key element in any software development agreement is the vendor commitment to technical support. The

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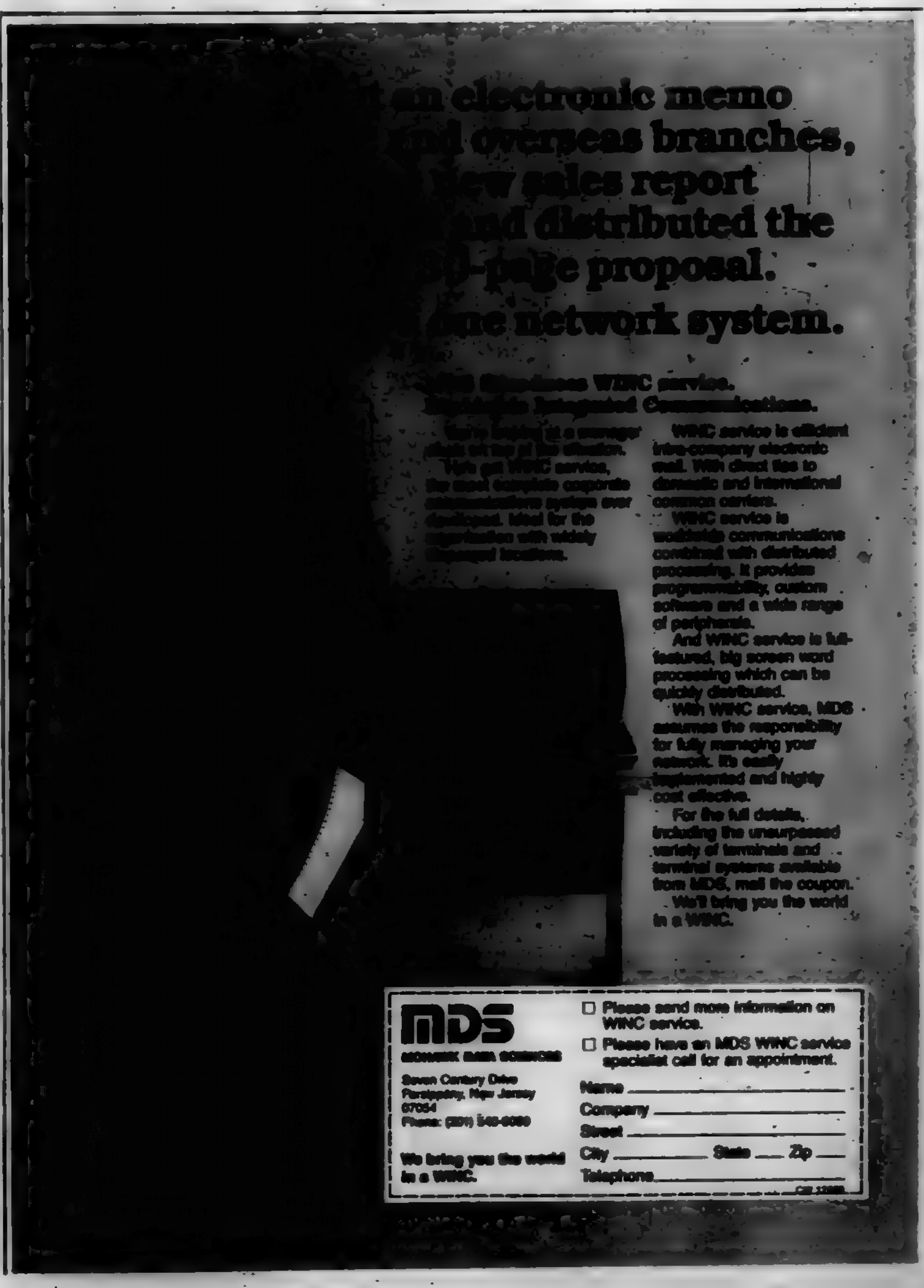

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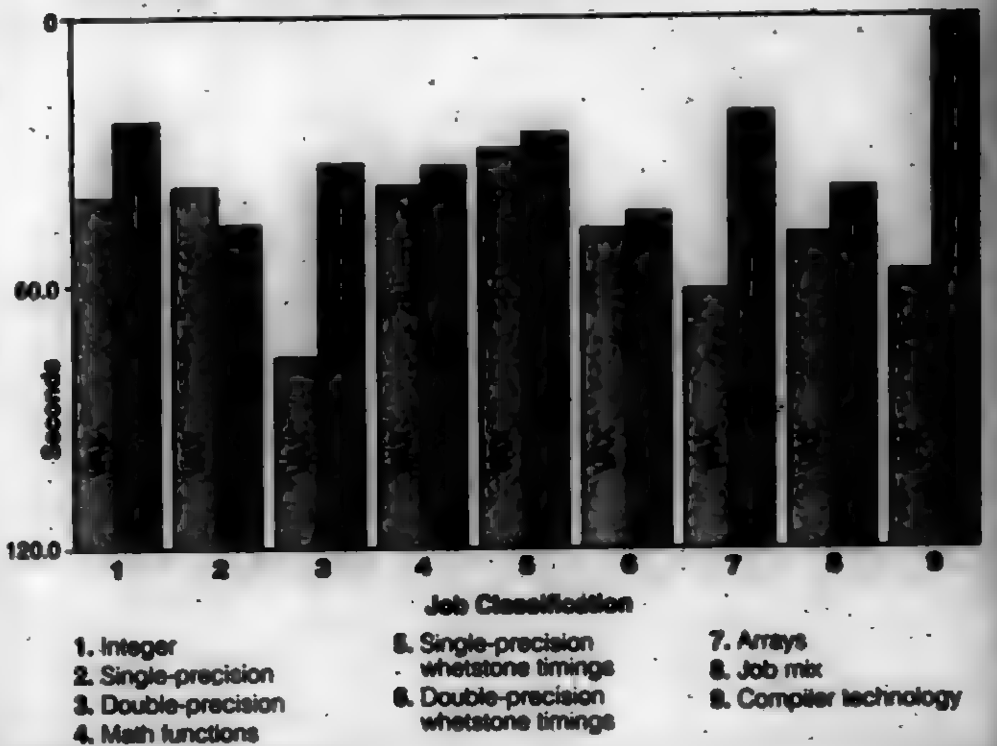
MEGA

1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.485	1.05
PMS0354	9.160	8.990	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0664	1.610	1.350	1.19
PMS0764	7.040	6.679	1.05
PMS0864	13.730	13.370	1.03
PMS0964	66.830	66.068	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.306	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.005	0.98
PMS1724	52.550	53.133	0.99
PMS1807	50.180	34.706	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.264	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.610	137.997	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2706	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.190	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	156.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.060	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.764	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4584	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5008	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5208	0.900	0.917	0.98
PMS5308	0.330	0.029	11.38
PMS5408	2.080	1.697	1.23
PMS5502	1.130	2.180	0.52
PMS5602	207.140	198.685	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

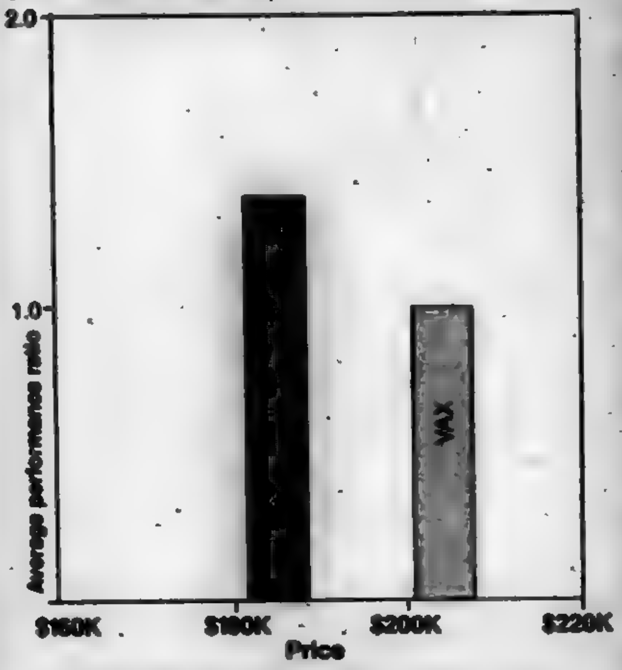
*Performance Ratio = $\frac{\text{VAX 11/780 CPU time}}{\text{Perkin-Elmer 3240 CPU time}}$

2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



*VAX is a trademark of Digital Equipment Corporation

3. Proven Price/Performance



The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

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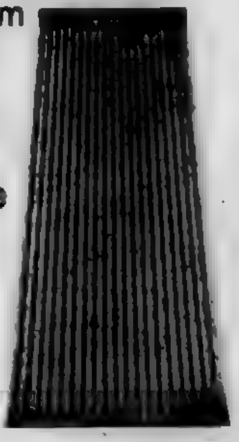

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IN DEPTH

(Continued from In Depth/33)

vendor is generally the expert in the field, whereas the user is a novice. There should be a commitment from the vendor to have adequate technical personnel available before, during and after implementation to assist and guide user personnel.

As part of the support, the vendor should also be committed to providing adequate training for user personnel. Software systems are often complex and require detailed training. The training can take the form of both informal in-house training at the user site or more formal structured education at the vendor location. The training should include courses not only for the user's technical personnel, but also for the employees who will actually be operating the system. For example, when a system is being converted from manual to automated, operators who are improperly trained and inadequately prepared can kill the project at the very inception, even though the system is perfectly adequate.

Within the software agreement, the vendor should make the representation that a particular hardware configuration is acceptable for running the software system. This representation is necessary so the user can order the applicable hardware for timely delivery, with lead times of six months or more sometimes required for delivery.

There is also the issue of the overall user budget. A need for more hardware may affect the user's decision as to which system to ultimately purchase. Since the vendor is the expert in the field, its opinion as to hardware requirements is expected to be relatively accurate.

Warranty Period

For at least one year after implementation, there should be a warranty period during which the vendor corrects program errors.

Depending upon the structure of the agreement, the user may want the option to terminate the agreement without cause. Such an option would enable the user to cut losses if it appeared the project was getting out of hand and was doomed to failure. Of course, if the user terminated without cause, it would be anticipated that the vendor would be compensated for whatever efforts were expended.

Ownership of the software should be clearly defined in the contract. If ownership definition is omitted, a serious misunderstanding between user and vendor can come up later. The user should also request the right to work in process programs, especially when smaller vendors are involved. Particularly when longer projects are involved, access to the partially finished system can be insurance to the user that the project can be completed even if the vendor is unable or unwilling to finish.

As in any business endeavor, proper planning can spell the difference between success and failure. A detailed and structured software contract means that both user and vendor have given sufficient thought to their commitments.

Although a properly drafted contract does not ensure success, it significantly increases the chances for a successful system installation.

Richard Raysman is an attorney with the New York law firm of Brown & Raysman and chairman of the New York State Bar Association Computer Law Subcommittee.

Raysman specializes in contract negotiation, litigation, protection of proprietary information and other areas of the law that relate to computers. He has written and lectured extensively on computer law for both attorneys and DP professionals.

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Study Sees Bad News in AT&T Changes

MINNEAPOLIS — Unsuspecting AT&T customers may lose millions of dollars and some specialized carriers may go out of business because of major marketing changes AT&T plans to make, according to an Info-Dyne, Inc. study reportedly directed by two former Bell executives.

In recent months, some Bell operating companies have applied to increase private-line service rates by 600%, an Info-Dyne spokesman noted. And AT&T plans to terminate Telpak, a discount service that reduces rates to users that buy several private lines. Further, Bell is revising its Wats rate structure.

The Info-Dyne study, led by former AT&T marketing director W. Porter Stone and another, unidentified, former Bell manager, has found that private-line services now account for more than $3 billion in annual revenues for AT&T. That is 10% of nonresidential revenues for Bell's Public Switched Network (PSN).

But private-line services also account for more than 30% of PSN expenses. "Bell is going to correct this," Stone predicted.

The world's largest telecommunications carrier is now installing technology that will allow service offerings similar to private lines but at far less cost, he said.

"Virtual private lines," for example, may be offered to customers through the PSN at rates well below those for conventional private lines.

AT&T competitors, especially specialized carriers such as MCI Telecommunications Corp. and Southern Pacific Communications Co., "could suffer a significant loss of customers," the Info-Dyne study concluded. "Their suppliers and the communication satellite companies

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With Turnkey Minis, 370 Rival

TRW-Fujitsu to Dive Into U.S. Market

By Brad Schultz
CW Staff

LOS ANGELES — Japan's largest computer maker will dive into the U.S. DP market next year, introducing minicomputer-based turnkey systems in the first quarter and later challenging IBM's smaller 370 mainframes.

Fujitsu Ltd. mostly wants end users. It will offer them hardware they do not have to understand, but which is claimed to be more reliable than hardware U.S. vendors can afford to put in competitive systems.

TRW-Fujitsu Co. (TFC) here will sell, distribute and service a small business systems family based on Fujitsu's V series minicomputers, including the 16-bit V-830, which did well against U.S. competition in Australia this year.

The company 51% owned by Fujitsu — whose assets exceed $2 billion — and 49% owned by TRW, Inc. will pit the largest member of the family against IBM's System/38, Hewlett-Packard Co.'s current 3000 and expected Vision models and other comparable commercial systems. This largest system will be driven by the 32-bit V-850, up until now seen only in Japan.

The system will not rival superminis such as Digital Equipment Corp.'s Vax-11/780 and Perkin-Elmer Corp.'s 3200s, which address a technically more sophisticated user market, TFC vice-president and general manager J. Garrett Fitzgibbons said in a recent interview. Two other models in the V series, smaller than the V-850, are also likely to serve as the basis of turnkey systems in TFC's lineup, he said.

TFC will also sell, distribute and service Fujitsu M series mainframes that run up to two million instructions per second (Mips). These are not the most powerful M processors — the M182AD and M200 execute 2.5 Mips and 8 Mips, respectively — and they will not threaten the plug-compatible systems offerings of Amdahl Corp., which is 28% owned by Fujitsu.

In contrast, Amdahl systems deliver at least 4 Mips, Fitzgibbons said. IBM mainframes in the performance class TFC plans to enter include the 370/148, 370/158, 3031, 4341-2 and 3033S, according to performance ratings issued by IBM.

Fitzgibbons did not name the M models TFC plans to offer in the U.S., but Fujitsu's Australasian outlet — Facom Australia Ltd. — has sold three models in the sub-2 Mips class: the M140F, M150F and M160F. IBM lost 24

(Continued on Page 60)

Retail Systems in Offing

LOS ANGELES — Besides small business systems and mainframes, TRW-Fujitsu Co. (TFC) plans to announce products for areas already served by its minority shareholder, TRW, Inc.

In the retail systems arena, the company mostly owned by Fujitsu Ltd. will show new products at the National Retail Merchants Association conference this January in New York. At some point in the first quarter of 1981, a retail point-of-sale system incorporating bubble memory, plasma display and an integrated magnetic stripe card reader will debut.

A typical configuration of this system will cost about $5,315 per terminal, a TFC spokeswoman said. According to general manager J. Garrett Fitzgibbons, financial systems products such as automated teller machines will follow in mid-1981.

Trial of Alleged Micro Spy Opens

By Chris Simpson
Special to CW

SANTA CLARA, Calif. — Peter Gopal, a California-based electronics consultant, went on trial last month in what may emerge as an important legal milestone for the rapidly expanding microcomputer industry. Gopal, 41, was indicted in November 1978 for allegedly attempting to sell sophisticated Intel Corp. computer chip design data and equipment to officials from Intel's arch-rival, National Semiconductor, Inc.

Although the trial itself is focusing on the alleged violation of California's trade secrets laws, there is another aspect to the case. Evidence seized in raids on Gopal's home and office appear to link him with an East German spy ring that has specialized in obtaining secrets from the microcomputer industry in the West.

According to Santa Clara County Assistant District Attorney Douglas Southard, who is prosecuting the case, Gopal obtained trade secrets and equipment for duplicating microcomputer chips from leading manufacturers such as Intel, National Semiconductor and Zilog, Inc. by bribing disgruntled employees, then sold them to the highest bidder.

Gopal's attorney, John W. Clark, argued that the state must "prove that it [evidence seized by the police] was a trade secret and that it was stolen" in order to get a conviction. "We don't think they can do either."

Many industry observers agree that what constitutes a "trade secret" in microelectronics is a gray area at best, with few precedents to guide a court's judgment.

(Continued on Page 54)

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Intel Commercial Systems Layoffs Tied to Division Reorganization

By Marcia Blumenthal
CW Staff

PHOENIX — Recent layoffs of marketing and support personnel at Intel Corp.'s Commercial Systems Division in Austin, Texas, are related to the reorganization of the division rather than poor performance of any product line, according to Vermond Crane, vice-president and general manager of the division.

Crane said the total number of employees terminated was less than 30. However, informed sources close to the company estimated the layoffs at 36, noting that some 20 management-level personnel had left the company voluntarily over the past several months.

The problem began in February 1979 when Intel acquired MRI Systems Corp., creator of the data base management product System 2000, Crane explained. At that time, MRI was developing a data base computer. After the acquisition, MRI, which became part of the Commercial Systems Division, beefed up its staff for the data base computer project.

However, in July of that year, Intel began examining that development project and the following November, the company decided to ditch it, noting the desired product could be created using a different technology.

At that time, technical personnel involved with the data base computer project were transferred to other projects. However, some marketing and support people could not be absorbed into other parts of the Commercial Systems Division and layoffs finally became inevitable, Crane maintained.

Shortfall in Sales

However, sources said the layoffs also had something to do with a shortfall in predicted sales of the System 2000. Crane said sales of the product were higher this year than last and termed it "still a very competitive software product" even though it is 10 years old.

Further explaining the personnel cuts, Crane said that after the acquisition of MRI, two separate sales forces and marketing organizations existed — one for MRI and one for Intel's Commercial Systems Division. Although the Austin group handled sales and marketing of the System 2000 only, it was twice the size of the organization here which carries the 3805 semiconductor disk product and add-on memory as well as the System 2000.

Since joining the company earlier this year, Crane has been attempting to reorganize the division, he said, merging the two organizations and apportioning personnel relative to their functions within the division. As a result of the changes, the Austin and Phoenix operations are now about equal in size, he reported.

Memorex Realigns In Streamlining Effort

SANTA CLARA, Calif. — Continuing efforts to streamline its operations resulted in Memorex Corp.'s recent decision to realign its Business Systems Division (BSD), integrating it within its Storage Systems Group.

BSD was responsible for marketing Memorex's line of IBM-compatible peripherals for the System/3, 34 and 38. Sales for storage products will be handled through the Storage Systems Group. Sales people transferred from BSD will become part of a dedicated small business equipment sales force, Memorex said.

Terminal and printer products formerly marketed by BSD will be marketed by the Communications Group. No BSD product lines were dropped, Memorex said.

Memorex said the former BSD manufacturing plant will continue production and no layoffs are expected at that plant.

Alleged Micro Spy Put on Trial

(Continued from Page 53)

Industry lobby groups such as the American Electronics Association are presently pressing Congress for legislation which will give copyright coverage to microcomputer designs. This move, they say, will slow the diversion of expensive research to "reverse-engineering" firms, such as Gopal's, which copy designs and then market similar or even identical designs for building microcomputer chips under new names.

According to Intel Chairman Dr. Andrew S. Grove, such reverse engineering has already given substantial advantages to Japanese firms and the Soviet Union, which have made concerted efforts to obtain U.S. microcomputer technology.

A conviction in the Gopal case, most observers agree, would tend to restrict the activities of microelectronics consulting and reverse-engineering companies, at least in California, where the industry is most concentrated.

Additional Charges

A recent secret U.S. Department of Commerce study leaked to the press last February, however, made far graver charges against Gopal. The study cited the connection between Gopal and an Austrian physicist and businessman named Rudolf Sacher as the probable source of stolen microcomputer designs that have found their way to East Germany and the Soviet Union.

According to documents on file with the California Secretary of State, Gopal's company, Semiconductor Systems International, was cofounded and partially financed by Sacher, whose Vienna-based company also specializes in reverse-engineering computer chips and other microelectronics. It is Sacher's close relations with the East German government that the Commerce Department finds so disturbing.

Spy Ring?

Werner Stiller, a former lieutenant in the East German state security service who defected to the West in 1979, alleged that Sacher is at the center of a successful East German ring that has specialized in obtaining information on the Western microelectronics industry.

Stiller's defection touched off a chain of arrests in West Germany which has resulted in the convictions of 12 West German government officials and North Atlantic Treaty Organization personnel. Austria, however, is a neutral country, and its attitude towards agents of the Soviet Bloc is more tolerant than that of West Germany. Sacher and several of his business associates, who were also named as agents, remain free.

A recent report by the West German security agency, BND, charged that the East Germans are presently mounting an "intensified campaign" aimed at the industry. As many as 500 East German agents are involved, the report said, with an annual cost of $28 million for this type of espionage alone.

Sacher has denied the charges against him. Stiller made up the story, he is contending, to gain credibility with West German intelligence and the Central Intelligence Agency.

Although Sacher is presently refusing to talk to the press, he was quite frank about his relations with the East Germans in an interview published last spring in the Austrian business magazine *Profil*. "We have developed a method whereby we can place electronic circuits in one-tenth the space required previously," he stated. "East Germany gave us the order and financed it."

Sacher denied obtaining secret information from Gopal, however, and Gopal denied buying or selling microcomputer secrets here in the U.S. Gopal, in an interview not authorized by his attorney, argued that he is being framed by National Semiconductor, Inc. to make him the "scapegoat" for the theft of computer tapes which National Semi itself, not Gopal, stole from Intel.

In a conversation which National Semi engineer Larry Worth secretly recorded, however, Gopal allegedly offered to sell him the Intel tapes and commented that he had "just returned from Europe," where he had sold similar data. He also offered to buy "anything you can get" from National Semi, according to prosecutor Southard.

AT&T Changes Seen Bad News

(Continued from Page 53)

could also witness a decline in sales."

According to Stone, "the specialized carrier business is based on a particular rate structure. When that structure changes, the reason for being is gone."

Eventually, these changes could leave some users of discount services with huge communications bills, Stone continued, or with expensive communications equipment that is obsolete. "It is essential," he maintained, "that business managers know where Bell is heading to avoid making the wrong business decisions."

Info-Dyne does not plan to make its study public, the company's spokesman said. Several companies underwrote the project, which culminated in a three-part report.

Phase I of the report discusses recent technological improvements Bell has made to its PSN and how the changes will encourage users to migrate to the network from discount services.

Phase II estimates new tariff rates and presents a time-table for when the price adjustments will take effect, the Info-Dyne spokesman noted.

Finally, Phase III of the report is an overview of AT&T's presumed marketing strategy, including speculation on what equipment and technology will be in place and how it all works.

Phase III also discusses how these developments may affect the plans and financial dispositions of U.S. telecommunications users.

Although the study is not for sale, the Info-Dyne spokesman asked that inquiries regarding it be directed to Info-Dyne at 1700 W. 78th St., Minneapolis, Minn. 55423.

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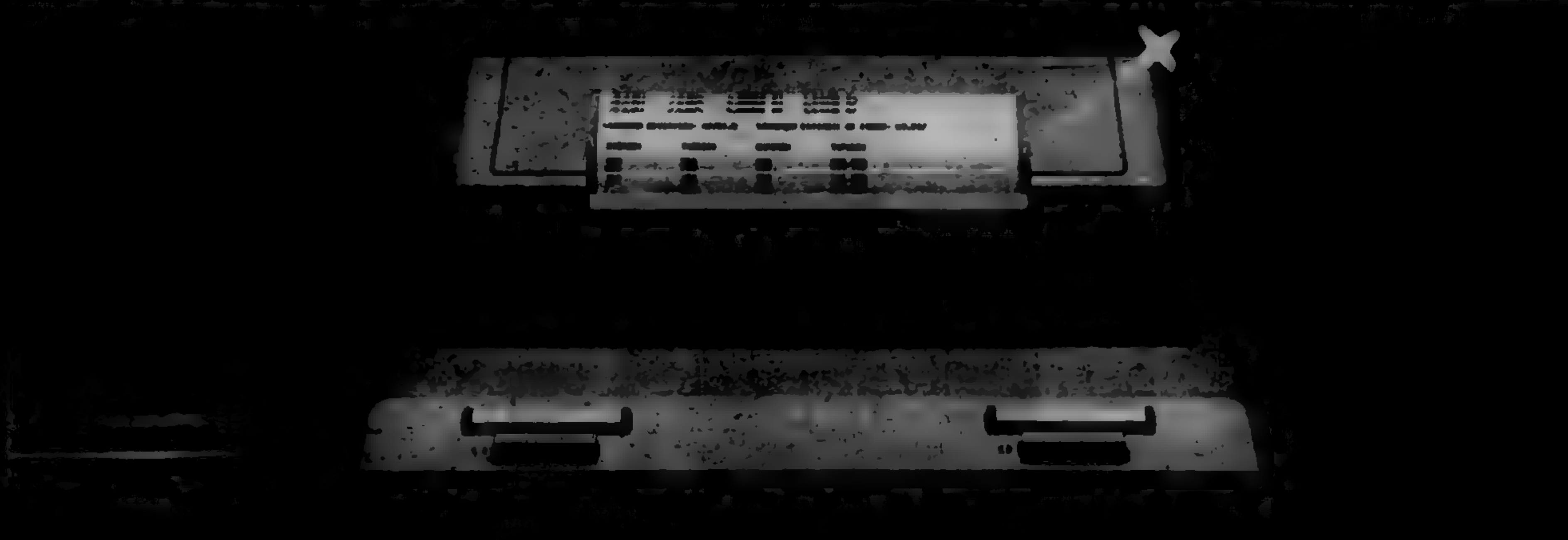

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The 2675 is also remarkably easy to operate. It uses friendly, English-like commands, and has a familiar, typewriter-style keyboard with eight soft keys you can define yourself. Once you've tailored the terminal to your application, those configurations come up automatically at every power-on, including automatic dialing and program calling. So even an inexperienced user can just pick up the terminal and go.

For fast, high-quality printing, the 2675's quiet thermal printer operates at up to 120 characters per second. And multiple print modes allow the printing of full-width computer reports on 8½" paper.

It makes communications a snap.

With both an RS-232-C and modem port, you can configure the terminal for two transmission speeds, each ranging from 300 to 9600 baud. And, to increase transmission accuracy, the built-in modem comes with a convenient modular jack for direct connection to your phone line.

What's more, the 2675's auto-answer and auto-dial features leave you free while the terminal's talking to the computer, and let you save by taking advantage of off-peak phone rates.

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Right now, Ligon's DPS 440s serve about 130 terminals at 29 separate locations. There are also two 1200 LPM printers, and two 6661 front-end network processors located at corporate headquarters.

But Ligon is growing and new Honeywell equipment is on the way. Ligon will soon install Level 6 computers for enhanced cost accounting, fleet maintenance, and data entry.

Altogether, the system will enable Ligon to take full advantage of a distributed processing environment.

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Microdata Restructures To Increase DDP Product, Small Business System Sales

By Jeffry Beeler
CW West Coast Bureau

IRVINE, Calif. — Microdata Corp. has quietly begun a corporate reorganization aimed at increasing the company's ability to sell and market its two main product lines.

The restructuring has resulted in a split of its sales and marketing organization into two independent entities, one geared primarily to the company's domestic activities and the other to its international operations.

In product emphasis, the two sales and marketing organizations differ sharply from one another. The domestic division is concerned primarily with the company's small business systems line, while the international division focuses mainly on the firm's distributed processing products, according to Microdata Chairman Don Fuller.

The two divisions also differ substantially from one another in their sales and marketing emphasis, Fuller added.

In most other respects, however, Microdata's domestic and international divisions will continue to share much in common. Both organizations, for example, will be served by the same manufacturing, engineering and service operations, Fuller said.

Fundamental Differences

Microdata's restructuring reflects the company's belief that small business systems and distributed processing constitute two fundamentally different product sectors and therefore need to be marketed and sold in fundamentally different ways.

Small business systems are sold primarily to first-time users and depend heavily on application software, whereas distributed processing products are aimed mainly at large, sophisticated users and are highly communications-intensive.

By dividing its domestic and international operations into two separate organizations, Microdata seeks to increase the company's ability to tailor its sales and marketing effort to the often conflicting needs of its two main product lines, Fuller explained.

Without a certain degree of specialization in the firm's sales and marketing operation, "you tend to get a confusion between the two products and your customer base," the Microdata chairman said. "Your customer base isn't quite sure what it is you're trying to sell them."

As its name suggests, the domestic division will limit its sales and marketing activities — at least for the time being — primarily to the U.S. The international division, by contrast, will be free to sell and market its products anywhere in the world, including the domestic sector.

The decision to let the international division straddle the U.S. and foreign markets reflects Microdata's desire to expand its share of the domestic distributed processing market, Fuller said. In the past, the company's activities in the distributed processing field have been confined primarily to the international sector.

Serving as president of the domestic division will be Al Cosentino, formerly Microdata's senior vice-president of marketing, sales and service. Cosentino's counterpart in the international division will be Gary Liebl.

Both Cosentino and Liebl will head all manufacturing, engineering, sales and marketing operations for their respective divisions.

Cosentino's previous position is now being held by Carl Jeremias, who came to Microdata about a month ago from Basic Four Corp., where he had served as vice-president of marketing.

Series/1 Cost Cut for OEMs

ATLANTA — IBM's General Systems Division is offering a 10% discount on its Series/1 small business computers for OEMs and other firms that remarket the system to end users.

The 10% cut is in addition to IBM's usual OEM discount, but the total discount is limited to a maximum of 20%.

The discount is being offered to OEMs, systems integrators and third-party programmers that enhance the Series/1 machine or programs in terms of function or capability and remarket them to unaffiliated third parties, an IBM spokesman said.

The 10% also applies to the approximately 200 software products offered for the Series/1, including the RPS and EDX operating systems.

IBM will provide marketing support to the value-added remarketers, but will not help in remarketing efforts or provide marketing support to their end users. End users, however, may obtain maintenance service from IBM, the spokesman continued.

In addition, IBM's usual 90-day warranty on the Series/1 is reduced to 30 days for those machines purchased with the OEM discount.

Former Calcomp Head Founds Another Firm

SALT LAKE CITY, Utah — The former chairman, president and chief executive officer of California Computer Products, Inc., George M. Canova, has formed a company to manufacture and market small business computers and intelligent terminals.

Novell Data Systems, Inc., based here, will offer its products worldwide through a network of computer dealers and distributors. Future plans call for an aggressive development program.

Major financing for the company is being provided by Safeguard Industries, Inc., a Philadelphia-based corporation that provides technical products and services to commercial, industrial and government customers.

Following Calcomp's acquisition by Sanders Associates, Inc., Canova became a director of Sanders while retaining his previous positions with Calcomp. He also founded Century Data Systems, which was acquired by Calcomp in 1972.

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Olivetti Forms Subsidiary

ELMSFORD, N.Y. – Olivetti Peripheral Equipment Sp A., manufacturer of printers and magnetic peripherals, has created a U.S. subsidiary to be known as Olivetti OPE.

Slated to be incorporated in the U.S. by year's end, Olivetti OPE will operate as an independent company, according to a spokesman.

The subsidiary will assume responsibility for making and implementing decisions with regard to the U.S. OEM market. Although independent operationally, the group will have access to the resources of the Olivetti Group in research and development and financing.

Although currently there are no plans for manufacturing facilities in the U.S., there will be limited facilities to adapt and modify equipment at headquarters here.

HP 85 Marketing Pact Offered To Spur Applications Programs

By Jeffry Beeler

CW West Coast Bureau

PALO ALTO, Calif. – Hewlett-Packard Co. is trying to encourage independent software suppliers to enter a cooperative marketing agreement aimed at expanding the range of available application programs for the company's Model 85 personal computer.

The agreement, known as the Software Supplier Program, is targeted primarily at software houses and system developers and was created to spur outside development of application packages for the HP 85, according to Glenn Theodore, computer product marketing manager for HP's Corvallis Division.

For independent software suppliers, the program provides an opportunity for increased sales by opening a new channel of product distribution and promotion.

For HP itself, the plan promises to boost Model 85 shipments by expanding the computer's potential customer base, Theodore said.

Wider Repertoire

Announcement of the Software Supplier Program comes at a time when HP is reportedly seeking to broaden the 85's repertoire of vertical applications.

Introduced early this year, the HP 85 was originally targeted primarily at scientific, engineering and technical users.

But since then, HP has enhanced the product with additional peripherals and software aimed at extending its capabilities to include a wide range of business applications, Theodore said.

HP realized, however, that it lacked the in-house programming expertise to supply application packages for every potential class of Model 85 user.

The company concluded that much of the personal computer's business-related software would have to be developed and supplied on the outside.

Several Inducements

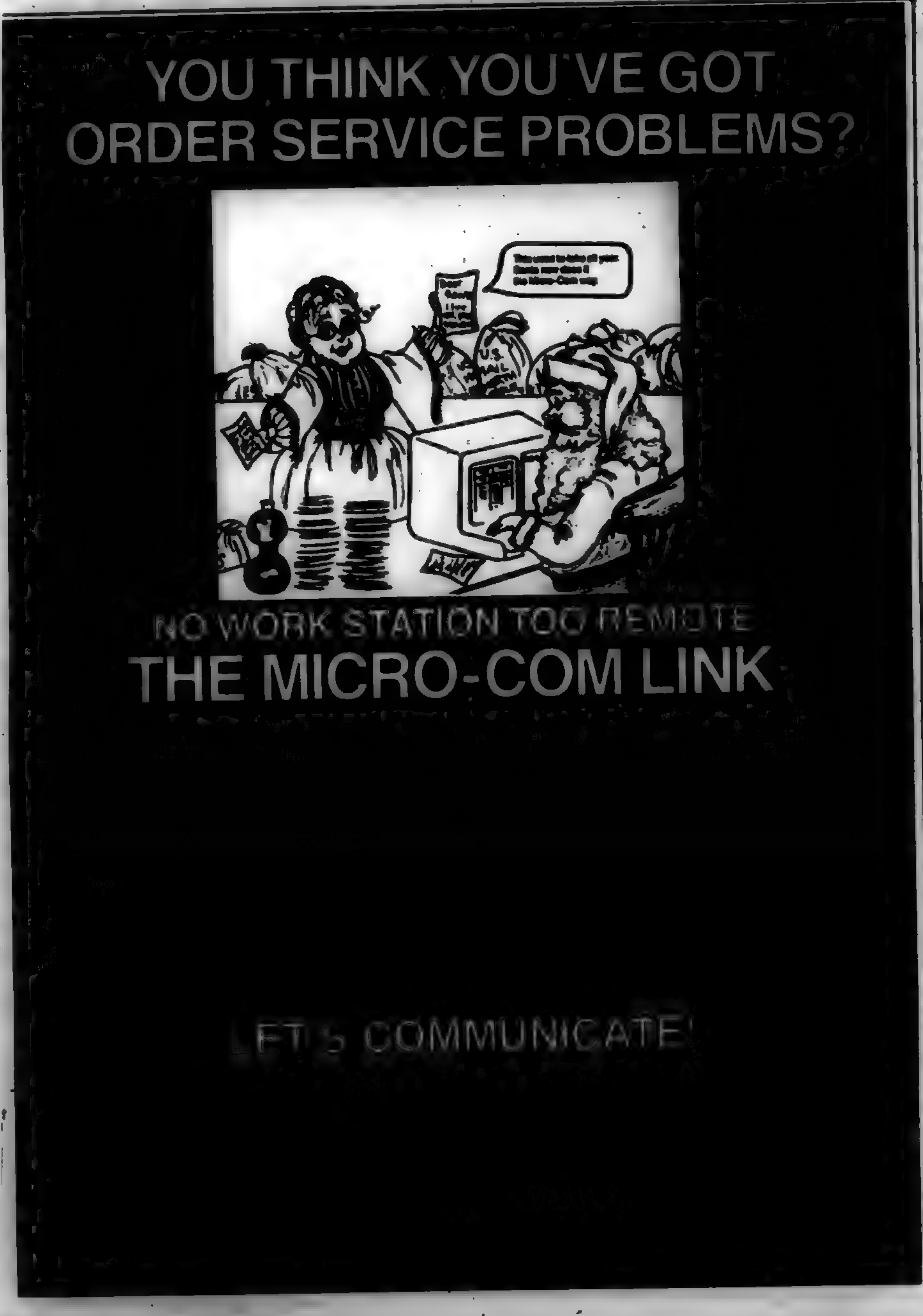
That line of reasoning led in turn to the formation of the Software Supplier Program, which reportedly gives independent software developers several inducements to write application packages for the HP 85's business-oriented users.

First, the plan will result in the creation and distribution of a directory listing all of the Model 85's available application programs and the names of their suppliers. The catalog, which will list both HP and non-HP products, will be made available to all of the company's dealers and sales offices by Dec. 1.

The directory, which is expected to be updated as often as every month, will also be distributed to all end users who subscribe to HP's User Library, Theodore said.

To further stimulate the creation of application programs for the HP 85, the marketing agreement will offer development systems to outside software suppliers at a 30% discount.

Under the plan, HP will also authorize its dealers to use cooperative advertising funds to help participating software suppliers to promote their products. In addition, suppliers will receive a complete listing of HP's dealers, Theodore said.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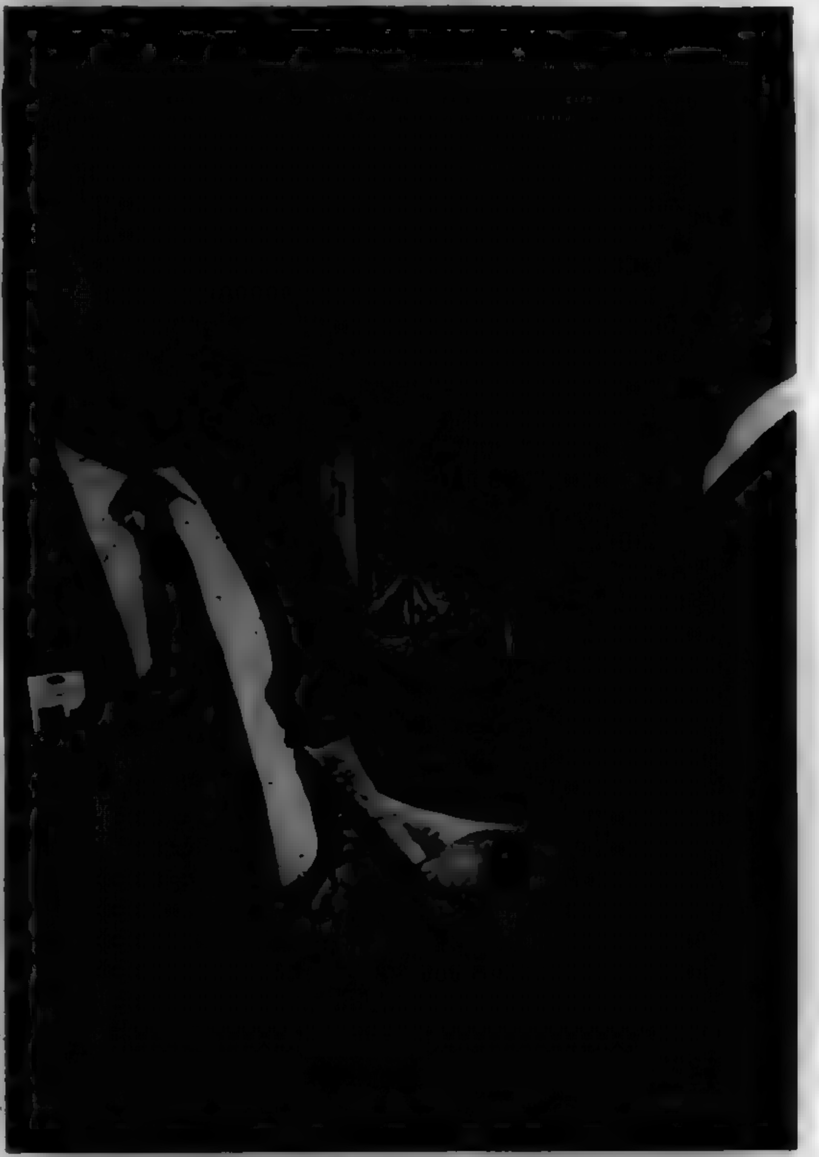

Frank J. Sanzone, Jr., is Assistant Director of Finance, Carroll County General Hospital, Westminster, Maryland. Robert Monogue is an NCR Representative.

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EDS Unearths Gold Mine Of Labor in Small Town

DALLAS — Officials of a large supplier of computer services believe there is a labor gold mine in Smalltown, U.S.A.

Marion, Ill. — population 17,000 — is a six-hour drive from Chicago and a two-plus-hour trip from St. Louis. You can hardly get there by air.

However, one year ago Dallas-based Electronic Data Systems Corp. (EDS) opened a small claims processing facility in Marion to help reduce a large backlog of Medicare claims that had accumulated in EDS' main Illinois facility outside Chicago. Almost immediately, the decision to locate in this small Illinois coal-mining community began to pay off, the firm said.

The initial EDS-Marion operation employed 42 newly hired and newly trained data entry clerks, most of whom were the wives and daughters of unemployed coal miners. They began to break the back of a 450,000-claims inventory that had plagued EDS for more than four months.

As EDS' new Marion employees' proficiency grew, so did their numbers. EDS now employs 102 there and intends to expand the staff to about 160 by next April. The firm hopes to re-create the Marion experience in other small towns across the country because of its success.

Of the some 20,000 Medicare claims EDS processes every day in Illinois, 12,000 are processed in Marion. Additionally, EDS-Marion has begun processing correspondence from Medicare beneficiaries and providers that was once processed at EDS' facility near Chicago's O'Hare Airport.

Work Ethic

What makes a DP operation in such a remote area worthwhile is simply the work ethic and the low turnover rate, according to Kenn Hill, EDS vice-president, who oversees the company's Medicare and Medicaid operations nationwide.

"Our biggest mistake in Illinois was our initial site selection," Hill admitted. "We thought we could operate from one centralized facility and, because of the proximity of O'Hare, we chose the Chicago suburb of Des Plaines."

Des Plaines had a low unemployment rate, however, so EDS had a hard time hiring qualified people and was forced to recruit from outlying areas. Then, when jobs opened up closer to their homes, the new employees opted for them over a long commute.

EDS lost its new employees faster than it could train replacements, Hill recalled. The result: an unacceptable inventory for anyone, especially a new contractor that was trying to prove a noninsurance company can administer Medicare for the government as well as the traditional insurance carrier for less money.

EDS believes the results speak for themselves. It now has less than a 100,000-claims inventory in Illinois — about one week's work compared to 1.6 to two weeks' work on hand for most other Medicare carriers. "We firmly believe Marion saved the day," Hill said.

Rick Honeycutt, EDS' Marion account manager, said his people "zero out" their portion of the inventory every day. "To begin every day with nothing left from yesterday is every manager's dream," according to Honeycutt, who also hopes he never wakes up.

Marion's 17% unemployment rate obviously provides the necessary work incentive, Honeycutt noted, but he is most impressed by the work ethic he has found abundant in Marion. "These people are honest, hardworking folks who take their jobs seriously," he said. His turnover rate since December 1979 has only been 3%.

Expansions

Digital Engineering, Inc. has relocated to facilities at 630 Bercut Drive, Sacramento, Calif. 95814.

General DataComm Industries, Inc. announced plans to expand its manufacturing operations with an additional plant in Waterbury, Conn.

The 359 employees of Qantel Corp. have completed their move into the company's $6 million headquarters at 4142 Point Eden Way, Hayward, Calif. 94545.

Univac has broken ground for a semiconductor facility in Eagan, Minn., south of Minneapolis.

Emulex Corp. has nearly doubled its headquarter space with the addition of another 10,000 sq ft of production space. It is located at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Integrated Circuit Engineering Corp. has announced the move of its headquarters to a site at 15022 N. 75th St., Scottsdale, Ariz. 85260.

Verbatim Corp. has made plans to open a facility in South Yarra, Australia, to manufacture flexible disks.

SCM Corp. is building a multimillion dollar computer center in Durham County, N.C., scheduled for completion late next year.

First Computer Corp. has begun construction of a $1.5 million headquarters facility in Westmont, Ill. The 38,000 sq ft site will house First Computer's offices, warehousing, system integration and testing.

Buro-Und Datentechnik, of Rottwell, West Germany, manufacturer and distributor of paper-handling devices for computer printers, has opened a manufacturing plant in Fountain Valley, Calif.

TRW-Fujitsu to Dive Into U.S. Market

(Continued from Page 53)

Australian accounts, representing 31 CPUs, to Facom in competition against those models and other M processors, a Facom spokesman told CW recently.

The M140F executes .35 Mips and features five data channels and a main memory capacity of 1M to 2M bytes, he said. The M150F runs .5 Mips and features six data channels and a main memory capacity of 2M to 4M bytes. The M160F runs .8 Mips and has eight data channels and a 2M- to 6M-byte capacity.

The M series systems to come from TFC will not compete as IBM plug-compatible machines in the usual sense, Fitzgibbons emphasized, although Facom has sold them that way. TFC will provide its own software and market complete systems, he indicated.

Australasian Experience

Facom is significant to American users because more than 110 M series customers in Australia, New Zealand and Papua, New Guinea, can soon talk to them in English about their experiences with the Japanese systems as alternatives to major U.S. brands. Also, Facom plans to make its 30th V-830 installation this March.

The Australasian region has the closest DP market to Japan that is sizable, English-speaking and served by a widerange of manufacturers that also cater to the U.S., Facom managing director Michael P. Rydon pointed out in a recent interview. Fujitsu saw Australasia as the place to start competing against vendors from English-speaking countries in English-speaking countries, using local people as managers, he said.

Facom's success may have led Fujitsu to its joint venture with TRW as well as the launching of other U.S. ventures this year, Rydon continued. Marketing executives with several firms that sell major brands of U.S. DP products to Australia agreed that Fujitsu systems will sell successfully in America.

Through domestic subsidiaries in different arenas of information technology, the giant Japanese corporation "will cut [domestic vendors] off at the knees," according to a marketing manager for one of Facom's principal competitors.

Hardware reliability is likely to be a major selling point of TFC systems in the U.S. For the V series minis, mean-time-before-failure estimates for major circuits are reckoned on the order of 50 months, Fujitsu representatives have claimed.

Common Problem

But TFC and Facom have a problem in common: finding applications software for their systems. Fujitsu can provide systems-level software, Rydon observed. "An understanding of English is not necessary for someone to write a compiler English-speaking users can apply," he pointed out.

Applications software such as general-ledger packages and query-response routines, however, must approximate English to be valuable in the U.S. For similar reasons, Fujitsu needs non-Japanese companies to write systems documentation in English, Rydon added.

TFC will write some of the applications packages for its small business systems and is evaluating proposals from other companies to write other packages. TFC is considering an offer from Martin-Marietta Corp. as well as from V series Pty. Ltd., a new Australian company formed to market Facom's V series minicomputers.

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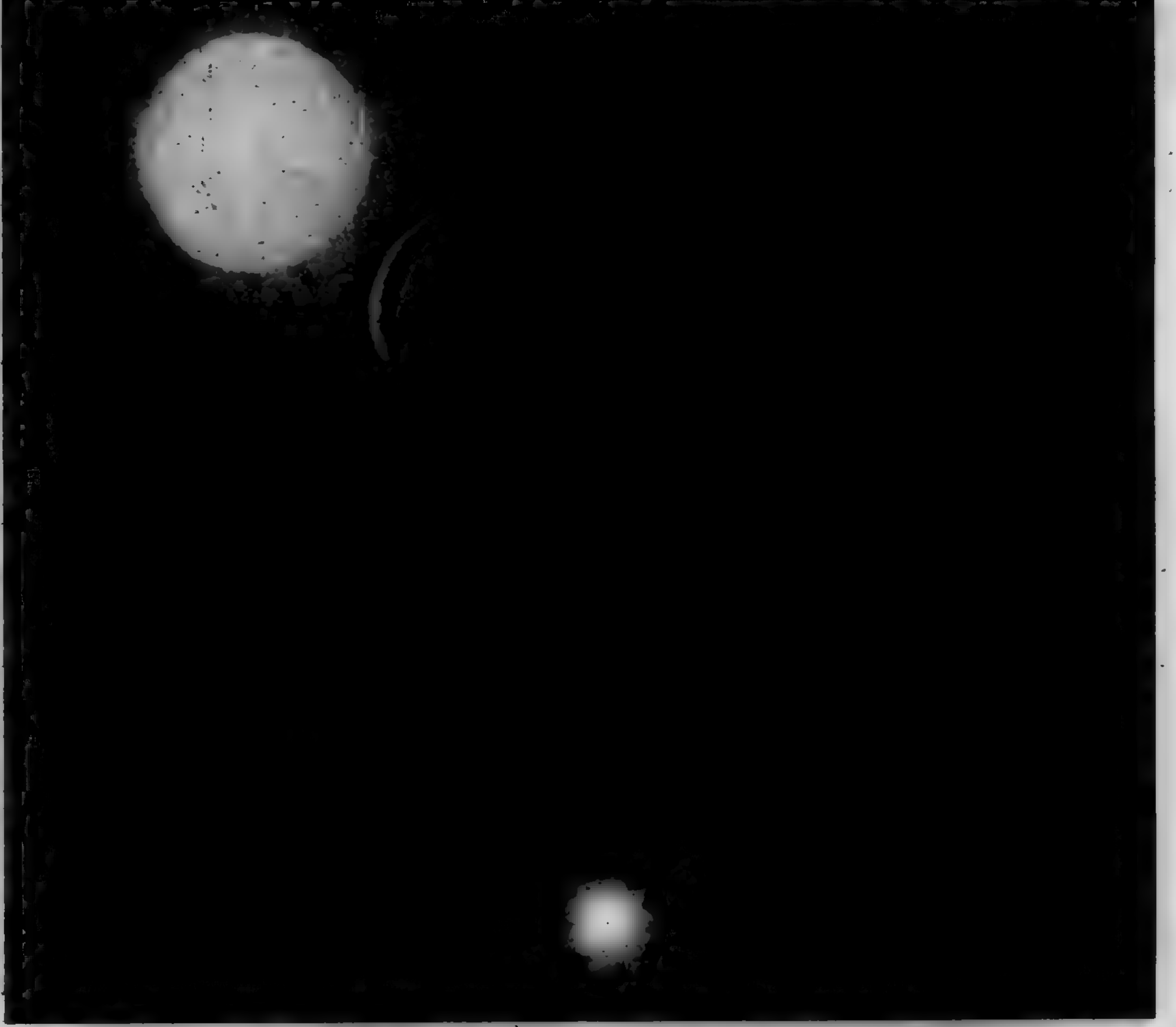

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Ohio Scientific, M/A-COM Sign

BURLINGTON, Mass. — M/A-COM, Inc. has signed a definitive agreement with Ohio Scientific, Inc. of Aurora, Ohio, as well as the affiliate, Ohio Scientific of Puerto Rico, Inc., whereby they would become M/A-COM companies.

The agreement calls for the acquisition of all stock of both companies for an undisclosed cash amount. Ohio Scientific will hence operate as a separate M/A-COM company under its present management while it maintains its current market objectives and works to develop a broadened line of communications products in conjunction with M/A-COM's various companies.

Ohio Scientific designs, manufactures and sells a line of microprocessor-based computers for the small business market and the home.

It presently has more than 400 dealers worldwide and also markets its products to OEMs.

In addition to the above-mentioned two plants, Ohio Scientific also has facilities in Bedford, Ohio, and Goleta, Calif.

Mergers & Acquisitions

Other Moves

Anacomp, Inc. has signed a letter of intent to acquire Zytron Corp., a division of Dun & Bradstreet's National CSS subsidiary, for an undisclosed amount.

Tymshare, Inc. has acquired all the stock of Telecheck Services, Inc., a Denver-based check guarantee service organization.

The interactive graphics systems manufacturer, Vector General, Inc., announced that it is acquiring the assets of CPS, Inc., a Sunnyvale, Calif., manufacturer of precision high-voltage power supplies and color graphics display monitors. Terms of the acquisition were not disclosed.

MSC Forms Separate Firm For Sales, Service

SUNNYVALE, Calif. — Microcomputer Systems Corp. (MSC) has formed a company, United Peripherals, to sell and service its end-user disk storage systems.

The company will initially handle the large storage systems made by MSC for users of Hewlett-Packard Co.'s 300 series computers. Sales and service operations are being set up here and in Los Angeles, Minneapolis, Boston and New York.

United Peripherals will sell the UP-1694 systems and its UP-1696 systems, which provide for 600M bytes of disk storage. More information can be obtained from MSC at 432 Lakeside Drive, Sunnyvale, Calif. 94086.

Executive Corner

- George H. Conrades has been named president of IBM's Data Processing Division.
- Franz Schulte has been appointed to the position of vice-president of human resources at the Basic Four Information Systems Division of Management Assistance, Inc.
- William E. Johnson has been named president of Heath Co., a wholly owned subsidiary of Zenith Radio Corp.
- Lawrence Cabrinety has been appointed president of Computer Peripherals, a subsidiary of Control Data Corp.
- Alex J. Najjar has joined CIS Equipment Leasing Corp. as vice-president and general counsel.
- Robert D. Briskman has been elected assistant vice-president of systems implementation at Comsat General Corp.
- Albert S. Kaplan has been named vice-president of operations at Informatics, Inc., where he will be responsible for monitoring the performance of Informatics' four operating groups.
- Ken Isaac has joined Century Data Systems, Inc. as vice-president of engineering, replacing Richard Charlton, not James Conway [CW, Nov. 3].

Nickels & Dimes

Honeywell, Inc. declared a regular quarterly dividend of 75 cents per share payable Dec. 15 to shareholders of record Nov. 28.

$$$

Timeplex, Inc. announced a three-for-two stock split of its common stock in the form of a 50% stock distribution. The distribution will be issued Dec. 29 to holders of record Nov. 21.

$$$

Intelligent Systems Corp. has filed a registration statement with the Securities and Exchange Commission for a proposed public offering of 600,000 shares of its common stock.

$$$

Dataram Corp. has purchased convertible notes and related warrants of CSP, Inc. from various institutional holders.

New Companies

Other Companies

The formation of Jan S. Gould Associates, Inc., a management consulting firm, was recently announced. It specializes in matters related to distributed data processing, office automation and data communications systems, and is located at Suite F-12, Twin Lights Terr., Highlands, N.J. 07732.

Garrick Lochhead, Inc. has been founded to provide scientific programming, process control software and advanced business systems. It is situated in Conway, Mass. 01341.

The Warner Group, an information processing consulting firm, was recently established to provide technical advisory service to industry and government. It is headquartered at Warner Center Business Park, Suite 400, 5850 Canoga Ave., Woodland Hills, Calif. 91367.

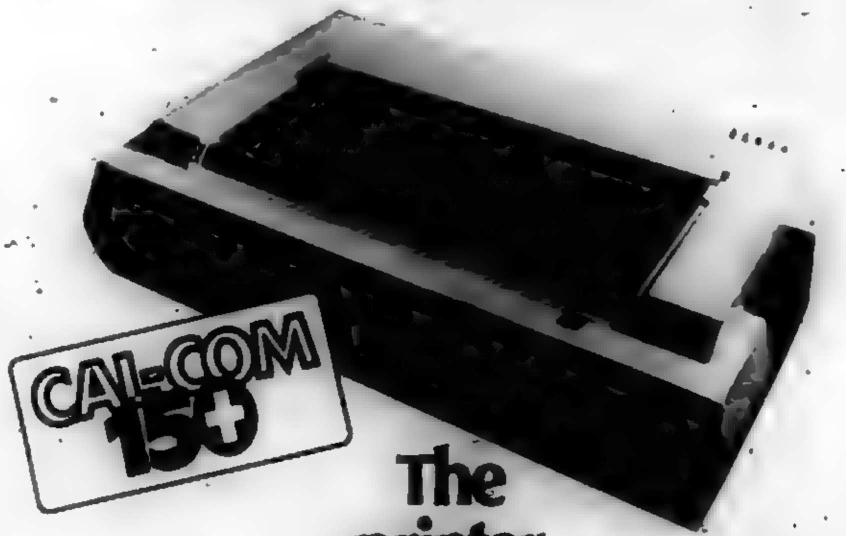
Ken Orr and Associates, Inc., previously the Advanced Systems Division of Langston, Kitch and Associates, Inc., has become a separate entity specializing in the area of systems technology research aimed at improving productivity. It is located at 715 E. 8th St., Topeka, Kan. 66017.

A group of independent executives from various computer and electronic outfits has incorporated a new company, called Data Systems Services, Inc., which specializes in the sale, support and service of computers and peripherals to Digital Equipment Corp. users.

Agency Management Systems, Inc., which develops and markets advanced computer systems to independent insurance agents, has been launched by Commercial Union Insurance Companies. It is headquartered at One Beacon St., Boston, Mass. 02108.

Orders & Installations

Sanders Associates, Inc. has received an $18 million U.S. government contract for a major production program to manufacture mobile signal exploitation systems.



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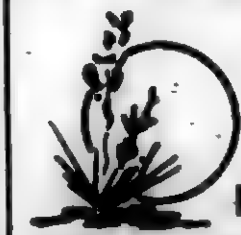

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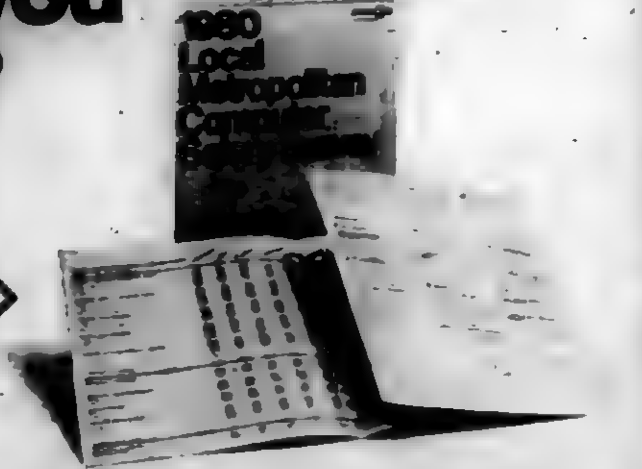
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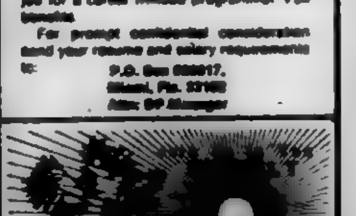

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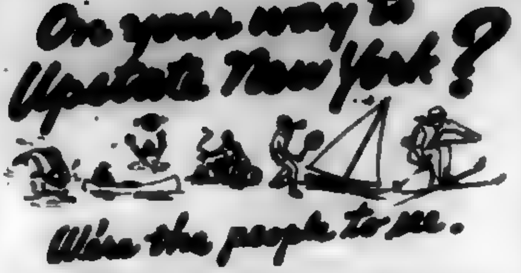

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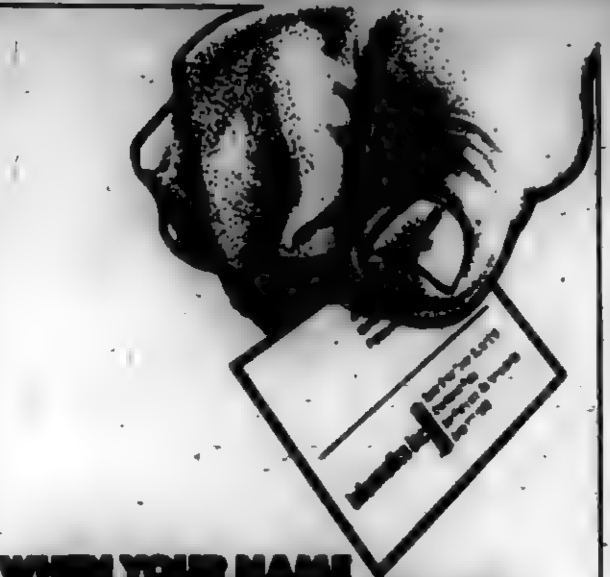

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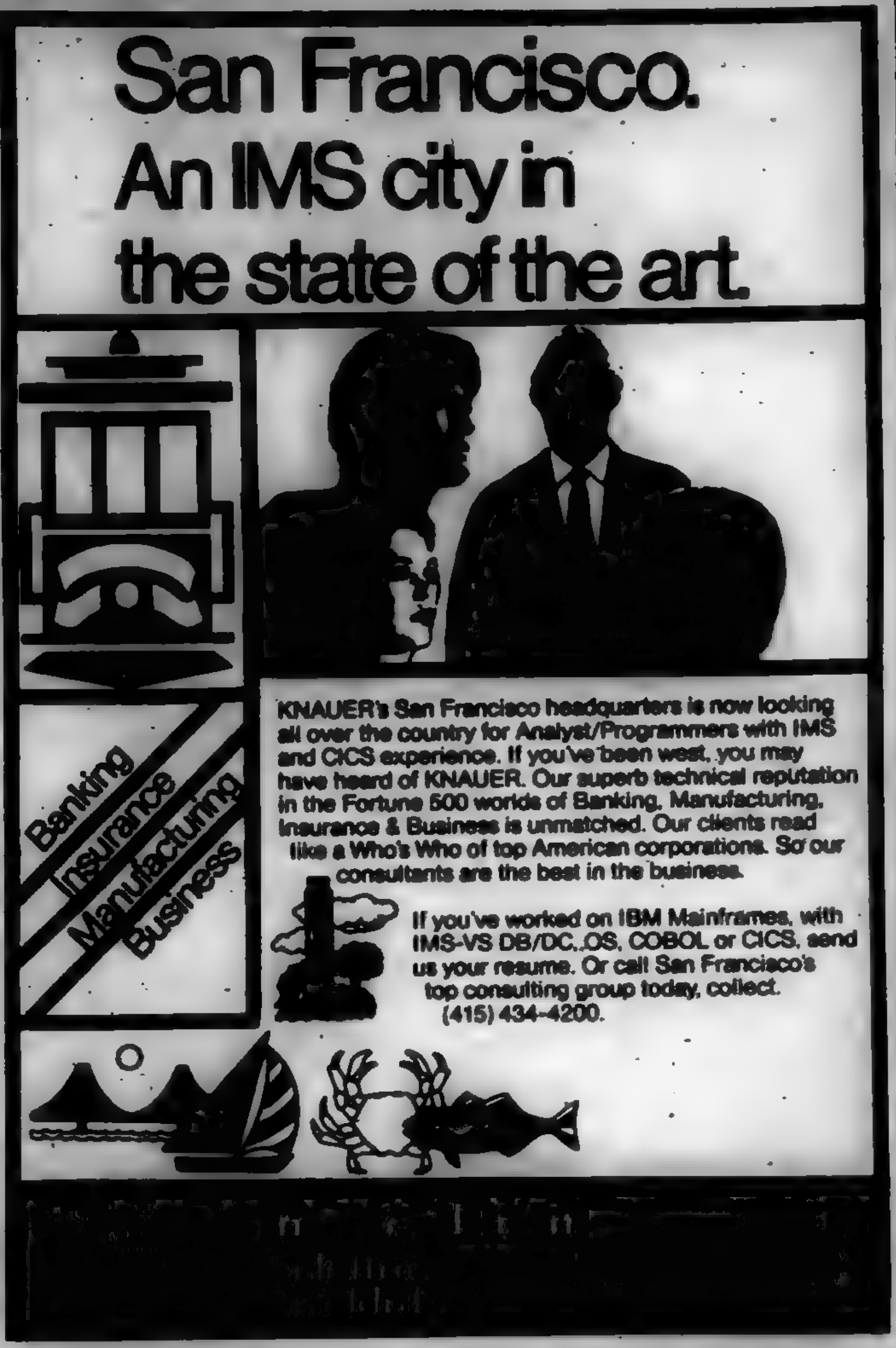

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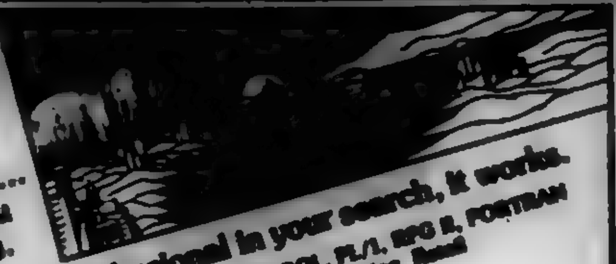

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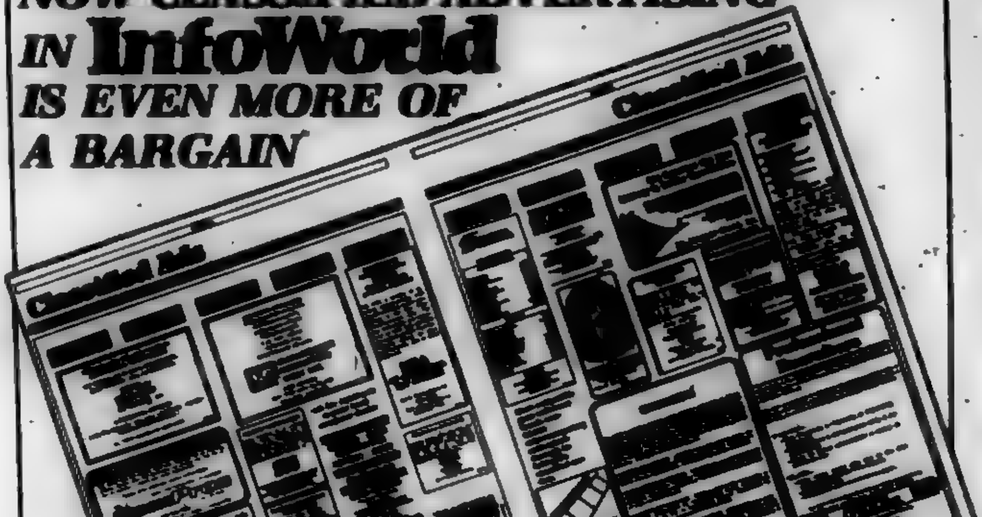

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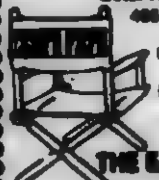

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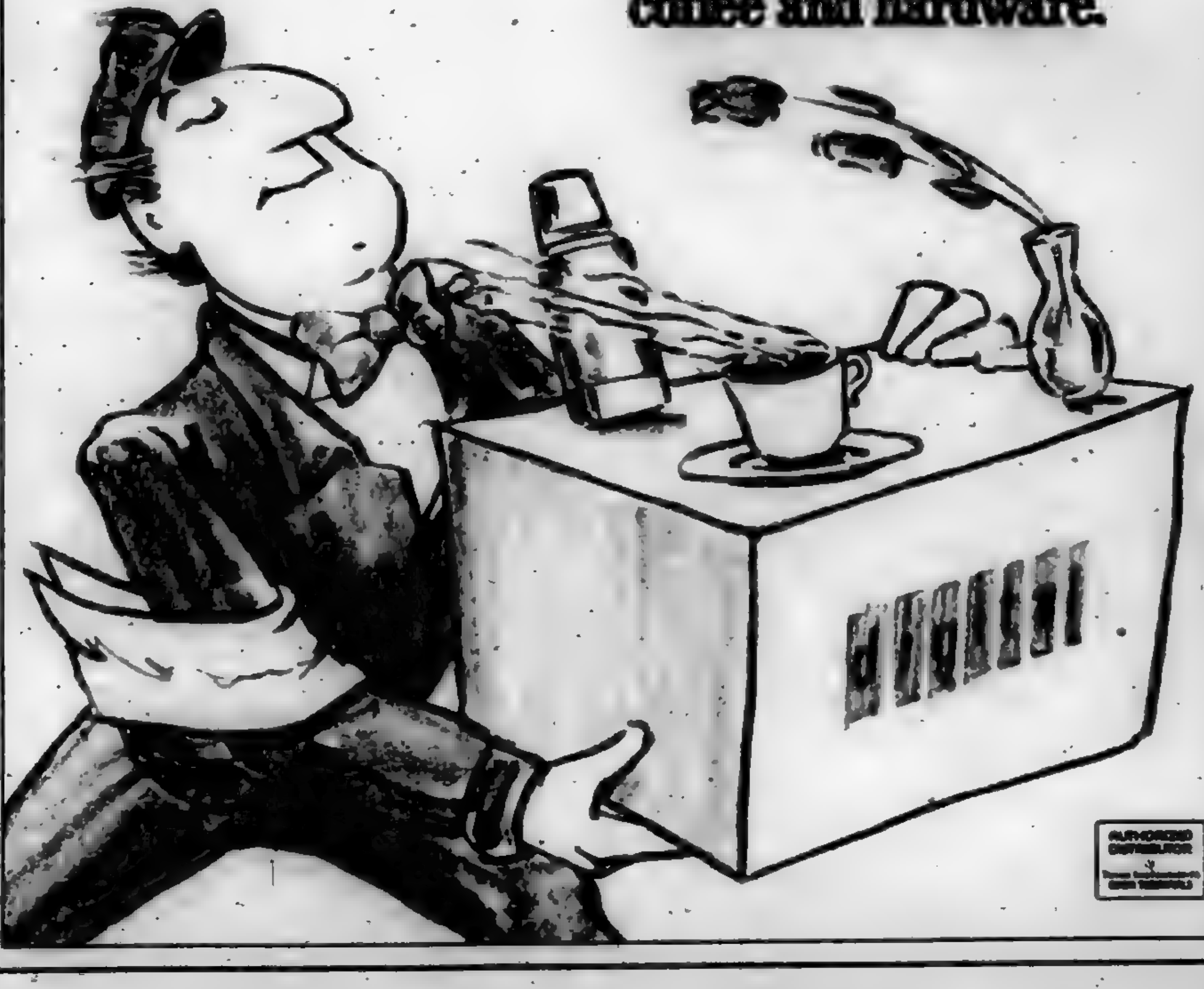

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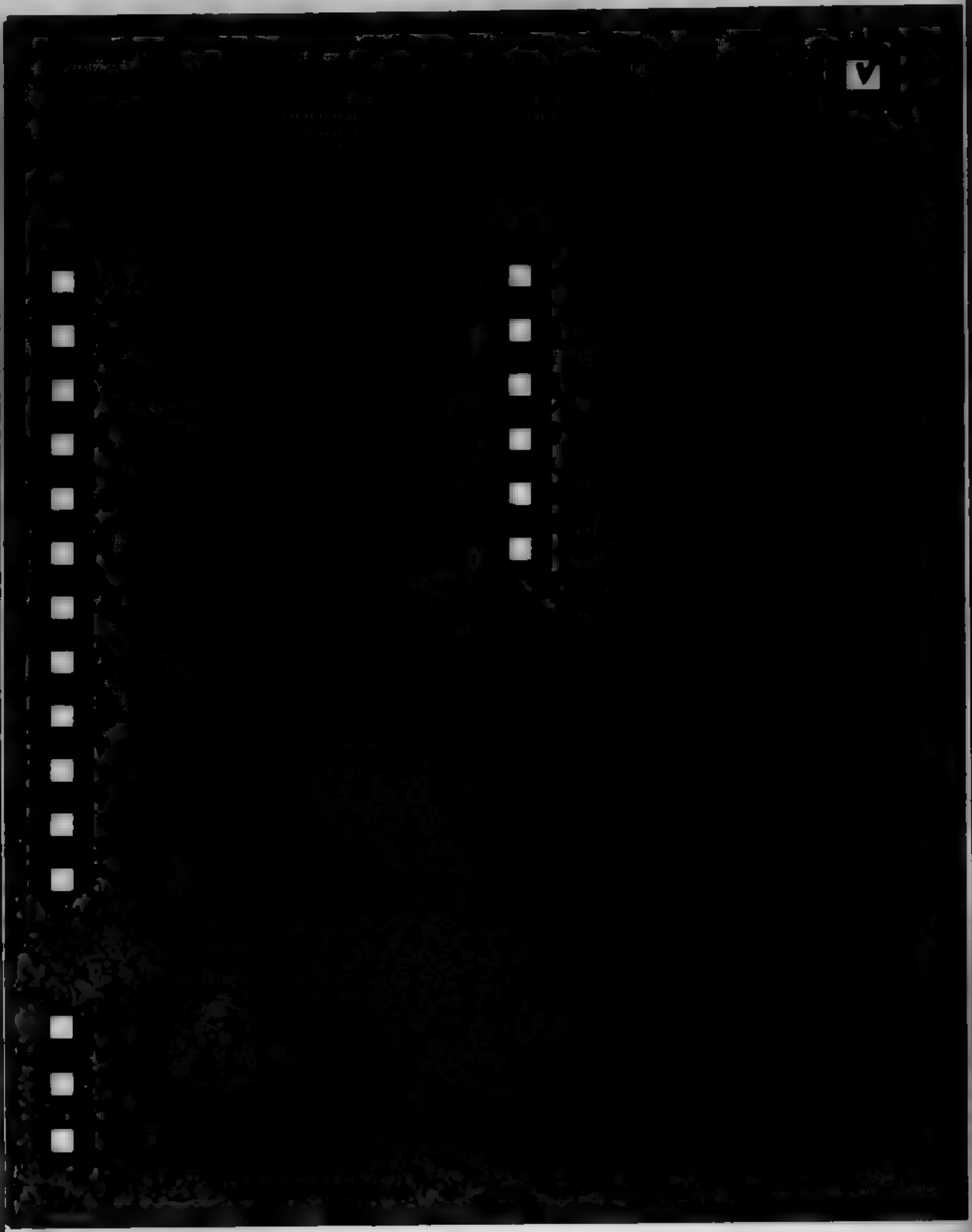

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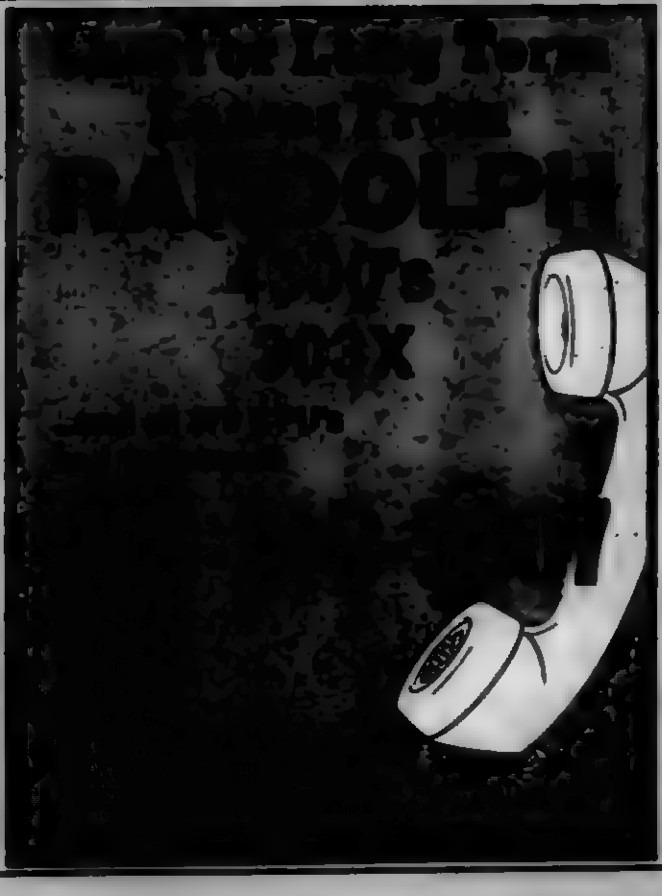

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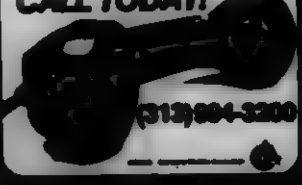

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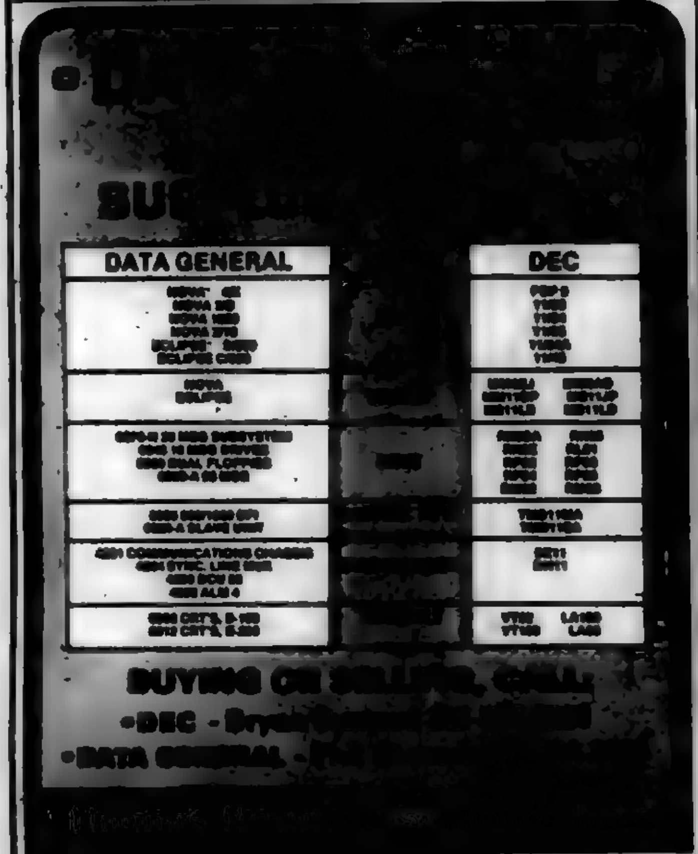

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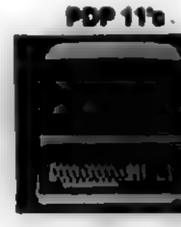

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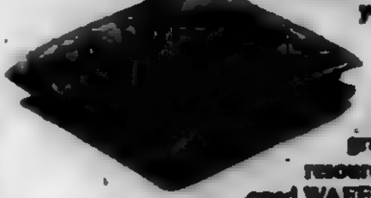

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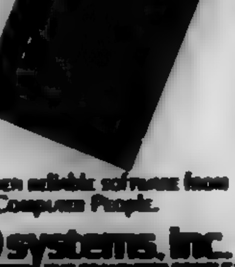

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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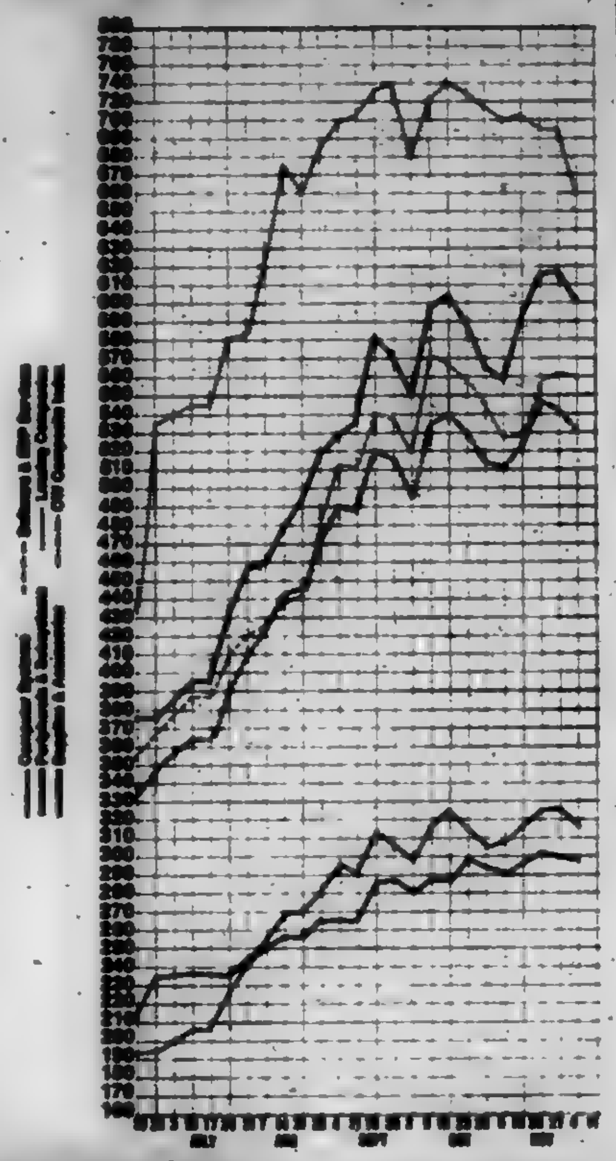

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 3, 1980

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 3 1980	WEEK NET CHANGE	WEEK PCT CHANGE
A	AMDAHL CORP	13- 42	35 3/8	+1 1/4	+3.6
N	BURROUGHS CORP	47- 88	50 3/8	-2	-3.8
O	COMPUTER AUTOMATION	9- 27	24	- 1/4	-1.0
N	CONTROL DATA CORP	38- 77	69 1/4	-4 1/4	-5.7
O	CRAY RESEARCH INC	30-103	99 5/8	+ 3/8	+0.3
N	DATA GENERAL CORP	44- 87	70 7/8	-5 3/4	-7.5
N	DATAPOINT CORP	44-115	100 3/4	-6 1/4	-5.8
N	DIGITAL EQUIPMENT	52- 99	87 1/8	-3 3/4	-4.1
A	EECO INC	4- 16	16	0	0.0
A	ELECTRONIC ASSOC.	4- 12	8 1/2	0	0.0
N	FOUR-PHASE SYSTEMS	20- 49	25 1/4	+ 1/2	+1.9
N	FOXBORO	31- 58	57 1/2	-1 1/4	-2.1
O	GENERAL AUTOMATION	3- 19	9 1/4	- 5/8	-6.3
O	GRI COMPUTER CORP	1- 3	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	46- 95	91 5/8	- 3/8	-0.4
N	HONEYWELL INC	65-106	100	-3 3/4	-3.6
N	IBM	50- 79	68	-1 1/2	-2.1
O	MAGNUSON COMP SYSTS	20- 45	42 1/4	-1 1/4	-2.8
N	MANAGEMENT ASSIST	9- 25	16 5/8	-1 3/8	[illegible]
O	MANUFACTURING DATA S	22- 80	77 1/4	-2 1/4	-2.8
O	MINI-COMPUTER SYST	2- 6	2 1/4	- 5/8	-21.7
O	MODULAR COMPUTER SYS	9- 31	25 7/8	-1 3/8	-5.0
N	NCR	52- 82	69	-3 1/4	-4.4
N	PRIME COMPUTER INC	15- 59	55 1/2	- 3/8	-0.6
N	PERKIN-ELMER	26- 70	64 1/2	-1 1/2	-2.3
N	SPERRY CORP	42- 60	58 1/8	-1 3/4	-2.9
A	SYSTEMS ENG. LABS	11- 53	52 3/4	+6 1/4	+13.4
O	TANDEM COMPUTERS INC	13- 49	47 1/2	+ 1/4	+0.3
N	TEXAS INSTRUMENTS	79-150	137 1/2	-6 3/8	-4.5
A	WANG LABS.	17- 40	38 1/4	-3 1/4	-7.8

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 3 1980	WEEK NET CHANGE	WEEK PCT CHANGE
O	BOOTHE FINANCIAL CP	13- 27	22 1/4	0	0.0
N	COMDISCO INC	6- 24	24	+1 3/8	+6.0
A	COMMERCE GROUP CORP	1- 2	7/8	- 1/8	-12.5
A	COMPUTER INVSTRS GRP	1- 4	3/4	-1	-57.1
O	CONTINENTAL INFO SYS	2- 15	4 7/8	0	0.0
A	DATRONIC RENTAL	2- 5	4 1/2	0	0.0
A	DCL INC	2- 6	2 7/8	+ 1/4	+9.5
N	DPF INC	5- 12	4 1/4	- 3/8	-5.6
N	ITEL	1- 15	1	- 1/8	-11.1
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 5/8	0	0.0
N	RELIANCE GROUP INC	34- 79	72 1/4	-1	-1.3
N	U.S. LEASING	12- 26	25	+1 3/8	+5.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 3 1980	WEEK NET CHANGE	WEEK PCT CHANGE
O	ADVANCED COMP TECH	1- 6	5 3/8	+ 1/2	+10.2
O	ANACOMP INC	7- 26	22 5/8	+1 1/8	+5.2
O	ANALYSTS INTL CORP	3- 14	13 1/2	+1 1/2	+12.5
A	APPLIED DATA RES.	4- 24	22	+1 3/8	+6.6
N	AUTOMATIC DATA PROC	31- 52	48	- 1/4	-0.5
O	CGA COMPUTER ASSOC	9- 17	13	-3 1/2	-21.2
O	COMPUTER HORIZONS	1- 3	2 3/8	0	0.0
O	COMPUTER NETWORK	4- 9	6 5/8	- 7/8	-11.6
N	COMPUTER SCIENCES	11- 20	16 3/4	0	0.0
O	COMPUTER TASK GROUP	3- 33	30 1/2	-1 1/2	-4.6
O	COMPUTER USAGE	2- 10	6 3/4	- 1/2	-6.8
O	COMPUT AUTO REP SVC	4- 11	10 1/2	- 3/8	-3.4
O	COMSHARE	11- 21	16 1/2	+ 1/4	+1.5
O	CULLINANE CORP	18- 40	38 1/4	-2 1/4	-5.5
O	DATA DIMENSIONS INC	1- 4	1 3/8	+ 1/8	+10.0
O	DATATAB	1- 4	1 1/8	0	0.0
O	DBI CORP	4- 9	8 1/2	- 1/8	-1.4
N	ELECTRONIC DATA SYST	19- 27	22	0	0.0
O	INFORMATICS INC	9- 28	23 3/4	- 1/2	-2.0
O	INSYTE CORP	1- 3	2 3/4	+ 5/8	+27.4
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/4	- 1/2	-8.6
O	KEYDATA CORP	1- 3	3/4	0	0.0
A	LOGICON	12- 38	29 1/2	- 3/8	-1.2
O	MATHEMATICA INC	3- 18	13	- 1/4	-1.8
O	MATHEMATICAL APP GRP	7- 33	18 1/2	-1	-5.1
O	NATIONAL DATA CORP	10- 31	29 7/8	+ 3/8	+1.2
N	PLANNING RESEARCH	5- 12	10 3/8	-1 1/8	-9.7
O	PROGRAMMING & SYS	1- 2	3/4	0	0.0
O	RAPIDATA INC	4- 10	9 1/4	- 1/2	-5.1
O	REYNOLDS & REYNOLD	21- 34	22 1/2	-1 1/2	-6.2
O	STSC INC	4- 26	24 1/4	+ 1/2	+2.1
O	SCIENTIFIC COMPUTERS	6- 32	32 1/4	+3	+10.3
N	TYMSHARE INC	31- 80	60 1/8	- 7/8	-1.0
A	URS CORP	9- 17	16 1/2	- 3/8	-2.2
N	WYLY CORP	4- 20	16 3/8	- 1/4	-1.5

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 3 1980	WEEK NET CHANGE	WEEK PCT CHANGE
N	AM INTERNATIONAL	13- 24	15 1/8	-1 1/2	-9.0
N	AMPEX CORP	14- 26	24	- 1/2	-1.4
A	ANDERSON JACOBSON	9- 25	24 7/8	+2 1/4	+9.9
P	APPLIED DIG DATA SYS	5- 12	11 7/8	0	0.0
O	AUTO-TROL TECHNOLOGY	18- 42	40	0	0.0
O	BEEHIVE INT'L	3- 26	26	+2	+8.3
A	BOLT,BERANEK & NEW	12- 37	34	-1 3/4	-4.8
N	BUNKER RAMO	17- 41	38	-1 5/8	-4.1
O	CAMBRIDGE MEMORIES	1- 9	3	+ 1/8	+4.3
N	CENTRONICS DATA COMP	29- 55	34	-1 3/8	-3.8
A	CETEC CORP	3- 7	5 7/8	- 1/8	-2.0
O	COMPUTER DEVICES INC	5- 10	7 1/8	+ 1/8	+1.7
O	COGNITRONICS	1- 10	9 3/4	- 1/4	-2.5
O	COMPUTER COMMUN.	4- 10	2 7/8	- 1/2	-14.8
O	COMPUTER CONSOLES	4- 29	23	- 3/4	-3.1
O	COMPUTER TRANSCEIVER	1- 5	6 7/8	0	0.0
N	COMPUTERVISION CORP	24- 92	75 1/4	-5 1/2	-6.8
N	CONRAC CORP	13- 35	18 5/8	-1	-5.0
A	DATA ACCESS SYSTEMS	6- 20	18 3/4	- 3/8	-1.9
A	DATAPRODUCTS CORP	11- 38	34	-1 3/4	-4.8
O	DATUM INC	2- 5	4	- 1/4	-5.8
O	DECISION DATA COMPUT	2- 6	5 1/4	+ 5/8	+13.5
O	DELTA DATA SYSTEMS	1- 3	1 7/8	+ 1/8	+7.1
N	DOCUMATION INC	7- 27	18 3/4	0	0.0
O	DATARAM CORP	6- 37	11 7/8	- 1/8	-1.0
N	ELECTRONIC M & R	3- 9	8 3/8	- 1/8	-1.4
O	EVANS & SUTHERLAND	21- 82	72	-4 1/2	-5.8
O	FABRI-TEK	1- 4	1 7/8	- 3/8	-16.6
O	GENERAL COMPUTER SYS	1- 7	4	0	0.0
O	GEN'L DATA COMM IND	8- 22	21 1/4	+ 1/4	+1.1
O	GENERAL TERMINAL CP	1- 4	1 3/4	- 3/8	-20.0
N	HAZELTINE CORP	12- 33	36 3/8	-1 3/8	-4.9
N	HARRIS CORP	25- 55	53 1/4	+1	+1.9
O	INFORMATION INTL INC	8- 25	11 1/4	- 3/4	-6.2
O	INTEL CORP	33- 50	43 1/2	-3 1/4	-6.9
O	INTERSIL	13- 34	33 1/2	- 1/4	-0.7
A	LUNDY ELECTRONICS	4- 17	13 1/8	+2 5/8	+25.0
O	MSI DATA CORP	9- 16	13 5/8	-1 1/4	-8.4
N	MEMOREX	10- 34	14 3/4	+ 5/8	+4.4
N	MOHAWK DATA SCI	10- 31	24 3/8	-2 5/8	-9.7
O	ONEX	2- 12	11	-1	-8.3
A	PARADYNE CORP	9- 33	29 3/8	-2 1/4	-7.1
A	PENRIL CORP	9- 15	13 7/8	- 1/2	-3.4
O	RAMTEK CORP	10- 22	22 3/4	+2 3/4	+13.7
O	RECOGNITION EQUIP	8- 21	18 7/8	-1 5/8	-7.9
O	SCAN DATA	1- 5	1 3/8	- 1/4	-17.0
N	STORAGE TECHNOLOGY	12- 26	24 1/4	-1	-3.9
O	SYKES DATATRONICS	14- 50	33	+ 3/4	+2.3
O	T BAR INC	14- 24	21 3/4	-1	-4.3
A	TEC INC	3- 9	4 3/4	0	0.0
N	TEKTRONIX INC	42- 70	63 3/8	-1 3/8	-2.1
N	TELEX	3- 6	5 1/4	- 3/4	-12.5
O	TESDATA SYSTEMS CP	9- 26	13 3/8	-1 1/4	-8.5
A	TIMEPLEX INC	7- 35	32 7/8	+1 3/8	+4.3
O	WILTEK INC	1- 3	2 1/4	+ 1/8	+6.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 3 1980	WEEK NET CHANGE	WEEK PCT CHANGE
A	AMERICAN BUS PRODS	8- 15	14 5/8	+ 1/4	+1.7
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	8- 28	19 1/4	-1 3/8	-6.6
O	CYBERMATICS INC	1- 3	7/8	- 1/4	-22.2
A	DUPLEX PRODUCTS INC	11- 16	13 5/8	0	0.0
N	ENNIS BUS. FORMS	13- 21	14 1/4	- 1/8	-0.7
N	3M COMPANY	46- 63	57	- 3/8	-0.6
O	MOORE CORP LTD	27- 37	34 1/2	+1 1/4	+3.7
N	NASHUA CORP	20- 35	26 7/8	- 1/4	-0.9
O	STANDARD REGISTER	27- 35	30 1/4	- 1/2	-1.6
A	TAB PRODUCTS CO	9- 20	20 1/8	+1 1/4	+6.6
N	WABASH MAGNETICS	16- 30	30	+3 1/2	+13.2
N	WALLACE BUS FORMS	12- 26	23 1/4	+ 1/2	+2.1

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

kly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

1 December 15, 1980 $1.00 a copy: $30/year

NEWSPAPER

Product Spotlight

Interface: The Name of the Game In Data Communications Software

By Rita Shoor
CW Staff

DELRAN, N.J. — Interface is the name of the game when selecting data communications (DC) software. It's a game being played by an estimated three out of four medium- to large-sized computer installations, according to Datapro Research Corp. here.

Datapro estimated that communications networks will continue to proliferate and nearly 90% of all DP installations will employ some form of network-based transaction processing by 1986. With this type of projected growth, it's inevitable that teleprocessing (TP) monitors will become increasingly important.

However, "data communications software" is a fairly nebulous term that carries different meanings in different environments, Datapro noted in "A Buyer's Guide to Telecommunications Monitors." One common factor that may help the prospective purchaser to fight his way through the fog of nebulous jargon that obscures TP monitors is to focus on the interface requirements for his particular installation.

First, the software must interface the user's application programs to the access method that controls the network. These telecommunications access methods are, in fact, control programs of a sort which operate under a larger control system — the computer's operating system, Datapro explained.

In addition to the telecommunications access/applications routine interface, the TP monitor also controls interfaces to file access methods, the data base management system (DBMS) when required, remote terminals, front-end processors and the operating system itself.

(Continued on Page 10)

'TLC,' Education Diet Urged for Programmers

By Bruce Hoard
CW Staff

CAMBRIDGE, Mass. — The programmer is a weird animal who requires special treatment and an ongoing supply of educational programs if he is to remain happy, according to Terry Ebert, senior training specialist at Comped Technical Corp.

Speaking at Data Training '80, sponsored by *Northeast Training News* here last week, Ebert predicted a 40% shortfall of programmers by 1985, even though some 300,000 will be in existence. Added to a 34% average industry turnover, that spells trouble for both DP installations and their training and education staffs, he asserted.

"If you have a three-year project, it's quite possible that nobody who was there at the start of the project will be there when it's over," the training specialist claimed.

He cited a survey of 800 programmers, which found 12% were actively seeking another job, 17% were inactively searching for new employment and 51% were not looking but would accept another job offer if it was to their liking.

Catalog of Needs

The fact that 80% of those programmers were so ready to move means the extensive and sometimes curious catalog of programmer needs must be attended to religiously, Ebert maintained.

One of those needs is state-of-the-art knowledge. If programmers — for instance, those working in a batch shop — do not get it, they become afraid they will be left behind and out of the job market.

"We are dealing with a professional group that has personalities distinct from any other professional group,"

(Continued on Page 4)

Allege 'Unfair Advantage'

Publishers Decry Bell Home Service

By Marguerite Zientara
CW Staff

AUSTIN, Texas — A group of Texas newspaper publishers is preparing to ask the state Public Utilities Commission (PUC) to block AT&T from testing a home and business electronic information system that would include classified, display and catalog advertising.

Slated to start in "mid-1981," according to AT&T, the experimental Electronic Information Service was given the go-ahead by the PUC without a public hearing — a major point of contention among newspaper publishers in and outside Texas.

Currently being drafted and expected to be filed within "the next couple of weeks," the formal request to the PUC will ask that the tariff be removed pending a public hearing on the matter, according to Phillip J. Meek, president and editorial chairman of the *Fort Worth Star-Telegram* and chairman of the Texas Daily Newspaper Association's telecommunications task force.

Direct Competition

The publishers, who had $14.5 billion in advertising revenues last year, regard the Austin test as an example of the "unfair advantage" they claim AT&T will have in developing services that are directly competitive with

(Continued on Page 6)

DP Copyright Act Awaits Carter Signature

By Rita Shoor
CW Staff

WASHINGTON, D.C. — The Computer Software Copyright Act of 1980 has passed both houses of Congress and, barring any unforeseen difficulties, President Carter is expected to sign it into law before year-end.

The act went through Congress attached to a bill amending the federal patent laws, and it incorporates all of the recommendations made by the National Commission on New Technological Uses of Copyright Works (Contu).

Contu recommended that Section 117 of the Copyright Act of 1976 be repealed — a section which stated that "prior law . . . continue in force until further federal legislation is enacted," according to Peter Maggs, a law professor at the University of Illinois who specializes in copyright legislation. The catch here was that copyright law before 1976 made no specific reference to computers in any context, so Congress had temporarily avoided the issue.

The 1980 act is the "further federal legislation" referred to in the 1976 act. In Section 101, it defines a computer program as a "set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."

The revised Section 117 provides the owner of a computer program with the exclusive right to copy it or transfer rights in it, including sale and leasing arrangements.

While this would appear to be a distinct improvement over the 1976 law, Maggs said the law was poorly drafted with an orientation that is "10 years out of date." Although individual program instructions will be protected

(Continued on Page 8)

Damages Slashed in Honeywell Fraud Suit

By Tim Scannell
CW Staff

NEW YORK — A September verdict, ordering Honeywell, Inc. to pay Triangle Underwriters, Inc. $1.1 million in damages for fraudulently misrepresenting the capabilities of a computer system, has been set aside.

Federal Judge Eugene Nickerson of the U.S. District Court of New York here has granted Honeywell a motion for judgment, notwithstanding a previous recommendation by a federal jury, and reduced the amount of damages awarded to the now defunct insurance broker to $35,000.

In a memorandum of opinion, the judge also stated that Triangle failed to prove that errors made by the Honeywell computer system were a direct result of the firm's misrepresenting the system's capabilities at the time of sale in 1970.

Although Triangle's lawyers could not be reached for comment, other sources indicated the company's president, Robert Weinstein, is expected to appeal the judge's decision.

The lawsuit filed in 1975 accused Honeywell of fraud, claiming that it had been "induced to purchase" an H-110 computer system and software programs devised by Honeywell. The suit contended that Honeywell never properly formulated or tested the computer programs necessary for the system to function properly.

Triangle also claimed that because of Honeywell's fraudulent misrepresentations regarding the system, the company was forced to close its doors in 1974 after 44 years of operation.

A federal jury ruled in favor of Triangle. The ruling marked the first time a trial jury found a company guilty of fraudulent computer sales tactics [CW, Sept. 15].

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN-0010-4841) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.00 a copy: U.S. – $30 a year; Canada, Central & So. America – $80 a year; Europe and Near East – $90 a year; other foreign – $130 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

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Adds Two Field-Upgradable V77s

Univac Plugs Holes in Mini Line

By Jeffry Beeler
CW West Coast Bureau

IRVINE, Calif. – Sperry Univac last week plugged two holes in its minicomputer systems series and in so doing smoothed the growth path to the company's top-of-the-line minicomputer, the V77-800.

Both the V77-500 and V77-700 use the same operating system as the rest of Sperry Univac's minicomputer family and run existing V77 application programs without recompilation, a company spokesman said.

In addition, the two 16-bit systems are reportedly field-upgradable to larger members of the V77 line. A typical upgrade takes about an hour and usually involves little more than the exchange of a few printed circuit boards, the spokesman said.

The V77-500 offers roughly the same level of processing power as the Data General Corp. Eclipse C/130 and C/150, Digital Equipment Corp. PDP-11/23 and Hewlett-Packard Co. 3000 Series 33. The V77-700, meanwhile, compares roughly in performance to the DG Eclipse C/230 and C/330, DEC PDP-11/44 and HP 3000 Series II, the spokesman explained.

Sperry Univac credited the Model 700 with providing anywhere from 30% to twice the computing power of the Model 500. The throughput gap between the two machines varies depending on whether the 700 is equipped with various performance-enhancing options like writable control storage and firmware accelerators.

Six Models

Announcement of the V77-500 and V77-700 expands Sperry Univac's minicomputer systems line to six models. Other V77 family members include the V77-200, -400, -600 and -800.

Announcement of the two additional systems has also rerouted the V77 family's primary upgrade path. Traditionally, the mainstream of that path formed a line between the V77-400 and V77-600. Today, however, the line is being diverted to run directly through the recently introduced V77-500 and V77-700.

Despite the shift in its mainstream upgrade path, Univac intends to continue selling and supporting both the existing Models 400 and 600, the spokesman said.

Sperry Univac sees the V77-500 and V77-700 as "competitors" with the 400 and 600, which the mainframe vendor "inherited" as a result of its acquisition of Varian Data Machines, Inc., the source added. The 500 provides about 30% more performance than its nearest V77 equivalent, the Model 400, for roughly a 5% higher price.

The 700, meanwhile, is said to be bracketed by the older 600, which can be specified either with or without cache memory.

Geared to DP Nets

Though suitable for standalone applications, the V77-500 and V77-700 are geared primarily to serving as nodes in distributed processing networks built around large IBM and Sperry Univac host mainframes. Both minis support the IBM 3270 and Hasp communications protocols as well as Sperry Univac's version of synchronous data link control.

The two minis also interface to Sperry Univac's Data Communication Architecture, a scheme roughly equivalent to IBM's System Network Architecture.

Typical customers of the two latest V77 additions will include software houses and large end users where real-time, transaction-processing applications abound.

Like the other members of the V77 line, the 500 and 700 run Sperry Univac's multiprogramming Vortex operating system as well as application programs written in Fortran IV, Cobol, RPG-II and assembler languages.

A V77-500 configuration supports 128K bytes to 1M byte of MOS error-correcting main memory and up to 50M bytes of disk storage, while the V77-700 accommodates 256K- to 2M bytes of main memory and as much as 500M bytes of disk capacity, the spokesman said.

Standard Features

Both machines provide a basic memory cycle of 600 nsec, hold up to 2K words of writable control storage as an option and come with several standard features, including hardware multiply and divide, direct memory access and memory mapping and control.

The 700 also comes with an optional floating-point processor, which speeds the execution of Fortran programs by an estimated 40 to 50 fold, the spokesman said.

A minimum Model 500 configuration with a 128k–byte processor costs $29,500, compared to $36,100 for a basic Model 700 machine with a 256K-byte main memory. Both units become available next March from Sperry Univac's Minicomptuer Operations at 17900 Von Karman Ave., Irvine, Calif. 92713.

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Scrooge

Think what might have happened if old Ebenezer had been a sort user!

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Scene: The MVS computer center of Scrooge & Marley, a busy counting-house. Enter Bob Cratchit, systems programmer and father of a large family.

Cratchit: Excuse me, sir. I was wondering if I might have December 25th off.

Scrooge: Bah, humbug, Cratchit! You know we have all those sorts to run by the end of the year. And nobody to run 'em but that green kid you hired. What's his name?

Cratchit: Tiny Tim, sir. (Bravely) He's my son and he says it's our sort program that's causing the trouble. He thinks we ought to try SyncSort—

Scrooge: Humbug, man! Our sort is made by the World's Leading Hardware Manufacturer. (Jams on his hat.) Now be here all the earlier on the 26th!

Scrooge takes a solitary meal at his local fast-food outlet and then retires to his gloomy bedchamber. Perhaps as a result of what he has eaten—a tacoburger washed down by a low-calorie soda—he experiences a harrowing nightmare.

He is visited not only by the ghost of his former partner, Jacob "Free Software" Marley, but also by the Ghosts of Data Processing Past, Present and Future.

Ghost of DP Present (as he shows Scrooge the Cratchit family gathered for their holiday meal): Yes, a happy family, but—alas—one over whom a cloud hangs. Poor Tiny Tim...

Scrooge: Is there no hope for the little chap, Spirit?

Ghost: No... unless Tiny Tim receives a new sort program, his operations are... doomed!

When Scrooge finally awakens from his ordeal, he is a greatly changed man. Happy to be alive, he springs from his bed, throws open his windows and calls to a blue-jeaned youth in the street below.

Scrooge: You there, boy! Do y'know the fine, big sort program that hangs in the shop down the street?

Boy: Crikey, sir, you must mean SyncSort.

Scrooge: I do indeed. Run and tell 'em to send it here at once! A half crown if it arrives in less than five miuntes. (Chortling) I'll send it along to Tiny Tim. If that doesn't goose up his sorting, nothing will.

From that day to this, no man keeps the holidays better than Scrooge, and nobody sorts better either. To Tiny Tim, who has just received his MBA, Scrooge has been a second father.

And to his other employees, who now enjoy ten paid holidays a year, Scrooge is as good a man and as good a master as anyone in the good old world of data processing!

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Teenagers Charged in DePaul CPU Shutdown

By Rita Shoor
CW Staff

CHICAGO — Manual procedures saved the day for DePaul University here after two suburban teenagers allegedly shut down one of the school's minicomputers during enrollment week this year.

Brian Catlin, 17, from Palatine, Ill., and a 16-year-old boy whose name was not released since he is legally a juvenile were charged with theft of services, officials said. Catlin is scheduled to appear in court Jan. 17, and the younger boy was scheduled for a December appearance.

The students are juniors at Fremd High School and allegedly gained access to the Hewlett-Packard Co. 2000 through a dial-up telephone line.

Although the mini is primarily used by DePaul personnel for research activities, it also processes tuition payments, according to Glen Wilken, associate director of academic computer services. The HP 2000 went down for a few hours one day and "we went through our usual recovery procedures," he said. Student payments were handled through a manual system for that relatively short, but very busy time span.

DePaul had installed some "minor security" features for the mini and had not had any problems in eight years, Wilken said. However, when the hardware went down again on a Saturday and Wilken found a message on a terminal that said, "If you don't give us a mixed-assembly software program, we'll shut you down again," he notified the police.

With some assistance from DePaul officials, the police traced a telephone number from the terminal to a public bulletin board service for computer hobbyists. After sifting through reams of computer printouts belonging to this service, the police found a message boasting that two high school students had shut down DePaul's system. Police investigators got in touch with area high school teachers who "knew right off the bat the couple of kids we had in mind," according to Douglas Ellis from the Chicago police financial crimes unit.

He was adamant about not releasing details on how the students managed to shut the mini down, but described the whole thing as a "minor incident."

Female Role in DP Ed Traced to Tradition

By Bruce Hoard
CW Staff

CAMBRIDGE, Mass. — A woman's place is traditionally in DP education and training, according to a sample of 10 women interviewed at Data Training '80 here last week. Asked why the proportion of women in training and education is higher than in other DP areas, most agreed that is where history has placed them.

"It goes back to the old attitude that the best teachers are women," said Paula Davis, DP technical coordinator for Alexander and Alexander. "Women are more person-oriented and more likely to accept a job men wouldn't."

Davis said she doesn't feel there will be a great influx of men into training and education departments as more and more emphasis is placed in that area. Their preoccupation with the more technical hardware areas will keep them away from the training room, she said.

"I think it's something that's been traditionally accepted by women," Judy Connolly, training administrator at Polaroid, said of the female role in training and education. "It's a role women are often slotted into." However, once men see training as a real profession, they will begin to migrate toward it, she noted.

Linda Michaud, who works part-time in support services at Steinberg, Inc., said the opportunity for part-time work may be one reason many women are in training and education. She also feels that increased emphasis on the area will draw more men in the future.

Rita Weimer, director of the Computer School for Information Computer Systems, took a slightly different tack on the question.

"Traditionally, the female has played a nurturing type of role, and so women have gravitated into education," she said. Training and education is a management area in which companies are more willing to put women, she added.

One woman who wished to remain anonymous didn't agree there are more women in training and education than any other DP area. "At most of the conferences I go to, there are about the same mix of men and women," she said.

Will more men come in as the area becomes more attractive? "It's hard to say," she replied.

Another anonymous respondent claimed it is the administrative abilities of women that have led them into teaching roles.

However, they will have to fight to hang on to training positions as men increasingly infiltrate the area, she asserted, adding that the best weapon to preserve this long-time feminine domain will be increased technological know-how.

Training Specialist Lists Programmer Needs

(Continued from Page 1)

he commented, adding both programmers and systems analysts are included in that unique category.

Both groups value intellectual achievement highly, he noted. They enjoy challenging projects that require the full range of their skills.

Also high on the list of programmer/systems analyst needs are cognitive structure, or an environment in which all necessary data is available, and order. Programmers and analysts do not like sloppy surroundings, Ebert said.

Of far less importance to the two groups are the need to be the center of attention and the need to maintain social contacts. In fact, when it comes to socializing, they would rather not take part at all, he suggested.

"Growth needs are perhaps the most burning in the DPers, the training specialist said, citing a Daniel Couger study. In that study, it was found that DPers exceeded all other groups, including salesmen, when it comes to the need for growth.

And an integral part of that growth need is the need for advanced training and education. Another survey showed companies providing the fewest educational opportunities for DPers suffered the highest turnover rates.

"If the median turnover rate is 34%, any higher rate terrorizes me," Ebert said.

Discriminating Students

Not just any training program will do (see related story on Page 16). Speakers must be articulate and organized. If they are not, DPers quickly become frustrated and the entire experience becomes a negative one. Even typos on training materials turn off these discriminating students, Ebert explained.

Teachers must tread softly when dealing with a class of DPers. If somebody is asked a direct question and is unable to answer, two sentiments are immediately manifested: deep embarrassment and dedicated vengeance. "Once you've threatened somebody, you've hit a very sensitive nerve," he added.

A more productive approach is reinforcement of correct answers. Ebert suggested the following riposte: "Gee, John, that's a good answer, thanks. Let me go off on a tangent of what John said."

Another good idea is the issuance of certifications of completion after DPers finish any training class. Such certificates give comfort to the programmer or analyst, who frequently attaches them to resumes when applying for jobs.

An active learning situation is more propitious than self-paced video courses when it comes to DPers, Ebert noted. Video courses are boring and monotonous to the DPer while interaction with an instructor both challenges the student and allays his fears about the material.

Also, people read and listen at different rates, he said. A video presentation can't be stopped and questioned, while an instructor can. "How the heck do you ask the screen a question?" he asked rhetorically.

Ebert listed several items to consider in selecting training and education systems. If a large number of sites are involved, a video system is best, he said. Video is also good if the stability or lifetime of the product concerned is high. In the case of a more sophisticated subject, instructors are necessary.

Cost is another factor. The cost of development per instructional hour is $170 for classroom, $900 for video and $1,750 for self-paced, he said. However, maintenance costs for classroom instruction are the highest of the three, he added.

The development time for a classroom program is three months, for a video program, eight months, and a self-paced program, 15 months.

Another factor to be aware of when implementing an educational system is who's running it. In the case of a vendor program, it's not uncommon for vendors to put on a self-advertisement instead of a class, Ebert said.

Course materials should also be relevant and up to date. Materials in permanently bound handbooks can be out of date. Loose-leaf material suggests more recent information.

Instructors should also be up to date, he said. A good stage presence can be a mask for inadequate and old information. Instructors who do nothing but instruct sometimes don't keep up on their subject matter.

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IBM Production Status Of 3031, 3032 Revised

By Tom Henkel
CW Staff

WHITE PLAINS, N.Y. – IBM's Data Processing Division has changed the production status of its 3031 and 3032 processors from "new" to "limited new." The change means recipients of those systems will get either a processor made of all new components or one that has been reconditioned.

While reconditioned processors are usually as good as new ones, the move suggests IBM is phasing the 3031 and 3032 out of its overall marketing picture.

Industry analysts had predicted the 3031 and 3032 would be phased out when IBM announced newer technology processors in the same performance range.

In the case of the 3031, IBM announced the 4341 Model Group 2, a processor that offered slightly better performance – 1.4 million instructions per second (Mips), compared with the 3031's 1.1 Mips – at about half the purchase price.

Nov. 12 Announcement

The 3032 was obsoleted by the Nov. 12 announcement of the 3033S processor. While the 3033S offers slightly less performance than the 3032, 2.2 Mips compared with 3.0 Mips, it allows users to field upgrade to the top of the 3033 line, the 3033 multiprocessor.

"Limited new" production is the middle of IBM's production classifications. The last stop on the production chain is "not new," which means a processor will either be a fully reconditioned machine or one made up of reconditioned parts.

Processors in the "not new" category include 370/115, 370/125, 370/158 and 370/168. Processors in the "limited new" category include the 370/138 and 370/148, IBM said.

Processors in "new" production are the 4300 line, the 8100 series and all 3033 models, according to IBM.

Ruling on SSN, Draft Appealed

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The Selective Service System has appealed a recent federal court ruling that it cannot require draft registrants to disclose their Social Security numbers (SSN).

Justice Department attorneys representing the Selective Service have asked the federal appeals court here to overturn the Nov. 24 decision and have also asked the U.S. District Court to stay its decision pending resolution of the appeal, the service said.

Last month's decision came in a suit brought by the American Civil Liberties Union (ACLU), which argued requiring Social Security numbers violated the Privacy Act [CW, Dec. 1]. The ACLU also said it brought the suit to stop the Selective Service from using the numbers to conduct data matching operations to identify draft-age males who fail to register.

While the decision is being appealed, the Selective Service has made plans to inform the next group of 18-year-olds scheduled to register they do not have to disclose their Social Security numbers, an agency spokeswoman said. That registration will be conducted the week of Jan. 5 - 10.

According to Joan Lamb of the Selective Service, the agency feels it has a "legitimate reason" for requiring Social Security numbers. The unique identifiers are essential to avoid confusing registrants' identities and to prevent mixups, she said.

She also said the agency believes its use of the numbers does not violate the privacy law because draft registration predates the 1974 act and thus comes under "grandfather" provisions of the law.

MCS Unveils MVS Extension

SAN JOSE, Calif. – Magnuson Computer Systems, Inc. (MCS) has announced a microcode extension – MVS Extended Facilities – that may increase performance as much as 17% at some installations.

Maximum performance increase would probably be observed by users with "large host operating systems," the vendor claimed. The extension supports IBM's three current MVS System Extension (SE) releases. These include SE Releases 1 and 2 and MVS System Product (SP) release. The microcode will also support IBM's announced but not yet officially available SP Releases 2 and 3.

The enhancement "allows a ... Magnuson M80 system to be added to MVS installations running offload applications and systems development work," Brent Stone, director of software development, noted.

Benchmark-tested at Exxon Corp.'s installation in Houston, the MVS microcode product is slated for release Jan. 15. MCS had previously announced a microcode assist feature for Cullinane Corp.'s Integrated Data Management System which is scheduled for release during the first quarter of 1981 [CW, Oct. 27].

The MVS microcode extension is priced at $8,000 and is also offered on a rental or lease basis from MCS at 2902 Orchard Park Way, San Jose, Calif. 95134.

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Arrest of Soviet Scientist Draws U.S. Protest

By Bruce Haard
CW Staff

NEW YORK — The arrest and detention of Soviet cyberneticist Viktor Brailovsky has prompted a raft of protests and petitions here in the U.S.

The Association for Computing Machinery (ACM) and scientists and engineers at three recent conferences have sent letters of protest to A.P. Aleksandrov, president of the USSR Academy of Sciences, over the arrest.

Brailovsky, a Soviet Jew who first applied for emigration papers in 1972, is under investigation for "defaming the Soviet state and public order." He has been held in Moscow's Butyrskaya prison since Nov. 13.

The dissident scientist is the editor of an underground newspaper for Jews in the USSR and the leader of the Moscow Sunday Seminar on Collective Phenomena. That group is composed of other "refusenik" (those refused permission to emigrate) scientists that have been cut off from the mainstream of Soviet science because of their political views.

The ACM's telegram sent to Aleksandrov, Procurator General Roman Rudenko and President Leonid Brezhnev, read as follows:

"The Association for Computing Machinery, the oldest and largest association of computer scientists with over 50,000 members, protests the arrest last week of Viktor Brailovsky, known and respected member of our profession, the leader of the Moscow Sunday Seminar and a dedicated scientist.

"Scientific cooperation between the Association for Computing Machinery and your country will continue to be impossible as long as human rights of scientists like Viktor Brailovsky are violated."

The ACM severed all institutional connections with agencies of the Soviet Union in February 1979, because of what it calls "systematic violations of the free interchange of scientific information."

Second Petition

More than 100 conferees at the Fifth Annual Conference on Pattern Recognition, held in Miami Beach Dec. 1-4, also signed a petition decrying the Soviet scientist's arrest.

In part, it read: "We were shocked and dismayed to learn of Dr. Brailovsky's arrest on Nov. 13. According to reports, he is to be charged with 'defaming the Soviet state and public order' in connection with his advocacy of the right 'to choose one's country of residence' on his own behalf as well as on behalf of thousands of Soviet Jews."

The petition went on to deplore the denial of Brailovsky's "fundamental human rights" and asked for his immediate release.

Another 150 conferees at the Nov. 20 44th Annual Statistical Mechanics Meeting and the 19th Eastern Theoretical Physics Conference on Nov. 21-22 made their feelings on the situation known by sending a similar message.

Publishers Decry Bell Home Service

(Continued from Page 1)

newspapers and other publications.

The experimental information system, the cost of which is "unknown" at this time, according to AT&T spokesman Ed Langsam, would include "about 600" homes and "about 50" businesses. Users would be able to access white pages and Yellow Pages telephone listings, as well as advertising by realtors, supermarkets, department stores and other businesses as well as brand-name listings.

The service would be completely free to users, whom AT&T would provide with the necessary modified TV sets, alphanumeric input keyboards and phones on a separate phone line. "In this case, since we don't want to affect the existing telephone line, in this experiment we'll be putting in an extra line," Langsam said, noting that any "ultimate" commercial service would not necessarily call for separate lines.

Besides the alleged "unfair advantage" of AT&T, the newspaper publishers are protesting the experiment on a procedural basis. "We think something of this nature should have a hearing as opposed to just getting filed and approved almost automatically," Meek said.

According to one of the three PUC members, Moak Rollins, the PUC staff investigated and approved the tariff change — filed by Southwestern Bell on May 21 — "as they have routinely done on hundreds of other tariff changes." Because the proposed plan did not require changes in certification or a change in customer rates, the matter was resolved without a public hearing and without referring the matter to the commissioners, Rollins explained.

The newspaper publishers also feel that "under existing regulations and law — going back to the 1956 Consent Decree — AT&T is not permitted to do this kind of thing, as we understand it," Meek noted.

"It's experimental and a test, and so forth," Meek said, "but why test something that is not currently legal?"

The basic issue, he said, is "whether or not an information carrier, which by definition has an outright monopoly on the phone lines going into every house and every establishment in a given area, should also be the information provider."

Not a Service

To the contention that AT&T would be acting illegally, AT&T's Langsam responded, "This is not a service offering, we are not selling the service in the hope of putting a foot in the door and then saying it's already established.

"This is an experiment; there is no charge; we are not prohibited from doing an experiment," he concluded.

Independent of the Texas publishers' action, Robert G. Marbut, head of the American Newspaper Publishers Association telecommunications committee, charged AT&T was deliberately rushing to get its information service into operation before either the new Congress or Federal Communications Commission (FCC) could decide what services Bell should be allowed to provide.

Congress and the FCC would be less likely to remove authorization for an existing service than they would be to prohibit starting a new service, Marbut contended.

AT&T stressed the experiment is "a test — nothing more, nothing less," according to Langsam. "We want to know how these customers will react to the services we're testing and whether or not they'll use them," he noted, adding that the firm wants to find out whether advertisers, as well, will "find it beneficial.

"It hardly seems fair," Langsam continued, "to freeze us in the print age while others, including newspapers themselves, are allowed to move ahead."

The PUC would be expected to respond within "not less than 30 days but probably within 90 days of receipt of the request for a hearing."

Judge Slashes Triangle Award

(Continued from Page 1)

In the recent decision, however, the trial judge here found that a senior programmer at Triangle in 1972 made changes to some of the computer system's software programs after relieving Honeywell of responsibility for the system's operation, according to a Honeywell spokesman. The programmer was subsequently fired by Triangle's president for incompetence.

Necessary Records

In his decision, the judge also noted that Triangle disposed of some necessary records after commencement of the lawsuit that might have shown that the computer's malfunctions and errors were attributable to program modifications made by Triangle or Honeywell employees. The judge stated that it would be unconscionable to allow a party to recover damages for recourse which might be disproven by records that were present at the beginning of the suit, but disappeared six months later.

The judge reportedly settled on the $35,000 figure in damages because that was the value claimed by Triangle of the difference between what the company actually received in equipment and services and what was promised by Honeywell.

In addition to the briefs filed, the judge's decision to reduce the amount in damages was based on the testimony of witnesses who worked on the installation of the H-110 computer system at Triangle, the Honeywell spokesman stated.

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Incompatibility Key Problem

Fragmenting Systems Design Called Dangerous

By Tom Henkel
CW Staff

MONTREAL — Some systems developers have come full circle in their philosophy on how to configure a large company's system by giving new life to an idea popular back in the 1960s — letting each remote site buy and develop its own computer system.

But the idea may have disastrous consequences, according to a speaker here at the Canadian Future Systems Forum.

Hal Becker, manager of distributed systems and networking at Advanced Computer Techniques Corp. (ACT), which cosponsored the conference with Toronto's Whitsed Publishing, Ltd., said firms that try the fragmentation method of systems development may find themselves in dire straits when it comes time to access data stored on an incompatible system.

Stressing that there is no right or wrong way to configure a large computer system, Becker said the two more traditional approaches to systems development, namely the central-site and distributed methods, are also strong. However, with declining costs of minicomputers, some firms are simply giving each site in need of a computer system money to develop its own system.

There are advantages to the fragmentation aproach. Many minicomputers are very easy to use, require little user training and are easy to maintain. However, the disadvantages — such as uncontrollable development and the possibility that a large firm could be computer-rich, but unable to use much of the data because system incompatibility has made cross-system access impossible — far outweigh advantages, Becker said.

Comparing the fragmentation approach with more traditional distributed and centralized techniques, Becker said problems are easier to define in a fragmented or centralized environment than in a distributed configuration. On the other hand, large centralized operations tend to become too big to handle.

Many large centralized users often identify virtual storage in terms of acres, as opposed to bytes. Some centralized operations can become so big they cannot be managed efficiently. In that case, many systems planners are forced to go the distributed route and develop several large computer sites as opposed to one central site, Becker said.

Distributed systems are not without fault. They tend to be hard to maintain because it is often difficult to pinpoint which site has the problem.

But despite vendors' claims of offering systems with distributed capabilities, Becker said the real thing has not been invented yet.

That means users will have to embark on some level of pioneering before they get the type of systems they want. Pioneering would come mainly in the areas of operating system modifications and changes to standard data base architecture, with the crux of the problem being most software is incapable of effectively knowing what information is stored where.

Centralization is a proven way of computing, but it can be dangerous. Many firms fail to realize that a single disaster could wipe out a central computer site. The result could be a temporary shutdown of the entire firm or, in more severe cases, permanent damage to the computer system, which could spell financial doom to the crippled firm, Becker said.

While many firms feel secure in having a disaster recovery plan on paper, few can swear the plan will work when implemented. Some firms have a backup computing site as part of the disaster recovery plan, but they do not have a plan if the backup center also is rendered useless. Others, while secure in knowing they have a backup center, have no idea how long it would take to actually switch to the secondary base, according to Becker.

CRTs Not Guilty In Stouffers Fire

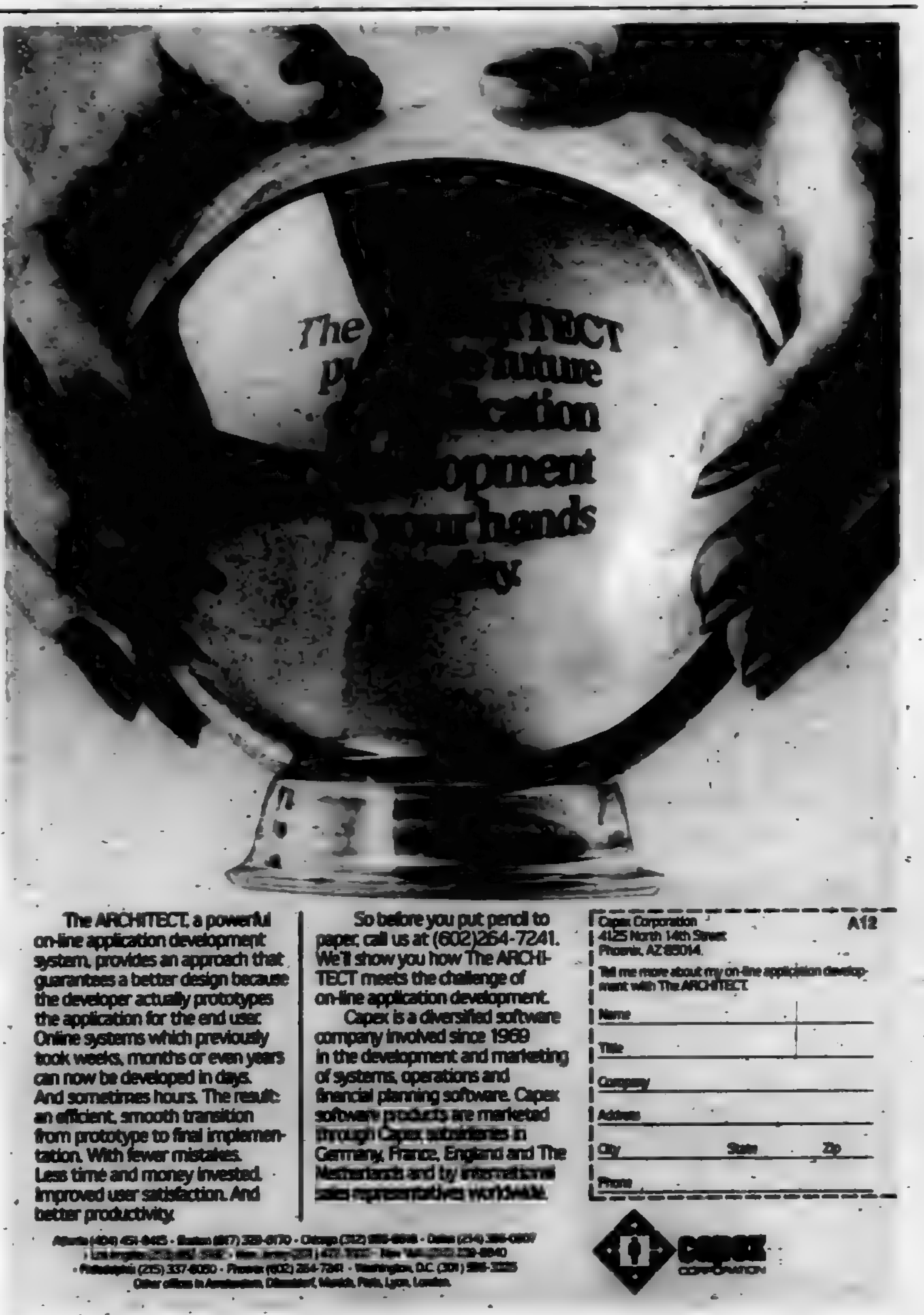
HARRISON, N.Y. — Computer equipment has been exonerated from culpability in the fire that killed 26 people at the Stouffers Inn here Dec. 4.

"That's right," Westchester County Department of Public Safety Police Commissioner Thomas Delaney said when asked if computer equipment was not responsible for the fatal conflagation.

Several CRT terminals were set up in the rooms occupied by executives of Arrow Electronics, Inc. when the blaze broke out. However, they were not in operation at the time, company officials claimed.

"Right now, there's no determination how the fire started," Delaney said, adding officials suspect it may have originated in the cockloft — a four-foot-deep area between a false ceiling and the roof that contained pipes and electrical wiring.

One theory is that smoke and gas built up in the area until the mixture exploded into the room where Arrow officials were holding a meeting.



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Data Base Machines Evolving Fast, Users Told

By John Whitmarsh
CW Staff

LONDON — There's a data base machine in your future — if you can wait until 1985.

That is when the first commercially available data base machine that incorporates new technological breakthroughs is expected to be introduced to the general DP market, according to Bruce Berra, chairman of the department of industrial engineering and operations research at Syracuse University.

While recent data base machine announcements, including a product from Software AG [CW, Oct. 10/27], depend upon current and proven architectures, future data base machines will be based on new developments in associative memories and cellular logic, he indicated.

Data base machine development is accelerating so quickly in so many quarters, Berra told attendees at the Infotech State-of-the-Art Review here, that commercial product offerings could possibly come from suppliers in Japan, West Germany and the UK as well as the U.S.

The driving forces of data base machine development are the same as those driving the information industry. The decreasing costs of hardware coupled with soaring costs of software and personnel are at the heart of it. But throw in the need for performance improvements of three or four magnitudes, and data base machines appear to make considerable marketing sense.

"Under these conditions, it becomes imperative to consider moving functions that are primarily executed in software to hardware," Berra said.

The interest in data base machines is an extension of the attention currently being given to data base management systems (DBMS). Because of the size and complexity of DBMS, the perceived need is for a new type of hardware — the data base machine — designed solely for the purpose of managing data.

What chiefly distinguishes a data base machine from a standard sequential computer is parallelism in content addressing, according to Berra.

Five Groups

Berra divided the current work in data base machines into five somewhat overlapping groups.

First is the associative memory/processor group. In these machines hardware associative memories or processors perform a variety of functions such as content search in parallel and parallel arithmetic operations. The Staran associative array processor is an example of this type of device.

Second are cellular logic devices. In systems such as the context-address segment sequential memory (CASSM) and the relational associative processor (RAP), some intelligence of the CPU is moved closer to secondary memory (which is usually disk storage but can include charge-coupled devices or bubble memory).

Multiple processor systems make up the third class of data base machines. Here several distinct processors perform several distinct functions. Examples of this group include the Ohio State Data Base Computer, the Infoplex system, the Direct system and the relational associative computer system (Relacs).

The fourth class — those Berra feels will have the greatest near-term impact in terms of performance and user transparency — are special-purpose function architectures (SPFA). These machines concentrate on a clearly defined function and develop an architecture that is concerned with only that function. Example: the content-addressed file store, the search processor, the merge processor, the inverted file processor, directory processors and dictionary processors.

The fifth class includes machines dedicated to information storage and retrieval, chiefly text processors. Examples are the associative file processor (AFP) and high speed text search (HSTS) system.

Development in these state-of-the-art systems will have a profound effect on how data is handled in data base management systems, according to Berra.

"There is no doubt that data base machines will become a reality," he said. "The question concerns how we get there from here."

Two Approaches

Berra outlined two distinct approaches at each end of the implementation spectrum.

"The revolutionary approach means going directly to a data base machine," he said. Two types of groups are likely to try this approach, in Berra's estimation. The first includes organizations with only a small investment in current DBMS software and data. "This group will leapfrog current sequential data base management systems and go directly to data base machines. Though this route is wrought with problems, nevertheless some organizations will take it."

The second group taking the revolutionary approach includes organizations heavily involved in DBMS today and whose requirements have exceeded the capabilities of their systems. "This group will have to discard much of their current investment in favor of trying to attain order of magnitude increases in performance and increases in function," Berra said.

But the largest group of DBMS users will take the evolutionary approach, Berra believes. Typically these organizations have tremendous investments in software and data but are unable to get along with current systems.

"Initially these users will see increases in performance and/or throughput as technological and architectural advances take place," Berra said.

"Most of the impact will come from special-purpose function architectures such as search processors, merge processors and data dictionary/directory processors.

"That is, there will be a 'bottom-up' approach in which enhancements will be made to existing systems at the hardware/firmware level without the user really knowing about it. All the user will see is the resulting increase in performance and/or throughput.

"As this evolution continues there will invariably be increases in functional capability which the user will soon recognise. Then the user will want to take advantage of those increases, and this represents the next major step in the evolutionary approach."

This trend will continue until many organizations have developed the use of data base machines, Berra predicted.

Error in Bar Exam Scoring 'Passes' Some Who Failed

NEW YORK — An apparent programming error in the weighting of the New York state bar examination caused 26 would-be lawyers to believe they had passed the exam when they had actually failed. The same error was also blamed for failing 35 law graduates when they had actually passed.

The State Board of Law Examiners, which used a computer to score tests for the first time, stated the mistake was made in the preparation of a program written by Gansk Associates, a consulting firm in Venice, Calif. Steven Kline of Gansk said, "It was simply a matter of the programmer transposing two numbers."

The national component of the bar exam was weighted at 45% and the New York essay portion at 40%. The board, however, assigned a weight of 40% to the national and 45% to the New York essay.

The State Board had not been automated until the spring of 1980 when a court decision doubled its work load.

Although the State Board utilizes an IBM System/34 in Albany, N.Y., officials of the board were impressed by a talk given by Kline on software for their purpose. Executive Secretary to the Board James Fuller said, "IBM was of no value to us at all, they offered no inclination to help."

Copyright Act Awaits Signing

(Continued from Page 1)

from unauthorized copying, copyright law doesn't protect the original algorithms or formulas upon which the program is based.

One example might be an instructional program for elementary school students with output readable by humans that was originally written in Cobol. If an unauthorized person copied that program in Fortran, it would be a "clear copyright violation," Maggs said, even though the programming language was different.

However, programs that are based on algorithms, such as software which interprets seismic data to locate oil, may not be protected — particularly "if there is really only one way to express the algorithm," according to Maggs.

There is also a question as to whether some programs can be classified as "writings" within the meaning of the copyright clause, Maggs said. The Constitution limits the power of Congress to provide copyright protection to "authors" for their "writings." The output of a microcomputer control system is a series of electronic impulses directed to a machine rather than a work directed to human readers. If this type of output is not a "writing," it cannot be protected constitutionally unless it qualifies as a discovery of an inventor, according to Maggs.

The rights of the copyright owner are also limited by the statutory definition of "copies," he said. For example, a competitor might make an exact reproduction of a program and seal it along with a microprocessor that executes the program instructions in a block of epoxy cement. Once that sealing had been accomplished, the program could not be "perceived, reproduced or otherwise communicated" so there would appear to be no "copy" made.

Given these possible loopholes, Maggs felt that trade secret law still offered the best protection to software developers. The main exception to this would be where the mode of distribution was so universal — television game programs would be an example — as to make the securing of trade secret agreements from all purchasers impractical. In that case, he felt that "copyright protection might be better than no protection."

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Buyer's Checklist Supplied

Datapro Sees DC Monitors in Managers' Future

By Rita Shoor
CW Staff

DELRAN, N.J. — If estimates made by Datapro Research Corp. are true portents of the future (see related story on Page 1), chances are good that information systems managers who have not yet participated in selecting a data communications (DC) monitor will have that chance before 1985.

This is an opportunity that has some negative aspects since anyone planning to implement a teleprocessing (TP) network must be "at least basically grounded" in DC concepts in general and TP monitors in particular, Datapro noted.

This is easier said than done, since this is a highly technical software area involving multiple methods, controls systems within systems and, almost inevitably, new vocabulary (see story on Page 13).

However, the research organization offered some pointers that should help with the selection in "A Buyer's Guide to DC Monitors." The complete novice with no DC knowledge should probably begin with one of the books authored by a DC expert, according to Datapro. Assuming a basic level of knowledge, the firm recommended attending at least one seminar dedicated to TP monitors and other DC software.

The next step involves contacting several experienced TP monitor uses to benefit from their planning, implementation and problem-solving approaches. Datapro then suggested a visit to one or more companies where a DC monitor is in operation in order to get a feel for what a monitor can do and what is involved in implementing a typical monitor system.

Product Spotlight

See Charts on Pages 10-12

Rare Expertise

Datapro contended that it would be rare if one person had the necessary expertise for all of the decisions that have to be made during the monitor selection process.

In addition to the formidable problems raised by a specialized vocabulary, it would be difficult for one individual to be aware of various features that are product-specific.

For example, two vendors have specialized access methods tied to the monitors. Insac Software, Inc. offers Shadow teleprocessing access method and Unique sequential access method for Shadow II. Software AG tied sequential direct (SD) file access method to its Com-plete monitor.

Cincom Systems, Inc. specializes in another area by offering a version of Cobol called Cobol-XT, which is processed via a Cincom compiler. Cobol-XT and specialized library structures were specifically designed for DC networks, according to product manager Mike Cullen. The compiler generates reentrant, relocatable paged code and although native mode Cobol is supported, Cullen stated that most users go with the Cincom-specific software.

Evaluation Team

Given these requirements, Datapro recommended that an evaluation team be given the responsibility of selecting the appropriate monitor for a firm's installation.

The panel should probably include a senior systems analyst who is familiar with the applications to head up the team, a software expert, a hardware specialist and a representative from the company's financial management area.

The evaluation team should begin by determining the system requirements for the given environment. Datapro recommended that the following major points be addressed:

- Determine functions to be supported. These could include data entry, inquiry/response, remote job entry, message switching or a mix of these functions.
- Define the network distribution. How many communications points will be established and what will they be?
- Estimate the traffic that will be moving between each pair of points, keeping in mind peak loads and peak load times.
- Set up priorities in terms of time constraints as dictated by user requirements.
- Allow for data verification programs to ensure system accuracy.
- Explore and define codes and line procedures. These include conversion facilities required to interface terminals and application programs with the overall system; determining which interface codes must be available and specifying the line protocol features, transmission characteristics and facilities that will be supported by the TP monitor.
- Determine the cost-effectiveness and ease of use of the proposed installation.

Once these requirements have been reviewed, the team should be ready to evaluate the available monitors. In addition to the factors specified in the accompanying charts, Datapro cautioned potential customers to take a close look at security provisions, vendor-offered support and vendor stability.

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DC Monitors for OS-Type Systems . . .

	SYSTEM / CHARACTERISTICS	IBM CICS OS Standard[1]	IBM CICS OS/VS	SDA Products, Inc. Intercomm	Software AG of North America Com-Plete
CONFIGURATION	Operating Systems	OS, VS1, SVS, MVS	VS1, MVS[2]	OS, VS1, SVS, MVS	OS, VS1, SVS, MVS
	Protocols Supported	BSC, Start/Stop	BSC, Start/Stop, SDLC	BSC, Start/Stop, SDLC	BSA, Start/Stop
	Average Partition Size	288K bytes	244K bytes	300K bytes	192K bytes
TASK MANAGEMENT	Telecommunications Access Methods Supported	Btam, Tcam, GAM	Btam, Tcam, Vtam, ACF/Vtam, ACF/Tcam	Btam, Tcam, Vtam	EXCP
	File Access Methods Supported	Vsam, Isam, SAM, Bdam	Vsam, Isam, SAM, Bdam	All standard IBM access methods	Isam, Bdam, Vsam, SD, Vtam
	Multitasking Capabilities?	Yes	Yes	Yes	Yes
	Single Thread/Multithread	Multithread	Multithread	Multithread	Multithread
	Method of Main Storage Management	Dynamic	Dynamic	Dynamic	Predefined
	Level of Data Updating Protection	File Level	Record Level	Record Level	File Level
	Task-to-Task Communication?	—	Also Intersystem Communication	Yes	Yes
	User Exit Provisions?	Yes	Yes	Yes	Yes
TERMINAL SUPPORT FACILITIES	Automatic Transaction Logging?	No	Yes	Yes	Yes
	Message Switching?	Yes	Yes	Yes	Yes
	CRT Format Support (Local and/or Remote)	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote
	Terminal Paging?	No	Yes	Yes	Yes
	Printer Support?	Yes	Yes	Yes	Yes
	System Monitoring Functions (System/Line/-Terminal Statistics)	Yes (all)	Dynamic Logging & Master Console Programs	Yes (all)	Yes (all)
	Test and Debugging Facilities	Trace, Dump, Simulator	Execution Diagnostic Facility	Trace, Dump, Simulator, Storage Protection	Dump Analysis, Logging Diagnostics
	Terminals Supported	3270, 2260, 2740, 2770, 7770	All current 370-, 30 series- and 4300-supported terminals, plus 3660, 3630	Most IBM & IBM-compatible	All standard IBM-type devices
RECOVERY FEATURES	Checkpoint/Restart?	No	Yes	Yes	Yes
	Network Recovery	Automatic	Automatic	Automatic	Automatic
	Automatic Warm Restart?	No	Yes	Yes	Yes
ET CETERA	Programming Languages Supported	Cobol, PL/I, Assembler.	Cobol, Fortran, PL/I, Assembler	Cobol, Fortran, PL/I, Assembler	Cobol, PL/I, Fortran, Assembler
	DBMS Interfaces Available	IMS-2, IMS/VS	IMS/VS	Total, Adabas, IDMS, System 2000, DL/1, Model 204	Adabas
	Approximate Current Number of Users	Not Available	Not Available	200	150
	Price (Base System, No Options)	$823/mo on monthly license only	$1,100/mo on monthly license only	$69,375[3]	Interactive Program Development: $36,000; Communications Monitor: $60,000 (MVS), $45,000 (SVS, VS1)[4]

[1] Available with Class C program support only.
[2] Version 1.5 released in September 1980. SVS is supported only in earlier versions.
[3] Includes all options plus education and installation.
[4] If both are purchased, cost is $80,000 under OS and $90,000 under MVS.

(Continued from Page 1)

Besides these multiple interfaces, the monitor should include a line control facility that accommodates the protocols within the network and must address the specific terminal characteristics of the devices employed in the network. In essence, Datapro said, the DC software provides the means of controlling the specific environment defined by the user.

The accompanying charts specify these interfaces and other relevant features for monitors designed to run on IBM and IBM-compatible mainframes. In general, the hardware includes IBM 360 and 370, 30 series and 4300 series computers. A representative group of vendors includes IBM, Retida, Inc., Software AG, Applied Data Research, Inc. (ADR), Cincom Systems, Inc., SDA Products, Inc., Mathematica Products Group, Insac Software, Inc., Turnkey Systems, Inc. and Westinghouse Electric Corp.

A review of the charts shows few product specification changes since Datapro's last overview in January 1979. The obvious exception is the modification required for DOS-type monitors to run under DOS/VSE. However there have been some changes among the vendors themselves since 1979. Altergo Software, Inc., for example, was acquired by Insac, Inc. as of Sept. 15, according to a company spokesman. Mathematica took over the package formerly marketed by GBA International (GBASwift) and renamed the monitor as MPGSwift.

SDA acquired the Intercomm and

Product Spotlight

. . . And for OS-, DOS-Type Systems

	System Characteristics	[illegible]	Cincom Systems, Inc. Environ/1	Insac Software, Inc. Shadow II	Turnkey Systems, Inc. Task/Master II	Retida, Inc. Betacomm
CONFIGURATION	Operating Systems	DOS, DOS/VS, DOS/VSE, OS, VS1, SVS, MVS, VM	DOS, DOS/VS, DOS, VSE, OS, VS1, SVS, MVS	DOS, DOS/VS, DOS/VSE, OS, VS1, SVS, MVS	DOS, DOS/VS, OS, VS1, SVS, MVS	DOS, DOS/VS, DOS/VSE, OS, MVT, MVS
	Protocols Supported	BSC, Start/Stop, SDLC	BSC, Start/Stop, SDLC	BSC, Start/Stop, SDLC	BSC, Start/Stop, SDLC	BSC, Start/Stop
	Average Partition Size	90K bytes (DOS); 130K bytes (OS)	110K bytes	80K bytes (DOS); 160K bytes (OS)	75K bytes (DOS); 170K bytes (OS)	80K bytes
TASK MANAGEMENT	Telecommunications Access Methods Supported	Btam, Vtam,	Btam, Tcam, Vtam	Btam, Tcam, Vtam, Stam	Btam, Tcam, Vtam	Btam, EXCP
	File Access Methods Supported	Bdam, Isam, SAM, Vsam, Relative Block Access for FBA drives	Bdam, Isam, SAM Vsam	All standard IBM methods plus Vsam	All standard IBM methods	Bdam, Tsam, Vsam SAM
	Multitasking Capabilities?	Yes	Yes	Yes	Yes	Yes
	Single Thread/Multithread	Multithread	Multithread	Multithread	Both	Multithread
	Method of Main Storage Management	Predefined/-Dynamic	Dynamic	Dynamic	Dynamic	Dynamic
	Level of Data Updating Protection	Record Level	Record Level	Record Level	Record Level	Record Level
	Task-to-Task Communication?	Yes	Yes	Yes	Yes	Yes
	User Exit Provisions?	Yes	Yes	Yes	Yes	Yes
TERMINAL SUPPORT FACILITIES	Automatic Transaction Logging?	Yes (selective)[1]	Yes	Yes	Yes	Yes
	Message Switching?	Yes	Yes	Yes	Yes	Yes
	CRT Format Support (Local and/or Remote)	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote
	Terminal Paging?	Yes	Yes	Yes	Yes	Yes
	Printer Support?	Yes	Yes	Yes	Yes	Yes
	System Monitoring Functions (System/Line/Terminal Statistics)	Yes (all)	Yes (all)	Yes (all)	Yes (all)	Application program times, terminal usage & errors
	Test and Debugging Facilities	Trace, Dump, Simulator	Dump, Simulator	Trace, Dump, Simulator On-Line Diagnostics	Trace, Dump, Simulator	Trace, Dump, Simulator, Storage Protection
	Terminals Supported	All IBM & IBM-compatible devices	All Btam-supported devices; SDLC/3270s and IBM 3600 series banking terminals under Vtam	All IBM-supported and compatible device?	Standard support for more than 400 device types	3270, TTY, 7770
RECOVERY FEATURES	Checkpoint/Restart?	Yes	Yes (task level)	Yes	Automatic	Yes
	Network Recovery	Automatic	Automatic	Automatic	Automatic	Automatic
	Automatic Warm Restart?	Yes	Yes[2]	Yes	Yes	Yes
ET CETERA	Programming Languages Supported	Cobol, Fortran, PL/I, Adpac, Assembler	Cobol, Fortran, BAL, PL/I, Cobol-XT[3]	Cobol, Assembler, PL/I	Cobol, Fortran, PL/I, Assembler	Cobol, Fortran, PL/I Assembler, RPG-II
	DBMS Interfaces Available	Datacom/DB, Total	Total	IDMS, Adabas, Total, Ramis, DL/1, Dbomp, System 2000/80, Isogen, Vandl/1	IMS, Adabas, IDMS, DL/1, Datacom/DB, Total, System 2000/80 & others	Total, Bomp, Dbomp, Vandl/1
	Approximate Current Number of Users	200	425	450	More than 300	100
	Price (Base System, No Options)	DOS, DOS/VS: $17,000 (entry), $32,000 (std.); OS, OS/VS: $37,000	DOS, DOS/VS: $15,000; OS, OS/VS: $18,300	DOS: $42,000; OS: $58,000	DOS: $20,000; OS: $44,000	$17,500

[1] User is required to identify via a transaction code the transactions to be identified.
[2] Automatic warm restart is at asynchronous point of failure; every terminal gets reset as of its last screen.
[3] Cobol-XT processed through Cincom-specific compiler.

Minicomm packages that had previously been marketed by Informatics, Inc. in August 1979. Bengt Holmgren, the original author of Betacomm, the third product in the Informatics group, is now selling that monitor through New Jersey-based Retida, Inc. Although Informatics had marketed the product solely for DOS-type operating systems, Holmgren said it also runs under OS, MVT and MVS.

Product specifications and price ranges are based upon information from the Datapro report with vendor confirmation whenever possible. And, while prices are always subject to change, many TP monitors have not been affected by inflationary pricing during the last 18 months.

While SDA increased the cost of Intercomm and Minicomm from $38,000 and $9,500 to $69,375 and $10,000, those prices reflect a decision to sell the products only in totally bundled form, said Aire Slot, director of marketing for communication systems.

Turnkey also opted to bundle its Task/Master II monitor. The DOS version now costs $42,000 and the OS version goes for $58,000, according to a company spokesman.

Mathematica hiked the cost of MPGSwift Version II from $9,500 to $10,500. IBM and Westinghouse also put increases into effect, but the standout is Shadow II, which went from $8,000 under DOS and $36,000 under OS to $20,000 and $40,000, respectively, when Insac acquired it. On the bright side, some four products remained at 1979 prices and Cincom's Environ/1 actually decreased. It went from $22,500 under DOS and $26,500 under OS to $15,000 and $18,300.

DC Monitors for DOS-Type Systems

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CONFIGURATION	Operating Systems	DOS, DOS/VS	DOS, DOS/VS	DOS, DOS/VS, DOS/VSE	DOS, DOS/VS, DOS/VSE	DOS, DOS/VS, DOS/VSE	DOS, DOS/VS, DOS/VSE
	Protocols Supported	BSC, Start/-Stop	BSC, Start/-Stop	BSC, Start/-Stop, SDLC	BSC, Start/-Stop	BSC	BSC, Start/-Stop
	Average Partition Size	73K bytes	109K bytes	101K bytes	4K bytes to 60K bytes	8K bytes plus space for largest single application	48K bytes (DOS); 4K bytes to 24K bytes real (DOS/VS)
TASK MANAGEMENT	Telecommunications Access Methods Supported	Btam	Btam, Tcam, GAM	Btam, Vtam, ACF/Vtame	Btam	EXCP	Btam, EXCP
	File Access Methods Supported	Vsam, Isam, SAM, Bdam	Vsam, Isam, SAM, Bdam	Vsam, Isam, SAM, Bdam	All standard IBM access methods	Any DOS-supported file access method	All standard IBM DOS and DOS/VS methods
	Multitasking Capabilities?	Yes	Yes	Yes	No	Yes	Yes
	Single Thread/-Multithread	Single Thread	Multithread	Multithread	Both: two versions available	Single Thread	Both
	Method of Main Storage Management	Dynamic	Dynamic	Dynamic	Preallocated	Preallocated	Preallocated; Roll-In/Out
	Level of Data Updating Protection	File Level	File Level	Record Level	Record Level	File Level	Record Level
	Task-to-Task Communication?	—	—	Also Intersystem Communication	Yes	Yes	Yes
	User Exit Provisions?	Yes	Yes	Yes	Yes	Yes	Yes
TERMINAL SUPPORT FACILITIES	Automatic Transaction Logging?	No	No	Yes	Yes	Yes	Yes
	Message Switching?	Yes	Yes	Yes	Yes	Yes	Yes
	CRT Format Support (Local and/or Remote)	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote	3270 Local & Remote
	Terminal Paging?	No	No	Yes	Yes	Yes	Yes
	Printer Support?	Yes	Yes	Yes	Yes	Yes	Yes
	System Monitoring Functions (System/Line/-Terminal Statistics)	Yes (all)	Yes (all)	Dynamic Logging & Master Console Program	Yes (all)	Application & Terminal Usage; Terminal Errors	Yes (all)
	Test and Debugging Facilities	Trace, Dump, Simulator	Trace, Dump, Simulator	Execution Diagnostic Facility	Trace, Dump, Screen Diagnostics	Trace, Dump, Simulator, On-Line Debug	Dump, Screen Display, Abend Routines
	Terminals Supported	3270, 2260	3270, 2260	All current 370-, 30 Series- and 4300-supported terminals, plus 3660, 3630	3270, 2260, 3767, 2740, 3741, 7770, TTY and all compatibles	3270, 2260	Most Standard IBM Types and TTY
RECOVERY FEATURES	Checkpoint/Restart?	No	No	Yes	No	No	No
	Network Recovery	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
	Automatic Warm Restart?	No	No	Yes	Yes	Yes	Yes
ET CETERA	Programming Languages Supported	Cobol, PL/I, Assembler	Cobol, PL/I, Assembler	Cobol, PL/I, Assembler, RPG	Cobol, Fortran, BAL, PL/I, Ramis, RPG-II, Adpac	Cobol, PL/I, Fortran, Assembler, RPG-II	Cobol, PL/I, Assembler, RPG-II
	DBMS Interfaces Available	Vandl/1	Vandl/1	IMS/VS, DL/1, DOS/VS	Total, IDMS, Bomp, Dbomp, Ramis-II, Datacom/DB, plus others	Total, DL/1, Bomp, Dbomp, Vandl/1	Total, Dbomp, Datacom/DB, IDMS, Bomp, DL/1, Adabas
	Approximate Current Number of Users	Not Available	Not Available	Not Available	More than 80	150	More than 550
	Price (Base System, No Options)	$235/mo on monthly license	$588/mo on monthly license only	$522/mo on monthly license only[2]	Version I: $7,500; Version II: $10,500; rental available	$20,000[3]	Local support: $11,000; Local/remote: $15,000

CW Chart

[1] Available with Class C program support only.
[2] Includes $165 monthly support fee.
[3] Includes all options plus education and installation.

Technician's Bane

Glossary of Terms Outlined for DC Monitors

By Rita Shoor
CW Staff

Most information systems specialists have a love-hate relationship with DP jargon. When approaching new concepts, it is the bane of the technician's existence. Once the technique is grasped, however, he usually delights in using the various acronyms and expressions that had previously caused him so much confusion.

The following list of acronyms was spelled out and explained where deemed necessary through the combined efforts of Datapro Research Corp.'s "Buyer's Guide to Data Communications [DC] Monitors" and spokesmen from several DC monitor vendor organizations.

Communications Protocols (procedures used for data transmission):

- BSC: Binary synchronous communications.
- SDLC: Synchronous Data Link Control — tied to Systems Network Architecture (SNA).

Telecommunications Access Methods (control sending and receiving messages from terminals and provide various other terminal control facilities):

- Btam: Basic Telecommunications Access Method — provides basic facilities for sending and receiving messages and for polling and addressing terminals.
- GAM: Graphics Access Method.
- EXCP: Execute Channel Program — allows the monitor to interact directly with the system at supervisor code level.
- Stam: Shadow Telecommunications Access Method — unique to Shadow II TP monitor from Insac Software, Inc.
- Qtam: Queued Telecommunications Access Method. In addition to facilities provided by Btam, Qtam allows for scheduling and resource allocation, queuing of messages on disk and message logging. Makes macro language available to applications programmer.
- Tcam: Telecommunications Access Method (more sophisticated than Qtam). It offers a message control program to handle message and network control functions and has facilities for system recovery, checkpoint/restart and control of system shutdown.
- Vtam: Virtual Telecommunications Access Method — usable only with IBM's DOS/VS and OS/VS operating system. In addition to Tcam facilities, it allows the user to dynamically interface with a variety of applications programs.
- ACF: Advanced Communications Functions. This feature is offered with Vtam, Tcam and Extended Vtam (Vtame).

File Access Methods:

- Bdam: Basic Direct Access Method.
- Isam: Indexed Sequential Access Method.
- SAM: Sequential Access Method.
- Vsam: Virtual Storage Access Method. Bdam, Isam, SAM and Vsam are standard IBM file access methods.
- SD: Sequential Direct — available only with Com-plete monitor from Software AG.
- Usam: Unique Sequential Access Method — available only with Shadow II from Insac.

Product Spotlight

Network Meet Set for Jan. 13

HOUSTON — The Communication Networks Conference and Exposition to be held here Jan. 13-15 will feature in-depth seminars on telecommunications technology and applications.

Subject matter at the conference will range from technological network aspects to a review of emergent electronic media. All but one of the nine seminars will be all-day sessions.

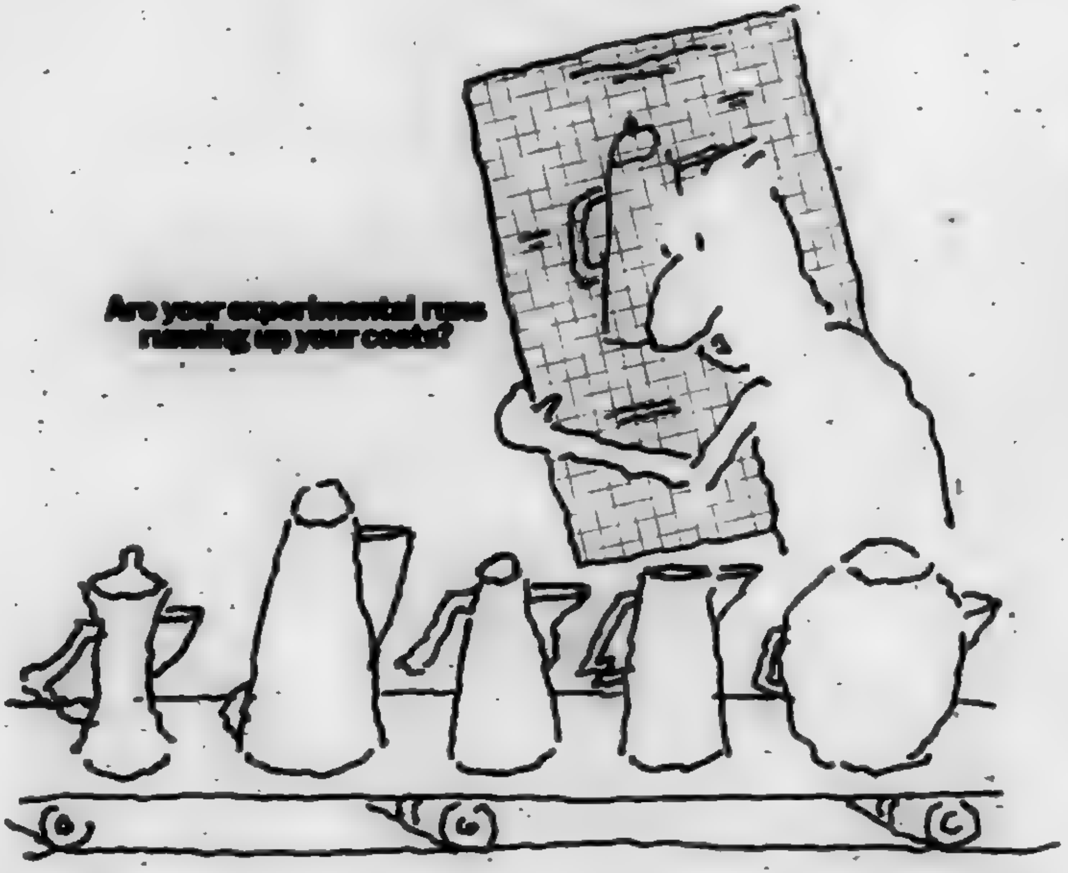
"Key Topics in Network Technology in the 1980s" will address itself to the growing assortment of implementation devices available for network builders over the coming decade. Solid-state devices, switches, intelligent controllers and new control hardware will all be discussed.

"New Electronic Media: Challenge for the 80s" will sort out and compare the various new electronic media, with special emphasis on illuminating the differences between them.

The cost for the conference is $195 for each full-day program and $50 for the one half-day seminars. The registration fee also covers admission to the Communications Networks Exposition.

Communication Networks, sponsor of the show, can be reached at 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Are your experimental runs running up your costs?



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Rarely Considered Early Enough

Software Performance Viewed a Design Problem

By Rita Shoor
CW Staff

BOSTON – Software performance is too rarely considered early enough in the development of on-line systems, according to Connie Smith, who spoke at the recent Computer Performance Evaluation (CPE) conference. This is ironic since it is at this time that the system design is malleable and improvements can achieve the most impact, she noted.

Smith described the merits of considering the performance of large software systems to an audience almost evenly split between managers and analysts at the Computer Measurement Group (CMG)-sponsored session on "Organizing to Solve CPE Problems."

While she conceded that functionality and expediency must be emphasized in the real world of project deadlines and organizational politics, she stressed that the usability of the final product and its impact on the host computer system must also be considered.

Unless this is done, the implemented software often performs so poorly that one of three things happens: New computer resources are required to run it; redesigning the software becomes an immediate necessity; or it is never used.

Explaining that she had "only recently joined a university environment" (Smith teaches at Duke University), she maintained that she "knows what it's like to fire-fight" when redesign is the selected option. During more than 10 years as a performance analyst, she was often called in to improve unacceptable response times for an implemented system while someone else redesigned the software.

These might be considered classic cases of reversed priorities, since "it is always far less expensive and more productive to select an appropriate design initially than to tune and patch systems with inappropriate designs after implementation," she said.

Even though a precise prediction of performance isn't feasible early in the design stage, she indicated that unsatisfactory or potentially disastrous designs can usually be eliminated early in the development process.

Critical Components

It is also essential to identify the "critical components" of the proposed system – usually described as "bottlenecks" or rate determining processes. These components should be implemented first with optimization directed toward them for maximum impact, Smith said. As they are implemented, the performance analyst should evaluate them and feed all relevant data back into all other system predictions.

This feedback process is necessary, she pointed out, since "modifications to [the system] design always occur during development." Therefore, the specifications must be continually reviewed and re-analyzed to ensure that predictions don't become obsolete.

She recommended comparing measurement data to the performance specifications for the system in order to improve the accuracy of future predictions.

The first analysis usually consists of collecting performance specifications, and Smith advocated doing this via performance-oriented design walk-throughs.

Based upon this information, the analyst generates an execution graph to reflect the system structure and uses the graphs to derive the mean expected response time as well as the expected best and worst cases. She recommended that optimistic assumptions always be used for the initial analysis.

When this is done, the designers can see very quickly if the response time won't work even under the best of conditions, she said. If worst-case assumptions are used, designers might argue that the given conditions will never happen rather than working to improve the response.

Execution graphs are a good tool since they enable the performance analyst to use graph theory to prove that the predicted performance is possible from the given specifications. Given these tools, the analyst can identify bottlenecks and propose alternative solutions prior to software implementation, she said.

Possible solutions include:

- Reducing the resource requirements by revising the design and thus the specifications.
- Reducing the system overhead by upgrading hardware.
- Restructuring and combining the processes to eliminate or reduce linkage time.

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Revamp of Transborder Data Policy Proposed

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – A broad reorganization of federal activities in international communications and information policy has been proposed in the House of Representatives.

The legislation, introduced Dec. 5, stems from a House subcommittee investigation of executive branch responses to emerging barriers to international information flows.

In introducing the bill, Rep. Richardson Preyer (D-N.C.) said the reorganization is needed to remedy "the confusion, conflicts and lack of coordination, which have so far plagued the executive branch."

Responsibility for international information policy is now spread among several federal agencies, including the State and Commerce Departments, the Federal Communications Commission (FCC) and the U.S. Trade Representative's office.

The new bill would set up special offices in several of those agencies to address these issues and establish a White House office to coordinate their activities.

Preyer, whose Government Information and Individual Rights Subcommittee has been looking into U.S. government response to international information flow problems, said "the current organization is based on a dangerously obsolete compartmentalization of government policymaking."

Consequently, Preyer said, the U.S. "has developed neither comprehensive plans nor a coherent strategy for responding to the policies of other nations which may damage U.S. interests.

"In simple economic terms," he said, "the U.S. is threatened with the loss of billions of dollars. In one of the few economic sectors in which American businesses hold a competitive edge – telecommunications and computer products and services – our ability to compete is threatened. At risk is a multibillion dollar export sector growing at a rate of more than 30% each year.

"The health and growth of other economic sectors dependent on the 'information industries,' such as international finance, are equally threatened, with billions more at stake," Preyer continued. "Barriers to international flow of information also threaten injury to fundamental democratic freedoms and individual rights throughout the world."

'Essential Weaknesses'

The severity of these problems and the "essential weaknesses" of the federal organizational structure that must respond to them led to the bill, Preyer said. Because the bill was introduced in the last days of the 96th Congress, no action can be taken on it until the new Congress arrives next year.

Preyer, chairman of the information subcommittee for the last four years, was defeated in November's election. Even without his presence in the next Congress, strong bipartisan support for better U.S. response to international information problems should lead to some action on the legislation within the next year, according to a subcommittee aide.

The centerpiece of the legislation is proposed establishment in the Executive Office of the President of a Council on International Communications and Information. The council would be composed of an executive secretary, appointed by the President and confirmed by the Senate, plus the secretaries of State and Commerce, the FCC chairman, the U.S. Trade Representative, the director of the Office of Management and Budget and the President's national security adviser.

The mandate of the council would be to "develop and implement a uniform, consistent and comprehensive U.S. policy on international communications and information" and to be the President's adviser for these subjects.

Besides serving as the office to which U.S. citizens and businessmen would bring "problems and concerns" regarding international communications and information, the council would coordinate the policies and activities of all federal agencies involving those issues.

Specifically, the bill says the council would "review all policy determinations of federal agencies and all proposed statements of U.S. policy by such agencies, relating to international communications and information and approve, disapprove or modify such policy determinations or proposed statements."

In that connection, the legislation says, "no federal agency may issue any policy statement, engage in any consultation, establish any policy or implement any change in policy relating to international communications and information" unless first authorized by the council.

The bill would also set up an advisory committee to "provide overall policy guidance to the council."

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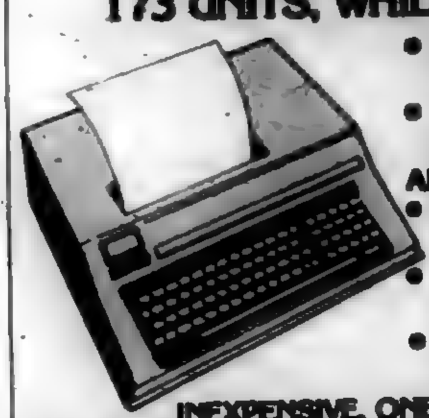

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Exec Maps Changes In Training Landscape

By Bruce Hoard
CW Staff

CAMBRIDGE, Mass. — Look for software to become "at least" four or five times more influential in the DP education and training process. Look for the number of terminal users hooked up to data communications systems to grow 100% over each of the next three years. And look for training and education budgets to triple in size during the '80s.

Those were some of the points delivered by Chet Mills, president of MSSI, Inc., during the Data Training '80 conference here last week. The conference was sponsored by Northeast Training News.

Mills described a volatile, rapidly changing training environment in which educators will be hard pressed to familiarize themselves with even a portion of the software available for use.

"IBM will release more system-level software in the next year than they have in the past 16," he claimed. In addition, the number of "productivity aids" released by IBM from September 1978 to the present will double during the early '80s, he declared. "If half that estimate is true, we're in trouble."

Future Problems

The increasing popularity of data communications systems and SNA-type architectures also poses a problem for educators, he said. As the number of people with terminals and access to data communications system grow, their demand from those systems will also grow, leading them into technical areas such as language, he said.

The tripling of training and education budgets will result from several reasons, including a projected 18% to 25% increase over the next four years of DPers who will require educational input, Mills asserted.

Those figures are "low end" and derived from 23 organizations Mills contacted that have gone through what he termed "evolutionary or revolutionary" changes as part of their growth.

Few DP shops will escape the ravages of those changes, he claimed. "Over one or two years, all the delivery requirements for education and training will flip right over and change quite radically," he said.

Mills discussed the educational needs of a new breed of programmers as an example of the increased burden trainers will have to shoulder.

The first, or "entry-level programmer Ad Hoc-systems person" writes small, short systems for existing automated environments. That programmer does not require the "full boat" of procedural languages.

The second, "systems designer/-programmer," is a competent programmer who can "design and do the whole job." He does programming and design and is found not in DP, but in end-user departments. Both employees require different instruction, one is not even in the DP department, but it is up to the DP training and education department to teach them both, Mills said.

He went on to address the challenge of distributed data processing (DDP). For awhile, after the announcement of the IBM 8100, it looked as though it would be the key to IBM's DDP strategy, he commented. Then, the 4300 series was announced and the DDP picture became murky.

Most recently, IBM has been releasing a great deal of 8100 software, leading Mills to speculate the 8100 is where it is at for IBM DDP for at least the next two to three years. That means people working with 8100s will have to learn to program them and that means added responsibility for training and education.

Even though there is a great proliferation of educational software being released and already in existence, it just is not enough. "For the first time in DP history, the vendors are lagging behind the market demand," he said, adding there is a conscious vendor effort to close the gap.

Software customization will be both a boon and a burden to training professionals, he said. It will be a boon because it will allow educators to put together the eclectic systems required by task-specific users.

On the other hand, customization presents difficulties because it requires instructors to constantly maintain their knowledge at the state of the art: There will be few if any prepackaged systems that will fit all the specific needs of any organization, Mills said.

Where it currently takes 40 man-days to bring an entry-level programmer up to operational level, custom software will do the same job in 10- to 80 days, depending on how it is purchased and implemented, Mills said. "Modularity in what vendors supply you will be extremely critical," he told his audience.

The wrong module for the wrong job can serve to greatly frustrate programmers, so trainers must engage line managers in a dialogue in which the trainer clearly understands programmer needs. Once the needs are understood, it is up to the trainer to assemble the proper package, Mills noted.

There will be no major shifts in the utilization of educational media in the near future, he claimed. Audiovisual, in-house training and computer-aided training all are positive forces that may be brought to bear on the instruction of DPers.

More and more media is available and "in most cases, people are using more media," he said. It will also become common for training and education departments to use mixed media presentations in which two or more are combined for instruction, he commented.

Mills called the ever-decreasing cost of media "insignificant," representing only about 12% of an educational budget even in computer-based design instruction systems. It is the mix, not the media, that is most important, Mills declared.

If they are to stay on top of their field, trainers and educators must continually seek knowledge from without, as well as within their own organizations, he advised. That means attending seminars and visiting other DP shops who have already experienced the problems that their own shops will soon go through.

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FCC OK's Rate Hike On Bell CCSA Service

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A big increase in AT&T's rates for Common Control Switching Arrangement (CCSA) service was OK'd by the Federal Communications Commission (FCC) earlier this month, despite protests from several users. They argued that the increase is part of a scheme by Bell and its operating companies throughout the country to charge whatever the traffic will bear for private-line terminals, transmission and switching facilities.

AT&T denies this allegation categorically.

The FCC's recent ruling allowed the phone company to increase its charges for CCSA local access lines from $7.95/mo to $35/mo. The higher rates became effective shortly afterward. According to four major CCSA users — Ford Motor Company, General Electric Co., U.S. Steel Corp. and Westinghouse Electric Corp. — the new charge represents a 440% increase in CCSA access line rates within the last two years [CW, Oct. 13].

They presented evidence to the FCC indicating the increase is based on a pricing scheme called the "Installed Base Migration Strategy." Allegedly, this strategy is aimed at making existing, long-established communication services, switching and terminal equipment so expensive that users will migrate to new versions offering enhanced features.

Key Element

The key part of the strategy, reportedly, is an estimate of how much the user is willing to pay for the enhancements. Once this is determined, the price of the new product/service is set and the charge for the competing, long-established offering is raised so that the difference between them equals the user's willingness to pay for the enhancements.

If the charge is true, the recent CCSA increase is illegal because the rates for this service, as well as all other telephone company offerings, are supposed to be based solely on the related costs.

The FCC, in allowing AT&T to increase its CCSA access charges, said Ford and the other opponents — who included MCI Telecommunications Corp. and the federal government — had failed to show the proposed rates were related to the Installed Base Migration Strategy.

A Common Control Switching Arrangement uses switching facilities in telephone company central offices, on a dedicated basis, to link voice and/or data terminals connected to a large private network. CCSAs are now being superseded by a computer-controlled system known as Enhanced Private Switched Communications Service.

A spokesman for Ford, General Motors, General Electric and Westinghouse said they were studying the Commission's ruling.

The CCSA rate increase appears related to several other recent tariff proceedings at both the state and federal levels. For example, Bell recently won permission from the FCC to shorten drastically the depreciation rates for its PBXs and other widely used terminal equipment. One part of this "represcription" ruling allows electronic PBXs to be depreciated differently from older versions of the same equipment. It will increase AT&Ts revenue requirement — the amount the company has to recover from its interstate customers — by $100 million in 1981. Another result will be to narrow the gap between the prices of new and existing terminal products.

In Massachusetts, the New England Telephone Company has been granted an "interim" rate increase which is expected to be applied mainly to older switching systems such as Model 701 switchboards, Centrex CU equipment and Model 756 crossbar PBXs. Newer equipment, such as the Dimension PBX, would then become more attractive.

In Texas, where Mountain Bell Telephone Co. has proposed a similar increase, a state utilities commission examiner, in the course of explaining the Installed Base Migration Strategy, made it clear that shortening the depreciation lives of older equipment is a key element of the scheme.

In California, Pacific Telephone and Telegraph Co. has been granted a rate increase — in the form of a local access charge — applying to all interstate and many intrastate users of CCSA, EPSCS, foreign exchange (FX) and tandem tieline services.

Tighe Elected Asis President

ANAHEIM, Calif. — Ruth L. Tighe was elected president-elect of the American Society for Information Science (Asis) during a recent meeting here. She will assume office in October 1981.

Tighe is a research associate at the National Commission on Libraries and Information Science, Washington, D.C. Her present responsibilities include staffing the task force on public/private sector relationships and the Ad Hoc Committee on Implementation of the White House Conference Resolutions. Tighe has been active in Asis since the late '60s.

Schultz Wins Merit Award

ANAHEIM, Calif. — Claire K. Schultz, professor of information science and director of libraries, Medical College of Pennsylvania, became the 16th merit award winner at ceremonies here during the 1980 annual meeting of the American Society for Information Science (Asis).

The annual award is made for "a noteworthy contribution to the field of information science." Schultz pioneered thesaurus construction and machine-aided indexing and was one of the early innovators who applied computers to information science. At Pennsylvania Medical College she developed and administered a program that included the design of a new medical library.

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Console Ends Du Pont's 15-Mile Commute

By William H. Myers
Special to CW

"The need to eliminate a time-consuming 15-mile commute made us write it," explained Joseph C. Szaflarski of The Du Pont Co.'s Information Systems Department.

"We needed to minimize the time and interruptions it was taking to travel between Wilmington, Del., where our Support Center operates and the Louviers Data Center near Newark, Del. where the 4331 we were testing as part of IBM's early support program was installed."

No software existed, so Szaflarski solved his commuting problem by writing a remote operators' console routine for the Interactive Computing and Control Facility (ICCF), which today lets the Du Pont DOS Support Group perform operating system maintenance from Wilmington on 4331s wherever they are in Du Pont. That is quite a time saver: Including installed systems and proposed installations, Du Pont will have more than 50 Series 4300 systems.

Szaflarski's remote console lets him see an image of the operator's console of any remote 4331 system, reply to messages, effect Initial Program Load (IPL), and in general, install, test and troubleshoot the operating system from his terminal in Wilmington.

With the delivery of Du Pont's newest 4331 to Remington Arms, Bridgeport, Conn., in October, the support center was able to complete installation in half the normal time — complete with the DOS/VSE Customer Information Control System (CICS), the content of the latest Program Update Tape (PUT) and whatever custom features the site requested.

All of this was checked and tested for trouble-free operation ahead of time by the technical group on the 4331 in Wilmington dedicated to this support service. In Bridgeport, no on-site systems programming personnel were needed.

Easy Installation

The anticipated ease and speed of installation was due in large part to the experience gained since the support center began remote service to Du Pont's first "off-site" 4331 installed at Towanda, Pa., in February of this year.

After some fine tuning of distribution procedures, the support center did a complete upgrade of the Towanda software in one hour. This upgrade included all maintenance on the IBM PUT tape, as well as some local corrections.

If this were done at Towanda, the PUT tape or similar maintenance would normally involve as much as eight hours of downtime, even with on-site systems programming.

Minimizing downtime is another need Du Pont's remote operating system support is meeting. Like many other corporations, Du Pont plants use DOS widely for 24-hour operations of critical systems — inventory, order processing, payrolls, weight/label/distribution record and so forth. Any amount of downtime for maintenance can bring tense expressions to the faces of plant supervision.

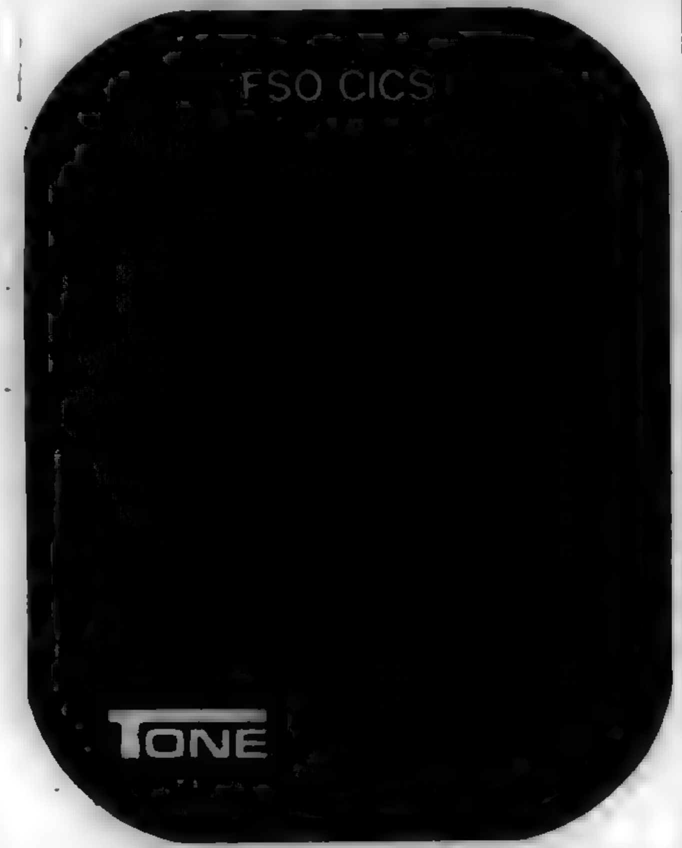
The Du Pont Support Center now handles the usual Towanda site needs easily. They have tied in new terminals, added two disk drives, removed two others and made changes to the CICS system — all from the Wilmington Site. To answer questions or solve problems during 8 a.m. to 5 p.m., the support center is only a phone call away from the primary plant contact for the site DOS operation.

"During other hours," Szaflarski said, "we respond to the phone call within a couple of hours."

Does Du Pont plan to enhance the remote console software for more complex operations? No.

In fact, when the manager of the Computer & Telecommunications Division, D.A. Nelson, described the Du Pont Remote Support Facility and the benefits it provides at IBM's Process Industries Data Processing Directors' Conference in March, he emphasized that Du Pont was urging IBM representatives to provide official IBM software for 4331 remote operating systems support.

Myers is system specialist for Du Pont's Information Systems Department.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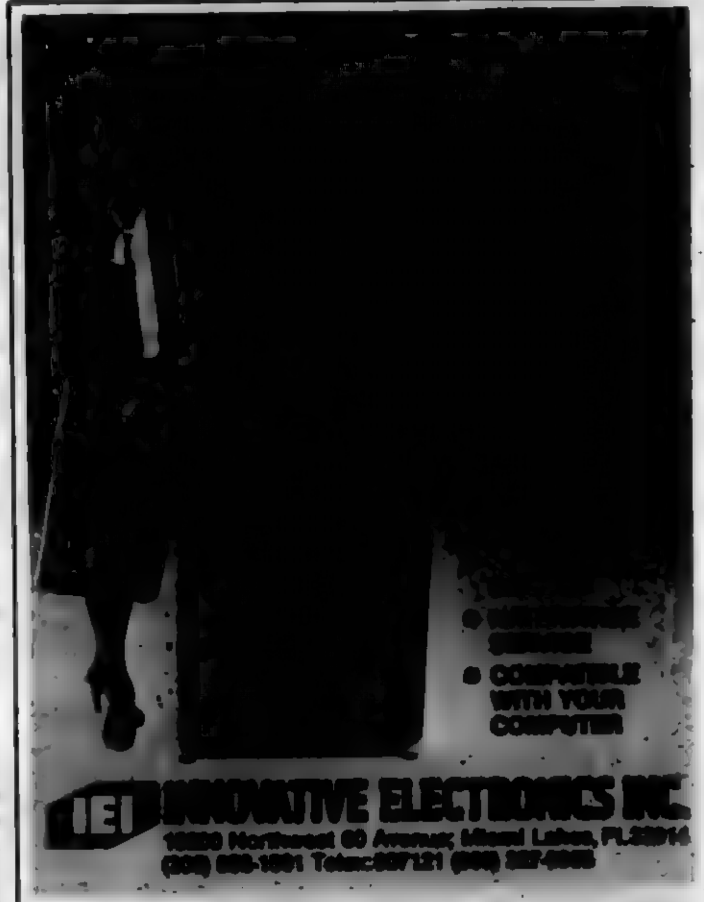
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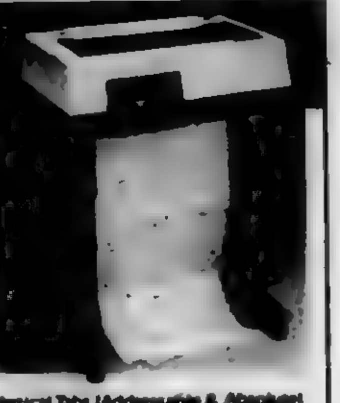
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To Seek Congressional Charter

Efforts Under Way to Form Security Group

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – Efforts are under way here to organize a nonprofit Computer Security Research Foundation that will identify computer security research needs, coordinate and promote related research projects and act as a clearinghouse for such efforts.

Early next year, sponsors of the project will seek a congressional charter for the foundation, computer security consultant Robert P. Campbell said recently.

Addressing the Computer Crime Info conference here recently, Campbell, president of Advanced Information Management, Inc., also urged formation of a joint government-industry "blue ribbon commission" to assess "the serious potential national vulnerability represented by the country's dependence on information systems."

"There is too great a potential for national disaster for this assessment not to be conducted," said Campbell, who explained the proposed commission would call attention to the kinds of security problems the foundation will address in greater detail.

Whether or not Congress supports the two proposals, the organization of the security research foundation will continue, he said. But preliminary contacts with members of Congress and with various congressional committees have found support for the foundation, he said.

The foundation is the brainchild of about a half dozen security experts from the federal government and private sectors. This group will have no part in the actual running of the foundation, Campbell stressed, so that the foundation cannot be attacked as merely a means for enriching private consultants.

According to Campbell, the group has already lined up the support of over 50 influential persons from the information industry, from academia, the legal and auditing professions and from general business circles. Members of this larger group and others like them will take over direction of the foundation, he said.

Interdisciplinary Nature

Robert G. McKenzie, an audit director for the National Aeronautics and Space Administration and a spokesman for the group pushing the foundation proposal, said the organization will be interdisciplinary in nature.

"We've got to take a more comprehensive view" of information systems security, McKenzie said, arguing that fragmented efforts by various information industry groups to address computer security issues do not seem to be producing answers to the many problems of computer vulnerability.

Although there is no lack of research into these issues, no one is "pulling it all together," according to McKenzie and his colleagues supporting the foundation effort. Society cannot rely on the computer hardware and software vendors to provide information systems security, they argue, because the problems are related to the overall management of modern organizations and are not just the concern of the information processing community.

On the systems level itself, Campbell said vendors claim their customers are not demanding security. But the consumers and clients of system users are the ultimate losers in this situation, he said. It is not the DP community that has the most to lose from lack of security, he maintained, but the institutions and organizations that rely on information systems.

However, an antitechnology backlash by the public is not inconceivable given the proliferation of computers in society and the resulting perception of privacy invasion, he said.

The technology is great, Campbell continued, "but there may be a dark side; there may be side effects." He cited last year's Louis Harris poll that found 63% of the general public believes computer use should be sharply restricted to preserve personal privacy [CW, June 11, 1979].

"Is the data processing industry taking the same position with regard to security, privacy and reliability as the auto industry took a decade ago about auto safety, pollution and gas economy?" Campbell asked. "Is data processing, in its euphoria over the technology, paying inadequate attention to these very serious problems?"

If the DP industry is to avoid the types of problems now besetting the U.S. automobile industry and if the U.S. is to avoid serious vulnerability due to reliance on unsecure information systems, immediate action is needed, he said.

"The time for action is now, during this period of unmatched prosperity for the data processing industry — not when, like the auto industry, it has been put back on its heels. The growing professional concern for and the seeming lack of national responsiveness to these issues must be heeded," according to Campbell.

Campbell and McKenzie said the foundation, when established, will seek government and private-sector grants and will serve primarily to channel those funds to organizations that can conduct computer security research.

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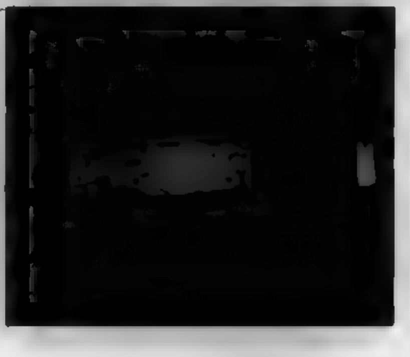

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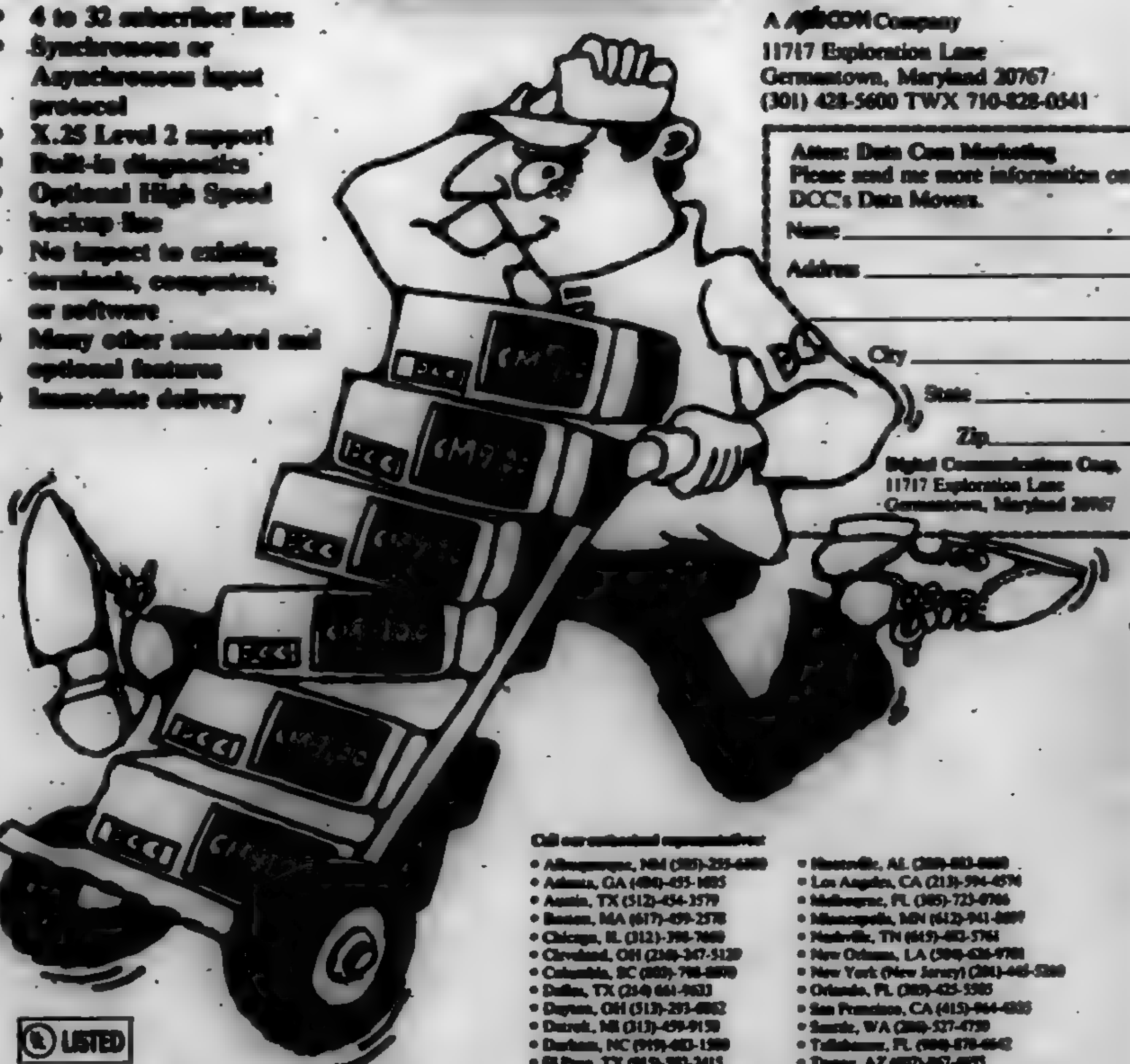

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Systems Security Called a Management Issue

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Why do computer security programs fail? They fail because they are *computer* security programs, according to a federal agency systems security officer.

"Systems security is a management issue, not a computer problem," Timothy Braithwaite told the Computer Crime Info conference here recently. "Security program activities must be integrated into the existing management process," according to Braithwaite, who is responsible for systems security for the Social Security Administration.

The first reaction to an organization's security problem is to build a staff and develop a security plan. The trouble with that, he said, is security should be built into the entire organization and not addressed as a separate program.

"We don't need another program," Braithwaite said. "Everyone wants to write a security manual," but the first task should be to define a security philosophy based on the organization's individual goals and systems, he said.

And, as one speaker after another here stressed, the philosophy has to have the support of top management. In fact, Braithwaite said, top management must take final responsibility for security.

Once management accepts the value of the resource being protected — information — it will accept responsibility for information security. "They didn't get there because they're dummies," he remarked.

"To some degree, information is a more valuable resource than all the others put together," Braithwaite noted. He said it is only when management recognizes that fact that true security can be built into an organization's operations.

Security cannot be achieved through a program that is "an appendage" to day-to-day operations, he said. For one thing, "management will not support security decisions they did not make themselves."

Security officers, he noted, cannot tell upper management what to do, and because the common response to security needs is to have a DP manager, or middle management officer or outside consultant come up with a security program, the whole effort is doomed to failure.

This does not mean security officers should not be information-systems-oriented, he said. In fact, just the opposite is true because "you are dealing with abstracts — the value of information."

According to Braithwaite, the security officer should be someone who understands the resource he is trying to protect and who can also make the case for security to top management officials so they can understand it and embrace the need for it.

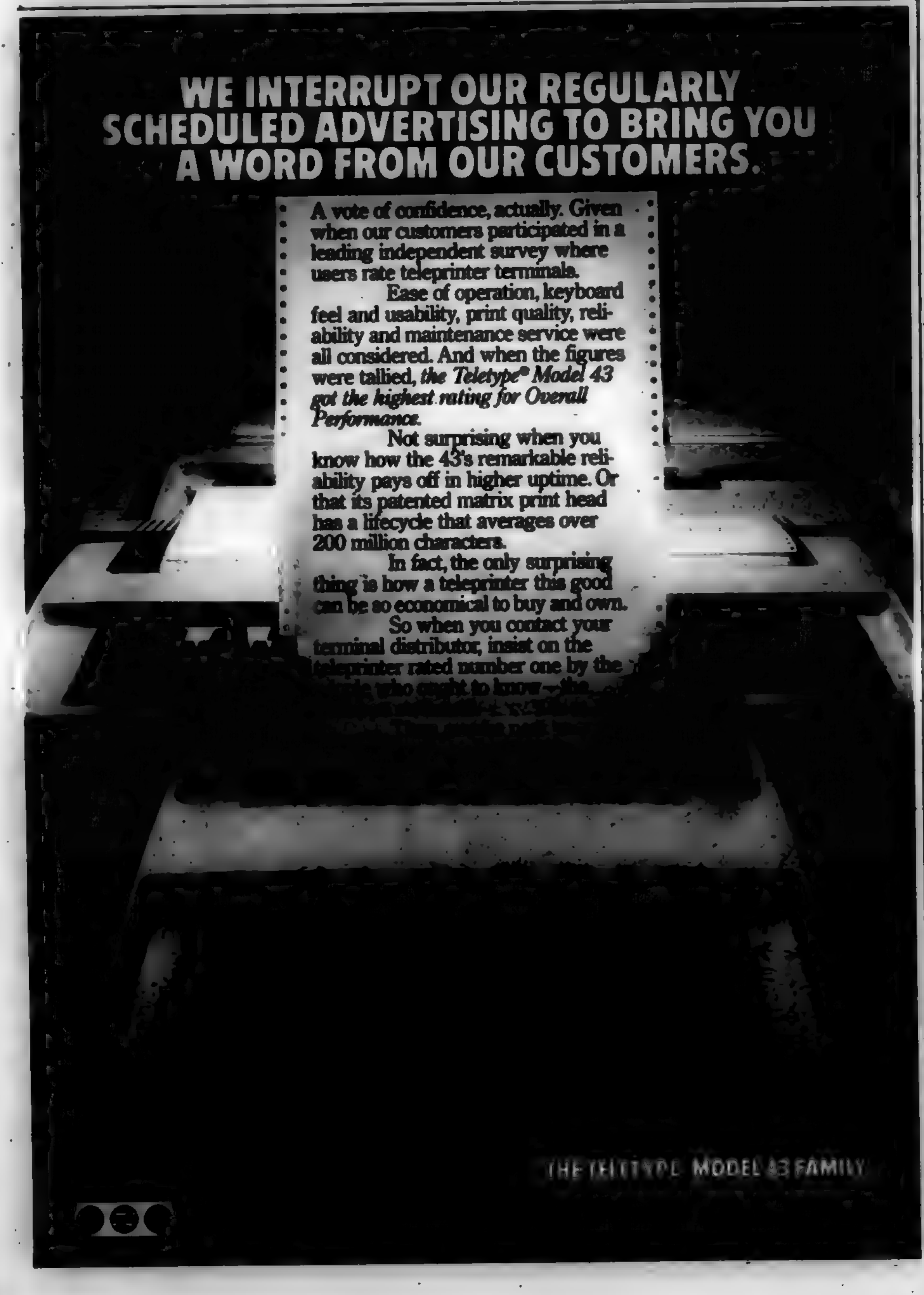
This does not preclude having a security officer in the computer room, he added. Someone is needed to change passwords and handle physical security details, but the organization as a whole needs someone who does not act as a policeman, but as a program manager, working with the cooperation of all other management levels.

Staff Commitment

Even in the computer room, however, there is no overwhelming need to call in consultants and laboriously construct a security program, he continued. Most DP departments can do an adequate job of protecting their systems with the resources they have in hand if a proper risk analysis is done and the staff is committed to security, he said.

The problem in many organizations, he said, is that when management hears the word "security" it thinks "computer". According to Braithwaite, "we've been trying to solve the problem from the inside out." If the organization as a whole is committed to security, DP security will not be the overriding concern.

Once the organization, at all levels, understands the value of its information resources and is committed to their security, the individual aspects of an overall security program can be developed, he said. Then the detailed risk analysis can be performed and proper risk management undertaken.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To Avoid Organizational Disaster

Capacity Planning Seen Hinging on Interaction

By Rita Shoor
CW Staff

BOSTON — Failure to establish lines of communication between personnel charged with capacity planning (CP) and executive management levels is likely to result in organizational disaster, according to Leonard Lipner, a consultant with BGS Systems here.

He explored the relationship between CP and strategic planning for information systems (IS) during the recent conference on computer performance evaluation (CPE) in the '80s.

Sponsored by The Computer Measurement Group, Inc., the conference drew an estimated 450 attendees.

A large number of the CPE specialists were drawn to the session on "Management Information Systems [MIS] for Resource Management."

Many firms still fail to recognize and formalize the relationships among the various planning cycles and activities within the organizational structure, the consultant noted.

Rather than having the top-level strategic planners making unilateral decisions that require CPers to respond in "fire-fighting" mode, he maintained that CP personnel should actually be the overseers for major IS development projects.

This means involvement in both long-term (two- to four-year) strategic plans and short-range one-year goals, he noted.

The CPers should be tied into all projects from the time they are a "gleam in the eye" to the IS planning area, through design, implementation and installation.

Case History

For those who were skeptical about the need to establish formal two-way communication between top management and CP representatives, Lipner provided the following case history.

Executives from one company decided to have all of the firm's branch offices on-line to a data center by year-end. At the same time, two data centers were being phased out. These were to be replaced by a new, consolidated data center that had not yet been built.

Yet, because of the phase-out process, no major upgrades were being allowed in the existing data centers. Since the stated executive decisions were totally inconsistent, the "CP fallout" would have been a disaster, according to Lipner. Fortunately, the executive decisions were reversed in time, he said.

Lipner contrasted these case histories with the advantages afforded by establishing communication among CP, IS strategic planning and IS development planning.

Interaction allows all three areas td share what he termed "baseline" information about the organization's applications portfolio, hardware configuration, user populations and required service levels, personnel resources and, of course, its data.

Information about currently deliverable technology and forcasted future technology allows for more realistic technology assessment by the groups, he continued.

CPer Requirements

Lipner listed the following requirements for the CPer who wishes to communicate effectively and regularly with IS on a strategic level:

- A sound knowledge of the current technical environment. This means familiarity with the equipment and its capabilities, operations work loads and their characteristics, service-level objectives and user populations and measurement capabilities.
- A sound knowledge of the business environment.
- A good background and awareness of available technology.
- The ability to translate work load projections into performance information.
- The ability to help formulate and manage data about work load characteristics for in-development applications.

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Upgrade Makes University 'Third-Party' User

LAS VEGAS — The computer center at New Mexico Highlands University here has, over the years, evolved into a true "third-party" system, first replacing its IBM operating system and this year replacing its IBM computer with an M80 system from Magnuson Computer Systems, Inc.

"We installed an IBM 360/40 in 1975 and originally ran the DOS operating system," recalled Robert Brandl, the university computer center's director. "In July 1976, we realized we could improve the system's efficiency with a third-party operating system and converted to Extended DOS [Edos], an IBM-compatible operating system from Nixdorf Computer Software Co."

Last March the university made the separation complete by replacing the 360/40 with a Magnuson M80/3. The M80 runs the same programs that ran on the IBM system without conversion.

The university emphasized the value of the replacement two months later by upgrading to Edos/VS, a more powerful version of the Nixdorf operating system.

Brandl, a former technical support representative for Nixdorf, pointed out that compatibility was not one of his primary concerns. "I knew of a West Coast company that put their Edos/VS package on a Magnuson system, and it had run as clean as a whistle," he said. "I knew the Edos/VS users, I knew the operating system, and I knew Nixdorf. Once I knew they had run it on their M80, I knew I could run it on mine."

Support Was the Key

Despite the fact Brandl wanted to buy the Magnuson system and had convinced the university that it was the right system for its computer center, the primary issue, Brandl said, was whether Magnuson would sell him a system.

"Providing strong support is so critical to us that we prefer to sell our computer systems close to the cities where our offices are located," explained Charles McCabe of Magnuson's Dallas office, who had worked with Brandl. "We were worried that we simply couldn't adequately support a system as far away as Las Vegas."

"Even IBM, who supported the 360/-40 system from Santa Fe, 60 miles southwest of here, considered us a remote location," Brandl said. "But as I talked with Magnuson, they began to realize that between my background in software troubleshooting and the high quality of the M80's diagnostics, I could handle 95% of the hardware and software problems that might come up."

Brandl and Magnuson discussed the possibility of providing spare parts on-site, and letting Brandl handle maintenance by replacing circuit boards. "It's worked beautifully," Brandl said. "We've had just two problems since the system was installed, and both were easily diagnosed and easily rectified." He noted that after four months of operation, the system has logged only two hours of downtime.

The Magnuson M80 requires one-fifth the electrical power and generates one-fifth the heat of a 370/148, according to Brandl.

System efficiency is one of the guidelines Brandl adheres to closely. "We have an obligation to the taxpayers of the state to use their money well," he said. "New Mexico Highlands has a history of using computer systems efficiently, and installing the Magnuson system continues that history.

"We increased the efficiency of the 360/40 by installing Edos, increased the efficiency of the computer center by installing the Magnuson system, and made that system more efficient by running Edos/VS.

"The Magnuson system provides economic efficiency," he added. "It assures us that we won't have to move in an entirely new computer when we decide to upgrade. All it will require is a change of printed circuit boards."

Director Brandl demonstrates Magnuson M80 system.

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Computer-Based Home Bank Service Unveiled

By Phil Hirsch
CW Washington Bureau

CHICAGO — The nation's first computer-based home banking service will go into operation within the next few weeks. Four hundred users already have been signed up and, by this time next year, there may be a total of 50,000.

Details of the Express Information Network were disclosed here last week at a home banking conference sponsored by the Electronic Funds Transfer Association (Efta). The speaker was Tom Sudman, one of the network's chief architects. Sudman heads United American Services Corp., which will offer the new service initially through its affiliate, the United American Bank of Knoxville, Tenn.

Besides banking services, the new network provides access to computer games, personal computing and other offerings of Compuserve, Inc., a nationwide home information network based in Columbus, Ohio. Sudman's organization is aggresively marketing network franchises to banks in all 50 states, he reported, adding that "almost 400" have expressed interest.

Effective Sales Pitch

One effective sales argument is that the new system provides a low-cost way of shifting a bank's customers from a paper-based to an electronic transaction system. Since the customer buys the terminal and performs the information input, the bank's capital and labor costs are reduced. Also, the new system is a far cheaper way of serving additional depositors than building a new branch bank, according to Sudman.

The terminal used with the Express Information Network consists essentially of a telephone, a standard commercial television set, and a Tandy Corp. "color computer" — a TRS-80 microprocessor with an attached full-Ascii keyboard. Sudman said the terminal will be supplied through Tandy's 6,000 Radio Shack retail outlets across the country. They also will provide customer support, including maintenance. The terminal will sell for $650, or it can be leased for $25 to $30/mo.

The Express Information Network permits the user to pay all his bills on-line, shows the current balance, plus deposits and withdrawals posted since the last statement to each of his bank accounts and provides current interest rates on various types of loans and securities offered by the sponsoring bank. In the first quarter of next year, software allowing the customer to reconcile his monthly checking account statement on-line will be added, and in the second quarter, a package permitting the user to apply for a loan on-line will be implemented.

Among the services available from Compuserve is a daily news report containing stories culled from 11 daily newspapers and the Associated Press. An electronic mail box service is also available. It can tell the user, at any time after a message is sent, whether and when it was delivered.

The user can also have received messages stored for any desired time in accessible storage within the Compuserve central computer. Express Information Network customers will pay a communications charge, but no other extra fees, to access the Compuserve services. Sudman said the charge will be $5/hour.

Initially, he reported, "We projected an installed base of 20,000 customers for the network by the end of next year. But now we expect it will be about 50,000."

The ability of the new network to increase the convenience of banking, he indicated, is a prime reason banks are interested in signing franchise agreements. "Our studies show that convenience is the main factor motivating a depositor to choose one bank instead of another."

Meet to Address IBM Moves

NEW YORK — "The Refocusing of IBM Beyond the 3031" is the title of a two-day seminar being conducted by the Yankee Group here on Feb. 24-25, and again in Palo Alto, Calif., on March 3-4.

The program will address IBM strategy, competition and market targets and its respective bearings on the industry at large. Also covered will be IBM's introduction of the 4300 series, along with the move to retail stores to lower its marketing costs.

Registration for this two-day program is $725 and includes seminar manual, symposium, lunches and a cocktail party. Further information is available from Marjorie Sugarman at the Yankee Group, P.O. Box 43, Harvard Square, Cambridge, Mass. 02138.

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About 45 on Drawing Boards

Home Bank Systems Seen Likely to Go On-Line

By Phil Hirsch
CW Washington Bureau

CHICAGO — At least seven computerized home banking systems are likely to go on-line in the U.S. within the next year or two. And about 45 are under development worldwide, consultant William Adcock reported here last week.

Adcock is senior vice-president of Payment Systems, Inc. (PSI), Atlanta, a market research firm that specializes in electronic funds transfer (EFT) systems. Adcock spoke at the opening of a conference on home banking sponsored by the Electronic Funds Transfer Association.

The first of the new systems to begin operation will be the Express Information Network in Knoxville, Tenn. (see story on Page 24). Notable among the other developers are Citibank and Chemical Bank in New York City and the United California Bank — three of the nation's largest. The savings and loan industry has teamed up with Cox Cable Communications — a major cable TV network operator — to test an interactive home information system — encompassing banking and other services — in San Diego, and similar tests involving commercial banks will begin shortly in Miami and Columbus, Ohio.

Despite all this development activity, a number of uncertainties cloud the future of "video banking," Adcock said. One question is whether — and to what extent — AT&T will enter the market.

Bell has sponsored a small trial of an on-line telephone directory service in Albany, N.Y., is participating in the trial of Miami's multiservice viewtron videotex system, and has announced plans for an "electronic yellow pages" trial in Austin, Texas. While the company is not likely to offer home banking services, its electronic yellow pages offering could cause problems for the banks. They would like to provide on-line shopping services, restaurant and theater listings, news and weather information as an adjunct to their home banking offerings. AT&T is apparently interested in doing likewise, based on its announced plans for Austin and its participation in the Viewtron trial. Some restrictions were imposed on the phone company in legislation considered during the last session of congress, but the legislation was not enacted.

AT&T is only one of the vendors jostling for market position at the moment, Adcock pointed out. The banks must also contend with cable television operators, television broadcasters and publishers — all of whom are now developing on-line systems.

Market Restrictions

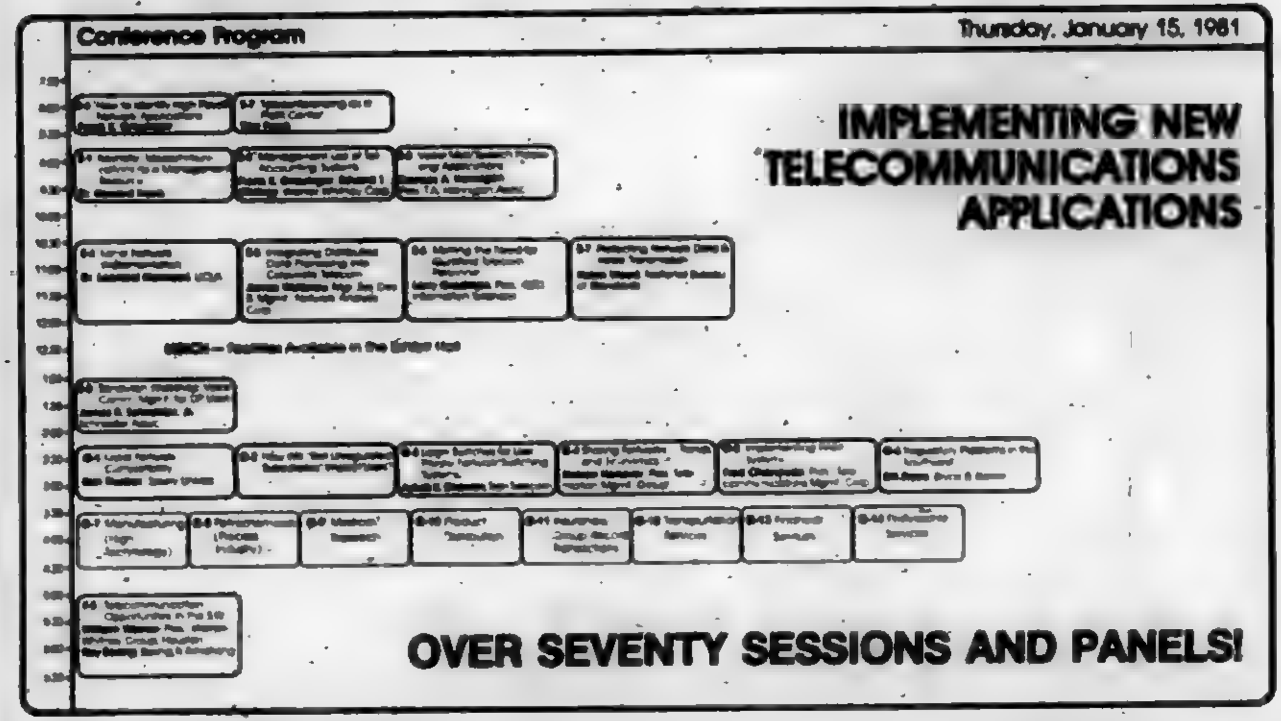
The market for home information systems in general will be largely determined by the cost of the terminal, he added, pointing out that costs appear to be declining rapidly.

The French are developing a CRT-keyboard terminal which they plan to give away to the nation's telephone subscribers. The terminal is scheduled to go into production early next year, at a projected cost of $100/unit. "The source," a U.S. on-line home information network, already has placed an order for several thousand.

In this country, Adcock reported, Tandy Corp. is manufacturing a much more sophisticated terminal, powered by its TRS-80 microprocessor. This unit will be leased for $25- to $30/mo by banks participating in the Express Information Network. Adcock indicated that other terminals, costing significantly less, are now under development.

The banking industry is in a good position to exploit on-line home information services, he said, because processing transactions in electronic form is far cheaper than handling paper checks and deposit/withdrawal tickets. It's also cheaper to serve customers on-line than to build a new branch bank.

experts in Houston on January 12th!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EDITORIAL

The Productivity Crisis

"Productivity" is clearly the up-and-coming buzzword for the next year — consultants will get rich talking about it; conferences will be held; and many will end up more confused than ever as the year ends.

Clearly there is a need for productivity improvement in the realm of information systems and services and there is now a real opportunity for managers who are forward looking and willing to experiment.

But tackling the productivity crisis will take new ways of looking at the way that applications are developed and new ways of managing change within an organization. The old order will have to drop away to accommodate the new.

Everyone knows that programmers — particularly, good programmers — are an increasingly scarce resource. And, unfortunately, new methods to get more out of this resource are just not adequate to the task ahead.

Structured techniques are certainly one way to get more out of this resource, but such techniques will only produce productivity gains on the order of 25%, according to recent studies.

This is just not good enough for the needs ahead. There is a real applications explosion occurring in the business world — computer and other information processing equipment is now fully accepted and is being called upon more and more by business.

To meet this applications explosion, managers need to look to new methods — in particular, the off-loading of work to the ultimate users of the systems.

Some pioneers have reported great success in this effort already — the Bank of America, for example, has 500 user-written programs running at the present time, all of which were developed by the ultimate users without assistance from the computer operation.

There are presently two things holding back the greater use of such methods. First, there are not too many tools available that allow the ultimate user to design his or her own programs. This is changing, however, and during the next year users should expect many announcements in this area from all vendors in the business.

Secondly, however, there is a resistance on the part of many information systems and services managers to use the new tools. This will be harder to overcome because many feel that they are losing control over their operations when work is off-loaded to users.

By sticking solely to the old methods, however, users will find that they are not able to keep up with the work load and will frustrate the end users.

By taking a risk and letting the users do it themselves, smart managers can actually enhance their positions because they will be providing greater service to their organizations.

In any case, users will clamor for such facilities in the coming years — the smart manager will provide it now.

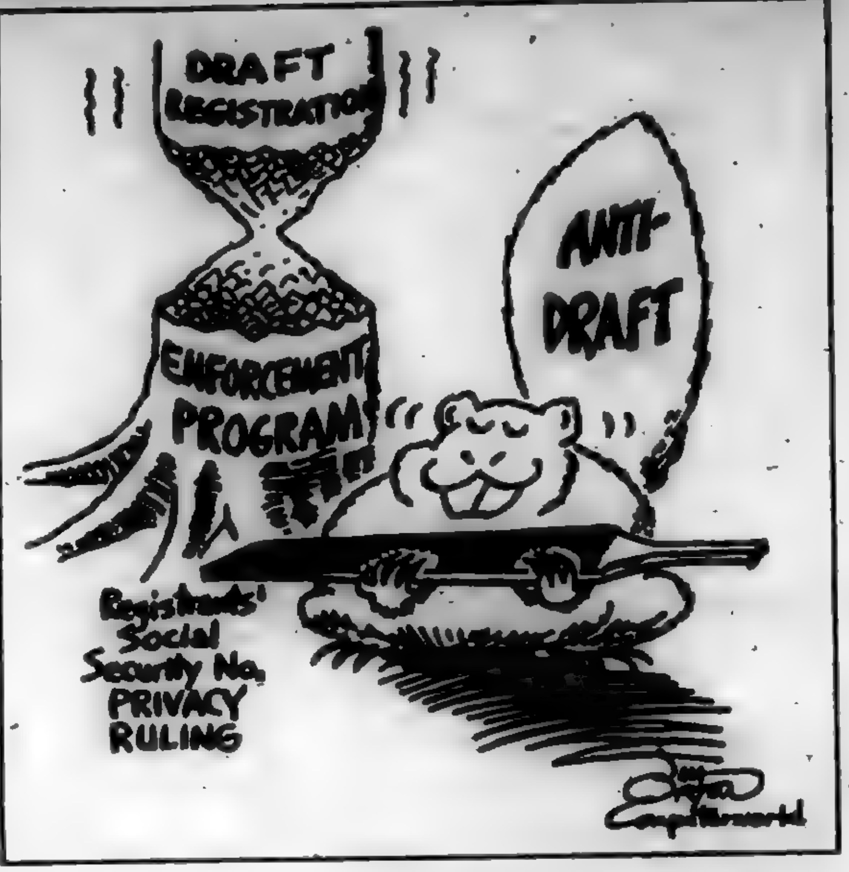
DATA PAST

Five Years Ago
Dec. 24, 1975

CONCORD, N.H. — Failure to update a record in the National Crime Information Center's (NCIC) wanted persons file has resulted in a lawsuit against seven policemen. William A. Smith, a 25-year-old Dover man, claimed he was "rousted" from bed and questioned for four hours by police who said his name matched the alias in the NCIC file. Apparently, his name and date of birth were mistakenly teletypewritten to the NCIC in Washington, D.C.

Eight Years Ago
Dec. 20, 1972

LOS ANGELES — A power failure here knocked out the city's computer center for about four hours, causing some delays in processing police wants and warrants. The power shortage occurred around 8 p.m. and an emergency backup system was up and running by midnight, enabling the center to catch up on all work by the time the day shift arrived in the morning. Officials indicated the failure might have been caused by a problem in the system.



LETTERS

Getting the Facts

I read with interest "A Zip Code Solution" [CW, Nov. 24]. Domenick Flotta could have improved his article by first contacting the U.S. Postal Service (USPS) and getting some facts.

The tapes that will be available from the USPS have 106 character records, blocked by 78. The tapes will have about 19.8 million records, residing on about 25 reels of 2,400-foot tapes, at 6,250 bit/in. The content of the records is described in a USPS paper titled "Preliminary File Description." This description, and a wealth of other information concerning the move to the nine-digit Zip is available from the USPS, either on a local basis or from headquarters in Washington, D.C.

The individual in charge of the USPS project is Sal Gennaro at the Washington headquarters.

The intent of this letter is not to criticize the content of Flotta's article, but rather to express dismay at the lack of investigation and research. This is directed at both the author and *Computerworld.*

Dan Warner

Sun Prairie, Wis.

MIS Chaos

Your report on R.G. Taylor's comments at the Canadian Computer Conference [CW, Nov. 24] indicates that the chaos often experienced in management information systems (MIS) planning can be blamed on structural changes in the organization which MIS serves. While major organizational changes would certainly impact MIS policies, priorities and operations, it is important to remember that it is the obligation of MIS management to oversee the creation of flexible systems which can adapt to and accommodate (within limits) mandated changes.

Furthermore, it is imperative that MIS management treat as a priority and ongoing concern the education of its users — keeping all levels of MIS clientele abreast of services which may change system performance or alter user expectations. Coupled with this is the continuous process of keeping users at all levels aware of their roles and responsibilities in the systems planning, development and operations process, from initial requirement specifications through systems acceptance and production.

If MIS management fails to accomplish this or pays lip-service to it, the trend toward user-controlled decentralized data processing operations will accelerate, whether economically or operationally justifiable or not, as users will insist on gaining control over needed information systems resources which have not been satisfied through a centralized corporate function.

Today's "user-friendly" terminals (were they previously "user-hostile" or "user-apathetic"?) and small systems permit users access to their informational needs on demand. It is imperative that MIS management and technicians become "user-friendly" and cooperate with those people who are, in fact, responsible for the organization and for keeping the MIS function in business.

It is often tempting to follow the path of least resistance and become immersed in the sea of technology without consideration of the effect on the user. If this continues for too long, the technocrats may find themselves without benefit of people to serve and their efforts will have been for naught.

H.L. Rosen

Rochester, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld,* 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

READER COMMENTARY George Pitagorsky

Firms Can Act to End Programming Crunch

On the applications programming scene, salaries are high, skill levels and reliability low and available people almost non-existent. Applications programmers today earn from $15,000 to $30,000 per year and cost from $175 to $300 per day on a contract basis. The programmer shortage is expected to continue through the 1980s.

What can large computer installations (50 programmers or more) do to ease this situation? It is possible for them both to reduce the number of programmers required over the next five years and reduce the required skill level for most of the programmers remaining.

As a programmer, computer user, founder of a large contract programming firm and computer-oriented management consultant, I have been quietly awaiting the beginning of a downward trend in the numbers of applications programmers required by the major systems users. But the current boom in programming continues because of an increasing demand for computer services by computer users and by a DP technical and management community that is resistant to changes in the way software is developed.

How Much Program?

In 1975, I saw a software package demonstration on a Digital Equipment Corp. PDP-11/70. The salesperson defined an information need — a file with several elements of data and a report based on the data. Within 10 minutes, a screen format and file were defined, data was entered and the completed report was coming off the printer.

Needless to say, I was impressed. At the time I was doing consulting work at a large IBM installation with OS, IMS and all the bells and whistles. It took a programmer at least a week to do what was done in 10 minutes using that package.

Today, five years later, there are a number of program generators, data base management systems (DBMS), inquiry systems and application generation systems on everything from microcomputers to mainframes, and it still takes more programming time to prepare JCL and IMS calls in that big installation than is required to program entire applications in mini and microcomputer installations using the available software development tools.

But even without sophisticated software tools, it is possible to reduce programmer effort and increase productivity significantly by adopting program models — skeletal programs for performing common functions like file update and input edit in which program structure and logic are predefined for an entire installation. With a set of models and a report generator, it is possible to reduce program coding and testing time by as much as 50%. The effect on maintenance effort can be dramatic.

What are the large mainframe installations doing to reduce reliance on application programmers?

(Continued on Page 31)

THE TAYLOR REPORT/Alan Taylor

Alternative Software Making Great Strides

Imagine having your own private Cobol compiler — with special security features and your user application statements — that you could develop and keep running on your future as well as current hardware. That would be a change indeed for any user, and as yet it is still just a dream. But there appear to be no technical reasons and few practical reasons to expect that such a compiler won't be generally available in a year or two.

The Forth Interest Group's (FIG) recent conference showed continued breakthroughs in really opening up software capabilities to users on at least six distinct fronts — hardware, languages, environments, cross-compiling, research targets and user training. This, only a year after the publication of the first FIG models of the Forth language, showed how some basic knowledge can bear fruit.

The power behind these and other developments has been a growing international group of people and firms. Headed by Chuck Moore's own Forth, Inc., independent user groups in America, Europe and Japan who appreciated the power of Forth have resulted in small commercial ventures with Forth compilers on micros. (The leader here, with more than 100 user groups of its own, is Miller Microsystems, located just a mile from *Computerworld's* headquarters!)

From this base of people, FIG is able to produce a technical journal, *Forth Dimensions*, which is improving all the time.

Since Forth is extendable — that is, any user can add new statements (either because the language is becoming more appreciated or else because the particular application or installation wants a different vocabulary) the journal's emphasis is on comparing different methods of implementing language elements. This focus allows the community to see how to keep the language efficient.

The journal also promotes the continued development of the Forth standard, annual conferences, and general communication among the many groups.

All this, however, is only as important as what is actually made with the FIG Forths. And that was why the 1980 conference was particularly important.

Outside Language

Forth, before now, had an outside language which, while somewhat Pascal-like, was distinctly forbidding and, because of the rareness of Forth programmers, something that users hated to use.

However, other more popular and conventional languages including Pascal, Lisp, Basic and (potentially) Cobol can be written in Forth, thus releasing the employment problem, while adding for their users the extending lan-

(Continued on Page 31)

HUMAN CONNECTION/Jack Stone

Civil Service Reform Policies Apply to DP

One of the major accomplishments of the Carter administration was the passage of the Civil Service Reform Act (CSRA) of 1978, the effects of which are only now being felt in federal government operations. One of its most impressive provisions pertains to the performance appraisal, merit pay and cash awards system for supervisors and management officials, grades 13-15.

CSRA introduces in the executive branch a whole new strategy of compensation for these individuals, which is pay for performance instead of longevity. Well, there's nothing new about this concept in private enterprise, but the point of interest in the CSRA approach is the process of implementation and how it can help personnel management in the computer center.

Basically, the new government merit pay system is intended to:

- Provide a clearly defined mechanism to recognize the performance of individual managers (not an easy task in any organization).
- Reward outstanding performance through salary increases ("merit pay") and, thereby, separate differential performance.
- Use periodic performance appraisals, based on objective criteria, as a quantitative basis for determining these increases.
- Provide for counseling and training to help build performance and improve overall fairness in conducting appraisals.
- Regulate the costs of operating the system by using management controls.

Emphasis on Communication

Bursting forth with some fresh thinking on the subject, Congress recognized that a merit pay system cannot be carried out through once-a-year appraisals. The act therefore requires that there be frequent communication between supervisor and employee regarding the quality and effectiveness of the employee's performance. As a result, the executive branch established *by regulation* that both the immediate supervisor *and* the employee take an active role in the appraisal process and perform tasks that, incidentally, are rarely found in the policies or practices of the typical computer center.

The supervisor is assigned the major responsibilities of:

- Ensuring that the employee is fully apprised of the mission, objectives, goals, plans and operations of the organization.
- Certifying that the employee's job description correctly describes his duties and responsibilities.
- Integrating management and employee goals to the extent possible.
- Working with the employee to obtain agreement on performance standards and specific elements that are critical to acceptable performance and documenting those standards *before* the beginning of the appraisal period.
- Conducting appraisals as needed or requested to discuss performance vs. standards and adjusting the standards as necessary.

Employee's Duty

In addition to the participation implied above, the employee has the additional responsibilities of:

- Reviewing the job description, appraisal forms and supporting documentation to ensure their accuracy.
- Informing the supervisor of requirements for resources and managerial support that may be needed to meet the performance objectives.
- Performing a self-appraisal to determine if performance standards are being met.

The regulations also require than an official(s) be assigned for "systems assurance" purposes, with the tasks of reviewing:

- Performance objectives and standards to make certain they are integrated into the total management process and are consistent with overall organizational objectives.
- Performance plans to ensure fairness and consistency in performance standards.
- Performance appraisals and recommending comparative ratings, noting employee comments along the way.
- Merit pay and cash award recommendations.
- Overall effectiveness of the system.

Finally, the personnel director is very much in the act with major responsibilities for providing:

- Controls to make sure that progress reviews are continuous and timely.
- Instructions and procedures for developing and identifying critical performance elements and standards.
- Adequate training for managers and supervisors, covering their duties and responsibilities under the system.
- Support in handling cases of unsatisfactory performance.

The program, in my judgment, is laudatory. Unfortunately, many of my friends in government don't share my views — not because they are afraid to take the political risks associated with excellence in a government position, but because they fear that political appointees may treat the bonus money as personal "slush funds" and distribute it to friends. I wonder how much of this goes on in private industry.

LETTERS

Missing Numbers

In the article "User Satisfaction Found Common In Europe" [CW, Dec. 1], the author clarified the concept of meaningless statistics brilliantly. The entire article fails to provide just a few numbers that could have made it extremely informative, such as the number of user sites responding, number of systems represented and number of systems installed in each, counting by manufacturer.

When only one votes, it's unanimous (or is it dictatorial?), but in any case it's 100%.

T.B. Bruce

Birmingham, Mich.

Misleading Survey

An article in the Nov. 3 issue referenced a survey conducted by Datapro Research Corp. This survey of remote computing services (RCS) users was taken to determine their satisfaction with RCS vendors.

After discussions with Datapro on the survey techniques, I do not feel that its method gives an accurate indication of user satisfaction.

McDonnell Douglas Automation Co. (McAuto) has more than 2,000 customers, and a sample size of three is not representative. In addition, there appears to be no correlation between overall satisfaction and the other categories. The users rated McAuto as 3 or above in every category, yet in overall satisfaction, users rated McAuto as a 2.7.

To be a meaningful survey, it should establish a correlation between each category and overall satisfaction. The survey provides little more than an exercise in how *not to* conduct a meaningful, informative survey.

This survey, which could be used as a baseline for the evaluation of a possible RCS vendor, would not be very accurate as a starting point.

R.L. Harmon
Executive Vice-President

McAuto
St. Louis, Mo.

More on 'Exclusive Or'

I was very excited by Ted Di Salvo's letter in the Nov. 24 issue. The letter, entitled "Flip Flop," caused me to spend hours thinking about the possibilities of the "exclusive or" operation.

Have you ever run into a situation where you want to set a variable to zero?

An example of this would be if you are about to calculate the mean of a set of numbers. One thing you need to do is count the numbers, and for this you use a counter variable. This variable needs to be set to zero before you begin counting.

The standard approach to this task could be to reserve an integer variable and zero the variable before the counting loop.

```
Initialize:
    LD     A,0
    LD     (COUNTER),A
```

Instead, why not zero the variable with the "exclusive or" operation?

```
Initialize:
    LD     A,(COUNTER)
    XOR    (A)
    LD     (COUNTER),A
```

This code fragment does exactly what the first did, but unfortunately requires seven bytes instead of five bytes. However, since most modern computers allow at least two addresses in an instruction, one can usually write:

```
Initialize:
    XOR    (COUNTER),(COUNTER)
```

This too only requires five bytes! Every time you pass through this code fragment, the variable is zeroed.

Zeroing will work on every bit specified in the XOR statement and only those bits. So if other variables were used for other purposes, each can be handled separately.

Paul C. Anagnostopoulos

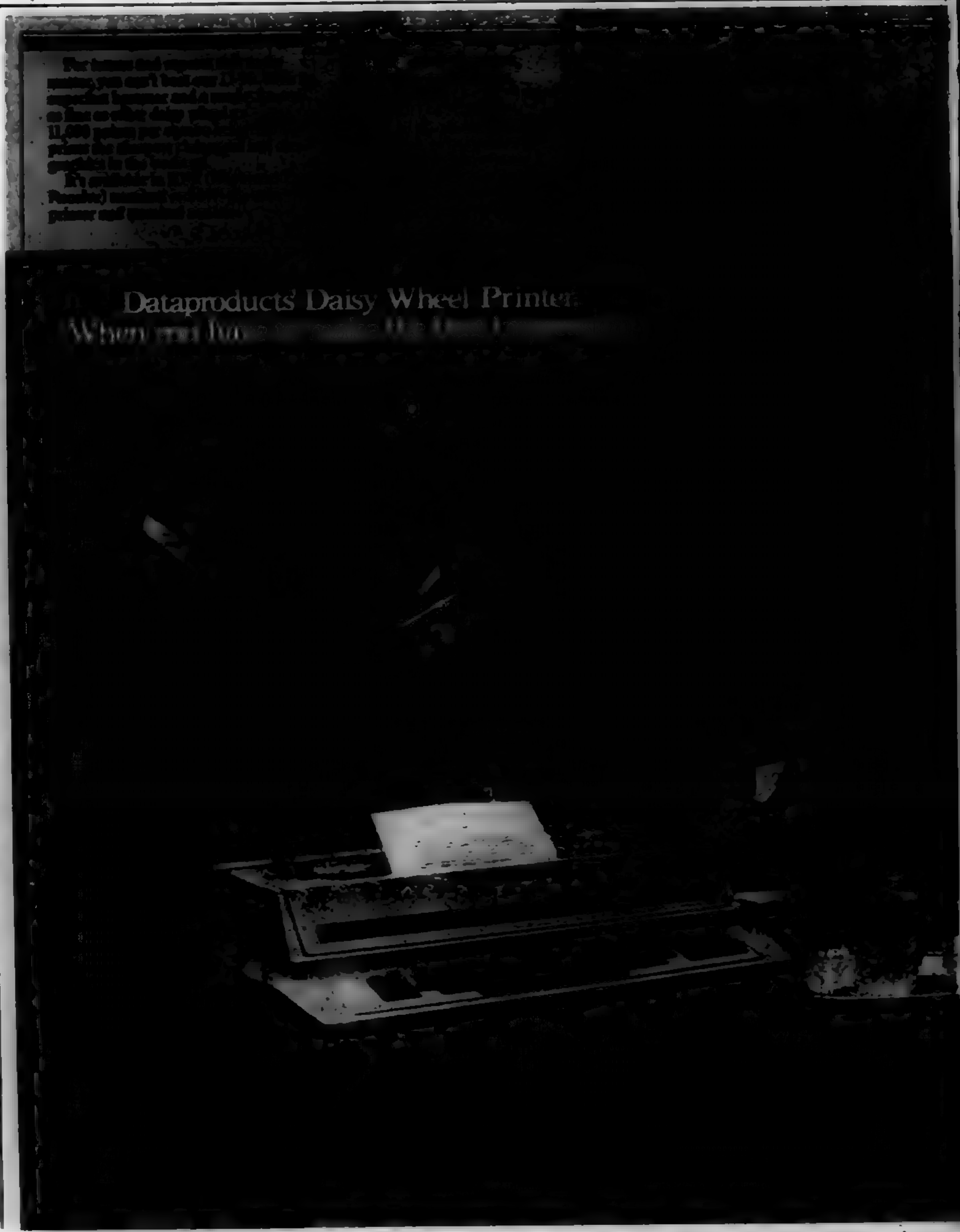
Nashua, N.H.

Computers in Schools

I have been combining my interests in computer science and education for 15 years now. I started as a high school mathematics teacher, developing a computer-assisted course that enabled my students to explore the structure of algebra functions without having to deal with tedious computations. Today, I serve as a systems analyst for a major nonprofit research and evaluation firm, working in the design and implementation of large-scale computer systems for the evaluation of social and educational programs. *Computerworld* has become essential reading in keeping me up to date in a fast-moving field.

In these years, as I have both participated in and observed the growing influence of data processing and information processing on our lives, I have been struck by the lack of a genuine debate on the real and imagined social consequences of automation. Our industry certainly has its share of gurus, futurists and bellwethers, but if your letter section is any indication, the readership of CW appears to be more concerned about the relative merits of PERFORMs and GOTOs than they are about the preparation their children are receiving for a world which is already far different from the one we were born into 30, 40, 50 and 60 years ago.

I have two reasons for writing. The first is to make your readership aware of the information gap that exists between our public schools and the growing information industry. The second is to invite discussion and de-



LETTERS

bate, either through the pages of CW or directly, on the "is" "ought" issues of computers in the schools.

Anyone interested in entering into a dialog with me can write to me at the American Institutes for Research, Box 1113, Palo Alto, Calif. 94302.

Annalee Elman

Palo Alto, Calif.

Only Answer

In the Nov. 24 issue, the headline on Page 59 read "Chase Manhattan Adds VAX to Data Base."

The article reported at length on a site doing a large-scale complex MIS system on a more than two-billion-byte data base for one of the largest banks in the world. The system was developed by a user department (comptrollers) on a Digital Equipment Corp. PDP-11/70 minicomputer with one or two man-years of effort to service online users in 35 countries.

A truly remarkable accomplishment!

In today's world, where the trendy industry issues are distributed processing, programmer productivity, high-level languages and so forth, all discussed at great theoretical length in "In Depth" articles, a reader of this article might ask himself how the system in the article came into being.

The only answer to be found in the article was "the use of Admins-11 software, a very high-level development language." How informative.

David Griffel
President

Admins, Inc.
Cambridge, Mass.

'It Seemed Better'

I was disappointed with the article "User Chooses HP Mini Over System/34" [CW, Nov. 17].

I expected it to compare the two systems and show the *reasons* Latchford Glass Co. made its decision.

Instead I read comments like, "The [Hewlett-Packard Co.] equipment was selected because it seemed to have a better data base system and was interactive" and "The delivery date also was better and the system was less expensive than IBM's."

Why did the HP *seem* to have a better data base system? How much better was the delivery date? How much cheaper was the HP? These are the questions the article should have answered if it was to *prove* why one system is better than the other.

I sincerely hope Latchford Glass Co. did not choose HP over IBM simply because "It seemed better."

Avery T. Horton Jr.

Washington, D.C.

Remarks Clarified

I enjoyed the Nov. 17 article on my talk at the Data Entry Management Association conference. I do want to clarify a few of my remarks which I feel were quoted somewhat out of context. The article quoted me as saying that "CRT workstations will outnumber typewriters in the office by mid-1980. With CRTs to take care of data entry, optical character recognition (OCR) equipment will be relegated to the back burners."

First, I was talking about the mid-'80s, not mid-1980. I stated that at that time, it was projected that CRT workstations sold would exceed nonmemory typewriters sold to the officeplace. The total population of typewriters, however, would still continue to exceed the total population of CRTs until later in the decade.

With regard to OCR, I indicated that since the role of *limited-font* OCR was primarily to allow the use of ordinary typewriters to prepare material for scanning rather than enter text directly on a CRT terminal, this type of OCR would become somewhat less important as CRT terminals became more prevalent.

Thus with regard to the back burner, I was talking about limited-font OCR, not OCR in general. Even with regard to limited-font OCR, I did not use the term "back burner." Since typewriters will still be widely used in the office environment for years to come, even limited-font OCR will still have significant use.

The thrust of my remarks was that limited-font OCR will become less dominant as the primary form of OCR available and that omni-font OCR, which can handle original source material without retyping, will find substantially increased use in the years ahead.

Raymond Kurzweil
President

Kurzweil Computer Products, Inc.
Cambridge, Mass.

It's Simple!

In the Nov. 17 issue, John Meurer requested a way of storing five alphanumerics in three characters. Simple!

On an IBM machine, each character is eight bits. This is enough for 255 possible characters. We need only 40 characters — 0-9, A-Z and a few special symbols (blanks and so forth). Therefore, only six of the eight bits are necessary.

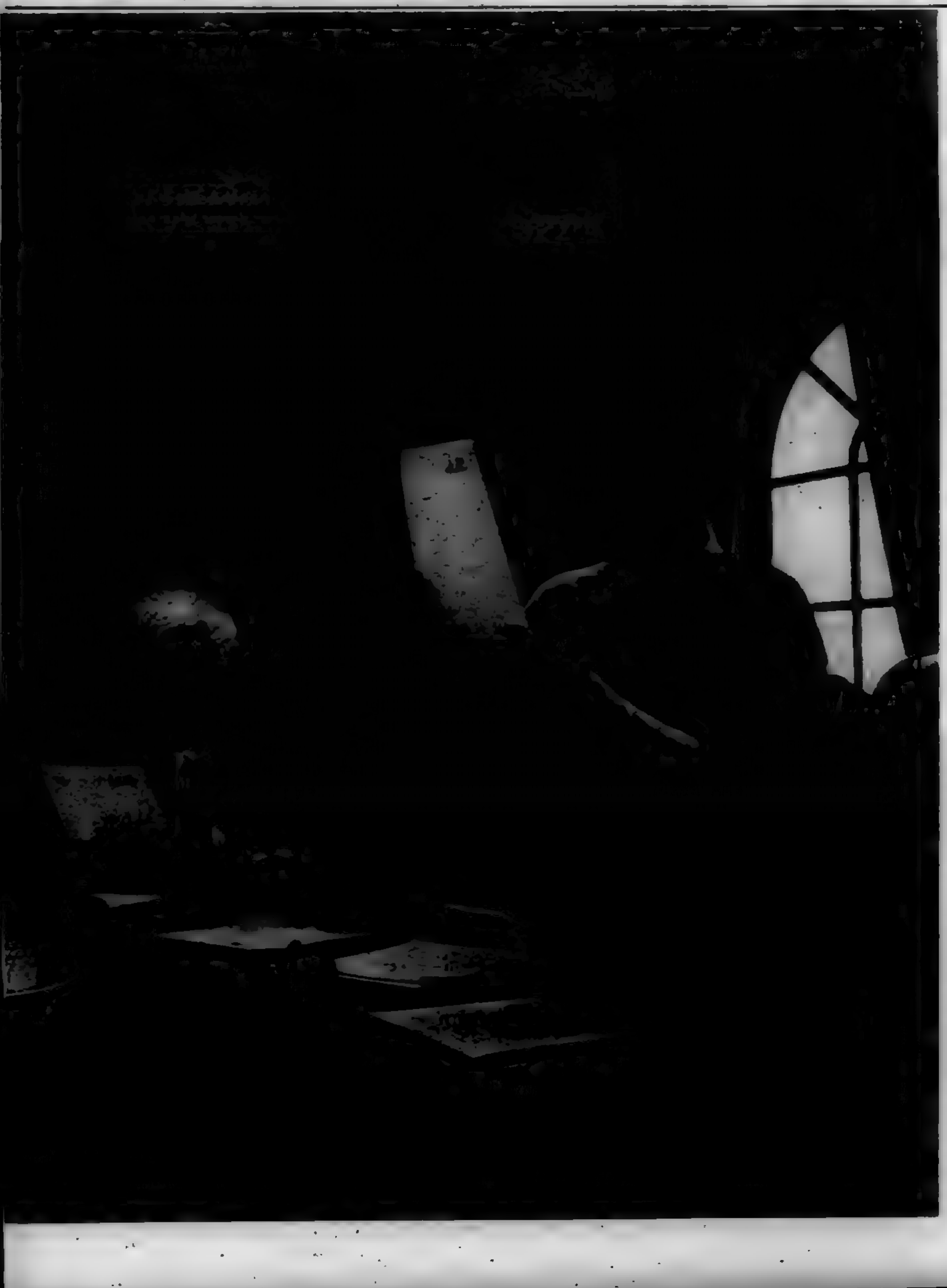
This yields 63 possible characters. Judicious selection of characters to prevent misunderstandings (zero but not o, 1 but not I and so on) would further reduce the requirement to five bits.

Using six bits, you can encode four characters in three bytes (24 bits). A slightly fancier method will get all five characters in three bytes.

The conversion will probably also require an assembly language subroutine.

Donald Weimer

Bethpage, N.Y.



LETTERS

Author Went Wrong

Sorry to see Robert Davis go wrong in "Where Have We Gone Wrong in DP?" [CW, Nov. 17].

First-generation computers, of course, were the first computers, employing vacuum tubes. Transistor computers such as the IBM 1401 are in the second generation. That bumps the IBM 360 into the third generation.

What I think marks the fourth generation is gate-array technology, as is found in the IBM 370/168 or Digital Equipment Corp.'s VAX-11/750. (Computer text authors please note!)

Patrick J. Sweeney

Woodside, N.Y.

How About Prototypes?

Robert Davis admirably addressed the significance of inept communication between DP and client communities. His suggestions for improvement involve a much tighter relationship between needers and providers, a relationship that seems to depend more on bidirectional osmosis of strategic intelligence than on concrete, time-proven techniques to assist in the marketing of a value-intensive product.

It can be argued, with perhaps some basis, that our products are soft; that we really peddle services in lieu of products; that we are rarely given the opportunity to offer a panacea, even when one is clearly available. On the other hand, our relationship with the client community seems to gravitate to involving the client in all activities; we just cannot wait to show the client the next flowchart or explain to him the most arcane rationale for choosing this data base structure over another.

What the person really wants is results; if he has to get involved with bits and bytes to improve his chances of getting results, all well and good — he does just that. I firmly believe that he doesn't have to get involved in the process — just let him see results he understands.

The management people in American business are too busy trying to understand and do something about their own problems to have the time to understand DP concepts and facilities. But we continue to ask and we continue to market our specialty (whether packages or promises) in a manner that demands management understanding of what we do and how we do it. The real difficulties arise when the DP community arrives at management's door with a paper representation of the be-all and end-all solution to knotty problems and with the honest expectation that management will enthusiastically support the commitment of corporate kilobucks to the development of what is essentially an unknown by a group of people who have essentially a pretty bad track record. Since this approach has backfired time and time again, we have grown to learn that the rewards come when we get management involved early and completely.

Davis' suggestions concerning the demonstration of existing systems, developing executive training programs and setting up steering committees and review boards may help to smoothe the anxiety with which the client community views DP people, but it probably won't significantly improve the mood the next time flip-and-flow charts come out at a major system presentation.

What is generally lacking is the willingness of the DP community to develop prototypes, a marketing tool used with great success in other disciplines. Prototyping of proposed system solutions carries demonstration to a pertinent depth, providing a tool that can be an extremely powerful catalyst to productive interaction between needers and providers. A prototype is a visualization, just as are the sketches provided by the architect; nothing helps the client community understand more than a real live demonstration of things to come.

Curtner B. Akin Jr.

New London, Conn.

Corrected Order Number

In reference to the two-part series by Barney L. Dewey on network failure remedies [CW, Nov. 3, Nov. 10], the errors are consistent. The modular telephone jack for the registered interface has been designated as RJ455. It is *not* an RJ455; when ordering from your local phone company, use the universal service order code (USOC) RJ45S. It is physically an eight-position 97B/-C modular connecting block, Data Ring (red) being position 4 and Data Tip (green) being position 5.

Dominick Tarricone

Commack, N.Y.

Frightening Idea

"Political Deception by Computer?" [CW, Nov. 3] somehow implied that tailoring political messages is something new because of computers. In fact it has been "cured" in turn by such modern inventions as the newspaper, telegraph, radio and television.

The really frightening idea in the article was someone (?) proposing a national comprehensive public data base on an individual person. The argument that a candidate totally forfeits privacy strikes me specious and Orwellian.

Burness R. Eiler

Minneapolis, Minn.

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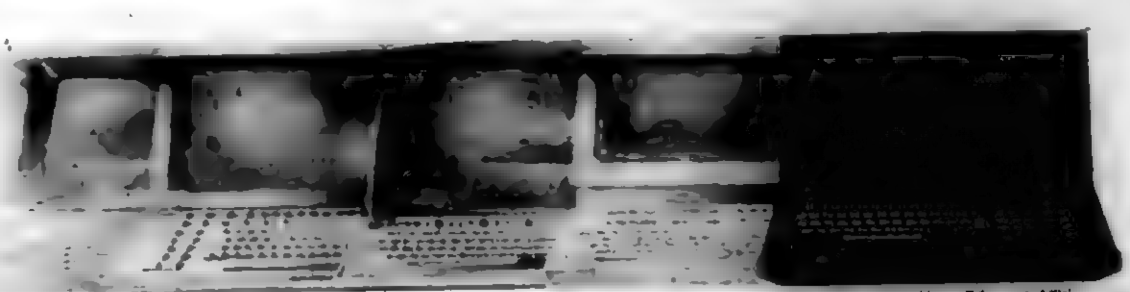

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DATAPOINT

Users Can Help End Programming Crunch

(Continued from Page 27)

In the companies I have seen, progress is slow and often unsupported by senior DP management. Nevertheless, progress is being made because computer users and general managers are becoming more knowledgeable about computers and their use. These people are insisting that their needs can be met faster, with less formality and at less cost. They are pointing to universities and other suppliers that offer the kind of services they want.

Some users are pressuring the large centralized DP departments by taking matters into their own hands. They are acquiring small-scale systems that can be used to perform many of the functions previously performed centrally.

For example, a $20,000 turnkey microcomputer system with software and a DBMS is used by a sales department for word processing, appointment calendars, budgeting and financial modeling as well as other applications. With some coordination between the user department and the central DP group, ad hoc reporting can be handled by the users.

Some computer professionals are discovering the realities of software development tools. They have been introduced to minicomputer systems that are both user and programmer friendly and are beginning to pressure their management and to advise computer users of what can be done.

Holding Back

With this push by users and technical/professional people, why does there seem to be little or no direction from DP management toward reducing the need for programmers?

There are several factors:

- Millions of dollars invested in "traditional" systems.
- A constant level of reactive activity to keep existing systems going and to respond to user requirements with traditional techniques.
- Lack of research and development budgets.
- Lack of long-term (five-year) planning in the area of software development methods.
- Managers who have come from the ranks of programming and who are not keeping themselves technically current.
- Managers who want to maintain the programming empires that have grown up over the last 20 years.
- Inertia.
- Programmers who have been spoiled by a marketplace in which their skills are in short supply.
- Pressure from some vendors to continue to use tools that are primitive when compared with those available from other vendors.
- Programmers who reject new approaches to software development.
- Inadequate training.
- Corporate management that has tired of computers and software and has turned management over to DP specialists.

What Will Happen?

Of course, no one really knows what will happen in the programmer marketplace.

I have faith in our technical capabilities and in the law of business that high-cost, labor-intensive processes, especially in nonunion-controlled industry, have short lives.

The marketplace will, undoubtedly, adjust itself. More programmers will be trained, new methods will be adopted, software that reduces the need for programmers will become widely used. But the negative effects and the time it takes for the change to occur can be reduced if the people in the DP power structures begin to work in an organized way to plan and direct the change in their own installations.

Action can be taken now to begin to reduce large company dependence on armies of application programmers. That action begins with a commitment to take control of the situation. If there is no long-term plan for software development, one should be started.

A primary goal should be containment of permanent and temporary programming staff. In addition, organizations should aim at reducing the required skill level for the majority of programmers to be hired.

These goals can be accomplished by establishing a software development environment with programming methods and tools that enable minimally trained people to perform the large proportion of application programming tasks that do *not* require specialized skills.

DP management must put forth a significant effort to begin to alter the current trends in application software development. This effort will have its reward in reduced DP budgets and greater service to the community of users.

Pitagorsky is president of People and Solutions, Inc., a management consulting firm in New York City.

Alternative Software

(Continued from Page 27)

guage abilities of Forth! This was the most important news that came out at the conference.

Even though the claims of speed and efficiency in comparisons with normal compilers were not able to be substantiated, work is being carried out mainly in Europe, and this could be Forth's biggest breakthrough.

The ability of the FIG Forth to be written for many different architectures was demonstrated and versions for most micros and major minis were shown and are becoming routine.

The situation seems to be that conversion to a new set of hardware only requires a man-week to a man-month of work and then all FIG Forth applications and facilities can be run on the new system. This is much better than having to wait until a vendor brings out its own (altered) version.

Environments Easier, Too

FIG Forth has grown up in a dedicated situation, with no non-Forth software around and with multitasking and so on in only some versions. Now, versions that can run along with alternative software environments are being built. These would, for instance, permit a CP/M user either to run Forth under CP/M or run CP/M under Forth!

The problem of teaching the language has also received attention. There is an interactive course that lasts about three hours. While I have seen only one version so far, it can go far to break down the current problems of learning Forth.

And there are even more related developments. FIG Forth versions of electronic mail systems and graphics of various types are being developed for public domain dedication, and the signs are that this trend will continue indefinitely.

These are some of the benefits alternative software can provide, even when it is less than two years old.

For most application-using users, it is probably still a year from making an immediate impact, but for long-range planners or developers, the situation can be immediately important.

(FIG can be contacted through P.O. Box 1105, San Carlos, Calif. 94070).

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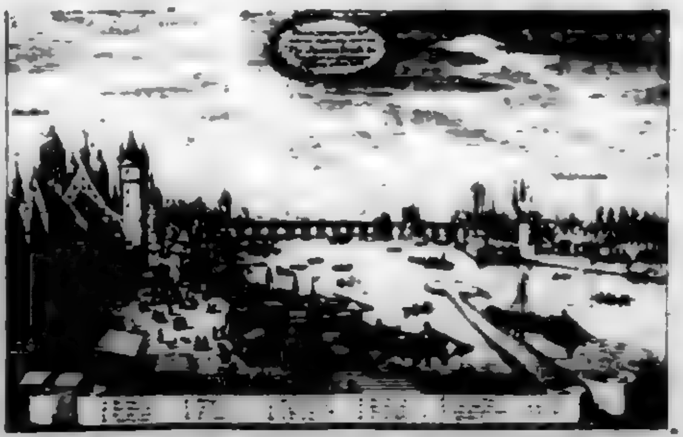

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Random Notes

System Development Tool Assists DP Administrators

WEST HARTFORD, Conn. — Multitask, Inc. is offering a system development and maintenance tool for analysts, programmers and data base administrators called LIBX-REF.

The package is said to automatically locate components of a DP system and document how those components relate to each other.

The product costs between $1,000 and $12,000 depending on options and support level required, Multitask said from Suite 15, 1007 Farmington Ave., W. Hartford, Conn. 06107.

Tool Lets DEC Users Define Operating System Commands

BOSTON — Users of Digital Equipment Corp. PDP-11 systems under RSX-11M reportedly can now define their own operating system-level commands with a new release of the RSX-11M Digital Command Language (DCL) from Andrew Rubel & Associates, Inc.

Version 1.5 of RSX-11M DCL allows the typing of a single command to invoke either an RSX-11M indirect command file or an executable task image. In either case, variable command parameters can be passed in to specify the object(s) of the command, a spokesman said.

DCL is available for a one-time license fee of $795 or for a 30-day no-obligation trial period from the firm at One Soldiers Field Park No. 605, Boston, Mass. 02163.

Electronic Mail System Out For IBM Series/1 Mini Users

SAN JOSE, Calif. — An electronic mail system for the IBM Series/1 minicomputer is available from Systar Corp.

Message/1 applications include transmission of administrative messages, reports, interoffice memos, orders and reservations.

The one-time license fee is $35,000 and there is a $375 monthly maintenance charge, the vendor said from 1762 Technology Drive, San Jose, Calif. 95110.

System Controls Job Streams To Utilize Optimal Resource

NEW YORK — A software package said to control DOS job streams for optimal resource utilization has been announced by H&M Systems Software, Inc.

Stream Control is also said to simplify job stream creation and maintenance, execution of reruns and increase data security after abnormal job terminations.

The software is available for a free 14-day trial period, under perpetual license for $4,000 or for rental at $175/mo from the firm at 40 Rector St., New York, N.Y. 10006.

Relational DBMS Offered For HP 3000 Series Minis

MOUNTAIN VIEW, Calif. — Computer Resources, Inc. (CRI) here introduced Relate/3000, a relational data base management system (DBMS) for Hewlett-Packard Co.'s top-of-the-line 3000 series of minicomputers.

Designed to run under MPE III, the DBMS was developed some two years ago. It was available during that time to CRI's timesharing clients who, in essence, performed the beta testing for Relate/3000, according to CRI.

Utilizing table-driven formats for data representation, the DBMS features a reportedly English-like interactive language called the Command Interpreter (CI) to enter user commands and a message subsystem that provides system status and error diagnostics in English, a spokesman said. The CI functions as a direct user interface to the data base, and the vendor claimed that "in many instances" it can fulfill user requirements and eliminate the need for custom programming.

Designed to allow nontechnical personnel to generate ad hoc reports and one-time data manipulations, Relate/3000 can cut programming time within an installation "up to 80%," the spokesman claimed.

Product specifications provide for interactive and batch operation, alterable key value fields, dynamically alterable index structure, dynamic file creation and deletion and creation of file subsets and consolidations. Library routines can be called from Cobol, Fortran, Basic and SPL programs, and data can be stored in integer, double-integer, single- or double-precision floating-point or Ascii formats.

The DBMS allows for structured data entry by the user, and the printed output will conform to the user's terminal characteristics, CRI said.

Current file allowences have the following maximums:

- Number of field/file: 127.
- Number of indexed fields: 25..
- Number of index/file: 9.
- Field name size: 10 characters.
- Alphabetic field size: 130 characters.
- Key size: 30 words.
- Record size: 256 words.

Available immediately, Relate/3000 is priced at $10,925 for one CPU. That fee includes one year of maintenance, CRI said from its headquarters at 2570 El Camino Real, Mountain View, Calif. 94040.

MRP System Meshes Planning, Financial Control

ANDOVER, Mass. — Small- to medium-sized manufacturers are now being offered integrated manufacturing resource planning (MRP) software that combines both manufacturing planning and financial control, all operating on a minicomputer.

Software packages from MRP Software International, Inc., a newly formed division of Software International Corp., features an on-line closed-loop series of interlocking modules based on MRP concepts that until now have been available only to large manufacturers, according to MRP.

Using the MRP System I or System II, manufacturers with $2 million in sales can achieve cost-efficiency and planning control and at the same time earn three to five times the payback for the system during its first full year of operation, MRP claimed.

The MRP software is similar to that offered to larger users, but runs on Microdata Corp., Prime Computer Corp. and Hewlett-Packard Co. minicomputers. A typical overall system might cost $100,000 for software, a minicomputer and on-site education for plant personnel, according to MRP.

The System I operates on Microdata minicomputers with OS Reality in Basic. MRP basic software functions include MRP/-Master scheduling, Bill of Material/Item Master, inventory transactions and scheduled receipts.

The manufacturing extensions give the small manufacturer shop floor control/-capacity planning/routing and work cen-

(Continued on Page 34)

Tymshare Lets Banks Share ATM Kiosks

CUPERTINO, Calif. — Tymshare Funds Transfer Services, Inc.'s recent introduction of an 11-location automated teller machine (ATM) network shared by 22 financial institutions marks the first time such a system has been established and operated by a third-party company, the firm maintained.

The network, called Option, consists of 11 teller kiosks, each containing two IBM 3624 ATMs, located in shopping centers and supermarkets throughout the San Fernando Valley area of Los Angeles.

Each kiosk permits customers to make deposits, withdrawals and balance inquiries from a variety of financial institutions 24 hours a day, seven days a week.

Each institution, now confined primarily

(Continued on Page 34)

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Stafford Adds Bank Package

TRAVERSE CITY, Mich. — Stafford Management Systems, Inc. has added a banking package to its line of software for IBM's 5100 line of desktop computers.

Called Bank Staff, the package offers land contract/mortgage management, installment and commercial loan processing, credit life insurance reconciliation, state-required financial statements and safety deposit box management, the vendor said.

The package costs between $1,750 and $6,750, depending on applications included, the vendor said from 3298 Wysong Road, Traverse City, Mich. 49684.

Tymshare Lets Banks Share ATM Kiosks

(Continued from Page 33)

to savings and loans, pays an annual participation fee based on the size of its customer deposits. As customers transact business at the Option kiosks, each institution pays for its own usage on a per-transaction basis.

"The new service gives smaller institutions that might not be able to afford off-premise services a way to compete," remarked Lon Magaro, executive director of Option for Tymshare Funds Transfer Services, Inc., a subsidiary of Tymshare, Inc.

Tymshare said it plans to open another regional network in Orange County, and a total of 21 geographic areas throughout California are planned to begin operating within the next three to five years.

Each region will have a minimum of 10 ATM kiosks, with a practical limit of about 20 per region, Magaro said. The Tymshare system is capable of accommodating up to 100 financial institutions and 4,000 teller terminals.

It can connect directly to 30 host computers and as many as 80 controllers, handling up to 10 transaction messages per second. These capacity limitations are arbitrary for the start up of the system and may be expanded as the system grows, Tymshare said.

The Tymshare computer switching system is compatible with most computer systems currently used by the member institutions, thus easily connecting into their central systems, Magaro said. In cases where an incompatible system exists, Tymshare's staff will assist the banks in developing the required software programs or hardware systems.

The Option project started in 1979 when Tymshare purchased the assets of and the electronic switch developed by the Savings Association Central Corp. There was some delay in bringing the system to market because of various applications the company had to make to state and federal banking regulatory agencies in order to launch the innovative service, a spokesman said.

Message Model Approach

The software design of the Tymshare system is based on a message model approach whereby all components of the system communicate through fixed messages. This approach makes additional functional changes easier and lends itself to a modular programming design. The software system is comprised of 13 on-line modules which facilitate the real-time processing mechanism, Tymshare said.

Most of the programs for the Option system are written in Fortran IV Plus, a high-level scientific language, with the remainder written in Macro 11, an assembler programming language.

Hardware for the network includes two Digital Equipment Corp. PDP-11/70 processors, each with 750K bytes of main memory; two DEC PDP-11/04 minis connected to the PDP 11/70s to do message validation and security processing; two Atalla Technovation model 7011 PIN security modules, IBM 3601 financial systems controllers and the IBM 3624 ATMs.

Further information on this service is available from the vendor at 20705 Valley Green Drive, Cupertino, Calif. 95014.

Integrated MRP Allows Planning

(Continued from Page 33)

ters, purchasing and order entry functions. The financial extensions to the MRP System I provide accounts payable, accounts receivable, general ledger, payroll and work order costing functions.

MRP basic software, the manufacturing extensions and the financial extensions typically cost $20,000, $12,500 and $12,500, respectively. Microdata hardware costs start at $50,000, MRP noted.

MRP System II

The MRP System II operates on Prime minicomputer equipment with DMMS written in Cobol 74 and on the HP 3000 with Image using Cobol 74. In addition to operating on more powerful systems and incorporating more memory capacity, the MRP System II adds a physical inventory function to its manufacturing extension software.

System pricing for the Prime hardware is $150,000 to $224,000 and up, and the HP 3000 ranges in cost from $175,000 on up, the firm said.

MRP basic software for the System II costs $24,000, the manufacturing extensions cost $20,500 and the Financial Extension cost $28,300 for a typical user.

The company is located at Software International's headquarters at Elm Square, Andover, Mass. 01810.

If Churchill had used SPSS®, he might have saved his statistical department a lot of blood, sweat and tears

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Thanks to the honest and tireless efforts of his Department, most of the war's critical decisions were based on facts, not hunches. Had they been able to use the SPSS Data Analysis Package, the Department's analysts could have explored the legions of data more quickly, efficiently, creatively . . . with easy-to-generate tables, graphs and reports, as well as sophisticated statistical analysis.

Using the SPSS Graphics Option, Churchill might have had graphs showing The Battle of Britain in terms of German and British aircraft losses by time. Using regression analysis, Churchill would have had an excellent estimate of future losses.

As a matter of fact, Churchill might have been able to do it on his own, without the Department, because SPSS is so easy to use. Churchill himself could have learned from the excellent SPSS self-teaching manual. No special training in computer language would have been necessary—SPSS talks, listens and reports in the user's language: plain English!

When you decide which data analysis software package is right for your life and death decisions, consider the facts, as Churchill would have done. SPSS is sophisticated in output, yet simple to input. It's extremely portable—works in almost all computer environments. And you needn't hire any extra data processing people—your data researchers work on their own . . . with considerably less "blood, tears, toil and sweat."

If you would like to see how SPSS-generated graphs and charts would have displayed The Battle of Britain to Churchill, or for more information on SPSS, call or write:

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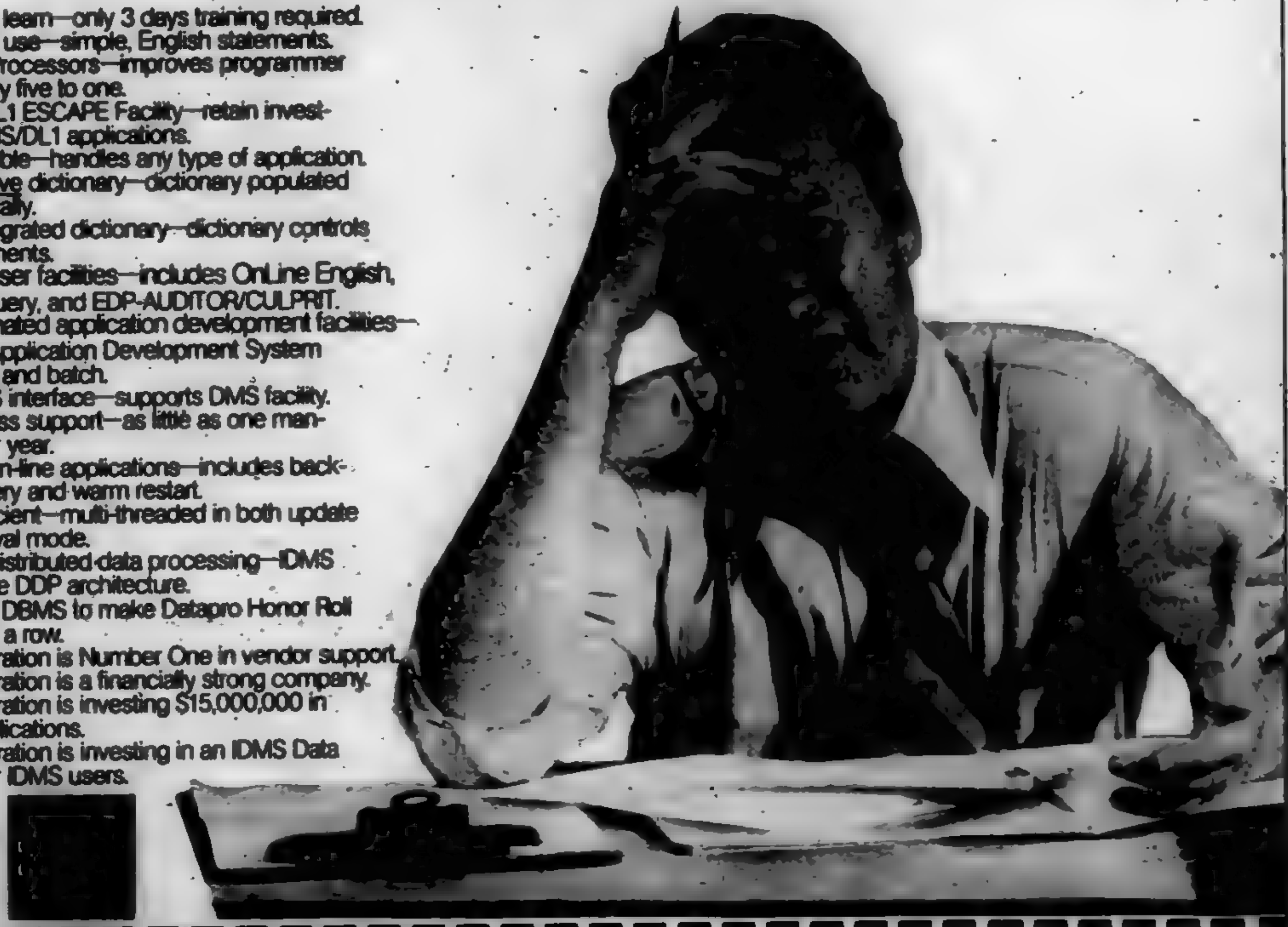

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Sort-Driven Report Writer Debuts

JERICHO, N.Y. – An "extremely fast, easy-to-use" sort-driven report writer has been announced by Computer Associates for use with any DOS/VS, DOS/VSE sort package.

Called CA-Dart, the package is accessible through any DOS/VS, DOS/VSE sort's E35 exit. The utility function of the sort package will allow a reduction in programming effort of up to 90% for such tasks as file conversions, reblocking of files, reformatting and changing the size of records, creation of backup and test data, Computer Associates said.

In addition, CA-Dart adds an ad hoc and general reporting facility.

Steps Integrated

The new report writer integrates the separate steps of coding, compiling and execution, Computer Associates claimed.

It uses a maximum of only 11 different commands; no knowledge of programming languages is required, a spokesman added.

The package requires 16K bytes of main storage in addition to that required by the sort. If Isam files are input, an additional 7K bytes is needed, the spokesman noted.

CA-Dart sells for $4,000 for use with any IBM or other IBM-compatible sort. However, it can be acquired for $2,000 when purchased as an adjunct to CA-Sort.

Computer Associates is at 125 Jericho Tnpk., Jericho, N.Y. 11753.

NCA Forms Users Group

SUNNYVALE, Calif. – NCA Corp. has announced the formation of the NCA Users Group, a coalition of users of NCA's minicomputer-based manufacturing and financial information management systems.

The users group will publish a quarterly newsletter and will meet twice each year – once on each coast. The next meeting is scheduled for February in San Francisco.

More information is available from Edward Silliman at American Telecommunications Corp., 9629 Flair Drive, El Monte, Calif. 91731.

Correction

Chase Enterprises, Inc., which recently brought out a conversion system that links the IBM Office System 6 and the 5110/5120 minicomputer [CW, Dec. 1], has moved. Its new address is Suite 255, 10717 Camino Ruiz, San Diego, Calif. 92126.

Reporting Tool Aids Management Analysis

RICHMOND, Va. – The Computer Installation Management System (Cims), a system performance reporting and job accounting software product developed by BMX Computer, Inc., is available from Nixdorf Computer Software Co. (NCSC).

Designed for users of the IBM 360, 370, 4300 and all plug-compatible mainframes, Cims supports fixed-block architecture (FBA) and CKD direct-access storage devices. Cims runs with DOS, DOS/VS, DOS/VSE, DOS/MVT, DOS/RS, Edos and Edos/VS operating systems.

Cims offers report facilities for management analysis, including system utilization and system performance reports. The standard reports are said to enable quick identification of system bottlenecks that otherwise might go undetected.

Customized Reports

Through the use of the report writer feature, Cims allows the user to write his own customized reports. Cims also provides a billing system capable of generating invoices for system users, the vendor said.

Cims is supported by NCSC from its U.S. offices in Los Angeles, Dallas, Chicago, New Jersey and Richmond, with toll-free telephone service available.

Cims can be installed using the standard job accounting interface of the supervisor or the Power spooling system. No special macros or exits are required, according to the firm.

Cims may be purchased for $5,000, with lease plans available from the vendor at 6317 Everglades Drive, Richmond, Va. 23225.

McAuto Now Offering 'Process' on T/S Network For Petrochemical Use

ST. LOUIS – McDonnell Douglas Automation Co. (McAuto) has installed the petrochemical simulation program known as Process on its IBM and Control Data Corp. computer systems for use through its time-sharing and batch teleprocessing networks.

Owned by Simulation Sciences, Inc., Process is used to solve design problems and make unit operations more dependable by using thermodynamic property data and correlations to predict results.

Charges for the use of the product are assessed according to the amount of computer time used.

McAuto is based in St. Louis, Mo. 63166.

IBM Series 1
Word Processing
CATS

The Computer Assisted Typing System (CATS) provides complete word processing capabilities for the IBM Series 1 computer. CATS is people engineered to produce maximum performance with minimum human effort and training. Single key entries perform most of the complex functions. Many automatic features help eliminate operator errors.

FEATURES: Speed typing with auto word wrap at the right margin. A full feature editor to insert, move, copy and correct text. An Auto Letter Generator to create custom letters, which allows the insertion of up to 9 text variables. The Copy Utility provides the capability to copy documents for modification and creation of different versions.

EQUIPMENT REQUIREMENTS: Any Series 1 Processor, 4978 Terminal (two rows of function keys), 3101 Terminal (available Jan 80). Any printer capable of upper and lower case printing. Text can be stored on disk or diskette.

COSTS: CATS Word processor and Utilities . . $1500; Auto Letter Generator and Utilities $750

CONTACT: Gary Irwin and Associates, 4102 Wilmore Drive, Irvine, California 92714, (714) 552-1004.

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System/34 Gets Disk Manager On Version 6

LUDLOW, Mass. – Computer Technologies, Inc. is offering a disk management package for the IBM System/34 that is operational only on Version 6 and is meant as an aid to new operators.

Four menu steps are featured. The first allows the user to expand a file size by keying in the name of the selected file. The screen displays the current allocation and the number of actual records used and prompts for a new size.

The second menu step copies a requested file to a new file and size, allowing the user to save a copy of the file before any procedures or programs changing the file are used. The third menu step copies a file from and to a certain record, and the last menu step copies one record from a requested file.

The menu can be incorporated into any library and is available by sending one 1D diskette and $5 for postage and handling to Computer Technologies, P.O. Box 259, Ludlow, Mass. 01056.

Cargo Program Based on Series/1

SAN FRANCISCO – A cargo reservation software program based on IBM Series/1 minicomputers has been introduced by Raymond G. Lorber, Inc.

The Japan Air Lines Cargo Reservation System (Jalcars) is said to provide the minicomputer with power to manage the task of reserving cargo on an international, interairline basis.

The on-line, interactive system licenses for $35,000 from the firm at Suite 2840, 333 Market St., San Francisco, Calif. 94105.

Upkeep Added To 'Pro/Test'

BEDFORD, Mass. – Synergetics Corp. is offering a maintenance support plan for its Pro/Test testing package that features a two-day training course and a one-day seminar.

To keep users up-to-date with both testing and Pro/Test developments, the plan will include subscriptions to Software Research Associates' "Testing Techniques" newsletter and a Pro/Test newsletter.

The package cost is equal to 15% of the value of installed components, the vendor said from One DeAngelo Drive, Bedford, Mass. 01730.

'Documate' Enhanced

ALBANY, Calif. – A software package that generates a table of contents from Micropro International, Inc.'s Wordstar text file has been developed by The Orthocode Corp.

Designed for systems using Digital Research Corp.'s CP/M operating system on 8-in. diskettes, Documate can also generate an index, in conjunction with a sort utility.

The CP/M version of Documate costs $50 plus $4 for shipping and handling from the firm through P.O. Box 6191, Albany, Calif. 94706.

Mailing Aided On 5110, 5120

SPRING HOUSE, Pa. – Whelan Associates, Inc. has announced a business prospect mailing list package for users of IBM 5110 and 5120 desktop computers.

The package can be used by direct mail and catalog sales firms as well as distributors, retailers, manufacturers, clubs and nonprofit organizations, the vendor said.

The package allows both printing and inquiry of the mailing list in its entirety or on a selective basis. It costs $950.

Whelan is headquartered at Gwynedd Plaza, A/E Center, P.O. Box 650, Spring House, Pa. 19477.

'Write-Up Tool Aids Accounting

SEATTLE – Dataword Corp. has developed a client "write-up" software system for accounting firms that will operate on microcomputers running under Digital Research, Inc.'s CP/M operating system.

Designed for either floppy or multiuser hard disks, Datawrite incorporates operator entry routines, account number structure, journal options and report writer capability allowing an accountant to format any client statement desired.

The price for Datawrite is $2,995, which includes training and documents.

Dataword is at 1404 140th Place, N.E., Bellevue, Wash. 98007.

HP Desktops Get Program Security

MT. HOLLY, N.J. – A program security system for Hewlett-Package Co. 9845B/C and 9835A desktop computers has been announced by Structured Software Systems, Inc.

OEMSEC is said to encipher a stored program so symbol names for variables, labels, defined functions and subroutines are deleted from the program listing.

Nodup prevents duplication of programs stored on tape cartridges so they cannot be copied or run unless the original tape is also present, a spokesman explained.

Nodup costs $2,500; OEMSEC costs $2,000; together they cost $4,000 from the firm at Irick Road, Box 1072, Mt. Holly, N.J. 08060.

Data Computed For Auto Finance

RALEIGH, N.C. – Software that reportedly computes the insurance cost, finance charge, monthly payment and annual percentage rate for automobile financing is available from Paul E. Sharpe & Associates.

All deals – closed and unclosed – may be saved on disk for later recall, and the terms may be changed when the customer is inclined to bargain, the vendor claimed.

The software costs $7,000, from Suite 220, 2312 Annapolis Drive, P.O. Box 12751, Raleigh, N.C. 27605.

'Finar' Out for VAX-11s

DENVER – Finar Systems, Ltd.'s Financial Analysis and Reporting language, Finar, is available in a high-speed version and may now be run on Digital Equipment Corp.'s VAX-11 in "native mode" under VMS.

Finar Extra Speed runs several times faster than the earlier Basic Plus version and has the same appearance to both the user and the internal file structures, the vendor claimed.

Finar was previously available for use only on PDP-11 models. Prices start at $18,000, the vendor said from Suite 2-300, 6000 E. Evans, Denver, Colo. 80222.

Genasys Updates 'Design Manual'

NEW YORK – Genasys International, Inc. has reformatted and enhanced the application and project planning information provided by the Design Manual documentation produced by its system development software.

The manual summarizes all user requirements, computer system specifications and processing rules that have been entered as the first step in system development.

The manual also describes all system reports, screens, files, data base segments and procedures needed to meet user requirements, according to the vendor.

Enhancements include modification of the logic underlying the Design Manual to allow run-time control of which sections are produced at any given time; prototyping support to produce pro forma report and screen samples; addition of the systems overview section; reformatting of the general descriptions of reports, screens files, data base segments and programs; cross-indexing of system products; and several other features, a spokesman explained.

The stand-alone Specifier costs $52,500 including training, but installed Genasys systems typically cost about $160,000.

Genasys is located at 17 E. 45th St., New York, N.Y. 10017

Portable Operating System, Offered for 16-Bit CPUs

SANTA CLARA, Calif.– A transportable operating system known as Tros and designed for high-volume end users, computer manufacturers, OEMs and distributors is available from Corporate Data Sciences.

The system comes with a command line interpreter, Basic interpreter and editor and allows real-time multiprogramming, according to a vendor spokesman.

It is oriented toward 16-bit or larger processors such as the Digital Equipment Corp. PDP-11 and Vax-11/780, Data General Corp. Eclipse, Interdata 8/32, Z8000, Motorola, Inc. 68000 and Intel Corp. 8086.

Tros costs $200,000, the vendor said from 3910 Freedom Circle, Santa Clara, Calif. 95050.

Data Labs Text Editor Geared To RT-11, RSX-11M Users

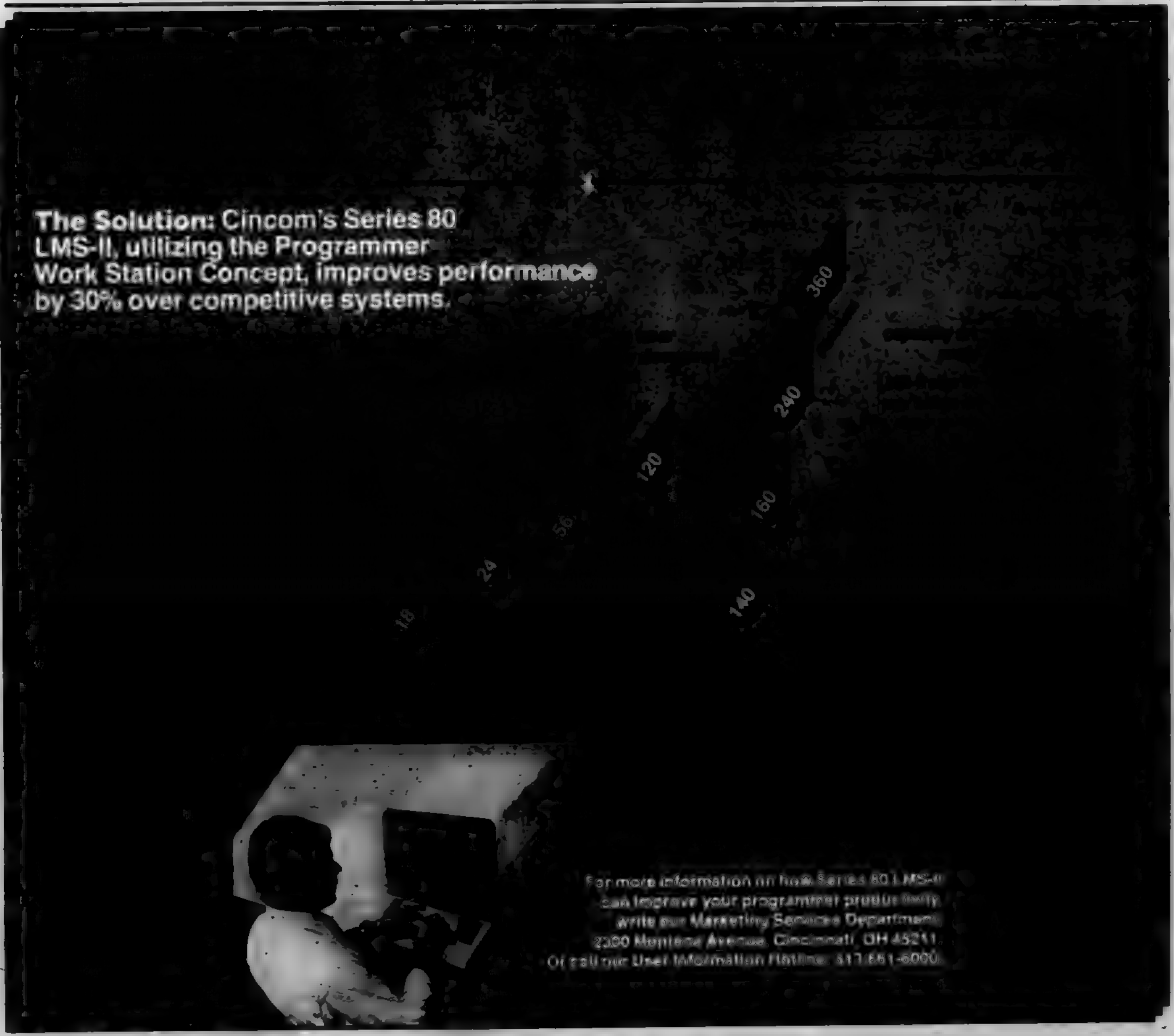
MARKHAM, Ont. – A text editor for users of Digital Equipment Corp. RT-11 and RSX-11M operating systems has been introduced by Data Labs Limited.

The AEO/2 Text Editor, for program development and document preparation, has the capacity of 8,000 to 16,000 lines of text or source program statements, according to the vendor.

All text files are said to be stored in standard sequential text file format, allowing network transmission via Decnet.

VT-100, VT-52 and Hazeltine Corp. terminals are supported, the vendor noted.

The AEO/2 single-CPU license costs $1,460 (U.S.) for the RT-11 and $1,810 (U.S.) for RSX-11M versions. Free trial packages at the cost of distribution media are available from the firm at No. 13, 400 Esna Park, Markham, Ont., Canada L3R 3K2.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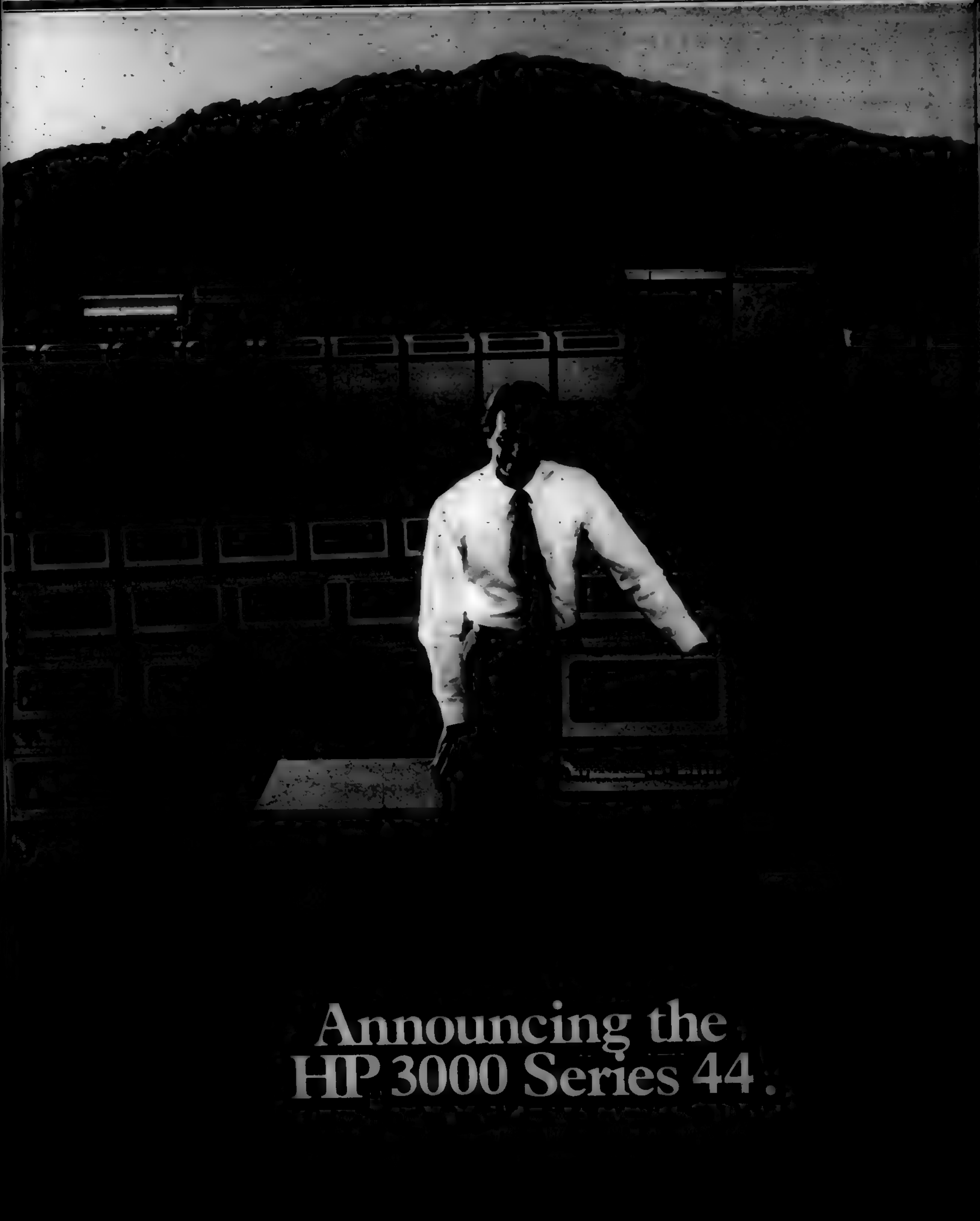

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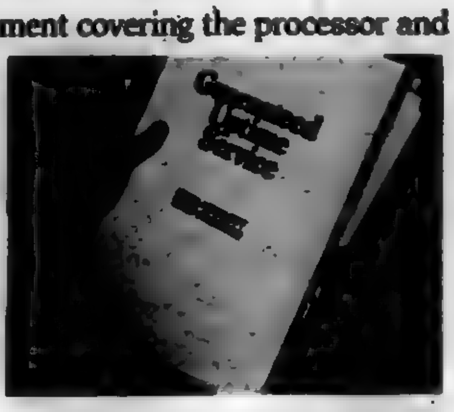
Introducing Guaranteed Uptime Service.

This is a new maintenance agreement covering the processor and two discs. It guarantees up to 99% uptime over any three-month period or our service on these critical components is free for the next month†

For more information about the powerful Series 44 and its remarkable guarantee, call your local HP sales office. Or write Hewlett-Packard, Attn: Bob Bond, Dept. 391, 11000 Wolfe Road, Cupertino, CA 95014.



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† Initially available in US only.

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Free Log Shares CICS 1.5 Lore

MARINA DEL REY, Calif. — A log reporting experiences faced by firms installing IBM's CICS 1.5 system is available to Omegamon/-CICS users from Candle Corp.

Items to be examined in the log include IBM's distribution and report schedule, installation testing by IBM, installation experiences, PTFs and Apars, Multi-Region Option, overhead experiences, application conversions and doucmentation experiences.

The log is available free to Omegamon/CICS users, the vendor said from Suite 624, 4676 Admiralty Way, Marina del Rey, Calif. 90291.

'Share/DPM' Gives Support For Nonprofit Institutions

DALLAS — A data base management system (DBMS) designed to support nonprofit organizations is available from American Southwest Data Systems.

Share/DPM, is compatible with six types of minicomputer systems and is capable of providing a high degree of data independence, the vendor claimed.

The system addresses the following functions: mail list management, fund accounting, subscription fulfillment and membership accounting.

Share/DPM runs in conjunction with SMC-Proprietary Systems, Inc.'s Idol DBMS and costs $25,000.

American Southwest is located at 4908 W. Lovers Lane, Dallas, Texas 75209.

Audyxx Adds WP

BETHESDA, Md. — Audyxx Corp. is offering word processing (WP) software that allows public accountants to produce letter-quality reports and documents on Audyxx accounting computer systems.

The Wordyxx package offers more than 70 test processing and editing functions, the vendor said.

The package costs $750 with a $50 annual license fee from the vendor at Cordell Ave., Bethesda, Md. 20014.

PDP-11s Gain Accounting

PENSACOLA, Fla. — A Contractor Management System is available from Digital Systems, Inc. for use on Digital Equipment Corp. PDP-11 computers.

The cost accounting system can be tailored to meet the needs of a contracting firm's accounting department, the vendor said.

The four main modules in the system — payroll, accounts payable, general ledger and job cost — are integrated so that information is input only once and then automatically transferred within the system to the appropriate module, a company spokesman said.

The system costs $15,000 for software only and $35,000 with hardware, the vendor said from 114 E. Gregory, Pensacola, Fla. 32501.

Updates Added To 'Econalyst'

ANN ARBOR, Mich. — Econalyst, an economic and financial data base offered by ADP Network Services and Townsend-Greenspan & Co., Inc., has been expanded to include financial information from Europe.

The first addition to Econalyst is Europrospects, 1,400 time series on key economic indicators from six major European countries: France, the UK, West Germany, Italy, Belgium and The Netherlands, the vendor said.

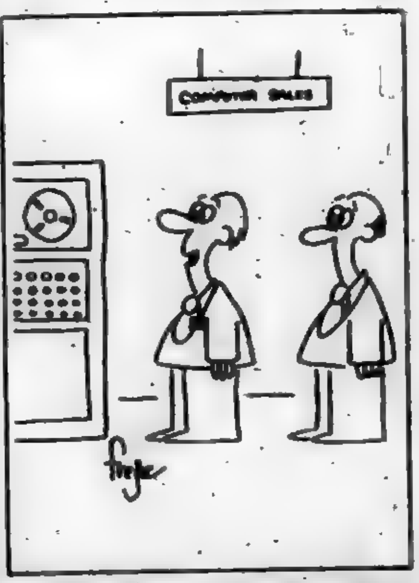
Subscription for the service costs $100 monthly, or $1,000 annually. Townsend-Greenspan & Co. and ADP also announced they are offering a searching system called Dictionary as part of Econalyst.

The service costs an average of $2 to $7 per search and is billed on an as-used basis.

The firm is located at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Micro Note

The Wordbank is a program for repetitive letter, report or manual writing, for the Radio Shack TRS-80 Model II. Price: $149.95. Vendor: Taranto & Assoc., P.O. Box 6073, 121 B Paul Drive, San Rafael, Calif. 94903.



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Adds Micro to Catch Errors

Lab Smartens Up Data Transmission

Special to CW

NEEDHAM HEIGHTS, Mass. — To provide faster response time and minimize the cost of reporting vital laboratory test results to client physicians and hospitals, a nationwide laboratory network has deployed an extensive telecommunications system by adding intelligence to a nonintelligent device.

Damon Corp.'s clinical laboratories analyze thousands of blood and urine specimens each day, transmitting test results to printer-stations in client facilities. While clinical laboratories employ inexpensive teletypewriters, Bob Kaufman, Damon's manager of data communications systems, concluded they could not check errors completely. They could only detect simple parity errors and put a special character in the error's place.

According to Kaufman, "While the industry was taking pains to ensure accurate medical testing, using standards, normals and repeated analysis, it was not really concerned with the accurate transmission of those results. Damon had to develop a data transmission system which would detect the double-bit parity error."

According to telephone company specifications, the error rate on voice-grade telephone lines is roughly one bit for every 100,000 bits transmitted. If one bit out of a 10-bit character is dropped or added and parity checking is used, a special character will be printed in place of the character in error. The user will thus recognize an error.

Problems With Two Bits

When two bits are dropped or added, however, there may be a problem. Since parity can remain undetected and another character printed in the real character's place, the user may not realize that an error occurred.

For example, a test for CPK, an enzyme present after heart attacks, could be transmitted over the phone line as "108," which is perfectly normal. However, if noise on the phone line distorts the data, it is possible that the printer may print "198" because Ascii bits 1 and 4 were picked up, thus making the second digit a "9" instead of an "0." This would not be detected as a parity problem because two bits were affected.

A CPK value of 198 is usually considered abnormally high; therefore, the client would receive invalid and potentially dangerous information.

Because Damon believed it should employ the same quality control in the transmission of laboratory reporting as in testing, it rejected teletypewriters with simple parity checking. Kaufman thought, instead, that this might be an ideal application for a microcomputer which, if programmed properly, could detect double-bit parity errors and automatically request retransmission of the data to ensure laboratory accuracy. Checking with other users in the country, he located several microprocessor systems houses willing to develop a small micro "adapter" to detect these types of errors.

Laboratory technician checks report output by Damon Printer Station, which includes a micro for checking transmission errors.

The Damon Printer Station was the result. It consists of a medium-speed matrix printer, a dial-up or private-line modem and, most important, the microcomputer for checking errors. After life tests were run on the Digital Equipment Corp. LA180 printer and the Tally Corp. 1602, Damon decided that both printers offered the desired reliability and serviceability.

The micro is an Intel Corp. 8080-based unit made by Air Land Systems, Inc. of Fairfax, Va., that cost about $1,500.

"Our specially designed microcomputer ensures that Damon printers will print only the exact data transmitted from our laboratories," Kaufman said. "When dealing with medical information affecting human lives, it is imperative that we use the highest quality control known in teletransmission as well as in clinical chemistry."

System Links IBM Hosts, POS Units

NEW YORK — Computer Dynamics, Inc. has developed an Advanced Point-of-Sale (POS) Communications System that establishes a direct data link between IBM 360 and 370 host computers and remote POS terminals.

The Advanced POS Communications System is a multiline, multitasking product that can transmit data to multiple POS terminals simultaneously. The unit currently can support terminals from NCR Corp., TRW, Inc., Data Terminal Systems, Inc., International Computers Ltd. and Sweda International, Inc. as well as the IBM 5260 POS terminal. Others will be added in the future, the vendor said.

The system operates over standard dial-up telephone lines. After stores have closed, it automatically calls them up and collects the day's sales transactions. After the data has been transmitted, the system can automatically power down the terminals, Computer Dynamics said.

The unit requires a communications controller at the host which may be a 270X, 370X or an ICA and runs under all versions of IBM operating systems and on all IBM 360, 370 or larger mainframes. It transmits data at rates varying from 1,200- to 4,800 bit/sec depending on terminal capability and modem configuration. It will also operate over leased lines, the vendor said.

The single-line version sells under license agreement for $8,000. Multitasking versions, which support communications with up to 50 stores, sell for $12,000. The purchase includes installation and maintenance for one year from the firm at 10 E. 39th St., New York, N.Y. 10016.

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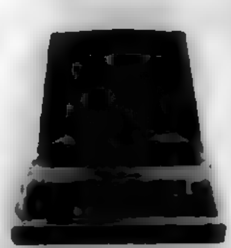
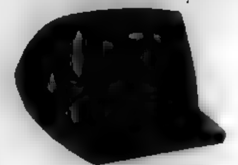

ADM-42 with a full four-page display optionally expandable to eight full pages. Detachable keyboard, blanking, underlining, blinking and reverse video modes, full editing capabilities, plus field-protection mode and much, much more.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ADM-3A+ is an enhanced version of the ADM-3A with upper and lower case, a built-in numeric keypad and more.

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CRT Terminal Features 14 User-Programmable Keys

ANAHEIM, Calif. — Soroc Technology, Inc. has introduced a CRT terminal that features 14 user-programmable function keys that can be activated by a single keystroke.

The IQ 135

The IQ 135 features programmable transmission and print delimiters, programmable keyboard repeat rate, programmable lead-in code, adjustable right-hand margin and programmable blink rate.

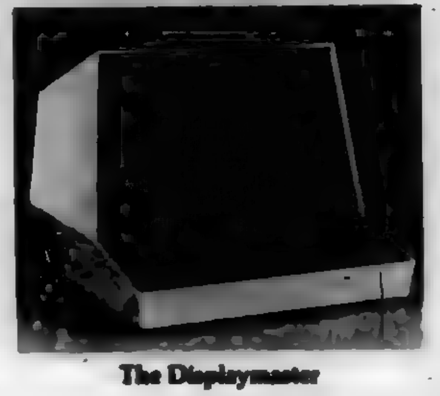
A full range of built-in edit commands that require no additional user programming is also included. Additional features are transmission and print commands, data rates from 110- to 19.2K bit/sec, tab and clear functions, video functions for operator convenience and cursor control in positioning anywhere on the screen.

In addition to other features, a graphics option is available that has line drawing capabilities with 11 special graphics characters.

Prices for the IQ 135 start at $1,090 from Soroc at 165 Freedom Ave., Anaheim, Calif. 92801.

Z80-Based Terminal Family Uses 13-In. by 7-In. CRT

SEATTLE — A family of 132 char./line, Z80-based CRT terminals using a 13-in. by 7-in. green phosphor CRT tube is being offered by Garyco Data Systems, Inc.


The Displaymaster

The standard Displaymaster terminal includes 132- and 80 char./line length, 24-, 27- and 30-line display, 16 programmable function keys, separate numeric key pad, screen highlighting, addressable cursor, setup mode, 128 Ascii characters, up to 19.2K bit/sec transmission, fixed tabs, 16K-byte display memory, an auxiliary port, block mode and line drawing.

The terminal is also compatible with Hazeltine Corp., Lear Siegler, Inc. and Digital Equipment Corp. VT-100.

The 13-in by 7-in. CRT provides a line width that is 1.5 in. wider than the common 15-in. diagonal screen used in most other terminals, according to the firm.

Models 132/C and 132/M offer the same basic features. The 132/M additionally provides graphics capabilities and supports 32K bytes of memory.

The 132/C CRT terminal costs $1,995 and the 132/M costs $2,195 from Garyco, 1911 22nd Ave. S., Seattle, Wash. 98144.

Terminal Units Priced Low

SUNNYVALE, Calif. — A line of low-cost terminal modules that provide full Ascii keyboard, composite video for a user-supplied CRT monitor and a power supply is being offered by Synertek Systems Corp.

The units come in two versions: the KTM-3, with a 40-char. display width, and the KTM-3/80, with an 80-char. display width. The units represent a low-cost approach of splitting up the terminal into keyboard/digital electronics and using a standard CRT monitor, the firm stated.

The KTM-3s consist of a 58-key keyboard, which generates the full Ascii set of 128 upper- and lowercase alphanumeric characters using an 8 by 10 field size matrix. Video control is provided for scrolling, full cursor control and absolute, as well as relative, cursor positioning. Clearing can be achieved to end-of-line or end-of-screen.

The KTMs provide even, odd or no parity with one or two stop bits. Framing and parity errors are displayed. With its switch-selectable transmission rate of 110- to 19.2K bit/sec and its control and character generator read-only memory compatible with programmable read-only memory, the KTM-3s can be easily customized, according to the firm.

The KTM-3 costs $389 and the KTM-3/80 costs $449 from Synertek at 150 South Wolfe Road, Sunnyvale, Calif. 94086.

Dot Matrix Printer Gives Communications

IRVINE, Calif. — Plessey Peripheral Systems has announced a high-speed serial dot matrix printer terminal that reportedly was designed for communications or local printing applications.

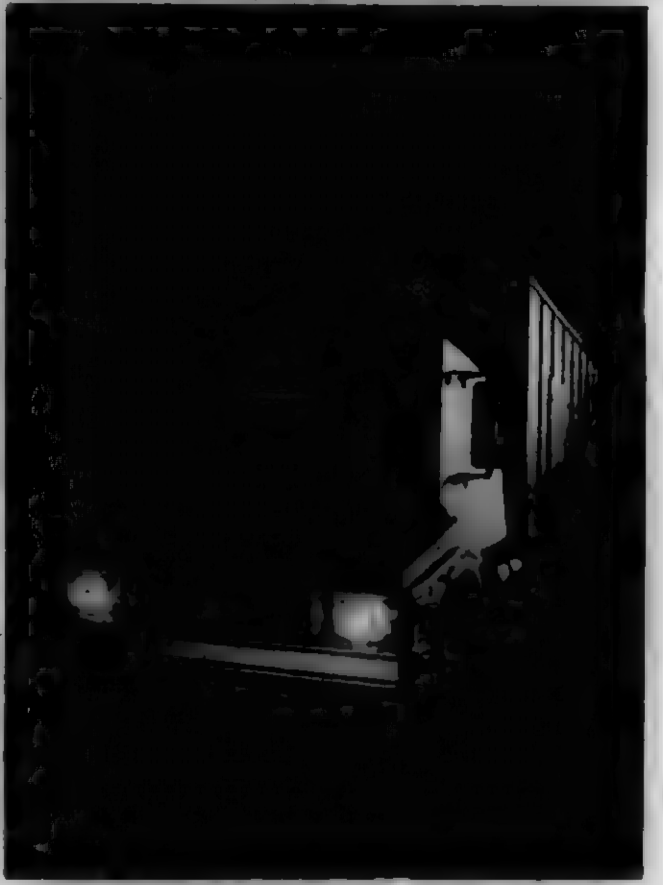
The PM-LC11 incorporates a push-button, self-test feature whereby both electronic and mechanical functions are tested and the test program is printed, the vendor said.

Other features include a nine-wire bidirectional print head, acceptance of a parallel RS-232 or current loop interface, a 600-char. Fifo buffer storage and full Ascii character set.

The unit costs $2,307, the vendor said from 1691 Browning Ave., Irvine, Calif. 92714.

BIG RIG.

A large Honeywell computer is helping this freight hauler keep 1,000 trucks truckin'.



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LOADS saves precious time, upgrades service, and helps to maintain friendly relations with Ligon's independent truckers and thousands of customers.

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It shows where the profits–and the problems–are. Giving management the information they need to steer a steady course.

It's all kept online in Ligon's Honeywell system. Available anytime.

Level 6's too.

Right now, Ligon's DPS 440s serve about 100 terminals at 29 separate locations. There are also two 1200 LPM printers, and two 6661 front-end network processors located at corporate headquarters.

But Ligon is growing and new Honeywell equipment is on the way. Ligon will soon install Level 6 computers for enhanced cost accounting, fleet maintenance, and data entry.

Altogether, the system will enable Ligon to take full advantage of a distributed processing environment.

It all boils down to information control. Knowing what's going on in the organization every minute of every day.

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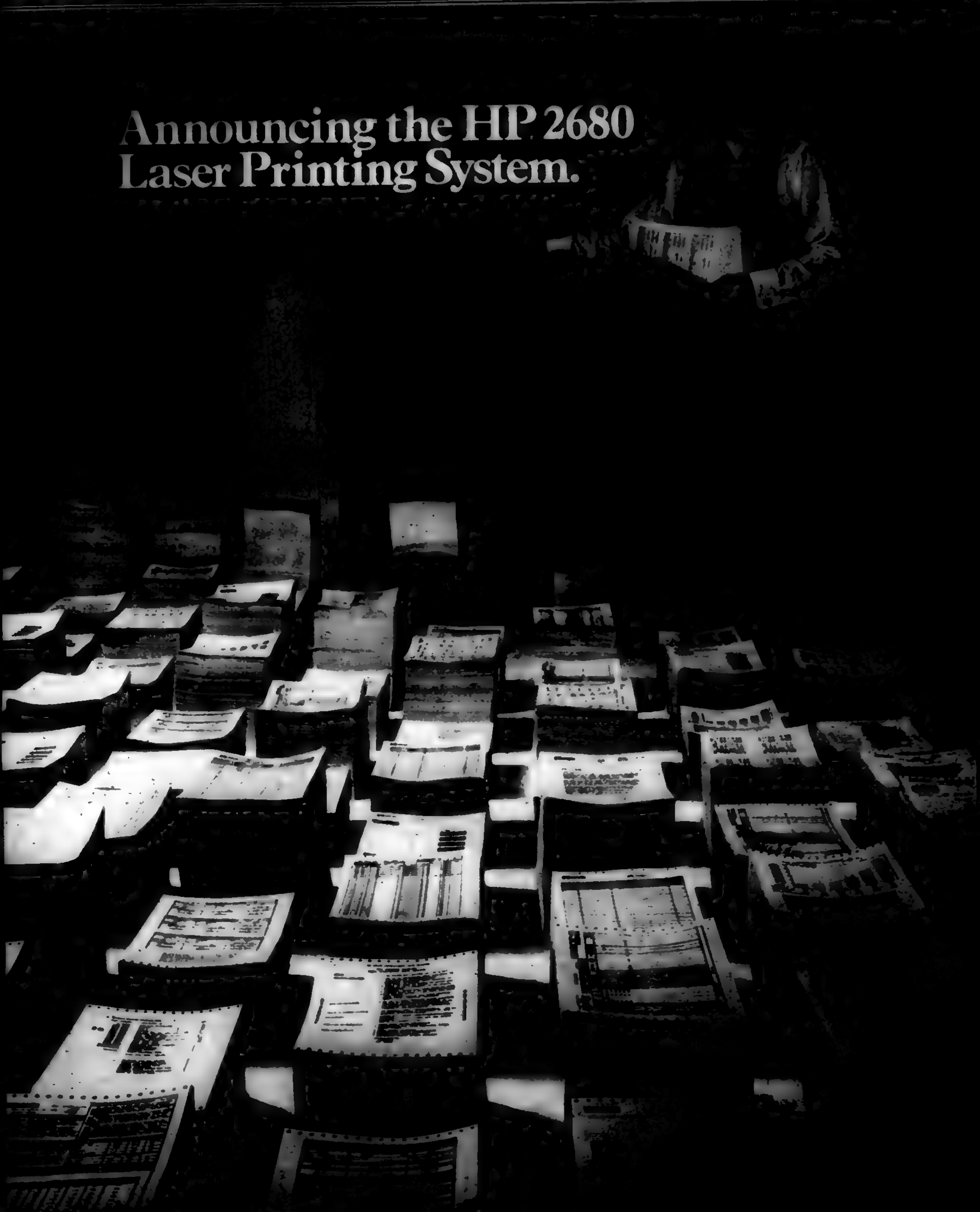

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Software for creative writing.

The 2680's two interactive software packages let you design your own characters, symbols and logos, and format them any way you like on a familiar 8½" x 11" page: with windowing, scaling, shading and zooming. You can even reduce the print size to get four logical pages on a single sheet. Or rotate the forms 90° so your Z-fold output reads like a book. Then, simply tell the computer what data you want on the forms, and the 2680 does the rest—including monitoring and correcting its own print quality!

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Think of it—with fewer pre-printed forms to stock, the 2680 dramatically reduces purchasing and inventory expenses (and the paperwork that goes with them!). And that means fewer chances for costly printing or delivery delays when you want to change the forms you're using. Add to that what you'll save on copying and reducing costs, and you'll find that the system pays for itself before you know it.

When you're ready to expand, our advanced networking software lets you send information to an HP 3000 anywhere in the world, where a local 2680 can print out your data. (As originals, of course.) And with data base management and other software features, the 2680/3000 can be a powerful part of your entire information processing system, including connections to your mainframe.

If you'd like to find out more about our new Laser Printing System, call your local HP sales office listed in the White Pages. Or write for more information, including print samples, to Hewlett-Packard, Attn: Bill Murphy, Dept. 393, 11311 Chinden Blvd., Boise, ID 83707.

HEWLETT
PACKARD

CRT Displays Characters In Large Sizes

The Director

WINCHESTER, Mass. – A CRT terminal that features an extra-large character display is available from Mystic Valley Engineering Co.

The Director terminal features characters that are eight times higher and six times wider than standard CRT terminals' characters, the vendor said.

The unit also offers "super-large" characters measuring 16 times higher and six times wider than standard letter size.

Prices for the Director start at $4,000. Mystic Valley Engineering is at 85 Bacon St., Winchester, Mass. 01890.

Diablo Printers Get Options

BEDFORD, Mass. – Bedford Computer Systems, Inc. is offering a series of upgrade options for the Diablo Systems, Inc. 1640/1650 printer terminals.

The options are contained on a single-module designed to be plugged into the unused module slot in the printer. The option module features automatic forward/reverse print that provides up to 7% increase in printer throughput and requires no software support, programmable keys that permit the operator to specify messages of up to 64 char. for each of the keys in the numeric pad, and a Centronix Corp. interface that provides a parallel interface which will permit the Diablo terminal to emulate a Centronix line printer.

The option module starts at $300 from Bedford Computer Systems at Three Preston Court, Bedford, Mass. 01730.

WUI Files AVD Tariff

NEW YORK – Western Union International, Inc. (WUI) has filed a tariff with the Federal Communications Commission (FCC) to establish alternate voice/data (AVD), telegraph-grade and sub-speed leased channel service between the continental U.S. and Kinshasa, Zaire.

When effective, WUI's rate for AVD service will be $4,140/mo.

WUI is headquartered at One WUI Plaza, New York, N.Y. 10004.

The Series 630 Data Screen

CRT Terminal Bridges Gap In TEC Line

TUCSON, Ariz. – TEC, Inc. has announced an intelligent CRT terminal that offers "ergonomic features."

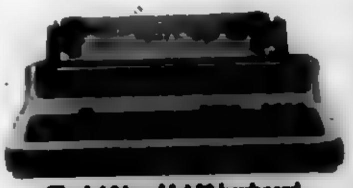
The Series 630 Data Screen is said to bridge the gap between TEC's low-end 610 series and the upper end 670 line, the firm said.

Features include a detached keyboard, auto-repeating after .75 sec and six function keys capable of generating two char. code sequences, the vendor said.

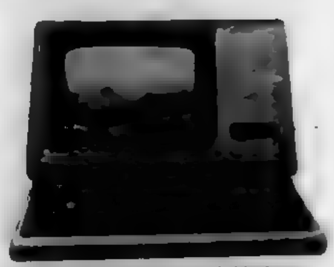
The unit costs $1,100 and will be available Jan. 1. The series will be sold to the OEM market, distributors and end users.

TEC is at 2727 N. Fairview Ave., Tucson, Ariz. 85705.

Terminals now sold at Digital's Computer Stores.



The LA34 and LA38 keyboard terminals and accessories. Both have 30 CPS, switch-selectable 110 and 300 baud rates. Pressure or tractor feed.



The VT100 video terminal. High performance, versatile video display terminal. Line-drawing graphic characters, smooth scrolling, split screen. Operates on full-duplex asynchronous communication lines. (Limited quantities.)

All terminals are cash and carry at attractive prices.

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Woodfield Commons West
1037 E. Golf Rd., Schaumburg
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Central Trust Tower
Fourth & Vine
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Cleveland:
1903-5 E. 9th St.
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Columbus:
Borden Building
180 E. Broad St.
[illegible]

Dallas:
1625 W. Mockingbird, Suite 116
(214) [illegible]-2520

Denver:
[illegible] Fairmont Hotel
Shopping Pavilion
555 17th St.
(303) 623-[illegible]

Houston:
2 Post Oak Central
[illegible] South Post Oak Rd.
(713) 840-0730

Long Island:
Roosevelt Field
[illegible] Garden City Plaza,
Garden City
(516) [illegible]

Los Angeles:
Los Angeles Athletic Club Bldg.
435 W. 7th St.
(213) 629-[illegible]

Los Angeles County:
15436 Ventura Blvd.,
Sherman Oaks
(213) [illegible]

Minneapolis:
WCCO Building
625 2nd Ave. S.
(612) [illegible]

New Hampshire:
Mall of New Hampshire,
Manchester
(603) [illegible]

New York Midtown:
42nd St. & Madison Ave.
(at the Biltmore Hotel)
(212) 599-[illegible]

Orange County:
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(714) 540-[illegible]

Philadelphia:
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Phoenix:
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Rosenzweig Center
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TRW-Fujitsu Adds Upgrades To ATM Line

LOS ANGELES – The TRW-Fujitsu Co. has announced five enhancements for the TM 8000 series of automated teller machines (ATM) to offer flexibility and increased compatibility with existing networks, the vendor said.

The enhancements include DES encryption and algorithm standards, IBM-SDLC communications interface, IBM 3601 communications interface, Docutel Corp. 2300 series emulation software and Diebold, Inc. 9XXX series emulation software.

Prices range from $1,800 to "just under" $5,000, according to a spokesman at Suite 620, 9841 Airport Blvd., Los Angeles, Calif. 90045.

Reports Geared To Banking

WASHINGTON, D.C. – Computer Based Solutions, Inc. is offering two management reports on electronic banking.

"Automated Teller Machines" and "Telephone Bill Paying" were prepared by management consultant M. Arthur Gillis. They contain statistics, costs, user experiences, trends and obstacles.

The two reports together cost $45. Computer Based Solutions is at Suite 603 E., 7315 Wisconsin Ave., Bethesda, Md. 20014.

Unit Comprises Four Modems

HAUPPAUGE, N.Y. – A four-channel, 2,400 bit/sec modem configuration, the Model GDCS 1050, has been introduced by General Datacomm Systems, Inc., the military and government subsidiary of General Datacom Industries, Inc.

Each of the four modems in the 19-in. rack contains a complete built-in test facility capable of faults detection of the modem card, the input equipment or the VF channel, according to the vendor.

Each modem has its own power supply so that failure of one will not affect the operation of the other modems.

The Model GDCS 1050 costs $4,775 from the vendor at 100 Parkway Drive S., Hauppauge, N.Y.

Hard Hats Offered Short-Haul Device

TROY, Mich. – A short-haul serial communications device for hard-hat factory, processing and mining applications is available from Gould, Inc.

The Functional F6790/91 is a dedicated short-haul Ascii extension cord that handles full-duplex, asynchronous RS-232 communications in environments hostile to modems.

The unit can handle transfer rates up to 9,600 bit/sec and can extend serial communications up to two miles, according to the vendor.

The Functional F6790/91 costs $1,200, Gould said from Suite 104, 155 W. Big Beaver Road, Troy, Mich. [illegible]

Coupler Fits Low-Speed Use

SAN JOSE, Calif. – An acoustic coupler and direct-connect modem is available from Anderson Jacobson, Inc. (AJ).

The AJ 347 is aimed at the low-speed market and features data rates from 0 to 450 bit/sec, compared with "ordinary" 300 bit/sec couplers and modems, an AJ spokesman pointed out.

The product provides full-duplex, asynchronous operation and is fully compatible with Bell 103/113-type data sets, the vendor claimed.

The AJ 347 costs $365 from the vendor at 521 Charcot Ave., San Jose, Calif.

IDS Adds Modem Sharer, Eliminator, Control Center

LINCOLN, R.I. – International Data Sciences, Inc. (IDS) has announced a Sharing Unit for modems or data terminals, a Modem Eliminator and a Tech Control Center.

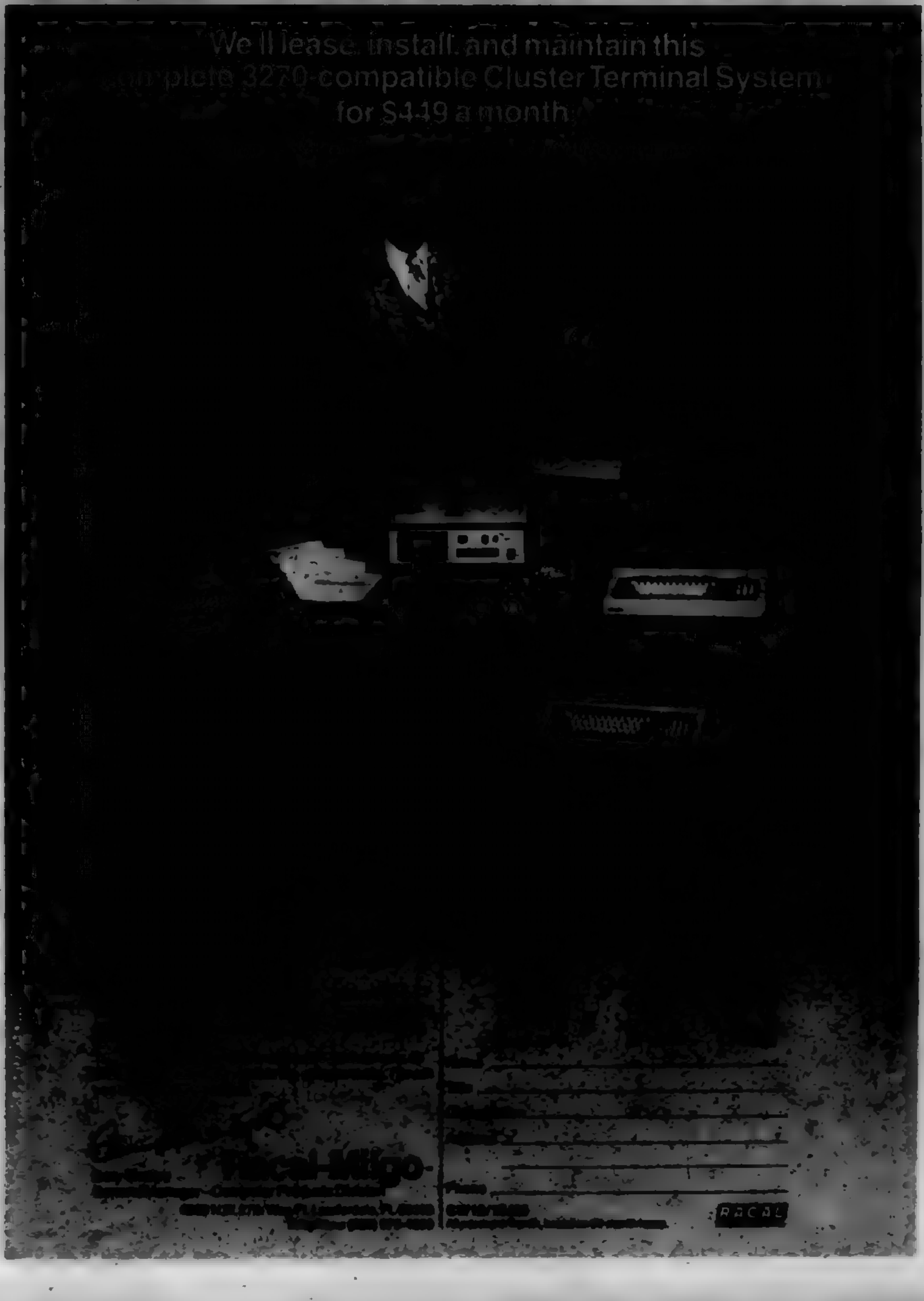
The Model 6101 Sharing Unit was designed to allow varied combinations of up to four modems or data terminals to share a common communications device. It operates at data rates up to 19,200 bit/sec in both synchronous and asynchronous modes, according to the vendor.

The Model 6110 Modem Eliminator allows interconnection of data terminal equipment without modems. It can be used in either synchronous or asynchronous modes.

The IDS Hawk 4000 series Datatrap is the heart of the Tech Control Center. The unit performs both interactive diagnostics and passive monitoring of serial data appearing at the EIA RS-232 interface to help isolate data communications problems.

The Sharing Unit costs $650; the Modem Eliminator costs $350; and a Tech Control Center in a typical configuration including two 16-channel switching systems, two patch panels, a remote control panel, Range Rider test set, printer, Datatrap, power supply, switching modules and patch modules costs $45,000.

The firm is located at 7 Wellington Road, Lincoln, R.I. 02865.



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Remote Unit Prints 300 Line/Min

ORLANDO, Fla. — A printer for users who want a remote printing capability up to 300 line/min is available from Transaction Data Systems, Inc.

The Transprinter reportedly has full forms capability, 132 columns and prints on up to six parts. With six character fonts available, the unit attaches to communications lines operating under IBM 2780/3780, IBM 3270 with no CRT required, Burroughs Corp. Select/Fast Select or NCR Corp. multipoint protocols.

Full print speed with ordinary text data requires a 4,800 bit/sec line.

The unit costs $8,500 with quantity discounts available from the firm at Suite 210, 5750 Major Blvd., Orlando, Fla. 32805.

Microterminal Handles Distributed Applications

TUCSON, Ariz. — Burr-Brown has added the Model TM71 to its Microterminal line. The unit offers full alphanumeric capability and was designed for distributed data processing (DDP) applications.

Features include a 42-key keyboard that is shiftable to generate 80 characters, a 16-char. LED display with scroll-left and scroll-right keyboard controls and insert and delete, the vendor said.

The TM71 costs $385. Burr-Brown can be reached through P.O. Box 11400, Tucson, Ariz. 85734.

Coupler Out For MSI/66

COSTA MESA, Calif. — A compact acoustic coupler that replaces an outboard electronics module has been introduced by MSI Data Corp. for use with its MSI/66 portable data entry terminal.

MSI's lowest portable data entry terminal, the MSI/66 is said to provide for low-to-medium-volume collection of bar-coded and conventional numerical information for electronic order entry and inventory management.

A 4,096-char. MSI/66 with Pocketcom is priced at $350. With 8K memory, its cost is $450. MSI is headquartered at 340 Fischer Ave., Costa Mesa, Calif. 92626.

Comsat to Serve Mariana Islands

SAIPAN, Mariana Islands — Communications Satellite Corp. (Comsat) has dedicated an earth receiving station for use with its satellite communications network.

The station was installed in conjunction with the Micronesian Telecommunications Corp. and will provide service to the Northern Mariana Islands.

Comsat is located at 950 L'Enfant Plaza, Washington, D.C. 20024.

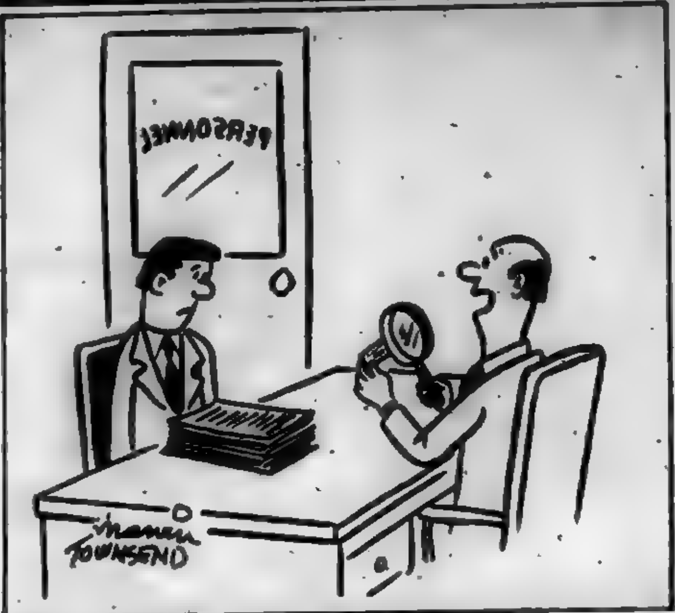
IBM 5251 Users Offered Shades

GLENDALE, Calif. — Terminal Glare Shades for IBM 5251 terminal users are available from Cass Marketing Services, Inc. on a seven-day free trial basis.

The special glasses were designed to eliminate "visual noises" from windows, lights, people and shadows, the vendor said.

The glasses cost $85.

Cass Marketing Services is located at Suite 838, 535 N. Brand Blvd., Glendale, Calif. 91203.



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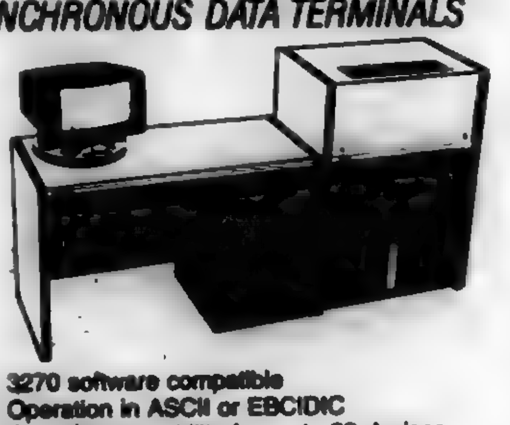

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Just as the management of complexity in design is the technology of the '80s, so we must have tools to manage the complexity of organizational structures.

The Challenge Of Cheap Complexity

BY WILLIAM J. TALBOT

If we lost the technology of semiconductors overnight, the world's computer industry would collapse.

Technological advancement since the advent of commercial semiconductors has been startling. Figures 1 and 2 show a forecast made in 1977. The straight line of advance on the logarithmic scale can be extrapolated backward to the beginning of semiconductors as a straight line. The bipolar memory line can probably be straightened out if we accept the need for liquid-cooled systems.

But in 1977 we foresaw that microprocessor development would slow down because of the difficulty in managing complexity in design, and we have no reason to change that forecast. As I will explain later, complexity translates into development cost with a nonlinear relationship. If the *concept* of complexity in design is difficult for management to grasp, the *reality* of escalating development costs and schedule over-runs impresses the management consciousness.

As we enter the '80s, the forecast represented by figures 1 and 2 may be too aggressive because the leading-edge technological product may slow down by a factor of four by the end of the decade. However, the vast bulk of current semiconductors are not leading edge. So there is plenty of slack to take up, and a 1M-bit memory chip is not an unreasonable expectation for the end of the '80s.

Complexity in product will continue to increase for any given price bracket. By any yardstick, today's complexity is cheap, tomorrow's will be cheaper and the day after cheaper still.

A constraint on hardware development is the cost of getting the complexity right. It has always been difficult, but we used to have the luxury of modifying our wiring. Once we put the complexity onto silicon, the technology is unforgiving, and there is no easy modification route. Around the mask-making loop, you have to produce a new part before you know whether your modification worked or not. So we have to use techniques to reduce dramatically the number of errors we make.

Computer-aided design, computer-aided testing and computer-aided manufacture are all part of the struggle to manage complexity in the design process. But I contend that we are losing that struggle because complexity has been advancing faster than our ability to manage it.

Of course we can cheat — and do. We put more of the complexity into microprogrammed processors at the heart of our systems, and this will soon be extended to the microprocessors themselves. But we only pass the buck. It is quicker to modify the microprogram than the silicon; unfortunately, in passing the buck we also lose control. At least with the hardware, it may not have been what you wanted, but it was fixed. The soft center gives greater

(Continued on In Depth/3)

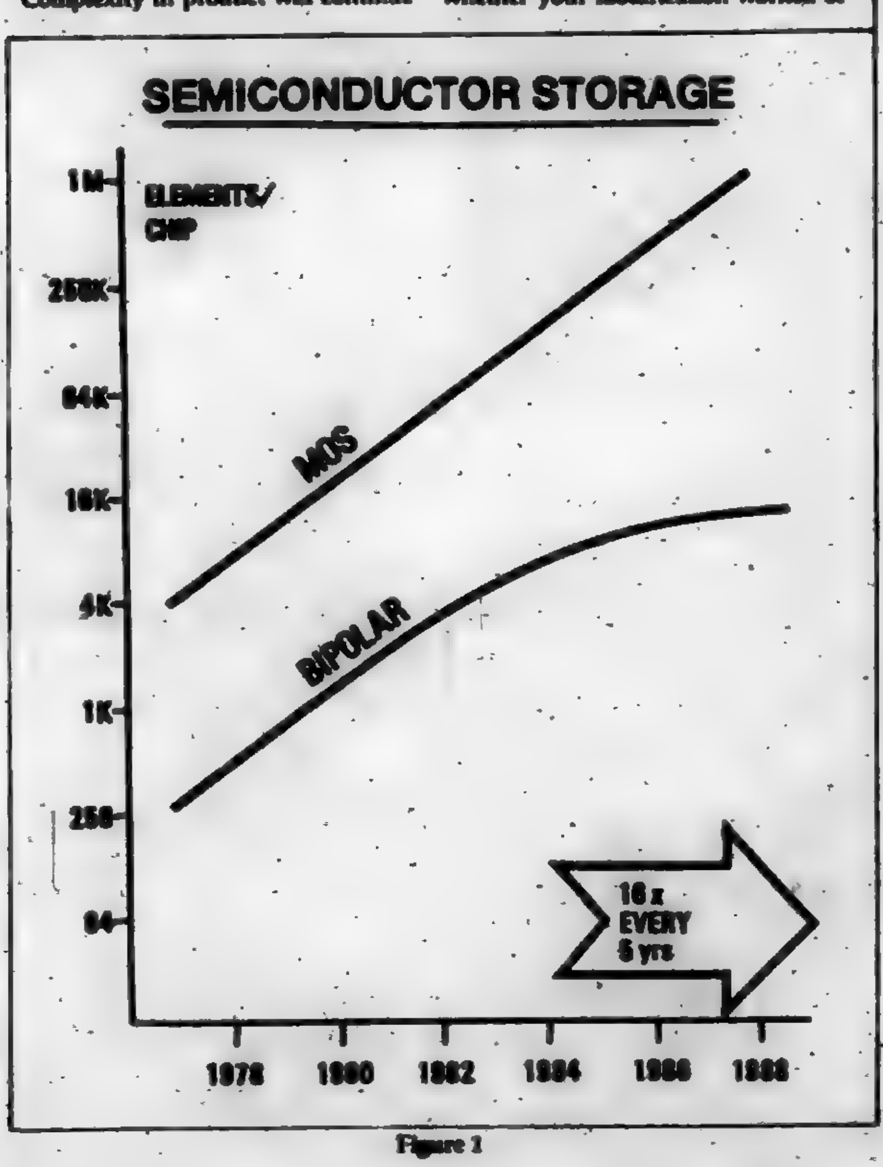


Figure 1

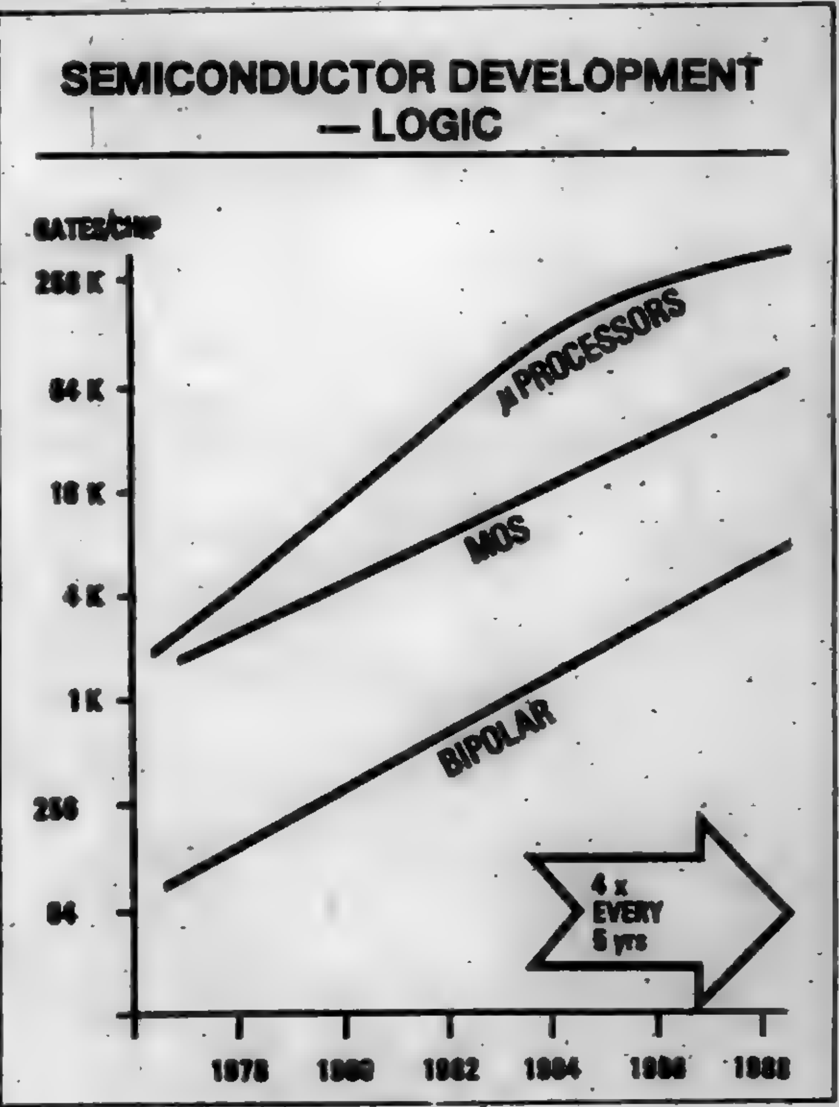
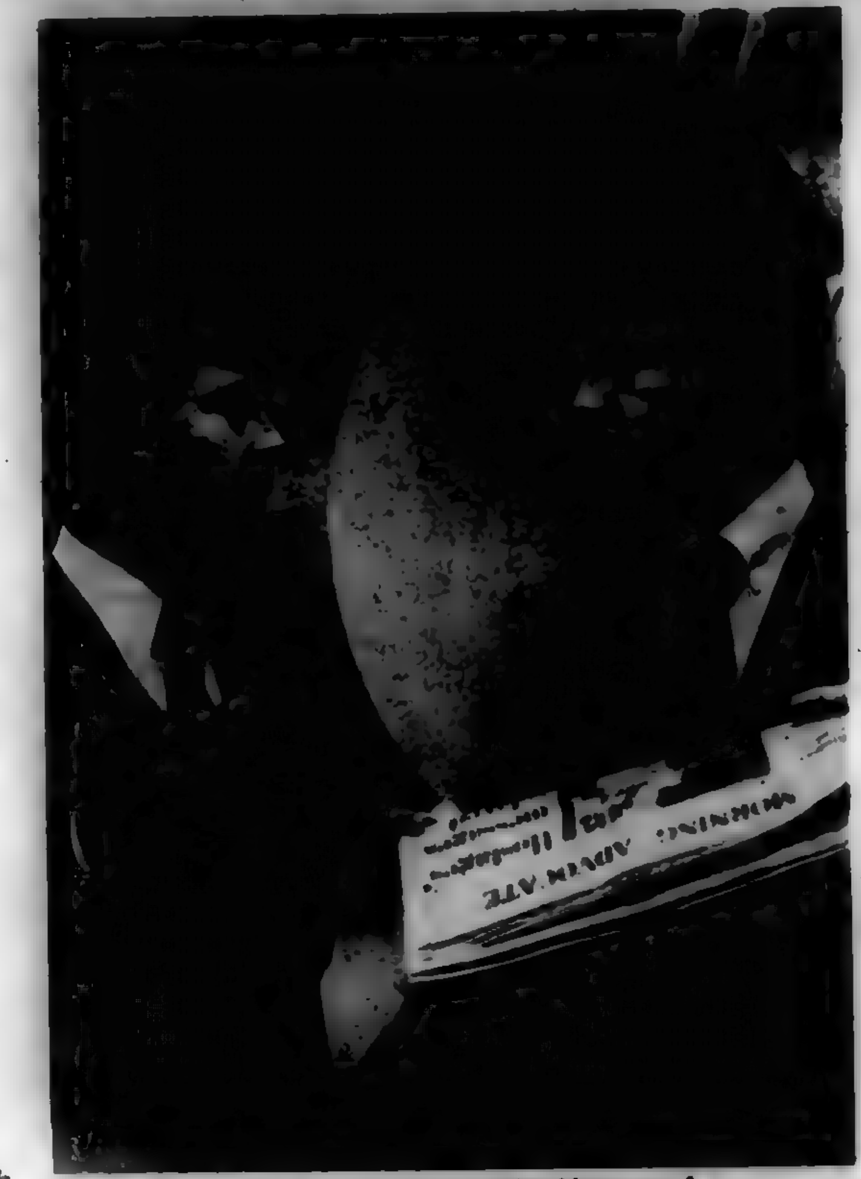


Figure 2

"Our NCR operating software makes our programmers more effective."

Richard Shurley, Capital City Press,
Publishers of STATE TIMES and MORNING ADVOCATE



Richard Shurley (right) is Data Processing Manager of Capital City Press, Baton Rouge, Louisiana. Thomas Miller is the NCR representative.

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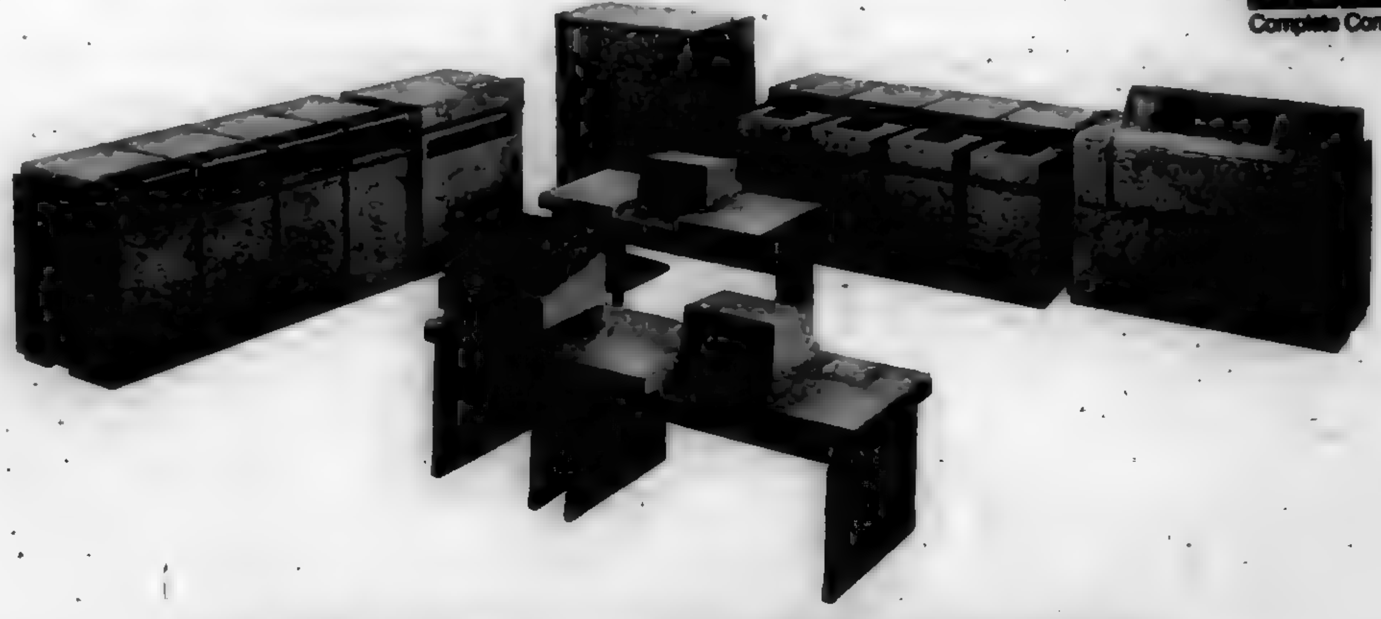

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IN DEPTH

freedom for change. It's like a democracy — we love it, but freedom really only works if one is disciplined.

Self-discipline must operate within a framework of legislation. How many of us have thought through that legislation, enacted it and set up the necessary police force to enforce it within our companies? For those who can hold up their hand on all three points, go to the top of the Fortune 1000 list. For the company president who understands what I am talking about so far, you can probably skip the rest of this article. The soft-centered approach is a powerful technology variant, just as a book of matches is, but you don't give a book of matches to a four-year old.

Let me, at this point, propose Talbot's Law of Managed Complexity. People who intuitively understand the issue of complexity say that cost of development should at least be proportional to the square of the complexity. And for years I accepted that statement because intuitively it seemed a reasonable proposition. In any case, it didn't seem to matter because I was reasonably happy with my "management judgment" sizing of problems.

Not Holding Up

But then it started to go wrong. My yardsticks weren't working. The best analogy I can give is the sense of unreality after living most of your life through an era of modest inflation only to live five years at 20% per year. A dollar isn't a dollar anymore.

I then started to think about complexity and found that the square law just did not fit the observed reality. We were doing significantly better than that, But why? As I looked back, I saw that all the technological advances, and hence achievable complexity, were matched by evolutionary adaptation of the design process, investment in aids and techniques to manage the complexity. We have been unconsciously adapting to manage the complexity better, with some doing significantly better than others.

Talbot's Law of Managed Complexity states that development cost is proportional to the complexity to the power 5/4. If we make an assumption that complexity is measured in gates or statements or lines of code, then we get:

$$Dc = Kn^{1.25}$$

Where Dc = development cost
n = number of units of complexity
K = a constant that is currency-related or productivity-related and that allows for the unit of complexity you have chosen and must allow for whether (in managerial terms) you are plus or minus.

Work out the implications of that modest power of 1.25 and you will never be complacent about complexity again, unless you have a more comforting law. Talbot's Law is only a model. If you don't like it, invent a better one and when you have, please tell Talbot.

Myths and Definitions

In the beginning, there was the computer and the data base. And then came the religion of the business. The computer became the Central Com-

(Continued on In Depth/4)

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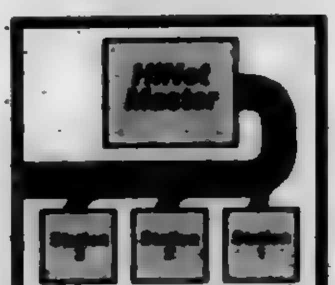

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Digital Microsystems.

IN DEPTH

(Continued from In Depth/3)

puter and the Central Data Base. And we had to erect arguments, to develop theology, and the Data Processing Department became the high priests of the new religion. Nobody was honest enough to admit that it was *the* Data Base because at that time we could only afford one. So let me explore some of the myths of the present.

Real time. Real time became a variant religion, schismatic but with its adherents.

The kindest thing I can say about it is that it was economical in the use of characters in comparison with today's transaction processing. But you know there never was a real time. Nature abhors a step function which my mind equates with real time. What the real-time adherents really had to say was that 20 years ago, the general-purpose computers' response time in particular applications did not match the need — it was not relevant to the task. If we are to talk of time we must append the modifier "relevant," relevant time.

Real time is not dead; it never lived. But relevant response time will always be relevant.

Distributed Processing

Distributed processing — another fad, another reason. I can see and hear Eddie Cantor singing it, and boy hasn't the industry been making "whoopee."

What does distributed processing mean? It is certainly a way of marketing computers. It is certainly a way of getting out from under the data processing department. It is definitely a way of getting under capital sanction authorization levels.

I once remarked that technology was outpacing the rule of law. Distributed processing was certainly a way of getting your own way more easily within the framework of your company's legislation. And it has been fun, the hangover only coming further down the track when you want a more orderly integration of your company's activities — even worse, when you want to move an application from one geographical point to another. Forgive the religious element, but the sins of the father are being visited upon the son; ironically the grandson, the microprocessor, is not doing badly in this direction either.

And yet the basic concept is sound. Put your processing where you need it, if you can afford it. A national grocery chain making all of its purchases centrally to make full use of its purchasing muscle needs a big machine at the center, but the holding company could well find that a microprocessor at its headquarters is more than enough for its needs. Distribute your processors, but not in a hierarchical power sense. Put the power where it is relevant.

Data Bases

What is true for processing is true for data bases. Some years ago, 13 to be precise, I told my staff I wanted distributed data bases. The data I wanted on my element of the company's data base concerned the effective running of the activities for which I was accountable. And yet I didn't personally want access to the whole of my unit's data base; after all, I thought I was only human. And I didn't see why my

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boss could cope with the information I could cope with since he had four other lots as well as mine to digest, and he was only human (even if I had reservations in that respect).

There is nothing wrong with the concept of distributed data bases, but make the distributed element relevant to the local activity and do, do get the rules and the legislation right and enforced. It is much more important than distributed processing.

DP and Computing

Data processing. Electronic data processing. Computing. I don't know about *Computerworld* readers, but I am weary of these terms. I would like to scrap the whole lot of them. They confer in my mind a fascination with the means without worrying about the ends. What do we want to compute or process data for? What was the purpose of the calculation or the processed data?

I am reminded of a definition that data is the lowest form of information, and information is the highest form of processed data. Information gives us insight, but *only* if it is relevant to the activities for which we are accountable.

Think of the hours you and I waste plowing through masses of irrelevant information searching for relevance. Who said, "Shoot a Xerox and save a forest"? We need information relevant to the activities we control. If we must have a conceptual god, let it be Activity Control, for that is what the game is all about.

An organization should simply be the adaptation of the resource to meet the need. You may build in your own qualifiers of profitable, efficient, optimal or responsive. But first I want to touch on that fundamental resource, the human being.

As managers, we are forced through expediency to reduce human beings to a head-count, a man-week or a standard-hour resource. For a part of my life, I ran a unit of more than 3,000 souls whose occupations varied from janitor to the most experienced of large computer designers and managers.

At that time, I read in one of the business magazines that I could classify all of my staff into *seven* types! I found this to be absolute rubbish. I had more than 3,000 people who were not only individually different, but who varied from day to day.

But the characteristic that sticks in my mind is human adaptability. In general, human beings have a marvelous knack for doing that which we managers forgot to ask them to do but which nevertheless contributed to an element of our company's success.

A colleague of mine has remarked that human societal structures are a combination of order disorder. We must not believe that order is always right and disorder is always wrong, notwithstanding my earlier comments on discipline. We must structure our future systems so that we do not inhibit positive adaptability because this is as important or more important than what we call good management.

Sloppy Approach

Again I observe in real life how sloppy we all are in the matter of organization. I repeatedly see and experience the confusion between the terms "responsibility" and "accountability." We are all responsible members of our companies, just as citizens we share a collective responsibility for the performance and behavior of our countries. As citizens we are accountable under the laws to behave within certain limits, including the payment of taxes.

Yet companies are not specific enough on accountability. "Accounta-

(Continued on In Depth/6)

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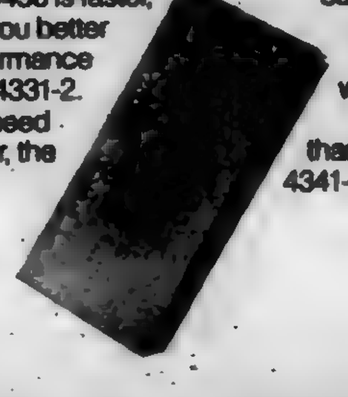

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(Continued from In Depth/5)

bilities" may be assigned to one unit with the resources necessary to carry out activities assigned or, more normally, left in another unit. Then responsibility syndromes develop and nobody is quite clear on who is accountable. And this can waste a lot of time, precious time.

Take your next project and map the accountabilities and resources necessary to discharge that project onto your current organization and resource disposition. Do it in the methodology we are now using for computer design – that is, top down. After all, you really cannot argue that the organization through which the project is to be implemented is less important than the project. It's like taking off in an airplane that has not been properly serviced.

The Corporate Entity

Let me develop the theme of the corporate entity, the company. At the head of each company is one man accountable for the activity of the whole company. He discharges that accountability through hierarchical delegation, and yet he is accountable for the integrated result of every activity within his company.

He needs to ensure that every individual does his job; he also needs to ensure that he in no way inhibits that adaptability to rapidly changing circumstances that occur daily on both a macro and micro scale. And to do this he needs to see that the structure of his organization is relevant to the task and that he has the tools to audit and adapt his organization as the company task and its resources change. We need those tools for, just as the management of complexity in design is the technology of the '80s, so we must have tools to manage the complexity of organizational structures – and the latter may spin out from the former.

One must know one's organization before irrevocably committing to an excess of cheap complexity which slows down the corporate body's reflexes. The bigger the company, the bigger the problem.

Don't Stop the World

I don't ask that we stop the world because we want to get off. I urge that we put more thought and method into our organization. If we understand our organizations, we can also understand the direction of change.

With that understanding, one can design distributed activity control systems that fit. With that understanding, the current organization can adapt to future organization and yet allow the lowest level activity manager the relevant information source and manipulation to optimize that lowest level of accountability.

Stop, think and proceed because you must. But if you don't watch out, cheap complexity will get you in the end, and don't blame the suppliers – they are only doing their job in selling that which you are prepared to buy.

If all the foregoing seems unreasonable, that's okay. Talbot has a law for that, too. Progress only comes through a process of iterative reasonableness. If you don't meet your customers' unreasonable demands, within limits, some other joker will.

William J. Talbot is director of the Technology Division at International Computers Ltd. (ICL), Manchester, England.

Talbot has been involved in the computer industry since the early 1950s when he delivered the then-largest fully transistorized DP system in the world to the British government.

He has held numerous positions in small and large systems development and manufacture, culminating in his current appointment which includes research and technology at ICL.

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BY PHILLIP G. ELAM

CHANGE

HOW USERS REACT

Most articles that address change resulting from the impact of data processing axiomatically assume that end users will resist any attempt to modify their work methods or the organizational structure within which they work. This resistance is reputedly based on a natural preference for the familiar; on the difficulty of overcoming habits that have become ingrained over a period of time; and on a certain reluctance that supposedly makes most employees unwilling to extend themselves if they do not have to do so. While it is true that there have been numerous and often highly publicized instances of resistance to DP, it is a gross misrepresentation to insist that end users will always resist change.

Attitudes toward change most often depend very simply on whether the end user perceives the new system or proposed change to be advantageous or disadvantageous to his situation. If end users have experienced comparable changes in the past, they are likely to assume that any changes resulting from a new level of DP technology will affect them in much the same way they did before. End users may also have certain preconceptions about proposed changes that are based on gossip, personal aspirations, fears or even hard facts. Finally, the end user's own basic motivations and psychological composition may incline him to support or oppose change, regardless of its nature or extent.

In analyzing the forces that affect attitudes toward change, it quickly becomes obvious that the prospect of having to alter a work-related habit has a complex motivational effect that is easier to understand in retrospect than to predict in advance. Perhaps the best place to start is to review the organization's past experience with DP-related changes, since these will have affected the thinking and actions of everyone in the organization.

Types of Organizations

For the purposes of this article, we can divide organizations into two types that represent the extremes — the bureaucratic organization and the open organization. Figure 1 below presents a summary of organizational characteristics, typical reactions to change and the corresponding implications for computerization.

The widely prevalent bureaucracy (also referred to as authoritarian, closed system, or Theory "X") is often unable to effectively cope with change because of its rigidity and adherence to historical legalism, its hierarchical-formal organizational structure and its rational-mechanistic viewpoints. Under this type of organizational structure, personnel may be viewed as irresponsible, work-shirking, responsive primarily to financial rewards and/or penalties and in need of close supervision.

In order to effect change, those in authority plan the changes and specify the modifications required in work content, staffing and structure. It is assumed that those under their authority will then make the necessary adaptations that are decreed.

Conversely, the open organization (also referred to as participative, problem-solving, democratic or "Theory Y") provides greater organizational flexibility, commitment, responsibility and effectiveness in adapting to the environment. In such organizations, personnel are assumed to be responsible, committed to organizational objectives, productive and respectful of interpersonal relationships as much as technology.

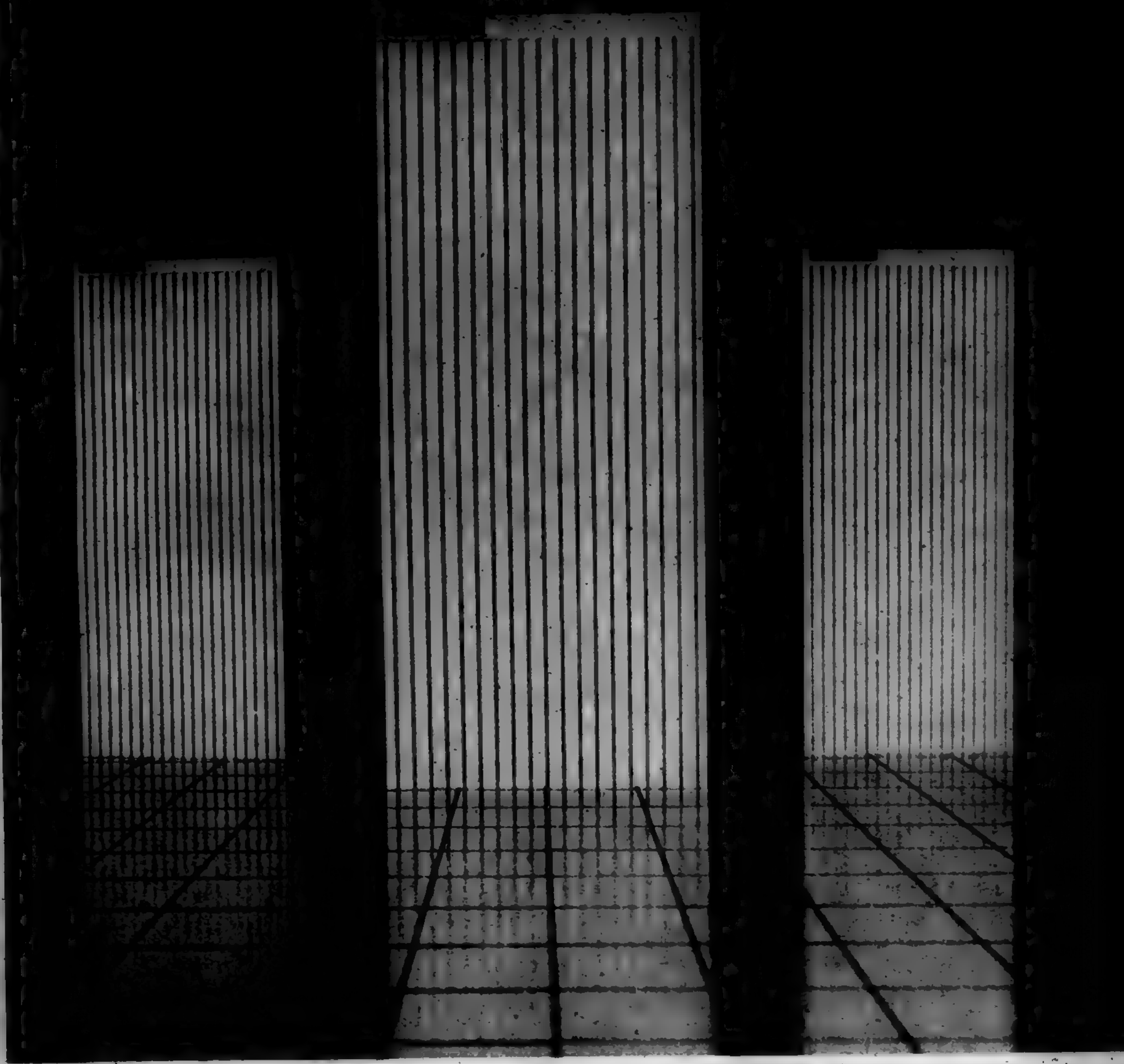
The bureaucratic organization has certain characteristics (such as rigidity, formality, departmentalization and authoritarian leadership) that tend to be barriers to change. Consequently, such organizations probably do not provide environments that will be receptive to the dynamic developments of information systems and computer-prompted change. On the other hand, the open organization's characteristics (flexibility, process-results orientation, participative climate and so forth) make such entities more adaptable to change. As a consequence, open organizations are not only better suited to absorb the developments of information systems

(Continued on In Depth/10)

TYPE OF ORGANIZATION	CHARACTERISTICS	REACTIONS TO CHANGE	IMPLICATIONS FOR COMPUTERIZATION
BUREAUCRACY	. Rigidity . Formality . Departmentalized . Authoritarian . Imposed standards . Adherence to rules . Goals set by a few top people . Mechanistic viewpoints . Sanctions imposed . Theory X orientation	. Resists change . Slow to adjust to change . Difficulty in corresponding with change	. Systems not likely to be progressive . Systems tend to perpetuate existing patterns . Computer usage likely to result in relatively marginal benefits
OPEN	. Flexibility . Informality . Participative . Self-imposed standards . Personal initiative . Collective goals . Humanism . Motivation . Theory Y orientation	. Adjusts to change . Induces desirable change . Easily corresponds with environment	. Modern, integrated systems are feasible . Dynamic systems tend to induce related changes in the organization . Computer usage is prone to result in significant benefits

Figure 1: A Paradigm of Organizational Extremes and Implications for Computerization

MEGAMINI



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(Continued from In Depth/7)

and computer-related change, but are much more likely to gain maximum benefits from them.

Organizational Reactions

DP-prompted procedural changes of any real magnitude require the full cooperation and support of end users who have a vested interest in the procedures to be modified or replaced. This group of end users can hardly be expected to be cooperative if the proposed changes appear to be contrary to what they regard as their own best interests. Trial and error has proven that the effective implementation of new methods and processes will require a careful and thorough explanation of what to expect and exactly how the new system will directly affect the end user. Most important, though, is that the affected end users be assured they will not "pay" for change by sacrificing privileges or productivity levels.

In those extreme cases where changes are classified as "labor saving," it is a relatively common practice to assure end users, prior to implementation of the change, whose jobs are eliminated that they will not be laid off, but will be assigned elsewhere in the organization — if that is, in fact, management's intention. Without such assurances, even the most "rational" change can produce the most "irrational" delays and inefficiencies. Never forget that most non-DP personnel in the organization are highly suspicious that the computer will eventually replace their function.

The ease with which an organization implements a new computerized approach is, to a considerable extent, predetermined by its history of prior changes. For example, in an organization that has a record of fairly frequent DP-related changes, end users can be expected to take additional changes more or less in stride. On the other hand, however, a previously stable organization may find changes in the processing of data to be unsettling and, perhaps, even chaotic.

In organizations that have already experienced changes in computing technology, the way in which the conversion or implementation of new processing techniques were managed will most certainly have a decided influence on the end user's willingness to cooperate in any future changes. If, in the past, the reasons and benefits were carefully explained and assurances truthfully given regarding the direct effect of changes in their jobs, end users are likely to view the change as a relatively benign process in which their own interests are not threatened. By contrast, however, if prior conversions created uncertainty and confusion — and especially if some employees were demoted or displaced — the remaining personnel are likely to regard this or any other change as a management (and DP) strategy to further undermine their security.

It is foolhardy for management to assume that a poorly handled conversion or implementation will "blow over" in time. End users will long remember those situations that threaten their security or well-being.

Figure 2 (on In Depth/11) outlines three types of typical dysfunctional behavior — aggression, projection and avoidance — relative to DP-oriented changes by the following groups: operational-level end users (both clerical and nonclerical), operating management, technical staff and top management.

Personal Reactions

Coupled with the previous experience of the organization as a whole, the individual motivations of its members will have an important effect on the overall reaction to DP-prompted change. There are at least four main reasons for the way in which a given end user reacts to the prospect of change within his working environment.

The first of these is, of course, economic. The types of changes that have been taking place in DP technology over the past few years clearly work to the economic advantage of some employees and to the detriment of others. Generally speaking, the younger and better educated end user with few old job-related skills to "unlearn" is usually the beneficiary of change as he is likely to respond more readily to the demands of the new system or approach. Conversely, the older employee with a lifetime investment in obsolete skills is likely to be the loser if

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ORGANIZATIONAL GROUP	RELATIONSHIP TO DATA PROCESSING	PROBABLE DYSFUNCTIONAL BEHAVIOR
Operating End-users (Non-clerical)	Provide systems inputs; sometimes utilize systems outputs	Aggression
Operating End-users	Particularly affected by systems; job pattern changes, sometimes eliminated	Projection
Operating Management	Controlled from above by information systems; job content modified by information-decision systems	Aggression, avoidance, and projection
Technical Staff	Systems designers and agents of system-level changes	Little
Top Management	Generally unaffected and often unconcerned with systems	Avoidance

Figure 2: Dysfunctional Behavior Related to DP-Oriented Change

he maintains an uncompromising attitude toward the proposed change.

A second factor affecting individual attitudes toward change is political. It relates to the end user's position in the power hierarchy prior to the change. New computer-driven operating methods can quickly change power relationships within an organization or, at least, create the possibility that old power lines will be challenged. This is especially true if the new system incorporates or combines any of the functions previously performed by two or more end-user departments. Another common example is where two or more departments are physically restructured in order to consolidate related activities or respond to the dictates of the new information processing system.

If an end user has a skill on which his employer is critically dependent, if he belongs to a group that has traditionally wielded a strong influence on policy and operations, or if he enjoys any other form of leverage over income and power, he will have a strong personal stake in preserving his favored position, regardless of the organization-level benefits of the newer technology. On the other hand, if the end user does not necessarily have an influential position under the existing structure, he will probably have little to lose under the new system and will respond accordingly.

User Motivation

A third major influence on attitudes toward change is the end user's own level of motivation or, to be more precise, the degree to which the job under the old system supported his psychological advantage. Effects of motivation on attitudes toward computing and change can best be illustrated by the security motive and the power motive. What matters most is not so much the end user's dominant motive as the extent to which that motive prompts him to preserve the status quo.

Consider first the security-oriented end user who, under the traditional mode of operation, enjoyed what he considered to be a relatively high degree of importance, both to his own department and the organization as a whole. He can best be described as feeling "safe." Change of any type means that the future becomes unpredictable.

Often lacking confidence in his ability to control events once they have begun to move in new directions, the user will quite probably fear the worst and, as such, have a strong stake in preserving the status quo. He may find it hard to accept the prospect of change and may even try to ignore it as long as possible. His "resistance," if it goes that far, is more likely to be passive "foot-dragging" rather than a more militant form of opposition.

A second type of end user is driven by similar security motives. Under the old system, however, he was not particularly privileged. The principal advantage of the old system was that he understood it. While such an end user may not welcome change, he is not likely to resist. Such an end user tends to have an attitude of indifference toward change or, perhaps, will view it as a nuisance that upsets comfortable old habits without any compensating gains.

The end user with strong power motives, that is, someone who has a controlling influence over people, resources and/or events, usually has a sensitivity for trends that may affect his position or power base. He will probably have assessed any pending change in methods or organization long before it actually occurs and will have decided whether the new approach will detract from his power base. He will not necessarily oppose change, provided he can assume control of the new technology. His instinct is to move from one power position to another rather than tie himself too

(Continued on In Depth/12)

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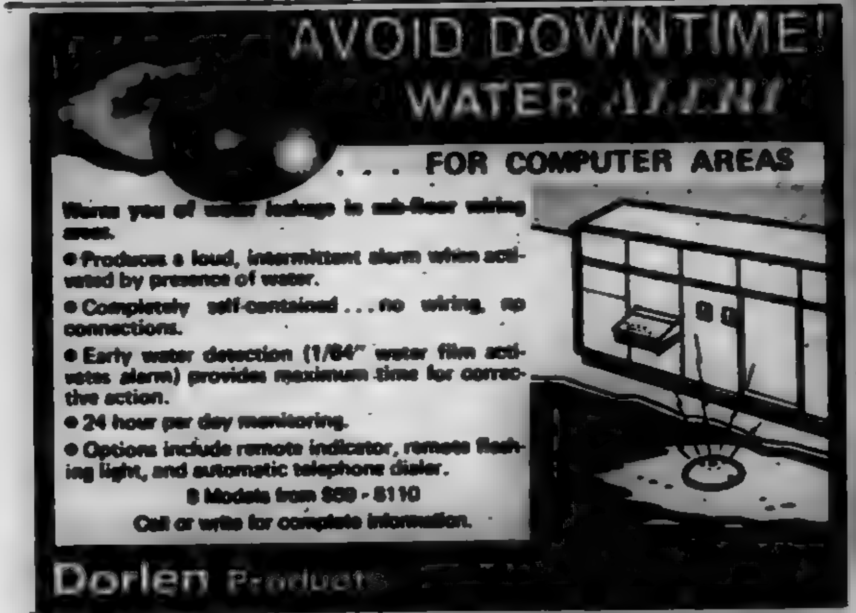

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(Continued from In Depth/11)

closely to any particular technique for getting the work done.

Assuming that he can gain control of the new system, he will become an open advocate of the proposed change. However, if another group in the organization manages to take control, he will oppose the change if he feels it can still be stopped. If it cannot, he will continue trying to persuade top management that the new system would work better if it were reassigned to his group.

The end user with strong power motives that does not enjoy much power or prestige under the old structure will be continually alert for potential ways of upsetting the existing power structure. Technology represents a vehicle for strengthening his position, or the position of his group, and he will be a principal supporter of change — right up to the point where he attains his goals.

The fourth factor affecting attitudes toward change is information (or the lack of it). Lacking adequate information about the new system and the changes it will bring, the end user may form an unrealistic opinion as to whether the change will benefit him. It is not uncommon for end users to have prejudged a situation on the basis of previous experiences, rumors or emotional biases for or against change.

What has sometimes been interpreted as "resistance" is really nothing more than a play for time in the hope that implications for the change will be clarified. This underscores the critical necessity for providing a clear, covincing explanation by management of how the new system or technology, and its related changes, will affect end users.

Figure 3 (on In Depth/13) outlines several other types of "resistance" to DP-related change by various work groups beyond economic or power motivations.

Satisfaction Levels

Advocates of computerization are too often blind to the fact that both organizational and technological change can have a profound effect on job satisfaction. Status may be enhanced or diminished, challenge to the end user may be increased or lessened and job security may be directly or indirectly affected. For these reasons, decisions concerning change are seldom made exclusively on their own merits, and the debates that are sometimes encountered prior to their implementation seldom have to do exclusively with what is best for the organization.

This is not to suggest that advocates for and opponents of change are motivated solely by self-interest or that decisions reached concerning the proposed change are not based primarily on the interests of the organization as a whole. The point is simply that everyone in the organization has an interest in having the organization support his psychological advantage. Accordingly, attitudes toward change resulting from the implementation of new levels of technology can hardly escape becoming colored to some extent by the effect end users expect to have on their particular situation.

Once it becomes known that some type of change is likely, employees are likely to begin trying to estimate its impact. It is precisely at this stage that a factual explanation is in order. The longer end users speculate in the absence of facts, the more believable their speculations become, until at last the facts may seem like fiction because they are inconsistent with prevalent beliefs. However, while careful explanations of the change and its effects on the individual end user will normally lessen resistance, explanations are not a panacea.

Managing Change

Many computer professionals, as well as management, make the mistake of assuming that information systems development is controlled only by technical, economic and schedule constraints. There is a fourth important constraint, operation, that deals primarily with the people element. In the long run, "operation" often has a far greater impact on systems development than the other three combined.

Much of the current literature related to the field of information systems reflects a valid concern that a preoccupation with technology and technique has replaced the DPer's ability to deal effectively with people. While the dramatic and rapid developments in tech-

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nology require an inordinate amount of attention from the system designer, these developments have also resulted in an even greater need to pay attention to the human element of systems work.

The major result of the system designer's work is change and, as such, he should realize that there will be many end users who cannot effectively deal with the changes they are being asked to accept. This problem is often more acute in those areas of the organization that manually performed many of the operations now done automatically by the new information system.

In his book *Future Shock*, Alvin Toffler stated that people basically resist change. He was concerned not so much with the direction of change but, rather, the rate of change. Rapid changes, according to Toffler, have a very unstabilizing effect on people and produce a variety of unusual behavior patterns. They include increased anxiety, depression, alienation, physical illness, apathy, withdrawal and even violence in certain extreme cases.

According to Toffler, an increased rate of change upsets people because they are reared with a "durational expectation." That is, people come to expect or "learn" how long one must wait until something happens or how long something will take. Technology is accelerating the rate of change and, since people cannot cope with the increased rate, they become upset. He goes on to suggest that one method of managing change is to hold firm to some aspects of life and not let them change. And, if possible, change should be introduced into other aspects of life in some managed fashion.

While a number of lessons can be learned from Toffler, it is important to remember that he is talking about society in general. Although any of the conditions he describes can exist in a number of different situations, they are not necessarily applicable to the business world.

In any event, both DPers and management must understand the range of human needs and emotions, both normal and neurotic. If system designers ignore the end user's needs, they risk rejection of the system by the people who use or are affected by it.

There are at least three approaches that can be used by system designers to avoid end-user resistance: the bulldozer approach, the participation approach and the objectives approach.

- *Bulldozer approach*. This approach is authoritarian in essence. Advocates of information system changes force them through regardless of the outcome. Some successful information systems have been developed and implemented using this approach. Normally, however, the results from such an approach create a greater resistance toward any subsequent changes that might need to be made. Such an approach causes most end users, and possibly many managers, to feel they are being controlled, used and manipulated. Feelings of frustration, alienation and insecurity increase, thereby decreasing motivation, cooperation and interest.

Although still used in some instances, this technique has little to recommend it. It would most likely be used by the bureaucratic organization mentioned earlier.

- *Participation approach*. Most people want to be recognized and gain acceptance. They also want to contribute to or participate in any changes. Participation gives end users a better understanding of the proposed changes in information processing and reduces their fear that they will become auto-

(Continued on In Depth/16)

TYPE OF RESISTANCE	END-USERS (NON-CLERICAL)	END-USERS (CLERICAL)	OPERATING MANAGEMENT	TOP MANAGEMENT
Threats to economic security		X	X	
Threats to status or power		X	X	
Increased job complexity	X		X	X
Uncertainty or unfamiliarity	X	X	X	X
Changed interpersonal relations or work patterns		X	X	
Changed superior-subordinate relationships		X	X	
Increased rigidity or time pressures	X	X	X	
Role ambiguity		X	X	X
Feelings of insecurity		X	X	X

Figure 3: Types of Typical Resistance to DP-Related Change by Work Group

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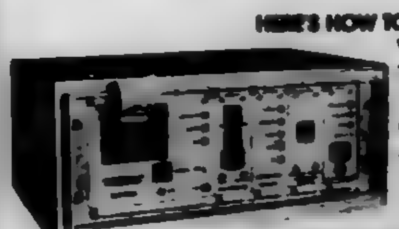

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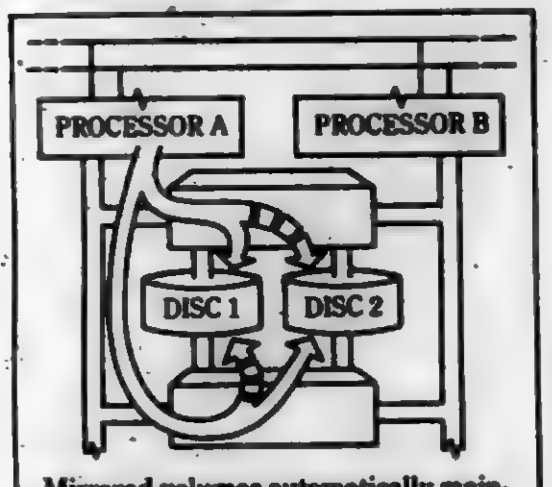

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(Continued from In Depth/13)

mators. Besides giving the participants a chance to go through a catharsis, their involvement provides the system designer a means by which he can receive helpful suggestions. When this is the case, the designer must remember to give credit where credit is due.

With this approach, it should be emphasized that merely allowing end users to participate in systems changes will not necessarily deter their resistance to proposed changes. This is especially true if the system designer merely pays lip service to involving end users in system changes to make them think they are really participating. Most end users will quickly recognize such tactics as a fraud, and this can have serious repercussions. Conversely, if system designers are conscientious in their efforts to have end users participate in the systems effort, they can better understand specific human needs and design the system to be compatible with those needs.

• *Objectives approach.* This places the system designer more in the role of teacher so that end users in the organization can be fully appraised of what the system objectives are. While the objectives approach uses many of the basic ideas included in the participation approach, the major development tasks are handled by the system designer. Most end users are interested in and motivated by those objectives that are consistent with their own goals, activities and needs. The objectives, therefore, must be acceptable to those who must react to change.

End-User Needs

Early in the systems development stage, the designer deals with end-user needs and associated problems of resistance.

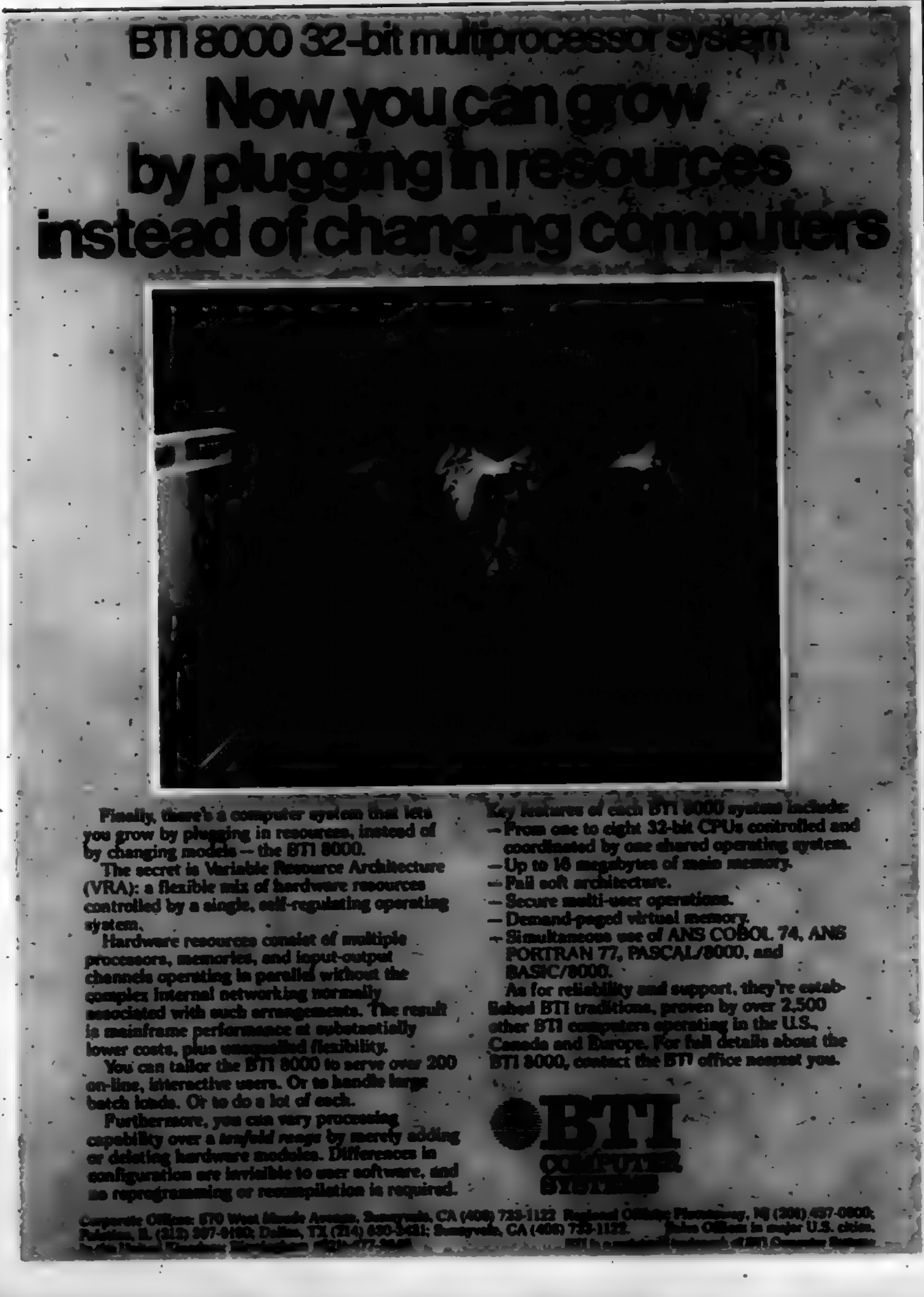
At each step during system development, the analyst gathers information about specific human needs, recognizes these as constraints and creates a system where the objectives are in line with human needs.

At the same time, the analyst must clearly communicate to end users exactly how the system's objectives save effort and time; how the system will increase efficiency, increase sales and promote better relations with customers; and how the end user will receive more specific, better tailored information.

Both the system designer and the management information services department must be fully aware of human needs and see to it that all system designs are compatible with those needs.

If the technical potential of information systems is to be realized, the various factors arising from people problems must be identified and satisfied first.

Phillip G. Elam is the manager of management advisory services at Alexander Grant & Co., a certified public accounting and management consulting firm in Dallas.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IBM 8100 Limitations Cited

Goodyear Upgrade Plans Up in the Air

By Ivan Berenyi
Special to CW

MACHELEN, Belgium — Like the company's famous blimp, Goodyear International's plans to replace its centralized European computer operation with a decentralized system are pretty much up in the air.

For one thing, the firm's European Information Systems (EIS) center here recently installed an 8M-byte IBM 3033N processor to replace a less powerful IBM 370/158 — a sign that the company will stick with a centralized system for at least the present time. For another, Goodyear's EIS decentralization plans revolve around IBM's 8100 computer, although standardization on this product on both sides of the Atlantic is yet to be finalized.

"We have, at EIS, installed a pilot model (8100) earlier this year to experiment with terminal handling," L.N. Lossing, EIS director, said. And the company "may eventually order anywhere between six to 15 units for different applications.

"But this is provided that the product shapes up satisfactorily," he added. "IBM has clearly got a significant future role in mind for the 8100, but for the moment it is still somewhat limited in both hardware and software terms." Of course, "there are other devices already on the market with enhanced capabilities," he pointed out.

Twofold Objective

Lossing, who has been with Goodyear International for more than 10 years and has served as manager of advanced systems development at the firm's corporate data center in Akron, Ohio, contends that the EIS distributed objective is twofold. First, the company wants to mechanize source data entry.

"It is our hope that by moving the data input closer to the originator of the data we will improve the accuracy of the data and simultaneously reduce the volume of manual manipulation of documents," he explained.

The second aspect is to increase each organization's awareness of and responsibility for the data and related information flow, necessary for their day-to-day operations.

"In order to accomplish the above objectives, local programming and systems personnel will be developed in diverse European locations to respond to local requests and to co-ordinate development efforts on corporate projects," Lossing said.

Goodyear's desire to stick with IBM processors for distributed processing is based on its commitment in central site hardware. The changeover to the field-upgradable 3033N, which, like the 370/158, runs under MVS, merely involved a CPU switch. The peripherals remained intact, Lossing continued.

"Though there were more than a dozen Memorex disk drives on a two-year lease at Machelen before, we phased them out and now use solely 3350s, 3420 tape decks, high-speed printers and a card I/O to a limited extent," he added.

Phased-Out 1500s

The bulk of Goodyear's data entry task is currently handled by some 15 Philips RJE and an unspecified number of IBM 3270 terminals scattered throughout the firm's European setup.

Those systems have gradually replaced a number of ICL/Singer 1500 units in recent years.

"We still use 1500s at two locations, but these will be phased out as soon as this becomes economically feasible," Lossing noted. The 1500 was a good product in its time, and served EIS well for long years, but now the overriding question is one of compatibility and future direction."

In 1976 there were more than 40 of the 1500 units in use, via leased lines linking Machelen to Luxembourg, Amiens, Paris, Copenhagen, Cologne, Zurich and Vienna. At present, five leased and numerous dial-up lines serve as terminal links, and EIS is connected to the Akron center in the U.S. via a single 9,600 bit/sec line split into four levels to serve teleprocessing, RJE, telex and message transfers.

Akron Link Upgrade

The upgrading of the Akron link in the near future is a forgone conclusion, but its extent is still under consideration at Machelen along with the advantages to be derived from such an advance, according to Lossing. Industry speculation points to a different cause though, namely the future of Satellite Business Systems.

"In terms of networking, we are in the process of developing network capabilities between Machelen, Luxembourg and the Akron computer complex using the standard IBM SNA products," Lossing observed.

In Luxembourg, Goodyear has multiple manufacturing locations

(Continued on Page 52)

Microfilm Storage, Retrieval Tied

NEW YORK — A system that ties together micrographic storage and computer-assisted retrieval (Mcar) is being introduced by Metropolitan Microforms, Ltd. (MML).

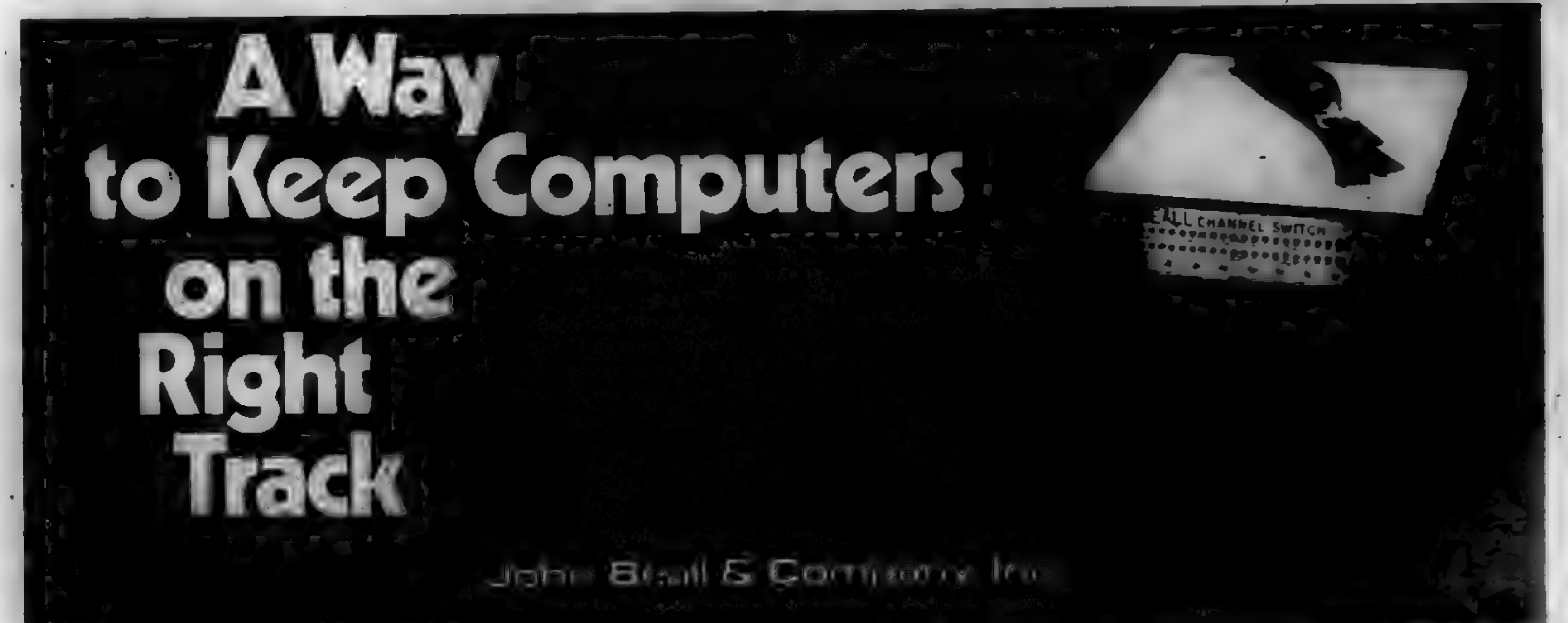
The Mcar system combines source document microfilming, data entry, computerized indexing, CRT terminal display, word processing, line printing and the automatic retrieval of stored microfilmed documents and related data.

Its features include an intelligent camera, computerized indexing of stored images, Minolta Corp. reader/printers that feature auto-load of Eastman Kodak Co. Ektamate magazines and 3M cartridges, plus automatic keyboard retrieval.

The Mcar system includes a Minolta Reader/Printer, an intelligent memory keyboard, Texas Instruments, Inc. CRT display, a minicomputer and word processing line printer, document blipping camera and word station and costs between $21,000 and $32,000 depending on the needs of the user.

MML is at 76 Madison Ave., New York, N.Y. 10016.

MML's Mcar System



Bits & Pieces

Trilanguage WP System Offers Communications

RALEIGH, N.C. – A word processing (WP) system that is programmable in Basic II, Cobol and assembler and features built-in communications capabilities is available from Word Plus.

The Word Plus system offers a full typewriter keyboard with special controls for text marking and correction and special function keys for text storage and retrieval.

It also has a 14-in. CRT with nonglare screen and 24 lines by 80 char. format.

Word Plus costs $14,000, the vendor said from The Beta Center, 5151 Glenwood Ave., Raleigh, N.C. 27622.

ECC Maintains Facility For Emergency Relocation

LENEXA, Kan. – The Emergency Computer Center (ECC) is maintaining an empty computer facility in a state of readiness here in case a member company's computers are destroyed and it needs a new location to continue working.

The building has 10,000 sq. ft. of raised floor space, the necessary air conditioning, humidity control and power distribution for computers and can accommodate most computer makes, according to Jackie Robb, ECC office manager.

Member companies pay an annual fee to reserve emergency space. ECC claimed computing facilities can be restored in the time it takes for the new equipment to be delivered.

It costs $9,000 to reserve 2,500 sq ft or less, $12,000 for 2,500- to 6,000 sq ft and $18,000 for 6,000- to 10,000 sq ft.

ECC is a subsidiary of the Kansas City-based C&C Sales, Inc., a designer of computer room environments, and is located at 10012 Darnell, Lenexa, Kan. 66215.

Dual-Purpose Printer Structured for DP, WP

WESTLAKE VILLAGE, Calif. – Malibu Electronics Corp. has unveiled a dual-purpose printer designed for DP and word processing (WP) uses.

Each character font stored in the printer features both a high-speed DP version and a reduced-speed WP version. Output speeds range from 165 char./sec to 250 char./sec in the DP mode and 42 char./sec to 60 char./sec in the letter quality mode, the vendor claimed.

The price for the unit is $3,000, the vendor said from 2301 Townsgate Road, Westlake Village, Calif. 91361.

Four-Pen Desktop Plotter Has RS-232, IEEE-488 Link

CONCORD, Calif. – Nicolet Zeta Corp. is offering a 12-in. four-pen desktop digital drum plotter.

The Model 1453SX offers maximum speeds of 15 in./sec axially, 21 in./sec diagonally with .001-in. resolution and was designed for use with continuous feed paper for unattended multiplot operation, the vendor claimed.

It is equipped with either RS-232 or IEEE-488 interface for connection with a variety of computers and terminals using either direct communications port or modem connection.

The product costs $9,950, the vendor said from 2300 Stanwell Drive, Concord, Calif. 94520.

Upgrade Plans Up in Air

(Continued from Page 51)

served by a 1M-bytes IBM 370/145 and an 800-strong Goodyear International Technical Center (GITC) where an IBM 1800 process control computer has been used for tire testing and production monitoring for the past 12 years. The 1800 had been linked core-to-core with a 360/65 (the 158's predecessor) at Machelen, and there had been plans for using the 1977-installed 145 and a 360/50 previously as on-line back-up machine to the central EIS mainframe, but they were discontinued.

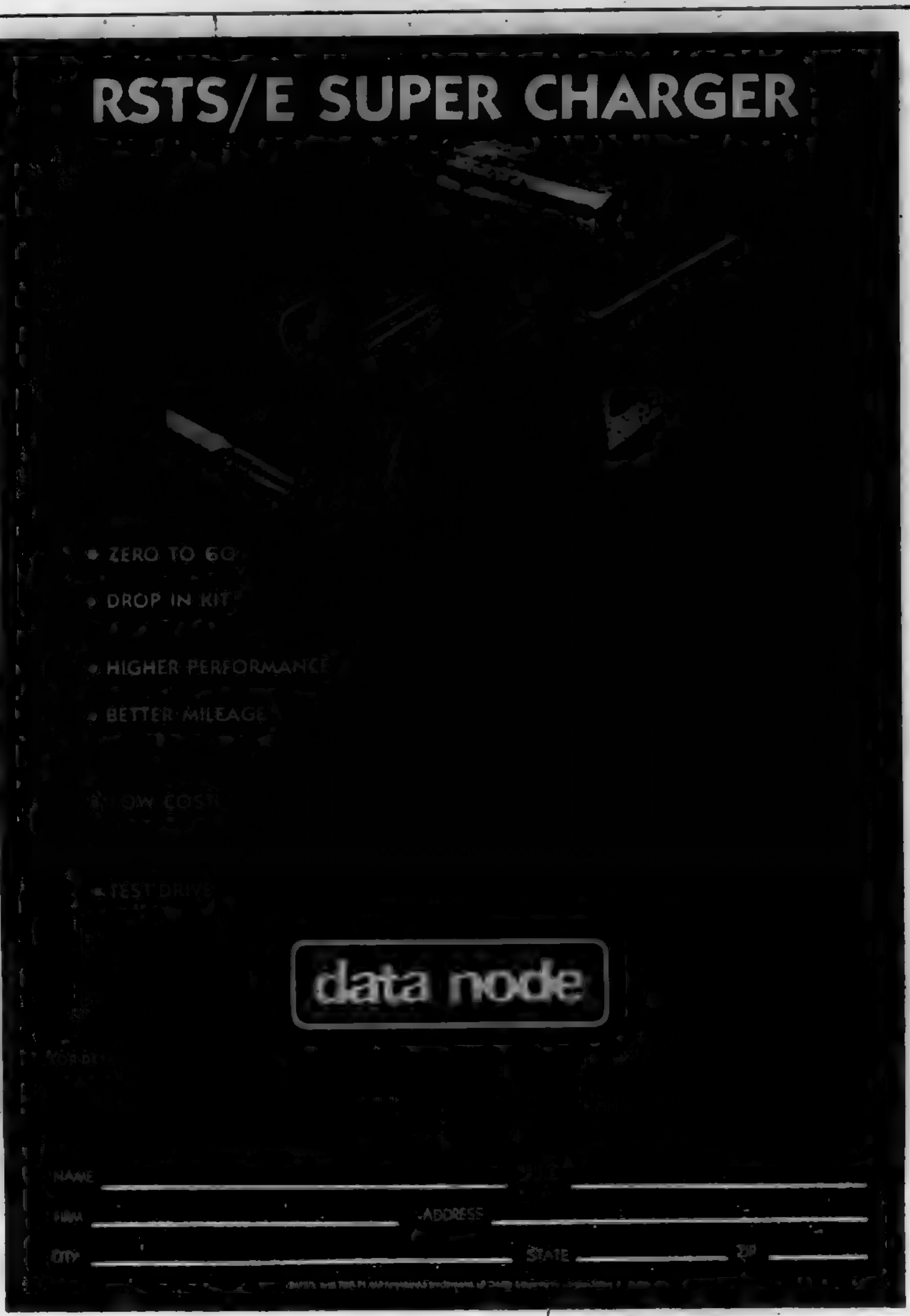
"We do keep very close contacts with the 145-based Luxembourg center, aiming at full systems compatibility, preparing for the time when we may want to cross over into their data structure," Lossing stated. He assured that this will happen only when the Goodyear network is up and ruled out a link merely serving backup purposes on economic grounds.

Instead, a fail-safe system provides temporary data security in case of a systems crash, which ensures recovery "within a relatively short time," unless the central system goes down for longer than a week.

With regards to GITC's 1800, Lossing is all for continuing limited operation. "The machine, which became the only piece of hardware we actually own in September, is very long in the tooth, but there is no reason why we should change it until it is supportable for monitoring purposes," he noted.

Correction

The correct address for Media Systems Technology, Inc. ["Initializer Runs Floppy Disks With Different Formats," CW, Dec. 1] is 1616 S. Lyon St., Santa Ana, Calif. 92705.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For Denver Athletic Club

System Serves Up Health, Schedule Data

Special to CW

DENVER — At the International Athletic Club here, a small business computer not only tells members when they can play squash and racquetball, but also tells who might not be physically fit for a particular game.

The club's Data General Corp. commercial CS/60 system is used by the club to handle standard accounting procedures such as membership payments, general ledger and inventory at the facility's pro shop.

The computer is also used to keep track of reservations for any of the club's 24 racquetball or squash courts, according to Rick C. Schliebe, club president.

Health History

However, the DG system also helps the club monitor members' health and prevent those with health problems from registering for classes or tournaments that might prove harmful to them. "When a person signs up for club membership, we take a health history," Schliebe explained.

A questionnaire collects data on current exercise frequency, present or past injuries, smoking habits and medical history. That data is keyed into the small business system.

Later on, during tournaments, the computer flags any possible health problems that might be harmful to an individual who wants to participate in the contest.

The case is then referred to the club's consulting staff of six physicians, who review the information and make a decision as to whether the individual should participate, Schliebe said.

The facility's small business system includes the CS/60 processor with 256K bytes of memory, 20M bytes of disk storage, a tape drive, a matrix printer and nine Dasher CRT terminals. Three CRTs are located in the membership office for data entry; two at the membership sign-in desk; two more in the locker rooms, where members can sign up for classes and lockers; and two in the computer room for development work.

Scheduling information generated by the computer is broadcast over television monitors scattered throughout the club's six floors.

On Top of Collectibles

The CS/60 has also cut membership dues receivable to zero — effectively paying for itself within one year, Schliebe said. In hard dollars, before the system was brought in, membership billings totaled about $918,000 per year.

Uncollectibles amounted to $78,000. Now, with the computer spotting problem accounts at the admission desk, uncollectibles are nominal on $1.2 million in annual dues.

Since noncorporate members pay by bank charge card, the system is geared to handle each card's bank number along with any other information required by the bank. The system then creates a record on magnetic tape in the format acceptable to the appropriate bank card and bank computer.

CRT terminals and on-line TV monitors scattered throughout Denver's International Athletic Club allow members to reserve squash or racquetball courts up to a week in advance.

By using magnetic tape, the club is able to get its cash within 24 hours instead of the usual 10- to 30-day wait with normal billing procedures, Schliebe pointed out.

Member IDs

Each member in the club is assigned a number that not only identifies payments, but is used to tell how often a person uses the club's facilities. If a person is not a frequent user, the club can write that individual a letter asking why, a technique described by Schliebe as "a very important aspect of our public relations."

According to the club president, the organization was committed to computerizing its business well before its doors opened. Schliebe and the other founders felt that a computer would give the club a business edge over competing ventures.

With this in mind, the club and its consulting firm, CSB Systems, Inc., conducted a survey of the small business systems on the market. They chose DG's system because "It was the least expensive system that could do the job we want to do," Schliebe remarked.

Software designed for the club's specialized requirements was written in DG Interactive Cobol under the CS operating system by Glen Rawlins of CSB Systems.

Expansion Plans

The International Athletic Club is interested in expanding its club concept to other cities across the nation. Schliebe uses a financial performance system written for the CS/60 to pose "what-if" questions that will help him make decisions about developing new clubs.

For example, variables such as the proposed city, square footage of land, land costs, number of members expected in the club, percent of members that are male and female, and amount charged for dues, can be keyed into the system.

Within a half-hour, the system will project monthly profits over the next 10 years for a club in the proposed city, Schliebe said.

Management can vary the data entered. For example, managers can ask, "What will happen to our profit over the next 10 years if we charge $45 dues instead of $40?" Schliebe noted.

A mailing list processing system is now used by the club's sales force to reach potential members and also by the membership office to send out mailings to existing members.

Disk Controller Fits VAX, PDP-11

PALO ALTO, Calif. — Minicomputer Technology is offering a single-board storage module disk controller for users of Digital Equipment Corp.'s VAX11/780 and PDP-11 Unibus series processors.

Featuring 32-bit data error control and header error control, the controller supports any one or two storage module device (SMD) interface-compatible drives, including Winchester types, the vendor said.

The SMV15 controller has a jumper-selectable direct memory access throttle rate, so users can choose transfer bursts from one to 15 words or maintain constant transfer while monitoring for bus requests.

Hex-Size Board

The single hex-size board plugs directly into any SPC slot, and high-speed bipolar microprocessor architecture implements most controller functions in firmware, according to the firm.

Up to 64K words can be transferred with one read/write command, the vendor claimed, adding that multiple-sector block transfers can be made under hardware control, reducing software overhead.

The system provides a sector-interleaving factor selectable during pack formatting as well as a 1K-byte random-access memory (RAM) providing two full-sector buffers for all disk I/O operations.

The controller is media-compatible with the SMC11 Minicomputer Technology disk drive, so users running both DEC computers under the same operating systems can read disk packs written on either CPU.

The SMV15 runs with current revisions of the VMS, RT-11, RXS-11M and RSTS/E operating systems. The controller costs $3,900 from the firm at 2470 Embarcadero Way, Palo Alto, Calif. 94303.

QT System Expands to 16M Bytes

MANHATTAN BEACH, Calif. — QT Computer Systems, Inc. has unveiled a system featuring a CPU, two 8-in. disk drives, a double-sided, double-density 5.25-in. and 8-in. floppy disk controller, power supply fan and Televideo 920C terminal.

Standard storage capacity for the system is 2M bytes, expandable to 16M bytes. Features include two RS-232C serial I/O ports and two parallel I/O ports.

The system was designed for businesspeople and engineers. It can be used for accounting and word processing, as well as a variety of scientific applications, the vendor claimed.

The 1M-byte system sells for $4,295, while a 2M-byte version sells for $4,995, the vendor said from 15620 S. Inglewood Ave., Lawndale, Calif. 90260.

The QT System

Peripheral Boards Extend Micronova

WESTBORO, Mass. — Four Micronova computer peripheral boards are available from Data General Corp. The products are a combination analog and digital I/O interface, a video interface, a random-access memory (RAM)/erasable programmable read-only memory (Eprom) memory board and an input/output Cmos memory board.

The Model 4335-S analog and digital I/O interface board was designed for compact packaging into data acquisition and process control applications. It costs $800.

The Model 4337-S video interface generates alphanumerics on a video-monitor and is an inteface to an Ascii keyboard. It costs $750.

Two Versions

The RAM/Eprom memory board extends Prom-able capabilities to DG's Micronova MP/200. It is available in two versions, models 8688 and 8689. They cost $630 and $1,260, respectively.

The input/output Cmos memory board provides the capability of a portable memory, which can be removed from the computer without losing its contents. It is available in the models 8316-A, 8316-B and 8316-C for prices of $800, $1,290 and $1,900, respectively.

DG is located at Rt. 9, Westboro, Mass. 01581.

Gives 125 Char./Sec

Matrix Printer Fits Intellec MPUs

NEWTON, Mass. — A 125 char./sec 9 by 9 dot-matrix printer designed for use with Intel Corp. Intellec Microcomputer Development Systems is available from EMC Corp.

The Model MDP-125 provides hard-copy output without requiring special hardware or software, the vendor said. The printer comes with a 10-ft cable and plugs directly into any Intellec model. An automatic on/off control allows it to be activated directly from the Intellec console.

MDP Features

The MDP features bidirectional operation; prints a 96-char. Ascii character set with true upper- and lowercase characters and underlining; and produces an original plus five copies.

The printer also includes a front- or bottom-loading forms tractor-feed mechanism, a long-life moebius loop ribbon cartridge, self-testing firmware and sound deadening, a spokesman said.

The unit costs $1,235 in an 80-col model and $1,345 for a 136-col model.

EMC Corp. is located at 385 Elliot St., Newton, Mass. 02164.

HP 9915A Offers Testing, Control

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced the HP 9915A, a system designed for dedicated test, measurement and instrument control applications.

The unit is rack-mountable, contains an HP 85 CPU, memory, operating system and I/O ports, the vendor said.

The HP 9915A can reportedly run programs developed on HP 85 desktop computers and can be used to debug and edit programs.

The 9915A costs $1,675. An optional cartridge tape costs $425 and an operator interface for adding custom keyboards costs $350.

HP is headquartered at 1501 Page Mill Road, Palo Alto, Calif. 94304.

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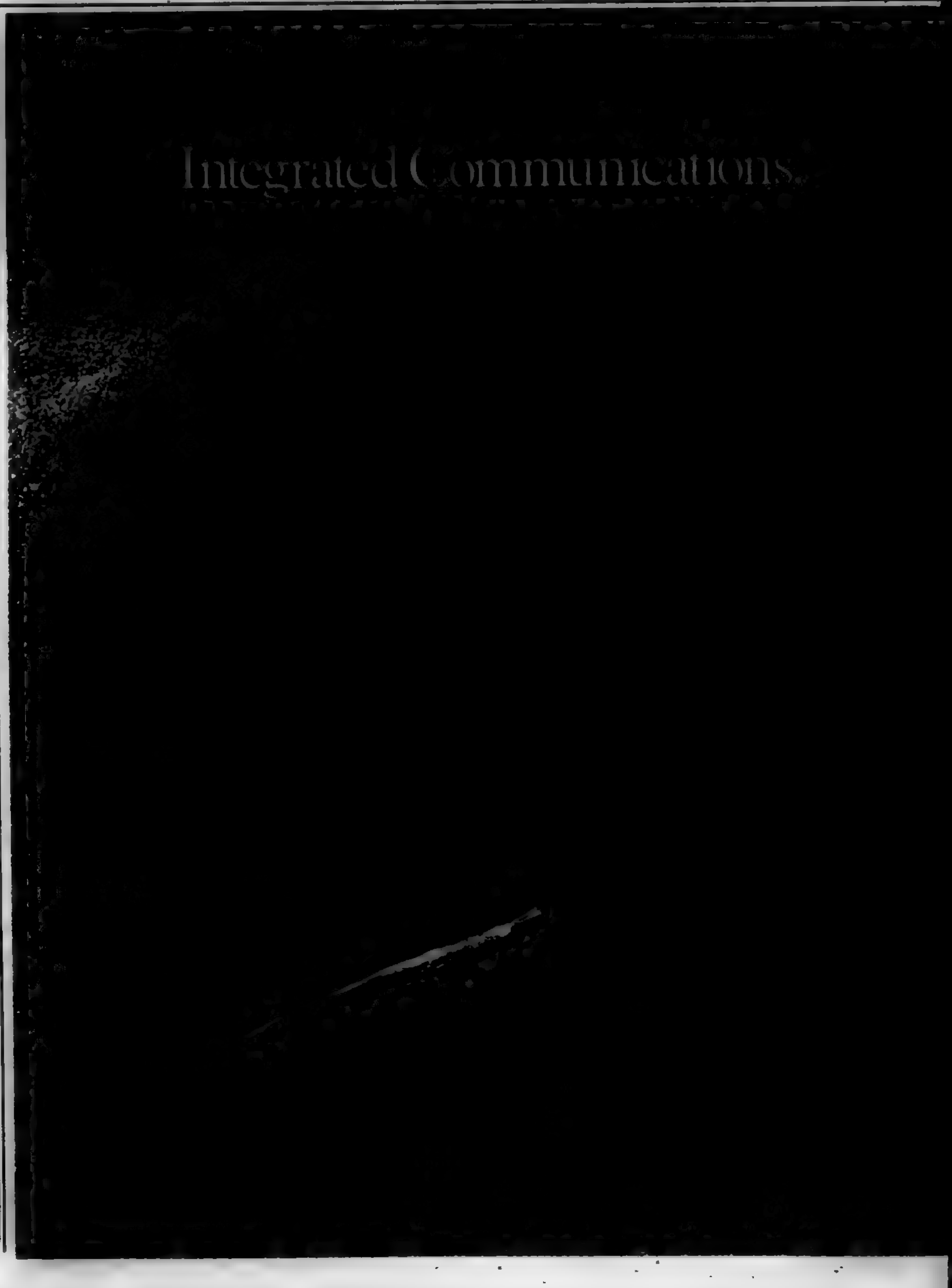


Office Workstation Built Around 16-Bit Micro

DETROIT — An office workstation based on a 16-bit microcomputer and designed to handle electronic mail, typesetting, laser printing and information storage and retrieval is available from Alphatext, Inc.

The Series 1000 office workstation stores indexed information on large capacity disks. Users can share files, make specific inquiries or browse through several subjects, the vendor claimed.

Messages of any length can be sent to any network member, regardless of location or time zone, using the electronic mail capabilities, a spokesman said.

One-Step Process

In addition, the laser printer can prepare up to 32,500 copies of documents in a single step, at the rate of two per second, the spokesman noted.

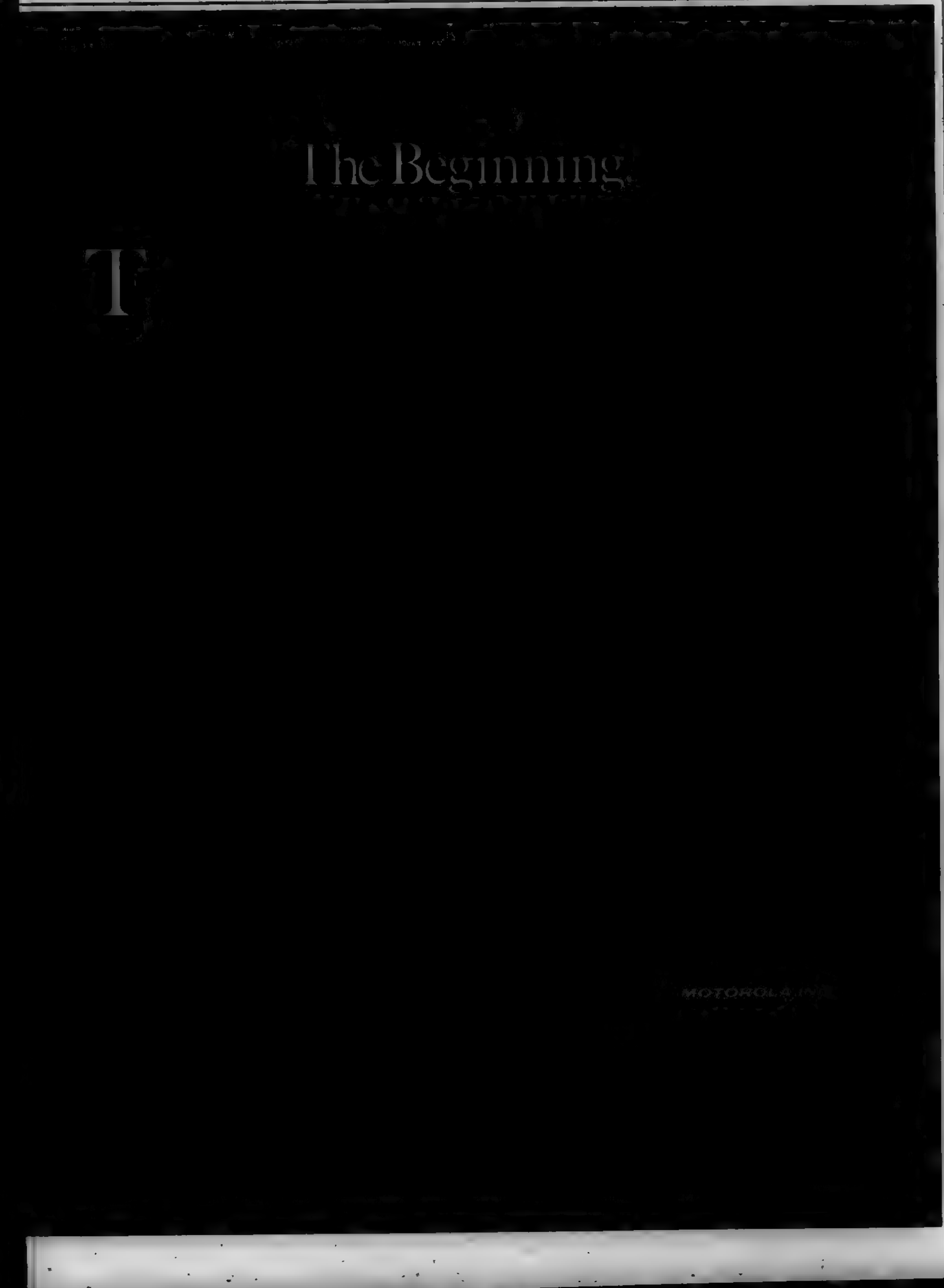
The price for the system is $15,500, the vendor said from 400 Renaissance Center, Detroit, Mich. 48243.

Line Printer Controller Runs With PDP-11 Unibus CPU

HOUSTON — The LPC 11 line printer controller being offered by Computer Extension Systems, Inc. is said to be completely hardware- and software-compatible with Digital Equipment Corp. PDP11 Unibus computers.

All popular type printer interfaces can be supported by the LPC 11, according to the firm, which noted that onboard DIP switches allow selection of address and vector locations.

The controller requires only one option slot. The LPC 11 comes with a cable and costs $525 from the vendor, which is headquartered at 17511 El Camino Real, Houston, Texas 77058.



Single Card Replaces Three Cards

DALLAS — Century Computer Corp. has unveiled a single-board CPU that replaces a previous, three-card version in any existing or currently produced Century system.

The three-card CPU set required three slots with special connectors; the single-card model uses one I/O slot. All software that ran on the old machines is also compatible with the new model, a spokesman claimed.

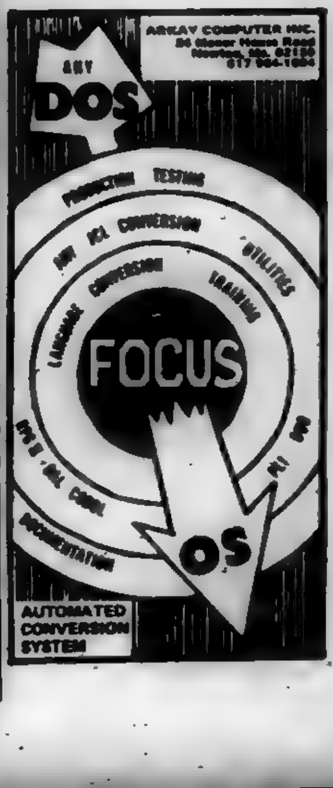
The one-card CPU costs $1,050, the vendor said from 4410 Spring Valley Road, Dallas, Texas 75240.

System Keeps Mailing Lists

CHICAGO — The Addressograph division of AM International has unveiled a microcomputer-based addressing system that maintains mailing lists for small and medium-sized volume mailers.

The Whiz features 56K bytes of random-access memory and dual minidiskette drives.

The product sells for approximately $15,000, the vendor said from 111 E. Busse Avenue, Mt. Prospect, Ill. 60056.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This book uses COBOL as the programming language and as the vehicle for discussion of systems concepts. It includes comprehensive coverage of the COBOL programming language based on principles of structured programming that does not require any previous exposure to programming or computers. This book enables the reader to write COBOL programs almost immediately. This edition includes greater emphasis on the relationship between information systems concepts and techniques of COBOL programming. $21.50

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Richard L. Thorsell.
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Elementary Structured COBOL: A Step by Step Approach, 2nd Ed.,
Gordon B. Davis, Margrethe H. Olson and Charles R. Litecky.
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How to Evaluate People in Business,
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The effective evaluation of people in employment situations—including hiring, promoting or supervising—is one of the most serious problems managers face. This practical book argues that employees should be judged on the basis of a documented "track record" of results-producing performances, rather than on such criteria as good conduct, pleasing traits or political pull. $14.95

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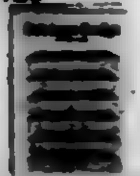

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Database Design,
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Hottest Mini Action Predicted for 32 Bits

NEW YORK — Although the minicomputer industry will continue to show a stellar annual growth rate of 27% through 1985, the real market action will be in the 32-bit segment, which will experience an estimated 56% growth rate yearly until 1985, according to a recent study by MSRA, Inc.

By that time, minicomputer revenues will total $25 billion, with the 32-bit segment comprising 22% of that pie, up from the 9% estimated for this year.

The past year has seen a bevy of 32-bit introductions. New entrants include Data General Corp. with its MV/8000 system, BTI Computer Systems, Inc., Apollo Computer, Inc. and Honeywell, Inc. Digital Equipment Corp. introduced its VAX-11/750, a smaller scale version of the VAX-11/780.

Although most 32-bit minis have been geared for scientific and engineering applications, Honeywell's DPS 6, DG's MV/8000 and the new DEC system are oriented heavily toward the commercial sector, and this trend will continue, industry analysts agree.

Four Advantages

The 32-bit mini has four major advantages: The word length allows more direct memory addressing capability, which allows higher throughput, thus improving machine productivity. Moreover, computations are more precise and program development is made easier by the longer word length.

Despite the glamour surrounding the 32-bit offerings, the mainstay 16-bit machines will remain the bread and butter product of the industry for the foreseeable future, the study noted.

This year the minicomputer market is expected to grow by 35% in terms of dollars and by 33% in shipments, growing to $7.65 billion, MSRA estimated.

Mini Vendor Rankings

Company (Yr. End)	1979 Revenues	1980E Revenues	1980E Mini-computers Revenues	Approx. % of Revs. from Minicomputers	Market Share	Compound Rev. Growth 1975-1980E	Est. Annual Proj. Mini-computer Rev. Growth (3-5 Yrs.)
Digital Equip. (6/30)	$ 1,804	$ 2,368A	$ 2,235	94%	29%	35%	25-30%
Hewlett-Packard (10/31)	2,361	3,070	1,300	42%	17%	26%	25-30%
Data General (9/30)	507	662	662	100%	9%	41%	30-35%
Honeywell (12/31)	4,210	4,890	340(1)	7%	4%	16%	30-35%
IBM (12/31)	22,863	25,450	320(2)	1%	4%	12%	35-40%
Datapoint (7/31)	232	319A	319	100%	4%	45%	30-35%
Wang Labs (6/30)	322	543A	316	58%	4%	40%	30-35%
Prime (12/31)	153	230	230	100%	3%	64%	40-45%
Perkin-Elmer (7/31)	733	900	215	23%	3%	34%	20-25%
Management Assist. (9/30)	272	325	200	61%	3%	38%	20-25%
Four-Phase (12/31)	179	200	200	100%	3%	32%	20-25%
Texas Instruments (12/31)	3,224	4,200	155	4%	2%	23%	20-25%
General Automation (7/31)	116	131	131	100%	2%	19%	15-20%
McDonnell Douglas (12/31)	5,279	6,100	115	2%	2%	40%(3)	20-25%
Tandem (9/30)	56	110	110	100%	1%	135%(4)	40-45%
Sperry(5) (3/31)	4,785	5,295	92	2%	1%	11%	30-35%
Modular Computer Sys. 12/31)	72	85	85	100%	1%	17%	25-30%
Systems Eng. Labs (6/30)	65	80A	80	100%	1%	35%	25-30%
Computer Automation (6/30)	64	72	72	100%	1%	10%	15-20%
Others(6)			168		1%		
			$7,650		100%		

MSRA Chart

In the chart above, "A" represents "actual revenues." The footnotes: (1) Does not include internal sales. (2) Series/1 only. (3) Based on Microdata Corp. revenues. (4) 1977-1980 estimates. (5) Results for following fiscal year. (6) Includes other domestic and foreign revenues.

Although sales traditionally have been heavily OEM-oriented and geared to industrial and scientific markets, by mid-decade the industry will be less skewed in these directions.

By 1985 the OEM/end user sales mix will be 55%/45% vs. the 59%/41% projected by MSRA for this year. Commercial applications will represent 40% of minicomputer use by 1985 compared with 27% today, MSRA forecast.

Despite the robustness of the market, mini makers will have to guard against competitive onslaughts from mainframers moving down into smaller systems and microprocessor makers adventuring into low-end mini systems.

In particular, MSRA noted that IBM will become much more ag-

(Continued on Page 58)

BDS

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CSI Offers 10-Day Turnaround For Prototype Wafer Fabrication

SUNNYVALE, Calif. — Comdial Semiconductor, Inc. (CSI) is offering a 10-day turnaround for prototype wafer fabrication.

The small semiconductor house here has allocated up to 35% of its process technology capacity for this service as well as for design, prototype test and verification and limited-production wafer fabrication, according to CSI President David P. Jones.

The service is geared to custom designs. The new service was spurred by the recognition that major semiconductor houses will not participate in the design process of a chip unless the customer subsequently orders chips in production quantities. Often companies need specialized chips that do not require large volume runs.

Even chip designers employed at large semiconductor houses or with hardware vendors with captive facilities need fast turnaround for prototype wafer fabrication, Jones noted. Prototype wafer fabrication accounts for 10% of an average two-year $250,000 design cycle.

CSI is a division of Comdial Corp., a company producing telephone apparatus with a high semiconductor content. CSI will aim its services at the telecommunications market, but is not limited to that segment.

Fed Changes Formal Hearing On Citicorp DP Service Plan

WASHINGTON, D.C. — The Board of Governors of the Federal Reserve System has expanded the scope of the formal hearing to be held next year on the subject of Citicorp's application to move into the DP services business.

The change announced by the Federal Reserve Board amounts to establishing full hearings on rewriting Regulation Y, according to Jerome Dreyer, president of the Association of Data Processing Organizations, Inc. (Adapso). Regulation Y governs the enterprises in which bank holding companies may participate as adjuncts to their traditional financial services.

Persons or organizations wishing to participate in the proceedings must file a statement of interest by today, Dec. 15, with the secretary of the Board of Governors of the Federal Reserve System, Washington, D.C. 20551.

The statement must include the extent to which participation is desired in the proceedings (written and/or oral presentation), a summary of the matters upon which the witness desires to submit testimony and the name of each witness.

The hearing arose from a petition filed by Adapso with the Fed urging denial of Citicorp's application to conduct computer services business under a wholly owned subsidiary named Citishare.

On March 18, 1981 *Computerworld Extra!* will devote an entire issue to an in-depth look at "Communications Systems in the 80's."

And more than half-a-million Computerworld readers will be receiving and reviewing this important communication.

Computerworld Extra! is an extra issue of Computerworld — the second we have done — to be published this March 18th. It will appear in what our Editor, Drake Lundell, calls a "tabezine" format. This means glossy, full-color covers on the outside, and a magazine format inside (printed on super calendared newsprint) — and tabloid-size throughout.

This issue of *Computerworld Extra!* will focus its entire editorial content on a single subject: "Communications Systems in the 80's." Top experts from all areas of the communications field will write magazine-length articles on a variety of topics including: Integrating Voice and Data Networks; The State of Videotex in the US, Uk, France, and Canada; Network Management; Satellite Technology in the 80's; The Past and Future of the Communications Act and Federal regulations; Network Standards and Protocols; and Future Directions in Telecommunications Technology. Plus, there'll be Wrap-up and Analysis articles for Data Communications Software, Data Terminal Equipment, and Data Communications Equipment.

Computerworld Extra! will be received and read by 107,000 paid *Computerworld* Subscribers (ABC 6/30/80) and more than 430,000 pass-along readers (Becker Research Corporation). These professionals have extensive purchase decision influence especially in the communications market, as our research indicates:

Personal Involvement in Purchase Decision by *Computerworld* readers at user organizations only (not including consultant and OEM readers)

	Subscribers		Pass-along Readers	
	Percent	Projected #	Percent	Projected #
Modems	48%	31,000	31%	78,000
Data Comm Terminals-Dumb	44	28,000	25	63,000
Data Comm Terminals-Smart	34	22,000	33	83,000
Multiplexers	30	19,200	29	73,000
Distributed Processing Equipment	28	17,900	18	45,000
Computer Services and Timesharing	26	16,600	20	50,000
Teleprinters	26	16,600	15	38,000
Graphics Terminals	22	14,100	7	18,000
Network Control and Diagnostic Equipment	12	7,700	15	38,000

Source: "A Profile of Computerworld Subscribers and their Companies" — Becker Research

We'd be glad to give you more information on advertising in this new publication from *Computerworld* — as well as complete details on our subscribers and readers. Just contact your local CW Sales Office, or, call Frank Collins, Display Advertising Manager, CW Communications/Inc. at (800) 343-6474.

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Law Directory To List Software

CHICAGO — The Economics of Law Practice Section of the American Bar Association is working with Arthur Young & Co. to publish "Locate," a directory of all computer application software (except word processing) available to law firms.

"Locate" will be free for all vendors and service bureaus listed in the directory, and it will be made available to the 14,000 attorneys who participate in computer selection for their law firms.

Vendors who market either in-house computer software or service bureau applications to law firms are invited to contact Lavina Dill of Arthur Young & Co. to be listed in the directory. The address is One IBM Plaza, Chicago, Ill. 60611.

Hottest Action Seen in 32 Bits

(Continued from Page 57)

gressive in the upper range of the mini market.

However, to their credit, the mini makers will be able to counter competitive moves by nonmini vendors because they can offer an array of proven software, upward compatibility of systems and an interactive approach, MSRA noted.

Aside from protecting their market from competitive thrusts, mini makers this year have proven they can ensure healthy earnings by raising prices when inflationary pressures become threatening. Led by DEC, most minicomputer vendors raised prices during the second and third quarter of this year by about 5% to 10%.

Labor Squeeze

Like other hardware vendors, mini makers have been squeezed on labor-intensive operations such as software development and service. The CPU and main memory now account for only 30% to 40% of the cost of a minicomputer system, compared with 80% earlier in this decade, the survey noted.

Besides evaluating the market, the 127-page report discusses in depth the VAX-11/780 and focuses on various mini makers and their products.

The report costs $600 and is available from MSRA at 115 Broadway, New York, N.Y. 10006.

ATM Market Growing 41%/Year

Financial Survey Finds EFT Business Booming

WASHINGTON, D.C. – The electronic funds transfer (EFT) business is booming, and automated teller machines (ATM) are leading the way.

That was the conclusion drawn by the Electronic Money Council, based on the results of a recent survey of 74 financial institutions with median assets of $1.6 billion.

In its electronic money index, the Electronic Money Council surveyed 23 banks, 12 thrift institutions, 28 commercial markets and 11 Federal Reserve districts from January 1979 to April 1980.

Of that group, most provide some form of automated teller technology, and about one-third of those polled said they only recently started offering the service. The automated teller market sported a 41% annual growth rate, the report said.

Pay-by-Phone

Telephone bill payment, check guarantee and point-of-sales services show an annual growth rate of about 30%. The report noted pay-by-phone services will probably show a greater percentage in the future because more firms are providing it.

Check guarantee and point-of-sale debit cards, on the other hand, show a low percentage of providers and the industry still views those concepts as experimental, according to the report.

Check guarantee is doing well in large-volume services, but there are not enough services available to push it forward, the report noted.

Growth Rate

The study revealed 40% of those polled in January 1979 were using some form of electronic funds transfer, and 50.2% said they were using EFT by the end of April 1980, for a 26% increase.

During the same period, ATMs were rated as being used by 63% of polled users in January 1979 and by 86% in April 1980, for a 23% increase, according to the report.

Firms offering telephone bill payment rose 17% in the survey period, while check guarantee services rose by 3% and use of point-of-sale terminals went unchanged at 11% of those surveyed, according to the report.

The amount of firms using automated clearinghouses rose moderately from 66% to 74%, an 8% increase, the report noted.

On the customer side, acceptance of electronic funds transfer is growing at about 45%, according to the report.

The Electronic Money Council is located at Suite 370, 2501 M St., N.W., Washington, D.C. 20037.

Division to Aid Manufacturers In MRP/Finance

ANDOVER, Mass. – Software International Corp. has created MRP Software International, Inc. to develop, market and implement software systems that combine both manufacturing planning and financial control.

The autonomous division was founded to provide MRP/financial software to manufacturers ranging in size from $2,000,000 and up in annual sales volume.

The low-cost software will be targeted at the some 200,000 smaller companies in the U.S. that are looking to increase their productivity at reasonable costs, according to the parent company.

Headquartered at Elm Square, Andover, Mass. 01810, MRP Software International, Inc. is under the direction of Patrick L. Shannon, president. Ross L. Trenholm is vice-president, sales; Robert T. Galante is senior vice-president, consulting and education, and H. Jeffrey Fencer is vice-president, technical services, the company said.

The new company was created by the acquisition by Software International of AMS, Inc., located in Bellevue, Wash.

Borden Forms Consulting Firm

BALA CYNWYD, Pa. – The LMA Group, Inc. has been formed by R. Barry Borden as a consulting company to provide computer industry firms with management assistance.

The new firm's capabilities will include business planning, product evaluation and financial consulting along with assisting in venture capital acquisition.

LMA can be reached through P.O. Box 677, Bala Cynwyd, Pa. 19004.

Cullinane Changes Name, Address

WELLESLEY, Mass. – Cullinane Corp. name and location changes are effective today.

The new name will be Cullinane Database Systems, Inc.

The new address will be 400 Blue Hill Drive, Westwood, Mass. 02090

AMPEX MAKES PDP 11/34 OUTPERFORM PDP 11/70.

INTERIM REPORTS
11/34
11/70

That's what happened at San Francisco General Hospital Medical Center. With the addition of Ampex Megastore, processing time was reduced to more than 1/3 the time previously required.

Ed Wong, Manager of Data Processing, was running 4,000 patient tests every day, seven days a week. And he needed help.

Ampex Megastore has been in use over one year for Ed Wong, seven days a week, 24 hours a day, without failure. According to Ed, "We put a lot of time and study into our selection of Megastore, so naturally we're very pleased with the results. Our line printer is now running at maximum rate, 600 LPM. Before it was less than half that. During peak load periods, we have experienced no wait time with our 26 terminals."

Dr. Myron Pollycove, M.D., Director, Clinical Laboratory, added, "We had considerable delays in processing information on the CRT screen, in some cases up to one minute. When you consider the number of inquiries from doctors, that kind of response time is just too slow. Of course, that was before we installed Ampex's Megastore."

With non-volatile storage of from ½ megabytes to 4 megabytes. It's made of core. And it's fast. 3 microseconds, max. And there's no latency. Megastore is transparent to minicomputer software, and requires no program changes. Additionally, it's high reliability improves system uptime and availability.

Megastore. The higher performance alternative to fixed head disks on PDP-11 minis that provides exceptional throughput and reliability.

For more information about how you can put Megastore to work performing for your system, call Cal Gosh at 213/640-0150. Or write him at Ampex Memory Products, 200 N. Nash Street, El Segundo, CA 90245. Ed Wong did.

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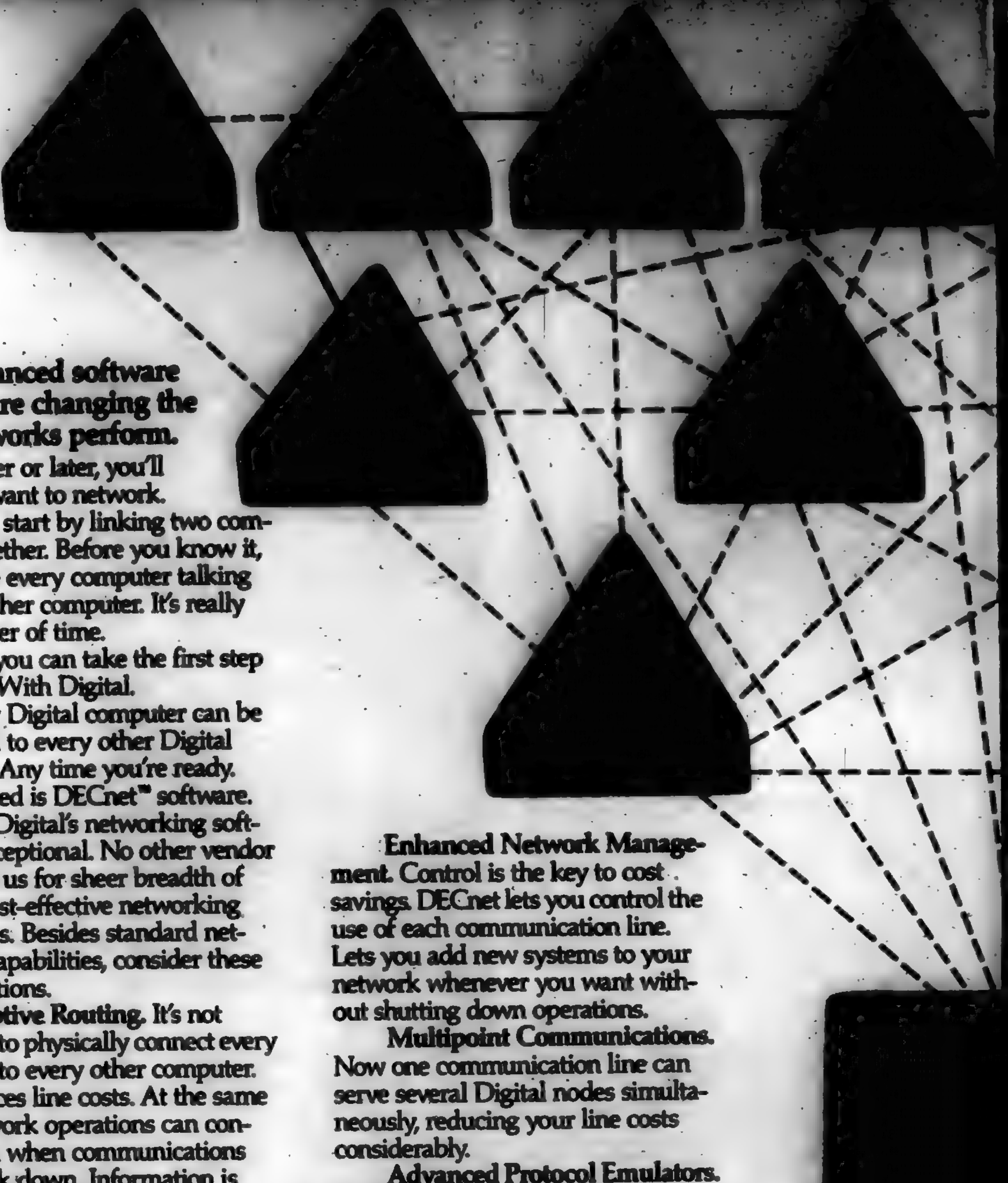

Our advanced software options are changing the way networks perform.

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Every Digital computer can be networked to every other Digital computer. Any time you're ready. All you need is DECnet™ software.

And Digital's networking software is exceptional. No other vendor can match us for sheer breadth of flexible, cost-effective networking alternatives. Besides standard networking capabilities, consider these Digital options.

Adaptive Routing. It's not necessary to physically connect every computer to every other computer. This reduces line costs. At the same time, network operations can continue even when communications links break down. Information is automatically rerouted around problem areas.

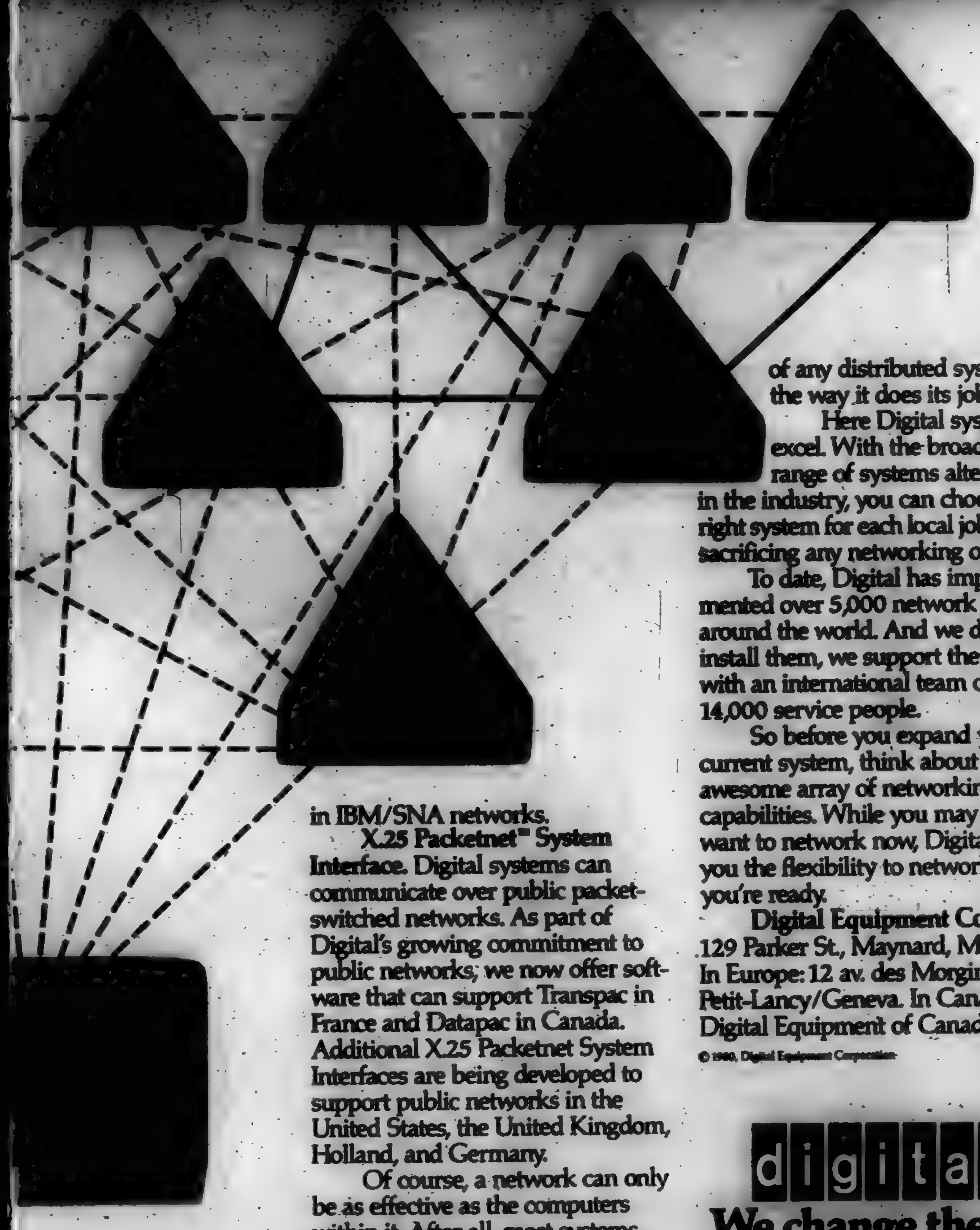
Network Command Terminals. You can control remote computers and remote applications from any location.

Enhanced Network Management. Control is the key to cost savings. DECnet lets you control the use of each communication line. Lets you add new systems to your network whenever you want without shutting down operations.

Multipoint Communications. Now one communication line can serve several Digital nodes simultaneously, reducing your line costs considerably.

Advanced Protocol Emulators. In addition to supporting Batch BISYNC, Interactive BISYNC, and other standard mainframe communications protocols, Digital offers an advanced SNA protocol emulator, so Digital systems can participate

like Digital.



in IBM/SNA networks.

X.25 Packetnet™ System Interface. Digital systems can communicate over public packet-switched networks. As part of Digital's growing commitment to public networks, we now offer software that can support Transpac in France and Datapac in Canada. Additional X.25 Packetnet System Interfaces are being developed to support public networks in the United States, the United Kingdom, Holland, and Germany.

Of course, a network can only be as effective as the computers within it. After all, most systems only use their networking capability 20 percent of the time. The real test of any distributed system is the way it does its job.

Here Digital systems excel. With the broadest range of systems alternatives in the industry, you can choose the right system for each local job, without sacrificing any networking options.

To date, Digital has implemented over 5,000 network nodes around the world. And we don't just install them, we support them, too, with an international team of over 14,000 service people.

So before you expand your current system, think about Digital's awesome array of networking capabilities. While you may not want to network now, Digital gives you the flexibility to network when you're ready.

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Local Net Market Explosion Predicted for '80s, '90s

NORWALK, Conn. – The market for local networks and short-range communications equipment will undergo rapid expansion in the mid-1980s and grow to a $3.2 billion market by 1990, according to a study by International Resource Development, Inc. (IRD).

The 124-page report predicted that local networks will be in wide use by 1990 and reach "explosive proportions" because of factors such as the increasing trend toward distributed processing, the plunging cost of minicomputers and the need to link DP equipment to other equipment, data bases, peripherals, satellite systems and long-distance networks.

The report, "Local Networks and Short-Range Communications," includes eight-year forecasts – from 1982 to 1990 – of the markets for local networks and short-range communications fiber optics, baseband and broadband coaxial.

Also included are a state-of-the-art technology overview, industry structure, a review of active companies and the results of a user market research survey.

The report is available for $985 from the firm at 30 High St., Norwalk, Conn. 06851.

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Alanthus 3033 Leases Up By 100% in Third Quarter

WESTPORT, Conn. – Alanthus Computer Corp. reported that in the third quarter of 1980, it arranged leases for IBM 3033 computers valued at approximately $40 million.

That was an increase of 100% over the second quarter, a company spokesman said.

The equipment was financed, delivered and installed for corporate end users that included Eastern Airlines, Insurance Systems of America, Exxon, CTI and General Motors.

"Leasing continued to grow in popularity as a computer acquisition strategy.

"Now that the H series has been introduced, we expect to see the logjam break as users order the 3081 or 3033S or purchase leasebacks on 3000's on short-term rental from IBM or choose used equipment," Jerry Minsky, president of Alanthus, said.

M/A-COM, Alanthus Sign

BURLINGTON, Mass. – Continuing its acquisition strategy, M/A-COM, Inc. recently reached an agreement in principle with U.T.G., Inc. of New York for the purchase of all the outstanding capital stock of Alanthus Data Communications Corp.

The purchase of Alanthus will be accomplished through cash and notes. The specific terms of the agreement were not disclosed.

A privately held firm, Alanthus markets a range of data communications and computer terminal products as well as software and support services. It has a customer base of about 2,000 with more than 20,000 units installed.

Okidata Winchester Line Sold To Ohio Scientific Memory

MOUNT LAUREL, N.J. – Okidata Corp. has sold its Winchester-disk product line to Ohio Scientific Memory Products, a wholly owned subsidiary of Ohio Scientific, Inc., which was recently purchased by M/A-COM, Inc.

The sale of Okidata's disk line was accomplished to allow greater concentration on the firm's printer products, according to Okidata's president, Bernard Herman.

Continued Manufacture

Ohio Scientific, which has been installing Okidata disk drives and printers in its systems since 1977, will continue to manufacture the 14-in. Winchester disk for its own use and for sale on the OEM market. The company has retained all of the Okidata employees in the manufacturing facility in Santa Barbara, Calif.

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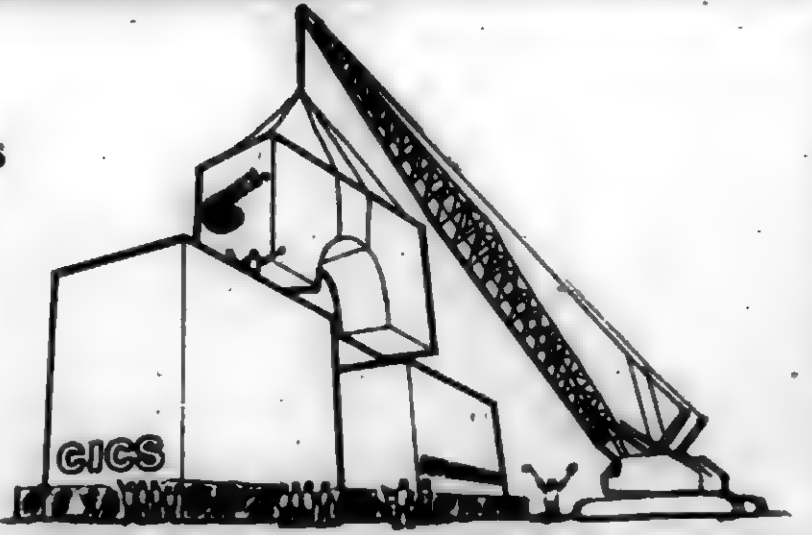

In minimum time: Central Software eliminates the complex, time-consuming programming usually associated with CICS applications. Repetitive routines are called forth by concise COBOL, PL1, or Assembly commands.

At minimum cost: The Central Software package comes with a reasonable price tag. And that's just the beginning. You'll be using less specialized programmers and putting more applications up faster.

Using minimum space: The smaller, more efficient applications made possible by Central Software make optimal use of machine core—and machine time.

With total data security: "Before image" processing assures data integrity during application usage. Added to controls inherent to CICS, that's security.

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Expansions

Data Packaging Corp. has announced plans to establish a $12 million plant in Mullingar in the county of Westmeath, Ireland.

Hewlett-Packard Co. has entered into a conditional purchase agreement to acquire 263 acres of land in Rohnet Park, Calif., for a future electronics plant. The agreement is contingent on zoning and utility considerations.

Information Builders, Inc., developers of Focus, has opened a new Midwest office at 2809 Butterfield Road, Oak Brook, Ill., a suburb of Chicago. Sales and support coverage will be provided to midwest prospects and clients from the new site.

NEC Electron, Inc., a subsidiary of Nippon Electric Co., has doubled its office and warehouse space in a move to new quarters at 252 Humboldt Ct., Sunnyvale, Calif.

Alpha Micro has announced the addition of a 12,500 sq ft facility located at 1881 Langley Ave. in Irvine, Calif.

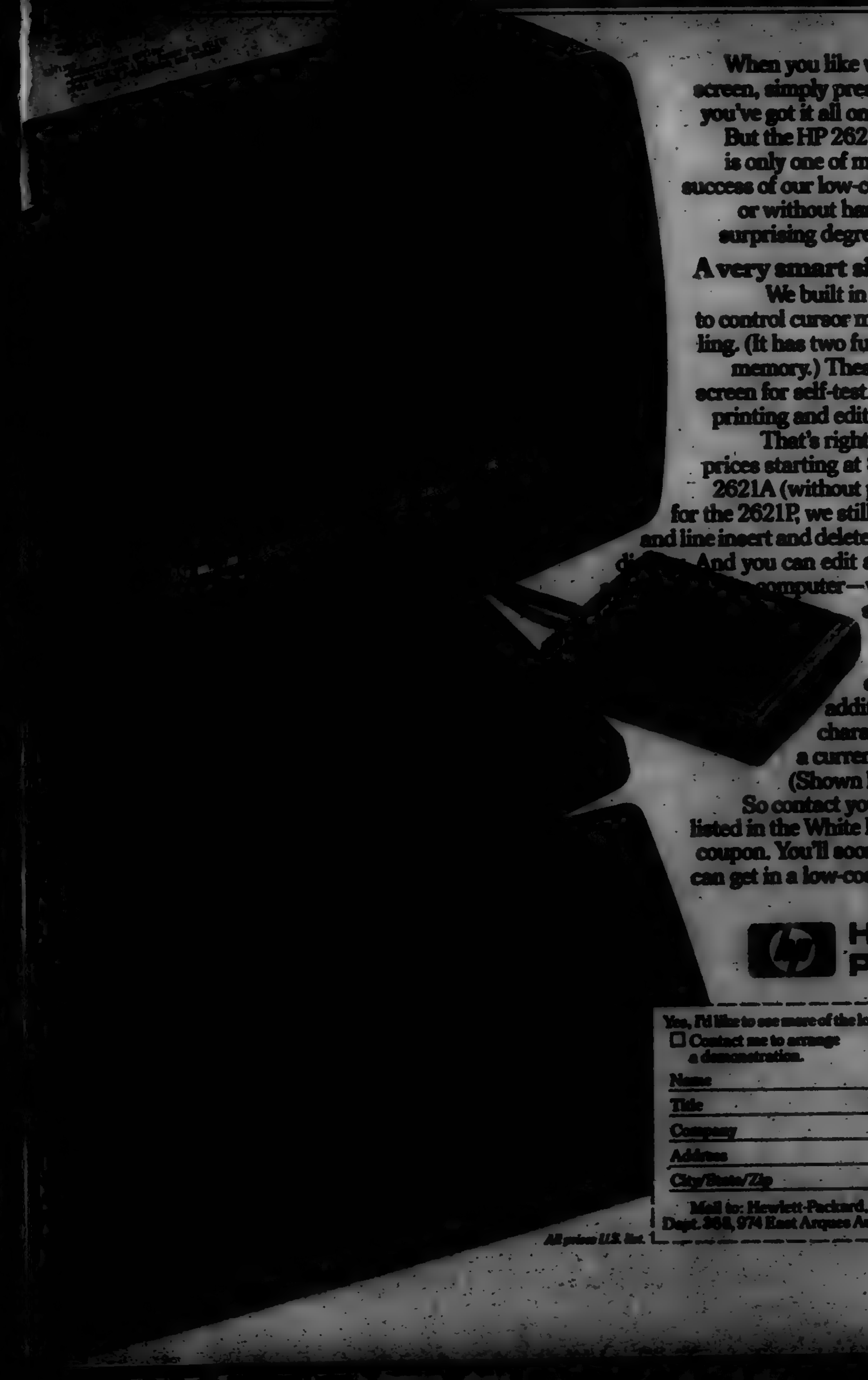
Data General Corp. has made plans to conduct major field engineering operations in facilities under construction in Milford, Mass.

Accu-Sort Systems, Inc. has added a West Coast office to its operations. It is located in Palos Verdes, Calif.

Input Business Machines, Inc. has relocated to bigger facilities at 1370 Piccard Drive, Rockville, Md. 20850.

Prime Computer, Inc. has established four sales offices in the following locations: Albuquerque, N.M.; Milwaukee, Wis.; Madrid, Spain; and Lagos, Nigeria.

see is what you get.



When you like what you see on the screen, simply press a key and presto! you've got it all on paper.

But the HP 2621P's built-in printer is only one of many reasons for the success of our low-cost terminals. With or without hard copy, they offer a surprising degree of sophistication.

A very smart simple terminal.

We built in eight function keys to control cursor movement and scrolling. (It has two full pages of scrolling memory.) These are labeled on the screen for self-test, soft configuration, printing and editing.

That's right: editing. Even with prices starting at $1,495 for the basic 2621A (without printer) and $2,650 for the 2621P, we still included character and line insert and delete, clear line and clear di. And you can edit a line of data before computer—without writing any system software.

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U.S. Delegation Sent to China For Micro Contacts, Not Contracts

By Deborah Wise
CW Staff

SAN FRANCISCO – Members of a recent microcomputer and personal computing mission to China went there to "assess the market and develop contacts rather than contracts," said John Craig, publisher of *Infoworld* and leader of the delegation.

"It was simply an invitation to American microcomputer manufacturers of both hardware and software to go to China and present their products," Craig said.

Craig said the response from the Chinese was "very enthusiastic," adding that "four out of five companies engaged in serious negotiations regarding joint ventures and technical transfers."

The delegation was comprised of seven industry representatives as well as Craig and two members of California Technical Delegations, who acted as liaisons between Chinese ministries and the mission.

In exchange for American technological expertise, the Chinese may be able to offer inexpensive labor. However, Craig said, "there was concern expressed by some members of the delegation over the quality of the work we had seen. It would not be adequate by American standards."

GIT System

The computers that the delegation were shown Craig called "vintage 1965-1970 American standard."

But they did see a Chinese-developed voice recognition system linked to an Apple Computer, Inc. microcomputer that could display the names of 50 Chinese cities in Chinese characters.

"One of the most exciting products we took over was a Global Integration Technology (GIT) system which displays Chinese characters on a terminal screen," Craig said. It takes 3.2 keystrokes to generate one character out of a possible 40,000, using an Ascii keyboard.

While in China, the delegates visited Tsing-hua University in Peking, which is going to install a California Computer Systems Z80-based CP/M system with dual disk drives and printer. CCS' president Daniel Burgoon was a member of the mission.

Allan Taylor of Ohio Scientific was shown a Chinese-built minicomputer, the DJS 140, that uses core memory at Tsing-hua University, Peking.

California Computer Systems, Inc., Intelligent Systems Corp., Global Integration Technology, Inc., Ohio Scientific, Inc. and Microsoft, Inc. all sent representatives on the two-week trip.

Nickels & Dimes

Four-Phase Systems, Inc. announced a restructuring of its bank credit facilities used to finance accounts receivable and the leasing of equipment to Four-Phase customers. The $100 million commitment provides for reduced interest rates, a revolving loan period through March 1983 and final maturity on March 31, 1988.

$$$

The board of directors at Tymshare, Inc. approved a two-for-one stock split effective Dec. 1.

$$$

Wang Laboratories, Inc. has filed a registration statement with the Securities and Exchange Commission for a proposed issue of $100 million of convertible subordinated debentures due in 2005.

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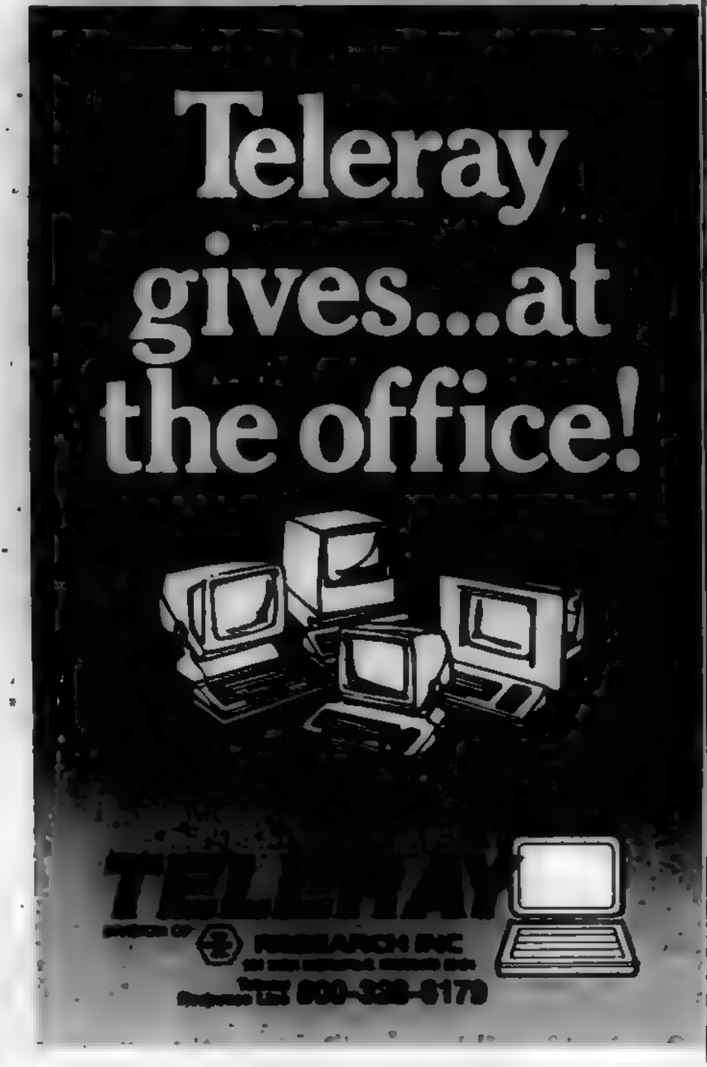
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Westwood
DATA COMMUNICATIONS EQUIPMENT

Orders & Installations

Sanders Associates, Inc. has received an $18 million order from the U.S. government for a major production program to manufacture mobile signal exploitation systems.

Hazeltine Corp. has received a $1.2 million U.S. Navy contract for the development of a digitally programmable communications buoy-buoy interface unit for use in submarine communications via satellite.

Anacomp, Inc. has signed an agreement with the First National Bank of Decatur, Ill., to establish a processing center to service that and other area banks.

Duquesne University of Pittsburgh, Pa., has ordered a large-scale computer system from Univac, which will be used for faculty research, student instruction and a variety of administrative applications.

Computer Sciences Corp. has received a $22.2 million government-approved subcontract from Univac on the U.S. Air Force's base-level data automation program Phase IV.

First Virginia Banks, Inc. has placed an order with Docutel Corp. for some $1.3 million of automated teller machines to be put into service at the holding company's 21 member banks throughout the state.

Versitron, Inc. has recently installed several fiber-optic links in a government building in Washington, D.C. The installed equipment included Versitron's standard fiber-optic modem, the FOM-3.

EG&G Washington Analytical Services Center has received an $18.4 million three-year contract from the U.S. Naval Sea Systems Command to provide system engineering and integrated support to the Submarine Advanced Combat System development program.

The New York State Division of Equalization and Assessment has placed a $10 million order with Burroughs Corp. for four large-scale Burroughs computers.

Mohawk Data Sciences has received a $472,000 order for its Series 21 and System 2400 information processing systems from Jobbers Warehouse Service, Inc.

A $1 million International Banking Information System contract has gone to Tymshare, Inc. for that company's totally integrated management information system.

Contracts

Univac Defense Systems has been awarded a $15 million contract by the Naval Sea Systems Command, Washington, D.C., for the development of the AN/UYK-43 computer system, which is expected to become the Navy's next generation standard large-scale shipboard computer.

NCR Corp. has announced that its Data Pathing Division has won a $26 million contract from the U.S. Navy. The agreement involves source data entry systems in eight naval ordinance plants, and spans nine years.

Anacomp, Inc. has signed a $300,000 contract with Mid-Continental Bancorporation, Inc. for the installation of Anacomp's integrated, on-line banking software system, CI/RF.

Diebold Files Suit Against Publisher

CANTON, Ohio – Diebold, Inc. has filed a libel suit totaling at least $11 million against HSN Consultants, Inc., publishers of *The Nilson Report*, and against H. Spencer Nilson, both of Santa Monica, Calif.

The suit seeks damages resulting from an article that appeared in *The Nilson Report* issue 247, Nov., 1980. The article alleged that Diebold would be purchased by Philips and "further contained misleading statements regarding Diebold's relationship with Bunker Ramo, with which the company has an ATM marketing agreement in the U.S.," Diebold said.

The libel suit seeks $1 million in general damages, $10 million in punitive and exemplary damages, plus all costs and attorney's fees.

AM Jacquard Systems has received a $500,000 contract from General Electric Co.'s Nuclear Energy Group for a variety of stand-alone and shared-logic word processing systems.

Sanders Associates, Inc. has been awarded a contract in excess of $300,000 from Hughes Aircraft Co. for computerized graphic display systems that will provide U.S. Navy F/A-188 weapons instructors with three-dimensional representations of opposing aircraft during air-to-air "dogfight" engagements.

California Microwave, Inc. has received contracts totaling $6.9 million from the Associated Press and World Communications, Inc., for satellite communications earth stations.

University Computing Co., a Wyly Corp. subsidiary, has signed a $4.4 million contract with Intercontinental Medical Statistics, Inc. of London, to provide a massive medical and pharmaceutical data base.

List Comprises Government Studies

WASHINGTON, D.C. – Washington Researchers is offering lists of government publications, reports and marketing surveys.

Claiming many government studies are free or are offered for a nominal charge, the research firm sells a full list of government offerings for $75.

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	55 CPS KSR	LETTER QUALITY	3375	135
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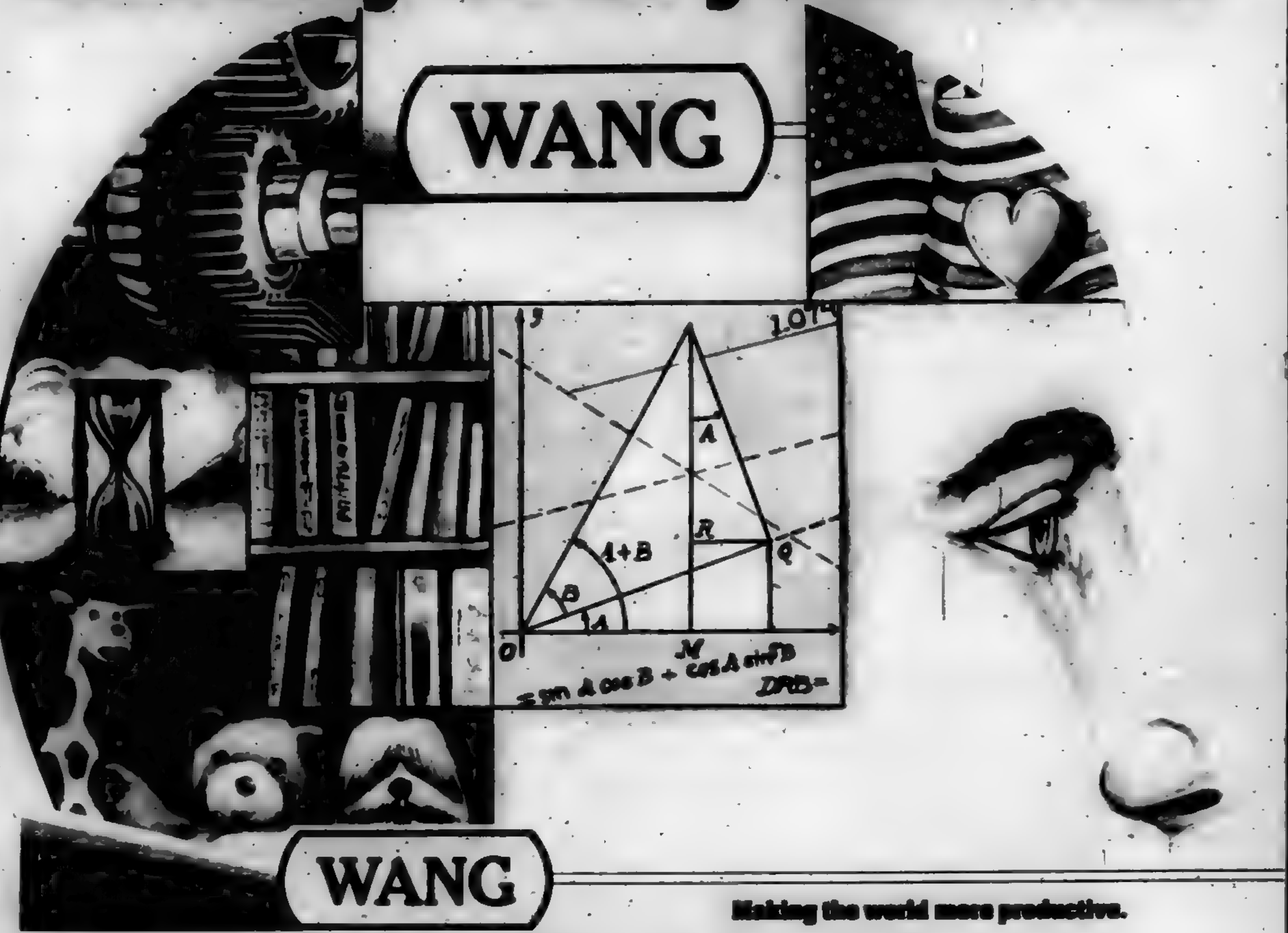

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Challenging opportunity to maintain software for Honeywell Level 6 mini using Mod 600 software This is a state-of-the-art company with everything to offer. $29,000

PROGRAMMER/ANALYST

Self-motivated and energetic candidates can do their thing by using Series 1 & EDX expertise This is that favor you always wanted to do for yourself. Low $30's

Tom Thorsted or
Nels Udell
ROBERT HALF
of Wisconsin, Inc.
777 E. Wisconsin Avenue
Milwaukee WI 53202
(414) 271-HALF (271-4253)

PHOENIX

SOFTWARE SPECIALIST

Phoenix is the site of the centralized development activities of the world leader in the development of large scale SNA networking. Rapid growth in the communications [illegible] has created the need for specialists in NCP, VTAM, CICS, VM, MVS and Series 1 RPS. $35,000

Roc Rogers
ROBERT HALF
of Phoenix, Inc.
3060 N. Central, Ste 1904
Phoenix, AZ 85012
(602) 264-6488

HARTFORD

TRAIN IN CICS

COBOL Prog Analysts. Exclusive Hartford area situation at premier firm. If you have OS exp for at least 2 yrs., our client will train you in CICS. Challenging & unique oppty.
Salary to $24,000

INSURANCE PROG ANALYST

Outstanding Conn based corp seeks talented COBOL prog to join IMS develop staff. Will train in IMS T P & gain exposure to distrib processing. Design resp. Salary to $25,000

SYST DEV MGR

Conn industrial seeks mgr in direct mfg. acctg systems. Current mgmt resp's req'd with any hardware bkgrd.
Salary to $27,000

CICS SPECS

Conn oppty's for CICS software trained indiv's to provide tech planning for lg corp on-line systems dev project.
Salaries to $25,000

PROJECT MGRS

New Eng insurer expanding mgmt staff! Indiv's with prop-casualty or group ins dev bkgrd qualify for positions with starting salaries to $36,000

HIGH TECH PLANNING

Conn multi-div corp with lg IBM MVS installations seeks indiv to direct software planning for current, future req's. Bkgrd in IBM sys req'd.
Salary to $35,000

PROG ANALYST

Major expansion of premier Central CT corp offers genuine dev oppty & rapid growth. IBM OS or DOS bkgrd. COBOL, JCL, CMS/TSO Min 2 yrs exp. Full relocation. Bonus program.
Salary to $24,000

Stan Darfee
Paul Meissner
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

BUFFALO

SYSTEMS ANALYST

Western NY State bank holding co needs NCR/NEAT 3 bkgrd. Intimate shop requires coding, design, development & implementation of all fin banking sys. COBOL helpful Must have client/user interface & be able to work without supv. $26,000

SYSTEMS & PROG SUPV

Start up pos. Profitable div of Fortune 200 mfg co implementing data ctr from scratch. Must be shirtsleeve mgr familiar with T/P, operations + design & implementation. Total resp for establishing bus sys. Implementing IBM 4331. $25,000

SYSTEMS ANALYST

Mfg co located in Western NY expanding DP staff Bkgrd must include prod control, MRP, invty systems design & implementation Pres converting to IBM 4331. Resp include mfg sys support for all operating div's. $28,000

TECH ANALYST

Back-up pos to proj mgr in technical sys area. State-of-the-art environ. Qualifications should include IMS DB/DC, CICS, OS SYSGENS. Excellent visibility. $28,000

ANALYST PROG

Min 2 yrs fin sys bkgrd. On-line OS/VSI installation needs prog anal with COBOL prog. IMS helpful. Pos rpts directly to MIS Mgr. $25,000

Pam Siegel
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

NEW YORK

SR SYSTEMS ANALYST

Congenial working environment and OUTSTANDING benefits in this growth oriented position. 3+ years analysis and design with OS 370 and COBOL programming experience. Environment is on-line 370/158 OS. Supervise development project. $28,000

RPG II SYSTEM 34

Potential for significant growth with this industry leader. 2+ years RPG II programming and SYSTEM 34 experience. Aid in development of the new COMMODITY system. Highly professional environment with excellent benefits. $25,000

DEC 11 BASIC

Rapid advancement opportunity for an up-and-coming computer pro. 2+ years BASIC PLUS or COBOL programming and RSTS-E exp. Company converting from IBM to DEC. Outstanding benefits include 30 days vacation Career climbing opportunity. $27,000

LEARN CICS $$$

If you are in yesterday's environment this may be the opportunity you have been looking for. Many opportunities exist in this highly STATE-OF-ART OS environment to aid in development and implementation of long term projects. 1+ years COBOL programming with good interpersonal skills. Outstanding benefits. $26,000

4341 COBOL

Frequent contact with upper level management during conversion to 4341 (Jan. 81). 2+ years COBOL programming with CICS exp. Responsibilities include INVENTORY and FINANCIAL applications in very dynamic data center. Superior opportunity. $30,000

Marty Amato
ROBERT HALF
of New York
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

MINNEAPOLIS/ ST. PAUL

VICE PRESIDENT

Small co w/good growth rate and excellent market position is looking to add an entrepreneur to their staff at the VP level. Individual will be resp for day-to-day operations, entailing software dvml and service bureau activities. Must have design exp, pref w/mini gear. Minn location.
Salary to Mid-30's

SOFTWARE PROD MGR

EXCLUSIVE LISTING! Rpt directly to Pres of this very fast growing service organization. You will be resp for their major product line, as well as, corporate decision making. Must be fast-tracker, pref w/an MBA. Knowledge of mini gear and software dvml a must. Fin'l bkgd must be very strong.
Salary to $50,000

DATA BASE ADM

Excellent opty to join prof'l staff w/in a rebuilding large IBM center. Highly visible position [illegible] who has solid IMS/DB exp in large center env. Will supervise DB analyst staff and direct all data base usage. Retail bkgd a plus. Salary to Mid-$40's

Ron Dijkstra
or
Kathi Grant
ROBERT HALF
of Minneapolis/St. Paul, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

LOUISVILLE

D P MANAGER

Several small oil companies are seeking experienced System 34 on-line individuals with 2-3 years RPG and screen designing is helpful. Degree is preferred but not required. Relocation and benefits are all paid. Salary to $25,000

UNIVAC 1100

Many opportunities in the Southeast exist for programmers, systems analysts. Operations Managers, systems programmers and tech support managers. Exec 8, DMS 1100, TIPS experience helpful. Call me collect today.
Salaries range from $25,000 to $50,000

PROGRAMMERS

Louisville based firms are looking for COBOL and ASSEMBLER programmers If your background is Banking, Mfg, Retail or Hospital and have 1 or more years working experience you can advance your career in OS/VS, MVS, DOS/OS, CICS. With degree salary to $28,000 With no degree salary to $24,000

Tom Williams
ROBERT HALF
of Louisville
680 South Fourth St.
Louisville, KY 40202
(502) 586-1751

SALT LAKE CITY

DP MANAGER

Wyoming division of National Corporation seeks manager with degree or 5+ years experience in System 3. $30,000

ROBERT HALF
of Salt Lake City
50 So. Main
Salt Lake City, UT 84144
(801) 364-5455

DAYTON

SOFTWARE CONSULTANT

Are you currently a systems programmer working in any of these areas: MVS, ACP, NCP, IMS, CICS internals? This large Midwest data center offers you the oppty to use your systems bkgrd as an internal consultant. Join this technically current system team where the emphasis is on systems expertise! Co will interview by phone. Benefits are incomparable! Fee paid. $40,000

MFG SYS ANALYSTS

Are you exp'd with mfg systems? This world acclaimed mfg organization has several oppty's available in areas of MRP, ORDER PROC, BOMP, etc. Explore your growth potential with an organization known for its career paths, salary progression, & unmatched benefits. Degree & prog bkgrd preferred. $35,000

ROBERT HALF
of Dayton, Inc.
One First National Plaza
Dayton, OH 45402
(513) 224-0660

CHICAGO

EDP AUDIT

A major insurance company needs a thorough, conscientious pro with 5+ yrs experience. Be the right hand to the director of internal audit. Some programming knowledge needed. $30,000

Bob Hendrik
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) 782-6930

ROBERT HALF

SAN ANTONIO

SYSTEMS PROGRAMMER MANAGER

Degree with exp IBM 370/DOS/CICS/COBOL/RPG II a MUST. Any type business background is acceptable, financial acctg a plus. Hardware evaluation expertise a real factor. Good benefits. [illegible]

PROGRAMMER

RPG II, Small IBM Systems experience a MUST. Develop design exposure a PLUS. Good growth/earnings potential. [illegible] + DOE

PROGRAMMER ANALYST

Degree preferred, 3 plus years in Assembler a MUST. Financial exposure with good basic skills a PLUS. Good fast advancement for qualified applicant. [illegible]

PROGRAMMER

Degree preferred, 2 plus years in IBM/COBOL/VSAM experience a MUST. CICS exposure On-line a PLUS. Fast expanding dept of shop needs good young people. [illegible] + DOE

Bob [illegible]
ROBERT HALF
of San Antonio, Inc.
First Nat'l Bank Bldg. [illegible]
San Antonio, TX [illegible]
(512) [illegible]

KANSAS CITY

MGR OF RETAIL SYS

Due to retirement, local distribution has opening for manager of retail systems. This individual will do all the planning for this large IBM 370/158 OS/VS shop. Experience with retail systems and point of sale a must. OCL experience preferred. Salary to [illegible]

SR ANALYST

Take charge of major new development project in state of the art MVS shop. All new design. All on-line. Have complete project control from start to finish. Exceptional visibility to top level corporate VP's. Proven track record of taking project into production required. Excellent benefits. Salary to [illegible]

SR SYSTEMS PROGRAMMER

Suburban state of the art MVS shop expansion requires the addition of a Sr Systems Program. Person will have complete responsibility for TSO, SPF, and JESS with backup for MVS. Additionally will serve as interface with programming staff for solving programming problems. Excellent career path with outstanding technical education provided. Salary to [illegible]

PROG/ANALYST

Prestigious K C firms offer the chance of a lifetime. One year programming experience on any equipment with a college degree qualifies for this state of the art staff expansion. Extension in-house training will be provided in MVS, COBOL, CICS, Data Base, and systems design. Excellent long term career potential. Salary to [illegible]

PROGRAMMER

State of the Art System 34 shop seeks knowledgeable RPG II programmer/analyst with solid OCL. Excellent advancement potential with a chance to go through a conversion to System 38 in January 81. Salary to [illegible]

George [illegible]
ROBERT HALF
of Kansas City, Inc.
127 W. 10th
Kansas City, MO 64105
(816) [illegible]

ST. LOUIS

OPERATIONS MANAGER

Excellent opportunity for DP "Pro" with strong mgmt skills, degree (4 yrs), working knowledge of COBOL and in IBM DOS/VSE environment. Responsibilities include supervision of operations and Data Entry personnel, and will interface with top mgmt, technicians and users. Stable company with promising future. To [illegible]

PROGRAMMER/ANALYSTS

At least 1 yr COBOL in a DOS/VS environment, for state-of-the-art 4300 DOS/VSE, CICS shop. These positions have excellent growth potential in a company that is committed to DP as an integral part of its operations. We know the company well — we placed the MIS Manager! To [illegible]

MANAGER, FINANCIAL SYS

At least 10 yrs DP exp. (Degree preferred), 4 yrs managing large projects, qualifies you for this international firm headquartered in the Southeast. Will manage a staff of 20 in a 370/OS shop with plans for a 3033. We placed the MIS Director, Data Center Manager & others, who are excited about this company! To High [illegible]

EDP DEPARTMENT MANAGER

At least 15 yrs DP exp with exposure to mfg & financial applications, strong management skills, for emerging DP Dept of division of top St. Louis company. IBM 370 background, CICS preferred. Degree required. EXCEPTIONAL OPPORTUNITY! To Mid [illegible]

Charles [illegible]
ROBERT HALF
of St. Louis, Inc.
[illegible] Forsyth Blvd.
St. Louis, MO [illegible]
(314) 727-[illegible]

SOUTHERN CALIFORNIA

LOS ANGELES

SYSTEMS PROGRAMMER

Requires 2+ yrs exper in ASSY & FORTRAN, some exp at operating system level Programming and some solid business applications. Our client utilizes DG ECLIPSE with AOS. To [illegible]

Duncan [illegible]
ROBERT HALF
of Los Angeles
[illegible] Wilshire, Suite [illegible]
Los Angeles, CA [illegible]
(213) [illegible]

ORANGE COUNTY

PROGRAMMER ANALYST

Financial applications. You would get involved with major International Orange City based mfr. Heavy development and design background best. No manufacturing. To [illegible]

Dave [illegible]
ROBERT HALF
of Orange County
[illegible] N. Broadway, [illegible]
Santa Ana, CA [illegible]
(714) [illegible]

COMMERCE

SYSTEMS ANALYST

Explosive growth firm in oil related field. Know COBOL but not a heavy programming post. Management potential is the key. [illegible]

Bob Dock
ROBERT HALF
of Los Angeles
[illegible] E. Telegraph Road
Commerce, CA [illegible]
(213) 721-[illegible]

HOUSTON

Listed below are only a few of the career move opportunities I have available for qualified people.

SYSTEMS SOFTWARE

Evaluate, recommend, develop or acquire and install systems software in an IBM OS/MVS environment. Assembler language a must, CICS/VS, DMS/VS, PA-11 are pluses. To [illegible]

SYSTEMS ANALYSTS

Solid business/commercial analysis and implementation exp on IBM 370/OS hardware. Degree required plus 5 yrs DP exp. No programming required but knowledge of COBOL is required. To [illegible] +

BANKING APPLICATIONS

Programmers, Prog Analysts, Systems Analysts and Project Leaders — Loans, Trust, Deposits, ATM's, financial systems. IBM 370/OS, COBOL and/or Assembler language. IMS a plus. To [illegible] +

DOS PROG/ANALYST

Business and commercial applications exp using COBOL on DOS/VSE equipment. Good benefits including dental and discount on new home. To [illegible]

OS PROG/ANALYST

COBOL and strong knowledge of personnel/payroll systems plus other acct'g systems is needed for large Fortune 500 energy co. IMS a plus. To [illegible] +

DATA BASE ANALYST

IBM 370/MVS and IMS environment. Must have good analytical ability. Will evaluate both purchased and in-house developed software packages and perform data base tuning and space management. To [illegible] +

PLANNING SPECIALIST

World-wide consultant for Fortune 500 energy co. Locations on types of hardware and software to be installed. Must know network planning and have experience with NJE, ACF, VTAM, TCAM, IMS/CICS, TOTAL or RAMIS. To [illegible] +

Jim Fleming
ROBERT HALF
of Houston, Inc.
[illegible] N. Post Oak Road, [illegible]
Houston, TX 77024
(713) [illegible]

PORTLAND

SR PROGRAMMER ANALYST(S)

Long standing Portland firm seeks 3-4 yrs COBOL and/or ASSEMBLER. Prefer large scale IBM, Burroughs or Honeywell. FLEX-TIME. Strong benefit package. Salary [illegible]

OPER ANALYST

Major organization seeks 3-5 yrs high technical expr in use of JCL, Proc & thorough knowledge of IBM utilities + TSO will provide technical support to production control & computer operations. Must have strong analytical communications + organizational skills. Salary $17-22,000

PROG/ANALYST

Progressive co seeks 3-5 yrs expr in financial systems on IBM 370-OS on-line [illegible] installation. Must be strong in COBOL and/or ASSY + JCL. Will analyze, estimate, code & document programs & provide technical direction to staff. Salary [illegible]

Bob Clemens
ROBERT HALF
of Portland, Inc.
1 S.W. Columbia
Portland, OR [illegible]
(503) [illegible]

NORTHERN CALIFORNIA

PALO ALTO SAN JOSE SAN FRANCISCO

D P MANAGER

System 34, RPG II, Multiple Openings. To [illegible]

SR PROGRAMMER ANALYST

3+ yrs. RPG II, System 34 on-line. To [illegible]

TECHNICAL SERVICES MGR

Prior Supervision and Systems/Operations exp. Hardware Planning. To [illegible]

JR SYSTEMS PROGRAMMER

Assembler, COBOL, IBM environment. To [illegible]

PROGRAMMER

PL 1, IBM O S. To [illegible]

OPERATOR

370/168 DOS/VS, VS1, VM. To [illegible]

SYSTEMS ANALYST

COBOL, IBM 370/OS. Financial Mfgd. Multiple Openings. To [illegible]

PROGRAMMING SUPERVISOR

Prefer HP 3000, COBOL or FORTRAN. To [illegible]

PROJECT LEADER

COBOL, B-4800, DMS II, GEMCOS. To [illegible]

SUPERVISOR DATA ENTRY

2 years mini's or Data Entry. IBM environment. Other Positions available in DATA BASE ADMINISTRATION, EDP AUDITING, and OPERATIONS.

Client Companies pay interviewing and relocation expenses. Call us collect today.

ROBERT HALF
of Northern California, Inc.
Personnel Service

Jim [illegible]
or
[illegible]

2 Palo Alto Sq., [illegible]
Palo Alto, CA [illegible]
(415) [illegible]
or
675 N. First St., [illegible]
San Jose, CA [illegible]
(408) [illegible]

Jerry Anderson
Bob [illegible]
or
Linda Strickland
111 Pine St., [illegible]
San Francisco, CA 94111
(415) [illegible]

DENVER

DATA BASE

Major financial organization with extensive new software projects seeks an IMS data base analyst. Must have knowledge of IMS internals, utilities, and backup procedures. Excellent ground floor opportunity on a growing technical support staff. Start [illegible] range

PROGRAMMER/ANALYST

Denver based oil and gas firm is currently developing a new on-line accounting system. They need a programmer analyst with at least 2 yrs COBOL on IBM 370 OS hardware. Will be able to follow from design through implementation. Exciting career development. Start [illegible] range

ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO [illegible]
(303) [illegible]

ATLANTA

SYSTEM PROGRAMMER

Dynamic publishing firm seeks person with desire for long term growth. DOS/VSE/CICS and strong assembly language. Possess good communication skills and professional attitude. [illegible]

SYSTEMS ANALYST

Progressive State-of-the-Art shop creating new positions due to growth. Prefer: COBOL, OS or MVS, financial appls. Excellent opportunity for advancement to management levels. 3081 on order. Large installation with small shop atmosphere. [illegible]

MIS DIRECTOR

Start-up operation. Qualifications: Degree, supervisory experience including budget planning, large mainframe, and manufacturing exp. Will supervise approx nine managers. 10% travel involved. This is top slot for leader in its industry. [illegible]

Ray Jennings
ROBERT HALF
of Atlanta, Inc.
[illegible] Peachtree Rd. N.E.
Atlanta, GA [illegible]
(404) [illegible]

SEATTLE

Rapid-growth downtown firm needs several programmer analysts for new on-line development projects. Prefer 3+ years COBOL using DL/I CICS. To [illegible]

SEATTLE D P

Shops are eager to interview experienced IBM COBOL & RPG II programmer/analysts. If you have 1+ years business/financial experience and plan to visit here, call me collect or send a resume ASAP.

Salary ranges are [illegible]

Ray Magill
1201-6th Avenue
Suite [illegible]
Seattle, WA [illegible]
(206) [illegible]

DALLAS

UNIVAC 1100

New Univac shop needs sharp programmers to take key role in development of new systems. Requires 1100 ECL, COBOL and at least two years experience. To [illegible]

PROGRAMMER/ANALYST

Shop developing new systems. Need sharp programmers and analysts. Excellent career advancement. Requires two years IBM, COBOL and/or PL-1. To [illegible]

PROGRAMMER/ANALYST

Shop going 4300 Series and adding CICS. Needs strong CICS technician to lead migration. Requires 3 years IBM, OS, COBOL and one year CICS experience. To [illegible]

SYSTEMS PROGRAMMERS

VM, OS and DOS Systems Programmers needed for various assignments. To [illegible]

John [illegible]
ROBERT HALF
of Dallas, Inc.
Two NorthPark East, [illegible]
Dallas, TX [illegible]
(214) [illegible]

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Ask for our latest Salary Survey.

FT. WORTH

OIL COMPANY
SYSTEMS ANALYST

On-line background, OS/COBOL in large IBM shop qualifies you for expanding client. Involvement includes analysis, design, and programming in an IMS environment. Full rate paid, handsome benefits . . . Salary to [illegible]

Suite 911 One Summit Ave
Ft Worth TX 76102 (817)336-4565

DATA PROCESSING CAREERS inc

KANSAS CITY

MVS SOFTWARE

KC company is seeking a software professional with experience in MVS/JES2 & TSO. Outstanding benefits. Suburban location. Salary in the [illegible]

6405 Metcalf Shawnee Mission
Kansas 66202 (913) 236-6266

DATA PROCESSING CAREERS inc

TULSA

MVS INTERNALS

Major energy firm requires an experienced MVS Systems Programmer for support of its multiple mainframe IBM installation. Ideal living and working conditions, salary to Mid [illegible]

2624 E 21st St Tulsa OK 74114
(918) 747-3621

DATA PROCESSING CAREERS inc

DALLAS

NEW INSTALLATION

Int'l co. moving hdqtrs. to our city needs to re-staff. IBM OS/MVS, COBOL, CICS, TCAM shop. High profile required for all positions. Prog, P/A, Proj Leader. Salary to low [illegible]

Suite 1100, Stemmons Tower W
Dallas TX 75207 (214) 637-6360

DATA PROCESSING CAREERS inc

PROGRAMMER/ANALYST

Growing food manufacturing company needs expertise in programming/analysis with HP 3000 Series III, RPG, COBOL. Image and view experience required. Excellent salary and fringe benefits. Excellent salary and fringe benefits. Send resume to:

BOYD COFFEE COMPANY
P.O. Box 20547
Portland, Oregon 97220

PROGRAMMER
Business Applications

Three years programming experience in business/financial applications using Datapoint equipment. Relocate in East Texas. Send resume and salary history to:

[illegible] Computing, Inc.
P.O. Box 1374
Kilgore, TX 75662
Attn: [illegible]

Pinellas County Government
Systems Programmer

Degree in Math, Data Processing, Accounting or Engineering and 3 years systems and programming experience, or combination totaling 7 years. Database experience desired, DL/I and VSAM. Also COBOL, BAL, DOS/VS, VSE, CICS. [illegible]. Apply by resume no later than 1/5/81. Send resume to Pinellas County Courthouse, Personnel Dept., Director of Personnel, [illegible] Court St., Clearwater, FL [illegible].

Equal Opportunity Employer

DATA PROCESSING PROFESSIONALS

[illegible]

National Medical Enterprises' International Division, is offering the experience of a lifetime to a few well qualified individuals. We have contracted with the Saudi Arabia government to staff modern, new health care facilities. In the Financial area, we have the following positions immediately available:

- *Systems Manager
- *Systems Programmer
- *Systems Analyst
- *Data Entry Operators

All positions require appropriate levels of experience. Previous experience with Hewlett Packard 3000 and hospital data processing experience are desirable.

NME is a major U.S. corporation and a dynamic force in the health care industry. We own and operate more than 60 hospitals in this country and provide health care facility management and staffing internationally.

We offer you the personal and professional challenge of being part of a development team for an important medical complex; excellent salary; an outstanding compensation package which includes – company paid housing; 60 days paid vacation, R & R and holidays; and more! For immediate consideration please call (COLLECT): TOM RATLIFF, 213/479-5526, ext. 547. Or submit resume to him at:

International Recruiting Department CW 1280

NATIONAL MEDICAL ENTERPRISES, INC.

[illegible]

Promote Yourself!

[illegible]

PRODUCT MANAGER - Product marketing experience with timesharing vendor. Must have marketing, management & technical skills. Top position with a Fortune 50. Will be responsible for product planning and determination of product mix and market position ...... to $45 K.

MINI-MICRO SOFTWARE DEVELOPMENT - BS CS, EE, or math. 1+ years experience with mini or micro computers in FORTRAN or assembler. Work in CAD/CAM, robotics, or signal processing. Companies in Philadelphia area and rural central Pennsylvania near universities .... to $28 K.

SENIOR PROGRAMMER ANALYST - COBOL, CICS, OS environment. Health insurance background a plus. New development. Low cost of living area .... to $26 K.

SENIOR SYSTEMS ANALYST - Top project in Southwest looking for #2 person. Minimum 2 years experience. Must have payroll/personnel, COBOL, CICS experience. Work in large IBM OS/MVS environment. Also position with leading bank in Southwest .... to $28 K.

PROGRAMMER ANALYSTS - Sunbelt, Midwest, East and West Coasts. Work in development in COBOL, OS, IMS environments .... to $28 K.

And Many More

Through the use of our in-house computer based search system we can assist you in checking out job opportunities almost anywhere. No fees or contracts. Client companies pay all expenses. Career counseling prior to action. Over 10,000 positions represented directly and through affiliates.

SEND YOUR CURRENT RESUME (or an old one with pencil updates) together with salary history and location desired in complete confidence or call:

SYSTEMS PERSONNEL, INC.
Suite C700, 207 Fox Lane, Wallingford, PA 19086
Phone (215) 565-2920

Systems Personnel inc

[illegible]

Consultants

ARI is a nationwide executive search firm retained exclusively by several major firms with large, well established management consulting practices.

Their continued rapid growth and promotions have created consultant openings at the middle and upper staff levels at various locations throughout the country.

These positions offer exceptional career opportunities for qualified individuals. The salaries range upward from 28K and travel, in most cases, will be less than 25%.

Candidates should have an undergraduate degree and 3-8 years experience designing and implementing financial and other business oriented systems.

Specialty skills in health care, manufacturing (MRP package implementation acceptable) or banking and minicomputer evaluation and systems security experience are especially desirable.

For prompt, confidential consideration for these and other positions, send your resume to:

ACCOUNTING RESOURCES INTERNATIONAL
CW Box [illegible], 375 Cochituate Road
Route 30, Framingham, MA 01701

Or, for immediate information, call:

[illegible]

Our Clients Are Equal Opportunity Employers M/F

PRINCIPAL ASSOCIATE PROGRAMMER

Seeking a principal associate programmer to perform mathematical modeling to develop algorithms and programs for our interactive graphics and automation system. Must model mathematically the printed circuit board's autoplacement by use of interactive graphic minicomputer. Will convert CADDS 3 autoplacement to CADDS 4 autoplacement and develop, improve and enhance effectiveness of autoplacement package. Requirements include M.S. and Ph.D. in Applied Mathematics or Numerical Analysis and strong theoretical background in Mathematics; excellent programming technique with Numerical Analysis background and knowledge of computer systems; knowledge of probability and statistics; and demonstrated ability to do independent research, such as thesis or publication. Must also have two years experience in position or in Applied Mathematics or Numerical Analysis. 40 hour week. Salary [illegible] per year. Send resume and cover letter to Mr. [illegible], Computervision Corp., 201 Burlington Road, Bedford, MA 01730.

An Equal Opportunity Employer

PERFORMANCE EXPERTS

APPLIED DATA RESEARCH is seeking MVS-oriented performance specialists who are knowledgeable in system tuning techniques. Candidates should have good verbal skills and enjoy conducting seminars, etc. If you are interested in a high technology environment with compensation based on achievements, reply in confidence to:

Director, Software Products Division
APPLIED DATA RESEARCH, INC.
Route 206 and Orchard Road, CN-8
Princeton, New Jersey 08540

An Equal Opportunity Employer m/f/h/v

ADR

FACULTY POSITIONS
DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF SOUTH ALABAMA

QUALIFICATIONS: Ph.D. in Computer Science or related field preferred. Interested in quality undergraduate education.

DEPARTMENT: In recognition of the general nature and applicability of computing, the Department is free standing and works closely with the Computer Center, both of which report to the Dean of Administrative Services. The computer science program serves over 300 undergraduate majors and provides a variety of service courses. Future plans include a professional master's program.

UNIVERSITY: The University of South Alabama was created in 1963. Located in the greater Mobile area, which has a population of over a million within a 75 mile radius, the University serves as the only major public institution of higher learning on the upper Gulf Coast. Current enrollment exceeds 7500.

COMPUTER EQUIPMENT: Hardware for academic and administrative computing consists of dual processors (IBM 370/148 and IBM 4341) with over 120 interactive terminals.

RANK AND SALARY: Open.

APPLY TO: Professor D.L. [illegible], Chairman of Department of Computer Science, University of South Alabama, Mobile, Alabama 36688. Telephone: (205) 460-[illegible]

AA/EOE

SALESPERSON

Major computer lessor has position available in NYC metro area for a qualified Salesperson with at least 3 years experience in marketing IBM 360 and 370 systems.

Excellent salary and company paid benefits.

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Excellent Fringe Benefits

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The City of Colorado Springs offers a competitive benefits package in addition to a prime environment at the foot of the Rocky Mountains. Interested individuals should submit resume to:

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Colorado Springs, CO 80901

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Corporate Staffing Director
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CY/RO

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(815) [illegible]

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The ideal position for the computer specialist interested in exploring "leading edge" technological advances and able to interpret impact on corporate resources, systems, hardware and software requirement. Candidate must have a bachelor's degree or equivalent, and be hardware/software oriented with DBMS and/or communications experience. A solid IBM/HP product knowledge a definite plus.

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A quantitative oriented individual who can apply Operations Research tools to solve short and long range business problems in user environment will find this position all the challenge needed. Candidate should possess appropriate Math/OR degree have significant modeling/simulation exp. an be user oriented with good interpersonal skills.

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DATA PROCESSING

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Equal opportunity employer

RESEARCH ENGINEER: MIT's Department of Aeronautics and Astronautics is seeking a research engineer to serve as Manager of Computer Services for the Gas Turbine and Plasma Dynamics Laboratory (GTL). The GTL computer facility is dedicated to large scale fluid dynamic calculations and high speed data acquisition and analysis. The Manager of Computer Services will be responsible for all software and operations of a facility presently consisting of a P.E. 3242 with array processor, a DEC PDP 11/70, and DEC MINC Computer.

Responsibilities include all aspects of computer operations, system and applications software, management of student programming staff, assistance to users, acquisition of new hardware and software.

Requires strong background in both systems and applications programming, graphics and applied mathematics. Experience managing a time sharing computer facility. 3-5 years as a computer professional and a graduate degree in applied science or engineering are required. The position is available immediately. Please submit detailed resume to: Prof. Jack L. Kerrebrock, Head, Dept. of Aeronautics and Astronautics, (Attn: Job No. [illegible]), c/o MIT Personnel Office, E19-238, 77 Massachusetts Avenue, Cambridge, MA 02139. MIT is an equal opportunity/affirmative action employer.

• San Diego •

PROGRAMMER ANALYSTS

TELEDYNE RYAN AERONAUTICAL is the world's largest manufacturer of pilotless jet target aircraft and remotely piloted vehicles used by our nation's military. We are currently seeking programmer analysts with 3-5 yrs. experience in the design and implementation of scientific/engineering computer software used in the analysis of aerospace engineering problems. Must be knowledgeable in the use of PL/1 and FORTRAN, IBM series computers, and Batch, as well as interactive computing techniques. BS degree in Engineering, Computer Science, Math or Physics.

Please send resume
or call collect
(714) 291-7311 Ext. 1194
John [illegible]/Bill Brockman

TELEDYNE RYAN AERONAUTICAL
2701 Harbor Dr.
San Diego, Ca. 92138

Equal Opportunity Employer

PORTLAND PROGRAMMERS

We are a leading worldwide manufacturer based in Portland, Oregon with challenging opportunities in our Corporate System Department. We are seeking programmers and senior programmers with 1-5 years experience. A familiarity with Burroughs, Data Point, and Structured Methods Design would be preferable. Salary ranges are from $15,000-$20,000. For prompt confidential consideration please send resume to:

Tim Stickney
ESCO Corp.
2141 N.W. 25th Ave.
Portland, OR 97210
503/228-2141, ext 749

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This position provides a challenging variety of responsibilities for an experienced software support professional. You'll supervise a department providing first line software support for our nationwide Dealer and Branch organization in the definition, coordination and resolution of system software problems. We're looking for a marketing-oriented individual who is willing to travel and able to express ideas clearly. Qualifications include assembly and high level language experience with a knowledge of IBM 2780/3780 Bisynchronous communications. Previous management or supervisory experience required.

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We need an individual of exceptional expertise to provide our nationwide Dealer and Branch Service representatives with high level technical assistance in resolving various hardware problems. Requirements include previous field service experience with word processing or minicomputer product lines. Previous experience in a field or headquarters technical support capacity is preferred. Some travel is required.

Technical Instructors

We're seeking confident professionals, well-versed-in public speaking and clear presentation of ideas, to train our Dealer and Branch Service representatives. The field of training will encompass repair and maintenance of micro processors, printers and disk-based systems. Qualifications include previous experience in course development and technical instruction of hardware systems.

Put your ideas into action with us at CPT.

Send resume or letter of introduction in complete confidence to:

Dave Kreager
Corporate Employment and Employee Relations Manager
CPT Corporation
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CPT

Equal Opportunity Employer

Director of Academic Computing

The Director will be responsible for the development and implementation of academic computing and for planning and implementing new programs and activities. The director will be accountable for academic computing on the main campus and at the branches and will establish faculty/staff training and development programs, conduct mini-courses for members of the C.W. Post/L.I.U. community, and communicate with constituent groups through newsletters, committees, documentation, etc. Qualifications are Master's Degree (PhD preferred) in Computer Science (or equivalent), experience as a supervisor in an academic computing services environment, and an established record of developing academic computer usage. Successful grant proposal writing experience a significant asset. Qualified candidates should send two copies of resume by January 31, 1981 to: Director of Personnel

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You'll need at least 3 years' experience in an IBM environment with heavy Assembler language background. Also prefer familiarity with DOS/VS/VSE environment for MVS generation and maintenance. CICS/VS, DL/1, COBOL a plus. Our current equipment is 370/148 and next year we are adding 4341/2 and MRP system.

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Executive Director of Computer Services

Responsible for providing all central academic and administrative computing services in a 2 year suburban community college of 20,000+ students. Environment includes over 175 terminals and microcomputers plus IBM 4341, HP 3000, DEC 11/34, WANG 140 and use of several related networks. Position reports to Computer Services Management Committee (President, Provost and Vice President) and provides coordination with Administrative Systems Users Advisory Committee and Academic Computing Users Advisory Committee. Bachelor's degree or equivalent and 5 years of responsible experience in an intermediate or large systems environment at a college or a university is required. Letters of application with a resume are being accepted by John V. [illegible], Director of Personnel, College of DuPage, [illegible] Lambert Rd., Glen Ellyn, IL [illegible]. [illegible]. Deadline for applications Jan. 15, 1981. Affirmative Action/Equal Opportunity Employer, M/F.

PROGRAMMING

MAJOR AIRLINE

4 DAY WORK WEEK

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CENTRAL EDP
16 [illegible] Road
[illegible], N.J. [illegible]
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Professional to assist in implementing new Shop Floor Control and Capacity Planning System in manufacturing company. Two to four years progressive experience preferred. Systems 3/15D, RPG II and CCP experience required. Send resumes and salary history in confidence to:

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Waverly, NE 68462

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Binswanger Glass Company, a growing division of National Gypsum, has an excellent career opening for a talented problem solver who thrives on challenge. You will be involved in a broad range of systems analysis in manufacturing, distribution and financial functions for our nationwide network of offices. Some travel is required. A bachelors degree in an appropriate dicipline or equivalent experience is required. Five to ten years of programming and systems analysis experience is required. Exposure to minicomputers and/or distributed processing is a plus. This is a responsible position with great potential for professional advancement. We can offer you an excellent salary, complete company paid benefits, and a sound future with a growing company. For immediate consideration, please send your resume and salary requirements to: John R. Jamieson.

BINSWANGER GLASS COMPANY
P.O. Box 171173
Memphis, TN 38117

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Marine Research Specialist III/IV in Physical Oceanography

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HBH offers generous salaries and benefits. Overseas positions offer a 2 year contract, salary differentials and bonuses, paid housing, and European R&R, plus home leave.

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Personnel Management, Systems Planning and coordination of entry level through Senior Staff in a highly diverse MVS-VM, Multi-CPU network environment. Broad range of projects including OS Maintenance, Systems dependent applications, and applied research.

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Telephone: (601) 42[illegible] -
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THE WILLIAMS COMPANIES
Department [illegible]
P.O. Box [illegible]
Tulsa, Oklahoma 74101
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Department 130
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St. Louis, MO 63105
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[illegible]

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Division of
Information Systems
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Sr. Systems Analyst

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Teaching entry level programmers including COBOL, RPG, Systems [illegible] courses. Two years work experience required. Teaching experience desirable. Appointment effective March 30, 1981. Starting salary range $12,[illegible]-$16,[illegible]. Deadline for receipt of all materials is Jan. 16, 1981. Send inquiries to:

[illegible]
[illegible]
[illegible] County Community College
[illegible]
[illegible], Ohio [illegible]
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ANALYST/PROGRAMMERS

FORTRAN

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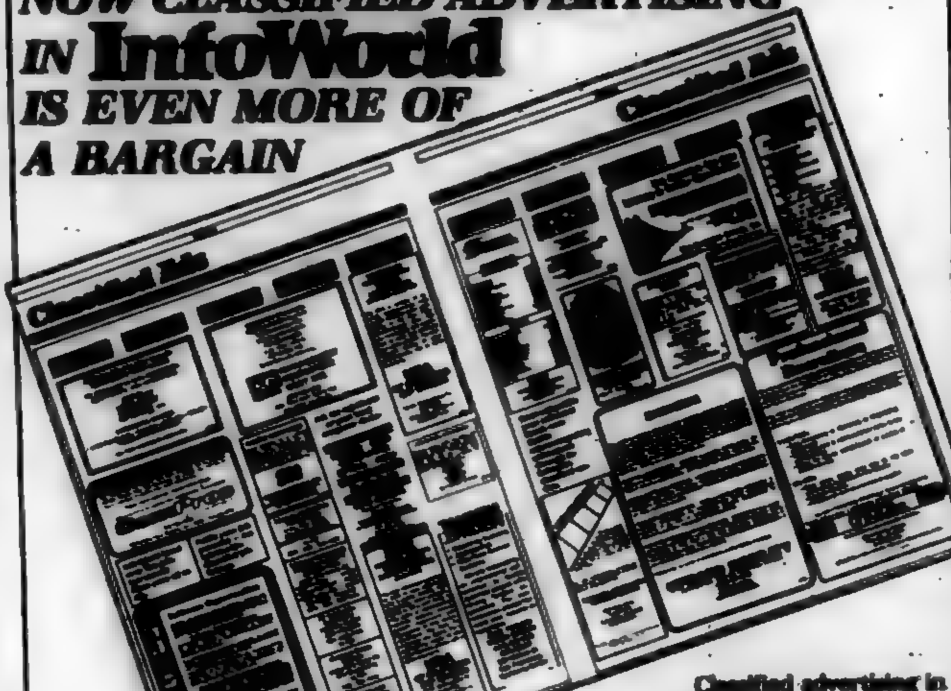

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THE SUCCESSFUL CANDIDATE SHOULD HAVE THESE QUALIFICATIONS:

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- Ability to effectively communicate with user groups.
- Mini Computer experience a plus.
- Bachelor's degree

Compensation is in the mid-twenties and an excellent corporate Benefit Package is provided. If you are seeking a challenging career opportunity, send resume and salary history to:

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Director of Personnel
P.O. Box [illegible]
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Academic Dean
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SYSTEMS Software 4341 CICS/VS VSAM MVS ... [illegible]
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Call [illegible] (212) [illegible]
WILLIAM [illegible] ASSOC
[illegible] Broadway NY [illegible]

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National hospital services company is looking for a unique individual for an analyst position in our computer division located in Birmingham, Alabama. [illegible] HP 3000 under MPE III, BASIC, COBOL, FORTRAN and SPL required. [illegible] This is an upper level position with a dynamic, rapidly expanding company. [illegible] Good salary and benefits [illegible] Position requires B.S. Degree in Computer Science or related discipline and a significant amount of experience.

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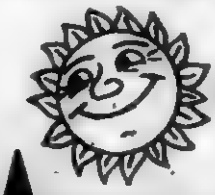

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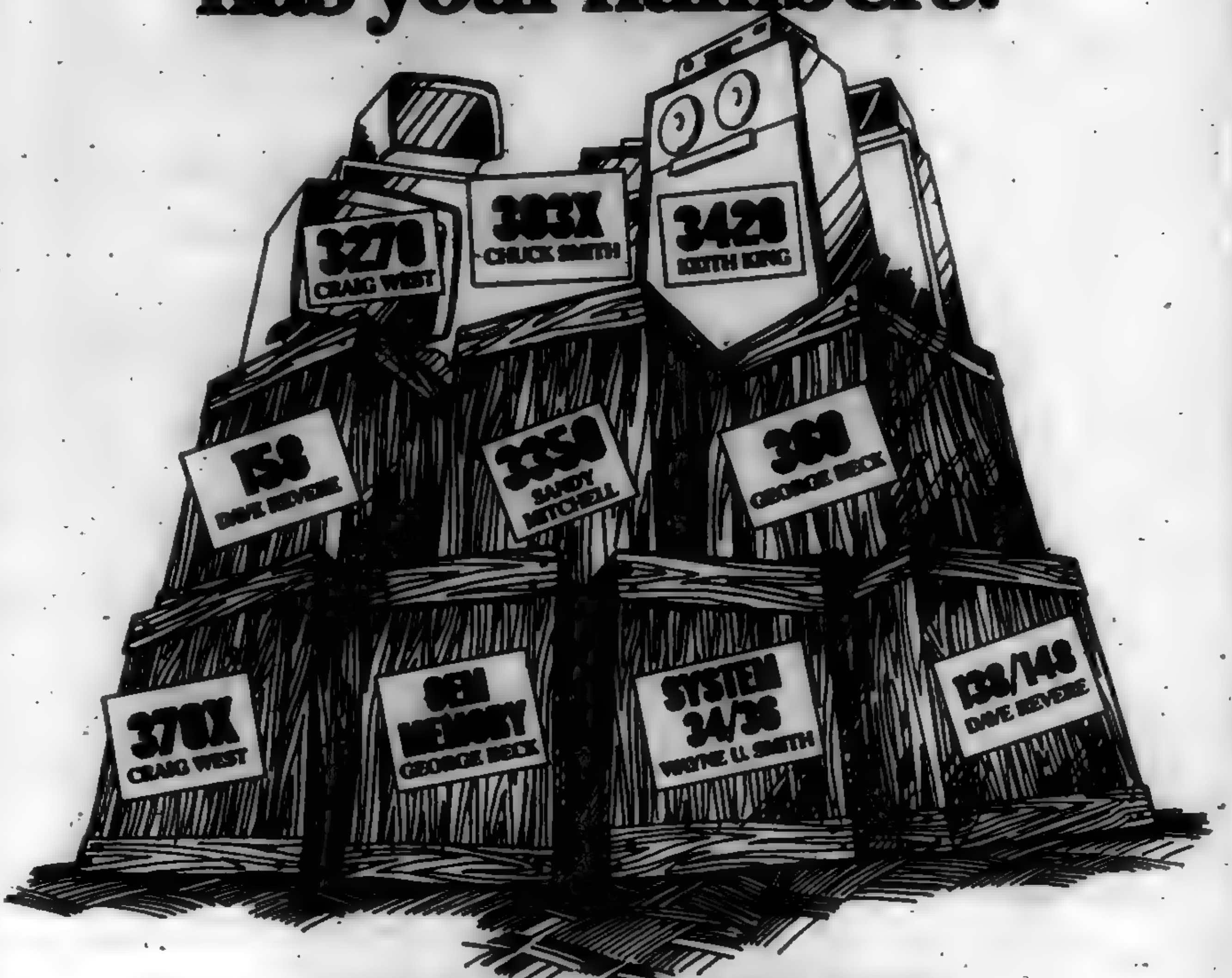

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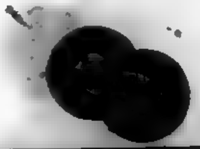

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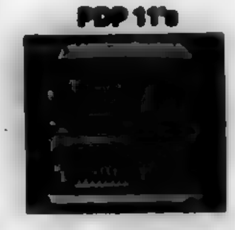

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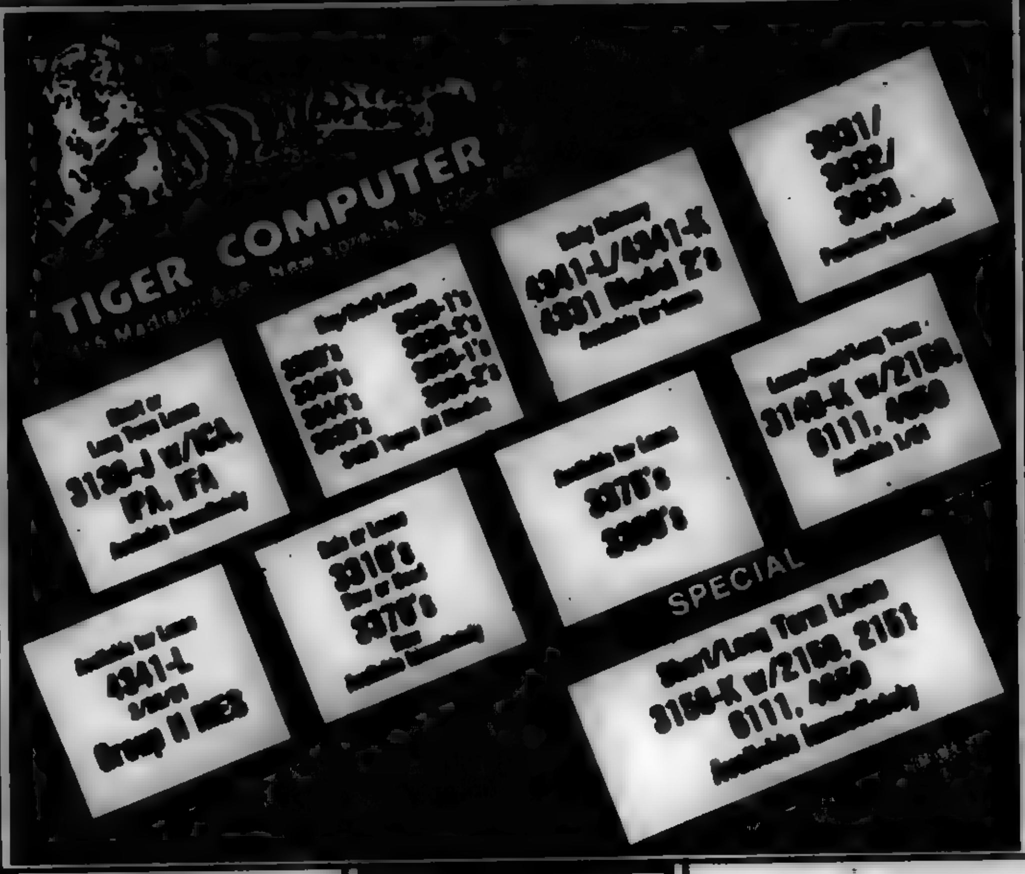
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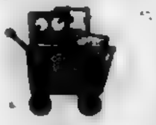

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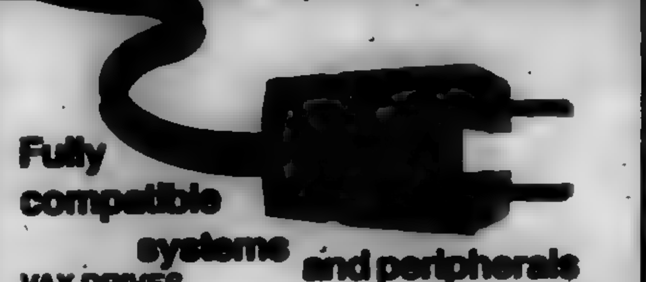

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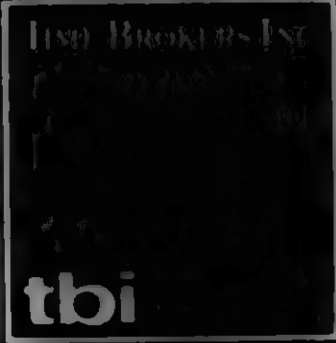

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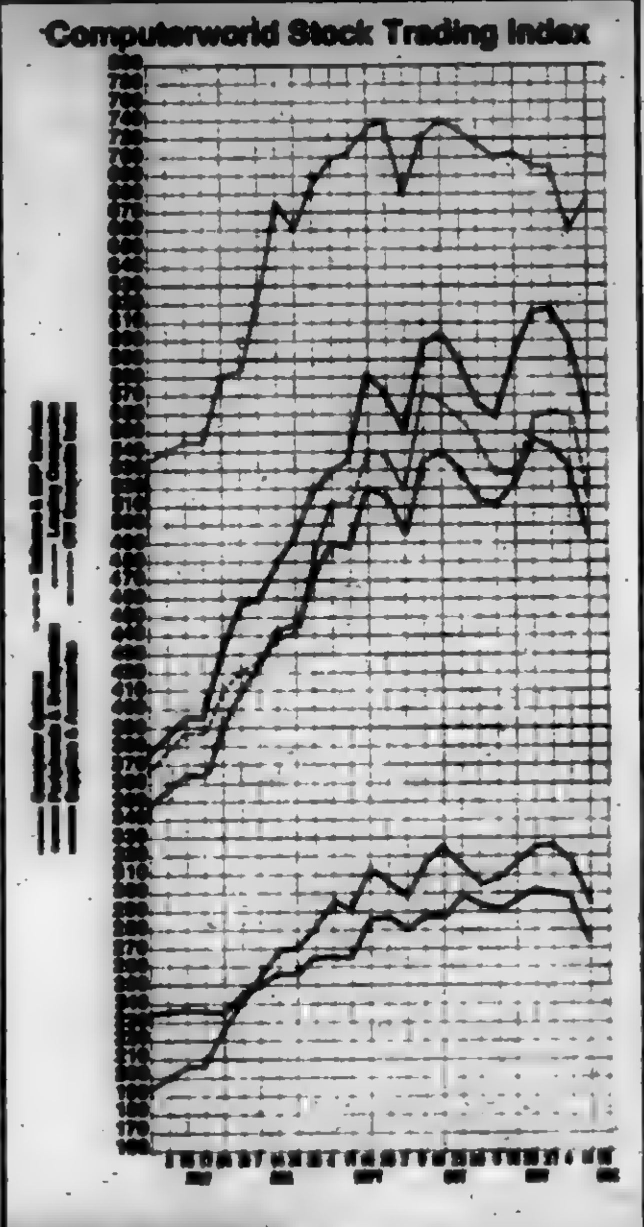
Computerworld Stock Trading Index



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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 10, 1980

All statistics compiled, computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE ($)	CLOSE DEC 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	18- 42	31 1/8	-4 1/2	-12.6
N	BURROUGHS CORP	47- 80	60 3/4	- 5/8	-1.2
O	COMPUTER AUTOMATION	9- 27	21 1/4	-2 3/4	-11.4
N	CONTROL DATA CORP	38- 77	63 1/2	-5 3/4	-8.3
O	CRAY RESEARCH INC	30-103	94 1/4	-5 3/8	-5.3
N	DATA GENERAL CORP	46- 87	68 1/2	-2 3/8	-3.3
N	DATAPOINT CORP	44-115	97 1/4	-11 1/2	-10.5
N	DIGITAL EQUIPMENT	52- 98	88 1/4	-4 1/4	-4.6
A	ECCO INC	6- 16	13 7/8	-2 1/8	-13.2
O	ELECTRONIC ASSOC.	6- 12	7 1/2	-1	-11.7
N	FOUR-PHASE SYSTEMS	20- 40	33 5/8	-2 5/8	-10.0
N	FOXBORO	31- 57	56 7/8	- 5/8	-1.6
O	GENERAL AUTOMATION	7- 19	8 3/8	- 3/8	-4.7
O	GRI COMPUTER CORP	1- 3	1 3/8	+ 1/4	+22.2
N	HEWLETT-PACKARD CO	46- 95	87 1/2	-4 1/8	-4.5
N	HONEYWELL INC	65-104	97 1/4	-2 3/4	-2.7
N	IBM	50- 79	63 3/4	-4 1/4	-6.2
O	MAGNUSON COMP SYSTS	20- 45	30 1/2	-3 3/4	-8.0
N	MANAGEMENT ASSIST	9- 25	14 1/2	-2 1/8	-12.7
A	MANUFACTURING DATA S.	22- 80	66	-11 1/4	-14.5
O	MINI-COMPUTER SYST	2- 6	2	- 1/4	-11.1
O	MODULAR COMPUTER SYS.	9- 31	23 3/8	-2 1/2	-9.6
N	NCR	52- 82	66 1/2	-2 1/2	-3.6
N	PRIME COMPUTER INC	13- 57	49 3/4	-5 3/4	-10.3
N	PERKIN-ELMER	26- 70	60 1/2	-6	-9.0
N	SPERRY CORP	42- 68	54 1/2	-3 5/8	-6.2
A	SYSTEMS ENG. LABS	11- 53	48 1/2	-4 1/4	-8.0
O	TANDEM COMPUTERS INC	13- 49	43 3/4	-3 3/4	-7.8
N	TEXAS INSTRUMENTS	79-130	120 1/4	-11 1/4	-8.6
A	WANG LABS.	17- 40	34 1/4	-4	-10.4

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE ($)	CLOSE DEC 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 27	21	-1 1/4	-5.6
N	COMDISCO INC	6- 24	20	-4	-16.6
A	COMMERCE GROUP CORP	1- 2	7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	1 1/2	+ 3/4	+100.0
O	CONTINENTAL INFO SYS	3- 15	4 1/4	- 5/8	-12.8
N	DATRONIC RENTAL	2- 5	4 1/2	0	0.0
A	DCL INC	3- 6	2 7/8	0	0.0
N	DPF INC	5- 12	5 3/8	- 5/8	-10.4
N	ITEL	1- 15	7/8	- 1/8	-12.5
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 5/8	0	0.0
N	RELIANCE GROUP INC	24- 79	71 1/8	-1 1/8	-1.5
N	U.S. LEASING	12- 26	23 3/8	-1 3/8	-5.5

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EXCH		PRICE 1979-80 RANGE ($)	CLOSE DEC 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	5 1/2	+ 1/8	+2.3
O	AMACORP INC	7- 24	19	-3 5/8	-16.0
O	ANALYSTS INTL CORP	3- 14	13 1/2	0	0.0
A	APPLIED DATA RES.	6- 34	30 1/8	-1 7/8	-5.8
N	AUTOMATIC DATA PROC.	31- 52	44 1/4	-3 3/4	-7.8
O	CBA COMPUTER ASSOC	9- 17	13 1/4	+ 1/4	+1.9
O	COMPUTER HORIZONS	1- 5	2	- 5/8	-23.8
O	COMPUTER NETWORK	4- 9	6 1/8	- 1/2	-7.5
N	COMPUTER SCIENCES	11- 20	17 3/4	+1	+5.9
O	COMPUTER TASK GROUP	1- 23	19 1/2	-1	-4.8
O	COMPUTER USAGE	3- 10	6 1/4	- 1/2	-7.4
O	COMPUT AUTO REP INC	4- 11	9 1/2	-1	-9.5
O	COMSHARE	11- 21	16	- 1/2	-3.0
O	CULLINANE CORP	10- 45	32 1/4	-3 1/2	-9.7
O	DATA DIMENSIONS INC	1- 6	1 1/4	- 1/8	-9.0
O	DATATAB	1- 4	1	- 1/8	-11.1
O	DBI CORP	4- 9	7 1/2	-1	-11.7
N	ELECTRONIC DATA SYST	19- 37	30 1/4	-1 3/4	-5.4
O	INFORMATICS INC	9- 25	21 1/4	-2 1/2	-10.5
O	INSYTE CORP	1- 3	2 1/2	- 1/4	-9.0
O	IPS COMPUTER MARKET.	1- 4	1 1/4	-1 3/4	-58.3
O	KEANE ASSOCIATES	3- 9	5 1/4	0	0.0
O	KEYDATA CORP	1- 5	1 1/8	+ 1/8	+12.5
A	LOGICON	12- 30	27	-2 1/2	-8.4
O	MATHEMATICA INC	9- 18	13	0	0.0
O	MATHEMATICAL APP GRP	7- 23	17	-1 1/2	-8.1
O	NATIONAL DATA CORP	10- 31	27 1/4	-2 5/8	-8.7
N	PLANNING RESEARCH	5- 13	8	-2 3/8	-22.8
O	PROGRAMMING & SYS	1- 3	3/4	0	0.0
O	RAPIDATA INC	4- 10	8 1/2	- 3/4	-8.1
N	REYNOLDS & REYNOLDS	22- 34	28 3/4	-1 3/4	-5.7
O	SYSC INC	6- 24	21 1/2	-2 3/4	-11.3
O	SCIENTIFIC COMPUTERS	6- 34	27	-5 1/4	-16.2
N	TYMSHARE INC	34- 88	78	-7 1/8	-8.3
A	URS CORP	5- 17	14 7/8	-1 5/8	-9.8
O	UTLY CORP	4- 20	15	-1 3/8	-8.3

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE ($)	CLOSE DEC 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	14 1/2	- 5/8	-4.1
N	AMPEX CORP	14- 36	31 1/4	-2 3/4	-8.0
A	ANDERSON JACOBSON	9- 25	21	-3 7/8	-15.5
O	AUTO-TROL TECHNOLOGY	18- 42	44	-5	-10.2
O	BEEHIVE INT'L	3- 28	22 1/4	-3 3/4	-14.4
A	BOLT,BERANEK & NEW	13- 37	31 1/2	-2 1/2	-7.3
N	BUNKER RAMO	17- 41	36	-2	-5.2
O	CAMBRIDGE MEMORIES	1- 9	3 1/4	+ 1/4	+8.3
N	CENTRONICS DATA COMP	20- 55	20 3/4	-5 1/4	-20.1
A	CETEC CORP	5- 7	5 3/4	1/8	2.1
O	COMPUTER DEVICES INC	5- 10	6 3/4	- 3/8	-5.2
O	COGNITRONICS	1- 10	8 5/8	-1 1/8	-11.5
O	COMPUTER COMMUN.	4- 10	1 7/8	-1	-34.7
O	COMPUTER CONSOLES	4- 29	17 3/4	-3 1/4	-14.1
O	COMPUTER TRANSCEIVER	1- 6	5	+ 1/8	+2.5
N	COMPUTERVISION CORP	24- 92	68	-7 1/4	-9.6
N	CONRAC CORP	13- 25	18 1/8	- 1/2	-2.6
A	DATA ACCESS SYSTEMS	6- 21	18 7/8	+ 1/8	+0.6
A	DATAPRODUCTS CORP	11- 38	32 1/8	-1 7/8	-5.5
O	DATUM INC	2- 9	3 3/4	- 1/4	-6.2
O	DECISION DATA COMPUT	2- 6	4 7/8	- 3/8	-7.1
O	DELTA DATA SYSTEMS	1- 3	1 3/4	- 1/8	-6.6
O	DATARAM CORP	4- 37	30 3/4	-1 1/8	-9.4
N	ELECTRONIC M & R	3- 9	7 1/4	-1 3/8	-15.9
O	EVANS & SUTHERLAND	21- 83	67	-5	-6.9
O	FABRI-TEK	1- 4	2 1/4	+ 3/8	+20.0
O	GENERAL COMPUTER SYS	1- 7	5 1/8	- 7/8	-14.5
O	GEN'L DATA COMM IND	8- 22	18 1/4	-3	-14.1
O	GENERAL TERMINAL CP	1- 4	1 3/8	-	-3.3
N	HAZELTINE CORP	12- 33	24 1/2	-1 7/8	-7.1
N	HARRIS CORP	25- 55	51 1/8	-2 1/8	-3.9
O	INFORMATION INTL INC	8- 18	10 3/4	- 1/2	-4.4
O	INTEL CORP	23- 50	41 1/4	-2 1/4	-5.1
O	INTERSIL	13- 24	13 5/8	+ 1/8	+0.9
A	LUNDY ELECTRONICS	4- 17	11 7/8	-1 1/4	-9.5
O	MSI DATA CORP	5- 16	12 1/8	-1 1/2	-11.0
N	MEMOREX	10- 34	13 1/4	-1 1/2	-10.1
N	MOHAWK DATA SCI	10- 31	22 1/4	-2 1/8	-8.7
O	ONEX	2- 12	11	0	0.0
A	PARADYNE CORP	9- 33	26 7/8	-2 1/2	-8.5
A	PENRIL CORP	9- 15	13	- 7/8	-6.3
O	QANTEX CORP	10- 23	20	-2 3/4	-12.0
O	RECOGNITION EQUIP	5- 21	15 7/8	-3	-15.8
O	SCAN DATA	1- 5	1 1/2	+ 1/8	+9.1
N	STORAGE TECHNOLOGY	12- 36	30 7/8	-3 3/8	-9.9
O	SYKES DATATRONICS	14- 50	36 3/4	-6 1/4	-14.5
O	T BAR INC	14- 34	30 1/4	-1 1/2	-4.7
A	TEC INC	3- 9	4 1/4	- 1/2	-10.5
N	TEKTRONIX INC	42- 70	60 1/8	-3 1/4	-5.1
N	TELEX	3- 6	4 7/8	- 3/8	-7.1
O	TESDATA SYSTEMS CP	8- 26	12 1/4	-1 1/8	-8.4
A	TIMEPLEX INC	7- 33	26 1/2	-6 3/8	-19.3
O	WILTEK INC	1- 3	2 3/8	+ 1/8	+5.5

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE ($)	CLOSE DEC 10 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 15	13 1/2	-1 1/8	-7.6
O	BALTIMORE BUS FORMS	1- 2	1/2	- 1/2	-50.0
N	BARRY WRIGHT	8- 22	17 7/8	-1 3/8	-7.1
O	CYBERMATICS INC	1- 2	7/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	12 3/4	- 7/8	-6.4
N	ENNIS BUS. FORMS	13 21	16	- 1/4	-1.5
N	3M COMPANY	46 63	56 1/8	-2 7/8	-4.8
O	MOORE CORP LTD	27- 37	32 7/8	-1 5/8	-4.7
N	NASHUA CORP	20 35	34 3/8	-2 1/4	-6.3
O	STANDARD REGISTER	22 35	30 1/4	0	0.0
A	TAB PRODUCTS CO	9 30	24	-4 1/8	-14.6
P	WABASH MAGNETICS	11- 30	29 7/8	- 1/8	-0.4
N	WALLACE BUS FORMS	12 26	21 7/8	-1 3/8	-5.9

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Honeywell

NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices

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No. 52 December 22, 1980 $1.00 a copy; $30/year

S-to-DOS Move Pulled Off Without Experienced Staffers

By Rita Shoor
CW Staff

KANSAS CITY, Mo. — National Dealer Service (NDS) here installed its first computer, converted some 150 application programs running under OS to execute under DOS/VSE and installed five additional system software products in approximately six months.

And the job was done without an experienced systems programmer or any computer operators, according to Dick Paste, systems and programming manager.

When NDS management decided to switch from buying time on an IBM 370/158 with an OS environment to installing an in-house IBM 4331 processor, the DP staff consisted of three programmer/analysts, Paste himself and the vice-president of DP, Dwight Pope. "Our first inclination was to go out and hire an expensive software person," he said, since none of the staff had any background in systems programming or technical support.

He estimated that an experienced systems programmer might cost NDS up to $30,000, including company benefits and costs based on the market value in the Kansas City area.

The staff's lack of systems software-related experience was compounded by the fact that pro-

(Continued on Page 8)

Software Survey Finds Users Tough Customers, Apt to Switch Vendors

By Bruce Hoard
CW Staff

Most packaged software performs just as the vendor promised "immediately," according to 76% of the 2,140 respondents in a recent survey.

Datapro Research Corp.'s eighth annual "User Ratings of Proprietary Software" reflected harsh scrutiny by users and a willingness to abandon computer vendors in favor of independent offerings.

Respondents were asked to evaluate their packages from several points of view, including cost, reliability and overall satisfaction. The bulk of the ratings were for utility packages rather than applications, probably because many utility-oriented DP managers have more experience with them than with applications.

Just over 80% of the respondents rated savings in human resources as the biggest advantage gained from their packages. Those savings hold a decided lead over flexibility, the advantage found by 69.2% of the survey respondents. Those two leaders are followed by capabilities, simplicity, system resource savings and "inexpensive" as the top advantage.

In the liabilities column, 24.5% cited complexity as the No. 1 disadvantage. Excessive use of resources (21.7%) was next on the negative list, followed by package-was-too-slow, package-was-too-costly, package-lacks-key-compatibilities, package-inflexible and package-not-compatible categories. The 2,140 respondents provided a total of 3,853 ratings.

Four packages stood out above all others. They are Flee/Film, a replacement for the IBM library maintenance

(Continued on Page 10)

NBS/Sutron Corp. Effort

Flexible Media Standards Planned

By Tim Scannell
CW Staff

FAIRFAX, Va. — The National Bureau of Standards (NBS) is currently working with an engineering research and development firm here to develop flexible disk media standards that could have a far-reaching impact on both the data processing and word processing communities.

Barring any unforeseen difficulties or surge of opposition, the media rules could be implemented by mid-1982.

The planned standards — which basically concern how data is formatted and recorded on a floppy disk — could save the government more than $80 million in computer equipment over the next five years, according to two yet-to-be-released reports compiled by Sutron Corp. Standardization would cut costs by allowing the government to competitively acquire computing gear rather than be locked into a particular vendor's data format, Gene Dickamore, director of the firm's Computer Systems Division, said.

However, a number of machine vendors — mostly those in the word processing sector — are vehemently opposed to the adoption of an NBS-sanctioned flexible media standard. Their argument is that an across-the-board media standard would not only cool down the heated battle between vendors for "locked-in" users, but could eventually run some companies out of the business.

"We found pretty much that there is

(Continued on Page 6)

FCC Approves Final Text on Inquiry II

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The final text of the Federal Communications Commission's (FCC) "final" Second Computer Inquiry Decision was approved by the commissioners last week, but it is virtually certain not to be the last word on the subject.

AT&T already has announced plans to seek judicial review of a key section of the order, which either destroys or reinterprets the company's 1956 Consent Decree, depending on one's point of view. And several of Bell's competitors, notably including vendors of computer-based information services, have asked the U.S. Court of Appeals for the District of Columbia to review the entire decision.

As finally approved by the FCC, the decision requires AT&T to market "enhanced" — i.e. computer-based — services through one or more separate subsidiaries. The operating companies, under this scheme, are limited to "basic" services — essentially transmission facilities priced on the basis of tariffs and subject to continued commission regulation. There are some exceptions, however. AT&T can apply for a waiver, permitting it to offer an enhanced service through an operating company.

Many of Bell's competitors strongly oppose the waiver provision, claiming it will lead to surreptitious cross-subsidies and enable the phone company to drive other vendors of similar services out of the market. This threat now may be even greater, for at last week's FCC meeting, the waiver provision was broadened — thanks largely to Commissioner Joseph Fogarty.

Because of his efforts, the record of the proceeding will show explicitly that AT&T can be granted a waiver whenever the FCC decides that offering the service through a separate subsidiary would impose "unreasonable costs" on AT&T or its customers, be

(Continued on Page 4)

Upkeep Costs Expected to Rise 22%/Year

By Marcia Blumenthal
CW Staff

SAN JOSE, Calif. — With software and hardware maintenance already claiming 40% of the average DP department budget, the prospect of paying more for this item is bitter medicine for users to swallow. Yet they will be doing just that during the next five years.

Users' expenditures for maintenance are forecast to increase annually by 22% until 1985 and then gradually diminish to 18% yearly for the rest of the decade, according to a recent study published by Strategic Business Services, Inc. These expenses are growing faster than all other major segments of DP expenditures.

IBM has set the pace in charging for maintenance — especially software maintenance that previously was included at no charge — and shifting the burden of problem identification to the user, the study observed.

But while the short-term outlook for maintenance costs is bleak, users could benefit from this trend in the long run. Quick response on calls to remote diagnostic centers can save time by eliminating a wait from a local program service representative.

And, when users are required to pay for maintenance, they will begin demanding highly maintainable software

(Continued on Page 8)

SEASON'S GREETINGS

COMPUTERWORLD

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Second-class postage paid at Framingham, Mass., and additional mailing offices FN127420. Computerworld (ISSN-0010-4841) is published weekly, except: semiweekly the third week in September and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.00 a copy: U.S.— $30 a year; Canada, Central & So. America — $50 a year; Europe and Near East — $90 a year; other foreign — $130 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

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POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Runs in IBM 3705 Controller

Package Helps Tie X.25, SNA Nets

By Brad Schultz
CW Staff

MANHATTAN BEACH, Calif. — A software package that smooths out the tortuous road between IBM's Systems Network Architecture (SNA) and the public packet networks was announced here last week by Comm-Pro Associates.

Data must travel that road for IBM users to employ large-scale packet-switching, a means of optimizing communication over hundreds of miles that breaks messages into small pieces and reassembles them at the destination.

SNA has yet to meet the X.25 de facto standard for interfacing data terminal equipment to packet nets, but Comm-Pro's revised X.25 Network Access Software (NAS) makes the point academic, a spokesman claimed.

Interactive Operation

The package allows interactive asynchronous terminals not made by IBM that are plugged into X.25 networks to act, from the standpoint of IBM mainframes, as if they were IBM terminals designed to work under SNA.

To do this, the new NAS runs in IBM's 3705 controller, which front-ends IBM mainframes in an SNA environment. The package is an extension of IBM's Network Control Program (NCP). In conjunction with NCP's Network Terminal Option, the Comm-Pro product would reroute present connections between interactive asynchronous terminals and X.25 networks.

The resulting "multidomain SNA network" could accommodate more remote hosts than ever, the spokesman said.

Also, the NAS package allows programmers to avoid worrying about whether their applications pertain to NCP and allied software or IBM's Emulator Program (EP), which controls an older generation of software. Presently, programmers employed by IBM customers must figure out when to shift from NCP to EP or the reverse, the spokesman explained, but the Comm-Pro package can automatically make that decision and execute it.

Package Options

Options include an X.25 call-out facility, which the user can use to open channels to a public packet net by engaging EP software. This replaces telephone dialing digits, the spokesman said, with I/O commands, allowing terminal operators to establish a virtual phone circuit between two host systems in which one host acts as an application program and the other host as an interactive asynchronous terminal.

> *'The package allows interactive asynchronous terminals not made by IBM that are plugged into X.25 networks to act, from the standpoint of IBM mainframes, as if they were IBM terminals designed to work under SNA.'*

As a result, connect-time is trimmed and throughput raised, the spokesman asserted. A single X.25 access line opened by the NAS package reportedly can eliminate a need for individual low-speed lines and modems. Besides reaching public packet nets, this X.25 pathway can reach single-end X.25 statistical multiplexers.

The Comm-Pro package also supports Bell Canada's Datapac 3303 end-to-end protocol for IBM 3270 terminals. This protocol requires that nodes of the Datapac network act as remote hosts for 3270s, the spokesman explained.

Only data packets pass between the nodes and the 3705 controller under the Datapac-compatible NAS, he stated, and different terminals on the same cluster can access different hosts connected to Datapac.

The current release of NAS was said to allow network 3270s to selectively access different EP applications, but subsequent releases are projected to extend support to NCP applications as well.

IBM to Follow Suit?

Will IBM itself add something like NAS to its SNA library next year? According to a Comm-Pro partner, IBM may well be working on some method for working X.25 compatibility into the vendor's network architecture, but probably something different from Comm-Pro's tactic of revising the 3705-resident NCP.

A specialist in 3705 software since 1973, Comm-Pro has written some of the packages sold by IBM — Extended Features Program Request per Price Quotation (PRPQ), for example — but IBM, under pressure to meet X.25 in the U.S., has not tapped Comm-Pro for the job, *Computerworld* was told.

Overseas, IBM does offer a device for fitting SNA installations to the X.25 networks in some countries, the Comm-Pro official noted, but rather than offer that 3705 attachment domestically, IBM may choose to redefine the path control section of its SNA design.

The basic NAS package requires at least 26K bytes of storage in the 3705 along with the capacity demanded by EP, or the Partitioned Emulator Program (PEP) that contains NCP and EP. The package leases for $600/month with EP or $800/month with PEP, but may be tried out for free.

Comm-Pro's address is Suite 700, 638 Fourteenth St., Manhattan Beach, Calif. 90266.

This Week

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(including IBM)

and

ADR

APPLIED DATA RESEARCH

Excerpts From Computer Inquiry Decision

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Following are excerpts from the final text of the Federal Communications Commission's (FCC) Computer Inquiry Decision, as proposed by the commission's staff. The commissioners approved this version after making some minor editorial changes.

"As presently structured, Dial-It and Custom Calling II constitute enhanced services under our Final Decision. [To classify them as basic services] as suggested by AT&T and GTE . . . would undermine any workable demarcation as to the boundary between basic and enhanced services . . . AT&T's attempts to classify these services as basic by analogizing to its time and weather recordings must also be rejected.

"[Regarding the argument that] certain services should be provided as part of an integrated basic transmission network . . ., to be efficiently offered or ubiquitously available . . . we conclude that evidence has not been presented that warrants such a determination.

"It is not our desire to impose significantly increased costs upon consumers . . . to preserve the integrity of structural separation . . . The merits of any waiver required for existing or future services must be premised on the existence of the separate subsidiary and its computer facilities, and must include not only the costs of not waiving the separate facilities requirement but also the potential for cross-subsidization and other anticompetitive effects.

"Evidence is lacking to support the proposition that protocol conversion must be performed as part of a basic service . . . Users are able to choose among an increasing number of alternatives . . . for performance of all levels of protocol conversion. These include providers of enhanced services, equipment manufacturers and firms that provide specialized protocol converters.

"We do not intend to imply that we would not consider granting a waiver of the [requirement that AT&T's subsidiary can't own transmission facilities] . . . In determining whether to grant such requests, we will weigh the preferred justification against . . . the counter-vailing regulatory considerations.

". . . Some restrictions on joint software development are essential . . . The best resolution . . . is to . . . [require] the separated subsidiary or its outside contractors to perform all software development, including firmware . . . The subsidiary may purchase any equipment its parent sells to the general trade so long as any software or firmware contained therein . . . is generic, (i.e.) contained, in standard form, within equipment . . . sold 'off the shelf' to any interested purchaser.

"We do not believe . . . additional information flow restrictions are warranted between entities affiliated with separate subsidiaries . . . The Final Decision sets forth in unambiguous terms . . . that network information must be disclosed to competitors of the subsidiaries at the same time and under the same terms and conditions as it is disclosed to the subsidiaries . . . We will extend [this] requirement to all carriers owning basic transmission facilities . . . insofar as such information affects either intercarrier interconnection or the manner in which interconnected customer-provided terminal equipment operates."

FCC Approves Final Text on Inquiry II

(Continued from Page 1)

"technologically impossible," involve "transitional factors" or conflict with "national security considerations."

The services most affected by this language are those the phone company plans to offer in the near future. Since Bell does not have to establish a separate subsidiary until March 1982, these services could be delayed without some means of waiving the requirement. Essentially, that's what Fogarty engineered last week by making "transitional factors" a basis for granting a waiver.

If AT&T can show the transition to a separate subsidiary will delay implementation of a new enhanced service, despite an immediate demand, the commission now has an explicit basis for allowing the service to be offered by a telephone operating company *before* the subsidiary is established. And since "unreasonable costs" represent one of the other bases for granting a waiver, AT&T may be able to continue offering such services through an operating company indefinitely by showing that transferring the offering to a subsidiary would be too costly.

Custom Calling II

Custom Calling II, a voice-based store-and-forward message service recently developed by Bell, appears to be the chief reason for this "clarification" of the Computer Inquiry Decision.

Custom Calling II threatens to put most of the nation's telephone answering services out of business; it also promises to be a relatively cheap alternative to the electronic mail services which many AT&T competitors are now offering and/or developing.

Their chief selling point is that they eliminate the time and expense of recalling when the party at the other end is unavailable; Custom Calling II, by storing messages within the network in easily accessible form, provides the same benefit.

Currently, Bell operating companies in New York, Texas, Illinois, Indiana, Wisconsin, Ohio and several other states are planning to tariff the new service, according to AT&T Vice-President James Billingsley. They're waiting for approval of the first Custom Calling II tariff, filed several months ago by Bell Telephone Co. of Pennsylvania. The Pennsylvania Public Utilities Commission (PUC) has deferred final action, pending the outcome of an investigation requested by the telephone answering service industry.

(Recently, a PUC administrative law judge recommended that the Pennsylvania commission allow the service to go into commercial operation. The commissioners are likely to act within the next few weeks).

A key objection of the telephone answering industry is that allowing Pennsylvania Bell to offer Custom Calling II would violate the separation of basic and enhanced services specified in the original "final" Computer Inquiry Decision handed down last April. The FCC's latest clarification of its waiver policy, however, appears at the very least to weaken that objection.

The FCC also clarified several other parts of the decision last week.

General Telephone and Electronics will not have to offer enhanced services through a separate subsidiary, but whether the company can absorb its recently acquired Telenet subsidiary must await the outcome of a related proceeding that deals with the merger agreement negotiated between the two companies.

AT&T's separate subsidiaries will not be able to own transmission facilities, but the subsidiaries can own "facilities for the provision of service among multiple buildings at a common business location." In other words, they can provide local-area networks.

The commission also reaffirmed its authority to regulate the structure of communication common carriers — meaning it retains the power to control AT&T's separate subsidiaries — but left open the extent of this power.

Although the decision leaves a lot of loose ends and could be further modified in court, it's nevertheless an important development in the 12-year struggle to divvy up markets between Bell and the computer industry. It could precipitate a final answer to the basic question of whether, and how, the phone company can offer enhanced services.

The decision allows the company to offer enhanced services on a deregulated basis, but AT&T's 1956 Consent Decree appears to prohibit such activity. Although the FCC and AT&T insist there is no conflict because enhanced services, as defined in the decision, are "incidental to" communications and thus explicitly permitted by the decree, several others — including the Department of Justice — oppose this interpretation.

Former Exxon Manager Pleads Guilty to Mail Fraud

By Marguerite Zientara
CW Staff

PHILADELPHIA — A former Exxon Corp. employee has pleaded guilty to trying to sell IBM detailed plans for Exxon's as yet unreleased Hornet line of information processing products [CW, Sept. 8].

Orion N. Briel, a former manager of marketing publications for QYX, the Exxon division developing the Hornet system, pleaded guilty Nov. 25 in U.S. District Court here to one count of mail fraud in offering IBM the plans by mail, according to an assistant to U.S. Attorney Peter Vaira.

According to reports pieced together at the time of Briel's arrest, he resigned from QYX on Aug. 13 and the next day mailed a certified letter to Dan McGlaughlin, vice-president of marketing for IBM's Franklin Lakes, N.J., office, offering the plans.

McGlaughlin contacted Exxon, which contacted the Federal Bureau of Investigation, investigators found. On Aug. 22, McGlaughlin telephoned Briel, who then reportedly repeated his offer to negotiate the transaction.

Five days later, the FBI agent and an Exxon engineer, both posing as IBM representatives, met Briel at a hotel in King of Prussia, Pa. Briel presented the two men with detailed plans and specifications for the Hornet product line and other products and asked $100,000 for the information, according to investigators.

The plans had been previously reported missing from a desk and cabinet at QYX headquarters in Lionville, Pa., by an Exxon security official.

Sentencing is expected to take place the week of Jan. 5, according to the U.S. Attorney's office.

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Claims Laws Backed its Actions

AT&T Files Pretrial Brief in Antitrust Case

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T insists that federal and state regulators approved, or at least condoned, its conduct during the 1960s and '70s and therefore, the company is not guilty of violating the Sherman Antitrust Act, as charged by the government.

Even if the court concludes otherwise, however, the government's proposal to break up the Bell System isn't even "remotely" justified because it would "restructure the enterprise . . . in ways that are unrelated" to Bell's liability.

This is the gist of a 272-page pretrial brief AT&T submitted to the U.S. District court for the District of Columbia early this month. Together with a similar brief submitted by the Justice Department, AT&T's filing describes the major issues that will be argued during the oral part of the trial, which begins next month.

The case is possibly even more important than the government's still-pending prosecution of IBM — partly because of the growing importance of communications to computer operations, and partly because the U.S. vs. AT&T, Western Electric and Bell Telephone Laboratories suit will impact current efforts in Congress to draft a new telecommunications policy.

Major Contention

In its pretrial brief, the Justice Department attempts to rebut AT&T's major contention by pointing out that "none of the conduct . . . relied upon by the government to show illegal monopolization was compelled by regulation or even approved as being consistent with the public interest. In fact, much of the challenged conduct ultimately was specifically disapproved by the Federal Communications Commission (FCC) or the courts.

The remainder was either unreachable under the Communications Act or . . . was . . . unreviewable by the FCC or other agencies due to AT&T's control of the available information."

Regarding the need for divesting AT&T of its key parts, Justice contended it's the only way to prevent continued abuse of the phone company's monopoly power.

"The Supreme Court has consistently ruled that the optimal remedy for persistent monopoly is structural relief," Justice pointed out, adding that "we will show that any internal restructuring in response to the [Second Computer Inquiry] decision is not likely to alleviate effectively the anticompetitive nature of AT&T's structure."

Connecting Arrangements

Both sides seem to agree that the case hinges on the phone company's actions during a roughly 10-year period that began in 1968 with the FCC's Carterfone Decision, which allowed users to interconnect "foreign attachments" — independently made terminal equipment — to the dial-up telephone network.

According to the government, however, the requirements for "connecting arrangements" which Bell cranked into its tariffs in the wake of Carterfone represents a major illustration of how AT&T used its monopoly position to curb competition illegally.

Since virtually all local loops were owned and operated by Bell operating companies, a user was forced to rent connecting arrangements on Bell's terms. Ostensibly, the connecting arrangement was needed to prevent improperly designed on manufactured foreign attachments from disrupting service.

However, according to the Justice Department, they were "overly designed, overly complex and consequently overly expensive. In some cases . . . the monthly and installation charges for connecting arrangements were more costly than the terminal equipment itself."

According to AT&T, however, the Carterfone Decision was one of a series of regulatory actions that ushered in "a prolonged period of uncertainty and debate" regarding the proper method of pricing communication services, the need for protecting the telephone network's level of service and the desirability of competition. State regulators "vigorously opposed" the FCC's regulatory policies.

Underlying this contention are two legal principles, allegedly supported by multiple judicial decisions, which Bell will lean on heavily.

One principle is that regulated enterprises are immune from antitrust prosecution "with respect to conduct . . . basic to the pervasive scheme of regulation to which they are subject." The other is a "rule of reason" which says, according to AT&T, that "where the conduct involved is subject to extensive regulation . . . the nature and effect of that regulation must be taken into account in determining whether a defendant has engaged in conduct violative of the Sherman Act.

Because of these court precendents, combined with regulatory history during the 10 years following the Carterfone Decision, many of the government's antitrust charges must be dismissed, Bell said.

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IBM Offers Pre-System/38 Program Conversion

By Bruce Hoard
CW Staff

BOCA RATON, Fla. — Users with IBM System/38s on order can now have their new computers without having them. All they need do is subscribe to IBM's System/38 Remote Testing Service.

The Remote Testing Service enables customers to convert existing programs and develop and test new applications prior to the installation of their System/38s — all this within the confines of the user's premises.

What the user needs is a CRT terminal and a matrix printer. IBM supplies the communications line, modem, technical support and services and delivers 4,800 bit/sec. The price: $1,750 a month, according to Ed Matthys, manager, Market Support Center for IBM's General Systems Division.

The user is tied to a System/38 at the test center headquarters in Atlanta. He can perform all his conversion and testing tasks from his terminal as though the machine was sitting in his own computer room.

However, conversion and testing is all the user is allowed. "We're not running a service bureau," Matthys commented.

In order to use the service, the user sends the Atlanta facility diskettes or magnetic tapes containing programs, test files or output from IBM System/3 batch conversion utilities. They are then loaded on the System/38 at the test center and compiled. The diskettes and tapes are then returned to the users.

The service was started as an aid to the first three System/38 field test customers. They liked it so much, the company put together a pilot project. It too was a success.

Available since last September, the service now has some 100 users and may be accessed for up to six hours daily between 8 a.m. and 8 p.m., Matthys said. The six hours do not have to be contiguous and users may alter their times to accommodate openings in the schedule.

Three Options

There are three user options when dealing with the service, he explained. Customers may signal that (1) they can't go on without help; (2) they would like someone to contact them before the day is out; and (3) they would like to consult with somebody at IBM's convenience.

There is also a question and answer file that lists queries made by users and the answers supplied by IBM.

There is a 30-day minimum usage and a 30-day cancellation notification requirement. The service must be discontinued within 30 days after installation of the System/38.

The number of System/38s IBM maintains in Atlanta to facilitate the service will rise in proportion to the demand for service, the manager said, adding no one will be refused. Anyone interested should contact his local IBM sales representative.

Amdahl Charged With Manslaughter

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Amdahl Corp. founder Dr. Eugene M. Amdahl faces a misdemeanor manslaughter charge after allegedly striking a local motorcyclist in a fatal Nov. 17 traffic accident.

The charge against Amdahl, 58, is contained in a complaint authorized by the Santa Clara County district attorney's office and filed Dec. 15 in Municipal Court here.

The complaint, which reportedly prompted the district attorney's office to issue a Dec. 15 warrant for Amdahl's arrest, charges the defendant with killing Manuel Turner Jr., a 57-year-old Silicon Valley engineer, while driving a car.

Amdahl will have "two weeks or so" to surrender himself voluntarily to law enforcement authorities and set a date for formal arraignment, according to a spokesman for the district attorney's office.

Involved in New Venture

The order for Amdahl's arrest comes only months after the internationally recognized engineer and entrepreneur resigned as president of the company that bears his name to start a new venture known as Acsys, which is expected to make advanced, large-scale processors for scientific applications.

Asked how his current legal problems might affect Acsys' future, Amdahl replied, "I don't think there will be much of an effect at all."

The charges facing Amdahl stem from an accident that occurred after Turner, who was riding a motorcycle at the time, stopped at an intersection in nearby Cupertino. Amdahl apparently failed to see the rider on the road ahead, and the car he was driving fatally struck the victim from behind, according to a local spokesman for the California Highway Patrol.

"Some of the evidence gathered in the case thus far suggests that he (Amdahl) was exceeding the speed limit at the time of the accident and failed to heed a traffic signal at the intersection in question," the spokesman said. "That's why a formal charge has been filed against him."

Amdahl was asked for his reaction to the allegations, but he declined comment on the advice of his attorney.

A police investigation immediately following Turner's death cleared Amdahl of any "gross negligence" in the accident and thus permitted his manslaughter charge to be downgraded from a felony to a misdemeanor.

Depending on how Amdahl pleads in the case, the charges against him could either lead to a formal trial or be settled out of court through plea bargaining or other behind-the-scenes legal negotiations.

NBS Developing Flexible Media Standards

(Continued from Page 1)

a real need for interchange standards," Dickamore explained. But, word processing vendors are opposed because "there's a whole lot of dollars to be made in that area. And the best way to maintain a market base is to lock your customers in to a unique format, where they really can't afford to leave you."

Sutron's Computer Systems Division began working with the NBS a little more than a year ago in response to an RFP put out by the government agency. The NBS wanted someone in the user or vendor community to develop labeling and format standards for flexible disks which are said to be heavily used throughout the government.

The standards would govern such characteristics as how many sectors a disk has per track, how many tracks per surface, what kind of controls are in each disk sector and where a user's data field is located on the media. Most importantly, Sutron would standardize disk labels, allowing a variety of machines to read or write to the same disk.

Any standards developed would parallel guidelines established earlier this year by the American National Standards Institute (Ansi), covering the physical and magnetic characteristics of floppy disks, Dickamore stated.

Popular Medium

Sutron officials spent about a year traveling across the country, talking with floppy disk manufacturers, disk drive vendors and people who integrated flexible disk drives into data and word processing systems. What they found was that despite pie-in-the-sky talk about charge-coupled devices (CCD) and bubble memories replacing floppy disks, the medium was extremely popular and would be around for at least five more years.

Sutron also uncovered "some very strong opinions" concerning the pros and cons of a flexible disk media standard, Dickamore claimed. However, he refused to identify any companies that expressed a negative view except to say that most were in word processing.

Based on its research, the five-year-old company compiled two reports which are scheduled to be released sometime next year pending NBS approval. In one of the reports, Sutron reveals that the government could save $39 million on DP and $43 million on word processing equipment — a sizable chunk when you consider that the government will buy about $300 million worth of word processing gear by 1982, according to a Government Accounting Office report released early last year.

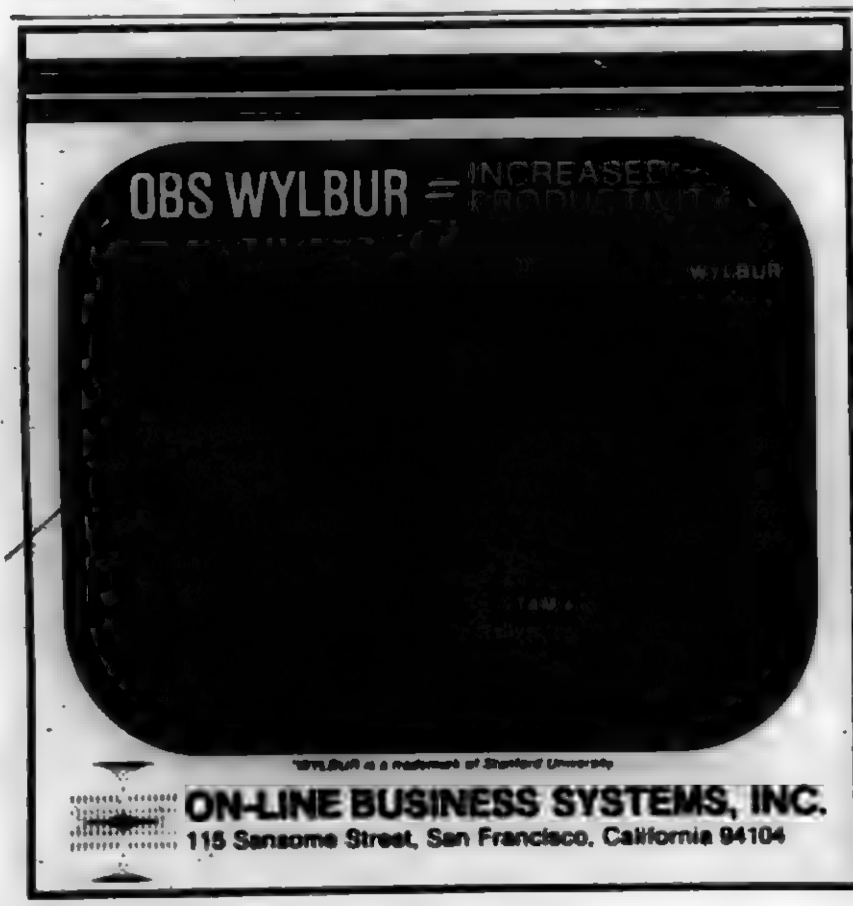
Government Go-Ahead

Its appetite wetted by Sutron's financial savings figures, the government has given the company the go-ahead to continue its research and develop acceptable standards.

The firm's initial goal is to have something on paper by July or August 1981. The proposed standards will then be published in the Federal Register where they will be available for review and industry comment. If accepted, they will become a Federal Information Processing Standard (Fips) about a year later, Dickamore said.

This recent standards movement is part of an NBS plan to release a series of information interchange standards over the next four years [CW, Sept. 29]. In addition to flexible disk file formatting rules, the NBS is seeking to formulate a text editing directives standard, text formatting standards and a message processing standard for computer-based message systems.

All of the proposed standards would be aimed at improving computer communications and integration and aiding electronic mail transmissions between automated offices, a government spokesman noted.



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For 'Wasteful Federal Spending'

DOT Driver System 'Wins' Golden Fleece

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A Department of Transportation (DOT) experimental computer system that gives drivers local travel directions has received the bureaucracy's equivalent of a Bronx cheer — the dreaded "Golden Fleece Award" handed out by Sen. William Proxmire (D-Wis.).

The short-term system, set up for the Washington, D.C., area, provided computer-originated responses to direction inquiries entered by drivers through Touch-Tone telephones. The experiment costs included $241,764 for computer support from a Massachusetts DP services company.

Proxmire's reaction to the project was that "this complex system is no substitute for asking at the nearest gas station." Despite that opinion, the Transportation Department's Federal Highway Administration (FHA), which conducted the experiment, said it would continue with the project.

'Use a Map'

In a statement issued on the December Golden Fleece Award, Proxmire said, "while the system is intended to aid lost motorists and save gasoline, it helps those who need it least. In order to use it, you have to know where you are and where you are going. If you have that much information," Proxmire said, "you can use a map."

The infamous Golden Fleece Award is given, in the official description from Proxmire's office, "to the biggest, most ridiculous or most ironic example of wasteful federal spending for that period."

The tongue-in-cheek tone of the often pun-filled statements accompanying the senator's fleece awards do not hide their serious purpose — to expose waste of taxpayers' dollars.

For this most recent award, Proxmire said, "the effect of this program is to substitute a very sophisticated, overly complex and expensive system for one that is simpler and already available — a map. This is not only paternalistic, but also is an example of technological overkill at its worst."

Ongoing Project

According to Lawrence Powers, chief of the Analysis and Experimentation Group of FHA's Traffic Safety Division, the experiment was to test driver reaction to an automated navigational system and is part of an ongoing project to develop ways to cut down on gasoline wastage and promote traffic safety.

British studies have found, he explained, that about 4% of total driving is wasted, done by "people who are either lost and meandering around trying to find their way to someplace or know where they are going but are not taking the best route."

"If we could recover a fraction of that 4%, when you consider the trillions and trillions of vehicle miles that are racked up every year in this country, if you could save a small portion of that, we're still talking about quite a large saving in fuel as well as travel time," he pointed out.

Powers added that lost drivers can be safety hazards because they tend to drive more erratically, making sudden maneuvers and driving faster than normal.

The experimental system used a computer to provide route information for 43 origins and destinations in the Washington area. The computer selected and played back appropriate parts of prerecorded instructions, depending on the route needed. The caller could enter additional codes through the telephone.

'In order to use the system, you have to know where you are and where you are going. If you have that much information, you can use a map.'

Computer support was provided through facilities here of a minority contractor, Input-Output Computer Services, Inc. of Waltham, Mass.

While money has been set aside for continuing the project next year, the next step is not into the procurement stage yet, he said.

Asked if the Golden Fleece Award would affect the FHA plans, Powers replied: "I don't know. Our feeling here is that we have a good project, that it's a worthwhile activity, has potential for energy and safety savings, and I'm not sure that it's going to affect us very much."

Correction

The correct prices for Insac Software, Inc.'s Shadow II data communications monitor are $20,000 for the DOS version and $40,000 for the OS version. They were listed incorrectly in the Product Spotlight chart specifying characteristics for OS- and DOS-type monitors [CW, Dec. 15]. Correct prices for Task/Master II from Turnkey Systems, Inc. are $42,000 for the DOS version and $58,000 for OS. Prices listed in the copy accompanying the charts are correct.

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Firm Converts OS to DOS in Six Months

(Continued from Page 1)

gram conversions were in an "opposite-to-normal" direction — from OS on the 370/158 to DOS/VSE on the 4331 Group 1 hardware. The "tremendous number of coding changes had to be done manually" because there weren't any packages available for converting OS Cobol programs to DOS format, Paste said.

However, the decision to go in that direction was based on an estimated cost savings of some 20% per month for the seven-year-old general insurance agency currently in the $45 million premium range.

Initial Reluctance

Paste admitted an initial reluctance to move from an OS to a DOS environment although it made sense from an economical standpoint. He thought the changeover might have a negative effect on the career paths of himself and his staff since DOS is generally regarded as less technically sophisticated than OS.

However, an informal look at the trend for companies comparable in size to NDS convinced him that "there will be a bigger demand than ever for programmers who are familiar with DOS/VSE." The 4300 series with DOS/VSE makes it feasible for more organizations in this range to install an in-house computer rather than using outside services, he said.

After attending several IBM-sponsored demonstrations and getting some exposure to its System Installation Productivity Option (Sipo), Paste and his technical group could see no reason why applications programmers couldn't handle the conversion — provided they had the necessary training and tools.

Everyone within the DP area took over a particular assignment for the conversion, according to Paste. Pope was responsible for ordering the hardware and setting up the physical site. This allowed Paste's group to concentrate on the system software considerations.

One of the programmer/analysts with three years of Cobol programming experience was assigned the task of handling all Vsam file considerations. The other programmer/analyst whose background was primarily confined to working with OS/JCL rather than applications programs performs the sysgens, installs software "fixes" as required and maintains CICS.

The two programmer/analysts went to the necessary IBM classes to fulfill their tasks and Paste attended all of the appropriate classes in order to function as a backup when required.

The programmer trainee with some six months of programming background coded the modifications to the 150 Cobol programs. Although the coding changes were extensive "so far, only two [programs] had to be recompiled because of coding errors," Paste said.

Education for the OS to DOS conversion began in May 1980 with Paste describing himself as "scared to death of DOS." Coming from an OS environment, I was concerned by the amount of operator intervention normally associated with the DOS operating systems."

He was also concerned about having to recompile programs if file allocations changed from disk to tape, he said. So, he followed the classic DP route of asking systems programmers and technicians he met at the classes for help and suggestions.

This technical grapevine pointed him towards five software products from Computer Associates, Inc. — products that he felt would make the lives of the OS-turned-DOS programmers easier.

CA-Dynam/T and CA-Dynam/D were installed to handle tape and disk file allocations and CA-Dynam/Fi allowed for switching between tape and disk without the need to rewrite application programs, he explained.

NDS had multiple Vsam files which require operator intervention when abends occur under DOS and used condition codes to control step execution in job streams. To avoid sacrificing the power and flexibility of OS JCL, CA/Driver was installed to minimize operator intervention and simplify JCL and job management, he said. The fifth product was the CA-Sort.

Stressing that none of the staff knew any assembly or machine-level language, Paste felt that the Computer Associates' software was especially helpful to the "nontechnical" applications-oriented staff at NDS.

After generating the Sipo software at the IBM support center and getting the 4331 installed, conversion took place over Labor Day weekend and the system went into production on Sept. 27.

Although originally scheduled for one month of full parallel testing with the 370/158, things went so smoothly under the new system that NDS went off the 158 on the originally estimated cutoff date of Oct. 15.

Upkeep Costs Predicted to Rise 22%/Year

(Continued from Page 1)

and hardware systems with integrated fail-soft capability, dynamic reconfiguration, automatic retry and checkpoint/restart type facilities, the study predicted.

Users should expect to see costs for software maintenance on a per-product basis increase, on the average, as much as hardware maintenance costs. However, the number of software maintenance items charged for during the next three to four years will increase by about 100% per year, the study estimated.

Besides largely personnel-related in-house maintenance expenses, users pay out-of-pocket expenses of nearly $3 billion for hardware and software maintenance, according to the research firm.

Behind the escalation of maintenance costs is IBM's move toward diminished local software support. The introduction of the 4300 in February 1979 set the maintenance philosophy IBM will pursue in coming years.

Prior to the introduction of the 4300, IBM had five main operating systems, the major portion of each classified as a System Control Program (SCP). There were generally no charges for the SCP products or their maintenance. On the other hand, program products (PP) have a monthly licensing fee which includes a component for maintenance.

With the introduction of the 4300, however, IBM reduced the scope of the SCP portion of the operating systems, reclassifying many parts of those systems as program products. While the monthly licensing fee generally includes maintenance, IBM earlier this year determined that for certain program products, visits by local program service representatives are chargeable either on a per-call basis or under maintenance contracts with monthly fees, the report observed.

Most of the SCP features that made DOS/VS workable, such as the ability to handle multiple partitions, were moved from the SCP category to the PP category with the introduction of DOS/VSE, essentially a new version of DOS/VS.

Support Centers

During the same time frame, IBM instituted its powerful support center concept. Under this arrangement, a user with a suspected software problem must first contact the support center which serves as a triage unit, dispatching a local program service representative only in a minority of cases.

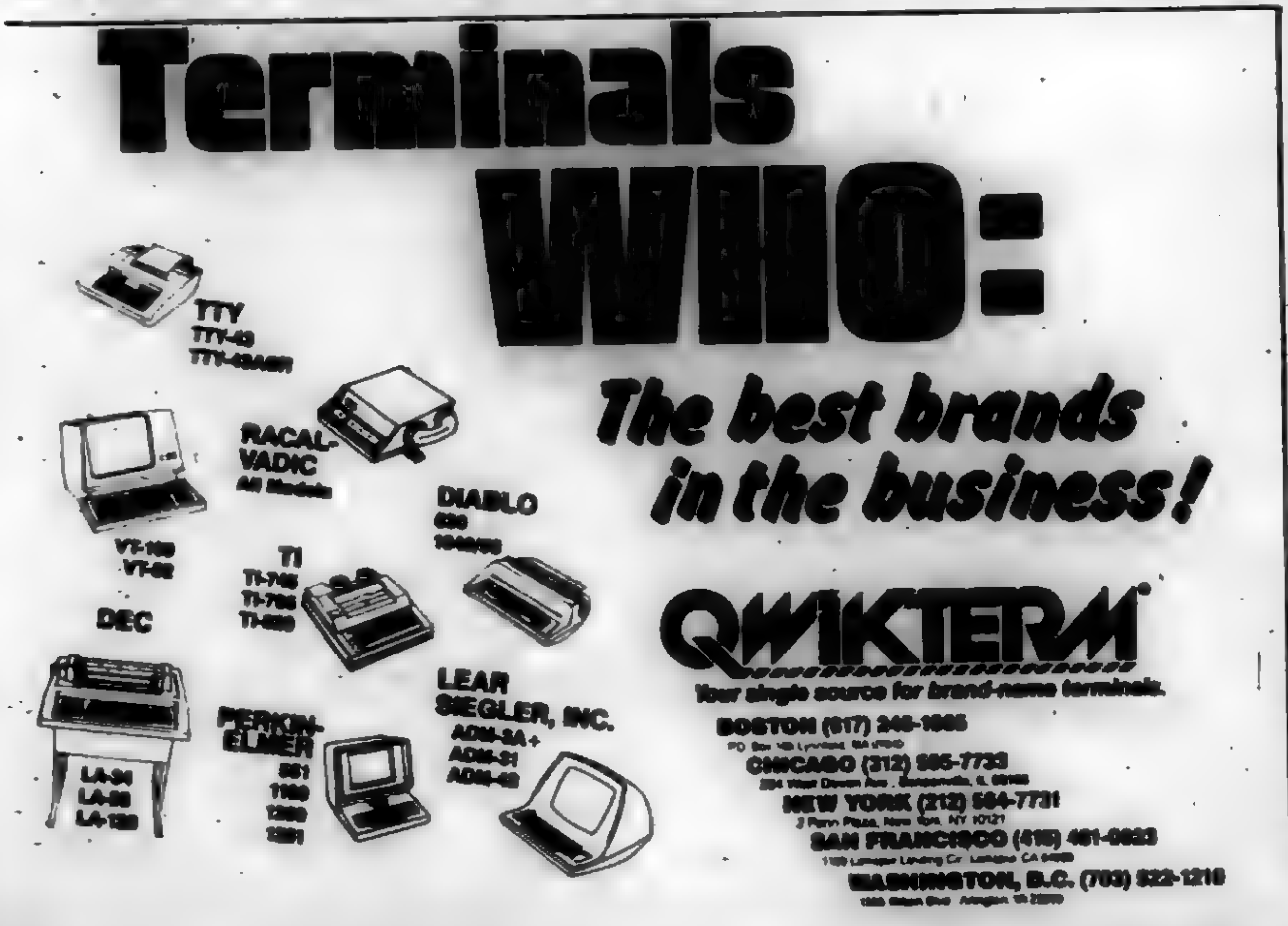
IBM expects two-thirds of all complaints to be resolved in the initial phone call to the support center.

Continuing the trend toward shifting the responsibility for problem identification and resolution to the user, IBM extended its support center coverage to MVS/SP for Series 30 systems and the 3081 and set a maintenance contract in place for local program support. However, IBM will not charge for local support for these systems until January 1982.

However, for these large systems IBM also offers an Information Access facility, a new feature of the Information/Systems Release 2 program product. A tool to improve maintenance capability, the feature allows users to access an IBM data base of customer failure information.

As a result of the unbundling of maintenance, users will have to devote a higher percentage of their already pressed maintenance staffs to activities once supplied by IBM at no charge.

The comprehensive survey entitled "Strategic Analysis of Software and Hardware Maintenance" analyzes IBM's maintenance policies in depth as well as those for other vendors such as Amdahl Corp. and Hewlett-Packard Co. The report costs $1,500 and is available from Strategic Business Services at Suite 215, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.



Data Loss, Falsification Reported

Problems Traced to 90% of Poland's DP Centers

By Bohdan O. Szuprowicz

Special to CW

WARSAW, Poland — More than 90% of the DP centers within Poland's national DP service organization (Zeto) have experienced some loss or accidental falsification of the data during processing, according to an article in *Informatica*, a monthly technical magazine published here.

This was among the problems identified in a study conducted during 1980 by the Military Academy of Politics here.

The academy found that the frequency of such events varied from center to center, with some reporting as many as 100 such instances and others reporting only a few problems during the same period.

The Military Academy of Politics is under the jurisdiction of the Ministry of National Defense, suggesting that the Polish military establishment may also be a user of the Zeto DP network whose performance would thus impact national security.

System Problems

Almost two-thirds of all Zeto service centers — which operate almost exclusively Polish, Soviet and other Eastern European-built computers and peripherals — linked magnetic tape units used with the breakdowns in reliability.

However, 48% of all the centers also reported similar problems resulting from the use of card and paper-tape equipment, and 45% had problems associated with magnetic disk units.

Equipment failures resulting from environmental causes due to inadequate air conditioning systems were reported by more than 63% of the Zeto centers.

Among the causes of these breakdowns, 81% of the centers reported those to be technical in nature, but 82% also reported human error as an important factor. Poor quality of tapes and disks was considered to be the major cause of problems by 26% of the centers.

Damage of magnetic media during transportation and storage was reported as another cause of processing problems by 46% of the centers. Another 36% reported problems due to damage from fire, floods and power failures, and 8% indicated vulnerability to electromagnetic field effects.

Programming error as a cause of bad output was admitted to by only 19% of the centers. More interestingly, only 64% of the centers took the trouble to inform their end-user clients about the existence of such problems or the loss and destruction of data.

Zeto is under the jurisdiction of the Ministry of Science, Higher Education and Technology and operates at least 81 large computers installed at 47 different computing centers throughout Poland.

Most of the equipment consists of Polish-built Odra 1300 series using George-2 and George-3 operating systems of ICL origin and various Riad series computers, some of which are imported from the Soviet Union, East Germany, Hungary, Czechoslovakia and Bulgaria using OS operating systems reportedly similar to IBM software used with 360 and 370 CPUs.

At least half the computer installations within the Zeto inventory are large configurations with multiple tape and disk drives, but unit record and paper tape I/O devices are also used extensively. Only three installations within the network are operated on a time-sharing basis.

Zeto provides DP services to more than 1,000 end-user clients in banking, insurance, commerce, social security, manufacturing, construction, housing and agriculture.

It employs more than 6,000 workers and derives about 75% of its revenues from machine time sales, although systems analysis and programming services are also available.

Although the primary objective of Zeto is to service domestic end users in Poland that are too small to justify their own computers, the organization has also been in the export business since 1978.

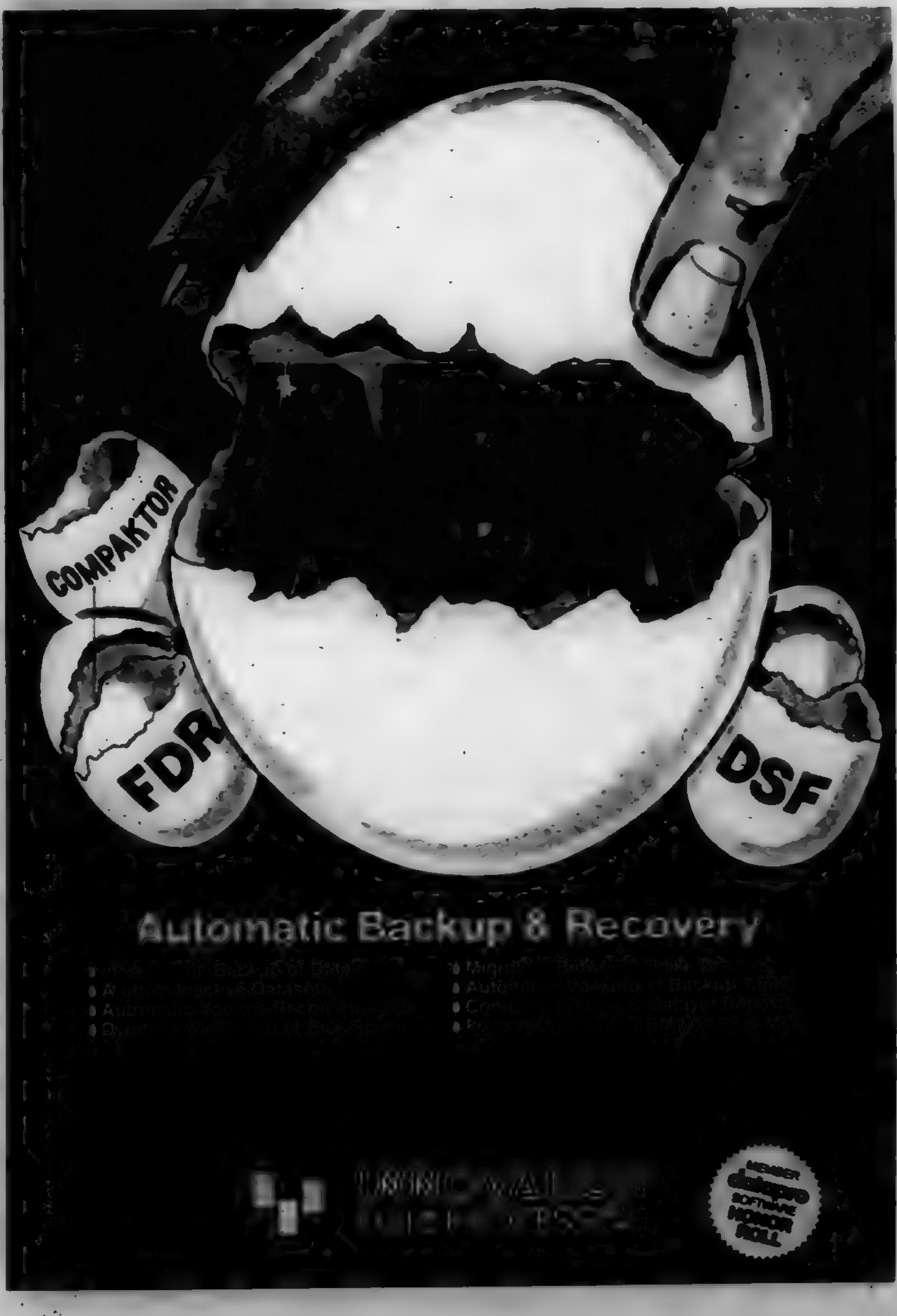
It now promotes and provides its software services not only to other Comecon countries but also in West Germany, Great Britain, France, the Netherlands and "selected" countries of the Third World.

Productivity Topic of Meet

WASHINGTON, D.C. — "Improving Organizational Productivity Through Systems Technology" is the theme of the Executive Computer Conference to be held here April 13-14. The conference is being sponsored by Infosystems.

Trends in the use of computer technology in planning, personnel management and paperwork will be discussed, as well as the impact of small computer technology and managerial decision support systems.

Registration for the conference costs $400. More information can be obtained from Kendall Burroughs at the Executive Computer Conference, Suite 400, 1730 N. Lynn St., Arlington, Va. 22209.



Rising Software Costs Found Offset by Other Savings

By Bruce Hoard
CW Staff

Software expenditures have gone up and will continue in that direction, according to the Datapro Research Corp.'s "User Ratings of Proprietary Software" report. However, increased expenditures are being counterbalanced by savings derived from package usage, the survey discovered.

Just over 86% indicated packages had saved them money. Also, most users achieved positive results through decreased spending in other areas — particularly, human resources (see related story). Only 17.3% claimed no dollar savings and 1.5% reported losses.

The expenditure growth rate from 1979 to 1980 was 21.6% and is expected to drop only slightly to 21.4% between this year and next.

More than 1,000 respondents supplied total dollar expenditure and average dollar expenditure for the three-year period. That information reflects total expenditures of $77,747,000, $112,895,000 and $108,892,000. In terms of average expenditure per user, the figures read $58,766, $71,452 and $86,773.

Table 1 portrays the approximate dollar amount spent, the number and percent of respondents and the relevant year of the expenditure.

Substantial expenditures were reported by the 24.9% of users who made software modifications. Almost 10% spent under $2,000, 8.1% spent between $2,000 and $10,000 and 5.5% expended over $10,000.

The majority (71.4%) of users said they required no modifications, while 13.6% reported modifications paid for by vendors.

	1979	1980	1981
No expenditure	9.6% (205)	6.0% (129)	5.2% (111)
Under $2,000	5.9% (127)	6.5% (139)	3.3% (70)
$2,000-3,999	6.6% (141)	7.1% (152)	5.0% (10[illegible])
$4,000-5,999	5.7% (122)	5.8% (125)	5.0% (108)
$6,000-8,999	4.5% (96)	5.0% (107)	2.7% (58)
$9,000-11,999	4.1% (87)	5.1% (110)	4.5% (97)
$12,000-15,999	4.8% (102)	5.5% (117)	3.7% (79)
$16,000-19,999	1.6% (34)	1.9% (41)	1.2% (25)
$20,000-29,999	6.6% (140)	7.1% (152)	7.6% (163)
$30,000-39,999	3.6% (77)	4.9% (105)	4.2% (90)
$40,000-49,999	2.0% (42)	3.3% (71)	2.6% (56)
$50,000-69,999	3.7% (80)	3.9% (83)	3.6% (78)
$70,000-99,999	3.4% (72)	4.2% (90)	3.5% (75)
$100,000-199,999	4.3% (91)	6.4% (136)	6.4% (136)
$200,000-499,999	2.4% (52)	3.1% (67)	3.8% (81)
$500,000 or more	1.3% (28)	1.8% (39)	1.6% (35)
No answer	30.1% (644)	22.2% (476)	36.2% (775)

Table 1

Chart Courtesy of Datapro

Datapro's Methods Based On Analyses by Clusters

The Datapro "User Ratings of Proprietary Software" report employed "cluster methodology" in an effort to classify its results.

Survey designers decided to establish four categories, or clusters, in which to report results.

They could have chosen any number but decided on four. Looking at it in academic grading terms, Cluster 1 represents an "A," Cluster 2 a "B" and so on.

In the case of reliability (see Table 2), the top range of answers (Cluster 1) ran from a low of 3.28 to a theoretical high of 4.

Integrity of Ratings

With four clusters, or categories, to choose from and based on the entire range of replies, it was decided that to include any score below 3.28 would impugn the integrity of those highest, and most favorable, ratings.

Separate cluster analyses were made for all 289 packages *fully* rated by three or more respondents.

Although 301 packages were evaluated by three or more users, key questions were not answered on some questionnaires, leading to disqualification of 12.

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Reliability	3.28 - 4.00	2.85 - 3.27	2.16 - 2.85	below 2.16
Troubleshooting	3.20 - 4.00	2.83 - 3.19	2.00 - 2.82	below 2.00
Efficiency	3.46 - 4.00	2.88 - 3.44	2.00 2.86	below 2.00
Documentation	3.16 - 4.00	2.67 - 3.14	2.16 - 2.88	below 2.16
Ease of Installation	3.42 4.00	2.88 3.41	2.00 2.87	below 2.00
User Education	3.33 4.00	2.88 3.32	2.16 2.84	below 2.16
Ease of Use	3.34 4.00	2.71 3.33	2.20 2.70	below 2.20
Vendor Maintenance	3.60 4.00	3.00 3.59	2.00 2.99	below 2.00
Overall Satisfaction	3.80 4.00	2.78 3.49	2.00 2.76	below 2.00

Chart Courtesy of Datapro

Table 2

Two-Page Questionnaire

The Datapro "User Ratings of Proprietary Software" survey was sent to 5,000 names from the *Computerworld* circulation list late last summer and consisted of a two-page questionnaire.

Recipients were broken down by title, occupation or function and business and industry classification. Typical titles included director of operations planning, director of DP, systems manager and manager of programming.

Business and industry classifications included wholesale and retail trade, financial institutions, insurance companies and real estate firms, non-DP business services and government.

The return rate was 60.9%: A total of 3,033 surveys were received. As could be expected, not all questionnaires were completely filled out. The survey results are based on those questionnaires in which at least one software package was evaluated. A package evaluation was not done unless the package received at least three ratings. The number of respondents rating one package was 1,055; 496 rated two and 589 rated three or more. In order to be eligible for evaluation, software packages must have been either tested or used extensively within the past year.

The mean average rating of each package was established on a scale of one to four, with four meaning excellent and one, poor.

Users Say Software Performs as Promised

(Continued from Page1)

system from Goal Systems Corp; IBM's System Support Programming (SSP), the operating system for the System/34; FMS-11, a multikey Isam file management structure from NCA Corp.; and Com-plete, a teleprocessing system from Software AG of North America, Inc.

An overwhelming 81.9% of users said they use software priced separately from computer vendors, while 26.4% indicated an exclusive reliance on vendor packages. An additional 13.8% said they use only independently supplied software and 58.5% rely on both computer and independent vendors.

DP managers play an integral role in software evaluation and acquisition, according to the survey. On the evaluation side, 90.3% said they participate, while a slightly lesser 80.9% said the DP manager is responsible for approving acquisitions.

See charts covering Datapro's "User Ratings of Proprietary Software" on Pages 11-20.

Total expenditures for software packages rose substantially from 1979 to 1980, the survey noted, adding that trend is expected to continue throughout 1981 (see story on Page 10).

Slightly less than one-third (30.9%) of all packages rated had been used or tested prior to 1978, an even 20% were used/tested in 1978, 30.4% were used/tested during 1979 and 31.2% were used/tested this year.

The survey also attempted to probe the users' "share of mind," or the software package that comes first to mind; "share of market," the package used most in the past year; and "share of future market," the package most likely to be bought next.

"Unsure" and data management topped the bill in all three categories, with the former rating first under share of future market and the latter occupying the top slot in the other two categories. Among the runners-up, system utilities, accounting, manufacturing and data communications all posted strong showings.

Asked to identify their mode of software acquisition, users indicated 65.3% of packages were acquired under permanent lease, 18.3% by long-term lease and 29.1% via short-term lease.

Cluster Methodology

A total of 301 packages supplied by 124 vendors were evaluated three or more times and rated through the use of cluster methodology (see related story). The following criteria were considered on a one-to-four-point scale, with four being excellent and one regarded as poor:

- Reliability.
- Efficiency.
- Ease of installation.
- Ease of use.
- Vendor's technical support (trouble-shooting, documentation and user education).
- Vendor's maintenance.
- Overall satisfaction.

Flee/Flim, SSP, FMS-11 and Com-plete were the only four packages rated in the top cluster for all nine criteria. However, 38 packages broke into the top cluster for overall satisfaction and were rated at least second in the other eight categories.

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Users Rate Their Software

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Admins, Inc.										
ADMINS-11	5	3.4	3.8	3.8	4.0	3.0	2.9	3.0	3.0	3.4
Allen Services, Inc.										
MSI	6	3.7	3.5	3.6	3.5	3.3	3.0	2.8	3.5	3.2
Altergo (now Insac Software)										
SHADOW II	10	3.6	3.7	3.7	3.8	3.1	3.1	2.9	3.0	3.5
SYSTEM/MANAGER	7	3.6	3.6	3.7	3.7	3.2	2.7	2.4	3.2	3.5
American Appraisal Assoc.										
Fixed Assets	3	3.7	3.0	4.0	2.7	3.0	3.0	3.3	3.0	3.3
Application Software, Inc.										
ASI-ST	6	3.8	3.4	3.6	3.0	2.2	3.0	2.4	2.8	3.0
Applied Data Research, Inc.										
DATACOM/DB	7	3.7	3.9	2.8	3.6	3.5	2.9	3.4	3.2	3.7
LIBRARIAN	42	3.6	3.4	3.5	3.5	3.2	3.2	3.0	3.2	3.4
LOOK	4	3.8	3.8	3.8	3.8	3.5	3.5	3.3	3.3	3.8
ROSCOE	27	3.7	3.5	3.2	3.5	3.0	3.1	3.1	3.3	3.4
VOLLIE	20	3.8	3.8	3.6	3.9	3.6	3.6	3.2	3.6	3.8
Ariste Mfg. Systems										
ARISTA	3	3.3	2.7	3.0	3.0	3.5	3.0	3.0	3.5	3.5
Arthur Andersen & Co.										
Accounts Payable	3	3.0	2.3	2.0	2.3	1.7	2.7	2.3	1.7	2.3
General Ledger	3	2.7	2.7	2.7	3.0	2.3	3.0	2.0	2.3	2.7
MAC-PAC	3	3.0	1.3	2.3	2.3	2.0	2.7	3.0	1.7	2.0
ASK Computer Services										
FINMAN	4	4.0	3.3	4.0	4.0	2.7	2.0	2.0	3.0	3.7
MANMAN	6	3.5	2.3	3.3	3.3	3.0	2.0	2.3	2.8	2.8
Atlantic Software, Inc.										
PC/70	7	2.9	2.0	2.7	2.6	2.4	2.8	2.9	2.8	2.6
Bancroft Computer Systems										
General Ledger	3	3.3	3.0	2.7	3.0	2.7	3.0	2.3	3.3	2.7
Boole & Babbage										
RESOLVE	3	3.3	3.7	3.0	3.0	2.3	2.7	2.5	2.3	3.0
Burroughs Corp.										
Accounts Payable	4	3.0	3.0	3.0	2.5	2.0	2.5	1.8	2.0	2.8
Audit Reporter	5	3.4	2.4	3.4	2.8	2.2	1.8	2.8	2.4	2.8
BHAS II	8	2.9	2.3	2.3	2.8	2.4	1.9	1.9	2.0	2.5
CANDE	10	3.8	3.6	3.7	3.6	3.3	2.9	2.6	3.1	3.5
CBMS II	6	2.8	2.6	2.7	3.2	2.0	2.8	2.2	2.3	2.3
COBOL	5	3.6	2.8	3.6	3.4	2.4	2.4	2.0	2.2	3.0
DMS II	28	3.3	2.9	3.1	3.1	2.5	2.3	2.5	2.6	3.0
FORTE II	6	3.6	2.6	3.0	3.2	2.8	3.0	2.4	2.8	3.0
General Ledger	3	3.3	3.3	3.0	3.0	1.7	3.0	1.7	2.0	2.7

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Admins, Inc.										
ADMINS-11	5	1	1	1	1	2	2	2	2	2
Allen Services, Inc.										
MSI	6	1	1	1	1	1	2	3	2	2
Altergo (now Insac Software)										
SHADOW II	10	1	1	1	1	2	2	2	2	1
SYSTEM/MANAGER	7	1	1	1	1	2	2	3	2	1
American Appraisal Assoc.										
Fixed Assets	3	1	2	1	3	2	2	1	2	2
Application Software, Inc.										
ASI-ST	6	1	2	1	2	3	2	3	3	2
Applied Data Research, Inc.										
DATACOM/DB	7	1	1	3	1	1	2	1	2	1
LIBRARIAN	42	1	2	1	1	1	1	2	2	2
LOOK	4	1	1	1	1	1	1	2	2	1
ROSCOE	27	1	1	2	1	2	2	2	2	2
VOLLIE	20	1	1	1	1	1	1	2	1	1
Ariste Mfg. Systems										
ARISTA	3	1	2	2	2	1	2	2	2	1
Arthur Andersen & Co.										
Accounts Payable	3	2	3	3	3	4	2	3	4	3
General Ledger	3	2	2	3	2	3	2	4	3	3
MAC-PAC	3	2	4	3	3	3	2	2	4	3
ASK Computer Services										
FINMAN	4	1	2	1	1	2	4	4	2	1
MANMAN	6	1	3	2	1	2	4	3	3	2
Atlantic Software, Inc.										
PC/70	7	2	3	3	3	3	2	2	3	3
Bancroft Computer Systems										
General Ledger	3	1	2	3	2	2	2	3	2	3
Boole & Babbage										
RESOLVE	3	1	1	2	2	3	2	3	3	2
Burroughs Corp.										
Accounts Payable	4	2	2	2	3	3	3	4	3	2
Audit Reporter	5	1	3	2	2	3	4	3	3	2
BHAS II	8	2	3	3	2	3	4	4	3	3
CANDE	10	1	1	1	1	1	2	3	2	1
CBMS II	6	2	3	3	2	3	2	3	3	3
COBOL	5	1	2	1	1	3	3	4	3	2
DMS II	28	1	2	2	2	3	3	3	3	2
FORTE II	6	1	3	2	2	2	2	3	3	2
General Ledger	3	1	2	2	2	4	2	4	3	3
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.86 to 3.27	2.85 to 3.44	2.88 to 3.41	2.71 to 3.23	2.63 to 3.19	2.67 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.85	2.00 to 2.85	2.00 to 2.87	2.33 to 2.70	2.00 to 2.62	2.14 to 2.66	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software . . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Burroughs Corp. (Continued)										
GEMCOS	5	3.4	3.0	3.5	3.2	2.6	2.4	3.0	2.4	3.0
MCP	5	3.8	3.6	3.6	3.8	2.8	3.0	2.8	3.4	3.4
NDL	9	3.7	3.2	3.2	3.6	2.0	2.6	2.4	2.1	3.1
ODESY	6	3.3	2.7	3.0	3.5	2.6	2.7	2.0	2.7	2.5
Payroll	4	2.5	3.3	2.5	3.6	1.3	2.3	1.3	2.0	1.8
PCS II	7	3.1	3.3	3.1	3.0	2.9	2.6	3.0	3.1	3.1
Text Editor	7	3.9	3.4	3.6	3.4	2.6	2.7	2.3	3.0	3.4
THRIFT	4	3.3	3.3	3.0	3.0	2.5	2.8	2.3	2.8	3.0
Business EDP										
PRO	4	3.5	3.3	3.5	4.0	3.0	3.3	3.5	3.5	3.5
Cambridge Systems Group										
ACF2	7	3.9	3.1	2.5	2.7	3.4	2.9	2.9	3.3	3.1
ASM2	4	3.3	3.0	2.3	2.5	2.8	1.8	2.5	2.8	3.0
Candle Corp.										
OMEGAMON	5	3.8	3.4	3.6	3.6	3.7	3.2	3.3	3.5	3.8
Capex Corp.										
MANAGE/IMS	3	3.0	3.0	3.3	3.0	2.3	2.7	2.3	2.3	2.3
OPTIMIZER III	12	3.7	3.3	3.5	3.4	3.3	3.2	3.0	3.5	3.6
TLMS	3	3.7	3.3	3.0	3.3	2.7	3.0	2.5	3.0	3.3
Century Analysis										
BOSS/3	11	3.6	3.5	3.5	3.5	3.5	3.2	3.6	3.5	3.7
Cincom Systems										
ENVIRON/1	7	3.0	2.7	1.7	2.3	2.3	2.1	2.3	2.7	2.3
TOTAL	46	3.5	3.1	3.2	3.2	2.9	2.8	3.0	3.0	3.1
Computer Associates										
CA-SORT	38	3.9	3.9	3.8	3.9	3.4	3.3	3.2	3.5	3.7
DYNAM/D	14	3.7	3.3	3.3	3.6	3.2	3.3	2.9	3.5	3.6
DYNAM/FI	5	3.4	3.6	3.6	3.6	2.6	2.8	2.4	3.0	3.2
DYNAM/T	29	3.7	3.5	3.7	3.8	3.4	3.1	2.9	3.4	3.6
JASPER+	8	3.4	3.1	2.9	2.8	2.6	2.8	1.8	2.3	3.0
Comserv Corp.										
AMAPS	4	3.8	3.3	2.8	3.0	3.3	3.5	3.3	3.0	3.0
The Continuum Co.										
LIFE/70	3	3.7	3.0	2.3	2.7	2.7	3.3	3.0	3.3	2.7
Cullinane Corp.										
CULPRIT	10	3.4	3.1	3.4	3.2	3.1	2.6	2.8	3.0	3.2
EDP AUDITOR	4	3.3	3.3	2.8	3.0	2.8	2.8	3.0	2.8	3.0
IDD	3	3.0	2.7	3.3	2.3	2.3	2.0	2.7	2.7	2.7
IDMS	35	3.3	3.1	2.9	3.1	3.0	2.8	3.2	3.0	3.2
INTERACT	3	3.3	3.3	3.3	3.3	3.3	3.3	2.3	2.5	3.0
Cyborg Systems										
Payroll	3	3.0	2.5	2.5	2.5	3.0	2.0	3.0	3.0	3.0

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

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Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Burroughs Corp. (Continued)										
GEMCOS	5	1	2	1	2	2	3	2	3	2
MCP	5	1	1	1	1	2	2	3	2	2
NDL	9	1	2	2	1	3	3	3	3	2
ODESY	6	1	2	2	1	2	2	4	3	3
Payroll	4	3	2	3	1	4	2	4	3	4
PCS II	7	2	2	2	2	2	2	2	2	2
Text Editor	7	1	2	1	1	2	2	3	2	2
THRIFT	4	2	2	2	2	3	2	3	3	2
Business EDP										
PRO	4	1	2	1	1	2	1	1	2	1
Cambridge Systems Group										
ACF2	7	1	2	3	2	1	2	2	2	2
ASM2	4	2	2	3	3	2	4	3	3	2
Candle Corp.										
OMEGAMON	5	1	2	1	1	1	1	1	2	1
Capex Corp.										
MANAGE/IMS	3	2	2	2	2	3	2	3	3	3
OPTIMIZER III	12	1	2	1	1	1	1	2	2	1
TLMS	3	1	2	2	1	2	2	3	2	2
Century Analysis										
BOSS/3	11	1	1	1	1	1	1	1	2	1
Cincom Systems										
ENVIRON/1	7	2	2	4	4	3	3	3	3	3
TOTAL	46	1	2	2	1	2	2	2	3	2
Computer Associates										
CA-SORT	38	1	1	1	1	1	1	2	2	1
DYNAM/D	14	1	2	2	1	1	1	2	2	1
DYNAM/FI	5	1	1	1	1	2	2	3	2	2
DYNAM/T	29	1	1	1	1	1	2	2	2	1
JASPER+	8	1	2	2	2	2	2	4	3	2
Comserv Corp.										
AMAPS	4	1	2	3	2	1	1	2	2	2
The Continuum Co.										
LIFE/70	3	1	2	3	3	2	1	2	2	3
Cullinane Corp.										
CULPRIT	10	1	2	2	2	2	2	3	2	2
EDP AUDITOR	4	2	2	3	2	2	2	2	3	2
IDD	3	2	2	2	3	3	4	3	3	3
IDMS	35	1	2	2	2	2	2	2	2	2
INTERACT	3	1	2	2	1	1	1	3	3	2
Cyborg Systems										
Payroll	3	2	3	3	3	2	4	2	2	2
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.46 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.63 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.62	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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. . . In a Variety of Categories

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Data Design Assoc. Fixed Assets	7	3.6	3.0	3.1	3.0	3.3	3.4	3.0	2.4	3.1
Data General Corp. AOS	4	3.3	3.0	3.8	3.5	2.3	2.0	2.7	2.3	3.0
Data Processing Design WORD-11	4	3.8	3.0	2.8	3.3	2.8	3.0	3.0	3.0	3.5
Data Systems for Industry Acct. Sys.	3	3.3	2.0	3.3	2.7	2.7	2.3	2.3	2.7	3.0
Digital Equipment Corp.										
BASIC-PLUS-TWO	3	4.0	2.7	3.3	3.3	2.7	3.0	3.5	3.0	3.3
COBOL	3	3.5	2.5	3.0	3.5	2.7	2.8	3.0	3.0	3.0
DATATRIEVE	11	3.5	3.0	3.8	3.3	2.3	2.5	2.2	2.7	3.0
DBMS-10	3	3.3	2.7	2.7	2.7	1.7	2.7	2.7	2.0	2.7
FORTRAN	6	3.6	3.5	3.4	3.6	2.7	3.0	3.0	2.8	3.3
RMS 11	5	3.8	3.4	3.2	3.0	3.2	3.2	3.0	3.2	3.2
RSTS/E	6	3.8	3.3	3.2	3.5	2.0	2.8	2.3	2.7	3.2
RSX-11M	12	3.4	3.0	3.1	3.0	2.7	3.2	3.1	3.3	3.3
RT-11	5	4.0	4.0	3.8	3.4	3.8	3.4	3.4	3.4	3.6
WISE	3	2.7	1.3	3.0	2.3	1.5	1.6	2.0	1.5	2.3
Digital Research CP/M	9	3.3	3.0	2.9	3.0	2.3	2.3	1.9	2.7	3.1
DNA Systems TSO	5	3.6	3.0	3.6	3.4	3.4	3.0	2.6	3.4	3.2
Dylakor Software Systems										
DYL-250	5	3.6	3.4	3.6	3.2	3.3	3.2	4.0	3.5	3.6
DYL-260	22	3.7	3.5	3.5	3.1	3.2	3.0	2.8	3.1	3.4
ETOS General Ledger	3	3.7	3.3	3.3	3.3	3.0	3.0	2.7	3.0	3.3
Evans/Griffiths/Hart KDSS	3	3.7	3.3	3.3	3.3	3.7	3.0	2.0	3.3	3.7
Execucom Systems IFPS	3	3.7	2.3	2.7	3.7	3.0	3.0	3.3	3.0	3.3
Florida Software										
Certificates of Deposit	7	2.9	2.3	1.6	3.0	1.9	2.3	2.0	1.7	2.0
DDA Savings	3	2.3	1.7	2.3	2.7	1.7	2.0	1.7	1.7	2.0
Fortex Data Corp.										
Accounts Receivable	3	2.7	2.3	3.0	2.7	2.3	2.7	2.3	3.0	2.7
C-ARMS	3	3.0	2.7	2.6	3.3	2.0	2.7	2.3	2.3	3.0
Four-Phase Systems DATA IV	4	3.0	3.5	4.0	3.8	3.0	2.3	2.5	2.8	3.3

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Data Design Assoc. Fixed Assets	7	1	2	2	2	1	1	2	3	2
Data General Corp. AOS	4	2	2	1	1	3	4	3	3	2
Data Processing Design WORD-11	4	1	2	3	1	2	2	2	2	1
Data Systems for Industry Acct. Sys.	3	1	3	2	3	2	3	3	3	2
Digital Equipment Corp.										
BASIC-PLUS-TWO	3	1	1	2	1	2	2	1	2	2
COBOL	3	1	3	2	1	2	3	2	2	2
DATATRIEVE	11	1	2	1	1	3	3	3	3	2
DBMS-10	3	1	2	3	3	4	2	3	3	3
FORTRAN	6	1	1	2	1	2	2	2	3	2
RMS 11	5	1	2	2	2	1	1	2	2	2
RSTS/E	6	1	2	2	1	3	2	3	3	2
RSX-11M	12	1	2	2	2	2	1	2	2	2
RT-11	5	1	1	1	1	1	1	1	2	1
WISE	3	2	4	2	3	4	4	4	4	3
Digital Research CP/M	9	1	2	2	2	3	3	4	3	2
DNA Systems TSO	5	1	2	1	1	1	2	3	2	2
Dylakor Software Systems										
DYL-250	5	1	2	1	2	1	1	1	2	1
DYL-260	22	1	1	1	2	2	2	3	2	2
ETOS General Ledger	3	1	2	2	1	2	2	3	2	2
Evans/Griffiths/Hart KDSS	3	1	2	2	1	1	2	4	2	1
Execucom Systems IFPS	3	1	3	3	1	2	2	1	2	2
Florida Software										
Certificates of Deposit	7	2	3	4	2	4	3	4	4	3
DDA Savings	3	3	4	3	3	4	4	4	4	3
Fortex Data Corp.										
Accounts Receivable	3	2	3	2	3	3	2	3	2	3
C-ARMS	3	2	2	3	1	3	2	3	3	2
Four-Phase Systems DATA IV	4	2	1	1	1	2	3	3	3	2

NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:

	Reliability	Efficiency	Ease of Installation	Ease of Use	Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Cluster 1	3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2	2.86 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.23	2.63 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3	2.10 to 2.85	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.62	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4	Below 2.10	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software . . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Gepac, Inc.										
ARSAP	3	3.0	3.0	3.0	2.7	2.3	2.3	1.7	2.0	2.3
Goal Systems										
FLEE/FLIM	14	3.9	3.8	3.4	3.9	3.5	3.5	3.4	3.8	3.6
Henco, Inc.										
INFO	3	3.7	2.7	3.3	3.7	3.3	2.3	2.7	3.5	3.3
Hewlett-Packard Co.										
IMAGE/1000	3	3.7	2.7	3.3	3.0	3.5	3.7	3.7	3.0	3.0
IMAGE/3000	18	4.0	3.8	3.7	3.7	3.3	3.4	3.2	3.5	3.7
KSAM/3000	3	2.7	2.7	3.3	2.7	2.3	2.7	2.3	3.3	2.3
MFG/3000	6	3.2	2.8	3.8	3.2	2.8	2.8	2.8	3.3	3.2
MPE	3	3.3	3.3	3.7	3.7	2.7	3.0	3.0	3.0	3.0
QUERY	3	3.7	3.3	3.3	3.7	3.3	3.7	3.3	3.3	3.0
VIEW/3000	6	3.5	3.0	3.5	3.5	3.0	3.0	2.8	3.3	3.3
Honeywell Information Systems										
DM-IV	6	3.3	3.2	3.0	3.0	2.7	2.5	2.7	2.8	3.0
GCOS	9	3.4	3.2	2.8	3.1	2.4	2.3	2.6	2.6	2.8
IDS	7	2.9	2.9	2.3	2.4	2.6	2.4	2.3	2.4	2.7
IMS	8	3.6	3.3	3.1	3.0	3.5	2.6	2.8	3.1	2.8
TDS	10	3.3	3.2	2.8	3.1	2.4	2.7	2.6	2.4	2.9
TPS	3	3.0	2.7	1.7	2.3	2.3	1.7	2.3	2.5	2.0
IBM Corp.										
Accounts Payable (S/3)	4	3.0	2.5	2.5	3.0	1.7	3.0	2.5	1.5	2.8
Accounts Payable (S/34)	5	3.2	3.0	3.2	3.0	2.8	3.4	2.8	3.4	3.2
Accounts Receivable (S/3)	4	3.3	2.8	3.3	2.8	2.0	2.0	2.0	2.0	3.0
Accounts Receivable (S/34)	4	2.5	2.8	2.8	2.8	2.0	2.8	2.5	2.3	2.8
ACF/VTAM	6	3.3	3.2	2.2	2.8	2.3	3.0	2.7	2.8	3.0
ADF	5	3.0	2.4	2.6	3.2	2.8	2.6	2.6	2.0	2.8
Alpha Search	3	4.0	3.3	3.0	3.3	3.3	2.7	2.5	2.7	3.0
ATMS	3	3.0	2.3	2.7	3.0	2.3	2.3	2.7	3.0	3.0
BOMP (S/3)	12	3.3	2.8	2.4	2.8	2.4	2.8	2.3	2.5	2.8
CICS	103	3.2	2.8	2.4	2.7	2.8	2.7	2.7	2.8	2.9
CMAS (S/3/32/34)	9	3.1	2.2	2.2	2.4	2.9	2.4	2.3	2.9	2.4
COBOL (360/370)	10	3.5	3.0	2.9	3.1	2.7	3.0	2.7	2.7	3.0
COBOL (S/34)	3	3.3	3.3	4.0	3.7	2.3	2.3	2.3	2.3	3.3
COPICS	15	2.8	2.3	2.4	2.6	2.3	1.9	2.2	2.4	2.5
Database Tech (S/3)	7	3.4	3.3	2.9	3.3	3.0	3.4	2.7	3.0	3.0
Database Tech (S/34)	3	3.3	3.3	3.3	3.3	3.0	3.3	3.0	3.0	3.3
Data Dictionary	4	3.3	2.0	2.5	2.8	2.8	2.8	3.3	3.0	3.0
DBOMP	3	2.3	2.3	2.0	2.3	1.7	1.7	1.3	1.7	2.0
DFAS II (S/34)	5	3.4	3.2	3.2	3.2	2.8	2.6	2.8	3.0	3.0
DFAS (S/32)	4	3.5	2.5	2.5	3.5	2.0	3.3	2.8	2.3	3.0
DITTO	3	3.5	3.0	3.0	3.0	2.0	2.0	3.0	3.0	3.0
DMAS II	6	2.2	2.3	2.3	2.2	2.0	2.2	2.3	2.2	2.2
DMS	14	2.8	2.3	2.7	2.6	1.9	2.0	2.3	2.3	2.1
DOS/VS	4	3.0	3.0	2.5	3.3	3.5	3.0	2.8	3.0	2.8
DOS/VS DL/1	12	3.2	2.4	2.8	2.9	2.3	2.4	2.6	2.8	2.8
DOS/VSE	3	3.0	3.0	2.3	3.0	2.7	2.7	2.5	3.0	3.0
EDX	6	3.0	2.8	3.3	3.0	2.8	3.0	1.8	2.8	3.0
EPIC SOCRATES	3	3.3	2.7	2.3	2.7	2.3	2.7	2.0	2.3	2.7

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction
						Trouble Shooting	Documentation	User Education		
Gepac, Inc										
ARSAP	3	2	2	2	3	3	3	4	3	3
Goal Systems										
FLEE/FLIM	14	1	1	1	1	1	1	1	1	1
Henco, Inc										
INFO	3	1	2	2	1	1	3	3	2	2
Hewlett-Packard Co										
IMAGE/1000	3	1	2	2	2	1	1	1	2	2
IMAGE/3000	18	1	1	1	1	1	1	2	2	1
KSAM/3000	3	2	2	2	3	3	2	3	2	3
MFG/3000	6	2	2	1	2	2	2	3	2	2
MPE	3	1	2	1	1	2	2	2	2	2
QUERY	3	1	2	2	1	1	1	1	2	2
VIEW/3000	6	1	2	1	1	2	2	3	2	2
Honeywell Information Systems										
DM-IV	6	1	2	2	2	2	3	3	3	2
GCOS	9	1	2	3	2	3	3	3	3	2
IDS	7	2	2	3	3	2	3	3	3	3
IMS	8	1	2	2	2	1	2	3	2	2
TDS	10	1	2	3	2	3	2	3	3	2
TPS	3	2	2	4	3	3	4	3	3	3
IBM Corp.										
Accounts Payable (S/3)	4	2	3	3	2	4	2	3	4	2
Accounts Payable (S/34)	5	2	2	2	2	2	1	3	2	2
Accounts Receivable (S/3)	4	2	2	2	2	3	4	4	3	2
Accounts Receivable (S/34)	4	2	2	3	2	3	2	3	3	2
ACF/VTAM	6	1	2	3	2	3	2	3	3	2
ADF	5	2	3	3	2	2	2	3	3	2
Alpha Search	3	1	2	2	1	1	2	3	3	2
ATMS	3	2	3	3	2	3	3	3	2	2
BOMP (S/3)	12	1	2	3	2	3	2	3	3	2
CICS	103	2	3	3	2	2	2	3	3	2
CMAS (S/3/32/34)	9	2	3	3	3	2	3	3	3	3
COBOL (360/370)	10	1	2	2	2	2	2	3	3	2
COBOL (S/34)	3	1	2	1	1	3	3	3	3	2
COPICS	15	2	3	3	3	3	4	3	3	3
Database Tech (S/3)	7	1	2	3	1	2	1	3	2	2
Database Tech (S/34)	3	1	2	2	1	2	1	2	2	2
Data Dictionary	4	2	3	3	2	2	2	2	2	2
DBOMP	3	3	3	3	3	4	4	4	4	3
DFAS II (S/34)	5	1	2	2	2	2	2	3	2	2
DFAS (S/32)	4	1	3	3	1	3	1	3	3	2
DITTO	3	1	2	2	2	3	4	2	2	2
DMAS II	6	3	3	3	4	3	3	3	3	3
DMS	14	2	3	3	3	4	4	3	3	3
DOS/VS	4	2	2	3	1	1	2	3	2	2
DOS/VS DL/1	12	2	3	3	2	3	3	3	3	2
DOS/VSE	3	2	2	3	2	2	2	3	2	2
EDX	6	2	2	2	2	2	2	4	3	2
EPIC SOCRATES	3	1	2	3	3	3	2	4	3	3
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.86 to 3.27	2.89 to 3.44	2.88 to 3.41	2.71 to 3.23	2.83 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.85	2.00 to 2.88	2.00 to 2.87	2.33 to 2.70	2.00 to 2.82	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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. . . And Their Manufacturers

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
IBM Corp. (Continued)										
ETSS	7	2.9	2.7	2.0	2.7	2.4	2.8	2.4	2.7	2.4
Fixed Assets (S/3/32/34)	11	2.8	2.5	3.2	2.9	2.5	2.7	2.8	2.3	2.7
General Ledger (S/3)	6	3.2	2.8	2.5	2.2	2.3	3.2	2.6	2.5	2.3
General Ledger (S/34)	6	3.0	2.8	2.3	2.7	2.4	3.0	2.8	3.4	2.7
HCS PCS	5	3.2	2.4	1.8	2.8	2.0	2.4	2.2	2.0	2.8
HFMS	6	3.0	2.7	2.5	2.6	3.0	3.8	3.0	2.8	2.4
ICCF	12	3.2	3.0	2.9	3.6	2.8	2.9	2.4	2.8	3.3
IDES II (S/1)	3	4.0	4.0	3.3	3.3	2.7	3.0	3.0	3.3	3.3
IMS	29	3.4	2.4	2.3	2.5	3.0	2.8	2.7	3.0	2.9
IPICS (S/3)	16	3.3	2.9	2.3	2.5	2.2	2.5	2.0	2.0	2.9
MAPICS Order Entry	3	3.3	2.7	3.7	3.7	2.7	3.3	2.7	3.0	3.3
MAPICS Payroll	7	3.0	2.7	2.3	2.7	2.7	2.2	2.0	2.5	2.7
MAPICS PDM	3	4.0	3.0	2.7	3.0	2.7	3.0	2.7	3.0	2.7
MAPICS (S/34)	40	3.4	2.8	2.9	2.8	2.3	2.9	2.6	2.9	2.7
MMAS (S/32)	3	3.0	2.3	3.3	2.7	2.3	3.3	3.0	3.3	2.7
MMAS-Payroll System	3	3.7	1.7	2.0	2.3	2.0	3.0	3.0	2.3	2.3
MVS/SE	7	3.3	3.1	3.4	3.4	3.0	3.1	2.8	3.3	3.3
Payroll (S/3)	7	3.0	2.9	2.4	2.6	2.5	2.6	2.2	2.3	2.7
Payroll (S/34)	5	3.2	3.0	2.8	2.8	2.8	2.8	2.6	2.8	2.8
PL/1	3	3.3	3.3	3.0	3.3	3.3	3.7	4.0	3.3	3.3
PLANCODE	3	2.0	1.0	2.3	2.3	1.3	2.0	1.7	1.7	1.7
POWER	4	3.5	3.3	3.3	3.3	3.0	3.3	2.5	3.8	3.3
Query By Example	3	2.3	1.0	2.7	3.0	1.7	2.3	2.3	2.3	2.0
RMF	3	3.7	3.7	3.0	3.3	2.3	3.7	3.0	2.7	3.3
RPG-II (S/3)	8	3.9	3.1	3.4	3.8	3.3	3.5	3.3	3.4	3.8
RPG-II (S/34)	9	3.8	3.3	3.6	3.4	3.0	3.1	3.1	3.4	3.4
Screen Design	6	3.8	3.5	3.3	3.0	2.8	2.8	2.3	3.2	3.0
Sort (360/370)	7	3.4	3.0	3.4	3.4	3.3	3.3	3.3	3.3	3.1
Sort (S/3)	5	3.8	3.6	3.0	3.4	3.0	2.8	2.6	3.0	3.8
Source Program Maint. (360/370)	8	3.6	3.1	3.0	3.5	2.8	2.6	2.0	2.9	3.3
Source Lib. Maint. (S/3)	16	3.7	3.2	3.0	3.0	2.7	2.6	2.2	2.7	3.1
SPF	18	3.8	3.2	3.3	3.7	3.0	3.3	3.1	3.5	3.6
SSP (S/34)	5	3.8	3.6	3.8	4.0	4.0	3.2	3.4	4.0	4.0
TSO	12	3.4	2.8	2.5	3.4	2.7	2.8	2.6	2.9	3.0
Utilities (S/34)	8	3.6	3.0	3.4	3.6	3.3	3.1	3.0	3.3	3.1
Video/370	4	3.8	3.0	2.8	3.3	3.0	2.5	2.5	3.0	3.0
IMSL, Inc.										
IMSL Library	10	3.4	3.4	3.1	3.0	3.4	3.2	2.6	3.1	2.4
Infodata Systems										
INQUIRE	4	3.3	3.0	3.0	3.7	3.0	3.0	3.3	2.7	3.0
Infonational										
Accounts Payable	6	3.2	2.8	2.8	3.0	2.3	2.8	2.8	2.0	3.0
General Ledger	7	3.3	2.6	3.0	3.0	2.3	3.0	2.7	2.7	3.1
Informatics, Inc.										
ACCOUNTING IV	13	3.0	2.2	2.3	2.7	1.8	2.3	2.3	2.0	2.4
ANSWER/II	4	3.3	2.8	3.0	2.8	3.3	2.8	3.0	3.0	3.0
General Ledger	8	3.3	2.6	2.7	3.1	2.6	2.4	2.3	2.7	3.0
INQUIRY IV/IMS	5	3.0	3.0	3.0	3.2	2.2	2.6	3.0	3.0	2.8
MARK IV	28	3.7	2.7	3.3	3.1	2.8	3.1	3.1	3.0	3.2
Stocks & Bonds	3	3.3	3.0	2.7	2.7	2.7	2.3	2.7	2.3	2.7

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
IBM Corp. (Continued)										
ETSS	7	2	2	3	3	3	2	3	3	3
Fixed Assets (S/3/32/34)	11	2	3	2	2	3	2	3	3	3
General Ledger (S/3)	6	2	2	3	4	3	1	3	3	3
General Ledger (S/34)	6	2	2	3	3	3	2	3	2	3
HCS PCS	5	2	3	4	2	3	3	3	3	2
HFMS	6	2	2	3	3	2	1	2	3	3
ICCF	12	2	2	2	1	2	2	3	3	2
IDES II (S/1)	3	1	1	2	1	2	2	2	2	2
IMS	29	1	3	3	3	2	2	3	2	2
IPICS (S/3)	16	1	2	3	3	3	3	4	3	2
MAPICS Order Entry	3	1	2	1	1	2	1	3	2	2
MAPICS Payroll	7	2	2	3	3	2	3	4	3	3
MAPICS PDM	3	1	2	3	2	2	2	3	2	3
MAPICS (S/34)	40	1	2	2	2	3	2	3	3	3
MMAS (S/32)	3	2	3	2	3	3	1	2	2	3
MMAS-Payroll System	3	1	4	3	3	3	2	2	3	3
MVS/SE	7	1	2	1	1	2	2	3	2	2
Payroll (S/3)	7	2	2	3	3	3	3	3	3	3
Payroll (S/34)	5	2	2	3	2	2	2	3	3	2
PL/1	3	1	2	2	1	1	1	1	2	2
PLANCODE	3	4	4	3	3	4	4	4	4	4
POWER	4	1	2	2	1	2	1	3	1	2
Query By Example	3	3	4	3	2	4	3	3	3	3
RMF	3	1	1	2	1	3	1	2	3	2
RPG-II (S/3)	8	1	2	1	1	1	1	2	2	1
RPG-II (S/34)	9	1	2	1	1	2	2	2	2	2
Screen Design	6	1	1	2	2	2	2	3	2	2
Sort (360/370)	7	1	2	1	1	1	1	1	2	2
Sort (S/3)	5	1	1	2	1	2	2	3	2	1
Source Program Maint. (360/370)	8	1	2	2	1	2	2	4	3	2
Source Lib. Maint. (S/3)	16	1	2	2	2	2	2	3	3	2
SPF	18	1	2	2	1	2	1	2	2	1
SSP (S/34)	5	1	1	1	1	1	1	1	1	1
TSO	12	1	2	3	1	2	2	3	3	2
Utilities (S/34)	8	1	2	2	1	1	2	2	2	2
Video/370	4	1	2	3	1	2	3	3	2	2
IMSL, Inc.										
IMSL Library	10	1	2	2	2	1	1	3	2	2
Infodata Systems										
INQUIRE	4	1	2	2	1	2	2	1	3	2
Infonational										
Accounts Payable	6	2	2	3	2	3	2	3	3	2
General Ledger	7	1	3	2	2	3	2	3	3	2
Informatics, Inc.										
ACCOUNTING IV	13	2	3	3	3	4	3	3	3	3
ANSWER/II	4	2	2	2	2	1	2	2	2	2
General Ledger	8	1	3	3	2	2	3	3	3	2
INQUIRY IV/IMS	5	2	2	2	2	3	2	2	2	2
MARK IV	28	1	2	2	2	2	2	2	2	2
Stocks & Bonds	3	1	2	3	3	2	3	3	3	3
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.46 to 4.00	3.42 to 4.00	3.34 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.60 to 4.00
Cluster 2		2.66 to 3.27	2.66 to 3.44	2.88 to 3.41	2.71 to 3.33	2.53 to 3.19	2.67 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.59
Cluster 3		2.16 to 2.65	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.66	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software . . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Information Associates, Inc. Student Records	3	3.7	3.3	2.7	3.0	3.0	3.3	3.0	3.3	3.3
Information Builders FOCUS	6	3.4	3.0	3.6	3.6	3.0	2.2	3.5	3.0	3.6
Information Processing, Inc. BLIS/COBOL	3	4.0	3.7	3.3	3.7	3.0	3.3	3.7	3.0	3.3
Information Science, Inc.										
Human Resources	4	3.0	2.5	1.8	2.5	1.8	2.3	2.8	1.8	2.3
Payroll	7	3.0	2.7	2.3	2.2	2.0	2.5	2.3	2.6	2.7
Innovation Data Processing										
Fast Dump Restore	27	3.9	3.7	3.8	3.8	3.4	3.2	2.8	3.5	3.7
IAM	3	3.7	4.0	3.7	3.3	3.7	3.0	3.0	3.3	3.7
Insurance Systems of America										
ABC	7	3.3	2.9	2.7	3.0	2.6	2.7	3.0	3.0	3.0
OSCARS	4	2.5	2.3	2.3	3.0	2.0	3.0	3.3	2.0	2.3
V-4	4	1.7	2.3	1.8	2.0	2.7	2.0	2.3	2.3	1.7
Integral Systems, Inc.										
Payroll	4	3.0	2.3	2.0	2.5	2.8	2.0	2.0	2.3	3.0
SCOPE	3	3.3	3.3	3.0	2.7	2.3	2.7	2.5	2.3	3.0
Integrated Software DISSPLA	6	3.5	2.3	2.8	3.0	3.0	2.8	2.5	2.8	3.0
Intel Corp. SYSTEM 2000	10	3.5	2.8	2.8	3.1	2.7	2.9	2.6	3.2	3.1
International Systems PAC II	7	3.0	2.4	2.5	2.8	2.7	2.7	3.0	2.5	2.7
Johnson Systems										
JARS/DOS	11	3.5	2.8	2.8	2.7	2.8	2.6	2.3	2.7	2.8
JARS/OS	5	3.4	3.2	3.0	2.4	3.0	2.8	2.3	3.0	3.2
Los Altos Research LARC Editor	3	3.7	3.3	3.7	2.7	3.3	2.7	2.3	3.5	3.5
Macro 4, Inc.										
BOOST	3	3.7	3.7	3.3	3.7	3.3	3.3	3.3	3.3	3.3
LOGOUT	4	4.0	4.0	3.8	4.0	3.7	3.7	3.5	3.5	3.8
Management Control Systems Practice Management	4	2.5	2.0	2.3	2.3	1.8	1.5	1.5	2.0	2.0
Management Science America										
Accounts Payable	7	3.1	2.4	2.4	2.7	2.3	2.8	2.8	2.8	2.6
Accounts Receivable	4	2.3	2.0	2.5	2.0	1.8	2.8	3.0	2.5	2.3
ALLTAX	8	3.8	3.1	3.1	3.5	3.6	3.3	3.0	4.0	3.6
FICS	7	3.4	2.4	2.4	2.9	2.9	3.1	3.1	3.0	2.9
Fixed Assets	6	3.4	3.0	2.6	3.2	2.8	3.2	3.2	3.0	3.2

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fell into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Information Associates, Inc. Student Records	3	1	2	3	2	2	1	2	2	2
Information Builders FOCUS	6	1	2	1	1	2	3	1	2	1
Information Processing, Inc. BLIS/COBOL	3	1	1	2	1	2	1	1	2	2
Information Science, Inc.										
Human Resources	4	2	3	4	3	4	3	3	4	3
Payroll	7	2	2	3	4	3	3	3	3	3
Innovation Data Processing										
Fast Dump Restore	27	1	1	1	1	1	1	2	2	1
IAM	3	1	1	1	1	1	2	2	2	1
Insurance Systems of America										
ABC	7	1	2	3	2	2	2	2	2	2
OSCARS	4	3	3	3	2	3	2	2	3	3
V-4	4	4	3	4	4	2	4	3	3	4
Integral Systems, Inc.										
Payroll	4	2	3	3	3	2	4	4	3	2
SCOPE	3	1	2	2	3	3	2	3	3	2
Integrated Software DISSPLA	6	1	3	3	2	2	2	3	3	2
Intel Corp. SYSTEM 2000	10	1	2	3	2	2	2	3	2	2
International Systems PAC II	7	2	3	3	3	2	2	2	3	3
Johnson Systems										
JARS/DOS	11	1	2	3	2	2	2	3	3	2
JARS/OS	5	1	2	2	3	2	2	3	2	2
Los Altos Research LARC Editor	3	1	2	1	3	1	2	3	2	1
Macro 4, Inc.										
BOOST	3	1	1	2	1	1	1	1	2	2
LOGOUT	4	1	1	1	1	1	1	1	2	1
Management Control Systems Practice Management	4	3	3	3	4	4	4	4	3	3
Management Science America										
Accounts Payable	7	2	3	3	2	3	2	3	3	3
Accounts Receivable	4	3	3	3	4	4	2	2	3	3
ALLTAX	8	1	2	2	1	1	1	2	1	1
FICS	7	1	3	3	2	2	2	2	2	2
Fixed Assets	6	1	2	3	2	2	1	2	2	2
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.46 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.86 to 3.27	2.66 to 3.45	2.88 to 3.41	2.71 to 3.23	2.83 to 3.19	2.87 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.85	2.00 to 2.65	2.00 to 2.87	2.33 to 2.70	2.00 to 2.82	2.14 to 2.86	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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. . . In a Variety of Categories

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Management Science America (Continued)										
General Ledger	31	3.1	2.3	2.6	2.6	2.6	2.7	2.9	2.6	2.6
Human Resources	3	3.7	2.7	2.0	2.7	3.0	2.7	3.3	3.3	3.3
Payroll	36	3.4	2.3	2.3	2.4	2.6	2.6	2.7	2.7	2.7
Personnel	3	3.3	1.7	1.7	2.0	2.3	2.3	2.7	2.7	2.3
Martin Marietta Data Systems										
MAS-H	5	1.6	1.8	1.6	2.2	1.8	1.8	2.4	2.2	1.8
Mathematica Products Group										
RAMIS II	9	3.8	3.1	3.7	3.7	2.9	2.3	2.9	2.9	3.1
John Mathis										
UFG	3	3.7	3.3	3.7	3.7	3.5	3.3	2.7	3.3	3.7
MCBA, INC.										
Accounting Software	12	3.3	2.3	2.9	3.4	2.1	2.5	1.3	2.4	3.3
Payroll	6	3.0	2.2	2.8	3.0	2.0	2.4	1.5	2.5	2.8
McCormack & Dodge Co.										
Accounts Payable Plus	12	3.2	2.8	2.7	2.9	2.6	2.7	2.5	2.7	2.8
Fixed Assets	4	3.0	2.3	2.0	2.5	2.3	2.8	2.8	2.0	2.3
General Ledger Plus	12	3.6	2.5	2.9	2.9	2.8	3.0	3.3	3.0	3.1
McMaster University										
SPSS	3	3.0	3.0	3.0	3.3	2.0	3.3	2.3	2.0	3.0
Micropro Intl. Corp.										
WORD STAR	4	3.5	3.5	3.8	3.0	3.0	3.5	3.0	3.0	3.7
Microsoft										
FORTRAN 80	3	3.7	3.3	3.3	3.0	2.7	3.7	3.3	3.0	3.7
Mid-American Control										
PROMPT	4	3.0	2.0	3.5	2.5	2.0	1.8	1.5	2.3	2.5
Morino Assoc.										
TSO/MON	4	3.3	3.3	3.0	2.8	3.3	3.3	2.8	3.0	3.3
Mountain Software Growers										
EQUAL	4	3.5	3.5	3.8	3.5	3.3	2.8	3.0	3.0	3.0
MSP, Inc.										
DATAMANAGER	5	3.8	3.0	3.0	3.0	2.7	2.8	2.0	2.7	3.0
National CSS										
NOMAD	5	3.8	3.2	3.0	3.6	2.7	2.8	2.8	3.0	3.3
National Information Systems										
DPL	6	3.5	3.0	3.4	3.2	2.2	2.7	2.3	2.7	3.0
NCA Corp.										
FMS-11	5	3.6	3.6	3.8	3.6	3.8	3.4	3.6	3.6	3.8
MS-11	4	3.5	2.8	3.5	3.5	3.0	2.8	3.3	3.5	2.5

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analysis were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and — Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings: Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Documentation	User Education	Vendor's Maintenance	Overall Satisfaction
Management Science America (Continued)										
General Ledger	31	2	3	3	3	2	2	2	3	3
Human Resources	3	1	2	3	3	2	2	1	2	2
Payroll	36	1	3	3	3	3	2	3	3	3
Personnel	3	1	4	4	4	3	3	3	3	3
Martin Marietta Data Systems										
MAS-H	5	4	4	4	4	4	4	3	3	4
Mathematica Products Group										
RAMIS II	9	1	2	1	1	2	3	2	3	2
John Mathis										
UFG	3	1	2	1	1	1	1	3	2	1
MCBA, INC.										
Accounting Software	12	2	3	2	1	3	3	4	3	2
Payroll	6	2	3	3	2	3	3	4	3	2
McCormack & Dodge Co.										
Accounts Payable Plus	12	2	2	3	2	2	2	3	3	2
Fixed Assets	4	2	3	3	3	3	2	3	3	3
General Ledger Plus	12	1	3	2	2	2	2	2	2	2
McMaster University										
SPSS	3	2	2	2	1	3	1	3	3	2
Micropro Intl. Corp.										
WORD STAR	4	1	1	1	2	2	1	2	2	1
Microsoft										
FORTRAN 80	3	1	2	2	2	2	1	1	2	1
Mid-American Control										
PROMPT	4	2	3	1	3	3	4	4	3	3
Morino Assoc.										
TSO/MON	4	2	2	2	2	1	1	3	2	2
Mountain Software Growers										
EQUAL	4	1	1	1	1	1	2	2	2	2
MSP, Inc.										
DATAMANAGER	5	1	2	2	2	2	2	4	3	2
National CSS										
NOMAD	5	1	2	2	1	2	2	3	2	2
National Information Systems										
DPL	6	1	2	2	2	3	2	3	3	2
NCA Corp.										
FMS-11	5	1	1	1	1	1	1	1	1	1
MS-11	4	1	2	1	1	2	2	2	2	1
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.66 to 3.27	2.65 to 3.44	2.88 to 3.41	2.71 to 3.23	2.53 to 3.19	2.87 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.65	2.00 to 2.64	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.86	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software . . .

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Relia-bility	Effi-ciency	Ease of Instal-lation	Ease of Use	Vendor's Technical Support			Vendor's Main-tenance	Overall Satis-faction
						Trouble Shooting	Docu-menta-tion	User Educa-tion		
NCI, Inc.										
OWL	7	3.7	3.3	3.2	3.5	2.8	3.0	3.2	3.0	3.0
SLICK	5	3.8	3.8	3.6	3.2	3.6	3.2	2.8	3.3	3.4
NCR Corp.										
CIF	12	3.4	3.1	2.6	2.9	2.0	2.8	2.8	2.6	2.9
CLASS	3	3.3	2.7	2.3	3.3	1.7	2.3	1.3	1.3	1.7
FCS	5	3.2	3.0	2.6	2.6	1.2	2.4	2.2	1.6	2.6
General Ledger	10	3.4	3.1	3.1	3.0	2.9	2.7	2.4	2.7	2.8
IGAS-IWDS	4	2.8	2.3	2.8	3.0	2.0	2.5	2.3	2.8	2.3
IPR	14	3.2	2.5	2.8	2.8	2.2	2.4	2.4	2.5	2.7
Payroll	9	3.5	2.8	3.1	3.1	3.2	3.1	3.0	3.5	3.1
SPIRIT	3	2.7	2.3	2.3	2.3	1.3	1.7	2.0	1.7	2.3
Nichols and Co.										
N6500	3	2.7	1.7	1.7	1.7	1.3	2.0	1.7	1.0	1.3
Nixdorf Computer Corp.										
NCSC DATABASE	3	3.7	3.7	3.7	4.0	3.0	3.0	4.0	3.0	3.7
Optipro, Inc.										
EXTRACTO	3	3.3	3.0	3.3	3.3	2.5	3.0	2.0	2.5	3.0
Oregon Software, Inc.										
PASCAL	4	3.3	3.0	3.7	3.7	3.0	2.3	2.0	2.5	3.3
Oxford Software										
UFO	4	3.0	2.0	3.5	3.5	2.8	3.0	2.3	2.3	3.0
Pansophic Systems										
EASYTRIEVE	57	3.7	3.4	3.4	3.3	3.0	3.1	3.1	3.2	3.4
PANVALET	74	3.8	3.5	3.5	3.5	3.2	3.3	3.1	3.3	3.6
Pennsylvania State Univ.										
MINITAB	3	3.0	3.7	3.0	3.3	3.3	3.0	2.0	3.3	3.3
Policy Management Systems										
PMS	5	3.4	3.2	2.4	3.0	2.8	2.6	2.6	2.2	3.2
The Poise Co.										
POISE	5	3.6	2.2	3.8	3.6	3.3	3.0	3.2	3.3	3.2
Prime Computer, Inc.										
COBOL	3	3.0	2.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0
FORMS	6	3.5	3.3	3.0	3.3	2.8	2.5	2.7	3.2	3.2
PRIME POWER	3	3.3	3.0	3.7	3.3	3.3	2.7	3.0	3.3	3.3
Program Products, Inc.										
Data Analyzer	5	3.8	2.8	3.3	3.3	2.8	3.3	3.3	2.8	3.0
Quasar Systems Ltd.										
QUIZ	3	4.0	3.7	4.0	4.0	3.5	3.3	3.3	3.5	3.5
Rago Software										
ADAGER/3000	3	4.0	3.7	4.0	4.0	4.0	3.3	—	4.0	4.0

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings								
		Relia-bility	Effi-ciency	Ease of Instal-lation	Ease of Use	Vendor's Technical Support			Vendor's Main-tenance	Overall Satis-faction
						Trouble Shooting	Docu-menta-tion	User Educa-tion		
NCI, Inc										
OWL	7	1	2	2	1	2	2	2	2	2
SLICK	5	1	1	1	2	1	1	3	2	2
NCR Corp.										
CIF	12	1	2	3	2	3	2	3	3	2
CLASS	3	1	2	3	1	4	3	4	4	4
FCS	5	2	2	3	3	4	3	3	4	3
General Ledger	10	1	2	2	2	2	2	3	3	2
IGAS-IWDS	4	2	3	3	2	3	3	3	3	3
IPR	14	2	3	3	2	3	3	3	3	3
Payroll	9	1	2	2	2	1	2	2	2	2
SPIRIT	3	2	3	3	3	4	4	4	4	3
Nichols and Co.										
N6500	3	2	4	4	4	4	4	4	4	4
Nixdorf Computer Corp.										
NCSC DATABASE	3	1	1	1	1	2	2	1	2	1
Optipro, Inc.										
EXTRACTO	3	1	2	2	1	3	2	4	3	2
Oregon Software, Inc.										
PASCAL	4	2	2	1	1	2	3	4	3	2
Oxford Software										
UFO	4	2	3	1	1	2	2	3	3	2
Pansophic Systems										
EASYTRIEVE	57	1	2	1	1	2	2	2	2	2
PANVALET	74	1	1	1	1	1	1	2	2	1
Pennsylvania State Univ										
MINITAB	3	2	1	2	1	1	2	4	2	2
Policy Management Systems										
PMS	5	1	2	3	2	2	2	3	3	2
The Poise Co.										
POISE	5	1	3	1	1	1	2	2	2	2
Prime Computer, Inc.										
COBOL	3	2	3	1	1	1	1	2	2	2
FORMS	6	1	2	2	1	2	3	3	2	2
PRIME POWER	3	1	2	1	1	1	2	2	2	2
Program Products, Inc.										
Data Analyzer	5	1	2	2	1	2	1	2	3	2
Quasar Systems Ltd.										
QUIZ	3	1	1	1	1	1	1	1	2	1
Rago Software										
ADAGER/3000	3	1	1	1	1	1	1	4	1	1
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.26 to 4.00	3.20 to 4.00	3.15 to 4.00	3.28 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2		2.86 to 3.27	2.86 to 3.44	2.88 to 3.41	2.71 to 3.25	2.53 to 3.19	2.57 to 3.14	2.85 to 3.22	3.00 to 3.59	2.75 to 3.49
Cluster 3		2.16 to 2.85	2.00 to 2.85	2.00 to 2.87	2.33 to 2.70	2.00 to 2.52	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.33	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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. . . And Their Manufacturers

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
S&H Computer										
TSX	3	3.3	3.0	3.7	3.7	1.7	2.7	2.0	2.0	3.3
SAS, Inc.										
Software 1040	5	3.6	2.8	3.0	3.2	3.2	2.8	2.8	2.8	3.2
SAS Institute										
SAS	30	3.8	3.4	3.6	3.7	3.2	3.1	2.9	3.2	3.6
SDA Products										
INTERCOMM	3	3.3	3.7	2.3	3.0	3.0	2.7	3.0	3.0	3.3
SDI										
EPAT	16	3.8	3.6	3.1	3.7	2.9	3.1	2.8	3.1	3.4
GRASP	4	3.8	3.5	3.5	3.5	3.3	3.0	3.0	3.3	3.5
Softech, Inc.										
PASCAL	3	3.7	3.7	3.3	3.7	2.0	1.7	1.7	2.3	3.3
Software AG of N.A.										
ADABAS	14	3.8	3.1	3.4	3.5	2.9	2.7	3.1	3.2	3.3
COM-PLETE	5	4.0	3.8	3.6	4.0	3.6	3.2	3.6	3.8	3.8
Software House										
System 1022	6	3.3	3.0	3.0	3.8	3.3	3.2	2.2	2.8	3.3
Software International										
Accounts Payable	5	3.4	2.6	2.8	3.0	2.4	2.0	2.0	3.3	3.0
Accounts Receivable	3	3.0	2.0	2.7	2.3	2.3	2.3	2.7	3.0	2.7
General Ledger	30	3.3	2.7	2.7	2.8	2.6	2.6	2.5	2.8	2.8
Software Module Marketing										
DMS/OS	4	3.8	3.5	4.0	3.3	3.5	3.3	3.0	3.3	3.3
Software Pursuits										
DOS/MVT	4	4.0	4.0	3.0	4.0	3.8	2.8	2.8	3.8	4.0
Sperry Univac										
ACS	3	3.3	2.7	3.0	2.3	2.3	1.7	1.7	1.7	1.7
BEM	6	3.7	3.6	3.0	3.4	2.7	2.6	2.2	3.0	3.1
DMS-1100	7	3.3	2.4	2.6	3.1	2.6	2.7	3.0	3.0	3.0
IMS/90	4	3.3	2.8	3.0	3.3	2.3	2.8	2.5	2.8	2.8
UNIS	5	3.0	2.8	2.4	2.8	2.6	2.2	2.4	2.8	2.8
SPSS, Inc.										
SPSS	36	3.6	2.8	3.2	3.2	2.7	2.2	2.7	3.0	3.2
Systems Research, Inc.										
SRI/EDIT	8	3.8	3.3	3.8	3.5	3.3	3.4	3.0	3.5	3.7
System Support Software										
QUIKJOB	10	3.9	3.7	3.8	3.5	3.2	3.2	2.5	3.2	3.2
Texas Instruments										
COBOL	3	3.7	3.3	3.7	4.0	3.7	3.0	3.0	3.3	3.7

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

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Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
S&H Computer										
TSX	3	1	2	1	1	4	2	4	3	2
SAS, Inc.										
Software 1040	5	1	2	2	2	1	2	3	3	2
SAS Institute										
SAS	30	1	2	1	1	1	2	2	2	1
SDA Products										
INTERCOMM	3	1	1	3	2	2	2	2	2	2
SDI										
EPAT	16	1	1	2	1	2	2	3	2	2
GRASP	4	1	1	1	1	1	2	2	2	1
Softech, Inc.										
PASCAL	3	1	1	2	1	3	4	4	3	2
Software AG of N.A.										
ADABAS	14	1	2	2	1	2	2	2	2	2
COM-PLETE	5	1	1	1	1	1	1	1	1	1
Software House										
System 1022	6	1	2	2	1	1	1	3	3	2
Software International										
Accounts Payable	5	1	3	3	2	3	4	4	2	2
Accounts Receivable	3	2	3	3	3	3	3	3	2	3
General Ledger	30	1	2	2	2	2	3	3	3	2
Software Module Marketing										
DMS/OS	4	1	1	1	1	1	1	2	2	2
Software Pursuits										
DOS/MVT	4	1	1	2	1	1	2	3	1	1
Sperry Univac										
ACS	3	1	2	2	3	3	4	4	4	4
BEM	6	1	1	2	1	2	2	3	2	2
DMS-1100	7	1	3	3	2	2	2	2	2	2
IMS/90	4	2	2	2	1	2	2	3	3	2
UNIS	5	2	2	3	2	2	3	3	3	2
SPSS, Inc.										
SPSS	36	1	2	2	2	2	1	3	2	2
Systems Research, Inc.										
SRI/EDIT	8	1	2	1	1	1	1	2	2	1
System Support Software										
QUIKJOB	10	1	1	1	1	1	1	3	2	2
Texas Instruments										
COBOL	3	1	2	1	1	1	2	2	2	1
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1:		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.60 to 4.00	3.50 to 4.00
Cluster 2:		2.86 to 3.27	2.65 to 3.44	2.88 to 3.41	2.71 to 3.23	2.83 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.59	2.75 to 3.49
Cluster 3:		2.16 to 2.85	2.00 to 2.64	2.00 to 2.87	2.23 to 2.70	2.00 to 2.82	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4:		Below 2.16	Below 2.00	Below 2.00	Below 2.23	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Users Rate Their Software

PROPRIETARY SOFTWARE: USER RATINGS AND CLUSTER ANALYSIS

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Tamark, Inc. ABEND-AID	11	3.8	3.6	3.6	3.7	3.4	3.2	3.2	3.2	3.5
TOSC, Inc. TOSC4	6	3.7	3.8	3.8	3.7	3.5	3.2	3.2	3.5	3.7
Tower Systems DFAST/VS	3	3.7	4.0	3.7	3.7	3.0	3.0	3.0	3.0	3.7
TFAST/VS	12	3.0	2.3	3.2	3.0	2.3	2.5	2.0	2.3	2.5
Transcomm Data Systems TOLAS II	3	3.3	3.0	2.0	3.0	1.7	1.3	1.3	1.7	2.0
Turnkey Systems TASK/MASTER	3	2.7	3.0	3.0	3.0	2.3	2.0	2.0	2.3	2.7
UCLA BMDP	5	3.8	3.8	3.3	3.3	2.0	2.8	2.5	1.8	3.0
United Computing Systems FORESIGHT	6	3.8	3.3	3.8	3.3	3.8	2.8	3.2	3.5	3.3
Universal Software, Inc. ADAS	4	4.0	3.3	3.8	3.8	3.3	3.3	3.0	3.0	3.3
ASAP	3	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
University Computer Co. FCS	4	3.3	2.0	1.8	1.8	2.3	2.0	2.5	2.5	2.3
Installment Loans	4	3.3	2.0	2.3	2.3	3.0	2.0	2.3	2.7	2.7
UCC-1 (TMS)	22	3.8	3.7	3.3	3.4	3.4	3.0	3.1	3.2	3.4
UCC-2 (DUO)	9	3.6	3.1	2.8	3.4	2.8	2.8	2.8	2.9	3.4
UCC-7	3	3.3	3.3	1.7	3.3	3.3	2.7	2.5	2.5	3.0
Value Computing, Inc. COMPUT-A-CHARGE	3	3.3	3.0	3.0	3.0	2.0	2.3	2.3	3.0	3.0
Vector Graphics Word Management System	3	4.0	3.3	3.0	2.7	2.5	3.7	3.0	1.0	3.7
Wang Labs. Payroll	4	3.7	2.7	2.7	3.0	2.8	2.5	2.8	3.0	3.0
Super Payroll/Personnel	3	3.0	2.5	3.0	2.5	3.0	3.5	3.0	2.5	3.0
Western Electric Co. UNIX	5	3.4	3.4	2.6	3.6	1.6	2.8	1.8	1.8	3.6
Westinghouse Disk Space Mgr.	5	3.4	3.2	3.2	3.2	2.8	2.8	2.3	2.8	3.0
Disk Utility	12	3.8	3.7	3.7	3.6	3.4	3.2	3.2	3.6	3.4
Job Monitor II	3	3.0	3.0	2.7	3.3	3.0	3.0	3.0	3.3	3.0
SCEPTER	6	4.0	3.7	3.3	3.7	3.5	3.2	3.3	3.7	3.8
WESTI	11	3.8	3.6	3.5	3.5	3.6	3.4	3.2	3.6	3.6
Whitlow Computer Systems SYNCSORT	67	3.8	3.7	3.5	3.7	3.3	3.3	3.1	3.3	3.6

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

REPRODUCED WITH PERMISSION

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble Shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Tamark, Inc. ABEND-AID	11	1	1	1	1	1	1	2	2	1
TOSC, Inc TOSC4	6	1	1	1	1	1	1	2	2	1
Tower Systems DFAST/VS	3	1	1	1	1	2	2	2	2	1
TFAST/VS	12	2	2	2	2	3	3	4	3	3
Transcomm Data Systems TOLAS II	3	1	2	3	2	4	4	4	4	3
Turnkey Systems TASK/MASTER	3	2	2	2	2	3	4	4	3	3
UCLA BMDP	5	1	1	2	1	3	2	3	4	2
United Computing Systems FORESIGHT	6	1	2	1	1	1	2	2	2	2
Universal Software, Inc. ADAS	4	1	2	1	1	1	1	2	2	2
ASAP	3	1	2	2	2	2	2	2	2	2
University Computer Co FCS	4	2	3	4	4	3	4	3	3	3
Installment Loans	4	1	3	3	3	2	4	3	3	3
UCC-1 (TMS)	22	1	1	2	1	1	2	2	2	2
UCC-2 (DUO)	9	1	2	3	1	2	2	3	3	2
UCC-7	3	1	2	4	1	1	2	3	3	2
Value Computing, Inc. COMPUT-A-CHARGE	3	1	2	2	2	3	3	3	2	2
Vector Graphics Word Management System	3	1	2	2	3	3	1	2	4	1
Wang Labs. Payroll	4	1	2	3	2	2	3	3	2	2
Super Payroll/Personnel	3	2	1	2	3	2	1	2	3	2
Western Electric Co. UNIX	6	1	2	3	1	4	2	4	4	1
Westinghouse Disk Space Mgr	5	1	2	2	2	2	2	3	3	2
Disk Utility	12	1	1	1	1	1	1	2	2	2
Job Monitor II	3	2	2	1	1	2	2	2	2	2
SCEPTER	6	1	1	2	1	1	1	1	1	1
WESTI	11	1	1	1	1	1	1	2	1	1
Whitlow Computer Systems SYNCSORT	67	1	1	1	1	1	1	2	2	1
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1		3.28 to 4.00	3.45 to 4.00	3.42 to 4.00	3.24 to 4.00	3.20 to 4.00	3.15 to 4.00	3.33 to 4.00	3.50 to 4.00	3.50 to 4.00
Cluster 2		2.86 to 3.27	3.05 to 3.44	2.88 to 3.41	2.71 to 3.23	2.50 to 3.19	2.57 to 3.14	2.85 to 3.32	3.00 to 3.49	2.75 to 3.49
Cluster 3		2.16 to 2.85	2.00 to [illegible]	2.00 to 2.87	2.30 to 2.70	2.00 to [illegible]	2.14 to 2.56	2.16 to 2.84	2.00 to 2.99	2.00 to 2.74
Cluster 4		Below 2.16	Below 2.00	Below 2.00	Below 2.30	Below 2.00	Below 2.14	Below 2.16	Below 2.00	Below 2.00

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Auditing Function Crucial

New Technology Seen Threatening Security

By Tom Henkel
CW Staff

MONTREAL — Higher storage densities, satellite communications and a growing base of intelligent terminals make information systems more vulnerable, according to Patrick Sullivan, director of the Technology Analysis Group at Advanced Computer Techniques Corp. (ACT).

Speaking at ACT's Future Systems Forum Canada, Sullivan said management must evaluate not only the processors and programs, but the users and all the procedures that make up a system, when it comes to creating a workable security system.

Noting that system security deals with protecting information, programs and resources — which include the CPU, memory and storage medium — Sullivan said the auditing function is one of the most powerful tools available to management to make sure systems are used properly.

System management and accounting controls, which interweave with system security and system auditability functions, will provide management with the type of control necessary to oversee the entire information flow, Sullivan said.

Potential Threats

And the scope of security violations is changing too. Sullivan said 50% to 80% of security problems can be categorized as errors or omissions. Other potential threats include (in order of importance) dishonest employees, fire, disgruntled employees (different from dishonest employees in that in the former category, the security violation tends to be theft, and in the latter, an unhappy employee, who may have been fired, could destroy data files and the like to get back at the company) water damage and external attack, according to Sullivan.

Citing Federal Bureau of Investigation figures that show $500 million worth of damage is annually caused to information systems as a result of external attack, Sullivan estimated that figure is about 1% of the total annual damage. The other cases go unreported, he said.

Too often, management views designing and building an information control system as wasted overhead. In fact, Sullivan said, a system control program is one of the best investments management can make because it produces a continuous payback and makes the overall operation of the information system more efficient.

In building a system control program, management should look at four basic areas: auditability, adequacy, accuracy and completeness. That means management should beef up some areas, like creating usage accounting and operations accounting functions. And it should institute new controls, like data entry and output controls, program preparation, testing and submission controls and library storage controls, Sullivan said.

Another area management should take a closer look at is its failure/recovery and restart controls. Sullivan said surprisingly few shops even have a failure/recovery program, and even fewer shops know such a program will actually work. As an example, he cited a firm that had tested its failure/recovery plan and estimated it could be functional inside of a few hours. It failed to consider how long it would take to switch communications lines if a problem developed there. Hence the firm was not adequately prepared, Sullivan said.

Other areas deserving of security controls are maintenance (modification and update controls), network traffic controls and data base administration controls, Sullivan noted.

Keeping information systems secure in the future will be even harder than it is today, Sullivan said, noting new areas of technology such as more sophisticated office systems, electronic mail, electronic funds transfer, specialized networks and public data networks will further complicate the security issue.

The Future Systems Forum Canada was sponsored by ACT in cooperation with Whitsed Publishing Ltd., Toronto, Canada.

Cuba to Host Spin Meeting

ROME — The 10th General Assembly of the Intergovernmental Bureau for Informatics (IBI) has accepted the invitation from the government of Cuba to hold the second Intergovernmental Conference on Strategies and Policies in Informatics (Spin) in Havana in the spring of 1983.

Issues to be discussed at this meeting are expected to include economic implications of informatics, particularly in relation to industrialization; educational needs of developing countries; transborder data flow issues; and new informatics technological developments.

All members of the United Nations will be invited to send official delegations to the conference. Additional information will be forthcoming from IBI, 23 Viale Civilta del Lavoro, 00144 Rome, Italy.

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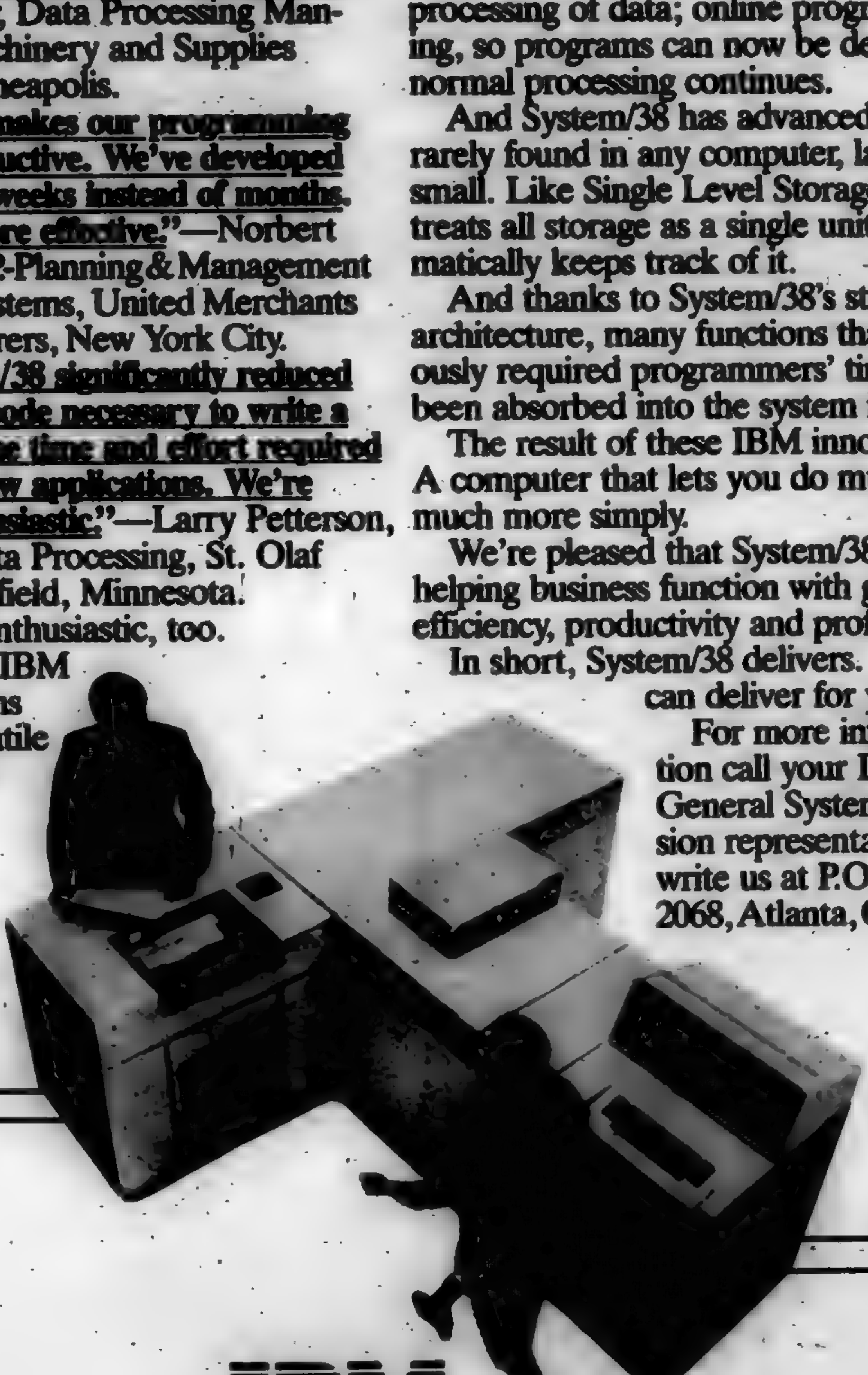

IBM

General Systems Division

In New York Police Department

City's Gun-Toting Programmers Wear Two Hats

By Bob Johnson
CW Staff

NEW YORK — Certain systems programmers here go to work carrying guns. They carry them not because they're particularly fearful of crime, but because it is part of their jobs. They're cops.

About half the people involved in the data processing functions of the New York City Police Department have dual positions — police officers and DP professionals. A cop may be debugging a program one day and be involved in solving a crime the next.

An integral part of their daily work is operating and maintaining the 911 emergency telephone service. More than 17,500 calls are dialed into 911 each day and are acted upon in less than two seconds by the department's Communication Section, civilian technicians and a dedicated IBM 370/148.

Using an IBM software package called the Special Police Response Inquiry Network (Sprint), based on the Airlines Control Program, each city borough is monitored in separate sections.

Every street, cross street and avenue of New York City is included in the Sprint data base, allowing a technician to determine the exact location in which an emergency is occurring.

The task of accumulating data on all these streets was time-consuming and harrowing, according to Police Officer Charles Karwelies. "We had to go out to every borough and document the names of streets and avenues. Sometimes this was confusing because some streets have two names and some are simply dirt roads."

This immense data base is used not only by the police department, but has also become a clearinghouse of sorts for many city agencies needing accurate data. IBM initially set up the data base, but it is now monitored by police department personnel and used frequently, as in the 911 function.

Camaraderie Helps

Although the system has helped a great deal in dispatching police, the human element is still very important. "The civilian technicians learn to think like police officers; they begin to anticipate true needs and can judge real emergencies," said Police Officer Gerry Sweikata of the Communications Section.

Such a combination of specialties as cop and DP professional can sometimes cause problems, but the sense of camaraderie among the police officers compensates for the dual-job pressures. It's a "get-it-done" attitude stemming from their police force training.

A police officer can enter DP by having either related experience or some college background. However, all must perform on the street for an unspecified time before becoming eligible.

Unfortunately, the dual role is developing into a bigger problem, according to some members of the department. Police officers paid by the city receive no further compensation for being data processing professionals. Thus, a policeman/programmer currently earns about $20,000, while the salary of a programmer in private industry is often substantially higher. Police officers who are not so gung-ho about service to the city are reportedly being lured into greener financial pastures.

As a result, the data center becomes an excellent place to learn, but after a police officer gains enough experience he has the tools to seek DP jobs privately, a situation that could eventually hurt the department's overall DP operations, according to some department members.

A handful of systems programmers/analysts now thoroughly know the department's data bases, which include many more than just Sprint. If they were to leave, a crisis situation might be precipitated in the event of an emergency without adequately trained staff, these same staffers said.

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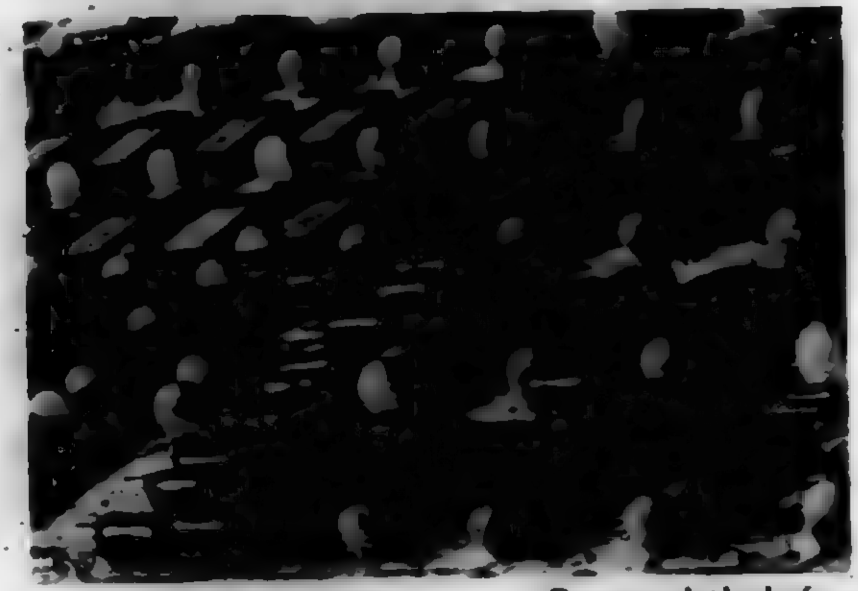

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SBS Sees Wideband Use Easing Net Bottlenecks

By Phil Hirsch
CW Washington Bureau

GAITHERSBURG, Md. — Increased use of wideband satellite transmission channels in the 1980s will greatly reduce the difficulty of using data communications, according to Robert C. Hall, president of Satellite Business Systems (SBS). Addressing a computer networking symposium here last week, Hall also predicted that wideband channels would lower unit data transmission costs significantly.

Today's difficulty comes from "the sheer number of choices" available to the network designer and from the proliferation of "new devices and capabilities" which are often incompatible. Another factor is "the curse of communications software" — how to get it, how to write it, how to find people with the right expertise and how to hold on to them "— without sending the manpower budget through the roof."

The result is that toward the end of the 1970s, "data communications started looking like a science of the occult, complete with a priesthood of free-lance specialists who offered to make things right, or at least to tell you how things went wrong," Hall said.

Major Bottlenecks

The wideband transmission networks that SBS and other carriers — such as Telenet, Tymnet and AT&T — will offer in the 1980s promise to bypass these "bottlenecks" in three major ways, he added: They will offer transparent interfaces, network-resident communications processing and turnkey contracts, thus enabling the user to get out from under much of the technical complexity he must contend with today.

One benefit of this change is that users' "software efforts increasingly will be devoted to [their] unique applications rather than to the routine requirements of interfacing." Another benefit: Users will be able to add new applications incrementally. "Such additions [should] actually improve the cost-effectiveness of the total system."

Another bottleneck likely to be broken in the '80s is the data communications user's dependence on telephone company-provided analog local loops. Optical fiber cable and microwave alternatives have been developed by a number of vendors — for example, Xerox Corp.'s Xten and Ethernet systems and Network Systems Corp.'s Hyperchannel.

Hall reported that his company has procured a prototype Hyperchannel adapter and, next year, will conduct a transcontinental data communications test utilizing a 56K bit/sec satellite channel interfaced in New York City to a coaxial cable local loop system, and in San Francisco to both cable and microwave local loops.

Wideband Costs

Regarding communication costs, he predicted that greater use of wideband facilities will cause the price/performance of communication channels to improve at a rate "comparable to the [present] price/performance trend in computer electronics."

Increased use will come initially from integration of voice, data and image transmissions now being carried over separate message paths, Hall said. As wideband traffic grows and rates decline, the lower prices will make electronic mail, computer networking, and video teleconferencing feasible for many companies that today find the costs prohibitive, he added.

Toward the end of the 1970s, 'data communications started looking like a science of the occult, complete with a priesthood of free-lance specialists who offered to make things right, or at least to tell you how things went wrong.'

Terminals and interfaces to support multimegabit transmission speeds have already been developed, Hall said. SBS, for example, is demonstrating a facsimile machine that transmits 70 page/min "and with quality comparable to a well-tuned office copier." The company's "data exchange controller," which interfaces users' terminals at the earth station to a satellite long-haul channel, can handle single-channel data rates of up to 6.3M bit/sec at an error rate of up to $1:10^{-12}$.

Through reprogramming, even higher speeds are possible. Use of a packetized transmission format allows voice, data, facsimile and/or video teleconferencing information to be transmitted in digital form simultaneously over each of these channels.

One result of the switch to wideband, Hall said, is that load sharing among dispersed computers will become more attractive. He also expects to see an end to the long-standing controversy over distributed data processing.

"Distributed processing, as the argument goes, is good because it puts computing power at the locations where it's most useful. But it's bad because it detracts from . . . centralized control . . . The solution may well reside in . . . megabit channel rates and [their] switched interconnectivity.

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Avoid Impersonal Attitudes

Expert Stresses Workers' Input in Automation

By Bruce Heard
CW Staff

NEW YORK — Workers should have increased input on the implementation of labor-saving technologies and managers must avoid impersonal attitudes, Dr. Bruce Gilchrist of Columbia University's Center for Computing Activities said in an interview here recently.

Gilchrist, a widely published author on the effect of automation on employment who calls himself a "concerned computer advocate," also claimed that the growth of automation does not portend wide-scale unemployment for U.S. workers.

Automation has been developing in the U.S. for the past 150 years, but "it's the acceleration of automation that concerns me now, especially when the gross economy is not expanding. If we had enormous demand, it would take care of our problems."

Asked how much input workers should have on the implementation of new technologies in the workplace, he replied, "A great deal." A good system design is dependent on the workers who will actually operate it, he said.

Noting that few systems throw out everyone from the previous system and start from scratch, he commented, "You have to get down below the managerial level and talk to people. It's not an either-or situation any longer because it's not the 19th century."

As an example of worker input, he cited the Volvo automobile company in Sweden where groups of workers are responsible for managing major segments of the production process. In Norway, a law requires workers to be "involved" with the implementation of new technologies, he said.

Increased automation is not leading to structural unemployment and a burgeoning number of white-collar jobs at the expense of blue-collar employment, he claimed. To draw such a distinction would be a "tragic dichotomy," he said.

The manufacturing work force has been shrinking historically, will continue to shrink and currently constitutes less than 30% of the workforce, Gilchrist declared. However, the white-collar work force is also threatened by automation, he added.

The demand for unskilled labor is going to drop as more tasks are automated. Displaced workers will have to educate themselves or face the specter of long-term unemployment, he explained. "The question is, what skills should they be taught?" he asked.

Employment Shifts

More and more automation does not mean we will reach a point where so many jobs have been automated, it will be impossible to find new positions for displaced workers, Gilchrist asserted.

Despite the recent vicissitudes of the U.S. economy, it has remained basically resilient and is likely to remain that way, he said. Faced with 7% to 9% unemployment, the number of people employed has grown over each of the past 30 years.

If automation was the insatiable juggernaut that some have painted it to be, unions would have mounted a serious challenge to its proliferation, Gilchrist commented. As it is, the unions have been more interested in wage levels than the number of employed union members, he claimed.

Both government and unions are heavily involved with automation efforts in Japan and West Germany, and, "both those countries are held up as the epitomies of success, so it's paradoxical to say unions and government should go away."

"What we need now is leadership," he said.

Power Failure Downs Norad

COLORADO SPRINGS, Colo. — The North American Air Defense Command (Norad) computer system, which has been blamed for several false attack warnings in recent months, fell victim to a power dropout here recently.

The power failure, which Norad said was caused by a failure in a commercial power line, knocked out an internal relay switch and caused two diesel generators, which run along with the commercial power supply, to fail. Although Norad was able to restore enough power to operate overhead lighting within 15 minutes, the computer system was down for more than an hour, a spokesman said.

Norad said it was a coincidence that the commercial power, which Norad uses to save money, failed at the same time as the facility's backup power units. Power was restored when the two diesel generators were restarted, along with a third from Norad's bank of six backup diesel generators, according to the spokesman.

The computer system, which is a Honeywell, Inc.-built processor designed for Norad, was not damaged in the failure, but some data was lost and later restored, according to Norad.

A spokesman said Norad switched to a manual voice communication system when the computerized warning system failed. No injuries were reported.

On March 18, 1981 *Computerworld Extra!* will devote an entire issue to an in-depth look at "Communications Systems in the 80's."

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Computerworld Extra! is an extra issue of Computerworld — the second we have done — to be published this March 18th. It will appear in what our Editor, Drake Lundell, calls a "tabezine" format. This means glossy, full-color covers on the outside, and a magazine format inside (printed on super calendared newsprint) — and tabloid-size throughout.

This issue of *Computerworld Extra!* will focus its entire editorial content on a single subject: "Communications Systems in the 80's." Top experts from all areas of the communications field will write magazine-length articles on a variety of topics including: Integrating Voice and Data Networks; The State of Videotex in the US, Uk, France, and Canada; Network Management; Satellite Technology in the 80's; The Past and Future of the Communications Act and Federal regulations; Network Standards and Protocols; and Future Directions in Telecommunications Technology. Plus, there'll be Wrap-up and Analysis articles for Data Communications Software, Data Terminal Equipment, and Data Communications Equipment.

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Data Comm Terminals-Smart	34	22,000	33	83,000
Multiplexers	30	19,200	29	73,000
Distributed Processing Equipment	28	17,900	18	45,000
Computer Services and Timesharing	26	16,600	20	50,000
Teleprinters	26	16,600	15	38,000
Graphics Terminals	22	14,100	7	18,000
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Source: "A Profile of Computerworld Subscribers and their Companies" — Becker Research.

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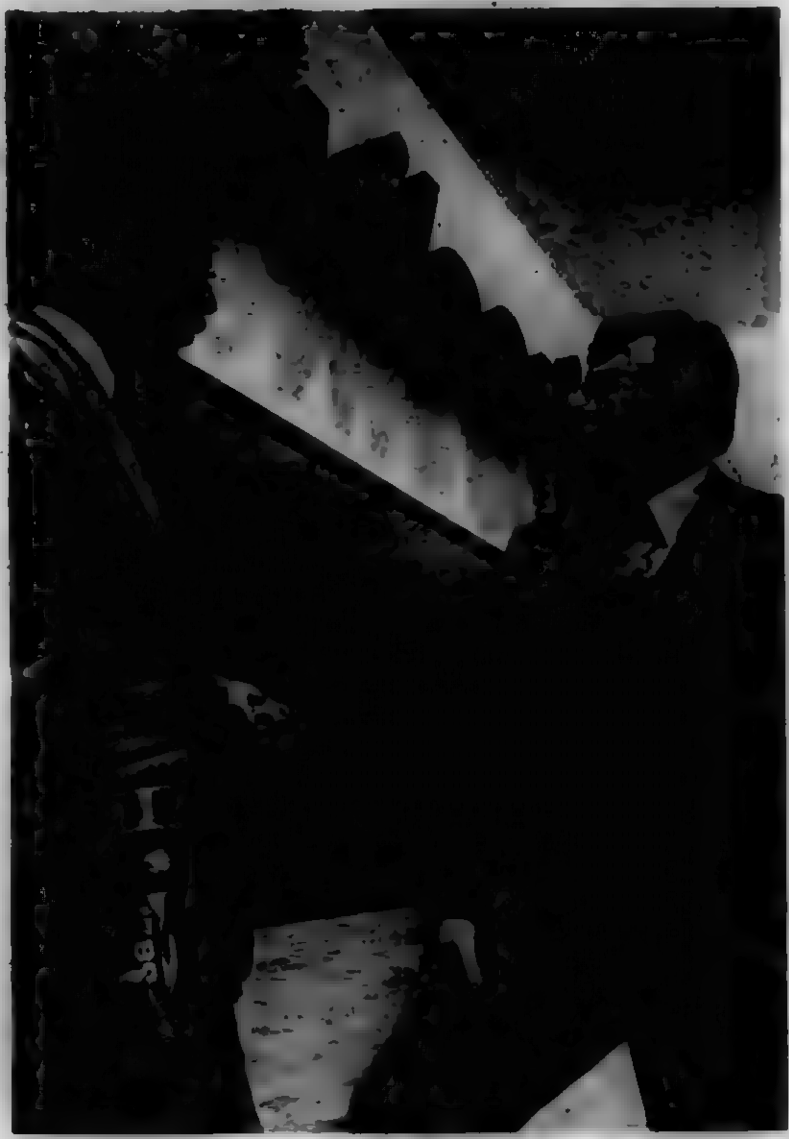

Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

PETE BLOZIS:
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Where to Find Data on Computer Groups?

Turnaround Time

By Larry E. Long

Q In an earlier column, you were looking for DP and computer organizations. There is a book that provides all the information you requested — *The Encyclopedia of Associations*, published by Gale Research of Ann Arbor, Mich. It is available in all public and university libraries and most corporate libraries.

If the organizations themselves do not respond to your query, try this book to help your readers.

A *The Encyclopedia of Associations* is far from comprehensive. My suspicions were confirmed that this and other such compilations of associations have omitted a good many professional DP and computer societies and organizations.

Although many have responded to my initial request, I would invite those who have not responded and wish to make known their organization to the DP community (through *Computerworld*) to do so. Beginning with this issue (see Page 29), CW will publish periodically a brief description of those organizations that respond.

Q I am a senior analyst in the computer department of a large company. We are responsible for providing services to all departments within the company. I have been asked to initiate a review of the procedures currently in place to develop cost estimates for the design and implementation of new systems. Our current procedures have not been yielding consistently accurate estimates. Can you recommend any references on procedures being used successfully elsewhere?

A There are several prerequisites to making consistently accurate cost estimates. A system development methodology is necessary to provide the framework (phases, activities and milestones) for estimation and the collection of historical data. To minimize in-progress revisions and, therefore, variations in estimation, the feasibility study should include a preliminary general systems design that provides sufficient detail to define the project's scope. Estimation is still very much an art and not a science; the wisdom of experienced personnel is a must.

One book that presents a methodology and encourages a realistic estimation via a preliminary design is *Data Processing Documentation and Procedures Manual* by a certain CW columnist who responds to inquiries (Reston Publishing Co., 11480 Sunset Hills Road, Reston, Va. 22090).

Q Your answer to the question about whether a knowledge of programming is a requirement to be a good systems analyst was well accepted where I work, but we go one step further. Entry-level people aspiring to be programmers and analysts start as operator trainees and work as operators for six months before they begin their programming training. During that six months, few of us saw the need for machine room experience. In retrospect, just about everybody deemed the experience invaluable. We highly recommend it.

A Your successes may prompt DP managers to rethink their career development programs for programmers and analysts. Thanks for writing.

Q Where does one obtain information about DP positions in the U.S. Government?

A The Office of Personnel Management offers federal employment information through a nationwide network of Federal Job Information Centers. These centers provide information on federal jobs and employment opportunities. I would recommend that you contact the Federal Job Information Center nearest you (Chicago, 312-353-5136) and request information on DP careers and employment opportunities.

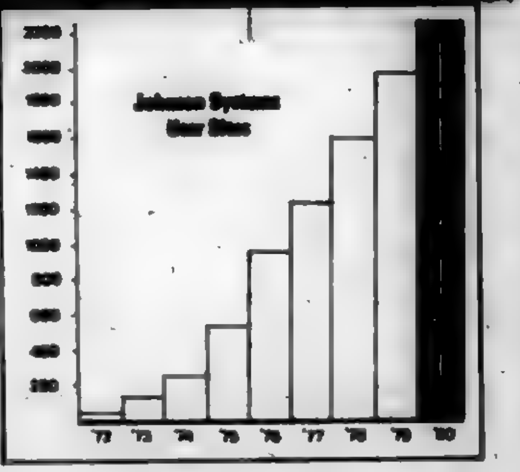
The federal government has moved very slowly in its efforts to update job classifications for the volatile field of DP. The "computer specialist" is the catchall for most professional DP positions. Existing position descriptions are inadequate to describe the scope and type of DP jobs within the federal government.

The Federal Job Information Center can provide information on a limited set of DP jobs. To obtain more detailed information about a specific job, you will probably need to contact the agency offering the job.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.

COMPLETE DATA CENTER ACCOUNTABILITY...



JARS—Job Accounting Report System

In 1971, Johnson Systems began providing performance services to data center managers concerned about the efficiency of their computer resources. Based on this first-hand experience, JSI designed its first product, the Job Accounting Report System now known worldwide as JARS. The first version of JARS, developed for DOS users, was installed in 1972. The OS version followed in 1973, and JSI was on its way to its goal of providing complete data center accountability.

Under the JSI theme of commitment, TSO support was introduced in 1974, POWER/VS support in 1975, graphic reporting capability in 1976, CICS/VS support in 1977, MVS and VM support in 1978, and DOS/VSE and IMS/VS support in 1979. Current versions of OS and DOS systems reflect JSI's concern to stay on the leading edge of full data center management accountability.

UMAX—CICS/VS Utilization Monitor And Chargeback System

In 1977, Johnson Systems introduced UMAX, the CICS/VS Utilization Monitor And Chargeback System, designed to provide DP Managers a tool with which to make effective analyses of CICS/VS activities and accountability. UMAX measures CICS/VS user productivity, monitors the CICS/VS environment, evaluates software efficiency, and provides data for equitable customer billing and cost distribution. Recently, JSI added GOLD, their Graphic Online Display System, as an option to UMAX users. Using bar graphs, charts and alphanumeric displays, GOLD permits the DP Manager to observe and fine tune the performance of his CICS/VS system, online, and to monitor the effect of those changes as they occur!

APEX—Automated Planning And Execution Control System

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ALARM—Hardware Reliability Measurement System

In 1980, Johnson Systems introduced ALARM, a Hardware Reliability Measurement System with which a user can pinpoint hardware and media reliability problems. ALARM permits the DP Manager to control vendor maintenance, enhance hardware reliability, and maximize his system.

☐ OS JARS—Job Accounting Report System. Performance measurement and computer accounting, costs distribution for OS users. [illegible]

☐ IMS/VS—Utilization Monitor and Chargeback System. [illegible]

☐ DOS JARS—Job Accounting Report System. [illegible] for DOS users. [illegible]

☐ UMAX—CICS/VS Utilization Monitor and Chargeback System. [illegible] used by CICS VS applications.

Please send me more information about the Johnson Systems Performance Products I have checked.

☐ GOLD—CICS/VS Graphic Online Display System. A UMAX option. GOLD permits the DP Manager to view component utilization, fine-tune performance elements and monitor changes interactively.

☐ ALARM—Hardware Reliability Measurement System. [illegible]

☐ APEX—Automated Planning and Execution Control System. [illegible]

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Larry Long's List of Professional Groups

Larry Long is compiling a list of professional DP/computer societies and organizations. His compilation begins in this issue and will be continued in future columns. To be included, societies and organizations should send a brief description of their purposes and objectives to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

● **Association for Systems Management (ASM).**

Purpose and objectives: The Association for Systems Management (ASM) is the international professional organization dedicated to the advancement and self-renewal of systems analysts and systems managers in business, industry and government. Our primary objective is to provide for the continuing education needs of the systems practitioner. There are 25 chapters organized into 21 division councils in Canada, the U.S. and Venezuela.

ASM is dedicated to promoting a wider understanding of the systems analysis function as a tool to more effective management, to encouraging high standards of education and performance among its members and to enlightening the general business community on the contribution of ASM members. The major functions of ASM are collecting, editing and transmitting pertinent information through periodicals, books, seminars, films and papers.

For more information: A. James Andrews, Director of Publications, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138, (216) 243-6900.

● **National Association for State Information Systems (Nasis).**

Purpose and objectives: Nasis is an organization having as its members the 50 states of the U.S., its territories and the District of Columbia. The Canadian provinces of British Columbia, Ontario and Quebec participate as associate members, while a correspondent relationship is maintained with many other foreign nations.

Nasis' central purpose is assistance to state government in providing effective service to its citizenry.

For more information: Judie Parish, Executive Assistant, National Association for State Information Systems, P.O. Box 11910, Lexington, Ky. 40578, (606) 252-2291.

● **Women in Data Processing (WDP).**

Purpose and objectives: WDP is a nonprofit, professional organization registered in the state of California. Our membership of men and women is spread throughout the state and extends into other states as well. The professional level of the members ranges from beginning data entry persons through department directors and covers all aspects of the data processing profession. We also have student memberships.

WDP members are career professionals interested in promoting the entry and advancement of women in the field of data processing. WDP offers seminars and workshops on state-of-the-art technology, personal development, educational opportunities and management practice.

For more information: Saxon Douda, Secretary, Women in Data Processing, P.O. Box 8117, San Diego, Calif. 92102.

● **Independent Computer Consultants Association (ICCA).**

Purpose and objectives: The ICCA is a national, not-for-profit, professional organization supporting independent businessmen and women across the country.

A major goal of the association is to promote professionalism within the industry. Every member of ICCA supports our code of ethics.

The ICCA publishes the National Directory of Computing and Consulting Services. ICCA also publishes a quarterly newsletter and holds an annual conference that focuses on the needs and problems of the membership.

For more information: Steven A. Epner, President, Independent Computer Consultants Association, P.O. Box 27412, St. Louis, Mo. 63141.

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Data Recovery Method Salvages 'Crucial' Files From MGM Grand

By Jeffry Beeler

CW West Coast Bureau

LAS VEGAS — A little-used data recovery method has apparently enabled the fire-ravaged MGM Grand Hotel to salvage several crucial disk files that otherwise would probably have been lost forever in the company's fatal Nov. 21 blaze.

The recovery procedure is credited with rescuing the last remaining copy of the MGM Grand's accounts receivable, accounts payable and guest registration files. All other copies of those records, including backup files, are believed to have been destroyed in the same fire that killed more than 80 of the hotel's guests [CW, Dec. 1].

Before the blaze struck, the files in question had resided on two disk packs. But on Nov. 21, both packs sustained a level of fire-related damage most users and vendors historically have considered beyond repair.

One of the packs was severely gouged and both were heavily contaminated by smoke, according to Lee Iles, field operations manager for the Santa Ana, Calif.-based Electronic Engineering Co. (Eeco), which supplies the MGM Grand's guest reservation system.

At first, MGM Grand officials reportedly feared that the magnitude of the damage would make data recovery impossible and thus leave the hotel's vital files "trapped" forever inside the two battered disk packs. But, with the help of a salvaging procedure developed and supervised by David Brown, an outside consultant, the MGM Grand was able to refurbish the packs, regain access to the apparently lost files and copy their contents to a standby, uncontaminated disk system, Iles said.

The refurbishing operation was not intended to return the contaminated packs to their original, mint condition, nor was such a total restoration necessary. All that was required was for enough of the damage to be repaired to allow the packs to be used one more time without causing a head crash, Iles said.

After the packs had been successfully reread and their files copied, they ceased to be useful to the hotel and were immediately discarded.

Permanent Loss Avoided

Eeco was quickly able to replace the hotel's ruined reservations system, which was built around a 64K-byte Data General Corp. Nova 3 and 50M-byte Century Data Systems, Inc. T50 disk units. But the problem of salvaging the hotel's valuable data files proved a much tougher nut for Eeco to crack. When the floor of the MGM Grand's computing department collapsed, smoke quickly filled the room and contaminated most of the hotel's disk packs, including the two containing its receivables, payables and guest directories.

Fearful that the contents of the two disk packs might be lost permanently, the hotel's management sought help from Eeco, which referred the matter to the Data Maintenance Division of Randomex, Inc., a Long Beach, Calif.-based disk-systems service firm. Randomex in turn sought the advice of outside consultant Brown, who serves as technical support manager for the Covina, Calif., office of Conrac Corp., the terminal maker.

For a fee of $1,200, Brown hand-cleaned the dirty packs and then loaded the read/write heads in the middle of the disks before bringing the heads back to "sector zero" by software, Iles said.

Disasters Are His Specialty

COVINA, Calif. — The fire-stricken MGM Grand Hotel is apparently only the latest in a long line of companies to have benefited from a post-disaster data recovery procedure developed by disk systems consultant David Brown.

During the last three years, Brown has tested his "proprietary" technique at 67 user installations, and only once has he failed to achieve at least partial success, he claimed.

Brown began developing the procedure in 1977 while pulling a two-year stint as manager of Memorex Corp.'s worldwide field engineering organization. Since then, he has refined the process gradually to the point where he can often recover data files from what many users have traditionally considered irreperably damaged disk packs. Brown currently works for Conrac Corp. as a technical support manager.

Almost all of Brown's calls come from users who have suffered some form of catastrophic disk pack damage.

Asked to explain how his data recovery procedure works, Brown declined to answer at length for fear of possibly divulging "proprietary" details. But he did disclose that the method consists of three main steps.

First, he inspects a damaged pack to assess the chances of a successful repair. During exceptionally violent crashes, some packs have so much of their data-bearing oxide stripped away that not even the most proficient salvaging operation can rescue them, Brown said.

Second, he refurbishes the pack to the point where read/write heads can once again fly safely over the unit's recording surfaces. Using several proprietary circuits, he also reportedly boosts the drive's read current to make it sensitive enough to detect any data remaining on the pack's damaged sectors.

Third, after the pack has been fully restored, Brown overrides the software safety checks that otherwise would prevent the crashed unit from being reinitialized.

Users wanting additional information about Brown's data recovery procedure can write to the developer at P.O. Box 3392, Anaheim, Calif. 92803.

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Firms Supporting Bell Terminals

AT&T Guide to List On-Line Service Bureaus

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — AT&T will begin publishing a directory early next year listing the names of on-line service bureaus and other information services firms that support Bell terminals.

The basic aim of the publication was explained by Market Manager Peter Bartolotta.

Prospective users of Bell's newer data communications products, such as the Dataspeed 40/4 and 4540, frequently lack in-house computer resource to fully exploit the terminals' capabilities, he pointed out.

Vendors of on-line data base and service bureau services typically interface with Model 28 and 33 teletypewriters, but are not aware of the revenue opportunities implicit in supporting the new devices.

The directory, by facilitating communication between both groups, is meant to encourage each to make greater use of these products, a Bell spokesman said.

The directory will be introduced during the first quarter of 1981. It will be distributed only to Bell operating company account executives.

Bell Contracts

When the need for a business application is identified by an account executive and a vendor capable of satisfying the requirement is not already listed in the directory, AT&T will attempt to find a suitable supplier by contacting the industry.

Bartolotta said AT&T is thinking about making a version of the new directory available to the public.

On-Line Directory

In addition, since only 400 firms will be in the initial publication and there are 8,000 to 10,000 companies offering information services in the U.S., "we will almost certainly be forced sooner or later to put the directory on-line," Bell said.

However, only Bell operating company account executives will have access to this on-line data base, he added.

Moreover, AT&T has "no plans" to take orders for information services listed in the directory, the firm said.

DEC Announces Seminar Series On Pascal

BEDFORD, Mass. — Digital Equipment Corp. has announced a series of seminars on "Pascal as a Second Language" for professional programmers.

No knowledge of Pascal is assumed but programming experience is a prerequisite, according to DEC's Educational Services Department.

The two-and-one-half-day seminar covers the reasons behind Pascal's development, and all elements of standard Pascal including data structures, control statements and program structure will be examined.

Seminar attendees will be expected to write program exercises to gain some understanding of Pascal's key features, DEC said.

The seminar costs $545 and will be run on the following 1981 schedule: Washington, D.C., Jan. 27-29; Los Angeles, Feb. 23-25; San Francisco, Feb. 25-27; Minneapolis, March 23-25; Dallas, March 25-27; Boston, April 27-29; New York, April 29-May 1; Atlanta, May 20-22.

Registration details are available from DEC at 29 Hudson Road, Sudbury, Mass. 01776.

Correction

NEW YORK — An announcement of the Yankee Group's Feb. 24-25 conference here should have listed the title as "The Refocusing of IBM Beyond the 3081."

Registration for the conference costs $725.

Inquiries should be sent to Marjorie Sugarman, P.O. Box 43, Harvard Square, Cambridge, Mass. 02138.

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50 Wholesale/Retail Trade
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22 Director/Manager/Supervisor DP
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31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other ____________

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Calendar

Jan. 11-13, Washington, D.C. – **Legal Issues in EFT.** Contact: Electronic Funds Transfer Association, Suite 502, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

Jan. 12-14, New York – **Auditing Teleprocessing Networks.** Contact: DP Auditors Association, Inc., G.P.O. Box 1279, New York, N.Y. 10001.

Jan. 13-14, Minneapolis/St. Paul – **Two Days to More Effective Writing.** Contact: Metropolitan College, St. Louis University, 221 N. Grand Blvd., St. Louis, Mo. 63103. Also being held Jan. 22-23 in Boston and Jan. 28-29 in St. Louis.

Jan. 29-30, Washington, D.C. – **Information and Telecommunications Services: Business Strategies for the '80s.** Contact: Executives Enterprises, Inc., 33 W. 60 St., New York, N.Y. 10023.

Feb. 1-4, New Orleans – **Bank Telecom '81 Workshop.** Contact: Ann Siegel, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Feb. 1-5, Lake Buena Vista, Fla. – **Microdata's User Conference.** Contact: Microdata Corp., 4300-L Lincoln Ave. Rolling Meadows, Ill. 60008.

Feb. 1-6, Los Angeles – **Managing the Information Resource Program.** Contact: Patricia Carlson, Suite 2381 Graduate School of Management, University of California, Los Angeles, Calif. 90024.

Feb. 2-3, Cambridge, Mass. – **DP Fundamentals for Management and Users.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Feb. 2-3, Houston – **How to Achieve the Cost Savings and Sales Benefits of Manufacturing Resource Planning.** Contact: Pam Richards, McGraw-Hill Seminar Center, 305 Madison Ave., New York, N.Y. 10017.

Feb. 2-3, Andover, Mass. – **How to Improve Your Productivity.** Contact: Education/Training Resource Center, New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

Feb. 2-4, Palo Alto, Calif. – **Cryptography and Data Security.** Contact: Hellman & Associates, 299 S. California Ave. Palo Alto, Calif. 94306.

Feb. 2-4, Boston – **Advanced/On-Line Systems.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Feb. 2-4, Washington, D.C. – **Peripheral Array Processors for Signal Processing and Simulation.** Contact: Continuing Education Institute, Suite 1030, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

Feb. 2-4, Washington, D.C. – **Computer Communication Systems and Networks.** Contact: The George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Feb. 2-4, Newport Beach, Calif. – **Computer Contracting – a Practical Guide.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Feb. 2-4, Madison, Wis. – **Microprocessor-Based Energy Management Systems.** Contact: Robert P. Madding, University of Wisconsin-Extension Engineering, 432 N. Lake St., Madison, Wis. 53706.

Feb. 2-4, New York – **Fundamentals of Finance and Accounting for the Nonfinancial Executive.** Contact: Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104. Also being held Feb. 4-6 in Los Angeles and Houston and Feb. 9-11 in Miami.

Feb. 2-4, San Francisco – **The IBM 4300 Series.** Contact: Technology Transfer Institute, P.O. Box 49765, Los Angeles, Calif. 90049.

Feb. 2-6, Houston – **Data Base Modeling and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Feb. 2-6 in San Francisco.

Feb. 3-4, Houston – **Microprocessors in Control Systems.** Contact: Instrument Society of America, P.O. Box 12277, Research Triangle Park, N.C. 27709.

Feb. 3-4, San Francisco – **Local Area Communications Networks.** Contact: McGraw-Hill Publications Co., Conference and Exposition Center, 1221 Ave. of the Americas, New York, N.Y. 10020.

Feb. 3-4, Houston – **Computer Process Control Strategies.** Contact: Instrument Society of America, P.O. Box 12277, Research Triangle Park, N.C. 27709.

Feb. 3-5, Philadelphia – **International Word Processing Symposium.** Contact: International Word Processing Association, 1015 N. York Road, Willow Grove, Pa. 19090.

Feb. 4-5, Washington, D.C. – **Computer Systems Risk Analysis.** Contact: CRC Systems, Inc. 4020 Williamsburg Court, Fairfax, Va. 22032.

Feb. 4-6, Chicago – **Product Evaluation and Planning.** Contact: Applied Management Institute, 555 E. Ocean Blvd., Long Beach, Calif. 90802.

Feb. 4-6, New York – **Data Processing: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 4-6, Hartford, Conn. – **Computer Auditing and Security.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Feb. 4-6, Washington, D.C. – **DP for Users: Managers and Professionals Who Depend Upon Computers.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Feb. 5-6, San Francisco – **Fundamentals of Management for New and Prospective Managers.** Contact: Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Feb. 5-6, New York – **Word Processing: Management Concepts, Organization and Guidelines for Implementation.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Feb. 5-6, Boston – **Techniques for Automating Auditing.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

Feb. 8-11, Lake Buena Vista, Fla. – **SAS Users Group International Conference.** Contact: SAS Institute, Inc., P.O. Box 8000, SAS Circle, Cary, N.C. 27511.

Feb. 9-11, Orlando, Fla. – **Managing DP System Maintenance.** Contact: Management Advisory Publications, P.O. Box 151, Wellesley Hills, Mass. 02181.

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EDITORIAL

Heading Off Bell

Newly deregulated AT&T, the company richer than most nations, plans to test a home and business information system in Texas next year, but some of the state's newspaper publishers have formed a posse to head Bell off at the pass.

Earlier this year, the Federal Communications Commission (FCC) moved to give Bell freer rein to enter the data processing marketplace so long as the carrier's DP side stays financially separate from its voice side, where a herd of phone companies make many billions of dollars every year.

Led by Phillip J. Meek, president and editorial chairman of the *Fort Worth Star-Telegram* and chairman of the Texas Daily Newspaper Association's telecommunications task force [CW, Dec. 15], the publishers regard the test Bell plans for Austin in mid-1981 as an example of the "unfair advantage" they claim Bell will have in developing services directly competitive with newspapers [CW, Dec. 15].

At stake may be quite a chunk of the $14.3 billion those publishers reportedly drew in advertising revenues last year.

For Bell's part, a spokesman has said "we are not selling the service in the hope of putting a foot in the door and then saying it's already established. This is an experiment; there is no charge; we are not prohibited from doing an experiment."

The test will offer about 600 homes and 50 businesses in the Texas capital access to white pages and Yellow Pages telephone listings, the spokesman noted, as well as advertising by realtors, supermarkets, department stores and other businesses.

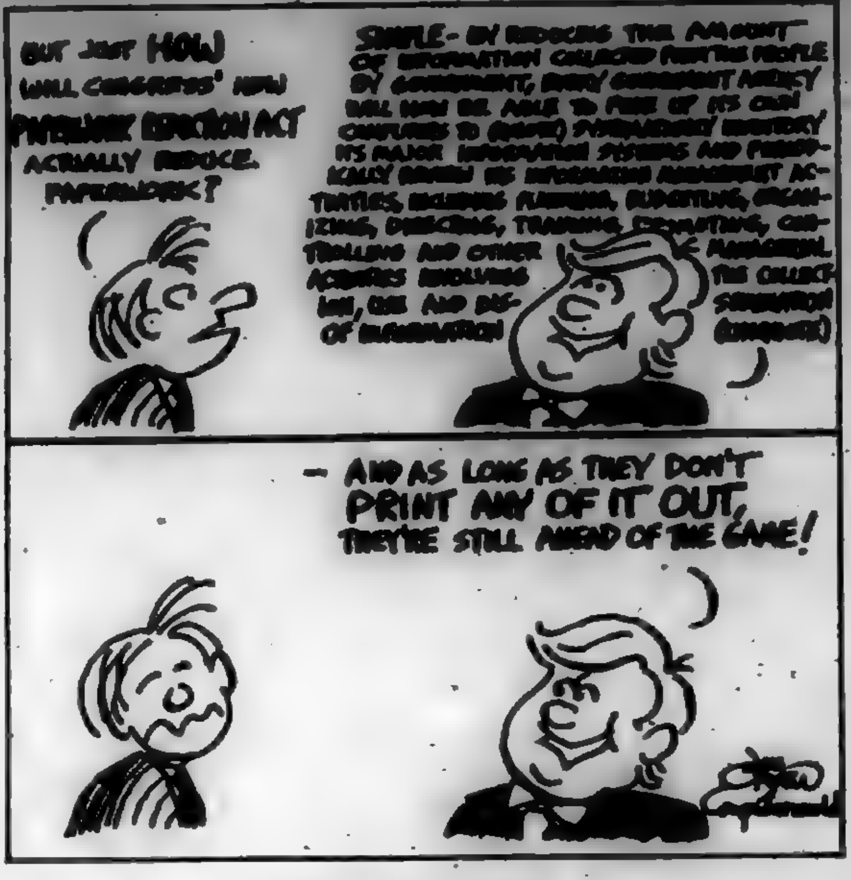
In a protest lodged with the Texas Public Utilities Commission (PUC) Meek and his colleagues are protesting the experiment on a procedural basis. "We think something of this nature should have a hearing as opposed to just getting filed and approved almost automatically," Meek stated.

Computerworld has learned that the PUC processed Southwestern Bell's application for the test without a public hearing and without referring the matter to the state commissioners. According to Meek, the riled newspaper publishers view Bell's apparent interest in offering computerized information services as violating the carrier's 1956 Consent Decree with the U.S. Justice Department. The decree was intended to keep Bell out of the DP corral.

Meanwhile, some Bell watchers are wondering whether the carrier will venture into the banking industry, which has developed services such as bill payment over phone lines with the home phone acting as a data terminal.

If Bell does want to enter publishing and banking, the matter warrants the attention of the public, legislators and the judiciary at the highest level.

Among the issues raised by this prospect are whether any single organization, especially a profit-making corporation, can dominate both the means of communication and information gathering normally available to an individual citizen.


BUT JUST HOW WILL CONGRESS' NEW PAPERWORK REDUCTION ACT ACTUALLY REDUCE PAPERWORK?
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— AND AS LONG AS THEY DON'T PRINT ANY OF IT OUT, THEY'RE STILL AHEAD OF THE GAME!

DATA PAST

Five Years Ago
Dec. 31, 1975/Jan. 5, 1976

WASHINGTON, D.C. — IBM and its partners planned to provide domestic satellite services to users in 1979, according to a proposal filed with the Federal Communications Commission (FCC). IBM was one of the major partners in Satellite Business Systems, created to carry on earlier proposals made by CML Satellite Corp. The SBS application complied with the FCC restrictions set forth in early 1975 that gave IBM and Comsat General several alternative ways to enter the satellite business.

Eight Years Ago
Dec. 27, 1972/Jan. 3, 1973

NEW YORK — An internal memo stated that an "intensive investigation" of IBM's pricing policies "would reveal the extent of our price control and its supporting practices" in the computer market. "Such a revelation would not be helpful to our monopoly defense," the memo added. The document was uncovered from the almost 27 million documents filed in the various antitrust cases against the company. The first memo stated that the "liability of IBM's risk lease is dependent on price leadership and control."

LETTERS

Inevitable Pathway

This is in reply to the Nov. 17 article on remarks by Charles D. Ferris, Federal Communications Commission chairman, who warned of privacy threats. He stated, "I would ask each of you to think of the privacy consequences, and to try to address them at an early stage. Design them away, program them away. Do your human engineering with this human interest goal in mind."

In my 15 years of systems work, I have found that you generally do what the boss asks of you or go your merry way. This thing is bigger that any programmer, analyst, project leader or manager. Have you ever noticed how a large computer system (and sometimes smaller ones) and city, county, state and federal governments act like a big machine that can be a help or a hindrance — can serve a good purpose or sometimes perform like a monster or beast that's gone out of control?

To say "Design them away, program them away," is amusing, if not just outright folly.

No one person or group can get us off that pathway that leads to control by the government through information about the people — even to the point of monitoring and controlling what we buy and sell.

James K. Carnine

Geneseo, Ill.

Golden Methodology

I found that the editorial on the subject of deskilling programmers created a very true impression of the status and problems surrounding structured methodology standards in data processing today [CW, Nov.10].

I have kept up with all previous editorials of structured programming methodology because I am a strong advocate of its implementation in data processing.

But there is a point I wish to make concerning the effect of structured methodology upon my early experience as a programmer.

During the formal data processing training I received, "structured methodology" was just a buzzword. Most information sources I consulted fell into one of the six categories stated for definition of structured methodology. Armed with this wealth of information, I was able to formulate a logical basis for the essential steps required to code programs that were easy to debug and clean running.

That progress was due to the proper direction of my efforts by the system programmer of the shop in which I started. This perspective at my early levels was fundamental in my progress as a beginning programmer.

And thus I come to my point. It is my opinion that if beginning or average-skilled programmers are given the proper instruction and direction in the early stages, their skills will develop in much the same manner as have mine.

In the sense of the text, structured methodology does deskill programming techniques used thus far in the history of programming, but for my experience as fairly well-skilled analyst who hates late-night telephone calls, structured methodology is worth twice its weight in gold.

Philip Shaner

Kansas City, Mo.

Antiquated JCLs

"IBMer Pans JCL" [CW, Oct. 13] stated that "IBM made a mistake when it created JCL . . . But not only IBM's JCL is behind the times . . . Every vendor's command language is antiquated."

I suggest that John McKeehan look at Burroughs Corp.'s command language. It is nothing like JCL; it provides unstructured human qualities and it certainly is not antiquated.

Harvey Schoenman

Pittsburgh, Pa.

SOFTLINE/Werner L. Frank

The Transaction Processor

In a previous column we discussed the software environment in which application programs operate. A trace of history showed the evolution of that environment moving from simple hardware-based bootstraps of the early 1950s to the complex four-part systems of today, via the operating system, the input/output control mechanism, the teleprocessing (TP) monitor and the data base management system (DBMS). The new kid on the block, the data dictionary, is making its emergence at this time.

Users pay for these facilities in the form of hardware extensions, additional memory and storage resources and the execution of a good number of machine memory and I/O cycles. But in return, the same user achieves standardization and convenience, which should gain higher application software implementation productivity as well as improved maintainability of the operating programs.

To this structure now looms one more software addition in support of the on-line, terminal-oriented systems proliferating in today's world of lower cost screen devices and distributed processing. This increment to the software environment is the transaction processor.

As in the past, this software element is derived by peeling off certain functions which are already resident within one or more of the existing environmental modules and extending them. These existing facilities are collected together and, by adding new capabilities, are further generalized. Thus the transaction processor module will draw heavily from the TP monitor, have a strong link to the data dictionary, depend upon the I/O system and become somewhat competitive with the standard operating system.

New Emphasis

This transaction processor, however, brings with it a new emphasis and some new features. The software is both a framework for structuring the interactive application as well as the mechanism for executing the on-line dialogue in a video screen-driven setting.

Earlier systems focused on individual lines of input and lines of output. This one-dimensional view of computing life was conditioned by the line of code, the individual card image and the line of printer output. The view was heightened even further when computing went on-line because of the preponderance of terminal devices which were functioning on a line-at-a-time basis. This practice persisted even with the introduction of CRT screen devices which more often than not simulated a piece of paper, virtually rolling across the display surface.

But several observations were made. CRT displays are two-dimensional and can heighten the performance of the user if the full screen is used simultaneously. Furthermore, structure of the screen display can be abstracted and hence generalized for implementation purposes. Finally, the flow of program logic is dictated by the screen display and sequence as viewed by the user, rather than from an internal procedural structure which must ultimately be transformed to output on an external device.

The transaction processor, therefore, must have the following five components:

- Screen definition capability.
- Screen generator and screen library capability.
- Dialogue composer.
- Processing logic.
- Binder and execution module.

Recognition that screens have the possibility of an inherent structure was no doubt motivated by the same factors that led to the abstraction of an output page, which earlier had quite naturally led to the report generator. In the latter case, for example, the abstracted features of a report are the title, page number, date, control break, column headings, detail line items and summary controls, as well as physically related features concerned with the number of characters per line or number of lines per page. Once recognizing this commonality, the generalized report writer/composer was not far behind.

The screen abstractions are similarly derived. They can have unique names that are managed through a screen library system and can be addressed or called from other screens so that a dynamic dialogue of sequenced screens can be generated.

The screen layout is composed of three parts: the protected area and the unprotected areas making up the presentation portion, and the control area for guiding the user. The first part consists of the fixed and unmodifiable information displayed on specified portions of the screen and protected from change by the user.

The second area is the location on the screen, which invites change through input of data or change of a setting under the control of a marker or cursor. The unprotected areas are often suitably displayed through various enhancing means such as underlines, reverse video bars or a number of special character symbols suggestive of solicited entry type and data structure.

It is also desirable to visibly show which unprotected input areas are mandatory input points and which are discretionary. Coupled with this feature is the optional presentation of default values directly into the unprotected fields. In this way the most likely to occur input is already present. Hence the actual user input, measured by keystroke, is minimized.

Graphics indication of permissible input form through Cobol "picture" notation or other prompting information, complete the architecture for the generalized screen presentation structure.

Control Function

However, a control function is still necessary. This is achieved by dedicating a third special area. Typically the first line or last line of the screen is often used to serve the dual function of providing prompts for alternative moves or actions based on the particular status of the screen information.

(Continued on Page 36)

HUMAN CONNECTION/Jack Stone

'Critical Elements' Key to Personnel Appraisal

As we look forward to another wild year for this industry, it seems appropriate to take stock of how you're handling the computer center employees — those vital, unsung heroes and heroines who are making the center the success (hopefully) that it is today. And perhaps the most significant aspect of your personnel management function is the performance appraisal system, the subject of this week's article.

All the employees want to know "where they stand" in the eyes of the management and what they have to do to improve; and if the employees are not getting this word on a regular basis, then the appraisal system is not doing the job.

The U.S. Office of Personnel Management (OPM) has done some crackerjack work in interpreting the intent of Congress in the Civil Services Reform Act of 1978, which includes the development of fairly specific procedures on how appraisals should be conducted. Here's the OPM approach to this challenge:

(1) The job must be carefully analyzed and the major elements of the job identified. To do this, a supervisor may have to access mission and functional statements, position descriptions, short- and long-range plans, budgets and project documentation.

(2) Then, "critical" elements are identified. These are job elements any one of which is so important that employee performance below the minimum acceptable standard requires remedial action, and may be the basis for reducing the grade level of the employee — or removing the person from the organization altogether.

Put into different words, a critical element is so important that failure to perform it satisfactorily would endanger the program or have other serious consequences. (Critical elements also include such disagreeable supervisory and managerial duties as recommending or making unfavorable personnel decisions, developing and counseling low performers and handling complaints regarding Equal Opportunity and Affirmative Action programs.)

Critical elements should include only those aspects of the work over which the employee has control. They should cover individual aspects of the employee's position, such as those relative to human resources management, work management, financial management and communications. They should also cover organizational aspects of the position, such as program planning and implementation.

How many elements are critical? OPM suggests eight or nine max — if the number is larger, then thought should be given to grouping them into broader categories. The number will also vary among positions and from year to year or more frequently.

(3) Next, performance standards are developed from the same sources used to develop critical elements. These standards should define performance in terms of *product* — what is to be accomplished, and *process* — how it is to be accomplished. These standards should be as specific and measurable as possible, and expressed in terms of quality, quantity, timeliness and cost.

The standards should be realistic in terms of what is achievable and yet challenging enough to stimulate employee growth. Realistic standards would take into account factors such as availability of resources, operating environment and uncontrollable factors which affect the individual's capacity to perform.

Because these factors may well change, the performance standards cannot be treated as immutable absolutes; clearly they must be reviewed regularly to assess validity under existing circumstances and revised promptly when necessary.

(4) A month before the appraisal period begins, the supervisor and the employee develop a written "performance plan." This document includes the critical and other performance elements which reflect the employee's significant duties and responsibilities, and the performance standards which will be used to evaluate the levels of accomplishment for these elements.

The performance plan should be evaluated in the light of the following: Appropriate critical elements are identified; the plan covers all significant duties and responsibilities; performance elements and standards are clearly and fully described; and achievements can be quantitatively measured.

If the supervisor and the employee disagree over the content of the performance plan, they should try to resolve them informally. However, the supervisor makes the final decision on the contents of the plan.

(5) Appraisals, supported by documentation, are to be conducted annually, with progress reviews as required. However, employees have the option to request a pre-appraisal meeting to present their own assessment of performance, inform the supervisor of special circumstances which may not be known, and identify objectives to be included in the performance plan for the next period.

I daresay that if DP departments followed appraisal guidelines similar to OPM's, we'd have much happier crews.

READER COMMENTARY/Omri Serlin

Application Generators High on Productivity

Re Werner L. Frank's article on application generators [CW, Oct. 27]. Figure 1 shows how I view application generators in relation to such other closely related techniques as:

- Reusable code systems.
- Data base management systems (DBMS)/query languages.
- Packaged applications.

The diagram shows a three-dimensional space with Applicability, Data Base Orientation and Productivity Improvement as axes.

Application generators (which are often and erroneously called "nonprocedural languages" — I think "menu-driven systems" is a far better name that avoids confusion with nonprocedural languages such as Simscript) occupy the center stage in this space, between reusable code and application packages. Reusable code systems, in which an existing library of precoded complete modules or module skeletons can be recalled by KWIC searches, are high on applicability because they contain far less of the final structure of the application.

Application packages, on the other hand, are classified as having "narrow" applicability, because the structure of the application is already fully determined by the manufacturer, with relatively little room for tinkering.

In terms of productivity improvement — the ability to generate and maintain new applications at minimum cost and in a short period — reusable code is low on the scale, although it is certainly higher than conventional programming, even when high-level languages such as APL, PL/1, or Pascal are used.

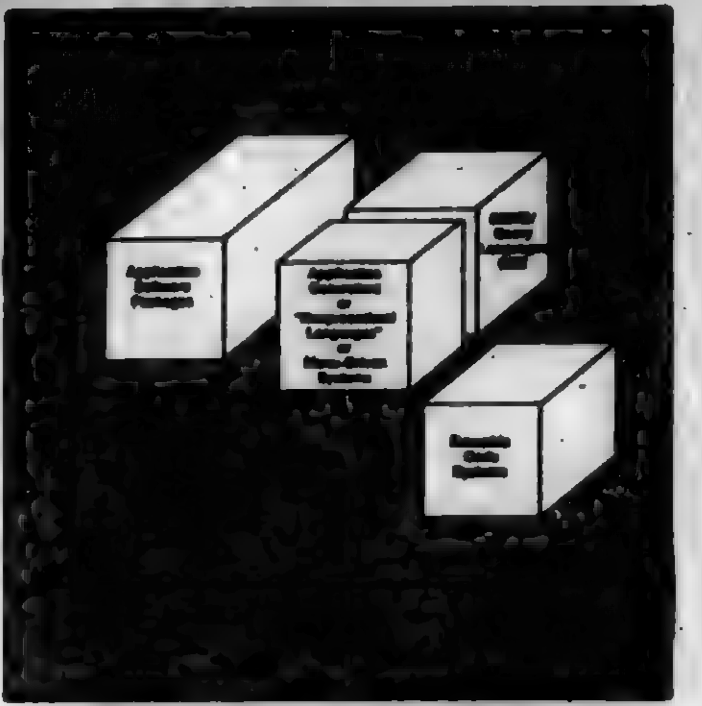
Application packages are very high on the productivity scale because they entail little effort to "produce," and their maintenance is standardized and generally supported by the manufacturer.

Inquiry languages that allow end users to quickly construct miniapplications against an existing data base, using the facilities of a DBMS, are probably halfway between reusable code and application generators in terms of applicability and productivity. However, they extend more into *the dimension of data base* dependency. Application generators, in practice, are also more data-base-dependent than either reusable code or packaged software.

There are far more application generators or menu-driven systems on the market today than the four that Frank cites (ADF, DMS, Generation 5 and Alms). I would add to the list:

- The Nocode system from General Automation, Inc.
- The Taps/TTP system, offered by Informatics, Inc.

Serlin is president of Itom International Co. in Los Altos, Calif.



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Transaction Processors

(Continued from Page 35)

This line is also used as the response location for error and remedial messages. Often this single line is augmented by special function keys physically available on the keyboard itself.

Given these screen composition rules it is possible to develop a screen definition and generation system inclusive of the following features:

- Naming the screen.
- "Painting" the screen on the physical CRT just as it would ultimately appear at use time.
- Specifing data entry or selection points including associated variable label, format, presentation attributes, default values, validation criteria and associated error messages.
- Compiling the screen and incorporating it in an accessible library.

Screen design and dialogue composition should not be arbitrary or random. At the very least, screens of one application should look like they belong together. Hence, a good screen generation and composing system will also enforce certain rules concerning screen structure and sequencing such as:

- Selection from a list is better than requiring entry of data.
- Names are better to deal with than numbers.
- Diagnostics should be self-explanatory.
- Entry points should be minimized.
- The system should be engineered for errors.
- The system should be easily forgiving.
- Redundancy of information is desirable.
- Alternative actions should be prevalent.
- Execution of a screen should be rapid.
- Successive screens should maintain consistency and a constant tempo.
- Screens should always lead to a goal and have no dead ends.
- Every action should be reversible.
- Tutorials should be strategically available.
- Structured sequences of screens should be amenable to short circuits for those who develop familiarity.

The dialogue composer is the piece of the transaction processor which causes screens to be laced together to form a specific application dialogue. In essence, the composer describes the hierarchy and the logic flow of moving from one screen to another.

Function Keys

The screens and associated interactive dialogue are further supported by the presence of the function keys. These function keys initiate general-purpose, application-independent facilities.

In addition, the function key will also be used to facilitate various exit options, during the course of executing the application, ranging from restarting input to the current screen, reinitiating the application, or aborting the present operation.

Which brings us to the binding and execution module.

We are now faced with an architectural question concerning implementation. Current systems go in two directions, procedural and nonprocedural.

The procedural approach ultimately leads to a standard, compiled program, typically Cobol, wherein "calls" or "includes" are stated which pick from the screen library the appropriate code or tables to generate the desired screens, and cause the entire application to execute. Here the control is under conventional program management (e.g., Cobol), and most of the transaction processor is really the screen definition and generator phase.

In the nonprocedural approach, control of flow is dictated by the logic and structure of the screen sequencing as defined by the dialogue composer. Processing is incidental to the screen, either through an external call or directly as part of the screen handling itself, as defined in the processing logic module. The actual execution of the application is then carried out by the execution module of the transaction processor subsystem.

In many older systems, especially for mainframes, transaction processors are not yet part of the basic software environment. Rather, there are special implementation tools such as the Development Management System offered by IBM and commercially available products like ACT I and Taps.

However, on many newly offered systems, and especially in the low-end scale of computer lines, the transaction processor is already a vital part of the basic software environment. This will also become the case for newly emerging mainframe computers in the 1980s.

READER COMMENTARY/Paul J. Wilczynski

How Important Is Experience?

The need for programmers is often not met at the same time that thousands of programmers are readily available because of what I believe are unrealistic and unnecessary requirements set by data processing managers and supervisors.

The requirements I have in mind have generally to do with the number of years of experience in data processing a prospective employee must have. Most often, the golden number is two — without the magic two years, a well-qualified and well-trained individual often is dismissed out of hand.

Admittedly, some positions require a high level of experience. Would you, for example, hire a freshly trained Cobol programmer as your senior systems programmer? Obviously not. But how many of the technical positions in your organization are actually at this level?

Drills or Holes?

Often the problem is that managers misunderstand the relationship between the results they want and the actual abilities needed to achieve those results. It is frequently said that people don't buy drills because they want drills; they buy drills because they want holes. So too, a manager should be looking more for ability and potential than for raw years.

Why, for example, in an IBM shop is an applications programmer with IBM experience almost invariably given preference over a person with, say, a Honeywell, Inc. background? Honeywell Cobol is not *that* different from IBM Cobol and our hypothetical Honeywell programmer may have abilities that outweigh those of the IBM applicant.

The technical difference between the two is probably more in terms of JCL and operating systems, and a good programmer should be able to adapt readily to a new environment.

The key point to consider here is motivation and ability to learn. Many individuals have succeeded in apparently Herculean tasks, or have broken through apparently insurmountable obstacles, not by virtue of what they already knew, but rather through their own desire and willingness to accomplish.

I would urge the data processing manager to take another look at new staffing requirements.

Ask yourself some serious questions. Given today's rapid escalation of programmer salaries, is there a possibility that the return on investment for a person with less experience might be significantly better than that for the more highly experienced individual? I think you'll be surprised.

Wilczynski is vice-president, internal operations, for Cybernet Corp., Framingham, Mass.

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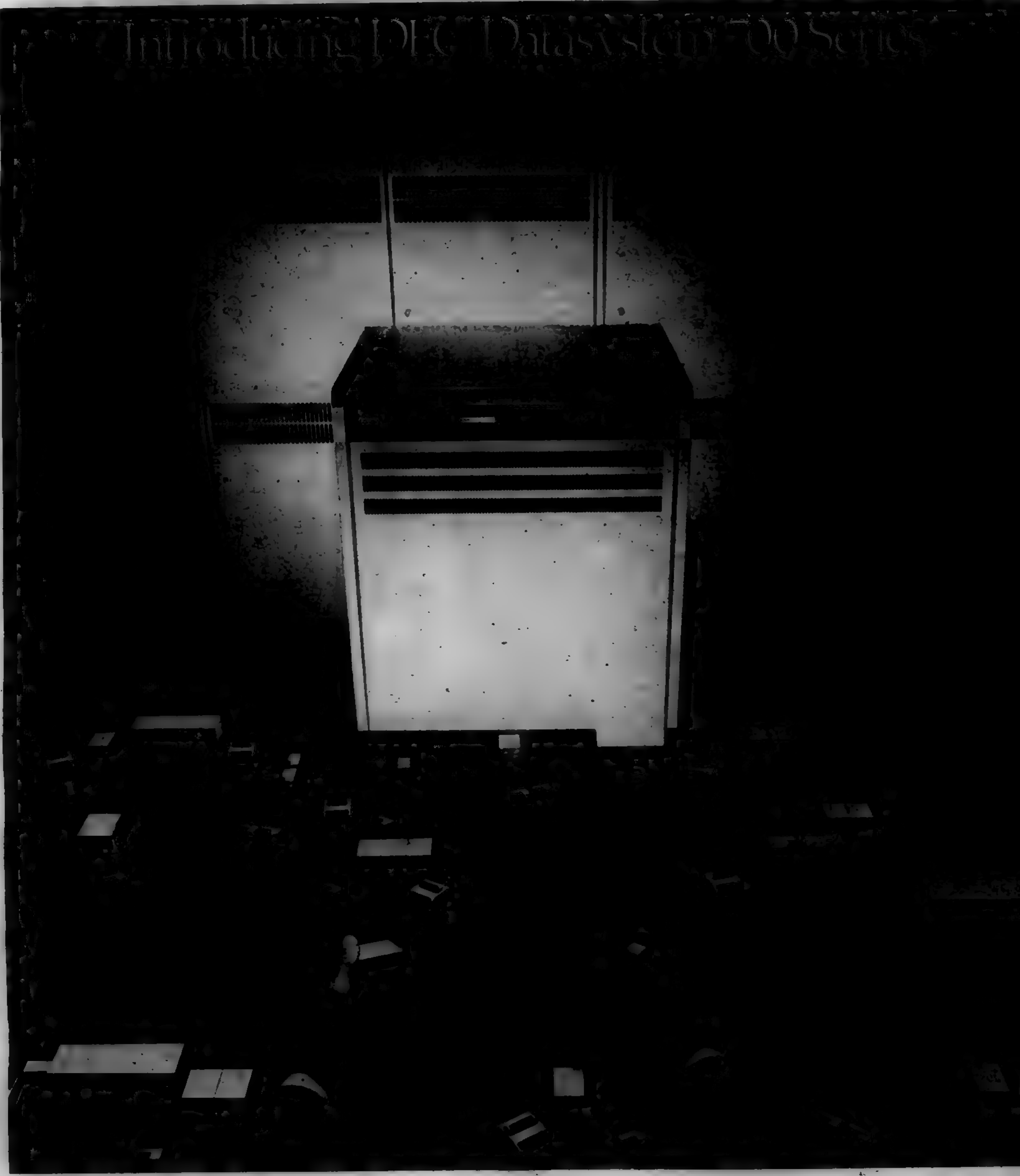
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COMMENTARY/Marguerite Zientara

The Thrill Is Gone

The thrill is gone from the American electorate's courting of a president. After long months of campaigning — during which time it was anybody's guess who would be the next U.S. president — the Nov. 4 computerized vote tally brought a quick end to this year's uncertainties.

Long before the polls had even closed in California, Oregon, Washington, Alaska and Hawaii, President Jimmy Carter had made his televised concession speech to the nation.

And, thanks to the magic of computer-aided projections based on models of "key precincts," both radio and television had told Westerners two hours before the concession — and with only 1% of the vote actually counted — that, essentially, the race was all over.

This frenzied use of computers can certainly be seen as irresponsible, being another of the many examples of man using computers simply because he can, not because he must.

Days Gone By

Editorial pages East and West have since carried fond recollections of the era when citizens excitedly stayed awake past midnight to hear the final outcomes of presidential contests.

Those days are gone. This year, in fact, no sooner had an Easterner settled into his easy chair for an evening of statistics and analysis than our president was telling him how much it hurt to lose the election.

But Jimmy was not the only American hurt in that election — millions of listeners on the West Coast, perhaps just preparing to venture out to the polls, undoubtedly felt a similar twinge of rejection on hearing the race was over before it even began. The message was clear enough: Their votes just did not matter.

Why does anyone need to know the projected outcome of a presidential election at 8:15 p.m. EST — the moment NBC News made its daring prediction last Nov. 4? The answer is: Nobody does.

The race to call the winner has evolved into a network free-for-all, without regard for the portion of the electorate that it disenfranchises. Besides being a function of the natural competition among the three major television networks, such rivalry also boils down to their courting of advertisers for future election coverage — both completely self-serving motivations.

Besides an informal plan prohibiting the counting of votes until Wednesday morning following the election, or another that would close all polls at the same time (5:00 Eastern, 6:00 Central, 7:00 Mountain and 8:00 Pacific Time), a possible solution lies in a bit of legislation introduced a week after the election by Sen. James A. McClure (R-Idaho).

McClure's bill would prohibit the broadcasting of presidential election returns until the polls have closed in all parts of the country, a plan that has recently been suggested in countless letters to the editors of newspapers around the country.

A similar law exists in Canada, which tackled the problem 45 years ago when the Liberal Party made such a sweep of the eastern provinces in the 1935 election that the Conservatives conceded while people were still voting in British Columbia.

After studying the problem and several possible solutions, in 1938 Canada added to its election code the provision that no one may publish in any province where the polls are still open the results, or purported results, of voting that has already taken place anywhere in the country.

Zientara is a CW writer/analyst.

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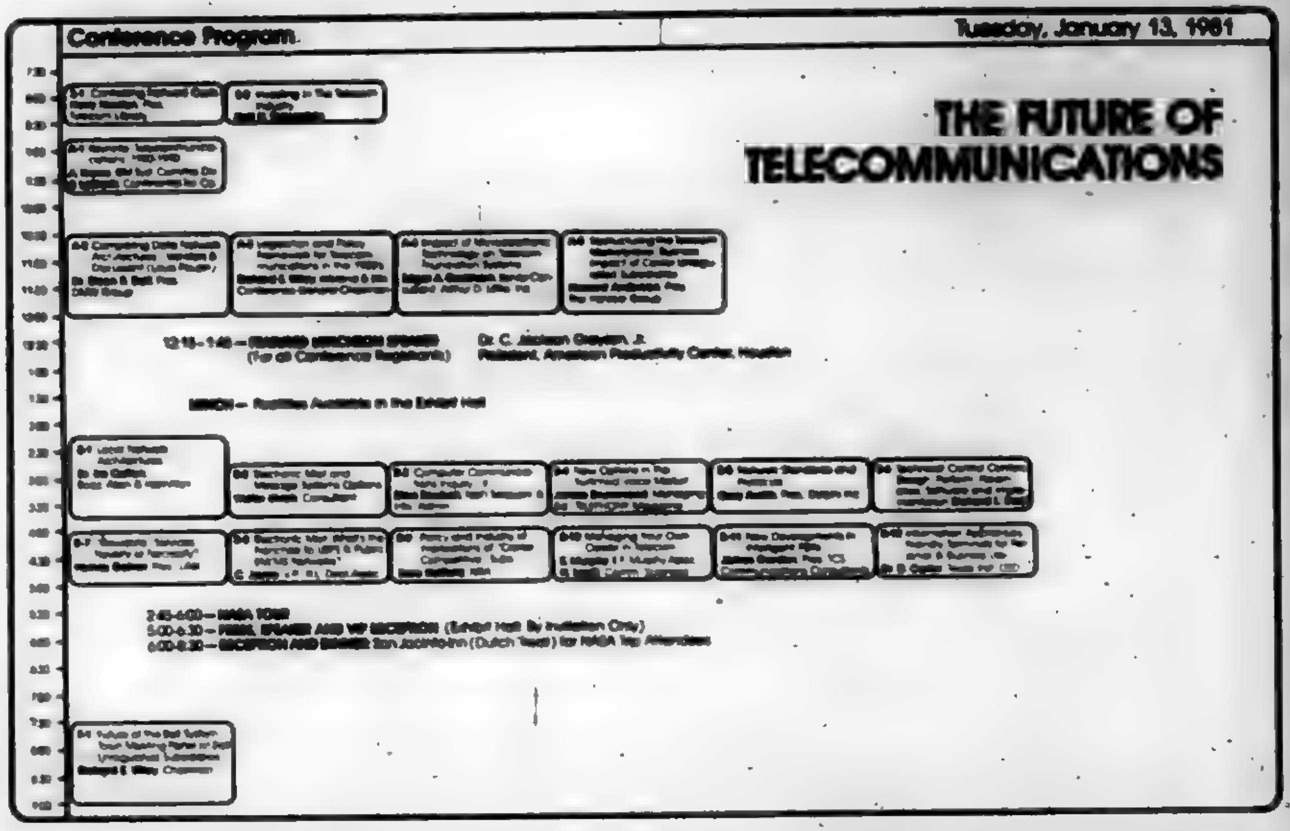
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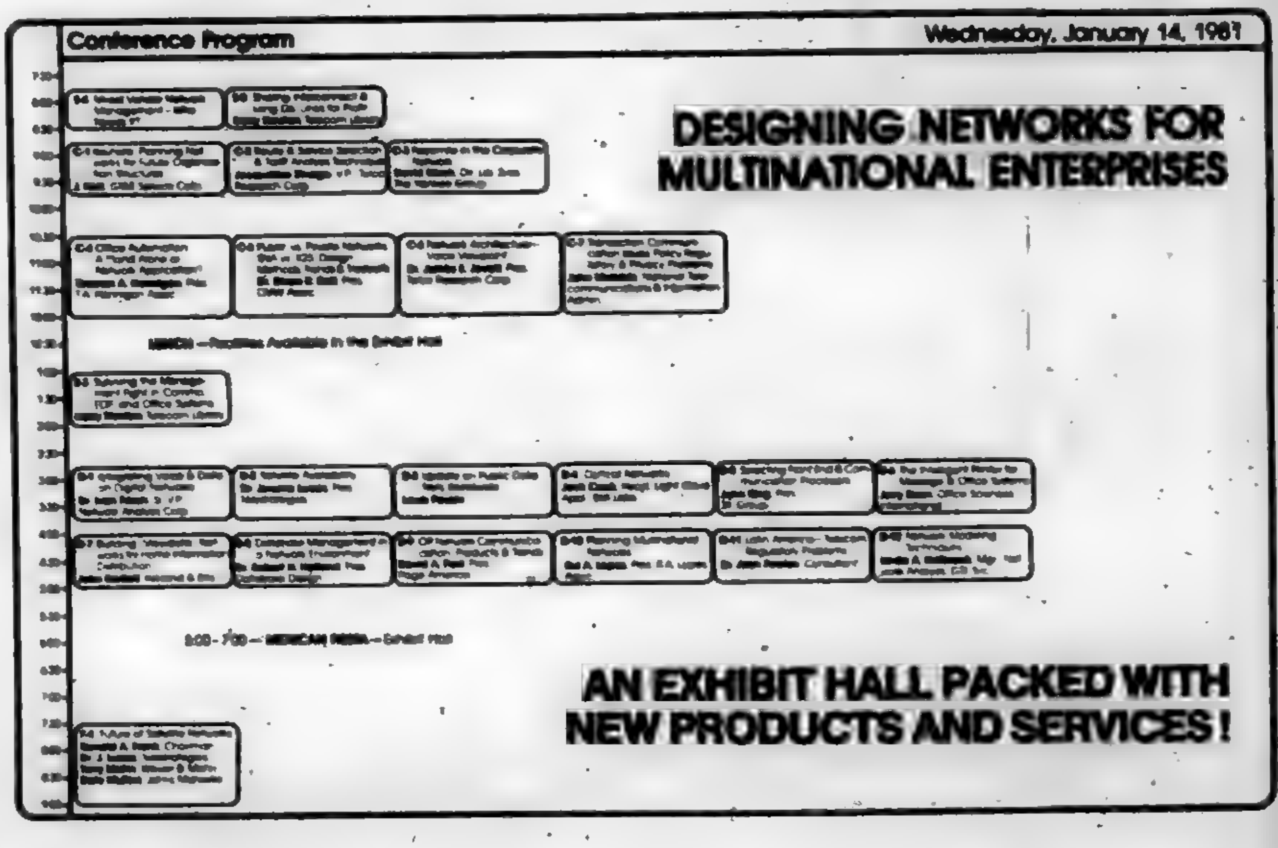
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LETTERS

'Failed' Software

Computerworld would be much improved if it stopped straining to put an anti-IBM slant on news. I refer to the article in the Sept. 29 issue, "Failure of IBM Packages Viewed a Boost to Industry."

John Imlay, a software executive, was quoted as saying, "The failure of IBM software packages like IMS has helped give the software industry a needed push." No explanation was given of why he judged IMS to have "failed" (The many installations using it? The commitment those installations feel to it?). No other packages were mentioned as examples of failures. The word "failure" makes a good lead, but is artificial when it has nothing to do with the thrust of the story and isn't supported by any facts.

Later in the article, Imlay drew the conclusion that after the U.S. vs. IBM case is settled, IBM will continue to be a dominating force in the industry. This is all the more impressive, considering that it *is* accomplished with "failed" software packages.

Gabriel Colberg

McLean, Va.

Poor Taste

Regarding the advertisement by Innovative Electronics, Inc.: Certainly a publication of *Computerworld*'s caliber could enforce better taste in advertisements.

All the articles in the world on professionalism and advancement based upon merit are discounted by sexist advertisements.

If you aren't publishing *Procurementworld*, maintain and/or return to your previous level of information and professionalism.

Norma Horton

Lewisville, Texas

Blatant Sexism

I am writing to complain about the blatantly sexist advertisement by Innovative Electronics, Inc. on Page 23 of the Oct. 27 issue.

What a woman in shorts and a tight T-shirt has to do with a peripheral is beyond me.

Why not a picture of a handsome man in a skimpy bathing suit with his hand draped over a CRT in a sexy pose? It would be about as sensible.

Men no longer have the monopoly on the purse strings in business. So clean up your act.

Or keep your ads in the National Rifle Association magazine, since that is the magazine your Madison Avenue people are catering to.

On behalf of all readers, especially the female ones, I feel you owe us an apology.

M. Bernstein

Address Withheld by Request

George Wallace Attitude

Catching up on some reading, I was amused by the article decrying that programmers were unwilling to train themselves at their own expense [CW, Oct. 20]. Two experiences of mine might be of interest:

(1). While working at a rather large DP installation, I was attending school to improve my DP skills. Without my permission, top management responded to this by calling the school and asking the school to drop me as a student.

(2). While working as a contract programmer in western Michigan, I was attending school. My employer decided to transfer me out of the area without consideration to my schooling and in spite of the fact that there was work to justify my presence in western Michigan until the completion of my schooling. Only through the intervention of the client was I able to complete my schooling.

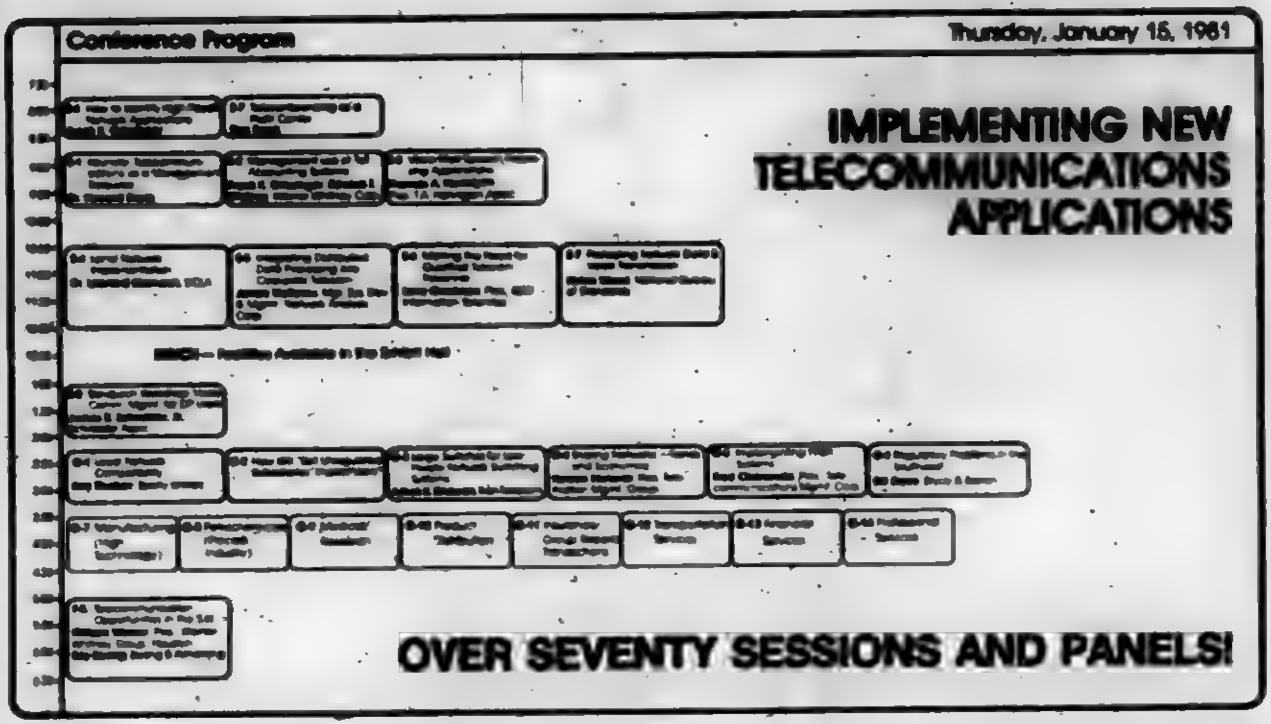
I would like to conclude with a comment about DP management in general. Most DP managers have what I refer to as the "George-Wallace-standing-at-the-school-door" attitude toward their employees. That is, "I didn't attend. Why should they?"

Robert Sobey

Detroit, Mich.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

experts in Houston on January 12th!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LETTERS

Accurate Acronyms?

I can detect no rhyme or reason to *Computerworld's* capitalization and noncapitalization of acronyms.

Many acronyms are, I believe, correctly capitalized. Among these are CW, DP, CRT, IBM, TI, DEC and DBMS.

There are a group of acronyms for which I do not know the correct capitalization. Some examples (using the CW capitalization) are Stardis, Globcom, Ascii, Dox, Epat, COBOL, Cobol, FORTRAN, Fortran and Fasttp.

Last, there is a group which I am all but positive are capitalized incorrectly by CW. Some examples are (again using the CW capitalization) Ecom, Isam, Ansi, Darts, Cope, Dems and Adds.

This letter is not meant as a criticism of the technical clarity of CW articles. However, I believe CW is capitalizing many acronyms incorrectly. It would contribute to your professionalism if you could get your act in order.

Bryan T. Lifsey

Simsbury, Conn.

CW uses all capital letters for two- or three-letter acronyms and uses only an initial capital for acronyms of four letters or more that can be pronounced as "words." — Ed.

Lumpy Modules

I see that Ansi X3J3 wants to introduce still another definition of "module" with its "core-plus-modules" description of the next Fortran standard ["Ansi X3J3 Putting Fortran on a Diet," CW, Nov. 17].

Since the diagram seems to be a central blob with little lumps attached to it, perhaps X3J3 should call them "nodules" instead.

Michael D. Shapiro

San Diego, Calif.

Off Track

I found the two Sept. 29 front-page articles on presentations by Robert Price (CDC) and Larry Welke (ICP) interesting and related, but off track.

All our computer enthusiasts seem to forget that all organizations have had some form of management information systems (MIS) with which to make decisions centuries before Babbage was even born. Computers are only a modern means to a very, very old need. Compared with the pre-Babbage MIS, the modern computer can get more managements into trouble faster when the "homework" is inadequate and it is fed incorrect "information" resulting from inadequate homework.

I concur with Price that a contributing cause to our productivity crisis is the misdirected focus of top management. True problem solving is not a technical undertaking; it is a human or behavioral undertaking. The technical aspects are always a snap relative to what we might loosely call the behavioral aspects because you don't really get on to the technical aspects until all the behavioral aspects are adequately satisfied. As Peter Drucker so aptly put it, we don't start problem solving or decision making with facts; we always start with human opinions. Once the behavioral aspects are satisfied, problem solving is downhill from there on.

Productivity improvement is stupidly simple provided top management is able to change its attitudes and vested interests. I have yet to find any organization that does not have all the talent needed in-house or people raring to go IF AND WHEN top management will turn them loose. The unused ingenuity and innovativeness is staggering when you purposely look for it.

I must disagree with Welke because computers and communication technology do not change the fundamental process of problem solving, nor the basic nature of a bona fide problem correctly diagnosed and stated. Mother Nature has never bought our expedient explanations and rationalizations. Our modern gimmickry can either assist or handicap basic problem-solving processes.

Warren Eberspacher

Durango, Colo.

Untapped Resource

Once again articles in *Computerworld* repeat the often-heard cry that there is a shortage of DP personnel.

The question arises as to whether employers are seriously considering applicants more than 40 years of age or shutting the doors on them because of thread-bare cliches that have been disproved so many times, it is a wonder DP and personnel managers still believe in them. By refusing to consider older applicants, management is depriving itself of a wealth of experience that no college degrees, not even those from Harvard, Yale, Princeton or Stanford, could ever impart.

Isn't it time now, perhaps as a New Year's resolution, to begin to treat these applicants justly and without blinders?

John Callahan

Terre Haute, Ind.

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If you're an MIS Executive, DP Manager, Project Leader or Lead Programmer, you'll want to read our January 26th Special Report. And if you market programming products or services, you'll want your ad in this issue. Ad closing date is January 9th, and your *Computerworld* representative can give you all the details. Or, to reserve space for your ad, call Frank Collins at (617) 879-0700.

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What About the DP Manager? — Part 1

Data Base Technology Forgets Managers

By Ron Ross
Special to CW

Much has been written about solving the technical problems tied to data base design and implementation. But what about the DP manager who has to bring the technicians, and users and technology together if the data base project is to be successful?

The DP manager is the forgotten man in the literature of data base. Vendors constantly claim that DBMS packages eliminate many of the traditional problems in system development and support — poor designs, maintenance tangles and operational bottlenecks — but never quite get around to letting the DP manager know just how these worthwhile objectives are to be achieved. The implication is that data base does those things itself, as if by magic.

This idea is nonsense, and the perceptive DP manager instinctively knows it. The more he watches the data base drama unfold at his company, the more he begins to suspect the truth. The fact is that data base technology does not offer him tools to manage his data base system projects, particularly in the critical preimplementation design and analysis phases.

As a result, the DP manager has no alternative but to stumble more or less blindly down the road to data base development, with setbacks virtually every step of the way.

Voices over the past few years have called for data base administrators (DBA) to bring centralized control over data base definitions; for data dictionaries, to manage the definitions and documentation of implemented systems; and for programmer training, query languages and application program generators to improve productivity in creating applications.

Each of these solutions has been badly needed and is usually helpful when implemented. Assistance to the DP manager, however, has been indirect at best.

The problem lies with the scope of these solutions. Not one addresses the preimplementation phases of data base system development — the *design* stages when crucial decisions are made.

For example, the question of which corporate areas are to be supported by the future data base system is unresolved, as is the identification detailed requirements that the system must satisfy. And what about a design blueprint for the overall architecture of the data base system?

Since these solutions concentrate on the implementation and postimplementation phases of the data base system project, they tend to improve technical tactics, while leaving the more important question of strategic planning unresolved.

Planning Tools Needed

The DP manager and the DBA need tools directed towards the preimplementation, planning and design stages of the project in order to control the data base system development.

The stages must be organized with appropriate conventions and standards and continuity between them must be ensured. The manager needs devices to improve the productivity of limited staff resources and to ensure that acceptable standards of quality and control are continuously met.

(Continued on Page 44)

The unique situations that arise when DP manager faces data base management system (DBMS) are isolated in Part 1 of this two-part series. Part 2 will explore some suggested solutions to these problems.

'Crystal' Clarifies, Predicts Software Performance Problems

BOSTON — BGS Systems, Inc. introduced a performance evaluation software package at the recent annual meeting of the Computer Measurement Group here.

The Crystal interactive package accepts a system description that could include hardware, file structure, work load and software structure.

This input is then evaluated in terms of response time and throughput levels and a determination is made of where system resources are being consumed, according to BGS.

The system was designed to provide "a structured approach to predicting performance of proposed and partially implemented systems in a way that gives managers early warning of upcoming performance problems," claimed BGS President Harold Schwenk Jr.

It also helps technical personnel to assess the effect of alternative designs and to evaluate trade-offs, he said.

'Successive Refinement Fashion'

Crystal is typically utilized in what BGS calls "successive refinement fashion." Although the information available during the early design phase is limited, the product allows for an initial estimate of performance and resource consumption.

As the development cycle proceeds and implementation decisions become firm, the model reflects a successively more detailed and accurate description of system performance, BGS said.

Designed to interface with Best/1, BGS' performance modeling package, Crystal is said to generate more than 20 reports that include a graphics response time report, histograms of individual module CPU and I/O consumption and a module status report. Other features include a feasibility testing system that allows the user to study the effects of varying design parameters and the facility to graph the performance results, the vendor said.

Available Feb. 1, Crystal is priced at $17,600 from BGS at 470 Totten Pond Road, Waltham, Mass. 02254.

'Spotlight' Focuses On HP 3000 Users

MOUNTAIN VIEW, Calif. — Insight is offering a package that reportedly improves system management and reliability on Hewlett-Packard Co. HP 3000 systems.

Spotlight can be applied to any software product or service including contracted software services, the vendor said. The package is written in Cobol and runs under the Image data base.

Spotlight costs $10,000, or $500/mo, Insight said from Suite 2, 210 Easy St., Mountain View, Calif. 94043.

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LMI to Market Artificial Intelligence Systems

LOS ANGELES — A hardware and software system built specifically for artificial intelligence will be commercially available this month.

The Massachusetts Institute of Technology, which previously built these Lisp machines, has licensed a California-based company, LMI Corp., to manufacture them for the commercial market. A principal in LMI, Richard Greenblatt, was chief research scientist at MIT and has supervised the design and construction of Lisp.

The Cadr Model A utilizes the Lisp programming and running language, which has evolved from early forms developed at MIT in the early 1960s. Until recently, artificial intelligence has been devoted primarily to research, and the artificial intelligence found conventional machines to be inadequate for running Lisp efficiently.

LMI already has orders for their Lisp machine from Control Data Corp. and Texas Instruments, Inc. The price for the basic system will be $80,000.

More information is available from Steve Wyle at LMI, 163 N. Mansfield Ave., Los Angeles, Calif. 90036.

Technology Leaves Out DP Manager

(Continued from Page 43)

The manager also must promote end-user participation in the project and ensure that user requirements are effectively and accurately captured.

Finally, since data base technology utilizes methods that differ from traditional technologies, the DP manager needs strategic tools oriented to that specific methodology.

This last point deserves closer attention. Data base systems actually aggravate certain problems that come up during system development. This occurs for the following reasons:

- Data base system projects are larger than traditional projects and involve more people over greater periods of time. This makes long-term coordination and cooperation more difficult.
- The personnel who gather and analyze logical data base requirements are often lacking in expertise and training. The DP manager must marshall scarce staff resources, with varying experience and competence levels, to meet his objectives.
- Unlike application-oriented systems, data base projects are not easily planned, scoped and phased. Planning units for strategic data resource development do not come in application-oriented packages, but must be "discovered" through careful analysis of commonality in data usage and corporate functions.
- Since data base systems are oriented toward on-line concepts, design criteria must balance data center specifications against process center specifications.
- Data base methods usually require substantial end-user participation during the development process. It is the manager's responsibility to promote nontechnical communication between end users and the DP staff.
- Conventional data base wisdom says that DBMS-oriented design decisions should be postponed as long as possible. This ensures that the data resource itself has been accurately defined and reduces the chance that inconsistencies and redundancies will harm future data base performances.
- Data base systems require active participation from diverse groups, and everyone must have ready access to a central body of design information reflecting the current status and progress of the project. How is such a body of information to be supported? This question will be tackled next week.

Ross is the editor of Performance Development Corp.'s Data Base Newsletter. *He has recently written a book on data administration and data dictionary systems that is scheduled for release by Amacom, the publishing arm of the American Management Association.*

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DG Provides MP/Basic For Micronova, Nova 4

WESTBORO, Mass. – Data General Corp. has announced an MP/Basic programming language for its Micronova and Nova 4 systems.

Included in MP/Basic are extensions to the Ansi specifications to make the language applicable for technical, scientific and educational fields, the vendor said.

String Variables

Enhancements include string variables of any length, string concentration, substrings and letter-digit array names, the vendor said.

The initial license fee for MP/Basic for the DG MP/OS operating system is $1,000, with a $400 fee for subsequent CPUs.

For the AOS operating system, the fee is $2,000 and the subsequent CPU charge is $800, the vendor said from Rt. 9, Westboro, Mass.

'Mega' Runs on System/34

E. LANSING, Mich. – A financial planning package for IBM's System/34 minicomputer is available from Standard Research, Inc.

The package, called Mega, is a high-level support system that features net present value, benefit/cost ratio, internal rate of return and what-if analysis, the vendor said.

Typical applications include budget planning, market analysis, sales forecasting and corporate financing, a spokesman said.

The package costs $5,000.

Standard Research may be contacted through P.O. Box 151, E. Lansing, Mich. 48823.

Boole & Babbage Enters Capacity Planning Market

SUNNYVALE, Calif. – Boole & Babbage, Inc. has announced two software products and its entry into the capacity planning and forecasting market.

Questor, a performance prediction software product, was designed as a model building and simulation system of the total DP environment. It will cost less than $30,000 and be available in the second quarter of next year, according to a company spokesman. The company is selling the product under the terms of an agreement made with Performance Systems, Inc.

VAM/SPF is a productivity enhancement tool that reportedly allows IBM SPF program products to run independent of TSO. It costs $25,000.

The firm's entry into the capacity planning and forecasting software products market will be marked by products designed to solve a range of planning problems by providing data oriented more to the DP manager than to technically oriented system programmers, a spokesman said.

Boole & Babbage is located at 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

'EP/3000' Aimed At HP 3000 User

GREENVILLE, S.C. – A job-cost-oriented manufacturing system for Hewlett-Packard Co. 3000 computers has been announced by Engineered Products.

The EP/3000 provides "complete data processing" from quotation through billing, including general ledger accounting, and reportedly gives on-line processing in manufacturing control/shop reporting, inventory control, and bill of materials/shop orders, according to a spokesman.

Also covered are project estimating and job cost, raw materials distribution and general ledger and financial systems. The firm's software utilizes the HP Image data base management system, View/3000 terminal control program and the Cobol II programming language.

Base price for the usually customized package is $40,000. The firm can be reached through P.O. Box 6767, Greenville, S.C. 29606.

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Payroll Update Aids DEC Users

EVANSVILLE, Ind. — Evansville Data Processing Corp. (EDPC) has enhanced its payroll systems for users of Digital Equipment Corp. computers.

Available in Dibol for CTS-300 and CTS-500 users, the distribution package includes the "one-shot" program to change the data files into the format needed for the new release, a company spokesman said.

New features include the ability to run the system from either a scope or printing terminal, two security items and maintenance programs.

The enhancements package costs $1,500 plus media from EDPC at 1010 S. Weinbach Ave., Evansville, Ind. 47714.

HP Desktops Get Security

MT. HOLLY, N.J. — Structured Software Systems, Inc. has announced a program security system that reportedly improves the security on Hewlett-Packard Co. 9845B/C and 9835 desktops.

The package is said to prevent unauthorized access to software and proprietary algorithms and to prevent duplication of program media.

The security package consists of two programs: Oensec, which enciphers stored programs, and Nodup, which prevents duplication of programs. The packages cost $2,500 each or $4,000 for both, the vendor said from 1072 Irick Road, Mt. Holly, N.J. 08060.

Transaction Manager Targets Small, Medium-Sized Banks

GRAND RAPIDS, Mich. — A Bank Information Management System designed for small to medium-sized banks has been introduced by Cascade Data, Inc.

Aimed at institutions that handle fewer than 10,000 transactions daily, the system includes proof of deposit, demand deposit, savings, certificates of deposit, loans, mortgages, payroll, general ledger, memo posting and inquiry capabilities.

The system typically includes a Cascade Data Concept III computer, 10M bytes or 20M bytes of disk storage, a printer and two CRT terminals. Up to 24 CRT terminals may be attached to the system.

The software applications cost $12,500 and the inquiry capabilities cost $2,000 from the firm at 6300 28th St. S.E., Grand Rapids, Mich. 49506.

VAX-11 Gains Video Support

PENNINGTON, N.J. — Pennington Systems, Inc. has announced video terminal support packages for the Digital Equipment Corp. VAX-11 family of computers.

Vidio/11 and SCRNIO/11 — already supported on DEC PDP-11 computers under RT-11, RSX-11M/M+/D and IAS operating systems — are now available on the VAX in native mode.

Vidio/11 offers run-time terminal independence, protected terminal screen, cursor control, "no echo" option, video attributes and partial-screen scrolling. SCRNIO/11 is said to provide screen format management.

A permanent lease for Vidio/11 for one CPU costs $1,800, and for SCRNIO/11, $2,000, with 90-day guarantee from the firm at 65 S. Main St., Pennington, N.J. 08534.

'Finar' Available For VAX Under VMS

DENVER — Finar Systems Ltd. has announced the availability of its Financial Analysis and Reporting (Finar) system on the Digital Equipment Corp. VAX-11 running in native mode under VMS.

Finar has been available for four years on the DEC PDP-11. Current Finar users that follow the migration path from PDP-11 to VAX can continue with no external change in function, a spokesman claimed.

Prices for Finar start at $18,009 from the firm at Suite 2-300, 6000 E. Evans, Denver, Colo. 80222.

Package Assigns Zips In Five, Nine Digits

BURLINGTON, Mass. — Urban Data Processing, Inc. is offering a Street Address Geographic Encoder (Sage) that is said to automatically assign correct Zip Codes for five- or nine-digit codes.

The package is IBM-compatible and can be installed on a user's system under a five-year lease plan.

The base price for the five-year plan is $19,500, the vendor said from 209 Middlesex Tnpk., Burlington, Mass. 01803.

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IEEE Stumped on Access Rights

By Brad Schultz
CW Staff

BEAVERTON, Ore. — As the year winds down, the Institute of Electrical and Electronics Engineers (IEEE) remains stumped on how to distribute access rights in a local network architecture.

At a recent meeting, the IEEE's Local Area Networking Committee narrowed the range of approaches to access rights distribution, but found it could not decide which of two incompatible approaches are better, Chairman Maris Graube told Computerworld.

Charged with producing IEEE Standard 802 — a model local net architecture — Graube's committee voted to continue investigating the merits of both carrier sense multiple access collision (CSMA/CD) and token passing. CSMA/CD involves statistical sampling of line traffic to detect collisions of data streams from two or more local net users [CW, Dec. 11]. In contrast, token passing makes collisions impossible by allowing only one user to transmit at a time.

The latest meeting of Graube's committee also featured discussion of the High-Level Data Link Control (HDLC) protocol promulgated by a committee of the American National Standards Institute (Ansi). According to Graube, the IEEE and Ansi committees appear eager to help each other, but HDLC does not recognize the peer-to-peer relationships that are considered necessary for Standard 802.

The Local Area Networking Committee will next meet in Boca Raton, Fla. on Feb. 2-6, Graube said.

Seeks Mass Market Appeal

AT&T Tuned In to Home Info Services

By Phil Hirsch
CW Washington Bureau

CHICAGO — Several insights into AT&T's plans for carving out a niche in the on-line home information market were disclosed here recently by Financial Services Marketing Manager Robert K. Potter. He addressed a conference on home banking sponsored by the Electronic Funds Transfer Association (Efta).

The phone company's immediate objective, Potter said, is to create a "critical mass" of on-line services priced at a level which will appeal to a mass market. AT&T's participation in viewtron, a videotex trial in Miami, and its projected test of a similar system in Austin, Texas are designed to define that critical mass. Potter expects that by 1984 or 1985, the phone company will know what specific services it wants to offer.

Developing the related hardware will be one of its next jobs. A viable terminal for the home information market must be priced at $200 to $250 and include both communications and local processing capability, he said. This is roughly half the price of the cheapest presently available equipment, but within the next two years, AT&T expects technological advances to close this gap.

Price Cut Likely

Another speaker at the Efta conference, Charles A. Phillips, senior vice-president of Radio Shack Corp., the retailing subsidiary of Tandy Corp., reported that the price of Tandy's videotex terminal, now $399, is likely to come down to $200 to $250 "within the near future." Two OEM purchase contracts are scheduled to be announced in the next few weeks, he indicated. The heart of the Tandy terminal is a TRS-80 microprocessor.

Asked by a reporter whether the phone company might give terminals away free to its customers, as the French telephone administration is doing, AT&T's Potter said this question has not really been addressed. He indicated, however, that Bell wants to enter the on-line home information market partly to eliminate some of its present costs.

One goal of the company's forthcoming videotex trial in Austin, for example, is to determine whether an on-line directory information service can reduce the need for printed telephone books and human information operators.

Potter agreed that if these latter costs can be reduced, the resulting savings could lower the price of the on-line terminal, possibly making it cheaper than the terminals offered by competitors.

Besides marketing information services to the home, AT&T also intends to sell support to its competitors, Potter said. Data base storage service billing, communications and application software, transmission, and

(Continued on Page 46)

Rixon Expands Multiplexer Line

SILVER SPRING, Md. — Rixon, Inc. has introduced two additions to its DCX line of intelligent multiplexers.

The DCX836 is a point-to-point statistical multiplexer that offers error-free transmission of up to 60 asynchronous channels over a single composite link.

The DCX840 network multiplexer offers the same transmission characteristics as the DCX836, but it also offers up to 240 asynchronous channels over as many as 12 composite links, the vendor said.

The DCX836 costs $5,285 (a rack-mountable unit costs $4,750) and the DCX840 costs $9,865 ($9,350 for a rack-mountable unit) the vendor said from 2120 Industrial Parkway, Silver Spring, Md. 20904.

Multiplexers Out For Nova, Eclipse

NORTHRIDGE, Calif. — Two communications multiplexers for the Data General Corp. Nova and Eclipse computers running under DOS, RTOS, RDOS and AOS have been unveiled by Quentin Research, Inc.

The Model 4111 is said to be software-transparent to the ULM series of DG equipment, and the Model 4311 is reportedly transparent to the ALM series.

Both multiplexers are single-board designs requiring one slot in the CPU and both contain eight asynchronous ports, one synchronous port, two EIA teletype ports and a real-time clock.

Both models sell for $2,100 each from the firm at 19335 Business Center Drive, Northridge, Calif. 91324.

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AT&T Tuned In to Home Services Market

(Continued from Page 47)

computer processing of the information exchanged by the service provider and his customers are among the offerings being studied for this latter market. "We want the telephone network to be prime communications facility," he added.

Potter brushed aside recent congressional efforts to limit AT&T's provision of on-line information services. The congressional goal, basically, was to prevent AT&T from using its ownership and operation of the nation's telephone network to gain an unfair competitive advantage in the new market.

Although legislation embodying this idea was not enacted, another try is virtually certain next year. Such protection is no longer needed, Potter indicated, since "our monopoly is dead."

He explained that AT&T has voluntarily formed "wholly separate subsidiaries" to provide regulated telephone network services separately from competitive, unregulated computer-based offerings.

The main point of Potter's speech was the alleged superiority of the telephone network, as opposed to cable television, for supporting on-line home information services.

Bob Patrick, manager of business development for Cox Cable Communications, Inc., presented the opposite view. Cox is part of a group developing an on-line home information service for San Diego. Known as Interactive Data Exchange, "Indax," this system is scheduled to begin test operation during the second quarter of next year.

The Indax terminal will cost the user $4 to $6/mo. It consists essentially of a keypad about the size of a pocket calculator.

Through this keypad, the user retrieves data base information which is then displayed on his television screen.

Potter insisted that the telephone network is superior because it serves more homes, provides greater switching capability, and is supported by an organization with greater financial resources.

Patrick insisted that within the next few years, two-way cable networks will be operative within all of the nation's major metropolitan areas and will be capable of reaching at least 90% of the household within those areas.

Cable's broadband transmission capability, he added, gives it an important advantage over the telephone network, which is still saddled with limited capacity analog local loops.

Additional Capital

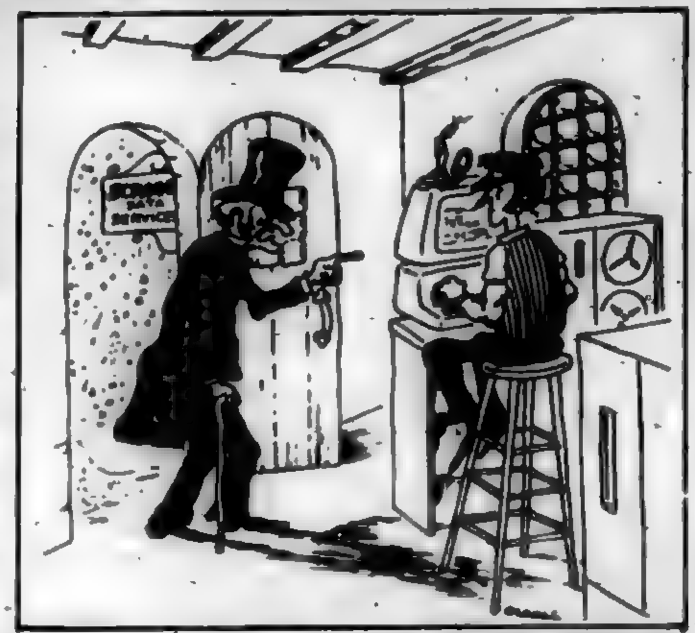
And although cable television operators lack Bell's resources, they are attracting additional capital. Westinghouse Electric Corp., for example, recently paid $646 million to acquire Teleprompter Corp., the nation's largest cable TV company. American Express Co., the New York Times, General Electric Co. and Capital Cities Broadcasting Corp. have also purchased cable companies recently.

Patrick admitted that the community antenna television industry still faces some problems in competing with the phone company.

Possibly the biggest obstacle is the limited reach of most cable networks. To cover the Los Angeles area, for example, an advertiser or information provider would have to contract with about 20 cable TV systems. That obstacle may be less formidable than it appears.

In most metropolitan areas, multipoint distribution service (MDS) carriers are now delivering commercial and pay-television to competing local networks, and the MDS industry is trying to develop additional markets.

The largest MDS carrier, Microband Corp., was recently acquired by Tymshare Corp., which is now exploring commercial uses of Antiope/Didon, a French videotex/teletext system.



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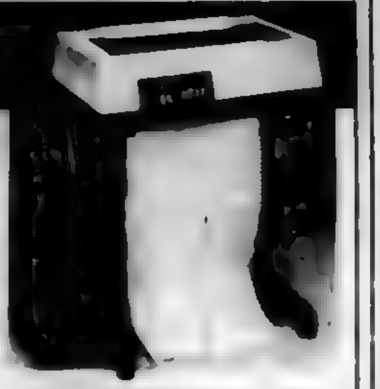

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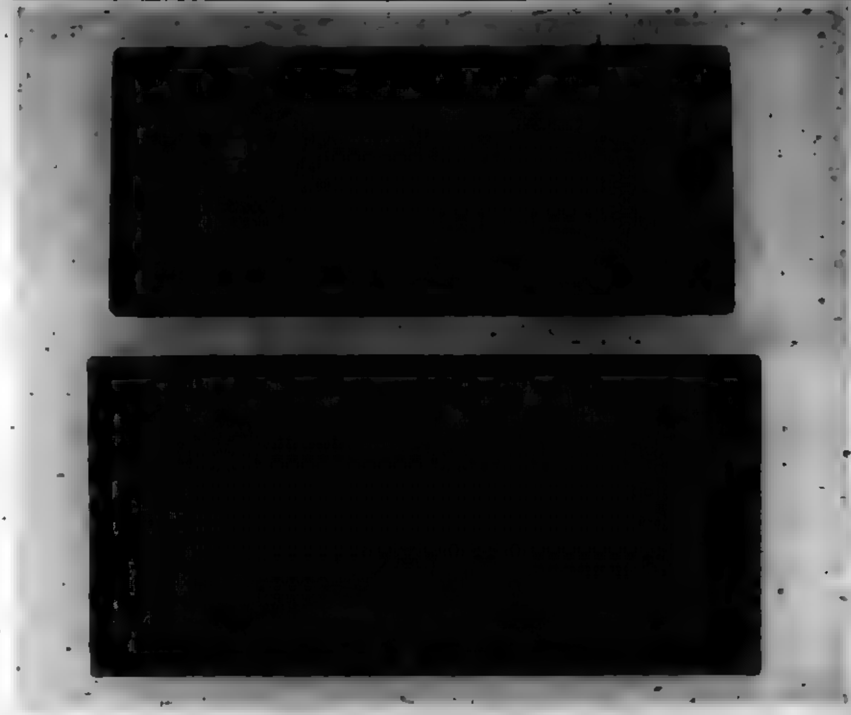


The M48C Series II Microplexer

Timeplex Multiplexers Boast Interface With 48 Channels

ROCHELLE PARK, N.J. – Two multiplexers that reportedly interface with up to 48 data channels are available from Timeplex, Inc.

Both models include the supervisory port, which functions as a "window" into the system and can be configured for single link or dual data link capabilities, the vendor claimed.

Designated the M4825 "Permanent Channel Assignment" and M4826 "Traffic Bypass" models, each uses dual 9,600 bit/sec data links providing aggregate data input rates up to 460,000 bit/sec, a spokesman said.

The M4825 assigns each data link to its own remote, single link microplexer. Channels are assigned on a "permanent address" basis to one or the other of the two data links. This allows the M4825 microplexer to replace two 24-channel multiplexers serving two remote sites, he said.

The M4826 incorporates two built-in data links and can shuttle information among three separate sites to meet an assortment of networking configuration requirements, the spokesman claimed.

Both basic models are priced at $5,000, the vendor said from One Communications Plaza, Rochelle Park, N.J. 07662.

Terminal Offers Text Options

SAN JOSE, Calif. – A daisy wheel terminal with programmable keyboard, nonvolatile memory, bidirectional printing, optional 1,200 bit/sec full-duplex operation and text enhancements is available from Anderson Jacobson, Inc.

The AJ833 Keyboard Printer Terminal features such optional text enhancements as proportional spacing, boldface printing, automatic centering, justification and underscoring. Its nonvolatile memory stores margins, tab settings, forms control and program key settings, pitch and plot modes, according to the vendor.

Every key can be programmed by the user to perform any character function, a spokesman said. In addition, seven keys can be programmed to perform repetitive functions of up to 31 steps at the touch of a single key for automatic log-on operations or other routines.

The unit costs $3,995, from the vendor at 521 Charcot Ave., San Jose, Calif. 95131.

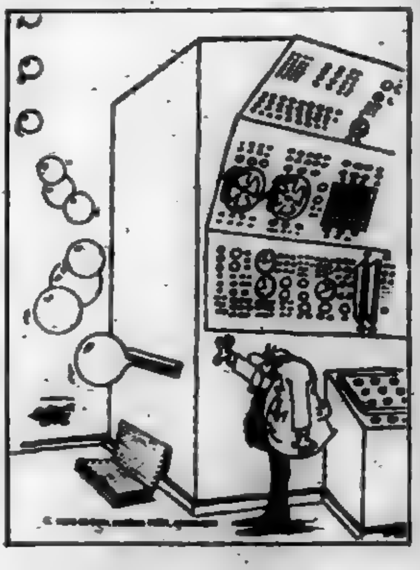
Interface Gives Pulse Dialing

SUNNYVALE, Calif. – An automatic dialing interface said to allow data terminal equipment to do pulse dialing on the switched network is available from Prentice Corp.

Model P-701 is FCC-registered for direct connection to the dial network, according to a company spokesman. The device reportedly allows a CPU or intelligent terminal to establish dial-up links without a telephone set or other external equipment.

EIA-plug-compatible with any Prentice dial modem, the unit operates in two modes: normal and bypass, where it is electrically removed from the circuit for modem testing. The unit derives its power from the modem.

The Model P-701 costs $175 from the firm at 266 Caspian Drive, Sunnyvale, Calif. 94086.



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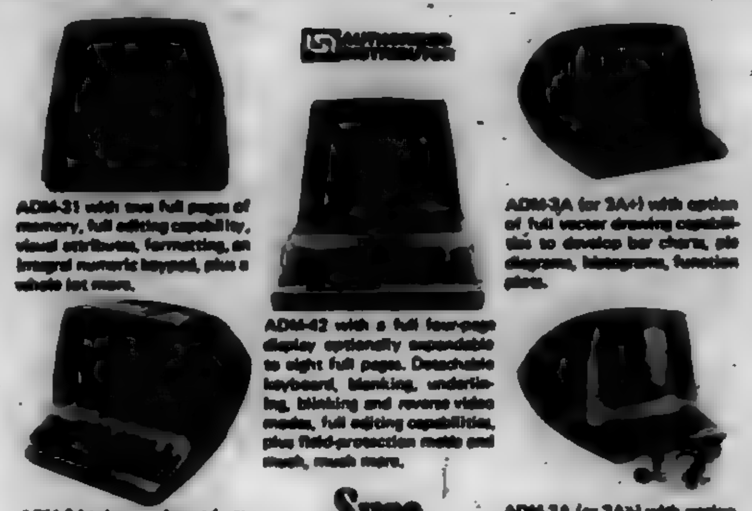

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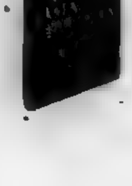

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Firm Shaves Budget in Jump to Memorex

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EDISON, N.J. – By making the jump from IBM to Memorex Corp. peripherals, a leading manufacturer of heating and air conditioning products here has shaved nearly $400,000 off its DP budget this year.

Earlier this year, Fedders Corp. replaced its IBM disk, tape and communications equipment with Memorex devices and reportedly improved the cost/performance of its DP operations. The decision to scrap the IBM equipment was made in early 1979 as part of an extensive cost-reduction program that encompassed all of the firm's departments and its three other production facilities located in other states, according to Robert Gutmann, Fedders' corporate director of management information systems.

"One way to ensure that DP is making positive bottom-line contributions is to make certain the operation is as cost-effective as possible," Gutmann said.

Fedders' present computer system, installed in 1977, is an IBM System/370 Model 158-3 with 1.5M bytes of memory. The computing center, which serves all corporate and many remote plant computing needs, employs some 60 people, including 25 programmers. The center operates three shifts on a five- or six-day-per-week schedule, depending on the job load and has an operating budget that has been growing at about 13%/year for the past several years.

System Evaluations

When system evaluations were started last year, the Edison facility had eight IBM 3350 disk spindles and 16 IBM 3330-11 spindles for on-line data storage, and eight IBM 3420 tape drives for off-line applications, Gutmann explained.

The conversion to Memorex disk and tape storage equipment offered several advantages to Fedders, according to Gutmann. The company was able to reduce its monthly expenditures by about 10% below its costs for the equivalent IBM hardware. Also, Fedders was able to realize a sizable financial gain on its previously installed IBM gear through an innovative broker benefits package recommended and handled by Memorex.

To date, Fedders has installed 20 Memorex 3650 disk spindles, with 12 more on order. When all of the new 317.5 M-byte/spindle equipment is in, the center will have a total on-line storage capacity of 10,160M bytes, nearly double the previous total. In addition, Fedders has installed eight Memorex 3228 tape drives to replace the IBM 3420 units.

At Fedders, the 3650 dual-spindle disk modules are connected in two strings through a pair of 3653 direct-access storage modules and controllers to an integrated storage control unit. This unit, in turn, is attached to the system block multiplexer on the 370/158-3 CPU.

The new disk configuration has enabled Fedders to increase its data base by about 80%, while adding only four additional modules over the number previously installed. "Since the Memorex 3650's have higher storage capacity than the replaced 3330-11 devices, we have been able to reduce the total amount of floor space per megabyte," Samuel L. Schumer, data center manager, noted. "This will be important to the center when further capacity upgrades are required because they can now be added without enlarging the physical size of the computer room."

System Throughput

Along with better facilities utilization, system throughput has reportedly been enhanced through the installation of the Memorex tape drives. Because of the higher tape speeds and data transfer rates of the 3228 drives – 200 in./sec and 1,250K byte/sec, respectively – higher efficiency has been achieved in dump/restore operations, Schumer said.

To maximize the efficiency of the new system, about 80 CRT terminals, many with 1,200 line/min printers, allow users throughout the Edison plant to access the computer for either data entry, or for retrieval and/or print-out of information. In the research and development laboratories, for instance, engineers can test new designs for heating and air conditioning products through computer modeling.

Test results can be retrieved and hard copies obtained for review through display terminals located right in the development engineering departments. In other areas, such as purchasing, order entry and inventory control, terminals and printers help assure fast, accurate response to other department needs or to customers throughout the world.

In addition to the Edison data center, each of Fedders' three other plants have their own DP capabilities to support a variety of activities relating to its own particular operation. At Buffalo, N.Y. and Frederick, Md., for example, DP is handled through on-site System/34 computers. At the Effingham, Ill. facility, the company has a newly installed 4331 processor which is supported by terminals and remote job entry stations throughout the plant.

Portable Terminal Joins MSI Line

COSTA MESA, Calif. – A portable data entry terminal – the MSI/88e-a – that brings an alphanumeric display to MSI Data Corp's. top-of-the-line numerical data entry family of Omega Generation user-programmable terminals has been introduced.

The 88e-a shares the 16-digit, 14-segment light-emitting diode display of the 88f and has the same keyboard and digit memory storage of the 88d numerical data entry terminal, the firm said.

The terminal's prompt/response capabilities allow data entry personnel to be "walked through" a data collection application, created by the user, the vendor said. The 88e-a is compatible with MSI's portable terminal accessories, including word scanners, and with its terminals' communication protocols, including full two-way communications and down-line loading of programs.

The 88e-a costs $1,200 and will be available in January 1981 from MSI at 340 Fischer Ave., Costa Mesa, Calif. 92626.

Power Unit Guards Against Transients

SAN JOSE, Calif. – RKS Enterprises, Inc. is offering a 220V power surge control device that reportedly protects computers, communications, medical and other electronic equipment from voltage transients.

The SS-220-H plugs into a standard 220V outlet and responds in picoseconds with a rated dissipation of 600,000W at 100 microsec. The unit has a neon light that indicates it is working properly.

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Tablet 1400

A graphics analysis tablet said to offer "a delicacy of distinction" accurate down to .001 in. has been announced by Numonics Corp. The portable Tablet 1400 has a 16-key integrated keypad cursor and an LED presence indicator and controls the system setup and analytic functions. The 24-in. by 24-in. version costs $5,000; the 36-in. by 48-in. version costs $6,900; and the 42-in. by 60-in. version costs $8,000 from the firm at 418 Pierce St., Lansdale, Pa. 19446.

Including Graphics Systems

Market Data Adds Options

NEW YORK — Market Data Systems, Inc. is offering five product options. The first two are graphics systems for displaying commodities price movements on the user's Market Data video monitor or plotter. The stripped-down version costs $11,000 with a $1,000 monthly charge. The second, more elaborate, version costs $22,000 with a $1,300 monthly charge.

The third option is a message-switching capability allowing the user's in-house computer to send interoffice administrative messages and charts. It costs $1,500 alone, $6,500 on the first graphics system and $14,500 on the second. A solid-state electronic wall-mounted quote board is the fourth option. Its base price is $16,000.

The final option costs $200 a month as part of the vendor's expanded network. The expanded network will allow simultaneous access to the customer's in-house computer data base as well as to the vendor computer center by personnel in a branch office location. Market Data is at 3835 Lamar Ave., Memphis, Tenn. 38118.

Interface Ties Versatec, LSI-11

SANTA CLARA, Calif. — Versatec, Inc. is offering a single-board interface that reportedly allows Digital Equipment Corp. LSI-11 microcomputer systems to use any Versatec electrostatic plotter or printer/plotter, input/-output multiplexer, hard-copy controller or vector-to-raster converter.

The Model 125 single-board interface provides for printing speeds up to 1,000 line/min and plotting speeds up to 34 sq ft/min, the vendor claimed.

The interface package costs $1,600, the vendor said from 2805 Bowers Ave., Santa Clara, Calif. 95051.

Media 12/7 Gets Graphics Option

NASHUA, N.H. — Sanders Technology is offering a graphics option for its Media 12/7 typographic printer that allows line drawings and coarse gray-scale drawings to be created on the printer.

The graphics option consists of a memory expansion board, two graphics fonts and special version of the printer software.

The graphics option is available for $500, the vendor said from Box 1226, Nashua, N.H. 03061.

Recorder/Scanner Runs 25 Line/Sec

CHELMSFORD, Mass. — A high-speed, large-format scanner/laser recorder that generates continuous tone and screened black and white images on photographic film for raster map scanning and digitizing is available from Optronics International, Inc.

The X2430 digital argon laser recorder/scanner writes up to 1,500 line/min or 25 line/sec at all rasters on a variety of film types, the vendor claimed.

The product offers a "personality" module to simplify the interface to a computer, as well as a selection of apertures and rasters and an unsharp masking vacuum hold down and user-defined pin registration system.

The product is priced under $200,000 and delivery time is nine months, from the vendor at 7 Stuart Road, Chelmsford, Mass., 01824.

Handles Administrative Tasks

Business System Geared to Smaller Users

The Control Business System

GREENWICH, Conn. — A small business computer system geared to handle the administrative functions of small and medium-sized companies has been introduced by the Service Bureau Co., a data services division of Control Data Corp.

The Control Business System series consists of five models — the 20, 30, 40, 60 and 80, each one incorporating either a Data General Corp. Eclipse S/140, Nova 4/X or Micronova MP200 processor.

The systems range in memory from 64K- to 512K bytes, can be fitted with a maximum of 790M bytes disk storage and can support up to 32 terminals in the system's largest configuration. The packages also include either a 60 char./sec or 900 line/min printer, a spokesman said.

Initially, the systems will be tailored toward the business needs of the wholesale distribution market. The vertically aimed software includes order entry and billing, inventory control, accounts receivable and sales, purchase order control, accounts payable, general ledger and payroll. The system operates under DG's DOS and Rdos operating systems and is programmed in Business Basic, the spokesman continued.

The entire system will be maintained by DG under a standard service contract, he added. The systems will sell from $25,000 to $150,000 and will be marketed initially in New York, Philadelphia, Chicago, Houston and Los Angeles.

The Control Business System is not the first computer offering by CDC's data services division. Other systems marketed by the company include Focus One, a computer aimed at credit agencies, and Cybercredit, a system that helps in the collection of loans and outstanding accounts.

Additional information on the small business computer system can be obtained from the Service Bureau Co., 500 W. Putnam Ave., Greenwich, Conn. 06830.

Wang Entry-Level Text Processor Debuts

By Ann Dooley

CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. has unveiled its Wangwriter, an entry-level, stand-alone text processing system aimed at capturing the increasingly competitive office automation market. The system also features a multicluster facility to connect its word processing (WP) functions with its DP product line.

In addition to the Wangwriter, Wang also introduced the Wang Minidiskette Workstation that allows the Wangwriter to transfer data to and from Wang Office Information Systems (OIS) — the Wang Remote Cluster Facility that allows OIS terminals to perform DP processing tasks when remotely connected to any Wang Virtual Storage (VS) computer system and various communication protocols.

Designed for the electronic typewriter marketplace, the Wangwriter is targeted at small firms or small departments within large companies — a customer base not usually serviced by Wang.

Competition for IBM

Although Wang claims its new unit is not intended to compete directly against the IBM Displaywriter, the Wangwriter is reportedly available for immediate delivery in selected U.S. cities, unlike the IBM product, which features long delivery dates. As many as 10,000 units will be available within the 12-month period, Wang claimed.

The modularly designed Wangwriter consists of a CRT terminal, movable keyboard and a printer console with minidiskette drives and 20 char./sec Wang Daisy print wheels that print 10-, 12- or 15 char./in.

The CRT terminal is a 12-in. screen capable of displaying 24 lines, with 80 char./line. Horizontal scrolling allows text lines of up to 158 char., the firm said.

The 5.4 in. double-sided, double-density minidiskette serves as a utility and storage medium, capable of storing 60 pages each. Three minidiskettes are provided with the system, one for document storage, the second for software and utility loading and the third for diagnostic testing.

The printer prints bidirectionally at an average rate of 20 char./sec, and the system features a typewriter-like keyboard with the addition of operational keys and a cursor movement keypad.

Each time the system is powered on, the unit automatically performs a series of diagnostic tests to ensure that the system is running optimally or, in case of a malfunction, ensure early detection and quick recovery.

Human Factors

Human factors are emphasized, according to the firm, which noted that the unit's keyboard can be moved up to 10 ft away from the printer console and a pivotal CRT terminal screen is included that reduces office glare.

The Wangwriter features automatic word wraparound, automatic centering, decimal alignment and right-hand justification, as well as advanced functions of Super Copy, Super Move and a special type-through mode that permits information to be typed at the printer and then displayed on the screen simultaneously. Special functions include document deletion, diskette duplication and default format modification.

An additional feature is Glossary, which allows commonly used words, phrases and paragraphs to be prestored on a diskette and then instantly retrieved and displayed on the screen.

The Wang Minidiskette Workstation, an

(Continued on Page 54)

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Telpar Adds PL-20EX Unit To 20-Column Printer Line

ADDISON, Texas — Telpar, Inc. has introduced the PL-20EX, an addition to its line of 20-column printing devices.

The unit is available with an RS-232, a 20mA loop and TTL serial interfaces. The unit and its parallel interface counterpart, the PL-20E, are available with enclosure and ac or dc power, the vendor said.

Standard features include a 5- by 7-in. dot matrix print head, a 2.5 line/-in. print speed and 91 printable Ascii char., the vendor said.

The unit also features invert mode and paper-out sensor. "Compact size and low power requirements" were cited by the vendor as further advantages.

The PL-20EX costs $315. With the enclosure and ac supply, it costs $513 and the unit costs $593 with dc power supply.

Telpar is headquartered at 4132 Billy Mitchell Road, P.O. Box 796, Addison, Texas 75011.

Scott Interfaces VET/2 to Apple II

DALLAS — An interface which permits Scott Instruments VET/2 voice entry terminals to interact directly with any 48K-byte Apple II microcomputer is now being offered by Scott. The enhancement gives the microcomputer truly integrated speech recognition for the first time, Scott claimed.

The VET/2 plugs into any slot in the Apple II and is linked functionally to the keyboard, allowing the user keyboard or voice input.

The terminal lets Apple users run "integer" Basic, Applesoft and machine-code programs by voice input with no program modifications.

The VET/2 is supplied with preprocessor, interface board, software with demonstration programs, headset, microphone and operators manual. The terminal with Apple interface costs $695.

Scott is at 815 N. Elm, Denton, Texas 76201.

Two DG Compact Tape Drives Use Streaming Method for Disk Backup

WESTBORO, Mass. — Data General Corp. has introduced two compact tape drives designed for disk backup.

The drives use streaming technology and 1,600 bit/in. recording density and a full IBM/Ansi .5-in. tape file exchange capacity.

DG's Model 6123 drive can be used for Micronova computer systems, and the 6125 can be used on Nova and Eclipse systems, the vendor said.

Prices start at $6,600 for the smaller 6123 tape drive, the vendor said from Rt. 9, Westboro, Mass. 01581.

System Eases Administration

(Continued from Page 53)

accompanying product introduced by Wang, is a peripheral device available on all Wang Office Information Systems and will provide media compatibility with Wangwriter minidiskettes, as well as function as a standard 64K OIS workstation.

The primary function is to provide for Wangwriter/OIS media compatibility and document transfer, Wang said. Documents being transferred to or from the Wangwriter will follow all Wangwriter conventions; a maximum of 4,000 char./page and 15 page/document. The workstation costs $6,200 and will be available the beginning of May 1981.

The remote Cluster Facility for Wang VS and Computer Systems and OIS systems, which was also introduced last week, allows a user to logically connect the WP and DP product lines, according to Wang.

Wang also enhanced both its 2200 Series Small Business Computer product line and its VS computer systems family with support for industry standard communications protocols.

IBM 3271 support capabilities for 2200 computer users allow direct communication to host mainframes within a 3271 bisynchronous network, while maintaining local system responsiveness, Wang said.

This enhancement consists of a new 2228D data communication controller and the 22TC-3271 software package, which include the emulation of a 3271 Model 2 control unit, 3277 Model 2 display station and 3288 Model 2 printer, supporting line speed of up to 9,600 bit/sec.

Additional Capabilities

Further communication capabilities are expected for the 2200 series, according to Wang. The 22TC-3271 emulation package software carries a one-time license fee of $1,000, with shipments beginning this month.

Support of Systems Network Architecture and Systems Data Link Control (SNA/SDLC) within the VS computer systems family was announced so that a level of functional compatibility is achieved allowing coexistence to 3274/76 in a transparent mode, interactive communications and 3777 Model III functions for batch transmission services, according to Wang.

The VS systems utilize a telecommunications processor that can support up to four active communication lines and SNA emulation software. TCP costs $5,000, $6,000, $7,000 and $8,000 for the one-, two-, three- and four-port versions, respectively. The 3274/76 emulation and 3777-III emulation are available for a $1,500 license fee each.

The Wangwriter sells for $7,500 from the firm at One Industrial Ave., Lowell, Mass. 01851.

DEC Minis Back CDC Drives

BURLINGTON, Mass. — An intelligent peripheral processor from Xylogics, Inc. reportedly allows Digital Equipment Corp. Unibus computer users to add Control Data Corp. disk drives of mixed capacities to their systems.

The Model 650, which also supports the BASF 8-in. Winchester 24M-byte disk drive, is said to emulate DEC RM02, RM03 and RM05 disk drives and will operate with RT-11 V4, RSX-11M V3.2, RSTS/E and IAS/RSX-11 operating systems.

The unit costs $3,200 in quantities of 25 to 49 from the firm at 42 Third Ave., Burlington, Mass. 01803.

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VDC Sees Industry Unscathed By World Recession Pressures

WELLESLEY, Mass. – Despite the fallout related to inflationary and recessionary pressures in the world economy, the computer industry will emerge relatively unscathed, with annual industry shipments growing at 15.3% between now and 1982, according to a recent survey.

Based on projections by Venture Development Corp. (VDC), computer industry shipments should hit $49.2 billion in 1982, up from $27.9 billion in 1978. This growth will be 50% greater than the consumer electronics market for the same period, the survey noted.

The study, "The U.S. Computer Industry 1980-1982: A Strategic Analysis," tracks the growth rate of three industry sectors – processors, peripherals and data storage systems.

The value of processor shipments will grow 15.6% annually, making it the fastest growing of the three sectors analyzed. Within this category, small business systems will have the highest annual growth rate, 39.1%, with desktop computers showing a 36.5% dollar growth rate and the value of minicomputer shipments' growth pegged at 26.7%.

The value of computer peripheral shipments will increase 14.8% annually through 1982, VDC projected. Within this category, shipments of graphics CRT terminals will show an exceptional 34.7% growth rate, while nonimpact printers will follow a close second, sporting a 30% annual growth rate.

Growing at a slightly slower rate than the other two categories, data storage or memory devices will show a 13.8% annual growth rate. While tape drives show only modest increases, disk drive shipments will expand markedly, with floppy disk drive shipments increasing 40.5% annually, VDC predicted.

In addition to forecasting U.S. shipments for every major product, VDC's study identifies marketing and technology trends impacting specific product groups. The report costs $950 and can be obtained from VDC at One Washington St., Wellesley, Mass. [illegible]

Burroughs Eyeing Long-Term Profits In Earnings Cuts

DETROIT – In order to assure its long-term profitability, Burroughs Corp. has adopted or is contemplating several programs which are expected to reduce its 1980 earnings by about $3 per share.

If all the programs are instituted, they will reduce this year's earnings by $125 million after taxes. This reduction in earnings will result in part from Burroughs' recently announced plans to ditch its scientific processor program.

Other changes under consideration are phasing out the company's calculator and adding machine products, consolidating several similar but small plants, closing certain small overseas marketing subsidiaries and changing inventory valuations including provisions for obsolescence.

The firm declined to comment on what definite plans have been made, but said it would announce these at the time it made public its year-end results in January.

Last year the firm earned $7.45 per share. Through its third quarter, Burroughs' earnings totaled $3.65 per share.

In an unrelated announcement, Burroughs also disclosed that the stockholders of System Development Corp. had approved the acquisition of its firm by the Detroit mainframer, which will become effective Jan. 5.

Four Phase To Buy Two Pi

By Marcia Blumenthal
CW Staff

CUPERTINO, Calif. – Four-Phase Systems Corp. has reached an agreement in principle to acquire Two Pi Corp. through an exchange of common stock, which could total $10 million.

If the merger is completed, Four-Phase, a maker of interactive front-end systems typically hooking into an IBM host, intends to offer the Two Pi system as a back-end processor handling batch or data base processing, a company spokesman said. Four-Phase's systems are communications-oriented and sometimes considered an alternative to IBM's 8100.

Located in Sunnyvale, Calif., Two Pi manufactures an IBM plug-compatible system – the V/32 – in the range of the 370/138 and 4331. However, Four-Phase said it is not going into the plug-compatible business.

Two Pi supplies its systems primarily on an OEM basis. One of its better known customers is National CSS, Inc., which markets the Two Pi processor as its 3200 system. To date, 150 Model V/32s are estimated to have been installed.

Two Pi is a wholly-owned subsidiary of U.S. Philips Corp. U.S. Philips reportedly agreed to sell the company because it had

(Continued on Page 59)

Panelists Forecast Fair Skies In Semi Outlook for 1981

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. – U.S. semiconductor makers will probably see a few financial storm clouds next year, but, fair economic skies will generally prevail over most of Silicon Valley and the rest of the nation's high-technology industry.

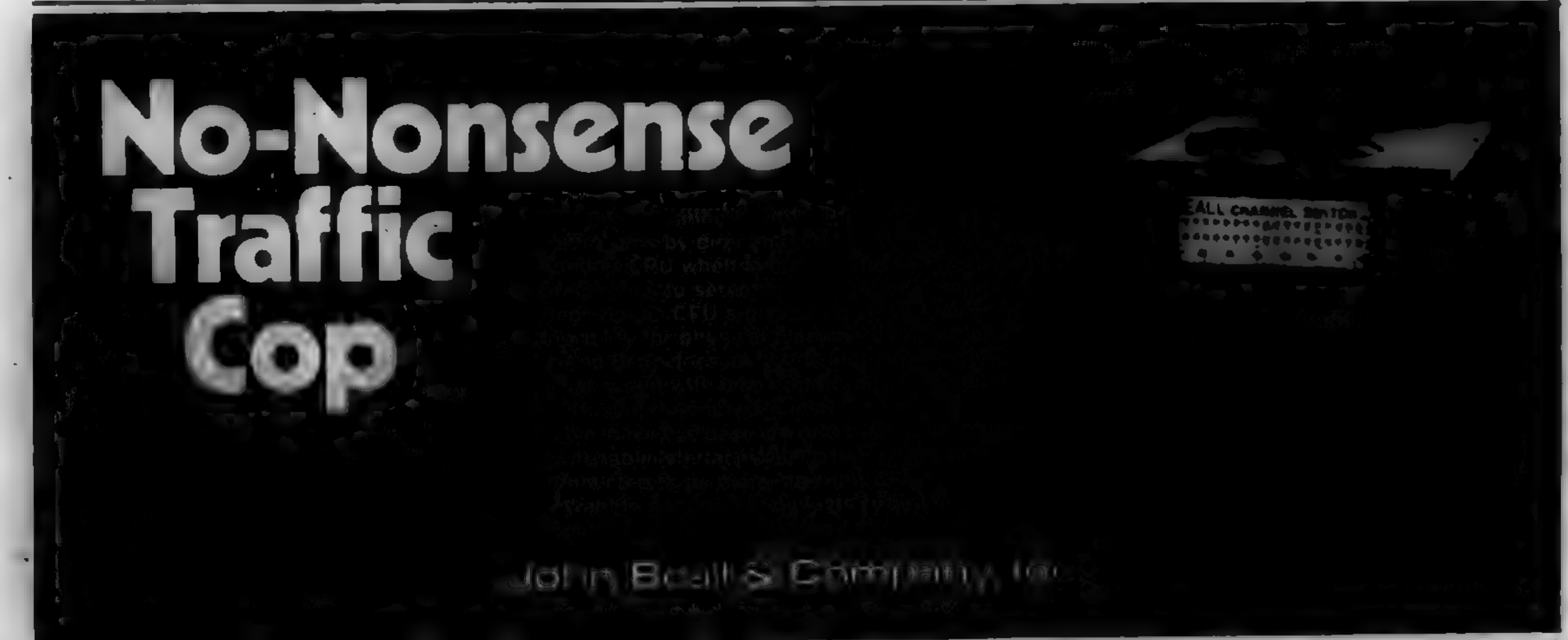
That statement sums up the views expressed at the latest installment of the "annual outlook dinner meeting" sponsored by the Semiconductor Equipment and Materials Institute (Semi).

The Dec. 10 meeting featured four panelists, each of whom was asked to forecast the semiconductor industry's economic future for the coming year and beyond. The panelists included Rolm Corp. Executive Vice-President Leo Chamberlain, Harris Corp. vice-president and General Manager James Dykes, Dataquest, Inc. Senior Vice-President James Riley and Dean Witter Vice-President Hans Severiens.

Each of the speakers addressed the topic at hand from a slightly different perspective, but on one point they all agreed: During the coming months and years, the U.S. semiconductor field will almost certainly continue its familiar pattern of rapid growth, high customer demand and worldwide market leadership.

The only thunderhead visible on the industry's business horizon is the fear that the early part of 1981 could bring a brief period of renewed recession, Severiens said. Otherwise, integrated circuit manufacturers can look forward to a prolonged season of nearly uninterrupted prosperity.

(Continued on Page 59)



"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."

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But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computer series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought. Worldwide expenditures are currently at $75 Billion, and growing by 20% a year.

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In Office Automation Race

Wang Revving to Beat IBM, Xerox

By Ann Dooley
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. is revving up to beat out its bigger and stronger competitors, IBM and Xerox Corp., in the office automation race.

During the recent announcement of its Wangwriter and related products — which one official called the "worst kept secret in the industry" — Wang outlined its definition of the office automation marketplace and indicated some future directions the company would be taking.

To achieve success, an office automation supplier must focus on six areas — word processing (WP), data processing, image processing, audio processing, networking and human factors, according to John Cunningham, executive vice-president for field operations.

Already a leader in WP, DP and human factors, according to Cunningham, Wang intends to pursue development of the three remaining areas and will provide users with tangible results in the short-term future.

Hinting at developments within the next 24 months, Frederick Wang, vice-president of market planning and development, stated the company would have 12 pilot projects in place that would involve new technology in all six key areas and would also spawn new products. The installation will be within Wang's current user base, Wang said.

Systems Approach

According to Fred Wang, networking is the backbone of all the office automation technologies, and Wang plans to implement a systems approach to the concept.

This will be accomplished by tying in local networks in which Wang products communicate with other Wang products in one building or site; remote networks in which Wang products communicate with others from site to site; and networks in which Wang products communicate to non-Wang products.

Calling this networking "gateways," Wang said the company will concentrate primarily on developments in local networks. Development of a digitally encoded broadband cable network is currently under way, using techniques from cable television, according to Wang.

The technology will be implemented at the department level so that individual user needs — something that Wang wants to emphasize — will be served.

Wang will also be focusing on business graphics, computer modeling programs, facsimile transmission, video conferencing, voice synthesis, voice store and forward and telephony in developing future products.

What will give Wang the leading edge over its competition will be its attention to man-machine interface, Wang officials concluded.

ASI Countersues Deltak

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) here recently filed a defamation suit against Deltak, Inc. and its president, Robert King, and has countersued Deltak alleging unfair competitive practices and misappropriation of trade secrets.

The countersuits, filed in the Circuit Court of Cook County, are answers to two suits filed by Deltak, one of which was against ASI and Paul Pinney and the other against one Jay Lassman, according to ASI president and chief executive officer John DeAno.

The defamation suit, which seeks $2 million in damages, arose in connection with comments made by King primarily in *Crain's Chicago Business* when Deltak filed its suits against ASI.

The two firms are the major vendors of multimedia training courses aimed primarily at the DP community.

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Panelists See Fair Skies in 1981 Semi Outlook

(Continued from Page 55)

Severiens described the U.S. economy as currently being in the midst of a "W-shaped" recession. "The first 'V' of that recession occurred earlier this year and is now behind us," the Dean Witter executive said. "Soon, we'll be entering the second 'V,' which will probably last until next summer when we can expect to see the first signs of an economic recovery."

Unlike the first "V," the second "V" of the U.S.' ongoing economic downturn is expected to bring "no severe business contractions," Severiens predicted.

Part of Severiens' optimism about the semiconductor industry's near-term business outlook, he said, stems from his belief that the incoming Reagan administration will adopt economic policies that will inhibit federal spending and thus perhaps ease inflationary pressures.

Severiens also bases his optimism on the recent passage of a federal tax law that, among other things, provides financial incentives for incremental research and development.

Such legislation is clearly aimed at encouraging increased R&D spending, which is sadly deficient among many U.S. semiconductor firms, he said.

In other good news for the industry, Harris' Dykes predicted continued U.S. high-technology leadership through at least 1985. In both product development and international marketing expertise, domestic semiconductor firms will maintain a clear superiority over their overseas counterparts, Dykes said.

For all their strengths, however, U.S. high-technology companies during the next five years are still expected to lose a "slight" part of their worldwide market share to Japanese vendors, which are confronting American industry with a growing competitive threat, the Harris executive said.

Domestic suppliers will also find themselves severely tested by a continuing shortage of both R&D funding and skilled technical personnel. Dykes blamed much of the manpower shortfall, which is expected to run as high as 20% to 25%, on the failure of U.S. universities to produce enough engineers and other technical professionals to keep pace with industry demand.

As one potential remedy for the growing labor problem, Dykes urged U.S. semiconductor makers to expand their use of occupational retraining.

Four Phase, Two Pi Sign

(Continued from Page 55)

made a large investment in product development into the system, which is now tested extensively in the field. However, U.S. Philips does not have a U.S. marketing organization that could provide widespread distribution for the product.

By contrast, Four-Phase has a large marketing organization and a sizable customer base.

During the next several weeks, the two companies will work out the arrangements of the acquisition. One point to be ironed out is how Two Pi's already established OEM commitments will be met. The firm will be operated as a wholly-owned subsidiary of Four-Phase, and it is unknown to what extent Two Pi will continue to offer the system on an OEM basis.

The proposed acquisition could involve an exchange of up to 400,000 Four-Phase common shares. The completion of a definitive agreement is expected in January.

It is anticipated that if the acquisition is completed, Four-Phase will retain Two Pi's current management.

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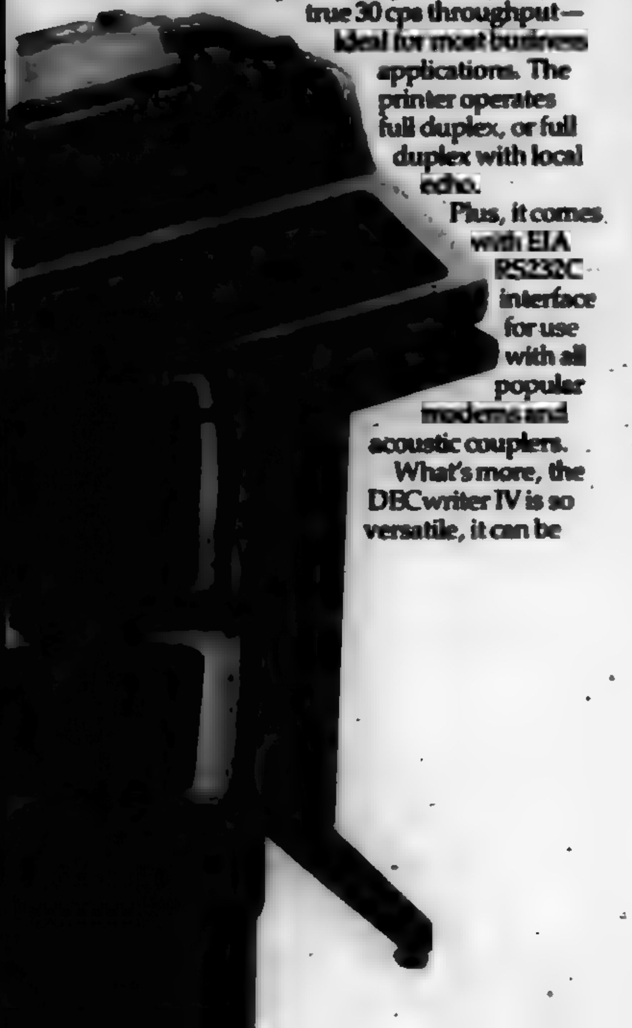

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Proffers Reforms and Legislation

DG Exec Ties 'Power of Future' to Public Policy

By Deborah Wise
CW Staff

CAMBRIDGE, Mass. – "The power of the future" may lie in the hands of today's engineers and computer designers, but they must recognize the effects public policies have on their ability to design, manufacture and sell computers.

In an address given as part of the Distinguished Lecture Series at MIT, Edson D. de Castro, president of Data General Corp., pinpointed five areas that, although not specifically related to technology, will influence its progress. De Castro also suggested reforms and legislation to help the computer industry.

The five issues involve capital investment, capital formation, the funding of research and development, human resources and international trade. "For computer companies to get started, grow and prosper requires that they raise capital, maintain state-of-the-art test and development equipment, undertake new research projects, advance educational programs and compete successfully throughout the world," de Castro said.

• Capital gains tax inhibits venture capital investment in start-up companies and expanding companies, said de Castro, who talked of his own experience, 12 years ago, when he formed DG.

"Had we waited one more year, it is possible that Data General would never have got started. The following year, the federal government raised the capital gains tax to 49%," he said.

However, this policy, designed to increase government revenue, failed. The tax was decreased last year to 20%, which de Castro said has resulted in "a doubling of new capital raised from initial offerings and a $200 billion increase in equity values.

"Any company in the computer and electronics industry that grows faster than 20% a year has difficulty generating enough cash itself to support growth. Thus, raising capital from other sources is necessary. Now, with improved incentives to invest, companies can raise money to grow somewhat easier," he said, but pointed out that many companies do not have a capital gains tax at all.

"The computer and electronics industry is now working with Congress to further reduce the capital gains tax in order that we may obtain greater funding that can produce economic growth and productivity," according to de Castro.

• Once a company has been formed it needs a capital formation base to keep competitive. However, equipment is expensive and becomes obsolete quickly.

De Castro advocated a reform in the depreciation laws that would allow companies to recover the cost of buildings and equipment as fast as they use them up.

A bill, currently before Congress, would allow for equipment write-off in five years, but de Castro said this is geared towards more mature companies. "It hurts fast-growing electronic and computer companies that need new equipment every two or three years."

• Calling research and development an "expensive investment" but a necessary one to maintain growth in the computer industry, de Castro described an industry push to create a national policy that would provide an incentive to increase that investment. "We have proposed legislation that will give firms a tax credit for increases in research and development beyond the average investment of the prior three years."

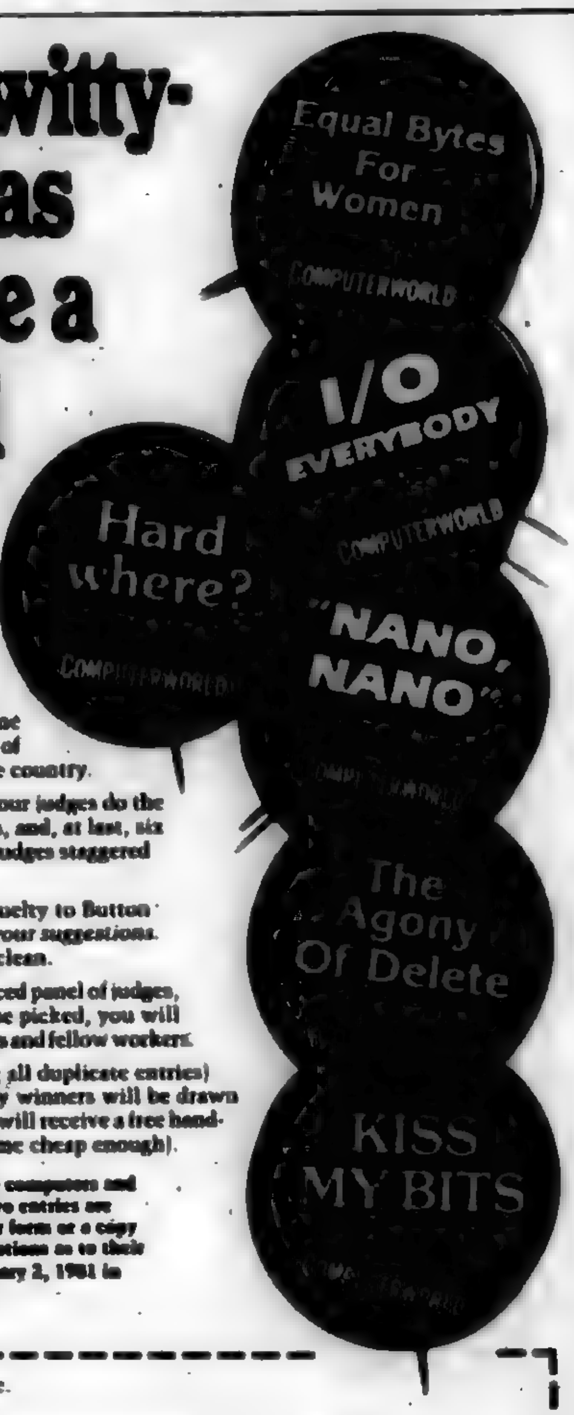
• The fourth area he discussed concerned the problems of human resources; not only their scarcity – for every 10 jobs available there are only five qualified people in the computer industry – but the difficulty that those on the job have in keeping up with new technological advancements.

Within university and colleges he saw a need to help expand and develop technical programs to train people for the industry environment. One way of keeping the facilities up to date would be make it economically attractive for companies to deduct the fair market value of the equipment that they donate for educational purposes. "This would mean that students would have more current resources at their disposal and that universities could conserve their limited funds," de Castro maintained.

De Castro dealt with the complicated issue of employees' share in a company's profits. He favored the idea that employees be given stock options, but said the present tax laws are not geared to allowing the employees to gain much from holding company stocks. He has, therefore, sent a proposal to Congress that outlines a tax policy change.

• On a more global note, de Castro advocated a "spirit of free trade" worldwide, decrying the tariff and nontariff barriers that countries use to make it harder for nonnative companies to be competitive in local markets. "While such barriers are intended to protect home-grown industries, they reduce competition and tend to subsidize noncompetitive firms at the expense of the customers," he said.

If you can write a witty-one-liner as good as these, you could be a winner in the 1981 Computerworld button contest.



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Last year, for the first time, we let our readers do the writing, and our judges do the laughing. We spent many hours sifting through hundreds of entries, and, at last, six winners (shown above) emerged from the smoke-filled room. The judges staggered out later.

This year, despite protests from the SPCBJ (Society to Prevent Cruelty to Button Judges), we've decided to do it again. And we're hereby *soliciting your suggestions.* They should be short, funny, relevant – and at least moderately clean.

As many as six suggestions will be chosen by our (by now) experienced panel of judges, based on criteria known only to them. If your entry is among those picked, you will receive a certificate of appreciation suitable for impressing your friends and fellow workers.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (at least their entries will) and six lucky winners will be drawn more or less at random (we never promised fair). These lucky souls will receive a free hand-held computer game valued at well under $100 (if we can find some cheap enough).

You may not enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representations as to their competence, skill or fairness are being made. Deadline for entries is January 2, 1981 in our offices in Framingham.

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BSEE with 3-6 years experience in design of low/medium voltage regulated switching power supplies for military and commercial applications.

SOFTWARE DESIGN

BSCS/EE with 2 or more years experience in design/development of real time operating systems or compilers for scientific or commercial applications. Assembler and Fortran language programming desired. Other language proficiency would be a plus. Hardware experience should include 16 or 32 bit minicomputer systems.

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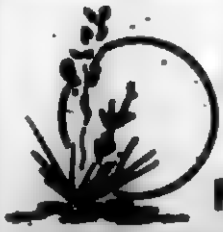

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To take advantage of these ground floor opportunities forward your resume to the address below. It must include a brief description of your involvement in banking applications, salary history, salary expectations and a phone number.

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Manager, Data Processing
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Responsibilities include managing the administrative systems analysis and programming staff, long range planning for administrative computer applications, administrative [illegible] including budgeting, expenditure control, and other administrative tasks as assigned; acts for the Director in his absence.

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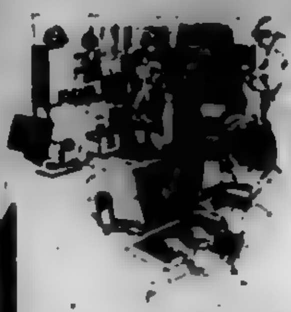

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The Data Communications Division of a large suburban Chicago medical center offers a challenging atmosphere of systems innovation directed by progressive and dynamic management. We are seeking the ambitious Programmer Analyst who has the following profile, to join our DOS-VS environment and assist in putting up a patient care system utilizing an IBM 4331:

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If you are the individual we select, you will work as part of our patient care system team and assist in defining and designing systems applications for eventual conversion to a DL/1 Data Base. To investigate this highly rewarding opportunity, call or submit your resume, in confidence, including salary history and requirements to:

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SYSTEMS PROGRAMMER

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Mr. James H. Barbour

The Institute for Advanced Study
[illegible] Olden Lane
Princeton, N.J. [illegible]
(609) 734-[illegible]

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SYSTEMS SOFTWARE PROGRAMMER/ANALYST TANDEM FROM 40K

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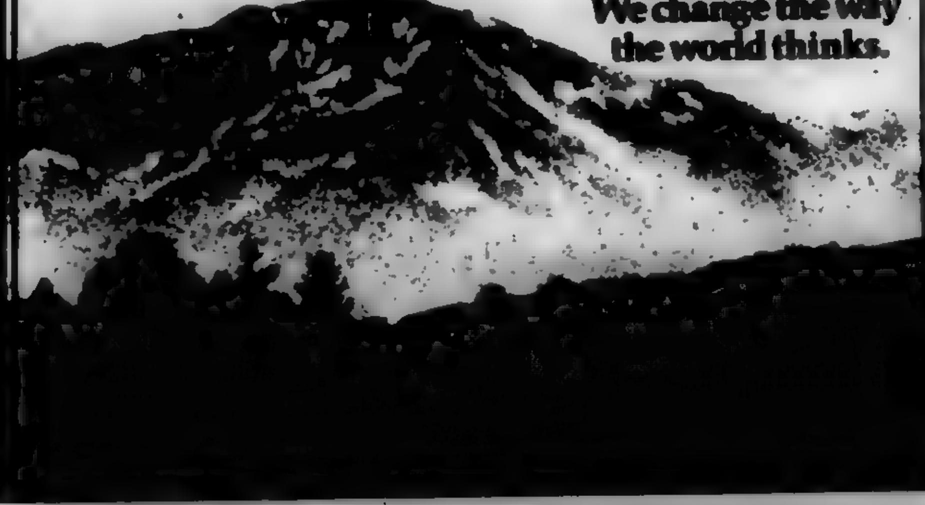

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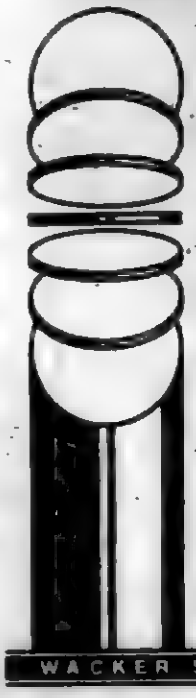

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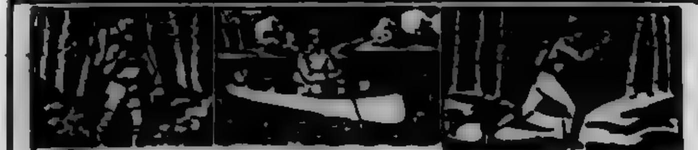

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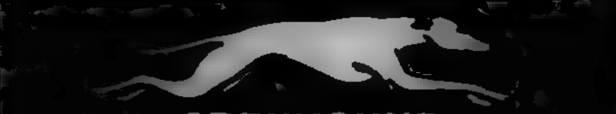

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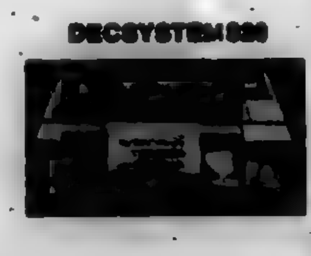

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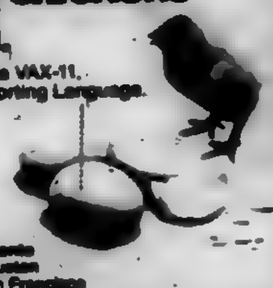

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Season's Greetings

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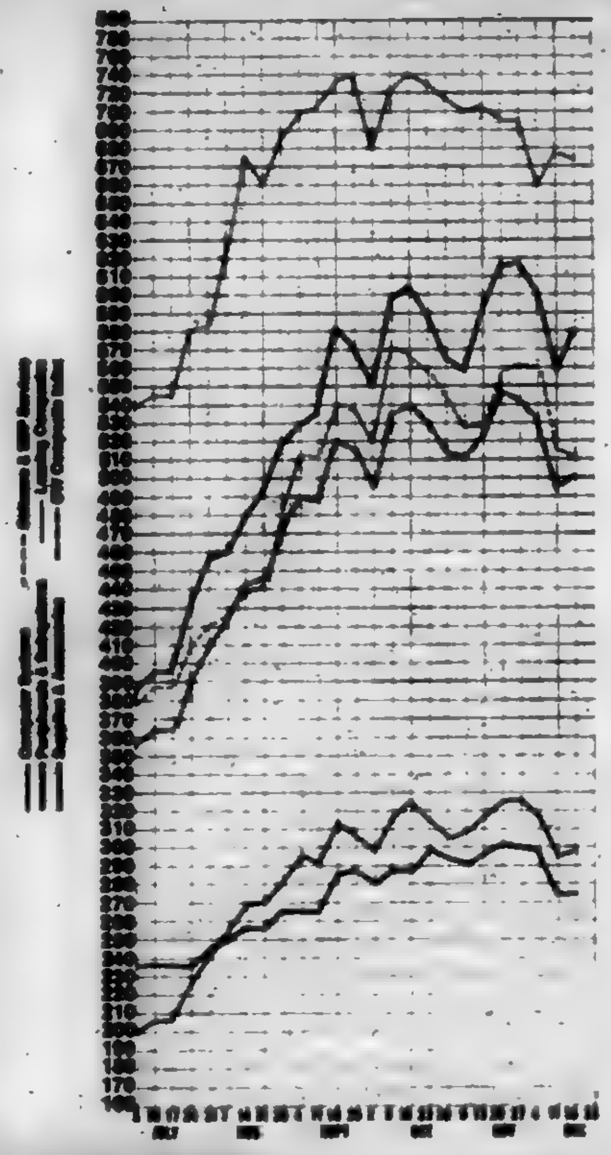

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 17, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHANGE	WEEK PCT CHANGE
N	AMDAHL CORP	15- 42	24 1/8	+2	+9.6
N	BURROUGHS CORP	47- 88	61 1/4	+1 1/2	+3.0
O	COMPUTER AUTOMATION	9- 27	21	- 1/4	-1.1
N	CONTROL DATA CORP	35- 77	70 3/4	+7 1/8	+11.4
O	CRAY RESEARCH INC	30-103	96 1/2	+2 1/8	+2.3
N	DATA GENERAL CORP	44- 87	69 1/2	+1	+1.4
N	DATAPOINT CORP	44-113	103 3/4	+6 1/2	+6.6
N	DIGITAL EQUIPMENT	52- 99	90 1/8	+6 7/8	+8.2
A	EECO INC	6- 16	14 1/8	+ 1/4	+1.8
N	ELECTRONIC ASSOC.	6- 12	7 3/4	+ 1/4	+3.3
N	FOUR-PHASE SYSTEMS	20- 49	22 1/8	- 1/2	-2.1
N	FOXBORO	31- 59	58 1/2	-1 3/8	-2.4
O	GENERAL AUTOMATION	7- 19	8 7/8	+ 1/8	+2.0
O	GRI COMPUTER CORP	1- 3	1 3/8	0	0.0
N	HEWLETT-PACKARD CO	44- 95	91 1/4	+3 3/4	+4.3
N	HONEYWELL INC	65-107	107	+9 3/4	+10.0
N	IBM	50- 79	68 1/4	+1 1/2	+2.3
O	MAGNUSON COMP SYSTS	20- 46	45 1/2	+7	+18.1
N	MANAGEMENT ASSIST	9- 25	14 1/4	- 1/4	-1.7
O	MANUFACTURING DATA S	22- 80	72	+6	+9.0
O	MINI-COMPUTER SYST	2- 6	2 1/8	+ 1/8	+6.2
O	MODULAR COMPUTER SYS	9- 31	22 1/8	-1 1/4	-5.3
N	NCR	52- 82	66 1/2	0	0.0
N	PRIME COMPUTER INC	18- 59	52	+2 1/4	+4.5
N	PERKIN-ELMER	26- 70	63	+2 1/2	+4.1
N	SPERRY CORP	42- 60	56 1/8	+1 3/8	+2.9
A	SYSTEMS ENG. LABS	11- 33	32 3/4	+4 1/8	+8.7
O	TANDEM COMPUTERS INC	13- 70	70	+6 1/4	+9.8
N	TEXAS INSTRUMENTS	79-120	120 1/4	-4	-3.1
A	WANG LABS.	17- 40	36 3/4	+2 1/2	+7.2

LEASING COMPANIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHANGE	WEEK PCT CHANGE
O	BOOTHE FINANCIAL CP	13- 27	20	-1	-4.7
N	COMDISCO INC	6- 24	20 5/8	+ 5/8	+3.1
A	COMMERCE GROUP CORP	1- 2	1 1/4	+ 3/8	+42.8
A	COMPUTER INVSTRS GRP	1- 4	5/8	- 7/8	-58.3
O	CONTINENTAL INFO SYS	2- 15	4 1/8	- 1/8	-2.9
O	DATRONIC RENTAL	3- 5	4 1/2	0	0.0
A	DCL INC	3- 6	2 3/4	- 1/8	-4.3
N	DPF INC	5- 12	5 5/8	0	0.0
N	ITEL	1- 15	7/8	0	0.0
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	4 1/8	+ 1/2	+13.7
N	RELIANCE GROUP INC	24- 79	78 3/4	- 3/8	-0.5
N	U.S. LEASING	12- 26	24 1/2	+ 7/8	+3.7

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EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHANGE	WEEK PCT CHANGE
O	ADVANCED COMP TECH	1- 6	3 1/4	- 1/4	-7.1
O	ADVANCED SYSTEMS INC	12- 15	12 1/2	-1	-7.4
O	ANACOMP INC	7- 24	19 1/4	+ 1/4	+1.3
O	ANALYSTS INTL CORP	3- 14	10 1/2	-3	-22.2
A	APPLIED DATA RES.	6- 24	19 3/8	- 3/4	-3.7
N	AUTOMATIC DATA PROC	35- 52	48 3/4	+1 1/2	+3.3
O	CDA COMPUTER ASSOC	9- 17	14 1/4	+1	+7.5
O	COMPUTER HORIZONS	1- 5	2	0	0.0
O	COMPUTER NETWORK	4- 9	6 1/8	0	0.0
N	COMPUTER SCIENCES	11- 20	18 1/4	+ 1/2	+2.8
O	COMPUTER TASK GROUP	1- 23	19	- 1/2	-2.5
O	COMPUTER USAGE	2- 10	6 1/2	+ 1/4	+4.0
O	COMPUT AUTO REP SVC	4- 11	9	- 1/2	-5.2
O	COMSHARE	11- 21	16	0	0.0
O	CULLINANE DATABASE	18- 45	36 3/8	+4 1/2	+13.9
O	DATA DIMENSIONS INC	1- 6	1 1/4	0	0.0
O	DATATAB	1- 4	1	0	0.0
O	DBI CORP	4- 9	6 7/8	- 3/8	-5.3
N	ELECTRONIC DATA SYST	19- 37	30 1/2	+ 1/4	+0.8
O	INFORMATICS INC	9- 25	22 3/8	+1 3/8	+6.4
O	INSYTE CORP	1- 3	2	- 1/2	-20.0
O	IPS COMPUTER MARKET.	1- 4	1 1/4	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/4	0	0.0
O	KEYDATA CORP	1- 5	7/8	- 1/8	-12.5
A	LOGICON	12- 38	34 3/4	-2 1/4	-6.1
O	MATHEMATICA INC	9- 18	14 1/2	+1 1/2	+11.5
O	MATHEMATICAL APP GRP.	7- 23	17 1/2	+ 1/2	+2.9
O	NATIONAL DATA CORP	10- 31	28 7/8	+1 3/8	+5.0
N	PLANNING RESEARCH	5- 13	7 5/8	- 3/8	-4.6
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 10	8 5/8	+ 1/8	+1.4
O	REYNOLDS & REYNOLDS	20- 34	30 1/4	- 1/2	-1.6
O	SYSC INC	6- 24	22	+ 1/2	+2.3
O	SCIENTIFIC COMPUTERS	6- 24	28	+1	+3.7
N	TYMSHARE INC	24- 60	51 1/2	+3 1/2	+7.3
A	URS CORP	5- 17	14 5/8	- 1/4	-1.6
N	WYLY CORP	4- 20	14 3/4	- 1/4	-1.6

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHANGE	WEEK PCT CHANGE
N	AM INTERNATIONAL	13- 24	13 1/8	-1 3/8	-9.4
N	AMPEX CORP	14- 26	22	+ 3/8	+1.7
A	ANDERSON JACOBSON	9- 28	21	0	0.0
O	AUTO-TROL TECHNOLOGY	18- 62	48 1/2	+4 1/2	+10.2
O	BEEHIVE INT'L	3- 28	24 1/4	+2	+9.0
A	BOLT,BERANEK & NEW	12- 37	33 3/4	+2 1/4	+7.1
N	BUNKER RAMO	17- 41	35 3/8	- 5/8	-1.7
O	CAMBRIDGE MEMORIES	1- 9	3 1/4	0	0.0
N	CENTRONICS DATA COMP	19- 55	22 7/8	+2 1/8	+10.2
A	CETEC CORP	3- 7	5 7/8	+ 1/8	+2.1
O	COMPUTER DEVICES INC	3- 10	6 1/2	- 1/4	-3.7
O	COGNITRONICS	1- 10	8 5/8	0	0.0
O	COMPUTER COMMUN.	4- 10	1 3/4	- 1/8	-6.6
O	COMPUTER CONSOLES	4- 29	23 1/4	+3 1/2	+17.7
O	COMPUTER TRANSCEIVER	1- 6	4 1/8	- 7/8	-17.5
N	COMPUTERVISION CORP	24- 92	76	+8	+11.7
N	CONRAC CORP	13- 25	17 1/2	- 3/8	-2.4
A	DATA ACCESS SYSTEMS	6- 22	22	+3 1/8	+16.5
A	DATAPRODUCTS CORP	11- 38	33 1/8	+1	+3.1
O	DATUM INC	2- 5	3 1/2	- 1/4	-6.6
O	DECISION DATA COMPUT	2- 6	4 7/8	0	0.0
O	DELTA DATA SYSTEMS	1- 3	1 5/8	- 1/8	-7.1
O	DATARAM CORP	6- 37	12	+1 1/4	+11.6
N	ELECTRONIC M & M	3- 9	7 1/2	+ 1/4	+3.4
O	EVANS & SUTHERLAND	21- 65	48	+1	+1.4
O	FABRI-TEK	1- 4	2 1/4	0	0.0
O	GENERAL COMPUTER SYS	1- 7	3 5/8	+ 1/2	+9.7
O	GEN'L DATA COMM IND	8- 22	17 3/4	- 1/2	-2.7
O	GENERAL TERMINAL CP	1- 4	1 3/8	- 1/4	-15.3
N	HAZELTINE CORP	12- 33	23 5/8	- 7/8	-3.6
N	HARRIS CORP	25- 50	40 1/2	-1 3/8	-3.3
O	INFORMATION INTL INC	8- 15	10	- 3/4	-6.9
O	INTEL CORP	23- 50	40 3/4	- 1/2	-1.2
O	INTERSIL	13- 34	33 7/8	+ 1/4	+0.7
A	LUNDY ELECTRONICS	4- 17	12 3/8	+ 1/2	+4.2
O	MSI DATA CORP	5- 16	15 7/8	- 1/4	-2.0
N	MEMOREX	10- 34	12 3/8	- 7/8	-6.6
N	MOHAWK DATA SCI	10- 31	23 3/4	+1 1/2	+6.7
O	ONEX	2- 13	11	0	0.0
A	PARADYNE CORP	9- 33	28 1/4	+1 3/8	+5.1
A	PENRIL CORP	9- 15	13	0	0.0
O	RAMTEK CORP	10- 23	21	+1	+5.0
O	RECOGNITION EQUIP	8- 21	16 1/4	+ 3/8	+2.3
O	SCAN DATA	1- 5	3 3/8	- 1/8	-3.3
N	STORAGE TECHNOLOGY	12- 26	21 7/8	+1	+4.7
O	SYKES DATATRONICS	14- 30	32 3/4	+6	+22.4
O	T BAR INC	14- 24	21	+ 3/4	+3.7
A	TEC INC	3- 9	4 1/4	0	0.0
N	TEKTRONIX INC	42- 70	60	- 1/8	-0.2
N	TELEX	3- 6	4 3/4	- 1/8	-2.5
O	TESDATA SYSTEMS CP	8- 26	12 5/8	+ 3/8	+3.0
A	TIMEPLEX INC	7- 33	29 1/4	+2 3/4	+10.3
O	WILTEK INC	1- 3	2 3/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1979-80 RANGE (1)	CLOSE DEC 17 1980	WEEK NET CHANGE	WEEK PCT CHANGE
A	AMERICAN BUS FORMS	8- 15	14 1/8	+ 5/8	+4.6
O	BALTIMORE BUS FORMS	1- 2	1/2	0	0.0
N	BARRY WRIGHT	8- 22	20 1/2	+2 3/8	+14.4
O	CYBERMATICS INC	1- 2	7/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 14	12 3/4	0	0.0
N	ENNIS BUS. FORMS	13- 21	15 3/8	- 5/8	-3.9
N	3M COMPANY	46- 63	58 3/8	- 3/4	-1.3
O	MOORE CORP LTD	27- 37	32 1/2	- 3/8	-1.1
N	NASHUA CORP	20- 35	23 1/8	-1 1/2	-6.0
N	STANDARD REGISTER	22- 35	30 3/4	+ 1/2	+1.6
A	TAB PRODUCTS CO	9- 28	23	-1	-4.1
N	WABASH MAGNETICS	15- 31	30 1/2	+ 5/8	+2.0
N	WALLACE BUS FORMS	12- 26	21 7/8	0	0.0

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
eekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1981 by CW Communications, Inc.
. 53/Vol. XV, No. 1 December 29, 1980/January 5, 1981 $1.25 a copy; $36/year

Forecast '81

WHAT'S AHEAD:
Personnel Shortage, Software Protection, Data Base

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM reg. U.S. Pat. Off.

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-0010-4841) is published weekly, except: semiweekly the third week in March and a single combined issue the last week in December and the first week in January by CW Communications Inc., 375 Cochituate Road, Framingham, Mass. 01701.

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$1.25 a copy: U.S. – $36 a year: Canada, Central & So. America – $65 a year: Europe and Near East – $125 a year: other foreign – $175 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

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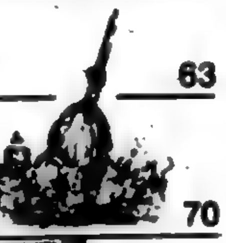

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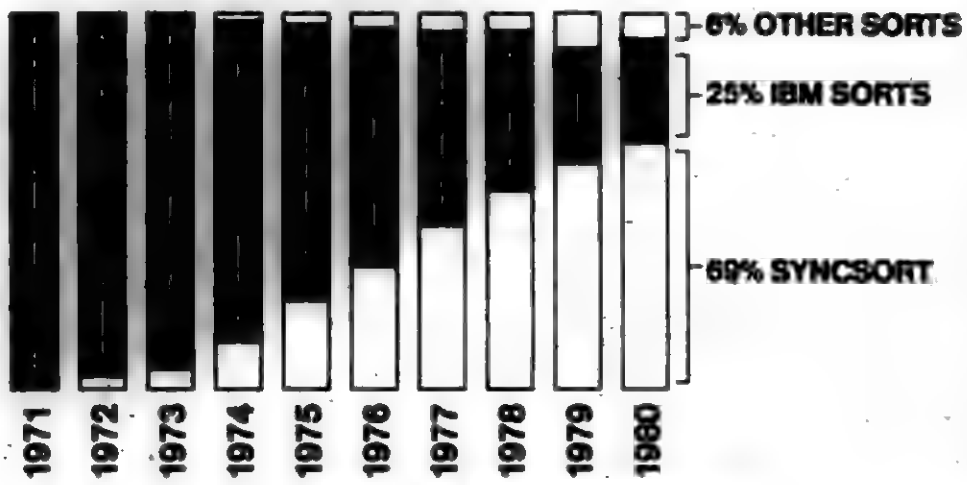

From IDC's OS Sort Studies

USERS OF	1977	1978	1979	1980
☐ SYNCSORT	43%	54%	62%	69%
■ IBM SORTS	53%	42%	29%	25%
☐ Other SORTS	4%	4%	9%	6%

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PREDICTIONS THAT FAILED

Prediction is a fascinating business.

Turn a major page on a calendar, and it's like turning the crank on a jack-in-the-box — just as the melody really gets going, up pops a futurist, spouting uncontradictable wisdom about the era to come.

Now I haven't got anything against futurists. For one thing, looking into the future is a necessity. All of us want some clues about what's to come, in order to know better what to do with what's already happened. For another thing, futurists liven up the place. If we all spent our time waddling around in the present, where would we get grist for our fantasies? All of us, in fact, are closet futurists. It's just that some of us are not as good at it as others.

Which brings me to the point of this article. There's a sadistic side of me that says, "In this time of forecast '81, let's check out the accuracy of the futurists of the past." Are futurists, in fact, generally worth listening to? It's a rotten question to ask, of course, in an article placed at the front of a suite of articles by futurists. But then, it's also an honest, useful question to ask. Let's.

Tip-toe with me, if you will, into the library stacks of the past. Sh!

Let's not tell our surrounding futurists what we're up to. Quietly, quietly, let's move swiftly over to the dusty computing periodicals of yesteryear. Here, among the pages ripe with pony-tailed young sex symbols selling computing products to crew-cut executives, are the futurists of the past. What are they saying?

Here's one in the January 1970 issue of *Datamation*. Lowell D. Amdahl is answering the architectural questions of the '70s in an article by the same name. "The third-generation infant has toddled, walked and now runs . . . Can another generation be far behind?" The answer, implicit in all that follows, is a resounding "No," Amdahl said.

Well, here we are 10 years later. The third generation infant is still running, and it looks a little different, what with all its facelifts. But basically, it's still the same child-now-grown-older.

"But," you whisper quietly so as not to disturb our library stack neighbors or alert any listening futurists, "maybe that was just one futurist's view. Surely others knew that the calamity of the generation change was nearly wound down?"

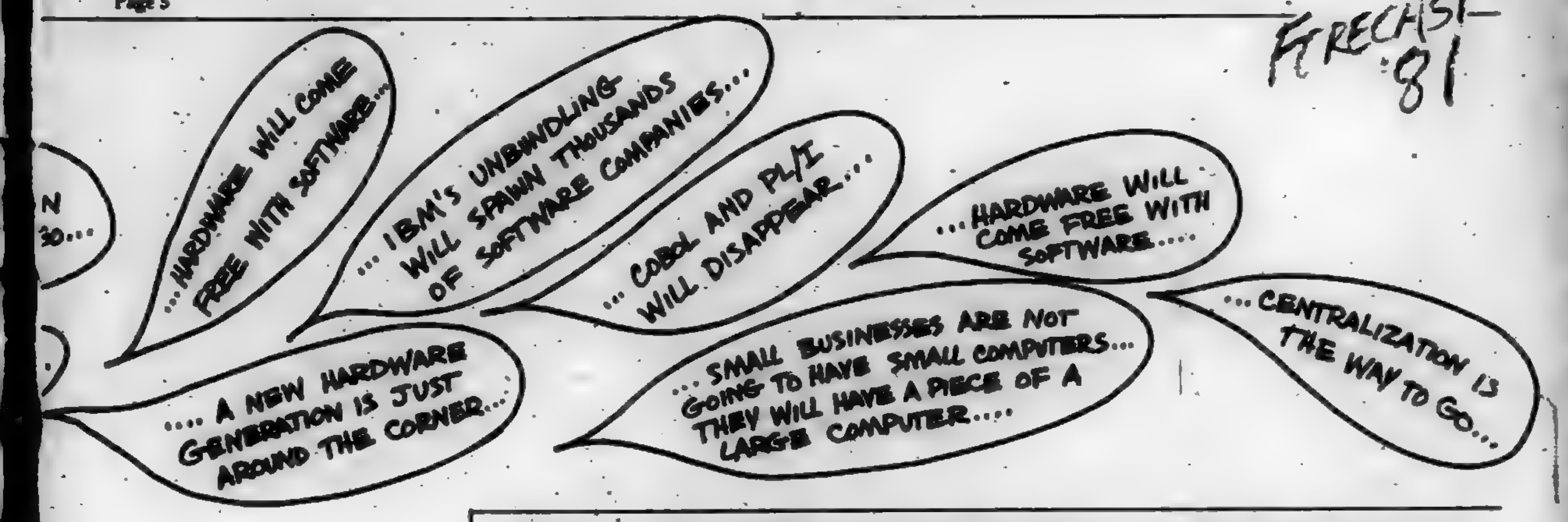
Ah-ha, here's another in the same magazine. Philip A. Dorn, in an article entitled "The Onslaught of the Next Generation," is saying, "Let's predict the next generation will be along soon, that it will be incompatible, that the users will snap it up, that the errors of 1965 will be repeated and magnified, and that you read it here first." Matters get worse, not better. Now the futurists are fighting to be first in line to be wrong! At least on major issues like new computing generations, the futurists were as good as out to lunch.

"Well, then, what about distributed processing as seen from the past?" you

---

Glass, a 25-year computing veteran, is the author of several books and a regular CW contributor.

FORECAST '81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30...
...HARDWARE WILL COME FREE WITH SOFTWARE...
...IBM'S UNBUNDLING WILL SPAWN THOUSANDS OF SOFTWARE COMPANIES...
...COBOL AND PL/I WILL DISAPPEAR...
...HARDWARE WILL COME FREE WITH SOFTWARE....
...A NEW HARDWARE GENERATION IS JUST AROUND THE CORNER...
...SMALL BUSINESSES ARE NOT GOING TO HAVE SMALL COMPUTERS... THEY WILL HAVE A PIECE OF A LARGE COMPUTER....
...CENTRALIZATION IS THE WAY TO GO...

By Robert L. Glass

ask, in hushed tones. "Surely the futurists saw that one coming." A good question. Let's check it out.

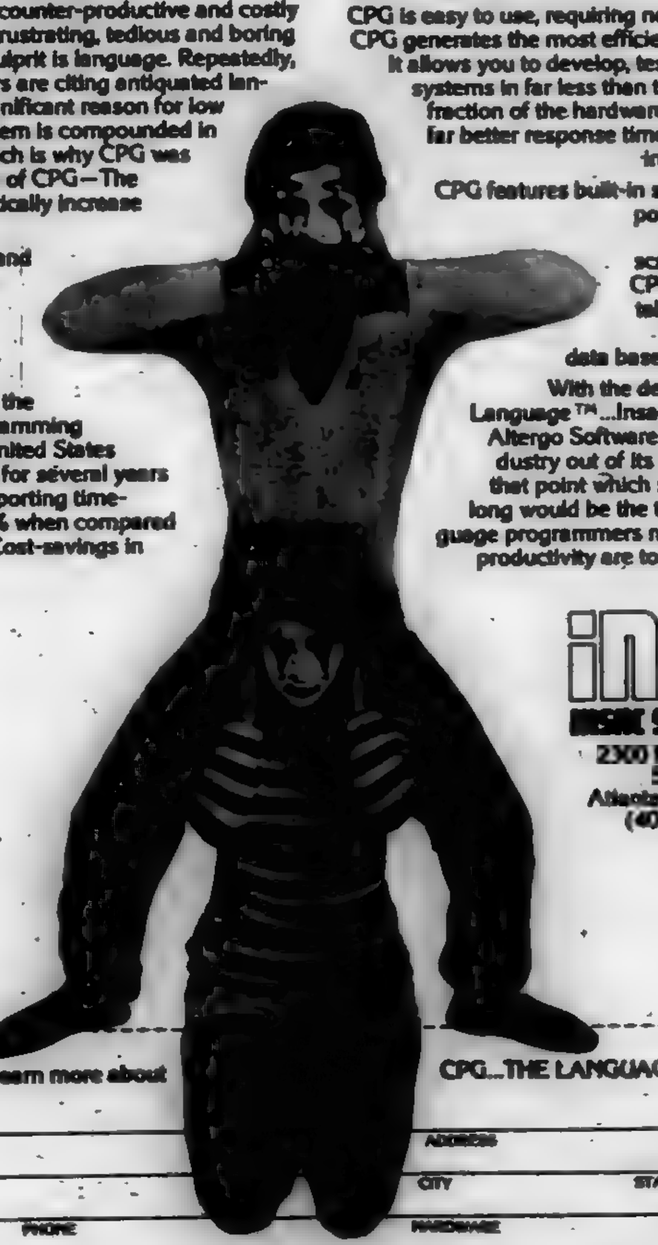
Here, in this same library-stale-smelling periodical, Lowell Amdahl has an answer. "All things considered, there would seem to be a developing tendency toward centralization for the large corporate user," he said. A little evasive, you say, what with all that "seem to be" and "larger corporate user"? Well, what about this one: When it comes to general-purpose computing, the economies of scale are swinging increasingly in the direction of large machines." Martin B. Solomon Jr. expressed that view in an article entitled "Are Small Free-Standing Computers *Really* Here to Stay?" in the July 1966 issue of *Datamation*.

That one's fairly clear — these futurists have come down firmly on the wrong side of the distributed processing fence.

Moving right along the stacks, let's look at software issues. It's 1970 again, and we're just beginning to recover from third-generation computers and software "unbundling." Remember unbundling? In the early days of computing, all software came "free" with the hardware. ("Free" is in quotes because it was often true that the more expensive hardware just happened to have more software with it than the cheaper hardware.)

Then, late in the 1960s, some of the hardware companies came to the far-sighted conclusion that software cost too much to give away, and they began charging for it separately, unbundling the cost out of the total hardware price. It was about this time that software entrepreneurs began salivating heavily, fantasizing the potential profits right around the unbundled corner. In the midst of this anticipation, a futurist of the '70s predicted

(Continued on Page 6)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FORECAST '81

(Continued from Page 5)

"the practice of separation between hardware and software sales may soon see as many as 1,000 companies, each offering scores of software packages for sale." That futurist was Howard Bromberg, also writing in the January 1970 issue of *Datamation*. The article was titled "Revolution 1970."

Alas, like the other forecasters, Bromberg saw all too clearly through a clouded crystal ball. The hardware companies, who could read futurist predictions as well as the next computing person, set their software prices carefully — just high enough to make some money, but just low enough to discourage predator companies — and the software entrepreneurial boom bombed. Not totally, of course. There are many successful software houses today. But not by the hundreds, each offering scores of products.

Then let's try over here . . . Look! It's a veritable treasure trove of past futurism. It's a series of 1970s-era interviews with "decision makers" published in *Computer Decisions* magazine. Each of the interviewees seems to be grinding his own ax, making a prediction that matches what he wishes would happen. Now this is a whole new kind of futurist, the kind who believes that predicting can make it so.

What did these attempts at self-fulfilling prophecy predict? Try these on for size:

- On small computers: Willian Bennett, in the January 1970 issue of *Computer Decisions* magazine, said, "Small businesses are not going to have small computers. It's not a practical way to go. Small companies are going to use a piece of a large computer."
- On the people problem: "As the industry matures and the pool of competent, experienced people expands . . . employers will have more candidates to choose from and then the marginal professionals . . . will have fewer opportunities." That bit of rare insight was expressed by Myron E. Parr and appeared in the March 1970 issue of *Computer Decisions*.
- On programming languages: "I believe that a major change to come on the part of users will be a shift away from both Cobol and PL/I . . . The computer world keeps talking about Cobol as if they knew what they were talking about. But in the final analysis, it just won't work . . . Cobol is hopeless." Peter Harris expressed those views on the subject in the March 1970 issue.
- On service bureaus: Chester Young, in the same series, was quoted as saying, "Service bureaus are in for some major changes . . . The most profound change will be a potential abandonment of "dedicated" in-house facilities by many companies."

Talk about out to lunch! These futurists missed the boat on such items as the microcomputer revolution, the ever-worsening programmer shortage, the ubiquitousness of Cobol (it's still number 1 on the programmers-who-use-it hit parade) and the role of the in-house computer. That's a pretty good grand slam of failed futurism!

Perhaps it's unfair to focus on predictions made in popular trade journals. Have the serious, scientific publications had something more accurate to say?

Over here, on this other set of shelves, are some prestigious journals. For openers, there just aren't any blatant predictions here. Look at this end-of-the-decade 1960 issue. There's stuff on sorting and character sets, but nothing on what the sorts or sets of the late '60s might look like.

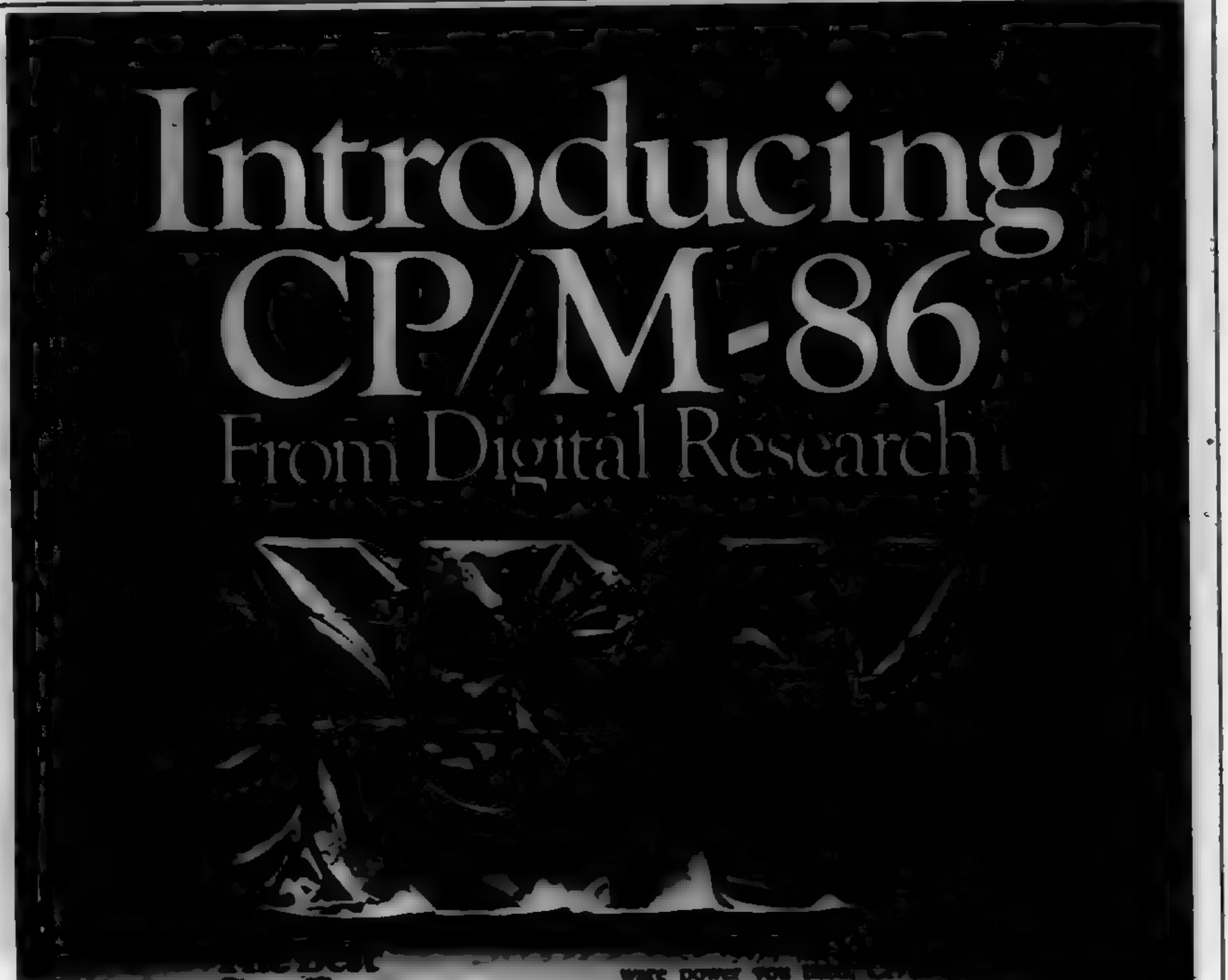
1970s-Era Forecasts

For balance, let's look at the '70s. If the popular journals were looking forward to fourth-generation hardware, centralized computers and software package proliferation, what are the serious journals saying?

Here's a computer science article on management information systems (MIS). Ah, the MIStique of the beginnings of the MIS era. What a shame it turned out to be, in many respects, a MIStake. We didn't know as much as we thought we knew, we can now see, about the information needs and methodologies of running an organization. The promise of the '70s dissolved into the partially successful groping of the '80s.

Were the predictions of the serious scientists of the '60s any better? Let's move down the stacks a decade, a few inches of printed matter, and take a look at some older computer science articles. Ah, here's one on theorem proving. We'll be using computers to evaluate and derive proofs for tough mathematical or philosophical questions in no time at all — that's the promise of the article. It was a promise to be left unfulfilled.

Maybe the problem here is that we're not listening to the real experts — the ones who are computing's household names. Let's do a quick scan for some quotes by some names of note. Ah,



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Forecast '81

here's Dan McCracken, well-known author and professional society activist. It's about a decade ago, and he's saying that Cobol will no longer be in use by 1980.

And over here, in a tattered issue of *Computerworld* dated June 7, 1972, Herb Grosch, another society activist and professional doubting Thomas, is predicting that by 1980 IBM will be the only computing supplier!

And even IBM itself isn't a very good seer. When IBM was bringing out the 7090, its top management felt that that super-fast new device would saturate the market with sales of 30 systems.

Well, with Cobol still the Number 1 language, with IBM competitors flourishing and with a computer in every garage (philosophically speaking) perhaps the real experts are no better than the unreal.

What to Do?

So, if the popular journals aren't very reliable at predicting the future and neither are the serious journals, or the well-known names, then what's a computer person who cares about the future to do?

One obnoxious answer is to go ahead and read all the predictions in this issue of *Computerworld*; add a healthy measure of doubt and file them away on a shelf to be looked at later — much as we just finished doing.

But there's another answer. It's the cowardly approach to predicting the future. What follows is a set of predictions made purely for the sake of boosting the predictor's average. They may not create a lot of fantasies — the other futurists on these pages will be much more fun — but they are backed by the knowledge of the solid, dull past. So here they are: the frustrated, failed futurist takes a nonrisk, nonmyopic look into the highly visible future:

- People will continue to make predictions about next-generation computers. Technical journals will continue to carry increasingly-more-accurate foresight on hardware-to-come. And, someday, those predictions will come true.
- Computer hardware builders will continue to be congratulated on the breathtaking drop in the purchase/-lease price of their products. People will continue to predict that hardware will soon be given away free with software, a rebundling 10 years after unbundling.
- Hardware improvements for the software builder will be nearly nonexistent. There will be no dramatic improvements in instruction sets or register conventions. The "Fortran machines" and "Cobol machines" of the year ahead will be the same sales-puffed paper tigers they were 10 years ago.
- People will continue to predict that automated generation of software by powerful utility programs is just around the corner. They will continue to be wrong, just as were their very bright colleagues of 10 years ago and 20 years ago.
- Software solutions for distributed systems will continue to be elusive. It is one problem to tie several hardware boxes onto bus connectors and say that the computers are now talking to each other; it is another to write the software that truly makes them talk.
- Some academicians will continue to base both theory and practice on the belief that programs may be proven correct someday. Some industry specialists will ignore proof of correctness on the grounds that it is too hard, too costly and too dubious. Time will prove the correctness of the industry approach.
- Managers of software projects will insist on more and more English-readable documentation describing their programs. Software specialists will grit their teeth and produce that documentation, knowing that no one but them will ever know if it really matches the code.
- Lecturers will get very rich presenting seminars on the new Defense Department programming language Ada. Theoreticians will both laud and ridicule that complex language. Pragmatisms will move fearfully toward the major new learning experience. Fortran and Cobol will, once again, survive.
- The adjective "structured" will continue to be applied to every meaningful noun in the computing milieu. It will continue to mean whatever the author of the moment says it means. Lecturers will not get as rich presenting seminars on structured methodology as they did five years ago.

Oh, and one last prediction, one with which no one will disagree:

- Next year at this time the futurists will pop out of their jack-in-the-boxes again with a whole new set of predictions. And we will read them just as avidly as we did this year's!

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FORECAST '81

By Vincent C. Rauzino

THE LOOMING BATTLE BETWEEN DATA BASE MACHINES AND SOFTWARE DATA BASE MANAGEMENT SYSTEMS

The rapid-fire effects of accelerating computer technologies have barely given user consciousness time to absorb data base management systems (DBMS). That same, much-battered consciousness is now being asked to absorb a potentially orders-of-magnitude improvement in DBMS called data base machines.

Obviously, the pace of technological innovation is not going to diminish during the coming decade. If anything, it will become even more furious and, consequently, less comprehensible to the user. However, the user cannot afford the option of ignorance, so each innovation must somehow be examined and incorporated into plans for growth.

The purpose of this article is to help the reader assimilate the important new technology of data base machines now and to project its impact on future computer installations. Data base machines will contribute just one brush stroke to the computer canvas of the '80s, but that single stroke could help add the long promised color of "information" to the drab browns and grays of data processing.

A data base, quite literally, is any collection of reasonably coherent data. Coherent data implies a systematic organization so that information can be retrieved by anyone who knows the system. A paper-based office file stored in metal cabinets qualifies as a data base. We could even bring the definition down to include, say, a collection of canceled checks, provided the checks are stored in numerical (thus coherent) sequence.

However, "data base" takes on a special meaning when it is linked with "computer." It can still be as conceptually simple as a canceled check file, or, more to the issue at hand, it can be a truly glorious collection of coherent files, compilers and interpreters, indexes, languages, communications interfaces, auditors and elaborate security safeguards.

This vast multipart structure is more aptly called a data base management system, with heavy stress on "management" and diminished emphasis on "data base." (DBMS is really what is meant by the data base part of a data base machine, but data base machine is euphonically superior to data base management system machine.)

Machine is easier to define. It is simply a generic synonym for computer metal that figuratively connects the heady world of DBMS software to the seemingly more functional familiarity of hardware.

A data base machine, then, is a computer or computer-like device whose sole purpose is to execute DBMS software or firmware relative to a coherent data file. A data base machine is not intended to be an independent computer, although it can be. It reacts to, and is controlled by, a general-purpose host computer. It also requires a disk subsystem to store the related data file.

It thus sits physically and logically between a general-purpose computer and at least part of the disk subsystem that forms a complete processing installation.

It is probably premature to talk about data base machines in the present tense because only a few products have been formally announced, and none as yet have been formally delivered. The most interesting device currently announced will be available only to OEMs. Because this article is framed in the future tense, we will arbitrarily treat data base machines as a current market commodity.

There appear to be two general ways to implement a data base machine: extracted function and dedicated function.

An extracted-function data base machine is defined as a standard DBMS, such as Cincom Systems, Inc.'s Total or Software AG's Adabas, that is off-loaded into a general-purpose mini- or microcomputer. A dedicated-function data base machine is defined as a special piece of hardware specifically optimized to handle the functions of data base and disk management.

An example of an extracted-function data base machine (EF/DM) is Software AG's recently announced Adabas data base machine, which is marketed as a "back-end data base machine." The "machine" part is provided by a dedicated mini of unspecified ilk and vintage called the externally supported processor or, predictably, the ESP.

ESP is compatible with the IBM 360, 370 and 4300 and can even run DOS, OS and VM/370 operating systems to back up its hosts in a crisis. An ESP can support 1M to its host through a channel-to-channel communicating system (CTCS).

CTCS consists of a data base machine communications module (DMCM), which resides in the ESP, and a user machine communications module (UMCM), which resides in the host; both help optimize the channel transfer rate.

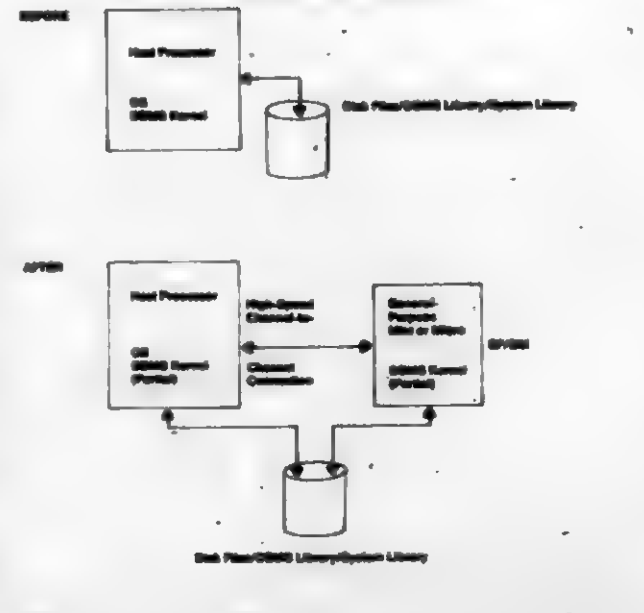
Most of the Adabas nucleus is off-loaded to the ESP, where all updates, deletions, additions and disk management operations are handled independent of the host. Applications programs executing in the hosts call needed portions of Adabas through the CTCS interface. The programs are, in turn, translated and sent to the ESP for data base-related processing. One host can support multiple Adabas machines, and one Adabas machine can support multiple hosts.

Software AG claims that 60% to 70% of Adabas CPU time can be off-loaded from the host; tests conducted by the company have reportedly demonstrated a 25% average increase in throughput for an off-loaded Adabas vs. a host-resident Adabas running the same jobs. The purchase price of the Adabas data base machine is approximately $400,000.

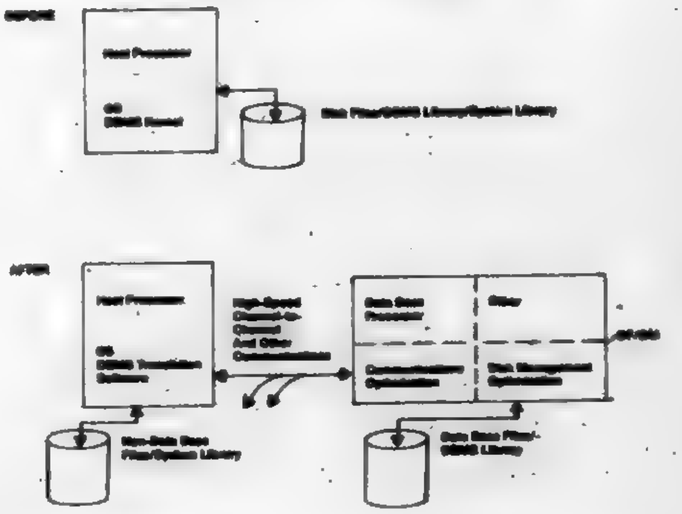
An example of a dedicated-function data base machine (DF/DM) is a device an-

(Continued on Page 10)

General Architecture of an Extracted-Function Data Base Machine (EF/DM)



General Architecture of a Dedicated-Function Data Base Machine (DF/DM)



Rauzino is senior editor/analyst of Data Decisions, Inc. in Cherry Hill, N.J.

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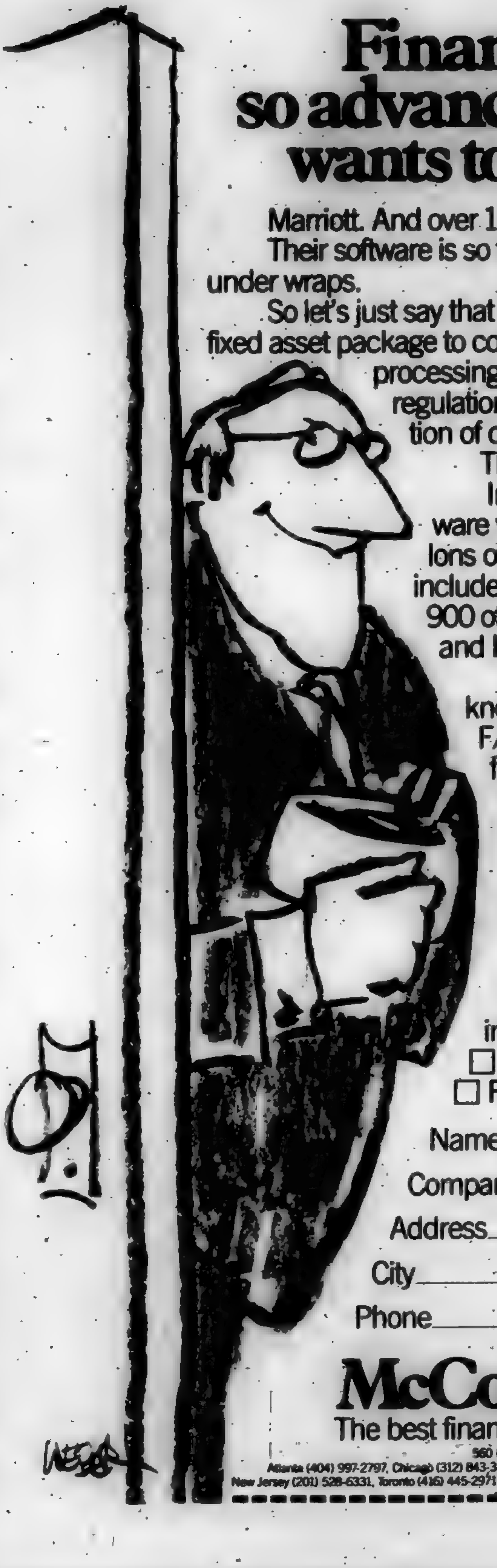

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FORECAST '81

(Continued from Page 8)

nounced by Britton-Lee, Inc. of Los Gatos, Calif., and scheduled for delivery in December 1980. It is called the Intelligent Database Machine (IDM) 500 and is offered only to OEMs. The data base and machine components of the IDM 500 are both highly innovative and incorporate many state-of-the-art data base techniques that thus far have only been talked about in the journals and at conferences.

The IDM 500 DBMS is one of the earliest commercially available completely relational data bases. It supports a file structure of relations (tables) in third-normal form (no repeating groups and no full or transitional dependencies). Logical views into the relational files are supported by B-trees (balanced-index hierarchies) and an integrated dictionary.

It is manipulated through a single language interface that includes all the functions of a data description language, a data manipulating language and a query language. Up to 32,000 relations can be handled within a maximum disk volume of 32G bytes. The maximum size of a relation is 2 billion 2,000-byte tuples (rows) and 250 domains (columns).

The IDM intelligent data base language (IDL) is a derivative of Quel, developed at the University of California, and of SQL2, developed by IBM for its fabled "System R." SQL2 is also the language used with Oracle, which is the first commercially available fully relational DBMS software package.

The machine portion of the IDM 500 is variously configurable. The minimum configuration consists of a specially designed data base processor with 256K bytes of random-access memory (RAM); one special asynchronous I/O channel that can handle up to eight terminals at speeds up to 19.2K bit/sec or one byte-parallel channel that operates at a rate of up to 250K bit/sec; and one 4-drive disk controller.

The maximum configuration supports up to 3M bytes (12 256K-byte boards) of RAM, up to eight mix-or-match serial/parallel I/O channels and up to four 4-drive disk controllers — and a most interesting option, a 10 million instruction per second (Mips) auxiliary Schottky transistor-to-transistor (TTL) pipelined processor called a data base accelerator. Britton-Lee claims a standard rate of 2- to 5 transaction/sec and an impressive 20- to 25 transaction/sec with the data base accelerator in place.

To round out the general picture of the IDM 500, it supports one clustering index per relation, up to 255 nonclustering indexes per relations and up to 15 domains (keys) per index. One IDM can handle up to 50 separately defined data bases within the maximally defined disk volume, and the IDM 500 was designed for multithread operation.

The minimum IDM 500 configuration sells to OEMs for $50,000 each or $27,000 in quantities of 128 or more. A fully configured IDM 500 can cost more than $150,000, with a variable option-dependent discount schedule for quantity purchases.

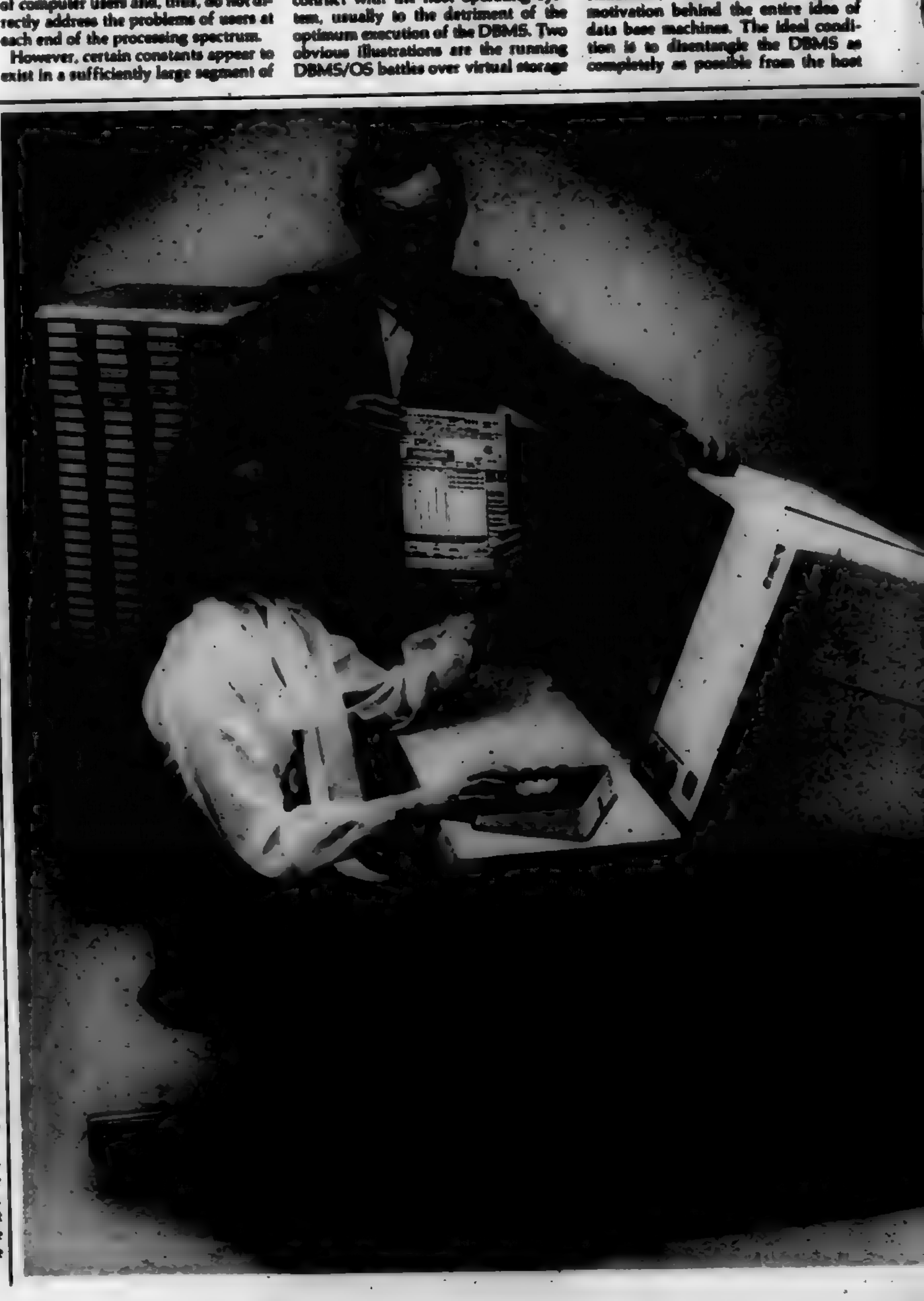
The preceding two examples of currently marketed data base machines are representative of the EF/DM and DF/DM models postulated earlier as the two mainstreams of data base machine architecture. But they are certainly not definitive examples of their respective genres, nor are they necessarily the only possible architectures for data base machines. They are aimed at approximately the mid-range of computer users and, thus, do not directly address the problems of users at each end of the processing spectrum.

However, certain constants appear to exist in a sufficiently large segment of the processing domain to warrant some generalizations on the criteria of the "ideal" data base machine. These criteria will be discussed in the following and will then be compared with the Adabas and IDM models to assess the actual fit of each model to the theoretical ideal.

Relationship to Host Operating Systems: DBMS programs, even the smaller ones, are inevitably in regular conflict with the host operating system, usually to the detriment of the optimum execution of the DBMS. Two obvious illustrations are the running DBMS/OS battles over virtual storage space and the physical placement of data on disk storage.

The conflicts result from the goal of an OS to share system resources among as many users as possible vs. the goal of a DBMS to linearize system data into modules that can be conveniently accessed by programs known to the data base.

The resulting tug of war is between the forces of generalization and specialization, which is the underlying motivation behind the entire idea of data base machines. The ideal condition is to disentangle the DBMS as completely as possible from the host



FORECAST '81

OS and, further, to make it independent of any specific operating system.

Language Interface: Obviously, a DBMS cannot be completely excised from its host OS, but the extent of its connections to the host depends almost entirely on the nature of the command/response interface between the DBMS and the host OS.

The ideal interface is a relatively nonprocedural language that uses the host operating system as a simple translation conduit to the interpretive and compilation facilities of the DBMS.

Similarly, the response from the DBMS should be as close as possible to the requested result. The operating system should not have to deal with raw data from the data base.

Architecture and Function Optimization: The picture that emerges from the preceding two criteria is of a freestanding DBMS, complete with independent disk management, indexing, data dictionary, compiler/interpreter, logging/auditing and security facilities, all with very generalized software linkages back to the host and, ultimately, to the user.

Each portion of this freestanding model can now be selectively optimized to enhance the performance of the DBMS without worrying about the effects of the optimizations on the host operating systems. Some optimizations that suggest themselves follow:

(1) Design data base-specific processor to get rid of the unnecessary components of a general-purpose computer.

(2) Include self-contained RAM for the DBMS kernel and a buffer (cache) for the disk and the host.

(3). Translate all standard software (e.g., disk management) into microcode and augment the code execution through embedded microprocessors.

(4). Maintain independent and autonomous control over an assigned disk volume to implement best-case data distributing and accessing algorithms.

- **Communications:** The two major impediments to the development of data base machines have been the lack of effective nonprocedural languages to support the DBMS excision from the host OS and the relatively slow speeds of the disks and the data channels that connect the disks to the processing environment. Remote communications still present a difficult speed problem, but higher disk transfer and local communications rates, particularly channel-to-channel rates, now more than offset the cost of managing the communications.

The ideal data base machine should thus have a communications interface that matches and preferably exceeds the highest current channel transfer rates. Teleprocessing (TP) functions can still be deferred to the host's monitor, but independent TP control could certainly be a component of future distributed data base machines.

Adabas vs. IDM 500 Machines

According to the preceding criteria, the Adabas machine, which exemplifies the EF/DM approach, does not qualify as a data base machine.

Although Adabas now includes an optional query-type nonprocedural language called Natural, most programming interaction with Adabas still occurs through its three lower level standard procedural languages. The inverted-file nature of Adabas with its heavily indexed logical structure also requires an inordinate amount of attention from its host OS. Adabas is typically tailored to its host OS to optimize the OS interface and is thus moved farther away from the independent ideal.

The Adabas data base machine is basically a general-purpose mini, which immediately violates the spirit of Criterion 3, and very little of the Adabas software is optimized in the equivalent of microcode to internally accelerate any Adabas functions. The Adabas machine is, however, supplied with channel-to-channel communications enhancements to satisfy part of Criterion 4.

The net result is that part of the existing Adabas software is simply transferred from the host into an associated mini that can then execute certain Adabas programs concurrently rather than serially within the host OS context. In other words, Adabas is treated as a semiperipheral connected to a high-speed direct memory access (DMA) port, with part of the I/O control system resident in the peripheral.

The IDM 500 qualifies as a data base machine, but with certain distinct limitations.

The choice of a relational structure for the IDM 500 data files not only supports but actually encourages independence from the host because of the inherent simplicity of relational language command predicates. The IDM 500 data base processor is not a general-purpose device, but is de-

(Continued on Page 12)

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(Continued from Page 11)

signed specifically to handle only DBMS-type operations. The criterion for function optimization is amply satisfied by the optional 10 Mips data base accelerator. The internal buffer (cache) is designed as a flexible two-way bucket for host-disk transfers, and the communications ports are at least plentiful if not overwhelmingly fast.

The significant point of the IDM 500 is that the design is totally new, so that the intelligence in the system could be broken into pieces during the design phase and positioned for best leverage within the system. Thus, the burdensome task of disk management, such as retrieve, update and write, for example, is separated from the processing software to gain another level of concurrency with consequently better throughput efficiency.

The reader could at this point safely surmise that the DF/DM model in the IDM 500 mold gets our total vote of confidence for the data base machine of the '80s, and that reader would be correct as long as the entire decade is considered. Unfortunately for Britton-Lee and for others whom we are sure will soon follow, there are a few current and insistent problems that dampen our short-term enthusiasm for DF/DM devices.

OEM Service

The IDM 500 is sold as an OEM device because its beautifully independent qualities also make it impossible to talk to directly from any given operating system. Someone must tailor a machine-specific software interface to the IDM 500. This is an unfortunate gap, but it also represents an interesting opportunity for a whole new group of cottage-industry software houses.

A relational data base is probably the best, and perhaps the only, choice for a DF/DM device, but a relational file must be normalized before it can work. The normalization process is an arduous, wholly intellectual effort that must be done off-line by people. Very little machine help is currently available.

On the other hand, Adabas, Model 204 and a few of the other DBMS' accept relatively unstructured files that can be loaded onto disk in a few hours with very little massaging.

The trade-off is simple. A relational file, once normalized, is exceptionally easy to maintain under any circumstances though it may have required considerable manpower to normalize. An inverted file, such as Adabas, can become very difficult to maintain, particularly in a large, volatile environment, though it was probably extremely easy to load initially.

The normalization or file conversion problem will probably also effectively lock out DF/DM systems from existing data base users, particularly if Total, IDMS and the other established DBMS' are offered in EF/DM form in the manner of Adabas. Very few users will be willing to tamper with working files simply to gain a place in tomorrow's sun.

More likely, they will opt for an EF/-DM version of their existing DBMS, and we fully anticipate that the established vendors will offer liberal software-to-hardware trade-ins to discourage experimentation among their users.

The short-term future, to about 1983, for true data base machines, or DF/-DMs as we have defined them, will probably be muted for the reasons we have just discussed, but established vendors will not be able to maintain their holding pattern forever. They will have to compete very hard with the upcoming DF/DM vendors for each new data base installation.

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By Rita Shoor

RELATIONAL DATA BASE MANAGEMENT SYSTEMS: FACT AND FICTION

"Relational data base management system (DBMS)" joined "structured methodology," "programmer productivity" and "distributed processing" this year at the top of the information systems buzzword honor roll. And, you can expect to hear more about relational systems for the next few years. But what is the current form of the relational DBMS — if it truly exists — and what changes might be expected in the near future?

First, it might help to pin down what is meant by "relation." As is often the case with DP-related jargon, this is more easily requested than accomplished. A few years ago, no one had heard of the term, noted Ron Weeks, a product manager with Cincom Systems, Inc. "Now, you ask nine people [for a definition] and get 10 answers."

When in doubt, it is perhaps best to go to a recognized authority like James Martin.

He defined "relation" as "a flat file . . . a two-dimensional array of data elements . . . a file in normalized form." By implication, then, a relational data base is one that is made up of these data elements and a relational DBMS would be one that allows the user to recombine all of the elements in the data base to form different relations as required for its specific application.

Expressed another way, a relational expression is more like calculus — a "black-box operation" as opposed to the perhaps more familiar algebra that requires the student to perform all operations himself, Weeks pointed out.

In order to be considered relational, the DBMS should also be accessed through some sort of nonprocedural language, according to Eugene Wong, vice-president of Relational Technology, Inc. (RTI). This makes it possible to utilize the data without knowing how it is structured or organized.

Is there such a DBMS and what, if any, are the drawbacks to using it? The answers to these questions vary depending on who is asked — an unsurprising situation in high-technology and academic circles.

The issue has perhaps been confused because there was a period of time when several vendors used the term as an advertising ploy, according to Stephen Robinson, president of S.L. Robinson and Associates. These firms have since changed their advertising copy to include terms such as "relational-like" or "offering many of the features of (relational data bases)."

In any case, a look at three products announced in 1980 may give clues as to next year's data base releases.

Oracle made its debut from Relational Software, Inc. (RSI) in June [CW, June 30], and both RTI's Ingres DBMS and Computer Resources, Inc.'s (CRI) Relate/3000 were introduced in December [CW, Dec. 8, 15].

While all three vendors describe the packages as "relational," it is too early to obtain opinions from a statistically significant number of end users. However, a Cullinane Corp. representative described Ingres as a DBMS that might be considered relational several months before it was officially introduced. Versions of the Ingres system had been installed on Digital Equipment Corp. PDP-11s for several years by the time the DEC VAX-11 versions were announced this year.

It becomes apparent that some of the DBMS vendors — Cullinane developed and markets the Integrated Data Management System (IDMS) — are keeping tabs on changing DBMS concepts.

Contacted during a small telephone survey of Oracle users, Hank Rush, manager of data base support at Texas Eastern Corp., was asked whether Oracle was truly relational. He summed up the opinions expressed by most of the DBMS small user base with, "That depends on your definition of relational."

Ease of use for end users through user view formats, data representation in tabular format and nonprocedural supporting language were what Rush wanted. After an eight-week test period through a time-sharing service while waiting for VAX-11/780s to be delivered, Rush felt that Oracle would meet these criteria.

But, there may be some drawback to all three products. They have not been around long enough for users to judge their performance on large volumes of data. In fact, Oracle does not have a high-speed loader, according to an evaluation performed by DP consultant Stephen Wright [CW, Nov. 10]. This feature is required in order to process large amounts of information efficiently, he said.

It is also true that both the RSI and RTI products are currently tied to DEC gear and Relate/3000 only runs on the HP 3000 mini. Users with IBM and IBM-compatible mainframe operating systems will have to wait until at least one of these vendors announces a mainframe version of its DBMS. RSI had indicated that such an announcement was originally planned for this December, so it would be reasonable to assume that Oracle for IBM 360, 370, Series 30 and 4300 CPUs will arrive during 1981.

However, DBMS specialists agree that relational data bases probably will not be cost-effective for applications that require extremely large data files until a technological breakthrough — quite possibly involving hardware — takes place.

One problem arises when the logical table structures being touted as a selling point by the relational DBMS vendors are mapped on the physical computer files. Given current storage constraints, these structures are "useful as a starting point," but "don't lend themselves to very nice mappings right now," Robinson noted.

There is also difficulty with effective interfile communication, Robinson pointed out, which will only be solved for large files with some sort of breakthrough such as the development of associative memory. Interfile communication problems for any general-purpose relational DBMS disappear when small files are being processed, he explained. Small amounts of data allow one to read all of the files into core at the same time and communication problems are eliminated.

Robinson described it as associative memory and a Cullinane technical specialist called it "content addressable storage." Whatever its name, this type of memory has yet to be made available to commerical users, but is needed for efficient processing of relational data bases, according to the Cullinane spokesman. Until this concept becomes a reality, the technician has to design a system that allows duplicated keys to be hooked together in an inverted manner, he said. At that point, he essentially is working with an inverted list — something already offered by several mainframe DBMS vendors.

Once such a breakthrough is made, the trade-offs tied to a decision between DBMS structures might disappear, Robinson claimed. For example, an inverted list structure designed to be good for ad hoc inquiries is less efficient for update processing since indexes may have to be modified when an update takes place. Hierarchical structures make data modification easy, but ad hoc retrievals become more difficult.

Don't look for this memory breakthrough in 1981, though. Opinions vary among consultants, but several more years may pass before large corporations will be able to implement a relational DBMS for massive amounts of data.

Shoor is senior editor, software, at CW.

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FORECAST '81

By William F. Zachmann

SIX TECHNOLOGIES HOLD THE KEYS TO THE FUTURE OF COMPUTING

Suppose you were asked to take over the management of a large data center housed in a brand new building. All the most modern architectural conveniences would be available. A big budget would be at your disposal and a staff of experienced professionals. Just one small thing you ought to know, however . . . you are to use computers that are 20 to 25 years old. You can, of course, pick the ones you want. What is your preference? A Univac II perhaps? An IBM 650 or 709?

Absurd? Of course. Yet, the fundamental hardware and software architectures in place in nearly every large installation today are nearly of that vintage! True, the actual hardware implementations have changed a great deal over the past 20 to 25 years. But the architectures which are implemented in the newer and faster hardware have not.

Cobol and Fortran, for example, together account for some 65% to 70% of all programming done in large computer installations. Cobol dates from 1959 and the first Fortran manual was published in 1956. The basic Von-Neumann machine architecture has been with us even longer, and the specific architecture which accounts for more than 70% of all commercial use today (the IBM 360/370 architecture and instruction set and OS operating system) was developed in the early 1960s and introduced in 1964.

When you look at the way technological change occurs, you find it has some very interesting properties. Although it may appear, superficially, that technological innovation moves along gradual curvilinear paths, the underlying pattern is somewhat different. Technological innovation, at its core, has properties very similar to those found in the quantum states of subatomic particles: It moves discontinuously.

Just as an electron in an orbital shell of an atom tends to remain in a state of dynamic equilibrium until internal and external forces combine to move it across a quantum discontinuity to another, higher, energy state, so, too, does technology. Technology tends to progress along a fairly straight path until a combination of internal and external factors builds enough force to deflect it.

The internal factors which affect changes in technology include the available knowledge which accumulates in academic and other research environments, channels for the transfer of technology into applications environments and inherent gains available from the newer technologies. External factors include the economics of production for new technologies, marketplace characteristics, potential benefits from the introduction of new technologies, amount of investment in older technologies and the extent to which that investment has been depreciated.

The last major change in computer architecture and software came in the late 1950s and early 1960s. This coincides with the beginning of widespread acceptance and use of Cobol and Fortran as programming languages. The period is capped with the introduction, in 1964, of the IBM 360 architecture and the OS operating system. All developments in the marketplace since then have fundamentally remained within the framework laid down at that time. Introduction of virtual operating systems, faster and more dense logic and storage technology, and those operating system and software innovations which have achieved acceptance thus far have yet to venture outside that framework.

The most recently shipped IBM 3033 or 4300, or Amdahl Corp. V8, and even (so far, at least) the recently announced IBM 3081 and Amdahl 580, still offer no more than a proper superset of the architecture and basic instruction set of the first IBM 360s shipped over 15 years ago. We have come to take these fundamental hardware and software architectures so much for granted that we begin to operate on the hidden assumption that they are somehow fundamental to the use of computer technology. In fact, they are not.

While the last major change in computer and software architecture is now nearly two decades behind us, the next such major change will occur within the next three to five years. The impact of this change will be substantial and will catch many users and vendors very much by surprise. This will happen precisely because we have grown so accustomed to the current technologies and have come to believe that relatively minor technological innovations within the commonly accepted architectures are all that is possible.

The next half decade will see the introduction of radically new approaches, hardware and software, to the development of computer/communication systems which will render many of our assumptions obsolete and untenable. *The ability to cope with these changes will not be merely a matter of casual interest. It will be a major survival requirement for users and vendors alike over the next decade!*

Many of the individual elements of technology which will play a part in these changes have been known in academic and research circles for some time. What is more, the coming changes, though radical and fundamental, will hardly change things overnight. Ten years from now there will still be installations using Cobol and the 360/370 architecture. There are still installations today running 1401 emulation. But these will not be the leaders in their industries.

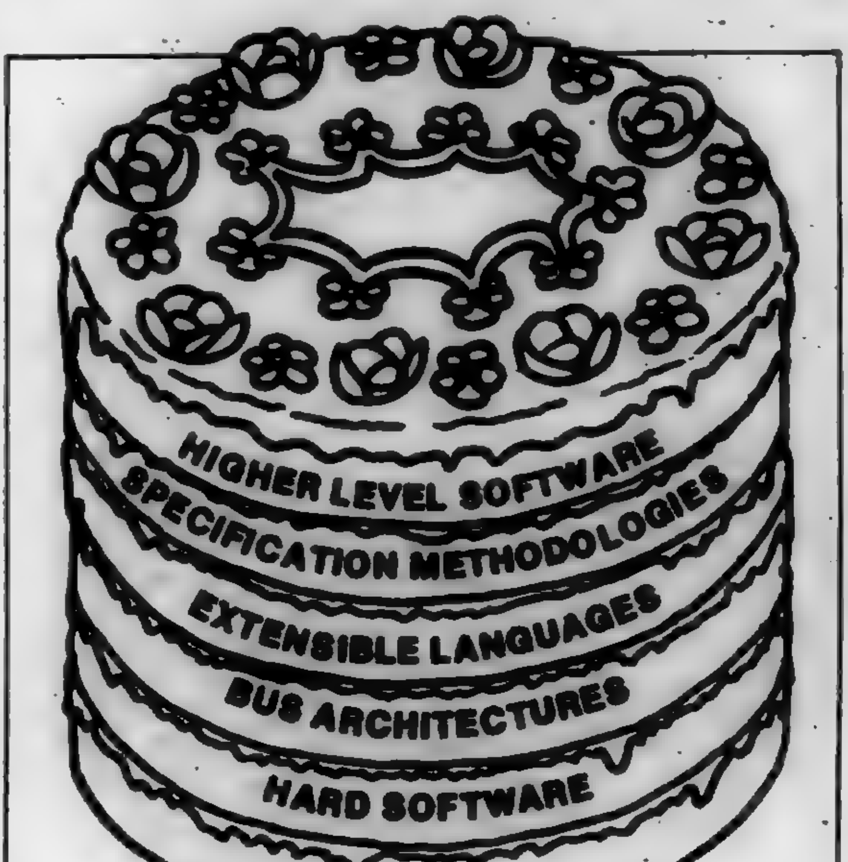
The next half decade will see the emergence of the technologies which will shape the use of computer/communication systems over the next two decades. During the latter half of the 1980s widespread acceptance and dissemination of the new technologies will occur.

Our recent research on the computer/communications industry has resulted in the identification of six key technology areas which we believe are critical areas to watch for indications of the direction the industry will go over the next few years. The six interrelated areas of technology are:

- Very large-scale integrated circuits (VLSI).
- Bus architectures.
- System specification methodologies.
- Extensible languages.
- Higher level software.
- Hard software.

VLSI provide the foundation for the changes in technology and system architectures which will come about in the next half decade. VLSI has been compared to the invention of the fractional horsepower motor in manufacturing, and quite rightly so. Prior to the invention of small motors which were cost-effective for manufacturing use, the machines in a factory were

(Continued on Page 16)



Zachmann is research director for the Information Systems Planning Service at International Data Corp. in Waltham, Mass.

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(Continued from Page 15)

typically driven by leather belts from large overhead shafts. The shafts were turned by a large central power source: a water wheel or a very large steam engine. This has a remarkably close analogy to the pattern of relatively "dumb" terminals serviced by a large central computer.

With the availability of economical fractional horsepower motors to drive machinery of all sizes, manufacturing became possible in increasingly flexible ways. Eventually, this led to the home tools with which we are all familiar: chain saws, electric drills, sanders and table saws. In addition, small motors made possible applications which the old factory belt drives could never have provided: electric kitchen appliances from the dish washer to the Cuisinart, toys and electric razors.

VLSI does for computing power very much the same thing which the fractional horsepower motor did for mechanical power: it makes it available in a cost-effective way in a variety of "sizes" which can provide computing power when and where it is needed. Already seen is the application of VLSI in automobiles, home appliances and games, as well as in the development of distributed resources computing systems. VLSI is having a broad range of impacts from business to home entertainment. Yet, thus far, we are only scratching the surface.

Just as the early motor cars were called "horseless carriages" and were built as if they were that, so the early use of VLSI tends to apply it according to older models of use. We are beginning, however, to see VLSI being applied in newer, more innovative ways. This will be a rapidly accelerating trend.

Functionality Issue

Increases in speed and circuit density and decreases in cost will, of course, continue. The real issue, however, increasingly becomes one of functionality, of what we wish to do with the technology. More and more we begin to see the problems of VLSI design as programming and applications problems. Rapid growth in the use of gate array chips highlights this. The gate array chip is essentially a "programmable" chip which allows the designer to "wire" the last layer or layers on a generalized gate array very much like we wired plug boards on IBM 401 accounting machines and EAM equipment 20 years ago.

Bus architectures, the second area of technology, refers to the growing implementation of system architectures in which hardware modules in a computer/communications system are linked together via standard interfaces on a common communications bus. Systems built in this way can be thought of as hardware counterparts of modularized structured software systems. Initially achieving widespread acceptance in the development of the internal architecture of minicomputer and microprocessor-based systems, bus architectures are now being increasingly used in the development of large scale computer systems.

The most exciting area of application, however, is in the development within the last decade of effective bus architectures for local area networks. Time division multiplexing (TDM) using carrier sense multiple access (CSMA) protocols on a local network bus can be expected to be a major growth area in the next few years. While much of this activity may be in the form of baseband systems such as Xerox Corp.'s Ethernet, we feel the most significant action will come in the use of broadband radio frequency (RF) modulated systems using community antenna television (CATV) coaxial bus architectures such as that developed by Mitre Corp. and those recently made available by vendors such as Amdax, Network Resources Corp. and Digital Communications Corp.

Ultimately these bus-based local area network systems will result in major changes in the way we design and develop operating systems as well as application systems. They will result in truly distributed systems in which there is no real hierarchy in the system (i.e., no single central computer or computer complex). This will also lead to much simpler communications implementations and less complex standards requirements than those implicit in protocols like X.25 or Systems Network Architecture (SNA).

Availability of VLSI components provides a key element in the implementation of bus architectures. Bus architectures, in turn, will require assistance from the third of our six key technologies: new system specification methodologies.

Strict Separation

We have been seeing a great deal of activity recently in attempts to develop methodologies for specifying large or complex systems. What is required here is a rigorous (possibly axiomatically based) system which permits a strict separation between the specification and the implementation of a system, is machine independent and allows the specification to be independent of hardware/software interface boundaries. Such a system would provide automatic static validation and verification of the specified system and ultimately will lead to automated implementation.

The typical system design cycle as traditionally followed (feasibility study, general design, functional design, detail design, code and test, install, maintain) does not sharply separate design from implementation. This is true even in the most advanced installations. It is still common for the individual who must finally sit down to write code for a module to find that he must resolve remaining design questions. Attempts to organize MIS divisions with separate groups for programming and for analysis regularly come to grief because of this problem.

Recent developments in this area, such as the Higher Order Software (HOS) methodology developed by Margaret Hamilton and Saydean Zeldin, are beginning to show real promise in solving some of these prob-

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lems. Along with work on systems such as Srem, PSL/PSA and Sadt, methodologies such as HOS can be expected to become available in usable forms over the next few years.

Alternative Languages

Closely related to these methodologies is renewed interest in alternatives to Cobol and Fortran for programming languages. We have been closely following the growing interest in Pascal and Ada in recent months. Ada, the newly developed language from the Department of Defense, represents a "top down" movement to bring in a new standard language for DOD applications. On the other hand, Pascal can be said to represent a "bottom up" movement where a very large number of students and micro computer users are learning to use and value Pascal. Both Pascal and Ada are in the Algol language family derived from the original Algol syntax. All offer inherent advantages for structured programming and are held by many experienced programmers to be greatly superior to Fortran and Cobol.

These are only the start, however. Much current interest also centers on languages such as Forth and C. The next few years will certainly see much discussion and ferment on the virtues of various languages. We will see significant growth in the use of newer languages at the expense of Cobol and Fortran.

It seems quite likely that additional languages will be developed and that they will go beyond the language features already available. In particular, we expect that truly extensible languages which are hierarchically composable and functional in architecture will eventually prevail both for commercial and scientific applications.

This means that extended functions will be maintained by the language facility itself rather than in external libraries and implies substantially different interfaces to operating systems than those common in the IBM OS/VS world today. We need to look to systems like UCSD Pascal and the Unix operating system to get an idea of what the newer operating systems will look like.

The newer extensible languages will also require very large address spaces in the hardware supporting them and will be capable of employing radically different I/O interfaces. More and more noticeable will be ways in which data which would have been handled by I/O to random access disk storage will begin to look like it is within the internal address space of the program or be accessed with high-level DBMS-like syntax. We will also see data flow computational model features allowing for multiple concurrent asynchronous processes and event-driven processes within the language syntax.

While new specifications methodologies and extensible languages will increasingly become part of the domain of the computer specialist, the fifth of our six key technologies, higher level software, will play a very important role in providing end users with powerful facilities for entering, manipulating, and accessing data. The higher level generalized software will grow out of present leading-edge data base management systems with powerful functionality in high-level syntax such as NCSS' or Nomad.

Internally, this software will be developed through the use of specification methodologies and extensible languages. Externally it will be linked with things like color graphics terminals and voice synthesis and recognition to provide user friendly facilities. It will also employ natural English syntax translators such as the Robot or Intellect system developed by Artificial Intelligence Corp.

In addition to providing a complementary alternative to the new system specification methodologies for end user access, this kind of software will allow widespread use of "breadboarding" for the development of ad hoc decision support systems and prototypes of operational systems for large systems. This, too, will require major changes in the way users interface with the operating systems on large machines and will be accompanied by highly automated facilities for managing structured collections of data.

Finally, the sixth of the key technologies, hard software, closes the loop that opened with VLSI. Hard software primarily refers to the increasing implementation of key software functions in hardware in the form of specialized VLSI chips. We are already seeing this in the various hardware assist options for key operating system functions from IBM and others. With the decreasing size and cost of circuits, hardware implementation of software functions becomes economically much more viable.

Highly modular designs for systems based upon bus architectures and extensible languages provide the environment in which frequently used modules can be implemented in hardware. This also extends to analog as well as to digital circuits.

Unfortunately it is not possible to discuss all the ramifications of these six key technologies in the space available here. They are not merely an arbitrary collection but represent six closely interrelated technologies which will have a crucial impact on the way computer/communications systems evolve over the next few years. By rearranging them (see figure) in the form of a six-layer cake, we can suggest the way each is founded upon and carries forward the impact of the others.

The present period is really the calm before the storm of technological change. It is characterized by a consensus opinion that is not expecting a big change. That opinion is wrong. We are about to enter the most exciting period of change since the first widespread use of computers. Users and vendors who are alert to the change have an unparalleled opportunity to move to the forefront.

For those prepared to meet the challenge of the new technologies head on, the 1980s promise to be an exciting era of constructive innovation of a kind seen only once every generation or two.

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FORECAST-'81

TELECOMMUNICATIONS OUTLOOK FOR '81: ANOTHER 'BELL BILL' IS ON THE WAY

By Phil Hirsch

WASHINGTON, D.C. – The big question facing the nation's telecommunications policymakers next year will be how to structure the Bell System so as to maintain the quality of present services while promoting technological innovation and competition. It is not exactly a new problem – some of the underlying conflicts go back to the 1950s. Despite the intervening years, neither Congress, the Federal Communications Commission (FCC), nor the courts have yet found a structure acceptable to the phone company and its adversaries.

It is likely, though, that a compromise of sorts will be hammered out during the coming year.

According to one observer here, the Reagan Administration will order the Justice Department to negotiate a settlement of its pending antitrust suit against AT&T. This rumor seems to have sprung from Reagan's comments opposing divestiture as a remedy for violations of the Sherman Act. Although he was referring to a pending Federal Trade Commission (FTC) suit against the nation's breakfast cereal makers, Reagan's statement has been interpreted to mean he opposes the Justice Department's efforts to dismember AT&T.

Even if such a settlement is negotiated in the coming year, AT&T's opponents almost certainly will appeal it to the U.S. Supreme Court – a move that probably would delay a final decision until 1982 or later.

Behind this negotiated settlement rumor is an unstated assumption: the new administration, because it is allegedly more partial to business interests than the Carter team was, will favor AT&T. However, some Bell antagonists are also members of the business community. They include Xerox, Corp., whose chief Washington attorney is Richard Wiley, one of the incoming president's key advisers. Another adviser is Walter Hinchman, former chief of the FCC Common Carrier bureau. He has been insisting for some time that divestiture offers the only real hope of making AT&T behave.

Another much discussed possibility is that in the coming year the Senate will pass a new communications act, which will allow AT&T to offer "enhanced," i.e., computer-based, online services on a deregulated basis through one or more separate subsidiaries.

AT&T favors such a scheme, as does Sen. Robert Packwood (R-Ore.), new chairman of the Senate Commerce Committee. Furthermore, Packwood said recently that he wants Congress, not the courts, to determine AT&T's corporate structure. If he really means it, a new communications act probably will have to be out of the Senate by this time next year because there is a good chance the Justice Department's antitrust suit against AT&T will be decided, at least initially, in 1982.

One way of estimating how quickly the next Congress can rewrite the Communications Act of 1934 is by looking at what happened in the last session.

Last summer, the Senate's proposed rewrite (S. 2827) died in committee because of a fight over language in section 205(b) allowing the FCC to restructure AT&T if the commission felt such a change was needed. The committee leadership – Sen. Ernest Hollings (D-S.C.) and Sen. Howard Cannon (D-Nev.) – refused to begin final markup unless the phone company withdrew its objection to this provision. Packwood, however, felt the markup should proceed despite Bell's objections.

"The committee members are capable of wrestling with these complex issues . . . I don't think this legislation should be fully orchestrated before the markup," he said.

Reportedly, it was not lack of faith in the committee's judgment that kept Hollings and Cannon from bringing the bill to a vote, but a much more prosaic consideration. "Packwood had the votes to kill section 205 (b)," said a knowledgeable source.

In the House, the same basic issue arose. The House Commerce Committee passed a bill (H.R. 6121) explicitly barring the FCC, in Section 219 (g), from changing AT&T's corporate structure. The House Judiciary Committee, however, blocked a final Floor vote because it felt the bill was "not acceptable" and there was not enough time left to make the needed changes. Significantly, one of the proposed amendments cited in the committee's report was a proposal to assert FCC authority over the internal relationships among AT&T's corporate components.

Although Republican representation on the Judiciary Committee will increase somewhat in the new Congress, the committee's views concerning telecommunications policy "aren't likely to change," according to a spokesman. Thus, even though Packwood's promotion to chairmanship of the Senate Commerce Committee removes one major obstacle that confronted AT&T in the last Congress, the other remains.

It would be a mistake, however, to conclude that the House Judiciary Committee's views, even if they are not likely to change, will not do so under any circumstances. Often things happen outside of Congress that cause a seemingly magic transformation of legislative perceptions, and that may be what is starting to occur in the case of the effort to rewrite the Communications Act of 1934.

AT&T recently announced, unofficially, that it will take the FCC's "final" computer inquiry decision to court. This refers specifically to the provision allowing the phone company to offer enhanced services through one or more deregulated subsidiaries.

Much of the opposition to the Second Computer Inquiry Decision is based on the argument that this "enhanced services" provision violates AT&T's 1956 consent decree. Basically, the decree says the phone company can offer only regulated communication services. Bell wants the court to endorse the commission's view, which says that allowing AT&T to offer enhanced services will not violate the decree because those services are "incidental to" presently regulated communication offerings (the decree specifically allows "incidental" services) and will remain "subject to" FCC regulation.

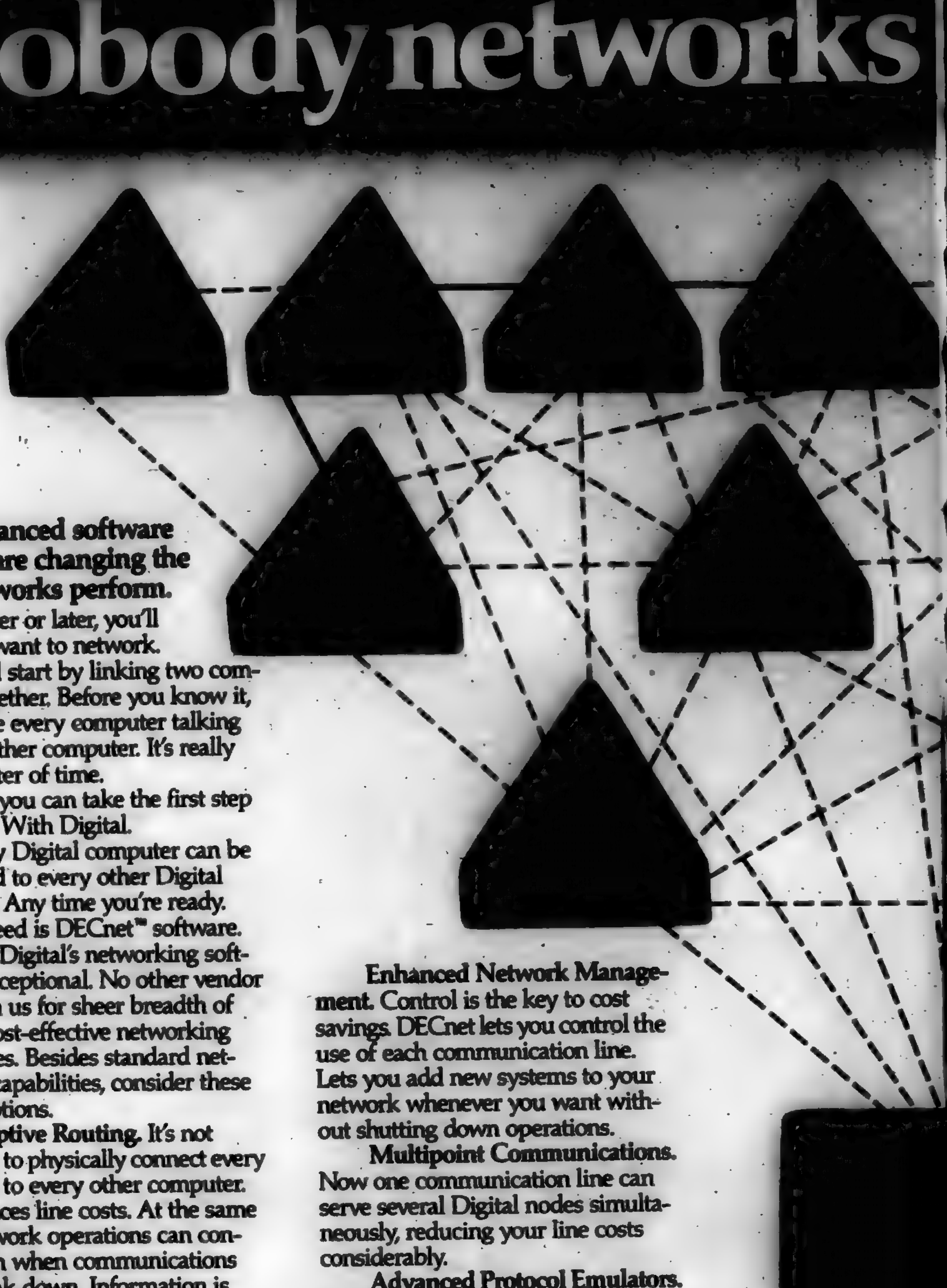
Several computer hardware/software vendors and their trade associations are in the forefront of those opposing the FCC's logic. Partly, this is because the argument implies the commission can regulate any enhanced service, including those offered by on-line service bureaus. Mostly, however, critics of the computer inquiry decision argue that the FCC has ignored the main purpose of the decree. The most concise statement of this latter point was made by the Computer & Communications Industry Association (CCIA) in one of the innumerable comments submitted to the commission during the inquiry.

Citing statements made by AT&T in 1958, two years after the consent decree was signed, and a more recent comment by the Justice Department to the House Commerce Committee, CCIA argued that both parties interpreted the decree to mean "AT&T would be confined to the regulated communications field, where its monopoly power could be regulated by

(Continued on Page 22)

Hirsch is senior writer, communications, at CW.

Nobody networks



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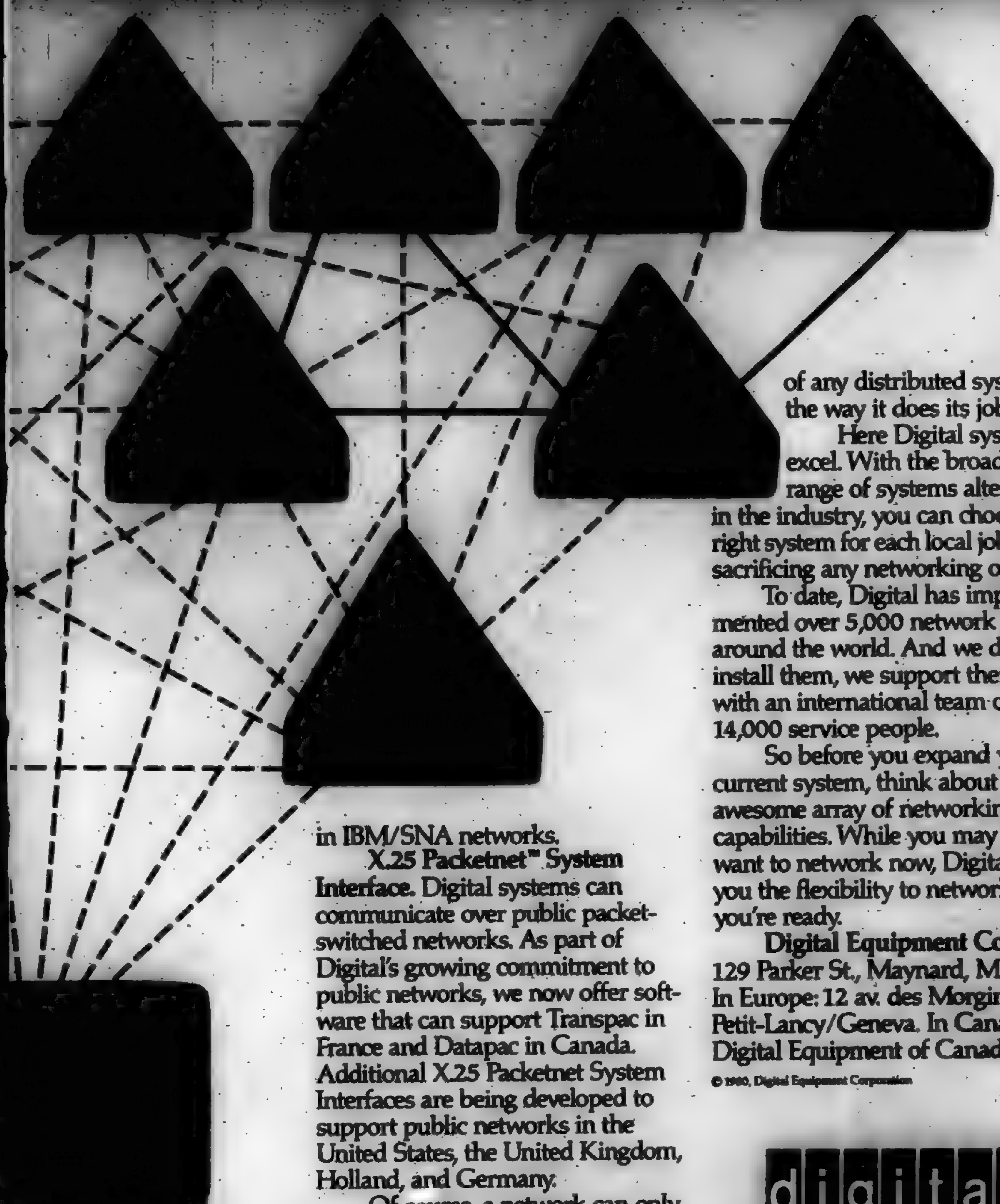

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(Continued from Page 19)

the commission.

"The Justice Department statement clearly reflects the rationale that AT&T was permitted to retain its vertically integrated structure on the basis of such restrictions; conversely, participation outside of its 'traditional arena' would be appropriate only if predicated on structural change . . . in the Bell System," i.e., establishment of Western Electric and Bell Labs as independent companies.

To suggest that the decree allows AT&T, as presently structured, to enter an "adjacent, unregulated market such as data processing," CCIA added, is contrary to the meaning of the decree as defined by AT&T and the Justice Department in the cited statements.

There is nothing particularly new about these objections. The quotes were taken from a statement CCIA submitted to the FCC last June, and even earlier expressions of the same basic idea are available. What makes the whole consent decree argument relevant for 1981 is the political change that has occurred in Congress together with AT&T's decision to seek the New Jersey federal district court's approval of the computer inquiry decision.

Major Obstacle

Now that Packwood is the new chairman of the Senate Commerce Committee, the only major obstacle preventing enactment of a communications act acceptable to AT&T is the House. More precisely, it is the House Judiciary Committee, since the House Commerce Committee, as indicated by the bill it passed in the last Congress (H.R. 6121), has already accepted the idea that separation rather than divestiture can adequately protect the phone company's competitors.

Reportedly, Rep. Tim Wirth (D-Colo.), the likely successor to Lionel Van Deerlin (D-Calif.) as chairman of the Commerce Committee's Communications Subcommittee, wants a "stronger" bill than last year's version. But among Wirth's constituents are several thousand members of the Communication Workers of America, which shares Bell's legislative views.

The judiciary committee is another matter. In the report it published shortly after blocking a final House vote on H.R. 6121 in the last session, the committee developed several paragraphs to a discussion of the consent decree.

"Antitrust settlements or agreements involving AT&T have been major watersheds in the company's history," said the committee. "The 1956 consent decree . . . [has] taken on even more significance because of the Bell System's decision to enter the data processing field."

There was "little disagreement" among the witnesses who appeared before the committee during its deliberations on H.R. 6121 concerning the impact of Section 218, the provision allowing AT&T to offer enhanced services and terminals on a deregulated basis through one or more separate subsidiaries. "Except for the testimony of the AT&T representative and the Assistant Secretary of Commerce [Henry Geller], the witnesses . . . expressed strong misgivings about . . . lifting . . . the . . . decree . . . Assistant Attorney General [Sanford] Litvack . . . was convinced . . . nothing had changed since 1956 to eliminate the anticompetitive incentives that underlay the decree. Since the decree was entered by a court, he preferred 'to see the court deal with [it].'"

This last statement suggests why AT&T has decided to ask the New Jersey federal district court to declare that the computer inquiry decision does not violate the consent decree. As a judiciary committee spokesman pointed out, if the court accepts the phone company's argument it would carry a "great deal of weight" with the committee. The implication is that a majority of the members would then agree that Bell can offer enhanced services on a deregulated basis through one or more seperate subsidiaries, thus clearing the way for passage of a new communications act acceptable to the phone company.

It is far from certain, of course, that the New Jersey court will agree with AT&T. Even if it does, CCIA and other opponents of the FCC/AT&T inter-

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pretation will appeal the decision. That may help rather than hinder Bell. If a final judicial decision is delayed, Congress probably will enact a new communications act before the verdict is in.

Packwood, as mentioned earlier, clearly wants Congress, not the courts, to resolve the structural question. At a recent press conference, after observing that he believes "a substantial portion of [the Bell System] can be split into separate subsidiaries," Packwood said he is "prepared to go ahead and introduce a bill early next year" if the Reagan Administration does not draft one of its own.

Later, an informed source said Packwood was not suggesting Congress should supersede or set aside a court decision specifying AT&T's corporate structure; rather, he wants Congress to decide the question before any court verdicts are announced.

It may be significant that news of AT&T's plan to seek judicial review of the computer inquiry decision surfaced immediately after Packwood's press conference.

All of this suggests that Bell's best strategy would be to present a convincing argument in the trial phase of the antitrust suit, scheduled to begin next month in Washington, and to ask for a hearing in New Jersey as soon as possible. If the company's lawyers are sufficiently persuasive in that forum as well, they should be able to convert at least some of the legislators who opposed last year's communications act rewrite.

AT&T Strategy

One argument Bell seems likely to make in New Jersey is that unless the consent decree is clarified, the phone company will be undertaking a substantial risk if it continues to market terminal equipment, and may decide not to do so as a result. The reason: The computer inquiry decision detariffs this equipment, and several critics, including the Justice Department, contend the consent decree prohibits Bell as well as its subsidiaries from offering terminal equipment on that basis.

The other main element of Bell's strategy is to delay final action in both court proceedings until Packwood and his associates can enact the kind of bill they seem to have in mind. If the legislation can be enacted first, it will indicate in unmistakable terms that Congress wants AT&T to offer enhanced services and terminal equipment on a deregulated basis, regardless of what the consent decree may say, and that it also does not want the Bell System broken up despite the Justice Department's contrary views.

Since Congress has been arguing about telecommunications policy for at least five years without accomplishing very much in terms of legislation, there is certainly a possibility it will not enact a bill soon enough to influence the court proceedings. But this may not be necessary. If the legislation gets through one chamber by this time next year, such as the Senate, Bell will probably gain valuable leverage. As a result, one of the key battles in the coming Congress is likely to be procedural. The phone company's opponents almost certainly will do whatever they can to prolong the committee debate.

While no one can predict at the moment whether the phone company's strategy will succeed, it appears that AT&T, because of what happened last November, is in a far better position than a year ago. It is also probable that AT&T has only a limited amount of time. There will be another election in 1982. Before then, though, the legality of the computer inquiry decision and the Justice Department's antitrust charges probably will be established. Any one of these developments could destroy the phone company's present advantage.

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IBM AFTER H

By Tom Henkel

By mid-decade, IBM will be well into the throes of perhaps the most extensive product realignment to hit the information processing industry.

The H series, believed by many to be the fourth generation of computers, will be fully unveiled. The Sierra line, supposedly the successor to the H series, will also have been announced. IBM's 4300 line will have been expanded to the limit, offering more models along with attached processor and multiprocessor versions. And IBM will already be working on a replacement for its 4300 — the Olympic series, according to Advanced Computer Techniques Corp.'s Bob Fertig.

Amid this product realignment, IBM must also deal with changes in the computer industry. Time-sharing will make another big push during the 1980s, possibly giving IBM its hottest competition in some time. Old faces like Xerox Corp. and Westinghouse Electric Co. will reappear on the computing scene along with some more familiar faces, like AT&T, to give the processing via communications links new life, according to ACT's president and chairman, Charlie Lecht.

Cryogenics will be the hottest technological prospect of the '80s, and IBM will be struggling to be the first to come out with a true Josephson Junction computer.

While Lecht claims IBM will have a commercial version of a Josephson Junction computer on the market by 1985, others say it will come later in the decade and it will be well into the 1990s before the new technology becomes commonplace.

During this time of development and turmoil, IBM will have to face the biggest challenge to its status as the Number 1 computer company — software compatibility. The 370-era software is dying. It was designed for computers that operate in the .5- to 1 million instructions per second (Mips) range. But IBM's recently announced 3081 processor is a 10-Mips machine, and some analysts predict the top of the Sierra line will be a 50 Mips machine. IBM is already having problems making its top-of-the-line MVS/SP operating keep up on the 10-Mips 3081.

To boost power, IBM has announced changes like global resource serialization and cross memory [CW, Nov. 17] along with some yet unspecified changes in MVS/SP Release 3. But some minor revisions to 370 software aren't good enough, said Ken Harvey, former IBMer-turned-consultant with Toronto's Art Benjamin Associates.

The problem with IBM's software is it can only access 16M bytes of addressable storage. To make any real headway in improving its software, IBM has to offer at least 32M bytes of addressable storage.

"I'm not saying there isn't a workable solution; it's just not a simple matter to achieve. It costs you money to see any magic show, and the more impressive the magic, the bigger the fee to sit and watch," Harvey said.

Extending the addressability to 32M bytes is not a big deal in terms of hardware, but some IBM software may be severly impacted, Harvey said.

"It's got serious architectural limitations to deal with the 1,000 Mips [machine]. I'm not worried about the 3081, but 10 years from now when we have two or three orders of magnitude faster processors dealing with 100 times as much on-line storage at one-tenth the cost, file access methods will become a major burden," Harvey said.

The most viable way to get around the compatibility problem, Harvey says, is to create a new VM environment and run MVS images under that.

"You can immunize a lot of incompatibility problems by leaving the things running directly under MVS the way they are. Then you can provide architectural extensions, managed by VM, as a resource manager," Harvey said.

IBM may be planning a step in that direction with its rumored revision of MVS, which Fertig calls MVS/E. Said to be ready for release on first shipments of the 3081, MVS/E will incorporate a new facility, a System Repository and Directory. This will act as a go-between for MVS and other IBM operating systems, like OS/VS1 and other subsystems like JES and IMS [CW, Dec. 1], ACT's Fertig predicted.

How IBM will solve the software compatibility problem is a subject of mutual interest to both IBM and users. Users are locked into 370-type software, just as IBM is locked into pleasing its users.

"The problem gets larger the longer IBM waits. It's not just the investment all the user community has made, but the dependency all IBM's software products have on a given hardware/-software assumption. Some of the products have been designed in such a way, either intentionally or otherwise, to be quite immune to major change. But a lot of them are so tightly ingrained (in the 370 era) they would need major surgery," according to Harvey.

The 370-era compatibility problem is deeply rooted in IBM hardware, too. Most analysts feel the latest 3081 processor is an appeasement to IBM's 3033 user base. Hence the processor — said to be the first model of the long-awaited H series — doesn't offer any new functions, or revolutionary advances in technology, according to ACT's Fertig.

Fertig contends IBM's next big line of processors, the Sierra series, will be much the same story in terms of 370-era appeasement as the H series — although he is quick to point out the true colors of the 3081 have yet to be revealed.

The first big test of IBM's answer to the compatibility problem will come in the H series native mode. The 3081 was announced as a big brother to the 3033, but both Fertig and Gartner Group analyst Tom Crotty agree IBM will announce a new native operating mode, and more functions with subsequent models.

"I think it's going to be more than a glorified 370," Crotty said, explaining IBM plans to use the 3081 "as a springboard to the future."

The first jump on the springboard will come in the first half of 1981, when IBM is expected to make a flurry of product announcements. Four new models of the H line, along with the somewhat mysterious native mode, and a 4341-2 AP will be announced, Crotty predicted. Fertig added IBM will also announce a high-speed tape storage unit to support the recently announced 3380 and 3375 disk drives. A front-end processor and a new 370X communications controller will be announced in the first three to six months of 1981.

When the first models of the H line are shipped, in early 1982, Fertig says IBM will also announce its much talked about relational data base, System R. While Fertig said that announcement will come as a big plus to the H series, it won't immediately kill IBM's IMS data base.

How will the users react to this flurry of announcements? Dr. Ulric Weil, vice-president of EDP research for Wall Street's Morgan Stanley, Inc., said they will probably take it all in stride.

Using the recent 3081 announcement as an example, Weil said IBM users will continue buying older IBM CPUs even when they know IBM will be announcing newer technology. This phenomenon was visible in a 3033 buying spree just prior to the 3081 announcement in November. Users seemed willing to purchase 3033s knowing IBM would soon cut prices in conjunction with the H announcement, he said.

Weil said IBM's pricing structure is also in a state of flux. The once-famous IBM price umbrella is gone, Weil said, adding IBM pricing used to be the most predictable around. Purchase prices on processors would remain steadfast until about three weeks prior to a new announcement. Then IBM would cut prices and stage a "fire sale" to make way for the replacement system orders.

Rent and lease prices too were very predictable. Prices remained virtually unchanged except for periodic 2% to 3% increases to offset higher maintenance costs, Weil said.

Now IBM has found frequent price changes can keep the plug-compatible manufacturer (PCM) competition off balance. Pointing to the 3033 line, Weil said IBM has made three purchase price cuts in the past year. It cut prices when it announced the 3033N, it made some back-door price cuts when it raised rental and lease prices in mid-1980 and it cut purchase prices again when it announced the 3081, Weil said.

The fluctuating pricing schedule will continue with the H series and future models, Weil said, theorizing IBM may be using the new pricing strategy as a defense against what seems to be a sag on the design and technology fronts.

But the price cut works well. When IBM cuts prices, the PCMs have to do the same. Price cuts come out of unit profits, and IBM has more profits to play with than the PCMs, Weil said.

Weil noted any loss in profits hurts, but it hurts the PCMs more. And price cuts coupled with technological advances hurt the PCMs even more.

ACT's Fertig disagrees with Weil's pricing philosophy. Fertig contends IBM will step back under the pricing umbrella and offer processors that can easily be enhanced to offer more power. In either case, the effect is the same: IBM seems to be determined to keep the PCMs off balance for the next decade.

Where IBM will turn for future revenues is unclear. There are several viable options, and IBM doesn't seem to be favoring one over the other.

ACT's Lecht said IBM's relationship with Satellite Business Systems (SBS) will be a key to what direction the firm will take.

IBM owns 47% of SBS, and Lecht pointed out that is more than IBM owns of IBM. That suggests IBM has a deep-seated interest in SBS — possibly as a long-haul communications supplier for a satellite-directed processing service. That would mean IBM plans to compete head to head with AT&T as well as some old computer companies, like Xerox and Westinghouse, that seem to find new life in the time-sharing business.

(Continued on Page 26)

Henkel is a staff writer at CW.

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IBM AFTER H

(Continued from Page 25)

the time-sharing business.

The satellite concept may not be all that far out. SBS just launched a satellite, and IBM seems to be the key beneficiary of it. Lecht says the two other principals in SBS, Aetna Life Insurance and Comsat General, could only make minimal use of the satellite.

"SBS can't make a move without IBM's consent," Lecht said, noting the strangle-hold interest in SBS suggests top IBM brass feel the subsidiary is vital to IBM's future.

Services Route

While most analysts agree IBM will eventually go the computer services route, exactly when is a big question. Gartner's Crotty said IBM won't offer computing services until it comes up with some way to secure data, whether through encryption or some other means. And the Gartner Group analyst couldn't hazard a guess on when that would be a reality.

Service bureau-type services may not be a panacea either. Big IBM users don't like the idea of losing control over their information processing systems, according to, Dave Smith, a consultant for Exxon Corp., one of IBM's biggest clients. Smith said Exxon has gone as far as to build its own power plants because it didn't like the quality of power supplied from public utilities. He also added Exxon wouldn't hesitate to maintain existing computers and possibly build its own large systems if IBM did not offer hardware and software.

Weil said that at least for the short term, IBM plans to stay in the hardware business. But Weil also predicted that by 1987 IBM will be making more money from non-hardware items, namely, software and maintenance, than it will on the actual hardware. IBM has said that switchover in primary revenue won't come this decade, but it didn't disagree with the premise, Weil noted.

Instead of getting out of the hardware business, as Lecht suggested, Weil said IBM would like to step up its production cycle of about five years, from design to finished product, to around three years. Weil said that's impossible in a bureaucracy the size of IBM. But, he added, four years is a possibility. That, accompanied by the aggressive pricing strategy IBM has used on the 3033 line, could severely impact the PCMs.

The PCMs don't seem to be worried — at least on the surface. F.T. White, president of Amdahl, Ltd. — the Canadian subsidiary of the U.S. Amdahl Corp. — said it may take Amdahl a year after the first customer shipments of the 3081 to meet some of the new functions IBM is expected to announce.

The PCM industry will be able to deal with H series changes the same way it dealt with "the microcode mirage" in the 4300 and 30 series systems, White added. But amid his confidence that the PCM industry can handle anything IBM can dish out, he also showed some intimidation. For example, he would not address IBM by name; he would only call it "the dominant supplier."

White said Amdahl plans to delve more deeply into the software business in hopes of cashing in on some areas where IBM is lacking.

"Software expertise offers the opportunity for both an offensive as well as defensive strategy to deal with the vagaries of the dominant supplier in the software area. As the dominant supplier looks increasingly to software as an additional revenue source, so must the PCMers," White said.

Weil said he may be right.

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2:45-6:00 — NASA TOUR
5:00-6:30 — [illegible] (Exhibit Hall By Invitation Only)
6:00-8:30 — RECEPTION AND DINNER San Jacinto Inn (Dutch Treat) for NASA Trip Attendees

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but only because IBM allows it. IBM's view of the PCM industry is a love-hate relationship. While IBM doesn't like losing revenue — several million dollars on large systems like the 3033 — IBM also needs the PCMs to produce in-between processors that eliminate what former Amdahl president Gene Amdahl calls "FUD" (fear, uncertainty and doubt) among IBM clients. Weil noted that while IBM may lose some business to PCMs like Amdahl, it has a long-term advantage in knowing those clients haven't become incompatible with IBM software, and they can come back at any time, if IBM were to announce a revolutionary processor or software.

Giant Step Ahead

For the present, IBM seems to be happy as long as it stays a giant step ahead of the PCMs in terms of profits. But to meet IBM's own growth goals, Weil said it will have to do much better in the future.

"IBM is on a treadmill. It must get more sales each year or net profits go flat," Weil said, citing IBM's poor net profit showing in 1979 as an example. He predicted 1981 will be a relatively flat year followed by a sharp jump in 1982 with volume shipments of the 3081.

For 3033 users, Weil's predictions are reasonably good news. That means a 3033 is worth about 60% of its original price from Nov. 12 (the day of the 3081 announcement) until volume shipments of that processor in 1982. Then the residual value will dip to 40% of the original purchase price. The bottom of the 3033 market will drop out when the Sierra line appears on the market, in 1985. At that time the residual value will drop to 10%, according to Weil.

As for expanding into other areas, IBM has some tough decisions to make, Weil said. Desktop computers offer the most promising market for the next few years. But IBM hasn't made a strong showing in that area yet, and Weil said it may be too late. Other vendors, like Wang Laboratories, Inc., may already have a stranglehold on that market. Office automation type products are also hot, but IBM has been lagging there too, Weil said.

Distributed Processing

In distributed processing, IBM's 8100 has so far been a disappointment, Weil said, adding the unit offers too little main memory. Gartner Group's Crotty, however, said the 8100 will be expanded sometime next year.

In peripherals, Harvey says IBM is making them too small to fit the larger systems. The newest disk drive from IBM, the 3380, is only 2.5 times as fast as the 3350, a disk drive designed for the 370/148, which is about one-tenth as fast as the 3081 processor. IBM has got to do better, Harvey said, or it will be faced with some real problems in the future.

Users "will be stifled by I/O contention. You have to move the data one level closer to the instructions when you take a tenfold jump in processing speed," he said. "What used to be acceptable in high-speed disks now needs to be in virtual storage. What used to be acceptable in virtual storage now can't tolerate paging, and it must be resident in real storage. And, what used to be acceptable in the ultra-high-speed buffer, now has to be part of the instruction itself," Harvey noted.

Whatever the solution, the upper bound of the information processing industry is facing a revolution. The old ways just won't work anymore, and users are looking to IBM for the answer. Whether IBM will be able to meet that challenge remains to be seen.

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COMPUTER GRAPHICS COMES OF AGE

Computer graphics is receiving more and more attention throughout the industry from both business and technical professionals. During the '70s computer graphics was generally found on large, expensive, often dedicated, systems and only very selectively on smaller, less expensive systems. The early '80s will produce a revolution in which computer graphics will come of age and be available at lower costs for a broad range of general business and technical users.

Display graphics will be widely available on hobby, professional, desktop and minicomputer terminals, either built-in or optionally available at a nominal cost. Graphics input and output peripherals will be available at a price/performance ratio commensurate with that of the computer — for example, $1,000 for small plotters linked to professional and home computers and $20,000 for large, drafting-quality plotters on minicomputers.

In order to understand the impact computer graphics will have on the way we do our work, it is important to understand the broad application areas to which it applies: data display graphics, real-time display graphics and design graphics.

- **Data display graphics** is characterized by the term "chart graphics," which is the display of business and technical data in the form of a graph to facilitate interpretation and analysis. The use of graphs provides an excellent means of presenting numerical information on trends and relationships in a concise visual format to allow quick comprehension. Data may be displayed on a video screen or CRT or on a variety of hard-copy devices such as X-Y plotters, dot matrix and line printers, as well as via photographic hard-copy devices.
- **Real-time display graphics** is characterized by "pictures," and is frequently associated with modeling and simulation. It can be useful in both business and technical applications, although more examples of technical applications can be found. Although it is sometimes similar to data display graphics, it is dynamic and produces a new graphics presentation as conditions change or new data is received. Examples include process monitoring, flight simulation and radar/sonar tracking.
- **Design graphics** can best be described as the conceptualization, design and dimensioning of objects. It frequently involves computer-aided design/computer-aided manufacture (CAD/CAM) applications and is generally found in large manufacturing companies. The large concentrations of design graphics applications are in the areas of electrical design, mechanical design and architectural design.

While the application areas in each of these graphics market segments are quite different, they have one common attribute: the beneficial effects of graphics on both business and technical productivity. The strong interdependence of graphics and productivity improvement will be a central focus throughout the early '80s, fueling the development of the automated office and automated factory.

The power of graphics to improve the human/computer interface has led to a great deal of interest throughout the computer industry. According to several industry and business journals, computer graphics is one of the fastest growing markets in the industry. The sale of all graphics peripherals, software and systems is estimated to exceed $1.5 billion in 1980. The market itself is growing at a rate of more than 25% per year.

The power of visual information has been recognized since cavemen began drawing pictures on cave walls. Confucius' famous statement about a picture being worth a thousand words is taking on a dramatic significance today, as modern research on information processing and the human brain shows that a single picture can sometimes convey more than 1,000 pages of written material.

While computers may be ideally suited for an alphanumeric interface, a study of neuropsychology by Marvin Patterson, engineering manager at Hewlett-Packard Co., indicated that the human brain may more effectively utilize a graphical format. The two distinctive cognitive modes of the brain — symbolic sequential mode and graphical parallel mode — process information differently and make widely varying uses of the visual channel capacity. The symbolic mode — verbal and written language functions, mathematical skills and other operations that involve logical manipulations and interpretation of symbols — makes minimal use of the visual channel capacity. The graphics mode — the ability to recognize scenes, visualize special information and recognize patterns or interre-

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Hamilton is marketing manager, Desktop Computer Division, and chairman of the Graphics Task Force at Hewlett-Packard Co.

FORECAST '81

By A. Peter Hamilton

lationships in graphical data — makes much better use of the visual channel capacity, allowing us to quickly ingest and analyze graphical data.

Research has shown, however, that an interface apparently exists between these two modes that may affect our interpretation of alphanumeric computer data. Once a mental visualization of a special object has been formed in our mind, for instance, reading a written description of that object can cause the visualization to be erased.

This may explain why we often find it so difficult to visualize trends, patterns and interrelationships when reading tabular, numeric data. Revealing the tabulated numbers to verify a possible pattern tends to further suppress any visualization that may have been formed. Presenting the same data in a line-graph format, however, makes trend and pattern information instantly understandable and sidesteps the interference problem.

It is the human ability to rapidly process visual information that makes graphics such an important computer interface, especially when the graphics system allows direct interaction with the computer. Interactive graphics allows computers to be used for determining the best presentation format for both business and technical data, as well as for specific design tasks, thus making it possible for the designer to visualize the format and then modify it. In business graphics, for example, a light pen or data tablet may be used interactively to develop the best presentation form — a bar chart, pie chart or trend graph — to emphasize the profile of the data in a form from which the reader can most easily extract the desired information.

Addition of the graphical data format for both input and output functions can provide major improvements in the efficiency of the human/computer interaction. An effective data format should make maximum use of the inherent data channels and mental processes.

The alphanumeric format, consisting of printed text or numeric tables, allows a data output rate of perhaps 30 word/min for a good typist and an input rate of about 200 to 350 word/min, with comprehension, for the average reader.

The estimated raw data capacity of the visual process is more than 40M word/min of information. Though alphanumerics may prove useful in some operations, this data display form uses only a small part of the visual channel's input capacity.

Any human problem-solving activity involves the need to analyze and communicate both symbolic and graphical data. The computer system that provides both data formats is better matched to the internal architecture and operation of the human brain than one that does not. In summary, then, computer graphics enhances the human/computer interface and speeds up the data comprehension process.

There are numerous graphics applications in business, but this article will discuss only three: decision support graphics, financial planning graphics and graphics presentations.

• **Decision support graphics.** Many companies are now finding that the periodic financial and operational data describing company or departmental performance can be more effectively and quickly presented via computer-generated graphics than tabular data.

Previously, information was presented as rows and columns of numbers in a stack of computer printouts. Occasionally, a manager might ask for a graph to be made, but this was infrequent because it had to be drawn manually or sent out to a commercial artist at considerable expense. Today, decision support graphics offers easy access to and analysis of data in just minutes. This method of management reporting and strategic analysis is becoming very popular because it allows executives to identify potential problems quickly without having to wade through volumes of numeric data and to perform calculations.

Decision support graphics allows managers to display data in the form most conducive to management requirements. It may, for instance, be used to show sales by sales region or by product type vs. quota. This allows management to quickly identify those regions that are over or under quota, or those that are successful with one product but not another. This data might be presented in bar-chart format, color-coded to highlight regional identity and product identity.

• **Financial planning graphics.** This form of graphics may involve econometric modeling, forecasting and historical data that can be displayed, manipulated and plotted to determine interdependence of variables. Better financial planning generally yields better financial results and graphics can greatly facilitate this process.

Financial planning graphics might be utilized to project product sales by year in a trend-graph form or order rate of change to show exceptionally fast or slow growth periods, or pie charts to indicate market share — perhaps in color to highlight the various competitors.

• **Graphics presentations.** This is the creation of visual presentations in a graphics form to aid the presenter in communicating to the audience. It may be by means of overhead transparencies or 35mm slides.

Graphics presentations can be created on a CRT terminal screen and interactively developed prior to being generated on a multicolor plotter, photographed by a variety of cameras directly from the CRT screen or copied via computer output cameras such as the Dunn or Matrix products.

It is important to realize that none of the above business applications requires a dedicated system to produce graphics output. In most cases, the existing computer system or a stand-alone terminal and hard-copy output device could produce the business graphics needed for decision support, financial planning or graphics presentation.

Small personal computers and desktop computers are also available with graphics capabilities for business applications. In some cases, the cost of these computers will be attractive for stand-alone, dedicated applications. In other cases, the cost will be such that graphics should be viewed simply as an integral part of a general-purpose processing capability.

Three of the most important technical applications in the use of graphics are process monitoring, measurement automation and CAD/CAM.

• **Process monitoring.** The importance of being able to display visually the process flow and to highlight the key elements in this flow has been recognized for some time. Graphics can increase the efficiency of monitoring and controlling process parameters by, for instance, highlighting over-limit conditions through video enhancements such as blinking. Graphics can be of enormous benefit in ensuring continuous operation of an expensive process facility and management of the process parameters for quality control.

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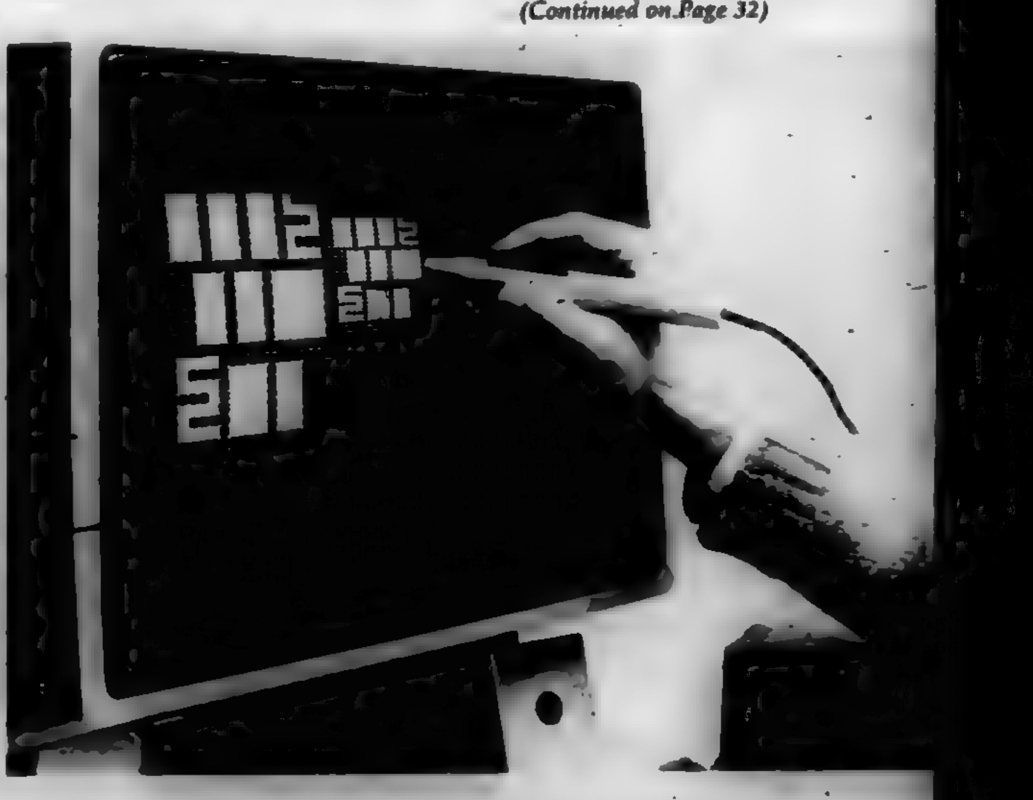

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• **Measurement automation.** Applications in this area include graphics display of a complex system being assembled or undergoing adjustment and calibration. In this example, graphics can highlight the area of the product to be adjusted, communicate with the operator and relate the step-by-step procedure as well as the current state of the adjustment relative to the correct set point. Automation of this type is found in aircraft and television assembly-test and a variety of other complex assemblies, as well as in the display of positional information in radar and sonar.

• **CAD/CAM.** Such applications, which involve conceptualization, design and dimensioning of an object interactively on a CRT terminal, require input devices such as light pens, data tablets and digitizers, and output devices such as plotters, printers and magnetic media.

An example of the use of CAD/CAM is the printed circuit (PC) board layouts required for electronic devices. PC boards may be designed on the CRT terminal, with components shown in the desired location and interconnections automatically routed for optimum circuit function and manufacturability.

In addition to full computer-aided design, sophisticated CAD/CAM systems are capable of performing design rule checks and providing machine-readable output suitable for manufacturing the finished PC board. This output is then utilized as input to the automated equipment to manufacture PC board blanks, drilling boards, performing the photolithography and even automating the loading of the components on the PC board.

Technical applications tend to demand more sophisticated and more expensive computer graphics capabilities than business applications. Dedicated CAD/CAM systems frequently cost $150,000 to $200,000. Although process monitoring systems are also frequently very expensive, the graphics display is a small part of this system cost. Process monitoring displays are available in the $2,000 to $3,000 range.

The cost of computer graphics is substantial, but without it many of the technical applications could either not be accomplished or would require highly skilled technical resources, a cost in labor that more than offsets the cost of the equipment.

State-of-the-Art Graphics

Graphics is virtually available on the entire range of computers, from personal and desktop computers to large mainframes. Graphics has perhaps had its greatest impact on the hobby computers, professional computers and desktop computers. Computers such as the Hewlett-Packard Co. HP 85, the Radio Shack TRS-80 and the Apple II, which range in price from less than $500 to $5,000, have provided computer graphics as an integral part of the system.

The user who in the past would have considered computer graphics beyond his or her budget and ability is given an opportunity to utilize graphics at a nominal incremental cost. These computers, programmed in Basic, emphasize a data display graphics capability and require minimal training to program.

Desktop computers such as the HP 9845 and the Tektronix Inc. 4050 have graphics built in. These systems, which cost from $5,000 to $25,000, provide sophisticated graphics for data display, real-time display and design. Desktop computers have displays from 12 in. to 19 in., pixel (smallest discernible picture element) resolution of 500 by 500 or 1,000 by 1,000 and are available in both monochromatic and color versions.

Graphics display speed becomes an important characteristic in these sys-

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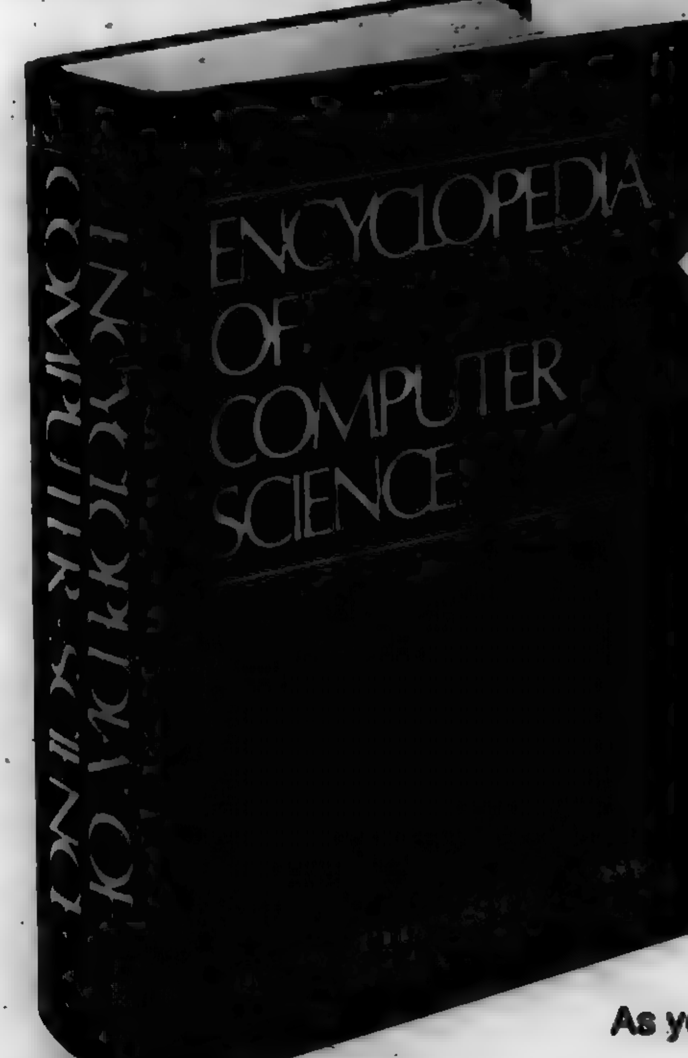

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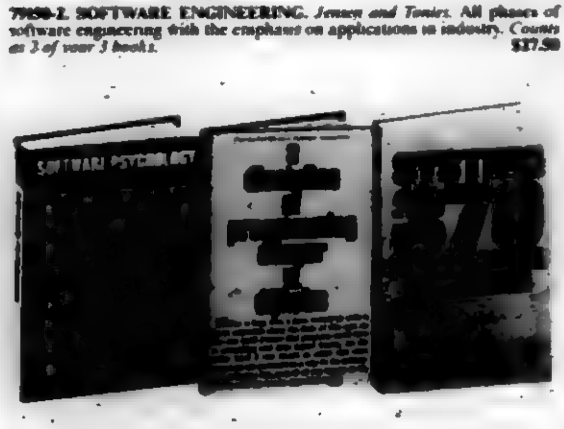

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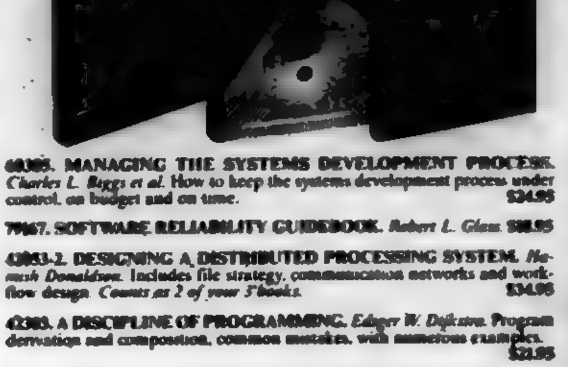

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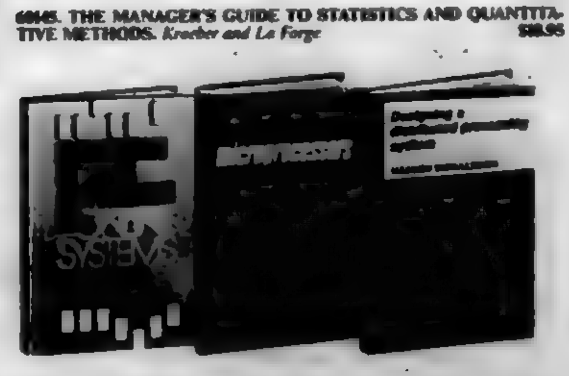

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tems. The ability to compute the direction, position and magnitude of the lines to create shapes requires a significant computational capability. And the ability to provide interactive graphics design requires high-performance displays capable of drawing 15,000 to 20,000 one-centimeter vector/sec. Display technology ranges from the direct view storage display with very high resolution and the lowest cost per pixel, to the more expensive raster displays that require memory for refreshing at 60 frame/sec and provide selective erase and the best interactive graphics capability with some sacrifice in resolution.

Broad Range

Users can choose from a broad range of terminals, some specialized for process monitoring or design graphics, from companies such as Ayden Controls, Inc., Evans and Sutherland Computer Corp., Sanders Associates, Inc., HP, Ramtek Corp., and Megatek Corp.

Many of these terminals have built-in microcomputers to handle display generation and manipulation. The terminals range in price from $2,000 to $50,000, and resolution varies from 500 by 500 to 2,000 by 2,000 pixels. The terminals generally use a high-level command language to facilitate the creation of the desired picture on the display and, in some cases, offer a full programming language such as Basic.

Typically, the terminals are dependent on a host computer for some significant portion of the application solution and can be characterized as either soft-copy output devices such as are found in process monitoring or interactive user interfaces as might be found in design engineering. Other devices include general-purpose business or technical terminals with an optional graphics capability.

Because an increasing number of computer users are aware of graphics as a powerful business and technical tool, most terminal vendors today are offering units with some graphics capability. The IBM 3279, for instance, offers high-quality alphanumeric and graphics and up to seven colors. Computer system vendors such as HP, Digital Equipment Corp. and the independent terminal manufacturers offer terminals with a wide variety of sophisticated graphics.

Historically, dedicated graphic systems have been very expensive and have been relegated to those tasks, such as CAD/CAM, that demand sophisticated computer graphics. The decreasing cost of computer hardware and the increasing availability of graphics on lower cost personal and desktop computers, however, have resulted in a number of dedicated systems for both business and technical applications.

Terminals connected to small minicomputers are capable of interactive business graphics, particularly in the decision support and financial planning areas. These systems range in price from around $5,000 to $70,000, depending upon software support and peripherals for graphics input and output.

I/O Devices

There are several important graphics input devices: light pens, which cost a few hundred dollars; data tablets, which cost $1,000 to $2,000; and digitizers, which range from $5,000 to $20,000. Each of these peripherals is designed for a particular type of graphics input: the light pen for picking and placing; the data tablet for drawing and digitizing where moderate resolution is acceptable; and the digitizer for precise digitizing of

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You'll find DPS 6 systems easy to install and easy to maintain. Best of all, they're so easy to expand you won't have to worry about growing too fast. Their built-in expansion capability means they'll keep on working – doing the future applications you haven't even dreamed of yet.

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Honeywell

(Continued from Page 36)

graphics images.

Graphics output devices include electrostatic printers, ink plotters and computer photographic camera units. Whereas electrostatic and photographic devices are best for dumping complex graphics images, plotters, which range in price from $1,000 to more than $20,000, are best for data display and drafting-quality drawings.

Since there is a wide range of graphics components to choose from, the key to success is matching your application to the specific capability you need, and, wherever possible, choosing components which have been integrated and tested as a system.

Software is another major ingredient of successful computer graphics. Software tools, developed to facilitate the display of data in the desired form, are often extensions to one of the computer programming languages such as Basic, Fortran and Cobol. In some cases, dedicated applications software is available. For example, HP's Decision Support Graphics for the HP 3000 system gives the user an opportunity to access and graphically display data in the system without developing specialized programs.

Product Trends

- **High-quality graphics displays.** The heart of a graphics system is the display unit. Although direct-view storage tubes and stroke refresh systems will continue to dominate applications that require fast, high-resolution random writing, raster scan or digital television systems will be increasing their share rapidly from 30% in 1980 to 75% in 1983. This trend will be fueled by the decreasing cost of refresh memory and the associated decreasing cost of the display, along with increased interactive capabilities and color options.

Color displays today offer from 8 to 256 pure colors. The low-cost color systems are based on commercial color TV displays while the high-performance wide-color-range displays are based on more expensive CRT technology. The choice of which color display is a matter of application and budget. Color is available for as little as $300 and as much as $30,000 extra.

High-quality graphics displays are becoming prevalent. A typical computer graphics display has twice the resolution of the home TV set. The 1,000 by 1,000 pixel displays and even some 2,000 by 2,000 pixel displays are becoming available and fit the requirements for real-time display and engineering design applications. Better resolution translates into smoother lines.

- **Increased user interaction.** System interactiveness will be increasing, particularly for business graphics. We will begin to see a broader range of low-cost graphics input devices and the appropriate software to support them. This will result in friendly, interactive access to business and technical information for data display. Light pens and data tablets will be in the forefront of this interactiveness. Graphics data base management, a tool that will prove valuable for creating and storing graphics images, is also on the horizon. Data base management systems today are designed to support the organization and retrieval of alphanumeric data, but will need enhancement to adequately support graphics images. Such systems will probably be available on the larger computers initially, and then transported in a more efficient subset form to the smaller computers.

Applications software will become more readily available for both business and technical users. Today's business graphics software is oriented toward graphics output. In the near future, we will be seeing software that will better support the users' thought process and enable communication with the computer in terms of shapes and surfaces rather than data points

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NCE UPON A TIME, in a kingdom far away, there lived a hard-working merchant.

Usually, the merchant was the merriest of men, happy with his calling and ready with a smile for everyone he met. This day, however, found him trembling in fear at the edge of the Great Unknown Forest, a sack slung over his shoulder. You can imagine how his heart jumped when a voice behind him asked, "What do you have in your sack, merchant"?

Spinning around, the merchant saw a tall figure, with a flowing white beard and robes, and eyes that shone with both wisdom and kindness. "I have notices to the people of the kingdom," blurted out the merchant, "telling of all the goods I'll have on my wagon when I come to visit them in the spring."

"But why are you taking them through the Great Unknown Forest?" asked the tall stranger. The merchant answered hurriedly, [illegible] King has made a Royal Proclamation. From no[illegible] notices to the kingdom will [illegible] to send, and they will [illegible] But [illegible] are brought to the Royal Post Office on the other side of the Great Unknown Forest. That's where I'm going now, Sire. But I'm very afraid, for everyone knows there are many fearful monsters there."

"You need not be afraid," said the white-haired stranger softly. "I am a Sage, wise in the ways of the Great Unknown Forest. I know how to cross the Forest safely, and I can unlock the great riches to be found there. Come, merchant, I will guide you."

The merchant learned much that day. He learned that the Nine-Digit Zip Code Monster, while indeed quite unnerving on first acquaintance, might not be quite the horrible creature so many people said he was. He learned that the terrible Postal Carrier Root Monster wasn't going to entangle him hopelessly, as many said it would. It just wanted to get his notices to the villagers faster than ever, and for 20% fewer pennies than before. Most important, the merchant learned that, whenever he faced new address-matching and geocoding problems, the Sage could show him how to turn those terrible-unknowns into profit-making opportunities.

From that day forward, the merchant was happy and prosperous. He married the king's beautiful daughter (didn't I mention her?), and they lived happily for quite a while.

FORECAST '81

and vectors.

The user interface will be greatly enhanced through specialized keyboards, as well as new input and output devices. Graphics hard copy, particularly as it relates to color, will see some progress. The cost and availability of photographic hard copy will be improved in the interim until ink and laser hard-copy output are practical and competitive.

The price/performance of graphics systems will continue to improve at a rate better than the 20% to 30% cost decline in the computer industry. The decreasing cost of memory, CRT terminals and specialized firmware and hardware to support graphics will all contribute to this decrease in overall system cost.

The graphics workstation, consisting of a variety of graphics components designed to solve a particular type of business or technical graphics application, will see increased prominence. As the hardware and software vendors better understand graphics applications, they will configure and support graphics systems or workstations that are essentially "turn on and start solving problems graphically" systems. Graphics workstations are available today that include a terminal or desktop computer, graphics input device and plotter or other hard-copy device, and which can function as stand-alone systems or can be connected to host computers for expanded graphics system capabilities.

For the most part, what is needed to further expand the use of computer graphics is not fundamentally new technology but rather a practical, cost-effective implementation of existing technology.

In the case of displays, for instance, the increasing volume requirement for high-performance, high-resolution color units will dramatically reduce their cost and increase their widespread availability. Ink-jet technology, driven by the demand to achieve lower cost in volume production where widespread use would be reasonable, is slowly making its entry into the computer graphics hard-copy arena. Memory prices are continuing to decline, which will directly benefit computer graphics applications because many of these are data base and memory intensive. Winchester disk technology is important for these same reasons, and high-density, lower cost disks are rapidly becoming available and will facilitate the growing demand for computer graphics. Specialized processors, graphics processors and other large-scale integration devices for enhancing the overall performance of computer graphics will receive a great deal of emphasis. I/O devices, based on laser technology, will permit real-time visualization of computer output as the input data is actually processed.

Perhaps the biggest single technological obstacle to the increased use of computer graphics is the lack of appropriate software engineering. Software developers and computer vendors are, however, increasing their effort to provide the basic tools necessary for faster programming of user applications incorporating graphics.

In short then, over the next year or two, we can look forward to an increasing use of computer graphics in both the business and technical areas. Supported by dramatic decreases in computer and graphics I/O costs and increasing productivity demands, computer graphics will offer users an easy-to-use, cost-effective interface to their computer applications. The end result will be a faster, more effective way of presenting, analyzing and understanding the data upon which both technical and business users depend.

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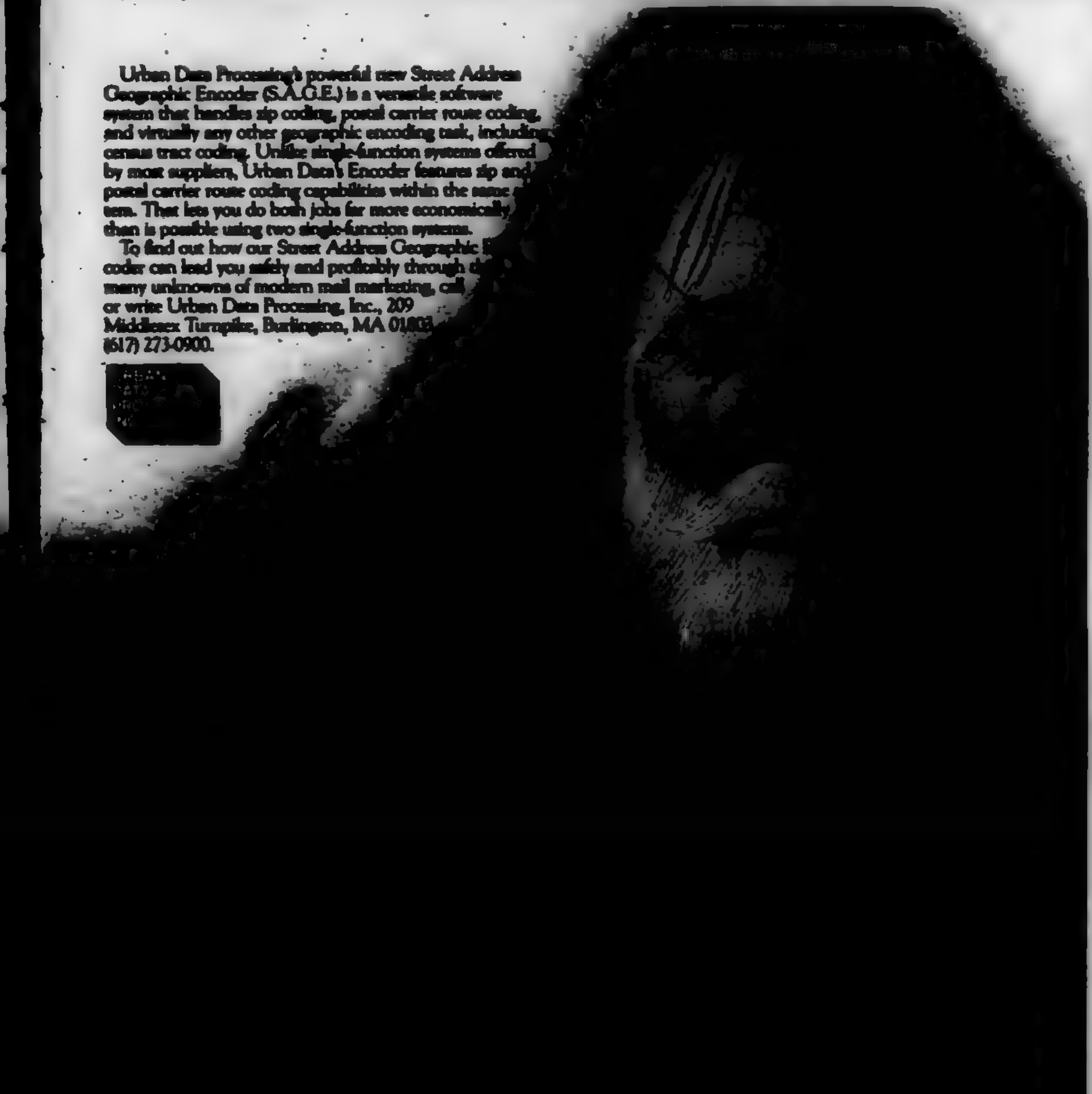

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FORECAST '81

By Ann Dooley

USER BUDGETS: UP, UP, UP

Overall Budget	Up 12%
Salaries	Up 13.1%
Communications:	
Line Charges	Up 28.4%
Terminals	Up 37.6%
Packaged Software:	
Systems and Utilities	Up 18%
Applications	Up 16.4%
Minicomputers	Up 25.6%
Mainframes	Up 11.6%
Peripherals	Up 12.2%
Maintenance	Up 8.4%

They're in charge of machines, but they worry about people.

Managers report an astounding 45.6% of data processing budgets is being swallowed up by employee salaries on the average — a figure that warrants concern. What's more, spending for salaries will rise another 13.1% during 1981.

Responding to *Computerworld's* annual budget survey, 45 top computer executives from around the country reported that spiraling people costs and retaining qualified people are their biggest headaches.

Overall, DP budgets are expected to rise an average 12% in 1981, the computer executives told CW. As many as 71.1% of the users in the survey are planning to increase their budgets next year, while 17.8% plan to hold budgets at 1980 spending levels. The remainder were either unclear or unsure of what their next year's budget increase would be.

But in almost all cases, the department heads indicated a cost consciousness that few in DP have had to contend with until recently.

Increased productivity was uppermost in the managers' minds, no matter how large of a budget increase was anticipated. Methods to achieve this varied among the respondents — some planned to hold the line on equipment purchases or employee hiring, while others plan to automate labor-intensive jobs more extensively or implement software packages aimed at increasing programmer productivity or moving work to the end-user departments (see story on Page 44).

As Willi Hartung, manager of information systems at Central Maine Power Co., stated, "Our main concern is to keep step with inflation by improving productivity without raising costs. More for less sums it up."

Labor-intensive areas of the budget like data entry are being sliced. On the average, user reported data entry spending will actually decrease next year by 1.5%. As many as 26.7% of the users surveyed are cutting their data entry spending, while 48.9% are planning to hold the line of spending in this age of inflation. Only 8.9% of the respondents will be increasing their data entry spending.

Most of the cuts are being accomplished by changing to on-line applications, adding terminals and dropping people and switching to a remote job entry environment, survey results showed.

Salary costs rose steadily among all the users surveyed, unlike some equipment categories which were affected by specific purchases of high-cost items.

The lowest salary apportionment was made by a Billings, Mont., DP director who allotted only 25% of his budget to salaries. At the highest point, salaries totaled 70% of the computer budget, for Donald Steel, director of information services at Tobin Packing Co., Albany, N.Y.

Nearly 60% of the users surveyed indicated salaries alone constituted more than half of their entire budget plans for next year. And one user who currently spends 35% of his budget on salaries plans to increase his salary allotment by 40% in 1981.

Most respondents plan to distribute the salary increases equally among all personnel categories. Of the 10 managers who indicated they were differentiating among the personnel types, programmers were seen to be receiving the highest raises, followed by systems analysts, managers, operators, and lastly, data entry personnel.

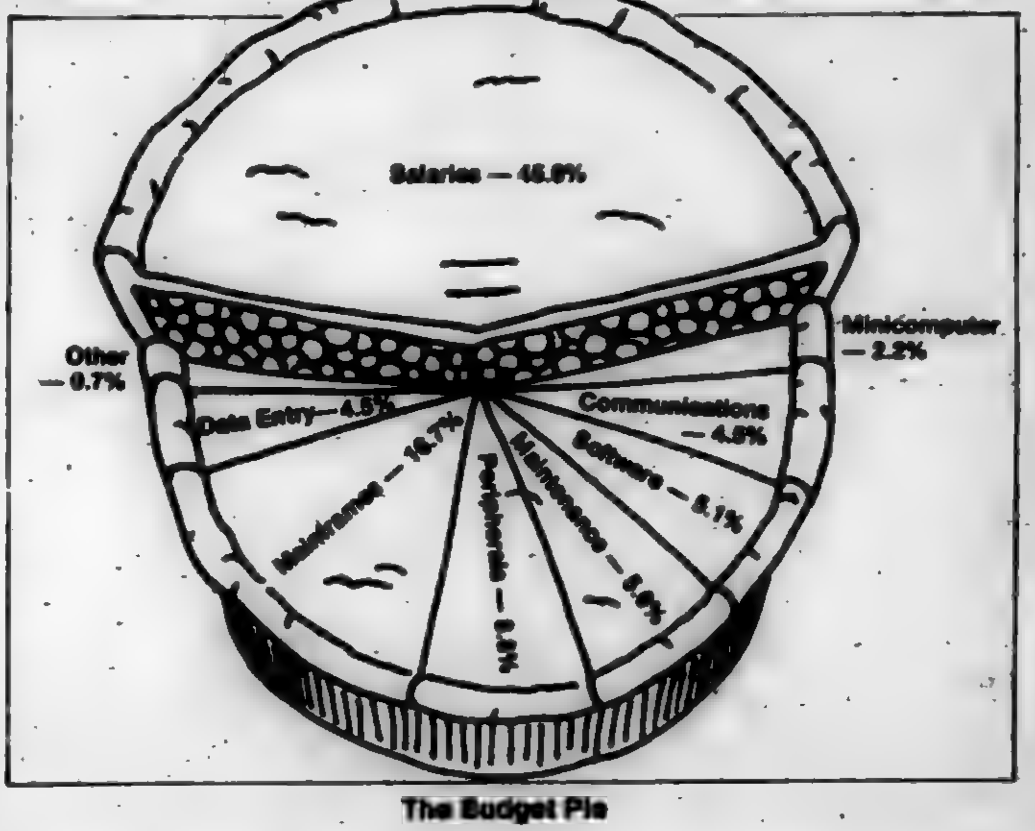
Surprisingly, more than half the managers do not plan to create new positions in their departments in 1981. Among 44 respondents, 54.5% have no plans to add new personnel, while 44.4% said they would add an average of seven new positions over the next 12-month period. Although many users plan on hiring four or five new people, one California clothing manufacturer plans to hire 50 new people as a result of new operations at his shop.

The new positions were overwhelmingly for systems analysts and programmers, although teleprocessing and operations positions were also in the offing.

Users reported that communications costs will increase more than any other budgetary item over the next year. Although communications comprises only a small portion of the overall budget, according to those surveyed, the high increases reported by the respondents for 1981 can frequently be attributed to specific purchases by individual users.

Communication line costs were reported to be rising 28.4% on the average and terminal costs will be increasing 37.6%, according to the survey

(Continued on Page 42)



The Budget Pie

The Computerworld annual budget survey was conducted by staff writers Ann Dooley, Bruce Hoard and Marguerite Zientara.

(Continued from Page 41)

results. This figure varied from a DP director in a western distribution firm who was reducing his communication costs by 40% next year, to a Washington state user who is increasing his costs by 200%. In his and in most other cases where high increases were reported, users indicated they were converting to on-line systems or distributed data processing (DDP) environments.

Software was another inflationary item in users' budget plans for 1981. When broken down by area, the survey showed that spending for systems and utilities packages will increase by 18%. Among those surveyed, 42.2% will be increasing their systems and utilities packages spending and 3.1% will be holding even.

Respondents reported an average 16.4% increase in spending for applications packages, and outlays for data base management systems — which drew a much smaller number of user responses — will increase an average of 6.2%.

Mini Outlays

Allotments for minicomputers will rise 25.6% in 1981, if the survey respondents utilizing minis are correct. Although a number of users are planning to obtain minis for the first time next year or will be expanding their usage, as many as 44% of those surveyed made either no significant use of minicomputers or had none at all.

The minis in use were reported to be functioning primarily in specific applications pertaining to an industry, such as electronic funds transfer applications in banks or instruction in schools. Other common uses included remote control processing, DDP, business functions, telecommunications and data entry.

In the system end of the budget, overall mainframe spending will increase 11.6%, according to the users surveyed. Approximately 44% will be increasing their mainframe expenditures in 1981, while 35.5% of the users plan to maintain spending at this year's levels and 8.8% reported cuts in spending. Those reporting reductions in mainframe costs attribute the phenomenon primarily to completion of equipment purchase.

IBM clearly came out ahead in mainframe selection for next year. Of the one-third who indicated they plan to purchase new systems, the most commonly mentioned purchase was an IBM 3033 (five purchases) followed by two purchases each of IBM's 3033N and 4341 systems and one IBM 370/148. Other mainframe purchases include a Hewlett-Packard Co. 300 system and a Burroughs Corp. B3700 and B3800 system.

In the area of peripherals, overall spending will increase by an average 12.2%. More than 42.2% of the respondents plan to maintain similar spending habits to 1980. Increases in spending for peripherals were indicated by 37.8% of the users while Cecil Patterson, director of systems and DP for the Port of Seattle, indicated he was decreasing his peripheral expenses. Patterson is also planning to decrease spending for systems and maintenance by implementing a distributed system.

An area that will experience a 7.8% average increase will be maintenance. Approximately 44% of the managers will be increasing their maintenance costs, 26.6% will stay at this year's level and 11.1% are planning to decrease their maintenance costs over the 12-month period.

Supplies — traditionally an area of cost contention among users — will again be going up, this time by an average of 8.4%, according to the computer executives polled. Citing paper and forms as the primary contributor to inflation, 60% of the users indicated their costs would be increasing in 1981. Nearly 25% report they will remain at 1980 spending levels for their supplies and 2.2% report they will be reducing their supply costs.

Those users who reported being able to hold level or reduce costs, most often attributed this achievement to "getting away from paper" by using more terminals and microfiche. Some plan to curtail their customized forms usage or switch to using both sides

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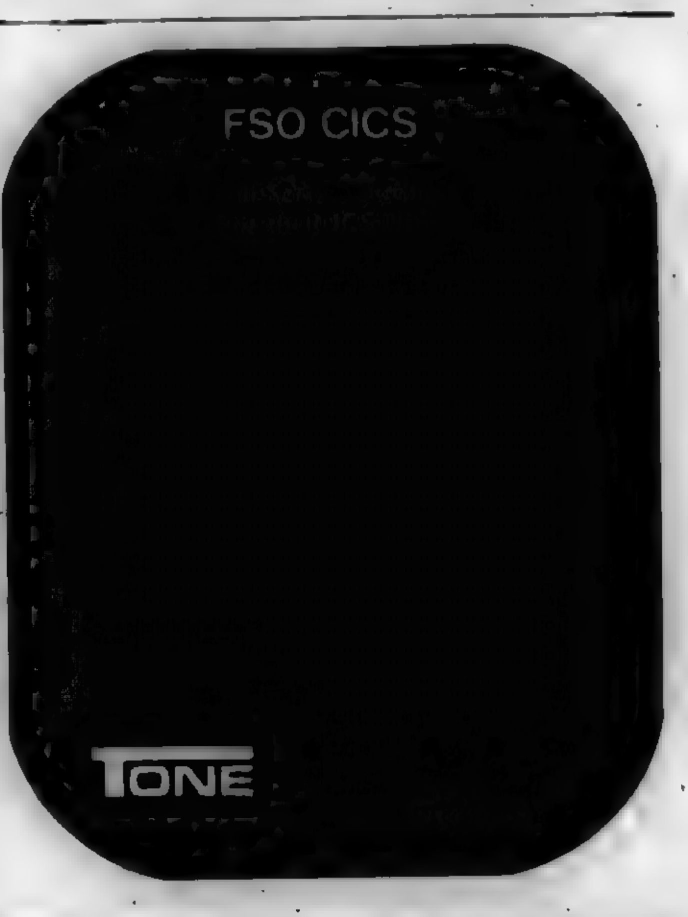

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of a form or adding to their lines-per-page ratio.

Although the managers polled did not predict salaries to be the highest rising cost in 1981, they ranked it as the most inflationary item in 1980. This may be a warning that keeping salary costs down may be an unrealistic expectation, given the anticipated rate of inflation and the need to remain competitive in the face of a high turnover rate expected throughout the year.

Departing from budget concerns, respondents mentioned some other worries for the upcoming year — and the Number 1 problem was retaining personnel (see story on Page 45).

System development and conversion problems and the ability to keep operations running was the second most mentioned concern among users. Long-range planning for system purchases, software applications and company growth paths were also ranked high by many of the executives. "We need to take time to plan our systems. We're running as fast as we can to fulfill user needs but we need an overall plan for the department and the company," one San Francisco bay area manufacturer's vice-president of information services stated.

Other concerns on the minds of users were programmer productivity, customer support, department reorganization, DDP implementations, holding down costs, work load and the availability of system uptime.

WP Function

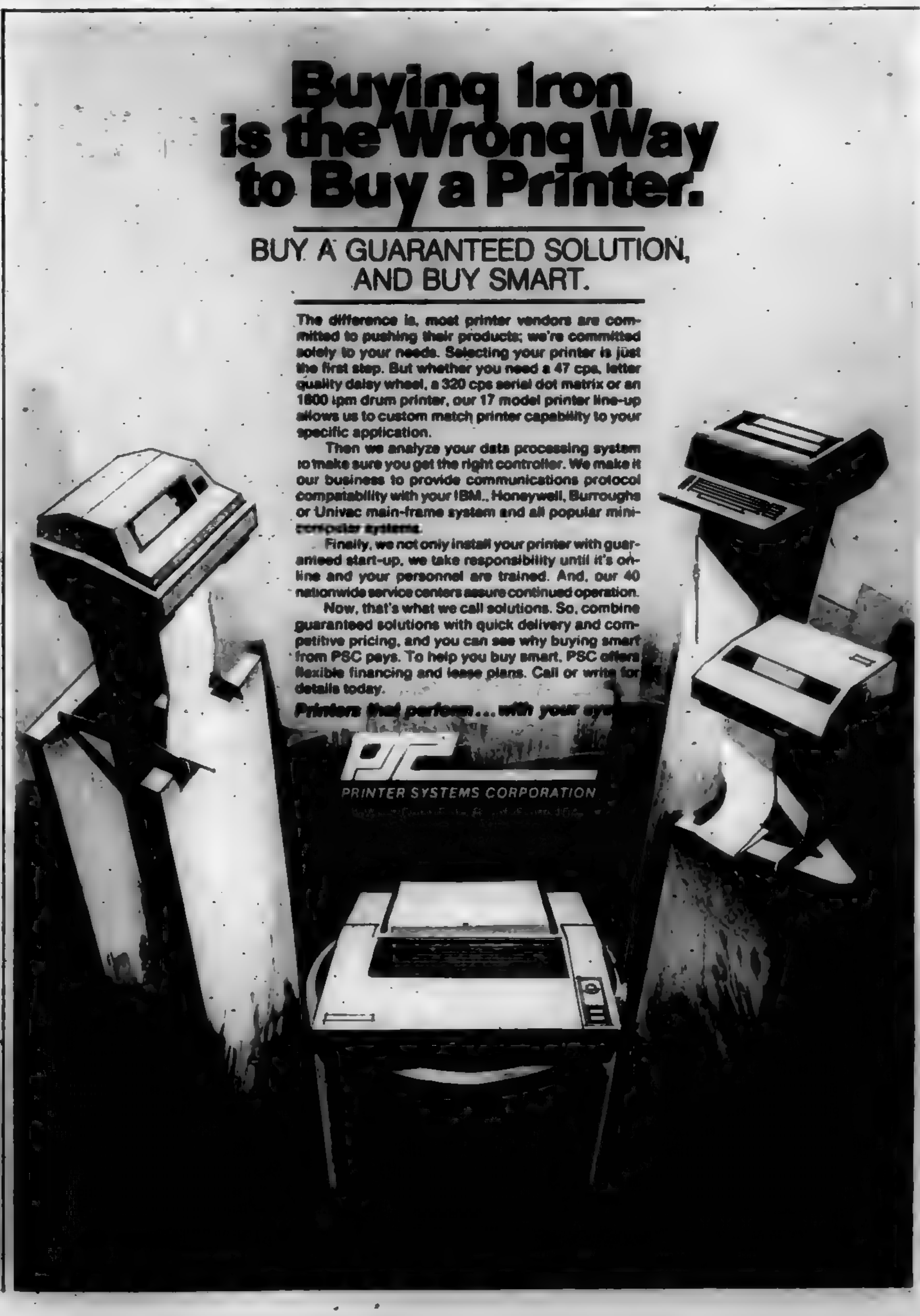
The computer executives reported that even though the word processing (WP) function in most companies was spread through several departments, the WP function came under the aegis of the data processing or information processing manager.

While 11.1% of the companies surveyed had no word processing system as yet, of those that do, 75.6% of the computer executives were either directly responsible for selecting WP equipment or instrumental in the decision. Only 13.3% of those with word processing in the company played no part in its selection, according to the survey.

In examining how their department's budgets related to the general economy, 60% of the respondents said they had been virtually unaffected by the recession. Only 28.8% said their departments' spending was affected. Of those, most cited delays or cuts in work projects as the result. Others indicated that their ordering patterns had been affected; they were forced to hold off buying new equipment or offer lower salary increases. But one happy vice-president at a Houston bank exclaimed, "No one knows there's a recession in Texas."

IBM proved to be the predominant vendor among the respondents with 71% using IBM mainframes.

The respondents worked in all parts of the country and represented a cross-section of shop sizes and a broad range of industries, including manufacturing, retail, service, educational and insurance. DP budgets ranged in size from $300,000 to $43 million among those surveyed.



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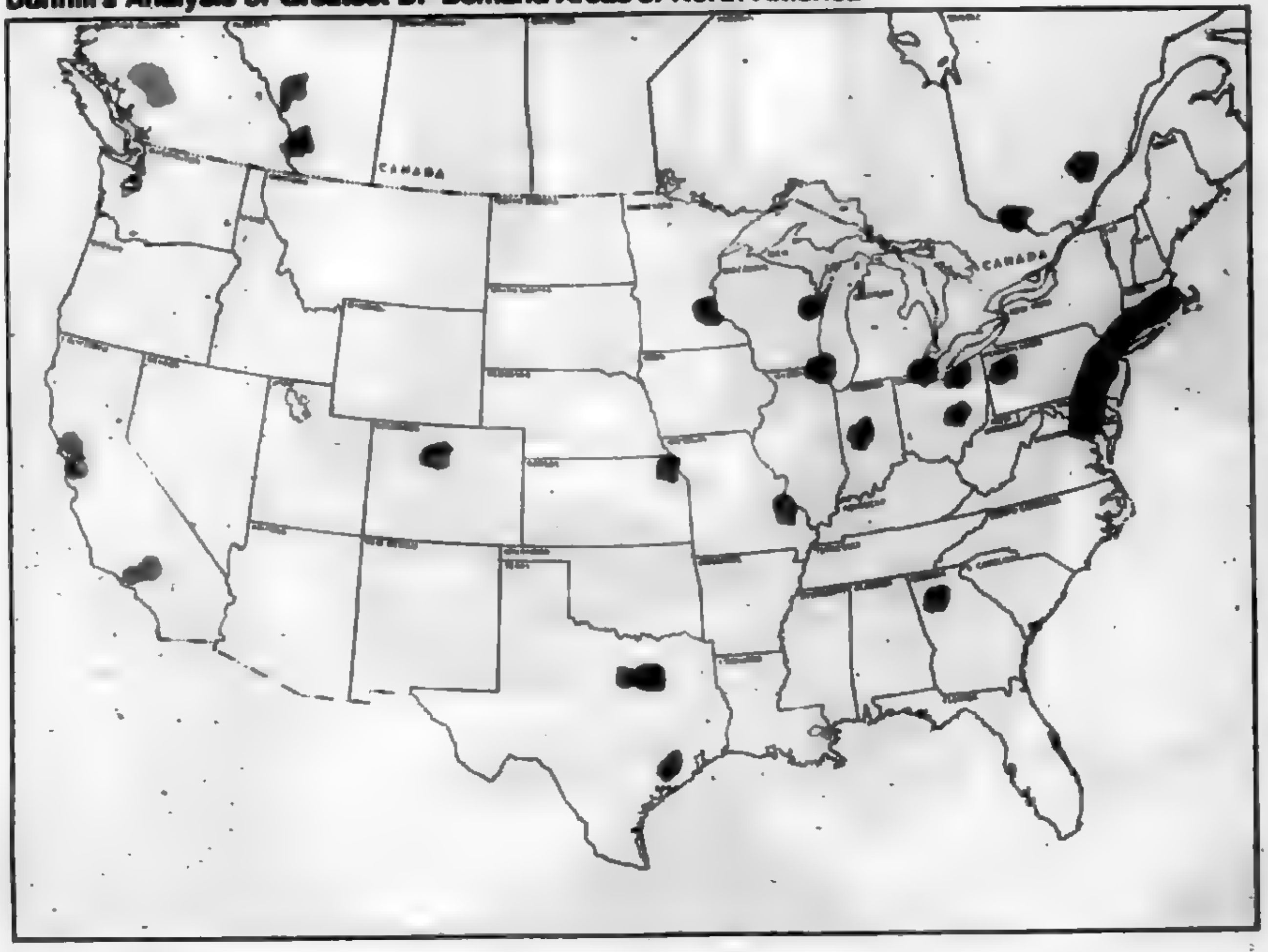
By Don DeCamp

EMPLOYMENT: THE '81 OUTLOOK

Dunhill's Analysis of Greatest DP Demand Areas of North America*



The employment forecast for computer-related professions should come as no surprise to anyone who has been keeping pace with the industry's outstanding growth and concomitant labor shortages. The prognosis is, simply, more of what we experienced in 1980.

There will be an ever-increasing demand for virtually anyone with any type of DP skill (despite the fact that serious inflation and a general business slowdown will force cutbacks in almost every other non-DP, white-collar job category). This demand will be coupled with an increasingly serious shortage of qualified, experienced DP personnel. The high demand/serious shortage complaint will be most acute for DP people with backgrounds in applications or software development.

What may come as a surprise to some are the figures. One government report estimates that during the next decade, personnel shortages within the industry as a whole will approach 20% compounded per year.

Readings taken throughout the industry by Dunhill/DP (a DP recruiting network in North America) indicate the possibility of a 20% shortfall for systems programmers during 1981 and a 40% shortfall for applications people. A nationwide survey Dunhill conducted this month among 20 top metro markets revealed that companies across the board plan to increase their hiring in 1981 by anywhere from 10% to 40%.

U.S. Department of Labor statistics confirm the serious nature of the shortages. Jobs for computer professionals are expected to increase nearly 84% by 1990, more than four times the projected rate of growth for all occupations in the country.

The Labor Department projects that there will be a 154% increase in jobs for computer service technicians, 119% for systems analysts, 116% for computer and peripheral operators and 102% for programmers. Only jobs for keypunch operators are expected to decrease by 16%, and this decline is really attributable to technological advances.

Perhaps the most interesting aspect of these Labor Department projections is that they fail to forecast employment trends for any computer-related job categories other than the ones mentioned above. Extrapolating from the 1970 census, there was no way of predicting the tremendous variety of DP job categories that would be created by the incipient technological revolution.

The past few years have seen the emergence of an era of processed information whose ultimate course has not yet been charted. Computers literally interface with almost every aspect of business, industry and government and are beginning to have a profound impact on individuals as well.

As a result, job descriptions unheard of in 1970 have become commonplace in 10 short years.

But if the Information Age was in its infancy in 1970, by 1980 the levels of technology and capability have become so sophisticated that user demands for the byproducts of this revolution far surpass the industry's resources to meet them. This intensifying user demand is one of the key reasons for the industry's current personnel shortages. Major institutions such as banks and insurance companies have traditionally been large consumers of computer technology, but there has been a recent rapid increase in the number and availability of small business systems whose future impact and potential effects on the country's economic development are just now being realized.

The development of prepackaged or mass-market-type programs that can be customized to meet specific in-house needs are creating new applications for computer technology at an astounding rate. By 1990, automated offices and offices connected by complex computer-controlled telecommunications networks will be commonplace. Home computers will create another strong user demand area over the next few years.

Proliferating user demand explains why the most serious current need for DP professionals lies in the applications end of the industry. Companies across North America report that the shortages that most paralyze their ability to harness computer technology are for applications programmers, programmer analysts and systems analysts, particularly those with between three and five years of experience.

Many executives have said that they have committed time, resources and large sums of money to projects that must be brought to completion, but which are currently stymied for lack of an adequate work force. In the past, these managers would have relied on new technology to compensate for limited staff. This may not be the case in 1981, when we may see fewer major technological developments on the horizon to relieve the pressures created by personnel shortages. In most companies, seven people will be doing the work of 10.

There is an equally serious shortage of technical support people. This technical shortage has been caused in part by newly created positions, but also by the rapidly increasing number of small systems houses and software suppliers, which are attracting some of the most experienced and innovative talent in the industry. Many DP professionals said that the opportunity for personal development and for keeping knowledge at the state of the art are far greater within a small systems house than a large company. A common problem for the highly motivated DP professional who participates in the implementation of a system on the corporate level, is that, once the system has been established, maintenance is often routine. At this point, with so many other opportunities available, many professionals opt for a more challenging position elsewhere.

The professional shortage is compounded by several factors. Universities are not graduating enough new talent and educators are not encouraged to remain within the university environment since they can often earn more in a corporation or software house than they can as a full professor. Secondly, people are not being attracted to the profession in the numbers calculated to sustain its development, a fact that many attribute to the lack of a so-called family tradition that is characteristic of the medical and legal professions. And lastly, those who do receive some form of technical education frequently lack the business background that will enable them to effectively apply their newly acquired

(Continued on Page 46)

DeCamp is national EDP recruiting director for Dunhill Personnel System, Inc.

FORECAST- 81

By Marguerite Zientara

COPING WITH STAFF TURNOVER

Photo by [illegible]

Imagination and resourcefulness may be the keys to acquiring and retaining skilled DP personnel in these days of technical manpower shortages,

In a recent telephone survey, 37 out of 45 DP managers interviewed said they had problems finding skilled workers in the technical area. Such shortages — besides taxing the creativity of employers — are resulting in lost project time, high turnover rates and very expensive talent for information processing managers around the country.

Some say the root of the problem is the American educational system, which continues to churn out millions of fine arts and liberal arts college graduates yearly in the face of diminishing demand for those fields. But whatever the cause or causes, it is The Cure that interests management, and that seems to lie in intelligent planning based on realistic manning expectations. Companies have to stop basing their plans on recruiting and retention levels that were never attained in past years, experts are advising.

In *Computerworld's* recent survey of recruitment problems and solutions — which was a subset of CW's annual budget survey (see story on Page 41) — not only did 82% of the respondents indicate they had problems getting skilled DP personnel, but 27 of the respondents, or 60%, said they had hired personnel without DP expertise or experience.

While a handful of those hiring people without DP backgrounds for DP jobs indicated the hirees were from other departments within the company or were hired only for clerical or operations positions, others specified they hired college graduates in business, math or other areas, for training as programmers or programmer analysts.

In all cases but one, managers indicated they were pleased with the results and that those workers proved effective, overall. The dissenting viewpoint came from a manager who indicated their effectiveness was "50-50" and he preferred "not to do it."

Others, however, have taken some novel approahces to the hiring of non-DP personnel for DP jobs. One midwestern manufacturing firm's DP department has instituted a "doubling part-time experiment" in which two part-time workers are hired for one full-time job. Not only is the situation ideal for "women raising families," the DP manager indicated, but "we expect to end up with full-time workers."

One firm's experience with hiring non-DPers extended only to bringing on-board a former factory supervisor, who proved to be effective. While that exemplifies some managers' reluctance to hire the nontechnical, David Henry, DP manager for the New Orleans food manufacturer W.B. Reilly & Co., has hired such people as manual laborers, stockmen and mailboys as operators and keypunchers.

Have they proven to be company assets? Yes, according to Henry, and furthermore, "They are loyal to the company."

One recruiter, however, in a separate interview, offered a bit of bad news regarding the hiring of college graduates with nontechnical degrees. Based on a study done by his company, Ed Haynes, employment manager for Texas Instruments, Inc. in Dallas, found the turnover rate among DP workers with "strange and flaky degrees" is three times the rate for those with computer science degrees.

"I don't know whether it's because those people tend to move around a lot, or because people without technical degrees are offered less money than technical people for the same jobs," Haynes said.

As an example, he estimated that an engineering graduate from a northeastern university, who majored in computer science, would earn a starting salary of $22,000 as of December 1980, while a business college or university graduate who majored in DP management would be offered $18,500 to $19,000 to start the same job.

The reason boils down to supply and demand, he noted. "There are just fewer graduates with that computer science degree; in fact, looking for a software engineer is like tracking an endangered species," Haynes added.

Calling the liberal arts college mill "one of the major areas of consumer fraud in the country today," Haynes cited a recent report of the College Placement Council, "Inflation and the College Graduate," which found that the real dollar value of the fine arts and liberal arts educational experience has gone down at a rate almost twice as fast as any other academic major in the last 17 years.

That group also found, in its 1979 annual salary survey, that 60% of the job offers made to the 1979 graduating class went to engineering graduates, who comprised only 6% of the entire class. When the offers that went to business and natural science majors are added to that figure, all the rest of the graduates, 68%, were left vying for only 6% of the positions being offered through on-campus recruiting, according to the council.

Whether or not the American educational system can rightfully be blamed for the shortage being so acutely felt in the industry, the ramifications thereof seem to touch several of a DP shop's facts of life.

In the area of personnel turnover, 12 out of 45 respondents to the CW survey (26.7%) said their turnover rates had increased over the last two years.

"Our turnover rate has increased a little, excluding layoffs, because the headhunters are busy and are stirring things up," one midwestern freight company's vice-president of information services said.

"The shortage of people is typical of the industry," he continued. "People move around a lot; things are getting tighter as the years go by, so there'll be more turnover."

For the DP manager of an Eastern seaboard manufacturing conglomerate, which has gone from manual to automated data processing just in the last year, "The biggest problem in the DP industry today is maintaining salaries internally; they can always get more money elsewhere."

At a Kentucky coal mining enterprise, the operations manager noted that, while its turnover rate in DP has increased generally in the last two years, the rate has decreased in the last year. "The economy is the reason for this year's lack of turnover," he felt.

And while some managers' turnover rates have increased, almost as many — 10 of those interviewed, or 22% — indicated their turnover rates have decreased in the same period.

(Continued on Page 47)

Zientara is a writer/analyst at CW.

(Continued from Page 44)

knowledge in a meaningful context.

All of these factors are contributing to two trends that we expect to see with increasing frequency throughout 1981. One is the development of highly sophisticated in-house training programs through which companies can smooth over technical gaps and reeducate DP staff to new systems.

In-house training may become an absolute necessity in 1981. The shortages in the DP arena are so acute that companies are more concerned with a person's capability to learn than they are with specific knowledge of language or hardware.

In addition to filling such knowledge gaps, well-designed and carefully run training programs have the added benefit of keeping staff up to the state of the art. This enables employees to continually upgrade their skills and can be a morale and incentive booster for an individual to remain with the company.

The second trend is the evolution of the contract programmer, in effect a form of office temporary, who works for companies on a project-by-project basis. The contract programmer will be utilized much more in 1981. With the development of more small business systems, many companies will not have the need for a full-time DP staffer, but may simply require someone to adapt a system and handle the start-up. Companies who do need full-time programmers frequently can not locate them.

As a result of both these factors, more and more programmers will begin to work on a limited contract basis, handling specific assignments for a prearranged period of time. This may be mutually advantageous to both company and programmer, who find that they can solidify their working relationships as a result of this "getting-to-know-one-another" period.

For programmers, working on a contractual basis has the added benefit of increased mobility, allowing them to investigate a new geographic locale for several months before making the decision to relocate.

Although there is much talk in the industry about software shortages, a serious scarcity of qualified personnel is literally embracing every phase of the industry and is acute in the hardware sector as well. Demand for mainframes and minicomputers is expected to remain strong and steady, but perhaps the greatest area of potential growth in 1981 will be in microprocessors.

Microprocessors have application in just about every phase of the computer industry, but will be particularly vital to the development of small business systems, home computers and the electronic gadgets of every sort that are gaining popularity among consumers.

Personnel shortages are fairly well distributed by industry and by geographic locale.

Perhaps the greatest demand for user-oriented DP professionals in 1981 will be in the services industry. In fact, the U.S. Department of Labor predicted a 109% increase in the number of computer professionals employed in this

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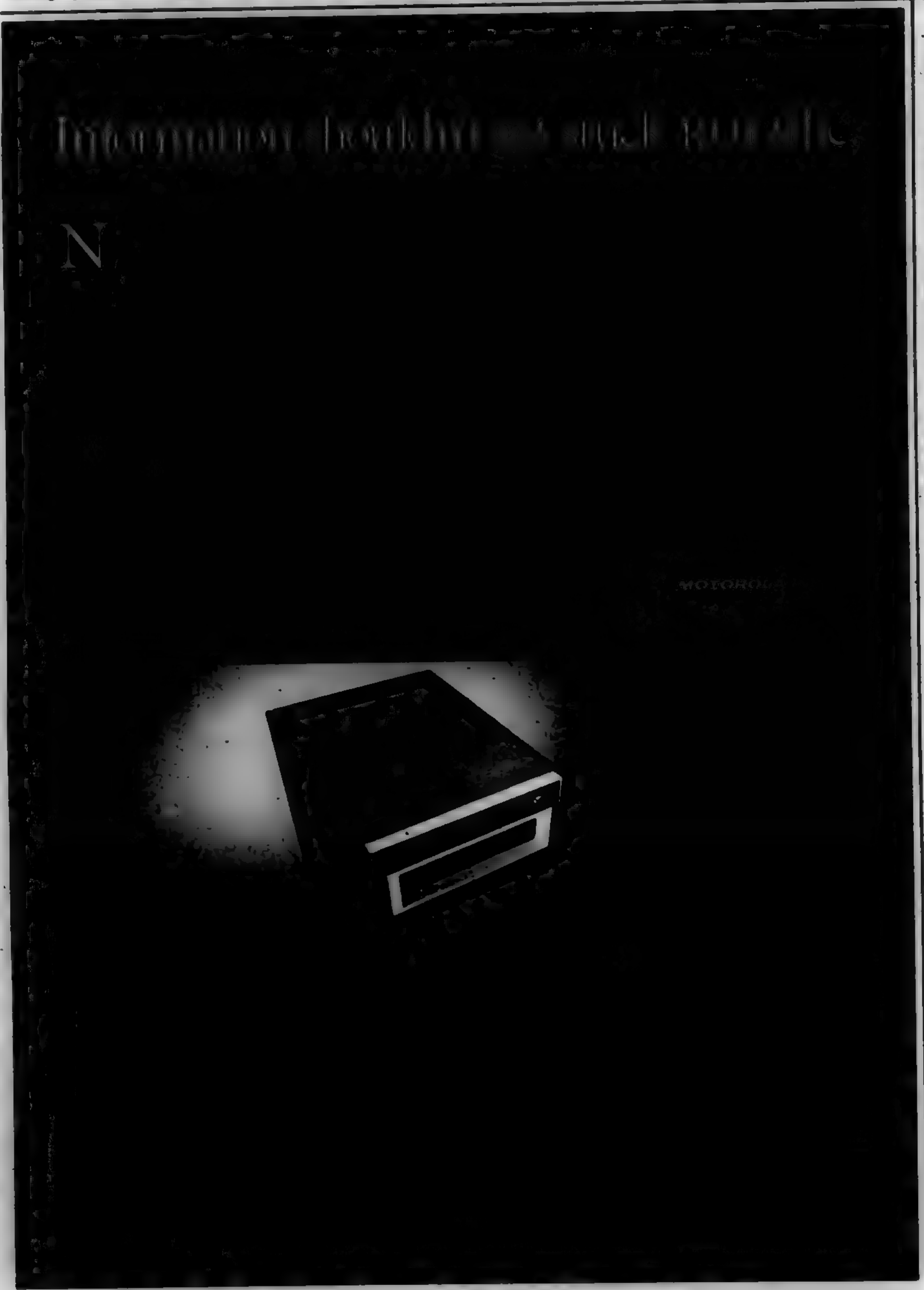

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FORECAST '81

(Continued from Page 45)

"I'm a heck of a nice guy to work for," the DP director of an Eastern heavy equipment distributor said, echoing the sentiments of several respondents who observed that workers stayed with companies where they were treated with respect and offered liberal benefits.

The overwhelming percentage of respondents — 48.9%, or 22 people — indicated their turnover rates had stayed the same in the last two years. Five of the 22 said they had no turnover in that time, although the figure may actually be higher, since some interviewees may not have felt it necessary to answer beyond saying the rate was the same.

"We keep our people happy with profit-sharing, a stock purchase plan, discount vacation plan, good salaries and good fringe benefits," noted Bill Sanders, vice-president of information services at Tri-State Motor Transit of Joplin, Mo., one of those with no turnover at all.

Another shop, with 16 workers, has had no turnover in four years. "I like to think it's a good shop," remarked David Henry of W.B. Reilly & Co. in New Orleans. Furthermore, when Henry needs new personnel, he relies on "word of mouth — that's usually all it takes."

One shop that has had no turnover "other than data preparation" in the last two years finds a problem in its "Brand X equipment — NCR Corp. or Burroughs Corp. — as opposed to IBM," according to Robert Chouinard, DP Director at Ryans, Inc., a wholesale grocery distributor in Billings, Mont.

The firm, whose newly acquired parent company is effecting a switch from NCR to Burroughs equipment, "can't find people skilled in our equipment," Chouinard complained.

New Hires

The stated difficulty in finding skilled personnel notwithstanding, 30 of the 45 respondents (66.6%) indicated they filled all their new hire positions last year. Ten people (22%) did not fill those positions, and five interviewees (11%) had none to fill.

Whether or not they were successful in filling their new hire positions, most managers cited traditional recruitment methods as those on which they had relied; newspaper advertising, search firms, referrals, internal employees, personnel agencies, walk-ins, DP schools and local colleges.

Among those who were successful in filling openings, there were two noteworthy exceptions to the conventional recruitment techniques. Lady Luck smiled on Jack Laubach, vice-president of information services at Scot Lad Foods in Lansing, Ill., when the nearby Wisconsin Steel Corp. closed down last summer.

"They had an exceptionally large staff who were very well qualified," he observed, enabling Laubach to choose from a stable of willing and able experts.

In Augusta, Me., a remote geographic location, Willi Hartung, manager of information systems for Central Maine Power Co., was able to take advantage of a progressive state program for the handicapped to fulfill some of his personnel needs.

"A major help was the Bureau of Rehabilitation's program to turn handicapped people into productive citizens," Hartung said. "We hired three programmer analysts through that program and are very happy with them."

The "heck of a nice guy to work for" mentioned above also managed to fill all his new hire positions last year. Said he, "I have more people call-

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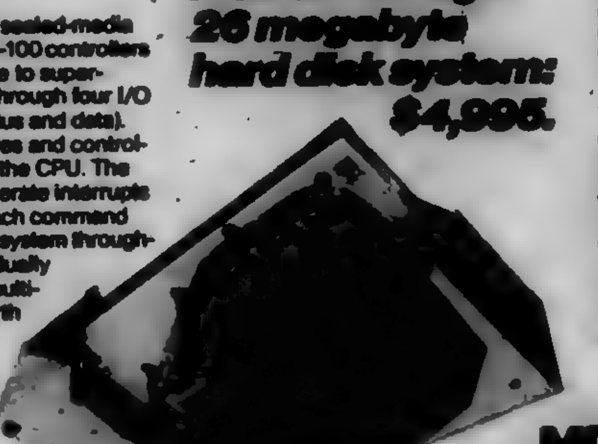

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(Continued from Page 47)

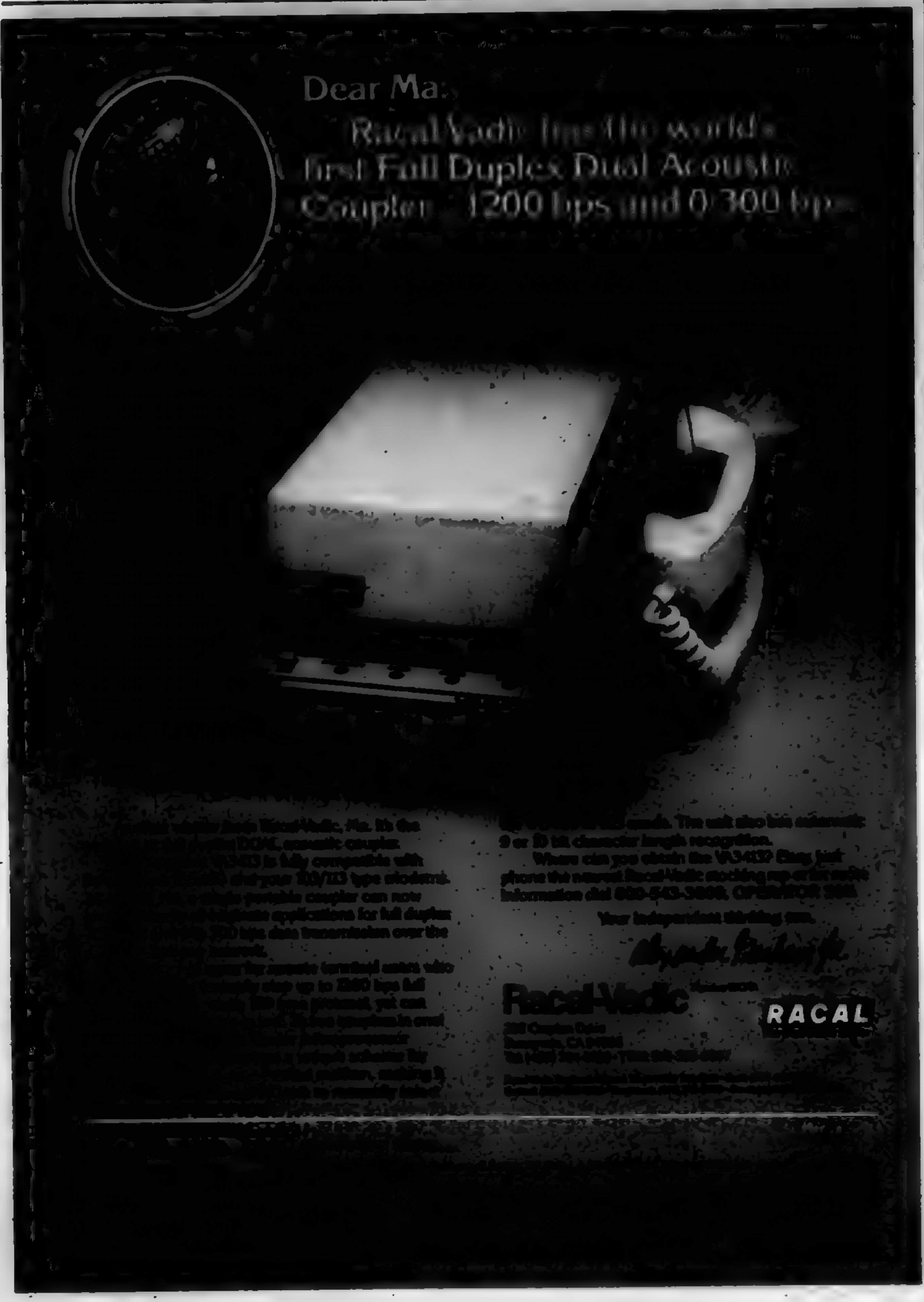
ing me and sending me resumes than I'll ever use."

Just because most managers did fill their openings last year, that does not mean it was always effortless. While J.H. Lowe, information systems director for A.C. Transit Co. in Oakland, Calif., filled his quota, "It took some time," he noted, as well as "every [recruitment method] that's known to man."

One manager who filled all his new positions last year said he may nevertheless initiate a program for giving employees bonuses if they find new programmers.

Of the 10 who were not able to fill their new hire positions last year, three indicated the lack of skilled people resulted in delayed implementation of projects. As one manager put it, "We were scrambling all year." Three others of the 10 who lacked workers indicated some projects just didn't get done at all. Four of the 10 who did not fill their positions said the situation did not adversely affect any long- or short-term projects.

Six of the 10 without their needed new hires said they would not try any new recruitment methods in the future.



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Employment: The '80 Outlook

(Continued from Page 46)

arena over the next decade.

We should also see an extremely high demand for DP professionals in the energy industry, currently one of the country's fastest growing business segments. The Labor Department projects an 89.9% increase in DP jobs in oil companies and mining firms, as well as in companies involved with the search for alternate energy sources.

City, state and federal governments will also provide an ever-increasing number of jobs for DP professionals (up by an estimated 77.8% by 1990), as will financial, real estate and insurance firms (up 75% by 1990), manufacturing companies (up 72.5%), construction (up 71.6%) and wholesale and retail companies (up 70.8%).

Demand for Auditors

Companies in every industry are reporting an across-the-board need for financial auditors with a DP background as a direct result of the ever-changing economy.

The DP audit may well be one of the main resources companies will have over the next several years to monitor cash flow and to hold a line on costs.

In fact, the advent of the computer has provided financial executives with a valuable tool for economic forecasting, which aids in such critical processes as corporate mergers and acquisitions.

Despite this trend, many managers report that they rarely see DP people with any accounting or auditing experience, nor do they see financial personnel with DP training. Employees who combine both skills are at a premium.

Geographically, the demand for computer professionals is fairly strong in virtually every region of the country.

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FORECAST '81

By John A. Murphy

MERGING WORD AND DATA PROCESSING:

A FIRST STEP TOWARD TOTAL INFORMATION INTEGRATION

While tomorrow's corporate information needs will be supported by fully integrated electronic systems that provide for voice and data communications as well as electronic mail and voice and data processing, we are not there yet. Today, users are taking their first steps toward that goal by beginning to integrate word and data processing.

Just what is implied by the "integration" of word processing (WP) and DP is difficult to define. As with other concepts popularized in the industry by catchy buzzword phrases, integration has connotations unique to particular situations or systems. Users and vendors view the concept within the context of their own immediate needs, desires or fears, coupling performance and operational requirements with economic and political considerations.

DPers have flirted with word processing and a form of integration since the early days of interactive or time-shared processing. WP was viewed just like any other application and was usually subordinate to most DP jobs. Implementation tended towards the text editing and formatting of large, multipage documents or reports with little emphasis placed on the handling of the more mundane correspondence common to office operations.

DP manufacturers, if they considered WP at all, would usually bundle it into some large, centralized system. Hardware and software interfaces were the same as those applied to DP operations. Users had to possess DP-level skills to implement WP, and little attention was given to extending such functions to office personnel.

Such attitudes still persist in present-day DPer views on WP. Managers burdened with line responsibility for DP have little inclination or time to consider the value of WP to overall operations. Some pay lip service to the importance of integration, while others hope that the whole idea will just fade away. Most consider that if integration must be accomplished, WP should fall under the auspices of the DP department and not be treated as an equal.

WPers at first did not consider DP or the implications of integration. They were enmeshed in selling the then-new WP concept to a conservative office management. Indeed, the mention of data processing or computers in relation to word processing was taboo. The use of these terms was avoided to allay any fears of managers or typists intimidated by such equipment. WP manufacturers coming from a similar office equipment environment and marketing to this conservative group also totally neglected data processing in their word processor designs.

Some present day WPers are also apprehensive about DP and the implications of integration. This time fear is expressed from the professional ranks of WP managers or supervisors. They feel DP, with its enormous budgets and close proximity to corporate power centers, will totally control WP to their and the user's detriment. These fears, coupled with the DPer's attitude that WP is a somewhat unsophisticated adjunct to DP, has placed a barrier between the two professional groups most involved with eventual integration.

While political differences divide WP and DP professionals, the manufacturers, as represented by their equipment, have come closer together in integration under the impetus of converging technologies. The rush to capitalize on such concepts as "distributed processing," "personal computers," "the electronic office" and so forth has flooded the market with products attuned to both word and data processing. Many of the DP systems coming on the market offer WP as an application package. Some of the more advanced WP systems introduced recently at least have compiler-oriented DP capability. DP, in expanding downwards to smaller or dispersed systems, has begun to address the needs of the office market. In a similar manner, WP, in expanding upwards to larger shared-resource systems, has begun to market products with the power to perform DP.

Specific embodiments of the integration concept also incorporate certain components of message or document communications and storage/retrieval. Again, depending on the integrator, such capability may be considered part of the DP or WP scheme of things or may be lumped under the electronic office concept of information processing. The following outlines some approaches taken toward integration by some of the off-the-shelf systems now on the market.

- **IBM/DPD 3730:** This multiterminal system is an enhancement of the older 3790 distributed data processor. Like the 3790, the integrated system is designed to function under the network and data base control of a larger IBM host system. Local WP or DP is performed on separate, dedicated display terminals, although some DP-type applications may be performed on WP terminals with display panel reprogramming. All program assembly, external system communications and data base transfers must flow through the host; no direct peer-to-peer 3730 data or document transmission are allowed. Market orientation is toward present IBM mainframe system users of the Fortune 500 class who desire WP and electronic mail capabilities in conjunction with present DP operations. IBM has recently announced support of 3730-type WP function and peripherals on the 8100, allowing an alternate approach or upward migration path to its large system users.
- **Wang Laboratories, Inc. OIS Series:** This family of integrated systems is an outgrowth of Wang's very successful WPS series of shared-resource word processors. As such, function is oriented more towards WP rather than DP. DP capabilities include a Basic compiler, WP-to-Basic file conversion and a just-announced legal accounting applications package. Intra- and inter-system communications is provided for electronic mail document transfers under Mailway software. Orientation is toward the office market requiring strong WP capabilities and a limited interest in DP.
- **AM/Jacquard Systems, Inc. J500/-J100:** Single- or multiterminal integrated systems first introduced as data processors but quickly augmented with full WP capability. Word and/or

(Continued on Page 50)

Murphy is executive editor of Data Decisions, Inc. in Cherry Hill, N.J.

SYSTEM CHARACTERISTICS

SYSTEM	WORD PROCESSING FEATURES	DATA PROCESSING FEATURES	UPGRADES NEEDED FOR FULL INTEGRATION
Word Processors	• Operator-friendly menu-prompt text entry, format, edit and manipulation routines. • WP-function-oriented keyboard-display and document printer terminals. • Moderate-to-high vendor hand-holding.	• Programmable logic and diskette/disk storage facilities. • Calculator-type arithmetics. • Limited file processing. • Ascii-type terminal communications.	• Enhanced shared-resource control and disk storage facilities to support multiple WP/DP terminal configurations. • System software supporting concurrent WP/DP operations and file transfers. • Applications program; terminal/protocol emulator; electronic mail and filing software support.
Data Processors	• Text editing employing DP code commands on DP-function terminals.	• Programmable logic and diskette/disk storage facilities. • Applications program facilities. • Communications emulators. • Full file/records processing.	• Enhanced shared-resource control and disk storage facilities to support multiple WP/DP terminal configurations. • System software supporting concurrent WP/DP operations and file transfers. • Operator-friendly WP software. • Electronic mail and filing software. • Dual-function WP/DP keyboard-display terminal and document printer terminal. • Enhanced vendor hand-holding.

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data processing is implemented through same terminal with ability to perform file access and transfers from both text or data storage areas when terminal is in either mode. DP capability includes interactive data entry and file management system, communications emulators for IBM 2780-, 3780-, 3270- and Univac 1004-type protocols, Super Basic compiler and interpreter and accounting applications packages. It lacks electronic mail and document electronic filing functions. It does provide a good mix of DP WP capability oriented to DP or office, small- to medium-scale facilities seeking integration.

- Four-Phase Systems, Inc. OMS/IV: Recently introduced upgrade to Four-Phase's Foreword integrated system that incorporates electronic mail and enhanced networking in addition to integrated WP and DP. It provides data entry, data base, batch and transaction processing capability and Cobol language support under multifunction executive with OS/DOS features. As with Jacquard system, the OMS/IV is equally at home in the small-to-medium DP or office environment.
- Datapoint Corp. ARC: This distributed multiprocessor DP system has been enhanced with strong word and document processing packages. It offers full network manager, communications, data entry, data base and time-shared access DP support; Basic, Cobol and RPG languages; and a number of applications packages. It is a good example on how to integrate WP, electronic mail and electronic filing functions into an existing DP product family. It competes in a medium-to-large scale market for users with primary interest in distributed processing as well as office automation.

These are but a few of the systems on the market that offer integrated WP and DP capabilities. Other vendors from the DP side of processing who have introduced integrated systems include Digital Equipment Corp., Basic Four Corp., Mohawk Data Sciences Corp. and Prime Computer, Inc. WP manufacturers who offer shared-resource systems with DP capability include CPT Corp., Lexitron Corp., Micom Systems, Inc. and Xerox Corp. All take a somewhat unique approach to integration with respect to features and functions provided and the ability to support ancilary electronic office operations. These then form the basis of integrated WP and DP in the early '80s.

WP/DP Checklist

The following checklist should serve as a guide to evaluating systems and their applications in a specific user environment:

- How large an operation is to be integrated? If a small single-terminal facility is envisioned, will dedicated word processing (WP) and data processing systems better support work loads when compared to a single system offering WP/DP integration features?
- In multiterminal, multiuser installations, is concurrent word and data processing supported on the system? If so, can WP or DP operations be run on the same terminal, or are dedicated function terminals employed?
- Can WP and DP files be accessed and transferred from a terminal that is in either operational mode?
- Are complete WP features and functions supported? Does the system provide equal WP capability when compared with a dedicated system: Do the terminals employed in WP offer user-friendly key arrangements and menu prompts?
- How complete are DP features and functions when compared with user needs for data base, data entry, transaction processing, batch processing operations and so forth? What languages are supported? Can programs be assembled on the system? What applications packages are supplied?
- How complete are communications and networking functions? Are various terminal and system emulators and protocols supported?
- Does the system offer ancillary electronic office-type functions such as electronic mail, electronic filing and electronic calendar scheduling? Is photocomposition supported?
- What upgrade or expansion paths are offered? Can the system be installed small and then migrated to larger configurations?
- How much experience does the vendor have in servicing an end-user market? Can the vendor adequately support or provide the degree of hand-hold that is often required by non-DP office operators?

The above checklist also provides a composite view of the full capabilities of systems expected in the mid-1980s.

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By Marcia Blumenthal

INDUSTRY OUTLOOK:

CAN DP VENDORS WEATHER THE STORM?

Although the computer industry weathered the 1980 recession relatively unscathed, companies are bracing themselves for further buffeting in 1981 by a troubled European economy and spiraling interest rates.

Vendors and analysts are not making doom and gloom predictions for 1981, but can best be described as "cautiously optimistic," a phrase which sometimes can be interpreted as crossing one's fingers.

Most mainframers saw 1980 earnings dip below 1979 levels in some quarters during the year, with other companies reporting flat earnings.

With inflation expected to be about 12% next year and interest rates now anticipated to top off at 22% during the first quarter of 1981, many suppliers may continue to experience an earnings pinch for the first half of the year, some analysts noted.

Order rates are going to soften during the first quarter of 1981, maintained William D. Easterbrook, vice-president of Kidder, Peabody & Co., Inc. Datapoint Corp., which had strong order gains during most of the year, experienced an order decline in the third quarter, denoting a softening in European markets, he stated. Since most firms depend on significant revenues from overseas markets — sometimes up to 40% of revenues — the crunch in Europe could take a toll on U.S. computer firms.

Last year the strength in the European market masked the deferment of orders by U.S. customers. NCR Corp. was one company whose financial performance was in part shielded by European gains.

Besides the economy in Europe, users there have become more nationalistic, increasingly preferring to buy from local companies, analysts noted.

While order recovery in the U.S. is expected to mask the impact of the European slowdown during 1981, high interest rates and a general attitude by consumers that another recession may be on the horizon could put a damper on the expected gain in orders, particularly on low-end systems

This phenomenon could also fuel a continued high lease/purchase ratio, which depressed 1980 earnings.

"When interest rates are high, IBM becomes the bank of first resort," said Jay Stevens, senior technology analyst with Oppenheimer & Co., Inc.

Despite economic doldrums in 1980, users continued a run on orders for 32-bit minis and high-end mainframes, analysts agreed. On the whole, 1981 revenues for U.S. computer manufacturers will grow by at least the same amount as during 1980, remarked Frederic G. Withington, a vice-president with Arthur D. Little, Inc. (ADL). Withington estimated gross revenues at 20% across the board for the top 100 manufacturers. Other analysts estimated industry revenue growth at 13% to 15% for the coming year.

With most major companies now at the beginning of a new product cycle and production problems at a minimum, the outlook for shipments is good, noted Stephen T. McClellan, a vice-president with Salomon Bros.

The economic vagaries of 1980 aside, 1981 should see IBM making a great number of product introductions, particularly additional models in the H series, maintained Tom Crotty, vice-president of research at the Gartner Group. While 1979 and 1980 saw other mainframers under pressure to respond to the 4300, 1981 will force competitors to reveal their high-end wares, he said.

As usual, most mainframers claimed they were watchful but nonplussed by actions IBM may take, noting they are already committed to high-end systems.

Burroughs Corp. is readying its "Attack" model — the 7900 — which is an upgrade to its high-end 7800, according to J. Roy Henry, the firm's executive vice-president of marketing.

While Burroughs said it is prepared to compete on the high end, it has had a variety of production problems during the past year. In particular, Henry said the firm found it difficult to "ramp up" production of new products and experienced a severe shortage of semiconductor components. However, Henry reported Burroughs now has these problems under control and is looking for good shipment levels next year. But its lower end 3950 product is still on "indefinite hold."

Sperry Univac also said it will upgrade its large-end 1100/80 systems to meet IBM's challenge. "At any given time we have two generations of systems under development, which will be more than adequate to meet competitive challenges," responded Richard L. Gehring, president of Sperry Univac. It is impossible to have a good distributed processing system without a large central site to manage the data base, he added.

In the IBM plug-compatible manufacturer (PCM) arena, many analysts see a good year ahead for PCMs, but predicted they will be injured by IBM in the long run because of IBM's continued [illegible] of microcode.

Responding to these predictions, PCMs as usual shrugged their shoulders, saying, "Where have we heard that before?"

Yes, IBM will continue its emphasis on microcode in upcoming announcements, noted Carl Amdahl, executive vice-president of advanced technology and development at Magnuson Computer Systems Corp.

However, the portions of the operating system IBM has microcoded are relatively stable. "Those are the kinds of packages we find easy to put into microcode in the Magnuson machine," Amdahl explained. "People talk about microcode as if you can do anything with it. You can't," Amdahl declared.

Although alert to competitive tactics by IBM, PCMs see the need to offer value-added features for their products. Magnuson recently announced microcode assists for IBM's MVS and Cullinane Corp.'s IDMS data base management system.

During the coming year, Magnuson will continue to work with independent software companies to develop unique microcode assist features.

At National Advanced Systems (NAS), a unit of National Semiconductor Corp., David Martin, executive vice-president, said, "All the hullabaloo about 3081 microcode is a giant mirage." IBM has made extensive use of microcode for years, not only for original design but for enhancements which provided assist and instructional features. The 3081 is the next generational step in the use of microcode, but will not present a competitive disadvantage because microcode changes are the easiest to make.

IBM could do more damage by making significant changes in hardware design, Martin noted.

However, the real threat IBM presents in the near term is not "technical gotchas but predatory pricing action," Martin insisted. Pricing of the 4300 came pretty close to predatory tactics, but the pricing of the 3081 seems to indicate IBM will not resort to significant underpricing, Martin said.

IBM will attempt to control but not eliminate the market share of PCMs through pricing, but for the foreseeable future the demand for automation will provide enough room in the market place for current competitors, he said.

Moreover, the PCM industry will evolve during the next five years, becoming suppliers of much broader product lines. NAS already has the capability to offer processors configured with plug-compatible peripherals, and during the next year, will offer software tools such as performance monitors.

Plug-compatible disk maker Storage Technology Corp. is evolving its line towards total system capability. Amdahl Corp. recently made a foray into communications processors and reportedly has a disk controller project in the developmental stages.

Although the most popular ox to gore, the PCM makers will not be the only vendors subject to IBM's competitive tactics in the near future. IBM will go much more aggressively after markets it has largely ignored, such as distributed processing, high-end minis and word processing, Kidder, Peabody's Easterbrook noted. The giant may not introduce solid attractive products in these areas next year, but the trend is definitely in place.

One industry observer projected IBM would hold 50% of the high-end mini market for commercial customers by mid-decade.

At the lower end, IBM has become very aggressive with its Series/1, noted Terry Carleton, Kidder, Peabody's mini market analyst. "Anytime IBM established a competitive product in a new market, it takes a piece of that market."

IBM, however, won't be the only mainframer making significant moves to gain a position in new markets. This will surely impact smaller vendors, experts agree.

A recent example was Honeywell, Inc.'s year-end thrust into the 32-bit mini and word processing arenas with its DPS 6 family.

Describing the new products, Stephen G. Jerritts, president of Honeywell Information Systems, remarked the system differs considerably from a typical mini. The Level 6 is a smorgasbord of functions requiring individual configuration, typical of a traditional mini. On the other hand, today's users don't want to do a lot of configuring on their own, Jerritts maintained.

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Blumenthal is senior editor, industry at CW.

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Instead, users want preconfigured hardware and software and the ability to put all of this on a network. This is the direction Honeywell will be pursuing in the next year. Although the company said it will continue to introduce new models in its high-end Series 60, Jerritts said the Level 6 and DPS 6 will contribute 25% of HIS' revenues in 1981 and 50% by the middle of the decade.

And Burroughs Corp. at year end announced word processing capability for its 90, 900 and 1900 systems. Although a buzzword in the late 1970s, distributed processing will become more of a reality in 1981, vendors and analysts agreed.

A major source of growth during the upcoming year will be on-line networks for users' current applications, ADL's Withington stressed.

This will create a demand for more processors, disk drives and terminals, which will be good for established vendors because it is more of the same. Aetna Insurance Co. expects to increase its terminal installations from 8,000 units to 35,000 units in the next five years, he said.

"What we need to do now is increase the functionality of our software and distributed processing features," Sperry Univac's Gahring emphasized.

While IBM is expected to make inroads into smaller system products, the firm will also pursue software revenues much more aggressively in the coming years. Easterbrook estimated IBM might derive up to 5% of its revenue from software next year and could triple that during the next couple of years. Forecasts by Shearson Loeb Rhodes, Inc. noted IBM's software revenues from the 4300 series could produce revenues equal to those from that hardware and that sales of H series software could be 25% to 50% of the hardware volume.

Independent Software Firms

This aggressiveness is bound to put a pinch eventually on the independent software companies who compete in the mainstream of IBM products. These vendors will be impacted as IBM puts a lot more options and features into its IMS and CICS products, remarked David Eskra, president of Pansophic Systems, Inc.

Pansophic specializes in information retrieval and library control systems, but doesn't see too serious a challenge from IBM in this arena.

Besides IBM, Eskra noted 1981 may prove to be highly competitive among independent software firms. There will be a lot more competition for the software dollars at user sites with the overall software budget dollar leveling out, he observed, and users who have to make a decision between a utility or application package may make their decision on which package to purchase based upon which vendor "gets to the door first."

While IBM will certainly put the pressure on independent software firms, its ability to compete may be hampered by its size, suggested Alex Kuli, marketing director for Cincom Systems, Inc. IBM may have a difficult time creating new software products until it breaks up its software development operations into smaller, entrepreneurial units, such as existed with the creation of DOS. If IBM makes this transition it should have the clout to dominate the market, he predicted.

To help retain its competitive edge, next year Cincom intends to make the use of its data base management systems less complex and allow word processing information to be hooked into the data base, Kuli said.

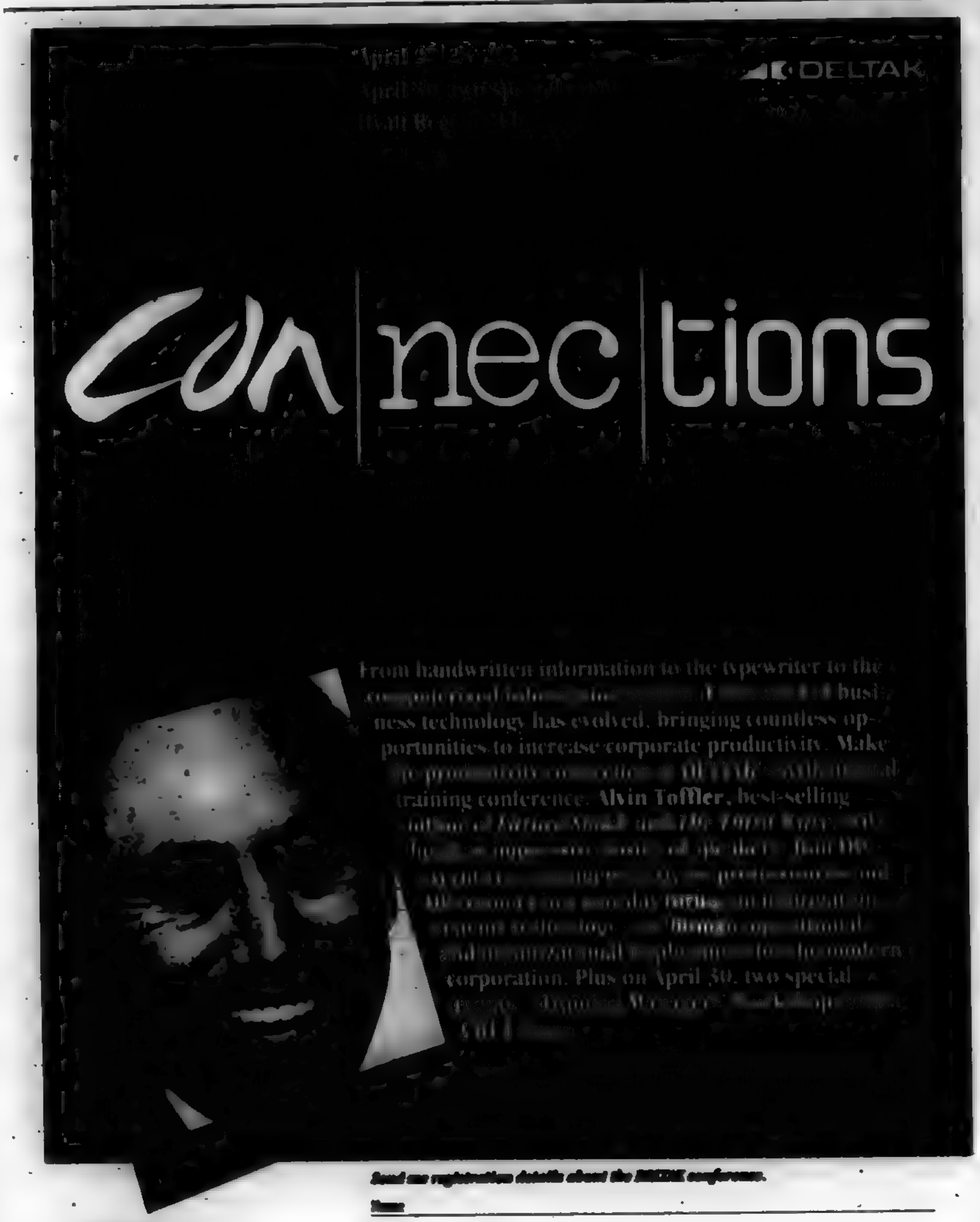
On-Line English

Cullinane Corp. will also continue developing tools to allow speedy applications development on its IDMS system. In addition, the firm will provide more tools such as On-Line English, which allows a nonstructured access to the data base for inexperienced users, according to Robert Goldman, senior vice-president of product development.

Moreover, Cullinane is developing or adapting standard application packages for use with IDMS.

With inflation continuing, users can expect to see price adjustments in its products. However, ADL's Withington does not think price increases will be very steep. "IBM has improved earnings under its current price umbrella."

And no forecast for the new year could be complete without remarking on the threat the Japanese present the mainstream computer industry. Although selling its products on an OEM basis to NAS, Amdahl and others, analysts and vendors interviewed expect to see the Japanese at most make a miniscule impact on the industry. Any inroads will be on the very low end such as personal computers, observers agreed.



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By Marcia Blumenthal

VENTURE CAPITAL: AN ERA OF GLORIOUS NONSENSE FOR HIGH TECHNOLOGY FIRMS

Venture capital investment in high-technology companies today may be entering an "era of glorious nonsense." That aphorism has been used several times during the past 20 years to describe the cyclical frothiness of the venture capital environment. It appears the heady atmosphere for investment in high-technology firms will continue unabated for at least the next year.

For the past two years, 63% of the total venture capital invested went to high-techology firms. Of this amount, 25% was invested directly in computer-related firms, 9% in communications companies and 18% in other electronics companies, according to Stanley E. Pratt, publisher and editor of *Venture Capital Journal.*

During 1979 a record $1 billion was disbursed by venture capitalists to smaller business, more than double the average annual disbursements for the previous five years. In 1980, approximately another billion was invested, with a moderate increase expected for 1981, Pratt estimated.

From 1970 to 1977 the total venture capital pool remained static at between $2.5 billion to $3 billion. Since 1978 that pool has grown to nearly $4.5 billion, boosted by private capital commitments of $570 million in 1978, $319 million in 1979 and $800 million this year, he said.

And capital is coming from new sources. For example, once-cautious pension funds last year supplied 31% of the new committed capital.

Venture capital firms today are highly liquid, but more than that they are professionally managed, the opposite of the situation that existed in the mid-1970s — the Dark Ages for venture capital.

Along with liquidity and good management, several events have contributed to the momentum of the venture capital community and its investment in high-technology firms. The 1978 reduction of the capital gains tax from 49% to 28% has already spurred investment in venture capital. By nature venture capital investments are long-term, with investors earning the bulk of their money after five years.

Besides the easing of the tax burden, there has been a tremendous resurgence of interest in entrepreneurship and small business. The recent White House Small Business Conference stimulated awareness of the vigor and innovation that *is* characteristic of small businesses.

"Productivity," the buzzword for 1980 and probably for 1981 also, was repeatedly the headline of numerous articles in top business publications.

Some 54% of all venture capital invested in the past decade was related to productivity improvements, Pratt estimated, with the computer industry certainly in the vanguard of productivity enhancements.

The publicity given to the issue of productivity, along with the visibility of stock market results for high-technology companies, has stimulated the dizzying demand for investment in technology-related companies.

High-technology stocks were one of the top-performing investment groups this year, with new issues selling like hotcakes. Apple Computer, Inc., which recently went public, was oversubscribed long before the offering, Grokers noted.

Interestingly, of the 100 venture-backed but now publicly held companies tracked by *Venture Capital Journal*, 56 are computer-related

All this fervor for entrepreneurship and high technology, combined with the availability of venture funding, has provided the impetus for an exodus of would-be and "born again" entrepreneurs from established firms. A goodly portion of these entrepreneurs are not tinkerers, but rather are executives who have been successful in other firms and already have a market focus for their products.

"There are thousands of people in industry who could break out into more creative areas," asserted William H. Draper III, a general partner in Sutter Hill Ventures, based in Palo Alto, Calif.

Two notable executives who emerged again as entrepreneurs during the past year were John W. Poduska, one of the founders of Prime Computer, Inc., and Gene Amdahl, founder of Amdahl Corp.

Poduska, who recently became founder and president of Apollo Computer, Inc., [CW, Dec. 1], raised more than $4 million in venture funding.

Amdahl, who recently announced plans to take on IBM with an H-Series-type system from his newly established Acsys Corp., needs an estimated $70 million to finance that venture.

Although entrepreneurs with good ideals looking for venture capitalists abound, venture firms increasingly are finding themselves vying for investment positions in high-technology firms.

A case in point is the recent venture funding of a software firm where Fidelity Ventures found itself to be one of 18 investors hoping to invest in the company, reported Peter D. Danforth, a general partner in Fidelity. The eventual cost of that investment was twice what Fidelity was willing to pay, Danforth noted, ultimately causing the firm to walk away from the opportunity.

As Danforth sees it, the stock market performance is one reason the cost of venture investments is skyrocketing. Price/earnings multiples for high-technology stocks have recently been in the 25 to 30 range, far above those for established firms in related industries such as the computer industry.

As a result of this "frothy" market

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Blumenthal is senior editor, industry, at CW.

Priam Corp.

CUPERTINO, Calif. — Now in its third round of venture capital financing totaling more than $7 million, Priam Corp., founded in March 1978, will turn a profit during the first half of 1981, according to President William Schroeder.

Schroeder and his partner, Al Wilson, executive vice-president of Priam, left Memorex Corp. in February 1978.

The concept behind Priam was to adapt the Winchester technology of the IBM 3350 disk drive for minicomputers.

The first round of financing, $1.4 million, was completed in July 1978 and was used for product development; the second round of $2.6 million in August 1979 was geared to production facilities; and the third round, $3.1 million last May, is being used for all-around scaling up of the company.

Since its initial funding, Priam's shares have increased 300% to 400% in value, Schroeder reported. Despite this appreciation, the partners and employees own "far less than the majority of the firm."

Seven venture capital firms are involved in the firm with Sutter Hill Ventures, the lead investor.

The company's revenue is expected to reach $20 million this calendar year. "We could go public; a lot of development companies are doing that," Schroeder remarked. However, he thinks the public route would be premature. "We are building a large, important company. After all, our major competition comes from Xerox Corp. and Control Data Corp.," he said.

Schroeder recalled that the initial funding for the start-up and the third financing for ongoing company activities were relatively easy to obtain. Second-round financing, however, was a little more difficult. Investors know how to value a start-up and can get excited about an ongoing firm, but that gray period when "you are getting the product to work, getting orders and getting costs in line" is sticky, Schroeder noted.

Relational Technology, Inc.

BERKELEY, Calif. — While he was a vice-president at Cullinane Corp., Jon Nackerud became acquainted with a software product called the Interactive Graphics and Retrieval System (Ingres), developed at the University of California at Berkeley several years ago.

Excited about this data base management system, Nackerud brought it to the attention of his employer, John Cullinane, president of Cullinane Corp.

Although Cullinane was interested, he did not want to acquire the product. Instead, he introduced Nackerud to two West Coast venture capital firms, Sutter Hill Ventures and Hambrecht & Quist.

Eventually choosing Sutter Hill Ventures, Nackerud formed Relational Technology, Inc. earlier this year. Sutter Hill funded the firm for $300,000 and located Gary Morganthaler to serve as executive vice-president of the fledgling software company.

The firm introduced Ingres this month.

Although Nackerud said the principals could have financed the firm themselves, their venture partner provided the company with good contacts within the industry and in banking and allowed the firm to avoid scrimping to get the product to market.

Doctoral Developers

The developers of the product are all Ph.D.s affiliated with the university — Michael Stonebraker, Eugene Wong and Lawrence Rowe. They serve as consultants to the company, but do not participate in the day-to-day operation of the firm.

Although the company is a start-up, Ingres had been in use for more than four years and had 125 installations by the time Nackerud acquired the product.

His aim is to commercialize the product, offering technical support, something the university could not do.

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condition, entrepreneurs today can retain a greater share of the ownership of the firms than could their predecessors two or three years ago.

While high-technology investments have not yet run out of control, many venture capitalists see warning signals in the current boom that may have repercussions for entrepreneurs and investors alike.

Young firms may go public prematurely, Draper maintained, interpreting the euphoria for new issues on the public market a danger sign. "Whenever this happens people lose a lot of money."

Moreover, the Investment Incentive Act of 1980, which provides for public investment in venture capital firms, could be troublesome, venture capitalists agree, because public investors are often looking to turn a quick profit. This could adversely impact the entrepreneur who is building a company and cannot immediately produce profits and the venture capitalist who traditionally has been in the investment for the long haul.

Another negative factor in the current market is that venture capital firms competing for high technology investments are being asked to make commitment decisions too quickly, observed Henry McCance, a general partner in Greylock Management Corp. This leads to shortchanging the evaluation process, which is tantamount to a violation of good management practices, McCance warned.

Despite these warnings, Sutter Hill's Draper sees 1981 as a promising year for venture capital investment. New start-ups have not yet become too high priced. In funding start-ups the venture firm offers more than capital, often providing consulting to the firm, putting together its management team, evaluating the market for a particular product and making introductions for the new firm in the financial world.

Although start-ups may still be reasonably priced, many venture capitalists noted the second and third financing is where the competition is. One firm sold its start-up shares for $1 apiece, but managed to obtain $5 per share from venture partners on a subsequent financing.

Although high-technology start-ups often require the infusion of venture capital, such firms can opt for venture financing at various times during their development.

Relational Technology, Inc. is an example of a new start-up firm that sought funds immediately. Integral Data Systems, Inc., on the other hand, is a profitable firm with $10 million in revenue, which sought venture financing for the first time only recently. That firm raised $1 million.

Still a third — Priam Corp., a two-year-old disk drive manufacturer — is now in its third round of venture funding (see related stories).

Within the venture capital arena the most active segment is the 200 private partnerships and firms that hold between $1.5 billion and $1.8 billion of the total venture capital assets. During the past two years some 15 to 20 partnerships have been formed annually. This compares to only two partnerships formed in 1977.

Another active segment is the 330 or so small business investment companies (Sbic), of which only one-third are active venture capital investors. The Sbics hold about $1.3 billion in venture capital assets.

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Integral Data Systems, Inc.

MILFORD, N.H. — Integral Data Systems, Inc. was founded in January 1977 with no venture capital funding. One of the founders, Dr. James VanderMey, now president, had worked at Codex Corp., now a subsidiary of Motorola, Inc.

VanderMey saw the need for a low-cost dot matrix printer to be used with minis and microcomputers. The products developed by Integral Data sell for $800 to $1,795 per printer.

For its last fiscal year, ended in June, the firm had revenues of $9.5 million and was profitable.

A year ago VanderMey decided to pursue venture capital funding and received about $1 million from Greylock Management Corp. and Fidelity Venture Associates. These investors have banking connections, understand the company's markets and the problems of small businesses, VanderMey noted.

The company had previously financed its growth from retained earnings, but wanted to establish banking relationships.

Although the venture financing was the company's first, it was like second-round financing because the owners did not have to yield much of their equity.

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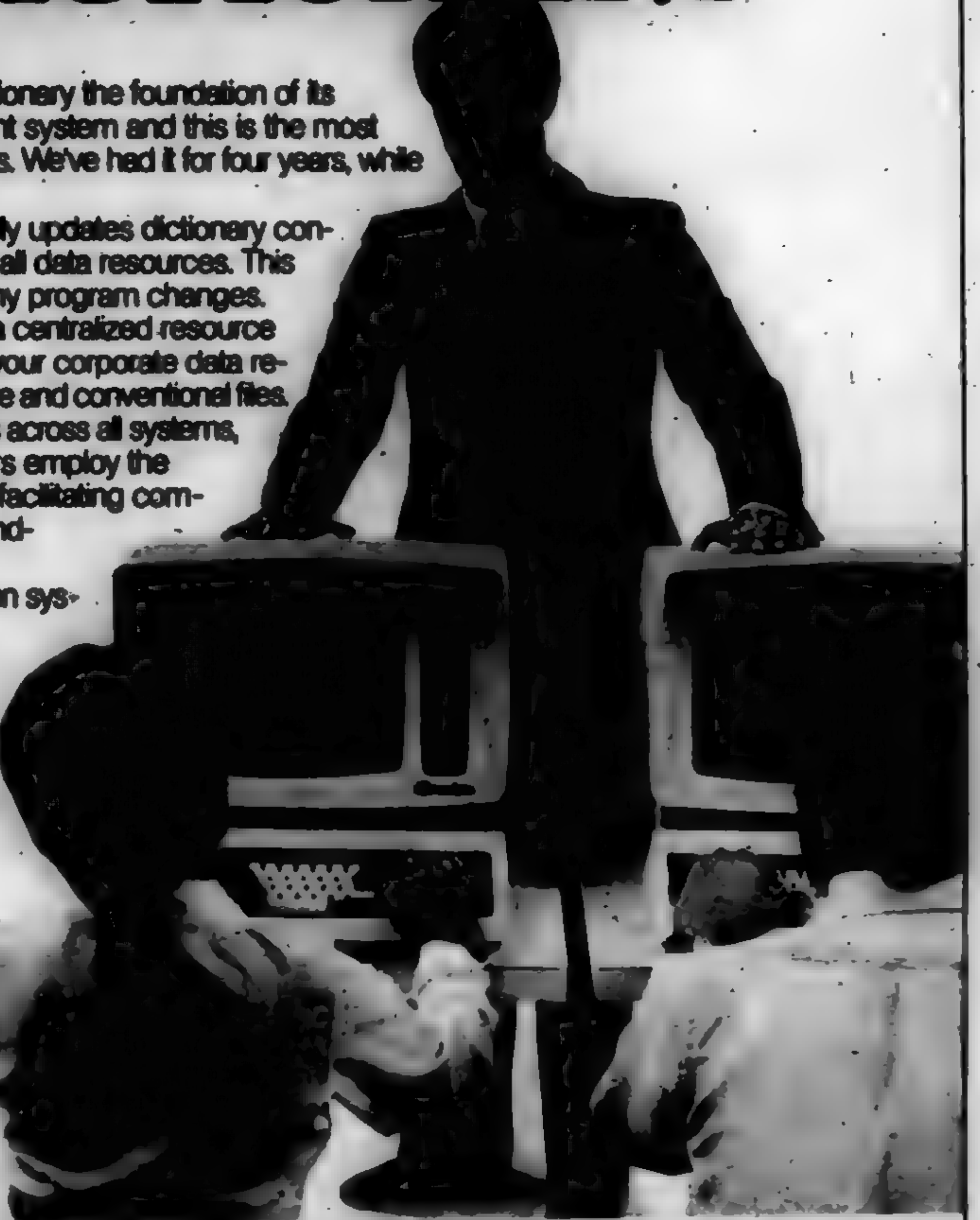

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NETWORK ARCHITECTURE:

The world is likely to move closer to standardization of data network architectures in 1981, but specifics of the expected standards will probably take several more years to define.

The big question many data communications users want answered next year is how far IBM will go in fitting its Systems Network Architecture (SNA), the bedrock of IBM communications offerings, to the evolving Open Systems architecture of the International Standards Organization (ISO).

Some large IBM customers assume the vendor will close the gap by offering domestic users compatibility with the X.21 and X.25 interface "standards" contained by the ISO model's first three layers. The ISO has yet to define the highest four layers of its architecture, but the organization has made clear its commitment to a concept of networking systems that runs counter to the approach IBM has long promoted.

Thus far, SNA has called for a fairly rigid hierarchy of master/slave relationships among remotely linked systems. And some communications experts have charged that SNA protocols and software make it difficult for users to accept non-IBM systems in SNA networks [CW, Oct. 6].

Work on the architectures for long-distance transmission became enmeshed this year with efforts to develop architectures for local-area transmission, which is usually defined as communication within a radius of a mile or a couple of kilometers.

In practice, a long-distance architecture will usually need to accommodate several local nets and both kinds of architecture will need to meet many of the same communications standards, such as X.21 and X.25. Coaxial cabling seems the favorite medium for local nets at present.

Recognizing a need for "openness" in networks, meaning smooth links between many different brands of systems, the ISO and sympathetic bodies such as the Consultative Committee on International Telephone and Telegraph (CCITT) and American National Standards Institute (Ansi) have labored to develop standards for interfacing data terminal equipment (DTE) — communicating processors and terminals — to public data nets.

Signaling a break with IBM's traditional approach to data communications, IBM Chief Scientist Lewis M. Branscomb told an international conference this year that SNA will come to feature "more and more peer capability and more and more openness" [CW, Nov. 3]. IBM will supply networks with systems for communication with many other brands of systems, Branscomb predicted.

IBM has no choice, consultant Jon S. Gould pointed out. No single vendor can hope to supply all systems for a large, sophisticated network in the 1980s, the O'Donnell & Associates, Inc. vice-president explained. For one thing, companies that merge with other companies must absorb each other's DP resources, and this is rarely done without running lines between different brands of processors.

Also, major vendors like IBM cannot profit from competition with much smaller firms in supplying certain specialized systems and therefore will choose not to, Gould stated. Many large users will need a few of such systems.

Branscomb's speech came a few weeks after Honeywell, Inc. and Sperry Univac announced that their respective network architectures would meet X.21, X.25 and generally the rest of what turns up in the ISO model [CW, Oct. 27].

Honeywell's Distributed Systems Architecture (DSA) was the only general-purpose, mainframe-based net architecture launched by a major vendor in 1980. Called the "blueprint" for Honeywell's DP products in this decade, DSA will embrace the openness trend and make a point of supporting systems under SNA, spokesmen said [CW, Oct. 13].

On the occasion of DSA's unveiling, 1973 Turing Award winner Charles W. Bachman, a Honeywell senior consultant who chairs the ISO subcommittee on Open Systems and until recently chaired the comparable Ansi committee, remarked:

"In the long term we have to assume that all computers, whether they're used by banks, governments, larger business corporations or small businesses, are going to have to cooperate with everybody else's computer on behalf of their owners. If that's so, the rigidly hierarchical approach of master/slave computer relationships is fundamentally wrong."

At odds with IBM tradition, this view from the man who won computer science's Nobel Prize for contributions to data base technology may be striking some IBM marketing strategists as a thunderclap.

In coming years, the major systems vendors, including the largest, must standardize communications between each other's systems without constant monitoring from the user's central headquarters: That's the message of 1980.

Among key changes in policy and offerings for SNA this year, IBM released several software enhancements based on the VM/System Product that purport to bring the full gamut of SNA capabilities to the terminal level of decentralized and end-user networks [CW, March 3]. Related to this, IBM indicated its VM/370 operating system will no longer be enhanced without charge and the VM/370 System Control Program "will be enhanced minimally, if at all."

As IBM continues to withhold X.21 and X.25 support domestically, vendors of competitive products have not — NCR Comten, Inc.'s 3600 front-end processors, for example [CW, July 14] — and pressure is mounting on the world's largest DP supplier to join the bandwagon.

Some large IBM customers with extensive overseas operations have written X.21 and X.25 along with SNA into long-term plans for network expansion because much data communications abroad demands the compatibility and these users expect IBM to come through [CW, Nov. 24]. IBM does offer X.21 and X.25 to customers in several foreign nations.

For IBM's part, Branscomb has maintained that the vendor's U.S. customers have no great need for X.21 or X.25 until the nation's common carriers, especially Bell, support those interface specifications first [CW, May 26].

Bell and other carriers that derive the bulk of their revenues from circuit-switched network offerings have no great need for X.25, the CCITT recommendation for interfacing DTE to packet-switched networks, some observers have said [CW, Dec. 1].

Should Bell put X.25 in its long-awaited Advanced Communications Service (ACS), however, IBM might react with the same sentiment as the coming White House to a Soviet invasion of Poland. X.25 in ACS would mean Bell customers — most American businesses — could run non-IBM terminals in place of IBM's 3270 models.

On the other hand, X.25's absence from SNA might hinder Bell's efforts to put ACS in IBM shops. ACS is expected to meet the CCITT recommendation, as the packet nets of GTE Telenet Communications Corp. and Tymnet, Inc. already do.

But X.25 itself is not without problems. The de facto standard's written description is hundreds of pages long, according to Jacob Sternberg, chairman of Conversational Systems Corp. "It loooks like a Russian encyclopedia," Sternberg remarked. As different portions rise and fall in favor, "It's Stalin in — Stalin out."

According to Sternberg, whose company made a system that switches a fourth of the New York Stock Exchange daily traffic, the real test of the standards incorporated by emerging architectures will come with implementation over the next few years.

"There will be no real conclusions until at least 1983," he predicted.

According to Gerard L. Power, a Pennsylvania State University computer scientist, the main problem in fitting SNA to X.25 — the problem IBM may solve for domestic customers next year — is SNA's path control "sublayer."

Incompatible with X.25, this sublayer breaks messages into packets and adds both addressing and sequencing information to each packet. This determines which node in the network each packet will visit next and how the packet is to be combined with other packets to reconstruct a message.

SNA's bit-oriented Synchronous Data Link Control (SDLC) protocol is a functional subset of the High-Level Data Link Control (HDLC) protocol contained by X.25 and which forms the second layer of the ISO's model architecture, Power noted. But the path control incompatibility gives IBM two ways to go in giving the nation's SNA users X.25.

IBM can either insert a "black box" — some device — between SNA and the X.25 network or rewrite SNA's path control sublayer, Power observed. Neither solution is appealing, he said, and a few alternatives are even less desirable.

IBM customers in France and Canada have resisted offerings of X.25 translators by which they could attach the Transpac and Datapac public networks, Power added.

Independent vendors interested in giving SNA users improved access to the X.25 public nets could try developing a black box for protocol conversion that would be inserted between the user's 3705 communications controller and the X.25 net, according to W. Gary Greathouse, project manager of S[illegible]-Honeywell, Inc., a company formed this year to manufacture packet-switching products.

Or, Greathouse continued, such vendors could try writing software to reside in the 3705, IBM's front-end processor for its mainframe systems, that might render the necessary protocol conversion and possibly eliminate a need for the expensive link hardware on which many IBM users presently depend for a pipeline between their shops and the public packet nets.

The latter approach was taken by Comm-Pro Associates, a firm specialized in 3705 software, in developing a package for use with IBM's Network Terminal Option for the Network Control Program. Comm-Pro's revised X.25 Network Access Software is said to reroute the connections between interactive asynchronous terminals and X.25 nets into a "multidomain SNA network" [CW, Dec. 22].

Comm-Pro's Christmas present for SNA users is claimed to void the distinction between 3270 terminals directly connected to IBM mainframes and those terminals linked to X.25 packet networks.

Using popular terminology, the ISO

Schultz is senior editor, communications, at CW.

FORECAST- '81

By Brad Schultz

SNA vs CHALLENGERS

model's lowest layer, X.21, describes the lines between network nodes; the second layer, HDLC, describes passage of data packets over lines; and the third layer, X.25, describes the passage of entire messages between nodes.

Awaiting definition: the fourth layer, transport, concerns transfer of messages from end-user to end-user; the fifth layer, session control, orders logical sessions; the sixth layer, presentation, maps information; and the seventh layer, application, applies that information in representing the end user to the system.

Nearly all the major systems vendors aimed at the U.S. market have now issued a network architecture. These include Burroughs Corp.'s Burroughs Network Architecture; NCR Corp.'s Distributed Network Architecture; Digital Equipment Corp.'s Decnet; Hewlett-Packard Co.'s Distributed System; Prime Computer, Inc.'s Primenet; Data General Corp.'s Xodiac; and Univac's Distributed Communications Architecture.

"One trend that will occur during the next few years is the upgrading of the vendors' architectural implementations," according to Bolt Beranek and Newman, Inc.'s Marianne Steiner and Ira Richer. "Moreover," they continued in a portion of *Advances in Data Communications Management, Volume One*, "in the future we expect that the different classes of users will begin to require more of the same types of functions.

"For example, minicomputer users taking advantage of Decnet will require more intelligence in the nodes, whereas IBM users will require more interprocess communication," they added in the book just released by Heyden & Son, Inc. of Philadelphia.

"The solutions offered by the different vendors will tend to converge, Steiner and Richer asserted. "For example, DEC is already moving its general-purpose communication function to front-ends."

As work proceeds next year with defining the ISO model's highest four layers, the major vendors will continue fleshing out their architectures with actual products.

And people will try using those products — which is, of course, the bottom line.

Local Loops

The advent of several local network architectures in 1980 may signal next year's marketing strategies for the major data communications suppliers.

Local loops, the data transmission links within a large building or a cluster of adjacent buildings, typically handle two-thirds the total volume of a big organization's data communications.

Some experts have argued that network planners should focus on the local traffic situation rather than the full gamut of remote processing operations to be encompassed by IBM's Systems Network Architecture (SNA), Xerox Corp.'s Xerox Telecommunications Network (Xten), Bell's Advanced Communications Service (ACS), or similar solutions.

One reason for bringing planning to the grass-roots level is that most of the action goes on there, but another is simply that all-encompassing designs for links across nations or around the world are too complicated to be well understood and not flexible enough to handle the impacts of corporate mergers and reorganizations or industrial vicissitudes.

It is really the old pitch for modularity in solving a complicated problem. Break the big mess into simpler subproblems, some consultant have counseled [CW, Nov. 24]: Once the local net situation is licked, the user can simply latch together its various local nets and run telecommunications as a utility.

Most universities and colleges with computer science programs have pet projects in local net design. For one thing, a college campus is — one might say — a text-book setting for such a facility.

Workers in academic buildings can benefit substantially from easy message-switching on circuits not in thrall to telephone companies. And the expertise needed to string up and maintain a local net is often available from modestly paid faculty, students and the plucky crew of technicians that serve campus laboratories.

Hence, this nation and other nations have produced innumerable local net designs that might contend for honors as a "standard." Next year, the major standards-making organizations relevant to data communications will continue efforts to produce a standard.

In the U.S., the National Bureau of Standards has produced documents and sponsored seminars toward this end, but the spotlight has recently shifted to the Local Area Networking Committee of the Institute of Electrical and Electronics Engineers (IEEE), chaired by Maris Graube of Tektronix, Inc.

As 1980 becomes history, Graube's committee is close to recommending IEEE Standard 802, but remains stymied by the issue of how to assign access rights in a local loop. Two incompatible approaches are under consideration: carrier sense multiple access collision (CMSA/CD) and token passing.

Ethernet, a local network architecture under joint development by three vendors, has CMSA/CD, which involves statistical sampling of lines to see whether data streams are colliding. Token passing allows only one user at a time to run data through the local net.

The proposed Ethernet is a passive coaxial cable-based medium for transmission among smart and dumb terminals. Its sponsors — Digital Equipment Corp., Intel Corp. and Xerox Corp. — plan to give the architecture "gateway" access to long-distance telephone circuits and the ability to multiplex voice communication with data [CW, May 26].

Until a few months ago, Ethernet appeared likely to be much the same as IEEE Standard 802, but important differences have cropped up. Although Ethernet is pegged for 10M bit/sec transmission, the IEEE wants a wide range of speeds permitted by its standard. Graube's committee has tentatively settled on 1M-, 5M-, 10M- and 20M bit/sec [CW, Dec. 1].

A few weeks after DEC, Intel and Xerox released specifications of Ethernet [CW, Oct. 6], Satellite Business Systems announced a deal with Network Systems Corp. to offer its all-digital specialized common carrier services through the Hyperbus local net architecture Network Systems offers for 50M bit/sec transmission. Through the Hyperchannel within Hyperbus, that rate is held possible for distances of 5,000 ft or less between local net nodes [CW, Oct. 27].

"Hyperbus exhibits strange behavior in that its performance depends upon the actual configuration of users on the system" according to Ivan T. Frisch, senior vice-president of Network Analysis Corp. in New York. His analysis of Ethernet, Hyperbus and Mitre Corp.'s Mitrenet — featured in *Computerworld's* Nov. 24 Special Report on network planning and implementation — found problems with all three local nets in achieving 10M bit/sec rates.

Mitrenet, however, can be modified easily to allow 10M bit/sec transmission, Frisch maintained, so a 100M-bit file could be moved between buildings with a 10-sec response time without affecting the local net's interactive traffic.

According to some observers, the multimegabit/sec rates local nets will offer in coming years will trivialize issues of access priority, since low-priority users will have virtually the same wait-time as high-priority users.

The super-rates may also eliminate a need for much of the protocols and software used to handle transmission errors, since the user could simply retransmit any faulty messages as soon as fault was found.

Another local net debut in 1980 that should keep the arena lively next year is Zilog, Inc.'s Z-Net, a packet-switched coaxial-based architecture intended to integrate DP, electronic mail and office automation traffic.

The main idea behind the Z-Net design is distributing a system's low-cost elements such as CPU, memory and terminal while sharing such high-cost elements as peripherals and data bases. Zilog, an Exxon Corp. affiliate, chose to unveil Z-Net within a few days of the Ethernet announcement and then, during the week Ethernet's specifications were publicized, introduced major Z-Net enhancements.

The latter included an asynchronous, bidirectional first-in/first-out buffer circuit for Z-Net users that reportedly provides elastic buffering between a CPU and peripheral circuits. This Z-FIO unit was accompanied by Z-Lab, a "method of physically distributing hardware and software development stations while keeping them part of an integrated system," a spokesman said.

Recent maneuvers within the Exxon Information Systems division, which along with the rest of Exxon Enterprises, Inc. is being absorbed into the parent company, Exxon Corp., suggest that Z-Net may loom large on the local net scene next year in terms of product announcements and simple promotion.

One tack for local network architectures to take in 1981 is stringing together desktop systems hitherto marketed as personal computers. Zilog's Z-Net will compete with architectures such as the Cluster/One from Nestar Systems, Inc., based on the Apple II systems from Apple Computer, Inc.

Ohio Scientific Co., acquired this year by MA/-COM, Inc., has also worked on fashioning a local net from its desktop family, and Apple's release of the Apple III, far more powerful than present competition in what is usually considered the personal computing arena, will probably spark efforts to build that desktop into a local net driver.

Another local-net architecture to watch next year is System 20 from Network Resources Corp., a Sytek, Inc. subsidiary. System 20 is reportedly able to support more than 24,000 terminals at 9,600 bit/sec for an aggregate link-level data rate of more than 14M bit/sec.

According to Sytek, the System 20 "allows transparent communications between all terminals in the network, provides for data encryption and interfaces to long-haul as well as internet and intracity connections."

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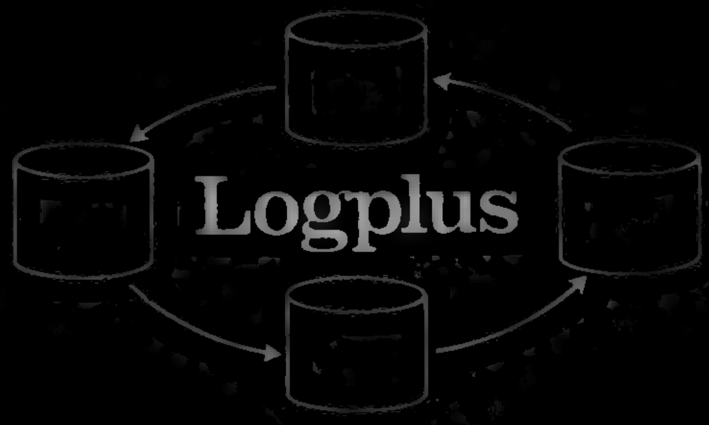

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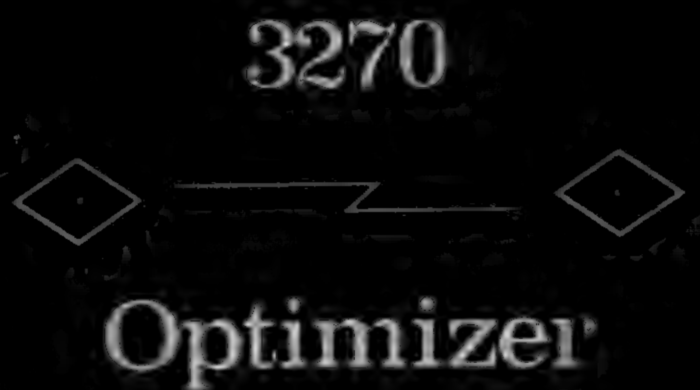

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FORECAST '81

By Tim Scannell

USER vs VENDOR: THE LEGAL BATTLES CONTINUE

Their sales tactics range from the age-old foot-in-the-door technique to an occasional bit of verbal sleight-of-hand.

And while they do not wear the stereotypical loud plaid uniform of the sideshow huckster, -if given the chance, they would probably sell you a product that not only balances your payroll, but tucks you lovingly into bed at the end of a long hard day.

Like the machines they sell, today's computer sales people are technically sophisticated and rely on a number of state-of-the-art tactics to bolster their sales pitch. But, by the same token, most of them frequently use song-and-dance sales routines that date back to when cavemen in three-piece bear skins marketed the first wheel.

In the past year or so, more and more users have filed suit against vendors, claiming they have been the victims of precontractual sales promises. Recently, a precedent was set in litigation history when a major computer manufacturer was actually found guilty of fraud for misrepresenting a machine's capabilities.

Just a few months ago, the aggressive actions of a relatively small user against a major vendor snowballed into a blizzard of at least more than 50 lawsuits claiming similar damages.

Unfortunately, even with the help of the courts, users are discovering that it is a lot more difficult to return a malfunctioning computer than it is to return that oversized Christmas sweater. And things will get more difficult in the future, especially for the user who puts more faith in the salesman's spoken words than what he signs for on the dotted line.

"When you're dealing with large organizations with complex products to sell, [the salesmen] get pressures, and quality control is not what it should be," according to Samuel B. Harvey, a senior vice-president with RHS & Associates, Inc., a New Jersey consulting firm. Whether it's computers or anything, there's going to be guys who will sell somebody something that they don't need."

When a user is stuck with a malfunctioning system bcause he was undersold or oversold on what the machine could do, he has only himself to blame, Harvey said. After all, "if you go into a store and buy something that doesn't fit you or that you don't need, to a large extent, it's your responsibility."

Harvey admits there is such a thing as the young and aggressive sales person who, during the heat of competition, focuses on nothing but getting the "fish on the hook." He also claims that it is a fairly standard procedure to simplify a user's requirements during the initial sales phase and, in some cases, "perhaps under-engineer the job a little bit."

These tactics are far from being fraud or deception, he added. On the contrary, they are just the by-products of healthy competition. And "if you're going to have a free competitive market, which we do . . . then we have to expect these guys are going to get in there and compete," Harvey explained.

Sidney Segelstein, a New York lawyer who has been involved with computer contract law for the past 15 years, agrees that vendor sales people might sometimes overemphasize a system's capacities, and that users should not walk blindly into a contractual affair. In fact, he has coauthored a book on the subject of computer contract negotiations with noted computer expert and fellow lawyer Richard Brandon. A second book by the legal duo, this one aimed at the virginal user, is scheduled to be released sometime in the beginning of 1981.

While Segelstein admits users should be cautious, he also feels some drastic changes are needed on the part of the computer manufacturers.

"Vendors tell you a lot of things about the characteristics of the equipment in terms of reliability, in terms of speed and in terms of capacity," Segelstein stated. "That's the way they sell."

Then the vendor hands the user a contract which he says is a formality, but which actually consists of a series of disclaimers. The contract usually disclaims any expertise with the user's application or warranty that the computer is suitable for any particular purpose, Segelstein said. In fact, most contracts do not even refer to the computer as a system or state directly that it performs any function at all.

"All the things that they put into the initial proposal, whether they are verbal or written, are negated by the contract," Segelstein pointed out. "There are no reflections in the contract of the kind of inducements that made the buyer's blood race faster, or the things that got him all heated up about the product in the first place."

As the price of hardware descends — making a computer affordable to people who know absolutely nothing about the technology — vendors are becoming more and more reluctant to make any kind of formal commitment. Binding contracts are dismissed as simple purchase orders, and potential users are told to "forget about all that fine print on the back," Segelstein claimed.

In the early days of DP, he continued, there may have been some justification for very tight and "disgracefully unprotected" contracts. The computer field was, for the most part, experimental and was growing at a phenomenally fast pace. Equipment and software came out before being adequately tested. Such gear was sold to large users, like insurance companies, that had some idea of how a computer was supposed to act. These early users also had enough corporate power to get satisfaction from a vendor if a particular system did not perform as promised.

Today, however, salesmen are using the same tactics to pump out hardware to a relatively unsophisticated audience, Segelstein said. "They never give the customer any idea of what's supposed to happen next. They hand them over to these OEMers who are either sloppy, over-burdened, low-ballers or whatever.

"The way our legal system works today, the user is at fault for not reading his contract and demanding . . . that he get some real protection." If the disgruntled user throws up his hands and pulls the vendor into court, the suit will more than likely be decided in favor of the vendor, Segelstein observed. In effect, the judge and the jury will say, "You're a big boy. You never should have signed the contract and now you've got to pay the price."

So far, the only success a user has had in fighting a large vendor and its legal juggernaut is by accusing the vendor of fraud or blatant misrepresentation. In the recent Triangle Underwriters, Inc. vs. Honeywell, Inc. case, for instance, the jury dismissed charges of negligence and breach of contract against the vendor defendent, but upheld the charge of fraud. Honeywell was first ordered to pay Triangle, a now defunct insurance broker, more than a million dollars in damages.

However, a few weeks later, a trial judge reviewed the case and reduced the amount of damages to $35,000. He based his decision on testimonies filed by both parties and some allegedly missing documents that could have weighed heavily in the case. So, even when the user wins, he may lose in relation to damages that result from a bum system.

Distant Light

To make the light at the end of the legal tunnel seem even more distant, Segelstein warned that the laws of commerce make fraud one of the hardest charges to pin on even the most apparently guilty vendor. "Its just not the way the world works." Whatever edge the frustrated user has now as an abused David going against a powerful Goliath is diminishing all the time, he said. Ultimately, the only person who can prevent needless litigation and keep the trusting customer happy is the front-line salesperson. The person who knocked on the client's door with colorful brochures describing the computer system in one hand and promises in the other.

"Vendors have to stop marketing computers in the same puffy way that they've been doing," Segelstein stressed. "There's a vast amount of unhappiness and disappointment. All you hear is problems," he said. And nobody is happy in part because vendors have inflated the customer's expectations.

"They're not in a position to produce [total happiness] and they shouldn't sell computers that way," he stated emphatically.

Whoever is to blame for a malfunctioning computer, whether it is a slick and over-zealous salesperson or a totally incompetent user, one thing is certain — more and more potential machine owners are opening their eyes a little wider before signing on the dotted line.

Unfortunately, "even though there is now a growing awareness of things that could go wrong with a computer,

(Continued on Page 60)

Scannell is senior editor, hardware, at CW.

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(Continued from Page 59)

computer contracting does not yet resemble normal, prudent business practices," Joseph Auer, editor of *Computer Negotiations Report* (CNReport) observed.

Auer insisted that demand has never been greater for his monthly newsletter, which reports on the various twists and turns of modern computer contract law and occasionally blows the whistle on a vendor through its "Ploy of the Month" feature. He is also kept busy guiding the user flock by hosting seminars sponsored by CNReport's publishing parent, International Computer Negotiations, Inc.

Although the newsletter's circulation figures are proprietary, Auer stated that he averages about four- to five inquiries per day from disgruntled users or fledgling DPers who want some kind of contracting assistance. In fact, user complaints have just noticeably risen over the past five years. The user's laments are all usually the same: They think the vendor is trying to pull a contractual "fast one."

"Every vendor contract has a clause in it that says if it is not part of the contract, it's not part of the deal," Auer pointed out. "They disclaim every reason you wanted a computer in the first place."

For the prospective buyer, Auer advises what mothers have been insisting all along — an ounce of prevention is worth a pound of cure.

"Anticipatory protection is better than litigation every time," he noted. "Even when users imagine they want a computer, they ought to notify all of the vendors that during the acquisition process, they expect everything the vendor says, writes or does during the sales campaign to be part of the contract.

"In so many cases, users don't get the vendors to even represent that they'll do anything specifically," he added. Instead, "they are sold on grandiose very general broadband terms."

Users Beware

Auer warns users to be particularly mindful of turnkey vendors, who will be more prevalent in the next few years. These vendors can be extremely dangerous to deal with because the buyer is usually left with no contractual link to the software or hardware supplier. There is "no flow through of warranty," he claimed. "This little turnkey house can be two guys working out of a '59 Chevy parked next to a telephone booth," he continued.

If the delivered system does not work or a problem develops, what does the user do? And if he decides to bring the issue to court, who does he sue?

"The size of the deal in some ways is not big enough for anybody to be concerned about except the poor guy who's getting it in the teeth," he said. Unbelievably, there have been an incredible number of these type of cases just in the past six months.

Despite all the doom and gloom directed at the first-time computer user — especially the very vulnerable small business person — there are some rays of hope. Influenced by user criticisms and growing mistrust of the industry, a number of vendors have instituted policies of even firmer "handholding" in their customer relationships. For instance, Data General Corp. publishes several first-user manuals on the subject of computers that are conspicuously devoid of self-gratuitous back-slapping. And companies like IBM and Digital Equipment Corp. have 24-hour toll-free hotlines that can be used to ask questions directly to the firms' technicians and system hotshots.

While these seem like nice gestures, CNReport's Auer believes that the vendors are increasing hand-holding tactics because the competitive market necessitates it, rather than doing it out of the goodness of their hearts.

Contract Advice

Finally, there are several things a potential user can do to combat what one chief executive officer of a major computer firm, currently involved in a precedent-setting lawsuit, called "the number one cause of all present and future computer litigation" — the young, aggressive and over-eager salesperson.

First of all, get both the vendor and user sides clearly defined in the contract down to generic responsibilities, task levels and implementation schedules, Editor Auer said. "Vendors don't mind negotiating this type of contract because they like to know what their specific responsibilities are . . . and what the users are going to do. And they also like to know when they're through."

Contract lawyer Segelstein simply advises to listen very carefully to the vendor. "Every piece of paper he hands you, every statement he makes, you write down and memorize it someway. And then try to get it in the contract."

When courting vendors, a buyer should be seductive yet firm, Segelstein continued. He should also not be afraid to push too hard or threaten to drop the vendor if his demands are not met. A lot of large vendors will turn tail and run at the first sign of a pushy customer "and concentrate on the fellows who are ready to sign on the dotted line," — which is just as well for the cautious buyer.

As negotiations reach the wire, get the vendor to spend a little time and money by setting up machine demonstrations and scheduling visits to similarly equipped shops. "The vendor is less likely to walk away after he has dedicated marketing time, energy and money," Segelstein observed.

Finally, the neophyte user should prepare for the worst, or at least a rollercoaster-like sales ride, before opening up the vendor catalogs and selecting that cute little dream system. Unlike fairy tales, where computers are concerned, there is no such thing as "living happily ever after."

"I see people getting told that computers are the greatest thing since sliced bread," Segelstein said. "And a year later, after the system has died four times over and they're ready to chuck it out, they realize — they are in data processing, and this is what data processing is all about."

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FORECAST '81

WASHINGTON ROUNDUP: A CLEAN SWEEP?

By Jake Kirchner

WASHINGTON, D.C. — The favorite cliche here these days is that the Reagan administration will "hit the ground running," and by every estimate it will do just that — moving quickly to cut taxes and trim government spending. But for the many complex issues whose resolution determines federal information policy, the best that can be reasonably expected is plodding but steady advance.

Computer manufacturers and vendors of information equipment and services are eagerly awaiting the economic moves expected from the corporate Camelot the Reagan team is quickly assembling here on the Potomac.

The corporate tax cuts, accelerated depreciation schedules and research and development (R&D) tax credits anticipated from the pro-business Reagan administration and conservative Congress bode well for all industry, but particularly well for capital-starved high-technology firms.

However, the social and human issues posed by technology, issues already clearly defined in many cases, may settle to the bottom of early legislative and regulatory agendas in the new year.

Nevertheless, privacy, transborder data flow, federal DP practices, U.S. Postal Service electronic mail initiatives, AT&T entry into unregulated data processing services and the myriad thorny issues attending this country's growing information economy will certainly receive renewed attention during the coming months.

The Carter administration has received high marks for addressing these and other information policy issues and there is no indication the Reagan team can or will want to ignore them. In the slow but deliberate policy-making process of Washington, D.C., issues, once articulated, tend to take on a life of their own.

Many of these information issues, such as privacy, barriers to international information flow and the need for more economical use of federal information processing resources, are essentially nonpartisan and are, according to many observers here, moving inexorably toward resolutions unlikely to be drastically affected by the conservative tide of November's elections.

This is not to say, however, that there will not be changes, perhaps drastic changes, in the emphases certain information issues are given by the new administration and the Republican-dominated 97th Congress.

A clearer picture of the 1981 information policy agenda will not be available until congressional committee and subcommittee assignments are finalized in February and the 300 or 400 top executive positions are filled.

One issue that can be considered a bellwether for federal information policy over the next year or two is privacy. Since the 1974 Privacy Act and the 1977 report of the Privacy Protection Study Commission (PPSC), questions of government access to personal records and the threat of automated recordkeeping systems to the confidentiality of those records have been debated at great length both on Capitol Hill and at the White House.

The Carter administration is generally credited with doing much to promote privacy legislation. One administration official likened Carter's response to the PPSC report to that of "a kid with a new toy," and the administration's so-called "privacy initiative" led to a number of legislative and regulatory proposals to implement the commission's recommendations.

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Kirchner is a correspondent for the CW Washington bureau.

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But the response of Congress clearly did not meet the President's expectations. There Carter's efforts were torpedoed, partly by his own team, by federal agencies — notably the FBI and the Treasury Department — that feared their ability to access citizens' financial, medical and insurance records would be unduly hindered.

This internal dissension was overcome in the case of the Right to Financial Privacy Act of 1978, but has been a large factor in dragging out other pieces of privacy legislation. This, along with a lack of what Richard Neustadt of the White House Domestic Policy Staff describes as a "constituency for privacy" have lengthened the privacy legislation process.

Illustrative of these problems was the fate of medical records privacy legislation during the last Congress. Brought up for a vote in the House of Representatives Dec. 1, the bill, although backed by numerous hearings and the approval of three separate House committees, was quickly killed by legislators who cited opposition to the legislation by the Federal Bureau of Investigation and "the intelligence community."

Republican opponents of the bill promised to bring it up again early in the next Congress. But their suggestion that the measure should also be cleared by the Judiciary and Intelligence Committees indicates the task congressional privacy proponents face in the coming year.

Players Lineup

The intelligence agencies have long been prime players in some of the toughest information policy debates in Congress, and the Republican sweep of November will do little to change that.

One example: Congress for years has wrestled with the question of whether to permit the FBI's National Crime Information Center (NCIC) to implement a message switched telecommunications system to transfer computerized criminal histories between state and federal law enforcement authorities.

Civil libertarians, who have long argued the NCIC proposal smacks of a "Big Brother" national police system, are now openly worried the new, conservative Congress will readily embrace any law and order proposals and will give the FBI and other law enforcement agencies carte blanche to develop their technological capabilities.

Viewing the electoral defeat of liberal senators such as Birch Bayh (D-Ind.) and John Culver (D-Iowa), one Senate Judiciary Committee source put it this way: "Civil libertarian-wise, you can pack up the game; it's all over. No question about it, the FBI will get whatever they want."

Presumably this will include beefed-up NCIC systems and stalled, or at least watered down, privacy legislation.

That, of course, is an admittedly worst case scenario. Other observers note that the big unknown in the privacy debate is the philosophies of incoming legislators. Many of the newly elected Republican senators and representatives, it should be remembered, espouse a states rights attitude, which may tend to tamper intelligence community bids for powers that could be seen as constituting federal interference in state law enforcement activities.

Also, as one White House adviser noted recently, Congress has been severely embarrassed by the revelations of congressional bribe-taking related to the FBI's so-called Abscam operation and may not take kindly to any FBI proposal. According to this theory, the Congress will be greatly interested in privacy, if only for self-protection.

The way the new Administration and Congress approach these federalism issues will affect a number of issues relating to technology and law-enforcement. The Transportation Department's proposal to implement a national, message-switched telecommunications system to beef up the National Driver Register to track illegal drivers is just one example.

Another is the federal computer crime bill stalled by congressional attempts to rewrite the entire federal criminal code. The FBI has vowed to push for the bill, despite the opposition of some state law enforcement authorities and despite the fact the legislation's sponsor, Sen. Abraham Ribicoff (D-Conn.) is retiring from office.

Increasing Efficiency

In a related law enforcement issue — combatting fraud and abuse in federal programs — Congress and federal agencies have shown steadily increasing willingness to employ sophisticated technology.

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grams to identify welfare cheaters, student loan defaulters and other abusers of federal largesse has grown in popularity to the point that many congressional spending bills now include provisions for computer use to increase efficiency of federal programs.

The shock tactics proposed by designated Office of Management and Budget (OMB) director Rep. Dave Stockman (R-Mich.) to cut agency spending suggest increased use of computer matching techniques. Similarly, Sen. Richard Schweiker (R-Pa.), the day after he was announced as Reagan's choice for Secretary of Health and Human Services (HHS), said fraud and waste in HHS programs would be one of his first concerns.

Schweiker reminded interviewers that he has proposed cutting off federal funds to states that do not employ computers to make their Medicare and Medicaid programs more efficient. This type of computer use is something he wants to see more of, he said.

There are a whole series of related proposals to use computers to make government more efficient. OMB estimated recently, for example, that the government has not collected on outstanding debts of almost $175 million.

About $25 million of that constitutes money federal agencies would not or could not collect, including approximately $15.8 million in delinquent taxes. There is a growing congressional support for more Internal Revenue Service funding to increase its DP capacity so it can collect a greater percentage of the taxes owed [CW, Nov. 10].

In fact, a whole range of government information processing practices will be on the agendas of the Reagan administration and the new Congress. The recently passed Paperwork Reduction Act mandates a broad reorganization of agency responsibilities in acquiring and managing information resources [CW, Dec. 8].

When the law takes effect this spring, OMB must assume a greater burden for planning, procuring and managing information processing equipment and services. OMB's efforts will be overseen by the law's sponsor, Rep. Jack Brooks (D-Texas).

Brooks, a longtime advocate of increased and more economical computer use by federal agencies, remains chairman of the House Government Operatons Committee. As such, he will have as much, if not more, to say about federal DP practices and policies than anyone in the new administration.

But, in the long run, the development of federal information policy will depend on the ability and willingness of Congress as a whole to tackle some of the tough issues new technology raises.

A prime example is the protracted congressional effort to rewrite the 1934 Communications Act. The central question of how to restructure AT&T to allow it entry into the data processing field has been complicated by vigorous lobbying by Bell, its opponents and labor organizations, as well as the involvement of the courts. One of the biggest obstacles to pushing through the rewrite legislation, however, has been the "massive indifference" to the issue in Congress, according to Neustadt.

The rewrite bill is expected to come up early in the new Congress, but its prospects are clouded by the federal antitrust suit against AT&T and court challenges to the Federal Communication Commission's (FCC) Second Computer Inquiry decision that would allow Bell to enter unregulated data processing markets [see story on Page 19].

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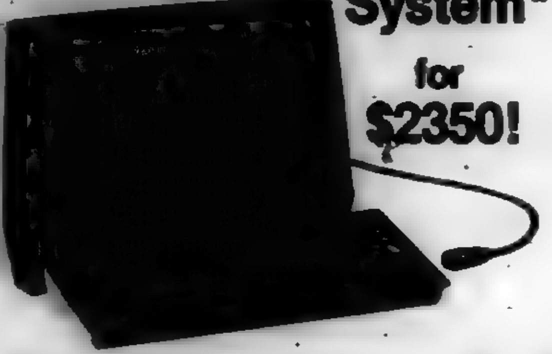

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A CLEAN SWEEP?

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One backer of the legislative effort, Rep. Albert Gore (D-Tenn.) also noted the bill has become something of a hot potato on Capitol Hill. Its main proponent over the years, Rep. Lionel Van Deerlin (D-Calif.) was defeated in November, and his opponent's charge that the legislation would raise home telephone rates contributed significantly to his loss.

Van Deerlin's defeat will make it harder to persuade other members of Congress to fight for the legislation, Gore predicted. He added that this and other information issues are a "real challenge" to Congress. The short-term outlook for Congress' meeting that challenge is not good, according to Gore, who said "I am a realist and do not have much optimism."

"The public rewards that ought to adhere to work in the information areas will increase as people become aware of the importance of these issues," Gore continued. People in the U.S. are only now beginning to realize "the significance of the information revolution," and there will be "increasing politicization" of related issues that will be harder and harder for Congress to ignore, he said.

Test Run

An early test of congressional willingness to tackle information issues will be the fate of the House Government Information and Individual Rights Subcommittee. Its chairman, Rep. Richardson Preyer (D-N.C.) was another victim of the November massacre and there is now a proposal to disband the subcommittee and spread its responsibilities among other government operations subcommittees.

Even if it remains intact, without Preyer the subcommittee's mandate to take on information issues could be severely weakened under new leadership.

Preyer has been for many years at the forefront of congressional attempts to address information issues, spearheading the fight for more privacy legislation and a more coordinated U.S. response to transborder data flow problems, to name just a few of his initiatives.

Another Preyer project was taking the U.S. Postal Service (USPS) to task for its nine-digit Zip Code scheme. Thanks largely to his efforts, the House and Senate agreed two weeks ago to delay the new Zip Codes until mid-1981.

The delaying measure, which would have allowed both houses to more carefully scrutinize the Postal Service effort to use automation to cut costs, did not survive the preadjournment parliamentary wrangling of the 96th Congress. Even so, the widespread support the measure gained on both sides of the Hill seems to assure that the new Congress will take a long look at the Zip Code expansion program.

The Zip Code expansion plan is just one of several postal technology issues Congress is expected to take up next year. Its proposal to enter the electronic mail marketplace is expected to come before the Senate Communications Subcommittee some time in 1981.

How Congress will go on the Postal Service's Electronic Computer-Originated Mail (Ecom) proposal is not clear at this point, but there has been considerable lobbying by private industry to at least limit Postal Service involvement in the types of telecommunications services private firms are rushing to offer.

Early Indications

Perhaps indicating the new administration's stance on Ecom, former FCC chairman Richard Wiley, now heading the Reagan transition task force at the Justice Department, said recently "if private industry can do the job, the government ought to get out; this extends to USPS as well."

If Wiley's philosophy is echoed by others in the Administration, it could bode well not only for the U.S. telecommunications industry, but also for vendors of on-line data bases and other sophisticated information services that are currently fighting to keep the government from competing with them.

One communications issue that seems assured of greater emphasis in 1981 is that of transborder data flow. After extensive congressional hearings and a House subcommittee investigation, Preyer introduced a bill that would drastically restructure federal activities in responding to data flow problems encountered by U.S. firms [CW, Dec. 15].

Although Preyer was not reelected and the bill was introduced too late in the session for the 96th Congress to act on it, there is reportedly enough bipartisan support for it to move forward in

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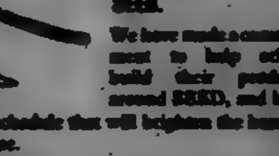

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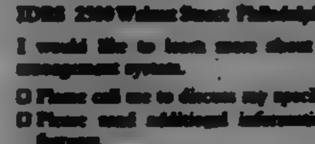

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(Continued from Page 66)

the new Congress.

There is also the possibility the Reagan team will reorganize the executive branch along lines that will preempt some of the provisions of the data flow legislation. In any case, it is apparently an issue whose time has arrived.

An official with the U.S. Trade Representative's Office noted recently the growing realization in official Washington of the importance of open international communications. "With the Hill beginning to push hard and everybody else beginning to recognize . . . how important it is," the official said, "I don't think that even if Reagan came in relatively opposed — and I don't think that would be the case at all because it's too important to the economy — that we wouldn't be moving ahead on it."

Enlightened Staffs

One school of thought has it that congressional consideration of the transborder data flow issues, with its aspects of international trade, finance, communications, technology and information policy, will help prepare the Senate and House for debates on a number of different information issues.

And, in the long run, the sophistication of all members and committee staffs of Congress will determine how information issues progress during the next several years. According to transition team member Wiley, Capitol Hill staffs are already "light years ahead" of where they were only a few years ago in being able to understand and handle information issues.

The significance of that remark can be gauged by keeping in mind that it is the staffs, both on Capitol Hill and in the executive agencies that handle most of the particulars of complicated issues such as those of information policy. It is often they who educate members of Congress and the Cabinet to the importance of these issues.

Indeed, staffing is currently the No. 1 priority in this town, both for the incoming Administration and for the Congress. With the new Republican majority in the Senate, many of the subcommittee staff positions are turning over. The same process is going on on the House side, where 74 new members take office in January.

But the 4,000 or so Capitol Hill positions changing hands pale in significance when compared to the turnover in the agencies, where at least 10,000 people will be brought in through political appointments and to fill jobs left vacant by the retirement and transfer of high-level civil servants.

The possible demise or downgrading of the Preyer information subcommittee and the rumored breakup of the National Telecommunications and Information Administration, which serves as the President's chief communications adviser, only add to the uncertainty of those concerned with federal information policy.

Corporate Model

In the final analysis, every one of the information issues mentioned above is up in the air. Much will depend on where the longtime staffers who have been fighting for these issues end up in the administration and Congress, whether they remain to push the issues on the new cabinet and congressional committees or are lost in the bureaucratic shuffle being orchestrated by Reagan and the new legislators.

On the administration side of the equation, one close Reagan adviser, former Diner's Club chairman Alfred S. Bloomingdale, was quoted recently as saying "running the government is like running General Motors." Indeed, the president-elect is staffing his administration as one would a large corporation.

What this will mean for information issues is at the moment unclear. How the corporate executives, supply-side economists and neoconservative politicians flocking to this city will approach information issues is as yet an unanswered question.

But if General Motors is truly to be the model for the new government, it should perhaps be noted that the giant auto maker currently advertises itself as the largest producer of computers in the world. Then again, General Motors is part and parcel of the same industry that brought us the Edsel.

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By Rita Shoor

DEFENSIVE SOFTWARE DEVELOPMENT

CHICAGO — When more than 100 lawyers from firms throughout the U.S. spend two full days discussing the implications and ramifications of computer software litigation, it is safe to assume that more information specialists than ever can expect a day in court relatively soon — maybe even in 1981.

Most speakers at the National Software Protection Conference here recognized that the jargon tied so closely to lawyers' and software programmers' specialties could make interaction difficult at best. "Most lawyers think Fortran and Cobol are wash-and-wear fabrics," admitted Robert Milgrim, a specialist in trade secrets (see related article). He was only half-joking.

However, Albert Madansky, a professor of business administration from the University of Chicago, managed to cut across this language barrier to speak to the nonlawyer conference attendees with his paper on "Defensive Software Development."

Rather than discussing issues of physical security or legal protection mechanisms, he confined himself to software-specific items that might be incorporated during the software development process. If they are implemented, these techniques may lead to successful prosecution of an unauthorized appropriator of trade secrets, according to Madansky. And, if a user should wind up the defendant in such a case as that involving Minnesota Title Financial Corp. [CW, Dec. 1], these items may provide some pointers for defense.

First, Madansky recommended a concept called "development accounting." This is not a financial accounting of project costs, but a process by which "the entire history of program development and inspection is recorded and summarized for management review."

According to one of Madansky's sources, development accounting requires a group of nonprogramming personnel who maintain the status of the programs being developed and record the history of this development. These people, who were compared to financial accountants, are also required to archive all documents generated during the development process — including faulty computer runs. The programmer is no longer responsible for managing the program materials.

While this type of program development history would seem to lead to "paper overload," R.C. Linger and H.D. Mills claimed in their book, *On the Development of Large Reliable Programs*, that this would not happen for the following reasons:

- Fewer runs would be made because "high-precision" programming techniques including the development history itself provide a better information base for the programmers.
- Development accounting leads to better clerical procedures which, in turn, permit easier access to large volumes of paper. In contrast, the authors described programmer-kept histories as "usually piles of unburst listings."

Madansky maintained that development accounting facilitates the recording of trade secrets while they are actually being created rather than after the fact. These secrets are not thought of in the planning process nor are they "readily identifiable upon looking at the final product," he said.

The top-down approach during the program development process was second on Madansky's list of recommendations. He defined the methodology as requiring a flowchart of major functions to be accomplished by the program. The flowchart is then tested — mostly through a set of dummy programs — and then each major function in that flowchart is broken down into subfunctions to produce a more detailed flowchart, which is again tested.

Aside from arguing the virtues of this process for designing programs, he indicated that the succession of flowcharts at various levels of the software development makes it easier to recognize the main ideas of the trade secrets being protected.

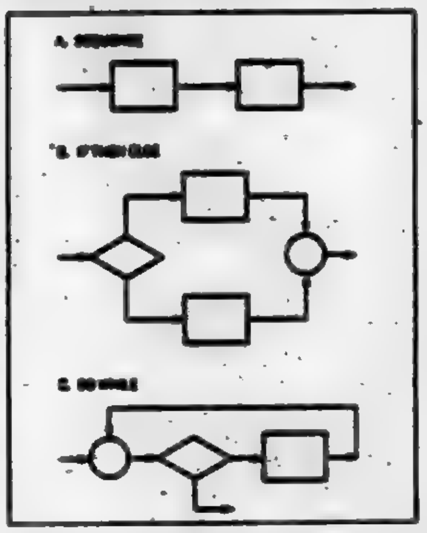
Mandansky advised the use of modular programming as a technique that allows the trade secrets to be more recognizable in the code itself. He gave the following rules of thumb for constructing the modules:

- Use symbolic parameters rather than embedded constants.
- Centralize assignment of values to parameters.
- Separate I/O from computational modules.
- Avoid sharing temporary storage locations.
- Use general-purpose subroutines as much as possible.

Madansky's fourth suggestion was to use structured programming — a technique that has generated an increasing amount of interest among *Computerworld* readers during 1980. He described this concept as consisting of the following processes: direct sequence; IF . . . THEN . . . ELSE; DO WHILE (see accompanying flowcharts).

In addition to blending with the top-down concept and being self-documenting, structured programming makes the disguising process which usually occurs when a program is stolen both more difficult and more apparent, Madansky maintained. The disguised program is usually a deliberately obscure version of the original and the structured form makes it easier to detect the transformation process.

He also advocated the use of decision tables to document the nature of the logical flow of basic and secret algorithms. While it is easy to alter a program's flow and the accompanying flowcharts, it is much more difficult to disguise this type of basic algorithm, he noted.



Sixth on his list was a recommendation to create an inventory of programming styles of the people who were involved in the original software development. This library could be used as an aid to spotting vestiges of that style in allegedly misappropriated software. He also suggested including a slight, deliberate error in each program — a technique that has been used successfully by map publishers to detect plagiarists.

Finally, he recommended that the software creator produce a catalog of the software's functions and features and annotate this catalog by pointing out what "potential extensions and/or modifications are merely that and not representative of novel development." While the features comparison is the weakest disproof of theft of trade secrets, he said, such a catalog might be useful as a counterargument.

Forecast '81

By Rita Shoor

SOFTWARE LITIGATION TRENDS

CHICAGO – Trade secret law, copyrights or patents – these are the tools available for protecting software.

But which choice is best? When lawyers from all over the country met at the recent National Software Protection Conference here, the consensus seemed to be that while trade secret law offers the best software protection, it is essentially a Hobson's choice.

The legal profession's fascination with these choices is probably prompted by the fact that litigation involving software may be on the rise. While the courts began to address the problem in 1980, as evidenced by the U.S. Supreme Court's decision to take up two cases involving patent protection for the computer industry [CW, Aug. 25], lawyers attending the conference predicted an increase in software litigation cases for next year.

One reason for the upswing in court cases may be that the available options are "old legal techniques which are being crammed and squeezed" to fit the needs of new technology. That was the opinion of Roger Milgrim, an adjunct professor of law at New York University's Law School, who spoke on "Trade Secret Law to Protect Software."

While conceding that patent law, copyrights and trade secret law are less than perfect, Milgrim flatly told attendees, "If you're not interested in less-than-perfect legal solutions, let's all go home."

The shortage of programmers in a labor-intensive industry will make a secondary contribution to the number of times software has a day in court. A shortfall of approximately 50,000 programmers has been predicted for 1981. This would naturally lead to a severe shortage of new application software. Therefore, as Milgrim pointed out, the pressure to misappropriate, misuse or otherwise improperly channel proprietary software may reach a "distressingly high level."

An awareness of the current attitude of the courts toward computer software is obviously necessary for any software development firm. However, end users and purchasers of proprietary software would also be well-advised to keep up with current litigation trends. This is illustrated by the recent suit brought against Minnesota Title Financial Corp. for alleged theft of a program licensed to the firm by Programmed Closing Systems, Inc. [CW, Dec. 1].

Both patent and copyright law were given relatively short shrift by Milgrim as far as software protection is concerned. He described the Copyright Act of 1976 as an "execrable piece of legislation . . . very complex and convoluted." Its most useful purpose may be that of "providing more activity for lawyers," he quipped.

Assuming that President Carter signs the recently passed Copyright Act of 1980 into law, it will supersede the 1976 act. However, one speaker who delved more deeply into the implications of the legislation described sections of the 1980 act as "rather poorly drafted" (CW, Dec. 15).

Peter Maggs, a specialist in copyright law from the University of Illinois felt that many of its potential loopholes result from a technological orientation that was "10 years out of date". Maggs indicated that copyright protection might be desirable for manuals tied to a computer program or for software that makes obtaining signed trade secret agreements impossible because of its mode of distribution – but not for complex software containing trade secrets.

If copyright law is less than satisfactory, patent protection does not look much better. Firms considering patent applications for proprietary software might do well to consider court decisions for the last 10 to 15 years, Milgrim cautioned. More than 70% of all patents adjudicated in court have been held to be invalid or unenforceable, he said.

While it is conceivable that the two upcoming Supreme Court cases might be exceptions, Maggs felt that "it will be the rare . . . program that is patentable." And, since it is necessary to reveal the underlying technology of an invention to obtain a patent, the software developer has little recourse if the patent is later deemed invalid.

Finally, although a patent offers considerably more protection than does trade secret law, there is little provision for enforcement, Milgrim said.

So, one is left almost by default with trade secret law, which leads to a new set of considerations. For example, trade secrecy offers no protection against the possibility of a third party developing essentially the same software independently and without access to a protected product. In addition, unlike the Copyright Act and Patent Act, trade secret law has no statutory framework. It was essentially "pulled out of the sky from common law" and is almost decided on a case-by-case basis, according to Milgrim.

Keeping this in mind, how does one ensure that he is entitled to trade secret protection? First, one must establish that the matter being protected is actually used in one's business. Second, it must be something "not generally known" in one's trade or business. Third, this information must lend some sort of competitive advantage. Finally, it must be used secretly.

Given these restrictions, the software developer must answer several questions correctly if he hopes to utilize trade secret law. Is he using his software secretly if his employees have access to it during its creation? Milgrim said that if the employer follows "basic steps" of limiting access to those employees with a "legitimate need to know," the answer is yes.

But what happens when you market the software? Once you have licensed the software for use by clients, can you still be said to be using it in secrecy? Milgrim's answer was "probably . . . if you employ the appropriate contractual and other techniques to ensure secrecy."

This means binding the recipient to respecting secrecy – something that may not be particularly easy to do when enmeshed in the selling process. After all, the client must guard his own interests by limiting his potential liability vis-a-vis a licensed software package as much as possible. In addition, the client's attitude may be, "We'd rather not be bothered . . . we don't know if we can police it and we don't want to take on obligations like that," Milgrim warned.

Another problem may arise because programmers often have the tendency common among scientists to "spill their hearts out" about their projects. The employer must make sure employees understand – preferably by contract – that what is imparted to them or developed by them in the employer/employee relationship is subject to restrictions on use or disclosure. They must realize that they cannot later work for a competitor and use this knowledge again, Milgrim emphasized.

While the best way to prevent competitive use of trade secrets is to restrict competitive employment, this is not possible in some states. California – one of the country's centers for computer software development – has a specific law to prohibit noncompetitive covenants, he pointed out.

Even with these gray areas, Milgrim indicated, trade secret law is generally preferable to either copyrights or patents on software.

Until the courts have set up some precedents to recognize software as a process, method or an idea, trade secrecy may well provide the best available protection.

Rita Shoor is senior editor, software, at CW.

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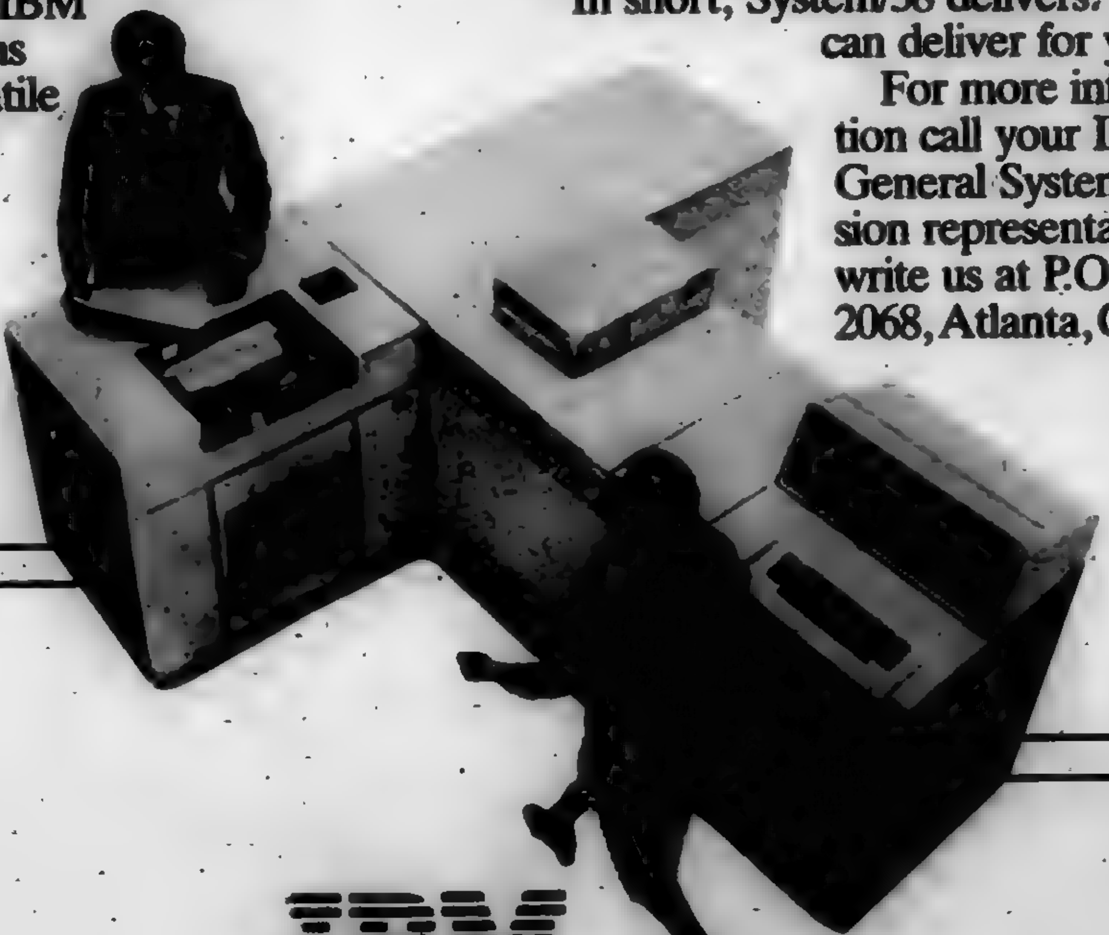

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TECHNOLOGY TRENDS FOR THE BELL SYSTEM NETWORK: Interview With John S. Mayo

How do you see the Bell System network of the future — say, 10 years from now — in terms of the technologies on which it will be based?

We're sure to see rapid growth in the use of digital techniques and software-controlled systems. Both these trends were spawned by advances in microelectronics technology, which have made them economically practical. Today, digital electronics and software-controlled systems are finding a place in every nook and cranny of the network.

Light-wave transmission will become increasingly important. The potentially low cost of light-wave systems and their ability to readily handle high-speed digital signals will result in more and more transmission of information by photons, rather than by electrons.

Computers ranging in size from single chips to large maxicomputers built into the network already make it highly intelligent. As greater numbers of circuits are packed onto silicon chips, we'll be able to put even more intelligence into the network of the future. Because computers run on software, software technology is becoming the foundation of this network.

What will this new technology mean to customers?

This largely digital and very smart network will enable the Bell System to bring a host of new services and features to our customers. For example, we can extend stored program control almost without limit to meet a wide variety of customer needs. In stored program control, a machine is controlled by instructions stored in a memory and executed by a processor.

Mayo is executive vice-president for Network Systems at Bell Laboratories in Murray Hill, N.J.

His responsibilities at Bell Labs include electronics technology, transmission systems, switching systems, operations support systems and network planning.

In a copyrighted interview with the Bell Laboratories Record *(November 1980), Mayo discussed both established and emerging technologies and their impact on telecommunications. Mayo was interviewed by* Record *Associate Editor John H. Ten Eyck.*

Low-cost digital electronics means that customers will be using more machines and terminals that "speak" to each other in digital signals. The network has always been able to handle these signals, but as it evolves, it will handle them more efficiently. This will bring the customer new and affordable services, ranging from energy control to computer networking.

How widely will light-wave transmission be used in this network?

I think light-wave transmission will be used more extensively than most people thought when the technology was first introduced. There are several reasons for this, but perhaps the most important has been the development of very low-loss fibers. Fewer repeaters are needed to transmit a signal over a given distance, and equipment costs are reduced. Low-loss fibers make light-wave systems particularly attractive for overseas communication via submarine cable.

As digital technology becomes more important, so does light-wave transmission. Light-wave systems are usually digital: Information is transmitted in a digital stream of light pulses. The fact that light-wave cables are small, immune to electromagnetic interference and easy to install also contributes to the pace at which light waves are entering the network. And the raw material of glass fibers — sand — is much more plentiful than copper. There are several Bell System light-wave systems in service today.

What developments are needed before light wave can be used in the subscriber loop, the telecommunications link between the central office and the customer?

I think light wave in the subscriber loop is primarily an economic issue. The technology we have today, in fact, has been used in the subscriber loop.

For example, there's an installation in Connecticut and the Lake Placid system set up for the Winter Olympic games — both are basically subscriber-loop arrangements.

But what you have in mind, I'm sure, is using fibers for the very large number of loops going directly into customers' homes and businesses. Light wave is best suited to bulk digital communications. While it will become economically practical to use light-wave systems to bring a large number of channels to the vicinity of a cluster of customers, it will be quite a while before it is practical to run fibers right up to their telephones.

Moreover, connecting the fiber directly to the telephone leaves some problems still to be fully solved. For example, fibers cannot yet carry as much power as wire pairs to ring main stations and extensions. But we're making progress in this area.

Bell Labs is working on light-wave communications systems that transmit light of lower frequencies, or longer wavelengths, than existing light-wave installations. How will these systems increase the usefulness of light-wave communications?

Principally by improving the economics. The actual and theoretical loss of fibers is considerably lower with the longer wavelengths. Because this allows increased spacing between the signal-regenerating stations, the total cost of the electronics needed along the light-wave route is considerably reduced. With longer wavelengths, we can also transmit information at faster bit rates, which offers another economic benefit.

The first long-wavelength light-wave communications system, which uses a light-emitting diode, is now being tested by the Bell System in Sacramento, Calif.

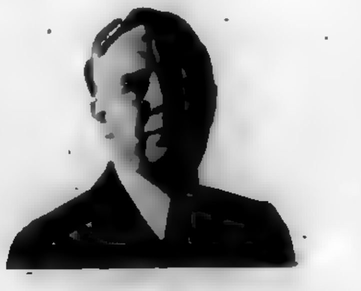
The Bell System has been using satellite communications for nearly 20 years. How will future satellite communications differ from systems now being used?

I think the difference will be measured in terms of flexibility and capacity. Scanning beams — one possible approach to adding to the geographic locations served by a satellite — is a concept announced by Bell Labs researchers some time ago. Scanning-beam satellites would be more selective than today's satellites. Rather than showering signals over a wide area, they would use sharply focused beams to deliver digital signals to hundreds of earth stations. And a gradual move to higher frequencies will give us more bandwidth, so satellites will be able to relay a greater number of signals simultaneously. The increased bandwidth also allows greater flexibility in handling digital signals.

We should also keep in mind improvements in the components that go into satellites. For example, our echo canceler chip has especially improved the quality of satellite-transmitted conversations. Right now, Bell Labs is making important advances in the design of gallium arsenide field effect transistors, which we're using in amplifiers for our terrestrial microwave systems. These transistors will also be used in satellite systems. And our research and development work with batteries continues to increase the useful lifetimes of communications satellites.

Meanwhile; what is the future of the analog portion of the network? Will analog remain an important transmission technique?

Analog facilities have significant versatility — they aren't limited to transmitting only analog signals. We've been transmitting digits over analog facilities for a long time. And there's a significant advantage in transmitting some types of signals in analog form over certain facilities — voice, for instance. You can't transmit voice signals digitally over a 4-KHz channel and get good quality. There are some applications, particularly with radio systems, where the extra bandwidth needed to transmit digital signals limits equipment capacity and makes digital transmission costly.



I think the time scale involved in digitization of long-haul facilities via light waves and satellites spans many years. During this period, our trans-

FORECAST '81

By John H. Ten Eyck

mission needs increasingly will be met by digital facilities, reducing the role of analog facilities in the network. But I don't see any places where anyone wants to go out and displace analog equipment or not use it to its fullest capacity. Quite the reverse. It will be used very effectively for many years to come.

The Bell System is in the process of deploying a nationwide network of software-controlled electronic systems larger than any existing or planned computer network. How close are we to achieving such a total stored program controlled network, and what do we still have to do to get there?

From the point of view of technology, we are very nearly there already. By that I mean that over half of the toll circuits today are served directly by stored program controlled switching systems; and in 1979, the number of trunks equipped for common channel interoffice signaling (CCIS) nearly doubled. CCIS is a separate intelligent network that carries call setup and disconnect information between stored program controlled switching systems. Back in 1965, we introduced stored program control into local switching, and a sizeable part of the local plant, too, is now equipped with ESS machines.

Are developments in hardware or software the stimulus to the stored program controlled network?

Both. Hardware and software are not as separable as they once were considered to be. Maybe the stimulus is a combination of the two in the form of systems architecture. Systems architecture — an extension of what we used to call systems engineering and systems design — considers both hardware and software. This unified approach accounts for much of the flexibility of the stored program controlled network when it comes to changing the network or updating it to meet new demands and to provide new services and features.

We hear a lot about the evolving Integrated Services Digital Network, which will further extend digital technology and services into the existing telecommunications network. What is the Integrated Services Digital Network, and what steps are being taken by the Bell System to implement it?

The Integrated Services Digital Network is more of a concept than an actual network, and it means different things to different people. Generally it is a combination of digital switching systems interconnected by digital transmission facilities and linked to customers by digital subscriber loops. This network would carry high-speed digital pulse streams to homes and offices equipped with digital terminals.

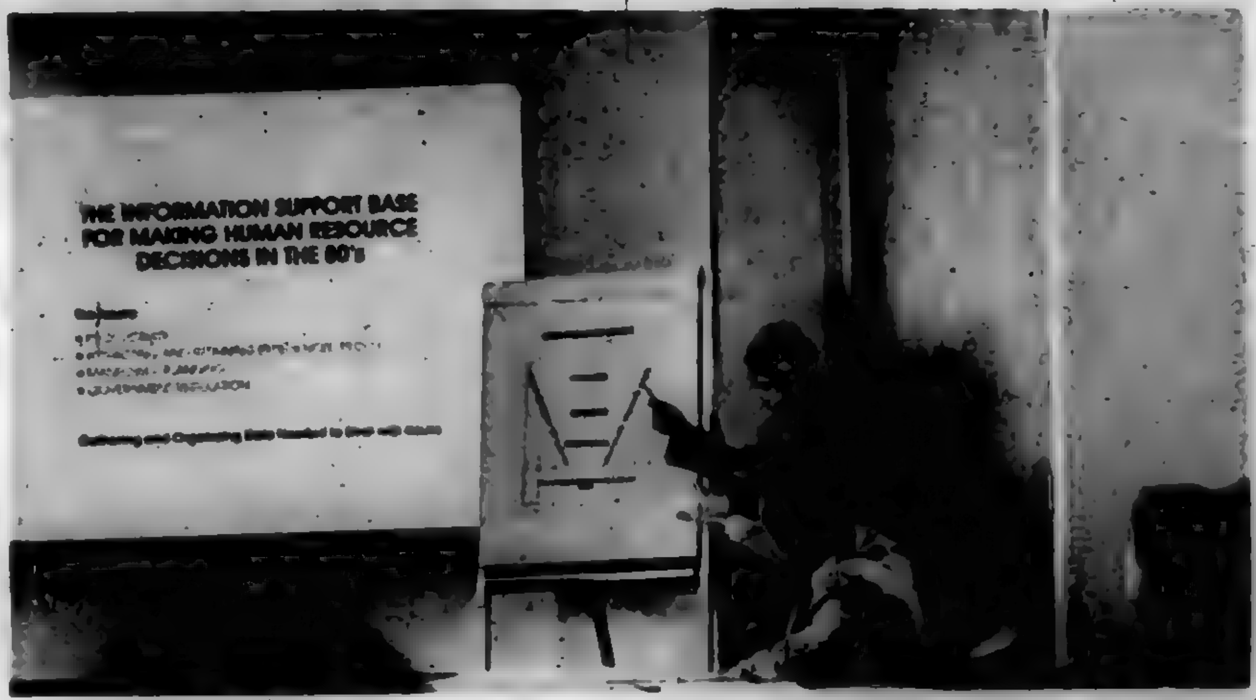
In a sense, we already have an integrated services digital network. Digitization of the telephone plant has been proceeding according to a general plan set up a long time ago.

Will there be a role in the network for intelligent terminals, or distributed processing, where local terminals or small computers can be programmed to handle some of the work of large, centralized computers?

Yes. From a network viewpoint, the beauty of intelligence spreading out to the ends of the network and penetrating customer terminals is that it will give rise to lots of exciting new services — many of them inherently digital. One of the drawbacks to an extensive digital capability in the network has been that there weren't all that many digits to transmit. So, the more the merrier, as far as digits are concerned.

How will new developments in electronics technology aid the develop-

(Continued on Page 76)



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(Continued from Page 75)

ment of stored program control and the Integrated Services Digital Network?

Mainly by providing lower cost electronics. The major thrust in electronics technology today very-large-scale integration (or VLSI), lowers equipment costs by putting more components on a single chip. Lower costs also result from the very high-speed operation of tightly packed VLSI circuits. The shorter the distance that signals must travel through the components of a microprocessor, for example, the faster it operates and the more work it can do. Although VLSI doesn't give you much technical capability that can't be provided by large-scale integration (LSI), lower-cost electronics means more memory and intelligence can be used in the network.

As to the digital network, VLSI and LSI are well matched to digital functions. A high-quality digital logic gate, the basic building block of all digital systems, cost a few dollars 25 years ago. Today, a quality logic gate costs only a few tenths of a cent, sometimes less. A cost reduction of this magnitude cannot help but widen the field of applications for digital systems and hasten the evolution of the integrated services digital network.

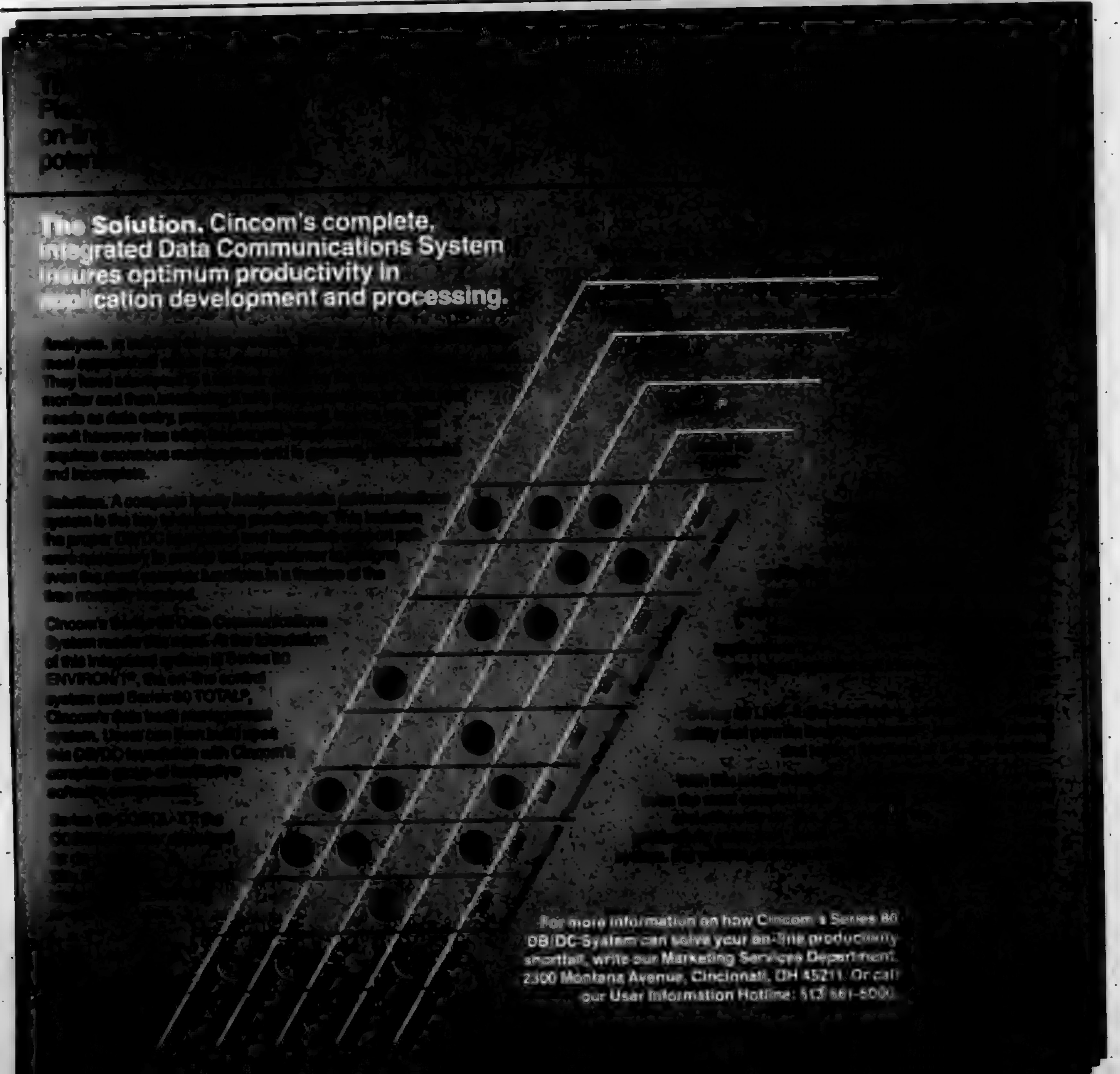
What new services and systems might be made possible by VLSI?

In the realm of telecommunications, there's a whole spectrum of things that have been conceptually possible for a long time, but which low-cost modern technology is only beginning to make feasible. For example, we live in a time when energy usage is critical and will become even more so in the future. Microelectronics and communications technologies together offer significant potential for energy management. Turning lights and other kinds of electrical equipment on and off in homes and places of business in an intelligent way is a simple task for microprocessors.

They can also monitor doors and windows to provide security for lives and property. Microprocessors easily connect to communications links to centralize surveillance and control. There's also the opportunity of associating telephone lines with television sets to call up and display text and data. These examples just skim the surface.

So I think the tremendous potential of VLSI is that it can put complex electronic systems at the disposal of people who couldn't previously afford them. This potential has caused what we call the microelectronics revolution, and it, in turn, has introduced us to the information age.

How have advances in computer-aided design fostered the development of VLSI?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FORECAST '81

Well, perhaps it should be stated the other way: The development of VLSI has fostered the use of computers to aid in designing circuitry. The reason for this is obvious. VLSI chips, with hundreds of thousands of components per chip, are already being produced in large numbers, and we're clearly going to up that component density to a half million and probably a million or more.

If you have a million components on a chip, you'll need two to three million interconnections between them. All that "wiring" must be put on the surface of the chip, and it won't work unless every connection is right. The only way you can design at this level of complexity and be sure the resulting device will work is with sophisticated computers.

Don't get me wrong. It's still the people and not the computers who are the real heroes.

You said that hundreds of thousands of components per chip isn't the end for VLSI — there is a step beyond. What are we doing to go this extra step?

VLSI is part of a continuum. The number of components we can put on a chip has been doubling each year since the integrated circuit industry began around 1960. We went from a few components per chip, to tens of components, to hundreds and thousands of components. As a matter of fact, the progress has been so fast that there isn't a common definition of LSI and VLSI.

What comes after VLSI is yet to be determined, but let's assume that it's going to start at a million to 10 million components per chip. We'll need new technologies to reach these densities, and we've been working on them. One of these is X-ray lithography, which lets us produce even finer features on a chip than are possible with some other technologies in general use.

We are arriving at the point where the wavelength of the light used to trace a pattern on an integrated circuit chip is too long compared with the small apertures in the masks used to fabricate these integrated circuit patterns. X-rays have very short wavelengths, so by using them to expose a pattern on the silicon surface, we can extend the limits of lithographic techniques.

We have also developed electron beam techniques for preparing the lithographic masks needed to define circuit patterns. These techniques use very fine beams of electrons to "write" a pattern on the lithographic mask. In the future, this technique may be used to write patterns directly on the surface of the silicon chip, avoiding the need for masks altogether. Using electron beams to write directly onto silicon, we may someday produce circuit densities 10 to 100 times greater, maybe more, than we are capable of producing today.

In the past, silicon processing largely depended on the use of liquid chemicals. New "dry" processes are allowing us to define increasingly fine circuits that would be difficult to fabricate with "wet" chemistry.

In these and other areas of silicon processing, we are making great progress, as is the rest of the industry. And I expect that complexity per chip will continue to grow for some time.

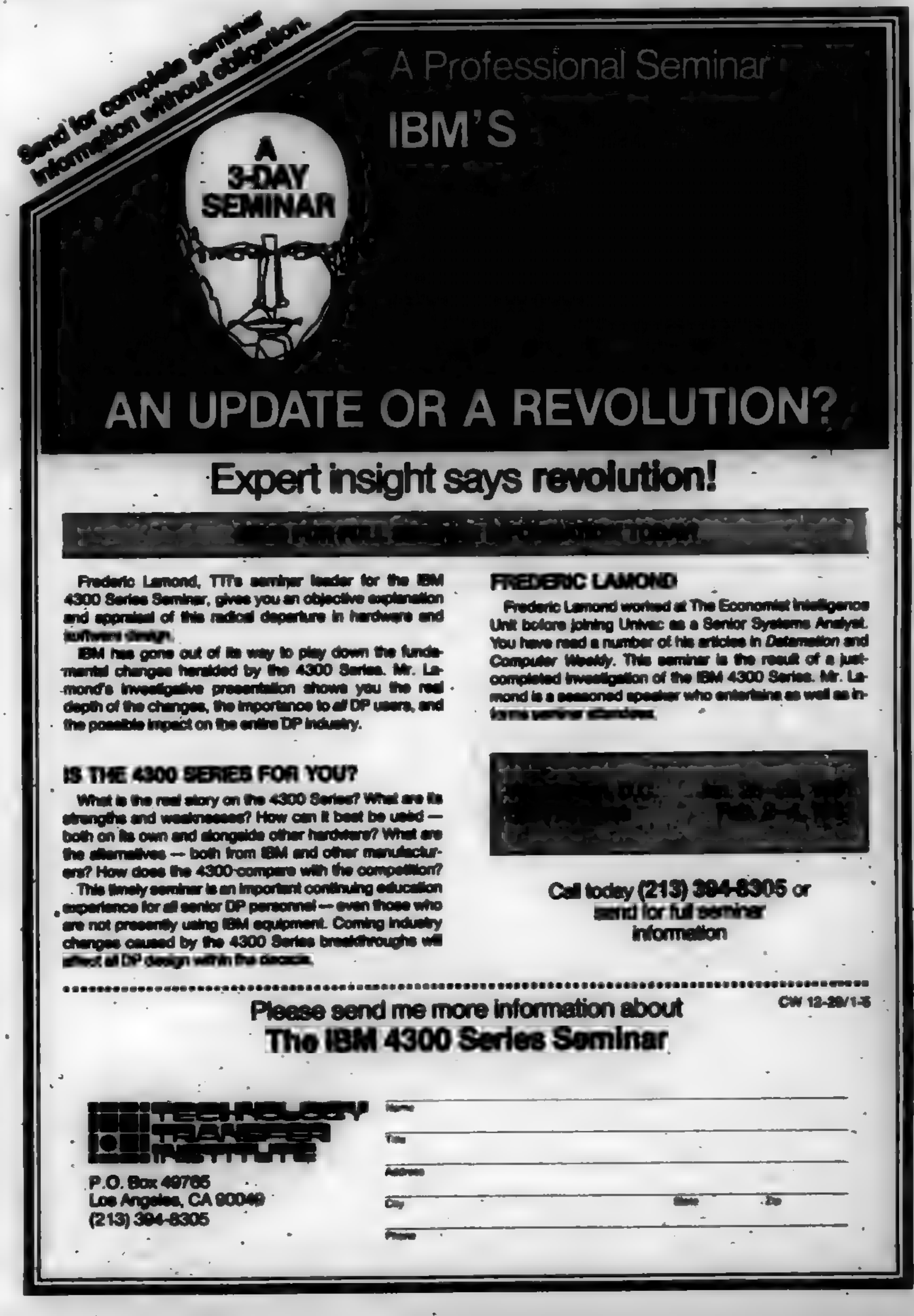
Advances in microelectronics have done much to further the application of computer technology to the network. But what of the software that makes computers do what we want them to do?

Progress is being made toward developing a science of software, but I think a good deal of this progress is in our attitudes toward the science. Software science may not conform to established notions of what a science is.

Will insights into the fundamentals of software lead to analytical breakthroughs of the kind we have had in the physical sciences? Maybe, but I'm skeptical.

But there are other questions we can ask about a science of software: Does software design have a regimentation, established procedures, approaches that can be documented? Can people be trained to design software by other means that an apprenticeship, a close working relationship to an expert? Can you teach software design using textbooks?

The answer to all these questions is yes. We have new employees right out of our colleges and universities who can go right to work designing software. So we must have a science of software, although it's not as analytically powerful as we would like, nor is it yet helping us to make great strides toward improving programming productivity. This is unfortunate — the world needs more software.



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FREDERIC LAMOND

Frederic Lamond worked at The Economist Intelligence Unit before joining Univac as a Senior Systems Analyst. You have read a number of his articles in *Datamation* and Computer Weekly. This seminar is the result of a just-completed investigation of the IBM 4300 Series. Mr. Lamond is a seasoned speaker who entertains as well as informs seminar attendees.

[illegible]

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THE ERA OF MASS MARKETING

Observers in the computer industry have foreseen for some time that the fastest growth sectors for the next two or three decades will be those involving what the mainframe manufacturers call the intermediate and small machines.

While the next few years will see leading positions established in the mass marketing of such machines, it is the next two years or so that will tell us much about who is going to lead — and how.

There can be little argument about some aspects of the long-term trend. Recent statistical reports (including International Data Corp.'s *EDP Industry Report*, May 1980 show) the decline in the number of general-purpose computer systems in use in the late '70s and reveal less than 20% annual growth in revenues from this sector for the large mainframe companies as a group.

In contrast, "small business" and "personal" computer sectors have grown more than 30% per year. Reputable analysts project industry sales of several billion dollars per year for the small systems market by the mid-'80s. Anticipations of greater growth in the area of smaller machines are rapidly being confirmed, and we see this process as a fundamental change, or evolution, in the nature of the computer industry.

It is important to keep in mind how the driving force behind this evolution, progressively lower costs per function, affects market development. Picture the increasing uses of DP as an expanding cone of development in which new sectors are steadily and progressively penetrated.

Just as steam, diesel and electric "prime movers" gradually spread beyond the central mills, factories and utilities where they were first employed, computer power too is disaggregating and spreading outward to millions of small niches in the economy.

In large corporations, for example, the movement is outward from the central computer site to the offices, factory floors and warehouses. On the national economic scene, computer power is emanating outward from the 50,000 firms with annual sales of more than $5 million to the more than two million companies with sales of less than $5 million. And within this small business sector, the movement is trickling down from the larger businesses to the smaller ones.

Beyond the small business market are 70 million households as yet untouched.

A change in product marketing characterizes this evolution as it has evolutions in other industries. Commercial refrigeration units are engineered and sold with considerable man-hours per installation, while household refrigerators are mass-marketed. Similarly, we are clearly headed toward the mass-marketing era of the data processing industry.

The Next Two Years

Retail stores are the primary mass-marketing outlet in our economic system. But they are not now and will not be in the future the only means of selling small computer systems. Many DP products will be incorporated in other consumer goods such as automobiles, video recorders and cooking ranges.

Nevertheless, companies are lining up on, or just breaking across, the mass-marketing/retailing border. Who are they and where are they headed?

Vendors are surging toward the mass market from every quarter of the industry and from some quadrants not previously recognized. We will touch only some high spots to illustrate directions of activity.

Two Approaches

Only two mainframers — IBM and Control Data Corp. — have signaled a clear intent to get into DP retailing. Their approaches differ as much as their companies.

IBM's approach might be termed the top-down, manufacturer-controlled approach. Coming from the general-purpose mainframe quadrant, the company has been moving toward the retail market with the downward extension of its product line, its 25 business computer centers and its new store in Baltimore. Rumors in the industry suggest that thousands of retail outlets will follow.

One can be reasonably confident that IBM plans to sell IBM products, IBM networks, IBM software and IBM "solutions" in these stores. IBM's penchant for market control seems likely to extend as far as it can go. While control of small business users seems unlikely, control of the product lines in tightly organized outlets is clearly feasible — and expected.

Following the wave downward from the high end, IBM is not visibly oriented to the "personal computer" market as yet.

CDC's approach tends toward a "services supermarket" concept. The company will not be selling CDC hardware as much as it will sell CDC services. Its concept for the 100 or so outlets envisaged seems to be to offer businesses a range of services including credit, management counseling and a variety of hardware and software management tools and aids. CDC considers itself a system integrator on behalf of the small business client.

Xerox Corp. enters the scene from the high-technology portion of the office supply spectrum. The company is pioneering what might be called an "office hardware supermarket" approach, offering copiers, small computers, staplers, paper clips and so forth. Xerox has gone to the extreme of selling a non-Xerox wet copier in its efforts to offer a full range of office equipment.

These large companies are similar in pitching their current campaigns at the retail business supply store level rather than at retail stores for individual customers.

Mini Makers

Minicomputer manufacturers are active in the marketplace, but Digital Equipment Corp. and Data General Corp. are taking different routes.

DEC, like IBM, seems to approach the store market from the top down, with manufacturer control. DEC's rapidly growing stores are also in the business supply store mode.

DG apparently foreswears control of the retail outlet, but clearly sees the need to push its product line down to the size and expense categories that can be handled by such outlets. DG has a large distributorship now, and the company plans to bring some of the amenities of the larger systems to the small systems market.

DG hopes to assemble products with sufficient potential for modification that they can be tailored to a variety of marketing channels, including specialty marketers. Precisely when DG will penetrate the under-$5,000 market is not known, but it probably will not be in the next two years. But the company, aware of what the discount stores have done to the traditional department stores, appears to understand the need to protect itself on the underside of the market.

Dan DeLay, a product line manager in DG's General Distribution Division, projects a strategy in which the manufacturer builds and orchestrates a complement of capacities in hardware, language choices and general program products (such as report generators and word processing plus particular application programs) and then exploits the capacities of various independently owned marketing channels to "tune" these capacities to the requirements of multitudinous market niches — doctors, lawyers, warehouses and so on.

Ohio Scientific in Aurora, Ohio, exemplifies the company that takes a fling at its own outlets, but eagerly opts for a place in a larger company's network when given the chance. Such probing opportunism may be repeated in this area more than once over the next two years.

Keeping Old Ties

The established mainframe and minicomputer firms that venture into the mass market will not abandon their contacts with corporate hierarchies or their one-on-one customer contact systems. Larger equipment sizes require such contacts. Contacts at the corporate level are also, as IBM knows, a way of moving large quantities of smaller equipment to divisions and branches.

Rather, the stores are a means of extending the marketing spectrum. The companies make a clear distinction between large-firm and small-firm buyers and are aiming their store outlets at firms in defined size brackets. One company defines the size as less than 20 employees, another as more than five employees. Interestingly, one is already looking at the office in the home.

The word processing vendors are out there at the "business supply store" level. One can see in their offerings a clear intent to provide as much of the full complement of office DP services as can be extracted before others soak up the available office space. We do not, however, see these companies creating owned chains of retail stores of the Radio Shack gender in the near future.

And then there are the newcomers to *Datamation*'s top 100, such as Apple Computer, Inc., Commodore Business Machines, Inc. and Tandy Corp. (Radio Shack), which sell the smaller variety of desktop computers. Of the three, Tandy most clearly illustrates the bottom-up approach. Working from an established network of consumer stores, Tandy first aimed at the personal market, but quickly raised its sights. Some in the computer industry may have misinterpreted this shift. Tandy has no more abandoned the personal computer market than IBM has abandoned mainframes. It is simply extending its line.

Spreading Like Crabgrass

What can we say that the stock market hasn't already said about the success of the companies coming into the market? They are spreading retail outlets like crabgrass, and the sales charts will show steep angles of ascent for at least the next two years.

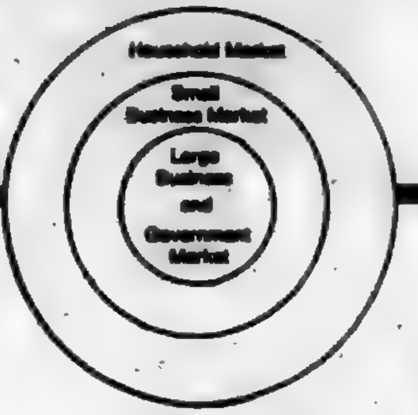
While the success of the bottom-up

C. Jack Pearce is an attorney based in Washington, D.C. Pearce was formerly with the Antitrust Division of the Department of Justice and with the White House Office of Consumer Affairs. He was also general counsel to the Computer Industry Association (now the Computer and Communications Industry Association).

Claude Ryo Shirai is president of Washington Nichibei, Inc., a research firm located in Washington, D.C.

The authors wish to express their appreciation to Steven R. Ratner, a student at Princeton University who furnished valuable assistance in assembling data and otherwise preparing this article for publication.

By C. Jack Pearce and Claude Ryo Shirai



Concentric Circle Chart
Of U.S. Computer Market

firms is now obvious, it took Radio Shack's demonstration of the timeliness and feasibility of the retail store concept to prove it. These mini-micro firms constitute a cutting edge as real and as important as the latest supercomputer architectures, though on a different scale.

While the DP industry is feeling its way toward productive combinations in the still *terra incognita* of retailing, retailing itself is a very old art. One can use some of retailing's history to predict the future of DP mass marketing.

First, there never has been any shortage of people to set up and run retail stores. Many of these people, as Xerox knows, can be recruited from existing retail establishments.

Without much impetus from manufacturers, the DP retail marketplace is already populated by hundreds of small, family-owned stores, a few small franchised chains, a few somewhat larger chains of company-owned stores and Tandy's big net.

If DP and marketing histories are reasonable guides, the next two years will see a 25% or more increase per year in the number of stores.

Second, the "chain" phenomenon, in which local management and often local ownership are married with standardized organizational forms and centralized support services, pervades U.S. retailing. This pattern is therefore highly likely to play a large role in DP retailing.

Franchised systems, one major manifestation of the pattern described above, are endemic to our retail scene. Notwithstanding early difficulties, we expect franchising to become a major factor in DP marketing. We expect some small franchised chains to grow rapidly and new ones to spring up over a two- to three-year period.

Third, the retailing chain more often than the manufacturing facility has become the organizational focus, the center of gravity. The result is that retail outlets carry multiple lines of manufactured goods. We would expect this trend to surface in DP retailing as well; and Xerox and CDC already reflect this market dynamic.

Fourth, systems personnel ought to look at retailing as a learning curve situation. Some already do.

For the manufacturer, some elements of the learning curve include optimum mixes of hardware and software and optimum vendor support techniques.

For those in the stores, elements of the learning curve include inducting large numbers of personnel without technical backgrounds, gaining familiarity with new hardware and software, acquiring some form of service support, learning effective forms of advertising and other sales generators plus mastering small business management.

The learning curve can be accelerated by recruiting people with retailing experience at all levels of DP mass marketing, from manufacturing to chain organization to the outlets. Those experienced in retailing already understand much of what the DP industry needs to learn.

Beyond the learning curve of the industry — but linked to it — is the learning curve of the users: the small business and household populations. Those in the computer industry are accustomed to steep slopes in the learning curve; there is no reason to expect otherwise in the mass market. Accounting, inventory, billing and similar applications constitute much of the near-term growth. Educational and entertainment materials have growing markets as well.

There will be experimentation, trial and error. But a growing market has some forgiveness built in, and considerable trial and error can be survived.

Last, we should not overlook the persistent survival of specialty stores, which invariably coexist with chains and general-purpose stores. Software houses are visible today at the retail level. Specialists by business user category are also visible. So we can expect to see more of both DP department stores and "boutiques."

Product Characteristics

A consensus on certain important characteristics is emerging from the action and statements of those nibbling at the mass market for DP equipment. That consensus emphasizes simplicity of use, the provision for prepackaged training, minimal use of one-on-one training techniques, high reliability, upward and downward compatibility, stand-alone and networking capabilities, communications capabilities and interactive capability.

Many equipment vendors and marketers seem determined to avoid the hand-held calculator syndrome, that is, ever-cheaper hardware and no substantial software sales. Our contacts indicate strenuous efforts by those contemplating this market to create and maintain a broad range of software products with each significant hardware introduction and to market the software in integrated, additive packages. Business software packages are the standard types expected: accounting, billing, inventory control and the like.

This, of course, has created an independent software industry which will flourish with the market as a whole. Manufacturers will have numerous software make-or-buy options.

Vendors in the $500-to-$5,000 computer market today seem to be climbing up the computer size and capacity ladder as rapidly as — or more rapidly than — those who are starting from higher levels and coming down the size ladder.

These small system vendors, who can read the history of IBM as well as anyone else in the industry, know the advantages of covering a broad range of needs with a compatible product line. They have every expectation of building into their machines scaled-down versions of all the nice things about today's mainframes — memory management systems, networks, remote data entry and more.

> *While the DP industry is feeling its way toward productive combinations in the still* terra incognita *of retailing, retailing itself is a very old art. One can use some of retailing's history to predict the future of DP mass marketing.*

Today Radio Shack is offering reasonably sophisticated small business systems for less than $10,000. In two years Tandy and other companies will be able to produce systems and software usable by companies the general public would not perceive as "small."

The "small" image of stores and small systems — and lack of user knowledge or assurance about the rate at which the equipment and support systems can and will grow in capacity — probably limit the retail store sales to businesses more than the latent capacity to service substantial business needs. We can expect to see Tandy and others make vigorous efforts to lift the public's expectations concerning their product lines in the immediately foreseeable future.

Some Notes on Strategy

Each set of manufacturers faces a stringent product and distribution system expansion test in the next two to five years. The mass market, like other battlefields, will go to those who get there "the firstest with the mostest."

We do not think that the traditional industry leaders will necessarily be first often enough to preempt the retail area. The rate at which the industry giants can generate new products and get them into the small business fields in their initial mass-marketing forays will tell much about their eventual market placements and market shares.

Small systems manufacturers face a difficult choice. They can try to fathom the mass market and control their placements in it, or they can manufacture products and accessories and assist others in tailoring an array of components to a spectrum of user needs. Both strategies will be used in the next two years, although the second may have more takers. Which will be more successful cannot yet be determined.

Company store? Franchise store? Independent distributor? These will be key choices and decisions for suppliers. Our prediction is that franchise and company store systems will spread most rapidly. We expect to see several new franchised systems in the next two years. Such franchised systems will create opportunities for a variety of manufacturers and software suppliers. Alert suppliers might do well to assist in developing franchised retail outlets. One cautionary note: Not all of the new chains will survive.

Broader Base

DP suppliers, of course, should not limit their thinking to computer stores. The efforts of Xerox and CDC demonstrate that broad-spectrum retailing concepts will probably play only one role in DP retailing. These broad-spectrum approaches will probably coexist with price unbundling of numerous products and services such as education and training.

Companies positioned to enter the DP mass market would do well to work through the problems of retailing as they would any other investment. Harmonizing manufacturer-retailer expectations, defining the necessary retail support services, constructing retailer-manufacturer feedback mechanisms, determining the kinds of personnel needed to succeed at the retail level — these are parts of the larger combination that will unlock the door to a bright future.

We believe the bulk of the computer industry is underestimating the mass market for DP products and is not yet fully conscious of the requirements for mass-marketing DP. Several million businesses and vastly more households can best be tapped only with sales approaches combining reliable, easy-to-use products with low costs per contact.

But perhaps this underestimation is not all bad. After decades of overexpectation, not to mention hype, some modesty in vision and expectation is refreshing. The nation's consumers need not fear that they will be neglected. Some newcomers to the computer world are showing great adeptness at building mass-marketing foundations. And were we not to do so here in the U.S., the Japanese would find a way.

The next two years will show who has the vision and the capacity to get in on the ground floor of DP's mass-marketing era. Those who are equal to the task have a long and interesting run ahead of them.

EDITORIAL

Risky Business

Making predictions is a risky business. As Bob Glass shows on Page 4, in a story loaded with a megabyte or two of humor, even the best minds in the business have been wrong. Sometimes they've been *very* wrong.

But *Computerworld* is dauntless. As we do every year in the annual "combined issue" (Dec. 29-Jan. 5 this time), we've cast sidelong glances at events in the past year, then bravely put down some forecasts for the future. Our predictions are pretty much short-term, but we hope you enjoy them and find them useful.

And we hope Bob Glass won't be writing about *us* next year.

1980
1981
DP MGR
SQUEEZE

LETTERS

'It's OS!'

Our corporation is making the conversion from DOS to OS. In keeping with the holiday spirit, one of our programmer/analysts composed these verses to the old favorite, "Let It Snow." We thought we would share this composition with *Computerworld* readers.

Programming and Analysis Staff
American Family Insurance Group
Madison, Wis.

It's OS!
Well, our software we're converting.
If it bombs, we'll be reverting.
It really could be a mess,
It's OS! It's OS! It's OS!

Oh, we know there's trouble brewing.
'Cause we don't know what we're doing.
Our JCL is a guess,
It's OS! It's OS! It's OS!

When we finally get it right,
It could very well be July.
We'll have to work day and night,
Getting the system to fly.

Oh, the problems are never-ending.
The programs keep abending.
We really can't take the stress,
It's OS! It's OS! It's OS!

— Mike Sharpe
(With apologies to Sammy Cahn)

Look at 'the Facts'

It was with some amusement that I read the letter from Donald Weimer in the Dec. 15 issue. He quite properly pointed out that one could store four six-bit characters in three eight-bit bytes. Then with a literary wave of the hand he alluded to a "slightly fancier method" that would be required to pack the fifth character.

Let's examine the facts. If you have an alphabet of 40 characters, and five character positions, then you can construct

$$40^5 = 102,400,00$$

different "words." You have 24 bits to store all this data, but that only allows for

$$2^{24} = 16,777,216$$

possibilities.

No encoding scheme, however fancy, can uniquely map 102 million symbols into 16 million. On the other hand, if you restrict yourself to 27 characters, then you can construct (only)

$$27^5 = 14,348,907$$

different "words," which *will* fit into 24 bits. The algorithm for packing is straightforward, obvious and probably useless.

Hanley A. Strappman
Marlboro, Mass.

How About the User?

Werner Frank did an excellent job of reviewing a key area hampering data processing productivity — software maintenance [CW, Nov. 24].

However, his suggestions for containing the "maintenance monstrosity" prevalent in all programming departments fell short. His suggestions centered around DP solutions to the problem. What about the user? System development must not only include users from an operational perspective, but also from a maintenance perspective.

User involvement is not a new concept. User-oriented report writers have assisted in breaking the programmer bottleneck in generating and modifying computer output. Why shouldn't the same concepts be applied to certain aspects of systems maintenance?

Working for a software vendor, I am pleased to say we practice what we preach. For more than 10 years we have been developing packaged software that involves the user in both system operation and maintenance as much as possible. In fact, our recently released product, called Dataryte, enables the user to create and maintain application system edits. Historically, thorough editing was either impractical or required excessive development time and expense. Dataryte provides a vehicle for improving the quality of system edits and it is table-driven, which allows the user to establish and change edit criteria.

Even though software maintenance is here to stay, let's find ways to enlist non-DP personnel to carry some of the work load.

Ray Possehl
Director, Sales & Marketing
Generated Systems, Inc.
Wheaton, Ill.

Deadly Sin

"The Menace of Micros" By David Stevens was very well done, and I thought it worthwhile contemplating his thoughts.

It may be a paradox that one of our seven deadly sins may save us — pride!

Most people I know love to brag. What's the use having the tailored suit of clothes, the latest terminal in your bedroom or the latest rubber dolly that talks, looks and feels like human and says and does only what you want (even the oldest profession may be on its last legs) — if you can't brag about it to someone?

I don't think human egos are strong enough — at least in humans living in what we call "highly civilized" technical countries — to do without ego support from other humans. Computers can't do it. They're not and never will be "built right" for that.

Ray Russ
Fairborn, Ohio

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

DATA PAST

Five Years Ago
Dec. 31, 1975/Jan. 5, 1976

SEATTLE — Several months after two contenders for a facilities management contract effectively knocked each other out of the running, Seattle accepted surrounding King County's offer to share its DP facility for three years — free. The offer was almost too good to be true, and skeptical city officials were at first reluctant to accept it. "There's no such thing as a free lunch," Councilman Randy Revelle was quoted as saying in the local press. With the offer, Seattle hoped to lop $300,000 off its projected 1976 DP budget of about $5 million.

Ten Years Ago
Dec. 30, 1970/Jan. 6, 1971

TORONTO — A debtor's data bank was being assembled under the auspices of the provincial Department of Justice. Scheduled to be completed in three years, it would provide information to anyone for a $2 per search fee.

— — —

NASHVILLE, Tenn. — Several, perhaps hundreds, of Internal Revenue Service computer tapes containing thousands of tax records, erased by airport radar last spring, had yet to be restored. Inadequate grounding of metal shielding was cited as the cause of the wipeout.

READER COMMENTARY **Bill Scott**

Users Must Share Blame For Many 'Horror Stories'

Data processing magazines are ablaze with articles detailing lawsuits set in motion by disgruntled consumers against "unscrupulous computer vendors." Everyone seems to be placing the blame only on the heads of those vendors.

Is that where the basic fault lies? Certainly not! Look around you. Automobiles that stay in the shop more than they stay on the road. Clothing that rips at the seams under the slightest strain. Throw away this, disposable that, shoddily made merchandise that looks great on the shelf, but is worthless in use.

Somebody has finally spotted this trend in the DP business. What made anyone think DP was immune?

I can remember when you could drive a car into a wall and it still resembled a car. I can remember watches that ran for a full year without running backwards. We as a competitive people have all assisted in creating our 20th-century "Junk Society." The American populace as a whole shares total responsibility for establishing and supporting our highly competitive environment.

We have all had to learn the hard way that you get what you pay for; however, great throngs of computer purchasers persist in trying to beat the system, only to find themselves in the trade magazines a short time later, screaming "foul, foul, foul."

All over the country, computer salespeople are being armed with systems that are barely adequate to run a convincing demonstration and people are buying them as if there were no tomorrow. I am reminded of the Indian chief who returned from surveying the resources available to his tribe during the coming winter storms. "I have good news and bad news," he proclaimed. "The crops are dead and there's nothing out there to eat but buffalo chips."

"What's the good news, Oh Great One?" cried a warrior. The chief replied, "There's plenty of buffalo chips."

When Phineas Taylor Barnum said, "There's a sucker born every minute," I think he was talking about us!

Stop and Listen

So many of us refuse to learn from the experiences of others. The subject of computerizing a business is so complicated and the jargon so esoteric that the businessperson is like a helpless animal being pursued by a well-armed safari. So before you become another horror story among a cast of thousands, stop and listen to the animals.

My company specializes in the petroleum market, and I am amazed that the primary concern of the majority of our prospective buyers is "how much"

(Continued on Page 88)

THE TAYLOR REPORT/Alan Taylor

Sites Can Choose Software First

Would any computer installation want to choose its software *before* knowing the hardware on which it was to run? And, if they would, then how would they fare in the 1981 marketplace? In short, *could* they do so and reverse the traditional process?

Well, one DP department wanted to and did. Recently, after I had been writing about transportable software without giving real histories, this department told me about its experience. Transportability was the key.

The company, a chicken producer, needed sites in various locations for a distributed system that would look after each chicken farm. There were two reasons the company wanted to choose its software first:

1. To ease the service problems.
2. To allow the best choice of hardware when expanding the system after it was programmed and operational.

Service Problem

The problem with service is obvious. Even with Hewlett-Packard Co. and its new maintenance guarantees, many systems need to watch uptime — or rather *downtime*. And downtime varies not only with the hardware, but also with the distance from service centers.

It just doesn't make economic sense to choose Hardware A over Hardware B when A is generally better, but some sites may be 50 miles from A's service station. Nor does it make sense to choose B over A when A is better and can properly service *most* of the sites.

Finally, it is not even reasonable to select both systems to get the best service possibilities at the cost of having to develop and maintain two separate sets of parallel software.

The solution — transportable software — did provide the best service capability, while requiring only one software development effort. So transportable software was chosen first.

Fast-Improving Systems

The future value problem this DP installation faces is not as obvious as the service problem is. Service problems are still universal, but only in the mini and micro areas is the explosion of vendors of good solid equipment making it practical to expect improved cost/benefits and facilities every two months or so, instead of about every two years.

This situation mainly springs from the nature of distributed processing and the variety of hardware vendors offering related pieces of 8-bit, 16-bit and, coming shortly, 32-bit computer architectures.

As these naturally don't all hit the

(Continued on Page 86)

READER COMMENTARY/Richard Van Tassell

The Lowly GOTO Defended

When Edsger Dijkstra disparaged the use of the branching statement (GOTO) in programming, he started a controversy within our profession which has raged unabated ever since. Perhaps it should be observed that neither Dijkstra nor anyone else has ever maintained that a correct program with GOTOs could not be written. What Dijkstra said, in essence, was that he had observed that competent programmers use relatively few of them. "Relatively" is the key operative word here.

After this pronouncement, various programming zealots, in their efforts to bring order out of chaos, have maintained that programs can be written without GOTO's. Some insist that a "structured" program should contain no GOTO statements. To date, however, there is no consensus within our profession as to just what constitutes a structured program. Each practitioner has a different idea of what that means.

Most of us apply the term to the creative process of programming, as well as to its end result, the program and its documentation. Indeed, the word is a treacherous one: for anything that is not random is, therefore, structured. Every computer program is structured, if one applies this last yardstick, no matter how poorly.

Nearly every statement in every programming language has implicit GOTO. To where? To the next statement, in "lexical" order; that is, the next one immediately after. A sequence of statements is, of course, implemented by these implicit, or understood, GOTOs whenever an explicit branching statement is absent.

Not Prohibited

Several authors in our field have written clearly and lucidly about structure in programming. Myers, Orr and Constantine have given us outstanding material. None of these writers prohibits the use of GOTOs as a condition of structure. Common sense also argues against such a prohibition, in my experience, for several reasons:

Some iterations ("loops") are so simple and obvious, and occupy so few lines when coded, that the use of a GOTO to get from the "bottom" to the "top" of the loop seems preferable to a PERFORM UNTIL from the standpoint of clear documentation, even if execution efficiency is no greater. The listing of a short Cobol loop implemented with a GOTO conveniently shows the statements to be executed in-line, right within the loop of which they are actually a part, rather than off in a closed subroutine in another part of the listing.

Second, a GOTO may very well be the method of choice or the only method to get from within a module, or performed procedure, to its labeled exit statement (so that it can return control immediately to its caller). This works well from a documentation point of view, for it proclaims: "As much of this procedure as it is necessary to do has already been accomplished."

Cobol's exit statement cannot readily take the place of such a GOTO, because, among other things, it cannot be conditioned with an IF clause and must be the only statement in its own paragraph.

Awkwardness Overcome

There are awkward syntax features in other programming languages that are easily overcome with a GOTO. For example, every RPG programmer knows that it is simpler to "branch around" a larger number of calculation statements that would all have to be conditioned upon the same indicators by simply conditioning one GOTO statement upon the logical negative of those indicators; with the target "TAG" being just beyond that group of statements, lexically.

Finally, the GOTO is undeniably useful in implementing a "case" structure, particularly in Cobol. Perhaps Cobol should offer a PERFORM statement with a DEPENDING ON option, but so far it doesn't. What is offered, by our compiler, is the DEPENDING ON option of the GOTO statement. Long series of IF clauses are often avoided by using the DEPENDING ON option.

GOTO statements do not necessarily detract from the quality of the programs we write, although their unrestricted use could very well have that result. In the Cobol programming of our firm, we have been very well served by several rules we have adopted as programming standards. They were designed to promote "structure," readability and maintainability, and the GOTO statement is an integral part of them.

Procedural Standards: A program is designed first, then pseudocoded, charted hierarchically, then coded. Test data is designed, created and tested. The program is then tested and debugged, using the test data. There is peer group review of each step of this process, and the completed documentation for each step serves as the basis for the review. Formal approval of the group is required at each step.

Module Naming Standards: Cobol modules are numbered in such a manner as to be in alphanumeric order within the listing. They are English-named also. The procedure division is not sectioned (unless a declaratives section is required, in which case the remainder of the division is coded as a single section). Therefore, all procedure-names are paragraph-names. The figure on Page 85 illustrates these points and a number of others yet to be made.

The top module of this program is named A10M-CREATE-MASTER-TAPE. The first letter identifies its

(Continued on Page 84)

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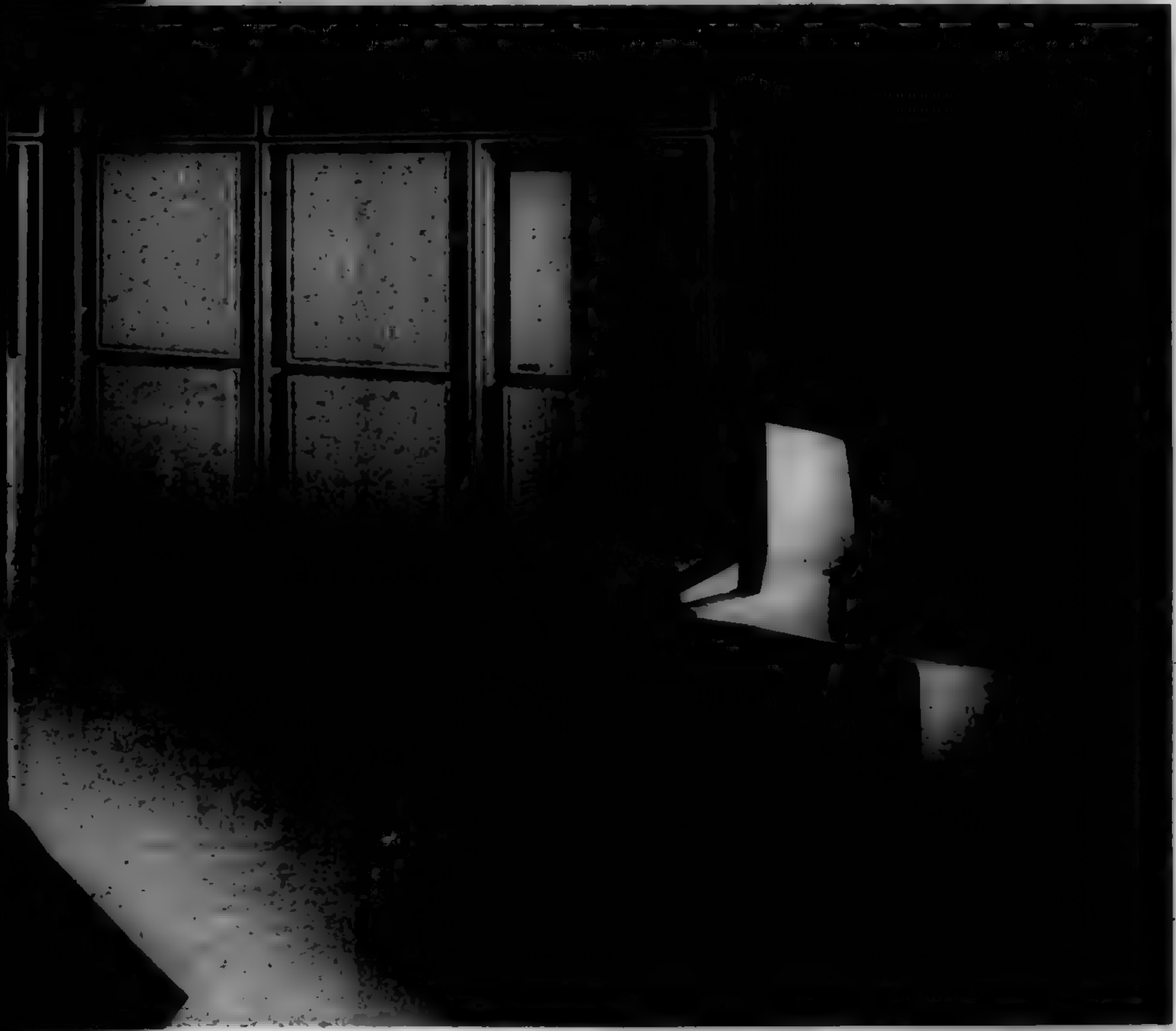

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Use of GOTOs Can Keep Programs' Structure

(Continued from Page 81)

level, A. It is the only module at this level. Each other, lower level module is named so that its first letter is one letter, alphabetically, beyond that of its lowest level caller, and the module is placed accordingly in the source code. Adherence to this rule assures that recursion, which is prohibited by the compiler, will not occur; that is, a module will never call itself, either directly or indirectly.

In addition, the hierarchy of modules is clearly indicated by these level designations, whether or not one happens to be looking at the hierarchical chart of program organization.

The second character is a number which, along with the first letter, is carried throughout the module. A1, for example, identifies each paragraph of the mainline module of the figure and, accordingly, identifies the module itself.

The third character is another digit, this one being chosen as required to cause paragraph-names to "ascend," in alphanumeric sequence, throughout each module and, for that matter, through the entire procedure division listing. The value of this rule in enabling paragraphs to be found quickly in the listing is obvious.

The fourth character is chosen from an "installation standard" list and used to describe the function of the module from a "data processing" point of view. For example, "M" is mainline, "R" is read, "X" is exit and so forth.

Module Names

Finally the module is named in English, to complete the paragraph-name. Our staff puts forth considerable effort in choosing the English portions of module names, as well as the names of their internal paragraphs. We have found that the descriptive quality of these names is often crucial to the quality of the program and to the success of subsequent maintenance.

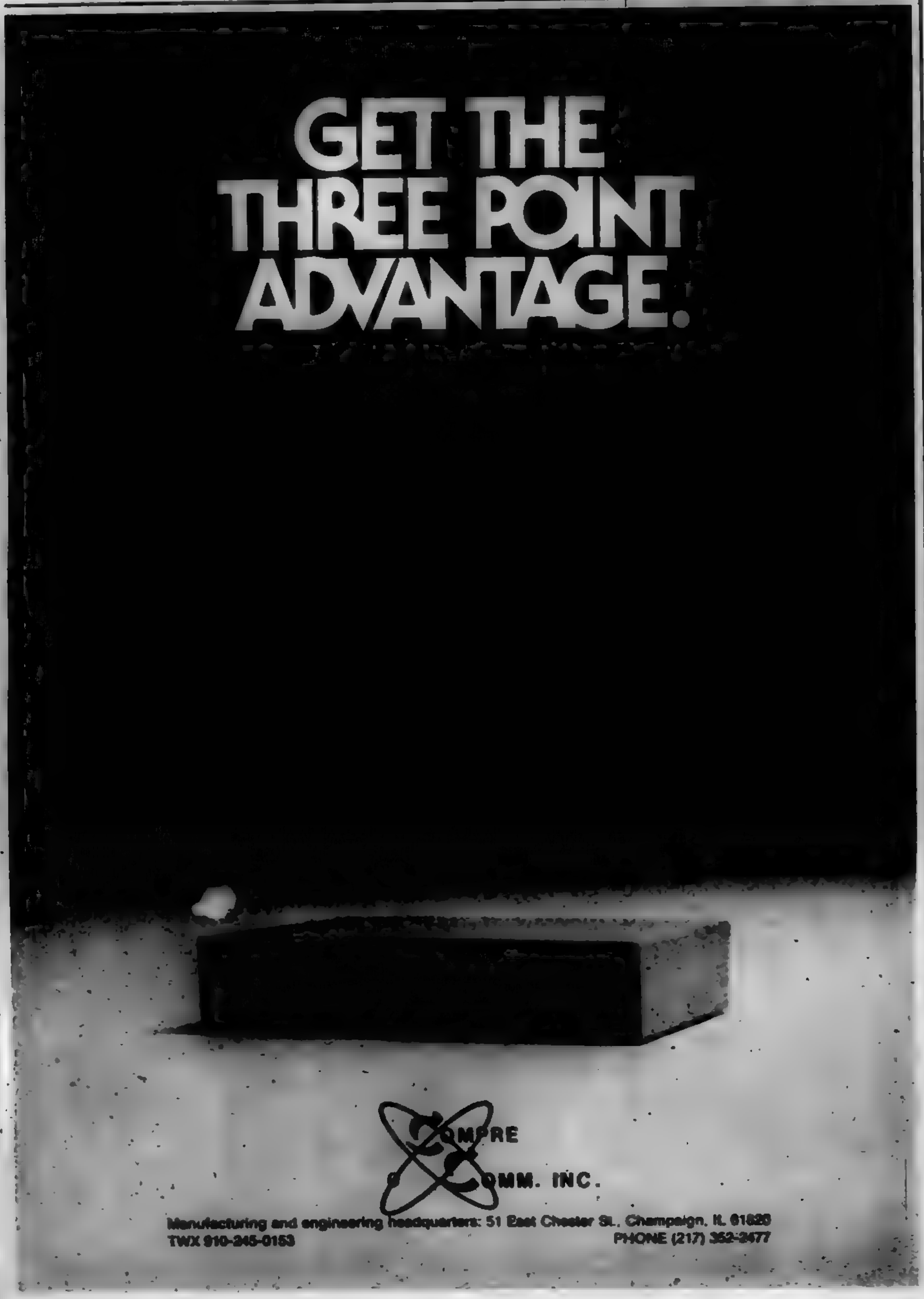
Briefly, the name should correctly describe the single function which is to be accomplished by the module, in a way not permitting misinterpretation. If such a name cannot be chosen, we conclude that the module, as conceived, lacks what Myers called "functional strength"; and so, we redesign until we achieve module(s) perceived as single-functional by the peer group.

In this connection, we have noted a tendency on the part of the programmers to name a paragraph in honor of what has already been accomplished at the point at which execution begins, rather than for what the paragraph itself is to accomplish. This is a natural enough tendency, and it results from the sort of thinking that goes like this: "If we got to here, then it was because such-and-so is true . . . or was done." This thinking, even if correct in any particular instance, would be irrelevant. It would be like naming each book on the library shelf for the contents of the book just to the left of it and would lead to confusion.

Each logical module has two or more named paragraphs, the first of which is also the module-name. All except the last one of these contribute to the purpose of the module, while the last is the exit paragraph and contains only the exit statement. The method of naming an exit paragraph is to let "9X" be the third and fourth characters of the name, followed by "-EXIT." The choice of "9X" allows the exit paragraph's name to be in alphanumeric order with the remainder of the module's paragraph names when it is placed at the end, lexically speaking.

Coding Standards: Whenever a module's purpose has been demonstrably accomplished while the "next statement" which would otherwise receive control is somewhere in mid-module, a "GOTO exit paragraph" statement is in-

'I Sure Hope That's Hard'



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and Readability Intact

serted.

This exit-paragraph technique is combined with the use of PERFORM statements with the THRU option, the second procedure-name referring always to the exit-paragraph of the performed module. In the example, paragraph A11 of the mainline calls B3 with this type of PERFORM statement, and B3 similarly calls two C-level modules.

The limits of each logical module are made obvious by these techniques. This is true whether one is looking at the code of the module itself or the code calling it.

Because the exit paragraph and its associated exit statement always mark the end of a logical module, new statements and indeed, new paragraphs (except at the very beginning) can be added, changed or removed within a module without changing the limits of the module as viewed from an "external" point. This is a valuable feature of the method, for it allows the programmer to concentrate on the immediate code requiring debugging, improvement or change.

GOTO EXIT PARAGRAPH statements will be part of this unchanging code if they are not immediately involved in the change, but are somewhere else in the module being revised. The same cannot be said of the alternatives, which would, generally speaking, involve nested IF statements, sometimes in very deep and hard-to-follow nestings.

The objective of this article has been to show, by actual example, circumstances in which the GOTO statement promotes the readability and maintainability of programs, while doing no violence to their structured quality. It is to be hoped that all will recognize the GOTO for what it really is: a tool that has its proper uses and can be used properly or misused, just like any other tool. Also, perhaps it might be realized that the "structure" of programs cannot be judged, either qualitatively or quantitatively, according to the mere presence or absence of GOTO statements.

Van Tassell is the general manager of Rich Industries, a service bureau in San Leandro, Calif.

```
PROCEDURE DIVISION.
A10N-CREATE-MASTER-TAPE.
    OPEN XXX XXX XXXXX XXXX.
    .
A11N-XXX-XXXX-XXXXX-XXX-XXX.
    .
    PERFORM B30I-GET-VALID-CONTROL-CARD
        THRU B39X-EXIT.
    .
    IF  XXX XXXX XXX XXX.
        CLOSE XXX XXX XXX XX.
        GO TO A19X-EXIT.
    .
A12N-GET-XXX-XXX-XXXX-XXX.
    .
A12N-TEST-XXX-XXXX-XXXX-XX.
    .
A19X-EXIT.
    STOP RUN.

B10N-XXX-XXXX-XXXX-XXXX.
    .
B19X-EXIT.    EXIT.
B20S-XXX-XXXX-XXXX-XX.
    .
B27R-XXXX-XXX-XXXX.
    .
B29X-EXIT.    EXIT.
B30I-GET-VALID-CONTROL-CARD.
    .
    PERFORM C10R-READ-NEXT-CONTROL-CARD
        THRU C19X-EXIT.
    IF  CONTROL-CARDS-ARE-AT-END
        GO TO B39X-EXIT.
    PERFORM C40S-TEST-CONTROL-CARD
        THRU C49X-EXIT.
    IF  CONTROL-CARD-IS-VALID
        GO TO B39X-EXIT
    ELSE
        DISPLAY CONTROL-ERROR-QUERY UPON CONSOLE.
B30I-IMPLEMENT-ERROR-DECISION.
    ACCEPT ERROR-DECISION FROM CONSOLE.
    IF  IGNORE-ERRORED-CONTROL-CARD
        GO TO B30I-GET-VALID-CONTROL-CARD
    ELSE
        IF  NOT CANCEL-JOB-WITH-CONTROL-ERROR
            DISPLAY 'WHAT' UPON CONSOLE
            GO TO B30I-GET-IMPLEMENT-ERROR-DECISION
        ELSE
            GOBACK.
B39X-EXIT.  EXIT.
    .
    .
    .
```

Sample Code

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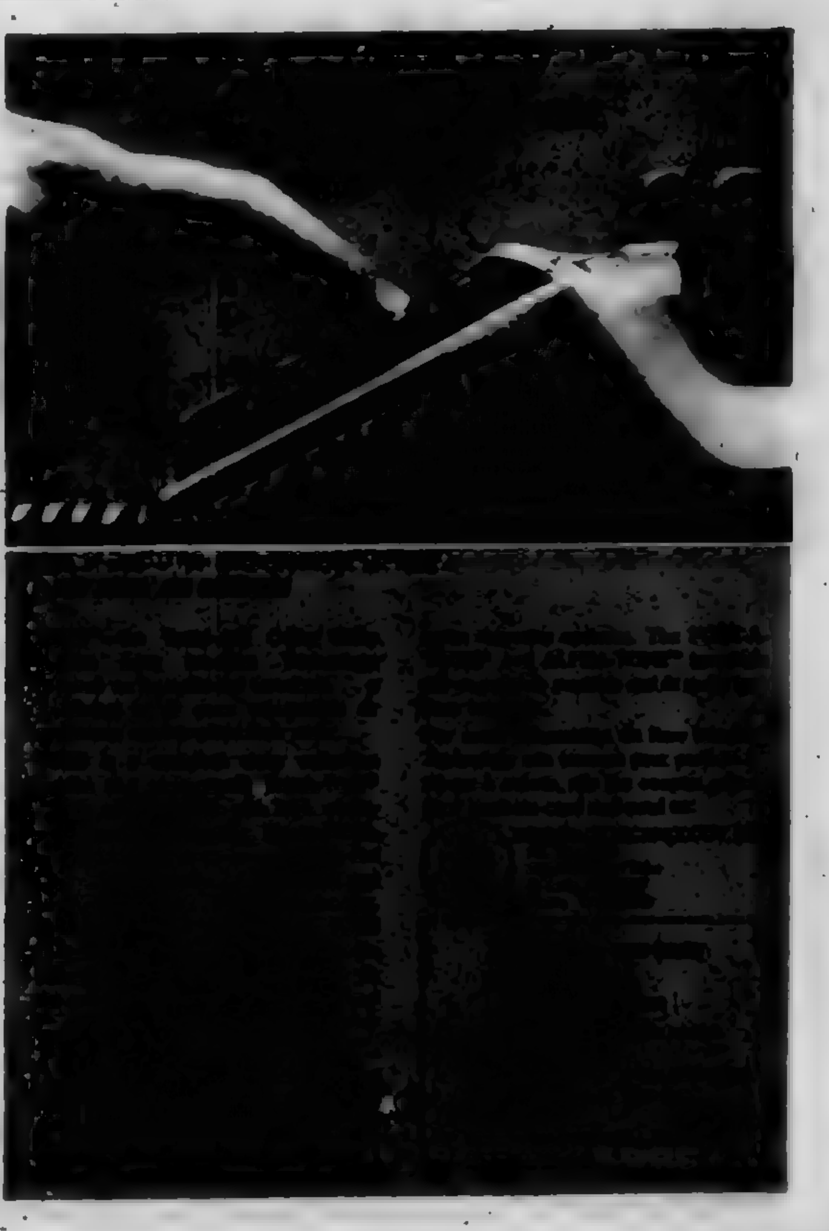

LETTERS

Don't Ignore the Facts

I have just seen the article on my paper presented at ACM '80 in Nashville. It was a fair resume of my talk. Naturally, it was a condensation of what I hope had been a closely reasoned and well-referenced paper.

The letter by Reinhard Mirkovich is another matter entirely [CW, Dec. 8]. The first rule of research is to check the original sources. Not only was this ignored, but the quotations from the *Computerworld* article were distorted. What sort of refutation can be based on "guilt by association"? Surely at least one of my arguments should have been countered.

In 1978 I predicted 20% unemployment by the end of 1983 and was exactly on course according to the October 1980 figures. I did not give technology as the only cause of unemployment, but modern technology is installed to increase productivity and quality. Although this may not cause unemployment at that plant, it certainly causes problems for the competititon. I quoted the investment of 250 billion yen in high technology by Japan as causing problems for Western automobile manufacturers.

Does Mirkovich doubt that increasing unemployment correlates with increasing crime and vandalism? Check the evidence.

Is there doubt that there is a growing movement seeking strong police powers to obtain "real law and order"? Read the right-wing papers.

Is there doubt that the technology exists to monitor our citizens? The West Berlin audiences I addressed early in October were convinced. They knew the danger.

I can appreciate that the ideas I put forward frighten Mirkovich — they frighten me. That is no excuse for ignoring the facts. Surely, we are entitled to have a properly argued refutation, not just an attack on my integrity.

Robert D. Parslow
Uxbridge, Middlesex, UK

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Choosing Software First

(Continued from Page 81)

market at the same time, competition is severe, and prices drop every few months or even weeks, while worthwhile features (including uptime-increasing diagnostics) improve.

The chicken producer wanted to reap these benefits for its new system. From the company's point of view, transportable software gives a double economic benefit over the standard hardware-first approach, allowing the user to get better equipment later and at lower prices.

The user finally chose Microcobol, a system that currently works on some 30 systems, varying from 16-bit systems like IBM Series/1 to 8-bit gear based on various common chips. In one way, Microcobol seems to be even more transportable than most other transportable products — even the disks themselves can be moved between different systems, provided that the physical characteristics (8-in. size or what have you) remain constant!

The language is familiar to Cobol programmers, although the vendor, CAP-CPP, Inc., has dropped out the identification and environment divisions. Two groups of software support have been provided, for application users and developers respectively. The user runtime facilities include a multiuser operating system (BOS) with standard utilities, optional linkage, security and interfacing capabilities, but without the development facilities of compiling, testing, libraries and debug utilities.

CAP-CPP and various OEMs also provide application programs which, because of the transportability of both language compiler and operating system, can be developed on one system and offered on dozens of others without modification.

With this software choice now made, the chicken producer's application is being developed, although most of the hardware has yet to be selected. Even its fundamental architecture is not firmly known, nor will it be uniform across the system.

In this case, "software first" has been a practical approach. The dollar costs are reasonable (single-copy retail price is $1,500 for the development system and the Multiuse Business Operating Runtime System is $750).

Alex D'Agapeyeff, CAP-CPP's chairman, admits that so far the ongoing development of micros and supermicros has not really impacted most DP departments, but he is confident that the effects cannot be long delayed. The existence of a software-first choice may well be the key point that moves other users over.

CAP-CPP can be contacted through Trevor Noble, CAP-CPP, Inc., 521 Fifth Ave., New York, N.Y. 10175 or Kenneth Clark, CAP-CPP, Inc., 299 California Ave., Palo Alto, Calif. 94306.

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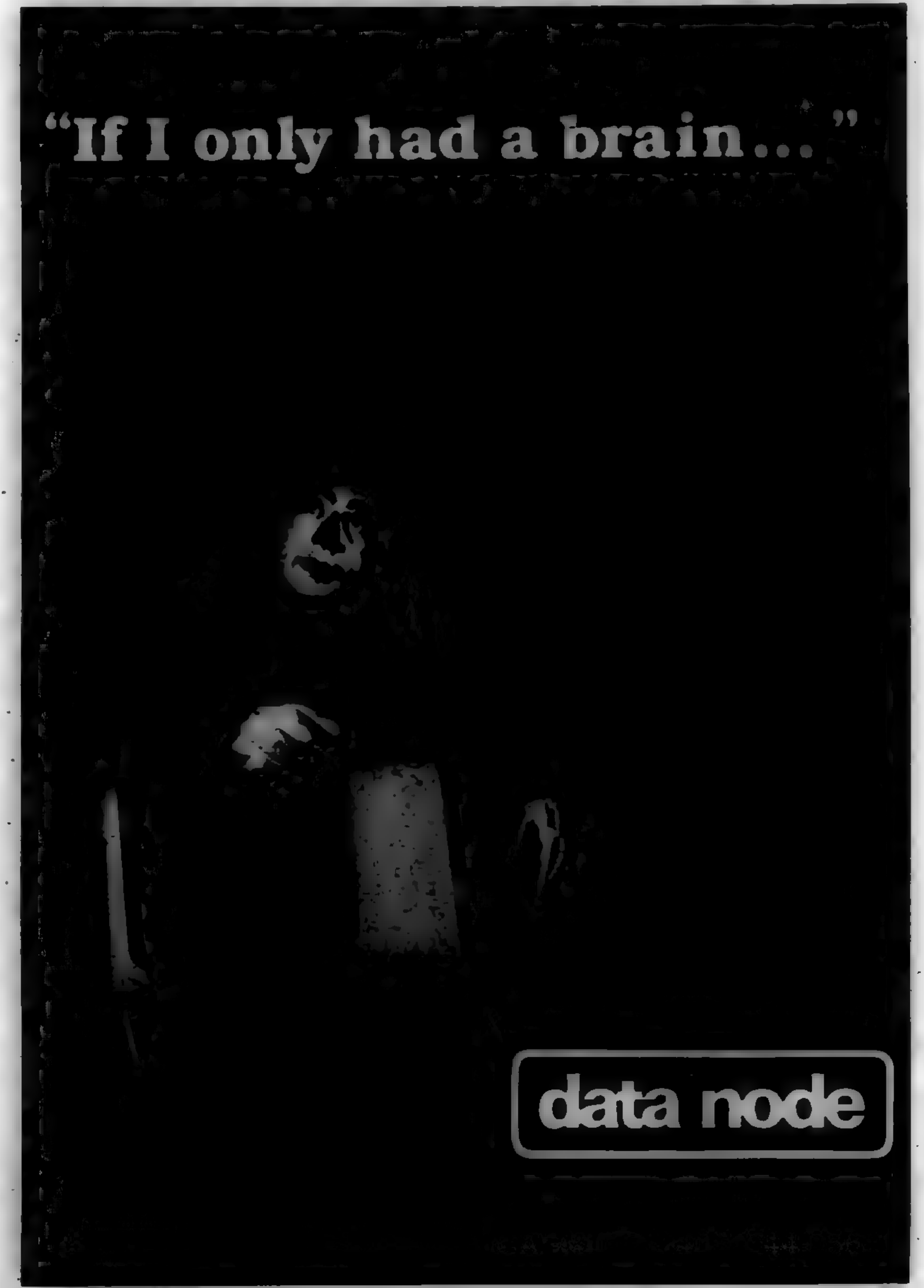

"If I only had a brain..."
data node

HUMAN CONNECTION/Jack Stone

How Good Is Your Personnel Appraisal?

Nearly everyone appreciates the importance of effective employee appraisals, yet most DPers know that the appraisal system is not working wonderfully well in their computer centers.

Part of the problem is that systems managers, as a rule, don't accept the subjective aspects of the performance appraisal, aside from their reluctance to "stand in judgment of their fellow man." Another aspect of the problem is that many senior top executives don't monitor the process in the center because they are fearful that negative appraisals — or at least those perceived by the employee as negative — might just drive some critically needed systems specialist out the door.

Still more of the problem is attributed to the personnel departments which, for one reason or another, haven't imbued (or is it "force fed"?) systems managers and supervisors with the principles and practices of effective performance appraisals.

With this background, it's no surprise that many DPers are reluctant to cooperate fully in the appraisal process. For example, they won't always bring up needs for counseling or additional training, thinking that management will use this information to reduce the coefficients of employee promotability.

Well, several hundred well-chosen words of mine on the subject aren't going to supply the answer, either, but perhaps the thoughts expressed in this and upcoming articles will encourage some readers to become more interested in the subject.

Imperfect Process

To begin with, it is well recognized that personnel appraisals can never be totally objective and appraisal tools can never be totally precise, and this observation is justifiably discomforting. But is this situation anything more than a reflection of the imperfect world in which we live? The fact that human judgment of other humans must enter the appraisal process should not be the basis for its condemnation and for letting its quality slip.

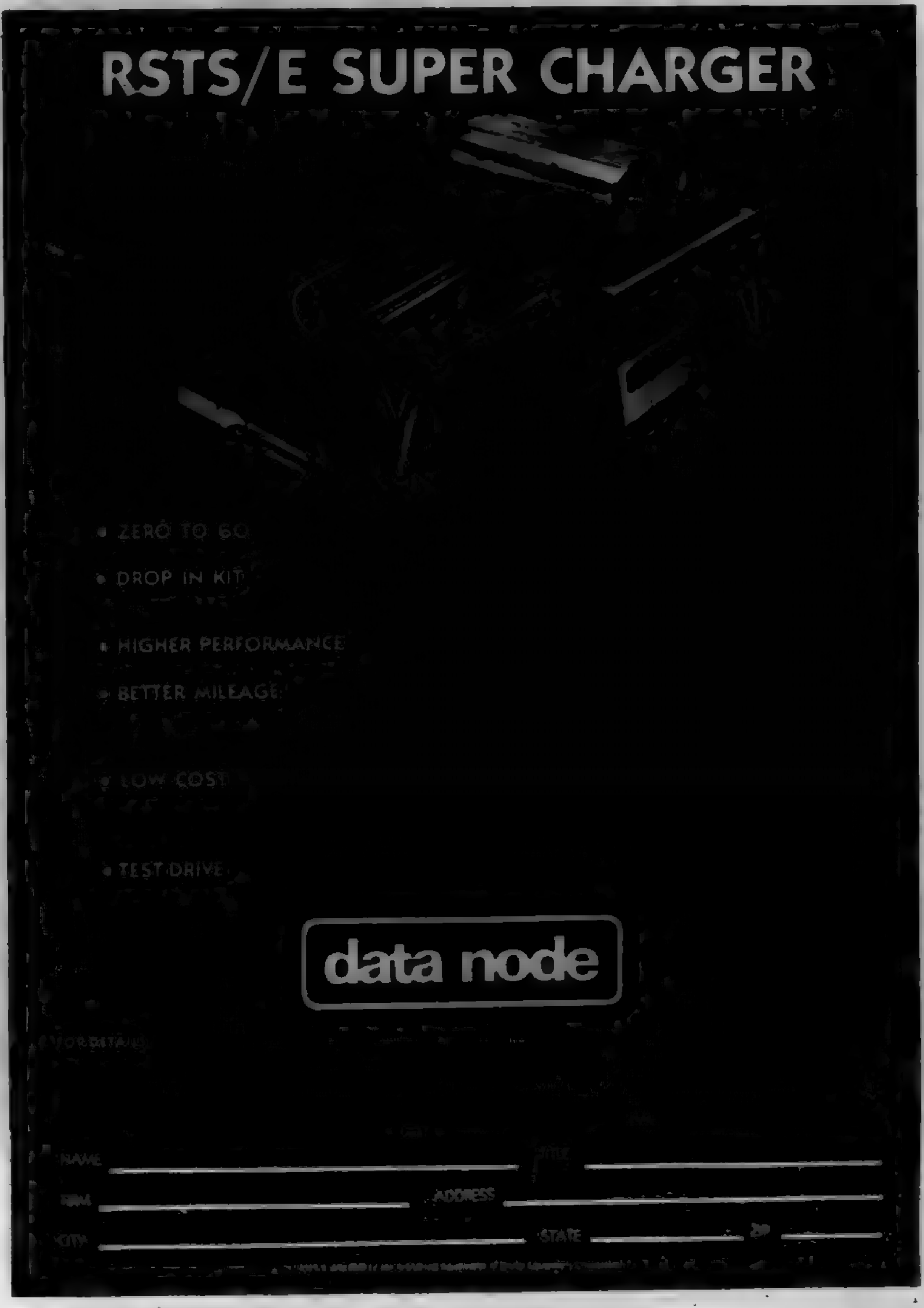
And on the subject of quality, how good is your appraisal system? To help you figure out an answer, here's a list of features of a top-quality appraisal system that you can use for comparison purposes:

- Performance appraisals are current.
- Data entered as part of the record is reasonably objective.
- Appraisal forms are easy to use and to understand.
- Employees are fully informed on the purpose of appraisals and their methods, plus the uses of the information developed from appraisals in follow-up personnel actions, such as promoting, demoting, training and retraining.
- Performance standards are comprehensive, clear, measurable (including subjective factors) and communicated to employees.
- There is an established procedure to handle employee complaints regarding the appraisal system.
- Employees are given both written and oral statements regarding the results of the appraisals and are asked to indicate by signature the receipt of the results; the employee also has the opportunity to enter differing views into the appraisal file.
- The appraisal system allows additional opportunities for management and employees to communicate about job performance, other than a single annual review.
- The appraisal is conducted in terms of specific needs of the employee, the job and the business, and not in abstract terms such as "value to the organization" or "long-term promotability." Techniques used in the appraisal process are relevant to the purposes of the appraisal.

If you determined that your system is not up to snuff, but you aren't worried about it, maybe I can get your attention by noting that appraisals have broader applications than merely documenting employee performance. Performance appraisals, if properly done, can also serve to:

- Help employees identify their full potential within the organization, thereby tending to maximize the utilization of personnel (and cut deeply into turnover statistics).
- Provide integrated job and personnel information to improve the quality of distribution of work and job assignment.
- Validate job placement and career plans.
- Identify personnel problems early on.
- Improve the working relationships between management and employees.
- Select candidates for future management slots.

If you still feel that appraisals are just a paper work nightmare, then perhaps your own performance should be judged, in part, on how well you support and conduct personnel appraisals. If this policy is implemented, I'm confident that the yelps and hollering that are often heard at "appraisal time" will diminish into the noise level.



Users Must Share Blame for 'Horror Stories'

(Continued from Page 81)

and not "how good." In the field of consulting, I find it literally astounding that I can talk myself blue in the face, armed with facts, figures, third-party stories, newspaper clippings and so forth only to hear that the customer has decided to go a cheaper route or the "do-it-yourself" route! I find him a short time later proclaiming "misrepresentation, whiplash, food poisoning" or whatever.

It wasn't too long ago that a "bargain hunter," having fallen ill, could seek out a medicine show and purchase remedies and cures from a peddler rather than going to a reputable, highly trained and more costly medical practitioner.

It was only after a significant number of citizens got burned that the federal government removed one of our freedoms and began putting some of those "quacks" in jail. Yet today, enterprising marketing companies come dangerously close to offering so-called cures and remedies through various advertising media. And judging from the size of their advertisements, they must be doing a land-office business. Why must we always be protected against our own search for bargains?

Big Mistake

A great number of businesspeople are making the mistake of buying books that promise to make them "informed computer purchasers" in one night of easy reading. That's as useful as reading a medical journal before going in for an operation. If you're buying a computer for your business, you don't need to be in DP. There are people trained for these jobs. Colleges are offering degrees in computer-related fields. There is nothing simple about a totally interactive order processing and general accounting system. You don't have to learn all about computers to get one to work for you any more than you have to study internal-combustion engines to drive to work.

A computer system should be installed at your office preprogrammed and ready to perform the specific jobs you had in mind at the time you purchased it. The books may be interesting, but they can't make you an expert. Businesspeople who find themselves getting involved in the detailed algorithms of computer programs often find themselves neglecting their own businesses.

A very successful businessman once told me, after he had purchased a Texas Instruments, Inc. computer, that his son (who had no previous programming experience) was going to take a three-day course and return to write all the necessary programs he needed to run his real estate company. Another businessman recently told me that he had a CPA friend who, given a couple of days, could write a computer program to make a computer do anything he wanted it to do.

These things are simply not possible. There is no cheap way of getting a computer system to perform more than simple tasks. A business computer installation will become a major investment. It should be planned for, thought about and planned for again.

It takes years to become a proficient computer programmer, yet businesspeople all over the country are entrusting their systems to would-be programmers with nothing more than a few hours of self-taught "game" programming behind them. This is really absurd. At the present time good computer programs may cost $100 or more per line of error-free code to develop. This means that a small company might spend from $40,000 to $80,000 to develop a totally integrated financial accounting system.

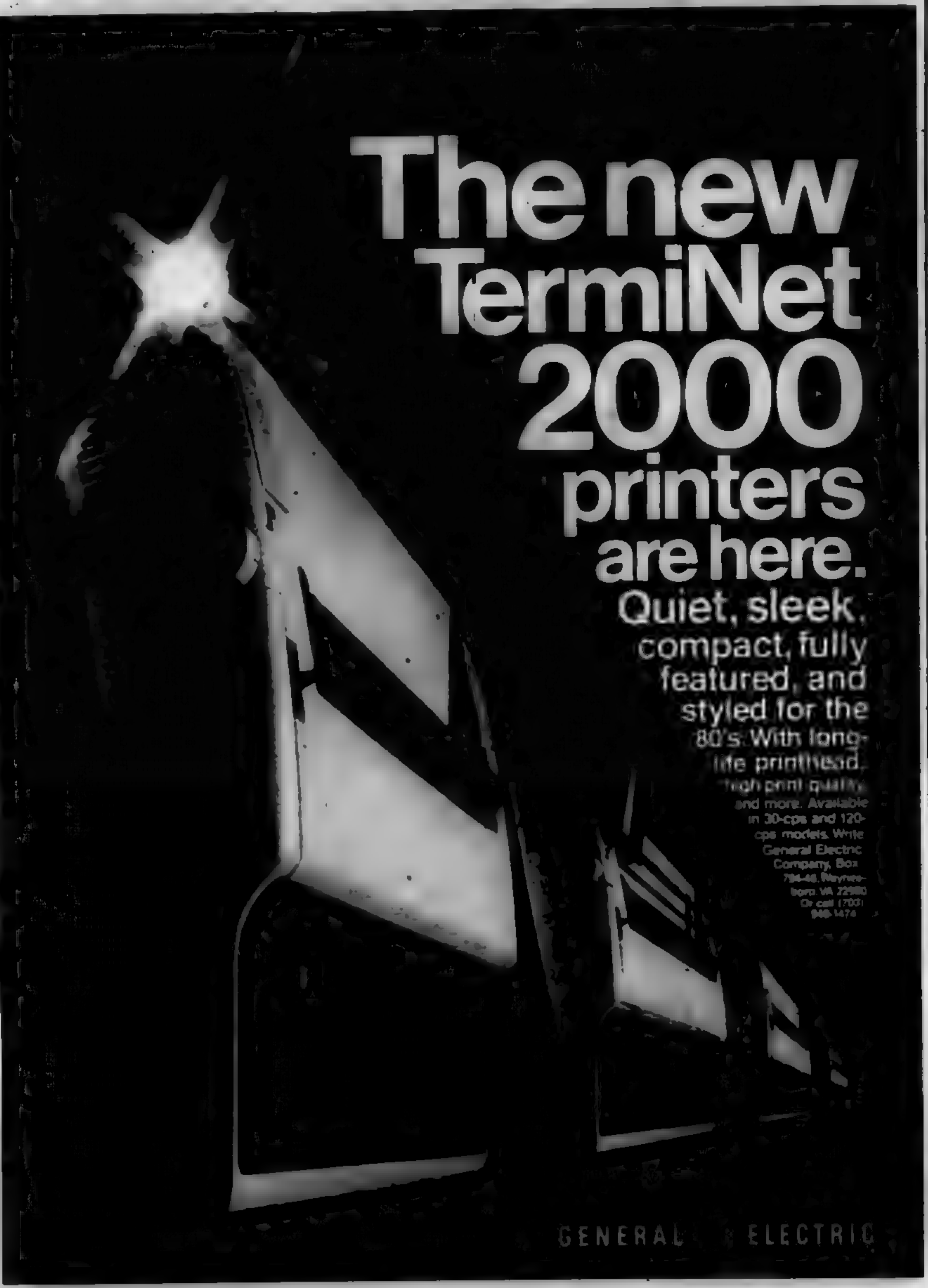
If you are considering a computer installation, you have become a prime target for a fast-talking, low-balling computer salesman. You'll need facts, proof, demonstrations at businesses already using a comparable system and, most of all, *expert* assistance.

Here are a few basic rules to prevent a costly mistake. You must adhere to them rigidly:

- Put everyting down on paper!
  - a. What do you want the computer to do? Exactly!
  - b. How much can you afford to spend?
  - c. When do you want it installed and working?
- Go find an expert! And I don't mean a relative who sells calculators or has taken a programming course in college. Hire a reputable computer consulting firm to go over your notes, and pay it to do an in-depth study of exactly what type of software is required to make a system work for you.
- Buy the computer system on which the software was designed to operate! The greatest software package in the world could be worthless to you unless you have the computer system for which it was designed. Ask the expert to determine that the system is expandable to meet your future requirements.

Further, I'm sure that there are hundreds of professional businesspeople who have purchased inadequate software, hardware or both and have invested so much money in their present system that they feel compelled to continue to throw good money after bad in an attempt to salvage something from a very embarrassing mistake. Well, pride is not the better part of survival. If you are one of these people, stop and go find an expert.

Scott is director of marketing for Applied Information Management Sciences, Inc. in Monroe, La.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What About the DP Manager? — Part 2

Data Dictionaries Bring DBMS Control

The DP manager vs. DBMS confrontation can be a painful one. Part 1 of this two-part series explored some of the control and coordination problems a manager faces when installing a DBMS [CW, Dec. 22]; Part 2 describes some of the possible solutions.

By Ron Ross

Special to CW

Despite current shortcomings, data dictionary packages are perhaps the most significant tool evolved to date to help the DP manager bring control over system development. The only drawback — and it proves to be a major one — is that almost all data dictionaries fail to support the preimplementation phases of the data base system project. If the data dictionary concept could be reoriented to address these phases, a powerful tool for controlling data base development projects would be offered to the DP manager.

What, When, How

Some reflection on the data dictionary approach shows why this is true. First, a data dictionary describes what information is to be collected, when to collect it and how to use it. The data dictionary provides coordination and stability to the efforts it supports because it gives permanence to the information and specifications on which those efforts are based.

It also helps the manager to marshal scarce staff resources by providing guidelines and conventions for the types of information to be collected. Thus, even inexperienced staff members can be productive in associated tasks.

The data dictionary promotes the establishment of orderly procedures by providing a focal point for review and development. Since each stage of the project can be assessed for completeness by reviewing associated dictionary documentation, clear-cut progress milestones can be established.

If applied to preimplementation phases of the data base system project, better control over the complex and crucial tasks of planning, estimating and scoping could be the result.

Another data dictionary advantage is that it functions as a central repository of information that can be shared by everyone, including end-users. This promotes communication and coordination.

Finally, the data dictionary is a crucial tool for both the data base administrator (DBA) and the data administrator (DA) because it puts real teeth into their control over system definitions. If this is effective during implementation and post-implementation phases of the project life cycle, dictionary participation in the preimplementation phase — the make-or-break period for adherence to standards — could significantly improve this control.

Today's data dictionary packages are not truly design dic-

(Continued on Page 90)

Tektronix Adds to 'Plot 50' Line

BEAVERTON, Ore. — Tektronix, Inc. here added seven products to its Plot 50 library for its 4050 series desktop computer. The software library includes graphing, drawing, document preparation, statistics, planning, management and digitizing programs that range in cost from $600 to $4,000.

The picture composition software was designed to aid the non-computer user in the development of engineering working drawings, Tektronix said. It reportedly allows the user to interact with graphics elements so that objects can be displayed, moved anywhere on the screen and deleted without affecting other display components.

Essentially an electronic sketch pad, it allows "virtually unlimited" drawing complexity because the user builds drawings from "graphics primitives" that include lines, arcs, boxes and circles, the vendor claimed.

Supporting the Model 4050 with dynamic graphics option, this package is priced at $1,500.

The new document preparation program was designed to assist in formatting and generating technical reports in an engineering or scientific environment, according to a spokesman.

An interactive text formatting program, it offers some 45 editing commands and operations that allow for producing two-sid-

(Continued on Page 90)

CICS, 'Shadow II' Users Get CPG

ATLANTA — Insac Software, Inc. is offering CPG, a programming language and execution environment for users of IBM's CICS/VS and Insac's Shadow II teleprocessing monitor operating under IBM's DOS/VSE, VS1, SVS and MVS operating systems.

Designed for on-line programming, CPG generates multithreaded programs for the teleprocessing environment, according to the vendor.

CPG is an open-ended nonprocedural language with integral screen mapping and data editing facilities.

It provides on-line interactive debugging and enables any program to be tested alongside production systems without the possibility of corrupting those production systems, the vendor claimed.

CPG costs $19,500 from Insac at Suite 3235, 2300 Peachford Road, Atlanta, Ga. 30338.

'Dataquery' Gets 4300 Support

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has announced Release 2.1 of Dataquery, the data base query package for its Datacom/DB relational-like data base.

Highlights of the release include support for IBM's 4300 hardware and fixed-block architecture on 3310 and 3370 disk drives; enhanced security; additional arithmetic capabilities; enhanced output facilities and formats such as support for user-specified headings in place of standard file names and access to numerical data for display and edit, the vendor said.

Release 2.1 is a free enhancement for users of Dataquery. The package costs $1,100 for users in an OS environment and $9,300 in a DOS environment. ADR is at Rt. 206 and Orchard Road CN-8, Princeton, N.J. 08540.

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Data Dictionaries Ease DBMS Development

(Continued from Page 89)

tionaries. Therefore, they provide little real assistance in the areas of project organization and control.

An assessment of currently effective data base system design methodologies — methods already in use in many state-of-the-art shops — shows that support for data models of the following areas would be required in a design dictionary:

- Organization of the company, its functions and the data used to perform these functions. This information, needed for data usage commonality carves out functions and data resource areas for phased development under the data base.
- Detailed end-user system requirements for the selected functions or data resource areas. Definition of these requirements should capture both the local data view — the structure of the data the user sees — and the delivery characteristics of that view. These include its frequency, volume, currency, availability and security, sequencing and qualification requirements.

These detailed requirements must be specified in such a way that users can discuss and understand them. While capturing data base potentials, they should avoid data base management system (DBMS) bias.

These detailed requirements must be integrated with the rest of the design dictionary to provide vital continuity for developmental success.

- Comprehensive blueprint for the planned data base system — logical data base architecture. Developing a logical architecture allows the design dictionary user to express the grouping of data elements into record types, record types into logical files and required keys and sequences in DBMS-free fashion. The data resource is defined optimally to ensure its evolutionary capacity and ability to satisfy end-user requirements.

The Changing Picture

Recent attention has been focused on tactical tools devoted to specialized tasks in the data base architecture area. Relational data analysers are one example.

Real assistance for the DP manager will arrive only when such tools are integrated within a master data base design dictionary system.

While some data base system design methodologies recommend the design dictionary concept, this dictionary is usually generated manually. Attempts to mesh it with the corporation's standard data dictionary usually meet with marginal success and the control aspect is not emphasized.

However, the picture is changing rapidly for several reasons. First, as data base system experience increases, the lack of a developmental control tool is becoming more apparent.

Second, data dictionary vendors are coming to a realization that a radical new approach is needed.

Finally, the advocates of various data base design methodologies are learning that implementation of a formalized discipline of collecting and maintaining specifications is necessary for the effective operation of the methodologies.

Ross is the editor of Performance Development Corp.'s Data Base Newsletter. *He has recently written a book on data administration and data dictionary systems that is scheduled for release by Amacom, the publishing arm of the American Management Association.*

Tektronix Adds To 'Plot 50'

(Continued from Page 89)

ed documents, an automatic table of contents, automatic page numbering and text insertion, he said.

Available for the 4052 and 4054 computers, this package costs $800.

Presentation Aids

A presentation aids package that creates bar charts, line graphs, pie charts and text on overhead transparencies was introduced for $850. The software produces quality text with a software font, widths and thicknesses so that charts and graphs can be combined with text on a single overhead slide, the vendor said.

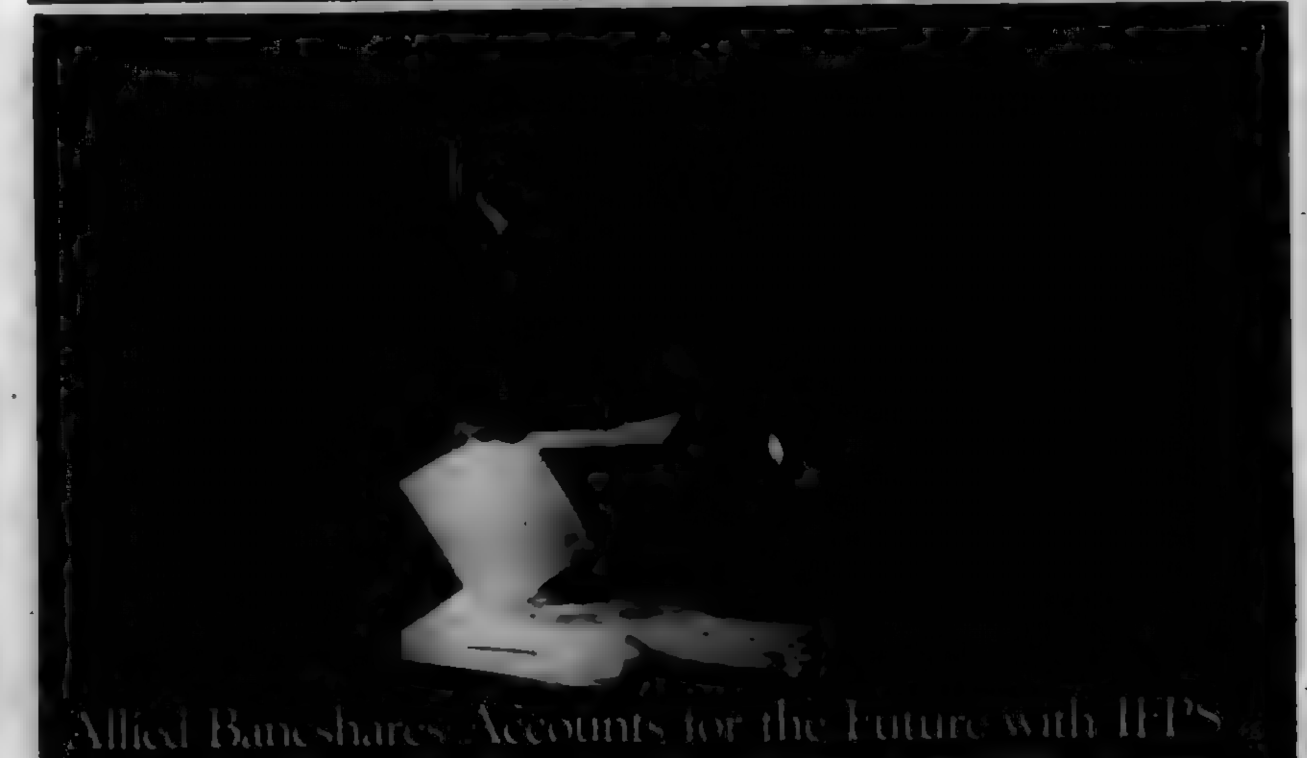
An interactive modeling package utilizes the 4050 graphics capabilities to create graphs, charts and diagrams that depict various project models, according to a company representative.

Designed to effectively schedule and track projects and to evaluate the interdependencies of tasks within a project, the project management software costs $4,000.

Two statistics software packages introduced at the same time offer analysis of variance and statistics and multiple linear regression at $800 each, the spokesman said. The second and third products in the Plot 50 statistics software family, they are disk-based programs that utilize a standard file format to allow different programs in the series to share data, he added.

The last product in the announcement was an interactive digitizing package designed to simplify graphics data base creation.

A menu-driven program that supports the 4052 and 4054 computers, it utilizes the 4956 graphics tablet for input and the Model 4907 file manager as a flexible disk storage device, according to Tektronix, which can be contacted through P.O. Box 500, Beaverton, Ore. 97007.



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Tom Clausen, Treasurer for Allied, recently said, *"The pace and nature of our acquisition program combined with the profitability posture established by Allied in the industry does impose some specialized requirements on parent company accounting. Often we deal with relatively small banks which have no automated financial systems of any kind. With IFPS, we find that we can bring new banks into our corporate financial system without an expensive and time-consuming conversion process. IFPS allows us to create a compatible financial data file regardless of the internal system of each member bank. The end result is an automated, comprehensive financial system maintained with minimal staff and no specialized data processing personnel."*

Buddy Pollard, Allied's Assistant Treasurer, added, *"We selected IFPS because it offered the most direct, rational approach to planning and problem-solving situations. IFPS has allowed us to minimize the staff and resources allocated to the problem translation and setup steps.*

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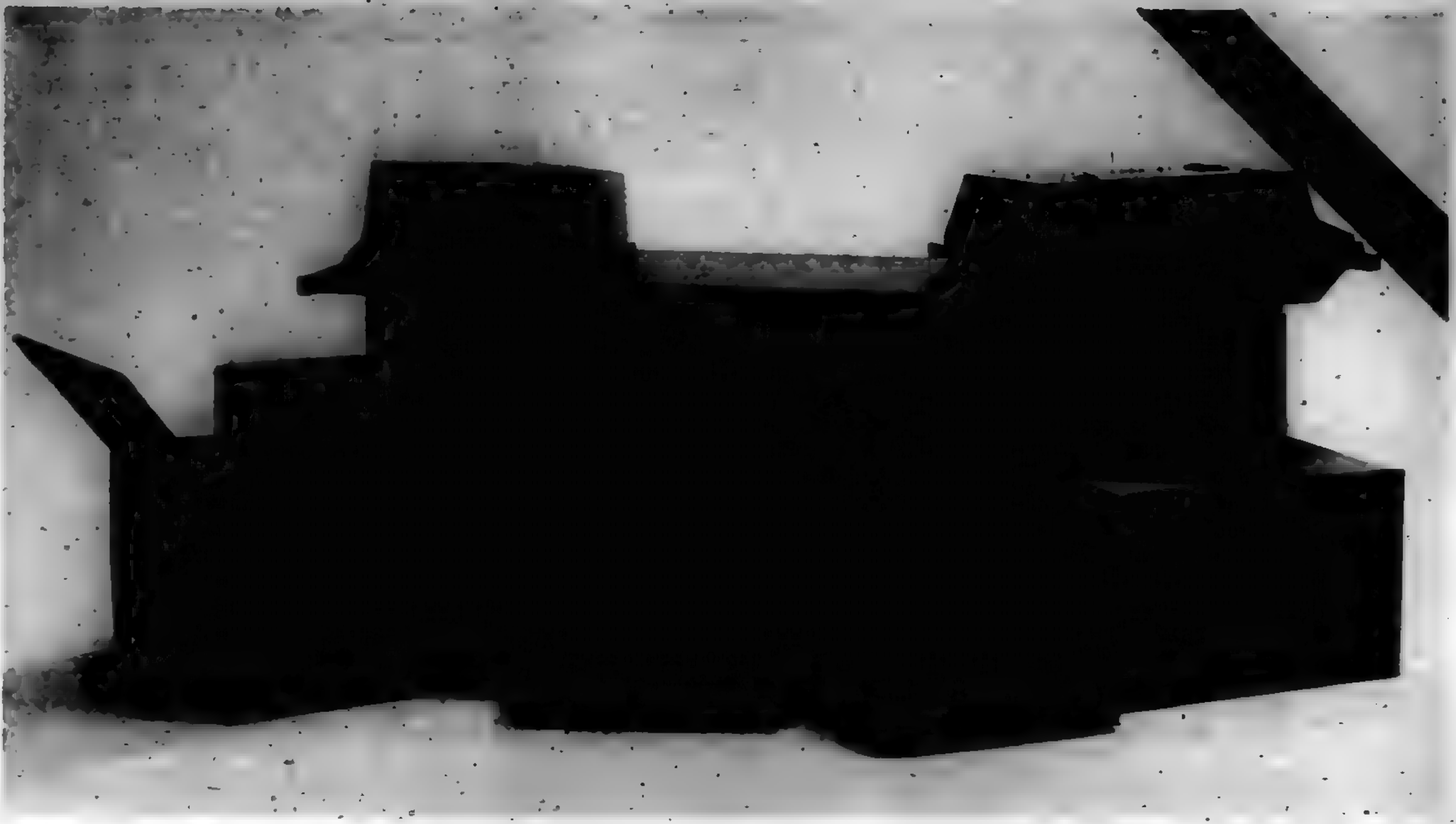

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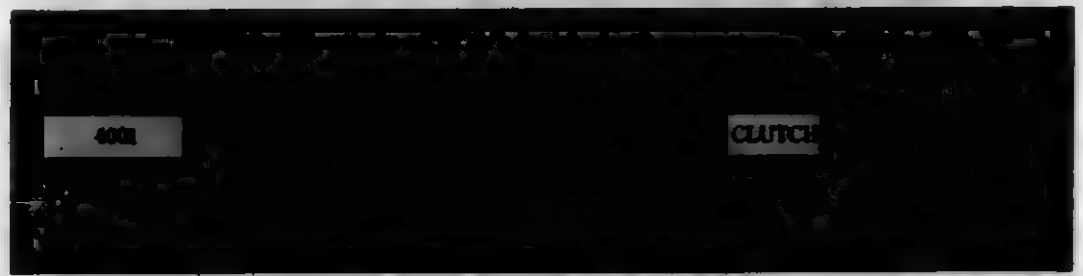

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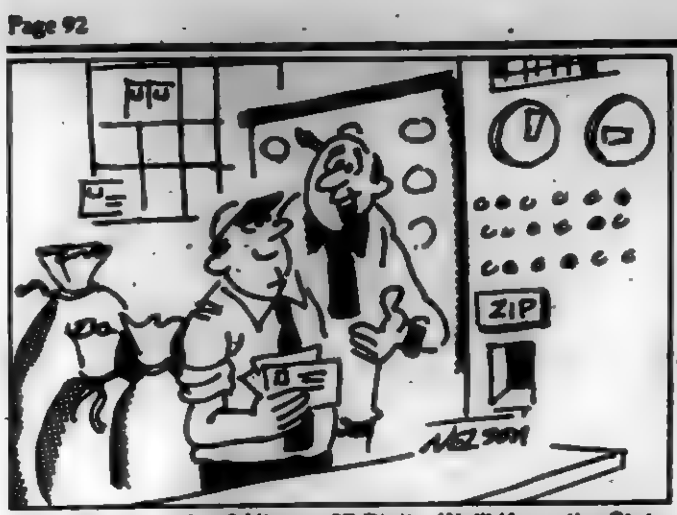

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Cobol Source Code Generator

'C/Script' Out for DG's AOS

AUBURN, Ala. — A Cobol source code generator formerly available only on Data General Corp.'s Icos operating system is now available for its Advanced Operating System AOS from Commercial Systems Corp.

The System Development System, C/Script, is said to reduce program development time by as much as 95% and program debugging time by as much as 100%.

C/Script takes user responses to questions and generates Cobol source programs to handle the functions of data entry, file maintenance, reports and inquiries, according to the vendor.

OEM and end-user licenses cost $7,500 and $4,500, respectively. Commercial Systems Corp. will reimburse travel expenses of up to $1,000 for prospects reviewing C/Script if they subsequently purchase a license. The firm can be reached through P.O. Box 2336, Auburn, Ala. 36830.

HP Software Available For 9800s

PALO ALTO, Calif. — Hewlett Packard Co. is offering Linear Systems Analysis software for its Series 9800 System 35 and System 45 desktop computers.

The software includes modules for entering the system design into the computer, producing analysis plots of the system performance.

It will be useful to electrical, mechanical and chemical control engineers, the vendor claimed.

The product is available for a one-time license fee of $500, the vendor said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Interface Links 'Datamanager,' 'The Librarian'

LEXINGTON, Mass. — Users of MSP, Inc.'s Datamanager data dictionary can obtain through Datamanager's Swap-Shop an interface program to The Librarian, Applied Data Research, Inc.'s program library management system.

Written by Magazine Zum Globus, Switzerland's third largest department store, the interface program was designed to synchronize the contents of the source program library and the data dictionary without the need for clerical updating.

Currently available for users of IBM's OS operating system, the interface program carries a handling charge of $25 through the Swap-Shop. MSP is located at 21 Worthen Road, Lexington, Mass. 02173.

'Estimator' Aids User Projections

PHILADELPHIA — Atlantic Software, Inc. has announced the automation of the estimating standards and process of its SDM/70 Systems Development Methodology.

Estimator, which can be provided with SDM/70 or as a stand-alone system, is said to help users estimate project time and cost for each phase of the systems life cycle.

Base price for the Estimator is $15,000 from 320 Walnut St., Philadelphia, Pa. 19106.

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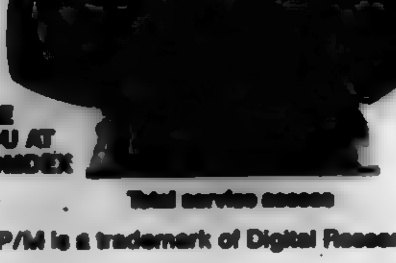

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For Series 1100

Univac Combines Screen Generator, Handler

BLUE BELL, Pa. — A Display Processing System (DPS) for the Sperry Univac Series 1100 mainframes assists users in the development and execution of application programs by combining an interactive screen generator and a screen handler.

The DPS 1100 will increase programmer productivity by eliminating the programming overhead typically associated with applications that create and access computer terminal displays, Univac claimed.

All input and output screen format design is done at the terminal by users entering the actual formats and field attributes to be used in an application.

Tutorial Mode

The screen generator has a tutorial mode which prompts and explains how to create or revise screens using the DPS 1100. Once screens are formatted, they are stored in a central screen file.

The screen handler portion of the DPS 1100 allows for the interaction of a program with these stored screens, the firm said.

The unit functions in either a transaction system such as the Series 1100 Transaction Interface Package (TIP) or in an interactive program development mode using the Conversational Timesharing System (CTS).

In addition to the screen generation and screen handler, other features of DPS provide for data editing and validation, applying passwords to screen and separate fields of screens and creation and controlled access to multipage screens.

Terminals supported by DPS 1100 are the Uniscope 100 and 200, the Universal Terminal System UTS 400 and the UTS 20 and UTS 40 of the UTS 4000 family.

The charge for DPS 1100 is $250/month and is available from Sperry's marketing branches throughout the U.S. The vendor can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

Newsletter Offers Tips On Testing

SAN FRANCISCO — Software Research Associates here is offering free subscriptions to its quarterly newsletter, "Testing Techniques."

The newsletter, devoted to the technology of software quality assurance, addresses methods that serve to enhance the effectiveness and quality of computer software of all kinds, a spokesman said.

Recent articles in the newsletter have included descriptions of quality analysis of Cobol programs, a description of structural coverage measures for single modules, investigations of methods for hierarchical decomposition of programs and methods for instrumentation of structured programs.

"Testing Techniques" is available free of charge to anyone who requests a subscription on company letterhead.

'Datascan' Gets WP, Graphics

WHITE PLAINS, N.Y. — Vista Computer, Inc. has unveiled graphics and word processing (WP) options for its data base management and reporting system, Datascan.

The graphics option allows users to depict with point, bar or connected-line graphs information that was previously presented only in report form, the vendor claimed.

The WP option combines the capabilities of a typewriter with enhancements that include editing functions associated with word processors, including 132-char. output.

The options cost $5,000 each.

Vista Computer is located at 709 Westchester Ave., White Plains, N.Y. 10604.

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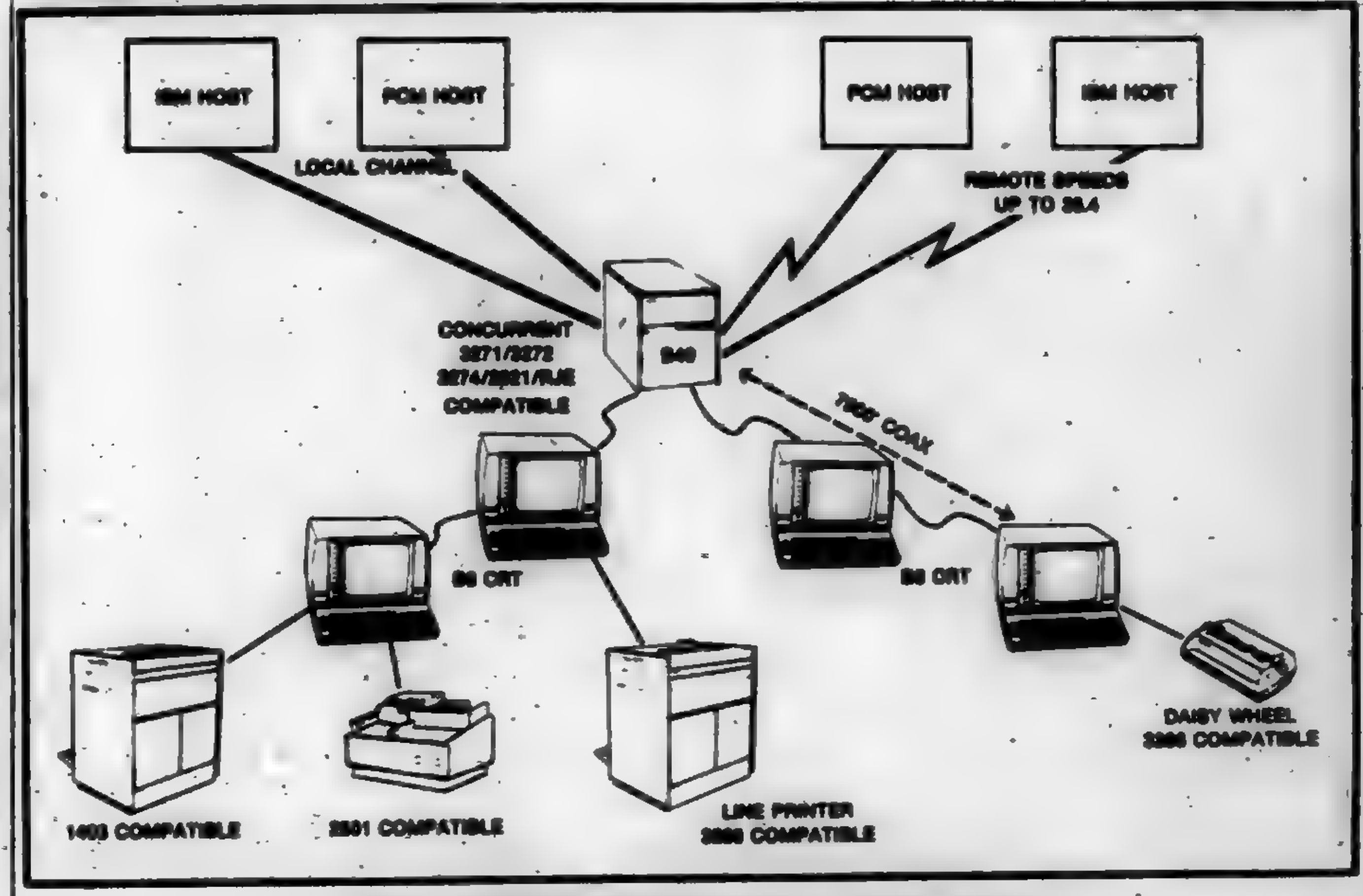

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'Super/Doc' Aids Users In Cobol Documentation

VAN NUYS, Calif. — A Cobol program documentation system designed to provide management, programmers and analysts with standardized tools for program and system documentation is available from Occidental Computer Systems, Inc. It runs on IBM and other Cobol systems.

Super/Doc is a complete set of program documentation outputs that may be selectively generated from a Cobol source program. It allows the user to utilize any or all of the 10 possible outputs for program documentation or as programmer aids in maintenance and debugging activities, the vendor claimed.

The system costs $1,260 from Occidental at 6666 Valjean Ave., Van Nuys, Calif. 91406.

'JSS' Release for IBM 5280 Includes Utility Package

JEFFERSON CITY, Mo. — Software Systems, Inc. has announced Release 2 of its Job Stream Supervisor (JSS) for the IBM 5280 distributed data system. This release includes a utility package consisting of FILE BUILD, DELETE, COPY and RENAME.

The JSS is an operating system that gives the 5280 the ability to execute job streams and procedures from menus using a System/34-like job control language, "effectively turning the 5280 into IBM's lowest priced small business computer system," Software Systems claimed.

JSS Version 2 is available immediately for a license fee of $500.

Software Systems can be reached through Box 1766, Jefferson City, Mo. 65102.

Series/1 WP Package Bows

SAN JOSE, Calif. — Systar Corp. has announced a new version of WP/1, the firm's word processing (WP) package for the IBM Series/1.

The new version is said to give users increased capability to create documents using stored information. "Boiler plate" letters from a mailing list or customized contracts from a series of stored paragraphs reportedly can be created.

WP/1 operates under EDX and can be run simultaneously by multiple users or in conjunction with other EDX-based application programs. WP/1 is provided on diskette with a self-teaching user's guide. A one-time license fee costs $2,500 from the firm at Suite 208, 1762 Technology Drive, San Jose, Calif. 95110.

Bentley College Continuing Ed To Offer Three-Day DBMS Meet

WALTHAM, Mass. — Bentley College Center for Continuing Education will offer a three-day seminar on data base management systems (DBMS) here Jan. 12-14.

Fundamentals of the data base concept, organizing information for storage and retrieval, the data base design process, new data base environments and organizing the data base administration function will be discussed. Participants will also learn the selection of the right data base system at the right price and with adequate back-up services and support from vendors.

Harvey M. Weiss will conduct the seminar. Registration costs $560 for the seminar.

More information is available from Bentley College's Center for Continuing Education, Beaver and Forest Sts., Waltham, Mass. 02254.

Rosa Elected Mims President

TUSTIN, Calif. — Joseph J. Rosa, director of management information services at Management Assistance, Inc.'s Basic Four Information Systems Division, has been named president of a newly formed group of users of Mitrol Industrial Management System (Mims) software.

Mims, a data base management system and high-level language, is used by many large companies for management information processing and reporting.

It was first developed by the Mitrol Corp. in Burlington, Mass., and is now owned by the General Electric Information Services Co.

The next group meeting will be held in the Netherlands in June.

Further details are available from Joseph Rosa at MAI's Basic Four Divisions, 14101 Myford Road, Tustin, Calif. 92680.

Audit Tool Directory Offered

CHICAGO RIDGE, Ill. — A directory that enables readers to identify and locate audit software tools that are available to perform specific audit tasks is available from EDP Audit Associates, Inc.

"Audit Utility Tools Directory" explains what 24 tools do, the systems within which they operate, their languages, advantages, suggested uses, minimum hardware, required training and cost.

The preliminary volume costs $25, including all first-year updates. Subsequent periodical updates will carry a nominal fee. The firm can be reached through P.O. Box 255, Chicago Ridge, Ill. 60415.

System/34 Gets Documentation

NEWTON UPPER FALLS, Mass. — A software documentation package for the IBM System/34 that is said to automatically provide management-level documentation without adding to a programmer's work load is being offered by Mann Data, Inc.

The package, made up of 12 reports, generates documentation that meets commercial standards and includes features not found on any other System/34 documentation packages, the firm claimed. By inserting the package in the job stream after program modifications have been made, users automatically receive a complete set of updated documentation.

The key reports offered by the package not found elsewhere, according to the firm, include an automatically generated table of contents; the ability to automatically describe procedures, files and programs with descriptive narrative; a screen/program cross reference; the ability to "explode" procedures so programmers can see the files that the procedures use; a procedure/-program cross-reference that lets programmers determine a list of procedures that are affected if a program is renamed or revised and a report layout that gives the title of a report and duplicates its format so nonprogrammers can identify it.

The System 34/documentation package costs $1,200 from Mann Data, Inc. at 50 Tower Road, Newton Upper Falls, Mass. 02164.

Table Changer For CICS Use

OVERLAND PARK, Kan. — HLE Systems, Inc. has unveiled a CICS On-Line Table Changer which reportedly allows changes in a real-time mode to the Program Control Table (PCT) and the Processing Program Table (PPT)

The utility runs under DOS and OS in less than 20K bytes of memory and eliminates the shutting down and restarting of CICS for a table change to either the PCT or PPT, the vendor claimed.

In addition, up to 10 different table options can be made.

The product costs $500 for source code and documentation, the vendor said from P.O. Box 4714, Overland Park, Kan. 66204.

Employment Job Browse Facility Designed for 8100s Under DPCX

WHITE PLAINS, N.Y. — IBM has announced an Employment Service Job Browse Facility for 8100 systems running the DPCX operating system.

The package was designed for state bureaus of employment security to offer an automated self-help job information system, using IBM 3270 terminals equipped with light pens.

The package is menu driven and lists available jobs by category and geographic location, according to IBM.

Most employment security offices currently use a microfiche system to list jobs. The 8100 package could be more easily updated, IBM said.

The package can be installed on the 8100 at a remote site, or it can be generated from a 370-compatible host, according to IBM.

The package costs $90/mo on a one-year basis, IBM said.

Software Bows For Dentists, Consultants

MISSION VIEJO, Calif. — Compusoco has announced software packages for dentists, attorneys and consultants. The packages were designed to perform appointment scheduling, professional time management, private client billing and management reporting.

The dental package, Professional I, features preparation of American Dental Association claims forms for third-party patients and facilitates the location and preparation of notices to patients who are due for them.

Professional II was geared for attorneys and features preparation of special reports for third-party legal plans and special accounting plans to analyze court-time usage and work on retainer or contingency engagements.

Professional III was designed for consultants, accountants and contract administrators. It allows the creation of subjobs, special cost centers, overhead accounts, billing under time and materials contracts, fixed-priced job cost accounting and other functions, the vendor claimed.

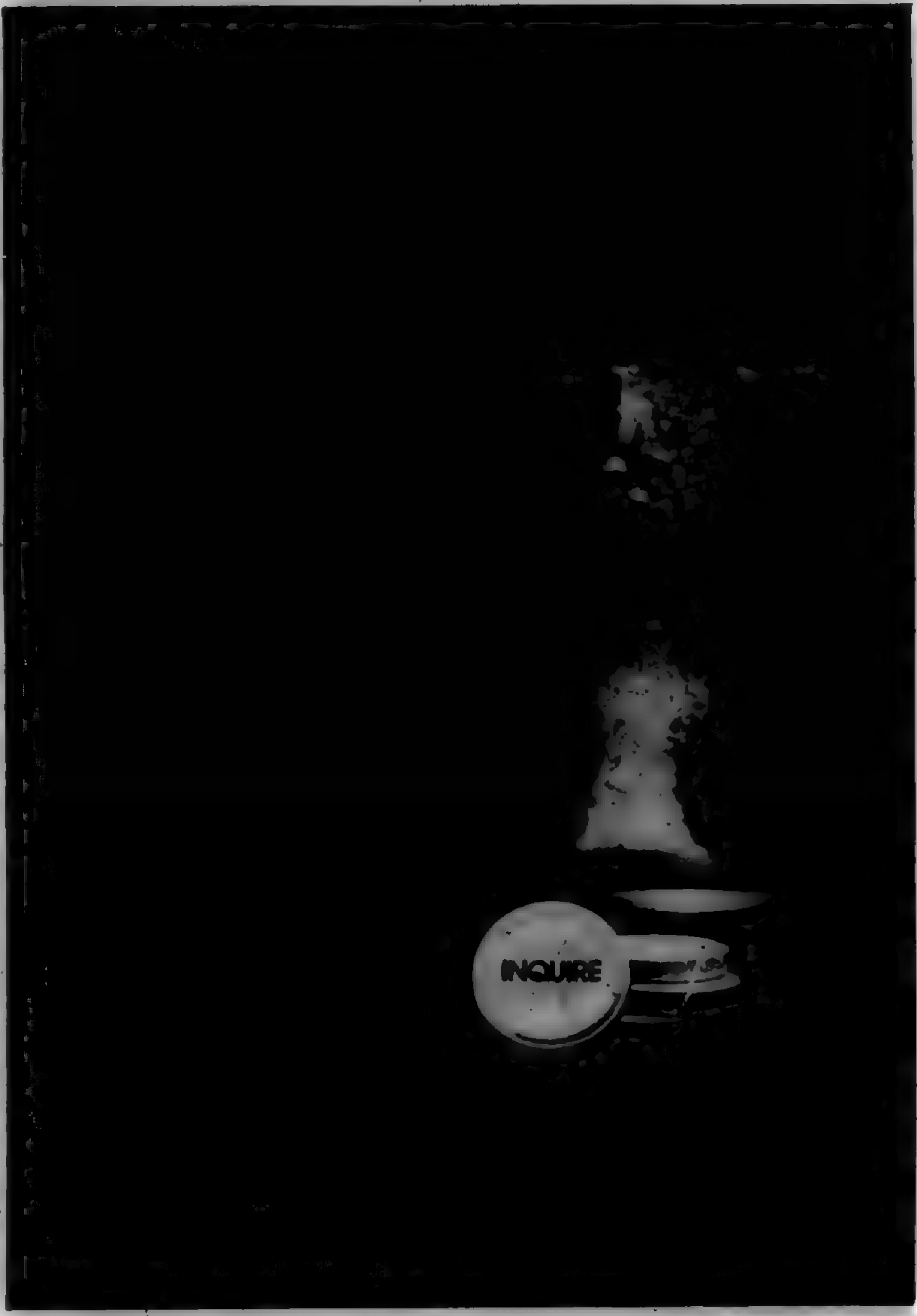
Each package costs $750, the vendor said from 26251 Via Roble, P.O. Box 2325, Mission Viejo, Calif. 92690.

Candle Monitor, Analyzer Back CICS

MARINA DEL REY, Calif — Candle Corp. has announced that its Omegamon/CICS real-time monitor and RTA/CICS response time analyzer now support Version 1, Release 5 of CICS in addition to CICS 1.3, 1.4 and 1.4.1.

Omegamon/CICS costs $15,000, and the optional RTA/CICS costs $5,000.

Candle is at Suite 624, 4676 Admiralty Way, Marina del Rey, Calif. 90291.



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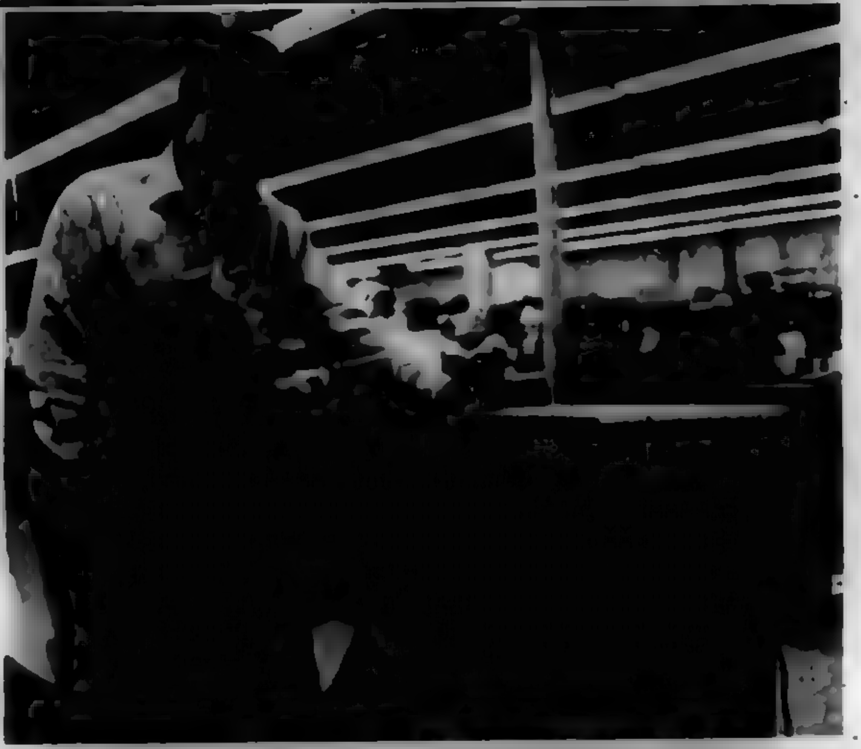

At one of 20 sites around Genrad's Acoustics, Vibration and Analysis Division, Tom Freeland pauses to speak with one user of the division's manufacturing information system.

Manufacturing Software Smooths Genrad Inventory

SANTA CLARA, Calif. — Beset by inventory control problems, Genrad, Inc. installed an interactive, on-line manufacturing software system to expedite the firm's business transactions.

Extended lead times, constantly changing prices and the burden of coordinating remoter assembly locations were some of the major problems leading to the purchase of NCA Corp.'s MS-11 package for Genrad's AVA Division.

Genrad was shipping less than $500,000 of orders a month using a manual inventory system when Tom Freeland, manufacturing manager at Genrad, first came to the company three years ago.

Using Genrad's new Digital Equipment Corporation PDP-11/35, Freeland supervised the six-month implementation of the $60,000 package. It went into receiving, storeroom, purchasing, receivables, accounts payable, data control and the MIS groups, as well as marketing and finance. Twenty terminals are placed at strategic sites throughout the plant of approximately 100 employees.

"With both the MS-11 system and well-defined product documentation, I knew we had the necessary building blocks to turn the operation around," Freeland said. "If marketing could provide the sales backlog necessary, I felt the shipping target could be achieved."

Today, AVA is shipping over a million dollars worth of product per month, and growing rapidly.

Saving hours of running around to various locations and departments for information, Genrad planners, buyers and schedulers use MS-11 as a common communications system, linked in real-time, right from their own desks.

"It's not like a batch system where all you have is last week's information," Freeland explained. "We immediately know where and how much we have at all of our locations. Thus, inventories remain at a minimum at all times."

Following a management-by-exception policy, Freeland can be confident he is in control. If either quantity or cost of input exceeds the bounds that management has established, the comprehensive nature of MS-11 directs attention to the difference. Freeland and his staff can then focus their efforts where they will do the most good.

Inventory Cuts

Stressing that aggregate inventory totals represent only the tip of the iceberg, Freeland believes the real value of Genrad's integrated MS-11 system is in its ability to take cuts across inventories. He illustrates his point by discussing the total inventory and accepted industry ratios.

"Our total inventory — including receiving, stockroom, work-in-process and finished goods — follows the industry rule of not letting inventory exceed 20% of sales.

"We're running right on target. Because we can take this cut across the inventory by product line, we can immediately determine inactive and obsolete inventories. The MS-11 system allows us to know what the deviation is, and where it is, so we can do something about it. In our ever-changing marketplace, that's management-by-exception at its best."

The MS-11 provides a simple and effective approach to monitoring vendor performance.

Suppliers who are consistently early in their deliveries may create a serious impact on inventory carrying cost, storage, cash flow, warehousing and traffic. In such cases Genrad can immediately defer delivery or payment in accordance with the schedule maintained on the MS-11.

Having advance knowledge of those suppliers who have slipped their delivery promises is paramount in running an efficient factory. At any time, Freeland can instantly ascertain Genrad's total commitment to vendors, who they are, when their products are due and other vital performance measurements.

International Software Meet Set for San Diego in March

SAN DIEGO — The Fifth International Conference on Software Engineering to be held here March 9-12 will feature demonstrations by commercial, academic and government software tool builders.

The goal of the conference is to increase knowledge of what software tools can do and how they can be used productively in software engineering.

The conference will include tutorial and seminar sessions. The charge for each tutorial ranges from $65 to $100, depending on when attendants register and whether or not they are members of the Association for Computing Machinery (ACM) or the Institute of Electrical and Electronic Engineers (IEEE).

More information is available from Ray Houghton, National Bureau of Standards, Room A266, Technology Building, Washington, D.C. 20234.

Theta's 'PDS' Offered Users Of DEC RT-11

GLENDALE, Calif. — Theta Business Systems is offering a Pascal Development System (PDS) for users running under Digital Equipment Corp.'s RT-11 operating system.

PDS can run in single-job or multiuser modes under TSX. It also runs within the standard 56K-byte RT-11 operating system, the vendor said.

Theta includes PDS with its accounting packages; however, it lists for $1,000, the vendor said from Suite 106, 1110 Sonora Ave., Glendale, Calif. 91201.

HP Desktops OK for McAuto

ST. LOUIS, Mo. — Three models of Hewlett-Packard Co.'s 9845 desktop computer have been qualified as remote terminals for the time-sharing network of McDonnell Douglas Automation Co. (McAuto).

The qualified models are Systems 45B, 45S and 45T. Systems 45B and 45T communicate with a host computer at line speeds up to 1,200 bit/sec. System 45S communicates at speeds up to 300 bit/sec.

HP's terminal emulator software for the 9845 computer must be modified slightly to communicate with McAuto's time-sharing network, but McAuto supplies instructions for making these changes.

McDonnell Douglas is headquartered in St. Louis, Mo. 63166.

'Denta-Count' Rx For Dental Clinics

SPRINGFIELD, Mo. — An integrated financial management package for single-doctor offices or multiple-dentist clinics is available from Data Center, Inc. It is named Denta-Count.

Designed for use with the AM Jacquard Systems, Inc. line of minicomputers, the package includes accounts receivable with systematic aging, billing, patient records control, relative value system, insurance claim handling and predetermination setup.

The basic system costs $19,000, the vendor said from 1950 V S. Glenstone, Springfield, Mo. 65804.

APL Video Course Out

TORONTO — A training course on APL is available on video tapes from Numetrix Limited.

The 20-hour course includes student manual with workbook and five video tapes. The course assumes no prior knowledge of computers or APL.

The course carries a one-time license fee of $5,000 from the firm at Suite 600, 3 Church St., Toronto, Ont., Canada M5E 1M2.

Accounts System Runs on PDP-11

ST. PAUL, Minn. — An accounts receivable and sales analysis system that runs on Digital Equipment Corp. PDP-11 computers under RT-11 and RSX-11 is available from PBS Computing.

The systems were designed for large and small businesses and offer several options for determining the format of monthly statements.

Statements show detail on activity for the month and can be produced with several optional user-defined promotional or dunning messages.

The accounts receivable system costs $2,500 alone and $3,000 with the sales analysis module, the vendor said from 3550 N. Lexington Ave., St. Paul, Minn. 55112.

DEC Users Get 'EZsort'

LOS ALAMITOS, Calif. — Software Techniques, Inc. has announced a program-internal sort capability for users of Digital Equipment Corp. operating systems.

Version 4.0 of EZsort runs on both RSTS/E and RSX, providing Basic-Plus-2, Cobol and Dibol applications programmers with reportedly fast "in-program" sort capability.

EZsort is said to work with any file management software, including Databoss, DBMS, DMS500, FMS, RMS and Total.

EZsort costs $775, with OEM discounts available from the firm at Suite 101, 5242 Katella Ave., Los Alamitos, Calif. 90720.

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On Chemical, Toxic Substances

Shell Oil's DBMS Keeps Information Flowing

By Phil Pack

Special to CW

HOUSTON – Up until four years ago, information about a chemical substance at Shell Oil Co. was handled by various departments or laboratories responsible for testing developmental substances. If a person was looking for information on a chemical outside his own area, he usually faced a lengthy search for the data.

At the same time, public concern over the toxic effects of chemical substances and their environmental impact was growing, and the Federal Environmental Protection Agency (EPA) issued its Toxic Substances Control Act (TSCA) requiring more recordkeeping and reporting on substances.

During this period – 1976 – Shell formed the Health, Safety and Environment (HS&E) organization, which assumed a number of responsibilities including supplying certain information on products and chemicals. HS&E's Information Services Department (25 people) was designated the primary supplier of product information providing standard reports, ad hoc retrievals and helping government reporting requirements – a big job.

When we assessed the business environment, we could forecast significant increases in the internal and external demands for product information in the future. We could see the need for a central repository of product data for supplying information on the physical and chemical properties of materials, toxicology information, health studies and other data as required for regulatory compliance. We knew our current manual methods of recordkeeping and reporting were just not cost-effective.

Establishing Objectives

Several objectives for a new Product Profile Information System were established: the system must be cost-effective, usable by non-data processing people, modular to facilitate growth and integration, have an expected life of 10 years, be secure and use existing software and hardware, when feasible, to take advantage of the experience base.

We looked at the objectives for the system and measured them against available software packages, including those that could be developed. When we began looking for keyword text processing capabilities, we checked to determine if any of the several proprietary software packages already in-house could do the work, including the Inquire data base management system (DBMS) from Infodata Systems, Inc.

When we considered the user-friendliness factor, Inquire was our best candidate. Inquire had been in use at Shell since 1970 for other systems, including several HS&E applications.

The core data module for the Product Profile Information System is a non-bibliographic data base that permits the recording of information contained in Shell's Material Safety Data Sheets. The system also handles the printing and distribution of these sheets to customers and employees for use in handling the materials.

Inquire handles all the data as well as mailing information, but more important than routine mailings, the system will automatically print revisions for all persons who received the original safety sheets. To help speed data collection, an IBM OS/6 word processing system is used and a Cobol program is used to interface between the word processing system and the DBMS.

Future plans include adding to the Product Profile Information System other modules containing information on Shell's products, including the Toxin and Chemfile data bases, which allow multi-data base retrieval. The modular design of the systems will permit adding additional information modules, additions anticipated to continue over the next five or six years.

Development Background

The Toxin and Chemfile data bases are two of many specialized information retrieval systems developed in 1977 under HS&E. Both took six months to develop and become operational. Mary Cubillas, senior information technologist in HS&E's Information Services Department, has been largely responsible for the development of these two applications.

"When the new HS&E organization was formed in 1976, we were faced with boxes of reports to index and catalog," she explained. "These reports included internal Shell toxicology reports, reports from contract laboratories outside of Shell as well as reports from such organizations as the American Petroleum Institute.

"Though the reports are circulated among corporate toxicologists first, our department has the responsibility for their retention and retrieval. We had been using Inquire for several years for handling toxicological data and were glad to have its help with the mammoth task ahead of us.

"Step one for our group was to determine what elements of these reports should be indexed to meet the needs of the HS&E professionals. We developed a prototype system and presented it to the toxicologists for comment. What evolved was a system containing, in addition to bibliographic information, four types of classifications: chemical substance indexing, study classifications, subject keywords and an abstract which included toxicology data extracted from each report, Cubillas said.

"Indexing of the chemical substance is extremely important in the Shell Oil Toxin application. Many times, reports are retrieved from this system for submission to governmental agencies or for the evaluation of the toxicity of a chemical by the Toxicology Department. Retrieval must be precise, even though reports may refer to the chemicals by trade names, product codes or by varying chemical nomenclature.

The demand for product information continues to increase rapidly and, as additional regulations are promulgated by federal and state agencies, the need for effective information systems to record and report this information will be more severe. We believe our Inquire-based Product Profile Information System will handle the increased volumes and let us satisfy these information needs cost-effectively.

Pack is manager of HS&E's Information Systems Department.

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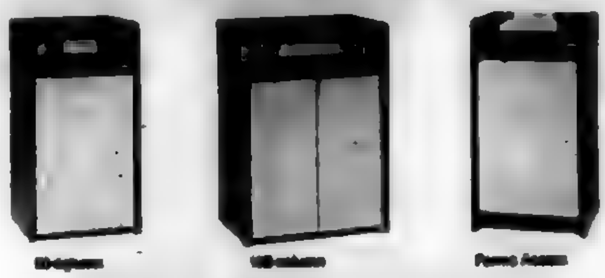

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Re Conversion Functions

FCC Asks Comments on Inquiry II Rule

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission (FCC) has asked interested parties to comment on whether some protocol/code conversion functions should be included in the "basic" services defined in its recent Second Computer Inquiry Decision [CW, Dec.22]. The question is esoteric, but nevertheless crucial to users, AT&T and other vendors.

If these conversion functions are made a part of basic services, AT&T operating companies will be able to interconnect a much greater variety of otherwise-incompatible user terminals, application programs and private networks. The specialized carriers — such as Telenet Communications Corp. and Tymnet, Inc. — already provide such interconnection, will face increased competition. Firms marketing specialized services, such as electronic mail and on-line information to the home, would also be impacted, since they typically use the telephone network and would have to interface with AT&T's protocol.

If the phone company's plans for entering these specialized markets materialize, Bell would be able, at least theoretically, to curb competiton by changing its protocol. Since it would take the other vendors awhile to change their software, once the new specifications were announced, AT&T could gain a marketing advantage, at least for awhile.

'Enhanced' Function

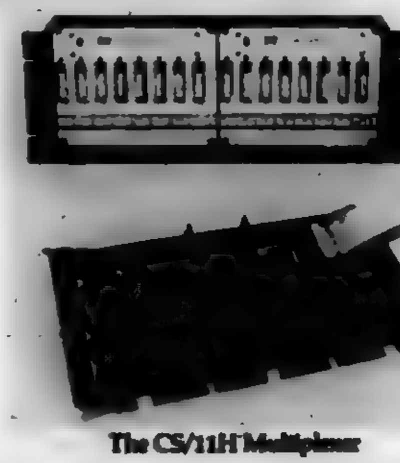
The FCC's "final" computer inquiry decision, issued last April, said protocol/code conversion was an "enhanced" rather than a basic communications function, meaning AT&T could provide it only through a separate subsidiary and not through a telephone operating company. However, the commission also said it planned an inquiry to consider whether some protocol conversion functions ought to be included in basic services. A notice describing that inquiry was

(Continued on Page 100)

Emulex Enters Front-End Mart With DEC-Compatible Mux

SANTA ANA, Calif. — Emulex Corp. has entered the communications front-end market by introducing a multiplexer subsystem that provides users of Digital Equipment Corp's. DH11 multiplexer with improved line-handling capabilities in a smaller package and at less cost, according to the firm.

The CS11/H communications multiplexer gives users of any PDP-11 or VAX-11 computer the ability to connect up to 64 asynchronous communications line devices to a single controller board housed within the CPU backplane. Additional lines may be connected by adding a communications controller card to the CPU and line adapter cards to external distribution panels, the firm said.



The CS/11H Multiplexer

The multiplexer uses a single hex size circuit board for the CC11/H communications controller that is connected by a 34-conductor ribbon cable to as many as four CP11 distribution panels, each of which contains its own integral power supply and either one or two eight channel Call Line Adapters.

The line adapters provide the data and modem interface circuitry plus the Uart-type circuitry which provides the serial-to-parallel and parallel-to-serial conversions for parallel data transfer between the adapters and the controller. The line interfacing variations are located outside the CPU for easier restructuring and expansion, according to the vendor.

The C511-H offers DMA output transmission, Fifo input and adaptability of line interfacing, speed and format selection. Individual byte count and address registers are provided for each line for DMA of characters transmitted from the CPU memory and diagnostic and operating software tran-

(Continued on Page 100)

Book Series Guides Communications Managers

By Brad Schultz
CW Staff

PHILADELPHIA — A book series for data communications managers was recently released here by Heyden and Son, Inc. under the editorship of Thomas A. Rullo, a Citicorp vice-president and former editorial director of Auerbach Publishers, Inc.

Advances in Data Communications Management, Volume One gathers 10 essays to help managers prepare for the fact that 80% to 95% of DP installations will have data communications this decade, according to Rullo's preface.

Fairly conversational in tone, these articles touch on topics such as network planning, energy considerations in design and procurement, net management per se, protocols, the trend toward open systems interconnection, architectures, fiber optics, satellite links and the status of existing and proposed data communications services.

In "Data Communication System Planning," Pete D. Moulton of the U.S. Senate Computer Center presents, among many other things, sample job descriptions of data network personnel.

The network manager, in Moulton's view, reports to the organization's computer center director. The manager's function is mainly to evaluate require-

(Continued on Page 104)

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FCC Seeks Comments on Conversion Functions

(Continued from Page 99)

issued earlier this month.

The inquiry will not deal with protocol conversions that involve internal network operations — those occurring between entry and exit nodes. It will focus, instead, on the header and trailer codes used to control information flow between the ends of the message path and between the user's terminal and the network.

In a packet-switched network, for example, where a message is divided into frames, each containing one or more information packets, the header/trailer codes, among other functions, show the beginning and end of each frame, identify the receiver's address, detect errors and provide a way of telling the sender, at any time, which packets have been received at the other end.

Although packet-network protocols have been partly standardized, a good deal of work remains to be done. And even after this process is completed, variations will be necessary to support different types of networks and applications. If, as seems likely, AT&T goes into the packet-switching business, it must be able to interconnect these different networks and applications on the same terms as its competitors. Under the computer inquiry decision, however, this is not possible — at least according to one interpretation.

Basic Service

Packet switching is classed as a basic service and thus can be offered by AT&T operating companies but protocol/code conversion is part of an enhanced offering, which Bell can market only through a separate subsidiary. A phone company competitor, by comparison, can integrate both functions into a single service and offer it through a single company.

Many of AT&T's competitors — led by IBM, the Association of Data Processing Service Organizations, Inc. (ADAPSO), Tymnet, and the Computer & Communications Industry Association — strongly oppose letting the telephone operating companies do likewise.

One argument is that although a telephone operating company can not offer an end-to-end packet-switched service requiring protocol/code conversion at the ends of the transmission path, a separate Bell subsidiary can offer such a service (by leasing transmission from an operating company). Thus, the discrimination allegedly imposed on Bell is more apparent than real.

Adapso Agrees

Another argument was provided by Adapso in one of its earlier comments in the computer inquiry. "If AT&T [operating companies are] allowed to perform protocol conversion, then AT&T could selectively choose which protocols and codes it utilizes and thus could destroy the competitiveness of equipment and service offerings of others," it said.

Adapso argued further that letting the operating companies perform protocol/code conversion for the end user would "create immeasurable opportunities for cross-subsidization."

Bell, for example, could load the conversion software into its computerized electronic switching systems, which now support telephone service. By allocating a disproportionate share of the related costs to telephone service — an easy task, given the sad state of telephone accounting systems — Bell could offer protocol/code conversion service for substantially less than its competitors.

Initial comments in the inquiry, formally known as Docket 80-756, are due next March.

Multiplexer Runs On PDP-11, VAX

(Continued from Page 99)

sparency.

The unit supports asynchronous line interfaces of all types, including RS-232, with full DM11-compatible modem control and current loop.

The system also provides for line parameters such as individual line speeds to 19.2K bit/sec using all commonly used transmission rates, split line speeds; character size from five to eight bits; and stop bits one one, 1.5 or two bits in size. The firmware programmable read-only memory used for the unit directly emulates the DEC DH11 functions, the firm said.

In addition, controller functions can be placed on one board that plugs into a single Unibus SPC slot as only one unit load on the Unibus. The single 34-conductor flat cable daisy chains up to four distribution panels which contain the line adapter circuitry.

The device provides improved performance, up to 19.2K bit/sec per line, with a total composite data rate of 50,000 char./sec on a single controller. Multiple controllers may be used for increased capacity. A 64-character Fifo buffer is provided for each group of 16 received data lines.

A basic configuration of one controller and one distribution panel with adapters for 16 channels, all including modem control, is priced at $5,800. To expand in increments of eight lines, additional panel and an eight-line adapter costs $2,500. To expand in increments of 16 lines, an additional panel and two eight-line adapters is priced at $3,900. A 32-line system would cost $9,700, the firm said from 2001 E. Deere Ave., Santa Ana, Calif. 92705.

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[illegible]

Starwriter Debuts

LOS ANGELES, Calif. — Computer Textile, Inc. has introduced the Starwriter, a letter-quality, receive-only, daisy wheel printer.

The Starwriter runs at 25 char./sec and comes with an industry standard Centronics Data Computer Corp.-compatible parallel interface. The printer uses Diablo Systems, Inc. ribbons and printwheels, has full graphics capability and is completely code-compatible with Qume Corp. and Diablo. No software changes are required to use boldface, underlining and bidirectional printing, the vendor said.

The Starwriter accommodates paper widths of up to 15 in. It costs $1,779 from the firm at Suite 1504, 10960 Wilshire Blvd., Los Angeles, Calif. 90024.

Multiplexers Get Rack Mount DE-4

CHAMPAIGN, Ill. — Compre Comm, Inc. is offering a DE-4 rack mount version of its Data Express statistical multiplexer and a flow control option for its multiplexers.

The DE-4 fits in standard 19-in. equipment racks and can be mounted with or without the cover. It costs $1,625.

The X-on/X-off feature adds protection from data loss during high activity periods and comes free of charge with the vendor's multiplexers, Compre Comm said from 51 E. Chester St., Champaign, Ill. 61820.

Programmer Out For Pals, FPLA

AUBURN, Calif. — A Universal Logic Array Programmer designed to program present and future logic array devices, including Pals and FPLAs, is available from International Microsystems, Inc.

Standard features of the IM3030 include menu-driven software, dual RS-232C ports for interfacing to development systems, switch-selectable transmission rates from 110- to 9,600 bit/sec and selectable 20mA current loop.

The mainframe costs $1,595 and module prices start at $595 from the firm at 11554 C Ave., Auburn, Calif. 95603.

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Bell 212A-Type Modem Runs in Full-Duplex Mode

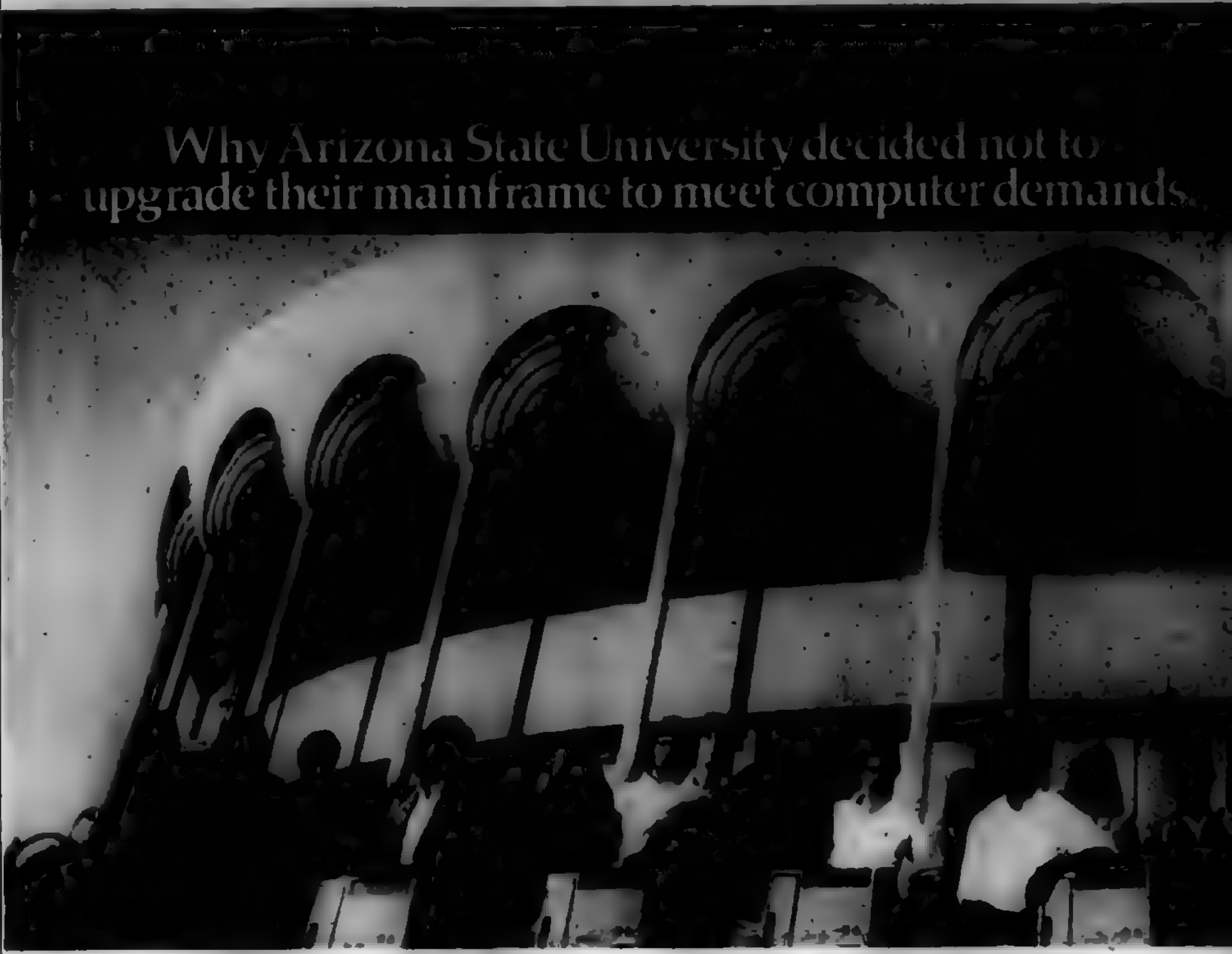
NEW BRIGHTON, Minn. — An FCC-registered Bell 212A-compatible modem that operates in the full-duplex mode over dial-up lines has been introduced by Multi-Tech Systems, Inc.

Both 1,200 and 0-300 bit/sec capability are provided with asynchronous or synchronous operation selectable in the 1,200 bit/sec mode. The MT212A is available in both stand-alone and rack-mounted configurations and provides originating and automatic-answering capability. Voice-to-data transferring is accomplished with a push button on the modem chassis, eliminating the need for 502 exclusion-key phones.

The stand-alone unit costs $850 from Multi-Tech at 82 Second Ave., S.E., New Brighton, Minn. 55112.

The MT212A Modem

Why Arizona State University decided not to upgrade their mainframe to meet computer demands.



Distributed Processing with Digital. The right system for the job. Every job.

As user demands grow, it can be tempting to get a headstart on future demand by upgrading an existing batch-oriented mainframe. But it's not always the smartest strategy.

For example Arizona State University had been using a mainframe exclusively—both for academic timesharing and for more complex research. So when timesharing demands skyrocketed, their inclination was to upgrade their mainframe.

Instead, they chose a different approach. Distributed processing. A strategy that allows them to solve individual needs and problems with individualized systems. Rather than one single upgrade, they added three dedicated, interactive PDP-11/70 computers. One each for their colleges of Engineering, Business and Liberal Arts. This distributed approach was a much more functional solution to their problems. Not only did it allow them to tailor each unit to its specific application, it gave them flexibility for the future. Now they can add and reassign computers effectively and cost efficiently.

Distributed Processing with Digital means not wasting your mainframe.

"We don't use the PDP-11/70 systems for all our academic applications," explains Darel Eschbach, Director, Computer Center. "But we use them for the very large number of smaller timesharing jobs needed by the various departments on campus. Most undergraduate timesharing is now on Digital's systems. The mainframe computer we now reserve for higher level computing for batch-oriented applications. Thus we've been able to realize an increased effectiveness in the use of all our computer facilities."

James Hershauer, Professor of Quantitive Systems in the Business College likes the interactive capabilities his PDP-11/70 provides. "I estimate that nearly one-third of the students in programming courses have never done anything on a computer. That's why the PDP-11/70 is so valuable. Here are students sitting down to program for the first time in their lives. Perhaps they'll make 10 passes before they have a successful program. It helps them to have the immediate response of the timesharing system."

Distributed Processing with Digital means more availability.

Max Ivey, Director of Academic Computing Services, sees the PDP-11/70 systems solving future demands too. "We do see some probable areas of growing use as in research and statistical applications. Availability is what makes these systems so appropriate for academic use. They're perfectly suited to do the type of work that students do," he concluded.

So when Arizona State opted for distributed

DEC Offers CRT Units For News Applications

MERRIMACK, N.H. — Digital Equipment Corp. has announced a line of CRT terminals for newspaper applications. The VT173/C (for classified advertising) and VT173/R (for reporting) contain an LSI-11/2 microcomputer and offer display and text handling features, the vendor said.

The VT173/R, with 32K bytes of internal storage and 105-key keyboard, costs $5,195.

The VT173/C has 32K bytes of internal memory and 123 keys; it costs $5,995.

DEC is headquartered in Maynard, Mass. 01754.

For Interdata Processors

IEEE Bus Controller Fits PE Gear

NEWPORT BEACH, Calif. — An IEEE bus controller for Perkin Elmer Corp. (PE) Interdata processors has been introduced by MDB Systems, Inc.

The board allows the computers to control programmable instruments, both talker and listener devices, as well as computer-oriented peripheral devices which are configured for the IEEE 488 bus, a spokesman said.

A full-capability controller (C1-C5), the MDB board generates parallel and serial polls, extends control to other intelligent devices and, when switch-enabled, acts as the system controller, according to the firm.

Among its capabilities are a talker function, a listener function, service request, remote/local and parallel poll.

The interface communicates with the computer via the multiplexer and selector channel I/O bus, the MDB spokesman stated.

Standard Interface

The MDB standard interface is contained on a single 15- by 15-in. board that is mechanically identical to the Interdata module and can be mounted in a single slot of the computer chassis.

All function select switches are located on the front edge of the interface board so board removal is not required to change switches, MDB noted.

The standard 24-pin IEEE bus receptacle for daisy chain cabling is also located on the front edge of the board, the spokesman explained.

The controller costs $1,250.

MDB Systems is headquartered at Suite 203, 2503 Eastbluff Drive, Newport Beach, Calif. 92660.

Burroughs CPUs Gain Input Port For Bar Code Data

BLUE BELL, Pa. — The introduction by National Computer Products of an auxiliary data input port has reportedly made it possible for users of Burroughs Corp. computers to enter bar code OCR-A or OCR-B data into a Burroughs computer using a hand-held wand.

Fits ND-830

The port fits on National's Burroughs-compatible ND-830 CRT terminal. It will allow Burroughs users to directly connect a bar code OCR-A or OCR-B reader with an RS-232C serial interface, the vendor claimed.

The scanned information is read directly into the ND-380 and displayed, with the data being treated in the same manner as keyboard entered data, the vendor explained.

The port costs $1,195.

National Computer Products may be reached through P.O. Box 154, Blue Bell, Pa. 19422.

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processing, they got several advantages.

First, the PDP-11/70 systems were tailored to their tasks. With interactive capabilities that made it easier for new students to learn. The university was also able to use their new and existing systems in a much more cost-efficient manner, and subsequently installed 3 additional units.

Distributed Processing with Digital means more flexibility.

Distributed processing lets universities like Arizona State evaluate and meet their needs on a simple, year-to-year basis. They can purchase different capabilities as required by different applications, adding and reassigning computers to meet their demands. Which means they'll never have to commit to more (or less) computer than they need.

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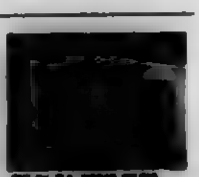

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Book Series Guides Communications Managers

(Continued from Page 99)

ments for data communications services; determine the organization, staffing, facilities and equipment needed to meet the requirements; plan for upgrades; and evaluate the effectiveness of equipment, personnel and other resources in meeting the network's stated objectives.

To qualify for network manager, an individual needs experience in planning, operation, development and maintenance of large data communications networks, Moulton noted in his essays. Also, the person needs comprehensive knowledge of the products and services available for data networking as well as experience in managing technical people.

The network manager should have seven years professional experience in data communications beyond the experience equivalent to a bachelor's degree. Two years should be in managing.

Reporting to the network manager is the assistant manager who, in Moulton's scheme, assists or fills in as needed and maintains liaison with other computer center sections, occasionally in addition to supporting short duration projects.

Moulton would have the assistant manager possess much the same credentials as the network manager, including a bachelor's degree or five years' professional experience in data communications software and computer system development.

Also reporting to the network manager is the section manager for communications software. This person takes charge of maintenance, documentation and enhancement of the computer center's communications software and leads communications programmers in various projects.

The section manager for communications software needs a knowledge of systems analysis and programming methodology, should be a stickler on detail and accuracy, know how to plan and schedule software development and understand real-time software design as well as data communications protocols, equipment and facilities. For this job, five years' professional experience beyond a bachelor's degree is also preferred.

Reporting to the section manager for communication software is the communications software specialist, who is essentially a communications-oriented programmer with an associate degree or at least three years' experience in software development and maintenance.

On a par with the communications software manager and also reporting to the network manager is the section manager for network equipment, Moulton continues. He or she directs installation of all data terminals and monitoring of their performance. Moulton considers an associate's degree or three years of college sufficient.

The network equipment section manager supervises computer terminal technicians and a network equipment coordinator. The latter dispatches and logs all service calls and schedules all installations and moves of equipment.

Another individual reporting directly to the network manager is the section manager for special projects, who is responsible for performance and implementation of special projects aimed at improving network effectiveness and reducing network costs. A consummate data communications professional, this person needs at least six years' background in the business and a bachelor's degree in computer science, engineering, mathematics or natural science.

The special projects section manager oversees communication system specialists, who generally have the same schooling but fewer battle scars. If they don't know it all, they should think they do and gracefully make up the difference.

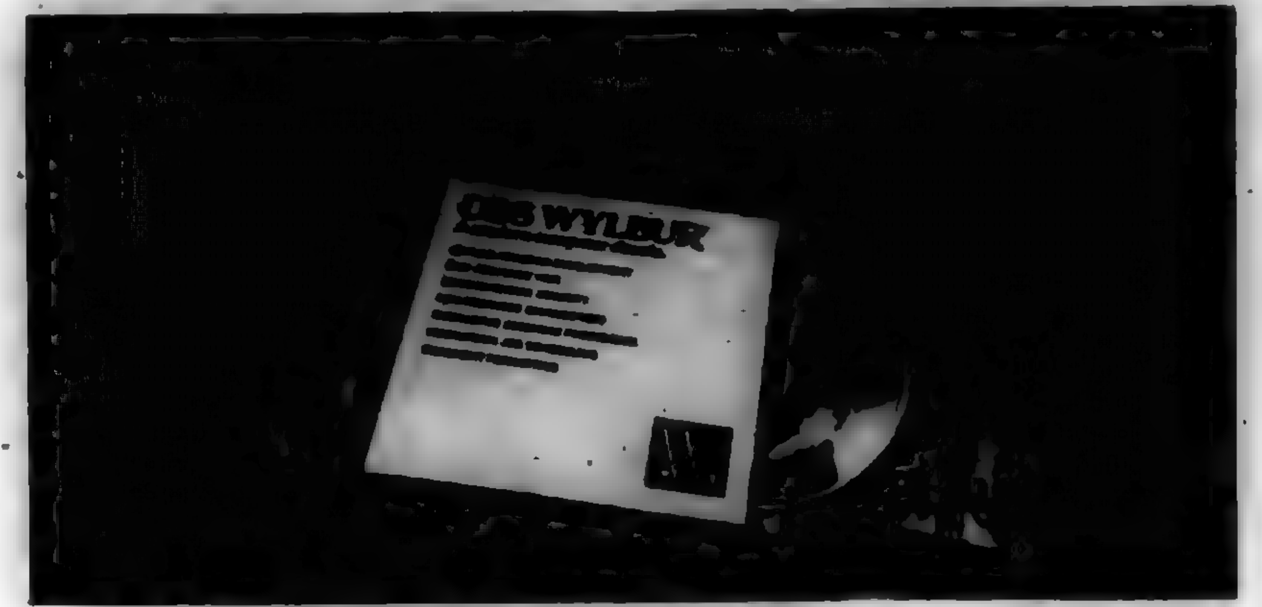
The final job slot reporting directly to the network manager in Moulton's scheme is the section manager for technical control. Responsibility is for operation, maintenance and enhancement of the computer center's technical control facility along with local and remote data communications facilities. This person troubleshoots crises, much like Scotty on the *Starship Enterprise*.

The post's duties include direction of patch-ups, post mortems and scheming for better gear. The technical control section manager needs savvy in both analog and digital communications and an ability to lead people. Education should approximate a communications-related bachelor's degree.

Reporting to the section manager for technical control is the communication engineer, senior network technician and network technician. The communication engineer is there to size up sudden problems and direct the technicians in solving them. All three can make good with a high school diploma and a six-month stint in an appropriate trade school, Moulton suggested.

Advances in Data Communications Management, Volume One also features useful descriptions of most well-known network architectures, protocols, packet-switched circuits, network architectures, protocols, packet-switched circuits, network services and links that leave the Earth.

More information on this book, *Advances in Distributed Management, Advances in Computer Security Management* and other books in the series edited by Rullo, is available from Heyden & Son at 247 S. 41st St., Philadelphia, Pa. 19104.



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With On-Line Communications

State Auditor Ends Conflicts Between Users, DP

By Richard W. Beddow
Special to CW

HARRISBURG, Pa. — On-line data communications techniques in use at the state's Department of the Auditor General here have brought rising DP costs under control while meeting increased DP requirements.

Within the past 18 months, Auditor General Al Benedict has been able to eliminate the problems and conflicts associated with priority setting between user areas and central data processing, greatly improving turnaround time for user requests and avoiding duplication of costs through common applications and sharing. At the same time, Benedict has responded to the unique requirements of the individual user bureaus in meeting the department's objectives.

The Bureau of Management Information Systems (MIS) utilizes a Univac 90/30 mainframe with a main storage of 256K bytes, five Univac 8418 disk drives with a total capacity of 290M bytes, three Uniservo 16 magnetic tape drives, a card reader and printer.

Also part of the system are two communications lines, a Univac UTS 400 microprocessor-based CRT terminal with a 64K-byte memory, a printer and a floppy diskette, as well as four UTS 400 terminals and three attached printers.

The department has 22 bureaus, all of which can request priority status for certain projects. However, only four bureaus (Comptroller's Office, Bureau of Personnel, Bureau of Communications and Bureau of Public Assistance Audits) warrant top priority status on the majority of their requests.

Previously, priority requests sometimes disrupted operations scheduling and could force postponement of a batch run. That, in turn, could result in a need for third-shift or weekend processing.

Moreover, priority requests seemed to arrive at the most inopportune times — such as when another priority request was running.

Major Problems

The major problems encountered were operations scheduling, slower turnaround time for nonpriority projects, increased workload on analysts, programmers, data entry and computer operators and changing priorities among jobs.

The solution was found by providing on-line capabilities to the four prime bureaus and also to five others, which resulted in a significant amount of time, responsibility and workload taken away from data entry and operations and returned to the user.

One of the key benefits is that users are no longer forced to compete for priority status among the various operations and audit bureaus and can schedule their own sessions and set their own priorities independent of other bureaus and MIS schedules. Simultaneously, the computer is now free to process other applications.

The advantages are twofold. Not only have the user bureaus helped, but the computer center no longer needs to modify its operations schedule for the shifting priorities of those projects currently on-line.

Furthermore, much of the data entry and verification activity associated with production runs has been eliminated since control was returned to the bureaus. (It should be noted that audit trails on data entry and reports are generated and routinely checked.) Data entry staff is minimal, with emphasis placed on new systems development.

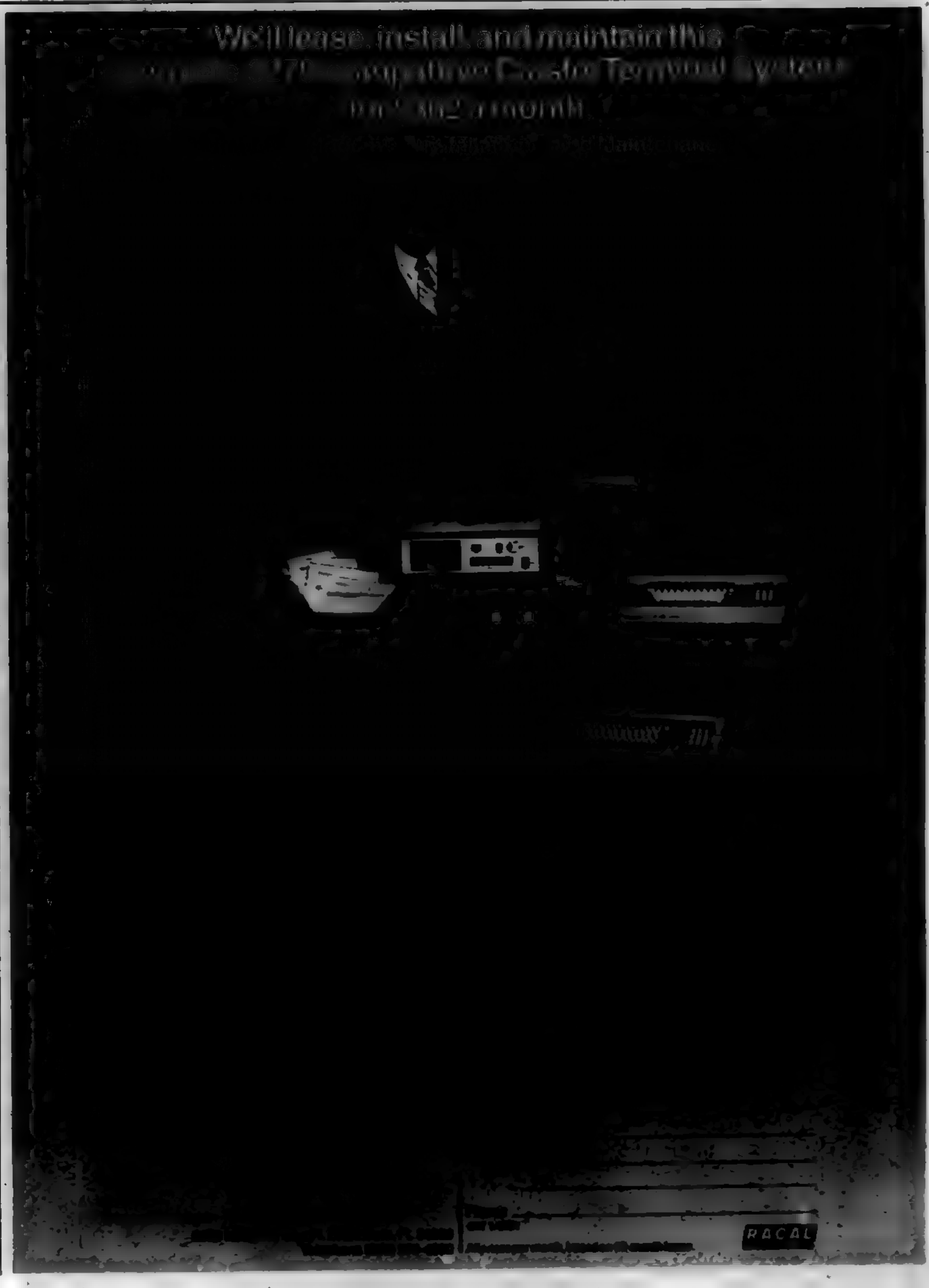
The Auditor General's initial approach was to develop on-line applications for a few key user bureaus with the communications network tied directly into the host computer. Once the applications were released into a production environment and the users became more aware of the computer's potential, their appetite was only whetted for additional on-line development.

To meet these increased demands, all terminals currently being ordered are intelligent and will function as microprocessors. Data being entered during updates will be immediately verified by the microprocessor and will relieve the host computer of this responsibility. Disk storage and printer terminals will also be included within the systems configuration for each of the key bureaus.

Through the application of on-line communications processing techniques, the computer's processing power has become more accessible to the individual bureaus. The planned installation of additional terminals will further extend the Auditor General's ability to more efficiently respond to his increasing mandated responsibilities.

Currently, all users that are on-line are in-house. However, in the near future, the department will be linking a remote site containing four users into the system; in the more distant future, on-line capabilities will be provided to certain field offices through the Commonwealth.

Beddow is the director of MIS with the Department of Auditor General, Harrisburg, Pa.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Touch-Sensitive CRT Units Quiet Library Access Woes

Special to CW

EVANSTON, Ill. – The Evanston Public Library has long been a leader in making its resources available to the public it serves. In 1896, the library began using a card catalog based on the newly established Dewey decimal system of classification to replace cumbersome "finding lists." In 1920, it became the first city library to employ a bookmobile.

Then, this fall, the library began replacing its traditional card catalogs with touch-sensitive CRT terminals. The new terminals let library patrons access more than one million entries in the library's catalog, including books, records, cassettes and films.

Unlike most terminals, the touch-sensitive terminals do not require keyboards. Each terminal screen is divided into a number of areas, each one displaying a particular information category. When a library user touches the area corresponding to the type of information he wants, the information is displayed in large bright characters on a large screen.

Designed for use by people unfamiliar with computer equipement, the terminal screen guides patrons through their choices. The user initiates a search of the library's holdings by touching with a fingertip one of three categories (author, title and subject) displayed on the screen. In doing so, the user begins to access the on-line data base of the library's host computer.

After this initial selection, a list of key words appears on the screen from which the user selects the one preceding the desired entry. As the process is repeated, the search is narrowed until the desired entry appears. The user can then obtain full information about the particular selection, including its location and availability.

Favorable Reports

In use since October, the terminals are getting favorable reports from the library's users. According to Jane Greenfield, adult services coordinator for the library, patrons making use of the new on-line information system can get more complete and more current information than was possible under the traditional catalog system.

Users interested in a particular title, for example, can learn from the terminal whether it has been checked out and whether other copies can be obtained at one of Evanston's three branch libraries. Some patrons have even done empirical research, first checking out a book, then running back to a browsing terminal to see if the check-out had been recorded on the system.

The touch-sensitive terminals are currently installed in the library's main lobby, the reference room, the art room and the children's room. While some of the library's adult users at first hesitated to make use of the browsing terminals, younger patrons have been enthusiastically exploring its capabilities from the start.

According to the library's public relations coordinator B.J. Jahnke, "It has been fun to watch children line up to use the terminals. They are totally thrilled with its possibility, and we've found in our suggestion box comments like 'absolutely fantastic.' "

Designed to be "patron-proof," the terminals have no exposed switches, wires, dials or knobs to intimidate users. According to Greenfield, the terminals are actually more resistant to damage from users than the library materials they help users locate.

Once library users have become accustomed to using the new terminals, the old card catalog will be eliminated. "Initially, having both versions of the catalog let our users become accustomed to on-line catalog at their own pace," Greenfield noted. "For some people, that made the transition more pleasant."

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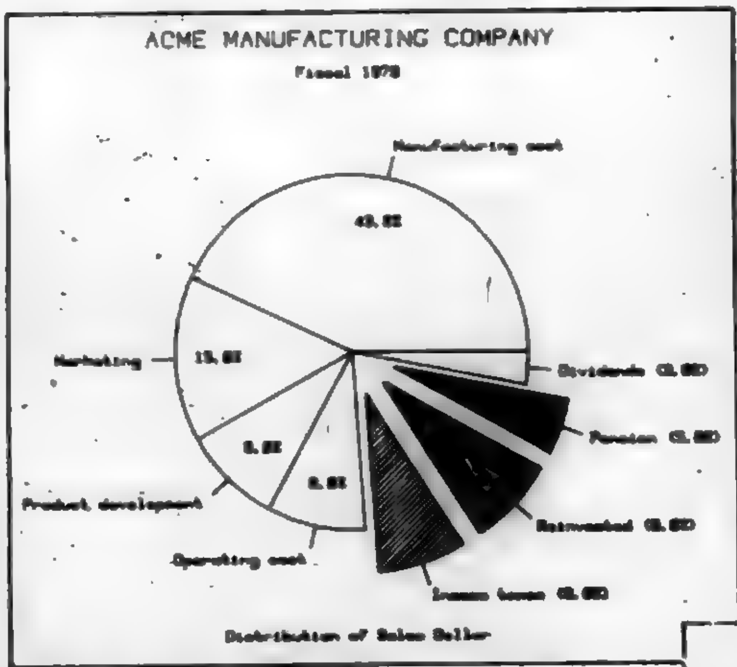

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IBM Constructs Superconductors To Push Limits

YORKTOWN HEIGHTS, N.Y. — Scientists at IBM's Thomas J. Watson Research Center here have constructed experimental superconducting magnetic sensing devices whose operating characteristics reportedly approach limits imposed by fundamental laws of physics.

When incorporated in complete measurement systems, the devices could permit measurement of changes in magnetic fields as small as one millionth of a millionth of the field of the earth when those changes occur at frequencies above 10 KHz. This represents a 100-fold increase in sensitivity over existing commercial measurement systems that use similar magnetic sensing devices for a range of application areas that includes geophysics, biomedicine and pure science.

The devices belong to a family of superconducting quantum interference devices (Squid), which employ superconducting metals that lose all electrical resistance at temperatures close to absolute zero (273° below zero Centigrade). Squids have been used in measuring variations in the magnetic field at the earth's surface, which is important in searches for geothermal energy sources and minerals and possibly in earthquake prediction. They have been used in detecting heart and brain waves (magnetocardiography and magnetoencephalography).

Squids have also been used to make voltage comparisons to one part in 100 million and current comparisons to one part in one billion. In addition, Squids have played roles in attempts to detect gravity waves and in searches for quarks, fractionally charged particles believed to be the building blocks of elementary particles such as neutrons and protons. They have also been used in studies of magnetic materials. Significant improvements in Squid performance thus have, potentially, both practical and scientific importance.

Advances Reported

The advances discussed here were reported to the worldwide scientific community by several IBM research groups beginning early last year and have stimulated further work at IBM as well as else-

(Continued on Page 112)

Drafting System Replaces Light Tables, Tracing Paper

Special to CW

SAN JOSE, Calif. — Light tables and tracing paper have made way for a computer-based drafting system here at an architectural and construction firm that specializes in electrical applications.

David M. Arrigoni & Associates, Inc.'s graphics computing system is currently built around six Tektronix, Inc. computers and reportedly tripled the speed of electrical and lighting system design. The system can not only lay out the entire floor plan of multilevel buildings, but it can accurately estimate the cost of a particular job in as little as four hours, according to David Arrigoni, the company's president.

Before installing its system, the firm used the usual manual procedures for designing and producing electrical drawings. An architectural drawing of a floor plan was placed on a light table and traced. A blueprint was made from the tracing and marked up by an engineer to show the location of electrical fixtures and wiring. The marked-up copy was given to a draftsman who used it to draw a bid document. Schedules and details were typed or drawn on a clear adhesive paper and stuck down on the drawing.

A typical job might involve 12 to 20 of these drawings, and take anywhere from 700- to 1500 man-hours, Arrigoni explained.

Too Slow

"The manual system was just too slow for the productivity we needed for growth," he said. "And the time-sharing system we were using for business applications didn't have much of a graphics capability. Besides, it had a number of accessibility and downtime problems."

Currently, the company's system consists of the processors, six 1.3M-byte Tektronix 4907 dual-density floppy disk units, three 4663 plotter-digitizers, a 4631 hardcopy unit, a 4924 magnetic tape unit and other plotting devices. The firm does all of its programming for the system in Tektronix' Extended Basic.

The company took the first step toward developing its own computerized design system about two- and one-half years ago, when it installed a Tektronix 4051 graphics computing system, a stand-alone computer with an 11-in. CRT terminal screen. According to Arrigoni, the firm chose the 4051 after a lengthy evaluation process and a benchmark in which the system proved to be twice as fast as its nearest competitor.

It was not until the Tektronix 4907 file management system was announced, however, that the firm began to develop in earnest an electrical design system utilizing the system's graphics capabilities.

Today, the floor-plan system is largely computerized, using several design and production workstations. At the design station, an architectural drawing is placed on a 3- by 4-in. digitizer, where a hand-held cursor is used to enter the drawing into the computer. First the floors and walls are digitized in, then the doors and windows. Doors, for example, are entered into the computer by us-

(Continued on Page 110)

Honeywell 316s Get Nonvolatile Disks

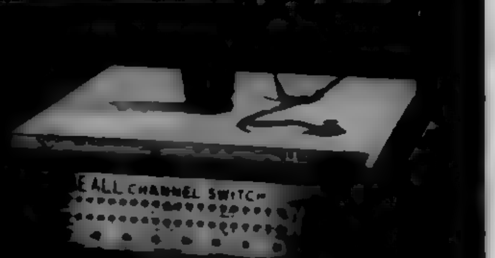
REDWOOD CITY, Calif. — Ampex Corp. is now offering an all-electronic nonvolatile disk replacement for Honeywell, Inc.'s H 316 computers that it claimed will improve and upgrade performance.

The Ampex Megastore 316 is available in 512K-byte (256K words) and 1M-byte (512K words) capacities. Two I/O mode options are provided, the firm said. The unit will operate directly through the direct multiplex control or as a program input/output device. Operating with no latency time and optional transfer rates of 19KHz to 297 KHz, the unit offers the flexibility to fit most applications, according to the vendor.

Data word length of the unit is 16 bits and data is transferred to and from the unit in 16-word sectors, with a single transfer being any number of sectors from one to 2,048. Each unit is installed with a write-lockout feature consisting of 16 switches and indicators. Depending on the specific unit's size, each switch, when set in the ON position, protects a group of tracks from being written. The 256K word unit protects 64 tracks in four-track increments while the 512K word device protects 128 tracks in eight-track increments.

The Megastore 316 comes complete with controller, power supply and interconnecting cables and costs $11,000 for .5M-byte and $18,000 for 1M byte. Ampex is located at 401 Broadway, Redwood City, Calif. 94063.

Instant Cure for Computer Indigestion



John Beall & Company, Inc.

Janitorial Firm Cleans Up

Cost, Pricing Control Motivates Switch to DDP

SAN FRANCISCO — American Building Maintenance Industries (ABM) went from decentralized processing to distributed data processing (DDP) in order to control costs and establish realistic prices in a labor-intensive industry, according to R. David Anacker, executive vice-president.

ABM provides janitorial and a variety of other building maintenance services to companies in the U.S. and Canada. Employing approximately 20,000 people, its clients contract for maintenance services, mechanical services, energy management, air filters, elevators, engineering, parking management, pest control, linen and sanitary supplies, security, signs and lighting, a spokesman said.

"People tend to look at us as providers of services necessary for their business to function," Anacker noted. However, the ability to win contracts and make profits is based upon our being able to remain competitive and that requires information, he said.

"If one of our subsidiary companies, for example, is asked to bid on a janitorial maintenance contract, there are multiple factors that would affect a cost-effective bid," Anacker explained. Included among these would be current and projected labor costs, special trash removal requirements and vehicle scheduling in order to bring equipment and personnel to the job, he said.

While the answers to all of these questions can often be found in the accumulation of ABM's experience, it is essential to make that information available where and when needed, he said.

Until 1973, when the federal government enacted wage and price controls that required extensive documentation, the necessary data was not available in any central processing system, Anacker noted.

The first tentative steps were taken toward DDP in early 1976 when Beind Bremer, director of management information systems (MIS), consolidated three separate DP systems operating in San Francisco and Seattle. They were replaced by an NCR Corp. N-8450 computer at ABM corporate headquarters in San Francisco. The system was upgraded to an NCR V-8550 and that, in turn was replaced by Model V-8555-M, Bremer said.

"We took advantage of NCR's migration path entineering to gain the power and memory we needed as we began building a data base to perform the routine applications our companies use today. Simultaneously, we laid the groundwork for a true DDP system," he continued.

The current configuration is a multiprocessor that employs Virtual Resource Executive (VRX) firmware to handle a remote job entry (RJE) network of data display terminals and impact printers with a 1.5M-byte mainframe.

Although ABM needed to provide local managements with a system for controlling data entry that allowed for allowed for timely information retrieval, it was impossible to implement it all at once, Bremer noted.

Critical Point

The initial applications were the most criticle and included payroll, accounts payable and receivable, job costing, general ledger, workers' compensation and stock option plans. "Getting these programs going allowed us to begin building a data base that could serve both central and local management," he said.

Data entry and retrieval was initially handled off-line with companies keying entries to disk and transmitting to the corporate offices via teletype, he explained. The information was transferred to computer tape and used to updated the various files involved, he said.

Some processed data was transmitted back to the local companies for check printing while management reports generated from the same data were printed at the corporate computer center and delivered by courier service.

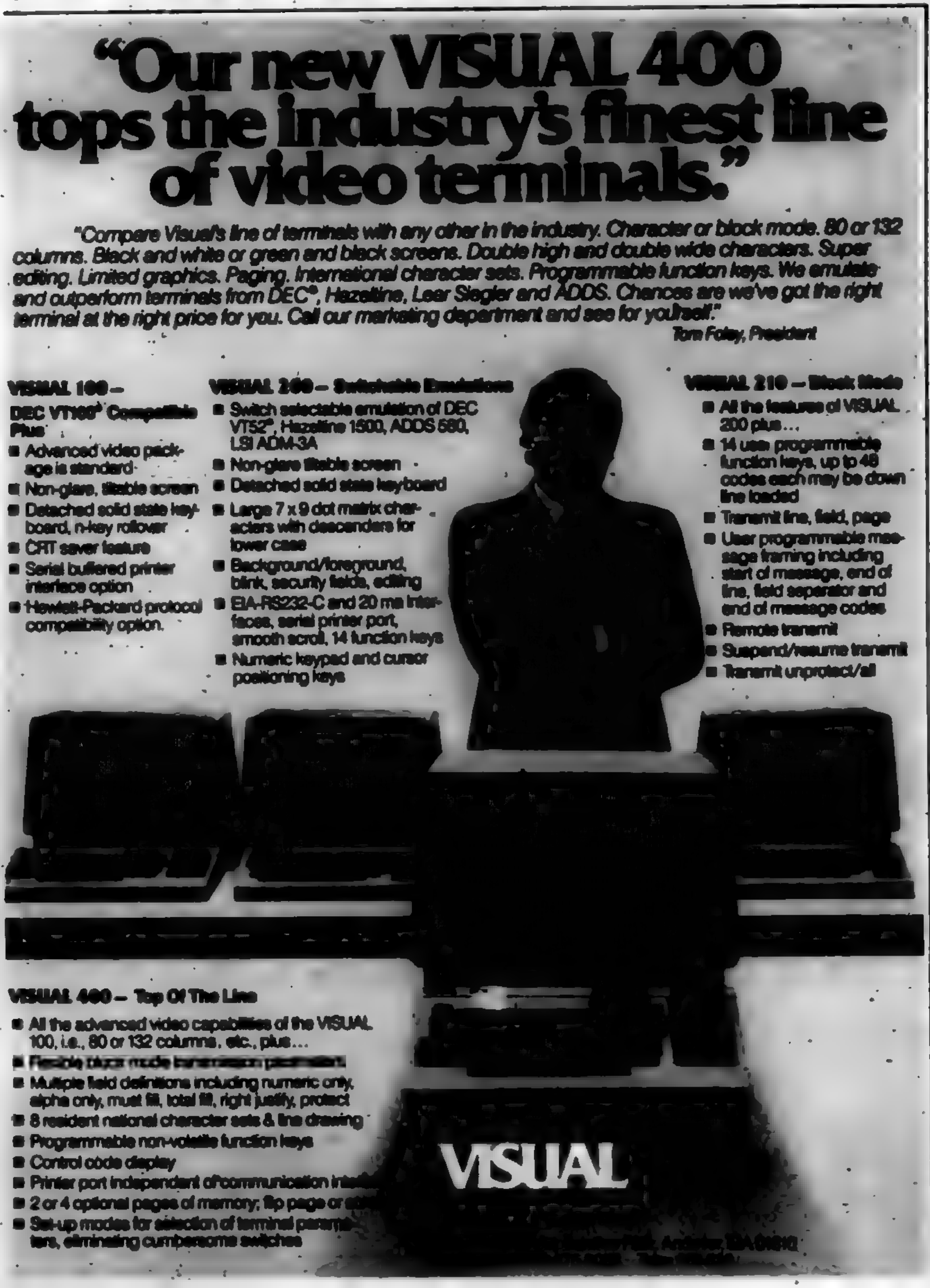
By mid-1979, some 30 ABM offices were using the central computer resource for data processing. The first RJE data display and printer terminals were installed in departments at corporate headquarters in Sacramento and Fresno, Calif.

Installations at other ABM companies in Phoenix, Albuquerque, N.M., Seattle, Los Angeles and Denver were slated for completion in early 1980 and by the beginning of 1981 Bremer estimated that some 40 RJE stations would be on-line.

The overall plan is to develop programs that allow companies to link into the central computer while maintaining individual identities, Bremer said. Each organization has its own way of doing things due to such factors as different union rates, state laws and unique company histories, he said.

Bremer allows programmers and systems analysts free access to computer time for developing software because this encourages the programmers to use hands-on experimentation.

While some auditors might not approve of this use of computer time, he feels that the policy has paid dividends in creative programming for ABM.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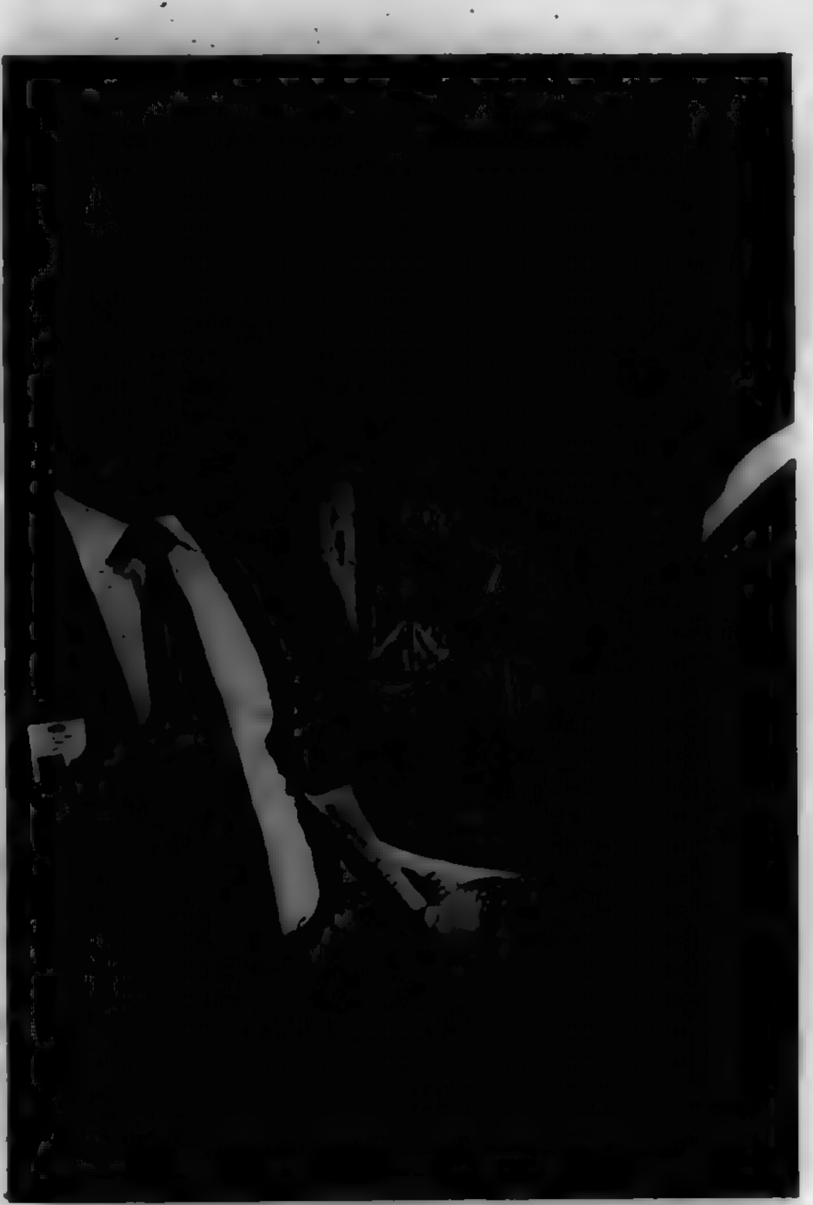
"We switched to NCR."

Frank J. Sanzone, Jr., Carroll County General Hospital



Frank J. Sanzone, Jr., is Assistant Director of Finance, Carroll County General Hospital, Westminster, Maryland. Robert Monogue is an NCR Representative.

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Drafting System Replaces Light Tables, Paper

(Continued from Page 107)

ing the cursor to indicate the hinge side, the latch side and the direction the door swings.

The system makes it possible to specify distances and door or window types and will automatically insert them at the proper locations in the walls. Once the floor plan has been entered, it is stored on floppy disk, from which it can be rapidly reviewed on the 4051 CRT terminal screen.

A series of plotter-printed "menus" representing the control commands (such as delete, erase, rotate, add, pen selection and so on) and the electrical symbols stored in the computer are positioned on the digitizer next to the drawing and the computer is told which menus are up and where they are located.

The user touches the digitizer cursor to the appropriate control commands and symbols and then touches the point on the drawing where the symbol is to be inserted. The user can bring the drawing up on the CRT terminal screen and zoom into any particular location to make sure that the operation was successful and that the symbols were included in the appropriate places.

After all the symbols have been entered for a particular drawing, the disk is taken to a production workstation, where the drawing is plotted out on one of the company's four plotters, Arrigoni said.

Though the computerized graphics system was originally designed for electrical engineers, Arrigoni points out that it can be used by engineers in many other disciplines, as well as by architects, interior designers and facility planners. In fact, the system has performed so well that Arrigoni plans to market it to other engineering firms.

Arrigoni recently enhanced the overall ease of use of the system with several hardware inventions of his own. The firm designed a special box that moves the CRT terminal cursor using two separate knobs. The box allows the user to move the cursor in either the X or Y direction with no drift.

He also has developed a special menu light system for attachment to the digitizer. The lights, which are positioned behind the menus on the digitizer, help the user remember which control commands are in effect.

'The system makes it possible to specify distances and door or window types and will automatically insert them at the proper locations.'

For the future, Arrigoni is in the midst of developing a "scratch pad" station to provide even greater design flexibility. This station will be built around the digitizing capability of the Tektronix 4663 plotter-digitizer, several more of which are on order. The firm is also acquiring two Tektronix 4054 graphics computers that feature 19-in. screens.

Pilgrim Offers Power Device

PLAINVIEW, N.Y. – An ac power conditioner said to protect microelectronic equipment from voltage spikes, transients and radio frequency interference has been introduced by Pilgrim Electric Co.

The Voltector Series 6 is based on an Electromagnetic Compatibility Analysis and Design (Emcad) Worst Case EDP Computer Analysis for compliance with FCC regulations.

Available with single, duplex or triplex outlets and with continuous current ratings of two to 20 amps, Voltector prices start at $99.

Pilgrim Electric is located at 29 Cain Drive, Plainview, N.Y. 11803.

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Interactive, Color Raster System

Scaled-Down Whizzard Offers CAD/CAM

SAN DIEGO – Megatek Corp. today introduced an interactive, line drawing color raster display system that is a scaled-down version of its Whizzard 7250 system introduced earlier this year.

The Whizzard 6250 system incorporates many of the features of the large-scale 7250 raster display system, but is designed to be an entry-level computer-aided design (CAD) and computer-aided manufacturing (CAM) device.

The 6250 has a 13-in. color display monitor rather than a 19-in. model and up to 64K bytes of vector memory instead of the maximum 192K bytes offered by the firm's top-end computer.

The 6250's 14-slot chassis includes a graphics processor, the vector memory, an RS-232C serial asynchronous interface and room for option modules, a spokesman said.

Options include additional memory, a hard copy output interface and a data tablet input interface.

Although the 6250 does not include some of the 7250's sophisticated features such as a three-dimensional picture, a user-definable character set and a black and white graphics option, the system is priced nearly 50% less than its older brother. The cost of the system, with basic software, is $17,500, the spokesman noted.

Although the system is geared for general business applications, it can be fitted with the firm's Template computer graphics software, which can be used to generate charts, graphs and other descriptive displays, the spokesman explained.

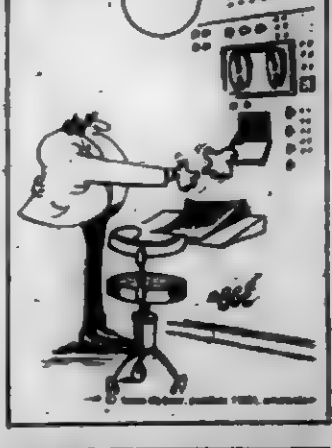
System Features

Features of the 6250 include the Whizzard Graphics Engine, which accomplishes full vector processing and hardware transformations, a double-buffered memory that allows the user to simultaneously display different parts of memory and a real-time zoom and pan feature that allows detailed examination of circuit and architectural displays.

The 6250 has a writing time of 160 nsec and it updates and manipulates complex pictures 20 to 30 times per second, the spokesman continued. The system's monitor uses a long-persistence phosphor to virtually eliminate screen flicker, he claimed.

Finally, the 6250, like the 7250, has a virtual vector space size that is said to provide a high level of detail in real-time steps, a key feature in the raster display market, the spokesman said. The system also offers a bit slice architecture microprocessor that, together with the basic Wand 6200 software, provides a high level of intelligence in the unit's remote terminal, reducing the amount of communications traffic with the host computer.

The 6250 is scheduled to be shipped in February. Additional information on the unit and the firm's other graphics systems can be obtained from the company at 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.



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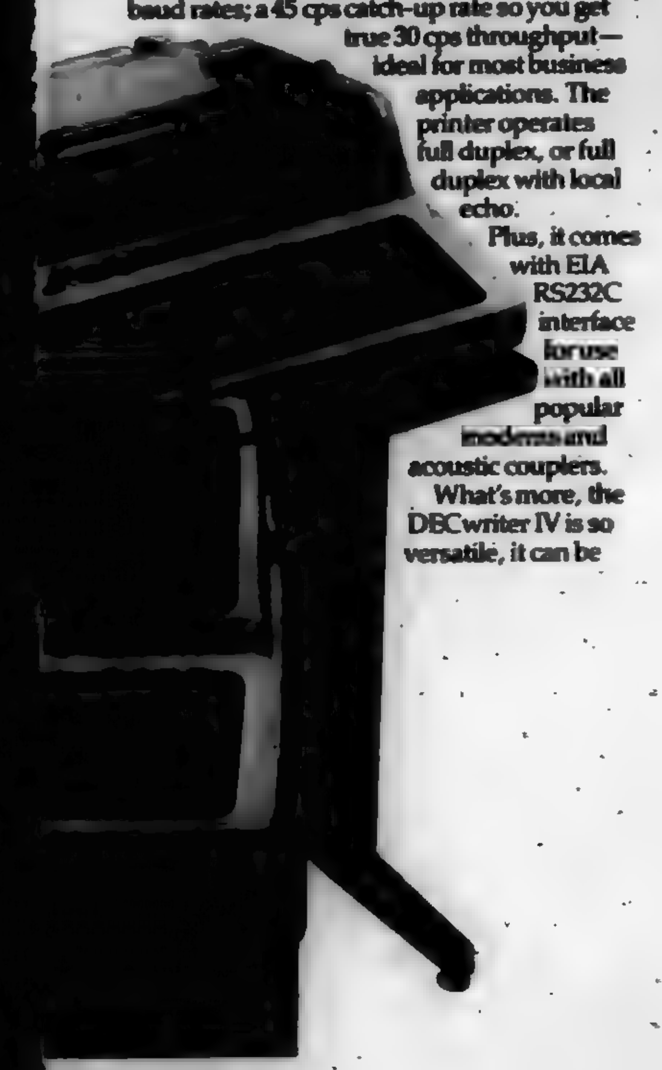

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And it's easy to use, because our printer has the feel and operation of a typewriter. With snap-in ribbon cartridge, sculptured keys, and clear character printing. It's also small and lightweight enough to be easily moved.

Yet while it's small, its performance isn't. Digital's terminal prints the full ASCII character set; gives you switch selectable 110 and 300 baud rates; a 45 cps catch-up rate so you get true 30 cps throughput—ideal for most business applications. The printer operates full duplex, or full duplex with local echo.

Plus, it comes with EIA RS232C interface for use with all popular modems and acoustic couplers.

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The DECwriter IV Model DA offers exceptional flexibility in paper handling. So you don't put up with 8½ by 11 inch paper sideways, or with the short shelf life of thermal paper. All of which makes the Model DA ideal for most terminal applications. In the standard friction-feed configuration, you can use roll or sheet paper in any width from 3 inches up to 14⅞ inches.

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In addition, the Model AA offers 212 modem compatibility, international character set printing, plus super and subscript printing with roll or sheet fed paper. Keyboard selectable features include parity, local echo and last character visibility so the printhead moves aside as desired.

With both the Model DA and AA, characters can be condensed to 16½ per inch so you can get 132 characters across an 8½ inch sheet for paper and filing economy. Characters can be expanded to 5 per inch with the AA or 10 per inch with the DA.

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We change the way the world thinks.

Superconductors Push Limits of Natural Laws

(Continued from Page 107)

where. The work relates to Squid devices made using several different technologies.

Fabrication of the "Josephson tunnel-junction" Squids relies heavily on technology developed in the long-term IBM research effort to build a laboratory prototype superconducting computer that uses related Squid devices in experimental memory and logic circuits. Those lead-alloy tunnel-junction Squids, designed and studied by researchers Dr. Mark B. Ketchen and Dr. Richard F. Voss, showed less noise by a factor-of-30 than the previous best example of such a device.

This performance has recently been equaled by a tunnel-junction Squid made with a different technology based on superconducting niobium that, moreover, exhibits exceptional durability, according to IBM researchers Voss, Dr. Robert B. Laibowitz, Dr. Stanley I. Raider and Dr. Christina M. Knoedler and Dr. John Clarke of the University of California at Berkeley.

Yet another Squid technology involves IBM's recently achieved ability to construct the world's narrowest metallic stripes (as little as 8 nanometers wide) with high-resolution, electron-beam lithography. The resulting ultrasmall "nanobridge" Squids, also fabricated out of superconducting niobium, display a factor-of-two improvement over the tunnel-junction Squids when measured at a temperature of 4.2° above absolute zero. This was the work of Voss, Laibowitz and Dr. Alec N. Broers.

The Squids discussed here consist of two Josephson elements connected together in a thin-film ring of superconducting metal. Each Josephson element has two superconducting electrodes that are separated by a "weak link," either a very thin layer of insulator that is placed sandwich-like between the electrodes (to form a tunnel junction) or an ultrasmall superconducting stripe connected between coplaner electrodes (to form a nanobridge).

These weak links give rise to so-called Josephson coupling effects by allowing supercurrents of electron pairs to "tunnel" or pass from one electrode to the other, up to some maximum supercurrent.

Squid operation is based on such Josephson tunneling and magnetic-flux quantization. In the latter phenomenon, when a superconducting ring is placed in an external magnetic field, supercurrents are set up in the ring such that the net magnetic flux (magnetic field times area) through the plane of the ring takes on values that can only be integral multiples of a fundamental unit of magnetic flux called the flux quantum.

The essential point, according to the researchers, is that fields external to the Squids affect the supercurrents through them: The fields change the maximum amount of supercurrent that can exist in the Squids: Currents greater than this critical supercurrent cause Squids to enter the nonsuperconducting or voltage state.

In a complete measurement system, an input coil is used to extend the versatility of the Squid for measurement of quantities such as voltage and current as well as to optimize magnetic-field measurements. Overall system performance, or sensitivity, depends on the input circuit as well as the Squid. Achievement of near-ultimate low noise levels in Squids consequently increases the importance of optimizing the input circuit for the purpose of improving overall system measurement sensitivity.

MIT Input Scheme

IBM researcher Ketchen, together with Jeffrey M. Jaycox, an MIT graduate student working at IBM, most recently reported such an optimized input coupling scheme. They devised and tested a method for lithographically constructing a lead-alloy thin-film multiple-turn coil directly above a Squid loop.

Noise is the ultimate limit to the sensitivity of a Squid sensing device. It can result, for example, from random motion of electrical charge produced by thermal agitation at elevated temperatures. Even at absolute zero, noise still exists as so-called zero-point fluctuations, a manifestation of the uncertainty principle of quantum mechanics.

The IBM researchers showed that the noise in the niobium nanobridge Squid is only somewhat greater than the limit set by fundamental physical theory.

In agreement with circuit theory, Squid noise reduction was a result of decreased size of the Josephson elements as well as optimization of circuit parameters. The cross-sectional area of the weak links in the nanobridge Squid — that is, the cross-sectional area of the metallic stripes — was 0.001 square micrometers. For the lead-alloy tunnel junctions, the weak-link or insulator area was 10 square micrometers. Finally, for the niobium tunnel junctions, the weak-link area was 1.0 square micrometers.

The reported low-noise behavior has been demonstrated only when magnetic-field changes occur at relatively high frequencies (10 kHz to 100 kHz). At sufficiently low frequencies, performance of all devices is degraded by the presence of so-called 1/f noise.

Measurements of the 1/f noise have been made for the lead-alloy Squid by Ketchen and Dr. Chang C. Tsuei. This noise was found to be comparable to that in commercially available Squids, indicating that the strength of the IBM Squids is in their higher frequency.

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Drives Offer 65% Capacity Gain

Ontrax Unveils 136M-Byte Winchesters

By Tim Scannell
CW Staff

SUNNYVALE, Calif. — Ontrax Corp. last week unveiled a series of 8-in. Winchester disk drives that offer up to 136M bytes of storage, a capacity said to be more than 65% greater than the present highest capacity 8-in. disk drive.

The Ontrax drives are available in three models, ranging from a two-platter 34M-byte version to the highest capacity unit, a five-platter model. They are competitively targeted at drives marketed by Control Data Corp., Century Data Systems, Inc. and Ampex Corp. The Ontrax offerings, however, are particularly aimed at Fujitsu, Ltd.'s 84M-byte 8-in Winchester drive which is the previous capacity king-of-the-hill, according to Jim Snow, the firm's vice-president of marketing.

The high-capacity Winchester drives are designed to be used with medium to large-scale minicomputer systems, whose company includes such 32-bit heavyweights as Digital Equipment Corp.'s VAX-11/780 and Data General Corp.'s MV/8000.

All of the disk units incorporate a patented digital head positioning device that requires no magnets — standard equipment in most conventional disk units — and reportedly eliminates the drive's servo head, servo arm, servo surface or servo read channel.

The drives will be marketed initially on an OEM basis by the one-and-a-half year-old company, but will be sold to end users sometime in the first quarter of next year, Jim Snow, the firm's vice-president of marketing, stated. Initial orders for the system will be taken in February, with shipments scheduled for March and April.

Drive's Heart

The heart of the Ontrax Winchester disk drive is the head position actuator, which not only costs about a third less but is said to be more accurate than present rotary actuator devices. The actuator is made up of nine concentric elements, each embedded with a solenoid coil. The elements — which vary in width — were designed to allow the actuator to cover 512 physical locations on the disk. Using a telescoping motion, the actuator moves the head to the correct position for a read or write operation, Snow said.

Unlike rotary actuator devices, which move the drive's head across the entire width of the media, Ontrax's actuator assigns each of the nine rings to a specific number of tracks and locates disk positions through varying combinations of these elements. The ring design not only allows for narrower disk tracks and, therefore, more storage, but is conducive to experimental thin-film head technology, Snow claimed.

To correct variances in head positioning due to temperature or other operating conditions the drives employ a "squeeze coil" that actually fine tunes the device and makes small corrections to insure an equal spacing between each track, he added.

All of the drives, except the 34M-byte model, have two positioning devices installed at either end of the disk drive to cut access times and to keep up with the higher speeds of minicomputers like those in the 32-bit word-size range. The disks also have a platter speed of about 4,878 RPM, which is approximately the same rate offered on present 14-in Winchester units. Present competing 8-in disk drives have speeds ranging from 2,400 to 3,600 RPM, Snow noted.

The three Ontrax drives have a data rate of more than 9.2M bit/sec and record data at 7.158 bit/in.

Detachable Controller

The 8-in units incorporate a detachable microprocessor-based controller with 16 I/O slots. The controller, which uses Motorola Corp.'s M68000 chip, has a memory card containing data buffering and processor instructions, a storage port interface and a communications port interface. The additional slots handle user-specified interfaces, cartridge or streaming backup systems, and can be used to link the device to an Ethernet office automation network. Under Ethernet, the disks can be used as storage nodes on the user's information line, Snow explained.

The controller's intelligence also handles backup chores for the Winchester device, relieving the processor of that duty, he said. Up to four drives can be used with one controller card.

Although end-user prices for the disk drives will not be released until early next year, the units will sell on an OEM basis for $5,500 in quantities of 250 to 500 units. The OEM price for the disk drive without the controller is about $4,000, Snow stated.

The drives will be maintained directly by Ontrax or by a third-party contractor, depending on the location of the customer.

Ontrax is located at 611 Vaqueros Ave., Sunnyvale, Calif. 94086.

Decsystems Get Controller, Printer Line

MENLO PARK, Calif. — A plug-compatible controller and line of printers for Digital Equipment Corp. Decsystem-10 and Decsystem-20 users are available from BDS Computer Corp.

The LPC-20 microprocessor-based controller handles printers with speeds of 300, 600, 900, 1,200, 1,500 or 1,800 line/min, compared with DEC's controller, which services 300- or 1,200 line/min printers, according to the firm.

The LPC-20 is said to be fully software-compatible with the Tops-10 and Tops-20 operating systems. It controls any of BDS' line printers from 300- to 1,800 line/min requiring only jumper or cable modifications, a spokesman said.

The LPC-20 controller costs $6,500. Printing systems range from $10,250 for a 300 line/min device to $33,500 for 1,800 line/min units. BDS is located at 1120 Crane St., Menlo Park, Calif. 94025.

Controller for Unibus Performs DMA Transfers

ORANGE, Calif. — MDB Systems, Inc. has announced a controller module for Digital Equipment Corp. Unibus computers that reportedly performs DMA data transfers to and from byte-oriented peripherals such as printers, plotters, graphics terminals and plasma displays.

The MDB PDI-11 offers PI/O compatibility. On a PI/O basis, the PDI/11 allows a peripheral device to appear to the computer like a DEC DL serial line unit.

This means the user can integrate the product into the system and run a peripheral with existing software while DMA software is being developed and integrated, the vendor claimed.

The price for the unit is $2,150, the vendor said from 1995 N. Batavia St., Orange, Calif. 92665.

DG Offers Backup Drives

WESTBORO, Mass. — Two reportedly compact and low-cost tape drives designed for disk backup storage have been introduced by Data General Corp.

Model 6123 for Micronova systems and Model 6125 for Nova and Eclipse systems use streaming technology and 1,600 bit/in. recording density, a spokesman said.

Designed to address the "Winchester backup problem," according to the spokesman, the tape drives allow users to back up the contents of a 25M-byte disk on one 8.5-in. reel of tape.

Model 6123 costs $6,600 and Model 6125 costs $6,800.

DG is located at Rt. 9, Westboro, Mass. 01581.

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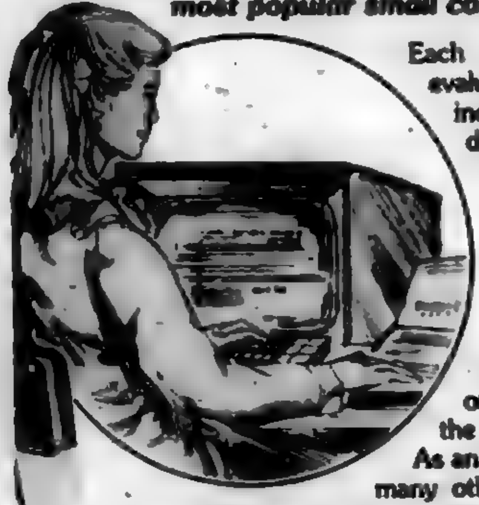

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ACU HAS THE FACTS

Small Business Systems Speed Insurer's Claims Work

BOSTON – By installing small business systems in some of its branch offices, Liberty Mutual Insurance Co. has speeded its processing of worker's compensation claims by 45% and increased accuracy by 75%.

Prior to installing the systems, new clerical personnel had to be hired whenever the information handling load increased, according to Bob Taylor, manager of technical research at the company's Boston headquarters.

Traditionally, Liberty Mutual clerks identified which claim a piece of mail was related to through the use of master index cards. The cards listed alphabetically all the employers covered by Liberty Mutual. The employer's card would be followed by cards on each of their employees who had a claim.

This manual system required many clerks scanning hundreds of index cards to match the claimant's name with the policyholder's name. A piece of mail might pass across 15 desks before a match was made, Taylor said. If clerks came up empty-handed, the company had to write back requesting additional information.

As a result, it would often take from four- to six weeks to complete the file on a claim and finally get a check into the mail.

Index System

Last fall, the Dallas and Houston offices each installed a Texas Instruments, Inc. DS990 Model 1 Small Business System to handle the Workers' Compensation Claimant Index System, according to Bill Walker, claims manager at Liberty Mutual's Dallas and Houston offices.

Based on TI's TMS 9900 microprocessor, the DS990 Model 1 computer incorporates a 1,920-char. video display, 64K bytes of random-access memory with parity, and an optional 30-char./sec internal thermal printer. Mass storage is provided by two- or four double-sided, double-density diskette drives in a separate tabletop chassis. Maximum diskette storage on the Model 1 is 4.6M bytes.

Application software for claimant indexing was developed in TI's Terminal Programming Language (TPL) by Liberty Mutual programmers. TPL software consists of two parts: forms and procedures.

TPL Forms is used for drawing VDT-oriented data entry forms with field-editing specifications determined through operator-prompting menus. TPL Procedures is an English-like processing language supported by an interactive text editor, program compiler, and object module linker.

The Model 1 also supports SBC Basic, TX5 Basic, DX5 Cobol execution, TX5 Fortran, 990 Assembly Language and Pascal execution.

Liberty Mutual clerks now identify which claim a piece of mail is related to through the claimant index system on the computer. The clerk simply keys in the name of the claimant. The computer automatically lists the claimant's name, policyholder's name and address, date of injury, file number of the claim file and code number for the supervisor handling the claim on the screen.

Multiple Claimants

If there is more than one claimant with the same name, the computer lists information on all of them. By matching information from the correspondence (such as date of injury or location) with the information on the screen, the clerk can quickly determine which claimant (and, therefore, which claim) this piece of mail is related to.

If the claimant's name is not on the computer, the clerk knows that Liberty Mutual has not yet received the accident report from the employer. In that case, the clerk holds the piece of mail and tries again in a few days. In the past, trying to match a piece of mail to

(Continued on Page 116)

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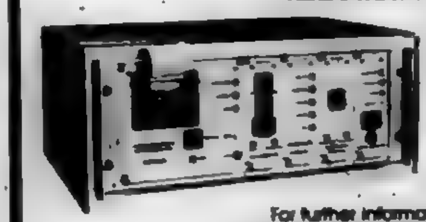

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Mini Bits

Management System Designed to Aid Doctors

PHOENIX — Computer Information Systems, Inc. is offering a practice management computer designed specifically for doctors.

The System 6000 is programmed to speed up receivables, control expenses, improve physician productivity and handle paperwork, the vendor claimed. It handles receivables aging reports, receivables patient status list, receivables day sheet and Blue Cross/Blue Shield insurance forms, a spokesman said.

The system costs $13,500. Computer Information Systems is at 850 N. Second Ave., Phoenix, Ariz. 85003.

Double-Density Minidisk Out for Microcomputers

MITCHELL, S.D. — A 5.25-in. double-sided, double-density flexible minidisk for microcomputers is available from Syncom. The product is part of the vendor's Ectype product line.

The disk was designed with a wear life of up to 10 million passes on both hard- and soft-sector products, the vendor claimed, adding the "human engineered" E-Z Vue box with its Tyvex envelope packaging ensures reduced abrasion and elimination static.

The disks cost between $4 and $7 depending on configuration, the vendor said from P.O. Box 130, Mitchell, S.D. 57301.

Callan Desktop Workstation Features Built-In Card Cage

WESTLAKE VILLAGE, Calif. — A desktop, integrated workstation including intelligent terminal and built-in card cage is available from Callan Data Systems.

The CD100's card cage is said to hold Intel Multibus or Digital Equipment Corp. LSI-11 Q-bus cards and the unit includes, as an option, two 5.25-in. mini-floppy disk drives.

Compatible CPUs include Intel Corp. 8080, 8085, Z80, 8086 and Z-8000. DEC's LSI-11 series permits a choice of the LSI-11/2 or the LSI-11/23. The unit costs $3,195 without floppy disks and $3,795 with two floppies from 2637 Townsgate Road, Westlake Village, Calif. 91361.

Floppy Disk Controller Bows For Teac FD-50 Disk Drives

MONTEBELLO, Calif. — Teac Corp. of America has unveiled a 5.25-in. floppy disk controller for use with its FD-50 series 5.25 floppy disk drives.

The FC-50 controller can be used with single- or double-sided drives and has the capability to read, write and format single- or double-density disks, the vendor claimed.

It costs $480, the vendor said from 7733 Telegraph Road, Muntebellow, Calif. 90640.

Standby Power Systems Line Fit Micro, Mini Users

NECEDAH, Wis. — Best Energy Systems for Tomorrow, Inc. is offering a line of automatic standby power systems for microcomputer and minicomputer users.

The Best models include the B12-1000 SPS5, B12-1000 SPS 25, B24-1000 SPS 5, B24-1000 SPS 25, BR24-2500 SPS 5 and the BR24-2500 SPS 25. Features include crystal-controlled frequency 60Hz or 50Hz (± .002), modified sine wave-supressed third harmonics, quick plug-ins or an optional direct wire, the vendor said.

The power units cost between $1,785 and $2,635, the vendor said from P.O. Box 280, Necedah, Wis. 54646.

Irwin International Offers 'Micro-Winchester' Disk

ANN ARBOR, Mich. — Irwin International has announced the Model 510, a 5.25-in. "micro-Winchester" disk drive.

The 10M-byte disk drive, with an average access time of 25 msec, costs $2,500.

Irwin is at 2000 Green Road, Ann Arbor, Mich. 48105.

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But Wang VS systems aren't just powerful computers. They're complete systems that make computer power ingeniously easy to use. Our programming aids, for example, let you create a data entry screen as easily as writing a word processing document. Our Symbolic Debug utility lets you test and modify COBOL, BASIC, RPG II and Assembler programs at the source level. And our menu-driven file management facilities let you set up files, process transactions, generate reports and establish field-level security controls — interactively.

In all, Wang VS systems give you more easy ways to use computer power than any other system marketed today. Word processing, phototypesetting, electronic mail and telecommunications are all VS system options.

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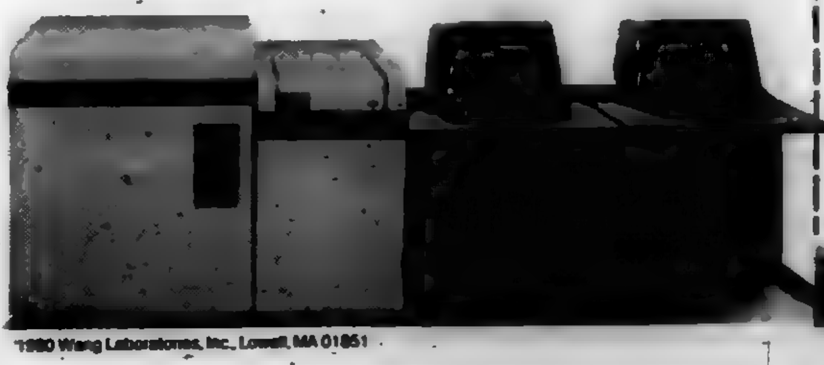

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For Small Businesses

Durango's Colt Desktop Available at Computer Store

BURLINGTON, Mass. — Durango Systems, Inc.'s Colt Desktop Computer System, with software available for small business users, is available at Computer Store, Inc. retail outlets.

An auxiliary dual disk drive may be added to the unit, which is a little larger than a typewriter, to increase diskette storage capacity to about 2 million characters.

Available applications software includes general ledger, accounts receivable, accounts payable, invoicing with inventory control and sales analysis, a spokesman said. A word processing package called Startext is also available.

The Colt Desktop

The basic unit including video screen, printer, keyboard, processor and file memory costs "just under $10,000," the spokesman said.

The Computer Store is located at Suite G-2, 50 Mall Road, Burlington, Mass. 01803.

Insurer Speeds Claims Work

(Continued from Page 114)

a file that was not yet created involved weeks of fruitless labor. Paradoxically, this is one of the computer's easiest chores.

"Our new system is about 45% faster, and about 75% more accurate than the manual indexing system. It's one of the better improvements added in the 27 years I've been with the company. With this system, we can get through the day's mail in the same day," Walker said.

With an eye toward the future, Walker added, "Our small business system supports two disk drives which can house up to 16,000 files. Right now it houses only 8,000, and that leaves a lot of room for programming. We could save a lot of time in other operations with more programming."

Follow-up studies by the Liberty Mutual home office show that, in terms of man-hours alone, each DS990 Model 1 will pay for itself in less than a year, with cost savings of $13,000/year afterward. Since the first two Model 1s were installed last year, Liberty Mutual has implemented 11 more nationwide.

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Small Firm Goes On-Line, Integrates WP and DP, Finds Needed Flexibility

PROVIDENCE, R.I. — Larger companies may have the luxury of specialized DP systems, but smaller firms sometimes need the flexibility of one system incorporating both DP and word processing (WP) functions.

In trying to meet its needs, Raymond F. Murphy & Co. here decided not only to integrate its DP and WP functions, but also to convert its older batch system to an interactive one.

Raymond F. Murphy & Co. started using computers in the late 1960s when it established its own computer service bureau to handle client payrolls on a batch processing system. Later, it added internal job costing and accounts receivable applications and got a bigger system, but it was still a batch processing machine. Richard Volpe, controller at Raymond F. Murphy & Co., recalled, "When I came on board in 1974, we used the computer about 12 hours a week. When we added more client services — general ledger, trial balances, and financial statements — we were using the computer 60 hours a week, and our clients, especially the smaller firms, still wanted more."

While evaluating DP systems, Volpe had seen a demonstration of the Wang Laboratories, Inc. VS, a multiuser, multiapplication, interactive computer. Wang was about to announce the capability that combined both WP and DP in a single VS computer — the Integrated Information System (IIS). At that time the firm had also been using a Wang WP 20 Word Processing System.

Volpe admitted having some initial doubts about the interactive DP aspect of the IIS approach: "I had been thinking 'batch' all along, and I needed to turn my thinking around to interactive computing for our back-office auditing operations."

R.F. Murphy installed the Integrated Information System in mid-1979. The configuration consists of a VS central processor with either 128K or 256K bytes of main memory, a 90M-byte disk drive, a 400 line/min upper- and lowercase line printer and six CRT terminals.

Direct Power Access

The interactive computer gives the auditor direct access to the power of the computer. With the batch processing system used previously at R.F. Murphy, the auditor developed trial balances and financial figures manually. Then his work was turned over to a DP specialist, who coded it off-line for input to the computer. Next, the coded data went to DP center, where it usually went through a trial or editing run to confirm that all the information was correct. Finally, the data was run, and the auditor saw some results.

In contrast, when the auditor works with the interactive Wang system, he does all his work at the computer terminal itself. He enters the account number and starts working. The computer immediately validates the figures as he enters them. A special package developed for clients in construction business also automatically posts each cost to a specific job, confirming that the job exists and that the cost is approved.

Instead of having to wait for a trial run to discover a mistake, he knows immediately if he has entered data incorrectly, used a wrong account category and so on — not two days later, when he is looking for his finished report. After he has finished his work, he simply presses a button, and finished statements are printed out. Finally, the auditor's figures can be transferred directly to WP to be incorporated into the formal documentation presented to the client.

The whole job, from rough figures to final statement, can be done by the auditor without the services of expensive DP specialists to code data and run the computer. Eliminating these intermediate steps means a major savings in overhead and a big jump in the auditor's productivity.

If Richard Volpe was not sure about interactive computing, he had no such doubts about Wang word processing when he chose the Integrated Information System.

With the introduction of the company's first word processing system Wang's WP 20, typing productivity soared. The improvement was not difficult to measure: Over the next two years, until the WP 20 was replaced by the IIS, R.F. Murphy's auditing staff grew 60%; yet the typing load was carried by the same two people.

As a programmer himself, Volpe is especially pleased with the File Maintenance and Report Generation capabilities of the Wang system. "Using the Wang, I can develop a basic file maintenance routine in a half hour, vs. five or six hours on other systems I've worked with. The Report Generation utilities that come with the Wang help design a report quickly; then the word processing system makes it look pretty," he said.

The Integrated Information System also gives R.F. Murphy greater flexibility in utilization of manpower. Because CRT terminals are relatively inexpensive compared to people, the firm's philosophy is to let everyone do everything, to avoid specializing. Of its six CRT terminals, four can be used for both WP and DP.

Portable Power System Geared to Small User

ST. PETER, Minn. — A portable power system for use in the event of a power loss has been announced by GTO Electronics.

The Pacs-300A and Pacs-300B supply 110V ac power for emergency use to customers using small computers and word processing systems among other applications. The 300B also supplies ac power to remote locations.

Both units provide 150W continuous/300W surge power, have self-contained batteries and a solid-state LED battery indicator.

Both models sell for less than $400. More information is available from Clifford A. Swenson, GTO Electronics, 430 Ritt St., St. Peter, Minn. [illegible]

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Computerworld Extra! is an extra issue of Computerworld — the second we have done — to be published this March 18th. It will appear in what our Editor, Drake Lundell, calls a "tabzine" format. This means glossy, full-color covers on the outside, and a magazine format inside (printed on super calendered newsprint) — and tabloid-size throughout.

This issue of *Computerworld Extra!* will focus its entire editorial content on a single subject: "Communications Systems in the 80's." Top experts from all areas of the communications field will write magazine-length articles on a variety of topics including: Integrating Voice and Data Networks, The State of Videotex in the US, UK, France, and Canada; Network Management, Satellite Technology in the 80's, The Past and Future of the Communications Act and Federal regulations, Network Standards and Protocols, and Future Directions in Telecommunications Technology. Plus, there'll be Wrap-up and Analysis articles for Data Communications Software, Data Terminal Equipment, and Data Communications Equipment.

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Data Comm Terminals-Smart	34	22,000	33	85,000
Multiplexers	30	19,200	29	75,000
Distributed Processing Equipment	28	17,900	18	45,000
Computer Services and Timesharing	26	16,600	20	50,000
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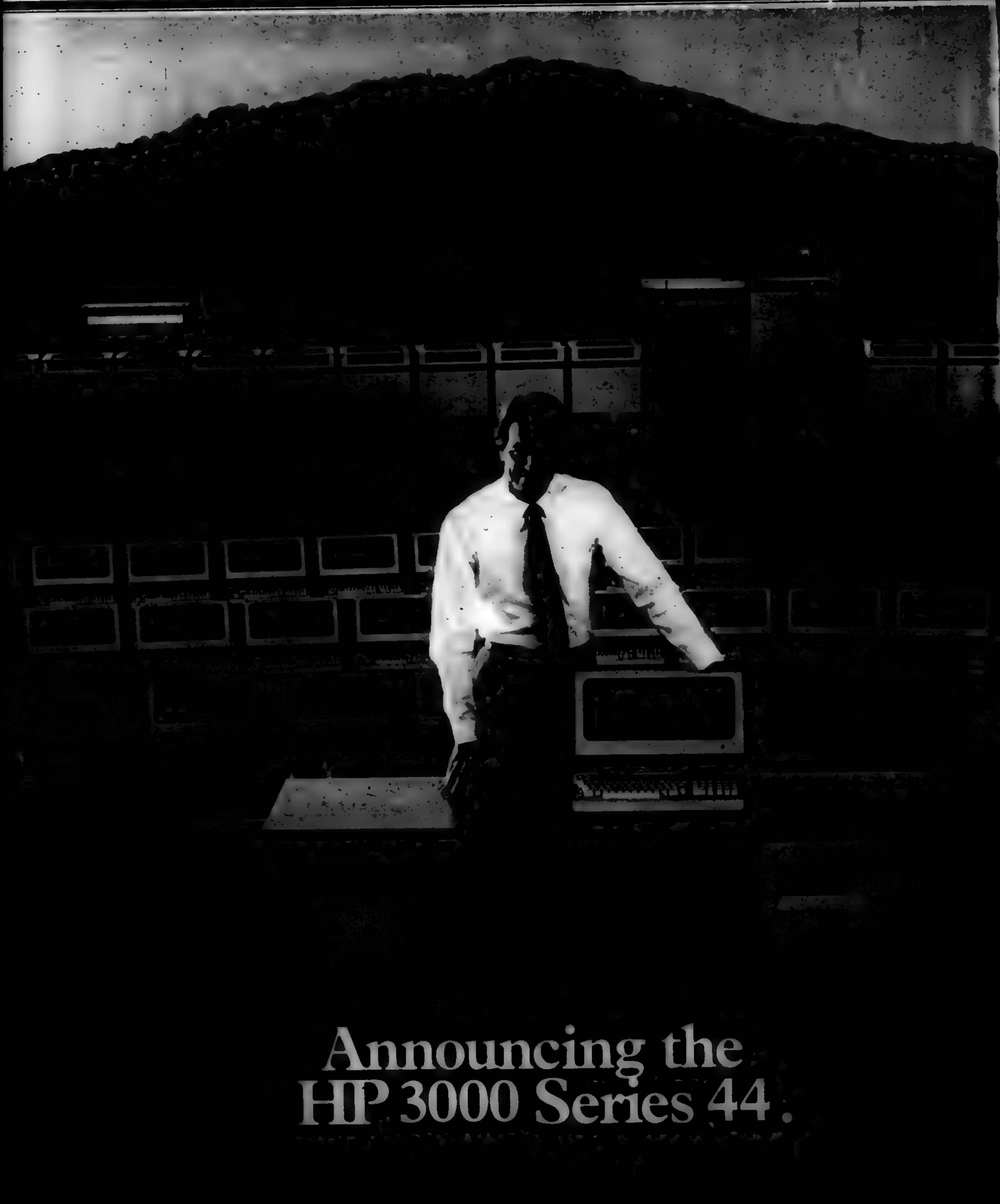
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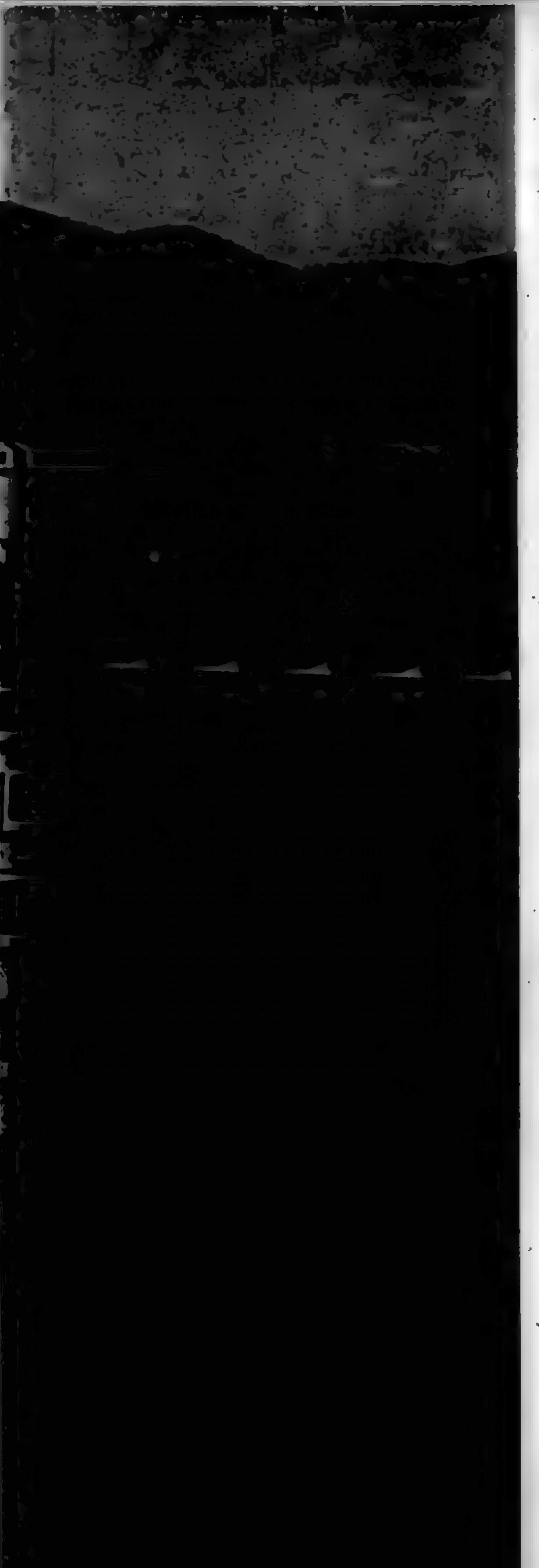

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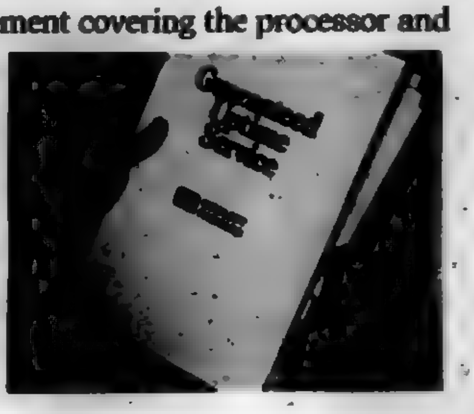

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In Medicare Claims Work

GAO Confirms EDSF Contract Violations

By Marcia Blumenthal
CW Staff

WASHINGTON, D.C. — The U.S. Government Accounting Office (GAO) has generally substantiated allegations that Electronic Data Systems Federal Corp. (EDSF) violated its contract with the Health Care Financing Administration (HCFA) in order to bring its Medicare claims processing backlog within acceptable limits.

The GAO report, made public Dec. 16, was the result of a probe initiated last year by Rep. Paul Simon (D-Ill.) [CW, Nov. 19, 1979].

Specifically, the GAO found EDSF, a subsidiary of Electronic Data Systems Corp., removed possibly as many as 100,000 unprocessed claims from its mailroom in order to reach a goal of 150,000 claims outstanding by the end of 1979. EDSF said it had 173,000 claims outstanding at year end, but the GAO found the firm had between 248,000 and 268,000 such claims.

The Health Care Finance Administration contract imposes penalties on the Medicare contractor in 12 categories, some of which are related to work load. EDSF had only met one work load standard through September of this year. To date, EDSF has been assessed $1.1 million in contract penalties.

EDSF also allowed its coding employees to use an override feature if the data being entered into the system would normally have been rejected through built-in controls or editing features, the report noted.

Although not violations of the contract but more in the realm of questionable operations, EDSF also sent thousands of claims out of the state of Illinois for processing without notifying HCFA and destroyed correspondence from claimants. This correspondence was generally related to inquiries on the status of claims or disputes about the award.

EDSF's contract to process Medicare claims for Illinois is an experimental one, paying the contractor on a fixed fee rather than a cost basis, a GAO official said. Moreover, the contract is the first EDSF has had to both process Medicare claims as well as operate the DP facility. Generally, EDSF has operated the DP facilities for other contractors processing Medicare claims.

The five-year experimental contract will pay EDSF $41.8 million for administrative costs. However, that is only 3% of the cost of the total operation. The remaining 97% is related to claims paid out, the GAO official said.

The contractor responsible for processing claims determines the amount of money paid to the claimant. If the formulas and data for reimbursement are not accurate, the government stands to lose a lot of money, he said.

High Error Rate

EDSF's error rate on claims payout until recently has been more than two times the national average, the official noted. The average national error rate on claims payout is between 2% and 2.5% of every $100 in claims. EDSF had an error rate of 3.6% to 8.1% from the quarters ending June 1979 to September 1980, the official reported.

One reason offered for EDSF's poor performance is that it is the firm's first contract for both processing and DP operations and the company is on a learning curve.

In addition to pointing out deficiencies in error rate and work load operations, the GAO report also faulted EDSF for its fair-hearing procedures.

The hearings officers for most Medicare contractors are attorneys. Although EDSF group of nine hearing officers are headed by an attorney, the remainder of the group are not attorneys, and only three have college degrees, HCFA found.

Despite the irregularities in EDSF's performance, HCFA has taken no action to suspend or alter the contract, but said it will monitor EDSF more closely.

The GAO has criticized the HCFA for its contract monitoring policies, noting that EDSF, under a work load crises, had to deviate from its normal operating procedures.

Responding to the report, EDS, the parent corporation, said the GAO report found that the company had done nothing deceptive or illegal. He added that EDSF was taking steps to correct procedures necessary to improve its performance.

IBM Continues Dip In Revenue Market Share

GREENWICH, Conn. — IBM continued to lose revenue market share last year, dropping to 40.1% in 1979 from 43.2% in 1978, according to a recently published report on the top 100 DP companies by the Gartner Group here.

The Gartner Group developed its report on the top 100 industry firms from analyses of information contained in the firm's data base. Other significant observations showed that the top 100 firms, with total DP revenues of $45.7 billion, grew at 15.8% from 1978 to 1979. The top 25 firms garnered 84.7% of total DP revenues for the companies included in the report. IBM's absolute share of the top 100 DP revenues was only 31.6%, the report noted.

Mainframe companies still comprise the largest sector, claiming 65% of the revenues of the top 100 companies, although during the 1978 to 1979 period the share of the revenue pie for these companies decreased 3.6%. Minicomputer manufacturers were the next largest sector with 13% of the total revenue of the top 100 firms, the Gartner Group reported.

Severe Margin Pressure

On the whole the computer industry was under severe margin pressure during 1979, with 32 of the firms reporting lower margins and 19 reporting lower earnings. Earnings for the 54 firms whose revenues are predominantly from computer products grew at less than 2% for that time period.

Despite these hardships, minicomputer firms had a strong year in 1979. This group reported an average 30.8% growth in revenues, 27.9% growth in earnings, 34.7% growth in research and development, 30.2% in capital expenditures and a 25.5% increase in employment.

For the industry as a whole, growth in R&D was 18% for the reporting period, although without IBM the rate was a remarkable 31%, the report observed.

Capital expenditure increased in 1979 by almost 30% to $2.9 billion, led by IBM's capital commitment growth of 34.6%.

Other tidbits included in the report revealed that there were 30 software and service firms in the top 100 companies, more than any other segment of the industry. The cutoff point for inclusion in the ratings was $30 million.

The report is part of the Gartner Group's regular client services, but can be obtained separately from the firm at 545 Steamboat Road, Greenwich, Conn. 16830.

TI Cuts Work Schedules, Cites Softening of Demand

DALLAS — A softening of demand for computer products and a temporary overcapacity in the computer memory chip business has prompted Texas Instruments, Inc. to reduce work schedules for about 17% of its 90,000 world wide work force beginning in January.

Expected to last at least through the first quarter of 1981, a spokesman for TI said the cuts will be in the form of a lesser number of work hour/week.

The primary areas of its business that will be effected by the reduced work hours will be semiconductor operations and consumer-related product areas. Other areas, such as digital systems and government electronics, will maintain regular work schedules.

Economic Uncertainties

The company noted that the economic outlook for 1981 contains many uncertainties which they feel may limit industry growth in the near future, although its long-range goals have not changed, and full work schedules will resume as soon as business conditions permit.

In November, TI ordered many of its employees to take their vacation days around the holidays attributing the action to "market weaknesses" for some products.

A slump in the ordering of semiconductor stocks has some analysts agreeing with TI's perception. November order-rates showed a substantial decline in the rate of new orders.

Although TI realistically reflects the industry, a New York economic forecaster, Benjamin M. Rosen, noted that among U.S. suppliers, TI has the largest percentage of its business going to Europe.

Managers Buy Computeristics

HAMDEN, Conn. — Computeristics, Inc. has been sold to the company's management by the parent corporation, Uniroyal Corp.

The firm develops accounts receivable, payable, general ledger and other packages for both mini and mainframe systems. In addition, the company is a vendor of Data General Corp. systems and provides consulting in micrographics. Sales for 1979 were about $6 million.

The owner/management team will continue to function as it presently does with James Chambers as president; Rolf Diegel, vice-president of marketing; Russell Tisdale, vice-president of finance; Richard Van Saun, vice-president of production; and Chet Habegger, vice-president of administration.

All current development programs will continue on schedule, including a new data base-oriented accounts receivable system slated for a spring announcement.

The company will be headquartered in Hamden.

Based on Demand for Minis

Ontrax Betting on Snug Niche for Disk Systems

By Marcia Blumenthal
CW Staff

SUNNYVALE, Calif. — Although entry into the disk drive market is a risky and expensive proposition today, Ontrax Corp. here is betting the heady demand for powerful mini systems will create a snug niche for high-performance mini disk systems.

Although Ontrax was officially formed about one and a half years ago, the company's founders have been developing a powerful 8-in. Winchester disk drive for the past two years, according to Jim Snow, vice-president of marketing. Now emerging from the engineering stage, the firm has 40 employees gathered from all corners of the disk drive world.

The company was financed by initial venture capital of about $1.5 million from four venture firms. Second-round funding will bring in an estimated additional $3 million, Snow said.

Ontrax's recently unveiled Mini Wini (story on Page 113) packs up to 136M bytes of storage, which Snow claimed is about 62% more capacity than Fujitsu Ltd.'s 84M-byte 8-in. drive — the largest now available.

Three-Part Market

As Snow sees it, the mini disk drive market is settling into three segments. The low end is typified by the highly successful Shugart Associates. The mid-range group of companies produces 8-in. Winchesters in the 40M-byte to 60M-byte range and 14-in. Winchesters in the 160M-byte range.

Although many companies debate the possibilities of the high-end market, to date Fujitsu and Control Data Corp., and now Ontrax, have made serious forays into this segment, Snow maintained.

However, Ontrax doesn't intend to confine itself to 8-in. disk systems. Within the next six to nini months the firm will introduce a 14-in. Winchester disk drive in the 550M-byte storage range, Snow said.

Although initially selling to the OEM market, Ontrax intends to pursue the more risky end-user market for its product — a strategy usually avoided by most mini disk drive makers.

Controller's 16 Cards

One reason the firm is opting for the end-user route is the controller developed for the disk product. While the controller for the current disk product uses four boards, Ontrax' controller has space for 16 cards. This design will allow a user to configure the controller as a CPU system that can be adapted for a variety of functions, Snow emphasized.

In designing its product, Ontrax developed and patented a head position actuator that requires no magnets. Ontrax uses two of these actuators in its 8-in. disk drive which, while not unusual in larger disk products, is unique to lower cost disk systems, Snow said. Moreover, the product can be adapted for use with thin-film technology, Snow said.

Although the firm is planning to sell its disk products to the end-user market, it has not yet set an end-user price, Snow noted.

On an OEM basis, in quantities of 250 to 500 units, the drive sells for $4,000 each and the basic controller costs $1,500.

Despite the power of an 8-in. Winchester system, its pricing is critical, Snow explained. With multiprocessing chips, such as Motorola, Inc.'s M68000, allowing a lot of power to be packed on a system for a low price, powerful peripherals must be priced relative to the processing unit, Snow noted.

The firm intends to set its end-user price for the 8-in. Winchester disk drive during the first part of 1981.

Aside from pricing, the major hurdle to serving the end-user marketplace will be establishing a sales and service organization.

Memorex Forms Sales Group

CUPERTINO, Calif. — Memorex Corp.'s Communications Group announced the formation of a sales force responsible for selling its communications products and appointed five regional sales managers to head this effort.

Memorex Communications Group products include the 1300 screen printer, 1377 and 2078 display stations, 2076 remote cluster controller, 1371/1372 terminal controllers, 2089 line printer, 1270 terminal control unit, 1380 communications processor and specialized software.

The five communications regional sales managers are Johnnie Holt, Western region; Ron Bulin, Central; Steve Foley, Southern; Joe Ryan, Eastern; and Jim Peck, Southwestern.

They will head a staff of sales representatives working out of Memorex offices in major cities across the U.S. Memorex International will continue to sell and service Memorex Communications products outside the U.S., a spokesman said.

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CW-16

Burroughs, Univac Win Air Force Contracts

Orders & Installations

SCOTT AIR FORCE BASE, Ill. — The U.S. Air Force recently awarded contracts to Burroughs Corp. and Sperry Univac with a total first-year value of $66 million to develop systems for its Phase IV program.

Started in 1970, the much talked-about Phase IV program will significantly reduce the number of base-level computer systems and save more than 250 positions in the DP work force, the Air Force said.

The program will also result in the establishment of 14 regional DP centers, each serving two or more Air Force installations.

The contracts have a short-term value of $38.5 million to Sperry Univac and $27.5 million to Burroughs.

For the next 26 months, each contractor will compete independently to convert the Air Force's existing Univac and Burroughs applications programs to operate on modern computer systems from their current product line. After each contractor has demonstrated operation of the transitioned programs on their equipment to meet base-level DP needs, one contractor will be selected in early 1983 to provide more than 150 modern computer systems for the Air Force.

Unique Concept

The contract implements a unique computer system acquisition concept. It will provide for the acquisition of new computer equipment, the transition of existing computer programs to operate on the new equipment, and result in the delivery of an integrated, ready-to-operate base-level computer system.

Ultimately, the new computer system will be installed at 115 Air Force installations around the world to meet individual base-level DP requirements, a spokesman said.

After Phase IV computer systems are installed, they will allow commanders and managers to more efficiently employ and support complex weapons systems such as the F-15 and F-16 tactical fighters. These computers will support essential weapons systems maintenance and supply activities and permit more effective management of personnel, financial, engineering and equipment resources throughout the Air Force.

Overdue Replacement

Colonel Dale Seastrom, Phase IV program manager, summarized the program as "a long overdue replacement of two expensive to operate and out-of-date computer systems.

"When it becomes fully operational in 1985, Phase IV will provide the Air Force with an integrated base-level DP capability to meet user needs into the 1990s and provide the potential for expansion of individual Phase IV computers to accommodate additional requirements through the remainder of this century," he said.

Other Awards

Informatics, Inc. has been awarded a two-year $600,000 contract from the U.S. Air Force's Rome Air Development Center. The terms of the agreement call for Informatics' support of the Air Force Intelligence Service's Common Users' Baseline for the Intelligence Community program (Cubic).

Interaction Systems, Inc. has received an order for 1,000 of its Model TT-100 touch-sensitive CRT terminals from CL Systems, Inc. The order is valued at between $2 million and $3 million.

MAP Array Processors, products of CSPI, Inc., have been ordered by the Ford Motor Co. for production-line engine test stations.

The National League of Cities has purchased a Local Government Financial System (LGFS), including a Digital Equipment Corp. PDP-11 minicomputer, from American Mangement Systems, Inc.

Nickels & Dimes

Digital Equipment Corp. plans to call for the redemption of its 8-7/8% convertible subordinate debentures due in 2005 in the near future, subject to market conditions.

$$$

Tandem Computers, Inc. intends to file a registration statement with the Securities and Exchange Commission with respect to 1.2 million shares of its common stock.

$$$

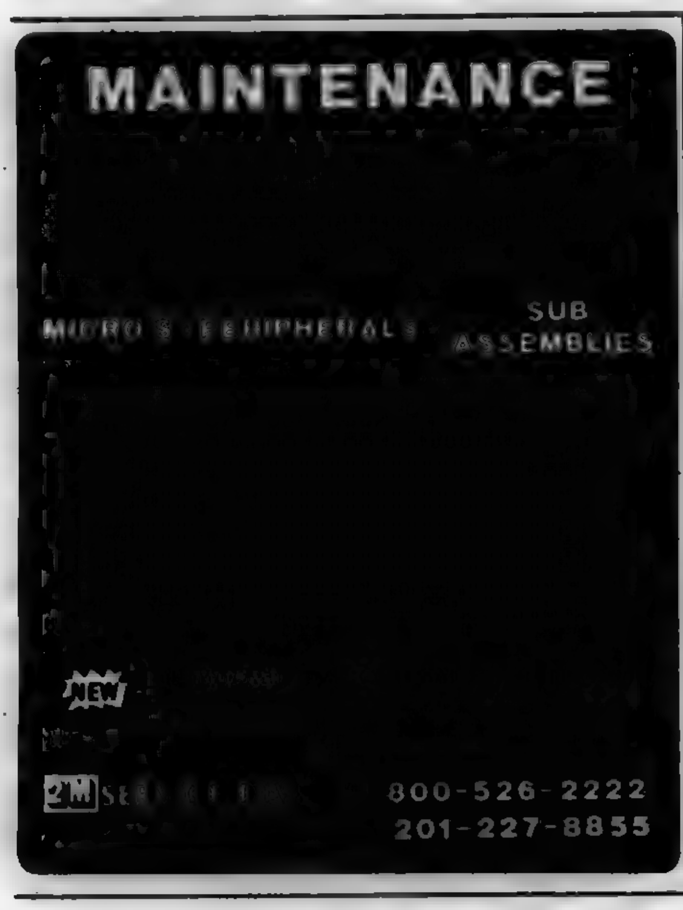
Comsat General Corp. plans to purchase a total of approximately 35,700 shares of Comsat common stock, for a proposed acquisition costing roughly $1.5 million.

$$$

Prime Computer, Inc.'s board of directors have approved a three-for-two stock split, effective in the form of a 50% stock dividend. These additional shares will be distributed Dec. 19 to stockholders of record Dec. 1.

$$$

Tesdata Systems Corp. has reported it gained a profit exceeding $1 million on an investment transaction. The after-tax profit, equal to approximately 60 cents per share, will be formally announced in 1980.



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Distributor Awarded Nearly $600,000

Adds Loses Suit Charging Unfair Competition

By Jeffry Beeler
CW West Coast Bureau

OAKLAND, Calif. — A former distributor of Applied Digital Data Systems, Inc. (Adds) CRT terminals has been awarded damages totaling nearly $600,000 in a lawsuit charging Adds with knowingly supplying defective products and unfairly competing with that distributor for a key sales order.

The suit — which was filed about two years ago by Consolidated Data Terminals, Inc. (CDT) — was decided Dec. 2 when a U.S. District Court judge here ruled that Adds knew about but failed to correct long-standing flaws in its Regent 100 and 200 CRT terminals.

The court also found that the terminals were "fraudulently represented [to CDT] as inherently reliable" even though they were "negligently designed" and routinely failed to meet performance specifications.

Intel Bid

In addition, the court concluded that Adds had "wrongfully interfered" with CDT's efforts to close a June 1978 end-user sales deal with Intel Corp.

Although the court decision reaffirmed Adds' right to compete with its distributors for the same order, the judge questioned the defendant's bidding practices in the Intel deal.

The original round of bidding for that order was at standard end-user prices and ended with CDT submitting the lowest quote and thus apparently winning the competition.

But when Adds was informed of the results and learned it had been underbid by $45, it submitted a revised quote based on the discounts it usually reserves for OEMs.

That tactic enabled Adds to undercut CDT's original bid and eventually win the lucrative Intel order at its distributor's expense.

The court agreed with CDT's contention that Adds' bidding practices in the Intel affair constituted interference in the distributor's business dealings and awarded the plaintiff almost $29,000 as compensation for its lost sales.

In other damages, the court awarded CDT nearly $112,000 to compensate it for the 1978-1980 profits it lost as a result of Adds' defective equipment.

In addition, the court ordered Adds to pay the distributor an additional $15,000 in fraud-related damages and $500,000 in punitive damages for "knowingly disregarding CDT's rights and interests."

At the same time, however, the court accepted Adds' counterclaim demanding that CDT honor some $70,000 in back payments and interest dating from Dec. 1978.

Altogether, Adds' liabilities from the suit total more than $585,000. The Hauppauge, N.Y.-based terminal maker has already disclosed its intention to appeal the court's decision.

The outcome of the CDT vs. Adds case will serve as a warning to hardware vendors in general and might even persuade other injured Adds distributors to sue the company on their own, according to CDT attorney Richard Perez.

Filed in Dec. 1978, the suit charged Adds with supplying terminals that operated at only one-fourth of their advertised 19,200 bit/sec data rate.

In some deliveries to CDT, all the enclosed products were defective in some way, and as many as 25% were found to be "dead on arrival," the distributor contended.

The high defect rate in Adds' product shipments reportedly hindered CDT's sales efforts and ate into the distributor's profits by necessitating frequent service calls to its customers.

In the spring of 1978, CDT severed its ties to Adds and turned to Lear Siegler, Inc. as its primary terminal supplier.

CDT's suit also accused Adds of consistently failing to furnish the distributor with sales leads, but the court rejected the plaintiff's complaint.

"Adds' failure to provide leads affected CDT's ability to sell Adds' products, but this failure did not constitute material breach of contract," the court said.

Contracts

Computer Sciences Corp. has received a $10 million contract from Pan American World Services, Inc., for technical services at the U.S. Air Force's Arnold Engineering Development Center in Tullahoma, Tenn.

Codex Corp. has announced the renewal of its contract with the Department of Defense Commercial Communications Office for the Channel Packing Program that Codex designed and installed.

The U.S. Defense Mapping Agency has signed a contract with Gerber Scientific Instrument Co. The agreement, which is approximated at $1 million, is for an undisclosed number of Gerber 4477P color cartographic drafting systems.

Boeing Computer Services Co. has won a contract valued at $8,400,000 from the General Services Administration to support the U.S. Army Request/Retrain program.

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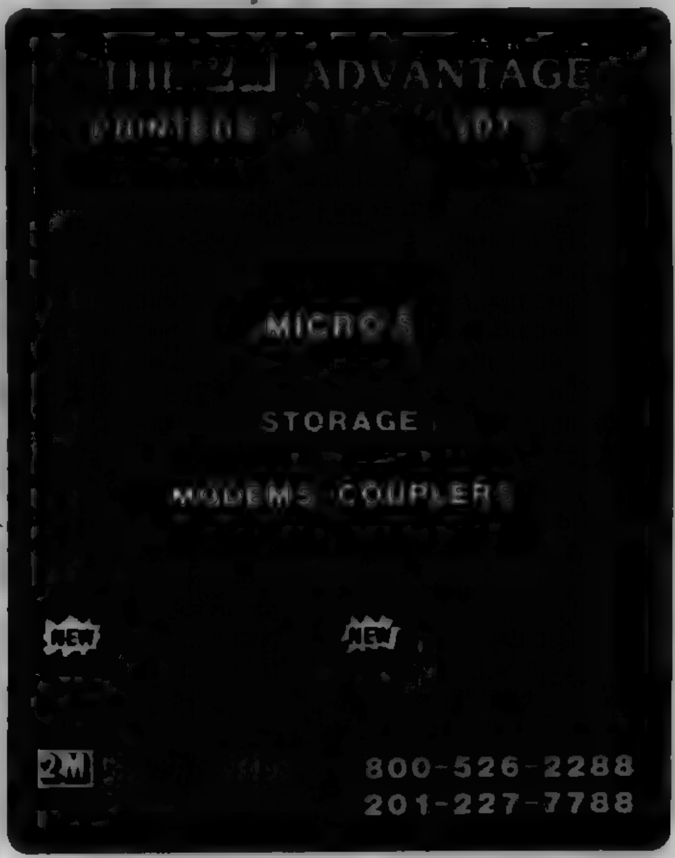
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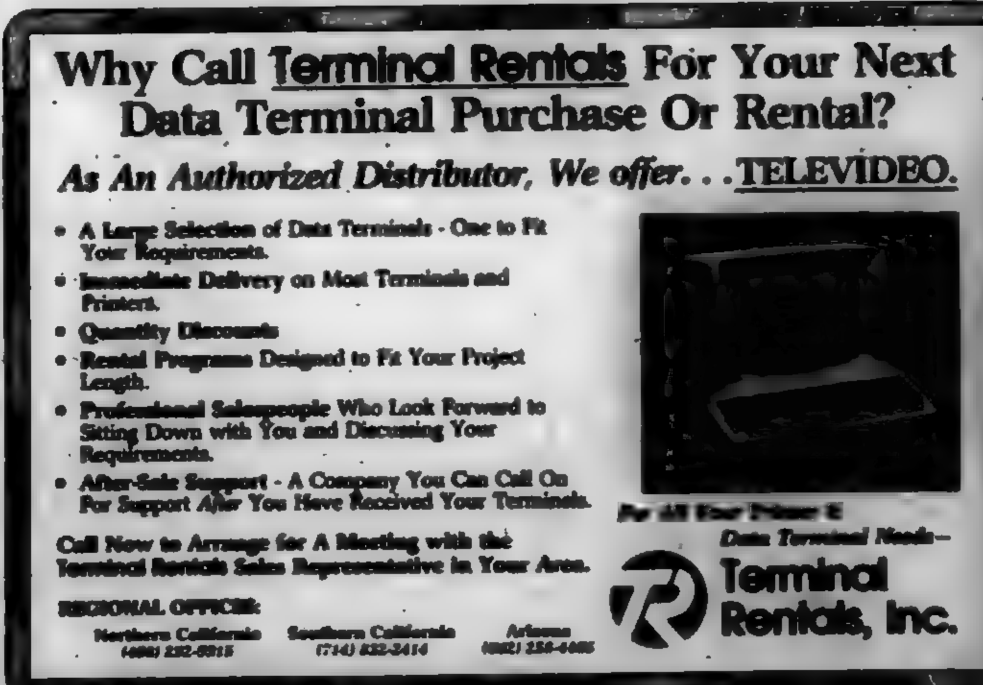
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Supershorts

Data General Corp. has begun making customer shipments of its AOS/VS software for the 32-bit Eclipse MV/8000 three months earlier than scheduled. The software was released early "because of the very positive feedback we have received from our five test sites," a DG spokesman said.

Erwin Tomash, founder of Dataproducts Corp., received the Outstanding Achievement Award from the University of Minnesota.

W. Michael Blumenthal, vice-chairman and chief executive of Burroughs Corp., announced that the company will endow a new fellowship at New York University's Graduate School of Business Administration as one of its regularly scheduled contributions to educational institutions.

Beehive International has finalized an agreement with the Irish Industrial Development Authority to construct a manufacturing plant in Fermoy, County Cork, Ireland.

Charge Card Association, which serves Visa and Master Card accounts throughout the Midwest, has installed the Genasys International, Inc.'s automated application system development software package for design, coding and documentation purposes.

Lee Data Corp. has authorized Genesis Marketing Group, Inc. to sell Lee's Series 300, IBM-compatible distributed systems, in a recent agreement.

American Management Systems, Inc., a computer systems, services and management consulting firm, has been named an authorized Digital Computer Distributor by Digital Equipment Corp.

Canadian General Electric, Data Communications Products Division, has entered an agreement with C. Itoh Electronics, Inc., for exclusive sales and service rights to C. Itoh's full line of computer peripherals in Canada.

RCA Service Co. said it now provides contract service on over 40,000 data communications terminals throughout the U.S.

Prime Computer, Inc. recently opened a regional customer education center in Oak Brook, Ill. to serve that 21-state area.

Donald R. Herriott, head of the Lithographic Systems Development Department of Bell Labs in Murray Hill, N.J., is the recipient of the Institute of Electrical and Electronics Engineers (IEEE) 1981 Cledo Brunetti Award.

Shugart Associates has reorganized its direct sales efforts into four geographic regions.

New Companies

Power Data Systems, Inc. has been established to market and sell hardware and software to the electronic information processing industry, specializing in communications, networking and multitasking systems. Its headquarters are at 160 New Boston St., Woburn, Mass. 01801.

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Our O/S Group would involve designing and implementing advanced system software for small, medium, and large systems. Projects encompass such areas as interactive multiprogramming, virtual memory and on-line transaction processing using PASCAL-based languages. You'll need a BSCS, with exposure to operating systems development, programming experience in high-level block structured languages, tools development, or data communications.

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You will measure and analyze the performance of a major software system, design performance benchmarks, monitor system performance throughout development, and specify performance instrumentation. You should have a BSCS/BSEE with at least 3 years experience in performance measurement, and operating systems familiarity.

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You will develop corporate data base software systems of diverse scope. You should have a BSCS degree and some software development experience. Exposure to data base management systems, structured programming, CODASYL and relational approaches, and PASCAL and COBOL languages is highly desirable.

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You will be responsible for integration of software, firmware, and testware. Project areas include functional specification review, test bed development, and monitoring and evaluation of test results. Background should include a BSCS degree, and experience in COBOL/PASCAL and assembly language programming.

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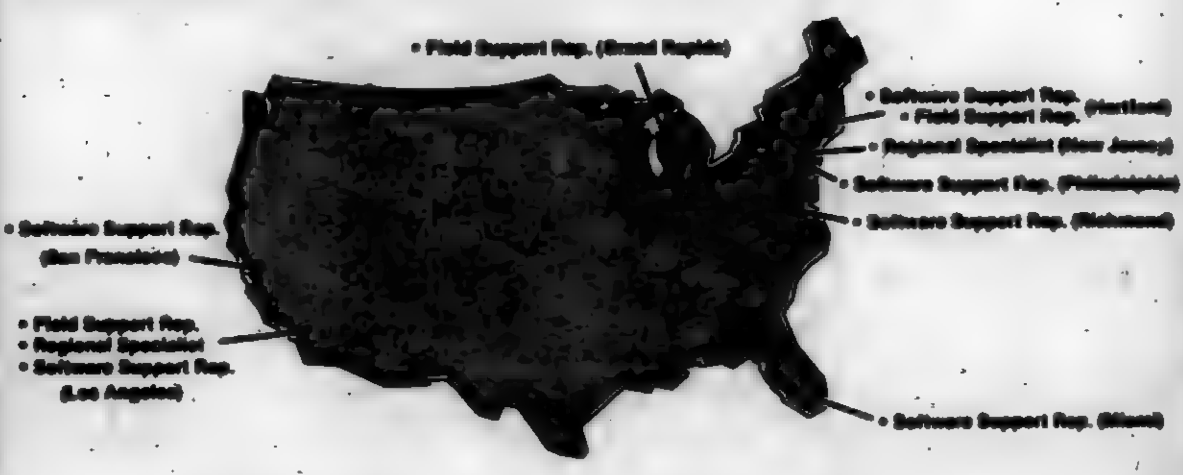
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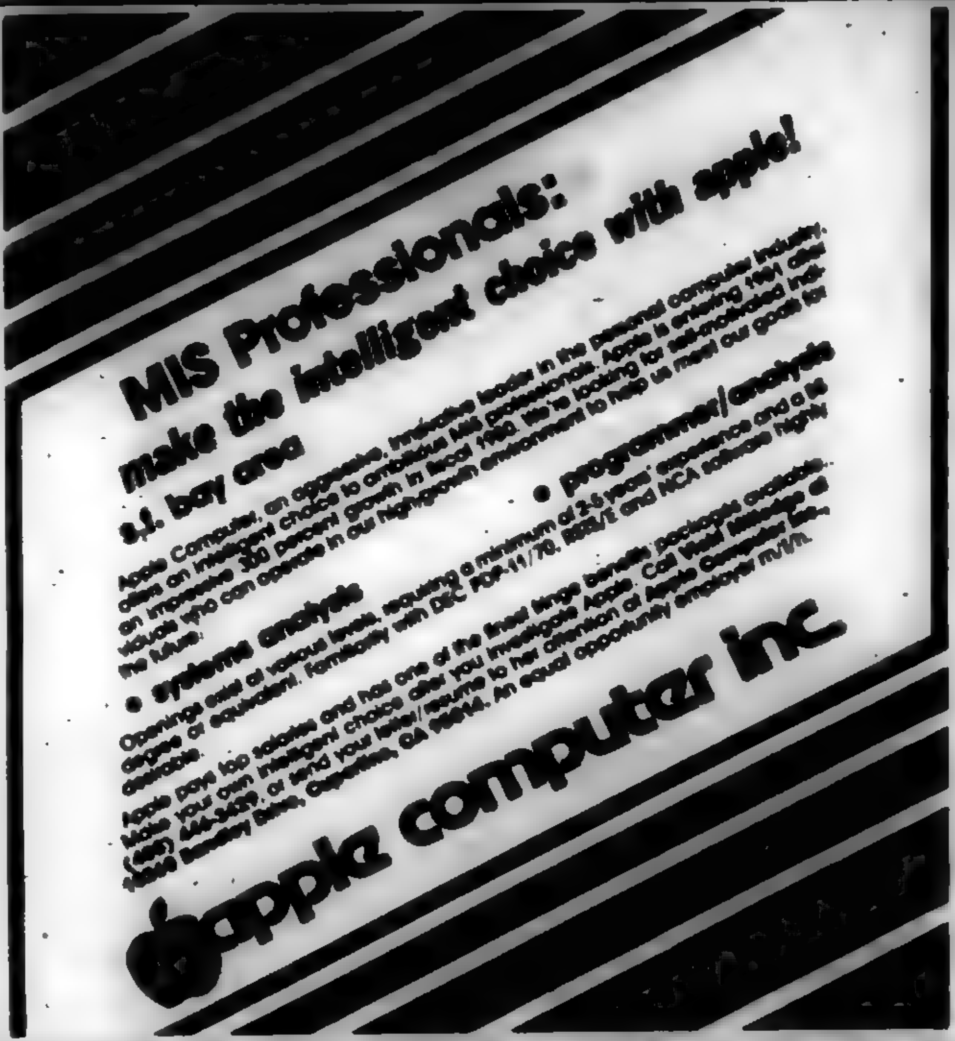

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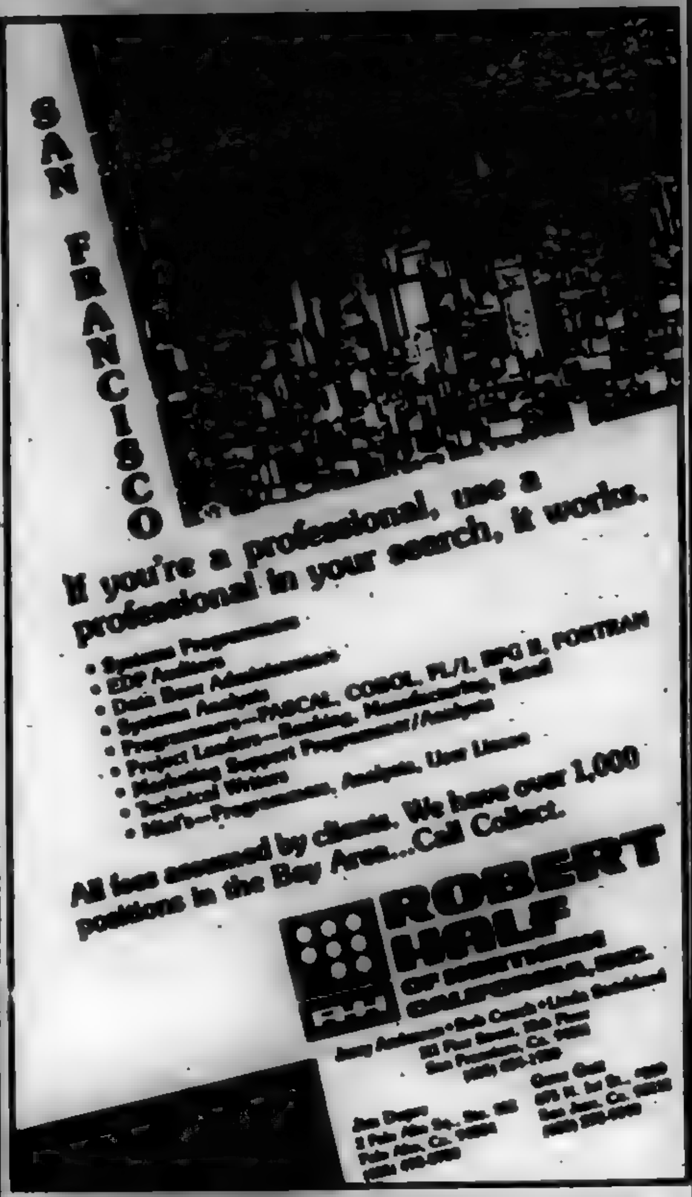

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1-3 years programming and systems design experience with IBM hardware/software, MVS/JES2, IMS, TSO, Utilities and JCL. Responsible for supervision of hotline analysts, interface with key data center users, establishment of priorities for user problems, and the design, implementation and management of programs to improve service to data center users.

MVS OPERATING SYSTEMS SOFTWARE PROFESSIONALS

TSO SYSTEMS PROGRAMMERS

3-5 years experience installing, maintaining and modifying TSO control programs: SPF, construction of CLIST's and performance monitoring and tuning of TSO commands.

IMS SYSTEMS PROGRAMMERS

3-5 years experience in multi-CPU IBM 370 environment using the Data Base and Data Communications features of IMS/VS, generating, installing, monitoring, and tuning the IMS DB/DC system and performing complex data base recovery; and knowledge of MVS externals, required.

PERFORMANCE MONITORING AND TUNING

Requires extensive background in performance tuning and a minimum of 2 years experience as an MVS Systems Programmer. Responsible for measuring, reporting and tuning systems performance.

SOFTWARE PROGRAM PRODUCT SUPPORT

Requires 1-3 years experience in IBM JCL, Utilities, TSO-SPF, and software debugging techniques. This position is responsible for the installation, testing, and ongoing technical support of a widely diversified software product portfolio.

OPERATIONS SUPERVISORS

2-5 years experience in supervision of technical computer operations personnel in a large multi-CPU installation; 303X console operations in a MVS/JES, IMS, MSNF, TSO, ACF, VTAM environment; demonstrated supervision ability and highly developed interpersonal skills.

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If you are unable to call, send your resume to: **F.J. Fullerman, FMC CORPORATION, One Oaks Plaza, Suite 1130, 6750 LBJ Freeway, Dallas, Texas 75240.** We are an equal opportunity employer m/f.

FMC

FLORIDA

Our client, a major statewide bank, has engaged our firm to recruit for the following candidates for their Data Processing Company.

[illegible] OPERATIONS MANAGER
To $[illegible]

8-10 years experience in managing computer operations, prod and data entry departments. NCR or IBM experience acceptable. This is a Vice President position responsible for 90 employees and reports to the President.

MANAGER SYSTEMS & PROGRAMMING
To $[illegible]

Background must include experience with NCR hardware and NEAT 3 language. Experience with NCR CIF applications is also required. Responsibilities will include supervision of 7 systems analysts/programmers and will report to the President.

All fees are paid by our client. Submit resume, complete with salary history to:

BLAKE
& ASSOCIATES, INC.
[illegible] E. Oakland Park Blvd.
Ft. Lauderdale, FL [illegible]
[illegible]

ASSISTANT TO THE DIRECTOR
For Development & Special Services

West Virginia Network for Educational Telecomputing (WVNET) is seeking a manager to head up its Development & Special Services group. WVNET provides computing services to all public colleges and universities in the State of West Virginia, serving administrative, instructional, and research computer users.

WVNET is in the process of a major equipment upgrade that will provide improved and expanded capability throughout the Network system. This will include batch and timesharing capacity at the host site in Morgantown on an Amdahl V/7A, timesharing capacity at the host site on two VAX's, batch and timesharing capacity on PDP 11/44's at remote sites, interactive computing on Apple II Plus microcomputers, and the use of national networking services.

The Development & Special Services division of the center is responsible for coordination of performance management for the Amdahl V/7A, and the VAX's and 11/44's as well as coordination of development and special projects.

The position calls for an individual with a strong user orientation, excellent organizational, managerial, and communication skills. The desirable candidate should have a Masters' degree and experience in a computer center in a higher education environment. Apply by January 15, 1981 to Personnel Office, WV Network, [illegible] Chestnut Ridge Road, Morgantown, WV [illegible].

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Distributed Microprocessor Systems Project Leader

Dynamic North Dallas financial software firm has a ground floor opportunity for a seasoned professional to guide development of a state-of-the-art DISTRIBUTED MICROPROCESSOR SYSTEM.

Candidates must have 2+ years comprehensive experience in at least three of the following areas:

- IBM COMMUNICATIONS PROTOCOL
- MICROPROCESSOR APPLICATIONS/SYSTEMS SOFTWARE
- MICROPROCESSOR SOFTWARE/ARCHITECTURE INTERFACE
- EXPERIENCE WITH A VARIETY OF MICROPROCESSOR SOFTWARE/HARDWARE
- SYSTEM DESIGN-DEVELOPMENT-EVALUATION

Management skills at project leader level required, and degree preferred. Well developed oral and written communications skills a must.

Compensation, and personal and professional skills are limited only by your skills and imagination. Take advantage of this rare opportunity to join a young, fast-paced leader in the computer service industry in the warm, sunny Southwest. Qualified candidates should submit resume and salary history in confidence to:

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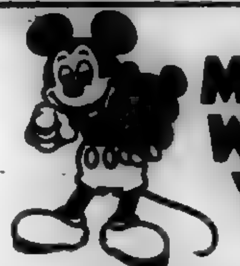
375 Cochituate Rd., Rte. 30
Framingham, MA 01701**



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ELECTRO MECHANICAL DESIGNERS DRAFTERS CHECKERS

Candidates will be responsible for all engineering drawings generated in the Electronics Engineering Department including schematics, logic & wiring diagrams; E/M assemblies; PCB (design) assemblies and details; packaging of major systems assemblies, sub-assemblies & peripherals and other types of graphic art.

Background should include five years minimum related experience in conjunction with a strong drafting background.

Candidates will find our projects challenging, unique, open to innovation and supported by an established stable organization which in itself is an industry leader — Walt Disney Productions.

For consideration apply to:

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Manager of Systems and Development

"Shirt sleeves" type of individual to assume responsibility of all Systems and Programming, SYSGEN'G and Software Patches on DEC PDP 11/70 using RSTS/E and DIBOL. Please send resume salary history and salary requirements to:

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- PROJECT LEADERS
- SOFTWARE COMMUNICATIONS
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Systems Manager

IBM 3033—PDP 11/70 Hybrid DP Network

ARCO Coal Company, a rapidly growing division of Atlantic Richfield, seeks a systems professional to manage the development, support, and maintenance of a comprehensive, large-scale information system network for new ventures in coal and synthetic energy development. You will be based in our Denver Headquarters.

Responsibilities will include direct supervision of five to eight systems professionals engaged in support of the Division's development of engineering and geologic work in coal mining and synthetic fuels. Applications include process monitoring for coal gasification, interactive computer graphics, networking, and a comprehensive geologic database.

Candidates should hold a Bachelor's degree in a technical discipline, with additional training to the Master's level desirable. Eight to ten years experience in data processing, languages, and operating systems and procedures is required. Prior supervisory experience is desirable.

We offer an excellent starting salary and a benefits package that includes a liberal relocation allowance—plus the long-range career opportunities you would expect from one of the nation's leading energy companies.

For prompt consideration, send your resume and salary history to: Mr. W. H. Sands, ARCO Coal Company, P.O. Box 5300, Denver, Colorado 80217.

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An immediate opening for a senior level analyst with a minimum of five years systym analysis experience and a BA/BS in Business. Preference will be shown for applicants with experience in a manufacturing environment. Experience in an on-line mini-computer environment will be considered a plus.

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Two immediate openings for programmer analysts in a PDP1170 RSTS/E computer environment. This is an opportunity to be creative with an exciting system in a start-up role. A minimum of three years experience in system design and implementation preferably in a manufacturing environment and a degree in business or computer science or equivalent is required.

Send resume in confidence to:

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We are seeking individuals to help with our financial and manufacturing applications in COBOL, using the database package IDMS and COMMAND level CICS (for online real-time updates). Our large IBM shop uses OS/VS1 and will be converting to MVS/TSO in 1981. We currently have several database systems with online real-time updating and will be developing more such systems.

You will function as team members and be responsible for designing, coding, testing, documenting, installing and maintaining programs assigned. Your 3 or more years of solid COBOL experience in an IBM OS environment is needed for these positions. Ideal candidates will have experience using CICS (Command Level) and IDMS databases.

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For immediate consideration, please send resume to Dave Thomas, Employment Administrator, Dept. DT-280, ESL INC., 1330 Geneva Drive, Sunnyvale, CA 94086. [illegible] An equal opportunity employer. U.S. Citizenship required.

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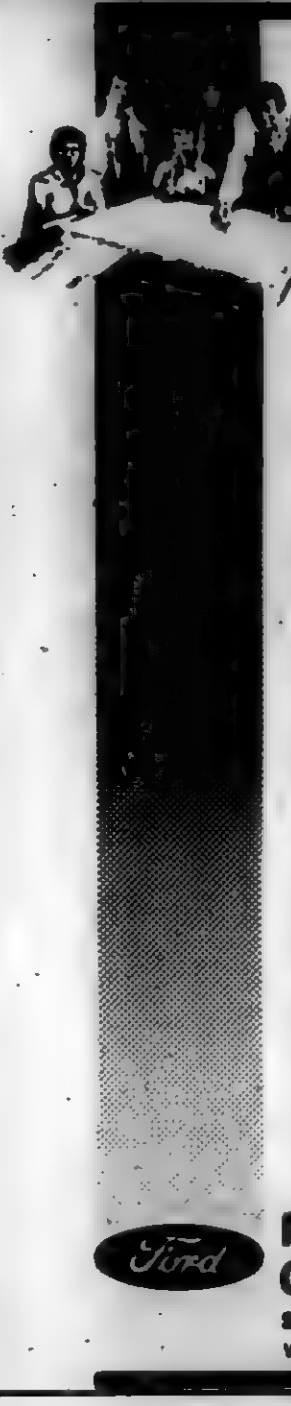

PROGRAMMERS

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THE RIGHT LOCATION: We're just 25 miles southeast of downtown Houston, a city with a vibrant economy, and we're minutes from beautiful lakes and the Gulf. And in Texas, there is no state income tax.

Currently we have opportunities for the following programmers.

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Design, code, verification, and documentation of assembly language programs in a real time environment. Telecommunication and/or process control experience using micro/mini-computers is a definite asset.

SYSTEM PROGRAMMERS: OS internals experience on micro, mini, or large scale computer systems. Design and implementation of I/O drivers, systems enhancement, and system utilites experience highly desirable. Experience with WCS is a plus.

We also offer excellent salary and benefits package. So, if this sounds like the right opportunity for you, send your resume to John Brown, Ford Aerospace & Communications Corporation, Dept. AJC, P.O. Box 58487, Houston, Texas 77058. (713) 488-1270.

Ford Aerospace & Communications Corporation
Space Information Systems Operation
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San Francisco Bay Area

Our client, a very large, profitable organization, requires a "top-notch" professional to fill the position of CICS Specialist to application programming groups.

The successful candidate will have demonstrated competence in the Following areas: CICS internals in an MVS environment, COBOL, ALC, CICS command and macro level coding. 3-6 years experience in CICS on-line application development and excellent verbal and written communication skills.

The position offers excellent opportunities for personal growth and financial reward as well as outstanding benefits and working conditions. If you are ambitious, successful, have a strong CICS background, are interested in helping a very successful company continue its growth, and consequently provide a solid financial future for yourself, please send your resume and current salary history to: Management Consultants . . .

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EDP Specialists
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PROGRAMMERS (3) TO $27,000 RANGE.
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PROGRAMMER ANALYSTS (4) $20,000–$24,000.
Large Mid-South financial institution urgently needs COBOL applications P/A's w/2yrs. experience from mainframe environment. Exceptional candidate will know OS/MVS, IMS or CICS and has analysis experience.

SR. PROGRAMMER ANALYST (2) TO $28,000 RANGE.
Division of billion dollar services corporation needs P/A's for new system's development group brought on by doubling of profits in last two years. Attractive southern resort locale. Prefer IBM, COBOL background from general business system applications. Outstanding benefits package and career opportunity.

SR. SYSTEMS ANALYST TO $30,000 RANGE.
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PROJECT LEADER $28,000–$32,000.
Energy equipment manufacturer has excellent opportunity for warm weather lover. Will supervise P/A's in design, programming and implementation of MRP, bill-of-material, master scheduling, and other manufacturing systems. Prefer senior analyst or small IBM shop manager from OS/MVS, CICS, data base background. Rapid advancement potential to Systems Manager.

SYSTEMS PROGRAMMERS (2) TO $30,000 RANGE.
Financial software leader needs S/P's for rapidly growing system's dept. in attractive Sunbelt Metro. Will accept DOS or OS background w/experience in system generation, maintenance and tuning of DOS/VS products. Knowledge of internals very helpful

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Experience with Z80 microprocessor hardware and software and a college degree necessary.

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Experience with RPG II in an On Line environment using the IBM System 34 developing business applications. Any experience with the MAPICS manufacturing system would be a plus.

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Steve Haskins
Professional Recruiter
(813) 536-4771

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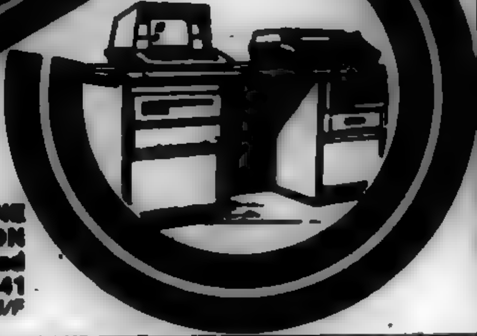

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System Software Programmer

Data Processing

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We prefer a degreed individual, with a minimum of two years experience with MVS, JES2, and TSO. Qualified applicants must also be thoroughly familiar with large-scale IBM equipment and operating software. In addition to these responsibilities, the applicant will be involved in establishing a new state-of-the-art environment, encompassing an IBM 3033N, MVS, JES2, TSO, CICS, IMS/DL/I, VTAM, SNA and an extensive array of utility and operating support software.

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Qualifications for the position include: BA and/or advanced degree and up to four years of related experience. A thorough knowledge of large system Burroughs, CANDE, ALGOL, and FORTRAN is highly desirable. Good interpersonal skills are necessary.

If you have the above qualifications and desire a high visibility position within a stable, progressive and growing Division/Corporation, please submit resume including salary history and requirements to:

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Send letters of application, resume, three letters of recommendation, and salary history to Richard R. Howard, Dean of Student Services, prior to January 20, 1981.

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Bachelor's degree in business desired. 2+ years experience as Programmer Analyst. Familiarity with on-line systems, data base and data communications desired.

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Employer assumes fee

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Call JIM FLEMING at 713-[illegible] or send your resume to:

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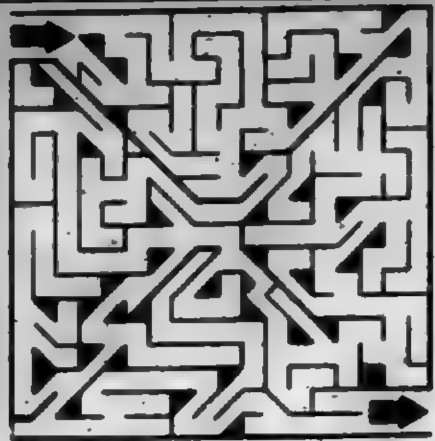

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- Computer Graphics
- EW/SIGINT/ELINT
- MIS/OPs Research
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☐ FUTURE: 4341 applications
☐ LANGUAGES: COBOL and Assembly

Candidates must have ability to implement new systems and equipment. Positions offer excellent compensation and benefits.

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PROGRAMMER ANALYSTS

Analyze and develop program specifications for programs requiring correction and/or modification, to code, test, and debug the application computer programs requiring change, and to implement such changes with corresponding documentation. A minimum of 1 year experience with IBM equipment 360/370 series. Must be proficient in ANS COBOL and OS JCL. Experience with ALC, ROSCOE, IMS-DL/1 and DC, or CICS a definite plus.

SENIOR PROGRAMMER ANALYST

[illegible] coding, testing, debugging of [illegible] programs and performing [illegible] system testing and interface testing. [illegible] of application programmers in the design, development, implementation and maintenance of a computer system.

Four year degree in Computer Science or related field and three years of Systems/Programming experience or an Associate degree and four years of Systems/Programming experience, or six years of experience in the field of data processing with at least four years in Systems/Programming. Two to four years IMS experience. [illegible] the activities of the project team when acting as a team leader.

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Blue Cross
of Central Ohio

Instructional Computing Coordinator

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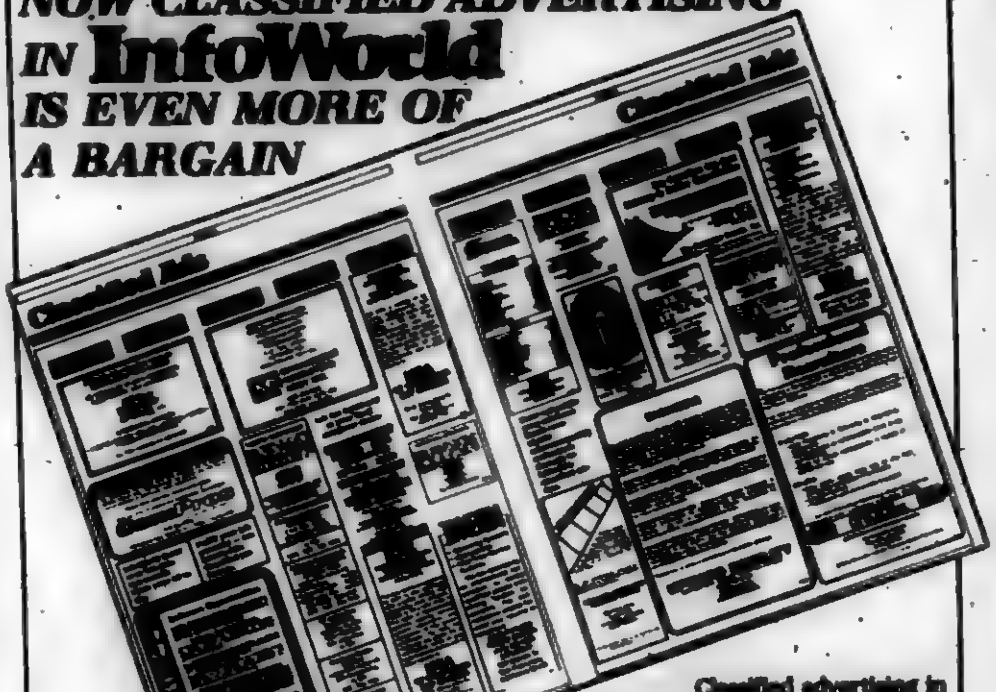

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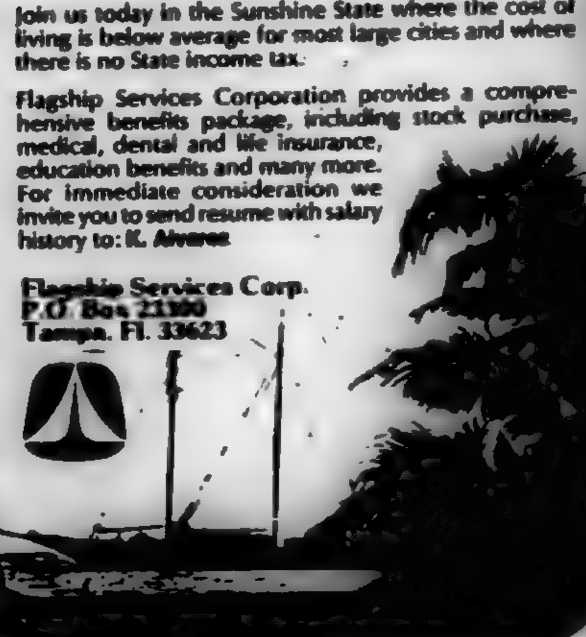

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Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $84.70 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $169.40 per insertion. Extra space is available in half-inch increments and costs $42.35. Box numbers are $10.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: ______ columns wide by ______ inches deep.

Issue Date(s): ______________________

Section: ______________________

Signature: ______________________

Name: ______________________

Company: ______________ Title: ______________

Address: ______________________

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Send this form to:
CLASSIFIED ADVERTISING, COMPUTERWORLD
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- SOFTWARE
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It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call Sue Stevens at 1-800-343-6474. She will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available): note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $84.70 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $169.40 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

1 col x 4" – 338.00
2 cols x 4" – 677.60
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Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available. $10 per insertion.
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To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

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William J. Mills, Manager Classified Advertising

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3370

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[illegible]
[illegible]

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303/761-6131

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WWM03	RWM03	80 MB DISK AND CONTROLLER	[illegible]	17800
WM02/03	RM02/03	80 MB DISK (SLAVE)	[illegible]	[illegible]
WJP06	RWP06	200 MB DISK AND CONTROLLER	44000	21800
WWP06	RWP06	200 MB DISK AND CONTROLLER	44000	22800
WP06	RP06	200 MB DISK (SLAVE)	34000	[illegible]
WJM04	RJM04	300 MB DISK AND CONTROLLER	N/A	[illegible]
WWM05	RWM05	300 MB DISK AND CONTROLLER	N/A	25800
WM04-05	RM04-05	300 MB DISK (SLAVE)	N/A	[illegible]
WTJ45	TJE16	45 IPS TAPE AND CONTROLLER	20200	8100
WTJ75	TJU45	75 IPS TAPE AND CONTROLLER	24800	[illegible]
WTJ125	TJU77	125 IPS TAPE AND CONTROLLER	30000	[illegible]
WH960	H960	CABINET FOR TAPE DRIVES	1800	1800
WMS11-LB	MS11-LB	128KB MOS MEMORY	[illegible]	2100
WMS11-LD	MS11-LD	256KB MOS MEMORY	6400	[illegible]
WDD11-CK	DD11-CK	FOUR SLOT BACKPLANE	440	[illegible]
WDD11-DK	DD11-DK	NINE SLOT BACKPLANE	[illegible]	780
WDD11-PK	DD11-PK	NINE SLOT PROC BACKPLANE	[illegible]	780
WM9312	M9312	BOOT/DIAGNOSTIC/TERMINATOR	[illegible]	780
WM9302	M9302	UNIBUS TERMINATOR	110	[illegible]
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129	Call	$110/mo
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Pack	Sale	Lease
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2316	$ [illegible]	—
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125 138 4331 3031
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3340 3411 3505 1442
3350 3420 3525 2501

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[illegible]

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([illegible]) [illegible]
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[illegible] — Integrated 3203-4 printer attach
[illegible] — Power Unit

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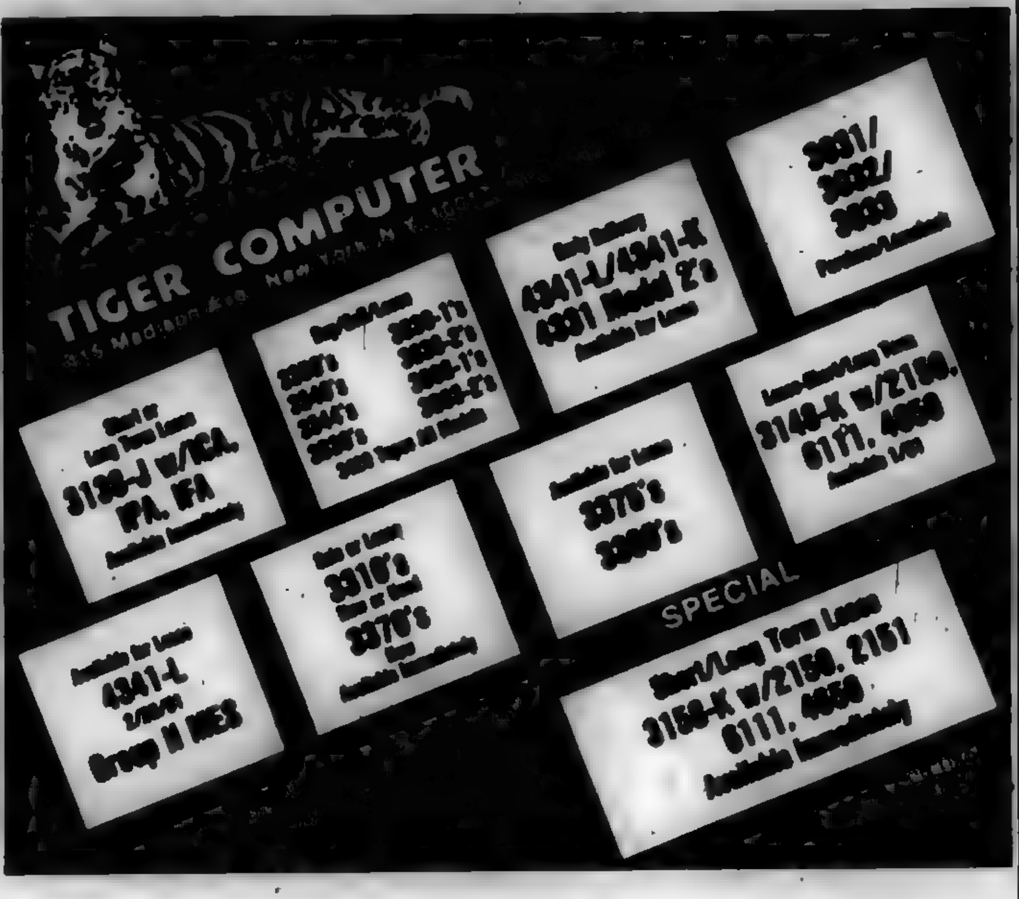

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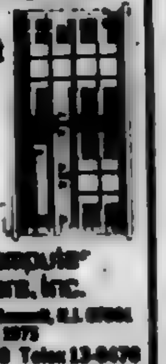

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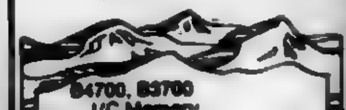

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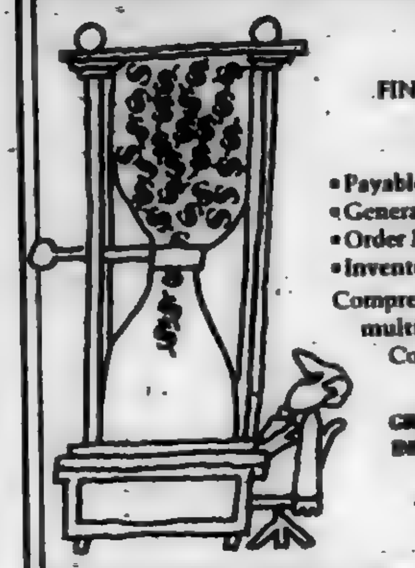

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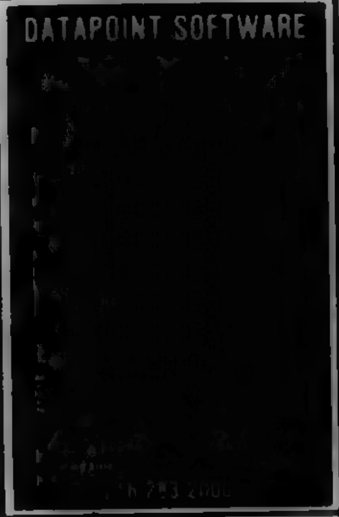

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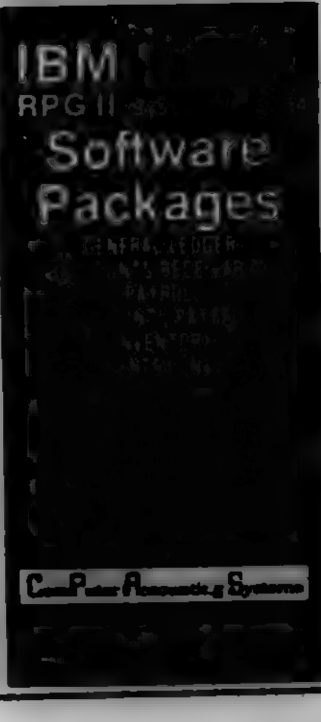

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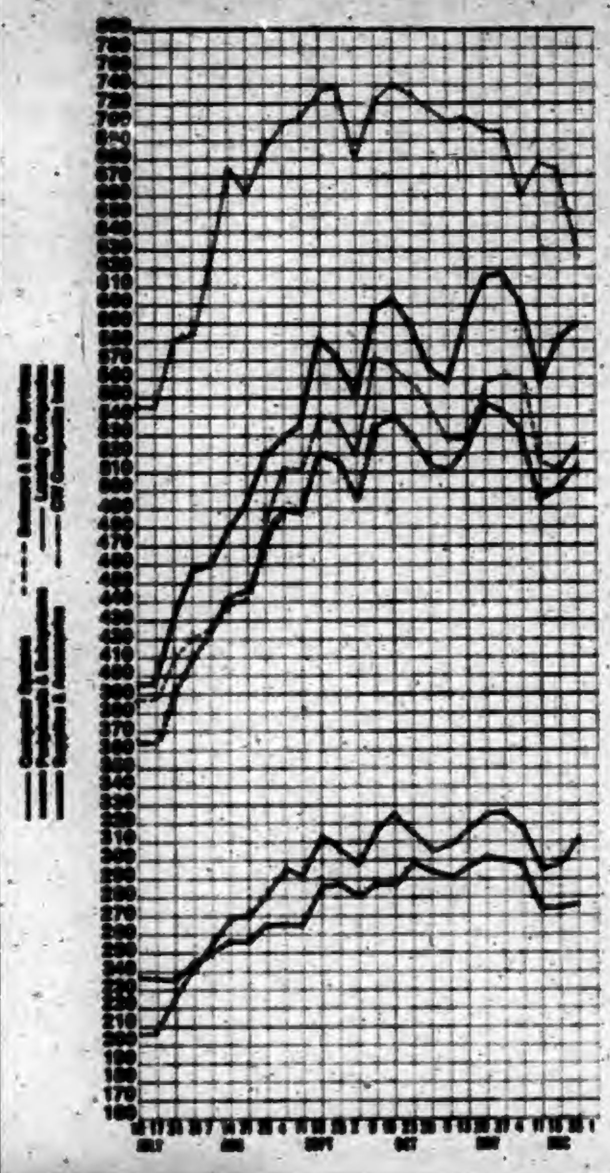

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Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, DECEMBER 23, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		PRICE 1979-80 RANGE (1)	CLOSE DEC 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	34 7/8	+ 3/4	+2.1
N	BURROUGHS CORP	47- 80	52 3/8	+1 1/8	+2.1
O	COMPUTER AUTOMATION	9- 27	19	-2	-9.5
N	CONTROL DATA CORP	35- 77	72	+1 1/4	+1.7
O	CRAY RESEARCH INC	10- 31	33 5/8	+1 1/2	+4.6
N	DATA GENERAL CORP	46- 87	67 3/4	-1 3/4	-2.5
N	DATAPOINT CORP	44-115	111	+7 1/4	+6.9
N	DIGITAL EQUIPMENT	52- 90	91 1/8	+1	+1.1
A	EECO INC.	6- 16	15 7/8	+1 3/4	+12.3
N	ELECTRONIC ASSOC.	6- 12	7 7/8	+ 1/8	+1.6
N	FOUR-PHASE SYSTEMS	20- 49	23 5/8	+ 1/2	+2.1
N	FOXBORO	31- 59	58 1/8	+2 5/8	+4.7
O	GENERAL AUTOMATION	7- 19	9 1/4	+ 3/8	+4.2
O	GRI COMPUTER CORP	1- 3	1 3/8	0	0.0
N	HEWLETT-PACKARD CO	46- 95	88 1/8	-3 1/8	-3.4
N	HONEYWELL INC	65-111	110 5/8	+2 5/8	+2.3
N	IBM	50- 79	67 1/4	+2	+3.0
O	MAGNUSON COMP SYSTS	20- 46	45	- 1/2	-1.0
N	MANAGEMENT ASSIST	9- 25	14	- 1/4	-1.7
O	MANUFACTURING DATA S	22- 80	72 1/2	+ 1/2	+0.6
O	MINI-COMPUTER SYST	2- 6	1 7/8	- 1/4	-11.7
O	MODULAR COMPUTER SYS	9- 31	24 1/2	+2 3/8	+10.7
N	NCR	52- 82	72	+5 1/2	+8.2
N	PRIME COMPUTER INC	10- 39	34 7/8	+ 1/4	+0.7
N	PERKIN-ELMER	26- 70	67 7/8	+4 7/8	+7.7
N	SPERRY CORP	42- 60	59 1/2	+3 3/8	+6.0
A	SYSTEMS ENG. LABS	11- 53	52 3/4	0	0.0
O	TANDEM COMPUTERS INC	13- 70	70	0	0.0
N	TEXAS INSTRUMENTS	79-150	117	-7 1/4	-5.8
A	WANG LABS.	17- 40	36 3/4	0	0.0

LEASING COMPANIES

E X C H		PRICE 1979-80 RANGE (1)	CLOSE DEC 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 27	21 1/2	+1 1/2	+7.5
N	COMDISCO INC	6- 24	22 1/2	+1 7/8	+9.0
A	COMMERCE GROUP CORP	1- 2	5/8	- 5/8	-50.0
A	COMPUTER INVSTRS GRP	0- 4	1/4	- 3/8	-60.0
O	CONTINENTAL INFO SYS	3- 15	4 1/4	+ 1/8	+3.0
N	DATRONIC RENTAL	3- 5	4 5/8	+ 1/8	+2.7
A	DCL INC	3- 6	2 3/4	0	0.0
N	DPF INC	5- 12	6 1/8	+ 1/2	+8.8
O	ITEL	1- 15	7/8	0	0.0
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 7/8	- 1/4	-6.0
N	RELIANCE GROUP INC	24- 79	71 1/4	+ 1/2	+0.7
N	U.S. LEASING	12- 26	25 3/4	+1 1/4	+5.1

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
I=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

E X C H		PRICE 1979-80 RANGE (1)	CLOSE DEC 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	5	- 1/4	-4.7
O	ADVANCED SYSTEMS INC	12- 15	13 1/2	+1	+8.0
O	AMACOMP INC	7- 24	21	+1 3/4	+9.0
O	ANALYSTS INTL CORP	8- 14	10	- 1/2	-4.7
A	APPLIED DATA RES.	6- 24	20 3/8	+1	+5.1
N	AUTOMATIC DATA PROC	31- 52	46 5/8	+ 7/8	+1.9
O	CGA COMPUTER ASSOC	9- 17	16 1/2	+2 1/4	+15.7
O	COMPUTER HORIZONS	1- 5	2 1/8	+ 1/8	+6.2
O	COMPUTER NETWORK	4- 9	6	- 1/8	-2.0
N	COMPUTER SCIENCES	11- 20	19 1/4	+1	+5.4
O	COMPUTER TASK GROUP	1- 23	20 1/2	+1 1/2	+7.8
O	COMPUTER USAGE	2- 10	7 1/4	+ 3/4	+11.5
O	COMPUT AUTO REP SVC	4- 11	7 7/8	-1 1/8	-12.5
O	COMSHARE	11- 21	16 1/2	+ 1/2	+3.1
O	CULLINANE DATABASE	18- 45	36 1/2	- 1/4	-0.6
O	DATA DIMENSIONS INC.	1- 6	1 1/4	0	0.0
O	DATATAB	1- 4	1 1/8	+ 1/8	+12.5
O	DSI CORP	4- 9	7 3/8	+ 1/2	+7.2
N	ELECTRONIC DATA SYST	19- 37	30 7/8	+ 3/8	+1.2
O	INFORMATICS INC	9- 25	23 7/8	+1 1/4	+5.5
O	INSYTE CORP	1- 3	1 3/4	- 1/4	-12.5
O	IPS COMPUTER MARKET.	1- 4	1 1/4	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/2	+ 1/4	+4.7
O	KEYDATA CORP	1- 5	7/8	-	-6.7
A	LOGICON	12- 30	26 5/8	+1 7/8	+7.5
O	MATHEMATICA INC	5- 18	14 3/4	+ 1/4	+1.7
O	MATHEMATICAL APP GRP	7- 23	17 1/2	0	0.0
O	NATIONAL DATA CORP	10- 22	21 3/4	+2 7/8	+9.9
N	PLANNING RESEARCH	5- 13	7 3/4	+ 1/8	+1.6
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 10	8 7/8	+ 1/4	+2.8
O	REYNOLDS & REYNOLDS	20- 24	20	- 1/4	-1.2
O	SYSC INC	6- 24	22 1/2	+ 1/2	+2.2
O	SCIENTIFIC COMPUTERS	6- 34	29 1/4	+1 1/4	+4.4
N	TYMSHARE INC	17- 44	41 1/4	+ 1/2	+1.2
A	URS CORP	5- 17	14 3/8	- 1/4	-1.7
N	WYLY CORP	4- 20	16 1/8	+1 3/8	+9.3

PERIPHERALS & SUBSYSTEMS

E X C H		PRICE 1979-80 RANGE (1)	CLOSE DEC 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	14 5/8	+1 1/4	+9.5
N	AMPEX CORP	14- 36	34 5/8	+2 5/8	+8.2
A	ANDERSON JACOBSON	9- 25	22 1/2	+1 1/2	+7.1
O	AUTO-TROL TECHNOLOGY	10- 62	47	-1 1/2	-3.0
O	BEEHIVE INT'L	3- 29	28 1/2	+4 1/4	+17.5
A	BOLT,BERANEK & NEW	12- 37	36 7/8	+3 1/8	+9.2
N	BUNKER RAMO	17- 41	37 3/4	+2 3/8	+6.7
O	CAMBRIDGE MEMORIES	1- 9	3 1/8	- 1/8	-3.8
N	CENTRONICS DATA COMP	19- 55	21 1/2	-1 3/8	-6.0
A	CETEC CORP	3- 7	5 7/8	0	0.0
O	COMPUTER DEVICES INC	5- 10	7 3/4	+1 1/4	+19.2
O	COGNITRONICS	1- 10	9 1/2	+ 7/8	+10.1
O	COMPUTER COMMUN.	4- 10	2	+ 1/4	+14.2
O	COMPUTER CONSOLES	4- 29	25 3/4	+ 1/2	+2.1
O	COMPUTER TRANSCEIVER	1- 6	4 5/8	+ 1/2	+12.1
N	COMPUTERVISION CORP	24- 92	77	+1	+1.3
N	COMRAC CORP	13- 25	17 5/8	+ 1/8	+0.7

E X C H		PRICE 1979-80 RANGE (1)	CLOSE DEC 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	6- 23	22 1/2	+ 1/2	+2.2
A	DATAPRODUCTS CORP	11- 38	35 5/8	+2 1/2	+7.5
O	DATUM INC	2- 5	3 3/8	- 1/8	-3.5
O	DECISION DATA COMPUT	2- 6	4 7/8	0	0.0
O	DELTA DATA SYSTEMS	1- 3	1 1/2	- 1/8	-7.6
O	DATARAM CORP	6- 37	11 1/2	- 1/2	-4.1
N	ELECTRONIC M & M	3- 9	7 1/2	0	0.0
O	EVANS & SUTHERLAND	21- 63	64 1/2	-3 1/2	-5.1
O	FABRI-TEK	1- 4	2 3/8	+ 1/8	+5.5
O	GENERAL COMPUTER SYS	1- 7	7	+1 3/8	+24.4
O	GEN'L DATA COMM IND	8- 22	17 1/4	- 1/2	-2.8
O	GENERAL TERMINAL CP	1- 4	1 1/4	-	-4.5
N	HAZELTINE CORP	12- 33	27 3/8	+3 3/4	+15.8
N	HARRIS CORP	25- 55	54	+4 1/2	+9.0
O	INFORMATION INTL INC	8- 15	10 1/4	+ 1/4	+2.5
O	INTEL CORP	23- 50	39 1/4	-1 1/2	-3.6
O	INTERSIL	13- 34	35 3/4	- 1/8	-0.3
A	LUNDY ELECTRONICS	6- 17	12 1/8	- 1/4	-2.0
O	MSI DATA CORP	5- 16	12 1/2	+ 5/8	+5.2
N	MEMOREX	10- 24	12 7/8	+ 1/2	+4.0
N	MOHAWK DATA SCI	10- 31	24 1/8	+ 3/8	+1.5
O	ONEX	2- 12	11	0	0.0
A	PARADYNE CORP	9- 34	34	+5 3/4	+20.3
A	PENRIL CORP	9- 15	13 3/4	+ 3/4	+5.7
O	RANTEK CORP	10- 23	21 1/4	+ 1/4	+1.1
O	RECOGNITION EQUIP	5- 21	16 3/4	+ 1/2	+3.0
O	SCAN DATA	1- 5	3 5/8	+ 1/4	+10.1
N	STORAGE TECHNOLOGY	12- 26	22 1/2	+ 5/8	+2.8
O	SYKES DATATRONICS	14- 58	36 1/2	+3 3/4	+11.4
O	T BAR INC	14- 24	21 1/4	+ 1/4	+1.1
A	TEC INC	3- 9	4 1/4	0	0.0
N	TEKTRONIX INC	42- 70	62 1/4	+2 1/4	+3.7
N	TELEX	3- 6	5 1/8	+ 3/8	+7.8
O	TESDATA SYSTEMS CP	8- 26	13 1/2	+ 7/8	+6.9
A	TIMEPLEX INC	7- 33	29 3/8	+ 1/8	+0.4
O	WILTEK INC	1- 3	2 7/8	+ 1/2	+21.0

SUPPLIES & ACCESSORIES

E X C H		PRICE 1979-80 RANGE (1)	CLOSE DEC 22 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 15	14 3/8	+ 1/4	+1.7
O	BALTIMORE BUS FORMS	1- 2	1/2	0	0.0
N	BARRY WRIGHT	8- 22	20 5/8	+ 1/8	+0.6
O	CYBERMATICS INC	1- 2	7/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	15	+ 1/4	+1.9
N	ENNIS BUS. FORMS	13- 21	15	- 3/8	-2.4
N	3M COMPANY	46- 63	56 1/2	+1 1/8	+2.0
O	MOORE CORP LTD	27- 37	34 1/4	+1 3/4	+5.3
O	NASHUA CORP	20- 35	24 1/4	+1 1/8	+4.8
O	STANDARD REGISTER	23- 38	33 1/4	+ 1/2	+1.6
A	TAB PRODUCTS CO	9- 30	22 1/8	- 7/8	-3.8
N	WABASH MAGNETICS	11- 31	30 1/4	- 1/4	-0.8
N	WALLACE BUS FORMS	13- 26	25 5/8	+ 3/4	+3.4

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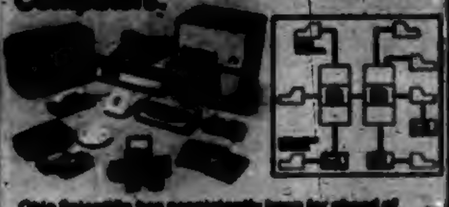

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Principal product/service____________

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